



180 Mockingbird Road
PHEASANTS NEST
Intensive Livestock
Agriculture comprising
Proposed Poultry Farm
Environmental Impact Statement

For Justin and Renee Camilleri
February, 2018

180 Mockingbird Road, Pheasants Nest

**Intensive Livestock Agriculture
comprising**

Proposed Poultry Farm

Environmental Impact Statement

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February, 2018

216307

SUBMISSION OF ENVIRONMENTAL IMPACT STATEMENT

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PREPARED UNDER THE ENVIRONMENTAL PLANNING AND
ASSESSMENT ACT 1979

EIS PREPARED BY

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PROPOSED DEVELOPMENT

Seeks approval to Construct and Operate a Livestock Intensive Industry with Associated Earthworks and Infrastructure (Schedule 3 Environmental Planning & Assessment Regulation 2000) being a Proposed Poultry Farm Operation defined as "intensive livestock agriculture" pursuant to Wollondilly Local Environmental Plan 2011.

PROJECT APPLICATION

Applicant Name: Justin and Renee Camilleri
Applicant Address: c/- Tattersall Lander Pty Ltd, 2 Bourke Street, Raymond Terrace, NSW 2324

Land to be developed: Lot 264 DP 625326 180 Mockingbird Road, PHEASANTS NEST, NSW 2570

ENVIRONMENTAL IMPACT STATEMENT

The Environmental Impact Statement addresses all relevant matters listed under Part 4 of the *Environmental Planning and Assessment Act 1979* and Environmental Planning & Assessment Regulation 2000

CERTIFICATE

I certify that I have prepared the contents of this EIS and to the best of my knowledge:

- (i) the statement has been prepared in accordance with this Schedule, and
- (ii) the statement contains all available information that is relevant to the environmental assessment of the development, activity or infrastructure to which the statement relates, and
- (iii) that the information contained in the statement is neither false nor misleading.

Name: Bob Lander

Signature:



Date: 21 February, 2018

JUSTIN AND RENEE CAMILLERI

**180 Mockingbird Road
PHEASANTS NEST**

Environmental Impact Statement

February, 2018

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GLOSSARY

Aquifer	A water bearing stratum of permeable rock, sand or gravel, able to transmit substantial quantities of water
Arboreal	Adapted for living in and/or moving around in trees.
Bioregion	Region in which the boundaries are primarily determined by (or reflect) similarities in geology, climate and vegetation.
Cleared Land	Where the native over-storey has been cleared, there is no native mid-storey and less than 50% of the groundcover vegetation is native species or greater than 90% of the groundcover (dead or alive) is cleared.
Clearing	Clearing of native vegetation is defined in the <i>Native Vegetation Act 2003</i> as any one or more of the following: cutting down, felling, thinning, logging or removal; killing, destroying, poisoning, ringbarking, uprooting or burning.
Community	The recognisable association of species that regularly occur together in similar environments.
Critical Habitat	Habitat declared to be critical in relation to that species or ecological community under the <i>Threatened Species Conservation Act 1995</i> or under the <i>Environment Protection and Biodiversity Conservation Act 1999</i> .
Endangered	A species, population or ecological community that is likely to become extinct or is in immediate danger of extinction.
Endangered Ecological Community	Ecological community specified as endangered under Part 3 of Schedule 1 of the <i>Threatened Species Conservation Act 1995</i> or under the <i>Environment Protection and Biodiversity Conservation Act 1999</i> .
Endangered Population	Population identified as endangered under Part 2 of Schedule 1 of the <i>Threatened Species Conservation Act 1995</i> .
Endemic	Restricted to a particular area having originated there.
Exotic Species	A non-indigenous species.
Fauna	The animals of a particular region, habitat or geological region.

Flora	The plants of a particular region, habitat or geological region.
Floristics	Species composition of a plant community.
Groundwater	Water held underground in the soil or in pores and crevices in rock.
Habitat	An area or areas occupied or periodically occupied by a species, population or ecological community and includes any biotic or abiotic component necessary to sustain survival and reproduction.
Hollow-Bearing Tree	Tree where the base, trunk or limbs contain hollows, holes or cavities that have formed as a result of decay, injury or other damage.
Hydraulic Conductivity	A coefficient of proportionality describing the rate at which water can move through a permeable medium.
Hydraulic Gradient	The change in total head with a change in distance in a given direction.
Indigenous	Native to, or originating in, a particular region or country.
Life Cycle	The series or stages of reproduction, growth, development, ageing and death of an organism.
Local Population	The population that exists in the study area as well as any individuals occurring in the adjoining areas known or likely to utilise habitats in the study area.
Native Species	A species that is indigenous to Australia or an external Territory, or periodically or occasionally visits.
Noxious	Harmful to the environment or ecosystem.
Offset (Biodiversity)	One or more appropriate actions put in place in an appropriate location to counterbalance or offset an impact on biodiversity values.
pH	Measure of the acidity or alkalinity of a substance, with 1 being the most acidic, 7 being neutral and 14 being the most alkaline.

Population	A group of animals or plants of the same species, potentially capable of interbreeding and sharing the same habitat in a particular area at a particular time.
Propagation	The reproduction of plants.
Rare	An animal is rare / near threatened if the population size or distribution of the wildlife is small and may become smaller; or the population size of the wildlife has declined, or is likely to decline, at a rate higher than the usual rate for population changes for the wildlife; or the survival of the wildlife in the wild is affected to an extent that the wildlife is in danger of becoming vulnerable.
Recharge	The process involving the infiltration of water from the surface to groundwater.
Regeneration	Where native vegetation is allowed to return naturally to an area generally by removing existing impacts such as grazing or slashing.
Regrowth	A young, usually even-aged forest stand that has regenerated after disturbance.
Rehabilitation	Making the land useful again after a disturbance. It involves the recovery of ecosystem functions and processes in a degraded habitat.
Remnant Vegetation	Any native vegetation that is not regrowth.
Revegetation	Use of methods such as planting of tubestock and direct seeding to return native vegetation to an area.
Risk of Extinction	The likelihood that the local population will become extinct either in the short term or long term as a result of direct or indirect impacts on the viability of that population.
Sediment	Any usually finely divided organic and / or mineral matter deposited by air or water in non-turbulent areas.
Soil Profile	The physical and chemical features of the soil imagined or seen in vertical section from the surface to the point at which the characteristics of the parent rock are not modified by surface weathering or soil processes.

Species	A group of biological entities that (a) interbreed to produce fertile offspring; or (b) possess common characteristics derived from a common gene pool.
Terrestrial	Pertaining to land, the continents, and/or dry ground. Contrasts to aquatic.
Topography	Description or representation of natural or artificial features of the landscape; the description of any surface, but usually the earth's.
Translocation	The transfer of plants and animals from one part of their range to another.
Viable	The capacity to successfully complete each stage of the life cycle under normal conditions.
Vulnerable	A species or ecological community that is rare, not presently endangered but likely to become endangered unless the circumstances and factors threatening its survival or evolutionary development cease to operate.
Weed	A plant that is considered undesirable because it threatens the persistence of native plants.
Wetland	Low-lying areas regularly inundated or permanently covered by shallow water. Usually important areas for birds and other wildlife.
Wildlife Corridor	A strip of habitat that facilitates fauna movement between otherwise isolated patches of habitat.

ABBREVIATIONS

AHD	Australian Height Datum
AHIMS	Aboriginal Heritage Information Management System
ASM	acid sulfate materials
ASS	acid sulfate soils
AWS	Automatic Weather Station
dB	decibel
DoPE	Department of Planning and Environment
DPI	Department of Primary Industries
EA	Environmental Assessment
EEC	Endangered Ecological Community
EHS	Environment, Health and Safety
EIA	Environmental Impact Assessment
EIS	Environmental Impact Statement
EMP	Environmental Management Plan
EP&A Act	<i>Environmental Planning and Assessment Act 1979</i>
EP&A Regulation	Environmental Planning and Assessment Regulation 2000
EPBC Act	<i>Environment Protection and Biodiversity Conservation Act 1999</i>
EPI	Environmental Planning Instrument
EPL	Environmental Protection Licence
ESD	Ecologically Sustainable Development
FM Act	<i>Fisheries Management Act, 1994</i>
GDEs	groundwater dependent ecosystems
GP	Global Positioning System

GWP	Groundwater Management Plan
HA	Heritage Assessment
ha	Hectare
INP	Industrial Noise Policy (EPA, 2000)
km	Kilometres
km/hr	kilometres per hour
LALC	Local Aboriginal Land Council
LEP 2011	<i>Wollondilly Local Environmental Plan 2011</i>
LGA	Local Government Area
m/d	metres per day
mg/L	milligrams per litre
MU	Map Unit
µS/cm	micro Siemens per centimetre
NEPM	National Environment Protection Measure
NOW	New South Wales Office of Water
NPWS	National Parks and Wildlife Service
NP&W Act	<i>National Parks and Wildlife Act 1974</i>
NSW	New South Wales
NV Act	<i>Native Vegetation Act 2003</i>
OEH	Office of Environment and Heritage
PASS	potential acid sulfate soils
PHA	preliminary hazard analysis
POEO Act	<i>Protection of the Environment Operations Act 1997</i>
PSNC	Project Specific Noise Criteria

RAP	Registered Aboriginal Parties
RBL	Rating Background Level
RMS	Roads and Marine Service
ROTAP	Rare or Threatened Australian Plants
SEAR's	Secretary's Environmental Assessment Requirements
SEPP	State Environmental Planning Policy
subsp.	Subspecies
Tattersall Lander	Tattersall Lander Pty. Ltd. Development Consultants
TSC Act	<i>Threatened Species Conservation Act 1995</i>
TSP	Total Suspended Particulates
WM Act	<i>Water Management Act 2000</i>
Water Act	<i>Water Act 1912</i>

EXECUTIVE SUMMARY

INTRODUCTION

Tattersall Lander Pty. Ltd. is engaged by Justin & Renee Camilleri to prepare an Environmental Impact Statement (EIS), to accompany a development application (DA) to Council under Part 4 of the *Environmental Planning and Assessment Act 1979* (the Act). The application is designated development pursuant to requirements of the *Environmental Planning & Assessment Act 1979*, nominated integrated development pursuant to the requirements of the *Water Management Act 2000* and also integrated development, requiring (1) an Environment Protection Licence pursuant to the *Protection of the Environment Operations Act 1997*; and (2) concurrence of the Mine Subsidence Board pursuant to the *Mine Subsidence Compensation Act 1961*.

The subject land is Lot 264 DP 625326, 180 Mockingbird Road, Pheasants Nest, NSW, 2570, located within the Wollondilly Local Government Area (LGA).

The application seeks approval to:

(1) Construct and Operate a Livestock Intensive Industry with Associated Earthworks and Infrastructure (Schedule 3 Environmental Planning & Assessment Regulation 2000) being a Proposed Poultry Farm Operation defined as “*intensive livestock agriculture*” pursuant to *Wollondilly Local Environmental Plan 2011*.

Components of the development include:

- 7 Tunnel Ventilated Poultry Sheds incorporating 742,000 birds (chicken broiler poultry) with 53,000 birds per shed
- Associated Infrastructure Operational Sheds
- Office and Workers Amenity Buildings
- Water Supply Dams

Total approximate cost of the development is \$6,525,090.

Employment associated with the proposed development is as follows:

- 5 full time on farm
- 5 full time off farm
- 3 transport operators
- 10 processing operators
- 30 construction positions.

It is intended that development construction will be staged; however, the application is not staged development for the purposes of the Act.

The Department of Planning and Environment (DoPE) was consulted and the Secretary's Environmental Assessment Requirements (SEAR 1107) were issued on the 18 November, 2016. The Secretary's requirements are discussed within the EIS.

It is noted that the SEARs were issued on the basis of the establishment of a 14-shed poultry farm with associated infrastructure to contain 742,000 birds. The project has been downsized to 7 sheds. Subsequent advices from the Department are that the existing SEARs adequately outline all requirements (albeit related to a proposed smaller development) and continue to apply.

The EIS describes the project, outlines relevant statutory provisions, identifies the key issues and comprehensively assesses potential environmental impacts. It describes a range of management and mitigation measures to ensure that short term (largely construction) impacts are minimised and that there is a net benefit from the proposal in the medium to long term.

The application is also integrated development pursuant to the provisions of the *Water Management Act 2000*, the *Protection of the Environment Operations Act 1997* and the *Mine Subsidence Compensation Act 1961*.

Background and Project Description

The current land owners, Justin & Renee Camilleri, are proposing to construct and operate a modern, tunnel ventilated seven (7) shed poultry operation with the inclusion of ancillary operations sheds, water supply dams, associated earthworks and infrastructure.

The site is currently occupied by an existing market garden facility, primarily growing vegetables. Ancillary buildings also exist on the land.

All existing greenhouses associated with the market garden are to be retained on site.

7 Tunnel Ventilated Poultry Sheds incorporating up to 742,000 birds (chicken broiler poultry) are proposed, accommodating 53,000 birds per shed at any one time.

Associated Infrastructure Operational Sheds and Office and Workers Amenity Buildings are also proposed.

The existing Water Supply Dam to the north-east of the site is to be retained. The existing dam to the south of the site is to be dewatered and removed. Two (2) new dams to the west of the site are proposed, with capacities of 24.4 ML and 1.41 ML.

Earth mounds and landscaping and a relocation of services are also proposed.

The construction and operation of the poultry sheds will also require the associated installation of silos for feed grains for the birds, gas tanks for shed heating and ventilation stacks for odour control. This proposal also includes the necessary landscaping and infrastructure to accommodate the development. The construction of the development will be staged over time.

The poultry industry is seeing continual growth and public demand for product has caused significant growth in the utilisation of processing facilities within the region.

Poultry meat growers are being encouraged by poultry processors to increase their operations to facilitate the additional and growing processing capacity and public demand for product.

STAKEHOLDER CONSULTATION

The Community

Stakeholders will have opportunity to raise relevant matters once the Council places the DA on public exhibition.

Statutory Authorities

In formulating the Secretary's Environmental Assessment Requirements (SEARs) the DoPE consulted with those agencies listed below. Poignant matters raised by those agencies for the purposes of incorporation within the EIS, are listed. See **Appendix A** for copies of correspondence.

NSW Environment Protection Authority

The Environment Protection Authority (EPA) has advised that the EIS should consider the following key requirements:

- General planning matters utilising best practice guidelines
- Air Quality;
- Water Quality;
- Noise;
- Waste Management;
- Contaminated Land Management; and
- The potential for licensing requirements pursuant to Schedule 1 of the *Protection of the Environment Operations Act 1997*.

Water NSW

The following specific matters were raised for the proponent to address as relevant:

- Annual volumes of surface water and groundwater proposed to be taken by the activity (including through inflow and seepage) from each surface and groundwater source as defined by the relevant water sharing plan.
- Assessment of any volumetric water licensing requirements (including those for ongoing water take following completion of the project).
- The identification of an adequate and secure water supply for the life of the project. Confirmation that water can be sourced from an appropriately

authorised and reliable supply. This is to include an assessment of the current market depth where water entitlement is required to be purchased.

- A detailed and consolidated site water balance.
- Assessment of impacts on surface and ground water sources (both quality and quantity), related infrastructure, adjacent licensed water users, basic landholder rights, watercourses, riparian land, and groundwater dependent ecosystems, and measures proposed to reduce and mitigate these impacts.
- Full technical details and data of all surface and groundwater modelling.
- Proposed surface and groundwater monitoring activities and methodologies.
- Assessment of any potential cumulative impacts on water resources, and any proposed options to manage the cumulative impacts.
- Consideration of relevant policies and guidelines.
- A statement of where each element of the SEARs is addressed in the EIS (i.e. in the form of a table).
- It is noted that proposed Shed 14 in the south-eastern corner of Lot 264 DP625326 will be located within 40 metres of a 1st order watercourse. The EIS will need to address the need for a controlled activity approval under the Water Management Act 2000.

The requirement to satisfy Water NSW General Assessment Requirements was also stipulated (see **Appendix A**). In summary, those requirements include:

- Key Relevant Legislative Instruments
- Water Sharing Plans
- Relevant Policies and Guidelines
- Licensing Considerations
- Dam Safety
- Surface Water Assessment
- Groundwater Assessment
- Groundwater Dependent Ecosystems
- Watercourses, Wetlands and Riparian Land
- Landform rehabilitation
- Stream rehabilitation

At this point, it is noted that the comments relate purely to the matter of providing requirements for the purposes of content and procedure associated with the EIS.

It is expected that DPI Water's requirements around any approval for nominated integrated development, being provisions related to a 'controlled activity approval' pursuant to section 91(b) of the *Water Management Act 2000* would be issued as General Terms of Approval (GTAs) with any consent issued for the DA. A controlled activity approval confers a right on its holder to carry out a specified controlled

activity at a specified location in, on or under waterfront land.

Department of Primary Industries (Agriculture)

DPI Agriculture has provided generic recommendations for inclusion in the EIS. in Attachment 1.

An important issue raised by the DPI is that the proposed farm is potentially within a 5km buffer distance of two breeder farms. The poultry industry generally prescribes the buffer requirement. The prescription is included in the DPI Best Practice Guidelines.

Other primary agriculture associated issues raised for further consideration and assessment include:

- Site Suitability
- Biosecurity Standards
- Water Supply
- Power Supply
- Shed and Range Design
- Surface and Groundwater
- Landscaping
- Dead Bird Management and Disposal
- Spent Litter Disposal
- Contingency and Environmental Management Plan
- Animal Welfare

Department of Primary Industries (Fisheries)

An e-mail received from the Department of Primary Industries (Fisheries) advises that the proposed development does not trigger any assessment under the *Fisheries Management Act*.

Draft EIS Consultation

Personal telephone contact was undertaken with the following listed authorities during October, 2017:

- Department of Primary Industries (Agriculture);
- Water NSW (now Department of Industry: Crown Lands & Water);
- Environment Protection Authority;
- Office of Environment & Heritage;
- Roads and Maritime Services;
- Rural Fire Service;
- Mine Subsidence Board
- Wollondilly Shire Council

As discussed above, the Department of Primary Industries (Agriculture), Water NSW and the Environment Protection Authority made requests for the EIS to address matters raised already communicated in the SEAR's. Other agencies advised that they will have the opportunity to comment further once Council refers the matter to them during the consultation process associated with assessment and determination of the development application, including any concurrence requirements as integrated development.

PRIMARY ENVIRONMENTAL IMPACT CONSIDERATIONS

Animal Welfare, Bio-Security and Disease Management

The development will utilise Industry Best Practices and the farm will be run with strict guidelines. An Animal Welfare and Biosecurity Assessment was undertaken by Advitech Pty. Ltd. (24 October 2017)¹. A copy of the assessment is located at **Appendix B**.

Air Quality

An Air Quality Impact Assessment was undertaken by Advitech Pty. Ltd. (30 November, 2017)². A copy of the assessment is located at **Appendix C**.

CALPUFF modelling for odour for the proposed poultry facility for 742,000 birds comprising seven (7) sheds was undertaken to enable assessment of odour impacts.

CALPUFF modelling for odour and particulates for the proposed poultry facility was undertaken to enable assessment of air quality impacts.

A population dependent complex odour criterion of 5 OU (99th percentile nose response time) was applied to modelled odour emissions from the poultry facility. Based on the assessment bases outlined in this report, the result of CALPUFF modelling suggests that predicted cumulative odour GLCs above the 5 OU criterion will not be encountered at any identified sensitive receivers. The highest predicted off-site odour concentration of 2.1 OU is at sensitive receiver R2 and R38.

Modelling results suggest that particulate GLCs may cause additional exceedances of the impact assessment criteria at off-site discrete receivers. It is recommended that particulate emissions be managed by the implementation of an air quality management plan which details best management practices. To assist with the management of air quality impacts from the poultry facility, it is recommended that a weather monitoring station is installed on-site.

¹ Advitech Pty. Ltd., 24 October 2017, *Animal Welfare and Biosecurity Assessment*, unpublished.

² Advitech Pty. Ltd., 30 November, 2017, *Air Quality Impact Assessment: Bishops Bridge Poultry Farm*, unpublished.

Noise

A Noise Impact Assessment was undertaken by Advitech Pty. Ltd. (6 December, 2017)³. A copy of the assessment is located at **Appendix D**.

Noise modelling was undertaken using the Predictor environmental noise modelling software, considering several operational scenarios with consideration to topographical and meteorological conditions. Strategic earth mounds are included in the modelled scenarios to provide attenuation measures.

Modelling of the construction activities indicate that predicted LAeq,15minute noise levels would exceed noise affected NML of 40 dB(A) at multiple receiver locations during each construction phase over day period; however, this modelling scenario was predicted to comply with the highly noise affected NML of 75 dB(A), above which there is likely to be strong community reaction to the noise.

A review of the items of plant and separation distances between the proposed construction works and the nearby sensitive receivers suggested that all of the proposed construction activities would be undertaken at safe distances to prevent any vibration impacts. It is therefore considered that the construction works would not result in any undue vibration impacts, on either cosmetic damage to buildings, or human comfort.

To reduce the noise impacts, it is recommended that the operating fans are all located either at the rear of the sheds or side of sheds facing the Hume Highway. On this basis, fans are not operating on the side of shed facing the Mockingbird Road. Modelling of the fans operating indicate that predicted LAeq,15minute noise levels would comply with the nominated PSNL criteria at all receiver locations under neutral and adverse meteorological conditions. Cumulative noise impact assessment for the fans operating also showed that the noise levels would comply with nominated PSNL criteria at all receiver locations.

Modelling of the feed delivery and silo refilling activities indicated that the predicted LAeq,15minute noise levels would not exceed nominated criteria any receiver location during day, evening and night time operations, under neutral and worst case operating conditions.

Modelling of the bird collection activities indicate that predicted LAeq,15minute noise levels would be below the nominated PSNL criteria at all receiver locations during various site activities. Modelled sleep disturbance (LA1, 1 minute) impacts due to forklift operation resulting from the proposed development operating during the night period, are also predicted to comply with the sleep disturbance criterion of

45 dB(A) at all receiver locations during bird collection activities under temperature inversion conditions.

³ Advitech Pty. Ltd., 6 December, 2017, *Noise Impact Assessment: Pheasants Nest Poultry Farm*, unpublished.

Ecological Assessment

An Ecological Impact Assessment was undertaken by Wildthing Environmental Consultants (February, 2018)⁴.

A copy of the assessment is located at **Appendix E**.

The majority of the 16.15ha site gently slopes to the west with the ground dropping more steeply in the far western corner due to the presence of two associated narrow gullies. The underlying geology consists of Triassic Wianamatta groups of shales and sandstones. The Hawkesbury Sandstone Sub Group was present in the west of the site and Shale associated with the Liverpool Sub Group in the east.

Native vegetation within the site has been highly modified by past clearing for agricultural practices. Smaller more intact areas of native vegetation largely associated with steeper terrain were present in the far west of the site. Remnant trees were scattered over a large portion of the site outside the existing development. As a result of fieldwork completed for this report a total of five vegetation communities were delineated within the site. These vegetation communities were:

- Sandstone Woodland (6.04ha);
- Sandstone Gully Forest (1.07ha);
- Shale-Sandstone Ironbark Forest (Poor Condition) (3.22ha);
- Pasture/Grassland (2.81ha);
- Aquatic Dam (1.14ha).

The 3.22ha area of Shale-Sandstone Ironbark Forest occurring within the east of the site was found to be consistent with a highly modified example of the threatened ecological community Shale/Sandstone Transition Forest which is listed as Critically Endangered Ecological Community under both state and national legislation. The proposal will result in the removal of 2.89ha of this community from within the site. Taking the Approved Conservation Advice (TSSC, 2014) into consideration the 3.22ha area of Shale Sandstone Transition Forest would meet the threshold for the patch sizes of >0.5ha, with the patch being contiguous with a native vegetation remnant (any native vegetation where cover in each layer present is dominated by native species) >1ha in area. However, the assemblage would fall below the threshold requiring >30% of the perennial understorey cover to be made up of native species. Therefore, the proposal is unlikely to require referral, assessment and compliance under the provisions of the EPBC Act. Considering the existing disturbance to this community, the proposal is unlikely to have an adverse effect such that its local occurrence is likely to be placed at risk of extinction.

A total of eight specimens of the threatened *Epacris purpurascens* var. *purpurascens* were located in the western portion of the site. All eight of the specimens will require removal for a proposed dam. Considering the current land practices where the specimens were located (such as grazing and slashing) the long-term outlook for these individuals would already have been reduced. According to the Bionet Atlas (OEH, 2017), larger numbers of specimens of *E. purpurascens* var. *purpurascens* have

⁴ Wildthing Environmental Consultants, February 2018, *Flora and Fauna Assessment on Threatened Flora and Fauna*, for Proposed Poultry Sheds at Lot 264 DP 625326, Mockingbird Road, Pheasants Nest, NSW, unpublished.

been recorded within the local area, particularly to the east within the Upper Nepean State Conservation Area over the Hume Motorway to the east. Approximately 50 plants were also recorded approximately 500m to the south-west along Mockingbird Bird Road in 1999 to 2000 (OEH, 2017). The loss of eight specimens will result in an incremental reduction of this species within the local area. However, the proposal is unlikely to have a significant effect on these threatened flora species such that a local extinction would occur. It is recommended that individual specimens of *E. purpurascens* var. *purpurascens* be translocated into adjacent suitable habitat. Any translocation of specimens of *E. purpurascens* var. *purpurascens* will require a Translocation Plan that is approved by OEH. None of the remaining addressed flora species were recorded within the site during the survey. The site was found to contain suitable habitat for a further 16 addressed flora species.

Seven threatened fauna species were recorded within the site during the survey, being;

- *Meridolum corneovirens* (Cumberland Plain Land Snail);
- *Petroica boodang* (Scarlet Robin);
- *Calyptrorhynchus lathamii* (Glossy Black-Cockatoo);
- *Mormopterus norfolkensis* (Eastern Freetail Bat);
- *Scoteanax rueppellii* (Greater Broad-nosed Bat);
- *Falsistrellus tasmaniensis* (Eastern False Pipistrelle);
- *Chalinolobus dwyeri* (Large-eared Pied Bat).

The proposal will result in a reduction of suitable habitat for these fauna species such as hollows for the tree roosting microchiropteran bats. However, the proposal is unlikely to have a significant impact on these threatened fauna species such that a local population would be placed at risk of extinction. Foraging/hunting/nesting resources of varying quality was available for 36 of the 46 remaining fauna species assessed. The proposal will result in a small incremental reduction of habitat in the local area for a number of these fauna species. Taking into consideration the recommendations of an Ecological Management Plan (EMP) to maintain and enhance areas of suitable habitat that will remain within the site and presence of the large areas of adjoining habitat, the proposal is unlikely to disrupt the life cycle of the addressed threatened fauna species such that local extinction would occur.

Investigations in accordance with State Environmental Planning Policy No. 44 - 'Koala Habitat Protection' revealed the site contained two listed Koala Feed Tree species, *Eucalyptus punctata* (Grey Gum) and, to a much lesser extent, *Eucalyptus tereticornis* (Forest Red Gum). These tree species comprise over 15% of the total trees present within the site and, are therefore considered to constitute 'Potential Koala Habitat'. However, considering the lack of Koala activity recorded within the site, it would unlikely be considered to constitute Core Koala Habitat and accordingly no further provisions of this policy apply to the site.

Considerations have been made to the Commonwealth Environment Protection and Biodiversity Conservation (EPBC) Act (1999). The listed Critically Endangered Ecological Community Shale/Sandstone Transition Forest and the threatened *Chalinolobus dwyeri* (Large-eared Pied Bat) were identified within the site. The proposed development is not likely to significantly affect any items of National Environmental Significance. The koala was also addressed and referral to the

Minister was deemed not recommended for adversely affecting habitat critical to the survival of the koala.

The proposal will result in an incremental loss of habitat within the local area, however, with the implementation of the recommendations and mitigation measures provided in the report and the undertaking of an Ecological Management Plan (EMP) to protect and enhance the remaining habitat within the site it is believed that the proposal will avoid adversely impacting upon any of the threatened species or threatened ecological communities considered in the report.

Historic Heritage Assessment

A Historic Heritage Assessment was undertaken by Advitech Environmental Consultants (14 November, 2017)⁵.

A copy of the assessment is located at **Appendix F**.

The study area is an evolved landscape resulting from housing, farming structures, vegetation clearing, the construction of dams and drainage lines, pastoralism, fencing and erosion. The study area is not considered to be significant, rare or representative at local, State or National level.

No items of historical or natural heritage, as defined by the NSW Heritage Office under the requisite criteria, were found to be located within the study area. Therefore, no approvals are required under the Heritage Act to proceed with the development.

Aboriginal Cultural Heritage Assessment

An Aboriginal Cultural Heritage Assessment was undertaken by Advitech Environmental Consultants (14 November, 2017)⁶.

A copy of the assessment is located at **Appendix F**.

It is concluded that the study area would have been suitable for transitory or opportunistic hunting or gathering of resources. It is considered that the remainder of the study area has nil to low potential for Aboriginal objects on the following basis:

- ☐ The lack of Aboriginal objects found during the survey;
- ☐ The lack of registered Aboriginal sites or places found within the study area;
- ☐ The topography, landforms and landscape within the study area;

⁵ Advitech Pty. Ltd., April 2017, *Archaeological Report: Historic Heritage Assessment and Aboriginal Cultural Heritage Assessment*, 180 Mockingbird Road Pheasants Nest in Wollondilly Shire, unpublished.

⁶ Advitech Pty. Ltd., April 2017, *Archaeological Report: Historic Heritage Assessment and Aboriginal Cultural Heritage Assessment*, 180 Mockingbird Road Pheasants Nest in Wollondilly Shire, unpublished.

- ❑ Consultation undertaken with local Aboriginal people and in accordance with the Aboriginal Cultural Heritage Consultation Requirements for Proponents 2010;
- ❑ The archaeological context; and
- ❑ The highly disturbed nature of the majority of the study area due to historical pastoral and market garden development and infrastructure.

No further investigation with regard to Aboriginal objects in the study area is required under the Aboriginal Cultural Heritage Consultation Requirements for Proponents 2010.

It is recommended that:

- ❑ The persons responsible for on site management will ensure that all staff, contractors and others involved in construction and maintenance related activities are made aware of the statutory legislation protecting sites and places of significance. Of particular importance is the National Parks and Wildlife Amendment (Aboriginal Objects and Aboriginal Places) Regulation 2010, under the *National Parks and Wildlife Act 1974*;
- ❑ In case of unexpected potential Aboriginal objects identified during any excavation works, an 'Unexpected Aboriginal Object Procedure' should be created and provided to all workers, contractors, sub-contractors and employees at their time of their work induction to the site. The 'Unexpected Heritage Items Procedure' should:
 - Define an Aboriginal object in accordance with the Guide to Investigating, Assessing and Reporting on Aboriginal Cultural Heritage in NSW (OEH, 2011); and
 - Contain provisions that if an Aboriginal object is incidentally discovered and it is likely to be disturbed damaged or destroyed by excavation, works must be suspended in that area and an archaeologist contacted to assess and, if necessary, register the find; and should any skeletal remains be found, all works should cease and the NSW Police Service and the Office of Environment and Heritage be immediately contacted; and
- ❑ A copy of this assessment should be lodged with the Aboriginal Heritage Information Management System.

Traffic and Transport

A Traffic Impact Assessment was undertaken by SECA Solutions (December, 2016)⁷.

A copy of the assessment is located at **Appendix G**.

From the site work completed and following a review of the documentation provided, it is considered that the proposed poultry farm development will have an acceptable impact upon the overall road network in the locality of the site. The existing traffic flows in the locality of the site are very low and well within the

⁷ Seca Solution, December 2016, *Traffic Impact Assessment for the proposed Poultry Farm*, 180 Mockingbird Road, Pheasants Nest, NSW.

capacity of the local roads. Any increases in the local traffic associated with operation of the proposed farm will not have a noticeable impact on the operation or safety of these roads.

The proposed site access operates in a safe manner and allows for vehicles to enter and exit the site in a forward direction, consistent with the existing rural nature of the site. Vehicles will be able to manoeuvre within the site to exist in a forward direction.

Any parking associated with the development can be accommodated within the subject site.

It is concluded that the development should be approved on traffic and access grounds.

Visual Assessment

The relative topography and vegetation of the site and surrounding land, including the presence of tracts of remnant forest along with the particular siting and scale of the proposed development mean that the visual characteristics of the poultry farm will not adversely affect surrounding residential receptors. Proposed landscaping at the site will add a greater depth of visual buffer already present. Similarly, the proposed development will not be highly visible from the Hume Motorway.

Diagrammatic representation of views into the site from various neighbouring dwellings are located at **Chapter 12**.

Stormwater Management, Soil and Water

A Stormwater Quality Report was undertaken by Tattersall Lander (November, 2017)⁸.

A copy of the assessment is located at **Appendix H**.

The results derived from modelling procedures indicate that long term water quality and quantity constraints are appropriately addressed in the proposed development through the capture and reuse of stormwater runoff, through the following measures:

- Construction of two new storage dams, Dam A with 24.4ML storage volume and Dam B with 1.41ML storage volume with appropriate sized outlets as detailed in the Tattersall Lander Detailed DA plans,
- Installation of 6x500kL water storage tanks for the poultry farm operation, and
- Installation of a 5kL tank with the worker's amenity building.

⁸ Tattersall Lander, November 2017 *Stormwater Quality Report for Proposed Poultry Farm, 180 Mockingbird Road, Pheasants Nest*, unpublished.

More so, the modelling demonstrates that the development will actually have a positive impact on both the stormwater pollutant levels and peak flowrates leaving the site, compared to the existing situation. From a stormwater quality and quantity perspective, approval is recommended.

Waste Management

It is proposed that used poultry litter will be managed under a contracted operation. Poultry litter will be removed from the site at bird cleanouts. A small amount of litter will be maintained onsite for bird composting and onsite farm agricultural uses. Details of the composting shed are included in associated plans.

The EIS (**Chapter 14**) provides comprehensive details relating to waste management at the site, including:

- Details of all potential waste streams including poultry litter, manure and disposal of dead birds for the proposal;
- Details of waste handling, including transport, identification, receipt, stock piling and quality control including off-site reuse and disposal; and
- The measures that would be implemented to ensure that the proposed development is consistent with the aims, objectives and guidelines in the NSW Waste Avoidance and Resource Recovery Strategy 2014-21.

A copy of the Waste Management Report is provided at **Appendix I**.

Mine Subsidence

The proposed development is located within a Mine Subsidence District requiring the concurrence of the Mine Subsidence Board pursuant to the *Mine Subsidence Compensation Act 1961*.

CONCLUSION

The proposed poultry farm can be implemented with minimal adverse adjoining neighbour impacts and will have only minimal environmental impacts as demonstrated throughout this EIS. The project is justified on the basis of the efficient utilisation of farming resources and overall economic benefits to local and regional economies. It satisfies the objectives of ecologically sustainable development.

1 INTRODUCTION

This section provides an introduction to the Environmental Impact Statement (EIS) for the development of the land for the purposes of a 'Livestock Intensive Agriculture'. It describes the proposed development site and its locational context. It also outlines the purpose and structure of the EIS.

1.1 LOCATIONAL CONTEXT

The proposed development site is situated approximately 16 kilometres south-south-east of Picton. The proposed development site is located on the eastern side of Mockingbird Road as depicted in Error! Reference source not found. and Error! Reference source not found.. The subject land is occupied by an existing market garden and ancillary buildings, all of which are proposed to be retained.



Figure 1-1: Proposed Development Site



Plate 1: View of Existing Site

Surrounding rural land is partially cleared with varying proportions of remnant vegetation. Rural activities on surrounding land include cattle and horse grazing. A majority of properties are also utilised for rural lifestyle purposes.

1.2 LAND OWNERSHIP

The subject site is owned by Justin and Renee Camilleri

1.3 SITE DESCRIPTION AND CHARACTERISATION

The subject site is identified as Lot 264 DP 625326, 180 Mockingbird Road, Pheasants Nest, located in the Wollondilly Local Government Area. The total approximate area encompassed by the site is 16 hectares. There is an existing market garden on the site and other ancillary buildings.

The site is gently sloping downwards towards the west. Vegetation on the site is characterised consistent with details contained in the Flora and Fauna Assessment prepared by Wildthing Environmental Consultants (February, 2018). There are three (3) existing farm dams on the site. A tributary of Carters Creek dissects the site at the far south-eastern corner. See **Plates 2 to 6**.



Plate 2: Looking North-East Towards Market Garden



Plate 3: Looking to North-West of the Site



Plate 4: Small Dam Directly to the South of Market Garden



Plate 5: Small Dam Directly to the South of Market Garden



Plate 6: Looking West

1.4 THE PROPOSAL

The application seeks approval to:

(1) Construct and Operate a Livestock Intensive Industry with Associated Earthworks and Infrastructure (Schedule 3 Environmental Planning & Assessment Regulation 2000) being a Proposed Poultry Farm Operation defined as *"intensive livestock agriculture"* pursuant to *Wollondilly Local Environmental Plan 2011*.

Components of the development include:

- 7 Tunnel Ventilated Poultry Sheds incorporating 742,000 birds (chicken broiler poultry) with 53,000 birds per shed
- Associated Infrastructure Operational Sheds
- Office and Workers Amenity Buildings
- Water Supply Dams

Total approximate cost of the development is \$6,525,090.

Employment associated with the proposed development is as follows:

- 5 full time on farm
- 5 full time off farm
- 3 transport operators
- 10 processing operators

- 30 construction positions.

It is intended that development construction will be staged; however, the application is not staged development for the purposes of the Act.

The Department of Planning and Environment (DoPE) was consulted and the Secretary's Environmental Assessment Requirements (SEAR 1107) were issued on the 18 November, 2016. The Secretary's requirements are discussed within the EIS.

It is noted that the SEARs were issued on the basis of the establishment of a 14-shed poultry farm with associated infrastructure to contain 742,000 birds. The project has been downsized to 7 sheds. Subsequent advices from the Department are that the existing SEARs adequately outline all requirements (albeit related to a proposed smaller development) and continue to apply.

The EIS describes the project, outlines relevant statutory provisions, identifies the key issues and comprehensively assesses potential environmental impacts. It describes a range of management and mitigation measures to ensure that short term (largely construction) impacts are minimised and that there is a net benefit from the proposal in the medium to long term.

The project will be undertaken with a staged construction program. The application is not staged development for the purposes of the Act.

1.5 APPLICATION AND APPROVAL PROCESS

With respect to the proposed development, the following is noted:

Pursuant to Schedule 3 of the Environmental Planning & Assessment Regulation 2000, the proposal is designated development.

The characterisation of the proposed development as designated requires that the application be accompanied by an Environmental Impact Statement (EIS). The content requirements of an EIS are primarily prescribed by the Secretary of the DoPE.

The DoPE Secretary's Environmental Assessment Requirements (SEARs) for preparation of the EIS of the were issued on 18 November, 2016 (SEARs 1107).

A copy of the SEARs is duplicated at **Appendix A**.

The proposed development is also nominated integrated development, requiring the concurrence under the *Water Management Act 2000*. The application is also integrated development pursuant to the *Protection of the Environment Operations Act 1997* and the *Mine Subsidence Compensation Act 1961*.

Structure and Content of the Environmental Impact Statement

The EIS has **19** chapters. The structure is as follows:

- **Chapters 1 to 4:** Background for the assessment and description of proposal, statutory requirements and consultation;

- **Chapters 5 to 14:** Description of existing environment and assessment of the potential impacts of the proposal;
- **Chapter 15:** Animal welfare, biosecurity and disease management;
- **Chapter 16:** Project mitigations;
- **Chapter 17:** Project justification
- **Chapter 18:** Statement of commitments
- **Chapter 19:** Conclusions
- **Appendices** (including SEARs and specialist studies).

Table 1-1 summarises the SEARs and identifies where each requirement is addressed within the EIS.

Table 1-1: DoPE Secretary's Environmental Assessment Requirements

Department of Planning and Environment

Environmental Assessment Requirements**Section 78A (8) of the *Environmental Planning and Assessment Act 1979*.****Designated Development**

SEAR Number	1017	Where Addressed in this EA
Proposal	Establishment of a 14-shed poultry farm and associated infrastructure to contain 742,000 birds. (NOTE: REDUCTION TO 7 SHEDS & CONTINUED APPLICABILITY OF SEARs) EIS Author emphasis.	
Location	180 Mockingbird Road, Pheasants Nest (Lot 264 in DP 625326), in Wollondilly local government area.	
Applicant	Tattersall Lander Pty Ltd	
Date of Issue	November 2016	
General Requirements	The Environmental Impact Statement (EIS) must meet the minimum form and content requirements in clauses 6 and 7 of Schedule 2 of the <i>Environmental Planning and Assessment Regulation 2000</i> .	
Key Issues Key Issues	The EIS must include an assessment of all potential impacts of the proposed development on the existing environment (including cumulative impacts if necessary) and develop appropriate measures to avoid, minimise, mitigate and/or manage these potential impacts. As part of the EIS assessment, the following matters must also be addressed:	Noted
	• strategic context – including: - a detailed justification for the proposal and suitability of the site for the development, including the need for any demolition of existing infrastructure; - a demonstration that the proposal is consistent with all relevant planning strategies, environmental planning instruments, development control plans (DCPs), or justification for any inconsistencies; - a list of any approvals that must be obtained under any other Act or law before the development may be carried out; and - a land use conflict risk assessment, including reference to separation distances and best management practices.	Chapter 3 Chapter 17
	• air quality and odour – including: - a description of all potential sources of air and odour emissions; - an air quality impact assessment in accordance with the relevant Environment Protection Authority guidelines; and - a description and appraisal of air quality impact mitigation and monitoring measures.	Chapter 7 Appendix C
	• biodiversity – including: - accurate predictions of any vegetation clearing on site or for any road upgrades; - a detailed assessment of the potential impacts on any	Chapter 9 Appendix E

threatened species, populations, endangered ecological communities or their habitats, groundwater dependent ecosystems and any potential for offset requirements; and - a detailed description of the measures to avoid, minimise, mitigate and offset biodiversity impacts.	
• waste management – including: - details of all potential waste streams including poultry litter, manure and disposal of dead birds for the proposal; - details of waste handling including, transport, identification, receipt, stockpiling and quality control including off-site reuse and disposal; and - the measures that would be implemented to ensure that the proposed development is consistent with the aims, objectives and guidelines in the <i>NSW Waste Avoidance and Resource Recovery Strategy 2014-21</i>.	Chapter 14 and Appendix I
• water resources – including: - details of and licensing requirements or other approvals under the <i>Water Act 1912</i> and/or <i>Water Management Act 2000</i>; and - an assessment of potential impacts on floodplain and stormwater management and any impact to flooding in the catchment.	Chapter 5 and Appendix H
• soil and water – including: - a description of local soils, topography, drainage and landscapes; - an assessment of potential impacts on the quality and quantity of surface and groundwater resources, including identification of potential water pollutants; - details of stormwater and wastewater management systems (including sewage), water monitoring program and other measures to mitigate surface and groundwater impacts; - the details of sediment and erosion controls; - a description of previous land uses of the site and characterisation of the nature and extent of any contamination; and - a description and appraisal of impact mitigation and monitoring measures	Chapter 5 and Appendix H
• animal welfare, bio-security and disease management – including: - details of how the proposed development would comply with relevant codes of practice and guidelines, including buffer distances from nearby operations; - details of all disease control measures; and - a detailed description of the contingency measures that would be implemented for the mass disposal of livestock in the event of disease outbreak.	Chapter 15 and Appendix B
• traffic and transport – including: - details of road transport routes and access to the site; - road traffic predictions for the development during construction and operation; and - an assessment of impacts to the safety and function of the road network; and the details of any road upgrades required for the development.	Chapter 8 and Appendix G
- The EIS must include an assessment of all potential impacts of the proposed development on the existing	Noted

	environment (including cumulative impacts if necessary) and develop appropriate measures to avoid, minimise, mitigate and/or manage these potential impacts. As part of the EIS assessment, the following matters must also be addressed:	
	• noise and vibration – including: - a description of all potential noise and vibration sources during construction and operation, including road traffic noise; - a noise and vibration assessment in accordance with the relevant Environment Protection Authority guidelines; and - a description and appraisal of noise and vibration mitigation and monitoring measures.	Chapter 6 and Appendix D
	• bushfire – including risk assessment level and a mitigation plan.	Chapter 13 and Appendix K
	• heritage - including Aboriginal and non-Aboriginal cultural heritage.	Chapter 10 and Appendix F
Environmental Planning Instruments and other policies	• visual - including an impact assessment at private receptors and public vantage points.	Chapter 12
Guidelines	The EIS must assess the proposal against the relevant environmental planning instruments, including but not limited to: • <i>State Environmental Planning Policy (Infrastructure) 2007</i>; • <i>State Environmental Planning Policy (Rural Lands) 2008</i>; • <i>State Environmental Planning Policy No. 33 Hazardous and Offensive Development</i>; • <i>State Environmental Planning Policy No. 44 Koala Habitat Protection</i>; • <i>State Environmental Planning Policy No. 55 Remediation of Land</i>; • <i>Wollondilly Local Environmental Plan 2011</i>; and • relevant development control plans and section 94 plans.	Chapter 3
Consultation	During the preparation of the EIS you should consult the Department's Register of Development Assessment Guidelines which is available on the Department's website at planning.nsw.gov.au under Development Proposals/Register of Development Assessment Guidelines. Whilst not exhaustive, this Register contains some of the guidelines, policies, and plans that must be taken into account in the environmental assessment of the proposed development.	Noted
Further consultation after 2 years	During the preparation of the EIS, you must consult the relevant local, State and Commonwealth government authorities, service providers and community groups, and address any issues they may raise in the EIS. In particular, you should consult with the: • Environment Protection Authority; • Rural Fire Service; • Office of Environment and Heritage; • Department of Primary Industries; • Roads and Maritime Services; • WaterNSW; • Wollondilly Shire Council; and • the surrounding landowners and occupiers that are likely to	Chapter 4 Appendix A

	be impacted by the proposal. Details of the consultation carried out and issues raised must be included in the EIS.	
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Agency	Key Issues	Where addressed in this EA
Environment Protection Authority	General Planning Matters - Details should be documented on the location of the proposed development including the affected environment to place the proposal in its local and regional environmental context. This should include but not be limited to details of land ownership, maps and/or aerial photographs showing surrounding land uses, planning zonings, potential sensitive receptors and catchments. Details should also be provided on the proposals relationship to any other industry or facility.	Throughout EIS
	Environment Protection Licence - Under the Protection of the Environment Operations Act 1997 (POEO Act) premises with a capacity to accommodate more than 250,000 birds at any time for commercial production are required to hold an Environment Protection Licence (EPL) for " <i>Livestock Intensive Activities — Bird Accommodation</i> ". Based on the number of chickens presented in the supporting information (up to 480,000 birds), if approved the activity will require an EPL. The EIS should include information justifying the need for an EPL. The EIS should include information that would also be relevant to an EPL application. Details on the information that should be included with an EPL Application are outlined in the <i>EPA Guide to Licensing</i>	Chapter 3
	Best Practice Guidelines - The proponent should consult the NSW Department of Primary Industry, " <i>Best Practice Management for Meat Chicken Production in NSW</i> ". This guideline provides a useful summary of the environmental considerations for new development and Best Management Practice for these activities. In particular, this document highlights the importance of adequate separation distance from sensitive land uses for both environmental and biosecurity reasons. In particular, this document states that: <i>Appropriate siting is the most cost-effective way of minimising environmental performance issues such as odour, dust, noise, storm water management and the protection of surface water and groundwater. If these issues are addressed at the planning stage, then ongoing operational costs and management issues can be significantly reduced.</i>	Chapter 15 and Appendix B
	Air Quality - The environmental outcome for the project should ensure: • no offensive odour beyond the boundary of the premises • emissions do not cause adverse impact upon human health or the environment • compliance with the requirements of the POEO Act and its associated regulations • all dust emissions from material handling, storage, processing, roadways, transport and material transfer systems are prevented	Chapter 7 and Appendix C

	or minimised • vehicular kilometres travelled are minimised. The EIS should document how the above outcomes will be achieved. Poultry activities if not appropriately sited, designed and managed have the potential to generate offensive odours beyond their boundary which can cause community complaint. Offensive odour can result from a range of activities associated with poultry operations including but not necessarily limited to: • moist litter (bedding material in use on the shed floor, for example, sawdust, and the associated manure). When moist litter and manure accumulates for even short periods, the mass becomes putrescent and supports anaerobic bacteria, which produce highly offensive odours which can be evident a considerable distance from the shed. Excessively wet litter can also be a source of odour in poultry sheds • stockpiling of litter outside of the shed can also give rise to complaints from offensive odours and provide potential for surface and groundwater pollution • the management of bird carcasses needs to be undertaken in a manner that prevents offensive odour emissions, pollution to waters and land pollution. Poultry operations can also be a potential source of dust emissions from a range of activities including bulk feed storage silos. In particular, these facilities require dust controls to manage any dust emissions during silo filling operations. The EPA recommends that an Air Impact Assessment must be prepared in accordance with the Approved Methods and Guidance for the Modelling and Assessment of Air Pollutants in New South Wales. A thorough assessment needs to be undertaken of the proposed operations to assess the impact of any air emissions and the adequacy of proposed air pollution controls. In particular, the assessment should include but not necessarily be limit to: (a) all potential sources of dust/particulate matter (TSP and PM10) during the construction and operation of the development (b) all potential sources of odour during the construction and operation of the development (for example, handling of dead stock, odour from wastewaters, wastes, etc) (c) details of the measures proposed to mitigate the impacts and quantify the extent to which the mitigation measures are likely to be effective in achieving the relevant environmental outcomes (for example, refrigeration of dead stock, appropriate odour control technologies) (d) any cumulative impacts.	
	Water Quality - The environmental outcome for the project should ensure: • there is no pollution of waters (including surface and groundwater) except in accordance with an EPL • polluted water (including process waters, wash down waters,	Chapter 5 and Appendix H Design Plans

	polluted stormwater or sewage) is captured on the site and directed to reticulated sewer where available or else collected, treated and beneficially reused, where this is safe and practicable to do so • bunding is designed in accordance with the "EPA's <i>Bunding and Spill Management Guidelines</i>". The EIS should document how the above outcomes will be achieved. The EIS should also include but not necessarily be limited to the following matters: (a) Describe the catchment including proximity of the development to any waterways and provide an assessment of their sensitivity/significance. (b) Provide details of the project relevant to any water impacts of the development such as drainage works and associated infrastructure; land-forming and excavations; working capacity of structures; and water resource requirements of the proposal. (c) Details on proposed water management at the site, in particular details on the management and separation of clean and dirty areas. This should include water management associated with activities including: • any equipment and maintenance areas, including wash down facilities, oil and water separation • stockpiles of materials or waste • unsealed/sealed areas • poultry farm sheds (these should be constructed in such a manner that water from rain and irrigation sprays does not wet litter or manure. The floor should be sealed with a suitable material to prevent groundwater pollution) • feed material processing and transfer areas • loading facilities • roadways • onsite sewage management • any associated treatment and reuse systems • Provide a description of the receiving waters including surface and groundwater. (d) Provide information regarding any wastewater management at the site. (e) Provide information on any water discharges including location, volumes, water quality, monitoring programs and frequency of discharge. (f) Describe the nature and degree of any likely impacts that the proposed project may have on the receiving environment. This should include a characterisation of any potential water pollutants at the site, an assessment of impact on receiving waters to ensure water quality outcomes are not compromised and any associated mitigation and management measures. (g) Demonstrate that all practical options to avoid discharge have been implemented and environmental impact minimised where discharge is necessary. (h) Describe how stormwater will be managed during the construction phase. A poultry farm should be located, designed and operated to	
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	avoid impact to surface and groundwater. Where a poultry farm is sited on permeable soils over a water resource, then great care must be taken to ensure that nutrients from manures do not leach through to the groundwater. Water from the roof and uncontaminated stormwater should be diverted away from waste generation, collection and disposal areas. All sheds should be designed to prevent the ingress of all water except that used for drinking and shed cleaning activities. Shed and truck washings (hosed down waste) should be contained and utilised by irrigation or disposed of in a manner which will not pollute waters. An integrated <i>Water Management Plan</i> should be developed for the site, which addresses all aspects of the water cycle. The aim of the plan should be to maximise the potential for reuse and minimise water demand and the risk of water pollution. It should evaluate options such as: (a) Using rainwater tanks to utilise the significant catchment area on the roofs of the sheds to substitute water supplied from other sources and reduce stormwater impacts (b) Collecting and storing stormwater and using it for dust control (c) Designing and locating poultry sheds to maximise water efficiency, and minimise the need for water for evaporative cooling.	
	Noise Impact - The environmental outcome of the project should be to minimise adverse impacts due to noise from the project. The Environmental Assessment must clearly outline the noise mitigation, monitoring and management measures the proponent intends to apply to the project to minimise noise pollution. Poultry operations can generate significant noise impact from a range of activities including the handling of stock. The assessment should be undertaken in accordance with the NSW Industrial Noise Policy. In particular, the assessment should include, but not necessarily limited to: the identification and assessment of all potential noise sources associated with the development, the location of all sensitive receptors, proposed hours of operation and proposed noise mitigation measures. The assessment should also take into account adverse weather conditions including temperature inversions. Sound power levels measured or estimated for all plant and equipment should be clearly stated and justified. It should also include an assessment of cumulative noise impacts, having regard to existing surrounding industrial activities and development. If 24-hour work is proposed, specific measures to address noise impact during night time hours will need to be specified in the EIS. In assessing night time activity sleep disturbance criteria would apply. Where found to be necessary, determine the most appropriate noise mitigation measures and expected noise reduction including noise controls and management of impacts	Chapter 6 and Appendix D

