

# Healesville - Koo Wee Rup Road Upgrade - Growling Grass Frog Surveys

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Prepared for:

VicRoads



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## Summary

Ecology Australia was commissioned by VicRoads (Metropolitan South East Region) to undertake a targeted survey for the Growling Grass Frog (*Litoria raniformis*) in relation to the future upgrade of the Healesville - Koo Wee Rup Road, between the Pakenham Bypass and the South Gippsland Highway. The Growling Grass Frog is listed as Vulnerable under the Commonwealth *Environment Protection and Biodiversity Conservation Act* 1999 (EPBC Act), threatened under the Victorian *Flora and Fauna Guarantee Act* 1988 (FFG Act) and is recognised as Near Threatened in Victoria. Therefore, the results of the survey will be used to gain an understanding of the status and distribution of the Growling Grass Frog in areas potentially affected by the road upgrade, assist VicRoads with upgrade alignment, and identify potential implications of the road upgrade in the context of the EPBC and FFG Act.

The study area falls within the Gippsland Plain Bioregion. The pre-European vegetation which would have occurred in the study area is likely to have been Swampy Woodland, Swamp Scrub and Swampy Riparian Woodland. Draining of the original Koo Wee Rup Swamp, vegetation clearance for agriculture, and channelling of watercourses has resulted in a predominantly pastoral landscape with scattered Swamp Scrub remnants along roadside drains, watercourses and at the Koo Wee Rup 'Swamp Lookout' reserve.

Aerial photographs and topographic maps were initially assessed for potential survey sites within a 100 m zone either side of the Healesville – Koo Wee Rup Road, and the triangular-shaped area bounded by reaches of the six drainage lines running west of Rossiter Road and south of Koo Wee Rup, Sybella Avenue and the South Gippsland Highway. A total of 32 sites were selected as potential survey sites. Due to the large area occupied by creek lines and drains, the whole area surrounding the Healesville – Koo Wee Rup Road could not be surveyed. This was partially overcome by surveying several sections along drains, and targeting drains which appeared to have more suitable frog habitat. We conducted frog surveys at 22 of the 32 sites selected; the remaining 10 were unable to be surveyed as they were dry at the time of survey, or access could not be obtained from property owners.

Spotlighting surveys were carried out between 16 December 2005 and 19 January 2006. During the surveys, call recognition and active searching confirmed the presence of Growling Grass Frogs at seven of the 22 sites surveyed, with a total of 13 individuals recorded, plus one dead specimen. Growling Grass Frog records comprised small numbers of frogs patchily distributed in water bodies spread over a 10.5 km section of the study area, from Deep Creek in the north to near the South Gippsland Highway. Potential habitat was identified further north, but access could not be obtained to survey these sites. Five other frog species were recorded throughout the study area; these were Southern Brown Tree Frog, Whistling Tree Frog, Spotted Marsh Frog, Striped Marsh Frog, and Common Froglet.

Potential impacts to the Growling Grass Frog in relation to the Healesville - Koo Wee Rup Road upgrade are the loss and/or fragmentation of habitat. Considering the broad distribution of Growling Grass Frogs in the study area it will probably be difficult to avoid all known or potential habitat.

Once the alignment is refined, further surveys and habitat assessments will be required to assess the significance of each water body, and therefore the potential impacts from the road upgrade.

It is recommended that VicRoads include consideration of Growling Grass Frogs in an EPBC referral. The design and future alignment of the road would determine whether or not a significant impact on the Growling Grass Frog is likely, and therefore whether it should be referred as a 'controlled' or 'non-controlled' action.

## 1 Introduction

Ecology Australia was commissioned by VicRoads (Metropolitan South East Region) to undertake a targeted survey for the Growling Grass Frog (*Litoria raniformis*) in relation to the future upgrade of the Healesville - Koo Wee Rup Road, between the Pakenham Bypass and the South Gippsland Highway.

The Growling Grass Frog is listed as Vulnerable under the Commonwealth *Environment Protection and Biodiversity Conservation Act* 1999 (EPBC Act), threatened under the Victorian *Flora and Fauna Guarantee Act* 1988 (FFG Act 1988) and is recognised as Near Threatened in Victoria (DSE 2003a). This species was identified as potentially occurring within the environs of the Healesville - Koo Wee Rup Road in a previous flora and fauna desktop review of the roadway conducted by Ecology Australia (Crowfoot et al. 2005).

This document reports on the results of a survey for the Growling Grass Frog along the Healesville - Koo Wee Rup Road and discusses potential impacts from the proposed road upgrade and the EPBC Act implications. The results of this survey will assist VicRoads in determining options for the future upgrading of the road along its current alignment.

### 1.1 Study Area

The final alignment for the road upgrade has not been decided, but is likely to include road-widening on both sides of the existing Healesville – Koo Wee Rup Road. Thus, for the purposes of this survey, the study area included a 100 m strip either side from the centre of the existing road. From north to south, the study area extended from the area of the proposed Pakenham Bypass to the South Gippsland Highway, Koo Wee Rup (Figure 1).

The areas targeted for Growling Grass Frog surveys were any water bodies (i.e. dams, creeks and drains) within the 100 m zone either side of the Healesville – Koo Wee Rup Road, and the triangular-shaped area bounded by reaches of the six drainage lines running west of Rossiter Road and south of Koo Wee Rup, Sybella Avenue and the South Gippsland Highway (see Figure 1).

The study area falls within the Gippsland Plain Bioregion. The pre-European Ecological Vegetation Classes (EVCs) which would have occurred within the study area are likely to have been Swampy Woodland, Swamp Scrub and Swampy Riparian Woodland (Oates and Taranto 2001; Crowfoot et al. 2005). Much of the study area and surrounds originally formed part of the Koo Wee Rup Swamp prior to drainage, vegetation clearance and watercourse leveeing. It is now characterised by a pastoral landscape with remnants of vegetation (e.g. degraded Swamp Scrub remnants in paddocks, along drainage lines, creeks and the Healesville - Koo Wee Rup Road), residential gardens and non-indigenous planted roadside trees (e.g. Southern Mahogany, Spotted Gum) and numerous farm dams scattered throughout private property. Considerable areas of remnant vegetation occur along the six watercourses draining into Westernport Bay and running to the northwest of the Koo Wee Rup Township, and through the Swamp Lookout reserve. These watercourses include the Healesville-

Koo Wee Rup Road Drain, McDonalds Drain, McDonalds Road Drain west, the Bunyip River, Main Road Drain and Boundary Road Drain.

