

# **APPENDIX E LANDSCAPE AND VISUAL IMPACT ASSESSMENT**



# LANDSCAPE AND VISUAL IMPACT ASSESSMENT

Oxley Solar Farm



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# 1.0 Introduction

## 1.1 Background

Moir Landscape Architecture have been commissioned by NGH Pty Ltd prepare a Landscape and Visual Impact Assessment (LVIA) for the proposed Oxley Solar Farm (the Project). The Oxley Solar Farm proposal site (referred to as the Site) is located on Lot 5 DP253346, Lot 6 DP625427 and part of Lot 2 DP1206469 and Lot 7004 and 7003 DP1060201 approximately 14km east of Armidale. The population of Armidale is 23,352 (ABS, 2016); it is the administrative centre for the northern tablelands region of New South Wales (Refer to **Figure 1**).

This report details the results of the field work, documents the assessment of the landscape character and visual setting, and assesses potential visual impacts associated with the Project. Survey work was undertaken during March 2020 using key viewpoints and locations with potential views towards the site.

The report also provides an overview of the proposed treatments which may be considered to assist in the mitigation of potential visual impacts. This information is provided to aid understanding of the likely impacts and how they may be managed to ensure that the positive character of the immediate area and surrounding visual landscape are not overly modified or diminished.

## 1.2 Project Requirements

The purpose of this report is to provide a qualitative and quantitative assessment of the visibility and potential visual impacts of the Project. The LVIA will support the Environmental Impact Statement (EIS) for the Project, pursuant to Part 4 of the Environmental Planning and Assessment Act 1979 (EP&A Act). The report has been prepared in accordance with the Secretary’s Environmental Assessment Requirements (SEARs) issued by the NSW Department of Planning, Industry and Environment (DPIE) which includes:

*“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 it has been developed in consultation with affected landowners.”*

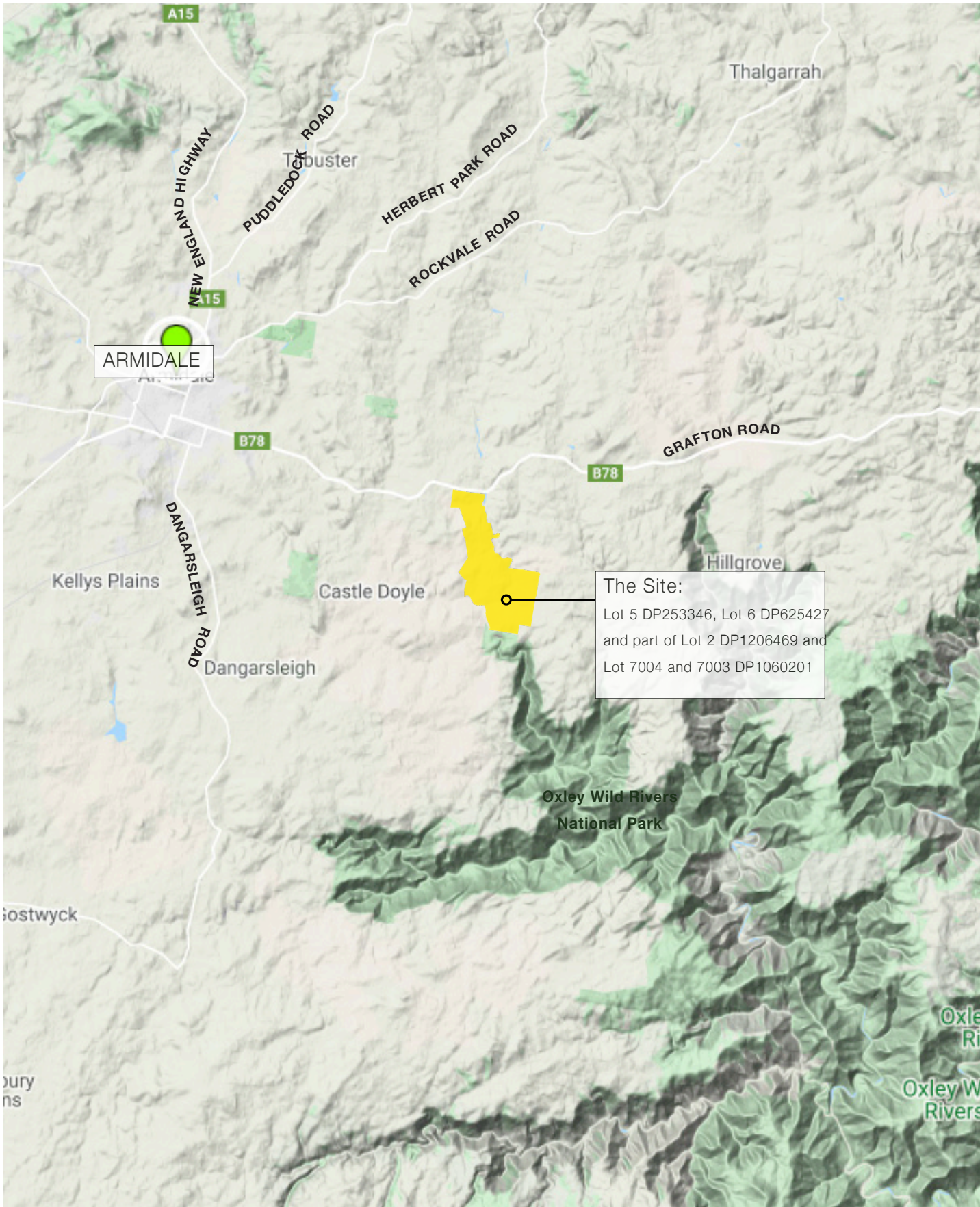


Figure 1: Site Locality Plan (Map source: Google Maps)

# 2.0 Study Method

## 2.1 Overview of the Study Method

Based on the existing policies and framework and Moir LA’s experience in large scale landscape and visual impact assessment, the following provides an overview of the study method utilised for undertaking the Landscape and Visual Impact Assessment (LVIA). The LVIA was undertaken in the stages as noted below in

Figure 2:

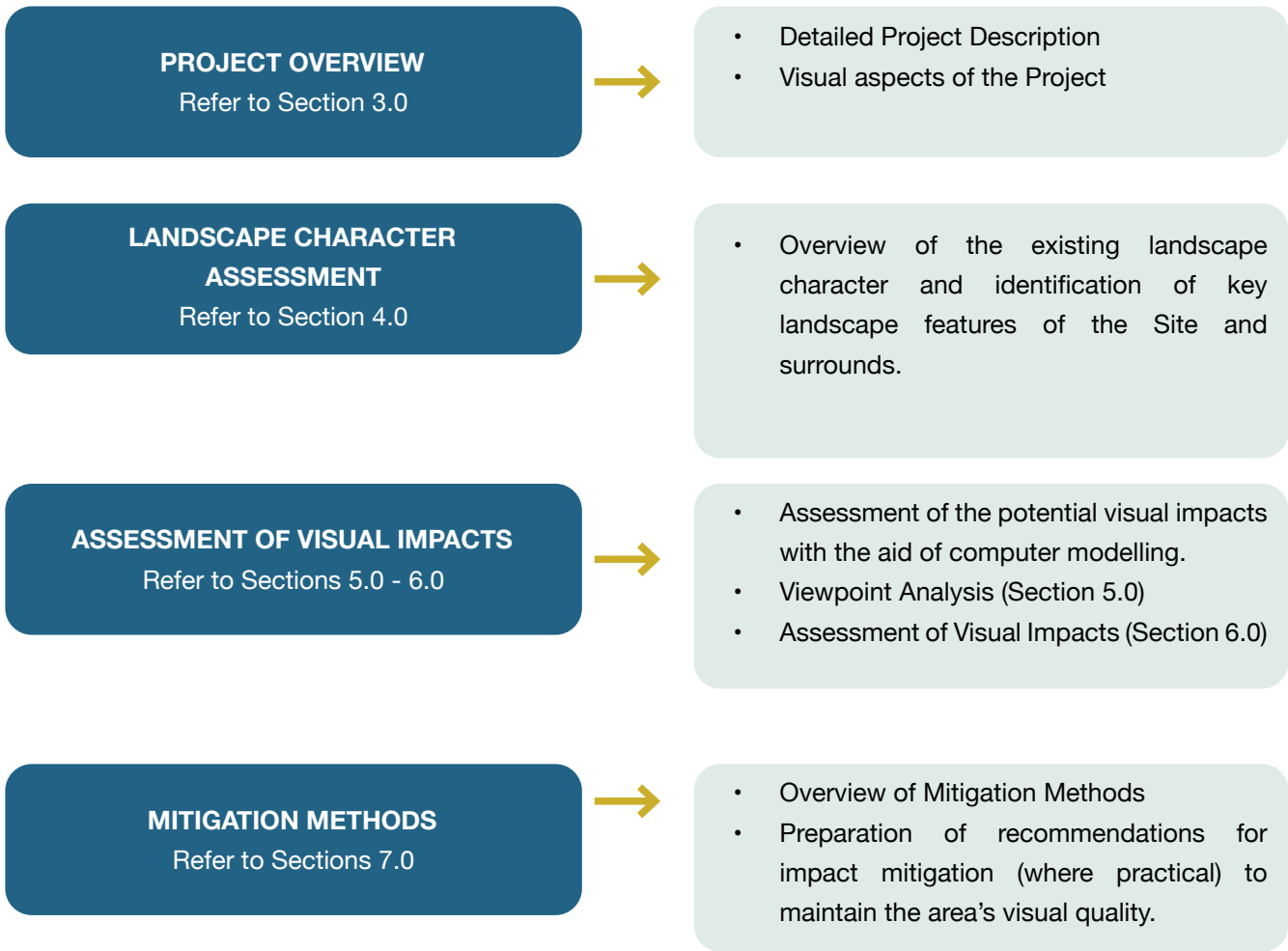


Figure 2: Study Method

## 2.2 Landscape Character Assessment

The landscape character of a site refers to the distinct and recognisable pattern of elements that occurs consistently in a particular type of landscape, and how this is perceived by people. It reflects how particular combinations of geology, landform, soils, vegetation, land use and human settlement create a particular sense of place for different areas within the landscape (The Landscape Institute and the institute of Environmental Management and Assessment, 2002).

The landscape character of the Study Area has been assessed at a regional, local and site scale. The Landscape Character Assessment is provided in **Section 4.0**.

## 2.3 Visual Impact Assessment

The potential visual impact of the Project is assessed based on the relationship between the visual sensitivity (refer to **Section 2.3.1**) and visual effect (refer to **Section 2.3.2**) see **Figure 3**:

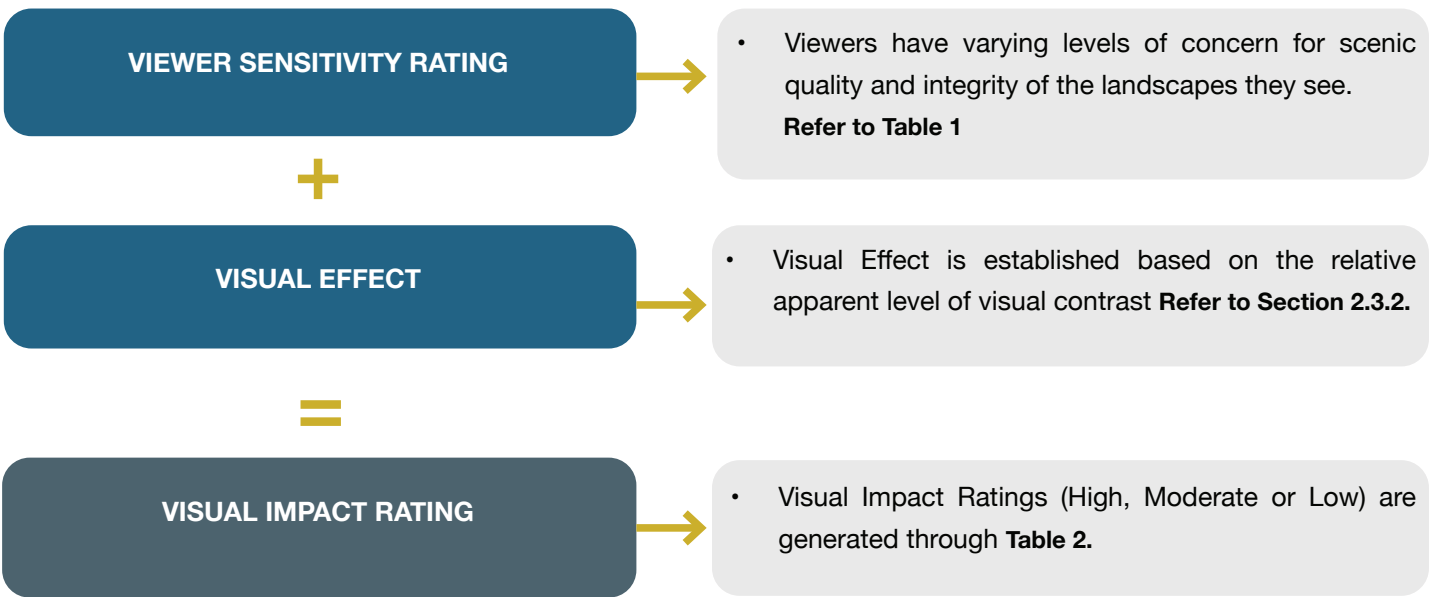


Figure 3: Visual Impact Assessment Method



## 2.0 Study Method

### 2.3.1 Visual Sensitivity

Visual sensitivity is a measure of how critically a change to the existing landscape is viewed by people from different areas. The assessment is based on the number of people affected, land use, and the distance of the viewer from the Project (EDAW, 2000).

For example, a significant change that is not frequently seen may result in a low visual sensitivity although its impact on a landscape may be high. Generally the following principles apply:

- Visual sensitivity decreases as the viewing time decreases.
- Visual sensitivity decreases as the number of potential viewers decreases.
- Visual sensitivity can also be related to viewer activity (e.g. A person viewing an affected site whilst engaged in recreational activities will be more strongly affected by change than someone passing a scene in a car travelling to a desired destination).

Sensitivity ratings are defined as high, moderate or low and are shown in the **Table 1** below (adapted from URBIS, 2009).

| VISUAL SENSITIVITY RATING |                    |          |            |           |           |
|---------------------------|--------------------|----------|------------|-----------|-----------|
|                           | DISTANCE FROM SITE |          |            |           |           |
| LANDUSE                   | 0-1 km             | 1-2 km   | 2 - 4.5 km | 4.5 -7 km | > 7 km    |
| Townships                 | HIGH               | HIGH     | HIGH       | MODERATE  | LOW       |
| Recreational Reserve      | HIGH               | HIGH     | HIGH       | MODERATE  | LOW       |
| Homestead                 | HIGH               | HIGH     | HIGH       | MODERATE  | LOW       |
| Rural Township            | HIGH               | HIGH     | MODERATE   | LOW       | NIL - LOW |
| Main Highway              | MODERATE           | MODERATE | LOW        | LOW       | NIL - LOW |
| Local Roads               | MODERATE           | MODERATE | LOW        | LOW       | NIL - LOW |
| Farm Road                 | LOW                | LOW      | NIL - LOW  | NIL - LOW | NIL       |
| Agricultural Land         | LOW                | LOW      | NIL - LOW  | NIL - LOW | NIL       |

**Table 1:** Visual Sensitivity Rating Table (Adapted from Urbis, 2009)

### 2.3.2 Visual Effect

Visual effect is defined as the interaction between a Project and the existing visual environment. It is often expressed as the level of visual contrast of the proposal against its setting or background in which it is viewed.

