# APPENDIX 35

## IMPACT OF A PROPOSED DEVELOPMENT OF AN AIRPORT IN THE CAPE WINELANDS ON POULTRY BIOSECURITY AND HEALTH

JULY 2025

# IMPACT OF A PROPOSED DEVELOPMENT OF AN AIRPORT IN THE CAPE WINELANDS ON POULTRY BIOSECURITY AND HEALTH

Dr Deryn Petty

## Terms of Reference

The aim of an environmental impact assessment is to minimize the impact of the development on the environment, including natural resources and residents and existing surrounding land usage , to ensure compliance with environmental legislation and to ensure that sites selected are suitable for long term sustainable development (Department of Infrastructure Planning and Natural Resources, ND) . As far as this section of the environmental assessment goes, I aim to investigate and as far as possible quantify the effect of a new airport on the  on the adjacent poultry farms, focusing on those aspects that will affect the biosecurity of a poultry farm and the health of the poultry.

I have relied on relevant publications and my own experience both visiting poultry farms as a poultry veterinarian and as a recognized biosecurity specialist, to address the impact that this development would have.

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## Deryn Brenda Petty - Background and qualifications

My academic qualifications include a BVSc Hons (cum laude) from the University of Pretoria and an MSc (physiology) from the University of Witwatersrand. I have lectured at both Wits and Pretoria University in the field of Physiology and Poultry Science. I was a state veterinarian at the Gauteng Department of Agriculture and Rural Development for 10 y and my job involved assessing biosecurity at pig and poultry farms in Gauteng. During my duties, I inspected over a hundred poultry farms in Gauteng and currently still make recommendations about biosecurity at poultry farms and feed mills all over the country. I have been involved in consulting with Department of Health officials about fly and smell issues with respect to pig and poultry farms. I have assisted with the biosecurity aspects of many of the environmental assessments done by GDARD. I have written opinions on the biosecurity risks of placement of landfill close to poultry farms for the city of Cape Town and for Distell and have been involved in investigating and documenting disposal of galley waste at the various South African ports of entry. At present I am a partner at The Poultry Practice.

## Declaration:

Although I am receiving fair remuneration for this report, I have no relationship of any nature with County Fair, or its holding company Astral. Any opinions expressed are my own and not necessarily those of The Poultry Practice.

Dr Deryn Petty

Signature on this day February 2024

## Description of the project

The Cape Winelands Airport (CWA) formerly known as Fisantekraal Airport is being developed in a phased approach which will include development of new landside and airside infrastructure. At present, CWA operates unscheduled operations and has 4 concrete runways of 90m in width and 700 to 1500 m in length. The site is located 10,5km northeast of Durbanville and 25km northeast of Cape Town. The current 150ha site is surrounded by cultivated land, livestock, and poultry farms. Flight activity averages approximately 100 air traffic movements per day at present. These are small aircraft and therefore the impact is relatively small.

Currently near the existing operations, there is a poultry breeder farm which is owned by County Fair (Astral) which consists of the Fisantekop Complex comprising of four broiler breeder farms, namely, Quarryside, Wheatlands, Fisantekop and Vergelee. On each of these four laying farms, there are six chicken houses (24 in total) with the total number of birds numbering 161,832. These are part of the County Fair broiler breeder stock and as such supply the broiler day old chicks to many farms in the Cape.

Since it is envisaged that the development of the airport will increase the air traffic as well as the number of people visiting the area, these topics are discussed. It is envisaged that the airport will service international flights, therefore the handling of galley waste and cabin waste will be discussed so far as it impacts animal health and biosecurity. Disease impacts, noise and light impacts are also discussed.

## Risks associated with increased development that would impact poultry.

The term biosecurity refers to a set of measures, both physical and managerial, designed to reduce or manage the risk of introducing or spreading a disease into the establishment. In general, these interventions encompass isolation, traffic control and sanitation among other things (California Department of Food and Agriculture, 2016).

Diseases, whether subclinical or clinical, can significantly reduce productivity, profitability, and the long-term financial viability of a poultry production unit. Broiler breeder operations have high biosecurity requirements, and the introduction of a disease can have catastrophic consequences as in some cases it can affect the broilers that emanate from the breeder farm. Thus, biosecurity is a very important issue for any poultry farmer, but especially for breeder farms.

## The issue of Geographic isolation


**Figure 1 The situation of the poultry farm showing poultry sites with different parent flocks less than 400 m from each other, less than 200m from a main road and less than 600m from a settlement. Note that the landside section of the airport will be developed very close to the farm.**

It must be noted that there has always been an airfield in the vicinity of the poultry farm and therefore many of the concerns about wild birds, rodents and people are existing biosecurity concerns, although the increase in the volume of traffic associated with an expanded airport needs to be taken into account. To my knowledge, proximity to an airfield has not been identified as a biosecurity concern for poultry, but any factor that would affect water quality, air quality, or a factor that attracts wild birds and pests to an area could potentially affect the health of the birds and mitigation for this must be investigated.

It must further be noted that in this case, there are four different parent flocks in close association with each other on this complex. The distance between the breeder flocks is certainly less than recommended for good biosecurity. It is noted that distance between poultry farms and other livestock concerns is the critical biosecurity issue rather than proximity to other forms of development. It is suggested that there are already existing biosecurity concerns pertaining to the County Fair breeder farm (see figure 1).

According to the World Organization of Animal Health (WOAH): *A suitably isolated geographical location is recommended. Factors to consider include the location of other poultry and livestock establishments, wild bird concentrations and the distance from roads used to transport poultry* (World Organization for Animal Health (WOAH), 2017). The California Department of Agriculture recommend that "*Proximity to a public road, an unrelated poultry operation, the number of poultry farms in the area, bodies of water, wild bird sanctuaries and nesting sites, landfill, back yard poultry flocks* are important in a biosecurity assessment (California Department of Food and Agriculture, 2016).

In a recent draft document (Department of Infrastructure, Planning and Natural Resources, n.d.) Tamworth Australia guidelines suggest that a biosecurity buffer of 2km around a broiler farm should be maintained where practical. Placement of farms at least 1 km from other poultry farms is required in South Australia (Environment Protection Authority South Australia, 1998). The purpose of such a buffer area is to provide protection from exotic diseases. It is always better to have a larger distance in place and especially when there are breeder farms as opposed to broiler and layer farms. There has been no real research on this issue. Nevertheless, a general practical guideline which is in use and informs many of the legal requirements is a distance of 1km between a poultry farm and a settlement or between a poultry farm and another poultry farm. No mention is made of industrial development or airports and proximity to a poultry farm in any of these publications mentioned above.

