APPENDIX F VISUAL IMPACT ASSESSMENT

Visual Impact Assessment

TARLEIGH PARK SOLAR FARM, WARRAGOON

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1 INTRODUCTION

NGH Environmental completed a visual impact assessment of the proposed Tarleigh Park Solar Farm (Tarleigh Park SF), on behalf of the proponent, RES Australia Pty Ltd (RES). Tarleigh Park SF is located in the Riverina Region approximately 23 kilometres east of Deniliquin, south of the Riverina Highway (B58), within the Edward River Council Local Government Area (LGA) (refer). The purpose of the report is to assess the potential visual impacts of the proposed Tarleigh Park SF. Visual amenity values and visual impacts are subjective, therefore the assessment included a transparent systematic evaluation to address subjectivity as much as possible.

1.1 PROJECT OVERVIEW

The Tarleigh Park SF would comprise the installation of a solar plant with a capacity of around 90 Mega Watt Alternate Current (MWAC). The proposal site is 250 hectares. The Tarleigh Park SF would include the following elements:

- solar panels mounted on a single axis tracking system
- access points to the site via Parfreys Road
- internal access tracks
- operations and maintenance buildings with associated car parking
- electrical substation
- underground electrical cable reticulation
- energy storage facility
- security fencing and CCTV with infrared lighting
- native vegetation screening, where required to break up views of infrastructure

A concept layout is provided in Appendix A.

Environmental assessment in accordance with Part 4 of the NSW *Environmental Planning and Assessment Act 1979* (EP&A Act) is required for the proposal. The Secretary's Environmental Assessment Requirements (SEARs), provided by NSW Department of Planning and Environment (DPE) on 2 June 2017, specify the impacts to be considered in the environmental assessment. The SEARs relevant to the visual impacts are:

- Visual – including an assessment of the likely visual impacts of the development (including any glare, reflectivity and night lighting) on surrounding residences, scenic or significant vistas, air traffic and road corridors in the public domain, including a draft landscaping plan for on-site perimeter planting, with evidence to demonstrate it has been developed in consultation with affected landowners.

1.2 SITE CONTEXT

The 250 hectare Tarleigh Park SF proposal site would be located on the freehold Lot 88 DP756339 Blighty. The site is in the locality of Warragoon, five kilometres west of Blighty, 23 kilometres east of Deniliquin, within the Edward River Council Local Government Area (LGA). The site is agricultural land used primarily for irrigated cropping. An involved residence located on the eastern side of the site fronts the unsealed Parfreys Road, which runs along the eastern boundary of the site. Parfreys Road intersects the Riverina

Highway 1.6 kilometres to the north of the proposal site and is used primarily by a low number of local residents and farmers.

The site comprises several large paddocks which have been levelled and largely cleared for cropping. Crops include rice, wheat, barley and canola. Native vegetation is present at the site in the form of paddock trees and linear native vegetation remnants. The paddock trees exist within cleared land with cultivated or exotic groundcover. Linear woodland remnants with native understorey are located on the northern boundary of the site (outside the development envelope) and along the eastern side of the site (outside the proposal site, within the public road reserve). The northern remnant is protected by a Property Vegetation Plan (PVP) under the *Native Vegetation Act 2003*. The PVP also imposes obligations on the management of soils and groundcover vegetation over some areas within the proposed development site.

Irrigation channels managed by Murray Irrigation Limited are present along the northern, western and southern boundaries of the site. Privately owned internal irrigation channels have been constructed within the property to distribute water to paddocks. A large storage dam has been constructed centrally on the property. Surface hydrology, landform and soils have been heavily modified by the paddock development and irrigation works.

Two existing powerlines pass through the site in an east-west direction.

1.3 OBJECTIVES OF THIS REPORT

This Visual Impact Assessment (VIA) includes a full assessment of the visual impacts associated with the Tarleigh Park SF. It includes an assessment of:

- Landscape character and scenic vistas (including significant or sensitive vistas).
- Potential impacts on representative viewpoints, including residences and road corridors.
- Potential impacts on air traffic.

Study area	Defined as within 15km of the proposed solar farm site (maximum view distance).
Proposal site / site	The lot boundaries within which the solar farm development is proposed.
Proposal	All infrastructure and activities required for the construction, operation and decommissioning of the solar farm.
Landscape character unit (LCU)	LCUs take into account topography, vegetation, land use, and other distinct landscape features. They are a way to categorise the existing scenic quality of the receiving environment and consider the ability of the environment to absorb visual change at the landscape scale.
Landscape management zone (LMZ)	LMZs are derived by combining scenic quality with viewer sensitivity and proximity to the proposed infrastructure at the landscape scale. A three-tiered management hierarchy sets out appropriate management objectives for each zone.
Zone of Visual Influence (ZVI) (or viewshed)	ZVI modelling uses GIS modelling and topography to determine areas which would be shielded from views of infrastructure at the proposed solar site. It does not take into account other existing or proposed screening features such as vegetation or built structures.

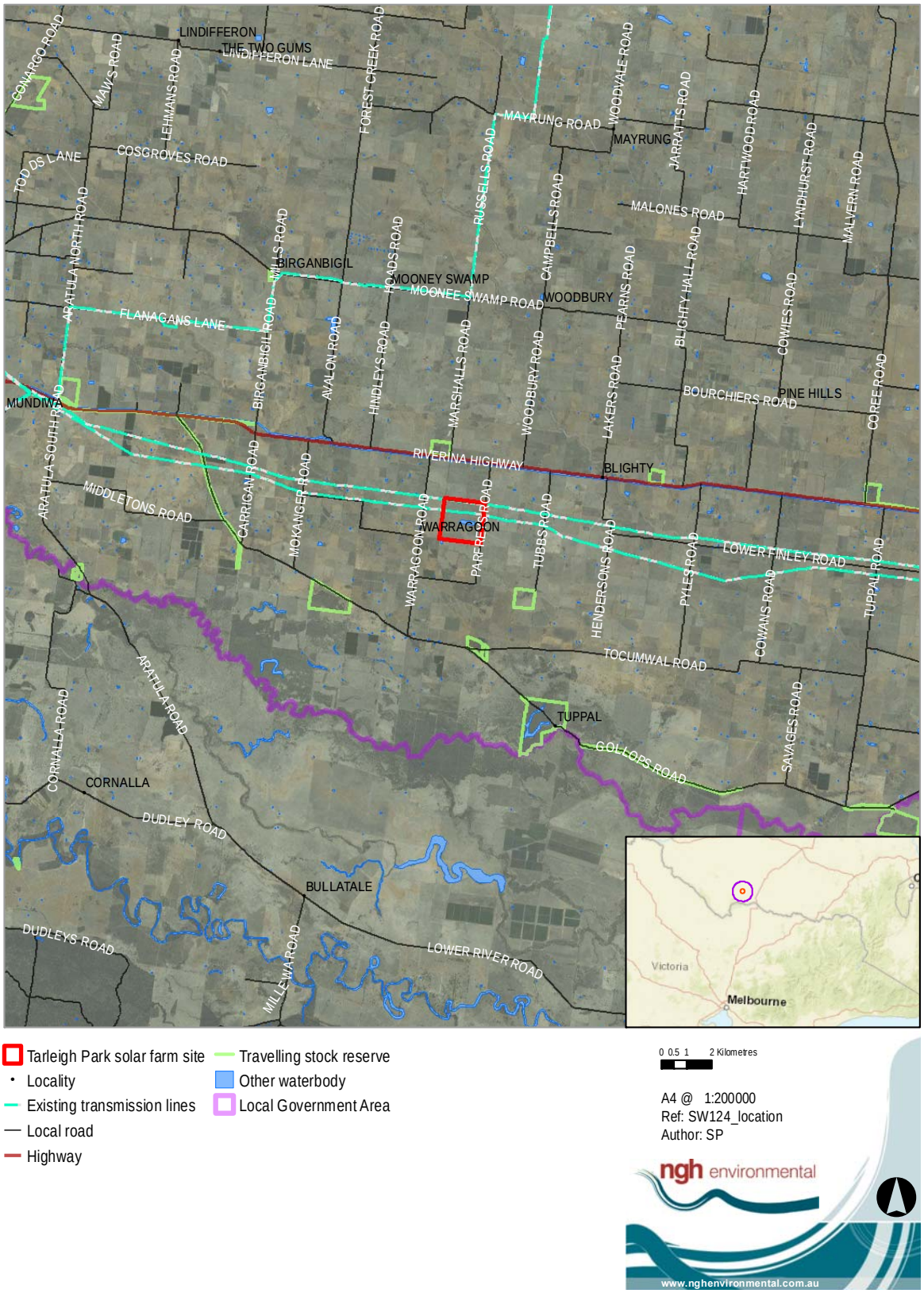


Figure 1-1 Location of the Tarleigh Park Solar Farm

2 METHODOLOGY

2.1 OVERVIEW

The visual impact assessment has been completed in the following stages:

- Background investigations, mapping and modelling
- Field survey including reconnaissance, ground truthing and photography
- Impact assessment
- Development of a visual impact mitigation strategy

These methods are detailed below.

2.2 BACKGROUND INVESTIGATIONS, MAPPING AND MODELLING

Background investigations included identifying key features within the landscape that may be affected by the visual impacts of the proposed solar farm. This was done using existing literature, tourism information, topographic maps and aerial photos.

Mapping and modelling were undertaken to:

- Identify and classify LCUs within 15km of the proposed solar farm. Fifteen kilometres is generally considered the approximate distance a viewer can see infrastructure similar to that proposed on a clear day. This was done based on aerial imagery and relevant GIS layers. LCUs are a way to summarise differences in landscape amenity and the sensitivity of different areas within the landscape to visual impacts.
- Define areas in which the infrastructure may be visible, using Zone of Influence (ZVI) modelling. A map identifying the ZVI (or viewshed) of the proposal was produced. This method uses topographic information to determine areas in which views of infrastructure would not be visible. It does not account for other features that may provide shielding such as vegetation or buildings. Topography was based on a 25m resolution Digital Elevation Model (DEM) sourced from Commonwealth of Australia (Geoscience Australia) (2017). Two viewshed models were prepared, one for the solar arrays and one for the other infrastructure (operations and maintenance buildings, substation, energy storage facility). The infrastructure on the proposal site was modelled as three metre high representative points for the solar arrays and 6.5m high representative points high for buildings. The viewer height was estimated at 1.5m above ground level. Following the field surveys (see below), some visual barriers were added to the ZVI modelling to refine the viewshed results.
- Identify key viewpoints such as major travel routes and other potential receivers (dwellings within five kilometres of the proposed solar farm). This step generally excluded areas deemed not to be visible from the ZVI modelling and/or following the field surveys.
- Understand the feasibility of screening to mitigate visual impacts.

