FINAL REPORT:

Targeted Striped Legless Lizard Surveys of the Stockyard Hill Wind Farm, Stockyard Hill, Victoria

ON BEHALF OF:

Stockyard Hill Wind Farm Pty Ltd

March 2012

Ecology and Heritage Partners Pty Ltd

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SUMMARY

Introduction

Ecology and Heritage Partners Pty Ltd was engaged by Stockyard Hill Wind Farm Pty Ltd (SHWFPL) (a subsidiary of Origin Energy) to undertake targeted surveys for the nationally significant Striped Legless Lizard *Delma impar* within the approved Stockyard Hill Wind Farm, Stockyard Hill, Victoria.

The targeted surveys were required to ascertain the extent of this species habitat within the study area, to identify any potential impacts on extant populations and to provide information on mitigation measures associated with the wind farm development.

Methods

Striped Legless Lizard

Targeted surveys for Striped Legless Lizard were conducted in accordance with *Survey guidelines for Australia's threatened reptiles*, with additional micro-climate parameters obtained on each survey date, as outlined in the *Biodiversity Precinct Structure Planning Kit*.

Targeted surveys involved the creation of artificial refuge structures, through establishing tile grids in areas of indigenous grassland and in mosaics of indigenous/exotic grassland within the study area. This survey methodology is widely accepted as the primary survey technique for this species, particularly in areas with surface rock. Ten tile grids were established within the study area on 1-3 August 2011, each comprising a grid of 5 x 10 tiles (measuring approximately 25 metres x 50 metres). Tile grids were checked on 8 occasions between September 2011 and February 2012.

Results

Striped Legless Lizard

There are 11 records of Striped Legless Lizard within 10 kilometres of the study area, inclusive of one record within the study area. Eight Striped Legless Lizards were recorded within the study area during targeted surveys. All eight Striped Legless Lizards were recorded at tile grid 10, located in Stockyard Hill Road reserve. The lizards were recorded on at this grid on three occasions (2 and 30 November, and 15 December 2011), with the additional record of two sloughs (shed skins) recorded on 16 November 2011 and 10 February 2012 (one on each occasion).

The majority of the study area is modified, as a result of previous land practices (i.e. surface rock removal, cultivation and grazing). However, areas supporting suitable habitat in the form of modified native grasslands, embedded and surface basalt rock and heavy, cracking clay soils are present in several sites within the study area.

Legislative Requirements

It is a requirement of EPBC Approval 2009/4719 Condition 1 and 3, that SHWFPL document the results of these targeted surveys and submit to the Department of Sustainability, Environment, Water, Population and Communities (SEWPaC) for approval, a salvage and translocation plan for relocating Striped Legless Lizard individuals disturbed during construction of the wind farm. This plan must be approved prior to the commencement of works on site and all works in areas of Striped Legless Lizard habitat must follow the approved plan.

As construction within the study area will likely require the direct removal of Striped Legless Lizard habitat, Management Authorisation under the *Wildlife Act 1975* for the capture and release of Striped Legless Lizard will need to be obtained prior to any salvage and translocation works within the study area.

Striped Legless Lizard habitat extent and the quality of habitat for the species, was identified during the current assessment in accordance with WEF Permit No: PL-SP/05/0548 Condition 11. This habitat mapping will need to be considered during detailed design for micro-siting of final infrastructure layout, to avoid and minimise impacts to identified Striped Legless Lizard habitat, where practicable.

Potential impacts and mitigation measures

It is understood that SHWFPL, in association with the Department of Sustainability and Environment (DSE), and input from Ecology and Heritage Partners, will develop management recommendations and contingencies to mitigate/ameliorate potential impacts on Striped Legless Lizard and their habitat in the study area. These recommendations and actions will be detailed in the Striped Legless Lizard Salvage and Translocation Plan, to be prepared to the satisfaction of SEWPaC and DSE. This Salvage and Translocation Plan will detail mitigation measures to be enacted in areas where avoidance of suitable habitat is not practicable.

The following should be considered as part of the project:

- Stockyard Hill Road reserve, which is known to support a significant population of Striped Legless Lizard, should be excluded from construction activities as far as practicable. This includes any potential widening of the road, which will impact on this known habitat corridor for the species;

- Habitat areas given a Rating 2 should be subject to micro-siting to avoid Striped Legless Lizard habitat as far as practicable. Further recommendations on the avoidance and minimisation of impacts on habitat will be incorporated into the Striped Legless Lizard Salvage and Translocation Plan;

- All construction works should minimise vehicle movements off formed roads and access tracks within properties where Striped Legless Lizard habitat is identified, to minimise impacts to those habitat areas;

- A qualified herpetologist/zoologist familiar with the capture and handling of Striped Legless Lizard should be present for the disturbance and/or removal of identified habitat to salvage any displaced individuals. Details of the methodology to be employed during construction works will be outlined in the Striped Legless Lizard Salvage and Translocation Plan;

- Zoologists undertaking any capture and relocation activities for Striped Legless Lizard within the study area will be required to obtain a Management Authorisation permit under the *Wildlife Act 1975*, issued by DSE; and,

- Consideration of the regionally significant Fat-tailed Dunnart, which has similar habitat requirements to Striped Legless Lizards and have also been recorded within the study area should be incorporated into any salvage works undertaken within the study area.

1 INTRODUCTION

1.1 Background

Ecology and Heritage Partners Pty Ltd was engaged by Stockyard Hill Wind Farm Pty Ltd (SHWFPL) to undertake targeted surveys for the nationally significant Striped Legless Lizard *Delma impar* within the approved Stockyard Hill Wind Farm, Stockyard Hill, Victoria.

The targeted surveys were required to ascertain the extent of this species habitat within the study area, to identify any potential impacts on extant populations and to provide information on mitigation measures associated with the wind farm development.

1.2 Objectives

The objective of the project was to satisfy the following permit conditions:

WEF Permit No: PL-SP/05/0548, Condition 11:

> "*Before development begins, a survey to identify the exact extent of non-indigenous habitat for the Striped Legless Lizard must be undertaken by a qualified ecologist, to the satisfaction of the Minister for Planning upon the advice of DSE* (Department of Sustainability and Environment)*. Should suitable habitat of the Striped Legless Lizard be identified, the wind farm infrastructure layout must be micro-sited to avoid these areas to the satisfaction of the Minister for Planning. If avoidance is not possible, then a salvage protocol for relocating disturbed individuals must be applied prior to construction to the satisfaction of the Minister for Planning on the advice of DSE.*":

EPBC Act Approval (EPBC 2009/4719), Condition 1:

> *"Prior to any works commencing, surveys for Striped Legless Lizard (*Delma impar*) and their habitat must be undertaken in areas that will be disturbed by the development of the wind farm and associated infrastructure."*

This was to be achieved by establishing ten tile grids in areas of suitable habitat for Striped Legless Lizard, within the Stockyard Hill Wind Farm (herein referred to as the 'study area'): These tile grids would then be checked at regular intervals during the active season for the species, to assist in determining their presence and likelihood of occurrence within the study area.

The results of these surveys will inform the categorising of known and suitable habitat for Striped Legless Lizard within the study area, to be taken into consideration by SHWFPL during their detailed design process.

1.3 Study Area

The approved Stockyard Hill Wind Farm site is located approximately 160 kilometres west of Melbourne (Figure 1).

The project area has an area of approximately 15,700 hectares (Figure 1) and largely comprises agricultural cropping land, and farming land grazed by cattle and sheep. It is situated in the Pyrenees Shire, to the west of Ballarat, between the township of Beaufort (approximately four kilometres to the north) and the Shire's southern boundary (near the northern outskirts of Skipton, which is itself located in Corangamite Shire). The site of the wind farm is some 10 kilometres south–east of the Challicum Hills Wind Farm, 25 kilometres southwest of the Waubra Wind Farm and some 20 kilometres south of the approved Lexton Wind Farm (all measured from the closest points).

1.4 Significant Species

Striped Legless Lizard *Delma impar*

Status

The Striped Legless Lizard is listed as Vulnerable under the *Environment Protection and Biodiversity Conservation* (EPBC) *Act 1999*, listed as threatened under the *Flora and Fauna Guarantee (*FFG) *Act 1999* and is considered to be endangered in Victoria (DSE 2007) (Plate 1).

Plate 1 Striped Legless Lizard © Ecology and Heritage Partners Pty Ltd

Description

The Striped Legless Lizard is a member of the family Pygopodidae, the legless or flap-footed lizards (Cogger 1996). As with other members of the legless lizard family, Striped Legless Lizards lack forelimbs and have only vestigial hind limbs, in the form of scale 'flaps' either side of their vent. Superficially, these animals resemble snakes, but can be readily distinguished from the latter by the presence of external ear openings, a fleshy undivided tongue and a tail which is longer than the body (Cogger 1996). Striped Legless Lizards are readily distinguished from other legless lizards by body colouration, body size and head scalation.

The Striped Legless Lizard is a pale-grey lizard up to 30 centimetres in length, with a maximum snout-vent length (SVL) of approximately 12 centimetres. Striped Legless Lizards have a long thin body and the tail, when unbroken, is about twice the length of the body. They have a series of stripes on their sides and the sides of their back, becoming diagonal bands on the tail (Cogger 1996). These stripes are dark-brown or blackish and extend the whole length

of the individual from the neck to the tail. However, in some individuals, particularly juveniles, these stripes may be very faint or absent (Cogger 1996).

Striped Legless Lizards generally feed only on invertebrate prey and are considered a selective arthropod feeder. While the main prey types of the species in Victoria were found to be crickets and noctuid moth larvae, spiders were found to be the predominant prey type within the ACT (O'Shea 2005).

Distribution

Before European settlement, the species was presumed to be common across many grassland areas in north-eastern, central and south-western Victoria, south-eastern NSW, the ACT, and, possibly, south-eastern South Australia (Smith and Robertson 1999), but it has suffered a substantial contraction in both geographic range and abundance over the past 100 years. A combination of factors, including clearing of grasslands for urban development, more intense agricultural practices (e.g. pasture improvement, cropping, and prolonged grazing), inappropriate fire regimes and weed invasion (e.g. Chilean Needle-grass) threaten the long-term survival of the species (Cogger *et al.* 1993).

The range contraction and resultant reduction in population size is likely to continue, due to the ongoing removal, fragmentation and deterioration of suitable grassland habitat (Smith and Robertson 1999). Current populations in Victoria persist primarily in the basalt plains to the west of Melbourne, and areas around Ballarat and Bendigo (DSE 2011; Hadden 1995).

Habitat:

The Striped Legless Lizard inhabits lowland native grasslands, typically dominated by native tussock-forming grass species. In Victorian populations, the species frequents habitats with exposed basalt rocks in grassland and areas of cracking clay soils, where the species can seek refuge under rocks and in earth cracks (Dorrough *et al.* 1995).

Although Striped Legless Lizards have been reported from areas of relatively undisturbed native grasslands, with a dense cover of perennial tussock grasses (Kukolic 1991; Kukolic and Osborne 1993), they are also known to inhabit areas of non-native grassland (Smith and Robertson 1999). This has been shown at several sites throughout the Basalt Plains in western Victoria, which are currently grazed at various stock densities (Rohr and Peterson 2003).

Within the study area, there are small remnants of the Ecological Vegetation Class (EVC) Plains Grassland, some of which qualifies as the federally listed community; Natural Temperate Grassland of the Victorian Volcanic Plain. These vegetation communities are strongly associated with Striped Legless Lizard habitat, particularly in areas where there is embedded and surface basalt rock. Other areas of modified grassland habitat which have a higher percentage cover of perennial pasture grasses, may still provide structural habitat characteristics suitable for the species and linkages between higher quality grassland remnants.

2 METHODS

2.1 Nomenclature

The names of terrestrial vertebrate fauna (mammals, birds, reptiles, amphibians) follow the Victorian Biodiversity Atlas (VBA) (DSE 2011).

2.2 Database Searches

The following resources and databases were reviewed:

- The VBA (DSE 2011) and Victorian Fauna Database (VFD) (Viridans Pty Ltd 2011) databases for fauna records;
- The previous consultant report prepared pertaining to the species within the study area (Brett Lane & Associates 2009)

2.3 Targeted Striped Legless Lizard Surveys

The study area has previously been identified as supporting Striped Legless Lizards through targeted surveys (Brett Lane & Associates 2009). In addition, there are a number of previous records in the local area, including a known population within the Blacks Creek Reserve adjoining the study area west of Stockyard Hill Road (DSE 2011; Figure 3). Targeted surveys were undertaken to investigate the quality and extent of Striped Legless Lizard habitat within the study area, to inform micro-siting of construction activities associated with the approved Stockyard Hill Wind Farm.

Targeted surveys for Striped Legless Lizard were conducted in accordance with *Survey guidelines for Australia's threatened reptiles* (SEWPaC 2011), with additional micro-climate parameters obtained on each survey date as outlined in the *Biodiversity Precinct Structure Planning Kit* (DSE 2010).

Targeted surveys involved the creation of artificial refuge structures, through establishing tile grids in areas of indigenous grassland and in mosaics of indigenous/exotic grassland within the study area. Ecology and Heritage Partners Pty Ltd has successfully used this technique to survey for Striped Legless Lizard at several sites in western Victoria. The intention of establishing a grid of roof tiles is that individuals will use the artificial habitat for shelter, and to assist in thermoregulation. The set of artificial refuges provide a target for zoologists to focus search attempts in which tiles are lifted to check for the presence of lizards. This survey methodology is widely accepted as the primary survey technique for this species, particularly in areas with surface rock (DSE 2010; SEWPaC 2011).

