Amendment Report

WELLINGTON NORTH SOLAR PLANT

AUGUST 2019

Document Verification

Project Title: Wellington North Solar Plant

Project Number: 17-382

Project File Name: WNSP Amendment Report final v3

Revision	Date	Prepared by (name)	Reviewed by (name)	Approved by (name)
Draft	12/02/19	Jane Blomfield	Brooke Marshall	Brooke Marshall
Final v1	1/03/19	Jane Blomfield Johanna Duck	Brooke Marshall	Brooke Marshall
Draft v2	2/05/19	Johanna Duck	Brooke Marshall	Brooke Marshall
Final v2	8/5/19	Johanna Duck	Brooke Marshall	Brooke Marshall
Draft v3	07/06/19	Johanna Duck	Brooke Marshall	Brooke Marshall
Final v3	19/08/19	Johanna Duck	Nick Graham-Higgs	Nick Graham-Higgs

NGH Environmental Pty Ltd (ACN: 124 444 622. ABN: 31 124 444 622)

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
suite 4, level 5, 87 wickham terrace
spring hill qld 4000 (t 07 3129 7633)

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)

CONTENTS

TABLES

FIGURES

ACRONYMS AND ABBREVIATIONS

ACHA	Aboriginal Cultural Heritage Assessment
ACHCRP	Aboriginal cultural heritage consultation requirements for proponents
AHD	Australian Height Datum
BDAR	Biodiversity Development Assessment Report
BOM	Australian Bureau of Meteorology
BSAL	Biophysical strategic agricultural land
dB(A)	Decibels, a measure of A-weighted *(c.f.)* sound levels.
DECC	Department of Climate Change (now OEH)
DECCW	Department of Climate Change and Water (now OEH)
DP	Deposited Plans
DPE	Department of Planning and Environment
EIS	Environmental Impact Statement
EL	Exploration Licence
EMFs	Electromagnetic fields
EP&A Act	*Environmental Planning and Assessment Act 1979* (NSW)
EPA	(NSW) Environment Protection Authority
GDE	Groundwater Dependent Ecosystems
ha	hectares
ICNG	Interim Construction Noise Guideline
ICNIRP	International Commission on Non-Ionizing Radiation Protection
Km	Kilometres
kV	kilovolts
LGA	Local Government Area
m	metres
ML	Megalitres
MW	Megawatt
MWh	Megawatt hours
NML	Noise Management Level
NPfI	NSW Policy for Industry
NSW	New South Wales
OEH	(NSW) Office of Environment and Heritage, formerly Department of Environment, Climate Change and Water
PV	Photovoltaic
RAPs	Registered Aboriginal Parties
RBL	Rating Background Level - the level of background noise
RNP	*Road Noise Policy*

SEARs	Secretary's Environmental Assessment Requirements
SSD	State Significant Development

1 INTRODUCTION

1.1 BACKGROUND

The Wellington North Solar Plant Proposal site is located approximately 7 kilometres (Km) north east of Wellington, within the Dubbo Regional Local Government Area (LGA) (Figure 1-1). The proposal includes the construction, operation and decommissioning of a photovoltaic (PV) solar plant and associated infrastructure that would produce up to 300 Megawatts (MW) of electricity. The proponent is Wellington North Solar Farm Pty Limited (AGL), a subsidiary of AGL Energy Limited.

The proposal requires development consent under Part 4 of the *Environmental Planning and Assessment Act 1979 (EP&A Act).* The proposal is considered State Significant Development (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 the *State Environmental Planning Policy (State and Regional Development) 2011).*

An Environmental Impact Statement (EIS) was prepared by NGH Environmental (NGH Environmental, 2018) on behalf of the proponent and was submitted to NSW Department of Planning and Environment (DPE). The EIS was placed on public exhibition from 22 August 2018 to 19 September 2018. During this period, submissions were invited from the local community, government agencies, interested parties and other stakeholders. DPE received a total of 13 submissions during the exhibition period, including two objections and two letters of support from members of the public and nine submissions from government agencies. The Submissions Report (NGH Environmental, 2019d) provides a response to all issues and comments raised during the public exhibition.

The Wellington North Solar Plant proposal remains generally as detailed in Section 4 of the EIS (NGH Environmental, 2018). However, two changes have been made since the public exhibition of the EIS, regarding the transmission line route and site access. These changes have been made in response to submissions and further detailed design.

1.2 PURPOSE OF THIS REPORT

The purpose of this document is to describe any substantive changes made to the Project since the public exhibition of the EIS and provide an updated environmental assessment considering those changes. New measures of avoidance, management and mitigation are also outlined.

1.3 LEGISLATION

This application is made under Clause 55 of the *Environmental Planning and Assessment Regulation 2000*. This amendment report describes proposed changes to an SSD application that are considered to be substantially the same as the development described in the EIS. This report considers whether the proposed amendments are comparable to the development described within the EIS, specifically relating to:

- Development size, scale and footprint.
- Intensity including existing developments.
- Use of the land.
- Project life and hours of operation.
- Extent, duration and severity of impacts.

The proposed safeguards and mitigation measures described in the EIS and the few additional measures outlined in this report would enable impacts to be either avoided, minimised or appropriately managed.

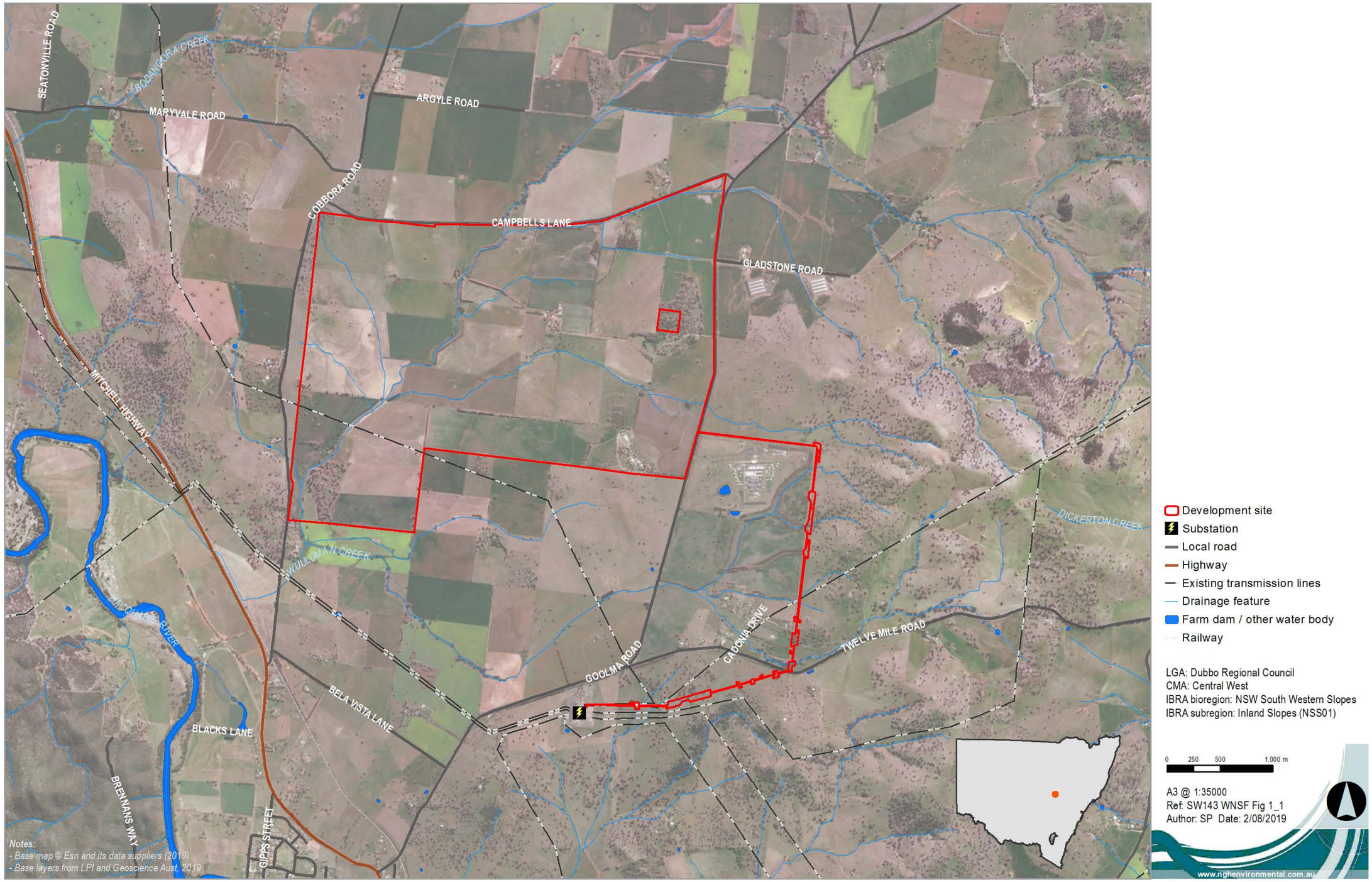

Figure 1-1 Locality map.

2 PROPOSED AMENDMENT

The Wellington North Solar Plant proposal remains generally as detailed in Section 4 of the EIS (NGH Environmental, 2018). However, two changes are proposed and are detailed in this section.

AGL has made the following changes to the proposal:

- **Transmission line route**: Two options were described in the EIS. AGL has now proposed to construct a new eastern transmission line option that was not described or assessed in the EIS. The justification for this is provided within Section 2.3 this report. The western and eastern transmission line options displayed in the EIS are no longer part of the proposal.
- **Site access:** Three options were described and assessed in the EIS. AGL has now committed that all construction site access would be via Campbells Lane. While the other two access points off Goolma Road are existing access points to the proposal site and may be utilised during operation, they would not be used during construction. These changes can be seen in the updated proposal layout and constraints map provided in Figure 2-1 and Figure 2-2.

The amendments are considered to result in a development that would be substantially the same as the development described in the EIS. The justification for the amendments is provided within Section 2.3 of this report. Updated consultation and assessment are provided where required, in Sections 2.4 and 3.

2.1 TRANSMISSION LINE OPTION

The new eastern transmission line option is considered a more appropriate option for the project than the two transmission line options presented within the EIS. The previously proposed eastern transmission line is not considered cost effective, due to the comparative cost of underground installation. Underground installation was required by the landowner, Wellington Correctional Centre. The previously proposed western transmission line is not considered as functional, when compared to the proposed new eastern transmission line option. The western and eastern transmission line options displayed in the EIS are no longer part of the proposal as the assessment of environmental impacts and consideration of the feasibility of options has concluded that the location of the new eastern transmission line as proposed in this amendment report is justified as it is the most feasible option and investigation has shown there are no substantive additional impacts or changes to mitigation strategies and would be consistent with the EIS.

The proposed new eastern transmission line option that would connect the solar plant to the existing Wellington Substation would be a 132kV or 330kV overhead transmission line. From the solar plant site, the transmission line would cross Goolma Road, approximately 400m north of the Soil Conservation Service site access. It would continue east for approximately 1.1km to the eastern side of the Wellington Correction Centre, before heading south to Twelve Mile Road for approximately 2km. It would cross Twelve Mile Road and enter the Wellington Substation from the east (refer to Figure 2-1). The transmission line would occur in the following lots and Deposited Plans (DPs):

- Lot 106, DP 2987
- Lot 73, DP 750760
- Lot 2, DP 1053234
- Lot 32, DP 622471

The transmission line would have an easement up to 60m wide and would have a maximum easement footprint of 30-31 ha equal to the now infeasible western transmission route. The assessments for the proposed new eastern transmission line assessed a larger study area than the proposed 60m wide

easement. This was undertaken to identify the most appropriate route within the study area. The area of vegetation removed within the easement would be approximately 9.43ha (as determined in the revised BDAR-v2.3, NGH 2019b). The line would involve three different land owners. Table 2-1 compares the proposed new eastern transmission line option to the two transmission line options presented within the EIS. The new eastern transmission line is considered to be substantially the same as the transmission line options presented within the EIS as the impacts are kept to a minimum.

Table 2-1 Proposed new eastern transmission line route compared to the two EIS transmission line routes.

	EIS Eastern transmission line option (underground)	EIS Western transmission line option (overhead)	New Eastern Transmission line, now proposed
Maximum easement footprint (hectares)	7	31	30-31
Number of non-involved landowners directly adjacent to the easement	2	5	8 (inclusive of 3 landowners that would be separated from the easement by Twelve Mile Road, refer to Figure 2-2)

2.2 SITE ACCESS

In response to Roads and Maritime Services submission for the EIS, AGL has now committed, as part of this proposed amendment, that all construction site access would be via Campbells Lane as the use of Campbells Lane for all construction access including all heavy vehicle access has been sufficiently addressed in the *Traffic Impact Assessment* (GHD, 2018) (Appendix K of the EIS).

The EIS described three vehicular access points (refer to *Traffic Impact Assessment* (GHD, 2018) (Appendix K of the EIS) and catered for the following traffic:

- **Access Point 1:** The primary access point would be via Campbells Lane along the northern boundary of the site. This access would be used for light and heavy vehicles.
- **Access Point 2:** The existing driveway off Goolma Road that leads to the Soil Conservation Service facilities. The access point may continue to be utilised by Soil Conservation Service staff in addition to light vehicle access to the solar plant. By exception only, the access point may be required for some heavy vehicle movements, such as the delivery high voltage transformers.
- **Access Point 3:** The existing driveway off Goolma Road that leads to the residential dwelling on the property. This access point would be utilised by light vehicles only.

Under the proposed amendment, no construction access for the solar plant would be via Goolma Road. The vehicles that would access the solar plant site via Goolma Road during operation would be limited to light vehicles for operational staff only. The impacts of light vehicle use remain the same and the impacts have been sufficiently assessed in the *Traffic Impact Assessment* (GHD, 2018) (Appendix K of the EIS).

The change in site access for construction would not change the type of potential impacts considered in the EIS. It would result in a reduction in impact extent: no construction traffic impacts would now occur at the two Goolma Road access points and the use of Campbells Lane for all construction access for the solar plant including all heavy vehicle access has been sufficiently addressed in the *Traffic Impact Assessment*

(GHD, 2018). Site access is therefore not considered further in the assessment or mitigation section of this amendment report.

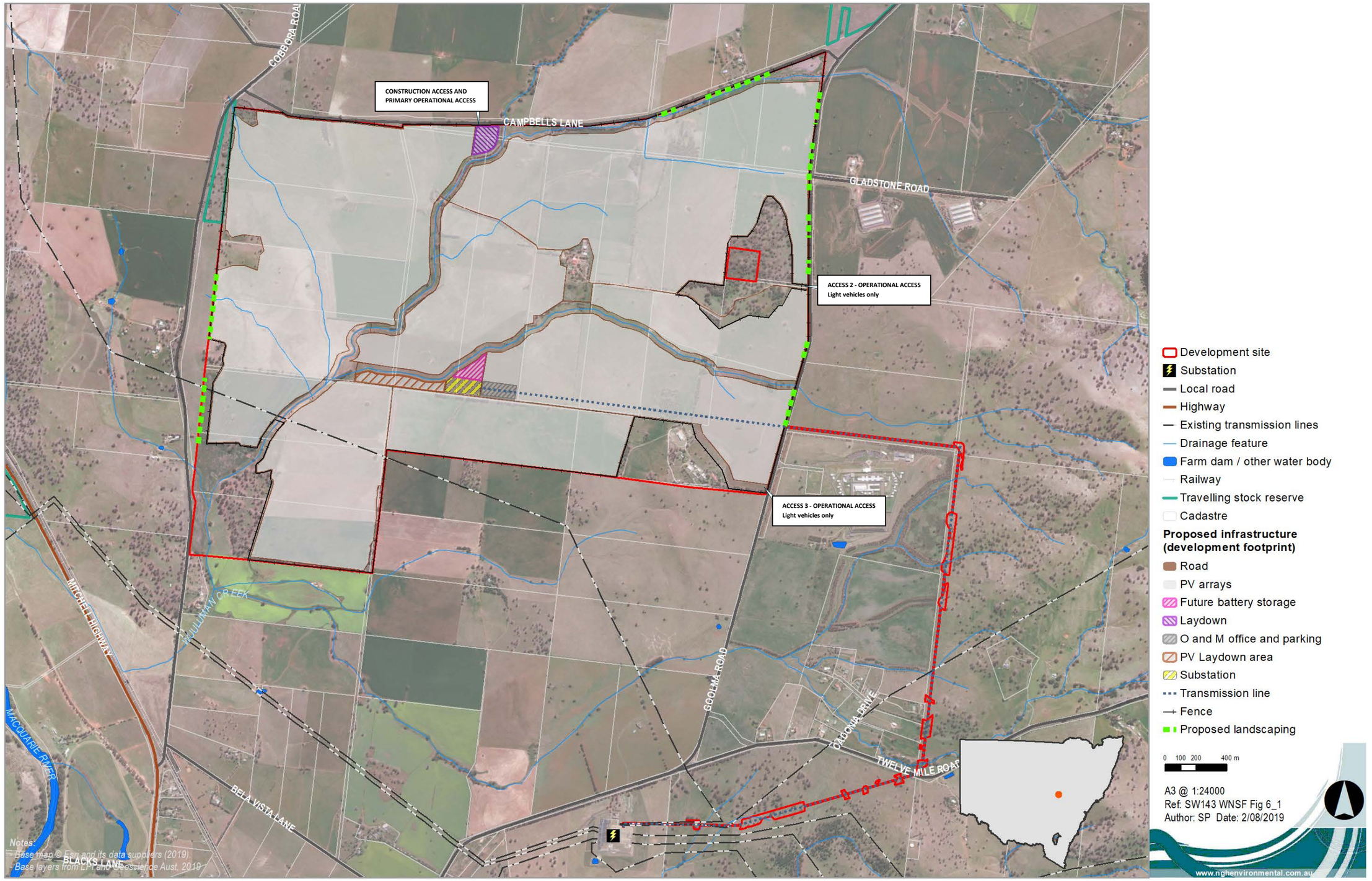

Figure 2-1 Updated proposal layout.

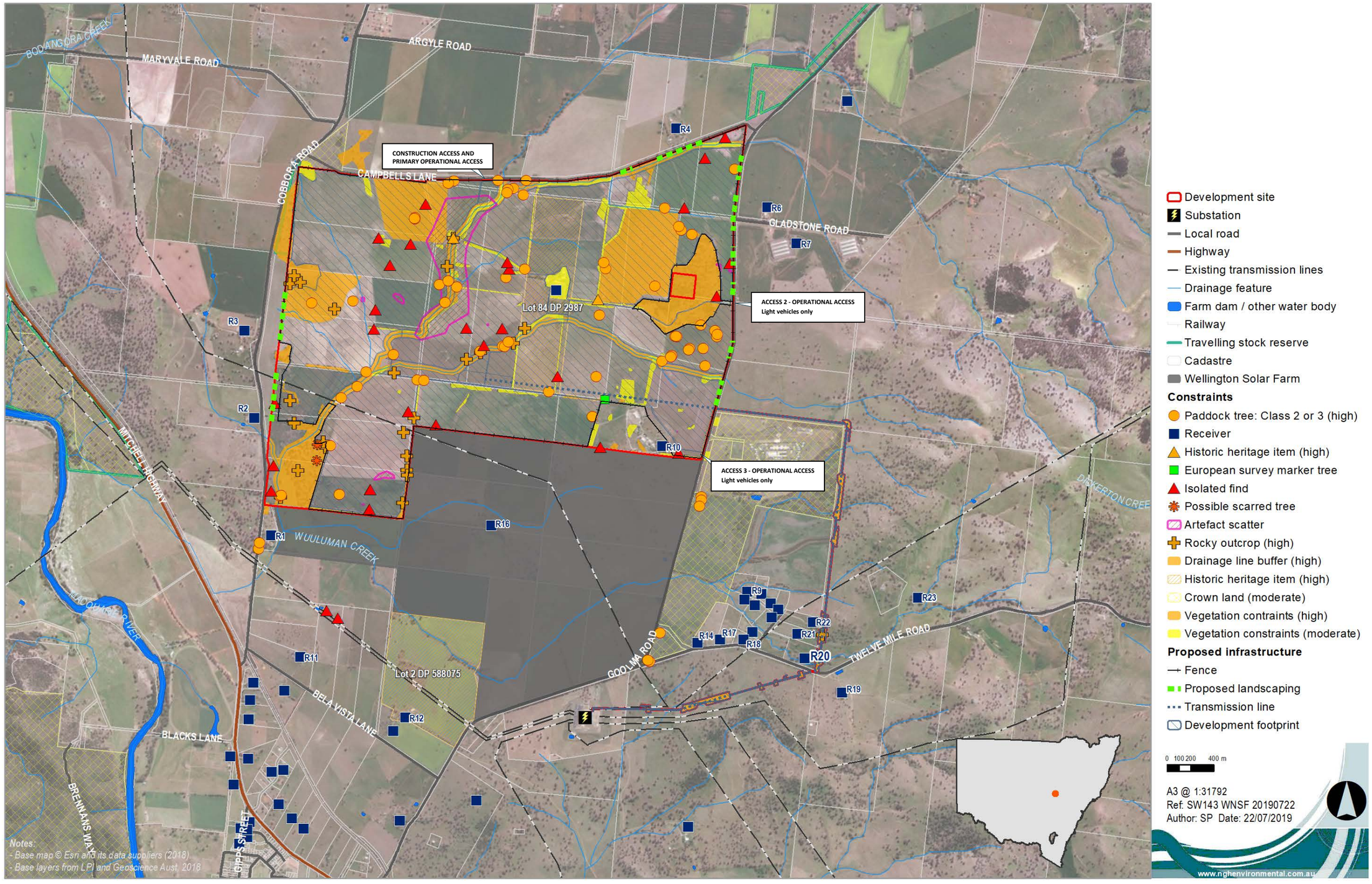

Figure 2-2 Updated constraints map

2.3 JUSTIFICATION FOR THE AMENDMENT

The amendments described within this report result in a development that is considered to be substantially the same as the development described in the EIS. Justification for the amendments is provided below.

2.3.1 New eastern transmission line

The new eastern transmission line is considered a more appropriate option for the project than the two transmission line options presented within the EIS.

1. Upon further investigation with the transmission authority, consultants and contractors, the previously proposed eastern transmission line was found to be technically risky and not cost effective, due to the limited market experience in constructing high voltage 330kV cables underground, and the comparative cost premium of underground installation. Underground installation proposed in the EIS was required by the landowner, Wellington Correctional Centre. However, it is now considered technically and economically infeasible to connect the project via underground cable.
2. Upon further investigation, the previously proposed western transmission line is not considered as practical, functional, or cost effective, when compared to the proposed new eastern transmission line option. A number of factors were considered when assessing the change in transmission line route including land access, technical feasibility, environmental assessment and cost.

Land Access

The proposed new eastern transmission line option required the consent and agreement of only three landowners, to provide the necessary access for the proposed route. This consent and agreement is now in place providing a fundamental advantage over the previously considered western route. Following over 12 months of negotiation with landowners on the western route for a continuous easement from the site to the transmission substation, AGL was not able to reach appropriate agreement on terms of access. AGL considers it inappropriate, impractical and not cost effective to purchase whole parcels of land for the purposes of transmission line access.

