VAST SOLAR

RESPONSE TO SUBMISSIONS REPORT

JEMALONG HYBRID SOLAR PARK: 50MW SOLAR PHOTOVOLTAIC (PV) PLANT

FEBRUARY 2018

ngh environmental

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NGH Environmental Pty Ltd (ACN: 124 444 622. ABN: 31 124 444 622) and NGH Environmental (Heritage) Pty Ltd (ACN: 603 938 549. ABN: 62 603 938 549) are part of the NGH Environmental Group of Companies.

)

www.nghenvironmental.com.au e: ngh@nghenvironmental.com.au

Sydney Region
18/21 mary st
surry hills nsw 2010 (t 02 8202 8333)

Canberra - NSW SE & ACT
8/27 yallourn st (po box 62)
fyshwick act 2609 (t 02 6280 5053)

Brisbane
level 7, 320 adelaide st
brisbane qld 4000 (t 07 3511 0238)

Newcastle - Hunter and North Coast
7/11 union st
newcastle west nsw 2302 (t 02 4929 2301)

Wagga Wagga - Riverina and Western NSW
suite 1, 39 fitzmaurice st (po box 5464)
wagga wagga nsw 2650 (t 02 6971 9696)

Bega - ACT and South East NSW
suite 1, 216 carp st (po box 470)
bega nsw 2550 (t 02 6492 8333)

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ACRONYMS AND ABBREVIATIONS

ABS	Australian Bureau of Statistics
AC	Alternating current
ACHAR	Aboriginal Cultural Heritage Assessment Report
AEMO	Australian Energy Market Operator
AEP	Annual Exceedance Probability
AHIMS	Aboriginal Heritage Information Management System
ANZECC	Australian and New Zealand Environment Conservation Council
APZ	Asset Protection Zone (bushfire)
ARENA	Australian Renewable Energy Agency
ARI	Average Recurrence Interval
ASC	Australian Soil Classification
ASL	Above Sea Level
BAR	Biodiversity Assessment Report
BCA	Building Code of Australia
BOM	Bureau of Meteorology
BSAL	Biophysical Strategic Agricultural Land
CASA	Civil Aviation Safety Authority
CCP	Community Consultation Plan
CCTV	Closed-circuit television
CEMP	Construction Environmental Management Plan
CMA	Catchment Management Authority
CSIRO	Commonwealth Scientific and Industrial Research Organisation
Cwth	Commonwealth
DA	Development Application
dB	Decibel
DC	Direct current
DEE	Department of the Environment and Energy (Commonwealth)
DEMP	Decommissioning Environmental Management Plan
DP&E	Department of Planning and Environment (NSW)
DP&I	(NSW) Department of Planning and Infrastructure
DPI	Department of Primary Industries (NSW)
EEC	Endangered Ecological Community
EIS	Environmental Impact Statement
ELF	Extremely Low Frequency
EMF	Electric and magnetic field
EP&A Act	*Environmental Planning and Assessment Act 1979*
EPL	Environment Protection Licence
ESD	Ecologically Sustainable Development
FBA	Framework for Biodiversity Assessment
FDI	Fire Danger Index
FIA	Flood Impact Assessment
FM Act	*Fisheries Management Act 1994* (NSW)
GDE	Groundwater Dependant Ecosystem
GHGs	Greenhouse Gases
GW	Gigawatts
GWh	Gigawatt hour

ha	Hectares
HAZMAT	Hazardous Material
Heritage Act	*Heritage Act 1977* (NSW)
HV	High voltage
Hz	Hertz
IBRA	Interim Biogeographic Regionalisation for Australia
ICNG	Interim Construction Noise Guideline
ICNIRP	International Commission on Non-Ionizing Radiation Protection
IEA	International Energy Agency
ISEPP	*State Environmental Planning Policy (Infrastructure) 2007*
JIL	Jemalong Irrigation Limited
kL	Kilolitre
km	Kilometre
kV	Kilovolt
LALC	Local Aboriginal Land Council
LCA	Life Cycle Analysis
LEP	Local Environment Plan
LGA	Local Government Area
m	Metres
mm	Millimetres
ML	Megalitres
MNES	Matter of National Environmental Significance
MW	Megawatt
MWe	Megawatts electric
MWh	Megawatt hour
MWth	Megawatts thermal
NEM	National Electricity Market
NES	Matters of National environmental significance under the EPBC Act (*c.f.*)
NOW	NSW Office of Water
Noxious Weeds Act	*Noxious Weeds Act 1993* (NSW)
NPI	NSW Noise Policy Industrial
NPI	National Pollution Inventory
NPW Act	*National Parks and Wildlife Act 1974*
NPWS	National Parks and Wildlife Service
NSW	New South Wales
NV Act	*Native Vegetation Act 2003*
O&M	Operation and Maintenance
OEH	Office of Environment and Heritage (NSW)
OEMP	Operational Environmental Management Plan
pa	Per annum
PAC	Planning Assessment Commission
PBP	*Planning for Bushfire Protection Guidelines 2006*
PCT	Plant Community Type
PCU	Power Conversion Unit
POEO Act	*Protection of the Environment Operations Act 1997*
PV	Photovoltaic
PVP	Property Vegetation Plan
RAPs	Registered Aboriginal Parties
RE Act	*Renewable Energy (Electricity) Act 2000* (Commonwealth)
REP	Regional Environmental Plan
RET	Renewable Energy Target
RFS	Rural Fire Service (NSW)

RMS	Roads and Maritime Services (NSW)
RNP	Road Noise Policy
SEARs	Secretary's Environmental Assessment Requirements (DP&E)
SEPP	State Environmental Planning Policy
SHI	NSW State Heritage Inventory
SIS	Species Impact Statement
SP	Solar Plant
sp/spp	Species/multiple species
SRD SEPP	*State Environmental Planning Policy (State and Regional Development) 2011*
SSD	State Significant Development, as defined by section 89C of the EP&A Act *(c.f.)*
TEC	Threatened Ecological Community
TMP	Traffic Management Plan
TSC Act	*Threatened Species Conservation Act 1995*
VIA	Visual Impact Assessment
VLM	Visual Landscape Management
WARR Act	*Waste Avoidance and Resource Recovery Act 2001*
WHO	World Health Organisation
WM Act	*Water Management Act 2000*
WMP	Waste Management Plan
WSP	Water Sharing Plans

TABLE OF DEFINITIONS

Jemalong Hybrid Solar Park	The proposed development of a combined solar park comprising the PV Plant and the CSP Plant.
Jemalong Solar PV Plant (PV Plant)	The construction, operation and decommissioning of an approximate 50MW solar plant generally comprising a solar field, access roads, underground and above ground cables, on-site substation and associated operational facilities including the construction of a 66kV Power line from the proposed on-site substation to the existing West Jemalong Substation, as set out in this EIS.
Jemalong CSP Plant (CSP Plant)	The construction, operation and decommissioning of a 30 MW concentrating solar thermal power plant and associated infrastructure which is the subject of an existing SSD application (SSD 14_6588), as amended.
Landowner	Twynam Pastoral Co. Pty Ltd ACN [000 193 377].
Proponent	Vast Solar Pty Ltd ACN [136 258 574]
Project	The PV Plant.
Jemalong Station	17,478ha rural property located at Jemalong, Lachlan Valley Way, NSW owned by the Landowner.
Hallidays	A 165ha parcel of land within the Jemalong Station being part of Lot 13 in DP 753118.
Study Area (Biodiversity Assessment)	The area of land surveyed for the purposes of the biodiversity assessment. The Study Area includes the Development Envelope and the surrounding landscape approximately one kilometre from the boundary around the PV Plant and all the vegetation within the proposed transmission line including adjacent patches of remnant bushland
Development Envelope	The land that will be used for the construction and operation of the Project, being the land set out in the Proposal Site map provided herein this EIS, comprising parts of the following lots: Lot 13 DP753118, Lot 41 DP 753118, Lot 1 DP 652274, the land known as Naroo Lane, Lot 5 DP 1118332, lot 48 753118, Lot 1 DP 1118332, the land comprising the Cadow Channel, Lot 1 DP

	441702 and Lot 141 in DP 528344. This comprises the land required to construct the substation, the solar field, the proposed internal access tracks, and the corridor for the 66kV power line and connection to the existing West Jemalong substation. The Proposal Site has been defined in a precautionary manner, in that it is a 'worst case' area; some areas within it may not be required to be impacted during construction. This is to ensure this assessment is robust to any minor changes that may occur to the layout during the detailed design phase.
Proposal Site	This is a smaller and more in-depth area surveyed for the purposes of the biodiversity assessment and includes the Development Envelope, immediate surrounds and the area assessed for the 66kV powerline with a 45m buffer.
Contractor	Responsible for the construction of the PV Plant and will implement the requirements of the development consent, EIS, CEMP and associated management plans.
Operator	Responsible for the operation and management of the PV Plant and will implement the requirements of the development consent, EIS and OEMP and associated management plans.
Sub contractor	Construction and operation subcontractors are contractually bound to implement the development consent, EIS, CEMP, OEMP, and associated management plans provided by the Contractor and/or Operator.
West Jemalong Substation	The Essential Energy substation located at Lot 1 DP441702, located at the corner of Lachlan Valley Way and Whispering Pines Lane as identified on the Proposal Site map provided herein this EIS.

1 INTRODUCTION

1.1 BACKGROUND

The Jemalong Solar PV Plant is proposed to be constructed approximately 37km west of Forbes in the Forbes LGA. The Jemalong Solar PV Plant proposal includes the construction, operation and decommissioning of a PV solar farm and associated infrastructure that would produce up to 50 MW of electricity.

The proposal requires development consent under Part 4 of the EP&A Act. The Proposal is SSD as it is development for the purpose of electricity generating works with a capital cost of greater than $30 million (clause 20, Schedule 1 of State Environmental Planning Policy (State and Regional Development) 2011).

The EIS was prepared by NGH Environmental on behalf of Vast Solar and was submitted to DP&E on or around November 17, 2017. The EIS was placed on public exhibition from 21 November 2017 to 21 December 2017. During this period, submissions were sought from the local community, government agencies, interested parties and other stakeholders.

1.2 PURPOSE OF REPORT

This Submissions Report has been prepared by NGH Environmental on behalf of Vast Solar to fulfil the requirements of Section 75H of the EP&A Act. The purpose of the Submissions Report is to:

- Consider and respond to the issues raised in the public and agency submissions for the Jemalong PV Plant.
- Describe any changes to the Project, including a revised set of proposed mitigation measures.

2 THE PROPOSAL

2.1 PROPOSAL AS EXHIBITED

The Jemalong Solar PV Plant Project is for the construction, operation and decommissioning of a PV solar plant that would produce up to 50 MW of electricity. The Jemalong Solar PV Plant Project remains generally as per the detailed description provided in Section 4 of the EIS, with the exception of those sections outlined below. Indicative layout is shown in Figure 2-1.

Coordinates of the Jemalong Solar PV Plant are provided in Table 2-2. Unit is Universal Transverse Mercator (UTM)

Table 2-1: Coordinates of the Jemalong Soalr PV Plant

ID[1]	Longitude (E)	Latitude (S)
1	558976	6304306
2	559631	6304210
3	559580	6303854
4	561138	6303394

5	561071	6302937
6	559636	6303155
7	558732	6303291

[1] refer to Figure 2-1. for location of 'ID' reference points

2.2 PROJECT BENEFITS

The benefits of the proposed Jemalong Solar PV Plant would remain unchanged. The proposed PV Plant would provide the following benefits, specific to Australia's environmental commitments:

- Reduction in greenhouse gas emissions required to meet our energy demands.
- Assisting the transition towards cleaner electricity generation.
- Direct contribution to help in meeting the RET.
- Attract and grow expertise in renewable energy.

Additionally, the Project would allow for the provision of:

- Significant economic benefits to the region, through the creation of direct and indirect jobs, supporting small business and by developing skills in a growing industry.
- Embedded electricity generation, to supply into the Australian grid closer to the consumption centres.

2.3 INDICATIVE LAYOUT

The EIS submission to DP&E was supported by a letter from Norton Rose Fulbright on behalf of Vast Solar. The purpose of this letter was to provide DP&E with an update on the status of a separate DA (SSD 6588) for a concentrated solar thermal power (**CSP**) plant.

Vast Solar intends to develop the Jemalong Hybrid Solar Park which will comprise the CSP Plant and the Project (which is the subject of this DA).

The DA for SSD 6588 currently contemplates that the CSP Plant will be located in the Hallidays paddock, which is also the proposed location of the Project. As such, the DA for the CSP Plant (SSD 6588) will be modified to relocate the CSP Plant immediately south of Hallidays. This is however only indicative at this stage. The final layout will be determined before a modification to DA 6588 is lodged and the environmental impacts of its relocation has been properly considered as part of the modified EIS.

The current indicative location of the CSP Plant is shown in Figure 2-1, and Appendix F.

2.4 SUBDIVISION

Section 4.3 of the EIS describes the proposed subdivision layout which is being sought as part of the DA. Section 4.3 provides that:

> *The Proposal would require subdivision for lease purposes of the existing lot (Lot 13 DP 753118) (refer Figure 4.1 for indicative proposed subdivisions). Approximately 165 ha of the existing Lot 13 DP 753118 will be subdivided to provide for the PV Plant. The Proposal will require an additional subdivision also of the existing Lot 13 DP 753118 for an approximate 0.5 hectare lot, for the construction of the substation.*

Lot 13 DP 753118 will therefore be subdivided into 3 lots:

- Lot 1 approximately 165ha for the PV Plant,
- Lot 3 approximately 0.5ha for the facility connection substation
- Lot 2 will comprise of the residual land of Lot 13 in DP 753118.

The subdivision for Lot 3 comprising of the facility connection substation, is necessary to enable a transfer of that facility to an electricity network operator if required by that operator.

Vast Solar have now been informed by Essential Energy that the existing West Jemalong Substation which is located in Lot 1 in DP 441702 requires a boundary adjustment on the eastern and southern boundaries to facilitate an increase in the area of Lot 1 to approximately 0.45 hectares. Development consent is also therefore sought for the increase in size of Lot 1.

2.5 WATER ENTITLEMENTS

Authorisation is sought for the use of water and the construction of a bore as part of the development consent.

Further detail is provided in Appendix D

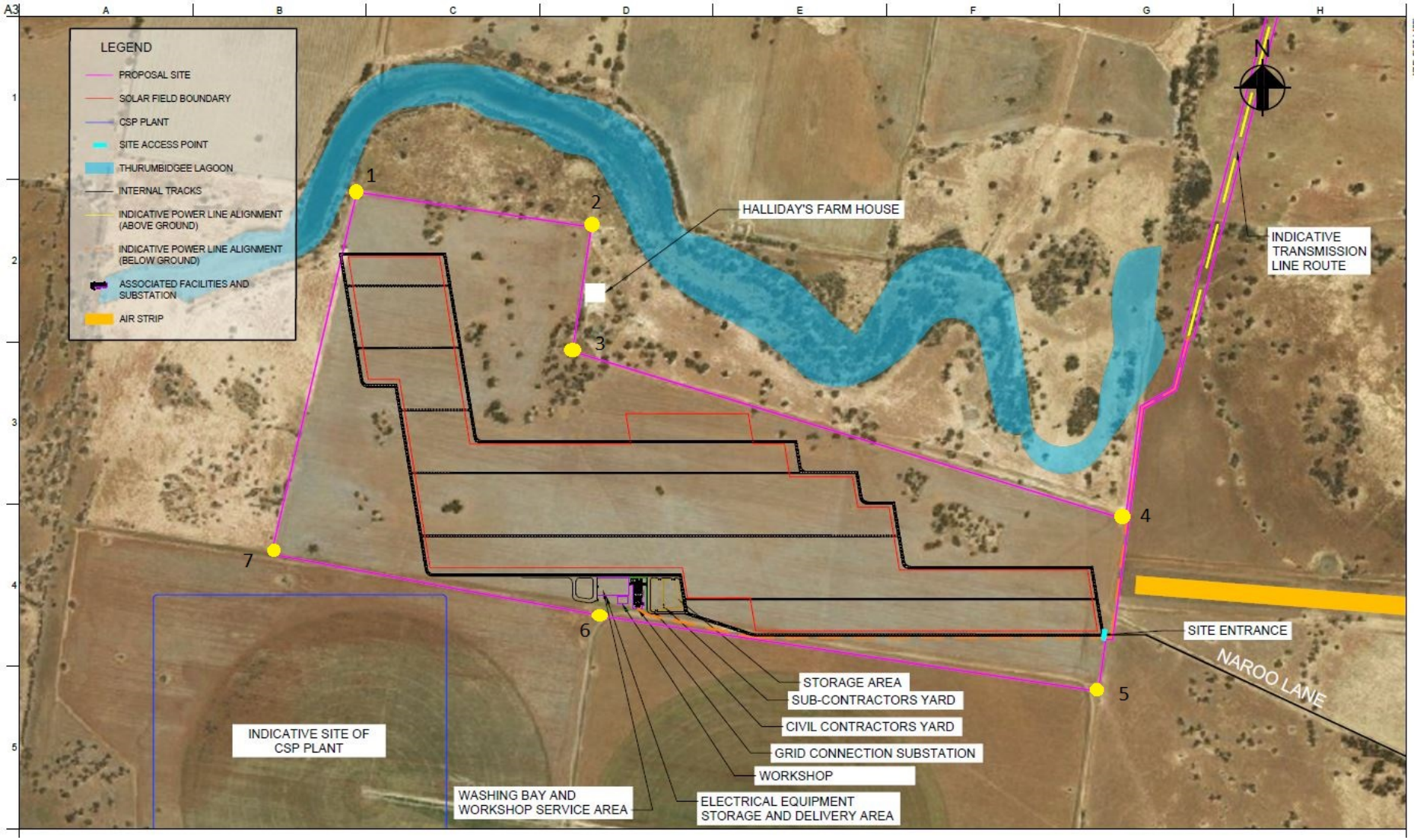

Figure 2-1 Indicative layout, as presented in the EIS.

3 CONSIDERATION OF SUBMISSIONS

3.1 EXHIBITION AND LOCATION

According to DP&E's website, the EIS was placed on public exhibition from 21 November 2017 to 21 December 2017. Printed copies of the EIS were available at the following locations during the exhibition period:

- Forbes Council, 2 Court Street
- DP&E, 320 Pitt Street, Sydney
- Electronic copies of the EIS were also available online at the Major Projects section of the DP&E website.

Local residents were notified of the exhibition period via mail. DPE also placed advertisements in the local and regional papers announcing the exhibition period.

3.2 SUBMISSIONS RECEIVED

DPE received nine (9) submissions during the exhibition period, and two additional submission were received and accepted after expiry of the exhibition period. Two submissions were received from individual members of the public and nine submissions were received from government agencies. No submissions were received from special interest groups.

The key issues raised are summarised in this document (Sections 4 and 5, respectively). The full submissions can be found on the Major Projects website:

http://majorprojects.planning.nsw.gov.au/index.pl?action=view_job&job_id=8803

Table 3-1 Responses received.

Category	Number of responses received
Total submissions	11
Individual members of the public who raised objections	2
Government agency submissions • Forbes Council • DPI • DP&E, Division of Resources and Geoscience • OEH • RFS • Fire and Rescue NSW • CASA • Airservices Australia • RMS	9

3.3 ADDITIONAL CONSULTATION

3.3.1 Government Agencies

In response to requests from RMS and Forbes Council, for additional information regarding transportation impacts in the construction phase of the Project (refer Table 5.1 and 5.8), Vast Solar engaged a specialist traffic consultant, Traffic Design Group (TDG), to undertake a "Traffic Access Assessment". The scope of this study included consultation with the RMS and Forbes Council, to discuss the details of the additional information requests. The following subsections summarise the discussion of the consultation.

Roads and Maritime Services

NGH staff met with Mr Andrew MacIntyre, in mid December 2017, to discuss and seek clarification on the issues raised by RMS. Based on these discussions, additional traffic studies and management measures have been described in this submissions report. Refer to Section 5.1, 5.8 and Appendix C.

TDG had a phone conversation with Mr. Andrew MacIntyre in early February 2018, regarding the intersection evaluation and recommended treatment options for Lachlan Valley Way/Wilbertroy Lane and Wilbertroy Lane/Naroo Lane intersections. The recommendations for the BAR/BAL (Basic Right Turn/Basic Left Turn) treatments are provided in the TDG report, Appendix C.2

Forbes Council

A senior Planning Official from Forbes Council visited Vast Solar's Pilot CSP Plant during January to inspect landscape screening plantings undertaken to screen the pilot plant from two resident houses located on Whispering Pines Lane. The Planning Official indicated they were very satisfied with the outcome achieved and the high level of resident satisfaction with the planting.

The landscape planting plan for the PV plant includes and will add further screening plantings to the planting established for the CSP Pilot plant.

4 PROPONENTS RESPONSE TO COMMUNITY SUBMISSIONS

This section considers the issues raised by the two public submissions. In both letters of objection, the comments raised relate to two issues: number of renewable energy DAs and rate of approval, and energy security and prices. These issues fall outside the remit of the Proponent and are targeted towards DP&E, other government agencies and power generation regulators at a policy level The Proponent has however provided a response to these two issues, in order to clarify the rationale that energy provision to the grid should be based on a mix of energy generation.

Note, the community members did not raise specific comments regarding the design, location, construction and operation of the Project. Nor were comments raised regarding impacts to the environment and social-economic issues. As such, **it is considered that no changes to the Project or EIS are required in response to the two community submissions.**

Table 4-1 Community submission and proponent response.

Issue	Proponent Response
Number of solar plant DAs and rate of approval	The Proponent has no control over the total number of renewable energy DAs submitted or approved by DP&E or local councils. It is one of many renewable energy developers in Australia, seeking to help the NSW government meets its target for renewable energy generation. This is a policy decision which has been set by the NSW and Australian Governments. Any submissions relating to how policy should be set or addressed is not relevant to this Project. The objective of the RET is to ensure that a portion of the total energy demanded by the NSW market and therefore supplied, is sourced from renewable energy. The total forecast for energy demand is based on predicted energy modelling by the Australia Energy Regulator. NSW has experienced an increase in commercial and industrial development, modernisation and population growth, and as a result energy demand is rising. The approval of the DAs is at the discretion of DP&E, subject to the provisions of the EP&A Act and, in particular, section 79C. In this regard, the Project generally complies with Commonwealth and NSW legislation, including EPIs. The design and operation of the Project also takes into consideration International Best Practice. The design and operation of the proposal also takes into consideration International Best Practice. In parallel to the planning approval process, Vast Solar liaises with Essential Energy and AEMO to ensure that the design of the Project meets all required grid standards. **No changes to the Project or EIS are required in response to this submission.**
Energy Security and Prices	A number of Australian coal plants are getting close to or have exceeded their expected lifespans, leading to the need for closure. Retired coal capacity means that the national electricity grid must connect new generators to meet NSW demand. Taking into account economic as well as environmental impact, renewable energy, and solar energy in particular, has a major role to play in

	providing a long-term alternative to coal power stations. Current total energy supply in NSW is 18,738MW, of this 236MW are supplied by solar and 610MW supplied by wind. This represents 1.26% and 3.25% respectively of the total power supply. The amount of power supplied by water (hydropower) is 4,644MW (24.7% of total supply). The remainder (70.79%) of the power is being supplied by coal, diesel, natural gas, coal waste, bagasse, black liquor, and landfill gas. (DP&E, Resource and Energy division. Website visited January 2018). Based on such proportions of supply, the presence of solar and wind in the power mix does not threaten the current security of power supply. Furthermore, major research organisations such as the CSIRO and Australian National University, believe that one hundred percent renewable energy future is technically achievable, with storage systems (battery and solar thermal) and smart grids expected to play a major role in allowing very high renewable energy penetration. Regardless of whether renewable energy projects are constructed in response to the Federal Governments Renewable Energy Target, any adverse impact to electricity prices as a result of this policy will occur as liable entities (electricity users) are required to either procure sufficient Largescale Generation Certificates (LGC) to achieve the RET or pay a penalty rate for any shortfall. Construction of renewable energy generators realises LGC's at a cost lower than the legislated penalty. As such, this Project and similar projects like this across Australia are being constructed as a direct result of the Commonwealth Government's policy on renewable energy, and the market demand that is generated as a result. It is therefore in the public interest for DP&E to approve projects which directly support the Commonwealth's policy position. **No changes to the Project or EIS are required in response to this submission**.

5 PROPONENTS RESPONSE TO GOVERNMENT AGENCY SUBMISSIONS

5.1 FORBES SHIRE COUNCIL

Table 5-1 Forbes Council submission and proponent response.

Comment and Recommendation	Proponent Response
Road Network	
The application indicates that during the construction phase, up to 100 workers will be on site during this phase which would generate up to three bus trips and between 10-20 light vehicle trips a day. This estimation is on the assumption that there would be an 80% take up of construction workers being transported to the site via buses. In any scenario there would be a substantial increase in not only	The EIS currently provides that "Wilbertroy Lane, Naroo Lane and internal access tracks would remain unsealed but may be re-sheeted with gravel to maintain their condition during the construction phase" (section 9.5.2, page 157). Further consultation has been undertaken with RMS to address the issue of road condition and improvement measures. Results of the consultation are discussed in

Comment and Recommendation	Proponent Response
transportation of construction workers to the site during the 12-month construction phase but also the increase in heavy ridged vehicles transporting construction materials and products to the site. The increased generation of trips along the unsealed roads of Wilbertroy Lane and Naroo Lane during the construction, operation and decommissioning phase will substantially impact on the quality of these roads. Not only will there be an impact on the quality of the road, but both Wilbertroy Lane and Naroo Lane are only narrow formations (4m) roads and were not designed for the traffic volumes or vehicle types proposed to be using these roads as a part of this project. Therefore, there is likely to be road safety implications during the construction phase of this project. Given the road safety implications generated from the Vast Solar project it is recommended that the Wilbertroy Lane and Naroo Lane are widened and sealed to ameliorate any impacts on road safety.	Section 3.3 TDG was engaged to undertake a Traffic Access Assessment of construction and operation traffic from the Project. The report is provided in Appendix C.2. The Report found that: • The *Unsealed Roads Manual: Guidelines to Good Practice*, dated March 2009, notes that the average traffic for gravel roads usually varies between 20 and 200 vehicles per day. • Naroo Lane and Wilbertroy Lane are estimated to currently accommodate 20 vehicle movements per day, which would increase to 170 vehicle movements per day during peak. Therefore, the traffic volumes will remain within the acceptable levels. • Given the expected traffic along Wilbertroy Lane and Naroo Lane during construction, it is concluded that the unsealed surface of the roads is suitable to accommodate the future traffic volumes, and the roads do not require sealing. The recommendations of the Report include: • Wilbertroy Lane is 7.0metres allowing for simultaneous two-way movement. It is recommended that a minimum of 7.0m width is maintained. • Naroo Lane is 4.0metres and accommodates two-way movement. Widening of the lane is not necessary, options to control one-way movement of construction traffic, such as traffic controllers, traffic signals or providing passing facilities at appropriate intervals should be explored for the preparation of the construction Traffic Management Plan (TMP). These recommendations will be incorporated in the requirements of the Traffic Management Plan for construction, operation and decommissioning.
Flooding of the Road Network	
The road network proposed to access the site (Lachlan Valley Way, Wilbertroy Lane and Naroo Lane) will be inundated in a flood event as this road network is within identified flood prone land. This road network does not provide sufficient drainage to ensure that the network	Vast Solar acknowledges the PV Solar Plant will not be accessible, when Lachlan Valley Way, Wilbertroy Lane and Naroo Lane are impassable as a result of flooding. The mitigation measure for the development of a Flood Response Plan will include the recommendation to include an access contingency plan that addresses the

Comment and Recommendation	Proponent Response
can cope with the funnelling of flood water away from the road and therefore this network is likely to be closed during a flood event. There is no alternative access to the site during a flood event. A contingency plan for access during these times should be developed.	procedures and options for safe access to the site, if this is deemed necessary in the event of flooding on these roads.
Flooding in relation to structures	
The proposed development is located on flood-liable land. Any structures located within the floodway should be designed to be capable of withstanding flood waters and debris which may impact on the structures.	Section 8.4, page 121 has identified the following design and construction measures to prevent damage to the solar plant: • The design of buildings and equipment foundations would consider the potential for flooding at the Proposal Site, and will be finalised by the EPC Contractor. • PV modules in flood prone areas of the Project Site would be installed on modules of 3 to 3.5m high • Earthen pads to be constructed for PCU's • Critical infrastructure to be located in site locations that are not subject to flooding, 1/25-year event • Use the cut-fill balance from the Project Site's grading program to elevate ground levels in flood prone area of the Project Site. We suggest that the above requirements can be dealt with by way of a condition of development consent. These requirements will also be included in the Proponent's statement of commitments. **No changes to the Project or EIS are required in response to this comment.**
Accommodation of workers	
The application indicates that during construction period, there would be up to 100 workers living in Forbes and Parkes who would be transported to the site. The EIS specifies that the workers will be locals, however this is the best-case scenario. The Environmental Impact Statement does not discuss how they will accommodate 100 workers where the workforce does not consist of locals. Whilst there would be significant economic benefits to both Forbes and Parkes through the increased population during the construction stage, there may be issues in obtaining accommodation within Forbes and Parkes given the tight rental	Please refer to Appendix E Housing and Accommodation

Comment and Recommendation	Proponent Response
markets. Information has not been provided in relation to how the 100 workers would be accommodated.	
Tourist Attraction	
The application states that the site may become a tourist attraction in a similar manner to the Parkes Radio Telescope. Council would encourage the development of the site as a tourist and education facility. Suitable areas for tourist facilities and parking should be considered in the development of the site.	Although, the area allocated for the administration buildings as part of the Project is not sufficient to accommodate additional facilities for large groups of visitors. There is scope to schedule visits for small groups and schools. Through the community engagement plan and Vast Solar website, interested groups and schools would be able to coordinate scheduled visits to the PV Plant. Additionally, Vast Solar proposes to maintain a forum on their website which would provide information on the design and construction of the PV Plant, and statistics on PV Plant performance during operation. Vast Solar would consult with the education establishments to identify the information that could be provided on the website. **No changes to the Project or EIS are required in response to this comment**.
Water Supply	
Details would need to be provided of how a potable water supply will be provided to the site during the construction and operation stages.	Volumes, source, supply and storage of potable water for construction and operation is reported in Table D1, of Appendix D of this Response to Submissions Report. **No changes to the Project or EIS are required in response to this comment**.
Onsite Disposal of Effluent	
Details of the onsite waste treatment facilities for effluent would need to be provided, indicating their suitability to cater for the expected 100 workers during construction stage, and how this facility would operate once the solar plant is operational.	Volumes and storage of wastewater for construction and operation is reported in Table D1, of Appendix D. **No changes to the Project or EIS are required in response to this comment**.
Stormwater	
The site should be graded to enable stormwater to flow to the stormwater control ponds.	Section 8.4.4, page 116 states "*The design of the PV Plant includes the construction of surface drainage structures in association with roads and buildings at the site. A Site Drainage Plan covering the construction and*

