EIS Volume 2 Appendix L

Visual Impact Assessments

L-1: Visual Impact Assessment

L-2: Addendum to the Visual Impact Assessment

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EIS Volume 2 Appendix L-1

Visual Impact Assessment

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Project EnergyConnect – Visual Impact Assessment

16 December 2020

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Abbreviations

Term	Definition
AHD	Above height datum
CLGR	Central Local Government Region of South Australia
DEM	Digital Elevation Model
DAWE	Australian Government Department of the Agriculture, Water and the Environment
EIS	Environmental Impact Statement
EPBC Act	Environment Protection and Biodiversity Conservation Act 1999
GPS	Global Position System
JBS&G	JBS&G Australia Pty Ltd
km	kilometres
kV	Kilovolt
m	metre
m2	Meters squared
mm	Millimetre
NA	Not applicable
NSW	New South Wales
OPGW	optical ground wire
SA	South Australia
SA EPA	SA Environmental Protection Act 1993
STRM Plus V3	Shuttle Radar Topography Mission Plus Version 3
TZVI	Theoretical Zone of Visual Influence
VIA	Visual Impact Assessment
VLT	visual landscape types
VP	Viewpoint
WA EPA 2018	Western Australia Environmental Assessment Guideline for Environmental factors and objectives

Glossary of Technical Terms

Term	Definition
Bioregion	A large, geographically distinct area of land with common characteristics such as geology, landform patterns, climate, ecological features and plant and animal communities.
Project area	The area which falls within the Theoretical Zone of Visual Influence.
Magnitude of change	The degree to which the Project infrastructure will visually change the landscape on which is occurs.
Project	The South Australian portion of Project EnergyConnect infrastructure including substation, towers, conductors, access tracks.
Receptor	Any human which will be able to see the Project infrastructure.
Sensitivity to change	The degree to which the Project area's existing visual environment can undergo.
Theoretical Zone of Visual Influence (TZVI)	The area within which the Project infrastructure is theoretically visible.
Theoretical visual impact	The modelled degree of change that a development causes on a landscape.
Visual absorption capacity	The ability of a landscape to hide a development. This is influenced by elements such as the presence of rugged terrain, vegetation height and density, the presence of man-made structures and dominant land use.
Visual landscape type	An area that can be described, assessed and classified based on distinctive visual elements and common visual characteristics.
Visual impact	The degree to which the Project changes the visual character of landscape.

Executive Summary

JBS&G has been appointed by ElectraNet to undertake a Visual Impact Assessment (VIA) for a high voltage electricity transmission interconnector proposed between Robertstown in South Australia (SA) and Wagga Wagga in New South Wales (NSW), with an added connection from Buronga in NSW to Red Cliffs in north-west Victoria.

The VIA contributes to the Environmental Impact Statement (EIS) for the ElectraNet portion (the Project) of Project EnergyConnect within South Australia. The proposed alignment of the Project extends approximately 200 km from Robertstown in the west to the SA/NSW border near Renmark in the east.

Through the use of spatial data analysis and photomontages, the visual impact of the Project was modelled. The analysis concluded that the Project area, defined as the Theoretical Zones of Visual Influence (TZVI) had a maximum radius of 6.2 km from each tower location.

The visual impacts were rated from High Visibility, to Negligible Visibility, based on the outcome of the analysis. The descriptions of the VIA analysis outcomes are summarised in **Table 1**.

Table 1: Visual Impact Matrix

Description	Modelled visual impact rating	Percentage of surface area of total TZVI within each impact zone
Developments dominate the visual field and dramatically alter the landscape.	High Visibility	0.3%
Developments are very obvious in the visual field and alter the landscape.	Moderate Visibility	2.6%
Developments are obvious, but do not dominate the landscape.	Low Visibility	1.5%
Developments can be seen in the visual field and alter the landscape to a small degree.	Very Low Visibility	8.1%
Limited/no visual effect on the landscape, visible as a very minor feature in some locations.	Negligible Visibility	87.4%

Following analysis, over 87% of the Project area falls within the Negligible Visibility zone, with 8% of the surface area falling within the Very Low Visibility zone. The Low and Moderate Visibility zones each covered approximately 2%, with less than 0.5% of the area falling into the High Visibility zone.

Visual Impacts from Social Receptor Locations

Social receptors included residential properties (those in towns, and those in agricultural settings) and structures for intermittent/transient residency. Most (463) were located within the Negligible Visibility zone, with an additional 11 receptors within the Very Low Visibility Zone. Very few residential properties were located within the Low (2), Moderate (1), and High Visibility zones (1).

Views from Town Centres

The Project will not be visible from the town centres located near the proposed alignment (Morgan, Cadell and Renmark), as these centres all fall outside of the TZVI. The Project may be slightly visible from some properties located to the north of these towns, but generally local vegetation shielding will mitigate views of the Project infrastructure.

Robertstown residents on the eastern side of the settlement may observe elements of the Project in the distance, but these views will not be dominated by the Project. The substation, and connecting transmission towers are the key infrastructure elements which will be approximately 5.5 km away and will be largely shielded by topographic barriers.

The settlement of Cooltong will likely experience higher degrees of visual impact as the Project traverses the southern boundary of Calperum Station, and north of the Cooltong Conservation Park.

Views in this area will be mitigated by the existing electricity distribution infrastructure, and vegetation shielding within the vicinity of most of the properties.

Visual Impacts from Roads

Views of the Project from major and minor roads within the TZVI will be possible for short sections of a journey. Visual impacts of the Project from most of the road users on the western end of the Project area will be mitigated by other transmission lines which are currently present in the area. Due to the transient nature of the views from roads users, visual impacts will be mitigated by the short duration of the views, and the presence of existing transmission infrastructure along the Goyder Highway.

Views of the centre portion of the Project will generally be mitigated by the low receptor numbers as there are few roads, and those that are present are generally used for private property access.

On the eastern end of the Project, views of the Project will be possible from the Wentworth-Renmark Road which runs immediately adjacent to the transmission lines. There are very few visual mitigation factors for receptors travelling along this road as there are no existing distribution or transmission lines, and the vegetation provides little visual mitigation due to close proximity of the transmission alignment.

Visual Impacts from Tourism Areas

The key regional tourism areas are located within close proximity to the River Murray. Views of the Project will not be possible from the river, or its immediate surrounds due to topographic barriers, and vegetation shielding preventing views to the north.

Other areas of conservation importance, such as Calperum and Taylorville Stations, receive low visitor numbers in the proximity of the proposed alignment. Visitors approaching the Calperum area will be visually impacted by the proposed transmission lines adjacent to the Renmark-Wentworth Road, but these views will only extend for approximately 6 km to the north into the station.

Mitigation of Visual Impacts

Visual impacts related to the Project have been mitigated where possible through routing away from visual receptors and visually sensitive landscapes and through design of Project elements to reduce visual massing. In addition, the proposed alignment has been selected to abut existing transmission infrastructure where possible.

1. Introduction

1.1 Project Background

Project EnergyConnect is a proposed high voltage electricity transmission interconnector to be constructed between Robertstown in South Australia (SA) and Wagga Wagga in New South Wales (NSW), with an added connection from Buronga in NSW to Red Cliffs in north-west Victoria.

The owner and operator of the South Australian transmission network, ElectraNet, has partnered with TransGrid, the manager and operator of the high voltage electricity transmission network in NSW, to deliver Project EnergyConnect which will ultimately be built, owned, operated and maintained by the two respective parties (ElectraNet and TransGrid). ElectraNet would be responsible for constructing and operating the SA portion of Project EnergyConnect from Robertstown to the SA / NSW Border (hereafter referred to as 'the Project') as seen in **Figure 1.**

The Project area for the purposes of the Visual Impact Assessment (VIA) is defined as the outer limit of the Theoretical Zone of Visual Influence (TZVI) of the tallest infrastructure element of the Project. The TZVI is an area 6.2 km from the centre of the proposed alignment.

JBS&G Australia Pty Ltd (JBS&G) has been engaged by ElectraNet to undertake a specialist Visual Impact Assessment (VIA) for the Project.

1.2 Visual Impact Assessment Objectives and Purpose

This specialist report has been prepared to support the Environmental Impact Statement (EIS) for the Project and provides an overview of the existing environment relevant to visual amenity, sensitivity of the landscape to change, the degree of visual exposure and potential change that may result due to the construction and operation of the Project.

The objectives of the VIA are to:

- Describe the existing baseline landscape character and resources within which the Project is set
- Provide a description of the proposed Project and associated activities that affect the visual environment
- Identify and assess the magnitude of change to the visual environment resulting from the proposed Project
- Calculate the visual impact on selected viewpoints within the Project area.

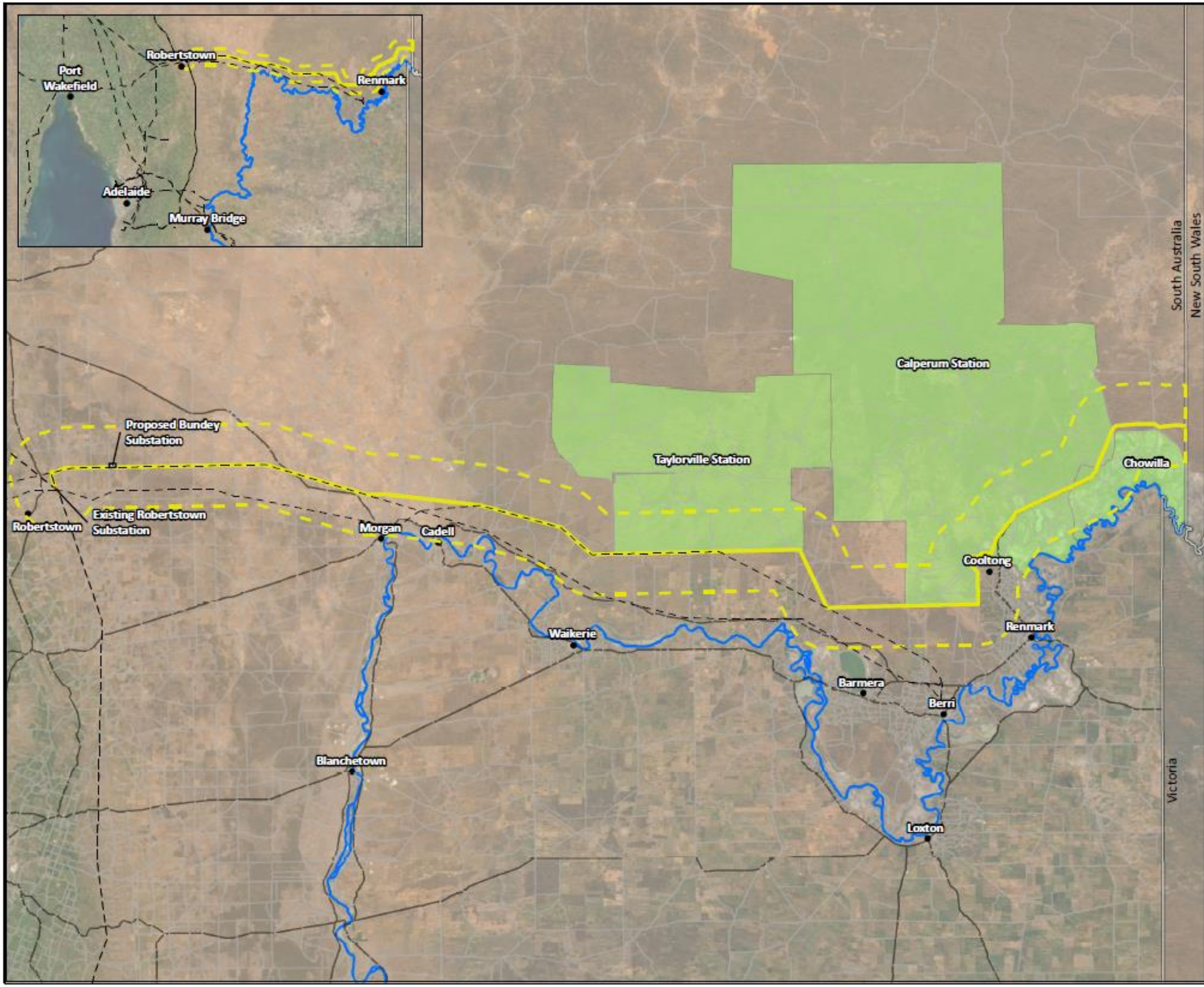
1.3 Scope of Works

The scope of works addressed during this VIA includes the following:

- Identify and describe visual elements within the Project area, encompassing natural and built forms
- Model the proposed development, determining the associated magnitude of change
- Identify key viewpoints affected by the Project
- Utilize the model to calculate the anticipated visual impact
- Verify/support modelled results with field analysis
- Identify and discusses potential impact events and proposed controls and mitigation strategies

- Present the outcomes of the impact assessment, including any additional mitigation measures where relevant.

Figure 1
Project Location



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2. Legislative Context and Guidelines

To ensure best practice and compliance with all relevant legislation and guidance, the VIA was taking into account the following guidance:

- The EIS Guidelines
- The Commonwealth *Environment Protection Biodiversity and Conservation 1999*
- South Australian planning assessment provisions
- Other State government guidance documents

2.1 EIS Guidelines

The EIS Guidelines issued by the State Planning Commission (SPC) on 12 November 2019, set out the level of assessment, the potential issues associated with the Project along with their scale of risk, as determined by the SPC. The EIS assessment requirements specific to visual impact assessment are included in Assessment Requirement 8 as detailed below.

> ***Assessment Requirement 8.1*** *Describe the effects of the proposal on the visual amenity and landscape quality for residents, visitors and tourists (especially near the River Murray Valley, major road crossings and other sensitive landscapes). Refer to construction, operation, maintenance and decommissioning aspects of the proposal, and outline the methodology adopted for classifying landscapes and assessing visual and landscape impacts.*

> ***Assessment Requirement 8.2*** *Describe alternative measures for minimising potential loss of visual amenity (e.g. structural design and placement, screening) and detail any compensatory and site rehabilitation measures that will be undertaken to minimise visual impacts as a result of vegetation clearance.*

These requirements are addressed within this report.

2.2 State Planning Policies, Planning and Design Code and Development Plans

Guidance for assessment and management of visual impacts of significant infrastructure is provided in the State's statutory planning framework.

2.2.1 Planning Policies

The State Planning Policy for Energy notes the role that the planning system plays in reducing the impacts of energy infrastructure including visual amenity, health, noise, public safety and maintenance. This is reflected in the Regional Plans relevant to the Project (Mid North, Murray and Mallee, and Far North) which form part of the State Planning Strategy and provide for:

- avoiding development in areas with significant landscapes
- avoidance of visual impacts through site selection; and
- design to minimise visual intrusiveness.

2.2.2 Design and Siting

Guidance on addressing potential visual impacts from development is further provided under the *Planning, Development and Infrastructure Act 2016* (PDI Act) and the *Development Act 1993*. The Project is being assessed as a Major Project under the Development Act which is in the process of being replaced by the PDI Act (due to be fully implemented in the first quarter of 2021). Due to the ongoing transition, the majority of the Project is located within local government areas which are now subject to the new Planning and Design Code (the Code) which has replaced Council

Development Plans. The exception is the Mid-Murray Council where the Development Plan remains in place, until the full roll-out of the PDI Act expected in the first half of 2021 (refer **Figure 2**).

Planning Code

The Planning and Design Code makes provision for the design and siting of structures to reduce aesthetic impacts to rural vistas (Remote Areas Zone PO 2.2), minimise impacts on the natural environment (Conservation Zone PO 4.1) , and seeks to avoid obscuring existing public views to landscape and visibility from key public vantage points (Conservation Zone PO 4.4).

The Infrastructure and Renewable Energy Facilities General Development Policy PO 2.1 aims to ensure the efficient provision of infrastructure to support renewable energy facilities in a manner that minimises hazard, is environmentally and culturally sensitive and manages adverse visual impacts. The policy covers the visual impact of above ground infrastructure, networks and services, renewable energy facilities, energy storage facilities and ancillary development from townships, scenic routes and public roads is minimised and managed by:

a. utilising features of the natural landscape to obscure views where practicable;

b. siting development below ridgelines where practicable;

c. avoiding visually sensitive landscapes;

d. using materials and finishes with low reflectivity and colours that complement the surroundings;

e. (using existing vegetation to screen buildings; and

f. incorporating landscaping or landscaped mounding around the perimeter of a site and between adjacent allotments used for residential or other sensitive land uses.

Mid Murray Council Development Plan

Accommodation of renewable energy facilities and ancillary developments such as connecting powerlines where appropriately sited is envisaged by the objectives of the relevant zones traversed by the alignment in the Mid Murray Council Development Plan (Enterprise Zone and Rural Zone Policy Area Number 15 – Pastoral Policy Area). The Development Plan acknowledges that in order to take advantage of the natural resource upon which they rely, such facilities may need to be visible from scenic routes and valuable scenic and environmental areas.

The Development Plan also seeks to minimise visual impacts to the scenic route along the Goyder Highway, while the General Section – Siting and Visibility stated objective is the *'Protection of scenically attractive areas, particularly natural, rural and coastal landscapes'.*

In addition, the principle of development control 162 in the Development Plan is also relevant providing that:

Development should be sited and designed to minimise its visual impact on:

a) the natural, rural or heritage character of the area

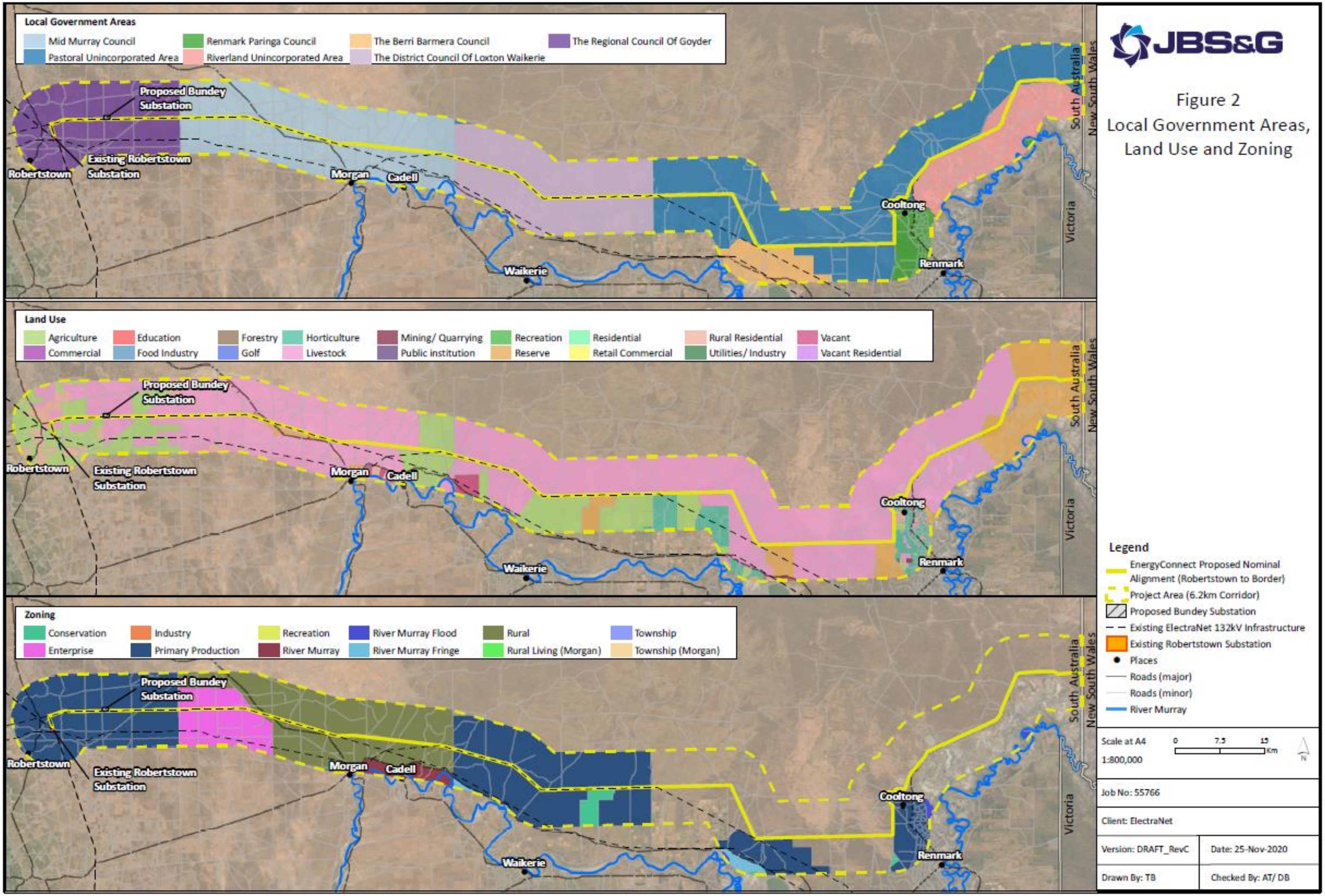
b) areas of high visual or scenic value, particularly rural areas, the natural character of the Mount Lofty Rangers, and its skyline and riverine areas

c) views from the River Murray, public reserves, tourist routes, walking trails and [identified] scenic routes.

Other Guidelines and Publications

As there are no recognised or standard visual assessment methodologies at federal, state or local government levels, this VIA has been designed to align with 'best practice' by utilising the following documents:

- Guidelines for Landscape and Visual Impact Assessment (Third edition) (2013), Landscape Institute
- Guidance Note for Landscape and Visual Assessment (2018), Australian Institute of Landscape Architects
- Western Australia Environmental Assessment Guideline for Environmental factors and objectives (WA EPA 2018)
- Visual Landscape Planning in Western Australia (2007), A manual for evaluation, assessment, siting and design, Western Australian Planning Commission
- Swanwick, C (2013), Guidelines for Landscape and Visual Impact Assessment. 3rd ed. United Kingdom: Landscape Institute and Institute of Environmental Management and Assessment
- Lothian, A (2000), Landscape Quality Assessment of South Australia. PhD Thesis Adelaide University.


Local Government Areas
Mid Murray Council
Pastoral Unincorporated Area
Renmark Paringa Council
Riverland Unincorporated Area
The Berri Barmera Council
The District Council Of Loxton Waikerie
The Regional Council Of Goyder
Proposed Bundey Substation
Existing Robertstown Substation
Robertstown
Morgan
Cadell
Waikerie
Cooltong
Renmark
South Australia
New South Wales
Victoria
Land Use
Agriculture
Commercial
Education
Food Industry
Forestry
Golf
Horticulture
Livestock
Mining/ Quarrying
Public institution
Recreation
Reserve
Residential
Retail Commercial
Rural Residential
Utilities/ Industry
Vacant
Vacant Residential
Zoning
Conservation
Enterprise
Industry
Primary Production
Recreation
River Murray
River Murray Flood
River Murray Fringe
Rural
Rural Living (Morgan)
Township
Township (Morgan)
JBS&G
Figure 2
Local Government Areas, Land Use and Zoning
Legend
EnergyConnect Proposed Nominal Alignment (Robertstown to Border)
Project Area (6.2km Corridor)
Proposed Bundey Substation
Existing ElectraNet 132kV Infrastructure
Existing Robertstown Substation
Places
Roads (major)
Roads (minor)
River Murray
Scale at A4
0
7.5
15
Km
1:800,000
N
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3. Existing Landscape - The Receiving Environment

The proposed Project infrastructure will be located within a variety of landscape types which will provide context to the perception of potential receptors of the various infrastructure elements.

Section 3.1 below outlines the biophysical visual environment surrounding the Project, and potential receptors of the visual effect of the Project are identified in **Section 3.2.**

3.1 Bioregions and Visual Landscape Types

The Commonwealth Department of Agriculture, Water and the Environment (DAWE) defines a bioregion as a '*large, geographically distinct area of land with common characteristics such as geology, landform patterns, climate, ecological features and plant and animal communities*'[1].

The Project traverses three bioregions[2] within which JBS&G has defined eight visual landscape types (VLT). A VLT is an area that can be described, assessed and classified based on distinctive visual elements and common visual characteristics.

Table 3.1 summarises which VLTs are located within each bioregion and assigns a scenic quality rating to each VLT.

Table 3.1: Bioregion and Visual Landscape Type

Bioregion	Visual Landscape Type	Project Chainage (km)/ % of total alignment length intersect	Scenic Quality	Local Government Area	Zone (P&D Code and Development Plan)	Land uses mapped
Flinders Lofty Block	Low Hills	0 - 7.84 3.84%	Moderate	Regional Council of Goyder	• Township and Settlement • Rural	Agriculture Commercial Education Livestock Public institution Recreation Reserve Residential Retail commercial Rural residential Utilities / Industry Vacant urban land
Murray Darling Depression	Degraded Agriculture Plains	7.84 - 66.47 28.68%	Low	Regional Council of Goyder Mid Murray Council	• Rural Intensive Enterprise • Enterprise (MMC) • Primary Production • Rural • Rural Living (Morgan)	Agriculture Livestock Mining / Quarrying Reserve Rural residential Utilities / Industry

[1] Australia's bioregion framework https://www.environment.gov.au/land/nrs/science/ibra/australias-bioregion-framework accessed 04/03/19

[2] Based on the Interim Biogeographic Regionalisation for Australia Sourced from Nature Maps from http://spatialwebapps.environment.sa.gov.au/naturemaps/?locale=en-us&viewer=naturemaps accessed 04/03/19

Bioregion	Visual Landscape Type	Project Chainage (km)/ % of total alignment length intersect	Scenic Quality	Local Government Area	Zone (P&D Code and Development Plan)	Land uses mapped
	Dryland Agriculture	66.47 – 103.45 18.09%	Moderate	District Council of Loxton Waikerie Mid Murray Council	• Conservation • Primary Production • Rural	Agriculture Livestock Reserve Utilities / Industry
	Murray Darling Depression Irrigated Agriculture	103.45 – 119.68 7.94%	Moderate	District Council of Loxton Waikerie Pastoral Unincorporated Area The Berri Barmera Council	• Conservation • Rural	Agriculture Horticulture Livestock Reserve Vacant Rural residential
	Mallee Dunefield	119.68 – 159.62 19.54%	High	District Council of Loxton Waikerie Mid Murray Council Renmark Paringa Council Berri Barmera Council Pastoral Unincorporated Area Riverland Unincorporated Area	• Conservation • Remote Area • Rural	Agriculture Horticulture Livestock Reserve Vacant Rural residential
Riverina	Irrigated Agriculture	159.62 – 167.07 3.64%	Low	Renmark Paringa Council Pastoral Unincorporated Area Riverland Unincorporated Area	• Conservation • Rural • Rural Horticulture	Agriculture Education Food Industry Horticulture Livestock Mining / Quarrying Public institution Reserve Rural residential Utilities / Industry
	Eastern Riverina	167.07 – 204.42 18.27%	High	Renmark Paringa Council Pastoral Unincorporated Area Riverland Unincorporated Area	• Conservation • Rural Horticulture • Remote Area	Forestry Horticulture Livestock Reserve Rural residential Utilities / Industry
	Western Riverina	0 – alignment bypasses the VLT, but is falls within the TZVI	Moderate	District Council of Loxton Waikerie Mid Murray Council	• Conservation • Rural • Industry • Recreation • River Murray • Rural Living (Morgan) • Township (Morgan)	Agriculture Commercial Golf Horticulture Livestock Public institution Recreation Reserve Residential Retail commercial Rural residential

Bioregion	Visual Landscape Type	Project Chainage (km)/ % of total alignment length intersect	Scenic Quality	Local Government Area	Zone (P&D Code and Development Plan)	Land uses mapped
						Utilities / Industry Vacant residential

The bioregions are shown in **Figure 3** and the derived VLTs are presented in **Figure 4.**

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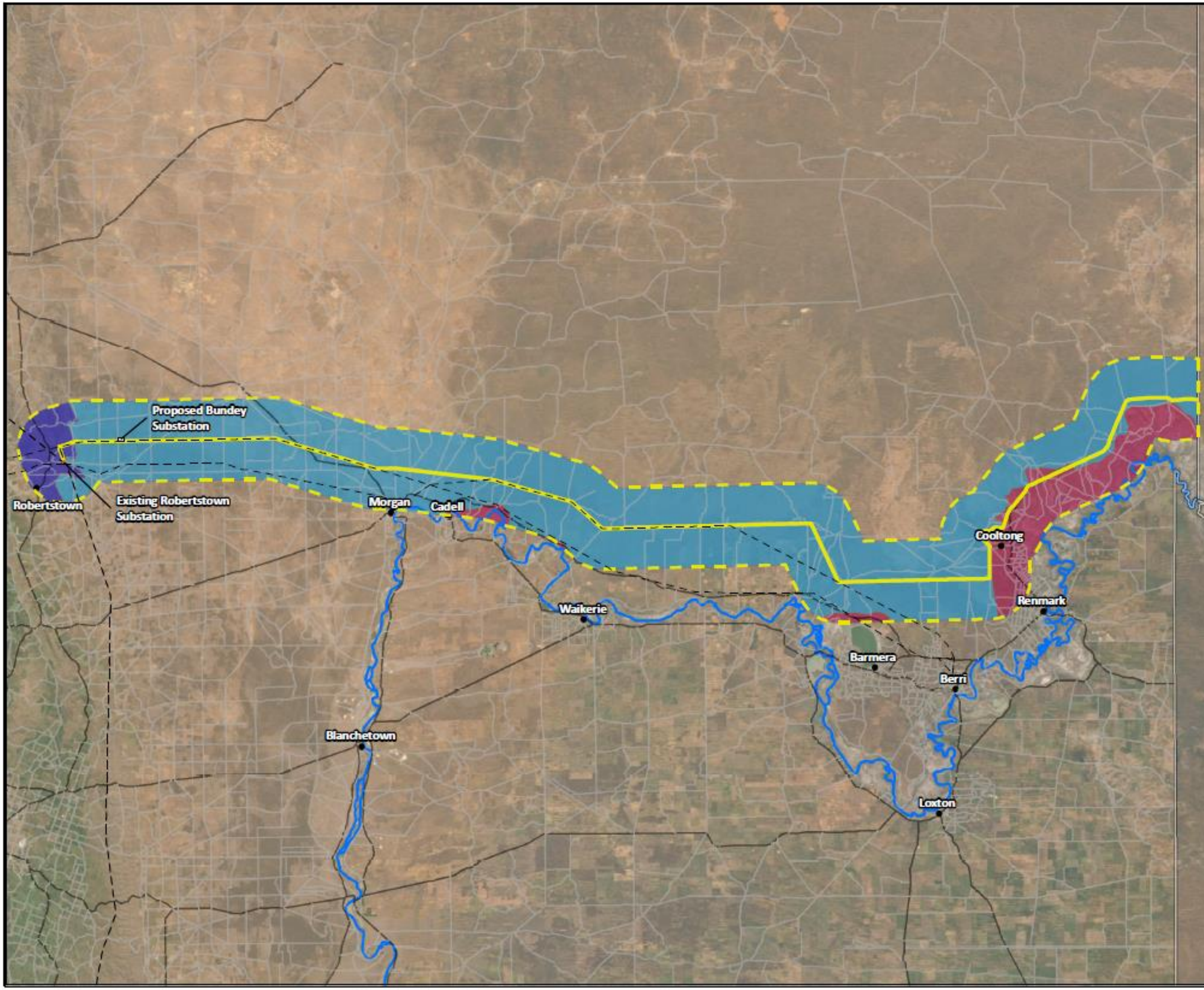
Figure 3
Bioregions