Technical Feasibility

The proposed new eastern transmission line option only needs to cross over one existing 132kV transmission line on the proposed route. The previously considered western transmission route required the powerline to cross over five existing 132kV powerlines and potentially two existing 330kV powerlines. Each crossing would require appropriate technical clearances between powerlines, requiring significantly taller poles at each crossing, resulting in increased visual and cost impacts. There is also an increased risk of outages and increased maintenance costs with each powerline crossing.

Environmental Assessment

The environmental assessment of additional impacts regarding the placement of the new eastern transmission line has been undertaken. Investigation has shown no substantive additional impacts or changes to mitigation strategies as detailed in Section 3 of this report and as summarised below.

- BIODIVERSITY (refer to Section 3.1 below)

  The new eastern transmission line would result in a minor increase to approximately 9.43ha of native vegetation that would be cleared along the new eastern transmission line easement.

Two management zones would occur in this transmission line easement to minimise clearing. These are:

- Management Zone 1: A 7m wide corridor would be cleared surrounding the powerline to include the installation of the powerline and provide an access track. In this management zone, both understorey and overstorey vegetation would be removed.
- Management Zone 2: A 60m wide corridor would be cleared surrounding the powerline for overstorey trees above 4m tall. In this management zone only overstorey vegetation would be removed.

The safeguards and mitigation measures to manage the new eastern transmission line biodiversity impacts would be consistent with the EIS. Although the credit requirement would change, no additional safeguards would be required to manage biodiversity impacts.

- ABORIGINAL HERITAGE (refer to Section 3.2 below)

  Ongoing consultation with Aboriginal stakeholders was undertaken in accordance with clause 80C of the NPW Amendment Regulation following OEH guidelines. Additional surveys were undertaken. The survey strategy was to cover as much ground surface as possible within the new eastern transmission line route study area. In total, two items were located. No other items of heritage significance were identified during the survey.

  The safeguards and mitigation measures to manage the new eastern transmission line heritage impacts would be consistent with the EIS. Minor amendments to the mitigation measures are proposed relating to the additional items and the revised study area.

- NOISE AND VIBRATION (refer to Section 3.3 below)

  The amended noise and vibration assessment for the construction and operation of the Wellington North Solar Farm demonstrates the eastern transmission line option would generally have similar potential impacts compared to the transmission line options presented in the EIS. The construction of the eastern transmission line has potential to exceed noise management levels (NML) at some nearby receivers. However, the impact is not expected to be significant due to the short construction period and implementation of mitigation measures already presented in the EIS.

  The safeguards and mitigation measures to manage the new eastern transmission line noise and vibration impacts would be consistent with the EIS. No additional safeguards would be required to manage noise and vibration impacts.

- VISUAL IMPACTS (refer to Section 3.4 below)

  Reasonable views from the R5 large lot subdivision are considered to be maintained. Views are composed of foreground, middle ground and background, all components must be considered to assess visual impacts. The impacts of the new eastern transmission line are considered to be reasonable because:

  - Key views through and beyond the structures are maintained.
  - Figure 3-9 shows the terrain, landform features and the potential views (that would be maintained) from the R5 large lot subdivision i.e. views to the west/south west across to Mount Arthur Reserve, views to the north to the

airport, views to the east to the low hills surrounding the R5 large lot subdivision, views to Mount Nanima to the south.

- The structures are minimal in nature and would have minimal visibility from main living areas of the dwellings and would be suitably screened by vegetation providing filtered views of the lines and poles. Additional planting will be provided to the two closest receivers to further filter/soften views of the poles and lines.
- Although the new eastern transmission line will be visual to road users, impacts are considered to be negligible.

There are two neighbours in relatively close proximity (within 200m) to the new transmission line option who would have an increased impact as a result of this proposed amendment. The key impacts would be visual, noise (during construction only) and amenity value of their properties. AGL has consulted with these landowners and proposed an impact mitigation plan which includes access to the solar package described in the Community Benefits Sharing scheme, to provide some enduring value to the properties, and visual screening with appropriate native vegetation plants.

The safeguards and mitigation measures to manage the new eastern transmission line visual amenity impacts would be consistent with the EIS. A minor amendment to the mitigation measures are proposed relating to an additional area of planting adjacent to the new eastern transmission line easement.

- OTHER ENVIRONMENTAL ASPECTS (refer to Section 3.5 below)
  - Soils and agricultural land capability: Soils onsite have a moderate to high erosion risk. Soil disturbance would occur with excavation for power pole footings and vegetation clearance and is considered minor due to the construction methodology. Agricultural production would be reinstated post construction and areas of disturbance would be rehabilitated with suitable vegetation.
  - Compatibility within existing land uses: Residences located near to the site may experience noise, dust and traffic during construction. These are considered to be temporary and manageable impacts. Steel transmission line poles may cause glint or glare depending on the sun angle. This is unlikely to unreasonably impact nearby receivers.
  - Historic Heritage: There are no items of historic heritage and no historic archaeological potential within the new eastern transmission line route.
  - Flooding: Flooding is unlikely to occur along the proposed transmission line. No impacts are foreseen.
  - Traffic, transport and safety: The construction of the transmission line would result in less traffic along Goolma Road and Twelve Mile Road than originally proposed in the EIS and are considered to be temporary and manageable impacts.
  - Water Quality and water use: The only ground disturbance would be for vegetation clearing and pole placement along the route. The proposed transmission line would not alter any existing water drainage patterns due to the minimal disturbance.
  - Social and economic impacts: The proposed transmission line would be visible for receivers along Goolma Road and Twelve Mile Road and within the R5 large lot subdivision. However, the impacts are not considered additional when compared to the previously proposed transmission line options.

- Bushfire: The construction of the transmission line has the potential to increase the risk of bushfire largely due to the increase in potential ignition sources associated with construction. However, these risks are not additional when compared to the transmission line options presented in the EIS. Operational risks for this transmission line are considered to be lower than for the transmission line options proposed in the EIS due to the lower number of existing transmission line crossings associated with the new transmission line route. No additional mitigation measures are proposed to those presented in the EIS.
- Electromagnetic Fields (EMF): There are no additional impacts from EMF associated with the new transmission line route when compared with the impacts and mitigations presented in the EIS.
- Air quality and Climate: The impacts are considered to be consistent with those presented in the EIS.
- Resource use and waste generation: The impacts are considered to be consistent with those presented in the EIS.

The safeguards and mitigation measures to manage the new eastern transmission line impacts are considered to be consistent with the EIS. No additional safeguards would be required to manage the impacts proposed in this amendment report.

Cost

AGL undertook a full technical and economic feasibility assessment of all the transmission line options. This was undertaken following stalled negotiations with landowners on the western transmission route as discussed above. This concluded that the proposed new eastern transmission option provided the most technically feasible and cost effective solution for connecting the Wellington North Solar Plant to the grid. This conclusion is reinforced by the land access and technical feasibility issues described above.

The western and eastern transmission line options displayed in the EIS are no longer part of the proposal. The assessment of environmental impacts and consideration of the feasibility of options has concluded that the location of the new eastern transmission line, as proposed in this amendment report, is justified as it is the most feasible option, and investigation has shown there are no substantive additional impacts or changes to mitigation strategies from those proposed in the EIS.

2.3.2 Site access

It was determined to be more appropriate that all construction site access for the solar plant would be via Campbells Lane. This amendment would result in a reduction in impact as no construction traffic would access the site off Goolma Road for the construction of the solar plant. The benefits and justification for the project remain unchanged and consistent with that presented in the EIS.

2.4 CONSULTATION

2.4.1 Summary and outcomes of consultation to date for this amendment

Impact/Issue	Stakeholder group	Engagement activity	Outcome/s and/or where addressed in this amendment report
Visual Amenity	Eastern Powerline Direct Neighbours	Phone calls to neighbours of the proposed new powerline route to describe what was planned and to listen to any concerns. This was followed up by an email to each landowner to give further detail of the proposal. AGL has also conducted one-on-one meetings with each of the landowners to discuss options for mitigating visual impacts and has followed up this meeting with a proposal to provide additional vegetation screening at the rear of their properties to limit the visual impacts.	Some neighbours had recently opposed transmission towers through or near their property and were concerned about the cumulative effects of an additional powerline. AGL is proposing poles rather than towers, thereby minimising the visual impact. It is expected that the visual amenity impact of the proposed transmission line on neighbours can broadly be mitigated with a small amount of onsite screening. Further detail of the assessment of visual amenity is provided in Section 3.4 of this report. The neighbours have provided a willingness to discuss the proposal and we are working towards agreed terms of impact mitigation.
EMF / Health Impacts	Eastern Powerline Direct Neighbours	Phone calls to neighbours of the proposed new powerline route to describe what was planned and to listen to any concerns. This was followed up by an email to each landowner to give a clearer picture of the proposal. AGL has also conducted one-on-one meetings with each of the landowners to discuss concerns about this issue.	Table 3-31 in Section 3.5 of this report outlines the assessment of EMF and health impacts associated with powerlines. Further to this assessment, transmission line easements are sized in accordance with Transgrid Transmission Line Design Standards which are designed to limit the EMF level at the edge of an easement to that found around the use of common household items. Transgrid has published "Fact Sheets" which would be presented and discussed with the concerned landowners at upcoming one-on-one meetings.
Amenity / property value	Eastern Powerline Direct Neighbours	Phone calls to neighbours of the proposed new powerline route to describe what was planned and to listen to any concerns. This was followed up by an email to each landowner to give further detail of the proposal. AGL has also conducted one-on-one meetings with each of the	The landowners are concerned about the increasing encroachment of industrial facilities on their rural residential properties, potential impacting their amenity value. There are currently two state approved gaols adjacent to their land and a

Impact/Issue	Stakeholder group	Engagement activity	Outcome/s and/or where addressed in this amendment report
		landowners to discuss options for mitigating impacts and has followed up this meeting with a proposal to provide additional and enduring value to their properties in line with the solar package proposed in the community benefits program described in the EIS	number of powerlines in the local vicinity. AGL's proposal seeks to mitigate some of this impact by providing long term value to their properties. The neighbours have provided a willingness to discuss the proposal and we are working towards agreement on terms.

3 AMENDED ASSESSMENT

As discussed, AGL has changed the transmission line option of the proposed Wellington North Solar Plant from what was presented in the publicly exhibited EIS. The proposed new transmission line option would be in a different location to the two options presented within the EIS. The new route would have similar types and similar magnitude of impacts as those present within the EIS. Due to the different location however, the following specialist reports have been provided as appendices and summarised in this report:

- Biodiversity Development Assessment Report (Appendix B) (NGH, 2019b). Updated report provided, removing the previously assessed transmission line options and replacing these with the proposed new eastern transmission line.
- Addendum Aboriginal Cultural Heritage Assessment (Appendix C) (NGH, 2019a). As above, updated report provided, removing the previously assessed transmission line options and replacing these with the proposed new eastern transmission line.
- Noise and Vibration Assessment (Appendix E) (Renzo Tonin, 2019). As above, updated report provided, removing the previously assessed transmission line options and replacing these with the proposed new eastern transmission line.

Summaries of these assessments are provided below. These are considered the key environmental aspects affected by the change. Assessments of the proposed changes for all other environmental aspects are provided in Table 3-31, undertaken with targeted specialist input only as required (visual and historic heritage).

3.1 BIODIVERSITY

3.1.1 Approach

An amended Biodiversity Development Assessment Report (BDAR) was prepared by NGH Environmental (NGH, 2019b) to add the potential impacts of the new eastern transmission line route for Wellington North Solar Plant to the existing biodiversity assessment. The aims of the report were to:

1. Address the requirements of the NSW Biodiversity Assessment Methodology (BAM) pursuant to the Biodiversity Conservation Act 2016 and the requirements of the SEARs in relation to biodiversity.
2. Assess the Proposal in relation to MNES as per the EPBC Act.

The full report is included in Appendix B and the report findings for the new eastern transmission line are summarised below.

The assessment approach involved literature reviews, database searches, and field surveys conducted in accordance with relevant survey guidelines. The proposed solar plant conforms to the definition of a site-based development according to the BAM a development other than a linear shaped development, or a multiple fragmentation impact development.

Targeted surveys within the study area for the new eastern transmission line route were undertaken between the 3rd-5th December 2018 (for Flora) and the 15th – 18th January and 29th January – 31st January 2019 (for Fauna).

The following assumptions for clearing within the new eastern transmission line route were:

- In treed areas the line is buffered to be 60m total width.

- In grassed areas the line is buffered to be 7m (allowing for a 5m track and additional allowance for power poles).

The following methods were adopted during the surveys:

- Vegetation Integrity Survey plots. A total of 13 plots were completed across native and exotic dominated areas.
- Random meander and targeted searches for threatened flora species.
- Fauna habitat assessment. Trees within the Proposal site were inspected for hollows, and the number, size and occupancy of the hollows, as well as the species, diameter at breast height and height of the hollow-bearing trees were all recorded.
- Targeted fauna surveys were conducted with the aim of identifying occurrence or defining habitat for threatened fauna species.

The aims of the site surveys were as follows:

- Determine vegetation communities present within the Proposal site, their condition and extent.
- Identify potential EECs within the Proposal site and determine their condition and extent.
- Conduct searches for threatened flora and fauna species predicted to occur in the Proposal site, in accordance with the BAM.
- Assess the availability and extent of flora and fauna habitat, particularly threatened species habitat, such as hollow-bearing trees.

A BAM Credit assessment was completed by an accredited assessor. The assessment ID for this proposal is 00009144/BAAS18074/19/00014567.

3.1.2 Existing environment

Native vegetation

Further vegetation integrity plots were undertaken on the 5th December 2018 to survey the transmission line route. One Plant Community Type (PCT) was identified along the transmission line route and stratified into three separate zones of a similar broad condition state. Thirteen vegetation integrity plots were undertaken in these zones.

The PCT identified in the transmission line route was:

- White Box grassy woodland in the upper slopes sub-region of the NSW South Western Slopes Bioregion (PCT 266).

This PCT forms part of the listed EEC – White Box – Yellow Box – Blakely's Red Gum woodland and Inland Grey Box Woodland.

WHITE BOX GRASSY WOODLAND IN THE UPPER SLOPES SUB-REGION OF THE NSW SOUTH WESTERN SLOPES BIOREGION (PCT 266)

The remnant woodland within the transmission easement is of moderate condition and is currently used for grazing (6.95 ha impact area). It is characterised by an overstorey of White Box (*E. albens*) that have been partially cleared through past agricultural practices, refer to Figure 3-1. The understorey is a mix of exotic and native grasses and forbs such as Wallaby Grass (*Rytidosperma* spp), Spear Grass (*Austrostipa* spp.), Fuzzweed (*Vittadinia cuneata*) and climbing saltbush (*Einadia nutans*). The woodland is also present in the creekline and is characterised by an overstory of White Box (E. albens) along Wuuluman Creek. The

exotic Pepper Tree (**Schinus molle*) is also abundant in this zone. The understorey is a mix of exotic and native grasses and forbs such as Couch (*Cynodon dactylon*) and Early Spring Grass (*Eriochloa pseudoacrotricha*). Fallen timber is present along the creekline.

Within the new eastern transmission line study area (refer to Figure 3-2), PCT 266 occurred as:

- Approximately 41.9 ha – Moderate condition with tree cover
- Approximately 0.8 ha – Creekline
- Approximately 51 ha – Derived Grassland

Figure 3-1 Example of White Box woodland in the new eastern transmission line.

Derived Grassland

Approximately 2.45ha (Impact Area) of vegetation within the new eastern transmission line is comprised of a mix of native and exotic grasses. These areas have been ploughed previously and are currently used for grazing of stock.

Cleared Areas (Non-native vegetation)

Approximately 0.38ha (Impact Area) of vegetation within the new eastern transmission line is comprised of exotic vegetation crops of Lucerne (**Medicago sativa*) and Kale (**Brassica oleracea*).

Rivers and Streams

The new eastern transmission line would cross Wuuluman Creek (0.43ha Impact Area) on the East of the development site. The creekline at this location has a canopy of White Box (*Eucalyptus albens*) and Pepper Trees (**Schinus molle* var. areira). The understorey is a mix of exotic and native grasses and forbs such as Couch (*Cynodon dactylon*) and Early Spring Grass (*Eriochloa pseudoacrotricha*). Fallen timber is present along the creekline.

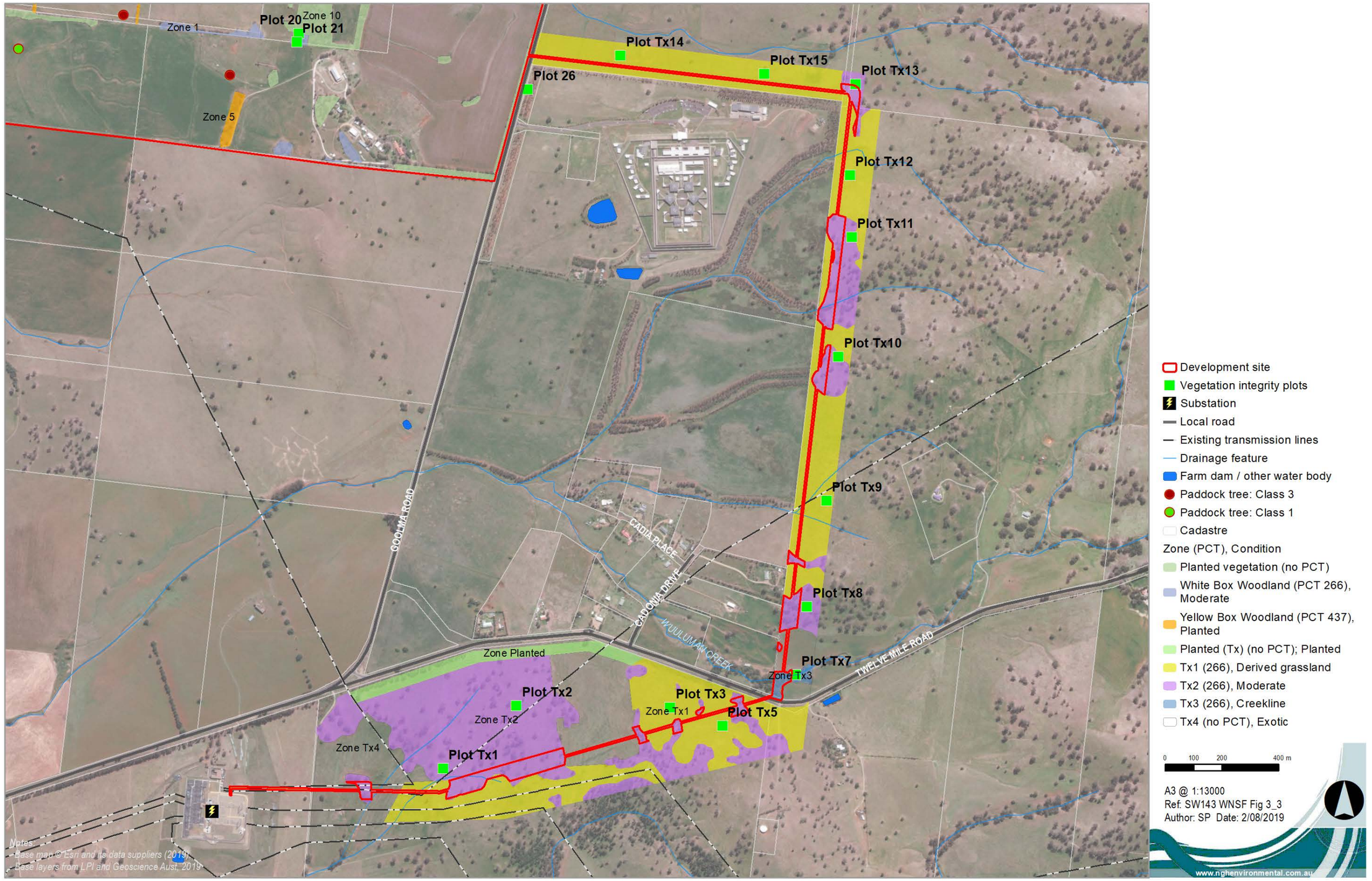

Figure 3-2 Vegetation zones within the Proposal site (south).

Threatened species

The following threatened species were identified from the BAM Calculator as potentially being present and requiring targeted survey (including within the new eastern transmission line route). Table 7-1 states whether each species was detected during surveys and furthermore, if they are expected to be impacted by the Proposal and therefore are required to be offset.

Table 3-1 Candidate species credit species returned from the BAM Calculator as requiring assessment.

