

**Pollution Prevention and Control
(Northern Ireland) Regulations 2003**

Application for a Permit

**Example of Supporting
Documentation - Laying
Hens**

Northern Ireland Environment Agency

Report prepared by:
M J Sharp
Senior Environmental Consultant

SAC
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A4.2 Non Technical Summary

The Farm

XYZ Poultry Farm is a privately owned site of approximately 2 hectares. The site contains 2 poultry sheds designed for housing laying hens in enriched cages, with a maximum stocking capacity of 140,000 birds for the farm. There is also a small egg packing building adjacent to the first poultry shed and a shed to provide dry covered storage for manure. The farm, which is located grid reference *a nnn nnn* is surrounded by pasture land.

Poultry housing

Laying hens are kept in 2 new sheds designed to accommodate enriched cages housing colonies of birds to the latest EU animal welfare standards. The sheds are of steel framed construction, have polished concrete floors and insulated wall panels. Ventilation is by an automatically controlled natural ventilation (ACNV) system supplemented by a mechanical system in that the sheds are fitted with gable mounted fans to provide through 'tunnel' ventilation when temperatures rise above pre-set levels. The system is controlled and monitored electronically to ensure optimum environmental and welfare conditions within the shed. Manure is collected on belts, dried using a forced air drying system and conveyed to an enclosed manure store to maintain dry manure at all times. The system is expected to produce manure with a dry matter content of ca 65% - 70%. Feed is delivered to storage bins located adjacent to the sheds. Working areas where vehicles operate and a limited area surrounding the sheds is laid with concrete. The manure management system is based on maintaining dry manure at all times, and all cleaning is done as a dry operation using compressed air so there is no wash water at any time from cleaning or manure handling operations. Never the less a small waste water tank is located underground at the corner of the site should any contaminated run-off have to be collected. Nipple drinkers are used in all sheds to reduce wastage of water and to ensure there is no spillage that may compromise the dry manure system.

Production cycle

Birds are brought into the sheds when they are around 15 weeks old and remain in the sheds for a further 60 weeks until the end of their egg producing lives. At that stage the birds are removed off site and processed for food products. Feed from a UFAS accredited mill is delivered in 28 tonne capacity covered lorries, consumption is approximately 118 g of feed per bird per day. Eggs are collected from the packing shed by lorry, and transported to a central processing and packing station. Manure is stored in a separate enclosed store and can be removed at any time when conditions are appropriate for land spreading. The majority of manure is utilised by local growers but some may also be utilised for mushroom compost, and opportunities for use on amenity land are being explored. Mortalities are removed from the sheds daily and the numbers recorded. Carcasses are kept on-site in covered vermin proof bins until they are collected under the National Fallen Stock Scheme [or incinerated in a DARD approved incinerator having a secondary combustion chamber but operating at less than 50 kg per hour].

These measures are intended to reduce the production and emission of ammonia, odours and dust from the sheds, and prevent liquid washings escaping to the environment. This in turn should reduce the environmental impact of the farming activities.

Responsibility

Primary responsibility for running the site rests with the proprietors <name>.

B1.3 Site Report and Site Map

Site Description

Located in the County of *name*, the site lies adjacent to the A12 road between the villages of *Village 1* and *Village 2*. It comprises a rectangular shaped area of land of approximately 2 ha, 150 m above sea level. The majority of the site area is occupied by the sheds and surrounding concrete hard standing. An outer vegetated strip of land has been planted with trees and shrubs to screen the sheds. At the north east side of the sheds, a vegetated bank provides further screening. At the foot of this bank is a swale that collects clean run-off from the concrete hard standing surfaces. This swale is heavily vegetated and drains to a local ditch and eventually into the *Local River* catchment. The area surrounding the site is pasture land located in a typical undulating landform with gentle slopes. A plan of the site is provided with the main application.

Land use class

Soil Survey Code SWG1ST shows that the land surrounding the farm has a land classification value of 3A.

Soil type

Soil survey sheet nn shows that the dominant soil series in the area is a Surface Water Gley Class 1 on Shale Till.

Water courses and groundwater vulnerability

Approximately 200 m to the east of the site a small water course flows north and joins the *Local River*. Two other streams in the same catchment are located approximately 0.5 km to the east and 0.5 km to the west of the site. These also flow north into the *Local River*. Water from a vegetated ditch, or swale, located along the east perimeter edge of the site, flows through underground drains to the watercourse 200m east of the site. A consent to discharge exists for the swale outlet. Groundwater vulnerability maps show land at the site and in the area surrounding the site as weakly permeable.

Site History

Prior to the building of the poultry sheds in 2004, the site was pasture land. Construction of the poultry farm involved the removal of topsoil, and levelling using virgin aggregates.

Operation of the site

The site is operated solely for the production of eggs. Pullets are introduced into the sheds at point of lay (15 - 16 weeks old) and remain there producing eggs until destocking after approximately 60 weeks of laying. The sheds are then dry cleaned and disinfected and the next batch of birds stocked. Mortalities are removed to sealed bins and thereafter removed by a licensed contractor in compliance with the requirements of the Animal By-Products Regulations. Manure is dried on belts in the poultry sheds and removed at regular intervals (every 2-3 days) to an enclosed manure store. It can be removed from the manure store at any convenient time for land spreading. As a dry cleaning system is used there is normally no need for disposal of wash water as none is created. However a small wash water tank has been installed in case there is a need to wash down hard standing areas. Feed is stored on-site in sealed steel bins.

Substances and emissions

Potentially polluting substances stored on site include 200 litres of diesel stored in a bunded fuel tank, and quantities of disinfectant concentrate stored in sealed containers. The main emissions from the site are ammonia, odours and dust. Dust deposited on hard standing within the site is regularly swept up and disposed of in accordance with the DARD code of good practice for prevention of pollution of water.

Previous use or activity	Potentially polluting substance(s)	Location
Diesel tank area	200 litres of diesel fuel	Generator house
Disinfectant	25 litres of concentrate	Pesticide store

History of incidents

No pollution incidents are known to have occurred at the site since construction of the poultry sheds in 2004, and there are no known incidents preceding construction.

