



# **SMOKY CREEK SOLAR POWER STATION RESPONSE TO INFORMATION REQUEST BY PRELIMINARY DOCUMENTATION**


**Edify Energy Pty Ltd**



## Document status

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## Approval for issue

Approver	Signature	Approval date
A. Fitzgerald		10/03/2023

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## Contents

1	INTRODUCTION .....	1
1.1	Purpose of the report.....	1
2	Overview of the project.....	4
2.1.1	Construction activities.....	4
2.1.2	Project operation and maintenance.....	5
2.1.3	Decommissioning .....	5
3	Description of action.....	6
3.1	Item 1.1.....	6
3.1.1	Information required .....	6
3.1.2	Response.....	6
3.2	Item 1.2.....	8
3.2.1	Information required .....	8
3.2.2	Response.....	8
3.3	Item 1.3.....	8
3.3.1	Information required .....	8
3.3.2	Response.....	8
4	Habitat assessment.....	12
4.1	<i>Solanum dissectum</i> and <i>Solanum johnsonianum</i> .....	12
4.1.1	Item 2.1 - Species general information.....	12
4.1.2	Item 2.2 – Species specific information .....	22
4.2	Ornamental snake ( <i>Denisonia maculate</i> ) – Vulnerable EPBC Act .....	24
4.2.1	Item 2.1 - Species general information.....	24
4.2.2	Item 2.2 – Species specific information .....	31
4.2.3	Item 2.2.4.....	31
4.2.4	Squatter Pigeon (southern) ( <i>Geophaps scripta scripta</i> ) – Vulnerable.....	33
4.2.5	Item 2.1.7 .....	41
4.2.6	Item 2.2 Species specific information.....	41
5	Impact assessment.....	46
5.1	Item 3.1.1.....	46
5.1.1	<i>Solanum dissectum</i> and <i>Solanum johnsonianum</i> .....	46
5.1.2	Ornamental snake .....	50
5.1.3	Squatter pigeon (southern).....	55
5.2	Item 3.1.2.....	60
5.2.1	Information required .....	60
5.2.2	Response.....	60
5.3	Item 3.1.3.....	60
5.3.1	Information required .....	60
5.3.2	Response.....	60
5.4	Item 3.1.4.....	61
5.4.1	Information required .....	61
5.4.2	Response.....	61
5.5	Item 3.1.5.....	61
5.5.1	Information required .....	61
5.6	Item 3.1.6.....	62
5.6.1	Information required .....	62
5.6.2	Response.....	62
6	Proposed avoidance, mitigation and management measures .....	63

6.1	Item 4.1.....	63
6.1.1	Information required .....	63
6.1.2	Response.....	63
6.2	Item 4.2.....	65
6.2.1	Information required .....	65
6.2.2	Response.....	65
6.2.3	<i>Solanum johnsonianum</i> .....	66
6.2.4	Squatter pigeon.....	67
6.2.5	Ornamental snake .....	68
6.3	Item 4.3.....	69
6.3.1	Information required .....	69
6.3.2	Response.....	69
6.4	Item 4.4.....	70
6.4.1	Information required .....	70
6.5	Item 4.5.....	72
6.5.1	Information required .....	72
6.6	Item 4.6.....	72
6.6.1	Information required .....	72
6.7	Item 4.7.....	72
6.7.1	Information required .....	72
6.8	Item 4.8.....	73
6.8.1	Information required .....	73
6.9	Item 4.9.....	73
6.9.1	Information required .....	73
6.10	Item 4.10.....	73
6.10.1	Information required .....	73
7	Rehabilitation .....	75
7.1	Item 5.1.....	75
7.1.1	Required information .....	75
7.1.2	Response.....	75
7.2	Item 5.2.....	75
7.2.1	Required information .....	75
7.2.2	Response.....	75
7.3	Item 5.3.....	75
7.3.1	Required information .....	75
7.3.2	Response.....	75
7.4	Item 5.4.....	75
7.4.1	Required information .....	75
7.4.2	Response.....	76
8	Environmental offsets – residual significant impacts .....	77
9	Ecologically sustainable development .....	78
9.1	Item 7.1.....	78
9.1.1	Information required .....	78
9.1.2	Response.....	78
10	Economic and social matters.....	80
10.1	Item 8.1.....	80
10.1.1	Required information .....	80
10.1.2	Response.....	80
10.2	Item 8.2.....	80



10.2.1	Required information .....	80
10.2.2	Response .....	81
10.3	Item 8.3 .....	81
10.3.1	Required information .....	81
10.3.2	Response .....	81
10.4	Item 8.4 .....	82
10.4.1	Required information .....	82
10.4.2	Response .....	82
10.5	Item 8.5 .....	82
10.5.1	Required information .....	82
10.5.2	Response .....	82
10.6	Item 9 .....	83
10.6.1	Required information .....	83
10.6.2	Response .....	83
11	References .....	84

## Tables

Table 1	Area of project components .....	8
Table 2	Coordinates of project area .....	9
Table 3	<i>Solanum dissectum</i> records within 50km of the Project area (Atlas of Living Australia 2022) .....	13
Table 4	<i>Solanum johnsonianum</i> records within 50km of the Project area (Atlas of Living Australia 2022) .....	14
Table 5	Habitat area for <i>S. johnsonianum</i> and <i>S. dissectum</i> .....	19
Table 6	Assessment of survey adequacy for <i>S. johnsonianum</i> and <i>S. dissectum</i> .....	21
Table 7	Ornamental snake records within 50km of the Project area (Atlas of Living Australia 2022) .....	27
Table 8	Habitat area for ornamental snake .....	28
Table 9	Assessment of survey adequacy for ornamental snake .....	30
Table 10	Squatter pigeon records within 50km of the Project area (Atlas of Living Australia 2022) .....	34
Table 11	Habitat area calculation for squatter pigeon .....	38
Table 12	Assessment of survey adequacy for squatter pigeon .....	40
Table 13	Vegetation structure .....	41
Table 14	Impact assessment for <i>S. johnsonianum</i> and <i>S. dissectum</i> .....	47
Table 15	Residual impact assessment and for the ornamental snake .....	51
Table 16	Residual impact assessment and for the squatter pigeon (southern) .....	56
Table 17	MNES habitat impacted by the Project .....	61
Table 18	Summary of MNES impacts .....	62
Table 19	Assessment of conservation actions for <i>S. dissectum</i> .....	65
Table 20	Assessment of conservation actions for <i>S. johnsonianum</i> .....	66
Table 21	Assessment of conservation actions for squatter pigeon .....	67
Table 22	Assessment of conservation actions for ornamental snake .....	68

## Figures

Figure 1	Project Location .....	3
Figure 2	Project Layout .....	7
Figure 3	Location of Key Infrastructure .....	11
Figure 4	<i>S. dissectum</i> records within 10 km of the Project Area .....	17

Figure 5	S.johnsonianum records within 10 km of the Project Area.....	18
Figure 6	S. dissectum and S. johnsonianum habitat map.....	20
Figure 7	Brigalow and/or Eucalypt forest and woodland on cracking clay soils.....	23
Figure 8	Ornamental snake habitat mapping in locality.....	26
Figure 9	Ornamental snake habitat mapping of project area.....	29
Figure 10	Squatter pigeon habitat mapping.....	39
Figure 11	Water resources proximate to the project area.....	44

## Appendices

Appendix A	Smoky Creek Power Station Habitat Assessment and Targeted Survey report (Terra Solutions 2023) .....	86
Appendix B	Risk Framework .....	87
Appendix C	Decision Notice – Approval (Amended 11 December 2019) .....	89
Appendix D	Smoky Creek Solar Power Station – Community Engagement Summary.....	90

# 1 INTRODUCTION

Edify Energy Pty Ltd are proposing to construct the Smoky Creek Power Station. The Project is required to contribute to Australia's emissions reduction targets by providing an additional source of renewable electricity to the national electricity grid.

The Smoky Creek Power Station is similar in structure and design to other utility scale solar facilities constructed in Australia. It consists of various linked components required to generate electricity from solar radiation including solar modules, module mounts, electrical transformers and inverters, electrical wiring, telecommunication equipment, electrical substation, a battery energy storage system (BESS) and electrical controllers.

Terra Solutions has been commissioned by Edify Energy to prepare this preliminary documentation to provide further information to the Department of Climate Change, Energy, the Environment and Water (DCCEEW) to further assess the significance of impact on Matters of National Environmental Significance potentially posed by the project.

The Project location is shown on Figure 1.

## 1.1 Purpose of the report

On 26 October 2021, the delegate of the Minister for the Environment determined the Smoky Creek Power Station, 460 Dodson's Road, Smoky Creek, Queensland (Qld) is likely to have a significant impact on listed threatened species and communities (sections 18 and 18A) protected under Part 3 of the *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act).

This report has been prepared in response to the request for additional information issued by the DCCEEW for the Smoky Creek Power Station project (EPBC 2021/9030) which is to be assessed by Preliminary Documentation.

The report has been prepared to respond specifically to the information requested to enable more reliable assessment of matters of national environmental significance (MNES) that may be impacted by the project.

Specifically, this report presents the findings of additional desktop and field-based ecological assessments undertaken to determine the type and extent of impacts and their effect on MNES including threatened flora, threatened and migratory fauna, and threatened ecological communities (TECs). In addition further information will be provided on how impacts have been reasonably avoided and managed and minimised (mitigated). The assessment presented in this report included the following items:

- Identifying the ecological values of the Project area, including vegetation communities and terrestrial flora and fauna through desktop and field-based methods
- Assessing the likelihood of occurrence of EPBC Act listed flora, fauna and TECs
- Assessing the potential impacts of the Project on EPBC Act listed flora, fauna and TECs
- Identifying actions to avoid, minimise, mitigate, and rehabilitate impacts on EPBC Act listed flora, fauna and TECs.

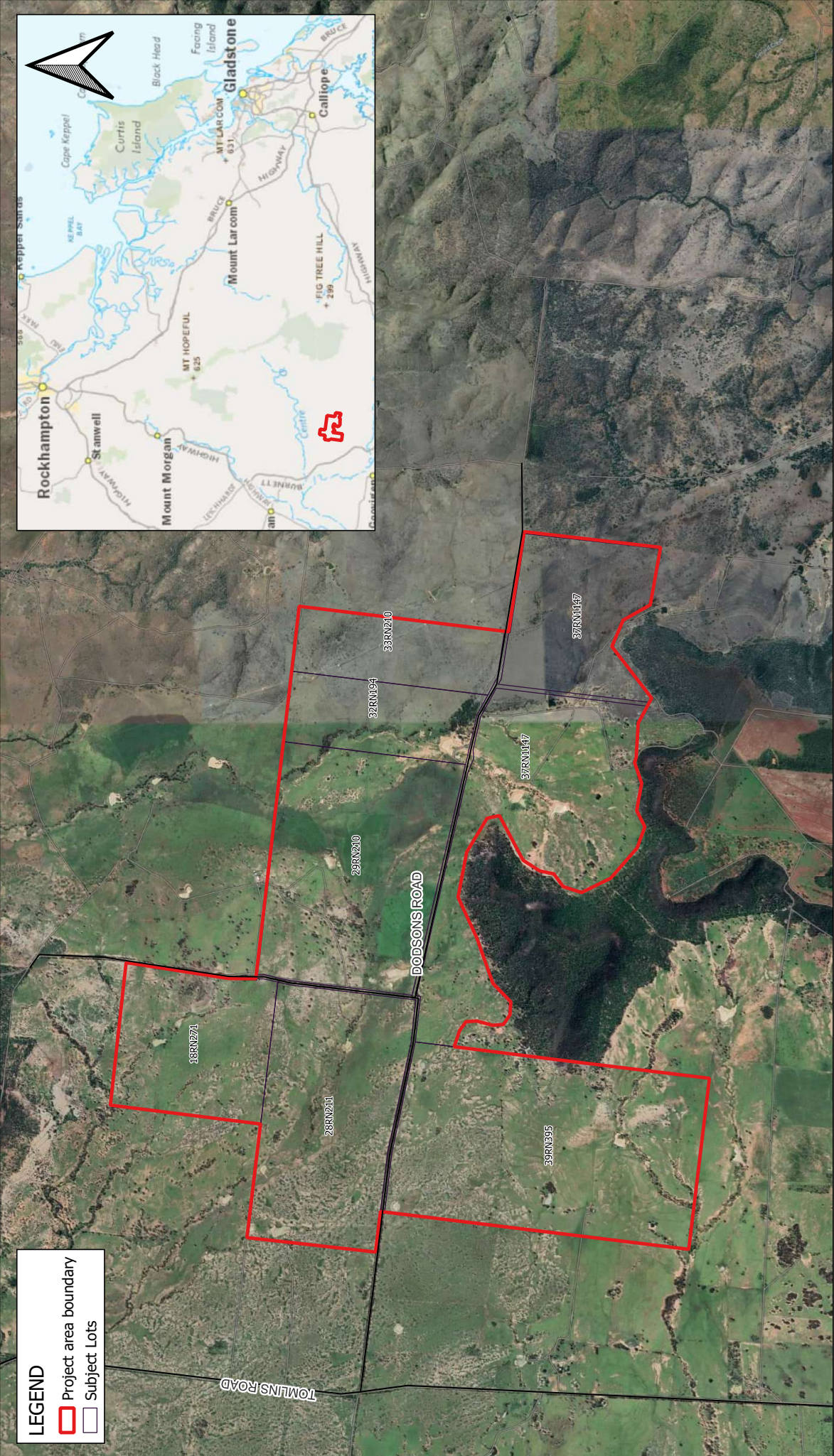
Where an MNES species or ecological community was confirmed present or considered 'likely to occur', a significance of impact assessment was undertaken in accordance with the Commonwealth's Significant Impact Guidelines 1.1 – Matters of National Environmental Significance (DotE 2013), or species-specific guidelines where these were available.

Further information is sought by the DCCEEW in relation to the following listed species and their habitat:

- *Solanum dissectum* – Endangered
- *Solanum johnsonianum* – Endangered

- Ornamental Snake (*Denisonia maculata*) – Vulnerable
- Squatter Pigeon (southern) (*Geophaps scripta scripta*) – Vulnerable.





		CLIENT: EDIFY ENERGY PTY LTD		Credits: Google Satellite Hybrid	
DOCUMENT: 202104 - Figure 1 - Location Map with Inset		FIGURE 1: PROJECT LOCATION			
DATE: 09/03/2023		AUTHOR: Anton Fitzgerald		0 1.5 3 4.5 6 km	
				1:35,000	
				Coordinate system: GDA2020 / MGA zone 56 EPSG:7856	



## 2 OVERVIEW OF THE PROJECT

This section presents an overview of the project and provides a summary of the development footprint, impact, avoidance and mitigation measures. Species specific impact assessments are presented in later sections of the report.

The project will involve the construction of utility scale solar facility over an area of approximately 1,823 ha and will incorporate solar modules and associated infrastructure, electrical transformers and inverters, electrical substation, battery energy storage system (BESS), new transmission infrastructure, electrical controllers and internal property access tracks.

The solar photovoltaic panels to be utilised at the Smoky Creek Power Station are supported on steel frames and operate under a solar tracking system. The solar tracking system will adjust the panel angles to remain perpendicular to the sun over the course of the day maximising the collection of solar radiation. The top edge of the panels will typically range from 3.0 m to 4.5 m above the ground with the bottom edge ranging from approximately 0.5 – 3.0 m above the ground depending on the sun's position.

Electrical inverters will convert energy generated from the PV panels from direct current (DC) to alternating current (AC) and subsequently transformers will increase the voltage to 33 (kV).

An underground electrical network will collect and transfer generated power to an internal electrical substation for export to the national grid via a new overhead powerline connecting to the 275 kV Calvale to Stanwell transmission line.

The solar panel arrays will be surrounded by grassed areas and gravel access tracks will encircle the entire facility perimeter with additional tracks providing access to the inverter/transformer pads located within the arrays. The perimeter access track will function as a fire break and will be accessed through the site entrance.

A 2.4 m high Chain Wire Security fence will be constructed outside the fire break for public health and safety protection. Additional safety measures will provide restricted access to high-risk areas and during construction.

The facility will be operated from a control building / switchroom located in the Operations and Maintenance Building area. The area will contain parking facilities for staff and visitors which will be accessible from Dodson's Road. The driveway to the control building will consist of a gravel access track.

Other onsite infrastructure may include temporary site buildings, site office and amenities for construction, and temporary laydown areas and construction compound/s.

### 2.1.1 Construction activities

The Smoky Creek Power Station has been designed to minimise the need for extensive civil works. The facility would be constructed from a range of materials including glass, steel, aluminium, copper, and plastics.

Internal access roads are not required between each panel row and will instead be constructed between zones for the placement of power units and around the boundary of each solar zone.

The construction process will generally be undertaken in the following order of works although some activities will be undertaken in parallel:

- Site office and amenities set up
- Vegetation removal and grubbing
- Construction of laydown areas
- Fencing construction
- Road construction

- Pile installation
- Trenching and underground cable installation
- Mechanical installations
- Solar module installation
- Inverter installation
- Battery system installation
- Construction of control building, HV switch room and spare parts building
- Testing and commissioning.

### **2.1.2 Project operation and maintenance**

The Smoky Creek Power Station is expected to operate for approximately 30 years with the following operation activities continuous over this period:

- Monitoring and control of the Power Station and battery energy storage system
- Maintenance activities
- Light vehicle movements.

### **2.1.3 Decommissioning**

On completion of the operational phase of the solar facility it will be decommissioned. The process will include the removal of all above and below ground infrastructure from the site. Spent materials from the Power Station will be sorted into various waste streams to be recycled or disposed of at a waste facility.

### 3 DESCRIPTION OF ACTION

#### 3.1 Item 1.1

##### 3.1.1 Information required

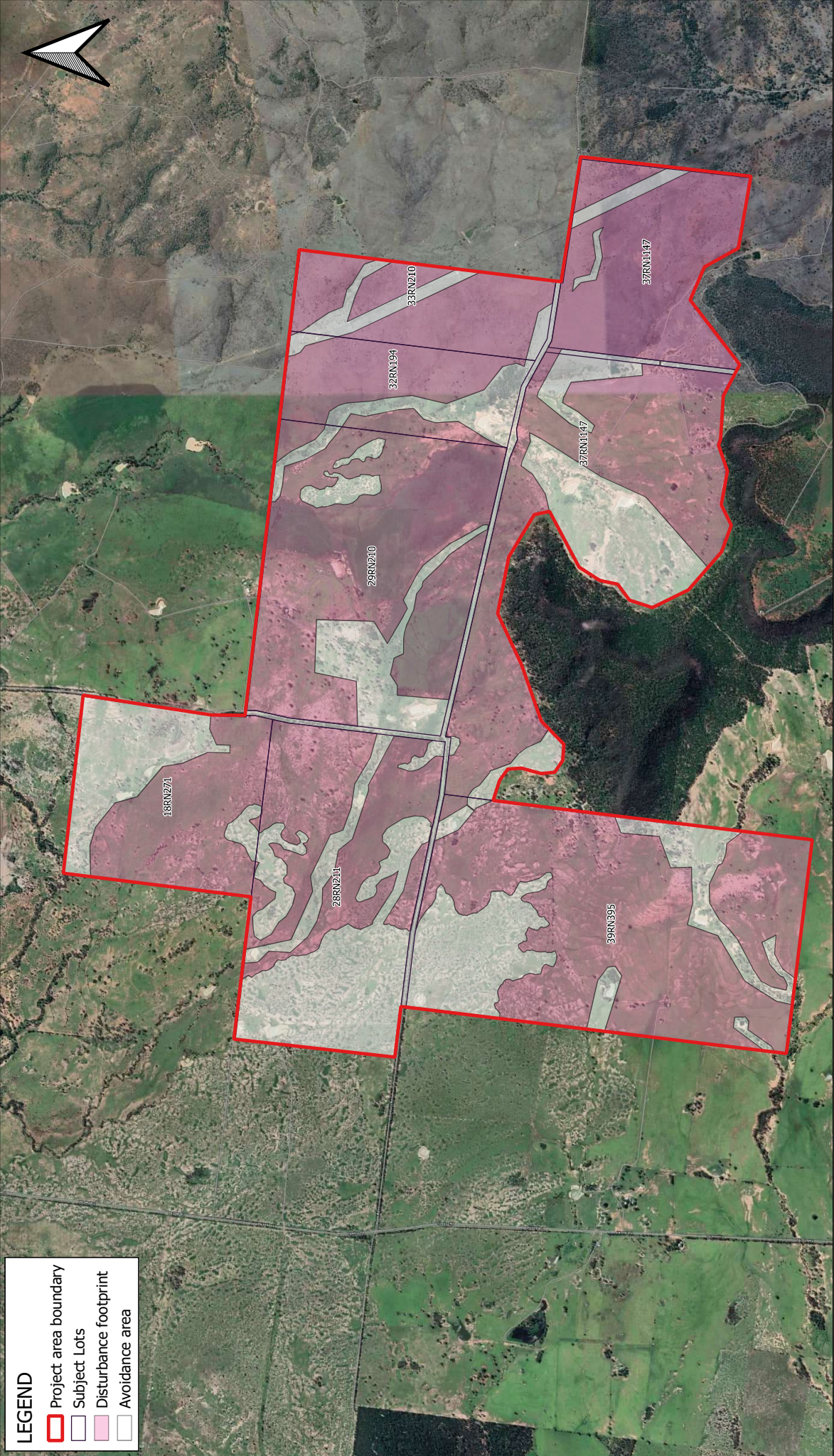
*Provide the location, boundary and size (in hectares) of the disturbance footprint and of any adjoining areas which may be indirectly impacted by the proposed action, including nearby vegetation.*

##### 3.1.2 Response

Smoky Creek Power Station is located on 460 Dodson's Road, Smoky Creek, Queensland and formally described as Lot 18 on RN271, Lot 28 on RN211, Lot 29 on RN210, Lot 32 on RN194, Lot 33 on RN210, Lot 37 on RN1147 and Lot 39 on RN395.

The total project area occupies 2,301 ha. The total development footprint including all project elements occupies approximately 1,600 ha. A total of 701 ha has been excluded from development (i.e. avoidance area) due to the presence or potential presence of MNES or their habitat or for constructability reasons (Figure 2).