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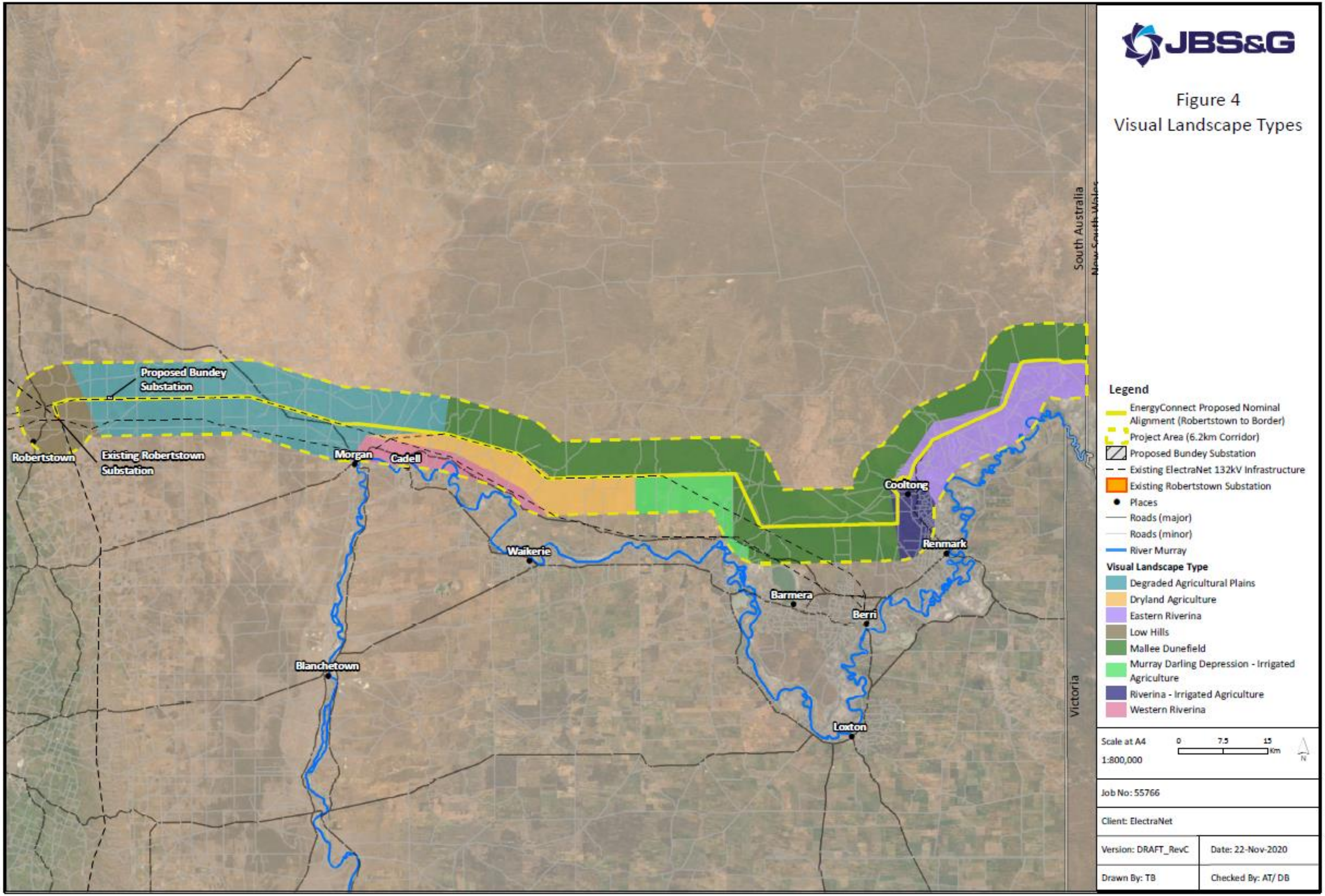

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Figure 4
Visual Landscape Types
Proposed Bundey Substation
Robertstown
Existing Robertstown Substation
Morgan
Cadell
Waikerie
Cooltong
Renmark
Barmera
Berri
Blanchetown
Loxton
South Australia
New South Wales
Victoria
Legend
EnergyConnect Proposed Nominal Alignment (Robertstown to Border)
Project Area (6.2km Corridor)
Proposed Bundey Substation
Existing ElectraNet 132kV Infrastructure
Existing Robertstown Substation
Places
Roads (major)
Roads (minor)
River Murray
Visual Landscape Type
Degraded Agricultural Plains
Dryland Agriculture
Eastern Riverina
Low Hills
Mallee Dunefield
Murray Darling Depression - Irrigated Agriculture
Riverina - Irrigated Agriculture
Western Riverina
Scale at A4
1:800,000
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3.1.1 Flinders Lofty Block Bioregion

A small area of the westernmost portion of the Project area is situated within the low hills of the Flinders Lofty Block bioregion. This region is characterised by ranges and hills with extensive rock outcrops, shallow soils with basin plains and narrow valleys[3].

Low Hills Visual Landscape Type

The low hills area is characterised by loamy soils with weak pedologic development, sparse low shrublands on plains between undulating hills, and Mallee woodland eucalyptus on the crest of hills. Spring Hut Creek and its tributaries are present in this landscape type. Significant clearing for agricultural purposes has confined remnant native vegetation primarily to hills, watercourses and road reserves, as shown in **Plate 1**.

Plate 1: Image of a typical Low Hills VLT

The dominant land use in the area is agricultural, with scattered farm residences and a range of road types which could be used for both commercial and tourism purposes. The small town of Robertstown is situated in the Low Hills and is the hub of the local farming community. The Ngadjuri Nation Native Title Claim Area (SC2011/002) loosely correlates with the Low Hills VLT.

3.1.2 Murray Darling Depression Bioregion

The majority of the Project area is categorised as the Murray Darling Depression which is characterised by a depositional plain situated on the flat plains east of the Low Hills VLT. This bioregion is characterised by a semi-arid dry climate and plains with variable dune coverage. The presence of claypans and saline soils host Mallee woodland, heath, and chenopod shrubland[4].

[3] Sourced from https://www.environment.gov.au/system/files/resources/a8015c25-4aa2-4833-ad9c-e98d09e2ab52/files/bioregion-flinders-lofty-block.pdf accessed 04/03/19

[4] Sourced from https://www.environment.gov.au/system/files/resources/a8015c25-4aa2-4833-ad9c-e98d09e2ab52/files/bioregion-murray-darling-depression.pdf accessed 04/03/19

Degraded Agricultural Plains Visual Landscape Type

This landscape type dominates the western extent of the Project area. The soils are highly calcareous loamy earths with yellow to grey cracking clays. As shown in **Plate 2**, the predominant vegetation is low-lying shrubs. The population density is sparse and farmhouses are scattered throughout the area with sealed and unsealed roads present. This VLT is characterised by relatively flat terrain with no specific focal aesthetic features, and no significant waterbodies present. A small ephemeral watercourse, Burra Creek, flows through this VLT. The White Dam Conservation Park runs alongside the Goyder Highway in this area and covers approximately nine square kilometres.

Plate 2: Image showing Degraded Agricultural Plains VLT

Dryland Agriculture Visual Landscape Type

This area is located to the south of the proposed alignment from Cadel in the west to near Devlin's pound in the east. The visual landscape type is characterised by a matrix of cleared fields, where native Mallee has been removed, and appears to be utilised primarily for grazing. The matrix of fields also consists of some ploughed lands which have no vegetation cover. The topography of the area is generally flat and featureless.

Plate 3: Image showing Dryland Agriculture VLT. (Source: ElectraNet)

Mallee Dunefield Visual Landscape Type.

This is the largest VLT within the Project area. This landscape possesses the highest density of vegetation cover, with a low to medium sized understory. The soils are characterised by brown calcareous soils with variable dune cover, as presented in **Plate 4** ephemeral waterbodies are present and there are numerous reserves utilised for tourism, scientific and recreational purposes. The population density within this area is very low. The VLT contains large portions of both Taylorville Station and Calperum Station.

Plate 4: Image of Mallee Dunefield VLT

Irrigated Agriculture Visual Landscape Type

As presented in **Plate 5** this landscape type is characterised by a gently undulating to flat topography with calcareous soils that have been cleared of native vegetation for intensive irrigated horticulture activities. The population density is sparse, with few residences in the area. Due to the presence of agriculture infrastructure and lack of vegetation, the VLT is highly modified.

Plate 5: Image of Irrigated Agriculture landscape

3.1.3 Riverina Bioregion

This area is characterised by the floodplains, terraces, residual islands and lakes of the lower Murray River. It supports many flora and fauna species, hosted by eucalyptus woodlands with a shrubby understory.

Western Riverina Visual Landscape Type

As shown in **Plate 6**, the western section of the Riverina hosts views of the Murray River. There is an increase in height and density of vegetation underlain by brown sands, which consists of eucalyptus woodlands and irrigated horticultural lands (fruit orchards). This landscape type hosts scattered residences along the river banks as well as a number of camping and recreation sites. The townships of Morgan and Cadell are located here. The First Peoples of the River Murray and Mallee Region Native Title Determination Area (SCD2011/002) covers the Murray River and associated waterbodies.

Plate 6: Image showing Western Riverina VLT

Eastern Riverina Visual Landscape Type

This area includes the Riverland Ramsar site which hosts extensive flood plains, islands, lakes and wetlands. As depicted in **Plate 7**, this landscape comprises low lying shrub plains with views towards the vast low-lying wetlands of the River Murray floodplain. This landscape also comprises the township of Cooltong and the development of infrastructure has been limited. The First Peoples of the River Murray and Mallee Region Native Title Determination Area (SCD2011/002) covers the Murray River and associated waterbodies.

The VLT contains portions of both the Calperum Station and Chowilla stations.

Plate 7: Image showing Eastern Riverina VLT

Riverina Irrigated Agriculture Visual Landscape Type

The landscape is characterised by a gently undulating to flat topography hosting a mixture of irrigated agricultural activities shown in **Plate 8**. This VLT largely consists of vineyards and orchards with scattered native eucalyptus vegetation. This VLT also comprises the township of Cooltong and dispersed agricultural residences.

Plate 8: Image of Riverina Irrigated Agriculture VLT

3.2 Potential Visual Receptors

3.2.1 Receptor Identification

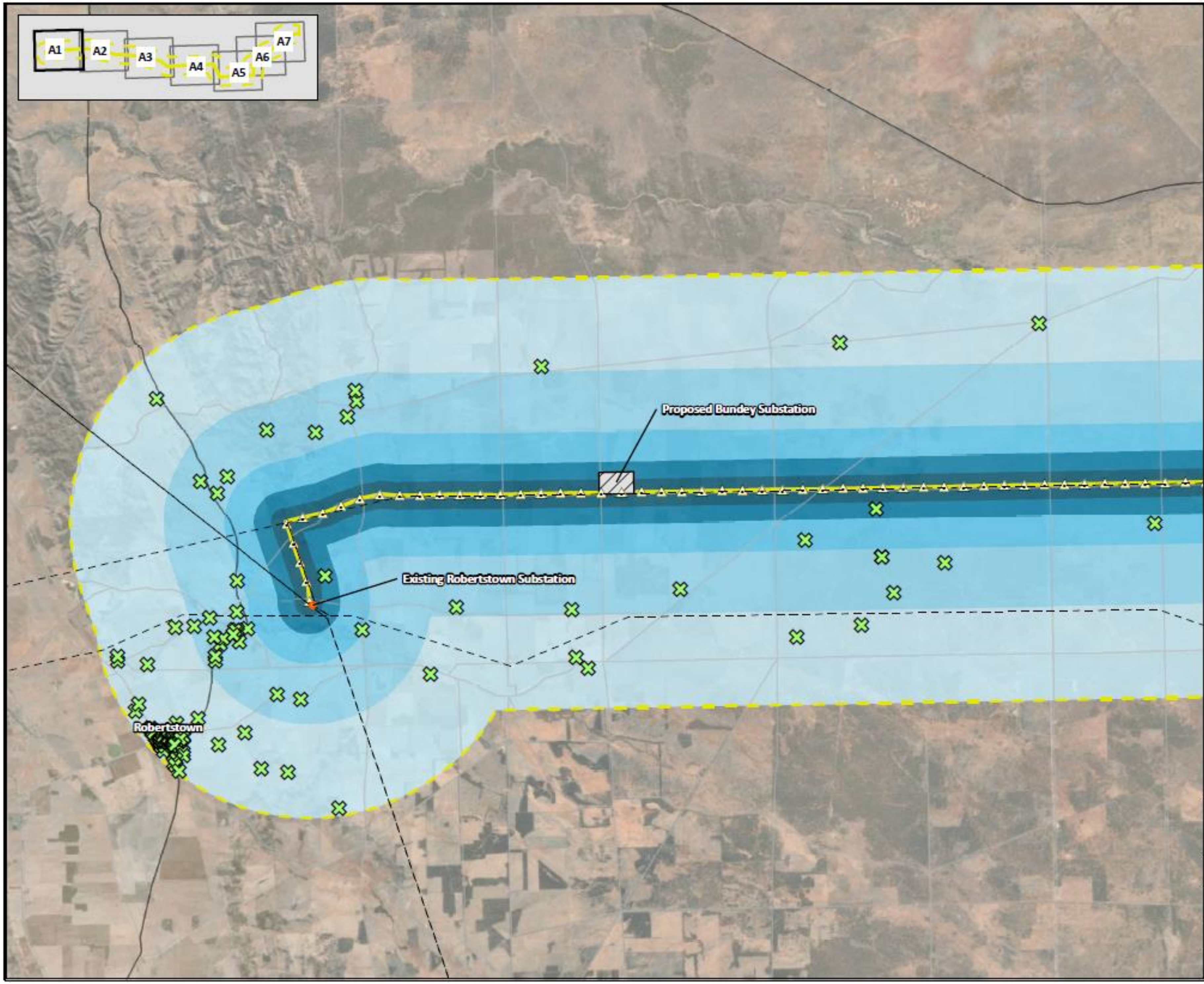
Receptors have been identified through a two-stage process as discussed below, and where possible, these have been verified through the public consultation process and field investigations.

3.2.1.1 Stage 1

A desktop review of relevant online databases and aerial imagery was undertaken to identify potential receptors. To ensure a thorough assessment of the landscape and inclusion of all potentially sensitive receptors, a data review was undertaken of the following sources of information and databases:

- Australian collaborative land use and management program
- Land development zones
- Land use generalised
- Local, State and Government registered towns
- South Australian heritage places.

All potential visual receptors identified as part of the receptor identification process are presented in **Figure 5 A1-A7**.



JBS&G

Figure 5: A1
Potential Visual Receptors

Legend

- EnergyConnect Proposed Nominal Alignment (Robertstown to Border)
- Proposed 64.5m Tower
- Project Area (6.2km Corridor)
- Proposed Bundey Substation
- Existing ElectraNet 132kV Infrastructure
- Existing Robertstown Substation
- Places
- Roads (major)
- Roads (minor)
- River Murray
- Potential Visual Receptors

Distance from Proposed Project Infrastructure

- 0 - 400m
- 401 - 900m
- 901 - 1,750m
- 1,751 - 3,500m
- 3,501 - 6,200m

Note: Legend is reflective of Figure 5: A1 to A7

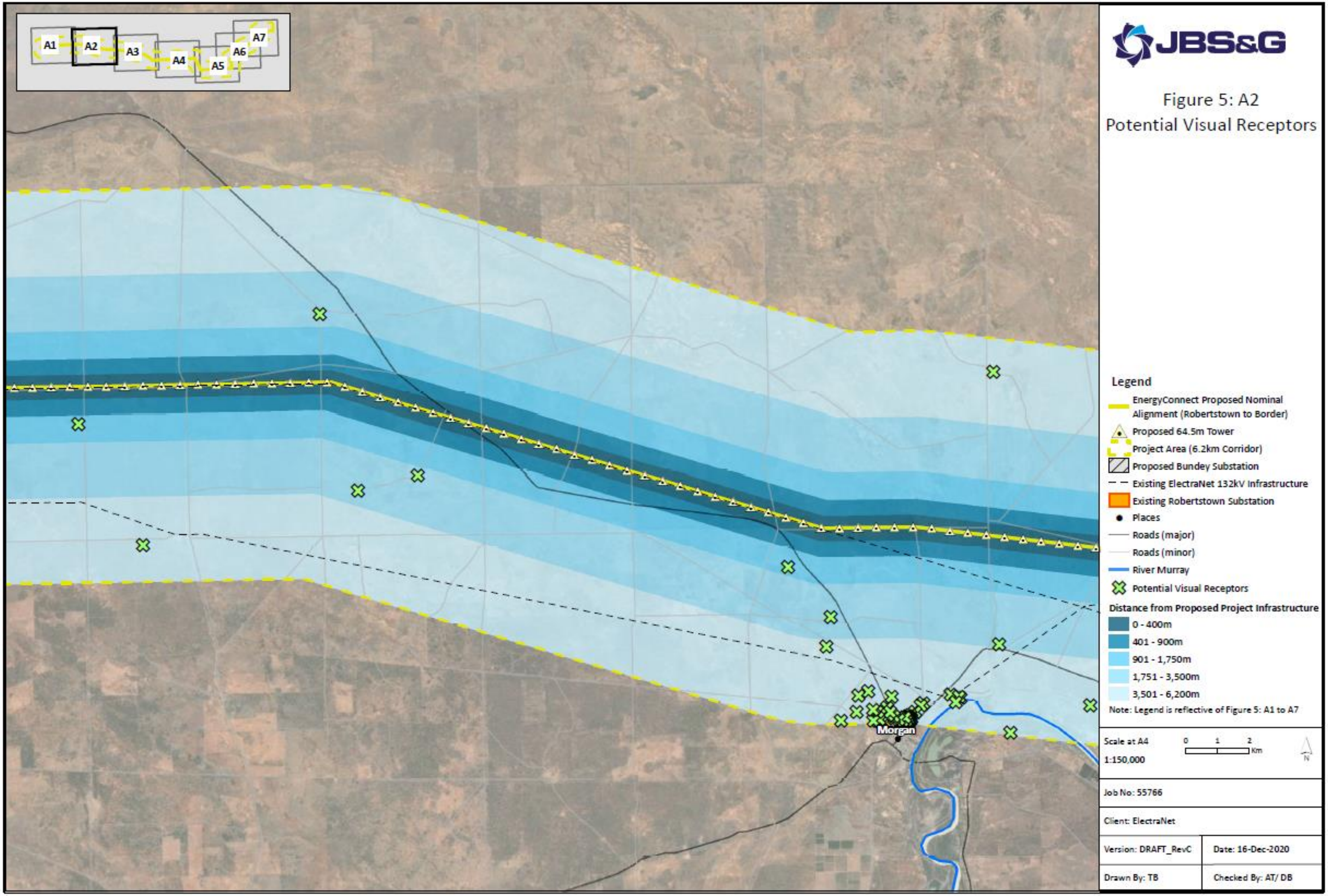
Scale at A4 1:150,000 — 0 1 2 Km — N

Job No: 55766

Client: ElectraNet

Version: DRAFT_RevC | Date: 16-Dec-2020

Drawn By: TB | Checked By: AT/ DB


A1
A2
A3
A4
A5
A6
A7
Morgan
JBS&G
Figure 5: A2
Potential Visual Receptors
Legend
EnergyConnect Proposed Nominal Alignment (Robertstown to Border)
Proposed 64.5m Tower
Project Area (6.2km Corridor)
Proposed Bundey Substation
Existing ElectraNet 132kV Infrastructure
Existing Robertstown Substation
Places
Roads (major)
Roads (minor)
River Murray
Potential Visual Receptors
Distance from Proposed Project Infrastructure
0 - 400m
401 - 900m
901 - 1,750m
1,751 - 3,500m
3,501 - 6,200m
Note: Legend is reflective of Figure 5: A1 to A7
Scale at A4
1:150,000
0 1 2 Km
N
Job No: 55766
Client: ElectraNet
Version: DRAFT_RevC
Date: 16-Dec-2020
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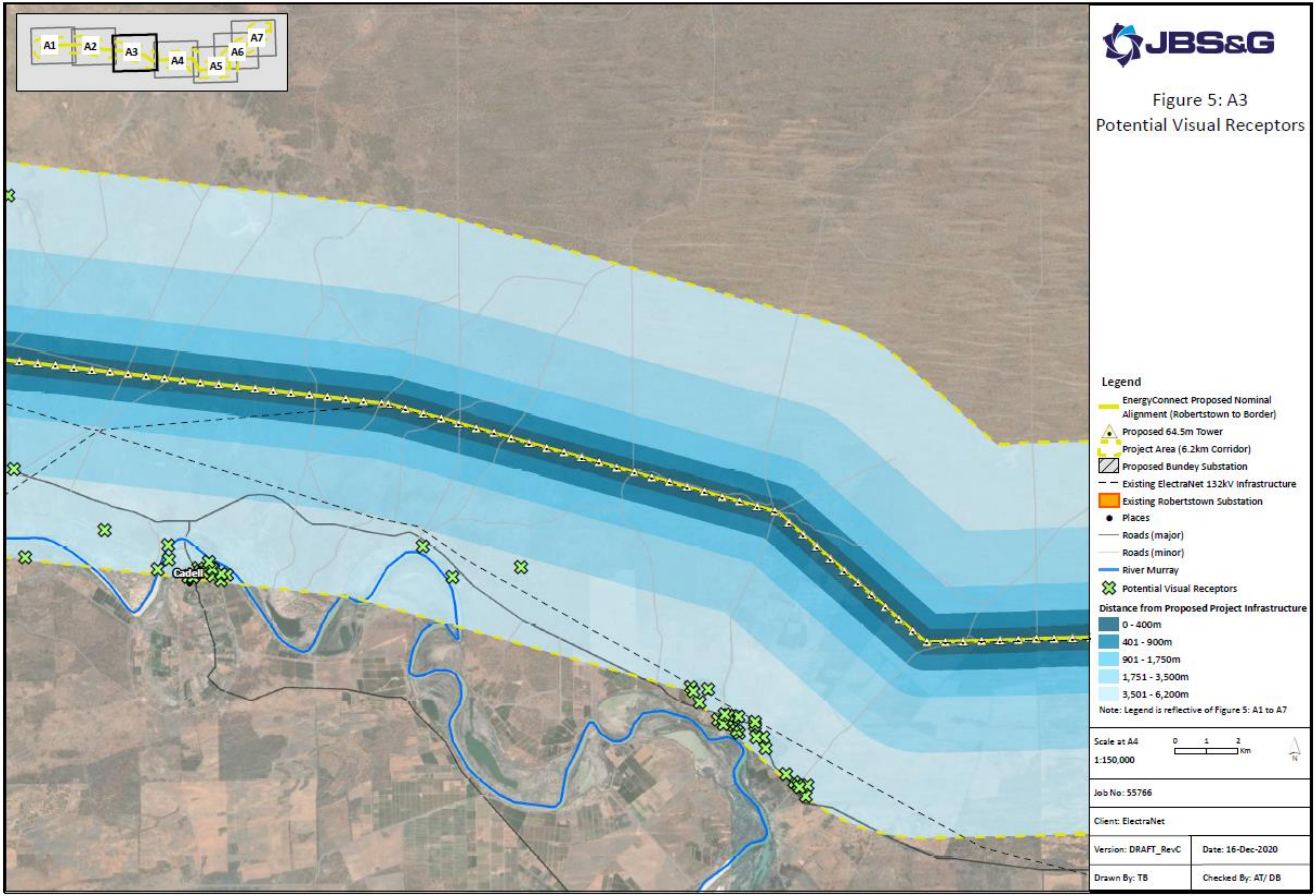
A1
A2
A3
A4
A5
A6
A7
Cadell
JBS&G
Figure 5: A3
Potential Visual Receptors
Legend
EnergyConnect Proposed Nominal Alignment (Robertstown to Border)
Proposed 64.5m Tower
Project Area (6.2km Corridor)
Proposed Bundey Substation
Existing ElectraNet 132kV Infrastructure
Existing Robertstown Substation
Places
Roads (major)
Roads (minor)
River Murray
Potential Visual Receptors
Distance from Proposed Project Infrastructure
0 - 400m
401 - 900m
901 - 1,750m
1,751 - 3,500m
3,501 - 6,200m
Note: Legend is reflective of Figure 5: A1 to A7
Scale at A4
1:150,000
0 1 2 Km
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Job No: 55766
Client: ElectraNet
Version: DRAFT_RevC
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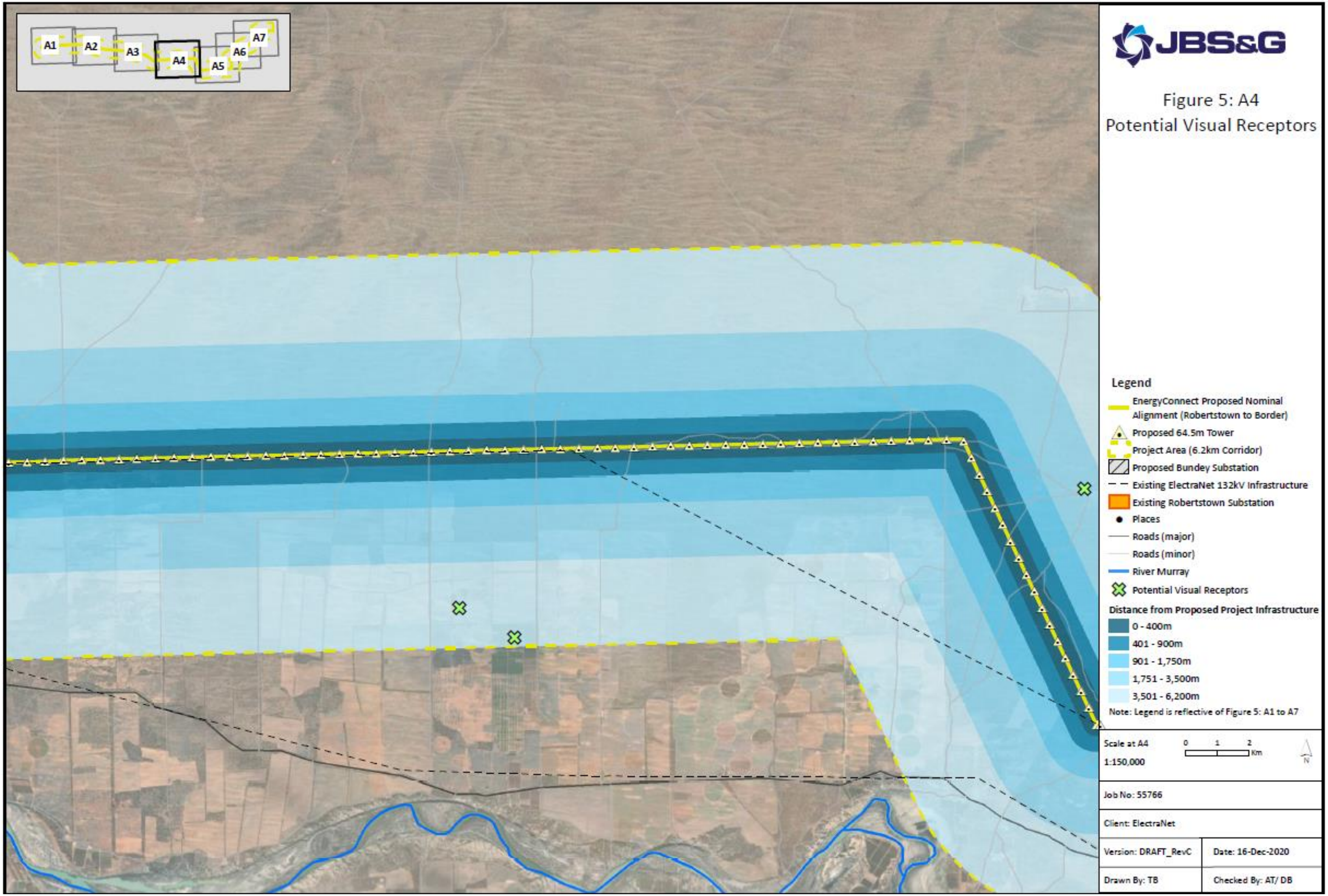

