

Technical Guidance Note

IPPC SRG 6.02 (Farming)

Integrated Pollution Prevention and Control (IPPC)

Noise Management at Intensive Livestock Installations



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Record of changes

Version	Date	Change
Version 1, Draft 1	September 2002	Included as appendix in version 2 of Standard Farming Installation Rules
Consultation Draft Version 1	March 2005	Guidance revised into a stand alone document for public consultation in England and Wales
Version 2	November 2005	Guidance revised following responses received from the public consultation

This guidance has been produced for England and Wales, Scotland and Northern Ireland. This document has undergone public consultation in England and Wales. It is anticipated that a public consultation on this guidance will take place in Scotland and Northern Ireland.

Contents

1	Background	4
1.1	What is IPPC?	4
1.2	Who should use this guidance?	4
1.3	How you should use this guidance	4
1.4	What standards of noise control are expected?	5
1.5	Information requirements	6
1.6	Time definitions	6
1.7	Complaints	7
2	Management of noise	7
2.1	General aspects of noise management	7
2.2	Noise management in intensive livestock installations	11
3	Writing a noise management plan	15
3.1	How to write a noise management plan	15
3.2	Noise management plan example and template	16
4	Full noise impact assessment	19
4.1	Overview	19
4.2	Measuring emissions	20
4.3	Predicting emissions	21
4.4	Interpretation of noise–level difference	22
4.5	Noise impact assessment reporting	22
	References	24

1 Background

1.1 What is IPPC?

Integrated Pollution Prevention and Control (IPPC) is a regulatory system that employs an integrated approach to control the environmental impacts of certain industrial activities. In England and Wales IPPC operates under the Pollution Prevention and Control (England & Wales) Regulations 2000. Similar regulations are in place in Scotland and Northern Ireland. In Scotland IPPC operates under the Pollution Prevention and Control (Scotland) Regulations 2000. In Northern Ireland, IPPC operates under the Pollution Prevention and Control Regulations (Northern Ireland) 2003 (Reference 1). These Regulations were made under the Pollution Prevention and Control (PPC) Act 1999, and implement the EC Directive 96/61 on IPPC. The Regulatory Regime applies to many industrial sectors, including the intensive farming of pigs and poultry. The threshold for such farms to be regulated under IPPC is:

- 40,000 places for poultry; or
- 2,000 places for production pigs (over 30kg); or
- 750 places for sows.

Regulation is achieved through the issue of a permit from the Environment Agency in England and Wales, the Scottish Environment Protection Agency (SEPA) in Scotland and the Environment and Heritage Service (NIEHS) in Northern Ireland. A permit covers all aspects of the operation of the farm as defined by the installation boundary. To gain a permit, Operators have to show that they have systematically developed proposals to apply the 'Best Available Techniques' (BAT) and meet other requirements for environmental protection, taking account of relevant local factors.

The Environment Agency, SEPA and NIEHS (referred to as the Agencies) have developed a simplified permitting approach for the farming sector, through the development of Standard Farming Installation Rules, the Scottish Standard Farming Installation Rules and the Standard Farming Installation Rules and Guidance (NI) respectively (Reference 2). These rules define BAT for the farming sector.

Aspects of noise management are integrated throughout the Standard Farming Installation Rules, but in some cases site-specific measures will be needed, and these must be identified in a Noise Management Plan.

The Regulations do NOT relate to occupational exposure to noise – only to noise as an environmental pollutant, i.e. beyond the installation boundary.

1.2 Who should use this guidance?

This guidance is specifically targeted at the pig and poultry sector, and includes many of the principles applied to all sectors regulated under IPPC referred to in Horizontal Guidance for noise (H3, Reference 3). The Agencies will refer to this Horizontal Guidance in determining conditions for noise at pig and poultry installations.

In England, Wales and Northern Ireland, you should use this guidance if:

- you answered 'yes' to question B2.9 on the application form, i.e. sensitive receptors are located within 400m of the installation; and/or
- the installation has a history of substantiated noise-related complaints within the last 3 years; and/or
- you are in the process of planning for a new installation, or extending an existing one – this guidance will provide information on best practice and impact assessment requirements.

In Scotland you should use this guidance for all applications.

1.3 How you should use this guidance

You should use this guidance in conjunction with the Standard Farming Installation Rules.

Section 2 provides guidance on the sources of noise, and some of the measures to minimise emissions.

Section 3 provides guidance on writing a noise management plan. This section should be used if you have sensitive receptors within 400m of the installation and/or the installation has a history of noise related complaints. You will need to consider some of the measures in section 2 in your noise management plan. In Scotland this section should be used for all applications.

Section 4 provides guidance on carrying out a noise impact assessment. This section should be used if you are in the process of planning for a new installation, or extending a new one and may be needed if you are applying for a permit for an existing installation. A noise impact assessment will often be required as part of the process of applying for planning permission. You may need to consult a noise specialist to complete the assessment, and should ask them to cover the points in this guidance.

1.4 What standards of noise control are expected?

1.4.1 What standard of control are we aiming for?

In the case of noise, pollution is considered in terms of causing environmental harm or offence to the sense of hearing, i.e. causing annoyance to people who live in the area or are there for some other reason, through exposure to noise.