Comment and Recommendation	Proponent Response
	operation phases would be developed prior to commencement of works (refer Section 9.2)". Mitigation measure in Section 9.1.3, page 125 state the two following measures: "A CEMP would be implemented to manage runoff, soil erosion and sedimentation and pollution risks at the site. The CEMP would be prepared in accordance with the 'Blue Book' Volume 1 Managing Urban Stormwater: Soils and Construction (Landcom 2004), Volume 2A Installation of Services (DECC 2008a) and Volume 2C Unsealed Roads (DECC 2008b). *As part of the CEMP, a Soil and Water Management Plan (incorporating a Site Drainage Plan and Erosion and Sediment Control Plan) would be prepared".* We suggest that the above requirements can be dealt with by way of a condition of development consent. These requirements will also be included in the Proponent's statement of commitments. **No changes to the Project or EIS are required in response to this comment**.
Erosion and Sedimentation Control	
Erosion and sedimentation control should be installed during construction period.	Please refer to previous response "Stormwater" The CEMP will include measures to manage erosion and sediment control during the construction period. We suggest that the above requirements can be dealt with by way of a condition of development consent. These requirements will also be included in the Proponent's statement of commitments. **No changes to the Project or EIS are required in response to this comment.**
Flora and Fauna	
Any fauna encountered onsite during construction period should be rehomed.	The EIS provides a number of safeguards including a commitment to: • Undertake pre-clearing surveys to assess if active nests are present or hollows being utilised • Prepare an unexpected threatened species finds procedure • Undertaking pre-clearing inspection by a qualified ecologist and

Comment and Recommendation	Proponent Response
	• Undertaken clearing in a manner that would minimise risk during felling to fauna. We suggest that the above requirements can be dealt with by way of a condition of development consent. These requirements will also be included in the Proponent's statement of commitments. **No changes to the Project or EIS are required in response to this comment.**
Landscaping Buffers	
Landscaping buffers should be provided so as to assist with screening of the solar plant from the dwellings in Whispering Pines Lane.	Provision for vegetation screening along Whispering Pines lane has been confirmed following consultation with the landowner adjacent to Whispering Pines Lane. In this regard, the screen planting plan provided in Appendix F, shows a row of trees will be planted to screen views of the PV plant for this resident. The proposed mitigation measures are proposed after consultation with this resident, who has approved and is satisfied with these measures. Furthermore, mitigation measures in Section 8.3.4, page 111 states: A Visual Verification Report and Landscape Plan would finalise the location and species for proposed screening, in consultation with nearest affected landholders. We suggest that the above requirements can be dealt with by way of a condition of development consent. These requirements will also be included in the Proponent's statement of commitments. **No changes to the Project or EIS are required in response to this comment**.
Site Remediation / Validation	
Following the decommissioning of the plant, the site should be remediated and validated, given the chemicals stored on the site.	An additional mitigation measure in the DEMP will be added to ensure that a Phase 1 site assessment for the potential presence of contaminated soils is undertaken immediately prior to decommissioning. This Phase 1 site assessment will be carried out where any minor environment incidents have occurred (for example, spills) during the operation of the PV Plant. This is because, during the operation of the PV Plant, there may be minor environmental incidents which occur (although these incidents will be remediated as and when they occur as part of the OEMP requirements). When the PV Plant is decommissioned, a review process will be undertaken of all

Comment and Recommendation	Proponent Response
	the operational documentation, and if any environmental incidents are found to have caused any soil contamination, a Phase 1 study may be required. Based on the recommendations of the Phase 1 site assessment, a Phase 2 assessment would be carried out to confirm the extent and nature of contamination, and to identify the procedures to remediate the contaminated area. The EPC engaged to undertake the decommissioning of the plant will implement the remediation procedure and provide validation.
Construction waste management	
The EIS specifies that the construction waste would be disposed at a licensed waste facility and that a Waste Management Plan would be development to minimise waste. The Waste Management Plan would include opportunities strategies to avoid, reuse and recycle waste. The closest licensed facility is Daroobalgie landfill and the rural landfills are reaching capacity and cannot accommodate the level of construction waste proposed to be generated from the site. It is therefore imperative for any Waste Management Plan prepared for the project to ensure that the maximum amount of construction waste is reused and recycled.	The mitigation measure for a Waste Management Plan, as stated in Section 9.11, page 197 of the EIS will include a provision to maximise the amount of construction waste that is re-used and recycled. We suggest that the above requirements can be dealt with by way of a condition of development consent. These requirements will also be included in the Proponent's statement of commitments. **No changes to the Project or EIS are required in response to this comment.**

5.2 NSW DEPARTMENT OF INDUSTRY (DPI)

Table 5-2 NSW DPI submission and proponent response.

Comment and Recommendation	Proponent Response
The proponent should ensure that the site is still used for agricultural purposes as part of the land management regime.	The development footprint of the Project is approximately 187ha, whilst Jemalong Station covers an approximate area of 17,478ha. The Proposal Site for the Project has been selected based on several suitability criteria including constructability, operational efficiency, and cost trade off from modification of the land use. Given that the project site represents only 1% of the total agricultural land at Jemalong Station, using the site primarily for energy production would not have a notable impact on the overall land management regime of Jemalong Station nor its

Comment and Recommendation	Proponent Response
	productivity. Income from the operation of the Project would improve farm income and would reduce impact of seasons of low productivity (eg. as occurs during periods of drought). In addition, upon decommissioning of the PV Plant, the land use of the Proposal Site will revert back to agricultural uses. We suggest that the above requirements can be dealt with by way of a condition of development consent. These requirements will also be included in the Proponent's statement of commitments. **No changes to the Project or EIS are required in response to this submission**
Any underground infrastructure should be buried at a depth greater than 800mm to allow greater opportunity for agricultural activities to continue, particularly for infrastructure that is to remain buried after decommissioning and rehabilitation.	During the Lifecyle of the PV Plant, the Proposal Site will be primarily used for energy production. As such, no disturbance to the soils beyond the top 200mm is anticipated in the operation phase. With regards to decommissioning, the EIS states the following: • Section 4.4.3, page 39 Underground cabling states that the minimum installation depth would be 500mm, with high voltage cables installed at 800mm. Cables would be protected in accordance with AS 3000. • Section 4.7, page 50 states "All underground infrastructure would be removed to a depth of 500mm." Decommissioning is not likely to occur before 30 years, and the type of agricultural activity that would be implemented at the Proposal Site cannot be determined at this time. As such, it is proposed that at the decommissioning planning stage, the requirement to remove services to a depth of 800mm would be assessed based on the identified future land use of the site. Any services that are not removed, would be mapped and communicated to the future landholder. We suggest that the above requirements can be dealt with by way of a condition of development consent. These requirements will also be included in the Proponent's statement of commitments. **No changes to the Project or EIS are required in response to this submission**
The final design criteria of the final land use should consider the soil and land capability of the site (Class 3), agricultural productivity (such as yield) and other indicators from land capability and soil testing to guide the return of the land back to full agricultural production. The final soil and land classification for the site should	An additional mitigation measure will be added that specifies: As part of the decommissioning process and in the preparation of the DEMP, the soil rehabilitation plan for the site will consider the soil and land capability of the site (Class 3), agricultural productivity (such as yield) and other indicators from land

Comment and Recommendation	Proponent Response
be equal to or better than the existing capability after rehabilitation.	capability and soil testing to ensure that the final soil and land classification of the site is equal to or better than existing capability. We suggest that the above requirements can be dealt with by way of a condition of development consent. These requirements will also be included in the Proponent's statement of commitments.
The proponent should clarify whether the licensing of the proposed use of water from irrigation channels under "landowners farm rights" is associated with an existing licensed entitlement or a water right associated with the landholding.	Please refer to Appendix D Section D.3 Water Licensing
The proponent should confirm an agreement to access the necessary water supplies and volumes.	Please refer to Appendix D Section D.3 Water Licensing
The proponent should provide further flood assessment to confirm the impacts of internal and external road infrastructure, and PV infrastructure installation at the site on the flood characteristics. This assessment should consider the requirements of the Floodplain Management Plan: Lachlan River: Jemalong Gap to Condobolin.	The results of the flood impact assessment revealed that the bulk of the site would not be impacted by flooding. Only the western portion of the PV Plant would be affected by a maximum predicted level of 0.5m water depth. In the event of a 1 in 25y flood event, higher velocity waters will not encroach into the PV plant site and will only be restricted to the lagoon. Consequently, scouring and erosion is highly unlikely at the Site and the PV Plant, and risk of damage to plant infrastructure is low, given the low velocities of flood water. Equally, as noted on page 114 of the EIS, an existing levee which follows the existing 1978 Guideline (WRC 1978) is present, and a second FMP approved levee located on Jemalong Station (Approval 70CW808642, converted to 70FW615691 in 1999) has also been constructed and is now well established with vegetation. Refer to figure 8-4 of the EIS, page 115. **No changes to the Project or EIS are required in response to this comment**.
Any approval of the project should include a condition of consent requiring that a Soil and Water Management Plan be developed in consultation with Crown lands & Water (water.referrals@dpi.nsw .gov.au).	An additional mitigation measure will be added that specifies: A Water Management Plan will be developed for the Operational phase of the Solar PV Plant. The plan will be prepared in consultation with Crown lands & Water (water.referrals@dpi.nsw .gov.au). We suggest that the above requirements can be dealt with by way of a condition of development consent. These requirements will also be included in the Proponent's

Comment and Recommendation	Proponent Response
	statement of commitments. **No changes to the Project or EIS are required in response to this submission**

5.3 NSW DIVISION OF RESOURCES AND GEOSCIENCE

Table 5-3 NSW Resources and Geoscience submission and proponent response.

Comment and Recommendation	Proponent Response
The proponent has addressed mining, exploration and minerals in the EIS, and has reviewed DRG online MinView database and Common Ground Viewer, successfully identifying that there are no mining or exploration titles, or application indicated over or in the vicinity of the Project site (Refer to page 61 of the EIS).	Noted. **No changes to the Project or EIS are required in response to this comment**
GSNSW notes that an assessment of current available data confirms that at this stage of the Project, here are no current mineral, coal or petroleum titles or applications, or extractive industries in the vicinity of the project site. Accordingly, GSNSW are satisfied the proponent has addressed the Divisions specific requirements and have no resource sterilisation concerns with the Project at this stage.	Noted. **No changes to the Project or EIS are required in response to this comment.**
Should biodiversity offsets be considered for this project, GSNSW requests consultation to ensure there are no potential sterilisation impacts to resources.	Vast Solar appreciates the input from GSNSW. An additional mitigation measure will be added to consult with GSNSW to ensure there are no potential sterilisation impacts to resources. We suggest that the above requirements can be dealt with by way of a condition of development consent. These requirements will also be included in the Proponent's statement of commitments. **No changes to the Project or EIS are required in response to this comment**

5.4 NSW OFFICE OF ENVIRONMENT AND HERITAGE (OEH)

Table 5-4 NSW OEH submission and proponent response.

Comment and Recommendation	Proponent Response
OEH notes that 0.84 hectares of native vegetation removal is now proposed at the site. OEH acknowledges and welcomes the reduction in impact with the proposed amendments to the transmission line route.	Noted **No changes to the Project or EIS are required in response to this comment.**
Appendix E of the EIS provides contradictory statements as to whether all remnant woodland patches within the solar array area have been avoided (page 47). As a result, OEH assumes that 0.21 ha of native vegetation will be cleared within the power plant area, and that the inability to avoid this clearing of remnant woodland is due to the new panel design footprint which has been arranged to avoid larger remnant woodland patches around the perimeter.	Yes, this is correct, .21 ha of native vegetation will be cleared **No changes to the Project or EIS are required in response to this comment.**
The EIS states that an offset will be established within two years of the commencement of construction. Given the small impact area and the commitment to either acquire or retire credits under the *Biodiversity Conservation Act 2016* or make payments into the Biodiversity Conservation Fund (BCF), OEH is of the view that acquittal of the credit requirement should be achieved in a shorter timeframe. OEH recommend that the Biodiversity Conservation Trust is contacted to discuss the most appropriate trigger (submission / application / payment) to be included in any associated consent condition relating to payment into the fund.	Vast Solar appreciates the input from OEH. An additional mitigation measure will be added to consult with the Biodiversity Conservation Trust to discuss the most appropriate mechanism for offsetting the residual impacts. We suggest that the above requirements can be dealt with by way of a condition of development consent. These requirements will also be included in the Proponent's statement of commitments. **No changes to the Project or EIS are required in response to this comment**

5.5 NSW RURAL FIRE SERVICE (RFS)

Table 5-5 NSW RFS submission and proponent response.

Comment and Recommendation	Proponent Response
A Fire Management Plan (FMP) shall be prepared for the proposed facility in consultation with the local NSW RFS District Office. The FMP shall include: • 24 hour emergency contact details including alternative telephone contact • site infrastructure plan	The Fire Management Plan, which is included in the table of mitigation measures in Section 9.7 will also include the listed recommendations. We suggest that the above requirements can be dealt with by way of a condition of development consent. These requirements will also be included in the Proponent's

• firefighting water supply plan • site access and internal road plan • construction of asset protection zones and their continued maintenance • location of hazards (physical, chemical and electrical) that will impact on the firefighting operations and procedures to manage identified hazards during the firefighting operations • such additional matters as required by the NSW RFS District Office.	statement of commitments. **No changes to the Project or EIS are required in response to this submission**
The entire solar array development footprint shall be managed as an asset protection zone as outlined within section 4.1.3 of Planning for Bush Fire Protection 2006 and the NSW RFS document Standards for asset protection zones.	The design and construction of the Solar PV Plant will take into consideration the Planning for Bush Fire Protection 2006 and the NSW RFS document Standards for asset protection zones. development consent. These requirements will also be included in the Proponent's statement of commitments. **No changes to the Project or EIS are required in response to this submission**
A 10-metre defendable space, managed as an asset protection zone, shall be provided around the perimeter of the solar array development site to allow for emergency service personnel to undertake property protection activities.	The design and construction of the Solar PV Plant will include a 10-metre defendable space, managed as an asset protection zone. We suggest that the above requirements can be dealt with by way of a condition of development consent. These requirements will also be included in the Proponent's statement of commitments. **No changes to the Project or EIS are required in response to this submission**
A 20,000-litre water supply (tank) fitted with a 65mm Storz fitting shall be located adjoining the internal property access road within the required asset protection zone.	This requirement is stated in Section 9.7.1, page 174 "Fire-fighting resources and preparedness" "A steel or concrete water storage tank would be installed adjoining the main internal access road for fire-fighting and other non-potable water uses, with a 65 mm Storz outlet, a metal valve and a minimum of 20,000 litres reserved for fire-fighting purposes." With the inclusion of the additional mitigation measures stated above, regarding the asset protection zone, further clarification is not required. We suggest that the above requirements can be dealt with by way of a condition of development consent. These requirements will also be included in the Proponent's statement of commitments. **No changes to the Project or EIS are required in response to this submission**

5.6 NSW FIRE AND RESCUE

Table 5-6 Fire and Rescue NSW submission and proponent response.

Comment and Recommendation	Proponent Response
That a comprehensive ERP is developed for the site.	An Emergency Response Plan (ERP) will be developed, prior to operation of the Solar PV Plant. The ERP will include: • Risk of foreseeable on-site and off-site fire event and other emergency incidents (e.g. fires involving solar panel arrays, bushfires in the immediate vicinity or potential hazmat incidents). • Detailed risk control measures that would be implemented to mitigate potential risk to health, and safety of firefighters and other first responders (including electrical hazards). • Measures would include: o level of personal protective clothing required to be worn o minimum level of respiratory protection required o decontamination procedures o minimum evacuation zone distances o safe method of shutting down and isolating the photovoltaic system (either in its entirety or partially, as determined by risk assessment). We suggest that the above requirements can be dealt with by way of a condition of development consent. These requirements will also be included in the Proponent's statement of commitments. **No changes to the Project or EIS are required in response to this submission**
That the ERP specifically addresses foreseeable on-site and off-site fire events and other emergency incidents, (e.g. fires involving solar panel arrays, bushfires in the immediate vicinity or potential hazmat incidents).	
That the ERP detail the appropriate risk control measures that would need to be implemented to safely mitigate potential risks to the health and safety of firefighters and other first responders (including electrical hazards). Such measures would include the level of personal protective clothing required to be worn, the minimum level of respiratory protection required, decontamination procedures, minimum evacuation zone distances and a safe method of shutting down and isolating the photovoltaic system (either in its entirety or partially, as determined by risk assessment).	
Other risk control measures that may need to be implemented in a fire emergency due to any unique hazards specific to the site should also be included in the ERP.	
That two copies of the ERP (detailed in recommendation 1 above) be stored in an 'Emergency Information Cabinet' located in a prominent position directly adjacent to the site's main entry point/s.	
Once constructed and prior to operation, that the operator of the facility contacts the relevant local emergency management committee (LEMC). The LEMC is a committee established under Section 28 of the State Emergency and Rescue Management Act 1989. LEMCs are required to be established so that emergency services organisations and other government agencies can proactively develop	Vast Solar will contact the relevant LEMC, upon start of construction and prior to operation of the Solar PV Plant, in order to ensure that the LEMC can develop comprehensive inter agency local emergency procedures for significant hazardous sites within their local government area. We suggest that the above requirements can be dealt with by way of a

comprehensive inter agency local emergency procedures for significant hazardous sites within their local government area. The contact details of members of the LEMC can be obtained from the relevant local council.	condition of development consent. These requirements will also be included in the Proponent's statement of commitments. **No changes to the Project or EIS are required in response to this submission**

5.7 CIVIL AVIATION SAFETY AUTHORITY

Table 5-7 CASA submission and proponent response.

Comment and Recommendation	Proponent Response
CASA is aware that modern solar panels are designed to absorb light, and not to reflect it. The solar farm is sufficiently distant from Forbes Aerodrome to not be of concern. The small airstrip immediately adjacent the solar farm is not subject to CASA regulation and CASA can only provide advice on potential impact.	Noted
It is possible that pilots using the private strip could be negatively impacted by the solar farm due to low level after image glare from the panels when they are rotated towards the east in early morning and also in the late afternoon when the panels are rotated towards the west. There is also the potential for turbulence to be created by convection currents created by the panels (p168 EIS) which could negatively impact aircraft operations to and from the airstrip. Given that there are only approximately two flights per year to and from this private strip (p167 EIS) the level of risk is low, and it remains the pilots responsibility to ensure that he / she is aware of the risks associated with flying near the solar farm and takes measures to reduce that risk.	The design and manufacture of the proposed panels used for the PV Plant include an anti-reflective coating. We suggest that the above requirements can be dealt with by way of a condition of development consent. These requirements will also be included in the Proponent's statement of commitments. **No changes to the Project or EIS are required in response to this comment.**
CASA has no objection to the proposal on the condition that the panels are treated with an anti- reflective coating. The owners of the airstrip should also be advised of the potential risks described above so that aircraft operators using the strip can be advised of those potential risks	Noted

5.8 AIRSERVICES AUSTRALIA

Table 5-8 Airservices Australia submission and proponent response.

Comment and Recommendation	Proponent Response
Airspace Procedures With respect to procedures designed by Airservices in accordance with ICAO PANS-OPS and Document 9905, at a maximum height of 226m (742ft) AHD the Jemalong solar farm will not affect any sector or circling altitude, nor any instrument approach or departure procedure at any Airport. Note that procedures not designed by Airservices were not considered in this assessment.	Noted **No changes to the Project or EIS are required in response to this comment.**
Communications/Navigation/Surveillance (CNS) Facilities This development to a maximum height of 226m (742ft) AHD will not adversely impact the performance of Precision/Non-Precision Nav Aids, HF/VHF Comms, A-SMGCS, Radar, PRM, ADS-B, WAM or Satellite/Links.	Noted **No changes to the Project or EIS are required in response to this comment.**

5.9 NSW TRANSPORT, ROADS AND MARITIME SERVICES (RMS)

Table 5-9 RMS submission and proponent response.

Comment and Recommendation	Proponent Response
The EIS lacks detail in relation to construction staff commuter traffic generated by the project	Please refer to Appendix C, Section C.1.Construction traffic and carpooling
The EIS lacks detail in relation to existing road and intersection treatments	Please refer to Appendix C, Section C.2 TDG Traffic Access Assessment
The EIS lacks detail in relation to how traffic will be managed to provide a high level of safety for all road users during construction and operation	Section 9.5.2 Potential Impacts discusses the traffic risks to local roads users during the construction and operation period and describes measures that will be implemented to minimise the risks, such as increased signage and community notification, driver safety induction by the proponent, timing the delivery of large equipment outside of peak commuter traffic hours, developing a Traffic Management Plan and other measures listed in Table 9.16 of Section 9.5 in the EIS. NGH staff consulted with Mr. MacIntyre in mid-December 2017, regarding the comments

	raised, and propose the following additional traffic management measures: • Invite RMS Education Staff to provide information, guidance and discussion on fatigue management and road safety. • Contractor management team, staff and proponent management team and staff will be required to participate, based on RMS education staff agenda. • The Traffic Management Plan will include management measures that consider the risk of collisions/accidents resulting from fatigue on both the daily commute and the weekend departure/return to the workers place of origin.
The assumption that 80% of construction staff will be transported to and from site each day by bus has not been substantiated	Please refer to Appendix C, Section C.1. Construction traffic and carpooling
Should the assumed 80% target not be met, no detail has been provided detailing how the proponent will manage the safe transportation of staff to and from site in the event of this target not being met	Please refer to Appendix C, Section C.1. Construction traffic and carpooling

6 ENVIRONMENTAL MANAGEMENT CHANGES

In summary, the following additional mitigation strategies are proposed, as detailed in Sections 4, 5 and the Appendices.

Table 6-1 Additional Mitigation Measures.

Issue	Safeguard and Mitigation Measures	Development Phase
Biodiversity	Prior to implementation of Biodiversity Offsets, consult with GSNSW to ensure there are no potential sterilisation impacts to resources.	Construction
Biodiversity	Consult with the Biodiversity Conservation Trust to discuss the most appropriate mechanism for offsetting the residual impacts.	Construction
Soils and Landforms	The DEMP's soil rehabilitation plan for the site will consider the soil and land capability of the site (Class 3), agricultural productivity (such as yield) and other indicators from land capability and soil testing to ensure that the final soil and land classification of the site is equal to or better than existing capability. This has been added as a mitigation measure in Section 6 of this Submission.	Decommissioning
Soils and Landforms	The DEMP will consider the requirement for a Phase 1 site assessment to identify the potential presence of contaminated soils during the decommissioning phase. Based on the recommendations of the Phase 1 site assessment, a Phase 2 assessment would be carried out to confirm the extent and nature of contamination, and to identify the procedures to remediate the contaminated area. The EPC engaged to undertake the decommissioning of the plant will implement the remediation procedure and provide validation.	Decommissioning
Soils and Landforms	During the decommissioning planning stage, the requirement to remove services to a depth of 800mm would be assessed based on the identified future land use of the site. Any services that are not removed, would be mapped and communicated to the future landholder.	Decommissioning
Water Use and Water Quality	Prepare a Water Management Plan for the Operational phase of the Solar PV Plant. The plan should be prepared in consultation with Crown lands & Water (water.referrals@dpi.nsw .gov.au).	Operation
Socio Economic	Develop a Housing and Accommodation Action Plan (HAAP) for the construction phase (Refer Appendix E). It is recommended that the HAPP include the following actions: • Establish point of contacts between the Project Manager and key LGA stakeholder • Maintain a record of the locally available long term and short-term accommodation facilities in the locality • Ensure that non-local workers are provided with this list of accommodation • Maintain records of the number of workers, type of accommodation and location of accommodation being used • Respond and act upon community complaints to help resolve any conflicts • Update the record every quarter	Pre-construction Construction

	• Provide the updated record to the LGAs, every quarter	
Traffic and Transport	• Ensure the length of Wilbertroy Lane utilised to access the solar farm be maintained at a minimum width of 7.0 metres to allow two trucks to pass, excluding the Cadow Channel crossing which is expected to continue to operate in an acceptable manner given its short length and the low traffic volumes along Wilbertroy Lane. • One of 3 options to control one-way movement of construction traffic, such as traffic controllers, traffic signals or providing passing facilities at appropriate intervals should be explored for Naroo Lane, between Wilbertroy Lane and the site access to manage the movement of trucks along this length of road. • Neighbours of the solar farm be consulted and notified regarding the timing of major deliveries which may require additional traffic control and disrupt access.	Pre-construction Construction
Traffic and Transport	• Invite RMS Education Staff to provide information, guidance and discussion on fatigue management and road safety. • Contractor management team, staff and proponent management team and staff will be required to participate, based on RMS education staff agenda.	
Hazards	The Emergency Response Plan (ERP) that will be developed prior to operation of the Solar PV Plant will include: • Risk of foreseeable on-site and off-site fire event and other emergency incidents (e.g. fires involving solar panel arrays, bushfires in the immediate vicinity or potential hazmat incidents). • Detailed risk control measures that would be implemented to mitigate potential risk to health, and safety of firefighters and other first responders (including electrical hazards). • Measures would include: o level of personal protective clothing required to be worn o minimum level of respiratory protection required o decontamination procedures o minimum evacuation zone distances o safe method of shutting down and isolating the photovoltaic system (either in its entirety or partially, as determined by risk assessment).	Prior to Operations Commencing
Fire and Bushfire Issues	Contact the relevant Local Emergency Management Committee (LEMC), upon start of construction and prior to operation of the Solar PV Plant in order to ensure that the LEMC can develop comprehensive inter agency local emergency procedures for significant hazardous sites within their local government area.	Prior to Operations Commencing
Fire and Bushfire Issues	The design and construction of the Solar PV Plant will take into consideration the Planning for Bush Fire Protection 2006 and the NSW RFS document Standards for asset protection zones.	Prior to Operations Commencing

The following mitigation measure have been revised based on the submissions presented in Section 4, 5 and the appendices of this submissions report.

Table 6-2 Revised Mitigation Measures.

Issue	Safeguard and Mitigation Measures	Development Phase
Traffic and Transport	A Traffic Management Plan (TMP) would be developed as part of the CEMP and DEMP, in consultation with Forbes Council and Roads and Maritime Services. The plan would include: • confirmation of designated routes for construction and haulage traffic • evaluation of any road or intersection upgrade requirements and associated traffic controls, in consultation with Forbes Council and Roads and Maritime Services (and consistent with Austroads Guides and Roads and Maritime Services supplements) • scheduling of deliveries • carpooling/shuttle bus arrangements to minimise staff vehicle movements • consultation and notification arrangements regarding traffic impacts for nearby residents and local road users, particularly when traffic delays are expected • arrangements and locations for traffic controls (speed limits, signage, stop/go) • procedure to monitor traffic impacts and adapt controls (where required) to reduce the impacts • provision of a contact phone number for stakeholders and the public to obtain information and to enable rapid response to any issues or concerns • assessment of road condition prior to construction on all local roads that would be utilised, and a road condition monitoring program • avoiding use of Naroo Lane and Wilbertroy Lane during floods or after heavy periods of rain. • management measures that consider the risk of collisions/accidents resulting from fatigue on both the daily commute and the weekend departure/return to the workers place of origin.	
Fire and Bushfire Issues	The Fire Management Plan, which is included in the table of mitigation measures in Section 9.7 will also include: • 24-hour emergency contact details including alternative telephone contact • site infrastructure plan • firefighting water supply plan • site access and internal road plan • construction of asset protection zones and their continued maintenance • location of hazards (physical, chemical and electrical) that will impact on the firefighting operations and procedures to manage identified hazards during the firefighting operations	Construction Operation Decommissioning

	• such additional matters as required by the NSW RFS District Office.	
Waste Management	A Waste Management Plan (WMP) would be developed to minimise waste, including: • maximising the amount of construction waste that is re-used and recycled • identification of opportunities to avoid, reuse and recycle, in accordance with the waste hierarchy • quantification and classification of all waste streams • provision for recycling management on-site • provision of toilet facilities for on-site workers and identify that sullage would be disposed of (i.e., pump out to local sewage treatment plant) • tracking of all waste leaving the site • disposal of waste at facilities permitted to accept the waste requirements for hauling waste (such as covered loads).	Construction Operation Decommissioning
Hydrology and Flooding	The Flood Response Plan covering all phases of the project would: • detail who would be responsible for monitoring the flood threat and how this is to be done • detail specific response measures to ensure site safety and environmental protection • outline a process for removing any necessary equipment and materials offsite and out of flood risk areas • consideration of site access in the event that some tracks become flooded • establish an evacuation point • define communications protocols with emergency services agencies. • Include an access contingency plan that addresses the procedures and options for safe access to the site, if this is deemed necessary in the event of flooding on Lachlan Valley Way and/or Wilbertroy Lane and/or Naroo Lane.	Pre-construction Construction Operation Decommissioning

The table in Appendix A documents the revised environmental management commitments of the Project. Where measures are relevant to more than one environmental aspect, they are cited only once under the most relevant aspect, to avoid duplication. The applicable project phase (construction, operation or decommissioning) is also noted.

7 CONCLUSIONS

This Submissions Report has been prepared by NGH Environmental on behalf of Vast Solar to fulfil the requirements of Section 75H of the *Environmental Planning and Assessment Act 1979*.

Regarding public and agency submissions:

- 2 issues were raised within 2 public submissions. The issues raised were outside the remit of the Proponent and were targeted towards NSW DPE, other government agencies and power generation regulators. However, the Proponent provided a response to these

issues, in order to clarify the rationale that energy provision to the grid should be based on a mix of energy generation. No changes to the Project or EIS further are required in response to the raised issues.

- Nine issues were raised within 9 government agency submissions. Further information has been provided in response to these resulting in the Project now committing to 12 additional mitigation strategies. Four mitigation measures were also modified.

The benefits of the proposed Jemalong Solar PV Plant would remain unchanged.

In consideration of the assessment of the impacts from the project contained in the EIS, and the proposed mitigation measures committed to in the revised mitigation measures (included in Appendix A of this report), it is believed that all relevant issues and concerns have been addressed and that the project should now proceed for approval by the Minister.

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Traffic Design Group Ltd (TDG) (2018) Jemalong Solar Farm, Traffic Access Assessment, February 5 2018

Water Resources Commission (WRC) (1978) Guidelines for Floodplain Development Lachlan River Jemalong Gap to Condobolin.

APPENDIX A REVISED MITIGATION MEASURES

The following table constitutes the revised mitigation measures to which the proponent commits, pending project approval, to manage the environmental impacts of the project. The modified mitigation measures are shown in **bold**.

