Finisher Pig Buildings Design and Build – a blueprint for English farms

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Section 1
Setting the scene
Section 1: Setting the scene

Introduction

This document aims to outline the key issues surrounding the construction and management of a new pig finishing building as either a new enterprise or part of an existing one.

The British pig industry has to remain competitive in a global market providing high-quality meat produced in accordance with some of the highest animal welfare standards in an environmentally sustainable manner. High-quality modern buildings are required in order to achieve these objectives. Opportunities exist for those rearing their own pigs and those with third-party contract agreements to grow pigs in either fully slatted or straw-based systems.

For businesses considering investment in new housing, either as a part of a modernisation programme, or as a new enterprise, this document enables an assessment of the opportunities and issues involved with constructing and operating a pig finishing building. It reflects a proactive approach defining best practice and provides an exciting road ahead to those who wish to remain or become key players in the British pig industry.

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Section 1: Setting the scene

1.1 Background to the British pig industry

The British pig industry has undergone significant consolidation and become a highly efficient supply chain. Commercial opportunities are readily available to those willing to invest in pig finishing buildings.

Structure of the Industry

This project focuses primarily on providing accommodation for growing and finishing pigs from 35kg through to 105kg slaughter weight. With productivity of the sow herd improving, there is increasing pressure on existing growing and finishing accommodation leading to a demand for more pig places either with the producer or on a contract basis. Contract opportunities arise in conjunction with businesses that are breeding pigs in both indoor and outdoor systems and need capacity to finish them off-site. They will already operate successfully in well-established supply chains with regular processor customers and strong links with specific outlets and retailers.

In some instances, integrated businesses operate across all the sections highlighted above. Variations also include:
- Solid floor, straw bedded, or slatted floor, slurry system
- Continuous throughput, or ‘all in, all out’ batch production
- Separate specialised buildings for rearers and finishers, or wean to finish from 7–105kg in the same general purpose building.
In the past, new accommodation for pigs would be tailor made to the farm. Bespoke projects are much more costly than standard blueprints that could be applied universally to different farms. Standardisation allows building companies to save cost by repeating the same building ‘off the shelf’ using the same materials to the same design and specification.

Supply chain logistics are also more efficient if deliveries to sites can be optimised or, at the end point, processors know they are getting full loads of pigs from each location rather than odd numbers here and there.

1.2 Commercial Opportunities

Contract finishing agreements are available where:

1. A farmer provides the buildings, labour, straw (if required) and utilities (water and power) to finish the pigs
2. The contracting company provides the pigs, feed and other variable inputs.

In some situations, this is called a ‘bed and breakfast’ arrangement. The farmer is simply paid a fee per pig or place and never actually owns the pigs that are supplied and sold by the contracting company. The contractor does not have to finance the cost of pigs, feed and other variable costs but, normally, will receive manures and slurries for us in their own business providing a considerable offset to purchased fertilisers.

The company could range from an individual breeder of pigs to a fully integrated pig/processing business. These often advertise for new contract growers in national and local press. BPEX regional Knowledge Transfer Managers (http://www.bpex.org.uk/2ts/contact.aspx) also can help facilitate introductions between parties seeking to establish new partnerships.

Professional advice should be sought before entering into any contract. Expensive details are often overlooked, such as who provides the straw and at what cost (if applicable). Ideally the term of the contract should be long enough to write off the investment by the farmer so the wording of notice periods and break/termination clauses are critical.

A building specially designed for pig production maximises efficiency, but the risk of being left empty can be spread by the farmer investing in a building that could readily be converted to alternative use.
Section 1: Setting the scene

1.3 Building Types

This project concentrates on the construction of new buildings that can either be integrated into an existing operation or be suitable for contract growing arrangements. Two main types are suggested:

- 1,035 place solid floor, straw bedded buildings
  These types of buildings would typically be used in a supply chain commanding a premium product, often linked to outdoor sows and specific production/genetic constraints, and often on a 7–100kg wean to finish system.

- 1,000 place fully slatted finishing buildings with below floor slurry holding tanks.
  These types of buildings would typically be used in a supply chain where efficiency of production would be the major driver or in areas without affordable and accessible straw supplies. The efficiency of this building is designed to allow the British farmer to compete with European producers.

In some situations, farmers have existing buildings that may be capable of adaptation for pig finishing. An approach to a contracting company would result in an assessment of their suitability being undertaken and the prospect of introducing another profit centre for the farm business.

Easy-to-clean, hygienic plastic pen divisions, solid concrete floor with ‘step down’ dunging area and insulated roof (under construction).
Section 2
Building design

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Section 2: Building designs

Introduction
This project aims to promote standard design blueprints for pig finishing buildings. This should lead to greater efficiency not only in terms of improved pig performance on existing units replacing tired or unsuitable buildings, as a new enterprise but also cost efficiency in terms of construction if engineers are replicating similar designs using similar materials. These standard designs:

- Conform to current planning and environmental legislation and production and welfare codes
- Can be operated to a standard production plan as part of existing farms or as new contract production facilities
- Can operate as ‘all in, all out’ facilities which match large-scale sow systems or units where batch production is practised
- Offer flexibility in terms of construction options to suit different farming enterprises
- Provide scope for personal preferences in terms of feeding system, feed hoppers, drinkers and penning, although potential users should be aware that variation costs money.

2.0 Blueprint package
This package considers systems for pigs provided with straw bedding producing farmyard manure (FYM), and for pigs kept on slatted floors which produce slurry. Both are for approximately 1,000 places to finish (slaughter weight) pigs from 35–105kg. In total there are four options described, using different types of construction in common use. The capacity is a nominal 1000 places based around legal requirements, industry standard practice and standard unit size for building frames and materials.

Solid floor, straw bedded options:
2.1 Standard solid floor straw bedded finisher building
2.2 ‘Polytunnel’ solid floor straw bedded finisher building

Slatted floor options:
2.3 Traditional UK finisher building with slatted floor (supported roof truss construction)
2.4 Portal frame finisher building with slatted floor (clear span construction)

This section will also consider:
2.5 Slurry pit construction
2.6 Feeding system options
2.7 Ventilation systems
2.8 Renewable energy
Section 2: Building designs

2.1 Standard solid floor straw bedded finisher building

Key features:
- Stand-alone building with 1,035 pig places
- 40-45 pigs per pen throughout
- Designed primarily for pigs from 35–105 kg, but can be adapted for 7–105 kg production
- Fully straw bedded lying and dunging areas
- Minimum of 0.545 m² of uninterrupted lying area per pig, plus additional dunging area
- Automatic ventilation
- Water provision to meet UK Farm Assurance standards
- Water medication facility
- Ad-lib dry feeding system
- 30 tonne feed bin and auger system
- Lighting system to meet legislative requirements
- Dirty water collection system
- Assumes hospital pens are provided outside the building so, therefore, not included.

2.1.1 General description

This straw bedded finishing building has been designed to meet the requirements of a particular sector of UK pig production seeking to finish pigs on a simple, flexible and cost-effective straw bedded system; often for outdoor reared pigs.

With an eaves height of at least 3.750 m and removable plastic panel pen divisions, this multipurpose portal frame building gives the producer a flexible design which is readily adaptable for other agricultural or light industrial uses, if required.

Pre-stressed concrete panels may be used to hasten construction of the side and end walls but concrete blocks offer a suitable alternative, particularly if semi-skilled farm labour can be used to reduce costs. A cost comparison should be made. Gable end walls are clad with fibre cement sheeting above the concrete panels or blockwork.

Ventilation is provided by 1.750 m deep plastic sidewall curtains with a 1.500 m drop which are fitted above the concrete panel or block built sidewalls. These are now usually automatically controlled with electronic sensors and motor operated winches in conjunction with automatic open/closing ridges.

Each building consists of 23 pens including two 2.525 m x 2.675 m push-through dunging areas situated on either side of a raised central 2.600 m x 9.700 m uninsulated concrete lying area. The two dunging areas are accessible to all the pigs in each pen during the finishing stage. The nominal dimensions of the outside of the building are 61.100 m x 15.250 m.
The plastic panel pens are bolted to metal posts set into the concrete floor of the lying area. The gates may be made of a similar material or metal vertical tubing if preferred; 2.6m is the most popular width. The plastic panels are very durable.

Alternatively, pen divisions may be constructed by semi-skilled farm labour using concrete blocks. This should reduce construction costs but is less readily adaptable.

A central, raised walkway runs along the length of the building on top of the pen walls. This creates a kennel for the pigs to lie in comfort and encourages desired lying and dunging behaviour, especially in cold weather. Straw is used to bed the pigs on the concrete lying areas, and manure is removed mechanically every day from the push through dung passages. Usually, the concrete under the lying area is uninsulated but high prices and poor availability of straw mean insulated lying areas are becoming economic.

There is a 250m² concrete manure pad outside one end of the building for short-term manure storage, and a 200m² tractor turning pad at the other end. Every week manure should be removed from these pads onto field heaps or a larger manure store. In some situations it may be advantageous to install a larger pad or combine with one from another building(s).

Although diluted runoff from a muck pad is not considered dirty water, a storage tank of at least 55,000L capacity should be installed in order to be sure of meeting the SSAFO regulations. See Section 5.4 for more details.

A centreless auger delivers feed to ad-lib feed hoppers situated in each pen, and water is supplied via two bowl drinkers per pen, or adjustable height nipple drinkers if the building is used for 7–100kg pigs. The plumbing system also includes provision for medication.

Additional plumbing provides a high-pressure power washing line supplying at least four washer connections and a pre-soak sprinkler facility.

A detailed specification is provided in Appendix 1.
Plan view of 1,000-place solid floor straw-bedded finisher building

N.B. This is a reduced-size drawing for illustration purposes only and is not to scale.
2.1.2 Description of adaption for 7–100kg

Some systems fill a building of this type with 7kg piglets that stay in the same building until slaughter weight. This requires the piglets to be enclosed in one half of each pen for warmth until 35kg, after which they are let out to the full pen area.

Removable plastic panel walls are therefore used to convert the 23 full width pens into half size, back-to-back pens suitable for the newly weaned pigs, as described below:

- 23 half-size pens down one side of the building are used initially to accommodate up to 45 x 7kg newly weaned pigs, each with one individual dunging area for the pen
- Lying area floors are covered with thick layers of straw to make a comfortable bedded lying area. More straw is then shaken out on top to increase weaned pig comfort during the housing period
- An insulated panel is laid across the pen divisions to form temporary kennels that create an optimum environment for the young pigs. This panel is attached to stainless steel support wires fixed to manual winches at one end of the building
- Step-up weaner sized hopper feeders are placed in each pen adjacent to the double single space finisher feeders to provide the additional feeding space for the 45 weaned pigs
- Double adjustable nipple drinkers are lowered to approx 20cm to provide the newly weaned pigs with drinking facilities at the correct height
- As the pigs grow, the plastic panel rear walls of the pens are removed to revert to full width pens.

2.1.3 Breakdown of building costs

The schedule below assumes a complete building package on a greenfield site:

<table>
<thead>
<tr>
<th>Item</th>
<th>Cost per pig place (£)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Baseworks</td>
<td>31</td>
</tr>
<tr>
<td>Concrete side panels</td>
<td>10</td>
</tr>
<tr>
<td>Building shell, electrics, ventilation, water</td>
<td>101</td>
</tr>
<tr>
<td>Feed system</td>
<td>15</td>
</tr>
<tr>
<td>Sundry</td>
<td>3</td>
</tr>
<tr>
<td>TOTAL</td>
<td><strong>£160 per pig place</strong></td>
</tr>
</tbody>
</table>

All prices as at 2013 and may subsequently go up or down

For this relatively simple type of construction, costs may be reduced by in-house supervision of a local portal frame manufacturer and subcontractors, and the independent purchase of concrete panels, penning, gates and curtain ventilation system. Further savings are possible if semi-skilled farm labour is used for some elements of the building, but care must be taken with the health and safety of staff and the operation will be subject to the Construction (Design and Management) Regulations.
2.2 ‘Polytunnel’ solid floor straw-bedded finisher building

The key requirements and internal description are similar to the standard solid floor straw bedded building.

Instead of a clad steel portal frame, a bow shape tubular frame is used and covered with durable polyethylene sheet. Usually this is erected over concrete panel walls, and the same pen sections and internal fittings can be used as with the standard building.

The gable ends are closed off and adjustable side curtains are used as in Section 2.1.1. It is essential that automatic ridge sections are used to ensure a healthy internal environment and avoid condensation occurring on the roof sheet.

The main advantages of the polytunnel over the standard solid floor building are:

- The initial capital cost can be up to 30% less, although the longer-term maintenance costs are higher. The polytunnel cover typically needs replacing after 10 years whereas a standard concrete building may last up to 30 years.
- The frame and polyethylene may qualify as plant and machinery for capital allowances, whereas a steel portal frame and cladding will not.
Section 2: Building designs

2.3 Traditional UK finisher building with slatted floor (supported roof truss construction)

Key requirements:
• Stand-alone building with 1,040 pig places
• 20-30 finished pigs per pen
• Designed for pigs from 35-105kg
• Fully slatted pen area conforming to EC Directive 2008/120:
  – Slot up to 18mm wide
  – Slat more than 80mm wide
  – Minimum of 0.65 m² of uninterrupted lying area
• Option of either fully automated fan powered ventilation or Automatically Controlled Natural Ventilation (ACNV)
• Water provision to meet UK Farm Assurance standards
• Water medication facility
• Ad-lib dry feeding system
• Two 18 tonne feed bins and auger system
• Lighting system to meet legislative requirements
• Hospital pens not included – these must be provided outside the building.

2.3.1 General description

The typical UK fully slatted finisher building has been designed as a specialist facility to house 1,040 pigs from 35-105 kg on an ‘all in, all out’ system.

This design model has a fairly narrow span and low pitched roofline which means that the building can be erected safely without the need for a crane. Side and gable end walls are built using factory produced laminated insulation panels with a choice of durable and easy clean internal and external surfaces.

The building is erected onto a poured concrete slurry pit as described in Section 2.5.

Laminated roof insulation panels are fixed and sealed between timber purlins attached to the supported roof trusses. A separate fibre cement roof is then fixed to the upper side of the purlins to give long-term durability of the roof structure.

The ventilation and internal monitoring system is described in Section 2.7.

A typical design has 40 pens: 20 pens per side at 3.000m x 5.700m designed to hold 26 pigs each up to slaughter weight at 105kg. This building will nominally be 61.265m x 12.458m but will vary according to individual manufacturer’s specifications.
Section 2: Building designs

The building must allow at least 0.65m² per finished pig place. Some building suppliers may assume that pigs are drawn from each pen for slaughter over a three-week period and therefore base pen floor area on 0.55m² per pig (55-85kg at full capacity) as opposed to 0.65m² per pig, as required for all pigs growing consistently up to the end of the cycle (85-110 kg liveweight).

The 50mm plastic panel pens and gates have stainless steel fixings and are therefore highly durable and easy to clean.

In dry feeding systems, a centreless auger delivers feed to ad-lib feeders situated in each pen and water is provided via two bowl drinkers per pen.

Liquid feeding systems; feed is delivered in a pipeline with a valve for each trough usually controlled from a central computer. Either long or short troughs may be used depending upon preference. Bite drinkers are usually used with long troughs, bowl type with short troughs. For further information see Section 2.6.

The plumbing system also includes provision for medication. Additional plumbing provides a high-pressure power washing line supplying four washer connections and a pre-soak sprinkler facility.

A detailed specification is in Appendix 2.
Plan view of 1,040-place traditional UK finisher building with slatted floor (supported roof truss construction)

N.B. This is a reduced-size drawing for illustration purposes only and is not to scale.
Section 2: Building designs

2.3.2 Description of use
Unlike the straw bedded model, this type of design limits the pig’s ability to choose its living conditions, so increases the emphasis on the stockperson using the building’s controls to provide an optimum environment. It is, therefore, important to emphasise the following points relating to environmental control:

- Service the control system regularly and ensure it is maintained in accordance with the manufacturer’s specifications
- Make sure that outside air is being pulled efficiently into the building, ie clean the inlets, fans and outlet trunks regularly and particularly at post batch cleaning
- Service the inlets to make sure they are opening and closing properly with correct cable tensions and minimum opening settings
- Monitor environmental conditions and compare them with system set points
- Train all staff to understand and operate the environment control system using clearly defined protocols.

