24 August 2021

Rob Beckett Project Manager FRV Level 22, 6 O'Connell Street Sydney NSW 2000



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Dear Rob Beckett

Re: Walla Walla Solar Farm Modification (SSD 9874; our reference: 21-200) Visual Impact Assessment Review

NGH were engaged by FRV to undertake an addendum visual impact assessment of proposed changes to the above project to inform a Modification Application being lodged under Section 4.55(1A) of the *Environmental Planning and Assessment Act 1979*.

The approach and findings are documented as attached.

If you have any questions, please contact me on 0425 283 868. I would be pleased to discuss this project with you further.

Yours sincerely,

to della

Les Seddon Principal Environmental Consultant 0425 283 868 NGH Pty Ltd

Introduction

The Walla Walla Solar Farm is located off Benambra Road, approximately 2.6 kilometres (km) west of Olympic Highway in the Greater Hume Local Government Area (LGA) as shown in Figure 1.

Development consent for the Walla Walla Solar Farm was provided by the Independent Planning Commission of NSW on 27 November 2020 (Application Number: SSD 9874) under Section 4.38 of the *Environmental Planning and Assessment Act 1979* (EP&A Act) (NSW). A visual impact assessment (VIA) was undertaken to supplement the Environmental Impact Statement (EIS) in 2019 by NGH Pty Ltd (NGH) (NGH Pty Ltd, 2019).

Walla Walla Solar Farm Pty Ltd (WWSF) are seeking approval to modify the approved Development Consent under the EP&A Act, and as a result have engaged NGH to undertake a visual impact assessment review to assess any additional visual impacts as a result of the proposed modifications.

Specifically, this Visual Impact Assessment considers the potential impact of the Proposed Modification and compares it to the impacts associated with the Walla Walla Solar Farm as approved on 27 November 2020 (the Approved Development).

Scope of the Modification

During detailed design, WWSF have identified three aspects of the consented project that require amendment. The proposed amendments are:

- An increase in the maximum height of power poles for the onsite substation, from 21 metres (m) to 36m.
- An increase the maximum height of solar panels from 4m to 4.85m above ground level.
- An amendment to the construction access and transport route for construction traffic associated with construction of the substation.

All other solar farm infrastructure proposed remains as described in the Development Consent. No changes to the project boundary or affected lots are required.

Substation Design Amendments – Poles

Additional design amendments by TransGrid have identified the need for taller transmission poles than described in the EIS. To allow safe clearance distances in accordance with Australian and TransGrid Standards, six 30m poles (217A and 217D) and two 36m poles (217B and 217C) are proposed to be installed (Refer Figure 2). It should be noted that these poles would be equivalent in size to the existing transmission infrastructure.

Panel Height

The approved project proposed approximately 900,000 single axis tracker PV solar panels mounted in rows on steel frames with a typical maximum height of 4m, with rows spaced between 8m and 14m.

Project amendments during the final stages of the Department's assessment placed strain on the development to produce its nameplate capacity, when offset distances for receiver R5a were increased from 800m to 1.8km. During detailed design, and because of improving technology, increasing the approved maximum height of solar panels to 4.85m would allow the project to improve efficiencies within the site, ensuring the financial viability of the project.

The new panels would not change the approved development footprint of 421ha. However, depending upon the final panel configuration, the proposed spacing between panels may change to between 4.5m and 14m. The new panels would have a typical maximum height of 4.85m.



Figure 1 Location of Walla Walla Solar Farm



Figure 2 Walla Walla Substation transmission connections

Potential Visual Impacts of Modification

The main aspects of the modification with potential to impact on the visual landscape are:

- Increasing the maximum height of power poles for the onsite substation, from 21m to 36m.
- Increasing the maximum height of solar panels from 4m to 4.85m above ground level.

The increase in construction traffic along Benambra Road to the substation access point is not considered to have substantial visual impacts on the landscape.

Existing management plans and dust suppression management measures for the solar farm and internal access roads will cover the unsealed sections of Benambra Road temporarily used for the substation construction.

Approach to assessment

This review has been prepared by NGH to provide a visual assessment for the proposed modification. The methodology is based on a comparison of the visual impact assessment undertaken as part of the EIS, and the proposed changes for the modification. The following components have been undertaken to achieve this:

- Review the original visual impact assessment ratings.
- Assessment of potential impacts from the visual modifications and sensitivity at key viewpoints as determined through new photomontages.
- · Consultation with potentially impacted receivers.
- Potential cumulative impacts.
- Additional mitigation measures required for the modification.

