

Riverview Group

Buffer Zone for Parkwood Egg Farm



March 2014



Consulting Environmental Engineers



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Dear David,

Reasonable Buffer Zone for Parkwood Egg Farm

Consulting Environmental Engineers (CEE) is pleased to provide this report to Riverview Group regarding a reasonable and appropriate buffer zone (based on air quality considerations) for the Parkwood Eggs Farm at West Belconnen, near the border of ACT and NSW.

1. Background

The Riverview Group proposes to develop a large area between Belconnen and the Murrumbidgee River in the ACT, and extending into NSW, for urban purposes. The area will potentially yield approximately 4,500 dwellings in the ACT and 3,500 dwellings in NSW over a period of about 25 years. The first stage is the development of a Structure Plan which will provide the technical basis for re-zoning the land under the ACT Territory Plan, the National Capital Plan and the Yass Valley Council Planning Scheme.

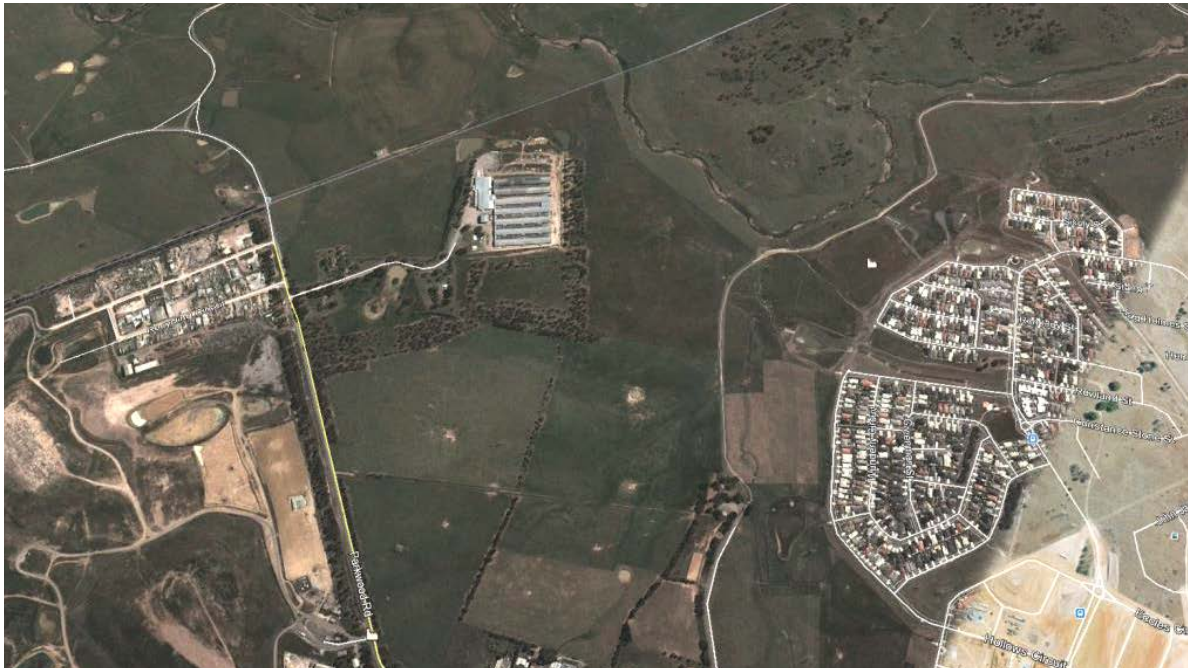
There are many considerations in the development of the Structure Plan including providing for appropriate "odour" buffer distances between the Parkwood Eggs facility and the proposed residential development. This report considers the issues involved in developing a buffer zone for the Parkwood Egg Farm including:

- Existing buffer zone in the ACT Territory Plan,
- Buffer zones recommended in State Guidelines and Policies,
- Buffer Guidelines recommended by the Australian Egg Corporation
- Results of preliminary odour modelling to examine the effects of regional wind patterns; and
- Consideration of local topography and night drainage breezes.