	for construction noise. The EIS must also identify the transport route(s) to be used, the hours of operation and assess any potential road traffic noise impacts in accordance with the "NSW Road Noise Policy". Any construction noise should also be assessed and any proposed noise mitigations measures identified and documented in the EIS in accordance with the Interim Construction Noise Guideline (DECC 2009).	
	Waste Management - The goal of the development should be to ensure: • it is in accordance with the principles of the waste hierarchy and cleaner production • the handling, processing and storage of all materials used at the premises does not have negative environmental or amenity impacts • land pollution is prevented • the beneficial reuse of all wastes generated at the premises are maximised where it is safe and practical to do so • no waste disposal occurs on site except in accordance with an EPA Licence. Any waste generated at the site should be assessed and classified in accordance with the Waste Classification Guidelines and documented in the EIS. Detail on this guideline is available in Attachment B. The proponent should also consult NSW EPA's <i>Better Practice Guidelines for Waste Management and Recycling in Commercial and Industrial Facilities</i> (DEC 2012). This guideline provides information on better waste management practice in design, establishment, operation and ongoing management of waste services in commercial and industrial developments. This guideline can be accessed at: http://www.epa.nsw.gov.au/warr/BPGuideCIFacilities.htm. The EIS should also detail the type and quantity of any chemical/pesticide substances to be used or stored at the site and describe arrangements for their safe use and storage in accordance with any legislative or EPA policy requirements. <u>Management of dead stock</u> A potential issue relates to the handling and treatment of dead stock generated as a result of daily mortality or incidents involving possible disease outbreak. The proponent should explore waste management in accordance with the waste management hierarchy of avoidance, resource recovery and lastly disposal, which covers all environmentally responsible disposal options. As stated in the <i>Best Practice Management for Meat Chicken Production in NSW</i> (DPI 2012) it is important that carcass disposal practices must not contaminate ground and surface waters or cause odour nuisance or land contamination. Poor management of dead	Chapter 14 Chapter 15

	and or diseased birds can also increase biosecurity risks. Best Management Practice for the treatment of dead birds requires daily collection from the shed and removal from the farm for rendering. If farms do not have ready access to a rendering plant, the next preferred method of disposal is composting. Other methods of disposal, subject to approval, include transport to existing EPA licensed waste disposal facilities or composting on site. The EIS should detail information on the management of dead stock. We advise that an Emergency Contingency Plan would need to be developed for the disposal of birds from endemic disease, heat stress or exotic disease in accordance with the "Best Practice Management for Chicken Production in NSW" requirements.	
Department of Primary Industries - Agriculture	Consistency with the manuals – Best Practice Management for Meat Chicken Production in NSW.	Chapter 15
	Biosecurity assessment and biosecurity management between other poultry farms and any potential waterbird habitat to assess potential biosecurity risks associated with wild birds.	Chapter 15 and Appendix B
	Information relating to the water requirements for the development and proposed supply arrangements	Chapter 5 and Appendices A and H
	Management of waste produced by the proposal, including dead birds, bird manure and poultry litter.	Chapters 14 and Appendix I
	A land use conflict risk assessment particularly relating to separation distances and management practices to minimise odour, dust and noise for sensitive receptors.	Chapters 6 and 7 and Appendices C and D
Department of Primary Industries - Office of Water	Annual volumes of surface water and groundwater proposed to be taken by the activity (including through inflow and seepage) from each surface and groundwater source as defined by the relevant water sharing plan.	Appendix H
	Assessment of any volumetric water licensing requirements (including those for ongoing water take following completion of the project).	Chapter 2
	The identification of an adequate and secure water supply for the life of the project. Confirmation that water can be sourced from an appropriately authorised and reliable supply. This is to include an assessment of the current market depth where water entitlement is required to be purchased.	Chapter 2 and Appendix H
	A detailed and consolidated site water balance.	Appendix H
	Assessment of impacts on surface and ground water sources (both quality and quantity), related infrastructure, adjacent licensed water users, basic landholder rights, watercourses, riparian land, and groundwater dependent ecosystems, and measures proposed to reduce and mitigate these impacts.	Chapter 5 and Appendix H
	Full technical details and data of all surface and groundwater modelling.	Appendix H
	Proposed surface and groundwater monitoring activities and methodologies	Appendix H
	Assessment of any potential cumulative impacts on water	Chapter 5

	resources, and any proposed options to manage the cumulative impacts.	and Appendix H
	Consideration of relevant policies and guidelines.	Chapter 3
	A statement of where each element of the SEARs is addressed in the EIS (i.e. in the form of a table).	Noted
	Water Management Act 2000 (WMA 2000) Key points: • Volumetric licensing in areas covered by water sharing plans • Works within 40m of waterfront land • SSD & SSI projects are exempt from requiring water supply work approvals and controlled activity approvals as a result of the Environmental Planning & Assessment Act 1979 (EP&A Act). • No exemptions for volumetric licensing apply as a result of the EP&A Act. • Basic landholder rights, including harvestable rights dams • Aquifer interference activity approval and flood management work approval provisions have not yet commenced and are regulated by the Water Act 1912 • Maximum penalties of \$2.2 million plus \$264,000 for each day an offence continues apply under the WMA 2000	Chapter 3
	Water Act 1912 (WA 1912) Key points: • Volumetric licensing in areas where no water sharing plan applies • Monitoring bores • Aquifer interference activities that are not regulated as a water supply work under the WMA 2000. • Flood management works • No exemptions apply to licences or permits under the WA 1912 as a result of the EP&A Act. • Regulation of water bore driller licensing.	Chapter 3
	Water Management (General) Regulation 2011 Key points: • Provides various exemptions for volumetric licensing and activity approvals • Provides further detail on requirements for dealings and applications. Water Sharing Plans — these are considered regulations under the WMA 2000 Access Licence Dealing Principles Order 2004 Harvestable Rights Orders	Chapter 3
	Water Sharing Plans It is important that the proponent understands and describes the ground and surface water sharing plans, water sources, and management zones that apply to the project. The relevant water sharing plans can be determined spatially at www.ourwater.nsw.gov.au . Multiple water sharing plans may apply and these must all be described. The Water Act 1912 applies to all water sources not yet covered by a commenced water sharing plan. The EIS is required to: • Demonstrate how the proposal is consistent with the relevant rules of the Water Sharing Plan including rules for access licences, distance restrictions for water supply works and rules for the management of local impacts in respect of surface water	Chapter 3

	and groundwater sources, ecosystem protection (including groundwater dependent ecosystems), water quality and surface-groundwater connectivity. • Provide a description of any site water use (amount of water to be taken from each water source) and management including all sediment dams, clear water diversion structures with detail on the location, design specifications and storage capacities for all the existing and proposed water management structures. • Provide an analysis of the proposed water supply arrangements against the rules for access licences and other applicable requirements of any relevant WSP, including: - o Sufficient market depth to acquire the necessary entitlements for each water source. - o Ability to carry out a "dealing" to transfer the water to relevant location under the rules of the WSP. - o Daily and long-term access rules. - o Account management and carryover provisions. • Provide a detailed and consolidated site water balance. • Further detail on licensing requirements is provided below. Relevant Policies and Guidelines The EIS should take into account the following policies (as applicable): • NSW Guidelines for Controlled Activities on Waterfront Land (NOW, 2012) • NSW Aquifer Interference Policy (NOW, 2012) • Risk Assessment Guidelines for Groundwater Dependent Ecosystems (NOW, 2012) • Australian Groundwater Modelling Guidelines (NWC, 2012) • NSW State Rivers and Estuary Policy (1993) • NSW Wetlands Policy (2010) • NSW State Groundwater Policy Framework Document (1997) • NSW State Groundwater Quality Protection Policy (1998) • NSW State Groundwater Dependent Ecosystems Policy (2002) • NSW Water Extraction Monitoring Policy (2007)	
	Licensing Considerations The EIS is required to provide: • Identification of water requirements for the life of the project in terms of both volume and timing (including predictions of potential ongoing groundwater take following the cessation of operations at the site — such as evaporative loss from open voids or inflows). • Details of the water supply source(s) for the proposal including any proposed surface water and groundwater extraction from each water source as defined in the relevant Water Sharing Plan/s and all water supply works to take water. • Explanation of how the required water entitlements will be obtained (i.e. through a new or existing licence/s, trading on the water market, controlled allocations etc.). • Information on the purpose, location, construction and expected annual extraction volumes including details on all	N/A

	existing and proposed water supply works which take surface water, (pumps, dams, diversions, etc). • Details on all bores and excavations for the purpose of investigation, extraction, dewatering, testing and monitoring. All predicted groundwater take must be accounted for through adequate licensing. • Details on existing dams/storages (including the date of construction, location, purpose, size and capacity) and any proposal to change the purpose of existing dams/storages • Details on the location, purpose, size and capacity of any new proposed dams/storages. • Applicability of any exemptions under the Water Management (General) Regulation 2011 to the project. Water allocation account management rules, total daily extraction limits and rules governing environmental protection and access licence dealings also need to be considered. The Harvestable Right gives landholders the right to capture and use for any purpose 10% of the average annual runoff from their property. The Harvestable Right has been defined in terms of an equivalent dam capacity called the Maximum Harvestable Right Dam Capacity (MHRDC). The MHRDC is determined by the area of the property (in hectares) and a site-specific run-off factor. The MHRDC includes the capacity of all existing dams on the property that do not have a current water licence. Storages capturing up to the harvestable right capacity are not required to be licensed but any capacity of the total of all storages/dams on the property greater than the MHRDC may require a licence. For more information on Harvestable Right dams, including a calculator, visit: http://www.water.nsw.gov.au/VVater-licensing/Basic-water-rights/Harvesting-runoff/Harvestingrunoff	
	Dam Safety Where new or modified dams are proposed, or where new development will occur below an existing dam, the NSW Dams Safety Committee should be consulted in relation to any safety issues that may arise. Conditions of approval may be recommended to ensure safety in relation to any new or existing dams. See www.damsafety.nsw.gov.au for further information.	N/A
	Surface Water Assessment The predictive assessment of the impact of the proposed project on surface water sources should include the following: • Identification of all surface water features including watercourses, wetlands and floodplains transected by or adjacent to the proposed project. • Identification of all surface water sources as described by the relevant water sharing plan. • Detailed description of dependent ecosystems and existing surface water users within the area, including basic landholder rights to water and adjacent/downstream licensed water users. • Description of all works and surface infrastructure that will intercept, store, convey, or otherwise interact with surface water	Chapter 5 and Appendix H

	resources. • Assessment of predicted impacts on the following: - flow of surface water, sediment movement, channel stability, and hydraulic regime, - water quality, - flood regime, - dependent ecosystems, - existing surface water users, and - planned environmental water and water sharing arrangements prescribed in the relevant water sharing plans.	
	Groundwater Assessment To ensure the sustainable and integrated management of groundwater sources, the EIS needs to include adequate details to assess the impact of the project on all groundwater sources. Where it is considered unlikely that groundwater will be intercepted or impacted (for example by infiltration), a brief site assessment and justification for the minimal impacts may be sufficient, accompanied by suitable contingency measures in place in the event that groundwater is intercepted, and appropriate measures to ensure that groundwater is not contaminated. Where groundwater is expected to be intercepted or impacted, the following requirements should be used to assist the groundwater assessment for the proposal. • The known or predicted highest groundwater table at the site. • Works likely to intercept, connect with or infiltrate the groundwater sources. • Any proposed groundwater extraction, including purpose, location and construction details of all proposed bores and expected annual extraction volumes. • Bore construction information is to be supplied to DPI Water by submitting a "Form A" template. DPI Water will supply "GW" registration numbers (and licence/approval numbers if required) which must be used as consistent and unique bore identifiers for all future reporting. • A description of the watertable and groundwater pressure configuration, flow directions and rates and physical and chemical characteristics of the groundwater source (including connectivity with other groundwater and surface water sources). • Sufficient baseline monitoring for groundwater quantity and quality for all aquifers and GDEs to establish a baseline incorporating typical temporal and spatial variations. • The predicted impacts of any final landform on the groundwater regime. • The existing groundwater users within the area (including the environment), any potential impacts on these users and safeguard measures to mitigate impacts. • An assessment of groundwater quality, its beneficial use classification and prediction of any impacts on groundwater quality. • An assessment of the potential for groundwater contamination	N/A

	(considering both the impacts of the proposal on groundwater contamination and the impacts of contamination on the proposal). • Measures proposed to protect groundwater quality, both in the short and long term. • Measures for preventing groundwater pollution so that remediation is not required. • Protective measures for any groundwater dependent ecosystems (GDEs). • Proposed methods of the disposal of waste water and approval from the relevant authority. • The results of any models or predictive tools used. Where potential impacts are identified the assessment will need to identify limits to the level of impact and contingency measures that would remediate, reduce or manage potential impacts to the existing groundwater resource and any dependent groundwater environment or water users, including information on: • Any proposed monitoring programs, including water levels and quality data. • Reporting procedures for any monitoring program including mechanism for transfer of information. • An assessment of any groundwater source/aquifer that may be sterilised from future use as a water supply as a consequence of the proposal. • Identification of any nominal thresholds as to the level of impact beyond which remedial measures or contingency plans would be initiated (this may entail water level triggers or a beneficial use category). • Description of the remedial measures or contingency plans proposed. • Any funding assurances covering the anticipated post development maintenance cost, for example on-going groundwater monitoring for the nominated period.	
	Groundwater Dependent Ecosystems The EIS must consider the potential impacts on any Groundwater Dependent Ecosystems (GDEs) at the site and in the vicinity of the site and: • Identify any potential impacts on GDEs as a result of the proposal including: - o the effect of the proposal on the recharge to groundwater systems; - o the potential to adversely affect the water quality of the underlying groundwater system and adjoining groundwater systems in hydraulic connections; and - o the effect on the function of GDEs (habitat, groundwater levels, connectivity). • Provide safeguard measures for any GDEs.	N/A
	Watercourses, Wetlands and Riparian Land The EIS should address the potential impacts of the project on all watercourses likely to be affected by the project, existing riparian vegetation and the rehabilitation of riparian land. It is recommended the EIS provides details on all watercourses potentially affected by the proposal, including: • Scaled plans showing the location of:	Chapter 2 and

	- o wetlands/swamps, watercourses and top of bank; - o riparian corridor widths to be established along the creeks; - o existing riparian vegetation surrounding the watercourses (identify any areas to be protected and any riparian vegetation proposed to be removed); - o the site boundary, the footprint of the proposal in relation to the watercourses and riparian areas; and - o proposed location of any asset protection zones. • Photographs of the watercourses/wetlands and a map showing the point from which the photos were taken. • A detailed description of all potential impacts on the watercourses/riparian land. • A detailed description of all potential impacts on the wetlands, including potential impacts to the wetlands hydrologic regime; groundwater recharge; habitat and any species that depend on the wetlands. • A description of the design features and measures to be incorporated to mitigate potential impacts. • Geomorphic and hydrological assessment of water courses including details of stream order (Strahler System), river style and energy regimes both in channel and on adjacent floodplains.	Appendix A
	Landform rehabilitation Where significant modification to landform is proposed, the EIS must include: • Justification of the proposed final landform with regard to its impact on local and regional surface and groundwater systems; • A detailed description of how the site would be progressively rehabilitated and integrated into the surrounding landscape; • Outline of proposed construction and restoration of topography and surface drainage features if affected by the project; and • An outline of the measures to be put in place to ensure that sufficient resources are available to implement the proposed rehabilitation.	Chapter 2 and Appendix A

2 DESCRIPTION OF THE PROPOSAL

Chapter Two provides a detailed description of the proposal including an outline of the proposed operations, the proposed transport operations, rehabilitation works, revegetation method and final landform.

2.1 LOCATION AND OVERVIEW

The subject land is Lot 264 DP 625326, 180 Mockingbird Road, Pheasants Nest, located in the Wollondilly Local Government Area.

Tattersall Lander Pty Ltd is engaged by Justin and Renee Camilleri to prepare an EIS, to accompany a development application to Council under Part 4 of the *Environmental Planning and Assessment Act 1979*. The application is designated development pursuant to requirements of the *Environmental Planning & Assessment Act 1979*, nominated integrated development pursuant to the requirements of the *Water Management Act 2000* and also integrated development pursuant to the *Protection of the Environment Operations Act 1997* and the *Mine Subsidence Compensation Act 1961*.

The application seeks approval to:

(1) Construct and Operate a Livestock Intensive Industry with Associated Earthworks and Infrastructure (Schedule 3 Environmental Planning & Assessment Regulation 2000) being a Proposed Poultry Farm Operation defined as “*intensive livestock agriculture*” pursuant to *Wollondilly Local Environmental Plan 2011*.

Components of the development include:

- 7 Tunnel Ventilated Poultry Sheds incorporating 742,000 birds (chicken broiler poultry) with 53,000 birds per shed
- Associated Infrastructure Operational Sheds
- Office and Workers Amenity Buildings
- Water Supply Dams

Total approximate cost of the development is 6,525,090.

Employment associated with the proposed development is as follows:

- 5 full time on farm
- 5 full time off farm
- 3 transport operators
- 10 processing operators
- 30 construction positions.

It is intended that development construction will be staged; however, the application is not staged development for the purposes of the Act.

2.2 LAND TITLE AND TENURE

Lot 264 DP 625326, 180 Mockingbird Road, Pheasants Nest, is jointly owned by Justin and Renee Camilleri.

2.3 EXISTING SITE CHARACTERISTICS AND LAND USE

The existing primary use of the site is as a market garden.

2.4 STAGED CONSTRUCTION

It is intended that development construction will be phased; however, the application is not staged development for the purposes of the Act.

2.5 TRANSPORTATION ACTIVITIES

The development has been assessed having regard to impacts on the local road hierarchy. It has been established that the current and anticipated traffic increases are well within the carrying capacities of the local road network. No upgrades to any existing road infrastructure is proposed or required. No formal parking is proposed.

Refer **Appendix G** for the complete Traffic Impact Statement.

Operationally, the sheds and overall pad designs will have a nominated traffic route so that all vehicles including feed trucks, bird delivery and bird pickups will be undertaken in a controlled and forward direction. Details of the internal truck movements are included on the engineering plans.

2.6 HOURS OF OPERATION AND EMPLOYMENT

Birds are grown on an approximate 54-day cycle with 'thinning' occurring from around day 32 to 34 and from day 42. 5.5 batches of birds are grown per year. Generally, the thinning is undertaken at night to cater for bird welfare and it is usual

for only two (2) trucks to be on site at any one time. It is possible that bird removal could extend into the early hours of a morning. The noise assessment has adequately addressed these impacts.

Feed trucks will make deliveries twice to three times a week and this is undertaken normally during daylight hours. Bird delivery would be undertaken during daylight hours and over several days.

Employment associated with the proposed development is as follows:

- 5 full time on farm
- 5 full time off farm
- 3 transport operators
- 10 processing operators
- 30 construction positions.

2.7 MACHINERY, EQUIPMENT, MATERIALS & CONSUMABLES

The proposed farming operations will utilise modern state-of-the-art operational machinery. Mowers and tractors required for the new shed arrangements are already on site and being used with the existing farming operations.

The current dependence on dam water will be augmented and new pumps installed to recirculate the stormwater back into the sheds.

Backup generators and duplicate power systems are to be installed for the new sheds. The current electrical supply will be extended to the new sheds.

Electricity, gas and diesel are the three main energy consumables.

Shed sanitisers will be used for decontaminating the sheds directly after a batch of poultry is removed. Associated chemicals are bought onto site by external contractors and are subsequently removed.

Rat and mice baits are used for the control of feral pests. Glyphosate is used to control vegetation immediately adjoining the sheds.

Poultry feed is provided by the processor and is pumped into the sealed silos on site by a contractor supply.

2.8 NEED FOR THE DEVELOPMENT

The development of this farming operation is both logical and necessary and at a scale that creates long term financial viability and stability. Poultry consumption is ever increasing and the growth of the industry with such a modern facility as

envisaged by this development is, in effect, a sustainable operation for the Wollondilly LGA and for local job growth.

2.9 ALTERNATIVE OF NOT PROCEEDING

Should the proposed development not proceed it is likely that the inefficient rural use of the land would be retained for a few years; perhaps transitioning to a rural lifestyle lot. Farming operations would most likely need to consider other potential rural activities, most of which are unlikely to produce the employment activities of a viable poultry farm or the financial returns to the grower and the local community.

Positive impacts on local processing and employment for the development of the total farming operations would be appropriate, logical and would result in a sustainable outcome.

3 STATUTORY REQUIREMENTS

3.1 COMMONWEALTH LEGISLATION

3.1.1 Environment Protection and Biodiversity Act 1999

The *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act) requires approval from the Commonwealth Minister for the Environment, for actions that may have a significant impact on matters of national environmental significance. The EPBC Act also requires Commonwealth approval for certain actions on Commonwealth land. Matters of national environmental significance under the EPBC Act are:

- World Heritage properties;
- National Heritage places;
- Great Barrier Reef Marine Park;
- Ramsar wetlands of international importance;
- Threatened species or ecological communities listed in the EPBC Act;
- Migratory species listed in the EPBC Act;
- Commonwealth marine environment;
- Nuclear actions.

The site is not listed as or located on or adjacent to the Great Barrier Reef, a World Heritage property, a National Heritage place or a wetland of international significance. The land is not designated as Commonwealth land and nuclear actions are not listed within 10 km of the site.

An assessment of whether the development will have or is likely to have a significant impact on any matters of national environmental significance is summarised in the ecological assessment as outlined in **Chapter 9** and in **Appendix E**.

Given the obligations and objectives of the Commonwealth EPBC Act, it is considered that the matter would not require referral to the Federal Minister for consideration or approval.

3.2 NEW SOUTH WALES STATE LEGISLATION

3.2.1 Environmental Planning & Assessment Act 1979

The provisions of the *Environmental Planning and Assessment Act 1979* (EP&A Act) and the *Environmental Planning and Assessment Regulation 2000* (EP&A Regulation) enable the preparation of local environmental plans, development control plans, regional environmental plans and State environmental planning policies to control development at the local, regional and State level. Those planning instruments and policies that are applicable to the proposal along with other relevant statutory considerations are addressed here.

The proposal is Designated Development as specified by the Regulation and as such, is to be assessed under these provisions, with the Council as the consent authority for the application.

The application is also nominated integrated development pursuant to the requirements of the *Water Management Act 2000* and also integrated requirement pursuant to the *Protection of the Environment Operations Act 1997* and the *Mine Subsidence Compensation Act 1961*.

3.2.2 Threatened Species Conservation Act 1995

Projects determined by a statutory authority of the NSW State Government are required to be assessed in accordance with the EP&A Act, as amended by the *Threatened Species Conservation Act 1995* (TSC Act). The TSC Act lists threatened species, populations and ecological communities under Schedules 1 and 2 of the Act, that are priorities for conservation within NSW. Schedule 3 of the TSC Act lists Key Threatening Processes for species, populations and ecological communities within NSW.

Section 5A of the EP&A Act lists seven factors that must be taken into account in the determination of the significance of potential impacts of a proposed development on threatened species, populations or ecological communities (or their habitats) listed under the TSC Act.

A seven-part test pursuant to Section 5A of the EP&A has been used to determine if the proposed development will have a significant impact on threatened species, populations and communities. This assessment is provided in full in **Appendix E** and summarised in **Chapter 9**.

3.2.3 National Parks & Wildlife Act 1974

The *National Parks and Wildlife Act 1974* (NP&W Act) guides the management of conservation areas as well as the protection of native vegetation, native fauna and Aboriginal objects across the State. Under the NP&W Act it is illegal to move, damage, deface or destroy a relic without written permission from the Office of Environment & Heritage (OEH).

Under Section 5 of the Act, "Aboriginal Object" means any deposit, object or material evidence (not being a handicraft made for sale) relating to the Aboriginal habitation of the area that comprises New South Wales, being habitation before or concurrent with (or both) the occupation of that area by persons of non-Aboriginal extraction, and includes Aboriginal remains. All Aboriginal objects within the State of New South Wales are protected under Section 90 of the NP&W Act.

During the preparation of this EIS, consultation with the local Aboriginal community was undertaken in accordance with OEH protocols.

Matters of Aboriginal significance are discussed in further detail in **Chapter 10** and **Appendix F**.

3.2.4 Rural Fires Act 1997

A Bushfire Assessment has been prepared for the proposed development. The report is located at **Appendix K**.

3.2.5 Mine Subsidence Compensation Act 1961

The proposed development requires the concurrence of the Mine Subsidence Board. Consequently, the DA is lodged as integrated development pursuant to Section 91 of the *Environmental Planning & Assessment Act 1979*.

3.2.6 Water Management Act 2000

The objectives of the *Water Management Act 2000* (WM Act) are to provide for the sustainable and integrated management of the water sources of the State for the benefit of both present and future generations. The provisions of the WM Act are being progressively implemented in NSW, repealing various other pieces of legislation in the process.

Controlled activity approvals under Section 91 of the WM Act apply in all areas of the state.

In relation to the proposed development:

- a water use approval under Section 89 of the WM Act is not required;
- a water management work approval under Section 90 of the WM Act is not required as the works are *Excluded Works under Schedule 1* of the WM Regulations
- a controlled activity approval under Section 91 of the WM Act is required as the proposed development will undertake works within 40 metres of a first order stream. The works are associated with the provision of an earth mound, incorporating landscaping (see Development Plans in **Appendix A**). The proposed development is nominated integrated development pursuant to Section 91 of the *Environmental Planning & Assessment Act 1979*.

Further detailed consideration and discussion of water use and water management issues is included in **Chapter 5**.

3.2.7 Water Management (General) Regulation 2011

The proposal will undertake all drainage and water quality works under Schedule 1 of the Regulation.

The *Water Management (General) Regulation 2011* (WM Reg) provides, under *Schedule 1 Excluded Works*:

Schedule 1 Excluded works

(Clause 3 (1), definition of “excluded work”)

- 3 Dams solely for the capture, containment and recirculation of drainage and/or effluent, consistent with best management practice** or required by a public authority (other than Landcom or the Superannuation Administration Corporation or any of their subsidiaries) **to prevent the contamination of a water source, that are located on a minor stream.**

A minor stream is defined under the Water Management (General) Regulation 2011 as being:

minor stream means:

“(a) any stream or part of a stream:

- (i) the location of which is represented on any of the topographic maps listed in Part 2 of Schedule 2, and

(ii) that is a first or second order stream, or part of such a stream, as determined in accordance with the system set out in Part 1 of Schedule 2, and

(iii) which does not maintain a permanent flow of water, being a visible flow which occurs on a continuous basis, or which would so occur if there were no artificial abstractions of water or obstruction of flows upstream, and

(iv) which does not at any time carry flows emanating from a third, fourth or higher order stream as determined in accordance with the system set out in Part 1 of Schedule 2, and

(b) any stream or part of a stream the location of which is not represented on a topographic map listed in Part 2 of Schedule 2".

3.2.8 Protection of the Environment Operations Act 1997

The proposed development requires a licence pursuant to Section 43(b) of the Protection of the *Environment Operations Act 1997* (POEO Act) as required by Section 48 of that Act and pursuant to Schedule 1 Clause 22 for the purposes of Livestock Intensive Activities comprising 'bird accommodation' in the amount exceeding 250,000 birds.

3.3 STATE ENVIRONMENTAL PLANNING POLICIES (SEPPs)

3.3.1 State Environmental Planning Policy (Infrastructure) 2007

The aim of this Policy is to facilitate the effective delivery of infrastructure across the State by:

- a) improving regulatory certainty and efficiency through a consistent planning regime for infrastructure and the provision of services, and
- b) providing greater flexibility in the location of infrastructure and service facilities, and
- c) allowing for the efficient development, redevelopment or disposal of surplus government owned land, and
- d) identifying the environmental assessment category into which different types of infrastructure and services development fall (including identifying certain development of minimal environmental impact as exempt development), and
- e) identifying matters to be considered in the assessment of development adjacent to particular types of infrastructure development, and

- f) providing for consultation with relevant public authorities about certain development during the assessment process or prior to development commencing.

The Policy provides triggers for appropriate referrals to the RMS under clause 104 Schedule 3. The proposed development is not in the category that is captured by this clause or schedule. The SEPP does not identify requirements for RMS concurrence.

3.3.2 State Environmental Planning Policy No 33: Hazardous and Offensive Development

This Policy aims:

- a) to amend the definitions of hazardous and offensive industries where used in environmental planning instruments, and
- b) to render ineffective a provision of any environmental planning instrument that prohibits development for the purpose of a storage facility on the ground that the facility is hazardous or offensive if it is not a hazardous or offensive storage establishment as defined in this Policy, and
- c) to require development consent for hazardous or offensive development proposed to be carried out in the Western Division, and
- d) to ensure that in determining whether a development is a hazardous or offensive industry, any measures proposed to be employed to reduce the impact of the development are taken into account, and
- e) to ensure that in considering any application to carry out potentially hazardous or offensive development, the consent authority has sufficient information to assess whether the development is hazardous or offensive and to impose conditions to reduce or minimise any adverse impact, and
- f) to require the advertising of applications to carry out any such development.

Definitions of “potentially hazardous industry” and “potentially offensive industry” are as follows:

“potentially hazardous industry means a development for the purposes of any industry which, if the development were to operate without employing any measures (including, for example, isolation from existing or likely future development on other land) to reduce or minimise its impact in the locality or on the existing or likely future development on other land, would pose a significant risk in relation to the locality:

- a) to human health, life or property, or
 - b) to the biophysical environment,
- and includes a hazardous industry and a hazardous storage establishment”.

“potentially offensive industry means a development for the purposes of an industry which, if the development were to operate without employing any measures (including, for example, isolation from existing or likely future development on other land) to reduce or minimise its impact in the locality or on the existing or likely future development on other land, would emit a polluting discharge (including for example, noise) in a manner which would have a significant adverse impact in the locality or on the existing or likely future development on other land, and includes an offensive industry and an offensive storage establishment”.

Other potentially pertinent definitions which have been considered include:

“hazardous industry means a development for the purposes of an industry which, when the development is in operation and when all measures proposed to reduce or minimise its impact on the locality have been employed (including, for example, measures to isolate the development from existing or likely future development on other land in the locality), would pose a significant risk in relation to the locality:

- a) to human health, life or property, or
- b) to the biophysical environment”.

“hazardous storage establishment means any establishment where goods, materials or products are stored which, when in operation and when all measures proposed to reduce or minimise its impact on the locality have been employed (including, for example, measures to isolate the establishment from existing or likely future development on the other land in the locality), would pose a significant risk in relation to the locality:

- a) to human health, life or property, or
- b) to the biophysical environment”.

“offensive industry means a development for the purposes of an industry which, when the development is in operation and when all measures proposed to reduce or minimise its impact on the locality have been employed (including, for example, measures to isolate the development from existing or likely future development on other land in the locality), would emit a polluting discharge (including, for example, noise) in a manner which would have a significant adverse impact in the locality or on the existing or likely future development on other land in the locality”.

“offensive storage establishment means any establishment where goods, materials or products are stored which, when in operation and when all measures proposed to reduce or minimise its impact on the locality have been employed (including, for example, measures to isolate the establishment

from existing or likely future development on other land in the locality), would emit a polluting discharge (including, for example, noise) in a manner which would have a significant adverse impact in the locality or on the existing or likely future development on other land in the locality".

The proposed intensive industry (poultry) farm is not considered to be characterised by any of the above land use definitions. Appropriate noise and air quality investigations have been completed and these reports have indicated general compliance with industry standards.

3.3.3 State Environmental Planning Policy 44: Koala Habitat Protection

State Environmental Planning Policy 44 – Koala Habitat Protection (SEPP 44) encourages the proper conservation and management of areas of vegetation that provide habitat for koalas to ensure a permanent free-living population over their present range and reverse the current trend of population decline.

The practical effect of SEPP 44 is that the consent authority must ensure that approval is not issued without prior investigation of *potential* and *core* koala habitat. The policy applies to developments over one hectare and to all local government areas within the known state-wide distribution of the koala.

Potential koala habitat is defined as vegetation that incorporates a minimum of 15% of tree species in the 'upper or lower strata of the tree component', as listed in Schedule 2 of SEPP 44. A person suitably qualified in tree identification (clause 7 (2)) must assess the identification of potential Koala habitat. If the subject land is not deemed to contain *potential* Koala habitat, the consent authority may grant development consent. Identification of *potential* Koala habitat requires further investigations to determine whether the site supports *core* habitat.

An assessment of Koala habitat values of the application and the impact of the project on Koala habitat against SEPP 44 is provided in more detail in **Chapter 9** and **Appendix E**.

A number of specimens of a *Eucalyptus punctata* (Grey Gum) 'Koala Feed Tree', were identified over a large portion of the vegetated area of the site. Three specimens of *Eucalyptus tereticornis* (Forest Red Gum) another recognised Koala Feed Tree' were also present in the far north-east corner of the site. Listed 'Koala Feed Tree' species would comprise over 15% of the total trees present within the site therefore would be considered to constitute 'Potential Koala Habitat', and accordingly further provisions of this policy apply to the site.

Considering the lack of Koala activity recorded, the site would unlikely be considered to constitute Core Koala Habitat and accordingly no further provisions of this policy apply to the site.

3.3.4 State Environmental Planning Policy No 55: Remediation of Land

SEPP 55 seeks to provide for the identification and remediation of contaminated land.

A Phase 2 Contamination Assessment has been prepared (**Appendix J**). Based on soil analytical results and site inspection, the subject land is considered suitable and safe for the proposed development of the land for an Intensive Livestock Industry.

3.3.5 State Environmental Planning Policy Rural Lands 2008

State Environmental Planning Policy Rural Lands (2008) applies to all rural lands zoned RU1 to RU6 (excluding RU5) and Environment Protection Zones E1 to E4. The aims of the policy are to, amongst other matters, facilitate the orderly and economic use and development of rural lands for rural and related purposes.

The SEPP operates under distinct principles, including:

- (a) the promotion and protection of opportunities for current and potential productive and sustainable economic activities in rural areas,
- (b) recognition of the importance of rural lands and agriculture and the changing nature of agriculture and of trends, demands and issues in agriculture in the area, region or State,
- (c) recognition of the significance of rural land uses to the State and rural communities, including the social and economic benefits of rural land use and development,
- (d) in planning for rural lands, to balance the social, economic and environmental interests of the community,
- (e) the identification and protection of natural resources, having regard to maintaining biodiversity, the protection of native vegetation, the importance of water resources and avoiding constrained land,
- (f) the provision of opportunities for rural lifestyle, settlement and housing that contribute to the social and economic welfare of rural communities,
- (g) the consideration of impacts on services and infrastructure and

appropriate location when providing for rural housing,

(h) ensuring consistency with any applicable regional strategy of the

Department of Planning or any applicable local strategy endorsed by the Director-General (sic).

As demonstrated in the preceding and following chapters of the EIS, the proposed poultry farm meets these principles.

3.4 WOLLONDILLY LOCAL ENVIRONMENT PLAN 2011

Wollondilly Local Environmental Plan 2011 (LEP 2011) is the principal local environmental planning instrument governing land use in the Wollondilly LGA.

The aims of LEP 2011 are:

- (a) to provide for the management of natural resources and the protection of the natural landscape character,
- (b) to protect, conserve and enhance the built, landscape and Aboriginal cultural heritage,
- (c) to protect water quality in land that is situated within water supply catchments,
- (d) to encourage development that provides for an integrated transport and infrastructure system and adequate facilities and service provision for future growth,
- (e) to recognise, manage and protect rural resource lands for sustainable agriculture and extractive industry practices,
- (f) to maintain the separation between towns and villages to retain their unique character and rural and natural settings.

Comment: The proposal is considered compliant with all of the above stated aims. Specifically, the proposal will maintain the rural amenity whilst providing for the orderly and sustainable economic development of this site in a manner which will not result in any land use conflict issues with adjoining land.

The subject land is zoned RU1 Primary Production pursuant to LEP 2011 (refer Land Zoning Maps – Sheet LZN_0081).

Land use objectives, permissible land uses and prohibitions relating to the subject land are as follows:

Zone RU1 Primary Production

Objectives of zone

- To encourage sustainable primary industry production by maintaining and

enhancing the natural resource base.

- To encourage diversity in primary industry enterprises and systems appropriate for the area.
- To minimise the fragmentation and alienation of resource lands.
- To minimise conflict between land uses within this zone and land uses within adjoining zones.
- To provide for a range of land uses (including tourism-related uses) that support the agriculture industry.
- To provide areas within which the density of development is limited in order to maintain a separation between urban areas.

Permitted without consent

Extensive agriculture; Home occupations

Permitted with consent

Agriculture; Air transport facilities; Animal boarding or training establishments; Bed and breakfast accommodation; Cellar door premises; Cemeteries; Community facilities; Crematoria; Depots; Dwelling houses; Environmental facilities; Environmental protection works; Extractive industries; Farm buildings; Farm stay accommodation; Flood mitigation works; Forestry; Funeral homes; Group homes; Home-based child care; Home businesses; Home industries; Home occupations (sex services); Information and education facilities; Intensive livestock agriculture; Intensive plant agriculture; Landscaping material supplies; Open cut mining; Places of public worship; Plant nurseries; Recreation areas; Research stations; Roads; Roadside stalls; Rural industries; Rural supplies; Rural workers' dwellings; Secondary dwellings; Signage; Transport depots; Truck depots; Veterinary hospitals; Water recreation structures; Water supply systems

Prohibited

Any development not specified as being permissible with or without consent

The proposed development is defined as **"intensive livestock agriculture"** which means:

"the keeping or breeding, for commercial purposes, of cattle, poultry, pigs, goats, horses or other livestock that are fed wholly or substantially on externally-sourced feed, and includes any of the following:

(a) dairies (restricted)

(b) feedlots
(c) piggeries,
(d) poultry farms,
but does not include extensive agriculture, aquaculture or the operation of facilities for drought or similar emergency relief".

Comment: The proposed development is permissible with the consent of Wollondilly Council.

The proposed development is consistent with the zone objectives and is permissible with consent under the LEP. Specifically, the proposal will increase the sustainable primary industry production within the capabilities of the site, without adversely impacting upon the amenity of adjoining land, or the local amenity in general.

Essential Services

Clause 7.1 stipulates that:

(1) Development consent must not be granted to development unless the consent authority is satisfied that any of the following services that are essential for the proposed development are available or that adequate arrangements have been made to make them available when required:

- (a) the supply of water,
- (b) the supply of electricity,
- (c) the disposal and management of sewage.

Comment: All necessary services are able to be provided to the proposed development.

Earthworks

Clause 7.5 stipulates:

(1) The objectives of this clause are as follows:

- (a) to ensure that earthworks for which development consent is required will not have a detrimental impact on environmental functions and processes, neighbouring uses, cultural or heritage items or features of the surrounding land,
- (b) to allow earthworks of a minor nature without requiring separate development consent.

(2) Development consent is required for earthworks unless:

- (a) the work is exempt development under this Plan or another applicable environmental planning instrument, or

(b) the work is ancillary to other development for which development consent has been given.

(3) Before granting development consent for earthworks, the consent authority must consider the following matters:

(a) the likely disruption of, or any detrimental effect on, existing drainage patterns and soil stability in the locality,

(b) the effect of the proposed development on the likely future use or redevelopment of the land,

(c) the quality of the fill or the soil to be excavated, or both,

(d) the effect of the proposed development on the existing and likely amenity of adjoining properties,

(e) the source of any fill material and the destination of any excavated material,

(f) the likelihood of disturbing relics,

(g) the proximity to and potential for adverse impacts on any watercourse, drinking water catchment or environmentally sensitive area.

Comment: All necessary measures are incorporated to the proposed development to enable it to satisfy the requirements of this clause.

A bulk earthworks plan is contained with the development plans at **Appendix A**.

3.5 WOLLONDILLY DEVELOPMENT CONTROL PLAN 2016

Wollondilly DCP 2016 (DCP) was first approved by Council on 21 December 2015 and commenced on 20 January 2016. The DCP is applicable to the entire Local Government Area.

The following DCP considerations are applicable to the proposed development of the land and its subsequent assessment by Council:

Table 3-1: Compliance with Wollondilly Development Control Plan 2016

Relevant DCP Components	Compliance	Commentary
Part 1 Preliminary	Yes	All relevant considerations have been addressed in the DA.
Part 2 General Considerations for All Development	Yes	All relevant considerations and requirements have been addressed and are included as part of DA documentation.
Part 3 Variations to the DCP	Not Applicable	
Part 4 Community Engagement	Yes	The proposed development will be advertised in accordance with relevant legislation and Council's DCP requirements
Part 5 Colonial Heritage (General)	Not Applicable	
Part 6 Heritage Specific Locations	Not Applicable	
Part 7 Aboriginal Heritage	Yes	Refer to Chapter 10 of the EIS
Part 8 Flooding	Not Applicable	
Part 9 Environmental Protection	Yes	The proposed development seeks to improve and maintain environmental outcomes for the site. Refer to the attached ecological assessment (including recommendations for 4 to 1 offset requirements related to vegetation with hollows and replacement with nest boxes, inclusive of felled hollows). Refer also to the stormwater assessment.
Part 10 Tree Removal	Yes	
Part 11 Landscaping	Yes	The proponent has expectations around prescription of landscaping conditions in any development consent issued.
Part 12 Signage	Not Applicable	

4 STAKEHOLDER CONSULTATION

Chapter Four describes the consultation undertaken with key stakeholders including government authorities and the local Aboriginal community, so as to identify relevant issues associated with the proposed future use of the site. Additional consultation is proposed with community members concurrently with Council's exhibition of the DA.

4.1 CONSULTATION WITH GOVERNMENT AUTHORITIES

In October 2016, the Secretary of the DoPE was provided with a request and associated plans to assist the Department in compiling the Secretary's Environmental Assessment Requirements (SEAR's) for the EIS. The SEAR's No 1107 (see **Appendix A**) were received with the following authorities providing input:

- Department of Planning and Environment;
- Water NSW
- Environment Protection Authority;
- Department of Primary Industries: Agriculture;
- Department of Primary Industries: Fisheries.

In formulating the SEAR's, consultation occurred with those agencies listed below. Poignant matters raised by those agencies for the purposes of incorporation within the EIS, are listed previously in the EIS and written comments provided at **Appendix A**.

Draft EIS Consultation

As previously detailed, further personal telephone contact was undertaken with the following listed authorities during October, 2017:

- Department of Primary Industries (Agriculture);
- Water NSW (now Department of Industry: Crown Lands & Water);
- Environment Protection Authority;
- Office of Environment & Heritage;
- Roads and Maritime Services;
- Rural Fire Service;

- Mine Subsidence Board
- Wollondilly Shire Council

As discussed above, the Department of Primary Industries (Agriculture), Water NSW and the Environment Protection Authority made requests for the EIS to address matters raised already communicated in the SEAR's. Other agencies advised that they will have the opportunity to comment further once Council refers the matter to them during the consultation process associated with assessment and determination of the development application, including any concurrence requirements as integrated development.

4.2 CONSULTATION WITH ADJOINING AND ADJACENT NEIGHBOURS AND WITH THE LOCAL COMMUNITY

Neighbouring landowners identified as potentially impacted 'sensitive receptors' (noise and/or odour impacts considerations) will be invited to attend a consultation evening during the course of Council's advertising/exhibition of the DA.

4.3 CONSULTATION WITH THE ABORIGINAL COMMUNITY

The involvement and input of the Aboriginal community is an essential component of any Aboriginal cultural heritage assessment. Consultation with the Aboriginal Community is discussed in detail in **Chapter 10** and **Appendix F**.

5 SURFACE & GROUNDWATER HYDROLOGY

Chapter Five describes existing issues related to surface water and water management, examines potential impacts on the water catchment, and describes potential impacts on groundwater usage and mitigation measures to manage hydrological risks.

The subject land contains a component of a first order stream as well as four (4) constructed dams of variable sized dams. The first order stream is located to the far south-east of the site. The site water catchment is approximately 17 ha. (See further detail in **Appendices A and H**).

The catchment (including runoff from upstream property) drains to the proposed storage dams on the site. While the Hume Motorway passes upstream of the site, roadway runoff has been directed into a large dam, and then around the site via an existing first order stream from adjacent lands.

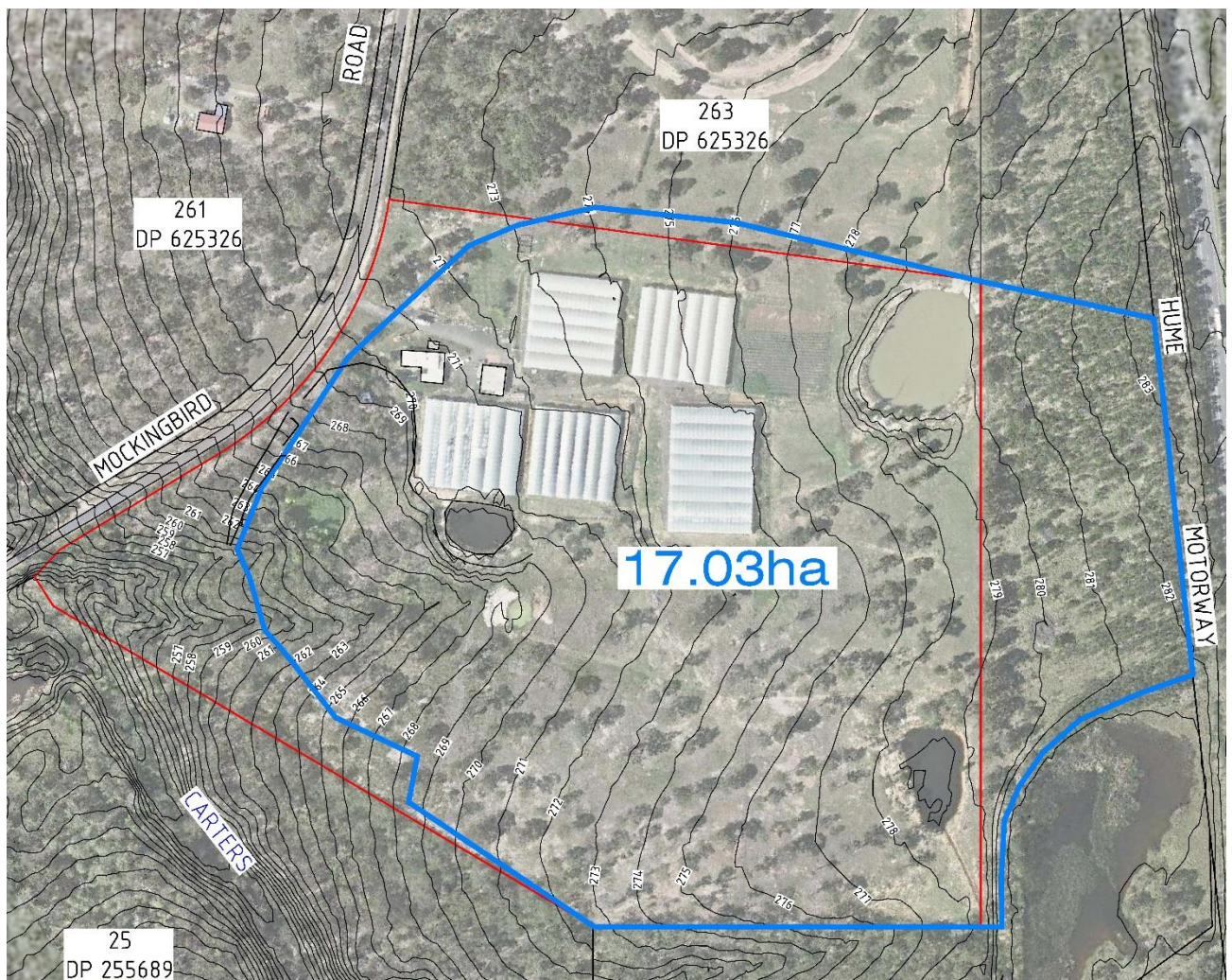


Figure 5-1: Existing Site Catchment

5.1 PROPOSED DEVELOPMENT CATCHMENT

The catchment in the proposed developed state is shown below in Error! Reference source not found..

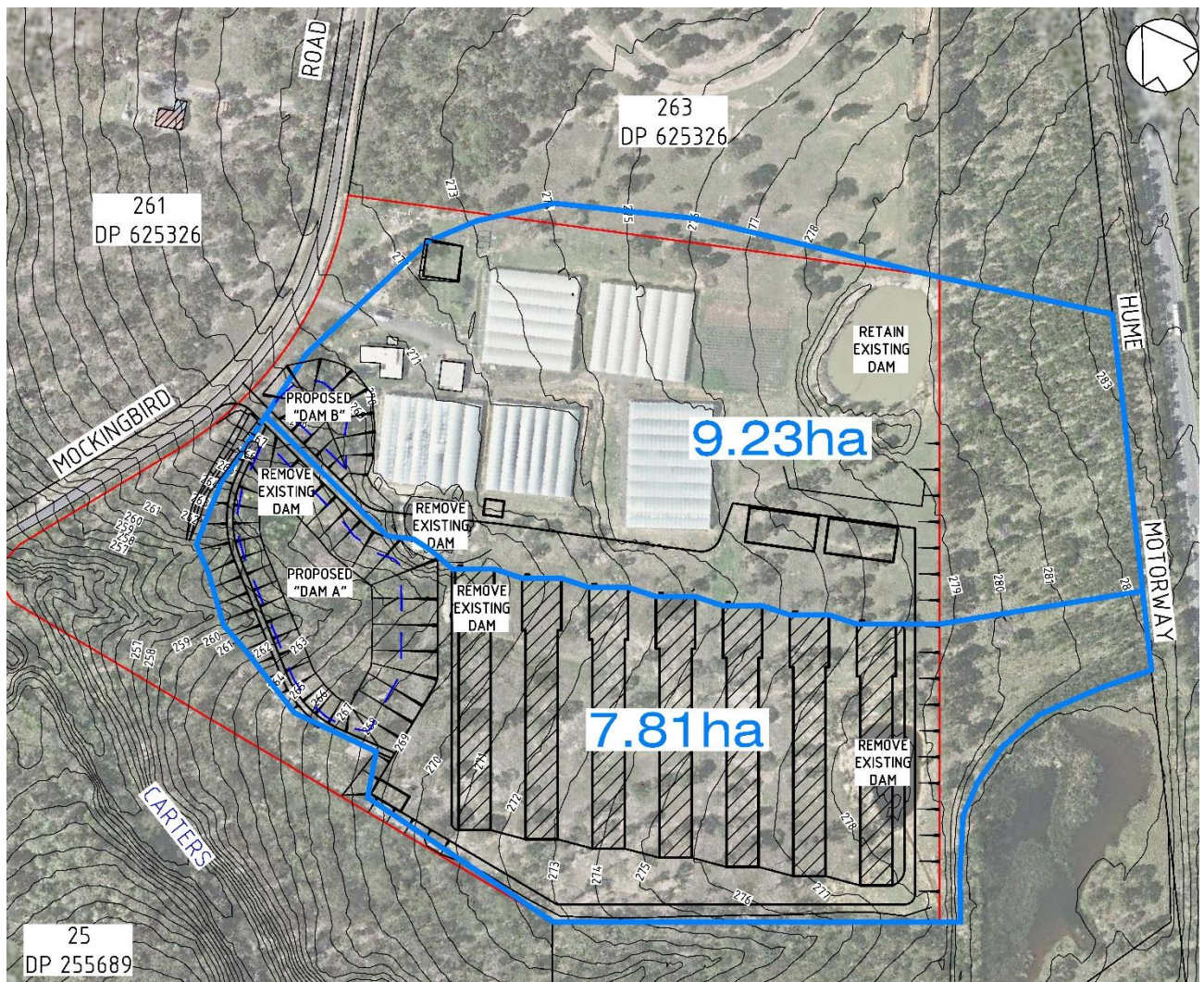


Figure 5-2: Post-Development Catchments

5.2 WATER QUALITY BACKGROUND

Understanding the water quality of runoff generated by the site is important to ensure the preservation of the downstream environments. Changes in land use and an increased proportion of impervious area can result in an increase in the quantities of suspended solids, nutrients and rubbish in storm water runoff. This section of the report aims to assess the water quality measures proposed as part of this development to confirm that they meet the relevant water quality objectives.