**Low level:** occurs when a proposal blends in with its existing viewed landscape due to a high level of integration of one or several of the following: form, shape, pattern, line, texture or colour. It can also result from the use of effective screening ie. Topography and vegetation.

**Moderate level:** occurs where a Project is visible and contrasts with its viewed landscape however, there has been some degree of integration (e.g. Good siting principles employed, retention of significant existing vegetation, provision of screen landscaping, appropriate colour selection and/or suitably scaled development).

**High level:** results when a Project has a high visual contrast to the surrounding landscape with little or no natural screening or integration created by vegetation or topography.

### 2.3.3 Visual Impact

Visual impact refers to the change in appearance of the landscape as a result of development. (EPHC, 2010). Visual impact is the combined effect of visual sensitivity and visual effect. Various combinations of visual sensitivity and visual effect will result in high, moderate and low overall visual impacts as suggested in **Table 2** below (URBIS, 2009).

| VISUAL IMPACT RATING |          |                 |                 |                 |
|----------------------|----------|-----------------|-----------------|-----------------|
|                      |          | VISUAL EFFECT   |                 |                 |
|                      |          | HIGH            | MODERATE        | LOW             |
| VISUAL SENSITIVITY   | HIGH     | HIGH IMPACT     | HIGH IMPACT     | MODERATE IMPACT |
|                      | MODERATE | HIGH IMPACT     | MODERATE IMPACT | LOW IMPACT      |
|                      | LOW      | MODERATE IMPACT | LOW IMPACT      | LOW IMPACT      |

**Table 2:** Visual Impact Rating Table (Adapted from Urbis, 2009)

# 2.0 Study Method

## 2.4 Guidelines and Statutory Framework

There are no specific guidelines for the development of solar farms, other than SEARS in NSW. The following provides an overview of the guidelines, relevant frameworks and considerations of authorities utilised to form the methodology for this visual impact assessment.

### 2.4.1 Armidale Regional Council

The project site is located within Armidale Regional Council LGA. The Site is zoned RU1 Primary Production under the *Armidale Dumaresq Local Environmental Plan 2012*. The project is broadly consistent with the objectives of the RU1 zone.

The objectives are:

- To encourage sustainable primary industry production by maintaining and enhancing the natural resource base.
- To encourage diversity in primary industry enterprises and systems appropriate for the area.
- To minimise the fragmentation and alienation of resource lands.
- To minimise conflict between land uses within this zone and land uses within adjoining zones.
- To allow for non-agricultural land uses that will not restrict the use of other land in the locality for agricultural purposes.

### 2.4.2 Office of Environment and Heritage

The Site is bounded to the south by Oxley Wild Rivers National Park. Consideration for development adjoining OEH lands is outlined in the *Guidelines for developments adjoining land managed by the Office of Environment and Heritage*. These guidelines provide general information on NPWS’s expectations in relation to development that has the potential to impact NPWS lands. The guidelines in relation to visual amenity are as follows:

**Aim:**

*There is no reduction of amenity on OEH land due to adjacent development.*

**Risks to OEH land:**

*These impacts may particularly affect native fauna species (for example, noise, vibration and lighting may disrupt foraging and breeding habits). They may also adversely affect the use and public enjoyment of walking trails, camping and picnic areas.*

**Recommended approach:**

*Planning authorities should take into account the visual (including lighting), noise, odour and air quality impacts of development adjacent to OEH land to ensure that it is sympathetic with natural and cultural heritage values, and does not impact upon amenity or public enjoyment of the land.*

*Planning authorities should consider whether it is appropriate to apply control measures, such as land-scaping with local native plant species, implementing buffer areas, limiting hours of operation, and use of appropriate colours, building materials, lighting and height controls. Some types of developments, such as quarries and road works, can result in particularly significant impacts (for example noise and dust). Large-scale developments of this type are likely to need detailed site-specific management plans.*

*OEH land should not be considered as a buffer zone between a development and other surrounding uses (such as residential areas).*

# 3.0 Project Overview

## 3.1 Project Overview

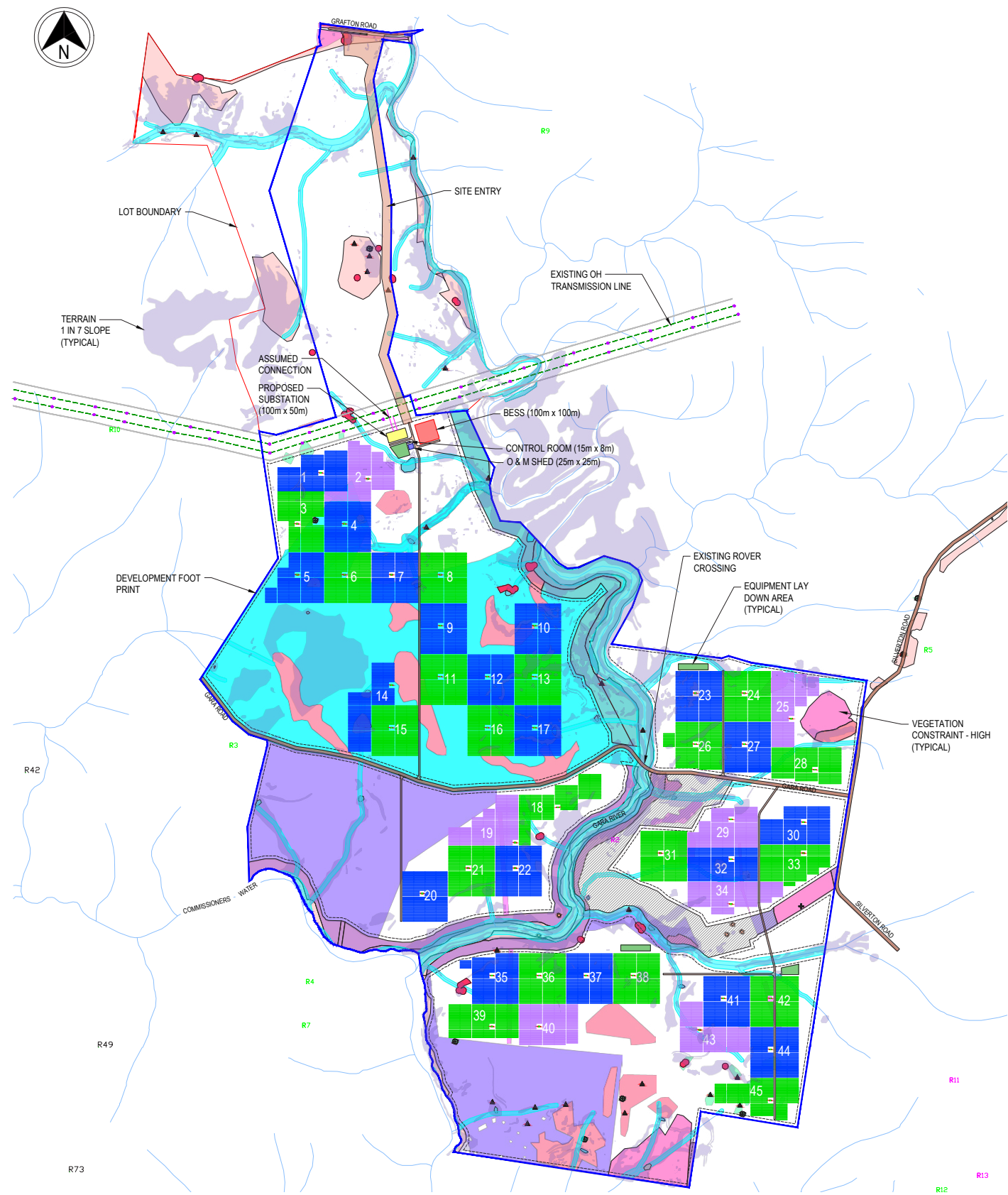
The Oxley Solar Farm Project (referred to as the Project) would involve the construction, operation and decommissioning of a photovoltaic (PV) solar array farm with a capacity of up to 225MW (AC) that would supply electricity to the national electricity grid. The proposed site is a maximum of about 1000 ha with the area of PV panels and associated infrastructure likely to occupy 895 ha of this area. This would include a battery storage facility with a proposed storage capacity of 30 MWh (i.e. 30 MW power output for one hour).

A 132 kV substation would be constructed in the vicinity of the existing 132 kV transmission lines. The exact connection method will be subject to further feasibility assessment. It is anticipated that the proposed solar farm would include development of the following infrastructure:

- Construction laydown and parking areas.
- PV modules.
- Inverter stations.
- An energy storage facility consisting of lithium ion batteries of a storage capacity up to 30 MWh (i.e. 30 MW power output for one hour). This would be housed in a purpose built building or within dedicated containers located in a secure compound close to the substation.
- Site office and maintenance building with associated car park.
- Internal access tracks to allow for site maintenance.
- Approximately 100 to 200 metres (depending on grid connection method) of overhead high voltage transmission lines to connect to the grid.
- Overhead lines and Underground electrical conduits and cabling to connect the arrays.
- Access track intersection treatments and upgrades, as determined by further traffic investigations.
- Water crossings for internal vehicle access tracks, where required, in accordance with the Guidelines for Watercourse Crossings on Waterfront Land.
- Vegetation planting to provide visual screening for specific viewers, if required.

The Project’s site boundaries are illustrated in **Figure 4**. An indicative layout would be informed by detailed site investigations during the assessment, planning and design stage.

The Project would be expected to operate for 30 years. The construction phase of the Project would take around 12 to 18 months. After the initial 30 year operating period, the solar farm would either be decommissioned, removing all above ground infrastructure and returning the site to its existing land capability, or re-purposed with new PV equipment subject to technical and planning consents. The Project would have an estimated capital investment of over \$348 million (inclusive of approximately \$30 million for the battery storage component). A CIV report would be prepared during the EIS process as part of the Project which would confirm the capital investment cost.



**Figure 4:** The Project (Source: NGH)



# 3.0 Project Overview

| Project Element                      | Description  |
|--------------------------------------|--|
| Capacity                             | Approximately 225MW (AC).  |
| Project site area                    | Approximately 1048ha.  |
| Development footprint area           | Approximately 895ha.   |
| Solar array                          | Number of panels: approximately 715,000<br>Area of panels: approximately 2,697,830m2<br>Row spacing: approximately 6m.<br>Height: 3 – 4m (less if fixed).  |
| Substation                           | Approximately 6ha.<br>132kV outdoor substation.<br>2 x 132/33kV transformers and associated infrastructure.<br>Maximum height of 6m subject to final design  |
| Battery storage                      | Located within the northern portion of the site close to the substation and laydown area.<br>With an electricity storage capacity of up to 30 MWh (i.e. 30 MW power output for one hour) and comprising of lithium ion batteries with inverters.<br>Estimated 15 shipping containers (40 foot each).<br>The footprint would be approximately 100m x 100m.  |
| Access tracks                        | External access tracks: unsealed gravel suitable for all weather conditions.<br>Internal access tracks: up to 50km of 7m wide unsealed gravel  |
| Operations and maintenance buildings | Steel framed, ColorBond finish demountable buildings to accommodate:<br>33kV switch gear.<br>Control and protection equipment.<br>Site office.<br>Staff amenities.<br>Warehouse.<br>These would likely be housed in two buildings including:<br>A control room with a 15m x8m footprint<br>An operation and maintenance shed with a footprint of 25m x 25m<br>Maximum height of 6m subject to final design |
| Security fencing, lighting and CCTV  | Steel security fence 2.3m high with barbed wire topping.<br>Security system with CCTV and local flood lighting.  |

Table 3: Project Components



Image 01.  
Typical Solar Panel  
(Source: NGH)



Image 02.  
Typical Solar Farm array



Image 03.  
Battery Storage Facility  
(Source: NGH)



Image 04.  
Typical Power Conversion Unit (PCU)  
(Source: NGH)



# 4.0 Existing Landscape Character

## 4.1 Site Description

The proposed Oxley Solar Farm (the Project) would be located mostly on Lot 5 DP253346 and Lot 6 DP625427, which is approximately 600ha in area. A small portion of the solar farm, could potentially cover parts of Lot 2 DP1206469 and Lot 6 DP625427. The current access to the Project Site is from Grafton Road. Grafton Road connects to Armidale, approximately 18km to the west (**Figure 5**).

Under the Armidale Dumaresq Local Environmental Plan 2012, the proposed solar farm is located on land zoned as RU1 Primary Production. Much of the proposal site has been cleared of woody vegetation and highly modified by farming practices. However, small fragments of woodland still occur.

The main waterway (Gara River) runs along the north-eastern boundary and through the centre of the proposal site. 24 constructed dams can be observed based from aerial imagery within the proposal boundaries. The southern boundary of the Site runs along the northern end of Oxley Wild Rivers National Park. Potential visual impacts of the amenity of the National Park have been considered in this report.

Two existing transmission lines run parallel to each other, just north of Lot 5 DP253346. Both lines are currently being considered as the connection point for the proposed solar farm to the electricity grid.



