APPENDIX 39

POULTRY BIOHAZARD ASSESSMENT

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

Dr Deryn Petty

Executive Summary

The proposed site for the construction of the Cape winelands airport lies adjacent to a poultry breeder farm and as such could constitute a biosecurity risk for the transmission of poultry diseases including but not limited to avian influenza.

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. The use of poultry manure for running a biodigestor is a major risk factor, as the movement of manure from one farm close to another will result in the transfer of any poultry diseases. Galley waste from international flights if improperly disposed of may be a risk for the spread of animal diseases.

Poultry health can be affected by noise, light and air pollution, dust, water pollution and water scarcity.

Deryn Petty

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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 the course of 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 November 2024

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 farming (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.

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.

Currently in close proximity to 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 laying 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 airport will service international flights, the handling of galley waste and cabin waste will be discussed so far as it impacts on animal health and biosecurity.

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.

Geographic Isolation and Biosecurity Concerns

According to the World Organisation of Animal Health (WOAH) there is a need for a suitably isolated geographical location for a poultry farm to prevent the transmission of diseases.

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 Organisation 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. Pakistan has recently withdrawn a proximity law which required mandatory distances of no less than 1km, 2km and 3km between poultry farms for broiler, parent, or grandparent respectively (Abduhu, 2012). 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.

The distance between poultry farms is controversial. 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 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.

Summary of Recommended Minimum Distances

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

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

Existing biosecurity concerns

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 that 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.

Considerations for Biosecurity

- **Existing Concerns:** Current proximity to an airfield has not been identified as a direct biosecurity concern. However, the increased traffic volume from an expanded airport should be factored into biosecurity measures.
- **Mitigation Measures:** Address potential impacts on water and air quality, and control wild birds and pests.

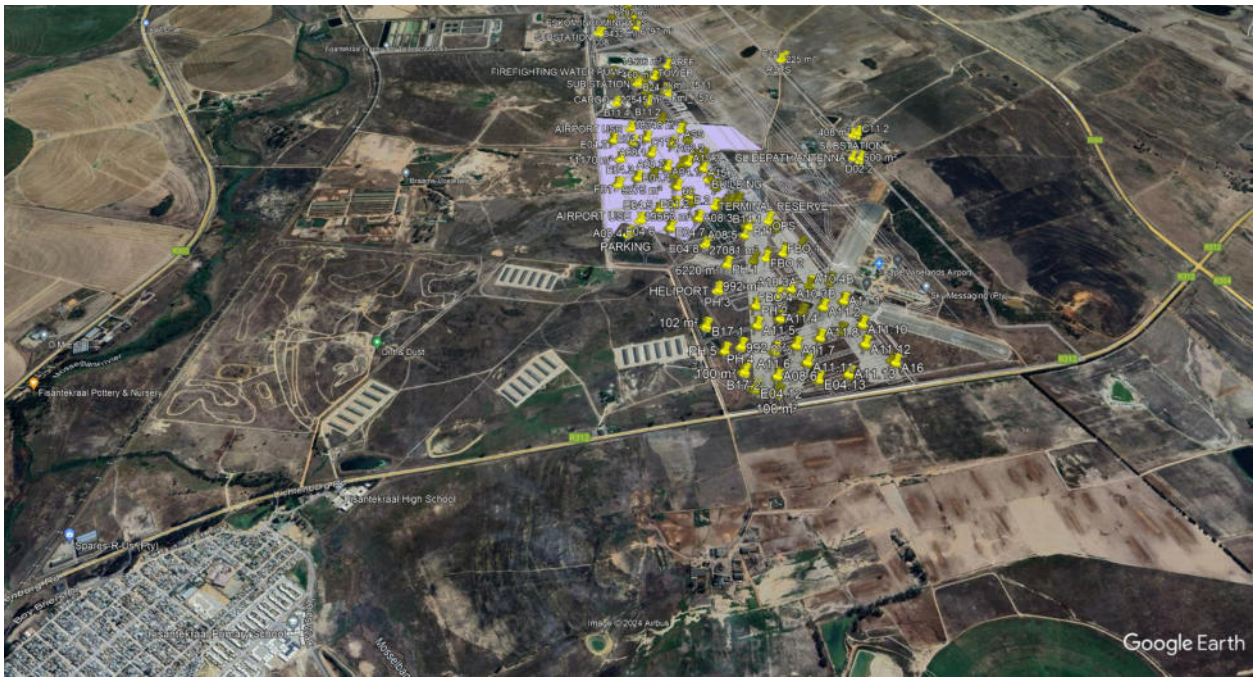

Figure 1 The situation of the poultry farm showing poultry sites with different parent flocks less than 400 m from each other, less than 200m from a main road and less than 600m from a settlement. Note that the landside section of the airport will be developed very close to the farm