Initially, it was intended that the buffer zone would be defined from an odour dispersion model based in actual and planned future operations at the Egg Farm, and on-site measurements of odour emissions. However access to the farm was not able to be arranged and therefore this alternative approach has therefore been adopted.

The Parkwood Egg Farm is the only egg farm in the ACT and is located in west Belconnen on Parkwood Road, just 50 m south of the ACT-NSW border. Figure 1 shows the existing land uses around the Egg Farm. The farm is surrounded on all sides by grazing land, with the Belconnen landfill/recycling centre at 400 m to the west, the recently-developed urban area of MacGregor at 700 m east and the Belconnen pony club at 850 m to the south. Ginninderra creek flows from Belconnen to the north-west at 150 m from the Egg Farm.

Figure 1. Existing Land Uses near Parkwood Egg Farm



2. Existing ACT Buffer Zone

Under the Belconnen District Precinct Code, Parkwood Eggs has a buffer zone of 500 m measured from the approximate boundary of the sheds (see Figure 2). In this buffer zone, development for residential use or community use is not permitted, to prevent the environmental impacts of existing land uses, such as the spread of odours and wind-blown particulates, from conflicting with more sensitive land uses. A similar buffer zone also applies to the Belconnen landfill and recycling centre.

No buffer zone has been defined for the EGG farm in NSW but the land is used for grazing and no residential development (other than Riverview) is contemplated.

3. External Inspection of Egg Farm

An external site inspection of the egg farm was conducted by Dr Terry Bellair of CEE to establish the general nature of the operation. There are seven sheds, each containing about 30,000 birds in cages, with manure apparently being stored/composted to the north of the sheds (see October 2013 satellite imagery). As access to the site was not possible, it is not possible to describe all aspects of the operation which influence odour emissions from the facility under normal operations and potential “upset” situations.

