Appendix 4

Additional information provided by Geolyse

- 1. DPI Water response
- 2. DPI Agriculture response

- 2. Del Agriculture response
 3. Lyn and Chris Newton response
 4. Photomontages
 Location 3 1450 Goldfields Way Gidginbung
 Location 4 'Dunboy' 250 Taylors Road Giginbung
 Location 6 'Barrine' 279 Taylors road Gidginbung



1.1 INTRODUCTION

This information is provided in response to a request from DPI-Water dated 7 April 2016 (Ref: ERM2016/0137).

1.2 **WATERCOURSE**

There is no watercourse present at the site. There are no defined watercourse beds or banks anywhere on the site.



Plate 1: Taken next to the tree in the centre of the site, facing south west towards the two dams at the bottom of the site.





Plate 2: Taken from the western (bottom) end of the site facing east.



Plate 3: Taken from the western most dam, facing up the "drainage flow" line marked on Drawing EV06.



1.3 WATER SUPPLY WORK APPROVAL

The proposed development does not entail the enlargement of an existing dam. Rather, it entails converting the existing dam into an on-site detention basin which, in addition to re-shaping the dam embankment and adding additional embankments either side, includes the addition of a low flow pipe outlet and high flow spillway. These works are about providing air space for managing flows, not increasing the holding capacity of the dam.

The function of these works is effectively linked to "flood detention and mitigation" – which are not included in harvestable right calculations. It is, however, noted that water from this dam could be used in certain circumstances where there was no other water in the other two existing dams and water was required for either emergency firefighting purposes, or to water the landscape plantings until they became established.

The MHR from this 65.16 ha site is 3.9096 ML. The estimate of the site's existing combined dam capacity is 2.738 ML (refer below).

Dam Capacities

Dam Location	Surface Area (m²)	Assumed Depth (m)	Capacity (ML)
East	315	1.5	0.473
South	710	1.5	1.065
West	800	1.5	1.2

The intent is to set the low flow outlet at the height of the existing top water level so the dam functions as a detention basin, as intended, and therefore not result in the permanent increase in dam storage capacity.



1.1 INTRODUCTION

This information is provided in response to comments from DPI dated 13 April 2016 (Ref: OUT 16/15407).

1.2 AGRICULTURAL PRODUCTION

The development will result in the loss of 65 ha of farming/grazing land in the locality.

This land is not mapped as Biophysical Strategic Agricultural Land (BSAL).

LAND OWNERSHIP 1.3

The current landowner signed the Development Application and future ownership arrangements will be determined through contractual agreement between the proponent and the current landowner.

The current landowner does own other adjacent Lots which will continue to be used for farming activities.

1.4 **RISK TO SOLAR PANELS**

The proponent does not consider that there is any risk to the solar panels from aerial spraying activities on adjacent farm land.

1.5 **DECOMMISSIONING MANAGEMENT PLAN**

The proponent understands and accepts that a DMP would need to include rehabilitation objectives and, if appropriate, strategies for returning the land to agricultural production.'



1.1 INTRODUCTION

This information is provided in response to the submission received by Lyn and Chris Newton.

1.2 WATER EASEMENT

The need for 24/7 access to the easement is understood, including during the construction period and operations. **Drawing EV06** in the SEE identifies both the easement and the location of gates in the south eastern and south western corners of the site.

1.3 VISUAL AMENITY

There was no intention to be misleading and suggest that parts of the solar farm would not be visible from certain parts of the Dunboy residence. Rather, that the northerly aspect of the home, and recessed veranda, was such that broad, expansive and open views out and over the solar farm site, from a particularly sensitive part of the home, would not be significantly affected. It is noted of course, that visual impact is subjective.

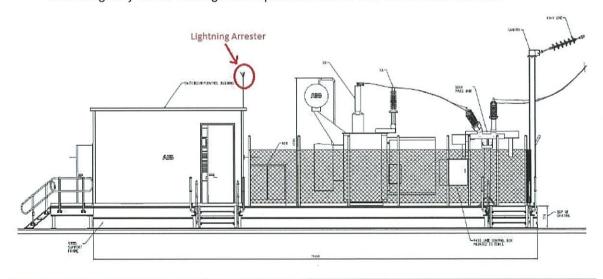
The attached montages showing the extent and scale of proposed solar farm infrastructure that will be visible from the viewing location identified (ie. on the top step of the veranda).