The point at which 'pollution' in the form of offence to the sense of hearing is occurring, is taken to be the point at which there is 'reasonable cause for annoyance'.

The need to "prevent" noise emissions is, in certain situations, less relevant for noise than for some other pollutants. Noise does not accumulate on the installation or in the environment permanently like some pollutants. In other words, when the installation ceases operations, the original noise climate may be restored. The aim should be, wherever feasible, to ensure that proposed additions to existing plant or activities do not add to the overall ambient level. In some cases, however, this may be unreasonable or beyond BAT.

The aim of the legislation is to achieve 'no reasonable cause for annoyance' to persons beyond the boundary of the installation, i.e. sensitive receptors, as far as is possible using BAT. For many installations environmental noise will not be an issue but for others it will need to be considered and controlled.

Note: The PPC Regulations also treat vibration as a pollutant, but if there is a vibration problem specialist advice should be sought and discussions held with the Agency Officer.

1.4.2 Who are sensitive receptors?

Sensitive receptors are primarily people in houses, hospitals, schools and commercial premises, but can include people frequenting open spaces, for example, parkland. The person in control of the installation would not normally be considered to be a sensitive receptor. Persons who live in close proximity in tied housing may be sensitive receptors (consider the families of the farm workers). If such properties are rented to people who do not work on the installation, the tenants are likely to be sensitive receptors, even if they rent with the knowledge that there is a noise source nearby. Sometimes habitats, such as Special Protection Areas, may be considered as sensitive receptors, in which case detailed advice should be sought from the Agency Officer

In any particular situation however, the interpretation of the courts will be the decisive factor.

1.4.3 What is "no reasonable cause for annoyance"?

The amount of annoyance should not be assessed only by means of the number of complaints. Often, in rural areas few people are exposed to noise from intensive installations, but they are entitled to the same reasonable expectations of a satisfactory environmental noise climate as those living in a more populated area.

The legislation requires that the amount of time and money that you spend on taking measures to reduce noise should be in proportion to the annoyance caused or potential to cause annoyance. Good practice should be adhered to at all times by all installations, but if a large number of complaints are received, or the installation is close to a built up area then you may have to expend more effort to

reduce noise. BAT covers management techniques (i.e. Best Practice), site design and layout as well as specific noise control measures such as barriers and silencers to control noise.

It should be remembered that it is not only the level of noise that can cause annoyance, but sometimes the source itself or the time of day or night, as illustrated in the examples below:

- feed deliveries;
- animal noises such as pigs squealing;
- the time the noise occurs (noise is often more annoying at night or during leisure times);
- clattering or banging;
- tonal noise, with distinctive notes, hums or whines from vacuum pumps, fans, motors etc.;
- noise that is perceived as unnecessary.

1.4.4 Standards for new installations

New intensive livestock installations will have to use BAT from the outset. Indicative sector BAT may help operators understand the requirements. As part of the planning process it is likely that an applicant will be required to undertake a noise impact assessment (section 4) to predict the noise emissions.

The acceptability, or otherwise, of noise from the installation will be influenced by the existing noise climate and as the Standard Farming Installation Rules state, the requirements and conditions for noise will be site specific so it is not possible to be prescriptive on acceptable numerical values. However, a British Standard BS 4142:1997 (Reference 4) may be appropriate to offer guidance on the likelihood of complaints arising.

1.4.5 Standards for existing installations

Existing installations will be allowed an appropriate timescale to upgrade where meeting BAT will involve capital expenditure, but will be expected to adopt good management practices from the date of being granted a permit. Any required changes in operation will be identified in an improvement plan set by the Agencies. This improvement plan may require the operator to investigate alternative techniques, provide recommendations and set timescales for implementation.

1.5 Information requirements

When producing a noise management plan you must provide information on the:

- techniques employed to control noise;
- emissions of noise from the installation;
- assessment of the impact of those emissions on the environmental receptors.

The level of detail supplied in the application should reflect the level of risk. The higher the risk of causing annoyance or other environmental impact, the more detail is required and the higher the expectation of a proactive approach to noise control.

Where the activities are inherently quiet and there is no history of noise nuisance, information requirements will be minimal.

1.6 Time definitions

In this guidance, the following time definitions have been used:

Day time	0700 - 2300
Night time	2300 - 0700
Working week	Monday to Friday and Saturday morning but exclusive of public and bank holidays

1.7 Complaints

Noise complaints relating to an installation may be received directly by the Agency or via the Environmental Health department of a Local Authority. If the installation operator holds a PPC permit, the Agency will investigate the complaint and if there is found to be a breach of the permit conditions, a notice may be served, requiring the operator to address the issues or proceedings may be instituted. If the complaint relates to activities not covered by the permit, the matter will be dealt with by the Local Authority.

2 Management of noise

2.1 General aspects of noise management

2.1.1 Overview

This section gives an overview of some of the principles of good practice for noise reduction and control. Not all aspects will apply to all installations and some installations will have arrangements, which are not described here. You will need to pick out those elements, which most closely match your circumstances and add in any other sources or problems. Although this guidance note specifically addresses noise, many of the solutions to noise issues will also help control other emissions from the installation. In some circumstances noise control may compromise other issues such as animal health and welfare and in these situations a considered approach will need to be adopted. Care must also be taken to ensure that there is no conflict with guidance designed to protect health and safety, prevent water pollution or other impacts on the local environment.