Proximity to a poultry farm is considered undesirable for the people who dwell close by, due to the noise, light, vehicle traffic, smell, air quality etc. The buffer zones applicable to human settlements are primarily designed to lessen the impact of the poultry farm on the quality of the surrounding environment for human settlement (Environment Protection Authority South Australia, 1998) rather with biosecurity considerations for the poultry farm in mind. Nevertheless, it is prudent to suggest a buffer of at least a kilometer to reduce the impacts of the industrial development and the poultry farms on each other. In this case the distance between the fence and the nearest shed is 100m and this means that the impact of the airport and the poultry farm on each other will have to be carefully considered. It must be noted that Transport Canada considers that there is a moderate risk for the erection of poultry houses within a 4km zone of an airport because such operations attract wild birds (Transport Canada , 2013/4).

Table 1: Summary of the recommended minimum distances between poultry and other poultry, water courses, human settlements and dwellings in various countries and states

| Minimum Distance between | NSW recommendations (Department of Infrastructure Planning and Natural Resources, ND) | Tennessee recommendations (Goon, ND) | Missouri (Pfost & Fulhage, 2009) |
|---|---|---|---|

| | | | |
|---|---|---|---|
| Poultry farm to urban settlement | 2km | 500m | 3km |
| Poultry farm to rural settlement | 1km | | 3km |
| Poultry farm to dwelling not associated with poultry farm | 300m | 153m | 600m (size related ) |
| Poultry farm to other poultry farm | 2km | | |
| Poultry farm to road | 100m | 45m | |
| Poultry farm to water course | 100m | 30m | 100m |

In summary, there is no documented disease and or biosecurity concern associated with proximity to an airport.

## Increased traffic of people past the farm gate

The airport can be expected to draw people to work there from the nearby settlement, Fisantekraal which is about 0.6km away from the poultry farm and about 2.5km from the airport site.

The township is likely to contain backyard poultry, which could be a risk for any nearby farm, as people entering the farm that have been in contact with backyard poultry can carry the disease to the farm poultry. As backyard poultry is more likely to be exposed to wild birds and therefore more likely to be infected with various diseases that birds are susceptible to, this could pose a risk. However, the workers on the farm come from this area already and therefore the existing risk is at least moderate. It is moot as to how much extra biosecurity risk there is from people walking past who do not have direct contact with the poultry on the farm.

Access to the airport for workers is most likely from the Melish Rd extension and this does not route traffic past any farm. Even when the occasional car or worker drives past the farm, it is unlikely that the farm will be affected as they are set slightly away from the road. If the Lucullus Rd option is pursued, the farm will not be able to operate effectively as the biosecurity on the farm will be inadequate.

Basic biosecurity as detailed below is already in place at farms and should be effective in maintaining a bio-secure entry. Basic biosecurity should include laborers' not keeping birds or being exposed to birds other than the company birds, the facility that is secure enough to prevent incursions of people into or near the sites, buildings built in such a way to keep out wild birds, concrete walkways provided to prevent workers from coming into contact with potentially contaminated soil or groundwater, feed and water provided from a secure source which is protected from exposure to wild birds and tested regularly, vehicles excluded from sites as far as possible and if essential, are sprayed with a disinfectant, workers required to shower on site and change into site dedicated clothing, visitors restricted, secure mortality disposal and timeous detection of diseases with appropriate treatment. There should be adequate rodent and fly control. All this is likely to be in place on a well-run poultry farm and therefore will mitigate any increased risk.

## Wild birds and disease

Wild birds can be attracted to a site where there is improper control over waste management (exposing food waste that attracts birds) as well as by the creation of bodies of water, which also attract birds. Wild birds that are migratory are associated with the spread of certain poultry diseases, the most well-known of which is avian influenza. However, migratory wild birds can also infect finches and other birds and therefore spread the disease to poultry (Jones , Sonnberg , Webby , & Webster, 2015). Covering of food waste, regular removal, rodent control are issues that will prevent access of waste to wild birds. Netting bodies of water that attract birds should be considered if these bodies of water are absolutely essential and close to a poultry farm. It should further be noted that bird strike is a significant problem for airports and therefore there will be standard bird deterrent measures in place which will mitigate the effects of wild birds on the area.

### Diseases related to wild birds.

#### Avian Influenza

Only viruses of the Influenza A virus genus have been isolated from birds. These viruses have haemagglutinin and neuraminidase antigens and the combination of these, along with the structure of the H antigen will determine how pathogenic the virus is. All 16 haemagglutinin (H1‑H16) and all 9 neuraminidase (N1‑N9) influenza A subtypes in the majority of possible combinations have been isolated from avian species (Alexander, 2007). Influenza A viruses infecting poultry can be divided into two groups. The very virulent viruses cause highly pathogenic avian influenza (HPAI), with flock mortality as high as 100%. These viruses have been restricted to subtypes H5 and H7, although not all H5 and H7 viruses cause HPAI. All other viruses cause a milder, primarily respiratory disease, low pathogenic avian influenza (LPAI), unless exacerbated. H6 strains are LPAI strains which commonly infect poultry and occur in poultry in South Africa relatively frequently (Deryn Petty).

Until recently worldwide, HPAI viruses were rarely isolated from wild birds, but for LPAI viruses extremely high isolation rates have been recorded in surveillance studies, with overall figures of about 11% for ducks and geese and around 2% for all other species. Influenza viruses may infect all types of domestic or captive birds in all areas of the world. The frequencies with which primary infections occur in poultry depend on the degree of contact there is with feral birds, who are in an area where migratory birds are common. In the case of South African ostriches, contact with wild geese and ducks in shared pastures is the major factor in causing initial outbreaks of HPAI and LPAI in that species. Secondary spread is usually associated with human involvement, either by bird or bird product movement or by transferring infective faeces from infected to susceptible birds, but potentially wild birds could be involved (Alexander, 2007).

In 2017 for the first time South Africa experienced a devastating Avian Influenza outbreak (H5N8) in poultry with significant losses in the W Cape. Although the outbreak started with several introductions of the disease by wild birds, once it spread to the Cape, it rapidly spread from farm to farm. Factors that may have influenced the spread of the disease were the high density of poultry farms and the presence of strong winds in the area.

South Africa is a dry country with very mild winters, and this has led to high levels of opportunism in African ducks (Cumming, Hockey, Bruinzeel, & du Plessis, 2008). There are no predictable migratory pathways for ducks in South Africa and the movement of these species is largely driven by fluctuations in rainfall and temperature. Waterfowl however are indirectly linked to Europe and parts of Asia as they are palearctic and nearctic migrants. Many of these species (storks, terns and waders) are present in significant numbers in the W Cape and indeed those areas that are close to Cape Town have been identified as hot spots for avian influenza outbreaks, based on among other things the occurrence of relevant waterfowl. Birds that have a strong association with sewage ponds, farm dams, livestock drinking troughs have been identified as a significant risk for outbreaks of avian influenza (Cumming, Hockey, Bruinzeel, & du Plessis, 2008).