Figure 2. Existing ACT Buffer Zone for Parkwood Eggs

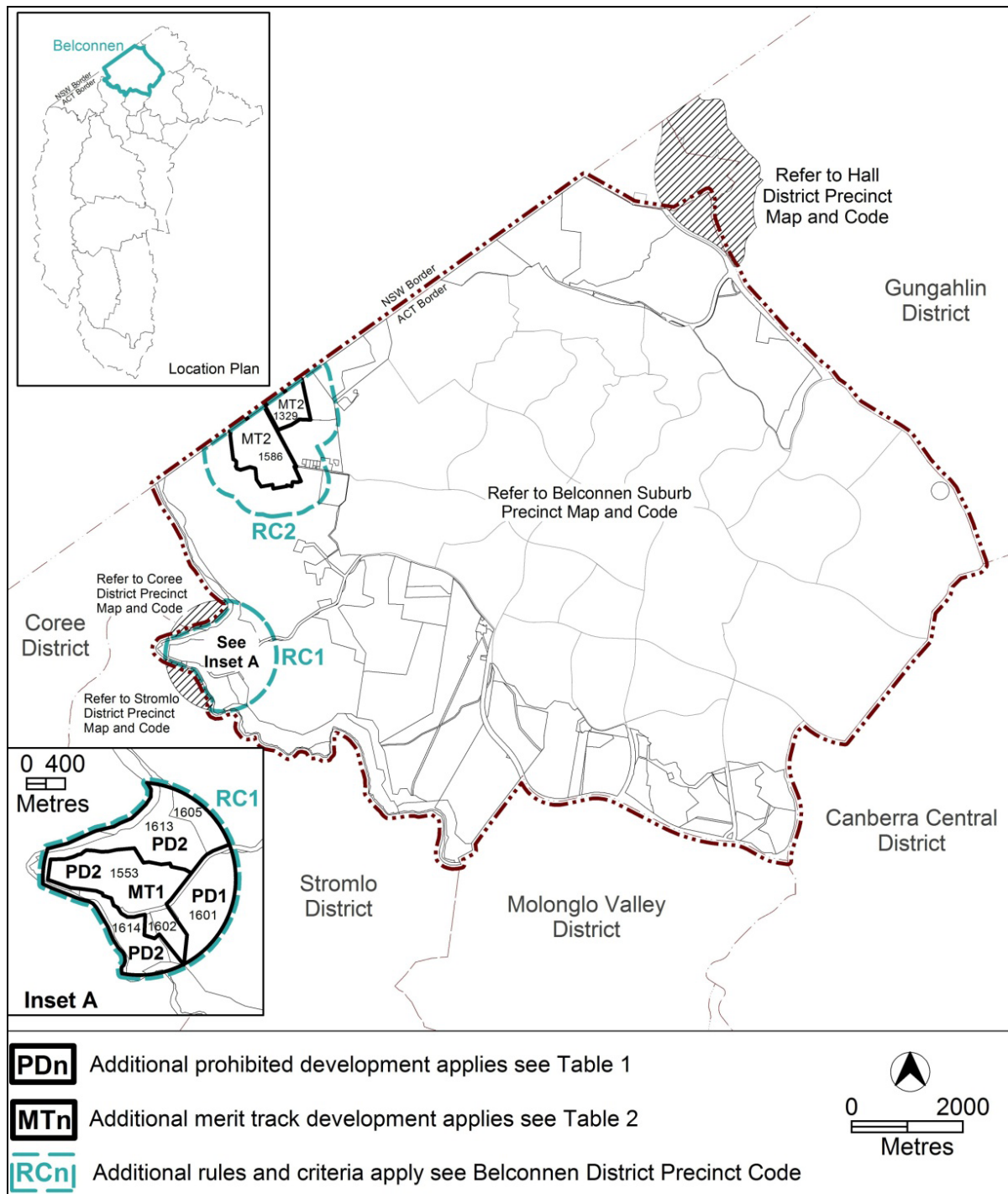


Figure 3. Photographs of the Parkwood Egg Farm Area



For this assessment, we have made the following assumptions about operations:

- There are 200,000 birds in seven sheds;
- Forced tunnel ventilation system to control temperature and odour;
- Birds are in cages, with belt under cages to remove droppings;
- Belt operated twice weekly in day hours to keep sheds relatively clean;
- Heating and cooling systems, with standby generator;
- Manure handling arrangements - including whether in-shed manure drying is undertaken (if so, at what times of the day), frequency of manure removal, whether any manure is held (or composted) on-site (potential fly breeding issue);
- Dead birds removed twice per day, frozen and removed from site daily;
- No processing of chickens at the site – only egg processing.

We have no information on whether or not there have been any odour complaints received or the nature and likelihood of “upset” conditions that may have resulted in elevated odour emissions. The sheds are in open relatively flat land, with a line of trees to screen the site from the road. The buffer zone has been determined for the existing facilities, based on good practice operations, but considering a future expansion to 300,000 birds (10 sheds).

4. State and Territory Guidelines

Each State and Territory has Guidelines for separation distances from various poultry facilities including broiler farms and egg (layer) facilities. There also are Australian Egg Corporation buffer guidelines. ACT tends to use the SA Guidelines.

5.1 South Australian Guidelines

Appendix 2 of the SA Guidelines¹ sets out a procedure for calculating recommended separation distances for poultry farms based on assigning numerical values to the following factors: the type of farm (for meat or egg production); receptor type; manure handling arrangements; surface roughness features and terrain.

Application of the SA guidelines would produce a recommended separation distance of 830 m, based on the following assumptions:

- 300,000 bird egg (layer) farm;
- “Town” receptor;
- Regular removal of manure from the site;
- Surrounding country with long grass and few trees; and
- Sloping terrain (1 to 2 %).

If manure is stored/composted on-site (which appears to be the case) the an additional factor of 1.3 applies, which would increase the recommended separation distance to 1,080 m.

¹ South Australian EPA (December 2007). “Guidelines for Separation Distances”.