Please find attached the montage prepared by our architect. Given the distance involved, the fall of the land and vegetation, we have included two separate images, with one coloured bright red so that it stands out. We have also included a 'close-up' of what the solar farm would look like on Taylors Road.

The location within the landscape, the scale and extent of solar farm infrastructure that will be visible, as shown, has been created by our architect using the same methodology as described in the Statement of Environmental Effects.

Please also note the following:

- The inverters have been modelled as 40 foot shipping containers, with the height of these modelled at 2.89 m.
- The sub-station building has been modelled with a height of 3.4 m from the ground with the gantry frame at 7.2 m above ground.
- The sub-station will include a lightning arrestor. The arrestor is shown (but not labelled) **on Figure**10 in the SEE and sits on top of the sub-station building. The top of the arrestor is lower (<7.2 m) than the gantry frame. This figure is reproduced below with the arrestor labelled.





The screen plantings proposed would be tube stock not be mature trees.

To this end, whilst proposed plantings at this stage have been nominated at the south eastern corner of the Lot (**Drawing EV06**), Epho has advised that it would be happy to discuss with you additional screen planting opportunities in the north west corner of the Lot.

It is suggested that, subject to securing development consent and construction of the solar farm, the location and composition of screen plantings in the north west corner of the Lot be agreed to in consultation with yourself. The only limitation to the extent of the plantings are restrictions within the two existing electricity transmission line easements. The 132 kV line (closest to you) has a 40 m wide easement (ie. 20 either side of the lines). Notwithstanding, this would still leave an area in the north west corner that could be planted.

The suggestion that this happen if the solar farm is approved and after it is built is based on the assumption that very targeted and specific plantings could address actual as opposed to modelled impacts.

1.4 CONSTRUCTION

The intent of the pre and post road condition report is to validate whether the road has been adversely impacted so that it can be repaired to its pre-construction condition: if required. Given the modest traffic associated with construction no adverse impact to the road is anticipated. The condition report is simply the means of ensuring a Council and community asset is protected.

Temporary construction traffic associated with the development does not warrant sealing of Taylors Road and Epho advise that from an operational perspective, dust from vehicle movements on Taylors Road is not a concern in terms of operating efficiencies of the solar farm.

1.5 AFTER COMMISSIONING

Documented and negotiated arrangements for responding to or managing a fire risk will form a key part of the Operations Environmental Management Plan (OEMP) which is to be prepared prior to commissioning.

This will include the refinement of operational procedures, allocation of responsibilities and the means of site access for all relevant stakeholders; including both the RFS, Temora Fire and Rescue unit, Council and neighbours. These procedures will be developed through consultation with all these stakeholders.

The OEMP would also be a publicly available document and Epho has confirmed that it would, as part of a good neighbour policy, host an information session with interested neighbours to talk through all the various procedures and management commitments documented in the OEMP. This would extend to all environmental management matters and not be limited to fire management.

Notwithstanding that detailed procedures and arrangements are yet to be formulated, the following considerations are provided with respect to the points raised in your submission.

In the event of a fire the solar farm can be isolated (disconnected) from the grid. This means the
inverters are switched off and the solar farm converts to an open circuit mode (ie. with no current
flow). This isolation would occur at the main switch in the substation control room.

The solar farm will be required to comply with the Australian Energy Market Operator (AEMO) and Essential Energy's operation protocols for embedded generators which, whilst it is yet to be determined, will likely include remote access requirements. If the solar farm is isolated remotely, it can be achieved very quickly.



If isolated manually, then this would take longer based on the proximity of services, but would be undertaken by either Essential Energy or RFS or the solar farm's Operations and Maintenance sub-contractor, all of whom will have authorised access to the site.

Again, finalising these arrangements and establishing capabilities and responsibilities for fire fighting in a potential high voltage environment will be necessary in order to prepare the Operations Environmental Management Plan (OEMP); which itself is a precursor to the solar farm becoming operational and will involve consultation with neighbours.

- Electrical switch gear will incorporate VEDA (Very Early Detection Alarm) fire detection system capabilities.
- In terms of plant control, any remote control equipment will be operated through either the 3G or 4G mobile networks. Alternatively, if mobile network coverage is not adequate, then satellite technology will likely be utilised.
- The IP Code (or International Protection Rating, sometimes also interpreted as Ingress Protection Rating) consists of the letters IP followed by two digits. As defined in international standard IEC 60529, it classifies the degrees of protection provided against the intrusion of solid objects, dust, accidental contact, and water in electrical enclosures. The digits (characteristic numerals) indicate conformity with specific the conditions.