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, contact with which by people, could be a risk for any nearby farm. 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 bird attractants

Wild birds can be attracted to a site where there is improper control over waste streams, exposing food waste that attracts birds. Moreover, the creation of bodies of water can also attract birds. Migratory wild birds are associated with the spread of certain poultry diseases, the most well-known of which is avian influenza. Additionally, migratory wild birds can infect finches and other birds, thereby indirectly spreading the disease to poultry (Jones, Sonnberg, Webby, & Webster, 2015).

To prevent wild birds from accessing waste, measures such as covering food waste, regular removal, and rodent control should be implemented.

Considerations for Attracting Migratory Birds

It is important to consider activities that may attract aquatic species into an area, which include creating attractive open water areas, providing a feed source, and offering nesting areas.

According to the National Biodiversity Assessment database (2018) (SANBI, 2018), Figure 2 illustrates the wetlands and rivers associated with the study and investigation areas (FEN, Freshwater Ecological Scoping Report, 2024). The map highlights numerous existing wetlands and rivers around the site, with the quarry depicted as a white area.

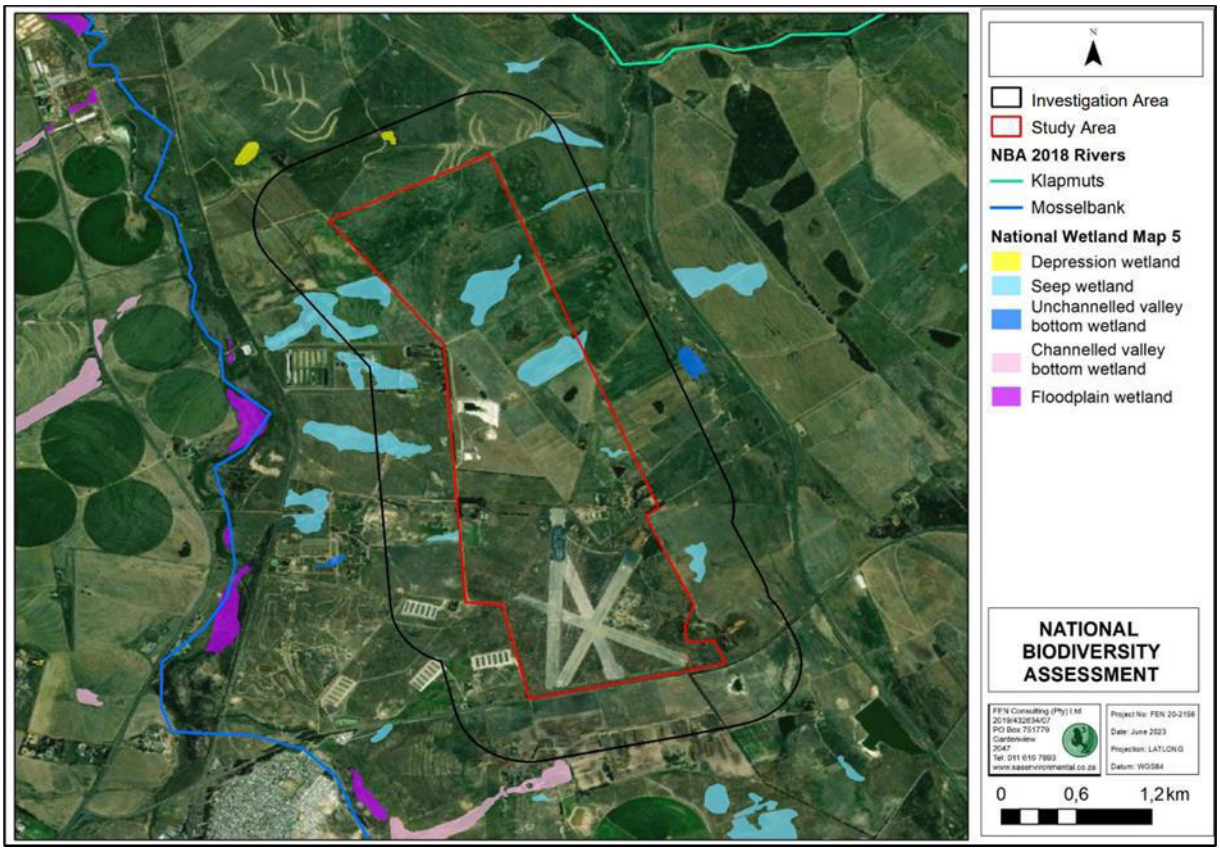

Figure 2 Wetlands and rivers associated with the study and investigation areas according to the National Biodiversity Assessment database (2018) (FEN, Freshwater Ecological Scoping Report, February 2024). Note the numerous wetlands around the site that already exist. The quarry can be seen as a white area on the map.