The results were used to inform the field survey.

2.3 FIELD SURVEY

With reference to the mapping and modelling, field reconnaissance and ground truthing was undertaken to:

- Verify and document the existing LCU in the study area (15 km) (only one LCU was identified, refer to Section 3.4).
- Document representative viewpoints within the LCU. Vegetation greatly restricted views of the solar farm beyond one to two kilometres from identified key viewpoints.
- Understand the likely sensitivity of the LCU to views of the proposed solar farm.
- Determine existing landscape features that would offer a visual barrier from key viewpoints (e.g. vegetation, raised banks along Murray Irrigation channels). The average height of some visual barriers (e.g. raised banks along Murray Irrigation channels) within and outside the proposal site and along the periphery was estimated and added to the ZVI models. While remnant vegetation is extensive in the region and provides a visual barrier, these were not added to the ZVI models but are discussed when assessing impacts.

Fieldwork consisted of driving along major and minor roads, investigating views from key local landscape features and general views from different distances from the site up to two kilometres away (the proposal was not considered visible from sensitive receivers further than two kilometres).

Where photographs and panoramas were produced, these were taken from public roads. All neighbouring properties were contacted to seek access to allow photographs to be taken from the residence. Where access was granted, photographs and panoramas were produced from the front of the home. Where access was not granted, photos were generally taken near to residences, from the road, generally at the location of the driveway entrance.

2.4 IMPACT ASSESSMENT AND DEVELOPMENT OF A MITIGATION STRATEGY

The impact assessment methodology used in this Visual Impact Assessment has been adapted from the Bureau of Land Management (BLM) Visual Resource Management System, developed by the BLM, US Department of the Interior (n.d). The BLM developed a systematic process to analyse the visual impact of proposed developments. The basic philosophy states that the degree to which a development affects the visual landscape depends on the visual contrast imposed by the project.

Key steps undertaken to assess the visual impact are as follows:

- Define LMZ, for the representative viewpoints, based on:
    - The scenic quality of the study area's LCUs.
    - The expected sensitivity at representative viewpoints.
- Evaluate the degree of contrast the solar farm would result in at representative viewpoints and in consideration of the management objectives of the relevant LMZ.
- Determine the acceptability of the contrast with the management objectives of the relevant LMZ; this is the resultant visual impact, rated as high, medium or low.

To help with the above, photomontages of the solar farm infrastructure were added to panoramas for some key viewpoints (Appendix E).

Criteria for scenic quality, sensitivity, contrast and visual impact are included in the assessment, Section 5.

Mitigation measures are considered for impacts greater than medium visual impact; for a medium impact, the contrast is considered acceptable.

3 EXISTING ENVIRONMENT

3.1 STUDY AREA

Edward River Council was formed following the merger of Conargo Shire and Deniliquin Councils in 2016. The proposal site is in the former Conargo Local Government Area (LGA), which has a population of 1,540 people (ABS 2013a). The Edward River Council area has a population of 8,972; covering an area of 8,881 square kilometres (NSW Government 2017). The main town and rural centre is Deniliquin with a population of 7,494.

The main local industry for employment in the Conargo district is agriculture; sheep, beef cattle, grain farming and dairy cattle (56 % in 2011) (ABS 2013b). The LGA is renowned for sheep breeding studs and cereal crops such as white rice and canola and its distinctive natural environment (CSC 2016). The regional Council defines the communities' environmental values as water, agriculture, wide open plains, and big skies (ERC 2016a).

Community facilities and services in the locality include a Rural Fire Service shed at Blighty, recreation reserves at Blighty and Conargo, halls at Blighty, Mayrung and Conargo Community and local schools including Conargo Primary School, Blighty Primary School and Mayrung Primary School (Australian Schools Directory 2017).

The proposal site is in the rural locality of Warragoon. The population of Warragoon was 302 in 2006 with a median age of 55 years (ABS 2007). The locality is characterised by large agricultural properties and widely dispersed residences. Most people in the locality (95.4%) were born in Australia, and 1% are from England (ABS 2007). The main occupations were Managers at a high 67.4% (the Australian average was 13.2%); Labourers at 12.8%, Professionals 5.8% and Community and Personal Service Workers 5.2% (ABS 2007).

The site is in the Riverina Bioregion of NSW, which experiences a dry semi-arid climate with hot summers and cool winters (OEH 2016). Tarleigh Park is in the Murray Fans Catchment Management Authority (CMA) subregion which is centred around the Murray and Edward-Kolety river systems (OEH 2016). This area is characterised by meandering channels, floodplains, overflow lakes and swamps with extensive River Red Gum forests and low floodplain, Yellow Box and Black Box with saltbush on the high floodplains and White Cypress Pines on deep sand (Morgan and Terrey 1992).

3.2 SIGNIFICANT VISTAS

Scenic vistas in the study area and their distance from the site include:

- Parfreys Road is a local road along the eastern boundary of the site. It is used by heavy and other vehicles accessing farms in the area as well as a quarry. It is not used for through traffic between localities. It includes utility infrastructure (powerlines) but also provides views into working farms (crops), defining the productive focus of this area. Views of the solar arrays would be visible from this road.
- Warragoon Road is the closest main local road that runs in a northerly direction about 800 metres to the west of the proposal site. It is used by heavy and other vehicles accessing farms and other areas in the locality. Distant views of the solar arrays would be visible from this road.

- The Riverina Highway is the main heavy vehicle transport route in the locality and is located about 1.5 kilometres to the north. The proposal site is not visible from this road due to the high bank along the Murray Irrigation channel that runs along the south of the highway.
- Deniliquin is the closest town to the proposal site (23 kilometres to the west). Views of the solar array, powerlines and other infrastructure would not be visible from this town.

3.3 COMMUNITY VALUES

3.3.1 General attitudes to solar infrastructure

Research indicates there is widespread support for solar energy as a source of energy for electricity generation in Australia (ARENA n.d); 78% of respondents are in favour of large scale solar energy facilities and 87% are in favour of domestic installations. The large scale solar energy sector is still at a relatively early stage of development in Australia. While most members of the community are aware of large scale solar energy, many do not know a great deal about their impacts (ARENA n.d.), including visual impacts.

Three approaches to improving community understanding of the visual impacts of large scale installations include:

- Provision of images (from many angles) of large scale solar facilities, particularly in the early stages of a proposal.
- Understanding the similarities between highly supported domestic scale installations and large scale facilities.
- Understanding the current function of the land proposed to hold the facility and the additional value the installation allows for.

(Source: extracted from ARENA n.d).

This report endeavours to address these issues.

3.3.2 Values of the local community to the proposal

Approximately 50 people attended the Blighty session and 40 attended the afternoon session at Deniliquin on 8 June 2017. The information session introduced the proposal to the community and sought initial feedback. The attendees included some government agencies and the wider community.

Key messages received during the information session from the local community, relevant to the visual amenity, included:

- Farming culture is of great importance to the local community.
- Maintaining visual amenity, in particular for surrounding residences, is important.
- Ensuring glare is not an issue for planes used in agricultural spraying is important.

3.4 LANDSCAPE CHARACTER UNITS (LCU)

LCUs take into account topography, vegetation, land use, and other distinct landscape features. They are a way to summarise differences in the receiving environment that may affect the visual impact of the proposed solar farm at different locations.

One key LCU was identified within 15 km of the proposal site:

- Agricultural land

It is characterised below in terms of their scenic quality. Scenic quality is rated as follows:

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

The LCU identified within 15 km of the proposed solar farm site is characterised in Table 3-1 in terms of its scenic quality and illustrated in Appendix B.

Table 3-1 Landscape Characteristic Units within 15km of the Tarleigh Park Solar Farm

Landscape Character Unit	Key features
Agricultural	Cropped and irrigated rectangular paddocks form a collection of intensively worked agricultural areas with various crops. This results in a mosaic of well-defined rectangular patches of varying colours (green to ochre) dependent on the season. The paddocks are often separated from one another by strips of remnant native vegetation. Remnant vegetation is also found along waterways and within a large number of paddocks. The proposed solar farm site is located within this LCU. The paddocks and their crops are of low relief on slightly undulating terrain, producing a uniform landscape. This is dissected by roads, sealed and unsealed, irrigation channels and powerlines that reinforce the linear patterns of the landscape and its key role as a primary production landscape. The powerlines provide a rare vertical element. Two powerlines are present within the proposal site and cut through the landscape east to west. Residences within this LCU are commonly well screened with vegetation, whether planted or remnant native vegetation. Other infrastructure is clustered and includes sheds and silos and low fences. **Scenic quality is generally moderate as the features and their variety are normally present in the character type and the presence of large areas of remnant vegetation across this landscape. The moderate rating also considered the results of the community consultation, with locals stating the importance of the farming culture.**

3.5 VIEWPOINTS AND EXPECTED SENSITIVITY

The BLM methodology requires identification of representative viewpoints in the study area. These may be travel routes such as roads, waterways and recreational tracks, residential areas, tourist facilities, houses and farmland.

The predicted sensitivity of each viewpoint can be determined, considering its proximity to the proposed solar farm site and factors such as use, scenic quality and regional significance.

Criteria for proximity and sensitivity are as follows:

- Proximity to the proposal site:
  - Foreground 0 – 1 kilometres
  - Middle ground 1 – 5 kilometres
  - Background 5 – 16 kilometres
- Potential sensitivity to visual impact:
  - High sensitivity:
    - high use routes or areas
    - routes or areas of national or state significance
    - areas with high scenic quality
  - Moderate sensitivity:
    - moderate use routes or areas, or where the duration of view is moderate
    - routes or areas of regional or local significance
    - areas with moderate scenic quality
  - Low sensitivity:
    - low use routes or areas, or where the duration of view is short or which will be seen by few people
    - routes or areas of low local significance
    - areas with low scenic quality

The ZVI modelling produced a set of maps that estimated the areas that would be shielded from views of infrastructure at the proposed solar farm site, based on topography, the location of existing visual barriers (eg raised banks along Murray Irrigation channels) and the proposed height of infrastructure (refer to Section 2.2).

Viewpoints were generally not selected in areas predicted to be shielded from views of the solar farm. Fourteen (14) representative viewpoints were identified within the ZVI. The 14 viewpoints are described in Table 3-2 in terms of their sensitivity, with the viewpoint locations illustrated in Appendix C.

