

# Conserving koalas in Wollondilly and Campbelltown LGAs

DRAFT

Recommendations from OEH with relevance to development of the Wilton and Macarthur Priority Growth Areas (PGAs) including identification of core koala habitat, primary movement corridors and priority road kill prevention works.

## Introduction

Koalas within the Wollondilly and Campbelltown Local Government Areas are priority populations under the NSW Government's Saving our Species (SoS) Program. Under this, OEH is collecting new information on koala distribution, abundance, movement and habitat usage within the Wollondilly LGA. Work commenced in March 2016, with data collection and analysis ongoing.

For this document, OEH has combined new and existing data to identify core koala habitat and important movement corridors critical to the long-term persistence of the koala populations around Campbelltown, Appin and Wilton. Key threats have been identified including the mapping of road kill hotspots. While the Wollondilly Koala Conservation Project still has several years before completion, the information collected to date has vastly improved our understanding of the koala population in this area. Sightings data, presence-absence spotlighting data, road kill data, koala habitat plots as well as home range and feed tree data from tracked koalas has been used to revise and update existing mapping to provide a new, fine-scale koala core habitat and corridors map and information to allow prioritisation within this.

The use of best-available information is crucial in understanding what is required to maintain the koala population in this area, and the actions required to avoid or minimise impacts and threats from new developments. As more information becomes available it will be used to refine outcomes, particularly in relation to filling identified data gaps.

## Principles for the conservation of koalas in Wollondilly and Campbelltown

South-western Sydney is facing large-scale land-use change with development of the Wilton and Macarthur PGAs. The proposed change from rural to low/medium density residential development has significant implications for the koalas of this area.

Key threats to koalas of major residential development in the Macarthur and Wilton PGAs are:

- Direct loss of core and supporting koala habitat
- An increased urban interface with koala populations, leading to increased interactions with people, houses, pools, domestic dogs and vehicles
- Increased traffic volumes on principal roads into the new residential areas that will require upgraded roads, leading to a greater risk of road kill
- Increased indirect impacts to koala habitat through more frequent fire, weed incursion, feral pests, light spill, noise and rubbish dumping.

OEH has assessed available information on koalas, the known threats and the extent of proposed development to identify a strategy to conserve koalas in Wollondilly and Campbelltown LGAs.

Four key principles have been identified to guide koala conservation within the Macarthur and Wilton PGAs. These are:

1. Avoid new residential development within core koala habitat and primary corridors
2. Separate residential development and koala populations to minimise ongoing threats from domestic dogs and vehicles
3. Identify critical revegetation zones that will augment and strengthen core habitat and corridors
4. Identify koala road kill hotspots requiring road kill mitigation fencing and/or underpasses to allow safe passage of koalas.

## Identifying and protecting key koala habitats and corridors

### Core koala habitat

Core koala habitat comprises shale and shale-transition vegetation types that contain known koala feed tree species and records of koalas (Figure 1). Koalas favour vegetation growing on fertile soils due to the increased nutrient availability in eucalypt leaves. Protection of core habitat is critical to the long-term survival of these koala populations.

Over the last 2.5 years, OEH has collected and collated nearly 700 new koala records for this area. This has vastly improved our understanding of the local koala population and allowed validation and refinement of existing habitat mapping. New information from radio-tracking of 8 koalas during 2017 has also allowed the identification of typical home range sizes and preferred habitat and feed trees. This has resulted in a better understanding of vegetation types favoured by koalas to support the identification of core koala habitat. The method used to identify core and supporting habitat for koalas is described in Appendix 1.