Potential pollution pathways

The site is relatively compact and consists mostly of the sheds and associated hard standing areas, consequently the whole area has been considered as a single zone. Potential pollution pathways have been identified as:

- Run-off from hard standing areas around the manure store if manure is removed in wet weather having potential for contamination with nutrients of land, water courses and groundwater. Run-off will be caught and treated by the swale.
- Contaminated run-off from apron areas, particularly if dust has been allowed to build up, resulting in potential for contamination of land and groundwater with nutrients, and possibly disinfectants. Run-off will be caught by the swale, and dust is regularly swept up.
- Leakage from waste water tanks that have not been well maintained.
- Spillage of diesel to soil around the filling area of diesel tanks.
- Ammonia and dust emitted to the atmosphere being deposited on the site and increasing the nutrient loading on vegetation.
- Potential soil contamination resulting from a build up of ash around the incinerator [if an incinerator is used].

Site Reconnaissance

An examination of the site was undertaken to establish whether pollution has occurred through any of the pathways above.

- Leakage from hard standing areas was assessed by visually examining vegetation and soil around the hard standing and searching for run-off channels or other evidence of leakage. Vegetation and bare ground did not show any obvious signs of pollution.
- A similar procedure was used to assess run-off from the apron area. There was some evidence of wet land as a result of rainwater run-off but this was en-route to the swale. There was no evidence of any contamination from, for example, dust or feed.

- The area around the waste water tank showed no signs of leakage and evidence of previous leaks such as a build up of algae were not obvious.
- There was no evidence of diesel spillage around an area where vehicles had been fuelled in the past.
- Vegetation around the sheds was green and lush, possibly as a result of ammonia deposition, but there was no evidence of damage or scorching to leaves on trees and shrubs.
- [If an incinerator is used.] The area around the incinerator was inspected visually for potential contamination such as a build up of ash. There were areas of bare earth around the base of the unit due to activity from people and vehicles, but no evidence of ash or carcass remains.

Statement of site condition

The area of the site comprising the poultry sheds is considered to be in a condition commensurate with agricultural land that has been developed for intensive poultry production. Given that this land was previously a green field area used for agricultural production, it is considered unlikely that contamination is present. The land surrounding the poultry sheds is still used for agricultural production and although some manure spreading is undertaken on this land, the presence of contaminants is considered unlikely.

[Note: If there is a possibility of contamination on any area of the site, for example areas around old fuel tanks and incinerators, applicants are advised to adopt a risk based approach to establish the level of contamination in defined zones of the site. In circumstances where pollution was suspected, monitoring requirements in addition to the inspection requirements set out in rules 2.1.1.1 to 2.1.1.3 of the Standard Farming Installation Rules may be included in the permit. See the Site Report Guidance¹ for further information on preparing a site report for your application

¹ Preparing Site Reports for Pig and Poultry Farms: Supplementary Guidance for IPPC Applications.

B2.1.1 Inspection and Maintenance

Demonstrate how you meet the requirements of Standard Farming Rules 2.1.1. to 2.1.1.3.

Scheduled inspections are undertaken by the farm owner (name) on a monthly basis. The findings are recorded using the form below and any defects noted and corrective action stated. In addition to the monthly schedule a number of daily checks are made as part of monitoring the production process.

Farm Name:.....

Month.....20.....

If any item is marked unsatisfactory, please detail corrective action required below.

Item	Points to check:	Satisfactory	Unsatisfactory (detail below)
Chemical/vet medicine stores	security, bunding, stock sheets correct, only essential items stored	✓	
Drinking water	meter readings, leaks, valves, condition of pipework, frost protection, records properly made	✓	
Manure storage	wet manure areas, condition of walls and floors, date store last emptied	✓	
Generator	fuel and oil leaks, exhaust leaks, condition of fuel lines and tanks, service records, records of weekly tests		✓
Feed bins	no spilled feed, impact damage, protective barriers, integrity of structures	✓	
Disinfectant baths	leakage, spent disinfectant, integrity of containers	✓	
Waste skips and bins	adequate facilities on site, secure covers in place, appropriate for nature of waste materials, leakage, containers clearly marked with type of waste	✓	
Hard standing areas	clean and free from dust, surface deterioration, appropriate surface slopes for run-off, no ponding	✓	
Storm drain manholes	evidence of discoloured water, flooding, integrity of covers, colour coding of covers		✓
Septic tanks	overflow, leakage, date last emptied	✓	
Perimeter ditches and swales	free from slime or discolouration, adequate flow, not stagnant, date next analytical test due?	✓	
Pest control	signs of rodent activity, records up to date, bait properly laid and protected, carcasses removed	✓	
Trees and crops	signs of leaf damage, excessive dust deposits	✓	
Buildings	loose or damaged panels, integrity of fan shrouds, dust deposits on roofs, rainwater collection - gutters & down pipes, security, water ingress etc., alarms tested and working	✓	
Incinerators	Evidence of overloading, inadequate combustion, ash properly cleaned up, site clean and tidy, no carcass remains, monitoring equipment and data ok.	✓	

Remedial action required:

1. Minor fuel leak from diesel pipe on generator engine. Tighten joint - replace at next engine service.
2. Broken manhole cover at NE corner of site. Replace cover.

.....

Inspection conducted by:

Date:

B2.1.2 Details of Staff Training

[Demonstrate how you meet the requirements of Standard Farming Rules 2.1.2.1. to 2.1.2.3.](#)

The following staff have attended a recognised training course on prevention and control of pollution on pig and poultry farms.

Training Records

Name	Job Title	Details of course and course supplier	Date training completed
A N Other	Proprietor	Livestock SVQ III with prevention and control of pollution on pig and poultry farms - National Training Provider	August 2006
A N Other	Assistant	Prevention and control of pollution on pig and poultry farms - ABC Agricultural College	August 2006
A N Other	Stockworker	Prevention and control of pollution on Company layer farms - in-house training programme	October 2006
A N Other	Stockworker	Prevention and control of pollution on Company layer farms - in-house training programme	October 2006
A N Other	Stockworker	Prevention and control of pollution on Company layer farms - in-house training programme	October 2006

Note: Evidence of training must be provided, you should enclose a copy of the course certificate awarded to successful trainees. If trainees have attended an in-house course, please provide an outline of the course context.

B2.2.1 Selection and Use of Raw Materials

[Demonstrate how you meet the requirements of Standard Farming Rules 2.2.1.1 and 2.2.1.2.](#)

All chemical and disinfectants used on site are listed in approved lists (MAFF/HSE Reference Book 500, National Office for Animal Health (NOAH) compendium, and DARD approved list of disinfectants). Details of the inventory are given in the Table in Section B.2.2.1 of the main application form.