LEGEND

- Project area boundary
- Subject Lots
- Disturbance footprint
- Avoidance area



CLIENT: EDIFY ENERGY

FIGURE 2: PROJECT LAYOUT

DOCUMENT: E:\Terra Solutions\PROJECTS -

DATE: 09/03/2023

AUTHOR: Anton Fitzgerald

0 1 2 3 4 5 km

1:28,000

Credits:  
Google Satellite Hybrid

Coordinate system: GDA2020 / MGA zone 56 EPSG:7856



## 3.2 Item 1.2

### 3.2.1 Information required

*Provide detail of the site layout, including the location and size of key infrastructure (e.g. solar panels, battery and transmission infrastructure, site buildings and access roads).*

### 3.2.2 Response

The proposed disturbance footprint consists of 15 distinct panel areas, maintenance building area, transmission easement, substation, access tracks and centralised battery. The layout of key infrastructure is provided in Figure 3 and the approximate size of each area is provided in Table 1.

**Table 1 Area of project components**

Disturbance footprint components	Area (ha)
Operations and maintenance building area	2.0
Transmission easement	48.9
Substation and centralised battery	3.1
Adjoining access tracks	<1 ha
Panel area A	9
Panel area B	69
Panel area C	209.5
Panel area D	52.3
Panel area E	268.9
Panel area F	151.2
Panel area G	16.6
Panel area H	24.3
Panel area I	302.8
Panel area J	67.4
Panel area K	72.9
Panel area L	138.1
Panel area M	143.3
Panel area N	4
Panel area O	16.4
<b>Total</b>	<b>1,599.70</b>

## 3.3 Item 1.3

### 3.3.1 Information required

*Include detailed mapping and coordinates for all components of the proposed action.*

### 3.3.2 Response

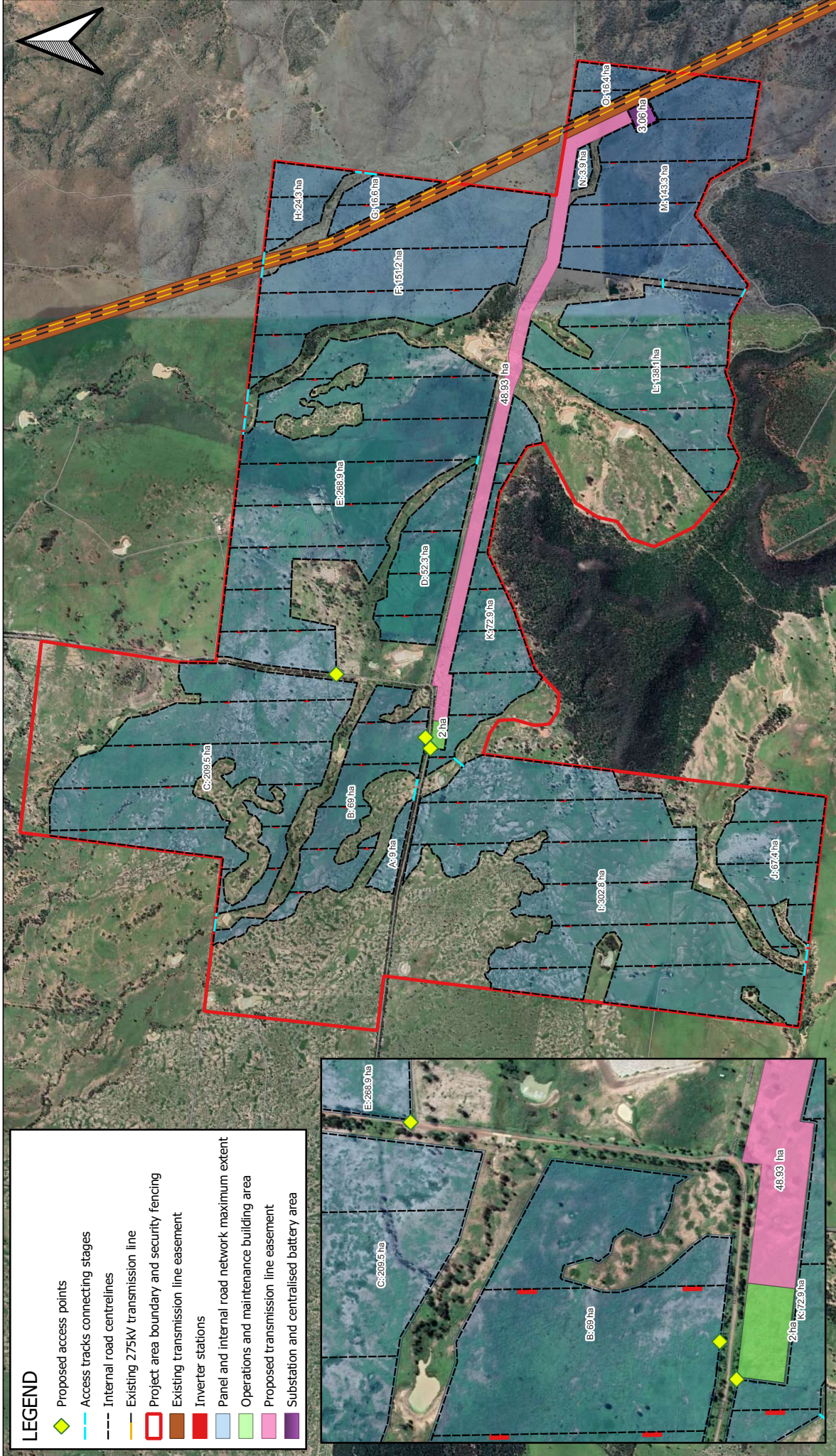
Detailed mapping for all project area is shown in Figure 3 and coordinates are detailed in Table 2.

**Table 2** Coordinates of project area

Point ID	Coordinates GDA94 MGA56	
	Easting	Northing
0	235800	7339582
1	235800	7339582
2	235801	7339582
3	235841	7339577
4	235841	7339577
5	239491	7339152
6	239243	7337121
7	239243	7337119
8	239243	7337119
9	239238	7337079
10	240229	7336923
11	240073	7335575
12	240073	7335575
13	240073	7335575
14	240073	7335575
15	240071	7335575
16	239504	7335675
17	239354	7335944
18	239093	7336057
19	238582	7335663
20	238334	7335794
21	237992	7335815
22	237942	7335832
23	237739	7335760
24	237469	7335810
25	237307	7335730
26	237096	7335807
27	236796	7336069
28	236654	7336356
29	236715	7336538
30	236840	7336630
31	236870	7336771
32	236976	7336936
33	237417	7337170
34	237392	7337292
35	237056	7337494
36	236609	7337580
37	236203	7337392

Point ID	Coordinates GDA94 MGA56	
38	235756	7337234
39	235572	7337057
40	235444	7337065
41	235350	7337129
42	235339	7337237
43	235383	7337392
44	235375	7337501
45	235287	7337564
46	235127	7337617
47	235006	7336657
48	234815	7335089
49	234815	7335089
50	233121	7335294
51	233489	7338306
52	233494	7338347
53	233093	7338396
54	233236	7339664
55	233236	7339670
56	234362	7339534
57	234362	7339534
58	234550	7341021
59	235958	7340865
60	235960	7340865
61	235805	7339853
62	235800	7339582





Proposed access points

Access tracks connecting stages

Internal road central lines

Existing 275kV transmission line

Project area boundary and security fencing

Existing transmission line easement

Inverter stations

Panel and internal road network maximum extent

Operations and maintenance building area

Proposed transmission line easement

Substation and centralised battery area

DOCUMENT: 202104 - Figure 3 - Key Infrastructure with Inset

DATE: 09/03/2023

AUTHOR: Anton Fitzgerald

CLIENT: EDIFY ENERGY PTY LTD

FIGURE 3: KEY INFRASTRUCTURE AND ACCESS POINTS

0

1

2

3

4

5 km

1:26,000

Credits:  
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 Coordinate system: GDA2020 / MGA zone 56 EPSG:7856



## 4 HABITAT ASSESSMENT

### 4.1 *Solanum dissectum* and *Solanum johnsonianum*

#### 4.1.1 Item 2.1 - Species general information

##### 4.1.1.1 Item 2.1.2

###### Information required

*Provide a discussion of habitat use requirements (e.g. shelter/refuge, breeding, foraging, dispersal, etc.), including consideration of known important habitat and suitable habitat).*

###### Response

Vegetation communities dominated by brigalow possess a range of vegetation structures and a suite of species that tend to occur on acidic and salty clay soils (Isbell, 1962; Johnson, 1964; Bui and Henderson, 2003) and therefore by association with brigalow communities both *S. dissectum* and *S. johnsonianum* display an affinity for saline clay soils.

*S. dissectum* and *S. johnsonianum* regenerate from rhizomes beneath the soil surface and can flower and fruit rapidly in response to rain (Fensham et al 2019). Both species are believed to benefit from minor ground disturbance or fire and will resprout following these events (Bean, 2004). A potential threat to *S. dissectum* and *S. johnsonianum* is ploughing or tilling of soil given the species' dependence on rhizome networks for persistence (Bean pers. comm. 2015 cited in TSSC 2016a, Bean pers.comm. cited in TSSC 2016b).

##### 4.1.1.2 Item 2.1.3

###### Information required

*Identify and describe known historical records of the species in the broader region. All known records must be supported by an appropriate source (i.e. Commonwealth and State databases, published research, publicly available survey reports etc.), the year of the record and a description of the habitat in which the record was identified.*

###### Response

A 50 km search buffer around the project area was used on records downloaded from the Atlas of Living Australia. Searches of the database returned six *S. dissectum* records (Table 3) and 37 *S. johnsonianum* records (Table 4). Records of *S. dissectum* and *S. johnsonianum* located within 10 km of the project area are presented in Figure 4 and Figure 5 respectively.

The records of the *Solanum* spp. are considered accurate with coordinates provided to four decimal places. Records for squatter pigeon and ornamental snake included numerous records from Birdlife Australia which have the practice of generalising location coordinates (i.e. rounded to one decimal place) resulting in a coordinate accuracy of 10 km.

Habitat information was provided for most records of the *Solanum* spp., and in most cases fit the preferred described habitat (Fensham et al. 2019; Bean, 2004). The habitat description for a small number of *S. johnsonianum* records were inconsistent with the findings of Fensham et al (2019) and included records in habitats with exotic grasses and small patches of remnant and regrowth habitat. There is insufficient detail with regards to patch size, canopy cover or ground layer density to determine whether the records are likely to be viable in the long-term.

**Table 3** *Solanum dissectum* records within 50km of the Project area (Atlas of Living Australia 2022)

Source	Record	Latitude	Longitude	Year	Habitat
Centre for Australian National Biodiversity Research (CANB) AVH data	CANB 188806.1	-24.4	150.516667	1966	Near roadside.
Queensland Herbarium (BRI) AVH data	BRI AQ0723951	-24.14008302	149.992202	2005	Open forest of <i>Acacia harpophylla</i> , with <i>Eucalyptus thozetiana</i> , some <i>Eremophila mitchellii</i> in understorey. Clay soil. Road reserve.
Queensland Herbarium (BRI) AVH data	BRI AQ0852893	-24.04797202	150.334	2014	Substantial remnant of <i>Acacia harpophylla</i> on gilgaied loamy clay with <i>Geijera parviflora</i> , and occasional <i>Eucalyptus cambageana</i> and <i>Casuarina cristata</i> .
Queensland Herbarium (BRI) AVH data	BRI AQ0852892	-24.080056	150.240972	2014	Brigalow on gently undulating foot slope of clay-loam with <i>Eucalyptus cambageana</i> , <i>E. thozetiana</i> , native grasses and much <i>Carissa ovata</i> . Also <i>Solanum johnsonianum</i> .
Queensland Herbarium (BRI) AVH data	BRI AQ0457635	-24.02341702	150.326083	1989	Plain, clay soil, pulled <i>Acacia harpophylla</i> regrowth.
Queensland Herbarium (BRI) AVH data	BRI AQ0852424	-24.048056	150.333056	2013	<i>Acacia harpophylla</i> with <i>Casuarina cristata</i> and or <i>Eucalyptus cambageana</i> in melonhole country, some wilga in the midstorey, much <i>Solanum johnsonianum</i> in the ground layer throughout. Remnant of considerable size for these parts.

**Table 4** *Solanum johnsonianum* records within 50km of the Project area (Atlas of Living Australia 2022)

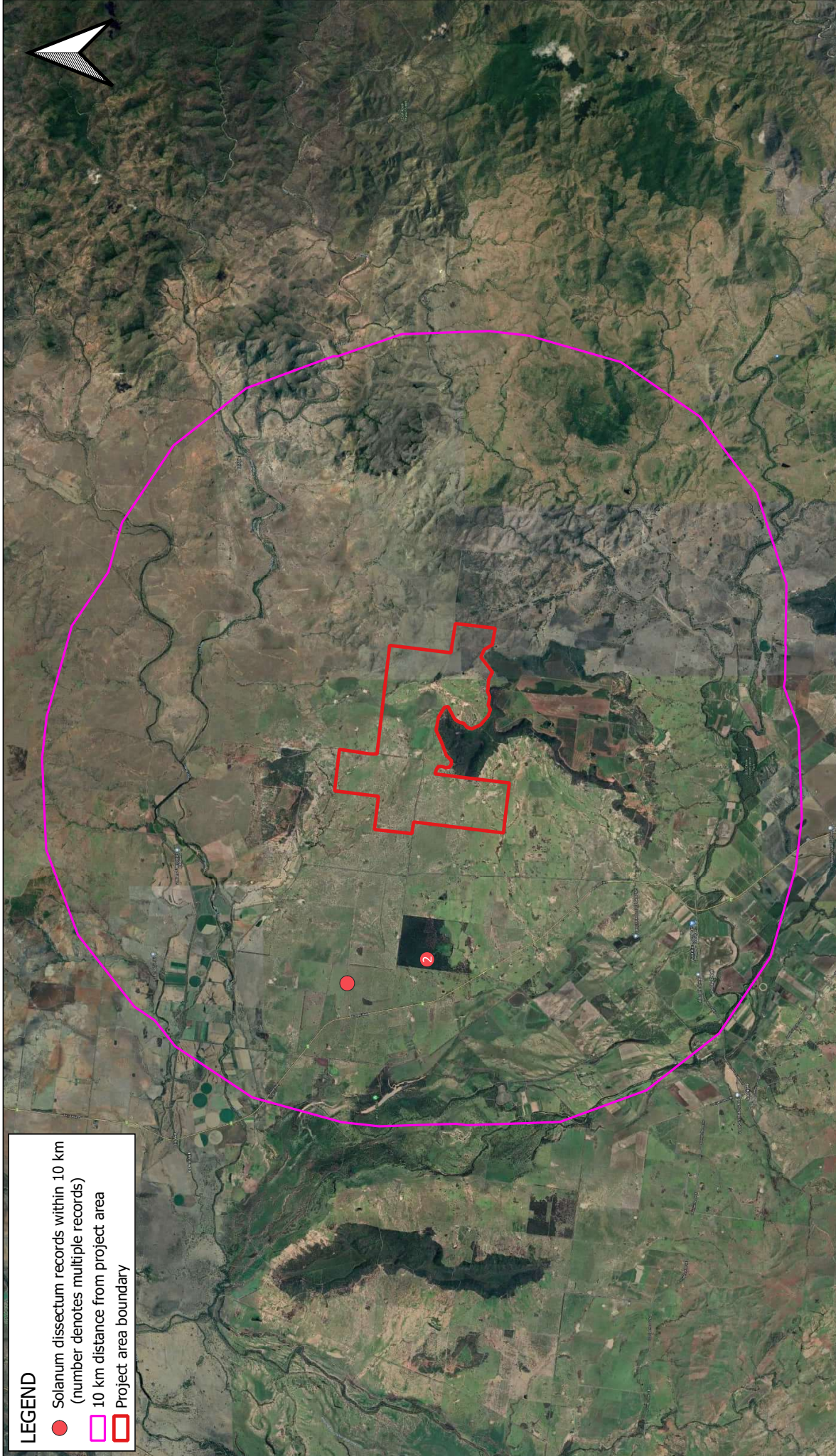
Source	Record	Year	Lat	Long	Habitat
Centre for Australian National Biodiversity Research (CANB) AVH data	CANB 126484.1	1963	-24.6833	150	In brown clay soil on cleared brigalow-belah scrub
Queensland Herbarium (BRI) AVH data	BRI AQ0818848	2012	-24.1145	150.3689	Habitat at original place of collection: roadside, with scattered clumps of <i>Acacia harpophylla</i> trees, with understorey of exotic pasture grasses
Queensland Herbarium (BRI) AVH data	BRI AQ0940805	-	-24.3965	149.9796	Brigalow open forest
Queensland Herbarium (BRI) AVH data	BRI AQ0816803	-	-24.4161	149.9281	Brigalow in road reserve. Heavy clay soil. Associated species <i>Acacia harpophylla</i> , <i>Casuarina cristata</i> , <i>Carissa ovata</i> , <i>Diospyros geminata</i> , <i>Notelaea microcarpa</i>
Queensland Herbarium (BRI) AVH data	BRI AQ0912116	-	-24.3627	150.0611	Non-remnant. <i>Acacia harpophylla</i> regrowth
Queensland Herbarium (BRI) AVH data	BRI AQ0854019	-	-24.539	150.0099	Broad clay plain (landzone 4)
Queensland Herbarium (BRI) AVH data	BRI AQ0852723	2012	-24.5708	150.1389	Black clay
Queensland Herbarium (BRI) AVH data	BRI AQ0853995	2014	-24.048	150.3341	Substantial remnant of <i>Acacia harpophylla</i> on gilgaied loamy clay with <i>Geijera parviflora</i> , and occasional <i>Eucalyptus cambageana</i> and <i>Casuarina cristata</i>
Queensland Herbarium (BRI) AVH data	BRI AQ0781453	-	-24.1145	150.3691	Road reserve, with <i>Acacia harpophylla</i>
Queensland Herbarium (BRI) AVH data	BRI AQ0816575	-	-24.4171	149.9286	Brigalow/belah fragment; fragmented and heavily disturbed with a weedy ground stratum
Queensland Herbarium (BRI) AVH data	BRI AQ0940809	2014	-24.1144	150.369	Scattered brigalow trees in road reserve
Queensland Herbarium (BRI) AVH data	BRI AQ0817238	-	-24.4864	150.1231	Black clay
Queensland Herbarium (BRI) AVH data	BRI AQ0852891	2014	-24.1452	149.9815	Small patch of Brigalow roadside, gilgais few, much green panic and harissa cactus. Other species incl. <i>Geijera</i>



Source	Record	Year	Lat	Long	Habitat
					<i>parviflora</i> , <i>Santalum lanceolatum</i> and <i>Carissa ovata</i>
Queensland Herbarium (BRI) AVH data	BRI AQ0970218	-	-24.536	150.0138	In brigalow, with associated <i>Acacia harpophylla</i> , <i>Geijera parvifolia</i> , <i>Lysiphyllum carronii</i> , <i>Casuarina cristata</i> , <i>Alectryon diversifolius</i> and <i>Senna coronilloides</i> . Plain with alluvium substrate and grey-brown or red-brown clay loam soils.
Queensland Herbarium (BRI) AVH data	BRI AQ0907200	2013	-24.5347	150.0139	<i>Acacia harpophylla</i> trees with <i>Lysiphyllum carronii</i> and <i>Eremophila mitchellii</i> . Flat ground. Brown loamy clay.
Queensland Herbarium (BRI) AVH data	BRI AQ0876178	2013	-24.3966	149.9796	
Queensland Herbarium (BRI) AVH data	BRI AQ0415410	-	-24.7567	149.7094	In brigalow-softwood scrub.
Queensland Herbarium (BRI) AVH data	BRI AQ0852430	-	-24.4897	150.1221	<i>Acacia harpophylla</i> and <i>Casuarina cristata</i> on a flat plain of grey clay loam. Ground layer native grasses. <i>Sarcostemma viminalis</i> , <i>Sclerolaena</i> etc. but mostly heavily invaded with green panic and buffel. <i>Solanum elaeagnifolium</i> also present, rare.
Queensland Herbarium (BRI) AVH data	BRI AQ0940811	-	-24.7444	149.659	Brigalow open forest.
Queensland Herbarium (BRI) AVH data	BRI AQ0940806	-	-24.3996	149.9818	Brigalow open forest.
Queensland Herbarium (BRI) AVH data	BRI AQ0414809	1959	-24.3234	150.3761	In heavy clay on recently burnt brigalow country.
Queensland Herbarium (BRI) AVH data	BRI AQ0039431	1963	-24.8234	149.7428	In brown clay soil on cleared brigalow-belah scrub.
Queensland Herbarium (BRI) AVH data	BRI AQ0940807	-	-24.3111	150.3155	Brigalow open forest, minute remnant
Queensland Herbarium (BRI) AVH data	BRI AQ0414803	1960	-24.3401	150.0427	In brigalow scrub
Queensland Herbarium (BRI) AVH data	BRI AQ0853948	2014	-24.6358	149.7393	Flat plain. Blackbutt with Brigalow regrowth. Mapped 11.4.8/11.4.9a. Light medium clay, landzone 4
Queensland Herbarium (BRI) AVH data	BRI AQ0940812	-	-24.6591	149.7036	Thin linear strip of brigalow open forest

Source	Record	Year	Lat	Long	Habitat
Queensland Herbarium (BRI) AVH data	BRI AQ0774484	2003	-24.1145	150.3689	Roadside, with scattered clumps of <i>Acacia harpophylla</i> trees, with understorey of exotic pasture grasses
Queensland Herbarium (BRI) AVH data	BRI AQ0940810	-	-24.4884	150.1231	Brigalow open forest
Queensland Herbarium (BRI) AVH data	BRI AQ0940808	-	-24.4151	149.9275	Brigalow open forest, linear remnant in road reserve
Queensland Herbarium (BRI) AVH data	BRI AQ0853996	-	-24.2	150.2803	Dense but stunted <i>Cadellia pentastylis</i> dominated forest to 12m tall with occasional <i>Acacia harpophylla</i> as well as emergent <i>Eucalyptus cambageana</i> to 20m tall. Other species <i>Acalypha eremorum</i> , <i>Croton insularis</i> , <i>Capparis shanesiana</i> , <i>Everistia vacciniifolia</i> ,
Queensland Herbarium (BRI) AVH data	BRI AQ0853997	-	-24.0292	149.9494	Undulating plain of grey-brown clay loam supporting narrow remnant strips of <i>Acacia harpophylla</i> with <i>Eucalyptus cambageana</i> emergents. Other species <i>Alectryon diversifolius</i> , <i>Geijera parviflora</i> , <i>Ehretia membranifolia</i> , <i>Capparis shanesiana</i> .
Queensland Herbarium (BRI) AVH data	BRI AQ0852426	2013	-24.6353	149.7389	Whipstick brigalow to 5m tall though most about 3m, with <i>Eucalyptus thozetiana</i> emergents to 18m tall. Also <i>Eremophila mitchellii</i> , <i>Carissa ovata</i> , <i>Solanum dissectum</i> , <i>S. elachophyllum</i> , <i>S. johnsonianum</i> .
Queensland Herbarium (BRI) AVH data	BRI AQ0854286	2014	-24.4146	149.9276	Plain. Woodland of Brigalow and Bulloak; Heavy clay soils.
Queensland Herbarium (BRI) AVH data	BRI AQ0039435	-	-24.5901	149.9094	On heavy clay soil. Associated with <i>Acacia harpophylla</i> .
Queensland Herbarium (BRI) AVH data	BRI AQ0912115	2013	-24.4163	149.9281	Roadside corridor. Brigalow regrowth.
Queensland Herbarium (BRI) AVH data	BRI AQ0912114	2013	-24.4085	149.954	Brigalow regrowth.
Queensland Herbarium (BRI) AVH data	BRI AQ0414804	1960	-24.3401	150.0427	In brigalow scrub.