Image 5. View across the Project Site from Gara Road

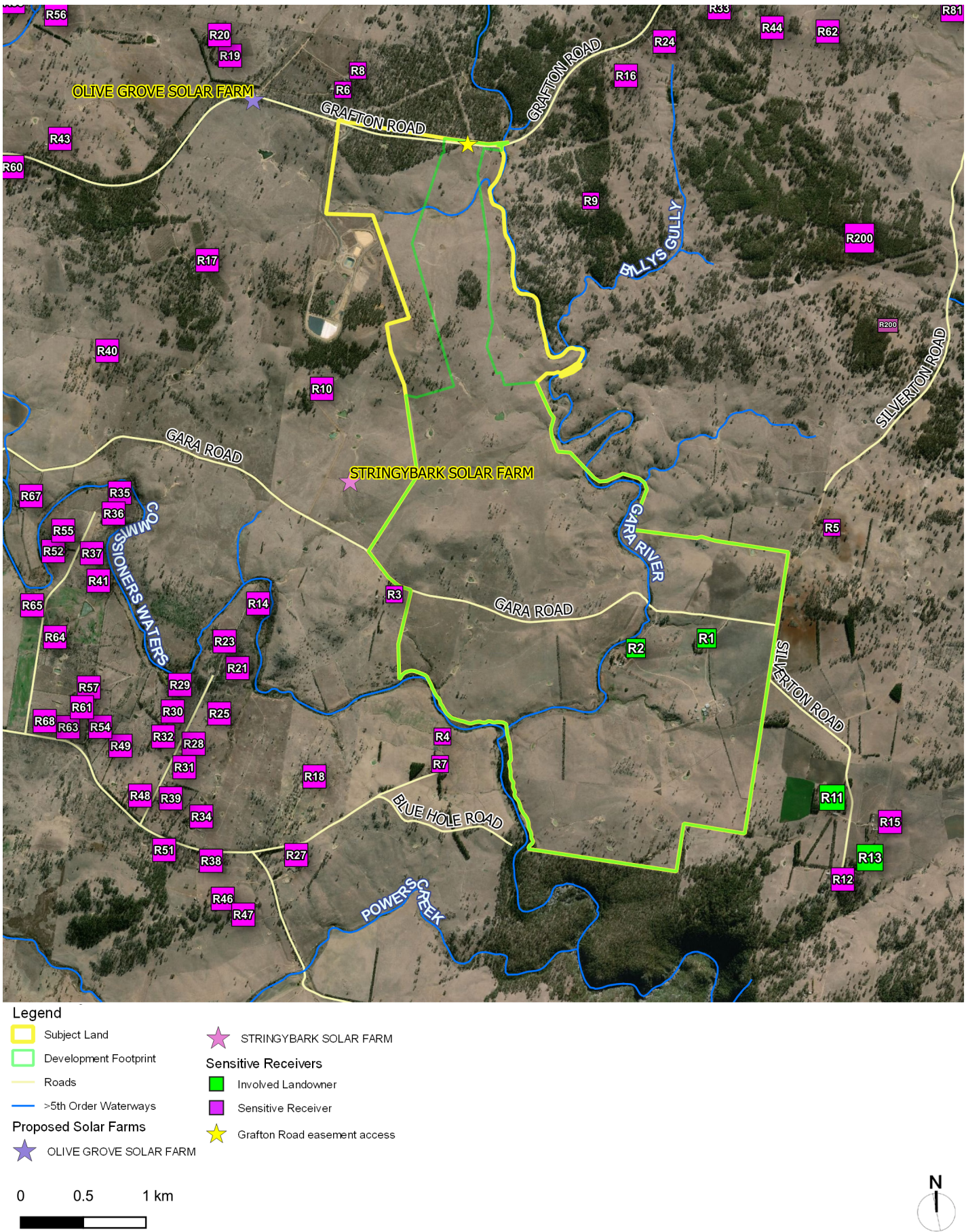


Figure 5: The Project Site (Source: NGH 2021)



## 4.0 Existing Landscape Character

### 4.2 Existing Landscape Character

#### 4.2.1 Land Use

The Project site is located in an agricultural area and is used primarily for grazing with a small amount of feed cropping. Land and soil capability mapping describes the majority of the proposed site as having severe to very severe limitations, with the south-eastern portion is described as having moderate to severe limitations (Class 4, 5 and 6). This indicates the area is limited in its potential use for high impact land management uses, such as cropping, and is not capable of supporting regular cultivation due to limitations including slope, erosion, and soil types. This land classification is generally best used for grazing, in terms of ongoing agricultural use (NSW OEH 2012).

#### 4.2.2 Roads

The current access to the Project site is from Grafton Road, which is located approximately 14 kilometres south-east of Armidale. Gara Road runs through the centre of the Project Site in an east to west direction, approximately 3.5 kilometres south of Grafton Road. Crown roads connect to the Site from Grafton Road in a north-south direction.

#### 4.2.3 Towns

The site is located approximately 14km south-east of Armidale. The population of Armidale is 23,352 (ABS, 2016); it is the administrative centre for the northern tablelands region of NSW.

#### 4.2.4 Infrastructure

Two existing 132 kV transmission lines are located within the northern section of the Project site and run west to east. Both transmission lines are being considered as a connection point for the proposed solar farm to the electricity grid.

#### 4.2.5 Vegetation

The Project site occurs on the Armidale plateau and contains a combination of scattered trees and small remnant clumps of Box-Gum Grassy woodland. Much of the Project site has been extensively cleared of woody vegetation and has been highly modified by historical farming practices. Remnant vegetation within the site are restricted to fragmented areas of woodland and isolated paddock trees that occur within the Project site as well small patches of derived native grassland where native species appear more abundant. The majority of the woodland patches have been subject to high and regular grazing pressure and additionally, are showing evidence of dieback impacting on their long term viability.



**Image 6.** *Typical Landscape Character*



**Image 7.** *Existing Powerlines on Gara Road*



**Image 8.** *Gara Road*



**Image 9.** *Vegetation associated with Oxley Falls National Park on the southern edge of the Site*



# 4.0 Existing Landscape Character

## 4.2.6 Topography

The northern portion of the Site is just south of Grafton Road. The topography falls in a south direction towards the Gara River. The area is predominately cleared for grazing with some scattered vegetation and dams evident.

The southern boundary of the Project site borders Oxley Wild Rivers National Park. Vegetation within this area consists of the better condition vegetation within the Project site evident by a higher abundance of native species and less evidence of dieback. Additionally, throughout the Project site, the hillier and rocky portions of the Project site that have had a lower intensity of sustained grazing pressure and farming have more abundant native species.

## 4.2.7 Water bodies

Twenty-four dams occur within the Project site, mostly fed by watercourses within the site. Twenty-two watercourses occur within the Project site eighteen of which are tributaries of the Gara River and four of which are tributaries of Commissioners Waters.

The Gara River is the most prominent watercourse within the Project site. It is a tributary of Salisbury Waters, which is located approximately 10km south of the Project site within the Oxley Wild Rivers National Park. At the south-western boundary, the Gara River intersects with Commissioners Waters, which runs west to east along the south-western boundary of the site. The Gara River continues flowing south through the Oxley Wild Rivers National Park.

## 4.3 Landscape Values

During community consultation, the Proponent undertook a survey to gain an understanding of the community values and concerns. Approximately 25% of respondents identified landscape and views were the reason for living in the area. Visual impacts were among the concerns raised by the community.



Image 10. Typical Landscape Character - Castledoyle



Image 11. Blue Hole



Image 12. Commissioners Waters



Image 13. Threlfall Picnic Area, Oxley Wild Rivers National Park



# 5.0 Viewpoint Analysis

## 5.1 Viewpoint Analysis Methodology

The viewpoint analysis visual assessment report considers the likely impact that development would have on the existing landscape character and visual amenity by selecting prominent sites, otherwise referred to as viewpoints.

Once the viewpoint had been selected, panoramic photographs were taken on a level tripod at a height of 150cm (to represent eye level). Photographs were taken with a Canon EOS 5D Mark IV Full Frame digital SLR through a 50mm fixed focal lens which closely represents the central field of vision of the human eye.

The visual impact of the viewpoint was then assessed both on site and with the topographic and aerial information to ensure accuracy. For each viewpoint, the potential visual impact was analysed through the use of a combination of the 3D terrain modelling, topographic maps and on site analysis. Viewpoint photographs and analysis is included in the following pages. The findings of the viewpoint analysis have been quantified and are summarised in **Table 3**.

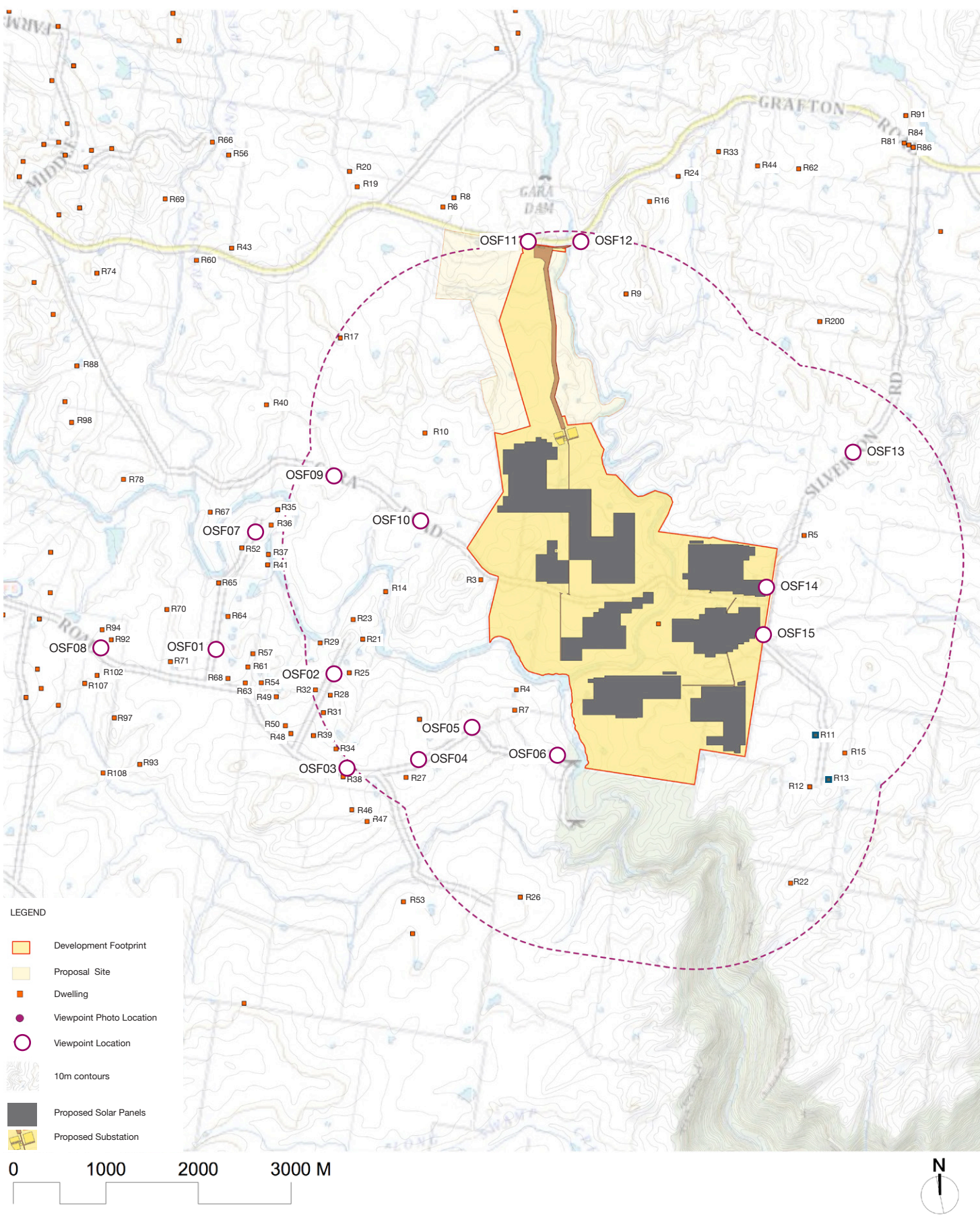
### 5.1.1 Viewpoint Selection Process

A total of **15 viewpoints** were recorded as part of the field work process. The locations of the viewpoints have been identified in **Figure 6** and the general viewing direction of each viewpoint is identified on each viewpoint. Viewpoints have been carefully selected to be representative of the range of views within the study area. The selection of viewpoints is informed by topographical maps, field work observations and other relevant influences such as access, landscape character and the popularity of vantage points.

Viewpoints are selected to illustrate a combination of the following:

- Areas of high landscape or scenic value.
- Visual composition (eg. focused or panoramic views, simple or complex landscape pattern).
- Range of distances.
- Varying aspects.
- Various elevations.
- Various extent of development visibility (full and partial visibility)
- Views from major routes.

It is important to note that the majority of these viewpoints for this study have been taken only from accessible public land (typically gates, walking tracks, roads, recreation reserves and lookouts) which were identified as having a potentially high visual impact through the desktop review process.

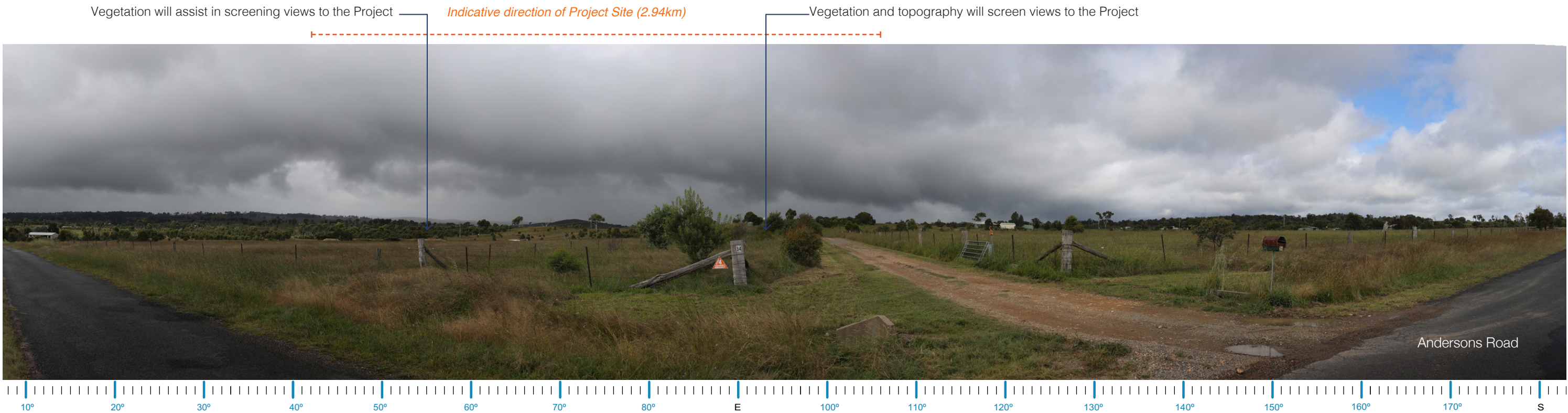


**Figure 6:** Viewpoint Assessment Locations (Source: Google Maps)



# 5.0 Viewpoint Analysis

## OSF01 Andersons Road



### LEGEND

- Indicative extent Project Site likely to be visible
- Indicative extent Project Site (Likely to be screened)



| VIEWPOINT OSF01      |   |   |   |
|----------------------|---|---|---|
| SUMMARY OF VIEWPOINT |   | VIEWPOINT DESCRIPTION   | POTENTIAL VISUAL IMPACT   |
| LOCATION             | Andersons Road                              | Photograph taken from Andersons Road at the entry to rural residence 34. Andersons Road runs in a generally north direction from Castledoyle Road to Commissioners Waters servicing approximately 10 rural residential dwellings. Land is generally flat with slight undulations in the middle ground to the east.<br><br>Visual sensitivity for rural residence is generally <b>high</b> . | The proposed development will not be visible from this viewpoint as it is concealed by topography and vegetation to the east.<br><br>The Visual Effect is assessed as <b>nil</b> and the resulting Visual Impact rating is <b>nil</b> . |
| COORDINATES          | 30°35'1.05"S 151°45'30.97"E                 |   |   |
| ELEVATION            | 960m  |   |   |
| VIEWING DIRECTION    | Generally East                              |   |   |
| DISTANCE TO SITE     | 2.94 km (Distance to nearest panel: 3.70km) |   |   |
| LAND USE             | Rural Residential                           |   |   |
| VISUAL SENSITIVITY   | <b>HIGH</b>                                 |   |   |
| VISUAL EFFECT        | <b>NIL</b>                                  |   |   |
| VISUAL IMPACT        | <b>NIL</b>                                  |   |   |