B2.2.2 Selection and Use of Feedstuffs

[Demonstrate how you meet the requirements of Standard Farming Rules 2.2.2.1. to 2.2.2.6.](#)

All feed is supplied from a UFAS accredited mill. Feed is carefully formulated to provide the necessary balance of nutrients but minimise the amount of nitrogen and phosphorus excreted by optimising crude protein input and feed utilisation.

A total of four diets are fed over the laying cycle and digestive enzymes are used to improve feed utilisation:

Diet 1 (crude protein = , Phosphorus =)

Diet 2 (crude protein = , Phosphorus =)

Diet 3 (crude protein = , Phosphorus =), etc.

[Note: give details of the diets you use and state the crude protein and phosphorus levels.]

B2.2.3 Optimising Water Use

[Demonstrate how you meet the requirements of Standard Farming Rules 2.2.3.1. to 2.2.3.3.](#)

Water is from a mains supply on the site. Average consumption is 210 litres per 1000 birds per day. The following practices ensure that water use is optimised and waste is avoided:

- Nipple drinkers are used to minimise losses and help maintain dry manure.
- Water consumption is monitored and recorded daily from individual meters within each shed. Any variation from normal levels is investigated immediately.
- Daily checks are made by staff to ensure that drinkers are functioning correctly. These checks also allow staff to attend to problems at an early stage, e.g. leaks in drinking lines.
- Sheds are fully insulated and provided with an efficient ventilation system to maintain an optimum environment for birds at all times including extremes of weather. Water consumption should not therefore increase significantly in hot weather.

A water audit will be undertaken within 3 years of the date of issue of the permit. [A pro-forma agricultural water audit is available from The Northern Ireland Environment Agency i.e. "Guidance for operators on preparing an agricultural water audit for intensive livestock IPPC installations]

B2.3.1 Feed Delivery, Milling and Preparation

[Demonstrate how you meet the requirements of Standard Farming Rules 2.3.1.1. to 2.3.1.5.](#)

Most diets are pelleted and this minimises dust during delivery. Feed is delivered to the site by lorry in covered 28 tonne loads and blown directly into sealed storage bins that are set back from high traffic areas to minimise risks from collision. Delivery times are restricted to between the hours of 0700 and 2200 to minimise disturbance from noise. Lorries are modern and well maintained, and are all fitted with efficient silencers. All drivers are equipped with empty bags shovels and brooms to clear up any spillage should this occur when attaching blower pipes etc. Spilled feed is attended to immediately to discourage pests and prevent risks from polluted run-off. On rare occasions when feed has to be moved on site, this is done in one of two ways; large quantities are moved by using a sucker/blower lorry, while smaller quantities are placed in sealed bags and moved by tractor trailer or barrow.

B2.3.2 Storage of Agricultural Fuel Oil, other Oils and Chemicals

[Demonstrate how you meet the requirements of Standard Farming Rules 2.3.2.1. to 2.3.2.4.](#)

The following facilities are used for storage of fuels and chemicals:

Product stored	Method of storage	Storage Capacity	Location (see also site map)
Diesel	Bunded tank	200 litres	Inside generator house

Biocides and pesticides	Proprietary chemical safe	200 litre	Farm store No 1
Petrol	Proprietary fuel container	max 10 litres	Farm store No 2
Veterinary medicines	Refrigerator	35 litres	Farm store No.1

Diesel for auxiliary generators is stored in a bunded tank that meets the requirements of The Control of Pollution, (Silage, Slurry and Agricultural Fuel Oil) (Northern Ireland) Regulations 2003. Biocides and small quantities of pesticides (e.g. rodenticides) are kept in a proprietary leak proof, fire resistant chemical safe in a dry frost free location. No more than two gallons of petrol are kept in a fuel container located in the farm store during the summer months for use in a lawnmower and strimmer. Small quantities of veterinary medicines are kept in a locked refrigerator. Records of raw materials held on site are kept in the farm office.

B2.3.3 Minimising Emissions from Housing

[Demonstrate how you meet the requirements of Standard Farming Rules 2.3.3.1. to 2.3.3.20.](#)

The following measures are adopted to prevent or minimise emissions to air, water and land.

Housing:

- Walls and roofs in sheds are insulated and have a smooth surface to aid cleaning. Buildings are well maintained and watertight.
- Manure is rapidly dried on belts using a forced air drying system prior to removal to an enclosed manure store. Rapidly drying and stabilising manure also reduces flies that can create a nuisance if present in large numbers.
- Dry cleaning methods are employed throughout to keep manure dry and eliminate wash water. Dust is blown downwards and swept up.
- Gable fans and air inlets are controlled and monitored electronically to ensure that optimum conditions are maintained within the house. Gable fans only operate when temperatures rise above pre-set levels (ca. 25°C).
- Fans are fitted with light filters that are also effective in filtering dust thus minimising emissions to the environment. Filters are regularly cleaned and dust swept up.
- Nipple drinkers are used to reduce wastage of water and maintain dry manure, thus reducing emissions of ammonia and odours.
- An automated system dispenses feed into trough feeders to minimise feed wastage.
- Low energy lighting is used.
- A review of existing housing and management practises will be undertaken within 12 months of the date of permit issue. Following the review an improvement plan shall be implemented.

Site drainage:

- A dry cleaning regime is adopted to eliminate wash water as far as possible.
- The site is concreted to allow a high standard of cleanliness and controlled drainage of storm run-off (including roof water).
- Clean run-off from the entire site is channelled to a swale running along the north side of the site. This then discharges to a field ditch.

- Contaminated wash down water is normally prevented due to the dry cleaning regime, but in the event of washing it is directed to an underground wash water tank.
- Valves are provided so that in the event of the hard-standing areas becoming contaminated, for example during cleaning out periods or when cleaning up dust, run-off from these areas can be diverted to a waste water tank rather than the swale.
- The waste water tank is emptied and disposed of in accordance with the requirements of the DARD code of good practice for prevention of pollution of water.

Manure utilisation:

- Most manure is land-spread on fields owned by third parties, the operation being undertaken by a specialist contractor. Smaller quantities are spread on land surrounding the site.
- Manure to be spread on land is kept dry and where appropriate incorporated into the ground within 24 hours to reduce volatilisation of ammonia. It is spread in accordance with the land owners' manure management plans.
- Details of the land bank available for manure spreading are provided with the manure management plan. The amount of land available at any one time may vary depending on local cropping patterns. Manure can be safely stored in the manure store and removed only when it is needed and weather conditions are suitable. This minimises the use of temporary storage in fields.