LEGEND

- Solanum dissectum records within 10 km (number denotes multiple records)
- 10 km distance from project area
- Project area boundary



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DATE: 28/11/2022

AUTHOR: Anton Fitzgerald

CLIENT: EDIFY ENERGY

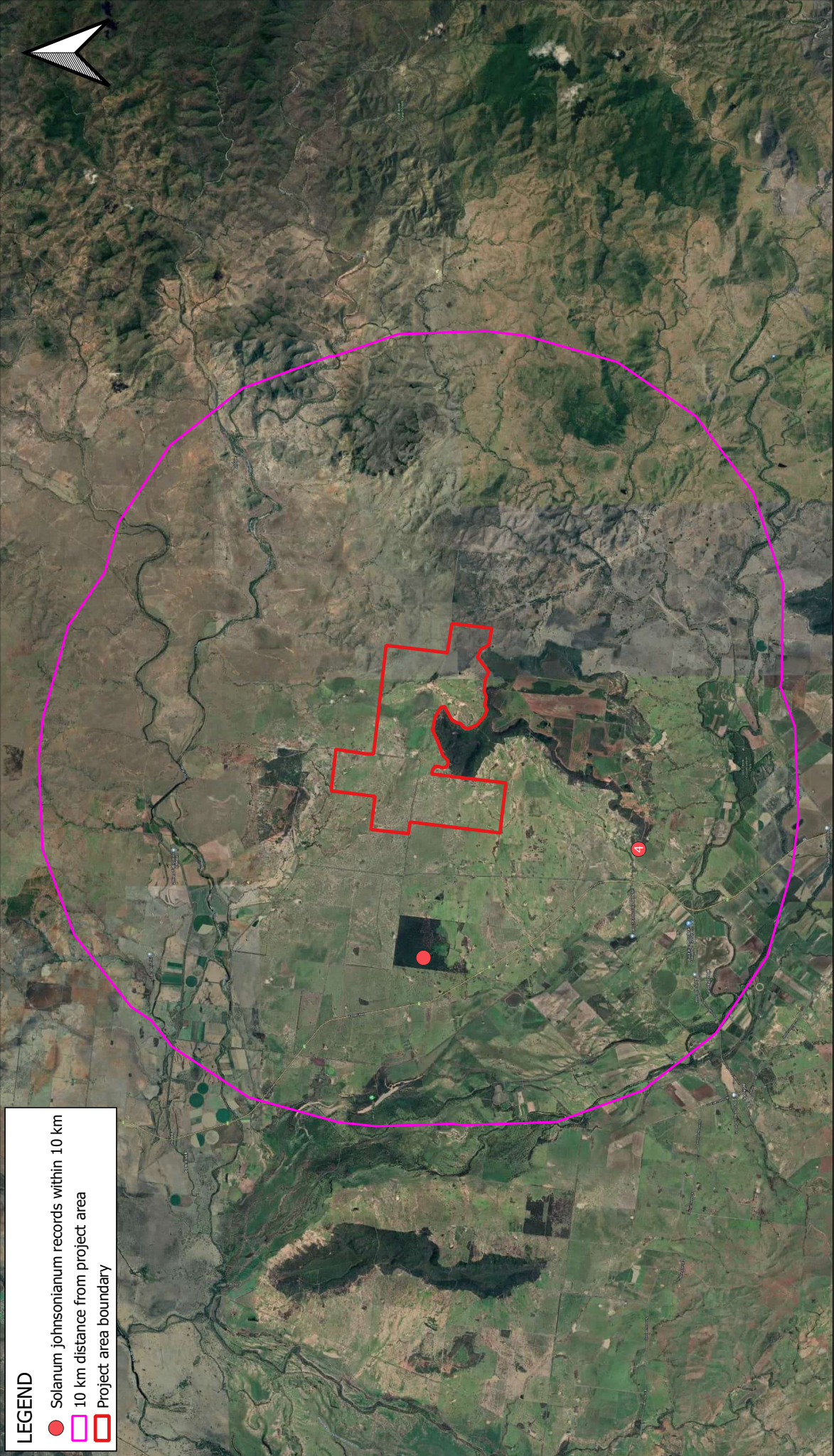
FIGURE 4: SOLANUM DISSECTUM RECORDS WITHIN 10KM OF PROJECT AREA



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Google Satellite Hybrid

Coordinate system: GDA2020 / MGA zone 56 EPSG:7856





LEGEND

- Solanum johnsonianum records within 10 km
- 10 km distance from project area
- Project area boundary



CLIENT: EDIFY ENERGY

FIGURE 5: SOLANUM JOHNSONIANUM RECORDS WITHIN 10KM OF PROJECT AREA

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DATE: 28/11/2022

AUTHOR: Anton Fitzgerald

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Google Satellite Hybrid

Coordinate system: GDA2020 / MGA zone 56 EPSG:7856



#### 4.1.1.3 Item 2.1.4

##### Information required

Provide the total area (in hectares) of each identified habitat type within the site (e.g. shelter/refuge, breeding, foraging, dispersal etc.), including consideration of disturbed (non-remnant vegetation) areas. Where habitat requirements overlap (e.g. where breeding and foraging occur within the same habitat type), provide the total area for both habitat types.

##### Response

Total area of habitat for *S. johnsonianum* and *S. dissectum* is provided in Table 5. All habitat for the species will be avoided.

**Table 5** Habitat area for *S. johnsonianum* and *S. dissectum*

Species	Habitat type	Project area (ha)	Disturbance footprint (ha)	Avoidance area (ha)
<i>S. dissectum</i> and <i>S. johnsonianum</i>	All habitats	19.24	0	19.24

#### 4.1.1.4 Item 2.1.5

##### Information required

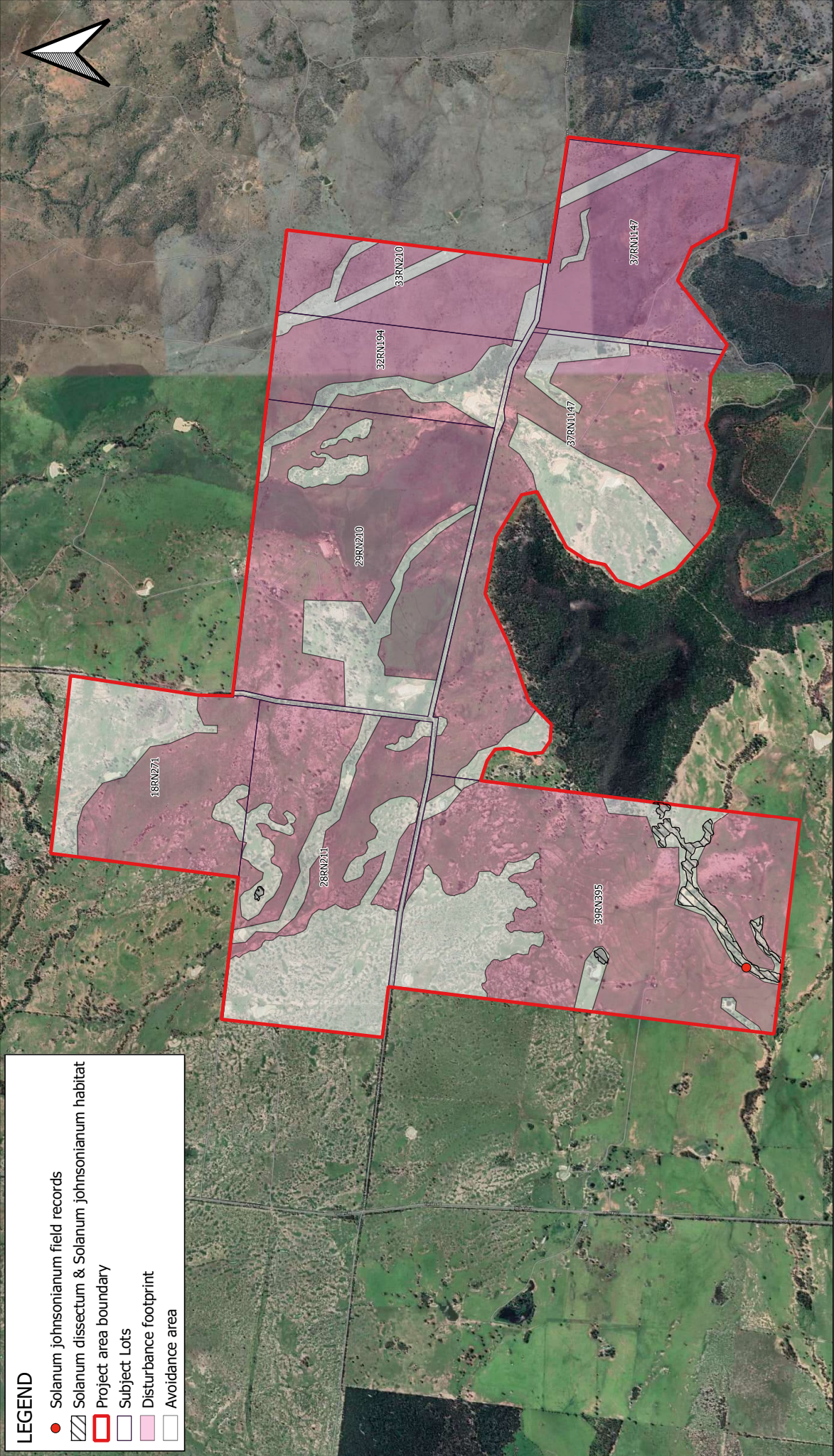
Provide detailed mapping of suitable habitat, which: identifies the location, size and type of habitat for each species; includes an overlay of the project disturbance footprint; and identifies the location of known species records derived from desktop analysis and/or field surveys.

##### Response

*S. johnsonianum* and *S. dissectum* habitat is published as open forest and woodland habitats where brigalow (*Acacia harpophylla*) dominates or co-dominates on heavy cracking clay soils (Bean 2004). The species is also associated with *E. thozetiana*. No Eucalypt Forest or woodland dominated by *E. thozetiana* occurs on the site. Immature brigalow on other soil types are present in small patches and along drainage lines.

Habitat mapping for *S. dissectum* and *S. johnsonianum* is provided in Figure 6.





		CLIENT: EDIFY ENERGY		Credits: Google Satellite Hybrid	
DOCUMENT: E:\Terra Solutions\PROJECTS -		FIGURE 6: S.DISSECTUM AND S.JOHNSONIANUM HABITAT			
DATE: 09/03/2023		0 1 2 3 4 5 km 1:28,000			
AUTHOR: Anton Fitzgerald		Coordinate system: GDA2020 / MGA zone 56 EPSG:7856			



#### 4.1.1.5 Item 2.1.6

##### Information required

Include an assessment of the adequacy of any surveys undertaken, including survey effort, timing and the extent to which surveys were appropriate for the listed threatened species, with reference to relevant departmental survey guidelines.

##### Response

For the purposes of field surveys searches for the *S. dissectum* and *S. johnsonianum* focussed on areas of brigalow forest and woodland with a less than a 50 % cover of exotic grass. The assessment of survey adequacy is provided in Table 6.

**Table 6 Assessment of survey adequacy for *S. johnsonianum* and *S. dissectum***

Species	Method	Timing and conditions	Effort	Adequacy of surveys
<i>Solanum johnsonianum</i> and <i>Solanum dissectum</i>	<ul style="list-style-type: none"> <li>Slow-driving using a side-by-side UTV vehicle</li> <li>10-minute meandering transects at 88 vegetation assessment sites</li> <li>Meandering transects in preferred habitats habitat types</li> </ul>	<ul style="list-style-type: none"> <li>The survey was undertaken over five days from 7 to 11 February 2022. The timing was considered suitable for both species.</li> <li>Both species thrive in the hotter months and respond quickly to rainfall.</li> <li>In the months leading up to the survey monthly rainfall totals in the area were very high: October was slightly below 90th percentile, November was the highest ever recorded and December was slightly below the 90<sup>th</sup> percentile.</li> </ul>	<ul style="list-style-type: none"> <li>14 person hours of searches at 88 vegetation assessment sites</li> <li>8 person hours of searches within preferred woodland habitat</li> <li>26 person hours of slow driving transects</li> </ul>	<ul style="list-style-type: none"> <li>All <i>Solanum</i>'s thrive in the hotter months of the year and especially following substantial rainfall. In the months leading up to the field survey there had been significant rainfall making survey conditions ideal.</li> <li>Most of the site contained unsuitable habitat for both species (i.e. <i>U. mosambiquensis</i> grasslands) however searches were undertaken in all habitat types.</li> <li><i>Solanum johnsonianum</i> was detected on the upper bank of a remnant watercourse where a thin, sodic clay layer was present.</li> </ul>

#### 4.1.1.6 Item 2.1.7

##### Information required

Attached all relevant ecological surveys referenced in the preliminary documentation as supporting documentation. Ecological surveys or reports already provided in the referral documentation do not need to be provided again.

## Response

Smoky Creek Power Station Habitat Assessment and Targeted Survey report (Terra Solutions 2022) was prepared to provide additional ecological information in response to the DCCEE request for information by PD in response to the EPBC act referral (2021/9030). The ecological assessment builds on work undertaken by RPS (2018) to fill ecological knowledge gaps for the site in relation to the following MNES threatened species:

- *Solanum dissectum*
- *Solanum johnsonianum*
- Ornamental Snake
- Squatter pigeon

The habitat assessment and targeted survey report is provided in Appendix A.

### 4.1.2 Item 2.2 – Species specific information

#### 4.1.2.1 Item 2.2.1

##### Information required

*Identification of all areas of Brigalow and/or Eucalypt forest and woodland on cracking clay soils within the site.*

##### Response

All areas of Brigalow (*Acacia harpophylla* dominant and co-dominant) and/or Eucalypt forest and woodland on cracking clay soils within the site are presented in Figure 7. No Eucalypt forest or woodland dominated by *E. thozetiana* occurs on the site. Brigalow communities on other soil types are present in small patches and along drainage lines.

#### 4.1.2.2 Item 2.2.2

##### Information required

*A detailed discussion of habitat requirements, including light levels, soil composition and moisture, and the suitability of the site to support the species.*

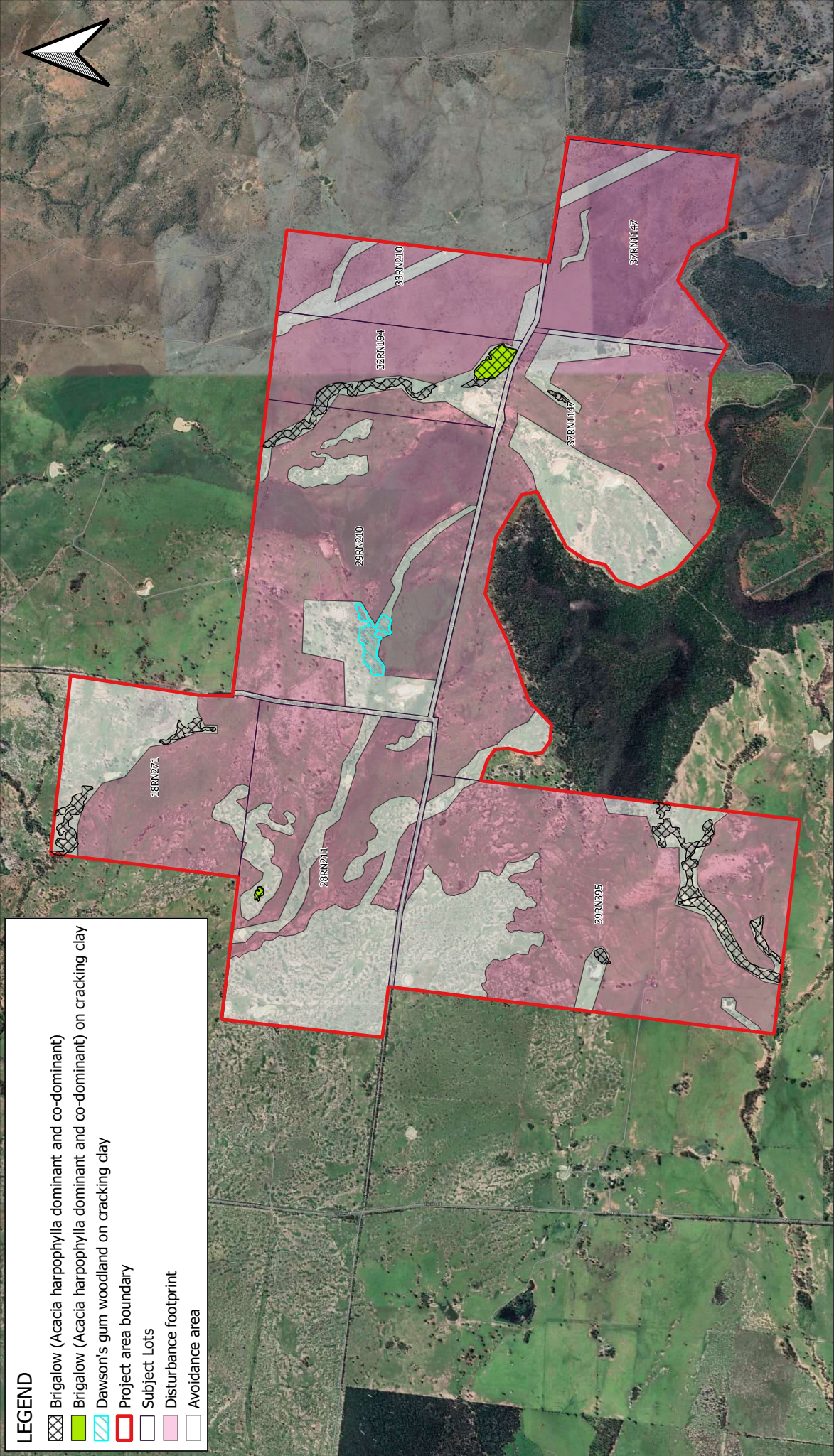
##### Response

There is no specific data relating to the preferred light levels for either *S. dissectum* or *S. johnsonianum*, although it may be inferred that both species prefer low or dappled light. Brigalow communities in the high rainfall areas of the brigalow belt where the *Solanum*.spp occur, typically form a dense canopy, low tree and/or shrub layer (Fensham et al 2019, DoE 2022) which limits light penetration to the ground layer resulting in dappled light.

Vegetation communities dominated by brigalow possess a range of vegetation structures and a suite of species that tend to occur on acidic and salty clay soils (Isbell, 1962; Johnson, 1964; Bui and Henderson, 2003) and therefore by association with brigalow communities both *S. dissectum* and *S. johnsonianum* display an affinity for saline clay soils.

Both *S. dissectum* and *S. johnsonianum* regenerate from rhizomes beneath the soil surface and can flower and fruit rapidly in response to rain (Fensham et al 2019). Their ability to regenerate from underground rhizomes allows the species to die off during dry periods and therefore soil moisture, whilst important for reproduction, is not a year-round requirement for the species.





LEGEND

Brigalow (Acacia harpophylla dominant and co-dominant)

Brigalow (Acacia harpophylla dominant and co-dominant) on cracking clay

Dawson's gum woodland on cracking clay

Project area boundary

Subject Lots

Disturbance footprint

Avoidance area

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FIGURE 7: BRIGALOW AND EUCALYPT WOODLAND AND FOREST ON CRACKING CLAY SOILS

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Credits:  
Google Satellite Hybrid

Coordinate system: GDA2020 / MGA zone 56 EPSG:7856



## 4.2 Ornamental snake (*Denisonia maculate*) – Vulnerable EPBC Act

### 4.2.1 Item 2.1 - Species general information

#### 4.2.1.1 Item 2.1.1

##### Information required

*Provide a habitat assessment for ornamental snake*

##### Response

Ornamental snake occurs in the Brigalow Belt North and parts of the Brigalow Belt South biogeographical regions where their core distribution is located within the Fitzroy and Dawson Rivers drainage basins (McDonald et al. 1991; Cogger et al. 1993).

The species is most encountered around moist areas on Queensland land zone 4 (Tertiary-early Quaternary clay plains) and less commonly on Landzone 3 (recent Quaternary alluvial systems) and Landzone 5 (Tertiary-early Quaternary loamy and sandy plains and plateaus). More specifically, ornamental snake records are typically from areas with vertisol soils (cracking clays) and especially where gilgai mounds and depressions are present. Gilgai most commonly occur on Landzone 4 but also occasionally on Landzone 3 and Landzone 5.

Within the project area vertisol soils are associated with Land zone 3 and occupy 862 ha of the project area. Gilgai mounds and depressions also occur over a smaller area of approximately 195 ha located in the west of the project area on Lot 18, 28 and 39 in addition to a small patch on Lot 29.

Preferred vegetation types are woodland and open forests associated with the preferred land zones and land formations (Agnew 2010 pers. comm.; Brigalow Belt Reptiles Workshop 2010; Wilson & Knowles 1988) and are typically mapped as the following Queensland Regional Ecosystems or pre-cleared RE's:

- 11.4.3: *Acacia harpophylla* and/or *Casuarina cristata* shrubby open forest on Cainozoic clay plains.
- 11.4.6: *Acacia cambagei* woodland on Cainozoic clay plains.
- 11.4.8: *Eucalyptus cambageana* woodland to open forest with *Acacia harpophylla* or *A. argyrodendron* on Cainozoic clay plains
- 11.4.9: *Acacia harpophylla* shrubby woodland with *Terminalia oblongata* on Cainozoic clay plains
- 11.3.3 - *Eucalyptus coolabah* woodland on alluvial plains.
- 11.5.16 - *Acacia harpophylla* and/or *Casuarina cristata* open forest in depressions on Cainozoic sand plains and remnant surfaces.