Sites were selected based on areas identified as the highest quality habitat patches, or areas with the highest likelihood of occurrence, which also achieved a representative spatial sample within the study area. Due to the expansive study area, comprising more than 15,000

hectares, with some properties supporting large areas of suitable habitat, site selection was also influenced by the proposed location of both turbines and access tracks (as per approved turbine layout 157). This habitat was largely present in the north-west, south-east and centre of the study area, however there were several other areas of potentially suitable habitat present in the vicinity of the tile grid locations. Many of the land parcels in the north-east section of the study area provide little suitable habitat for Striped Legless Lizards, with extensive cultivation and improved pasture. Properties of similar type were located throughout the study area and therefore did not warrant placement of a tile grid.

This habitat assessment resulted in the placement of ten tile grids within the study area, each consisting of a grid of 5 x 10 tiles (measuring approximately 25 metres x 50 metres), laid on 1-3 August 2011 at the following locations (Table 1; Plates 2-11; and, Figures 2a-e):

Table 1. *Location of Tile Grids placed within the study area*

Tile Grid Number	Latitude	Langitude
1	37°31'36.84"S	143°16'38.76"E
2	37°37'16.32"S	143°24'23.52"E
3	37°37'9.90"S	143°24'16.68"E
4	37°27'25.14"S	143°15'19.74"E
5	37°27'40.98"S	143°17'42.78"E
6	37°34'17.16"S	143°14'2.16"E
7	37°33'24.90"S	143°17'22.50"E
8	37°29'14.34"S	143°20'55.80"E
9	37°29'4.68"S	143°23'6.84"E
10	37°33'53.22"S	143°18'48.96"E

Plate 2: Tile Grid 1 – An extensive rocky rise with modified native grassland located off Geelong Road in private property. No stock was in the paddock at the time of tile grid placement, although cattle were rotated in and out of the paddock during the assessment period.

Plate 3: Tile Grid 2 – A rocky rise of predominantly introduced vegetation (common pasture grasses) with occasional native tussocks, following a larger rocky ridgeline between this property and the property adjoining to the south.

Plate 4: Tile Grid 3 – This site comprises grassland, graduating to a rocky rise that spans this property and the southern neighbouring property. This modified native grassland (grazed by sheep), supports good quality habitat, with embedded and surface basalt rock

Plate 5: Tile Grid 4 – A north-west facing slope of a rocky rise in the north west of the study area. This modified native grassland (grazed by sheep), supports good quality habitat, with embedded and surface basalt rock.

Plate 6: Tile Grid 5 – High quality native grassland with extensive tussock cover (i.e. *Themeda triandra* and *Austrodanthonia* sp.) in the north-west of the study area, along a ridgeline of proposed turbines. This grassland is in close proximity to a large patch of woodland and lacks the surface and embedded basalt rock seen in other parts of the study area.

Plate 7: Tile Grid 6 – Northern slope of a contiguous rocky ridgeline through this property and neighbouring properties to the east, in the centre of the study area. Modified native grassland lightly grazed by sheep, with extensive surface and embedded basalt rock.

Plate 8: Tile Grid 7 – Rocky rise of modified and introduced grassland, grazed by cattle intermittently throughout the survey period. This ridgeline extends through this property, into neighbouring property to the east.

Plate 9: Tile Grid 8 – This grid was split between the roadside reserve and the adjoining private property, along a ridgeline of Thompsons Road. A small amount of embedded rock and modified native grassland within the property, which was grazed by sheep, was present. Good native tussock cover was present in the road reserve.

Plate 10: Tile Grid 9 – A small rocky rise in paddocks primarily surrounded by cropping. Modified native grassland, with embedded and surface rock, though relatively undisturbed due to adjoining land practices (i.e. no grazing and not suitable for cropping). Good cover of native tussock grasses such as *Austrostipa* sp. and *Austrodanthonia* sp.

Plate 11: Tile Grid 10 – Road reserve of Stockyard Hill Road, north of Dunnetts Road. Modified native grassland with embedded and surface rock present and some cracking clay soils. This road reserve is contiguous for several kilometres, with varying grassland quality. Suitable habitat for Striped Legless Lizard occurs to the west (near Black Lake), east (private property supporting extensive rocky rises in this area) and south (Blacks Creek Reserve).

Tiles were checked on eight occasions between 29 September 2011 and 10 February 2012, as shown below (Table 2):

Table 2 Tile Survey Dates at Stockyard Hill Wind Farm

Tile Check Number	Date
1	29/09/2011
2	13/10/2011
3	2/11/2011
4	16/11/2011
5	30/11/2011
6	15/12/2011
7	5/01/2012
8	10/02/2012

2.4 Assessment Qualifications and Limitations

The tile grid surveys for Striped Legless Lizards were undertaken in accordance with methods recommended by the Department of Sustainability, Environment, Water, Population and Communities (SEWPaC) (2011) as far as practicable, with the exception of duration of 'bed-in' time for the tiles. The time allowed between tile grid establishment on site and the commencement of tile checks was 8 weeks (two months), one month short of the recommended timing (SEWPaC 2011). However, it was determined that commencement of tile checks was of greater importance, to increase the likelihood of detecting the species during its active season (spring and early summer) (DSE 2010; SEWPaC 2011).

It is important to note that Striped Legless Lizard is difficult to detect even with the use of targeted survey methodologies such as tile grids and active searching, due to the species' cryptic nature. Other survey methods, such as pitfall trapping, were not used due to the geology of the study area (presence of embedded and surface basalt rock).

The WEF Planning Permit states that "*a survey to identify the exact extent of non-indigenous habitat for the Striped Legless Lizard must be undertaken by a qualified ecologist*". Whilst detailed habitat assessments have been undertaken within the study area, it is difficult to accurately delineate the boundaries of suitable and unsuitable habitat. This is due to the modified and changing nature of the study area and areas where suitable habitat is interspersed with unsuitable habitat and vice versa. As such, Ecology and Heritage Partners have employed the precautionary principle when categorising habitat, to ensure that all areas considered likely to support Striped Legless Lizards will be subject to appropriate mitigation measures. In addition to this, access to some land parcels was restricted during the establishment of tile grids, inclusive of the Tayler property adjoining Stockyard Hill Road. It was subsequently determined that areas within this property, not subject to active cultivation (i.e. cropping practices), were deemed suitable habitat and likely to support the species, considering the records of Striped Legless Lizard immediately adjoining this property. This is reflected in the mapping.

Notwithstanding the aforementioned limitations, it is considered that the survey effort, timing and results presented meet the objectives of the survey and satisfy the WEF Permit No: PL-SP/05/0548, Condition 1.

3 RESULTS

3.1 Database Searches

There are eleven previous records of Striped Legless Lizard within 10 kilometres of the study area, inclusive of one record within the study area (Brett Lane & Associates 2009; DSE 2011). Striped Legless Lizards have been recorded from a number of locations adjoining the study area, primarily within Blacks Creeks Reserve (Table 3; Figure 3). The most recent record for each location is shown in Figure 3, as many of these survey sites have several records attributed to them for several years of survey (DSE 2011).

During targeted surveys of Stockyard Hill Wind Farm by Brett Lane & Associates (2009), Striped Legless Lizards were recorded along Stockyard Hill Road, adjacent to Black Lake (Figure 3).

The following table (Table 3) details the location and date of records of the species in the local area:

Table 3 Database records of Striped Legless Lizard in the local area (DSE 2011)

Date of most recent record	Distance from study area boundary	Direction from study area	Name of location
2009	5 kms	NW	Ballyrogan
2009	4.2 kms	W	Yalla Y Poora
2004	4 kms	W	Yalla Y Poora
2006	4 kms	W	Yalla Y Poora
2008	< 500 m	Central	Blacks Creek Reserve
2007	< 500 m	Central	Blacks Creek Reserve
2004	< 500 m	Central	Blacks Creek Reserve
2005	< 500 m	Central	Blacks Creek Reserve
1997	4.9 kms	E	Chepstowe
2005	4.9 kms	E	Chepstowe
2007	5.6 kms	E	Chepstowe

3.2 Targeted Survey - Striped Legless Lizard

Eight Striped Legless Lizards were recorded within the study area during targeted surveys (Plates 12-15; Appendix 2). All 8 Striped Legless Lizards were recorded at tile grid 10, located in Stockyard Hill Road reserve (Figure 2c). They were recorded at this grid on three occasions (2 and 30 November, and 15 December 2011), with the additional record of two sloughs (shed skins) recorded on 16 November 2011 and 10 February 2012 (one on each occasion) (Tables 4-11). The greatest number of Striped Legless Lizards recorded on one date was 30 November, where 4 individuals were observed. Based on the presence of a population of Striped Legless Lizard, this part of the study area is considered to be of national significance (Appendix 1.3).

Three other locally common lizard species, Tussock Skink *Pseudemoia pagenstecheri*, Eastern Three-lined Skink *Bassiana duperreyi* and Eastern Striped Skink *Ctenotus robustus*, were observed during the tile inspections (Tables 4-9). Additional fauna species observed during tile checks were three frog species: Southern Brown Tree Frog *Litoria ewingii;* Spotted Marsh Frog *Limnodynastes tasmaniensis;* and, Southern Bullfrog *Limnodynastes dumerilii* and two mammal species; Fat-tailed Dunnart *Sminthopsis crassicaudata* and House Mouse *Mus musculus.*

Fat-tailed Dunnart, a regionally significant marsupial species, listed as near threatened on DSE's Advisory List (DSE 2007), was recorded on one occasion (30 November 2011) at tile grids 6 and 7. This species was also recorded during previous tile grid surveys of the study area, near a record from the current survey (Brett Lane & Associates 2009; Figure 2). Preferred habitat for Fat-tailed Dunnart has similar characteristics to suitable habitat for Striped Legless Lizard, therefore this species is often recorded during tile grid surveys where Striped Legless Lizard is the target species.

Table 4: Summary of results during tile check #1 (29/09/2011)

		Microclimate parameters						Results	
Grid #	Time	Ambient Temp ˚C	Humidity %	Wind m/s	Under tile temp ˚C	Above tile temp ˚C	Soil Temp ˚C	SLL present	Other spp
TG1	14.00	6.7	81.1	2.7	10.9	9.4	11.3		
TG2	13.00	9.6	75	7.2	11	10.6	12.1		
TG3	13.30	10.8	79	6.4	12.5	11.6	10.8		
TG4	8.45	8.2	100	2.9	12.5	9.7	10.6		
TG5	7.50	8	80.2	3	10.8	9.4	11.8		
TG6	10.45	9.9	80.4	2	11.7	13.3	11.8		
TG7	11.30	9.3	71	4.9	11.3	9.6	10.9		
TG8	12.50	13.3	76	1.8	15.3	14.3	13		MM
TG9	12.00	10.1	71.5	4.1	13.3	11.9	11		MM, PP
TG10	11.00	10.6	84	4.2	15.8	20.7	11.3		BD, PP, TS

Table 5: Summary of results during tile check #2 (13/10/2011)

		Microclimate parameters						Results	
Grid #	Time	Ambient Temp ˚C	Humidity %	Wind m/s	Under tile temp ˚C	Above tile temp ˚C	Soil Temp ˚C	SLL present	Other spp
TG1	9.10	10.9	82	0.3	13.6	15	10.3		
TG2	7.45	7.6	70.9	1.1	8.8	7.9	10.9		
TG3	8.00	8	79.4	0.5	6.9	5.9	9.6		LE
TG4	13.00	20.7	44.9	0.6	30.5	31.6	15		
TG5	11.15	18.6	54.7	1.3	29	23.4	12.4		
TG6	10.30	15.3	60.3	0.6	20.2	25.5	11.3		
TG7	10.00	16	75	1.9	15.4	16.3	10.5		
TG8	11.45	21	53.1	1.3	27.3	25.3	12.6		
TG9	12.00	19.6	56.5	1.5	23.1	32.5	10.2		PP
TG10	8.30	9.3	80.6	1.3	12	10.4	10.2		PP

Table 6: Summary of results during tile check #3 (2/11/2011)

Grid #	Time	Microclimate parameters						Results	
		Ambient Temp °C	Humidity %	Wind m/s	Under tile temp °C	Above tile temp °C	Soil Temp °C	SLL present	Other spp
TG1	10.30	12.6	91.5	1	18	7.8	15.5		CR
TG2	13.10	14.1	95.2	0.9	17.8	21.8	15.6		
TG3	13.20	14.9	86.8	2.5	19.7	20.7	14.7		
TG4	9.15	12	83	1.7	14.5	12.9	12.8		
TG5	10.20	11.9	100	1.6	17.4	16.4	14.5		
TG6	15.00	14.5	88.3	3.4	16.9	17.6	16.7		
TG7	11.30	13.1	100	4.1	16.3	16.7	14.9		
TG8	9.45	11.4	92	1.2	14.3	15.1	13.2		MM, LT
TG9	12.30	13.1	98.5	4	16.5	19.4	12.8		PP
TG10	11.00	13.1	100	1	16	15.8	12.9	2	BD

Table 7: Summary of results during tile check #4 (16/11/2011)

Grid #	Time	Microclimate parameters						Results	
		Ambient Temp °C	Humidity %	Wind m/s	Under tile temp °C	Above tile temp °C	Soil Temp °C	SLL present	Other spp
TG1	13.30	21.1	40.6	0.7	31.2	34.2	18.9		CT, LD
TG2	9.45	17.6	63.2	1	17.8	17.2	16.7		
TG3	9.20	17.4	62.3	1	19.5	18.4	14.6		
TG4	11.20	15.3	56.2	1.1	29.6	29	16.4		
TG5	10.35	15.6	57.3	1	26	29.2	17.7		
TG6	8.40	12.3	74.5	1.2	15.1	14.4	17.2		
TG7	14.15	22.4	41.9	1.2	39	41.1	24.1		
TG8	12.30	19.5	48.2	1.1	29.5	34	18		
TG9	12.15	19.4	46.6	1.3	23.1	30.4	15		
TG10	7.50	12	77	0.6	12.7	10.1	14.6	1 (slough)	