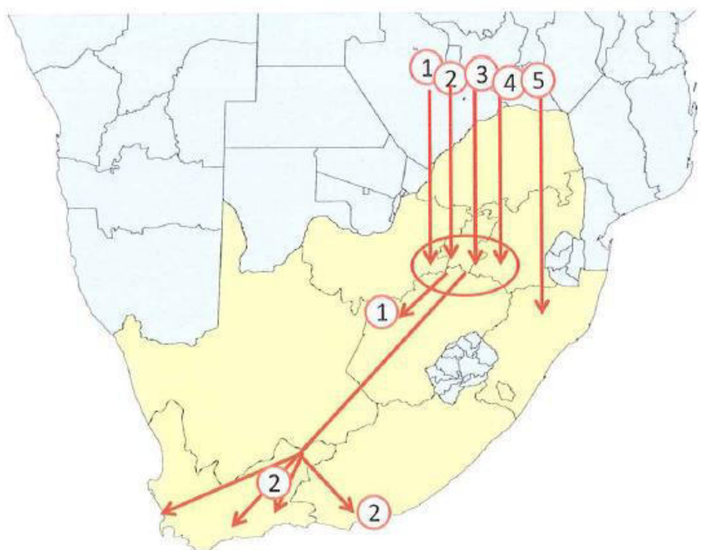


Figure 3: Introduction and spread of Clade 2.3.4.4 HPAI H5H8 to South Africa in 2017

**Figure 2 The spread of H5N8 in South Africa in 2017 (taken from Celia Abolnik's final report for DAFF on the sequencing of the H5N8 avian influenza virus from the 2017 outbreaks)**

Infected birds shed influenza virus in their saliva, nasal secretions, and faeces. Susceptible birds become infected when they have contact with contaminated secretions or excretions or with surfaces that are contaminated with secretions or excretions from infected birds. Domesticated birds may become infected with avian influenza virus through direct contact with infected waterfowl or other infected poultry, or through contact with surfaces (such as dirt or cages) or materials (such as water or feed) that have been contaminated with the virus. A recent study has found evidence that avian influenza infection in finches sporadically spread to poultry and more easily to bobwhite quail and that transmission occurs through a shared water resource and via the airborne route (Jones , Sonnberg , Webby , & Webster, 2015). People with contaminated footwear and clothing, fomites (cages trays, equipment, feed) may spread avian influenza.

Different species of birds have different risk profiles when it comes to the infection with, and transmission of Avian Influenza. Geese and ducks, especially the migratory types are seen as a risk for the transmission of AI. Shorebirds and other migratory birds can become infected with H5N1, but they generally shed small amounts of virus (Kilpatrick, et al., 2006). Infection with H12-H13 is more common though.

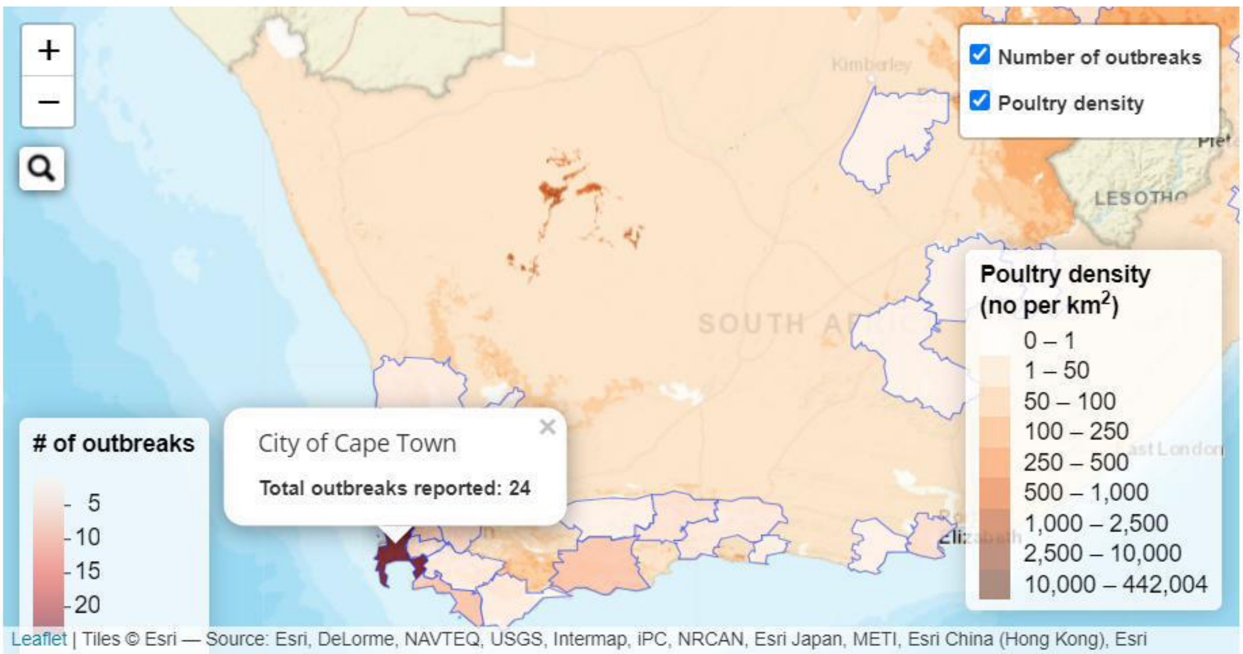


**Figure 3 2021 outbreaks of HPAI H5N1 outbreaks in the Cape province (https://sapa.jdata.co.za/)**

Fisantekraal area lies in the City of Cape Town metropolitan municipality and as can be seen, there is a high risk for avian influenza and there have been devastating outbreaks, as well as the regular occurrence of the disease in wild birds. The risk for avian influenza is influenced by the poultry farm density, presence of dams and water courses. Any increase in open water which attracts wild birds would be ill advised.

## Newcastle disease:

Newcastle disease is caused by viruses in avian paramyxovirus type 1 (APMV-1). In its virulent form, it can cause close to 100% mortality in susceptible avian populations. Newcastle outbreaks are a big problem in South Africa and cause many outbreaks in poultry. In the most recent outbreaks of

Newcastle in Africa, Abolnik et al (2017) suggested that galley waste, fomites and people, and not wild birds were responsible for the spread of the VIIh strain in Africa and South Africa.

Prolonged shedding of the virus has been reported in some avian species, including owls (more than four months) and cormorants (one month) (The Center for Food Security and Public Health, 2016). Shedding can also be sporadic in some species. APMV-1 is present in all parts of the carcass, and some outbreaks in raptors have been linked to eating infected chicken, pigeon, or quails. Wild birds, particularly waterfowl, may be the reservoir hosts for lentogenic (low virulence) Newcastle viruses. These viruses could become more virulent after becoming established in poultry. Cormorants could transmit velogenic (high virulence) viruses to poultry and gulls associated with cormorant colonies could also be a source of virus and are more likely to visit farms. Whether flies are competent vectors for APMV-1 is still uncertain, but fly control is prudent on and near infected farms. The importance of aerosols in long distance transmission is controversial. In one study, APMV-1 was found 64 meters but not 165 meters downwind of an infected farm. The survival of aerosolized virus is probably dependent on humidity and other environmental factors, as well as the concentration of infected poultry (The Center for Food Security and Public Health Iowa State University, 2008).