No.	Mitigation measure	Phase
Biodiversity		
B1	Clearing impacts would be minimised by: • A CEMP would be prepared including an erosion sediment control plan, vegetation management measures, a revegetation and weed management program, fauna management measures, and Work Methods Statements for all works within 10 m of the waterways occurring adjacent to the Proposal Site. All site workers should be inducted and made aware of the conservation issues and associated CEMP for the site. • Prior to the commencement of work, the clearing limit needs to be clearly demarcated and implemented. The delineation of such a boundary may include the use of temporary fencing, flagging tape, parawebbing or similar. • Pre-clearing surveys would be carried out by an ecologist and would include targeted surveys for nesting Superb Parrots, Grey-crowned Babblers, Brown Treecreepers and general tree hollow inspections where possible. They would include targeted searches for arboreal fauna and inspections of vegetation for other fauna occupancy. Habitat trees would be clearly marked with flagging tape. If active nests are found during clearing works, or hollows are being used by nesting birds or arboreal mammals, an ecologist or local wildlife carer should be contacted to remove the eggs, chicks or juvenile mammals to be hand-raised. • Trees would be removed in such a way as not to cause damage to surrounding vegetation. Root systems of trees and shrubs to be removed should be retained in-ground to ensure surrounding ground layer vegetation is undisturbed and to prevent soil erosion. • Where possible, trees to be removed would be mulched on-site and re-used to stabilise disturbed areas. • Where trees are to be retained, an adequate tree protection zone (TPZ) should be provided around each tree for the duration of construction. Details for calculating TPZs are provided within *Australian Standard 4970-2009 – Protection of trees on development sites*. • If work cannot avoid encroaching into the TPZ, it would not impinge on the structural root zones (SRZ) of trees to be retained. Details for calculating the SRZs are provided within *Australian Standard 4970-2009 – Protection of trees on development sites*. • An unexpected threatened species finds procedure would be developed before clearing is begun.	Construction
B2	Hollow bearing tree impacts would be minimised by: • Staged habitat removal for the removal of hollow-bearing trees would be undertaken where non-habitat vegetation would be cleared initially following a pre-clearing inspection by a qualified ecologist. Habitat trees would be disturbed by 'knocking' at this time and cleared at least 24 hours after. • Clearing of hollow-bearing trees would not take place between September and February, where possible. If clearing during this period cannot be avoided, an ecologist would be present on site to check all hollows for animals. If a hollow is being used by a threatened species (e.g. Superb Parrot), an exclusion barrier of appropriate distance (e.g. 30 m from the base of the tree) would be	Construction

No.	Mitigation measure	Phase
	installed to prevent disturbance. If a hollow is being used by a species not listed under the TSC Act or EPBC Act, any animals present will be caught and either released into appropriate alternative habitat or taken to a wildlife carer.	
B3	Residual impacts would be offset: • An Offset Management Plan would be developed and implemented to offset the loss of native vegetation, including hollow-bearing trees. This may include direct offsets or other strategies to improve biodiversity outcomes commensurate with the impacts of the project on native vegetation.	Operation
B4	To minimise impacts native vegetation outside the impact zone, stockpile and compound sites would be located using the following criteria: • Within the Proposal Site. • At least 40 m away from the nearest waterway. • In areas of low ecological conservation significance (i.e. previously disturbed land). • On relatively level ground. • Outside the 1 in 10 year Average Recurrence Interval (ARI) floodplain.	Construction
B5	• A Weed Management Plan would be developed for the sites to prevent/minimise the spread of weeds in and between sites. This would include: • Declared noxious weeds would be managed according to the requirements stipulated by the *Noxious Weeds Act 1993* during and post construction • Develop protocol for weed hygiene in relation to plant, machinery and importation and management of fill • All pesticides would be used in accordance with the requirements on the label. Any person undertaking pesticide (including herbicide) application would be trained to do so and have the proper certificate of completion/competency or statement of attainment issued by a registered training organisation. • Any occurrences of pathogens such as Myrtle Rust and Phytophthora would be monitored, treated and reported.	Construction Operation Decommissioning
B6	Disturbance to habitat features would be minimised by: • Any fallen timber, dead wood and bush rock (if present) encountered on site would be left in situ or relocated to a suitable place nearby. Rock would be removed with suitable machinery so as not to damage the underlying rock or result in excessive soil disturbance.	Construction
B7	To minimise injuries to microbats and birds:	Construction

No.	Mitigation measure	Phase
	• Use of barbed wire would be avoided.	Operation
B8	Implement feral animal management program, including species such as rabbits, rodents and starlings to reduce risk of attracting raptors.	Operation
B9	**Prior to implementation of Biodiversity Offsets, consult with GSNSW to ensure there are no potential sterilisation impacts to resources.**	**Construction**
B10	**Consult with the Biodiversity Conservation Trust to discuss the most appropriate mechanism for offsetting the residual impacts.**	**Construction**
Aboriginal heritage		
A1	A Cultural Heritage Management Plan would be prepared to guide the process for management and mitigation of impacts to Aboriginal cultural heritage. This would be undertaken in consultation with a consulting archaeologist, the registered Aboriginal parties and the NSW Office of Environment and Heritage. The 66kv HV line has been relocated eastward away from the lagoon so that the predicted sensitive area within 200m of the lagoon is avoided. Parts of the new alignment were not surveyed in 2014. Additional survey will need to be carried out during the detailed design phase.	Pre-construction
A2	Personnel involved in the construction and management phases of the project would be trained in awareness and procedures to implement recommendations relating to cultural heritage, as necessary.	Construction
A3	Cultural heritage would be included within any environmental audit of impacts proposed to be undertaken during the construction phase of the development.	Construction
A4	In the unlikely event that human remains are discovered during the construction, all work must cease in the immediate vicinity. OEH, the local police and the registered Aboriginal parties should be notified. Further assessment must be undertaken to determine if the remains were Aboriginal or non-Aboriginal.	Construction
A5	Additional archaeological assessment would be required in any areas which are proposed for impacts that have not been surveyed during the current assessment	Construction
Visual amenity and landscape character		•
V1	The following measures are recommended to reduce the general visual impact of the development: • PV Plant infrastructure should be reduced in height as far as practicable. • the materials and colour of onsite infrastructure will, where practical, be non-reflective and in keeping with the materials and colouring of existing infrastructure or of a colour that will blend with the landscape. Where practical: o buildings and other infrastructure will be non-reflective and in eucalypt green, beige or muted brown.	Design

No.	Mitigation measure	Phase
	o mounting systems for the solar arrays will be non-reflective. • security fencing posts and wire would be non-reflective; green or black rather than grey would reduce the industrial character of the fence.	
V2	Parking areas, material stockpiles and other construction activities would be located as far as practical from nearby residences and roads or screened (by existing vegetation) for the period of construction.	Construction
V3	Areas of soil disturbed by the project would be rehabilitated progressively or immediately post-construction, reducing views of bare soil.	Construction
V4	Night lighting would be minimised to the maximum extent possible (i.e. manually operated safety lighting at main component locations) Light fittings shall be directional as deemed appropriate for their use and intended areas of illumination. Lighting column and lighting head design should be chosen to limit back spill and any unwanted light spill to other site areas or, those areas off the site. Strictly monitor the light intensity, direction and duration of lighting. Design and install lighting such that light bulbs and reflectors are not visible from public viewing areas. Lighting should not cause reflected glare.	Construction
V5	A verification process would be implemented close to the completion of the construction phase. A Visual Verification Report and Landscape Plan would: • confirm the assumptions of this assessment by ground based assessment and ensure medium impacts are mitigated. • finalise the location and species for proposed screening, in consultation with nearest affected landholders. detail planting methods and maintenance requirements of the screen planting.	Construction
V6	Select colours for above ground structures, including the construction site offices, sympathetic to the landscape character of the site.	Construction
V7	The following screening requirements would be met: • planting would be more than one row deep and preferably be located on the outside of the security fence, so that it breaks up views of the fencing as well as onsite infrastructure. The final location of planting and density would be undertaken following verification of actual impacts. • the plant species to be used in the screen are to be native and consistent with existing vegetation types on the Proposal Site. They should be fast growing, with spreading habit. Species selection should be undertaken in consultation with a botanist. • vegetation should include a high shrub layer which would provide a more effective visual screen compared to trees as the panels would be maximum 3m high. Where feasible, plants selected should be of adequate size when initially planted to allow immediate effect as a visual screen. • the timing is recommended to be close to completion of construction so that actual and not predicted impacts of infrastructure are	Construction

No.	Mitigation measure	Phase
	mitigated. • The screen would be maintained for the operational life of the PV Plant. Dead plants would be replaced. Pruning and weeding would be undertaken as required to maintain the screens visual amenity and effectiveness in breaking up views.	
Hydrology and water quality		
H1	The design of buildings and equipment foundations would consider the potential for flooding at the site	Design/ Pre-Construction
H2	PV modules in flood prone areas of the Proposal Site would be installed on modules of 3 to 3.5m high	Design/ Pre-Construction
H3	Earthen pads to be constructed for PCU's	Design/Construction
H4	Critical infrastructure to be located in site locations that are not subject to flooding, 1/25 year event	Design/Construction
H5	Grazing under tree canopies adjacent to the Lagoon would be prevented, so as to prevent erosion and sedimentation entering the lagoon.	Design Operation
H6	The design and construction of the internal access tracks will include soil erosion and sediment control measures.	Design Construction
H7	The Flood Response Plan covering all phases of the project would: • detail who would be responsible for monitoring the flood threat and how this is to be done • detail specific response measures to ensure site safety and environmental protection • outline a process for removing any necessary equipment and materials offsite and out of flood risk areas • consideration of site access in the event that some tracks become flooded • establish an evacuation point • define communications protocols with emergency services agencies. • **Include an access contingency plan that addresses the procedures and options for safe access to the site, if this is deemed necessary in the event of flooding on Lachlan Valley Way and/or Wilbertroy Lane and/or Naroo Lane.**	Preconstruction Construction Operation Decommissioning
Soils and landforms		

No.	Mitigation measure	Phase
S1	The solar array would be designed and installed to allow sufficient space between panels to establish and maintain perennial groundcover (subject to climatic conditions).	Preconstruction Construction
S2	A CEMP would be implemented to manage runoff, soil erosion and sedimentation and pollution risks at the site. The CEMP would be prepared in accordance with the 'Blue Book' Volume 1 Managing Urban Stormwater: Soils and Construction (Landcom 2004), Volume 2A Installation of Services (DECC 2008a) and Volume 2C Unsealed Roads (DECC 2008b).	Pre-construction Construction
S3	As part of the CEMP, a Soil and Water Management Plan (incorporating a Site Drainage Plan and Erosion and Sediment Control Plan) would be prepared, implemented and monitored during the proposal to minimise soil and water impacts. These plans would include provisions to: • install, monitor and maintain erosion controls • identify and protect sensitive features such as native vegetation, dams and Irrigation channels • ensure that machinery leaves the site in a clean condition to avoid tracking of sediment onto public roads • manage topsoil: in all excavation activities, separate subsoils and topsoils to restore natural soil profiles and assist revegetation, guided by the findings of the pre-works soil survey. Topsoils stockpiled for extended periods would be managed to avoid contact with overland runoff, minimise weed risks, and maintain soil organic matter, soil structure and microbial activity • minimise the area of disturbance from excavation and compaction and rationalise vehicle movements to minimise soil impacts • ensure any discharge of water from the site is managed to ensure ANZECC (2000) water quality criteria are met • as far as practicable, ensure excavations are not scheduled when heavy rainfall events are predicted or soils are saturated.	Pre-construction Construction
S4	The CEMP, OEMP and DEMP and relevant sub-plans should incorporate the following management recommendation: • soil disturbance should be kept to a minimum where higher localised salinity or sodicity may be present. Topsoil stripping should avoid mixing salty and/or sodic subsoils with the topsoil – testing is recommended. Excavation of subsoils should be limited and subsoils should be stockpiled and contained to avoid dispersion and sediment transfer • direction of surface waters and run-on should be avoided to minimise mobilisation of any salts stored in the soil • appropriate infrastructure design is required to avoid damage caused by shrink-swell clays • deep rooted vegetation should be maintained where present, ground clearing should be minimised and ground cover around the structures should be maintained where possible • seed bed preparation and rolling, gypsum and/or composted organic matter will improve surface structure and germination in coarse structured soils. Low intensity, deep watering should be used. Fertilisers should be applied before and during plant growing periods. Compaction relief may be required for revegetation • plant species used for revegetation need to be adapted to cracking, alkaline, moderately to poorly drained, fertile soils with high plant available water holding capacity.	Preconstruction Construction Operation Decommissioning

No.	Mitigation measure	Phase
S5	A contamination management plan would be developed to address: • Clean up of the existing farm rubbish site within the Proposal Site. Procedure for discovering buried contamination within the Proposal Site (eg pesticide containers). Disposal would be at a facility able to accept the waste.	construction
S6	A water cart (or other means) would be utilised to manage dust on all access roads and exposed dusty surfaces in response to visual cues and complaints.	Construction Operation Decommissioning
S7	Spill Response Plan would be developed as part of the overall Risk Management Plan to prevent contaminants affecting adjacent pasture and dams. It would: • Manage the storage of any potential contaminants onsite. Mitigate the effects of soil contamination by fuels or other chemicals (including emergency response and EPA notification procedures and remediation).	Construction Decomissioning
S8	The substation will be cooled with silicone or mineral oil (5000L), oil containment and fire safety measures outlined in Ausgrid (2017) NS189 Oil Containment for Major Substations would be implemented.	Preconstruction Construction Operation
S9	Following the construction phase, a Site Rehabilitation Plan would be implemented remediating soils as, removing rubbish, restoring soil and landform profiles and decompacting soils in construction areas.	Construction
S10	Any area that was temporarily used during construction (laydown and trailer complex areas) would be restored back to original condition or re-vegetated with appropriate species (native in native dominated areas).	Construction
S11	Live grass cover would be maintained at or above 70% at all times (subject to climatic conditions) to protect soils and landscape function. Any grazing stock would be removed from the site when cover falls below this level. Grass cover would be monitored on a fortnightly basis using an accepted methodology.	Operation
S12	**The DEMP's soil rehabilitation plan for the site will consider the soil and land capability of the site (Class 3), agricultural productivity (such as yield) and other indicators from land capability and soil testing to ensure that the final soil and land classification of the site is equal to or better than existing capability.**	**Decommissioning**
S13	**The DEMP will consider the requirement for a Phase 1 site assessment to identify the potential presence of contaminated soils during the decommissioning phase.** **Based on the recommendations of the Phase 1 site assessment, a Phase 2 assessment would be carried out to confirm the extent and**	**Decommissioning**

No.	Mitigation measure	Phase
	nature of contamination, and to identify the procedures to remediate the contaminated area. **The EPC engaged to undertake the decommissioning of the plant will implement the remediation procedure and provide validation.**	
S14	**During the decommissioning planning stage, the requirement to remove services to a depth of 800mm would be assessed based on the identified future land use of the site. Any services that are not removed, would be mapped and communicated to the future landholder.**	**Decommissioning**
Water Use and Water Quality		
W1	The Spill and Contamination Response Plan prepared as part of the Emergency Response Plan would include measures to: • respond to the discovery of existing contaminants at the site (e.g. pesticide containers or asbestos), including stop work protocols and remediation and disposal requirements • manage the storage of any potential contaminants on-site • mitigate the effects of soil and water contamination by fuels or other chemicals (including emergency response and EPA notification procedures) • ensure that machinery and materials arrive on site in a clean and secure condition • prevent contaminants affecting adjacent pastures, irrigation channels, dams and native vegetation • monitor and maintain spill equipment • induct and train site staff.	Pre-construction Construction Operation
W2	If the substation used is oil-cooled, the layout, oil containment bunding and drainage would comply with the standards and guidelines in Ausgrid (2017) NS189 Oil Containment for Major Substations. The substation would be bunded with a capacity exceeding the volume of the cooling oil. The bund would be regularly inspected and cleaned, including removal of rainwater.	Pre-construction Construction Operation
W3	The Proponent will consult with EPA to determine whether any changes are required to Jemalong Station's EPL 5102.	Construction
W4	Road and carpark sealing works would not be undertaken if rain is anticipated within 24 hours of the completion of the works. Where possible, sealing works would be scheduled during fine, sunny, warm/hot conditions, avoiding wet, overcast, cool conditions.	Construction
W5	All fuels, chemicals, and liquids would be stored at least 50m from any waterways or drainage lines, in an impervious bunded area. The refuelling of plant and maintenance would be undertaken in impervious bunded areas on hardstand areas only.	Construction Operation Decommissioning
W6	All machinery on-site would contain spill kits to manage hydrocarbon spills. Machinery would be checked regularly to ensure there is no oil, fuel or other liquids leaking from the machinery.	Construction Operation Decommissioning

No.	Mitigation measure	Phase
W7	Any soils contaminated by hydrocarbons, chemicals or concrete during any phase of the project would be removed from the site and disposed of appropriately.	Construction Operation Decommissioning
W8	Any soils, fill or track surfacing materials imported to the site would be clean and non-dispersing.	Construction
W9	No detergents or other chemicals would be added to the solar panel cleaning water.	Construction Operation
W10	Concrete washout shall be carried out offsite or in concrete washout areas described in the Soil and Water Management Plan and identified on the Erosion and Sediment Control Plan (ESCP)	Construction Decommissioning
W11	Procedures for testing, treatment and discharge of construction waste water must be as described in the Soil and Water Management Plan.	Construction Decommissioning
W12	Machinery would be checked daily to ensure there is no oil, fuel or other liquids leaking from the machinery. All staff would be appropriately trained through toolbox talks for the minimisation and management of accidental spills	Construction Operation Decommissioning
W13	All staff would be appropriately trained through toolbox talks for the minimisation and management of accidental spills.	Construction Operation Decommissioning
W14	A Groundwater Management Plan would be developed to manage impacts on groundwater. This would be informed by onsite geotechnical survey and include: • Pollution controls • Management of dewatering.	Pre-Construction
W15	**Prepare a Water Management Plan for the Operational phase of the Solar PV Plant. The plan should be prepared in consultation with Crown lands & Water (water.referrals@dpi.nsw .gov.au).**	**Operation**
Noise and vibration		
N1	Noise control measures, such as those suggested in Australian Standard 2436-2010 “Guide to Noise Control on Construction, Demolition and Maintenance Sites” should be implemented to reduce predicted construction noise levels. Reference to Australian Standard 2436-2010, Appendix C, Table C1 suggests possible remedies and alternatives to reduce noise emission levels from typical construction equipment. Table C2 in Appendix C presents typical examples of noise reductions achievable after treatment of various noise sources. Table C3 in Appendix C	Construction

No.	Mitigation measure	Phase
	presents the relative effectiveness of various forms of noise control treatment.	
N2	In addition to physical noise controls, the following general noise management measures should be followed: • Plant and equipment should be properly maintained. • Provide special attention to the use and maintenance of 'noise control' or 'silencing' kits fitted to machines to ensure they perform as intended. • Strategically position plant on site to reduce the emission of noise to the surrounding neighbourhood and to site personnel. • Avoid any unnecessary noise when carrying out manual operations and when operating plant. • Any equipment not in use for extended periods during construction work should be switched off. • In addition to the noise mitigation measures outlined above, a management procedure would need to be put in place to deal with noise complaints that may arise from construction activities. Each complaint would need to be investigated and appropriate noise amelioration measures put in place to mitigate future occurrences, where the noise in question is in excess of allowable limits. Good relations with people living and working in the vicinity of a construction site should be established at the beginning of a project and be maintained throughout the project, as this is of paramount importance. Keeping people informed of progress and taking complaints seriously and dealing with them expeditiously is critical. The person selected to liaise with the community should be adequately trained and experienced in such matters.	Construction
N3	Where noise level exceedances cannot be avoided, then time restrictions and/or providing periods of repose for residents, must be considered where feasible and reasonable. That is, daily periods of respite from noisy activities may also be scheduled for building occupants during construction hours.	Construction
N4	Some items of plant may exceed noise limits even after noise treatment is applied. To reduce the overall noise impact, the use of noisy plant may be restricted to within certain time periods, where feasible and reasonable and to be negotiated with Council and the residents. Allowing the construction activities to proceed, despite the noise exceedance may be the preferred method in order to complete the works expeditiously.	Construction
N5	A letter box drop would be prepared and provided to residences within 2km of the site. The letter would contain details of the proposal including timing and duration of construction and a contact details for a person for any enquiries or complaints. Plant would be operated in an effective manner to minimise noise such as by turning off plant which is not being used.	Construction Operation
Social and economic		
SE1	The Community Consultation Plan would continue to be implemented throughout the planning, assessment and construction phases of the project, and would include:	Preconstruction Construction

No.	Mitigation measure	Phase
	• regular community updates about the progress of the proposal and findings of the assessments • consultation and notification of local residents and other relevant stakeholders regarding the timing of major deliveries and other activities which may produce particular social and economic impacts • an accessible complaints process with a timely response protocol.	
SE2	Neighbours of the Jemalong PV Park property would be consulted and notified regarding the timing of major deliveries which may require traffic control and disrupt access.	Construction Decommissioning
SE3	Local businesses would be used to supply good and services during all phases of the project wherever possible, as a first priority. The proponent would actively liaise with local industry representatives to maximise and coordinate the use of local contractors, manufacturing facilities and goods and materials suppliers, and to minimise adverse impacts to local supplies, services and tourism.	Construction Operation Decommissioning
SE4	Local representatives would be consulted regarding accommodation options for staff, to minimise adverse impacts on local services	Construction Operation Decommissioning
SE5	Large deliveries involving oversize or overmass loads or vehicles requiring traffic control which may inconvenience road users on Lachlan Valley Way would not be scheduled during festivals or other major tourism activities. Local tourism industry representatives would be consulted to manage potential timing conflicts with local events.	Construction Decommissioning
SE6	**Develop a Housing and Accommodation Action Plan (HAAP) for the construction phase (Refer Appendix E). It is recommended that the HAPP include the following actions:** • **Establish point of contacts between the Project Manager and key LGA stakeholder** • **Maintain a record of the locally available long term and short-term accommodation facilities in the locality** • **Ensure that non-local workers are provided with this list of accommodation** • **Maintain records of the number of workers, type of accommodation and location of accommodation being used** • **Respond and act upon community complaints to help resolve any conflicts** • **Update the record every quarter** • **Provide the updated record to the LGAs, every quarter**	**Pre-construction** **Construction**
Traffic, transport and road safety		
T1	A Traffic Management Plan (TMP) would be developed as part of the CEMP and DEMP, in consultation with Forbes Council and Roads and Maritime Services. The plan would include: • confirmation of designated routes for construction and haulage traffic	Preconstruction Construction Decommissioning

No.	Mitigation measure	Phase
	• evaluation of any road or intersection upgrade requirements and associated traffic controls, in consultation with Forbes Council and Roads and Maritime Services (and consistent with Austroads Guides and Roads and Maritime Services supplements) • scheduling of deliveries • carpooling/shuttle bus arrangements to minimise staff vehicle movements • consultation and notification arrangements regarding traffic impacts for nearby residents and local road users, particularly when traffic delays are expected • arrangements and locations for traffic controls (speed limits, signage, stop/go) • procedure to monitor traffic impacts and adapt controls (where required) to reduce the impacts • provision of a contact phone number for stakeholders and the public to obtain information and to enable rapid response to any issues or concerns • assessment of road condition prior to construction on all local roads that would be utilised, and a road condition monitoring program • avoiding use of Naroo Lane and Wilbertroy Lane during floods or after heavy periods of rain. • **Management measures that consider the risk of collisions/accidents resulting from fatigue on both the daily commute and the weekend departure/return to the workers place of origin.**	
T2	The proponent would ensure the approval of Forbes Council prior to the selection of the final construction access route on local roads.	Construction
T3	Vast Solar to develop a Driver Behaviour Code in line with their corporate statement policy for employee safety. All construction and operation staff would be inducted to the Driver Behaviour Code.	Construction Operation Decommissioning
T4	The proponent would consult with Roads and Maritime Services/Forbes Council in regard to use of the Wilbertroy Lane / Lachlan Valley Way intersection and requirement for upgrades, if any.	Construction Decommissioning
T5	Consultation with stakeholders including Roads and Maritime Services, Forbes Council, local landholders and emergency services would continue during construction and decommissioning to advise of any changes to road use and conditions.	Construction Decommissioning
T6	Where possible, large deliveries requiring stop/go traffic controls would not be scheduled during peak tourism periods (such as during local festivals), and morning and evening commuting or school bus operating periods. The proponent would aim to restrict traffic delays to a maximum of 10 minutes.	Preconstruction Construction Decommissioning
T7	Prior to construction, a pre-condition survey of the relevant sections of the existing road network would be undertaken, in consultation with Forbes Council. During construction the sections of the road network utilised by the proposal would be monitored and maintained to ensure continued safe use by all road users, any faults attributed to construction of the PV Plant would be rectified. At the end of construction a post-	Preconstruction Construction

No.	Mitigation measure	Phase
	condition survey would be undertaken to ensure the road network is left in the consistent condition as at the start of construction. This approach would also be applied during the decommissioning phase.	Decommissioning
T8	**Ensure the length of Wilbertroy Lane utilised to access the solar farm be widened to a minimum width of 7.0 metres to allow two trucks to pass, excluding the Cadow Channel crossing which is expected to continue to operate in an acceptable manner given its short length and the low traffic volumes along Wilbertroy Lane.**	**Pre-construction** **Construction**
T9	**One of 3 options to control one-way movement of construction traffic, such as traffic controllers, traffic signals or providing passing facilities at appropriate intervals should be explored for Naroo Lane, between Wilbertroy Lane and the site access to manage the movement of trucks along this length of road.**	**Construction**
T10	**Neighbours of the solar farm be consulted and notified regarding the timing of major deliveries which may require additional traffic control and disrupt access.**	**Construction**
T11	**Invite RMS Education Staff to provide information, guidance and discussion on fatigue management and road safety.**	**Pre-construction** **Construction**
T12	**Contractor management team, staff and proponent management team and staff will be required to participate, based on RMS education staff agenda.**	**Pre-construction** **Construction**
Hazards		
HA1	An Emergency Response Plan, incorporating an Evacuation Plan, Fire Response Plan, Flood Response Plan and Spill and Contamination Response Plan, would be developed prior to commissioning the PV Plant. A copy of the plan would be kept on site in a prominent position adjacent to the site entry point at all times.	Preconstruction Construction Operation Decommissioning
HA2	Dangerous or hazardous materials would be transported, stored and handled in accordance with AS1940-2004: The storage and handling of flammable and combustible liquids and the ADG Code where relevant. All potential pollutants kept on-site would be stored in accordance with relevant HAZMAT requirements and bunded.	Construction Operation Decommissioning
HA3	**The Emergency Response Plan (ERP) that will be developed prior to operation of the Solar PV Plant, will include:** • **Risk of foreseeable on-site and off-site fire event and other emergency incidents (e.g. fires involving solar panel arrays, bushfires in the immediate vicinity or potential hazmat incidents).** • **Detailed risk control measures that would be implemented to mitigate potential risk to health, and safety of firefighters and other first responders (including electrical hazards).**	**Operation**

No.	Mitigation measure	Phase
	• **Measures would include:** o **level of personal protective clothing required to be worn** o **minimum level of respiratory protection required** o **decontamination procedures** o **minimum evacuation zone distances** o **safe method of shutting down and isolating the photovoltaic system (either in its entirety or partially, as determined by risk assessment).**	
EMF		
HA3	All electrical equipment would be designed in accordance with relevant codes and industry best practice standards in Australia.	Preconstruction Construction
HA4	All design and engineering would be undertaken by qualified and competent person/s with the support of specialists as required and would aim to minimise EMFs.	Preconstruction Construction
Aviation		
HA5	The materials and colour of on-site infrastructure will, where practical, be non-reflective and in keeping with the materials and colouring of the local landscape.	Preconstruction Construction
Fire and Bush Fire		
F1	The Fire Management Plan would be developed in consultation with the local RFS District Fire Control Centre, and include: • specific management of activities with a risk of fire ignition (hot works, vehicle use, smoking, use of flammable materials, blasting) • incorporation of fire safety and response in staff and contractor induction, training, OHS procedures and Work Method Statements • dedicated staff training on the use and maintenance of fire-fighting equipment and resources • designation of a staff safety officer tasked with ensuring implementation of the plan and regular liaison with firefighting agencies • document all firefighting resources maintained at the site with an inspection and maintenance schedule • monitoring and management of vegetation fuel loads • identification of Asset Protection Zones (APZs) and key access routes • a communications strategy incorporating use of mobile phones, radio use (type, channels and call-signs), Fire Danger Warning signs located at the entrance to the site compounds, emergency services agency contacts • activation triggers for the Emergency Response Plan and Fire Response Plan.	Preconstruction Construction Operation Decommissioning

No.	Mitigation measure	Phase
	• **24-hour emergency contact details including alternative telephone contact** • **site infrastructure plan** • **firefighting water supply plan** • **site access and internal road plan** • **construction of asset protection zones and their continued maintenance** • **location of hazards (physical, chemical and electrical) that will impact on the firefighting operations and procedures to manage identified hazards during the firefighting operations** • **such additional matters as required by the NSW RFS District Office**	
F2	In developing the Fire Management Plan, NSW RFS would be consulted on the volume and location of water supplies, fire-fighting equipment maintained on-site, fire truck connectivity requirements, proposed APZ and access arrangements, communications, vegetation fuel levels and hazard reduction measures.	Preconstruction
F3	An APZ of minimum 10 metres would be maintained between remnant or planted woody vegetation and PV Plant infrastructure. The APZ around the perimeter of the site would incorporate a 4 metre wide gravel access track.	Preconstruction Construction
F4	Average grass height within the APZ would be maintained at or below 5 centimetres throughout the October-April fire season. Average grass height outside the APZ, including beneath the solar array, would be maintained at or below 15 centimetres throughout the fire season.	Construction Operation Decommissioning
F5	The overhead powerlines at the site would be managed by maintaining appropriate vegetation clearance limits to minimise potential ignition risks, in accordance with the ISSC 3 Guideline for Managing Vegetation Near Power Lines.	Operation
F6	Landscaping around buildings at the site would comply with Appendix 5 Bush Fire Provisions - Landscaping and Property Maintenance in the PBP guidelines.	Construction Operation
F7	Appropriate fire-fighting equipment would be held on site to respond to any fires that may occur at the site during construction. This equipment will include fire extinguishers, a 1000 litre water cart retained on site on a precautionary basis, particularly during any welding operations. Equipment lists would be detailed in Work Method Statements.	Construction
F8	A steel or concrete water storage tank would be installed adjoining the main internal access road for fire-fighting and other non-potable water uses, with a 65 mm Storz outlet, a metal valve and a minimum of 20,000 litres reserved for fire-fighting purposes.	Preconstruction Construction Operation Decommissioning
F9	The NSW RFS and Fire and Rescue would be provided with a contact point for the PV Plant, during construction and operation.	Construction