Table 8: Summary of results during tile check #5 (30/11/2011)

		Microclimate parameters						Results	
Grid #	Time	Ambient Temp °C	Humidity %	Wind m/s	Under tile temp °C	Above tile temp °C	Soil Temp °C	SLL present	Other spp
TG1	10.10	12.1	77.3	3.1	17.6	14.7	16.8		
TG2	12.35	13.2	77.5	2.2	18.8	20.3	16.8		
TG3	12.20	10.6	91.5	1.7	17.8	20.4	17.9		LT
TG4	9.25	10.5	69.8	0.6	15.7	15.9	16.4		
TG5	14.00	15.2	76.2	0.6	19.7	18.4	19.6		
TG6	11.20	12	83.1	3.3	17.7	14.5	18.4		SC
TG7	10.35	11.2	82.8	1.3	19	13.6	22.5		SC
TG8	8.55	13.3	72.1	1	15.9	15.1	16.4		TS
TG9	8.20	11.8	78.9	4.3	15.4	13	16.1		MM
TG10	13.20	9.9	98.9	1.5	14.9	14.7	16.6	4	

Table 9: Summary of results during tile check #6 (15/12/2011)

		Microclimate parameters						Results	
Grid #	Time	Ambient Temp °C	Humidity %	Wind m/s	Under tile temp °C	Above tile temp °C	Soil Temp °C	SLL present	Other spp
TG1	14.30	29	34	1.1	43.9	42.9	29.7		
TG2	10.00	14.9	48.8	0.4	18.1	19.1	15.6		
TG3	9.40	13.9	55.4	1	19.1	19.5	16.9		MM
TG4	11.50	21.6	36.6	1.2	30.7	43.2	19.1		
TG5	7.50	10.5	60.3	1.7	13.1	10.7	16.8		
TG6	11.05	20.7	38.2	1.4	31.5	32.3	20.2		
TG7	14.00	24.1	37.4	2.6	40.6	31.6	36.2		
TG8	8.15	12	61.9	0.5	12.8	12.3	14.3		
TG9	8.40	13.3	58.5	1.2	14.4	13.9	14.1		BD, PP
TG10	10.25	14.8	55	1.5	23.6	25.3	14.9	2	

Table 10: Summary of results during tile check #7 (5/01/2012)

Grid #	Time	Microclimate parameters						Results	
		Ambient Temp °C	Humidity %	Wind m/s	Under tile temp °C	Above tile temp °C	Soil Temp °C	SLL present	Other spp
TG1	13.20	23.7	30.5	1	32.9	32.6	28.5		
TG2	8.20	14.2	69.1	1.7	18.8	20.5	19.4		
TG3	8.35	15.2	61.4	0.9	18.7	17.5	19.9		
TG4	10.30	19.8	49.7	1.2	25.7	32.6	20.8		
TG5	11.15	21.5	41.3	0.8	30.1	40.5	24.5		
TG6	9.45	18.4	51.7	1.4	25	27.5	24.8		
TG7	12.55	19.8	31.6	1.3	43.4	41.2	27.6		
TG8	11.45	20.5	33.1	0.4	32.6	38.9	20.5		
TG9	12.15	25.7	31.8	1	30.8	38.3	18.7		
TG10	7.50	9.6	86	1.6	13.5	11.1	17.8		

Table 11: Summary of results during tile check #8 (10/02/2012)

Grid #	Time	Microclimate parameters						Results	
		Ambient Temp °C	Humidity %	Wind m/s	Under tile temp °C	Above tile temp °C	Soil Temp °C	SLL present	Other spp
TG1	9.25	16.8	73.4	0.3	22.1	23.3	22		
TG2	11.25	14	55.7	0.4	23.7	24.2	22.9		
TG3	11.40	20	66.5	0.5	22.2	23.6	22		
TG4	8.10	13.8	83.4	0.3	18.5	16.7	17.7		
TG5	7.30	13.7	75.9	0.1	17.1	16	19.5		
TG6	10.15	13.7	61.6	0.6	22.7	20.3	21.3		
TG7	9.55	17.2	73	0.3	22.7	23.4	22.6		
TG8	8.45	13.3	86.9	0.3	18.2	17.2	18.4		
TG9	9.05	14.1	83.8	0.3	19.7	18.4	19.1		
TG10	10.40	17.9	73.9	0.5	25.2	24	18.4	1 (slough)	

Note: SLL (Striped Legless Lizard); LT (*Limnodynastes tasmaniensis*); LE (*Litoria ewingii*); LD (*Limnodynastes dumerilii*); BD (*Bassiana duperreyi*); CR (*Ctenotus robustus*); PP (*Pseudemoia pagenstecheri*); TS (*Tiliqua scincoides*); MM (*Mus musculus*); and, SC (*Sminthopsis crassicaudata*).

3.2.1 Habitat assessment

The majority of the study area is modified, as a result of previous land practices (i.e. surface rock removal, cultivation and grazing). However, areas supporting suitable habitat in the form of modified native grasslands, embedded and surface basalt rock and heavy, cracking clay soils are present in several sites within the study area. The likelihood of occurrence for Striped Legless Lizard within the study area varies from known/highly likely to low/unlikely based on the variety of habitat present. An example of a 'highly likely' site would be where there is a high percentage cover of indigenous grasses and an abundance of surface and e

mbedded rock (Figure 4). Examples of 'low likelihood' habitat can be found in several properties which are actively cultivated and thus support no suitable habitat features (Figure 4).

Both suitable and unsuitable habitat occurs throughout the study area, though suitable habitat largely occurs in the centre of the study area, between Stockyard Hill Road and Beaufort-Carranballac Road. Additional areas considered likely to support the species occur in the north-west section and south-east section of the study area. There are several other properties given a moderate likelihood of occurrence based on the presence of some suitable habitat features, such as presence of indigenous tussock grasses and/or embedded rock. The ratings attributed to each property's likelihood to support Striped Legless Lizard are outlined below:

- **Rating 1** (Records of Striped Legless Lizard / High quality habitat)
- **Rating 2** (High quality habitat / High likelihood)
- **Rating 3** (Moderate quality habitat / Moderate likelihood)
- **Rating 4** (Low quality or, no suitable habitat / Low likelihood)

These ratings were allocated to properties based on the presence of the preferred habitat characteristics of Striped Legless Lizard and proximity to current and/or previous records of the species. A summary of the properties which fall into the aforementioned likelihood categories and a description of habitat condition are outlined below (Table 12) and represented in Figure 4. Other habitat features taken into consideration for determining quality are outlined in Appendix A1.4.

Table 12. *Habitat condition and ratings assigned to properties within Stockyard Hill Wind Farm.*

Habitat rating	Properties included	General habitat description
Rating 1	29, 30 (Figure 4c)	Rating 1 habitat is defined as a site where Striped Legless Lizard (SLL) were recorded during the present survey, or have previously been recorded within the study area. It supports high quality habitat, with several of the preferred structural characteristics including; native tussock grasses, embedded and surface rock and cracking soils. This habitat is also connected to surrounding high quality habitat and areas where there are historical records (i.e. Blacks Creek Reserve)
Rating 2	4, 24, 25, 27, 28, 29, 34, 43, 45, 47, 49, 50 (Figure 4a-e)	Rating 2 habitats are defined as areas where SLL are considered highly likely to occur but the species is yet to be recorded. It supports high quality habitat, with several of the preferred structural characteristics including; native tussock grasses, embedded and surface rock and cracking soils. This habitat is generally connected to high or moderate quality habitat.
Rating 3	4, 6, 9, 11, 14, 15, 21, 22, 41, 43, 45, 48, 50 (Figure 4a-e)	Rating 3 habitats are defined as areas where SLL are considered moderately likely to occur. It supports moderate quality habitat, with one or two of the preferred habitat characteristics (i.e. embedded rock, but no native grass cover). This habitat generally adjoins Rating 2 habitat, but is less suitable for SLL.
Rating 4	1, 2, 5, 7, 8, 10, 12, 13, 17, 18, 19, 20, 22, 23, 24, 25, 29, 40, 41, 42, 44, 48, 50 (Figure 4a-e)	Rating 4 habitats are defined as areas where SLL are considered unlikely to occur. This habitat type is largely cultivated land (i.e. actively cropped or ploughed) and does not support suitable habitat characteristics for SLL. Areas not cultivated that may still fall under Rating 4 are those with no native grass cover, improved (fertilised) soils and no surface or embedded rock.

4 LEGISLATIVE IMPLICATIONS OF THE FINDINGS

4.1 Legislative and Policy Implications

This section identifies biodiversity policy and legislation relevant to the proposed development, and principally addresses the:

- Commonwealth *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act)
- Victorian *Flora and Fauna Guarantee Act 1988* (FFG Act)
- *Wildlife Act 1975* and *Wildlife Regulations 2002*
- *Planning and Environment Act 1987*

4.2 *Environment Protection and Biodiversity Conservation Act 1999*

The EPBC Act establishes a Commonwealth process for assessment of proposed actions that are likely to have a significant impact on matters of National Environmental Significance (NES), or on Commonwealth land. An action (i.e. project, development, undertaking, activity, or series of activities), unless otherwise exempt, requires approval from the Commonwealth Environment Minister if they are considered likely to have an impact on any matters of NES. A referral under the EPBC Act is required if a proposed action is likely to have a 'significant impact' on any of the following matters of NES:

- World Heritage properties
- National heritage places
- Ramsar wetlands of international significance
- Threatened species and ecological communities
- Migratory and marine species
- Commonwealth marine area
- Nuclear actions (including uranium mining)
- Great Barrier Reef Marine Park

An action requires approval from the Commonwealth Environment Minister if it will, or if it is likely to, have a significant impact on an endangered or critically endangered species, or on an 'important population' or critical habitat of a listed vulnerable species.

Eight Striped Legless Lizards, a species listed as Vulnerable under the EPBC Act, were recorded at one survey location within the study area during targeted surveys. In addition, the study area supports several other areas of high quality habitat considered likely to support the species.

Implications for the wind farm development

An EPBC Act referral to the Commonwealth Environment Minister has already been submitted and approved (EPBC Approval 2009/4719).

It is a requirement of approval condition 1 and 3, that SHWFPL document the results of these targeted surveys and submit to the Department for approval, a salvage and translocation plan for relocating Striped Legless Lizards disturbed during construction of the wind farm. This plan must be approved prior to the commencement of works on site and all works in areas of Striped Legless Lizard habitat must follow the approved plan.

4.3 *Flora and Fauna Guarantee Act 1988*

The primary legislation for the protection of flora and fauna in Victoria is the FFG Act. The Act builds on broader national and international policy in the conservation of biodiversity.

The broad objectives of the FFG Act are to:

1) Ensure native flora and fauna survive, flourish and maintain in situ evolutionary potential,
2) Manage threatening processes,
3) Encourage the conserving of flora and fauna through cooperative community endeavours, and
4) Establish a regulatory structure for the conservation of flora and fauna in Victoria.

The Act contains protection procedures such as the listing of threatened species and/or communities of flora and fauna, and the preparation of action statements to protect the long-term viability of these values.

Implications for the wind farm development

The targeted surveys recorded Striped Legless Lizards which are listed under the FFG Act. As Striped Legless Lizards were recorded within public land (within Stockyard Hill Road reserve), the proponent (SHWFPL) will be required to obtain a permit to 'impact upon fauna habitat' should any works be required along this area of known habitat.

In addition, the preparation of the Salvage and Translocation Plan should take into consideration the conservation objectives outlined in the Action Statement for Striped Legless Lizards (Action Statement #17), prepared under the FFG Act by DSE (2003).

4.4 *Wildlife Act 1975 and Wildlife Regulations 2002*

The *Wildlife Act 1975* is the primary legislation in Victoria providing for protection and management of wildlife.

The Act requires people engaged in wildlife research (e.g. fauna surveys, salvage and translocation activities) to obtain a permit under the Act to ensure that these activities are undertaken in a manner consistent with the appropriate controls.

The *Wildlife Act 1975* has the following objectives:

- To establish procedures for the promotion of protection and conservation of wildlife, the prevention of species extinctions, and the sustainable use and access to wildlife; and,
- To prohibit and regulate the conduct of those involved in wildlife related activities.

Wildlife Regulations 2002

The objectives of the Wildlife Regulations are:

- To make further provision in relation to the licensing system established by section 22 of the *Wildlife Act* 1975;
- To prescribe fees, offences, royalties and various other matters for the purposes of the *Wildlife Act* 1975; and,
- To provide for exemptions from certain provisions of the *Wildlife Act* 1975.

Implications and Recommendations

While a permit will be required for removal of habitat within the study area, this will likely be incorporated into the permit to remove native vegetation under the *Planning and Environment Act 1987*.

Consequently, a separate permit to remove fauna for this project under either the *Wildlife Act 1975* or the *Wildlife Regulations 2002* is unlikely to be required if a permit under the *Planning and Environment Act 1987* is obtained. However, any permit under the *Wildlife Act 1975* will need to be discussed with DSE and is likely to be dependent upon the following:

- Other permits and approvals and the extent of consultation and involvement with DSE; and,
- Extent of salvage and translocation that may be undertaken as part of the proposed development.