2.3.3 Breakdown of building costs
These costings assume a complete building package. Building companies will be prepared to use a variety of cladding and insulation materials which will reduce the overall cost slightly but in general they prefer to maintain the integrity of the overall building package.

<table>
<thead>
<tr>
<th>Item</th>
<th>Cost per pig place (£)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Base works</td>
<td>40</td>
</tr>
<tr>
<td>Slats</td>
<td>25</td>
</tr>
<tr>
<td>Building shell incl ventilation</td>
<td>105</td>
</tr>
<tr>
<td>Feeding system</td>
<td>15</td>
</tr>
<tr>
<td>Sundry</td>
<td>5</td>
</tr>
<tr>
<td>TOTAL</td>
<td>£190 per pig place</td>
</tr>
</tbody>
</table>

2.4 Portal frame finisher building with slatted floor (clear span construction)
Key requirements:
As for the Traditional UK slatted finisher building in Section 2.3, holds 990 pigs to slaughter weight.

2.4.1 General description
A clear span portal frame construction allows a farmer greater flexibility over the use of the building which can be readily converted for other agricultural or light industrial purposes in the future, should circumstances change.

The clear span structure features some elements of traditional UK slatted design but, in this case, a crane is required to erect the portal frame. The side and gable end walls are constructed from factory produced laminated insulation panels with a choice of durable and easy clean internal and external surfaces.
Section 2: Building designs

The building is constructed over a poured (cast in situ) concrete slurry pit – see Section 2.5 for details and specification.

Coated metal sheeting is fixed to the timber purlins to form the outer roof cladding and 80mm or thicker, white aluminium laminate insulation panels are slotted into H section fixing profiles to the underside of the purlins to form a smooth internal pitched ceiling.

The ventilation and internal monitoring system is described in Section 2.7 below.

A typical design is at least 3.750m to the eaves and contains 21 pens of 3.292m x 5.960m capable of holding 30 pigs and 15 pens of 3.292m x 4.720m capable of holding 24 pigs to 105kg. The nominal overall building dimensions of the example used here are 36.000m x 20.117m.

The building must allow at least 0.65m² per finished pig place (85-110kg liveweight). The 40mm plastic panel pens and gates are used with stainless steel fixings for durability and easy of cleaning.

A centreless auger delivers feed to ad-lib feeders situated in each pen and water is provided via two bowl drinkers per pen. The plumbing system also includes provision for medication. Alternatively, a liquid feeding system may be employed as described in Section 2.6. Additional plumbing provides a high-pressure power washing line supplying four washer connections and a pre-soak sprinkler facility.

A detailed specification is included at Appendix 3.
Plan view of 990-place portal frame finisher building with slatted floor
(clear span construction)

N.B. This is a reduced-size drawing for illustration purposes only and is not to scale.
Section 2: Building designs

2.4.2 Breakdown of building costs

Assuming a complete package:

<table>
<thead>
<tr>
<th>Item</th>
<th>Cost per pig place (£)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Baseworks</td>
<td>40</td>
</tr>
<tr>
<td>Slats</td>
<td>30</td>
</tr>
<tr>
<td>Building including plumbing and electrics</td>
<td>105</td>
</tr>
<tr>
<td>Feeding system</td>
<td>15</td>
</tr>
<tr>
<td>Sundry</td>
<td>5</td>
</tr>
<tr>
<td><strong>TOTAL</strong></td>
<td><strong>£195 per pig place</strong></td>
</tr>
</tbody>
</table>

2.5 Slurry storage and base work construction

The storage of slurry is dictated by the Silage, Slurry and Agricultural Fuel Oil (SSAFO) regulations which have covered the whole of the UK since 1991, and most recently updated in 2010. SSAFO normally requires a minimum four months’ storage capacity of slurry plus rainwater. See Section 5.4 for further details.

However, the Nitrate Vulnerable Zone (NVZ) areas cover a large area of England and it is, therefore, prudent to plan any new slurry storage to accommodate six months’ production in order to observe the closed spreading periods over autumn and winter.

A site with less than 2,000 finishing places over 30kg currently falls below the threshold for the Environmental Permitting Regulations (EPR), previously known as ‘IPPC’. In this instance, slurry storage can be under the slats within the building. However, sites with more than 2,000 finishing places will be subject to EPR and, therefore, Best Available Techniques (BAT) apply which require the ‘regular’ removal of slurry from under the slats to an external covered store. Any likely expansion should consider these requirements.

Slurry storage facilities, or channels for temporary holding capacity prior to storage, should be ‘impermeable, protected against corrosion and capable of withstanding wall loadings as specified in BS5502 Part 50’ to be compliant with the SSAFO regulations. This means that concrete blockwork surfaces in contact with slurry should be rendered and painted with a suitable acid-resistant coating. Precast or poured in-situ concrete is preferable to concrete blocks in terms of durability and may be of lower cost to install. Concrete should be of the correct mix specification with at least the minimum specified cover to steel reinforcing to comply with the standards.

It should also be noted that, currently, Building Regulations in England do not apply to agricultural buildings and, therefore, the associated British Standards relevant to such structures are only guidelines and not law.

The designs proposed in this document are extensible in terms of compliance with SSAFO, NVZ and EPR regulations and more detailed storage requirements are considered in the following sections.
2.5.1 Slurry output and storage requirements – pit depth considerations

Assuming an average daily output of 4.50 litres of slurry per pig and, with an allowance for washing out, the total annual output of slurry from a 1,000 place finishing building will be approximately 1,650m³ – see Table 2.1.

In order to comply with SSAFO Regulations for a structure classified as a slurry store, a freeboard allowance of 300mm is assumed in the following calculations (ie slurry depth = pit depth – 300mm). A holding channel, where slurry is only held for a short period, also requires 300mm freeboard.

Note, there is scientific evidence showing that diffusion of ammonia into the house and consequential air quality for the pigs is better if the level of slurry is not allowed to get within 300mm of the bottom of the floor slats.

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### Table 2.1 Calculation of slurry storage requirements per 1,000 places

<table>
<thead>
<tr>
<th>Storage period</th>
<th>Pit depth (m)</th>
<th>Freeboard (m)</th>
<th>Slurry depth (m)</th>
<th>Capacity (m³)</th>
<th>Extra storage (m³)</th>
<th>Extra cost per pig place (£)</th>
</tr>
</thead>
<tbody>
<tr>
<td>4 months</td>
<td>1.000</td>
<td>0.300</td>
<td>0.700</td>
<td>534</td>
<td></td>
<td></td>
</tr>
<tr>
<td>6 months</td>
<td>1.000</td>
<td>0.300</td>
<td>0.700</td>
<td>534</td>
<td>291**</td>
<td>13.10*</td>
</tr>
<tr>
<td>6 months</td>
<td>1.380</td>
<td>0.300</td>
<td>1.080</td>
<td>825</td>
<td></td>
<td></td>
</tr>
<tr>
<td>4 months</td>
<td>0.450</td>
<td>0.300</td>
<td>0.150</td>
<td>114</td>
<td>420</td>
<td>18.90*</td>
</tr>
<tr>
<td>6 months</td>
<td>0.450</td>
<td>0.300</td>
<td>0.150</td>
<td>114</td>
<td>711</td>
<td>32.00*</td>
</tr>
</tbody>
</table>

* The additional cost for slurry storage assumes an average cost of £45/m³ (see Section 2.5.3)
**Four months’ storage meets the minimum period as required by SSAFO but, in order to meet an extended period of six months, additional storage of 291m³ would be required.

Should it be required to provide a minimum of six months’ storage within the building, the pit depth would need to increase to 1.38m. However, internal storage would not qualify as BAT on a site requiring an EPR permit, so any likely expansion plans should be fully considered. In terms of obtaining planning permission, compliance with the principles of BAT could be a benefit when addressing matters such as odour and ammonia impacts locally.

If the building were on a site requiring an EPR permit, it would, therefore, be necessary to restrict the pit depth to suit ‘frequent removal’.

This would have the benefit that all slurry stored beneath the building would only be from each batch, with the likely consequence of improved health control.
Any additional storage outside the building will have cost implications including pipework and possibly a reception pit and pump, depending on site topography. It is possible that in some circumstances there might be some existing storage on the site.

The pull plug system required in shallow pits will also have cost implications compared to a deep pit that could be emptied by vacuum tanker from a small sump(s).

2.5.2 Pit construction methods

Traditionally, in the UK pig sector, pits under buildings have been constructed with concrete blocks, and most building suppliers place the building structure on an additional course of blocks above the pit level. Depending on the depth required, and site conditions, these may vary from simple 150mm solid blocks to 150 or 225 hollow blocks with reinforcing rods and a concrete filling.

Reinforced concrete poured in situ using specialist formwork, often used on UK cattle farms, has become the preferred method in other countries, and can offer cost savings where specialist base work teams are available.

However, as mentioned previously, to comply fully with SSAFO and other regulations, blockwork structures will almost certainly need to be rendered on both sides and treated with a bitumen type product internally. Poured concrete may therefore offer a cost effective alternative. There are a number of specialist hire companies offering formwork which could be considered for use by farm labour.

2.5.3 Additional storage options

All new slurry storage structures, associated reception tanks and pipework must have a design life of more than 20 years in accordance with the SSAFO regulations.

For a site requiring an EPR permit, any new slurry storage structure must be covered to reduce emissions and this increases cost. In many areas, apart from those with very low rainfall, covering of facilities to prevent access by rainwater can be cost-effective over the expected lifespan. Upfront capital cost is a barrier, but this has to be balanced against 20 years of transport and spreading. BPEX has compiled a guide to the different covering options.

Below-ground tanks can be constructed in conventional reinforced blockwork, but are more likely to be compliant if constructed from concrete poured in-situ, or purpose-made precast panels. The cost of such structures is likely to be in the order of £40-50 per m³ depending on site conditions and the need for a pump, etc.

Above-ground tanks can be constructed from steel or precast concrete panels and are likely to cost around £45-60 per m³.

Slurry bags constructed from polyester fabric covered with high grade plastic can be either permanent, in which case they are installed partly below ground, or portable/semi-permanent and sited on level ground.

These are available in a range of sizes, and costs vary from £30-40 per m³ so can provide a cost-effective alternative to more conventional structures.

Earth bank lagoons are still an option in some soil types but, increasingly, the requirement for a butyl liner to ensure impermeability makes this option less cost-effective.
2.6 Feeding system options

The building options described in this manual could incorporate dry or wet feeding systems. The choices of either will depend upon personal preference and local circumstances, particularly the availability of co-products suitable for wet feeding equipment.

Dry feeding systems typically incorporate a delivery system (centreless auger or flight and chain conveyor) conveying feed from a store to ad-lib hoppers from which pigs eat at will. A sensor in one or more of the feeders will normally trigger the delivery system to add more feed.

Liquid feeding systems are of two main types. Both are supplied from mixing tanks where the preset quantities of materials used are measured via a programmable control computer.

Pigs are fed using a short trough where the quantity of feed in the trough is measured by sensor. As pigs consume feed, and levels in the trough fall below the sensor, the system calls for more feed to be added. Such systems may be set to check feed levels at varying intervals throughout the day.

The alternative is to feed pigs on a number of occasions throughout a 24-hour period using a long trough which allows all pigs to feed simultaneously. A feed curve is set for each pen of pigs and the computer controlled equipment delivers quantities which increase incrementally as pigs grow.

2.6.1 Wet Feeding advantages

- Feed intakes and daily liveweight gain may be higher, and feed conversion ratios better than when dry feeding is employed using equivalent dietary inputs. This helps to offset higher capital and maintenance costs
- Provides an opportunity to utilise co-products which may contribute to lower unit costs for nutrients
- Less irritation from dust in the atmosphere and, therefore, reduced respiratory problems
- Improves gut health which leads to a reduction in evidence of salmonella infection.
2.6.2 Wet Feeding additional capital costs

A liquid feeding system is a viable alternative to dry feeding where a new 1,000 place finishing building represents expansion to an existing finishing site that is already using liquid feeding.

The approximate cost of a sensor liquid feeding system for a stand-alone 1,000 place finishing site would be as follows:

<table>
<thead>
<tr>
<th>Item</th>
<th>Cost per pig place (£)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total materials cost</td>
<td>19</td>
</tr>
<tr>
<td>Installation costs</td>
<td>9</td>
</tr>
<tr>
<td>Liquid feed troughs – additional cost</td>
<td>3</td>
</tr>
<tr>
<td>Feed auger – cost reduction</td>
<td>(6)</td>
</tr>
<tr>
<td><strong>TOTAL</strong></td>
<td><strong>£25 per pig place</strong></td>
</tr>
<tr>
<td>Supplementary storage for co-products</td>
<td>£6 per pig place per product</td>
</tr>
<tr>
<td>Covered feed kitchen area</td>
<td>£3 per pig place</td>
</tr>
</tbody>
</table>

To help make the best decision, users of this publication are advised to take note of the BPEX-funded work described in reports published from the *Finishing Pigs: Systems Research Trials 1, 2, 3 and 4* conducted at the MLC Pig Development Unit, Stotfold. [www.bpex.org.uk](http://www.bpex.org.uk), tel: 0247 647 8792.

2.6.3 Dry Feeding advantages:

- Lower equipment costs than wet feeding systems. Less storage containers are required, and the mixing and distribution equipment is relatively simple. Wet feeding systems may add an additional £25 per pig place over dry feeding systems depending on the exact design and storage equipment required
- Simpler and lower cost of maintenance
- Less compromise required on pen shape/layout; although there is a need to provide adequate feeding space, and the adjacency of feed and water are important to gain full performance from dry feeding
- Raw materials are more easily checked for nutritional quality than when co-products are used
- Pen cleanliness may be easier to maintain than with wet feeding
- Less effluent may be produced than with wet fed systems.
2.7 Ventilation systems in buildings

In slatted buildings, ventilation systems are regulated by a computer capable of co-ordinating the fan units (fully controlled ventilation only) or inlets to achieve a stable control of temperature. Temperature regulation should be accurate to within +/- 0.5°C and temperature differences within the building should not exceed 3°C from the outside temperature. To help control temperature during periods of very hot weather, a water misting system activated by the ventilation controller is required.

The computer will also include set temperature and minimum ventilation rate curves. In a fully controlled fan-ventilated building, ventilation rate is controlled by fan speed or interval timing, or a combination of both, together with interconnected controlled air inlets. With ACNV ventilation, typically only the air inlets are controlled, although sometimes the size of the exhaust opening can be controlled by flaps or slides. In addition, alarm systems with appropriate off site warning must be provided as a legal requirement. These will warn of mains failure and if internal temperatures get too high or too low.

The building can be supplied with a monitoring system capable of logging internal ambient temperatures as well as water, feed and energy use. This system will allow remote and automatic data recovery and analysis for end users.

Visual information provided by these monitoring and recording systems allows the manager to quickly observe that everything is operating as it should and, therefore, production is being optimised. It also provides quick alerts to when something is wrong. This could be a water leak or stoppage, or the building temperature being out of range, which will have negative impacts on pig feed intake and growth rates.

The costs of these systems can be quickly recouped in savings and better performance. This is recognised by some building suppliers who fit such systems as standard.

To order a copy of BPEX’s Pig Unit Ventilation DVD, email kt@bpex.ahdb.org.uk.
2.8 Renewable energy

Given the incentives paid for renewable energy generation, it makes sense to consider installing a system when erecting a new pig building.

Generally, pigs are trying to get rid of heat at the finishing stage, so the heat incentives are not relevant unless warmth is being recovered from the exhaust air, slurry areas or muck passages, and then used elsewhere on the farm.

Slatted buildings have a relatively high electricity demand, especially in the summer when ventilation fans are working hard. It therefore becomes viable to install a solar photovoltaic (PV) array on the south facing roofsapce or ground mounted close by. Currently, a 50kW installation is the optimum size in terms of return on investment. It should cost no more than £70,000 to install a PV system on a suitable roof, and should pay for itself within 12 years depending on subsequent tariff levels.

A 10-15kW wind turbine would produce a more even amount of electricity day and night, and all year round, for a slightly shorter payback period for the same capital investment. However, additional planning permission would be required which can be difficult to obtain.