While there is a loss of a wetland area due to the development, the redevelopment of another wetland will compensate for this (Hohne, 2024) (PHSCONSULTING, 2024). The six ponds that will be developed to channel water from the site are shown; however, it is important to note that five out of six ponds are dry ponds and, as a result, will not attract birds.

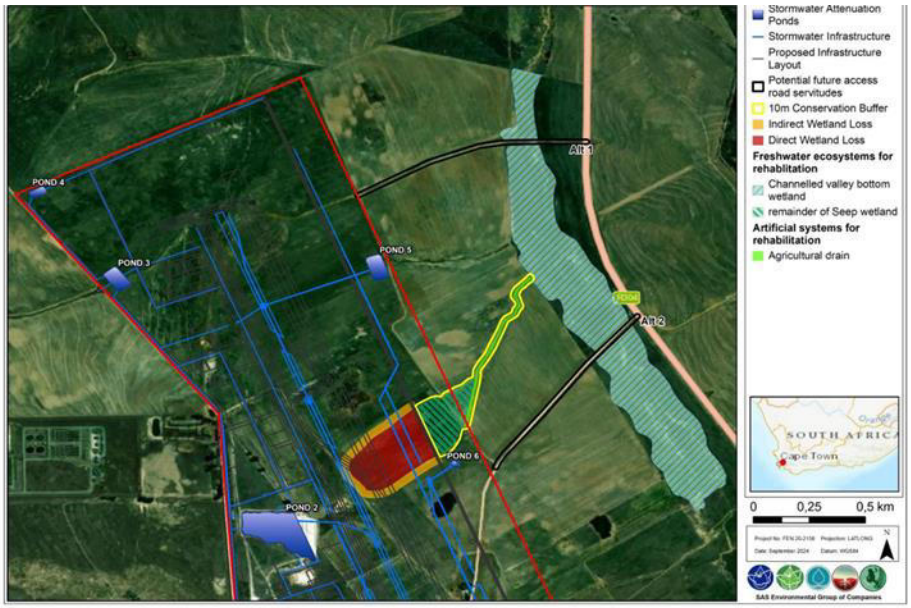

Figure 14: Extent of wetland to be lost (7.44ha) vs identified wetland areas to be rehabilitated.

Pond No. 2 is the closed quarry in the process of rehabilitation, which will hold 95,000 liters of surface water. If not carefully managed, this pond may attract birds.

Figure 3 The quarry will be used to store rain water. If it is rehabilitated it may attract wild birds (PHSCONSULTING, 2024)

Figure 3 indicates that the quarry will be used for rainwater storage, and if rehabilitated, it may attract wild birds. In order to address any potential issues with the quarry attracting aquatic bird species, netting the body of water should be considered. However, it is believed that such severely degraded water will not attract many birds due to the availability of other water sources.

Additionally, bird strikes pose significant problems for airports, which is why standard bird deterrent measures will be implemented to mitigate the effects of wild birds in 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 water fowl. 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).

