



Cooljarloo Energy Park

Wind Farm Shadow Flicker Assessment

DC Project SPV1 PTY Ltd as Trustee for DC Project Trust 1

Prepared by:

SLR Consulting Australia Pty Ltd

SLR Project No.: 675.073398.00003

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Basis of Report

This report has been prepared by SLR Consulting Australia Pty Ltd (SLR) with all reasonable skill, care and diligence, and taking account of the timescale and resources allocated to it by agreement with DC Project SPV1 PTY Ltd as Trustee for DC Project Trust 1 (the Client). Information reported herein is based on the interpretation of data collected, which has been accepted in good faith as being accurate and valid.

This report is for the exclusive use of the Client. No warranties or guarantees are expressed or should be inferred by any third parties. This report may not be relied upon by other parties without written consent from SLR.

SLR disclaims any responsibility to the Client and others in respect of any matters outside the agreed scope of the work.



Executive Summary

SLR Consulting Australia Pty Ltd (SLR) has been engaged by DC Project SPV1 PTY Ltd as Trustee for DC Project Trust 1 to provide a shadow flicker assessment for the proposed Cooljarloo Energy Park within a land development area on the Tronox Mine site. This assessment has been conducted in accordance with the Draft National Wind Farm Development Guidelines and the WA draft Renewable Energy Planning Code which typically support the planning and environmental approval processes.

The Cooljarloo Energy Park will include:

- Up to 210 MW of wind energy generation (up to 27 wind turbines).
- Up to 150 MW / 900 MWh of Battery Energy Storage System (BESS).

The site is approximately 170 km north-northwest of Perth on Tronox's mining site. The site is on the west side of the Brand Highway between the towns of Badgingarra and Cataby.

Shadow Flicker Modelling

Shadow flicker studies normally distinguish between the predictions from two scenarios:

- An "idealised" scenario which involves calculations that do not take into account factors such as weather cloudiness, wind directionality, operational downtime, etc, which reduce the level of shadow flicker experienced by a receiver. These predictions can therefore be considered a "theoretical worst-case" scenario.
- A "real-world" or "actual" scenario which does take into the real-world factors that influence the shadow flicker that would actually be experienced. These predictions can be considered an "expected" scenario.

Criteria

The widely accepted criteria for shadow flicker are:

- Theoretical Worst-case Scenario:
 - o 30 hours per year and 30 minutes per day
- Expected Real-world Scenario:
 - o 10 hours per year and 30 minutes per day

SLR has also considered WA's draft Renewable Energy Planning Code which outlines the following criteria.

- Element Objective: Wind turbines are sited and operated to minimise shadow flicker impacts at any visually sensitive land use on non-host lots.
- Performance Outcome - Wind turbines are sited and operated to ensure that shadow flicker at any visually sensitive land use on non-host lots does not exceed:
 - a. 30 hours per year and 30 minutes on any single day, based on theoretical shadow flicker modelling; or the values given above for the theoretical and expected cases.
 - b. 10 hours per year, based on predicted actual shadow flicker modelling
- Acceptable Outcome - Wind turbines are set back a minimum distance of 265 times the maximum blade chord length from any existing or approved visually sensitive land use on non-host lots.



Baseline Study Results

Pursuant to the draft National Wind Farm Guidelines, the main risk associated with shadow flicker are the amenity impacts to residents in the vicinity. Accordingly, impacts to non-residential land uses are not required as part of the assessment.

The assessment evaluated the Theoretical and Expected shadow flicker from a maximum of 27 proposed WTG locations with respect to 16 sensitive receivers located around and within the Project Area.

The Theoretical scenario modelling showed no exceedances of the shadow flicker criteria.

The draft Renewable Development Planning Code also considers impacts to visually sensitive land uses, defined as

“a land use where people live or regularly spend extended periods of time, including residential dwellings, short-stay accommodation, schools, hospitals, recreation areas and generally excludes commercial or industrial premises.”

The Theoretical and Expected scenario results demonstrate the proposal also meets the Performance Outcomes of WF Element 5 – Shadow Flicker (WF-PO5.1) under the draft Renewable Energy Planning Code. The proposal additionally meets the Acceptable Outcome WF-AO5.1 given that the wind turbines are set back a minimum of 265 times the maximum blade chord from any existing visually sensitive land use on non-host lots.



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Acronyms and Abbreviations

CEP	Cooljarloo Energy Park
DECC	UK Department of Energy and Climate Change
km	Kilometre(s)
m	Metre
MW	Megawatt
RE	Renewable Energy
WTG	Wind Turbine Generator

Definitions

Arc second	Unit of angular measurement equal to 1/3600 of a degree
Expected model	Model taking into account real world meteorological and operational factors
Mast	Structure supporting the nacelle and rotor of a wind turbine
Sensitive Receiver	Location where the potential time of shadow flickering impact is calculated
Theoretical model	Model assuming worst case conditions
Timestep	Time interval between model calculations
Wind Power Project	An array of wind turbine generators



1.0 Introduction

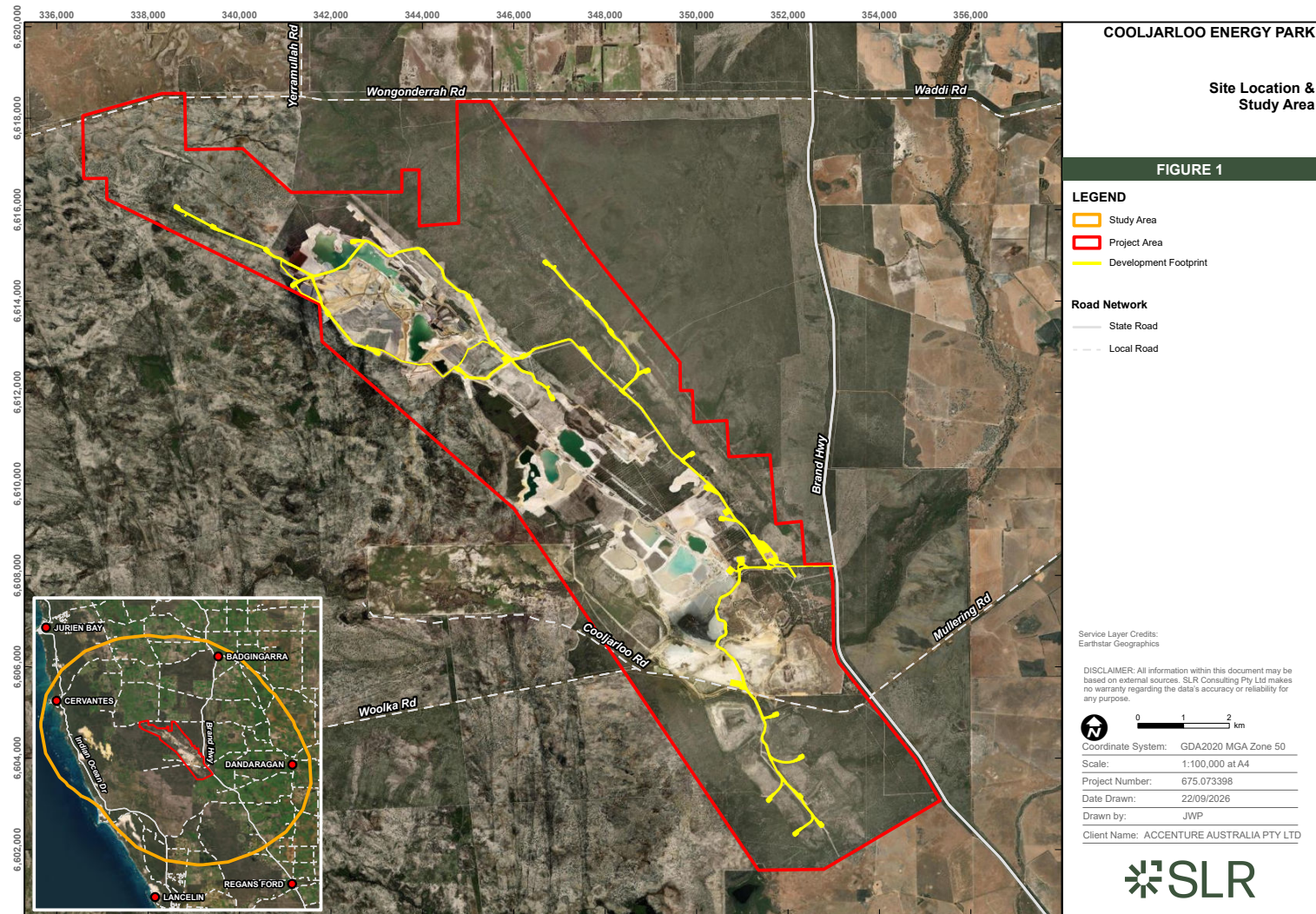
SLR Consulting Australia Pty Ltd (SLR) has been engaged by DC Project SPV1 PTY Ltd as Trustee for DC Project Trust 1 to provide a shadow flicker assessment for the proposed Cooljarloo Energy Park within a land development area on the Tronox Mine site. This assessment has been conducted in accordance with the Draft National Wind Farm Development Guidelines and the WA draft Renewable Energy Planning Code. It has been prepared to support the planning and environmental approval processes. It should be noted that SLR have been provided a final WTG layout on 3 September 2026. This final layout removed WTGs A11 and A12. All results and conclusions are based on the new total of 27 WTGs.