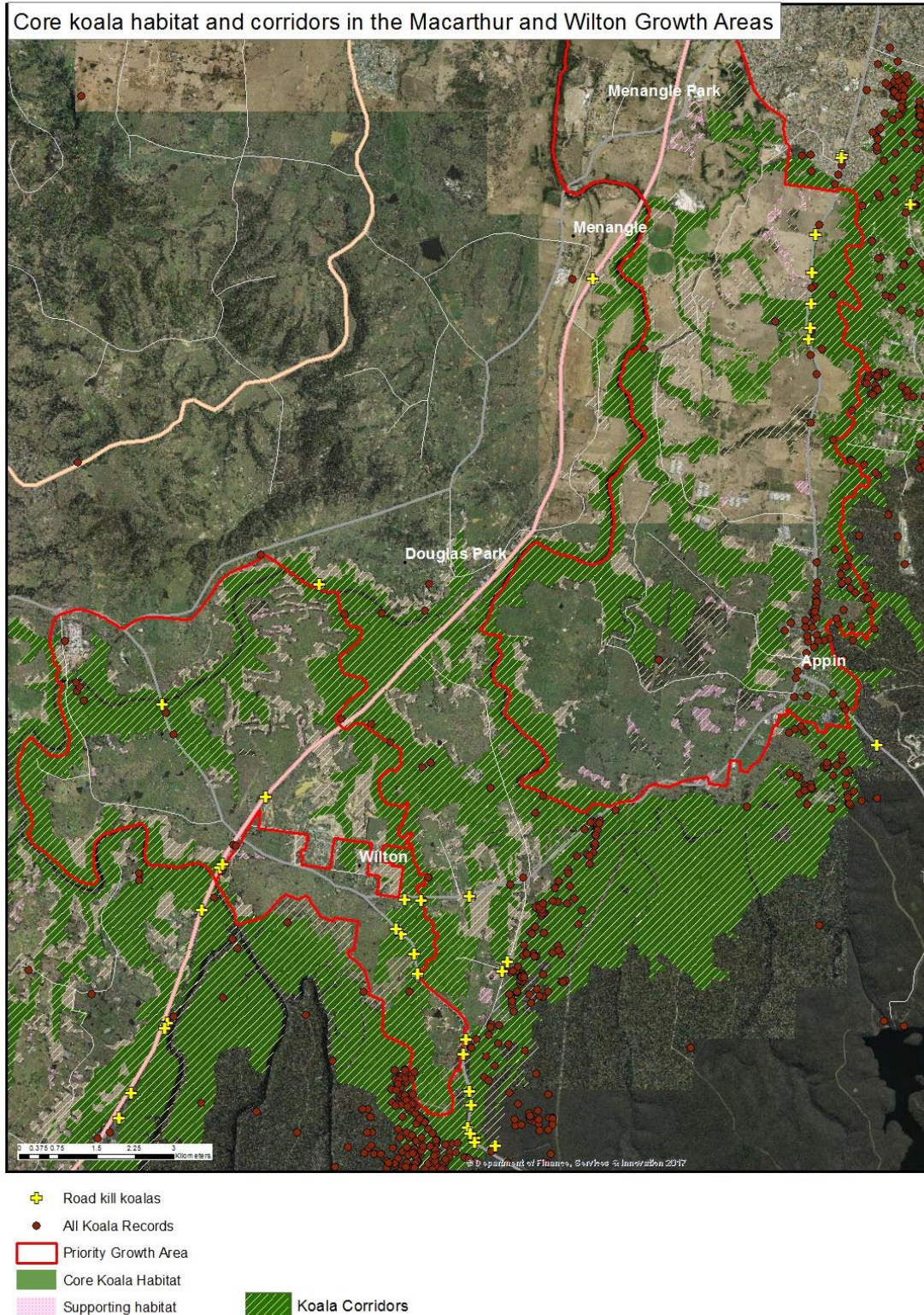
The stronghold for the koala populations of the Campbelltown and Wollondilly LGAs is the large patches of core habitat along the eastern edge of the Cumberland Plain. The remaining areas of shale-sandstone transition forest along the Nepean River and its major tributaries provide the only other core habitat for koalas in the region. This habitat is more limited in extent and linear in configuration, however still supports significant numbers of resident koalas and is vital to the persistence of the population.