Poultry can be sources of Newcastle disease for wild birds and vice versa. The risk would depend on the degree of contact between wild birds and poultry. The risk of aerosol transmission cannot be ruled out but in the light of the above research, aerosol transmission does not seem to occur if the distances are too great. In the abovementioned study, there was no transmission 165m away from the infected farm (The Center for Food Security and Public Health Iowa State University, 2008). Aerosol transmission would probably be promoted by high winds and damp wet weather conditions.

## Other diseases

Research (Elmborg, Berg , Lerner , Waldenstrom, & Hessel , 2017) suggests that swans and geese may play a role in the transmission of avian influenza , salmonella, campylobacter and antibiotic resistance, but not Newcastle disease, West Nile virus, duck plague, Vibrio, Yersinia, Chlamidophila, Clostridia and Borrellia. Birds may act as vectors for invasive Non-typhoidal *Salmonella* (NTS) (Fenlon, 1981). They probably acquire bacteria from the food source. Gulls scavenging on landfill sites have relatively low levels of Salmonella (2.6% of those sampled) while those feeding on sewage have very high levels. It is likely that the gulls, like other birds, act as fomites (passive carriers) rather than getting infected with *Salmonella*.

Gulls have been linked to NTS infection in livestock (Fenlon, 1981) and would be a source of NTS for poultry. Other scavenging birds are likely to be exposed to *Salmonella* in food waste in a similar way. Infection of poultry with NTS often causes an inapparent infection, however NTS has been implicated in many outbreaks of foodborne human illness from consumption of infected poultry and poultry products.

*Salmonella Gallinarum* and *Salmonella Pullorum* are two species specific *Salmonellae* which cause disease in birds (but usually not in humans). In susceptible poultry, the disease can be devastating with significant mortality. Their occurrence is rare in wild birds and these diseases are not maintained in wild bird populations (USGA, 1999). S. Gallinarum and S. Pullorum do not pose a risk to people and consumption of meat is not associated with any infection. Vaccination of poultry against these diseases is widely carried out and has reduced the incidence of this disease in poultry. As many birds act as vectors, effective bird proofing of poultry houses to prevent contact between poultry and wild birds is essential.

*Campylobacter* has been isolated in a percentage of cases from seagull faeces (13.7%) (Moore, et al., 2002) as well as from the faeces of other wild birds. Wild birds can cause outbreaks of *Campylobacter* in poultry flocks (Kazwala, et al., 1990). Consumption of *Campylobacter* contaminated poultry is associated with human illness.

*Mycoplasma gallisepticum* and *Mycoplasma synovia* are important pathogens of poultry. Mycoplasmas have been isolated from a number of different avian species. Recent outbreaks of MG have been recorded in songbirds in the USA but these isolates are not infective to poultry. Mycoplasmas are quite species specific so are unlikely to cause poultry outbreaks by jumping from species to species.

*Erysepelas*, Necrotic enteritis, *Staphylococcus aureus*, *Tularaemia* are all diseases which have affected wild birds and could be transferred to poultry and humans (USGA, 1999). More recent research has questioned the role of at least some wild birds in the transmission of these and other diseases (Elmborg, Berg , Lerner , Waldenstrom, & Hessel , 2017).

## The role of people in transferring poultry diseases

It is said that in more than 90% of cases, people are the cause of disease on poultry farms (Butcher & Yegani , 2019). This is because the movement of people is associated with the movement of poultry pathogens when such people move from one farm to another. In this instance the clothing and equipment of such people can passively carry pathogens from one farm to another. However, for this to happen, the people, equipment, clothes must be in direct contact with the poultry. Basic biosecurity around access control of both people and vehicles as well as enhanced security measures to prevent people from gaining access will prevent this risk.

Visitors from urban areas and those who have no livestock contact present very little risk of introducing disease onto a poultry farm, especially if they are not allowed to enter the facility (Schueneman, Bowman , & Shulaw , 2017).

Routing the roads away from the farm by using an extension of Melish Road will enhance the biosecurity of the poultry farm by routing people and traffic away from the farm. The use of the Lucullus Rd extension would render the farm unable to operate as a road going through the center would destroy the existing biosecurity arrangements. Thus, this option would only proceed if the farm was bought out and stopped operations.

## Noise

Nose from aircraft presents a human health concern and is considered a difficult problem to mitigate (Alquezar & Macedo , 2019). There are studies that show that poultry exposed to 80 decibels (dB) levels of noise had decreased growth (Voslarova, et al., 2011). Another study by McFarlane (McFarlane, et al., 1989) and colleagues in 1989 in which Hubbard x Hubbard chicks were exposed to continuous noise up to 95 dB from day 10 to day 17 found that noise did not influence weight gain, feed intake or behavioural traits in broiler chicks. In addition, studies have shown that loud noises such as found near airports, railroad tracks or loud hydraulic or pneumatic equipment and machinery close to the chickens leads to lower egg production, stunted growth, higher blood pressure, stress and fatigue in the chickens (Cons , 2016). No effects on growth of fowl were detected in experimental studies of the effects of jet overflights, helicopter overflights, and sonic booms (*Stadelman, 1958a; Cottereau, 1972; Kagan and Ellis, 1974; Von Rhein, 1983*). Sample sizes were large enough in those studies to detect subtle differences in growth rate (Department of Defense Noise Working Group, 2023).

The County Fair Poultry Farm is currently experiencing 55 dB(A) and 39 dB(A) during day- and nighttime respectively on its boundary, as measured recently (Dracoulides, 2023). Noise during construction is likely to be 57db and at night 59.4 db as based on a model of noise 200m from the site (Dracoulides, 2023). This is assuming that the construction will continue right through the night which is unlikely.

It is clear that the effect of noise emanating from the airport can have a significant effect on poultry. One of the additional tools used by airports and regulatory authorities are sound level contour maps, often just called noise maps. Using a combination of sound level measurements and appropriate sound mapping software, an airport can establish expected noise levels and determine, for example, locations where noise mitigation is needed (Basner, et al., 2017). In general, the highest sound levels occur immediately next to the runways and along the primary aircraft takeoff and descent ground tracks. Moving away from these highest levels, decreased noise is found. Such noise maps can be very useful for assessing current and future noise exposure within several kilometers of airports (Basner, et al., 2017) and more accurate predictions of the effect of noise pollution on the affected poultry can be made. These maps have been created and presented in the Noise assessment and are briefly mentioned here but a fuller explanation is contained in that report (Dracoulides, 2023).