1.1 Location

The site is approximately 170 km north-northwest of Perth on Tronox's mining site. The site is on the west side of the Brand Highway between the towns of Badgingarra and Cataby. To the west along the coast are National Parks and nature reserves while to the east is mainly farmland. The locality and general wind farm layout are shown in Figure 1.



Figure 1 Project Location



1.2 Project Overview

The Cooljarloo Energy Park (“CEP”, “Energy Park”, or “Project”) is planned to be a multi-technology renewable energy (RE) generation and storage project located at the operational Cooljarloo Mine. Located approximately 170 km north-northwest of Perth, the Cooljarloo Mine is owned and operated by Tronox Management Pty Ltd (“Tronox”). DC Project SPV1 PTY Ltd as Trustee for DC Project Trust 1 is coordinating pre-FID development works including initial design, project approvals, network approvals and associated studies.

Tronox’s Australian operations are predominantly based on the mining and processing of titanium ore, zircon, and other materials, with the Cooljarloo Mine being an important source of raw materials for titanium dioxide production. The CEP is part of Tronox’s commitment to carbon reduction targets, requiring all possible regions to source ‘green power’ by 2030.

The CEP will include:

- Up to 210 MW of wind energy generation (up to 27 wind turbine generators, WTGs).
- Up to 150 MW / 900 MWh of Battery Energy Storage System (BESS).

The CEP will provide renewable energy to Tronox’s Western Australian operations, including the Cooljarloo Mine and six other grid-connected sites. The CEP location has been selected as it offers several benefits, including:

- The site offers a large expanse of already disturbed land, enabling the development of a large-scale renewable project. BESS and wind turbine locations are targeting areas previously disturbed by mining activities within the mine’s existing approved disturbed boundary, minimising clearing of native vegetation.
- A solid baseline understanding of fauna and flora exists, given previous studies as well as existing management plans that are being implemented successfully.
- Established relationships within the community given existing operations.
- Cataby Substation, a zone substation for the regional 132 kV network, is located on the site.



2.0 Project Description

The Project will comprise a range of permanent and temporary infrastructure required for construction and operation of the wind farm.

2.1 Wind Turbine Generators

The wind farm will include up to 27 wind turbine generators (WTGs). Each WTG will consist of a tower, nacelle, hub and rotor assembly mounted on a reinforced concrete foundation. Key indicative specifications include:

- Rotor diameter: up to 181.1 m
- Blade length: up to 89 m
- Hub height: up to 150 m

Each WTG will include a hardstand and assembly area used during construction for turbine installation and crane operations.

2.2 Proposed WTG Model

The representative WTG selected for the Project has the following technical features relevant to this study.

Table 1 WTG Details

Parameter	Representative Characteristics
Rated power	7.8 MW
Rotor diameter	181.1 m (approx. blade length = 89 m)
Hub height	150 m
Cut-in wind speed	3 m/s
Rotor swept area	26,016 m ²
Wind class	IEC S
Max Blade Width	4.90 m
Average Chord Width	2.97 m
Blade Width at 90% length	1.09 m



3.0 WTG Layout and Description

The proposed turbine layout is shown in Figure 2. Figure 3 shows the primary dimensions and components of the WTG.

All WTGs generally consist of the following:

- Foundation – embedded base to support the WTG.
- Tower – a tapered steel column.
- Nacelle – placed on top of the tower and houses the generator as well as other components. The nacelle rotates to face the wind direction with the rotor hub attached to the front.
- Blades – all large modern WTGs have three blades forming the rotor attached to a central hub. The blades can be rotated about their spanwise axis to provide control over the speed of the rotor.



Figure 2 Turbine Layout

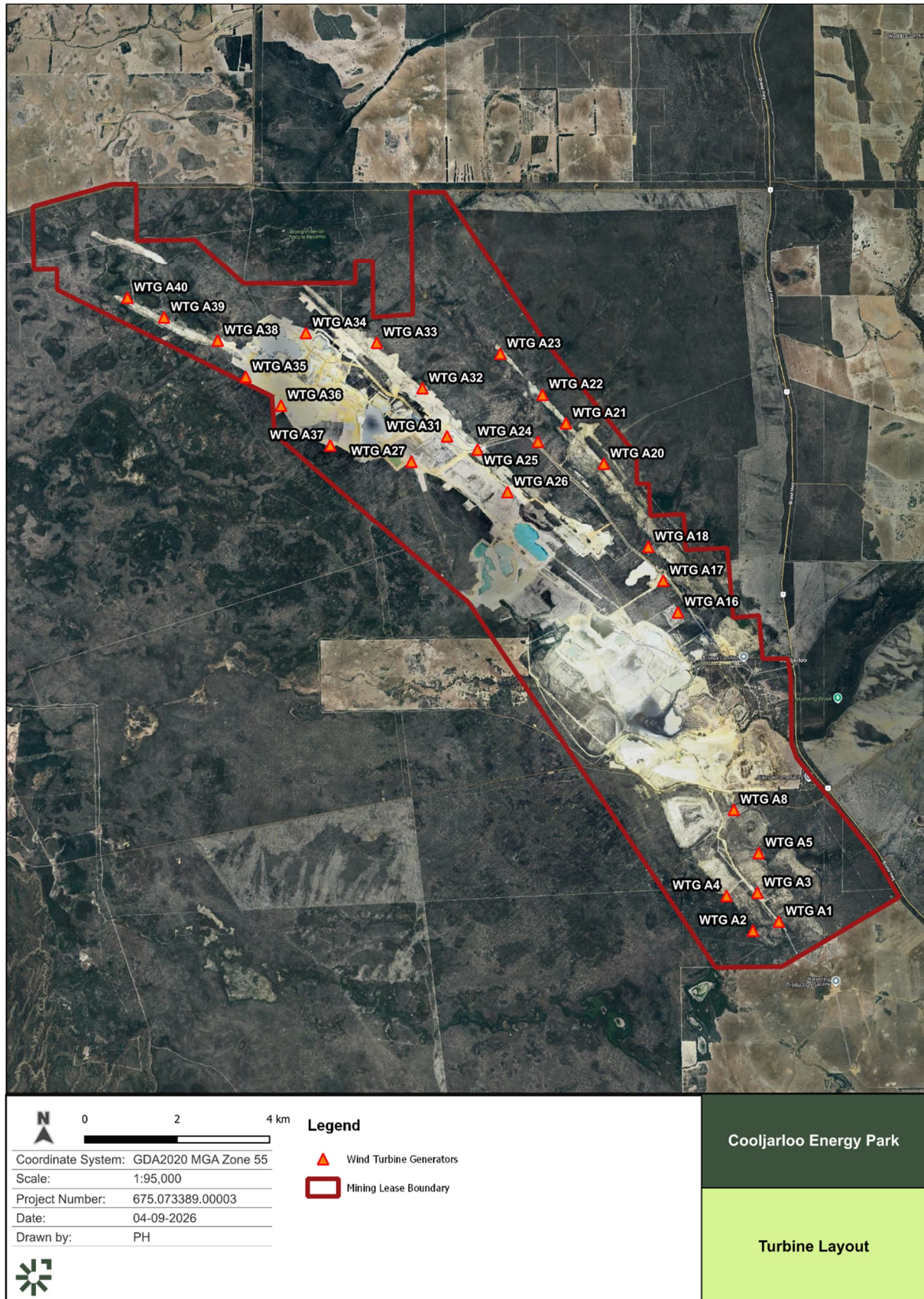
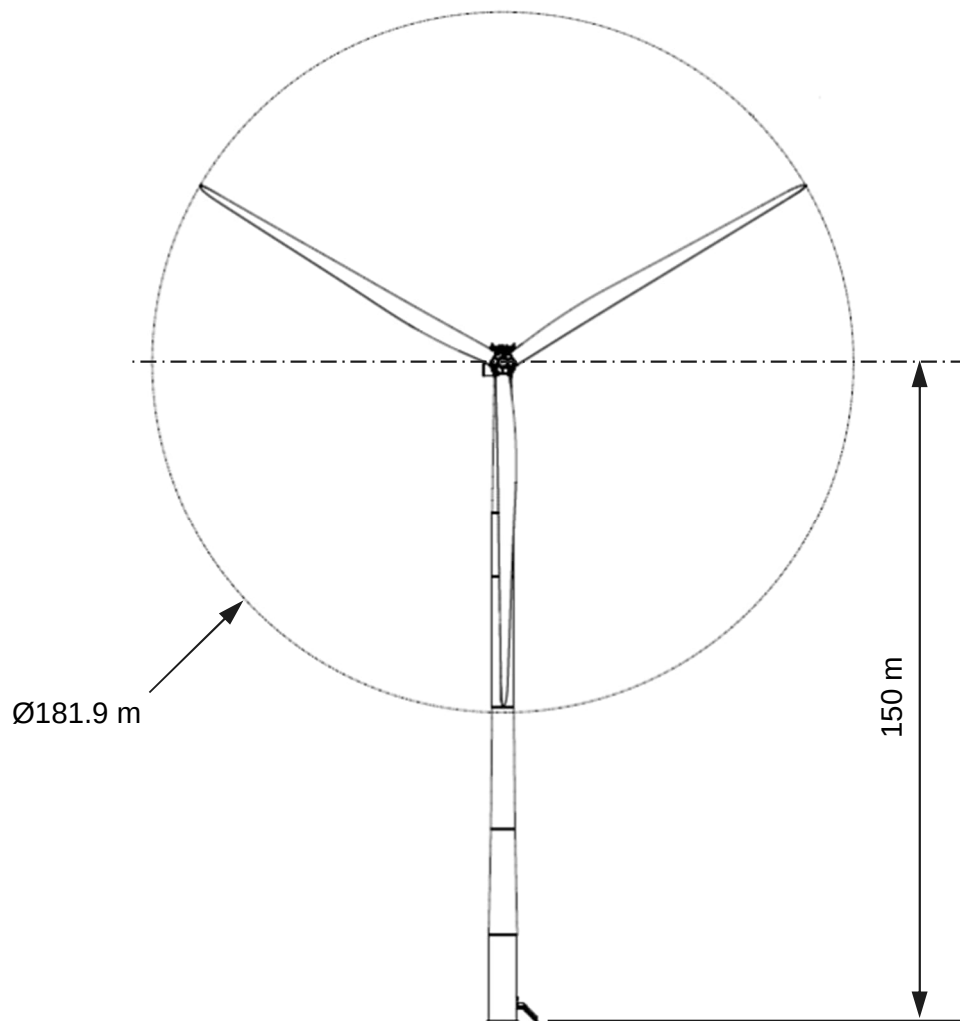


Figure 3 Modelled Turbine Dimensions



4.0 Shadow Flicker

Shadow flicker is the effect experienced by an observer as sunlight passes through the swept area of an operational wind turbine. This tends to occur more often during winter when the sun's altitude is lower but can also be experienced in other seasons close to sunrise and sunset.