A1
A2
A3
A4
A5
A6
A7
JBS&G
Figure 5: A4
Potential Visual Receptors
Legend
EnergyConnect Proposed Nominal Alignment (Robertstown to Border)
Proposed 64.5m Tower
Project Area (6.2km Corridor)
Proposed Bundey Substation
Existing ElectraNet 132kV Infrastructure
Existing Robertstown Substation
Places
Roads (major)
Roads (minor)
River Murray
Potential Visual Receptors
Distance from Proposed Project Infrastructure
0 - 400m
401 - 900m
901 - 1,750m
1,751 - 3,500m
3,501 - 6,200m
Note: Legend is reflective of Figure 5: A1 to A7
Scale at A4
1:150,000
0
1
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Km
N
Job No: 55766
Client: ElectraNet
Version: DRAFT_RevC
Date: 16-Dec-2020
Drawn By: TB
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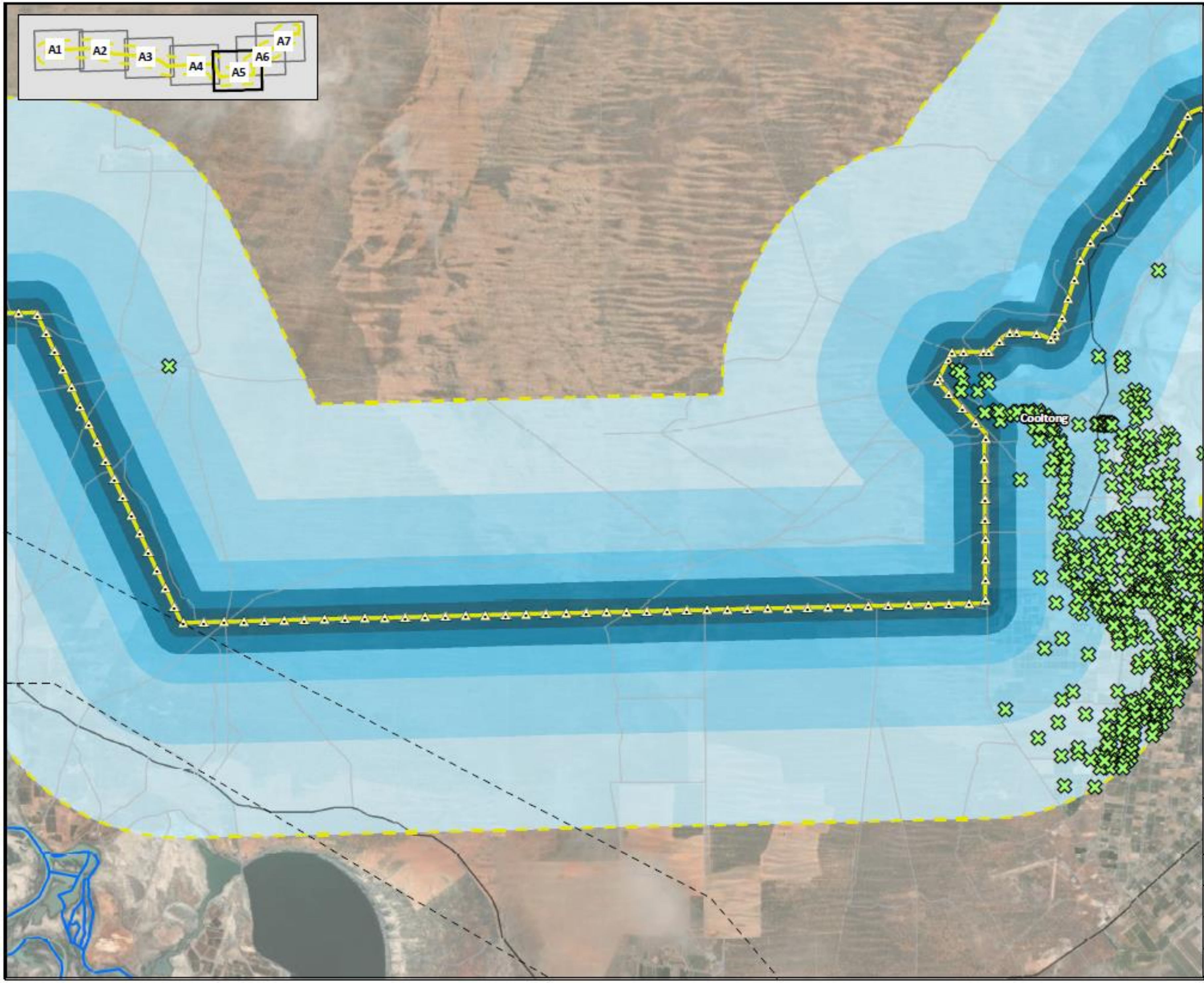


JBS&G

Figure 5: A5
Potential Visual Receptors

Legend

- EnergyConnect Proposed Nominal Alignment (Robertstown to Border)
- Proposed 64.5m Tower
- Project Area (6.2km Corridor)
- Proposed Bundey Substation
- Existing ElectraNet 132kV Infrastructure
- Existing Robertstown Substation
- Places
- Roads (major)
- Roads (minor)
- River Murray
- Potential Visual Receptors

Distance from Proposed Project Infrastructure

- 0 - 400m
- 401 - 900m
- 901 - 1,750m
- 1,751 - 3,500m
- 3,501 - 6,200m

Note: Legend is reflective of Figure 5: A1 to A7

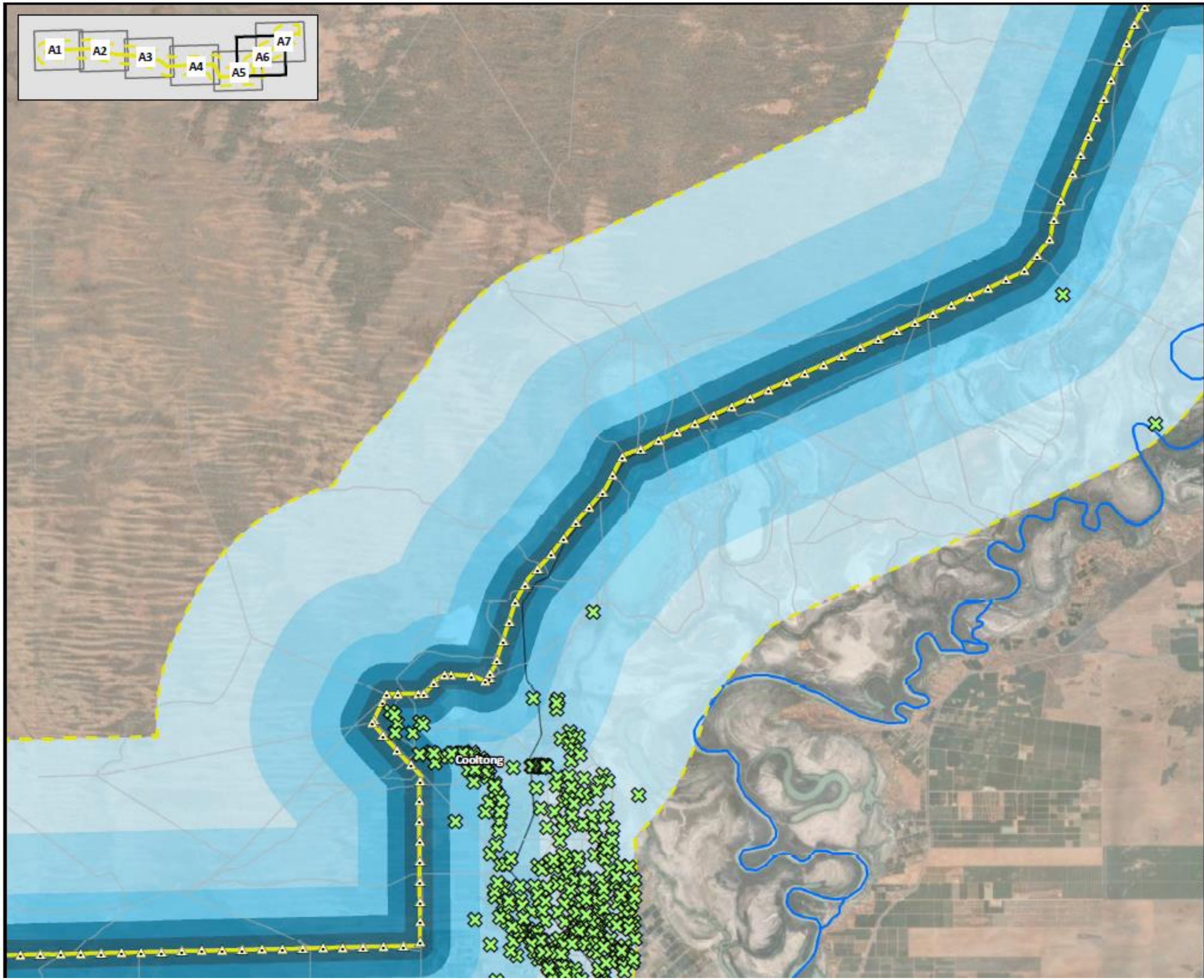
Scale at A4 1:150,000 — 0 1 2 Km — N

Job No: 55766

Client: ElectraNet

Version: DRAFT_RevC | Date: 16-Dec-2020

Drawn By: TB | Checked By: AT/ DB



JBS&G

Figure 5: A6
Potential Visual Receptors

Legend

- EnergyConnect Proposed Nominal Alignment (Robertstown to Border)
- Proposed 64.5m Tower
- Project Area (6.2km Corridor)
- Proposed Bundey Substation
- Existing ElectraNet 132kV Infrastructure
- Existing Robertstown Substation
- Places
- Roads (major)
- Roads (minor)
- River Murray
- Potential Visual Receptors

Distance from Proposed Project Infrastructure

- 0 - 400m
- 401 - 900m
- 901 - 1,750m
- 1,751 - 3,500m
- 3,501 - 6,200m

Note: Legend is reflective of Figure 5: A1 to A7

Scale at A4 1:150,000	0 1 2 Km N
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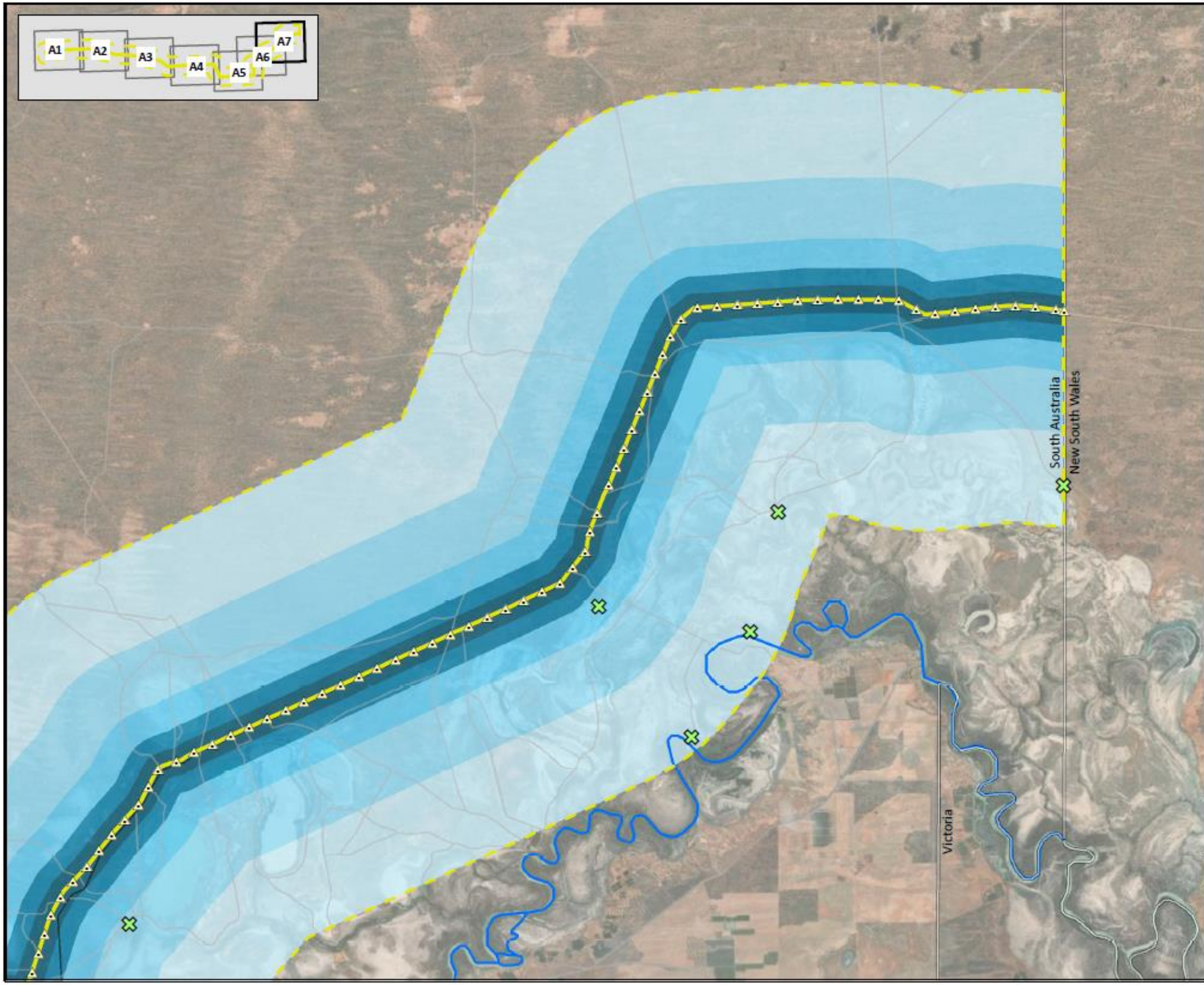
Client: ElectraNet	
Version: DRAFT_RevC	Date: 16-Dec-2020
Drawn By: TB	Checked By: AT/ DB



JBS&G

Figure 5: A7
Potential Visual Receptors

Legend

- EnergyConnect Proposed Nominal Alignment (Robertstown to Border)
- Proposed 64.5m Tower
- Project Area (6.2km Corridor)
- Proposed Bundey Substation
- Existing ElectraNet 132kV Infrastructure
- Existing Robertstown Substation
- Places
- Roads (major)
- Roads (minor)
- River Murray
- Potential Visual Receptors

Distance from Proposed Project Infrastructure

- 0 - 400m
- 401 - 900m
- 901 - 1,750m
- 1,751 - 3,500m
- 3,501 - 6,200m

Note: Legend is reflective of Figure 5: A1 to A7

Scale at A4 1:150,000 — 0 1 2 Km — N

Job No: 55766

Client: ElectraNet

Version: DRAFT_RevC | Date: 16-Dec-2020

Drawn By: TB | Checked By: AT/ DB

Receptor Types

Receptor types generally have different levels of concern, or sensitivity, with respect to the perception of the visual environment. The receptor types and relative visual exposure to the Project are presented below in **Table 3.2**.

Table 3.2 Receptor Type

Receptor Type	Description	Likely visual exposure	Frequency of views	Duration of views	Likely Sensitivity
Transient (Road)	Passing through or close to the Project area	Likely to be exposed to short sections of the transmission line infrastructure for short periods of time.	Low	Short term	Low
Social	Residents and transient/ intermittent residents within the vicinity of the Project area, with daily visual exposure to the Project area	Constant exposure to transmission line infrastructure. Receptors are likely to be sensitive to changes to the landscape particularly if views of the transmission line infrastructure are visible from permanent residences.	High	Long term	High
Tourism	Visiting the Project area for recreational purposes	Tourists within areas around the River Murray and nature conservation areas (such as Calperum Station) would be sensitive to changes in views of the transmission line infrastructure.	Low	Short term	High

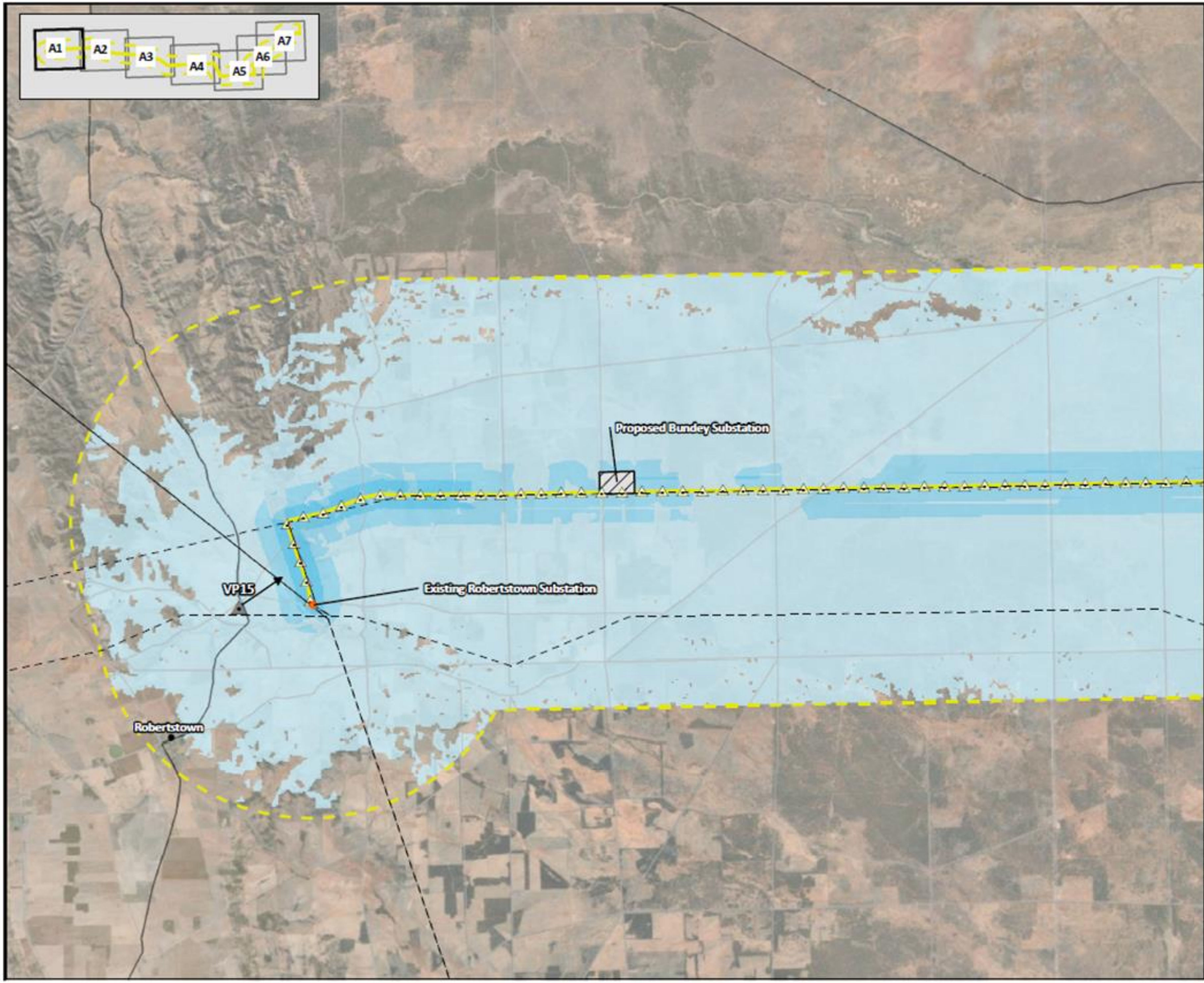
The receptor type groupings describe the potential receptors that are located within the TZVI of the Project. These high-level groups have not all been field-verified and may require further assessment as the Project is developed. They do, however, on initial analysis provide an indication of the approximate proportion of receptor groupings, and their approximate location in relation to Project infrastructure.

The most sensitive group of receptors, that are most likely to see the Project infrastructure on a frequent basis, are the social receptors. While tourism receptors are regarded as sensitive viewers, they will have a low frequency of views primarily due to the main tourism area (River Murray and related floodplains), being located largely outside the TZVI. The Taylorville and Calperum Stations are also largely located outside the TZVI and receive low tourism numbers.

Stage 2 (as described below) provided more detailed visual assessment of selected viewer locations.

3.2.1.2 Stage 2

Viewpoints for the capturing of images were chosen following an analysis of receptor type and frequency of observation of the Project infrastructure. This assessment was based on information collected from both desktop analysis, site visits and stakeholder engagement. The final receptor selections incorporated a range of landscape types, to ensure a reasonable range of representative views were considered. Viewpoint location are presented in **Figure 6 A1-A7**.



JBS&G

Figure 6: A1 Viewpoint Photomontage Locations

Legend

- EnergyConnect Proposed Nominal Alignment (Robertstown to Border)
- Proposed 64.5m Tower
- Project Area (6.2km Corridor)
- Proposed Bundey Substation
- Existing ElectraNet 132kV Infrastructure
- Existing Robertstown Substation
- Places
- Roads (major)
- Roads (minor)
- River Murray
- Viewpoint Photomontage Location
- Viewpoint View Direction (compass bearing)

Theoretical Visual Impact Matrix

- High Visibility
- Moderate Visibility
- Low Visibility
- Very Low Visibility
- Negligible Visibility

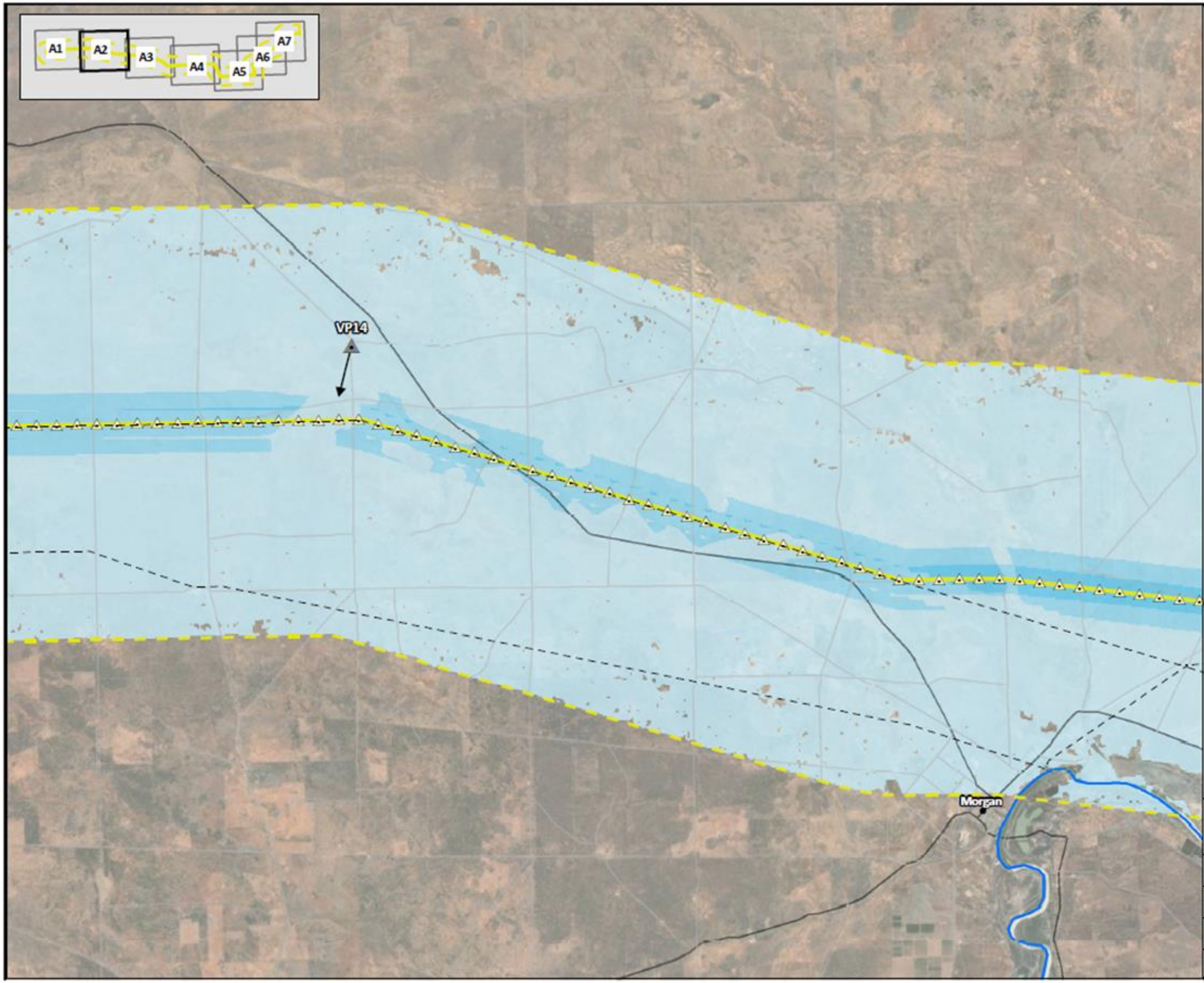
Note: Legend is reflective of Figure 6: A1 to A7

Scale at A4 1:150,000 — 0 1 2 Km

Job No: 55766

Client: ElectraNet

Version: DRAFT_RevC	Date: 25-Nov-2020
Drawn By: TB	Checked By: AT/ DB



JBS&G

Figure 6: A2 Viewpoint Photomontage Locations

Legend

- EnergyConnect Proposed Nominal Alignment (Robertstown to Border)
- Proposed 64.5m Tower
- Project Area (6.2km Corridor)
- Proposed Bundey Substation
- Existing ElectraNet 132kV Infrastructure
- Existing Robertstown Substation
- Places
- Roads (major)
- Roads (minor)
- River Murray
- Viewpoint Photomontage Location
- Viewpoint View Direction (compass bearing)

Theoretical Visual Impact Matrix

- High Visibility
- Moderate Visibility
- Low Visibility
- Very Low Visibility
- Negligible Visibility

Note: Legend is reflective of Figure 6: A1 to A7

Scale at A4 1:150,000 — 0 1 2 Km

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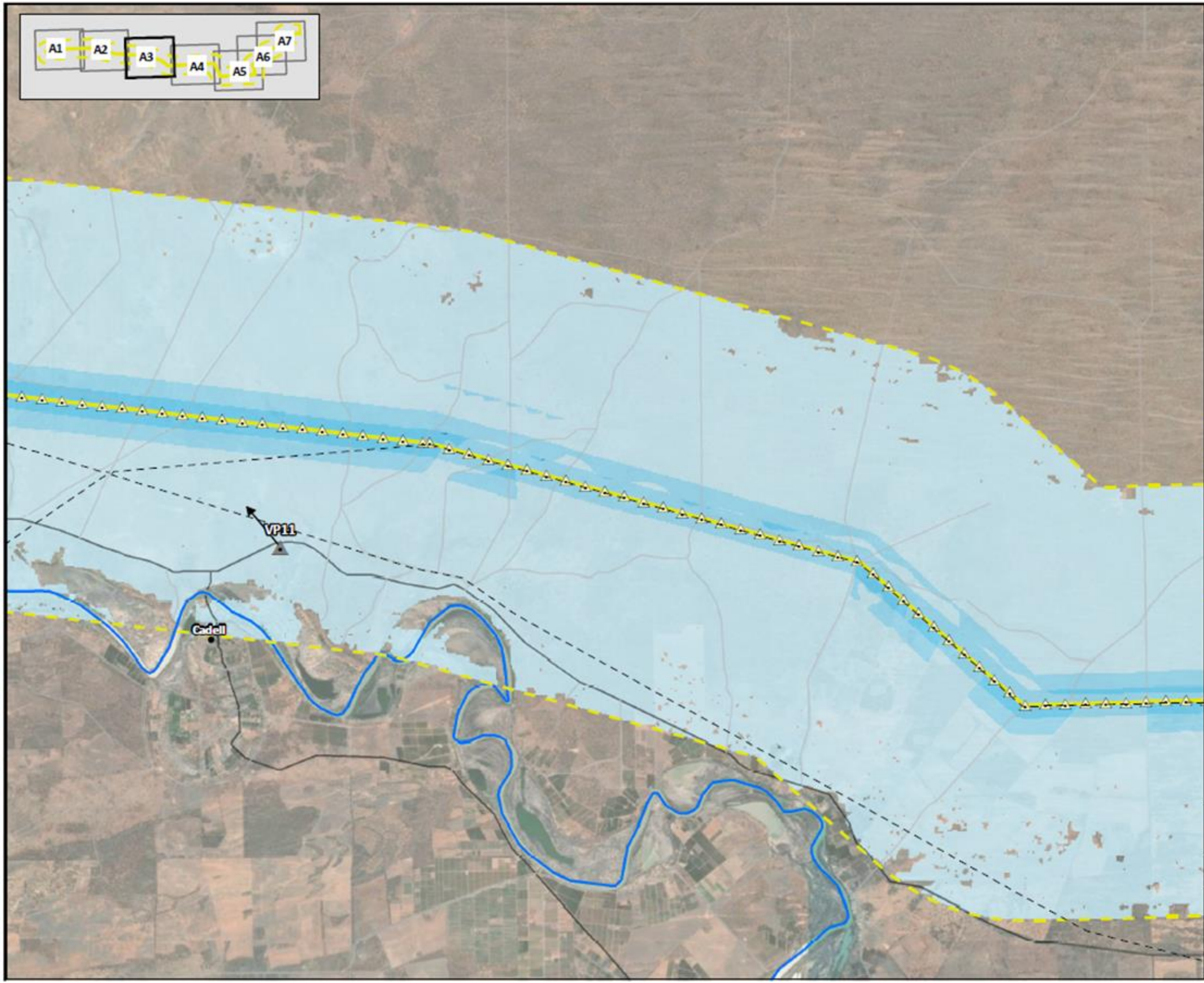
Job No: 55766

Client: ElectraNet

Version: DRAFT_RevC	Date: 25-Nov-2020
Drawn By: TB	Checked By: AT/ DB



JBS&G

Figure 6: A3 Viewpoint Photomontage Locations

Legend

- EnergyConnect Proposed Nominal Alignment (Robertstown to Border)
- Proposed 64.5m Tower
- Project Area (6.2km Corridor)
- Proposed Bundey Substation
- Existing ElectraNet 132kV Infrastructure
- Existing Robertstown Substation
- Places
- Roads (major)
- Roads (minor)
- River Murray
- Viewpoint Photomontage Location
- Viewpoint View Direction (compass bearing)

Theoretical Visual Impact Matrix

- High Visibility
- Moderate Visibility
- Low Visibility
- Very Low Visibility
- Negligible Visibility