Species Credit Species	Biodiversity risk weighting	Survey Time	Assumed to occur/survey/ expert report	Present on site?	Species polygon area or count
FAUNA					
Pink-tailed Legless Lizard *Aprasia parapulchella*	2.00	September - November	Surveyed Oct 2017 Not surveyed for in transmission line route	Assumed present in transmission line route	0.57ha (Rocky areas in transmission line easement)
Bush Stone Curlew Burhinus grallarius	2.00	All Year	Surveyed Jan 2019	No	-
Glossy Black Cockatoo *Calyptorhynchus lathami*	2.00	May - August	Surveyed May 2018 Not surveyed for in transmission line route	Assumed present in transmission line route	6.67ha (100m buffer around medium to large hollows in transmission line easement)
Gang-Gang Cockatoo *Callocephalon fimbriatum*	2.00	October - January	Surveyed Oct 2017 and Jan 2019	No	-
Large-eared Pied Bat *Chalinolobus dwyeri*	3.00	September - March	Surveyed December 2017	No	-
Eastern Pygmy Possum *Cercartetus nanus*	2.00	October - March	Surveyed Oct 2017	No	-
Little Eagle *Hieraaetus morphnoides*	1.5	August -October	Surveyed Oct 2017 Not surveyed for in transmission line route	Assumed Present in transmission line route	7.37ha (wooded areas in transmission line easement)
White Bellied Sea-Eagle	2.00	July-December	Surveyed Oct 2017	No	-

Species Credit Species	Biodiversity risk weighting	Survey Time	Assumed to occur/survey/ expert report	Present on site?	Species polygon area or count
Haliaeetus leucogaster					
Swift Parrot *Lathamus discolor*	3.00	May - August	Surveyed Oct 2017	No – not within mapped important area	-
Square-tailed Kite *Lophoictinia isura*	1.5	September-January	Surveyed Oct 2017 and Jan 2019	No	-
Superb Parrot *Polytelis swainsonii*	2.00	September - November	Surveyed Oct 2017 Not surveyed for in transmission line route	Assumed Present in transmission line route	6.67ha (100m buffer around small to large hollows in transmission line easement)
Eastern Bent-wing bat *Miniopterus schreibersii oceanis*	3.00	November - February	Surveyed Dec 2017	Yes. Foraging only. No Breeding Habitat	-
Southern Myotis *Myotis macropus*	2.00	November – March	Surveyed December 2017	Yes	0.23ha – (Combined area of hollow bearing trees within 200m of watercourse)
Barking Owl *Ninox connivens*	2.00	May - December	Surveyed Oct 2017 Not surveyed for in transmission line route	Assumed Present in transmission line route	2.13ha (100m buffer around large hollows>20cm in transmission line easement)
Masked Owl *Tyto novaehollandiae*	2.00	May – August	Not surveyed for in transmission line route	Assumed Present in transmission line route	2.13ha (100m buffer around large hollows>20cm in transmission line easement)
Squirrel Glider *Petaurus norfolcensis*	2.00	All Year	Surveyed Oct 2017 and Jan 2019	No	-
Brush-tailed Phascogale	2.00	All Year	Surveyed Oct 2017 and Jan 2019	No	-

Species Credit Species	Biodiversity risk weighting	Survey Time	Assumed to occur/survey/ expert report	Present on site?	Species polygon area or count
Phascogale tapoatafa					
Koala *Phascolarctos cinereus*	2.00	All Year	Surveyed Oct 2017, Oct 2018 and Jan 2019	No	-
Grey-headed Flying Fox *Pteropus Poliocephalus* (Breeding camps)	2.00	October - December	Surveyed Oct 2017 and Oct 2018	Foraging only. No Breeding Camps.	-
Regent Honeyeater *Anthochaera phrygia*	3.00	September - December	Surveyed Oct 2017	No – not within mapped important area	-
FLORA					
Ausfeld's Wattle *Acacia ausfeldii*	2.00	Any	Surveyed Oct 2017 and Dec 2018	No	-
Bluegrass *Dichanthium setosum*	2.00	December – May	Surveyed Feb 2018	No	-
Euphrasia *Euphrasia arguta*	3.00	-	Surveyed Oct 2017 and Dec 2018	No	-
Small Purple-pea *Swainsona recta*	1.00	September - October	Surveyed Oct 2017 Not surveyed for in transmission line route	No	-
Silky Swainson-Pea *Swainsona sericea*	2.00	September - February	Surveyed Oct 2017 and Dec 2018.	No	-
Zieria obcordata *Zieria obcordata*	3.00	All	Surveyed Oct 2017 and Dec 2018.	No	-

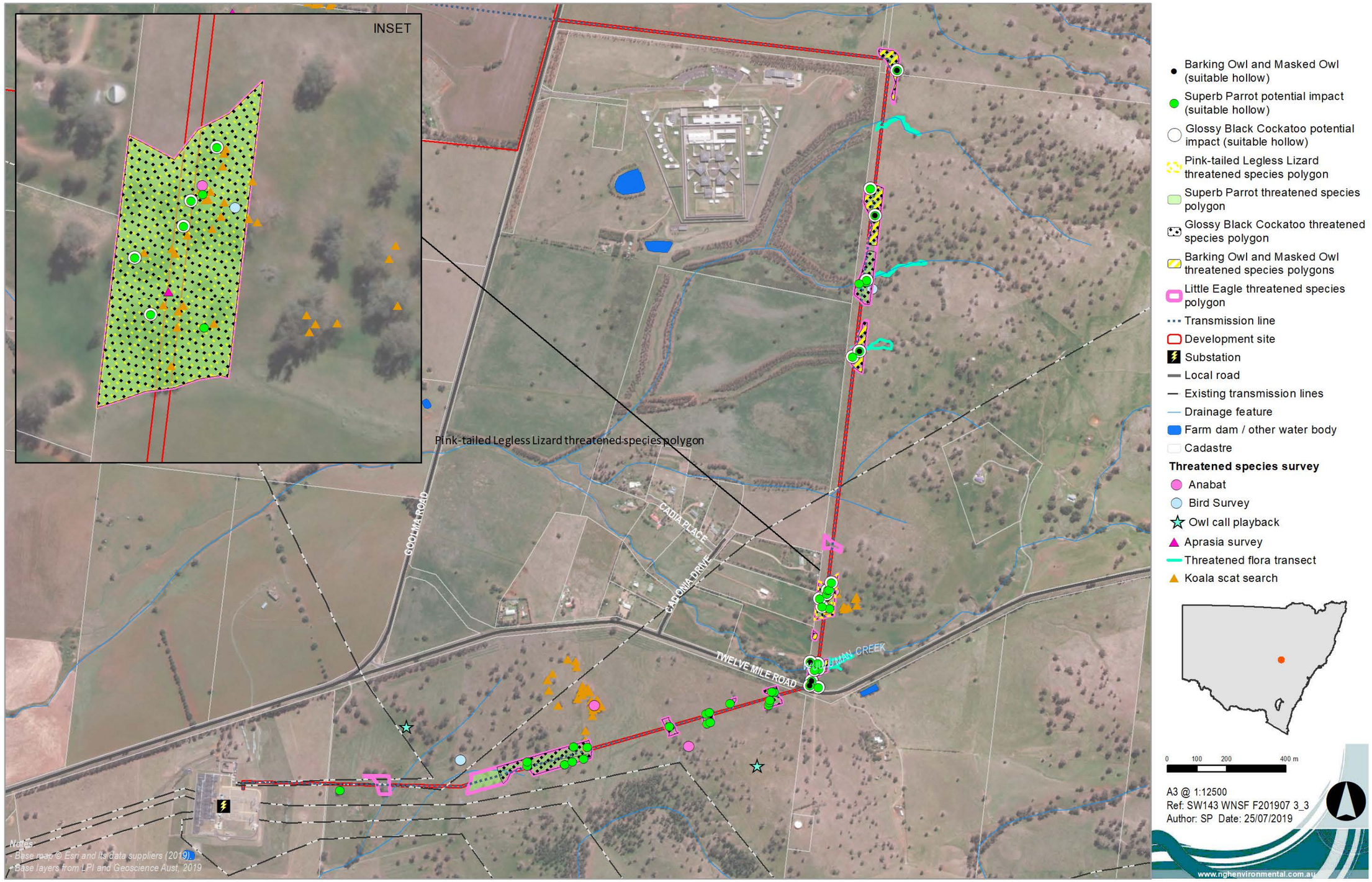

Figure 3-3 Threatened species polygons and targeted survey locations (south).

Site survey deficiencies

Six species credit species were unable to be surveyed during the appropriate survey times in the new eastern transmission line easement. These species (Pink-tailed Legless Lizard, Glossy Black Cockatoo, Little Eagle, Superb Parrot, Masked Owl and Barking Owl) were assumed to be present within suitable habitat within the transmission line easement (refer to Figure 3-3) and generated credits within the BAM Calculator.

3.1.3 Potential impacts

Avoidance of impacts

To inform the development of the most appropriate proposal, an environmental constraints analysis of the Proposal site was undertaken in the early planning stages to assist with designing the solar plant layout and planning the detailed methodologies for the environmental assessment.

The following methodologies were adopted for the design of the new eastern transmission line route:

- Minimising the impact to areas of moderate condition remnant vegetation (EEC's). These were areas of White Box Grassy Woodland and Yellow Box Woodland with a grazed understorey.
- Buffering waterways in accordance with their classifications and the "Guidelines for Riparian Corridors on Waterfront Land" (NSW office of Water, 2012) to minimise impacts on hydrology and water quality.
- Avoiding impacts to Rocky Outcrops, where practicable.
- Avoiding impacts to Hollow-bearing trees, where practicable.
- Locating ancillary facilities in areas where there are no biodiversity values.
- Making provision for the ecological restoration, rehabilitation and/or ongoing maintenance of retained native vegetation habitat on the Proposal site.

Impacts on native vegetation

Approximately 9.43ha of native vegetation would be cleared along the new eastern transmission line easement. Two management zones would occur in this transmission line easement. These are:

- Management Zone 1: A 7m wide corridor would be cleared surrounding the powerline to include the installation of the powerline and provide an access track. In this management zone, both understorey and overstorey vegetation would be removed.
- Management Zone 2: A 60m wide corridor would be cleared surrounding the powerline for overstorey trees above 4m tall. In this management zone only overstorey vegetation would be removed.

The changes in vegetation scores from the transmission line easement for each of these management zones are shown in Table 3-2.

Table 3-2 Table of current and future vegetation integrity scores for each vegetation zone within Transmission Line easement.

Zone ID	PCT	TEC and/or threatened species habitat?	Management Zone	Area of impact (ha)	Current vegetation Integrity Score	Future vegetation Integrity Score
Tx-1	266_Derived Grassland	EEC – White Box-Yellow Box-Blakely's Red Gum Woodland	MZ 1 7 m Easement		25.6	**0**
Tx -2	266_Moderate	EEC – White Box-Yellow Box-Blakely's Red Gum Woodland	MZ 1 7 m easement		49.5	**0**
			MZ 2 60 m easement (Overstory clearing only)		49.5	**33**
Tx-3	266_Creekline	EEC – White Box-Yellow Box-Blakely's Red Gum Woodland	MZ 1 7 m easement		69.8	**0**
			MZ 2 60 m easement (Overstory clearing only)		69.8	**43.9**
Total:						

3.1.4 Loss of species credit species habitat or individuals

The loss of species credit species habitat or individuals as a result of clearing within the new eastern transmission line is documented in Table 3-3 below.

Table 3-3 Summary of species credit species loss within the new eastern Transmission line

Species Credit Species	Biodiversity risk weighting	Area of habitat lost (ha)
Pink-tailed Legless Lizard (*Aprasia parapulchella*)	2	0.57
Glossy Black Cockatoo (*Calyptorhynchus lathami*)	2	5.92
Little Eagle (*Hieraaetus morphnoides*)	1.5	7.06
Barking Owl (*Ninox connivens*)	2	2.13
Superb Parrot (*Polytelis swainsonii*)	2	6.55
Masked Owl (*Tyto novaehollandiae*)	2	2.13

3.1.5 Loss of hollow-bearing trees

220 Hollow-bearing trees were recorded within the transmission line study area. 40 of these Hollow-bearing trees occur within the development footprint and would be removed by the Proposal. The number of hollow bearing trees in each zone are shown in Table 7-6.

Table 3-4 Hollow bearing trees impacted by the Proposal

Zone	Description	HBTs within zone	HBTs impacted
Tx 1	266_Derived Grassland	0	0
Tx 2	266_Moderate	210	34
Tx 3	266_Creekline	10	6
TOTAL		**220**	**40**

Direct and indirect impacts unable to be avoided

The construction and operational phases of the Proposal has the potential to impact biodiversity values at the site that cannot be avoided, consistent with the EIS these apply to the amended transmission route.

Construction and decommissioning

In addition to the offset requirement, direct impacts that must be managed during construction and decommissioning include:

- Habitat clearance for permanent and temporary construction facilities (e.g. solar infrastructure, transmission lines, compound sites, stockpile sites, access tracks). The consequences of this impact may include:
    - Direct loss of native flora and fauna habitat from clearing, including removal of hollow bearing trees and habitat for Southern Myotis (*Myotis Macropus*) and Glossy Black Cockatoo.
    - Displacement of resident fauna.
    - Injury and mortality to fauna during clearing of fauna habitat.
    - Disturbance to fallen timber, dead wood, bush rock and riparian vegetation.

A commitment to a Biodiversity Management Plan to address the risks during construction and decommissioning forms part of the Proposal.

Indirect impacts identified in the BDAR included:

- Risks for soil and water contamination.
- Introduction and spread of weeds and pathogens.
- Creation of barriers to fauna movement.
- Generation of excessive dust, light or noise.

Operation

Consistent with the EIS, the potential impacts during operation of the transmission line include:

Indirect impacts identified in the BDAR - risks for light spill, weed encroachment, increased vehicle traffic, fences, pest animals, and mobilisation of sediments.

Serious and Irreversible Impacts (SAIIs)

One threatened ecological community would be impacted on by the Transmission line (refer to Figure 3-4) that is listed as a potential SAII entity in the Guidance to assist a decision-maker to determine a serious and irreversible impact. This is the;

- White Box-Yellow Box- Blakely's Red Gum Woodland EEC (Box-gum Woodland)

One threatened species observed within the Proposal site is listed as an SAII entity in the Guidance to assist a decision-maker to determine a serious and irreversible impact. This is the;

- Eastern Bent-wing Bat (*Miniopterus schreibersii oceanensis*).

An assessment of the impacts to the Box-gum woodland and Eastern Bent-wing Bat was undertaken under the Guidance to assist a decision-maker to determine a serious and irreversible impact. Based on these criteria, it is considered unlikely the Proposal would have a serious and irreversible impact on the White Box Yellow Box Blakely's Red Gum Woodland EEC and the Eastern Bent-wing Bat *Miniopterus schreibersii oceanensis*.

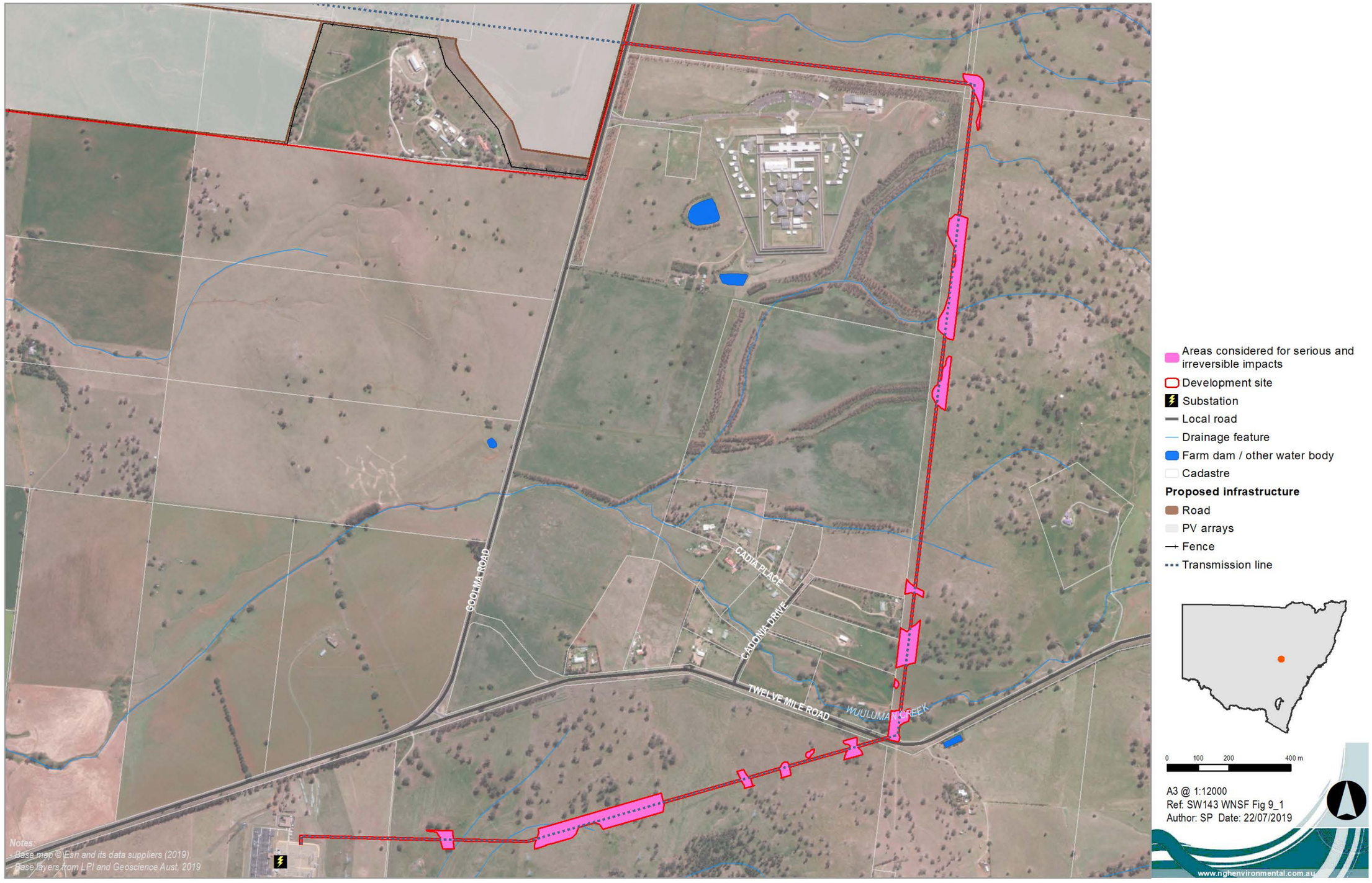

Figure 3-4 Location of areas considered for potential serious and irreversible impacts (south).

Matters of National Environmental Significance

THREATENED ECOLOGICAL COMMUNITIES

The White Box Woodland within the new eastern transmission line easement meets the condition threshold of the EPBC listed community and is considered to form part of a White Box-Yellow Box-Blakely's Red Gum Grassy Woodland and Derived Native Grassland. 7.4ha of this woodland vegetation would be removed by the development. An assessment of significance was undertaken for this community and concluded that a significant impact was unlikely on the basis that the proposal would not significantly:

- Reduce the extent of the ecological community
- Increase fragmentation of an ecological community
- Modify or destroy abiotic factors
- Cause a substantial change in the species compositions
- Cause a substantial reduction in the quality or integrity of an occurrence of an ecological community.

An EPBC referral is not considered necessary for this community.

THREATENED FAUNA AND FLORA

Eleven EPBC listed species were considered to have the potential to occur within the development site:

- Regent Honeyeater (*Anthochaera phrygia*).
- Painted Honeyeater (*Grantiella picta*).
- Swift Parrot (*Lathamus discolor*).
- Superb Parrot (*Polytelis swainsonii*).
- Large-eared Pied Bat (*Chalinolobus dwyeri*).
- Corben's Long-eared Bat (*Nyctophilus corbeni*).
- Koala (*Phascolarctos cinereus*).
- Grey-headed Flying Fox (*Pteropus Poliocephalus*).
- Pink-tailed Worm-lizard (*Aprasia parapulchella*).
- Striped Legless Lizard (*Delmar impa*r).
- Small Purple-pea (*Swainsona recta*).

Surveys were undertaken for these species and only one of these species was detected.

The Grey-headed Flying Fox was observed foraging along tributary 1 and flying overhead. An assessment of significance has been completed for the Grey-headed Flying-Fox (Appendix I) and concluded that a significant impact was unlikely on the basis that the proposal would not:

- Lead to a reduction of the size or area of occupancy of an important population, or fragment or disrupt the breeding cycle of an important population.
- Affect habitat critical to the survival of the species.
- Affect habitat or introduce disease such that the species would decline.
- Introduce invasive species harmful to the Grey-headed Flying Fox.
- Interfere with the recovery of the species.

An EPBC referral is not considered necessary for this species.

Known records of the Superb Parrot occur within 10km of the development site. The Superb Parrot was unable to be surveyed for during the breeding season in the transmission line easement. 43 suitable hollow

bearing trees would be removed within the transmission line easement. An assessment of significance has been completed for the Superb Parrot (Appendix I) and concluded that a significant impact was unlikely on the basis that the proposal would not:

- Lead to a reduction of the size or area of occupancy of an important population, or fragment or disrupt the breeding cycle of an important population.
- Affect habitat critical to the survival of the species.
- Affect habitat or introduce disease such that the species would decline.
- Introduce invasive species harmful to the Grey-headed Flying Fox.
- Interfere with the recovery of the species.

An EPBC referral is not considered necessary for this species.

The EPBC Referral Guidelines for the Koala (DoE, 2014) documents the 'Koala habitat assessment tool' to assist proponents in determining if a proposal may impact on habitat critical to the survival of the Koala. The tool is provided as Table 3-5 below as it applies to the proposal. Impact areas that score five or more using the habitat assessment tool contain habitat critical to the survival of the Koala. The assessment in Table 3-5 resulted in a score of 4 and as such habitat within the study area is not considered to be critical to the survival of the Koala. An assessment of significant impact is not required for the Koala.

Table 3-5: Koala habitat assessment tool for inland areas (DoE, 2014).

Attribute	Score	Inland	Applicable to the proposal?
Koala occurrence	+2 (high)	Evidence of one or more koalas within the last 5 years.	
	+1 (medium)	Evidence of one or more koalas within 2km of the edge of the impact area within the last 10 years.	
	0 (low)	None of the above.	✓
Vegetation composition	+2 (high)	Has forest, woodland or shrubland with emerging trees with 2 or more known koala food tree species, **OR** 1 food tree species that alone accounts for >50% of the vegetation in the relevant strata.	✓ White Box and Yellow Box are listed food trees.
	+1 (medium)	Has forest, woodland or shrubland with emerging trees with only 1 species of known koala food tree present.	
	0 (low)	None of the above.	
Habitat connectivity	+2 (high)	Area is part of a contiguous landscape ≥1000 ha.	

Attribute	Score	Inland	Applicable to the proposal?
	+1 (medium)	Area is part of a **contiguous landscape** <1000 ha, but ≥500 ha.	✓ Remnant vegetation can connect to large stands of woodlands south and west of Goolma Road.
	0 (low)	None of the above.	
Key existing threats	+2 (high)	Little or no evidence of koala mortality from vehicle strike or dog attack at present in areas that score 1 or 2 for koala occurrence. Areas which score 0 for koala occurrence and have no dog or vehicle threat present.	
	+1 (medium)	Evidence of infrequent or irregular koala mortality from vehicle strike or dog attack at present in areas that score 1 or 2 for koala occurrence, **OR** Areas which score 0 for koala occurrence and are likely to have some degree of dog or vehicle threat present.	✓ Some degree of Vehicle Threat present along Goolma Road.
	0 (low)	Evidence of frequent or regular koala mortality from vehicle strike or dog attack in the study area at present, **OR** Areas which score 0 for koala occurrence and have a significant dog or vehicle threat present.	
Recovery value	+2 (high)	Habitat is likely to be important for achieving the interim recovery objectives for the relevant context, as outlined in Table 1.	
	+1 (medium)	Uncertain whether the habitat is important for achieving the interim recovery objectives for the relevant context, as outlined in Table 1.	
	0 (low)	Habitat is unlikely to be important for achieving the interim recovery objectives for the relevant context, as outlined in Table 1.	✓ Study area is not considered a habitat refuge nor does it provide important connectivity to large areas surrounding a habitat refuge.

Attribute	Score	Inland	Applicable to the proposal?
Total	**4**	**Decision: Habitat not critical to the survival of the Koala—assessment of significance not required**	

3.1.1 Offset requirements

The following updated credit requirement (refer to Table 3-6 Credit requirements for the project) is generated for the project (inclusive of the new eastern transmission line, refer to Figure 3-5), and shows an increase in credits required.