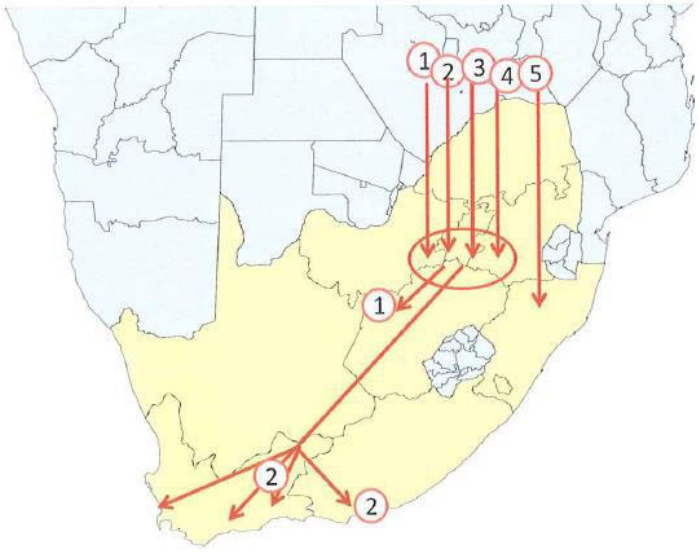

Figure 3: Introduction and spread of Clade 2.3.4.4 HPAI H5H8 to South Africa in 2017

Figure 4 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.

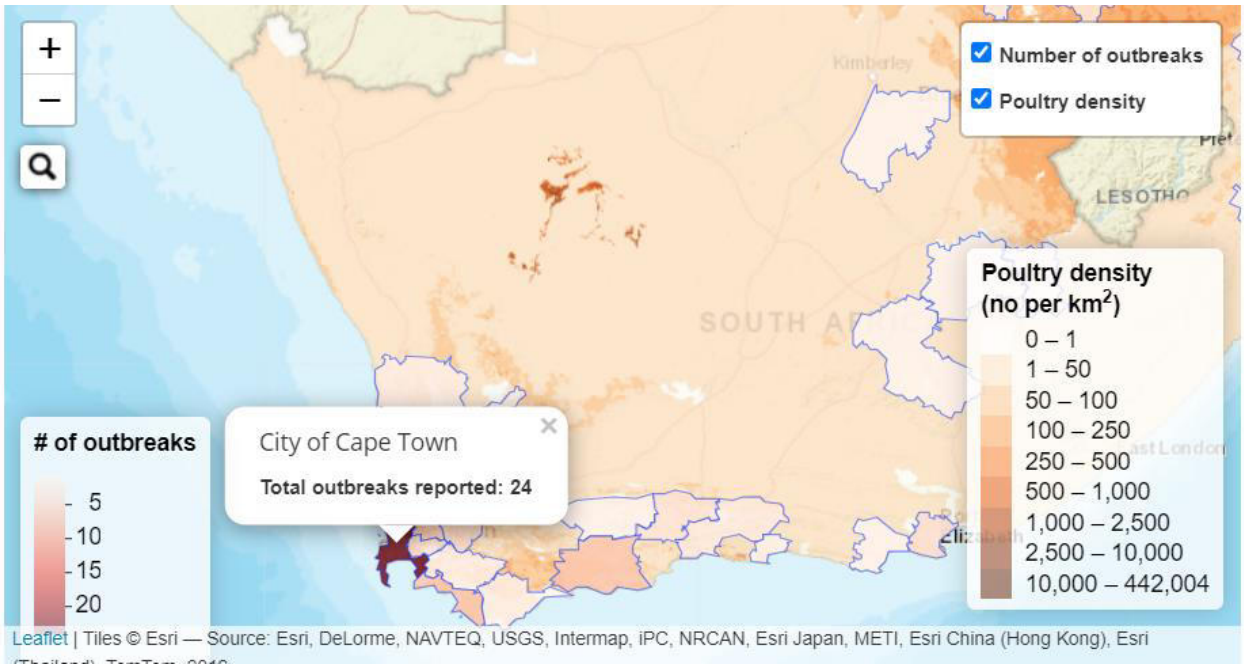

Figure 5 2021 outbreaks of HPAI H5N1 outbreaks in the Cape province (https://sapa.jdata.co.za/)

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 Impact on Poultry and Mitigation Strategies

Aircraft noise is a significant concern for human health and is challenging to mitigate (Alquezar & Macedo, 2019). Studies show that poultry exposed to noise levels of 80 decibels (dB) or higher experience decreased growth (Voslarova et al., 2011). However, McFarlane et al. (1989) found that continuous noise up to 95 dB did not affect weight gain, feed intake, or behavioral traits in broiler chicks. Nonetheless, other studies indicate that loud noises near airports, railroads, and machinery can lower egg production, stunt growth, increase blood pressure, and cause stress and fatigue in chickens (Cons, 2016).