Management practices

The principal emissions from the site are ammonia, odours, dust, and at certain times noise. Good manure quality (i.e. dry manure) is a significant factor in minimising ammonia and odour emissions, and measures described above under housing all help reduce these emissions. Good management practice is also important. Causes of wet manure include sick animals, leaking equipment, poor ventilation, and high humidity within the shed. The following management checks are made:

- daily checks of animal welfare;
- daily checks and records of water consumption and equipment;
- daily checks of temperature and ventilation;
- regular maintenance and cleaning of fans and other equipment e.g. feeding and drinking systems;
- site kept clean and tidy and free from sources of odour e.g. spilled feed, uncovered bins for mortalities.

The main causes of dust are birds and feed. Excitable birds disturb manure and generate dust. Good husbandry practice lessens the likelihood of birds becoming stressed and thus help to reduce dusts. The colony cage system is good in this respect. Any dust emitted is regularly swept up and removed from hard standing areas. Landscaping with trees and shrubs can also help to minimise the impact of dust emissions from some types of housing.

Sources of noise on poultry farms include vehicle movements, feed deliveries (blowing into bins) and fan noise. Feed deliveries are only permitted between the hours of 0700 and 2200 and fans are fitted within cowls to reduce noise. Gable fans

only operate in warm weather, above 25°C and are large diameter and therefore slower speed. This helps reduce fan noise.

B2.3.4 Slurry, Litter and Manure Storage

[Demonstrate how you meet the requirements of Standard Farming Rules 2.3.4.1. to 2.3.4.9.](#)

Approximately 3,500 tonnes of manure at 65% - 70% dry matter per annum is produced as a by-product. (Note: accurate data regarding quantities of manure from your own farm must be provided.) All manure is dried on belts within the poultry houses and then conveyed to an enclosed manure store located on the site. Manure is kept dry in this store and can be removed at any convenient time when weather conditions are suitable for the intended end use. The stabilisation obtained from rapidly drying the manure will reduce ammonia and odour emissions and is expected to minimise fly activity and thus reduce potential nuisance. Manure can be loaded inside the manure store to further reduce odour and noise nuisance.

B2.3.5 Control of Slurry, Litter and Manure Spreading Operations

[Demonstrate how you meet the requirements of Standard Farming Rules 2.3.5.1. to 2.3.5.20](#)

Approximately 3,500 tonnes of manure at 65% - 70% dry matter is produced each year. All this manure is spread on land belonging to third parties. Approximately *nnn* ha of land has been identified in the manure management plan as being suitable for land spreading. Efforts are also being made to identify other utilisation routes. Manure is expected to have the following analysis:

Example nutrient analysis of layer manure at 65% dry matter. [Note: figures will vary with dry matter content please provide figures appropriate for your system.]

	N	P ₂ O ₅	K ₂ O
Total nutrients, kg tonne ⁻¹	35	28	20

Note: Details of your arrangements for spreading manure must be appended to this application. For existing installations where landspreading currently takes place, the plan should set out the nutrients generated from the installation, the capacity of the land currently used for spreading. If the plan shows a nutrient surplus, initial proposals for addressing these surpluses must also be submitted. An improvement plan must be submitted within 6 months of date of the permit issue setting out measures planned to ensure that spreading of manures will be in accordance with crop requirements. An example of a nutrient budget for a 100,000 laying hen unit producing 30% dry matter manure, is given in APPENDIX II

For further information on preparing a manure management plan see the NIEA “Guidance for operators on slurry and manure management planning for IPPC installations”.

B2.3.6 Measures for Controlling Odour

[Demonstrate how you meet the requirements of Standard Farming Rule 2.3.6.1.](#)

Buildings, land spreading of manure, feed storage and preparation, incineration of carcasses, disinfectants, and dust can all be sources of odours. There are a small number of local receptors (private dwellings) that could be affected by odours. These include private dwellings located at points 'A' 'B' and 'C' on the site map. Measures for controlling odours from buildings are essentially the same as those for controlling ammonia and other emissions and are detailed in section B2.3.3 above. The following is a summary of measures adopted:

- Dry manure is maintained by ensuring optimum temperature and humidity conditions in the shed, no leaks from drinking systems, and by rapidly drying manure on belts.
- A high standard of cleanliness is maintained around the site with dust deposits being regularly cleaned up.
- Dust emissions are minimised by fitting light filters, these also filter dust to a degree. Dust is directed on to hard standing where it is regularly swept up.
- All feed storage bins are sealed.
- Disinfectant baths do not leak.
- Mortalities are regularly collected.
- During manure removal, where possible trailers are loaded in the manure shed or close to the doors. All loads are covered and hard standing areas are swept clean after loading.
- Weather conditions and the location of sensitive receptors are considered when land spreading manure. The requirements of the DARD code of good practice for prevention of pollution of air and soil are adhered to.

Note: If you have sensitive receptors (private houses, schools etc.) within 400 m or there is a history of odour complaints an Odour Management Plan must be included.

B2.4.1 Disposal or Discharge of Dangerous Substances to Land or Water [Demonstrate how you meet the requirements of Standard Farming Rules 2.4.1 and 2.4.2.](#)

There is no disposal or discharge of dangerous (List I or List II) substances to land or water. As a dry cleaning system is used there is usually no wash water to dispose of.

B2.5 Avoidance, recovery and disposal of wastes (including carcass disposal) [Demonstrate how you meet the requirements of Standard Farming Rules 2.5.1. to 2.5.3.](#)

The following waste types may arise during egg production:

- cracked or soiled eggs (melange);
- plastic waste from wrapping used on egg trays and empty detergent containers;
- damaged egg trays;
- mortalities;
- re-usable pallets.

With the exception of mortalities, wastes are stored in covered bins and removed to landfill. Where possible wastes are segregated for reuse or recycling. The quantity of waste is minimised by good management practices. Large empty plastic biocide containers can be 're-cycled' as foot dip containers or rubbish bins for store rooms.

A waste audit will be undertaken using the Defra guide 'Opportunities for Saving Money by Reducing Waste on Your Farm' within 3 years of the date of issue of the permit. Following the audit measures will be implemented to prevent or reduce wastes generally, and specifically in any priority areas identified by the audit. Waste residues will not be stored on site.