In terms of IP ratings for the GSF, there are various components used in the engineered design, each with different IP ratings. Some components are designed to a high IP rating such as IP67, whilst others are designed to a low IP rating such as IP23. For example, solar modules are designed for an IP rating of IP65 or IP67 because of their direct exposure to external elements (i.e. rain, hail, snow, sun and wind) and the need to conduct electricity. However, inverter enclosures have multiple components installed in them and their ratings range from IP23 to IP54. These inverter enclosures are specifically engineered for permanent outdoor use exposed to the same external elements as solar modules. If direct jets of water are focused on parts of the inverter enclosure, it may have adverse effects in relation to the operation of the electrical components internally, but Epho advise that this does not preclude the attendance of RFS or similar services using fire hoses in the case of a fire.

Alternatively, the solar modules will be designed and built to comply with IP65 or 67. IP 67 means the modules will be totally protected against immersion in water up to 1 m depth; that is, ingress of water in harmful quantity shall not be possible when the enclosure is immersed in water under defined conditions of pressure and time (up to 1 m of submersion). IP 65 provides protection against 'water jets'; specifically, water projected by a nozzle (6.3mm) from any direction shall have no harmful effects.

The need to ensure that there is a suitable capacity and systems in place to deal with and prepare
for an encroaching grass fire is fully understood. Preparation of an OEMP, developed in
consultation with all response stakeholders (RFS/Fire and Rescue), including neighbours, will
ensure this capability is in place prior to operations commencing.

1.6 GLARE AND GLINT

The modelling of potential glare and glint impact has been undertaken with the Solar Glare Hazard Analysis Tool (SGHAT). This model was created by Sandia National Laboratories. Sandia Corporation operates Sandia National Laboratories as a contractor for the U.S. Department of Energy's National Nuclear Security Administration (NNSA) and supports federal, state, and local government agencies, companies, and organisations in the States.

SGHAT is recommended by the Federal Aviation Administration (USA) and is used throughout the world by consultants, PV installers and researchers to predict and plan for glare.

SGHAT is also an R&D 100 Award-winning tool. R&D Magazine honours inventors by identifying the 100 most technologically significant products and advancements each year and recognizing the winning innovators and their organizations. Winners are chosen from an international pool of submissions from



universities, private corporations, and government labs. Sandia was awarded an R&D award in 2013 for the SGHAT.

On the basis of the above Geolyse has selected and used this tool with the objective of identifying, accurately, potential glare impacts. The model runs at one (1) minute intervals are from our research is the most sophisticated tool available to accurately predict impacts.

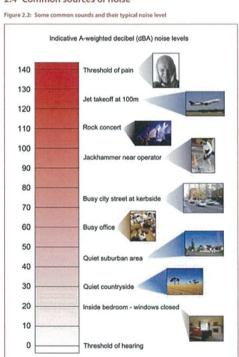
It should also be noted that there is a difference between glint and glare. Glint is momentary (ie. a flash) and occurs when something is moving or changing rapidly. An example would be a driver in a moving vehicle sees a brief glint of solar glare from a building window that he/she passes, or a stationary observer sees a glint of reflected light from a rotating ornament.

The implication of the above is that it is not suggested that you will never experience momentary glint from the solar farm. This would, however, only be momentary, not prolonged, and not cause a glare impact.

1.7 NOISE

Noise attenuation over distance is logarithmic not lineal. L_{Aeq} (equivalent continuous noise level) is the level of noise equivalent to the energy-average of noise levels occurring over a measurement period. The values are based on logarithmic scale. As a general rule of thumb, an increase of 2dBA is hardly perceivable. However, an increase of 10dBA is perceived as twice as loud.

The chart below is extracted from the NSW EPA's *Noise Guide for Local Government* to put a perspective as to how loud is a 24dB to 29dB noise level is equivalent to. Based on the chart, the noise level with enhancement from meteorological enhancement will be equivalent to that of a quiet countryside. Also do note that the worst case predicted noise level of 29dB is still within the most stringent noise criteria of 35dBA (based on background of 30dBA plus 5dBA).