No.	Mitigation measure	Phase
		Operation
F10	Following commissioning of the PV Plant, the local RFS and Fire and Rescue brigades would be invited to an information and orientation day covering access, infrastructure, firefighting resources on-site, fire control strategies and risks/hazards at the site.	Operation
F11	The substation will be cooled with PCB oil (5000L), oil containment and fire safety measures outlined in Ausgrid (2017) NS189 Oil Containment for Major Substations would be implemented.	Preconstruction Construction
F12	The perimeter access track would comply with the requirements for Fire Trails in the PBP guidelines. All access and egress tracks on the site would be maintained and kept free of parked vehicles to enable rapid response for firefighting crews and to avoid entrapment of staff in the case of bush fire emergencies. Access tracks would be constructed as through roads as far as possible. Dead end tracks would be signposted and include provision for turning fire trucks.	Construction Operation Decommissioning
F13	Machinery capable of causing an ignition would not be used during bushfire danger weather, including Total Fire Ban days.	Construction Operation Decommissioning
F14	A Hot Works Permit system would be applied to ensure that adequate safety measures are in place. Fire extinguishers would be present during all hot works. Where possible hot works would be carried out in specific safe areas (such as the Construction Compound temporary workshop areas).	Construction Operation Decommissioning
F15	**Contact the relevant Local Emergency Management Committee (LEMC), upon start of construction and prior to operation of the Solar PV Plant in order to ensure that the LEMC can develop comprehensive inter agency local emergency procedures for significant hazardous sites within their local government area.**	**Pre-construction** **Operation**
F16	**The design and construction of the Solar PV Plant will take into consideration the Planning for Bush Fire Protection 2006 and the NSW RFS document Standards for asset protection zones.**	**Design** **Pre-construction**
Historic Heritage		
HH1	Should an item of historic heritage be identified, the Heritage Division (OEH) would be contacted prior to further work being carried out in the vicinity.	Construction
Air Quality and Climate		
A1	The Community Consultation Plan would continue to be implemented throughout the planning, assessment and construction phases of the project, and would include: • consultation and notification of local residents and other relevant stakeholders regarding the timing of major deliveries and other activities which may affect local air quality	Preconstruction Construction Decommissioning

No.	Mitigation measure	Phase
	• an accessible complaints process with a timely response protocol.	
A2	Dust generation by vehicles accessing the site and earthworks at the site would be suppressed using water applications or other means as required.	Construction Decommissioning
A3	Vehicle loads of material which may create dust or litter would be covered while using the public road system.	Construction Decommissioning
A4	All vehicles and machinery used at the site would be in good condition, fitted with appropriate emission controls and comply with the requirements of the POEO Act, relevant Australian standards and manufacturer's operating recommendations. Plant would be operated efficiently and turned off when not in use.	Construction Decommissioning
Land Use and Resource		
L1	Essential Energy would be consulted prior to commencement of works to ensure that the works do not adversely affect electricity transmission or impede access for inspection and maintenance.	Pre-construction
L2	Construction and operations personnel would drive carefully and below the designated speed limit according to the Traffic Management Plan, to minimise dust generation and disturbance to livestock.	Construction Operation Decommissioning
L3	Consultation with Jemalong Station Farm Manager regarding any temporary impacts to access or risks to livestock. Additional specific mitigation may be required such as: • Additional fencing to protect livestock from collision risks. • Vehicle speed restrictions on access roads.	Construction Decommissioning
L4	Landholders and residents adjacent to the property and along the access route from the Lachlan Valley Way would be consulted and notified regarding the timing of works to minimise the noise, dust, traffic and other disturbance impacts.	Construction Decommissioning
L5	Underground cabling and other works to remain in situ following decommissioning of the PV Plant would be installed deeper than 500mm to allow cultivated cropping to resume following decommissioning.	Construction
L6	If possible and practical, sheep grazing would be used as a preferred option to control weeds and grass growth, and to maintain agricultural production at the site.	Operation
L7	A DEMP would be prepared and submitted to DPE for approval prior to decommissioning. The DEMP would include a Site Rehabilitation Plan covering: • criteria and indicators for the restoration of land capability and agricultural potential based on pre-works soil survey results	Decommissioning

No.	Mitigation measure	Phase
	• details of rehabilitation actions such as removal of infrastructure, remediation of soils, reinstatement of dams and irrigation/drainage channels as required and establishment of suitable groundcover vegetation on bare areas • a monitoring and assessment process to demonstrate that the target state has been achieved • an expected timeline for the rehabilitation program.	
Waste		
Wa1	**A Waste Management Plan (WMP) would be developed to minimise waste, including:** • **maximising the amount of construction waste that is re-used and recycled** • **identification of opportunities to avoid, reuse and recycle, in accordance with the waste hierarchy** • **quantification and classification of all waste streams** • **provision for recycling management on-site** • **provision of toilet facilities for on-site workers and identify that sullage would be disposed of (i.e., pump out to local sewage treatment plant)** • **tracking of all waste leaving the site** • **disposal of waste at facilities permitted to accept the waste requirements for hauling waste (such as covered loads).**	**Construction** **Operation** **Decommissioning**
Wa2	A septic system would be installed and operated according to the Forbes Council regulations.	Construction Operation
Cumulative impacts		
C1	Construction management plans prepared for the proposal would take into account the cumulative impacts of any council or RMS road works should these activities occur concurrently.	Preconstruction Construction

APPENDIX B SUBMISSIONS

B.1 COMMUNITY SUBMISSIONS

In early May, 2017, I submitted the same set of Comments to the four NSW solar farms then on exhibition (Limondale, Beryl, Gilgandra and Bayley Park)[1]. Together with others, I expressed concern for the impact of the growing avalanche of solar farm Applications would have on energy security and electricity prices.
Over the ensuing months, the Department wrote an identical response as the Assessments for these four projects were published.
In the last Assessment for the Beryl solar farm, the response (attached) was relegated to the "Other Issues" section.
The PAC also failed to consider the issue during the Beryl Determination, so the following objection will be submitted to the three solar farms currently on exhibition (Jemalong, Tarleigh Park and Currawarra).

Since May, 2017, the situation has worsened significantly.

Twenty six (26) **new** solar projects have entered the NSW planning system, totaling 4425 MW of capacity.[2]
All will be approved within the next 12 months because that is what the Department does and has proved this year that they can.[3]
New solar projects are entering the NSW planning process, on average, weekly. I do not have access to the equivalent figures for other states, but due to their Renewable Energy targets, I would expect them to be as high or higher.[4]
In addition there are over 1500 MW of approved but unbuilt NSW solar farms.

So, you have competing trends.

- Overall demand for grid-based electricity in NSW, approximately 14000 MW at the summer peak, is not increasing
- Rooftop solar continues to rise rapidly, and therefore, as rooftop solar is behind the grid, Demand for grid based electricity will consequently fall.
- In a matter of years, the solar backlog could provide all the grid based electricity needed during NSW summer windless afternoons.

What happens on those hot windless afternoons when the sun begins to set?

Firstly though, a review of what the Department wrote in their Assessments of the original four solar farms in response to our submissions.

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[1] It is worth reading. See Beryl submission 204624
[2] Power will be required on hot windless summer afternoons when demand is highest. Solar efficiency at these times is at its peak, so capacity is a good measure of output.
[3] Goonumbla solar farm was approved less than 7 months after the issuance of SEARs
[4] Victoria. 40% renewables by 2015. Queensland 50% renewables by 2030.
NSW has a more sensible "aspirational target" of 50% decrease in Net greenhouse gas emissions by 2050, but that could change with a change of Government. However, the argument could be made that NSW faces a bigger challenge, as they have to actually do something to make it happen. Vic and Qld may meet their targets by doing nothing. As coal fired baseload is forced out of the market, renewable energy is all they will have left.

A couple of paragraphs from these identical responses are of particular interest:

> "These concerns were expressed at a high level, and were not supported by any detailed evidence showing how intermittent energy in general could affect energy security and/or electricity prices, or how this project in particular would do that.
>
> This makes it difficult, if not impossible, for the Department to evaluate these concerns in any meaningful way, particularly in the context where it is required to look at the planning merits of this project."

This inability to understand, and respond to the issues, is of course typical departmental nonsense, as anyone who keeps track of the looming renewables debacle on top of what happened last summer in South Australia and elsewhere would agree. DPE planners responsible for assessing NSW solar projects should be the first to see the issues. Blaming it on community members for not proving their case is also typical.
To assess each project individually without considering the cumulative impact is totally irresponsible.

Over the same ensuing months since May 2017, the Department changed its mission statement to include:

> "To enrich the lives of people in NSW through our work on high quality planning, housing delivery, great design, culture, clean environments, wildlife protection and energy security."

By adding "energy security", someone in the Department had enough awareness to recognize the looming disaster.
Over the same ensuing months, NSW and Federal politicians and supporting government controlled entities have also recognized this looming disaster.
In late November, AEMO released its solution to the potential summer problems of "black events" facing Victoria and South Australia by finding some extra fossil fueled resources and some volunteers to have their own private little blackouts, otherwise known as demand management.
NSW was not mentioned. We apparently will be OK until Liddell closes either completely in 2022 (planned) or partly next month (unplanned).

Over the same ensuing months, every consumer connected to the grid has recognized, through their electricity bills, this looming disaster. Average retail electricity prices have risen 13% in 2016 (AER, May 2017) and are expected to rise by 20% in 2017.

Yet, on four separate occasions, departmental planners and management have expressed an inability to understand the comments made by me and others.

So we give them another chance, through three different solar farms, assessed by three different planners.
They need to consider a few self-evident truths:

Renewable Energy is cheap because no-one is prepared to pay too much for an unreliable and/or unavailable product.
Development for new energy is not driven by market forces, ie the need for new electricity sources, but by Government decree, the RET.
Renewable energy suppliers will accept any price as their prime revenue comes from RECs.
Renewable energy will cause further baseload closures. Why, therefore, would the owners of baseload generators invest the millions needed just to maintain some of them at their present state of disrepair?
Reliable baseload becomes more expensive as, at times, it is the only option available and the quantity available is dropping as generators close, and continue to close.
Generators are in private hands, many overseas owned. They are interested primarily in profitable performance. They have no allegiance to Australia.
Liddell is closing primarily to bolster the price that AGL can obtain from its remaining portfolio of baseload generators.
Expecting coal and gas fired baseload to be sitting there idling away when called upon is a fairytale.
Should NSW need to call on the interconnectors, will their be anything there? Our adjoining states will lose the sun at the same time during the windless summer peaks of demand and will need all of their dwindling or virtually non-existent baseload for themselves.
Any remaining NSW baseload generators will charge the earth for power during a hot windless twilight.

So I ask again,

Will the Department of Planning consider the collective impacts of individual solar projects on the security and costs of our once great electricity network?

The planning process should be bidirectional. The Government, through the Minister, sets the boundaries. Equally, the Secretary should advise Government when the process goes awry.

The Department is running out of opportunities to highlight to the Premier and Cabinet, through their Minister, the contribution the NSW Department of Planning & Environment is making to our expensive dark energy future primarily through solar projects, but also through the few remaining active wind applications, such as our beloved Jupiter.

Should a blackout occur in NSW over the coming summer the Premier will be looking for scapegoats. Planners Hawkeswood, Ko and Stuckey, respectively, may be unfairly targeted. Key DPE solar executive Clay Preshaw and his wind farm equivalent Mike Young will deservedly be the focus of attention as they seem smart enough to grasp, and act on, the issues.

On past performance, I would not be surprised if the Department totally ignores the contents of this submission. Most times I prefer it that way. They can never, however, claim they were unaware of the issues.

Anthony Gardner
Mt Fairy

Beryl Assessment (Page 21)

Issue

Energy Security

 Concerns were raised in three submissions that the project, or a combination of the project and a range of other renewable energy projects, could have an adverse impact on energy security in NSW and increase electricity prices.

 These concerns were expressed at a high level, and were not supported by any detailed evidence showing how intermittent energy in general could affect energy security and/or electricity prices, or how this project in particular would do that.

 This makes it difficult, if not impossible, for the Department to evaluate these concerns in any meaningful way, particularly in the context where it is required to look at the planning merits of this project.

 Any such evaluation, however, would need to have regard to the broader strategic context on these matters.

 First, there is strong policy support at both the Commonwealth and State level for the increased development of renewable energy projects, to both ensure that a greater proportion of electricity is generated by renewable sources and to reduce greenhouse gas emissions associated with any electricity generation.

 Second, NSW forms part of the National Electricity Market (NEM). The NEM is complex and is governed by a robust statutory framework at both the Commonwealth and State level which covers the regulation of electricity generation, distribution and pricing.

 In the Department's view, the likelihood of the project having an adverse impact on energy security or electricity prices in NSW is extremely low, given that it would only add 87 MW of capacity to the NEM, which at this stage has a total generation capacity of over 47,000 MW.

 Further, any incremental or cumulative impacts associated with the potential intermittency of renewable energy projects could be mitigated through the operation of the NEM.

This proposal for intermittent power is another of a continuing threat to electricity security for NSW and a cause of increased wholesale and consumer power prices.

The proponent has provided no evidence that this project will not further raise NSW electricity prices and not increase the threat to the stability and security of NSW electricity supply.

As a consequence of similar projects, consumer prices in real (i.e. inflation-adjusted) terms for the people of NSW have doubled since 2000. This project, depending as it does, on revenue from renewable energy certificates, which all electricity consumers are forced to pay for, will further increase NSW electricity prices.

The Department already has detailed submissions from me as to why addition of intermittent energy generators (solar and wind) are a threat to NSW electricity security.

The PAC has admitted in response to a GIPA request that it has been approving similar installations without the PAC having any analysis or evidence that they pose no threat to NSW electricity security.

The Secretary of DPE, in a letter to me, has admitted that the Department also has no such analysis and no plan for adding such facilities to the grid without causing threats to the grid.

Both DPE and the PAC have been in breach of the EP&A Act for their wilful disregard of the impact of such projects on the public interest and specifically for not carefully evaluating the impact on utilities.

Approval of this intermittent electricity project would be another decision contrary to the provisions of the EP&A Act.

In relation to impact on grid security, this proposal cannot be evaluated in isolation. DPE knows there is a pipeline of currently approved but not yet built wind and solar farms in NSW. You can do the maths and work out the approved capacity yet to come into operation in NSW. You should also be able to ascertain the pipeline of approved wind and solar farms yet to be built in other states in the NEM. AEMO does most of the work for you, if you don't know.

On previous occasions when I have pointed out the problems for grid security, the planners involved have professed ignorance about how adding further intermittent electricity generators (wind and solar) to the grid could harm grid security and force up electricity prices.

In the interest of helping your education (which would be unnecessary were DPE doing its job), I have attached copies of open letters to

- Dr Finkel, re his report
- Minister Frydenberg re advice he received from AEMO; and
- Minister Frydenberg re the new Federal Government plan announced earlier this year.

These letters have been distributed to members of Federal Parliament as well as the named addressees. Should you take the time to read them you will find explanations of how intermittent power harms grid security and raises electricity prices so that many citizens of NSW are now forced into energy poverty.

As well as attending to the matter of intermittency of output, I suggest you also take the time to learn about "essential frequency control, system strength and inertia services necessary to keep the system secure", which AEMO, in its advice to Minister Frydenberg, noted are not provided by intermittent generators (AEMO *Advice to Commonwealth Government on Dispatchable Capacity*, p. 2).

The adage "none so blind as those who will not see", which has been written for millennia, has characterised the Department's previous approach to this matter. Perhaps it is time a DPE planner decided to break the mould and worry about the effect of these proposals on the people of NSW.

Dr Michael Crawford

Dr Alan Finkel AO
Chief Scientist
GPO Box 2013
CANBERRA ACT 2601

June 23rd 2017

Open letter re your Review into the Future Security of the National Electricity Market

I have read your recent report with interest. Over about half a century I have observed that government reports are sometimes dishonest, ideological, obfuscatory, authoritarian, bureaucratised, wanting in courage, illogical and sometimes downright stupid.

I have to salute you sir. Your recent report appears to have set new heights in this respect.

Let me take some time to explain why your report so qualifies.

Dishonesty

Under section 137.1(1) of the *Criminal Code Act 1995*, a person commits an offence if they give information to (i) a Commonwealth entity, or (ii) a person who is exercising powers or performing functions under, or in connection with, a law of the Commonwealth, AND the person (the source of the information) does so knowing that the information (i) is false or misleading; or (ii) omits any matter or thing without which the information is misleading.

As will be seen below, your report appears to meet all of these conditions. Now I know that holding government officials to the same legal standards as apply to other citizens is considered, in official circles, to be unsporting. I also appreciate that the Prime Minister and sundry Ministers and other officials would find it enormously embarrassing were the author of your report to be taken before the courts. So I suspect the chance of you actually having to face charges is pretty slim.

That does not alter the fact that your report appears in breach of section 137.1(1) of the Act in a way that would lead to penalties for less privileged mortals.

So as to the details. The document is false and misleading in numerous ways, but for brevity we will stick with the following:

- the ***big lie*** of the "Clean Energy Target";
- omission of an accurate explanation of how and why coal-fired, on-demand plants are being driven from our electricity system;
- grossly misleading statements about relative costs of various forms of electricity generation;
- omission of any mention of the minute effect, if any, that your proposed policy will have on temperatures for Australia and the earth as a whole;
- omission of details of the broad social and economic impacts and different balance of payment consequences of the alternative forms of generation considered.

The Big Lie of the "Clean Energy Target"

The word "clean" occurs about 50 times in your report, particularly in conjunction with what you label a "Clean Energy Target". This nomenclature is a stroke of which Josef Goebbels would be proud.

It clearly implies that the alternative, in particular our fossil-fuel based legacy system, which is still the source of the vast majority of Australia's electricity production, is dirty and thus ought to be replaced.

It is reputed that you are a scientist. As such, you must be aware that the main emissions from fossil-fuel generators are water vapour and carbon dioxide (CO_2) and not the element carbon in molecular or particulate form. After all, the whole Anthropomorphic Global Warming thesis is about the purported impact of elevated levels of atmospheric carbon dioxide on global climate, not elevated levels of carbon.

As a scientist, you must be aware that this nefarious substance, implicitly labelled "unclean" in your report, does not actually blacken or discolour clothes on the washing line; does not degrade our physical infrastructure; does not interfere with the operation of machinery; does not cause unfortunate odours; does not obscure the sky; does not irritate the skin or eyes; and does not cause harm to our lungs or other parts of the human body. In short, it does nothing that fits with what people normally understand as "unclean" or "pollution".

Indeed, you are no doubt aware that every breath you, and the rest of us, exhale has a concentration of CO_2 about 100 times higher than in the atmosphere. Perhaps you intend to claim that all mankind has unclean breath on this basis.

You are also undoubtedly aware that without carbon dioxide there would be no life, as we know it, on earth; that it is as essential for our life as are water, oxygen and light. You must know that, together with light and water, it is the critical input for plant life, to be converted into carbon compounds upon which our own sustenance then depends.

Do you claim that water, light and oxygen are also "unclean"?

The simple fact is that carbon dioxide in no way meets any criteria for being "unclean" and ***you know that you have intentionally used a false label to emotionally mislead the broad majority of the community***, including many politicians, about the true nature of the emissions from fossil-fuel plants.

Omission of accurate reason for the displacement of coal-fired generators

Your report refers to the closure of coal-fired power stations and anticipates continuing closures. In fact you realise this is rapidly becoming disastrous for the total electricity system so you propose a draconian rule that operators of such plants must give three years notice of closure, an authoritarian action which appears to have real problems at law.

It is clear you realise the problem. But it is only possible to offer a proper solution if you are honest about the cause. And you surely know that these closures are due to the RET scheme and the massive subsidies it offers to unpredictable, intermittent electricity devices (**IEDs**) (i.e. the ones you quaintly call VREs), which your report does not honestly admit.

Under the RET scheme, fossil-fuel generators have a single source of income, which is the money paid for the electricity they sell into the grid. IEDs have two sources, money paid for electricity sold into the grid and money paid (ultimately by electricity consumers) for the RECs the federal government authorises them to print and which electricity distributors are compelled to buy.

Last year the average AEMO NSW electricity price was $51.60 per MWh. (It was $28.27 in 2000 and $81.40 so far for 2017.)[1] Over the last six months, the spot price for Large-Scale Generation Certificates (LGC), mandated under the RET, has varied around $85 per MWh[2].

So, in that period (using rounded numbers for illustration), a coal-fired generator selling into the grid at spot prices might receive $80 per MWh supplied. However, an IED would receive the same spot price of $80 per MWh AND a further $85 per MWh from selling the RET-mandated LGC it is authorised to create for each MWh supplied into the grid. So, for selling the same amount of electricity, the coal-fired generator receives $80, while the IED receives $165.

Of course, as you know, the system is even more weighted to the benefit of the IED. The spot price varies greatly even within a day but in a way that guarantees the IED provider will always receive more in total per MWh than the fossil-fuel generator because of that LGC subsidy which electricity consumers are all forced to pay.

Because of the combination of the subsidies and the AEMO's rules for supply of electricity into the grid, IEDs are effectively guaranteed to be able to sell into the grid all the electricity they produce (when the wind is blowing right or the sun is shining) while fossil-fuel generators are allowed to supply only the balance needed to meet demand, despite their capacity to provide reliable power 24/7.

So, thanks to federal and state governments, we have a combination of market structures and subsidies which pay more money for electricity from the least reliable and most expensive generators and gives those generators privileged access to the grid, guaranteeing their proliferation while making fossil-fuel generators uneconomic. The more IEDs added to the grid, the less economic fossil-fuel generators will become, thus driving them from our electricity system and increasing both the price to electricity consumers and the unreliability and insecurity of the grid.

It would be hard to devise a more perverse system if the aim is to provide low cost, secure and reliable electricity for the people of Australia – as your terms of reference specify.

Failing to spell that out in a report on "the future security of the national electricity market" is clearly a material omission whose effect is to mislead and thus breach s137.1(1) of the *Criminal Code Act 1995*.

Misleading statements about relative costs of various forms of electricity generation

Given that electricity prices and costs to consumers and industry are part of your terms of reference, it seems strange that your report ignores the history of electricity prices in Australia

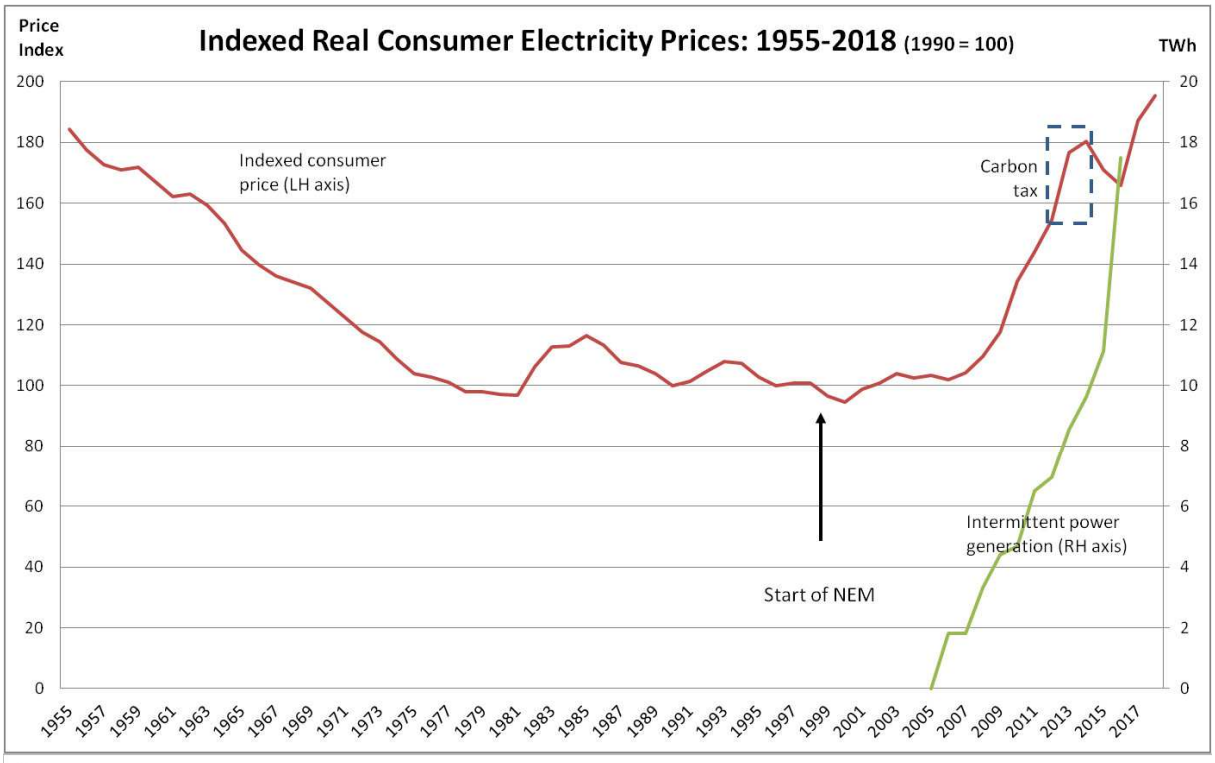
[1] Source: https://www.aemo.com.au/Electricity/National-Electricity-Market-NEM/Data-dashboard#average-price-table

[2] Source: http://greenmarkets.com.au/resources/lgc-market-prices

and prefers, instead, to dabble in price forecasts despite the forecasters having a history of being badly wrong.

Presumably you are familiar with the general historical pattern of consumer electricity prices shown in the graph below, which shows real prices as an index for the period 1955 – 2018. The highlights are:

- During the four decades covered in which state governments were independently responsible for producing and distributing electricity in their states, ***real*** electricity prices ***fell*** by about 45%, providing a large benefit to consumers and industry.
- In the two decades since the inception of the National Electricity Market, which was supposed to further reduce prices, Australia has had a ***more than 90% increase*** in ***real*** electricity prices, so that they have wiped out all the gains made between the 1950s and 1990s, now exceed the real price in 1955, and appear headed "to the moon".
- Most of the increase in ***real*** prices has occurred over the last decade or so and is ***strongly correlated with the increase in production from IEDs***.



Sources
Prices 1955 - 1980: *Electricity in Australia*, prepared for CIGRE by Frank Brady AM (former CEO, Electricity Commission of NSW), 1996
1980 - 2016: ABS 6401.0 Consumer Price Index
2017 - 2018: Adjustment (15% nominal increase) to take account of price increases announced by major elect distributors in June 2017
Intermittent power generation (Terra Watt hours, TWh) from Figure 4.2 in *Independent Review into the Future of the National Electricity Market*

I appreciate that correlation is not causation but normally in science when a correlation exists people do at least look closely to try to determine whether this is a spurious correlation or whether there is a real connection. Your report appears to intentionally avoid such a normal practice.

Most people considering the history shown in the graph would at least set out to evaluate the hypothesis that the electricity supply arrangements Australia had, in the period before the

NEM and intermittent energy, were in fact superior to what now exists in terms of price, reliability and security.

Yet you have eschewed laying out this information for governments and the community, information which might lead to very different conclusions than advocated in your report. You provide no analysis as to why Australia is prevented from reverting to the benefits of low cost, reliable electricity supply and the means through which that was delivered.

Instead you simply assert, without any logical argument or evidence, "There is no going back from the massive industrial, technological and economic changes facing our electricity system." (p. 3) Yet in your own report you tell us that in 2016, 76% of electricity in the NEM came from coal-fired generators (p. 87).

Including hydro and gas-fired stations, which also are on-demand, over 90% of Australia's electricity production is still from non-intermittent generators. Despite that, you want to claim it is impossible to call a halt to the lemming-like rush to install more IEDs because "there is no going back".

It is patently obvious that if Australia wants to regain a low cost, reliable electricity supply it is in a position to do so. Certainly some of those generators will have to be replaced over time. That is the case with any industrial facility, even wind turbines.

You note (p. 91) that the weighted cost of capital for coal-fired stations is now much higher than for intermittent generators. That has nothing to do with the technology per se. Cost of capital is always related to risk. The pro-intermittent, anti-fossil-fuel policies of governments, together with oscillating policies as emission fantasies keep colliding with reality, has now caused extreme risk for any private generator not backed by subsidies.

Our coal-fired electricity infrastructure before the NEM actually had low cost of capital, because it was a low risk activity in government hands.

Because of the uncertainty created by governments, Australia will only build more low cost, reliable electricity generators when it is either done by government or done with a take-or-pay contract with government. The only way Australia will be able to regain a low cost reliable and secure electricity supply is through the means that produced it in the past.

Of course that also means abolition of the NEM and the massive army of well paid paper-pushers which have come with it. They have added nothing to the security of Australia's electricity supply but have, as the data shows, massively inflated the cost of Australia's electricity. They are themselves an additional expense for which consumers are forced to pay.

The fact that you have failed to present and explain how Australia provided secure, low cost electricity with generally declining real prices in the more than four decades before the NEM is a major instance of presenting misleading information through omission thus a breach of s137.1(1) of the *Criminal Code Act 1995*.

Destructive complexity and lack of accountability

Increased organisation complexity tends to degrade performance. Australia's electricity system pre-NEM was much simpler than that which now exists. In each state there was a unitary organisation responsible for the efficient and secure production of electricity, using a

small number of high capacity plants. Likewise the transmission system was relatively simple, being focused on moving electricity from that small number of plants to end users. In addition, there was strong accountability for performance though state governments each of which was wholly in charge of producing and distributing the state's electricity and accountable to the electorate for the reliability and price of doing so.

The NEM fragmented the production components and overlaid that with multiple other organisations, each of which has an interacting role with others and each of which adds to the complexity of the whole industry.

In addition, accountability to electorates has been destroyed. The industry is now notionally overseen by COAG – but citizens don't get to vote on COAG and the results citizens experience may be predominantly determined by members of COAG other than their own state representatives. There is no direct accountability to voters by the multiple bodies each of which fiddles with the electricity system but none of which has actual overall control.

Electricity supply is inherently a monopoly or oligopoly activity, especially in a small economy such as Australia's. Pre-NEM there was a state monopoly in the hands of each state government, responsible to its voters for the discharge of that monopoly, and those local monopolies were in competition with one another to attract industry to their states. When the NEM came into being, those local monopolies were broken up but they are now reforming as an oligopoly spanning the country and not under the control of voters.

You report (p. 81) that "In the period from 2009 to 2017, the major retailers have increased their share of NEM generation capacity from 15 per cent to 48 per cent". The logic of their action, from their perspective, is unassailable. So we are in the process of replacing what were state monopolies under the control of state voters, with a three member oligopoly not under control of the voters. We are heading for greater concentration in control of electricity generation than we have in financial services, with that oligopoly being exploited to the benefit of its owners, with greater foreign control, rather than that of the citizens of states.

In a chapter heroically entitled *Stronger Governance*, you refer to multiple institutions needing to have "shared accountability". Anyone with the least understanding of organisations knows this is an oxymoron. "Shared accountability" means no one can actually be held to account, i.e. penalised for bad performance. Arguing for "shared accountability" to produce stronger governance is pious cant. Either there is some identified party with authority, who can be dismissed by the voters, or no one is accountable.