Note: Legend is reflective of Figure 6: A1 to A7

Scale at A4 0 1 2 Km

1:150,000

Job No: 55766

Client: ElectraNet

Version: DRAFT_RevC	Date: 25-Nov-2020
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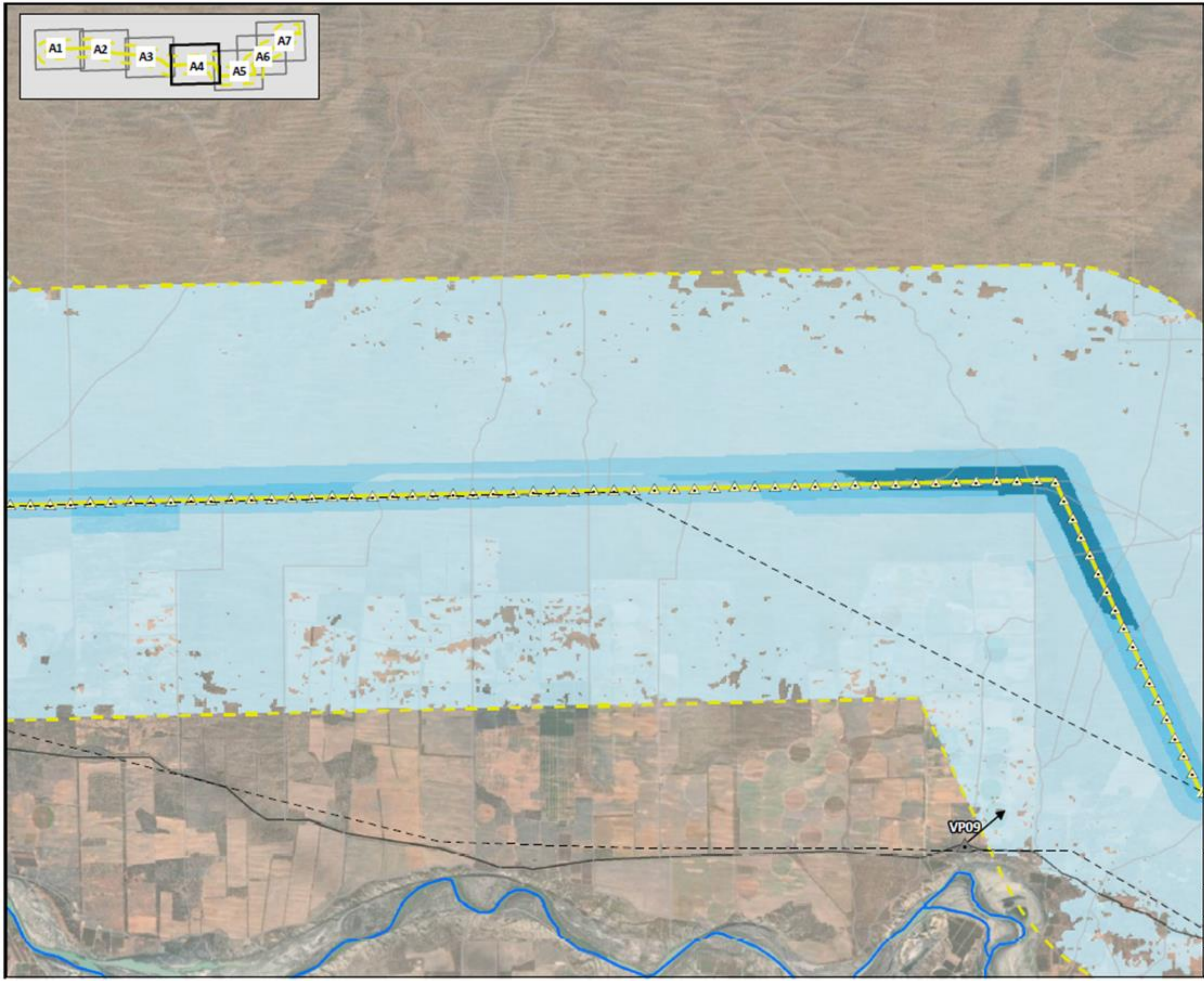


JBS&G

Figure 6: A4 Viewpoint Photomontage Locations

Legend

- EnergyConnect Proposed Nominal Alignment (Robertstown to Border)
- Proposed 64.5m Tower
- Project Area (6.2km Corridor)
- Proposed Bundey Substation
- Existing ElectraNet 132kV Infrastructure
- Existing Robertstown Substation
- Places
- Roads (major)
- Roads (minor)
- River Murray
- Viewpoint Photomontage Location
- Viewpoint View Direction (compass bearing)

Theoretical Visual Impact Matrix

- High Visibility
- Moderate Visibility
- Low Visibility
- Very Low Visibility
- Negligible Visibility

Note: Legend is reflective of Figure 6: A1 to A7

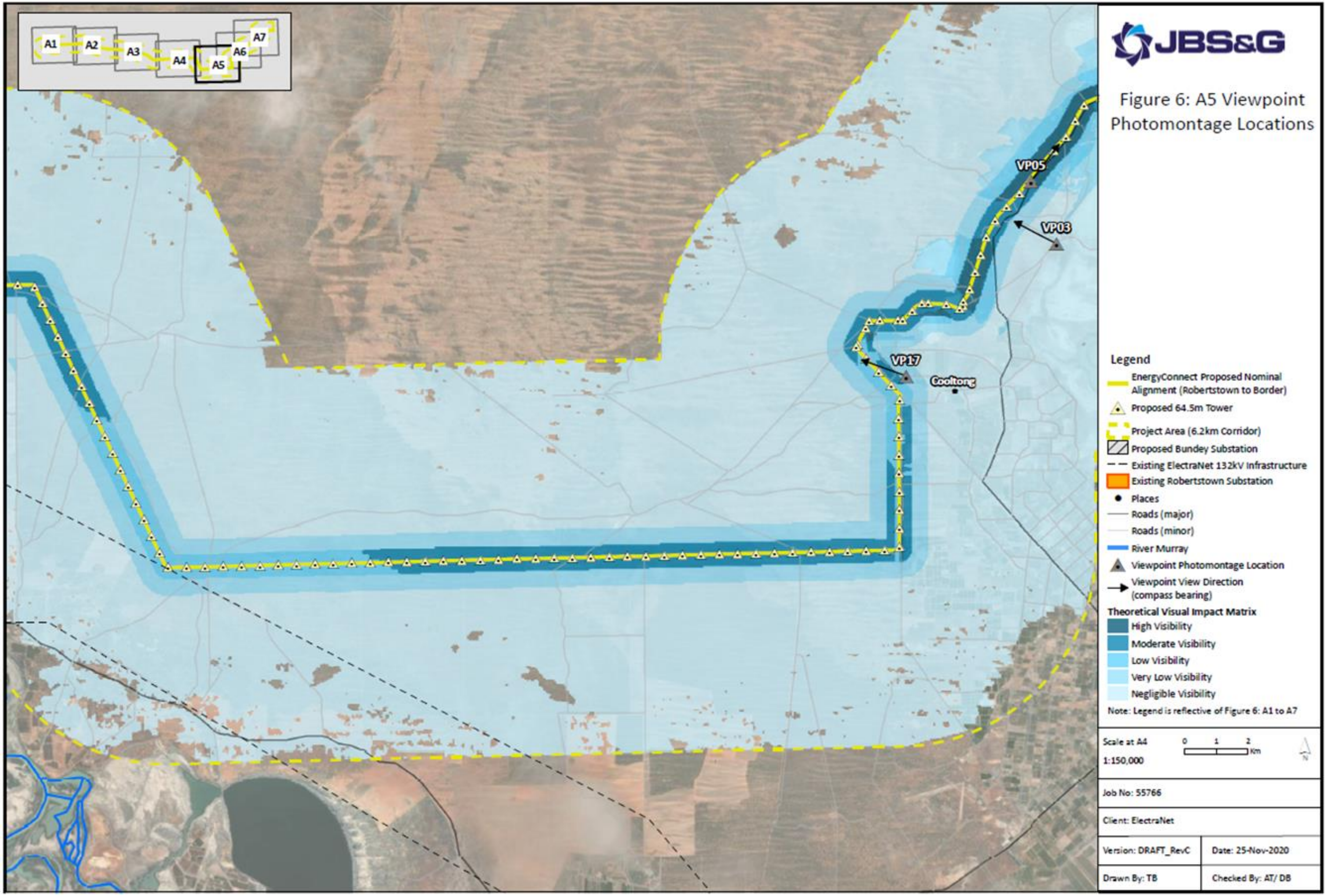
Scale at A4 1:150,000 — 0, 1, 2 Km

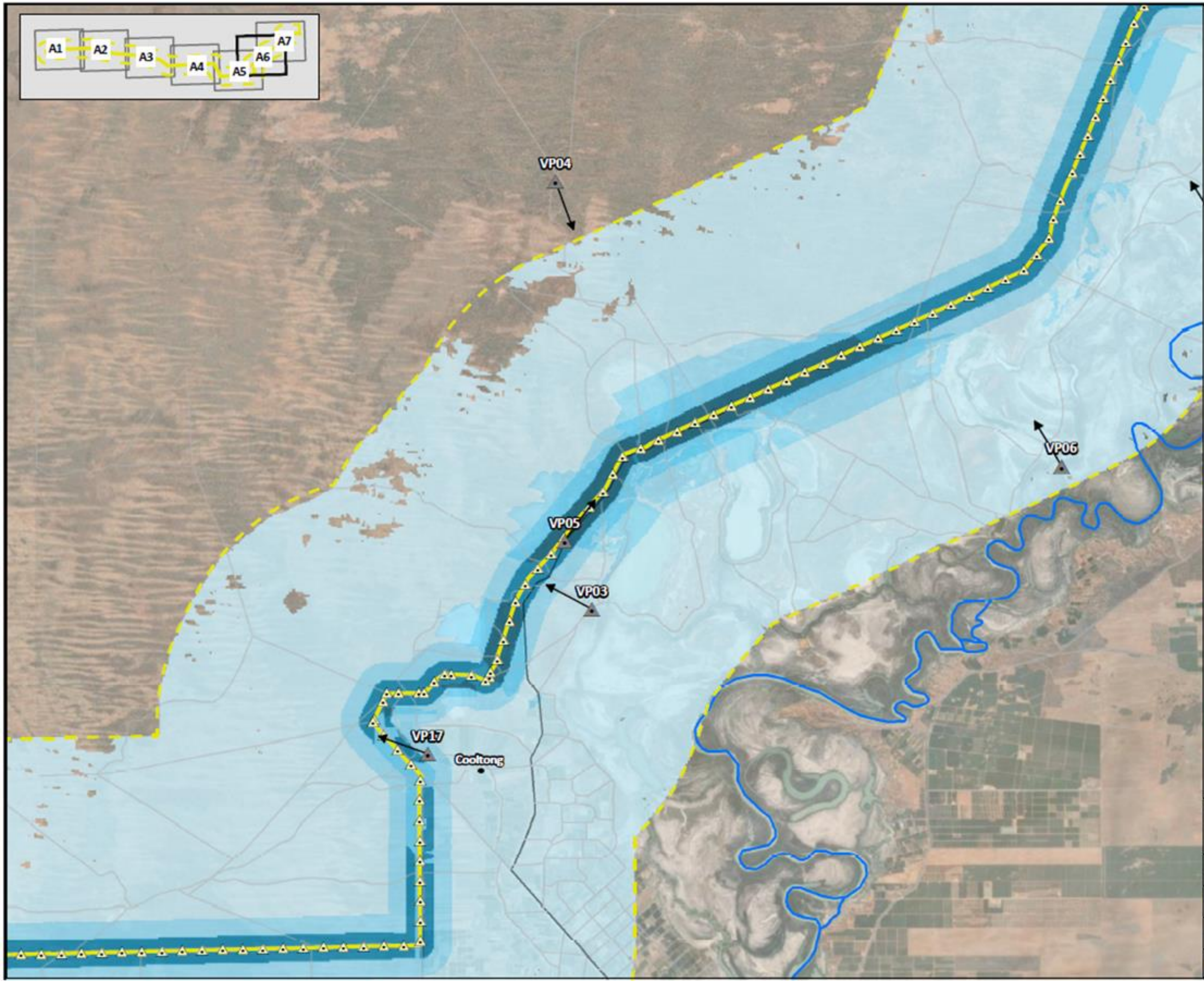
Job No: 55766

Client: ElectraNet

Version: DRAFT_RevC | Date: 25-Nov-2020

Drawn By: TB | Checked By: AT/ DB


A1
A2
A3
A4
A5
A6
A7
VP05
VP03
VP17
Cooltong
JBS&G
Figure 6: A5 Viewpoint Photomontage Locations
Legend
EnergyConnect Proposed Nominal Alignment (Robertstown to Border)
Proposed 64.5m Tower
Project Area (6.2km Corridor)
Proposed Bundey Substation
Existing ElectraNet 132kV Infrastructure
Existing Robertstown Substation
Places
Roads (major)
Roads (minor)
River Murray
Viewpoint Photomontage Location
Viewpoint View Direction (compass bearing)
Theoretical Visual Impact Matrix
High Visibility
Moderate Visibility
Low Visibility
Very Low Visibility
Negligible Visibility
Note: Legend is reflective of Figure 6: A1 to A7
Scale at A4
1:150,000
0 1 2 Km
N
Job No: 55766
Client: ElectraNet
Version: DRAFT_RevC
Date: 25-Nov-2020
Drawn By: TB
Checked By: AT/ DB



JBS&G

Figure 6: A6 Viewpoint Photomontage Locations

Legend

- EnergyConnect Proposed Nominal Alignment (Robertstown to Border)
- Proposed 64.5m Tower
- Project Area (6.2km Corridor)
- Proposed Bundey Substation
- Existing ElectraNet 132kV Infrastructure
- Existing Robertstown Substation
- Places
- Roads (major)
- Roads (minor)
- River Murray
- Viewpoint Photomontage Location
- Viewpoint View Direction (compass bearing)

Theoretical Visual Impact Matrix

- High Visibility
- Moderate Visibility
- Low Visibility
- Very Low Visibility
- Negligible Visibility

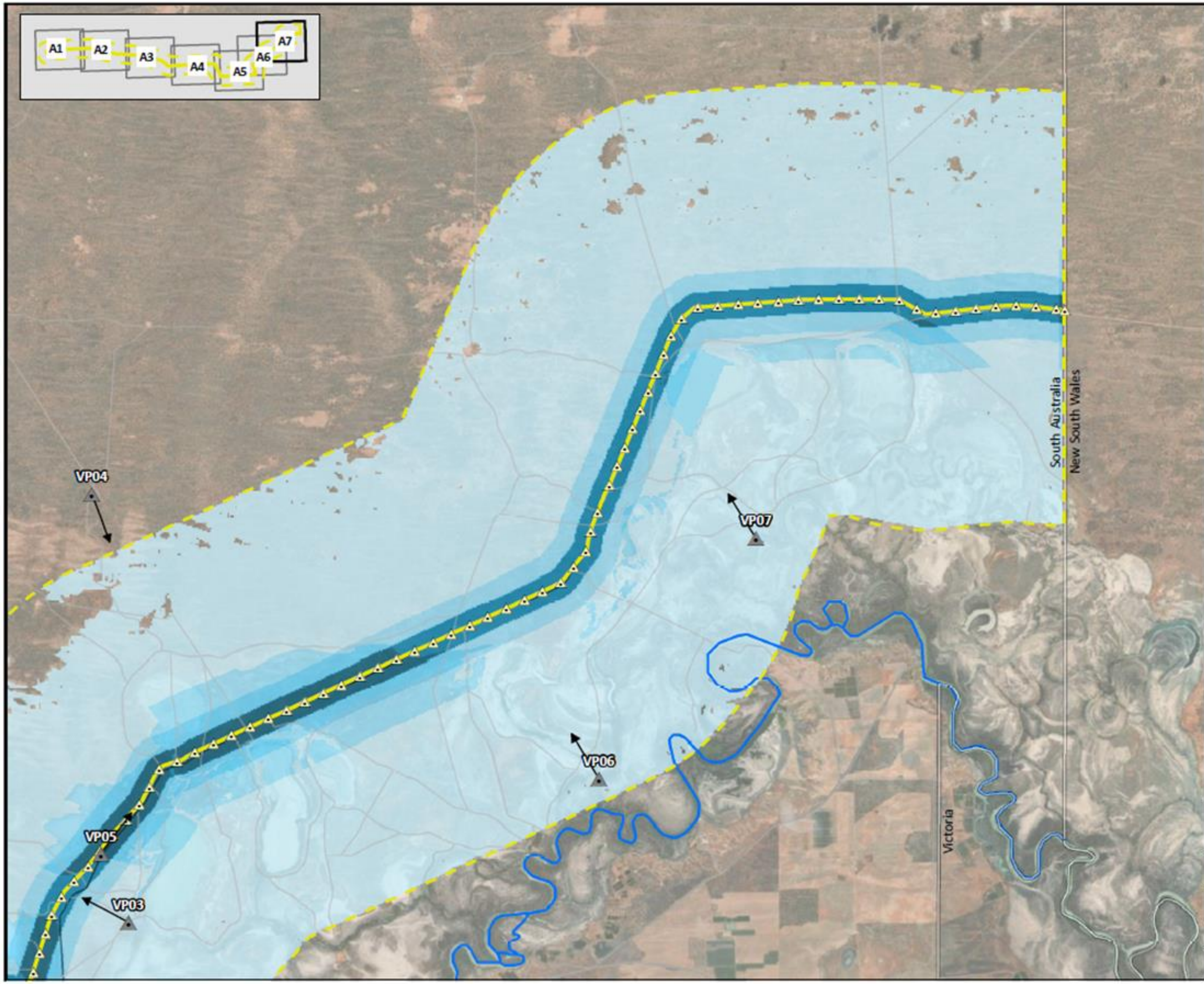
Note: Legend is reflective of Figure 6: A1 to A7

Scale at A4 1:150,000

0 1 2 Km

N

Job No: 55766	
Client: ElectraNet	
Version: DRAFT_RevC	Date: 25-Nov-2020
Drawn By: TB	Checked By: AT/ DB



JBS&G

Figure 6: A7 Viewpoint Photomontage Locations

Legend

- EnergyConnect Proposed Nominal Alignment (Robertstown to Border)
- Proposed 64.5m Tower
- Project Area (6.2km Corridor)
- Proposed Bundey Substation
- Existing ElectraNet 132kV Infrastructure
- Existing Robertstown Substation
- Places
- Roads (major)
- Roads (minor)
- River Murray
- Viewpoint Photomontage Location
- Viewpoint View Direction (compass bearing)

Theoretical Visual Impact Matrix

- High Visibility
- Moderate Visibility
- Low Visibility
- Very Low Visibility
- Negligible Visibility

Note: Legend is reflective of Figure 6: A1 to A7

Scale at A4 1:150,000 — 0 1 2 Km

Job No: 55766

Client: ElectraNet

Version: DRAFT_RevC | Date: 25-Nov-2020

Drawn By: TB | Checked By: AT/ DB

3.2.2 Towns

The towns/settlements that fall within the TZVI are:

- **Morgan** – town centre falls outside of the TZVI, only the northern residences within Morgan fall marginally within the TZVI therefore it is likely residences will not have views of the Project infrastructure
- **Cadell** - town centre falls outside of the TZVI, only the northern residences within Cadell fall marginally within the TZVI therefore it is likely residences will not have views of the Project infrastructure, and the large tress and other vegetation within the town provide visual screens to the north.
- **Cooltong** – this settlement falls within the TZVI and many of the residences will have views of the Project infrastructure if facing north and / or west.
- **Renmark West**– Renmark town centre falls outside the TZVI, only the western and northern residences fall marginally within the TZVI. These properties could have views of the Project if they face north west.

3.2.3 Transient

The Traffic Impact Assessment (Tonkin, 2020) conducted as part of the Project EIS estimated that approximately 12,000 road users per day travelled along the Sturt Highway through Renmark, and approximately 60 per day along the Wentworth-Renmark Road. Approximately 30% of the traffic in the area is made up of heavy vehicles and unlikely to be sensitive to the Project infrastructure. It is likely that most of the traffic data above falls outside the TZVI.

Views of the transmission towers from road users on the Goyder Highway will be possible from the areas near Morgan and Cadell. Approximately 600 vehicles per day pass along this section, with approximately 24% of these being heavy vehicles.

Views from the Wentworth-Renmark Road will be obvious as the Project infrastructure is located immediately adjacent to the road. Approximately 60 vehicles per day pass along this road, with almost 8% of them being heavy vehicles.

3.2.4 Tourism

Regional Development Australia reports that the Murraylands and Riverland Region generates approximately 420,000 bed nights from international visitors per year, over two million domestic visitor nights, and almost 1.5m visitor nights per year[5]. Most tourists to this area are unlikely to travel within the TZVI as they will visit the areas immediately adjacent to the River Murray to the south of the TZVI. Very low visitor numbers to the Taylorville and Calperum Stations mean that there will be a low viewer frequency (in the order of 300-400 visitors per year) in a visually sensitive area due to the high conservation value and the untransformed nature of this area. It should also be noted that the proposed alignment traverses the southern boundary of these expansive Stations.

These receptor groups are analysed in the context of the receiving environment, and the proposed Project infrastructure as part of this assessment in **Section 6.**

[5] https://economy.id.com.au/rda-murraylands-riverland/tourism-visitor-summary

4. Proposed Development – Key Visual Elements

4.1 Project Infrastructure

This VIA has been conducted for the SA portion of the Project which comprises the following key components:

- approximately 10 km of 275 kV transmission line supported by steel towers from the existing Robertstown substation (approximately 117 km NNE of Adelaide) to a proposed new substation located towards the western extent of the transmission line at Bundey, near Robertstown
- approximately 195 km of 330 kV transmission line supported by steel towers from the new Bundey substation to the SA /NSW border (approximately 40 km NE of Renmark)
- associated telecommunications infrastructure
- associated access tracks
- associated temporary facilities (i.e. temporary construction compounds, site offices, laydown areas and mobile construction camps).

The Project location and key project elements are shown in **Figure 1**. A summary of the key Project elements and specifications is provided in **Table 4.1** below. Examples of the key Project elements are shown in **Plate 9** to **Plate 11** below.

Plate 9: Example of existing access tracks

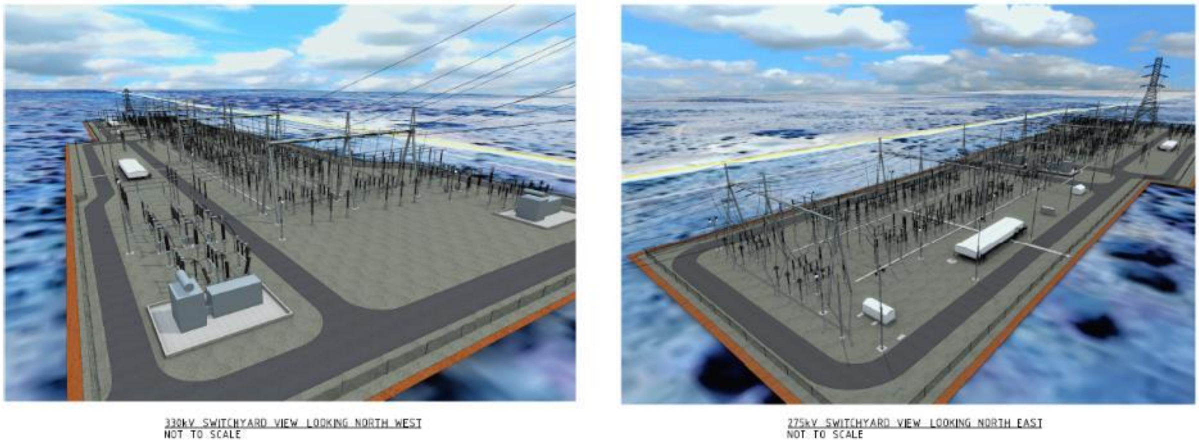


Plate 10: Example of substations

Plate 11: Example of transmission line towers

Table 4.1: Summary of Key Visual Project Elements

Key Visual Infrastructure	Infrastructure Visual Element	Detail
Total length	Towers, easement, conductors	Approximately 200 km

Towers	Type	• Steel lattice towers
		  ○ Approximately 300 suspension towers (mix of heavy and light suspension towers)
		  ○ Approximately 70 medium angle strain towers
		  ○ Approximately 4 terminal towers (structurally similar to angle strain)

	Height	• Approximately 45-65 m
	Spacing	• Approximately 400-600m
	Footings	• Approximately 45-65m^2
	Foundation	• Approximately 13-16 m deep cast in-situ concrete foundation • Approximately 1.2-1.8 m diameter at each leg of the tower Up to 600 mm of the concrete footing above ground level

Conductors	Type	• Galvanised steel reinforced aluminium conductors
		  ○ *Robertstown Substation to Bundey Substation:* 275 kV double circuit
		  ○ *Bundey Substation to SA/NSW Border*: 330kV double circuit

	Number	• *Robertstown Substation to Bundey Substation* (275kV): Double circuit single conductor (6 wires) plus earth wire and OPGW • *Bundey Substation to SA/NSW Border*: Double circuit twin conductor (12 wires) plus earth wire and OPGW
Easement	Width	• 80m (typically)
	Max veg height under easement	• 4m beneath lowest point of conductor sag
	Land use allowed	• No new permanent structures are allowed • Across much of the easement the existing land use will be able to continue, and most of the existing vegetation will remain undisturbed
Substation	Footprint	• 400 m x 250 m bench
	Max height	• 20 – 30 m (lightning tower)
	Components	• Gantries, switch gear, transformers (275/330 kV), control buildings, lightning towers and palisade perimeter fence
Telecommunications	Towers	• One 20 m radio tower at Bundey substation
	Footprint	• Approximately 20 m x 20 m
	Components	• Two local telecommunication huts and access tracks
Access tracks	Type	• Approximately 5-8 m wide, depending on terrain • Gravel, unsurfaced • Use of existing tracks wherever possible
	Timing	• Mainly during construction, but also for maintenance during operation
Construction activities	Laydown	• Not larger than 50m x 50m cleared for each tower • 100 m x 100 m staging and laydown areas for the temporary storage of materials, plant and equipment
	Winching sites	• Winch and brake sites every 3-8 km • 40 m x 50 m cleared area • comprises a motorised winching machine
	Stockpiles	• Every footing (roughly every 500m) temporary stockpile of 2m height of around 250 m^3 and approximately 15 m x 15 m in area
	Concrete batching	• Temporary concrete batching plants

Plate 12 below shows the design of numerous types of transmission towers for reference and comparison. The tower proposed to be utilised in the project is a 70 m version of the double circuit 330 kV steel tower shown below.

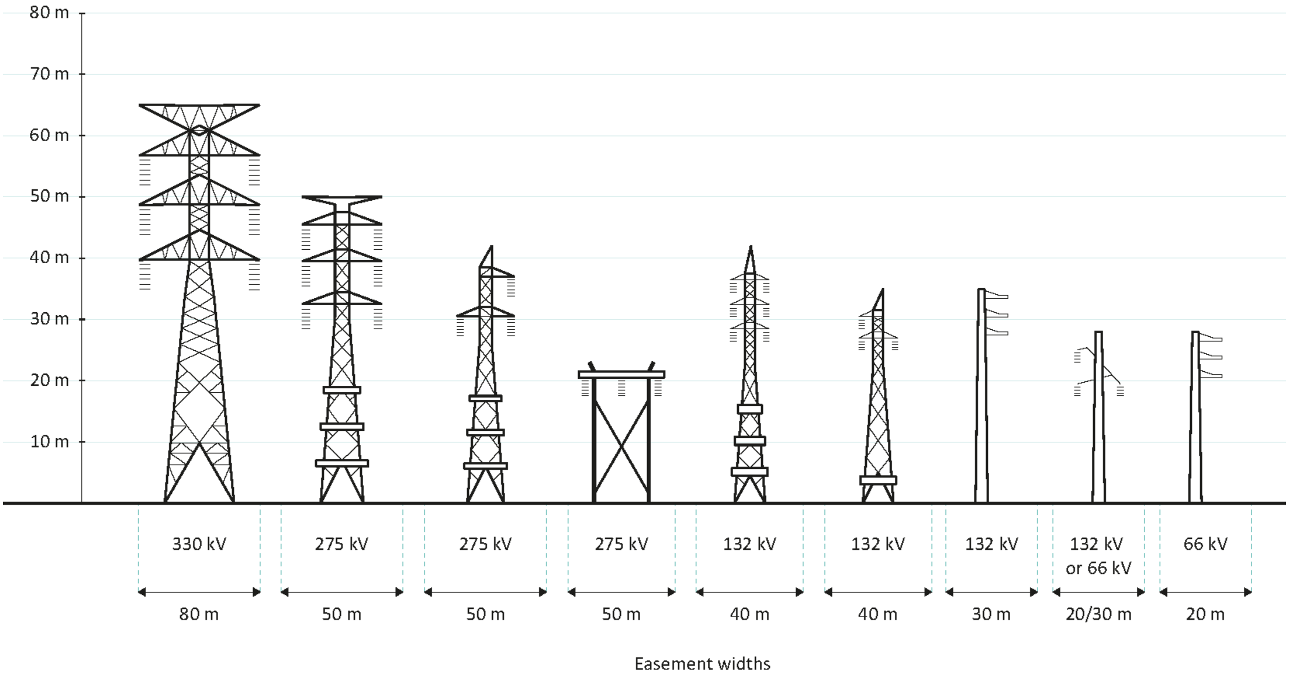


Plate 12: Schematic showing different transmission tower designs and easement widths

5. Visual Impact Assessment Methodology

The VIA was undertaken in broad accordance with applicable Federal and State legislation, Council development plans and other guidelines.

The VIA consists of two main components:

- A quantitative desktop assessment to determine the theoretical visual impact of the Project
- A qualitative photomontage assessment to verify and support the quantitative analysis/assessment.

The visual impact assessment process is summarised graphically below in Plate 13**.**

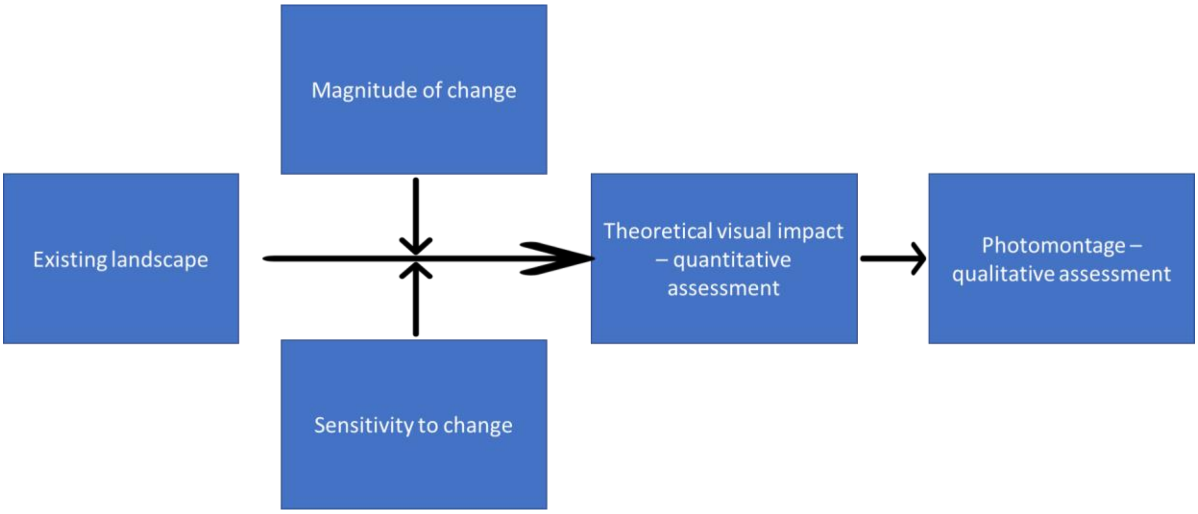


Plate 13: VIA process

The limitations and assumptions which are considered as part of the GIS visual impact assessment methodology are provided in Section 9 of this report.