Two reports prepared for MAFF (now Defra) in 1999 offer guidance on the control of noise on pig and poultry installations (References 5 and 6).

Many noise problems can be prevented by good management, consideration and ensuring a good standard of maintenance of plant and equipment. The hierarchy for control should be to:

1. **Prevent** generation of noise at source by good design and maintenance.
2. **Minimise or contain noise at source** by observing good operational techniques and management practice.
3. **Increase the distance** between the source and receiver.
4. **Use physical barriers or enclosures** to prevent transmission to sensitive receptors.
5. **Sympathetic timing and control** of unavoidably noisy operations.

2.1.2 Prevention and minimisation

Good design and management can prevent the generation of noise. This can include:

- selection of plant and equipment that produce less noise;
- suitable timing of noisy operations;
- appropriate siting of noisy operations and noise sources at the design stage.

It is far easier to deal with potential noise problems at the design stage of a new installation or an extension or alteration to an existing one. When new equipment is purchased it is often more effective to purchase quieter equipment, that is slightly more expensive, rather than have to modify it at a later date. Many manufacturers now provide detailed noise information on their products.

2.1.3 Increase the distance between the source and receiver

Care should be taken to site noisy activities away from noise-sensitive areas. The day to day location of equipment and vehicles on the installation and the way in which they are used can play a major part in reducing noise levels. Some noise sources are directional, such as fans or engine exhausts, and simply turning the noisy aspect away from the sensitive receptors can noticeably reduce the noise levels.

2.1.4 Acoustic barriers

The following are examples of good acoustic barriers:

- buildings on site;
- earth banks;
- heavy and solid close boarded wooden fencing, masonry walls;
- straw bales can provide good temporary noise barriers provided there is no fire risk.

All barriers should be high enough to break the line of sight and extend beyond the noise source so that the noise does not “wrap” around the ends and top of the barrier. Vegetation barriers (trees and hedges) are often thought to provide a degree of noise reduction if planted between the source and local dwellings. However in practical terms the reduction is marginal and barely noticeable, if at all, unless the planting is very thick and many tens of metres wide. The psychological effect of removing the noise source from view probably has a much greater overall effect on the perception of the noise rather than the actual noise reduction offered.

2.1.5 Complaints procedure

A procedure should be established for verifying and responding to complaints about noise. The existence of a complaints procedure can help you to:

- improve relationships with neighbours;
- identify sources of noise and prevent future problems.

Prompt action in response to complaints, including a discussion with an explanation to the complainant, is very important and may stop issues escalating and further complaints being made. It should be remembered that when people are woken at night, for example, by something that they believe to be avoidable (whether it is or not) they might be short-tempered. A quick and sympathetic response to complaints can often defuse a situation to the benefit of the complainant and the operator.

A suggested form for recording complaint details is given below.

The complaints record form should be tailored to the specific installation, location and neighbours, but most will have the following elements:

- 1) The form should be completed, signed and dated by a ‘responsible person’.
- 2) The name, address and telephone number should be given by the caller.
- 3) Each complaint should be given a reference number.
- 4) The caller should be asked to give details of:
 - the time the noise was heard;
 - how long it lasted;
 - how often it occurs;
 - the nature of the noise – what sort of noise was it? What did it sound like?
- 5) The ‘responsible person’ should then, if possible, make a note of:
 - the weather conditions at the time the noise was detected – usually wind direction and a note of the conditions (light wind, no wind, strong breeze, or use the Beaufort scale in Table 2.1, clear, full cloud cover etc); and

- the activity on the installation at the time the noise was detected, particularly anything unusual.

Table 2.1 Beaufort scale

Force	Description	Observation	km/hr
0	Calm	Smoke rises vertically	0
1	Light air	Direction of wind shown by smoke drift, but not wind vane	1-5
2	Light breeze	Wind felt on face; leaves rustle, ordinary vane moved by wind	6-11
3	Gentle breeze	Leaves and small twigs in constant motion	12-19
4	Moderate breeze	Raises dust and loose paper; small branches are moved	20-29
5	Fresh breeze	Small trees in leaf begin to sway, small branches are moved	30-39
6	Strong breeze	Large branches in motion; umbrellas used with difficulty	40-50
7	Near gale	Whole trees in motion; pressure felt when walking against wind	51-61

- 6) The reason for the complaint should be investigated and a note of the findings added to the log – this need not be complicated but should be sufficient to identify any activity that may have led to the complaint.
- 7) The caller should then be contacted with an explanation. It often helps if you can show that you have taken some kind of action to minimise the noise in future.

Following complaints it may be appropriate to review the Noise Management Plan, if one exists.

The complaints record relating to activities covered by the permit, should be made available to the Agency on request.