2.4 Common sources of noise

Part 2: Noise assessment 2.17



The estimated increase in noise due to adverse weather conditions was derived from Appendix C and Appendix D of the EPA's Industrial Noise Policy. This was done to provide a conservative basis for assessment as the Industrial Noise Policy states that where night time operation is not proposed (which is the case for the solar farm), there is no need to consider the effect of temperature inversions. Further, it is noted that inversion effects are typically considered where the noise source is at higher altitude than the residential receiver, and where there is no intervening higher ground.

The air conditioning units on the inverters will not run on hot or cold nights to maintain temperature or humidity.

1.8 RADIO FREQUENCY INTERFERENCE

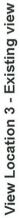
Epho advise that in terms of inverters and radio frequency interference (RFI) all inverter manufacturers are required to meet the requirements of the Australian Communications and Media Authority (ACMA).

ACMA lists a number of mandatory standards on their website in relation to section 162 of the Radiocommunications Act 1992.

This ensures that inverter manufacturers meet specific requirements in relation their electromagnetic compatibility (EMC) for inverters. The Schneider central inverters, as referenced in the DA, are required to meet IEC61000-6-4 emission standards. IEC61000-6-4 applies to emission requirements in the frequency range 0 Hz to 400 GHz.

In terms of a Microwave Control Link, there are no plans to utilise this technology as a means of controlling the farm.





Photomontage created by:

James Buckley - B.Arch(Hons) A.I.A NSW Board of Architects registration No 8504

AutoCAD 2016, Sketchup 2016, Thea Render, Adobe photoshop Photomontage Image created using:

Base photograph details: Camera: Photo taken: Location of photo:

Height above ground:

∰ GEOLYSE

GIDGINBUNG SOLAR FARM STATEMENT OF ENVIRONMENTAL EFFECTS



	YLTD	0
	EPHO PT	5
cuent	Ш	0

	SIZE A1	361	33	
	A09.deg			8
NG	99C, A01			P
XISTI	E 215436			A06
VIEW_03_EXISTING	DRAWING FILE 215436_00C_A01.409.dmg			SHEET AGE OF 09
VIEW	ROJECT NUMBER, 215436	SOURCE	MAGE SOURCE SIX MAPS	STATUS FOR REVIEW





Photomontage created by:

James Buckley - B.Arch(Hons) A.I.A NSW Board of Architects registration No 8504

AutoCAD 2016, Sketchup 2016, Thea Render, Adobe photoshop Photomontage Image created using:

Base photograph details: Camera: Photo taken: Location of photo:

DETALS	WORKING DRAFT	CLENTISSUE	VIEW OI SHEETS ADDED		
APPD.	AB WOR	AB CUEN	AB VIEW		
DETD. APPD.	ž	845	945		
REV. DATE	2500,0016	91020200	12,04,2016		
REV.	<	an	U	Г	Γ

∰ GEOLYSE

c sn						
STM130	WORKING DRAFT	CLENTISSUE	VIEW OD SHEETS ADDED			
APPD.	2	2	2			
0670	Æ	945	945			
DATE	2002006	91020300	20022015			
	-	÷	-	_	_	_

GIDGINBUNG SOLAR FARM STATEMENT OF ENVIRONMENTAL EFFECTS



	٥	•
	YLT	9
	OPT	5
	EPH	
GEN		

	+	Т	Т
3_WITH PANELS			OF OF
H PAN			202
VIEW_03_WITH PANELS			CHEET ANY
VIEW	JUNCE C LOTTON	AGE SOURCE SIX MAPS	TIATUS FOR REVIEW





Photomontage created by:

James Buckley - B.Arch(Hons) A.I.A NSW Board of Architects registration No 8504

AutoCAD 2016, Sketchup 2016, Thea Render, Adobe photoshop Photomontage Image created using:

Base photograph details: Camera: Photo taken: Location of photo:

NIKON COOLPIX P600 10.16am on 08/04/2016 E: 543651 N: 6201523 1.6 m Height above ground:

⊗ GEOLYSE

154 PEISLEY STREET P.O. BOX 1953 ORANGE, NSW 2800 Ph. (02) 6393 5000 Fr. (02) 639 5050

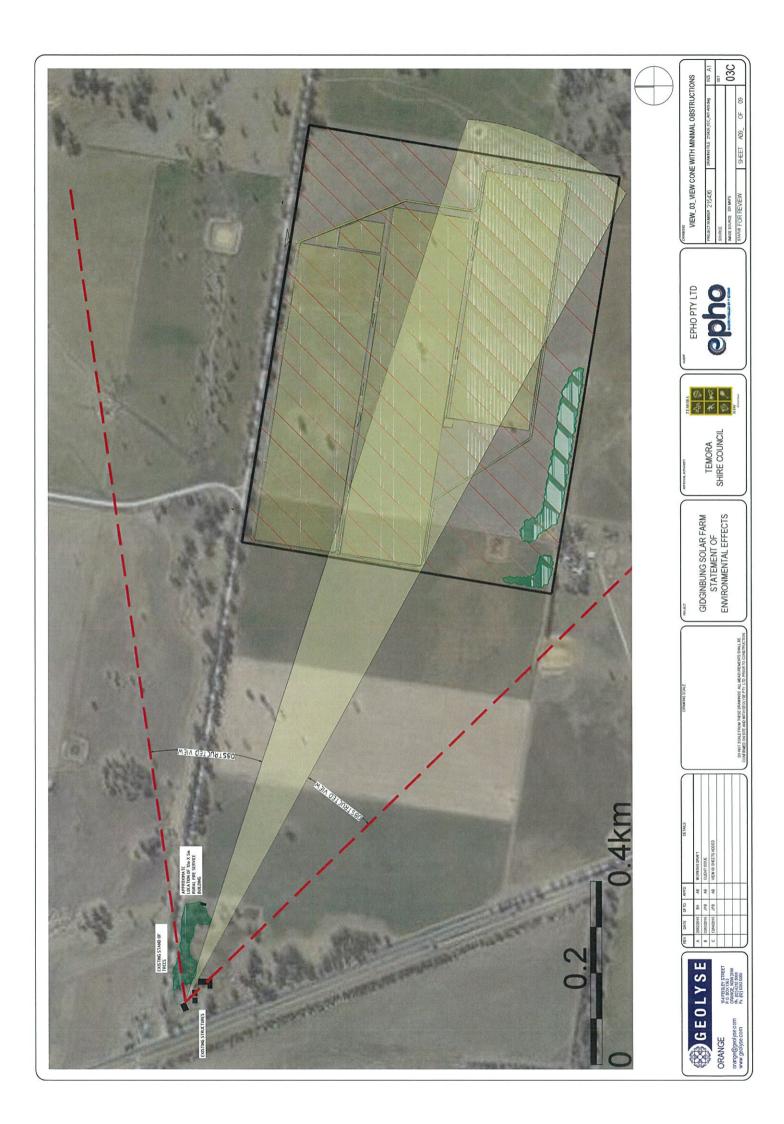
GIDGINBUNG SOLAR FARM STATEMENT OF ENVIRONMENTAL EFFECTS

TEMORA SHIRE COUNCIL



EPHO PTY LTD

VIEW_03_WITH PANELS HIGHLIGHTED



NOTE: Electricity wires and poles are existing



View Location 4 - View from "Dunboy"

Photomontage created by:

James Buckley - B.Arch(Hons) A.I.A NSW Board of Architects registration No 8504

Photomontage Image created using:

AutoCAD 2016, Sketchup 2016, Thea Render, Adobe photoshop

NIKON COOLPIX P600 12.21pm on 14/04/2016 Base photograph details: Camera: Photo taken: Location of photo:

Height above ground:

⊕ GEOLYSE

154 PEISLEY STREET P.O. BOX 1953 ORANGE, NSW 2800 Ph. (02) 6393 5000 Fr. (02) 6393 5050

ORANGE

GIDGINBUNG SOLAR FARM STATEMENT OF ENVIRONMENTAL EFFECTS





V DEMANING	View_From Dunboy	
ряолест измаея 215436	DRAWING FLE 215436_000_A01-A012-dwg	SICE A1
Sounce		SET
MAGE SOURCE. SOXMAPS		030
TATIO COL OCT STATE	the state of a second of	_

NOTE: Electricity wires and poles are existing

-Substation (partially obscured by trees)

View Location 4 - View from "Dunboy"

Photomontage created by:

James Buckley - B.Arch(Hons) A.I.A NSW Board of Architects registration No 8504

AutoCAD 2016, Sketchup 2016, Thea Render, Adobe photoshop Photomontage Image created using:

Base photograph details:

NIKON COOLPIX P600 12.21pm on 14/04/2016 E: 546095 Camera: Photo taken: Location of photo:

Height above ground:

ERTO AVEO. BRI AR WORKING CRAFT 379 AR CLEKTI BISU.E 379 AR VIEWA SHEETS ACCED 379 AR VIEWA SHEETS ACCED

CETALS WOODING SOLVET WHITE SINCE WHITE SHEETS ACCED WHITE SHEETS ACCED			_			DO NOT SCALE FROM THE
	DETALS	WORKING DRAFT	CLENTISSUE	VIEW GS SHEETS ADDED	VIEWS SHEETS ADDED	

	<u> </u>	Ш	_
The Comment			DO NOT SCALE FROM THE SE DIAMENUS, ALL MEASUREMENTS SHALL BE
			0

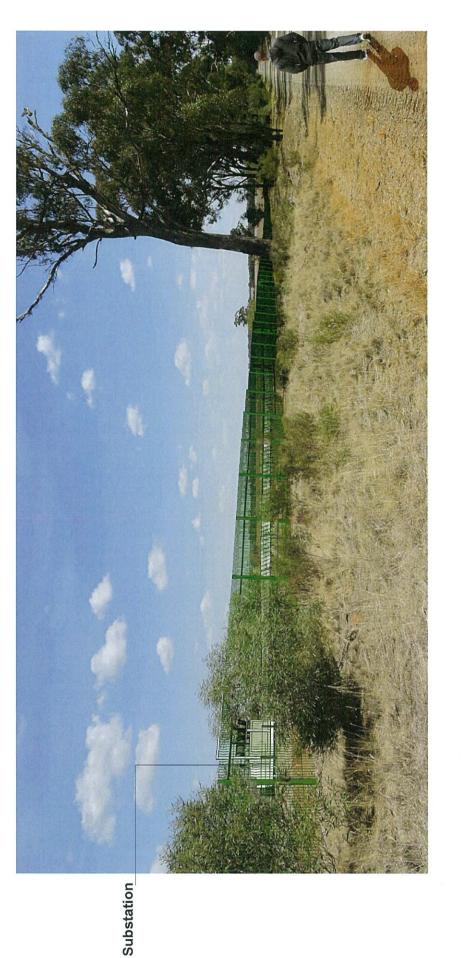
GIDGINBUNG SOLAR FARM STATEMENT OF ENVIRONMENTAL EFFECTS





Vie	View From Dunboy(2)	(2)
PROJECT NUMBER 215436	DRAWING FILE 215406_000_A01-A0	J401-A012da
SOURCE		
IMAGE SOURCE SOCIMAPS		
eratie COO DELICE	At some to	200

SIZE A1	36.1	1030	
12.dwg			99
0,401.40			P
215.05.0			A11_
DRAWING FILE 215405_000_A01-A012-ds			SHEET
98			N



View Location 5 - View From Taylors Road

Photomontage created by:

James Buckley - B.Arch(Hons) A.I.A NSW Board of Architects registration No 8504

AutoCAD 2016, Sketchup 2016, Thea Render, Adobe photoshop Photomontage Image created using:

NIKON COOLPIX P600 2.24pm on14/04/2016 E: 545445 N: 6201281 1.5m Camera: Photo taken: Location of photo:

Base photograph details:

Height above ground:

DFT0. APP0.	BH AB WORKING DROFT	JPB AB CUENTISSUE	JPB AB VIEW OS SHEETS ADDED	JPB AB VIEWSSHEETS ADDED	
DATE	25,000,016	00,000,0016	12/04/2016	201042016	
REV. DAT	A ZSMOD	B govoo	C 12,640	D 20104D	