Any increase in noise levels is likely to exceed the levels at which poultry could be affected as described. It is noteworthy that the birds already experience relatively high levels of noise without any apparent effects. It might be possible that there will be some form of adaptation. In addition, depending on the flight path, the decibel level experienced will be substantially lower as the runway is 900m away from the farm and since sound intensity is inversely proportional to the square of the distance, this will decrease the effect. The current runway is relatively close to the farm and with the current 100 air traffic movements per day contributes to the current noise level. With the expansion of the CWA, the airport will attract bigger, and more planes and the noise level will be therefore increased. Noise exposure contour maps correlate well to community response to aircraft noise (Transport Canada , 2013/4) and ~~can be~~ are used to predict the effect on the poultry farm. ~~Further work is needed to explore~~

~~this issue.~~ For the new runway under full utilisation, most of the daily movements will take place between 08h00 and 18h00, and there will be three night-time operations (see Table 4-9). These night-time operations are programmed to take place before 11h00 (Dracoulides, 2023).

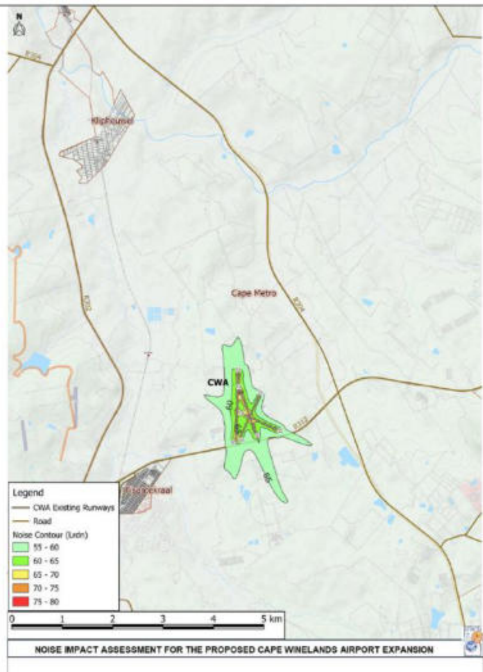


Figure 4-7. Scenario 1: Day-Night Noise Rating Level ($L_{Rdn}$)

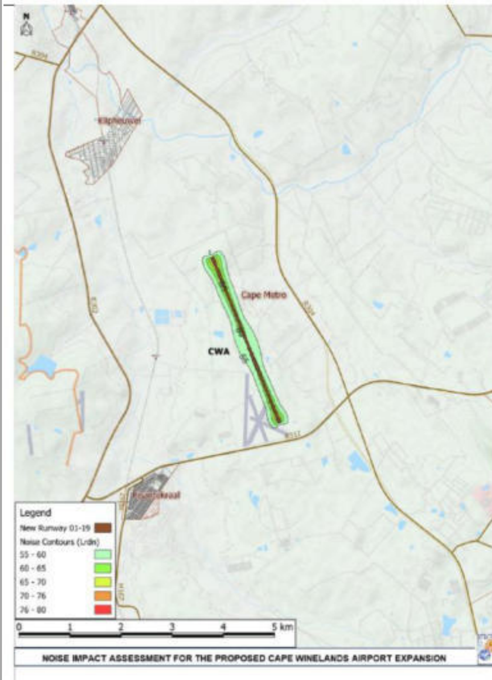


Figure 4-10. Scenario 2: Day-Night Noise Rating Level ($L_{Rdn}$)

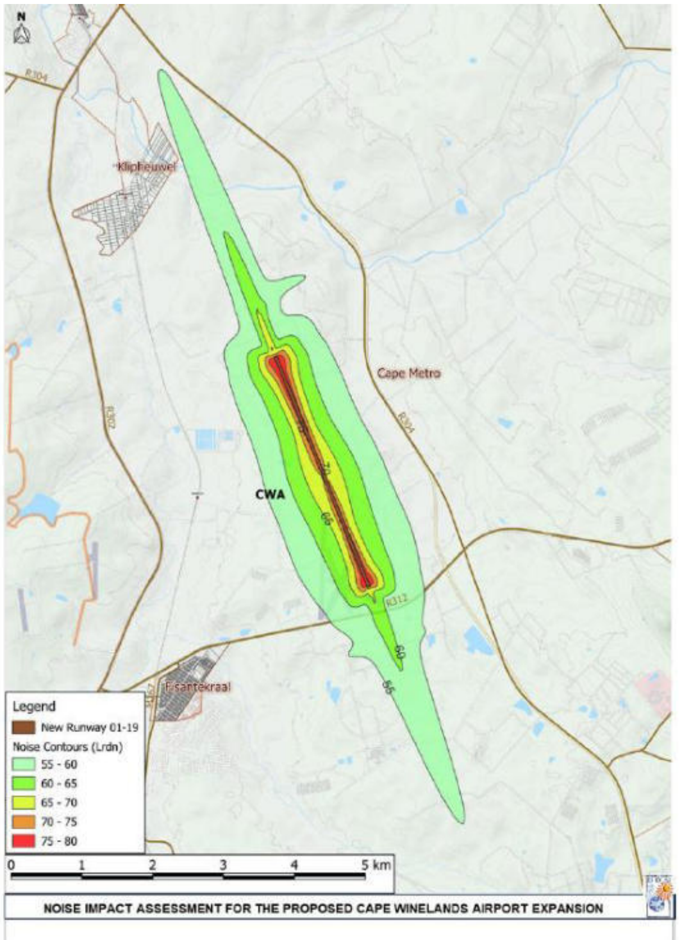


**Figure 4-12. Scenario 3: Day-Night Noise Rating Level ($L_{Rdn}$)**

In all three the above scenarios, as can be seen from the graphs, the average noise levels show small impacts on the County Fair farm. In scenario 3 ,based on the contours, there is a minimal average effect of noise on the farm with average levels in the region of 55db.