5.1 Phase 1: Quantitative Assessment

The quantitative desktop assessment of this VIA comprised the following components which, when combined, produce the theoretical visual impact for any chosen location within the Project Area as summarised in **Table 5.1**.

Table 5.1: Components of Quantitative Assessment

Component	Inputs	Model	Outputs
Magnitude of Change	• Proposed Project design • Distance to receptor	Magnitude of Change Model	Theoretical Visual Impact
Sensitivity to Change	• Visual Landscape Scenic Quality and Visual Absorption Capacity • Distance from existing transmission line infrastructure • Vegetation height	Sensitivity to Change Calculation	

5.1.1 Magnitude of Change

The Magnitude of Change refers to the proposed Project's respective design, within the context of the Project area's physical environment and topography.[6] It determines the overall visual effect and the visibility of the Project. This is primarily driven by:

- Height of the Project infrastructure
- Distance of the receptor from the Project infrastructure.

5.1.1.1 Theoretical Zone of Visual Influence

The Theoretical Zone of Visual Influence (TZVI) is the area within which the components of a development are theoretically visible to a human receptor standing on the ground. The key factors in determining this are the visual capability of humans (human field of vision), the dimensions of the development, the distance (visual attenuation) of the viewpoint, and the characteristics of the surrounding topography.

The human field of vision is defined as including far peripheral to central vision. Human far peripheral vision is weak in distinguishing detail, colour and shape. By contrast, central vision is where detailed image processing and symbol recognition occurs and is defined by a central cone of approximately 15 degrees (Marieb, 2014). This is graphically presented in **Plate 14**. Consideration of this measurement impacts on the degree of visibility (significant or not) of any object.

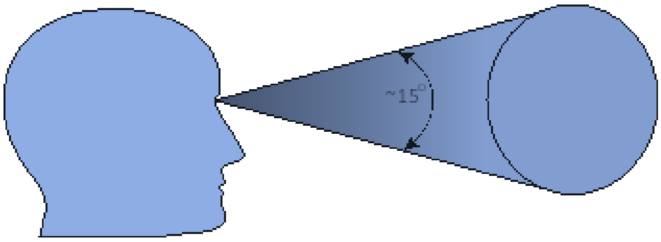
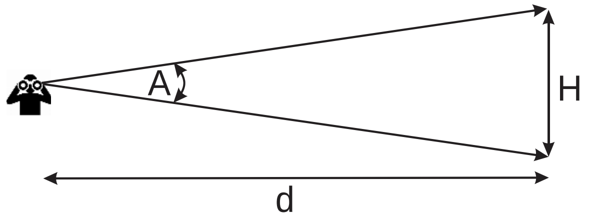


Plate 14 : Human Central Field of Vision.

The limit of significant visibility for a particular object is defined as when the object occupies less than 5% of the central cone. This corresponds to an angular size of 0.75 degrees. The relationship between the angular size of an object, its height and the distance to the receptor is shown in the graphical representation and equation in **Plate 15** (Maoz, 2016).

6 The topography data used was obtained from the Shuttle Radar Topography Mission (SRTM) a product from a collaborative mission by a number of space agencies (Including the National Aeronautics and Space Administration (NASA), the National Imagery and Mapping Agency (NIMA), the German space agency (DLR) and Italian space agency (ASI)) to generate a near-global one arcsecond digital elevation model (DEM) of the Earth using radar interferometry (NASA JPL, 2013).



$$d = \frac{360H}{2\pi A}$$

Where:

- A = Angular size of object
- H = Height of object
- d = Distance to object

Plate 15: Graphical representation of the measurement of angular size.

A viewshed analysis was undertaken using a digital elevation model (DEM). The highest infrastructure element of 64.5 m (Medium Angle Strain tower) with approximately 500 m spacings was used to determine the maximum extent of the TZVI which is presented in **Figure 7**. For conservatism, a buffer was applied to the TZVI as part of the VIA process (specifically, the calculated TZVI has been multiplied by 1.25 (a 25% extension) to ensure a robust outcome). This results in a TZVI of 6.2 km (as presented in below in Table 5.2).

The TZVI represents a 6.2 km radius around each tower. Areas that fall outside of the TZVI are assumed to have no effective visual impact on a receptor and have not been considered further within this assessment. The smallest TZVI, which is of the substation, (taking the highest point of the radio tower) results in a TZVI of 2.9 km.

Table 5.2: Infrastructure TZVI Calculation

Infrastructure Visual Element	TZVI Calculation
30m lightning tower at substation (highest point at substation)	$d = \frac{360 * 30}{2\pi 0.75} = 2.3 \text{ x } 1.25 = \mathbf{2.9\ km}$ A = 0.75º H = 30m
63.5m (Heavy Suspension) Tower	$d = \frac{360 * 63.5}{2\pi 0.75} = 4.8 \text{ x } 1.25 = \mathbf{6.1\ km}$ A = 0.75º H = 63.5m
64.5m (Medium Angle Strain) Tower	$d = \frac{360 * 64.5}{2\pi 0.75} = 4.9 \text{ x } 1.25 = \mathbf{6.2\ km}$ A = 0.75º H = 64.5m

Smaller infrastructure elements including radio towers, and substation are lower than the transmission towers, and therefore fall within the transmission towers' TZVI. The most conservative TZVI of 6.2 km from each tower centre has therefore been adopted for the Project.

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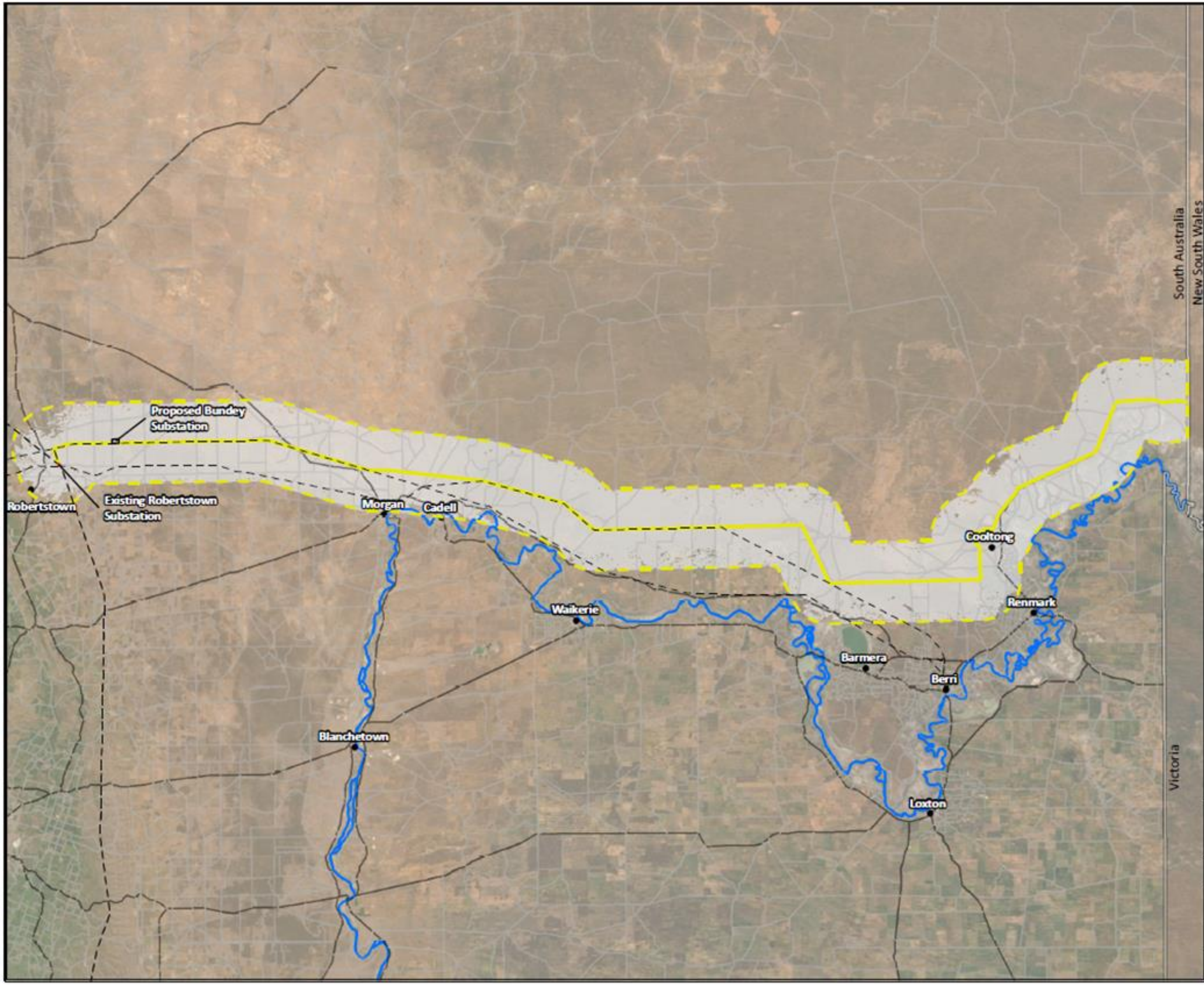
Figure 7
Theoretical Zone of
Visual Influence



Legend

- EnergyConnect Proposed Nominal Alignment (Robertstown to Border)
- Project Area (6.2km Corridor)
- Proposed Bundey Substation
- Existing ElectraNet 132kV Infrastructure
- Existing Robertstown Substation
- Places
- Roads (major)
- Roads (minor)
- River Murray
- Theoretical Zone of Visual Influence

Scale at A4 1:800,000	0 7.5 15 Km
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5.1.1.2 Distance from the Project

Distance is a key determining factor in visual impact attenuation, as both apparent size and visual contrast decrease exponentially with distance (Hecht, 2017). The non-linear horizontal scale for increasing distance from the visual receptor has been selected as this represents the exponential effect of visual degradation over distance. The highest level of visual impact from the visual source will be within 400 m, with the visual impact decreasing rapidly as one move away from the visual impact source. The visual effect of the Project will not be relevant beyond the limit of the TZVI as it will not be discernible by receptors.

Distance can be broken into five categories of visual impact based on distance of the receptor from the Project, as seen in **Table 5.3** and shown in **Figure 8**.

Table 5.3: Distance from Project Infrastructure (Magnitude of Change)

Associated Visibility	Distance from The Project	Description	Model Input Value
High	0 – 400 m	Infrastructure (landform/structure) dominates the visual field and dramatically alters the viewpoint location landscape	16
Moderate - High	401 – 900 m	Decreasing effect, but infrastructure (landform/structure) are very obvious within the visual field and alter the viewpoint location landscape	8
Moderate	901 – 1,750 m	Moderate visibility of infrastructure (landform/structure) – easy to see and alters the viewpoint location landscape to a degree	4
Low	1,751 – 3,500 m	Low visibility of infrastructure (landform/structure) – harder to see and not obvious in the viewpoint location landscape	2
Very Low	3,501 – 6,200 m	Limited/ no visual effect of the infrastructure (landform/structure). Visible as a minor feature in the viewpoint location landscape	1
Outside TZVI	>6,200 m	Outside TZVI	0

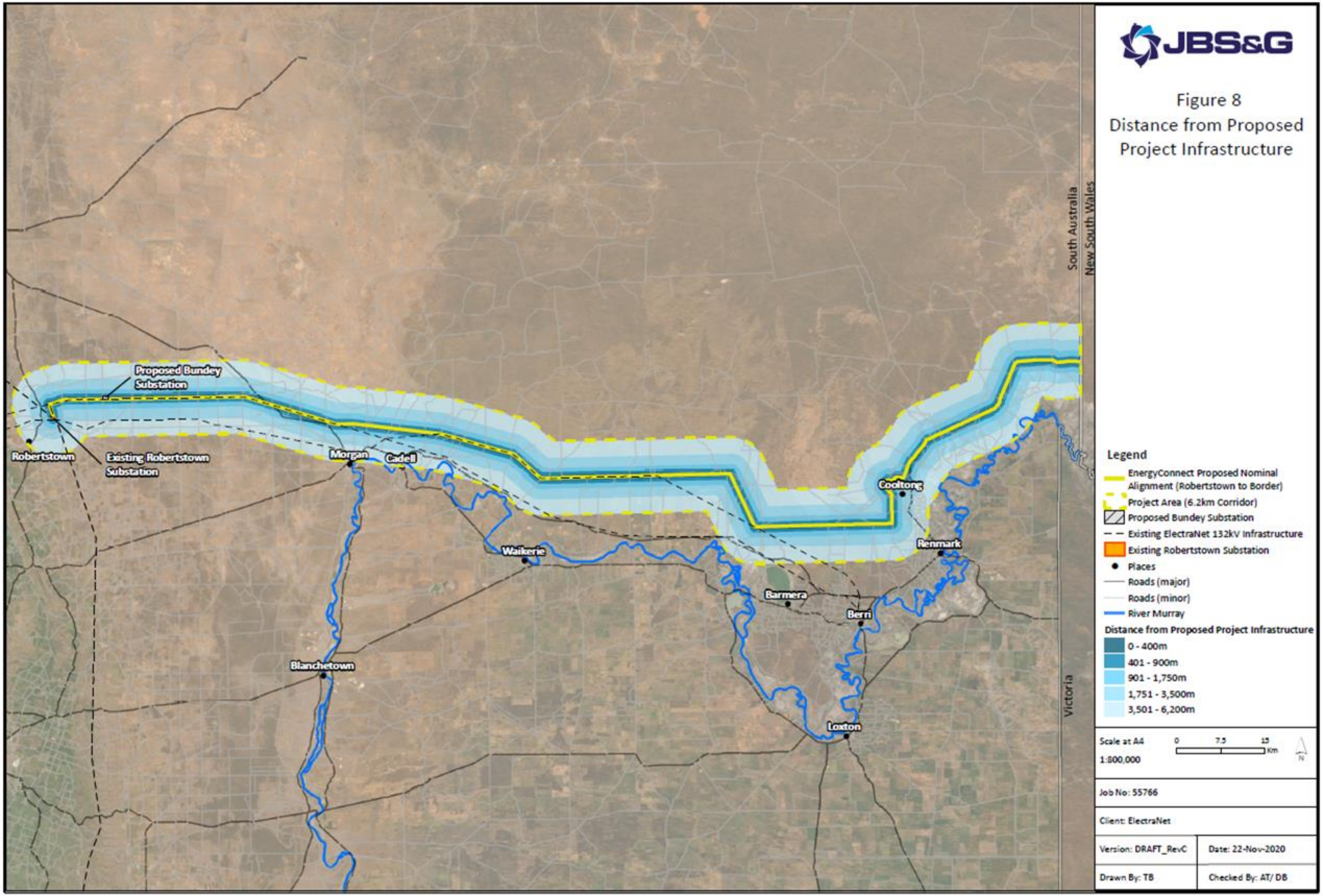
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Figure 8
Distance from Proposed Project Infrastructure
South Australia
New South Wales
Victoria
Proposed Bundey Substation
Existing Robertstown Substation
Robertstown
Morgan
Cadell
Waikerie
Cooltong
Renmark
Barmera
Berri
Blanchetown
Loxton
Legend
EnergyConnect Proposed Nominal Alignment (Robertstown to Border)
Project Area (6.2km Corridor)
Proposed Bundey Substation
Existing ElectraNet 132kV Infrastructure
Existing Robertstown Substation
Places
Roads (major)
Roads (minor)
River Murray
Distance from Proposed Project Infrastructure
0 - 400m
401 - 900m
901 - 1,750m
1,751 - 3,500m
3,501 - 6,200m
Scale at A4
1:800,000
0
7.5
15
Km
N
Job No: 55766
Client: ElectraNet
Version: DRAFT_RevC
Date: 22-Nov-2020
Drawn By: TB
Checked By: AT/ DB

5.1.2 Sensitivity to Change

The Sensitivity to Change measure assesses the degree to which the Project area's existing visual environment can undergo alteration based on the following key factors:

- Visual landscape scenic quality and visual absorption capacity
- Physical setting (vegetation type and height and existing transmission line infrastructure).

These are described below and in detailed in **Table 5.4** and **Table 5.6.**

5.1.2.1 Visual Landscape Scenic Quality

The scenic quality of an area is highly subjective, however, for this assessment, it is related to areas of high natural value, which correlates to the degree of transformation (via anthropomorphic activity) of the landscape. More specifically this refers to the degree of anthropogenic infrastructure present, the state of the natural vegetation, the diversity of the landscape and its overall aesthetic value. The visual sensitivity ratings are included in **Table 5.4**.

Table 5.4: Visual Landscape Sensitivity Rating

Sensitivity to Change	Description	Model Input Value
High	Negligible built infrastructure present, natural vegetation is not altered, land use has not altered the natural aesthetic qualities. The landscape is unique and has outstanding, diverse features with numerous or significant focal areas	8
Moderate	Very little built infrastructure present, natural vegetation is only slightly altered, land use has somewhat hardly altered the natural aesthetic qualities, the landscape has scenic diversity	4
Low	Some built infrastructure present, natural vegetation is somewhat altered, land use has somewhat altered the natural aesthetic qualities, the landscape has some scenic diversity	2
Very Low	Significant built infrastructure is present, natural vegetation is significantly altered, land use had significantly altered the natural aesthetic qualities, the landscape has little scenic diversity	1

The Project area's existing visual landscape is influenced by the scenic (or aesthetic) quality. An assessment of the scenic quality based on visual absorption capacity for each Visual Landscape Type is presented in **Table 5.5.**

The visual absorption of a landscape is influenced by elements such as the presence of rugged terrain, vegetation height and density, the presence of man-made structures and dominant land use. A visual landscape with a high visual absorption capacity is considered to be less sensitive to change than a visual landscape within a low visual absorption capacity.

Table 5.5: Visual Landscape and Scenic Quality

Bioregion	Visual Landscape Type	Scenic Quality/Sensitivity Rating[7]
Flinders Lofty Block	Low Hills	Moderate
Murray Darling Depression	Degraded Agricultural Plains	Low
	Mallee Dunefields	High
	Irrigated Agriculture	Moderate
Riverina	Western Riverina	Moderate
	Eastern Riverina	High

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Bioregion	Visual Landscape Type	Scenic Quality/Sensitivity Rating[7]
	Agriculture	Low

5.1.2.2 Vegetation Height

The presence of vegetation assists in mitigating the visual impact by providing a physical visual barrier between the receptor and the proposed Project, and drawing the focus of the eye to a different area than that of the proposed development. Sensitivity to change based on vegetation height is broken into four categories of visual impact, as detailed in **Table 5.6** and shown in **Figure 9**.

Table 5.6: Vegetation Height

Sensitivity to Change	Average Vegetation Height[8]	Description	Model Input Value
High	<1 m	Where vegetation is lower than 1 m, it provides limited/no visual mitigation. The associated visual impact is high.	8
Moderate	1 – 2 m	Where vegetation is between 1 m and 2 m high, it is starting to provide a visual screen, and will partially hide transmission towers when close to a viewer. The associated visual impact is moderate.	4
Low	3 – 10 m	Vegetation at this height will create a visual shield at greater distances and, when present over a large area, begins to dominate the visual field. The associated visual impact is low.	2
Very Low	>10 m	Vegetation over 10 m dominates the landscape and provides a visual screen for great distances. The associated visual impact is very low.	1

[8] Vegetation data is sourced from the National Vegetation Information System Version 6.0 (2003)

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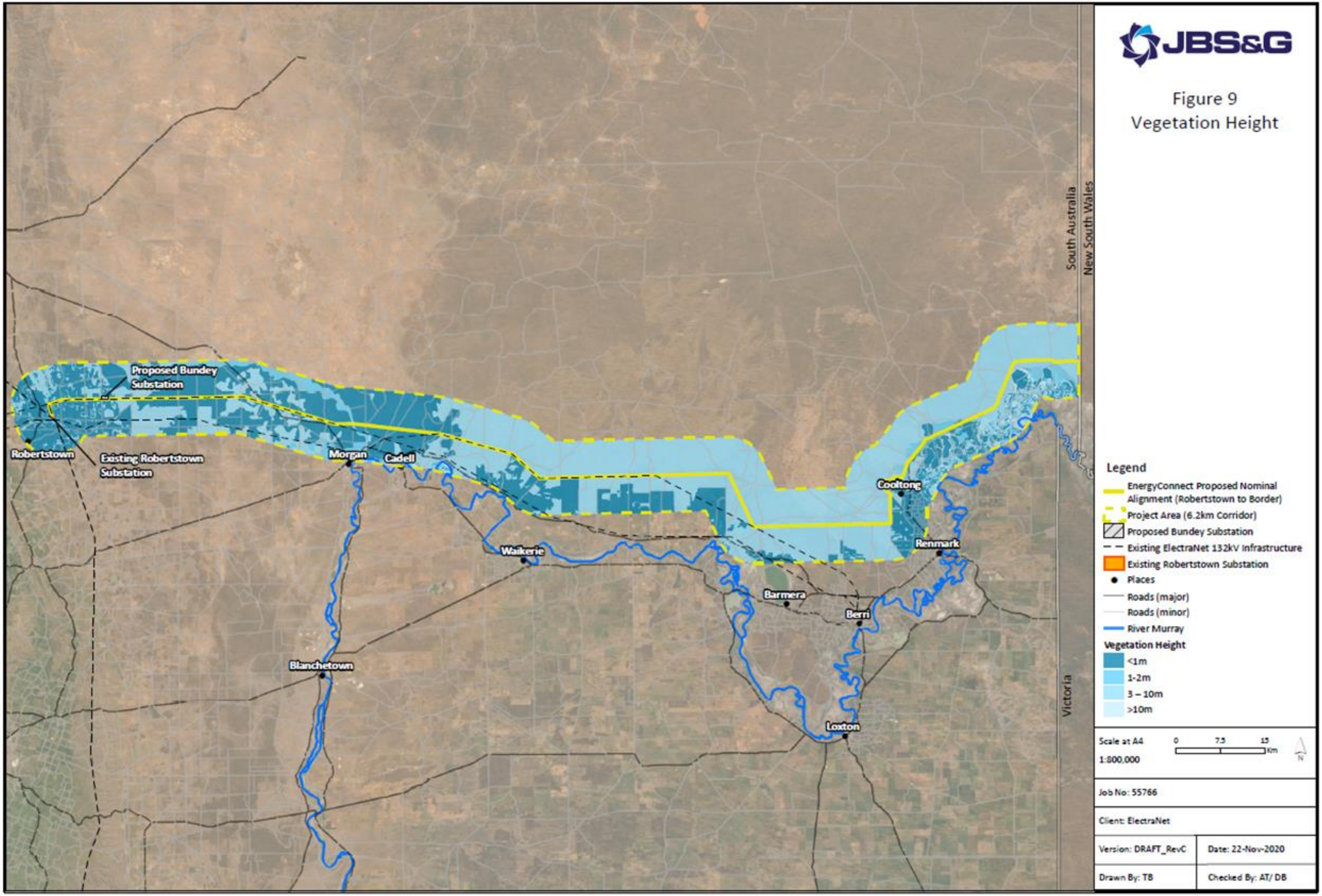

Figure 9
Vegetation Height

5.1.2.3 Existing Transmission Line Infrastructure

The Project is sited adjacent to existing transmission line infrastructure corridors for more than half of the total proposed length of the proposed alignment. The existing transmission infrastructure needs to be considered because it will assist in mitigating the visual impact of the Project, i.e. reducing the sensitivity of the receiving environment. This aspect of visual impact is categorised based on the distance of the visual receptor from existing transmission line infrastructure, as detailed in **Table 5.7**. The presence of existing 132kV towers/ poles and transmission lines is modelled on an assumed 25 m tower/pole height and shown in **Figure 10**. The further a receptor is from the existing infrastructure, the higher the sensitivity of the landscape will be to change.

Table 5.7: Existing Transmission line Infrastructure

Sensitivity to Change	Distance of receptor from Existing transmission line Infrastructure[9]	Description	Model Input Value
High	>3,351 m	Existing infrastructure is visible as a very minor feature in some locations, and therefore provides limited/no visual mitigation.	8
Moderate - High	1,676 – 3,350 m	Existing infrastructure is less distinct and is not obvious in the visual field and therefore provides little visual mitigation.	4
Moderate	851 – 1,675 m	Infrastructure can be seen in the visual field and alters the landscape to a degree and therefore provides moderate visual mitigation. At 1,050 m a 25 m tower occupies 1.432°, or roughly 10% of the central field of view.	2
Low	401 – 850 m	Existing Infrastructure is very obvious in the visual field and alters the landscape, providing a significant visual mitigating factor. At 450 m a 25 m tower occupies approximately 3°, or roughly 22% of the central field of view.	1
Very Low	0 – 400 m	Existing infrastructure dominates the visual field and resulting in an existing dramatically altered landscape providing a very significant mitigating factor. At 150 m a 25 m tower occupies approximately 10°, or roughly 66% of the central field of view.	0

[9] Data is sourced from (Data SA, 2019).

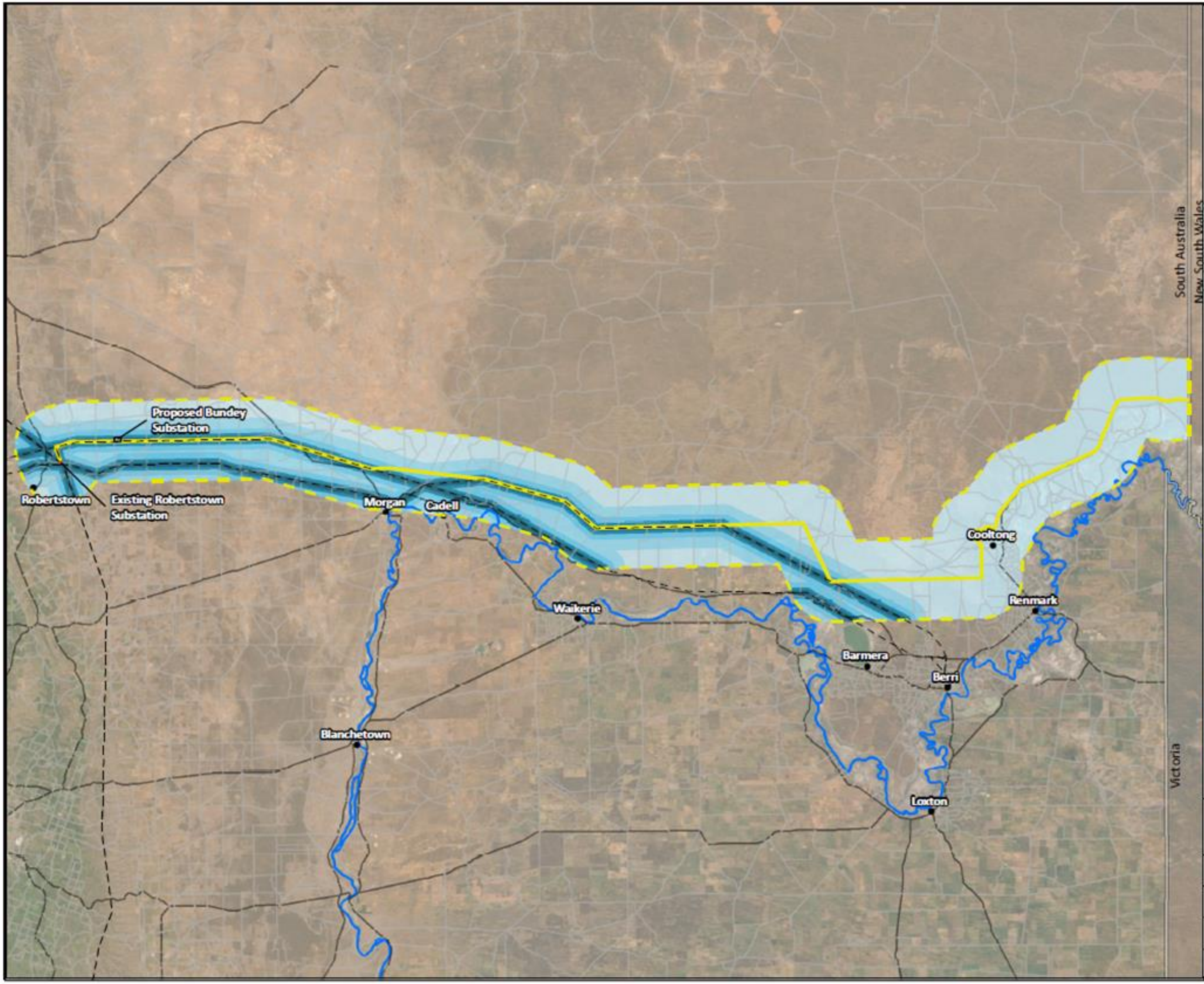

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Figure 10
Distance from Existing ElectraNet Infrastructure

Legend

- EnergyConnect Proposed Nominal Alignment (Robertstown to Border)
- Project Area (6.2km Corridor)
- Proposed Bundey Substation
- Existing ElectraNet 132kV Infrastructure
- Existing Robertstown Substation
- Places
- Roads (major)
- Roads (minor)
- River Murray

Distance from Existing ElectraNet Infrastructure
- 0 - 400m
- 401 - 850m
- 851 - 1,675m
- 1,676 - 3,350m
- >3,351m

Scale at A4 1:800,000 — 0, 7.5, 15 Km — N

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Client: ElectraNet	
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5.1.3 Visual Impact Matrix

Following the assessment and categorisation of visual impact for each component, the theoretical (quantitative) visual impact of the Project infrastructure can be calculated for any chosen location within the Project area. These findings are then supported by the photomontages at selected viewpoint locations to illustrate the project infrastructure in situ (as it would appear on the landscape to a receptor).