Table 3-6 Credit requirements for the project

Ecosystem Credits	Offset credits required
White Box Grassy Woodland in the upper slopes sub-region of the NSW South Western Slopes Bioregion (PCT 266)	201
Paddock Trees – White Box Grassy Woodland in the upper slopes sub-region of the NSW South Western Slopes Bioregion (PCT 266)	7
Subtotal:	**208**
Yellow Box Grassy Woodland on lower hillslopes and valley flats in the Southern NSW Brigalow Belt South Bioregion (PCT437)	256
Paddock Trees - Yellow Box Grassy Woodland on lower hillslopes and valley flats in the Southern NSW Brigalow Belt South Bioregion (PCT437)	25
Subtotal:	**281**
TOTAL	**489**

Species Credits	Offset Credits Required
Southern Myotis (*Myotis Macropus*)	6
Pink Tailed Legless Lizard (*Aprasia parapulchella*)	6
Superb Parrot (*Polytelis swainsonii*)	70
Glossy Black Cockatoo (*Calyptorhynchus lathami*)	70
Little Eagle (*Hieraaetus morphnoides*)	58
Barking Owl (*Ninox connivens*)	24
Masked Owl (*Tyto novaehollandiae*)	24
TOTAL:	**258**

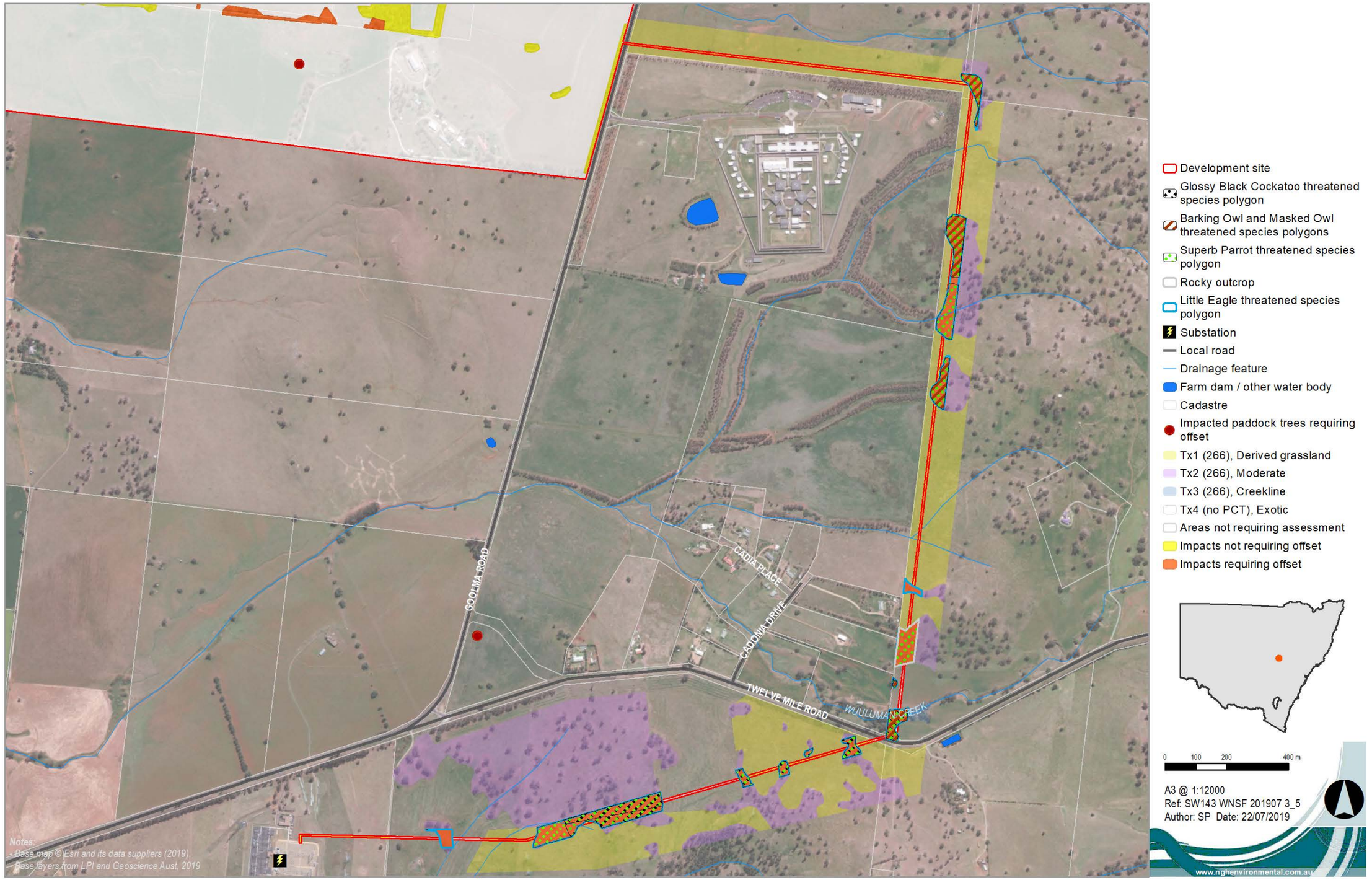

Figure 3-5 Impacts requiring offsets, not requiring offset and not requiring assessment (south)

3.1.2 Safeguards and mitigation measures

The safeguards and mitigation measures to manage the new eastern transmission line biodiversity impacts would be consistent with the EIS. Although the credit requirement would change, no additional safeguards would be required to manage biodiversity impacts.

3.2 ABORIGINAL HERITAGE

3.2.1 Approach

The Aboriginal Cultural Heritage Assessment Report for the proposed Wellington North Solar Plant, prepared by NGH Environmental (NGH, 2019a), has been updated based on the proposed changes set out in Section 2 of this report. The updated report (addendum) is provided in Appendix C and is summarised below. It includes consideration of Aboriginal heritage impacts from the construction and operation phases of the proposal, in accordance with SEARs.

This ACHA addendum was prepared in line with the following:

- *Guide to Investigating, Assessing and Reporting on Aboriginal Cultural Heritage in NSW* (OEH, 2011).
- *Code of Practice for the Archaeological Investigation of Aboriginal Objects in New South Wales* (OEH, 2010a).
- *Aboriginal cultural heritage consultation requirements for proponents 2010* (ACHCRP) (OEH, 2010b)

The consultation with Aboriginal stakeholders was undertaken in accordance with clause 80C of the NPW Amendment Regulation following the consultation steps outlined in the (ACHCRP) guide provided by the OEH. All consultation undertaken for the original Wellington North solar farm ACHAR is clearly outlined and documented in the original report. Consultation with the Aboriginal community was continuous and followed the process outlined in OEH's *Aboriginal cultural heritage consultation requirements for proponents 2010.* The full list of consultation steps, including those groups and individuals that were contacted and a consultation log is provided in Appendix C.

The fieldwork was organised, and all registered parties were asked to participate in the fieldwork. The additional field survey was carried out on the 28th and 29th of November 2018 and attended by representatives from:

- Wellington Valley Wiradjuri Aboriginal Corporation.
- Gallangabang Aboriginal Corporation.
- Binjang Wellington Wiradjuri Heritage Survey.

Details of the new eastern transmission line subject of the addendum were provided to all the registered parties for comment.

3.2.2 Archaeological context

This report reflects changes to the transmission line options presented in the EIS; neither of these would now be developed. They have been replaced by the new eastern transmission line, shown on Figure 3-7 as the 'additional transmission line area'. Only this new eastern transmission line is now relevant to the assessment.

An AHIMS search for the updated Wellington North solar farm site footprint and new eastern transmission line was undertaken on 12th November 2018. A total of 36 registered sites were identified within the revised project development footprint by the search. These included those sites registered from the original ACHA survey only, no other sites were found to be in proximity to the new eastern transmission line, refer to Figure 3-6.

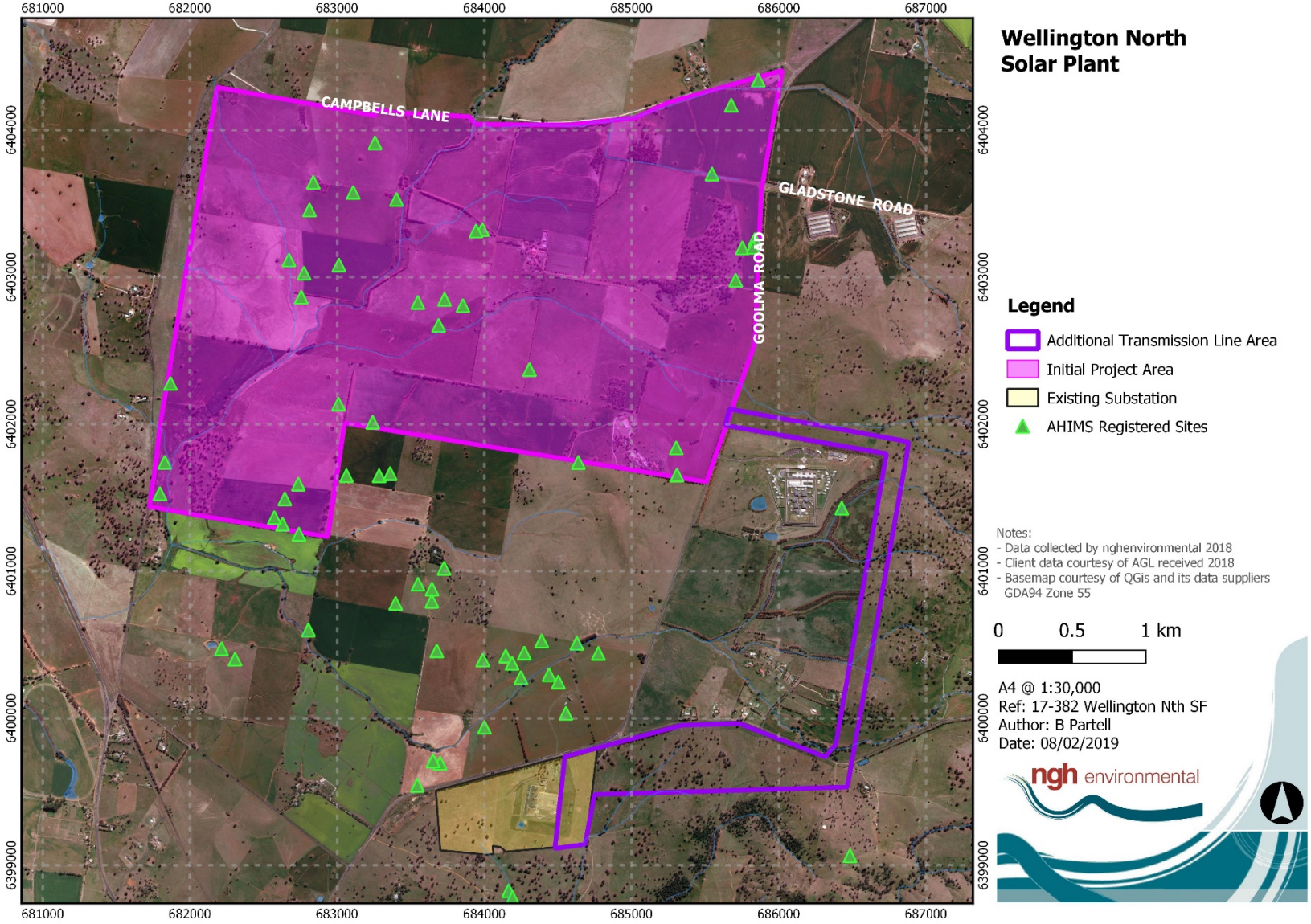

Figure 3-6. Registered AHIMS sites in proximity to the proposal area.

3.2.3 Survey results

The survey strategy was to cover as much ground surface as possible within the new eastern transmission line route study area. A pedestrian transect survey was undertaken to achieve maximum coverage of the location and maximum opportunity to identify any heritage features.

Visibility was moderate across the proposal area at the time of survey (approximately 20%) due to significant areas of high vegetation cover. Between the survey participants, over the course of the field survey, approximately, 49km of transects were walked across the new eastern transmission line route. Allowing for an effective view width of 5m for each person and given the variability in the ground visibility across the new eastern transmission line, overall the survey effectively examined 8.8% of the new eastern transmission line. It is considered that the survey of the new eastern transmission line had sufficient and effective survey coverage.

In total, two stone artefacts were located in the southern portion of the new eastern transmission line. No other items of heritage significance were identified during the survey. The presence of the two stone isolated finds aligns with the finds across the Wellington North solar farm area. The details of the two additional isolated artefacts are included in Table 3-7.

The isolated artefacts located during the survey of the new eastern transmission line are determined to have low archaeological significance and should be salvaged alongside the other reported material recommended for salvage in the original AHCAR if a 5 m buffer zone cannot be implemented around the sites during construction of the transmission line.

The cultural significance of the sites recorded during this assessment is only determined by the local Aboriginal community.

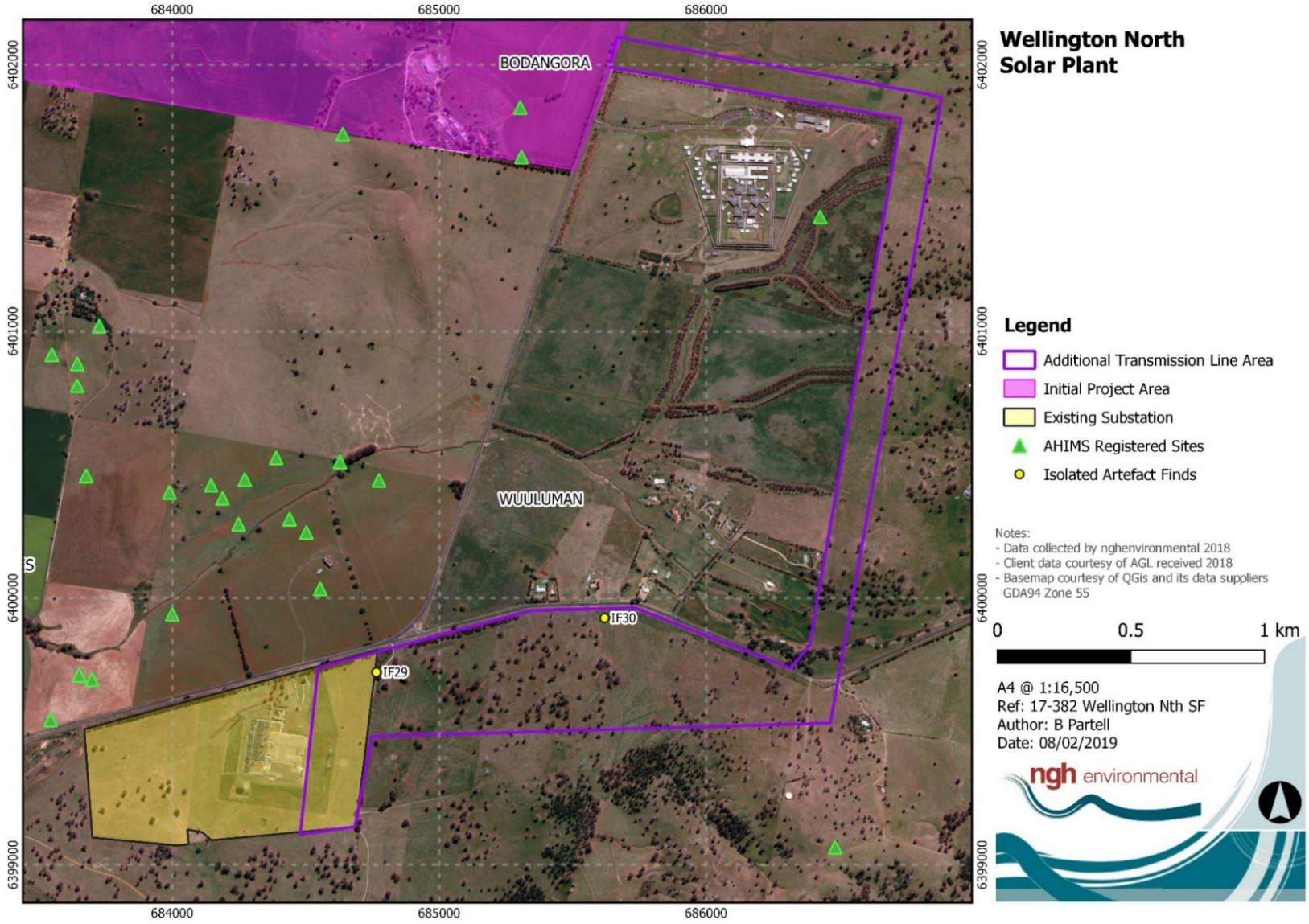

Figure 3-7. Location of two isolated artefacts (November 2018).

3.2.4 Potential impacts

The new eastern transmission line that would extend to the existing Wellington substation on Lot 106 DP2987, Lot 73 DP750760, Lot 2 DP1053234, Lot 2 DP107409 and Lot 32 DP622471 would have an easement up to 60m wide. The total on ground impact area would be approximately 9.43ha. The impact is likely to be most extensive where earthworks occur and would involve the removal, breakage or displacement of artefacts. This is considered a direct impact on the Aboriginal objects by the development in its present form.

The impact to the scientific values if the two recorded isolated finds (Wellington Nth IF29 and Wellington Nth IF30) were to be impacted by the new eastern transmission line is considered low.

The stone artefacts have little research value apart from what has already been gained from the information obtained during the present assessment. This information relates more to the presence of the artefacts and in the development of Aboriginal site modelling, which has largely now been realised by the recording.

The Wellington North Solar Plant proposal is classified as SSD under the EP&A Act which have a different assessment regime. As part of this process, Section 90 harm provisions under the NPW Act are not required, that is, an AHIP is not required to impact Aboriginal objects as the DPE provides development approval.

The table below details the impacts to the two isolated finds within the new eastern transmission line.

Table 3-7 Identified risk to known sites.

Site name	Scientific significance	Type of harm	Degree of harm	Consequence of harm	Recommendation
Wellington Nth IF29	Low	Direct	Total	Total loss of value	Salvage object prior to development of Proposal site.
Wellington Nth IF30	Low	Direct	Total	Total loss of value	Salvage object prior to development of Proposal site.

3.2.5 Safeguards and mitigation measures

The safeguards and mitigation measures would be consistent with the EIS. Only two safeguards and mitigation measures for Aboriginal heritage measure were altered from the original EIS measures, these are identified below in Table 3-8.

Table 3-8 Safeguards and mitigation measures for Aboriginal heritage

C: Construction; O: Operation; D: Decommissioning

ID	Safeguards and Mitigation Measures	C	O	D
1	**If complete avoidance of the nine artefacts scatters and 30 isolated find sites recorded within the Proposal site is not practicable, the artefacts within the development footprint must be salvaged prior to the proposed work commencing and moved to a safe area within the property that would not be subject to any ground disturbance.**	C		

ID	Safeguards and Mitigation Measures	C	O	D
2	**Further archaeological assessment would be required if the Proposal activity extends beyond the area of the current investigation as detailed in this report and in the initial ACHA. This would include consultation with the registered Aboriginal parties and may include further field survey.**	C	O	D

3.3 NOISE AND VIBRATION

3.3.1 Approach

The Construction and Operational Noise and Vibration Assessment for the proposed Wellington North Solar Plant, prepared by Renzo Tonin and Associates, has been updated based on the proposed changes set out in Section 2 of this report. The updated report is provided in Appendix E and is summarised below. It includes consideration of noise and vibration impacts from the construction and operation phases of the Proposal in accordance with SEARs.

3.3.2 Existing environment

The proposal is located in a regional setting, approximately 7km north east of Wellington. The surrounding land uses to the proposed solar plant are generally agriculture, including cropping and cattle and sheep grazing. Noise sources in the locality include traffic along Goolma Road, Twelve Mile Road and agricultural activities such as the operation of large harvesters, tractors, haulage trucks, irrigation pumps, quad bikes and 4WD vehicles.

Figure 3-8 illustrates the locations of the nearest receivers to the proposal site, with the nearest non-involved residential dwelling being approximately 110m north of the Solar Plant proposal site (R4). There are seven residential receivers directly adjacent to the proposed new transmission line route (R14, R17-R22).

3.3.3 Noise monitoring

Criteria for the assessment of construction and operation noise are usually derived from the existing noise environment of an area. The NSW Policy for Industry (NPfl) (EPA, 2017) outlines methods for determining the background noise level of an area. This assessment of the proposed works has used long-term noise monitoring.

Noise monitoring was undertaken near the closest residence (R4, monitored at L1 on Figure 3-8. Long term (unattended) noise monitoring was carried out at L1 between Thursday 5th October and Thursday 12th October 2017. This noise monitoring was undertaken as part of the EIS, no additional monitoring was undertaken for this updated noise assessment. The existing background and ambient noise levels determined from the monitoring are presented in Table 3-9.

Table 3-9 Measured existing background (L_{90}) & ambient (L_{eq}) noise levels, dB(A).

Monitoring location	L_{90} Background Noise Levels			L_{eq} Ambient noise level		
	Day	Evening	Night	Day	Evening	Night
L1 (near R4) (-32°29'0.48", 148°58'26.84")	27	34	26	49	46	47

The identified receivers surrounding the subject site are all classified as rural under NPfI guidelines. It was found that the background noise levels were typical for a rural area, with a day RBL less than 40dB(A), an evening RBL of 35 dB(A) and a night RBL less than 30dB(A).

Based on Table 2.1 of the NPfI Guidelines, where background noise levels are less than the minimum assumed Rating Background Noise Levels (RBLs), the minimum assumed RBL's are adopted for all receiver locations. Therefore, the background noise levels relevant to the Proposal are as per the fourth column of Table 3-10 below.

Table 3-10 Rating Background Noise Level, dB(A).

Time of day	Measured Existing Background (L_{90}), dB(A)	Minimum Assumed RBLs, dB(A)[1]	Applicable Rating Background Level, dB(A)
Day	27	35	**35**
Evening	34	30	**34**
Night	26	30	**30**

[1] In accordance with Table 2.1 of the NSW NPfI.

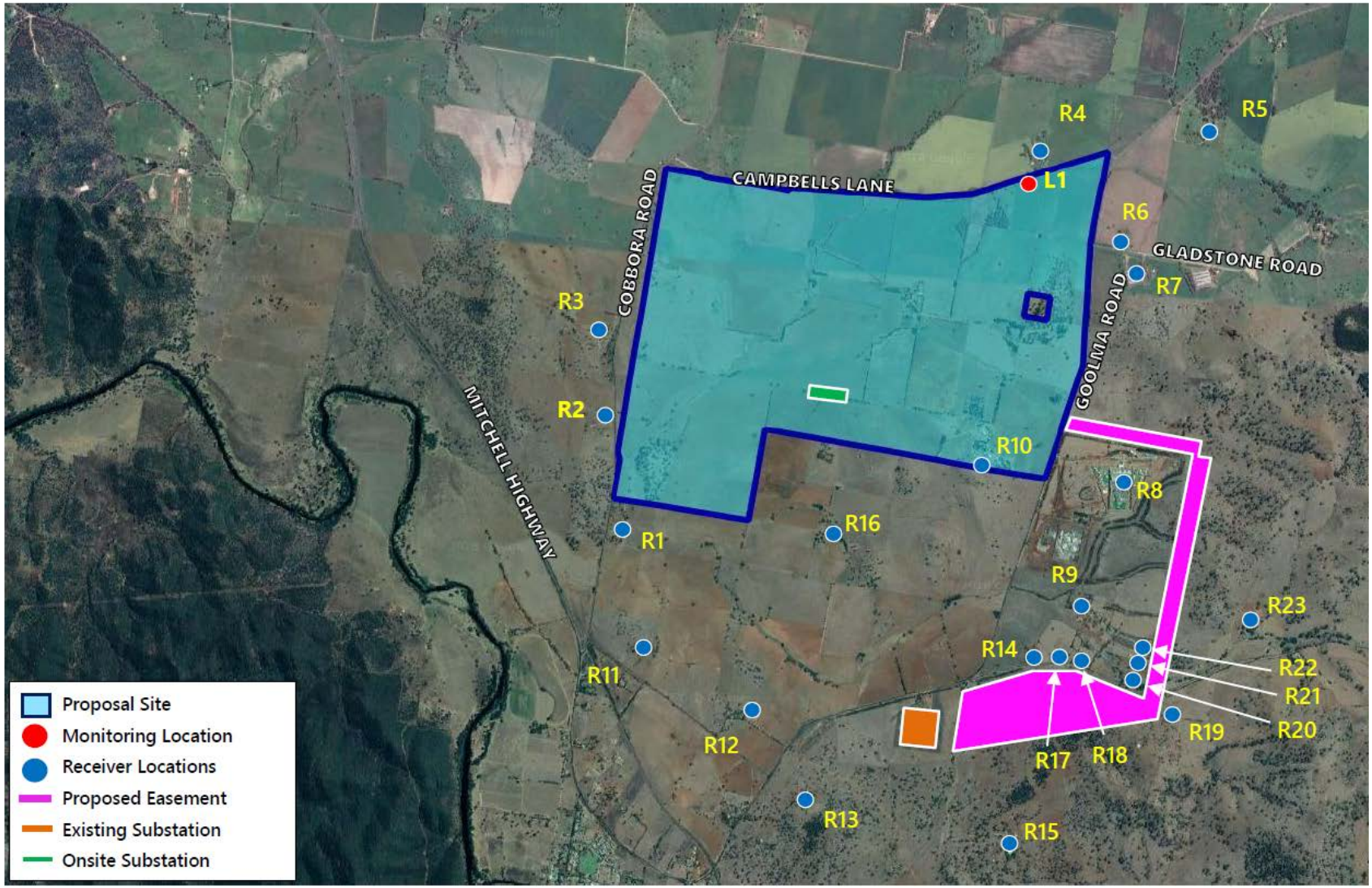

Figure 3-8 Residential receivers and noise monitoring locations adjacent to the proposal site. The new proposed transmission line study area is outlined in pink (Renzo Tonin, 2019).