5.2 NSW Guidelines

The “Technical Framework – Assessment and Management of Odour from Stationary Sources in NSW”² provides a policy framework for assessing and managing activities that emit odour and offers guidance on dealing with odour issues. However, without site-specific information on the operation of the Parkwood Eggs Facility or its odour emissions, it is not possible to undertake an odour impact assessment as described in the document as the “Technical Framework” makes reference to a “Primefact Sheet”³ for further information on selecting appropriate sites for broiler (meat) farm developments, but not for layer farms.

Chapter 6 of the “Living and Working in Rural Areas” handbook published by the NSW Department of Primary Industries⁴ provides a guide (in Table 6) to recommended minimum buffer distances for primary industries noting that the recommended buffers “should be used as a starting point and guide only in the absence of any other more appropriate separation arrangements”. The recommended buffer distances between residential areas and urban development and “poultry (presumably broiler) sheds and waste storage”, is 1,000 m.

In our experience, odour emissions from normal operations at broiler and layer farms (with similar bird numbers) are broadly comparable, with slightly lower emissions from well-operated egg farms. Potential odour emissions from “upset” situations from broiler farms are likely to be substantially higher than from (caged) layer farms, because of the very strong and highly offensive odours which can be generated from wet broiler litter.

5.3 Victorian Guidelines

Victorian EPA Publication 1518⁵ lists recommended separation distances for “industrial residual air emissions” (which are elevated emissions resulting from factors such as process upsets or failure of emission control equipment). In the case of poultry farms for eggs, Publication 1518 adopts the guidelines developed by the Australian Egg Corporation⁶ (see below).

The DPI Victorian Broiler Code⁷ (which does not apply specifically to egg farms) set out a formula for making an initial estimate of the minimum buffer distance. For a 300,000 bird broiler farm, the minimum buffer distance is 590 m.

² Department of Environment and Conservation (November 2006). “Technical Framework – Assessment and Management of Odour from Stationary Sources in NSW”.

³ NSW Department of Industry & Investment (March 2011). “Better Site Selection for Meat Poultry Developments”.

⁴ NSW Department of Primary Industries. “Living and Working in Rural Areas Handbook”.

⁵ Victorian EPA (March 2013). “Recommended Separation Distances for Industrial Residual Air Emissions”. EPA Publication 1518.

⁶ Australian Egg Corporation (June 2008). “Environmental Guidelines for the Australian Egg Industry”. AECL Publication No 08/01.

⁷ Dept Primary Industry (2009) “Victorian Code for Broiler Farms”

5.4 Australian Egg Corporation Guidelines

The AEC Guidelines⁶ state, on page 27: *"In lieu of any specified by state and local government departments and agencies separation distance requirements - - - provide at least 500 metres between the impact source and any land use zone that is not compatible with the development (eg residential, rural residential)".*

5.5 West Australian Guidelines

The WA Statement of Planning Policy⁸ (No 43) poultry farm policy specifies a minimum buffer distance of 500 m from existing or proposed future residential areas.

The WA EPA's separation distance guidelines⁹ list a "generic" separation distance of between 300 and 1,000 m (depending on size) for intensive poultry farming (presumably relating to both broiler and layer farms).

5.6 Summary of Recommended Buffer Zone from Guidelines

This review of the buffer zone recommended in the various Guidelines shows that:

- The minimum buffer distance is 500 m;
- Mid-range buffer distances are 590 to 680 m; and
- The maximum buffer distance is 1,000 m;

On this basis, the existing buffer distance of 500 m is the minimum likely to apply.

5. Computer Modelling for Egg Farm

In practical terms, the buffer distance should be greater in the directions in which night drainage breezes or frequent low-speed night winds travel. The shape of the buffer zone for the egg farm can be examined by using an odour dispersion model in combination with a local meteorological file.