Original Visual Impact Assessment

The 2019 VIA was undertaken in the following stages:

- 1. Background investigations and mapping, including identifying Land Character Units (LCUs), defining where infrastructure may be visible in the landscape, and identifying key viewpoints such as major travel routes, potential residences and built up areas.
- 2. Field survey including reconnaissance, ground truthing and photography, and understand the likely sensitivity of LCUs within the landscape.
- 3. Consultation, including understanding community values and documenting community perception.
- 4. Impact assessment, describing the potential impact on visual amenity during construction and operation of the proposal.
- 5. Visual impact mitigation measures were developed in consultation with near neighbours including significant vegetation buffers and screening for people who would have a view of the residence.

Photomontages were prepared for selected viewpoints to provide a realistic impression of the operational solar farm. The viewpoints for the photomontages were selected based on distance to the development site, frequency of view from a public place and the location of the nearest sensitive residences. Three viewpoints were selected for the production of photomontages as they were determined to have the greatest potential for visual impact and best represent a range of distances and locations with differing views.

Community consultation specific to the assessment of visual impacts for the proposal was conducted for near neighbours and the broader community.

Four LCUs were identified within Walla Walla and surrounding areas:

- Rural (including agricultural lands).
- Residential (viewpoints near rural residence/homes).
- Industrial (major roads, electrical and other built infrastructure).
- Commercial (businesses, town centre).

The scenic quality was rated in each LCU as follows:

- A high scenic quality rating describes areas with outstanding, unusual or diverse features.
- A moderate scenic quality rating applies to areas with the features and variety normally present in the character type.
- A low scenic quality rating is given to areas lacking features and variety.

Twelve representative viewpoints were identified as shown in . Considering the sensitivity of local viewpoints, the following assessments were made:

- **Rural viewpoints** were assessed as generally having a moderate to low scenic quality given the surrounding agricultural activities. Rural views are located on moderate to low routes, or areas only accessed by local traffic. As motorists use local roads, views increase as vehicles approach the development site. View durations are generally short as vehicle speeds are up to 100 km/hr, and the expected number of local vehicles on these local roads is considered to be low to moderate. Regional and local significance is low, with scenic quality being moderate.
- **Residential viewpoints** were assessed as generally having a moderate to high sensitivity. If there was a view to the solar farm, the view duration could be expected to be high from a residence.
- Industrial viewpoints were assessed as having low sensitivity and include Hurricane Hill Quarry, Olympic Highway and areas around existing powerlines. Any views from these areas would be fleeting due to vehicle speed, hard to discern and fragmented by existing roadside vegetation. Built structure is more commonly functional than aesthetic in these settings.
- **Commercial viewpoints** of Orange Grove Gardens were assessed as having moderate to high sensitivity given its location in the landscape and nature of operations.

The operational visual impacts were then assessed via consideration of:

- The proposed solar farm components.
- The potential for the proposed solar farm to be viewed from representative viewpoints.
- The degree of contrast the proposed solar farm would have within the identified LMZ. LMZs were assigned to viewpoints based on the results of the field work, and the contrast at that viewpoint was evaluated, as described below.
- The potential impact from glare.

The ratings for the degree of contrast created by the proposed solar farm at each viewpoint utilised the following definitions (U.S. Department of the Interior, n.d.):

- High contrast: the proposal would be dominant within the landscape and generally not overlooked by the observer; the visual change would not be absorbed.
- Medium contrast: the proposed activity would be moderately dominant and noticed; the visual change would be partially absorbed.
- Low contrast: the proposed activity would be seen but would not attract attention; the visual change would be well absorbed.
- Indistinct: contrast would not be seen or would not attract attention; the visual change would be imperceptible.

To determine if the objectives for the VLM zone were met, the contrast rating for the viewpoint was compared with the relevant management objectives to give a visual impact level. The visual impact level was defined as:

- High impact: contrast is greater than what is acceptable.
- Medium impact: contrast is acceptable.
- Low impact: visual contrast is little or not perceived and is acceptable.

Medium impacts were deemed likely for five viewpoints:

- Orange Grove Gardens was recognised as having a potential impact due to its location in the landscape and the nature of its business. The business is located over 1800m from the proposal and existing vegetative screening fragments the view of the development site. Setbacks of the solar array were increased from 800m to 1800m in response to community submissions, and a significant vegetation screening buffer of 50m would also be provided.
- 2. Viewpoint 6 () is located approximately 80m off the development site boundary with views overlooking the proposal. Existing vegetation and topography partially screen views of the

development site. Due to the close proximity of sensitive receivers R1a and R1b () a setback of 210m has been provided from R1a, and an extensive 50m-wide vegetation screening buffer would also be provided.