OSF01 Location



# 5.0 Viewpoint Analysis

## OSF02 Milne Road



- LEGEND**
- Indicative extent Project Site likely to be visible
  - Indicative extent Project Site (Likely to be screened)



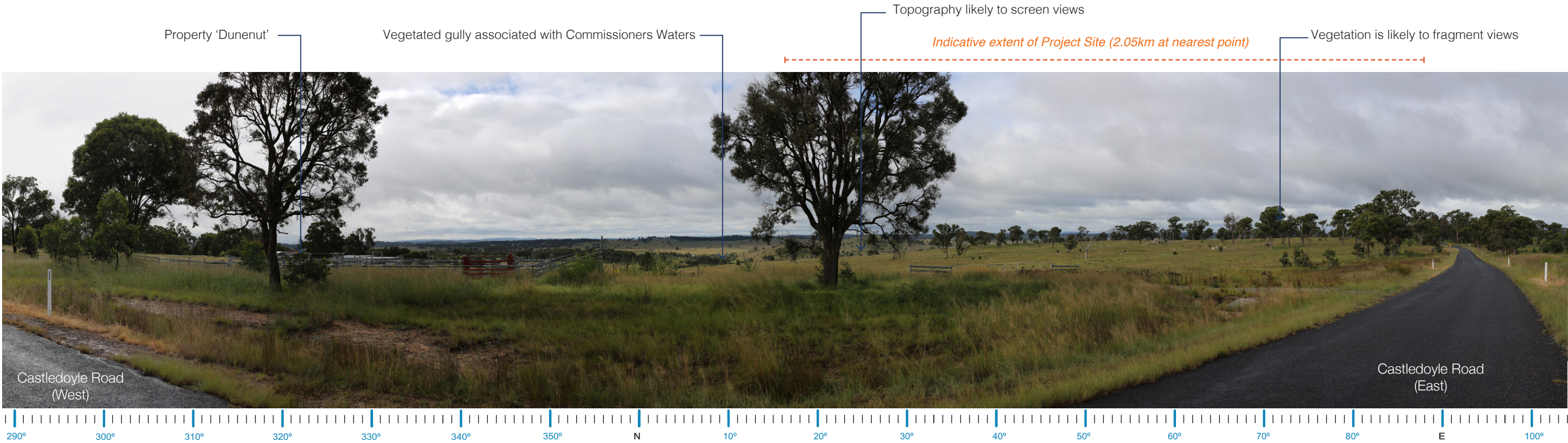
OSF02 Location

| VIEWPOINT OSF02      |  |  |   |
|----------------------|--|--|---|
| SUMMARY OF VIEWPOINT |  | VIEWPOINT DESCRIPTION  | POTENTIAL VISUAL IMPACT   |
| LOCATION             | Milne Road                                 | View from Milne Road, a minor road which runs in a northerly direction from Castledoyle Road, providing access to a dozen rural residential properties. Land slopes to the north towards Commissioners Waters. Land is predominately cleared with mature trees scattered through the landscape. Views are screened to the east by vegetation in the middle ground. Views to the north east extend to distant vegetated hills.<br><br>Visual sensitivity for rural residence is generally <b>high</b> . | From this viewpoint it is likely views to a small portion of the Project Site will be visible (approximately 1.74kms at its nearest point). Existing landscape elements including topography and vegetation in the middleground will assist in screening views to a large percentage of the Site from this location.<br><br>The visual effect is likely to be <b>low</b> as the proposal will occupy a small portion of the view from this location.<br><br>When combined with the high visual sensitivity, the resulting visual impact from this location is <b>moderate</b> . |
| COORDINATES          | 30°35'10.24"S<br>151°46'18.07"E            |  |   |
| ELEVATION            | 952m                                       |  |   |
| VIEWING DIRECTION    | Generally North East                       |  |   |
| DISTANCE TO SITE     | 1.7 km (Distance to nearest panel: 2.46km) |  |   |
| LAND USE             | Rural Residential                          |  |   |
| VISUAL SENSITIVITY   | <b>HIGH</b>                                |  |   |
| VISUAL EFFECT        | <b>LOW</b>                                 |  |   |
| VISUAL IMPACT        | <b>MODERATE</b>                            |  |   |



# 5.0 Viewpoint Analysis

## OSF03 Castledoyle Road



LEGEND

- Indicative extent Project Site likely to be visible
- Indicative extent Project Site (Likely to be screened)



| VIEWPOINT OSF03      |   |   |  |
|----------------------|---|---|--|
| SUMMARY OF VIEWPOINT |   | VIEWPOINT DESCRIPTION   | POTENTIAL VISUAL IMPACT  |
| LOCATION             | Castledoyle Road                            | View from Castldoyle Road looking in a north direction across the gently undulating grazing land. Castledoyle Road is a local road which runs in a generally east west direction providing access to rural residential properties. The road continues to become Blue Hole Road and provides access to the Oxley Wild Rivers National Park (approximately 2.5kms from this viewpoint). Views from this location are expansive towards distant vegetated ranges with some scattered vegetation in the middleground screening views (to the north east). | From this viewpoint the Project is located in a generally north east direction. Views in this direction are mostly screened by vegetation in the middleground. The project is located over 2 kilometres from this location and therefore it is likely it will be screened. |
| COORDINATES          | 30°35'43.13"S<br>151°46'23.16"E             |   |  |
| ELEVATION            | 979m  |   |  |
| VIEWING DIRECTION    | Generally North                             |   |  |
| DISTANCE TO SITE     | 2.06 km (Distance to nearest panel: 2.60km) |   |  |
| LAND USE             | Local Road                                  | The visual sensitivity of this viewpoint has been rated as <b>low</b> due to land use being classified as a local road.   | The visual impact has been rated as <b>nil</b> from this location.   |
| VISUAL SENSITIVITY   | <b>LOW</b>                                  |   |  |
| VISUAL EFFECT        | <b>NIL</b>                                  |   |  |
| VISUAL IMPACT        | <b>NIL</b>                                  |   |  |

OSF03 Location



# 5.0 Viewpoint Analysis

## OSF04 Blue Hole Road



- LEGEND**
- Indicative extent Project Site likely to be visible
  - Indicative extent Project Site (Likely to be screened)



| VIEWPOINT OSF04      |   |  |  |
|----------------------|---|--|--|
| SUMMARY OF VIEWPOINT |   | VIEWPOINT DESCRIPTION  | POTENTIAL VISUAL IMPACT  |
| LOCATION             | Blue Hole Road                              | View from Blue Hole Road, approximately 400 metres east of the intersection with Castledoyle Road. Blue Hole Road is an unsealed minor road which provides access to Oxley Wild Rivers National Park. Land in this area is predominately cleared with some stands of remnant vegetation. Land falls away to the north east towards the Gara River. | From this viewpoint it is likely the Project will be visible to the north east. The Project is approximately 1.5 kilometres from this location. Existing vegetation and a low rise in topography provides screening to majority of the Project Site. The small portion of the Project that will be visible will be a minor element in the overall visual landscape and will result in a low visual effect. |
| COORDINATES          | 30°35'41.27"S<br>151°46'52.26"E             |  |  |
| ELEVATION            | 975m  |  |  |
| VIEWING DIRECTION    | Generally North East                        |  |  |
| DISTANCE TO SITE     | 1.5 km (Distance to nearest panel: 1.84 km) |  |  |
| LAND USE             | Local Road                                  | The visual sensitivity of this viewpoint has been rated as <b>low</b> due to the land use of local road.   | The resulting visual impact from this location is likely to be low from this location.   |
| VISUAL SENSITIVITY   | Low   |  |  |
| VISUAL EFFECT        | Low   |  |  |
| VISUAL IMPACT        | Low   |  |  |

OSF04 Location



# 5.0 Viewpoint Analysis

## OSF05 Blue Hole Road



LEGEND

- Indicative extent Project Site likely to be visible
- Indicative extent Project Site (Likely to be screened)



| VIEWPOINT OSF05      |   |  |  |
|----------------------|---|--|--|
| SUMMARY OF VIEWPOINT |   | VIEWPOINT DESCRIPTION  | POTENTIAL VISUAL IMPACT  |
| LOCATION             | Castledoyle Road                            | View from Blue Hole Road, the photograph is taken from a bend in the road at the entry to house number 111. Views from this location are expansive, with screening across grazing land to the north, with vegetation associated with the property visible in the foreground. Vegetation associated with the Gara River and Oxley Wild Rivers National Park is visible to the east. | From this viewpoint the Project is likely to be visible on low lying land approximately 1 kilometre away to the east. Vegetation in the foreground associated with 111 Blue Hole Road is likely to screen a portion of the Site. The Project site will be visible (although fragmented by foreground vegetation) on the hill in the middleground to the north. |
| COORDINATES          | 30°35'29.38"S<br>151°47'14.38"E             |  |  |
| ELEVATION            | 965m  |  |  |
| VIEWING DIRECTION    | Generally North East                        |  |  |
| DISTANCE TO SITE     | 1.05 km (Distance to nearest panel: 1.19km) |  |  |
| LAND USE             | Local Road                                  | The visual sensitivity of this viewpoint has been rated as <b>moderate</b> .   | The visual effect from this location has been assessed as <b>moderate</b> resulting in a <b>moderate</b> visual impact rating.   |
| VISUAL SENSITIVITY   | <b>Moderate</b>                             |  |  |
| VISUAL EFFECT        | <b>Moderate</b>                             |  |  |
| VISUAL IMPACT        | <b>Moderate</b>                             |  |  |

OSF05 Location

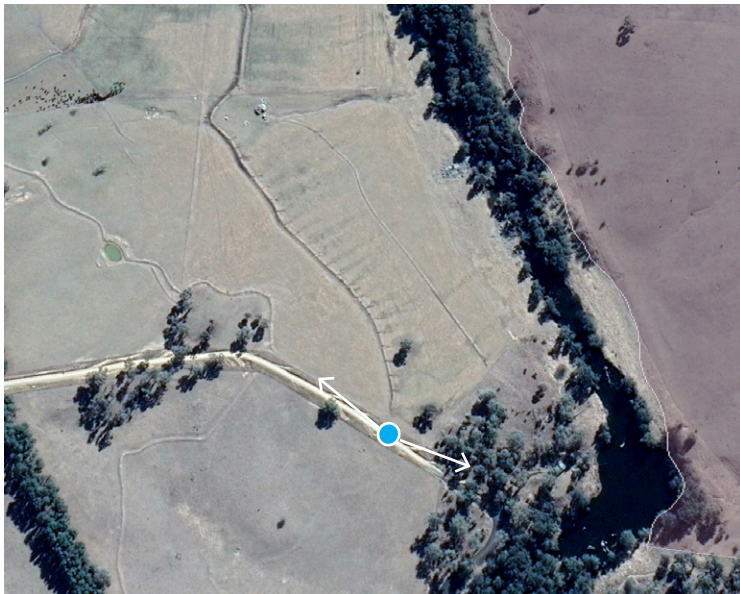


# 5.0 Viewpoint Analysis

## OSF06 Blue Hole Road



- LEGEND**
- Indicative extent Project Site likely to be visible
  - Indicative extent Project Site (Likely to be screened)



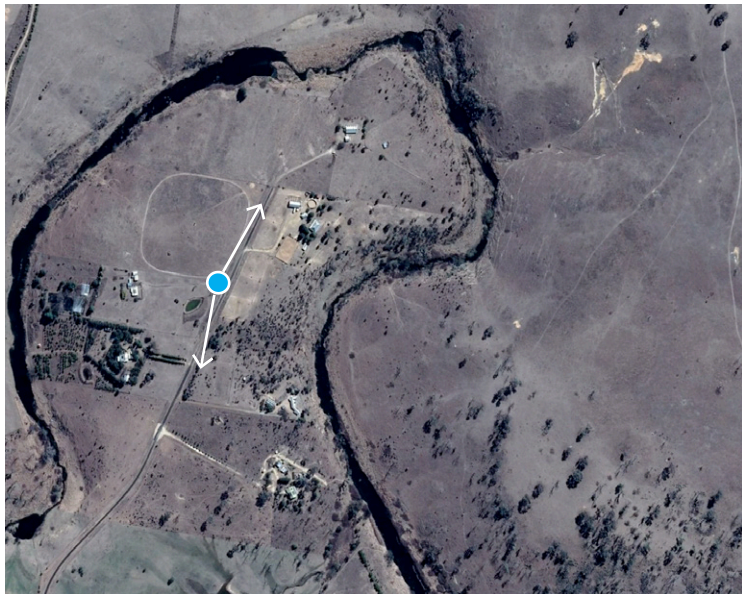
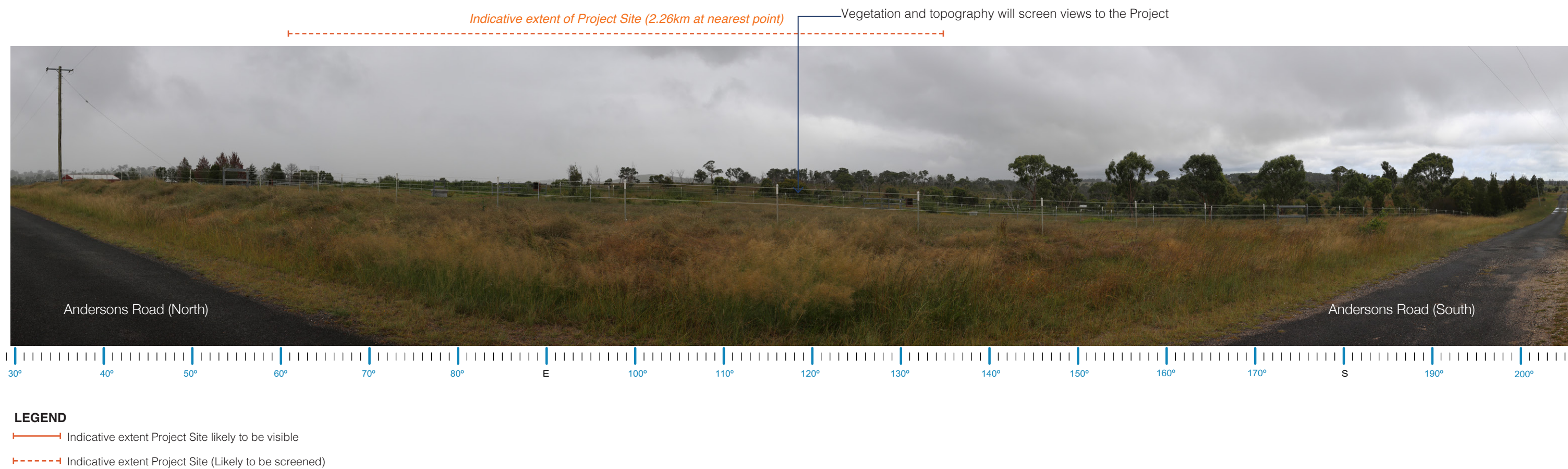
OSF06 Location

| VIEWPOINT OSF06      |  |   |   |
|----------------------|--|---|---|
| SUMMARY OF VIEWPOINT |  | VIEWPOINT DESCRIPTION   | POTENTIAL VISUAL IMPACT   |
| LOCATION             | Blue Hole Road                               | View from Blue Hole Road approximately 150 metres to the entry to Oxley Wild National Park. Land in this area is predominately cleared with the exception of vegetation associated with the Gara River to the north. Topography is gently undulating and slopes down to the river. Views are available across the Project Site to vegetated hills in the distance.<br><br>The visual sensitivity has been rated as <b>moderate</b> due to land use and close proximity to the Site. | From this location the Project Site will be visible and occupy a large portion of the view. Vegetation associated with Oxley Wild National Park will screen a portion of the Site to the south.<br><br>The visual effect has been rated as <b>high</b> resulting in a <b>high</b> visual impact rating. |
| COORDINATES          | 30°35'39.89"S<br>151°47'50.60"E              |   |   |
| ELEVATION            | 928m   |   |   |
| VIEWING DIRECTION    | Generally North                              |   |   |
| DISTANCE TO SITE     | 270 metres (Distance to nearest panel: 516m) |   |   |
| LAND USE             | Local Road                                   |   |   |
| VISUAL SENSITIVITY   | Moderate                                     |   |   |
| VISUAL EFFECT        | High   |   |   |
| VISUAL IMPACT        | High   |   |   |