Residences were assessed to have moderate sensitivity. In agricultural areas, gardens and plantings have often been incorporated into house lots, most likely to provide shade as well as screening (views, dust, noise) from the intensively worked agricultural lands. These areas provide an 'oasis' within the broader LCU. They are also likely to offer some visual screening to views of the solar farm.

Table 3-2 Representative viewpoints (ID) with reference to the Tarleigh Park Solar Farm

Viewpoint ID	LCU	Scenic quality	Viewpoint	Proximity	Sensitivity
1	Agricultural	Moderate	Road	Middle ground	Low
2	Agricultural	Moderate	Road	Middle ground	Low
3	Agricultural	Moderate	Road	Foreground	Low
4	Agricultural	Moderate	Residence	Middle ground	Moderate
5	Agricultural	Moderate	Residence	Middle ground	Moderate
6	Agricultural	Moderate	Residence	Middle ground	Moderate
7	Agricultural	Moderate	Road	Foreground	Low
8	Agricultural	Moderate	Road	Foreground	Low
9	Agricultural	Moderate	Road	Foreground	Low
10	Agricultural	Moderate	Road	Middle ground	Low
11	Agricultural	Moderate	Residence	Middle ground	Moderate
12	Agricultural	Moderate	Road	Foreground	Low
13	Agricultural	Moderate	Residence	Foreground	Moderate
14	Agricultural	Moderate	Road	Middle ground	Low

4 VISUAL CHARACTERISTICS OF KEY INFRASTRUCTURE COMPONENTS

The key infrastructure components of the Tarleigh Park SF, with reference to the stage of the project and the potential visual amenity impacts they may generate are discussed below and referenced in the visual impact assessment, Section 5.

4.1 INFRASTRUCTURE COMPONENTS

The proposed infrastructure components include:

- Solar arrays:
  - Piles driven or screwed to the ground.
  - Racking systems to allow the installation of solar panels.
- Solar panels (single-axis trackers)
- Power conversion units
- Energy storage facility (Lithium ion batteries in containers)
- Cables and trenches
- Substation
- Internal access tracks to allow for site maintenance vehicles, and gravel access road and parking for staff and visitors
- Control room, switch room and storage shed
- Perimeter security fencing

Ancillary facilities would be located within the site boundary and would include:

- Material laydown areas
- Temporary construction site offices
- Temporary car and bus parking areas for construction workers transportation. Once the plant has been commissioned a small car park would remain for the minimal staff required and occasional visitors.

These components are discussed in terms of their visual characteristics below.

4.1.1 Construction components

Construction impacts would be temporary, confined to approximately 12 months. Visual impacts could be generated during this time by:

- Development of site compound areas, site offices and stock piles, located within the site boundaries. Steel sheds can generate reflectivity and glare although would be a similar look to existing farm sheds. Material stockpiles may detract from visual amenity, particularly if dispersed across broad areas.
- Construction traffic would increase visual impacts and add to dust on unsealed roads.
- Areas of bare soil created through trenching cables could contribute to dust and detract from visual amenity until they are rehabilitated.

4.1.2 Operational components

Operational impacts relate to the look of the solar farm, once construction is complete.

- There would be around 243,000 panels installed. Each panel would be around two metres by 1 metres and the solar arrays would have a maximum height of around three metres.
- The potential for glare associated with non-concentrating photovoltaic systems which do not involve mirrors or lenses is relatively limited. PV solar panels are designed to reflect as little sunlight as possible (generally around 2% of the light received; Spaven Consulting 2011), resulting in negligible glare. The reason for this is that PV panels are designed to absorb as much solar energy as possible in order to generate the maximum amount of electricity or heat. The panels will not generally create noticeable glare compared with an existing roof or building surfaces (NSW Department of Planning 2010).

  Other onsite infrastructure that may cause glare or reflections depending on the sun angle, include:

  - Steel array mounting - array mounting would be steel or aluminium
  - Temporary site offices, sheds
  - Battery storage facility
  - Permanent staff amenities, office and maintenance building
- Approximately 14 Power Conversion Units (PCUs) would be installed across the site, each containing:
  - a transformer to step the AC voltage up to high voltage for transmission to the substation
  - inverters
  - HV switchgear
  - communications and ancillary equipment.

  The PCUs would measure around 12 metres long, 3 metres wide and 3 metres high, and would be delivered fully containerised or skid mounted. The PCUs would be placed on concrete footings, with the floor level set approximately 300mm above ground level.
- A building approximately 12 metres long, 10 metres wide (including timber-decked veranda) would be constructed on concrete footings to house control facilities. The building would have a skillion roof and be clad in fibre cement sheeting. Guttering and a water tank would be installed to collect rainwater. The control room building would contain an office and staff amenities (toilet, kitchen).
- A building approximately 29.5 metres long, 5.5 metres wide and 4.5 metres high would be constructed for the HV switchroom, with services, protection and control facilities. The skillion-roofed building would be clad in Colorbond® sheeting. A communications tower may be installed on or adjacent to the building.
- A gable roofed storage shed measuring approximately 20 metres long, 15 metres wide and 6 metres high would be constructed at the proposal site. The shed would be clad in Colorbond® monoclad sheeting and include steel roller doors and windows with fixed metal louvers. Guttering and a water tank would be installed to collect rainwater.
- The energy storage facility would be composed of up to eight individual containers. Each container would be approximately 12.2 metres long, 2.5 metres wide and 3 metres high. The containers would be set on concrete footings, with the floor level approximately 0.5 metres above the ground.
- It is expected that the substation would occupy approximately 80 metres by 80 metres and contain one main transformer, associated switchgear and control and protection equipment. The substation may also include a control building, switchgear building, drainage and oil containment

system, and would be surrounded by a security fence. Gravel hardstand would be placed under and around the substation compound to restrict vegetation growth and provide a safe working environment.

- Electricity cables would be installed underground between the array modules, producing no visual impact.
- Fencing would be a two metre high security fence along the site boundaries. Views would be afforded beyond the fence. Security lighting (non visible infrared) and security cameras would also be installed on posts approximately 3.5 metres high.
- Access to the site during construction would be from the local Parfreys Roads. Access upgrades may create additional bare areas prior to rehabilitation.
- An area for parking would be included within the site boundaries. This would accommodate a small number of vehicles.

Examples of the look of some of the key infrastructure components are provided below.

a) Solar arrays single axis tracking system

b) Example of a power conversion unit

c) Example of energy storage (Lithium-ion batteries in containers)

d) Example of a substation

Figure 4-1 Images representative of infrastructure components proposed

5 VISUAL IMPACT ASSESSMENT

The visual impact assessment was undertaken considering the:

a) Infrastructure components proposed (set out in Section 4)
b) Their potential impact on landscape character units and representative viewpoints
c) The degree of contrast the development would have within the identified Visual Landscape Management Zones and if these are considered acceptable

This section defines the LMZs for the study area and assesses the contrast with the LMZ management objectives to determine the level of visual impact. The potential for mitigation is then discussed for higher impacted viewpoints, to reduce them to an acceptable impact level.

5.1 DEFINITION OF LANDSCAPE MANAGEMENT ZONES

Visual Landscape Management Zones (LMZ) were developed for the study area. These zones were derived by combining information about scenic quality (from the LCU, Section 3.2), viewer sensitivity and the distance of the area from viewpoints (section 3.3). Combined they produce a three-tiered management hierarchy: A – C, as shown in Table 5-1.

Table 5-1 Visual Landscape Management Zone decision matrix

		Proximity / sensitivity						
		Foreground High	**Middle ground High**	**Background High**	**Foreground Moderate**	**Middle ground Moderate**	**Background Moderate**	**Foreground Low**
Scenic quality	**High**	A	A	A	A	B	B	B
	Moderate	A	B	B	B	B	C	C
	Low	B	B	B	B	C	C	C

Each zone has associated objectives to guide management of visual change and to help evaluate proposed project impacts. These are shown in Table 5-2:

Table 5-2 Visual Landscape Management Zone management objectives

Management priority	Management objectives
A	Maximise retention of existing visual amenity. Landscapes are least able to absorb change. Developments may lead to a major change.
B	Maintain existing visual amenity, where possible. Protect dominant visual features. Developments may be allowed to be visually apparent.
C	Less importance for retaining existing visual amenity. Landscapes are able to absorb change. Developments may be allowed to dominate but should reflect existing forms and colours where possible.

5.2 EVALUATING VISUAL IMPACTS

The ratings for the degree of contrast created by the proposed solar farm infrastructure in each viewpoint have the following definitions (BLM n.d.).

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

To determine if the objectives for the LMZ are met, the contrast rating for the viewpoint is compared with the relevant management objectives to give a visual impact level. The visual impact level is consequently defined as:

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

5.3 VISUAL IMPACT ASSESSMENT OF THE PROPOSAL

Table 5-3 below evaluates the visual impact on the representative viewpoints to the proposal site. Visual impacts are also illustrated in Appendix D.

Table 5-3 Visual impact at representative viewpoints with reference to the Tarleigh Park Solar Farm

View ID	Viewing opp.	Scenic quality	Proximity	Sensitivity	LMZ	Objective	Contrast	Visual Impact
1	Road	Moderate	Middle ground	Low	C	Landscapes are able to absorb change. Developments may be allowed to dominate but should reflect existing forms and colours where possible.	Indistinct	No impact The proposal would not be visible from road users of the Riverina Highway due to the high bank of the Murray Irrigation Channel which blocks views to the south.
2	Road	Moderate	Middle ground	Low	C	Landscapes are able to absorb change. Developments may be allowed to dominate but should reflect existing forms and colours where possible.	Low	Low impact Users of Parfreys Road at this location would have distant filtered views of the proposal. Reducing visual impacts is not considered necessary for this viewpoint.
3	Road	Moderate	Foreground	Low	C	Landscapes are able to absorb change. Developments may be allowed to dominate but should reflect existing forms and colours where possible.	Low	Low impact A photomontage is provided in Appendix E. The proposal would generally be visible from Parfreys Road as road users approach the proposal site from the north. Vegetation along the road and within the adjacent farmland would absorb some of the changes. From this viewpoint around one kilometre from solar farm infrastructure, the impact would be low but it would increase when approaching the proposal site (see viewpoints 7). Parfreys Road has a low usage and is generally only used by owners of surrounding farms. The impact would be transient as road users move across this section of the road. There is an opportunity to improve screening of the solar farm by including additional screening along the northern boundary of the proposal site, if required.