### Koala corridors

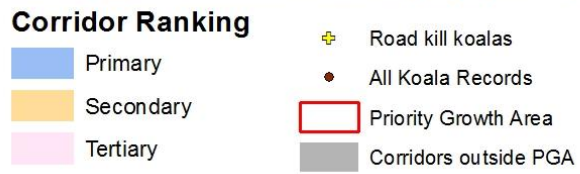
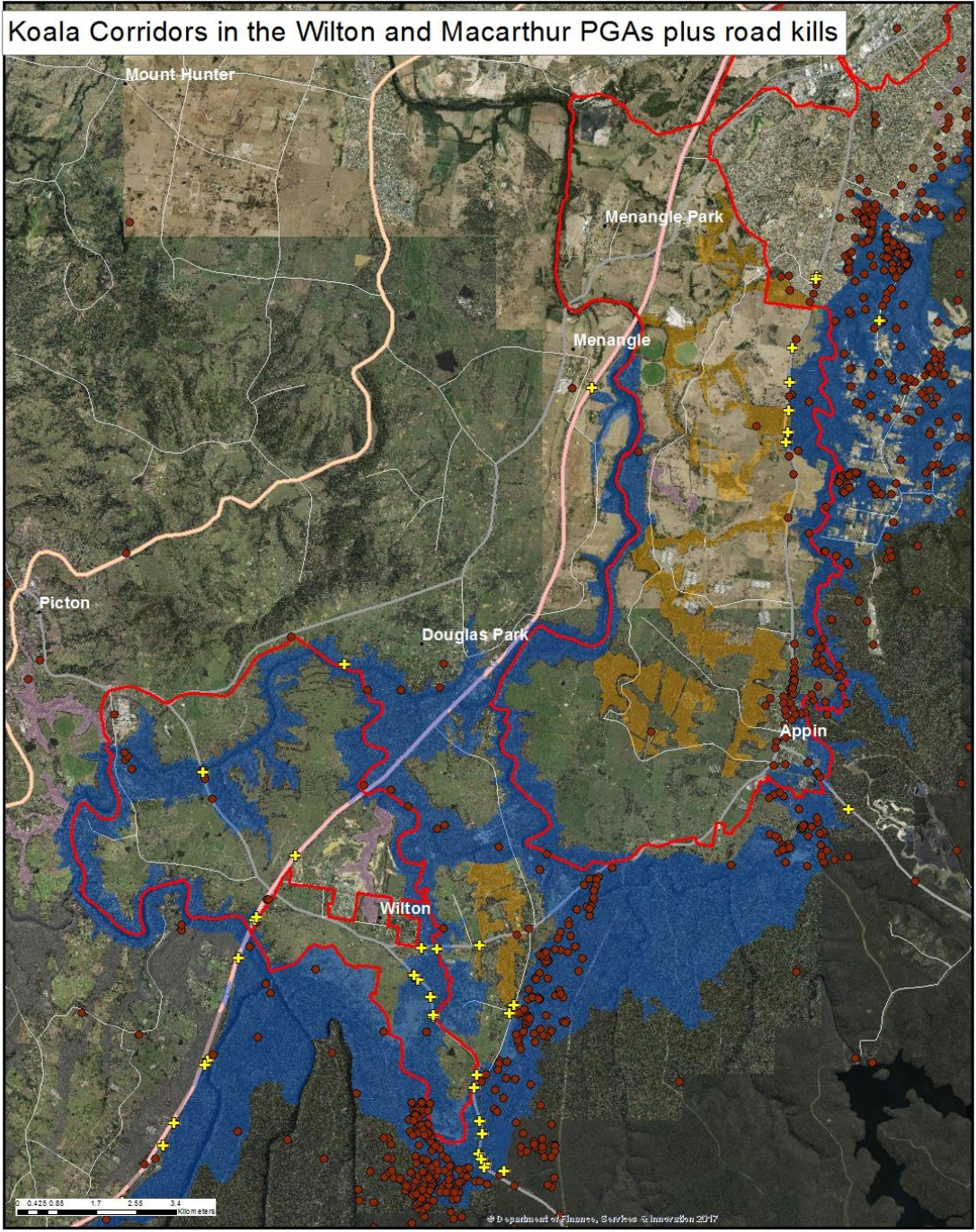
Koala populations operate at the landscape level and require habitat connectivity for animal movement, particularly in the spring breeding season and for the dispersal of young animals. The configuration of remaining core habitat in this region presents significant challenges for maintaining connectivity for the population. Adding large areas of residential development throughout much of the space between remaining core habitat places significant pressure on smaller, narrower patches and their role in keeping the population linked.