These watercourses flow into the Western Port Ramsar Wetland Site (ANCA 1996; DSE 2003b). Ramsar wetlands are internationally important wetlands listed under the International Convention on Wetlands (i.e. the Ramsar Convention). These wetlands are important especially in regard to total numbers and/or numbers of species of waterbird, and are also matters of national environmental significance listed under the EPBC Act.

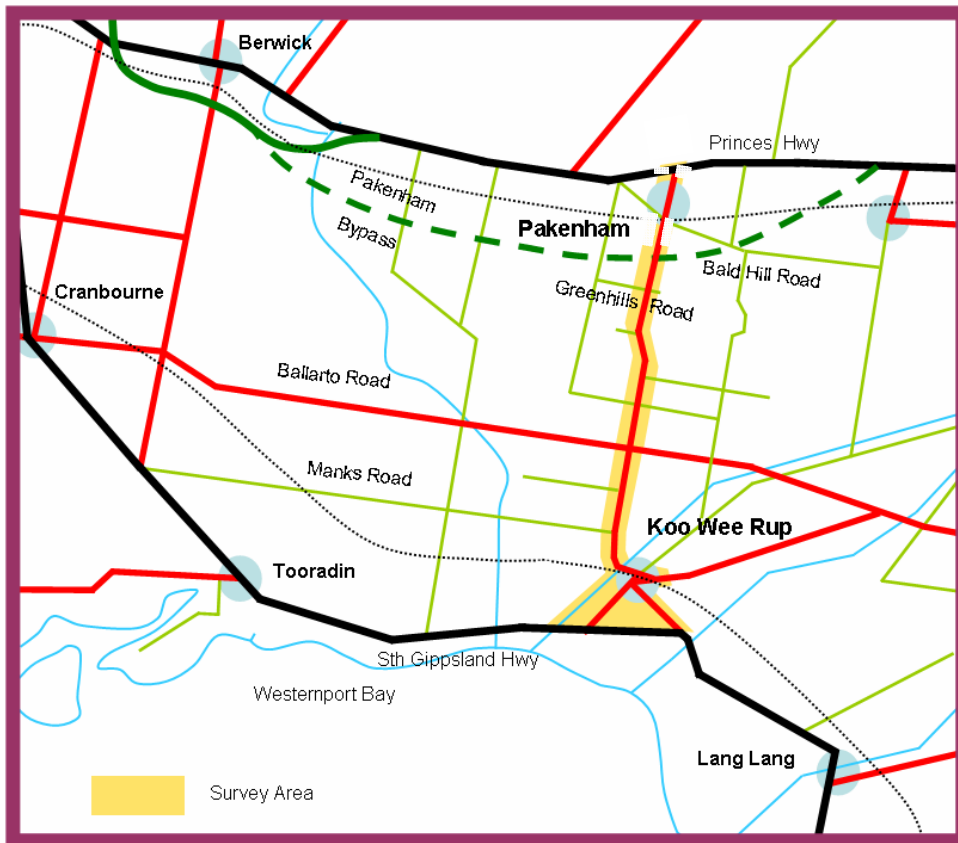


Figure 1 Study area (yellow)



## 2 Methods

### 2.1 Desktop review

The Atlas of Victorian Wildlife (AVW) database (DSE 2005) was interrogated for records of Growling Grass Frogs within the Pakenham – Koo Wee Rup area. In addition, the Conservation Management Plan for the Growling Grass Frog in Pakenham (Organ 2005) was also referred to as part of this project.

### 2.2 Field surveys

#### Site Selection

Aerial photographs and topographic maps were initially assessed for potential survey sites within a 100 m zone either side of the Healesville – Koo Wee Rup Road, and the triangular-shaped area bounded by reaches of the six drainage lines running west of Rossiter Road and south of Koo Wee Rup, Sybella Avenue and the South Gippsland Highway. During the first site visit, undertaken on 16 December 2005, a total of 32 sites were assessed (see Table 1 and Figure 2).

Table 1 List of sites assessed for potential Growling Grass Frog surveys along the Healesville-Koo Wee Rup Road study area, 16 December 2005.

Key: Healesville – Koo Wee Rup Rd:- H-K Rd.

South-Gippsland Highway:- S-G Hwy

KWR:- Koo Wee Rup

Site No.	Description	Type of Water body	UTM Co-ordinate
1	Water body c. 200m north of Greenhill Road (east of H-K Rd)	Dam	367748 5782025
2	Water body, adjacent to H-K Rd south of Greenhill Rd	Dam	367471 5781926
3	H-K Rd drain parallel to H-K Rd to the west, south of Greenhill Rd	Drain	367453 5781928
4	H-K Rd drain parallel to H-K Rd to the east, south of Greenhill Rd	Drain	367409 5781752
5	Water body, north of Deep Creek	Dam	367410 5781585
6	H-K Rd drain, north of Deep Creek, parallel to H-K Rd to the east	Drain	367297 5780383
7	Deep Creek, 100 m either side of H-K Rd	Creek	367333 5780383 (upstream, east of H-K Rd) 367141 5780384 (downstream, west of H-K Rd)
8	Water body c. 50m south of Deep Creek	Dam	367176 5780335
9	Water body, c. 500 m south of Deep Creek, 150 m west of H-K Rd	Dam	367196 5779842