The vegetation community and structure of these gilgai habitats are generally consistent with the following ornamental snake habitat requirements detailed by Agnew pers. comm. (2010):

- Contains shallow water with aquatic vegetation or inundated fringing groundcover. Especially occurs in flooded gilgais where the dominant aquatic macrophyte is bog hyacinth.
- The gilgai have a diversity of size and depths (if deep, then broad with gently sloping gradients at the sides).
- Soils possess a high clay content, deep cracking characteristics and a high capacity for water retention.
- Refuge habitat for use during dry periods is present. Typically this habitat is deep cracking clay on gilgai mounds.
- Habitat assessment of the project area confirms that ground timber is so sparse as to be functionally absent and this has probably been the case to various degrees for the last 80 years.



Surface soils on gilgai mounds on the site were found to be self-mulching and whilst some cracks were present, they were not common at the time of the survey. This is probably indicative of significant rainfall in the months prior to the survey and the moisture of subsurface soils which possess the deep cracking attributes. Notwithstanding, as the dry periods progress it is likely that the deep cracking attributes cited above occur throughout the gilgai mounds.

Significant soil development and preparation has been undertaken in past years to improve the success of sowed pastures. The process of soil preparation has included mechanical tilling and/or blading to at least 60 cm in depth (pers comm. Maynard 2022). This has been undertaken at least twice in gilgai lands to enable water penetration. The time between significant periods of soil disturbance appear to have been sufficient for population recovery from a source population or at least some individuals survived in-situ.

Agnew (pers. comm 2010) indicates that habitats where ornamental snake are present typically exceed ten hectares in area and are within, or connected, to larger areas of remnant vegetation. Gilgai habitats on the site form part of an extensive complex of around 2,000 ha which extends to the west of the site of which 220 ha (11.1 %) occurs in the project area (Figure 8). This large gilgai complex includes an area of preferred ornamental snake brighalow habitat covering around 290 ha. This habitat is located approximately 2.7 km from the site. No other areas of gilgai on the site have any form of connectivity with larger areas of remnant habitat.

Collectively the absence of broad-scale woodland-open forest habitat, critical surface microhabitats (i.e. rocks, timber and bark) and the influence of subsurface disturbance from soil reworking has resulted in degraded habitats for the species. The detection of five ornamental snakes within the project area indicates that in this location, the species is resilient to the degradation of habitat values (i.e. minimal surface microhabitats and lack of canopy) and threatening processes experience over the last 70 years (cattle, blading of soils).







#### 4.2.1.2 Item 2.1.2

##### Information required

*Provide a discussion of habitat use requirements (e.g. shelter/refuge, breeding, foraging, dispersal, etc.), including consideration of known important habitat and suitable habitat.*

##### Response

Ornamental snake shelters in deep soil cracks on gilgai mounds during the day (Brigalow Belt Reptiles Workshop 2010) and during dry periods the species could potentially remain inactive in these cracks for months (Agnew 2010 pers. comm.; DSEWPac 2011; Shine 1983).

Agnew (pers. comm 2010) identifies other critical shelter requirements for ornamental snake including coarse woody debris, rocks, bark, and ground litter (Brigalow Belt Reptiles Workshop 2010). Ground timber is particularly significant as it tends to be abundant in the species undisturbed natural habitat. Since the species is nocturnally active, ground timber provides protection from predation by introduced species such as cats and foxes along with native predators such as owls. During the day ground timber protects against desiccation and predation by raptors, kookaburras, and butcherbirds etc. Ground timber is particularly important when subsurface refuges in soil cracks are unavailable due to waterlogging and soil swelling.

#### 4.2.1.3 Item 2.1.3

##### Information required

*Identify and describe known historical records of the species in the broader region. All known records must be supported by an appropriate source (i.e. Commonwealth and State databases, published research, publicly available survey reports etc.), the year of the record and a description of the habitat in which the record was identified.*

##### Response

Desktop assessment identified four records of ornamental snake within a 50 km of the site. These records are presented in Table 7.

**Table 7 Ornamental snake records within 50km of the Project area (Atlas of Living Australia 2022)**

MAP ID	Source	Record	Latitude	Longitude	Year	Habitat
0	Queensland Museum provider for OZCAM	J5618	-24.4	150.5167		Non-remnant
1	Queensland Museum provider for OZCAM	J14401	-24.3333	149.9833		Non-remnant
2	Queensland Museum provider for OZCAM	J22620	-24.35	150.5	1972	Non-remnant
3	Queensland Museum provider for OZCAM	J8025	-24.2	150.3667		11.3.4/11.3.25

#### 4.2.1.4 Item 2.1.4

##### Information required

*Provide the total area (in hectares) of each identified habitat type within the site (e.g. shelter/refuge, breeding, foraging, dispersal etc.), including consideration of disturbed (non-remnant vegetation) areas. Where habitat requirements overlap (e.g. where breeding and foraging occur within the same habitat type), provide the total area for both habitat types.*

##### Response

Total areas of ornamental snake habitat types are provided in Table 8. Due to lack of available literature on ornamental snake breeding habitat, breeding, and foraging habitat for the species are considered analogous. All 219.96 ha of ornamental snake habitat will be avoided by the development.

**Table 8** Habitat area for ornamental snake

Species	Habitat type	Project area (ha)	Disturbance footprint (ha)	Avoidance area (ha)
Ornamental snake	All habitats	219.96	0	219.96

#### 4.2.1.5 Item 2.1.5

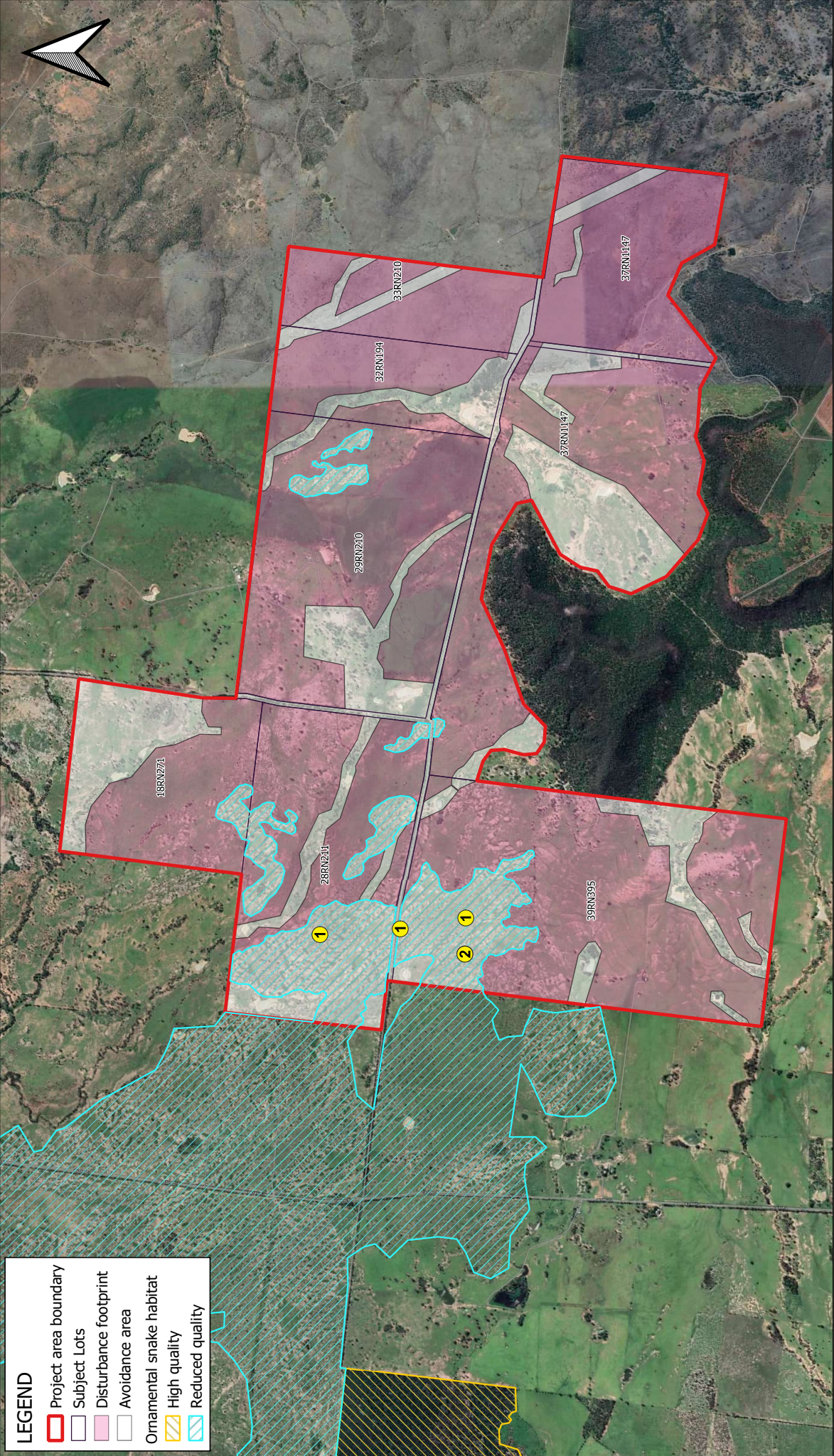
##### Information required

*Provide detailed mapping of suitable habitat, which: identifies the location, size and type of habitat for each species; includes an overlay of the project disturbance footprint; and identifies the location of known species records derived from desktop analysis and/or field surveys.*

##### Response

Habitat mapping for the ornamental snake within the project area is provided in Figure 9.





**LEGEND**

- Project area boundary
- Subject Lots
- Disturbance footprint
- Avoidance area
- Ornamental snake habitat
- High quality
- Reduced quality



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FIGURE 9: ORNAMENTAL SNAKE HABITAT IN PROJECT AREA



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Google Satellite Hybrid

DOCUMENT: E:\Terra Solutions\PROJECTS -

DATE: 09/03/2023

AUTHOR: Anton Fitzgerald

Coordinate system: GDA2020 / MGA zone 56 EPSG:7856



#### 4.2.1.6 Item 2.1.6

##### Information required

*Include an assessment of the adequacy of any surveys undertaken, including survey effort, timing and the extent to which surveys were appropriate for the listed threatened species, with reference to relevant departmental survey guidelines.*

##### Response

For the purposes of field surveys searches for the ornamental snake focussed on the best available habitat (i.e. gilgai wetlands and intervening areas). The assessment of survey adequacy is provided in Table 9.

**Table 9 Assessment of survey adequacy for ornamental snake**

Species	Method	Timing and conditions	Effort	Adequacy of surveys	Results
Ornamental snake	<ul style="list-style-type: none"> <li>Spotlighting surveys on foot within an around gilgai wetlands particularly in areas where frogs were active.</li> <li>Spotlighting surveys on foot of the gilgai mounds and gilgai flats</li> <li>Slow-driving spotlighting surveys along tracks and roads proximate to suitable habitat using a UTV vehicle.</li> </ul>	<ul style="list-style-type: none"> <li>Nocturnal spotlighting surveys were undertaken in February 2022 and 2023 during warm evenings.</li> <li>There had been limited rainfall prior to the survey but inundated gilgai was common.</li> <li>Frogs were actively calling and abundant.</li> </ul>	<ul style="list-style-type: none"> <li>A total of 64 person hours of active searches over four nights.</li> <li>A total of 30 person hours of slow-driving nocturnal spotlighting</li> </ul>	<ul style="list-style-type: none"> <li>Available habitat whilst best on offer was of poor quality.</li> <li>Survey conditions were conducted under conditions where the detection of species would be likely if present (i.e. during warm February evenings when frogs were actively calling and abundant at the site).</li> </ul>	<ul style="list-style-type: none"> <li>Five individual snakes were detected in the western extent of the project area</li> </ul>

#### 4.2.1.7 Item 2.1.7

##### Information required

*Attached all relevant ecological surveys referenced in the preliminary documentation as supporting documentation. Ecological surveys or reports already provided again.*

##### Response

Smoky Creek Power Station Habitat Assessment and Targeted Survey report (Terra Solutions 2022) was prepared to provide additional ecological information in response to the DCCEEW request for information by PD in response to the EPBC act referral (2021/9030). The ecological assessment builds on work undertaken

by RPS (2018) to fill ecological knowledge gaps for the site relation to the following MNES threatened species:

- *Solanum dissectum*
- *Solanum johnsonianum*
- Ornamental Snake
- Squatter pigeon

The habitat assessment and targeted survey report is provided in Appendix A.

## 4.2.2 Item 2.2 – Species specific information

### 4.2.2.1 Item 2.2.3

#### Information required

*A discussion of vegetation composition and structure on relevant land zones (i.e. riparian vegetation, gilgai mounds and depressions, Brigalow Threatened Ecological Community, cracking clay soils and microhabitat features).*

#### Response

The preferred REs, 11.4.3, 11.4.6, 11.4.8, 11.4.9 11.3.3 and 11.5.16 are not present on the site, however in areas containing gilgai landforms the pre-clearing is mapped as RE 11.3.1 - *Acacia harpophylla* and/or *Casuarina cristata* open forest. Whilst this RE is not recognised in Federal documentation specifically, the landform, presence of gilgai and pre-clearing vegetation structure is likely to have historically been identified as suitable habitat for ornamental snake.

The contemporary vegetation present on vertisol soils within the project area consists of an exotic grassland of sabi grass (*Urochloa mozambiquensis*) and other introduced pasture grasses. Isolated trees are too sparse to be classified as open woodland and include brigalow (*Acacia harpophylla*), Dawson's gum (*Eucalyptus cambageana*), mountain coolabah (*Eucalyptus orgadophila*), coolabah (*Eucalyptus coolabah*) and Queensland bottle tree (*Brachychiton rupestris*). Occasional patches of shrubs including immature brigalow, scrub wilga (*Geijera parviflora*), Queensland ebony (*Diospyros humilis*), currant bush (*Carissa ovata*), various canthiums (*Psyrax* spp) and holly bush (*Alectryon diversifolius*) are also present.

The vegetation changes in and around the gilgai depressions, half of which contained water during the survey and contained a layer of aquatic plants which typically exceeded 70% cover. The plants included various *Cyperus* spp., velvet knotweed (*Persicaria attenuata*), sourgrass (*Paspalum conjugatum*), *Caldesia oligococca*, Nardoo (*Marsilea drummondii*), blue hyacinth (*Monocoria cyanea*), rice sedge (*Cyprus difformis*), round-leaf cassia *Chaemacrista rotundifolia*, *Eliocaris* sp, slender canegrass (*Dinebra decipiens*) and *Aponogeton queenslandicus*.

The surrounding gilgai mounds and inter-gilgai flats still tended to be dominated by a mid-dense cover of sabi grass however saline patches dominated by salt-tolerant species such as lagoon saltbush (*Atriplex muelleri*), roly-poly (*Salsola australis*), ruby salt bush (*Enchylaena tomentosa*), currant bush and Australian dropseed (*Sporobolus australasicus*) were also common. These areas were sparser due to the exposure of subsurface saline soils during the formation of gilgai landforms.

### 4.2.3 Item 2.2.4

#### Information required

*Details and locations (including a map) of known food sources (i.e. frog species) and other required habitat features, including but not limited to cracking clay soils, gilgai mounds and depressions.*

## Response

Ornamental snake forage almost exclusively on frogs which it hunts for around water at night (Cogger et al 1993). Frog species common to areas where ornamental snakes have been found include striped burrowing frog (*Cyclorana alboguttata*), short-footed frog (*Cyclorana brevipes*), wide-mouthed frog (*Cyclorana novaehollandiae*), water-holding frog (*Cyclorana platycephala*), spotted marsh frog (*Limnodynastes tasmaniensis*), green tree frog (*Litoria caerulea*), floodplain frog (*Litoria inermis*), broad-palmed frog (*Litoria latopalmata*), desert tree frog (*Litoria rubella*) and ornate burrowing frog (*Opisthodon ornatus*).

The field survey found the highest density of frogs near the gilgai depressions located in the west of the site and rarely in other areas including other vertisol habitats of low-lying cracking clays. Surveys for ornamental snake targeted these areas to increase the likelihood of detection and found the important prey item striped burrowing frog (*Cyclorana alboguttata*) in high abundance. Other species in much lower abundance included: eastern snapping frog (*Cyclorana novaehollandiae*), eastern dwarf tree frog (*Litoria fallax*), bumpy rocket frog (*Litoria inermis*), striped rocket frog (*Litoria nasuta*), ruddy tree frog (*Litoria rubella*), green tree frog (*Litoria caerulea*). If ornamental snakes were to utilise the site, the primary foraging area is most likely in and around the ornamental snake habitat presented in Figure 9.



## 4.2.4 Squatter Pigeon (southern) (*Geophaps scripta scripta*) – Vulnerable

### 4.2.4.1 Item 2.1.1

#### Information required

*Provide a habitat assessment for Squatter Pigeon (southern)*

#### Response

The known distribution of the Squatter Pigeon (southern) extends from the Burdekin-Lynd divide in the southern region of Cape York Peninsula to the Border Rivers region of northern NSW, and from the east coast to Hughenden, Longreach and Charleville, Queensland (ALA - OEH 1999, 2006; Cooper et al. 2014; Frith 1982; Ford 1986; Higgins & Davies 1996; Schodde & Mason 1997, in prep.; Squatter Pigeon Workshop 2011; Storr 1984c) and potentially to the Queensland – New South Wales border.

Squatter pigeon (Sth.) is a ground-dwelling species found in remnant, regrowth or partly modified grassy open forest to open woodland and scrub dominated by a canopy of Eucalyptus, Corymbia, Acacia, or Callitris species located within three kilometres of water.

Squatter pigeon habitat consists of remnant or regrowth open forest to woodland communities with a patchy, tussock grass understorey on well-draining, gravelly, sandy or loamy soils with that support the subspecies' breeding and foraging requirements (Squatter pigeon workshop 2011).

Foraging and breeding habitat occurs where well-drained gravelly, sandy or loamy soils support the preferred open communities dominated by Eucalyptus, Corymbia, Acacia or Callitris species and within 3 km of a permanent or seasonal waterbody (Squatter pigeon workshop 2011).

### 4.2.4.2 Item 2.1.2

#### Information required

*Provide a discussion of habitat use requirements (e.g. shelter/refuge, breeding, foraging, dispersal, etc.), including consideration of known important habitat and suitable habitat.*

#### Response

The species prefers a patchy groundcover with a mix of native grasses and low shrubs and forages (and dust bathe) on bare ground in these habitats. Typically, the species will forage under an open canopy of trees where the ground cover rarely exceeds 33% of the ground area (Squatter pigeon workshop 2011). The species is granivorous and primarily obtains energy from carbohydrates in the grains and due to the lack of water in grains regularly supplements the diet with water.

Breeding habitat on stony rises within 1 km of a suitable water resource where the subspecies nests in shallow depressions, thus requiring well-draining soils (Squatter pigeon workshop 2011). Squatter pigeon can breed year-round under favourable conditions but typically nest from May – July, within 1 km of water.

Foraging and breeding habitat occurs where well-drained gravelly, sandy or loamy soils support the preferred open communities dominated by Eucalyptus, Corymbia, Acacia or Callitris species and within 3 km of a permanent or seasonal waterbody (Squatter pigeon workshop 2011).

### 4.2.4.3 Item 2.1.3

#### Information required

*Identify and describe known historical records of the species in the broader region. All known records must be supported by an appropriate source (i.e. Commonwealth and State databases, published research,*

publicly available survey reports etc.), the year of the record and a description of the habitat in which the record was identified.

## Response

A 50 km search buffer around the project area was used on records downloaded from the Atlas of Living Australia. These records are presented in Table 10.