4.1 Factors Affecting Shadow Flicker

The impact of shadow flicker is influenced by two main factors, 1) the distance a viewer is from the turbine in question, and 2) the duration that the flickering occurs. Other factors affecting shadow flicker are:

- The size and height of the WTG.
- The relative ground elevation in the surrounding area.
- Intervening vegetation.
- The wind direction, which affects the direction the plane of the rotor is facing.
- Cloud cover.
- General visibility such as the presence of smoke etc.

The intensity of the shadows cast by the turbine decreases as the distance from the receiver increases and it follows that the intensity of any flickering will also decrease. This is due to a larger proportion of visible disc of the sun being blocked as the blade passes across it (BERR, 2009), when a viewer is closer to the WTG. The effect of shadow flicker tends to dissipate at distances beyond 10 rotor diameters (DECC, 2011. Note that this is a UK body).

4.2 Potential Impacts on Surrounding Viewers

The key risk associated with shadow flicker is annoyance of residents. In some cases other sensitive receiver locations such as schools or hospitals may be considered however for this project the focus is on surrounding residential dwellings. The closer a receiver is to a wind farm, the greater the likelihood that annoyance may be experienced. This was the finding of NHMRC (2015) which cited one study (with a high risk of bias) where people who lived within 5 kilometres (km) of a wind farm were more likely to be annoyed by shadow flicker than those who lived 5-10 km away. It also found no studies that assessed the health effects of shadow flicker or other visual stimuli from wind farms.

The Draft National Wind Farm Development Guidelines (2010) note negligible risk of distraction for drivers experiencing shadow flicker, as the effect is similar to that of passing through a shadow from a tree on the side of the road.



5.0 Standard Practice and Guidelines

5.1 Australian Guidelines

At a national level, the Draft National Wind Farm Development Guidelines (EHPC, 2010) provide guidance on the assessment of wind farm shadow flicker. At State/Territory level, Victoria, NSW and Queensland also have their own guidelines that generally follow the lead of the national guideline. Western Australia EPA documents mention that shadow flicker can be an impact and should be considered. References typically point back to the Draft National Wind Farm Development Guidelines

The Draft National Guidelines provides further guidance for assessing wind farm shadow flicker. It recommends the following shadow flicker duration limits at receiver locations:

- A theoretical value of 30 hours per year and a maximum of 30 minutes per day.

If the theoretical value is exceeded:

- An expected or measured value of 10 hours per year day taking into account various real-world considerations.

Allowable limits for shadow flicker vary from country to country, however the generally agreed limit of 30 hours per year (for a theoretical scenario) is widely used. The Australian Energy Infrastructure Commissioner (2022) concurs with this figure and notes that it is currently used across the country.

5.2 Theoretical Worst-Case Model Assumptions

The Theoretical Worst-Case modelling scenario is based on astronomical worst-case conditions:

- There is continual sunshine (i.e. permanently cloudless skies) from sunrise to sunset.
- There is sufficient wind for continually rotating turbine blades.
- The WTG rotor is always perpendicular to the incident direction of the sunlight.
- Solar angles less than 3° above the horizon are disregarded (due to likelihood for vegetation and building screening and atmospheric particle dispersion).
- Distances between the WTG rotor plane and the mast are negligible.
- Light refraction in the atmosphere is not considered.
- The assessment area of interest for shadow flicker extends horizontally from the WTG locations (the calculation of this distance is discussed further in **Section 5.4**).
- The modelling period covers a full non-leap year.
- The height of all sensitive receivers should be 1.5 metres (m) – 2 m or at the window or balcony heights where the dwelling has more than one storey.
- The topography of the surrounding area should be included.
- The timestep used for the model should be 10 minutes or less.
- The annual duration of the shadow flicker should be reported for an area surrounding a receiver of interest (i.e. residence) comprising a circle of radius 50 m.
- The grid size used for mapping the sensitive receivers should not be more than 25 m.



5.3 Expected Real-World Model Assumptions

The Expected Real-World modelling scenario is a refinement of the Theoretical Worst-Case scenario using a more realistic evaluation of the potential occurrence of shadow flicker. The amount of predicted shadow flicker is reduced due to the following conditions.

- Cloud cover – not all days of the year will be sunny; meteorological data sourced from the closest site should be used to calculate the reduction in shadow flicker hours.
- Wind speed and wind direction frequency data (i.e. a wind rose sourced from a nearby meteorological station) can be used to determine the reduction of shadow flicker hours due to the orientation of the turbine.
- If it can be shown that the view of a turbine from a particular receiver is blocked, then the hours of shadow flicker from that turbine can be ignored.
- If the operation of a turbine has scheduled times when it is shut down, this can also be factored into the calculation.

5.4 Modelling the Area of Interest

As stated above, the assessment area of interest to include in the calculation is calculated horizontally from the WTG. There are a number of different ways to calculate this distance generally involving a function of the blade chord or the rotor diameter.

SLR notes that the Draft Guideline was published 15 years ago and there has been significant development in wind turbine technology since the time of publication (2010). At the time of publication, a modern WTG had a power generation output of approximately 2 MW, whereas the WTGs for this Project are 7.8 MW and much larger in physical size.

When the Draft Guideline was written there was a wide variance in the distances used across jurisdictions. Victoria's recommendation was 265 times the maximum blade chord, while South Australia recommended 500 m.

The DECC uses a factor of 10 times the rotor diameter while the German regulations recommend 2 km around each turbine. The assessment software to be used has a slightly different method again, using a 20% blockage method, this equates to a factor of approximately 683 times the mean blade chord. This approach is slightly more conservative than other reports from industry peers which use a factor of 680 times the mean blade chord.

At the distances in question this is a change of less than 0.5% and would not be expected to significantly impact the results.

5.5 Draft WA Renewable Energy Planning Code

In December 2025 the WA Department of Planning, Lands and Heritage along with the Western Australian Planning Commission released the draft Renewable Energy Planning Code for comment. Section 2.6, Element 5 covers shadow flicker. The WF Element 5 – Shadow Flicker Element Objective is that *“Wind turbines are sited, designed and operated to minimise shadow flicker impacts on any existing or approved visually sensitive land use located on a non-host lot”*. The draft code outlines two methods for meeting this objective.

Acceptable Outcome

Wind turbines are set back a minimum distance of 265 times the maximum blade chord length from any existing or approved visually sensitive land use on non-host lots.



Performance Outcome

Wind turbines are sited and operated to ensure that shadow flicker at any visually sensitive land use on non-host lots does not exceed:

- 30 hours per year and 30 minutes on any single day, based on theoretical shadow flicker modelling; or
- 10 hours per year, based on predicted actual shadow flicker modelling.

The draft code was open to comments between December 2025 and April 2026 and the final code is yet to be released. As such SLR's comments relate to the advertised version of the draft code.



6.0 Methodology

SLR has conducted the shadow flicker assessment using the WindPRO version 4.2 software package. WindPRO is a widely accepted modelling software package developed specifically for the design and evaluation of wind power projects.

WindPRO has been used to develop both Theoretical (Worst-Case) and Expected (Real-World) model predictions based on the assumptions described in **Sections 5.2 and 5.3** respectively.

6.1 Inputs

Step 1: Digital Terrain Model

Terrain elevation data was added to the model.

- The Australian Digital Elevation Model was chosen which has a resolution of 1 arc second. A 35 km by 35 km section was imported to cover the Project Area and the nearby surrounds.

Step 2: WTG Data Inputs

The 27 WTGs were added to the model. The base case layout shown in Figure 2 was used for the assessment.

- The following specification was added manually to the WindPRO WTG input data:
 - Hub Height – 150 m
 - Rotor Diameter – 181.9 m
 - Maximum Blade Chord – 4.90 m
 - Mean Blade Chord – 3.17 m
 - Chord at 90% blade length – 1.43 m

Step 3: Modelling the Area of Interest

- SLR reviewed the following guidelines when determining a suitable assessment distance for the area of interest:
 - Australian Draft Guidelines (EPHC, 2010) and WA Draft Renewable Energy Planning Code: $265 * 4.90 = 1,299 \text{ m}$
 - UK DECC 2011: $10 * 181.9 = 1,819 \text{ m}$
 - WindPRO Default: $\frac{5 * 3.17 * \text{distance to the sun}}{1097780} = 2,161 \text{ m}$
 - “20% Blockage” method: $680 * 3.17 = 2,152 \text{ m}$
 - German Regulations: $= 2,000 \text{ m}$

The WindPRO Default distance, 20% Blockage method and the German regulations are within 2% of each other (mean assessment distance = 2,104 m) and greater than the EPHC and DECC recommendations.