More information is available at www.bpex.org.uk/environment-hub under Energy.
Section 3
Finance

www.bpexenv.org.uk
Section 3: Finance

Introduction
Any new business enterprise should return the amount of money invested well within the working life of the assets involved, even allowing for conservative worst case figures. In the case of a pig finishing project, these assets are the building and equipment. Such investment is paid off by income yielding from the enterprise by sales or fees, less the operating or running costs.

3.0 Income versus expenditure
A high-quality permanent pig finishing building could be expected to have a working life of at least 20 years. In British agriculture, a project is doing well if it has paid for itself within half its lifespan. Unfortunately, static output prices and rising costs mean a lot of investments are not into profit until the assets are nearing their end, so careful consideration of the financial risk is needed.

Running costs should include a finance charge to reflect the cost of borrowing even if the money required has been rolled over from a gain elsewhere in the business. This is necessary to gauge the opportunity cost of not employing the money in another investment.

Potentially, the greatest returns are gained by those buying their own pigs and feeding and medicating them at their own cost. However, such reward is not without significant risk because of the ever-fluctuating cost of feed, relative to pig prices. This can be mitigated by contract finishing where the supplier retains ownership of the pigs and supplies the feed so the farmer is not exposed to these predominant risks.

3.1 Model costings
The model costings included below assume contract finishing, and the farmer is just paid a management fee. The costings are only models designed to illustrate the expense categories involved and how the financial dynamics work. They use typical values indicated by recent history but are not projections that can be relied on for project budgeting. Specialist business advice should always be sought before undertaking a pig finishing project, not least because a bank will require such professional input.
## 3.1.1 1,000 finishers on straw

<table>
<thead>
<tr>
<th>Item</th>
<th>Year 1</th>
<th>Year 20</th>
</tr>
</thead>
<tbody>
<tr>
<td>Management fees</td>
<td>£25,000</td>
<td>£30,200</td>
</tr>
<tr>
<td>Bonuses</td>
<td>£7,000</td>
<td>£8,460</td>
</tr>
<tr>
<td>Fertiliser value of manure</td>
<td>£10,690</td>
<td>£12,910</td>
</tr>
<tr>
<td><strong>Total income</strong></td>
<td><strong>£42,690</strong></td>
<td><strong>£51,570</strong></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Item</th>
<th>Year 1</th>
<th>Year 20</th>
</tr>
</thead>
<tbody>
<tr>
<td>Labour/farmer’s time</td>
<td>£5,000</td>
<td>£8,770</td>
</tr>
<tr>
<td>Contract and hire</td>
<td>£400</td>
<td>£700</td>
</tr>
<tr>
<td>Equipment repairs</td>
<td>£800</td>
<td>£1,410</td>
</tr>
<tr>
<td>Straw</td>
<td>£5,100</td>
<td>£8,945</td>
</tr>
<tr>
<td>Manure spreading</td>
<td>£2,830</td>
<td>£4,955</td>
</tr>
<tr>
<td>Water</td>
<td>£1,200</td>
<td>£2,100</td>
</tr>
<tr>
<td>Power</td>
<td>£1,200</td>
<td>£2,110</td>
</tr>
<tr>
<td>Admin</td>
<td>£800</td>
<td>£1,400</td>
</tr>
<tr>
<td>Insurance</td>
<td>£500</td>
<td>£880</td>
</tr>
<tr>
<td>Sundry</td>
<td>£800</td>
<td>£1,400</td>
</tr>
<tr>
<td>Building repairs</td>
<td>£500</td>
<td>£880</td>
</tr>
<tr>
<td>Finance</td>
<td>£9,600</td>
<td>Paid off</td>
</tr>
<tr>
<td><strong>Total expenses</strong></td>
<td><strong>£28,730</strong></td>
<td><strong>£33,550</strong></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Item</th>
<th>Year 1</th>
<th>Year 20</th>
</tr>
</thead>
<tbody>
<tr>
<td>Net return (excl tax)</td>
<td><strong>£13,960</strong></td>
<td><strong>£18,020</strong></td>
</tr>
<tr>
<td>Capital cost</td>
<td>£160,000</td>
<td></td>
</tr>
<tr>
<td>Net return over capital cost</td>
<td>8.73%</td>
<td></td>
</tr>
<tr>
<td>Payback (incl inflation)</td>
<td></td>
<td>10 years</td>
</tr>
</tbody>
</table>

See Appendix 4 for a detailed cashflow and analysis of manurial values.

### Comments

A straw-bedded system is cheaper to build but is more labour intensive and requires the purchase of straw. However, straw-based systems are favoured by some processors because of welfare perceptions.

In addition to the net return, the farmer can ‘pocket’ the labour cost if he is doing the work himself, making a total return of potentially £18,960 in Year 1 before tax and loan repayments, if applicable.

For comparison, the actual return from letting residential property is circa 7% after all the landlord’s costs are properly considered.
### 3.1.2 1,000 finishers on slatted floors

<table>
<thead>
<tr>
<th></th>
<th>Year 1</th>
<th>Year 20</th>
</tr>
</thead>
<tbody>
<tr>
<td>Management fees</td>
<td>£24,000</td>
<td>£29,000</td>
</tr>
<tr>
<td>Bonuses</td>
<td>£7,000</td>
<td>£8,460</td>
</tr>
<tr>
<td>Value of slurry</td>
<td>£5,890</td>
<td>£7,115</td>
</tr>
<tr>
<td><strong>Total income</strong></td>
<td>£36,890</td>
<td>£44,575</td>
</tr>
<tr>
<td>Labour/farmer’s time</td>
<td>£3,000</td>
<td>£5,260</td>
</tr>
<tr>
<td>Contract and hire</td>
<td>£400</td>
<td>£700</td>
</tr>
<tr>
<td>Equipment repairs</td>
<td>£800</td>
<td>£1,410</td>
</tr>
<tr>
<td>Slurry spreading</td>
<td>£1,600</td>
<td>£2,800</td>
</tr>
<tr>
<td>Water</td>
<td>£1,200</td>
<td>£2,100</td>
</tr>
<tr>
<td>Power</td>
<td>£500</td>
<td>£880</td>
</tr>
<tr>
<td>Admin</td>
<td>£800</td>
<td>£1,400</td>
</tr>
<tr>
<td>Insurance</td>
<td>£500</td>
<td>£880</td>
</tr>
<tr>
<td>Sundry</td>
<td>£800</td>
<td>£1,400</td>
</tr>
<tr>
<td>Building repairs</td>
<td>£500</td>
<td>£880</td>
</tr>
<tr>
<td>Finance</td>
<td>£11,400</td>
<td>Paid off</td>
</tr>
<tr>
<td><strong>Total expenses</strong></td>
<td>£21,500</td>
<td>£17,710</td>
</tr>
<tr>
<td>Net return (excl tax)</td>
<td>£15,390</td>
<td>£26,865</td>
</tr>
<tr>
<td>Capital cost</td>
<td>£190,000</td>
<td></td>
</tr>
<tr>
<td>Net return over capital cost</td>
<td>8.1%</td>
<td></td>
</tr>
<tr>
<td>Payback (incl inflation)</td>
<td>10 years</td>
<td></td>
</tr>
</tbody>
</table>

See Appendix 5 for a detailed cashflow and analysis of manurial values.

**Comments**

A slatted system is more expensive to build but is more efficient to run both in terms of labour and energy input.

The payback and Year 1 return on investment figures are similar to a straw-bedded project, but the longer-term returns are greater. In Year 1, the combined labour and net return is £18,390 but this rises to £32,125 by Year 20, compared to only £26,790 from the straw bedded building.
3.2 Funding options
There are a number of possible funding options available to producers. These are offered in broad principle only and are subject to individual advice by a certified tax accountant.

3.2.1 Mortgage/long-term loan
Funding through the retail banks now tends to be over a 10-year term with an option to refinance for longer if needed.

The bank would require security over land or buildings at up to 75% market value of the assets secured. 100% project funding from banks is now unusual unless the customer has particularly high value assets available for security. However, some processors offer their own finance packages to encourage suppliers to construct new buildings.

3.2.2 Mortgage/loan taken through a self-invested pension fund
Pension legislation effective from April 2006 would allow the producer to place the asset of the land and finishing building into a self administered pension fund, with the pension fund itself borrowing for the cost of the building.

The pension fund then has the option to charge the main farm a rental at least equal to the repayments.

The tax advantages are:
- Income of the pension fund is tax free
- Any rental charged by the fund to the farm is a tax-deductible expense
- Any capital gain on land and buildings in the fund would be tax exempt.

There is, however, a possible complication here as the revised legislation only permits a pension fund to borrow a maximum of 50% of the Net Value of assets within the fund. Net Value means the market value less any outstanding debt secured against the asset.

3.2.3 Leasing
If a producer is not paying mainstream corporation tax, the leasing of assets offers some benefits in terms of overall borrowing costs. Leasing of the building may be an option but there are some drawbacks:
- The rental period available is unlikely to exceed 5 years making debt service commitments high
- The producer will never own the asset. In the long term, once debt is extinguished, this may be counterproductive for generation succession
- The accommodation building is not particularly attractive to a leasing company as it would clearly have restricted transferability. It is probable, therefore, that a leasing company would ask for other makeweight security
- For the above reasons leasing has been largely discounted as a serious funding option.
Section 3: Finance

3.2.4 Hire purchase
Unlike leasing, hire purchase would allow the producer to own the asset at a similar cost because the interest charged is a tax deductible expense. Taking hire purchase on the accommodation building may, therefore, be an option but there remain drawbacks similar to leasing:

- The repayment period available is unlikely to exceed 5 years making debt service commitments high
- It is probable that a hire purchase company would ask for other makeweight security.

3.2.5 Enterprise Finance Guarantee scheme
Launched in January 2009, this scheme allows an applicant to borrow between £1,000 and £1 million with 75% of the loan guaranteed to the bank by the Department for Business Innovation and Skills (BIS). The bank is not permitted to ask the applicant for security for the remaining 25%.

Repayment is available under the scheme to a maximum of 10 years.

However:

- The scheme is only supposed to apply if the applicant is unable to offer conventional security to the lender
- Turnover of the applicant must not exceed £41 million pa
- The scheme is relatively expensive as a 2% annual premium is charged by BIS directly to the borrower on the guaranteed element. (e.g. £3,750 in the first year on a loan of £250,000), in addition to normal interest charges.

In view of the 25% unsecured risk the banks have to underwrite, they are reluctant to promote the scheme. There is also a significant amount of paperwork to negotiate.

This source may be best considered as a makeweight ‘top-up’ solution if the security available is short of the bank’s normal requirement.

3.2.6 National Loan Guarantee Scheme
This scheme allows banks to raise funding guaranteed by the Government, to lend directly to smaller businesses (who are more reliant on bank finance) at a lower cost than would otherwise be the case. Key features are:

- UK businesses with a turnover of up to £50m will be eligible to benefit from the scheme
- Banks apply for Government guarantees against the borrowing within a two-year window for a fee. They can use the guarantee to raise funds at a lower cost
- In order to qualify for the guarantees, banks will demonstrate that they can pass the benefits of the guarantee through to cheaper loans (as in the European Investment Bank’s (EIB) well-established ‘Loans for SMEs’ scheme)
- Participating banks retain the full credit risk of the loans they make under the scheme
- In many cases, the scheme will lead to a reduction in the cost of business loans of up to two percentage points. Some do this directly by reducing the interest rate over, say, the first five years. Others return the benefit at the beginning of the term with a cashback equivalent, e.g. £102,000 is introduced to the business account rather than £100,000
- A range of banks will provide access to the scheme.
3.3 Likely funding costs

This document is written at a time when base interest rates are 0.5% with variable interest on loans generally charged at 3.5% over base, and fixed interest at 6-7% depending on the bank and the customer. These rates are historically very low.

In addition to interest, banks are also charging, but not necessarily quoting, fees for arranging or modifying a loan. Expect £3,000 to be charged for a typical building loan.

3.4 Taxation

The Agricultural Buildings Allowance has now ceased.

The only Capital Allowances available for new buildings are for those elements that qualify as plant and fixtures (see below for details). For 2012/13, the maximum that can be claimed is £25,000 in the qualifying year.

Different write-down allowances are then available each subsequent year to offset income for tax purposes as follows:

<table>
<thead>
<tr>
<th>Category</th>
<th>Annual write down allowance</th>
</tr>
</thead>
<tbody>
<tr>
<td>Short life assets, eg tractors and implements</td>
<td>18%</td>
</tr>
<tr>
<td>Long-life assets integral to a building, ie more than 25 years life expectancy</td>
<td>8%</td>
</tr>
<tr>
<td>Environmentally beneficial or energy-saving plant and machinery, eg solar panels</td>
<td>100% can be written off in the first year.</td>
</tr>
</tbody>
</table>

**Qualifying Assets**

The NPA and HMRC have agreed what parts of a pig building qualify for allowances:

- All slurry tanks and lagoons (but not water lagoons for irrigation unless the water has been treated)
- Automatically controlled natural ventilation shutters and curtains
- Specialist lighting for heat (or, say, non-greening of potatoes)
- Slats and everything below, including the whole slurry system
- Concrete pads and low level barriers (not walls) for muck
- Ventilation shafts (part of the air conditioning system)
- Metal mesh and curtains for controlling airflow
- Gutters and associated piping, if they are carrying waste rainwater to be collected and used for washing down the unit
- Internal cladding which has a trade-specific surface designed to enable washing down
- Room partitions that have a trade-specific function to reduce pig damage and to enable cleanliness
- Feeders, drinkers, pen-dividers.
Example:
Some £70,000 of plant and fixtures may qualify for allowances in a new 1,000 place finishing building. Potentially £25,000 of this capital expenditure could be offset against trading income in the year of the build. In subsequent years 8% of the remaining balance can then be used i.e. £3,600 in Year 2 (8% of the remaining £45,000) £3,312 in Year 3 (8% of the remaining £41,400) and so on.

Assuming a 20% tax rate, the value of these allowances could reduce a tax liability by:
£5,000 in Year of purchase
£720 in Year 2
£662 in Year 3
and so on.

This is an example to illustrate the benefits of Capital Allowances only. Everyone’s tax situation is different and advice should be sought from a certified tax accountant as to what the individual benefits might be. If no tax is payable because the business is not profitable in the first place, the benefits of the allowances may not be realised.
Section 4
Planning permission guidance

www.bpexenv.org.uk
Section 4: Planning permission guidance

Introduction
The planning system in England and Wales is governed by the Town and Country Planning Act 1990 and implemented through Local Authorities. In most cases this Local Authority will be a District or Borough Council although in some areas and for some forms of development it will be the County Council. The planning office of the Local Authority will be responsible for granting planning permission where required in their area.

Usually, planning permission is needed for most forms of development, but there are some exceptions, and what is defined as ‘development’ can be very arbitrary.

Permitted development
Planning permission should be required for most of the standard designs proposed in the project. However, if it is decided to construct a building of less than 465m² and it is more than 400m from a ‘protected’ building, the building may be allowed to proceed without planning permission.

This is called ‘permitted development’ but, contrary to popular belief, in the case of a new stand-alone building, this still requires an application procedure to notify the Local Authority. They then have 28 days from receipt of the notification to say whether planning permission will be required or not. Sometimes they will not respond at all, in which case the development can go ahead.

The full list of parameters that define permitted development relevant to pig buildings is as follows:

- Less than 465m² ground area covered within 90m over the last 2 years
- More than 400m from a protected building, eg a house/office/school occupied by people, but not including houses/offices on the agricultural unit concerned
- Less than 12m height (less than 3m within 3km of the perimeter of an airfield)
- More than 25m from a classified road including ‘C’ roads
- The agricultural unit is more than 5ha.

Permitted development is possible on units of less than 5ha (but more than 0.4ha) for some agricultural alterations and installations of plant without notification, but not for new buildings. More details can be found at www.bpex.org.uk/environment-hub under Pig Housing Development.
Section 4: Planning permission guidance

Polytunnels
Whether polytunnels class as ‘development’ and, therefore, require planning permission is an area that has consumed a lot of legal time and clients’ money, particularly in the fruit industry. Essentially, a planning office will consider three factors in defining ‘development’:
- Size/scale
- Permanence
- Fixture to the ground

None of these can be taken in isolation and it can be highly variable and arbitrary as to how a planning office will treat each case. Ordinarily, the polytunnel structure proposed in Section 2.2 should require permission due to its size, permanence and fixture to the ground.