10	Water body, c. 500 m south of Deep Creek, c. 300 west of H-K Rd – no access	Dam	367104 5779839
11	H-K Rd drain south of Hall Rd, east of H-K Rd	Drain	367626 5778425 (north) 367690 5778834 (south)
12	H-K Rd drain crosses under H-K Rd north-west to south-west, adjacent to Soldiers Road	Drain	367527 5777718
13	H-K Rd drain continuation of Site 12, further south, parallel to H-K Rd to the west	Drain	367418 5776839
14	Water body, c. 20 m east of H-K Rd, c. 1.5 km north of Ballarto Rd	Dam	367529 5777207
15	Large Water body, c. 20 m west of H-K Rd, c. 600 m north of Ballarto Rd	Dam	367374 5776818
16	H-K Rd Drain	Drain	366537 5771246 (middle)
17	McDonalds Drain West	Drain	366579 5771195 (downstream of KWR Bridge) 366736 5771366 (upstream of KWR Bridge)
18	McDonalds Drain	Drain	366668 5771247 (downstream of KWR Bridge) 366565 5771149 (upstream of KWR Bridge)
19	Bunyip River	River	366493 5771061 (downstream of KWR Bridge )
20	Main Drain	Drain	366840 5771305 (downstream of KWR Bridge)
21	Boundary Drain	Drain	367022 5771271 (downstream of KWR Bridge) 366871 5771192 (upstream of KWR Bridge)
22	Water body c. 300 m north of Rossiter Rd	Dam	366286 5770555
23	Water body c. 350 m north of Rossiter Rd	Dam	366445 5770672
24	Water body c. 250 m north of Rossiter Rd	Dam	366723 5770655
25	Water body c. 100 m north of Rossiter Rd	Dam	366944 5770630
26	Drainage-line northern side of Rossiter Rd	Drain	366279 5769946
27	Water body, c. 70 m south of Rossiter Rd	Dam	366220 5769780
28	Water body, c. 150 m north of South-Gippsland Hwy	Dam	366926 5769767
29	Drain runs south-west under Sybella Ave and continues south under the S-G Hwy		366967 5769772 (S-G Hwy) 368324 5769594 (middle) 367889 5770329 (Sybella Ave)
30	Water body, c. 5 m east of Sybella Ave c. 500 m north of S-G Hwy	Dam	368219 5769742
31	Drainage-line, eastern side of Sybella Av (within South-east Water- Waste Water Treatment Plant Works)	Drain	368207 5769783 (north) 366923 5769486 (south)
32	Koo Wee Rup Swamp and Bunyip River	Swamp	364957 5769514

Spotlighting surveys were conducted at 22 of the sites listed in Table 1. The remaining 10 were not surveyed because they were dry at the time of survey, or access was not obtained. Sites where frogs were detected on the first visit were not re-visited, so more sites within the study

area could be surveyed to potentially gain a greater appreciation of Growling Grass Frog distribution throughout the study area.

### **Spotlighting Surveys**

Spotlighting surveys were carried out between 16 December 2005 and 19 January 2006.

Surveying stream or drain sites and standing water bodies varies slightly due to physical differences of the two habitat types. Surveys of stream/drain sites perpendicular to Healesville - Koo Wee Rup Road were conducted in c. 100 m linear transects either side of the road reserve. Transects within the Healesville - Koo Wee Rup Road drain ranged from c. 100 m to 500 m in length. Surveys of drains and streams incorporated both banks of the stream (c. 5 m above the water-line) and the entire water's surface.

Surveys of standing water bodies (i.e. dams) covered the entire circumference of the water body, a strip of bank c. 10 m in width, incorporating 5 m either side of the water-line. Any emergent or floating vegetation within the water body was also scanned.

Surveys for the Growling Grass Frog were undertaken at night by teams of two people between the hours of 2100 and 0200 DST. Hand-held 30 W spotlights were used to detect the frogs; this is a commonly used and effective technique for detecting Bell Frogs (Williams 2001, Hamer et al. 2002, Robertson and Heard 2002). Survey time for water bodies varied according to the size and habitat complexity of each site. Where possible, surveys were limited to suitable weather conditions (i.e. night = air temp. greater than 12°C and/or absence of a strong wind).

At the beginning of each survey, a period of five minutes was spent listening for male frogs calling. The abundance of all calling males from all frog species was recorded during this time. Weather variables were recorded at the beginning of each survey, including: air temperature, cloud cover, rain, wind levels and a general description of the weather conditions. Following this, each site was systematically searched for active frogs using the following techniques (outlined in Crump and Scott 1994):

- whilst traversing the length of the water bodies, spotlights were used to scan the surface and edge of the water bodies, focussing on the fringing and aquatic vegetation;
- frogs were detected either by direct encounter or identification of the frogs' distinctive eye shine with the aid of binoculars (see Williams et al. 2001);
- upon detection, the time, AMG coordinates using a Garmin GPS unit, and microhabitat (e.g. floating on Water Ribbon) were recorded; and
- frogs were assigned to a size class: metamorphlings (specimens equal to or less than 30 mm in total length), sub-adult (between 30-50 mm), or adult (specimens above 50 mm).

Methods to reduce the possible spread of infectious pathogens (such as 'chytrid fungus') between sites were implemented in accordance with standards described by the New South Wales National Parks and Wildlife Service (NPWS 2001). For purposes of hygiene management, water bodies

with no probable interchange of specimens were considered separate sites (NPWS). The following measures were used to mitigate the spread of disease between sites:

- footwear was thoroughly disinfected (saturated with 'Toilet Duck') at the commencement of field work and between each survey site; and
- wetlands were only approached on foot to eliminate car tyres as a source of transmission.

### **Limitations**

Due to the large area occupied by creek lines and drains, the whole area could not be surveyed. This was partially overcome by surveying several sections along drains, and targeting drains which appeared to have more suitable frog habitat. As many dams as possible were assessed, however, we were unable to obtain permission to access several properties.

### 3 Results

Call recognition and active searching confirmed the presence of Growling Grass Frogs at seven of the 22 sites surveyed, with a total of 13 individuals recorded, plus one dead specimen (see Table 2 and Figure 2 and 3).

Five other frog species were recorded within the study area, these were Southern Brown Tree Frog (*Litoria ewingii*), Whistling Tree Frog (*Litoria verreauxi verreauxi*), Spotted Marsh Frog (*Limnodynastes tasmaniensis*), Striped Marsh Frog (*Limnodynastes peroni*) and Common Froglet (*Crinia signifera*) (Table 2).

**Table 2** Growling Grass Frog survey results from Healesville - Koo Wee Rup Road reserve, 16 December 2005 - 19 January 2006.