As construction within the study area will likely require the direct removal of Striped Legless Lizard habitat, a Management Authorisation permit for the capture and release of Striped Legless Lizard will need to be obtained prior to any salvage and translocation works within the study area. This Management Authorisation authorises the holder to salvage, temporarily hold or translocate any Striped Legless Lizard captured during construction of the wind farm. All salvage activities under the permit obtained will need to be in accordance with the Salvage and Translocation Plan, to be prepared to the satisfaction of SEWPaC and DSE.

4.5 *Planning and Environment Act 1987*

Pyrenees Shire Council

The wind farm site is wholly located within the Pyrenees Shire Council municipality, and there are no overlays within the study area. There is a requirement to satisfactorily complete Condition 11 of the wind energy facility (WEF) Permit No: PL-SP/05/0548 (in relation to the wind farm site).

Implications for the Proposed Development

A Planning Permit under the Pyrenees Planning Scheme has already been obtained (Permit No: PL-SP/05/0548) and Condition 11 refers to Striped Legless Lizard, stating that:

> "*Before development begins, a survey to identify the exact extent of non-indigenous habitat for the Striped Legless Lizard must be undertaken by a qualified ecologist, to the satisfaction of the Minister for Planning upon the advice of DSE. Should suitable habitat of the Striped Legless Lizard be identified, the wind farm infrastructure layout must be micro-sited to avoid these areas to the satisfaction of the Minister for Planning. If avoidance is not possible, then a salvage protocol for relocating disturbed individuals must be applied prior to construction to the satisfaction of the Minister for Planning on the advice of DSE.*"

Striped Legless Lizard habitat assessments were undertaken during the targeted survey period and the extent and quality of habitat for the species mapped (Figure 4). This habitat mapping will need to be considered during detailed design for micro-siting of final infrastructure layout, to avoid and minimise impacts to identified Striped Legless Lizard habitat where practicable. In addition, a Salvage and Translocation Plan will be prepared to the satisfaction of SEWPaC (as per EPBC Act approval 2009/4719; Condition 3) for any salvage activities required during construction, where suitable habitat cannot be avoided.

5 POTENTIAL IMPACTS AND MITIGATION MEASURES

Any loss of habitat for nationally significant fauna species due to the proposed development should be viewed in the overall context of ongoing loss, fragmentation, and deterioration in the quality of remnant grasslands for Striped Legless Lizard throughout the Victorian Volcanic Plain bioregion.

It is understood that SHWFPL, in association with DSE, and input from Ecology and Heritage Partners, will develop management recommendations and contingencies to mitigate/ameliorate potential impacts on Striped Legless Lizard and their habitat in the study area. These recommendations and actions will be detailed in the Striped Legless Lizard Salvage and Translocation Plan, to be prepared to the satisfaction of SEWPaC and DSE.

Ecology and Heritage Partners also recommends that the following should be considered:

- Stockyard Hill Road reserve, which is known to support a significant population of Striped Legless Lizard, should be excluded from construction activities as far as practicable. This includes any potential widening of the road, which will impact on this known habitat corridor for the species;

- Habitat areas given a Rating 2 should be subject to micro-siting to avoid Striped Legless Lizard habitat as far as practicable. Further recommendations on the avoidance and minimisation of impacts on habitat will be incorporated into the Striped Legless Lizard Salvage and Translocation Plan;

- All construction works should minimise vehicle movements off formed roads and access tracks within properties where Striped Legless Lizard habitat is identified (Figure 4a-e), to minimise impacts to those habitat areas;

- A qualified herpetologist/zoologist familiar with the capture and handling of Striped Legless Lizard should be present for the disturbance and/or removal of identified habitat to salvage any displaced individuals. Details of the methodology to be employed during construction works will be outlined in the Striped Legless Lizard Salvage and Translocation Plan;

- Zoologists undertaking any capture and relocation activities for Striped Legless Lizard within the study area will be required to obtain a Management Authorisation permit under the *Wildlife Act 1975*, issued by DSE; and,

- Consideration of the regionally significant Fat-tailed Dunnart, also recorded within the study area should be incorporated into any salvage works undertaken within the study area.

6 CONCLUSION

Eight Striped Legless Lizards and two sloughs were recorded within the study area during targeted surveys, along Stockyard Hill Road (tile grid 10). In addition, two Fat-tailed Dunnarts listed as regionally significant were also recorded under tile grid 6 and 7 on one occasion at each location (Figure 2).

While the study area is largely modified due to historic land use practices (i.e. cultivation and improved pasture), there are large areas of suitable habitat for Striped Legless Lizards. The study area has been subject to habitat assessments in conjunction with targeted survey and subsequently categorised into one of four habitat quality ratings (from known and high quality habitat through to low quality habitat) for the species. These areas have been presented in Figure 4 (a-e) and will be reflected in the management actions and salvage requirements to be implemented during construction of the wind farm.

It is a requirement of EPBC Act approval (EPBC 2009/4719) Condition 3 that; SHWFPL submit to SEWPaC for approval, a Salvage and Translocation Plan for Striped Legless Lizard that may be impacted during construction works. This plan must be submitted and approved by SEWPaC and DSE prior to the commencement of construction within areas of identified Striped Legless Lizard habitat. In addition, a Management Authorisation under the *Wildlife Act 1975* will need to be obtained prior to implementing the plan and the commencement of any salvage activities within the Stockyard Hill Wind Farm.

Subject to addressing the recommendations of this report and complying with the WEF Permit and EPBC Approval (EPBC 2009/4719), it is considered the development of the Stockyard Hill Wind Farm will be able to proceed in a manner that does not significantly impact on the local population of Striped Legless Lizard.

FIGURES

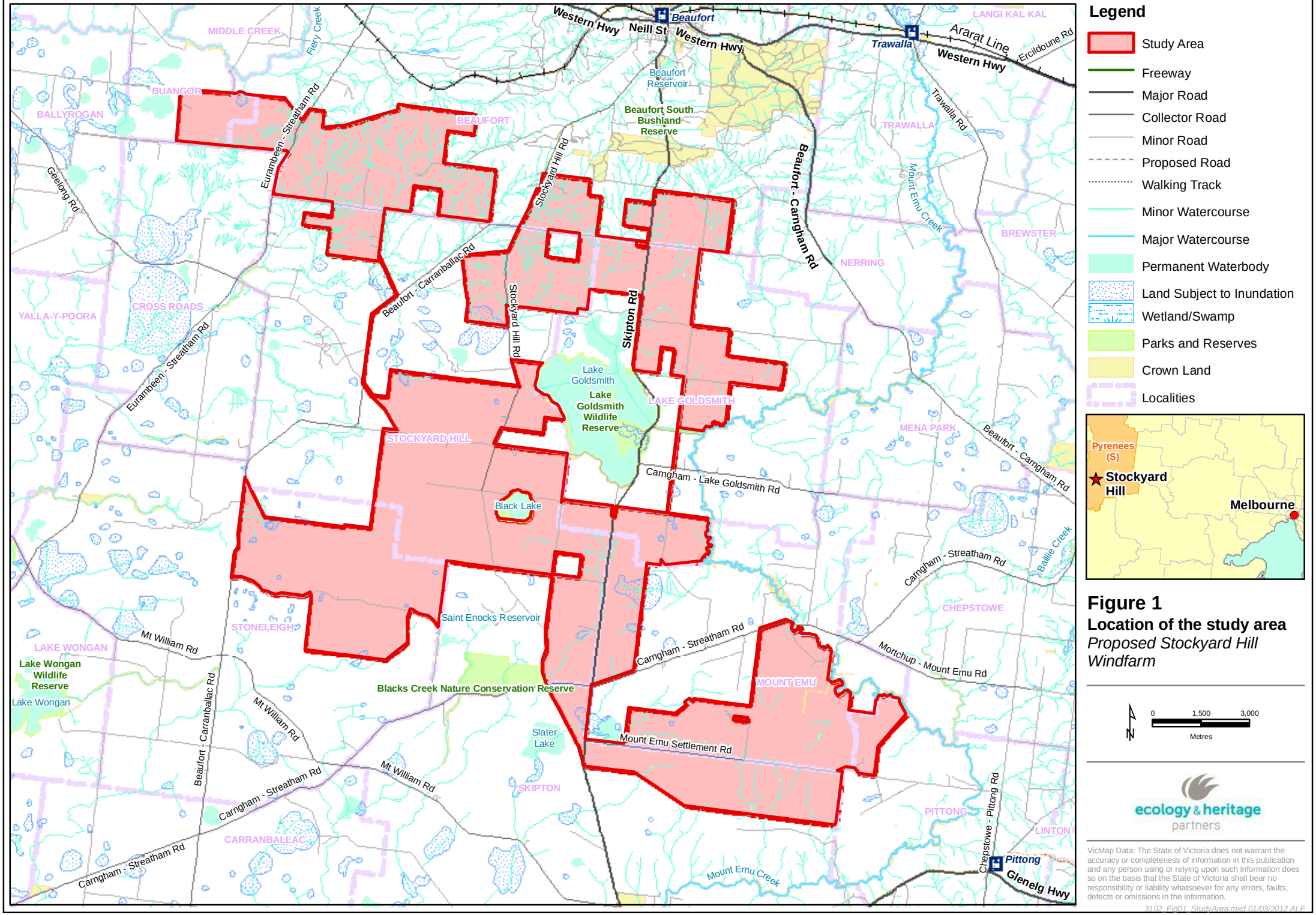

Figure 1

Location of the study area

Proposed Stockyard Hill Windfarm

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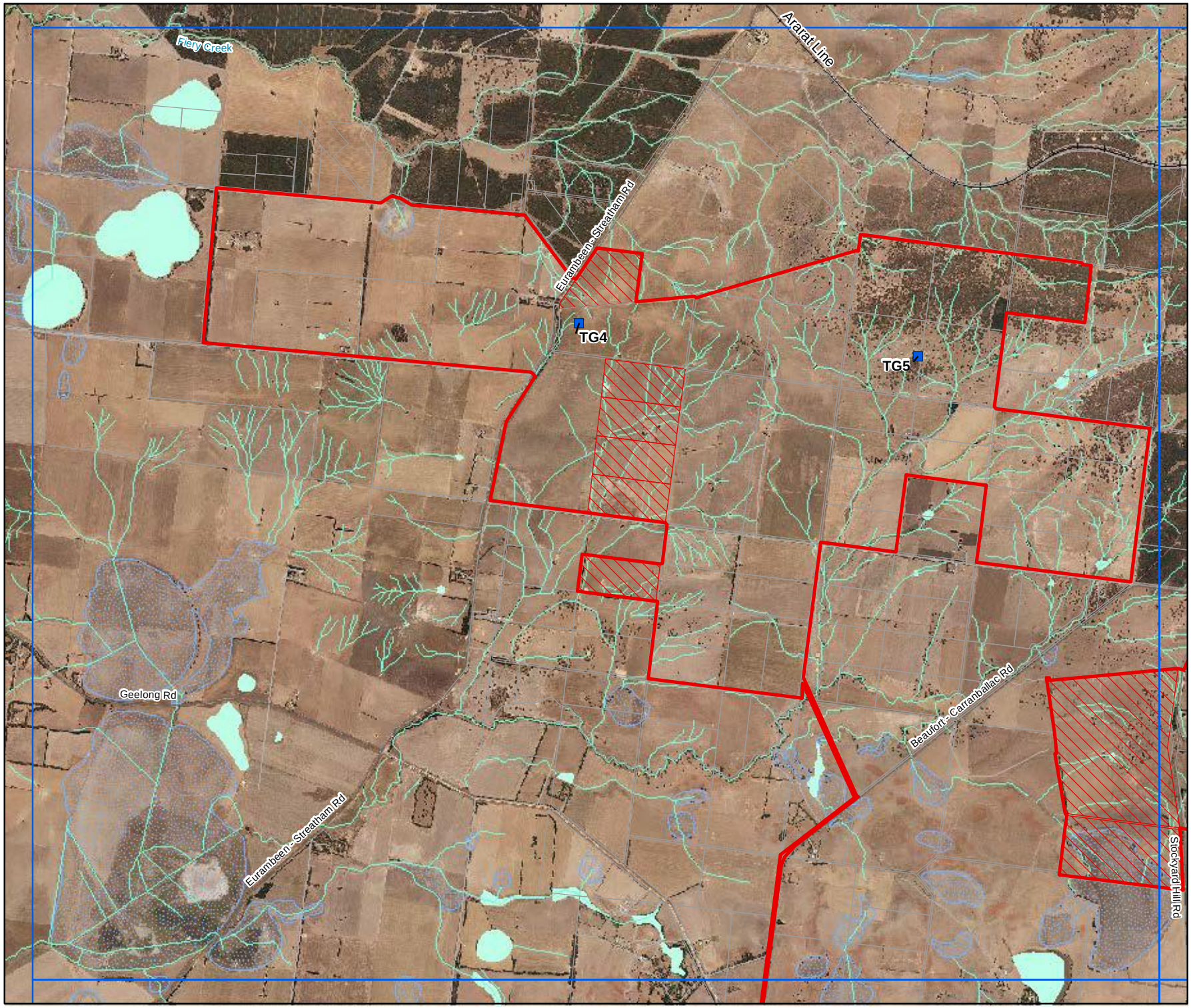

Legend

- Study Area
- Landowner not participating
- Property Boundary
- Tile Grid Locations