5.3 WATER QUALITY TARGETS

The proposed development is part of a larger catchment eventually draining to the Nepean River via Carters Creek. As such, it is important that flows and pollutant loads leaving the site are managed appropriately.

Specifically, current industry standards require the management and assessment of Total Suspended Solids, Total Phosphorus, Total Nitrogen and Gross Pollutants. These are the pollutants most commonly increased by development with the most potential to impact on downstream environments. It is noted that adequate treatment of these pollutants will also mitigate the impacts of a large range of other, less significant pollutants.

For this development a "Neutral or Beneficial Effect" target has been adopted for Total Suspended Solids, Total Phosphorus and Total Nitrogen concentrations. That is, the annual volumes of these pollutants leaving the site after the proposed development are equal or less than those leaving the site in its current state. For the Gross Pollutants, a 90% load reduction target is desired (when compared to the unmitigated development scenario). These targets are in line with industry best practice.

5.4 MUSIC MODELLING

MUSIC is the Model for Urban Stormwater Improvement Conceptualisation, developed by the Cooperative Research Centre for Catchment Hydrology. MUSIC provides the ability to model both quality and quantity of runoff generated by catchments. Therefore, MUSIC can simulate annual stormwater volumes, and expected annual pollutant loadings. MUSIC has become the industry standard for stormwater pollutant assessments.

MUSIC is designed to model stormwater runoff systems in urban catchments. It is used to simulate a range of temporal and spatial scales. Catchment modelling can be performed for areas up to 100 km², with times steps from 6 minutes to 24 hours to match the range of spatial scale. This enables long term modelling of continuous historical rainfall data from pluviograph sources, and reflects the ability to account for temporal variation in data for an annual rainfall series directly.

MUSIC also has the ability to model a number of treatment devices, and measure their effectiveness in terms of the quantity and quality of runoff downstream. This allows determination of the degree of reduction in annual pollutant loadings.

It is important to note that the MUSIC simulation relies heavily on input variables and it is usually recommended MUSIC models be calibrated to local conditions wherever possible. When calibration is not possible default values can be used, or variables can be sourced from values recommended for stormwater modelling in NSW from a technical report prepared for the DECC by the Co-operative Research Centre titled "*Stormwater Flow and Quality, and the Effectiveness of Non-Proprietary Stormwater Treatment Measures*" (Fletcher et al, 2004).

Given the scale of the proposed development site and hence the MUSIC model, it was determined to be unreasonable to perform a calibration in this instance.

5.5 CLIMATE / RAINFALL

To accurately model a site of this size a continuous rainfall record spanning at least five years with a six-minute timestep is required. Rainfall data was obtained from the Bureau of Meteorology in the form of historic pluviograph record from the Liverpool (Whitlam Centre) rainfall gauge. In this case, ten years of data was utilised between January 1985 and January 1995, which has a mean annual rainfall of 783mm. This is comparable with other Bureau of Meteorology long term average data for the area, including:

- 805mm at the Picton (Council Depot) weather station (approximately 12km from the site)
- 783.2mm at the Cawdor (Woodburn) weather station (approximately 18km from the site)
- 788.8mm at the Camden Airport weather station (approximately 26km from the site).

5.6 EVAPORATION

To accurately model the outcome of water quality treatment measures, monthly potential evapotranspiration (PET) data is required. Monthly average areal potential evapotranspiration values were read from maps in the 'Climate Atlas of Australia, Evapotranspiration' (BoM, 2001), and are shown in Error! Reference source not found. below.

Table 5-1: Monthly Average Areal Potential Evapotranspiration Figures

Month	Potential Evapotranspiration (mm)
January	162
February	128
March	116
April	76
May	57
June	44
July	44

August	59
September	87
October	120
November	124
December	158
Total	1175

5.7 NODE PARAMETERS

The MUSIC model was used to simulate the pollutant export generated during a ten-year period of average rainfall. Rainfall-Runoff parameters for a “sandy clay loam” soil type were adopted from Table 3-7 & 3-8 of the Draft NSW MUSIC Modelling Guidelines (2010) and typical pollutant concentrations derived from Fletcher et al.

Table 5-2: Adopted Rainfall-Runoff MUSIC Parameters

Impervious Area Properties	
Rainfall Threshold (mm/day)	1.00
Pervious Area Properties	
Soil Storage Capacity (mm)	108
Initial Storage (% of Capacity)	25
Field Capacity (mm)	73
Infiltration Capacity Coefficient - a	250.0
Infiltration Capacity Exponent - b	1.30
Groundwater Properties	
Initial Depth (mm)	10
Daily Recharge Rate (%)	60.00
Daily Baseflow Rate (%)	45.00
Daily Deep Seepage Rate (%)	0.00

Note that Rainfall Thresholds of 0.30mm/day and 1.50mm/day were adopted for the “Roof” nodes and “Hardstand” nodes (modelled as unsealed roads) respectively per the recommendations in the Draft NSW MUSIC Modelling Guidelines (2010). The Rainfall Threshold of 1.00mm/day was adopted for all other nodes.

Table 5-3: Adopted MUSIC Pollutant Generation Parameters

			Rural Residential	Unsealed Road	Roof	Agricultural	Forest
TSS	Baseflow	Mean	1.15	1.20	-	1.30	0.78
	(mg/L- log ₁₀)	Standard Deviation	0.17	0.17	-	0.13	0.13
	Stormflow	Mean	1.95	3.00	1.30	2.15	1.6
	(mg/L- log ₁₀)	Standard Deviation	0.32	0.32	0.32	0.32	0.2
TP	Baseflow	Mean	-1.22	-0.85	-	-1.05	-1.52
	(mg/L- log ₁₀)	Standard Deviation	0.19	0.19	-	0.13	0.13
	Stormflow	Mean	-0.66	-0.30	-0.89	-0.22	-1.10
	(mg/L- log ₁₀)	Standard Deviation	0.25	0.25	0.25	0.30	0.22
TN	Baseflow	Mean	-0.05	0.11	-	0.04	-0.52
	(mg/L- log ₁₀)	Standard Deviation	0.12	0.12	-	0.13	0.13
	Stormflow	Mean	0.30	0.34	0.30	0.48	-0.05
	(mg/L- log ₁₀)	Standard Deviation	0.19	0.19	0.19	0.26	0.24

5.8 EXISTING POLLUTANT ANALYSIS

The existing site was modelled to determine the current pollutant loads present.

Figure 5-3 below shows the layout of the existing model:

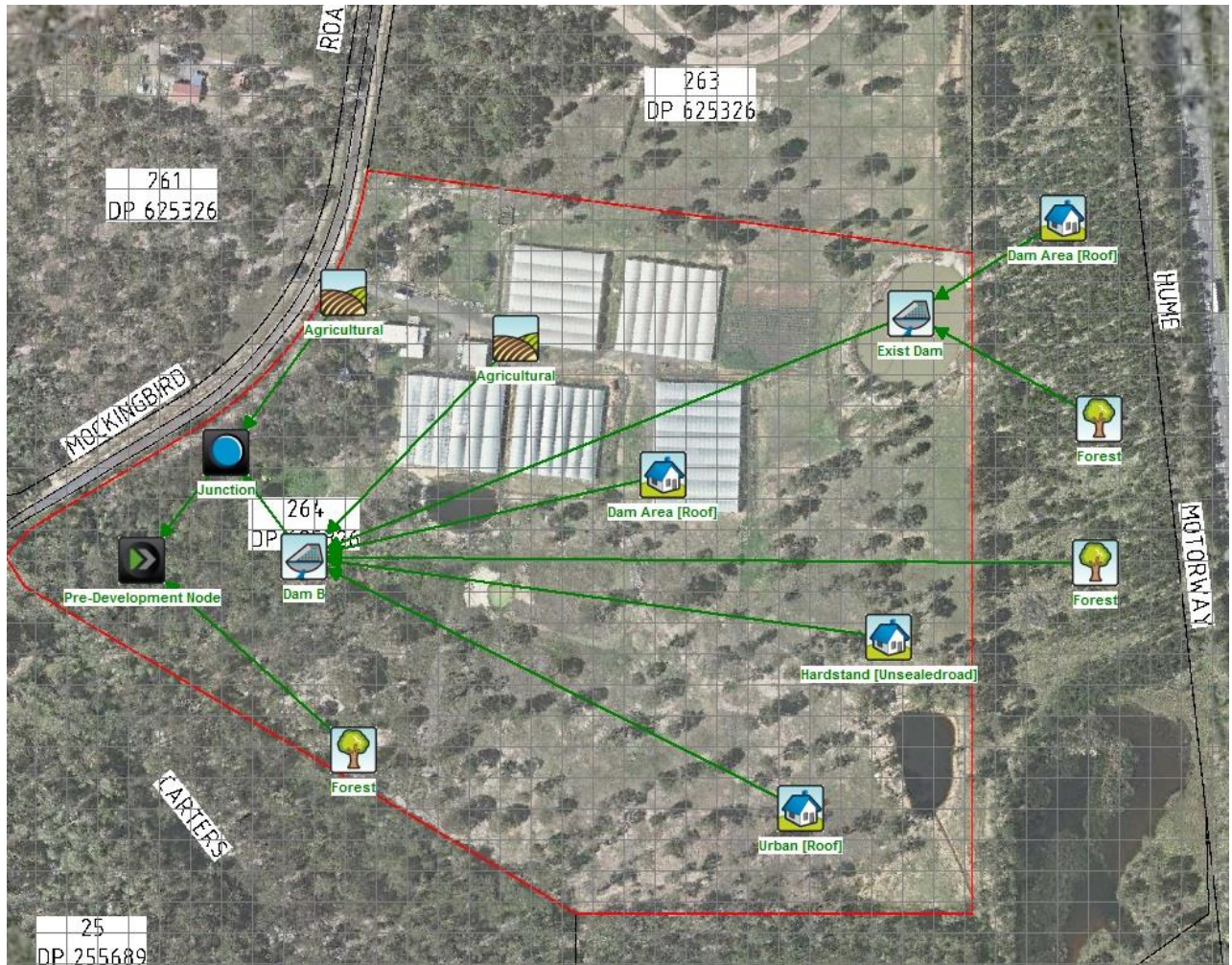


Figure 5-3: Existing State MUSIC Model

Existing State MUSIC Model

The catchment was broken up into different areas depending on their current use according to the *Draft NSW MUSIC Modelling Guidelines (2010)*.

- Hardstand areas were modelled as "unsealed roads" (50% impervious) with parameters per the *Draft NSW MUSIC Modelling Guidelines (2010)*.

- Forested areas were modelled as forest nodes, as per the Draft *NSW MUSIC Modelling Guidelines (2010)*.
- Grazing and cropping areas were modelled as agricultural nodes, as per the Draft *NSW MUSIC Modelling Guidelines (2010)*.
- Roof areas on existing sheds and greenhouses were modelled as roofs per the Draft *NSW MUSIC Modelling Guidelines (2010)*.
- The three existing dams below the greenhouses were modelled as a combined "sedimentation basin" as this node type allows a dam volume and re-use parameters to be included. Note that an additional "Dam Area" source node was included to account for rainfall over the surface of the dam. Re-use values for the existing market gardens have been taken from data provided by the Australian Bureau of Statistics (Water Use on Australian Farms, 2014-15). The data indicates that for the Hawkesbury-Nepean region, the average application rate for vegetables for human consumption is 3.5ML/ha/year. This was distributed relative to PET (as rainfall does not directly enter the greenhouses).
- Primary links were incorporated into the model as required to depict the layout of the farm.

An analysis of the Pre-Development Node reveals the following:

Table 5-4: Pre-Development Node Analysis

Flow (ML/yr)	38.7
Total Suspended Solids (kg/yr)	1770
Total Phosphorus (kg/yr)	7.96
Total Nitrogen (kg/yr)	68.9
Gross Pollutants (kg/yr)	0

5.9 PROPOSED DEVELOPMENT ANALYSIS

A Post-Development model was prepared to simulate the pollutant generation and treatment for the proposed development, as shown below.

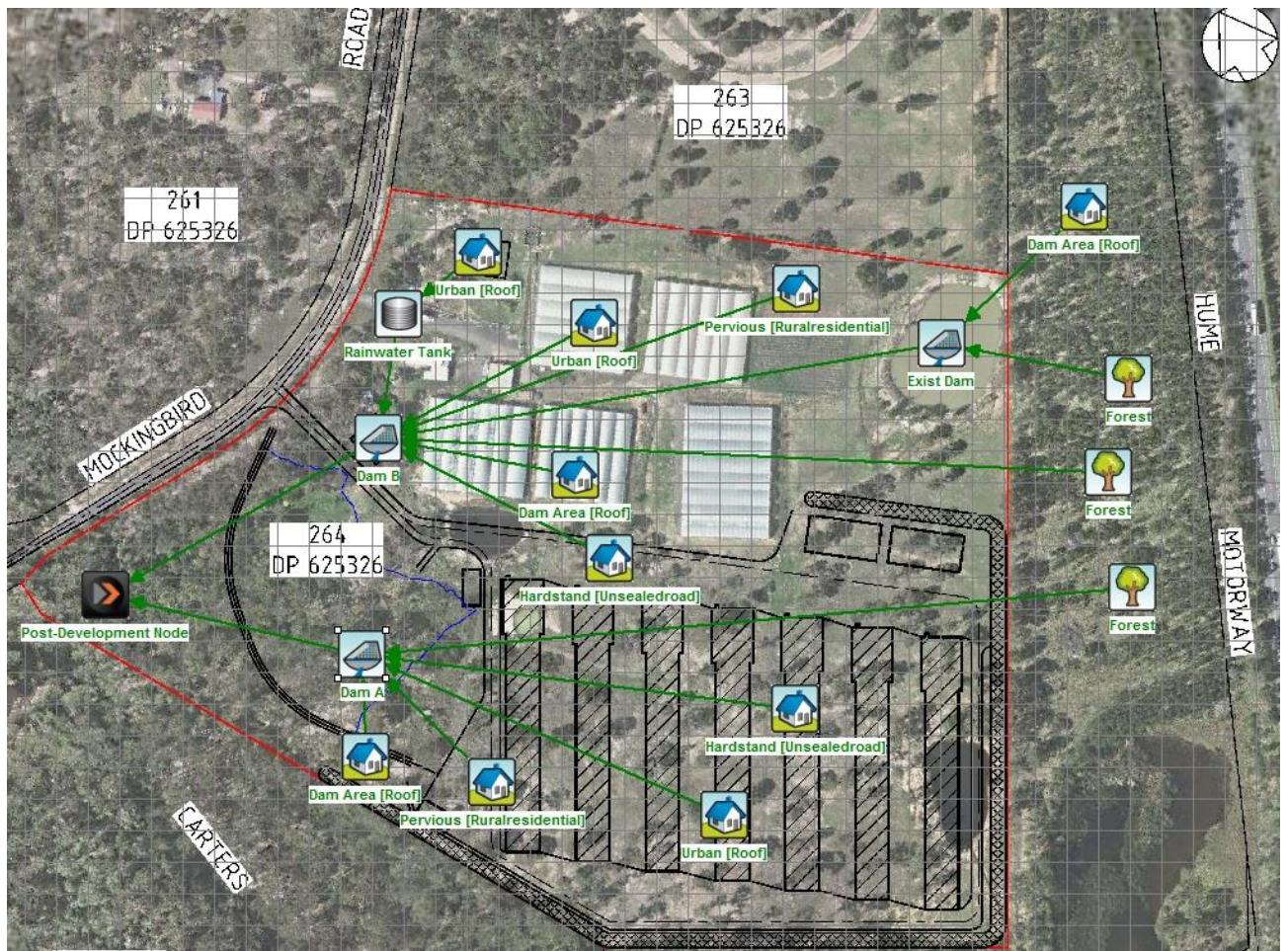


Figure 5-4: Proposed Development MUSIC Model

5.10 SUMMARY OF WATER QUALITY MODELS

Pollutant loads were compared between the existing and proposed MUSIC models and a relevant comparison made.

Table 5-5: Development Annual Flow and Pollutant Loads Summary

	Flow (ML/yr)	Total Suspended Solids (kg/yr)	Total Phosphorous (kg/yr)	Total Nitrogen (kg/yr)	Gross Pollutants (kg/yr)
Target	-	NorBE	NorBE	NorBE	90% Reduction
Existing Site	38.7	1770	7.96	68.9	0
Proposed Development	26.7	1690	4.03	43.3	0
Target Met	-	Yes	Yes	Yes	Yes

* NorBE – “Neutral of Beneficial Effect”

The results show the Neutral of Beneficial Effect targets are met in the proposed development - i.e. the proposal will result in an overall decrease in pollutants discharging from the study area, for Suspended Solids, Phosphorous and Nitrogen. This is principally due to the reduction in overall flow discharge from the site by the re-use of water in the poultry farm operations, removing flows that currently discharge pollutants into downstream waterways.

Additional analysis of the node water balance on the proposed dams indicates approximately 63% of the requested reuse was supplied. That is, run-off captured from the site and contained within the on-site dams will only meet around 63% of long term total water requirements for a poultry farm and market gardens of this scale. As with the existing operation on site, it is intended to make up this shortage with water from the existing licensed bore.

5.11 HYDROLOGY

With the addition of significant sheds and hardstand areas, the increased impermeable surface can decrease runoff times and create higher peak storm flow rates. It is expected that detention within the two dams will counter the increase in permeable surfaces, and it is important to assess the post-developed peak discharges to ensure there is not increased downstream flooding as a result of this development. Overall dam sizes, design Top Permanent Water Levels, spillway levels, outlet pipe sizes and levels have all been determined to find the right balance between storage for reuse and detention. All details are documented on Tattersall Lander DA design plans.

As described earlier in this report, Dam A will be collecting runoff from the roof areas and surrounds of poultry sheds, and Dam B will collect water off the existing greenhouses, existing hardstand and upstream lands, as well as from the new machinery and litter sheds and hardstand areas.

A 1D XP-Storm hydrological and hydraulic routing model has been prepared to quantify the effectiveness of the proposed measures. Rainfall was simulated utilising the Laurenson Method with IFD data sourced from the Wollondilly Council's Design Specifications Subdivision & Engineering Standards. A range of storms were run to determine the critical duration for both the pre and post development scenario (found to be the 120min storm).

In both models it was assumed that all dams were full to their Top Permanent Water Level at the start of the design rainfall event.

Table 5-6: Post-Development Node Analysis

	Existing Site	Dam A	Dam B
Total Catchment Area	17.03 ha	7.81ha	9.23%
Percentage Impervious	14.6%	44.0%	32.0%
Average Slope	4%	4%	4%

Resulting pre and post development discharge hydrographs are shown below.

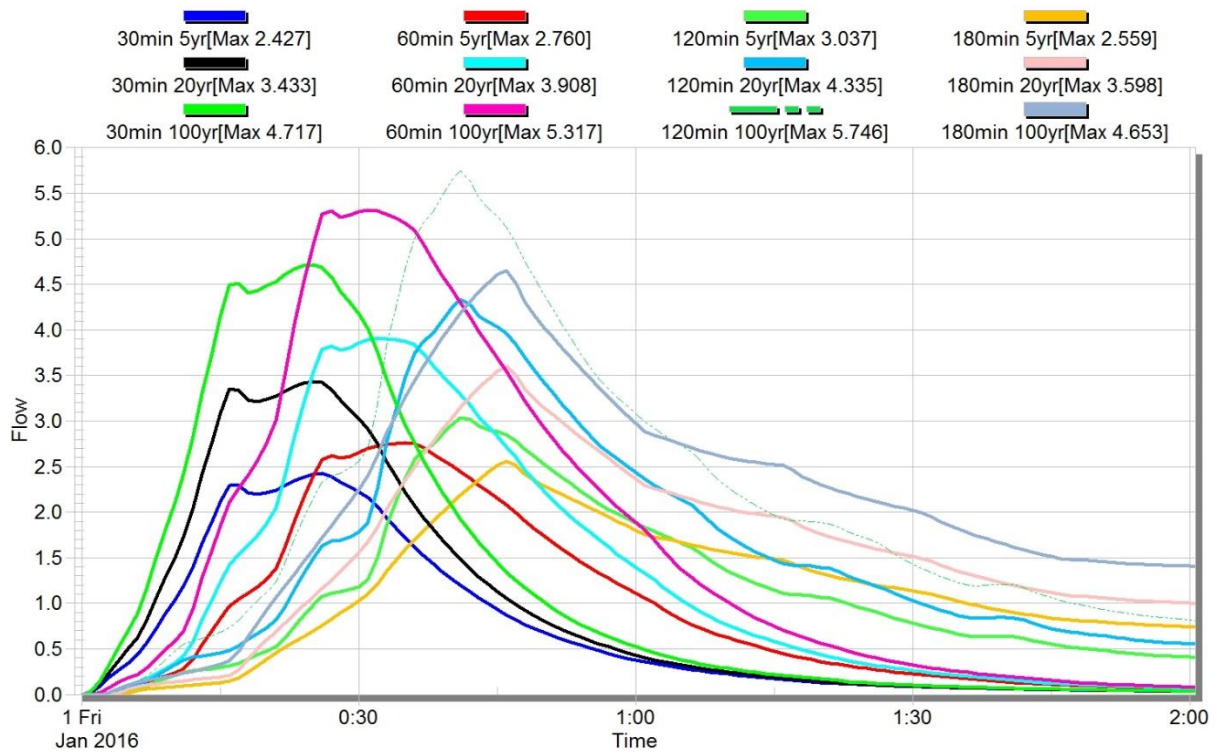


Figure 5-5: Pre-Development Hydrograph

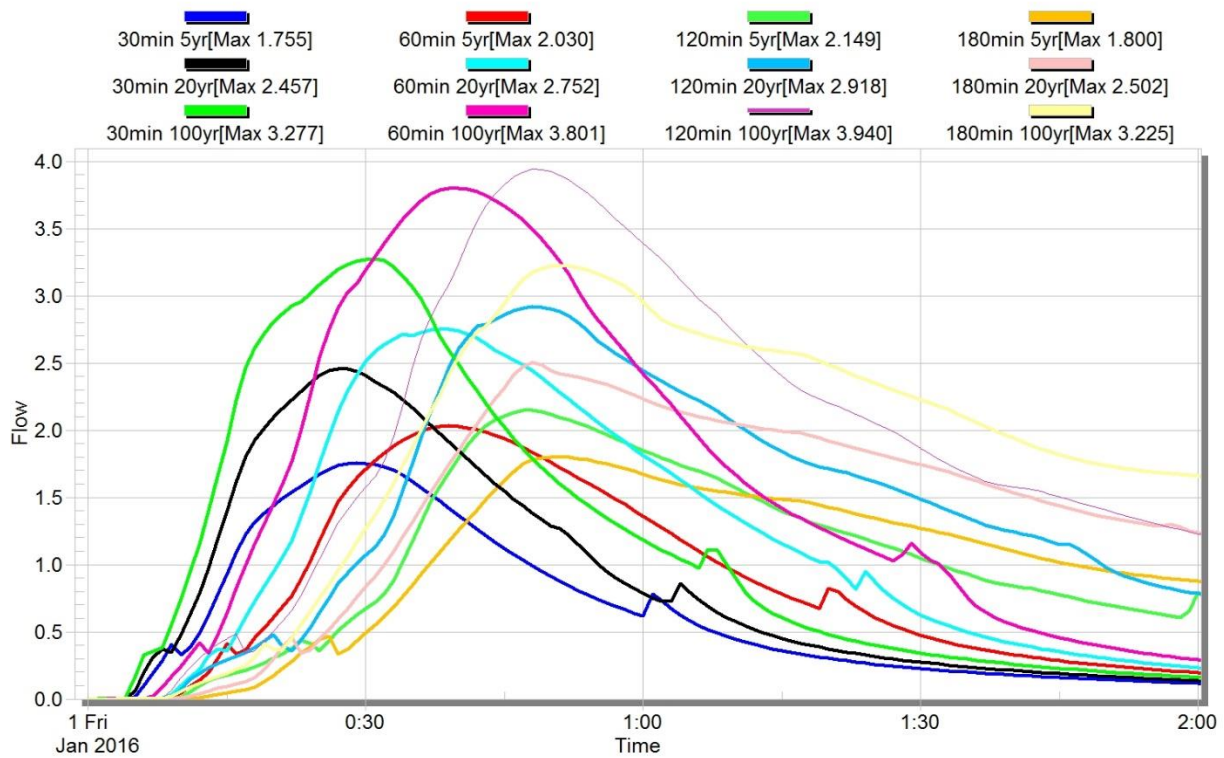


Figure 5-6: Post-Development hydrograph

It can be seen from the figures above that the 5yr, 20yr and 100yr post-development peak discharge rates are lower than the existing site, ensuring no increased downstream flooding impacts as a result of the proposed development.

As a check on both the hydrological and hydraulic representations of the 1D model described above, detailed 2D 'Rainfall-On-Grid' models were created to represent both the existing site, and the detailed and complex surface runoff patterns of the proposed development. This also allows more detailed design of drainage structures across the site.

This 2D modelling approach can remove much of the vagrancies of catchment interpretation and hydrologic routing methods as rainfall is applied directly to a detailed DTM and the slopes, roughness and length of flow paths, losses and catchment extents are determined organically across the grid. A 1m grid size was adopted with a 0.25s timestep, and land use infiltration and roughness values determined from site survey information, aerial images and design layouts.

The figures below illustrate samples of the model outputs achieved

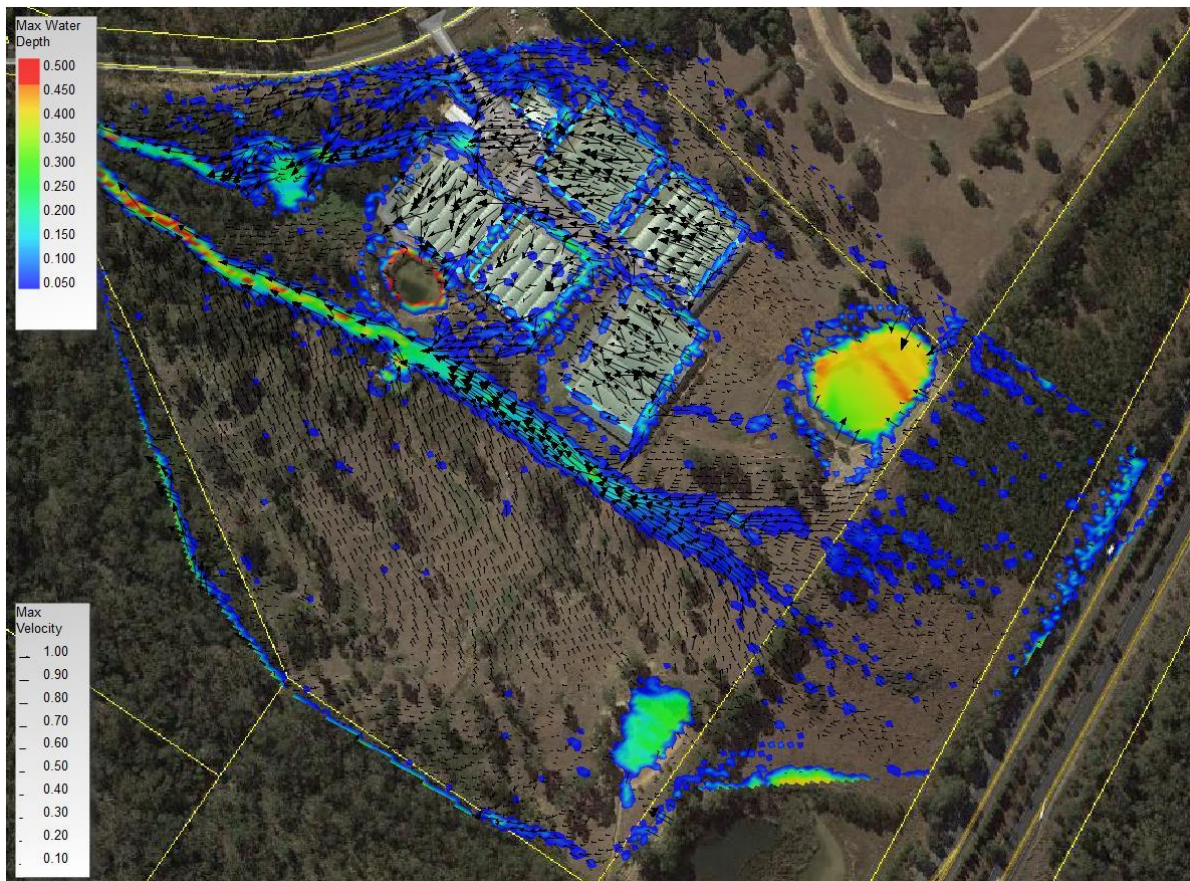


Figure 5-7: 2hr 100yr Pre-Development Peak Flow Depths and Velocities

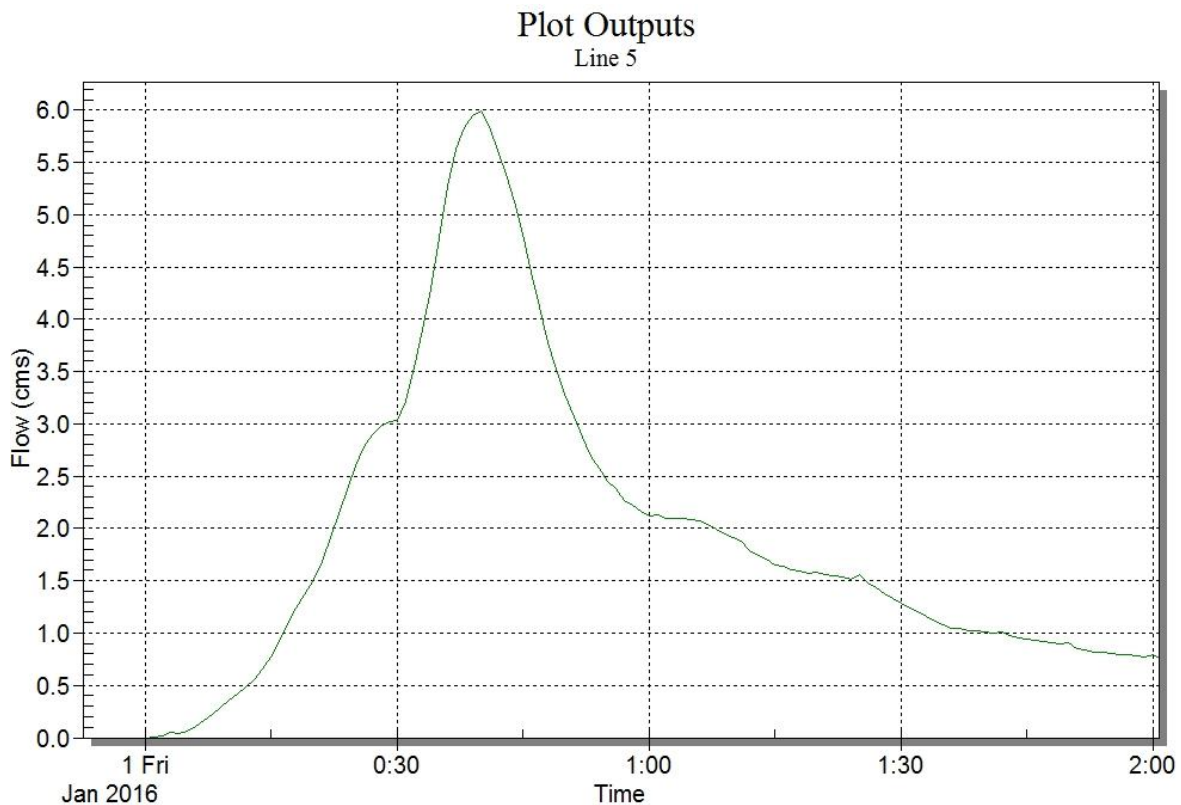


Figure 5-8: 2hr 100yr Pre-Development Peak Flow Depths and Velocities

5.12 CONCLUSIONS

The results derived from modelling procedures indicate that long term water quality and quantity constraints are appropriately addressed in the proposed development through the capture and reuse of stormwater runoff, though the following measures:

- Construction of two new storage dams, Dam A with 24.4 ML storage volume and Dam B with 1.41 ML storage volume with appropriate sized outlets as detailed in the Tattersall Lander Detailed DA plans,
- Installation of 6x500kL water storage tanks for the poultry farm operation,

More so, the modelling demonstrates that the development will actually have a positive impact on both the stormwater pollutant levels and peak flowrates leaving the site, compared to the existing situation. From a stormwater quality and quantity perspective, approval is recommended.

6 NOISE ASSESSMENT

Chapter Six provides a detailed assessment of the likely acoustic impacts associated with the proposed development, including traffic operations associated with the site.

6.1 IDENTIFICATION OF SENSITIVE RECEIVERS

Table 6-1 provides the details of the nearby identified sensitive receivers that would potentially be impacted by activities associated with the proposed development. The receivers were identified based on their proximity and exposure to the subject site.

Table 6-1: Nearest Identified Sensitive Receivers

Receiver Identifier (ID)	Receiver Type	Approximate Distance from Facility Noise Source (m)	Easting (UTM) (km)	Northing (UTM) (km)
R1	Residential	315	282.6942	6205.037
R2	Residential	300	282.4975	6205.052
R3	Residential	800	282.9785	6205.427
R4	Residential	590	281.9581	6204.821
R5	Residential	695	281.8468	6204.723
R6	Residential	800	281.7552	6204.61
R7	Residential	950	281.6529	6204.413
R8	Residential	1,035	281.6319	6204.256
R9	Residential	700	282.075	6205.279
R10	Residential	920	282.0765	6205.541
R11	Residential	970	282.1754	6205.645
R12	Residential	1,085	282.2843	6205.818
R13	Residential	1,170	282.3181	6205.902
R14	Residential	1,220	282.1918	6205.927
R15	Residential	1,150	282.087	6205.807
R16	Residential	1,120	281.9944	6205.737
R17	Residential	1,100	281.9455	6205.681
R18	Residential	1,000	281.8334	6205.451
R19	Residential	980	281.7342	6205.299
R20	Residential	760	281.8564	6205.089
R21	Residential	715	281.8751	6205.017
R22	Residential	665	281.8913	6204.913
R23	Residential	910	281.6569	6204.949

Receiver Identifier (ID)	Receiver Type	Approximate Distance from Facility Noise Source (m)	Easting (UTM) (km)	Northing (UTM) (km)
R24	Residential	820	281.7215	6204.735
R25	Residential	905	281.6422	6204.656
R26	Residential	985	281.5702	6204.597
R27	Residential	1,005	281.5625	6204.521
R28	Residential	1,120	281.4506	6204.512
R29	Residential	1,160	281.4453	6204.375
R30	Residential	1,185	281.4386	6204.308
R31	Residential	1,305	281.3563	6204.195
R32	Residential	1,425	282.1404	6206.107
R33	Residential	1,235	282.3566	6205.973
R34	Residential	1,500	282.6698	6206.246
R35	Residential	1,460	283.0833	6206.116
R36	Residential	1,185	281.4869	6204.200
R37	Residential	1,335	281.3952	6204.054
R38	Commercial	845	282.4349	6203.911
R39	Commercial	810	282.7217	6203.969

Of the 39 identified sensitive receivers within a radius of approximately 1.50 kilometres of the proposed site, 37 were residential receivers and two were commercial receivers (service stations). The location of the sensitive receivers is shown in **Figure 6-1: Nearby Sensitive Receivers**.

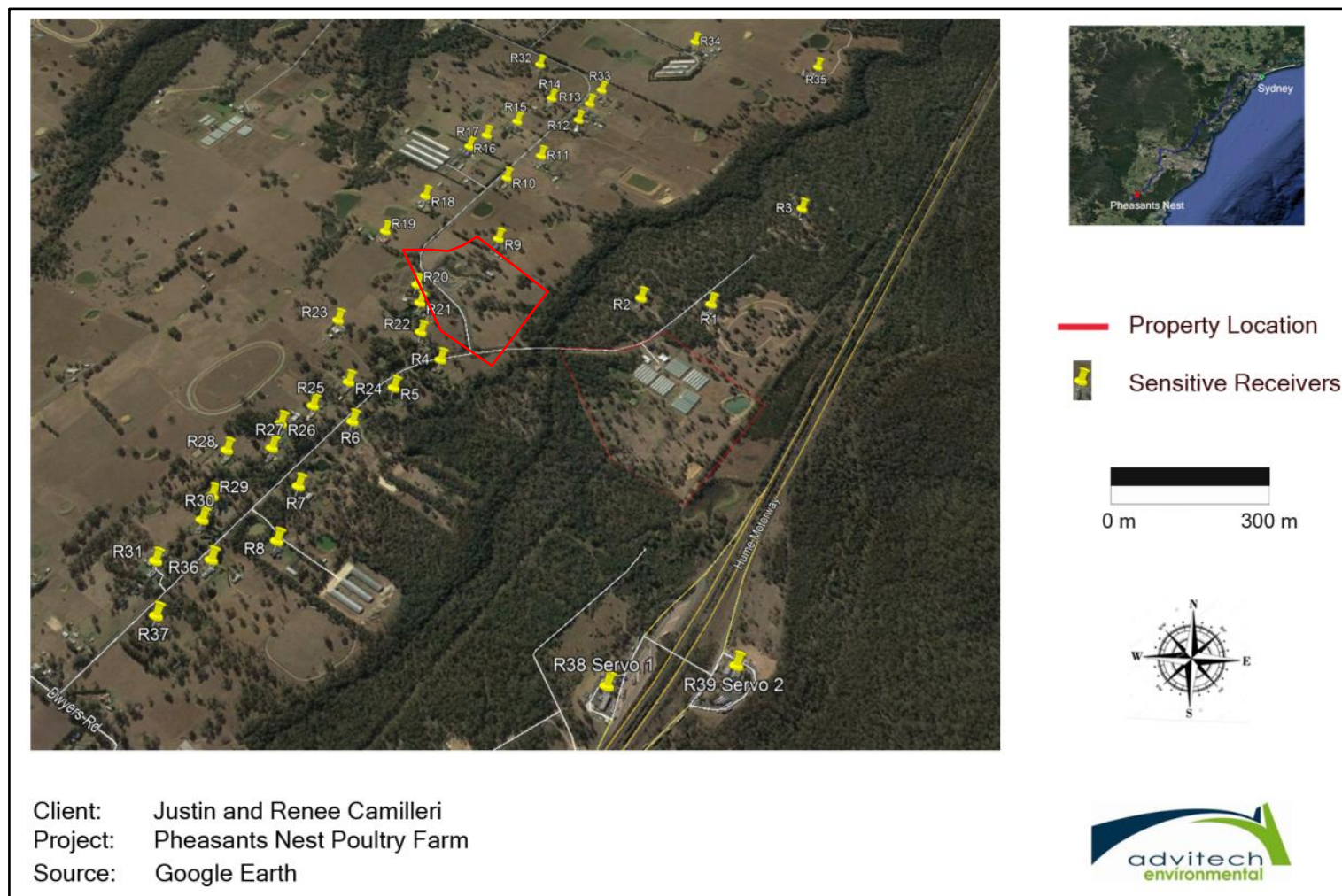


Figure 6-1: Nearby Sensitive Receivers

6.2 EXISTING NOISE ENVIRONMENT

The existing noise environment is assessed in accordance with the provisions of the NSW EPA *Industrial Noise Policy* (INP).

The methodology for assessing the background noise levels within the ambient environment includes:

- long term (unattended) monitoring should be undertaken for a period of not less than 7 days (or until such time as 7 days' worth of valid monitoring data is obtained);
 - local meteorological monitoring should be undertaken in order to identify and exclude noise levels during periods influenced by high wind speeds and/or rainfall that contribute to extraneous noise (not typical to the site);
- monitoring locations selected should be representative of the noise environments at sensitive receivers adjacent to the proposed development;
- monitoring should be undertaken at the time(s) of day that the proposed works would operate; and
- attended monitoring is undertaken to supplement unattended noise logging data, particularly in complex noise environments where existing construction or industrial noise sources may exist.

Ambient noise levels within the receiving environments may display significant temporal variation due to the characteristics of the noise generating activities at that locality. To account for the temporal variation of ambient noise levels, the INP indicates that background noise levels are to be measured for the day, evening and night periods. The INP defines these periods as follows:

- Day – the period from 7:00 am to 6:00 pm Monday to Saturday; or 8:00 am to 6:00 pm on Sundays and public holidays;
- Evening – the period from 6:00 pm to 10:00 pm; and
- Night – the period from 10:00 pm to 7:00 am Monday to Saturday, or 10:00 pm to 8:00 am Sundays and public holidays.

Analysis of aerial photography indicates the study area is rural in nature; however, given the close proximity of each of the receivers to local thoroughfares including Mockingbird Road and Nightingale Road, and considering that Hume highway passes upstream of the site, approximately 150 metres from the proposed site, road transport noise may significantly influence the noise environment of the locality. The monitoring locations are shown in **Figure 6-2**.

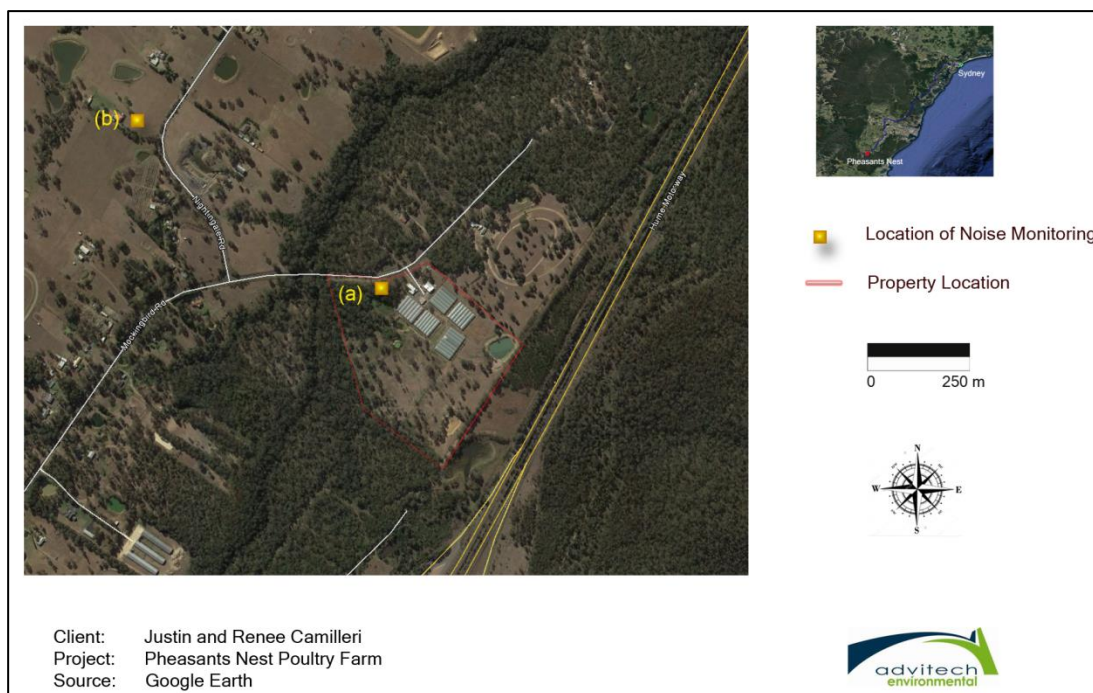


Figure 6-2: Locations of Noise Monitoring

6.3 ATTENDED NOISE MONITORING

Short term attended monitoring was undertaken at monitoring locations A and B on 20 January, 2017 during the day period and on 1 February, 2017, during the night period as a means of characterising the ambient noise sources within the receiving environments. The attended monitoring was undertaken using a Svantek (SVAN) 958, Type 1 sound level meter (SLM) (S/N:20777), with the results of the monitoring detailed in **Table 6-2**

Table 6-2: Attended Monitoring Results, dB(A)

Location	Date	Time	L _{A10}	L _{Aeq}	L _{A90}	Comments
Location A (180, Mockingbird Road, day time)	20.01.2017	16:20	52	51	40	Insect Noise to ~42 dB(A) Bird Calls to ~58 dB(A) Local Noise ¹ to ~71 dB(A)
Location B (55, Nightingale Road, day time)	20.01.2017	15:50	48	47	36	Local Traffic to ~62 dB(A) Bird Calls to ~52 dB(A) Insect Noise to ~46 dB(A)
Location A (180, Mockingbird Road, night time)	1.02.2017	22:20	42	42	41	Road Noise ² to ~49 dB(A) Local Noise ³ to ~44 dB(A) Bird Calls to ~48 dB(A)

Location	Date	Time	L _{A10}	L _{Aeq}	L _{A90}	Comments
Location B (55, Nightingale Road, night time)	1.02.2017	22:46	41	39	32	Local Traffic to ~45 dB(A) Insect Noise to ~40 dB(A) Local Noise ³ to ~47 dB(A) Barking dogs to ~41 dB(A) Aircraft Noise to ~54 dB(A)

Note 1: Noise from machinery on site.

Note 2: Road Noise from Hume Highway.

Note 3: Impact Noise from site.

Existing poultry operations in the locality of the study site were not audible at any time during the attended noise monitoring events.

6.4 CONTINUOUS NOISE MONITORING

Long-term, unattended noise monitoring was undertaken from 20 January to 1 February, 2017 using two ARL 316 Environmental Noise Loggers to capture the background noise levels within each of the two identified noise environments. The details of the Environmental Noise Logger used for the monitoring are provided in **Table 6-3**.

Table 6-3: Continuous Noise Logging

Location	Location A – Rural Receivers	Location B – Road Receivers
Logger Serial Number	16-203-513	16-299-450
Calibration Expiry Date	22/02/2018	31/08/2018
Measurement Title	Mockingbird Road	Nightingale Road
Run Started	20/01/17 14:45	20/01/17 15:30
Run Stopped	2/02/17 10:30	2/02/17 10:30
Frequency Weighting	A	A
Time Response	Fast	Fast
Engineering Units	dB SPL	dB SPL

The unattended noise monitoring was undertaken to assess the L_{A90} background noise level, and L_{Aeq}, L_{A10} and L_{A1} noise levels within the receiving area. The L_{A1}, L_{A10}, L_{A90} and L_{Aeq} noise levels for the continuous noise logger are presented graphically in **Appendix D**. Local meteorological conditions, used in the evaluation and validation of noise monitoring data, were measured using a Davis Vantage Vue Precision Weather Station, established at monitoring location A.

The long-term unattended noise monitoring data was analysed to determine the single figure Assessment Background Level (ABL) representing each assessment period, during each day. The ABL is calculated as the lowest tenth percentile of the L_{A90} noise descriptor for each period. The Rating Background Level (RBL), which represents the overall single figure background noise level for each assessment period (day, evening and night) over the duration of the monitoring period, is calculated as the median of all the ABLs for each assessment period. Once the RBLs have been calculated, the most stringent of the RBLs at each of the monitoring locations were used to determine the Project Specific Noise Levels (PSNLs) relevant to the project.

The results for the monitoring location are presented in **Table 6-4**. Periods for which the ABL are not presented were omitted from the analysis due to the occurrence of meteorological conditions that may contribute to extraneous noise.

Table 6-4: Noise monitoring results dB(A)

Date	Location A (Mockingbird Road)			Location B (Nightingale Road)		
	Day	Evening	Night	Day	Evening	Night
20/01/2017	-	-	32.2	-	-	30.4
21/01/2017	33.7	39.1	26.8	30.5	31.2	23.7
22/01/2017	30.4	39.1	29.7	27.2	32.2	26.5
23/01/2017	34.7	36.2	34.8	30.7	32.8	30.1
24/01/2017	-	-	32.1	-	-	28.2
25/01/2017	35.1	36.3	29.0	30.0	30.5	24.9
26/01/2017	33.0	37.1	29.0	26.1	30.4	26.0
27/01/2017	34.6	36.6	28.7	28.8	34.9	26.7
28/01/2017	31.9	34.9	29.4	31.0	32.2	29.6
29/01/2017	32.8	36.7	31.9	29.9	32.7	28.7
30/01/2017	33.6	33.0	35.0	31.0	30.1	30.0
31/01/2017	34.1	37.1	30.7	31.8	33.6	27.4
01/02/2017	32.0	-	31.3	27.1	-	28.7
02/02/2017	42.7	-	-	37.5	-	-
Rating Background Level (RBL)	34	37¹	31	30	32¹	30

Note1: Application notes for the INP indicate that in circumstances where the evening and night period RBLs are higher than the day period RBL, the allowable noise levels for the more sensitive periods should not exceed those of the day period. Where this happens, the Intrusiveness Criteria for the more sensitive period should be set to that of the less sensitive period.

6.5 NOISE AND VIBRATION ASSESSMENT CRITERIA

6.5.1 Construction Noise Criteria

The NSW *Interim Construction Noise Guideline* (ICNG) (2009) provides guidance on managing construction works to minimise noise, with an emphasis on communication with, and cooperation from all stakeholders affected by construction noise. The guideline does not identify a single approach for managing construction noise; rather, it provides a framework for assessing construction noise impacts based on the complexity of the project and condition of the ambient noise environment.

The framework identifies the following steps for managing construction noise impacts:

- identify any sensitive land uses that may be affected;
- identify the operating hours and duration of the proposed construction works;
- determine the noise impacts at sensitive receivers; and
- select and apply the best work practices to minimise noise impacts.

The scale and duration of the construction works, and the number and type of potentially affected sensitive receivers defines the extent to which assessment and management of impacts should be undertaken. The quantitative noise assessment approach is applied to larger construction projects, anticipated to extend for a period greater than three weeks. This approach involves predicting noise levels from construction activities, and comparing them to Noise Management Levels (NML), as per Table 2 of the ICNG, reproduced as Table 6-5 below. The NMLs specific to this project, provided in **Table 6-5** represents the noise level above which there may be some community reaction to the noise.

It should be noted that the ICNG recognises that the potential long-term benefits of some construction works may offset short term amenity losses. On this basis, the NML are not statutory criteria above which impacts are deemed to be non-compliant, but the level at which reasonable and feasible management measures would be required. For commercial premises, the external noise levels at the most-affected occupied point of the premises should not exceed L_{Aeq} (15 min) 70 dB(A).

Table 6-5: Noise at Residences (Quantitative Assessment) from ICNG (DECC, 2009)

Time of Day	Management Level, L_{Aeq} (15 min)*	How to apply
Recommended standard hours:	Noise affected RBL + 10 dB	The noise affected level represents the point above which there may be some community reaction to noise.
Monday to Friday		Where the predicted or measured L_{Aeq} (15 min) is greater than the noise affected level, the proponent

7 am to 6 pm		should apply all feasible and reasonable work practices to meet the noise affected level.
Saturday 8am to 1 pm		The proponent should also inform all potentially impacted residents of the nature of works to be carried out, the expected noise levels and duration as well as contact details.
No work on Sundays or public holidays	Highly Noise affected 75 dB(A)	The highly noise affected level represents the point above which there may be strong community reaction to noise. Where noise is above this level, the relevant authority (consent, determining or regulatory) may require respite periods by restricting the hours that the very noisy activities can occur, taking into account: 1. times identified by the community when they are less sensitive to noise (such as before and after school for works near schools, or mid-morning or mid-afternoon for works near residences) 2. if the community is prepared to accept a longer period of construction in place of restrictions on construction times.

Table 6-6: Construction Noise Management Levels (LAeq, (15 min))

Receiver Type	Recommended Standard Hours	Management Level (L _{Aeq} , (15 min))
Residential Receivers	Monday to Friday: 7am to 6pm	Noise Affected NML (RBL + 10) 40
	Saturday: 8am to 1pm	Highly Noise Affected NML 75
Commercial Receivers		External NML 70

6.5.2 Operational Noise Criteria

The *Best Practice Management for Meat Chicken Production in NSW* (Manual 1 & 2) (NSW Department of Primary Industries, 2012) provides 'best management' guidance on the operation of meat chicken farms in NSW. These manuals are intended to promote consistent application of best management and uniform regulation of poultry farming in NSW. While the Manuals provide guidance on best management practices, they do not present assessment criteria against which compliance is demonstrated. Section 3.2.4 of Manual 1 indicates that 'best practice management' requires that the likely noise impacts are assessed in accordance with the *NSW Industrial Noise Policy* (INP) (NSW EPA, 2000).