# 5.0 Viewpoint Analysis

## OSF07 Andersons Road



| VIEWPOINT OSF07      |  |   |  |
|----------------------|--|---|--|
| SUMMARY OF VIEWPOINT |  | VIEWPOINT DESCRIPTION   | POTENTIAL VISUAL IMPACT  |
| LOCATION             | Andersons Road                             | View from the northern end of Andersons Road near the entry to 171 Andersons Road. Land in this area is characterised by rural residential properties. Views are generally contained by vegetation and a slight rise in topography in the foreground. | The Project will be screened by a combination of vegetation and topography from this location. |
| COORDINATES          | 30°34'20.01"S<br>151°45'47.44"E            |   |  |
| ELEVATION            | 951m                                       |   |  |
| VIEWING DIRECTION    | Generally East                             |   |  |
| DISTANCE TO SITE     | 2.26km (Distance to nearest panel: 2.61km) | The visual sensitivity of this viewpoint has been rated as <i>high</i> due to the rural residential land use.   |  |
| LAND USE             | Rural Residential                          |   |  |
| VISUAL SENSITIVITY   | High                                       |   |  |
| VISUAL EFFECT        | Nil  |   |  |
| VISUAL IMPACT        | Nil  |   |  |

OSF07 Location



# 5.0 Viewpoint Analysis

## OSF08 Castledoyle Road



- LEGEND**
- Indicative extent Project Site likely to be visible
  - Indicative extent Project Site (Likely to be screened)



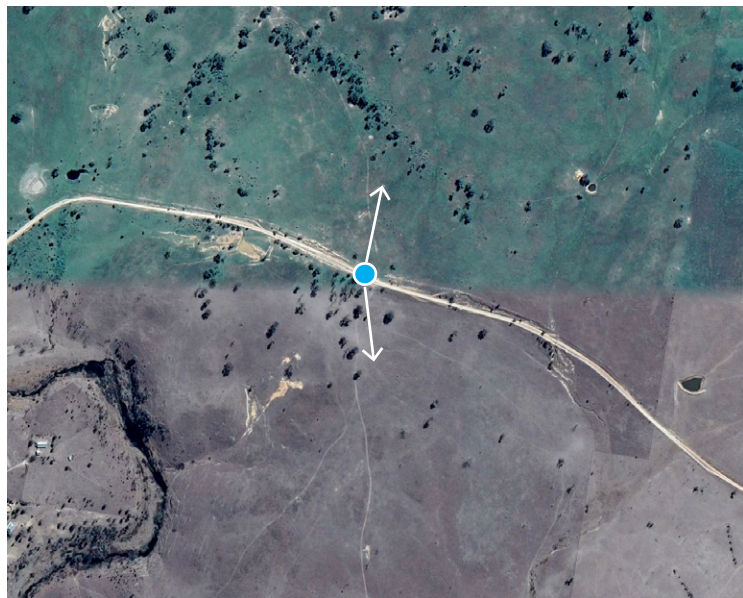
OSF08 Location

| VIEWPOINT OSF08      |   |  |   |
|----------------------|---|--|---|
| SUMMARY OF VIEWPOINT |   | VIEWPOINT DESCRIPTION  | POTENTIAL VISUAL IMPACT   |
| LOCATION             | Castledoyle Road                            | View from Castledoyle Road, approximately 4.1 kilometres west of the Project Site. Views from this location extend to distance vegetated hills to the east across cleared grazing land. Vegetation associated with rural residential dwellings is visible in the foreground to the north.<br><br>The visual sensitivity of this viewpoint has been rated as <b>low</b> . | From this location the Project Site has the potential to be visible in the distance (in excess of 4 kilometres from this location). Views to the Proposal would be fleeting for motorist travelling along Castledoyle Road, and occupy a small portion of the overall view.<br><br>The visual effect has been rated as <b>low</b> resulting in a visual impact rating of <b>low</b> . |
| COORDINATES          | 30°34'59.77"S<br>151°44'43.75"E             |  |   |
| ELEVATION            | 966m  |  |   |
| VIEWING DIRECTION    | Generally East                              |  |   |
| DISTANCE TO SITE     | 4.10 km (Distance to nearest panel: 4.53km) |  |   |
| LAND USE             | Main Road                                   |  |   |
| VISUAL SENSITIVITY   | Low   |  |   |
| VISUAL EFFECT        | Nil - Low                                   |  |   |
| VISUAL IMPACT        | Low   |  |   |



# 5.0 Viewpoint Analysis

## OSF09 Gara Road



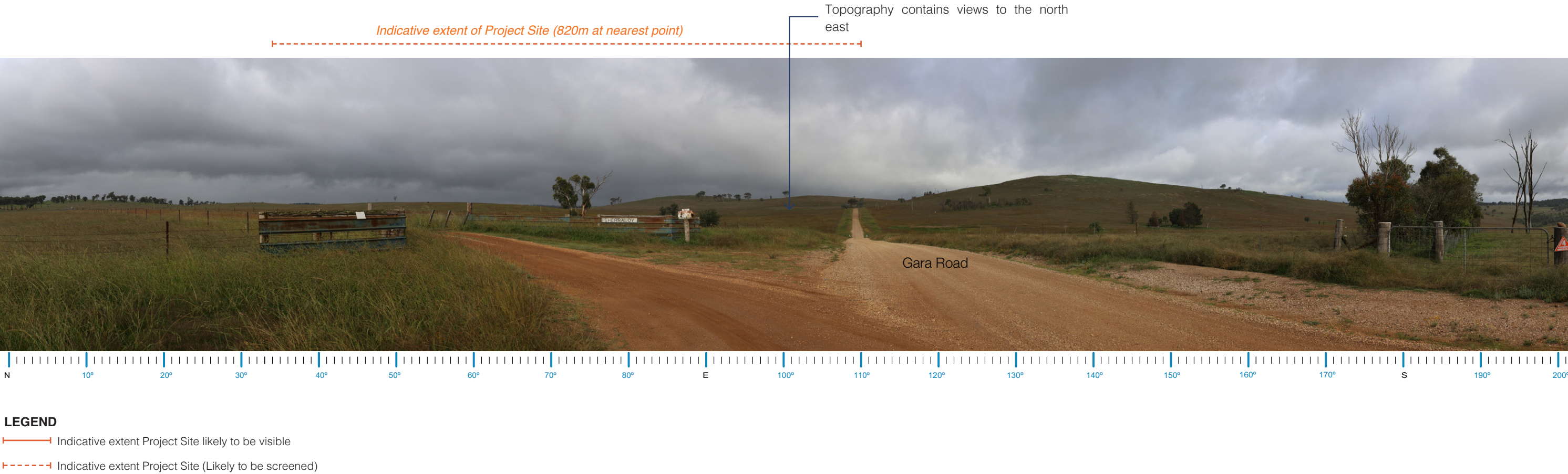
| VIEWPOINT OSF09      |   |   |   |
|----------------------|---|---|---|
| SUMMARY OF VIEWPOINT |   | VIEWPOINT DESCRIPTION   | POTENTIAL VISUAL IMPACT   |
| LOCATION             | Blue Hole Road                              | View from Gara Road, an unsealed minor road which is located between Castledoyle Road and Grafton Road. Gara Road runs in a generally east west direction from Grafton Road to Silverton Road. The road provides access to a small number of isolated homesteads.<br><br>The visual sensitivity has been rated <b>low</b> for this viewpoint. | From this location, views to the Project Site will be available to the east when travelling along Gara Road. As the road has a low number of users it is likely to affect a small number of receptors.<br><br>The visual effect is likely to be <b>low</b> as the Project would occupy a small portion of the view from this location, resulting in a <b>low</b> visual impact. |
| COORDINATES          | 30°34'0.67"S<br>151°46'21.70"E              |   |   |
| ELEVATION            | 960m  |   |   |
| VIEWING DIRECTION    | Generally East                              |   |   |
| DISTANCE TO SITE     | 1.55 km (Distance to nearest panel: 1.72km) |   |   |
| LAND USE             | Agricultural                                |   |   |
| VISUAL SENSITIVITY   | Low   |   |   |
| VISUAL EFFECT        | Low   |   |   |
| VISUAL IMPACT        | Low   |   |   |

OSF09 Location



# 5.0 Viewpoint Analysis

## OSF10 Gara Road



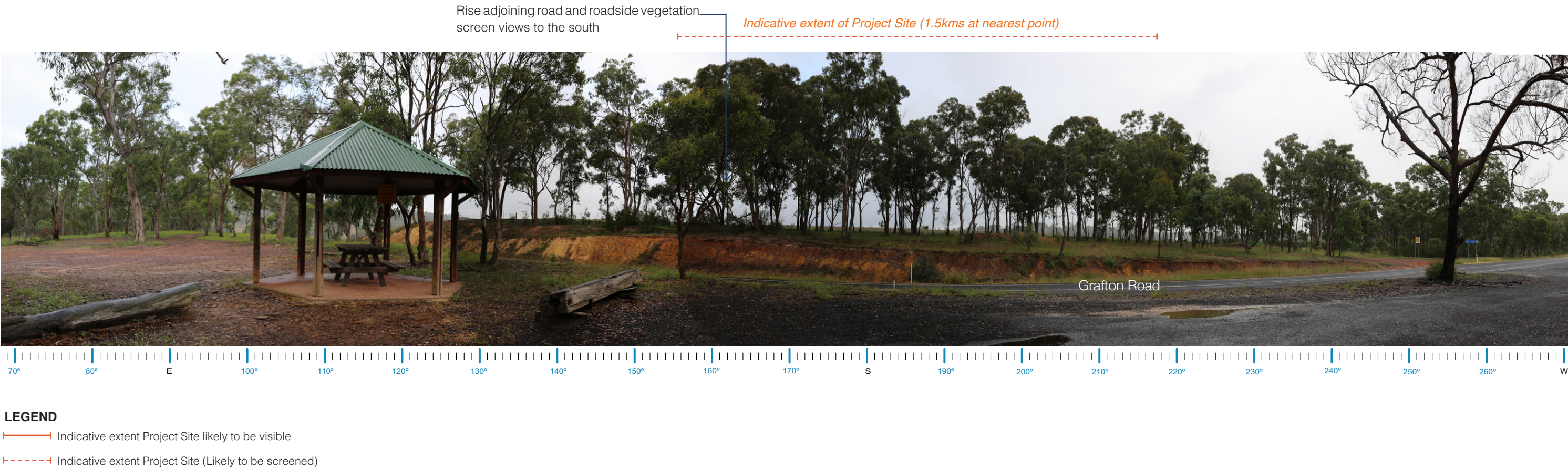
OSF10 Location

| VIEWPOINT OSF10      |   |   |  |
|----------------------|---|---|--|
| SUMMARY OF VIEWPOINT |   | VIEWPOINT DESCRIPTION   | POTENTIAL VISUAL IMPACT  |
| LOCATION             | Gara Road   | View from Gara Road, approximately 800 metres west of the Project Site. Land in this area is characterised by gently undulating, predominately cleared grazing land. Views to the east (towards the Site) are largely contained by a rise in topography in the middleground. Vegetation associated with Commissioners Waters is visible to the south. | From this location it is likely the rise in topography in the foreground will screen views to the majority of the Project Site. Some associated infrastructure may be visible above the hills. |
| COORDINATES          | 30°34'16.88"S<br>151°46'54.68"E                       |   |  |
| ELEVATION            | 952m  | The visual sensitivity of this viewpoint has been rated as <b>low</b> due to the land use.  | The visual effect and visual impact has been rated as <b>nil - low</b> from this location. The resulting visual impact is <b>nil - low</b> .   |
| VIEWING DIRECTION    | Generally East  |   |  |
| DISTANCE TO SITE     | 820 metres<br>(Distance to nearest panel: 815 metres) |   |  |
| LAND USE             | Minor Road  |   |  |
| VISUAL SENSITIVITY   | Low   |   |  |
| VISUAL EFFECT        | Nil - Low   |   |  |
| VISUAL IMPACT        | Nil - Low   |   |  |



# 5.0 Viewpoint Analysis

## OSF11 Grafton Road



| VIEWPOINT OSF11      |  |  |   |
|----------------------|--|--|---|
| SUMMARY OF VIEWPOINT |  | VIEWPOINT DESCRIPTION  | POTENTIAL VISUAL IMPACT   |
| LOCATION             | Grafton Road                               | View from a rest area located on Grafton Road, approximately 2 kilometres north of the Project Site. Grafton Road is a main arterial road which runs in a generally east direction from Armidale towards the coast. Views from this location are typical of this section of Grafton Road, with roadside vegetation containing views.<br><br>The visual sensitivity of this viewpoint has been rated as <b>moderate</b> . | Views to the Site are not available from this location due to a combination of the rise and roadside vegetation on the southern edge of the road. Access to the Site is approx. 250 metres east of this location.<br><br>The visual impact from this location is <b>nil</b> . |
| COORDINATES          | 30°32'38.93"S<br>151°47'39.05"E            |  |   |
| ELEVATION            | 966m                                       |  |   |
| VIEWING DIRECTION    | Generally South                            |  |   |
| DISTANCE TO SITE     | 2.06km (Distance to nearest panel: 2.09km) |  |   |
| LAND USE             | Rest Area                                  |  |   |
| VISUAL SENSITIVITY   | Moderate                                   |  |   |
| VISUAL EFFECT        | Nil  |  |   |
| VISUAL IMPACT        | Nil  |  |   |