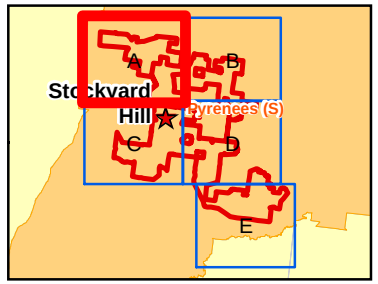

Figure 2A

Location of Tile Grids

Proposed Stockyard Hill Windfarm

N

0 600 1,200

Metres

ecology & heritage partners

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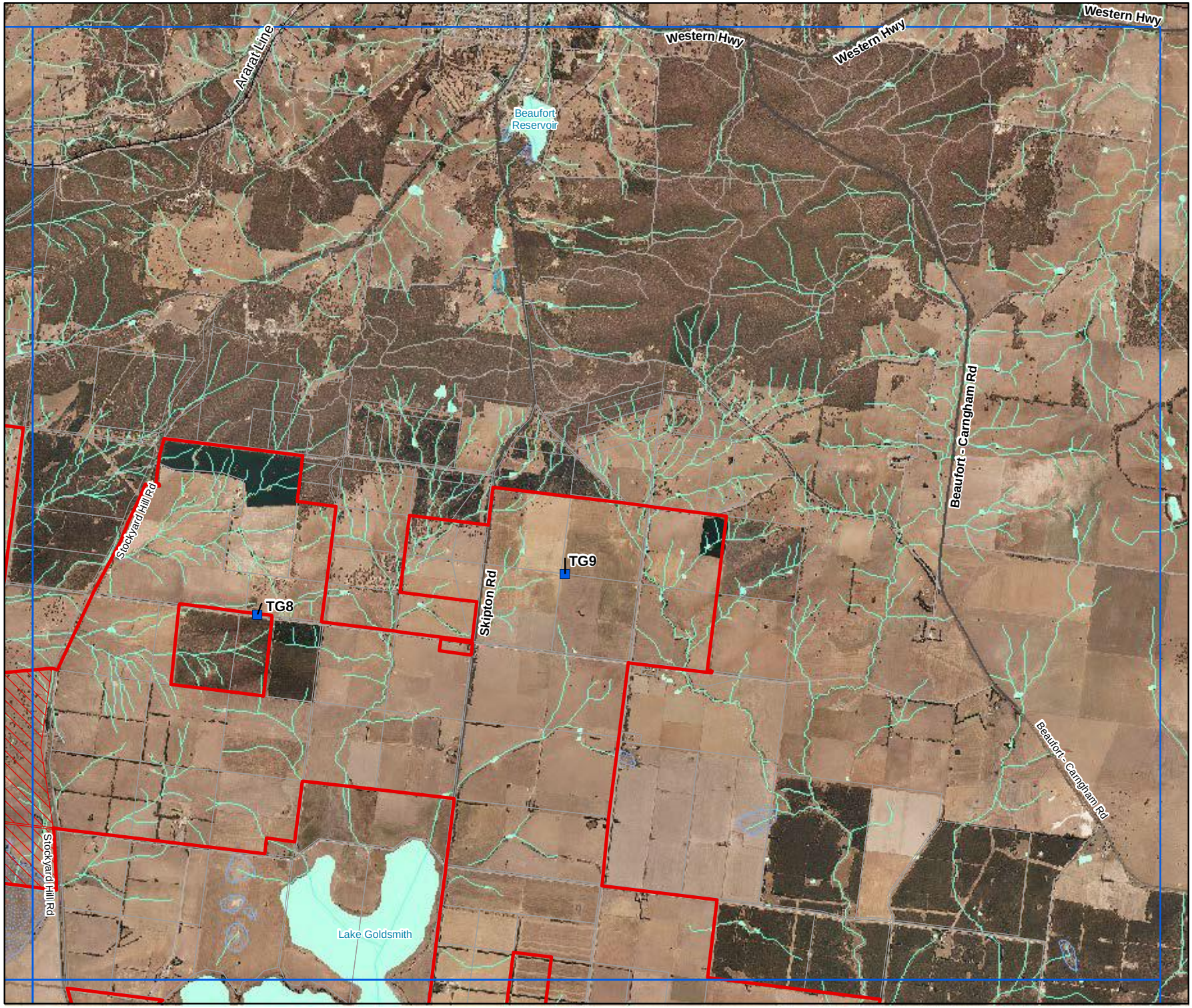

Legend

- Study Area
- Landowner not participating
- Property Boundary
- Tile Grid Locations

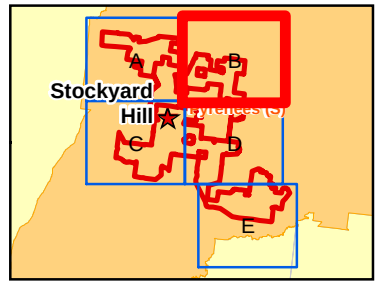

Figure 2B

Location of Tile Grids

Proposed Stockyard Hill Windfarm

N

0 600 1,200

Metres

ecology & heritage partners

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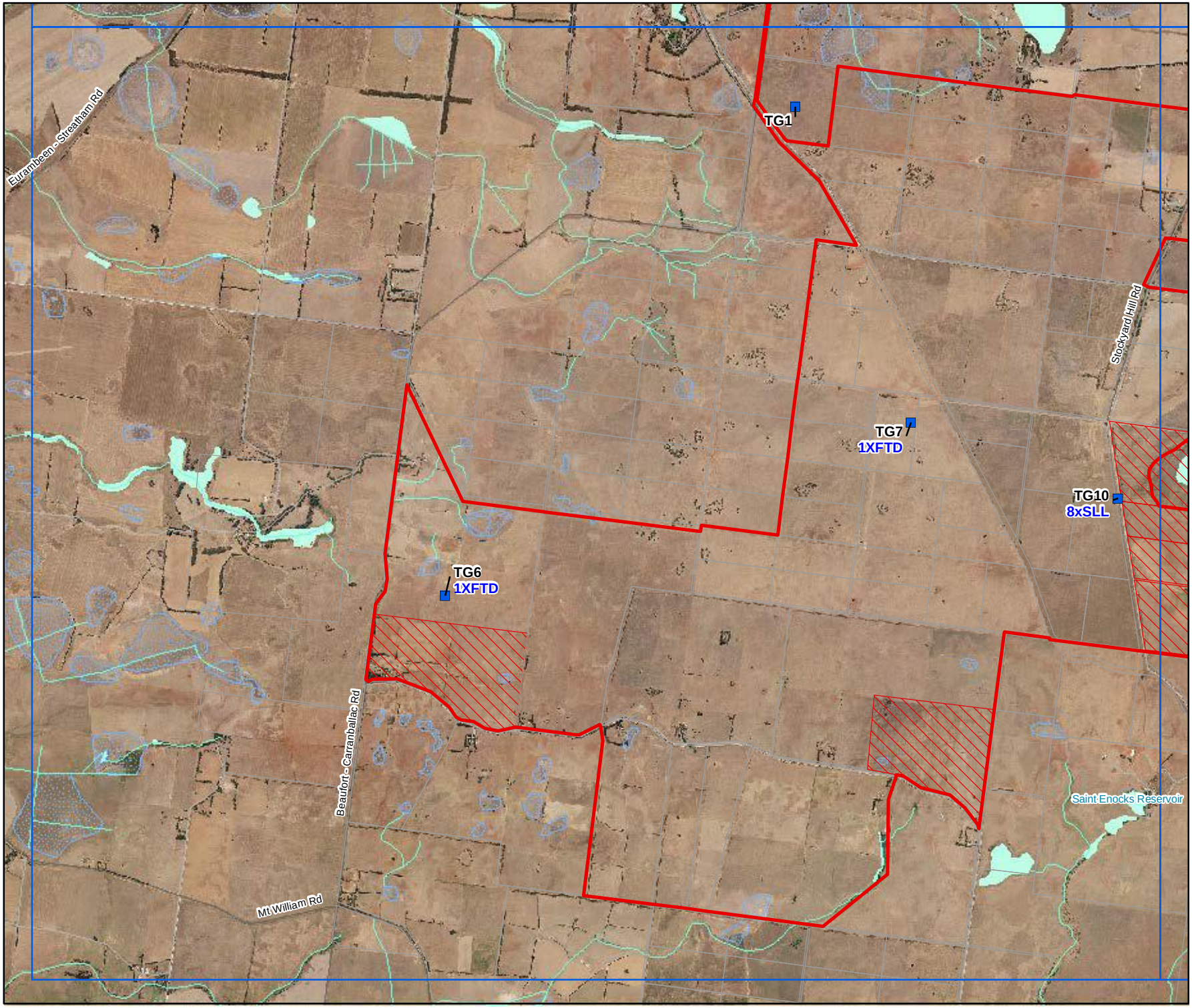

Legend

- Study Area
- Landowner not participating
- Property Boundary
- Tile Grid Locations

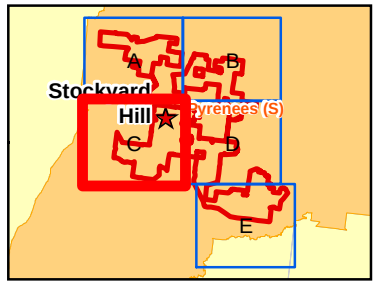

Figure 2C

Location of Tile Grids

Proposed Stockyard Hill Windfarm

N

0 600 1,200

Metres

ecology & heritage partners

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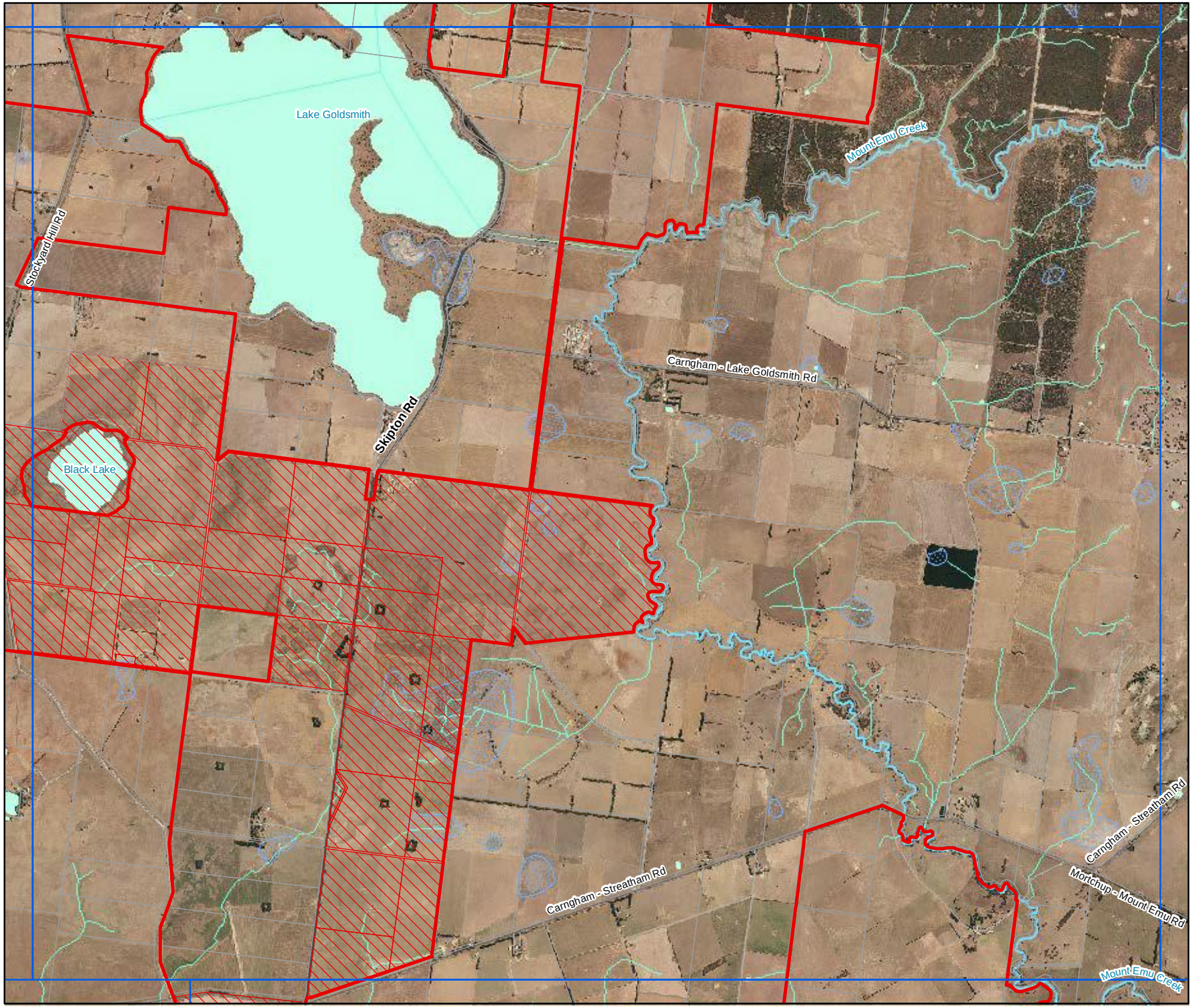

Legend

- Study Area
- Landowner not participating
- Property Boundary
- Tile Grid Locations

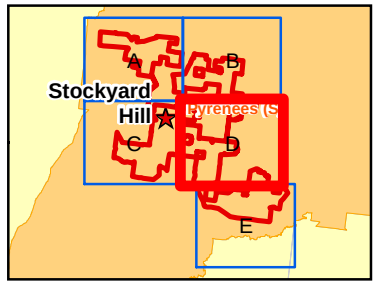

Figure 2D

Location of Tile Grids

Proposed Stockyard Hill Windfarm

N

0 600 1,200

Metres

ecology & heritage partners

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Legend

- Study Area
- Landowner not participating
- Property Boundary
- Tile Grid Locations