For this assessment, the Ausplume dispersion model was used to define the shape of odour isopleths based on local wind and atmospheric stability conditions, as it is a robust modelling system that has been used successfully in the ACT, SA, NSW and Victoria in the past for egg farms. The assumptions used in this odour modelling are listed below:

- Odour emission rates for 300,000 birds at 4 OU.m³/min per 1,000 birds, corresponding to best practice in odour management at the site;
- One year wind file containing hourly values of wind speed, wind direction (as measured at Canberra airport) plus stability category and mixing height calculated from hourly solar radiation and cloud cover;
- Flat site with low to medium roughness.

⁸ WA Dept of Planning (2003). Statement of Planning Policy No 43 "Poultry Farm Industry"

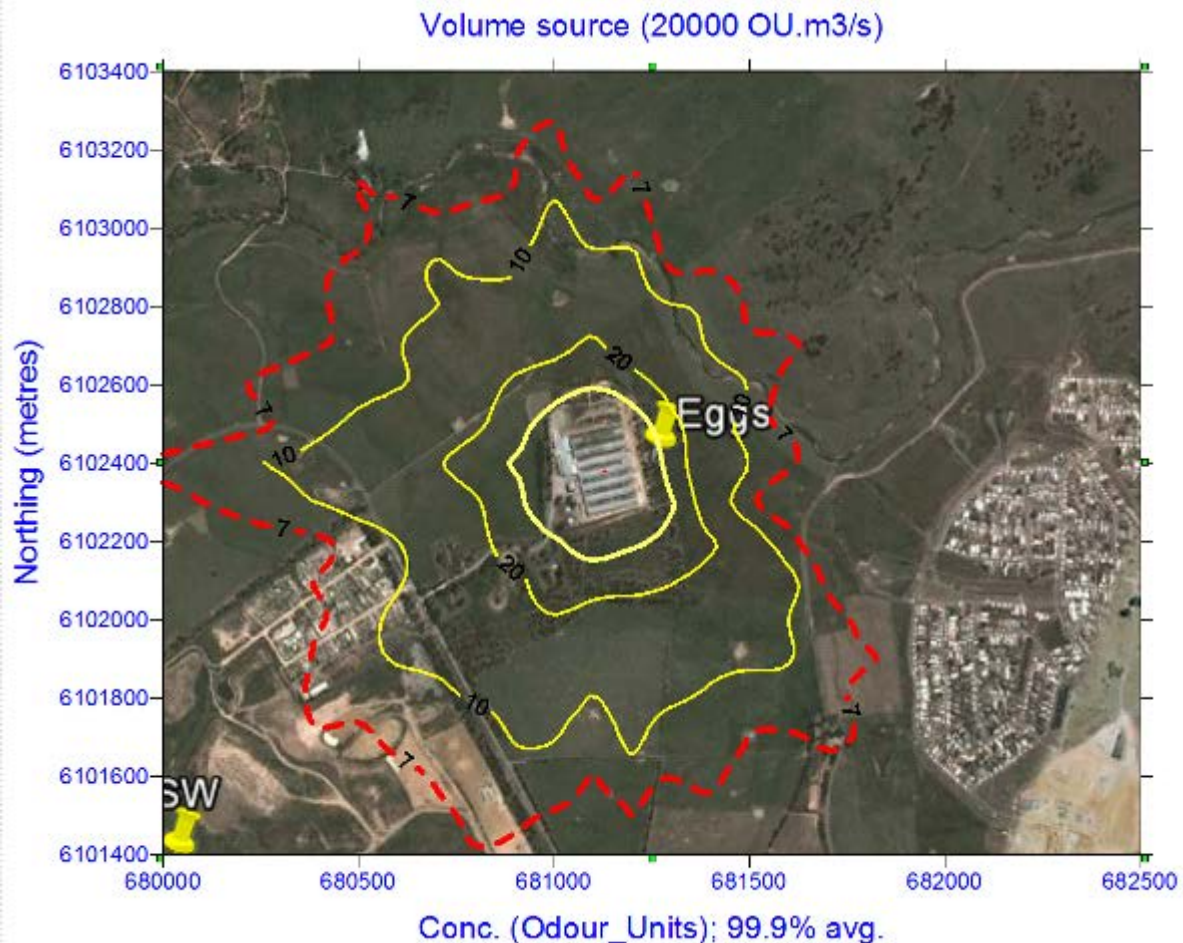
⁹ WA EPA (June 2005). "Separation Distances between Industrial and Sensitive Land Uses". Final Guidance No 3.