The INP presents two criteria for the assessment of industrial noise sources, intrusive noise impacts and amenity noise levels. In assessing the noise impact of industrial sources, both components are considered for sensitive receivers. Typically, the more stringent of these criteria would be applied as the Project Specific Noise Level (PSNL) for the development as a means of managing intrusive noise impacts and preserving the amenity of the receiving environment.

6.5.3 Intrusive Noise Impacts

The intrusiveness of an industrial noise source is generally considered acceptable if the predicted $L_{Aeq,15\text{minute}}$ impact does not exceed the background noise level by more than 5 dB when measured in the absence of the source. The background noise level, or Rating Background Level (RBL), is determined in accordance with Section 3 of the INP and is the median value of the Assessment Background Levels (ABL) determined for the monitoring period. The use of the median accounts for noise level variations over time. The intrusiveness criterion is equal to the RBL + 5dB.

6.5.4 Amenity Noise Level

To limit continuing increases in noise levels, the EPA has identified recommended maximum ambient noise levels for typical receiver areas and land uses. The relevant section of *Table 2.1* of the INP has been reproduced as *Table 6-7*.

Where the existing noise level from industrial sources is close to the acceptable noise level (ANL), the noise level from any new source(s) must be controlled to preserve the amenity of the area. If the total noise level from industrial sources already exceeds the ANL for the area in question, the L_{Aeq} noise level from any new source should not be greater than 10 dB below the acceptable noise level if there is reasonable expectation that existing levels may be reduced in the future; or 10 dB below the existing level if there is no such reasonable expectation that existing levels will fall. *Table 2.2* of the INP (reproduced as **Table 6-8**) sets out implications and adjustment requirements for noise from industrial sources.

Table 6-7: Recommended LAeq noise levels from industrial noise sources

Type of Receiver	Indicative Noise Amenity Area	Time of Day	Recommended Acceptable Level dB(A)	Recommended Maximum dB(A)
Residential	Rural	Day	50	55
		Evening	45	50
		Night	40	45
	Suburban	Day	55	60
		Evening	45	50
		Night	40	45
	Urban	Day	60	65
		Evening	50	55
		Night	45	50
	Urban/Industrial Interface	Day	65	70
		Evening	55	60
		Night	50	55
School – internal	All	Noisiest 1-hr	35	40
Place of worship – internal	All	When in use	40	45
Passive recreation	All	When in use	50	55
Active recreation	All	When in use	55	60
Commercial Premises	All	When in use	65	70
Industrial Premises	All	When in use	70	75

Source: Environment Protection Authority INP Table 2.1 (2000)

Table 6-8: Modification to acceptable noise levels (ANL) to account for existing level of industrial noise

Total existing LAeq noise level from industrial sources, dB(A)	Maximum LAeq noise level for noise from new sources alone, dB(A)
Acceptable noise level plus 2	If existing noise level is <i>likely</i> to decrease in the future: Acceptable noise level minus 10. If existing noise level is <i>unlikely</i> to decrease in the future: Existing noise level minus 10
Acceptable noise level plus 1	Acceptable noise level minus 8
Acceptable noise level	Acceptable noise level minus 8
Acceptable noise level minus 1	Acceptable noise level minus 6
Acceptable noise level minus 2	Acceptable noise level minus 4
Acceptable noise level minus 3	Acceptable noise level minus 3
Acceptable noise level minus 4	Acceptable noise level minus 2

Total existing LAeq noise level from industrial sources, dB(A)	Maximum LAeq noise level for noise from new sources alone, dB(A)
Acceptable noise level minus 5	Acceptable noise level minus 2
Acceptable noise level minus 6	Acceptable noise level minus 1
< Acceptable noise level minus 6	Acceptable noise level

The level of transportation noise (road traffic noise in particular) may be high enough to result in the noise from an industrial source being effectively inaudible, even though the LAeq noise level from that industrial noise source may exceed the recommended acceptable noise level as shown in Table 6-7.

In such cases, the amenity criterion for noise from industrial noise becomes the LAeq, period(traffic) minus 10 dB. This criterion replaces the amenity criterion in **Table 6-7** and is used in the same way the amenity criterion is used, that is, in conjunction with the intrusiveness criterion, to determine the limiting criterion. This criterion may be applied only if all the following apply:

1. Traffic noise is identified as the dominant source at the site;
2. The existing traffic noise level is 10 dB or more above the acceptable noise level for the area; and
3. It is highly unlikely that the road traffic noise levels would decrease in the future.

6.5.5 Modifying Factor Adjustments

Where a noise source contains certain characteristics, such as tonality, impulsiveness, intermittency, or dominant low frequency content, the "unusual" noise may cause greater annoyance than other noise at the same level. On the other hand, noise levels from a single event of a short duration, may cause less annoyance to nearby sensitive receivers. In such circumstances, a modifying factor should be applied to the acceptable noise level at the nearby sensitive receivers. These modifying factors are provided in **Table 6-9**.

Table 6-9: Modifying Factor Corrections

Factor	Assessment/ Measurement	When to Apply	Correction
Tonal Noise	One-third octave or narrow band analysis	Level of one-third octave band exceeds the level of the adjacent bands on both sides by: 5 dB or more if the centre frequency of the band containing the tone is above 400 Hz 8 dB or more if the centre frequency of the band containing the tone is 160 to 400 Hz inclusive 15 dB or more if the centre frequency of the band containing the tone is below 160 Hz	+5 dB

Low Frequency Noise	Measurement of C-wt and A-wt noise level	Measure C-wt and A-wt noise levels over same time period. Correction to be applied if the difference between the two levels is 15 dB or more	+5 dB
Impulsive Noise	A-weighted fast response and impulse response	If difference in A-weighted maximum noise levels between fast response and impulse response is greater than 2 dB	+5 dB
Duration	Single-event noise duration up to 2.5h	One event in any 24-hour period	0 to -20 dB

Source: Environmental Protection Authority INP Table 4.1 (2000)

It is considered that normal operational activities would not generate unusual noise characteristics. Furthermore, Advitech Environmental understands that tonal reverse alarms would not be used in mechanical plant on the proposal site. Therefore, no modification factors have been applied for tonality, impulsive noise or low frequency noise.

6.5.6 Project Specific Noise Levels

Project specific noise levels (PSNLs) for the development are assigned after determining the relevant noise levels from the intrusiveness and amenity criteria, and set the benchmark against which noise impacts and the need for noise mitigation are assessed. **Table 6-10 and Table 6-11** provide an assessment of the acceptable noise levels, and establish the PSNLs relevant to the project.

Table 6-10: Assessment of project specific noise levels (Residential Receivers)

Location	Time Period	Day (7:00 to 18:00)	Evening (18:00 to 7:00)	Night (22:00 to 7:00)
All receivers	Intrusiveness Criteria L_{Aeq}, 15min (RBL +5)	35	37	35
	Mean L _{Aeq}	48	46	36
	Recommended Acceptable L _{Aeq} Noise Level (ANL-Rural)	50	45	40
	Amenity Criteria	44	38	34
	Project Specific Noise Level (PSNL) L_{Aeq}, 15minute	35	35¹	35

Note1: The INP Application Notes suggests that in circumstances where the evening and night period RBLs are higher than the day period RBL, the allowable noise levels for the more sensitive periods should not exceed those of the day period.

Table 6-11: Recommended Acceptable L_{Aeq} Noise Level (ANL-Commercial Premises)

Receiver Type	Time of Day	Recommended L _{Aeq} Noise Level, dB(A)
Commercial Premises	When in use	65

6.5.7 Sleep Disturbance Criteria

The occurrence of elevated noise levels over short durations, such as reversing beepers and noise from heavy items being dropped, have the potential to cause sleep disturbance to nearby residents. While the INP does not specifically address sleep disturbance from high noise level events, the INP Application Note suggests that the current criterion of an L_{A1} (1 minute) not exceeding the L_{A90} (15 minute) by more than 15 dB(A) should be used as a guide to identify the likelihood of sleep disturbance. This means that where the criterion is met, sleep disturbance is not likely to occur, but where it is not met, a more detailed analysis is required to:

- assess the maximum noise level or L_{A1} (1 minute);
- the extent that the maximum noise level exceeds the background noise level; and,
- the number of times any exceedance occurs during the night period.

The proposed Sleep Disturbance criterion for the receiving environment adjacent to the proposed works area is presented in **Table 6-12**.

Table 6-12: Sleep Disturbance Criteria dB(A)

Location	RBL (night)	Sleep Disturbance Criteria
All receivers	30	45

Guidance on the potential impacts of short duration, elevated noise levels is contained within the review of research results in the *NSW Road Noise Policy* (RNP). From research on sleep disturbance to date, it can be concluded that:

- maximum internal noise levels below 50 – 55 dB(A) are unlikely to awaken people from sleep; and
- one of two noise events per night, with maximum internal noise levels of 65 – 70 dB(A), are not likely to affect health or wellbeing significantly.
-

6.6 SUMMARY OF NOISE CRITERIA

Background noise levels were determined for the receiving environment adjacent to the proposed works area, in accordance with provisions established in Section 2 and 3 of the INP, to establish the project specific noise levels (PSNLs), which represent the criteria relevant to the construction and operational phases of the proposed development. Where predicted noise levels exceed the PSNLs, reasonable and feasible noise control methods would be required to be implemented to manage the potential adverse impacts. The relevant noise criteria for the proposed development are summarised in **Table 6-13**.

Table 6-13: Summary of Noise Criteria – Construction and Operational Phases

Receiver Type	Work Activity	L _{Aeq,15minute}		L _{A1,1minute}	
		Day	Evening	Night	Sleep Disturbance
Residential Receivers	Construction works	40	N/A	N/A	N/A
	Operation of Fans	35	35	35	N/A
	Feed Delivery Silo Refilling	35	35	35	N/A
	Bird Collection	35	35	35	45
Commercial Receivers	Construction works	70 (When in use)			
	Operational works	65 When in use)			

6.7 ROAD TRAFFIC NOISE GUIDELINES

The *NSW Road Noise Policy (RNP) (2011)* provides a framework for the management of traffic noise issues associated with new developments near existing or new roads, and new or upgraded road developments adjacent to new or planned building developments. The primary aim of the RNP is to provide assessment criteria for road traffic noise based on protecting amenity and wellbeing.

The proposed development would require few off-site traffic movements including semi-trailer trucks for silo refilling and truck and dogs for bird pickup. These traffic movements would be confined to feed deliveries at a rate of three movements per week, and bird pickup/delivery activities, which would occur approximately every 32 to 54 days. The bird pickup activities would require approximately five to six vehicles per shed, with a maximum of two trucks on site at any one time. These activities would generally be confined to the night period only, as the birds are more easily handled during the cooler night periods.

The proposed development would involve access to the site from Mockingbird Road. The road traffic noise criteria for Mockingbird Road, as a "local Road", are provided in **Table 6-14**.

Table 6-14: Road Traffic Noise Criteria

Road Category	Type of Project / Land Use	Assessment Criteria – dB(A)	
		Day 7am – 10pm	Night 10pm – 7am
Local	Existing residences affected by additional traffic on existing sub-arterial roads generated by land use developments	L _{Aeq, (15hr)} 55 (external) Limit increases to < existing level + 2dB	L _{Aeq, (9hr)} 50 (external)

Source: *NSW Road Noise Policy (2011) Table 3*

6.8 GROUND VIBRATION GUIDELINES

The NSW Department of Environment and Conservation (DEC) (2006) document *Assessing Vibration: a technical guideline* provides guidance on the assessment of human response to vibration, including the maximum vibration values and recommendations for measurement and evaluation techniques.

The DEC guideline considers the following sources of vibration that may result in undue impacts to nearby receivers:

- Continuous vibration – from uninterrupted sources.
- Impulsive vibration – up to three instances of sudden impact (i.e. dropping heavy items).
- Intermittent vibration – such as from drilling, compacting or other activities that would result in continuous vibration if operated continuously.

The preferred and maximum vibration levels for continuous, impulsive and intermittent vibration are provided in **Table 6-15**.

Table 6-15: Daytime Preferred and Maximum Vibration Levels for Human Exposure

Vibration Source (Residential Receivers)	Preferred Vibration Level RMS Acceleration	Maximum Vibration Level RMS Acceleration
Continuous	0.010 m/s ²	0.020 m/s ²
Impulsive	0.30 m/s ²	0.60 m/s ²
Intermittent	0.20 m/s ^{1.75}	0.40 m/s ^{1.75}

While the guideline provides preferred and maximum values for human responses to vibration, it does not address vibration-induced change to buildings or structures. At present, building damage from construction-induced vibration is commonly assessed with respect to the British Standard 7385

Part 2-1993 *Evaluation and measurement for vibration in buildings*. The recommended limits (guide values) for transient vibration to ensure minimal risk of cosmetic damage to residential buildings are shown in **Table 6-16**.

Table 6-16: Transient Vibration Guide values – Minimal Risk of Cosmetic Damage

Type of Building	Peak Component Particle Velocity in Frequency Range of Predominant Pulse	
	4 Hz to 15 Hz	15 Hz and above
Unreinforced or light framed structures. Residential of light commercial type buildings	15 mm/s at 4 Hz to 20 mm/s at 15 Hz	20 mm/s at 15 Hz to 50 mm/s at 40 Hz and above

6.9 PREDICTED NOISE LEVELS

A model of the proposed construction and operation phase activities, and adjacent sensitive receivers was constructed using the ISO9613 calculation methodology in the *Predictor* environmental noise modelling software, with consideration to the CONCAWE sub-method to evaluate meteorological influences. *Predictor* is an environmental noise mapping package that facilitates calculation of noise impacts, accounting for source receiver relationships, terrain and meteorological affects. To assess the potential noise impacts, predictions derived through the noise modelling are presented against the relevant noise criteria.

6.10 NOISE GENERATING ACTIVITIES

The modelled impact of the proposed activities is based on the Sound Power Level (SWL) and location of noise sources within the proposed works area. Third-octave (1/3 octave) SWL data representative of the proposed works were used as model inputs. These data were sourced from:

- *SWLs of processes supplied by the client;*
- *the UK Department of Environment, Food and Rural Affairs (DEFRA, 2005);*
- *AS 2436-2010: Guide to noise and vibration control on construction, demolition and maintenance sites; and*
- *the Advitech Environmental noise source library, including SWL measurements of processes at similar poultry operations.*

As the proposed works comprise a number of phases of work, noise prediction models were constructed to evaluate noise impacts from specific activities, during each work phase. These work phases relate to both construction activities and operational activities.

6.10.1 Construction Noise

During the construction works, the specific work phases or activities would include:

- Primary earthworks, including formation of access road and excavation of the site;
- Levelling the pad to provide a finished ground surface; and
- Construction of infrastructure, including concrete works and building of the poultry sheds.

The primary earthworks were modelled relative to the natural land surface. Bulldozers

and excavators were modelled as point sources, located at the point nearest to the sensitive receivers. The dump truck was modelled as a moving source, assumed to travel at an average speed of 20 km/h, with a maximum of eight vehicle movements in any one hour.

The site levelling works were modelled relative to the final land surface following cut and fill of the site. The graders, bulldozers and rollers were modelled as point sources, located at the point nearest to the sensitive receivers. The water cart was modelled as a moving source, assumed to travel at a speed of 20 km/h, with a maximum of two vehicle movements in any one hour.

Construction of the poultry sheds was assumed to involve the formation of concrete structures, and the building of the poultry sheds with the earth mounds/barrier in place. During this phase, delivery trucks and concrete trucks were modelled as moving sources, assumed to travel at an average speed of 10 km/h, with four vehicle movements per hour. All other sources, including concrete pumps, concrete screes, franna crane and hand tools were modelled as point sources at the location most exposed to the nearby sensitive receivers. A list of the proposed equipment, as well as their respective SWLs has been provided in **Table 6-17**.

Table 6-17: Construction Noise Sources

Activities	Equipment Used	Sound Power Level, dB(A)
Primary Earthworks	Dump Truck	114
	Excavator	105
	Bulldozer	112
Level Pad	Grader	109
	Roller	102
	Bulldozer	112
	Water Cart	107
Construction	Delivery Truck	101
	Concrete Truck	108
	Concrete Pump	103
	Concrete Scree	91
	Franna	103
	Hand Tools	102

6.10.2 Operation Noise

During the operation of the proposed poultry facility, the specific work phases or activities include:

- Operation of the extraction fans for tunnel ventilation;
- Feed delivery and mechanical silo refilling; and
- Bird delivery and collection using transport truck and forklift.

Ventilation fans have been identified as the primary continuous noise generating activity at the proposed development. Each broiler shed will have 15 Euroemme EM52 exhaust fans to facilitate tunnel ventilation. Multiple fan configurations were considered throughout this assessment, with the most appropriate configuration involving twelve ventilation fans located at the rear of each shed (south western end), and three fans located on the side of each shed facing the Hume Highway (south east). The fans operate automatically on an as-required basis, with a greater number of fans operating during warmer or more humid conditions. It is considered that only extreme meteorological conditions, late in the production cycle, would warrant the operation of all 15 fans, and such conditions would typically occur during the day period only. To account for adverse meteorological conditions however, the modelling scenarios assumed 15 fans per shed during the night time (neutral conditions) and five fans per shed during the night time (temperature inversion conditions) (see Section 6.11 below). These scenarios are considered to be highly conservative, and these operating conditions are likely to occur rarely, if at all.

The proposed development site on Mockingbird Road is close to two naturally ventilated broiler farms on Mockingbird Road and Pheasants Nest Road, and one tunnel ventilated broiler farm on Nightingale Road. As such, the cumulative environmental effects that are likely to result from the designated project on Mockingbird Road in combination with the physical activity on the other three broiler farms needs to be considered. The cumulative noise levels due to the operation of the ventilation fans of the proposed sheds were modelled under worst case operating conditions, during the day and night periods.

Due to the topography of the proposed development site, excavation and fill of the site would be required to provide a near level pad upon which to construct the proposed poultry sheds. It is anticipated that the floor level of the nearest shed on the western side of the proposed development would be approximately four metres above the access road entrance. The existing access road, currently being used for market gardens, would be used for the delivery trucks during feed delivery and bird collection.

Feed delivery and mechanical silo refilling scenarios were assessed during the day and night periods. Following advice from the client, it was determined that up to three feed delivery trucks per week were expected on site, with no more than one truck on site during any one day. The feed delivery truck movements were modelled as a moving source, travelling at a speed of 10 km/hr around the designated access route. Mechanical silo refilling was modelled as a point source on the north-eastern side of the proposed sheds near the greenhouses at one location representing the most exposed location to the nearest sensitive receivers. It was assumed that the mechanical silo refilling would occur for approximately 20% of the time during each one-hour period.



Figure 6-3: Locations of Nearby Broiler Farms

During bird collection, a maximum of two transport trucks would be onsite at any one time (four truck movements). It is anticipated that the trucks would typically leave the site approximately one hour apart, and would not travel in convoy. A forklift would operate continuously during the bird collection, alternating between activities inside and outside the buildings. To account for the sheds being partially open at the time of the bird collection activities, the forklift has been modelled as operating for 100% of the time outside the buildings only. The bird collection scenario was modelled for the day, evening and night periods.

During the night period, it was determined that the activity most likely to cause peak levels that may disrupt the sleep of nearby residents, was the operation of the Forklift. To assess the potential for sleep disturbance, the L_{A1} (1 minute) from forklift operation was modelled. A list of the proposed equipment, as well as their respective SWLs has been provided in **Table 6-18**.

Table 6-18: Operational Noise Sources

Activities	Equipment Used	Sound Power Level,
Ventilation Fan	Multifan 130 Exhaust Fan	88
Feed Delivery	Delivery Truck	101
	Mechanical Refiller	104
Bird Collection	Delivery Truck	101
	Forklift	95
	Forklift (LA1 (1 minute))	107

6.11 METEOROLOGICAL CONDITIONS

The INP states that meteorological conditions such as gradients winds and temperature inversions can enhance or inhibit noise propagation. As per Section 5 of the INP, in circumstances where wind or temperature inversions are determined to be a feature of the area, these conditions are required to be considered when assessing the potential impacts from the proposed development.

Temperature inversions are considered to be a feature of a site when the percentage occurrence of the total night time, winter temperature inversions exceeds 30%. The night time period for determining the frequency of temperature inversions is one hour before sunset, to one hour after sunrise (taken to be 6:00 pm to 7:00 am). The analysis of prevailing conditions indicated that 'moderate' to 'high' temperature inversions (F and G Class) were present for approximately 52% of night periods during the winter season. As the prevalence of temperature inversions was greater than 30%, the effects of temperature inversions were considered in the modelling of adverse meteorological conditions. Due to the absence of significant topographical features in the locality of the proposed site, drainage-flow wind, associated with temperature inversion conditions, has not been considered in the modelling of potential noise impacts.

Table 6-19: Modelled Meteorological Parameters

Meteorological Parameter	Modelled Meteorological Conditions		
	Day (Neutral)	Evening/Night (Neutral)	Evening/Night (Inversion)
Temperature (deg C)	20	10	10
Humidity (%)	60	50	50
Wind Speed (m/s)	0	0	0
Wind Direction (deg)	N/A	N/A	N/A

Meteorological Parameter	Modelled Meteorological Conditions		
	Day (Neutral)	Evening/Night (Neutral)	Evening/Night (Inversion)
Stability Class	D	D	F

Wind is considered to be a feature of a site where source-to-receiver winds of up to 3 m/s occur for 30% of the time, for all time periods. Long term meteorological data from the Bureau of Meteorology (BOM) stations at Camden (068192), indicates that source-to-receiver winds of up to 3 m/s at the study site do not occur for 30% of the time during any season. Therefore, gradient winds are not considered to be a feature of the site, and have not been considered in the prediction of noise impacts.

In accordance with the provisions established in Section 5 of the INP, neutral and adverse meteorological conditions have been assumed in the prediction of potential noise impacts associated with the proposed poultry facility. The modelled meteorological scenarios are shown in **Table 6-19**.

6.12 NOISE MODEL RESULTS

6.12.1 Construction Phase Noise Predictions

The predicted $L_{Aeq,15\text{minute}}$ noise levels at the nearest sensitive receivers, for primary earthworks, levelling the pad, and construction of infrastructure activities are shown below. To assist with the understanding of these results, the predicted noise level contours are provided in **Appendix D**. The predicted noise levels represent conservative assumptions, based on all plant operating at maximum capacity at locations most exposed to the nearby sensitive receivers. It is therefore considered that these modelled predictions represent the upper limit of expected noise levels.

It should be noted that many of the items of plant proposed for the construction phase activities have the potential to generate tonal influences, particularly in the case of reverse alarms. Where tonal reverse alarms are used in lieu of broadband reverse alarms, the predicted noise levels are expected to be up to 5 dB higher than those modelled.

6.12.2 Operational Phase Noise Predictions

The predicted $L_{Aeq,15\text{minute}}$ noise levels at the nearest sensitive receivers, for operational phase activities are shown in following tables. To assist with the understanding of these results, the predicted noise level contours are provided in **Appendix D**.

Table 6-20: Predicted LAeq,15minute noise level – primary earthwork activities, dB(A)

Receiver	Predicted Noise Levels (LAeq,15 minute) Shed Construction	Criteria dB(A) (Day)	Compliance (Yes or No)
R1	50	40	No
R2	52		No
R3	40		Yes
R4	52		No
R5	50		No
R6	48		No
R7	46		No
R8	46		No
R9	48		No
R10	45		No
R11	44		No
R12	43		No
R13	40		Yes
R14	42		No
R15	38		Yes
R16	43		No
R17	38		Yes
R18	44		No
R19	45		No
R20	48		No
R21	49		No
R22	49		No
R23	45		No
R24	45		No
R25	47		No
R26	43		No
R27	45		No
R28	41		No
R29	43		No
R30	44		No
R31	43		No
R32	36		Yes
R33	40		Yes
R34	34		Yes
R35	34		Yes
R36	43		No
R37	40		Yes
R38 ¹	47		No
R39 ¹	42		No

Note 1: Service Station (External NML should be below 70 dB(A))

Table 6-21: Predicted LAeq,15minute noise level – levelling the pad activities, dB(A)

Receiver	Predicted Noise Levels (LAeq,15 minute) Shed Construction	Criteria dB(A) (Day)	Compliance (Yes or No)
R1	45	40	No
R2	50		No
R3	36		Yes
R4	50		No
R5	48		No
R6	46		No
R7	44		No
R8	44		No
R9	44		No
R10	42		No
R11	41		No
R12	40		Yes
R13	37		Yes
R14	35		Yes
R15	35		Yes
R16	40		Yes
R17	34		Yes
R18	41		No
R19	42		No
R20	45		No
R21	46		No
R22	47		No
R23	42		No
R24	43		No
R25	44		No
R26	41		No
R27	43		No
R28	38		Yes
R29	40		Yes
R30	41		No
R31	40		Yes
R32	33		Yes
R33	36		Yes
R34	31		Yes
R35	30		Yes
R36	39		Yes
R37	37		Yes

Receiver	Predicted Noise Levels (L _{Aeq,15 minute}) Shed Construction	Criteria dB(A) (Day)	Compliance (Yes or No)
R38 ¹	45		No
R39 ¹	40		Yes

Note 1: Service Station (External NML should be below 70 dB(A))

Table 6-22: Predicted LAeq,15minute noise level – construction of infrastructure activities, dB(A)

Receiver	Predicted Noise Levels (L _{Aeq,15 minute}) Shed Construction	Criteria dB(A) (Day)	Compliance (Yes or No)
R1	38		Yes
R2	41		No
R3	29		Yes
R4	38		Yes
R5	36		Yes
R6	35		Yes
R7	32		Yes
R8	31		Yes
R9	33		Yes
R10	30		Yes
R11	29		Yes
R12	28		Yes
R13	26		Yes
R14	27		Yes
R15	27	40	Yes
R16	28		Yes
R17	27		Yes
R18	29		Yes
R19	30		Yes
R20	34		Yes
R21	34		Yes
R22	35		Yes
R23	31		Yes
R24	32		Yes
R25	32		Yes
R26	30		Yes
R27	31		Yes
R28	28		Yes
R29	28		Yes
R30	29		Yes
R31	28		Yes
R32	24		Yes
R33	26		Yes
R34	23		Yes

Receiver	Predicted Noise Levels (L _{Aeq,15 minute}) Shed Construction	Criteria dB(A) (Day)	Compliance (Yes or No)
R35	23		Yes
R36	28		Yes
R37	27		Yes
R38 ¹	34		Yes
R39 ¹	33		Yes

Note 1: Service Station (External NML should be below 70 dB(A))

Table 6-23: Predicted LAeq,15minute noise level - operation of ventilation fans, dB(A)

Receiver	Predicted Noise Levels (L _{Aeq,15 minute})			Criteria dB(A) (D/E/N)	Compliance (Yes or No)
	Day 15 Fans (Neutral)	Evening/Night 15 Fans (Neutral)	Evening/Night 5 Fans (Inversion)		
R1	31	31	26	35/35/35	Yes
R2	31	29	28		Yes
R3	23	24	19		Yes
R4	32	33	29		Yes
R5	28	28	26		Yes
R6	25	26	24		Yes
R7	23	23	21		Yes
R8	22	22	20		Yes
R9	26	26	25		Yes
R10	24	24	23		Yes
R11	23	24	23		Yes
R12	22	22	22		Yes
R13	21	22	21		Yes
R14	22	22	21		Yes
R15	22	23	22		Yes
R16	22	22	21		Yes
R17	22	22	21		Yes
R18	24	25	23		Yes
R19	30	30	27		Yes
R20	31	31	29		Yes
R21	33	34	31		Yes
R22	32	33	30		Yes
R23	26	26	23		Yes
R24	26	26	24		Yes
R25	24	24	22		Yes
R26	23	23	21		Yes
R27	23	23	20		Yes
R28	22	22	20		Yes
R29	21	22	19		Yes
R30	21	21	19		Yes
R31	20	20	18		Yes
R32	20	20	19		Yes

Receiver	Predicted Noise Levels (L _{Aeq,15 minute})			Criteria dB(A) (D/E/N)	Compliance (Yes or No)
	Day 15 Fans (Neutral)	Evening/Night 15 Fans (Neutral)	Evening/Night 5 Fans (Inversion)		
R33	21	21	20	35/35/35	Yes
R34	19	19	17		Yes
R35	19	20	15		Yes
R36	21	21	19		Yes
R37	19	20	17		Yes
R38 ¹	25	25	23		Yes
R39 ¹	27	27	23		Yes

Note 1: Service Station (Acceptable L_{Aeq} noise level should be below 65 dB(A))

Table 6-24: Predicted LAeq,15minute cumulative noise level - operation of ventilation fans, dB(A)

Receiver	Predicted Noise Levels (L _{Aeq,15 minute})		Criteria dB(A) (D/E/N)	Compliance (Yes or No)
	Day Fans (Mockingbird Road and other broiler farms)	Evening/Night (Inversion) Fans (Mockingbird Road and other broiler farms)		
R1	31	26	35/35/35	Yes
R2	31	28		Yes
R3	24	19		Yes
R4	32	29		Yes
R5	28	26		Yes
R6	26	24		Yes
R7	24	21		Yes
R8	23	20		Yes
R9	27	25		Yes
R10	25	23		Yes
R11	25	23		Yes
R12	24	22		Yes
R13	24	21		Yes
R14	26	21		Yes
R15	27	22		Yes
R16	26	21		Yes
R17	28	21		Yes
R18	28	23		Yes
R19	31	27		Yes
R20	31	29		Yes
R21	33	31		Yes
R22	33	30		Yes
R23	27	23		Yes
R24	27	24		Yes
R25	25	22		Yes
R26	24	21		Yes
R27	24	20		Yes
R28	23	20		Yes

Receiver	Predicted Noise Levels (L _{Aeq,15 minute})		Criteria dB(A) (D/E/N)	Compliance (Yes or No)
	Day Fans (Mockingbird Road and other broiler farms)	Evening/Night (Inversion) Fans (Mockingbird Road and other broiler farms)		
R29	22	19	35/35/35	Yes
R30	22	19		Yes
R31	21	18		Yes
R32	25	19		Yes
R33	24	20		Yes
R34	21	17		Yes
R35	20	15		Yes
R36	22	19		Yes
R37	20	17		Yes
R38 ¹	26	23		Yes
R39 ¹	27	23		Yes

Note 1: Service Station (Acceptable L_{Aeq} noise level should be below 65 dB(A))

Table 6-25: Predicted LAeq,15minute noise level - feed delivery and silo refilling, dB(A)

Receiver	Predicted Noise Levels (L _{Aeq,15 minute})			Criteria dB(A) (D/E/N)	Compliance (Yes or No)
	Day (Neutral)	Evening/Night (Neutral)	Evening/Night (Inversion)		
R1	32	31	29	35/35/35	Yes
R2	34	32	33		Yes
R3	24	24	22		Yes
R4	33	33	32		Yes
R5	29	29	28		Yes
R6	27	27	27		Yes
R7	25	25	25		Yes
R8	23	23	22		Yes
R9	27	27	27		Yes
R10	25	25	25		Yes
R11	24	24	25		Yes
R12	23	23	24		Yes
R13	22	22	22		Yes
R14	22	22	23		Yes
R15	23	23	23		Yes
R16	23	23	23		Yes
R17	22	22	22		Yes
R18	25	25	25		Yes
R19	30	30	29		Yes
R20	31	32	30		Yes
R21	33	34	33		Yes
R22	33	33	32		Yes
R23	26	27	25		Yes
R24	27	27	26		Yes

Receiver	Predicted Noise Levels (L _{Aeq,15 minute})			Criteria dB(A) (D/E/N)	Compliance (Yes or No)
	Day (Neutral)	Evening/Night (Neutral)	Evening/Night (Inversion)		
R25	25	25	24	35/35/45	Yes
R26	24	24	24		Yes
R27	24	24	24		Yes
R28	23	23	22		Yes
R29	23	23	23		Yes
R30	22	22	22		Yes
R31	21	21	20		Yes
R32	20	20	20		Yes
R33	21	22	22		Yes
R34	19	19	19		Yes
R35	19	20	17		Yes
R36	22	22	21		Yes
R37	20	21	19		Yes
R38 ¹	26	25	24		Yes
R39 ¹	27	27	25		Yes

Note 1: Service Station (Acceptable L_{Aeq} noise level should be below 65 dB(A))

Table 6-26: Predicted LAeq,15minute and LA1,1minute (sleep disturbance) noise levels - bird collection, dB(A)

Receiver	Predicted Noise Levels (L _{Aeq,15 minute})			Criteria dB(A) (E/N/Sleep disturbance)	Compliance (Yes or No)
	Day (L _{Aeq,15minute} , Neutral)	Evening/Night (L _{Aeq,15minute} , Inversion)	Sleep Disturbance (LA1,1minute)		
R1	33	33	44	35/35/45	Yes
R2	34	35	45		Yes
R3	22	25	36		Yes
R4	32	31	38		Yes
R5	29	31	39		Yes
R6	27	29	37		Yes
R7	25	26	35		Yes
R8	24	25	34		Yes
R9	29	30	40		Yes
R10	26	27	37		Yes
R11	25	27	37		Yes
R12	23	25	33		Yes
R13	22	23	32		Yes
R14	23	24	34		Yes
R15	23	24	32		Yes
R16	25	26	36		Yes
R17	23	24	32		Yes
R18	26	27	36		Yes
R19	29	28	32		Yes
R20	31	30	35		Yes

Receiver	Predicted Noise Levels (LAeq,15 minute)			Criteria dB(A) (E/N/Sleep disturbance)	Compliance (Yes or No)
	Day (LAeq,15minute, Neutral)	Evening/Night (LAeq,15minute, Inversion)	Sleep Disturbance (LA1,1minute)		
R21	33	32	37		Yes
R22	32	32	39		Yes
R23	27	27	35		Yes
R24	27	29	38		Yes
R25	25	28	36		Yes
R26	24	27	34		Yes
R27	24	26	33		Yes
R28	23	25	33		Yes
R29	22	24	32		Yes
R30	22	23	32		Yes
R31	21	22	31		Yes
R32	20	22	30		Yes
R33	22	23	31		Yes
R34	19	20	29		Yes
R35	20	18	29		Yes
R36	22	21	31		Yes
R37	20	19	31		Yes
R38 ¹	25	17	27		Yes
R39 ¹	27	18	29		Yes

6.12.3 Assumptions of the Model

Key assumptions of the model include:

- topographical information was obtained from the 1 second SRTM Derived Digital Elevation Models produced by Geoscience Australia;
- all cleared areas were modelled considering a conservative ground factor of 0.5 to account for a mixture of hard and vegetated surfaces;
- all residential receivers were modelled at 1.5 metres above the ground surface, at the most noise affected location within approximately 1.5 kilometres of the dwelling;
- to reduce the noise levels at the nearby sensitive receivers, the fans on the side of sheds facing the Mockingbird Road were relocated to the rear of the sheds;
- all sources operate at their maximum assumed noise levels for the duration of the assessment period;
- the three-metre earth mound/barrier surrounding the proposed site was modelled from south eastern end to north western end, and around the designated access route;
- four-metre-tall Colorbond fencing was modelled at the rear of the sheds to provide attenuation during the operation of fans;

- the L_{A1} (1 minute) for the operation of the forklift was based on a recent measurement of bird collection activities at a similar facility in the Hunter Region; and
- no modifying factors have been applied to noise source sound power levels (SWLs) as tonal influences are not considered to be a feature of the operational noise environment.

It must be noted that these represent conservative assumptions, and the modelling results represent the upper limit of expected noise levels.

6.13 ROAD TRAFFIC NOISE ASSESSMENT RESULTS

The proposed development is not considered a traffic generating development according to Schedule 3 of the *Infrastructure SEPP*. According to the proponent, the proposed facility will generate a maximum of four truck movements (two ingressing and two egressing) during any one hour of the night period during bird collection. To enable the assessment of road traffic noise associated with the proposed development, the single event sound power level of 108 dB(A) for a typical truck movement at 80 km/hr was used to predict the $L_{Aeq,1hr}$ traffic noise level, using the following relationship:

$$L_{Aeq,9hr} = SEL + 10 \log(N) - 10 \log(32400) - 20 \log(r) - 8$$

Where: SEL is the sound exposure level from a truck pass-by;

N is the number of truck movements during the night period;

32400 is the number of seconds in 9 hours;

r is the distance from road to the receiver; and

8 is a constant for converting sound power levels to sound pressure levels.

Based on a single event truck pass-by sound power level of 108 dB(A), a distance of approximately 145 metres from the access road to the nearest residential receiver on Mockingbird Road and a maximum of two trucks deliveries each hour (four truck movements) over the course of the night period (9 hours), the predicted $L_{Aeq,1hr}$ traffic noise level at the nearest sensitive receiver is anticipated to be in the order of 27 dB(A). This complies with the daytime and night time criteria established in **Table 6-14** for local roads and would not increase the traffic noise levels from Mockingbird Road.

6.14 VIBRATION ASSESSMENT RESULTS

A desktop vibration assessment was undertaken having regard to site construction activities, the types of vibration events, and the distance between the vibration source and the nearest receiver locations. The typical ground vibration levels from construction activities, provided in **Table 6-27** have been sourced from the South Australian Department of Planning, Transport and Infrastructure document

Management of Noise and Vibration: Construction and Maintenance Activities (2015), and the Transport for NSW (TfNSW) (2012) *Construction Noise Strategy*. It should be noted that vibration levels are influenced by the actual operating condition of the items of plant and the local site and geotechnical conditions. **Table 6-27** provides indicative vibration levels and associated safe working distances, however, where there is the potential for ground vibrations to occur; vibration level monitoring should be undertaken at the site to quantify the potential impacts.

Table 6-27: Typical Vibration Levels from Construction Activities

Activity	Typical Levels of Ground Vibration	Safe Working Distance	
		Cosmetic Damage	Human Comfort
Truck traffic over irregular surfaces	2mm/s at 10m	<10m	40m
Bulldozer	2mm/s at 5m	<10m	20m
Roller/Compactor	2mm/s at 15m	<15m	50m
Excavator	0.2mm/s at 40m	<15m	40m
Excavator (with rock breaker)	1.3mm/s at 10m	<10m	40m

The majority of the proposed construction activities are considered to occur intermittently, in that they occur for relatively short periods during any one cycle of the construction activity. Nevertheless, due to the potential for plant to operate for extended periods of time, all items of plant are considered to operate in a continuous fashion throughout the construction period.

A review of aerial photographs indicated that the closest point between the proposed construction site and the nearest sensitive receiver is approximately 300 metres. Based on the typical vibration levels from the proposed construction activities, vibration impacts from the proposed works, associated with cosmetic damage to buildings and human response to vibration, are unlikely to occur. It is important to note that the safe working distances are indicative and depend on site specific conditions including items of plant and geotechnical conditions.

6.15 ASSESSMENT OF POTENTIAL IMPACTS

6.15.1 Construction Phase

Modelling of potential impacts associated with construction phase activities indicated that predicted noise levels would exceed the *noise affected* Noise Management Level (NML) of 40 dB(A), at multiple receiver locations for each phase

of construction. The *noise affected* NML is considered to be the point above which there may be some community reaction to the noise being generated by the construction activities. It should be noted that the *highly noise affected* NML of 75 dB(A), considered to be the point above which there is likely to be strong community reaction to the construction noise, was not predicted to be exceeded at any of the nearby receiver locations during the proposed construction phase.

For the purpose of this assessment, three construction phases were considered. These include primary earthworks; levelling and compacting the site; and the construction of the poultry sheds. The primary earthworks were considered to be activities for the purpose of 'cutting' the site. All noise sources were modelled relative to the existing ground level. The site levelling and compacting works were considered to be the activities for the purpose of redistributing excavated material (filling) the site, and compacting the site. All noise sources during this phase were modelled relative to final ground surface. The shed construction works were considered to include all activities relating to shed construction including concrete works and shed building. Advitech Environmental understands that the ground works, including the site excavation and compacting would be undertaken over a period of approximately four weeks. It is also recommended that the earth berms/barriers proposed to reduce the impacts associated with noise and air quality should be constructed during the site excavation and levelling pad works.

The results of the modelling indicate that the highest predicted noise levels at each of the sensitive receiver locations would generally occur during primary earthworks. The predicted noise levels were observed to exceed the noise affected NML at 30 of the 39 identified nearby residential receivers, with the highest noise levels predicted at receiver locations R2 and R4 (52 dB(A)).

During the site levelling and compacting works, the results of the noise modelling indicate that the predicted noise levels would exceed the noise affected NML at 22 of the 39 identified nearby residential receivers. The highest noise levels were predicted to occur at receiver locations R2 and R4 (50 dB(A)).

During the shed construction works, the results of the noise modelling indicate that the predicted noise levels would exceed the noise affected NML only at one of the 39 identified nearby residential receivers. The highest noise levels were predicted to occur at receiver location R2 (41 dB(A)).

It is noted that the predicted noise levels represent conservative assumptions, based on all plant operating at their maximum capacity at the locations that present the highest potential exposure to the nearby sensitive receivers. It is therefore considered that the modelled predictions represent the upper limit of the expected noise levels. During 'normal' operating conditions, it is likely that items of plant would operate below their maximum capacity, and items of plant would likely be dispersed throughout the construction site. It is therefore anticipated that construction noise levels would typically be lower than those presented.

To reduce the impact on potentially affected residential receivers, it is recommended that a construction phase noise management plan (NMP) should be

prepared prior to start of construction. Specifically, the NMP should ensure that early and ongoing consultation with potentially affected receivers adjacent to the works area is undertaken, and site work practices to minimise noise are implemented. Some practical methods for managing the potential impacts may include:

- designing of the site to avoid the use of reverse alarms or employ the use of broadband alarms to reduce the occurrence of any annoying characteristics;
- place as much distance between plant or equipment and other sensitive land uses;
- place fixed equipment in cuttings or behind earth mounds/barrier;
- regularly inspect and maintain equipment to ensure it is good working order; and
- train workers to minimise noise by avoiding shouting; minimising slamming vehicle doors; avoiding the use of radios or stereos outdoors where neighbours can be affected; and preventing the dropping of materials from height or unnecessary metal to metal contact on equipment.

Assessment of the potential vibration impacts associated with construction works indicates that the proposed construction activities would occur at a distance greater than the minimum safe working distances for each of the items of plant proposed for the works. It is therefore considered that the construction works would not result in any undue vibration impacts, on either cosmetic damage to buildings or human comfort.

6.15.2 Operation Phase

Modelling of potential impacts for the operation of the ventilation fans during the day, evening and night periods, modelled under neutral and adverse meteorological conditions, indicates that the noise levels would comply with the $L_{Aeq,15\text{minute}}$ criteria at all receiver locations. Cumulative noise impact assessment for the fans of the existing tunnel ventilated sheds at Nightingale Road and the fans of the proposed sheds at Mockingbird Road showed that the noise levels would comply with the $L_{Aeq,15\text{minute}}$ criteria of 35 dB(A) during day and night periods at all receiver locations.

Noise levels generated during feed delivery and silo refilling activities are predicted to comply with the day, evening and night time $L_{Aeq,15\text{minute}}$ criterion of 35 dB(A) under neutral and adverse meteorological conditions at all receiver locations.

Bird collection activities would generally occur during the night periods over a period of approximately one week, for each five to eight-week production cycle. However, the potential noise impacts associated with bird pickup were undertaken for both day and night periods in case any bird pick up would occur during day period also. It should be noted that peak noise levels during night time were modelled based on adverse meteorological conditions involving the occurrence of a temperature

inversion. The results of the modelling indicate that the predicted noise levels for bird pickup activities during the day, evening and night periods would comply with the associated $L_{Aeq,15\text{minute}}$ criteria for all receiver locations.

In addition to general bird collection activities, the $L_{A1 (1\text{minute})}$ for the operation of the forklift, to be used during bird loading, was modelled to predict whether $L_{A1 (1\text{minute})}$ noise levels would exceed the sleep disturbance $L_{A1,1\text{minute}}$ criterion of 45 dB(A). The results of the analysis indicates that the $L_{A1 (1\text{minute})}$ noise levels would not exceed the sleep disturbance $L_{A1,1\text{minute}}$ criterion at any receiver.

Although the results of the predictive modelling indicated that no exceedances of the day, evening or night criteria are anticipated, it is advised that universal work practices to minimise noise impacts should be implemented. Some of the work practices that may be considered for the operation of the proposed facility include:

- training workers on ways to minimise noise outside the sheds. This includes avoiding the use of radios, loud talking and the slamming of vehicle doors;
- operating the equipment in a quieter or more efficient manner include low truck speeds travelling on site;
- minimising time that equipment is left idling;
- reducing heavy acceleration / engine revving, and ensuring that heavy vehicles avoid using air breaking on site; and
- equipment should be regularly checked and maintained to ensure that it is in good mechanical condition so that unwanted annoying characteristics are not produced.

6.16 CONCLUSIONS

Noise modelling was undertaken using the *Predictor* environmental noise modelling software, considering several operational scenarios with consideration to topographical and meteorological conditions. Strategic earth mounds are included in the modelled scenarios to provide attenuation measures.

Modelling of the construction activities indicate that predicted $L_{Aeq,15\text{minute}}$ noise levels would exceed noise affected NML of 40 dB(A) at multiple receiver locations during each construction phase over day period; however, this modelling scenario was predicted to comply with the highly noise affected NML of 75 dB(A), above which there is likely to be strong community reaction to the noise.

A review of the items of plant and separation distances between the proposed construction works and the nearby sensitive receivers suggested that all of the proposed construction activities would be undertaken at safe distances to prevent any vibration impacts. It is therefore considered that the construction works would not result in any undue vibration impacts, on either cosmetic damage to buildings, or human comfort.

To reduce the noise impacts, it is recommended that the operating fans are all located either at the rear of the sheds or side of sheds facing the Hume Highway. On this basis, fans are not operating on the side of shed facing the Mockingbird Road. Modelling of the fans operating indicate that predicted $L_{Aeq,15\text{minute}}$ noise levels would comply with the nominated PSNL criteria at all receiver locations under neutral and adverse meteorological conditions. Cumulative noise impact assessment for the fans operating also showed that the noise levels would comply with nominated PSNL criteria at all receiver locations.

Modelling of the feed delivery and silo refilling activities indicated that the predicted $L_{Aeq,15\text{minute}}$ noise levels would not exceed nominated criteria any receiver location during day, evening and night time operations, under neutral and worst case operating conditions.

Modelling of the bird collection activities indicate that predicted $L_{Aeq,15\text{minute}}$ noise levels would be below the nominated PSNL criteria at all receiver locations during various site activities. Modelled sleep disturbance ($L_{A1, 1\text{ minute}}$) impacts due to forklift operation resulting from the proposed development operating during the night period, are also predicted to comply with the sleep disturbance criterion of 45 dB(A) at all receiver locations during bird collection activities under temperature inversion conditions.

7 AIR QUALITY ASSESSMENT

Chapter Seven provides a detailed air quality assessment to identify potential impacts of the proposed poultry farm extension. The chapter provides the results of meteorological investigations and detailed air quality modelling, estimates emissions, and compares the likely impacts on air quality against relevant industry standards.

The proposed sheds would be approximately orientated in a north east to south west direction. Ventilation would be provided by 15 axial fans per shed directed through a 10 metre (m) stack positioned at the earth mound facing end of the shed. The proposed sheds measure 150 m by 18.3 m, giving a total floor area of 2,745 m². The birds will remain in the sheds at all times.

7.1 SENSITIVE RECEIVERS

The site is positioned in a rural receiving environment, with small acreages surrounding the site. The closest urban settlement to the proposed development is Bargo located approximately 5 km to the west.

Of the 39 identified sensitive receivers within a radius of approximately 1.5 km of the proposed site, 37 are residential receivers and 2 are service stations on the Hume Motorway. Sensitive receivers were identified based on their proximity and exposure to the subject site. The locations of nearby sensitive receivers are shown in Figure 7-1 and detailed in **Table 7-1**.

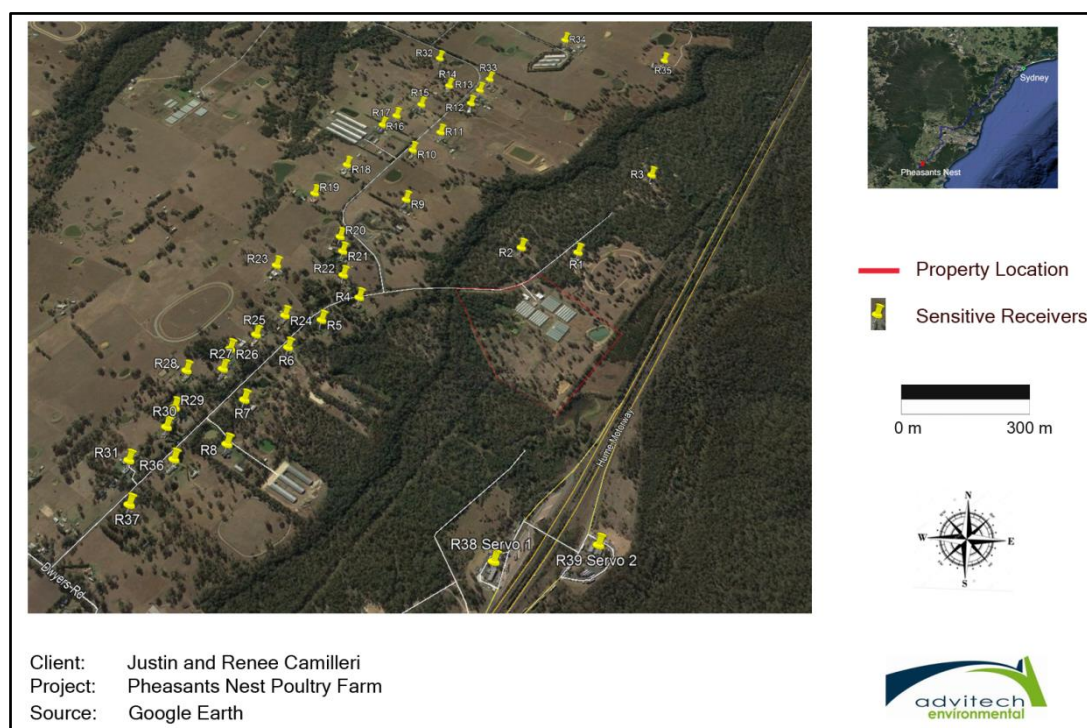


Figure 7-1: Nearby Sensitive Receivers

Table 7-1: Nearest Identified Sensitive Receivers

Receiver Identifier (ID)	Receiver Type	Receiver Address	Easting (UTM) (km)	Northing (UTM) (km)
R1	Residential	220 Mockingbird Road, Pheasants Nest	282.6942	6205.037
R2	Residential	185 Mockingbird Road, Pheasants Nest	282.4975	6205.052
R3	Residential	225 Mockingbird Road, Pheasants Nest	282.9785	6205.427
R4	Residential	110 Mockingbird Road, Pheasants Nest	281.9581	6204.821
R5	Residential	100 Mockingbird Road, Pheasants Nest	281.8468	6204.723
R6	Residential	80 Mockingbird Road, Pheasants Nest	281.7552	6204.61
R7	Residential	60 Mockingbird Road, Pheasants Nest	281.6529	6204.413
R8	Residential	50 Mockingbird Road, Pheasants Nest	281.6319	6204.256
R9	Residential	50 Nightingale Road, Pheasants Nest	282.075	6205.279
R10	Residential	90B Nightingale Road, Pheasants Nest	282.0765	6205.541
R11	Residential	90 Nightingale Road, Pheasants Nest	282.1754	6205.645
R12	Residential	110 Nightingale Road, Pheasants Nest	282.2843	6205.818
R13	Residential	120 Nightingale Road, Pheasants Nest	282.3181	6205.902
R14	Residential	115 Nightingale Road, Pheasants Nest	282.1918	6205.927
R15	Residential	95 Nightingale Road, Pheasants Nest	282.087	6205.807
R16	Residential	85 Nightingale Road, Pheasants Nest	281.9944	6205.737
R17	Residential	75 Nightingale Road, Pheasants Nest	281.9455	6205.681
R18	Residential	65 Nightingale Road, Pheasants Nest	281.8334	6205.451
R19	Residential	55 Nightingale Road, Pheasants Nest	281.7342	6205.299
R20	Residential	35 Nightingale Road, Pheasants Nest	281.8564	6205.089
R21	Residential	15 Nightingale Road, Pheasants Nest	281.8751	6205.017
R22	Residential	119 Mockingbird Road, Pheasants Nest	281.8913	6204.913
R23	Residential	105 Mockingbird Road, Pheasants Nest	281.6569	6204.949
R24	Residential	95 Mockingbird Road, Pheasants Nest	281.7215	6204.735
R25	Residential	85 Mockingbird Road, Pheasants Nest	281.6422	6204.656
R26	Residential	79 Mockingbird Road, Pheasants Nest	281.5702	6204.597
R27	Residential	71 Mockingbird Road, Pheasants Nest	281.5625	6204.521
R28	Residential	63 Mockingbird Road, Pheasants Nest	281.4506	6204.512
R29	Residential	55 Mockingbird Road, Pheasants Nest	281.4453	6204.375
R30	Residential	45 Mockingbird Road, Pheasants Nest	281.4386	6204.308
R31	Residential	35 Mockingbird Road, Pheasants Nest	281.3563	6204.195
R32	Residential	155 Nightingale Road, Pheasants Nest	282.1404	6206.107
R33	Residential	130 Nightingale Road, Pheasants Nest	282.3566	6205.973
R34	Residential	294-296 Pheasants Nest Road, Pheasants Nest	282.6698	6206.246

Receiver Identifier (ID)	Receiver Type	Receiver Address	Easting (UTM) (km)	Northing (UTM) (km)
R35	Residential	180 Whipbird Road, Pheasants Nest	283.0833	6206.116
R36	Residential	40 Mockingbird Road, Pheasants Nest	281.4869	6204.200
R37	Residential	20 Mockingbird Road, Pheasants Nest	281.3952	6204.054
R38	Commercial	Northbound Service Station, Hume Highway, Pheasants Nest	282.4349	6203.911
R39	Commercial	Southbound Service Station, Hume Highway, Pheasants Nest	282.7217	6203.969

UTM – Universal Transverse Mercator coordinate System based on the WGS84 Datum

7.2 SITE TOPOGRAPHY

The subject site is located at approximately 270 to 280 m Australian Height Datum (AHD) on undulating terrain within a valley in the NSW Southern Highlands. Local atmospheric dispersion could be influenced by night-time katabatic drainage flows from elevated terrain or channelling effects in valleys or gullies around the site. A three-dimensional representation of the area showing the site location is presented in **Figure 7-2**.