Current Noise Levels

County Fair Poultry Farm experiences 54 dB(A) during the day and 39 dB(A) at night on its boundary (Dracoulides, 2023). Any increase in noise levels might exceed the harmful levels for poultry. It's possible the birds have adapted to current noise levels due to the runway's distance (900m away) and the inverse relationship between sound intensity and distance.

Noise Sources and Mitigation

The current runway contributes to noise, and with the CWA expansion, noise will increase from larger aircraft and higher traffic. Noise sources include aircraft landing and taking off, as well as trucks and cars around the airport. Developing access roads away from poultry farms and using traffic calming measures can manage ground traffic noise.

Adhering to Western Cape Noise Control legislation will help keep noise within permissible limits (45dBA for rural and 70dBA for industrial areas). Higher-angled landings and take-offs, along with higher altitude maneuvers, can reduce noise by about 7.7 dB at ground level (Antoine & Kroo, 2004).

Noise Mapping

Sound level contour maps are valuable for assessing noise exposure. These maps combine sound level measurements with mapping software to establish expected noise levels and identify mitigation needs (Basner et al., 2017).

Noise mapping was done for the scenarios (described below) (Dracoulides D. , 2024).

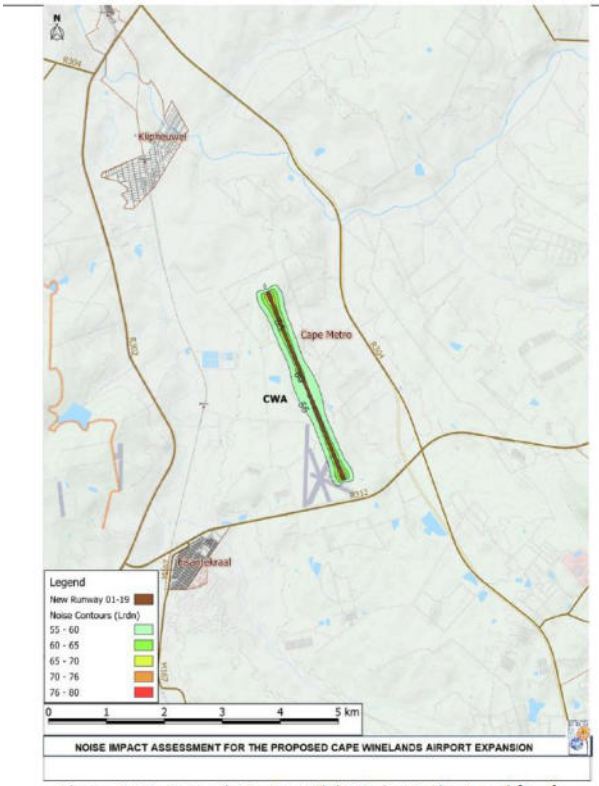

Figure 4-10. Scenario 2: Day-Night Noise Rating Level (L_{Rdn})