SLR has chosen the WindPRO Default distance for the assessment (2161 m). This distance provides ample conservatism and is sufficient to capture any areas of impact regarding the criteria set out in **Section 5.0**.



Step 4: Other Modelling Inputs

- A time interval of 1 minute was used across the whole year.
- For the Expected (Real-World) scenario, average sunshine hours were included, based on cloudiness data sourced from nearby meteorological stations.

Table 2 Average Daily Sunshine Hours

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
11.13	10.26	9.14	7.29	6.25	5.21	5.54	6.54	7.4	9.10	10.04	11.09

The following was excluded:

- Vegetation screening close to any potentially impacted receivers was not taken into account, therefore producing a more conservative result.

6.2 Sensitive Receivers

DC Project SPV1 PTY Ltd as Trustee for DC Project Trust 1 has provided SLR with a building register for on-site and neighbour buildings. As per the Draft National Guidelines for shadow flicker, only non-host are considered for the assessment. However, SLR has been asked to assess the buildings of the Billinue community which are within the mining lease boundary. This gave 23 locations which are shown in Figure 4 below.

These include:

- 15 buildings outside the project boundary;
- 8 buildings in the Billinue Community area;

Of the 15 neighbouring buildings, seven are commercial as detailed in Table 3 and will not require assessment leaving a total of 16 locations. The receivers were modelled with a 360° field of view, i.e. an observer being able to look in all directions equally, rather than considering the orientation of the windows of a residence. This provides a level of conservatism in the model. Most neighbouring dwellings are well outside the area of interest in relation to shadow flicker concerns, but they still have been included for the completeness of the assessment. It is noted that some of the buildings in the Billinue Community are sheds.



Figure 4 Sensitive Receiver Locations

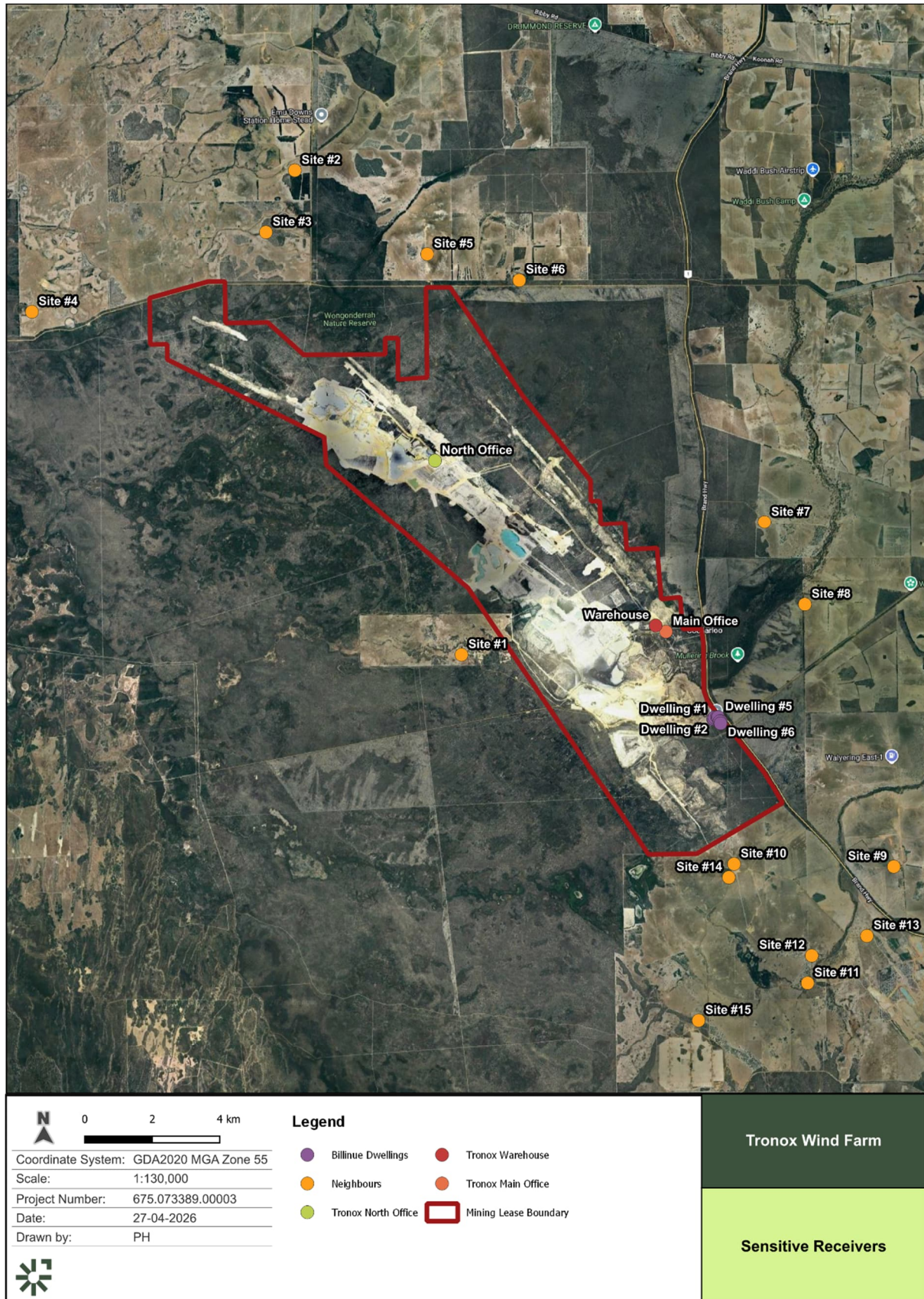


Table 3 Modelled Sensitive Receivers

Property #	Type	Address	Landgate Lot Number	Distance to Nearest WTG	Nearest WTG
West of Mine					
Site #1	Dwelling	792 Cooljarloo Road, COOLJARLOO 6507	Lot 980 On Deposited Plan 103269	~2.0 km	WTG A29
North of Mine					
Site #2	Dwelling	371 Yerramullah Road, NAMBUNG 6521	Lot 3862 On Plan 209085	~6.2 km	WTG A40
Site #3	Dwelling	215 Yerramullah Road, NAMBUNG 6251	Lot 3861 On Plan 209085	~4.2 km	WTG A40
Site #4	Dwelling	1964 Wongonderrah Road, NAMBUNG 6521	Lot 3860 On Plan 209085	~5.7 km	WTG A40
Site #5	Dwelling	762 Wongonderrah Road, BADGINGARRA 6521	Lot 3806 On Plan 209084	~4.3 km	WTG A33
Site #6	Dwelling	482 Wongonderrah Road, BADGINGARRA 6521	Lot 3807 on Plan 209084	~3.9 km	WTG A23
East of Mine					
Site #7	Commercial	12438 Brand HWY, Cooljarloo	Lot 3902 On Plan 209567	~4.4 km	WTG A15
Site #8	Dwelling	271 Mullering Road, Cooljarloo	Lot 105 on Plan 59027	~4.6 km	WTG A14
Site #9	Commercial	10944 Brand Hwy, Cataby	Lot 201 On Plan 73034	~5.9 km	WTG A1
Dwelling #1	Billinue Site Dwelling	11785 Brand Hwy, Cooljarloo	Lot 100 On Diagram 82665	~1.55 km	WTG A9
Dwelling #2	Billinue Site Dwelling	11786 Brand Hwy, Cooljarloo	Lot 100 On Diagram 82666	~1.55 km	WTG A9
Dwelling #3	Billinue Site Dwelling	11787 Brand Hwy, Cooljarloo	Lot 100 On Diagram 82667	~1.55 km	WTG A9
Dwelling #4	Billinue Site Dwelling	11788 Brand Hwy, Cooljarloo	Lot 100 On Diagram 82668	~1.55 km	WTG A9
Dwelling #5	Billinue Site Dwelling	11789 Brand Hwy, Cooljarloo	Lot 100 On Diagram 82669	~1.55 km	WTG A9
Dwelling #6	Billinue Site Dwelling	11790 Brand Hwy, Cooljarloo	Lot 100 On Diagram 82670	~1.55 km	WTG A9
Dwelling #7	Billinue Site Dwelling	11791 Brand Hwy, Cooljarloo	Lot 100 On Diagram 82671	~1.55 km	WTG A9
Dwelling #8	Billinue Site Dwelling	11792 Brand Hwy, Cooljarloo	Lot 100 On Diagram 82672	~1.55 km	WTG A9
South of Mine					
Site #10	Commercial	No Street Address	Lot 3907 On Plan 209656	~1.5 km	WTG A1



Property #	Type	Address	Landgate Lot Number	Distance to Nearest WTG	Nearest WTG
Site #11	Dwelling	367 Caro Rd, Cataby	Lot 754 On Plan 249997	~5.7 km	WTG A1
Site #12	Commercial	No Street Address	Lot 1555 On Plan 252096	~5.1 km	WTG A1
Site #13	Commercial	11019 Brand Hwy Cataby	Lot 101 on Diagram 66701	~5.9 km	WTG A1
Site #14	Commercial	No Street Address	Lot 1 on Diagram 43813	~1.8 km	WTG A1
Site #15	Commercial	N/A	N/A	~5.6 km	WTG A2



7.0 Shadow Flicker Results

The results of the shadow flicker modelling have been visualised in Figure 5 for the Theoretical (Worst-Case) scenario and detailed in the following sections.