Your "solution" to this problem is the addition of more institutions that will make the whole system even more complex and even further removed from the control of citizens.

Coercing consumers

Part of your perverse "solution" is to make consumers adjust their electricity demand to fit the vagaries of production by IEDs, something which was unnecessary before subsidised IEDs were introduced to our electricity system.

In a masterpiece of Orwellian language, worthy of *1984*, you claim to propose "rewarding consumers" (Chapter 6) when in reality your plan is all about punishing Australians who wish to consume electricity but you will punish them a little less if they consume only at times

which suit the vagaries of your system whose purpose is to foster the introduction of more IEDs.

You state that "An increasing proportion of investment in new generation assets comes from individual consumers." (p. 137) Perhaps you imagine consumers just want to adorn their rooftops with solar panels.

The real reason is, of course, shown in the earlier graph, i.e. the massive and continuing increase in real electricity prices through the grid as a consequence of the explosion of IEDs, together with the incentives governments provided for people to install solar panels.

That in turn leads to inefficient use of the electrical distribution infrastructure which still must be paid for. So under the Finkel grand plan, anyone connected to the grid will have escalating costs for being connected to it, while many spend money on home-based generation because of the ever-rising price of power purchased through the grid.

What Australians want from an electricity system is pretty simple: *low cost electricity which is reliably available whenever they want it*. We had electricity on that basis for decades and we still want it on that basis.

Instead you offer an authoritarian system in which consumers and industry are to be coerced to adjust their demand to suit the requirements of your IED-fostering system, while paying continuously increasing ***real*** prices, already double what we once paid. This is to be provided through a fascist system of a tight oligopoly, with increasing foreign ownership, hand-in-hand with a plethora of government agencies and bureaucrats tending the needs of IEDs and the oligopoly, and wholly removed from any democratic control by the voters of either individual states or the country as a whole. It is an edifice truly worthy of *1984* or Mussolini and not the form of society for which I and many others have fought on behalf of Australia.

Your emissions fetish

Your report is larded with mentions of emissions and emission reduction, which do not appear in your terms of reference.

The preface of your report says "COAG Energy Council asked the Review Panel to recommend enhancements to the National Electricity Market to optimise security and reliability, and to do so at lowest cost." No mention of emissions or emission reduction in that task – but note the reference to "***lowest cost***".

You were asked to do so consistent with the *National Energy Objective* which, according to the *National Electricity Law* is:

> *to promote efficient investment in, and efficient operation and use of, electricity services for the long-term interests of consumers of electricity with respect to price, quality, safety, reliability, and security of supply of electricity; and the reliability, safety and security of the national electricity system.*

Again, no reference to emissions or emission reduction. Despite that, your report is built around reducing emissions of carbon dioxide.

Given that intent plays so large a part in your report, and drives the whole structure of the electricity system you propose, it is incumbent on you to be publicly clear about what will be

the actual benefit to Australia and its citizens if Australia's carbon dioxide emissions fall as you propose.

There is plenty of public evidence that even were your proposed targets to be achieved, the consequences for global temperatures and Australian temperatures would be so minute as to be effectively unmeasurable. It is also beyond dispute that your total target reductions for Australia are swamped by the increased emissions, *each and every year*, by both China and India, not to mention the increased emissions by other undeveloped countries with rapid increases in population.

Indeed, at a Senate hearing on June 1 this year, in answer to a question from Senator Ian MacDonald, you said that ***totally*** abolishing Australia's emissions of carbon dioxide would make virtually no difference to the world's climate. This is information that the government and public surely need to have.

Yet that fundamentally important piece of information, and the corollary that restricting carbon dioxide production in Australia will have no material benefit for the country, does not make its way into your emissions-centric report.

Failing to provide honest information about that matter, which goes to the heart of the IED-driven electricity system you propose, appears to be another material omission whose effect is to mislead and thus breach s137.1(1) of the *Criminal Code Act 1995*.

Ignores safety

Part of the *National Electricity Objective*, cited above, is to produce and distribute electricity safely. You must surely be aware that there are ongoing claims of harm from wind farms to members of local communities. Certainly some members of your panel are aware of it.

I appreciate that the matter is still one of contention. However, it has been deemed significant enough by the NHMRC for that body to commission studies of the matter, as are also occurring around the world.

It would be unreasonable to expect you to make a definitive statement on this point, but equally you are not in a position to be sure there are not health problems which will become more widespread if your IED-fostering policy is adopted and which might then render that policy unviable.

Your report is similar to someone decades ago evaluating building materials, lauding the benefits of asbestos products for building purposes without mentioning that there are some known grounds for suspecting they may be harmful to health.

It is telling that your report refers to possible safety issues in relation to battery technology, development of gas reserves, and in relation to small modular nuclear reactors but makes no mention in relation to wind farms, despite that the health effects of wind farm emissions is the only one for which the NHMRC appears to have awarded research grants.

This appears to be a deliberate decision on your part to make no mention of the matter lest it be some threat to your proposed policy, and thus to be another instance of misleading by omission.

Omission of broad economic impact

Your terms of reference were focused on cost, reliability, safety and security of Australia's electricity system. However, you chose to make emissions reduction the corner-stone of your review. That implies you impute some significant benefit from reductions in carbon dioxide emissions, though you apparently did not see the need to explain or quantify that impact.

If you are broadening the scope, then reasonably you can be expected to discuss the wider economic and social impacts of your proposals and advice, something you apparently decided to ignore.

The Australian economy and its people received a very large benefit from the big reduction in ***real*** electricity prices from the 1950s to the 1990s, including support for industrial development. Conversely, they have experienced a very large disbenefit over the last decade as ***real*** electricity prices have doubled, de-industrialising the country with consequent loss of jobs and skills and with adverse balance of payment effects.

Your IED-cosseting policy will inevitably further increase real electricity prices and further destroy Australian industry and jobs.

There is another aspect of this policy. Not only is the full cost of IED electricity much greater than that from fossil-fuels, as our history has shown, but electricity from intermittent electricity generators is more capital intensive than from fossil-fuel generators. Since we make none of those generators, and will not, all must be imported.

In the case of fossil-fuel sourced electricity, part of the cost is imported plant and part is locally produced coal or gas, of which Australia has a massive supply. In the case of IEDs, the cost is predominantly imported plant. Consequently the latter create a larger deficit on our balance of payments while the former provide good jobs, in Australia, mining and distributing the fuel used.

Failure to discuss these important effects in any way again misleads about the likely consequences of the policy you advocate. It appears to subordinate the welfare of the Australian people to the interests of those associated with or for other reasons supportive of IEDs.

Summary

Your report appears to breach section 137.1(1) of the *Criminal Code Act 1995* in multiple, highly material, ways whose effect is to mislead while advocating a policy which lengthy historical evidence shows has created harm to the people of Australia and creates more harm the longer it is pursued.

It is exemplified in the ***big lie*** about "Clean Energy" as though our fossil-fuel power sources are unclean when their predominant emissions are water vapour and carbon dioxide which is no more "unclean" than oxygen and nitrogen which, together with carbon dioxide and water vapour, form most of our atmosphere.

You fail to clearly explain the perverse nature of the system which pays more money for electricity from the least reliable and most expensive generators (intermittent wind and solar) and gives those generators privileged access to the grid, guaranteeing their proliferation while

making fossil-fuel generators uneconomic and driving the latter from our electricity system despite the fact that they are the ones that provide low cost, reliable power.

You fail to draw attention to Australia's history of electricity supply and its implications. That history was of a 45% reduction in ***real*** electricity prices, over about 4 decades, when state governments were responsible for the production and distribution of electricity. It has been followed by a doubling of ***real*** electricity prices since the inception of the NEM and particularly over the last decade as IEDs have become a material, though still small, part of our electricity system.

You have offered no evidence that this explosion in consumer prices is going to abate under your policy. Indeed as we have seen in the last month, they are about to jump 15% or more in real terms from July 2017, something not forecast in your report.

Thanks to the NEM, we already have an extremely complex electricity industry structure, which has brought no benefits to consumers, and is unaccountable to the voters of states and the country as a whole. Your policy is to make it even more complex and less accountable, which guarantees it will serve consumers even more poorly.

You advocate a policy which will not only make consumers subject to even higher prices and system insecurity but require they be behaviourally coerced, despite their preferences, to fit in with the vagaries of electricity supply under your IED-cosseting policy.

You ignore potential adverse safety consequences of your policy, especially involving wind farms. You also ignore the ongoing deindustrialisation of Australia driven by this policy and the adverse balance of payments effects.

All of these things appear to be ignored because of your focus on reducing the emission of carbon dioxide, which was not actually part of your terms of reference, and despite the fact that you are apparently unable to quantify any material benefit to the people of Australia from such reductions.

Given the opportunity to do a great service for the people of Australia and clarify the bankruptcy of energy policy over the last two decades, you have chosen to advocate more of what is failing badly, to obfuscate with more government agencies outside the control of the citizens who are being forced to pay you for this, and to advocate more authoritarian control over them.

In short, your report is a travesty of what you were asked to do.

Perhaps this is the best of which you were capable. Or perhaps you were overcome by a religious desire to limit atmospheric carbon dioxide, irrespective of other considerations. Or perhaps there was a want of courage to explain to the political establishment why the electricity policies of the last two decades have been so disastrous and will become even more so.

Dr Michael Crawford
mcrawford.boro@gmail.com

cc: Members of Australian Parliament and other interested parties

Hon. Josh Frydenberg MP
Minister for the Environment & Energy
PO Box 6022
House of Representatives
Parliament House
Canberra ACT 2600

18th October 2017

Minister

Open letter re your Monty Pythonesque electricity plan

I understand you have devised an ingenious plan to rectify the current government-directed destruction of our once reliable and affordable power system. According to media reports, your scheme will require electricity retailers to do essentially what they are currently doing, while the "renewable" rorters do what they are currently doing, and electricity distributors continue to do what they are currently doing.

Despite the fact that everyone will be continuing as at present (except of course that we will now pay for some more government officials to oversee this plan, and for some more bandaids), I understand that you and the Prime Minister are confident that electricity prices will fall in maybe ten years time, by a paltry amount, and the lights will stay on because you have willed it so.

Could you please clarify whether your advisers got the script for this plan from Monty Python or from Blackadder. Attribution should go to the right source.

I understand the crux of your ingenious scheme is that retailers will be obliged to purchase at least 1MW of electricity from baseload sources for each 1MW of unreliable (i.e. wind and solar) electricity they purchase. What exactly do you think they are doing at present?

Dr Finkel's report was grossly misleading in multiple ways. However, he did provide some basic facts pertinent to your plan. On p. 87 of his report, he noted that "In FY2016, 76 per cent of electricity produced in the NEM came from coal-fired generators."

So the ratio of electricity from coal-fired baseload sources to all other sources was 3:1 in 2016 – and those other sources included gas and legacy hydro. Dr Finkel's projections (Figure 3.8 in his report) are for the ratio of baseload to intermittent sources to be 3:1 in 2020 and 1.5:1 in 2030 under his Big Lie "Clean" Energy Target, and 2:1 in 2030 under current arrangements.

Consequently, your mandated 1MW:1MW requirement would make no difference to the behaviour of wholesale purchasers of electricity in the immediate future and indeed for decades. Consequently it will not deter the "renewable energy" rorters from building more unreliable, intermittent power stations causing increased variability across the grid and more expensive power which your government forces electricity consumers to purchase.

Your ingenious plan demonstrates a complete lack of understanding of how the introduction of intermittent power generation has created system unreliability and doubled real electricity prices in Australia, and how it will continue to do so.

In short:

- Intermittent wind and solar is highly expensive electricity, requiring the combination of high wholesale prices plus LRET subsidies (paid by consumers) of a roughly similar amount, to make them viable.
- Because of the subsidies and the nature of the NEM, subsidised generators are able to always place their output into the grid, at the expense of baseload generators, with the latter then being turned into intermittent generators – not because of any deficiency on their part but because they keep getting shut out of the grid on an intermittent and unpredictable basis.
- Since they are thus prevented from operating at full capacity, baseload generators then also require high prices per MWH in order to be viable, and those necessary prices increase as the intermittency forced on them increases.
- Given that the proportion of intermittent generators is continuing to increase under your policy, and thus also the intermittency forced onto baseload generators, and given Australian government is driven by irrational ideology, no independent party will invest in new baseload plant or in the refurbishment of existing plant.
- Wind and solar generators are not just intermittent, they also fail to provide the frequency control and other functions essential to a widespread grid and which are an intrinsic part of baseload generators. Thus the increasing proportion of intermittent generators also adds increasing instability to the grid.
- Because of the multiplicity of intermittent generators mushrooming around the country, much more transmission infrastructure is required. Each of those generators requires an expensive substation to convert its output into a form suitable for the grid, plus new transmission links. The cost of this comes out of the pockets of electricity consumers.
- Many members of the public have responded to your high electricity prices (and in many cases encouraged by government subsidies) by placing solar panels on their roofs. Most of them remain connected to the grid because they also want electricity at night (adequate battery storage is very expensive) which cannot come from solar farms, and only sometimes will it come from wind farms, so you need additional investment (either legacy baseload or new gas-fired installations) to back up those private investments. All that investment has to be paid for by end-users. In addition, local distribution networks have consequent less demand on them, so their owners are requiring increased per household connection charges to meet their costs.
- You and previous governments have produced a Rube Goldberg structure of government agencies to oversee the NEM, which have destroyed affordable and reliable electricity, and whose failure is rewarded with expansion. In addition, you have duplicated at the national level government officials that once existed only at state level. Electricity consumers and taxpayers pay for this mess.
- The financial sector has got in the act offering hedging instruments so various parties can cope with the financial uncertainty caused by this system, uncertainty we never had before the NEM and intermittent power. The financial sector employs people and capital to provide those hedging instruments. That is a real cost which again ultimately comes out of the pockets of electricity consumers.
- Where once electricity in each state was produced by a state government responsible to its electorate, it is now produced by an unscrupulous oligopoly whose members use

every tactic they can to game the fake market Australian governments have created and thereby add further costs to consumers in order to pad the profits of their largely foreign owners.

As I pointed out in an earlier letter to you, this complex mess over which you are presiding and which you refuse to correct is costing the Australian community an ***excess*** and wholly unnecessary cost of between ***$30Bn and $50Bn per annum***. Yes, that is measured in ***tens of billions of dollars each year***. It is increasing each year and it is destroying tens of thousands of jobs.

Despite that knowledge, while presiding over a system where real consumer electricity prices are now twice what they were before your NEM started, you insult the Australian people by claiming you'll deliver them a reduction of less than 5% in maybe a decade's time, when you will be long gone from office. In other words ***you are telling them the country will have to suffer unaffordable power prices now and for decades*** – because you and the Prime Minister are too gutless or incompetent to fix it.

And all of this is done supposedly to limit the beneficial trace-gas carbon dioxide, despite your Chief Scientist having testified to the Senate that ***totally*** abolishing Australia's emissions of carbon dioxide would make virtually no difference to the world's climate.

More of the detail behind these points is explained in my letter to you re AEMO's recent misleading advice to you and in my open letter to Dr Finkel, of which you also have a copy.

I pointed out previously what is now being commonly recognised. There is only one way to ***restore*** affordable, secure electricity to Australia and its citizens. It has two parts:

- Abolish ***now*** all subsidies for particular forms of electricity supply. That means the RET-based subsidies for wind and solar in particular but also the various other forms like preferential funding for intermittent power generators.
- Offer long-term government contracts for low cost dispatchable electricity supply which is also able to provide the other characteristics needed for stable supply (e.g. frequency control) sufficient to meet Australia's electricity requirements with the safety margin we once enjoyed.

If you do not understand that, you are too clueless to be worth feeding. If you do understand it, then the policies you are following are outright treachery against Australia and its people – and all the Liberal and National party members who support this treachery are also culpable.

Dr Michael Crawford
mcrawford.boro@gmail.com

cc: Members of Australian Parliament and other interested parties

Hon. Josh Frydenberg MP
Minister for the Environment & Energy
PO Box 6022
House of Representatives
Parliament House
Canberra ACT 2600

28th September 2017

Minister

Open letter re recent dishonest and misleading advice from AEMO

You recently received a report from AEMO (*Advice to Commonwealth Government on Dispatchable Capacity*) which rivals the earlier report by Dr Finkel in its total aversion to explaining what lies behind the electricity security and price calamity being inflicted on the Australian people.

However, the AEMO report differs from Dr Finkel's in a couple of significant aspects.

- It takes steps to put itself beyond even theoretical exposure to the *Criminal Code*, though in reality it is nearly as dishonest and misleading as Dr Finkel's; and
- Unlike Dr Finkel, who has no operational responsibility for our electricity supply and is never going to be called to account for its continuing failure, the AEMO officials know that when the power goes off, many people will be pointing the finger at them. So, in self protection, they have been forced to be a bit more honest about the nature of the immediate threat – though they refuse to discuss what is causing that threat.

Dishonest and misleading – and no warranties

In a detailed letter to Dr Finkel in June, none of which he has repudiated, I pointed out that his document appeared to breach section 137.1(1) of the *Criminal Code Act 1995*, in relation to giving false or misleading information to someone exercising powers of the Commonwealth Government.

AEMO and its American CEO have avoided this risk, not by being markedly less misleading than Dr Finkel, but rather by covering the report with caveats. The very first page has a disclaimer telling you that:

> "AEMO and its officers, employees and consultants involved in the preparation of this document:
>
> - make no representation or warranty, express or implied, as to the currency, accuracy, reliability or completeness of the information in this document; and
> - are not liable (whether by reason of negligence or otherwise) for any statements or representations in this document, or any omissions from it, or for any use or reliance on the information in it."

In multiple places throughout the document there are repeated statements about the uncertainties.

So you have a report that AEMO is willing for you to rely on but AEMO will not guarantee its accuracy and will take no responsibility if it turns out to be wrong and you waste a few billion dollars more, or the power goes out more often or earlier than they suggest at various points.

As you read the document you were probably impressed to see many figures with an appearance of great accuracy, frequently with 3, 4, or even 5 significant digits. I hope when you read them you kept remembering that caveat up front, that AEMO makes no warranty "as to the currency, accuracy, reliability or completeness" of that information.

Hopefully you know the Australian vernacular phrase for such statements, so I won't spell it out here.

Given the inaccuracy of some of AEMO's past predictions, it certainly would be unwise of you to rely on any now presented. After all, ***if they really understood the NEM and were honest about it, they would have forecast the current problems years ago***.

The self-serving AEMO report:

- fails to mention actual electricity prices for users and what has caused the doubling of real consumer electricity prices and the continuing increase;
- fails to mention that AEMO's proposed solution will increase system costs and thus prices to end users;
- ignores the absolutely central past and continuing role of federal and state government policies, including the LRET, in creating the havoc that has destroyed our once affordable and secure electricity;
- refuses to mention that the NEM over which AEMO presides has been a total dud and has become a paradise for rorters, many of them foreigners;
- while it cannot completely hide the electricity security consequences of what it calls variable generators (wind and solar), promotes the dishonest impression that those generators provide lower cost electricity despite their existence being wholly dependent on subsidies and them being allowed to externalise numerous costs onto the rest of the system.

The purpose of the report is to protect the jobs of the bureaucrats who run this shonky system and the profiteers who exploit it, while destroying the lifestyles of Australians and their jobs. It presents the bare minimum of reality necessary in order to provide a rationale for adding some high cost fiddles to the NEM to reduce the likelihood of imminent blackouts and mass sackings of high-priced AEMO management. It conceals most of the facts and understanding necessary to re-establish an electricity system whose purpose is to serve electricity users and our society as a whole rather than a plague of profiteers.

That is totally consistent with AEMO's statement that it makes:

> "no representation or warranty, express or implied, as to the currency, accuracy, reliability or completeness of the information in this document"

Climate

I notice that the letter to you by the American lady you imported to run the Australian national energy market (you apparently having concluded no Australian was up to it) is garnished with the requisite PC phrases about weather and climate.

She notes the electricity system is "at risk from increased vulnerability to *climatic events*, such as *extended periods of high temperatures*" and she is concerned about having to "manage the potential impacts of *severe weather* on the power system" (*emphases mine*).

Perhaps you might send her one of Dorothea Mackellar's poems. Hopefully you know the one that includes:

I love a sunburnt country,
A land of sweeping plains,
Of ragged mountain ranges,
Of droughts and flooding rains.

and point out to her that it was written more than 100 years ago, by an Australian lady who knew tough "climatic events", such as "*extended periods of high temperatures*", are just part of Australia's normal climate, well before today's global warming hysteria.

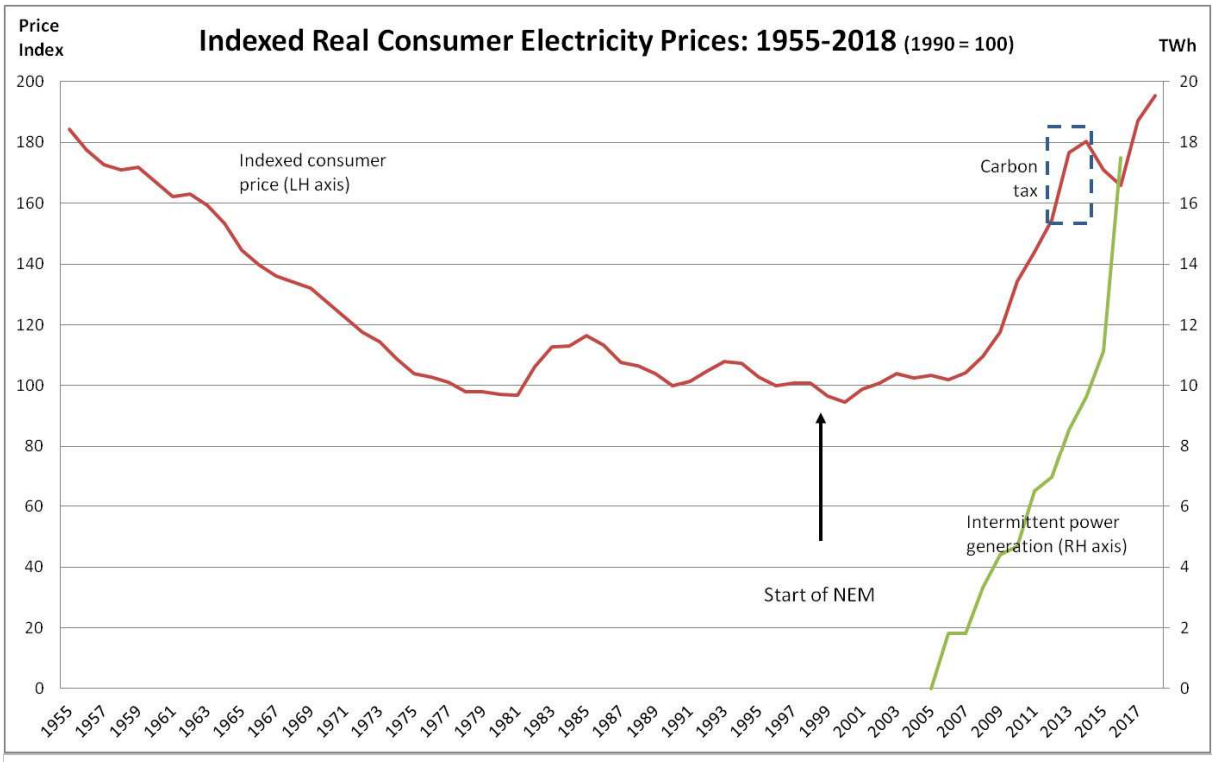
The state governments which built Australia's power generation and distribution system, before the NEM, were likewise familiar with our climate, which they took for granted, and they created systems which operated reliably, efficiently and at low cost in that environment – before the federal government got involved in turning one of the world's best and cheapest electricity systems into a basket case presided over by multiple unaccountable, expensive and incompetent bureaucracies.

Market Nonsense

In one very self-serving paragraph, your American correspondent claims:

> "AEMO's view is that optimal approaches towards ensuring an efficient balanced system must target mechanisms that allow the greatest practical level of competition and innovation. This will allow AEMO to operate a NEM, which along with the external financial markets, produces the most economically efficient results for consumers."

I suggest you share the following graph with your adviser and ask her to present her real-world **evidence** (not theories) to support her claim that the NEM, over which AEMO is presiding, "produces *the most economically efficient results for consumers*", or will do so.



Sources
Prices 1955 - 1980: *Electricity in Australia*, prepared for CIGRE by Frank Brady AM (former CEO, Electricity Commission of NSW), 1996
1980 - 2016: ABS 6401.0 Consumer Price Index
2017 - 2018: Adjustment (15% nominal increase) to take account of price increases announced by major elect distributors in June 2017
Intermittent power generation (Terra Watt hours, TWh) from Figure 4.2 in *Independent Review into the Future of the National Electricity Market*

The graph shows that real consumer electricity prices (i.e. inflation adjusted) have actually doubled since the NEM was formed. I suggest you take a few moments to think about that absolutely central piece of information and its consequences for all Australians. For all the families in Australia taking power from the grid, the inflation-adjusted rate per KWH is now basically twice as high as a decade ago, and it seriously affects their lives.

What does that mean in dollars?

Excess household expenditure on electricity (compared to holding real energy prices at 2000 rates) by Australian consumers is approx ***$12.7Bn in 2017 and will be $14.4Bn in 2018***.

The additional $12.7Bn which consumers have to spend on electricity, due entirely to real electricity price increases, is removed from expenditure on other goods and services. ***That has eliminated about 44,000 jobs elsewhere in Australia and it will be about 49,000 by end of 2018*** [1].

This is without including jobs lost because businesses also have faced massive increases in wholesale electricity prices, which has caused many to cease operating in Australia and others to cut back employment to offset the increased electricity costs. AEMO data shows business uses about 73% of total Australian electricity production, with 27% going to household use. Thus business uses almost three times as much electricity as do households. The excess cost

[1] Australian businesses, on average, employ one person for just under each $300,000 of income (extrapolated from *ABS 81550DO001_201314*), so $12.7Bn diverted from other expenditure destroys 44,000 jobs.

to Australian households is now about $12.7Bn p.a. In addition, a **larger** electricity cost burden is falling directly on Australian businesses, which also destroys jobs.

Perhaps you can get one of your advisors to do the sums on the total Australian excess electricity expenditure (at current real prices compared to 2000 real prices). Adding the excess expenditure for business to the excess expenditure for consumers, the total must be somewhere between $30Bn and $50Bn ***per year***.

Despite that reality, your American correspondent has the gall to claim that this AEMO controlled market "produces *the most economically efficient results for consumers*". The historical evidence shows the statement is a massive falsehood.

Your American correspondent also claims in that paragraph that:

> "an efficient balanced system must target mechanisms that allow the greatest practical level of competition and innovation"

That is another self-serving statement by AEMO which is repudiated by reality. From 1955 until the formation of the National Energy Market, real electricity prices in Australia ***fell*** by about 45%, particularly until the early 1980s. Throughout that period generation and distribution were in the hands of state governments.

Low cost, reliable, electricity was provided without the benefit of the markets your American correspondent thinks we need and without innovation away from coal-fired power stations which provided electricity that was dispatchable, cheap and reliable.

Has your American correspondent provided any credible plan to halve the real cost of our electricity supply so it equates with what state governments provided before the formation of the NEM and indeed achieved four decades ago? If not, why not, and why are you taking advice from someone who fails to recognise that the current system is a disaster for all Australians except those who like you and her are cushioned by hefty salaries.

The Nonsense of "The transformation challenge"

Your American correspondent tells you that "Australia's energy system is undergoing unprecedented transformation" which is "radically changing the dynamics of the power system". That is certainly true – which is why real consumer electricity prices have doubled and we are now having a national conversation about electricity security which was previously unheard of in this country.

She unfortunately neglects to tell you that this has been, and continues to be, entirely driven by federal and state government policies, especially the massive subsidies they have forced electricity consumers to pay to the rorters who provide intermittent and unpredictable energy supplies.

She assures you this is happening in other countries, as indeed it is – but only in those countries whose governments have stupidly decided to mandate intermittent electricity supplies which are having precisely the same effect for them as for Australia. Any rational person not blinded by ideology would find a lesson in that commonality worth mentioning – but it is a lesson your American correspondent is either blind to or wishes not to draw to your attention.

This misinformation by your correspondent is compounded by the statement:

> "older baseload units find it increasingly difficult to compete in this environment. These units have historically relied on relatively constant high production levels and stable revenues. In general, they are not well suited to respond to rapidly varying energy system needs. Their business model will be further challenged by the increasing variability in the system and falling costs of competitive sources of energy."

The first sentence in that paragraph is true. The rest is dishonest misinformation.

She says "These units have historically relied on relatively constant high production levels and stable revenues", as if that is a defect. Anyone with a modicum of knowledge of economics and business understands that achieving high capacity utilisation of productive assets of all kinds is the way to get low production costs, which is exactly what those baseload units gave, and will continue to give if run to match actual demand.

Is your American correspondent ignorant of this aspect of production economics – or is she just trying to mislead you?

She goes on to say "they are not well suited to respond to rapidly varying energy system needs". That is probably true, but the country does not have "rapidly varying energy system needs". It did not have it in the past and it does not have it now.

What Australia now has, is rapidly varying electricity supply from the intermittent power generators which, because federal government policy gives them pre-emptive access to the grid when they do generate power, forces rapid and large amplitude variations in the residual demand for power from baseload plants.

And the more of those unpredictable intermittent generators you add to the grid, to satisfy Finkel and other ideologues, the stronger will be the fluctuations in demand for electricity to be supplied by dispatchable sources and thus the less economic will those sources be unless electricity prices rise further to cover the inefficient way in which they are used. AEMO has not bothered to tell you this.

Incidentally, you might think from the words of your American correspondent that wind and solar farms are, unlike coal-fired plant, "well suited to respond to rapidly varying energy system needs". That is a reasonable inference from her words. Unfortunately, like much of what you might understand from her letter and the AEMO report, it is totally false.

In order to be "well suited to respond to rapidly varying energy system needs", a plant must be able to provide power that matches those supposed "rapidly varying energy system needs". Of course, neither wind nor solar can do that. They can provide power only when the wind is blowing and the sun is shining – irrespective of what electricity consumers want. Surely even your American correspondent understands the sun does not shine at night and wind farm output is sporadic and unpredictable and overall averages about one third of rated capacity.

The business model of baseload, coal-fired power stations is "challenged", as she quaintly puts it, because the federal government has mandated a massive subsidy and preferential grid access for intermittent electricity generators – at the expense of efficient forms of electricity generation and Australian electricity users.

Their business model would not be "challenged" were they being run to provide continuous power output as was the case when owned by state governments, at which time they provided us with reliable electricity at half the current real price.

And her statement about "falling costs of competitive sources of energy" is just pathetic propaganda for intermittent power sources and shows the gross biases of the people you have running AEMO. If the cost of electricity from those sources was falling in any way material to Australian consumers, those sources would not need enforced subsidies and real electricity prices would be going down, not up.