Wastes produced by the egg production process are described above. Mortalities are collected daily and stored in sealed bins for collection under the National Fallen Stock Scheme [or by burning in a small (less than 50 kg per hour) incinerator three or four times per week as required. Temperature in the combustion chamber of the incinerator is monitored to demonstrate that 850°C is achieved thus ensuring complete combustion. Manufacturers operating instructions are followed to avoid overloading and to ensure correct start-up and shut-down procedures.] Good husbandry practice minimises mortalities.

Records of wastes produced by the activities on the site, and of wastes sent off-site, are maintained and kept in the farm office. A waste hierarchy is adopted so that where possible wastes are avoided, re-used or recycled with disposal as a last option. Where appropriate, waste management licences or licence exemptions required for on-site recovery or disposal of wastes from the installation, under the Waste Management Regulations (NI) 2006, will be obtained from NIEA.

B2.6 Energy Use

[Demonstrate how you meet the requirements of Standard Farming Rule 2.6.1.](#)

The farm has subscribed to the <Insert name> Climate Change Levy Discount Scheme since <date>. The document reference number for the agreement is *nnnnnnnn*. [\[Enclose a copy of your agreement.\]](#)

Energy efficiency measures

The following design features are incorporated in the design of sheds to reduce energy consumption:

- A high level of insulation in walls and roofs.
- Efficient automatically controlled ventilation systems to maintain optimum internal temperature.
- Main fans only used when temperatures rise above a pre-set level, otherwise ventilation is by an ACNV system.
- Precise electronic control of the system maintains constant temperature conditions thus avoiding large variations and consequent increased demands on heating and ventilation systems.
- Low wattage lighting used throughout.
- Well maintained ventilation and feeding systems to help reduce energy consumption (power consumption can increase as a result of increased friction in feeding systems, or dust laden fan blades reducing efficiency).

An energy audit will be completed using the same MAFF document as the waste audit 'Opportunities for saving money by reducing waste on your farm' within 3 years

of the date of issue of the permit. Measures identified in the audit shall be implemented.

B2.7 Accident Prevention and Management

[Demonstrate how you meet the requirements of Standard Farming Rule 2.7.1.](#)

Note: A copy of the accident management plan for the installation should be attached, an example is provided in Appendix I.

B2.8 Measures for controlling noise and vibration

[Demonstrate how you meet the requirements of Standard Farming Rule 2.8.1.](#)

Noise at the site may be emitted by vehicles, machinery, fans, auxiliary generators, and birds during emptying of sheds. There are [*insert number*] sensitive receptors within a 400 metre radius of the site, and there is no history of complaints about noise.

The highest noise levels during the production cycle usually occur during feed deliveries when lorries blow feed into bins. To prevent nuisance at quiet times feed deliveries are restricted to between 0700 and 2200 hours, and all vehicles are well maintained and fitted with effective silencers.

The modern design of the sheds and the fact that they incorporate an ACNV ventilation system mean that noise emissions will be kept to a minimum. Noise levels are likely to be higher when the gable fans are running but these are large diameter low speed fans located on the end of the sheds away from sensitive receptors.

Sheds walls and roofs are of insulated panel construction. This provides an adequate barrier for poultry and machine noise from within the shed. Staff monitor noise and vibration from fans, augers and other machinery on a daily basis to ensure correct operation. Broken or badly maintained machinery can generate excess noise resulting in greater stress for birds as well as increased noise emissions.

Bird noise can increase during catching for bird de-stocking. To reduce this, catchers try to minimise disturbance and crates into which birds are placed for transport are fitted with side shields to quieten them during travel. Lorries are scheduled for consecutive loading to ensure that the operation is conducted as quickly as possible. Filling and de-stocking occurs at the beginning and end of a 60 week laying cycle.

During manure removal, trailers are filled near to doors or inside the manure store to reduce machinery noise and are filled to capacity to reduce the volume of traffic leaving the site.

Note: If you have sensitive receptors (private houses, schools etc.) within 400 m or there is a history of noise complaints a Noise Management Plan must be included with your application.

B2.9 Measures for Monitoring Emissions

[Demonstrate how you meet the requirements of Standard Farming Rules 2.9.1.1 to 2.9.2.2](#)

Emissions to air

Emissions of ammonia and dust to air are monitored using standard factors provided in Section B3.1 of the IPPC application form. [If an incinerator is used.] In addition to the factors in Section B3.1, a small (less than 50 kg per hour) incinerator is used for burning carcasses. Temperature in the combustion chamber of the incinerator is monitored to demonstrate that 850°C is achieved thus ensuring complete combustion. A monthly check is made of the incineration site (as per the inspection and maintenance schedule) to ensure that there is no build up of ash or other residues, and no potential for contaminated run-off from the area. [Note: if an incinerator is used the temperature must be monitored.]

Emissions to water

As a dry cleaning system is used this should almost eliminate contaminated run-off. If contaminated run-off is likely, for example during cleaning out, it is channelled directly from hard standing areas to an under ground waste water tank. The tank is emptied and disposed of in accordance with the requirements of the DARD code of good practice for prevention of pollution of water. Records are kept of when tanks are checked (maintenance schedule) and when they are emptied.

Emissions to land

Emissions to land include deposition of ammonia and dust from air, and manure spread on land. Measures for monitoring ammonia and dust are described above under 'Emissions to air'. Land spreading of manure is undertaken according to the manure management plan and records of quantities and location of spreading are kept.

B2.10 Closure and Decommissioning

[Demonstrate how you meet the requirements of Standard Farming Rules 2.10.1 to 2.10.4](#)

Note: A site closure plan is not required at application, however, within 12 months from the date of the issue of the permit, you are required to prepare and maintain a site closure plan which demonstrates how the activities can be decommissioned to avoid any pollution risk and return the site of operation to a satisfactory state. A review of this plan is required to be carried out at least every 3 years.

Buildings and equipment

After the last birds have been removed the buildings will be cleaned out and disinfected. Yard areas will also be thoroughly cleaned and disinfected. All salvageable equipment such as feeding, drinking, heating and ventilation systems will be removed from the sheds. Fan and ventilation apertures will be closed, covered and sealed to keep out pests.

Raw materials

All raw materials will be removed from the site. Feed will be transferred from bins to an operational farm, and the bins will be cleaned, disinfected and sealed. Fuel would be removed from tanks by the supplier and the tank then locked closed, or moved to another operational site. All other raw materials such as disinfectants and veterinary

medicines would be removed from store rooms to other operational farms or returned to the suppliers.