Corridors linking the koala population are shown in Figures 1 and 2. These corridors have been produced by updating the decade old regional-scale Koala Linkage (DECC 2007). The updated corridor follows the same pathway as the 2007 corridor, which was derived from a Generalised Linear Model of Koala Habitat (DECC 2007). It incorporates the most recent vegetation mapping and linework and has been validated using the newly acquired survey and tracking data. The corridor mapping can be used at a local scale (approx. 1:10000).

**Primary Corridors** are the most important linkages of koala habitat within the region. They contain the majority of core koala habitat within them and are contiguous links (gaps of less than 100m) of the most important koala habitat. Breaking or weakening of primary corridors will have serious ramifications on the long-term viability of the koala population in the area.



**Figure 1: Core koala habitat and corridors in the Macarthur and Wilton Priority Growth Areas**



**Figure 2: Koala corridors across the Wilton and Macarthur Priority Growth Areas.**

**Secondary Corridors** contain core koala habitat and are connected to primary corridors, however links to these aren't as strong and may be connected by scattered trees across more than 100m. Retention of secondary corridors is not critical to the long-term functioning of koala corridors in the region, however they could be enhanced to further support primary corridors and core habitat.

**Tertiary Corridors** contain core koala habitat but are poorly linked to primary corridors, or only linked at one end (i.e. they provide little connectivity value). They may be enhanced to provide greater connectivity and habitat for the koalas of the region, but they are the least valuable connectivity asset to retain for koalas.

As with core habitat, the primary corridor for the persistence of koalas is through the continuously linked band that runs along the eastern edge of the Cumberland Plain from Campbelltown, through Wedderburn, the eastern part of Appin, crossing Picton Road south of Wilton and skirting the southern edge of the Wilton South East growth area. This area is directly and continuously linked by primary corridors along the Nepean River, Allens Creek and Cataract Creek north to Menangle. Secondary corridors link the Nepean corridor with the Georges River in the northern part of the area.

## Koala Population Estimates within corridors

OEH has generated koala population estimates for each identified corridor. These calculations are based on the 67 systematic, 2 ha spotlights surveys undertaken within the identified corridors. A koala density has been calculated based on this data which was then extrapolated over the entire “core habitat” area within each corridor. Cleared land, scattered trees and regrowth areas have been excluded for these calculations although they will be used by koalas. Thereby, this is a conservative, minimum estimate of koala numbers and densities for this area. Figures for the Georges River corridor have not been calculated as it is mostly outside the Wollondilly LGA where new research has been occurring, thus there were insufficient presence-absence spotlighting sites to derive this figure.

**Table 1: Koala population estimates by corridor**

Corridor Name	Corridor Rank	Habitat	Area of Core Habitat (Ha)	Koala Density per ha within Corridor	Number of Koalas
Nepean	Primary	Core	1742.58	0.0522	91
Allens	Primary	Core	1235.17	0.0522	64
Wallandoola-Cataract	Primary	Core	1193.03	0.0522	62
Avon-Nepean	Primary	Core	1089.23	0.0522	57
Cordeaux	Primary	Core	628.64	0.0522	33
Cascade	Primary	Core	605.28	0.0522	32
Cataract	Primary	Core	381.38	0.0522	20
Ousedale-Mallaty	Secondary	Core	390.08	0.0522	20
Simpsons-Elladale	Secondary	Core	255.31	0.0522	13
Woodhouse-Menangle	Secondary	Core	220.33	0.0522	12
Noorumba	Secondary	Core	122.01	0.0522	6
Clements	Secondary	Core	107.86	0.0522	6
Stonequarry	Tertiary	Core	124.15	0.0522	6
Myrtle	Tertiary	Core	84.48	0.0522	4
Stringybark	Tertiary	Core	78.43	0.0522	4
Leafs Gully	Tertiary	Core	34.52	0.0522	2
<b>Total</b>	<b>All</b>		<b>8292.46</b>		<b>433</b>

Table 1 shows that the Primary Corridors contain significant “Core Habitat” and provide habitat for at least 359 koalas. These key stretches of contiguous, high quality koala habitat need to be protected and enhanced not only for their value in connectivity, but as important koala habitat in their own right.