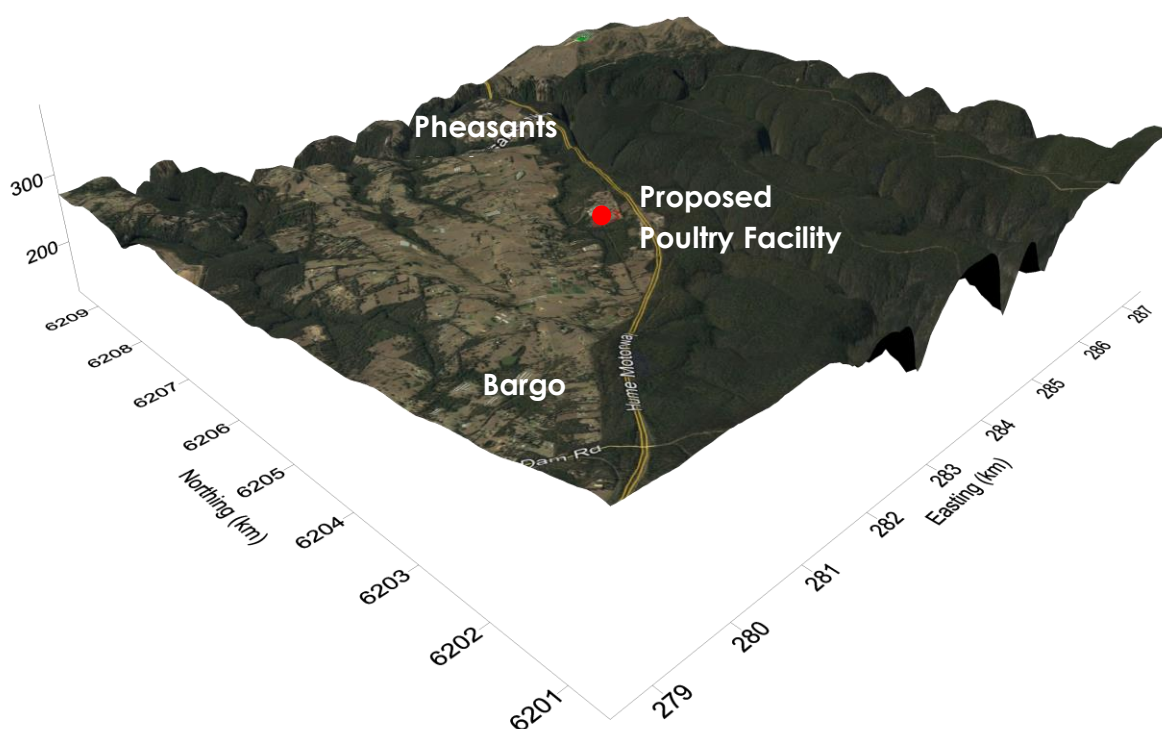


Figure 7-2: Project Area Showing Topographic Features

7.3 AIR QUALITY GUIDELINES

The NSW Office of Environment and Heritage (OEH) specify impact assessment criteria for emissions to air and permissible ground level concentrations (GLCs).

Note: The NSW Office of Environment and Heritage (OEH) came into existence in April 2011. OEH was previously part of the Department of Environment, Climate Change and Water (DECCW). The DECCW was also recently known as the Department of Environment and Climate Change (DECC), and prior to that the Department of Environment and Conservation (DEC). The terms OEH, DECCW, DECC and DEC are interchangeable in this report.

7.4 GROUND LEVEL CONCENTRATIONS

The NSW DEC in the publications *Approved Methods for the Modelling and Assessment of Air Pollutants in NSW* (NSW EPA, 2016) and the *Assessment and management of odours from stationary sources in NSW*¹ (DEC, 2006) specify impact assessment criteria. The relevant sections from this publication are reproduced below in **Table 7-2** which presents the GLC criteria for each applicable air pollutant.

Table 7-2: NSW DECC Impact Assessment Criteria

Pollutant	DECC Design Criteria	Units	Averaging Time
Odour	2-7 ^a	OU	1 hour ^b
TSP ^c	90	µg/m ³	Annual
PM ₁₀ ^d	50	µg/m ³	24 hours
	25	µg/m ³	Annual
PM _{2.5} ^e	25	µg/m ³	24 hours
	8	µg/m ³	Annual
Deposited Dust ^f	2 ^g	g/m ² /month	Annual
	4 ^h		

^aSource: NSW EPA, *Approved Methods for the Modelling and Assessment of Air Pollutants, 2016* (Table 7.5). The range 2-7 OU represent population-dependant odour performance criteria. Odours below 2 OU are not considered offensive (NSW EPA, 2016).

^bOdour concentration adjusted to one second nose response time using published peak-to-mean factors.

^cTotal suspended particulates.

^dParticulate materials with an aerodynamic diameter less than 10 µm.

^eParticulate materials with an aerodynamic diameter less than 2.5 µm.

^fDust is assessed as insoluble solids as defined by AS 3580.10.1.

^g Maximum increase in deposited dust level.

^h Maximum total deposited dust level.

The air dispersion modelling review was undertaken using the US EPA air dispersion model CALPUFF Version 6.42.

An odour and particulates assessment was undertaken to assess potential impacts on receivers surrounding the project site. Odour was assessed for the 99th percentile, one-second average GLC. GLCs were determined using appropriate odour emission rates obtained from available representative literature reports concerning poultry layer facilities.

TSP, PM₁₀ and PM_{2.5} was assessed for the 100th percentile over the respective averaging period using one year of meteorological data.

The impact assessment criteria for odour are based upon the NSW OEH affected population performance criteria for complex mixtures of odour. **Table 7-3** lists the odour impact assessment criteria as a function of population.

Table 7-3: Odour Assessment Criteria¹

Population of affected community	Odour Assessment Criteria
Rural single residence (<=2)	7.0
≈10	6.0
≈30	5.0
≈125	4.0
≈500	3.0
Urban area (>= 2000) and/or schools and hospitals	2.0

¹ 99th percentile. Based on nose-response-time average of one-second.

According to the NSW OEH, the affected population is categorised as the number of people who are impacted by odour concentrations of 2 OU and above. In accordance with the NSW OEH definition of "affected population", six residences with a residence population of 3.3 are estimated to be "affected" within the impacted radius of the proposed poultry. The commercial receptors (R38 and R39) are not expected to exceed four working employees at a given time and therefore the average population of 3.3 persons per receptor is considered representative. According to the NSW OEH population performance criteria for complex odours, this

equates to an odour performance criteria of 5.3 OU. This assessment has applied an odour criterion of 5 OU to determine regulatory compliance.

As the population density increases, the proportion of sensitive individuals is also likely to increase, so that more stringent criteria are necessary. Hence, the impact assessment criteria for complex mixtures of odours were designed to take into account the range of sensitivity to odours within the community and to provide additional protection for individuals with a heightened response to odours. This is achieved using a statistical approach that is dependent upon population size.

To arrive at a one-second averaging time appropriate peak-to-mean factors have been applied to hourly average odour concentrations. Peak-to-mean factors estimate the effects of plume meandering and concentration fluctuations perceived by the human nose. A peak-to-mean factor of 2.3 has been adopted, corresponding to near-field and far-field receivers for point (stack) sources, for all stability classes (A-F).

Peak-to-mean ratios (P/M60) will alter the overall odour emissions rate depending on the type of emissions source. The recommended factors developed by Katestone Scientific and listed in the NSW EPA Approved Methods are shown in **Table 7-4**.

Table 7-4: Peak-to-Mean Ratio¹

Source Type	Pasquill-Gifford Stability Class	Near field PM/60	Far field P/M60
Area	A,B,C,D	2.5	2.3
	E,F	2.3	1.9
Line	A-F	6	6
Surface wake-free point	A,B,C	12	4
	D,E,F	25	7
Tall wake-free point	A,B,C	17	3
	D,E,F	35	6
Wake-affected point	A-F	2.3	2.3
Volume	A-F	2.3	2.3

¹ Source: NSW EPA Approved Methods

A peak-to-mean ratio of 2.3 has been applied to the estimated odour emissions rate (OER) as the source type is a wake affected point. The shed ventilation stacks are located approximately 10 m above the ground level and immediately adjacent to

the poultry building and it is not considered that the source type is a tall wake free point source.

The odour assessment assumes that if the CALPUFF peak-to-mean adjusted one-hour ground level odour concentration is higher than the regulatory standard, a potential odour problem is apparent.

7.5 CLIMATE AND DISPERSION METEOROLOGY

To determine the most representative 12-month calendar period, required for modelling air emissions from the proposed poultry farm at Pheasants Nest, historical Bureau of Meteorology (BOM) climate data at Camden/Bankstown were reviewed in **Table 7-5**.

Table 7-5: Bureau of Meteorology (BOM) Climate Data History for Camden/Buxton¹

Year	Temperature (degrees Celsius)				Rainfall (mm)	
	Maximum year average	Difference from long term average	Minimum year average	Difference from long term average	Yearly total	Percentage of long term average
2007	23.8	+0.1	10.9	+0.7	1023.4	129%
2008	23.0	-0.7	10.0	-0.2	840.8	106%
2009	24.6	+0.9	10.7	+0.5	587.6 ¹	68%
2010	23.7	+0.0	10.8	+0.6	943.0 ¹	110%
2011	23.4	-0.3	10.5	+0.3	757.4	95%
2012	23.4	-0.3	9.7	-0.5	796.8	100%
2013	24.7	+1.0	10.2	+0.0	970.8 ¹	113%
2014	24.7	+1.0	10.8	+0.6	841.6 ¹	98%
2015	23.8	+0.1	10.5	+0.3	813.6	116%

¹Rainfall data from Buxton (Amaroo) has been used for years 2009, 2010, 2013 and 2014 as Camden data was not complete.

A review of Bureau of Meteorology (BOM) climate data suggests greater deviations in either the average rainfall or temperatures for the years 2007, 2009, 2010, 2013 and 2014. It is noted that the Camden meteorological station did not have complete rainfall information for 2009, 2010, 2013 and 2014, so nearby Buxton (Amaroo) was used to analyse climate deviation from average.

The years with the least deviation from long term average climate statistics are years 2008, 2011, 2012 and 2015. Given the availability of data for 2011, it was selected as the representative year for weather and climate to model air emissions from the proposed poultry farm at Pheasants Nest.

7.6 CALMET METEOROLOGICAL DOMAIN

Air dispersion modelling requires the creation of a three-dimensional (3D) CALMET meteorological data file that represents the weather and climate for the region (domain) modelled. Briefly, CALMET is a meteorological model that develops hourly (or sub-hourly) wind and other meteorological fields on a 3D gridded modelling domain. Associated two dimensional fields, such as mixing height, surface characteristics, and dispersion properties are also included in the file produced by CALMET. The final time varying wind field thus reflects the influences of local topography and land uses.

Compilation of a 2011 3D meteorological data file for the Pheasants Nest area representative of the proposed site was obtained from the following data sources:

- Fifth-Generation NCARIPenn State Mesoscale Prognostic Model (MM5) for 2011;
- Tahmoor Coal AWS hourly meteorological data for 2011;
- BoM Camden Airport AWS hourly meteorological data for 2011;
- NSW DECC 2007 Land Use NSW; and
- Terrain data set with SRTM1 30 m resolution topography data.

MM5 is a widely-used 3D numerical meteorological model which contains non-hydrostatic dynamics and a variety of physics options. Extensive comparison between MM5 outputs and observed weather data has validated its use for application in the preparation of 3D CALMET weather files (refer to **Appendix C**). MM5 is capable of simulating a variety of meteorological phenomena such as tropical cyclones, severe convective storms, sea-land breezes, and terrain forced flows such as mountain valley wind systems.

Hourly weather information for 2011 was obtained from the nearby Tahmoor Coal facility. The Tahmoor Coal monitoring station is located approximately 4.5 km west of the proposed poultry farm. The subsequent generated 3D meteorological file used in this report was developed using high resolution MM5 meteorological information and the Tahmoor Coal weather data.

The recording of hourly weather information is not undertaken at Pheasants Nest by the BOM. The nearest BOM weather station recording good quality hourly weather data is at Camden Airport, and is located approximately 26 km north of the proposed poultry farm. This report has not considered the Camden Airport meteorological observations as representative to the assessment location, although was included in the CALMET model to ensure a complete observational data set for 2011.

The MM5 wind field was used as an initial guess in CALMET. Final wind fields was generated by applying observational meteorological data to the initial wind field

and then adjusted to account for the kinematic and thermal effects of terrain on wind.

7.7 POULTRY FARM SITE METEOROLOGY

7.7.1 Wind Direction

The CALMET model wind field predictions of seasonal wind speed, direction and frequency for the year 2011 at the Pheasants Nest poultry farm site are presented in **Figure 7-3**.

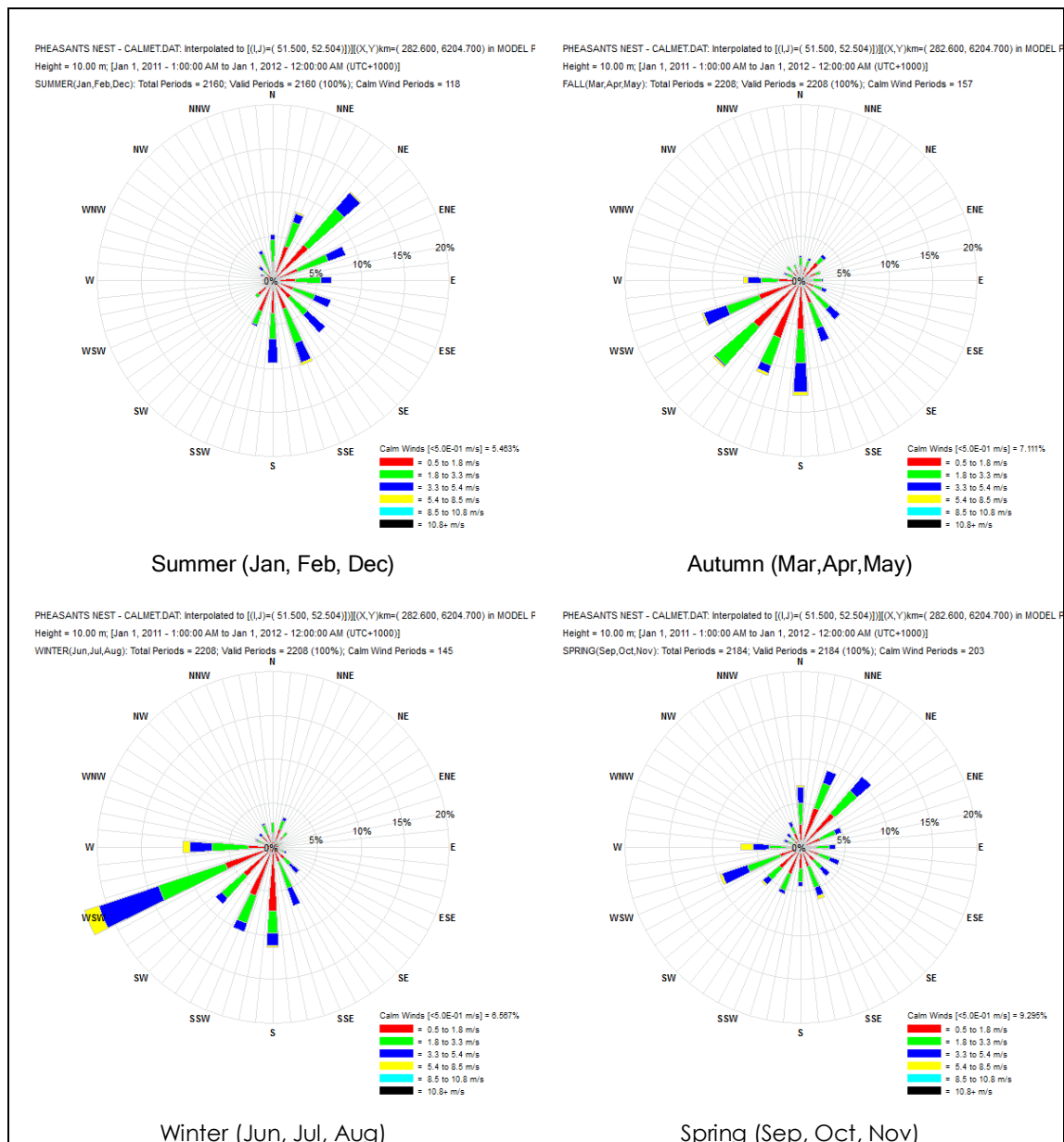


Figure 7-3: CALMET 2011 Pheasants Nest Poultry Farm Site Seasonal Wind Rose

The CALMET seasonal wind roses at the Pheasants Nest poultry farm site predict that the predominant winds are from a southern direction in summer and autumn, with the wind direction being more variable in the winter and spring months. Furthermore, calm winds are predicted to account for 5.5 to 9.3 % of the 2011 modelling period.

7.7.2 Atmospheric Stability

Atmospheric stability refers to the tendency of the atmosphere to resist or enhance vertical dilution. The Pasquill-Gifford-Turner assignment scheme identifies six Stability Classes, 'A' to 'F', to categorise the degree of atmospheric stability. These classes indicate the characteristics of the prevailing meteorological conditions.

Stability Class 'A' represents highly unstable conditions that are typically found during summer, categorised by strong winds and convective conditions. Conversely, Stability Class 'F' relates to highly stable conditions, typically associated with night-time clear skies, light winds and the presence of a temperature inversion. Classes 'B' through to 'E' represent conditions intermediate to these extremes. **Figure 7-4** presents the stability class frequency for the proposed poultry farm location.

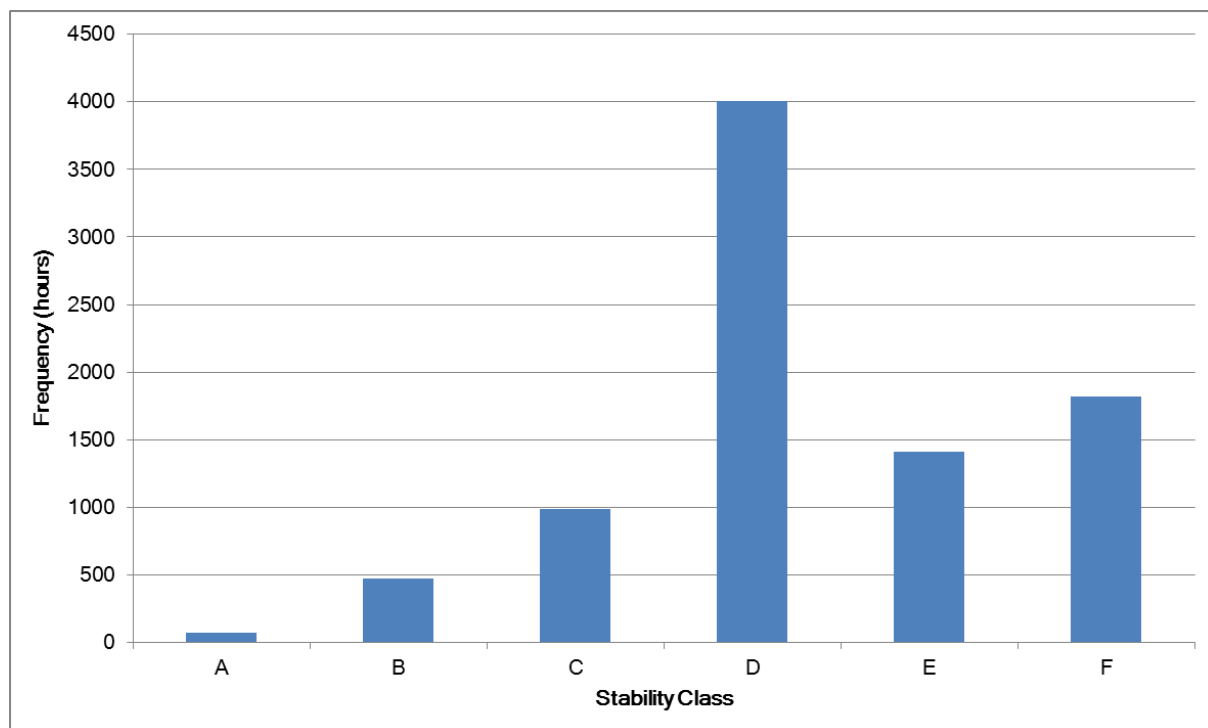


Figure 7-4: Proposed Pheasants Nest Poultry Farm 2011 Stability Class Frequency

7.7.3 Mixing Height

Mixing height is used by meteorologists to quantify the vertical extent of mixing in the atmosphere. It is the height to which vertical mixing extends and is usually defined as the layer of air beneath the inversion. The atmosphere within this layer is usually well-mixed through turbulent motion.

Mixing height usually reaches a maximum in the afternoon and is at a minimum at dawn. The diurnal variation in atmospheric mixing height with time is presented in **Figure 7-5**. The low mixing height predicted during evening and early morning periods are not conducive to good air dispersion.

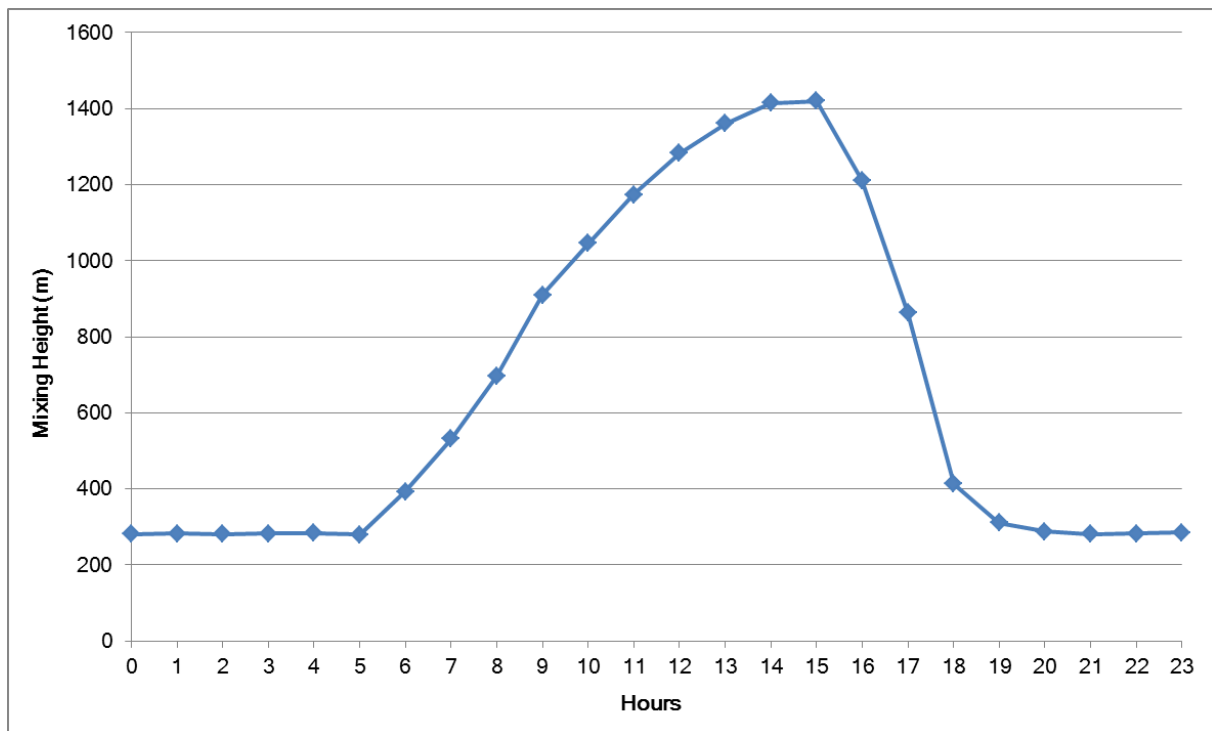


Figure 7-5: Proposed Pheasants Nest Poultry Farm 2011 Diurnal Annual Mixing Height

7.8 MODELLING APPROACH/METHODOLOGY

The current Level 2 odour and particulate assessment utilises the CALPUFF (Version 6.42) modelling system. The CALPUFF modelling system comprises of three main components: CALMET, CALPUFF and CALPOST and a large set of pre-processing programs designed to interface the model to standard routinely available meteorological and geophysical databases.

The project site is situated amongst locally significant topography. These particular topological landforms will contribute to the local meteorology. This phenomenon is displayed in the CALMET wind field presented in **Figure 7-6** where the arrow length of the wind vector is proportional to the wind speed and the direction is representative of the wind direction.

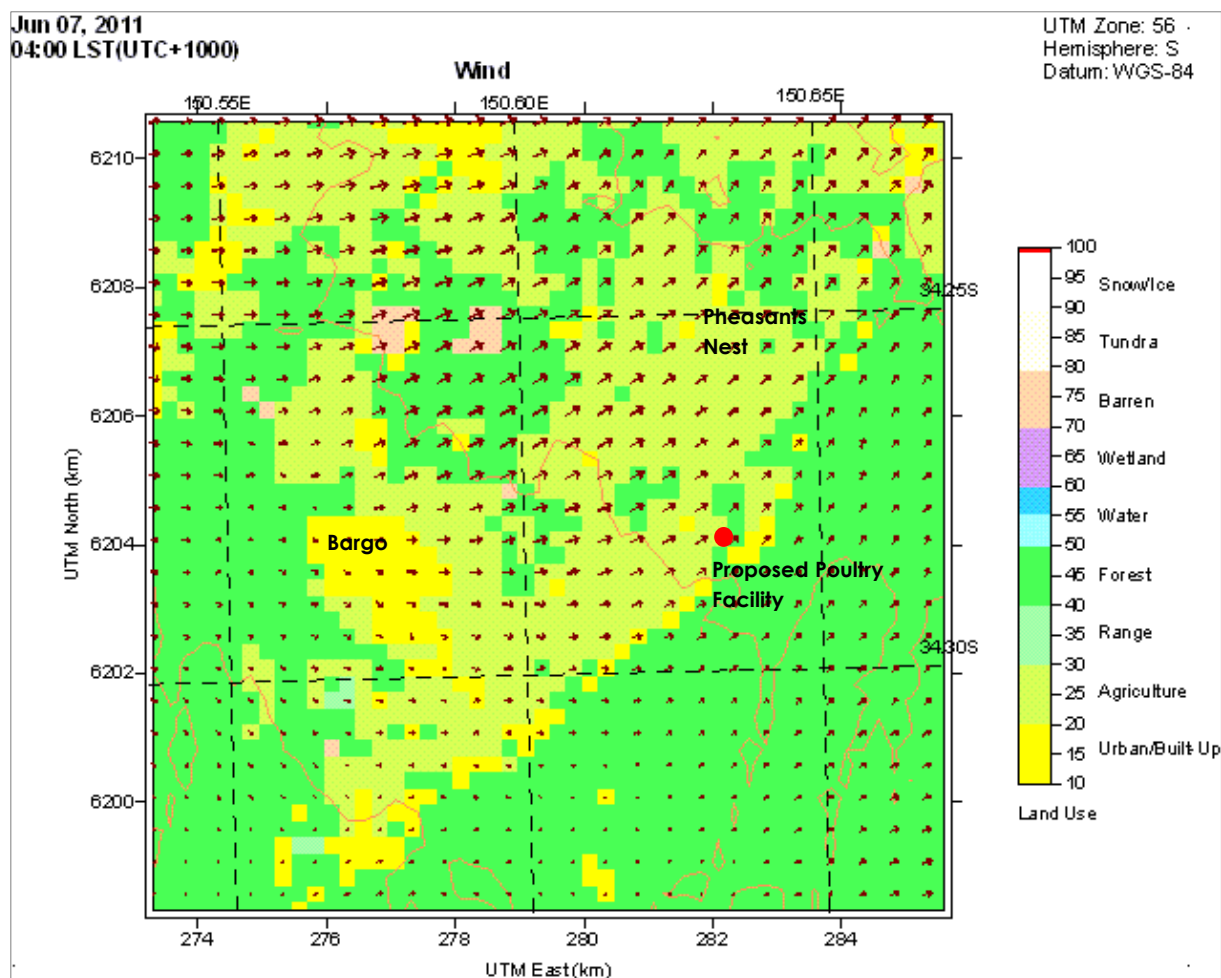


Figure 7-6: CALMET Modelling Domain – Example of Spatially Variable Surface Winds

7.9 EXISTING AIR QUALITY ENVIRONMENT

7.9.1 Odour

Aerial photographs indicate the subject area is rural in nature. Upon inspection, other operational poultry farms are located with 2 km of the subject site. To determine whether cumulative odour impacts associated with the closely situated poultry farm are applicable, Advitech has reviewed the poultry farms for separation distances in accordance with the *NSW DEC Technical Notes: assessment and management of odour from stationary sources in NSW*.

7.9.2 Particulates

The NSW DECCW operate an air quality monitoring program that collects accurate real-time measurements of ambient level pollutants at 28 monitoring sites within the air quality monitoring network (AQMN), located around the greater metropolitan area of Sydney, the Illawarra, the Lower Hunter and selected rural sites around NSW. The monitoring location that is considered to be most representative of the

Pheasants Nest area is located at Bargo approximately 6 km to the south-west of the proposed development. PM_{2.5} ambient monitoring data was not available from the Bargo monitoring station and was taken from the nearest available monitoring station at Liverpool. **Table 7-6** displays the background particulate concentrations at the Bargo and Liverpool monitoring station for the 2011 monitoring year.

Table 7-6: OEH Background Air Quality

Pollutant	Background Concentration ^a	Units	Averaging Time
TSP	25.8 ^b	µg/m ³	Annual
Dust Deposition	na	g/m ² /month	Annual
PM ₁₀	Variable (refer to Figure 7-7)	µg/m ³	24 Hours
	12.9	µg/m ³	Annual
PM _{2.5}	Variable ^c (refer to Figure 7-7)	µg/m ³	24 Hours
	5.9	µg/m ³	Annual

^a Reported value is the average 24-hour result

^b Assumed from PM₁₀ background (TSP = 2 x PM₁₀)

na - Not available

In the absence of DECCW dust deposition data, the maximum increase in deposited dust level (i.e. 2 g/m²/month) has been used as the impact assessment criteria.

Figure 7-7 displays the PM₁₀ and PM_{2.5} 24-hour average background concentrations for 2011. The monitoring data indicates one PM₁₀ exceedance (i.e. 17 September 2011) above the DECCW impact assessment criteria of 50 µg/m³. The monitoring data indicates two PM_{2.5} exceedances (i.e. 21 May 2011 and 15 November 2011) above the DECCW impact assessment criteria of 25 µg/m³. For the purpose of the assessment, a maximum 24-hour PM₁₀ and PM_{2.5} concentration of 43.6 µg/m³ and 22.2 µg/m³ is respectively applied.

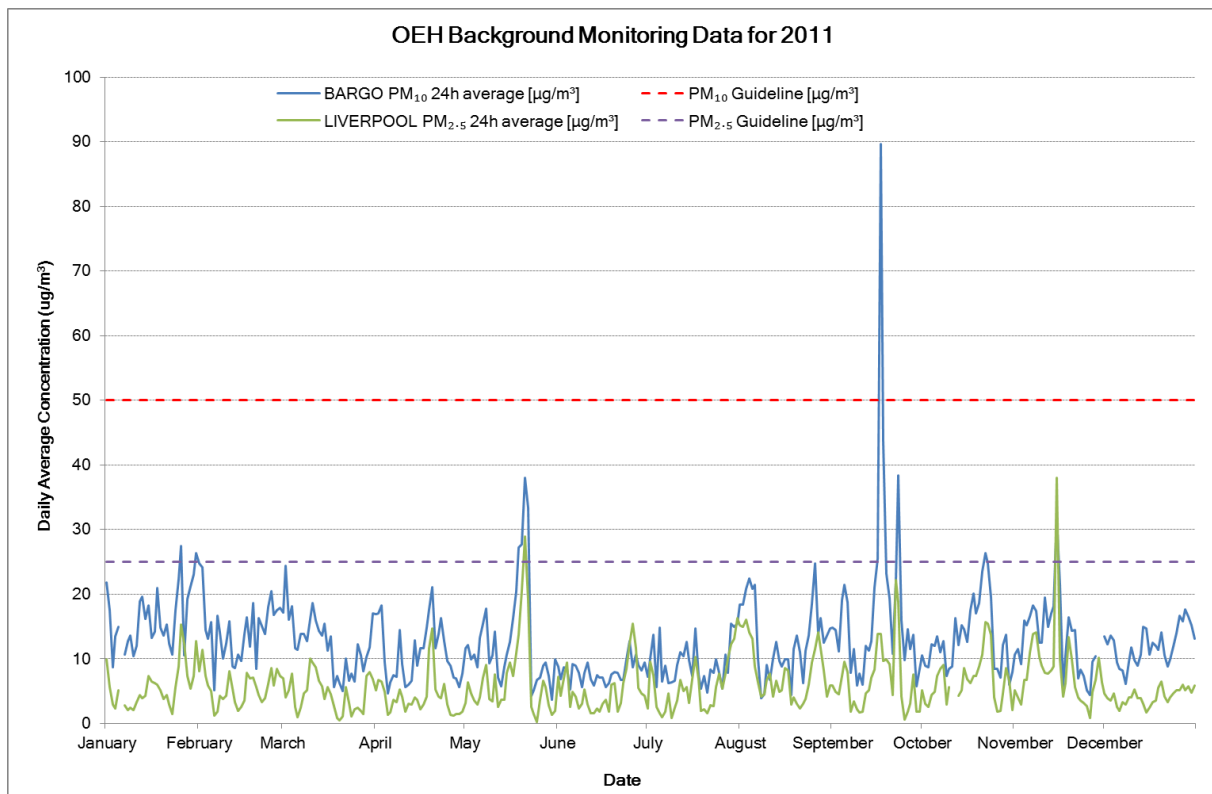


Figure 7-7: Bargo and Liverpool Background Monitoring Data from 2011

7.10 AIR EMISSION APPROACH/METHODOLOGY

There has been considerable research into describing and characterising odour emissions from poultry facilities (refer to **Appendix C**). It is generally accepted that the poultry shed OER is a function of:

- The number of birds;
- The bird age/mass;
- The shed ventilation rate; and
- The ambient temperature.

The shed OER is dependent upon the ventilation rate at any particular time, and can vary substantially should growing conditions within the shed change.

The Air Quality report has assumed a three-phase production cycle for the project site. The first phase is the brooding phase, which begins from day 1 to 22. During this phase the ventilation system is operated under minimum ventilation. The second phase is between day 23 and 50, where the ventilation system is operated under tunnel ventilation mode. During this growing cycle gradual flock thinning was undertaken to maintain optimum flock health, as well as to account for partial flock

harvesting. After day 50, the sheds are cleaned and sterilized and remain ready for chick restocking. This last phase takes 17 days.

This report assessed one year of farm operation for both properties that includes approximately 5.5 growing batches per shed. All sheds (i.e. seven sheds) are assumed to operate in a synchronous fashion i.e. the batches in all sheds started and finished at the same time, and so peak odour and particulate emission rates from the farm are considered in the modelling. This potentially represents a worst-case operating scenario from an air quality (i.e. odour and particulates) perspective. This is consistent with the modern poultry industry policy of poultry facilities operating on an “all in, all out” basis.

7.10.1 Ventilation

Ventilation requirements for all types of poultry houses are dependent upon ambient temperatures, the age and bodyweight of the birds and the number of birds housed. There are two dominant modes of shed ventilation offered during the bird growing cycle, ‘minimum’ and ‘tunnel’.

Minimum ventilation is achieved by utilising chimney fans for the proposed poultry farm, located along the roof of the shed. This report has assumed eight horizontal discharge chimney fans equally spaced along the length of the shed roof. Minimum ventilation is the dominant ventilation type applied during the initial 22 days of the bird growing cycle. During this period, birds require warmer conditions for optimal growth. As the growing phase continues throughout the 22-day period the rate of minimum ventilation is increased to account for increases in bird mass. The odour emissions from each chimney fan were modelled with a release height of 4.6 m and a constant efflux velocity of 8 m/s.

After day 22 of the growing cycle, the ventilation mode transitions to ‘tunnel ventilation’. Tunnel ventilation is achieved with the mounting of large axial flow fans at the end of the sheds, resulting in a more controlled and consistent flow of air through the shed. During this period, odour emissions from each fan were modelled considering a vertical release at a height of 10 m and a constant efflux velocity of 8 m/s. This report has assumed that air would be extracted by 15 exhaust fans for the proposed sheds, providing a maximum ventilation rate of approximately 125 m³/s for each new shed. To compensate for reduced tunnel ventilation flowrates during cooler periods, this report assumes that the 8 m/s efflux velocity is maintained by numbers of fans switched off while the remaining operational fans operate at full capacity. 10 m stacks are to be constructed to achieve a vertical release at the poultry sheds.

It is also recognised that guidelines regarding the ventilation rate can vary considerably between environments/climates, the bird species farmed and specific

poultry grower ventilation program settings (refer to **Appendix C**). This is significant because the shed ventilation rate can greatly influence the predicted odour GLC's during cool overnight conditions when the atmosphere is generally too stable to affect good odour dispersion. It is generally accepted that high OERs that are modelled during cool overnight conditions will significantly impact on the peak percentile GLCs.

The ventilation rate profile for the first growing cycle in the modelled year is presented in **Figure 7-8**.

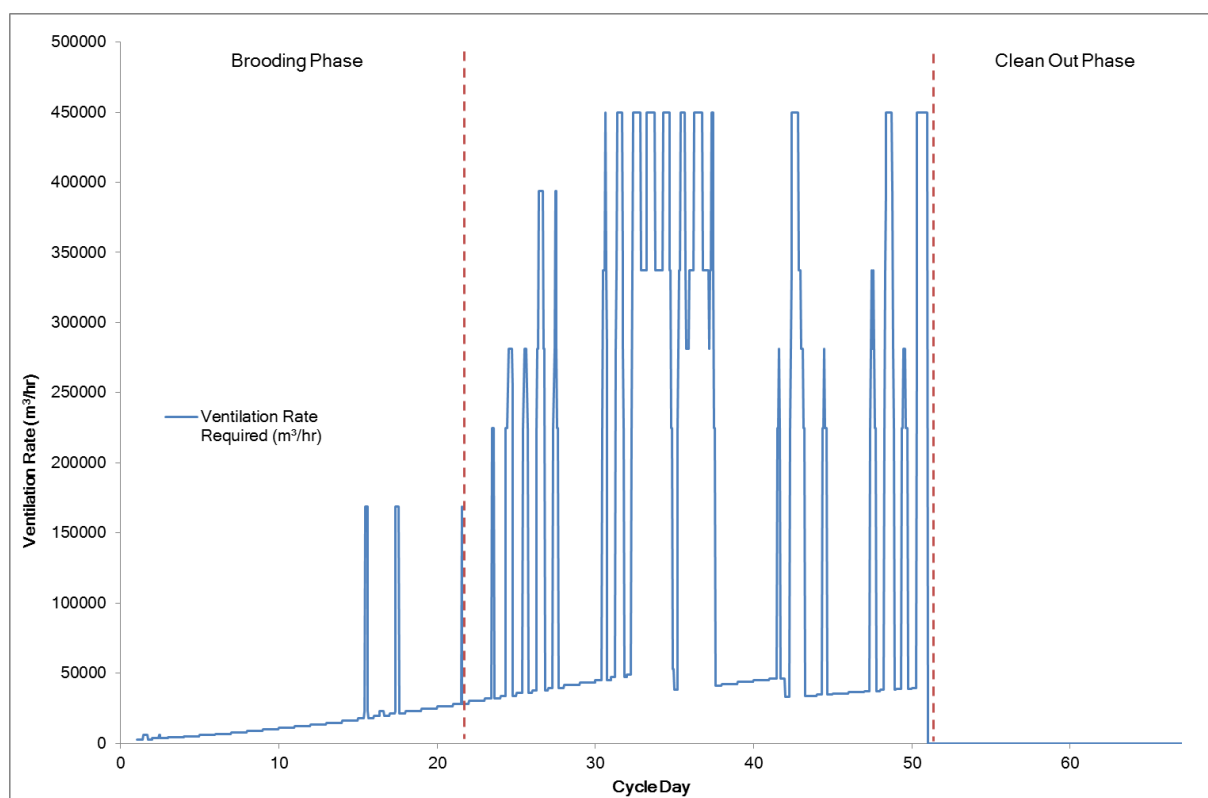


Figure 7-8: Ventilation Rate Profile – Example for One Proposed Shed

7.10.2 Odour Emissions

The OER for each ventilated shed (i.e. minimum or tunnel ventilated shed) at any given stage of the growth cycle was calculated according to the following equation (see detail in **Appendix C**):

$$\text{OER} = 0.025 \times K \times A \times D \times V^{0.5}$$

where:

- OER is the odour emission rate (OU.m³/s).
- K = 2.2 (empirical factor unitless). A value of 2.2 represents new poultry facilities confirming to best practice. This is considered conservative as the literature indicates that the value of K may be one (1) for very well designed and managed sheds that operate with minimal odour emissions, and a value of K may be five (5) for a very poorly managed shed with high odour emissions.
- A is the total shed floor area (m²).
- D is the average shed bird density (kg/m²). Bird density (D) is related to the age of the birds and the stocking density i.e. the number of birds placed per unit area.
- V is the ventilation rate (m³/s).

The odour emissions profile for the first growing cycle in the modelled year is presented in **Figure 7-9**. The corresponding hourly time series odour emissions profile, commensurate of all shed odour emission locations, was generated and included into the CALPUFF modelling dispersion program.

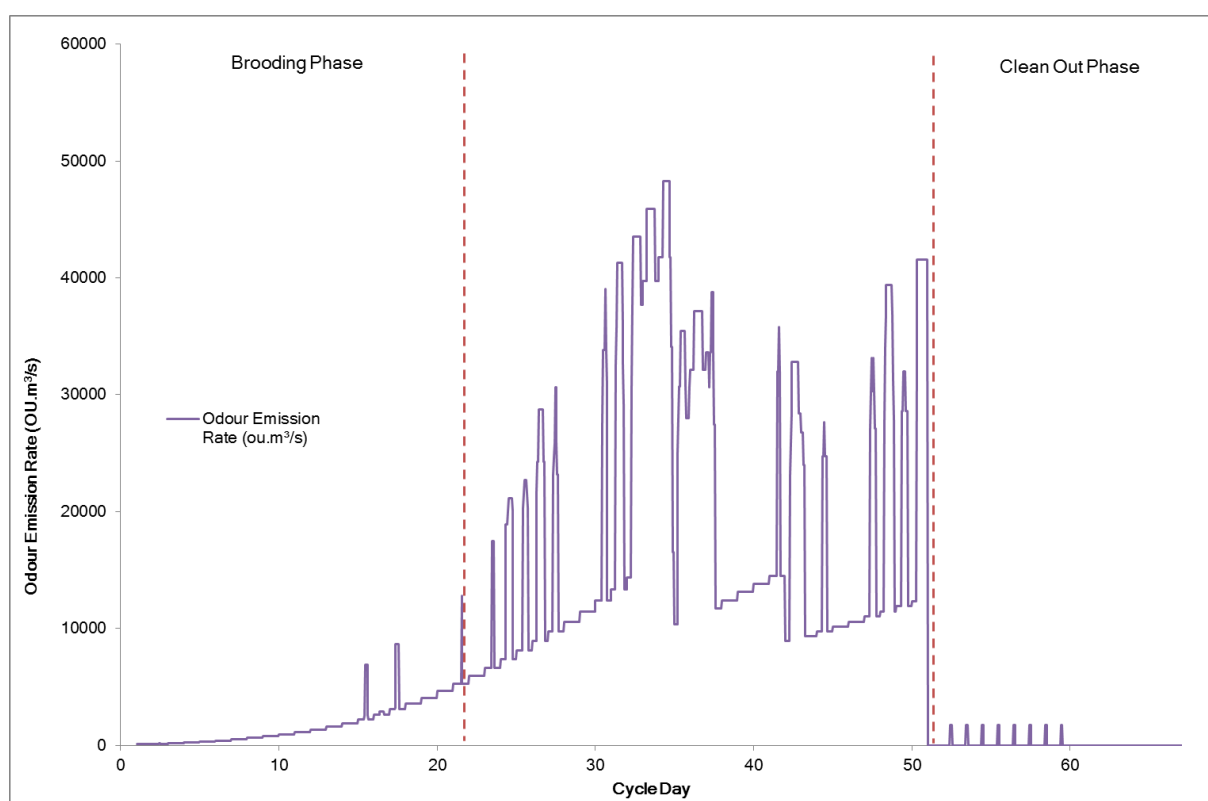


Figure 7-9: Odour Emission Rate Profile – Example for One Proposed Shed

The clean out phase of the growing cycle occurs after all the birds have been removed from shed. It is understood that the removal of the litter during this phase can be an odorous process. The complete removal of the litter has been assumed to occur during day 52 – 59 between 11 am – 2 pm. The odour emissions have been

modelled as a volume source from the open shed doors with an odour concentration of 553 OU/m³ and 0.5 air changes per hour (refer to **Appendix C**).

On site composting will be undertaken in an enclosed shed within four internal composting bays. Only one composting bay will be used for active composting. The remaining bays will be used for storing used litter, storing mature compost and a vacant bay ready for the next cycle. The compost consists of layers of dead poultry covered by used litter. The compost will not be turned throughout the process and will remain in the composting bay for at least five weeks after the last layer is added to the composting bay before being removed from the site. Once the active composting bay is at capacity, a new composting layer will begin in a vacant composting bay.

A representative odour emission rate was taken from *Heggies. (2006). Woodlawn Alternative Waste Technology Facility – Air Quality Impact Assessment* (refer to **Appendix C**). The specific odour emission rate for fresh putrescible waste (5.65 OUV/m²/s) is considered appropriate for the composting on site. The composting shed was modelled as a continuous volume source with an assumed active composting area (i.e. actively worked composting bay) of 50 m².

7.10.3 Particulate Emissions

The maximum particulate emission concentration (PEC) for a given total bird mass is calculated by the following equation (refer to **Appendix C**):

$$PEC = aM + b$$

where:

- PEC is the maximum particulate emission concentration (mg/m³).
- M is the total mass of birds (tonnes).
- $a = 0.270$ for TSP or 0.115 for PM₁₀, $b = 0.385$ for TSP or 0.917 for PM₁₀.

To account for the dilution that occurs under higher flow rates, the particulate emission concentration (PEC_v) is calculated using the equation below:

$$PEC_v = PEC \times (cV^d)$$

where:

- PEC_v is the particulate emission concentration (mg/m³).
- PEC is the maximum particulate emission concentration (mg/m³).
- V is the shed ventilation rate (m³/s).

- $c = 3.3$ for TSP and 4.11 for PM_{10} .
- $d = -0.49$ for TSP and -0.58 for PM_{10} .

A particulate emission rate (PER) is calculated by multiplying the PEC_v by the ventilation rate (V). Wheel generated PM_{10} and TSP emissions are calculated using default estimates from the NPI Manual for Mining Version 3.1 (refer to **Appendix C**).

$PM_{2.5}$ emission rates are estimated using available literature for poultry shed and wheel generated emissions. The poultry shed $PM_{2.5}$ emissions are estimated using a PM_{10} to $PM_{2.5}$ ratio determined from measured data in the report produced by the Australian Poultry CRC (refer to **Appendix C**). Wheel generated $PM_{2.5}$ emissions are calculated using estimates in AP42 Section 13.2.2 Unpaved Roads (refer to **Appendix C**).

The particulate emissions profile for the first growing cycle in the modelled year is presented in **Figure 7-10**. The corresponding hourly time series particulate emissions profile, commensurate of all shed particulate emission locations, was generated and included into the CALPUFF modelling dispersion program.

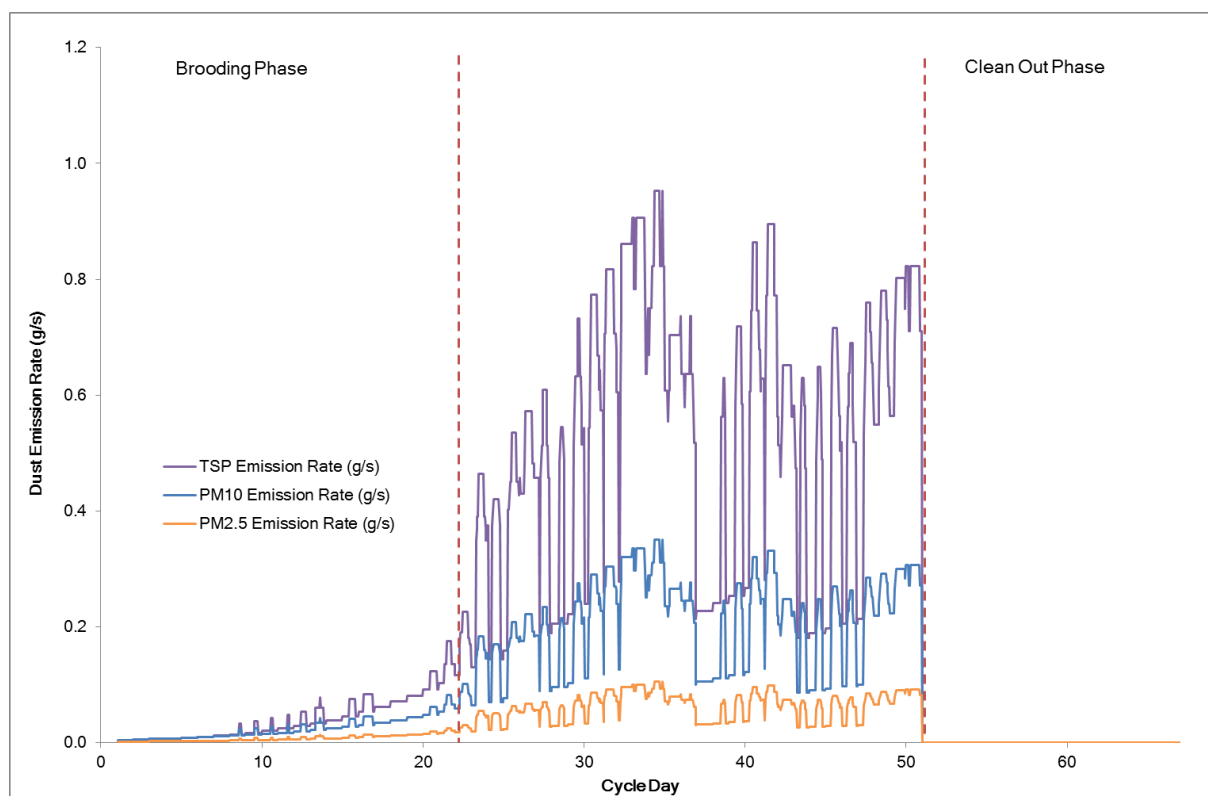


Figure 7-10: Particulate Emission Rate Profile – Example for One Proposed Shed

7.11 DISPERSION MODELLING

7.11.1 Meteorological Model Configuration

Table 7-7 details the parameters used in the meteorological modelling to drive the CALMET model.