The solution to actually provide affordable, reliable electricity

There is only one way to ***restore*** affordable, secure electricity to Australia and its citizens. It has two parts:

- Abolish all subsidies for particular forms of electricity supply. That means the RET-based subsidies for wind and solar in particular but also the various other forms like preferential funding for intermittent power generators.
- Offer long-term government contracts for low cost dispatchable electricity supply which is also able to provide the other characteristics needed for stable supply (e.g. frequency control) sufficient to meet Australia's electricity requirements with the safety margin we once enjoyed.

If wind and solar operators, who claim to be innovators, can figure out some way to provide competitive, low cost, unsubsidised dispatchable power on that basis, fine. In reality, they, AEMO, you and I know they can't – but the two-pronged approach does not discriminate against them. Physics and reality do.

The main sources likely to meet the dispatchable provision are, as AEMO itself notes, coal, gas, liquid fuel, hydro and biomass, and of course nuclear, which AEMO fails to mention despite being used successfully in most of the developed world.

Of course the rorters will squeal like stuck pigs. But Australian governments totally ignored the effect of current energy policies on Australian companies forced out of business and the loss of value in their investments, and on the Australian citizens forced to go without power and those who were forced to cut back consumption of food and other goods and services to pay for vastly inflated electricity prices.

Nothing in the Australian Constitution or even the bible says we have to keep fleecing our population to benefit rorters – though your reticence to do something about it suggests you feel some imperative to protect the latter.

And let's not have the red herring about "sovereign risk". Through the "renewable energy" fantasy, Australian governments have destroyed the value of a massive amount of pre-existing industrial production, which was there in accordance with previous government policies, without anyone suggesting that created a "sovereign risk" problem. There is no "sovereign risk" problem from treating the intermittent electricity rorters in the same way. In fact there is a true "sovereign risk" if by persisting with this stupidity we continue to destroy our economy and thus Australia's future capacity to pay its debts.

Politicians of all parties have totally destroyed any rational market for investment in electricity generators. It doesn't matter what you or the PM or the leader of the Opposition says, no one will now make an investment that depends on continuous rational behaviour by Australian governments, which have shown themselves too often driven by clueless irrationality and fantasy.

All generator investment is now dependent on an expectation of massive subsidies (RET) or on having long-term, take or pay, contracts with government which cannot be set aside.

AEMO recommends you enter supply contracts – but not in a form that would reduce electricity costs and prices. Rather its recommendation is for some contracted "backup" provision which must inevitably be a cost on top of the subsidy-based, high cost system currently driven by destructive government policies.

In other words, having failed to see the problem coming and done anything about it, AEMO proposes to add further costs to our electricity system and further real prices increases to electricity consumers.

That might be a "solution" good for AEMO. It is not a solution good for Australia and its people.

The simple fact is you have received from AEMO advice which is self-serving and grossly dishonest and misleading. At least they have told you in their caveats that they don't claim the advice is *accurate, reliable or complete*.

You can follow their advice and go down in Australia's history as being even more destructive for our country than the Rudd/Gillard governments. In so doing, you will continue to impose on the people and businesses of Australia a massive and wholly wasteful cost currently somewhere between $30Bn and $50Bn p.a.

Or you can just do the job the people of Australia are paying you for, and take the steps necessary to restore to our country a genuinely affordable and reliable electricity supply, as once we had.

Dr Michael Crawford
mcrawford.boro@gmail.com

cc: Members of Australian Parliament and other interested parties

B.2 AGENCY SUBMISSIONS

FORBES SHIRE COUNCIL
ABN 86 023 614 567
Administration Centre:
2 Court St Forbes NSW 2871
All mail to:
General Manager
PO Box 333
Forbes NSW 2871
General Enquiries:
T 02 68 502 300
F 02 68 502 399
Mayor and
General Manager:
T 02 68 502 304
F 02 68 502 399
Engineering Services:
137 Lachlan Street
Forbes NSW 2871
T 02 68 502 874
F 02 68 502 899
Environmental Services:
T 02 68 502 344
F 02 68 502 398
Email & Web:
forbes@forbes.nsw.gov.au
www.forbes.nsw.gov.au

Document: 397016

21 December 2017

NSW Planning and Environment
GPO Box 39
Sydney NSW 2001

Subject: Jemalong Solar Farm Project (SSD8803)

Dear Sir/Madam,

Council is in receipt of the Environmental Impact Statement for the Jemalong Solar Station 50MW Photovoltaic Plant.

Council supports the construction and operation of the 50MW Photovoltaic Plant.

Council has had a good working relationship with Vast Solar in the development of their two previous pilot plants constructed within the Forbes Shire.

Council raises the following comments for consideration in the assessment of the application.

Road Network
Lachlan Valley Way (Forbes to Condobolin) is a regional RMS classified road.

Wilbertroy Lane and Naroo Lane are both roads under Council control.

The application indicates that during the construction phase, up to 100 workers will be on site during this phase which would generate up to three bus trips and between 10-20 light vehicle trips a day. This estimation is on the assumption that there would be an 80% take up of construction workers being transported to the site via buses. In any scenario there would be a substantial increase in not only transportation of construction workers to the site during the 12 month construction phase but also the increase in heavy ridged vehicles transporting construction materials and products to the site. The increased generation of trips along the unsealed roads of Wilbertroy Lane and Naroo Lane during the construction, operation and decommissioning phase will substantially impact on the quality of these roads.

Not only will there be an impact on the quality of the road, but both Wilbertroy Lane and Naroo Lane are only narrow formations (4m) roads and were not designed for the traffic volumes or vehicle types proposed to be using these roads as a part of this project. Therefore there is likely to be road safety implications during the construction phase of this project.

Given the road safety implications generated from the Vast Solar project it is recommended that the Wilbertroy Lane and Naroo Lane are widened and sealed to ameliorate any impacts on road safety.

Flooding of the Road Network

The road network proposed to access the site (Lachlan Valley Way, Wilbertroy Lane and Naroo Lane) will be inundated in a flood event as this road network is within identified flood prone land.

This road network does not provide sufficient drainage to ensure that the network can cope with the funnelling of flood water away from the road and therefore this network is likely to be closed during a flood event. There is no alternative access to the site during a flood event. A contingency plan for access during these times should be developed.

Flooding in relation to structures
The proposed development is located on flood-liable land. Any structures located within the floodway should be designed to be capable of withstanding flood waters and debris which may impact on the structures.

Accommodation of workers
The application indicates that during construction period, there would be up to 100 workers living in Forbes and Parkes who would be transported to the site. The Environmental Impact Statement specifies that the workers will be locals, however this is the best case scenario. The Environmental Impact Statement does not discuss how they will accommodate 100 workers where the workforce does not consist of locals.

Whilst there would be significant economic benefits to both Forbes and Parkes through the increased population during the construction stage, there may be issues in obtaining accommodation within Forbes and Parkes given the tight rental markets.

Information has not been provided in relation to how the 100 workers would be accommodated.

Tourist Attraction
The application states that the site may become a tourist attraction in a similar manner to the Parkes Radio Telescope.

Council would encourage the development of the site as a tourist and education facility. Suitable areas for tourist facilities and parking should be considered in the development of the site.

Water Supply
Details would need to be provided of how a potable water supply will be provided to the site during the construction and operation stages.

Onsite Disposal of Effluent
Details of the onsite waste treatment facilities for effluent would need to be provided, indicating their suitability to cater for the expected 100 workers during construction stage, and how this facility would operate once the solar plant is operational.

Stormwater
The site should be graded to enable stormwater to flow to the stormwater control ponds.

Erosion and Sedimentation Control
Erosion and sedimentation control should be installed during construction period.

Flora and Fauna
Any fauna encountered onsite during construction period should be rehomed.

Landscaping Buffers
Landscaping buffers should be provided so as to assist with screening of the solar plant from the dwellings in Whispering Pines Lane.

Site Remediation / Validation
Following the decommissioning of the plant, the site should be remediated and validated, given the chemicals stored on the site.

Construction waste management
The Environmental Impact Statement specifies that the construction waste would be disposed at a licensed waste facility and that a Waste Management Plan would be development to minimise waste. The Waste Management Plan would include opportunities strategies to avoid, reuse and recycle waste.

The closest licensed facility is Daroobalgie landfill and the rural landfills are reaching capacity and cannot accommodate the level of construction waste proposed to be generated from the site. It is therefore imperative for any Waste Management Plan prepared for the project to ensure that the maximum amount of construction waste is reused and recycled.

Council requests that the above issues be considered in the assessment of the application.

Council also looks forward to working with Vast Solar on the development and continued operation of the 50MW Photovoltaic Plant.

Should you require further information, please contact the undersigned on ***6850 2344***

Yours faithfully

Paul Bennett
Director
ENVIRONMENTAL SERVICES & PLANNING

NSW GOVERNMENT | Department of Industry

OUT17/ 46694

Ms Rose-Anne Hawkeswood
Resource Assessments
NSW Department of Planning and Environment

Rose-Anne.Hawkeswood@planning.nsw.gov.au

Dear Ms Hawkeswood

Jemalong Solar (SSD 8803)
Comment on the Environmental Impact Statement (EIS)

I refer to your email of 21 November 2017 to the Department of Industry in respect to the above matter. Comment has been sought from relevant branches of Crown Lands & Water and Department of Primary Industries.

Any further referrals to Department of Industry can be sent by email to landuse.enquiries@dpi.nsw.gov.au.

The department has reviewed the EIS and provides the following recommendations:

- The proponent should ensure that the site is still used for agricultural purposes as part of the land management regime.
- Any underground infrastructure should be buried at a depth greater than 800mm to allow greater opportunity for agricultural activities to continue, particularly for infrastructure that is to remain buried after decommissioning and rehabilitation.
- The final design criteria of the final land use should consider the soil and land capability of the site (Class 3), agricultural productivity (such as yield) and other indicators from land capability and soil testing to guide the return of the land back to full agricultural production. The final soil and land classification for the site should be equal to or better than the existing capability after rehabilitation.
- The proponent should clarify whether the licensing of the proposed use of water from irrigation channels under "landowners farm rights" is associated with an existing licensed entitlement or a water right associated with the landholding.
- The proponent should confirm an agreement to access the necessary water supplies and volumes.
- The proponent should provide further flood assessment to confirm the impacts of internal and external road infrastructure, and PV infrastructure installation at the site on the flood characteristics. This assessment should consider the requirements of the Floodplain Management Plan: Lachlan River: Jemalong Gap to Condobolin.
- Any approval of the project should include a condition of consent requiring that a Soil and Water Management Plan be developed in consultation with Crown lands & Water (water.referrals@dpi.nsw.gov.au).

Yours sincerely

Alex King
A/Director, Planning Policy & Assessment Advice
20 December 2017

NSW Department of Industry Crown Lands and Water Division
Level 49 | 19 Martin Place | Sydney NSW 2000
Tel: 02 9934 0805 landuse.enquiries@dpi.nsw.gov.au ABN: 72 189 919 072

Planning & Environment
Resources & Geoscience

21 December 2017

Rose-Anne Hawkeswood
Senior Planning Officer, Resource Assessments – Planning Services
Department of Planning & Environment
GPO Box 39
SYDNEY NSW 2001

Your Reference: SSD 8803
Our Reference: OUT17/49828

Emailed: Rose-Anne.Hawkeswood@planning.nsw.gov.au

Dear Ms Hawkeswood,

Re: Jemalong Photovoltaic Solar Farm SSD 8803 – Environmental Impact Statement

Thank you for the opportunity to provide advice on the above matter. This is a response from the NSW Department of Planning & Environment – Division of Resources & Geoscience, Geological Survey of New South Wales (GSNSW).

GSNSW specific requirements for the Jemalong Photovoltaic Solar Farm Project (SSD 8803) required the proponent to include in the Environmental Imapct Statement (EIS) a dated mining and exploration title and application search referencing DRGs MinView databases.

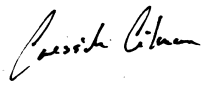
The proponent has addressed mining, exploration and minerals in the EIS, and has reviewed DRG online MinView database and Common Ground Viewer, successfully identifying that there are no mining or exploration titles or application indicated over or in the vicinity of the Project site (Refer to page 61 of the EIS).

GSNSW notes that an assessment of current available data confirms that at this stage of the Project, here are no current mineral, coal or petroleum titles or applications, or extractive industries in the vicinity of the project site. Accordingly, GSNSW are satisfied the proponent has addressed the Divisions specific requirements and have no resource sterilisation concerns with the Project at this stage.

Should biodiversity offsets be considered for this project, GSNSW requests consultation to ensure there are no potential sterilisation impacts to resources.

Queries regarding the above information, and future requests for advice in relation to this matter, should be directed to the GSNSW Land Use team at landuse.minerals@industry.nsw.gov.au.

Yours sincerely



Cressida Gilmore
Manager - Land Use

DOC17/597323-1
SSD 8803

Ms Rose-Anne Hawkeswood
Senior Planning Officer
Department of Planning & Environment
rose-anne.hawkeswood@planning.nsw.gov.au

Dear Rose-Anne

Jemalong Solar Farm Exhibition

I refer to your email dated 23 November 2017 requesting that the Office of Environment and Heritage (OEH) provide comments on the Environmental Impact Statement (EIS) for the proposed Jemalong Solar Farm.

The proposal involves the construction and operation of a commercial scale 50 megavolt photovoltaic (PV) plant instead of a 30MW concentrating solar thermal (CST) power plant as originally proposed and assessed by OEH for this site. OEH understands that the concentrating solar thermal power plant is now being relocated to another location.

The EIS for the previously proposed 30MW CST power plant indicated that all remnant patches of woodland within the power plant site were to be avoided, and 1.83 hectares of native vegetation would be removed for the transmission line.

OEH notes that 0.84 hectares of native vegetation removal is now proposed at the site. OEH acknowledges and welcomes the reduction in impact with the proposed amendments to the transmission line route.

Appendix E of the EIS provides contradictory statements as to whether all remnant woodland patches within the solar array area have been avoided (page 47). As a result, OEH assumes that 0.21 ha of native vegetation will be cleared within the power plant area, and that the inability to avoid this clearing of remnant woodland is due to the new panel design footprint which has been arranged to avoid larger remnant woodland patches around the perimeter.

The EIS states that an offset will be established within two years of the commencement of construction. Given the small impact area and the commitment to either acquire or retire credits under the Biodiversity Conservation Act 2016 or make payments into the Biodiversity Conservation Fund (BCF), OEH is of the view that acquittal of the credit requirement should be achieved in a shorter timeframe. OEH recommend that the Biodiversity Conservation Trust is contacted to discuss the most appropriate trigger (submission / application / payment) to be included in any associated consent condition relating to payment into the fund.

If you have any questions regarding this matter, please contact David Geering on 02 6883 5335 or email david.geering@environment.nsw.gov.au.

PO Box 2111 Dubbo NSW 2830
Level 1, 48-52 Wingewarra Street Dubbo NSW 2830
Tel: (02) 6883 5330 Fax: (02) 6884 8675
ABN 30 841 387 271
www.environment.nsw.gov.au

Yours sincerely

PETER CHRISTIE
Director North West
Regional Operations Division

20 December 2017

Contact officer: DAVID GEERING
6883 5335

NSW RURAL FIRE SERVICE

The Secretary
Department of Planning and Environment
GPO Box 39
Sydney NSW 2001

Your reference: SSD 8803
Our reference: D17/3594

14 December 2017

Attention: Rose-Anne Hawkeswood

Dear Sir/Madam,

Notice of Exhibition – Jemalong Solar Farm

Reference is made to correspondence dated 21 November 2017 seeking comments on the State Significant Development Application and Environmental Impact Statement (EIS) prepared in relation to the above site in accordance with the *Environmental Planning and Assessment Act 1979.*

The New South Wales Rural Fire Service (NSW RFS) has reviewed the information provided and advises that is has no objection to the proposal subject to the following conditions:

1. A Fire Management Plan (FMP) shall be prepared for the proposed facility in consultation with the local NSW RFS District Office. The FMP shall include:
   - 24 hour emergency contact details including alternative telephone contact
   - site infrastructure plan
   - fire fighting water supply plan
   - site access and internal road plan
   - construction of asset protection zones and their continued maintenance
   - location of hazards (physical, chemical and electrical) that will impact on the fire fighting operations and procedures to manage identified hazards during the fire fighting operations
   - such additional matters as required by the NSW RFS District Office.
2. The entire solar array development footprint shall be managed as an asset protection zone as outlined within section 4.1.3 of *Planning for Bush Fire Protection 2006* and the NSW RFS document *Standards for asset protection zones.*

Postal address
NSW Rural Fire Service
Records Management
Locked Bag 17
GRANVILLE NSW 2141

Street address
NSW Rural Fire Service
Planning and Environment Services (East)
42 Lamb Street
GLENDENNING NSW 2761

T 1300 NSW RFS
F (02) 8741 5433
E pes@rfs.nsw.gov.au
www.rfs.nsw.gov.au

3. A 10 metre defendable space, managed as an asset protection zone, shall be provided around the perimeter of the solar array development site to allow for emergency service personnel to undertake property protection activities.

4. A 20,000 litre water supply (tank) fitted with a 65mm Storz fitting shall be located adjoining the internal property access road within the required asset protection zone.

If you have any queries regarding this advice, please contact Development Assessment and Planning on 1300 NSW RFS.

Yours sincerely,

Nika Fomin
Manager, Planning and Environment Services (East)

Fire & Rescue NSW

File Ref. No: BFS17/2806 (8000002060)
TRIM Doc. No: D17/87570
Contact: Station Officer Graeme Turnbull

20 December 2017

The Department of Planning & Environment
C/- Rose-Anne Hawkeswood
GPO Box 39
SYDNEY NSW 2001

E: rose-anne.hawkeswood@planning.nsw.gov.au

Dear Ms Hawkeswood

Secretary's Environmental Assessment Requirements (SEARs)
Jemalong Hybrid Solar Park Project (SSD8803)
Jemalong Station Lachlan Valley Way, Forbes

I refer to the above development proposal and the Department of Planning & Environment's (the Department) invitation for agencies to provide input for consideration in development of the SEARs. Fire & Rescue NSW (FRNSW) have reviewed aspects of the proponent's Environmental Impact Statement (EIS) and the following comments and recommendations are submitted for consideration.

FRNSW notes that the facility's proposed location is within a NSW Rural Fire Services' (RFS) Fire District. Notwithstanding, in the event of a significant fire event (either on or off-site in close proximity to the development) or hazardous material incident FRNSW will be responded to either assist the RFS or to fulfill the role of designated combat agency.

It is FRNSW experience that small and large scale photovoltaic installations present unique electrical hazard risks to our personnel when fulfilling their emergency first responder role (the Fire Brigades Act 1989 imposes specific statutory functions and duties upon the Commissioner of FRNSW).

In addition, the Work Health and Safety (WHS) Act 2011 (and its subordinate Regulation) classify FRNSW as an entity conducting a business or undertaking (PCBU). Clauses 34 and 35 of the WHS Regulation impose specific obligations upon a PCBU to identify hazards and manage risks at workplaces.

Due to the electrical hazards associated with large scale photovoltaic installations and the potential risk to the health and safety of firefighters, both FRNSW and the NSW Rural Fire Service must be able to implement effective and appropriate risk control measures when managing an emergency incident at the proposed site.

Recommendation/s

Should a fire or hazardous material incident occur, it is important that first responders have ready access to information which enables effective hazard control measures to be quickly implemented. Without limiting the scope of the emergency response plan (ERP), the following matters are recommended to be addressed:

1. That a comprehensive ERP is developed for the site.

2. That the ERP specifically addresses foreseeable on-site and off-site fire events and other emergency incidents, (e.g. fires involving solar panel arrays, bushfires in the immediate vicinity or potential hazmat incidents).

3. That the ERP detail the appropriate risk control measures that would need to be implemented to safely mitigate potential risks to the health and safety of firefighters and other first responders (including electrical hazards). Such measures would include the level of personal protective clothing required to be worn, the minimum level of respiratory protection required, decontamination procedures, minimum evacuation zone distances and a safe method of shutting down and isolating the photovoltaic system (either in its entirety or partially, as determined by risk assessment).

4. Other risk control measures that may need to be implemented in a fire emergency due to any unique hazards specific to the site should also be included in the ERP.

5. That two copies of the ERP (detailed in recommendation 1 above) be stored in an 'Emergency Information Cabinet' located in a prominent position directly adjacent to the site's main entry point/s.

6. Once constructed and prior to operation, that the operator of the facility contacts the relevant local emergency management committee (LEMC). The LEMC is a committee established under Section 28 of the State Emergency and Rescue Management Act 1989. LEMCs are required to be established so that emergency services organisations and other government agencies can proactively develop comprehensive inter agency local emergency procedures for significant hazardous sites within their local government area. The contact details of members of the LEMC can be obtained from the relevant local council.

For further information please contact Graeme Turnbull of the Fire Safety Assessment Unit, referencing FRNSW file number BFS17/2806 (8000002060). Please ensure that all correspondence in relation to this matter is submitted electronically to firesafety@fire.nsw.gov.au.

Yours sincerely

Station Officer Mark Castelli
Team Leader
Fire safety Assessment Unit

Australian Government

Civil Aviation Safety Authority

AIR NAVIGATION, AIRSPACE AND AERODROMES
File Ref: F16/3626-3

11 January 2018

Ms Rose-Anne Hawkeswood
Senior Planning Officer
NSW Planning and Environment
GPO Box 39
SYDNEY NSW 2001

Dear Ms Hawkeswood,

Re: Jemalong Solar Farm Project (SSD 8803)

Thank you for referring the Jemalong Solar Farm Project to CASA for review.

CASA is aware that modern solar panels are designed to absorb light, and not to reflect it. The solar farm is sufficiently distant from Forbes Aerodrome to not be of concern. The small airstrip immediately adjacent the solar farm is not subject to CASA regulation and CASA can only provide advice on potential impact.

It is possible that pilots using the private strip could be negatively impacted by the solar farm due to low level after image glare from the panels when they are rotated towards the east in early morning and also in the late afternoon when the panels are rotated towards the west. There is also the potential for turbulence to be created by convection currents created by the panels (p168 EIS) which could negatively impact aircraft operations to and from the airstrip.

Given that there are only approximately two flights per year to and from this private strip (p167 EIS) the level of risk is low and it remains the pilots responsibility to ensure that he / she is aware of the risks associated with flying near the solar farm and takes measures to reduce that risk.

CASA has no objection to the proposal on the condition that the panels are treated with an anti-reflective coating. The owners of the airstrip should also be advised of the potential risks described above so that aircraft operators using the strip can be advised of those potential risks.

Yours sincerely

Matthew Windebank
Aerodrome Engineer

Zeina Jokadar

Subject: FW: NGH - worth including update from airservices in agency response please - Fwd: FW: AIRSERVICES RESPONSE: NSW-MA-510 - Dev, Jemalong Solar farm [SEC=UNCLASSIFIED]

From: **Rose-Anne Hawkeswood** <Rose-Anne.Hawkeswood@planning.nsw.gov.au>
Date: Tue, Feb 6, 2018 at 10:34 AM
Subject: FW: AIRSERVICES RESPONSE: NSW-MA-510 - Dev, Jemalong Solar farm [SEC=UNCLASSIFIED]
To: "anthea.fawcett@vastsolar.com" <anthea.fawcett@vastsolar.com>

Hi Anthea

Comment from Air Services below on the Jemalong PV proposal.

Kind regards

Rose-Anne Hawkeswood

Senior Planning Officer | Resource Assessments | Planning Services

320 Pitt Street | GPO Box 39 | Sydney NSW 2001
T 02 9274 6324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From: Airport Developments [mailto:Airport.Developments@AirservicesAustralia.com]
Sent: Thursday, 25 January 2018 10:38 AM
To: Rose-Anne Hawkeswood <Rose-Anne.Hawkeswood@planning.nsw.gov.au>
Cc: airspace.protection@casa.gov.au
Subject: AIRSERVICES RESPONSE: NSW-MA-510 - Dev, Jemalong Solar farm [SEC=UNCLASSIFIED]

Hi Rose-Anne

I refer to your request for an Airservices assessment of the Jemalong Solar farm.

Airspace Procedures

With respect to procedures designed by Airservices in accordance with ICAO PANS-OPS and Document 9905, at a maximum height of 226m (742ft) AHD the Jemalong solar farm will not affect any sector or circling altitude, nor any instrument approach or departure procedure at any Airport.

Note that procedures not designed by Airservices were not considered in this assessment.

Communications/Navigation/Surveillance (CNS) Facilities

This development to a maximum height of 226m (742ft) AHD will not adversely impact the performance of Precision/Non-Precision Nav Aids, HF/VHF Comms, A-SMGCS, Radar, PRM, ADS-B, WAM or Satellite/Links.

Kind regards,

William Zhao

Advisor Airport Development | Operational Standards & Assurance

Airservices Australia

Phone: +61 3 9339 2504

Email: airport.developments@airservicesaustralia.com

www.airservicesaustralia.com

From: Airport Developments
Sent: Friday, 12 January 2018 11:25 AM
To: Rose-Anne Hawkeswood <Rose-Anne.Hawkeswood@planning.nsw.gov.au>
Subject: RE: NSW-MA-510 - Dev, Jemalong Solar farm [SEC=UNCLASSIFIED]

Thanks Rose-Anne,

Regards

William Zhao

Advisor Airport Development | Operational Standards & Assurance

Airservices Australia

Phone: +61 3 9339 2504

Email: airport.developments@airservicesaustralia.com

www.airservicesaustralia.com

From: Rose-Anne Hawkeswood [mailto:Rose-Anne.Hawkeswood@planning.nsw.gov.au]
Sent: Thursday, 11 January 2018 3:14 PM
To: Airport Developments <Airport.Developments@AirservicesAustralia.com>
Subject: RE: NSW-MA-510 - Dev, Jemalong Solar farm [SEC=UNCLASSIFIED]

Hi William

As requested, the proponent has supplied the coordinates of the solar farm (attached).

Kind regards

Rose-Anne Hawkeswood

Senior Planning Officer | Resource Assessments | Planning Services

320 Pitt Street | GPO Box 39 | Sydney NSW 2001
T 02 9274 6324

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From: Airport Developments [mailto:Airport.Developments@AirservicesAustralia.com]
Sent: Thursday, 11 January 2018 10:41 AM
To: Rose-Anne Hawkeswood <Rose-Anne.Hawkeswood@planning.nsw.gov.au>
Subject: NSW-MA-510 - Dev, Jemalong Solar farm [SEC=UNCLASSIFIED]

Hi Rose-Anne,

I have received your proposal and commenced the Airservices assessment which will take approximately 6 weeks for completion.

If you have any questions, please contact the Airport Developments team and quote assessment code: NSW-MA-510

Please note that all completed Airservices assessments are also forwarded to CASA.

Regards,

William Zhao

Advisor Airport Development | Operational Standards & Assurance

Airservices Australia

Phone: +61 3 9339 2504

Email: airport.developments@airservicesaustralia.com

www.airservicesaustralia.com

From: Rose-Anne Hawkeswood [mailto:Rose-Anne.Hawkeswood@planning.nsw.gov.au]
Sent: Tuesday, 9 January 2018 2:42 PM
To: 'lpsi.directorate@defence.gov.au' <lpsi.directorate@defence.gov.au>; 'aar.corro@casa.gov.au' <aar.corro@casa.gov.au>; Airport Developments <Airport.Developments@AirservicesAustralia.com>; Windebank, Matthew <Matthew.Windebank@casa.gov.au>
Subject: Jemalong Solar Farm Project (SSD 8803) - Invitation to comment on EIS

Vast Solar Pty Ltd has submitted a Development Application for the Jemalong Solar Farm (SSD 8803) to be located on the property known as “Hallidays” (a part of Jemalong Station) on Lachlan Valley Way in the Forbes local government area.

The proposal involves the construction and operation of a 50 MW solar photovoltaic (PV) plant and associated infrastructure, including a transmission line.

In addition to Forbes Airport located approximately 20 kilometres to the north east of the site, there is a small privately operated air strip is located about 500 metres to the east of the proposed development site.

The Environmental Impact Statement (EIS) for the Jemalong PV solar farm may be viewed on the Department's website at http://majorprojects.planning.nsw.gov.au/index.pl?action=view_job&job_id=8803.

I invite your agency to comment on the proposal, including providing advice on recommended conditions of approval, **by Friday 2 February 2018.**

Note:

The site is also the subject of a development application made by the same proponent for a concentrating solar thermal plant. The proponent has advised that they intend to amend the development application for the concentrating solar thermal plant to relocate that development to an adjacent site. The amendment to the development application for the concentrating solar thermal plant would be a separate process in the future.

Kind regards

Rose-Anne Hawkeswood

Senior Planning Officer | Resource Assessments | Planning Services

320 Pitt Street | GPO Box 39 | Sydney NSW 2001
T 02 9274 6324


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13 December 2017

SF2014/057972; WST14/00080/04

The Manager
Resource Assessments
Department of Planning and Environment
GPO Box 39
SYDNEY NSW 2001

Attention: Rose-Anne Hawkeswood

Dear Ms Hawkeswood

SSD 8803: Lots 13, 41 & 48 DP 753118, Lot 1 DP 652274, Lots 1 & 5 DP 1118332 and Lot 1 DP 441702; 'Hallidays' Naroo Lane, Forbes; Jemalong Hybrid Solar Park

Thank you for your email on the 21 November 2017 referring SSD8803 to Roads and Maritime Services for comment. Reference is made to Roads and Maritime's previous submission in relation to this proposal dated 23 October 2017 (copy inclosed)

The EIS has been reviewed and Roads and Maritime notes the following components of the proposal:

- Construction, operation and decommissioning of a 50 megawatt solar photovoltaic plant south-west of Forbes. The projected lifespan of the facility is 30 years.
- Vehicular access to the site via the Newell Highway (HW17), Lachlan Valley Way (MR377), Wilbertroy Lane and then Naroo Lane.
- Construction period extending over 12 months, with peak construction works requiring up to 100 personnel on site.

The proponent has identified the types (basic) and total volumes of construction related traffic in the EIS, however, the EIS lacks detail in relation to construction staff commuter traffic generated by the project, existing road and intersection treatments and how traffic will be managed to provide a high level of safety for all road users during construction and operation of the solar farm. Specifically, the assumption that 80% of construction staff will be transported to and from site each day by bus has not been substantiated. Should the assumed 80% target not be met, the proposal will generate significant vehicular movements on narrow unsealed roads and bridges and no detail has been provided detailing how the proponent will manage the safe transportation of staff to and from site in the event of this target not being met.

Based upon the information provided, Roads and Maritime is not able to undertake a full assessment of the proposal and is unable to advise the Department on what measures are required to provide a high level of road safety during construction and operation of the solar plant.

Roads and Maritime, at this time, withholds making comment. To reconsider its position, Roads and Maritime requests that additional information be provided that addresses all the information requested on and as set out in Roads and Maritime's letter dated 23 October 2017.