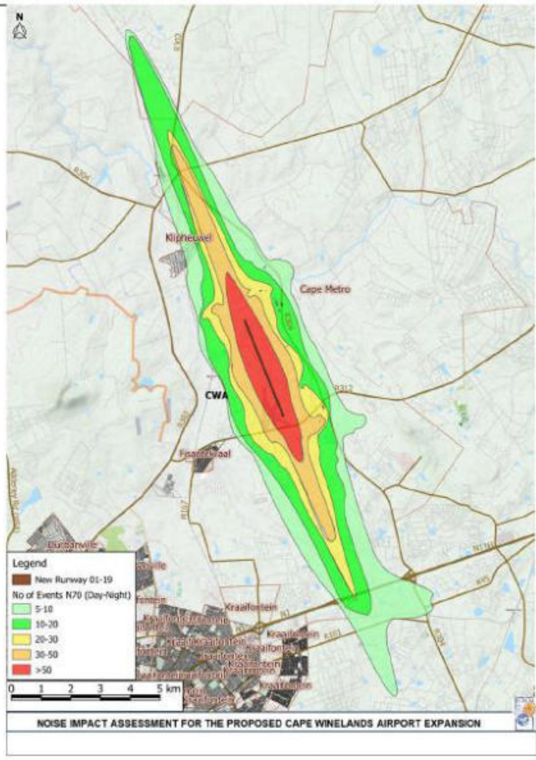


**Figure 4-14. Scenario 3: Day-Night N70 Contours**

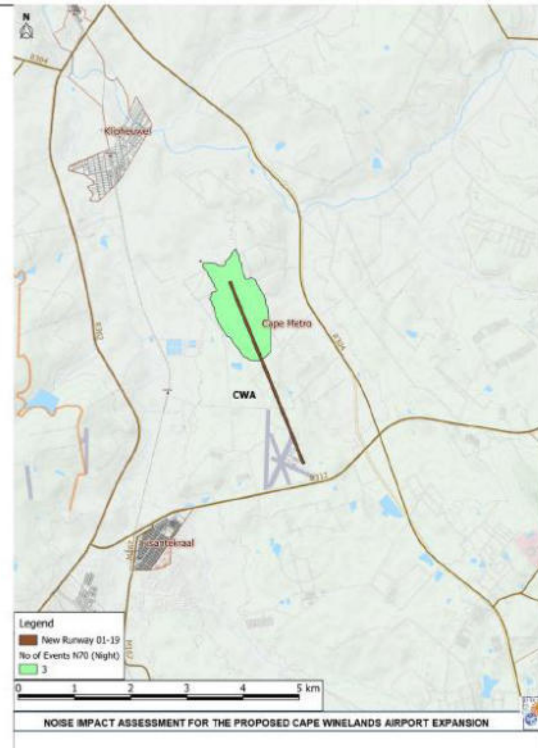


**Figure 4-15. Scenario 3: Night N70 Contours**

However, when one looks at the incidence of noise events above 70dB during the day (N70 scenario 3) it becomes clear that there are 20-30 noise events where the levels of noise rise above 70dB for a minute or two and then just as quickly fall to the average (as planes take off and land)will be experienced during the day. This has the potential to affect the birds. There is no effect at night however.

By far the most comprehensive literature review on this topic is the technical bulletin produced by the department of defense working group on Effects of aircraft overflights on domestic fowl. (Department of Defense Noise Working Group, 2023).

The authors identify three areas of potentially damaging responses to noise, namely mortality or morbidity due to panic reactions, changes in productivity and changes in marketability. The most significant of these is the panic response. It is well known that birds can pile upon top of each other in an area of the house in response to a sudden unexpected stressor, usually a predator. This can cause mortality and injury which can result in infections. Domestic fowl exhibit a short term startle response after exposure to sudden intense noise. However the reaction stops as soon as the noise stops. One study demonstrated effects on marketability due to exposure to aircraft noise (*Bradley et al., 1990*), but no studies identify the effects on productivity as measured by weight gain or egg production. Based on experimental studies and interviews with growers, panic piling and crowding behavior occurs only in naïve birds and is extinguished within five exposures to a startling stimulus (*usually within two exposures*). The threshold for the naïve response in turkeys can be estimated at around 85-95 dBA. Below this threshold, severe crowding does not occur, and above it, crowding is likely to occur. The response is likely to be the same in chickens. It must be noted that the threshold for a startling stimulus is 86db . All expected noise events are predicted to be less than this.

The effect of noise from trucks and cars arriving at the airport and leaving from the airport can be a significant source of noise. The airport parking is adjacent to the farm and will need to be managed carefully. This can in part be mitigated by developing roads that access the site but do not come close to the poultry farms, and where this in not possible, the use of traffic calming bumps to prevent speeding would be applicable, as well as signage about noise reduction. Adherence to Western Cape Noise control legislation will result in noise levels that are significantly lower than those quoted above (SANS 10103 2008 – permitted levels for rural areas are 45dBA max and in industrial areas 70dBA). Truck traffic will mostly be arriving on the side of the airport away from the farm. There are minimal flights that are expected to arrive at night and this is a crucial time when noise will affect poultry.

Landing and take-off procedures produce the most noise, with landings being noisier than take-offs. It is possible that including higher-angled landings and take-offs, and execution of manoeuvres at higher altitudes may reduce the noise from aircraft. These changes may demand pilot training, but landings at a 4.5◦inclination, instead of at 3◦can reduce noise production in about 7.7 dB at ground level (Antoine & Kroo , 2004).

Vibrations as the result of aircraft sound.

Although the issue of vibrations has been raised as an issue (Levetan, 2025), it is clear from the study quoted (Ncho, et al., 2024) that the vibrations referred to are vibrations of the birds as the result of road transport and machinery in the poultry house and not as the result of noise. Noise from aircraft is intermittent and likely the poultry house and walls around the farm will act as dampers and prevent the resonance frequency from being achieved in the house. It is therefore unlikely to result in vibrations of the birds themselves, but it is possible there will be some movement of the equipment , e.g the waterlines. Such vibrations will only last as long as the sound event. It is suggested there will be some degree of habituation as the noise events are infrequent (Ncho, et al., 2024). It is significant that this issue has not been raised as an effect of flyover of aircraft in other studies (Department of Defense Noise Working Group, 2023).

## Light pollution

Light is an important factor in the regulation and control of behaviour and health of most animals. The light environment may affect domestic fowl through interactions between physiological and behavioural responses (Kristensen , et al., 2007). Light is detected in photo ganglion cells in the eye and through a series of neural pathways result in the production of melatonin as well as activation of the sympathetic system to evoke many effects including alterations in hormones (Navara & Nelson , 2007). Ovulation depends on an endogenous mechanism that is closely related to external factors. The synchronization of these factors is called circadian rhythm and allows ovulation to occur regularly during lay (Jacome , Rossi, & Borille , 2014).

The effects of light on poultry are well known and both light intensity and duration are manipulated to cause the onset of maturity and egg laying behavior in layers. Broiler breeders that are exposed to longer periods of light (such as would occur with artificial light shining into a shed for extended periods of time will experience altered laying cycles (Lewis, 2009). Although light pollution can disrupt the circadian rhythm, another important consideration would occur from headlights shining into poultry sheds at night is the startling of the birds, who respond to being startled by bunching together in a corner away from the stimulus and killing each other by suffocation. Numbers that can be lost in this way can be quite large.

<u>The effect of light and light mitigation strategies are dealt with in some detail in the Visual Impact Assessment Report </u>(Smit, 2025/02/26)

## Air pollution

Commercial airport activity can adversely impact air quality in the vicinity of airports (Riley K, 2021). Studies consistently showed that ultrafine particulate matter (UFP) is elevated in and around airports. Furthermore, many studies show elevated levels of particulate matter under 2.5 microns in diameter ($PM_{2.5}$), black carbon, criteria pollutants, and polycyclic aromatic hydrocarbons as well (Riley K, 2021). In general, most on-airport studies in the U. S. showed slightly elevated concentrations of gaseous criteria pollutants, specifically carbon monoxide (CO), nitrogen dioxide ($NO_2$), and sulfur dioxide ($SO_2$), even though concentrations are often still below national ambient air quality standards(USA) (Riley K, 2021). Dispersion of pollutants is strongly affected by prevailing wind patterns.