- 3. The viewpoint located on public locations along Benambra Road was representative of residences in the immediate area. The Project would be highly visible to representative residences, therefore on-site vegetative screening would be undertaken as a priority.
- 4. Viewpoints 5, 7 and 8 () are also located within 1km of the Project and are representative of views from R2 () and motorists along Benambra Road. Viewpoints were assessed as having a moderate impact due the visibility of the TransGrid substation from R2. Solar arrays and the substation entrance would be clearly visible to motorists travelling along Benambra Road.
- 5. Whilst the solar array would be visible to motorists along Benambra Road, existing native vegetation occurring along Benambra Road and Schneiders Road would mitigate views of the project. Where patches of native vegetation are to be enhanced for biodiversity, this would aid to further break up views from local roads. The location for the TransGrid substation was selected for providing minimal visual impact on R2.

DPIE accepted in its assessment that the project was not visible from Walla Walla and Culcairn townships or the Olympic Highway. Low impacts were expected for the majority of the study area and representative viewpoints due to distance to infrastructure, existing vegetative screening, retained on-site vegetation and the overall undulating terrain of the area. No mitigation was required for these locations.



Figure 3 Location of representative viewpoints



Figure 4 Proximity of sensitive receivers to the Project

Addendum Visual Impact Assessment

Near neighbour and public viewpoint locations as adopted for the approved project's original visual impact assessment are shown in Figure 5.

Landscape character remains unchanged as do the scenic quality and sensitivities of viewpoints. It is noted the approved development footprint is less than that assessed in the original visual impact assessment due to increasing the buffer from R5. The approved development footprint is maintained with no change to proximities of the project infrastructure to viewpoints due to the modifications.

Changes to the visibility of the modified proposal from increased panel and pole heights were reviewed to determine any changes to contrast requiring a change to the level of visual impact.

Previous photomontages were updated for the three residential viewpoints, in Figure 6 to Figure 20, to assist review visibility and contrast ratings.





Photomontages

Photomontages prepared for the approved project EIS are reproduced below with proposed infrastructure changes to assist assessing proposed modifications.



Figure 6 R1 Existing view



Figure 7 R1 Approved Project (showing panel height of 4m) superimposed view prior to screening



Figure 8 R1 Proposed Modification (showing panel height of 4.85m) superimposed view prior to screening



Figure 9 R1 Approved Project (showing panel height of 4m) superimposed with vegetation screening



Figure 10 R1 Proposed Modification (increased panel and pole height) superimposed with vegetation screening



Figure 11 R2 Existing view



Figure 12 R2 Approved Project (showing panel height of 4m, and tower height of 21m) superimposed view prior to screening



Figure 13 R2 Proposed Modification (showing panel height of 4.85m, and tower height of 36m) superimposed view prior to screening



Figure 14: R2 Approved Project (showing panel height of 4m, and tower height of 21m) superimposed with vegetation screening



Figure 15: R2 Proposed Modification (showing panel height of 4.85m, and tower height of 36m) superimposed with vegetation screening



Figure 16 R5 Existing view



Figure 17 R5 Previous infrastructure (approved panel height with buffer distance of 1.2km) superimposed view prior to screening



Figure 18 R5 Proposed infrastructure (increased panel and pole height) superimposed view prior to screening (note 1.8km buffer)



Figure 19 R5 Previous infrastructure (approved panel height with buffer distance of 1.2km) superimposed with vegetation screening



Figure 20 R5 Proposed infrastructure (increased panel and pole height) superimposed with vegetation screening (note buffer distance of 1.8km)

Increase of solar panel height

The proposed increase in panel height would be wholly within the approved development footprint. There is no change to the general layout of the Walla Walla Solar Farm as presented in Appendix 1 of the development consent.

Proposed solar panel heights would vary between 2.7m and 4.85m during the course of the day. It is noted that panels would typically be at their most vertical orientation (greatest height) during the early morning and late afternoon, for a maximum of approximately 30 minutes per day. Overnight, panels would be kept in the horizontal plane. To be precise, the increase in panel height would result in a height exceeding 4m for up to 2 - 3 hours at sunrise and 1 - 3 hours at sunset.

To assess the impacts of the proposed increase in panel height, new photomontages were reviewed to assess any substantial increases in visibility of the solar panels from previously assessed sensitive receivers.

Receivers R1, R2 and R5 () remain the only residences that would have views of the modified project. R1 would be most affected, as they are closest to the Project, with R1 being approximately 210m north from the development footprint.