Figure 3 shows the location of the koala corridors identified in Table 1. The most important corridor is the Nepean River and the key links between that and the intact bushland to the east, i.e. Allens Creek and Cataract corridors. All contain significant core habitat for koalas as well as providing connectivity.

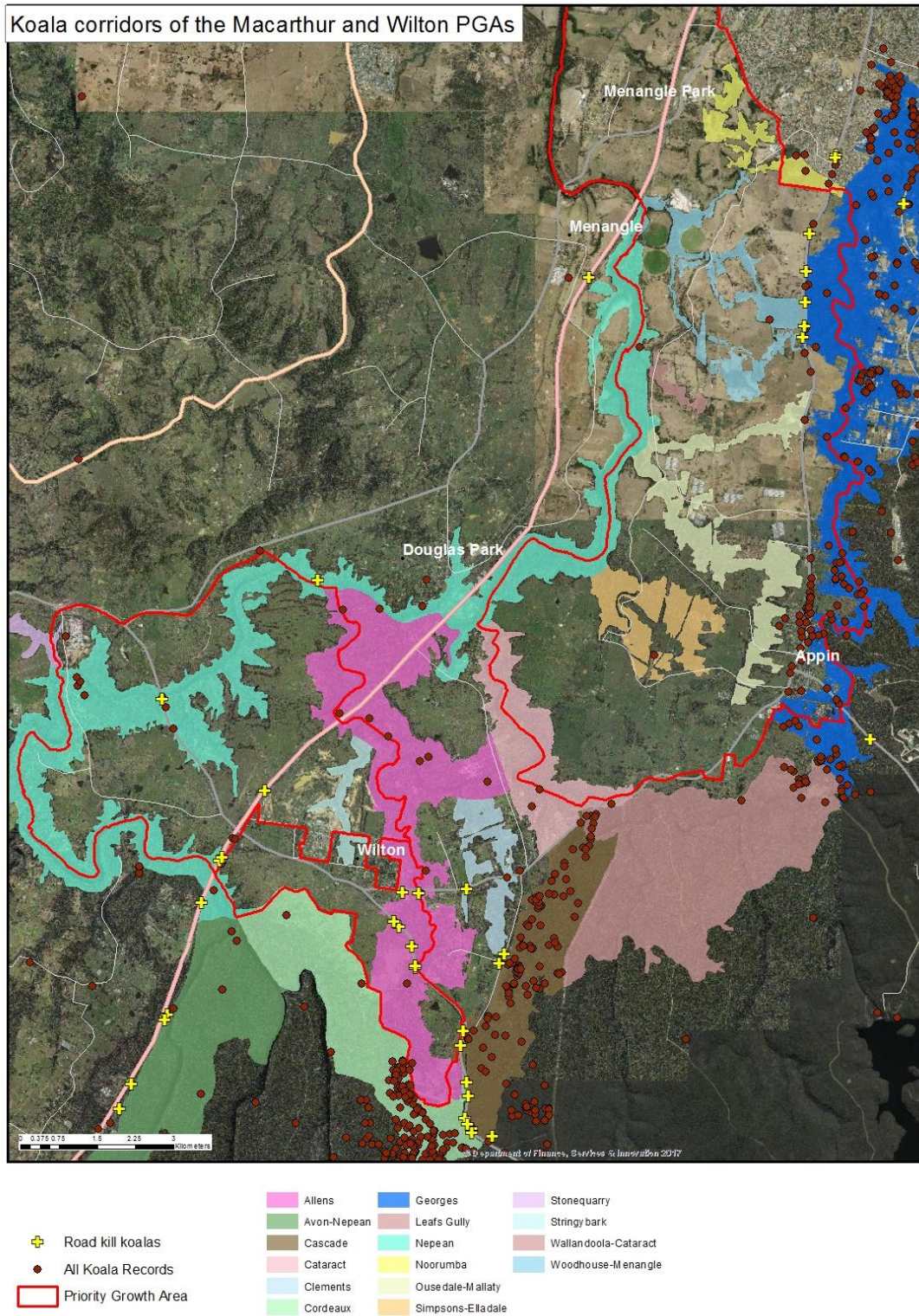


Figure 3: Koala corridors of the Macarthur and Wilton PGAs.