3.3.4 Construction noise impact assessment

Criteria

The NSW *Interim Construction Noise Guideline* (ICNG) (DECC, 2009) deals with managing construction noise impacts. According to the guideline, a quantitative assessment of noise impacts is warranted when works are likely to impact an individual or sensitive land use for more than three weeks in total. The construction of the Wellington North Solar Plant meets the requirements of a quantitative assessment.

Residential receivers

The guideline specifies noise targets, or 'noise management levels', for residences and other noise sensitive receivers (Table 3-11). The Rating Background Level (RBL) is used when determining the management level. The RBL is the overall single-figure background noise level measured in each relevant assessment period. Residential receivers are considered 'noise affected' where construction noise levels are greater than the noise management levels identified below.

Table 3-11 Noise management levels at residential receivers

Time of day	Management Level
Recommended standard hours: Monday to Friday 7 am to 6 pm Saturday 8 am to 1 pm No work on Sundays or public holidays	Noise affected Rating Background Level + 10dB(A)
	Highly noise affected 75dB(A)
Outside recommended standard hours	Noise affected Rating Background Level + 5dB(A)

Table 3-12 identifies the adopted construction Noise Management Levels (NMLs) for the nearest noise sensitive residential receivers for the Wellington North Solar Plant proposal (refer to Figure 3-8). The NMLs for the receiver locations are derived from the RBLs represented by the background noise levels measured at the monitoring location (Table 3-10) and NSW ICNG (DECC, 2009) criteria (Table 3-11). During standard construction hours, a highly affected noise criteria of 75 dB(A) applies for all receivers.

Table 3-12 Construction noise management levels at residential receivers

Location description	Day L_{A90} background noise level (RBL)	Day noise management $L_{A90\ (15min)}$
All residential receivers (R1-R6, R9 and R11-R16)-	35 dB(A)[1]	35 + 10 = 45 dB(A)

Notes: 1. As no night works or works outside the recommended standard hours are proposed.

Sensitive land uses

Table 3-13 sets out ICNG noise management levels for other types of noise sensitive receiver locations applicable to the Wellington North Solar Plant proposal.

Table 3-13 Construction Noise Management Levels at other Noise Sensitive Land Uses

Land use	Receiver type	Where objective applies	Management level L_{Aeq} (15min)
Receiver R7 – 104 Gladstone Rd, Bodangora	Industrial	External noise level	75B(A)
Receiver R8 – Wellington Correctional Centre	Commercial	External noise level	70dB(A)
Receiver R10 – NSW SCS Commission Offices	Commercial	External noise level	70dB(A)

Construction noise sources

Noise impact predictions take into account the typical noise levels of construction equipment likely to be used for the construction phase. The equipment and their sound power levels to be used within the Proposal site are in Table 3-14. While Table 3-15 details the equipment required to construct the transmission lines for the Proposal.

Table 3-14 Construction equipment sound power levels within Proposal site.

Equipment used	LAeq Sound power levels (dBA) per single item	No. Items required
Small Pile Driving Rig	114	10
Crane	110	4
Drum roller	109	4
Padfoot roller	109	4
Wheeled loader	109	3
Dump Truck	108	6
30T Excavator	107	10
Grader	107	6
Chain trencher	104	4
Water truck	104	4
Telehandler	98	4
Forklift	90	4

Table 3-15 Construction equipment sound power levels for transmission line construction.

Equipment used	LAeq Sound power levels (dBA) per single item	No. Items required
Crane	110	1
Dump Truck	108	1
30T Excavator	107	1
Grader	107	1
Chain trencher	104	1
Water truck	104	1

Construction noise assessment

Noise emissions were determined by modelling the noise sources, receiver locations, topographical features of the intervening area, and possible noise control treatments surrounding the study area. The modelling calculates the contribution of each noise source at each specified receptor point and allows for the prediction of the total noise from a site.

The noise prediction models take into account:

- Location of noise sources and receiver locations.
- Height of sources and receivers.
- Separation distances between sources and receivers.
- Ground type between sources and receivers.
- Attenuation from barriers (natural and purpose built).

Table 3-16 presents the noise levels likely to be experienced at the nearby affected receiver locations during the construction works within the Proposal site. The predicted levels are considered a worst-case scenario with up to three nosiest plants operating concurrently.

Table 3-16 Predicted $L_{Aeq\ 15\ min}$ construction noise levels at receiver locations for works with the Proposal site.

Receiver location (refer to Figure 3-8)	Noise management level[1]	Predicted construction noise Level, $L_{Aeq\ (15\ min)}$ [2]	Compliance with criteria? (Yes/No)
Residential receivers			
R1	45	<20-41	Yes
R2		**<20-51**	**No**
R3		<20-45	Yes
R4		**<20-49**	**No**
R5		<20-33	Yes
R6		**<20-46**	**No**
R9		<20-31	Yes
R11		<20-31	Yes
R12		<20-28	Yes
R13		<20-23	Yes
R14		<20-28	Yes
R15		<20-20	Yes
R16		20-36	Yes
R17		<20-29	Yes
R18		<20-28	Yes
R19		<20-23	Yes
R20		<20-26	Yes
R21		<20-27	Yes
R22		<20-27	Yes
R23		<20-26	Yes
Sensitive land uses			
R7	75	<20-42	Yes
R8	70	<20-42	Yes
R10		<20-59	Yes

Notes: 1. Noise management for standard day time construction works (i.e. Monday to Friday 7am to 6pm and Saturday 8am to 1pm).

2. Based on up to three nosiest construction plant and equipment operating concurrently.

Table 3-17 refer to the noise levels likely to be experienced at the nearby affected receivers due to the construction of the transmission line. The noise levels represent the noise source being located at the furthest to the closest proximity to each receiver location.

Table 3-17 Predicted $L_{Aeq\ 15\ min}$ construction noise levels at receiver locations for works within the transmission line route.

Receiver location (refer to Figure 3-8)	Noise management level[1]	Predicted Construction Noise Level, $L_{q\ (15\ min)}$ [2]	Comply? (Yes/No)
Residential receivers			
R1	45	<20-20	Yes
R2		<20-20	Yes
R3		<20-20	Yes
R4		<20-21	Yes
R5		<20-20	Yes
R6		<20-25	Yes
R9		24-38	Yes
R11		<20-20	Yes
R12		<20-24	Yes
R13		<20-26	Yes
R14		**<20-63**	**No**
R15		<20-32	Yes
R16		<20-24	Yes
R17		**21-62**	**No**
R18		**22-63**	**No**
R19		**<20-50**	**No**
R20		**20-57**	**No**
R21		**22-50**	**No**
R22		**22-63**	**No**
R23		<20-40	Yes
Sensitive land uses			
R7	75	<20-27	Yes
R8	70	<20-43	Yes
R10		<20-36	Yes

Based on the construction noise levels presented in the tables above, the construction management levels at receivers R2, R4 and R6 may be exceeded when the construction works are conducted on the Proposal site.

For the proposed new eastern transmission line route, the construction noise management levels at Receivers R14 and R17-R22 would be exceeded. It is noted that construction noise levels at all receivers are predicted to be less than the highly noise affected level of 75dB(A) for works in all locations.

Compared to the two EIS presented Transmission line options, the new transmission line option has potential to exceed construction noise levels for a greater number of receivers. The previously assessed eastern transmission line option had no exceedances, while the western transmission line option had exceedances at R1 and R2. The proposed new transmission line is adjacent to a subdivision along Twelve Mile Road. However, the potential noise generated by constructing the powerline would be short term, with the work in the immediate vicinity of the subdivision taking approximately three to four weeks to complete.

In light of the predicted noise levels above, it is recommended that a feasible and reasonable approach towards noise management measures be applied to reduce noise levels as much as practicable to manage the impact from construction noise and assist in meeting compliance for receivers. Table 3-18 outlines potential noise reductions from using some recommended control methods (refer to Appendix E).

Table 3-18 Relative effectiveness of various forms of noise control, dB(A).

Noise control method	Practical examples	Typical noise reduction possible in practice		Maximum noise reduction possible in practice	
		AS2436	Renzo Tonin and Associates	AS2436	Renzo Tonin and Associates
Distance	Doubling of distance between source and receiver	6	6	6	6
Noise screening	Acoustics barriers such as earth mounds, temporary or permanent noise barriers	5 to 10	5 to 10	15	15
Acoustic enclosures	Engine casing lagged with insulation and plywood	15 to 25	10 to 20	50	30
Engine Silencing	Residential class mufflers	5 to 10	5 to 10	20	20
Substitution by alternative process	Use electric motors in preference to diesel or petrol	-	15 to 25	-	40

3.3.5 Operational noise assessment

Background noise monitoring

The background noise data collected to assess construction noise was also used to assess operational noise.

Criteria

The NSW *Noise Policy* for Industry (NPfl) (EPA, 2017) specifies noise criteria relating to intrusive noise impacts and noise level amenity. The assessment criteria under the NPfl for the Wellington North Solar Plant is outlined in Table 3-19.

Table 3-19 NPfl Proposal Specific criteria

Assessment Criteria	Proposal Specific Criteria
Intrusive	Rating background level + 5dBA
Amenity	$L_{Aeq\ period}$ recommended amenity noise levels - 5dBA $L_{Aeq\ period}$ + 3dBA

The operational proposal-specific noise criteria for the solar plant based on the NPfl criteria and guidelines (Table 3-19) is shown in Table 3-20 and Table 3-21.

Table 3-20 Intrusiveness noise criteria

Receiver	Period	LAeq (15 minute) (dBA)
All residential receivers [1]	Day	35 + 5 = 40
	Evening	34 + 5 = 39
	Night	30 + 5 = 35

Notes: Intrusiveness criteria is only applicable for residential receivers.

Table 3-21 Applicable amenity noise criteria

Receiver	Indicative noise amenity area	Time of day	Recommended noise level	
			$L_{Aeq\ Period}$	$L_{Aeq\ 15\ min}$
Residence (R1-R6, R9 and R11-R13)	Rural	Day [1]	50 – 5 = 45	45 + 3 = 48
		Evening [2]	45 – 5 = 40	40 + 3 = 43
		Night [3]	40 – 5 = 35	35 + 3 = 38
Commercial premises (R8 and R10)	All	When in use	65 – 5 = 60	60 + 3 = 63
Industrial premises (R7)	All	When in use	70 – 5 = 65	65 + 3 = 68

Notes:
1. Day is defined as 7.00am to 6.00pm, Monday to Saturday, 8.00am to 6.00pm Sundays and Public holidays
2. Evening is defined as 6.00pm to 10.00pm, Monday to Sunday and Public Holidays.
3. Night is defined as 10.00pm to 7.00am, Monday to Saturday, 10.00pm to 8.00am, Sundays and Public Holidays.

In accordance with the NPfl guidelines, the Proposal noise trigger levels are the lowest (i.e. more stringent) value for the Proposal intrusiveness noise levels and proposal amenity noise levels. These have been determined and reproduced in Table 3-22 below.

Table 3-22 Proposal Noise Trigger Levels, dB(A).

Receiver location (refer to Figure 3-8).	$L_{Aeq\ 15\ min}$ Proposal Noise Triggers[1]		
	Day	Evening	Night
Residential receivers			
R1-R6, R9, R11-23	40	39	35
Sensitive land uses[4]			
R7	68	68	68
R8	63	63	63
R10			

Notes:
1. Monday-Saturday, Daytime 7.00 am to 6.00 pm; Evening 6.00 pm to 10.00 pm; Night-time 10.00 pm to 7.00 am.
2. On Sundays and Public Holidays, Daytime 8.00 am - 6.00 pm; Evening 6.00 pm - 10.00 pm; Night-time 10.00 pm - 8.00 am.
3. The LAeq index corresponds to the level of noise equivalent to the energy average of noise levels occurring over a measurement period.
4. Proposal Noise Trigger Levels only apply when premises are in use.

To assess the likelihood of sleep disturbance, the potential of maximum noise level events from premises during the night-time period has been considered in this assessment. In accordance with NPfI, a detailed maximum noise level event assessment should be undertaken where the subject development night-time noise levels at a residential location exceed:

- $L_{Aeq,15min}$ 40dB(A) or the prevailing RBL plus 5dB, whichever is the greater, and/or
- L_{AFmax} 52dB(A) or the prevailing RBL plus 15dB, whichever is the greater.

Operational noise sources

The potential sources of noise during operation of the solar plant considered for the assessment included:

- Mechanical noise from the tracking system of the solar panels, from up to 13,367 tracking motors to drive solar panels.
- Operation of 155 inverter stations that are evenly distributed across the site.
- Operation of four new 175MVA transformers (two within the new onsite substation and two within the existing offsite substation).
- Operation of two existing 375MVA transformers (within the existing offsite substation).
- Four staff members onsite daily with the use of a light vehicle.

The sound power level data for the existing 375MVA transformers were provided by the client and were measured to be 96dB(A) each. To provide a conservative assessment it was assumed that all the existing and proposed transformers have the same sound power level as the existing larger 375MVA transformer.

The predicted power levels of these operation activities are outlined in Table 3-23.

Table 3-23 Typical operational plant and equipment and sound power levels for the Proposal

Plant description	LAeq Sound power levels (dBA)
Tracker motor (up to 13,367 in total)	78 (each)
Ingeteam 1640TL B630 inverters (up to 155)	88 (each)
New 175MVA transformers (4 in total)	96 (each)
Existing 375MVA transformers [1] (2 in total)	96 (each)
Light vehicle (4 in total)	88 (each)

[1] Sound power levels determined using formula provided in AS/NZS 60076.10:2009

During the night time period, only mechanical plant would be operating, including the tracking motors, inverters and the substation.

Operational noise assessment

In order to determine the noise impacts of the operating solar plant, a computer model incorporating all significant noise sources, receiver locations, topographical features of the intervening area, and potential noise control treatments surrounding the study area. The modelling calculates the contribution of each noise source at each specified receptor point and allows for the prediction of the total noise from a site.

Additionally, in accordance with NPfl noise predictions, three meteorological conditions are considered, including:

- Calm and isothermal conditions (acoustically neutral) – no wind and no temperature inversion.
- Slight to gentle breeze –3m/s wind velocity at 10m from ground level between each noise source and each noise receiver (as per INP default wind conditions). Wind direction was based on wind travelling from the source to the receiver.
- Moderate temperature inversion – applicable for noise predictions during night time periods only.

Table 3-24 and Table 3-25 present the predicted noise levels for the 'worst case scenario' based on concurrent operation all plant and equipment shown in Table 3-23. The tracker motors were time corrected based on their operation of one (1) minute out of a 15 minute period.

Table 3-24 Predicted $L_{Aeq\ 15min}$ operational noise levels at residential receiver locations, dB(A).

Receiver location (refer to Figure 3-8)	Proposal noise triggers[1]			Predicted operational noise levels, LAeq (15 min)			Comply? (Yes/No)
	Day	Evening	Night	Calm and isothermal conditions	Slight to gentle breeze	Moderate temperature inversion[2]	
R1	40	39	35	24	31	30	Yes
R2				30	34	34	Yes
R3				28	33	33	Yes
R4				28	32	33	Yes
R5				<20	26	26	Yes
R6				28	33	33	Yes
R9				24	31	31	Yes
R11				31	28	28	Yes
R12				25	31	31	Yes
R13				27	33	33	Yes
R14				28	34	34	Yes
R15				28	33	33	Yes
R16				28	34	34	Yes
R17				26	32	32	Yes
R18				25	30	31	Yes
R19				20	27	27	Yes
R20				22	28	29	Yes
R21				22	28	29	Yes
R22				21	28	28	Yes
R23				<20	26	26	Yes

Notes: 1. Criteria for Day, Evening and night periods

2. Applicable for the night time period only.

Table 3-25 Predicted $L_{Aeq\ 15min}$ operational noise levels at other sensitive receiver locations, dB(A).

Receiver location (refer to Figure 3-8)	Proposal noise triggers[1]			Predicted operational noise levels, $L_{Aeq\ (15\ min)}$			Comply? (Yes/No)
	Day	Evening	Night	Calm and isothermal conditions	Slight to gentle breeze	Moderate temperature inversion[2]	
R7	68	68	68	26	32	32	Yes
R8	63	63	63	26	32	31	Yes
R10	63	63	63	31	35	35	Yes

Notes: 1. When in use

2. Applicable for the night time period only.

Based on the predicted noise levels presented in the table above, operational noise levels from the proposed solar plant and the upgraded substation at the nearest receivers each comply under all scenarios and meteorological conditions.

The predicted operational noise levels would additionally be below the sleep disturbance criteria of 40 dB(A) and 52 dB(A). No specific mitigation measures are required.

Therefore, no noise mitigation measures are required to reduce operational noise impacts.

3.3.6 Vibration assessment

Vibration generating activities would occur only during the construction phase. There are no vibration generating activities expected during the operational phase. The nearest identified non-involved receiver is in excess of 100m from the solar plant proposal site and 70m for the proposed eastern transmission line route, structural damage due to vibration is not expected. Assessment for vibration impact on human comfort is assessed during the construction phase.

Assessment of potential disturbance from vibration on human occupants of buildings is made in accordance with EPA's *Assessing Vibration: A Technical Guideline* (DECC, 2006). Based on the proposed plant items to be used during construction (Table 3-14), vibration generated by construction plant was estimated and potential vibration impacts are summarised in Table 3-26.

Table 3-26 Potential vibration Impacts for Identified receivers.

Receiver location (refer to Figure 3-8)	Approx. distance to nearest buildings from works	Type of nearest sensitive buildings	Assessment on potential vibration impacts	Vibration monitoring
R1	330m	Residential	Very low risk of adverse comment	Not required
R2	135m	Residential	Very low risk of adverse comment	Not required
R3	315m	Residential	Very low risk of adverse comment	Not required
R4	110m	Residential	Very low risk of adverse comment	Not required
R5	910m	Residential	Very low risk of adverse comment	Not required
R6	225m	Residential	Very low risk of adverse comment	Not required
R7	330m	Commercial	Very low risk of adverse comment	Not required
R8	400m	Commercial	Very low risk of adverse comment	Not required
R9	1,220m	Residential	Very low risk of adverse comment	Not required
R10	75m	Commercial	Very low risk of adverse comment	Not required

Receiver location (refer to Figure 3-8)	Approx. distance to nearest buildings from works	Type of nearest sensitive buildings	Assessment on potential vibration impacts	Vibration monitoring
R11	580m	Residential	Very low risk of adverse comment	Not required
R12	250m	Residential	Very low risk of adverse comment	Not required
R13	530m	Residential	Very low risk of adverse comment	Not required
R14	350m	Residential	Very low risk of adverse comment	Not required
R15	1300m	Residential	Very low risk of adverse comment	Not required
R16	760m	Residential	Very low risk of adverse comment	Not required
R17	90m	Residential	Very low risk of adverse comment	Not required
R18	90m	Residential	Very low risk of adverse comment	Not required
R19	150m	Residential	Very low risk of adverse comment	Not required
R20	100m	Residential	Very low risk of adverse comment	Not required
R21	170m	Residential	Very low risk of adverse comment	Not required
R22	70m	Residential	Low risk of adverse comment	Not required
R23	370m	Residential	Very low risk of adverse comment	Not required

The potential for adverse comment to vibration impacts was determined to be very low.

No vibration mitigation measures are required.

3.3.7 Road traffic noise assessment

The road traffic noise assessment is as per the EIS.

No additional mitigation measures are required.

3.3.8 Cumulative assessment

Additional advice was sought from Renzo Tonin regarding cumulative impacts, should Wellington Solar and Wellington North Solar be constructed and operated at the same time.

CONSTRUCTION

Construction activities associated with the recently approved Wellington Solar Farm may potentially occur at the same time as construction works required for the proposed Wellington North Solar Plant. As a result, some of the nominated receivers may be impacted by construction noise from both solar plants concurrently. Therefore, a cumulative construction noise assessment has been undertaken for the scenario where both solar plants are being constructed at the same time; however, it is highly unlikely the two solar plants would be constructed concurrently due to the different timelines of the projects and the timing of approvals.

The construction and operation noise and vibration assessment for the Wellington Solar Farm was previously prepared by Renzo Tonin & Associates [ref: TJ643-01F01 Report (r5), dated 24 November 2017], which identified nearby receivers potentially impacted by construction noise.

The following assessment assumes that the same construction plant and equipment are being used at both solar plants concurrently during the construction of the solar plants. Furthermore, the construction of the Wellington Solar Farm concurrently with each of the easement options have also been assessed.

From the comparison of Table 3-14 and Table 3-15, it is evident that the typical plant and equipment used to construct the solar plant slightly differ to the plant and equipment used for the construction of the easements. Therefore, for the scenario where the easements are constructed concurrently with the Wellington Solar Farm, a conservative approach has been taken, where it is assumed that the three (3) noisiest plant items from each work site are operating concurrently.

Table 3-27 presents cumulative construction noise levels likely to be experienced at the nearby affected receivers based on the concurrent construction of the Wellington North Solar Plant and Wellington Solar Farm. Similarly, Table 3-28 present the cumulative construction noise levels for the scenario where the transmission line easement associated with the Wellington North Solar Plant is constructed concurrently with the Wellington Solar Farm.

Table 3-27 Predicted $L_{Aeq\ 15\ min}$ cumulative construction noise levels from Wellington North Solar Plant and Wellington Solar Farm.

Receiver location (refer to Figure 3-8)	Noise management level[1]	Predicted cumulative construction noise Level, $L_{Aeq\ (15\ min)}$ [2]	Compliance with criteria? (Yes/No)
Residential receivers			
R1	45	**26-50**	**No**
R2		**26-51**	**No**
R9		26-39	Yes
R11		26-35	Yes
R12		26-41	Yes
R13		26-39	Yes
R14		26-44	Yes
Sensitive land uses			
R8	70	26-46	Yes
R10		24-60	Yes

Notes: 1. Noise management for standard day time construction works (i.e. Monday to Friday 7am to 6pm and Saturday 8am to 1pm).

2. Based on up to three nosiest construction plant and equipment operating concurrently.

Table 3-28 Predicted $L_{Aeq\ 15\ min}$ cumulative construction noise levels from Wellington Solar Farm and Wellington North Solar Plant's transmission line options.