Solar panels
More details about planning permission and permitted development for renewable energy can be found at www.bpex.org.uk/environment-hub under Pig Housing Development.

However, to summarise the situation with installing photovoltaic cells on the roof, these can be installed without an application or notification as long as:
- The upper surface of the panels is not more than 200mm off the face of the roof
- The panels do not increase the height of the building (excl chimneys or vent housings) more than 1,000mm
- The panels are installed within 1,000mm of the edge of the roof
- The panels are not installed within the site of a scheduled monument, on or within the curtilage of a listed building, or fronting the highway within a building conservation area.
4.0 Full planning permission
The standard designs outlined in Section 2 should all require full planning permission, and the rest of this section describes the processes involved in making an application to the Local Authority.

4.1 Pre-application advice
It is usually recommended that an applicant consults the local planning office before making an application. Despite the perceived risk of inviting trouble, there are three overriding reasons why an applicant should request pre-application advice from the local authority:
• Part 5 of the application is dedicated to ascertaining what pre-application advice has been received. It looks poor if this is blank and the main application is first contact.
• Planning is a relational exercise dependent on arbitrary perceptions. It is important to make the planning officer concerned feel they are involved from project conception, rather than setting up a ‘them and us’ relationship later.
• The planning office should outline what documents/assessments will be required to support the application, including the required fee. Otherwise, they may ask for amendments or additional information before they register an application already submitted.

4.2 Pre-application public consultation
It is also recommended to consult the neighbours and Parish Council about a proposal. This carries the same perceptions of inviting trouble as pre-application advice but there are similar reasons for consulting the neighbours:
• The parish also needs to feel an applicant is working with them rather than against them
• The parish will find out about the proposal anyway because notices will be displayed and published. It will be regarded as discourteous if this is the first they hear about a proposal and this will stimulate objections on emotional grounds, albeit disguised behind reasons of noise or odour, etc
• Active objections at the pre-application consultation stage often deflate to just passive discontent by the time the formal planning consultation stage arrives.
4.3 Application documents

A full planning application will require the following originals plus at least three copies of:

- Completed application form which includes:
  - the ‘Ownership Certificate’ at Part 24
  - the ‘Agricultural Land Declaration’ at Part 25 (note that ‘Holding’ means rented land as opposed to freehold).
- Location plan:
  - ideally drawn to 1:1,250 or 1:2,500. RLR maps are usually 1:5,000 so magnifying these by 200% on a photocopier will produce a plan at 1:2,500
  - with the scale and direction of North clearly marked and location (postcode, or grid hairs) readily identifiable
  - with the applicant’s land outlined in blue and the gross site to be developed including access route to the highway outlined in red.
- Block plan showing the site in more detail in relation to the farmyard etc at least 1:500
- Floorplan, roofplan and side elevations all drawn to at least 1:200
- Design and Access Statement describing the background and context of the proposal, why the location/orientation chosen, the reasoning behind the design/materials/colours used and how the site would be accessed from the highway – even if only during the construction phase
- If there are neighbouring properties in the vicinity, an independent risk assessment of:
  - Odour pollution
  - Noise pollution. Normally at least 35dB is permissible at any nearby dwelling
    (Manure and dirty water disposal can usually be explained concisely in Part 11 of the application form, as can dead pig disposal in Part 16)
  - A photomontage showing an impression of the completed building from three main angles, should suffice for determination of the visual impact. Otherwise, a full visual impact assessment might be needed, including a landscaping plan provided by a landscape architect, especially in an area of outstanding natural beauty.

The appropriate fee (agreed during pre-application advice) is also required.

A covering letter addressed to the planning officer who gave the pre-application advice is courteous and adds a personal touch. It all helps.

Environmental Impact Assessment (EIA)

The necessity of an EIA should be determined by a screening opinion requested from the Planning Department and this should come out of the pre-application advice.

An Environmental Impact Assessment will be required for any new developments for more than:

- 3,000 places for production pigs (over 30kg)
- 900 places for sows
- any project likely to have a significant effect on the environment.

This is in addition to any requirements for EPR permitting where applicable, which has lower thresholds, although much of the EPR process translates to EIA.
Section 4: Planning permission guidance

An EIA is also required when any development of an intensive livestock unit exceeds the above threshold or any part is within an environmentally sensitive area where:

- the area of new floor space exceeds 500 metres square
- more than 0.5ha of semi-natural or uncultivated land is developed.

An EIA assesses the effect a proposed new unit could have upon the environment through noise, smell, pollution, visual impact, traffic, potential flooding and ecology, and considers means of reducing the impacts of the proposal.

4.4 The determination process

The local authority is allowed at least 56 days from registering the application, which can be delayed if the appropriate supporting documents are not included, to notifying a decision for approval or rejection.

During this time they will display and publish notices about the application, and formally consult the Parish and statutory bodies such as the Environment Agency.

Straightforward applications, such as a General Purpose barn within the existing curtilage of a farmyard, are usually determined by the planning officer on their own. More significant developments and those that are likely to be contentious, such as pig buildings near villages, will probably be heard by the Planning Committee. If this is the case, then objectors and supporters will be invited to speak.

Speaking at the planning committee

The necessity of an EIA should be determined by a screening opinion requested from the Environment Agency and this should come out of the pre-application advice.

Protocol varies between districts, but usually only one spokesman for objection is allowed to speak, followed by someone speaking in support of the development. It is vital that the applicant or agent arranges to speak.

Usually the speakers are limited to three minutes each and limited to points of objection rather than waxing lyrical about the pros and cons of pig farming. It is significant that the supporter is second to speak. This opportunity of the last word should be taken to thoroughly discredit any objections. Do not waste the opportunity.

4.5 Notification

Often, local authorities allow themselves more than 56 days to determine an application but applicants can appeal to the Planning Inspectorate to oblige the local authority to make a decision within 56 days. However, this can often prompt a refusal and, unless there is a significant need for urgency, the planning office should be left to take the time they feel they need.

If permission is granted, then conditions are often attached, eg subject to an EPR permit being granted if applicable. The discharge of some conditions has to be applied for, ie demonstrating they have been met, and this often incurs a further fee.
If permission is refused, or unreasonable conditions are imposed, then the applicant can appeal to the Planning Inspectorate. Appeals against refusal have a less than 40% chance of success and only succeed where it can be demonstrated that the local authority has gone against policy only. Moral principle is irrelevant.

It is, therefore, much more effective to find out in the pre-application stage what will be allowed and, if necessary, compromise for that, rather than ‘locking horns’ with the planning officer and ‘trying to get it on appeal’.

Example of planning drawing: site location

N.B. This is a reduced-size drawing for illustration purposes only and is not to scale.

This would normally be at a scale of 1:2,500 extracted from Ordnance Survey Superplan data and show the grid references to allow precise location of the site. Various agencies, including many local planning authorities, are licensed agents for Ordnance Survey and can supply the required number of prints for a planning application for a nominal fee. The extent of land owned by the applicant should be clearly marked in colour on this map.
Example of planning drawing: site plan

N.B. This is a reduced-size drawing for illustration purposes only and is not to scale.

This would normally be at a scale of not less than 1:500 and should indicate site boundaries. Any landscaping and/or tree planting should be clearly marked in colour.
While the Agriculture and Horticulture Development Board, operating through its BPEX division, seeks to ensure that the information contained within this document is accurate at the time of printing, no warranty is given in respect thereof and, to the maximum extent permitted by law, the Agriculture and Horticulture Development Board accepts no liability for loss, damage or injury howsoever caused (including that caused by negligence) or suffered directly or indirectly in relation to information and opinions contained in or omitted from this document.

Example of planning drawing: elevations

N.B. This is a reduced-size drawing for illustration purposes only and is not at the scale indicated.

This would normally be suitably labelled to indicate the main external appearance features, eg Roof – natural grey fibre-cement profiled sheets with 10% translucent sheets and continuous open-ridge ventilation etc.
Section 5
Environmental compliance

www.bpexenv.org.uk
Section 5: Environmental compliance

Introduction

The blueprint designs for both the straw and slatted pig finishing buildings aim to include features which comply with all aspects of current legislation. However, it is the responsibility of the contractee to take into account all the following considerations as well as keeping abreast of any new legislation. The most relevant legal obligations have been outlined below but the list is by no means exhaustive. If any doubts arise about the relevance and completeness of any statutory obligations, seek professional advice.

The Code of Good Agricultural Practice for farmers, growers and land managers, Protecting Water, Soil and Air (Defra 2009) is an overall reference. Parts of this code are statutory, others are just guidelines, but compliance with the Code is a requirement for claimants of the Single Payment Scheme.

Planning permission

This is covered in detail in Section 4 but it should be emphasised that permission will be subject to environmental compliance. The application must, therefore, demonstrate that the design, construction and operation of any new pig buildings will be environmentally safe.

Environmental Impact Assessment (EIA)

EIA is also covered in Section 4 in the context of planning and development to which it applies.
5.0 Water Framework Directive (WFD)

The WFD is a piece of overarching European legislation that was adopted by the UK in September 2000, and brings with it certain responsibilities for pig keepers and those that manage land on which manure is spread.

These responsibilities include:

- Prevention of further deterioration and the protection and enhancement of the status of aquatic ecosystems and associated wetlands
- Promotion of sustainable water consumption
- Contributing to mitigating floods and droughts.

The WFD consolidates and updates a series of water policy directives developed since the 1970s, and has the key objective of achieving good ecological status for all waters by 2015. This would involve pig farms and the management of any associated land with respect to the impact of:

- Phosphorus
- Nitrates
- Sediments and soil loss
- Organic wastes
- Pesticides
- Veterinary medicines
- Faecal micro-organisms.

Avoidance of phosphorus and nitrate pollution is particularly crucial. Grants may be available under the Catchment Sensitive Farming Initiative to implement measures on farms that improve water quality in target areas.

www.naturalengland.org.uk/ourwork/farming/csf/cgs/default.aspx

5.1 Phosphorous

50% of phosphorus pollution in UK fresh water is attributed to agricultural sources. Currently, there are no specific regulations to enforce better management of phosphorous in agriculture. Ultimately, the Environment Agency has powers to impose Water Protection Zones on areas where water quality is failing but these are rarely imposed.

Phosphates are much less soluble than Nitrates, and usually enter water courses attached to soil particles. Therefore, the main way that Phosphorous is controlled in agriculture is by encouraging good soil management on farms. Soil Protection Reviews are needed under GEAC. Good Environmental and Agricultural Condition 1 of the Cross Compliance requirements to claim the Single Payment.

On-farm rapid nutrient content testing of pig slurry.
Section 5: Environmental compliance

Phosphorous pollution can be prevented by:
• Spreading manures and slurries as part of a crop nutrient management regime
• Maintaining good soil structure on the farm
• Avoiding damaging field operations
• Buffer strips along water courses (one of the main options selected under Environmental Stewardship)
• Adding phytase to pig diets to increase the availability of phosphorus to the pig and limit its excretion in the slurry.

5.2 Nitrates

The Nitrate Pollution Prevention Regulations were most recently updated in 2012 involving further changes to the Nitrate Vulnerable Zones (NVZ) within which the rules apply. All the measures from the 2008 regulations should have been implemented by 1 January 2012 and there are further changes due on 1 January 2013 and 2014.

It is the occupier of a holding who is responsible for implementing the rules which are summarised below from a pig perspective only. Detailed requirements are referenced in brackets to NVZ guidance leaflets published by Defra: https://www.gov.uk/nitrate-vulnerable-zones

5.2.1 Closed spreading periods for pig slurry (NVZ Leaflet 8) – current to 31 March 2013

<table>
<thead>
<tr>
<th>Grassland</th>
<th>Tillage land</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sandy or shallow soils</td>
<td>All other soils</td>
</tr>
<tr>
<td>1 Sep – 31 Dec</td>
<td>15 Oct – 15 Jan**</td>
</tr>
<tr>
<td></td>
<td>1 Aug – 31 Dec*</td>
</tr>
<tr>
<td></td>
<td>1 Oct – 15 Jan**</td>
</tr>
</tbody>
</table>

*On tillage land with sandy or shallow soils, application is permitted between 1 August and 15 September inclusive, provided a crop is sown on or before 15 September.

**Was extended to 31 January each year following 15 October 2013 (2014 for new NVZs)

NOTE: revised regulations came into force on 17 May 2013. Readers are strongly advised to check for the latest position on Defra’s website to ascertain the current situation.

Registered organic producers may apply organic manures during the closed periods, subject to certain conditions.

From the end of the closed period until the last day in February, the maximum amount that can be applied to land at any one time is 30m³/ha of slurry. There must be at least three weeks between each individual application.

The closed periods do not apply to stackable manures (FYM). Similarly Dirty Water with low total nitrogen content is also excluded. Run-off from muck pads which is diluted by rainfall and collected separately from slurry in a dirty water system is not considered slurry.
5.2.2 Storage requirements (NVZ Leaflet 4)

- Six months’ storage capacity – 1 October to 1 April inclusive – for pig slurry (not FYM)
- Record a calculation showing existing storage capacity and whether extra storage capacity is needed.

BPEX has produced two e-calculators for this purpose, which are available at www.bpex.org.uk/environment-hub under Nitrate Vulnerable Zones. Typically, a 1,000 place 35kg-105kg finishing building will require at least 121m³ of storage per month @ circa £50/m³.

- Farmyard manure (FYM) must be stored:
  - in the livestock house or covered building
  - on an impermeable base constructed to the appropriate standard
  - at a suitable, temporary field site (provided the manure can be stacked and liquid does not drain from within the stack)
- Record field sites on a risk map including dates of use
- New, substantially enlarged or reconstructed manure storage facilities must comply with the construction standards set down in the SSAFO Regulations (see Section 5.4).

5.2.3 Whole farm limit (NVZ Leaflet 5)

170kg/ha of Total N from livestock manures, including grazing deposition, in each calendar year averaged over the area of the whole farm.

Record:
- The numbers and types of livestock, and the number of days they spend on the holding
- The nitrogen produced by livestock on the holding each calendar year (standard values are provided in NVZ Leaflet 3)
- Details of any livestock manures sent off the holding to another farm (export)
- A calculation showing the livestock manure N loading.

BPEX has produced two e-calculators for this purpose which are available at www.bpex.org.uk/environment-hub under Nitrate Vulnerable Zones. Typically, a 1,000 place 35kg-105kg finishing building will require at least 53ha to spread its slurry or FYM each year.
5.2.4 Individual field limit (NVZ Leaflet 8)
250kg/ha of Total N from any manures in any 12-month period over each field.

5.2.5 Manure spreading (NVZ Leaflets 8)
- Carry out a risk assessment for spreading organic manure.
- Produce a risk map to identify suitable field locations for manure applications. Where relevant, the map must also show sites suitable for temporary field heaps of solid manures.

Don’t spread in the red areas.
Avoid orange areas in winter and in a dry summer when the soil cracks down to the drains, or when the soil is compacted.
You can use yellow areas throughout the year subject to ground conditions, but restrict application rates in the winter.
Green areas can be used throughout the year.
Risk maps are needed to meet GAEC 19 of the Cross Compliance requirements to claim the Single Payment, whether in an NVZ or not.

- When undertaking field operations:
  - Do not apply organic manure if the soil is waterlogged, flooded or snow covered, or has been frozen for more than 12 hours in the preceding 24 hours
  - Do not apply organic manure within 10 metres of surface water, except on land managed for breeding wader birds or as species-rich semi-natural grassland and under certain other restrictions. This reduced to 6 metres for slurry spread by precision application from 17 May 2013
  - Do not apply organic manure within 50 metres of a spring, well or borehole
  - Make a field inspection to assess the risk of run-off to surface water before spreading organic manure
  - Do not apply organic manure if there is a significant risk of nitrogen getting into surface water, taking into account:
    - the slope of the land, particularly if the slope is more than 12 degrees (1 in 5)
    - any land drains (other than a sealed impermeable pipe)
    - ground cover, proximity to surface water, weather conditions and soil type
- Apply organic manure in as accurate a manner as possible. Slurry spreading must now use low trajectory equipment, ie less than four metres off the ground.