Typical form for the recording of a noise complaint

Noise Complaint Report Form			
Installation to which complaint relates:		Date recorded:	Reference number:
Name and address of caller:			
Tel no. of caller:			
Location of caller in relation to installation:			
Time and date of complaint:			
Date, time and duration of offending noise:			
Caller's description of noise (e.g., hiss, hum, rumble, continuous, intermittent, vehicle noise, machinery):			
Has the caller any other comments about the offending noise?			
Weather conditions (e.g. dry, rain, fog, snow):			
Wind strength and direction (e.g. light, steady, strong, gusting) or use Beaufort scale (see Table 2.1):			
Any other previous complaints relating to this noise?			
Any other relevant information:			
Potential noise sources that could give rise to the complaint:			
Operating conditions at the time Offending noise occurred – e.g. deliveries, feeding, use of machinery etc:			
Follow-up Date and time caller contacted:			
Action taken:			
Amendment requirement to noise management plan:			
Form completed by:		Signed:	

2.2 Noise management in intensive livestock installations

This section identifies the more common noise problems arising on installations that have the potential to affect people nearby, and offers suggestions for preventing or reducing noise in each case. Not all of the sub-sections will apply to all installations and some will have noise sources not discussed below. These aspects will be determined on a site-specific basis.

In many cases restricting noisy operations to reasonable times may be sufficient to overcome environmental noise problems. Reasonable times are generally considered to be the normal working day (see section 1.6), but it is understood that certain activities may have to be undertaken outside the normal working day, in which case additional measures may be required in order to achieve a satisfactory noise climate. The noise emitted by activities such as feed milling can be reduced considerably by enclosure within insulated buildings. It should be remembered however that the effectiveness of any form of building or enclosure as a means of reducing noise can be severely compromised by leaving doors, windows or unguarded vents open.

2.2.1 Good operational practices to reduce noise

Problem	Actions to prevent or minimise noise
<p>Feed, fuel and other deliveries</p>	<ul style="list-style-type: none"> • Location Feed bins should be located so that, as far as possible, delivery movements and handling on site are reduced. Their location should not be in conflict with biosecurity arrangements. Delivery and collection points for feed, fuel, other materials, livestock, slurry and other waste should be sited, as far as is practicable, to benefit from the noise screening effects of local barriers, such as the lie of the land and buildings, to achieve optimum benefit. • Operation Staff, contractors and visitors should be instructed not to raise voices or play radios unnecessarily at night. Pagers or mobile phones may need to be considered for on site communications. Hard materials should be lowered on to hard surfaces rather than dropped. The drop height of any bulk material should be reduced as much as possible. • Timing of operations Delivery and collection of feed, fuel, other materials, livestock, slurry and other wastes should take place at reasonable times, i.e. during the normal working day, as far as is practicable. Drivers should comply with any speed limits on site and avoid taking empty vehicles over rough ground wherever possible.
<p>Ventilation fans</p>	<ul style="list-style-type: none"> • Design Efficient design of ventilation fans will minimise the number needed per building. The use of sheet metal or other similar materials of construction, which may vibrate, should be avoided, where practicable. Use fewer, larger fans operating at lower speeds or variable speed fans that may produce less noise than smaller high speed fans. N.B Although this is an effective means of noise control, variable speed fans are less effective at odour dispersion so a balance needs to be achieved. Minimising the resistance at the inflow and outflow to avoid placing unnecessary loading on each fan. Fan outlet cowls and stacks can provide noise reduction but, if too small, can increase the pressure drop by restricting airflow.

	<ul style="list-style-type: none"> • Location Orientate noisy equipment in one direction so that noise is directed away from noise-sensitive areas. Locate fans at low level, i.e. on sidewalls, rather than at rooftop level as any noise emitted will be more readily blocked by other buildings, local topography etc. N.B. Although this is an effective means of noise control, variable speed fans are much less effective at odour dispersion so a balance needs to be achieved. Use acoustic barriers to absorb the noise. • Operation The use of inlet silencers may be suitable for fan pressurised ventilation systems. Increase the absorption capacity of a building by increasing the presence of rough surfaces such as straw bales inside to absorb sound. • Timing of operations Poultry – a small number of fans operating continuously is preferable to a larger number, switching off and on, particularly at night. However, a number of fans running continuously may not give the correct minimum ventilation required by the operator. • Inspection and maintenance Fans should be maintained and inspected in accordance with the manufacturers or suppliers instructions. Out of balance or worn fans can produce high noise levels with annoying frequencies or tones. • ACNV (Automatically Controlled Natural Ventilation) ACNV is an alternative method of ventilation but its use may be restricted by welfare or production factors and may be less effective at odour dispersion, so a balance needs to be achieved. Its effectiveness can be affected by its location, in particular being sheltered by other buildings, hedges etc. such that it is not always a viable alternative to fan-assisted ventilation.
<p>Vehicles and machinery on site</p>	<p>You should ensure that you comply with Health and Safety requirements when considering how to reduce noise from vehicles and machinery.</p> <ul style="list-style-type: none"> • Design Reduce the need for scraping by minimising the area of yard contaminated when removing manure and litter from buildings. Pressure washers and compressors may need to be placed inside buildings, purpose built or proprietary acoustic enclosures during use. Always consult with the manufacturer or supplier before enclosing any plant since suitable ventilation may be required to prevent overheating. • Location Noisy machinery and operations should be sited as far as possible from noise sensitive areas. Loading/offloading points can be screened by the use of natural barriers (buildings, fences) or temporary screens such as straw bales. Generators should be placed within an acoustic enclosure or sited behind an acoustic barrier. Suitable insulation can be provided as part of a packaged generator set or by the use of an acoustically insulated building. Consideration should be given to the frequency of use, the level of risk