Please confirm with Roads and Maritime that the development application will not be determined until such time as Roads and Maritime has had an opportunity to comprehensively assess the development application following provision of the additional information. Should you require further information please contact the undersigned on 02 6861 1453.

Yours faithfully,

Andrew McIntyre
Manager Land Use Assessment
Western

APPENDIX C TRAFFIC AND TRANSPORT

C.1 CONSTRUCTION WORKER TRAFFIC AND CARPOOLING

The construction phase will last approximately 12months with a nine-month peak construction period. The number of workers on site is expected to range from 30 employees in the start of construction and rise to approximately 100 employees during peak construction.

During operation, only 3 to 4 full time employees would be required for the ongoing day to day operation of the facility.

The following table provides a breakdown of the number of workers by category over a 33-week construction program, which is based on the development of a Solar PV Plant with a similar power output to the Jemalong PV Solar Plant.

Since the Jemalong PV Plant construction program is 52 weeks, the example used provides a conservative assessment of weekly staffing requirements.

Table C-1 Weekly Staff Requirements

Week	Blue Collar							White Collar	Total
	Civil	Trade assistant (Labourer)	Operator	Rigger	Subcontract	Electrician	Commissioning	Project management and delivery	
1	0	2	0	0	1	0	0	5	8
2	0	2	0	0	2	0	0	5	9
3	4	1	0	0	4	0	0	9	18
4	7	0	0	0	10	0	0	9	26
5	11	0	2	0	11	0	0	9	33
6	11	0	2	0	8	0	0	9	30
7	9	0	2	0	9	0	0	20	40
8	2	3	1	0	10	0	0	20	36
9	4	7	1	0	10	0	0	23	45
10	5	8	1	0	29	2	0	23	68
11	12	17	4	0	25	7	0	23	88
12	5	28	2	0	20	13	0	25	93
13	11	30	2	0	29	17	0	25	114
14	9	47	3	0	25	18	0	25	127
15	8	39	2	0	23	33	0	24	129
16	5	54	3	0	11	35	0	24	132
17	9	57	4	0	1	23	0	20	114
18	3	47	2	0	0	20	0	20	92
19	1	54	2	0	0	17	0	20	94
20	1	53	2	1	1	22	0	17	97
21	1	41	0	2	1	31	0	17	93
22	0	38	0	1	0	35	9	17	100
23	0	29	0	0	0	22	10	17	78
24	0	20	0	0	0	10	10	17	57
25	0	20	0	0	0	10	11	17	58
26	0	23	0	0	0	4	11	17	55
27	0	11	0	0	0	6	11	4	32
28	0	5	0	0	0	5	11	4	25
29	0	0	0	0	0	0	11	4	15

Week	Blue Collar							White Collar	Total
	Civil	Trade assistant (Labourer)	Operator	Rigger	Subcontract	Electrician	Commissioning	Project management and delivery	
30	0	0	0	0	0	0	11	4	15
31	0	0	0	0	0	0	11	4	15
32	0	0	0	0	0	0	10	4	14
33	0	0	0	0	0	0	10	4	14
Max	**12**	**57**	**4**	**2**	**29**	**35**	**11**	**25**	

The total number of workers in this schedule is 132, in week 16. The peak construction period in this example starts from week 11 to week 22, where numbers range from 88 to 132, with an average of 106 workers.

The workers are categorised by blue collar and white collar. The maximum number of white collar workers is 25, the average over 33 weeks is 15, whilst in the peak construction period it is 21. As such, the number of white collar workers does not vary significantly over the construction period.

With regards to blue collar workers, the trades with the highest number of workers over the longest period of construction are:

- Trade assistant. The maximum is 57, the 33-week average is 20, and peak construction average is 42.
- Subcontract. The maximum is 29, the 33-week average is 7, and peak construction average is 12.
- Electrician. The maximum is 35, the 33-week average is 10, and peak construction average is 23.

The numbers of trade assistants do not vary significantly over time, and they are present on the project site from start of construction until mid-commissioning (week 28).

The number of subcontracts is variable, with the bulk of workers appearing between week 10 and week 15. Their presence on site is effectively negligible after week 15. It is notable that their presence during peak construction is for only 5 of the 12-week peak period, and their overlap with electricians is limited to a 7-week period.

The number of electricians is also variable, with the bulk of workers appearing in week 12 and tapering to less than 10 in week 24. The presence of electricians overlaps with the commissioning trades and trade assistants in the later part of the construction programme.

The following histogram depicts the proportion of workers present, and the overlap amongst the most popular trades. This provides a good indication of the potential contribution of traffic throughout the construction period, based on the distribution and overlap of workers.

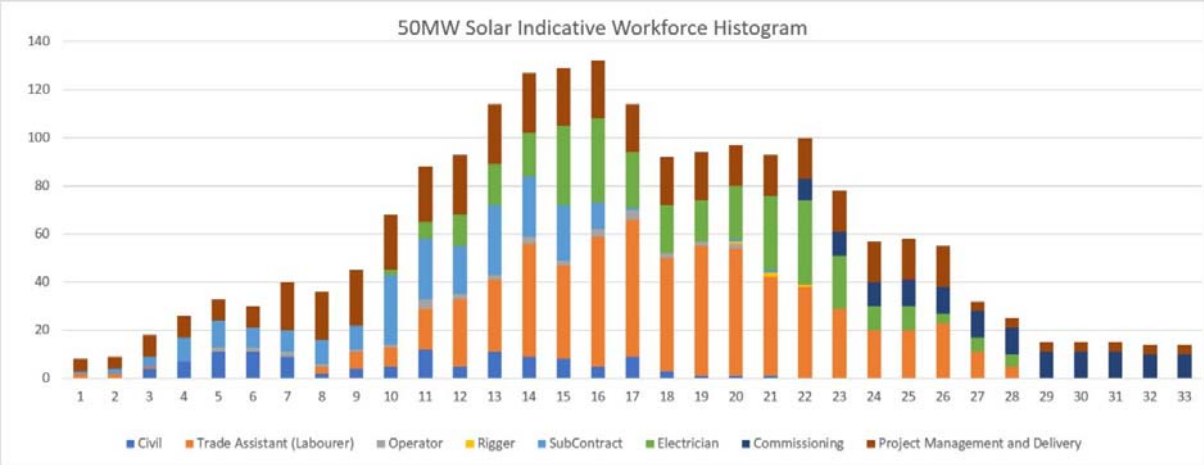

Plate 1 Workforce Histogram

The main impact to traffic density on the haulage roads, relates to the number of commuter traffic. The Traffic Management Plan (TMP) will establish mechanisms and controls to mitigate the impacts from heavy and light vehicles. However, separate to the TMP, the proponent and EPC will seek measures and opportunities to reduce the overall number of commuter traffic throughout the construction period. These measures will consist of carpooling for skilled workers and provision of minibuses for unskilled workers. Generally, skilled workers such as electricians and commissioning workers will have one or two trade assistants and therefore are very likely to carpool. Consequently, for each utility vehicle (4WD) 2 to 3 workers will carpool.

With regards to civil engineers and subcontracts, depending on the work activity, these may carpool or use minibuses. As such the uptake per vehicle may range from 2 to 6 workers.

The likelihood of carpooling and using minibuses increases with the duration of the workers presence on site, as this would facilitate committing to a carpool plan with other workers. As such, the trade assistants, electricians, and subcontracts are more likely to organise a carpool or use minibuses.

Given the carpooling practices of skilled workers, and the longevity of the employment period for some tradies, it is conservatively estimated that 20 to 80% of workers will either use minibuses or carpool.

Based on the category of workers discussed above, it is conservatively estimated that:

- 80% of electricians will carpool.
- 20% of civil engineers and commissioning workers will use the minibuses
- Trade assistants will be split between carpooling with skilled workers and others using minibuses. The average number of electricians is 10 and the average number of trade assistants is 20, half of these trade assistants will car pool, another 20% will likely use minibuses, as they are engaged for 28weeks of the 33week program.

With regard to white collar workers, they will be employed throughout the construction period, therefore carpooling and using minibuses is likely; a conservative estimate would be 20% uptake.

Therefore, in any given week of the construction program, we can anticipate that 20% to 80% of the total number of weekly workers will either carpool or use minibuses. In a peak construction week where 132 workers are present on site, there will be between 26 and 100 fewer single car commuters accessing the site per day.

In order to ensure that carpooling and minibuses use targets are met, the proponent would monitor carpooling and minivan usage, and consult with workers to identify any constraints to accessing the group commute services being provided. Additionally, the proponent would require that the EPC provide bus service to/from the Project site to public transport stations in the main towns where workers are likely to reside.

C.2 TDG - TRAFFIC ACCESS ASSESSMENT

TDG NSW Pty Ltd
5 Wilson Street, Newtown, Sydney, NSW 2042
PO Box 937, Newtown, Sydney, NSW 2042, Australia
P +61 2 8378 7145 www.tdgaustralia.com.au

Nick Graham-Higgs
Managing Director
NGH Environmental
Unit 18, 21 Mary Street
Surry Hills NSW 2010

TDG Ref: 15260
8 February 2018

Issued via email: nick.gh@nghenvironmental.com.au

Dear Nick,

Jemalong Solar Farm - Traffic Access Assessment

TDG has reviewed the proposed access arrangements for the Jemalong Solar Farm, which is located approximately 32 kilometres west of Forbes, between the site access and Lachlan Valley Way. Access to the site will be provided via the unsealed local roads of Naroo Lane and Wilbertroy Lane. Wilbertroy Lane connects to Lachlan Valley Way at its northern end, with Lachlan Valley Way being controlled by Roads and Maritime Services (RMS). An Environmental Impact Statement (EIS) has been submitted for the project, which has been reviewed by Forbes Shire Council (Council) and RMS, who have both provided comments in relation to traffic generated by the proposal. An assessment of the access arrangements for the solar farm is provided below, which also addresses the comments raised by both Council and RMS.

1. Existing Conditions

1.1 Road Network

Lachlan Valley Way is a Regional State Arterial Road, which generally runs in an east-west alignment between Newell Highway and Kidman Way. In the vicinity of the site, it accommodates one lane of traffic in each direction and has a sealed surface.

Wilbertroy Lane is a local road under the care and management of Council. It runs in a north-south alignment extending from Lachlan Valley Way. It accommodates two-way vehicle movements and typically has a width of approximately 7.0 metres, allowing for simultaneous two-way movement. However, at the Cadow Channel, located 40 metres south of Lachlan Valley Way, the road narrows to approximately 4.0 metres and acts as a one lane road. This includes the crossing provided over. Wilbertroy Lane has an unsealed surface.

Naroo Lane is also a local road that extends in an east-west direction from Wilbertroy Lane. It has an unsealed carriageway of approximately 4.0 metres and accommodates two-way vehicle movement. Naroo Lane has an approximate length of 1.2 kilometres between Wilbertroy lane and the site access.

The intersection of Lachlan Valley Way and Wilbertroy Lane is priority controlled, with vehicles exiting Wilbertroy Lane required to give way to vehicles travelling on Lachlan Valley Highway. No turning facilities are provided for vehicles turning from Lachlan Valley Way. The intersection of Wilbertroy Lane with Naroo Lane is also priority controlled.

1.2 Traffic Volumes

Traffic survey information for Lachlan Valley Way has been provided by Council, and is detailed within the EIS. The survey data for Lachlan Valley Way recorded an average annual daily trip rate of 516 vehicles. Therefore, it is considered that Lachlan Valley Way currently carries a modest level of traffic.

Wilbertroy Lane and Naroo Lane currently accommodate low traffic volumes, which are associated with the agricultural land uses in the vicinity of the site. During the harvest season, large grain haulage trucks will use the roads to transfer harvest crops to town. During a typical harvest year these roads are expected to accommodate approximately eight heavy vehicle movements per day. In addition, there would also be vehicles associated with transporting harvest workers to/from site. During non-harvest times there would be approximately four truck movements per day.

2. Traffic Generation

Construction activities would be undertaken during standard daytime construction hours (7:00am to 6:00pm Monday to Friday, and 7:00am to 1:00pm on Saturdays). Any construction outside of these normal working hours would only be undertaken with prior approval from relevant authorities.

Approximately 16 trucks will access the site per day during construction. The delivery trucks will predominantly be Medium Rigid Trucks (MRV as defined within AS 2890.2:2009). Articulated Vehicles (AV as defined within AS 2890.2:2009) will occasionally be used to transport larger plant such as the PV panels. It is anticipated that the delivery of the PV panels will occur over a 40-day period, generating approximately three AV vehicles per day during this time. Accordingly, the site is expected to generate a maximum of 19 trucks, or 38 truck movements per day (19 inbound and 19 outbound).

As outlined within the EIS, a Traffic Management Plan (TMP) will be prepared for the project, which would be developed in consultation with Council and RMS. The TMP will include organising carpooling and mini-bus services from nearby towns to transport the majority of up to 132 construction personnel required on-site, during peak periods.

Based on the breakdown of staff provided within the EIS, it is assumed that 20% of staff (26 workers) will utilise the mini-bus service, provided by three mini-buses (one to each of the nearby townships). Each mini-bus would generate one vehicle movement to the site in the morning peak, and vehicle movement from the site during the evening peak. The remaining 80% of staff (106 workers) will carpool to work with an average vehicle occupancy of 2.0 workers per vehicle. Accordingly, it is estimated that 112 trips would be required per day by standard or 4WD vehicles, during the construction program.

Table 1 summarises the traffic movements generate during the peak construction period of the solar farm.

Vehicle Type	Vehicle Movements per Day
Light Vehicle (car / 4WD / minibus)	106
Minibus	6
MRV	32
AV	6
Total	150

Table 1: Traffic Generation During Peak Construction Periods

Accordingly, the site is expected to generate approximately 150 vehicle movements per day during peak periods.

3. Appropriateness of the Access Roads

The *Unsealed Roads Manual: Guidelines to Good Practice*, dated March 2009, notes that the average traffic for gravel roads usually varies between 20 and 200 vehicles per day. The document also notes that roads may warrant paving when maintenance costs increase to unacceptable levels, in wet climates, or when economic or social benefits are evident.

Naroo Lane and Wilbertroy Lane are estimated to currently accommodate 20 vehicle movements per day, which would increase to be 170 vehicle movements per day during peak construction periods (an increase of 150 vehicle movements generated by construction traffic). Therefore, the traffic volumes will remain within the acceptable levels for gravel roads.

The use of these roads by larger vehicles delivering plant to the site would not be dissimilar to the existing use of the road by trucks associated with the surrounding agricultural use.

As outlined within the EIS, a Construction Traffic Management Plan (Construction TMP) will be prepared prior to construction of the site. It is recommended that the following form part of the Construction TMP to minimise the impact of construction traffic along the unsealed roads:

- Prior to construction, a pre-condition survey of the relevant sections of the existing road network be undertaken, in consultation with Council. During construction the sections of the road network utilised by the proposal are to be monitored and maintained to ensure continued safe use by all road users, and any faults attributed to construction of the PV Plant would be rectified. At the end of construction, a post-condition survey would be undertaken to ensure the road network is left in the consistent condition as at the start of construction.
- Construction of the proposal may result in increased dust on unsealed roads. During construction, water is to be used to minimise dust generation on the unsealed lanes.

Given the expected traffic along Wilbertroy Lane and Naroo Lane during construction, it is concluded that the unsealed surface of the roads is suitable to accommodate the future traffic volumes, and the roads do not require sealing. In addition, the adoption of the above recommendations will assist to mitigate any impact to the road surface and adjacent properties.

Council have noted that the access route does not provide sufficient drainage to ensure that the network can cope with the funnelling of flood water away from the road and is likely to be closed during a flood event. It is recommended that a Flood Response Plan be prepared that will include an access contingency plan during these times.

4. Access Route Assessment

Wilbertroy Lane and Naroo Lane both accommodate two-way traffic movements but operate as a one lane road along certain sections. The sections that are one lane are highlighted within Figure 1, which shows that all of Naroo Lane and the Cadow Channel bridge at the northern end of Wilbertroy Lane operate as a one lane road.

Tuesday, 6 February 2018

Jemalong Solar Farm - Access Design

Wilbertroy Lane / Naroo Lane Road Plan

TDG

1

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In order to manage the flow of two-way traffic along the one lane sections of road it is recommended that the following be adopted:

- Ensure the length of Wilbertroy Lane utilised to access the solar farm be widened to a minimum width of 7.0 metres to allow two trucks to pass, excluding the Cadow Channel crossing which is expected to continue to operate in an acceptable manner given its short length and the low traffic volumes along Wilbertroy Lane.
- One of the following options be adopted in order to control traffic movement along Naroo Lane between Wilbertroy Lane and the site access:
    - Traffic controllers be established at either end of Naroo Lane to ensure traffic is only travelling in one direction at any time. No access is provided to agricultural land in this area which will ensure this section of road can be easily managed.
    - Alternatively, traffic signals could be provided in place of traffic controllers. A passing/waiting area would need to be provided within the site, and vehicles would be required to wait within Wilbertroy Lane.
    - Passing facilities be provided at 100 metre intervals along the 1.2 kilometre length of Naroo Lane. Passing bays should have a storage length of 20 metres and provide 20 metre tapers at each end to allow vehicles to access the passing facility. This would provide a minimum of seven passing facilities. At these locations, Naroo Lane should have a width of 7.0 metres.
- Neighbours of the solar farm be consulted and notified regarding the timing of major deliveries which may require additional traffic control and disrupt access.

It is recommended that the above be adopted and detailed within the Construction TMP, which is to be prepared for the development at a later stage. Given the minimal amount of traffic expected to be generated by the development, and that the majority of traffic will be accessing the site in the morning peak period and exiting the site in the evening peak period, Naroo Lane will continue to operate in an acceptable manner as a one lane road.

5. Intersection Assessment

5.1 Lachlan Valley Way / Wilbertroy Lane

The *Austroads Guide to Traffic Management Part 6: Intersections, Interchanges, and Crossings* specifies the turning treatments required at intersections. In particular, Figure 2.26, shown below in **Figure 2**, specifies the required turn treatments on the major road at unsignalised intersections, and is provided below for a design speed of 100km/hr.

During the construction phase of the solar farm, when traffic generated will be at its peak, Lachlan Valley Way will accommodate approximately 616 vehicle movements per day, and Wilbertroy Lane is expected to accommodate 170 vehicle movements per day. Assuming 10% of these trips are generated during peak periods, the major and minor roads will accommodate approximately 62 and 17 vehicle movements during the peak hour, respectively. Based on these volumes, the intersection would require Basic Right Turn (BAR) and Basic Left Turn (BAL) turning treatments.

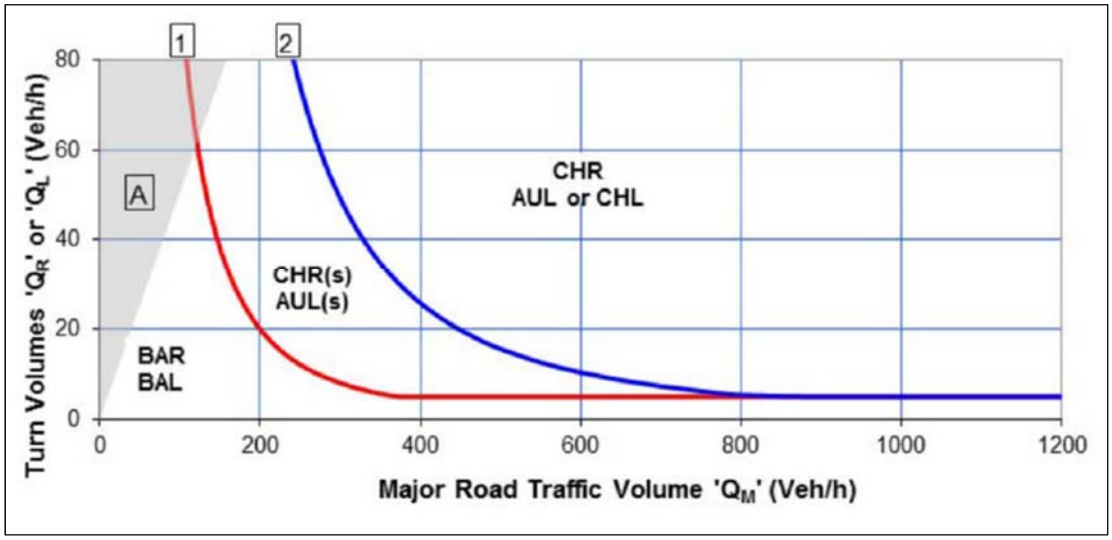

Figure 2: Figure 2.26 from the Austroads Guide

The Austroads Guide to Road Design Part 4A: Unsignalised and Signalised Intersections specifies the requirements for the design of turn treatments. The proposed design for the intersection of Lachlan Valley Way and Wilbertroy Lane is provided in **Figure 3** within **Appendix A**, based on an AV design vehicle, which is the largest vehicle expected to access Wilbertroy Lane. The swept path assessment, created using the software package 'AutoTurn', is shown in **Figure 4** within Appendix A. Accordingly, the proposed intersection turning treatments have been appropriately designed and in accordance with the Austroads dimensional requirements.

5.2 Wilbertroy Lane and Naroo Lane

The intersection of Wilbertroy Lane and Naroo Lane is expected to accommodate approximately 17 vehicle movements per hour. The movement of vehicles travelling along the access route to/from the site will be via a one-lane section of Naroo Lane. The unsealed carriageway of the intersection will be widened to accommodate the largest design vehicle expected to access the site, an AV. The proposed design for the intersection is provided in **Figure 5** within **Appendix B**, with the corresponding swept path assessment shown in **Figure 6**.

6. Conclusion

TDG has assessed the access arrangements of the Jemalong Solar Farm between the site access and Lachlan Valley Way. The assessment determined the following:

- The traffic volumes along Naroo Lane and Wilbertroy Lane during peak periods of construction will remain well within the acceptable levels for unsealed roads.
- It is recommended that traffic control measures be adopted to control vehicle movement of trucks along the one lane section of Naroo Lane, and ensure Wilbertroy Lane has a minimum width of 7.0 metres along the access route.
- The designs provided within Appendix A and B will ensure the associated intersections along the access route will operate in a safe manner and will be able to accommodate the maximum design vehicle expected to access the site.

Accordingly, based on the above assessment and the adoption of the associated recommendations and intersection designs, it is concluded that the proposed access arrangements for the solar farm are suitable to accommodate the vehicle type and traffic volumes generated during the construction phase.

Yours sincerely
Traffic Design Group Ltd

Michael Willson
Senior Associate / NSW Branch Manager
michael.willson@tdgaustralia.com.au

Tom Guernier
Senior Traffic Engineer
tom.guernier@tdgaustralia.com.au

enc: Appendix A – Lachlan Valley Way / Wilbertroy Lane Intersection Design
Appendix B – Wilbertroy Lane / Naroo Lane Intersection Design

Appendix A

Lachlan Valley Way / Wilbertroy Lane
Intersection Design

LACHLAN VALLEY WAY

46.0m

10.0m

22.5m

159.5m

3.2m

3.2m

6.5m

15.0m

15.0m

51.0m

PROPOSED EDGE OF SEAL

PROPOSED EDGE OF SEAL

EXTENT OF PROPOSED SEAL

35.0m

6.0m

7.0m

EXISTING CENTRE LINE

42.0m

WILBERTROY LANE

CADOW CHANNEL

The following design details have been taken from *Austroads Guide to Road Design Part 4A*:

Rural Basic Right-turn Treatment (BAR) Section 7.5.1.
1: Design speed of 100km/h.
2: 3.2m Lane widths have been used.
3: Taper lengths calculate to 46m.
4: Formation/carriageway widening is 3.2m.
5: Storage length is 22.5m for one 19m design vehicle.

Rural Left-turn Treatment (BAL) Section 8.2.1.
1: Design speed of 100km/h.
2: Lane widths of 3.2m have been used.
3: Taper length calculates to 42m.
4: Formation/carriageway widening is 2.8m.
5: Minimum length of parallel widened shoulder used from Table 8.1 is 35m

Thursday, February 01, 2018 13:22:08

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Jemalong Solar Farm - Access Design

Lachlan Valley Way / Wilbertroy Lane Intersection

Proposed Intersection Layout Plan

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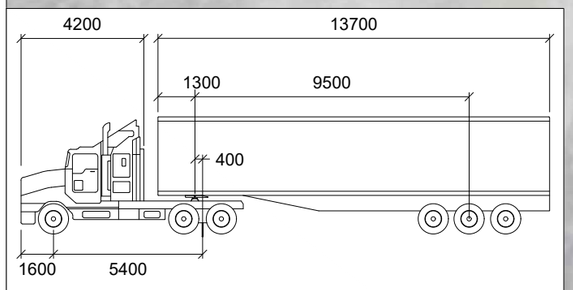
LACHLAN VALLEY WAY

WILBERTROY LANE

CADOW CHANNEL



AV

	mm		
Tractor Width	: 2500	Lock to Lock Time	: 6.0
Trailer Width	: 2500	Steering Angle	: 28.3
Tractor Track	: 2500	Articulating Angle	: 70.0
Trailer Track	: 2500		

Thursday, February 01, 2018 13:22:08

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Jemalong Solar Farm - Access Design

Lachlan Valley Way / Wilbertroy Lane Intersection

Swept Path Assessment - AV Left Turn In / Out

DRAWN: TJG	---	---
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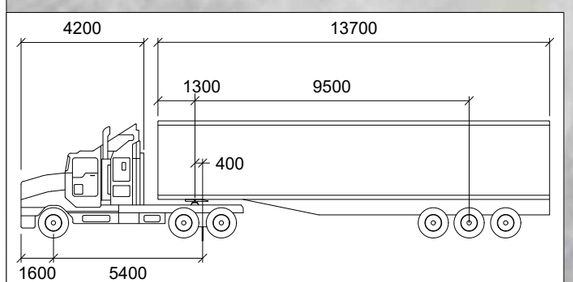
LACHLAN VALLEY WAY

WILBERTROY LANE

CADOW CHANNEL



AV

	mm		
Tractor Width	: 2500	Lock to Lock Time	: 6.0
Trailer Width	: 2500	Steering Angle	: 28.3
Tractor Track	: 2500	Articulating Angle	: 70.0
Trailer Track	: 2500		

Thursday, February 01, 2018 13:22:08

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Jemalong Solar Farm - Access Design

Lachlan Valley Way / Wilbertroy Lane Intersection

Swept Path Assessment - AV Right Turn In

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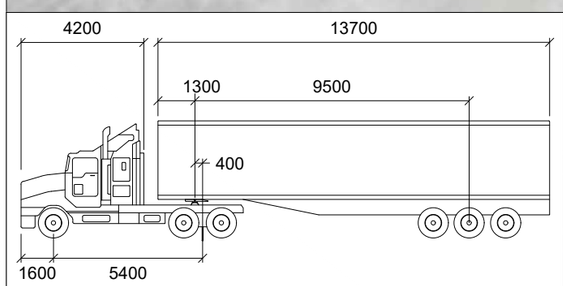
LACHLAN VALLEY WAY

WILBERTROY LANE

CADOW CHANNEL



AV

	mm		
Tractor Width	: 2500	Lock to Lock Time	: 6.0
Trailer Width	: 2500	Steering Angle	: 28.3
Tractor Track	: 2500	Articulating Angle	: 70.0
Trailer Track	: 2500		

Thursday, February 01, 2018 13:22:08

REV	DATE	DRN	CHK	DESCRIPTION
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Jemalong Solar Farm - Access Design

Lachlan Valley Way / Wilbertroy Lane Intersection

Swept Path Assessment - AV Left Turn In / Right Turn Out

DRAWN: TJG	---	---
DATE: 02/02/18	STATUS: ---	
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DWG NO:15260-0S1A		

TDG

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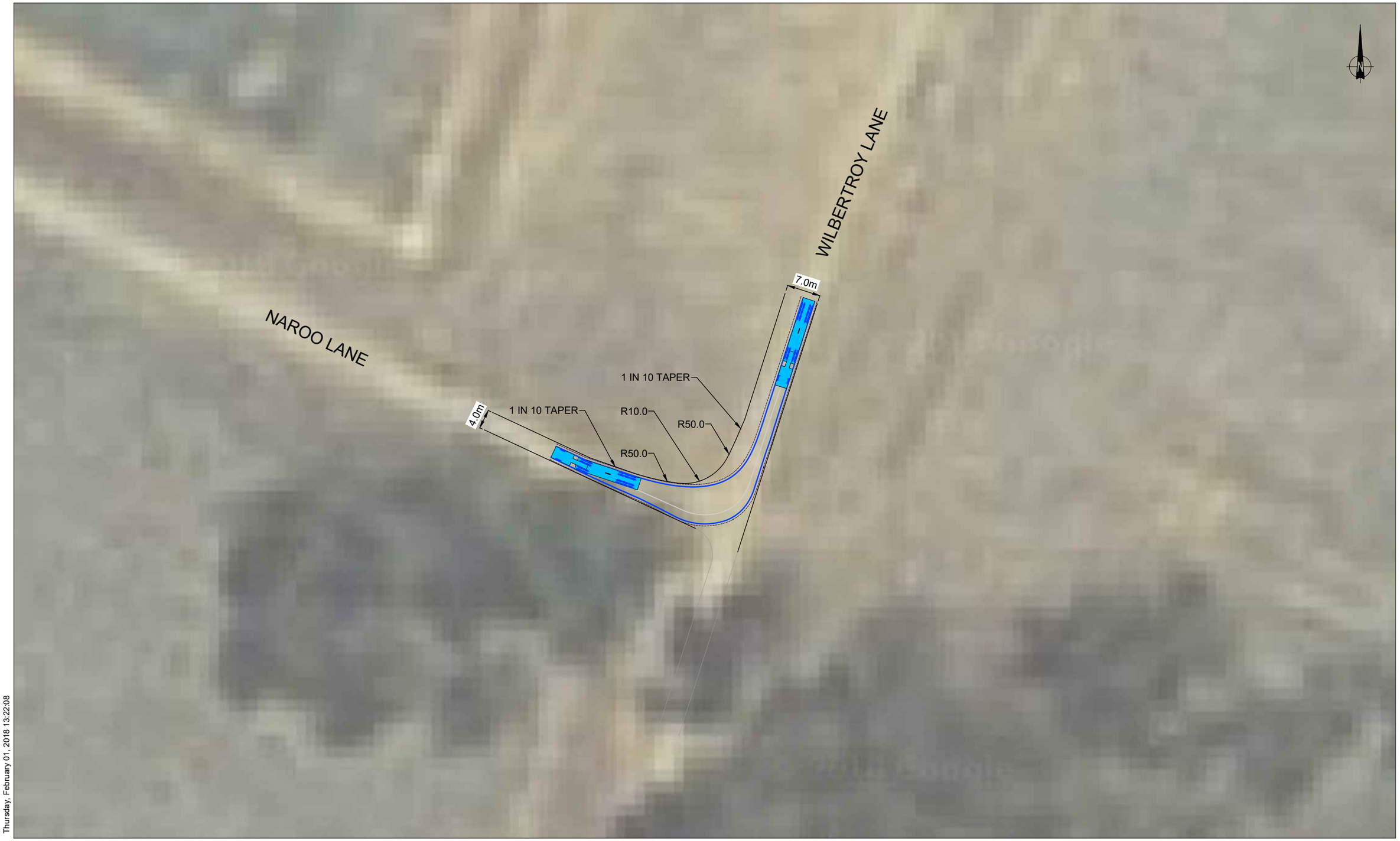
Appendix B