- On bare soil or stubble:
  - incorporate slurry into the soil as soon as practicable, and within 24 hours at the latest, unless it is applied by a band spreader or injected under the soil surface
  - incorporate FYM into the soil as soon as practicable, and within 24 hours if the land is sloping and within 50 metres of surface water that could receive run-off from that land.

### 5.2.6 Available Nitrogen

The farm and field limit values for manures are on a total nitrogen basis. Actual crop applications including manufactured nitrogen are on an available nitrogen basis (N max) whole farm. Unless it can be demonstrated otherwise by analysis, the statutory percentage availabilities are now:

<table>
<thead>
<tr>
<th>Material</th>
<th>Availability</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pig slurry</td>
<td>45%</td>
</tr>
<tr>
<td>FYM</td>
<td>10%</td>
</tr>
</tbody>
</table>

This will change to 50% for Pig slurry from 1 January 2014.
5.3 Environmental Permitting Regulations (EPR) – formerly IPPC

Under EC Industrial Emissions Directive, the Environmental Permitting Regulations (EPR) require any UK pig unit with:

- more than 750 sow places
- or
- more than 2000 finishing places (pigs above 30kg)

on the same site, to obtain an EPR permit. This permit also encompasses waste licences and installation permits. Intensive pig units defined by the thresholds above are classified as installations that require a permit to operate.

If applicable, units will be required to construct buildings, implement changes and carry out practices according to Best Available Techniques (BAT) outlined in the European Commission Reference Document on Best Available Techniques for the intensive rearing of pigs and poultry (BREF). For example, stand-alone slurry stores are required instead of tanks under slats.

(Image: European Commission. Fully slatted floor with vacuum system (BREF figure 4.17).

The EA should take no more than three months to determine an EPR application, although complex or contentious cases may take longer. Given that some of the supporting assessments are common with a planning application, it is advisable to commence the EPR application as soon as the planning application is submitted. But do not pay the fee for the permit until planning permission is granted.

None of the standard buildings described in this project will currently require an EPR permit on their own because they are only for 1,000 finishing places. If, however, their construction meant that there would be more than 2,000 finisher places on the same site then a permit would be required.

The EA has the responsibility of determining what constitutes the same site but, for example, a new 1,999 place finisher unit would probably not currently require a permit:

- If it is at a different address (especially postcode)
- If it is not in close proximity to the perimeter of another finishing unit operated by the same entity.

However, the stocking thresholds are under constant pressure to be lowered.

Those considering new facilities should seek further information from BPEX and the EA before committing to a structure. It would be wise to implement BAT where practical/economical in case the thresholds are lowered.
5.4 Silage, Slurry and Agricultural Fuel Oil storage (SSAFO)

SSAFO is covered in some detail in Section 2.5 but a summary of the requirements applicable to storage of pig slurry is included below with reference to the following diagrams (courtesy of the Environment Agency 2011):

1. Slurry stores, tanks, pipes and channels must be impermeable. Where walls of the slurry store are not impermeable (e.g. weeping wall stores), the base must extend beyond the walls and have perimeter drains that connect to a slurry tank or irrigation system.

2. The base and walls of the slurry storage tank, any effluent tank, channels and reception pit, and the walls of any pipes, must be protected against corrosion, as described in BS5502, Part 50 (1993).

3. Slurry storage tank and reception pit must be designed to BS5502, Part 50 (1993).

4. The reception pit and associated channels must normally hold at least two days’ slurry production, including rainwater.

5. A slurry storage tank must normally hold at least four months’ production, including allowance for all rainwater. In designated Nitrate Vulnerable Zones this increases to at least six months.
6. The slurry storage tank must be designated to have a minimum 300mm freeboard, except earth banked stores which must have a minimum 750mm freeboard maintained at all times.

7. All parts of the slurry storage system must be designed to last for 20 years with routine maintenance.

8. Two valves in a series, on any drainage pipe, must be locked shut when not in use (from 2010 at least one metre spacing between the valves).

No part of the structure should be within 10 metres of a watercourse without written agreement from the Environment Agency (EA) beforehand.

A person who proposes to have custody or control of silage, slurry or fuel oil that is to be kept in a new or improved store must give the EA notice, specifying the type of silo or storage system and its location, at least 14 days before work to construct the new or improved store begins. A suitable form is available at: www.environment-agency.gov.uk/business/sectors/118798.aspx

5.5 Water Supply Regulations

The Water Supply Regulations replaced local water by-laws in 1999 to protect the supply of mains water.

If applicable, the regulations mean that a water supplier must be notified of any additions to water distribution systems. It is possible for an approved contractor to make these additions. However, if one is not employed, then the new installation work must be agreed and approved by a by-laws inspector before connection to the existing system.

Where water or water-using equipment is used with fluids or materials which could contaminate it, there must be adequate protection to stop backflow of potentially contaminated water into other parts of the system, especially drinking water. The regulations define Fluid Risk Categories by the type of contaminants which are present and specify the appropriate type of prevention device which must be fitted to guard against backflow.

Livestock farms fall within Class 5 installations on account of the potential for contamination by faecal material. Preventative measures include:

- One way valves with filters to prevent contaminated backflow
- Header tanks to provide a break with the mains system
- Float valves and overflow outlets to stop the water level reaching the mains inlet
- Lagging or burying pipes to prevent splits in the pipe caused by freezing, through which contaminants could enter the mains system.

A full guide can be ordered using the form found at www.wras.co.uk/Regulations_guide.htm
5.6 Dead pig disposal

Pig farmers have responsibilities under the ‘Animal By-Products Regulation’ – Regulation (EC) No. 1774/2002 regarding the disposal of fallen stock. The burying of dead pigs is now banned.

On very large pig units, on-site incineration is often used for the disposal of carcasses. Rules concerning low capacity incinerators, ie burning less than 50kg of animal by-products per hour are exempt from the requirements of Part B Local Authority Air Pollution Control.

Any farm incinerator used for disposal of fallen pigs must be a Defra ‘low capacity type approved incinerator’ and the installation must be approved by the State Veterinary Service.

Alternatively, dead pigs can be collected from pig farms signed-up to The National Fallen Stock Company. This is no longer subsidised by the government, but it is a not for profit private organisation that facilitates an efficient and competitive nationwide service for the collection and disposal of fallen stock, and does this by working with around 100 fallen stock collectors around the country www.nfsco.co.uk

Alternatively, a local licensed contractor (knacker collectors) may be employed. The cost of each option should be investigated and reviewed periodically.

Within Contract Finishing Agreements, it is the contractee’s responsibility to comply with the strict biosecurity arrangements regarding temporary storage of dead stock. Contractees must also ensure that hauliers comply with strict regulations regarding the collection and transport of fallen stock and the rules for the haulier regarding collection and transport arrangements.
Section 6
Management overview

www.bpexenv.org.uk
Introduction

The finishing stage of the pig production cycle accounts for most of the money invested in the enterprise, principally as feed. Only at the end of the finishing period is a return on that investment made in the form of a payment for the slaughter pig.

The main objectives are, therefore, to optimise pig performance in terms of rapid growth and cost per kg liveweight gain, and maximise the final value of the slaughter pig by satisfying the customer’s requirements.

Maximum output is achieved by:

• Ensuring that the correct numbers of pigs pass as efficiently as possible through the facilities
• Avoiding housing more pigs in the building than that specified from the design criteria. Overstocking will be detrimental to feed intake, space allowance, control of the environment and pig health
• Encouraging feed intake. This is central to the development of lean meat and overall pig performance and is only achieved where:
  – Diets are suited to the stage of growth
  – Pigs are grouped to match the size of pens available and the equipment is matched to the stage of growth
  – The environment in which the pigs are kept buffers them from climatic extremes
  – The pigs are not burdened with ill health.
Section 6: Management overview

6.0 Management

This section sets down guidance for the operation of the unit from the point prior to pigs being initially received to when the first batch has been marketed and the unit prepared to receive the next batch.

Every pig unit should have a copy of Defra publication “Code of recommendations for the Welfare of Livestock” PB7950 and all those with responsibility for the care and welfare of the pigs must be familiar with it and know of its whereabouts.

For all sites, all health control procedures should be put into place from the moment the site is commissioned for use, even though there might be some delay before the first pigs arrive.

Human health and safety procedures must be as strictly enforced as anywhere else on the farm. It focuses the mind to consider that in 2010/11 there were 42 fatalities on farms in the UK:

- 15 struck by moving vehicles or overturning
- 8 struck by a moving or falling object
- 6 injured by an animal, usually bulls but boars are also dangerous
- 5 falling from a height
- 3 from moving machinery or material being machined
- 1 drowned
- 1 trapped by something collapsing or overturning
- 1 from explosion
- 1 slipped or tripped on the same level
- 1 electrocuted

Pig farms involve working in close proximity with moving machinery or apparatus, so it is vital that Safe Stop procedures are used and guards are fitted to moving parts. Workers must have ready access to communications to summon help if needed and an HSE first aid box must be available on site at all times. Could you get yourself to a phone or first aid box if you lost a limb in the finishing building?

Further to that, pigs are a source of several diseases that affect humans, particularly salmonella and e.coli. Staff welfare facilities must be provided and workers must wash thoroughly when leaving the site and before eating/drinking. See Appendix 7.1.3 for more details.

It is easy to get overwhelmed with regulations, but operators must at least carry out their own assessment of the hazards on their site + the likelihood of them resulting in injury (=risk) and take mitigatory action.

Universally, appropriate protective clothing and equipment must be issued to workers, eg feeding 1,000 pigs in the absence of ad-lib food can be deafening, so ear defenders become necessary.

BPEX has produced a Health and Safety of Pig Keepers publication which can be found at www.bpexenv.org.uk and click on Health and Safety.
6.1 Preparing to receive and unload pigs

6.1.1 Set up routines

Delivery of pigs will be arranged between the supplier and the site. Arrangements for delivery or collection will form part of the agreement between the parties.

It is vital to health control that no pigs, other than those forming part of the agreement, enter the site. Contact with other pigs should also be embargoed for those who may come into contact with the site.

Prior to the arrival of the pigs it is also vital that the building and unit environs are cleaned and disinfected. The haulier should have disinfected his vehicle before arrival and should also pass through a chemical dip on entering the farm. The disinfectant in this dip and any foot dips should, therefore, be refreshed.

6.1.2 Receiving and unloading pigs

All pigs must enter/leave the unit via a loading ramp, details of which can be found at Appendix 7.1.8.

Pigs arriving at a unit will have been subject to the stress of loading, transport and perhaps mixing. Every effort should have been made by the source farm to move the pigs with minimum distress. The haulier should have been trained and certified and should have loaded and transported the pigs in a manner conducive to good animal welfare.

Despite these best efforts, the pigs may have been in transit for a considerable length of time and are likely to be dehydrated, shaken and tired by the experience.

Farm staff should, therefore, be aware of the possible ‘fragile’ condition of the arriving pigs and handle them considerately at all times. In addition, the haulier will have a schedule to keep and, therefore, farm staff must prepare in advance to ensure that the unloading procedure is a quick and trouble-free operation.

6.1.3 Penning considerations

The pigs’ requirements for space and temperature at the start of this growth phase will be quite different from those which will apply when they reach slaughter weight. The optimum penning arrangements provided will vary according to the time of year, the actual weight of the pigs, the numbers of pigs received, and the extent to which weight variation is apparent within the batch.

The stocking density used will depend upon the housing variant used; however, there are additional operational considerations that should be made when penning incoming pigs:
6.1.3.1 Space and temperature provision

Smaller pigs require less space than larger pigs. Smaller pigs are more demanding of air temperature yet are less able to generate sufficient heat output to provide suitable minimum temperatures during the coldest weather conditions.

Thus, it might be operationally helpful if more pigs are placed in a pen to start with so that more heat is generated to help offset any lower critical temperature deficits. However, this can only be contemplated where:

- Welfare and assurance stocking densities are not exceeded
- Sufficient feed-hopper and drinking space can still be met
- Such action only requires simple splitting of the group later and does not require subsequent mixing of pigs.

Additionally, it might be sensible to consider using space heaters to warm slatted floor buildings and/or provide a simple cover within each pen under which pigs can lie and which helps to retain body heat locally within the pen to help the smaller, incoming pigs to perform normally over the week or two after arrival – particularly during colder spells.

6.1.3.2 Penning by weight/sex

There is an obvious need to maximise utilisation of floor space without either exceeding stocking densities or causing excessive stress by mixing pigs. Where this is unavoidable in order to make best use of the building’s penning arrangements, mixing is best done when pigs first arrive so that any subsequent disturbance and stress will be minimised.

Ideally, where pigs delivered are to be broken down into smaller groups to match the penning provision of the site, it is desirable to batch them, where possible, by weight and sex.

- Weight: evenly sorting pigs according to weight at penning will reduce variation in growth rates and make eventual marketing easier. A target variation of +/- 2.5kg within a pen is suggested
- Sex: segregating pigs by sex allows the opportunity for differential management and marketing in order to capitalise on the leaner carcase potential of entire boars over gilts, and may help to reduce stress caused by sexual activity as the pigs grow.

6.1.3.3 Dealing with smaller individual/less fit pigs

It is often difficult for supplying units to avoid variation in weight of pigs within a batch. This creates potential problems for the finisher. The disturbance caused by transportation may increase injury and increase in the expression of illness among the pigs. These possible issues should be considered when penning pigs initially.

At the time of unloading, the use of a marker to identify pigs that are too small, suffering injury or that appear less thrifty is recommended. This allows a decision to be made as to whether to remove these individuals and to pen them separately or to treat them within their group.
6.2 Daily routines

Successful finishing relies upon the correct and timely application of a series of individual skills directed at maintaining pig health and improving production efficiency and productivity. Both pigs and people are creatures of habit and benefit from individual skills being organised into a coherent daily routine.

The key priorities are:
• Maintaining pig health
• Ensuring good access to feed and water
• Maintaining the correct environment.

These are best achieved by carrying out at least two daily routine checks when an assessment is made of:
• Pig appearance, performance and behaviour
• The environmental conditions and monitoring equipment
• The equipment, especially that used to deliver feed and water to the pigs.

On the day of delivery, and immediately following it, more frequent checks are advisable.

6.2.1 Checking appearance, performance and behaviour

The Farm Animal Welfare Council has defined the main requirements of animals which form the basis of the Welfare Codes of Practice and legislation. These are termed the Five Freedoms:

1. Freedom from hunger and thirst
2. Freedom from discomfort
3. Freedom from pain, injury and disease
4. Freedom from fear and distress
5. Freedom to express normal behaviour

Essentially, pigs should appear, perform and behave as though they are experiencing these freedoms.

The Five Freedoms are achieved where housing, feeding, hygiene and health, handling and general care and interaction with other pigs are all provided to enhance welfare and well-being of pigs. In addition, provision of such conditions is also likely to enhance physical productivity, reduce costs of production and improve product quality and, hence, marketing opportunity.
6.2.2 Checking the environment

Temperature is widely recognised as the component of the environment which has the greatest influence on productivity, but uncontrolled airflow (draughts), humidity, light and build-up of noxious gases can also materially affect pig appearance, performance and behaviour.

If installed, real time monitoring will give an excellent insight into the climatic status of the building but should not be a substitute for the operator’s observational skills.

Temperature

Under conditions where temperatures are not precisely controlled and matched to the pig’s weight and requirements, pigs are often unable to consume sufficient feed to maintain normal appearance and growth. Smaller pigs require higher air temperatures and have less ability to generate heat themselves.

The actual temperature at pig level should remain in the range of +/- 20°C of that set on the controller but the weight of pig, ambient temperatures and other factors will affect the acceptable degree of temperature tolerance.

<table>
<thead>
<tr>
<th>Weight range (kg)</th>
<th>Fully slatted (°C)</th>
<th>Straw bedded (°C)</th>
</tr>
</thead>
<tbody>
<tr>
<td>7-15</td>
<td>30</td>
<td>28</td>
</tr>
<tr>
<td>15-25</td>
<td>25</td>
<td>22</td>
</tr>
<tr>
<td>25-35</td>
<td>22</td>
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<td>35-50</td>
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<td>50-65</td>
<td>20</td>
<td>18</td>
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<tr>
<td>65-80</td>
<td>19</td>
<td>17</td>
</tr>
<tr>
<td>80-100</td>
<td>18</td>
<td>16</td>
</tr>
<tr>
<td>100 +</td>
<td>17</td>
<td>15</td>
</tr>
</tbody>
</table>

Suggested room temperatures are tabulated here:

Figures assume a dry floor, no draughts at pig level and ad-lib feeding.