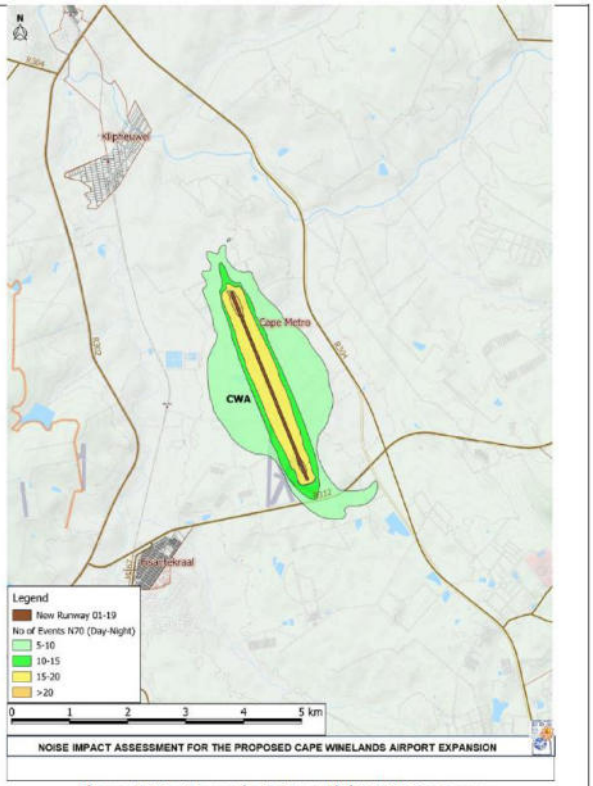

Figure 4-11. Scenario 2: Day-Night N70 Contours

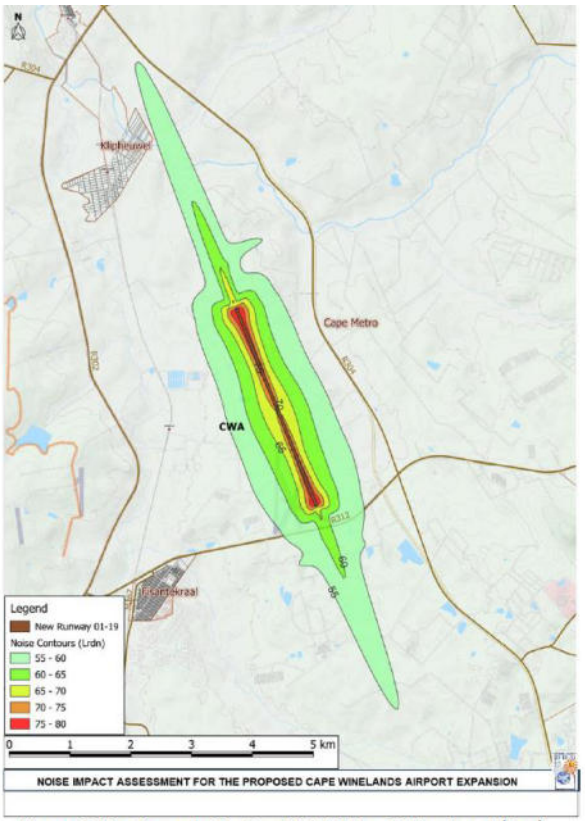

Figure 4-12. Scenario 3: Day-Night Noise Rating Level (L_{Rdn})

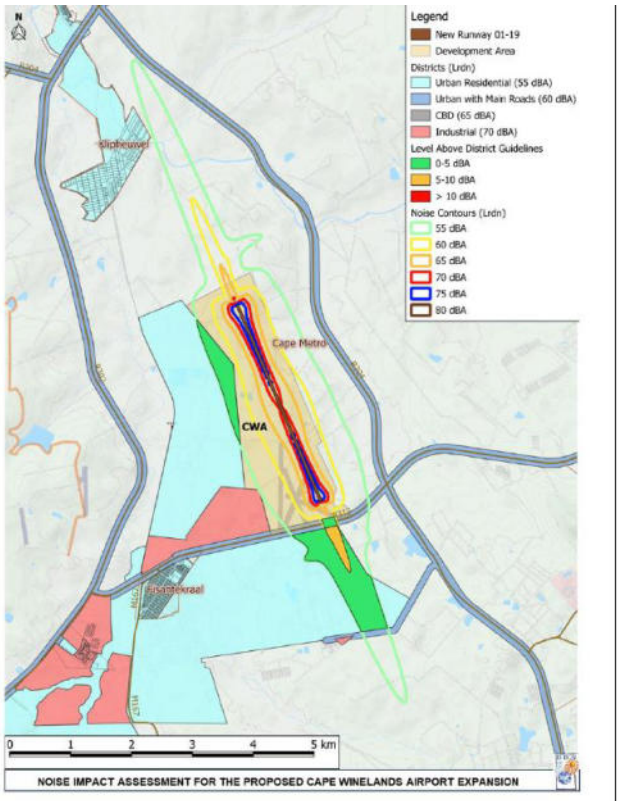

Figure 4-13. Scenario 3: Day-Night Noise Rating Level (L_{Rdn}) above the SANS 10103 District Guidelines

The above shows noise level contours in the two different scenarios. As can be seen, the noise impact on the poultry farm is low (Dracoulides D. , 2024). This is summarized below.

Noise Levels and Scenarios

Baseline Noise: For the poultry farm, 55.2 dB (daytime) and 39.1 dB (nighttime) (Dracoulides D. , 2024).

Scenario 1:	Existing runway setup under full utilisation (No-Go Alternative);
Scenario 2:	Operations on the new runway 01/19 in the operational year;
Scenario 3:	Operations on the new runway 01/19 at full capacity.