Key:

H-K Rd – Healesville Koo Wee Rup Road  
GGF – Growling Grass Frog  
SBTF – Southern Brown Tree Frog  
WTF – Whistling Tree Frog  
StrMF – Striped Marsh Frog  
SpoMF – Spotted Marsh Frog  
CF – Common Froglet

Site No.	Description	UTM Co-ordinate	Dates Visited	Total No. of GGF	Other frog species
1	Water body c. 200m north of Greenhill Road (east of H-K Rd)	367748 5782025		0	0
7	Deep Creek, 100 m either side of H-K Rd	367333 5780383 (upstream, east of H-K Rd) 367141 5780384 (downstream, west of H-K Rd)	21/12/05	0 * 2 seen	0
8	Water body c. 50m south of Deep Creek, west side of H-K Rd	367176 5780335	21/12/05	^ 5 seen/1 dead	0
9	Small water body, c. 500 m south of Deep Creek, 150 m west of H-K Rd	367196 5779842	12/1/06	1 heard/seen	StrMF, WTF heard
11	H-K Rd drain south of Hall Rd, east side of H-K Rd	367626 5778425 (north) 367690 5778834 (south)	21/12/06	0	SpoMF
12	H-K Rd drain crosses under H-K Rd north-west to south-west, adjacent to Soldiers Road	367527 5777718	18/1/06	0	0
13	H-K Rd drain continuation of Site 12, further south, parallel to H-K Rd to the west	367418 5776839	11/1/06 18/1/06	2 heard/seen	CF
14	Water body, c. 20 m east of H-K Rd, c. 1.5 km north of Ballarto Rd	367529 5777207	11/1/06 18/1/06	0	0
15	Large Water body, c. 20 m west of H-K Rd, c. 600 m north of Ballarto Rd	367374 5776818	11/1/06 18/1/06	0	WTF heard
16	H-K Rd Drain	366537 5771246 (middle)	16/12/05	0	StrMF

# Healesville - Koo Wee Rup Road Upgrade - Growling Grass Frog Surveys



17	McDonalds Drain West	366579 5771195 (downstream) 366736 5771366 (upstream)	16/12/05 19/1/06	0	0
18	McDonalds Drain	366668 5771247 (downstream) 366565 5771149 (upstream)	16/12/05 19/1/06	0	StrMF
20	Main Drain	366840 5771305 (downstream) 366871 5771192 (upstream)	16/12/06 19/1/06	0	0
21	Boundary Road Drain	367022 5771271 (downstream) 366871 5771192 (upstream)	12/1/06	0	StrMF
24	Water body c. 250 m north of Rossiter Rd	366871 5771192 (upstream)	9/1/06	0	SpMF
25	Water body c. 100 m north of Rossiter Rd	366944 5770630	9/1/06	1 seen	SBTF, StrMF
27	Water body, c. 70 m south of Rossiter Rd	366220 5769780	9/1/06	1 seen	
28	Water body, c. 150 m north of South-Gippsland Hwy	366926 5769767	9/1/06 11/1/06	1 heard	SpoMF, StrMF
29	Drain runs south-west under Sybella Ave and continues south under the S-G Hwy	366967 5769772 (S-G Hwy) 368324 5769594 (middle) 367889 5770329 (Sybella Ave)	11/1/06	0	SpoMF
30	Water body, c. 5 m east of Sybella Ave c. 500 m north of South-Gippsland Hwy	368219 5769742	11/1/06 18/1/06	0	SpoMF
31	Drainage-line, eastern side of Sybella Av (within South-east Water- Waste Water Treatment Plant Works)	368207 5769783 (north) 366923 5769486 (south)	11/1/06	0	SpoMF, StrMF, CF
32 a and b	Koo Wee Rup Swamp and Bunyip River	364957 5769514	18/1/06	0	0

\* Aaron Organ, pers.comm. Ecology Partners P/L.

^ Two GGF also seen in Canary Grass clump during the day



Plate 1 Deep Creek, c. 50 m downstream of Healesville - Koo Wee Rup Road (Site 7). Two Growling Grass Frogs were recorded here (A. Organ pers.comm.) (December 2005).



Plate 2 Farm Dam c. 50 m south of Deep Creek, and c. 30 m west of Healesville - Koo Wee Rup Road, (Site 8). Five Growling Grass Frogs, plus one dead specimen were recorded in this dam (December 2005).





Plate 3 Healesville – Koo Wee Rup Road Drain (on western side), c. 500 m north of Ballarto Road (Site 13). One Growling Grass Frog was heard calling, and one was seen in this drainage-line (December 2005).