SLR notes that the acceptable outcome of the draft Renewable Energy Planning Code is achieved for all of the neighbouring dwellings and the Billinue Community buildings. The performance outcome of the draft Renewable Energy Planning Code would be assessed in a similar manner to the methodology set out in **Section 6.0** as discussed below.

7.1 Theoretical (Worst Case) Results

Table 4 shows the key output results at each of the modelled locations in terms of:

- Theoretical (Worst-Case) Scenario:
 - o Hours per year and (maximum) minutes per day.

Theoretical (Worst-Case) Scenario

- Shadow flicker in excess of 30 hours per year is not predicted for any of the neighbouring dwellings.
- Shadow flicker in excess of 30 hours per year is not predicted for any of the eight Billinue Community dwellings.

Table 4 Shadow Flicker Results (Theoretical Worst-Case Scenario)

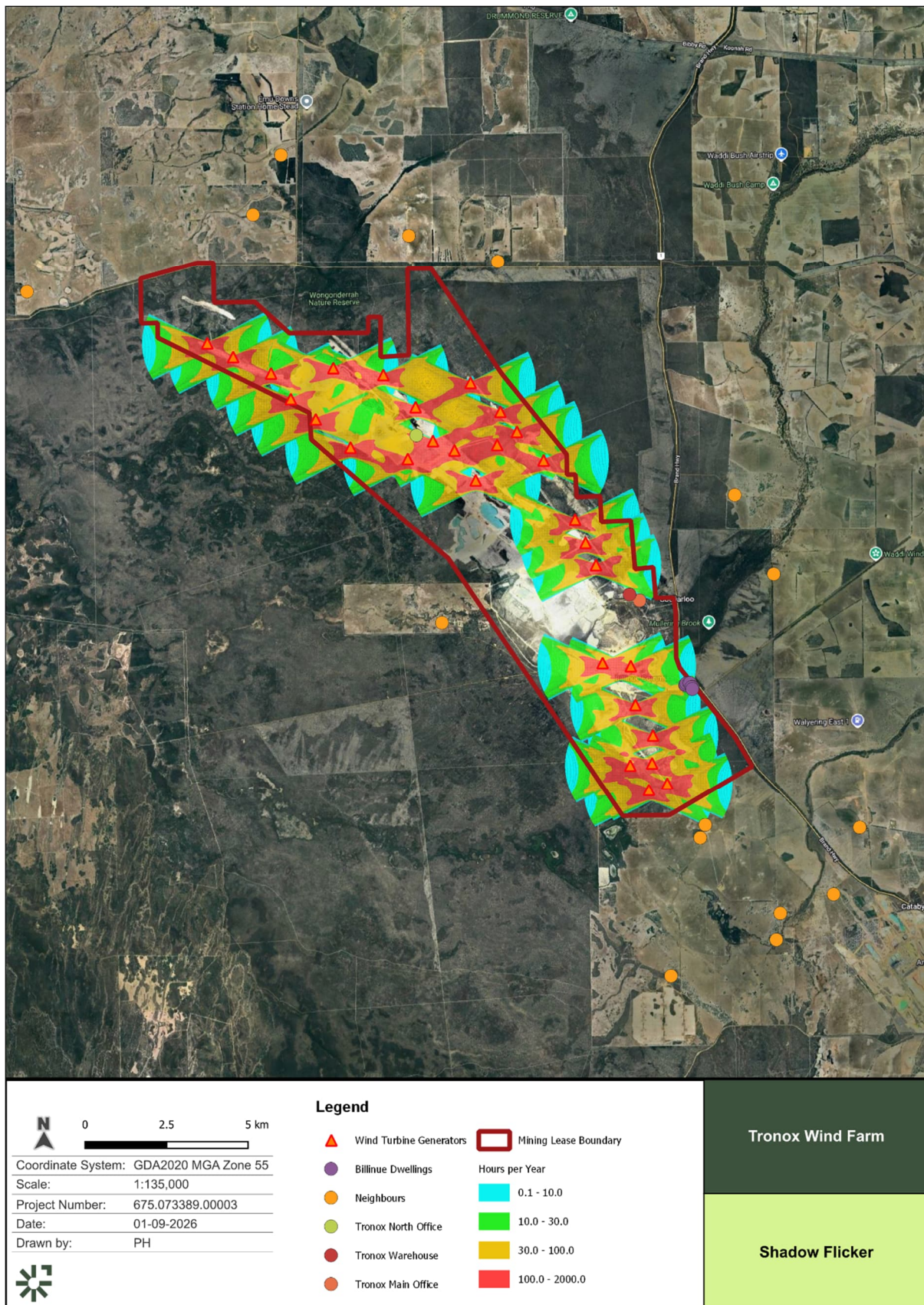
WindPRO ID	Project ID	Impacting WTG	Theoretical Shadow Flicker (hours/year)	Theoretical Shadow Flicker (max minutes/day)
D – N	Neighbouring Sites	-	-	-
S	Dwelling #1	A8	23:53	25
T	Dwelling #2	A8	25:27	25
U	Dwelling #3	A8	23:50	24
V	Dwelling #4	A8	21:30	22
W	Dwelling #5	A8	17:16	22
X	Dwelling #6	A8	9:57	20
Y	Dwelling #7	A8	10:30	21
Z	Dwelling #8	A8	9:21	21

7.1.1 Theoretical (Worst Case) Map

In general, it can be seen that the majority of the WTGs are a sufficient distance from the non-involved dwellings and as a result there is no impact at many locations. As discussed in the introduction shadow flicker hours from WTGs A11 and A12 can be ignored.



Figure 5 Shadow Flicker (Hours per Year)



7.2 Expected (Real-World) Results

As the Theoretical (Worst-Case) scenario showed no exceedances of the hours per year and minutes per day requirements, the Expected (Real World) scenario will not need to be evaluated, and no further mitigation will be required.



8.0 Blade Glint

Blade 'glint' involves the theoretical reflection of sunlight from a turbine blade as seen by an observer as a periodic flash of light. Blade glint is not generally caused by modern wind turbines given that non-reflective coatings are used for the surface of the blades. As stated in the EPHC Draft National Wind Farm Development Guidelines (2010), which provide guidance on blade glint:

"The sun's light may be reflected from the surface of wind turbine blades. Blade Glint has the potential to annoy people. All major wind turbine manufacturers currently finish their blades with a low reflectivity treatment. This prevents a potentially annoying reflective glint from the surface of the blades and the possibility of a strobing reflection when the turbine blades are spinning. Therefore, the risk of blade glint from a new development is considered to be very low."

Assuming these treatments are used for the Project, blade glint is not expected to have an impact on any surrounding sensitive receivers.



9.0 Conclusion

Shadow Flicker Modelling

Shadow flicker studies normally distinguish between the predictions from two scenarios:

- An “idealised” scenario which involves calculations that do not take into account factors such as weather cloudiness, wind directionality, operational downtime, etc, which reduce the level of shadow flicker experienced by a receiver. These predictions can therefore be considered a “theoretical worst-case” scenario.
- A “real-world” or “actual” scenario which does take into the real-world factors that influence the shadow flicker that would actually be experienced. These predictions can be considered an “expected” scenario.

Criteria

The widely accepted criteria for shadow flicker are:

- Theoretical Worst-case Scenario:
 - o 30 hours per year and 30 minutes per day
- Expected Real-world Scenario:
 - o 10 hours per year and 30 minutes per day

Baseline Study Results

The assessment evaluated the Theoretical and Expected shadow flicker from a maximum of 27 proposed WTG locations with respect to 16 sensitive receivers around and within the Project Area.

The Theoretical scenario modelling showed no exceedances of the shadow flicker criteria.



10.0 References

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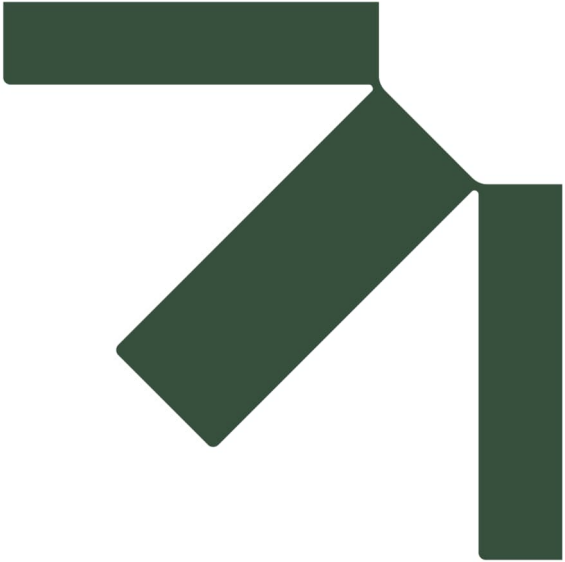
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Appendix A WTG Location Data