It is noted that an egg farm with 300,000 birds would produce around 60 t of manure each week and thus regular removal is required. There also will be around 500 dead birds each week to be taken off site, and these should be regularly collected from the cages and frozen until carted away.

The Victorian EPA has defined the boundary between “Low risk” and “medium risk” as corresponding to 7 to 10 OU, as predicted by the Ausplume model, at 99.9 % frequency using a 3-minute averaging period.

Figure 4 shows the predicted odour contours for the future Parkwood Egg Farm with 300,000 birds with best practice odour management. The present farm has 200,000 birds but probably less than best practice odour management (we have not made any specific observations of operations on the site) and thus the odour contours from the existing site during normal operations are probably similar to the predicted future contours.

Figure 4. Predicted Odour Contours for Future Parkwood Egg Farm



It can be seen in Figure 4 that the predicted 7 OU contour is about:

- 400 m east of the egg farm;
- 700 m south of the egg farm;
- 600 m west of the egg farm; and
- 600 m north of the egg farm.

The predicted 7 OU contour is well short of existing residential areas and therefore we would not expect that there would be odour complaints (about the egg farm) from residents in MacGregor (except in the event of “upsets” resulting in substantially elevated odour emissions). The predicted 7 OU contour extends across the landfill and recycling centre but we would not expect this to be a cause of odour complaints because of the background odour at that site, short occupation time by most people, low expectation of amenity and few or no occupants at night (when the highest odours occur).

Thus there should be no odour complaints (under normal operating conditions) at present but a potential for complaints in the future if residential development occurs too close to the egg farm.

7. Biosecurity for Chicken Farms

Biosecurity measures are essential for egg farms to reduce the risk of disease entering the poultry population or transferring from farm to farm, from wild bird populations to farmed birds or (more unlikely) from an infected farm to birds outside the farm. The high density of birds in commercial farms means that diseases that gain entry to a farm can spread rapidly.

The two most serious diseases of poultry are **Newcastle disease** and **avian influenza**. Australian strains of both viruses are present in wild birds and occasionally enter poultry flocks with severe consequences. Overseas (exotic) strains of both viruses are much more virulent than the Australian strains.

Other diseases already present in Australia such as **laryngotracheitis** and **infectious bronchitis** can have devastating effects on farm birds. Other diseases do not cause problems in poultry but can cause serious disease when transmitted to humans, including **salmonellosis** and **campylobacter** infections.

It is important that every step should be taken to contain infectious diseases and such measures should be adopted routinely to minimise disease.

Monitoring and Recognising Disease

Those responsible for the care of poultry should be recognize the signs of disease, which include reduced food and water intake, reduced production, egg abnormalities, behavioural or activity changes, increased deaths, changes in quality of feathers or faeces or other physical signs such as coughing and gasping. Any event meeting the case definition of Newcastle disease must be reported to the relevant authorities.

Buffer Distance from Adjacent Poultry Farms

Disease can enter a farm with the movement of poultry, poultry products, people and equipment, water, vehicles, wild birds and pets, and from neighbouring farms if the farms have insufficient separation. Biosecurity principles are set out in the *National Farm Biosecurity Manual - Poultry Production*¹⁰.

¹⁰ Dept Agriculture and Fisheries (2013) “National Farm Biosecurity Manual – Poultry Production”

Ideally, egg farms should be located in areas where poultry farm density is low and at least 1000 m from neighbouring poultry establishments (see *Environmental Code of Practice for Poultry Farms in WA*¹¹). Being separated by an adequate distance will minimise the opportunity for wind-borne diseases to spread from neighbouring properties. A buffer of trees and vegetation will also help, as well as reducing the visual impact of the farm on the environment. Farms and sheds should be located away from creeks, wetlands and lakes.