The small increase in visibility to R1 due to increased panel height shown without screening in Figure 8 and with screening in Figure 10, compared to the approved panel height without screening in Figure 7 and with screening in Figure 9, is minimal.

Similarly, the changes in visibility to R2 and R5 are barely discernible. It is noted that since the previous visual impact assessment the buffer distance from R5 to the WWSF was increased from 1.2km to 1.8km during the project determination stage.

The proposed modifications would not result in a change to the previous low mitigated visual impact for R2 and R5, or the medium mitigated visual impact ratings for R1 or public viewpoints.

Due to distance, topography, and dense existing vegetation, it is unlikely that R6 would be able to see the modified project.

Whilst the increase in panel height would be noticeable to motorists using Benambra Road, as per the previous assessment it is noted that views would be fleeting, and significantly mitigated by existing mature roadside vegetation. It is noted that the proponent would provide additional landscaping along much of the project's boundary with Benambra Road.

Increasing the maximum solar panel height would not have an increased potential for glare impacts. As stated in the VIA (NGH Pty Ltd, 2019), "the potential for glare associated with non-concentrating PV systems that do not involve mirrors or lenses is relatively limited. PV solar panels are designed to reflect as little sunlight as possible, generally around 2% of the light received (Spaven Consulting, 2011), resulting in negligible glare or reflection".

We note that DPIE accepted in its assessment of the original development that the project would not cause noticeable glint and glare for the above reasons, and that visual impacts generally would be significantly reduced by the effective implementation of additional vegetation buffers.

Increase Substation Transmission pole height

The proposed increase in transmission pole height would be wholly within the approved development footprint. There is no change to the general layout of the Walla Walla Solar Farm as presented in Appendix 1 of the development consent.

The existing transmission tower infrastructure is already a feature in the landscape in the vicinity of the substation. The proposed pole height would be equivalent in height to existing electrical infrastructure associated with the Wagga Wagga – Jindera 330kV transmission line.

Receiver R2 is considered likely to be impacted by an increase to transmission pole heights at the substation. To assess the impacts of the proposed modification, photomontages were updated to assess any substantial increases in visibility of the poles from sensitive receiver R2.

As shown in Figure 12 and Figure 14, the small increase in visibility to R2 due to increased pole height, compared to the approved pole height, is barely discernible due to the distance and the nature of existing transmission line towers within the view. This impact would be less discernible with proposed mitigation, as shown in Figure 13 and Figure 15.

As summarised in Table 1 the proposed modifications would not result in a change to the previous medium or low visual impact ratings for residences or public viewpoints.

Receiver / Viewpoint	Distance from Project Site	Distance from infrastructure	Approved Project	Proposed Modification	Comment	
			Unmitigated / Residual Visual Impact Level			
R1a	80m	210m	High / Mederate	High / Mederate	Barely discernible change to	
R1b	350m	485m	Moderate	Moderate	contrast and visual impact rating.	
R2	800m	900m	Moderate / Low	Moderate / Low	Slightly discernible change to visibility. No change to contrast and visual impact rating.	
R5	800m	1,800m	Moderate / Low	Moderate / Low	Barely discernible change to visibility. No change to contrast and visual impact rating.	

Table 1 Summary visual impact levels

Changes to public viewpoints visibility are barely discernible and will not change residual impact level ratings.

Consultation

The proponent consulted with nearby receivers that were previously assessed as having a visual impact of the proposal.

Whilst restrictions as a result of public health orders surrounding the COVID-19 prevented face to face consultation, online communication was undertaken regarding the modification.

Many concerns raised related to the initial development application, including Heat Island Effect, social impacts and economic impacts.

Visual impacts and associated economic impacts were the primary concern raised by adjacent neighbours with respect to the modification. Additional mitigation, such as on-curtilage screening was offered and will be further considered by affected receivers. The proponent consulted with

Council regarding the proposal in late July. Council was satisfied with the proponent's approach to directly engage with neighbours concerning the project's visual impacts.

Cumulative Impacts

Adverse cumulative impacts occur when the infrastructure or activities at the solar farm site exacerbate the negative impacts of other infrastructure or activities occurring nearby. The location of Culcairn Solar Farm in proximity to the proposal and residences, as shown in Figure 4, was addressed in the Project EIS.

Construction

Development Consent was recently provided to the Culcairn Solar Farm, which would utilise Benambra and Weeamera Roads as part of its construction transport route. Visual disturbance associated with construction traffic for Residence 1a and 1b would be exacerbated by the use of Benambra Road by both the Culcairn Solar Farm and the Walla Walla substation construction traffic. During construction, the additional traffic and dust generation on Benambra Road west of Weeamera Road are probably the greatest potential for cumulative visual impacts.