OSF11 Location



# 5.0 Viewpoint Analysis

## OSF12 Grafton Road



- LEGEND**
- Indicative extent Project Site likely to be visible
  - Indicative extent Project Site (Likely to be screened)



OSF12 Location

| VIEWPOINT OSF12      |  |  |  |
|----------------------|--|--|--|
| SUMMARY OF VIEWPOINT |  | VIEWPOINT DESCRIPTION  | POTENTIAL VISUAL IMPACT  |
| LOCATION             | Grafton Road   | View from Grafton Road travelling in a generally west direction (towards Armidale). Views from this location are generally contained by vegetation to the north and south of the road corridor. The road crosses the Gara River approximately 160m west of this viewpoint.<br><br>The visual sensitivity of this viewpoint has been rated as <b>moderate</b> . | A proposed site access point is located approximately 350m west of this viewpoint providing access into the Site from the north. The proposed site access is unlikely to be noticeable to motorists travelling along Grafton Road. There are a number of similar access roads in the vicinity. The Proposed Solar Farm is approximately 2 kilometres to the south of this location and is not visible due to vegetation and distance.<br><br>The visual effect has been rated as <b>nil</b> from this location and therefor there will be <b>no visual impact</b> from this viewpoint. |
| COORDINATES          | 30°32'38.67"S<br>151°48'0.41"E                               |  |  |
| ELEVATION            | 946m   |  |  |
| VIEWING DIRECTION    | Generally South West   |  |  |
| DISTANCE TO SITE     | 350m (to Site Access)<br>(Distance to nearest panel: 2.04km) |  |  |
| LAND USE             | Main Road  |  |  |
| VISUAL SENSITIVITY   | <b>Moderate</b>  |  |  |
| VISUAL EFFECT        | <b>Nil - Low</b>   |  |  |
| VISUAL IMPACT        | <b>Nil - Low</b>   |  |  |



# 5.0 Viewpoint Analysis

## OSF13 Silverton Road



**LEGEND**

Indicative extent Project Site likely to be visible

Indicative extent Project Site (Likely to be screened)



| VIEWPOINT OSF13      |   |   |   |
|----------------------|---|---|---|
| SUMMARY OF VIEWPOINT |   | VIEWPOINT DESCRIPTION   | POTENTIAL VISUAL IMPACT   |
| LOCATION             | Silverton Road                              | View from Silverton Road, approximately 3500 metres south of Grafton Road. Land in this area is predominately cleared for grazing with scattered vegetation and stands of trees throughout the landscape. Views are expansive, across grazing land that slopes gently towards the Gara River. Vegetated hills form a backdrop to views in the distance. | From this location it is likely views of the solar array will be visible in the middleground. Scattered vegetation may assist in fragmenting views.<br><br>The visual effect is likely to be <b>moderate</b> , however when combined with a low visual sensitivity the visual impact rating is <b>low</b> . |
| COORDINATES          | 30°33'54.18"S<br>151°49'50.06"E             |   |   |
| ELEVATION            | 995m  |   |   |
| VIEWING DIRECTION    | Generally South West                        | The visual sensitivity of this viewpoint is <b>low</b> due to the land use and distance to site.  |   |
| DISTANCE TO SITE     | 1.45 km (Distance to nearest panel: 1.46km) |   |   |
| LAND USE             | Minor Road                                  |   |   |
| VISUAL SENSITIVITY   | Low   |   |   |
| VISUAL EFFECT        | Moderate                                    |   |   |
| VISUAL IMPACT        | Low   |   |   |

OSF13 Location



# 5.0 Viewpoint Analysis

## OSF14 Silverton Road



OSF14 Location

| VIEWPOINT OSF14      |                                 |   |  |
|----------------------|---------------------------------|---|--|
| SUMMARY OF VIEWPOINT |                                 | VIEWPOINT DESCRIPTION   | POTENTIAL VISUAL IMPACT  |
| LOCATION             | Silverton Road                  | View from Silverton Road, approximately 125m north of the intersection with Gara Road. Views from this location are expansive across cleared grazing land which slopes down towards the Gara River. Vegetated ranges are visible in the background. Scattered vegetation and stands of vegetation associated with properties are visible in the middleground. | The Project will be visible from this location and is likely to alter the existing landscape character. Views across land to the west of this location will be dominated by the proposed solar array.        |
| COORDINATES          | 30°34'42.00"S<br>151°49'16.18"E |   |  |
| ELEVATION            | 972m                            |   |  |
| VIEWING DIRECTION    | West                            |   |  |
| DISTANCE TO SITE     | 60 metres                       | The visual sensitivity of this viewpoint has been rated as <b>moderate</b> due to the close proximity to the Site.  | Access along Silverton Road is limited to people travelling to homesteads along Silverton Road or Gara Road and therefore the frequency of the view is low number of people affected by the view is limited. |
| LAND USE             | Minor Road                      |   |  |
| VISUAL SENSITIVITY   | Moderate                        |   |  |
| VISUAL EFFECT        | High                            |   | The visual effect has been rated as <b>high</b> resulting in a <b>high</b> visual impact from this location.   |
| VISUAL IMPACT        | High                            |   |  |



# 5.0 Viewpoint Analysis

## OSF15 Silverton Road



| VIEWPOINT OSF15      |                                 |   |   |
|----------------------|---------------------------------|---|---|
| SUMMARY OF VIEWPOINT |                                 | VIEWPOINT DESCRIPTION   | POTENTIAL VISUAL IMPACT   |
| LOCATION             | Silverton Road                  | View from Silverton Road, near the gate to 'Silverton'. Views from this location are expansive across cleared grazing land which slope down towards the Gara River. Vegetated ranges are visible in the background. Scattered vegetation and stands of vegetation associated with properties are visible in the middleground. | The Project will be visible from this location and is likely to alter the existing landscape character. Views across land to the west of this location will be dominated by the proposed solar array.<br><br>The visual effect has been rated as <b>high</b> resulting in a <b>high</b> visual impact from this location. |
| COORDINATES          | 30°34'57.68"S<br>151°49'13.02"E |   |   |
| ELEVATION            | 961m                            |   |   |
| VIEWING DIRECTION    | West                            | The visual sensitivity of this viewpoint has been rated as <b>moderate</b> due to the close proximity to the Site.  |   |
| DISTANCE TO SITE     | 50 metres                       |   |   |
| LAND USE             | Minor Road                      |   |   |
| VISUAL SENSITIVITY   | Moderate                        |   |   |
| VISUAL EFFECT        | High                            |   |   |
| VISUAL IMPACT        | High                            |   |   |

OSF15 Location

# 5.0 Viewpoint Analysis

## 5.2 Overview of Viewpoint Analysis

As discussed in the rationale for the viewpoint selection process, these viewpoints are representative of the worst case scenario. For each viewpoint, the potential visual impact was analysed through the use of a combination of topographic maps and on site analysis.

The visual sensitivity and visual effect of each viewpoint have been assessed which, when combined, result in an overall visual impact for the viewpoint (**Refer to Table 4**).

Of the 15 viewpoints assessed as part of this VIA, the Project would be visible from a total of 11 viewpoints. Of the 11 viewpoints from which the Project would be visible,

- 6 were assessed as having a Visual Impact Rating of **low** or **nil - low**
- 2 were assessed as having Visual Impact Rating of **moderate**
- 3 received a Visual Impact Rating of **high**

It is noted visual impacts associated with the proposed development are likely to be higher during the construction phases and mitigated overtime with the implementation of measures to ultimately achieve a low or negligible visual impact level. The incorporated mitigation measures outlined in **Section 8** of this report seek to avoid, reduce and where possible remedy adverse visual effects arising from the proposed development.

The viewpoints which were rated as having a **high** visual impact were taken within close proximity of the Project in locations where there was an absence of existing vegetation to screen views into the proposed development. Mitigation measures such as effective screen planting will reduce the visual effect to being rated as LOW, resulting in an overall visual impact of **moderate**.

Primarily viewpoints that were rated as **moderate** consisted of views into the Site that were already partially screened by topography or existing established vegetation. The addition of screen planting would further reduce the visual impact.

Generally, viewpoints that were rated as **low** contained limited views to the Site, adequate screening or roadside vegetation and landforms from the viewpoint to obscure views.

| Viewpoint | Location         | VISUAL SENSITIVITY | VISUAL EFFECT | POTENTIAL VISUAL IMPACT |
|-----------|------------------|--------------------|---------------|-------------------------|
| OSF01     | Andersons Road   | HIGH               | NIL           | NIL                     |
| OSF02     | Milne Road       | HIGH               | LOW           | MODERATE                |
| OSF03     | Castledoyle Road | LOW                | NIL           | NIL                     |
| OSF04     | Blue Hole Road   | LOW                | LOW           | LOW                     |
| OSF05     | Blue Hole Road   | MODERATE           | MODERATE      | MODERATE                |
| OSF06     | Blue Hole Road   | MODERATE           | HIGH          | HIGH                    |
| OSF07     | Andersons Road   | HIGH               | NIL           | NIL                     |
| OSF08     | Castledoyle Road | LOW                | NIL - LOW     | NIL - LOW               |
| OSF09     | Gara Road        | LOW                | LOW           | LOW                     |
| OSF10     | Gara Road        | LOW                | NIL - LOW     | NIL - LOW               |
| OSF11     | Grafton Road     | MODERATE           | NIL           | NIL                     |
| OSF12     | Silverton Road   | LOW                | LOW           | LOW                     |
| OSF13     | Silverton Road   | LOW                | MODERATE      | LOW                     |
| OSF14     | Silverton Road   | MODERATE           | HIGH          | HIGH                    |
| OSF15     | Silverton Road   | MODERATE           | HIGH          | HIGH                    |

\*Please note the Viewpoint Visibility Assessment Summary is based on the visibility assessment criteria outlined in Section 2.1 of this report.

**Table 4:** Viewpoint Visual Impact Summary

# 6.0 Visual Impact Assessment

## 6.1 Assessment of Visual Impacts

### 6.1.1 Overview of Visual Impacts

In addition to the photographic viewpoint assessment, the following section provides an overview of the potential visibility from areas surrounding the site. This is by no means an exhaustive description of the visibility from every locality, it is intended to provide an overall assessment of the potential visual impact on areas potentially affected by the proposal.

Overall the proposed development will result in the modification of the existing visual landscape. However due to the relatively small vertical scale, existing landscape features including vegetation and topography screen the proposal from a distance. Therefore the highest visual effect is likely to be from areas within close proximity to the Site.

### 6.1.2 Overview of Visual Impacts on Public Land

Publicly accessible viewing locations are generally limited to the minor roads which transverse the landscape. These roads have a very low frequency of use, providing access to isolated residences and farmland.

There will be limited areas within publicly accessible land where the development can be viewed in its entirety. The highest visual impact is likely to be from Gara Road and Silverton Road. These roads are generally used to provide access to isolated homesteads and have a relatively low frequency of use.

Views to the Project will also be available from a small portion of Blue Hole Road, which is utilised by visitors to the Oxley Wild Rivers National Park and has a slightly higher frequency of use. Views to the Project have the potential to be visible to the north of the National Park, refer to **Section 6.1.3**.

Roads with a higher frequency of use including Grafton Road and Castledoyle Road are less likely to have views to the Proposal. The main travel route in the area is the Grafton Road. Roadside vegetation characterises the road and contains views (refer to Viewpoint OSF11). At its closest point the road is approximately 2 kilometres from the Site. A combination of speed, roadside vegetation, distance and topography limit the views into the Site and it is unlikely views would be available to motorists travelling along Grafton Road.

Any views to the Project from Castledoyle Road, Milne Road and Anderson Road would be relatively distant and a combination of roadside vegetation, undulating topography and general road direction would limit the opportunities to view the Project.



# 6.0 Visual Impact Assessment

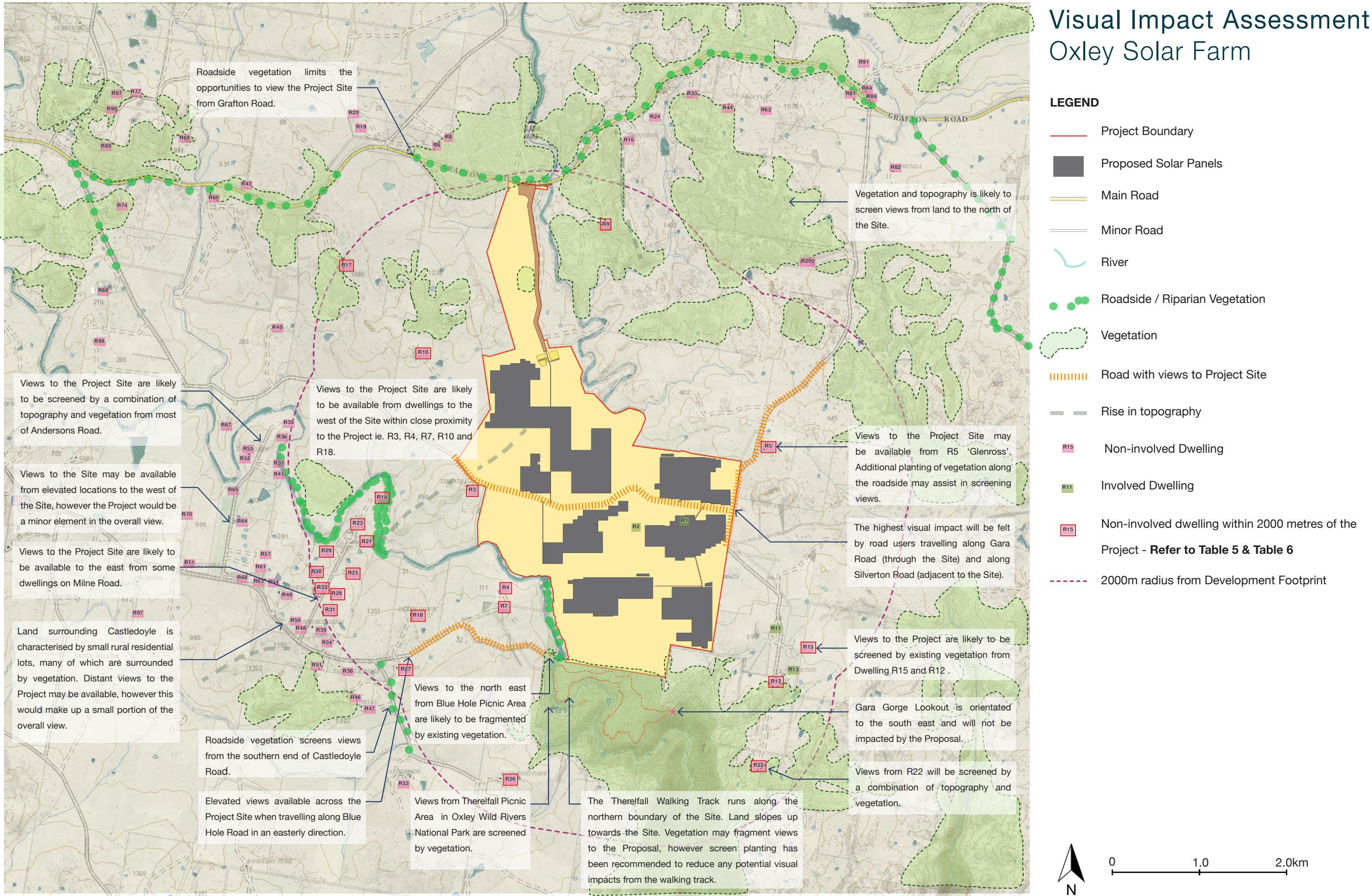


Figure 6. Landscape Impact Assessment



# 6.0 Visual Impact Assessment

## 6.1.4 Overview of Visual Impact on Oxley Wild River National Park

The Project Site is bounded to the south by the Oxley Wild River National Park. The proposed solar panels are 600 metres to the north of Oxley Wild River National Park.