Table 7-7: CALMET Meteorological Parameters used in this Report

Identifier	Descriptor	Comment
MM5	Grid spacing	1.33 km × 1.33 km
	Year of analysis	2011
	Time step	hourly
CALMET (v 6.333)	Meteorological grid domain	10 km x 10 km
	Meteorological grid origin (SW corner)	277500 m, 6199500 m
	Meteorological grid resolution	0.1 km
	Surface meteorological station	Camden Airport AWS, Tahmoor Coal AWS
	TERRAD value	5 km
	Critical Parameters (R1, R2, R1Max, R2Max)	5 km, 5 km, 6 km, 6 km
	Cell Face Heights	0, 20, 40, 80, 160, 320, 700, 1300, 1700, 2300, 3000

7.11.2 Dispersion Modelling Configuration

CALPUFF is an advanced non-steady-state meteorological and air quality modelling system. The model advects 'puffs' of material emitted from modelled sources, simulating the dispersion and transformation processes along the way. The model has been adopted by the U.S. Environmental Protection Agency (U.S. EPA) in its guideline on air quality models. CALPUFF uses the 3D wind fields generated by CALMET with the primary output files from CALPUFF processed in CALPOST to produce time-based concentration or deposition fluxes evaluated at selected receiver locations.

Odour and particulate concentrations were simulated for a regular Cartesian receiver grid covering a 10 km by 10 km computational domain, set within the CALMET modelling domain and centred over the project area, with a grid resolution of 0.1 km. High resolution MM5 meteorological data for the year 2011 has been used in conjunction with locality specific meteorological data.

Appendix C contains example CALMET and CALPOST input files.

7.11.3 Modelling Scenarios

The assessment of particulate and odour emissions from the proposed poultry farm involved modelling 45,000 birds per shed.

Odour and particulate emissions from sheds were modelled as point (stack) sources for the entire 2011 growing cycle period. Poultry sheds have traditionally been modelled as volume sources. Over time it has become known that this approach does not allow for appropriate temperature buoyancy to be considered. It has therefore become more appropriate to model tunnel ventilated poultry sheds as point (stack) sources (see **Appendix C**).

Odour emissions from the cleanout phase have been modelled as a single volume source to simulate the open doors without mechanical ventilation during litter removal. The composting shed has been modelled as a continuous volume source with a constant odour emission. **Table 7-8** lists the locations of the stack and volume sources.

Table 7-8: Odour Emission Source Characteristics

Source ID	Easting (UTM)(km)	Northing (UTM)(km)	Ground Elevation (m)	Stack/Release Height (m)	Exit Velocity (m/s)	Exit Temperature (K)	Sigma y (m)	Sigma z (m)
Tunnel 1	282.416	6204.618	271	10	8	Variable	N/A	N/A
Tunnel 2	282.416	6204.618	271	10	8	Variable	N/A	N/A
Roof 1	282.494	6204.735	271	4.6	8	Variable	N/A	N/A
Roof 2	282.484	6204.721						
Roof 3	282.474	6204.706						
Roof 4	282.464	6204.692						
Roof 5	282.454	6204.677						
Roof 6	282.445	6204.662						
Roof 7	282.435	6204.648						
Roof 8	282.425	6204.633						
Cleanout	282.500	6204.745	271	2	N/A	Ambient	42	2.3
Compost	282.389	6204.667	269	2.3	N/A	Ambient	5	2.7

7.11.4 Assumptions

The following assumptions have been used in the CALPUFF model computation of odour and particulate GLCs.

7.11.4.1 General

- Options within CALPUFF modelling reflect the *NSW EPA Generic Guidance and Optimum Model Settings for the CALPUFF Modelling System guidelines* (refer to **Appendix C**).

- The production cycle is 67 days and consists of three distinct phases. The first phase is the brooding phase and begins from day 1 to 22. During this phase the ventilation system is operated under minimum ventilation. The second phase is between day 23 and 50 where the ventilation system is operated under tunnel ventilation mode. After day 50, the sheds are cleaned and sterilized and remain ready for chick restocking. This period (phase 3) lasts for 17 days.
- The modelling assessment assumes the farm is fully stocked with poultry (i.e. seven sheds with 45,000 birds per shed) at the proposed farm and in operation for 365 days per annum.
- All sheds are mechanically ventilated. The sheds are not naturally ventilated.
- Shed emissions are affected by building downwash. Plumes are trapped in building wakes in the cavity region immediately downwind of a building or subjected to plume downwash and enhanced horizontal or vertical spreading due to the turbulent zone that exists further downwind. The ISC-method of building downwash has been applied in this report.
- In the event the outside ambient dry bulb temperature fell below 22 degrees Celsius, the tunnel ventilation system reduced to between 1% and 5% of full capacity flow (i.e. between 1% and 5% of 125 m³/s).
- In the event the outside ambient dry bulb temperature fell below 20 degrees Celsius, the tunnel ventilation system reduced to a minimum ventilation rate (i.e. up to 70,000 m³/h), as defined by the Ross Broiler Management Handbook 2014 (refer to **Appendix C**).
- The discharge ducting for the tunnel ventilated fans that are located at the end of each shed is orientated so that all exhaust emissions are emitted as a vertical discharge through two stacks at a height of 10 m and constant velocity of 8 m/s.

7.11.4.2 Odour

- Predicted odour GLCs are the one-hour average 99th percentile dispersion model value and adjusted using a P/M 60 factor of 2.3 to represent the one second nose-response-time.
- Odour emissions from all tunnel fans on a shed are modelled as one shed specific stack source (e.g. 7 sheds equating to 7 stacks) and odour emissions from roof chimney fans are modelled as individual stack sources (e.g. eight roof fans on one shed equating to eight stacks per shed).
- Minimum turbulence velocity, sigma v, is set to 0.2 for all stability classes as per *NSW EPA Generic Guidance and Optimum Model Settings for the CALPUFF Modelling System guidelines* (refer to **Appendix C**).
- Odour emissions from the removal of shed litter are modelled as one specific volume source (i.e. large shed doors at north-eastern end of the shed).
- Shed litter remains in the shed after the final bird pickup, and is removed from the sheds during the following week. The used shed litter is taken to the composting shed after the shed cleanout.

- Composting of used litter does not involve mechanical turning or any addition of water. Odours from the composting shed have been modelled as a constant odour emission represented as a volume source.
- No odours are generated from loading, storage and distribution of feed material into sheds.

7.11.4.3 Particulates

- Wheel generated emissions modelling is based on the expected truck movements during the growing cycle. It is assumed six trucks per shed are required during each poultry thinning and two trucks per week for feed delivery.
- Wheel generated particulate emissions are estimated using the default emission rate from the National Pollutant Inventory (NPI) Emission Estimation Technique (EET) manual for mining version 3.1.
- Predicted PM₁₀ and PM_{2.5} GLCs are the 24-hour average 100th percentile dispersion model value and predicted TSP GLCs are the annual average 100th percentile dispersion model value.
- Particulate air emissions from poultry shed ventilation use a geometric mass mean diameter of 1.96 µm and a geometric standard deviation of 1.54 µm (refer to **Appendix C**).
- Particulate air emissions from unpaved haul roads use a geometric mass mean diameter of 8.30 µm and a geometric standard deviation of 1.18 µm (refer to **Appendix C**).

7.12 EMISSIONS SOURCES

Odour and particulate emission rates vary diurnally, seasonally, throughout the life of the flock and will be different at different poultry facilities depending on management and infrastructure (refer to **Appendix C**). The main source of odour from poultry facilities is typically the litter within the chicken sheds. As the litter (made up of dry organic litter, manure, dust and feathers) begins to break down odorous compounds are created which then volatilise. High litter moisture content, low oxygen levels, small particle size, high temperatures and low pH levels encourage anaerobic bacterial activity and the generation of odour. The rate at which the compounds then volatilise is dependent on the litter pH and temperature, ventilation rates and climate (refer to **Section Error! Reference source not found.**, reference **Error! Reference source not found.**).

This report presents the modelling of odour and particulate emissions associated with the 180 Mockingbird Road, Pheasants Nest poultry facility operating at 315,000 chickens. The chickens and waste material within the chicken shed are the only sources onsite that have the potential to generate odour.

7.13 DISPERSION MODELLING RESULTS

7.13.1 Odour

Figure 7-11 and **Table 7-9** present the incremental 99th percentile one-second average GLC of odour at the surrounding sensitive receiver locations, as predicted by CALPUFF, for the proposed operation. The DECCW odour criterion as outlined in **Table 7-3** is 5 OU.

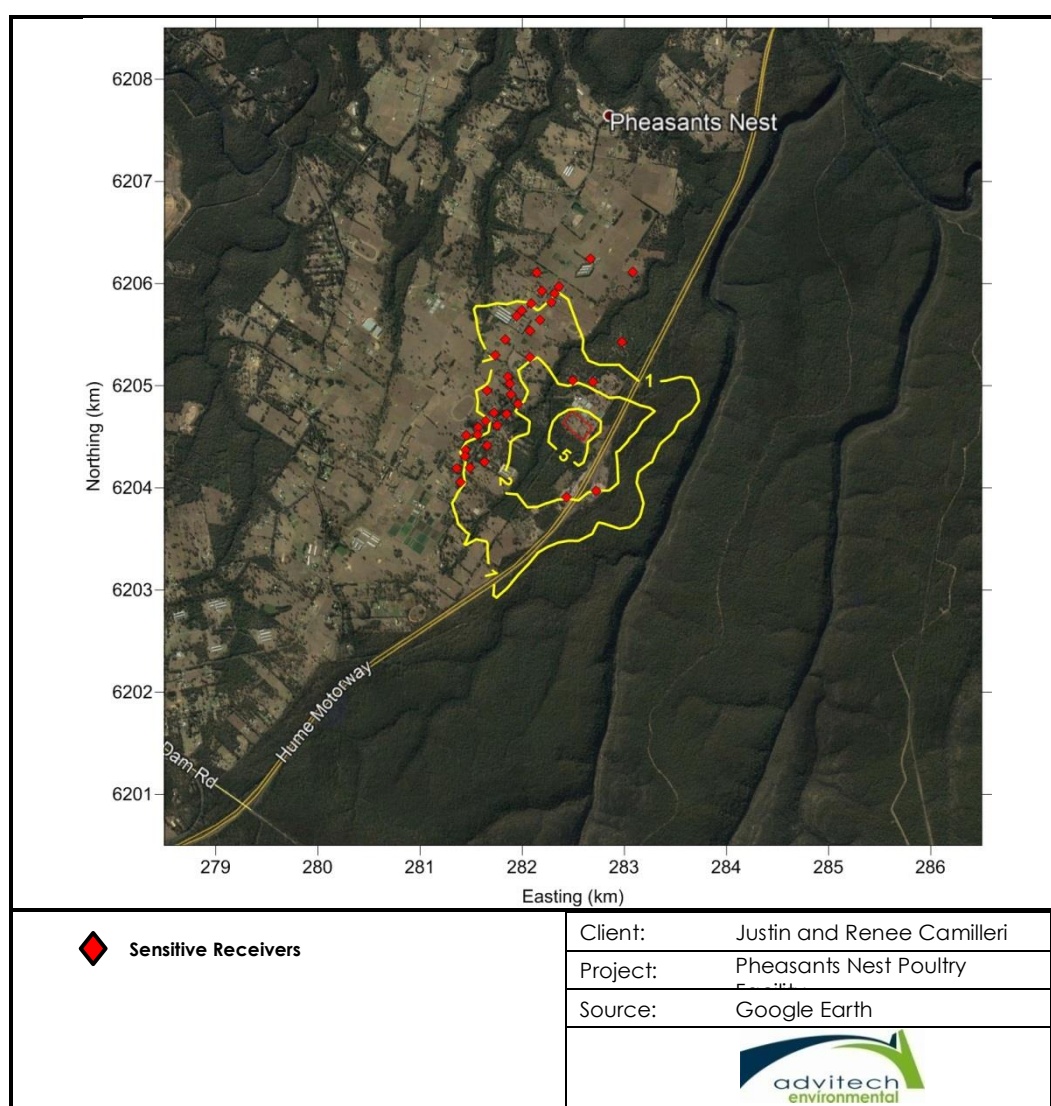


Figure 7-11: 99th Percentile One-Second Average Odour Concentration (Contour labels = 1, 2, 5 OU)

Table 7-9: Predicted Odour at Sensitive Receivers

Receiver	Receiver ID	Predicted GLC 99 th Percentile One-Second Odour (OU)	Impact assessment criteria (OU)
R1	Residential	1.8	5 OU
R2	Residential	2.1	
R3	Residential	0.5	
R4	Residential	1.9	
R5	Residential	1.4	
R6	Residential	1.1	
R7	Residential	1.4	
R8	Residential	1.5	
R9	Residential	2.0	
R10	Residential	1.5	
R11	Residential	1.2	
R12	Residential	1.1	
R13	Residential	1.1	
R14	Residential	0.9	
R15	Residential	1.0	
R16	Residential	1.1	
R17	Residential	1.2	
R18	Residential	1.4	
R19	Residential	1.3	
R20	Residential	1.5	
R21	Residential	1.4	
R22	Residential	1.6	
R23	Residential	1.1	
R24	Residential	1.2	
R25	Residential	0.9	
R26	Residential	0.8	
R27	Residential	0.8	
R28	Residential	0.8	
R29	Residential	1.0	
R30	Residential	1.1	
R31	Residential	1.1	
R32	Residential	0.7	
R33	Residential	1.0	
R34	Residential	0.5	

Receiver	Receiver ID	Predicted GLC 99 th Percentile One-Second Odour (OU)	Impact assessment criteria (OU)
R35	Residential	0.2	
R36	Residential	1.1	
R37	Residential	1.0	
R38	Commercial	2.1	
R39	Commercial	1.9	

The results indicate the 99th percentile one second average odour GLC criteria is not exceeded at any sensitive receivers.

7.13.1.1 Cumulative Impact

To address concerns regarding the issue of potential cumulative odour impacts associated with the proposed development, a semi-quantitative assessment was undertaken to understand if the resultant odour risk profile supported additional detailed cumulative odour dispersion modelling. Our assessment included the following considerations:

- The type and nature of similar poultry operations in the surrounding locality; and
- The request of a public register of odour nuisance complaints in the surrounding locality.

The information used in our assessment was provided by Tattersall Lander who has an understanding of surrounding poultry operations and good relations with the Wollondilly Shire Council. Based on the information received from Tattersall Lander, we note the following:

- a) No information regarding the nature (i.e. type, intensity of operation etc.) of the surrounding poultry farms has been supplied by the Wollondilly Shire Council.
- b) Information regarding publicly registered odour nuisance (i.e. poultry) complaints for the locality surrounding 180 Mockingbird Road, Pheasants Nest NSW has been supplied by the Wollondilly Shire Council. Wollondilly Shire Council has provided 21 complaints for 75 Nightingale Road, Pheasants Nest. No complaints were recorded for the farms at 50 Mockingbird Road, Pheasants Nest and 294 Pheasants Nest Road, Pheasants Nest.

To understand if additional detailed cumulative odour dispersion modelling was warranted, Advitech assessed each of the surrounding poultry operations using the NSW EPA Level 1 assessment guidelines for broiler farms (refer to **Appendix C**). The

application of this odour policy assessment method (i.e. by estimating the required odour separation distances of the existing poultry farms) is useful in understanding if the resultant odour risk profile(s), when combined with the current AQIA odour predictions, justifies any further assessment.

The site factors applied to the NSW EPA Level 1 assessment are based on satellite imagery obtained through Google Earth. The numbers of birds per shed have been calculated on the floor areas of the sheds and an initial stocking density of 18 birds per square metre. It has been assumed the sheds are stocking meat poultry (broilers) for the purpose of this assessment. The predicted odour concentrations of the proposed development and the calculated odour separation distances for the surrounding poultry farms (i.e. Farm 1, 2 and 3) are displayed in **Figure 7-12**.

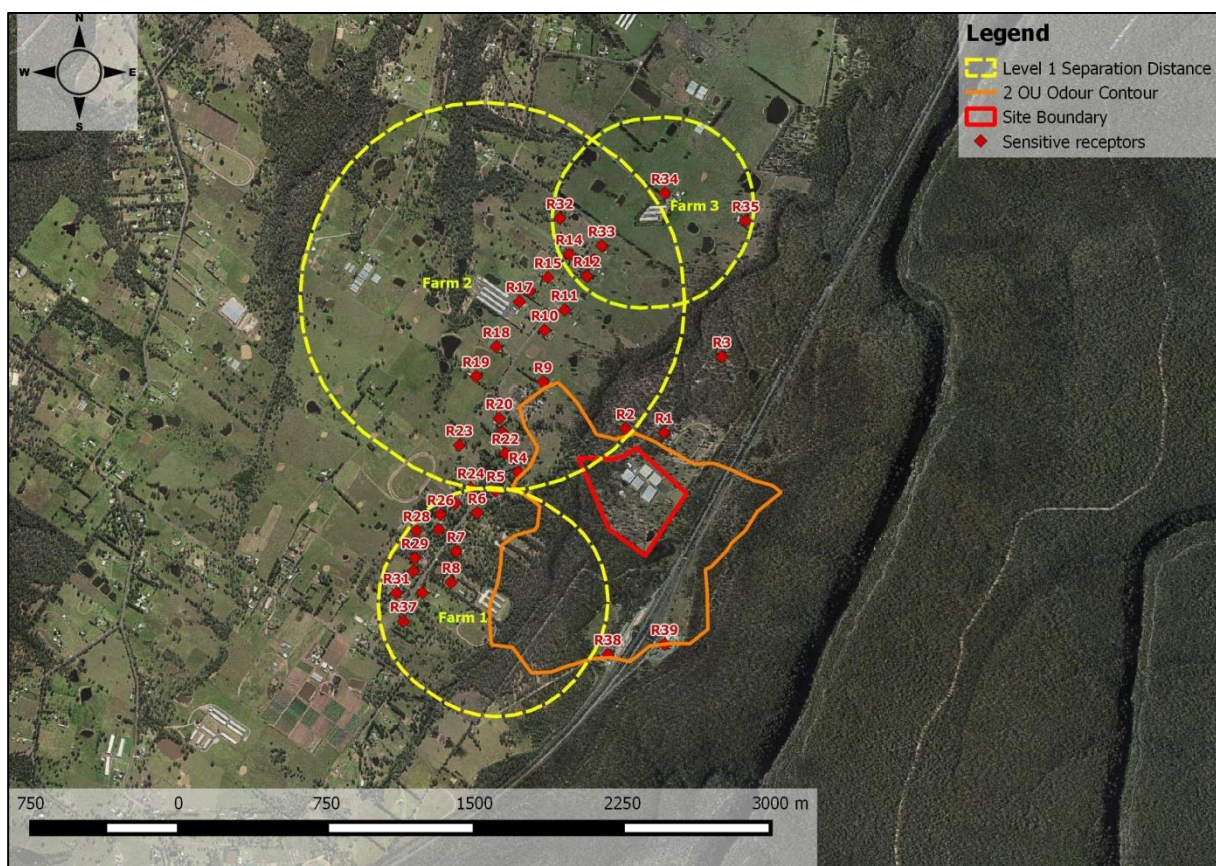


Figure 7-12: Overlay Predicted Level 1 Odour Assessment Impact With Odour Contours

The odour population dependency criterion is 5 OU. **Figure 7-12** indicates that the calculated Level 1 odour separation distances from surrounding poultry farms overlap the subject site and the predicted 2 OU contour isopleth. It is also noted that the predicted incremental 2 OU isopleth from the proposed poultry farm does not intersect any off-site receptor. Furthermore, it is not expected that odour

concentrations in excess of the 5 OU criterion will occur where the AQIA odour contour (i.e. 2 OU) and separation distance boundaries overlap.

On the balance of information used in this assessment, it is our opinion that the contribution of odour from surrounding poultry related operations will not materially impact on the outcomes and additional odour modelling will not be required.

7.13.2 Particulates

7.13.2.1 Annual Average PM₁₀

The predicted concentrations of annual average PM₁₀ for the proposed operation are presented in **Figure 7-13** and **Table 7-10**.

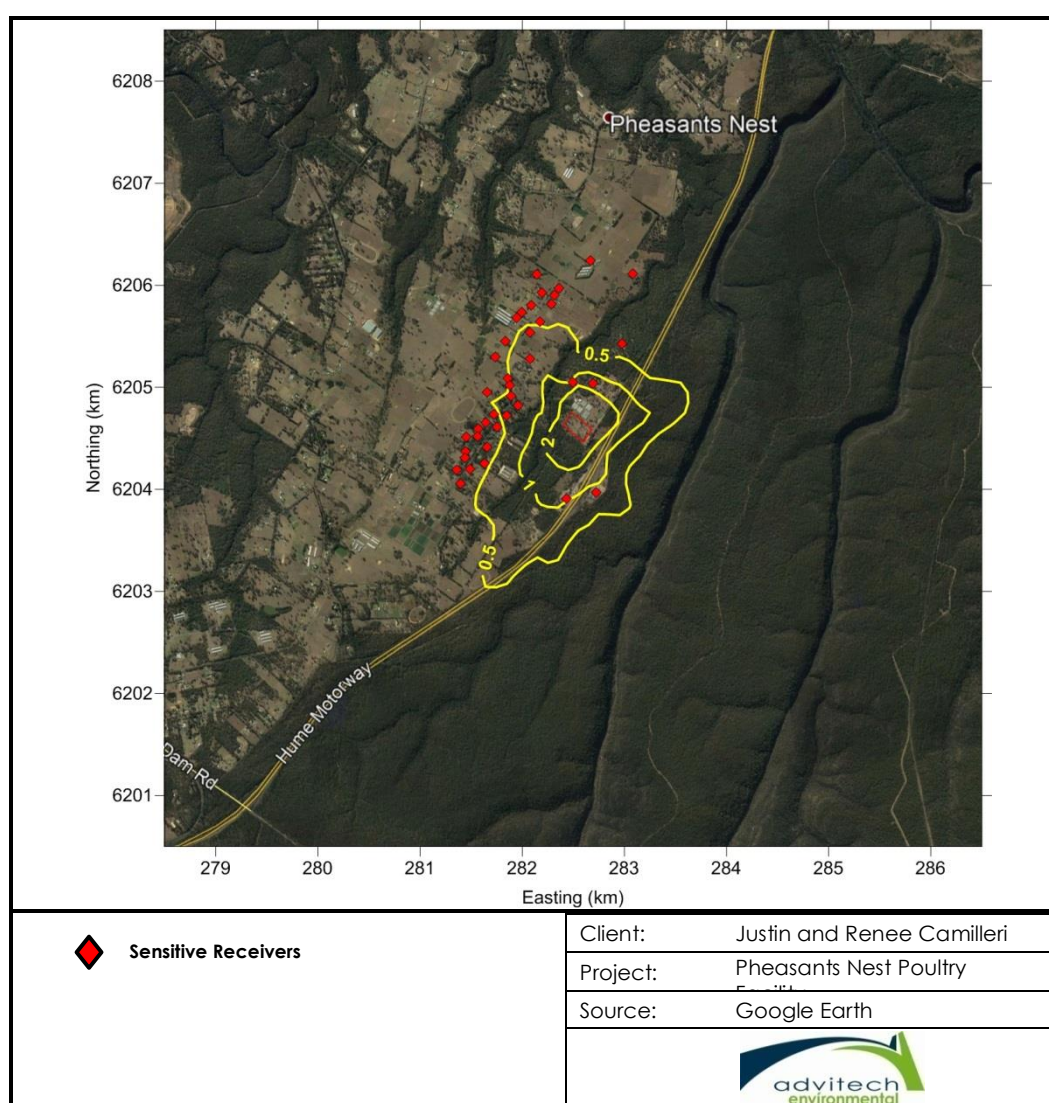


Figure 7-13: 100th Percentile Annual Average PM₁₀ Concentration (Contour labels = 0.5, 1, 2 µg/m³)

Table 7-10 presents the predicted cumulative 100th percentile annual average PM₁₀ for sensitive receivers respectively. A maximum annual PM₁₀ background

concentration of 12.9 µg/m³ has been applied (refer to **Table 7-6**) to determine if further assessment is required.

Table 7-10: Predicted Annual Average PM₁₀ at Sensitive Receivers

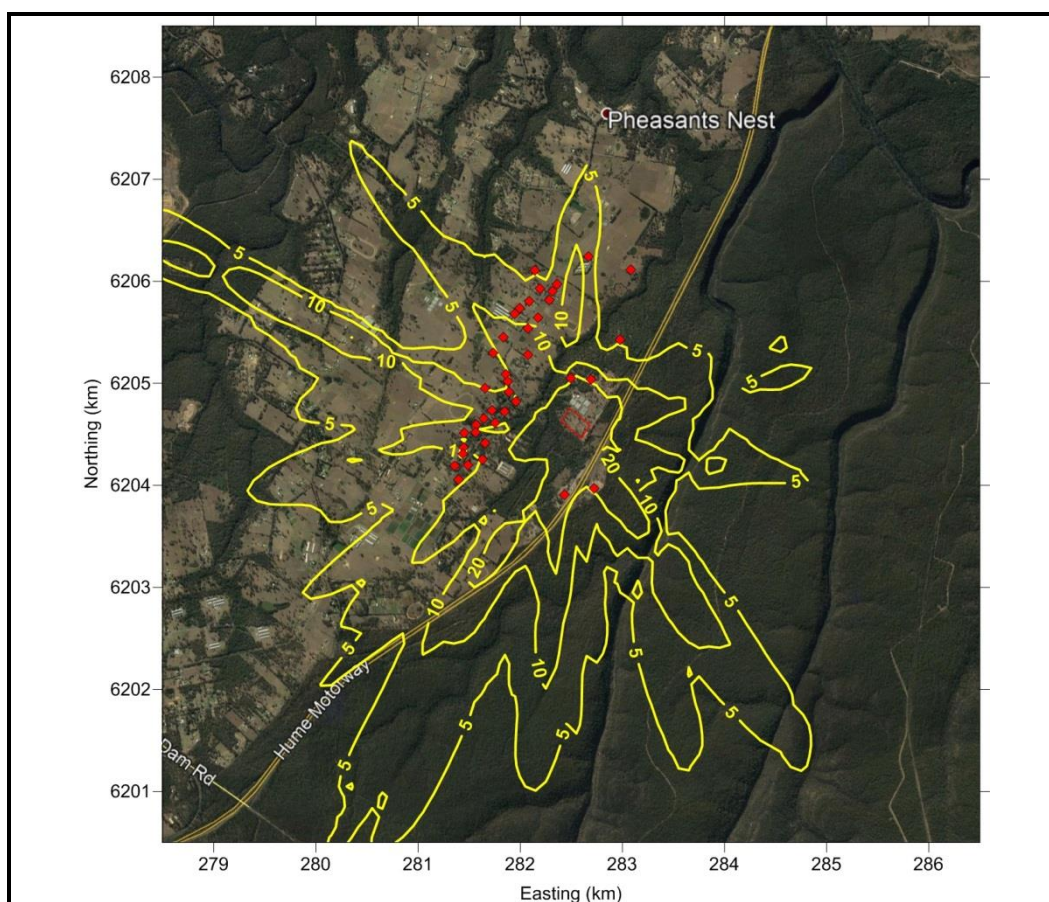
Receiver	Predicted Increment (µg/m ³)	Background Concentration	Total (µg/m ³)	Impact Assessment Criteria
R1	1.4	12.9 µg/m ³	14.3	25 µg/m ³
R2	1.6		14.5	
R3	0.3		13.2	
R4	0.7		13.6	
R5	0.5		13.4	
R6	0.4		13.3	
R7	0.4		13.3	
R8	0.4		13.3	
R9	0.8		13.7	
R10	0.6		13.5	
R11	0.5		13.4	
R12	0.4		13.3	
R13	0.4		13.3	
R14	0.3		13.2	
R15	0.4		13.3	
R16	0.4		13.3	
R17	0.5		13.4	
R18	0.5		13.4	
R19	0.4		13.3	
R20	0.5		13.4	
R21	0.5		13.4	
R22	0.6		13.5	
R23	0.4		13.3	
R24	0.4		13.3	
R25	0.4		13.3	
R26	0.4		13.3	
R27	0.4		13.3	
R28	0.3		13.2	
R29	0.3		13.2	
R30	0.3		13.2	
R31	0.4		13.3	
R32	0.3		13.2	

Receiver	Predicted Increment ($\mu\text{g}/\text{m}^3$)	Background Concentration	Total ($\mu\text{g}/\text{m}^3$)	Impact Assessment Criteria
R33	0.4		13.3	
R34	0.2		13.1	
R35	0.1		13.0	
R36	0.4		13.3	
R37	0.4		13.3	
R38	1.1		14.0	
R39	0.8		13.7	

The annual PM_{10} impact assessment criteria are not exceeded at any sensitive receivers. According to the NSW OEH guidance, no additional contemporaneous assessment of annual average PM_{10} is required.

7.13.2.2 24 Hour Average PM_{10}

The predicted concentrations of 24-hour average PM_{10} maximum increment for the proposed operation are presented in **Figure 7-14**.



 Sensitive Receivers	Client:	Justin and Renee Camilleri
	Project:	Pheasants Nest Poultry
	Source:	Google Earth
		

Figure 7-14: 100th Percentile 24 Hour Average PM₁₀ Concentration (Contour labels = 5,10, 20 µg/m³)

The predicted concentrations of the 24-hour average PM₁₀ impact for the proposed operation are presented in **Table 7-11**.

Table 7-11: Maximum Impact of 24 Hour Average PM₁₀

Receiver	Predicted Increment (µg/m ³)	Maximum Background Concentration	Total (µg/m ³)	Impact Assessment Criteria
R1	16.2	43.6 µg/m ³	59.8	50 µg/m ³
R2	25.4		69.0	
R3	4.5		48.1	
R4	10.6		54.2	
R5	11.0		54.6	
R6	10.4		54.0	
R7	11.9		55.5	
R8	10.3		53.9	
R9	16.5		60.1	
R10	10.4		54.0	
R11	8.3		51.9	
R12	6.6		50.2	
R13	6.6		50.2	
R14	6.3		49.9	
R15	7.1		50.7	
R16	8.3		51.9	
R17	9.4		53.0	
R18	14.5		58.1	
R19	8.2		51.8	
R20	9.0		52.6	
R21	8.9		52.5	
R22	10.6		54.2	
R23	10.0		53.6	
R24	11.3		54.9	
R25	11.6		55.2	
R26	14.9		58.5	

Receiver	Predicted Increment ($\mu\text{g}/\text{m}^3$)	Maximum Background Concentration	Total ($\mu\text{g}/\text{m}^3$)	Impact Assessment Criteria
R27	9.4		53.0	
R28	10.5		54.1	
R29	11.2		54.8	
R30	10.3		53.9	
R31	8.3		51.9	
R32	5.0		48.6	
R33	6.5		50.1	
R34	8.2		51.8	
R35	1.7		45.3	
R36	8.0		51.6	
R37	9.1		52.7	
R38	27.2		70.8	
R39	21.8		65.4	

¹ The background concentration of $89.7 \mu\text{g}/\text{m}^3$ has been discounted as it is above the impact assessment criteria.

Bold and grey highlighted text indicates exceedances above the assessment criteria (i.e. $50 \mu\text{g}/\text{m}^3$).

The exceedances at nearby sensitive receivers of the 24-hour average PM_{10} concentration presented in **Table 7-11** indicates that a Level 2 contemporaneous impact and background assessment is required to determine any additional exceedances as a result of the proposed operation. A summary of the 24-hour average PM_{10} contemporaneous impact and background assessment (Level 2 Assessment) for identified sensitive receivers are presented in **Table 7-12**. The detailed results of the contemporaneous impact and background assessment for each receiver are given in **Appendix C**.

Table 7-12: Summary of 24 Hour Average PM₁₀ Contemporaneous Impact and Background

Date	PM ₁₀ 24-hour average (µg/m ³)				Date	PM ₁₀ 24-hour average (µg/m ³)			
	Highest Background	Predicted Increment	Receiver	Total		Background	Highest Predicted Increment	Receiver	Total
17/09/11	89.7	0.1	R1	89.8	26/01/11	27.5	27.2	R38	54.7
18/09/11	43.6	0.2	R2	43.8	01/09/11	14.8	25.4	R2	40.2
23/09/11	38.4	0.1	R1	38.5	31/08/11	14.7	23.4	R2	38.1
21/05/11	38	2.1	R1	40.1	10/02/11	12.4	22.2	R38	34.6
22/05/11	33.4	1.0	R1	34.4	01/02/11	24.8	21.8	R39	46.6
15/11/11	31.8	4.1	R2	35.9	05/11/11	15.2	21.7	R38	36.9
20/05/11	27.7	1.8	R1	29.5	02/02/11	24.2	20.8	R39	45.0
26/01/11	27.5	27.2	R38	54.7	19/04/11	17.7	18.1	R2	35.8
19/05/11	27.2	3.0	R1	30.2	26/06/11	8.7	18.0	R2	26.7
31/01/11	26.4	7.2	R39	33.6	29/04/11	5.7	16.7	R2	22.4
22/10/11	26.4	2.5	R18	28.9	15/06/11	7.1	16.5	R9	23.6
16/09/11	25.5	0.1	R2	25.6	23/08/11	11.3	16.4	R2	27.7

The detailed results of the contemporaneous impact and background assessment for each highlighted receiver as shown in **Table 7-12** are given in **Appendix C**. There is one additional exceedance (i.e. 26 January 2011) of the 24-hour PM₁₀ impact assessment criteria at nearby sensitive receivers. According to the NSW OEH guidance, mitigation measures or emission controls that reduce emissions are required.

The exceedances of the criteria are a result of the combination of the ambient dust concentration, poultry shed emissions and wheel generated emissions. It is recommended that particulate emissions be managed by the implementation of an air quality management plan which details best management practices.

7.13.2.3 Annual Average TSP

The predicted concentrations of annual average TSP for the proposed operation are presented in **Figure 7-15** and **Table 7-13**.

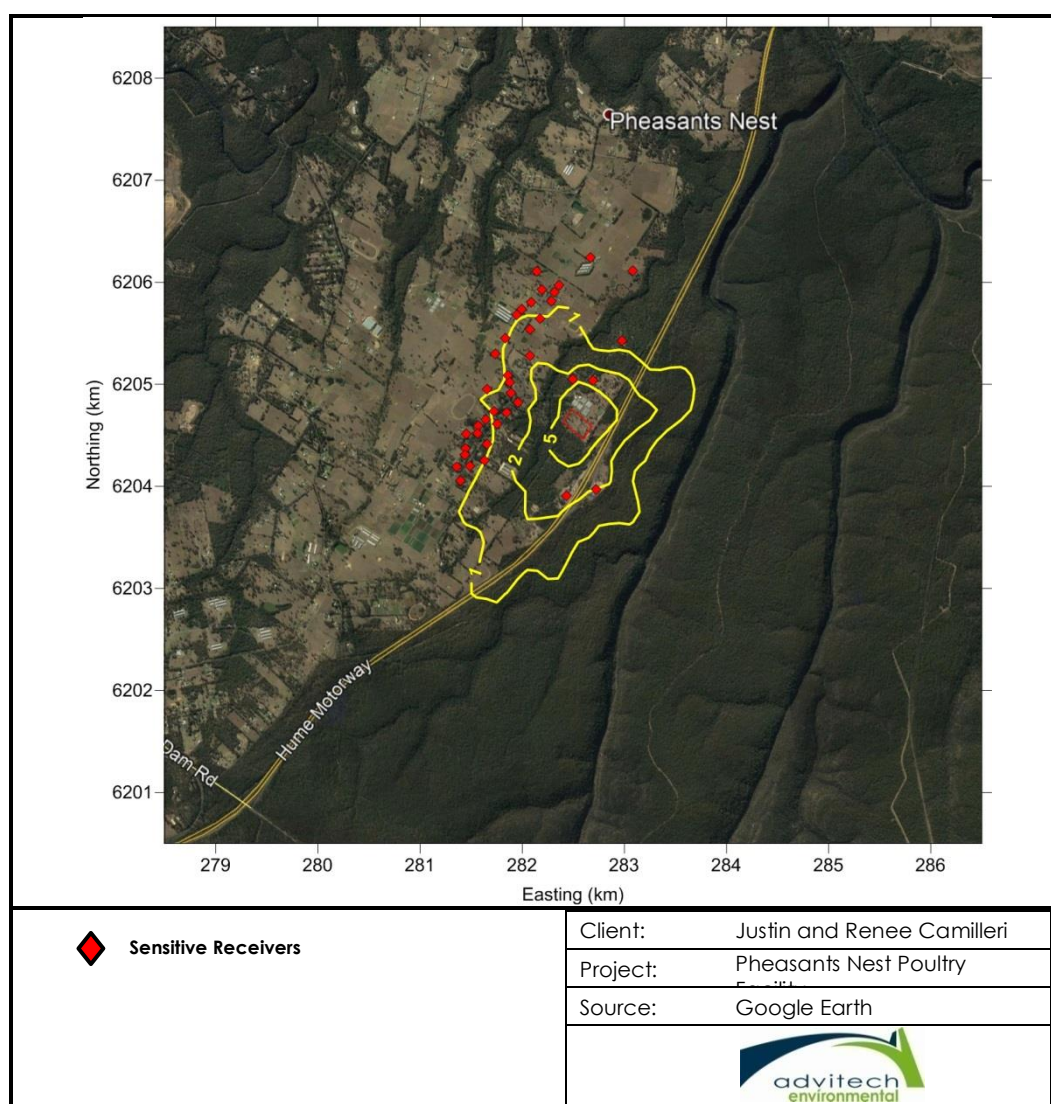


Figure 7-15: 100th Percentile Annual Average TSP Concentration (Contour labels = 1, 2, 5 µg/m³)

Table 7-13: Predicted Annual Average TSP at Sensitive Receivers

Receiver	Predicted Increment ($\mu\text{g}/\text{m}^3$)	Background Concentration ¹	Total ($\mu\text{g}/\text{m}^3$)	Impact Assessment Criteria
R1	3.6	25.8 $\mu\text{g}/\text{m}^3$	29.4	90 $\mu\text{g}/\text{m}^3$
R2	4.3		30.1	
R3	0.8		26.6	
R4	1.6		27.4	
R5	1.1		26.9	
R6	1.0		26.8	
R7	0.9		26.7	
R8	1.0		26.8	
R9	1.7		27.5	
R10	1.3		27.1	
R11	1.1		26.9	
R12	0.9		26.7	
R13	0.8		26.6	
R14	0.7		26.5	
R15	0.9		26.7	
R16	0.9		26.7	
R17	1.0		26.8	
R18	1.0		26.8	
R19	0.9		26.7	
R20	1.1		26.9	
R21	1.1		26.9	
R22	1.3		27.1	
R23	0.9		26.7	
R24	1.0		26.8	
R25	0.9		26.7	
R26	0.9		26.7	
R27	0.8		26.6	
R28	0.8		26.6	
R29	0.7		26.5	
R30	0.7		26.5	
R31	0.8		26.6	
R32	0.6		26.4	
R33	0.8		26.6	
R34	0.5		26.3	

Receiver	Predicted Increment ($\mu\text{g}/\text{m}^3$)	Background Concentration ¹	Total ($\mu\text{g}/\text{m}^3$)	Impact Assessment Criteria
R35	0.3		26.1	
R36	0.8		26.6	
R37	0.8		26.6	
R38	2.6		28.4	
R39	1.9		27.7	

¹Considered to be twice the annual average PM_{10} value (refer to **Table 5**)

The modelling results for the proposed operation indicate that the predicted GLCs for annual average TSP at all receivers surrounding the facility will not exceed the impact assessment criteria of $90 \mu\text{g}/\text{m}^3$.

7.13.2.4 Annual Average $\text{PM}_{2.5}$

The predicted concentrations of annual average $\text{PM}_{2.5}$ for the proposed operation are presented in **Figure 7-16** and **Table 7-14**.

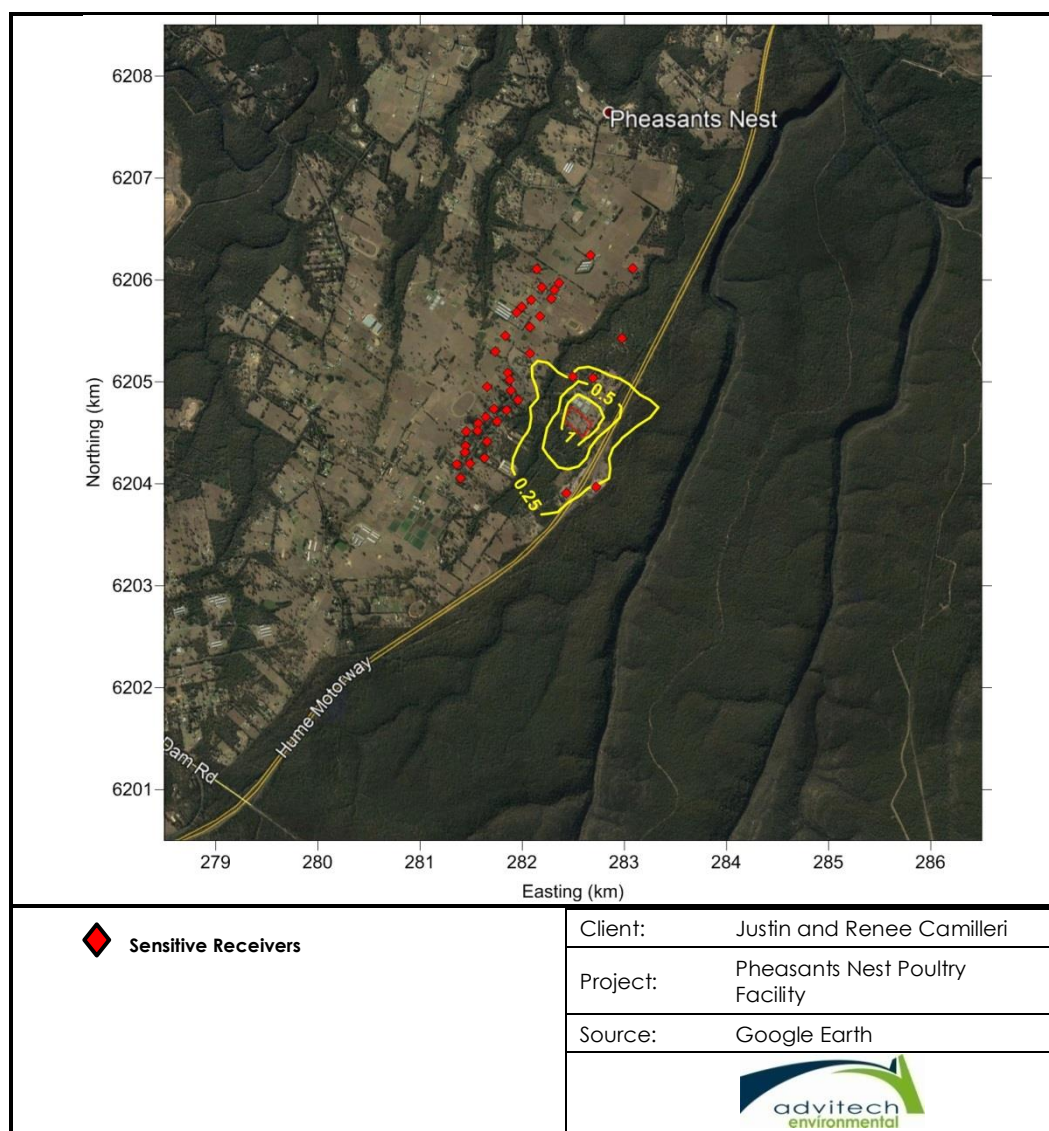


Figure 7-16: 100th Percentile Annual Average $\text{PM}_{2.5}$ Concentration (Contour labels = 0.25, 0.5, 1 $\mu\text{g}/\text{m}^3$)

Table 7-14 presents the predicted cumulative 100th percentile annual average PM_{2.5} for sensitive receivers respectively. An annual average PM_{2.5} background concentration of 5.9 µg/m³ has been applied (refer to **Table 7-6**) to determine if further assessment is required.

Table 7-14: Predicted Annual Average PM_{2.5} at Sensitive Receivers

Receiver	Predicted Increment (µg/m ³)	Background Concentration	Total (µg/m ³)	Impact Assessment Criteria
R1	0.4	5.9 µg/m ³	6.3	8 µg/m ³
R2	0.4		6.3	
R3	0.1		6.0	
R4	0.2		6.1	
R5	0.1		6.0	
R6	0.1		6.0	
R7	0.1		6.0	
R8	0.1		6.0	
R9	0.2		6.1	
R10	0.2		6.1	
R11	0.1		6.0	
R12	0.1		6.0	
R13	0.1		6.0	
R14	0.1		6.0	
R15	0.1		6.0	
R16	0.1		6.0	
R17	0.1		6.0	
R18	0.1		6.0	
R19	0.1		6.0	
R20	0.1		6.0	
R21	0.1		6.0	
R22	0.2		6.1	
R23	0.1		6.0	
R24	0.1		6.0	
R25	0.1		6.0	
R26	0.1		6.0	
R27	0.1		6.0	
R28	0.1		6.0	
R29	0.1		6.0	

Receiver	Predicted Increment ($\mu\text{g}/\text{m}^3$)	Background Concentration	Total ($\mu\text{g}/\text{m}^3$)	Impact Assessment Criteria
R30	0.1		6.0	
R31	0.1		6.0	
R32	0.1		6.0	
R33	0.1		6.0	
R34	0.1		6.0	
R35	0.0		5.9	
R36	0.1		6.0	
R37	0.1		6.0	
R38	0.3		6.2	
R39	0.2		6.1	

The annual $\text{PM}_{2.5}$ impact assessment criteria are not exceeded at any sensitive receivers. According to the NSW OEH guidance, no additional contemporaneous assessment of annual average $\text{PM}_{2.5}$ is required.

7.13.2.5 24 Hour Average $\text{PM}_{2.5}$

The predicted concentrations of 24-hour average $\text{PM}_{2.5}$ for the proposed operation are presented in **Figure 7-17** and **Table 7-15**.

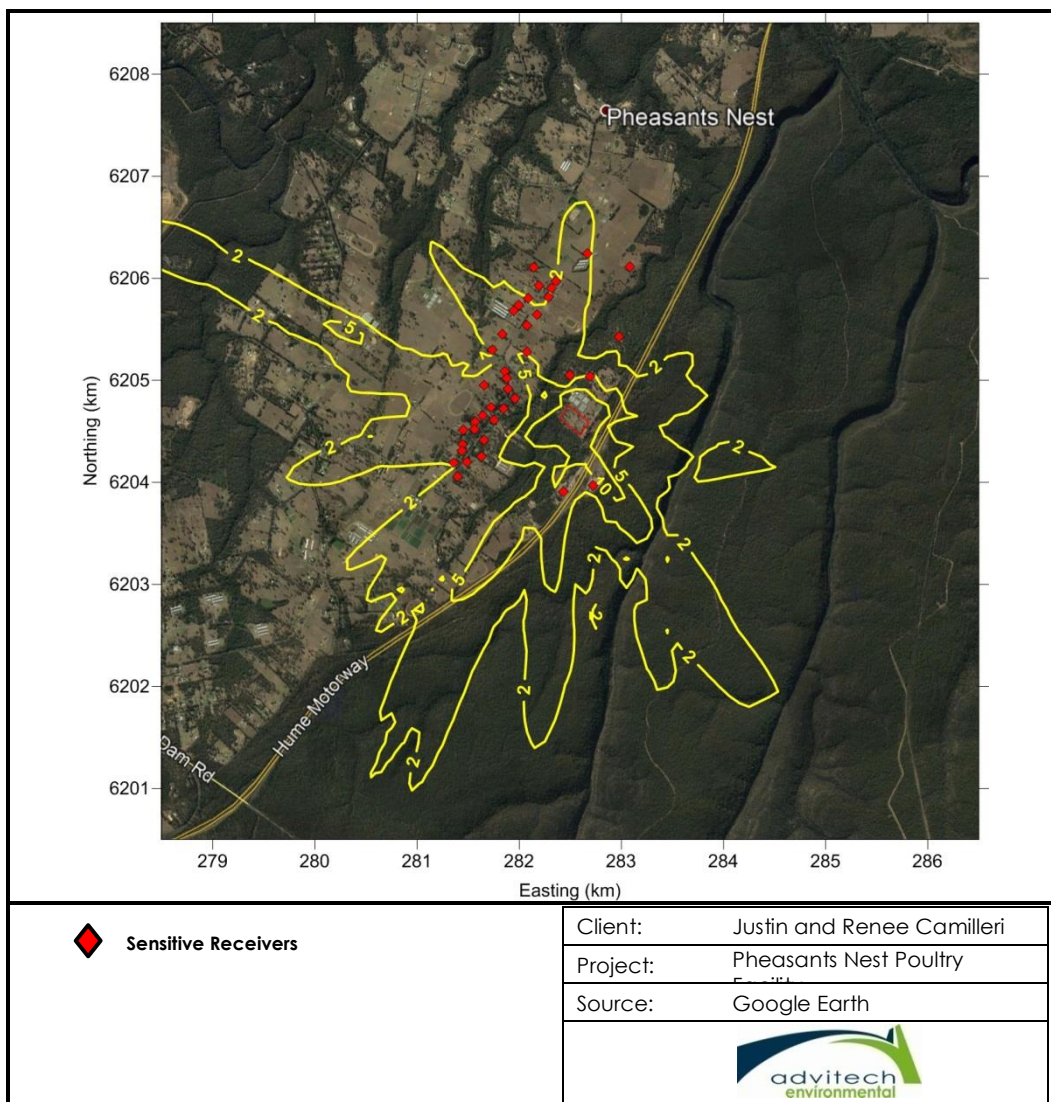


Figure 7-17: 100th Percentile 24 Hour Average PM_{2.5} Concentration (Contour labels = 2, 5, 10 µg/m³)

Table 7-15 presents the predicted cumulative 100th percentile 24-hour average PM_{2.5} for sensitive receivers respectively. A maximum 24-hour PM_{2.5} background concentration of 22.2 µg/m³ has been applied (refer to **Table 7-6**) to determine if further assessment is required.

Table 7-15: Predicted Maximum 24-Hour Average PM_{2.5} at Sensitive Receivers

Receiver	Predicted Increment (µg/m ³)	Background Concentration ¹	Total (µg/m ³)	Impact Assessment Criteria
R1	4.8	22.2 µg/m ³	27.0	25 µg/m ³
R2	4.4		26.6	
R3	1.3		23.5	
R4	3.2		25.4	
R5	3.3		25.5	
R6	3.1		25.3	
R7	3.6		25.8	
R8	3.1		25.3	
R9	4.9		27.1	
R10	3.1		25.3	
R11	2.5		24.7	
R12	2.0		24.2	
R13	2.0		24.2	
R14	1.9		24.1	
R15	2.1		24.3	
R16	2.5		24.7	
R17	2.8		25.0	
R18	4.2		26.4	
R19	2.5		24.7	
R20	2.7		24.9	
R21	2.7		24.9	
R22	3.2		25.4	
R23	3.0		25.2	
R24	3.4		25.6	
R25	3.4		25.6	
R26	4.4		26.6	
R27	2.8		25.0	
R28	3.1		25.3	
R29	3.3		25.5	
R30	3.1		25.3	
R31	2.5		24.7	
R32	1.5		23.7	
R33	2.0		24.2	
R34	2.5		24.7	

Receiver	Predicted Increment ($\mu\text{g}/\text{m}^3$)	Background Concentration ¹	Total ($\mu\text{g}/\text{m}^3$)	Impact Assessment Criteria
R35	0.5		22.7	
R36	2.4		24.6	
R37	2.7		24.9	
R38	8.2		30.4	
R39	6.5		28.7	

¹ The background concentration of $38 \mu\text{g}/\text{m}^3$ and $28.9 \mu\text{g}/\text{m}^3$ has been discounted as it is above the impact assessment criteria.