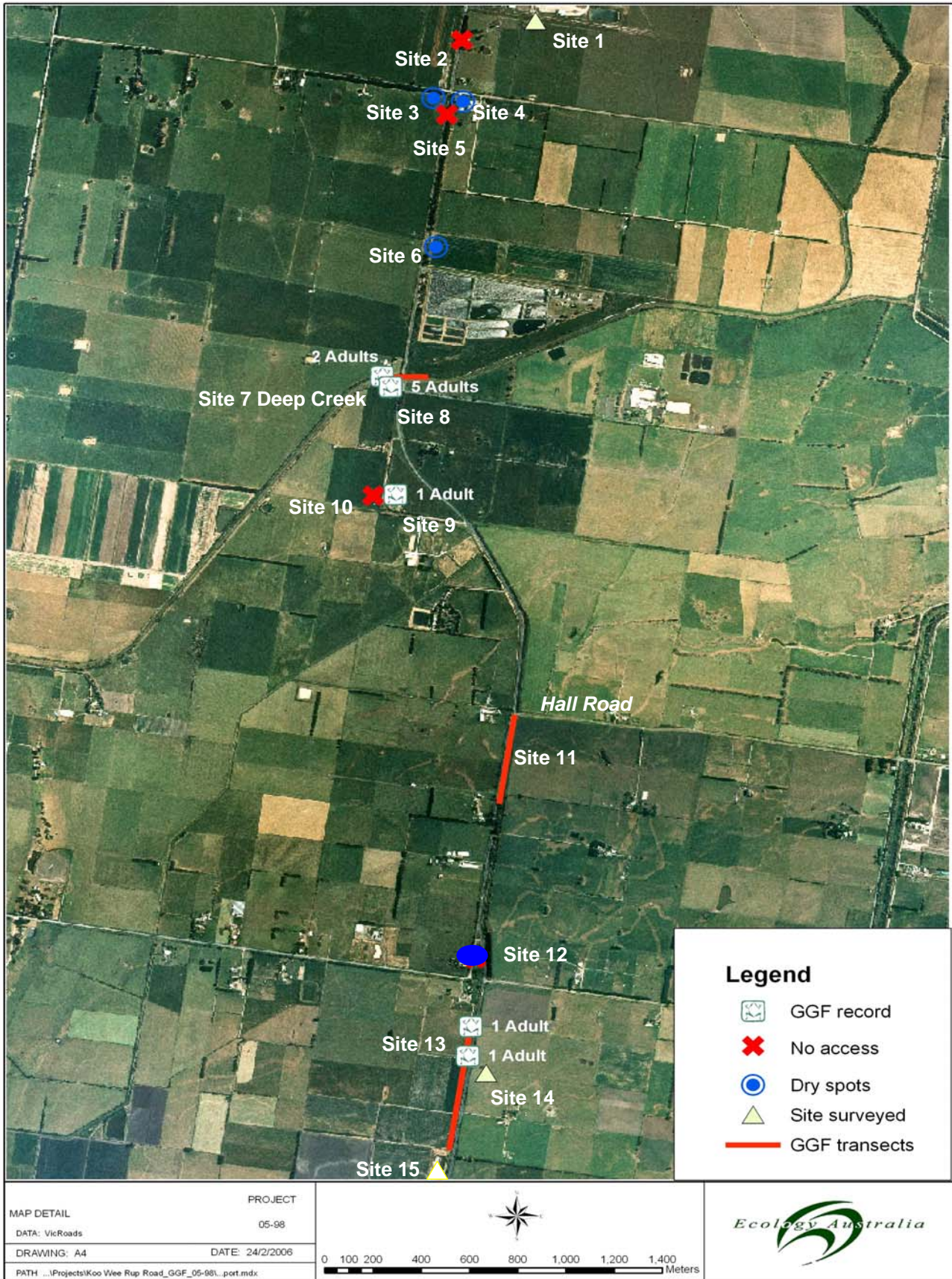


Figure 2 Location of survey sites to the north, and Growing Grass Frog (GGF) records

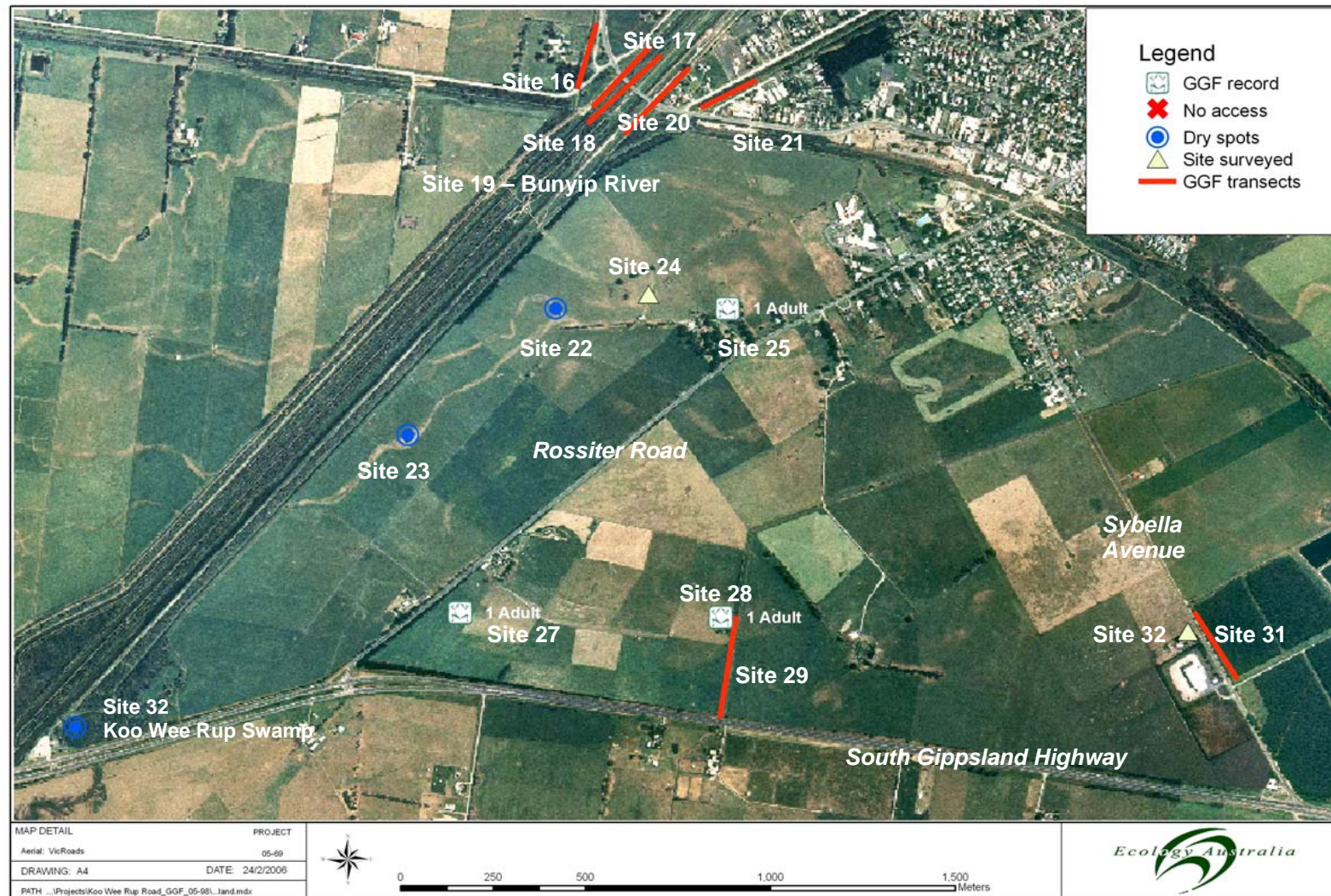


Figure 3 Location of survey sites to the south, and Growling Grass Frog (GGF) records

## 4 Discussion

### 4.1 Growling Grass Frog Distribution

In Victoria, Growling Grass Frogs have a wide distribution, including significant populations in urban and semi-rural Melbourne. However, population declines have been recorded in these areas, and consequently the known distribution has reduced dramatically over the past 20 years (Tyler 1997, Robertson et al. 2002, Organ 2005).

Records of Growling Grass Frogs illustrate that there are still a number of suitable breeding sites and important populations in the Pakenham area (DSE 2005, Organ 2005). These include:

- Over 30 records in farm dams, west of McGregor Rd, Pakenham (February 2004);
- One record from Pakenham, in a dam adjacent to a road (January 2003);
- Fifteen records at Pakenham and District Golf Course, south of Princess Highway (December 2002 and January 2003);
- Fifteen records in farm dams, c. 2.5 km east of Healesville - Koo Wee Rup Rd, south of Deep Creek (December 2003);
- Fifteen records at Mary Street, west of Pakenham (December 2002);
- Five records in dam along Lecky Road, next to Gum Scrub Creek (December 2002);
- Three records in a dam north of Lecky Road (December 2002);
- Three records at Kaduna Park property, 4 km west of Pakenham (December 2002);
- Three records in dam c. 300 m south of Lecky Road (December 2002);
- Four records in Key Lane, c. 2 km south of Pakenham (December 2002);
- Two records in a dam c. 200 m north of Key Lane (December 2002);
- Two records in a dam c. 200 m north-west of Key Lane (December 2002);
- Two records in a dam c. 300 m north-west of Key Lane (December 2002);
- Three records, Watson's Road, c. 3 km south of Pakenham (December 2002);
- Twenty-two records in farm dam north of railway-line, just south of Princess Highway (December 2002);
- One record in culvert adjacent to railway-line (December 2002);
- One record from Warneet, which is c. 12 km west - northwest of Koo Wee Rup (January 1979).