Cooljarloo Energy Park

Wind Farm Shadow Flicker Assessment

DC Project SPV1 PTY Ltd as Trustee for DC Project Trust 1

SLR Project No.: 675.073398.00003

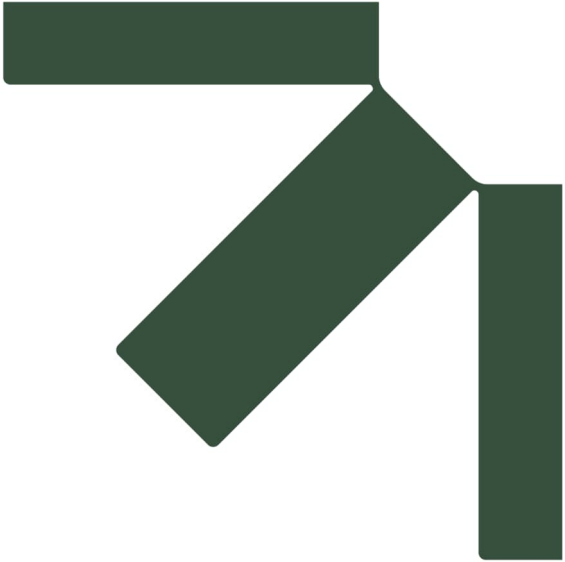
17 September 2026

WTGs

	Longitude	Latitude	Z [m]	Row data/Description	WTG type		Type-generator	Power, rated [kW]	Rotor diameter [m]	Hub height [m]
					Valid	Manufact.				
1	115.456258° E	-30.702518° N	94.3	Envision EN-182/7.8 ... No	No	Envision	EN-182/7.8-7,800	7,800	181.9	150.0
2	115.462144° E	-30.700832° N	97.9	Envision EN-182/7.8 ... No	No	Envision	EN-182/7.8-7,800	7,800	181.9	150.0
3	115.457801° E	-30.687411° N	96.8	Envision EN-182/7.8 ... No	No	Envision	EN-182/7.8-7,800	7,800	181.9	150.0
4	115.457398° E	-30.695143° N	93.9	Envision EN-182/7.8 ... No	No	Envision	EN-182/7.8-7,800	7,800	181.9	150.0
5	115.452316° E	-30.678903° N	98.6	Envision EN-182/7.8 ... No	No	Envision	EN-182/7.8-7,800	7,800	181.9	150.0
6	115.441991° E	-30.667206° N	90.1	Envision EN-182/7.8 ... No	No	Envision	EN-182/7.8-7,800	7,800	181.9	150.0
7	115.440312° E	-30.640106° N	93.0	Envision EN-182/7.8 ... No	No	Envision	EN-182/7.8-7,800	7,800	181.9	150.0
8	115.437078° E	-30.633887° N	93.4	Envision EN-182/7.8 ... No	No	Envision	EN-182/7.8-7,800	7,800	181.9	150.0
9	115.433829° E	-30.627237° N	93.8	Envision EN-182/7.8 ... No	No	Envision	EN-182/7.8-7,800	7,800	181.9	150.0
10	115.424027° E	-30.610772° N	107.4	Envision EN-182/7.8 ... No	No	Envision	EN-182/7.8-7,800	7,800	181.9	150.0
11	115.415619° E	-30.602765° N	101.8	Envision EN-182/7.8 ... No	No	Envision	EN-182/7.8-7,800	7,800	181.9	150.0
12	115.409240° E	-30.606301° N	89.8	Envision EN-182/7.8 ... No	No	Envision	EN-182/7.8-7,800	7,800	181.9	150.0
13	115.410407° E	-30.597150° N	99.0	Envision EN-182/7.8 ... No	No	Envision	EN-182/7.8-7,800	7,800	181.9	150.0
14	115.401005° E	-30.589033° N	95.6	Envision EN-182/7.8 ... No	No	Envision	EN-182/7.8-7,800	7,800	181.9	150.0
15	115.395560° E	-30.607657° N	76.5	Envision EN-182/7.8 ... No	No	Envision	EN-182/7.8-7,800	7,800	181.9	150.0
16	115.388718° E	-30.604977° N	75.3	Envision EN-182/7.8 ... No	No	Envision	EN-182/7.8-7,800	7,800	181.9	150.0
17	115.383309° E	-30.595540° N	76.6	Envision EN-182/7.8 ... No	No	Envision	EN-182/7.8-7,800	7,800	181.9	150.0
18	115.373163° E	-30.586530° N	80.2	Envision EN-182/7.8 ... No	No	Envision	EN-182/7.8-7,800	7,800	181.9	150.0
19	115.357186° E	-30.584432° N	73.2	Envision EN-182/7.8 ... No	No	Envision	EN-182/7.8-7,800	7,800	181.9	150.0
20	115.343452° E	-30.592807° N	69.6	Envision EN-182/7.8 ... No	No	Envision	EN-182/7.8-7,800	7,800	181.9	150.0
21	115.337253° E	-30.585657° N	67.5	Envision EN-182/7.8 ... No	No	Envision	EN-182/7.8-7,800	7,800	181.9	150.0
22	115.380589° E	-30.609837° N	75.0	Envision EN-182/7.8 ... No	No	Envision	EN-182/7.8-7,800	7,800	181.9	150.0
23	115.351330° E	-30.598516° N	73.7	Envision EN-182/7.8 ... No	No	Envision	EN-182/7.8-7,800	7,800	181.9	150.0
24	115.362317° E	-30.606444° N	72.6	Envision EN-182/7.8 ... No	No	Envision	EN-182/7.8-7,800	7,800	181.9	150.0
25	115.450389° E	-30.695677° N	93.1	Envision EN-182/7.8 ... No	No	Envision	EN-182/7.8-7,800	7,800	181.9	150.0
26	115.402208° E	-30.616017° N	77.3	Envision EN-182/7.8 ... No	No	Envision	EN-182/7.8-7,800	7,800	181.9	150.0
27	115.450992° E	-30.668150° N	85.3	Envision EN-182/7.8 ... No	No	Envision	EN-182/7.8-7,800	7,800	181.9	150.0
28	115.325219° E	-30.580952° N	60.8	Envision EN-182/7.8 ... No	No	Envision	EN-182/7.8-7,800	7,800	181.9	150.0
29	115.317003° E	-30.577045° N	58.9	Envision EN-182/7.8 ... No	No	Envision	EN-182/7.8-7,800	7,800	181.9	150.0

Note: WindPRO ID 6 and 27 have been removed





Appendix B Receptor Location Data

Cooljarloo Energy Park

Wind Farm Shadow Flicker Assessment

DC Project SPV1 PTY Ltd as Trustee for DC Project Trust 1

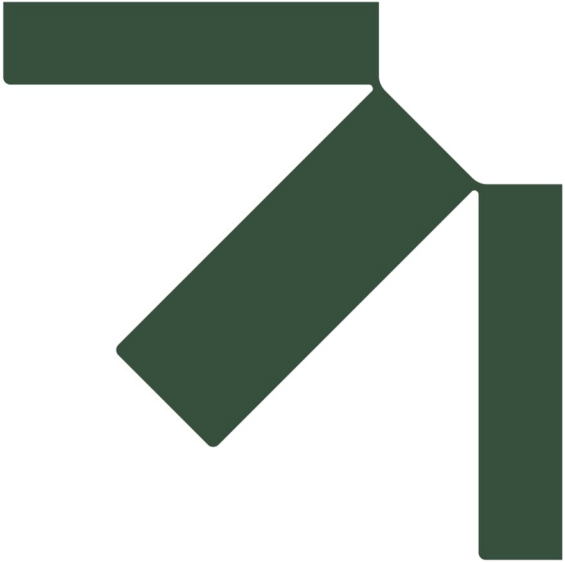
SLR Project No.: 675.073398.00003

17 September 2026

Shadow receptor-Input

No.	Longitude	Latitude	Z	Width	Height	Elevation a.g.l.	Slope of window	Direction mode
			[m]	[m]	[m]	[m]	[°]	
A	115.450917° E	-30.648357° N	104.1	2.0	1.5	1.0	90.0	"Green house mode"
B	115.383430° E	-30.603340° N	77.2	2.0	1.5	1.0	90.0	"Green house mode"
C	115.454096° E	-30.650043° N	104.9	2.0	1.5	1.0	90.0	"Green house mode"
D	115.390752° E	-30.655429° N	77.1	2.0	1.5	1.0	90.0	"Green house mode"
E	115.341443° E	-30.525055° N	97.3	2.0	1.5	1.0	90.0	"Green house mode"
F	115.332231° E	-30.541492° N	73.1	2.0	1.5	1.0	90.0	"Green house mode"
G	115.259591° E	-30.562014° N	49.4	2.0	1.5	1.0	90.0	"Green house mode"
H	115.381937° E	-30.547966° N	133.4	2.0	1.5	1.0	90.0	"Green house mode"
I	115.410251° E	-30.555514° N	148.7	2.0	1.5	1.0	90.0	"Green house mode"
J	115.485001° E	-30.621032° N	172.2	2.0	1.5	1.0	90.0	"Green house mode"
K	115.497145° E	-30.643241° N	154.8	2.0	1.5	1.0	90.0	"Green house mode"
L	115.523567° E	-30.713764° N	144.3	2.0	1.5	1.0	90.0	"Green house mode"
M	115.474133° E	-30.712498° N	97.7	2.0	1.5	1.0	90.0	"Green house mode"
N	115.496410° E	-30.744534° N	99.4	2.0	1.5	1.0	90.0	"Green house mode"
O	115.497808° E	-30.737224° N	98.6	2.0	1.5	1.0	90.0	"Green house mode"
P	115.514952° E	-30.732161° N	99.7	2.0	1.5	1.0	90.0	"Green house mode"
Q	115.472469° E	-30.716051° N	96.6	2.0	1.5	1.0	90.0	"Green house mode"
R	115.462508° E	-30.754124° N	87.4	2.0	1.5	1.0	90.0	"Green house mode"
S	115.468321° E	-30.673648° N	105.4	2.0	1.5	1.0	90.0	"Green house mode"
T	115.468396° E	-30.673389° N	105.5	2.0	1.5	1.0	90.0	"Green house mode"
U	115.468729° E	-30.673077° N	105.8	2.0	1.5	1.0	90.0	"Green house mode"
V	115.469554° E	-30.672982° N	106.4	2.0	1.5	1.0	90.0	"Green house mode"
W	115.469866° E	-30.673055° N	106.4	2.0	1.5	1.0	90.0	"Green house mode"
X	115.470646° E	-30.674113° N	105.8	2.0	1.5	1.0	90.0	"Green house mode"
Y	115.470300° E	-30.674181° N	106.0	2.0	1.5	1.0	90.0	"Green house mode"
Z	115.470566° E	-30.674731° N	106.0	2.0	1.5	1.0	90.0	"Green house mode"