View ID	Viewing opp.	Scenic quality	Proximity	Sensitivity	LMZ	Objective	Contrast	Visual Impact
4	Residence	Moderate	Middle ground	Moderate	B	Maintain existing visual amenity, where possible. Protect dominant visual features. Developments may be allowed to be visually apparent.	Low	Low Impact Considering the distance of the property (1.2 kilometres) and vegetation surrounding the property which would block views to the proposal site for occupants of the residential building, the contrast is considered to be acceptable. Reducing visual impacts is not considered necessary for this viewpoint.
5	Residence	Moderate	Middle ground	Moderate	B	Maintain existing visual amenity, where possible. Protect dominant visual features. Developments may be allowed to be visually apparent.	Low	Low Impact Considering the distance of the property (1.2 kilometres) and vegetation surrounding the property which would block views to the proposal site for occupants of the residential building, the contrast is considered to be acceptable. Reducing visual impacts is not considered necessary for this viewpoint.
6	Residence	Moderate	Middle ground	Moderate	B	Maintain existing visual amenity, where possible. Protect dominant visual features. Developments may be allowed to be visually apparent.	Low	Low Impact Considering the distance of the property (1.2 kilometres) and vegetation surrounding the property which would block views to the proposal site for occupants of the residential building, the contrast is considered to be acceptable. Reducing visual impacts is not considered necessary for this viewpoint.

View ID	Viewing opp.	Scenic quality	Proximity	Sensitivity	LMZ	Objective	Contrast	Visual Impact
7	Road	Moderate	Foreground	Low	C	Landscapes are able to absorb change. Developments may be allowed to dominate but should reflect existing forms and colours where possible.	High	Medium impact A photomontage is provided in Appendix E. The proposal would generally be visible from Parfreys Road as road users approach the proposal site from the north. Along here, vegetation along the road would absorb some of the changes. Parfreys Road has a low usage and is generally only used by owners of surrounding farms. The impact would be transient as road users move across this section of the road. There is an opportunity to improve screening of the solar farm by including additional screening along the northern boundary of the proposal site, if required.
8	Road	Moderate	Foreground	Low	C	Landscapes are able to absorb change. Developments may be allowed to dominate but should reflect existing forms and colours where possible.	Moderate	Low impact This location is the proposed site entry point where the substation and other buildings would be present. There is a gap in the roadside vegetation, a gate and overhead powerlines. Parfreys Road has a low usage and is generally only used by owners of surrounding farms. The impact would be transient as road users move across this section of the road. Road side vegetation is present north and south of this viewpoint which would absorb some of the change. No additional screening is considered necessary.
9	Road	Moderate	Foreground	Low	C	Landscapes are able to absorb change. Developments may be allowed to dominate but should reflect existing forms and colours where possible.	High	Medium impact The proposal would generally be visible from Parfreys Road as road users approach the proposal site from the south. Vegetation along the road would absorb some of the changes. Parfreys Road has a low usage and is generally only used by owners of surrounding farms. The impact would be transient as road users move across this section of the road. There is an opportunity to improve screening of the solar farm by including additional screening along the southern and eastern boundary of the proposal site, if required.

View ID	Viewing opp.	Scenic quality	Proximity	Sensitivity	LMZ	Objective	Contrast	Visual Impact
10	Road	Moderate	Middle ground	Low	C	Landscapes are able to absorb change. Developments may be allowed to dominate but should reflect existing forms and colours where possible.	Low	Low impact Due to the distance from this viewpoint and large areas of remnant vegetation between the solar farm and the viewpoint, the proposal would only have distant and filtered views. Reducing visual impacts is not considered necessary for this viewpoint.
11	Residence	Moderate	Middle ground	Moderate	B	Maintain existing visual amenity, where possible. Protect dominant visual features. Developments may be allowed to be visually apparent.	Low	Low impact Considering the distance of the property (1.2 kilometres) and vegetation surrounding the property which would block views to the proposal site for occupants of the residential building, the contrast is considered to be acceptable. Reducing visual impacts is not considered necessary for this viewpoint.
12	Road	Moderate	Foreground	Low	C	Landscapes are able to absorb change. Developments may be allowed to dominate but should reflect existing forms and colours where possible.	Low	Low impact A photomontage is provided in Appendix E. Users of Warragoon Road located 850 metres to the west would have distant but unfiltered views of the proposal site due to limited vegetation on the adjacent farmland. The proposed infrastructure buildings would be located on the eastern side of the proposal site, 2.4 kilometres from the road, reducing the visual impact. The low height of the solar panels (maximum 3 metres) and distance to the road would reduce impacts to an acceptable level. The impact would be transient as road users move across this section of the road. Reducing visual impacts is not considered necessary for this viewpoint.

View ID	Viewing opp.	Scenic quality	Proximity	Sensitivity	LMZ	Objective	Contrast	Visual Impact
13	Residence	Moderate	Foreground	Moderate	B	Maintain existing visual amenity, where possible. Protect dominant visual features. Developments may be allowed to be visually apparent.	Low	Low impact Considering the distance of the property (980 metres) and vegetation surrounding the property which would block views to the proposal site for occupants of the residential building, the contrast is considered to be acceptable. Reducing visual impacts is not considered necessary for this viewpoint.
14	Road	Moderate	Middle ground	Low	C	Landscapes are able to absorb change. Developments may be allowed to dominate but should reflect existing forms and colours where possible.	Low	Low impact Users of Warragoon Road located 1.6 kilometres to the north west would have distant and filtered views of the proposal site. The impact would be transient as road users move across this section of the road. Reducing visual impacts is not considered necessary for this viewpoint.

5.3.1 Results summary

Medium impact – mitigation could be considered

Medium impacts are seen from Parfreys Road for vehicle and other road users approaching from the north or south, in particular in those sections of the road where there is no or limited roadside vegetation. While the impact would be transient, there is an opportunity to reduce visual impacts by providing landscaping at strategic locations along the norther site boundary and south and eastern site boundaries. A suggested screening plan has been developed (refer Appendix F) that includes screening. This is discussed further in Section 6.

Low or indistinct impacts – no mitigation

Low and indistinct impacts are seen for roads not immediately adjacent to the proposal site and for surrounding residences to the east, west and south. The short duration of views experienced from moving vehicles, distance from the proposal site, as well as existing vegetation screening around residences, ensure the views of the site will be low and acceptable in these areas without specific measures required.

5.4 CUMULATIVE IMPACTS

Adverse cumulative impacts occur when the infrastructure or activities at the proposal site exacerbate the negative impacts of other infrastructure or activities occurring nearby.

During construction, the additional traffic impact is probably the greatest potential for cumulative visual impacts. Parfreys Road is only used by a low number of vehicles and therefore there is unlikely to be a cumulative impact. The visual impact of increased traffic movements to the site would be predominantly limited to construction period. During operation, excepting unusual maintenance operations such as inverter or transformer replacement, a small maintenance team using standard vehicles are all that will be required.

Generally, adverse cumulative visual impacts are anticipated to be manageable due to the ability to effectively screen infrastructure in this low relief landscape.

5.5 GLARE, REFLECTIVITY AND NIGHT LIGHTING IMPACTS

The identified potential risk to aviation from the solar farm is glint and glare. Glint is a quick reflection that occurs when the sun is reflected on a smooth surface. Glare is a longer, sustained reflection. Infrastructure at the site that may cause glint or glare depending on the sun angle, include:

- solar panels
- metal array mounting (steel or aluminium)
- site buildings.

The potential for glint or glare associated with non-concentrating PV systems which do not involve mirrors or lenses is relatively limited. PV solar panels are designed to absorb as much solar energy as possible in order to maximise electricity generation. As such, they reflect only around 2% of the received light (Spaven Consulting 2011). The panels would also have an anti-reflective coating to further reduce the potential for glare and glint.

A comparative reflection analysis against other surfaces is shown in Figure 5-1. The figure shows that in relation to water and snow, a solar panel (with a reflectivity coating) reflects a much lower percentage of light. It has a similar reflectivity to crops/grassland. The Department of Planning (2010) discussion paper on planning for renewable energy generation confirmed that solar panels will not generally create noticeable glare compared with an existing roof or building surfaces.

For other infrastructure such as the buildings and steel support posts, impacts from glint and glare is considered minor due to their small size and low surface area. Careful design and colour schemes can further reduce any potential reflection problems.

The largest glare hazard for aviation remains the sun (Spaven 2011). The US Federal Aviation Administration (FAA) Technical Guidance for Evaluating Selected Solar Technologies on Airports (FAA 2010) cites several case studies of operating solar facilities at large airports, including Denver International, Fresno Yosemite International and Albuquerque International Sunport. In their review of the FAA policies, the US Department of Energy's National Renewable Energy Laboratory (NREL)) found that, with proper planning, solar can be successfully installed at airports with minimal or no impacts (Kandt and Romero 2014. The report notes that successful solar systems have been installed at dozens of airports worldwide, noting examples in the United Kingdom, Greece, Italy and United States ranging between 45kW and 12.5 MW capacity.

The Civil Aviation Safety Authority (CASA) has advised that, given the distance involved, the proposal is not considered to be a hazard to operations at the Deniliquin Aerodrome. In line with CASA advice, local agricultural aerial services companies have been advised of the nature and location of the proposal, including Field Air, Deniliquin Ag Operations, Woorayl Air Services, Riverina Crop Care and Agflite. Paul Thomas, Field Air Operations Manager for Deniliquin and Hay attended the community consultation events at Blighty and Deniliquin and has also been directly consulted by the proponent. Field Air indicated that the solar farms would be marked on company mapping and would not impact on Field Air operations. Woorayl Air Services advised that their business is centred on the western region of Deniliquin and their operation would not be affected by the solar farm.

Impacts of glint and glare on aviation as a result of the solar farm infrastructure are considered to be minor and can be effectively managed with the implementation of the mitigation measure outlined below.