## Separating koala conservation and residential development

Residential development poses a suite of direct and indirect threats to koala populations. While cleared land or areas with scattered paddock trees provide lower habitat value, koalas will move across these areas. The filling of these areas with residential development, the incursion of roads and the need for fire asset protection zones may all directly impact on core koala habitat and corridors. 'Sensitive urban design', where koalas live alongside new residents sounds appealing, however the ever-present threats of domestic dogs, cars and swimming pools mean these areas are often a 'sink' for nearby koala populations in intact bushland.

Keeping koalas out of residential areas minimises these threats. This can be achieved in two ways. Firstly, residential subdivision should be designed to limit the interface between core habitat and corridors. The integrity of corridors is increased by increasing width, so avoiding housing infill within primary corridors to provide maximum movement potential and minimal disturbance is critical. Secondly, where development proceeds next to core habitat and corridors fencing and other barrier solutions should be installed to keep koalas, houses and their occupants separate. Creating access points for residents to enjoy the bush is important to link communities with their landscape, but identifying a smaller number of well-considered places will limit the likelihood that koalas will wander into danger in the suburbs.

## Habitat restoration and revegetation

Wider corridors and larger areas of habitat are better than narrow corridors and smaller areas of habitat. Habitat linkages may be compromised or incomplete in some areas due to historical clearing. Where areas of core habitat can be augmented and strengthened, restoration and revegetation is effective in filling gaps.

When considered along with the principle of separation of urban development and koala populations, clear priorities for habitat restoration emerge. The highest priority in the Wilton South East precinct is in the south-east corner, where residential development has been proposed for an area of cleared land surrounded by core habitat at the start of a primary corridor along Allens Creek. The cleared area is almost fully enclosed by high quality koala habitat and residential development would introduce significant threats and compromise the corridor value. The conservation of the koala population would be greatly enhanced by returning this area to high quality habitat, an outcome that would consolidate and double the width of the existing primary corridor and result in a far more sensitive urban design outcome.