∰GEOLYSE

ORANGE

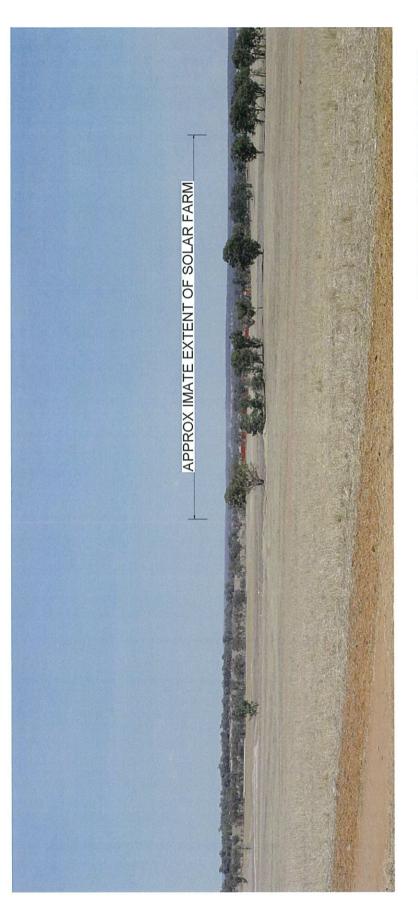
WORKING DRAFT	CLENTISSUE	VIEW OS SHEETS ADDED	VIEWS SHEETS ADDED		
B	8	2	AB		
H		845	188		1
25,000,016	91020000	12542016	20,042,016		
<	8	o	0		

GIDGINBUNG SOLAR FARM STATEMENT OF ENVIRONMENTAL EFFECTS



DRAMING	PROJECT NUMBER 21543	SOURCE	IMMGE SOURCE SOCIMPS
O PTY LTD			TANLIN ET P. STONS

	3258	361	03	Г
Viewus_Laylors Road	DRAWING FILE 215-05_000_A01-A012-dwg			SHEET A12 OF 09
AIC.	SCTN/MBER 215436	35	SOURCE SOCIMPS	A FOR REVIEW



View Location 6 - View from "Barrine" (approx 2.4 km away)

individual elements would not be distinguishable. The view above shows the portion of 65ha Solar Farm that is visible, lifted NOTE: The Solar farm is approx 2.4km away from the location where the photo of the view was taken. At this distance approximately 3m above the ground.

Photomontage created by:

James Buckley - B.Arch(Hons) A.I.A NSW Board of Architects registration No 8504

Photomontage Image created using:

AutoCAD 2016, Sketchup 2016, Thea Render, Adobe photoshop

Base photograph details:

NIKON COOLPIX P600 1.48pm on14/04/2016 E: 549838 N: 6202853 1.5m Camera: Photo taken: Location of photo:

Height above ground:

⊕ GEOLYSE

154 PEISLEY STREET P.O. BOX 1943 ORANGE, NSW 2800 Ph. (02) 6333 5000 Fx. (02) 6335 5050

ORANGE

GIDGINBUNG SOLAR FARM STATEMENT OF ENVIRONMENTAL EFFECTS

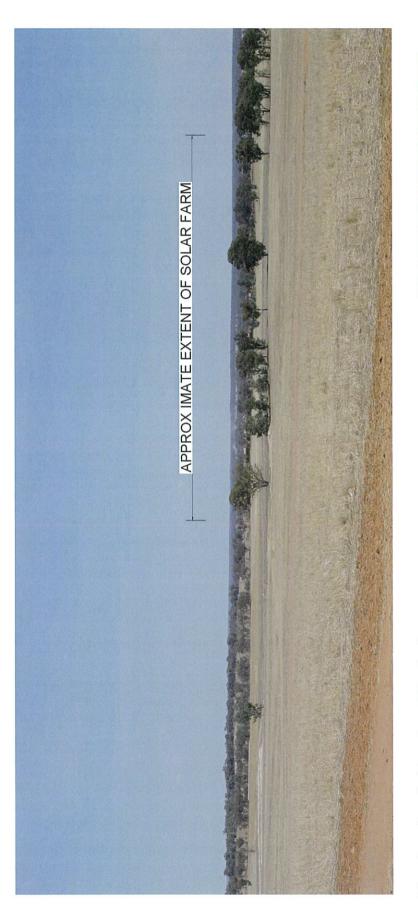
● 第
◆ # ● TEMORA SHIRE COUNCIL





	8	85	$\stackrel{\circ}{\vdash}$	_
	DRAWING FLE 25505_000_A01-4012dag			OF 09
arrine	25436_0			A13
Mew from Barrine	DRAWING FLE			SHEET A13
Vie	NOJECT NUMBER 215436	OURCE	MGE SOURCE. SIX MAPS	TATUS FOR REVIEW

DRAWINS FLE 23545_000_AN1-A012-bag
DRAWING FLE 205436_000_A01-40
DRAWING FLE 215436_01
DRAWING FLE



View Location 6 - View from "Barrine" (approx 2.4 km away)

NOTE: The Solar farm is approx 2.4km away from the location where the photo of the view was taken. At this distance individual elements would not be distinguishable. The view above shows the portion of 65ha Solar Farm that is visible, lifted approximately 3m above the ground.