	<p>involved and the cost implication.</p> <ul style="list-style-type: none"> • Operation Care should be taken to prevent unnecessary movements of trailers and loaders. <p>Avoid idling of machines between work periods and revving of engines.</p> <p>Catching should be organised to minimise manoeuvring of forklift trucks etc. outside of buildings.</p> <p>Staff, contractors and visitors should be instructed not to raise voices or play radios unnecessarily at night. Pagers or mobile phones may need to be considered for on site communications.</p> • Timing of operations If powered equipment is used, cleaning out and removal of manure and litter should take place at reasonable times, where practicable. • Inspection and maintenance Site roads/tracks should be maintained in a state of good repair to reduce any noise from the passage of vehicles. <p>Ensure loaders and tractors etc. are well maintained especially exhaust systems and silencers.</p> <p>Reduce noise caused by vibrating machinery with rotating parts by proper servicing, balancing and regular maintenance. Lack of maintenance may lead to overheating, resulting in engine covers having to be left open.</p> <p>Reduce noise caused by friction in conveyor rollers, trolleys and other machines by proper lubrication and regular maintenance.</p> <p>Testing of emergency generators and alarms should be carried out during the daytime of the normal working week and preferably between 0900 and 1700. The noise level emitted by the alarms must not exceed that required to alert persons working within the site. However, to ensure the response given by call centres is 100%, alarms may also be tested at weekends. The disturbance caused by their testing can be minimised by testing at the same time and day of the week or month etc. If there are problems local residents should be consulted and timings of testing discussed with them. Testing should be in accordance with manufacturer or supplier instructions.</p>
<p>Feeding equipment</p>	<ul style="list-style-type: none"> • Design Auger systems are usually the quietest and most energy efficient method of transporting feed mechanically. • Operation Conveyors or augers should not normally be operated when they are empty. <p>Pipe and/or conveyor runs should be kept as short as possible.</p> <p>Pneumatic transfer systems can be a source of high frequency noise. It is often preferable to use a higher capacity system running at a lower speed than to use a low capacity system at high speed.</p> • Timing of operations Feed mills should be operated at reasonable times. Operate hammer mills and pneumatic conveyors when background noises are highest to minimise effect.

	<ul style="list-style-type: none"> • Inspection and maintenance Maintain equipment to ensure equipment is operating to optimum standards.
Manure and slurry handling	<ul style="list-style-type: none"> • Design External runs should be constructed so that they are protected from the weather and to prevent noise generation. Pneumatic conveyor systems should be designed to minimise the length of the run and number of bends. • Location Conveyors for manure should be contained within a suitably constructed enclosure appropriately designed to reduce noise emissions. • Timing of operations Operate equipment and vehicles at reasonable times, whenever possible. • Inspection and maintenance Maintain equipment to ensure equipment is operating to optimum standards.
Animal noise	<ul style="list-style-type: none"> • Feeding pigs Use passive feeding techniques where appropriate, to minimise squealing in anticipation of feeding. Reduce noise produced in response to a stimulus prior to feeding by direct delivery of feed. • Stocking and destocking between cycles The timing and methods used in stocking and destocking of animals should be carefully considered to minimise any noise produced.

3 Writing a noise management plan

You will need to produce a noise management plan if:

- You answered 'yes' to question B2.9 on the application form, i.e. sensitive receptors are located within 400m of the installation or the installation has a history of noise-related complaints; or
- You are making your application in Scotland.

3.1 How to write a noise management plan

To produce a noise management plan you should do the following:

1. Identify the sources of noise and/or complaint on your installation

Carry out a **subjective assessment 'walk around'** to identify where noises are coming from.

This type of assessment does not involve measuring or predicting noise levels - instead it relies upon a subjective assessment of whether the noise is audible or not, how loud it sounds and if it has any noticeable characteristics. However, operators should be aware of the limitations of a subjective methodology given the subjective nature of when noise becomes annoying.

This assessment can be carried out at specific points around the perimeter of the installation or close to the sensitive receptors, during a typical day, evening and night. There are two aspects of this assessment:

- 1) Assess individual noisy events when they take place, such as deliveries, feeding time or manure scraping; and
- 2) Longer continuous noises such as fans, generators etc. that run for prolonged periods. These long term noise sources should be assessed when they are likely to be more intrusive.

Unless the distances are more than a few hundred metres the influence of the weather on noise levels is quite limited, but the weather itself can affect the sound levels in an area, by blowing in trees and hedges, and this could result in a false impression of the impact being formed. Hence the assessment should be undertaken when:

- Any busy roads nearby are dry since wet roads are noisier than dry roads;
- It should not take place in bad weather conditions such as rain, fog, snow etc.;
- There should be no temperature inversions (i.e. still conditions, often with mist forming in layers);
- The wind speed and direction should be noted, and ideally the force should be less than Force 2 of the Beaufort Scale (see Table 2.1).