The visual impact rating is calculated using the following formula:

- Distance of receptor from Project Infrastructure (**a**) is determined
- This number (**a**) is then multiplied by the average of the sum of the "sensitivity to change factors" [Visual Landscape Scenic Quality (**b**), vegetation height (**c**), distance from existing transmission line infrastructure (**d**)] as summarised in the following formula:

a x (average of b+c+d) = quantitative visual impact model score

A description of the visual impact rating model scores and the corresponding degree of visual impact is presented below in **Table 5.8** and graphically in **Figure 11 A1-A7.**

Table 5.8: Theoretical Visual Impact Matrix

Model Score	Description	Modelled visual impact rating
101 - 128	Developments dominate the visual field and dramatically alter the landscape.	High Visibility
76 – 100	Developments are very obvious in the visual field and alter the landscape.	Moderate Visibility
51 – 75	Developments are obvious, but do not dominate the landscape.	Low Visibility
26 – 50	Developments can be seen in the visual field and alter the landscape to a small degree.	Very Low Visibility
1-25	Limited/no visual effect on the landscape, visible as a very minor feature in some locations.	Negligible Visibility
0	Outside the TZVI	Outside TZVI

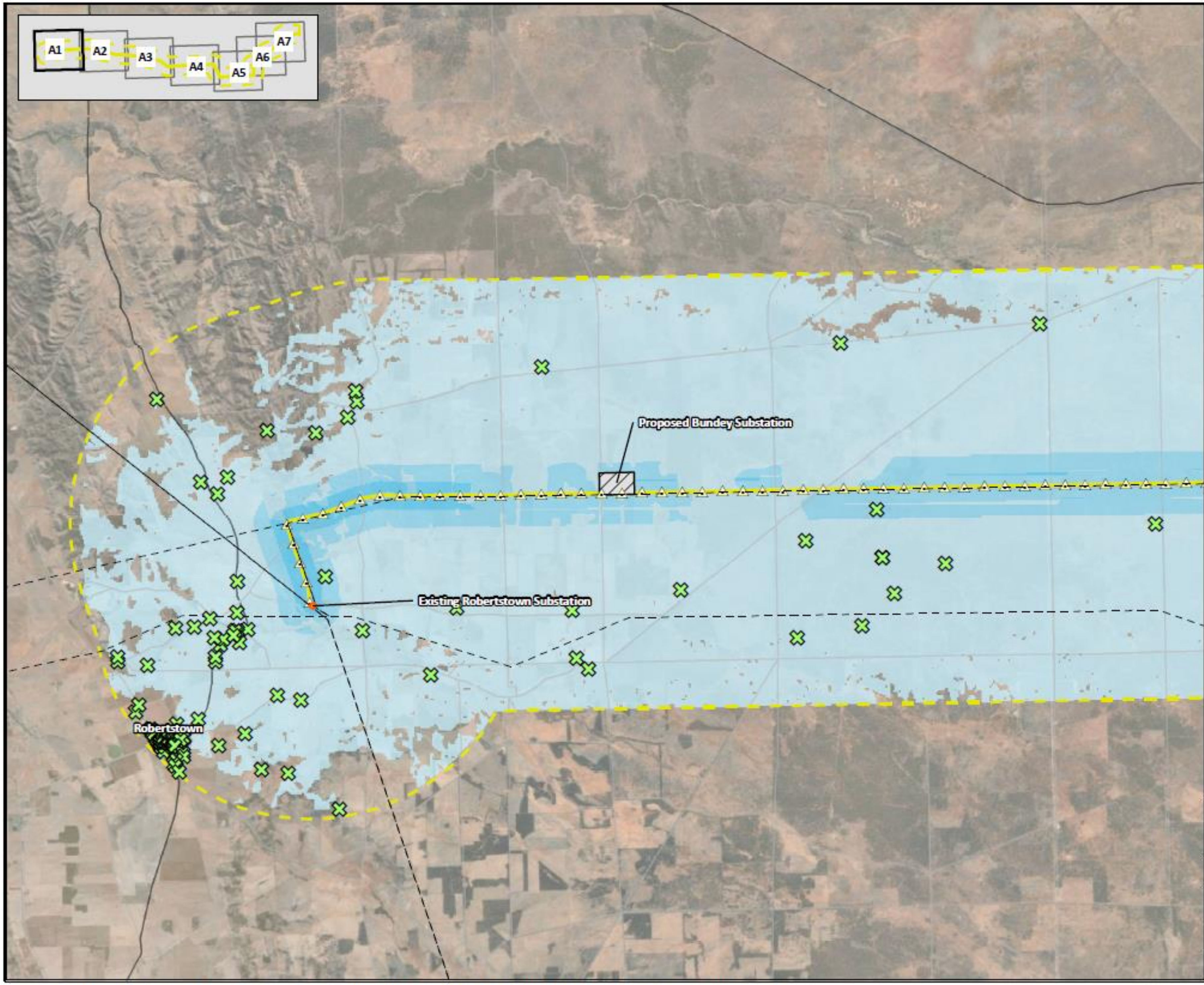

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Figure 11: A1 Theoretical Visual Impact

Legend

- EnergyConnect Proposed Nominal Alignment (Robertstown to Border)
- Proposed 64.5m Tower
- Project Area (6.2km Corridor)
- Proposed Bundey Substation
- Existing ElectraNet 132kV Infrastructure
- Existing Robertstown Substation
- Places
- Roads (major)
- Roads (minor)
- River Murray
- Potential Visual Receptors

Theoretical Visual Impact Matrix

- High Visibility
- Moderate Visibility
- Low Visibility
- Very Low Visibility
- Negligible Visibility

Note: Legend is reflective of Figure 11: A1 to A7

Scale at A4 1:150,000 (0 1 2 Km) N

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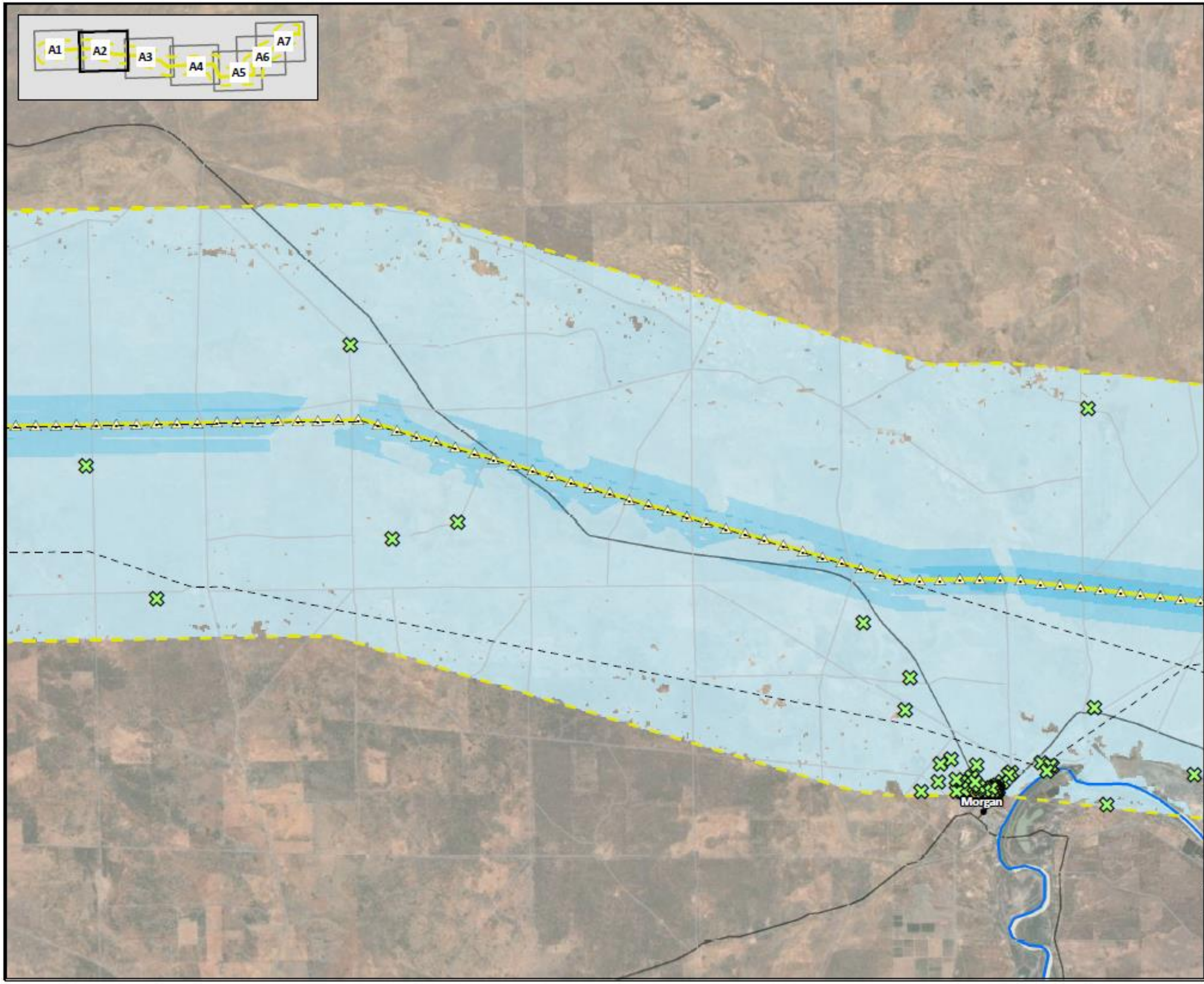

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Figure 11: A2 Theoretical Visual Impact

Legend

- EnergyConnect Proposed Nominal Alignment (Robertstown to Border)
- Proposed 64.5m Tower
- Project Area (6.2km Corridor)
- Proposed Bundey Substation
- Existing ElectraNet 132kV Infrastructure
- Existing Robertstown Substation
- Places
- Roads (major)
- Roads (minor)
- River Murray
- Potential Visual Receptors

Theoretical Visual Impact Matrix

- High Visibility
- Moderate Visibility
- Low Visibility
- Very Low Visibility
- Negligible Visibility

Note: Legend is reflective of Figure 11: A1 to A7

Scale at A4 1:150,000 — 0 1 2 Km

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Client: ElectraNet

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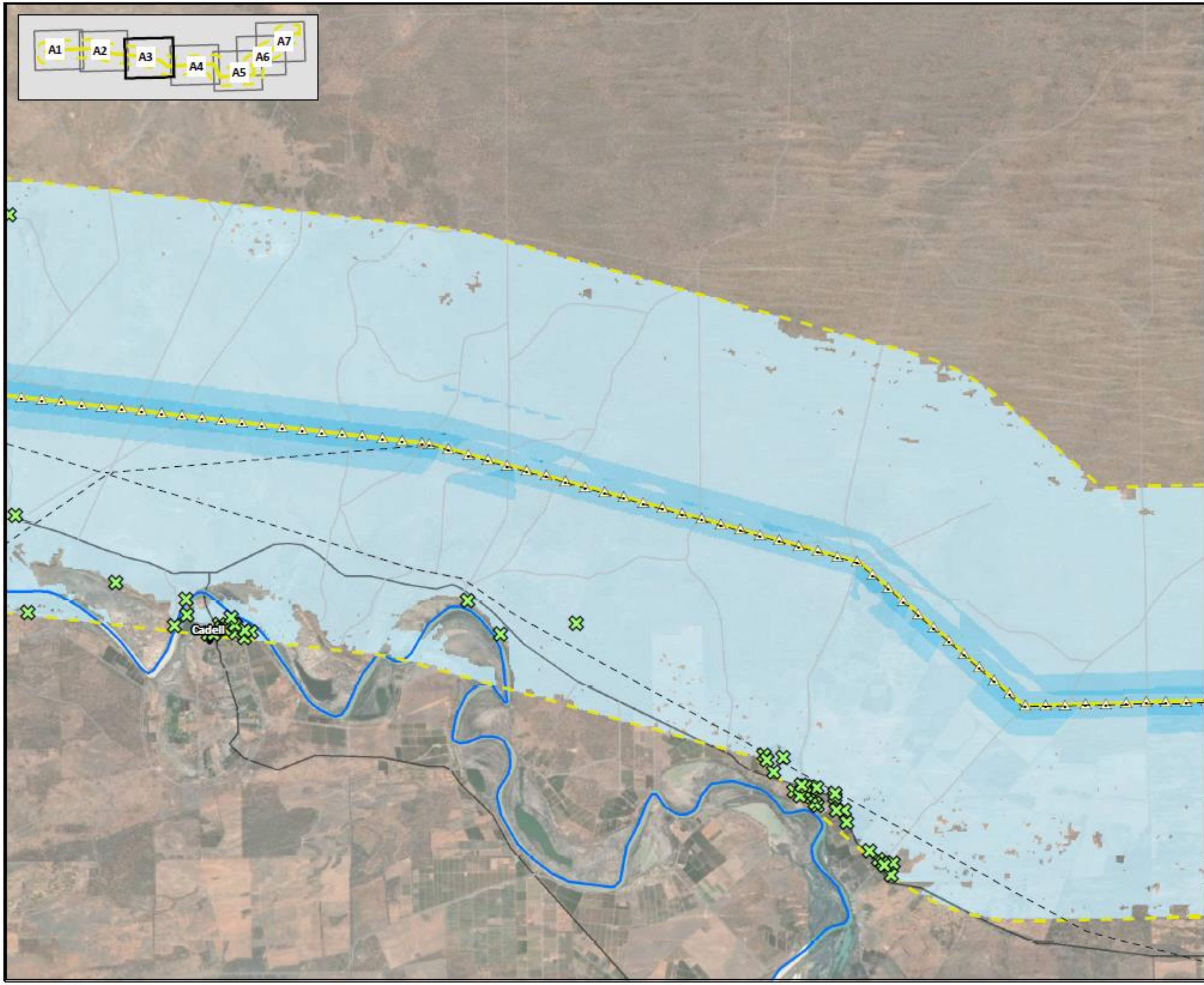

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Figure 11: A3 Theoretical Visual Impact

Legend

- EnergyConnect Proposed Nominal Alignment (Robertstown to Border)
- Proposed 64.5m Tower
- Project Area (6.2km Corridor)
- Proposed Bundey Substation
- Existing ElectraNet 132kV Infrastructure
- Existing Robertstown Substation
- Places
- Roads (major)
- Roads (minor)
- River Murray
- Potential Visual Receptors

Theoretical Visual Impact Matrix

- High Visibility
- Moderate Visibility
- Low Visibility
- Very Low Visibility
- Negligible Visibility

Note: Legend is reflective of Figure 11: A1 to A7

Scale at A4 1:150,000 — 0 1 2 Km — N

Job No: 55766

Client: ElectraNet

Version: DRAFT_RevC | Date: 16-Dec-2020

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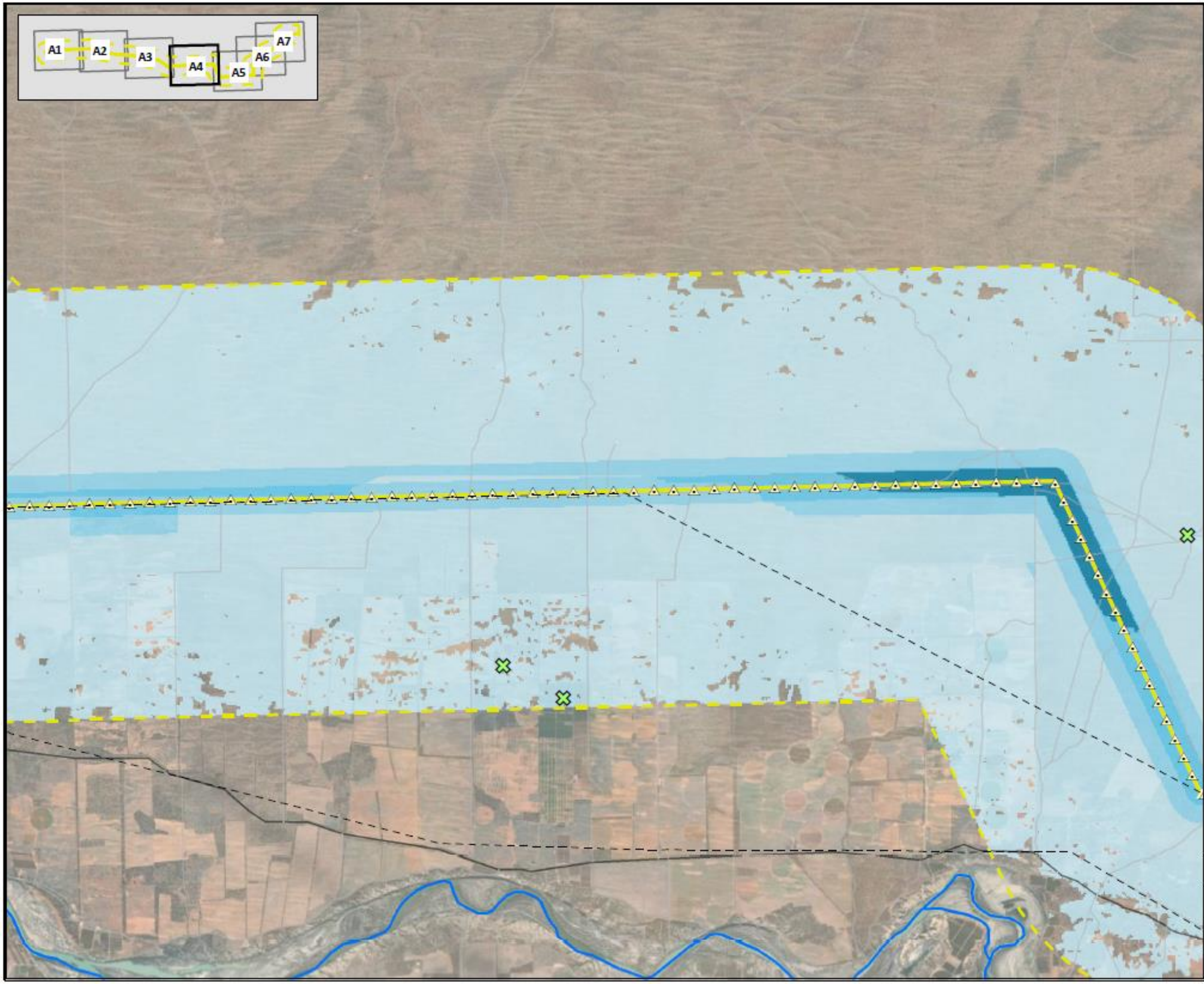

Figure 11: A4 Theoretical Visual Impact

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Legend

- EnergyConnect Proposed Nominal Alignment (Robertstown to Border)
- Proposed 64.5m Tower
- Project Area (6.2km Corridor)
- Proposed Bundey Substation
- Existing ElectraNet 132kV Infrastructure
- Existing Robertstown Substation
- Places
- Roads (major)
- Roads (minor)
- River Murray
- Potential Visual Receptors

Theoretical Visual Impact Matrix

- High Visibility
- Moderate Visibility
- Low Visibility
- Very Low Visibility
- Negligible Visibility

Note: Legend is reflective of Figure 11: A1 to A7

Scale at A4 1:150,000 — 0 1 2 Km — N

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Client: ElectraNet	
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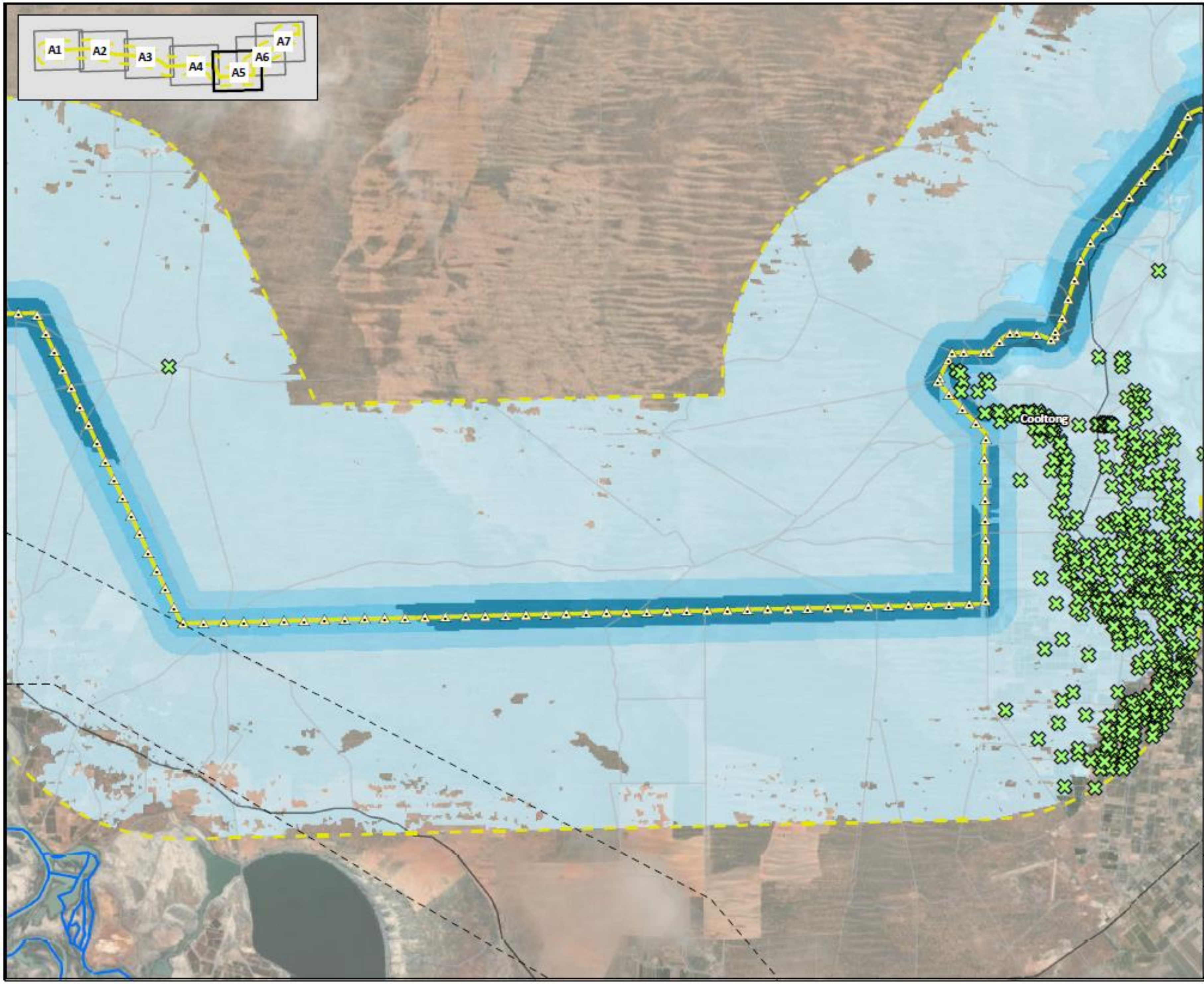
Figure 11: A5 Theoretical Visual Impact



Legend

- EnergyConnect Proposed Nominal Alignment (Robertstown to Border)
- Proposed 64.5m Tower
- Project Area (6.2km Corridor)
- Proposed Bundey Substation
- Existing ElectraNet 132kV Infrastructure
- Existing Robertstown Substation
- Places
- Roads (major)
- Roads (minor)
- River Murray
- Potential Visual Receptors

Theoretical Visual Impact Matrix

- High Visibility
- Moderate Visibility
- Low Visibility
- Very Low Visibility
- Negligible Visibility

Note: Legend is reflective of Figure 11: A1 to A7

Scale at A4 1:150,000 — 0 1 2 Km — N

Job No: 55766

Client: ElectraNet

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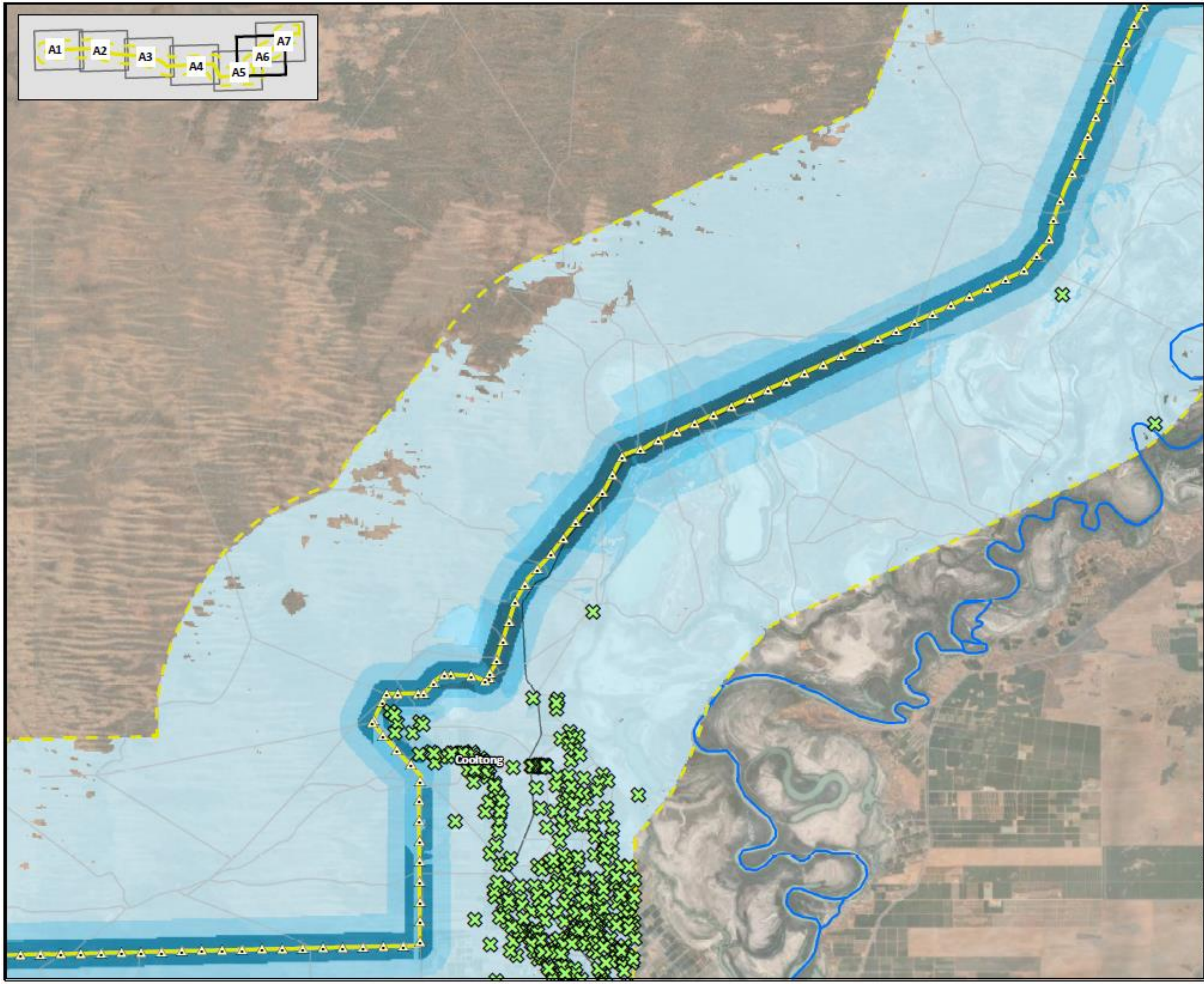

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Figure 11: A6 Theoretical Visual Impact

Legend

- EnergyConnect Proposed Nominal Alignment (Robertstown to Border)
- Proposed 64.5m Tower
- Project Area (6.2km Corridor)
- Proposed Bundey Substation
- Existing ElectraNet 132kV Infrastructure
- Existing Robertstown Substation
- Places
- Roads (major)
- Roads (minor)
- River Murray
- Potential Visual Receptors

Theoretical Visual Impact Matrix

- High Visibility
- Moderate Visibility
- Low Visibility
- Very Low Visibility
- Negligible Visibility

Note: Legend is reflective of Figure 11: A1 to A7

Scale at A4 1:150,000

0 1 2 Km

N

Job No: 55766

Client: ElectraNet

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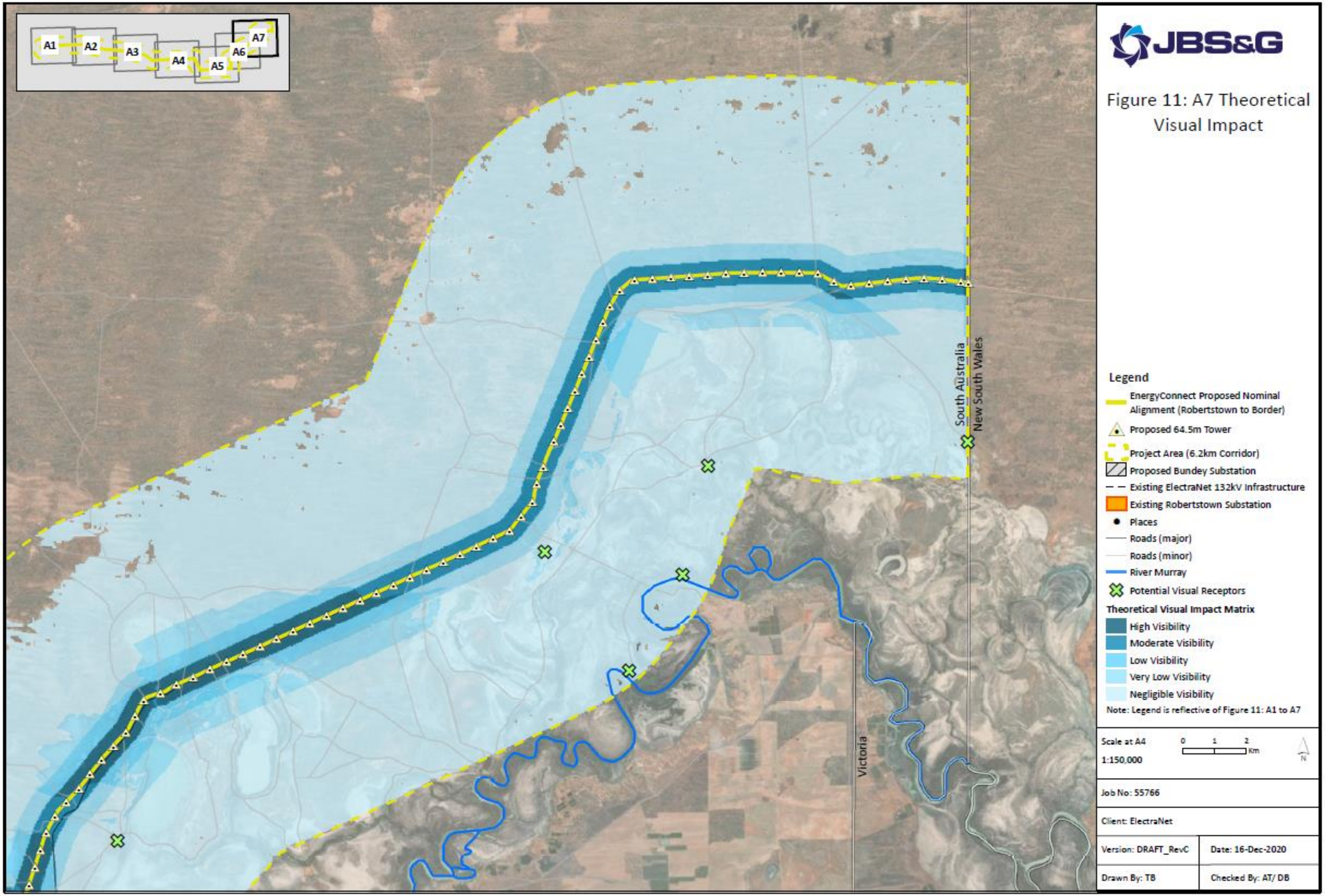
Drawn By: TB	Checked By: AT/ DB


A1
A2
A3
A4
A5
A6
A7
South Australia
New South Wales
Victoria
JBS&G
Figure 11: A7 Theoretical Visual Impact
Legend
EnergyConnect Proposed Nominal Alignment (Robertstown to Border)
Proposed 64.5m Tower
Project Area (6.2km Corridor)
Proposed Bundey Substation
Existing ElectraNet 132kV Infrastructure
Existing Robertstown Substation
Places
Roads (major)
Roads (minor)
River Murray
Potential Visual Receptors
Theoretical Visual Impact Matrix
High Visibility
Moderate Visibility
Low Visibility
Very Low Visibility
Negligible Visibility
Note: Legend is reflective of Figure 11: A1 to A7
Scale at A4
1:150,000
0 1 2 Km
N
Job No: 55766
Client: ElectraNet
Version: DRAFT_RevC
Date: 16-Dec-2020
Drawn By: TB
Checked By: AT/ DB

5.2 Phase 2: Photomontage Assessment

5.2.1 Photomontage Methodology

JBS&G and specialist visualisation consultants, Convergen, have developed a photomontage methodology based on national and international best practice guidelines. Using a combination of assessment with Global Position System (GPS) referencing, onsite photographic capture and computer-generated simulations, photographic representations of the proposed development are produced with a high degree of clarity and accuracy.