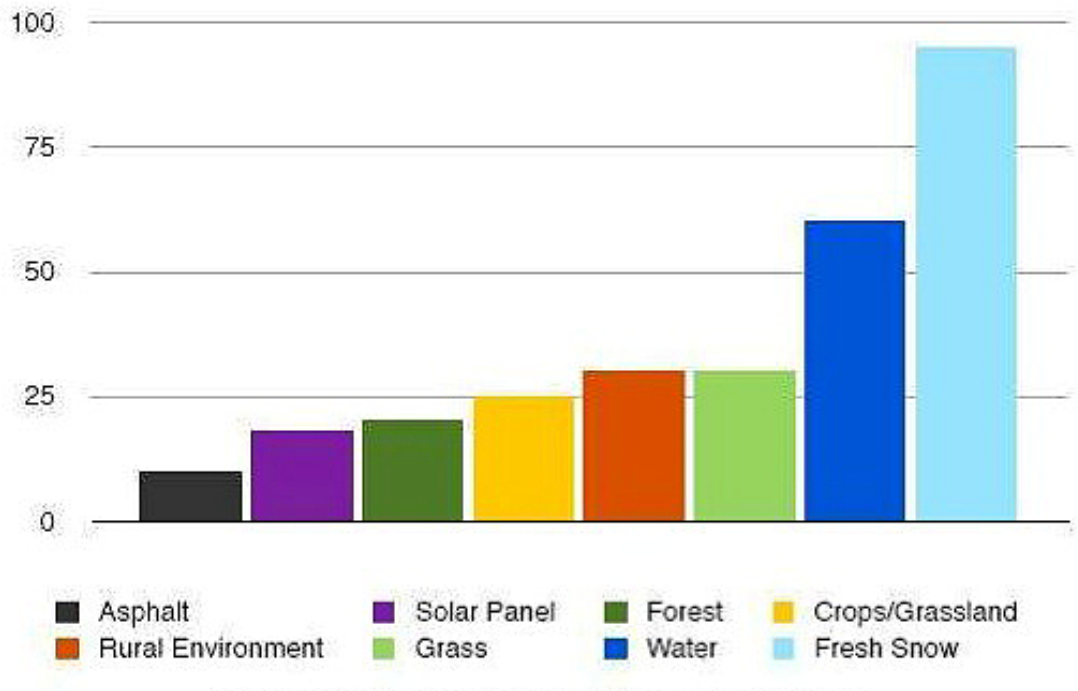


Figure 5-1 Comparative reflection analysis (Spaven 2011)

6 MITIGATION MEASURES

A Landscape Management Plan is recommended to address the 'as built' visual impacts of the proposed solar farm. The plan would include:

- Onsite vegetation screening for viewers for which a medium impact is confirmed following construction of the solar farm (refer to verification process below). This would be aimed at 'breaking up' not blocking views of onsite infrastructure.
- General methods to reduce visual impact. This would centre on the colour, form and positioning of infrastructure, to reduce the overall visual contrast of the project.
- A process for verification of predicted and actual impacts. This would improve the reliability of the measures and provide a trigger to undertake additional mitigation if required.

These measures are outlined below. They are considered feasible, in that the proponent has agreed the measures can be implemented as part of the proposal. They are considered effective, as the measures would be implemented nearing completion of construction and in consultation with affected landholders (where relevant). It is noted that vegetation screens can take time to grow, grow differently than expected or expire before effective height is achieved. This has been considered in the development of the mitigation measures. Furthermore, the as built infrastructure may differ from that assessed in this report, predicted impacts may be found to be different to actual impacts. For this reason, a verification process is included in the plan.

6.1 SCREENING

6.1.1 Screen location

A suggested onsite planting layout is provided in Appendix F. This would be confirmed nearing completion of construction and in consultation with property owners to the east and south.

6.1.2 Screen requirements

- Planting would be more than one row deep and be located on the outside of the security fence, so that it breaks up views of the fencing as well as onsite infrastructure. The final location of planting and density would be undertaken following verification of actual impacts.
- The plant species to be used in the screen are to be native and consistent with existing vegetation types on the proposal site. They should be fast growing, with spreading habitat. Species selection should be undertaken in consultation with a botanist.
- Vegetation should include a high shrub layer which would provide a more effective visual screen compared to trees as the panels would be maximum 3 metres high. Where feasible, plants selected should be of adequate size when initially planted to allow immediate effect as a visual screen.
- The timing is recommended to be close to completion of construction so that actual and not predicted impacts of infrastructure are mitigated.
- The screen would be maintained for the operational life of the solar farm. Dead plants would be replaced. Pruning and weeding would be undertaken as required to maintain the screens visual amenity and effectiveness in breaking up views.

It is noted that the aim of plant screens is to break up the view and not eliminate it entirely. Partial views are considered likely, particularly while vegetation is developing to maturity.

6.2 GENERAL MEASURES

The following measures are recommended to reduce the general visual impact of the development for all other receivers:

6.2.1 Design

- Solar Farm infrastructure should be reduced in height as far as practicable.
- The materials and colour of onsite infrastructure will, where practical, be non-reflective and in keeping with the materials and colouring of existing infrastructure or of a colour that will blend with the landscape. Where practical:
    - Buildings and other infrastructure will be non-reflective and in eucalypt green, beige or muted brown.
    - Mounting systems for the solar arrays will be non-reflective.
    - Security fencing posts and wire would be non-reflective; green or black rather than grey would reduce the industrial character of the fence.

6.2.2 Construction

- During construction, dust must be controlled.
- Parking areas, material stock piles and other construction activities would be located as far as practical from nearby residences and roads or screened (by existing vegetation) for the period of construction.
- Areas of soil disturbed by the project would be rehabilitated progressively or immediately post-construction, reducing views of bare soil.
- Ground cover would be maintained beneath the panels and within the site boundary, to break up views of the infrastructure from the side view.
- Night lighting would be minimised to the maximum extent possible (i.e. manually operated safety lighting at main component locations).

6.3 VERIFICATION OF ACTUAL IMPACTS

A verification process would be implemented close to the completion of the construction phase. A Visual Verification Report and Landscape Plan would:

- Confirm the assumptions of this assessment by ground based assessment and ensure medium impacts are mitigated.
- Finalise the location and species for proposed screening, in consultation with nearest affected landholders.
- Detail planting methods and maintenance requirements of the screen planting.

7 CONCLUSION

This report has been prepared to assess the potential visual impacts of the proposed Tarleigh Park SF. A systematic evaluation has been undertaken to address subjectivity as much as possible. The report was informed by background investigations, mapping and modelling, field survey including reconnaissance, ground truthing and photography and the results of project-specific community consultation.

The proposed Tarleigh Park SF would be located in an agricultural area of generally medium scenic quality. The visual characteristics of this rich farming land are important to members of the local community. The solar farm site is located next to one local road. Residential properties are located about one kilometre away at their closest point. A low to medium impact was determined for these receivers as existing vegetation on the proposal site and in surrounding land and the transient nature of impacts for road users would partially minimise impacts. This existing vegetation in the locality would screen the proposal from sensitive receivers beyond two kilometres.

General measures to reduce impacts for all receivers have also been recommended. These centre on use of design elements to reduce visual contrast, mitigation of construction impacts such as dust that may reduce visual amenity and mitigation of operation impacts, such as maintaining ground cover beneath the panels, to break up side on views of infrastructure and soften the appearance of the facility.

Large scale solar panels are still relatively new in Australia. While they enjoy support from many in the community, provision of information on expected visual impacts and involvement in mitigating impacts (for affected receivers) is considered very important to obtaining social license to operate. With the proposed involvement of the affected landowners in the mitigation strategy set out in Section 6, the visual impacts of the proposal are considered acceptable and manageable.

8 REFERENCES

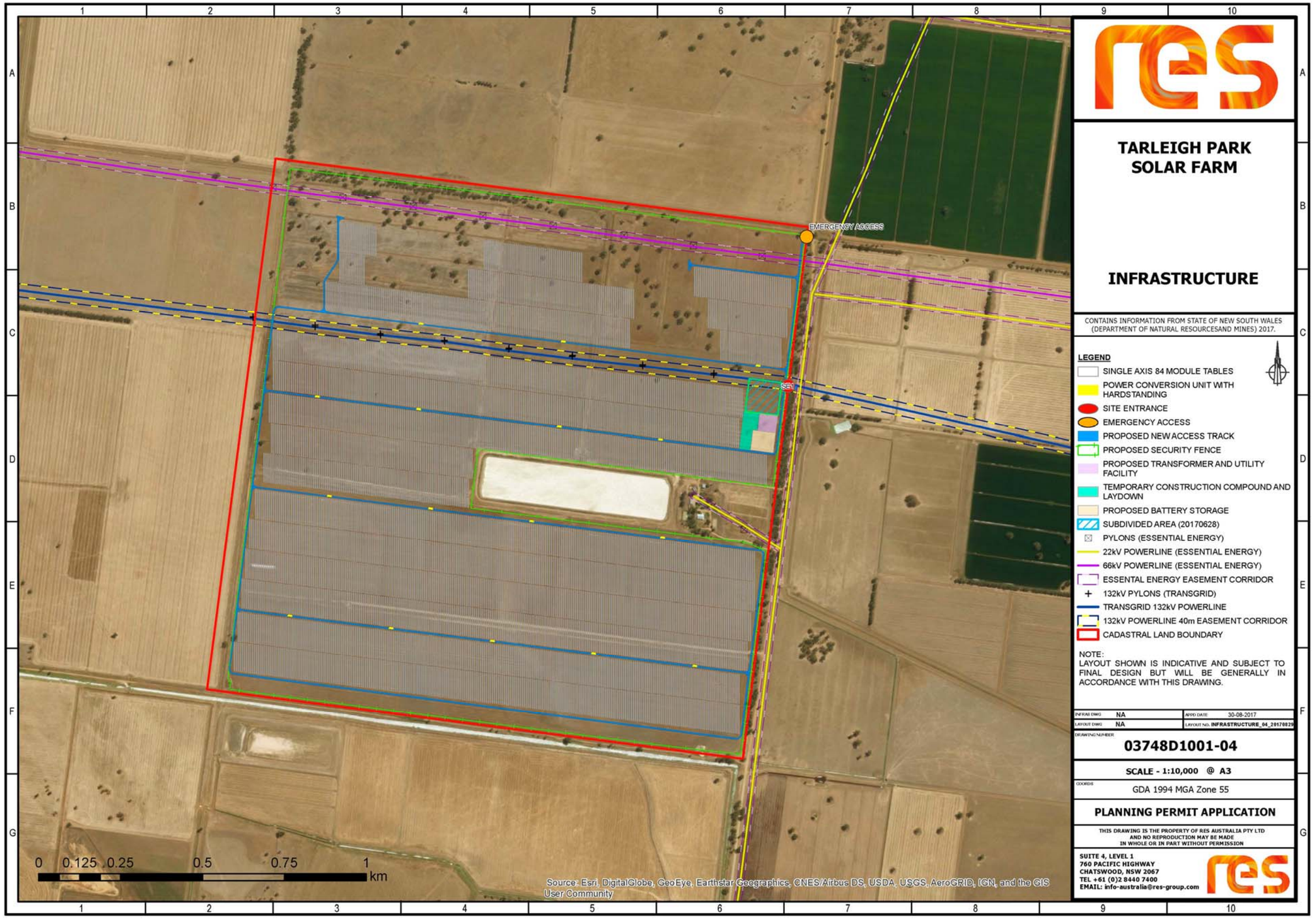
Australian Renewable Energy Agency (ARENA) no date. Establishing the social licence to operate large scale facilities in Australia; insights from social research for industry.