Receiver location (refer to Figure 3-8)	Noise management level[1]	Predicted cumulative construction Noise Level, $L_{q\ (15\ min)}$ [2]	Comply? (Yes/No)
Residential receivers			
R1	45	**25-49**	**No**
R2		26-36	Yes
R9		28-42	Yes
R11		25-33	Yes
R12		25-40	Yes
R13		25-39	Yes
R14		**27-63**	**No**
Sensitive land uses			
R8	70	26-47	Yes
R10		25-58	Yes

Notes: 1. Noise management for standard day time construction works (i.e. Monday to Friday 7am to 6pm and Saturday 8am to 1pm).

2. Based on up to three nosiest construction plant and equipment operating concurrently.

The results presented in Table 3-27 indicate exceedances above the NML for Receivers R1 and R2. The exceedance at Receiver R1 is mainly due to the construction of the Wellington Solar Farm (to the south of the proposed Wellington North Solar Farm), which was initially identified as exceeding the NML in the Wellington Solar Farm's noise and vibration assessment [ref: TJ643-01F01 Report (r5), dated 24 November 2017]. The construction of the Wellington North Solar Plant is the main contributor to the exceedance at Receiver R2. Therefore, the predicted cumulative noise impact from the construction of both solar plants does not identify any new exceedances at nearby affected receivers.

For the cumulative construction noise levels of the Wellington North Solar Plant's transmission line option and the Wellington Solar Farm construction works, Receivers R1 and R14 exceed the NML. The exceedance at Receiver R1 is only due to the construction works from the Wellington Solar Farm, while the exceedance at R14 only occurs when the three (3) noisiest plant and equipment are operating at the closest proximity to the receiver from the construction of the transmission line.

Compared to the EIS presented transmission line options, the proposed new eastern transmission line had the same results as the EIS eastern transmission line option, exceedances at R1 and R14. **The proposed new eastern transmission line would have a lesser potential cumulative construction impact than the EIS western transmission line option, which had exceedances at three receivers, R1, R2 and R12.**

The probability of the scenario, where the Wellington Solar Farm and the Wellington North Solar Plant's transmission line option are constructed concurrently and have their three (3) noisiest plant equipment operating at the closest proximity to the affected receivers, is considered very low. However, if it were to occur it is recommended that a feasible and reasonable approach towards noise management measures should be applied to reduce the noise levels as much as possible to manage the impact from the cumulative construction noise. These measures are outlined in Section 3.3.9.

It is noted that under all scenarios, the cumulative construction noise levels of the Wellington Solar Farm and the Wellington North Solar Plant, and it's associated easements, are predicted to be less than the highly noise affected level of 75dB(A).

VIBRATION

The potential for adverse cumulative vibration impacts was determined to be very low for both Solar Plant projects. **No vibration mitigation measures are required.**

OPERATIONAL

It is likely that the recently approved Wellington Solar Plant, located south of the proposed Wellington North Solar Plant, would be operating concurrently with the Wellington North Solar Plant. Therefore, cumulative noise impacts at the nearest affected receivers due to both solar plants operating has been considered. The construction and operation noise and vibration assessment of the Wellington Solar Plant was previously prepared by Renzo Tonin & Associates [ref: TJ643-01F01 Report (r5), dated 24 November 2017], which identified nearby receivers potentially impacted by operational noise.

An assessment of cumulative noise impacts from the Wellington North Solar Plant, the upgraded substation and the Wellington Solar Plant has been quantified for the nearest affected receivers. The cumulative noise levels are presented in Table 3-29 for the applicable meteorological conditions.

Table 3-29 Predicted $L_{Aeq\ 15min}$ cumulative operational noise levels at residential receiver locations, dB(A).

Receiver location (refer to Figure 3-8)	Proposal noise triggers[1]			Predicted operational noise levels, LAeq (15 min)			Comply? (Yes/No)
	Day	Evening	Night	Calm and isothermal conditions	Slight to gentle breeze	Moderate temperature inversion2	
R1	40	39	35	28	33	33	Yes
R2				30	35	35	Yes
R9				29	34	34	Yes
R11				25	31	31	Yes
R12				28	34	34	Yes
R13				28	34	34	Yes
R14				**33**	**37**	**37**	**No**
R8[3]	63	63	63	29	35	35	Yes
R10[3]				33	37	37	Yes

1. Trigger levels for Day, Evening and Night periods

2. Applicable for the night time period only

3. When in use

From Table 3-29 it can be seen that the predicted noise levels generally comply at all receiver locations under all scenarios and meteorological conditions. However, under noise enhancing weather conditions, the predicted cumulative noise levels at Receiver R14 exceed the criterion by 2dB(A) during the night period. The exceedance at R14 is mainly attributed to the noise emissions from the Wellington Solar Farm, which predicts noise levels equal to the night time Project Noise Trigger Level of 35dB(A). When the noise emissions from the upgraded substation is considered, it is predicted to increase the overall noise levels by 2dB(A) at the receiver and therefore yielding an exceedance of 2dB(A) at Receiver R14.

In accordance with Table 4.1 and Table 4.2 of the NPfI, a 2dB(A) exceedance is considered to be negligible as a 2dB(A) change in noise level is not discernible or noticeable to the average person. **Therefore, the predicted noise levels at Receiver R14 are determined to be acceptable in accordance with the NPfI and no further reasonable and feasible noise mitigation measures are required.**

3.3.9 Summary

During construction of the proposed new eastern transmission line option, the construction noise management levels at Receivers R14 and R17-R22 would be exceeded. Compared to the two EIS presented transmission line options, the new transmission line option has potential to exceed construction noise levels for more receivers. The proposed EIS eastern transmission line route had no exceedances, while the EIS western transmission line route had exceedances at two receivers (R1 and R2). The exceedances of the proposed new transmission line route at seven receivers is due to the proposed new transmission line being adjacent to a subdivision along Twelve Mile Road. It is noted that construction noise levels at all receivers are predicted to be less than the highly noise affected level of 75dB(A) for works in all locations. The potential noise generated by constructing the powerline would also be short term, approximately taking three to four weeks to complete. It is unlikely to be a significant impact with the effective implementation of measures outlined in the EIS. No additional measures are recommended.

The amended vibration, operational noise and road traffic noise assessments as well as the cumulative operational assessment were found to be consistent with the assessment provided within the EIS, including:

- The operational noise levels at the nearest receivers each comply under all scenarios and meteorological conditions.
- The potential for adverse comment on vibration impacts was determined to be very low.
- Road traffic noise level contributions from the truck movements associated with the construction works are at least 5dB(A) below the applicable noise criteria.
- During operation of the Wellington North SP and First Solar's Wellington Solar Farm the predicted noise levels generally comply at all receiver locations under all scenarios and meteorological conditions. However, under noise enhancing weather conditions, the predicted cumulative noise levels at Receiver R14 exceed the criterion by 2dB(A) during the night period. This is due to exceedance at Wellington Solar Farm.

For the cumulative construction noise levels of the Wellington North Solar Plant's eastern transmission line option and the Wellington Solar Farm construction works, Receivers R1 and R14 exceed the NML. The exceedance at Receiver R1 is only due to the construction works from the Wellington Solar Farm, while the exceedance at R14 was due to the transmission line construction. Compared to the EIS presented transmission line options, the proposed new eastern transmission line had the same results as the EIS eastern transmission line option, exceedances at R1 and R14. While the proposed new eastern

transmission line would have less of a potential cumulative construction impact than the EIS western transmission line option, which had exceedances at three receivers (R1, R2 and R12).

The amended noise and vibration assessment for the construction and operation of the Wellington North Solar Farm demonstrates the eastern transmission line option would generally have similar potential impacts than the EIS presented transmission line options. The construction of the eastern transmission line has potential to exceed NML at nearby receivers. However, the construction of the transmission line has potential to impact an additional five to seven receivers than the EIS presented transmission line options. This is due to the location of the transmission line, but the impact is not expected to be significant due to the short construction period and implementation of mitigation measures already presented in the EIS. The cumulative construction impact of the eastern transmission line option and First Solar's Wellington Solar Farm would have the same and reduce impact than the EIS presented transmission line options. Overall this amended assessment found no additional safeguards and mitigation measure would be required for the proposed new transmission line option.

3.3.10 Safeguards and mitigation measures

The safeguards and mitigation measure will be consistent with the EIS. No additional noise safeguards would be required to manage noise.

3.4 VISUAL AMENITY

3.4.1 Approach

NGH Environmental has completed a desktop assessment of visual amenity, including consideration of field observations from site surveys of the new eastern transmission line. The environmental assessment of the potential impacts is discussed below and has shown that the new eastern transmission line is substantially the same as the development described in the EIS.

3.4.2 Existing environment

The region and locality have been described in the Section 7.4 of the EIS and are not listed here to avoid duplication; they remain as applicable to the new eastern transmission line as to the options presented in the EIS.

The proposed new transmission line route is located within land zoned RU1 Primary Production, SP2 Classified Road and Electricity supply. The topography is undulating with an elevation between 348 and 420m Australian Height Datum (AHD). The transmission line would cross two minor roads, Goolma Road and Twelve Mile Road.

The landscape, typical of the region, is predominately cleared, open grazing land with scattered groupings of remnant native trees. Remnant native trees are common along water courses, roadsides and along the perimeters of paddocks and property boundaries. A number of intermittent watercourses run throughout the proposed easement, in the form of small streams and minor drainage lines. These watercourses generally lack riparian vegetation and are prone to erosion.

The Wellington Correctional Centre and Wellington Substation are the key built form in the area. Other existing infrastructure in the area is roads, power lines, farm structures and minimal residences. The R5 large lot residential land is made up of 15 lots, with the smallest lot having an area of approximately

15000m2 (dwellings surrounded by agricultural character land). There is an existing transmission line that traverses the R5 large lot subdivision. The surrounding RU1 land has sparse rural dwellings.

3.4.3 Potential impacts

Residential properties within the R5 Large Lot subdivision would have permanent intermittent views of the proposed new transmission lines however, it is expected that views from the main living areas of the dwellings would be limited based on window size and orientation, surrounding land form and existing vegetation.

The transmission line would be visible for vehicles travelling along Goolma Road and Twelve Mile Road, however, impacts to road users are considered to be negligible as the views would be short term for motorists in transit. It is considered that the proposed transmission line would not result in a significant visual impact or significant cumulative impact and therefore would be substantially the same as the options presented in the EIS. The addition of the transmission line along this corridor would only result in minor modifications of the rural character of views to the east of Goolma Road and south of Twelve Mile Road.

The proposed new transmission line would not be a new element in the landscape; there are a number of transmission lines in the landscape, specifically, to the south of Twelve Mile Road connecting to the existing substation including an existing 132kv line that traverses the R5 large lot subdivision. The proposed new eastern transmission line and easement would be of a similar character. Transmission and phone lines are considered to be a common element in any rural landscape particularly closer to towns. Due to the flat to gently undulating and open nature of rural land these elements are typically visible within the landscape and are not considered to be an unacceptable feature (refer to locality images including examples of the existing infrastructure in the landscape at Figure 3-10, Figure 3-11, Figure 3-12 and Figure 3-13).

In comparison to the previous options considered in the EIS, there are amenity benefits from the new transmission line location:

- Views of the new transmission line would be located to the rear of the lots of the closest receivers (refer to Figure 3-10).
- Views of the new transmission line would be limited because the new eastern transmission line would be located predominantly at the base of the hills forming to the east of the R5 Large lot subdivision and would not be overlooked or located in line with the average eyeline or view (refer to Figure 3-10).

Being located to the east the lines do not obstruct the key views to the west across the landscape to the Mount Arthur Reserve (refer to terrain map at Figure 3-9).

Views through to the hills in the background (eastern view) for the R5 large lot subdivision, which make up a minor part of the views within the area, would be maintained (refer to terrain map at Figure 3-9).

The areas where the poles would be located are gently undulating land and would be located within paddocks that have well established vegetation/trees. Although some of these trees would be removed, the screening provided by the trees that would remain would break up views to the poles and lines and this is considered a reasonable mitigation when considered in tandem with the proposed planting that would further break up the views of the transmission lines for those dwellings located within 200m of the new eastern transmission line.

The design of the poles has been carefully considered for visual impact and the use of free-standing poles is proposed (not lattice structures) which significantly reduces the visual impact of the structures.

The background view (from the rear of the lots) to the east would remain as the dominant element due to the spacing of the poles, and minimal diameter of the poles and lines that would not obscure views and retain the ability to view beyond the structure. As such, the views are considered to be only minimally obstructed. The change from the western side of the rural subdivision to the eastern side would result in less interrupted views to the west.

The number of directly impacted residents is low and consistent with the original options for the transmission line described in the EIS (since been found to be infeasible and have had to be abandoned as a concept).

The potential construction and operational impacts of the new eastern transmission line are considered to be manageable and able to be mitigated.

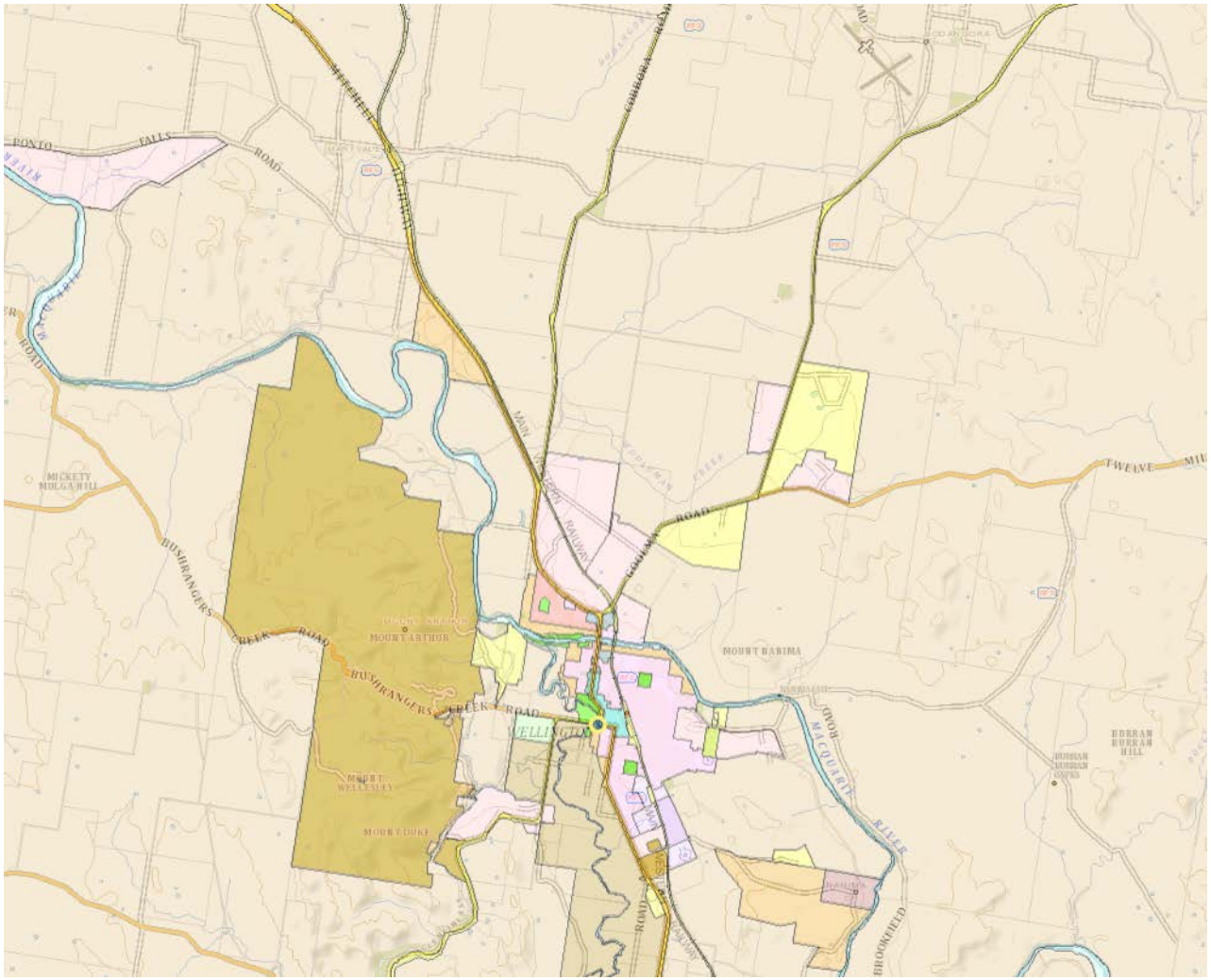

Figure 3-9 Terrain and feature map (source: https://www.planningportal.nsw.gov.au/spatialviewer - NSW Basemap - NSW Govt. DPE)

Figure 3-10 View along the north-south run of the new eastern transmission line (photo taken at the southern end adjacent to the rear of the lot of the closest receiver)

Figure 3-11 Example of the existing powerlines that cross the R5 large lot subdivision and rural setting

Figure 3-12 Example of the existing powerlines within the rural landscape and foreground, middle ground and background views

Figure 3-13 Example of distant views lattice pylons located to the south of the R5 large lot subdivision

3.4.4 Safeguards and mitigation measures

After consideration of AGL's discussions with the closest receivers (two adjacent landowners) an additional planting area has been included in the existing visual amenity mitigation measure as listed below in Table 3-30 (refer to **bold** text and Figure 2-2). All other dwellings are expected to be greater than 200m from the easement and a greater distance from the transmission line and are not considered to require additional screening.

Table 3-30 Safeguards and mitigation measures for visual amenity

C: Construction; O: Operation; D: Decommissioning

ID	Safeguards and Mitigation Measures	C	O	D
1	Regarding landscaping to fragment / soften the view of infrastructure: • An intermittent band of screen planting would be located: o Between the property boundary and the solar arrays, in locations along Goolma Road and Cobbora Road where there is no existing vegetation and where the arrays are immediately adjacent to the boundary. o Along the Campbells Lane boundary to mitigate impacts on properties on the northern side of Campbells Lane (identified in Appendix H). o **Within or directly alongside the transmission line easement directly adjacent to the rear of the R5 zoned lots where dwellings are located closer than 200m from the proposed new eastern transmission line easement.** • To ensure that the screen planting integrates into the existing landscape character: o Bands of planting would be a mix of locally native tree and shrub species to ensure a naturalistic effect whilst also providing habitat and movement corridors for native fauna. o Planting would not form a consistent hedge between the road and the solar farm but rather form a row of intermittent copse plantings that reflect the existing character of roadside vegetation in the area • Screen planting should be considered for locations surrounding buildings associated with the proposal where appropriate. • Strategies to ensure the effective screening is maximised early in the project life and maintained would be implemented, for example: o Planting would aim to be undertaken as soon as practical in the construction process depending on the season, as it would take time for the plants to establish and become effective as a screen. Seasonal requirements for planting should also be considered. o Successional planting may be undertaken (quick growing species replaced by longer living species). • The screen would be maintained for the operational life of the solar plant. 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.	C		

3.5 OTHER ENVIRONMENTAL ASPECTS

The following aspects were assessed by desktop assessment, with targeted specialist input as required (visual and historic heritage). No additional site work or modelling is considered to be required for these matters.

Table 3-31 Assessment of the proposed changes.

Relevant EIS section	Environmental factor	Existing environment of new eastern transmission line route	Potential impacts	Updated mitigation measures
7.5	Soils and agricultural land capability	The topography of the transmission line is flat to undulating. The northern part of the transmission line adjacent to the correctional centre and the southern part of the transmission line at the substation include the soil landscape Bodangora ('bz'). This soil landscape has the following limitations (Lawrie and Murphy, 1998): • High erosion hazard under cultivation and low cover levels. • Moderate fertility. • Friable surface soils. • Moderate to high shrink-swell potential in subsoils. • Aggregated clays may leak in earthworks.	**Construction** The proposed new transmission has an easement area of 30-31 ha. This is equal to the western transmission line route presented in the EIS. Approximately 9.43ha of native vegetation would require removal. It is identified that the soils onsite have a moderate to high erosion risk. Soils have been previously disturbed by agriculture activities. The proposal would disturb soils through the following activities: • Excavation for power pole footings. • Vegetation clearance. The disturbance of soils has the potential to result in the following impacts:	No additional mitigation measures are required.

		The section of the transmission line east of the correctional centre and south of Twelve Mile Road includes the soil landscape Namina ('na'). This soil landscape has the following limitations (Lawrie and Murphy, 1998): • High erosion hazard under cultivation and low cover levels. • Moderate fertility. • Friable surface soils. • Moderate to high shrink-swell potential in subsoils. • Steep slopes often with rock outcrop. • Aggregated clays may leak in earthworks. A search of the Environmental Protection Authority (EPA) *Contaminated Lands Record of Notices* for the Wellington LGA as of 09/01/2019, did not reveal any sites. A review of EPA *List of NSW Contaminated Sites Notified to EPA as of* 09/01/2019 did not reveal any sites notified to the EPA related to the proposal site. Two sections of the transmission line are mapped as Biophysical Strategic Agricultural Land (BSAL). The first section	• Erosion and sedimentation could result in loss of top soils and impact waterways. • Compaction of soils in hardstand areas and access tracks. • Machinery and vehicles have potential to track sediments onto public roads. • Expose buried contaminants (pesticides and hydrocarbons). The construction soil impacts are considered minor as they would be restricted to pole footings and minor compaction due to access. During the construction of the transmission line there would be a temporary removal of agricultural production along the route. This would be restricted to during construction. **Operation** All areas disturbed during construction would require rehabilitation, where groundcover would be established, monitored and maintained as part of existing commitments. During operation, cropping and grazing would be able to still occur under the transmission line. The transmission lines would be similar to other transmission lines in the area. Equipment would be able to access underneath the lines. There would be no permanent access track	

Relevant EIS section	Environmental factor	Existing environment of new eastern transmission line route	Potential impacts	Updated mitigation measures
		is from the solar plant site and along the northern boundary of the Wellington Correctional Centre. The other section is along Twelve Mile Road to the Substation. The current land management along the transmission line is dominated by grazing. Lucerne and Kale have been planted along the southern section of the route. The site is unlikely to have sustained cropping.	underneath the line, however access would be required. No land use conflicts are anticipated for existing adjacent agricultural land uses or future agricultural land uses on the proposal site or adjacent lands during construction. The construction and operational potential impacts of the proposed changes do not vary substantively from what was presented within the publicly exhibited EIS.	
7.6	Compatibility within existing land uses	The proposed new transmission line route is located within land zoned RU1 Primary Production, SP2 Classified Road and Electricity supply. The current land use along the transmission line is grazing. Lucerne and Kale have also been planted along the southern section of the route. Adjacent land uses include: • Agricultural production (cropping and grazing, poultry farming).	**Construction and decommissioning** During the construction and decommissioning of the transmission line, potential impacts to surrounding the land uses may include: • Residences located near to the site may experience noise, dust and traffic during construction. These are considered to be temporary and manageable impacts. No impacts on the use of any recreational areas would occur. • There would not be able to be any extraction of minerals onsite during	No additional mitigation measures are required.