As shown, most of the previous records are concentrated in Pakenham, thus the records from this survey are significant, as the Koo Wee Rup area does not appear to have been as extensively surveyed.

Of the sites surveyed during this study, the most northern site where Growling Grass Frogs were recorded was in Deep Creek c. 20 m downstream of the Healesville - Koo Wee Rup Road (A. Organ, Ecology Partners, pers. comm.). It is likely that frogs at least occasionally occur further north of Deep Creek in farm dams and drains. However, access was not obtained to survey all dams. As such, further surveys will need to be conducted at these sites if the final alignment impacts on these. South of Deep Creek, Growling Grass Frogs were recorded in five dams and one drainage-line. The site furthest to the south was c. 150 m north of the South-Gippsland Highway (see Figure 2). It is possible that frogs occur in the Koo Wee Rup Swamp (the most southerly site, adjacent to the South Gippsland Highway – Koo Wee Rup Swamp Lookout) when conditions are suitable; however, it was dry at the time of survey (i.e. 18/1/06). The overall distribution of Growling Grass Frogs in the study area encompasses an area of c. 100 m wide by 10.5 km long. Considering the recent records in Pakenham and our survey results, it appears the species has a relatively broad distribution in the Pakenham - Koo Wee Rup area and these records potentially constitute a single population. The frogs' distribution in the study area is also consistent with Organ's (2005) assessment, which showed the scattered nature of populations throughout the Pakenham area. Although only small numbers (colonies) of frogs were found during surveys in habitat supporting this species, the population may be effectively 'linked' through the many drains, dams and creeks across the Pakenham – Koo Wee Rup landscape (i.e. part of the nationally-significant population recorded by Organ, 2005).

In considering the results of the frog surveys it is important to note that on any given night only a small proportion of the population in a given area will be detected (Michael Scroggie, Arthur Rylah Institute, pers. comm. cited in Robertson et al. 2002), and the number of frogs recorded during the surveys is likely to represent an underestimate of the population size in a given area.

#### **4.2 Growling Grass Frog Habitat and Habitat Availability**

The Growling Grass Frog is known to inhabit permanent or semi-permanent still or slow moving water bodies with extensive emergent, floating and submergent aquatic vegetation (e.g. streams, lagoons, farm dams and former quarry sites) (Hero et al. 1991, Barker et al. 1995, Pyke 2002, Robertson et al. 2002). The species is also associated with ephemeral water bodies (e.g. wetlands along the periphery of creeks) for breeding purposes, so long as they contain water for several months during the breeding season (Organ 2005, Quin et al. 2005). For example, at Bayles c. 8 km north-east of the Koo Wee Rup township, Growling Grass Frogs occur along low-lying ephemeral and near permanent wetlands within the leveed stream bed of Yallock Creek (Quin et al. 2005). This habitat configuration allows frogs to move up and down the stream bed between wetlands as conditions become unfavourable (e.g. wetlands dry out). Suitable terrestrial habitat for post-breeding dispersal and over-wintering refuge sites are also

required, including dense ground-level vegetation, rocks, logs and other solid ground cover (Robertson 2001).

### **Habitat within the Study Area**

During the surveys, Growling Grass Frogs were recorded in three different types of water bodies: dams, a creek and a drain. These water bodies are likely to serve different purposes throughout the species' life cycle. For instance, creeks and drains are likely to provide habitat links for dispersing and/or moving frogs during the breeding season, and would also provide foraging opportunities. Additionally, these water courses would provide shelter and/or over-wintering sites for frogs during the non-breeding season, as most are surrounded by dense ground-layer vegetation. Several of the drains however, also appear to have potential breeding habitat, as they support aquatic vegetation which Growling Grass Frogs are known to be associated with. For example, Site 13 contained extensive floating and emergent vegetation in the form of Water Ribbon (*Triglochin* spp.), Floating Pondweed (*Potamogeton tricarinatus*) and floating algae (see Figure 2 and Plate 3). Interestingly, a recent study found that the number of Growling Grass Frogs at a site was correlated with the cover of Pondweed (A. Organ, Ecology Partners, pers.comm). During this study, one Growling Grass Frog was heard calling, and one seen in this drainage-line, suggesting that frogs may attempt to breed in these water courses if habitat is suitable

Farm dams within the study area are more likely to provide potential breeding habitat for frogs, as they often contain key habitat features. For example, several of the dams surveyed contained aquatic emergent vegetation, such as Tall Spike-rush (*Eleocharis sphacelata*), *Typha* sp., Common Reed (*Phragmites australis*) and Water Ribbon. These vegetation types, as well as exposed banks and rocks at the waters edge, provide calling stages for male frogs, basking sites, elevated sites in which frogs can ambush prey, and shelter during the day or the over-wintering period. Submergent and floating vegetation (e.g. Sago Pondweed, *Potamogeton pectinatus* and algae) provide sites for egg deposition and shelter for tadpoles. While some dams were dry at the time of survey, they may have provided suitable breeding habitat earlier in the season (i.e. October – November) when more water was available.

Not all dams in the study area however, are suitable for breeding. Several dams support no, or very little, aquatic vegetation due to grazing by livestock, and these have become polluted by sedimentation and droppings from cattle. Water quality is likely to have deteriorated, potentially rendering the dams unsuitable for breeding. Nonetheless, one of these dams contained five Growling Grass Frogs (plus one dead specimen) at the time of survey. It is thought that these frogs moved in from Deep Creek (c. 50 m to the north) in search of breeding habitat and/or foraging opportunities. In addition to the absence of suitable vegetation in several dams, some dams supported large populations of the introduced and predatory Mosquito Fish (*Gambusia holbrooki*). This fish species can reduce the likelihood of successful breeding by preying on frog eggs (Anstis 1999). Predatory fish are thought to be one of the factors contributing to the decline of Growling Grass Frogs (Tyler 1997, Robertson 2003).