**Table 10 Squatter pigeon records within 50km of the Project area (Atlas of Living Australia 2022)**

Source	Record	Lat	Long	Year	Habitat
WildNet - Queensland Wildlife Data	WildNet:3669258	-24.4817	150.5677	1977	Non-remnant
WildNet - Queensland Wildlife Data	WildNet:2995365	-24.4067	150.6511	1993	11.11.9/11.11.5/11.11.4
WildNet - Queensland Wildlife Data	WildNet:4528426	-24.3483	150.4844	1955	Non-remnant
WildNet - Queensland Wildlife Data	WildNet:6316931	-23.8021	150.6374	2017	11.3.4/11.3.2
WildNet - Queensland Wildlife Data	WildNet:4518677	-24.2985	150.5011	1953	Non-remnant
iNaturalist Australia	97879850	-23.6489	150.1452	2020	11.3.4/11.3.2/11.3.25
iNaturalist Australia	111463877	-24.3673	150.6123	2022	Non-remnant
iNaturalist Australia	51327280	-24.0118	150.9024	2018	Non-remnant
iNaturalist Australia	51329368	-24.0129	150.9089	2018	Non-remnant
eBird Australia	OBS805581112	-23.6516	150.118	2019	Non-remnant
eBird Australia	OBS632743626	-24.4251	150.3535	2018	Non-remnant
eBird Australia	OBS1105268368	-23.685	150.327	2021	11.11.15
eBird Australia	OBS683289516	-24.0249	150.8911	2018	Non-remnant
eBird Australia	OBS1101294703	-23.6196	150.2343	2021	11.11.15
eBird Australia	OBS1044770107	-23.6498	150.1409	2020	Non-remnant
eBird Australia	OBS811923783	-23.6516	150.118	2019	Non-remnant
eBird Australia	OBS1245794028	-24.1496	149.9512	2021	Non-remnant
eBird Australia	OBS231499629	-24.4167	150.5833	1993	Non-remnant
eBird Australia	OBS1193308883	-24.0803	150.8373	2011	Non-remnant
eBird Australia	OBS1153598450	-23.6196	150.2343	2021	Non-remnant
eBird Australia	OBS1187953982	-24.242	150.5326	2021	Non-remnant
eBird Australia	OBS1296263156	-24.3683	150.29	2021	Non-remnant

Source	Record	Lat	Long	Year	Habitat
eBird Australia	OBS1070518101	-23.6948	150.6935	2021	Non-remnant
eBird Australia	OBS961417671	-23.7417	150.3292	2020	Non-remnant
eBird Australia	OBS1011540214	-23.6502	150.1242	2020	Non-remnant
eBird Australia	OBS519725741	-23.6923	150.6955	2017	11.11.16/11.3.26/1 1.3.1/11.3.25
eBird Australia	OBS1011537983	-23.6502	150.1242	2020	Non-remnant
eBird Australia	OBS1024539733	-24.3028	149.9721	2020	Non-remnant
eBird Australia	OBS1062778040	-23.6811	150.7125	2021	Non-remnant
eBird Australia	OBS1070547501	-23.6948	150.6935	2021	Non-remnant
eBird Australia	OBS1296820983	-23.6507	150.661	2021	11.3.4/11.3.2/11.3. 25
eBird Australia	OBS436452477	-23.6507	150.661	2016	11.3.4/11.3.2/11.3. 25
eBird Australia	OBS995238050	-23.6502	150.1242	2020	Non-remnant
eBird Australia	OBS973516822	-23.6948	150.6935	2020	Non-remnant
eBird Australia	OBS1193314446	-24.0163	150.9288	2012	11.12.17
eBird Australia	OBS228421143	-24.3246	150.499	1955	Non-remnant
eBird Australia	OBS966331848	-23.6502	150.1242	2020	Non-remnant
eBird Australia	OBS1011540073	-23.6502	150.1242	2020	Non-remnant
eBird Australia	OBS973510733	-23.6948	150.6935	2020	Non-remnant
eBird Australia	OBS1282299006	-23.685	150.327	2021	11.11.15
eBird Australia	OBS1278734193	-23.6196	150.2343	2021	Non-remnant
eBird Australia	OBS953840261	-24.0249	150.8897	2014	Non-remnant
eBird Australia	OBS971214811	-23.6502	150.1242	2020	Non-remnant
eBird Australia	OBS1011537854	-23.6502	150.1242	2020	Non-remnant
eBird Australia	OBS1008947612	-23.6502	150.1242	2020	Non-remnant
eBird Australia	OBS1170876950	-23.585	150.467	2021	Non-remnant
eBird Australia	OBS1282760103	-24.2479	150.3974	2021	11.3.4/11.3.25/11. 3.2
eBird Australia	OBS1220932819	-23.6507	150.661	2021	11.3.4/11.3.2/11.3. 25
BirdLife Australia, Birdata	651607	-24.1	150.8	-	
BirdLife Australia, Birdata	5810761	-24.1	150.8	-	



Source	Record	Lat	Long	Year	Habitat
BirdLife Australia, Birdata	9634377	-23.7	150.7	-	
BirdLife Australia, Birdata	2397907	-24	149.9	-	
BirdLife Australia, Birdata	5494784	-23.9	150.2	-	
ALA species sightings and OzAtlas	ec41c9f3-a862-4bd9-b69d-4223c37ffeaf	-23.7652	150.351	2018	Non-remnant
Historical Bird Atlas	129241	-24.3	150.5	-	
First Bird Atlas	1699105	-24.1	150.8	-	
First Bird Atlas	1113555	-24.3	150.4	-	
First Bird Atlas	1227229	-24.3	150.4	-	
First Bird Atlas	372969	-24.1	150.9	-	
First Bird Atlas	1389780	-24.3	150.4	-	
First Bird Atlas	1043066	-24.3	150.4	-	
First Bird Atlas	1513263	-24.1	150.9	-	
First Bird Atlas	286561	-24.1	150.9	-	
First Bird Atlas	898423	-24.1	150.9	-	
First Bird Atlas	1309569	-24.1	150.9	-	
First Bird Atlas	1538628	-24.3	150.4	-	
First Bird Atlas	827258	-23.8	150.8	-	
First Bird Atlas	1697883	-24.3	150.4	-	
First Bird Atlas	1859419	-24.1	150.9	-	
First Bird Atlas	1074496	-24.1	150.9	-	
First Bird Atlas	984878	-24.3	150.4	-	
First Bird Atlas	2291192	-24.1	150.1	-	
First Bird Atlas	481766	-24.1	150.8	-	
First Bird Atlas	2492923	-24.1	150.8	-	
First Bird Atlas	2312950	-24.1	150.9	-	
First Bird Atlas	664395	-23.8	150.8	-	
First Bird Atlas	1087504	-24.1	150.9	-	
First Bird Atlas	853122	-24.3	150.4	-	
First Bird Atlas	1889091	-23.8	150.8	-	
First Bird Atlas	361513	-24.3	150.4	-	

Source	Record	Lat	Long	Year	Habitat
First Bird Atlas	362021	-24.3	150.4	-	
First Bird Atlas	1465785	-24.3	150.4	-	
First Bird Atlas	801485	-23.8	150.8	-	
First Bird Atlas	928517	-24.3	150.4	-	
First Bird Atlas	92108	-23.8	150.8	-	
First Bird Atlas	426315	-24.4	150.6	-	
First Bird Atlas	1161273	-23.6	150.4	-	
First Bird Atlas	2635891	-24.5	150.5	-	
First Bird Atlas	1287281	-24.5	150.5	-	
First Bird Atlas	2245051	-23.6	150.4	-	
First Bird Atlas	1726775	-23.8	150.3	-	
First Bird Atlas	1938663	-23.8	150.8	-	
First Bird Atlas	2111738	-23.8	150.3	-	
First Bird Atlas	2107430	-23.8	150.8	-	
First Bird Atlas	1666367	-23.6	150.3	-	

#### 4.2.4.4 Item 2.1.4

##### Information required

*Provide the total area (in hectares) of each identified habitat type within the site (e.g. shelter/refuge, breeding, foraging, dispersal etc.), including consideration of disturbed (non-remnant vegetation) areas. Where habitat requirements overlap (e.g. where breeding and foraging occur within the same habitat type), provide the total area for both habitat types.*

##### Response

Total area of squatter pigeon habitat types is provided in Table 11. Of the 63.13 ha of potential habitat for squatter pigeon, the entire area will be excluded from the disturbance footprint.

**Table 11 Habitat area calculation for squatter pigeon**

Species	Habitat type	Project area (ha)	Disturbance footprint (ha)	Avoidance area (ha)
Squatter pigeon	Breeding	7.09	Nil	7.09
	Foraging	64.59	15.85	48.74
	Dispersal	85.00	15.85	69.15

#### 4.2.4.5 Item 2.1.5

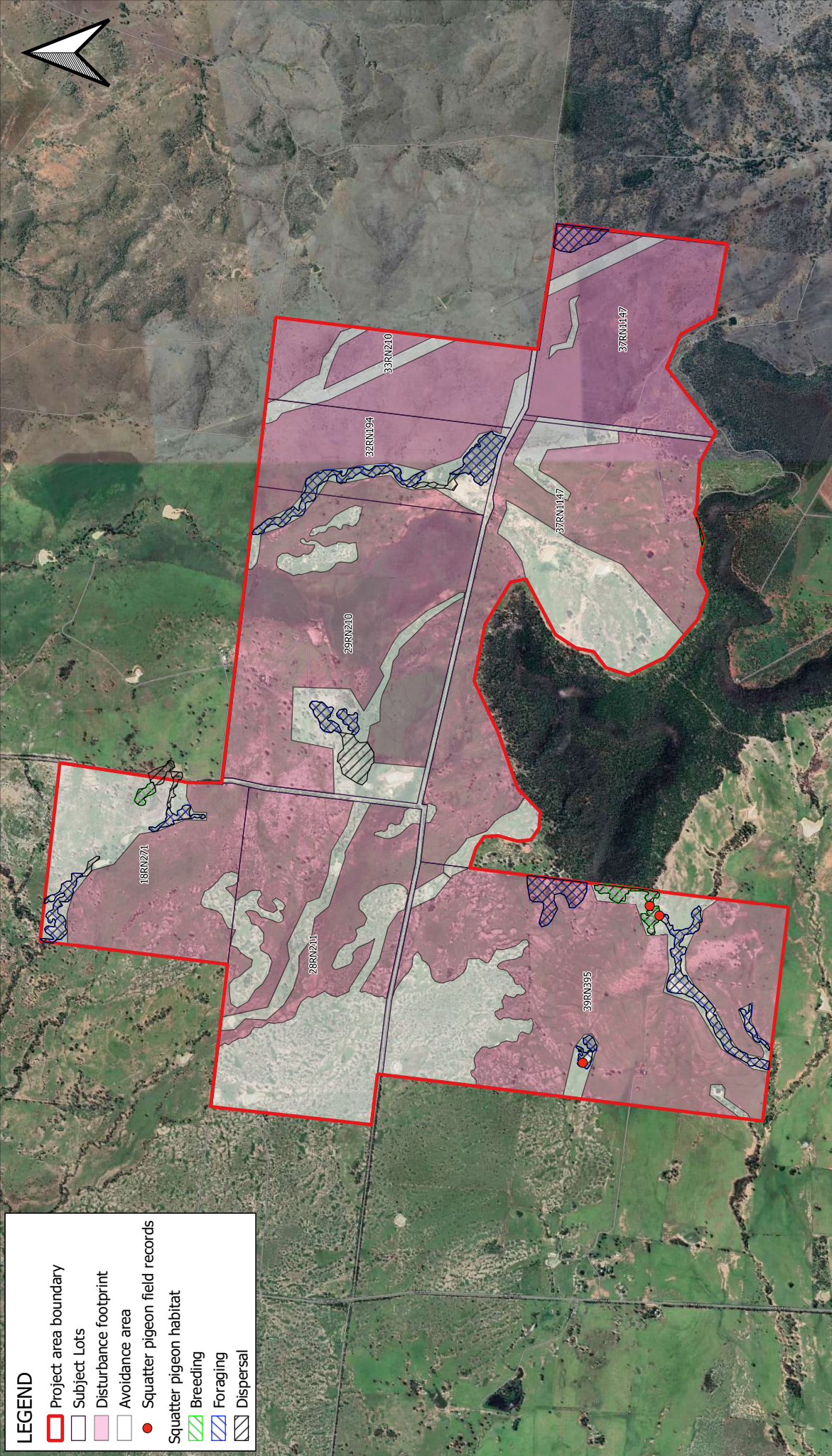
##### Information required

*Provide detailed mapping of suitable habitat, which: identifies the location, size and type of habitat for each species; includes an overlay of the project disturbance footprint; and identifies the location of known species records derived from desktop analysis and/or field surveys.*

##### Response

Habitat mapping for squatter pigeon is provided in Figure 10.





LEGEND

- Project area boundary
- Subject Lots
- Disturbance footprint
- Avoidance area
- Squatter pigeon field records
- Squatter pigeon habitat
- Breeding
- Foraging
- Dispersal



CLIENT: EDIFY ENERGY

FIGURE 10: SQUATTER PIGEON HABITAT



Credits:  
Google Satellite Hybrid

DOCUMENT: E:\Terra Solutions\PROJECTS -

DATE: 20/03/2023

AUTHOR: Anton Fitzgerald

Coordinate system: GDA2020 / MGA zone 56 EPSG:7856



#### 4.2.4.6 Item 2.1.6

##### Information required

*Include an assessment of the adequacy of any surveys undertaken, including survey effort, timing and the extent to which surveys were appropriate for the listed threatened species, with reference to relevant departmental survey guidelines.*

##### Response

The assessment of survey adequacy for squatter pigeon is provided in Table 12.

**Table 12 Assessment of survey adequacy for squatter pigeon**

Species	Method	Timing and conditions	Effort	Adequacy of surveys
Squatter pigeon	<ul style="list-style-type: none"> <li>Squatter pigeon habitat assessment and area searches at vegetation assessment sites</li> <li>Area searches in potential breeding and foraging habitat (i.e. woodlands on sandy / stony soils).</li> <li>Slow driving transects in a side-by-side vehicle to detection the species foraging / dust bathing near tracks farm tracks.</li> <li>Waterhole surveys at farm dams near woodland or forest vegetation.</li> <li>Area searches at three separate cattle yards</li> </ul>	<ul style="list-style-type: none"> <li>Surveys were undertaken in early February.</li> <li>Conditions during the survey were generally excellent for bird surveys. Meteorological conditions were calm and without any rainfall.</li> </ul>	<ul style="list-style-type: none"> <li>14 person hours of searches at 88 vegetation assessment sites</li> <li>8 person hours of area searches within potential breeding/foraging habitat</li> <li>4 person hours of dam surveys</li> <li>26-person hours of slow-driving transects</li> <li>1-person hour of searches in and around cattle yards</li> </ul>	<ul style="list-style-type: none"> <li>Surveys for squatter pigeon were extensive in terms of the area covered and period of investigation.</li> <li>The survey was not undertaken in the optimum period (May – October) however the species can be detected year-round.</li> <li>Three birds were detected, all flushed whilst undertaking area searches in preferred habitat.</li> <li>Access tracks and cattle yards were dry and dusty during the survey and suitable to target the species during slow driving transects.</li> <li>The dense ground cover of <i>U. mosambiquensis</i> rendered much of the site unsuitable for squatter pigeon at the time of the survey. Consequently greater focus was given to areas walking transects where grass cover was less than 30 %, slow driving along access tracks and waterholes and dams adjacent to</li> </ul>

Species	Method	Timing and conditions	Effort	Adequacy of surveys
				preferred woodland habitats.

#### 4.2.5 Item 2.1.7

##### Information required

Attached all relevant ecological surveys referenced in the preliminary documentation as supporting documentation. Ecological surveys or reports already provided again.

##### Response

Smoky Creek Power Station Habitat Assessment and Targeted Survey report (Terra Solutions 2022) was prepared to provide additional ecological information in response to the DCCEEW request for information by PD in response to the EPBC act referral (2021/9030). The ecological assessment builds on work undertaken by RPS (2018) to fill ecological knowledge gaps for the site relation to the following MNES threatened species:

- *Solanum dissectum*
- *Solanum johnsonianum*
- Ornamental Snake
- Squatter pigeon

The habitat assessment and targeted survey report is provided in Appendix A.

#### 4.2.6 Item 2.2 Species specific information

##### 4.2.6.1 Item 2.2.5

##### Information required

A discussion of vegetation composition and structure on relevant land zones (i.e. specific tree and grass species).

##### Response

Distinct vegetation communities occurring on land zones typically utilised for by squatter pigeon for foraging and/or breeding purposes within the Project area are detailed in Table 13.

**Table 13 Vegetation structure**

Community	Community description
<i>Acacia rhodoxylon</i> woodland on sand and loam	Rosewood ( <i>Acacia rhodoxylon</i> ) woodlands occupy a small area of rocky rises associated with an ironstone formation in the south of the Project area. A sparse shrub layer of <i>Carissa ovata</i> occurs and the mid-dense ground layer consists of a sparse layer of sabi grass and occasional native grasses.
Dawson's gum woodland on sand and loam	The canopy consists of Dawson's gum and Queensland bottle tree. The community includes a sparse to very sparse shrub layer of mostly currant bush, holly bush and nipan ( <i>Capparis lasiantha</i> ) and a sparse to dense monoculture of sabi grass in the ground layer. Other



Community	Community description
	species observed in this community include crow's ash ( <i>Flindersia australis</i> ).
<i>Eucalyptus crebra</i> woodland on sand and loam	The canopy consists of narrow-leaved ironbark ( <i>E. crebra</i> ) or Dawson's gum and Queensland bottle tree. The community includes a sparse to very sparse shrub layer of mostly currant bush, holly bush and nipan ( <i>Capparis lasiantha</i> ) and a sparse to dense monoculture of sabi grass in the ground layer. Other species observed in this community include crow's ash ( <i>Flindersia australis</i> ).

#### 4.2.6.2 Item 2.2.6

##### Information required

*A discussion of breeding, foraging and dispersal requirements*

##### Response

###### Breeding habitat

Breeding habitat is located within 1 km of a suitable water resource and where well-drained gravelly, sandy or loamy soils support the preferred open communities dominated by Eucalyptus, Corymbia, Acacia or Callitris species. Typically nest sites are located on stony rises where squatter pigeon lay their eggs in shallow depressions on freely draining soils (Squatter pigeon workshop 2011).

###### Foraging habitat

Foraging habitat occurs where well-drained gravelly, sandy or loamy soils support the preferred open communities dominated by Eucalyptus, Corymbia, Acacia or Callitris species and within 3 km of a permanent or seasonal waterbody (Squatter pigeon workshop 2011). The species prefers a patchy groundcover with a mix of native grasses and low shrubs and forages (and dust bathe) on bare ground in these habitats and typically forages under an open canopy of trees where the ground cover rarely exceeds 33% of the ground area (Squatter pigeon workshop 2011). Consequently foraging habitat within the project area is located within or close to existing woodland and forest and primarily on the less productive soils which have a lower density of grasses. Other foraging habitat in the project area includes sandy drainage lines and brigalow communities that possess a retained canopy.

Squatter pigeon will move into adjacent natural grasslands and highly modified or degraded habitats (e.g. pastures, stockyards and road reserves to forage or drink from stock troughs or dams with gently sloping banks, and dust-bathe on bare, dusty ground (Longmore 1976; Lord 1956; Squatter Pigeon Workshop 2011) but is unlikely to move far from woodland trees which provide protection from predatory birds (Squatter Pigeon Workshop 2011).

###### Dispersal habitat

Squatter Pigeon (southern) dispersal habitat consists of any forest or woodland between foraging or breeding habitat and suitable waterbodies used for hydration. Whilst clays soils are rarely used as foraging or breeding habitat due to the denser vegetation that commonly occurs, clay soils tend to form in lower lying areas with greater water availability and the subspecies is known to utilise forests or woodlands occurring on these soils to access suitable waterbodies (Squatter Pigeon Workshop 2011).

Where scattered trees still occur, and the distance of cleared land between remnant trees or patches of habitat does not exceed 100 m, individuals may be found foraging in, or moving across modified or degraded environments (Squatter Pigeon Workshop 2011).

#### 4.2.6.3 Item 2.2.7

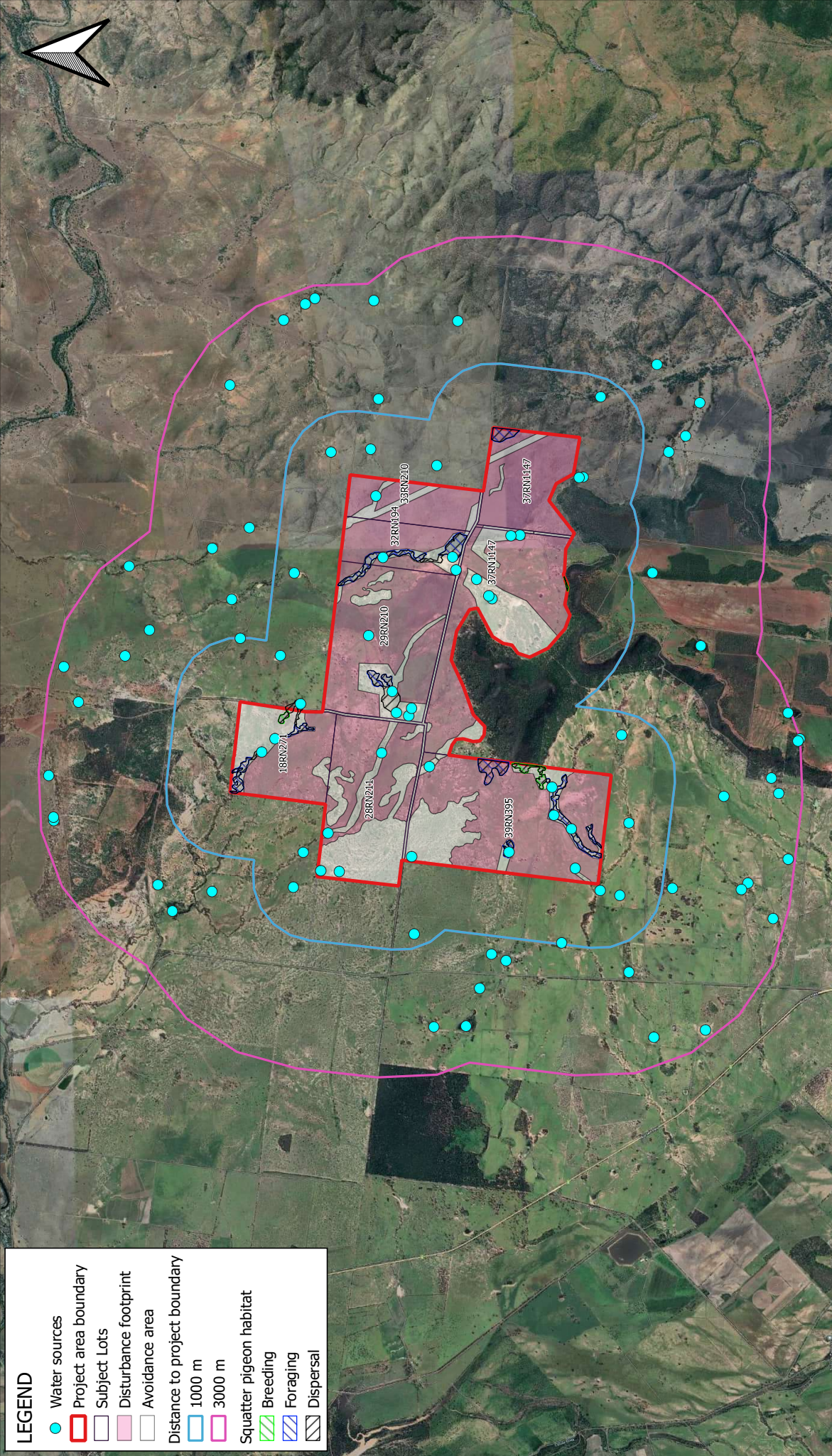
##### **Information required**

*Identification of permanent or seasonal water bodies or watercourses within 1 kilometre (km) of the disturbance footprint to support breeding habitat.*

##### **Response**

All permanent and/or seasonal waterbodies within 1 km of the project footprint are presented in Figure 11. Breeding habitat was determined by identifying all woodland habitats on freely draining soils within 1 km of water.





LEGEND

● Water sources

Project area boundary

Subject Lots

Disturbance footprint

Avoidance area

Distance to project boundary

1000 m



3000 m

Squatter pigeon habitat

Breeding

Foraging

Dispersal

	<b>CLIENT: EDIFY ENERGY</b>		<b>Credits:</b> Derived from Watercourse lines - Queensland © State of Queensland (Department of Resources) 2021, Google Satellite Hybrid	
	<b>FIGURE 11: WATER RESOURCES</b>			
	0      2      4      6      8      10 km 		1:55,000 Coordinate system: GDA2020 / MGA zone 56 EPSG:7856	
DOCUMENT: E:\Terra Solutions\PROJECTS - DATE: 20/03/2023		AUTHOR: Anton Fitzgerald		



#### 4.2.6.4 Item 2.2.8

##### **Information required**

*Identification of permanent or seasonal water bodies or watercourses within 3 km of the disturbance footprint to support foraging habitat.*

##### **Response**

Since the Project is located within an agricultural landscape it is not surprising that the entire project area is located within 3 km of a permanent or seasonal waterbody.