It is well known that air quality affects broiler performance and suppresses immune function (Almuhanna, et al., 2011). This is primarily as the result of the unique physiology of the respiratory system of the bird, which results in many particles being deposited in the lungs, poorly ventilated air sacs and removed by heterophils and macrophages (Latif, et al., 2010). At levels of 1.5 µg/ml (levels which would result from burning of biomass) broilers were more resistant to these contaminants than other species.

Any activity which adversely affects air quality will have a negative effect on broiler health, however, the source of reduced air quality is normally as the result of conditions in the house like the type of litter, stocking density and/or ventilation. The total suspended particulate concentration in a typical broiler operation was measured was between 4.25 and 3.64 mg/m3 (Almuhanna, et al., 2011). The air quality appears to be more strongly affected by conditions in the barn than by external conditions. Air pollution can be associated with increased levels of polycyclic hydrocarbons and in one study, broilers were found to be less susceptible to toxicity as the result of these chemicals than other species. Broilers are susceptible to high ammonia levels (Miles, et al., 2004) which are generally caused by wet litter in the broiler house but can also be as the result of poor air quality. It is suggested that ammonia levels be managed to below 25ppm for optimal growth (Miles, et al., 2004). Increases in CO2, methane and other gases would result in an increase in the occurrence for respiratory diseases.

It is thus unlikely that air quality will have a significant impact on broiler breeders in this situation.

## Water

Both declines in the quantity and the quality of water, both as the result of increased water usage and as the result of environmental contamination from run off would affect the ability of farms to produce poultry. Since the farm uses municipal water from the City of Cape Town, this is unlikely to be an issue. For further information on the quantity and quality of water, and this is dealt with in the geohydrological report, which provides for adequate mitigation and management measures to prevent contamination and or depletion of the water resource.

## Pests

### *Rodents*

Rodents play a major role in the transmission and maintenance of Salmonella contamination cycles in poultry facilities (Umali, et al., 2012). In a recent study, of the 128 roof rats captured from a salmonella contaminated poultry barn, 41% of samples from 51 cages were positive for Salmonella Infantis and 3.92% were positive for Salmonella Enteriditis. Mice are also associated with the spread of salmonella (Davies & Wray, 1995). Clearly, the ability of rodents to play a role in the transmission of disease from a waste handling facility to a poultry farm is going to depend on the distance between the two and the ability and willingness of the rodent to move from one site to another. Some indication of this can be obtained by looking at the normal home range of the species. The best estimates of mean home range length for each sex of the Norway rat (the usual rat found on landfill) being 54.8 m and 66.1 m for female and male respectively. The longest recorded distances travelled during known life of this species were 850 m for a female and 954 m for a male, although the median distances travelled were only 43 m and 52 m respectively. The median distance travelled during a sampling period (seven nights) was about 24 m for both sexes (Hartley & Bishop, 1979). In another report, they were found to stay within 30m of food and water but if there was no food they could migrate up to 2.5km in search of food (Mississipi state university extension service, n.d.). House mice which also can transmit disease are unlikely to be a problem as they have a very small range (less than 10m) (Mississipi state university extension service, n.d.). In both the case of rats and mice, these species are likely to stay in close proximity to a constant food source rather than migrate in search of other food sources. The proposed site for a commercial garage is the closest to the poultry farm. Attention should be given to the waste handling at this facility.

***Diseases related to flies.***

More than 100 pathogens associated with the house fly may cause disease in humans and animals, including typhoid, cholera, bacillary dysentery, tuberculosis, anthrax, eye infections and infantile diarrhoea, as well as infestation with parasitic worms (Kgware, et al., n.d.).

In a study to determine the range of flies, marked released flies were found between 7 and 9 km away from the release point and survived between 1 and 2 weeks after release (Nazni, et al., 2005). Flies have been implicated as being vectors in most poultry diseases. Effective fly control programmes in both the industrial area and the poultry farm are essential.

## Waste management.

Waste can be considered any form of unwanted or unused products that happen to be produced or arrive at the airport (International Civil Aviation Organisation , n.d). Not only can the normal waste generated by the airport itself in the form of food waste attract rodents and other pests, but waste emanating from the aircraft including food waste can have an impact on biosecurity.

The waste from aircraft consists mainly of two kinds, namely galley waste from the aircraft galleys as well as cabin waste. Galley waste from international flights can be classified as hazardous waste and has been associated with Foot and Mouth outbreaks, African Swine fever, Classical swine fever and others. In addition, biological things confiscated from or voluntarily surrendered by international travelers will also be classified as high risk. There is a requirement for it to be handled and disposed of in a responsible manner. Hazardous waste landfill and incineration have been used in other countries to effect disposal (International Civil Aviation Organisation , n.d).

Waste management at an airport can have a significant impact on biosecurity. Areas where waste are sorted or handled should be undercover with efficient removal systems and rodent control. At least 20% of the municipal solid waste from the airport and 80 % of the cabin waste can be recycled as it consists of paper and plastic. Food waste from the airport and even galley waste can effectively be dealt with in a biodigestor dedicated to converting food waste to grey water and sludge. These biodigesters are available commercially and have been used in airports. Using a biodigestor would be an effective and safe way to deal with galley waste.

The use of a biodigestor to convert poultry manure and feed waste into methane is an entirely another matter and needs to be considered carefully. It is important to distinguish between manure and litter. Breeder farms and broiler farms have a deep litter system and at the end of a cycle the litter is used, typically for soil enrichment. Layer farms with caged birds typically produce large amounts of manure. This manure is often very wet, has large amounts of nitrogen and often contains antibiotics and heavy metals that inhibit the bacteria essential to the digestor process. Although chicken manure has the highest potential for biomethane production, there has been very little research into its use. Although the use of poultry manure was considered, it is no longer a viable option and therefore this section is not relevant any more

The volumes mentioned in the waste section would be difficult to source since there do not appear to be layer farms near the airport. Furthermore, the transport of manure is associated with adverse aesthetic elements (it smells and because of its wetness often leaks out and contaminates roads, feathers in the manure will also contaminate the area). It forms a significant biosecurity risk for any poultry farm since large quantities of poultry manure from a layer farm will almost certainly pose a disease risk to wild birds and poultry in the area. If manure contaminated with antibiotics is fed into a biodigestor, it is likely that the microorganisms will be inhibited or even killed (Tawfik, et al., 2023) which may interfere with the process and result in the biodigestor needing to be cleaned out. Large amounts of organic waste piling up will adversely affect the environment of the airport. In addition, methane leaks are not uncommon, and this will be hazardous to passengers and crew. Careful attention should be given to the situation of such a biodigestor off site and in a suitably remote area with methane being piped onto the airport premises. This section is no longer relevant as the use of poultry manure is no longer being considered.

Sewage waste

Two solutions have been proposed to manage sewage (Zutari Pty Ltd , 2023). In the first instance, there is the possibility to connect to the Fisantekraal wastewater treatment works (FWWTW)and capacity does exist at the FWWTW and in the second instance there is the possibility to develop a sewage processing works at the airport, using an Organica system or a conventional membrane bioreactor. It is for noting that many airports have sewage processing systems but that these are closed systems and do not resemble the traditional sewage systems that serve towns (International Civil Aviation Organisation , n.d). If there are no open bodies of water and sedimentation dams, the second solution will have no impact on poultry. More information is needed to see what is envisaged.