BLM (n.d.) BLM Visual Resource Management System. Available online from the Bureau of Land Management, US Department of the Interior. (www.blm.gov)

NSW Department of Planning (2010). Discussion Paper On Planning For Renewable Energy Generation - Solar Energy, prepared April, 2010.

Spaven Consulting (2011). Solar Photovoltaic Energy Facilities: Assessment of potential for impact on aviation. Report prepared January 2011, for RPS Planning and Development.

APPENDIX A PROPOSED INFRASTRUCTURE LAYOUT


EMERGENCY ACCESS
SS1
0 0.125 0.25 0.5 0.75 1 km
Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community
TARLEIGH PARK SOLAR FARM
INFRASTRUCTURE
CONTAINS INFORMATION FROM STATE OF NEW SOUTH WALES (DEPARTMENT OF NATURAL RESOURCESAND MINES) 2017.
LEGEND
SINGLE AXIS 84 MODULE TABLES
POWER CONVERSION UNIT WITH HARDSTANDING
SITE ENTRANCE
EMERGENCY ACCESS
PROPOSED NEW ACCESS TRACK
PROPOSED SECURITY FENCE
PROPOSED TRANSFORMER AND UTILITY FACILITY
TEMPORARY CONSTRUCTION COMPOUND AND LAYDOWN
PROPOSED BATTERY STORAGE
SUBDIVIDED AREA (20170628)
PYLONS (ESSENTIAL ENERGY)
22kV POWERLINE (ESSENTIAL ENERGY)
66kV POWERLINE (ESSENTIAL ENERGY)
ESSENTAL ENERGY EASEMENT CORRIDOR
132kV PYLONS (TRANSGRID)
TRANSGRID 132kV POWERLINE
132kV POWERLINE 40m EASEMENT CORRIDOR
CADASTRAL LAND BOUNDARY
NOTE:
LAYOUT SHOWN IS INDICATIVE AND SUBJECT TO FINAL DESIGN BUT WILL BE GENERALLY IN ACCORDANCE WITH THIS DRAWING.
INFRAS DWG NA
APPD DATE 30-08-2017
LAYOUT DWG NA
LAYOUT No. INFRASTRUCTURE_04_20170829
DRAWING NUMBER
03748D1001-04
SCALE - 1:10,000 @ A3
COORDS
GDA 1994 MGA Zone 55
PLANNING PERMIT APPLICATION
THIS DRAWING IS THE PROPERTY OF RES AUSTRALIA PTY LTD AND NO REPRODUCTION MAY BE MADE IN WHOLE OR IN PART WITHOUT PERMISSION
SUITE 4, LEVEL 1
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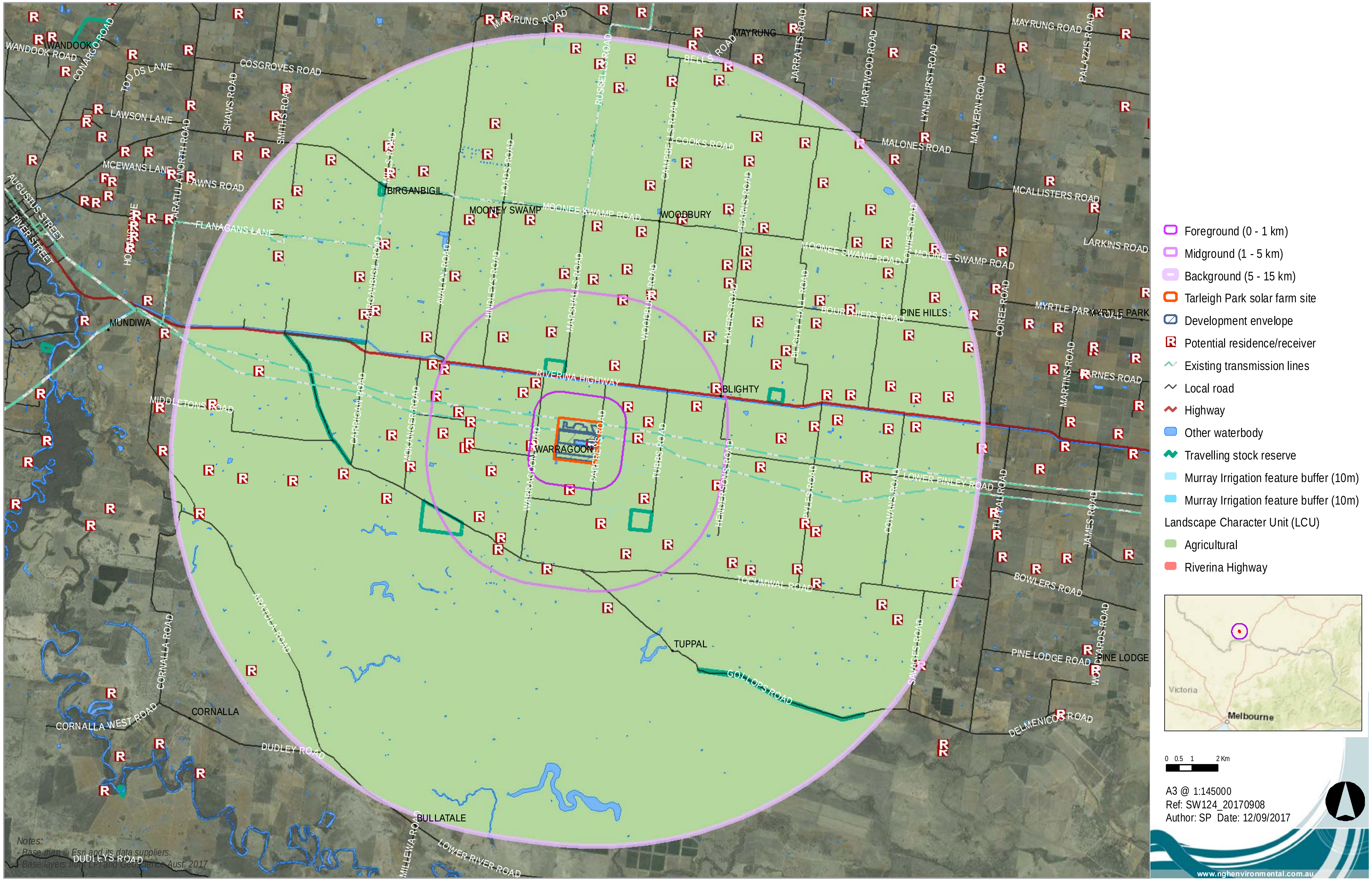
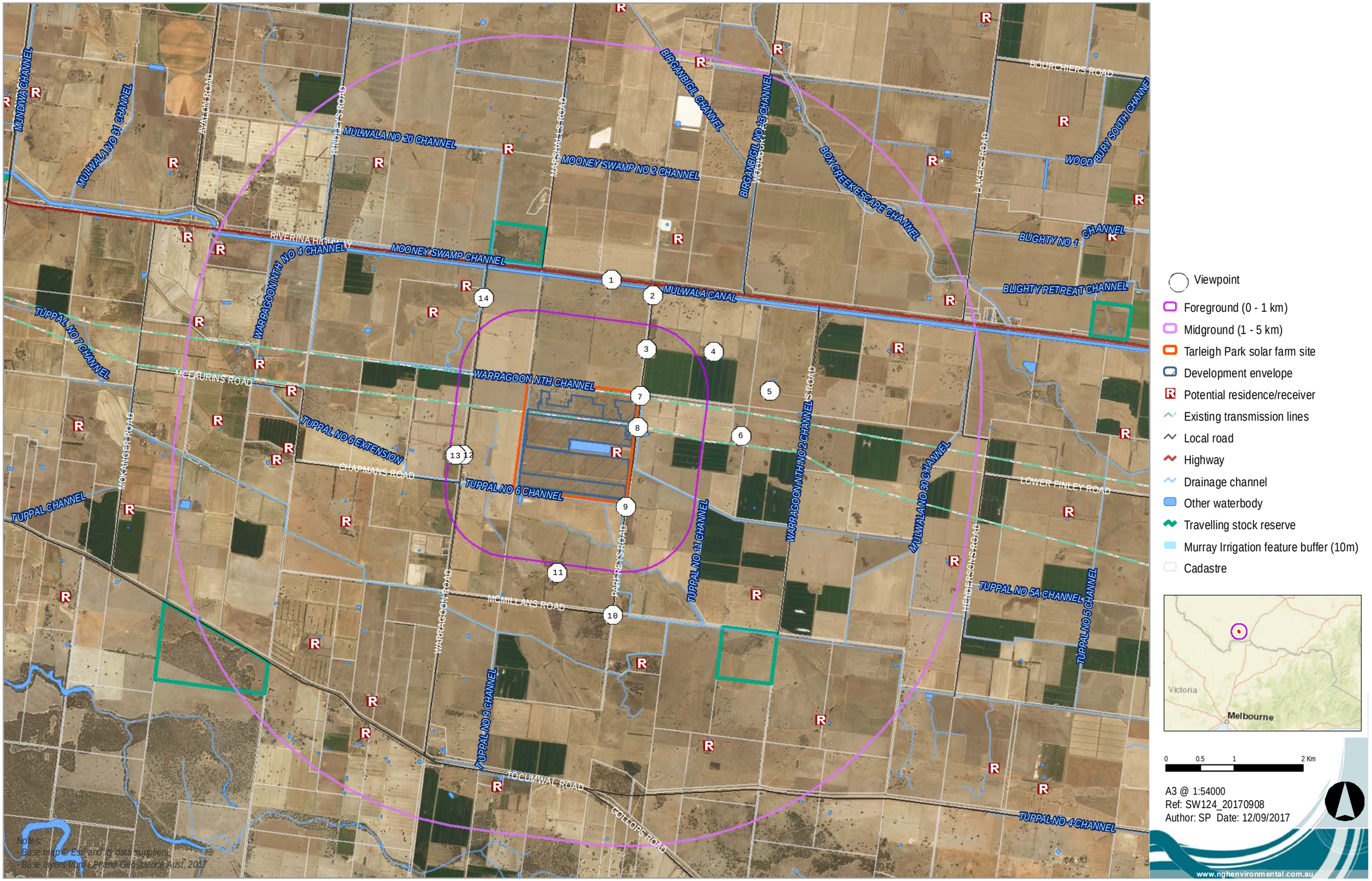
CHATSWOOD, NSW 2067
TEL +61 (0)2 8440 7400
EMAIL: info-australia@res-group.com