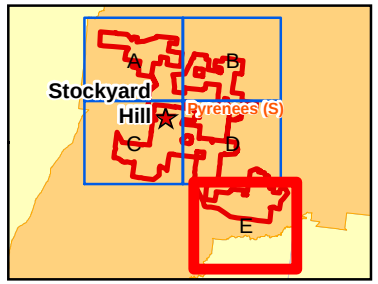

Figure 2E

Location of Tile Grids

Proposed Stockyard Hill Windfarm

N

0 600 1,200

Metres

ecology & heritage partners

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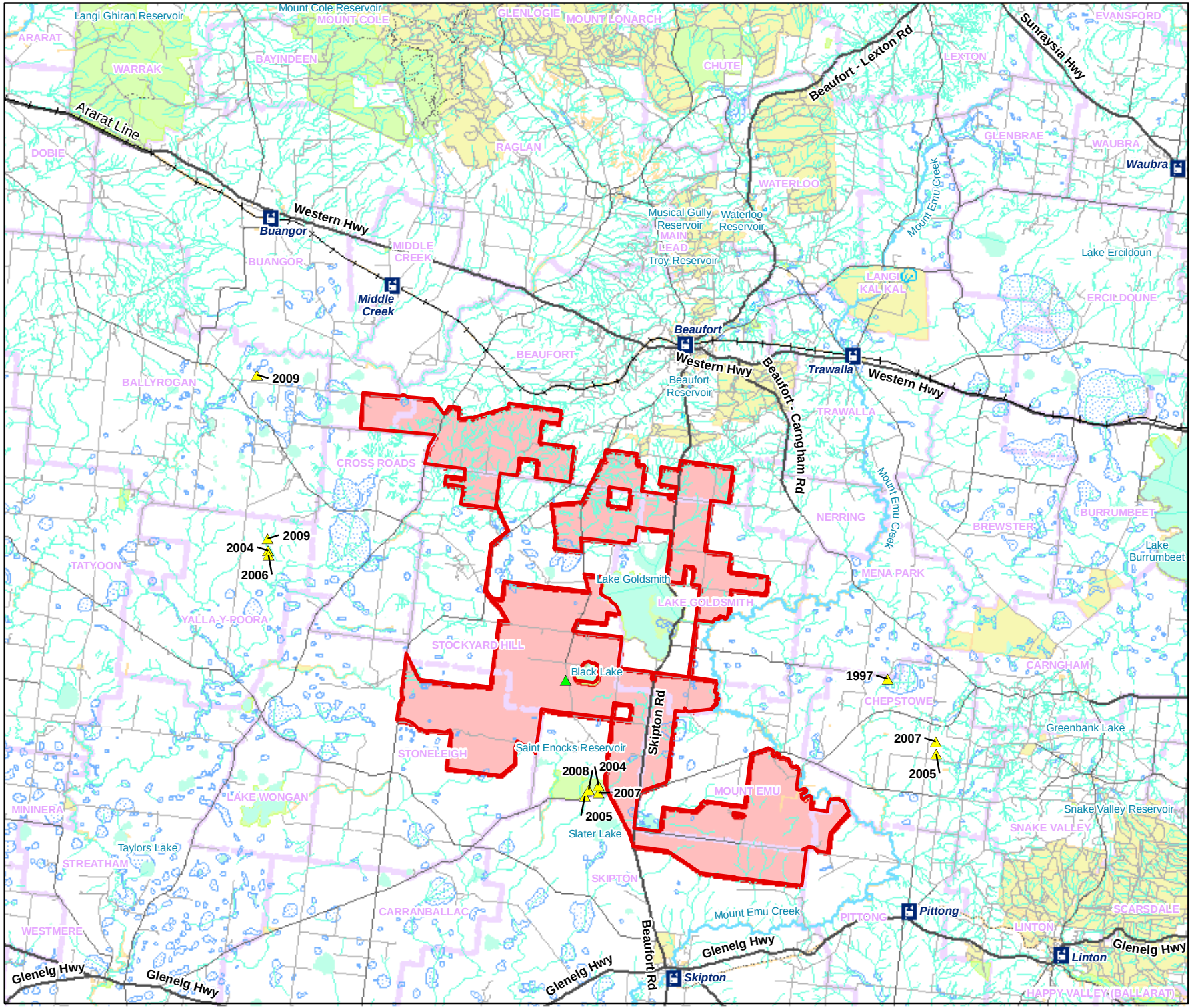

Legend

- Study Area
- Victorian Biodiversity Atlas Records
- Brett Lane & Associates Record

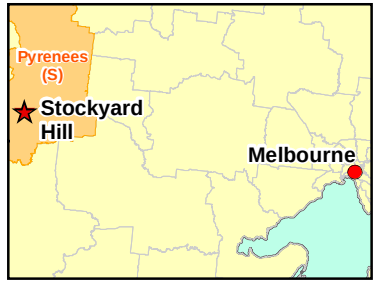

Figure 3

Location of Previous Striped Legless Lizard Records

Proposed Stockyard Hill

0 2,350 4,700

Metres

ecology & heritage partners

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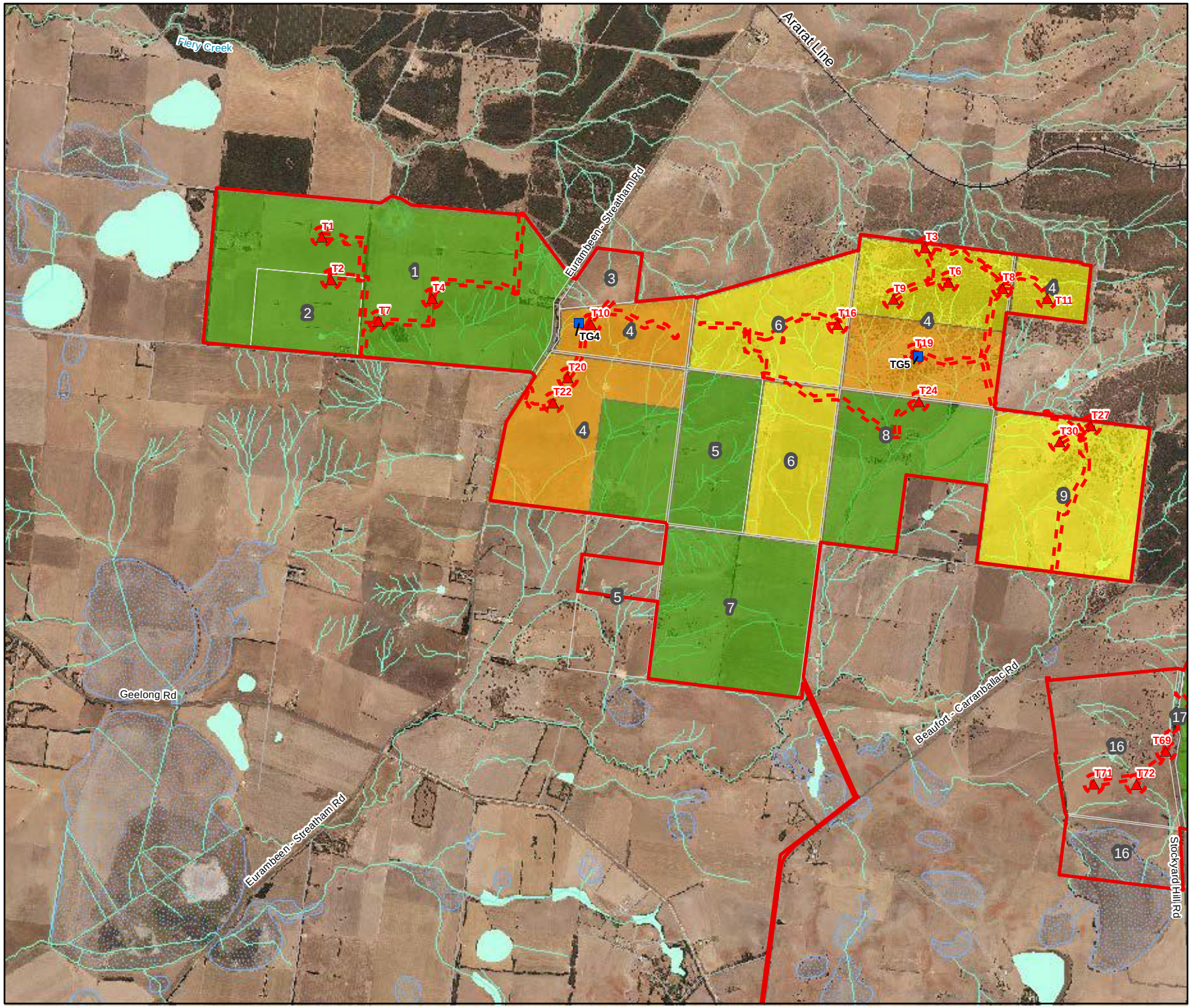

Legend

- Study Area
- Property Boundaries
- Tile Grid Locations

Potential SLL Habitat

- Known
- High
- Moderate
- Low
- Permitted - 50m access track
- Permitted - Turbines
- 37 Unique EHP Property Identifier

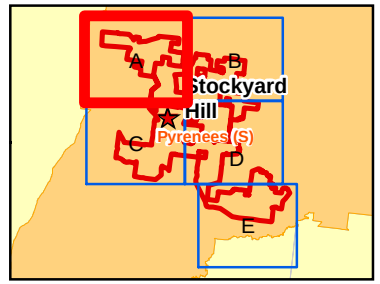

Figure 4A

Location of Potential Striped Legless Lizard Habitat

Proposed Stockyard Hill

N

0 600 1,200

Metres

ecology & heritage partners

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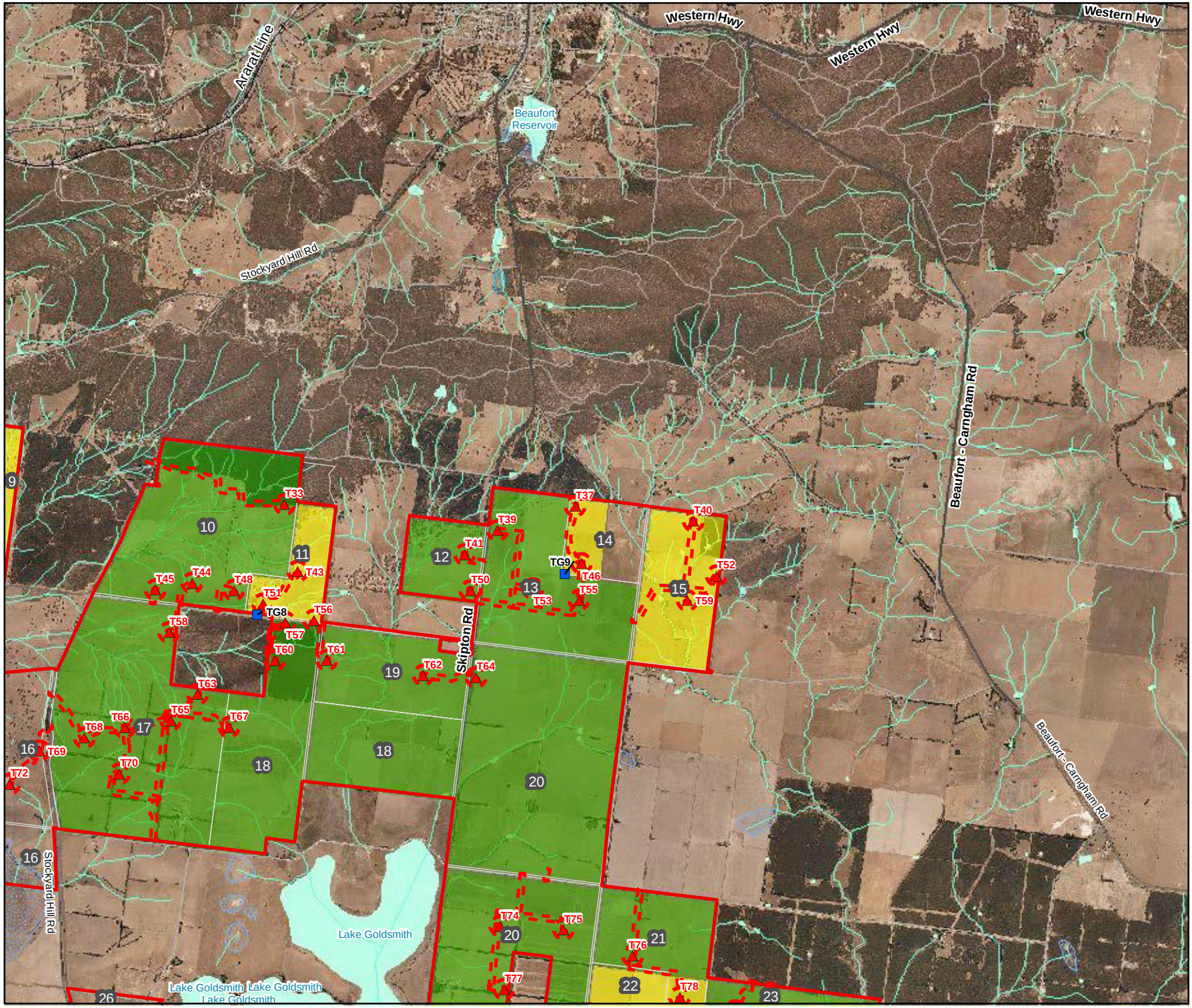

Legend

- Study Area
- Property Boundaries
- Tile Grid Locations

Potential SLL Habitat

- Known
- High
- Moderate
- Low
- Permitted - 50m access track
- Permitted - Turbines
- 37 Unique EHP Property Identifier