The species is granivorous and primarily obtains energy from carbohydrates in the grains and due to the lack of water in grains regularly supplements the diet with water.

## 5 IMPACT ASSESSMENT

### 5.1 Item 3.1.1

#### 5.1.1 *Solanum dissectum* and *Solanum johnsonianum*

##### 5.1.1.1 Information required

An assessment of the likely impacts associated with the construction, operation, maintenance and decommissioning phases of the proposed action. Consider direct and indirect loss and/or disturbance of individuals and suitable habitat as a result of the proposed action.

##### 5.1.1.2 Response

A significant impact assessment and a summary of the Project's potential impacts on *S. dissectum* and *S. johnsonianum* and mitigation measures is presented in Table 14.

The total area of habitat for *S. johnsonianum* and *S. dissectum* within the project area is 19.24 ha of which 0.48 ha is in the disturbance footprint. The remaining 18.76 ha of potential habitat is in the avoidance area.

The project area is on the extreme north-eastern extent of the known distribution *S. dissectum* and *S. johnsonianum* and occurs adjacent to an area where the species is modelled as likely to occur (DAWE 2021). *S. johnsonianum* and *S. dissectum* habitat is published as open forest and woodland habitats where brigalow (*Acacia harpophylla*) dominates or co-dominates on heavy cracking clay soils (Bean 2004). The species is also associated with *E. thozetiana*. No Eucalypt Forest or woodland dominated by *E. thozetiana* occurs on the site. Immature brigalow plants occur on other soil types and are present in small patches but there is insufficient canopy cover to support these species and the density of introduced grasses is higher than considered suitable for the species. Suitable habitat is primarily limited to riparian areas with a canopy and these areas have been excluded from the disturbance footprint.

*S. dissectum* was not recorded during field surveys and there are no confirmed records of the species within the project area. *S. johnsonianum* was recorded during surveys within woodland ecosystems that have been excluded from the disturbance footprint and associated with elements of Brigalow community along a drainage line. Historical clearing of woodland, long-term cattle grazing, and pasture improvement have resulted in decreased habitat value for both species across the disturbance footprint. As these species are highly fragmented, produces few seeds and is threatened by introduced grasses it is unlikely that either species would recolonise the site in the foreseeable future. Therefore, the project is unlikely to have a significant adverse impact *S. dissectum* or *S. johnsonianum*. Accordingly, a residual significant impact on either species is not expected.

Table 14 Impact assessment for *S. johnsonianum* and *S. dissectum*

Impacting process	Initial risk rating	Mitigation measures	Residual impact rating	Reason for assessment
<b>Construction</b>				
Habitat loss	Low	<p><b><u>Avoidance</u></b> All identified habitat for <i>S. johnsonianum</i> and <i>S. dissectum</i> to be avoided</p> <p><b><u>Management</u></b> Clearing areas to be demarcated to avoid inadvertent clearing of species habitat Where possible temporary laydown and construction areas are to be located within the proposed solar PV area Existing disturbed areas to be utilised (where possible) Implementation of a CEMP, CESC and ESCP to prevent smothering of vegetation and degradation of suitable habitat. Environmental awareness training for construction personnel</p>	Low	<i>S. johnsonianum</i> and <i>S. dissectum</i> habitat has been avoided and neither species was identified in the disturbance footprint
Species mortality	Low	<p><b><u>Avoidance</u></b> All identified habitat for <i>S. johnsonianum</i> and <i>S. dissectum</i> to be avoided</p> <p><b><u>Management</u></b> Pre-clearance surveys undertaken by a qualified ecologist Environmental awareness training for construction personnel provided in relation to species identification and process for confirmation</p>	Low	<i>S. johnsonianum</i> and <i>S. dissectum</i> habitat has been avoided and neither species was identified in the disturbance footprint
Fragmentation of habitat and loss of connectivity	Low	<p><b><u>Avoidance</u></b> All identified habitat for <i>S. johnsonianum</i> and <i>S. dissectum</i> to be avoided and dispersal corridors implemented upstream and downstream of detected habitats</p> <p><b><u>Management</u></b> Clearing areas to be demarcated to avoid inadvertent clearing of species dispersal habitats</p>	Low	<i>S. johnsonianum</i> and <i>S. dissectum</i> habitat has been avoided and neither species was identified in the disturbance footprint



## REPORT



Impacting process	Initial risk rating	Mitigation measures	Residual impact rating	Reason for assessment
		Where possible temporary laydown and construction areas are to be located within the proposed solar PV area Existing disturbed areas to be utilised (where possible) Implementation of a CEMP, CESP and ESCP to prevent the loss of connectivity habitats upstream and downstream of known populations Environmental awareness training for construction personnel provided in relation to species identification and process for confirmation		
Increased erosion	Low	<b><u>Avoidance</u></b> Land adjacent to known species habitats are avoided as a buffer area <b><u>Management</u></b> Avoid vehicle movements and access tracks along steep sections of the site Construction erosion and sediment control plans to include appropriate erosion and sediment controls such as sediment dams, earthen bunds or rock checks etc. Vehicles to remain on dedicated tracks	Low	Erosion is most likely to occur within the disturbance footprint which is not considered important habitat for foraging or nesting purposes.
Spread of invasive species	Moderate	<b><u>Management</u></b> Weed management plan and weed hygiene protocols, included in the CEMP including a focus on retained threatened species habitats Vehicle movements to remain on dedicated tracks Identify areas of dense outcrops of introduced flora to eliminate construction vehicles from entering the area	Low	The introduction of weeds into known breeding and foraging habitats has the potential to reduce habitat quality through increase in ground layer density.
<b>Operation</b>				
Injury or mortality	Low	Low level vehicle movement approximately once per week along corridor	Low	<i>S. johnsonianum</i> and <i>S. dissectum</i> habitat has been avoided and neither species was identified in the disturbance footprint.

## REPORT



Impacting process	Initial risk rating	Mitigation measures	Residual impact rating	Reason for assessment
Habitat degradation and increased erosion	Low	ESCP and appropriate erosion and sediment controls to be maintained until landform has sufficiently stabilised Vehicle movements to remain on dedicated tracks	Low	
Spread of invasive species	Low	<b><u>Management</u></b> Waste management plan, as part of the OEMP Weed management plan and weed hygiene protocols, as part of the OEMP Vehicle movements to remain on dedicated tracks Implement trapping and baiting programs should introduced pest fauna be identified	Low	The introduction of weeds into woodland habitat has the potential to reduce habitat quality through increase in ground layer density and decrease in diversity.
Panel shading	Low	<b><u>Management</u></b> Strategic grazing provides a potential solution to this problem, requiring further investigation	??	Changed micro-climate under and between panels due to shading, may affect organic matter, soil structure, water infiltration, nutrients and biological activity.  The listed threatened Solanum spp are unlikely to occur within the disturbance footprint due to the existing ecological conditions in the area (i.e. vegetation community structure and existing ground layer composition).
Fire	Moderate	<b><u>Management</u></b> Where infrastructure is proposed in the bushfire hazard area, develop a Bushfire Management Plan	Low	Implementation of bushfire management plan including maintenance of fuel loads under solar panels

## 5.1.2 Ornamental snake

### 5.1.2.1 Information required

*An assessment of the likely impacts associated with the construction, operation, maintenance and decommissioning phases of the proposed action. Consider direct and indirect loss and/or disturbance of individuals and suitable habitat as a result of the proposed action.*

### 5.1.2.2 Response

An EPBC Act significant impact assessment and a summary of the project's potential impacts on ornamental snake and mitigation measures is presented in Table 15 respectively. The risk rating criteria are outlined in Appendix B.

All 219.96 ha of potential ornamental snake habitat will be avoided by the development (Figure 9). These habitats comprise gilgai landforms where the pre-clearing RE was 11.3.1 - *Acacia harpophylla* and/or *Casuarina cristata* open forest with or without scattered emergent *Eucalyptus* spp. but currently contains only isolated *Eucalyptus* spp. or *Acacia harpophylla* trees. As previously detailed, these areas contain some values required by the species (namely gilgai) but lack other important resources including a canopy and ground timber. Furthermore, the site is not connected to preferred high-value habitats presented in Figure 8.

Most of the project area has been cleared, and remaining habitats have been degraded by long-term cattle grazing practices which have in turn, allowed weed invasion. This invariably diminishes habitat values for a variety of native fauna (including frogs), and in turn, affects ornamental snakes which rely on an abundance of frogs as prey. The exclusion of this area from high intensity grazing is likely to support the species recovery.

Feral pigs are known to occur in the project area and pigs are a recognised threat to ornamental snakes. The project will implement a Weed and Pest Management Plan to monitor and control both environmental weeds and feral animals (including pigs) to minimise any potential off-site impacts. Implementation of invasive species controls by the project will positively contribute to minimising invasive species within the locality, and in particular, the small patch of potential habitat for ornamental snake.

Approximately 2,100 ha of gilgai land to the west contains similar environmental values for ornamental snake. Development of the Project does not adjoin this area and edge effects associated with the facility are unlikely as a result.

The dominant vegetation community in the project area is sabi grass, an introduced species. Sabi grass has already invaded adjacent remnant woodlands over all major soil types. Therefore, further degradation of this area through edge effects will not occur because of the project. As a result of historical broadscale clearing, presence of dispersive soils and steep slopes, erosion processes were moderate to severe in sections. The proposed mitigation and management measures are likely to improve erosion processes within the project area and therefore likely to improve downstream impacts.

Due to the project area's previous disturbance (clearing, blading etc), the avoidance of all potential habitat and speed limits that will be implemented during construction and decommissioning phases, the indirect impacts associated with the project will be negligible. Therefore, the project is unlikely to have residual impact on the ornamental snake.



Table 15 Residual impact assessment and for the ornamental snake

Impacting process	Initial risk rating	Mitigation measures	Residual impact rating	Reason for assessment
<b>Construction</b>				
Habitat loss	Low	<p><b>Management</b></p> <p>Avoid all potential ornamental snake habitat</p> <p>Minimise disturbances to hydrology associated with ornamental snake habitat (i.e. gilgai areas)</p> <p>Backfill all trenches with surface soils</p> <p>Clearing areas to be demarcated to avoid inadvertent clearing of species habitat</p> <p>Where possible temporary laydown and construction areas are to be located within the proposed solar PV area</p> <p>Existing disturbed areas to be utilised (where possible)</p> <p>Implementation of a CEMP and CЕССР to prevent smothering of vegetation and degradation of suitable habitat.</p> <p>Environmental awareness training for construction personnel</p>	Low	Ornamental snake habitat has been avoided and has not been identified in the disturbance footprint
Injury or mortality due to vegetation clearing	Low	<p><b>Management</b></p> <p>Avoid all potential ornamental snake habitat</p> <p>Pre-clearance surveys and clearing activities to be supervised by a qualified fauna spotter</p> <p>Reduce speed limits</p> <p>Environmental awareness training for construction personnel provided in relation to species identification and process for confirmation</p>	Low	
Fragmentation of habitat and loss of connectivity	Low	<p><b>Management</b></p> <p>Backfill all trenches with surface soils to maintain pre-development landforms</p> <p>Clearing areas to be demarcated to avoid inadvertent clearing of species habitat</p> <p>Existing disturbed areas to be utilised (where possible)</p>	Low	

Impacting process	Initial risk rating	Mitigation measures	Residual impact rating	Reason for assessment
		Where possible temporary laydown and construction areas are to be located within the proposed solar PV area Where temporarily clear areas (e.g. laydown areas) cannot be collocated in the proposed solar PV area, disturbed areas to be rehabilitated Environmental awareness training for construction personnel provided in relation to species identification and process for confirmation		
Disturbance from increased light, noise and vibration	Low	<b>Management</b> Avoid all potential ornamental snake habitat Restricted sources of artificial lighting. Direct lighting away from sensitive areas for the species	Low	
Habitat degradation through increased dust, erosion, run-off and sedimentation	Low	<b>Management</b> Avoid all potential ornamental snake habitat Minimise disturbances to hydrology associated with ornamental snake habitat (i.e. gillgai areas) Avoid vehicle movements and access tracks along steep sections of the site Monitor weather events when working within watercourses Prepare a ESCP to include appropriate erosion and sediment controls such as sediment dams, earthen bunds or rock checks etc. Reduce speed limits during dry conditions or employ a water truck to reduce dust rates Vehicle to remain on dedicated tracks	Low	Erosion may occur because of changes in hydrology in the adjacent Project area. All potential habitat is not considered important habitat for foraging or nesting purposes.
Spread of invasive species	Low	<b>Management</b> Avoid all potential ornamental snake habitat Weed management plan and weed hygiene protocols, included in the OEMP including a focus on retained threatened species habitats Vehicle movements to remain on dedicated tracks	Low	The introduction of weeds into known breeding and foraging habitats has the potential to reduce habitat quality through increase in ground layer density.

## REPORT



Impacting process	Initial risk rating	Mitigation measures	Residual impact rating	Reason for assessment
		Identify areas of dense outcrops of introduced flora to eliminate construction vehicles from entering the area Implement trapping and baiting programs should introduced pests be identified		
<b>Operation</b>				
Injury or mortality	Low	<b>Management</b> Avoid all potential ornamental snake habitat Low level vehicle movement approximately once per week along corridor Reduce speed limits Environmental awareness training for construction personnel provided in relation to species identification and process for confirmation	Low	Vehicle movements are primarily limited to daylight hours and in areas adjacent to potential habitat. Night movements limited to emergency situations.
Disturbance from increased light, noise and vibration	Low	<b>Management</b> Avoid all potential ornamental snake habitat Lighting to be kept to a minimum (unless for safety reasons) Operational works will typically be performed in daylight hours	Low	
Habitat degradation and increased erosion	Low	<b>Management</b> Avoid all potential ornamental snake habitat Minimise disturbances to hydrology associated with ornamental snake habitat (i.e. gilgai areas) ESCP and appropriate erosion and sediment controls to be maintained until landform has sufficiently stabilised Vehicle movements to remain on dedicated tracks	Low	Erosion may occur because of changes in hydrology in the adjacent Project area. All potential habitat is not considered important habitat for foraging or nesting purposes.
Spread of invasive species	Low	<b>Management</b> Avoid all potential ornamental snake habitat Weed management plan and weed hygiene protocols, included in the OEMP including a focus on retained threatened species habitats	Low	The introduction of weeds into known breeding and foraging habitats has the potential to reduce habitat quality through increase in



## REPORT



Impacting process	Initial risk rating	Mitigation measures	Residual impact rating	Reason for assessment
		Vehicle movements to remain on dedicated tracks Identify areas of dense outcrops of introduced flora to eliminate construction vehicles from entering the area Implement trapping and baiting programs should introduced pests be identified		ground layer density and decrease in diversity.
Fire	Low	<b>Management</b> Avoid all potential ornamental snake habitat Where infrastructure is proposed in the bushfire hazard area, develop a Bushfire Management Plan	Low	Fire is not recognised as a key risk to ornamental snake due to the primarily underground habit.

### 5.1.3 Squatter pigeon (southern)

#### 5.1.3.1 Information required

*An assessment of the likely impacts associated with the construction, operation, maintenance and decommissioning phases of the proposed action. Consider direct and indirect loss and/or disturbance of individuals and suitable habitat as a result of the proposed action.*

#### 5.1.3.2 Response

A summary of the Project's potential impacts on squatter pigeon and mitigation measures is presented in Table 16. The risk rating criteria are outlined in Appendix B.

The project area is located relatively central in the known distribution of the squatter pigeon (sth). The southern sub-species was recorded in woodland at two locations during field surveys. There are no other confirmed records of squatter pigeon (sth) within 30 km of the project area.

Historical clearing of woodland, long-term cattle grazing, and pasture improvement have resulted in a contraction of suitable habitat for squatter pigeon (sth) within the project area. The total area of squatter pigeon habitat identified within and adjacent to the project is approximately 85 ha (consisting of 85 ha of dispersal habitat, 64.59 ha of foraging habitat and 7.09 ha of breeding habitat (Table 11). Of the 85 ha of habitat identified a total of 15.85 ha (foraging and dispersal habitat) is in the disturbance footprint. Of the 63.13 ha of potential habitat for squatter pigeon, the entire area will be excluded from the disturbance footprint.

It is unlikely that the proposed future changes in land use would result in an adverse impact to the survival of the subspecies. Habitat of marginally higher habitat value for foraging and breeding is associated with the surrounds of the waterways and these areas have been avoided. The provision of buffers and exclusion of habitat associated with waterways within the project area will retain habitat of comparatively higher value for squatter pigeon (sth). Accordingly, a residual significant impact on squatter pigeon is not expected.

Indirect impacts to foraging, breeding and dispersal habitat will be limited to short-term construction impacts (e.g. increase in noise and air emissions,).

As a result of historical broadscale clearing, presence of dispersive soils and steep slopes, erosion processes were moderate to severe in sections. The proposed mitigation and management measures are likely to improve erosion processes within the project area and therefore likely to improve downstream impacts.

Due to the project area's previous disturbance (clearing, blading etc) and speed limits that will be implemented during construction and decommissioning phases, impacts from increased traffic will be negligible.

Therefore, the project is unlikely to have residual impact on the squatter pigeon.

Table 16 Residual impact assessment and for the squatter pigeon (southern)

Impacting process	Initial risk rating	Mitigation measures	Residual impact rating	Reason for assessment
<b>Construction</b>				
Habitat loss	Low	<p><b><u>Avoidance</u></b> Preferred habitat for squatter pigeon (i.e. woodland and forest habitats have been excluded from the Development footprint In-stream and other farm dams have been excluded from the development footprint</p> <p><b><u>Management</u></b> Clearing areas to be demarcated to avoid inadvertent clearing of species habitat Where possible temporary laydown and construction areas are to be located within the proposed solar PV area Existing disturbed areas to be utilised (where possible) Implementation of a CEMP, CESC and ESCP to prevent smothering of vegetation and degradation of suitable habitat. Environmental awareness training for construction personnel</p>	Low	Squatter pigeon breeding and woodland foraging habitat will be avoided
Injury or mortality due to vegetation clearing	Low	<p><b><u>Avoidance</u></b> Preferred habitat for squatter pigeon (i.e. woodland and forest habitats have been excluded from the Development footprint</p> <p><b><u>Management</u></b> Pre-clearance surveys and clearing activities to be supervised by a qualified fauna spotter to identify nests Environmental awareness training for construction personnel provided in relation to species identification and process for confirmation Implement low onsite speed limits for employees and contractors Reduce speed limits CEMP to include incident response procedures implemented for injured birds</p>	Low	Squatter pigeon is a relatively mobile species and breeding, and woodland foraging habitat will be avoided



## REPORT



Impacting process	Initial risk rating	Mitigation measures	Residual impact rating	Reason for assessment
		Environmental awareness training for construction personnel provided in relation to species identification and process for confirmation		
Fragmentation of habitat and loss of connectivity	Low	<p><b><u>Avoidance</u></b> Preferred habitat for squatter pigeon (i.e. woodland and forest habitats have been excluded from the Development footprint Upstream and downstream sections of preferred habitats have been retained to enable species movement. Connectivity to stony elevated landforms off the site have been retained along key waterways</p> <p><b><u>Management</u></b> Clearing areas to be demarcated to avoid inadvertent clearing of species dispersal habitats Where possible temporary laydown and construction areas are to be located within the proposed solar PV area Existing disturbed areas to be utilised (where possible) Implementation of a CEMP, CESP and ESCP to prevent the loss of connectivity habitats upstream and downstream of known populations Environmental awareness training for construction personnel provided in relation to species identification and process for confirmation</p>	Low	Three key movement corridors have been retained within the project area to mitigate the potential loss of marginal movement habitats (i.e. pasture grasslands) and all woodland habitats will be avoided.
Disturbance from increased light, noise and vibration	Low	<p><b><u>Management</u></b> Where possible piling activities to begin in areas distant to known habitats and progressively working toward habitats, enabling individuals to become somewhat accustomed to construction noise. Restricted sources of artificial lighting. Direct lighting away from sensitive areas for the species</p>	Low	If disturbance occurs, species is likely to move away from noise sources.
Habitat degradation through increased	Low	<p><b><u>Management</u></b> Avoid vehicle movements and access tracks along steep sections of the site</p>	Low	Erosion is most likely to occur within the disturbance footprint which is

## REPORT



Impacting process	Initial risk rating	Mitigation measures	Residual impact rating	Reason for assessment
dust, erosion, run-off and sedimentation		Monitor weather events when working within watercourses Prepare a ESCP to include appropriate erosion and sediment controls such as sediment dams, earthen bunds or rock checks etc. Reduce speed limits during dry conditions or employ a water truck to reduce dust rates Vehicle to remain on dedicated tracks		not considered important habitat for foraging or nesting purposes.
Spread of invasive species	Moderate	<b>Management</b> Weed management plan and weed hygiene protocols, included in the CEMP including a focus on retained threatened species habitats Vehicle movements to remain on dedicated tracks Identify areas of dense outcrops of introduced flora to eliminate construction vehicles from entering the area Implement trapping and baiting programs should introduced pests be identified	Low	The introduction of weeds into known breeding and foraging habitats has the potential to reduce habitat quality through increase in ground layer density.
<b>Operation</b>				
Injury or mortality	Low	<b>Management</b> Low level vehicle movement approximately once per week along corridor Reduce speed limits Environmental awareness training for construction personnel provided in relation to species identification and process for confirmation	Low	Vehicle strike is the only potential cause of injury/mortality during operation and given that vehicle movements will be uncommon these impacts will be negligible.
Disturbance from increased light, noise and vibration	Low	<b>Management</b> Lighting to be kept to a minimum (unless for safety reasons) Operational works will typically be performed in daylight hours	Low	
Habitat degradation and increased erosion	Low	<b>Management</b> Waste management plan to be included as part of the OEMP to include the appropriate disposal of weed material. Weed management plan and weed hygiene protocols, as part of the OEMP	Low	Erosion is most likely to occur within the disturbance footprint which is not considered important habitat for foraging or nesting purposes.