APPENDIX B LANDSCAPE CHARACTER UNITS



ngh environmental

APPENDIX C REPRESENTATIVE VIEW POINTS


MUNDWA CHANNEL
MULWALA NO 31 CHANNEL
AVALON ROAD
HINDLEYS ROAD
MULWALA NO 20 CHANNEL
MARSHALLS ROAD
MOONEY SWAMP NO 2 CHANNEL
BIRGANBIGIL CHANNEL
BIRGANBIGIL NO 13 CHANNEL
BOX CREEK ESCAPE CHANNEL
BOURCHIERS ROAD
LAKERS ROAD
WOOD
BURY SOUTH CHANNEL
BLIGHTY NO 1 CHANNEL
RIVERINA HIGHWAY
MOONEY SWAMP CHANNEL
WARRAGOON NTH NO 4 CHANNEL
MULWALA CANAL
BLIGHTY RETREAT CHANNEL
TUPPAL NO 7 CHANNEL
MCLAURINS ROAD
WARRAGOON NTH CHANNEL
TUPPAL NO 6 EXTENSION
CHAPMANS ROAD
TUPPAL NO 6 CHANNEL
MCKANGER ROAD
TUPPAL CHANNEL
PARFREYS ROAD
TUPPAL NO 11 CHANNEL
WARRAGOON NTH NO 2 CHANNEL
MULWALA NO 33 CHANNEL
LOWER FINLEY ROAD
HENDERSONS ROAD
TUPPAL NO 5A CHANNEL
TUPPAL NO 5 CHANNEL
WARRAGOON ROAD
MCMILLANS ROAD
TUPPAL NO 9 CHANNEL
TOCUMWAL ROAD
GOLLOPS ROAD
TUPPAL NO 4 CHANNEL
1
2
3
4
5
6
7
8
9
10
11
12
13
14
Viewpoint
Foreground (0 - 1 km)
Midground (1 - 5 km)
Tarleigh Park solar farm site
Development envelope
Potential residence/receiver
Existing transmission lines
Local road
Highway
Drainage channel
Other waterbody
Travelling stock reserve
Murray Irrigation feature buffer (10m)
Cadastre
Victoria
Melbourne
0
0.5
1
2 Km
A3 @ 1:54000
Ref: SW124_20170908
Author: SP Date: 12/09/2017
www.nghenvironmental.com.au
Notes:
- Base map © Esri and its data suppliers
- Base layers from LPI and Geoscience Aust. 2017

Key viewpoint 1 – Road. Looking south from the Riverina Highway at bank of Murray Irrigation channel.

Key viewpoint 2 – Road. Looking south from northern end of Parfreys Road.

Key viewpoint 3 – Road. Looking south from northern end of Parfreys Road.

Key viewpoint 5 – Residence. Looking south west. Proposal is not visible from residence.

Key viewpoint 7 – Road. Looking west from the north eastern corner of the proposal site

Key viewpoint 8 – Road Looking west to the proposed site entrance and location of the proposed substation, energy storage area and other buildings.

Key viewpoint 9 – Road. Looking north west from the south eastern corner of the proposal site.

Key viewpoint 10 – Road. Looking north west from the southern end of Parfreys Road.

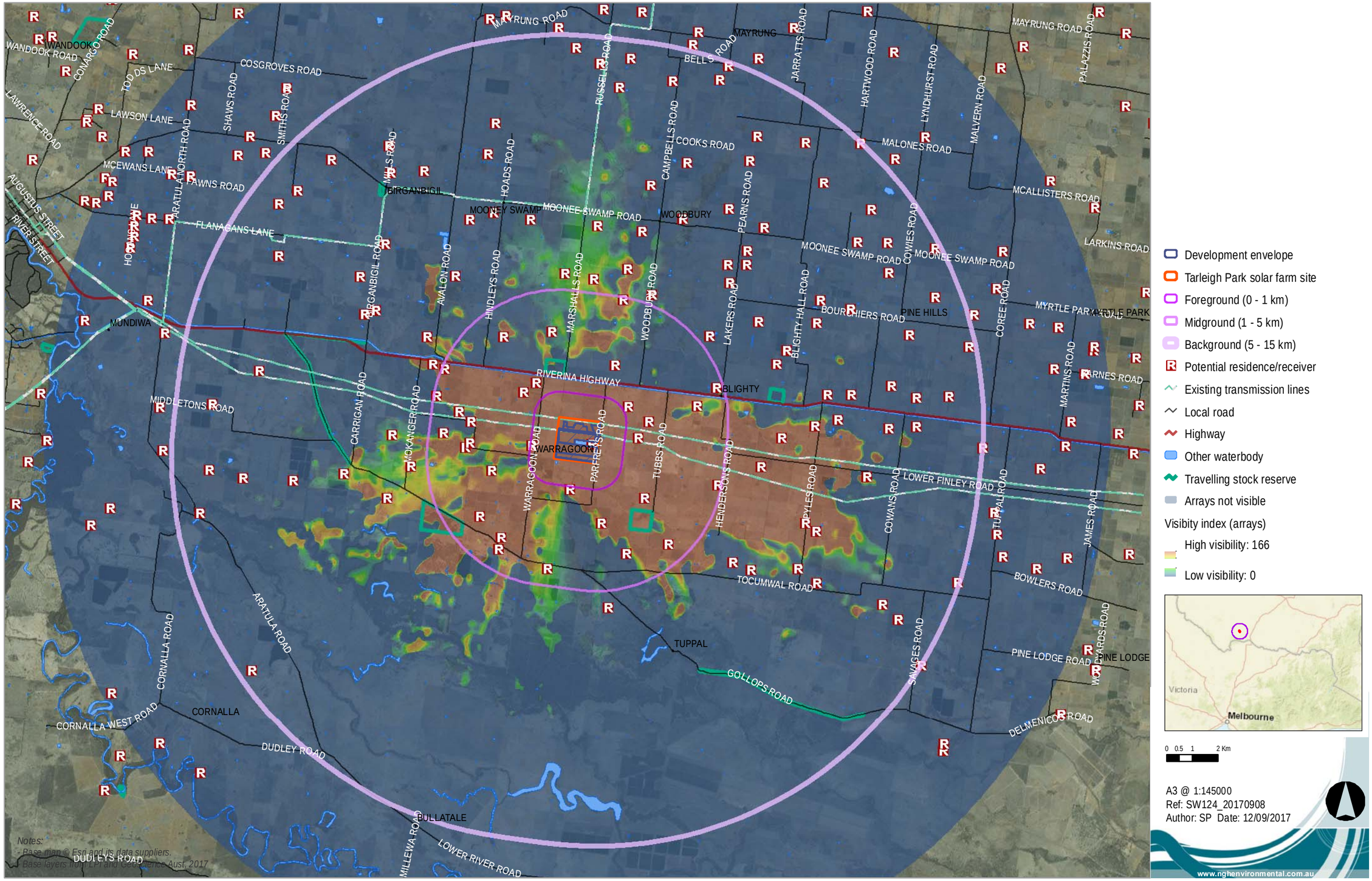
Key viewpoint 12 – Road. Looking east from Warragoon Road.

Key viewpoint 14 – Road. Looking south east. Proposal is not visible or has very filtered views.