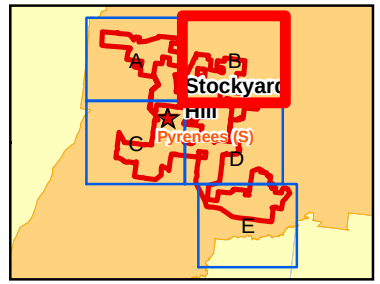

Figure 4B

Location of Potential Striped Legless Lizard Habitat

Proposed Stockyard Hill

N

0 600 1,200

Metres

ecology & heritage partners

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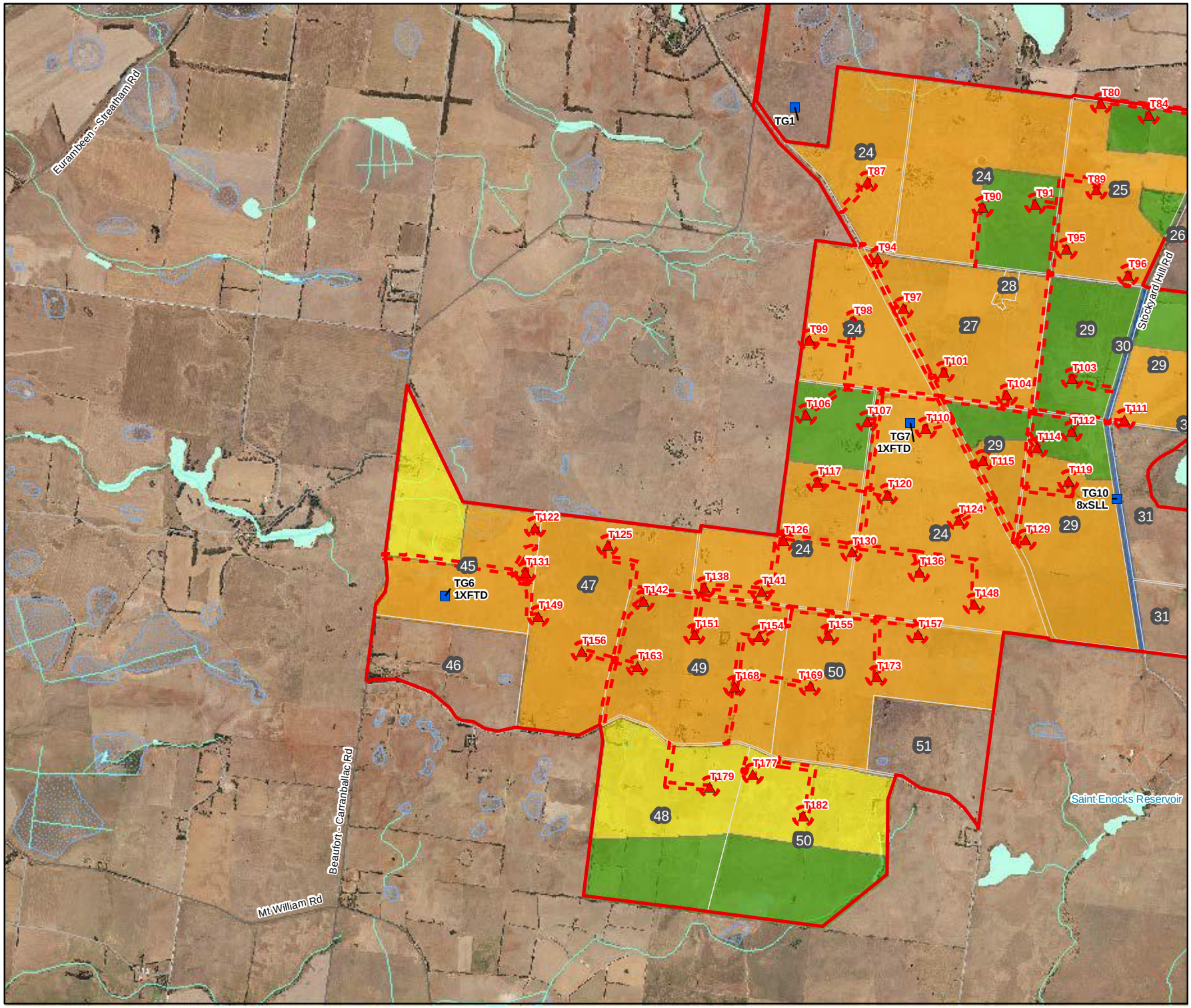

Legend

- Study Area
- Property Boundaries
- Tile Grid Locations

Potential SLL Habitat

- Known
- High
- Moderate
- Low
- Permitted - 50m access track
- Permitted - Turbines
- 37 Unique EHP Property Identifier

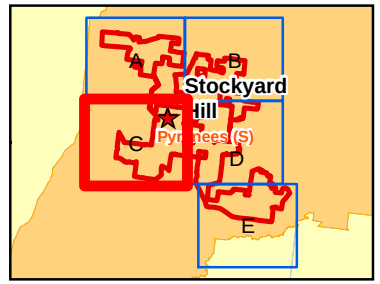

Figure 4C

Location of Potential Striped Legless Lizard Habitat

Proposed Stockyard Hill

N

0 600 1,200

Metres

ecology & heritage partners

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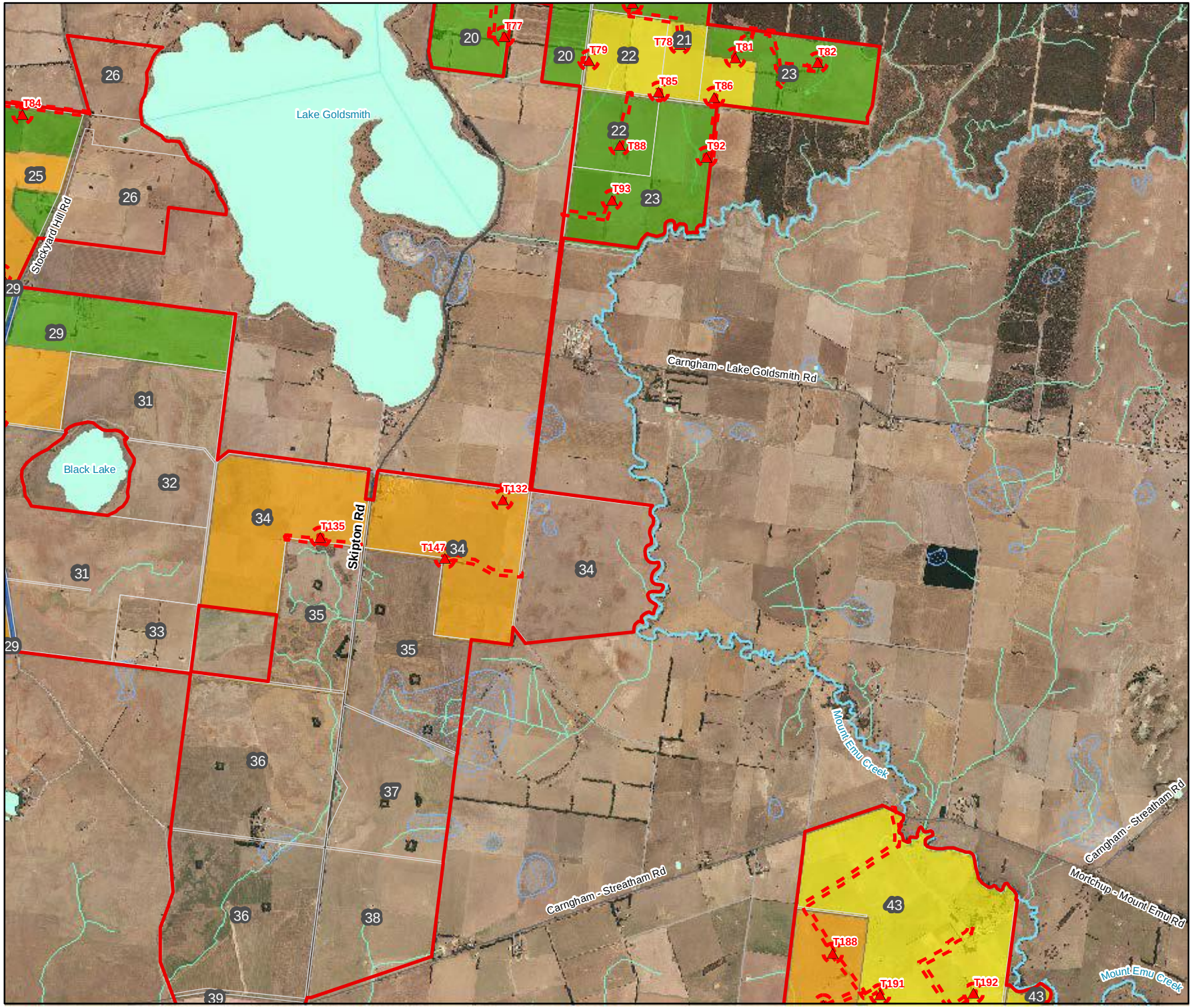

Legend

- Study Area
- Property Boundaries
- Tile Grid Locations

Potential SLL Habitat

- Known
- High
- Moderate
- Low
- Permitted - 50m access track
- Permitted - Turbines
- Unique EHP Property Identifier

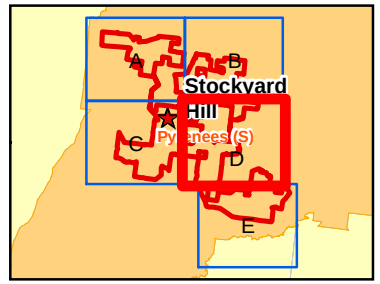

Figure 4D

Location of Potential Striped Legless Lizard Habitat

Proposed Stockyard Hill

N

0 600 1,200

Metres

ecology & heritage partners

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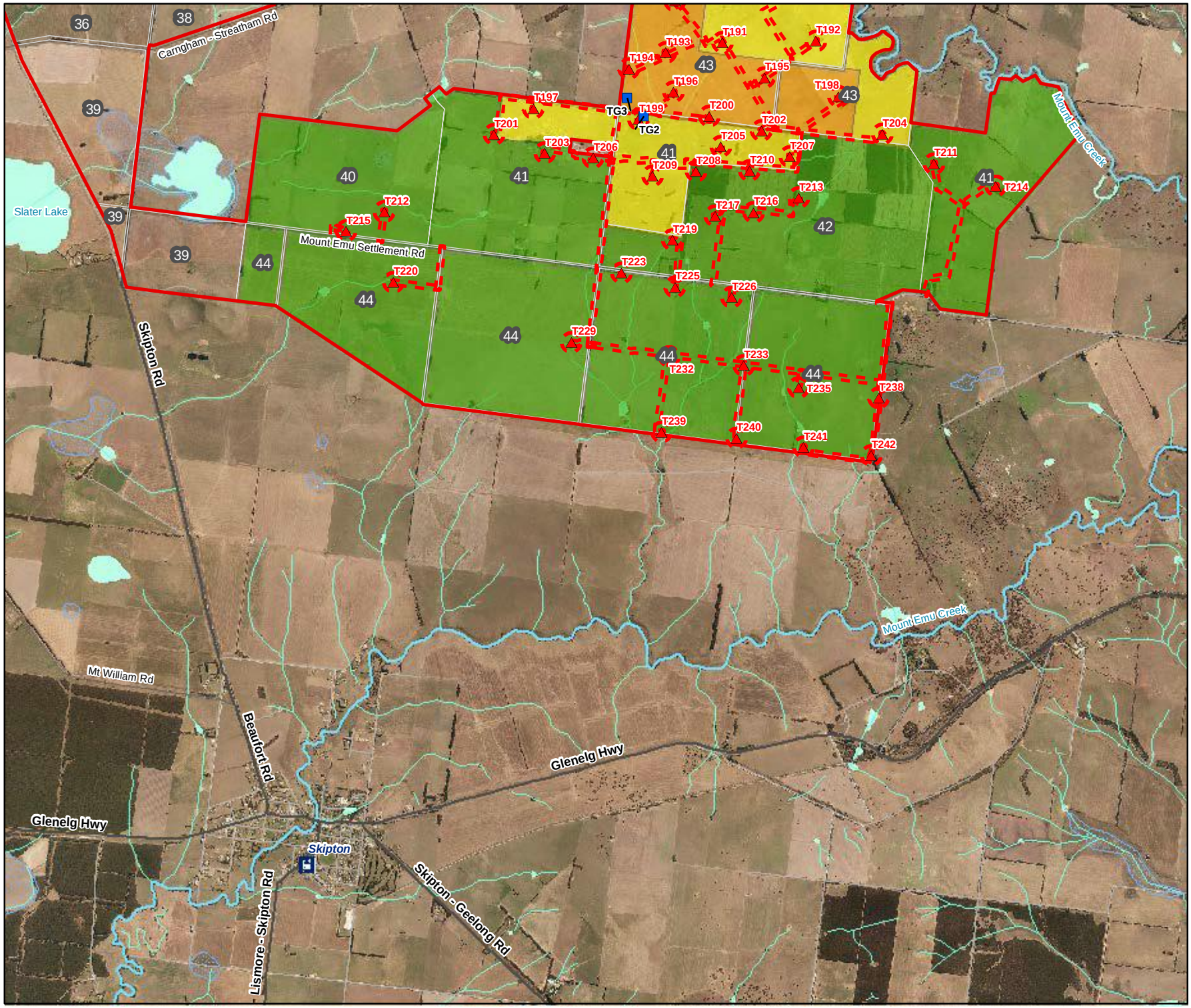

Legend

- Study Area
- Property Boundaries
- Tile Grid Locations

Potential SLL Habitat

- Known
- High
- Moderate
- Low
- Permitted - 50m access track
- Permitted - Turbines
- 37 Unique EHP Property Identifier

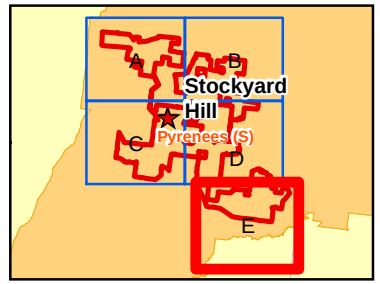

Figure 4E

Location of Potential Striped Legless Lizard Habitat

Proposed Stockyard Hill

N

0 600 1,200

Metres

ecology & heritage partners

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APPENDICES

Appendix 1 – Significance Assessment

Criteria used by Ecology and Heritage Partners Pty Ltd to define conservation significance, vegetation condition and habitat quality is provided below.