Appendix C Shadow Flicker Results

Cooljarloo Energy Park

Wind Farm Shadow Flicker Assessment

DC Project SPV1 PTY Ltd as Trustee for DC Project Trust 1

SLR Project No.: 675.073398.00003

17 September 2026

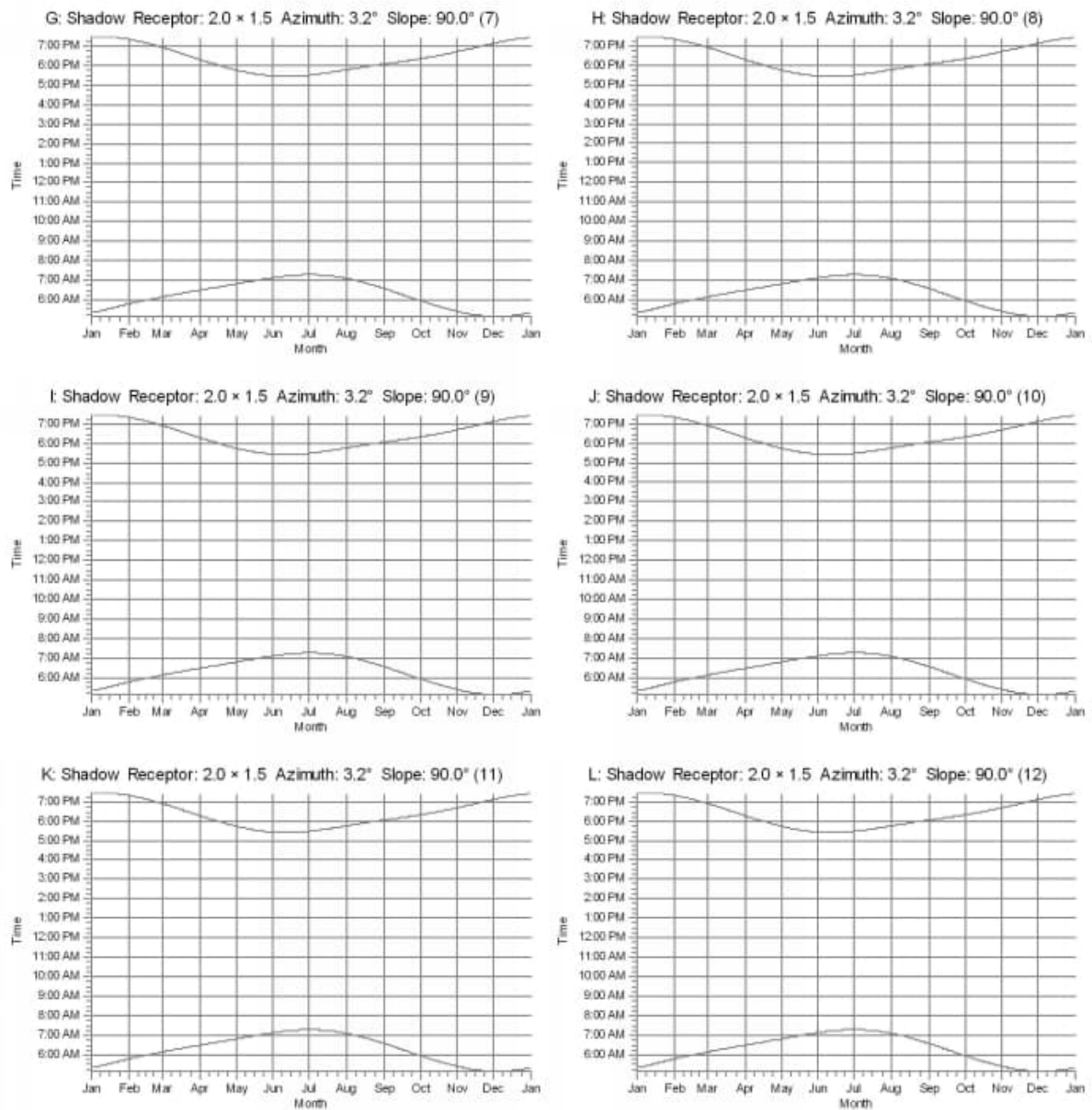
SHADOW - Calendar, graphical

Calculation: Assessment v2



SHADOW - Calendar, graphical

Calculation: Assessment v2

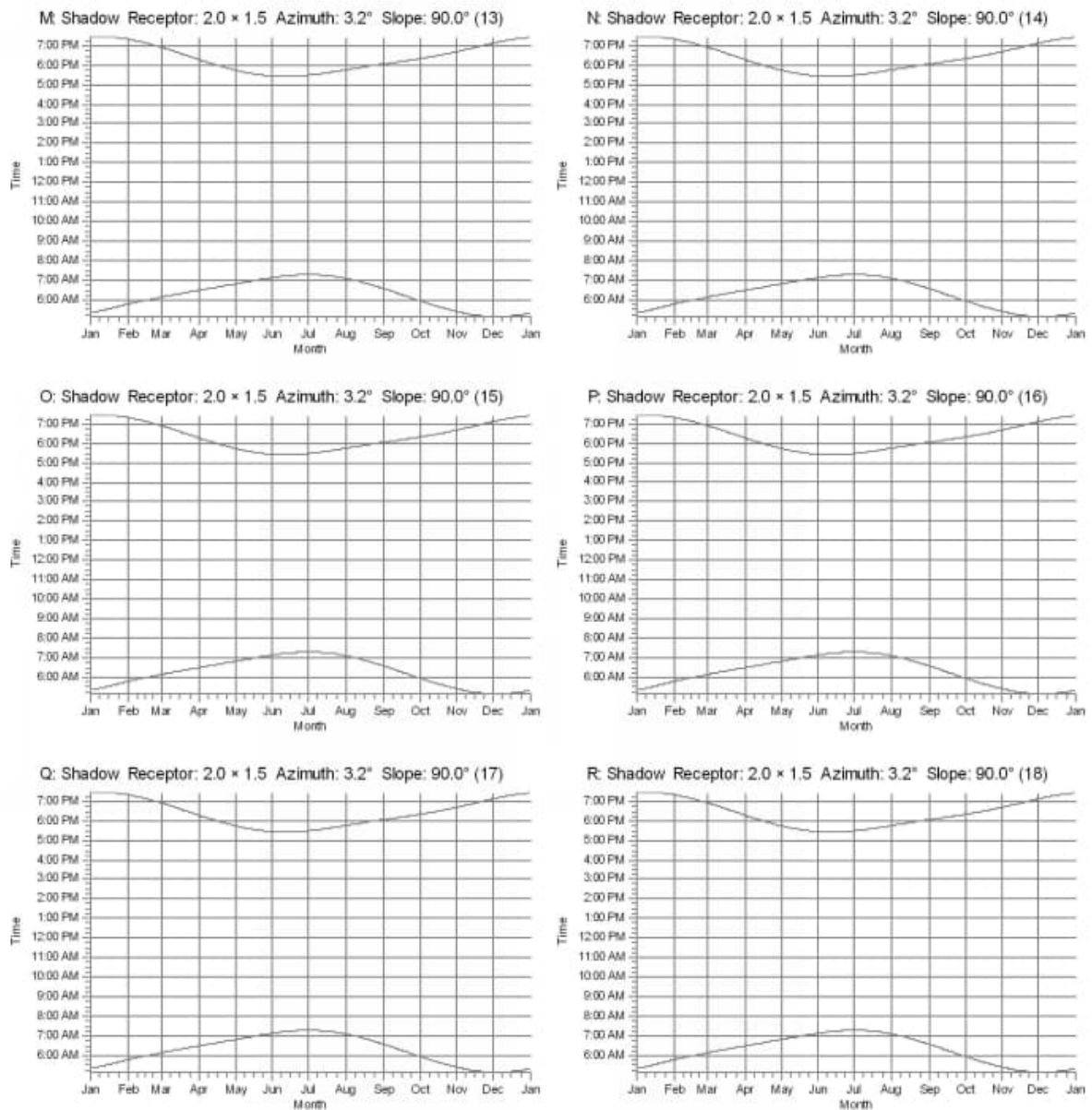


WTS



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Calculation: Assessment v2