## REPORT



Impacting process	Initial risk rating	Mitigation measures	Residual impact rating	Reason for assessment
		Vehicle movements to remain on dedicated tracks		
Spread of invasive species	Moderate	<p><b>Management</b></p> <p>Weed management plan and weed hygiene protocols, included in the OEMP including a focus on retained threatened species habitats</p> <p>Vehicle movements to remain on dedicated tracks</p> <p>Identify areas of dense outcrops of introduced flora to eliminate construction vehicles from entering the area</p> <p>Implement trapping and baiting programs should introduced pests be identified</p>	Low	The introduction and/or proliferation of weeds into known breeding and foraging habitats has the potential to reduce habitat quality through increase in ground layer density.
Fire ignition and destruction of habitat	Moderate	<p><b>Avoidance</b></p> <p>Include an asset protection zone between woodland habitats and infrastructure.</p> <p><b>Management</b></p> <p>Bushfire management plan to include maintenance of fuel loads within the disturbance footprint and fire response procedures</p>	Low	Fire ignition is a known issue in utility scale Power Stations and an unavoidable consequence of this form of energy generation. The implementation of a BMP and application of asset protection zones along with the control of ground layer vegetation is expected to keep fire relatively isolated to ignition points and surrounds.



## 5.2 Item 3.1.2

### 5.2.1 Information required

*An assessment of the likely duration of potential impacts to listed threatened species, including a discussion of potential impacts that are unknown, unpredictable or irreversible where relevant.*

### 5.2.2 Response

- Potential impacts will predominantly be associated with the construction phase which is expected to 24-36 months. Impacts during the construction phase include:
  - Habitat loss
  - Injury or mortality due to vegetation clearing
  - Fragmentation of habitat and loss of connectivity
  - Disturbance from increased light, noise and vibration
  - Habitat degradation through increased dust, erosion, run-off and sedimentation
  - Spread of invasive species
- The estimated duration of the project is anticipated to be a 30-year lease. The key impacts associated with operation over this 30-year timeframe are primarily restricted to the following:
  - Injury or mortality
  - Disturbance from increased light, noise and vibration
  - Habitat degradation and increased erosion
  - Spread of invasive species
  - Fire ignition and destruction of habitat.

The estimated duration of rehabilitation and monitoring of the site post-closure is expected to be 12 - 24 months. Impacts associated with rehabilitation are limited to the removal of existing infrastructure and expected to be negligible. Footings for the inverters, switch station and potentially onsite control buildings will be removed 1 m below ground level unless otherwise agreed by the landowner or council following decommissioning.

## 5.3 Item 3.1.3

### 5.3.1 Information required

*Provide a discussion of potential impacts to soil composition, moisture and stability, and water availability and quality, in relation to habitat requirements for listed threatened species.*

### 5.3.2 Response

Preferred habitat for threatened species has been excluded from the disturbance footprint including in-stream farm dams and dams located more broadly throughout the site. Access to hydration points within the project area has been retained by maintaining connectivity corridors to these sources where they are present. Access to hydration points is therefore not expected to be an issue for threatened species.

Soil composition within the project area is currently degraded through a long-term combination of mechanical manipulation and cattle grazing including compaction and disturbance of surface soils. The removal of high

intensity grazing from the site and implementation of erosion and sediment control program is expected to minimise further impacts to surface soils. These impacts may include:

- Altered or increased runoff from rainfall
- Soil erosion due to a concentrated dripline effect along panels.

Cook and McCuen (2013) modelled runoff rates from panels finding that solar panels did not have a significant effect on runoff volumes, peaks, or time to peak provided that vegetative groundcover under the panels was maintained. It is noted however, that most of the site is located on level to gently undulating terrain and high peak flows are unlikely over most of the site. Where panel infrastructure intersects sloping land, a Stormwater Management Plan and Erosion and Sediment Control Plan will be implemented to maintain water quality in the receiving environment. These measures may include bunds, rock checks and/or vegetated strips to slow water flow rates.

With the implementation of these measures impacts to MNES are expected to be negligible.

## 5.4 Item 3.1.4

### 5.4.1 Information required

*Provide a discussion of potential impacts to habitat requirements for listed threatened flora species, including shading from solar panels.*

### 5.4.2 Response

Previous desktop assessment and field investigations confirmed that habitat within the proposed infrastructure footprint is unsuitable for the listed threatened flora species *Solanum johnsonianum* and *Solanum dissectum* and consequently are unlikely to occur or be impacted by shading from solar panels.

## 5.5 Item 3.1.5

### 5.5.1 Information required

*Provide the total area (in hectares) of each identified habitat type that will be cleared or impacted within the site (e.g. shelter/refuge, breeding, foraging, dispersal etc.), including detailed mapping. Where habitat requirements overlap (e.g. where breeding and foraging occur within the same habitat type), provide the total area for both habitat types.*

The total area of habitat or potential habitat for MNES to be cleared are presented in Table 17. Avoidance area is the area of potential habitat that is excluded from the disturbance footprint. Detailed mapping of these areas was presented in Figure 6, Figure 9 and Figure 10.

**Table 17 MNES habitat impacted by the Project**

Species	Habitat type	Project area	Disturbance footprint	Avoidance area
<i>S. dissectum</i> and <i>S. johnsonianum</i>	All habitats	19.24	0	19.24
Ornamental snake	All habitats	219.96	0	219.96
Squatter pigeon	Breeding	7.09	Nil	7.09
	Foraging	64.59	15.85	48.74

Species	Habitat type	Project area	Disturbance footprint	Avoidance area
	Dispersal	85.00	15.85	69.15

## 5.6 Item 3.1.6

### 5.6.1 Information required

*Demonstrate, with supporting evidence, how the proposed action will not be inconsistent with:*

- Australia's obligations under the Biodiversity Convention, the Convention on Conservation of Nature in the South Pacific (Apia Convention), and the Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES)
- A recovery plan or threat abatement plan

### 5.6.2 Response

Considering the habitat quality of the site and the proposed implementation of the general mitigation measures in the impact assessment section of this report, no significant residual impact is expected because of the project.

The Project adherence to avoid, mitigate, offset hierarchy along with consideration of the relevant recovery plans, conservation advice/s, and/or threat abatement plans ensures that the management of MNES through the Project lifecycle achieves outcomes consistent with the Biodiversity Convention and the Convention on Conservation of Nature in the South Pacific (Apia Convention). Broadly this incorporates maintaining species populations and enhancing the extent and quality of ecosystems. The Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES) is not applicable, as the project does not involve the trade of endangered species.

**Table 18 Summary of MNES impacts**

Matter	Impact	Impact on habitat critical to the survival of the species or important population	Important population present in development footprint	Significance of impact
<b>Flora species</b>				
<i>S. dissectum</i> and <i>S. johnsonianum</i>	Removal of 0.48 ha of potential habitat	No impact	No	Not significant
<b>Fauna species</b>				
Squatter pigeon (southern)	Removal of 15.85 ha of foraging and dispersal habitat	Removal of 15.85 ha of foraging and dispersal habitat	No	Not significant



## 6 PROPOSED AVOIDANCE, MITIGATION AND MANAGEMENT MEASURES

### 6.1 Item 4.1

#### 6.1.1 Information required

*Detail of measures proposed to be undertaken by the proponent to avoid, mitigate and manage impacts of the proposed action on listed threatened species, including those required through other Commonwealth, State and local government approvals*

#### 6.1.2 Response

Management plans for the proposed development have yet to be developed due to the uncertainty of the EPBC approval requirements. Management plans to be developed and key measures are provided below.

##### Onsite Wastewater disposal report

- The onsite wastewater disposal report will be developed to determine whether the site is suitable for and on-site wastewater management system
- Determine the most suitable on-site wastewater management system for the site and soil conditions in accordance with Australian Standards.

##### Erosion and Sediment Control Plan

- The following key management measures are proposed to minimise impacts to the environment through implementation within the Erosion and Sediment Control Plan:
- Maintain grass under solar panels or a vegetated buffer strip on the downslope side of panels.
- Stabilise disturbed areas as construction progresses by reinstating the land profile as soon as possible after disturbance and replace groundcover with a suitable fodder species to support a grazing land use with the objective of achieving a minimum of 75% cover within 12 months.
- Install, inspect, and maintain stormwater controls to manage water flows into, through and from the Project area. Measures may include sediment basins, sediment fencing and earthen berms.
- All stockpiles of construction materials, fill or cleared vegetation will be restricted to level ground within existing cleared areas and at least 50 m from watercourses. Stockpiles should not be placed in the vicinity of large watercourses that are liable to flood.
- Minimise the timeframe that stockpiles are present on the site and cover existing stockpiles during windy conditions to prevent dispersal of dust.
- During significant rainfall events ensuring that tracker panels are placed in a vertical position to minimise the dripline effect.
- Construction activities to be staged to minimise the extent and duration of ground disturbance at any given time.

##### Construction Phase Environmental Management Plan (CEMP) and Operational Phase Environmental Management Plan (OEMP)

The CEMP and OEMP address the following:

- Erosion and sediment control
- Stormwater management / water quality
- Groundcover management

- Water management
- Air quality management
- Noise and vibration management
- Management of light spill and on-site lighting
- Land contamination (storage / use of fuel and chemicals)
- Biosecurity Management (animal and plant pests)
- Waste management
- Flora and fauna impact management
- Storage and handling of fuel and other hazardous goods
- Emergency management
- Environmental monitoring and reporting
- Management of works near existing above ground and underground infrastructure
- Hazard management
- Complaints handling and management
- Statutory obligations and approvals.

Vegetation clearing will be undertaken in accordance with a CEMP which will include a range of measures aiming to minimise unnecessary impacts on native vegetation, flora, and fauna.

These measures will include but will not be limited to the following:

- Vegetation will be removed following a staged approach whereby non-habitat vegetation is cleared followed by a pre-clearing inspection of any identified habitat trees. Habitat trees will be knocked and then cleared after 24 hours in the presence of a wildlife spotter-catcher with training in the detection, retrieval, and rescue of fauna.
- The clearing of hollow-bearing trees and other critical microhabitats will not take place between September and February during critical life-cycle events. If clearing during this period cannot be avoided, an ecologist or suitably qualified spotter-catcher would be present on site to check all hollows for animals.
- Where hollows are being utilised for breeding and rearing purposes an exclusion barrier will be deployed at least 30 m from the tree base to avoid disruption to the species. A species management plan for colonial or breeding animals may be necessary.
- All onsite personnel will be provided with an environmental induction including a familiarisation with the ecological values of the Project area and the proposed measures to protect biodiversity.
- Areas of native vegetation will be demarcated from clearing activities by fences to prevent any inadvertent vegetation clearing beyond the infrastructure footprint.
- Key habitat features such as hollow trunks and limbs will be relocated within the Project area and/or adjacent areas of woodland as far as is practicable.
- All vegetation clearing, however minimal will be undertaken sequentially to minimise impacts to native fauna.
- Noisy works to occur during daylight hours to minimise impacts to nocturnal fauna on adjacent land

#### Waste management plan

The WMP will address the following:

- A description of the development activities that may generate waste
- The types and amount of waste that might be generated by the activities
- How the waste will be dealt with, including a description of the types and amounts of waste that will be dealt with under each waste management practices under the waste hierarchy
- Procedures for identifying and implementing opportunities to minimise the amount of waste generated, promote efficiency in the use of resources, and otherwise improve the waste management practices employed
- Procedures for dealing with accidents, spills and other incidents impact waste management
- How often the waste management practices will be assessed.

## 6.2 Item 4.2

### 6.2.1 Information required

*The statutory or policy basis for the proposed measures, including reference to the SPRAT database, and relevant approved conservation advice, recovery plan or threat abatement plan, and a discussion on how the proposed measures are not inconsistent with relevant plans.*

### 6.2.2 Response

#### 6.2.2.1 *Solanum dissectum*

This Conservation Advice for *S. dissectum* provides sufficient direction for recovery requirements and it is unlikely sufficient extra protection would be provided by the implementation of a recovery plan for the species.

An assessment of the *S. dissectum* Conservation Advice conservation actions against the proposed measures is provided in Table 19.

**Table 19 Assessment of conservation actions for *S. dissectum***

Conservation actions	Assessment
<b>Primary Conservation Action</b>	
Maintain and protect existing populations, and protect and enhance habitat to provide potential for reproduction of plants within existing populations.	No populations of <i>S. dissectum</i> were identified during ecological assessments of the site and areas of potential of habitat are being retained. The project is therefore consistent with the Primary Conservation Actions of the species.
<b>Conservation and Management Actions</b>	
Undertake appropriate seed collections from a wide range of populations and prepare and store seed using leading practice in a recognised seed bank facility.	No populations of <i>S. dissectum</i> were identified during ecological assessments of the site and areas of potential habitat will be avoided. All habitat and potential habitat areas under control of the proponent will be made accessible to individuals or organisation seeking to undertake the listed conservation and management actions. A weed management plan is proposed to control the advance of exotic weeds and pasture grasses into potential habitats for the species.
Consult with private landowners with <i>Solanum dissectum</i> on their properties and develop site-specific management actions and the implementation of conservation agreements.	
Manage sites to identify, control and reduce the spread of invasive species such as introduced grasses, especially buffel grass ( <i>Cenchrus ciliaris</i> ).	
<b>Survey and monitoring priorities</b>	



Conservation actions	Assessment
Implement an appropriate monitoring program to establish a more accurate assessment of the current extent of occurrence, area of occupancy and population size, with sufficient power to detect sudden changes, and notable fluctuations, in populations.	No populations of <i>S. dissectum</i> were identified during ecological assessments of the site and areas of potential habitat will be avoided. The project is unlikely to inhibit survey and monitoring opportunities for the species.
<b>Information and research priorities</b>	
Undertake seed germination and/or vegetative propagation experiments to determine the requirements for successful propagation and potential translocation.	No populations of <i>S. dissectum</i> were identified during ecological assessments of the site and areas of potential habitat will be avoided. The Project will not prevent research into the species or populations.
Identify recruitment and vegetative responses to fires, and optimal fire regimes for regeneration (vegetative regrowth and/or seed germination), and response to other prevailing fire regimes.	
Improve understanding of mechanisms, including the level of reliance on bird dispersal, for dispersing the species and options for linking, enhancing or establishing additional populations.	

### 6.2.3 *Solanum johnsonianum*

This Conservation Advice for squatter pigeon provides sufficient direction for recovery requirements and it is unlikely sufficient extra protection would be provided by the implementation of a recovery plan for the species.

An assessment of the *S. johnsonianum* Conservation Advice conservation actions against the proposed measures is provided in Table 20.

**Table 20 Assessment of conservation actions for *S. johnsonianum***

Conservation actions	Assessment
Primary Conservation Action	
Maintain and protect existing populations and protect and enhance habitat to provide potential for reproduction of plants within existing populations.	One population of <i>S. johnsonianum</i> was identified during the ecological assessment and that location in addition to all similar and known habitats within the project area will be avoided. The project is therefore not inconsistent with the Primary Conservation Actions of the species.
Conservation and Management Actions	
Undertake appropriate seed collections from a wide range of populations and prepare and store seed using leading practice in a recognised seed bank facility.	One population of <i>S. johnsonianum</i> was identified during the ecological assessment and that location in addition to all similar and known habitats within the project area will be avoided. All habitat and potential habitat areas under control of the proponent will be made accessible to individuals or organisation seeking to undertake the listed conservation and management actions. A weed management plan is proposed to control the advance of exotic weeds and pasture grasses into potential habitats for the species.
Consult with private landowners with <i>Solanum johnsonianum</i> on their properties and develop site-specific management actions and the implementation of conservation agreements.	
Manage sites to identify, control and reduce the spread of invasive species such as introduced grasses.	
Survey and monitoring priorities	
Implement an appropriate monitoring program to establish a more accurate assessment of the current	All habitat and potential habitat areas under control of the proponent will be made accessible to

Conservation actions	Assessment
extent of occurrence, area of occupancy and population size, with sufficient power to detect sudden changes, and notable fluctuations, in populations.	individuals or organisation seeking to undertake the listed conservation and management actions.
<b>Information and research priorities</b>	
Undertake seed germination and/or vegetative propagation experiments to determine the requirements for successful propagation and potential translocation.	All habitat and potential habitat areas under control of the proponent will be made accessible to individuals or organisation seeking to undertake the listed conservation and management actions.
Identify recruitment and vegetative responses to fires, and optimal fire regimes for regeneration (vegetative regrowth and/or seed germination), and response to other prevailing fire regimes.	
Improve understanding of mechanisms, including the level of reliance on bird dispersal, for dispersing the species and options for linking, enhancing or establishing additional populations.	

### 6.2.4 Squatter pigeon

The Conservation Advice for squatter pigeon provides sufficient direction for recovery requirements and it is unlikely sufficient extra protection would be provided by the implementation of a recovery plan for the species. The following three Threat Abatement Plans are relevant to the species:

- Threat abatement plan for predation by feral cats
- Threat abatement plan for competition and land degradation by rabbits
- Threat abatement plan for predation by European red fox

The Project is unlikely to increase predation of squatter pigeon by feral cats or European red fox or through land degradation by rabbits. Access to the land would be substantially reduced through installation of perimeter fencing. These exotic fauna species are currently present in the region and management by surrounding landowners is unlikely to change because of the project.

An assessment of the *Squatter pigeon (sth)* Conservation Advice conservation actions against the proposed measures is provided in Table 21.

**Table 21 Assessment of conservation actions for squatter pigeon**

Conservation actions	Assessment
<b>Conservation and Management Actions</b>	
Identify sub-populations of high conservation priority, especially in the southern part of the squatter pigeon's (southern) range.	All habitat and potential habitat areas under control of the proponent will be made accessible to individuals or organisation identifying sub-populations of high conservation priority.
Protect and rehabilitate areas of vegetation that support important sub-populations.	Habitat of marginally higher habitat value for foraging and breeding is associated with the surrounds of the waterways and woodland habitat. The provision of buffers and exclusion of habitat associated with waterways and woodland within the project area will retain habitat of comparatively higher value for squatter pigeon (sth).
Protect sub-populations of the listed subspecies through the development of covenants,	The development will not prevent the protection of squatter pigeons within the habitat of marginally

Conservation actions	Assessment
conservation agreements or inclusion in reserve tenure.	higher habitat value for foraging and breeding associated with waterways and woodland within the project area that will be retained.
Develop and implement a stock management plan for key sites.	The project will exclude cattle grazing and a perimeter fence will be installed to prevent access to cattle and feral pigs.
Develop and implement a management plan, or nominate an existing plan to be implemented, for the control and eradication of feral herbivores in areas inhabited by the squatter pigeon (southern).	The development will not prevent the development and implementation of a management plan for the control and eradication of feral herbivores.
Raise awareness of the squatter pigeon (southern) within the local community, particularly among land managers.	The development will not prevent the raising of awareness of the squatter pigeon within the local community, particularly among land managers.
<b>Survey and monitoring priorities</b>	
Monitor selected sub-populations throughout the distribution of the subspecies to identify rates of population change.	All habitat and potential habitat areas under control of the proponent will be made accessible to individuals or organisation seeking to undertake the listed conservation and management actions.
<b>Information and research priorities</b>	
Identify preferred food plants, and the responses of these to fire and grazing regimes.	All habitat and potential habitat areas under control of the proponent will be made accessible to individuals or organisation seeking to undertake the listed conservation and management actions.
Determine patterns of dispersal or residency, and the factors that may determine these.	
Assess reproductive success, and the factors that affect this.	
Assess the species' status, and the impacts of mining, in central Queensland.	

### 6.2.5 Ornamental snake

This Conservation Advice for ornamental snake provides sufficient direction for recovery requirements and it is unlikely sufficient extra protection would be provided by the implementation of a recovery plan for the species. The Threat Abatement Plans relevant to the species is the 'Threat abatement plan for predation, habitat degradation, competition, and disease transmission by feral pigs.

The Project is unlikely to increase predation, habitat degradation, competition, and disease transmission of ornamental snake by feral pigs. Access to the land would be substantially reduced through installation of perimeter fencing. Feral pigs are currently present in the region and management by surrounding landowners is unlikely to change as a result of the project.

An assessment of the ornamental snake Conservation Advice conservation actions against the proposed measures is provided in Table 21.

**Table 22 Assessment of conservation actions for ornamental snake**

Conservation actions	Assessment
<b>Regional and local priority actions</b>	
Habitat Loss, Disturbance and Modification <ul style="list-style-type: none"> <li>- Identify populations of high conservation priority</li> <li>- Investigate formal conservation arrangements, management agreements</li> </ul>	Five ornamental snakes were identified during the February 2023 targeted survey. Areas of potential habitat will be avoided. All habitat and potential habitat areas under control of the proponent will be made accessible to individuals or organisation seeking to

Conservation actions	Assessment
and covenants on private land and crown and private land investigate inclusion in reserve tenure if possible - Minimise adverse impacts from land use at known sites	undertake the listed conservation and management actions.
<b>Animal impacts</b> - Control introduced pests such as pigs to manage - Develop and implement a management plan for the control of cane toads in the region	Feral pigs' access to land would be substantially reduced through installation of perimeter fencing.
<b>Conservation Information</b> - Raise awareness of the Ornamental Snake and other reptiles found in the Brigalow Belt Bioregion within the local community.	The development will not prevent the raising awareness of the ornamental snake and other reptiles found in the Brigalow Belt Bioregion within the local community.
<b>Research priorities</b>	
More precisely assess population size, distribution, ecological requirements and the relative impacts of threatening process.	All habitat and potential habitat areas under control of the proponent will be made accessible to individuals or organisation seeking to undertake the listed conservation and management actions.
Design and implement a monitoring program in key habitat and priority conservation areas.	
Monitor known populations to identify key threats.	
Monitor the progress of recovery, including the effectiveness of management actions and the need to adapt them if necessary.	

## 6.3 Item 4.3

### 6.3.1 Information required

*All proposed measures must be drafted to meet the S.M.A.R.T principle:*

- S – Specific (what and how)
- M – Measurable (baseline information, number/value, auditable)
- A – Achievable (timeframe, money, personnel)
- R – Relevant (conservation advice, recovery plans, threat abatement plans)
- T – Time-bound (specific timeframe to complete).

### 6.3.2 Response

Management plans for the proposed development have yet to be developed due to the uncertainty of the EPBC approval requirements. Management plans will be detail tangible, on-ground actions that will be implemented in event the monitoring programs indicate that environmental outcomes have not or will not be achieved.



## 6.4 Item 4.4

### 6.4.1 Information required

*Include the plans specified above (in approved or draft format) as appendices to the preliminary documentation.*

#### 6.4.1.1 Response

Management plans for the proposed development have yet to be developed due to the uncertainty of the EPBC approval requirements. Management plans to be developed and key measures are provided below.