You should spend at least 3 to 5 minutes at the monitoring point(s) chosen and, if the noise is audible you should consider which of the following best describes the volume of the noise when localised or intermittent noise sources are quiet (e.g. no passing cars):

- Inaudible
- Barely audible
- Clearly audible
- Loud and intrusive

You should also consider whether it has any characteristics that may be annoying, such as whines, bangs or clatters, and animals squealing. Careful thought must be given to this aspect since the nature of the noise may be disturbing, even though the volume may be quite low.

A description of the noise should be recorded, together with its intensity and characteristics. The date and the precise monitoring location as well as the name of the person undertaking the assessment should be recorded.

2. Look at the noise sources and corrective actions discussed in Section 2

Note down those sources or activities which **do** cause a problem on your installation and the types of corrective actions that you will need to highlight in your noise management plan.

3. Transfer the relevant information into the Noise Management Plan template in Section 3.2

- Identify each noise problem/source in the 'Noise problem' column.
- Select the appropriate corrective action from Section 2 for each problem. Adapt it to your particular circumstances – what would you do on your installation to achieve the same outcome?
- Identify the corrective actions in the 'Actions' column.

Ideally, you should discuss your proposed plan with the Agency Officer before you send it in together with your Permit application. Where you already have a Permit and need a noise management plan to deal with specific problems, you should discuss it with the Agency Officer and then send a copy to the Agency.

You will be expected to follow the actions you have set out in the plan.

If there are complaints and you can show that you have complied with these actions then the Plan may need to be revised. You should start again at Point 1, above and discuss this with the Agency officer.

If you have not complied with the Plan and complaints are received, then you may be liable to enforcement action.

If you cannot control the noise by use of good practice then the Agency may require more stringent measures to be used. It is therefore in your interest to ensure that the Noise Management Plan is adhered to by all those employed at the installation as well as visitors, contractors etc.

3.2 Noise management plan example and template

This section contains a blank table (Noise Management Plan Template) on which to note down the installation-specific actions to be taken. The columns should be completed using the guidance given in Section 3.1. You should adjust this as necessary to make it relevant to the noise problems on your particular installation. Allocate number references to each problem and put these into the left-hand column.

Where specific actions are required, such as maintenance it should also be recorded in the noise management plan.

An example of the type of information used to complete the template is given in Table 3.1.

Table 3.1 Example Noise Mangement Plan Template

No ref	Noise problem	Actions you will take to prevent or minimise the noise	Completion date
1	Rattling and clanking from operation of conveyor	Regular maintenance and proper lubrication. Minimise empty conveyor running.	
2	Rearing of broiler chickens in ventilated houses	Fans maintained and inspected to manufacturers instructions. Inspect roof on House No.5 and fasten down metal sheeting. Review once completed.	
3	Early morning loading of pigs for transport	Load animals behind machinery store to act as a barrier between animals and New Village Cottages. Instruct contractors not to whistle and shout.	
4	Bird catching	All handlers trained to Assured Chicken Production standards to minimise bird stress and noise.	
5	Cleaning of animal housing	In reasonable time only. Notice of manure movements given to neighbours 1 week in advance. Litter is moved from housing direct to trailers in the doorways of the buildings and removed immediately from site, to minimise vehicle movements.	
6	Emergency generator	Test time Tuesday 11am. Timing agreed with neighbours. If emergency generation is required, Neighbours will be notified within x hours.	
7	Bird feeding	The existing conveyor system to be replaced by auger system by MM/YYYY.	
8	Delivery of feed	No deliveries outside 7pm. Feed company X has fitted silencers to all vehicles for transfer to feed bins.	
9	Delivery of fuel	No deliveries outside 6pm.	
10	Other (specify) Advice for staff, contractors and visitors	Advice notices in the site office covering the points above. Instruction not to shout unnecessarily. Instruction to turn off engines while not in use.	

Noise Management Plan Template

No ref	Noise problem	Actions you will take to prevent or minimise the noise	Completion date

4 Full noise impact assessment

4.1 Overview

This section describes the options for carrying out a full noise impact assessment. It also describes the information that should be contained in the impact assessment report. You may need to consult a noise expert in order to carry out a noise impact assessment.

You may need to carry out a full noise impact assessment if:

- you are applying for a Permit for an existing unit and have answered yes to any part of Question B2.9 of the PPC permit application form; and
- a subjective “walk round” assessment suggests that a noise problem exists or is likely to occur.

You will need to carry out a full noise impact assessment if:

- you are applying for a Permit for a new unit or you are applying for a variation of a Permit for an extension to an existing unit and there are sensitive receptors which may be affected; or
- you have failed to control noise sufficiently using housekeeping measures and consequently other steps are needed to reduce the noise emissions.

The closer the sensitive receptors the greater is the likelihood that a full noise impact assessment will be needed. Additionally, in the case of extensions to existing installations, the complaint case histories may influence the need for an impact assessment.

It should be noted that an impact assessment which has been carried out for planning purposes may not contain sufficient information for an IPPC application. You should check with the Agency Officer.

In all cases you will be expected to regularly (e.g. monthly, quarterly – depending on the risk of an off site impact) walk around the installation perimeter and at, or near, the sensitive receptors to listen if the noise from the installation can be heard. This is a ‘subjective assessment’ as described in Section 3.1. People who are generating the noise through their own operations often become tolerant to it so it is often helpful to get someone who does not spend all their time at the installation to do this.