Oxley Wild River National Park is accessed via Blue Hole Road. The National Park has two picnic areas, Blue Hole Picnic Area, situated at the entry to the National Park from Blue Hole Road in the north) and Therelfall Picnic Area (approximately 600 metres to the south). Views from Therelfall Picnic Area are concealed by dense vegetation.

Access through the National Park is generally limited to the Therelfall Walking Trail which runs in a loop from Blue Hole Picnic Area out to Gara Gorge and past Therelfall Picnic Area. Views to the north from the southern end of the trail and Gara Gorge Lookout are contained by vegetation. The Therelfall Walking Track runs close to the northern boundary of the Oxley Wild Rivers National Park. Topography rises to the north of the walking trail and when combined with vegetation, opportunities to view the proposal from the walking trail are limited. Mitigation methods outlined in **Section 7.0** include screen planting along the southern boundary of the Project to minimise any potential views to the Project from the walking trail within the National Park.

Blue Hole Picnic Area (refer to Images 14 and 15) is located at the entry to Oxley Wild Rivers National Park. The Picnic Area has a BBQ shelter, picnic tables and signage that serves as an entry point to the National Park. Blue Hole is a popular swimming area. The Project Site extends to the north eastern edge of the National Park and has the potential to be visible from Blue Hole Picnic Area. Screen planting suggested in Section 7.0 would reduce the potential visibility.



**Image 14.** View towards the Site from Blue Hole Picnic Area



**Image 15.** View towards Blue Hole Picnic Area from the carpark



# 6.0 Visual Impact Assessment

## 6.1.3 Overview of Visual Impact on Residences

It is likely a number of surrounding residences would have varying degrees of visibility toward the development site. However, some residences would have fragmented views due to existing vegetation, orientation of the dwelling or topography.

There are a total of **30** residences within 2000 metres of the Development Footprint (see **Figure 6**). Eight (8) dwellings are located within 1000 metres, twelve (12) dwellings are located between 1000-1500m and ten (10) are located within 1500-2000m of the Development Footprint.

Castledoyle is the most populated area within close proximity to the Project Site. Castledoyle is characterised by rural residential properties that are generally accessed via Castledoyle Road. Dwellings associated with Castledoyle Road are generally set back from the roadside and a large majority have wind break planting along boundaries and fence lines. It is likely some views will be available to dwellings associated with Castledoyle Road, however these views are likely to form only a small element in the visual catchment.

Andersons Road and Milne Road run in a generally north direction from Castledoyle Road. Residences on the eastern side of Milne and Andersons Road are likely to have views to the Proposal to the east. The Project is likely to form a small portion of these views and in the context of the visual character would have a low visual impact.

The highest visual impact is likely to be experienced from dwellings within close proximity to the Site (within approximately 1 kilometre). This includes a relatively small numbers of dwellings typically located along Gara Road, Blue Hole Road and Silverton Road.

**Table 5 & 6** provide an overview of potential visual impact from all eight (8) dwellings within 1000 metres and ten (10) non-involved (and two involved) dwellings within 1000-1500 metres of the Project. **Table 7** provides an overview of the ten (10) dwellings located between 1500 - 2000m of the Project. Of the 30 dwellings assessed, the Project is likely to be screened by either topography, vegetation or both from fifteen (15) dwellings and visible in varying degrees from the remaining 15 dwellings. If mitigation methods suggested in **Table 5** and outlined in **Section 7.0** of this LVIA are employed, the potential visibility of the Project is likely to be significantly reduced from these dwellings.

| Dwell-ing                                      | Location / Name                | Distance to the Site Boundary   | Visual Assessment  | Recommended Mitigation Measures (Refer to Section 7.0)   |
|--|--------------------------------|---------------------------------|--|--|
| Dwellings within 1000m of the Project Boundary |                                |                                 |  |  |
| R3   | Trig Hill 686<br>Gara Road     | 200m<br>(Nearest panel: 597m)   | The Project is located 200m east of R3. Views to the southern portion of the Pro-<br>ject will be available.   | Proposed screen planting along western boundary of the Site will assist in screening views to the Project from this residence. Screen planting could be undertaken in consultation with the landowner of R3 to further assist in screening views.        |
| R4   | 111 Blue Hole<br>Road          | 320m<br>(Nearest panel: 570m)   | R4 is elevated above project and views to the Project will be available to the north and east.   | Screen planting could be undertaken in consultation with the landowner of R4 to assist in reducing the potential impact.   |
| R5   | Glenross 455<br>Silverton Road | 317m<br>(Nearest panel: 546m)   | Views to the Project may be available to the south east. Existing scattered vegetation to the south east of the dwelling is likely to fragment views.              | Proposed screen planting along eastern boundary of the Site will assist in screening views to the Project from this residence. Supplementary planting could be undertaken in consultation with the landowner of R5 to further assist in screening views. |
| R6   | 8 Argyle-Mining<br>Road, Metz  | 330m<br>(Nearest panel: 2.68km) | Dwelling is located to the north of the Site on the northern side of Grafton Road. Dense vegetation to the south of the dwelling screens views toward the Project. | Not required.  |
| R7   | 109 Blue Hole<br>Road          | 550m<br>(Nearest panel: 739m)   | Dwelling is in an elevated position and appears to be orientated to the NE towards the Project.  | Proposed supplementary planting to the east of R7, in consultation with the land owner and in keeping with existing band of vegetation would assist in reducing views to the Project from this dwelling.   |
| R8   | 52 Argyle-Mining<br>Road, Metz | 430m<br>(Nearest panel: 2.75km) | Dwelling is located to the north of the Site on the northern side of Grafton Road. Dense vegetation to the south of the dwelling screens views toward the Project. | Not required.  |
| R10  | 597 Gara Road                  | 905m<br>(Nearest panel: 865m)   | The Project is located 905m south east of R3. Views to the northern portion of the Project will be available.  | Screen planting could be undertaken in consultation with the landowner of R10 to assist in reducing the potential impact.  |
| R12  | 761 Silverton<br>Road          | 825m<br>(Nearest panel: 829m)   | Existing wind break planting to the north west is likely to screen the Project from R12.   | Not required.  |

Table 5: Overview of Dwellings within 1000m of the Project

6.0 Visual Impact Assessment

| Dwell-ing   | Location / Name            | Distance to the Site Boundary     | Visual Assessment   | Recommended Mitigation Measures<br>(Refer to Section 7.0)  |
|---|----------------------------|-----------------------------------|---|--|
| Dwellings within between 1000 - 1500m of the Project Boundary |                            |                                   |   |  |
| R9  | 1392 Grafton Road          | 1471m<br>(Nearest panel: 1.79km)  | The Project is likely to be screened by vegetation.                                   | Not required.  |
| R11   | Involved landowner.        |                                   |   |  |
| R13   | Involved landowner.        |                                   |   |  |
| R14   | 132 Milne Road             | 1185m<br>(Nearest panel: 1.63km)  | The Project will be screened by topography.   | Not required.  |
| R15   | 723 Silverton Road         | 1078m<br>(Nearest panel: 1.07km)  | Existing vegetation to the west is likely to screen the Project from R15.             | Not required.  |
| R16   | 1490 Grafton Road, Metz    | 1100 m<br>(Nearest panel: 2.87km) | The proposal will not be visible from this dwelling due to topography and vegetation. | Not required.  |
| R18   | 21 Blue Hole Road          | 1295m<br>(Nearest panel: 1.66km)  | Dwelling is slightly elevated, views will be available to the east.                   | Supplementary planting could be undertaken in consultation with the landowner of R18 to assist in reducing the potential impact. |
| R19   | 7 Argyle-Mining Road, Metz | 1100m<br>(Nearest panel: 3.24km)  | The Project is likely to be screened by a combination of topography and vegetation.   | Not required.  |
| R21   | 128 Milne Road             | 1443m<br>(Nearest panel: 1.97km)  | The southern portion of the Site may be visible.                                      | Screen planting could be undertaken in consultation with the landowner of R21 to assist in reducing the potential impact.        |
| R22   | 711 Silverton Road         | 1500m<br>(Nearest panel: 1.51km)  | The Project will be screened by topography and vegetation.                            | Not required.  |
| R23   | 133 Milne Road             | 1479m<br>(Nearest panel: 2.02km)  | The Project will be screened by a combination of topography and vegetation from R23.  | Not required.  |
| R24   | 1514 Grafton Road, Metz    | 1490m<br>(Nearest panel: 2.95km)  | The proposal will not be visible from this dwelling due to topography and vegetation. | Not required.  |

Table 6: Overview of Dwellings within 1500m of the Project

| Dwell-ing  | Location / Name                    | Distance to the Site Boundary    | Visual Assessment   | Recommended Mitigation Measures<br>(Refer to Section 7.0)   |
|--|------------------------------------|----------------------------------|---|---|
| Dwellings located between 1500 - 2000m of the Project Boundary |                                    |                                  |   |   |
| R17  | 1060 Grafton Road                  | 1964m<br>(Nearest panel: 2.13km) | The Project will be screened by topography.   | Not required.   |
| R25  | 90 Milne Road                      | 1561m<br>(Nearest panel: 2.29km) | Views to the Project may be available to the north east.  | Screen planting could be undertaken in consultation with the landowner of R25 if deemed necessary to assist in reducing the potential impact.   |
| R26  | Kenwood Park 1474 Castledoyle Road | 1560m<br>(Nearest panel: 2.08km) | Vegetation associated with the Oxley Wild Rivers NP is likely to screen views to the Project. Some distant views to the north may be available. | Screen planting to the north could be undertaken in consultation with the landowner of R26 if deemed necessary to assist in reducing the potential impact.  |
| R27  | 'Meroo' 22 Blue Hole Road          | 1750m<br>(Nearest panel: 2.03km) | Views to the Project are likely to be available to the north east.  | Screen planting to the north could be undertaken in consultation with the landowner of R27 if deemed necessary to assist in reducing the potential impact.  |
| R28  | 66 Milne Road                      | 1825m<br>(Nearest panel: 2.53km) | A small portion of the Project may be visible to the north east.  | Screen planting to the north east could be undertaken in consultation with the landowner of R28 if deemed necessary to assist in reducing the potential impact.   |
| R29  | 113 Milne Road                     | 1840m<br>(Nearest panel: 2.43km) | Topography and existing vegetation to the east is likely to screen the Project.   | Not required.   |
| R30  | 73 Milne Road                      | 1923m<br>(Nearest panel: 2.66km) | A small portion of the Project may be visible to the north east.  | Proposed supplementary planting to the north east of R29, in consultation with the land owner and in keeping with existing band of vegetation would assist in reducing views to the Project from this dwelling. |
| R31  | 52 Milne Road                      | 1950m<br>(Nearest panel: 2.62km) | A small portion of the Project may be visible to the north east.  | Screen planting to the north could be undertaken in consultation with the landowner of R31 if deemed necessary to assist in reducing the potential impact.  |
| R32  | 57 Milne Road                      | 1954m<br>(Nearest panel: 2.67km) | A small portion of the Project may be visible to the north east.  | Proposed supplementary planting to the north east of R29, in consultation with the land owner and in keeping with existing band of vegetation would assist in reducing views to the Project from this dwelling. |
| R33  | 1584 Grafton Road                  | 2000m<br>(Nearest panel: 3.38km) | The Project will be screened by topography and vegetation.  | Not required.   |

Table 7: Overview of Dwellings within 1500-2000m of the Project

## 6.0 Visual Impact Assessment

### 6.2 Assessment of Associated Infrastructure

#### 6.2.1 Substation and Battery Storage Facilities

The proposed substation is situated in the northern end of the Site. The footprint of the substation is around 120m x 60m, although only approximately a half of this will be built form. A summary of the proposed infrastructure heights can be found in **Table 3**. The majority of the substation will remain under 10m high, although the lightening poles will reach up to 20m high and the gantry up to 18m high. The proposed substation is located in a generally isolated location. If mitigation methods outlined in Section 7.0 of this report are employed, overtime the proposed substation and battery storage facilities will be screened.

#### 6.2.2 Night Lighting

There will be no permanent night lighting installed within the array. Night lighting will only be used in the case of maintenance and in the event of an emergency and would designed to ensure reduce disturbance to neighbouring properties. Any lighting installed will be in accordance with AS4228-1997 - Control of Obtrusive Effects of Outdoor Lighting.



# 6.0 Visual Impact Assessment

## 6.3 Reflectivity

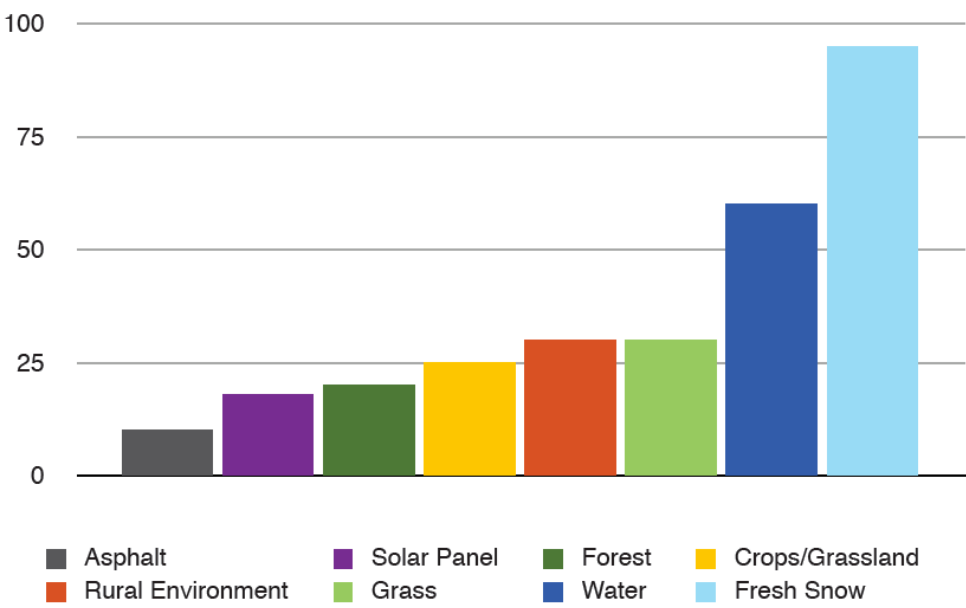
Due to the materials used in the construction of PV panels being primarily glass and steel there is a perceived issue of glint and glare surrounding the reflectivity solar panels. As a result of the perceived reflection levels, there is a concern of possible distractions to motorists, aircraft and the hazard of eye damage.