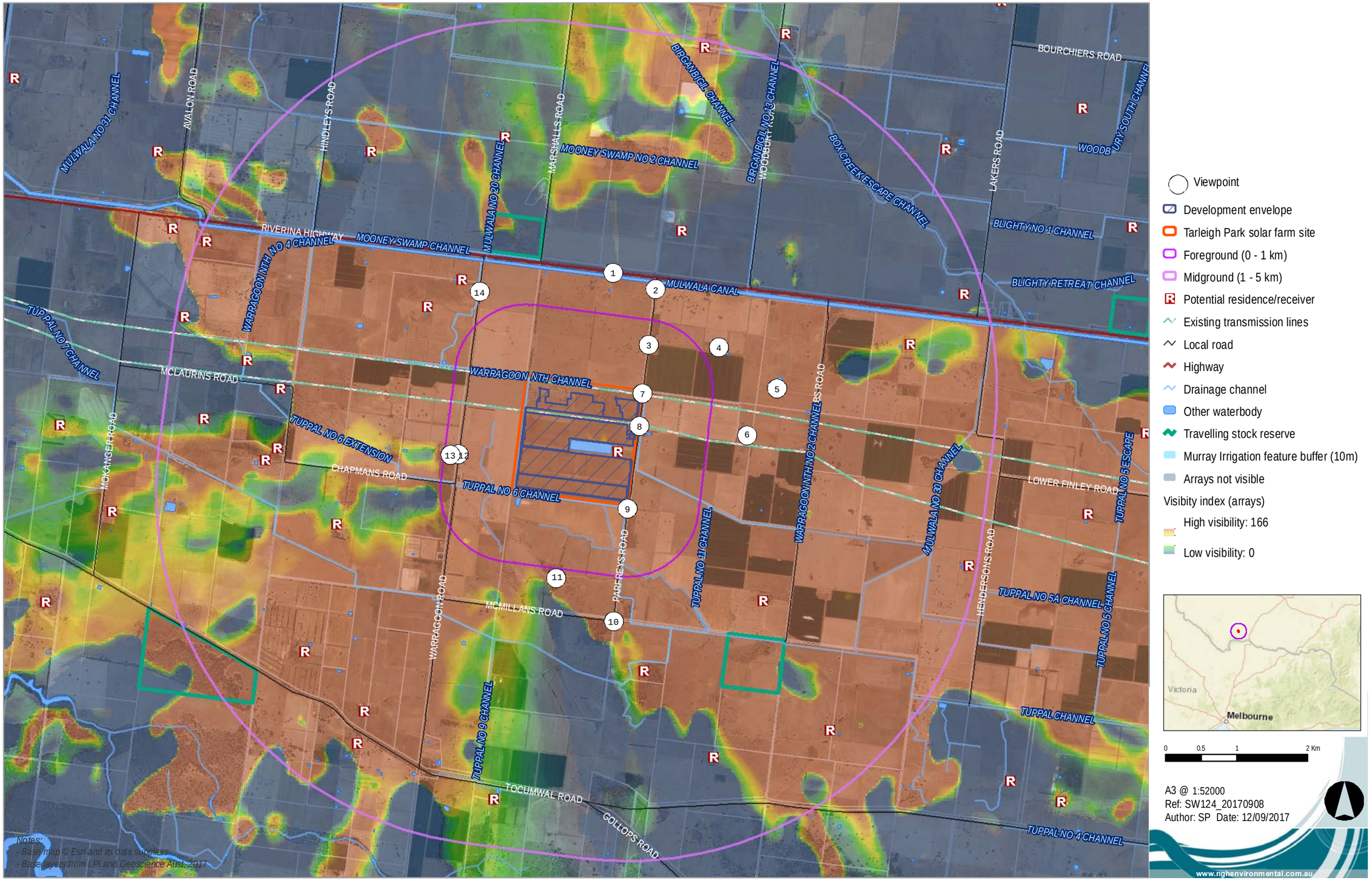
APPENDIX D ZONE OF VISUAL INFLUENCE

ZVI

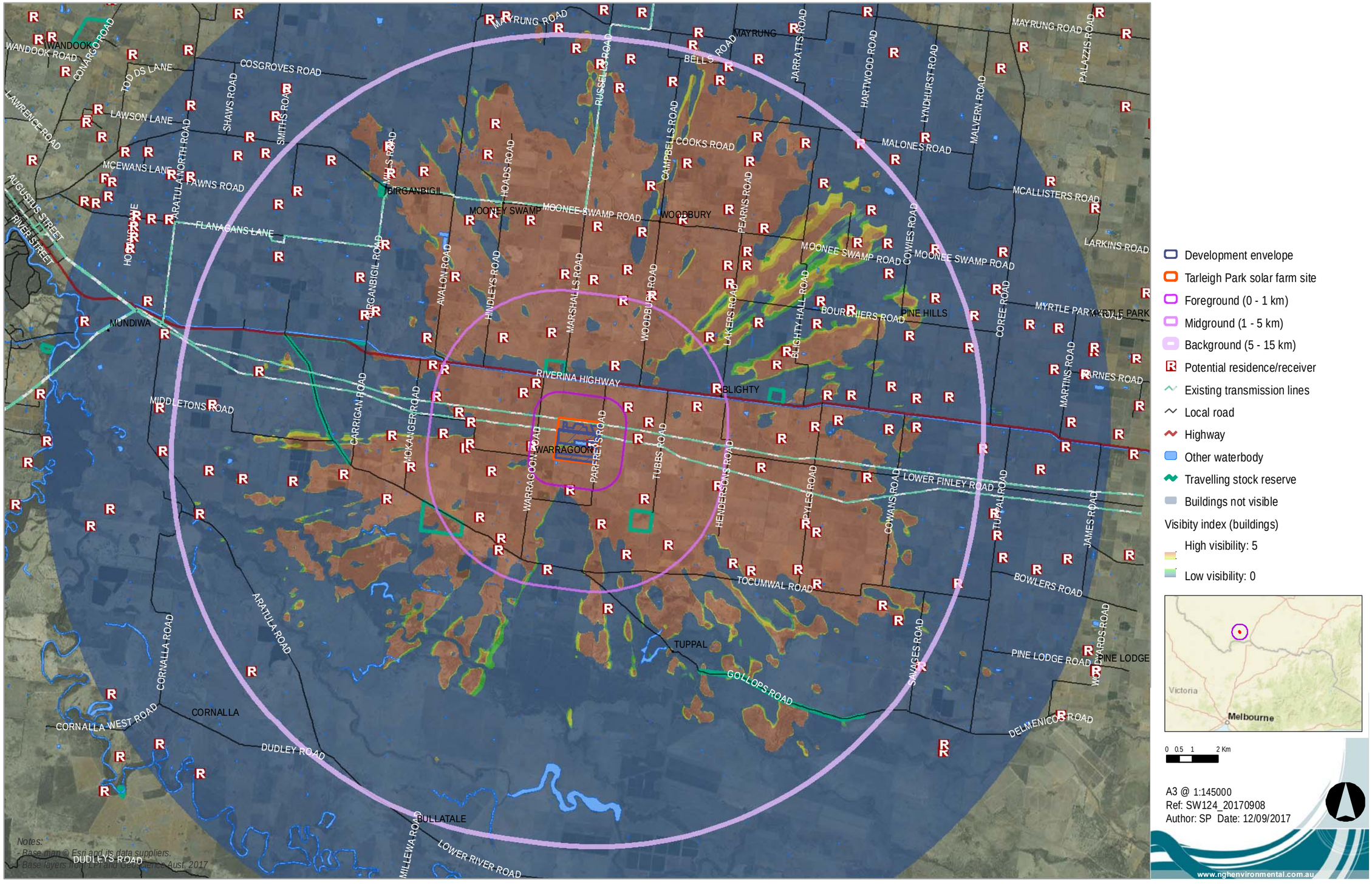
The ZVI (or viewshed) of the proposal was produced using topographic information. A height of three metres was used to model onsite infrastructure. This is realistic approximation of the height of panels. Separate viewsheds were also prepared to address buildings and other infrastructure. Topography was based on a 25m resolution Digital Elevation Model (DEM) derived from 25m contours. The ZVI takes into account some raised banks of surrounding Murray Irrigation Channels, in particular along the Riverina Highway, but not existing vegetation.



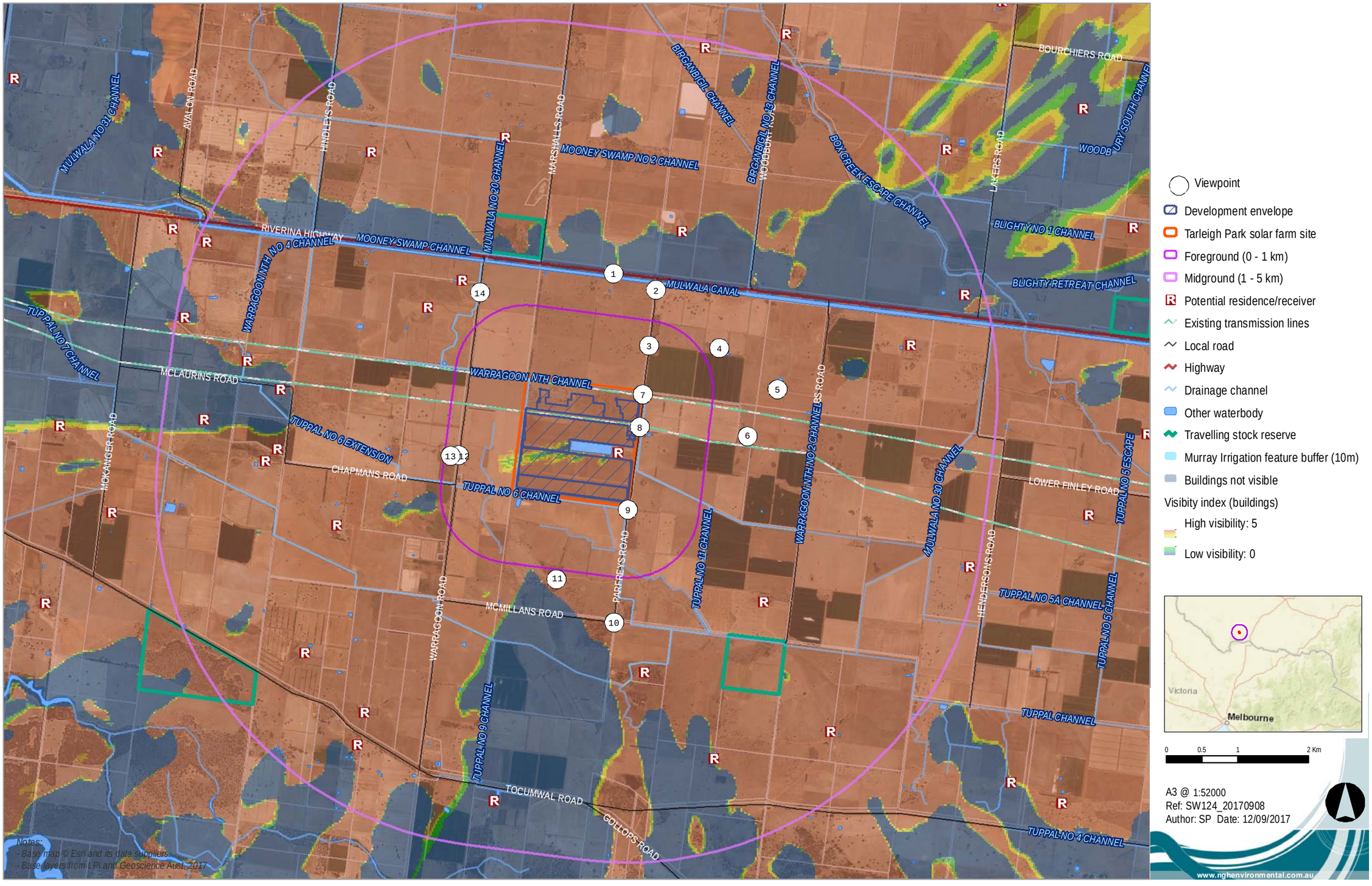
Solar array viewshed (20 kilometres from proposal site)



Solar array viewshed (5 kilometres from proposal site)



Buildings viewshed (20 kilometres from proposal site)



Buildings viewshed (5 kilometres from proposal site)

APPENDIX E PHOTOMONTAGES

The following provides montages of the solar infrastructure from various representative viewpoints.

Key viewpoint 3 – Road. Looking south from northern end of Parfreys Road.

Key viewpoint 7 – Road. Looking west from the north eastern corner of the proposal site

Key viewpoint 12 – Road. Looking east from Warragoon Road.

APPENDIX F PROPOSED ONSITE SCREENING

Screening requirements would be confirmed post construction however, sections of the site boundary that could be targeted for planting are indicated below, to mitigate impacts.


38 DP1050736
85 DP756339
1 DP128994
773 DP857448
39 DP661866
774 DP857448
WARRAGOON NTH NO 3 CHANNEL
PARFREYS ROAD
88 DP756339
R
WARRAGOON NTH CHANNEL
78 DP756339
TUPPAL NO 6 CHANNEL
46 DP756331
86 DP756339
Notes:
- Base map © Esri and its data suppliers.
- Base layers from LPI and Geoscience Aust, 2017
Tarleigh Park solar farm site
Property Vegetation Plan area
Proposed landscaping
Proposed security fence
Proposed new access track
Emergency access
Site entrance
Power Conversion Unit (PCU) with hardstanding
Proposed energy storage facility
Temporary construction compound and laydown
Proposed tracker layout block
Proposed transformer and utility facility
Transgrid subdivided area (substation)
Potential residence/receiver
Existing transmission lines
Local road
Drainage channel
Other waterbody
Murray Irrigation feature buffer (10m)
Victoria
Melbourne
0
100
200
400 m
A3 @ 1:9000
Ref: SW124_20170908
Author: SP Date: 12/09/2017
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