Environment control equipment

In buildings that are fitted with environment control equipment (fans vents and their ancillary controllers and equipment), this should be checked and calibrated to ensure that the set temperature is being accurately and consistently achieved. The actual temperature might be read from the controller itself and checked from monitoring equipment, or from a maximum/minimum thermometer suspended close to the temperature sensor within the building. This should indicate whether the control equipment requires re-calibration or resetting.

In ‘all-in, all-out’ systems there is potential for the general climate to be compromised particularly during cold and windy weather, when the building is stocked with small or too few pigs. If minimum fan speed is set too low, in an attempt to avoid excessive loss of heat, for example, a build-up of humidity and noxious gases may occur.

It may be necessary to consider provision of covers over lying areas to allow pigs to generate a warmer zone within the pen, or to provide supplementary heating so that ventilation rates are used to maintain suitable air quality.

If effective operating temperature rises more than 2°C above the preset temperature due to high ambient levels, or in a building full of slaughter weight pigs, it is essential to check the fans do run at full speed. This may be achieved by reducing the set temperature on the controller, checking if fans speed up, and that vent/inlet adjustments are functioning correctly. It may be possible in hot weather conditions to improve pig comfort by spray cooling pigs, passing incoming air through cool cells or by using air deflectors which downwardly direct air over the pigs.
Section 6: Management overview

**Airspeed**

If airspeed is uncontrolled, it is recognised by pigs as a draught, which can cause them to feel chilled, particularly in colder weather, and affect their efficiency and comfort.

Smoke generators may be used to pinpoint sources of uncontrolled air movement where the pigs’ lying patterns suggest discomfort, eg if they huddle together. Where air moves at speeds of 0.15m/second or more at pig level, pigs will begin to feel cold at recommended room temperatures.

In extremely cold weather conditions, particularly where this is accompanied by high wind speeds, it may be necessary to baffle inlets to reduce the extent to which cold ambient air falls onto the animals.

**Humidity levels**

Humidity levels are closely related to temperature. In cold weather, reduced ventilation rates can increase humidity and gas levels due to lower rates of air exchange and this is easily detected by glass surfaces misting up. This might call for re-setting of controllers or, in extreme conditions, provision of supplementary heat in order to allow modest increase in air exchange rates.

In warm weather, high humidity indicates inadequate air exchange and is typified by pigs being dirty due to their attempts to wet their skin in order to cool down. These conditions will almost certainly cause them to have reduced feed intake. The techniques described above to help control high temperatures will also help reduce humidity levels and the build-up of harmful gases.

Pigs thrive within a relative humidity range of 60-90%. Where humidity levels are too low, appetite and skin appearance will suffer. Pigs appear to be dry skinned and the additional dust levels caused might trigger coughing.

**Light**

Welfare guidelines suggest that pigs should be provided with 40 lux for 8 hours/day. In windowless pig buildings the level should be 50 lux. This light intensity approximates to that required to read a newspaper.

Inadequate light levels may also impair the proper inspection of pigs and fittings and it is important to ensure that light fittings are not dust-choked so that efficiency is reduced.
6.2.3 Checking the feed systems

Provision of adequate feeding space is fundamental to ensure optimum feed intake by each pig. The building designs in Section 2 have, therefore, been carefully designed to take feeding space recommendations into account.

In addition to providing the correct hopper feeding space allowances, intakes may be enhanced where feeding and drinker points are situated adjacent to each other. This helps encourage the pig’s natural behaviour of drinking and eating during the same sequence of activity.

With ad-lib feeders there is a need to ensure that feed wastage and spoilage is minimised by controlling the length of the feed system drop-pipes. This limits the amount of feed entering the feed hopper.

Feed hygiene may be improved by closing off feed drop pipes once every week. This causes the feed hoppers to run empty and so it is helpful at that time to thoroughly check them for mouldy feed and clean them if necessary.

*Care must be taken to ensure that neither of these techniques results in pigs being deprived of feed.*

Most feed hoppers have an adjustment mechanism which alters the flow of feed into the feed trough. It is necessary to check feeder adjustment regularly to ensure that feed is flowing correctly and also to cater for any change in its physical form, eg a change in pellet size, which may occur between phases.

Pig appearance and performance can also be affected by fouling of the feed. This often is related to inappropriate pen or building design, or it might result from condensation getting onto the feed, or blockages caused by physical factors. Whenever feed is fouled or spoiled there is no option but to remove it from the feeder and dispose of it in a way which does not attract vermin.

6.2.4 Checking drinkers

Finishing pigs need at least five litres a day each, and nipple drinkers should dispense at least one litre per minute. If pigs are not eating or the whole pen looks distressed, check the water supply!

The height of drinkers can affect the performance of the pigs. They are lazy creatures and if they have to work too hard to get their water they will only drink enough to maintain normal body function, which may be considerably less than that required to eat and grow optimally.

- Adjustable height drinkers should be kept at shoulder height
- Bowl and trough drinkers must be checked for freedom from fouling, which will restrict intakes, and to ensure that flow is adequate
- Some types of bite/nipple drinkers contain filters and, if these are blocked or partially blocked, especially with limescale in hard water areas, they will need unscrewing and cleaning
- Other types also have adjuster screws to allow flow rates to be controlled, and these must be altered if flow is inadequate
- Too fast a flow causes waste and increased slurry volume, and can discourage young pigs and cause them to drink less. Therefore, it is important to check that the drinkers suit the water pressure of the building and that they are suitably adjusted.
Section 6: Management overview

6.2.5 Manure removal

**Slurry-based systems** should look after themselves on a daily basis but that does not mean they should be forgotten. While checking each pen, accumulations of dung should be scraped through the slats and an eye kept out for leaks and blockages in the slurry system.

**Straw-based systems** should be scraped through daily. Pigs normally try and keep themselves clean and should dung in the muck passage and lie in the straw area. However, there are always pens that get this wrong!

- Accumulations of dung in the lying areas should be scraped into the muck passages and the pigs shut in
- A scraper is then driven through each muck passage
- Clean straw is then put in each lying area: enough to satisfy welfare requirements, but not too much to create excessive FYM volume
- The pigs are then let out into the full width of their pen.

6.3 Weekly routines and non-pig operations

6.3.1 Feed supplies

It is important that feed supplies are as fresh as possible so stores should be low when the next consignment is delivered or home mixed. While it is critical that pigs never run out of feed, stocks should be modest so that any need to react to the use of medication or maintenance can be rapidly made. It may be prudent to adjust the size of feed orders to account for bank holidays, breakdowns and weather conditions.

It is advisable to allow bins to run empty when the diet is changed, or monthly, to allow checks for bridging/cleanliness, but this should be carefully managed to ensure the pigs do not run out of feed.

Particular care should be taken as pigs begin to be marketed. The feed bin must be empty as the building is emptied since the subsequent batch will require a different diet on arrival.

Equally, where in-feed medication is prescribed, care is needed to ensure the bin is completely emptied prior to receiving unmedicated feed.
Section 6: Management overview

6.3.2 Other weekly unit routines

Regular tasks which should be undertaken on a weekly basis include:

- Monitoring other supplies
- Arranging for delivery of incoming stock
- Organising the collection of slaughter pigs
- Completing an inventory of pig numbers
- Comparing weekly performance with target parameters
- Arranging for any maintenance repairs
- Checking the water system:
  - Repair/replace filters
  - Read meter
- Reading the electricity meter
- Checking slurry/manure levels, and releasing or removing as appropriate
- Organising the collection/emptying of dead pig stores according to unit arrangements
- Arranging for collection/disposal of inorganic wastes according to unit protocols
- Arranging to take delivery of bedding as required
- Cleaning all passageways: remove all cobwebs and clear dust accumulations of ventilation flaps and fans. These are traps for pathogens
- Cleaning and replenishing disinfectant reservoirs at the entry to the unit/buildings/hospital pens
- Testing alarm, failsafe and back-up generation equipment at a date and time known to all staff
  - Checking for responses to supply failure, low and high temperature response, triggering of alarm and operation of drop-out panels
  - Recording that these tests have been undertaken
  - Noting any breaches of protocols or functions rectified
  - Resetting all fittings immediately following tests.

6.3.2 Disposal of deadstock

Any dead animals must immediately be removed and recorded and, if necessary, veterinary notifications made. It is a requirement that carcases are stored under cover, so that they do not adversely affect the environment or attract vermin, etc. Therefore, a covered leak proof container is needed that should be kept on the periphery of the unit so that the collection lorry does not have to enter the farm area which could compromise biosecurity.

6.4 Selection of pigs for sale

Each outlet will set standards which will, in turn, mirror the retailer’s needs. The genetics of the pigs kept/supplied and the feeding regime undertaken will mirror these requirements. Failure to meet the requirements will result in financial penalty to the business.

Money can be made or lost on pig grading. Good grading attracts bonuses; poor grading attracts penalties.
Typically, there will be variation in weight at the end of the finishing period. Unfortunately, it is rarely possible for all pigs to meet the requirements of the market together which would allow them all to be sold simultaneously. Weight is the most critical slaughter criterion since major deductions are applied where pigs are either above or below the stated range.

To gain a balance between the needs of the customer, optimising the average weight sold, and making best use of floor space, it is normal for pigs from one batch to be marketed over a period of about four weeks. This depends on the evenness of the group, when supplied, besides the accuracy of the penning and feeding management described earlier in this section.

6.4.1 Meeting requirements for weight

At the end of the finishing period there may be considerable variation in the weight of finishing pigs. If the average weight of a group of pigs is 105kg, approximately 95% of the pigs will fall between 85 and 130kg unless steps are taken to reduce the variation. If such a group of pigs is marketed at the same time, there will be considerable downgrading due to pigs being either overweight or underweight.

Weighing pigs will be the most commonly used method of minimising penalties due to pigs falling outside of the weight bands. In practice, pigs are either put through a weigh scale, or assessed by eye on a weekly basis as they approach slaughter weight.

Although time-consuming, mechanical weighing is usually more accurate than assessment by eye.

Assessing weights by eye calls for concentration and skill, but has the advantage of:
- Saving time
- Reducing disturbance to the pigs
- Requiring less equipment.

However, it may be less accurate and lead to greater penalties being imposed.

It may be possible to weigh a representative sample of pigs and then to use those that are of the required weight as a visual reference.
6.4.2 Slap marking

Every site has a designated slap mark identification which must be used. It is vital that each pig is clearly slapped on each shoulder with the slap marker being pressed into the ink on the pad between every slap mark.

Good quality ink should be used on the marker pad and the pad cleaned thoroughly after every marking session, and topped up with ink after every 20 or so pigs have been marked. The slap marker numbers should be checked for both cleanliness and soundness prior to and after each marking session and during the session to ensure integrity of the marking.

6.4.3 Smaller pigs

It may be necessary for arrangements to be made for the smaller pigs within a batch to be marketed differentially from the main population in order to allow between-batch cleaning to commence and, therefore, make best use of facilities.

Because such individuals may be those whose growth has been impaired by illness or injury, they are the most likely pigs to have received treatment, so it is especially important that careful checks are made to ensure compliance with medicine withdrawal periods.

Regardless of the weight at disposal, all recording and marking should be carried out as described for pigs marketed in the preferred weight band.

6.4.4 Loading pigs for sale

Good liaison between those responsible for the marketing of the pigs, the haulier and the unit are essential.

Prior to loading, good liaison between the unit operatives and the vehicle driver is also important so that pigs are presented in the numbers required by the vehicle configuration. The same biosecurity measures should be adhered to as with receiving pigs. The driver should be provided with clean wellingtons and must stay out of the holding area.

All necessary movement documentation should be completed before the haulier’s vehicle arrives so that the pigs can be moved as soon as possible after loading. This allows them to settle into their journey with minimum stress.

All livestock movements must be licensed and Animal Movement Licence 2 (AML2) is used for pigs. BPEX has provided an electronic version that can be found at www.eaml2.org.uk/ami/home.eb
6.4.5 After loading

After the completion of loading, all surfaces should be cleaned as described in the unit Veterinary Health Plan.

*It is a legal requirement that the loading area itself must be washed down and it is also important that checks for both biosecurity and physical penning security are made.*

If the building is divided into sections, it may assist with the control of the environment if those pigs not sold are moved into another section of the building.

6.5 Training

Well trained and motivated staff can mean the difference between the success and failure of a pig enterprise. Good stockmanship can make up for a host of health or environment-related issues.

BPEX operates a three-stage scheme for personnel to attain Certificates of Competence:

**Stage 1** Basic Stockmanship & Pig Welfare

**Stage 2** Pig Husbandry Skills

**Stage 3** Pig Unit Supervision & Operation

Visit: [www.bpex.org/2TS/training/CertificatesOfCompetence](http://www.bpex.org/2TS/training/CertificatesOfCompetence) for more information.
Section 7: Nutrition

Introduction

Feed is the most significant input to a finishing unit and comprises the greatest part of the financial gross margin. The management of nutrition is, therefore, critical to the performance of any pig enterprise.

7.0 Nutrition

Performance limits of pigs are genetically determined primarily by:

- The ability of the pig to grow lean meat (lean tissue growth rate)
- The appetite potential of the pig.

However, the genetic potential inherent in improved stock is rarely fully achieved in commercial production because of:

- Disease – this will reduce the pig’s lean tissue growth rate and divert nutrients from growth into fighting disease
- Poor control of the environment
- Incorrect stocking density
- Insufficient water provision and intake
- Inappropriate operational management
- Unsuitable feed specification and diet form.

Therefore, correct nutrition in conjunction with good health management, genetics and stockmanship allow units to achieve excellent performance targets.

7.1 Nutrition and pig performance

The aim of good nutrition is to maximise nutrient intake, growth rate and Feed Conversion Ratio (FCR). Typical performance targets over the last decade are as follows:

<table>
<thead>
<tr>
<th>Performance targets for pigs from 35–105 kg</th>
<th>Average</th>
<th>Good</th>
<th>Excellent</th>
</tr>
</thead>
<tbody>
<tr>
<td>Feed intake (g/day)</td>
<td>1.97</td>
<td>2.13</td>
<td>2.17</td>
</tr>
<tr>
<td>Growth rate (g/day)</td>
<td>801</td>
<td>842</td>
<td>867</td>
</tr>
<tr>
<td>Feed Conversion Ratio (FCR)</td>
<td>2.82</td>
<td>2.49</td>
<td>2.45</td>
</tr>
</tbody>
</table>

Pig performance tends to decline as disease challenge increases. Units in continuous production typically show a deterioration in FCR of 0.1 in the first year, then around 0.05 in the following 2-4 years following restocking. Mortality may increase over time with declining growth rates. Production has moved towards ‘all in, all out’ finishing on a batch cycle which can allow disease cycles to be broken.
As pig weight increases, feed intake continues to rise as can be seen in the table below. Actual feed intakes will vary according to genetics, pig health, stocking density and environmental factors:

As the pig ages, it becomes less feed efficient and, during the finishing period, the FCR may get worse at an accelerated rate.

Average backfat depth (‘P2’) is one of the key grading measurements in any specification. In the UK, P2 is, typically, 11mm at 77kg deadweight but can vary from 8-14mm and is often dependent on seasonal temperatures.
Very lean pigs are likely to be those:
- Slaughtered in the spring
- With low appetite potential
- Restricted in their feed intakes, usually as a result of environmental or health impositions
- Where nutritional standards have been deliberately manipulated to control growth.

Fatter pigs may be those:
- Slaughtered in the autumn (typically 0.5-1.0mm fatter)
- With higher appetite potential
- That originate from outdoor sow lines
- Where poor control of nutritional inputs is exercised.

Killing-out percentage (dressed carcase weight as a percentage of liveweight) is typically about 75%, and increases with weight and fatness. Entire boars have a poorer killing-out percentage than gilts because of testicle removal in dressing.