As the substation for the Walla Walla Solar Farm would commence construction early during the construction period, it is highly unlikely that there would be significant overlap with the construction of the Culcairn Solar Farm, particularly given that peak construction traffic associated with the WWSF substation would be limited to an approximate six month period.

Existing management plans and dust suppression management measures for the solar farm and internal access roads will cover the unsealed sections of Benambra Road temporarily used for the substation construction.

Operation

Residence 2 would have limited views of both the approved Walla Walla Solar Farm as well as the recently approved Culcairn Solar Farm. Views of the WWSF would predominantly be associated with its on-site substation.

DPIE considered that the visual impact to R2 from Culcairn Solar Farm was low due to the setback from infrastructure, existing intervening vegetation and proposed additional planting.

Whilst a slightly discernible increase in visibility of the WWSF substation transmission poles is possible from R2, the poles are in keeping with existing transmission line infrastructure in the immediate area. The original residual low visual impact rating from the Walla Walla Solar Farm on Residence 2 is not altered by the proposed increase on panels and poles heights.

During operation, excepting unusual maintenance operations such as inverter or transformer replacement, a small maintenance team using standard vehicles are all that would be required. Cumulative visual and traffic impacts are considered manageable.

Mitigation Measures

Mitigation measures presented in the VIA (NGH Pty Ltd, 2019) include:

No.	Safeguards and mitigation measures	С	0	D
VA1	 Screening would be required on-site, generally in accordance with the Landscape Plan developed in consultation with neighbouring landholders. Plantings would be more than one row deep and where practical, planted on specific sections outside of the permitter fence, to break up views of infrastructure including the fencing. Screening within the vicinity of Residences 1a and 1b and 2 and 5a would be within a 15m buffer to allow for maximum screening. The plant species to be used in the screen would be native and derived from the naturally occurring vegetation community in the area. They should be fast growing and comprise a mixture of trees and shrubs capable of reaching a height of 3 to 4m within 10 years. Species selection is being undertaken in consultation with affected near neighbours and a landscape architect. Planting would be 2 months of completion of construction, so actual views of infrastructure are known or during winter/spring to increase the chance of plant survival. The screen would be maintained for the operational life of the solar farm. Dead plants would be replaced. Pruning and weeding would be undertaken as required to maintain the screen's visual amenity and effectiveness in breaking up views. 	С	Ο	D
VA2	 Prior to the commencement of construction, a detailed landscape plan will be prepared including: Screening location. Species type. Planting density and spacing. Method for planting. Descriptive measures that would be implemented to ensure vegetative screening is successful (i.e. irrigation or other watering method). A program to manage, monitor and report on the effectiveness of implemented measures. 	Design stage		
VA3	The materials and colour of onsite infrastructure would, where practical, be non-reflective and in keeping with the materials and colouring of existing infrastructure or of a colour that would blend with the landscape.	Design stage		
VA4	During construction, dust would be controlled in response to visual cues. Areas of soil disturbed by the project would be rehabilitated progressively or immediately post-construction, reducing views of bare soil.	С		

No.	Safeguards and mitigation measures	С	0	D
VA5	Construction night lighting would be minimised to the maximum extent possible (i.e. manually operated safety lighting at main component locations). It would be directed away from roads and residents so as not tocause light spill that may be hazardous to drivers.	С	0	D
VA6	The vast majority on construction vehicles would enter the development site via the north eastern entrance on Benambra Road, 2.6km off Olympic Highway to minimise impact on residences.	С		

C: Construction; O: Operation; D: Decommissioning

The following additional mitigation measure is proposed as a result of consultation for the Modification.

No.	Safeguards and mitigation measures	С	0	D
VA7	If requested by R1, the proponent would provide additional on- curtilage landscaping to R1a so as to further minimise views of the project.	С	0	

References

NGH Environmental (2019), Visual Impact Assessment Walla Walla Solar Farm, prepared for FRV.

Spaven Consulting (2011) Solar photovoltaic energy facilities: assessment of potential for impact on aviation. <u>https://www.solarchoice.net.au/wp-content/uploads/Reflectivity-of-Solar-Electric-PV-Modules.pdf.pdf</u>

U.S. Department of the Interior (n.d.) Visual Resource Management. Accessed on 10 June 2019 from https://www.blm.gov/programs/recreation/recreation-programs/visual-resource-management

B.2 Addendum Traffic Impact Assessment