The exceedances at nearby sensitive receivers of the 24-hour average $\text{PM}_{2.5}$ concentration presented in **Table 7-16** indicates that a Level 2 contemporaneous impact and background assessment was required to determine any additional exceedances as a result of the proposed operation. A summary of the 24-hour average $\text{PM}_{2.5}$ contemporaneous impact and background assessment (Level 2 Assessment) for identified sensitive receivers are presented in **Table 7-16**. The detailed results of the contemporaneous impact and background assessment for each highlighted receiver are given in **Appendix C**.

Table 7-16: Summary of 24 Hour Average PM_{2.5} Contemporaneous Impact and Background

Date	PM _{2.5} 24-hour average (µg/m ³)				Date	PM _{2.5} 24-hour average (µg/m ³)			
	Highest Background	Predicted Increment	Receiver	Total		Background	Highest Predicted Increment	Receiver	Total
15/11/2011	38.0	0.7	R2	38.7	26/01/2011	15.3	8.2	R38	23.5
21/05/2011	28.9	0.6	R1	29.5	10/02/2011	4.3	6.6	R38	10.9
22/09/2011	22.2	0.0 ¹	R1	22.2	1/02/2011	8.1	6.5	R39	14.6
20/05/2011	20.6	0.5	R1	21.1	5/11/2011	6.8	6.3	R38	13.1
22/05/2011	19.1	0.2	R1	19.3	2/02/2011	11.4	6.2	R39	17.6
23/09/2011	18.8	0.0 ¹	R1	18.8	15/06/2011	1.8	4.9	R9	6.7
31/07/2011	16.3	1.5	R1	17.8	8/11/2011	14.1	4.9	R38	19.0
3/08/2011	16.1	2.2	R1	18.3	7/08/2011	6.4	4.8	R1	11.2
22/10/2011	15.7	0.8	R18	16.5	9/11/2011	10.3	4.4	R38	14.7
23/10/2011	15.4	1.0	R38	16.4	7/11/2011	13.8	4.4	R26	18.2
26/06/2011	15.4	3.0	R2	18.4	1/09/2011	5.9	4.4	R2	10.3
26/01/2011	15.3	8.2	R38	23.5	12/02/2011	5.4	4.2	R18	9.6

¹No predicted 24-hour average PM_{2.5} recorded at any sensitive receiver.

There are no additional exceedances of the 24-hour PM_{2.5} impact assessment criteria at nearby sensitive receivers. According to the NSW OEH guidance, no additional assessment of 24-hour average PM_{2.5} is required.

7.13.2.6 Dust Deposition

The predicted concentrations of annual average deposited dust for the proposed operation are presented in **Figure 7-18**.

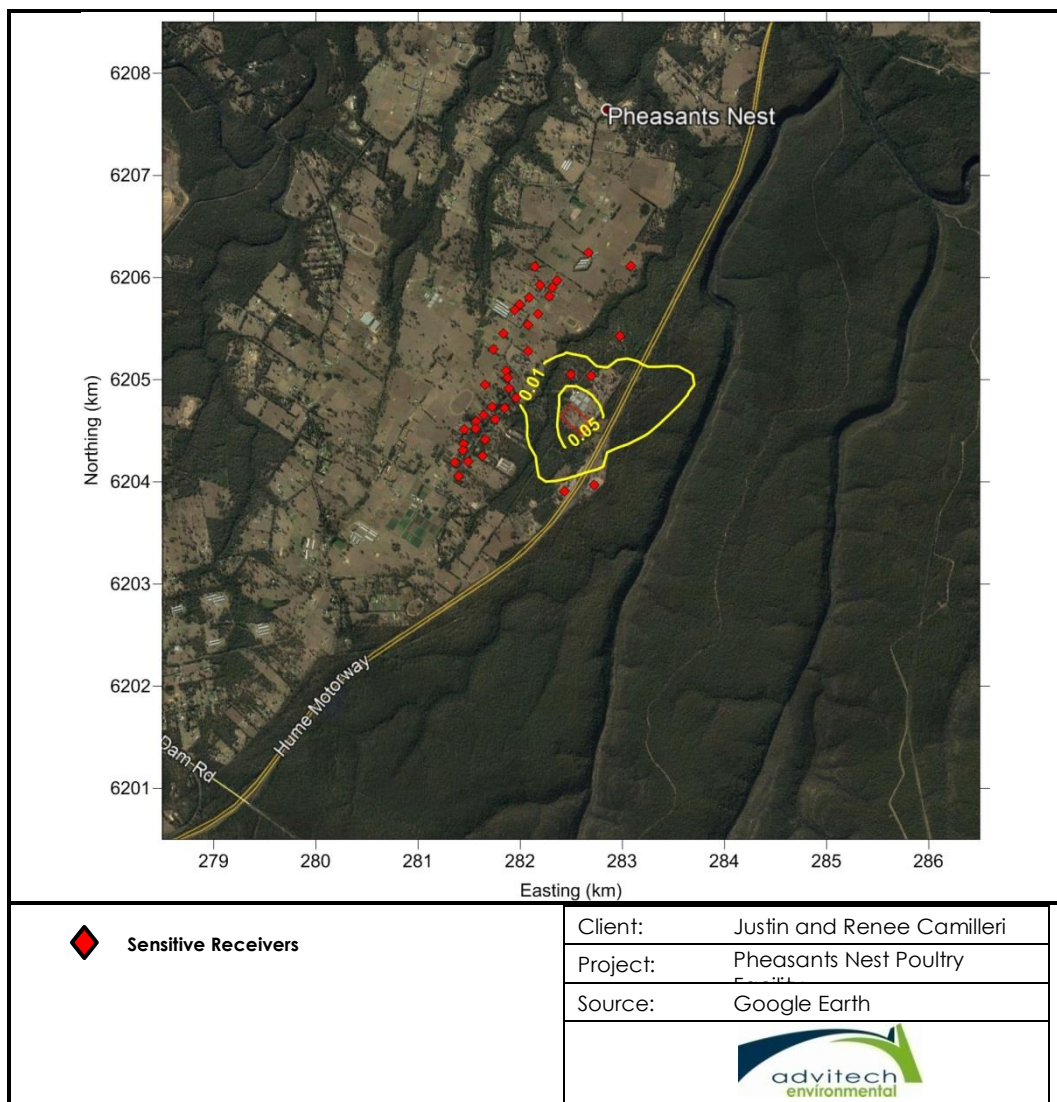


Figure 7-18: Annual Average Deposited Dust (Contour labels = 0.01, 0.05 g/m²/month)

The modelling results for the proposed operation predict the dust deposition rate to be low. The incremental deposited dust level predicted at any sensitive receiver is predicted to be less than 0.05 g/m²/month. The impact is not expected to exceed the maximum increase in deposited dust level criteria of 2 g/m²/month.

7.14 DISCUSSION

The air quality impact assessment indicates that odour GLCs at sensitive receivers will not exceed the impact assessment criteria. It should be noted that the odour nuisance risk to the transient service station users at R38 and R39 has been considered to be low due to the short duration of a visit and low predicted odour concentration. Based on the assessment bases outlined in the report it is a requirement that the development of the poultry farms be constructed with 10 m stacks to achieve air quality compliance.

The particulate dispersion modelling indicates that there may be an additional exceedance of the 24-hour average PM₁₀ impact assessment criteria at nearby sensitive receivers. The exceedance of the criteria is a result of the combination of the ambient dust concentration, poultry shed emissions and wheel generated emissions. It should be noted that wheel generated dust emissions are based on emission factors from the *AP42 Section 13.2.2 Unpaved Roads* (refer to **Appendix C**) and may be considered conservative for this application.

Particulate exceedances during periods of high background concentrations can be minimised by the implementation of best management practices such as:

- Moderate driving speeds (<40 km/h) are maintained on unsealed internal roads;
- Loads are securely covered for transport;
- Farm operations are planned and performed by taking into account weather conditions and forecasts (e.g. wind direction and strength) to minimise the impact of windblown dust on nearby sensitive land uses;
- Roads are wetted as a contingency action if unacceptable dust impacts on neighbours during peak periods of truck movement are likely during pick-up (e.g. in particularly dry and windy conditions); and
- Vegetative screens, impact walls, earthen mounds or enclosures at the end of tunnel ventilated sheds are installed as control measures against unacceptable dust impact.

It is recommended that particulate emissions be managed by the preparation and implementation of an air quality management plan which details best management practices. To assist with the management of air quality impacts from the poultry facility, it is recommended that a weather monitoring station is installed on-site.

7.15 AIR QUALITY CONCLUSIONS

CALPUFF modelling for odour and particulates for the proposed poultry facility was undertaken to enable assessment of air quality impacts.

A population dependent complex odour criterion of 5 OU (99th percentile nose response time) was applied to modelled odour emissions from the poultry facility. Based on the assessment bases outlined in this report, the result of CALPUFF modelling suggests that predicted cumulative odour GLCs above the 5 OU criterion

will not be encountered at any identified sensitive receivers. The highest predicted off-site odour concentration of 2.1 OU is at sensitive receiver R2 and R38.

Modelling results suggest that particulate GLCs may cause additional exceedances of the impact assessment criteria at off-site discrete receivers. It is recommended that particulate emissions be managed by the implementation of an air quality management plan which details best management practices. To assist with the management of air quality impacts from the poultry facility, it is recommended that a weather monitoring station is installed on-site.

It should be noted that air dispersion models such as CALPUFF are predictive models. CALPUFF is dependent upon the accuracy of emission locations and inventories, local meteorology and the representativeness of background concentrations. As such there is always a degree of uncertainty in the predicted air quality impact.

8 TRAFFIC & TRANSPORT

Chapter Eight summarises traffic and transport considerations associated with the proposed development of the land.

From the site work completed and following a review of the provided documentation, it is considered that the proposed poultry farm development will have an acceptable impact upon the overall road network in the locality of the site. The existing traffic flows in the locality of the site are very low and well within the capacity of the local roads. Any increases in the local traffic associated with operation of the proposed farm will not have a noticeable impact on the operation or safety of these roads.

The proposed site access operates in a safe manner and allows for vehicles to enter and exit the site in a forward direction, consistent with the existing rural nature of the site. Vehicles will be able to manoeuvre within the site to exist in a forward direction.

Any parking associated with the development can be accommodated within the subject site.

It is concluded that the development should be approved on traffic and access grounds.

A specialised Traffic Impact Assessment (TIA) was prepared for the proposed development. The TIA was prepared by SECA Solution. The TIA is reproduced as **Appendix G**.

9 ECOLOGICAL CONSIDERATIONS

Chapter Nine summarises flora and fauna investigations within the proposed poultry farm development and surrounding locality. A detailed description of existing flora and fauna and the impacts of the proposed development is provided separately at **Appendix E**.

9.1 ECOLOGICAL IMPACT ASSESSMENT

Native vegetation within the site has been highly modified by past clearing for agricultural practices. Smaller more intact areas of native vegetation largely associated with steeper terrain were present in the far west of the site. Remnant trees were scattered over a large portion of the site outside the existing development. As a result of fieldwork completed for this report a total of five vegetation communities were delineated within the site. These vegetation communities were:

- Sandstone Woodland (6.04ha);
- Sandstone Gully Forest (1.07ha);
- Shale-Sandstone Ironbark Forest (Poor Condition) (3.22ha);
- Pasture/Grassland (2.81ha);
- Aquatic Dam (1.14ha).

The 3.22ha area of Shale-Sandstone Ironbark Forest occurring within the east of the site was found to be consistent with a highly modified example of the threatened ecological community Shale/Sandstone Transition Forest which is listed as Critically Endangered Ecological Community under both state and national legislation. The proposal will result in the removal of 2.89ha of this community from within the site. Taking the Approved Conservation Advice (TSSC, 2014) into consideration the 3.22ha area of Shale Sandstone Transition Forest would meet the threshold for the patch sizes of >0.5ha, with the patch being contiguous with a native vegetation remnant (any native vegetation where cover in each layer present is dominated by native species) >1ha in area. However, the assemblage would fall below the threshold requiring >30% of the perennial understorey cover to be made up of native species. Therefore, the proposal is unlikely to require referral, assessment and compliance under the provisions of the EPBC Act. Considering the disturbance to this community and the proposal is unlikely to have an adverse effect such that its local occurrence is likely to be placed at risk of extinction.

A total of eight specimens of the threatened *Epacris purpurascens* var. *purpurascens* were located in the western portion of the site. All eight of the specimens will require

removal for the proposed dam. Considering the current land practices where the specimens were located such as grazing and slashing the long-term outlook for these individuals would be reduced. According to the Bionet Atlas (OEH, 2017) larger numbers of specimens of *E. purpurascens* var. *purpurascens* have been recorded within the local area, particularly to the east within the Upper Nepean State Conservation Area over the Hume Motorway to the east. Approximately 50 plants were also recorded approximately 500m to the south-west along Mockingbird Bird Road in 1999 to 2000 (OEH, 2017). The loss of eight specimens will result in an incremental reduction of this species within the local area. However, the proposal is unlikely to have a significant effect on these threatened flora species such that a local extinction would occur. It is recommended that individual specimens of *E. purpurascens* var. *purpurascens* be translocated into adjacent suitable habitat. Any translocation of specimens of *E. purpurascens* var. *purpurascens* will require a Translocation Plan that is approved by OEH. None of the remaining addressed flora species were recorded within the site during the survey. The site was found to contain suitable habitat for a further 16 addressed flora species.

Seven threatened fauna species were recorded within the site during the survey, being;

- *Meridolum corneovirens* (Cumberland Plain Land Snail);
- *Petroica boodang* (Scarlet Robin);
- *Calyptrorhynchus lathamii* (Glossy Black-Cockatoo);
- *Mormopterus norfolkensis* (Eastern Freetail Bat);
- *Scoteanax rueppellii* (Greater Broad-nosed Bat).
- *Falsistrellus tasmaniensis* (Eastern False Pipistrelle);
- *Chalinolobus dwyeri* (Large-eared Pied Bat).

The proposal will result in a reduction of suitable habitat for these fauna species such as hollows for the tree roosting microchiropteran bats. However, the proposal is unlikely to have a significant impact on these threatened fauna species such that a local population would be placed at risk of extinction.

Foraging/hunting/nesting resources of varying quality was available for 36 of the 46 remaining fauna species assessed. The proposal will result in a small incremental reduction of habitat in the local area for a number of these fauna species. Taking into consideration the recommendations of an Ecological Management Plan (EMP) to maintain and enhance areas of suitable habitat that will remain within the site and preserve the large areas of adjoining habitat the proposal is unlikely to disrupt

the life cycle of the addressed threatened fauna species such that local extinction would occur.

Investigations in accordance with State Environmental Planning Policy No. 44 - 'Koala Habitat Protection' revealed the site contained two listed Koala Feed Tree species, *Eucalyptus punctata* (Grey Gum) and to a much lesser extent *Eucalyptus tereticornis* (Forest Red Gum). These tree species comprise over 15% of the total trees present within the site and therefore considered to constitute 'Potential Koala Habitat'. However, considering the lack of Koala activity recorded within the site, it would unlikely be considered to constitute Core Koala Habitat and accordingly no further provisions of this policy apply to the site.

Considerations have been made to the Commonwealth Environment Protection and Biodiversity Conservation (EPBC) Act (1999). As previously mentioned the listed Critically Endangered Ecological Community Shale/Sandstone Transition Forest and the threatened *Chalinolobus dwyeri* (Large-eared Pied Bat) were identified within the site. For reasons previously given the proposal was is not likely to significantly affect any items of National Environmental Significance. The koala was also addressed and referral to the minister was deemed not recommended for adversely affecting habitat critical to the survival of the koala.

The proposal will result in an incremental loss of habitat within the local area, however, with the implementation of the recommendations and mitigation measures given below (with further detail in **Appendix E**) and the undertaking of an Ecological Management Plan (EMP) to protect and enhance the remaining habitat within the site it is believed that the proposal will avoid adversely impacting upon any of the threatened species or threatened ecological communities considered in this report.

9.2 OFFSETS AND MITIGATION WORKS

A number of mitigation measures are specified to minimise the impact of the loss of habitat. The measures include:

- Protection of remaining native vegetation and habitat within the site;
- Rehabilitation of native vegetation within the site; and
- Protection of native fauna during and after construction.
- It is recommended that an Ecological Management Plan (EMP) be prepared and adopted to enhance, conserve and manage the ecological characteristics of the remainder of the site. This requirement should be incorporated into any conditions of development consent issued for the proposed development of the land.

1. • It is recommended that a Vegetation Management Plan (VMP) be prepared and adopted to manage weeds within the site. This requirement should be incorporated into any conditions of development consent issued for the proposed development of the land.

9.2.1 Protection, Rehabilitation and Enhancement of Remaining Native Vegetation and Habitat

To protect and enhance native vegetation occurring within the site the following measures are required to be implemented:

- (1) An Ecological Management Plan is to be prepared and adopted to enhance, conserve and manage the ecological characteristics of the remainder of the site. This requirement should be incorporated into any conditions of development consent issued for the proposed development of the land.

As part of the Ecological Management Plan, to reduce the impact on any fauna species which may be present, any removal of hollow-bearing trees will be required to be supervised by a suitably qualified fauna ecologist. Where required, and at the discretion of the on-site ecologist, trees will need to be gently and slowly felled utilising methods aimed at reducing any impact on fauna. Hollow bearing trees may only be removed after breeding season when hollows have been generally vacated. Any removed tree hollows will be replaced by suitable nest boxes* at a ratio of 4:1 (four nesting boxes*/hollow). *Utilisation of any existing felled hollows in lieu of man-made nest boxes is preferred.

The Ecological Management Plan needs to focus on measures to enhance Cumberland Plain Woodland in the non-development areas of the site including the Critically Endangered Community; Shale Sandstone Transition Forest.

- (2) A Vegetation Management Plan is to be prepared and adopted to manage and enhance native vegetation and mitigate weeds within the site. This requirement should be incorporated into any conditions of development consent issued for the proposed development of the land. The following matters are relevant:

- Appropriate sediment and runoff controls are to be implemented to prevent sediment and nutrient runoff;
- Trees will be required to be clearly highlighted and marked, specifically discerning any proposed removal to avoid other trees being mistakenly removed or damaged;
- Trees occurring within close proximity to the development will require temporary fencing around their dripline to avoid disturbances including those such as compaction;

- The extent of all areas of native vegetation outside the disturbance area is to be clearly defined on the ground and permanently fenced to ensure they are not subject to disturbance during construction and future land practices within the site;
- To compensate for the loss of trees it is recommended that additional trees be planted at a ratio of 4:1 outside the development. Any plantings must comply with the Bushfire Asset Protection Zone Requirements. Tree species are to include those native to the site such as *Eucalyptus punctata* (Grey Gum), a known Koala Feed Tree Species.
- It is recommended that individual specimens of *E. purpurascens* var. *purpurascens* be translocated into adjacent suitable habitat. Any translocation of specimens of *E. purpurascens* var. *purpurascens* will require a Translocation Plan that is approved by OEH.

9.2.2 Protection of Native Fauna

To protect native fauna within the site the following measures are required to be implemented:

- (1) An Ecological Management Plan is to be prepared and adopted to enhance, conserve and manage the ecological characteristics of the remainder of the site. This requirement should be incorporated into any conditions of development consent issued for the proposed development of the land.

As part of the Ecological Management Plan, to reduce the impact on any fauna species which may be present, any removal of hollow-bearing trees will be required to be supervised by a suitably qualified fauna ecologist. Where required, and at the discretion of the on-site ecologist, trees will need to be gently and slowly felled utilising methods aimed at reducing any impact on fauna. Hollow bearing trees may only be removed after breeding season when hollows have been generally vacated. Any removed tree hollows will be replaced by suitable nest boxes* at a ratio of 4:1 (four nesting boxes*/hollow). *Utilisation of any existing felled hollows in lieu of man-made nest boxes is preferred.

The Ecological Management Plan needs to focus on measures to enhance Cumberland Plain Woodland in the non-development areas of the site including the Critically Endangered Community; Shale Sandstone Transition Forest.

All trees will be required to be inspected for Koalas prior to removal.

Koala feed trees and hollow-bearing trees are to be retained within APZs.

Fencing around any areas of native vegetation must allow for the movement of all native fauna. No barbed wire is to be used.

Artificial lighting is to be kept to a minimum and away from areas of vegetation which are associated with nocturnal fauna.

Low speed limits are to be set along the access roads to help avoid collision with any native fauna. Driver awareness regimes are also required to educate all persons associated with the proposed development of the land.

10 ARCHAEOLOGICAL ASSESSMENT & STATEMENT OF HERITAGE IMPACT

Chapter Ten provides a summary of a detailed Archaeological Cultural Heritage Assessment and a Statement of Heritage Impact (undertaken by Advitech Pty. Ltd.) to assess the impacts of the proposed poultry farm on items of Aboriginal and European heritage.

A copy of the Advitech report is provided separately in **Appendix F**.

The principal objectives of the study were to identify, evaluate and, if necessary, propose appropriate management protocols for material cultural evidence located in the study area and or at some risk from direct or peripheral effects of the project. It is concluded that there are no constraints, on archaeological or cultural grounds, to the proposed development in the current areas proposed for impact. This conclusion and the following recommendations are made on the basis of:

- The legal requirement under the NPW Act which states that it is illegal to knowingly deface, damage or destroy a relic or Aboriginal place in New South Wales without first obtaining the written consent;
- The legal requirement of the Heritage Act which states that it is an offence to damage, disturb or despoil any relic, deposit or place listed on the State Heritage Register; and
- Research into the archaeological, environmental and historical record of the study area as detailed in this report.

However, should the current areas proposed for impact be varied causing further direct or peripheral impacts to subsurface areas further into the south western corner of the property, further archaeological and cultural investigation will be required.

10.1 HISTORIC OR NATURAL HERITAGE

The study area is an evolved landscape resulting from housing, farming structures, vegetation clearing, the construction of dams and drainage lines, pastoralism, fencing and erosion. The study area is not considered to be significant, rare or representative at local, State or National level.

No items of historical or natural heritage, as defined by the NSW Heritage Office under the requisite criteria, were found to be located within the study area. Therefore, no approvals are required under the Heritage Act to proceed with the development.

The Advitech report recommends that:

- In the case of unexpected potential heritage items identified during any excavation works, that an 'Unexpected Heritage Items Procedure' be created and provided to all workers, contractors, sub-contractors and employees at

their time of their work induction to the site. The 'Unexpected Heritage Items Procedure' should:

- Define a relic;
 - Provide that, if a relic is discovered in the course of excavation, that is likely to be disturbed damaged or destroyed by works, then all works must be suspended in that area and an archaeologist contacted to assess the find; and
 - Provide that if the proponent must notify the Heritage Branch, Office of Environment and Heritage, or its delegate and suspend work in the vicinity of the object that might have the effect of disturbing, damaging or destroying such relic until the requirements of the Heritage Branch have been satisfied; and
- A copy of the Advitech assessment should be lodged with the NSW Department of Heritage.

11 CONTAMINATION

The history and current use shows that this property has had market garden activity since the 1980s and some grazing across it. Sampling and testing for chlorinated hydrocarbon analysis was undertaken in the properties for potential pesticide contamination.

The laboratory test results indicate that no levels (or very low) of 4,4'-DDE are present across the subject site and are therefore within the EPA guideline for an "Intensive Livestock Keeping Establishment" (poultry farming) enterprise. Testing also indicate some very low levels of Organophosphorus Pesticides (OPP), namely Dimethoate and Malathion. These pesticides were found predominantly within the shed they are stored and within the igloos they are sprayed in. Low levels were also found in 2 of the dams, however further testing of the sediment in these dams showed no levels present. Both these pesticides are approved for the current use of the land and are not persistent in the environment and don't pose any threat.

As these OPP's only have a life of around 14 days in the environment, they are consequently not a concern for the environmental integrity of the subject property.

Sampling for heavy metal contamination, organochloride pesticides and total petroleum hydrocarbon (TPH) was undertaken around existing structures and stored metallic objects particularly sheds. The laboratory test results indicate very low or no presence was detected. A high level of zinc was detected but this was localised to a metal shed erected with zinc alum and leaching would be attributable to the level recorded in the soil surface.

All soil samples were analysed for the presence of asbestos and all samples were free of respirable asbestos fibres and no free fibro particles samples were observed.

All other heavy metal concentrations were found to be non-detectable and within the background rural levels and below EPA guideline levels and there is no potential for contamination by heavy metals over the subject site and property.

Hydrocarbons were not detected in any of the samples analysed and locations sampled provided the highest potential to be impacted by hydrocarbons and, it may be concluded that hydrocarbons are not present and will not impede the proposed erection of an "Intensive Livestock Keeping Establishment" (poultry farming) enterprise.

Based on the soil analytical results and our site inspection, the property and subject site can be considered safe for use as a Poultry Keeping Enterprise.

Ground water was not encountered during the test pitting and consequently was not analysed. The low permeability of the soils would prevent any vertical movements of contaminated water. There is no evidence that any ground water

would have the potential to be contaminated from the surface activities in the subject properties.

Elaboration of report detail and conclusions is illustrated as **Appendix J**.

12 VISUAL ASSESSMENT

Chapter Twelve describes the visual impacts of the proposed development. Potential visual impacts were determined through evaluation of the interaction between visual modification and visual sensitivity.

12.1 METHODOLOGY AND VISUAL IMPACTS

Visual sensitivity is a measure of how critically a change to the existing landscape will be viewed from various viewpoints. This sensitivity is dependent on a number of viewer characteristics which, for the purposes of this study, are land use, distance of the poultry farm from viewers and the visibility from critical viewing locations.

The existing landscape character of an area is a fundamental factor in determining the visual impact of any development. The background setting and surrounding natural or built environments can either expose a new development to view or help absorb the visual effects. The following elements influence the character of the landscape and visibility of a development:

- vegetation – influences lines of view as well as the visual character of an area;
- topography – can obscure or expose a development;
- distance of views – influences the area potentially affected by a development and the degree of impact; and
- built structures – form part of the visual character of an area and may also block or create lines of view.

The visual impact of the proposed poultry farm extension was assessed through a pragmatic exercise utilising computer-based software to illustrate view cross sections of the proposed development from specified potential neighbouring sensitive receptors and public location.

illustrations

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Figure 12-2: Cross Section 1

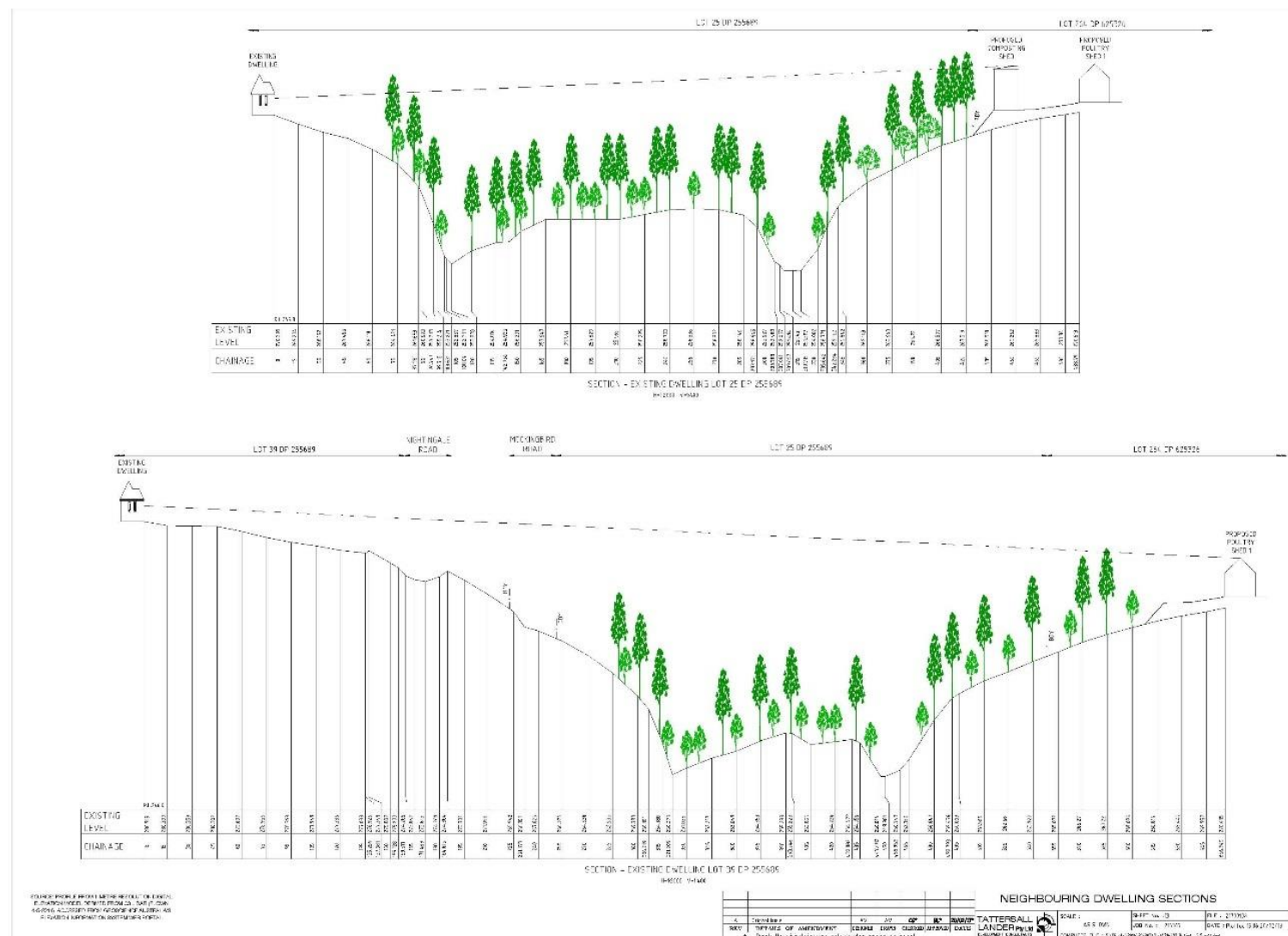


Figure 12-3: Cross Section 2

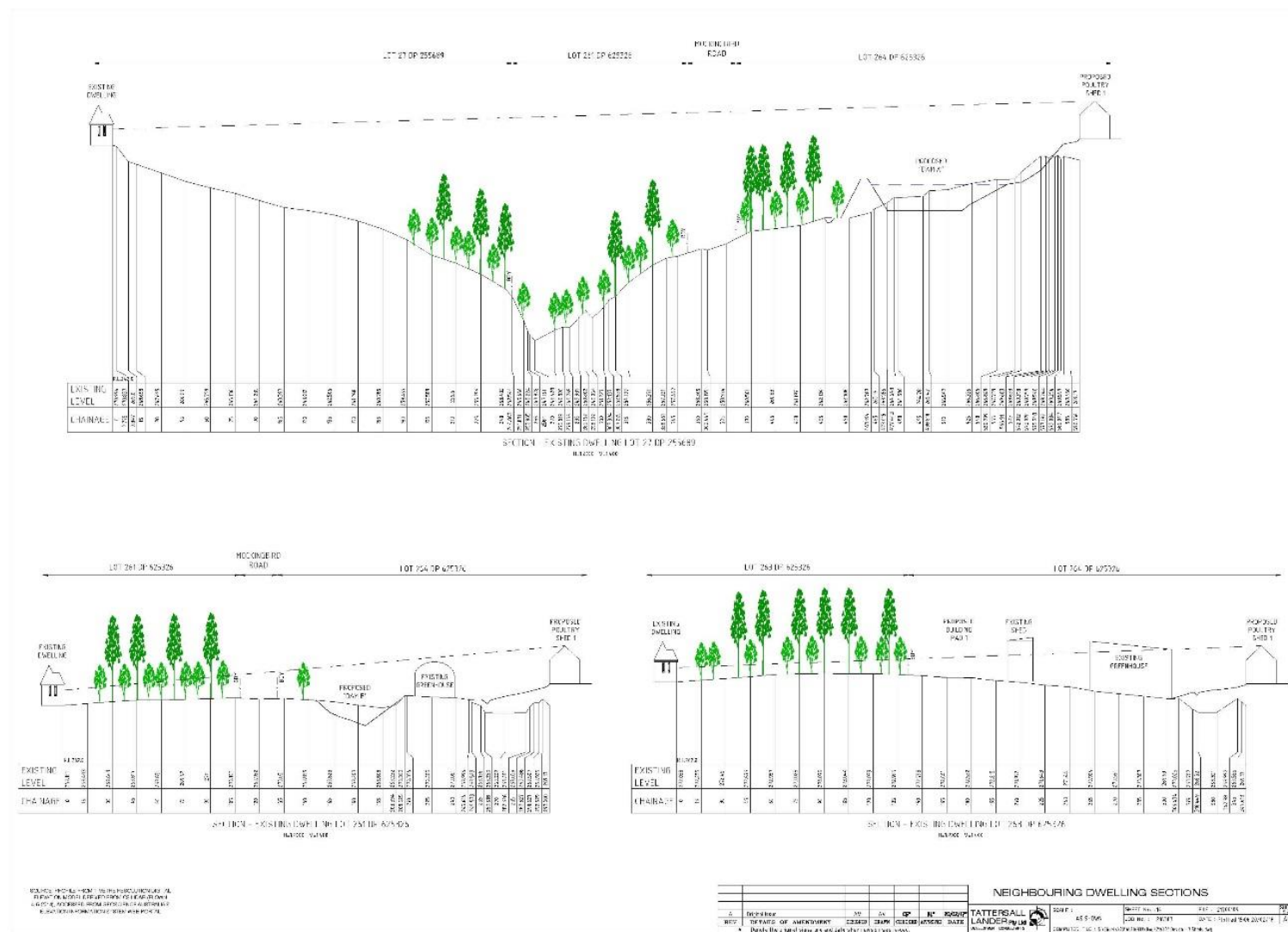
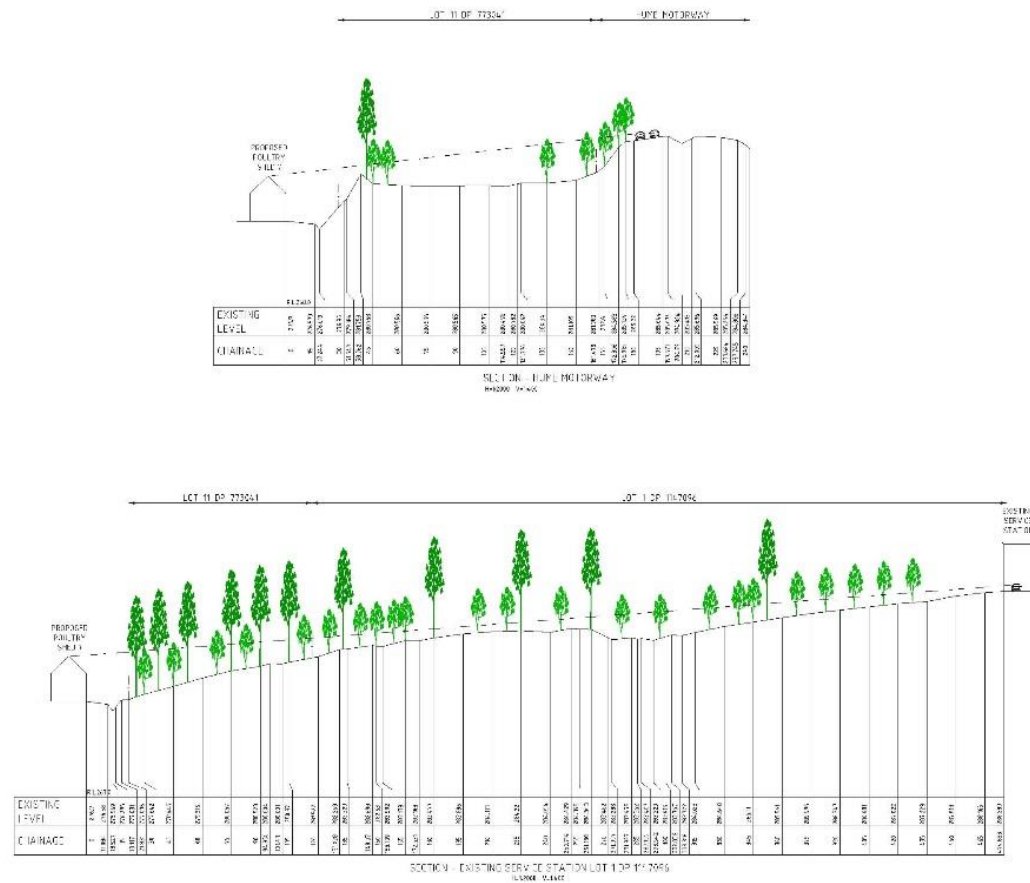


Figure 12-4: Cross Section 3



NOTES: 1. THIS DRAWING IS A PRELIMINARY DESIGN AND IS NOT TO BE USED FOR CONSTRUCTION. 2. THE DESIGNER ACCEPTS NO LIABILITY FOR ANY LOSS OR DAMAGE CAUSED BY THE USE OF THIS DRAWING. 3. THE DESIGNER IS NOT RESPONSIBLE FOR ANY LOSS OR DAMAGE CAUSED BY THE USE OF THIS DRAWING.

NEIGHBOURING DWELLING SECTIONS									
NO.	DESCRIPTION	NO.	NO.	NO.	NO.	NO.	NO.	NO.	NO.
1	REPAIRS OF AMENITY	2	REPAIRS OF AMENITY	3	REPAIRS OF AMENITY	4	REPAIRS OF AMENITY	5	REPAIRS OF AMENITY
6	REPAIRS OF AMENITY	7	REPAIRS OF AMENITY	8	REPAIRS OF AMENITY	9	REPAIRS OF AMENITY	10	REPAIRS OF AMENITY

The cross sections readily illustrate that visual impact of the proposed development is negligible. The proposed development will be physically screened from any nearby public road. Local topography and extensive vegetation largely prevents the visibility of the proposed poultry farm from all surrounding residences.

13 BUSHFIRE ASSESSMENT

Chapter Thirteen considers matters related to bushfire management and assessment under NSW legislation.

NSW Rural Fires Act 1997

The site is identified as being bush fire prone on the Cessnock Bush Fire Prone Land Map, however, the development is not for a habitable building, nor are any of the sheds within 10 metres of a habitable building and hence this is not a relevant issue. It is also noted that the sheds are to be constructed from non-combustible materials.

14 WASTE MANAGEMENT

Chapter Fourteen considers the waste management regime to be implemented in association with the proposed development.

Relevant authorities have requested full consideration of waste outputs from the proposed development.

To facilitate the successful operation of the proposed poultry farm, waste streams generated during the construction and operational phases of the development will be effectively managed and or disposed offsite. Waste management at the Pheasants Nest facility will be in accordance with the *NSW Waste Avoidance and Resource Recovery Strategy 2014-2021* (WARR Strategy).

All waste management strategies for the site will be outlined within the Operations Manual for the site, which will be kept on site and easily accessible for reference at all times. Waste management strategies at the Pheasants Nest Farm will be developed with consideration of the NSW Waste hierarchy presented in **Figure 14-1**.



Source: <http://www.epa.nsw.gov.au/images/waste/waste-hierarchy.jpg>

Figure 14-1: NSW Waste Hierarchy

14.1 GENERAL NON-RECYCLABLE WASTE

The disposal of general non-recyclable waste is applicable to both the construction and operation phases of the proposal. Construction wastes will be the responsibility of the building contractors and management of these wastes will be presented in the Construction Management Manual.

Day to day general waste will be placed into enclosed skips and removed from the facility by a licensed contractor on a regular basis. This waste will be transported to and disposed of at a local landfill site. No general, non-recyclable waste material will be stockpiled and or disposed of on site.

14.2 RECYCLABLE WASTE

The site will incorporate standard recycling protocols for mixed recycling, ensuring that recyclable waste is not disposed of in landfill. Recyclable waste will be sorted to Council requirements, collected by a licenced contractor, and then transferred to the nearby Bargo Waste Management Centre. Recycling will be carried out in accordance with *Better Practice Guidelines for Waste Management and Recycling in Commercial and Industrial Facilities* (EPA, 2012).

14.3 CHEMICAL CONTAINERS

Chemicals used at the Pheasants Nest facility will be primarily for sanitisation and disinfection. These chemicals would be brought to the site and removed by contracted shed cleaners at the end of each farm cycle. Any empty chemical containers generated by shed cleaning would be removed from the site and appropriately disposed of by the respective cleaning company.

The proponent would be responsible for waste generated by chemicals stored on site. The following chemicals would be stored on site for water sanitation, as well as pest, vermin and weed control:

- Glyphosate 20L drums (herbicide);
- Rat bait stations (vermin control in sheds); and
- Chlorine (disinfectant and sanitisation).

The above chemicals will be stored in an appropriately bunded storage area for short terms and in limited volumes. Chlorine will be stored in the pump shed in double walled containers and managed under contract with the processor. All stored chemicals will be placarded if quantities exceed WorkCover placarding requirements. In the unlikely event that the quantities of chemicals stored exceed dangerous goods notification thresholds, WorkCover will be notified and standard Dangerous Goods handling processes followed.

Empty chemical containers will be disposed of either via a chemical supply company, or the drumMUSTER program. Bargo Waste Management Centre is the nearest drumMUSTER drop off site; located 4km to the west.

The potential risks associated with the management of chemical wastes at the Pheasants Nest Development are considered low, based on the use of best management practices, the limited volumes of chemicals stored, as well as the locations and design of chemical storage sheds. Risks will be further reduced through the preparation and implementation of an environmental operations manual prior to operations commencement, which will detail requisite mitigation measures, including incident management procedures and waste disposal protocols.

Safety Data Sheets (SDS) for all chemicals kept on-site would be available for reference by staff at all times. Procedures for dealing with spills of chemical waste will follow chemical SDS protocols and detailed within the environmental operations manual for the facility.

14.4 POULTRY LITTER

To minimise the risk of disease spread amongst flocks and likelihood of offensive odours emitted from the proposed facility, spent litter and manure will be removed from the sheds at the end of each batch. This is followed by washing and disinfecting before placing the next batch of chickens.

Spent litter will be trucked promptly off site to be used as a fertiliser on rural properties. Apart from a small amount of spent litter to be used for composting, waste litter and manure would not be stockpiled to reduce odour impacts and biosecurity risks. The use of spent litter (manure and spent bedding) for land application is permitted by The Manure Exemption (2014), under Part 9, Clauses 91 and 92 of the Protection of the Environment Operations [POEO] (Waste) Regulation 2014. Reuse of spent litter as a fertiliser and composting medium is consistent with the WARR Strategy.

Given the close proximity of the Pheasants Nest facility to Sydney's primary food production basin, there is unlikely to be a shortage of demand for the spent poultry litter from the production facilities. Hence, the use of poultry litter generated by the proposal for fertiliser would be a reliable disposal strategy that would benefit local businesses.

The proponent has two arrangements to provide fertiliser to local properties:

- The grower will have contractual arrangements with a litter company who sources a local market; and or
- The grower arranges their own market whereby local farmers have a semiformal arrangement for the receipt of spent poultry litter.

At the end of each eight-week production cycle, a typical poultry shed at the Pheasants Nest facility will have accumulated approximately 150m³ of poultry waste. Once birds are removed from the sheds, shed cleaning contractors will remove the litter directly to trucks for removal from site; in accordance with contractual arrangements and the processors Broiler Handbook.

Loads leaving the site will be required to be secured in accordance with Regulation 292 of Road Rules Regulation (2014). In addition, the proponent will make every effort to ensure that loads leaving the site for use on local properties are covered to minimise chances of spillage and odour emissions.

The safe handling and application of the fertiliser material once it has left the development site will be the responsibility of the end-user. To promote appropriate handling and application of fertiliser offsite, the proponent will direct end users to the management guidelines provided in the *National Environmental Management System for the Meat Chicken Industry* (RIRDC 2014). Records of the quantity, transporter, destination and intended use will be maintained on site.

14.5 ROUTINE MORTALITY DEAD BIRDS

Routine mortality within broiler facilities is usually 0.1 to 0.25% per day. Accounting for projected thinning, the projected weight of mortalities across each production cycle per shed is displayed in **Figure 14-2** (thinning will occur around Days 35 and 42, with 15 and 25% of stock processed, respectively). However, it must be noted that

mortality rates are not constant, with mortality usually typically greatest at days three to four, then stabilise until approximately day 45 when mortality increases to 0.6%.

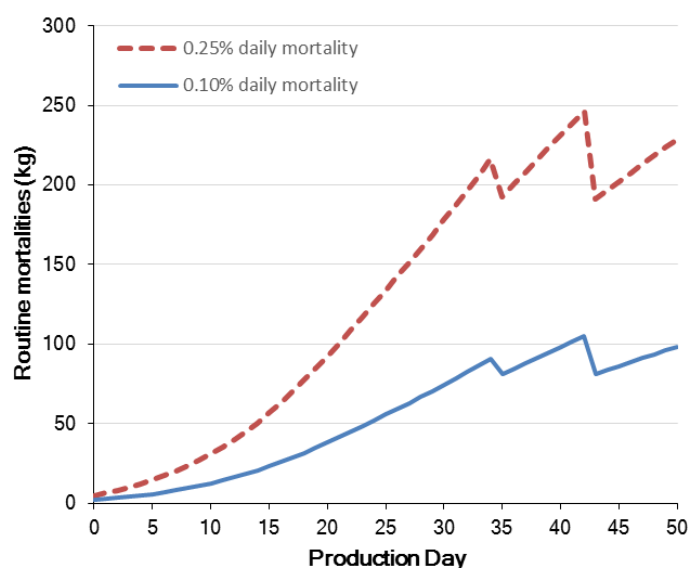


Figure 14-2: Upper and lower predicted mortality rates across the production cycle per shed, accounting for thinning on days 35 and 42.

To dispose of routine mortalities, composting in bays onsite is the proposed disposal option for the Pheasants Nest Development. Composting is a suitable disposal option for the Pheasants Nest site as it is located outside the Sydney drinking water catchment.

When composting facilities are effectively designed, composting of routine bird mortalities is an environmentally sustainable and biologically safe option for disposal (RIRDC, 2014). Onsite disposal via composting is also an accepted practice described in *Best Practice Management for Meat Chicken Production* (DPI, 2012). The major benefit of composting bird material is the production of nutrient rich humus-like material, which is a valued fertiliser and or soil amendment. Production of this compost is consistent with waste reduction avenues outlined in the WARR strategy.

Onsite routine mortality composting at the proposed development will be carried out in accordance with:

- *Environmental Guidelines: Composting and Related Organics Processing Facilities* (NSW DEC, 2004);
- *National Environmental Management System for Meat Chicken Industry* (RIRDC 2014);
- *Australian Standard (AS) 4454 – 2012 Composts, soil conditioners and mulches*; and
- Any Council and regulatory authority requirements.

The composting protocol will involve the daily removal of dead and injured birds during routine animal welfare inspections. Any bird not deceased, but showing signs of illness or disease, will be humanely destroyed in accordance with animal welfare standards by appropriately trained personnel. Within 24 hrs of death, all mortalities will be collected in enclosed containers within the

poultry sheds, then transported directly to the onsite composting facility for disposal. In the unlikely occasion that routine mortalities exceed the capacity of the composting facility, they would be stored in a freezer, and collected by a pre-arranged pet food company.

The proposed onsite composting system has been designed to manage the predicted volume of routine dead birds during production cycles for each farm, plus additional capacity for periodic fluctuations.

The composting shed will also:

- be located toward the south eastern extent of the property, which is at an appropriate distance from the production facilities of each farm and sensitive receivers;
- be covered, out of public view and have a concrete (impermeable) floor to prevent leaching to ground water and watercourses;
- be designed to maintain complete coverage of carcasses in compost piles;
- maintain aerobic activity;
- have clean water diverted around the composting site; and
- be appropriately managed to prevent pests and vermin.

The composting shed will consist of three bays, whereby at any time, one bay will be used for composting mortalities over an eight-week cycle. These mortalities will be layered over an initial base layer of sawdust, with layers of mortalities interspersed between layers of poultry litter. To prevent localised wet areas and poor composting, carcasses will be arranged so that they do not overlap. The second bay will be used to store used litter, whilst the third will be cleaned out and prepared for the next cycle of composting. To minimise odour impacts, only benign poultry litter will be used for composting. At the end of the eight weeks, in synchrony with the broiler production cycle, a front-end loader will remove all compost material.

Fertiliser material generated through composting would be supplied to the same customers as those purchasing poultry litter. Records of the quantity, transporter, destination and intended use will be maintained on site.

The location of the proposed composting shed is shown with further design details in the development plans located at **Appendix A**.

14.6 SEWAGE

Sewage generated by onsite staff amenities at the Pheasants Nest Site will be by on-site waste disposal.

14.7 MASS MORTALITIES

In the unlikely event of mass bird deaths, the proponents would institute the Emergency Quarantine and Disease Management Plan and would immediately contact the integrator/processor who will arrange for an inspection by the company technical staff to ascertain the cause of death. The NSW Department of Primary Industries (DPI) will be notified by the Broiler processor.

In NSW high mortality and disease events fall under the jurisdiction of the following legislation and regulations:

- *New South Wales Exotic Diseases of Animals Act 1991*;
- *Exotic Diseases of Animals (General) Regulation 1998*;
- *Stock Diseases Act 1923*;
- *Stock Diseases (General Regulation) 1997*; and
- *State Emergency and Rescue Management Act 1989*.

If the suspected cause of the poultry deaths is an Emergency Animal Disease, the NSW Department of Agriculture will be notified in accordance with relevant AUSVETPLAN manual procedures. All birds on the farm and adjacent farms may need to be slaughtered with an extended vacancy time before the reintroduction of birds.

The Emergency Quarantine and Disease Management Plan will outline immediate measures to be implemented to isolate the infected farm, effect strict quarantine procedures to prevent the spread of the disease, and notify all relevant persons of the nature of the outbreak. Destruction and disposal of carcasses, spent litter, feed and the decontamination of equipment, buildings, equipment and so on, in this instance, will be under the direct control of the Chief Veterinary Officer of the DPI. Where appropriate and directed by DPI, urgent ring vaccination will be considered.

Upon confirmation that it is a disease outbreak, and immediate slaughter of farm stock is necessary, killing will be managed by the DPI in co-ordination with the EPA and the processor. The birds will be euthanased humanely within the sheds at the facility.

Wollondilly Council may need to be contacted to assist in the disposal of the birds on farm (burial, composting) or off-farm (land fill site).

14.8 TREATMENT AND DISPOSAL OPTIONS

The method of destruction of birds will depend on the site and number of birds involved but usually is by dislocation of the neck or gassing in accordance with the *AUSVETPLAN Destruction of Animals Manual* (AUSVETPLAN, 2015).

The disposal options available for a mass death of birds will depend upon the cause of death (AUSVETPLAN, 2015). The preferred method of mass bird disposal will be determined by the processor with consultation with the DPI to ensure appropriate quarantine control and standard operating procedures are implemented in line with the relevant AUSVETPLAN disease strategy. For diseases such as Newcastle Disease, birds may need to be incinerated at high temperature. Other disposal options may include:

- **Mass onsite disposal:** from an historical perspective, on-site burial of diseased poultry has been favoured for reasons of practicality and expediency. However, this practice is now discouraged on the basis of significant environmental risk and more favourable options becoming available. If poultry are to be buried on-farm as a requirement of a

government agency with an exotic disease outbreak, specification will be as advised in the *National Environmental Management System for the Meat Chicken Industry* (RIRDC 2014);

- Disposal in a land-fill site;
- Protein recovery facility: preferable, but may be economically, geographically and logistically prohibitive in some circumstances. If the carcasses are to be rendered, contact will need to be made with local plants;
- On-farm in shed composting: euthanased birds are layered and with a co-composting material and formed into windrows within the sheds and managed in accordance with document *The Biosecurity of Mass Poultry Mortality Composting* (RIRDC, 2014); and
- Incineration.

Infected sheds, equipment, disposal sites and personnel involved in the operation will need to be disinfected and sterilised to prevent the spread of a disease in accordance with the *AUSVETPLAN Operational Procedures Manual Decontamination* (AUSVETPLAN, 2008). If an Emergency Animal Disease is diagnosed, all subsequent activities involving plant and personnel will be decided by NSW and Federal authorities.

14.9 SUMMARY OF PRIMARY WASTE STREAMS AND MANAGEMENT COMMITMENTS

Primary waste streams, along with other potential waste streams, are listed in **Table 14-1** with their Classifications under the *Waste Classification Guidelines Part 1: Classifying Waste* (EPA, 2014) and intended management.