### 7.2 Feeds and feeding programmes

This section provides an outline of principles of feeding for the purpose of this project. Detailed advice should be sought from a pig nutritionist or feed supplier.

The majority of pigs will be fed ad-lib or to appetite. The modern pig has been selected to express lean tissue growth rate and ‘full feeding’ systems allow the pigs to behave more naturally rather than being conditioned to feeding at particular times. The control of nutrient intake, growth and carcase quality are affected by the manipulation of nutrient density as described below.

In the growing and finishing phases, different feeds are usually recommended for the 30-60kg (Finisher 1) and 60-100kg (Finisher 2) stages. As pigs increase in weight their amino acid requirements decrease so a higher level of lysine and other amino acids are used in the Finisher 1 diet than in Finisher 2. This reduction generally reduces feed cost.

An additional benefit is that protein levels in the Finisher 2 diet can be lowered which in turn reduces nitrogen output. Reducing the energy content of the Finisher 2 diet may also help to improve grading, ie less fat deposition if there is a problem.

Changing feeds at 60kg is approximately halfway through the finishing period and in most units, is often the breakpoint for worsening FCR related to pig age/weight. A group of pigs with a 60kg average may well have individual pigs ranging from 50kg to 70kg. Gilts can be fed separately and changed to Finisher 2 earlier because their amino acid requirements are lower. If pigs are taken to 100kg plus slaughter weights, to maintain grading, 90kg liveweight is a good changeover weight for a third diet.
If the diet is changed over abruptly, a reduction in intake may occur for a few days and dung looseness may be observed. These effects can be reduced by blending the Finisher 1 and Finisher 2 over a five-day period, and also by ensuring that there are no dramatic differences in the raw material make-up of the two feeds.

Every effort should be made to measure and record feed intakes on commercial units so that the nutritionist can refine feeding programmes.

As well as feed intake, commodity prices can influence feed specification. A producer mixing home-grown wheat will minimise feed costs compared to a producer purchasing compound feed.

Buying a lower specification diet to reduce feed cost is often going to increase cost per kg gain. At a time of high feed price it is more economic to use a high specification diet with better protein quality as it will reduce FCR. Feed to gain efficiency is paramount at a time of high feed costs and reducing feed cost per kg gain.

**Diet formulations**

Most feeds on Contract Finishing Agreement will be supplied ready mixed.

Feed mixed on farm is often simpler with fewer raw materials in the formulations. Formulations may change with changing commodity prices and quality control criteria. To optimise feed and pig performance, feed specifications should be modified to meet farm requirements, particularly pig health and genotype.

It is important that, where genetics, environmental control or health reduces feed intake, the upper dietary inclusion levels of feed components are used to formulate rations.

Close monitoring of performance and feed intake must always be maintained so the nutritional advisor/supplier can recommend suitable adjustments to dietary specification and formulation to suit the individual site.

Some slaughter contracts demand that diets are made from GM-free raw materials which require discussion with raw material and diet suppliers. GM-free raw materials may increase the overall cost per tonne of finished feed compared to those able to use GM raw materials.
Section 8
Veterinary health

www.bpexenv.org.uk
Section 8: Veterinary health

Introduction
Herd health status is a vital component of production efficiency and must be regarded as a high priority. A Veterinary Health Plan (VHP) is an important part of any pig enterprise.

The vet practice associated with any Contract Finishing Agreement should provide template health protocols, examples of which are available from BPEX upon request.

8.0 Disease control
Health problems have a major impact on finishing herd efficiency. The extent to which this may affect an individual farm will depend upon:

The system
This project is based around ‘all in, all out’ operation. This management regime, linked to good end of batch cleaning procedures and downtime between batches, provides a break in production which greatly assists disease control.

Operation of the system
Implementation of the Veterinary Health Plan and related Protocols will result in effective control of common diseases and continued cost-effective performance.

Relationship with the veterinary surgeon
Effective prevention and control of diseases are more effectively developed where good communications exist between the operator and herd veterinarian. Accurate information on the occurrence of health issues and the number of pigs affected allows more precise diagnosis and treatment, and may also highlight management adjustments that might reduce the extent of problems.

Most units now operate with close and regular communication between the site and the veterinarian which allows the veterinarian to be familiar with unit procedures so that prevention can be used rather than treatment to control disease.

Proximity of other pigs
Although often difficult to arrange in some parts of England, a distance of 3km from other pigs is preferable, with at least 1km from a major road along which pigs may be regularly transported is also desirable.

Before investing in the facilities, advice should be sought and consideration given to the potential impact upon the future health of pigs on the site from diseases in pigs kept by others.

The greater the local concentration of pigs, the greater the potential risk they pose. Wind direction and natural topography can also help to increase or decrease the possible impact of other pigs upon the site.
Section 8: Veterinary health

Health of the pigs when delivered
This should be well controlled where pigs are acquired from a regular known source/supplier. In situations where the breeding and finishing sites have different vets, they must be encouraged to establish and maintain close contact. This will help in the development of operational procedures which minimise the impact of any prevalent health conditions spreading from the supplying site.

8.1 Common health problems

8.1.1 Respiratory conditions

The groups of agents associated with respiratory disease are common and widespread, making respiratory conditions difficult to control.

In recent years, Porcine Respiratory Circovirus (PRCV) has become widespread throughout pig keeping countries. It is associated with Post-weaning Multisystemic Wasting Syndrome (PMWS) and Porcine Dermatitis Nephropathy Syndrome (PDNS).

In the early stages, when this virus enters lungs already infected by other pathogens, conditions exist for a major respiratory disease outbreak. Such other pathogens include:

- Porcine Reproductive and Respiratory Syndrome (PRRS)
- Swine Influenza Virus (SIV)
- Enzootic pneumonia, caused by Mycoplasma hypopneumoniae
- Haemophilus suis (HPS)
- Pasteurella multocida

(Swine influenza typically triggers a period of low appetite and reluctance to move, and spreads rapidly between pigs throughout the building.)

After the condition becomes apparent, the spread throughout a group of pigs is often very rapid. Pigs will:

• Repeatedly cough and possibly sneeze
• Have laboured and more rapid breathing
• Have a higher than normal temperature
• Have a severely restricted appetite
• Suffer very rapid condition loss – often over a few hours.

Severity may depend upon the pathogens involved and the extent of the infection as well as the management systems which are applied. The most common times for such outbreaks to occur are:

• Within 10-14 days of transfer into the unit
• Following any disturbance or movement.

PDNS often occurs 8-10 weeks into the finishing period when considerable costs of rearing have already been incurred.
Early observation of pigs displaying any of the signs and symptoms described should be marked and noted. If there is rapid progression amongst the population then this should be discussed with the veterinarian.

8.1.2 Gut or enteric disorders

These conditions follow infection of either the small intestine or the colon with bacteria or viruses. A range of diseases may be involved including porcine epidemic diarrhoea, porcine enteropathy, salmonellosis, swine dysentery, transmissible gastroenteritis, colitis and ileitis.

Enteric problems progressively affect pigs less as they grow but may still exert a substantial brake upon full performance. Typically, first signs include:

- Looseness (scour)
- Often a change in colour of the dung
- Affected pigs become ‘dirty’ under the tail
- Loss of appetite
- Often have a raised body temperature
- Some organisms also cause bleeding into the intestine leading to blood-stained diarrhoea
- Often a subclinical status may exist where pigs may not display obvious scour but still do not thrive.

The effective operation of an ‘all in, all out’ policy should prevent carryover of gut disorders from batch to batch. The following factors may predispose pigs to a build-up of the causal agents leading to gut disorders and the symptoms described above:

- Sudden change triggers stress in the pigs – careful planning, particularly around delivery, calm inspection routines will help to minimise stress. Mixing of pigs should be avoided
- Care at the changeover of diet is exercised – particularly with younger pigs – diet formulation, fibre levels and particle size may all be associated with digestive upset
- Poor environmental control, particularly the control of draughts and sudden temperature change, can also lead to outbreaks of scour.

Due to the stress involved at transfer some units routinely practice medication of all pigs for a few days after arrival with veterinary prescription of antibiotics either via the water system or in the feed.

Where individual pigs are observed they may be marked for review at the next inspection or immediately treated. Where there is widespread diarrhoea and/or loss of performance, veterinary advice on the total treatment of a batch with antibiotics via the feed or water would be considered.

Salmonella rarely causes signs of ill health in the pigs. However, blood antibody checks are made at the abattoir to detect whether pigs have come into contact with the organism so, in order to avoid any penalties, it is vital that measures are taken to avoid this organism being present. Avoidance of stress, integrity of the water supply, site hygiene, especially hospital pens and control of vermin are all important.

For more information about reducing the risk of salmonella, visit the ZNCP website at www.bpex-zncp.org.uk
8.1.3 Rectal prolapse

The dramatic observation of blood on the flanks of pigs and on surfaces of the pen at routine checks is often an indication that one or more pigs have suffered a rectal prolapse. This condition results from the supporting muscles and ligaments around the rectum failing to retain the rectum of a pig allowing it to become exposed.

This is most commonly triggered by gross intake of feed following some feed intake restriction caused by an interruption of supply or other management factors. Rectal prolapse is more likely to occur where pigs are penned on slippery or sloping floors.

Measures to control the condition include:

• Ensuring that pen surfaces are clean and do not cause pigs to slip or encourage them into a ‘dog sitting’ position
• Avoiding interruptions in feed supply and excessive competition when feeding to prevent surges in intake
• Checking diet formulation with the feed supplier/advisor if a persistent problem occurs.

Once a prolapse is evident, it is quite often too late to undertake any treatment, as other pigs often bite the affected part causing it to subside and become retained – often within a period of a few hours.

Treatment:

If the prolapse is fresh it is possible to carry out a prolapse repair but, unless this condition occurs frequently, it is best to:

• Remove the affected pig from its pen immediately
• Wash the prolapse with warm water containing antiseptic
• Keep the pig clean and separate from its pen mates.

If prolapse becomes a persistent or frequent occurrence, assistance and guidance from the unit veterinarian should be sought.

8.1.4 Rectal stricture

This condition is frequently seen in pigs which have suffered rectal prolapse some weeks previously and results from blockage of the rectum with scar tissue. Affected pigs may be seen to have an enlarged abdomen or simply be found dead with a swollen abdomen because gases have been unable to escape.

Pigs found in this condition should be withdrawn from their pen and humanely destroyed. Avoiding circumstances which might trigger prolapse in the first place is the best prevention strategy.
8.1.5 Twisted gut (torsion of the mesentery or ‘Whey Bloat’) or sudden death

This is similar in appearance to rectal stricture except that the affected pig is normally found dead with a distended and gas-filled gut.

Pigs in the weight range 35-70kg with well-established appetites are most commonly affected and, although the condition is most prevalent in pigs fed on whey, any set of circumstances that allow fermentation and gas build-up in the gut can predispose pigs to the problem.

Because of the speed of onset no treatment is possible as the animal dies quickly.

**Prevention:**
- Reduce the ratio of whey in the diet
- Add formalin to the whey storage tanks
- In dry feeding systems avoid surges in feed intake.

**Clostridia**

A similar condition, where otherwise apparently fit pigs are found dead but have a discoloured and rapidly decomposing gut, may be caused by clostridia infection.

This organism is dust borne so is more often associated with use of straw/bedding or where accumulation of dust arises – sometimes through poorly set ventilation controls.

No treatment is possible and prevention involves minimising and removing dust build-up. Where clostridia infection is a common occurrence, vaccination with a clostridia vaccine might be considered.

8.1.6 Ruptures

Hiatus hernias can be quite common in finishing pigs. This is where the gut protrudes into a pouch under the skin through the abdomen wall.

If kept in a pen of relatively calm benign pigs, the affected pig may not suffer any undue pain and can finish quite successfully. They should not be removed and grouped with other affected pigs because such mixing will lead to stress and aggression that may cause injury to the ruptured area.

The risk is that the muscle walls of the abdomen can constrict and strangulate the protruding gut, or the pouch bursts. Regular observation of such pigs is therefore critical, and they should be euthanised immediately if the rupture proceeds to trauma.
8.1.7 Abscesses

An abscess is a swelling resulting from the formation of pus in a cavity and usually develops as a direct result of infection of a wound with staphylococcus or streptococcus bacteria. Abrasions, fighting and treatment/vaccination sites are the most usual causes of the initial damage.

**Treatment:**
- Separate the pig from its pen mates into its own holding area
- Restrain the pig, clean the site of the abscess with warm, soapy water and lance the abscess with a scalpel
- Take care to expel all the pus and to clean the wound area with antiseptic solution
- Wear latex gloves throughout and dispose of soiled materials according to unit protocols
- Disinfect the snare, any reusable instruments and the holding area.

The incidence of abscesses is minimised by avoiding conditions which result in damage to the skin.

**Prevention:**
- Avoid mixing pigs since this limits aggression and skin damage
- Check equipment for sharp edges and remove obstacles and protrusions which may injure pigs
- Practice careful and hygienic injection/vaccination procedures.

8.1.8 Lameness

This condition may occur through a wide range of causes and can pose significant problems in wean to finish systems. The discomfort caused may seriously reduce the affected pigs’ capacity to eat and drink normally and so may markedly affect performance.

**Treatment:**
- Train staff in early identification of problem animals
- Chose between in-pen treatment or hospitalisation
- Apply the appropriate therapy
- Clearly identify the pig and complete the treatment record
- Assess the pig daily regarding recovery potential
- Humanely destroy pigs which fail to respond.

**Prevention:**
- Carry out regular checks on flooring and other pen fittings
- Check slat widths. On concrete they should be no more than 18mm with at least 80mm beams
- Gently handle pigs at all times
- Avoid circumstances, already described, which might lead to aggression.
8.1.9 Tail, ear and flank biting

These vices are triggered by a range of predisposing factors. It may be environmental irritation, boredom or sheer mischief which makes some pigs attack their pen mates causing severe wounds to tails, ears and flanks. This may lead to economic loss in both growth efficiency and possible abattoir deductions.

Pigs suffering severe wounds need to be isolated from those attacking them and any wounds dressed with suitable antiseptic lotions/antibiotic sprays.

Close observation of a pen for just a few minutes can identify malicious individuals and removing them from the pen often solves the problem.

Checklist:

- Check space allowances for lying, moving, feeding and drinking as well as the precision of the climate control equipment
- Dim lighting levels, while still meeting welfare guidelines, to help reduce activity and reduce the amount of vices
- Provide ‘toys’ which pigs may chew and manipulate, e.g. chains with attachments, empty feed bags, empty plastic drums or bottles, plastic balls and bedding materials that do not compromise the manure system
- Check nutritional factors which may predispose pigs to vices, i.e. salt, fibre levels, feed particle size
- Check for the incidence of greasy pig disease and apply control measures if necessary.

8.1.10 Salt poisoning

Extreme circumstances of water deprivation caused by supply disruption, drinker malfunction, excessive competition, etc can lead to a condition known as ‘salt poisoning’ whereby the pig’s nervous system is disturbed.

Hot and humid conditions may exacerbate the problem and affected pigs will typically have a lack of control of movement, turn ‘in circles’, and collapse with a paddling motion of the front legs.

Streptococcal (bacterial) meningitis may cause similar symptoms.

Treatment:

- Move the affected pig into the passageway or another pen for treatment and until recovered
- Administer water from a plastic bottle by placing the bottle on the back of the tongue and gently pouring, giving frequent breaks every 3-4 seconds
- Treat over a five-minute period and then leave the pig with a plentiful water supply placed adjacent to its head.
Section 8: Veterinary health

8.1.11 Gut ulceration

Some degree of gastric ulceration is very common in finishing pigs and affected individuals will typically appear pale, lose body condition and have poor feed intake. The cause of the condition is multifactorial but is often related to irregular feeding patterns and stress. Certain genotypes appear more susceptible to the problem.

Control:
- Check access to feed and water
- Check for stress causing management factors including stocking densities, adverse environmental conditions
- Check dietary fibre levels and the quality of fibre used
- Check feed particle size as very finely ground feed is a common cause of the problem.

8.2 Carrying out routine pig tasks

8.2.1 Restraining of pigs for treatment

There may be a need to restrain individual pigs for the administration of medicines or to attend to or dress wounds/prolapses/abscesses, etc.