Site facilities

All bins and receptacles (e.g. bins for mortalities, rubbish etc) would be cleaned and removed from site, either to be reused at other sites or disposed of by a licensed waste contractor. Any substance or article considered to have potential for environmental pollution will be removed from site. Dirty water tanks will be emptied and closed after all potential contaminants have been removed and the site cleaned. Water and electricity supplies will be shut off and all houses and store rooms locked to prevent unauthorised access.

Site inspection

A final site inspection would be conducted to ensure that all pollution risks had been removed and that there was no potential for pollution, flooding or other mishap due to vandalism, inclement weather or other unforeseen event. Keys for access and all records relating to the site will be stored for safe keeping.

B3.1 Emissions to air, water and land

[Provide details of the nature, quantity and sources of emissions to air, water and land from the installation.](#)

Emissions to air

Details of emissions to air from the installation are provided in the tables in section B3.1 of the application form.

Emissions to water

There are no emissions to water from the installation [if there are emissions to water from the installation, please provide details].

B4.1 Identifying Significant Environmental Impacts

[Provide an assessment of the potential significant environmental effects of the foreseeable emissions from your installation](#)

Sensitive receptors around the farm are shown on the location map submitted with this application. In addition to the owners property there are three private houses within 400 metres of the farm. There are no designated sites such as ASSIs within 2 km of the farm.

[Note: Identify on a map all sensitive receptors (houses, schools, businesses, etc.) within a 400 metre radius of the site boundary. Also where known, identify any ecologically sensitive sites with a statutory designation e.g. an ASSI within a 2km radius of the site.]

The environmental impacts from the farm are assessed in the Table below.

For further information on carrying out an assessment of environmental impact from your poultry farm see NIEA Guidance “Assessing environmental impacts of poultry farms – supplementary guidance for IPPC application”

Source of Impact	Impact e.g. odour, noise, dust, ammonia, run-off, spillage	Receptor Air, water, land Humans, plants	Description of Negative Impact Nature of impact i.e. short term ST, medium MT or long term LT	Significance of negative impacts after mitigating measures applied: major +++ moderate ++ minor + nil 0	Mitigation / Management Measures e.g. site planning, technical measures
Livestock housing	Ammonia	Air Land Plants	Possible direct toxic effect on trees ST Increased acidification of soil close to housing MT Changes to sensitive ecosystems LT	0 + 0	<ul style="list-style-type: none"> • Dry manure maintained • No sensitive woodland or other ecological receptors close to housing • Appropriate soil pH maintained by liming
	Odour	Humans	Nuisance ST	++	<ul style="list-style-type: none"> • Dry manure maintained • Hard standing areas kept clean and spillages prevented • Manure air dried to reduce odours
	Dust	Humans Plants Land Water Air	Nuisance ST Contributes to odours ST Health issues - inhalation LT Covers leaves stopping photosynthesis ST Nutrient enrichment of water courses MT Impacts on air quality ST	+ + 0 + + +	<ul style="list-style-type: none"> • Gable fans fitted with cowls and light filters • Regular clearing of dust to prevent build up on surfaces and around vents • No sensitive vegetation around sheds • Houses far enough away not to be affected • Hard standing cleaned to prevent dust being washed into water courses • Run-off treated by swale
	Noise	Humans	Nuisance ST	+	<ul style="list-style-type: none"> • Feed delivery times restricted, vehicles well silenced • Doors in housing sited away from neighbours

	Used disinfectants	Water	Possible toxic effects on wildlife ST Increased biochemical oxygen demand (BOD) of watercourses ST	+ +	<ul style="list-style-type: none"> Spent disinfectant disposed of into dirty water tank Use of Defra/NOAH approved disinfectants
Disposal of carcasses	Odour	Humans	Nuisance ST	0	<ul style="list-style-type: none"> Good husbandry to minimise mortalities Use of covered/sealed skips to store carcasses Carcasses disposed of weekly
	Disease	Humans	Health risks ST	0	<ul style="list-style-type: none"> Use of covered/sealed containers No contact with people
		Livestock	Biosecurity issues ST	+	<ul style="list-style-type: none"> Use of covered containers Carcasses disposed of daily Bait traps used
	Incinerator stack emissions (if used)	Air	Odour nuisance ST Emission of acid gases contributing to acid deposition LT	+ +	<ul style="list-style-type: none"> Incinerator fully complies with requirements of Animal By-Products Regulations Performance is monitored
Cleaning out	Contaminated run-off	Land Water	Increase in nitrogen and phosphorus levels in soil MT Potential for increased mineral or metal content of soils LT Increased biochemical oxygen demand (BOD) of watercourses ST Nutrient leaching from soil to surface waters and groundwater LT Nutrient enrichment (eutrophication) of watercourses and ground water LT	+ + + ++ ++	<ul style="list-style-type: none"> Dry cleaning system used Any run-off diverted to waste water tank Hard standing has kerbing Waste water disposed of in line with DARD Water Code Dirty water tank are emptied prior to clean out All lightly contaminated run-off treated by swales when not cleaning out

	Noise	Humans	Nuisance ST	++	<ul style="list-style-type: none"> • Machinery operated at reasonable times, wherever possible • Equipment maintained to optimum standards • Need for scraping minimised due to reduced yard area • Machinery and equipment sited as far as possible from neighbours • Idling of machines avoided • Voices not raised unnecessarily • Roads and tracks maintained to minimise noise produced
	Odour	Humans	Nuisance ST	++	<ul style="list-style-type: none"> • Cover loads • Load close to the shed door or inside • Outdoor heaps avoided • Yard areas cleaned at the end of each day • Dirty water tank emptied promptly
Manure spreading	Ammonia and major nutrients (N:P:K)	Air Land Plants	Contributes to climate change LT Contributes to odours LT Nutrient enrichment or 'fertilising' effect on crops, plants and water. LT Changes to sensitive ecosystems such as natural woodland, heathland or peatland. LT Nutrient enrichment of soils, particularly phosphorus LT Potential for increased mineral and metal content of soils Eutrophication caused by run-off MT Reduced biodiversity LT	+ ++ ++ 0 + ++ + +	<ul style="list-style-type: none"> • Manure applied in accordance with manure management plan • Balanced diets fed to reduce N & P in manure • Manure incorporated within 24 hours • Application in accordance with DARD codes of good practice • Only temporary field heaps used • No ecologically sensitive receptors near the site

	Odours	Humans	Nuisance ST	++	<ul style="list-style-type: none"> • No spreading in adverse weather conditions • No spreading at weekends or on Bank Holidays • No spreading close to neighbours' houses • Manure incorporated within 24 hours • Manure applied in accordance with manure management plan
Storage of fuel, chemicals etc.	Leakage	Water	Contamination of surface and groundwaters ST Killing of animals, plants and aquatic life ST	+ 0	<ul style="list-style-type: none"> • All tanks are bunded and compliant with legislation • Use of chemicals least hazardous to the environment • Spill kits available

APPENDIX I

ACCIDENT MANAGEMENT PLAN

Address: XYZ Poultry Farm

Date of Plan: May 2006

Date for Review: May 2007

Approved by:

Distributed to:

.....