Photomontage created by:

James Buckley - B.Arch(Hons) A.I.A NSW Board of Architects registration No 8504

Photomontage Image created using:

AutoCAD 2016, Sketchup 2016, Thea Render, Adobe photoshop Base photograph details:

Camera: Photo taken: Location of photo:

NIKON COOLPIX P600 1.48pm on14/04/2016 E: 546838 N: 6202653 1.5m

Height above ground:

GEOLYSE

154 PBQLEY STREET P.O. BOX 1363 ORANGE, NGW 2000 Ps. RQ1 6383 5000 Fx. RQ1 6383 5000

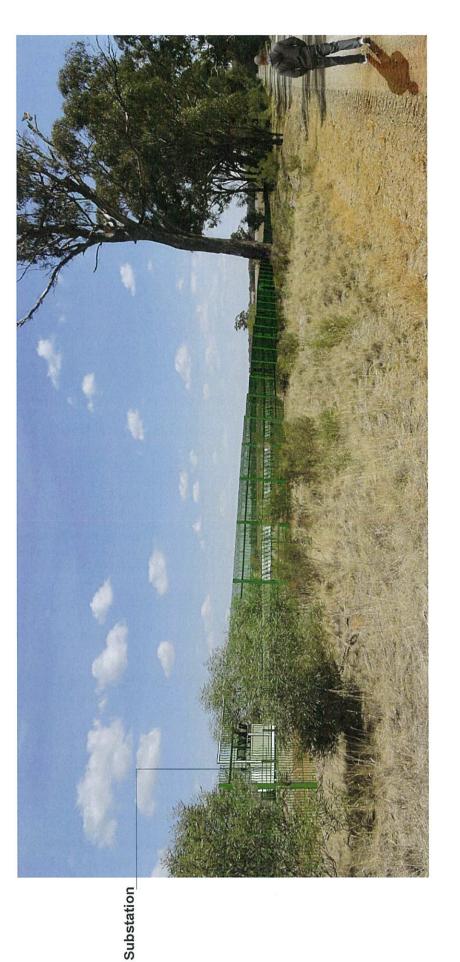
GIDGINBUNG SOLAR FARM STATEMENT OF ENVIRONMENTAL EFFECTS





эро	(
THO PTY		CTD		P E1080
		EPHO PTY	2	DESPRINGED IN

	SEE A	136	33	_
e (Z)	JAANING FILE 216405_000_A01-A012:dwg			OF NO
View from Barnne (2)	DRAWING FILE 2154			SHEET A14 OF M
Viel	PROJECT NUMBER 215436	SOURCE	IMAGE SOURCE SDCMAPS	STATUS FOR REVIEW



View Location 5 - View From Taylors Road

Photomontage created by:

James Buckley - B.Arch(Hons) A.I.A NSW Board of Architects registration No 8504

AutoCAD 2016, Sketchup 2016, Thea Render, Adobe Photomontage Image created using:

Base photograph details:

Camera: Photo taken: Location of photo:

Height above ground

∰GEOLYSE

DETALS			ADDED	0300		
	WORKING DRAFT	CLENTISSUE	VIEW OS SHEETS ADDED	VIEWS SHEETS ADDED		
APPD.	2	2	SA.	82		
DFTD.	五	945	348	85		T
REV DATE DETO APPO	25,000,0016	91020000	12,042,016	20042016		
REV	<	00	U	۵	I	

154 PEISLEY STREET P.O. BOX 1963 ORAWGE NSW 2800 Ph. (82) 6393 5090 Fr. (82) 639 5090

ORANGE

DETALS

GIDGINBUNG SOLAR FARM STATEMENT OF ENVIRONMENTAL EFFECTS



	2	
	7.	\succeq
	PT	
	EPHO P	
	Ш	1
l,		
8		

VIE	Viewub_I aylors Koad	
PROJECT NUMBER 215436	DRAWING FILE 215405_000_A01_A012.04g	SGE A1
SOURCE		136
NAMES SOURCE: SIX NAPS		103D
STATUS FOR REVIEW	CLEET A42 OF 00	T