There are two main methods in carrying out a noise impact assessment:

- measuring emissions;
- predicting emissions.

The method chosen depends on whether it is an existing installation, an extension to an existing installation or a proposal for a new installation.

A full assessment will almost certainly have to be carried out by a noise expert who is suitably qualified and/or experienced in undertaking and reporting environmental noise assessments.

In the case of an existing installation the noise levels would normally be measured at the most affected sensitive receptors and the measured levels compared to the background levels and recognised standards such as BS 4142:1997. However, in some cases the noise levels may be measured closer to the installation and then the levels at the affected receptors calculated.

In the case of a new installation, or an extension to an existing one then it is more likely that the levels will have to be predicted. The predictions can be based on the noise from the existing installation, manufacturers data or data from a similar installation or a combination of all, or any, of these.

4.1.1 Acoustic terms

dB (decibel)

A decibel is the unit of measurement of sound level. As sound can vary in intensity within the range of human hearing, a logarithmic loudness scale (similar to the Richter scale for earthquake magnitude) is used to keep sound intensity numbers at a manageable level.

Adding together two equal sound sources will increase sound intensity by approximately 3 dB. For example, two feed delivery lorries of a sound intensity level of 92 dB would increase the sound intensity to about 95 dB.

The threshold of hearing is 0dB and 140 dB is the threshold of pain. A change of 10 dB corresponds approximately to halving or doubling the loudness of sound.

dBA

Since the human ear is not equally sensitive to all sound frequencies, noise level measurements are adjusted and given an A-weighting, expressed as the unit dBA. This is used for evaluating continuous or average noise levels.

Typical Noise Levels for Common Sounds (Reference 7)

Noise Level dBA	Common Sounds
0 - 5	Faintest audible sound
18 - 25	TV and sound studio
20 - 30	Quiet library
40 - 45	Quiet office
55 - 60	Conversation
65 - 75	Loud radio
75 - 85	Busy street
90 - 100	Heavy lorry (7m away)
110 - 115	Punch presses
115 - 120	Riveting, boiler shop
140	Jet aircraft taking off 25 m away

Background Noise Level $L_{A90,T}$

Background noise consists of noises present in the environment such as in the table above. The measurement of the overall background noise level, adjusted with an A-weighting in decibels exceeded for 90 per cent of a given time, is expressed as the $L_{A90,T}$. In rural areas, daytime background levels may be between 38 - 42 dB but can fall to below 30 dB during the night.

Equivalent Continuous Noise Level $L_{Aeq,T}$

Some noises vary in their intensity and how long they last. The equivalent continuous noise level, measured in $L_{Aeq,T}$, is a measure of the average amount of noise measured within a specified time period. It can be measured directly with an integrating sound level meter over time ranges from one second to 24 hours.

4.2 Measuring emissions

Noise measurement and prediction is a complex matter and further guidance can be found in IPPC H3 (Reference 3) but invariably will have to be undertaken by a suitable qualified and experienced noise expert. All measurements and assessment should be carried out in accordance with BS 4142:1997 Method for rating industrial noise affecting mixed residential and industrial areas (Reference 4).

Section 10 of the standard details the information that shall be reported for a full assessment. This includes:

- the source(s) under investigation;
- subjective impressions;
- measurement locations;
- sound level measuring instruments used;
- field calibration details;
- weather conditions;
- date(s) and time(s);

- specific noise level(s);
- measurement time intervals;
- reference time intervals;
- rating level;
- background noise level;
- excess of rating level over background.

The standard requires that daytime assessments are based on the $L_{Aeq,T}$ from the noise source over a period of 1 hour, while at night-time an assessment period of 5 minutes is specified.

4.3 Predicting emissions

When it is not possible to measure emissions, perhaps because the impact assessment relates to a proposed installation, it is possible to predict emissions by using:

- measurements taken at a similar unit (similarity must be justified);
- manufacturer's data; or
- typical noise levels for example References 5 and 6 reproduced below:

Example Noise Levels on Pig Units (Reference 5)

Noise Source	Sound Pressure Level dBA	Equivalent Continuous Noise L_{eq} dBA
*Pig fattening house: <i>inside building</i>	93	87
*Sow accommodation: <i>hand feeding (inside building)</i>	99	91
*Normal pig building environment: <i>inside building</i>	67	
*Mill Mix Unit: <i>inside building</i>	90	85
<i>outside building</i>	63	
*Pig building ventilation fans <i>(outside building)</i>	43	
Feed delivery lorry (5 metres from side)	92	
Power washer (5 metres from side of pump)	88	
Propane gas delivery lorry (5 metres from side)	82	

* The time period used and the distance the source is measured from follow the requirements of BS 4142:1997.

Reference to 'Pig fattening house' is now more commonly known as 'Pig finishing accommodation'.