Wilbertroy Lane / Naroo Lane
Intersection Design



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Jemalong Solar Farm - Access Design

Wilbertroy Lane / Naroo Lane Intersection

Proposed Intersection Layout Plan

DRAWN: TJG	---	---
DATE: 02/02/18	STATUS: ---	
SCALE: 1:750 @ A3		
DWG NO:15260-0S1A		

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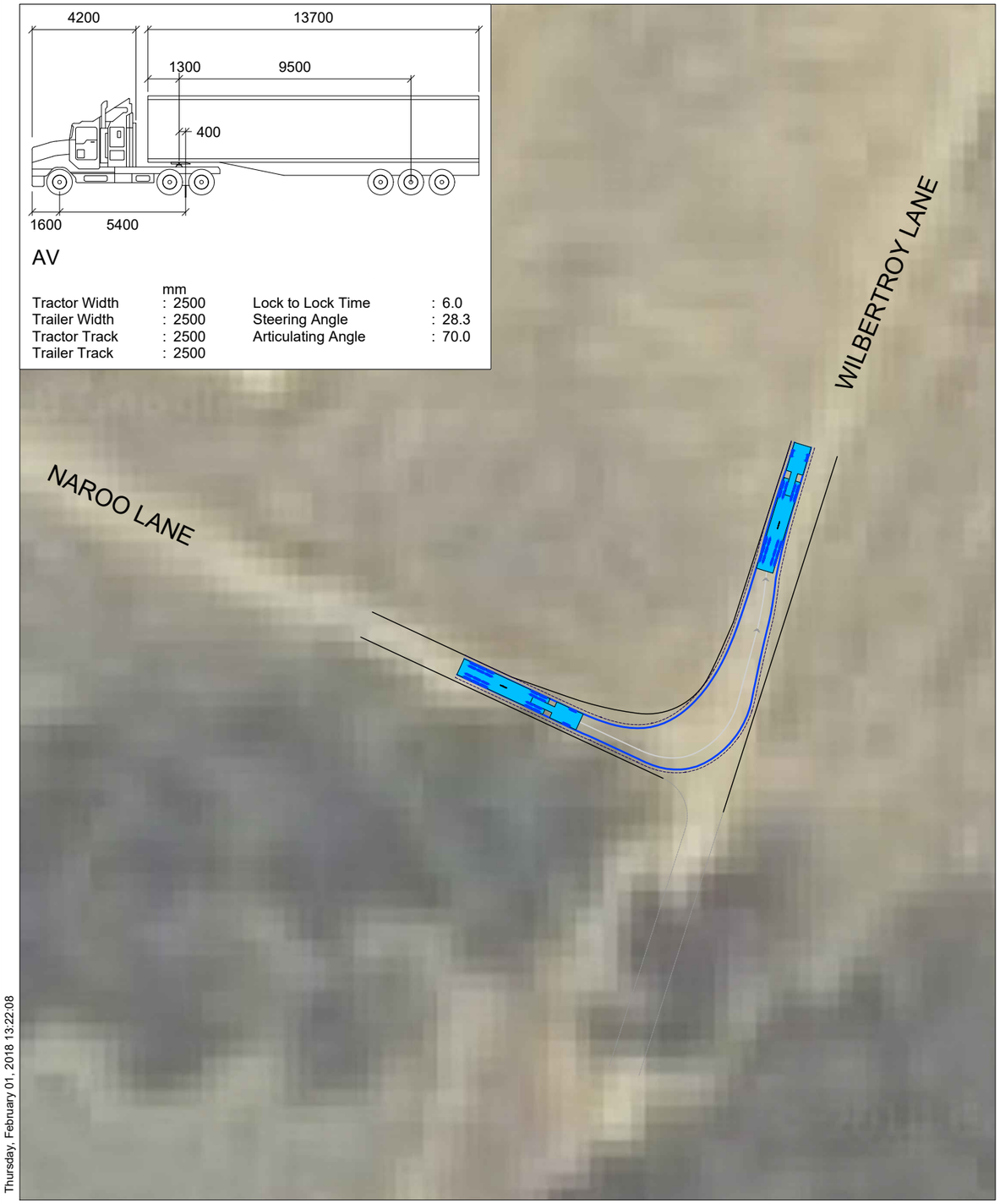
AV

	mm		
Tractor Width	: 2500	Lock to Lock Time	: 6.0
Trailer Width	: 2500	Steering Angle	: 28.3
Tractor Track	: 2500	Articulating Angle	: 70.0
Trailer Track	: 2500		



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Jemalong Solar Farm - Access Design

Wilbertroy Lane / Naroo Lane Intersection

Proposed Intersection Layout Plan

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DATE: 02/02/18	STATUS: ---	
SCALE: 1:750 @ A3		
DWG NO:15260-0S1A		

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APPENDIX D WATER RESOURCES

D.1 WATER SUPPLY

D.1.1 Water Use

Further details of water use has been considered by Vast Solar, in response to the agency submissions as part of the EIS exhibition.

Water will be required for various stages of the Project, as follows:

1. Construction phase: approximately 3.49ML pa of water is required to be used by workers, as well as for dust control and concrete curing.
2. Operational phase: approximately 260KL of water is required for panel cleaning and other minor ancillary uses, including for workers.

Vast Solar are proposing to obtain water from existing WAL 32025, which will be transferred from the Landowner to a new WAL which will be created as part of the transfer process with Water NSW. Alternatively, Vast Solar are investigating whether there is any additional capacity in the aquifer to allow the grant of a new water allocation from Water NSW.

The water will either be extracted from the existing bore located on Lot 141 in DP 528344 (which is attached to WAL 32025), or a new bore will be constructed on the new lot that is to be created for lease purposes which will contain the PV Plant and new substation (currently part of Lot 13 in DP 753118). In any event, authorisation is sought as part of this development application for the following:

1. Construction of a new bore on Lot 13 in DP 753118.
2. Use of the water for solar farm purposes.

For additional details, see section on water licensing below.

D.1.2 Wastewater

With regards to wastewater, the estimated quantity generated is approximately 75% to 80% of the potable water used. As such, approximately 72KL pa of wastewater is likely to be generated over the construction program. Wastewaster will be contained in a 3.8KL septic tank, installed near the administration building or an alternate location on the Proposal Site. It should be noted that for the operation phase, the site office will be converted to the administration building, as such the septic tank will remain in use for operation. A certified wastewater service company will be used to collect and dispose of the wastewater at a licensed wastewater treatment facility.

Furthermore, portable cabins will be installed at multiple locations across the construction site to ensure convenient access for workers, throughout the 12-month construction programme. The total number of cabins and their location would vary in accordance with the progression of construction and number of workers. Under the service agreement with the portable cabin supplier, the wastewater storage tanks will be emptied on a scheduled basis.

In accordance with the requirements of the CEMP, the EPC contractor will be required to engage a licensed wastewater service supplier and maintain a record of the wastewater disposal receipts in accordance with the audit requirements.

During operation it is estimated that 8KL pa will be generated, which will be stored in the on-site septic tank near the administration building. The septic will be the same tank used during construction and will not have been moved (same tank that was used in the construction phase). A licensed septic tank service supplier would be used to manage the disposal and treatment of the wastewater at a licensed facility.

D.2 WATER USE

Table D-1 Volume and Supply of Potable Water

Phase	Volume	Source	Supply/ Transport*	Storage/ Treatment
Construction				
Potable Water	90KL pa	imported/rain water	6 trucks	
Non-Potable (dust and concrete)	3.49ML pa	bore	N/A	
Wastewater**	72KL pa	N/A	20 trucks	3.8KL Septic
Operation				
Potable Water	10KL pa	Imported/rain water	1truck	
Non-Potable/ Panel Cleaning Water	250KL pa	rain water and bore water	N/A	220KL tank
Wastewater**	8KL pa	N/A	3 trucks	3.8KL Septic

*Based on a typical 27.5KL truck capacity

**Generally, 75 to 80% of potable water is considered as quantity of sewage produced (WHO 2000. Global Water Supply and Sanitation Assessment). Non-potable water is lost to evaporation and ground infiltration.

D.3 WATER LICENSING

The following table summarises the water licenses held by Jemalong Station.

Table D-2 Summary of Water Entitlements

#	Number	Type of Approval	Lot/DP*	Status
1	WAL 32025	Water Access Licence (**WAL**)	N/A	Entitlement = 1,000 units or ML This WAL attaches to 70CA614084
2	70CA614084	Water supply work and water use approval	Water use approval: Lot 141, DP 528344 Lot 13, DP 3753118 Water supply work approval (location of bore):	Use purpose = irrigation Water supply work = 1 x bore, extraction works (groundwater)

Lot 141, DP 528344

Under the current water use approvals for WAL 32025, the water can be used for the purposes of irrigation and industry/irrigation respectively.

Ordinarily, a modification to the existing water use approvals which attach to the WAL (70CA614084) would need to be sought from Water NSW.

However, because the Project is SSD, section 89J of the EP&A Act provides an exemption from the need to obtain a water use approval where that use is authorised by the SSD development consent. As such, Vast Solar seeks consent to include the use of a portion of the water entitlements under WAL 32025 for the purposes of the Project. The approximate amount of water is 3.49ML.

Similarly, where Vast Solar are able to obtain a new water entitlement from Water NSW, authorisation is sought to use this water for the purposes of the Project.

In addition, Vast Solar are seeking authorisation to construct a bore on Proposed Lot 1 (currently part of Lot 13 in DP 753118 where a new bore is required.

APPENDIX E HOUSING AND ACCOMMODATION

E.1 BACKGROUND

The Project is approximately 36km west of the town of Forbes. The construction program will be approximately 12 months long with a nine-month peak construction period. The number of workers on site is expected to range from 30 employees in the start of construction and rise to approximately 100 employees during peak construction.

During operation, only 3 to 4 full time employees would be required for the ongoing day to day operation of the facility.

The estimated numbers of workers in the following discussion, is based on the workforce requirements of a PV plant of similar power output to the Jemalong PV Solar Plant, with a 33-week construction period, as discussed in Appendix C.

E.2 CONSTRUCTION WORKFORCE

The types of workers employed in the construction phase would cover a range of technical skills (blue collar) and managerial experience (white collar). Blue collar categories can be further broken into skilled workers (e.g. electricians) and general construction labour which would include apprentices.

The following table lists the categories of workers, the approximate number in the three phases of construction and an estimated percentage of workers that would be hired within the three closest towns to the proposal (local), versus the remainder that would have to be hired from over a 1hour drive from the Project and would therefore likely have to relocate to the nearest towns.

Table E-1 Summary of Workforce

Category	Start	Peak	End	% Local	% New arrival	Justification
Blue collar						
Trade assistant (Labourer)	8	57	11	100	0	Low skill level and entry level trade. Local towns should have sufficient supply.
Operator	0	4	0	100	0	High skill, but not many needed. Scheduling of the engagement contract would ensure a local hire.
Rigger	0	2	0	100	0	High skill, but not many needed. Scheduling of the engagement contract would ensure a local hire.
Electrician	0	35	11	70	30	High skill, but few needed spread over the construction program. Scheduling of the engagement contract would help maximise local hire.
Civil	9	12	0	50	50	Medium skill level, local towns may not have sufficient supply.
Subcontract	11	29	0	50	50	Range of skills which may not all be resourced locally. However, since the work is temporary it increases the likelihood of finding local workers.
Commissioning	0	0	11	30	70	Variety of specialised skills specific to power plant commissioning, will likely require resourcing from larger cities. However, this is in the last phase of construction, therefore little to

Category	Start	Peak	End	% Local	% New arrival	Justification
						no overlap with the presence of construction workers.
White collar						
Project Management and Delivery	9	25	4	60	40	Range of skills in construction management, and project management. The number and skill set will vary in accordance with the construction program. Maximising local hire is targeted.

The majority of the blue-collar workers and in particular those trades which do not require specialised training would be sourced locally, from the nearest towns located within 1hr drive from the proposal. These towns include Forbes, Parkes and Condobolin. These trades would have the longest engagement period, and therefore would be attractive to local workers looking for opportunities to gain experience and broaden their skills. Additionally, the regional TAFE campuses in Forbes and Parkes, may be a potential source of apprentices seeking to fulfil their training requirements. The Proponent may consult with the regional TAFE colleges to assess the feasibility of such a resource. Finally, there are many apprenticeship support agencies that provide services to employers seeking to engage apprentices, these agencies work under the Australian Government Initiative – 'Australian Apprenticeship Support Network.

With regards to skilled blue-collar workers, such as electricians, riggers and operators, the Project's requirements are not significant with up to 35 electricians needed in the peak construction period, starting after the third month from the start of construction. Given the delayed requirements and progressive increase in the number of electricians, the project managers would be able forecast demand and match the local availability to the construction program. As such, it is expected that up to 70% of the electricians could be hired locally amongst the three closest towns.

The numbers of riggers and operators is less than 5, over a 4-month period. Additionally, the intensity of the hiring would vary in accordance with the construction program. As such the project managers would be able to schedule the resourcing accordingly, and facilitate the likelihood of matching the availability of local riggers/operators with the demand of the construction program.

The number of required civil engineers is not high, with an average of 6 required over a 4-month construction period. Given the advanced qualifications required for the position, and the short-term hire, it is expected that half the engineers would be non-local.

With regards to the subcontractors, these would comprise of service suppliers, local material suppliers and mechanical engineers. Depending on the specialty of the service and its local availability, the subcontracted personnel may be local or would be temporarily relocated to a nearby town. The duration of stay of the subcontractors and the number of personnel would vary based on the scope of work for the subcontractor. Typically, these arrangements would be handled by the sub-contract company. It is conservatively estimated that half the sub-contract workers would be non-local.

Commissioning of a power plant is a specialised line of work, more so for solar plants, although the staffing numbers are not high. As such, it is anticipated that most employees will be non-local and temporarily accommodated in the nearest towns. Since this stage of work is at the end of the construction phase, and therefore not in the peak period, there is very little to no overlap with the other categories of blue-collar work.

Project Managers would be present throughout the construction program with the numbers varying in parallel to the intensity of construction activities. Resourcing of construction project managers would likely be split between local and non-local, based on the experience requirements, duration of contract

and construction phase. Maximising local hire is targeted, and this should be achievable with forecasting demand against local availability.

E.3 POPULATION AND EMPLOYMENT IN THE LOCAL AREA

E.3.1 Forbes

Forbes LGA occupies around 4,700 km^2 of land in the Central Tablelands of NSW, with Forbes as its main town centre containing 95% of the population. Smaller villages within Forbes include Bedgerabong, Corinella, Ootha and Wirrinya. The Forbes LGA has a population of approximately 10,500 as recorded in the 2016 census (idcommunity 2017), which has been rising since 2011 (FS 2017).

The following tables summarise the population and employment data obtained from the ABS 2016 census.

Table E-2 Employment Status

Forbes - Persons	2016		
Employment status	**Number**	**%**	**Western NSW Region %**
Employed	3,950	94.5	93.6
Employed full-time	2,495	59.7	59.1
Employed part-time	1,338	32.0	32.3
Unemployed (Unemployment rate)	230	5.5	6.4
Looking for full-time work	156	3.7	4.1
Looking for part-time work	74	1.8	2.4
Total labour force	**4,180**	**100.0**	**100.0**
Source: Australian Bureau of Statistics, Census of Population and Housing 2011 and 2016. Compiled and presented by .id , the population experts.(Usual residence data)			

The size of Forbes Shire's labour force in 2016 was 4,180, of which 1,338 were employed part-time and 2,495 were full time workers.(.idcommunity2016, http://profile.id.com.au/wnswphn/employment-status?WebID=230)

Table E-3 Industry Sector

Forbes Shire - Employed persons	2016		
Industry sector	**Number**	**%**	**Western NSW Region %**
Agriculture, Forestry and Fishing	714	18.2	11.1
Mining	112	2.8	4.5
Manufacturing	191	4.9	5.3
Electricity, Gas, Water and Waste Services	46	1.2	1.2
Construction	254	6.5	7.0
Retail Trade	439	11.2	9.8
Wholesale trade	130	3.3	2.2
Accommodation and Food Services	208	5.3	6.9
Transport, Postal and Warehousing	145	3.7	3.7
Information Media and Telecommunications	13	0.3	0.8
Financial and Insurance Services	55	1.4	1.3
Rental, Hiring and Real Estate Services	33	0.8	1.0
Professional, Scientific and Technical Services	121	3.1	3.4
Administrative and Support Services	67	1.7	2.7
Public Administration and Safety	187	4.8	7.2
Education and Training	400	10.2	9.5

Health Care and Social Assistance	456	11.6	13.7
Arts and Recreation Services	26	0.7	1.0
Other Services	146	3.7	3.9
Inadequately described or not stated	189	4.8	3.7
Total employed persons aged 15+	**3,932**	**100.0**	**100.0**
Source: Australian Bureau of Statistics, Census of Population and Housing 2011 and 2016. Compiled and presented by .id , the population experts. (Usual residence data)			

The three most popular industry sectors in Forbes Shire in 2016 were Agriculture, Forestry and Fishing (714 people or 18.2%), Health Care and Social Assistance (456 people or 11.6%), and Retail Trade (439 people or 11.2%). In combination, these three industries employed 1,609 people in total or 40.9% of the total employed resident population.

Table E-4 Occupation of Employment

Forbes Shire - Employed persons	2016		
Occupation	Number	%	Western NSW Region %
Managers	758	19.2	16.1
Professionals	563	14.3	16.2
Technicians and Trades Workers	550	14.0	14.1
Community and Personal Service Workers	379	9.6	11.6
Clerical and Administrative Workers	397	10.1	11.3
Sales Workers	374	9.5	8.9
Machinery Operators And Drivers	323	8.2	8.1
Labourers	506	12.8	11.9
Not stated or inadequately described	49	1.2	0.9
Total employed persons aged 15+	**3,938**	**100.0**	**100.0**
Source: Australian Bureau of Statistics, Census of Population and Housing 2011 and 2016. Compiled and presented by .id , the population experts. (Usual residence data)			

The three most popular occupations in Forbes Shire in 2016 were: Managers (758 people or 19.2%), Professionals (563 people or 14.3%), and Technicians and Trades Workers (550 people or 14.0%). In combination these three occupations accounted for 1,871 people in total or 47.5% of the employed resident population.

E.3.2 Parkes

Parkes LGA occupies around 5,900 km^2 of land in the Central NSW, with a total population of approximately 14,946 as recorded in the 2016 census (idcommunity 2017). The major townships of Parkes are: Parkes population (12,096), Peak Hill population (1,150), Trundle population (666), Tullamore population (373), and Bogan Gate population (307).

The following tables summarise the population and employment data obtained from the ABS 2016 census.

Table E-5 Employment Status

Parkes - Persons	2016		
Employment status	Number	%	Western NSW Region %
Employed	5,838	92.6	93.6
Employed full-time	3,644	57.8	59.1
Employed part-time	2,065	32.8	32.3
Unemployed (Unemployment rate)	465	7.4	6.4
Looking for full-time work	304	4.8	4.1
Looking for part-time work	161	2.6	2.4

Total labour force	**6,303**	**100.0**	**100.0**
Source: Australian Bureau of Statistics, Census of Population and Housing 2011 and 2016. Compiled and presented by .id , the population experts.(Usual residence data)			

The size of Parkes Shire's labour force in 2016 was 6,303, of which 2,065 were employed part-time and 3,644 were full time workers. (.idcommunity2016, http://profile.id.com.au/wnswphn/employment-status?WebID=230)

Table E-6 Industry Sector

Parkes Shire - Employed persons	2016		
Industry sector	**Number**	**%**	**Western NSW Region %**
Agriculture, Forestry and Fishing	697	11.9	11.1
Mining	447	7.6	4.5
Manufacturing	210	3.6	5.3
Electricity, Gas, Water and Waste Services	65	1.1	1.2
Construction	307	5.2	7.0
Retail Trade	608	10.4	9.8
Wholesale trade	119	2.0	2.2
Accommodation and Food Services	427	7.3	6.9
Transport, Postal and Warehousing	361	6.2	3.7
Information Media and Telecommunications	34	0.6	0.8
Financial and Insurance Services	71	1.2	1.3
Rental, Hiring and Real Estate Services	55	0.9	1.0
Professional, Scientific and Technical Services	151	2.6	3.4
Administrative and Support Services	153	2.6	2.7
Public Administration and Safety	418	7.1	7.2
Education and Training	505	8.6	9.5
Health Care and Social Assistance	714	12.2	13.7
Arts and Recreation Services	36	0.6	1.0
Other Services	250	4.3	3.9
Inadequately described or not stated	220	3.8	3.7
Total employed persons aged 15+	**5,848**	**100.0**	**100.0**
Source: Australian Bureau of Statistics, Census of Population and Housing 2011 and 2016. Compiled and presented by .id , the population experts. (Usual residence data)			

The three most popular industry sectors in Parkes Shire in 2016 were Health Care and Social Assistance (714 people or 12.2%), Agriculture, Forestry and Fishing (697 people or 11.9%), and Retail Trade (608 people or 10.4%). In combination, these three industries employed 2,019 people in total or 34.5% of the total employed resident population.

Table E-7 Occupation of Employment

Parkes Shire - Employed persons	2016		
Occupation	**Number**	**%**	**Western NSW Region %**
Managers	1,016	17.4	16.1
Professionals	856	14.7	16.2
Technicians and Trades Workers	857	14.7	14.1
Community and Personal Service Workers	617	10.6	11.6
Clerical and Administrative Workers	650	11.1	11.3
Sales Workers	522	8.9	8.9
Machinery Operators And Drivers	602	10.3	8.1

Labourers	609	10.4	11.9
Not stated or inadequately described	60	1.0	0.9
Total employed persons aged 15+	**5,839**	**100.0**	**100.0**
Source: Australian Bureau of Statistics, Census of Population and Housing 2011 and 2016. Compiled and presented by .id , the population experts. (Usual residence data)			

The three most popular occupations in Parkes Shire in 2016 were: Managers (1,016 people or 17.4%), Technicians and Trades Workers (857 people or 14.7%), and Professionals (856 people or 14.7%). In combination these three occupations accounted for 2,729 people in total or 46.7% of the employed resident population.

E.3.3 Condobolin

ABS 2016 census data for the township of Condobolin reveals the following:

- There were 3,486 people in Condobolin, of these 49.4% were male and 50.6% were female. Aboriginal and/or Torres Strait Islander people made up 22.1% of the population
- The median age of people in Condobolin was 38 years.
- There were 1,500 people who reported being in the labour force, of these 57.2% were employed full time, 27.2% were employed part-time and 8.1% were unemployed.
- The most common occupations included Managers 20.5%, Technicians and Trades Workers 13.3%, Professionals 12.9%, Community and Personal Service Workers 12.2%, and Labourers 11.2%.

Table E-8 Occupation of Employment

	Managers	Professionals	Technician and trades workers	Community and personal service	Clerical and administrative	Sales workers	Machinery operators and	Labourers
Agriculture, Forestry and Fishing	41	0	15	0	3	3	6	19
Mining	3	3	12	0	3	0	24	0
Manufacturing	13	4	23	0	4	12	11	7
Electricity, Gas, Water and Waste Services	0	0	6	0	3	0	3	0
Construction	9	0	23	0	0	0	14	8
Wholesale Trade	3	9	5	0	0	14	4	3
Retail Trade	19	3	9	0	8	54	0	12
Accommodation and Food Services	14	0	12	20	0	3	0	12
Transport, Postal and Warehousing	7	0	0	0	5	0	16	3
Information Media and Telecommunications	0	0	3	0	0	0	0	0
Financial and Insurance Services	0	0	0	0	5	0	0	0
Rental, Hiring and Real Estate Services	0	0	0	0	0	3	0	0
Professional, Scientific and Technical Services	3	11	4	0	7	0	0	0
Administrative and Support Services	0	0	0	0	3	0	0	12
Public Administration and Safety	5	17	9	13	11	0	24	8
Education and Training	4	54	0	37	6	0	0	4

	Managers	Professionals	Technician and trades workers	Community and personal service	Clerical and administrative	Sales workers	Machinery operators and	Labourers
Health Care and Social Assistance	5	30	0	69	19	0	0	22
Arts and Recreation Services	4	0	3	0	0	0	0	0
Other Services	3	3	24	5	8	0	0	8
Inadequately described/Not stated	11	3	8	3	3	6	8	13
Total	**138**	**144**	**158**	**159**	**99**	**92**	**110**	**123**

Table E-9 Industry of Employment

	15-19	20-24	25-34	35-44	45-54	55-64	65-74	75-84	85 years	Total
Agriculture, Forestry and Fishing	0	8	22	8	12	14	8	11	3	93
Mining	0	12	17	10	3	6	0	0	0	46
Manufacturing	0	13	23	19	11	5	0	0	0	68
Electricity, Gas, Water and Waste Services	0	6	3	4	0	4	0	0	0	18
Construction	0	3	12	6	7	12	3	0	0	43
Wholesale Trade	0	3	4	3	10	5	5	0	0	32
Retail Trade	5	12	19	11	19	19	8	0	0	97
Accommodation and Food Services	13	5	11	5	17	13	3	0	0	61
Transport, Postal and Warehousing	0	4	8	6	12	3	9	0	0	35
Information Media and Telecommunications	0	0	0	0	0	0	0	0	0	8
Financial and Insurance Services	0	0	0	0	0	3	0	0	0	11
Rental, Hiring and Real Estate Services	0	0	0	0	0	5	0	0	0	9
Professional, Scientific and Technical Services	0	3	0	4	3	11	0	4	0	25
Administrative and Support Services	0	0	8	0	6	0	0	0	0	17
Public Administration and Safety	0	8	21	18	18	28	0	0	0	88
Education and Training	0	15	36	22	30	10	0	0	0	110
Health Care and Social Assistance	6	17	31	32	24	32	3	0	0	150
Arts and Recreation Services	0	3	0	3	0	0	0	0	0	10
Other Services	0	3	9	8	5	11	5	0	0	42
Inadequately described/Not stated	3	3	18	17	6	16	6	3	0	74
Total	**30**	**119**	**244**	**168**	**196**	**209**	**55**	**19**	**4**	**1,042**

E.4 HOUSING AND ACCOMMOMDATION AVAILABLITY

With a management strategy focusing on the majority of construction workers being recruited from the local area, it is anticipated that the majority of the construction workers would already reside in one of the three nearest towns discussed above. Based on the distribution and assumptions set out above, there may be a need to temporarily accommodate up to 30-35 workers in the main townships of Forbes, Parkes and Condobolin.

The introduction of non-local construction workers will result in a temporary and minor local impact on the population for the duration of the solar plant construction. As the number of non-local construction workers will be limited, they could be accommodated within existing hotels, motels, caravan parks and rental accommodation in the nearest townships.

It is assumed that the split of workers that need accommodation between the townships would be determined on price, amenities, distance to the Proposal Site and the general amenities of the township and therefore the likely peak demand for accommodation would be as follows:

- Forbes: 15-20 rooms for a period of 6-9 months
- Parkes: 10-15 rooms for a period of 6-9 months
- Condobolin: 5-10 rooms for a period of 6-9 months

The operation phase is unlikely to place any additional demand on housing, since only 3-4 workers would be required. This workforce will be sourced from the existing community. Training will be provided to new staff as required.

E.4.1 Rental

Results from rental search on Realestate.com.au reveals the following rental availability in Parkes, Condobolin and Forbes.

Table E-10 Rental in the nearest townships (Source: Realestate.com.au, January 2018)

Township	Number of Houses	Units	Median House rent (3 bed)	Median Unit rent	Supply and Demand
Forbes	15	3	250pw	188pw	Low
Parkes	36	8	280pw	175pw	Low
Condobolin	6	0	220pw	N/A	Low

As this table illustrates there is sufficient accommodation available within the surrounding townships. However, given the number of short term construction projects in the Parkes region, an undersupply of quality rental accommodation is likely to occur.

The types of projects currently listed on the DP&E website, include 2 mines, 1 hospitals, 1 rail terminal, 1 road construction, and 3 solar farms. The overall duration and overlap in the construction programs, along with the additional longterm employment generated by the hospital and mines is likely to encourage housing development in Parkes and the neighbouring townships.

E.4.2 Short term

There is also short-term accommodation available in the surrounding townships. The following table summarises the current availability (Note: this list is not exhaustive or conclusive):

Table E-11 Tourist accommodation (Source Forbes Shire Council and Parkes Shire Council websites)

	Motel	Hotel	Caravan Park	Occupancy*
Forbes	7	2	4	51.1%
Parkes	15	7	4	52.4%

* Source Destination NSW, Tourist Accommodation Profile, Year End June 2016

Information from the Visit Parkes website (http://www.visitparkes.com.au/Stay.aspx) indicates there are approximately 1500 bed spaces in the town, with an additional 300 bed spaces available in historic pubs, quality motels and caravan parks in the smaller Shire towns of Peak Hill, Bogan Gate, Trundle & Tullamore.

On the basis of this information, there is sufficient availability of short term accommodation to meet the needs of the proposal, particularly given the occupancy rate. Overlap in construction schedules with other developments may occur, however this would be of short duration and is unlikely to create any conflict. The possibilities of subletting, accommodation sharing and entering into short term agreements with Bed & Breakfasts in the low season may help to mitigate any pressure on the short-term housing market.

E.5 CONCLUSION

In conclusion, the construction of the Project is unlikely to have a significant impact on the existing housing and accommodation demand given the low numbers of contractors that are likely to be employed from outside the area, the duration of the peak construction period and the low numbers of long term employees for the on-going operation of the facility.

It is however proposed that a Housing and Accommodation Action Plan (HAAP) is developed for the construction phase to ensure that potential undersupply of housing and accommodation in the surrounding communities are mitigated or managed during the construction of the proposal.

The HAAP would be developed following further consultation with the Local Government Authorities with the objective of establishing a point of contact between the Project Manager of the proposal and key stakeholders in Forbes and Parkes Council, as well the relevant local housing authority to ensure that any concerns raised by the communities in relation to housing supply and demand can be further addressed. It is recommended that the HAPP include the following actions:

- Establish point of contacts between the Project Manager and key LGA stakeholder
- Maintain a record of the locally available long term and short-term accommodation facilities in the locality
- Ensure that non-local workers are provided with this list of accommodation
- Maintain records of the number of workers, type of accommodation and location of accommodation being used
- Respond and act upon community complaints to help resolve any conflicts
- Update the record every quarter
- Provide the updated record to the LGAs, every quarter