A1.1. Rare or Threatened Categories for Listed Victorian Taxa

Table A1.1. *Rare or Threatened categories for listed Victorian taxa.*

Rare or Threatened Categories
CONSERVATION STATUS IN AUSTRALIA **(Based on the EPBC Act 1999, Briggs and Leigh 1996)**
EX - Extinct: Extinct is when there is no reasonable doubt that the last individual of the species has died.
CR - Critically Endangered: A species is critically endangered when it is facing an extremely high risk of extinction in the wild in the immediate future.
EN - Endangered: A species is endangered when it is not critically endangered but is facing a very high risk of extinction in the wild in the near future.
VU - Vulnerable: A species is vulnerable when it is not critically endangered or endangered but is facing a high risk of extinction in the wild in the medium-term future.
R* - Rare: A species is rare but overall is not currently considered critically endangered, endangered or vulnerable.
K* - Poorly Known: A species is suspected, but not definitely known, to belong to any of the categories extinct, critically endangered, endangered, vulnerable or rare.
CONSERVATION STATUS IN VICTORIA **(Based on DSE 2005, DSE 2007, DSE 2009)**
x - Presumed Extinct in Victoria: not recorded from Victoria during the past 50 years despite field searches specifically for the plant, or, alternatively, intensive field searches (since 1950) at all previously known sites have failed to record the plant.
e - Endangered in Victoria: at risk of disappearing from the wild state if present land use and other causal factors continue to operate.
v - Vulnerable in Victoria: not presently endangered but likely to become so soon due to continued depletion; occurring mainly on sites likely to experience changes in land-use which would threaten the survival of the plant in the wild; or, taxa whose total population is so small that the likelihood of recovery from disturbance, including localised natural events such as drought, fire or landslip, is doubtful.
r - Rare in Victoria: rare but not considered otherwise threatened - there are relatively few known populations or the taxon is restricted to a relatively small area.
k - Poorly Known in Victoria: poorly known and suspected, but not definitely known, to belong to one of the above categories (x, e, v or r) within Victoria. At present, accurate distribution information is inadequate.

A1.2. Defining Ecological Significance

Table A1.2. *Defining Ecological Significance.*

Criteria for defining Ecological Significance	
NATIONAL SIGNIFICANCE	
Flora	National conservation status is based on the EPBC Act list of taxa considered threatened in Australia (i.e. extinct, critically endangered, endangered, vulnerable).
	Flora listed as rare in Australia in *Rare or Threatened Australian Plants* (Briggs and Leigh 1996).
Fauna	National conservation status is based on the EPBC Act list of taxa considered threatened in Australia (i.e. Extinct, Critically Endangered, Endangered, Vulnerable).
	Fauna listed as Extinct, Critically Endangered, Endangered, Vulnerable, or Rare under National Action Plans for terrestrial taxon prepared for the SEWPaC: threatened marsupials and monotremes (Maxwell *et al.* 1996), bats (Duncan *et al.* 1999), birds (Garnett and Crowley 2000), reptiles (Cogger *et al.* 1993), amphibians (Tyler 1997) and butterflies (Sands and New 2002).
	Species that have not been included on the EBPC Act but listed as significance according to the *IUCN 2009 Red List of Threatened Species* (IUCN 2009).
Communities	Vegetation communities considered critically endangered, endangered or vulnerable under the EPBC Act and considering vegetation condition.
STATE SIGNIFICANCE	
Flora	Threatened taxa listed under the provisions of the FFG Act.
	Flora listed as extinct, endangered, vulnerable or rare in Victoria in the DSE Flora Information System (FIS 2011).
	Flora listed in the State Government's *Advisory List of Rare or Threatened Plants in Victoria*, 2005 (DSE 2005).
	Flora listed as poorly known in Australia in *Rare or Threatened Australian Plants* (Briggs and Leigh 1996).
Fauna	Threatened taxon listed under Schedule 2 of the FFG Act.
	Fauna listed as Extinct, Critically Endangered, Endangered and Vulnerable on the State Government's *Advisory List of Threatened Vertebrate Fauna in Victoria - 2007* (DSE 2007).

Criteria for defining Ecological Significance	
	Listed as Lower Risk (Near Threatened, Conservation Dependent or Least concern) or Data Deficient under National Action Plans for terrestrial species prepared for the SEWPaC: threatened marsupials and monotremes (Maxwell *et al.* 1996), bats (Duncan *et al.* 1999), birds (Garnett and Crowley 2000), reptiles (Cogger *et al.* 1993), amphibians (Tyler 1997) and butterflies (Sands and New 2002).
Communities	Ecological communities listed as threatened under the FFG Act.
	Ecological vegetation class listed as threatened (i.e. endangered, vulnerable) or rare in a Native Vegetation Plan for a particular bioregion (www.dse.vic.gov.au) and considering vegetation condition.
REGIONAL SIGNIFICANCE	
Flora	Flora considered rare in any regional native vegetation plan for a particular bioregion.
	Flora considered rare by the author for a particular bioregion.
Fauna	Fauna with a disjunct distribution, or a small number of documented recorded or naturally rare in the particular Bioregion in which the study area is located.
	A particular taxon that is has an unusual ecological or biogeographical occurrence or listed as Lower Risk – Near Threatened, Data Deficient or Insufficiently Known on the State Government's *Advisory List of Threatened Vertebrate Fauna in Victoria - 2007* (DSE 2007).
Communities	Ecological vegetation class listed as depleted or least concern in a Native Vegetation Plan for a particular bioregion (www.dse.vic.gov.au) and considering vegetation condition.
	Ecological vegetation class considered rare by the author for a particular bioregion.
LOCAL SIGNIFICANCE	
Local significance is defined as flora, fauna and ecological communities indigenous to a particular area, which are not considered rare or threatened on a national, state or regional level.	

A1.3 Defining Site Significance

The following geographical areas apply to the overall level of significance with respect to the current survey.

National: Australia

State: Victoria

Regional: Victorian Volcanic Plain bioregion

Local: Within 10 kilometres surrounding the study area

Table A1.3. *Defining Site Significance.*

Criteria for defining Site Significance
NATIONAL SIGNIFICANCE
A site is of National significance if: - It regularly supports, or has a high probability of regularly supporting individuals of a taxon listed as 'Critically Endangered' or 'Endangered' under the EPBC Act and/or under National Action Plans for terrestrial taxon prepared for the SEWPaC. - It regularly supports, or has a high probability of supporting, an 'important population' as defined under the EPBC Act of one or more nationally 'vulnerable' flora and fauna taxon. - It is known to support, or has a high probability of supporting taxon listed as 'Vulnerable' under National Action Plans. - It is known to regularly support a large proportion (i.e. greater than 1%) of a population of a taxon listed as 'Conservation Dependent' under the EPBC Act and/or listed as Rare or Lower Risk (near threatened, conservation dependent or least concern) under National Action Plans. - It contains an area, or part thereof designated as 'critical habitat' under the EPBC Act, or if the site is listed under the Register of National Estate compiled by the Australian Heritage Commission. - It is a site which forms part of, or is connected to a larger area(s) of remnant native vegetation or habitat of national conservation significance such as most National Park, and/or a Ramsar Wetland(s).
STATE SIGNIFICANCE
A site is of State significance if: - It occasionally (i.e. every 1 to 5 years) supports, or has suitable habitat to support taxon listed as 'Critically Endangered' or 'Endangered' under the EPBC Act and/or under National Action Plans. - It regularly supports, or has a high probability of regularly supporting (i.e. high habitat quality) taxon listed as 'Vulnerable', 'Near threatened', 'Data Deficient' or 'Insufficiently Known' in Victoria (DSE 2005, 2007), or species listed as 'Data Deficient' or 'Insufficiently Known' under National Action Plans. - It contains an area, or part thereof designated as 'critical habitat' under the FFG Act. - It supports, or likely to support a high proportion of any Victorian flora and fauna taxa. - It contains high quality, intact vegetation/habitat supporting a high species richness and diversity in a particular bioregion. - It is a site which forms part of, or connected to a larger area(s) of remnant native vegetation or habitat of state conservation significance such as most State Parks and/or Flora and Fauna Reserves.

Criteria for defining Site Significance
REGIONAL SIGNIFICANCE
A site is of Regional significance if: - It regularly supports, or has a high probability of regularly supporting regionally significant fauna as defined in Table 1.2. - Is contains a large population (i.e. greater than 1% or 5%) of flora considered rare in any regional native vegetation plan for a particular bioregion. - It supports a fauna population with a disjunct distribution, or a particular taxon that has an unusual ecological or biogeographical occurrence. - It is a site which forms part of, or is connected to a larger area(s) of remnant native vegetation or habitat of regional conservation significance such as most Regional Parks and/or Flora and Fauna Reserves.
LOCAL SIGNIFICANCE
Most sites are considered to be of at least local significant for conservation, and in general a site of local significance can be defined as: - An area which supports indigenous flora species and/or a remnant EVC, and habitats used by locally significant fauna species. - An area which currently acts, or has the potential to act as a wildlife corridor linking other areas of higher conservation significance and facilitating fauna movement throughout the landscape.

A1.4. Defining Habitat Quality

Several factors are taken into account when determining the value of habitat. Habitat quality varies on both spatial and temporal scales, with the habitat value varying depending upon a particular fauna species.

Table A1.4. Defining Habitat Quality.

Criteria for defining Habitat Quality
HIGH QUALITY
High degree of intactness (i.e. floristically and structurally diverse), containing several important habitat features such as ground debris (logs, rocks, vegetation), mature hollow-bearing trees, and a dense understorey component.
High species richness and diversity (i.e. represented by a large number of species from a range of fauna groups).
High level of foraging and breeding activity, with the site regularly used by native fauna for refuge and cover.
Habitat that has experienced, or is experiencing low levels of disturbance and/or threatening processes (i.e. weed invasion, introduced animals, soil erosion, salinity).
High contribution to a wildlife corridor, and/or connected to a larger area(s) of high quality habitat.
Provides known, or likely habitat for one or more rare or threatened species listed under the EPBC Act, FFG Act, or species considered rare or threatened according to DSE 2007.
MODERATE QUALITY
Moderate degree of intactness, containing one or more important habitat features such as ground debris (logs, rocks, vegetation), mature hollow-bearing trees, and a dense understorey component.
Moderate species richness and diversity - represented by a moderate number of species from a range of fauna groups.
Moderate levels of foraging and breeding activity, with the site used by native fauna for refuge and cover.
Habitat that has experienced, or is experiencing moderate levels of disturbance and/or threatening processes.
Moderate contribution to a wildlife corridor, or is connected to area(s) of moderate quality habitat.
Provides potential habitat for a small number of threatened species listed under the EPBC Act, FFG Act, or species considered rare or threatened according to DSE 2007.
LOW QUALITY
Low degree of intactness, containing few important habitat features such as ground debris (logs, rocks, vegetation), mature hollow-bearing trees, and a dense understorey component.
Low species richness and diversity (i.e. represented by a small number of species from a range of fauna groups).
Low levels of foraging and breeding activity, with the site used by native fauna for refuge and cover.
Habitat that has experienced, or is experiencing high levels of disturbance and/or threatening processes.
Unlikely to form part of a wildlife corridor, and is not connected to another area(s) of habitat.
Unlikely to provide habitat for rare or threatened species listed under the EPBC Act, FFG Act, or considered rare or threatened according to DSE 2007.

Appendix 2 – Photos of fauna located under tile grids

The following is a selection of photos of fauna species located under tile grids within Stockyard Hill Wind Farm. All photos © Ecology and Heritage Partners Pty Ltd

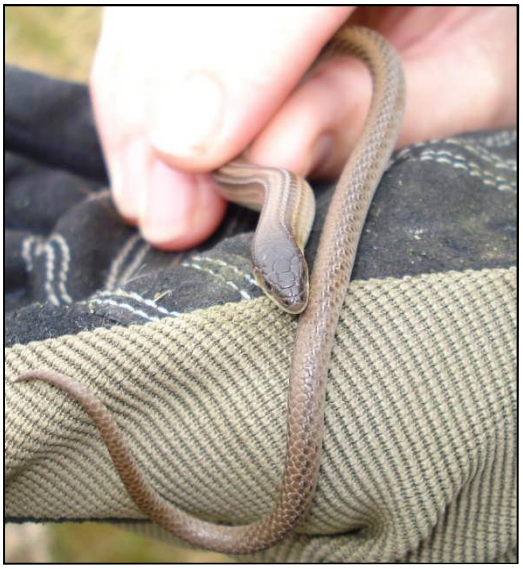

Plate 12 Striped Legless Lizard

Plate 13 Striped Legless Lizard

Plate 14 Striped Legless Lizard

Plate 15 Striped Legless Lizard

Plate 16 Fat-tailed Dunnart

Plate 17 Southern Brown Tree Frog (green morph)

Plate 18 Tussock Skink

Plate 19 Eastern Striped Skink

Plate 21 Eastern Three-lined Skink

Plate 21 Eastern Three-lined Skink