.....

.....

.....

.....

A copy of this document must be located in a prominent place near the telephone in the farm office.

EMERGENCY CONTACT DETAILS

Emergency Contacts	Office hours	Out of hours
Emergency services:		999
Local Police:		
Doctor:		
NIEA		
Pollution hotline:		0800 80 70 60
District Councils:		
NI Water :		
Gas supplier:		
Electricity supplier:		
Fuel oil supplier:		
Spreading contractor:		
Slurry tanker operator:		
Forklift operator:		
Maintenance contractor:		
Plumber:		
Electrician:		
Vet:		
Proprietor:		
Farm Manager:		
Shed staff:		
Processing company:		
Processing company manager:		
Transport manager:		

SITE DRAINAGE PLAN

Include a plan of your installation here showing the following detail:

- general layout of buildings and services;
- feed bins, feed conveyors,
- access routes for emergency services;
- location of fire hydrants;
- hard-standing areas;
- surface water and foul drains (colour foul drains red and surface water drains blue, and show the direction of flow);
- swales, ponds or wetlands for treating run-off;
- location of waste water tanks, septic tanks and manholes;
- valves for diverting surface water to waste water tanks tanks;
- ditches, field drains and watercourses;
- surface water outfalls;
- LPG tanks, diesel tanks, chemical stores, bunded areas;
- location of incinerator or carcass disposal skips.

ACCIDENT MANAGEMENT PROCEDURES

The accident management procedures detailed in this document are designed to prevent or mitigate harmful environmental impacts arising from the following:

Event	Aspects to consider
Fire:	buildings and feed storage fuel and chemical stores manure storage fire water run-off
Spillage:	fuel and oil tanks chemical and disinfectant containers and stores wet manure (i.e. flooded shed) feed
Unable to utilise manure:	restriction on land access i.e. bad weather, disease restriction (e.g. AI, FMD)
Mechanical/electrical failure:	ventilation and feeding systems, incinerator
Interruption to water supply:	buildings, drinking systems
Storm damage:	buildings feed storage systems drainage system flooding
Extraordinary mortalities:	carcass disposal quarantine

Training and information

All staff and contractors working on site shall be made aware of the emergency plan, and must be familiar with the actions stated in it. The Operator shall be responsible for ensuring that staff are aware of their duties and the procedures to follow to prevent pollution in the event of unforeseen circumstances.

- The emergency plan is located in the farm office, next to the telephone.
- The inventory of chemicals, fuel and oil and raw materials is located in the farm office, next to the telephone.

Responding to accidents/emergencies

Fire

In the case of an accident/emergency staff must immediately contact the fire service giving the location and nature of the fire. Where relevant, details of hazardous substances must be given to the fire service, and locations of fire hydrants pointed out.

Staff must be familiar with the location and operation of fire extinguishers. Staff should only attempt to fight fires where the risk to their own safety is low. The location of fire extinguishers is shown on the fire safety plan located in the office.

Staff will notify nearby residents/workers and ensure affected buildings are evacuated.

Provided personal safety is not compromised, staff shall try to ensure that run-off such as fire fighting water and any other polluting substance is prevented from entering drains or watercourse, by channelling to dirty water tanks; absorbing with straw, wood shavings, soil or other absorbent material. A tanker is available at

.....
(name, address & tel.) and must be requested to empty tanks and prevent overflow.

Injured birds must be humanely slaughtered on-site according to the instructions of the attending veterinary officer. If numbers affected exceed the capacity of normal mortality disposal systems, skips must be requested for interim storage. Skips are available from:

.....
(name & tel.). Unaffected birds if below marketable age must be re-housed on another site, or if at marketable age, sent for immediate processing.

Spillage

Minor liquid spillage, e.g. of disinfectant or fuel oil, may occur when tanks or containers are being filled. Staff must immediately clean up such spills using absorbent material such as granules, sawdust, wood shavings, straw or soil.

Absorbent materials and equipment for cleaning up spillage are stored at the following locations:

Material	Location
Absorbent granules:	Generator shed and chemical safe
Wood-shavings/sawdust:	General store
Straw/soil:	Main farm steading
Pollution spill kits:	South end of sheds No1 and No 2
Brushes/shovels	South end of all sheds
Fork lift	name, address, telephone
Slurry tanker	name, address, telephone

If small containers are found to be leaking the contents must be transferred to a sound empty container, preferably one of the same type. Spillage must be cleaned up as per minor spills above.

If a major liquid spillage occurs, such as may happen when a fuel tank is damaged, staff shall contact the Northern Ireland Environment Agency pollution hotline

(0800 80 70 60). They must then try to prevent spillage entering drains or watercourses by using sawdust, wood shavings, straw, soil, pollution spill kits or other suitable material. The storm drainage system must be diverted to waste water tanks to try and contain spillage and drain blockers used where appropriate. Staff shall assist agency and emergency service personnel by making sure they are aware of the locations of drains and by identifying the potential routes pollutants may take. Care shall be taken when cleaning up and disposing of absorbent material that further pollution does not occur.

Spillage of feed or manure shall be promptly swept up and removed.

Unable to utilise manure

If circumstances prevail where it is not possible to spread manure on land, or export it to another user e.g. prolonged bad weather, access restrictions due to disease, or similar, the following contingency plan will be implemented. Manure will be contained in the enclosed store on the site. This is located away from field drains and watercourses and manure is kept dry. The store can accommodate ca 10 months of manure production. This should obviate the need for emergency storage sites, but if further storage is needed a suitable outdoor site can be identified for emergency storage of manure on an area of flat ground well away from watercourses and field drains.