Relevant EIS section	Environmental factor	Existing environment of new eastern transmission line route	Potential impacts	Updated mitigation measures
		• Residential (large rural holdings as well as two smaller lot subdivisions). • Industry and commercial including the Wellington Correctional Centre and Wellington Substation. One exploration licence (EL) applies to the transmission line, EL 8505 owned by Drummond West Pty Ltd. AGL has consulted with Drummond West Pty Ltd as part of the Solar Plant Project. The transmission line would intersect a small portion of Crown Land (paper road) at the north eastern corner of the Wellington Correctional Centre.	the construction period, affecting mineral lease holders (nor during operation). Due to the Proposal being highly reversible however, mineral exploration would not continue to be sterilised in the long term, post decommissioning. The relevant leaseholders have been notified of these restrictions • There is unlikely to be any impacts on aviation or aerial spraying during construction of the transmission line. The proposed changes to the site access during construction would reduce the potential cumulative impact with other proposed developments in the area. The use of only Campbells Lane to access the site during solar plant construction would reduce the number of vehicles on Goolma Road which is used by other developments in the region. Some vehicles would require use of Goolma Road to access the proposed new eastern transmission line but the number of vehicles would be low. **Operation** The installation of this infrastructure would not impact on any flight paths or present a hazard to aircraft.	

Relevant EIS section	Environmental factor	Existing environment of new eastern transmission line route	Potential impacts	Updated mitigation measures
			Steel transmission line poles may cause glint or glare depending on the sun angle. This is unlikely to impact nearby receivers due to the passing nature of the potential glint and glare. The potential construction and operational impacts of the proposed changes do not vary substantively from what was presented within the publicly exhibited EIS. This proposed development is considered to not be inconsistent with the Rural Lands and Primary Production SEPP aims specifically to reduce land use conflict and sterilisation of rural land by balancing primary production, residential development and the protection of native vegetation, biodiversity and water resources.	

Relevant EIS section	Environmental factor	Existing environment of new eastern transmission line route	Potential impacts	Updated mitigation measures
7.7	Historic Heritage	Heritage database searches including the Australian Heritage Database, NSW State Heritage Inventory and the Wellington Local Environmental Plan 2012 showed nil historic heritage items within the eastern transmission line route. The historical land use and background of the proposal area has highlighted the longstanding use of the project area for agricultural purposes, both cultivation and grazing. There is no evidence of any permanent or significant structures of features being constructed within the proposal area. The transmission line area comprises primarily of cleared paddocks with low hills sloping down to creeks and drainage lines. The vegetation in the area ranges from very low cover to areas of very dense grass. There is no evidence to suggest the existence of subsurface archaeological deposits. (NGH, 2019c)	There are no items of historic heritage and no historic archaeological potential within the new eastern transmission line route. An unexpected finds protocol would be followed at all stages of development to ensure that any unexpected historical finds, features or subsurface deposits are correctly managed and assessed. (NGH, 2019c)	No additional mitigation measures are required.

Relevant EIS section	Environmental factor	Existing environment of new eastern transmission line route	Potential impacts	Updated mitigation measures
7.8	Flooding	The proposed eastern transmission line route is not mapped as a flood risk or flood planning area (Geoscience Australia, 2019; DPE; 2019). The transmission line intersects Wuuluman Creek and four of its tributaries along the eastern section between the Wellington Correctional Centre and Twelve Mile Road. An unnamed 2nd order stream is located adjacent to the proposed transmission line route, north of the Wellington Correctional Centre. All watercourses are described as ephemeral and would only contain flowing water during rainfall. Wuuluman Creek is a tributary of the Macquarie River, which is located approximately 4.7km west of the transmission line route.	Flooding is unlikely to occur along the proposed transmission line. If flooding was to occur, it unlikely components would be mobilised. Due to the small disturbance area of the proposed transmission line, there is unlikely to be an increase in surface roughness resulting in increased flood levels. The potential impacts of the proposed changes do not vary substantively from what was presented within the publicly exhibited EIS.	No additional mitigation measures are required.
7.9	Traffic, transport and safety	The proposed transmission line route would be accessed via Goolma Road and Twelve Mile Road. Goolma Road functions as a sub-arterial road with a north-south alignment. Goolma Road runs between Gulgong in the north and Wellington in the south,	**Construction** For the solar plant construction including the new transmission line option, the peak construction workers and number of vehicles would be consistent with the EIS. During construction period it is estimated that 250 workers (peak) and a total of 15,081 vehicles	No additional mitigation measures are required.

Relevant EIS section	Environmental factor	Existing environment of new eastern transmission line route	Potential impacts	Updated mitigation measures
		forming priority controlled intersections at Mitchell Highway and Campbells Lane. Twelve Mile Road is a local road running in a north eastern alignment from Goolma Road near the Wellington Substation to Goolma Road, 8.6km south of Goolma. The road is approximately 43.8km long and would be used by local residents. At the proposed transmission line route, Goolma Road and Twelve Mile Road are both sealed with one lane in each direction and an undivided carriageway. There is unrestricted parking and no dedicated pedestrian, bicycle facilities or public transport.	movements throughout construction would be required to undertake the works. The number of oversized vehicles for the solar plant is expected to be two. The solar plant proposal site would now be accessed only via Campbells Lane during construction. The proposed changes to the site access during construction for the solar plant, would have reduced the impact compared to the site access options proposed in the EIS. The construction of the transmission line would result in minimal traffic along Goolma Road and Twelve Mile Road (alternate access roads to those used during the construction of the solar plant). The increase in traffic has potential to increase collision risks, damage to road infrastructure, sediment transfer, noise and dust and disruption to normal traffic impacts. This is likely to be minimal due to the nature of the construction of a transmission line. There is likely going to be limited additional traffic as the construction requires less equipment and should be constructed relatively quickly. Overall during construction with proposed changes to the proposal, traffic impacts would be minimised and are considered to be manageable.	

Relevant EIS section	Environmental factor	Existing environment of new eastern transmission line route	Potential impacts	Updated mitigation measures
			Operation The potential operation impacts of the proposed changes do not vary substantively from what was presented within the publicly exhibited EIS.	
8.1	Water quality and water use	The transmission line intersects Wuuluman Creek and four of its tributaries along the eastern section between the Wellington Correctional Centre and Twelve Mile Road. An unnamed 2nd order stream is located adjacent to the proposed transmission line route, north of the Wellington Correctional Centre. All watercourses are described as ephemeral and would only contain flowing water during rainfall, minimising the impact of multiple dried up stream beds. These act as natural drainage patterns for surface water. Wuuluman Creek is a tributary of the Macquarie River, which is located approximately 4.7km west of the transmission line route. Groundwater depth ranges approximately 12.2 to 17.4 meters across the Solar Plant proposal site locality.	**Construction** The construction of the proposed transmission line poses as a minimal risk to the water quality and waterways in the area. Potential impacts include sediments and other pollutants from the proposed earthworks and use of vehicles and machinery entering the waterways. These impacts are considered unlikely and manageable due to the proposed minimal disturbance. The only ground disturbance would be for vegetation clearing and pole placement along the route. The proposed transmission line would not alter any existing water drainage patterns due to the minimal disturbance. Impacts to groundwater during construction and decommissioning are unlikely to occur due to the depth of groundwater. Water use during construction is expected to be consistent with the EIS. Up to 55ML per annum during construction. **Operation**	No additional mitigation measures are required.

Relevant EIS section	Environmental factor	Existing environment of new eastern transmission line route	Potential impacts	Updated mitigation measures
		There are no bores within proximity of the transmission line option (DPI, 2019). The *Wellington Local Environmental Plan 2012* identifies the transmission line as groundwater vulnerable, suggesting groundwater has potential to be intercepted. There are a number of low and moderate potential terrestrial groundwater dependent ecosystems (GDEs) mapped along the proposed transmission line route (BOM, 2019) site, including: • *E. conica, E. melliodora, E. macrocarpa.* • *E. microcarpa/Dodonaea viscosa subsp. Cuneate, Acacia buxifolia.* • *E. blakelyi, E. melliodora, E. bridgesiana/Acacia dealbata.* • *Maireana microphylla, Pimela neo-anglica, Sclerolaena birchii/Dichanthium.* • *E. albens/Acacia decora, Acacia implexa, Acacia deanei.*	The operation of the transmission line is unlikely to impact on water quality. Water is unlikely required during the operation of the transmission line. The potential construction and operation impacts of the proposed changes do not vary substantively from what was presented within the publicly exhibited EIS.	

Relevant EIS section	Environmental factor	Existing environment of new eastern transmission line route	Potential impacts	Updated mitigation measures
8.2	Social and economic impacts	The proposal site lies within Dubbo Regional Council LGA. Within a 10km radii are Bodangora at 3.4km north east and Wellington at 7km south. Although previously dominated by the agriculture industry, between 2011-2016 there was a huge decline in jobs within this sector. The visual impact of solar farms has been notably an issue amongst community attitudes in agriculturally dominant areas such as these. Public concern also encompasses construction noise, traffic issues, surrounding property values and the decrease in agricultural land available. These are addressed in other sections. Bordering the proposed site of the transmission line is the Wellington Correctional Centre.	**Construction** The proposed transmission line is part of the Wellington North Solar Plant proposal. The proposal would assist in providing direct economic stimulus to the Orana region, utilising up to 250 staff during peak construction. Many of these would be drawn from the local area, hence increasing employment opportunities. The proposed transmission line would be visible during construction for receivers along Goolma Road and Twelve Mile Road and within the R5 large lot subdivision. The construction would also results in potential noise, dust and traffic impacts for nearby receivers. (These matters are discussed in Section 3.3 and within this table). **Operation** The proposed transmission line is part of the Wellington North Solar Plant proposal and would be visible for receivers along Goolma Road and Twelve Mile Road and within the R5 large lot subdivision. Visual impacts are discussed at Section 3.4 of this report. The proposal has potential to increase economic security to rural economies through the following means:	No additional mitigation measures are required.

Relevant EIS section	Environmental factor	Existing environment of new eastern transmission line route	Potential impacts	Updated mitigation measures
			• Diversification of employment opportunities and income streams. • They provide a substitute for carbon emission producing electricity production that is stable and renewable, and consistent with State and National greenhouse emission reduction objectives. The potential construction and operation impacts of the proposed changes do not vary substantively from what was presented within the publicly exhibited EIS.	
8.3	Bushfire	The proposal site is predominantly grassland with small patches of remanent vegetation. Sites of remanent vegetation are generally prone to bushfire risk. Along the proposed transmission line option there is only one site deemed bushfire prone by the NSW DPE (2019). This site is located north of the Wellington Correctional Centre and east of the solar plant site. The site has been identified as a category 2 and category 1. The site occurs within the area of the Orana Bush Fire Management Committee with over 60 brigades within	**Construction** The construction of the transmission line has the potential to increase the risk of bushfire largely due to the increase in potential ignition sources associated with construction. These sources include; the use of power tools, hot work activities, sparks and contact ignition from vehicles, smoking onsite and electrical faults. With the implementation of mitigation measures the identified risks can be managed. **Operation** Operational risks for this transmission line include powerline failure and contact between vegetation and the powerlines. With the	No additional mitigation measures are required.

Relevant EIS section	Environmental factor	Existing environment of new eastern transmission line route	Potential impacts	Updated mitigation measures
		their Fire Service. The Orana BFMC indicates that only 10-15 fires each year are considered major fires. Their bushfire season generally commences on the 1st October and concludes 31st March. Fire brigades are located at Wuuluman, Maryvale and Wellington. The main sources of fires in the Orana Bush fire area include: • Campfires. • Lightning strikes. • Electrical power supply lines. • Agricultural machinery. • Vehicle exhaust systems when in contact with vegetation on the sides of roads. • Escaped controlled permit burns. • Burning of stolen vehicles. • Arson activity and careless acts by individuals (such as the use of cutting/welding equipment).	implementation of mitigation measures the identified risks can be managed. The potential construction and operation impacts of the proposed changes do not vary substantively from what was presented within the publicly exhibited EIS.	
8.4	Electromagnetic fields	Electromagnetic fields (EMF) are produced through the use of electricity when both magnetic and electric fields are produced. While short-term	**Construction** There is low potential for EMF impacts during the construction of the transmission line. The maximum magnetic field of the proposed	No additional mitigation measures are required.

Relevant EIS section	Environmental factor	Existing environment of new eastern transmission line route	Potential impacts	Updated mitigation measures
		exposure to high levels can be harmful no major public health concerns have emerged during the decades of research. The International Commission on Non-Ionizing Radiation Protection have implemented exposure limits. In regard to this proposal, the 132 kV to 330 kV overhead transmission lines is likely to produce electromagnetic fields.	transmission line is well under the 200µT and 1000µT limits respectively recommended for public and occupational exposure. Exposure to EMFs during the construction of the transmission line would be short term, therefore the effects are likely to be negligible. **Operation** During the operational phase the magnetic fields are expected to be well within the public and occupational exposure levels and the electric fields would be minimal using the Principle of Prudent Avoidance to design. The potential construction and operation impacts of the proposed changes do not vary substantively from what was presented within the publicly exhibited EIS.	
8.5	Air quality and climate	The air quality within the Dubbo Regional LGA is considered to be of the general high quality that consists across the rural setting of NSW. Although typically impacted by vehicle emissions, dust, mining, agricultural activities and emissions from house fires and bush fires, the site remains of a high air quality.	**Construction** The largest potential impact in regard to the air quality is the dust created from earthworks and vehicle movement on unpaved surfaces. The construction of the proposed transmission line would have minor ground disturbance. Emissions would also be generated through the use of vehicles and machinery. The emissions	No additional mitigation measures are required.

Relevant EIS section	Environmental factor	Existing environment of new eastern transmission line route	Potential impacts	Updated mitigation measures
		A search of the National Pollutant Inventory (Australian Government, 2019) identified no facilities within the Dubbo Regional Council LGA that are required to record emissions. The proposal site is located within the South Western Slopes Bioregion consisting of a sub-humid climate with an annual mean maximum of 24.4 °C . As the effects of climate change increase it is expected there would be an increase in hot days and fewer cold days coupled with rainfall decline. There is also expected to be an increase in extreme events including flood, drought and bushfires. As such, many of the agricultural farms come under risk.	are considered negligible due to the minimal equipment required for the transmission line. Climate would not be impacted by this aspect of the proposal. **Operation** The operation of the transmission line is unlikely to impact on air quality or climate. The transmission line would require minimal maintenance. The potential construction and operation impacts of the proposed changes do not vary substantively from what was presented within the publicly exhibited EIS.	
8.6	Resource use and waste generation	The resource use for this proposal site are the same as those outlined in the EIS in Table 8-12. The policy for waste management and generation is also detailed in the EIS and has not changed. The main EPA licensed landfill of relevance to the Proposal is in Dubbo; the Whylamdra Waste and Recycling Facility in Dubbo.	**Construction** The construction of the transmission line would require minimal resources and non that are currently limited or restricted. There are a number of possible sources of solid waste that would be produced during the construction phase. This may include packaging materials, excess building materials, scrap material and excavation of topsoils and	No additional mitigation measures are required.

Relevant EIS section	Environmental factor	Existing environment of new eastern transmission line route	Potential impacts	Updated mitigation measures
			vegetation clearing. However, the waste generated is expected to be minimal. **Operation** During the operational phase there is not expected to be any waste produced. Furthermore there are no resources used during the operational phase, except in the instance that the transmission line requires maintenance. The potential construction and operation impacts of the proposed changes do not vary substantively from what was presented within the publicly exhibited EIS.	
8.7	Cumulative	Proposed developments within the locality or region which may contribute to the cumulative impacts of the Proposal include: • The Bodangora Wind Farm, proposed by Infigen Energy, is located 10km north of the Proposal site and has commenced construction. • The Wellington Solar Farm, proposed by First Solar, would be located directly south of the Proposal and has been approved.	Potential cumulative impacts are primarily associated with the following issues: • Biodiversity impacts. • Noise impacts. • Visual and landscape character impacts. • Traffic impacts. • Pressures on local facilities, goods and services. These have been discussed above. The proposed changes to the site access during construction, would reduce the potential cumulative impacts. Access during construction would now only be via Campbells Lane, with	No additional mitigation measures are required.

Relevant EIS section	Environmental factor	Existing environment of new eastern transmission line route	Potential impacts	Updated mitigation measures
		• The Suntop Solar Farm, proposed by Photon Energy, would be located 12km south west of the Proposal site. The EIS and DA are currently being prepared. • The Maryvale Solar Farm, proposed by Photon Energy, would be 2km north west of the Proposal site. The EIS and DA are currently being prepared. • The Uungula Wind Farm, proposed by CWP Renewables, would be 40km east of the Proposal site. The EIS and DA are currently being prepared.	access via Goolma Road no longer proposed. Goolma Road is proposed to be used by other developments in the region. The potential cumulative impacts of the proposed changes do not vary substantively from what was presented within the publicly exhibited EIS.	

4 ENVIRONMENTAL MANAGEMENT CHANGES

In consideration of the additional assessment for the proposed new eastern transmission line, the following additional mitigation strategies are now proposed.

The project's updated mitigation measures from this assessment and the Submissions Report (NGH, 2019d) are provided in Appendix A.

Table 4-1 New mitigation measures, that now form a commitment of the proposal.

PC: Pre-Construction, C: Construction, PO: Pre-operation, O: Operation, D: Decommissioning

Safeguards and mitigation measures	C	O	D
Aboriginal heritage			
If complete avoidance of the nine artefacts scatters and 30 isolated find sites recorded within the Proposal site is not practicable, the artefacts within the development footprint must be salvaged prior to the proposed work commencing and moved to a safe area within the property that would not be subject to any ground disturbance.	**C**		
Further archaeological assessment would be required if the Proposal activity extends beyond the area of the current investigation as detailed in this report and in the initial ACHA. This would include consultation with the registered Aboriginal parties and may include further field survey.	**C**	**O**	**D**
Visual Amenity			
Regarding landscaping to fragment / soften the view of infrastructure: • An intermittent band of screen planting would be located: o Between the property boundary and the solar arrays, in locations along Goolma Road and Cobbora Road where there is no existing vegetation and where the arrays are immediately adjacent to the boundary. o Along the Campbells Lane boundary to mitigate impacts on properties on the northern side of Campbells Lane (identified in Appendix H). o **Within or directly alongside the transmission line easement directly adjacent to the rear of the R5 zoned lots where dwellings are located closer than 200m from the proposed new eastern transmission line easement.** • To ensure that the screen planting integrates into the existing landscape character: o Bands of planting would be a mix of locally native tree and shrub species to ensure a naturalistic effect whilst also providing habitat and movement corridors for native fauna.	**C**		

Safeguards and mitigation measures	C	O	D
Aboriginal heritage			
o Planting would not form a consistent hedge between the road and the solar farm but rather form a row of intermittent copse plantings that reflect the existing character of roadside vegetation in the area • Screen planting should be considered for locations surrounding buildings associated with the proposal where appropriate. • Strategies to ensure the effective screening is maximised early in the project life and maintained would be implemented, for example: o Planting would aim to be undertaken as soon as practical in the construction process depending on the season, as it would take time for the plants to establish and become effective as a screen. Seasonal requirements for planting should also be considered. o Successional planting may be undertaken (quick growing species replaced by longer living species). The screen would be maintained for the operational life of the solar plant. 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.			

5 CONCLUSION

This amendment report has considered the amendments to the proposed Wellington North Solar Plant proposal, that could not be included within the Submissions Report (NGH, 2019d). The proposed changes are to the transmission line route (requiring updated specialist assessments) and site access options (confirmed to reduce impacts of the project overall).

The western and eastern transmission line options displayed in the EIS are no longer part of the proposal, as the assessment of environmental impacts and consideration of the feasibility of options has concluded that the location of the new eastern transmission line, as proposed in this amendment report, is justified, as it is the most feasible option, and investigation has shown there are no substantive additional impacts or changes to mitigation strategies to those proposed in the EIS.

It was determined to be more appropriate that all construction site access for the solar plant would be via Campbells Lane. This amendment would result in a reduction in impact as no construction traffic would access the site off Goolma Road for the construction of the solar plant. The benefits and justification for the project remain unchanged and consistent with that presented in the EIS.

The benefits of the proposed Wellington North Solar Plan would remain unchanged. The Proposal would result in a number of benefits including:

- Support Commonwealth and NSW climate change commitments.
- Generation of enough clean, renewable energy for about 114,000 average NSW homes.
- Displacement of approximately 581,000 metric tonnes of carbon dioxide – the equivalent of taking about 125,000 cars off the road.
- Enhance electricity reliability and security.
- Creation of local job opportunities.
- Injection of expenditure in the local area and spread of benefits through a local community energy offer and a local community investment program.
- Exploitation of a new land use thereby diversifying the regional economy.

The Project has been assessed in accordance with the *Environmental Planning and Assessment Act 1979* and has taken into consideration the *Environment Protection and Biodiversity Conservation Act 1999*, along with other Federal, State and Local Government legislation, policy and guidelines. The scope of the assessment covered the Secretary's Environmental Assessment Requirements, the requirements of other State and Federal agencies, and consideration of the wellbeing of community stakeholders. The Environmental Impact Statement process, including responses received and responded to arising from public exhibition, entailed consultation with a wide range of Project stakeholders. Specialists were also engaged to provide impact assessment expertise in key environmental areas including biodiversity, noise and Aboriginal heritage.

The specialist's reports found that impacts would be generally managed consistent with the measures set out in the initial EIS. The only minor amendments made to the wording of the existing mitigation measures are required for:

1. Biodiversity – the credit requirement for the project has been updated.
2. Aboriginal heritage - to protect the additional isolated finds and to limit works impacts.
3. Visual amenity - an additional planting area is committed to provide additional filtering of views of the transmission line.

In consideration of the assessment of the impacts from the Proposal 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 matters have been addressed and that the project should now proceed for approval by the Minister.

6 REFERENCES

Australian Government, 2019, *National Pollutant Inventory*, accessed January 2019 from http://www.npi.gov.au/npi-data/search-npi-data

BOM, 2019, *Groundwater Dependent Ecosystems Atlas*, accessed January 2019 from http://www.bom.gov.au/water/groundwater/gde/map.shtml

DECC, 2006, *Assessing Vibration: a technical guideline,* Sydney: Department of Environment and Climate Change.

DECC, 2009, NSW *Interim Construction Noise Guideline,* DECC, Sydney.

DECCW, 2011, *NSW Road Noise Policy*, DECCW, Sydney.

DPE, 2019, *NSW Planning Portal*, accessed January 2019 from https://www.planningportal.nsw.gov.au/.

DPI, 2019, *Groundwater data*, accessed January 2019 from http://allwaterdata.water.nsw.gov.au/water.stm

EPA, 2017 *NSW Policy for Industry*, Sydney: EPA.

Geoscience Australia, 2019, *Australian Flood Risk Portal*, accessed January 2019 from: http://www.ga.gov.au/flood-study-web/#/search.

Lawrie, J.W. and Murphy, B.W. 1998, *Soil Landscapes of the Dubbo 1:250 000 Sheet Report*, Dept of Land & Water Conservation, Sydney

NGH Environmental, 2018, *Wellington North Solar Plant Environmental Impact Statement*, report prepared for AGL.

NGH Environmental, 2019a, *Addendum to the Aboriginal Cultural Heritage Assessment Wellington North Solar Plant,* prepared for AGL.

NGH Environmental, 2019b, *Biodiversity Development Assessment Report,* prepared for AGL.

NGH Environmental, 2019c, *Historical Archaeological Assessment,* prepared for AGL.