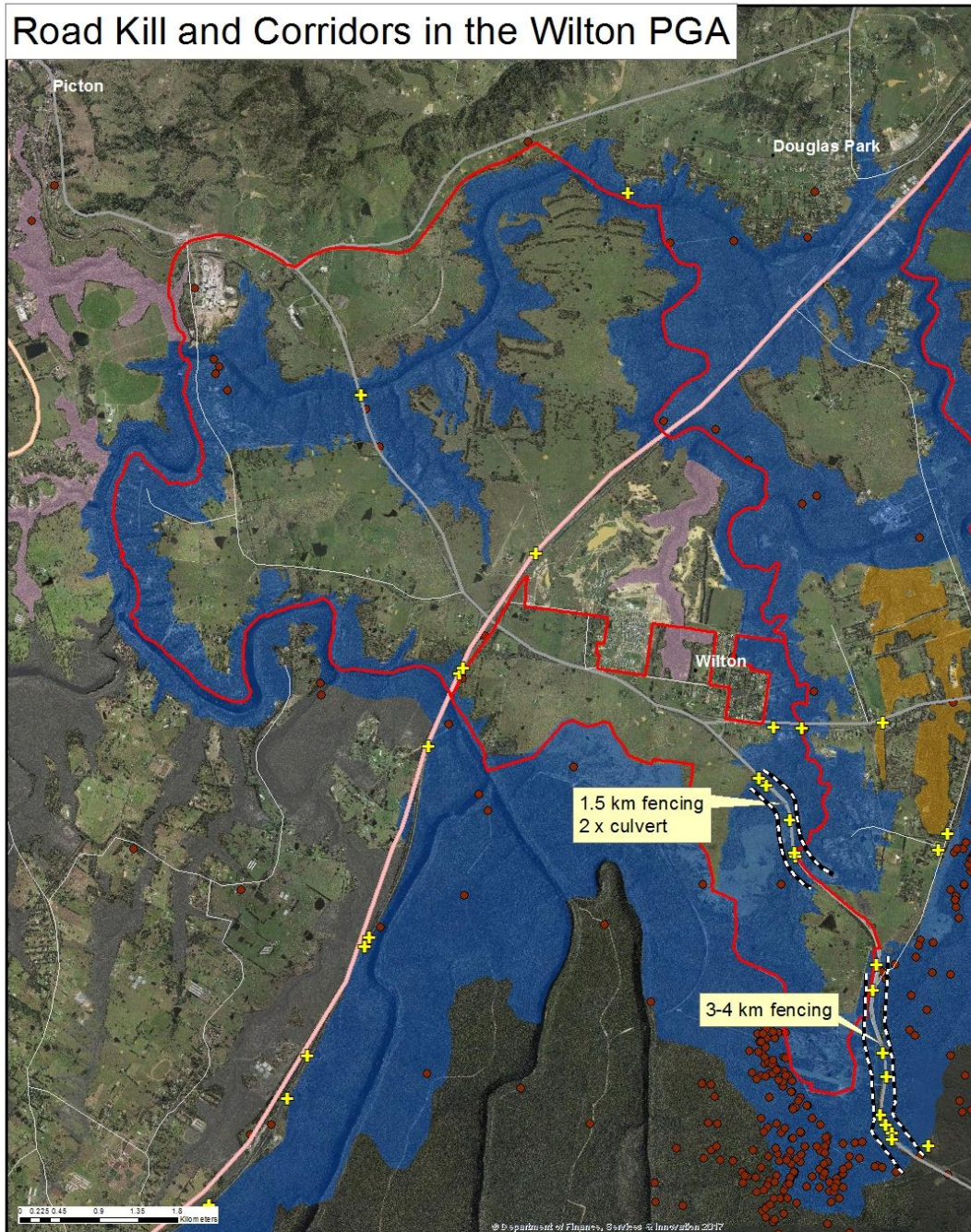
## Preventing koala road kill

Koala road kill is a highly visible and increasing threat to koalas in Campbelltown and Wollondilly LGAs. Much of the remaining core koala habitat is intersected by major roads, with the Hume Motorway, Picton Road, Wilton Road, MacArthur Drive and Appin Road all traversing areas of core habitat and primary corridors. Traffic on Picton and Appin Roads has rapidly increased over the last five years and with this there has been an increase in the number of road kill koalas. With land-use change and further increases in traffic, the number of koalas being hit, injured and killed will continue to rapidly increase without significant investment in road kill mitigation. Widening and upgrades of major arterial roads provides an opportunity to implement road kill mitigation measures.

Road kill hotspots have been identified based on collation of records in the NSW Wildlife Atlas (Figure 4). Hotspots have been identified as stretches of road with greater than four road kill koalas within a two kilometre stretch. Hotspots are along Picton Road between Cordeaux Dam and Wilton, MacArthur Drive, the eastern end of Wilton Road and Appin Road between Appin and Campbelltown. Another important hotspot occurs on the Hume Motorway at the Bargo exit, just south of the Wilton Growth Area. All hotspots occur where a major road intersects a Primary Koala Corridor, typically at the headwaters of a watercourse.

Options to reduce koala mortality on these roads include exclusion fencing and improved road underpasses along existing gully line underpasses such as on Allen's Creek. OEH does not consider signage as an effective road kill mitigation measure on major roads.

# Road Kill and Corridors in the Wilton PGA



## Corridor Ranking

- Primary
- Secondary
- Tertiary

- Road kill koalas
- Priority Growth Area
- All Koala Records
- Corridors outside PGA

Locations for strategic fencing at roadkill hotspots

**Figure 4: Recommended koala road kill mitigation infrastructure in the Wilton Priority Growth Area**