If land spreading of dirty water is not possible arrangements must be made to have waste tanks emptied by:

.....
(name & tel.) licensed waste disposal contractor.

[Note; Emergency storage sites for manure must be agreed with NIEA prior to use.]

Mechanical/electrical failures

If the power fails ensure that the emergency generators have started and that all systems are operating. Monitor fuel level, temperature and oil pressure of the generator. Avoid spillage when filling generator fuel tanks. Contact the electricity supply company to notify them of the fault.

If mechanical failures occur, establish what equipment or system has failed and call the maintenance engineers. Consider the risks of bird welfare and pollution that may arise from loss of the equipment. Arrange for appropriate repairs or alternative equipment to be provided.

Ensure system alarms are operating correctly and are set at appropriate levels (alarms must not disturb neighbours).

If the incinerator fails, and the repair is likely to take longer than the storage capacity of bins used to temporarily store mortalities, skips must be obtained and disposal arranged with:

.....
(name & tel.) licensed waste disposal contractor.

Interruption to water supply

Staff shall check immediately to ascertain the cause of interruption to the supply and undertake a thorough inspection of the system. They must pay particular attention to the possibility of frozen or burst pipes, and the consequences of flood damage and the pollution this may cause.

If flood damage does occur clean up activities shall be as described in the section on major spillage. Staff must be aware of the location of the main stopcock (shown on the site plan) in case the supply needs to be isolated.

Call the plumber if the fault is on site. If the fault is due to a failure of the mains supply contact the water services company, informing them that livestock are dependant on the water supply.

Storm damage

Ensure that staff are safe and if necessary evacuated from the buildings, and that bird welfare is maintained as far as is practicable. If welfare is compromised the company vet must be summoned.

Conduct an initial internal and external assessment of damage, paying attention to the overall integrity of the building, and services such as water, gas, electricity, and fuel oil.

Assess the risk of pollution from any disruption to these services, and where appropriate take action as described in the section on minor and major spillage. If the building has been damaged, or flooding has occurred, assess the likelihood of contaminated run-off from wet manure getting into watercourses.

Ensure that the drainage system is diverted to waste effluent tanks and that spillage is mitigated as described in the section on spillage. As far as practicable, try to keep buildings watertight.

If necessary arrange for birds to be re-housed or sent for processing.

Extraordinary mortalities

In the event of an outbreak of a notifiable disease requiring the slaughter of birds, carcasses must be disposed of in compliance with the requirements of the State veterinary service. Notwithstanding this, staff shall be aware of the pollution potential of having large numbers of carcasses on the premises.

Drainage systems must be protected and all run-off diverted to the waste tanks. Arrangements must be made for these to be emptied regularly with disposal of the effluent undertaken in accordance with veterinary advice. Skips must be used to contain carcasses if there is any delay in disposal.

Distribution and revision

All staff shall be provided with copies of the Accident Management plan and be trained in the procedures contained in it. A copy shall also be held in the farm office next to the telephone.

The accident management plan shall be reviewed at least every 3 years or as soon as is practicable after an accident (whichever is earlier).

APPENDIX II

Example nutrient budget

Existing installations – off farm activity.

Table 1 Example assumptions – crop nutrient requirements

(Assume a soil P index of 2; Moderate N status)

Crop	N (kg/ha)	P ₂ O ₅ (kg/ha)	K ₂ O (kg/ha)
Grazing (28d cycle)			
- Dairy	60	20	0
- Beef	50	20	0
Silage – 1 st cut	120	40	70
- 2 nd cut	100	25	75
- 3 rd cut	80	15	60
Grass - reseed	60 (spring)	50	50
Winter Wheat	150	70	85
Spring wheat	120	55	70
Winter barley	120	70	85
Spring barley	100	55	70
Potatoes	200	180	290
Forage maize	40	60	170

Table 2 Existing farms – example of requirements

Reference	Area (ha)	Crop	Nitrogen (N) Requirement (kg)	P ₂ O ₅ requirement (kg)	K ₂ O requirement (kg)
Farm 'A'	100	Silage (1 st & 2 nd cuts)	17,000 (100 x 170)	6,500 (100 x 65)	14,500 (100 x 145)
Farm 'B'	10	Potatoes	1,700 (10 x 170)	1,800 (10 x 180)	2,900 (10 x 290)
Farm 'C'	100	Winter wheat	15,000 (100 x 150)	7,000 (100 x 70)	8,500 (100 x 85)
Total	210		33,700	15,300	25,900

Nutrient budget for above – Laying hens

100,000 laying hens producing 40 tonnes manure/1000 bird/year = 4,000 tonnes manure. (Manure at 30% dry matter.)

Analysis showed litter contained 16kg N; 13kg P₂O₅; 9kg K₂O
(Note: analysis for manure at 30% dry matter, provide data relevant for your system.)

	4000t of Layer Manure
Nitrogen content	64,000 kg
Phosphorus (P ₂ O ₅) content	52,000 kg
Potassium (K ₂ O) content	36,000 kg

Farm	Crop	Area ha	N reqt Kg	P reqt Kg	K reqt Kg	N constraint t Manure	P Constraint t Manure	t Manure used
A	Silage 2 cuts	100	17000	6500	14500	1062.5	500	500
B	Potatoes	10	1700	1800	2900	106.3	138.5	106.3
C	Winter wheat	100	15000	7000	8500	937.5	538.5	538.5
Total			33700	15300	25900			1144.7

Total manure utilised	1144.7 t	Extra land required (ha)		
Total manure generated	4000 t			
Surplus	2855.3 t	Silage–2 cuts	W Wheat	Potatoes
P Surplus	37,118.8 kg	571.1	530.3	206.2
N Surplus	45,684.6kg	268.7	304.6	253.8

Examples of additional land requirements are shown in red above ie.

- = 571 ha silage(1st & 2nd cuts),or (P Limiting)
- = 530 ha winter wheat, or (P Limiting)
- = 254 ha potatoes. (N Limiting)

Nitrate Action Programme Nitrogen limit of 170 kg N/ha = 210 ha x 170 kg = 35,700 kg N

An additional **269 ha** of land will be required to meet 170 kg N/ha limit (i.e. 45,684/170) and apply organic nitrogen according to crop requirements. To meet the 170kg N/ha only, an additional 166ha of land would be required (i.e. 4000 x 16 = 64,000 – 35,700 = 28,300 / 170 = 166ha).