Control of Access

Ducks, commercial or otherwise, should not be kept on chicken farms. Age groups of chickens should be kept to a minimum, with birds of similar ages kept together. (The two on-site dams at Parkwood are potentially attractive to wild waterbirds, including ducks).

Access to the property must be restricted to only essential personnel, because disease can be carried on footwear, hands, clothing and equipment. Procedures such as automatic feeding can minimise the number of people entering the shed. Visitors are actively discouraged. People required to perform essential tasks must take stringent precautions such as washing hands and changing boots and overalls before entering and leaving the sheds. All vehicles entering the site must be inspected and if necessary cleaned to ensure that there is no contamination. It is preferable if all vehicles pass through a wheel bath of fresh disinfectant.

Other Management Practices

Dead birds should be collected, recorded and disposed of daily by despatching them to a rendering plant. Pick-up points should be as far from sheds as possible. Between batches or birds, all droppings and litter should be removed from the farm, all equipment dismantled and cleaned and the shed disinfected and fumigated. Litter should be removed entirely from the property and new sawdust/litter, feed, gas and other equipment only delivered after completing the clean-up.

Egg collection points, and gas and feed deliveries should be located so that there is no need for drivers to enter sheds or come in contact with birds. Trucks that collect birds or manure are a high risk because of the nature of their cargo. Therefore, it is essential that these vehicles are thoroughly cleaned and disinfected before entering the property. This is especially important on layer farms where partial depopulation/clean-up is common. All manure should be fully covered before being transported.

Poultry and Other Domestic Birds

Some apparently healthy birds can harbour infectious agents. Not only poultry, but backyard, show and aviary birds can carry diseases of importance to poultry - often without obvious ill-effects themselves.

Contact between the farm birds and all other birds be prevented. Employees may not keep backyard, show or aviary birds.

¹¹ Dept of Agriculture (2011) "Environmental Code of Practice for Poultry Farms in WA".

Wild Birds

Australian surveys indicate that a significant percentage of native waterfowl are infected with avian influenza and Newcastle disease viruses. Close association with wild waterfowl or water contaminated by waterfowl are considered to be responsible for many of the outbreaks of avian influenza in Australia.

Pigeons may also be a source of disease and may play a role in the spread of exotic disease. Parrots are also capable of carrying Newcastle disease viruses. To minimise this danger, sheds are bird-proof and great effort should be taken to separate all wild birds, particularly waterfowl, from sheds.

8. Recommended Buffer Zone for Egg Farm

A buffer zone for the Parkwood Egg Farm needs to be defined to allow planning for the adjacent areas to be advanced. A buffer zone is recommended below based on experience with other egg farms and broiler farms, the recommendations from various State Guidelines for separation distances from various poultry facilities including broiler farms and egg (layer) facilities, and the Australian Egg Corporation buffer guidelines.

It is recognized that any buffer zone must reflect a social compromise and an economic compromise. The social compromise is to permit continued operation of the egg farm and production of eggs locally within the ACT while allowing development of land beyond the buffer zone for a variety of community purposes, including residential and commercial development. The economic compromise is to balance the costs of effective management of odours at the farm compared to the benefits of increasing the area of land available for development.

Some uncertainty is introduced by the absence of an inspection of operations and actual measurements of odour emissions. On the other hand, there are many egg farms that have been inspected and tested, so there is no reason to expect the operations at Parkwood to be out of the ordinary.

Thus our recommendations for a planning buffer zone are as follows:

1. The minimum buffer distance is 500 m from the perimeter of the sheds;
2. A buffer of 600 m should be allowed down-slope from the sheds (the path of night drainage breezes) to the north-east, north and west of the sheds;
3. There should be a buffer of 800 m from the sheds to any constructed wetland, to provide adequate biosecurity against transmission of disease from wild water birds to the farm.

Prepared by Ian Wallis
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March 2014