The base modelling of the development for photomontages is produced using Blender™ (an open-source 3D computer graphics software tool set used for creating animated films, visual effects, art, 3D printed models, interactive 3D applications and video games). Kolor Autopano Giga Pro™ was used for stitching the individual photographs together into a panorama. Adobe Photoshop™ was used for combining the base photography with the 3D elements and for masking purposes. All three programs are commonly used within the development industry for visual assessment of infrastructure projects.

The method consists of a staged approach summarised as:

- Viewpoints are identified during an onsite assessment and in consultation with the client, consultants and residents. The viewpoints are selected to represent typical or important views where the development is visible within the field of view. The location of the viewpoints is selected to be representative of the landscape character of the locality.
- The photographs are taken onsite using a 50mm lens Full Frame Digital SLR camera with a 360- degree robotic head. This enables a 360-degree photographic capture of the existing landscape using multiple overlapping digital images. Numerous research papers have concluded that a 50mm equivalent lens is the most representative of the human eye in relation to the depth of field. Photographs are taken on a mounted tripod, and the eye height recorded to a height of 1.75 metres. Also, the elevation of the viewpoint is recorded at the Australia Height Datum (AHD) using the barometric measure on a handheld GPS device. The weather and time of day are also recorded to enable the 3D computer model to reflect similar daylight and shadowing conditions. This information is used during the rendering of the computer model.
- The centre of the field of view is identified on site using a bearing compass and GPS to the projected centre of the development. A field of view of 60 degrees to either side of centre is established onsite to provide the full 120 degrees. This field of view (FOV) is representative of the full field of view experienced by a human when looking in one direction. The extent of the field of view is recorded and evaluated onsite using the GPS and bearing compass. During the site assessment numerous fixed known visual markers are recorded with a GPS location and bearing from the viewpoint. These markers provide reference points within the computer modelling to enable accurate alignment of the model with the reference points represented in the photographs.
- To generate the panoramic photographs, the individual photographs are stitched together using Kolor's Autopano Giga Pro software.
- Using Blender™ software a draft digital model of the proposed development is produced using the drawings supplied of the proposed development. A digital terrain model, is used to create a digital representation of topography and existing urban form. A virtual camera is added into the model based off the GPS locations and associated with the 360-degree photographic capture. The draft digital model is then superimposed on the 360-degree photographic capture and matched in accordance to reference markers and topographic features in the digital model such as ridgelines and rooftops using Photoshop™. The correct

field of view is established by matching the viewing centre of the view angle to the camera and lens used for the 360-degree photographic capture. This ensures that the size and angle of view of the digital model in the draft photomontages match the photographs taken.

- A second site visit is conducted to verify the correct locations of the proposed development using a GPS, site reference points and bearing compass. Site observations are compared with the draft photomontages. Minor alterations (if required) are noted. Ground truthing the photomontages provide rigour to the process and increase the degree of accuracy.

Once the draft photomontages have been reviewed, fully rendered images are produced. The rendered model is completed in Blender™ using the correct sun angle for the date and time of the day that the photographs were taken. The rendered model is exported to Photoshop™ for final matching with the panoramic photograph. The rendered model is edited, masking the development or parts of the development that are screened by vegetation and other elements within the foreground to ensure that the proposed development appears in the correct location in the photomontage.

6. Visual Effects of Project

The results of the visual impact model have been obtained by applying the analytical assessment tools to each layer of the GIS model, applying the formulas as outlined to determine a final visual impact rating for each zone within the TZVI. The photomontage locations, image locations and potential receptors were then analysed against the VIA model to determine the level of visual impact on the identified receptors.

The calculated visual impact at chosen representative key viewpoints are shown below in **Figure 12** to **Figure 21**, in the form of theoretical visual impact and photomontages. **Figure 6 A1-A7** shows the location of the selected viewpoints.

6.1 Transmission Towers

For the purposes of modelling the TZVI, the tallest visual element will be the 330 kV (64.5-65.5 m) transmission towers. These have been used to produce a conservative scenario TZVI.

The steel lattice towers will contrast with the largely natural visual setting, however, the fact that it is not a large, solid surface will allow the receptor to “see through” the towers to the landscape and views beyond. Given the landscape is generally flat, most views of the towers will be skyline views, with the sky forming a backdrop to the towers across the landscape. In general, the towers will be evident as unnatural structures on the landscape. The conductors appear almost invisible beyond a couple of kilometres and are not considered to constitute a significant component of the overall visual impact.

There will be limited vegetation clearing due to the predominance of low vegetation within the proposed easement. Small areas of vegetation will be cleared to facilitate the construction of the tower footings which will not result in a change to the view unless the receptor is immediately adjacent to the clearing. Partial reinstatement of these clearings will occur post construction with operational clearances maintained during operation.

6.2 Bundey Substation

The tallest element of the substation will be the lightning tower and telecommunications towers (20 - 50m), which is lower than the proposed 330 kV transmission towers adjacent to the substation. The visual impact of the substation is likely to be contained to views from within a couple of kilometres, and likely less as the bulk of the substation infrastructure will not exceed 5 m in height. No receptors have been identified immediately adjacent to the proposed substation site.

6.3 Other components: Construction and Decommissioning

The other Project components that are potentially visually significant are the temporary construction camps, laydown areas, and access tracks. These elements are not considered to result in a significantly negative visual effect on any receptors due to the short-term presence, and low elevation (height) of these components. The construction camps will only be present during the construction phase of the Project. Generally, they will be located close to the centre of the alignment and away from visual receptors.

Construction impacts will be short term and localised, and therefore have not been modelled. It is anticipated that construction and maintenance activities will be significantly less than the modelled operational impacts. Maintenance activities are considered part of the operational phase and will have a negligible impact on visual amenity compared to the presence of the transmission towers. Night-time lighting may negatively affect receptors immediately adjacent to the construction camps.

The design life of the Project is approximately 100 years. Decommissioning will be conducted in accordance with environmental standards and legislative requirements at the date of decommissioning, and has not been modelled in this assessment.

6.4 Cumulative Impacts

Cumulative impacts are those that take into account the impacts of other developments within the Project area that may affect the findings of this assessment. It is likely that a number of new renewable energy projects such as solar and wind may be developed within proximity to the Project which may result in increased visual impacts (in the case of wind projects), and will result in a much smaller visual impact in the case of solar projects. The cumulative visual impacts related to the future developments is unknown at this point.

The cumulative impacts of existing developments within the TZVI (such as existing transmission lines) provide visual mitigation of the development of the Project infrastructure where the visual sensitivity of the landscape is decreased due to existing infrastructure.

6.4.1 Views from roads

Views from the major roads within the TZVI will be from the Goyder Highway between Whites Dam and Cadell.

Project infrastructure will be a dominant feature for transient receptors on the Wentworth-Renmark Road.

6.4.2 Views from social receptors

All identified potential social receptor locations (including residential properties and structures used intermittently) within the TZVI were spatially analysed against the VIA model as summarised in **Table 6.1**. This table shows that the majority of receptors (474) fall within the Negligible Visibility and Very Low Visibility zones. These two groupings represent the lowest visual impact scores. Two receptor locations are likely to have Low Visibility of the transmission lines and one receptor identified to be located within the Moderate Visibility area. One receptor was identified to fall within the area of High Visibility in the Cooltong area.

Very few social receptors fall within the TZVI, and the highest density of residential development (in the vicinity of the settlements of Morgan, Cadell, Cooltong and Renmark West) is located outside of the TZVI. Residential areas on the fringes of these settlements, and agricultural residences within farming areas within the TZVI, account for the majority of the social receptors. Due to the high frequency of views by social receptors, they are considered to be the most sensitive of the three receptor groups. The modelling of the Project infrastructure shows the majority of the social receptors within the TZVI will not be aware of the presence of the transmission lines, and others will have limited visibility due to a variety of visual mitigation factors such as vegetation, existing power infrastructure and the level of transformation of the landscape.

Table 6.1 Potential visual social receptors location impact analysis

Visual Impact Category	Social receptor numbers	Description
High Visibility	1	Developments dominate the visual field and dramatically alter the landscape. One social receptor is located within this impact zone.
Moderate Visibility	1	Developments are very obvious in the visual field and alter the landscape. Two social receptors are located within this impact zone.
Low Visibility	2	Developments are obvious, but do not dominate the landscape. Two social receptors are within this impact zone.
Very Low Visibility	11	Developments can be seen in the visual field and alter the landscape to a small degree. Eleven social receptors are located within this impact zone.
Negligible Visibility	463	Limited/no visual effect on the landscape, visible as a very minor feature in some locations. 463 social receptors are located within this impact zone.

6.4.3 Views from tourism areas

The main tourism area within the vicinity of the TZVI are those that are dependent on the scenic qualities of the River Murray floodplain. The Project passes to the north of this area, and the areas adjacent to the River Murray fall outside of the TZVI and therefore will not have views of the Project. The visual mitigation of the tall riparian vegetation, and the topographic variation within this area, assist in preventing views of the transmission infrastructure.

Limited numbers of tourists (mainly students and research-related visitors) may be visually impacted by the Project. Although these visitors will be sensitive to any changes to the visual landscape, the low frequency of views will reduce the magnitude of the impact within the Calperum area. Views of the Project infrastructure will only be possible from the far southern extent of this area and will be mitigated by the height of the vegetation which will shield views from receptors.

6.5 Photomontage Assessment

Photomontage locations were selected to provide examples of views towards the Project infrastructure in a variety of landscape contexts. Photomontages were produced to allow representative views of various landscape types where a number of towers could be seen across the landscape. **Table 6.2** presents the assessed viewpoints locations and are presented graphically on **Figures 12-20**. Each photomontage viewer location was analysed trough the VIA model to arrive at a viewpoint location visual impact rating that could be correlated to the photomontages.

Table 6.2: Viewpoint photomontage locations

Visual analysis	View direction	Distance from Project Infrastructure (m) Table 5.3	Theoretical Visual Impact Rating Table 5.8	Theoretical Visual Impact Description Table 5.8
VP 3	North west	1951	16	Negligible Visibility
VP 4	South south east	8005	0	Outside TZVI
VP 5	North east	78	107	High Visibility
VP 6	North west	5544	6	Negligible Visibility
VP 7	North west	4477	6	Negligible Visibility
VP 9	North east	6793	0	Outside TZVI
VP 11	North west	3450	9	Negligible Visibility
VP 14	South west	2140	5	Negligible Visibility
VP 15	North east	2045	8	Negligible Visibility
VP 17	North west	556	48	Very Low Visibility

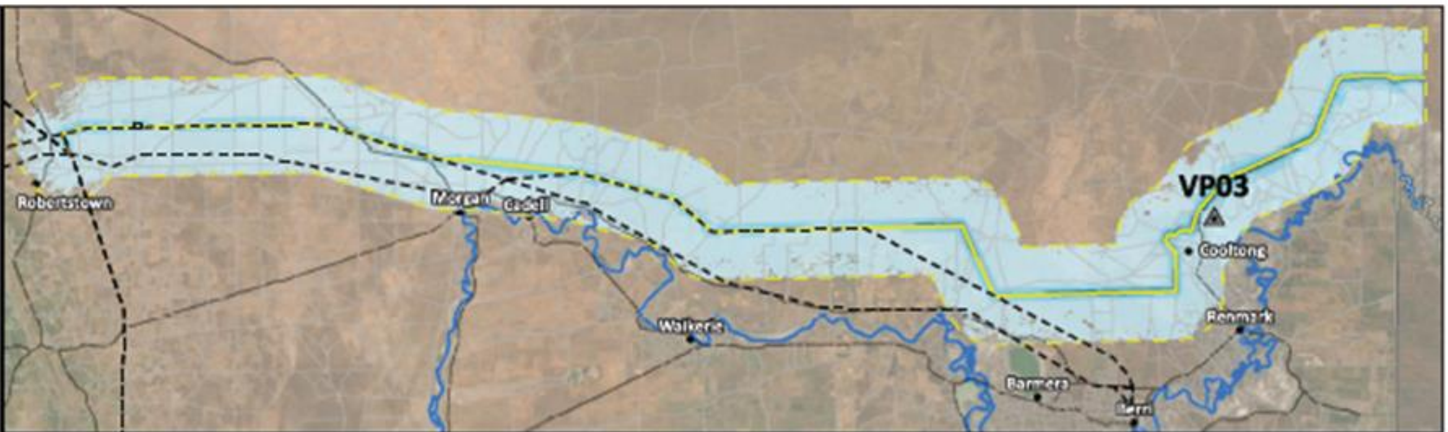
The selected photomontage images are located above the detailed analytical tables for each image to assist in validating the VIA model and method. Viewpoints VP4 and VP9 were selected to confirm that the transmission infrastructure would not be visible from these points as they fall outside of the TZVI. The photomontages confirm that this is the case, and the TZVI is therefore valid. The location at VP5 was selected as it illustrates the highest visually impacted area, immediately under the transmission towers. In addition, VP17 is rated as having Very Low Visibility based on the model inputs, while the Project infrastructure will be theoretically visible based on the photomontages. It is noted that this viewpoint is close to the boundary of being classified as a higher impact rating however due the presence of existing infrastructure and the low sensitivity of the visual landscape type, the assessed impact level is considered appropriate.

Current Landscape

Landscape and Project

Project Highlighted

Project Location Overview



JBS&G

Figure 12
VP03: Photomontage

Base Image Date of Capture	03/06/2019
Base Image Time of Capture	11:27 AM
View Direction (compass bearing)	298
Eastings	473,338.51
Northings	6,233,119.94
Elevation (mAHD)	18.31
Horizontal Field of View (degrees)	120
Vertial Field of View (degrees)	36
Distance from Project Infrastructure (m)	1,951.04
Associated Visibility	Low
Visual Landscape Type	Eastern Riverina
Sensitivity to Change	High
Average Vegetation Height	<1m
Sensitivity to Change	High
Distance of receptor from Existing powerline Infrastructure	>3,351m
Sensitivity to Change	High
Theoretical Visual Impact Level	Negligible Visibility

Job No: 55766	
Client: ElectraNet	
Not to Scale at A3	
Version: DRAFT_RevC	Date: 25-Nov-2020
Drawn By: TB	Checked By: AT/ DB
Image Reference: JBS&G/ Convergen	

Legend:
Project Tower Designs
(presented in 'Projected Highlighted' image)

64.5m (Medium Angle Strain) Tower

Current Landscape

Landscape and Project

Project Highlighted

Project Location Overview

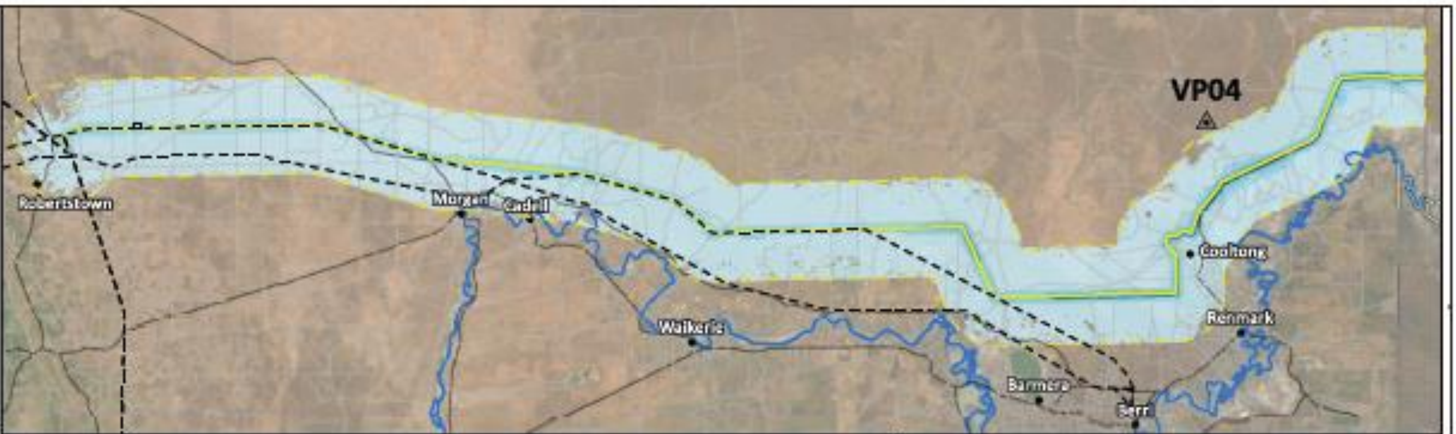


Figure 13
VP04: Photomontage

Base Image Date of Capture	03/06/2019
Base Image Time of Capture	10:38 AM
View Direction (compass bearing)	160
Eastings	472,282.49
Northings	6,245,446.68
Elevation (mAHD)	43.19
Horizontal Field of View (degrees)	120
Vertial Field of View (degrees)	36
Distance from Project Infrastructure (m)	8,005.57
Associated Visibility	Outside TZVI
Visual Landscape Type	Outside TZVI
Sensitivity to Change	Outside TZVI
Average Vegetation Height	Outside TZVI
Sensitivity to Change	Outside TZVI
Distance of receptor from Existing powerline Infrastructure	Outside TZVI
Sensitivity to Change	Outside TZVI
Theoretical Visual Impact Level	Outside TZVI

Job No: 55766	
Client: ElectraNet	
Not to Scale at A3	
Version: DRAFT_RevC	Date: 25-Nov-2020
Drawn By: TB	Checked By: AT/ DB
Image Reference: JBS&G/ Convergen	

Legend:
Project Tower Designs
(presented in 'Projected Highlighted' image)

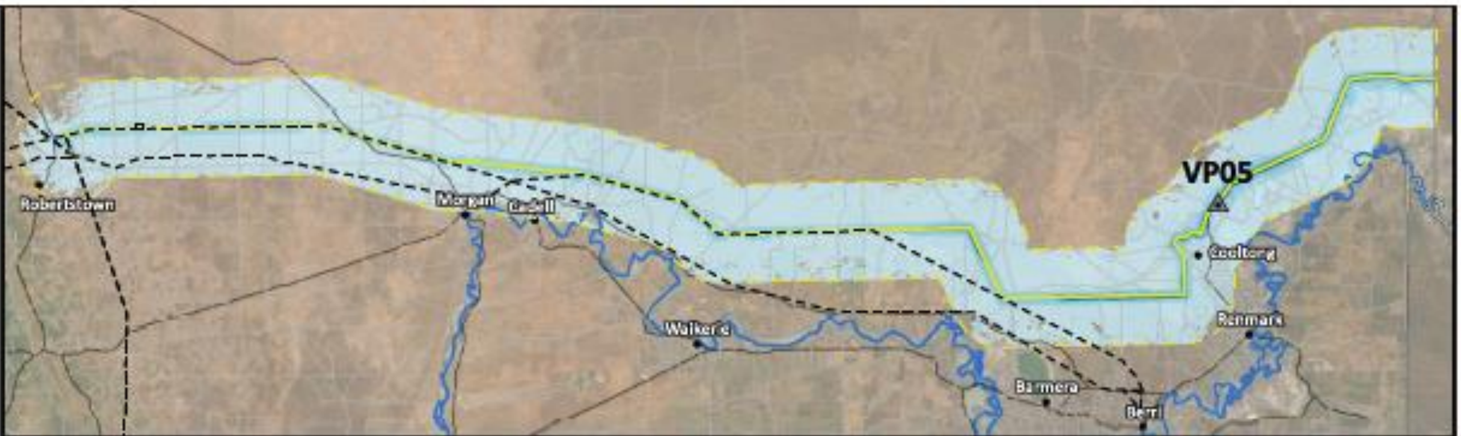
64.5m (Medium Angle Strain) Tower

Current Landscape

Landscape and Project

Project Highlighted

Project Location Overview



JBS&G

Figure 14
VP05: Photomontage

Base Image Date of Capture	03/06/2019
Base Image Time of Capture	12:51 PM
View Direction (compass bearing)	22.6
Eastings	472,549.74
Northings	6,235,091.35
Elevation (mAHD)	33.96
Horizontal Field of View (degrees)	120
Vertial Field of View (degrees)	36
Distance from Project Infrastructure (m)	78.76
Associated Visibility	**High Visibility**
Visual Landscape Type	Eastern Riverina
Sensitivity to Change	**High**
Average Vegetation Height	1-2m
Sensitivity to Change	**Moderate**
Distance of receptor from Existing powerline Infrastructure	>3,351m
Sensitivity to Change	**High**
Theoretical Visual Impact Level	**High Visibility**

Job No: 55766	
Client: ElectraNet	
Not to Scale at A3	
Version: DRAFT_RevC	Date: 25-Nov-2020
Drawn By: TB	Checked By: AT/ DB
Image Reference: JBS&G/ Convergen	

Legend:
Project Tower Designs
(presented in 'Projected Highlighted' image)

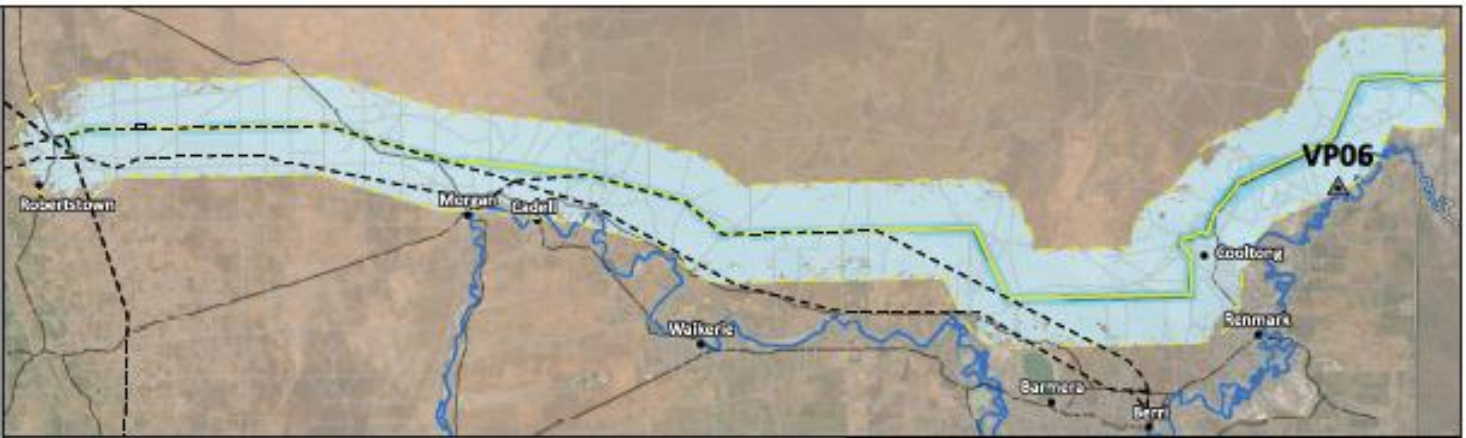
64.5m (Medium Angle Strain) Tower

Current Landscape

Landscape and Project

Project Highlighted

Project Location Overview



JBS&G

Figure 15
VP06: Photomontage

Base Image Date of Capture	03/06/2019
Base Image Time of Capture	1:37 PM
View Direction (compass bearing)	329
Eastings	486,858.17
Northings	6,237,250.01
Elevation (mAHD)	24.84
Horizontal Field of View (degrees)	120
Vertial Field of View (degrees)	36
Distance from Project Infrastructure (m)	5,544.35
Associated Visibility	Very Low
Visual Landscape Type	Eastern Riverina
Sensitivity to Change	High
Average Vegetation Height	>10m
Sensitivity to Change	Very Low
Distance of receptor from Existing powerline Infrastructure	>3,351m
Sensitivity to Change	High
Theoretical Visual Impact Level	Negligible Visibility

Job No: 55766	
Client: ElectraNet	
Not to Scale at A3	
Version: DRAFT_RevC	Date: 25-Nov-2020
Drawn By: TB	Checked By: AT/ DB
Image Reference: JBS&G/ Convergen	

Legend:
Project Tower Designs
(presented in 'Projected Highlighted' image)

64.5m (Medium Angle Strain) Tower

Document Path: V:\05 Projects\ElectraNet\55377_ElectraNet EnergyConnect Environment and Planning\01_VIA\07_Photomontage\08_RevC_2020_11_18\12_20_55377_RevC_2020_11_25.cdr

Current Landscape

Landscape and Project

Project Highlighted

Project Location Overview

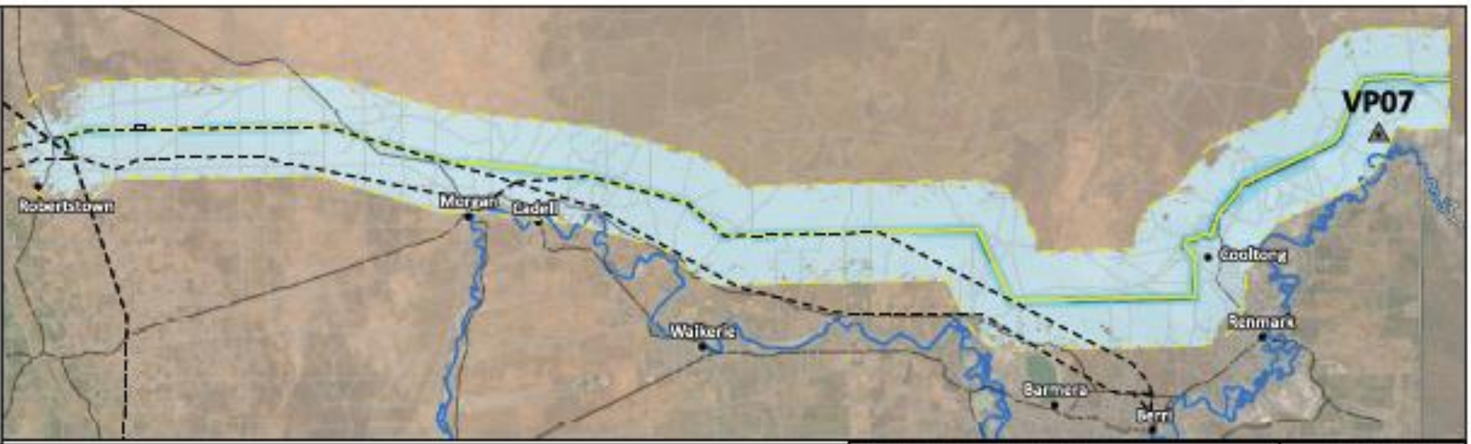


Figure 16
VP07: Photomontage

Base Image Date of Capture	03/06/2019
Base Image Time of Capture	2:15 PM
View Direction (compass bearing)	328
Eastings	491,378.20
Northings	6,244,160.12
Elevation (mAHD)	22.1
Horizontal Field of View (degrees)	120
Vertial Field of View (degrees)	36
Distance from Project Infrastructure (m)	4,477.81
Associated Visibility	Very Low
Visual Landscape Type	Eastern Riverina
Sensitivity to Change	High
Average Vegetation Height	3 – 10m
Sensitivity to Change	Low
Distance of receptor from Existing powerline Infrastructure	>3,351m
Sensitivity to Change	High
Theoretical Visual Impact Level	Negligible Visibility

Job No: 55766	
Client: ElectraNet	
Not to Scale at A3	
Version: DRAFT_RevC	Date: 25-Nov-2020
Drawn By: TB	Checked By: AT/ DB
Image Reference: JBS&G/ Convergen	

Legend:
Project Tower Designs
(presented in 'Projected Highlighted' image)