Stormwater management

Many stormwater management options could become wildlife attractants (if no protection is put in place) and thus create potential hazards for aviation (International Civil Aviation Organisation , n.d)but also for poultry farms since wild birds are known to carry avian influenza and other diseases. However, most airports establish wildlife management plans that identify potential hazards and outline procedures for managing water, wildlife, and to support the operational safety of aircraft. In Amsterdam Schiphol Airport, bird control efforts make waterways around the runway area less attractive to water birds by installing green lasers, fixing ropes and/or netting across ditches and canals or floating hopper balls in them. In the US, the FAA recommends any stormwater or wastewater features have a separation distance of 10,000 feet from the airport’s aircraft operations area (for airports serving turbine-powered aircraft). Additionally, the FAA recommends stormwater detention ponds be designed, engineered, constructed, and maintained for a maximum 48–hour detention period after the storm, and to remain completely dry between storms. The 48-hour detention period reduces the attractiveness of ponds to facilitate the control of hazardous wildlife (International Civil Aviation Organisation , n.d). The same mitigation measures that will reduce hazards for aircraft will be effective in reducing the risk to the poultry farm. There are a number of dry runoff dams planned that will temporarily absorb excess water and not be a permanent feature. Any dams that are created to store effluent should be managed to discourage wild birds as suggested above. More detail is provided in 5.6 of the Cape winelands Airport Engineering Services Report (Zutari Consulting, 2025/02/19).

## Risk assessment and mitigation for nuisance factors pertaining to airport impact.

| FACTOR | PROBLEM | MITIGATION |
|---|---|---|
| Erection of airport and associated structures | Increased activity, dust, noise will affect the poultry | Planting of fast-growing vegetation that does not attract wild birds, and/or a solid wall to screen the section of the poultry farm closest to the construction (Gerber, Opio, & Steinfeld, 2007) |
| Flies and rodents associated with improper waste management | Flies and rodents can transmit diseases | Adherence to good housekeeping and municipal by laws |
| Light pollution as the result of road usage at night and lighting of the airport | The use of lights near the poultry farm at night may interfere with the circadian rhythm of breeder and layer birds | Design the road so that light does not shine into poultry sheds, signs requiring that car lights are dipped on the affected section of road, diversion of traffic to an alternative road, barriers that prevent light going into the sheds erected on farms , hood the sources of light, erection of a facility wall which will block some of the light, use of minimal lighting in the car park area. Avoid scheduling flights after 11pm. |
| Noise aircraft and vehicles | Loud noises can disturb, stress the birds as well as decrease production | Planting fast growing vegetation to muffle noise, construction of facility wall to muffle sound, schedule arrivals during the daytime, avoid runways closest to the farm (phase 1). Ensure good management when birds are introduced onto the farm and are being habituated to the unaccustomed noise |
| Air pollution | Increased pollutants can cause respiratory issues in poultry | This needs to be monitored. This is unlikely to be an issue. |
| Contamination of the ground water | Contamination of the ground water with runoff water used for cleaning and as well as the occurrence of accidental spills | This is dealt with in the hydrogeological report and its effect with mitigation is low |

| | | |
|---|---|---|
| Influx of people into the area | People may act as fomites and transmit poultry diseases | Isolate the people from the farm -do not allow people access to the farm, keep the fence of the farm well maintained. |
| Wild birds attracted to the area | Wild birds may transmit diseases if they come into contact with poultry | Avoid creating stagnant pools of water by treating wastewater in closed systems, handle waste according to municipal bylaws. Bird proof all poultry houses, avoid feed spillage on poultry farms. |
| Use of poultry manure to fuel methane production | Manure is wet and may contaminate the roads and attract flies, it is odiferous, it carries many diseases as it is a product of layer birds in cages. | Place any biodigestor dependent on manure off site and in an isolated area. The use of the FWWT is recommended. This is no longer a factor |
| International waste | International waste poses a risk for disease outbreaks | Handling and disposal of international galley waste must be done in a safe way |

| Factor | Spatial extent | Duration | Probabliity | Reversibility | Medium impact after mitigation | Low impact after mitigation |
|---|---|---|---|---|---|---|
| Visual | Local | Permanent | High | No | medium | low |
| Flies /Rodents | Local | temporary | Low | Yes | | low |
| Aircraft noise | Local | Permanent | High | yes | Medium | |
| Noise of the cars | Local /Area | Permanent | High | yes | | low |
| Light pollution from the cars /airport lighting | Local | Permanent | Medium | yes | | Low |
| Water issues (scarcity and contamination) (Refer to hydrogeological report) | Local | Permanent | low | Yes | | low |
| Increased attraction of wild birds | Local | Permanent | Low | Yes | | Low |
| Increased volume of human traffic | Local | Permanent | High | | | Low |

| | | | | | | |
|---|---|---|---|---|---|---|
| transmitting disease to poultry | | | | | | |
| Use of biodigestor with poultry manure as substrate for processing waste | Local | Permanent | High | yes | Medium to high | |

*Confidence level with respect to these predictions is high

## Effect of the no go alternative.

If there is no development, the airport will continue as it is.

The advantages of this would be decreased human traffic on roads, no additional usage of water, and no potential for pollutants associated with development as described above.

The disadvantages of the no go alternative being applied would be no jobs, no development- further poverty in the area.  As there will be no close alternative airport to CTIA, there will be increased fuel that needs to be carried on aircraft and all the associated costs.

## Conclusion

Factors that increase the biosecurity risk for poultry farms are developments on the site that attract wild birds and other pests, like the construction of dams, bodies of water that are created by poor drainage, or the presence of food waste that attracts birds. It must be noted that all airports have bird deterrent programmes. Standard pest control measures that are in place at waste sites will reduce the presence of wild birds and pests. Dams and other open water can be netted to stop them attracting birds.

The use of poultry manure for running a biodigestor is a major risk factor. Poultry manure is often very wet, has large numbers of feathers and constitutes a major risk for disease spread in poultry. The volumes needed for such an enterprise would also pose a risk. Such a development should not be contemplated within 3km of a poultry farm.

Galley waste from international flights, if improperly disposed of may be a risk for the spread of animal diseases. The use of town landfills should be avoided, however a biodigestor would be sufficient to ensure safe disposal.

Poultry health can be affected by noise, light and air pollution, dust, water pollution and water scarcity, as well as declines in water quality. While it is possible to place lighting away from the farm and hood lighting to prevent it affecting the houses, the noise factor may be less easy to mitigate. More data will become available in the impact assessment phase and allow better assessment of this potential impact. Water used by the farm comes from the CoCT municipal supply and this is unlikely to be affected.

In general, with suitable mitigation measures it should be possible for the farm and the proposed airport to coexist.

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