The configuration of water bodies within the study area is favourable to the Growling Grass Frog. It is likely that creeks/drains and a predominantly pastoral landscape (Growling Grass Frogs are known to traverse pasture on humid nights when light rain is falling, Keir Jarvis, Melbourne Water, pers.comm. cited in Robertson et al. 2002) allow relatively continuous movement throughout most parts of the study area. Thus, these features provide important habitat links between potential breeding sites (i.e. dams or drains with high quality habitat). This configuration also reduces the possibility of colonies (sub-populations) becoming isolated, and hence facing extinction when conditions become unfavourable (e.g. water bodies dry out or predatory fish are introduced). However, without further evidence of frog movement between sites, the importance of each individual and/or series of water bodies for the long-term maintenance of populations in the Pakenham – Koo Wee Rup area is currently unknown (Organ 2005).

### 4.3 Potential impacts

Potential impacts to the Growling Grass Frog in relation to the Healesville - Koo Wee Rup Road upgrade are the loss and/or fragmentation of habitat. An indirect impact usually associated with road projects is the fragmentation and isolation of animal populations and habitats. Thus, roads may present a barrier to movement of animals, resulting in isolation and reduction in sizes of populations, which increases the stochastic risk of extinction. Roads may also increase the dispersal distances between populations (e.g. see Andrews 1990; Forman 1995; Forman et al. 1995; Forman and Alexander 1998; Organ 2005). As such, fauna underpasses and culverts are often designed specifically to mitigate barrier effects and maintain continuity of animal populations (e.g. Mansergh and Scotts 1989; Forman 1995; Forman et al. 1995; AMBS 1997; Robertson 2002; Organ 2005).

Ideally, the design would avoid areas where Growling Grass Frogs occur or where they are likely to occur. Therefore the alignment, as far as is possible, should avoid dams within the 100 m zone either side of the Healesville-Koo Wee Rup Road, as they are likely to be utilised by frogs at some stage during their life cycle (i.e. for breeding, dispersal, shelter or foraging). In particular, dams which are in close proximity to other occupied dams or drains/creeks (e.g. Site 8, c. 50 south of Deep Creek) should be avoided. In addition, drains which provide suitable habitat should be avoided where possible (i.e. drains with semi-permanent to permanent water for potential breeding, and suitable vegetation for shelter, foraging and movement, see Plate 3).

Considering the broad distribution of Growling Grass Frogs in the study area (i.e. c. 10.5 km north to south range) it will probably be difficult to avoid all known or potential habitat. Once the alignment is refined, further surveys and habitat assessments will be required to assess the significance of each water body, and therefore the potential impacts from the road upgrade.

#### **4.4 EPBC Act Implications**

The *Environment Protection and Biodiversity Conservation Act 1999* pertains to matters of national environmental significance, for example Ramsar Wetlands and listed threatened species (e.g. Growling Grass Frog). The proponent is obliged to refer matters to the Commonwealth Environment Minister if such values, such as an 'important population' of a threatened species, may be affected by a proposed action. The Department of Environment and Heritage (DEH) decides whether there will be a significant impact and if it needs to be a 'controlled action'.

In the case of the proposed works associated with the Healesville-Koo Wee Rup Road upgrade, it is recommended that VicRoads include consideration of Growling Grass Frogs in an EPBC referral. The design and future alignment of the road would determine whether or not a significant impact on the Growling Grass Frog is likely, and therefore whether it should be referred as a 'controlled' or 'non-controlled' action.



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## 6 Acknowledgments

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- John McGuckin (Streamline Research P/L);
- Aaron Organ (Ecology Partners P/L); and
- Property owners who kindly allowed access.

Appendix 1 VicRoads Assignment Task Brief

**3.02.1 Purpose**

Ecology Australia will undertake flora and fauna surveys along the Healesville - Koo Wee Rup Road reservation and immediate surrounds. The primary purpose of the surveys will be to determine the presence/absence of rare plants (particularly River Swamp Wallaby-grass) and of the Southern Brown Bandicoot.

**3.02.2 Background**

A planning study is being undertaken to determine options for the future upgrading of the Healesville - Koo Wee Rup Road (refer Figure 1). It is expected that the development of Healesville - Koo Wee Rup Road will consist of the duplication of the existing road between the Pakenham Bypass and McDonalds Drain. At the southern end it is proposed to construct a bypass of Koo Wee Rup on a new alignment to the west of the township between McDonalds Drain and the South Gippsland Highway.

A flora and fauna desktop review has been undertaken for the route by Ecology Australia. The findings of this review are contained in a report dated July 2005.