N.B. These data were collected in 1999 and may not be representative of current noise levels

Example Noise Levels on Poultry Units (Reference 6)

Noise Source	Sound Pressure Level dBA	Equivalent Continuous Noise L _{eq} dBA
*Catching and handling broilers		57-60
*Mill Mix Unit: <i>Inside building</i>	90	85
<i>Outside building</i>	63	
Stock Ventilation Fans	43	
Feed delivery lorry (5 metres from side)	92	
Power washer (5 metres from side of pump)	88	

* The time period used and the distance the source is measured from follow the requirements of BS 4142:1997.

N.B. These data were collected in 1999 and may not be representative of current noise levels

4.4 Interpretation of noise–level difference

The likelihood of complaints can be assessed by subtracting the measured background level from the noise source level to give a 'difference' rating. The greater the difference, the greater the likelihood of complaints:

- a difference of around + 10 dB or more indicates that complaints are likely;
- a difference of around + 5 dB is of marginal significance;
- a difference of below - 10 dB is a positive indication that complaints are unlikely.

4.5 Noise impact assessment reporting

A report, where required, should be completed once the full noise impact assessment has been completed.

4.5.1 Overview

The following is a summary of good practice in terms of reporting protocol and should allow confirmation that the scope and conduct of the work has been competently handled and reflects the variability in noise emissions.

4.5.2 What should a report cover?

Each assessment will be different and installation-specific but there are a number of common features, which should be covered in a well-planned and executed survey. Detailed information is available in IPPC H3 (Reference 3).

Unless the assessment is deliberately targeted at specific events only, it is usual to consider both 'normal' operation and also 'worst case'. When carrying out an assessment to predict the impact of a new installation or an extension to an existing one it is important to make sure that these particularly noisy operations are included.

The report may also make recommendations as to the possible measures that could be taken to achieve BAT, both in terms of housekeeping and other management practices, and options for noise reduction by the addition of end-of-line abatement equipment.

The aspects which should be addressed during the survey, and reflected in the final report, can be broadly categorised as:

- summary of findings;
- a description of the process, its throughput and location;
- a statement of the objectives of the survey;

- a description of the methodology used for sampling and analysis;
- a description of the installation-based work actually undertaken;
- monitoring results;
- interpretation of the results and conclusions drawn;
- recommendations and discussion.

For each aspect, the following would be expected:

i) Summary of findings

A summary of the report.

ii) Process description and 'scene-setting'

The following should be included, as appropriate:

- The location of the installation in relation to the nearest sensitive sites (usually dwellings).
- A diagram of the layout and/or map showing the relative positions of the animal housing and the nearest residential houses.
- A description of the process - including the number of animals, and the techniques used to minimise noise. A description of the nature of the buildings, the ventilation system or other operation such as milling should be given, if appropriate.
- A description of the nature of the noise problem and the typical rate of occurrence.
- Complaint history - numbers, quantity, duration, frequency, any pattern or trends.
- The location and nature of any other potential noise sources in the locality, which may affect measurements, such as a busy nearby road.
- A description of any work previously undertaken with respect to the noise issue - perhaps previous survey work or actions taken to mitigate noise and the success or failure of such measures.

iii) A statement of the objectives of the survey

iv) A description of the methodology used for sampling and analysis

A description of the main features of any standards or other methodologies used. Where sound level measurement is undertaken, the guidance given in the BS 4142:1997 (Reference 4), should be followed and all departures from the procedures described should be justified and recorded.

- a description of the equipment used for sampling and analysis;
- an estimate of error associated with both sampling and analysis.

v) A description of the activities going on when the samples were taken

It is usual to consider 'worst case' and normal operation when carrying out a noise impact assessment. This will entail taking samples at an appropriate time relative to the work being undertaken to account to any variation in emissions in order to avoid 'averaging' the peaks.

The report should detail:

- sampling locations;
- sampling times;
- an explanation of why the particular sampling points and sampling times were chosen;
- process activities whilst the work was being undertaken;
- weather conditions on the day of the survey and wind direction, and strength.

vi) Monitoring results

- raw data should be given - lack of raw data prevents checking or validation of the scope of the assumptions made;
- time elapsed between sampling and assessment;
- any deviations from standard analytical/assessment methods.

vii) Interpretation of the results and conclusions drawn

- A description of the data that was input into the model to account for topography and buildings, meteorology etc. State the origin of the meteorological data obtained and which area it relates to and why it is applicable to the particular assessment. (Wind directions given by met stations would generally relate to open land). Care is needed in applying the frequencies directly to mixed terrain, hills, valleys etc.
- Any features of the local topography which are likely to have an effect on the noise levels.
- A statement of any assumptions that have been made with respect to predictions used in place of sampling.
- Maps, figures and contour plots used to illustrate the extent of noise impact, including identification of specific sensitive receptors.

viii) Recommendations and discussion

This will obviously be strongly influenced by the nature and purpose of the survey and may cover:

- an estimate of the likely impact of current or predicted emissions on sensitive receptors;
- an estimate of the amount by which emissions will need to be reduced to avoid causing annoyance;
- suggested changes to activities or buildings;
- relevant control technology and costs if available;
- measures to be employed to monitor the effectiveness of any changes made.

The above is not exhaustive but should be provided as a minimum (where relevant to the purpose of the survey) by a competent expert or survey team.

The completed Noise Impact Assessment report should be submitted to the Environment Agency as part of the supporting documentation to the permit application.

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