Solar panels are designed to absorb the sun energy and directly convert it to electricity. Current PV modules absorb approximately 93.5% of the light received. The solar panels are designed using anti-reflective solar glass effectively reducing reflectivity. Thin slivers of metal stripping on the face of the panels further reduce any potential glare issues that may occur.

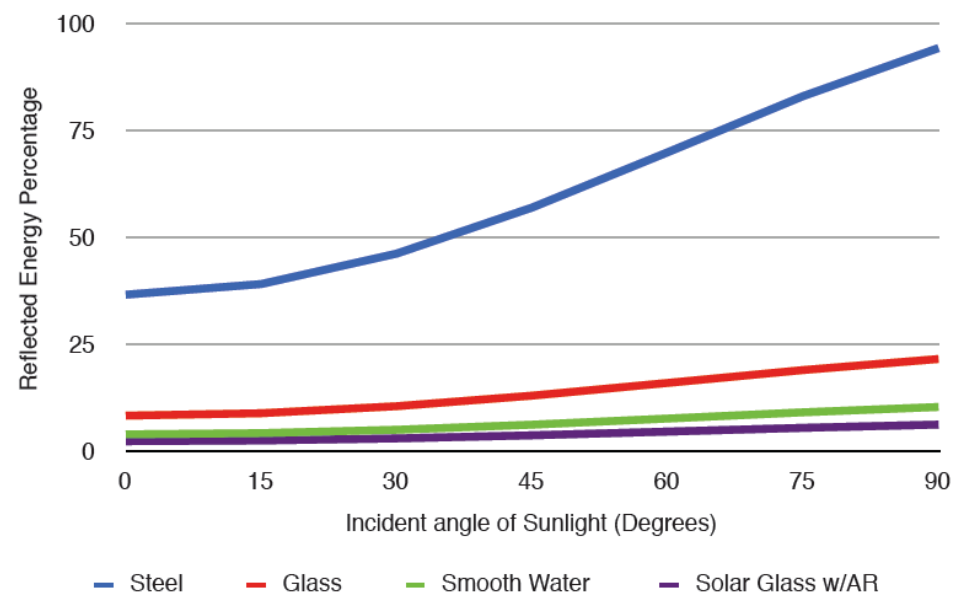
The level of glare and reflectance from the PV solar panels are considerably lower than the level of glare and reflectance of common surfaces, particularly those surrounding the proposed solar plant. The PV panels would reflect approximately 6.5% of energy which is less than typical rural environments which have a reflectivity of approximately 15-30%. It is also worth noting that because they will be single access tracking, the incident angle would be lower than the example given in **Image 16**. **Figure 7 & 8** compare the percentage of reflected energy from common reflective surfaces to that of a PV Solar Panel.



**Image 16.** Example of Solar Panels installed at Manildra Solar Farm (2018)



**Figure 7.** Comparative Reflectivity Analysis



**Figure 8.** Analysis of Typical Material Reflectivity



# 7.0 Mitigation Methods

## 7.1 Recommended Mitigation Methods

These recommendations seek to achieve a better visual integration of the proposed development within the existing landscape character of the area. The mitigation measures suggested in this section are intended to lessen the visual impact of the development whilst ensuring the existing visual character of the area is not altered significantly. This is by no means an exhaustive list however the adoption of these recommendations will assist considerably in ensuring that potential impacts are reduced.

### 7.1.1 Design Considerations

Good design principles employed through the project design phase can significantly reduce the visual impact. These include the siting principles, access, layout and other aspects of the design which directly influence the appearance of the proposed development. The following outlines the design considerations as applied to the site:

- Consideration of potential visual impacts should be considered when siting the PCU's and storage shed within the proposed development footprint. They should be situated at a suitable distance from residences. Excess material should be used to berm the southern section to assist in fragmenting views.
- The design should retain the existing roadside planting along the eastern boundary of the site. This would reduce the overall visual impact of proposed development.
- Consideration should be given to the material and colours of the PCU's, the battery, and storage shed to ensure minimal contrast and to help blend into the surrounding landscape. In general materials should be nonreflective and should be painted in neutral colours that are sensitive to the surrounding landscape.
- Consideration should be given to controlling the type & height of PCU's, the battery, and storage shed to ensure the development does not contrast significantly with surrounding landscape.

### 7.1.2 Vegetation retention

Sparse, scattered vegetation and undulating agricultural land characterise the area. Therefore, the Site has limited existing vegetation to retain. However, existing vegetation should be retained and protected, where possible, during the works to maintain the existing level of screening.

### 7.1.3 Landscaping and Screen Planting

It is recommended that a variety of landscape mitigation strategies are employed to assist in the integration of the proposed development into the existing landscape character. The following outlines the suggested mitigation strategies (refer to **Figure 10**).

1. A wide band of native plantings of trees up to 5-10m in height for the southern boundary of the development site to address potential visual impacts from the Oxley Wild Rivers National Park. These can be positioned in three (3) rows (or approximately 6 - 9m wide) between the property boundary and security fence. The tree canopy should not intrude into the zone that exists between the edge of the security fence and the solar panels (refer to **Figure 9**).

2. Screen planting along Silverton Road to assist in screening views from Dwelling R5 and reducing the visual impact from Silverton Road.

3. Screen planting on the western boundary of the Site to reduce the potential visual impact from R3.

4. Consultation with landowners identified in **Table 5 & 6** within 2000 metres of the Proposed development to undertake screen planting near dwelling as required. Screen planting is to be undertaken in consultation with landowners to ensure desirable views are not diminished.

It is suggested that mitigation methods utilised are in keeping with the existing vegetation typologies (scattered grouping of a variety of natives). It is important that the trees are planted at varying heights and arranged randomly (ie. not straight lines). This ensures a naturalistic effect that blends rather than contrasts with the overall landscape.

The species selected should tolerate severe drought and have low flammability. The species for consideration include;

- Myoporum montanum
- Acacia implexa
- Geijera parviflora

To ensure that mitigation planting is successful all landscape works should be maintained regularly for a period of 24 months.



# 7.0 Mitigation Methods



Image 17: Example of landscape screening along the boundary of a substation - Rothbury NSW. 2012)

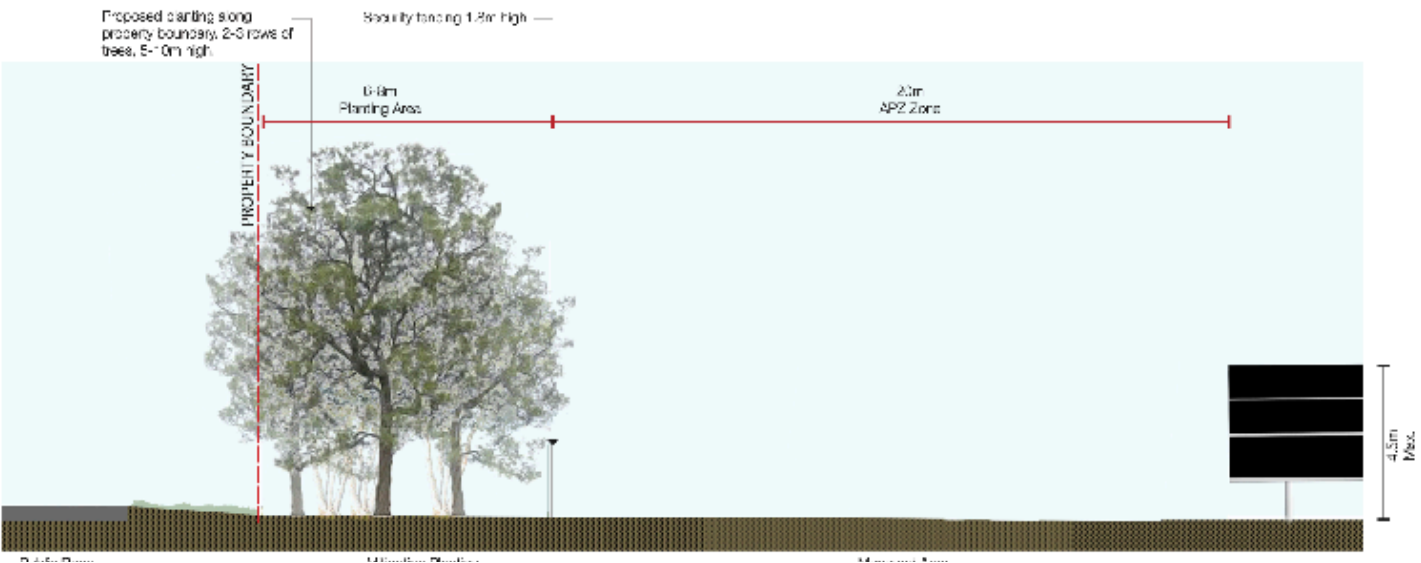


Figure 9: Typical section of proposed screen planting

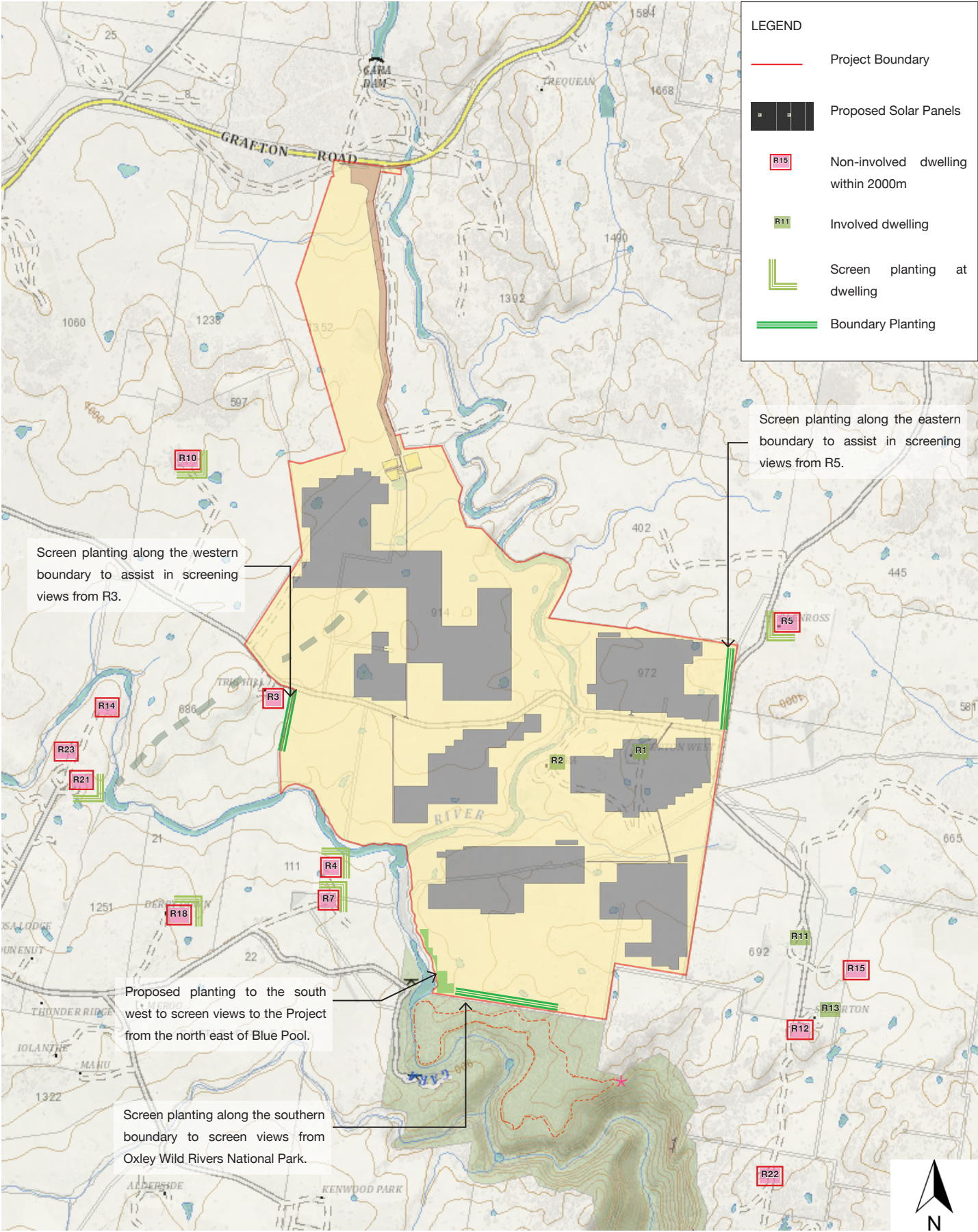


Figure 10. Proposed Mitigation Methods



## 8.0 Conclusion

### 8.1 Conclusion

With all visual impact assessments the objective is not to determine whether the proposal is visible or not, it is to determine how the proposal will impact on existing visual amenity, landscape character and scenic quality. If there is a potential for a negative impact on these factors it must then be investigated and determined how this impact can be mitigated to the extent that the impact is reduced to an acceptable level.

The proposed development has the potential to alter the existing visual character of the area. Although the proposal will contrast with the existing visual landscape it is important to acknowledge that the landscape surrounding the site is a highly modified rural landscape which has been modified for the purpose of commercial farming.

The highest visual impact is likely to be from residences and roads within close proximity to the Project. Dwellings in excess of 2000 metres may have views to the Project, however it likely these would form only a small portion of the broader view from these properties. Beyond this distance there are very few opportunities to view the proposal due to topography, access and the low level of density.

Due to the relatively low height of the panels, the flat topography and the broad scale of the view, recommended mitigation methods such as boundary planting can be very effective in mitigating impacts. It is important to note that the success of vegetative screening is dependant on success during the establishment period. These measures have the potential to minimise the visual impact of the proposal and better integrate the development into the surrounding landscape. With the implementation of the recommended mitigation measures, the proposed development could be undertaken whilst maintaining the core landscape character of the area, and have a minimal visual impact on the surrounding visual landscape.



# References

## PUBLICATIONS AND REPORTS

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## MAPS

Google Maps, 2020 <http://google.com/maps/>

Six Maps