Construction Noise: At closest points (100m - 200m), daytime noise is 60.1 dB and nighttime 64.2 dB.

Operational Scenarios: Scenario 1: Easternmost section within 55-60 dB contour. The rest of the farm is outside the contour.

Scenario 2: Couty Fair falls outside the 55-60 dB contour.

Scenario 3: Easternmost boundary of the farm is within 55-60 dB contour.

All scenarios remain below the 80 dB level associated with harm to poultry and are only slightly higher than current levels.

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 a large number of 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 have been 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.

Impact of Airport Activity on Air Quality and Poultry Health

Air Quality Concerns

Commercial airport activity can significantly impact air quality in surrounding areas (Riley K, 2021). Studies show elevated levels of ultrafine particulate matter (UFP), PM2.5, black carbon, criteria pollutants, and polycyclic aromatic hydrocarbons (Riley K, 2021). In the U.S., on-airport studies generally show slightly elevated concentrations of carbon monoxide (CO), nitrogen dioxide (NO2), and sulfur dioxide (SO2), though often still below national ambient air quality standards (Riley K, 2021). Wind patterns strongly influence pollutant dispersion.

Effect on Poultry

Poor air quality can affect broiler performance and suppress immune function due to their unique respiratory system, which deposits many particles in the lungs and air sacs, removed by heterophils and macrophages (Latif, et al., 2010). Broilers are more resistant to contaminants at levels resulting from biomass burning (1.5 µg/ml). Poor air quality in barns, often due to litter type, stocking density, or ventilation, affects bird health more than external conditions.

- **Total Suspended Particulates (TSP)**: In broiler operations, TSP ranges between 4.25 and 3.64 mg/m^3 (Almuhanna, et al., 2011).

- **Ammonia Levels**: High ammonia, often from wet litter, should be managed below 25 ppm for optimal growth (Miles, et al., 2004).
- **Pollutant Effects**: Increased CO2, methane, and other gases can elevate respiratory disease occurrence.

Construction Phase Concerns

During construction, dust is the main pollutant, generated by land clearing, site preparations, bulk earthworks, material handling, and wind erosion (Draculoulides, 2024). Dust settles near sources but can affect nearby poultry farms, especially if construction is adjacent. Although the main construction may last up to 2 years, with dust deposition expected below the DEA guideline of 600 mg/m²/day (for residential areas), most of the construction will happen away from the farm side and dust ceases to become an issue 300m away from the construction site . The time period where dust is of concern is therefore limited. Mitigation measures include (Draculoulides, 2024):

- Applying wet suppression on main site roads.
- Implementing a 30 km/h speed limit on unpaved roads.
- Preferential routing away from the western site boundary.
- Reducing stockpile disturbance frequency.
- Installing a solid barrier (wall) between the farm and the development.

Operational Phase Scenarios

- **Scenario 1:** Current low to no air quality issues are found.
- **Scenario 2:** Low air pollutant levels outside airport boundaries during operation.
- **Scenario 3:** Air quality impact zones for the new runway extend beyond airport boundaries in a north-westerly and south-easterly direction, within standards except for highest 1-hr NO2 concentrations in small areas.

Summary

Long-term air quality is unlikely to impact poultry significantly, but construction phase mitigation is needed to prevent dust and noise from affecting the poultry. It is noted that the waste water treatment plant will generate ammonia emissions but this is too far away from the poultry farm to be of significance.

Water

Impact of Water Quality and Quantity on Poultry Production

Both declines in the quantity and quality of water can significantly affect the ability of farms to produce poultry. Currently, County Fair relies on two boreholes for its water supply; while the airfield was previously supplied by one borehole of poor quality, two potential production boreholes have been developed within the proposed development area (CWA_CWA_BH001 and CWA_CWA_BH002), with a third being planned for. REF

Concerns Regarding Groundwater Resources

There is concern that overutilization of groundwater could adversely affect poultry operations. This issue is addressed in the Water Use License application summary report and the GEOSS geohydrology report REF. The combined conservative estimate of groundwater available from both boreholes is approximately 110,376 m^3 per annum. In contrast, the projected groundwater demand for the long-term operation of the airport is anticipated to be 256,703 m^3 per annum. By 2038, during Phase PAL 2, additional groundwater will be needed to meet this demand, necessitating the drilling of additional boreholes capable of providing an estimated 146,327 m^3 per annum (or 4.7 L/s).