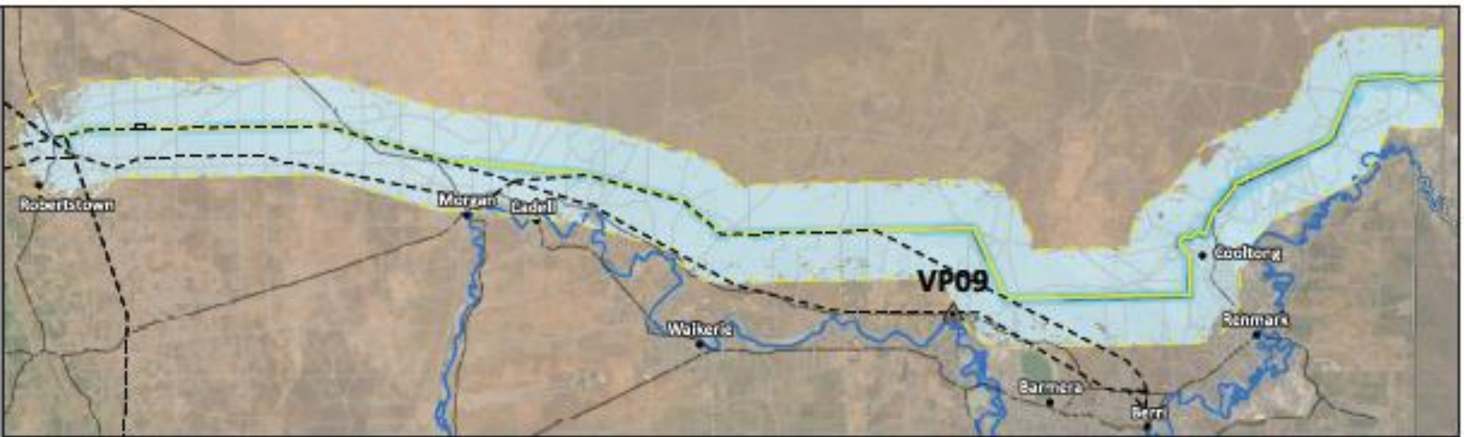
64.5m (Medium Angle Strain) Tower

Current Landscape

Landscape and Project

Project Highlighted

Project Location Overview



Base Image Date of Capture	04/06/2019
Base Image Time of Capture	8:57 AM
View Direction (compass bearing)	50
Eastings	438,476.10
Northings	6,221,325.15
Elevation (mAHD)	55.25
Horizontal Field of View (degrees)	120
Vertial Field of View (degrees)	36
Distance from Project Infrastructure (m)	6,792.96
Associated Visibility	Outside TZVI
Visual Landscape Type	Outside TZVI
Sensitivity to Change	Outside TZVI
Average Vegetation Height	Outside TZVI
Sensitivity to Change	Outside TZVI
Distance of receptor from Existing powerline Infrastructure	Outside TZVI
Sensitivity to Change	Outside TZVI
Theoretical Visual Impact Level	Outside TZVI

JBS&G

Figure 17
VP09: Photomontage

Job No: 55766	
Client: ElectraNet	
Not to Scale at A3	
Version: DRAFT_RevC	Date: 25-Nov-2020
Drawn By: TB	Checked By: AT/ DB
Image Reference: JBS&G/ Convergen	

Legend:
Project Tower Designs
(presented in 'Projected Highlighted' image)

64.5m (Medium Angle Strain) Tower

Document Path: V:\JBS Projects\ElectraNet\55377_ElectraNet EnergyConnect Environment and Planning\01_VIA\07_Photomontage\08_RevC_2020_11_18\13_20_55377_RevC_2020_11_25.cdr

Current Landscape

Landscape and Project

Project Highlighted

Project Location Overview

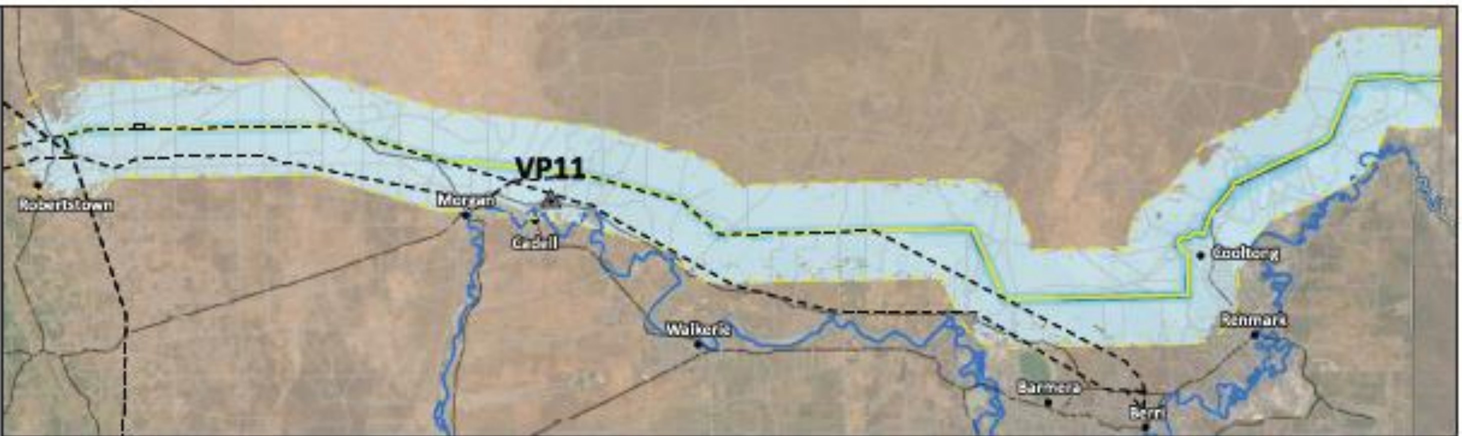


Figure 18
VP11: Photomontage

Base Image Date of Capture	04/06/2019
Base Image Time of Capture	11:28 AM
View Direction (compass bearing)	321
Eastings	387,808.16
Northings	6,235,613.27
Elevation (mAHD)	22.92
Horizontal Field of View (degrees)	120
Vertial Field of View (degrees)	36
Distance from Project Infrastructure (m)	3,449.84
Associated Visibility	Low
Visual Landscape Type	Western Riverina
Sensitivity to Change	Moderate
Average Vegetation Height	<1m
Sensitivity to Change	High
Distance of receptor from Existing powerline Infrastructure	401 - 850m
Sensitivity to Change	Low
Theoretical Visual Impact Level	Negligible Visibility

Job No: 55766	
Client: ElectraNet	
Not to Scale at A3	
Version: DRAFT_RevC	Date: 25-Nov-2020
Drawn By: TB	Checked By: AT/ DB
Image Reference: JBS&G/ Convergen	

Legend:
Project Tower Designs
(presented in 'Projected Highlighted' image)

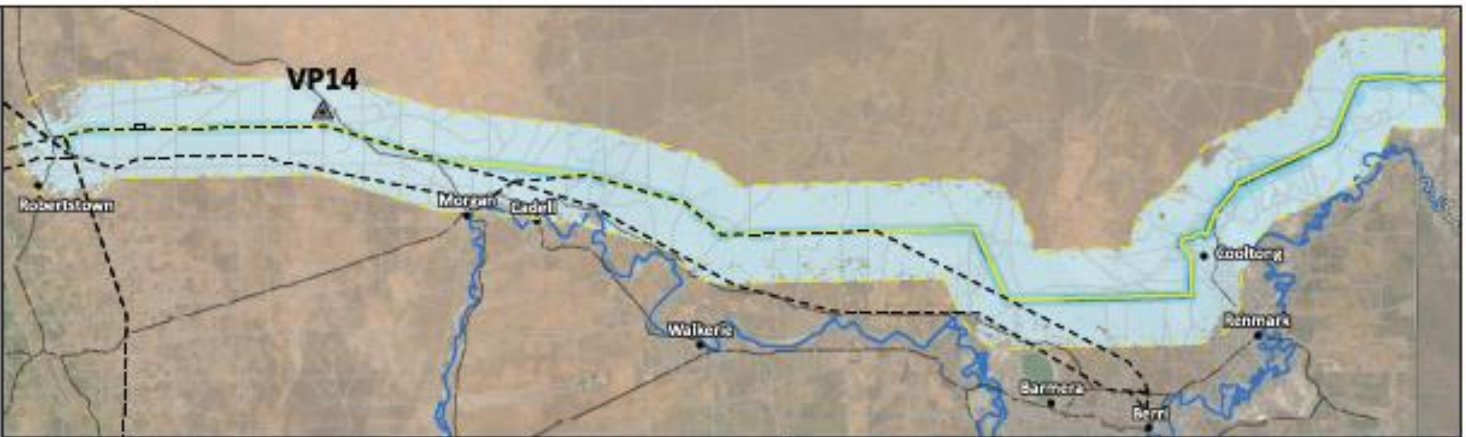
64.5m (Medium Angle Strain) Tower

Current Landscape

Landscape and Project

Project Highlighted

Project Location Overview



JBS&G

Figure 19
VP14: Photomontage

Base Image Date of Capture	04/06/2019
Base Image Time of Capture	2:00 PM
View Direction (compass bearing)	195
Eastings	358,831.66
Northings	6,246,969.31
Elevation (mAHD)	108.14
Horizontal Field of View (degrees)	120
Vertial Field of View (degrees)	36
Distance from Project Infrastructure (m)	2,139.96
Associated Visibility	Low
Visual Landscape Type	Degraded Agricultural Plains
Sensitivity to Change	Low
Average Vegetation Height	3 – 10m
Sensitivity to Change	Low
Distance of receptor from Existing powerline Infrastructure	1,676 - 3,350m
Sensitivity to Change	Moderate - High
Theoretical Visual Impact Level	Negligible Visibility

Job No: 55766	
Client: ElectraNet	
Not to Scale at A3	
Version: DRAFT_RevC	Date: 25-Nov-2020
Drawn By: TB	Checked By: AT/ DB
Image Reference: JBS&G/ Convergen	

Legend:
Project Tower Designs
(presented in 'Projected Highlighted' image)

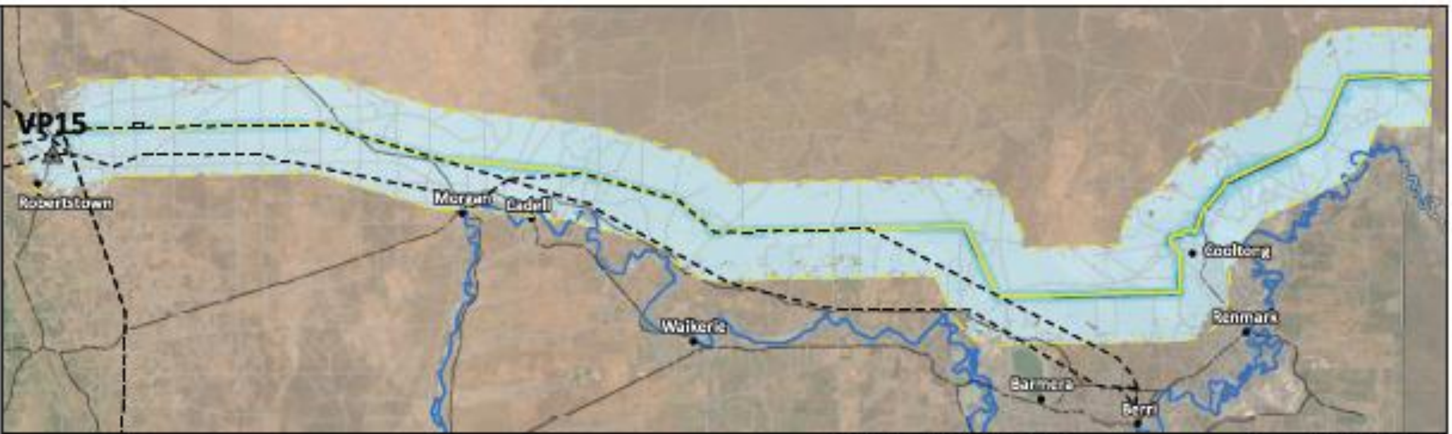
64.5m (Medium Angle Strain) Tower

Current Landscape

Landscape and Project

Project Highlighted

Project Location Overview



JBS&G

Figure 20
VP15: Photomontage

Base Image Date of Capture	04/06/2019
Base Image Time of Capture	2:52 PM
View Direction (compass bearing)	57
Eastings	324,824.41
Northings	6,241,116.47
Elevation (mAHD)	320.11
Horizontal Field of View (degrees)	120
Vertial Field of View (degrees)	36
Distance from Project Infrastructure (m)	2,044.60
Associated Visibility	Low
Visual Landscape Type	Low Hills
Sensitivity to Change	Moderate
Average Vegetation Height	<1m
Sensitivity to Change	High
Distance of receptor from Existing powerline Infrastructure	0 - 400m
Sensitivity to Change	Very Low
Theoretical Visual Impact Level	Negligible Visibility

Job No: 55766	
Client: ElectraNet	
Not to Scale at A3	
Version: DRAFT_RevC	Date: 25-Nov-2020
Drawn By: TB	Checked By: AT/ DB
Image Reference: JBS&G/ Convergen	

Legend:
Project Tower Designs
(presented in 'Projected Highlighted' image)

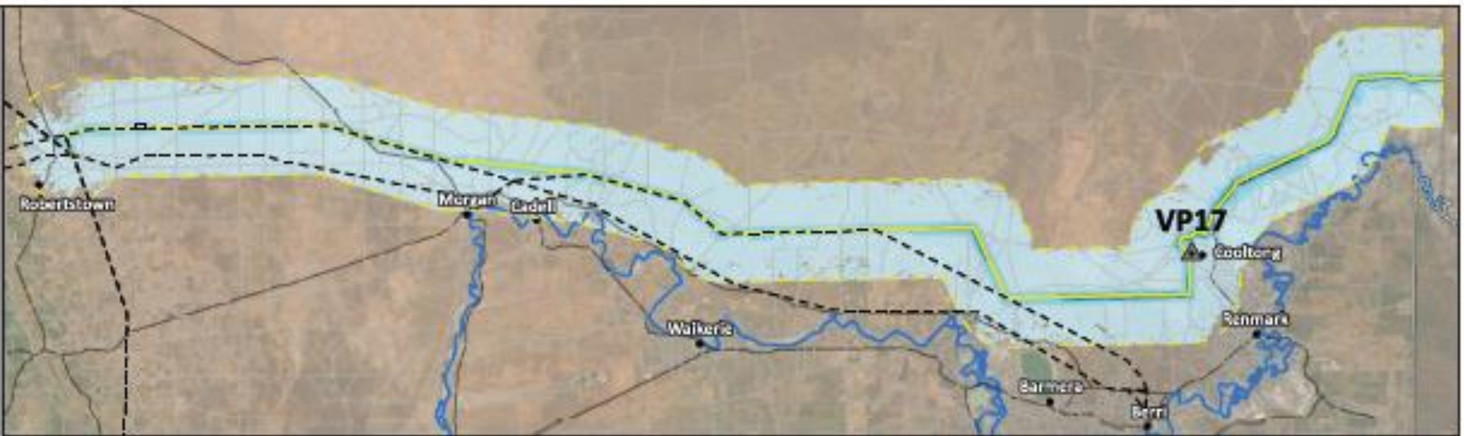
64.5m (Medium Angle Strain) Tower

Current Landscape

Landscape and Project

Project Highlighted

Project Location Overview



JBS&G

Figure 21
VP17: Photomontage

Base Image Date of Capture	12/10/2019
Base Image Time of Capture	10:14 AM
View Direction (compass bearing)	290
Eastings	468,597.21
Northings	6,228,951.02
Elevation (mAHD)	41.67
Horizontal Field of View (degrees)	120
Vertial Field of View (degrees)	36
Distance from Project Infrastructure (m)	555.87
Associated Visibility	Moderate
Visual Landscape Type	Riverina - Irrigated Agriculture
Sensitivity to Change	Low
Average Vegetation Height	<1m
Sensitivity to Change	High
Distance of receptor from Existing powerline Infrastructure	>3,351m
Sensitivity to Change	High
Theoretical Visual Impact Level	Very Low Visibility

Job No: 55766	
Client: ElectraNet	
Not to Scale at A3	
Version: DRAFT_RevC	Date: 25-Nov-2020
Drawn By: TB	Checked By: AT/ DB
Image Reference: JBS&G/ Convergen	

Legend:
Project Tower Designs
(presented in 'Projected Highlighted' image)

64.5m (Medium Angle Strain) Tower

Document Path: V:\05 Projects\ElectraNet\55377_ElectraNet EnergyConnect Environment and Planning\01_VIA\07_Photomontage\08_RevC_2020_11_19\12_20_55377_RevC_2020_11_16.cdr

7. Visual Impact Mitigation Measures

Due to the size, location and scale of the transmission towers, it is often not practical or possible to mitigate the visual impacts associated with this infrastructure. Key mitigation measures are detailed below.

7.1 Routing

A key mitigation measure is related to the routing of the alignment away from areas that are visually sensitive, for example towns, or scenic tourism areas to ensure that these areas are, where possible, located either at the periphery, or outside of the TZVI.

As part of the scoping process of the Project, visual impacts were considered in the determination of the alignment options. This key visual impact mitigation measure allows visually sensitive receptors to be avoided, and therefore the visual impact of the Project infrastructure is reduced based on the visual degradation over distance, and measures as discussed in this report.

The key potentially sensitive receptors were identified early in the Project scoping process which included towns, and tourism hotspots. This assisted the refinement of the alignment away from the River Murray and its associated wetlands, as well as avoiding towns such as Morgan, Renmark, as well as Calperum and Taylorville Stations.

As a part of route options analysis, consideration was given to locating the alignment close to existing linear infrastructure and areas of disturbance such as roads and existing transmission infrastructure. These alignment options facilitate the grouping of impacts within infrastructure corridors, and reduce the cumulative effect of spatially-separated infrastructure corridors across a landscape, aiming rather to group similar infrastructure elements.

7.2 Design

Visual massing is a concept which describes the ability of an object to draw visual attention. For example, a 50 m tall waste rock dump (in the case of a mining project), would have a greater visual mass than a 50 m tall transmission tower. Visual mass also refers to the “gaps” within a structure. For example, a monopole could be regarded as having a higher visual mass than a lattice tower as you can see “through” a lattice structure, which is not the case with a monopole structure which creates a more obvious visual element within a viewshed. ElectraNet has considered a number of factors regarding the design of the towers which need to include structural, practical, location-specific constraints, and cost. Consideration of these factors has resulted in the selection of a small range of tower designs centred around a self-supporting lattice structure.

8. Conclusion

The visual impact assessment of the Project infrastructure has taken into account the magnitude of visual change caused by the placement of the infrastructure on the landscape, and the sensitivity of receiving environment to the anticipated changes. Based on this analysis of the data provided the following conclusions can be made.

8.1 Magnitude of Change

The placement of an approximate 65 m tower on a predominantly flat landscape will mean the tower is likely to be visible to an outer extent of approximately 6.2 km, beyond which point they will barely be noticeable, or not visible at all. Visual degradation over distance is a key factor in determining the magnitude of change.

8.2 Sensitivity to Change

The sensitivity of the receiving environment provides an indication of the likelihood of the landscape to absorb the development as a result of mitigating factors such as vegetation height, and the degree of transformation of the existing landscape from other infrastructure elements such as transmission lines, residential or other developments.

8.3 Summary

The routing of the Project infrastructure which has considered locations away from visually sensitive areas, and adjacent to existing linear infrastructure, has resulted in a relatively low overall visual impact where high numbers of receptors have been avoided. Highly sensitive landscapes have been largely avoided, and where they are crossed (for example in the eastern sector) there are very few receptors.

The synthesis of these various aspects combined with tower design to reduce visual mass has resulted in the optimisation and mitigation of significant visual impacts on the receiving environment.

The visual impact assessment modelling has determined that the area within the TZVI is likely to have several potential visual impact rating areas based on a synthesis of the magnitude of change and the sensitivity to change criteria. These areas are summarised in **Table 8.1** and illustrated within **Figure 11 A1-A7**.

Table 8.1 Proportion of modelled Project infrastructure visibility

Visual impact rating	Surface area (ha)	Percentage of total TZVI
High Visibility	1,038.10	0.3%
Moderate Visibility	10,353.32	2.6%
Low Visibility	6,042.85	1.5%
Very Low Visibility	31,839.37	8.1%
Negligible Visibility	342,311.31	87.4%

The vast majority of the TZVI will not be significantly impacted by the transmission infrastructure with 87% of the area falling to the Negligible Visibility zone. Conversely, on 0.3% of the area (1,038 ha) within the TZVI falls into the High Visibility zone.

The areas where the Project infrastructure will be most noticeable are located within a couple of hundred metres of the alignment, in areas that have low vegetation height, where receptors are present. The Project infrastructure will not be visible beyond 6.2 km (the TZVI). The highest visual impact will be from areas closer to the transmission line, which decreases exponentially as the receptor moves away towards the outer edge of the TZVI. Within the TZVI, the visual impact experienced by a receptor is influenced by landscape sensitivity and receptor types, vegetation screening and other mitigation factors.

In general, the Project will have limited visual impact. There will be a few, localised areas within the TZVI, close to the alignment that will be visually affected with the Project infrastructure being visually dominant.

9. Limitations

The following limitations and assumptions are considered as part of the GIS visual impact assessment:

- It is noted that the DEM (STRM Plus V3) has a spatial resolution of approximately 30 meters and an absolute vertical height accuracy of less than 16 metres;
- Rapid changes in the DEM terrain (STRM Plus V3) are smaller than scale (e.g. some rises) and will likely be smoothed over as an average elevation;
- Detailed final construction and construction process of the Project's infrastructure has not been considered during the viewshed analysis, as have potential aviation lighting and bird flappers;
- Weather effects such as sunlight, dust, lighting and rain have not been considered; and
- Certain aspects of the model aim to quantify variables that are subjective in nature. While the modelling aims to be highly conservative, these variables could change with differing interpretation.

This report has been prepared for use by the client who has commissioned the works in accordance with the project brief only, and has been based in part on information obtained from the client and other parties.

The advice herein relates only to this project and all results conclusions and recommendations made should be reviewed by a competent person with experience in environmental investigations, before being used for any other purpose.

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This report does not provide a complete assessment of the environmental status of the site, and it is limited to the scope defined herein.

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Addendum to the Visual Impact Assessment

JBS&G

project energy connect

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Project EnergyConnect – Visual Impact Assessment Addendum

10 March 2021

58170 - 136,213 (RevA)

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1. Addendum to the Visual Impact Assessment 10 March 2021

1.1 Overview

JBS&G has reviewed the alignment refinements to Project EnergyConnect (PEC) in the vicinity of Overland Corner and Hawks Nest.

This addendum serves as a record of the review and implications of the changes to the visual effects of PEC infrastructure. Our assessment has confirmed that the changes to the alignment are not likely to result in any significant increased visual impact to surrounding visual receptors.

1.2 Changes to the Visual Impacts in the Overland Corner area

The alignment change results in newly identified potential visual receptors falling into the Theoretical Zone of Visual Influence (TZVI), as shown in the figures below. These potential receptors are unlikely to be visually affected by PEC infrastructure as they will fall into the Negligible Visibility category, the lowest level of visual impact identified. Figure 1 shows the previous alignment (left) and the new alignment (right).

Figure 1: Comparison of previous, and new alignment

Figure 10: A4 dated 16 December 2020	Figure 10: A4 dated 4 March 2021

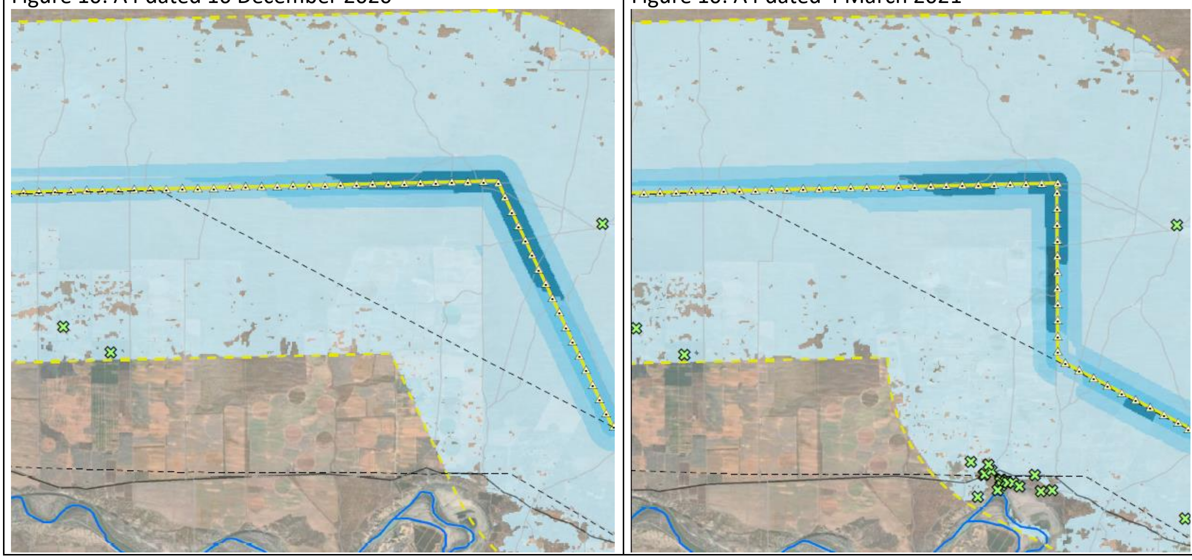
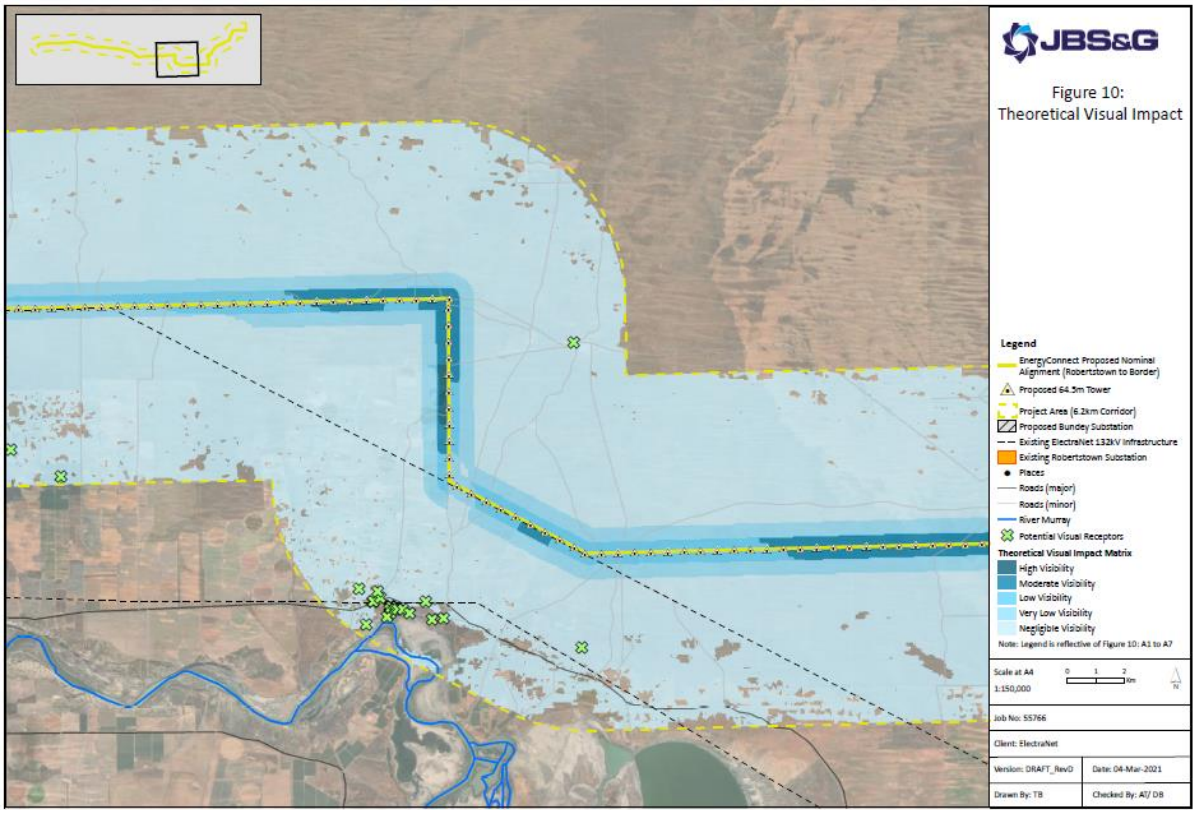


Figure 2: New alignment showing potential visual receptors



1.3 Bioregions and Visual Landscape Types

The change brings an additional area of Murray Darling Depression Bioregion into the TZVI, and introduces a new area of Western Riverina Visual Landscape Type which describes the riverine areas adjacent to the River Murray. In addition, a small area of Murray Darling Depression – Irrigated Agriculture is also now included in the TZVI. Typically, these areas represent farming and rural residences and tourism facilities.

1.4 Potential Visual Receptors Types

As shown in Figure 2, there are total of 21 new receptors that fall within the project area (6.2 km from the alignment). These receptors appear to mainly be rural residences, with at least two related to the tourism industry (Riverfront Cottage, and Overland Corner Hotel). There are no towns located within the Overland Corner area. This area is likely to host residential, tourism, and transient receptors.

Transient receptors will be associated with vehicles travelling along the Goyder Highway.

1.5 Findings

As a result of topographic features, the tourism related receptors fall outside of the Negligible Visibility category, meaning that the majority of these identified potential receptors would not be able to see the Project infrastructure from these locations.

Visual modelling showed that as a result of the route alignment change, 12 additional potential receptors would be located within the "Negligible Visibility" category, and therefore would be unlikely to be visually affected by the Project infrastructure. The remaining nine of the 21 new receptors are within the TZVI but outside all Visual Impact Zones and therefore are not anticipated to experience any visual impact.

Views of the PEC infrastructure from towns are not expected to change as Overland Corner is not considered a town. Views from tourism areas are not expected to significantly change however based on modelling of the theoretical Visual Impact, a small portion of the River Murray at Overland Corner is within the Negligible Visibility impact range.

Due to the presence of vegetation along the river, the river is not expected to host views of transmission infrastructure. This is confirmed by the VIA model outputs shown in Figure 2.

The Goyder Highway passes through approximately 10 km of the Negligible Visibility category. As a result, views towards the Project infrastructure from the Goyder Highway are not expected to be visually affected.

2. Limitations

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Sampling and chemical analysis of environmental media is based on appropriate guidance documents made and approved by the relevant regulatory authorities. Conclusions arising from the review and assessment of environmental data are based on the sampling and analysis considered appropriate based on the regulatory requirements.

Limited sampling and laboratory analyses were undertaken as part of the investigations undertaken, as described herein. Ground conditions between sampling locations and media may vary, and this should be considered when extrapolating between sampling points. Chemical analytes are based on the information detailed in the site history. Further chemicals or categories of chemicals may exist at the site, which were not identified in the site history and which may not be expected at the site.

Changes to the subsurface conditions may occur subsequent to the investigations described herein, through natural processes or through the intentional or accidental addition of contaminants. The conclusions and recommendations reached in this report are based on the information obtained at the time of the investigations.

This report does not provide a complete assessment of the environmental status of the site, and it is limited to the scope defined herein. Should information become available regarding conditions at the site including previously unknown sources of contamination, JBS&G reserves the right to review the report in the context of the additional information.

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