- Onsite Wastewater disposal report
- The onsite wastewater disposal report will be developed to determine whether the site is suitable for and on-site wastewater management system
- Determine the most suitable on-site wastewater management system for the site and soil conditions in accordance with Australian Standards.
- Concept Erosion and Sediment Control Plan
- The following key management measures are proposed to minimise impacts to the environment through implementation within the Erosion and Sediment Control Plan:
  - Maintain grass under solar panels or a vegetated buffer strip on the downslope side of panels.
  - Stabilise disturbed areas as construction progresses by reinstating the land profile as soon as possible after disturbance and replace groundcover with a suitable fodder species with the objective of achieving a minimum of 75% cover within 12 months.
  - Install, inspect, and maintain stormwater controls to manage water flows into, through and from the Project area. Measures may include sediment basins, sediment fencing and earthen berms.
  - All stockpiles of construction materials, fill or cleared vegetation will be restricted to level ground within existing cleared areas and at least 50 m from watercourses. Stockpiles should not be placed in the vicinity of large watercourses that are liable to flood.
  - Minimise the timeframe that stockpiles are present on the site and cover existing stockpiles during windy conditions to prevent dispersal of dust.
  - During significant rainfall events ensuring that tracker panels are placed in a vertical position to minimise the dripline effect.
  - Construction activities to be staged to minimise the extent and duration of ground disturbance at any given time.

#### Construction Phase Environmental Management Plan (CEMP) and Operational Phase Environmental Management Plan (OEMP)

The CEMP and OEMP will address the following:

- Erosion and sediment control
- Stormwater management / water quality
- Groundcover management
- Water management
- Air quality management
- Noise and vibration management

- Management of light spill and on-site lighting
- Land contamination (storage / use of fuel and chemicals)
- Biosecurity Management (animal and plant pests)
- Waste management
- Flora and fauna impact management
- Storage and handling of fuel and other hazardous goods
- Emergency management
- Environmental monitoring and reporting
- Management of works near existing above ground and underground infrastructure
- Hazard management
- Complaints handling and management
- Statutory obligations and approvals.

Vegetation clearing will be undertaken in accordance with a CEMP which will include a range of measures aiming to minimise unnecessary impacts on native vegetation, flora, and fauna.

These measures will include but will not be limited to the following:

- Vegetation will be removed following a staged approach whereby non-habitat vegetation is cleared followed by a pre-clearing inspection of any identified habitat trees. Habitat trees will be knocked and then cleared after 24 hours in the presence of a wildlife spotter-catcher with training in the detection, retrieval, and rescue of fauna.
- The clearing of hollow-bearing trees and other critical microhabitats will not take place between September and February during critical life-cycle events. If clearing during this period cannot be avoided, an ecologist or suitably qualified spotter-catcher would be present on site to check all hollows for animals.
- Where hollows are being utilised for breeding and rearing purposes an exclusion barrier will be deployed at least 30 m from the tree base to avoid disruption to the species. A species management plan for colonial or breeding animals may be necessary.
- All onsite personnel will be provided with an environmental induction including a familiarisation with the ecological values of the Project area and the proposed measures to protect biodiversity.
- Areas of native vegetation will be demarcated from clearing activities by fences to prevent any inadvertent vegetation clearing beyond the infrastructure footprint.
- Key habitat features such as hollow trunks and limbs will be relocated within the Project area and/or adjacent areas of woodland as far as is practicable.
- All vegetation clearing, however minimal will be undertaken sequentially to minimise impacts to native fauna.
- Noisy works to occur during daylight hours to minimise impacts to nocturnal fauna on adjacent land.

#### Waste management plan

The WMP will address the following:

- A description of the development activities that may generate waste
- The types and amount of waste that might be generated by the activities
- How the waste will be dealt with, including a description of the types and amounts of waste that will be dealt with under each waste management practices under the waste hierarchy

- Procedures for identifying and implementing opportunities to minimise the amount of waste generated, promote efficiency in the use of resources, and otherwise improve the waste management practices employed
- Procedures for dealing with accidents, spills and other incidents impact waste management
- How often the waste management practices will be assessed.

## 6.5 Item 4.5

### 6.5.1 Information required

*Information on the timing, frequency and duration of the proposed avoidance, mitigation, management and monitoring measures, and corrective actions to be implemented.*

#### 6.5.1.1 Response

Management plans for the proposed development have yet to be developed due to the uncertainty of the EPBC approval requirements. The management plans will be developed to include appropriate avoidance, mitigation, management and monitoring measures and corrective actions.

## 6.6 Item 4.6

### 6.6.1 Information required

*Details of specific and measurable environmental outcomes to be achieved for the relevant listed threatened species. All commitments must be drafted using committal language (e.g. 'will' and 'must') when describing the proposed measures.*

#### 6.6.1.1 Response

Management plans for the proposed development have yet to be developed due to the uncertainty of the EPBC approval requirements. The management plans will be developed to contain specific and measurable environmental outcomes to be achieved and will contain committal language.

## 6.7 Item 4.7

### 6.7.1 Information required

*An assessment of the expected or predicted effectiveness of the proposed measures.*

#### 6.7.1.1 Response

Management plans for the proposed development have yet to be developed due to the uncertainty of the EPBC approval requirements. Once developed, an assessment of the expected or predicted effectiveness of the proposed measures will be undertaken in the form of a risk assessment.

## 6.8 Item 4.8

### 6.8.1 Information required

*Details of ongoing management, including monitoring programs to support an adaptive management approach, that validate the effectiveness of the proposed measures and overall demonstrate that environmental outcomes will be achieved.*

#### 6.8.1.1 Response

Management plans for the proposed development have yet to be developed due to the uncertainty of the EPBC approval requirements. Management plans will provide details of ongoing management, including monitoring programs to support an adaptive management approach, that validates the effectiveness of the proposed measures and overall demonstrate that environmental outcomes will be achieved.

## 6.9 Item 4.9

### 6.9.1 Information required

*Details of tangible, on-ground corrective actions that will be implemented in the event the monitoring programs indicate that the environmental outcomes have not or will not be achieved.*

#### 6.9.1.1 Response

Management plans for the proposed development have yet to be developed due to the uncertainty of the EPBC approval requirements. Management plans will be detail tangible, on-ground actions that will be implemented in event the monitoring programs indicate that environmental outcomes have not or will not be achieved.

## 6.10 Item 4.10

### 6.10.1 Information required

Details of any measures proposed to be undertaken by Queensland and local governments, including the name of the agency responsible for approving each measure.

#### 6.10.1.1 Response

Banana Shire approved an amended Negotiated Decision Notice on 15 September 2020 for a combined Material Change of Use for a Public Facility - Other (Solar PV Power Station (Power Station) and Associated Facility Switchyard and Electrical Transmission Line) and Reconfiguring a Lot for Subdivision by Agreement (10 Lease Areas) (Appendix C). Relevant conditions imposed by the Development Permit are summarised below:

- Project is setback a minimum of 20 metres from all other site boundaries including Dodson's Road.
- Project infrastructure is setback 50 metres from the top of the bank of watercourses and 27 metres from the edge of vegetation mapped under the *Vegetation Management Act 1999*.
- Where infrastructure is proposed in the bushfire hazard area, the applicant must prepare and submit to Council, a Bushfire Management Plan to adequately mitigate against the risk from bushfire.
- The Power Station should not adversely interfere with the existing hydrological regime of adjoining properties or catchments.



- All stormwaters being discharged from the site is to meet the requirements of the CMDG and Queensland Water Quality Guidelines 2009.
- A detailed Erosion and Sediment Management Plan is to be provided to Council as part of the operational works application
- The applicant must prepare a separate detailed Construction Phase Environmental Management Plan and Operational Environmental Management Plan and must address the following:
  - Erosion and sediment control
  - Stormwater management / water quality
  - Water management
  - Air quality management
  - Noise and vibration management
  - Management of light spill and on-site lighting
  - Land contamination (storage / use of fuel and chemicals)
  - Biosecurity Management (animal and plant pests)
  - Construction waste management
  - Flora and fauna impact management
  - Storage and handling of fuel and other hazardous goods
  - Emergency management
  - Environmental monitoring and reporting
  - Management of works near existing above ground and underground infrastructure
  - Hazard management
  - Complaints handling and management
  - Statutory obligations and approvals
- Ensure that all reasonable and feasible avoidance and mitigation measures are employed so that noise, dust, glare, vibration and other emissions generated by the construction and operation or the approved does not cause a nuisance at any sensitive land use.
- The applicant is required to prepare a Waste Management Plan
- Commence rehabilitation of areas of existing land degradation identified in the approved Land Condition Assessment.

## 7 REHABILITATION

### 7.1 Item 5.1

#### 7.1.1 Required information

*Rehabilitation acceptance criteria, including for the restoration of habitat for relevant listed threatened species and communities.*

#### 7.1.2 Response

Management plans for the proposed development have yet to be developed due to the uncertainty of the EPBC approval requirements. If required, rehabilitation acceptance criteria will be developed for the restoration of habitat for relevant listed threatened species and communities.

### 7.2 Item 5.2

#### 7.2.1 Required information

*A summary of the procedures, including contingency measures, that will be undertaken to achieve the rehabilitation acceptance criteria.*

#### 7.2.2 Response

Management plans for the proposed development have yet to be developed due to the uncertainty of the EPBC approval requirements. If required, contingency measures will be developed to achieve the rehabilitation acceptance criteria.

### 7.3 Item 5.3

#### 7.3.1 Required information

*A summary of a monitoring program to determine the success of rehabilitation activities implemented by the proponent.*

#### 7.3.2 Response

Management plans for the proposed development have yet to be developed due to the uncertainty of the EPBC approval requirements. If required, a monitoring program will be developed to determine the success of rehabilitation activities implemented by the proponent.

### 7.4 Item 5.4

#### 7.4.1 Required information

*The details of any rehabilitation activities proposed to be undertaken as required by Commonwealth, State or Territory, and local government legislation. Attach relevant Commonwealth, State or Territory, and local government approvals and permits as supporting documents to the preliminary documentation.*

### 7.4.2 Response

The amended Negotiated Decision Notice on 15 September 2020 (Appendix C) contain a condition to undertake the following:

- Commence rehabilitation of areas of existing land degradation identified in Figures 7, 8, 9 or 10 of the approved Land Condition Assessment as soon as practical after the approval takes effect. The areas are to be rehabilitated to a condition consistent with the soil classification identified on Map 2 contained in Appendix A of the approved Land Condition Assessment.

## 8 ENVIRONMENTAL OFFSETS – RESIDUAL SIGNIFICANT IMPACTS

A residual impact assessment that was undertaken on *S. dissectum* and *S. johnsonianum*, ornamental snake and squatter pigeon (sth.) (Section 51 to 5.3), determined that the project was unlikely to have a residual impact on these species. Consequently, no offset area has been nominated or a draft offset area management plan developed. Should DCCEEW deem that a residual significant impact is likely following the evidence provided within this report, reconsideration of the project footprint is preferable to the requirement of an offset site.



## 9 ECOLOGICALLY SUSTAINABLE DEVELOPMENT

### 9.1 Item 7.1

#### 9.1.1 Information required

*A description of how the proposed action meets the principles of ESD, as defined in section 3A of the EPBC Act.*

#### 9.1.2 Response

Australia's National Strategy for Ecologically Sustainable Development defines ecologically sustainable development (ESD) as:

*'using, conserving and enhancing the community's resources so that ecological processes, on which life depends, are maintained, and the total quality of life, now and in the future, can be increased'.*

Section 3A of the EPBC Act defines principles of ecologically sustainable development as:

- a. Decision-making processes should effectively integrate both long-term and short-term economic, environmental, social and equitable considerations.
- b. If there are threats of serious or irreversible environmental damage, lack of full scientific certainty should not be used as a reason for postponing measures to prevent environmental degradation.
- c. The principle of inter-generational equity—that the present generation should ensure that the health, diversity and productivity of the environment is maintained or enhanced for the benefit of future generations.
- d. The conservation of biological diversity and ecological integrity should be a fundamental consideration in decision-making.
- e. Improved valuation, pricing and incentive mechanisms should be promoted.

The following section details how the Project aligns with the principals of ESD.

As a renewable energy development, the Project is consistent with several international, Commonwealth, State and regional/local agreements, policies and plans that aim to respond to climate change and the development of renewable energy infrastructure. These policies include The Paris Agreement, The Kyoto Protocol, the Commonwealth Renewable Energy Target, Queensland renewable energy target and the National Strategy on Ecological Sustainable Development.

Renewable resources offer a contribution to the long-term alternative energy supply and have several advantages over conventional fossil fuels. Renewable resources:

- create virtually no carbon dioxide (CO<sub>2</sub>) or other air pollutants during their operation and as such do not contribute to either global climate change or local air pollution
- contribute to a reduction in our dependence on the finite reserves of fossil fuels, which are being rapidly depleted
- reduce dependence on oil and gas imports and increase self-sufficiency in energy production.
- Edify energy follows consistent environmental management principles in relation to the positioning and design of infrastructure.
- Avoid: locating activities to avoid direct and indirect impacts on environmental values.
- Minimise: minimising direct and indirect impacts where they cannot be completely avoided.
- Mitigate: implementing mitigation and management measures to reduce direct, indirect and cumulative impacts.

- Remediate and rehabilitate actively remediate and rehabilitate impacted areas to promote long-term recovery.
- Offset: provide suitable offsets for activities that result in significant residual impacts to ecological values even with the implementation of the above principles.

## 10 ECONOMIC AND SOCIAL MATTERS

### 10.1 Item 8.1

#### 10.1.1 Required information

*An analysis of the economic and social impacts of the action, both positive and negative.*

#### 10.1.2 Response

During the Pre-construction Engagement phase, Edify establishes a Local Participation Strategy (LPS) that aims to identify and catalyse the local economic prospects, capabilities and involvement for the regional stakeholders. The LPS is informed by the Australian Industry Participation (AIP) National Framework and is adapted to address the specific local conditions of the project and local community. Edify's LPS also targets job creation opportunities for local Young People, with a focus on options for traineeships, apprentices, and internships to ensure skills are developed and retained locally and ensure all social procurement targets and major skills guarantees are not only met but exceeded throughout the life of the projects.

Prior to construction commencing, Edify will quickly establish the LPS, in conjunction the local Chamber of Commerce (or similar) and continue to build the capacity of the local supply chains and labour forces in the respective areas. This has previously been achieved through collaboration with TAFE, Regional Advisory Groups and local contractor agencies. Based on the local circumstance, Edify's LPS specifies baseline participation targets for Indigenous, female and apprenticeship roles during the construction and operational phases of the project.

Edify's prior experience suggests that up to 50% of the total employment and procurement opportunities generated by the project will be filled by local businesses (i.e. in the immediate region of the Project area). The remainder of the workforce (typically specialised contractors, consultants etc) will come from Australia, with the vast majority of that from within Queensland. Edify's prior experience in executing various regional Queensland projects shows that additional indirect opportunities are created for other services, including accommodation, food preparation and delivery (commonly utilising a food truck located at site throughout construction), grocery supply and hospitality.

Some notable examples from Edify's previously successful LPS include:

- Consulting with Industry Capability Network (ICN)
- Hosting local supplier briefings, outlining pre-requisite certifications and specifications to be eligible for employment and equipment supply opportunities
- Publishing Supplier Information Guidelines specifically for local and Indigenous businesses and individuals seeking to supply goods, equipment or services directly to the project
- Promoting local Small & Medium-sized Enterprises (SMEs), who was recognised for outstanding service to the project
- Supporting the employment pathways for apprenticeships and cadetships across our executed projects

### 10.2 Item 8.2

#### 10.2.1 Required information

*Details of any public consultation activities undertaken and their outcomes.*

## 10.2.2 Response

Consultation with landowners, neighbouring properties and local stakeholders has been ongoing since 2018 using a combination of registered mail, phone conversations, numerous site visits, emails, newspaper notifications and media announcements.

Public consultation was undertaken during the Development Application Process in accordance with the approaches and timeframes stipulated by the *Planning Regulation 2017*. Responses were given for eleven properly made submissions about the application.

A summary of the community engagement activities undertaken on and for the Project is provided in Appendix D.

## 10.3 Item 8.3

### 10.3.1 Required information

*Describe any Indigenous consultation and their outcomes, that has been undertaken, or will be undertaken in relation to the proposed action, in accordance with the Guidance for proponents on best practice Indigenous engagement for environmental assessments under the EPBC Act (2016).*

### 10.3.2 Response

Edify is committed to maximising opportunities for Indigenous people wherever possible throughout our project development portfolio, as we seek to fulfill our role in “closing the gap” and supporting the world’s oldest living cultures. Edify is currently working closely with thirteen (13) Registered Aboriginal Parties (RAPs) or Traditional Owner groups (TOs) across its Australian project development portfolio, including four RAPs/TOs in Queensland. These relationships are some of the first to be established once commencing project plans and evolve into collaborative partnerships as we collectively identify any culturally significant aspects of the project land. Each of these relationships are established with the respective elders and Aboriginal Land Council/s and are long term relationships that endure throughout the life of the project.

Once project planning is complete, Edify builds upon these early relationships during the Pre-construction Engagement Strategy and when appointing the Principal Contractor for project execution and operation. Edify leverages these pre-existing relationships and details the scopes of work, services and material supply opportunities that are upcoming and available to consider, in addition to collectively identifying any gaps or issues to be appropriately qualified.

Some previous examples of the long-term collaboration between Edify and the local aboriginal groups include:

- Selecting Principal Contractors that exhibit clear targets to hire and retain Indigenous staff
- Auditing employment hours and materials supplied to the project to ensure compliance with pre-specified participation targets
- Preferencing Principal Contractors that conduct training and workforce development initiatives

Edify remains committed to working with Principal and sub-contractors who share these mutual objectives of showcasing the capabilities of the local Indigenous communities.

Edify has negotiated and executed (10 July 2021) a Cultural Heritage Investigation Management Agreement (CHIMA) with the Gaangalu Nation People (GNP), the Traditional Owners (Registered Aboriginal Party) of the project lands. The CHIMA provides the framework for Edify and GNP to engage and is an agreement providing a comprehensive means by which both parties can avoid and minimise harm to Gaangalu Cultural Heritage for the project area. The CHIMA has been registered with the Queensland Department of Aboriginal and Torres Strait Island Partnerships.



The Gaangalu Nations People have consented to Edify providing a copy of the CHIMA (CHMP) to DCCEEW and are aware the document will not be made publicly available (this was completed during the original Referral of this Project).

A Cultural Heritage survey, to determine if items of cultural heritage are present, has been scheduled for the Project for 5-16 September 2022, weather permitting. The survey will be attended by representatives from GNP and Edify.

## 10.4 Item 8.4

### 10.4.1 Required information

Projected economic costs and benefits of the project (in dollars), including the basis for their estimate through cost/benefit analysis or similar studies.

### 10.4.2 Response

Given the early stages of the project, the planning efforts are yet to facilitate detailed supply agreements. In addition, the Engineering, Procurement and Construction (EPC) agreement been formalised yet. We are currently progressing discussions in relation to finalising the optimised project design configuration and terms and conditions of the project specific EPC contract with various 'Tier-1' EPC providers.

Early market engagement with various international suppliers suggests the estimated capital cost of the project is \$1.43 billion. These costs are a best estimate in today's market; however, the market and prices are variable and are subject to change.

Regarding the project's benefits, the project will provide economic activity to the regional economy during both the construction and operation phases. These regional economic impacts will be assessed in detail prior to the construction commencement phase, using Input-Output analysis conducted by a qualified economist. In preparing this analysis, Edify Energy will continue to work with Banana Shire Council and the local community so that the benefits of the projected economic growth in the region are maximised and any impacts are minimised. Edify will facilitate measures such as employing local and regional residents where practicable, hosting business group meetings and events in the regional community and the purchasing of local non-labour inputs to production.

## 10.5 Item 8.5

### 10.5.1 Required information

Employment opportunities expected to be generated by the project (including construction and operational phases).

### 10.5.2 Response

The Project will be a significant generator of employment opportunities, particularly during construction, and provider of local benefits. Construction of the project will take approximately 36 months from the commencement of site establishment works to commissioning of the three array areas. It is anticipated that the project will be constructed in two stages to balance the objective of completing construction in a timely manner against the objective of minimising the number of workers on site and subsequent impacts on local infrastructure and the broader community. Initial estimates of employment opportunities indicate approximately 1,160 direct and indirect jobs will be created during the construction phase. Approximately 36 direct and indirect jobs will be required throughout the operational phase of the project.

## 10.6 Item 9

### 10.6.1 Required information

*The preliminary documentation must include details of any proceedings under a Commonwealth, State or Territory law for the protection of the environment or the conservation and sustainable use of natural resources against:*

- a) *The person proposing to undertake the action; and*
- b) *For an action for which a person has applied for a permit, the person making the application*

*If the person proposing to take the action is a corporation, details of the corporation's environmental policy and planning framework must also be included.*

### 10.6.2 Response

Edify Energy is committed to environmental protection and the management of adverse activities associated with their developments. All Edify Energy employees including contractors have a responsibility to implement the overarching environmental objectives of the organisation and actively engage the companies' commitments.

Edify Energy has not been involved in environmental proceedings of any kind under Commonwealth, State or Territory law and will continue to enact the highest environmental standards in their work practices and onsite management of the environment.

Edify Energy carefully select sites and design infrastructure with a determined focus of avoiding environmentally significant and sensitive areas with an understanding that impacts associated with large-scale developments are often not seen for several years. Edify Energy has successfully referred several projects to the Federal Environment Minister and will continue to work closely with Government to modify development features to reduce impacts to MNES to the greatest extent possible.

Edify Energy and their contractors maintain their high standards of environmental protection through the following measures:

- Setting objectives and targets to monitor performance aimed at the elimination or minimisation of work-related injury, illness, and environmental harm.
- Systematically identifying, assessing, and managing as far as reasonably practicable the health and safety risks and environmental impacts which may arise from our activities.
- Ensuring that health, safety and environmental responsibilities are clearly defined within management plans and procedures
- Engaging with employees, landowners, and key stakeholders to identify critical environmental issues on land under Edify's control.
- Ensuring that the planning, design, construction, operation, and maintenance of Edify's assets occur in accordance with Government approvals.
- Provide the resources required to achieve Project approval commitments
- Implement mitigation and management measures to minimise impacts to air, water, land, and biota unless authorised under license or approvals to
- Complying with the requirements of environmental legislation and any Environmental Management Plan and Environmental Work Plan that applies to the property being accessed.
- Taking all reasonable actions to ensure that weeds, pests, or pathogens are not spread.

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