The Aquifer Firm Yield Model has confirmed that the Groundwater Resource Unit (GRU) in the region has the capacity to support the additional water extraction required for future phases of development. Borehole CWA_BH003 is currently being developed to add to the available water supply. According to the registered WARMS boreholes (database last updated May 2023), the current volume of groundwater abstracted within the GRU is 1,392,176 m^3 per annum (Figure 20). Only registered and active sites were accounted for in this assessment.

By analyzing the current water volumes, a surplus of 1,172,623.3 m^3 per annum (calculated as 2,564,799.3 m^3 per annum – 1,392,176 m^3 per annum) is available within the GRU. The additional volume of 104,857 m^3 per annum, for which a license is being applied, is less than the surplus volume available within the firm yield of the GRU REF. Hence, the water demand of the property is well within the sustainable supply volume of the aquifer, indicating that there is no overutilization of the water source and that there will be adequate water available for County Fair.

Water Quality Considerations

It should be noted that while the quantity of groundwater may be sufficient, the quality of the water is considered marginal for human consumption due to high levels of iron and manganese REF. This aspect of water quality is crucial for poultry operations, as it can impact both the health of the birds and the overall safety of the water supply used in the farming process. The groundwater in this area was of poor quality before the onset of the project and is likely going to need treatment to avoid negative consequences for the birds. The project is unlikely to contribute to the contamination of the groundwater. For more details on this consult the relevant report.

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. Since 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 biodigestors 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 other 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 contain 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.

The volumes mentioned in the waste section would be difficult to source since there do not appear to be layer farms in close proximity to 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 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.

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 waste water 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). As long as there are no open bodies of water and sedimentation dams, the second solution will have no impact on poultry. The existing waste water treatment works does have emissions of ammonia

that are high and only partially mitigated but this is too far away from the poultry farm to affect the ammonia levels on the farm (Draculoulides, 2024).

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.15 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. It is clear that 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.

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). Also use of water to settle dust, enforcement of 30km /h speed limits, rerouting traffic away from the farm.
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	The use of lights near the poultry farm at night may interfere with the circadian	Design the road so that light does not shine into poultry sheds, signs requiring that car lights are dipped

lighting of the airport	rhythm of breeder and layer birds	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.
Noise aircraft and vehicles	Loud noises can disturb , stress the birds as well as decrease production	Planting fast growing vegetation that does not attract birds,to muffle noise, construction of facility wall to muffle sound, schedule arrivals during the day time, avoid runways closest to the farm (phase 1).
Air pollution	Increased pollutants can cause respiratory issues in poultry	This needs to be monitored , see above mitigation for the construction phase.
Contamination of the ground water	Contamination of the ground water with run off of water used for cleaning and 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
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 waste water in closed systems, handle waste according to municipal by laws.
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
International waste	International waste poses a risk for disease outbreaks	Handling and disposal of international galley waste must be done in a safe way and with regard to legislation

Factor	Spatial extent	Duration	Probabliity	Reversibility	Medium impact after mitigation	Low impact after mitigation
Visual	Local	Permanent	High	No	medium	
Flies /Rodents	Local	temporary	Low	Yes		low

Aircraft noise	Local	Permanent	Low	yes	Medium	
Noise of the cars	Local /Area	Permanent	High	yes		low
Light pollution from the cars /airport lighting	Local	Permanent	High	yes		Low
Water issues (scarcity and contamination) (Refer to hydrogeological report)	Local	Permanent	low	Yes		Refer to hydrogeological report
Increased attraction of wild birds	Local	Permanent	Low	Yes		Low
Increased volume of human traffic transmitting disease to poultry	Local	Permanent	High			Low
Use of biodigestor with poultry manure as substrate for processing waste	Local	Permanent	High	yes	Medium to high	Low (if there is no poultry manure) used in the biodigestor

*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 would be: no jobs, no development- further poverty in the area.

Conclusion

In my opinion, the construction of the Cape Winelands Airport will undoubtedly impact the adjacent poultry farm. However, it must be borne in mind that the biosecurity is already compromised by its situation close to a main road as well as a settlement. The critical mitigation which would be important is not to use poultry manure for the biodigestor as this has implications for biosecurity. Other recommended mitigations are important to avoid health and production losses.

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