Table 14-1: Primary waste streams, their classification and selected management commitments for the Pheasants Nest Farm.

Waste Type	NSW Classification	Management
General Waste	General solid waste (putrescible and non-putrescible)	Collected on a regular basis from the Development Site by a licensed contractor, or onsite personnel for recycling and/or disposal at Bargo Waste Management Centre.
Chemical and fuel containers	Hazardous waste: If containers were previously used to store Dangerous Goods (Class 1, 3, 4, 5 or 8) and have not been cleaned out to remove residues. General solid waste (non-putrescible): If the containers have been washed or vacuumed.	Returned to the chemical supply company for recycling, reuse or appropriate disposal. Non-returnable chemical containers will be collected and managed by the drumMUSTER program, which runs locally out of the Bargo Waste Management Centre. Note that transport of any Dangerous Goods will be conducted in accordance with Australian Codes.
Poultry litter	General solid waste (putrescible)	Collected and transported offsite at end of each production cycle for reused as agricultural fertiliser. A small amount of litter will be maintained on site for the purpose of the dead bird composting facility. Retained litter will be stored at the composting facility, away from the production area.

Waste Type	NSW Classification	Management
Routine / daily dead birds	General solid waste (putrescible)	Deceased birds will be collected from the poultry sheds on a daily basis immediately after shed inspections and disposed at the onsite composting facility. The onsite composting facility will be managed in accordance with regulatory requirements.
Sewage (from staff amenities and residences)	Liquid	Collected (pump-out system) on a regular basis by a licensed contractor for offsite disposal in accordance with relevant standard and guidelines and control approvals. If on site disposal is used it would be by irrigation or infiltration.
Tyres	Special waste	Offsite recycling or disposal at licenced facility.
Green waste	General solid waste (non-putrescible)	Composting and/or direct reuse on site.
Used motor oil, air and oil filters and rags	Special waste	Offsite recycling or disposal at licensed facility.
Batteries	Hazardous waste	Offsite recycling.
Light bulbs	Hazardous waste	Offsite recycling.
Mass bird mortalities	General solid waste (putrescible)	Several feasible options for disposal are available (See Section 3.7.1). Option to be determined by NSW DPI.

STATEMENT OF COMMITMENTS

Table 14-2 outlines a Statement of Commitments that will be made by the proponent.

Table 14-2: Statement of Commitments

Aspect/Commitment
Appropriate systems will be implemented to ensure that all waste streams generated by the development are effectively managed and or disposed of offsite.
General waste will be collected on a regular basis from the site by a licensed contractor, or personnel for recycling and or disposal at the Bargo

Waste Management Centre.
Storage of all chemicals will be placarded if quantities exceed WorkCover placarding requirements. In this case, WorkCover will be notified and standard Dangerous Goods handling processes followed.
Empty chemical containers will be returned to the chemical supply company for recycling, reuse or appropriate disposal. Any non-returnable chemical containers can be collected and managed via the drumMUSTER program which runs locally out of the Bargo Waste Management Centre.
Poultry litter will be collected from the sheds at the end of each production cycle and removed from site for provision as a fertiliser.
No waste litter and manure will be stockpiled on site except the small amount retained for the purpose composting routine dead bird (retained litter will only be stockpiled nearby the composting shed, and not the production area).
Deceased birds will be collected from the poultry sheds on a daily basis within 24 hours of death and disposed of in the onsite composting facility immediately following inspection.
Composted routine mortalities will be collected from the sheds at the end of each production cycle and removed from site for provision as a fertiliser.
An Emergency Quarantine and Disease Management Plan, in consultation with NSW DPI (Agriculture), EPA and Council, will be developed prior to commencing operations.

15 ANIMAL WELFARE, BIO-SECURITY AND DISEASE MANAGEMENT

Chapter Fifteen considers and assesses animal welfare, biosecurity and disease management matters. Specifically:

- Department of Primary Industry (Agriculture) requirements for a 5km separation distance between poultry existing poultry breeder complexes and new Intensive Livestock Intensive Industry (Poultry Farm Operations).
- Details of how the proposed development would comply with relevant codes of practice and guidelines;
- Details of all disease and bio-security control measures; and
- A detailed description of the contingency measures that would be implemented for the mass disposal of livestock in the event of disease outbreak.

15.1 PROPOSED DEVELOPMENT: PROXIMITY TO EXISTING POULTRY BREEDING COMPLEXES

The Department of Primary Industries (Agriculture) specified in its comments to the DoPE (via request for SEARs) that any future Intensive Livestock Industries (Poultry Farms) should be located in excess of 5 kms from any existing Poultry Breeder Farm Complexes.

Our **Figure 15-1** illustrates the current locational relationship between existing prescribed Poultry Breeder Complexes and existing Intensive Livestock Industries (Poultry farms) in the locality.

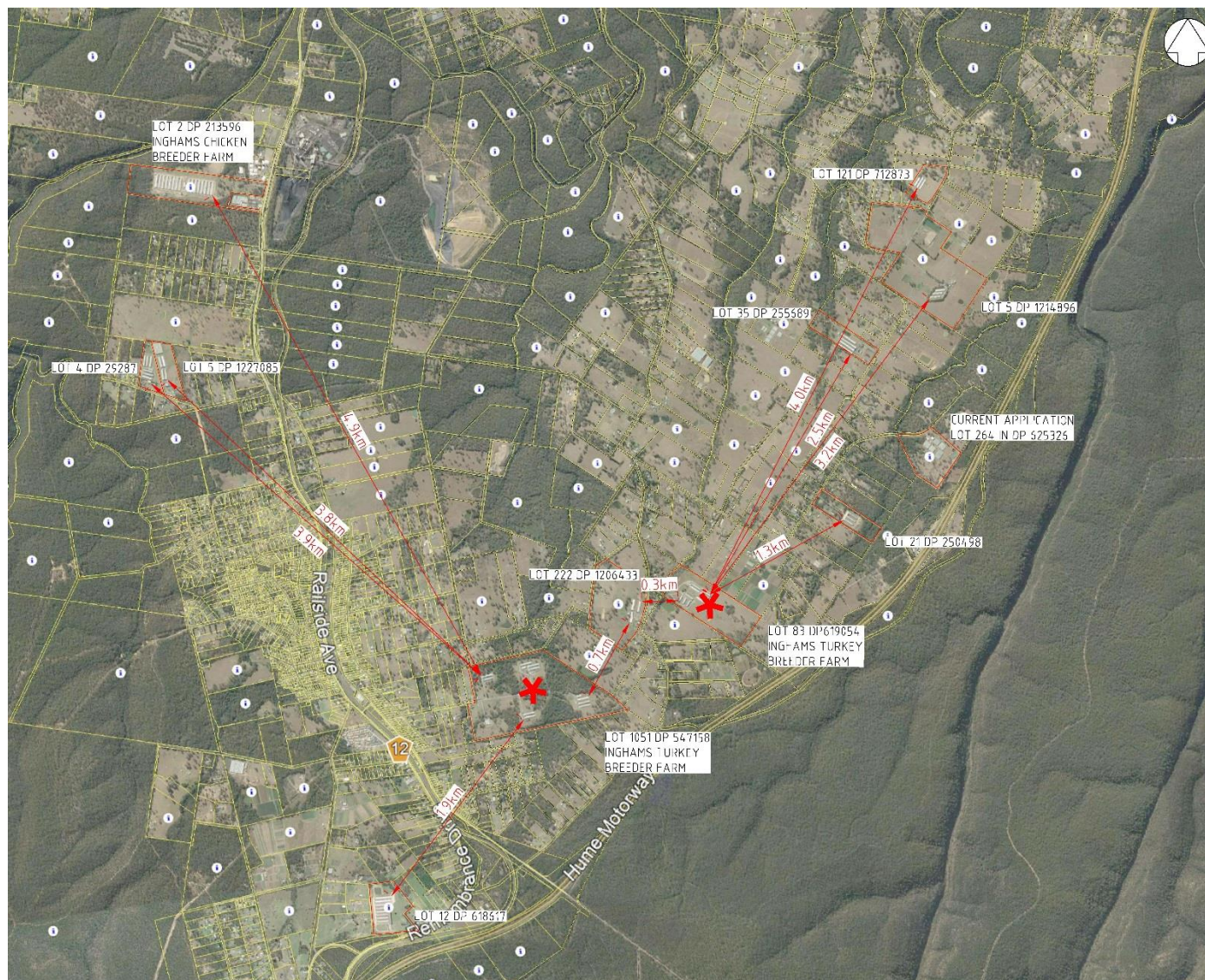


Figure 15-1: Existing Poultry Farms & Proximity to Poultry Breeding Complexes

From our research (and as illustrated in **Figure 15-1**) it is apparent that there are significant numbers of Intensive Livestock Industry (Poultry Farms) facilities already well within a 5km proximity of existing prescribed Poultry Breeder Complexes. In that regard, extensive precedent has already been established. Within the locality, there are already 8 existing Intensive Livestock Industry (Poultry Farms) facilities well within 5 kms of Poultry Breeder Complexes.

It would be unreasonable to decline this application on that basis.

15.2 ANIMAL HEALTH AND WELFARE

There are several Codes of Practice and Guidelines designed to safeguard the health and welfare of poultry during growing, transportation and slaughter associated with meat chicken production. These are:

- *National Animal Welfare Standards for the Chicken Meat Industry* (Australian Poultry CRC, 2008);
- *Primary Industries Standing Committee Model Code of Practice for the Welfare of Animals – Domestic Poultry* (2001) (*The Model Code*);
- The Australian Department of Agriculture Fisheries and Forestry *National Farm Biosecurity Manual for Poultry Production* (2009);
- The Australian Department of Agriculture Fisheries and Forestry *National Water Biosecurity Manual for Poultry Production* (2009); and
- The Australian Chicken Meat Federation Inc. *National Farm Biosecurity Manual for Chicken Growers* (2010).

Additionally, the NSW Department of Primary Industries has published the *Best Practice Management for Meat Chicken Production in NSW* (2012) of which *Manual 1- Site Selection and Development* provides guidance on poultry welfare requirements and *Manual 2 – Meat Chicken Growing Management* provides guidance on the management of biosecurity risks.

Bird welfare, flock performance and economic functioning go hand-in-hand. The proponent is committed to maintaining the highest animal welfare standards in accordance with *The Model Code*. Key aspects of this commitment to animal health and welfare include the following issues which are further discussed below:

- Space Allowance;
- Equipment;
- Lighting;
- Ventilation;
- Water;

- Inspections;
- Transportation; and
- Shed Personnel and Bird Handling requirements.

15.2.1 Space Allowance

Stocking densities of sheds are determined by a combination of weather, shed design and climate control capabilities. To prevent birds from overheating in hot weather, stocking density will be such that poultry have adequate space to facilitate body heat loss through panting, gular flutter, and the ability to hold wings away from the body. Stocking densities in each shed at the facility will not exceed 32 kg/m² as required for tunnel ventilated sheds by *The Model Code*. However, stocking densities may be re-evaluated immediately and adjusted accordingly upon the occurrence of disease or evidence of behavioural changes, such as cannibalism. The need to adjust stocking densities will be revised following daily inspection.

Industry calculations of maximum stocking density for the proposed development have been based on the following assumptions:

- 15 birds / m²;
- Shed dimensions of 18.5 m x 165.2 m = 3,056.2 m²;
- Day 1 stocking number per shed = 45,000 birds;
- Routine mortality rate of 0.1% per day (MCE, 2016); and
- Thinning rate at days 32 to 34 (one third of stock) and 42 (one further third of stock) each cycle.

Based on the proposed shed dimensions and assumptions listed above, the recommended maximum stocking density at the end of a cycle would be 20,000 birds per shed (6.5 birds per m² at 3,056.2 m²). Planned day one stocking rates of 45,000 chicks will result in an end of cycle stocking density of 77,180 kg total end weight (approximately 25 kg/m²), taking daily mortality and thin outs into consideration. Hence, the maximum stocking densities proposed for the Bishops Bridge facility are less than the maximum stocking rates recommended in the *Model Code*.

15.2.2 Equipment

All equipment to which the birds have access will be selected and maintained to avoid injury, pain and stress to the birds.

Automated shed control equipment, including ventilation and temperature control systems, will be regularly checked and maintained to ensure optimum efficiency. Feeding and watering equipment will be checked daily to ensure all birds have sufficient access to food and water.

Automated equipment monitors and alarms will be installed in case of equipment failure.

15.2.3 Lighting

Lighting within the poultry sheds will be operated in accordance with the processor's management manual, and depend on the production cycle and operations being undertaken in the shed. The practices adopted in the shed will ensure:

- Sudden increases in light intensity would be avoided to prevent flight reactions;
- Adequate lighting to allow thorough inspection of poultry welfare (supplemented with a torch where needed);
- Lighting provided over at least eight hours per day;
- Lighting used for bird pickup and the grow out stage would be capable of being dimmed and turned on in a dimmed state; and
- Lighting levels will be checked routinely with light metering equipment.

15.2.4 Ventilation

The proposed sheds are designed with tunnel ventilated fully enclosed climate control systems. The tunnel ventilated system is able to provide optimal environmental parameters to maintain poultry wellbeing, growth and productivity. The tunnel system will be fully automated, computer controlled and alarm monitored. The facility will incorporate a backup power generation system for use in the event of power failure.

The ventilation system for the farm will meet the criteria outlined in *The Model Code*, ensuring that:

- Fresh air is provided;
- Shed temperature and relative humidity are maintained at acceptable levels (< 80% at temperatures above 30°C), even during extreme weather events;
- Dust and odour are minimised; and
- Build-up of harmful gases, with hydrogen sulphide levels below 5 ppm and carbon dioxide below 3000 ppm (0.3%) are reduced.

15.2.5 Food and Water Supply

In accordance with *The Model Code*, there will be no greater than 85 birds, maximum density, per pan feeder. Poultry will be fed a diet containing adequate nutrients and provided with access to sufficient potable water for good health and vitality. Automated feed delivery will be maintained daily and kept flowing; however, enough food would be on hand in the event that the mechanical feeding system fails.

Each shed will incorporate four rows of pan feeders with individual pans spaced at 0.75 m. Based on the shed dimensions supplied in the EIS, each shed will house 880 feeders (165 m / 0.75 m x 4 rows) providing a maximum of about 51 birds per pan

feeder at Day 1 stocking rates and about 34 birds per pan feeder at the end of cycle. These densities are well within the recommended feed space and access requirements described in *The Model Code*. Availability of pan feeders during the brooding period (Day 1 to 14) will vary dependent on the size of the chicks' restrictions within the shed.

The sheds will utilise nipple drinking systems. In accordance with the *Model Code*, during brooding, there should be a maximum density of 50 chicks per nipple, and during grow out, the density will be 25 birds per nipple. Water will be supplied at a temperature at which they do not refuse to drink. Prior to commencement of operation, water will also be tested for salt content and microbiological contamination and in accordance with the processors requirements.

Nipple feeder drip lines will be spaced each 3 metres across the sheds and at 0.2 metre intervals along each drip line. Based on the shed dimensions supplied in the EIS, there will be 4125 nipple access points available or a maximum of 5 birds per nipple at the end of the cycle. Availability of nipples during the brooding period (Day 1 to 22) will vary dependent on the size of the chicks' restrictions within the shed. At no time will the water availability exceed the maximum bird per nipple density described in *The Model Code*.

Best Management Practice (DPI, 2012) requires the availability of at least 2 days of water supply at 2 L per bird in the event of an emergency service interruption. The site will incorporate these requirements. In the unlikely event of daytime transportation of birds, water and pan feeders will not be lifted any earlier than three hours before transportation/loading times.

15.2.6 Inspections

The poultry facility will engage in a schedule of daily and weekly inspections to ensure the humane treatment and welfare of the poultry are maintained. Under some circumstances, such as hot weather, disease outbreak and/or cannibalism, inspections would be carried out more frequently than once a day.

To ensure the welfare of the birds, daily inspections will incorporate checks for:

- Reduced bird health and general wellbeing manifesting as reduced food and water intake, reduced production, changes in activity level, abnormal feather or dropping condition or any other physical feature;
- Presence of parasites (for example, the presence of lice) and infectious diseases;
- Checking for entrapment in manure areas;
- Problem behaviours (for example, feather pulling and cannibalism);
- Sufficiency of food and water supply systems;
- Effectiveness of ventilation and lighting; and
- Dead and injured birds will be removed for disposal or appropriate treatment. Any bird which is removed but not deceased, and cannot be

suitably isolated and treated without unreasonable pain, will be humanely destroyed.

Weekly inspections of lighting levels and uniformity, alarm systems, cooling systems, fans and general site maintenance and housekeeping will be conducted. Records of inspections and findings will be rigorously maintained.

15.2.7 Shed Personnel and Bird Handling

Persons responsible for the management and handling of birds will need to have undergone appropriate induction, training and supervision in the humane treatment of the shed stock before being deemed competent, as prescribed by *The Model Code*. To ensure bird welfare during management and handling:

- The ability of birds to move to reach food and water, as well as other signs of ill health (for example, abnormal feathers or droppings and behavioural changes), is assessed daily. If this is not possible, injured birds would be culled promptly and humanely (neck dislocation is an acceptable method that may be used, and would be carried out competently)
- Effective program run to manage internal and external parasitism (for example, lice);
- Outbreaks of feather picking and cannibalism are managed through reducing stocking density, light intensity, temperature, humidity, removing instigating birds, eliminating sharp beams of sunlight;
- Entrapped birds are freed immediately and actions taken to reduce risk of this re-occurring;
- Once a day and immediately before pickup, dead, incurably sick and injured birds will be removed;
- Sheds will be managed to minimise entry of predators (for example, by cats, foxes and rats), wild birds and other pests, which may stress stock birds and or introduce disease;
- To reduce stress, cooler periods of the evening would be used for bird pick up;
- Access to water is not removed until pick-up crews arrive on the farm;
- Feed lines will be left in place for not less than 3 hours before pick up; and
- Following part pick-up, water lines and feed-lines will be quickly reinstated.

15.2.8 Poultry Transport

Since transportation is highly stressful for poultry, all efforts will be made to avoid unnecessary stress during catching, loading, transportation and unloading. The facility and associated infrastructure would be designed to allow loading and unloading of poultry without undue suffering or distress.

Cooler periods, such as at night, are used to reduce stress on the chickens, as hotter temperatures usually result in significant stock loss. Transportation will occur during the night time period (that is, after 9:00 p.m.).

Procedures will be implemented to ensure that transportation does not occur until all certification and chains of custody are clearly defined and completed to ensure minimal delay during bird movement.

15.3 BIOSECURITY AND DISEASE MANAGEMENT

15.3.1 Procedures and Practices

The proponent is committed to upholding the objectives of the *National Farm Biosecurity Manual for Chicken Growers* (ACMF 2010), which are:

- To prevent the introduction of infectious disease agents to meat chicken flocks;
- To prevent the spread of disease agents from an infected area to an uninfected area; and
- To minimise the incidence and spread of microorganisms for public health significance.

A copy of the *National Farm Biosecurity Manual for Chicken Growers* (ACMF, 2010) will be maintained at the site with ready availability for staff.

Biosecurity refers to those measures taken to prevent or control the introduction and spread of infectious agents to a flock. It aims to prevent the introduction of infectious diseases, and prevent the spread of disease from an infected area to an uninfected area. The nature of each avian influenza outbreak that has occurred in Australia (five over the past 50 years) suggests that one or more biosecurity deficiencies were involved in the spread of the virus within and between properties (AAHC, 1999). Effective biosecurity practices are an integral part of a successful poultry production system. The biosecurity procedures and practices to be implemented include, but may not necessarily be limited to:

- **Farm signage:** Appropriate signage will be erected at the farm entrance. Signs will notify visitors of biosecurity requirements and direct them to contact the operator prior to proceeding, and any other requirements relating to access.
- **Farm isolation:** The facility is located less well in excess of 1km from another poultry farm, the nearest being at Sawyers Gully, some 6 km away. This distance is beyond the minimum separation distance requirements defined by NSW DPI (2012); being a minimum of 1 km to other intensive poultry farms, and 5 km to poultry breeder farms.

Additional measures to ensure isolation from disease include:

- Secure perimeter fencing will be installed;

- Control gates will be installed at the site office/manager residence to restrict access to immediate production area;
 - Poultry water will be provided free from microbial contamination that could cause disease and or food safety issues. Regular water quality tests will be conducted, and, if necessary, sanitised prior to storage in reservoirs;
 - Poultry sheds and equipment will be cleaned and disinfected at the end of each production cycle;
 - Dogs and cats will not be allowed in shed, unless dogs are part of flock security strategies;
 - Feeding systems will, wherever possible, be closed to ensure that feed is protected from contamination by wild birds and rodents;
 - Shed litter will be removed from site at the end of each cycle;
 - Bird mortalities during the cycle will be composted in accordance with *Environmental Guidelines: Composting and Related Organics Processing Facilities* (DEC, 2004) (see the main body of the EIS for more detail);
 - All farm staff members working in direct contact with poultry livestock will not be permitted to keep other bird species or pigs at their place of residence;
 - All farm staff members and visitors will not be permitted to travel between separate poultry farms without changing clothes and footwear;
 - Attempts will be made to limit and detract wild birds and vermin from the poultry sheds, related farm buildings, and surrounding area of the farm. This will include keeping the shed doors closed following final pickup, washing and disinfecting, shed doors would be remained closed to prevent access by wild birds where feasible;
 - Litter and manure will not be stockpiled in the production area; and
 - The poultry sheds will provide adequate hygiene footbaths, hand sanitisers and change facilities.
- **Single Age Sheds:** To reduce the risk for disease transfer and outbreak, the poultry flock units placed within any given shed on the farm will all be of the same age to prevent the potential for infected vaccinated stock without signs transferring disease to younger or susceptible birds.
 - **Closed Flock System:** Once a flock is established on site, no new birds will be introduced from any other source.
 - **Pest control:** Pest control measures described elsewhere in the EIS will be implemented. Pest management will also be detailed in the agreed Processor Agreement.
 - **Vehicle hygiene:** Vehicle hygiene is managed under the guidance of the processor. All vehicles entering site will be required to pass through a wheel wash prior to site entry. Further, the potential for mechanical transmission of disease pathogens is reduced through the requirement that vehicles pass through processor washing facilities prior to leaving the

processor site and do not enter other production facilities on route to the facility.

- **Documentation and training for biosecurity:**
 - All farm staff will receive training in the relevant part of the manual and training will be recorded;
 - Maintenance of appropriate records; and
 - Site induction and restricted access procedures.
- **Water quality standards:** Maintenance of appropriate water quality standards will be maintained in accordance with the *National Water Biosecurity Manual – Poultry Production* (DAFF, 2009).
- **Personnel Standards** to minimise the introduction or spread of disease or contaminants by staff contractors and visitors:
 - Equipment cleaning and timing of maintenance procedures;
 - Visitor (including contractor) check-in procedures and inductions systems will be implemented and maintained; and
 - Biosecurity procedures for pickup and delivery crews relating to scheduling of delivery, litter delivery and traceability of movements.
- **Emergency management for animal disease** aimed at minimising and isolating movement of biosecurity threats. The facility will establish clear guidelines regarding when an emergency disease alert should be raised, appropriate contact details for notification and immediate cessation of bird and other movements. Additional actions for emergency biosecurity management include:
 - Locked facility and sheds;
 - Availability of equipment for disinfection;
 - Additional visitor restriction;
 - Routine work restriction;
 - Additional hygiene standards when leaving the production area for personnel and vehicles; and
 - Adherence to procedures as required at the direction of the State's Chief Veterinary Officer and in accordance with Animal Health Australia.

15.3.2 Disease Management

There is a major economic incentive for the proponents to ensure flocks are kept disease free. As well as affecting bird health and welfare, disease can significantly reduce production efficiency and product quality. If a flock requires depopulating, the economic gain from the flock is immediately lost. In addition, there is considerable cost associated with the removal and euthanasia of birds, carcass disposal, shed disinfection and remediation activities. On this basis, there is increasing emphasis on maintaining flock health through proper nutrition, vaccination, farm hygiene and biosecurity.

A consideration that will be made by the proponents is the efficient disposal of wet litter. Excessive wet litter can lead to an outbreak of foot pad dermatitis lesions (RIRDC, 2015). To maintain acceptable dry and friable litter quality, a warm and ventilated shed will be maintained to ensure moisture evaporation, along with good nutrition to ensure gut integrity, and regular maintenance of watering lines.

Australia has an excellent record on quarantine and stringent disease control measures, which are critical to ensuring healthy flocks. Due to Australia's 'island' status, high standards are set by the Australian Quarantine and Inspection Service (AQIS), and the industry's biosecurity measures provide significant protection against disease entering local poultry flocks. The proponents are committed to upholding these standards and will implement a range of biosecurity measures in accordance with the *National Farm Biosecurity Manual – Poultry Production* (DAFF, 2009), as well as be part of any requisite national coordinated response as outlined in the *Enterprise Manual Poultry Industry (chickens, ducks and turkeys)* (AUSVETPLAN, 2013).

The two most serious diseases that must be kept out of poultry flocks are Newcastle Disease and Avian Influenza). Although these two devastating diseases are not present in commercial poultry in Australia, the poultry industry is at risk from their introduction. Other poultry diseases include coryza, chronic respiratory disease, infectious laryngotracheitis, lice and mite infestations, chlamydiosis, blackhead and internal parasites. A strict hygiene program is required to keep diseases out of poultry. Some diseases are controlled by vaccination or medication strategies.

15.3.2.1 Avian Influenza

Avian Influenza (AI) is an infectious viral disease of birds. AI can be spread by movements of infected birds (domestic or wild), through droppings and secretions of infected birds directly or through movement of contaminated objects, clothing or vehicles. Windborne spread from infected large flocks is also possible over short distances. Other animals like cats and dogs can also spread the AI virus if they come in direct contact with contaminated materials or infected birds.

There have been a number of outbreaks of AI in domestic poultry since 1976 in Victoria, Queensland and New South Wales. All outbreaks were contained and successfully eradicated. Five outbreaks between 1976 and 1997 were caused by the H7 subtype AI, and none were related to migratory birds. In 2012, two egg farms near Hay, NSW, were infected with the H7 subtype.

The Australian Government has an extensive emergency animal disease response plan in place that clearly sets out how industry and government agencies would act to isolate farms with the disease and eliminate it, while ensuring no further spread occurs (AUSVETPLAN, 2011). The proposed facility will strictly adhere to this protocol.

15.3.2.2 Newcastle Disease

Newcastle Disease (ND) is a viral disease of domestic poultry (chickens, turkeys, ducks and geese), cage and aviary birds, and wild birds. ND usually presents as a

respiratory disease, but depression, nervous manifestations, or diarrhoea may be the predominant clinical signs.

In response to outbreaks of the Newcastle Disease between 1998 and 2002, the Australian government and the poultry industry jointly developed a National Newcastle Disease Management Plan to provide for a national approach to the long-term management of the disease in Australia (Animal Health Australia, 2012; see also AUSVETPLAN, 2014). A key element of this Plan is the compulsory vaccination of all commercial domestic poultry flocks across Australia, according to nationally agreed standard operating procedures. Since the adoption of the National Management Plan, the implementation of vaccination and other measures, such as enhanced biosecurity practices, the Australian poultry industry has, at least to date, prevented the re-emergence of Newcastle Disease in Australia.

15.3.3 Mass mortalities

Broiler farms need to have a contingency plan for the occurrence of high mortalities. An Emergency Quarantine and Disease Management Plan will be established prior to commencement of farm operations and will address both:

- Consultation; and
- Treatment and disposal options.

15.3.3.1 Consultation

In the unlikely event of mass bird deaths, the proponents would institute the Emergency Quarantine and Disease Management Plan and would immediately contact the integrator/processor who will arrange for an inspection by the company technical staff to ascertain the cause of death. The NSW Department of Primary Industries (DPI) will be notified by the Broiler processor.

In NSW high mortality and disease events fall under the jurisdiction of the following legislation and regulations:

- *New South Wales Exotic Diseases of Animals Act 1991*;
- *Exotic Diseases of Animals (General) Regulation 1998*;
- *Stock Diseases Act 1923*;
- *Stock Diseases (General Regulation) 1997*; and
- *State Emergency and Rescue Management Act 1989*.

If the cause of the deaths is an Emergency Animal Disease (EAD), the NSW Department of Agriculture will be notified in accordance with relevant AUSVETPLAN manual procedures. All birds on the farm and adjacent farms may need to be slaughtered with an extended vacancy time before the reintroduction of birds.

The Emergency Quarantine and Disease Management Plan will outline immediate measures to be implemented to isolate the infected farm, effect strict quarantine procedures to prevent the spread of the disease, and notify all relevant persons of the nature of the outbreak. Destruction and disposal of carcasses, spent litter, feed and the decontamination of equipment, buildings, equipment and so on, in this instance, will be under the direct control of the Chief Veterinary Officer of the DPI. Where appropriate and directed by DPI, urgent ring vaccination will be considered.

Upon confirmation that it is a disease outbreak, and immediate slaughter of farm stock is necessary, killing will be managed by the DPI in co-ordination with the EPA and the processor. The birds will be euthanised humanely within the sheds at the facility. Cessnock City Council may need to be contacted to assist in the disposal of the birds on farm (burial, composting) or off-farm (land fill site).

15.3.3.2 Treatment and Disposal Options

The method of destruction of birds will depend on the site and number of birds involved but usually is by dislocation of the neck or gassing in accordance with the *AUSVETPLAN Destruction of Animals Manual* (AUSVETPLAN, 2015).

The disposal options available for a mass death of birds will depend upon the cause of death (AUSVETPLAN, 2015). The preferred method of mass bird disposal will be determined by the processor with consultation with the DPI to ensure appropriate quarantine control and standard operating procedures are implemented in line with the relevant AUSVETPLAN disease strategy. For diseases such as Newcastle Disease, birds may need to be incinerated at high temperature. Other disposal options may include:

- Mass onsite disposal: from an historical perspective, on-site burial of diseased poultry has been favoured for reasons of practicality and expediency. However, this practice is now discouraged on the basis of significant environmental risk and more favourable options becoming available. If poultry are to be buried on-farm as a requirement of a government agency with an exotic disease outbreak, specification will be as advised in the *National Environmental Management System for the Meat Chicken Industry* (RIRDC 2014);
- Disposal in a land-fill site;
- Protein recovery facility: preferable, but may be economically, geographically and logistically prohibitive in some circumstances. If the carcasses are to be rendered, contact will need to be made with local plants;
- On-farm in shed composting: euthanised birds are layered and with a co-composting material and formed into windrows within the sheds and managed in accordance with document *The Biosecurity of Mass Poultry Mortality Composting* (RIRDC, 2014); and
- Incineration.

Infected sheds, equipment, disposal sites and personnel involved in the operation will need to be disinfected and decontaminated to prevent the spread of a disease in accordance with the *AUSVETPLAN Operational Procedures Manual Decontamination* (AUSVETPLAN, 2008).

If an EAD is diagnosed, all subsequent activities will be decided by NSW and Federal authorities.

15.4 COMMITMENTS REGARDING ANIMAL WELFARE AND BIOSECURITY

15.4.1 Animal Welfare Commitments

Commitments in relation to Animal Welfare Issues are presented in **Table 15-1**.

Table 15-1: Animal Welfare Statement of Commitments

Aspect/Commitment
Animal Welfare
The proponents will meet all standards of care and management for animal health and welfare as detailed in the <i>National Animal Welfare Standards for the Chicken Meat Industry</i> (Australian Poultry CRC, 2008).

15.4.2 Biosecurity and Disease Management

Proponent statements of commitment in relation to Biosecurity are presented in **Table 15-2**.

Table 15-2: Biosecurity Statement of Commitments

Aspect/Commitment
Biosecurity
The proponents will implement a suite of biosecurity measures in accordance with the <i>National Farm Biosecurity Manual for Chicken Growers</i> (ACMF, 2010).
Disease Management / Mass Mortality
- In the unlikely event of a major disease outbreak, the EPA, DPI and Cessnock Council will be contacted as soon as the breakout is suspected. Immediate measures will be implemented to isolate the infected sheds, effect strict quarantine procedures to prevent the spread of the disease, and notify all relevant stakeholders. Where permitted, urgent ring vaccination of flocks within the controlled area will be organised. - Upon confirmation that it is indeed an exotic disease or EAD outbreak and immediate slaughter of farm stock is necessary, slaughter will be managed by the DPI in co-ordination with the EPA and technical service units of the poultry industry. The birds will be slaughtered humanely within the poultry sheds. - Depending on the scale of the mass mortality event and advice from the DPI and EPA, the following options can be implemented for the disposal of bird carcasses and fomites: - Rendering – transportation to a protein recovery plant for treatment and disposal. This would occur under the supervision of the DPI to ensure

appropriate quarantine control and standard operating procedures are implemented in line with the relevant AUSVETPLAN disease strategy.

- Landfill disposal - landfilling would be carried out under appropriately qualified supervision from the DPI, EPA and Council to ensure appropriate quarantine control and standard operating procedures are implemented in line with the relevant AUSVETPLAN disease strategy.

- In-shed composting – composting would occur under the supervision of the DPI and EPA and in accordance with the standard operating procedures for mass poultry composting developed by RIRDC (2014).

16 PROJECT MITIGATIONS

Chapter Sixteen provides a summary of all mitigation activities to ensure that the development can proceed and any specific activity will not adversely impact on adjoining neighbours or the environment.

16.1 MITIGATION ACTIVITIES

Table 16-1 below provides a summary of proposed actions:

Table 16-1: Mitigation Actions

Issue	Proposed Mitigation Actions
Ecology 8.17ha out of a total of 10.33ha of native vegetation of varying quality (largely more disturbed areas). - The removal of 2.89ha of a highly modified Critically Endangered Community; Shale Sandstone Transition Forest; - Eight specimens of <i>Epacris purpurascens</i> var. <i>purpurascens</i> to make way for the dam; - Approximately 8.17ha of known habitat of varying quality for seven affected threatened fauna species; <i>Meridolum corneovirens</i> (Cumberland Plain Land Snail), <i>Calyptrorhynchus lathamii</i> (Glossy Black Cockatoo), <i>Petroica boodang</i> (Scarlet Robin), <i>Chalinolobus dwyeri</i> (Large-eared Pied Bat), <i>Mormopterus norfolkensis</i> (Eastern Freetail Bat), <i>Falsistrellus tasmaniensis</i> (Eastern Falsistrelle) and <i>Scoteanax rueppellii</i> (Greater Broad-nosed Bat); 296 native trees will require removal including 19 of the 26 hollow-bearing trees from the site; 76 Koala Feed Tree Species in the form of <i>Eucalyptus punctata</i> (Grey Gum) will require removal;	This remnant vegetation was found to be highly disturbed within the proposed footprint and, largely, through the remainder of the proposed development site. Preparation of Ecological Management Plan Preparation of Vegetation Management Plan Vegetation and Nest box offsets Fauna Friendly Fencing Weed Management Ecologists to be present during tree felling and any dam dewatering; associated animal welfare considerations and replacement within the existing dam to the north of the site. Tree felling during times of fauna non-breeding season only Slow felling of trees which are home to animals at the time

• Potential Injury/Mortality to native fauna during felling of trees; • Suitable habitat for a number of additional threatened and other flora and fauna species which may utilise the study area.	
Removal of Existing Site Dams	An ecologist must be present at the dewatering and habitat removal of any existing dams and ensure fauna is safely relocated to the existing dam to the north of the site. Water from the dams are to be redirected into proposed new dams.
Visual Impacts	The ES clearly establishes that no adverse visual impacts will occur. Notwithstanding, a series of vegetated buffers and earth mounds are proposed to be established at the site.
Air Quality and Odour Impacts The result of CALPUFF modelling suggests that predicted cumulative odour GLCs above the 5 OU criterion will not be encountered at any identified sensitive receivers. The highest predicted off-site odour concentration of 2.1 OU is at sensitive receiver R2 and R38. Modelling results suggest that particulate GLCs may cause additional exceedances of the impact assessment criteria at off-site discrete receivers.	It is recommended that particulate emissions be managed by the implementation of an air quality management plan which details best management practices. To assist with the management of air quality impacts from the poultry facility, it is recommended that a weather monitoring station is installed on-site. It should be noted that air dispersion models such as CALPUFF are predictive models. CALPUFF is dependent upon the accuracy of emission locations and inventories, local meteorology and the representativeness of background concentrations. As such there is always a degree of uncertainty in the predicted air quality impact.
Noise Impacts Modelling of the construction activities indicate that predicted LAeq,15minute noise levels would exceed noise affected NML of 40 dB(A) at multiple receiver locations during each construction phase over day period; however, this modelling scenario was predicted to comply with the highly noise affected NML of 75 dB(A). The construction works would not result in any undue vibration impacts, on either cosmetic damage to buildings, or human comfort. Predicted LAeq,15minute noise levels will comply with the nominated PSNL criteria at all receiver locations under neutral and adverse meteorological	Low truck speeds travelling on site, minimising time that equipment is left idling, reducing heavy acceleration / engine revving, and ensuring that heavy vehicles avoid using air breaking on site. Equipment will be regularly checked and maintained to ensure that it is in good mechanical condition. Extensive earth mounds and associated landscaping are proposed throughout the development site. These features will mitigate noise emanation from the property.

conditions. Cumulative noise impact assessment for the fans also showed that the noise levels would comply with nominated PSNL criteria at all receiver locations. Modelling of the feed delivery and silo refilling activities indicated that the predicted LAeq,15minute noise levels would not exceed nominated criteria any receiver location during day, evening and night time operations, under neutral and worst case operating conditions. Modelling of the bird collection activities indicate that predicted LAeq,15minute noise levels would be below the nominated PSNL criteria at all receiver locations during various site activities. Modelled sleep disturbance (LA1, 1 minute) impacts due to forklift operation resulting from the proposed development operating during the night period, are also predicted to comply with the sleep disturbance criterion of 45 dB(A) at all receiver locations during bird collection activities under temperature inversion conditions	
Aboriginal Cultural Heritage The detailed archaeological assessment of the site concluded that the wider study area would have been suitable for transitory or opportunistic hunting or gathering of resources. It is considered that the proposed development site itself has nil to low potential for Aboriginal objects on the following basis: ❑ The lack of Aboriginal objects found during the survey; ❑ The lack of registered Aboriginal sites or places found within the study area; ❑ The topography, landforms and landscape within the study area;	The persons responsible for on site management will ensure that all staff, contractors and others involved in construction and maintenance related activities are made aware of the statutory legislation protecting sites and places of significance. Of particular importance is the National Parks and Wildlife Amendment (Aboriginal Objects and Aboriginal Places) Regulation 2010, under the National Parks and Wildlife Act 1974; In case of unexpected potential Aboriginal objects identified during any excavation works, an 'Unexpected Aboriginal Object Procedure' should be created and provided to all workers, contractors, sub-contractors and employees at their time of their work induction to the site. The 'Unexpected Heritage Items Procedure' should: - Define an Aboriginal object in accordance with the Guide to Investigating, Assessing and Reporting on Aboriginal Cultural Heritage in NSW (OEH, 2011); and - Contain provisions that if an Aboriginal object is incidentally

❑ Consultation undertaken with local Aboriginal people and in accordance with the Aboriginal Cultural Heritage Consultation Requirements for Proponents 2010; ❑ The archaeological context; and ❑ The highly disturbed nature of the majority of the study area due to historical pastoral and market garden development and infrastructure. No further investigation in regard to Aboriginal objects in the study area is required under the Aboriginal Cultural Heritage Consultation Requirements for Proponents 2010.	discovered and it is likely to be disturbed damaged or destroyed by excavation, works must be suspended in that area and an archaeologist contacted to assess and, if necessary, register the find; and should any skeletal remains be found, all works should cease and the NSW Police Service and the Office of Environment and Heritage be immediately contacted; and A copy of the Aboriginal Cultural Heritage Assessment should be lodged with the Aboriginal Heritage Information Management System.
European Heritage	The potential for any impacts on European Heritage has been assessed as nil. No mitigation works are consequently proposed.
Traffic and Transport The proposed poultry farm development will have an acceptable impact upon the overall road network in the locality of the site. The existing traffic flows in the locality of the site are very low and well within the capacity of the local roads. Any increases in the local traffic associated with operation of the proposed farm will not have a noticeable impact on the operation or safety of these roads. The site access is proposed to operate in a safe manner and allows for vehicles to enter and exit the site in a forward direction, consistent with the existing rural nature of the site. Vehicles will be able to manoeuvre within the site to exist in a forward direction. Any parking associated with the development can be accommodated within the site.	No physical traffic or transport mitigation measures or network improvements are required. Drivers entering the site will be educated around any specific traffic-related procedural requirements.

Bushfire The site is identified as being bush fire prone, however, the development is not for a (human) habitable building. An alternate bushfire solution is proposed.	1. The sheds are to be constructed to BAL-FZ (AS3959-2009). 2. An Emergency Management Plan (EMP) is to be prepared prior to occupation of the sheds; this EMP is to be kept on site at all times and a copy is also to be provided to the local branch of the RFS. 3. Fire resistant species are to be utilised on the vegetated mound. 4. The area between the vegetated mound and for a minimum of 20 metres in all other areas is to be managed as an inner protection area.
Stormwater & Groundwater Impacts	It is proposed that the discharge of stormwater will be managed by way of internal reticulation as part of a generally closed system which will provide a best practice operation.
Animal Welfare/Biosecurity/Disease Management	Best practice will be undertaken on the farm and the incorporation of relevant and modern standards, work practices and stakeholder auditing will ensure comprehensive compliance. Operational maintenance and management of a quarantined area will mitigate disease outbreaks.
Waste Management	Comprehensive waste management procedures will be incorporated into procedures associated with the proposed development as detailed in the EIS. All procedures will be in accordance with industry best practice guidelines.

16.2 CONCLUSION

All impacts of the development have been recognised, investigated and on merit, mitigated. Sufficient robustness with recommendations and farm management actions will ensure that the development can proceed.

17 PROJECT JUSTIFICATION

Chapter Seventeen provides conclusions regarding the overall suitability of the project taking into consideration the environmental impacts of the project, the suitability of the site and the benefits of the project. The project is justified in relation to socio-economic considerations and the principles of ecologically sustainable development.

17.1 JUSTIFICATION FOR THE PROPOSAL

Schedule 2 of the Environmental Planning and Assessment Regulation, 2000 requires that an EIS include:

The reasons justifying the carrying out of the development or activity in the manner proposed, having regard to biophysical economic and social considerations and the principles of ecologically sustainable development.

The proposal can be justified if:

the socio-economic and environmental benefits outweigh the disadvantages; and

the overall impacts are acceptable to the community in terms of the principles of ecologically sustainable development.

This section justifies the proposal in these terms.

17.2 SOCIO-ECONOMIC CONSIDERATIONS

The proposed poultry farm will provide a long-term future for the proponents and will have positive impacts in the local economy, including associations with the downstream processor. All necessary onsite infrastructure and downstream processing infrastructure is either in place or currently being underutilised for agricultural production.

Developing the farm with the specified bird capacity will realise the addition of the following full-time jobs:

- 5 full time on farm
- 5 full time off farm
- 3 transport operators
- 10 processing operators
- 30 construction positions.

17.3 ENVIRONMENTAL CONSIDERATIONS

The environmental impacts of the proposal have been carefully considered during the preparation of the EIS. The proposed development poses minimal risk to environmental considerations both at the site and in the surrounding locality.

The proposed development will not impact on Aboriginal cultural heritage values, nor European heritage matters.

Ecological considerations have determined that the proposed development impact is minimal and that offsets can be provided to assist in promoting biodiversity conservation both within the site and neighbouring locality.

Waste management is in accordance with best practice/industry guidelines.

Stormwater management at the site provides an enclosed system of rainwater recycling with water being treated and reused for bird drinking water.

Whilst the proposal will have a minimal environmental impact, on balance it provides a cost-effective food source of poultry to the industry and consumers. Mitigation measures have been developed to manage any minor potential impacts.

17.4 ECOLOGICALLY SUSTAINABLE DEVELOPMENT

Ecologically Sustainable Development (ESD) can be defined as 'using, conserving and enhancing the community's resources so that the ecological processes, on which life depends, are maintained and the total quality of life, now and in the future, can be increased'.

The four principles of ESD are listed in Schedule 2 of the Environmental Planning and Assessment Regulation 2000 as follows:

*(a) the **precautionary principle**, namely, that if there are threats of serious or irreversible environmental damage, lack of full scientific certainty should not be used as a reason for postponing measures to prevent environmental degradation. In the application of the precautionary principle, public and private decisions should be guided by:*

- (i) careful evaluation to avoid, wherever practicable, serious or irreversible damage to the environment, and
 - (ii) an assessment of the risk-weighted consequences of various options,
- (b) **inter-generational equity**, namely, that the present generation should ensure that the health, diversity and productivity of the environment are maintained or enhanced for the benefit of future generations,
- (c) **conservation of biological diversity and ecological integrity**, namely, that conservation of biological diversity and ecological integrity should be a fundamental consideration,
- (d) **improved valuation, pricing and incentive mechanisms**, namely, that environmental factors should be included in the valuation of assets and services, such as:
- (i) polluter pays, that is, those who generate pollution and waste should bear the cost of containment, avoidance or abatement,
 - (ii) the users of goods and services should pay prices based on the full life cycle of costs of providing goods and services, including the use of natural resources and assets and the ultimate disposal of any waste,
 - (iii) environmental goals, having been established, should be pursued in the most cost-effective way, by establishing incentive structures, including market mechanisms, that enable those best placed to maximise benefits or minimise costs to develop their own solutions and responses to environmental problems.

17.4.1 The Precautionary Principle

According to the POEO Act, the precautionary principle means that 'if there are threats of serious or irreversible damage, lack of full scientific certainty should not be used as a reason for postponing measures to prevent environmental degradation'.

In the application of the principle, decisions should be guided by careful evaluation to avoid, wherever practicable, serious or irreversible damage to the environment and an assessment of the consequences of various options.

This principle was developed in response to the difficulty of interpreting scientific data. The scientific method produces results based on confidence limits determined by the scope of data acquisition, interpretation methods and general understanding within a particular scientific discipline.

This proposal has been planned and assessed through a conservative

and precautionary approach. The proposal has been assessed as having a minor environmental impact. Long term impacts will be minimised by a commitment to rehabilitation and revegetation. The proposal is economically sound, as it requires relatively minor additional site preparation, it will utilise existing infrastructure and it will provide a food resource close to the market ensuring continuation of the current fresh meat supply to the community.

In addition, potential threats to the quality of the environment have been determined with a reasonable degree of certainty through the use of scientific investigation and analysis of the individual and cumulative environmental impacts of the proposal. It should be noted that no major threats of 'irreversible or long-term environmental damage' were identified during the planning process and where other more minor issues have been identified, the application has been modified with appropriate controls proposed and will be put in place should the proposal proceed.

17.4.2 Social & Intergenerational Equity

Social equity involves value concepts of justice and fairness so that the basic needs of all sectors of society are met and there is a fair distribution of costs and benefits to improve the wellbeing and welfare of the community, population or society. Social equity does not imply equality, rather that there should be equal access to opportunities for improved welfare with a bias towards advantaging the least well-off sectors of society.

Social equity includes intergenerational equity, which requires that the present generation should ensure that the health, diversity and productivity of the environment is maintained or enhanced for the benefit of future generations. The proposal provides employment opportunities for a number of people:

- 5 full time on farm
- 5 full time off farm
- 3 transport operators
- 10 processing operators
- 30 construction positions.

Additionally, the potential direct impact of the proposed development on Aboriginal cultural heritage was assessed as nil.

17.4.3 Conservation of Biological Diversity & Ecological Integrity

Biological diversity refers to the diversity of genes, species, populations, communities and ecosystems and the linkages between them. Biological resources are responsible for vital ecological services such as maintaining soil fertility and the supply of fresh water. Maintaining biological diversity safeguards life support functions and can be considered a minimal requirement for ecological integrity.

A comprehensive assessment of the likely impacts of the proposal on site and neighbouring flora and fauna is detailed in the ecological assessment for the site.

17.4.4 Improved Valuation & Pricing of Environmental Resources

This principle establishes the need to determine economic values for services provided by the natural environment, such as the atmosphere's ability to receive gaseous emissions, cultural values and visual amenity. Applying standard methods of valuation and pricing to environmental resources is a difficult process, largely due to the intangible nature of much of the natural environment.

The environment has conventionally been considered a free resource and environmental factors have been excluded from determining the real cost of an activity. The indicative costs to the environment are shown by the cost of the mitigation measures and safeguards and are included in the real costs of any development.

The proposal assists ESD outcomes by providing access to processors, feed supplies and the local consumers close to its point of production, thus reducing environmental impacts relating to the transport of bulk materials and fresh poultry.

18 STATEMENT OF COMMITMENTS

Table 18-1: Statement of Commitments

Aspect/Commitment
Appropriate systems will be implemented to ensure that all waste streams generated by the development are effectively managed and/or disposed of off-site.
General waste will be collected on a regular basis from the site by a licensed contractor, or personnel for recycling and or disposal at the Bargo Waste Management Centre.
Empty chemical containers will be returned to the chemical supply company for recycling, reuse or appropriate disposal. Any non-returnable chemical containers can be collected and managed via the Drum MUSTER program which operates out of the Bargo Waste Management Centre.
Poultry litter will be collected from the sheds at the end of each production cycle and removed from site for provision as a fertiliser as previously discussed.
No waste litter and manure will be stockpiled on site except the small amount retained for the purpose of composting routine dead bird (retained litter will only be stockpiled in composting shed or immediately adjacent to it).
Deceased birds will be collected from the poultry sheds on a daily basis within 24 hours of death and disposed of in the onsite composting facility immediately following inspection.
Composted routine mortalities will be collected from the sheds at the end of each production cycle and removed from site for provision as a fertiliser.
An Emergency Quarantine and Disease Management Plan, in consultation with the processor, NSW DPI (Agriculture), EPA and Council, will be developed prior to commencing operations.
Preparation and Implementation of a Vegetation Management Plan
Preparation and Implementation of an Ecological Management Plan
All operational measures proposed to mitigate any noise impacts will be implemented
All operational measures proposed to mitigate any air quality/odour impacts will be implemented
All measures detailed in animal welfare and biosecurity commitments will be implemented

19 CONCLUSION

The EIS has been prepared having regard to the Secretary's Environmental Assessment Requirements and the requirements of the *Environmental Planning & Assessment Act 1979* and the *Environmental Planning & Assessment Regulation 2000*.

The proposed development is permissible with the consent of Council. The proposed development also requires a Controlled Activity Approval from the NSW Office of Water for minor works. To this end, the proposed development is nominated integrated development under section 91 of the *Environmental Planning & Assessment Act 1979* and section 91 of the *Water Management Act 2000*.

The application is also integrated development pursuant to the *Protection of the Environment Operations Act 1997* and the *Mine Subsidence Compensation Act 1961*.

The impacts of the proposal have been carefully considered during the preparation of the EIS with expert reports prepared examining all relevant matters.

It is considered that the proposed development poses an acceptable and very low risk to the environment. Whilst some environmental impacts are expected, these are minor and mitigation measures are proposed to minimise and offset the impacts, ensuring that operations can proceed in an environmentally sustainable manner.

The project can be implemented with minimal adverse socio-economic and environmental impacts as demonstrated throughout the EIS.

The project is justified on the basis of the efficient utilisation of existing infrastructures, resources and overall economic benefits to local, regional and State economies. The proposed development satisfies the objectives of ecologically sustainable development.

The production of poultry has been occurring for many years in this location, with minimal negative impacts to the local community and adjoining owners in the vicinity. This operation will be a modern and highly controlled facility where any impacts can be readily abated and controlled.

Developing a poultry farm in this location provides a cost-effective supply of an important food product of fresh poultry products to local and regional centres.

**Appendix A – Secretary’s Environmental Assessment Requirements & Statutory
Agency Responses & Development Plans**

Appendix B – Animal Welfare & Biosecurity Assessment
Advitech

Appendix C – Air Quality (Odour) Impact Assessment

Advitech

Appendix D – Noise Impact Assessment

Advitech

Appendix E – Flora & Fauna Assessment
Wildthing Environmental Consultants

**Appendix F – Archaeological Report – Historic Heritage & Aboriginal Cultural
Heritage Assessment (Public Version)**

Advitech

Appendix G – Traffic Impact Assessment
SecaSolution

Appendix H – Stormwater Impact Report & Maximum Harvestable Rights Calculation

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Appendix I – Waste Management Assessment
Advitech

**Appendix J – Geotechnical/Environmental Investigation – Stage 2 Contamination
Report**

GDK Keighran Geotechnics

Appendix K – Bush Fire Risk Assessment

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