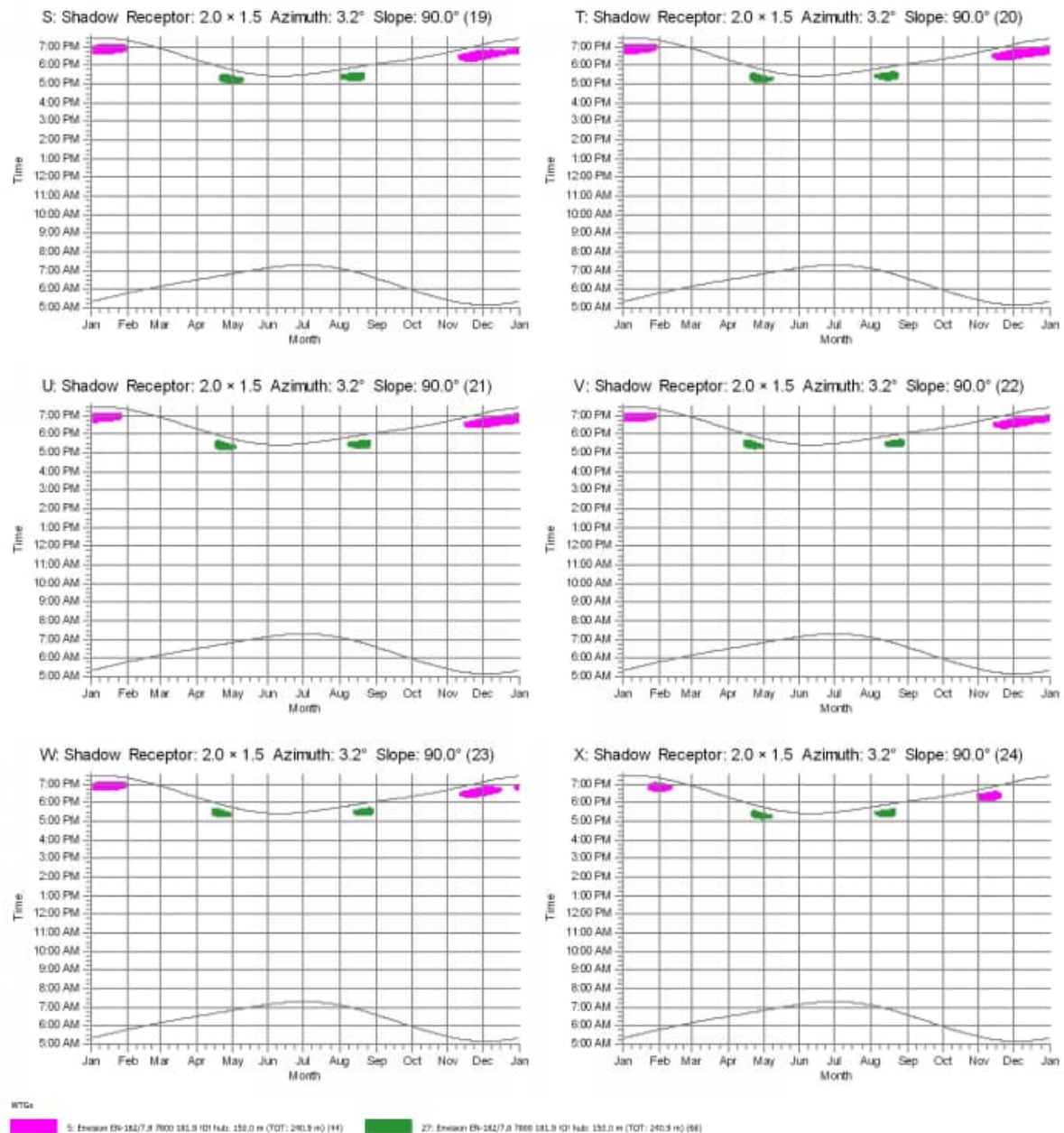


WYG



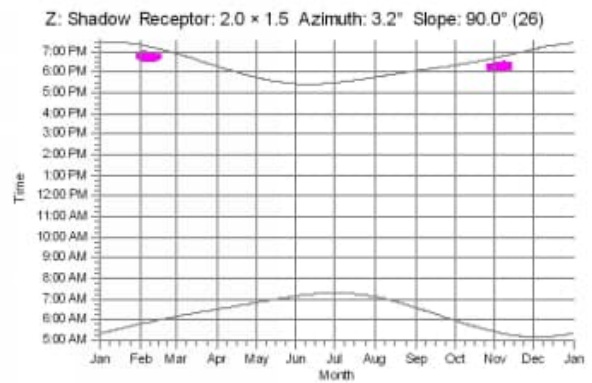
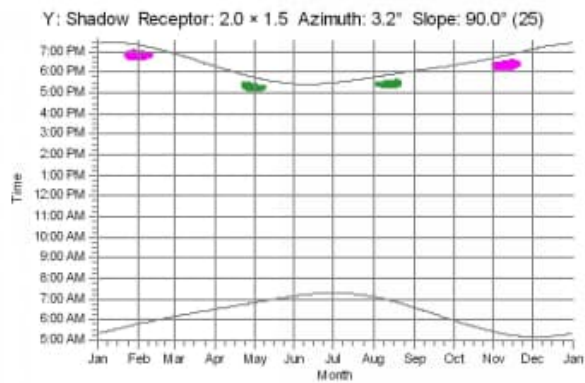
SHADOW - Calendar, graphical

Calculation: Assessment v2



SHADOW - Calendar, graphical

Calculation: Assessment v2

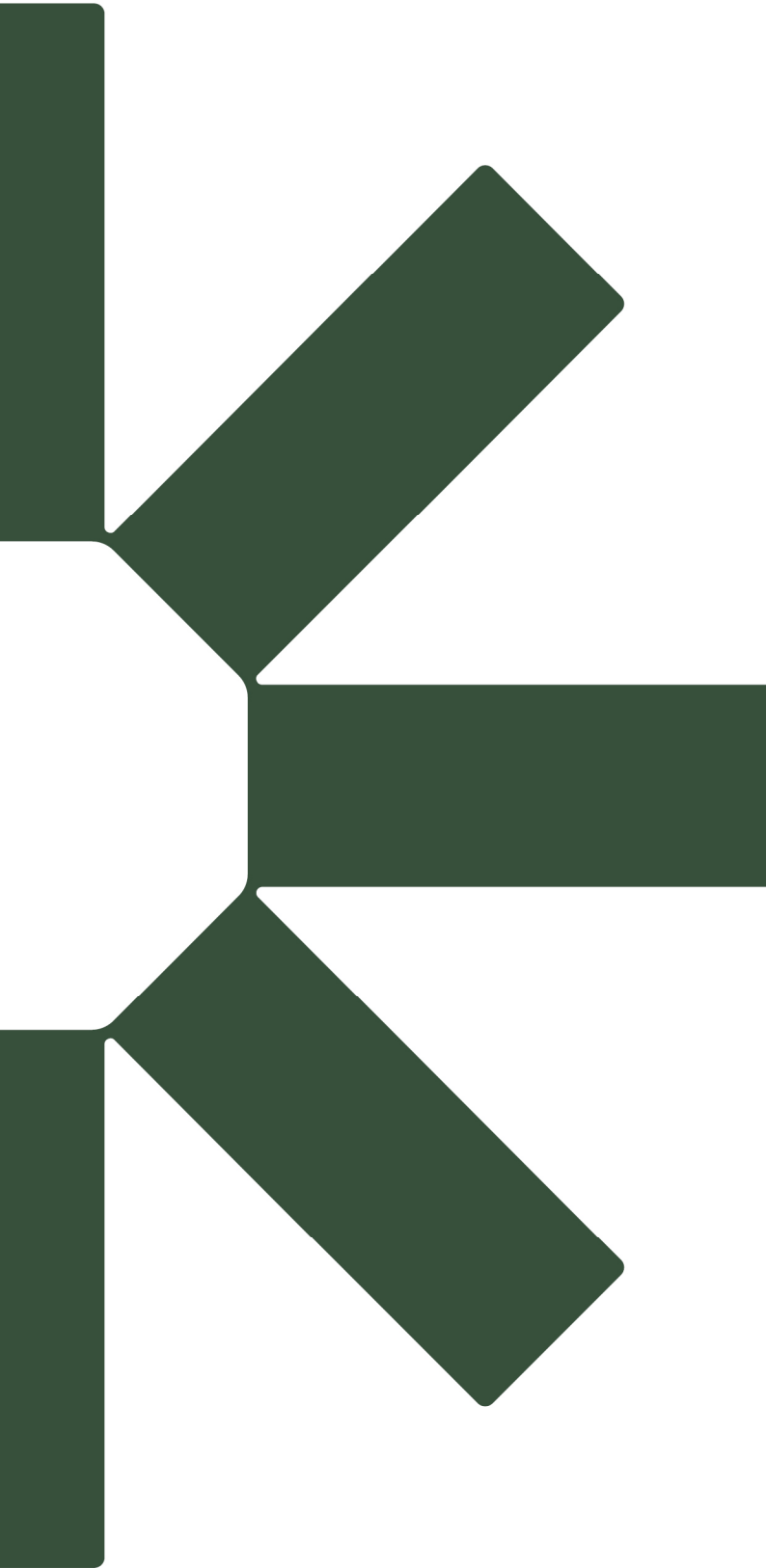


WTGs

5: Elevation 69°-182/7.8 7000 181.9 101 hubs: 150.0 m (TOT: 240.9 m) (44)

27: Elevation 69°-182/7.8 7000 181.9 101 hubs: 150.0 m (TOT: 240.9 m) (88)





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