NGH Environmental, 2019d, *Wellington North Solar Plant Submissions Report,* prepared for AGL.

NSW Government, 2019, *NSW OEH contaminated site register*, accessed January 2019, from http://www.epa.nsw.gov.au/prclmapp/searchregister.aspx

Renzo Tonin and Associates, 2019, *Wellington North Solar Plant Construction and Operation Noise and Vibration Assessment*. Report prepared for AGL, January 2019.

APPENDIX A REVISED MITIGATION MEASURES

The complete set of updated mitigation measures are presented below. New measures from this additional assessment are in **Bold.** New and modified measures based on the Submissions Report (NGH, 2019d) are in *italics*.

PC: Pre-construction, C: Construction, PO: Pre-operation, O: Operation, D: Decommissioning

ID.	Mitigation measure	C	O	D
Biodiversity				
1	Time works to avoid critical life cycle events: • Hollow-bearing trees would not be removed during breeding season or hibernation period (Winter to early summer) to mitigate impacts on Southern Myotis. • If clearing outside of this period cannot be achieved, pre-clearing surveys would be undertaken to ensure no impacts to fauna would occur.	C		
2	Implement clearing protocols during tree clearing works, including pre-clearing surveys, daily surveys and staged clearing, the presence of a trained ecological or wildlife handler: • Pre-clearing checklist. • Tree clearing procedure.	C		
3	Relocate habitat features (fallen timber, hollow logs) from within the Proposal site: • Tree-clearing procedure including relocation of habitat features to adjacent area for habitat enhancement.	C		
4	Clearing protocols that identify vegetation to be retained, prevent inadvertent damage and reduce soil disturbance; for example, removal of native vegetation by chainsaw, rather than heavy machinery, is preferable in situations where partial clearing is proposed: • Approved clearing limits to be clearly delineated with temporary fencing or similar prior to construction commencing. • No stockpiling or storage within dripline of any native vegetation. • In areas to clear adjacent to areas to be retained, chainsaws would be used rather than heavy machinery to minimise risk of unauthorised disturbance.	C		

ID.	Mitigation measure	C	O	D
5	Light shields or daily/seasonal timing of construction and operational activities to reduce impacts of light spill: • Avoid Night Works. • Direct lights away from vegetation.	C	O	
6	Temporary fencing to protect significant environmental features such as riparian zones: • Prior to construction commencing, exclusion fencing and signage would be installed around habitat to be retained.	C		
7	Hygiene protocols to prevent the spread of weeds or pathogens between infected areas and uninfected areas: • A Weed Management Procedure would be developed for the Proposal to prevent and minimise the spread of weeds. This would include: • Management protocol for declared priority weeds under the Biosecurity Act 2015 during and after construction • Weed hygiene protocol in relation to plant, machinery, and fill • Any occurrences of pathogens such as Myrtle Rust and Phytophthora would be monitored, treated, and reported. • The weed management procedure would be incorporated into the Biodiversity Management Plan.	C	O	
8	• Staff training and site briefing to communicate environmental features to be protected and measures to be implemented: • Site induction. • Toolbox talks.	C		
9	Preparation of a vegetation management plan to regulate activity in vegetation and habitat adjacent to the proposed development:	C		

ID.	Mitigation measure	C	O	D
	• Preparation of a Biodiversity Management Plan that would include protocols for: o Protection of native vegetation to be retained. o Best practice removal and disposal of vegetation. o Staged removal of hollow-bearing trees and other habitat features such as fallen logs with attendance by an ecologist. o Weed management. o Unexpected threatened species finds. o Rehabilitation of disturbed areas.			
10	Making provision for the ecological restoration, rehabilitation and/or ongoing maintenance of retained native vegetation habitat on or adjacent to the Proposal site: • Retained native vegetation would be considered as an offset site.		O	
11	Staff training and site briefing to communicate impacts of traffic strikes on native fauna: • Awareness training during site inductions regarding enforcing site speed limits. • Site speed limits to be enforced.	C	O	
Aboriginal heritage				
1	The development must avoid the two possible Scarred Tree (Wellington Nth ST1 and Wellington Nth ST2) as per the proposed development footprint in this report. A minimum 10m buffer around the trees should be in place to protect the tree canopy and root system.		Design	
2	**If complete avoidance of the nine artefacts scatters and 30 isolated find sites recorded within the Proposal site is not practicable, the artefacts within the development footprint must be salvaged prior to the proposed work commencing and moved to a safe area within the property that would not be subject to any ground disturbance.**	**C**		
3	The collection and relocation of the artefacts should be undertaken by an archaeologist with representatives of the registered Aboriginal parties and be consistent with Requirement 26 of the *Code of practice for Archaeological Investigation of Aboriginal Objects in New South Wales.* A new site card/s would need to be completed once the artefacts are moved to record their new location on the AHIMS database. The Aboriginal community requests that a Cultural Smoking Ceremony take place to cleanse any artefacts salvaged and the reburial location.	C		

ID.	Mitigation measure	C	O	D
4	A minimum 5m buffer should be observed around all artefact scatters and isolated find sites including those outside the development footprint.	C	O	D
5	Wellington North Solar Plant Pty Limited should prepare a Cultural Heritage Management Plan (CHMP) to address the potential for finding additional Aboriginal artefacts during the construction of the Solar Plant and management of known sites and artefacts. The Plan should include the unexpected finds procedure to deal with construction activity. Preparation of the CHMP should be undertaken in consultation with the registered Aboriginal parties.	C		
6	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 would be undertaken to determine if the remains were Aboriginal or non-Aboriginal.	C		
7	**Further archaeological assessment would be required if the Proposal activity extends beyond the area of the current investigation as detailed in this report and in the initial ACHA. This would include consultation with the registered Aboriginal parties and may include further field survey.**	**C**	**O**	**D**
Noise and vibration				
1	Implement noise control measures such as those suggested in Australian Standard 2436-2010 “Guide to Noise Control on Construction, Demolition and Maintenance Sites”, to reduce predicted construction noise levels.	C		
2	A Noise Management Plan would be developed as part of the CEMP and would specifically target R1, R2, R4 and R6 in order to achieve compliance. The plan would include, but not be limited to: • Use less noisy plant and equipment where feasible and reasonable. • Plant and equipment to 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. • Complaints procedure 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.	C		

ID.	Mitigation measure	C	O	D
	• Establish good relations with people living in the vicinity of the site at the beginning of proposal and maintain. Keep people informed, take complaints seriously, deal with complaints expeditiously. The community liaison member of staff should be adequately experienced.			
Visual amenity and landscape character				
1	Regarding landscaping to fragment / soften the view of infrastructure: • An intermittent band of screen planting would be located: o Between the property boundary and the solar arrays, in locations along Goolma Road and Cobbora Road where there is no existing vegetation and where the arrays are immediately adjacent to the boundary. o Along the Campbells Lane boundary to mitigate impacts on properties on the northern side of Campbells Lane (identified in Appendix H). o **Within or directly alongside the transmission line easement directly adjacent to the rear of the R5 zoned lots where dwellings are located closer than 200m from the proposed new eastern transmission line easement.** • To ensure that the screen planting integrates into the existing landscape character: o Bands of planting would be a mix of locally native tree and shrub species to ensure a naturalistic effect whilst also providing habitat and movement corridors for native fauna. o Planting would not form a consistent hedge between the road and the solar farm but rather form a row of intermittent copse plantings that reflect the existing character of roadside vegetation in the area • Screen planting should be considered for locations surrounding buildings associated with the proposal where appropriate. • Strategies to ensure the effective screening is maximised early in the project life and maintained would be implemented, for example: o Planting would aim to be undertaken as soon as practical in the construction process depending on the season, as it would take time for the plants to establish and become effective as a screen. Seasonal requirements for planting should also be considered. o Successional planting may be undertaken (quick growing species replaced by longer living species).	Pre-construction		

ID.	Mitigation measure	C	O	D
	The screen would be maintained for the operational life of the solar plant. 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.			
2	• Where feasible, co-location of powerlines would be undertaken to minimise the look of additional power poles. If additional poles are required, these would match existing pole design as much as practicable. • Materials and colours utilised in the construction of site sheds, battery storage and associated infrastructure would be considered to ensure that Visual Impacts are minimised. In general materials should be non-reflective and should be painted in neutral colours that are sensitive to the surrounding landscape.	Design stage		
3	• Night lighting would be minimised to the maximum extent practicable (i.e. manually operated safety lighting at main component locations).	C	O	
Soils, Agriculture and land capability				
1	*As part of the CEMP, a Soil and Water Management Plan (SWMP) (with erosion and sediment control plans) would be prepared, implemented and monitored during the Proposal, in accordance with Landcom (2004), to minimise soil (and water) impacts. These plans would include provisions to:* • *Prepare SWMP in consultation with DoI – Lands and Water.* • *Implement management responses outlined in the Soil Survey Report (McMahon, 2018).* • *Install, monitor and maintain erosion controls.* • *Ensure that machinery leaves the site in a clean condition to avoid tracking of sediment onto public roads which may cause risks to other road users through reduced road stability.* • *Manage topsoil in all excavation activities, separate subsoils and topsoils and ensure that they are replaced in their natural configuration to assist revegetation. Stockpile topsoil appropriately so as to minimise weed infestation, maintain soil organic matter, maintain soil structure and microbial activity.* • *Minimise the area of disturbance from excavation and compaction; rationalise vehicle movements and restrict the location of activities that compact and erode the soils as much as practical. Any compaction caused during construction would be treated such that revegetation would not be impaired.* • *Manage works in consideration of heavy rainfall events; if a heavy rainfall event is predicted, the site should be stabilised, and work ceased until the wet period had passed.*	*C*	*O*	*D*

ID.	Mitigation measure	C	O	D
2	A Groundcover Management Plan would be developed in consultation with an agronomist and taking account of soil survey results to ensure perennial grass cover is established across the site as soon as practicable after construction and maintained throughout the operation phase. The plan would cover: • Soil restoration and preparation requirements. • Species election. • Soil preparation. • Establishment techniques. • Maintenance requirements. • Perennial groundcover targets, indicators, condition monitoring, reporting and evaluation arrangements – i.e. Live grass cover would be maintained at or above 70% at all times to protect soils, landscape function and water quality. 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. • Contingency measures to respond to declining soil or groundcover condition. • Identification of baseline conditions for rehabilitation following decommissioning.	C	O	
3	The array would be designed to allow sufficient space between panels to establish and maintain ground cover beneath the panels and facilitate weed control.	Design		
4	A Spill and Contamination Response Plan would be developed as part of the overall Emergency Response Plan to prevent contaminants affecting adjacent surrounding environments. The 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. • Requirement to notify the EPA for incidents that cause material harm to the environment (refer s147-153 of the POEO Act). • Manage the storage of any potential contaminants onsite. • Mitigate the effects of soil contamination by fuels or other chemicals (including emergency response and the EPA notification procedures and remediation. • Ensure that machinery arrives on site in a clean, washed condition, free of fluid leaks. • Prevent contaminants affecting adjacent pastures, dams, water courses and native vegetation. • Monitor and maintain spill equipment. • Induct and train all site staff.	C	O	D

ID.	Mitigation measure	C	O	D
5	A protocol would be developed in relation to discovering buried contaminants within the Proposal site (e.g. pesticide containers). It would include stop work, remediation and disposal requirements.	C	O	D
6	*A Rehabilitation Plan would be prepared to ensure the array site is returned to its pre-solar Plant land capability. The plan would be developed with reference to the base line soil testing, baseline agricultural productivity (i.e crop yields and stocking rates over the last 3 years) and with input from an agronomist to ensure the site is left stabilised, under a cover crop or other suitable ground cover. The plan would reference:* • *Australian Soil and Land Survey Handbook (CSIRO, 2009).* • *Guidelines for Surveying Soil and Land Resources (CSIRO, 2008).* • *The land and soil capability assessment scheme: second approximation (OEH, 2012).*			*D*
7	Manage pests and weeds during construction and operation. Where practicable integrate weed and pest management with adjoining land owners.	C	O	
8	Consultation with local community, to minimise impact of the Proposal on adjacent agricultural activities and access.	C	O	D
Land use				
1	Consultation would be undertaken with TransGrid regarding connection to the substation and design of electricity transmission infrastructure.	C	O	D
2	Consultation with Proposal site mineral titleholders regarding the Proposal and potential impacts.	C	O	D
Historic heritage				
1	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.	C	O	D
2	The Noonee Nyrang Homestead would not be altered whilst in use as an Office and Maintenance building for the solar plant.	C	O	D
3	The existing outbuildings and stone shed around the Noonee Nyrang Homestead would be maintained and not altered.	C	O	D
Flooding				
1	The design of buildings, equipment foundations and footings for electrical componentry and panel mounts would be designed to avoid the 1% AEP flood level to minimise impacts from potential flooding including: • The solar array mounting piers are designed to withstand the forces of floodwater (including any potential debris loading) up to the 1% AEP flood event, giving regard to the depth and velocity of floodwaters;		Design	

ID.	Mitigation measure	C	O	D
	• The mounting height of the solar module frames would be designed such that the lower edge of the module is clear of the predicted 1% AEP flood level. • All electrical infrastructure, including inverters, would be located above the 1% AEP flood level. • Where electrical cabling is required to be constructed below the 1% AEP flood level it would be capable of continuous submergence in water. • The proposed perimeter security fencing would be constructed in a manner which does not adversely affect the flow of floodwater and should be designed to withstand the forces of floodwater, or collapse in a controlled manner to prevent impediment to floodwater.			
2	An Emergency Response Plan incorporating a Flood Response Plan would be prepared prior to construction covering all phases of the Proposal. The plan 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 (i.e. rotate array modules to provide maximum clearance of the predicted flood level). • Consider site access in the event that some tracks become flooded. • Establish an evacuation point. • Define communications protocols with emergency services agencies.	C	O	D
Traffic, transport and safety				
1	*The following intersections treatments would be undertaken in consultation with Dubbo Regional Council:* • *The intersection of Cobbora Road / Campbells Lane would be upgraded to provide a BAR/BAL turn type treatment including shoulder widening on Cobbora Road (major road);* • *The proposed site access on Campbells Lane would be designed to provide BAR/BAL turn type treatment; and* • *Intersection treatments would be designed to accommodate articulated vehicles of 19 m in length.* • *All gates would be setback a minimum of 26 metres from the property boundary to permit a B- Double vehicle to fully stand within the property boundary and not overhang onto the road reserve while any access gates are being opened or closed.*	*Design stage*		
2	A Haulage Plan would be developed with input from the roads authority, including but not limited to: • Assessment of road routes to minimise impacts on transport infrastructure.	PC		D

ID.	Mitigation measure	C	O	D
	• Scheduling of deliveries of major components to minimise safety risks (on other local traffic). • Consideration of cumulative traffic loads due to other local developments. • Traffic controls (signage and speed restrictions etc.).			
3	Upon determining the haulage route(s) for construction vehicles associated with the Proposal, and prior to construction, undertake a Road Dilapidation Report. The report would: • Assess the current condition of the road(s) • Describe mechanisms to restore any damage that may result due to traffic and transport related to the construction of the Proposal. • Be submitted to the relevant road authority for review prior to the commencement of haulage.	PC		
4	*A pavement review would be undertaken and bituminous surface be applied to Campbells Lane between Cobbora Road and the site access to reduce pavement degradation and improve driver safety. The bitumen surface would be in accordance with Dubbo Regional Council's rural road standard including being a minimum of 7.5 metre wide bitumen sealed two-way carriageway.*	*C*		
5	*A Traffic Management Plan would be developed as part of the CEMP and DEMP, in consultation with the Dubbo Regional Council and Roads and Maritime Services (RMS). The plan would include, but not be limited to:* • *The designated routes of construction traffic to the site.* • *Carpooling/shuttle bus arrangements to minimise vehicle numbers during construction and ensure that warrants provided in the Austroads Guide to Road Design Part 4A: Unsignalised and Signalised Intersections that apply to major road turn treatments are maintained within the limits of the proposed BAR / BAL turn treatments.* • *Identify specific road hazards associated with the area including not limited to fog, wet weather, frost and wildlife.* • *Pedestrian management - Site access is to be restricted to authorised personnel only and existing employees on site. Pedestrian access to and around the site is to be maintained at all times. Within the site pedestrian travel paths are to be maintained to key areas such as building entrances and be free from trip hazards.* • *Scheduling of deliveries.* • *Community consultation regarding traffic impacts for nearby residents and school bus operators.* • *Consideration of impacts to the railway.* • *Traffic control plans (speed limits, signage, etc.).*	*PC*		*D*

ID.	Mitigation measure	C	O	D
	• *Procedure to monitor traffic impacts and adapt controls (where required) to reduce the impacts.* • *Providing a contact phone number to enable any issues or concerns to be rapidly identified and addressed through appropriate procedures.*			
Water quality and water use				
1	Design waterway crossings and services crossing in accordance with the publications: • *Why do fish need to cross the road? Fish Passage Requirements for Waterway Crossings* (Fairfull & Witheridge, 2003). • *Policy and Guidelines for Fish Friendly Waterway Crossings* (NSW DPI, 2003). • *Guidelines for Watercourse Crossings on Waterfront Land* (NSW DPI, 2012). • *Guidelines for Laying Pipes and Cable in Watercourses on Waterfront Land* (NSW DPI, 2012).	C	O	D
2	All fuels, chemicals, and liquids would be stored at least 40m from any waterways or drainage lines, not on sloping land and would be stored in an impervious bunded area.	C	O	D
3	The refuelling of plant and maintenance would be undertaken in impervious bunded areas on hardstand areas only.	C	O	D
4	All potential pollutants stored on-site would be stored in accordance with HAZMAT requirements and bunded.	C	O	D
5	Roads and other maintenance access tracks would incorporate appropriate water quality treatment measures such as vegetated swales to minimise the opportunity of dirty water leaving the site or entering the waterways.	C		D
6	A WAL would be obtained, should onsite ground water sources be used.	C		
Social and economic				
1	Liaison with local industry representatives to maximise the use of local contractors, manufacturing facilities, materials.	C		
2	Liaison with local representatives regarding accommodation options for staff, to minimise adverse impacts on local services.	C		D
3	Liaison with local tourism industry representatives to manage potential timing conflicts with local events.	C		D
4	The Community Consultation Plan would be implemented to manage impacts to community stakeholders, including but not limited to:	C		D

ID.	Mitigation measure	C	O	D
	• Protocols to keep the community updated about the progress of the Proposal and proposal benefits. • Protocols to inform relevant stakeholders of potential impacts (haulage, noise, air quality etc.). • Protocols to respond to any complaints received.			
Bushfire				
1	Dangerous or hazardous materials would be stored and handled in accordance with AS1940-2004: *The storage and handling of flammable and combustible liquids*.	C	O	D
2	*Develop a Bush Fire Management Plan (BFMP) in consultation with NSW RFS District Fire Control Centre. The BFMP will include but not be limited to:* • *Specific management of activities with a risk of fire ignition (hot works, vehicle use, smoking, use of flammable materials, blasting)* • *Document the location of hazards (Physical, Chemical and Electrical) that will impact on fire fighting operations and procedures to manage identified hazards during fire fighting operations.* • *Describe the construction of asset protection zones and their continued maintenance.* • *Incorporation of fire safety and response in staff and contractor induction, training, OHS procedures and Work Method Statements.* • *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.* • *24/7 contact details including alternative telephone contact.* • *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.* • *Specific plans outlining:* • *Site infrastructure.* • *Fire fighting water supplies.* • *Site access and internal roads.* • *Any additional matters as required by the NSW RFS District Office (Plan review and update).*	*C*	*O*	*D*

ID.	Mitigation measure	C	O	D
	In developing the Bush 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.			
3	*An APZ of minimum 10 metres would be maintained between remnant or planted woody vegetation and solar plant infrastructure. The APZ around the perimeter of the site would incorporate a 4 metre wide gravel access track. The APZs will be in accordance with section 4.1.3 and Appendix 5 of 'Planning for Bush Fire Protection 2006' and the NSW Rural Fire Service's document 'Standards for asset protection zones'.* *Average grass height within the APZ would be maintained at or below 5 centimetres on average throughout the October-March 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.*	*C*	*O*	
4	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.		O	
5	Appropriate fire-fighting equipment would be held on site to respond to any fires that may occur at the site during construction. This equipment would include fire extinguishers, a 1000 litre water cart retained on site on a precautionary basis, particularly during any blasting and welding operations. Equipment lists would be detailed in Work Method Statements.	C		
6	The NSW RFS and Fire and Rescue would be provided with a contact point for the solar plant, during construction and operation.	C	O	
7	Following commissioning of the solar 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.		O	
8	*The perimeter access track would comply with the requirements for Fire Trails in accordance with Section 4.1.3(3) of Planning for Bush Fire Protection 2006. 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 practicable. Dead end tracks would be signposted and include provision for turning fire trucks.*	*C*	*O*	*D*
9	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 practicable hot works would be carried out in specific safe areas (such as the Construction Compound temporary workshop areas).	C	O	D
10	Machinery capable of causing an ignition would not be used during bushfire danger weather, including Total Fire Ban days.	C	O	D

ID.	Mitigation measure	C	O	D
11	*Prior to operation of the solar plant, an Emergency Response Plan (ERP) must be prepared in consultation with the RFS and Fire & Rescue NSW. This plan must include but not be limited to:* • *Specifically addresses foreseeable on site and off site fire events and other emergency incidents.* • *Risk control 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 PV system (either in its entirety or partially, as determined by risk assessment).* • *Outline other risk control measures that may need to be implemented in a fire emergency due to any unique hazards specific to the site.* • *Two copies of the ERP are stored in a prominent 'Emergency Information Cabinet' which is located in a position directly adjacent to the site's main entry point/s.* *Once constructed and prior to operation, the operator of the facility would contact the relevant local emergency management committee (LEMC).* *The ERP will be submitted to Dubbo Regional Council for approval.*		*O*	
12	*A 20,000 litre water supply (tank) fitted with a 65mm storz fitting shall be suitably located along a property access road to the development within the APZ.*	*C*	*O*	
Electromagnetic fields				
1	All electrical equipment would be designed in accordance with relevant codes and industry best practice standards in Australia.	C		
2	All design and engineering would be undertaken by qualified and competent person/s with the support of specialists as required.	C		
3	Design of electrical infrastructure would minimise EMFs.	C		
Air quality and climate				
1	Dust generation by vehicles accessing the site and earthworks at the site would be suppressed using water applications or other means as required.	C		D
2	Vehicle loads of material which may create dust would be covered while using the public road system.	C		D
3	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	C	O	D

ID.	Mitigation measure	C	O	D
	manufacturer's operating recommendations. Plant would be operated efficiently and turned off when not in use.			
4	Fires and material burning is prohibited on the Proposal site.	C	O	D
Resources use and waste generation				
1	A Waste Management Plan (WMP) would be developed to minimise wastes. It would include but not be limited to: • 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 onsite. • Provision of toilet facilities for onsite 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).	C	O	D
2	Septic system is installed and operated according to the Dubbo Regional Council regulations.	C	O	

APPENDIX B UPDATED BDAR

APPENDIX C UPDATED ACHAR

Draft report, in advance of RAP comments.

APPENDIX D UPDATED HISTORICAL ARCHAEOLOGY ASSESSMENT

APPENDIX E UPDATED CONSTRUCTION AND OPERATIONAL NOISE AND VIBRATION ASSESSMENT