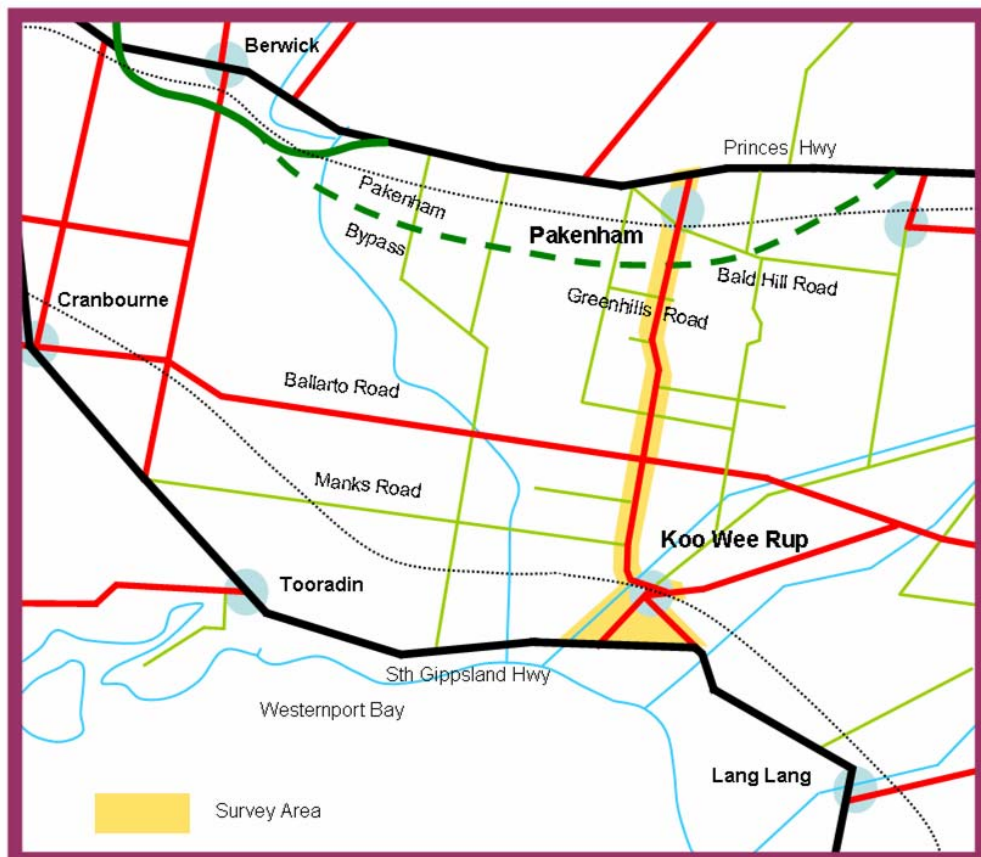


Figure 1 :

Healesville – Koo Wee Rup Road, Princes Highway to South Gippsland Highway

### 3.02.03 Services to be Provided by the Consultant

#### *Standard Requirements*

a) VicRoads' Environment Strategy

The VicRoads' Environment Strategy sets the environment policy framework within which VicRoads operates and consultants should be familiar with the Strategy.

b) Permits

The Consultant shall ensure that they have all necessary permits for undertaking the investigations and that all work be carried out in accordance with these permits.

#### *Survey Tasks*

Field work, collation of data and reporting as set out in the Proposal.

The rare plant survey would be undertaken in October/November. The main species in question is River Swamp Wallaby grass, which is best surveyed at this time.

The Southern Brown Bandicoot work would entail a hair tube survey of Swamp Scrub remnants along the existing road and top banks of the watercourses/drains at Koo Wee Rup where considerable remnant vegetation is present, and at the intersection of Rossiter Road and the South Gippsland Highway. This work would involve two zoologists placing the hair tubes in the field over two days, leaving the tubes in place for two weeks, collecting them, and sending the hair tube wafers with hair samples to Dr. Hans Brunner for identification of the hair. This would be undertaken in early to mid-spring (September and/or October) to avoid hotter months when the by-catch of reptiles is higher.

The study area for the survey shall include:

- The existing road reservation for Healesville-Koo Wee Rup Road between the Pakenham Bypass and McDonald's Drain, and a 100 m wide strip each side of the reservation boundary.
- The area bounded by McDonalds Drain (Bunyip River), South Gippsland Highway and Sybella Avenue plus a 100m wide strip along the north-west edge of McDonalds Drain (Bunyip River).

### 3.02.04 Information to be Supplied by Corporation to Consultant

VicRoads will provide copies of all previous reports and other relevant information.

VicRoads will provide available aerial photos (if required) and plans showing the corridors.

Whilst not expected to be required, VicRoads will arrange, as far as possible, access to private property or will inform the consultant where access is not available or of any known special requirements for access. The Consultant will be fully responsible for contacting all owners prior to entering their property.

VicRoads will co-ordinate liaison with other specialist consultants as required.

### 3.02.05 Information to be Provided by the Consultant to the Corporation

The consultant shall supply VicRoads with a report for each survey, as set out in 3.02.08, Deliverables.

**HP** It is anticipated that the Southern Brown Bandicoot survey will be completed within two (2) weeks of the commencement of the contract. A draft report will be presented to VicRoads within two (2) weeks. VicRoads will review the report and within two (2) weeks accept, reject or suggest amendments to it for inclusion into the final report. A final report shall then be submitted within two (2) weeks from the date of receipt of VicRoads response to the draft report.

It is anticipated that the Rare Plant (River Swamp Wallaby grass) survey and draft report will be completed within eight (8) weeks of the commencement of the contract. VicRoads will review the report and within two (2) weeks accept, reject or suggest amendments to it for inclusion into the final report. A final report shall then be submitted within two (2) weeks from the date of receipt of VicRoads response to the draft report.

### 3.02.06 Methodology

a) General

The Consultant shall conduct the Assignment in accordance with the methodology submitted to and approved by VicRoads, prior to the commencement of the survey.

b) Liaison with VicRoads

On all contractual matters, the Consultant shall liaise only with the Superintendent or the Superintendent's Representative.

The VicRoads Superintendent's Representative for the assignment will be Mr Tony Hillman. The contact details are as follows:

Phone: (03) 9881 8078  
Email: tony.hillman@roads.vic.gov.au

### 3.02.07 Reporting

The Consultant shall notify VicRoads immediately on the commencement and completion of any field work or discovery of any significant issues which arise as a result of the investigations and notify VicRoads immediately of any other issues that VicRoads should be made aware of.

### 3.02.08 Deliverables

#### Draft and Final Reports

- One bound copy and one unbound copy of the Draft Report should be presented to VicRoads for comment and review.
- Three bound and one unbound copy of the Final Report should be presented to VicRoads including colour plans as deemed required.
- An electronic copy of the Final Report should be provided to VicRoads on a disc in Microsoft Word format and in Adobe Portable Document File (pdf) format.
- All reports shall contain an executive summary
- All reports shall contain a copy of the Consultant Task Brief as an Appendix (i.e. Section 3.02 of

this contract)

- All reports shall conform to the following requirements:-
  - Binding margin : 25mm
  - Open margin : 10mm
  - In practical terms, provide the 25mm margin on both sides of each page so that VicRoads can produce double-sided documents.
  - Top margin : 10mm
  - Bottom margin : 10mm
  - Start each section on the right hand page.
  - Have fonts generally no smaller than 12 point.
  - Start Chapter 1 on the right hand page. Start all other chapters as they occur.
  - First page of Chapter 1 is Page 1.
  - All preceding pages to be in Roman numerals.
  - Odd numbered pages to be right hand pages.
  - Be consistent with style. Use Commonwealth Style manual or similar.
  - Minimise use of colour figures and photographs. Colour figures should be capable of being reproduced in black and white.
  - Supply clean artwork (not photography)
  - Supply unfolded plans if greater than A4 size.
  - Supply loose photographic prints.
  - Where continuous alignment drawings are broken down to A3 size drawings, all annotation and text shown on the continuous alignment drawings must be self contained within each A3 drawing.