Lighter pigs weighing up to about 45kg, might be restrained for a minor procedure by the back leg above the hock joint.

Larger pigs may just need holding against the pen wall with a movement board but have all the necessary equipment for treatment ready to hand.

Where tasks are likely to be of a longer duration, eg to lance an abscess or repair a prolapse, it might be necessary to restrain a pig using a restraining snare/noose through the mouth. This will make the pig squeal but is perfectly harmless.

8.2.2 Injecting and vaccinating pigs

Many diseases are best treated by the injection of medication. It is vital to use the correct needle size and administration route for the medicine to work.

Vaccines are usually administered under the skin (subcutaneous) in the neck by standing on the opposite side of the pig to get the angle required.

Other medicines may be injected deep into the muscle of the neck using a longer syringe standing on the same side of the pig to get the right angle required. Avoid injecting in the ham because this may reduce the quality of this prime meat joint.

Ideally, each injection should be administered with a new needle, however, when injecting large groups of pigs, needle change can be carried out after every twelve pigs.
8.2.3 Taking a pig’s temperature

The normal body temperature range for a healthy pig is 38-39°C (~102°F). Significant deviation from this would indicate that the pig is fighting an infection.

The traditional method is inserting a lubricated medical (red alcohol) thermometer into the anus of the pig, but non-invasive digital thermometers are becoming available.

8.2.4 Management of the hospital pen

All units need hospital pen/pens where sick or injured pigs can be moved away from their pen mates and isolated, giving them a better chance of recovery.

These are not included in the standard plans and may be best located in a separate building for isolation purposes. See Action for Productivity factsheet No. 15 for more details, available at: www.bpex.org.uk/publications/

A high standard of management care is required to nurse sick and injured pigs back to health. Sufficient time and effort need to be spent to ensure that hospital areas do not just accumulate ‘no-hopers’ who should be euthanised to avoid further suffering and economic loss.

8.2.5 Administration of medication through the water system

The use of water medication rather than multiple injections or in-feed medication allows quicker uptake of medicine by animals that are unwell, since pigs give drinking precedence over eating.

When medication through the water is prescribed, it is necessary to be able to stop the flow of unmedicated water to the pen or pens. This can generally be achieved by means of a simple valve arrangement that allows normal flow to be switched off so that the water flows through a calibrated dosator.

A stock solution of the medicine is mixed into a container according to the veterinary prescription and a pipe from the dispenser allows the solution to be withdrawn according to the rate of flow of water.

Checklist:

• Carefully check the dilution details for preparing the stock solution
• Check all the pipe work, etc. to minimise leakage and spillage
• Provide medication for the prescribed number of days and only make up sufficient stock solution for this period or less
• Enter the number of animals treated, treatment period, etc. in the medicines record book and note the withdrawal period.
8.2.6 Administration of medication through the feed

Where in-fed medication is prescribed, considerable organisational care should be exercised.

**Checklist:**

- Ensure that all bins containing medicated feed are clearly marked with a sign displaying a red ‘cross’ so that all operators understand that treatment is being undertaken
- If only one feed bin is used, allow supplies to run down to a low level before placing medicated feed in the bin
- Carefully organise a return to unmedicated feed at the end of the treatment period so that there is no chance of compromising the obligatory medicine withdrawal period at slaughter
- Enter treatments in the medicines record book and note the withdrawal period.

8.2.7 Withdrawal periods

Most medicines have statutory withdrawal periods, ie days from last treatment that pigs can enter the food chain. These will be found on the medicine container and should be entered in the medicine record book.

Only treat pigs approaching finished weight and, therefore, dispatch if absolutely necessary, and be prepared to hold onto them before the withdrawal period has passed by which time they can go as Heavies.

8.2.8 Euthanising pigs

Any pigs which fail to respond to treatment or are suffering for painful and incurable conditions should be humanely killed on farm (culled) without delay.

A copy of the Pig Veterinary Society booklet ‘The Casualty Pig, Revised 2009’ should be retained on farm and its advice adopted. This includes decision-making information.

The Humane Slaughter Association also publishes a number of guidance notes on the subject of euthanising livestock and runs training courses for those needing to prove competence in this area. It is a useful source for the most up-to-date information on this subject both practical and legal. [www.hsa.org.uk](http://www.hsa.org.uk)

8.3 BPEX Health projects

BPEX has launched a number of projects aimed at improving pig health and related issues.

For more information on current health projects go to: [www.bpex.org.uk/R-and-D/Pig-Health/](http://www.bpex.org.uk/R-and-D/Pig-Health/)
Section 9
Farm assurance

www.bpexenv.org.uk
Introduction
The main farm assurance scheme for pig production is now the Red Tractor Farm Assurance Pigs Scheme. Previously known as Assured British Pigs (ABP), the Red Tractor Farm Assurance Pigs scheme is now fully integrated into Assured Food Standards (AFS). Other assurance schemes exist such as the RSPCA's Freedom Foods and the application of these will depend on each supplier.

9.0 Red Tractor Farm Assurance Pigs Scheme
The full standards manual can be downloaded via:
http://assurance.redtractor.org.uk/rtassurance/farm/pigs/pg_docs/pg_standards.eb
An overview of the main standards of the scheme are reproduced below.

9.1 Traceability and Integrity
To provide consumers with the confidence they require, all food must be fully traceable so it is possible to establish where it is from and where it went.

9.2 Animal Health and Welfare
All animals must be maintained in good health and their welfare requirements must be met to ensure they are free from hunger and thirst, from discomfort, from pain, injury or disease; from fear and distress and to express normal behaviour. Competent staff are key to ensuring that animals are managed to good standards of husbandry and welfare as provided for in current EU, UK and regional legislation and Codes of Practice.
Section 9: Farm Assurance

9.3 Feed and Water
All animals must be fed to ensure their good health and well-being. Safe feedstuffs are vital both for the animals’ health and to ensure there is no risk of contamination of the meat and milk they produce. All feedstuffs must comply with relevant, current EU, UK and regional legislation, be stored in good conditions and relevant records must be kept to ensure all feed is traceable.

Feed must be sourced from suppliers certified to UFAS, FEMAS, or other equivalent schemes or appropriately assured farm.

UFAS (Universal Feed Assurance Scheme) deals with the production and delivery of compound feeds and the supply of feed materials to farms.

FEMAS (Feed Materials Assurance Scheme) covers the sourcing and production of feed materials right back to the country where they are grown.

9.4 Housing, Shelter and Handling Facilities
Provision of sufficient facilities which allow comfortable and clean housing and allow for the safe handling of animals is important to ensure healthy animals and prevent the spread of disease. Evidence that livestock have been injured as a result of inadequate facilities is not acceptable.

9.5 Animal Medicines and Biosecurity
The use of medicines (including vaccines) and treatments may be required to maintain animals in good health and it is essential they are administered only when necessary and in an appropriate manner by competent staff. All medicines and treatments must be stored and disposed of safely to ensure no risk to animals, humans or the environment and all relevant medicine records must be kept to ensure traceability and demonstrate that the meat and milk is safe to consume. Managing biosecurity is important in the production of safe food and preventing the spread of disease.

9.6 Casualty and Fallen Stock
Promptly managing any fallen stock on farm by handling, storing and disposing of them in accordance with current legislation and best practice will prevent pollution of the environment (including watercourses, soil, air and wildlife habitats), contamination and spread of disease.
Section 9: Farm Assurance

9.7 Livestock Transport
To ensure animals are transported safely and compassionately, all farmers moving their own livestock must do so in accordance with current legislation which includes transporter authorisation and certificates of competence for drivers and attendants (Defra leaflet PB12340). Drivers are responsible for the welfare of any animal they transport and must drive in an appropriate manner. Precautions to minimise animals contaminating each other during transit are important to prevent the spread of disease.

9.8 Environmental Protection and Contamination Control
A responsible attitude to the countryside and the environment is essential. Carefully managing the storage, application and disposal of fertilisers, pesticides (including insecticides, herbicides and fungicides), manures and other potential pollutants in accordance with current legislation and best practice will prevent pollution of the environment (including watercourses, soil, air and wildlife habitats), contamination and spread of disease.

9.9 Staff and Contractors
Properly trained and competent staff, whether directly employed or contractors, are essential to achieving good standards of production.

9.10 Documents and Procedures
Access to certain documents and Codes of Practice ensures the most relevant information and best practice guidance is available to producers. Certain plans, records and procedures are required to assist the legal and safe production of food. (Other records will also be required by specific scheme standards.)

9.11 Vermin Control
Control of vermin (including birds, rodents and insects) and other animals (including cats and dogs) is vital to prevent contamination of animal feed.
Section 9: Farm Assurance

9.12 Required publications

- Code of Recommendations for the Welfare of Livestock – Pigs
- FAWC Report on the welfare of pigs kept outdoors
- Industry Code of Practice for On-farm Feeding April 2010
- Protecting our Water, Soil and Air – A Code of Good Agricultural Practice for Farmers
- RUMA Guidelines – Responsible use of antimicrobials in pig production
- Serious about Salmonella A guide for pig producers
- The Casualty Pig
- Welfare of Animals During Transport – Pigs
- Welfare of Animals During Transit – New Rules for transporting animals, Defra leaflet PB12340
Appendix 1

1.0 Detailed specification: 1,000-place straw-based building

Portal frame building design

1.1 Earthworks
- Building pad stripped of topsoil
- Building pad covered with a minimum of 150mm of levelled and compacted hardcore
- Mass concrete stanchion foundations made to manufacturer’s specification

1.2 Portal frame

Steelwork
- Stanchions, rafters and gable/door posts sized to manufacturer’s specification
- Stanchions to include cleats for fixing bottom and top curtain beams and extra cleats for fixing precast stressed concrete wall panels should these be used in place of concrete blocks
- All steelwork to be manually cleaned and painted with High Build Zinc Phosphate primer.

1.3 Roof
- Fully treated timber roof purlins to manufacturer’s specification
- Fibre cement roof sheeting and matching flashings
- Automatic ventilation ridge (bird proofed) working in conjunction with ACNV
- PVC gutters and fall pipes to manufacturer’s specification discharging to soakaway (soakaway is site specific and the responsibility of the client).

1.4 Floor
- 150mm reinforced concrete over levelled and compacted hardcore to dunging push through area floors laid with an overall fall of 150mm towards the ‘muck pad’ end
- 100mm reinforced concrete over levelled and compacted hardcore to lying area floors laid to a fall of 25mm towards each side dunging passage. Including a layer of insulation under the concrete would add to efficiency and decrease straw demand and, therefore, manure volumes
- 75mm wide x 75mm high (100mm less 25mm fall) kerbs to both sides of the 2.525m wide push-through passage.
I.5 **Dung pads**
- 18.0m x 14.0m x 0.15m concrete manure pad over levelled and compacted hardcore at one end of the building. Pad to have perimeter drainage channel and drain connection to appropriate slurry collection tank or lagoon to contain seepage, surface and wash water. Pad laid to a fall.
- 18.0m x 11.0m x 0.15m concrete tractor turning pad over levelled and compacted hardcore at the opposite end of the building to the manure pad.
- 1.0m x 0.215m manure pad walls along the back and sides of the manure pad base to form pushing walls. Walls to be made from pre-cast reinforced panels installed as per manufacturers directions.
- Minimum 55,000 litre tank installed to collect water from the muck pad.

I.6 **Walls**
- 2.0m high, 100mm thick precast stressed concrete panels attached to cleats on gable posts. Gables can be 1.0m high.
  - Or
  - 140mm solid fair-faced blocks built to a height of 1.5m inside the web of the gable end posts.

I.7 **Side wall curtain system**
- Top and bottom curtain beams to manufacturer’s specification.
- 50mm x 100mm studs at 1.22m centres to support bird netting.
- 1.75m deep curtain ventilation system including:
  - two motor winches
  - ventilation control computer and sensors
  - plastic curtains
  - black plastic bird netting
  - storm straps and strap eyes
  - stainless steel cable
  - polypropylene cord
  - curtain clips and thumbnuts

I.8 **End wall cladding**
- Gable rails to manufacturer’s specification.
- Fibre Cement roof sheeting down to 2.44m at dung passage doorways and to 1.35m for the area between the gable end posts, ie overlapping this section of the gable end walls by 150mm.
- Pedestrian access door and steps with hand rail to kennel roof/inspection walkway installed at each end.

I.9 **Dunging passage doors**
Four flat metal sheeted sliding dunging passage doors on 50mm x 50mm SHS frames with Kingtrack or similar running gear.
1.10 Penning

- 51mm x 1.0m proprietary plastic panel pen side divisions set into 70mm x 70mm Standard Hollow Section (SHS) gate posts with one-way 50mm x 5mm flanges for Panelplus fixing.

Or

- Side walls may be made from 140mm hollow concrete blocks set into 178mm x 76mm channel iron gate posts situated alongside dunging passages and 178mm x 102mm H beams at the centre of the pen dividing wall.

- 51mm x 1.000m proprietary plastic panel removable pen back divisions attached to flanges on 178mm x 102mm beams by anti-loose pins.

1.11 Kennel roof/inspection walkway

Solid kennel roof/inspection walkway with safety side rails and toe board to each side, to run the length of the building directly under the ridge. Minimum width 2.4m. Supported on pen sides or steel supports.

1.12 Temporary kennel supports

Rewindable stainless steel support wires fixed to manual winches at one end of the building and laid out across pen division tops to support plastic sheeting so forming a kennel for newly weaned pigs.

1.13 Gating

- 51mm x 1.0m x 2.6m slotted proprietary plastic panel type gates hung to give a finished height of 1,100mm with 100mm gap beneath the gate and less than 75mm gap on the ends of the gate.

Or

- 1.0m x 2.6m vertical barred gates made of 40mm x 40mm SHS with 22mm tube at 125mm centres so leaving 75mm gaps between the bars. Finished height of 1.1mm with 100mm gap beneath the gate and less than 75mm gap between the ends of the gate and the outside wall or support post. (75mm to avoid pigs escaping between pens).

1.14 Feeding system

- 30 tonne bulk feed bin with double boot

- Two R75 centreless feed augers with telescopic drop tubes to supply double single space or step up feed hoppers.

1.15 Feeders

- Forty six 400mm x 610mm x 915mm double single space black plastic feed hoppers positioned adjacent to the side divisions starting 710mm into the pen from the dunging passage kerb.

- Twenty-three 1.830m x 200/275mm x 450mm step up black plastic weaner feed hoppers positioned adjacent to single space feeders for newly weaned pigs.
1.16 Plumbing and drinkers

Mains intake: One stop cock, one drain cock and one check valve as compliant with Water Supply Regulations to prevent contaminative backflow (see Section 5.5 for more details).

System:
- Two recycled juice barrels or tanks with a capacity of 1200 litres to act as header tanks with float, drain, service valves and overflow sets
- 22mm lagged speed fit pipe to tanks and 15mm speed fit pipe to drinkers
- Two bowl drinkers fitted in each pen on the same pen division as the feed hoppers, each starting 150mm in from the dunging passage kerb edge
- If 7-100kg system: double adjustable nipple drinker fitted on to the pen division opposite the feed hopper down one side of the building
- One medication unit
- Soaking system with two rows of 23 sprinklers with 250mm drops (minimum three bar main supply required)
- Power-washer line in 15mm stainless pipe (four outlets).

1.17 Electrics

Supply
It is the client’s responsibility to bring mains electricity to the building.

The installation does not cover connection to Network Alarm or Auto Dialler System:
- Main distribution board fitted with:
  - All ancillary drivers
  - MCB circuit protection
  - RCD circuit protection
- Two 13 amp splash-proof switched sockets and two 16 amp splash proof switched sockets – one of each on either end of the building
- All metalwork bonded to earth
- All in UPVC conduit
- All splash-proof to a minimum of IP 44
- All installed to current edition of IEE/NAPIT

Lighting
- Conduit
- Twenty-three 1.500m vapour-proof fluorescent fittings
- Two two-way switches by end doors

Electric devices
- Two motor winches
- Two environment control computers
- Two auger motors.

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Appendix 2

2.0 Detailed specification: UK 1,040-place slatted finisher building

Bonded panel, supported truss design

2.1 Earthworks

- Building pad stripped of topsoil
- Building pad covered with a minimum of 150mm of levelled and compacted hardcore.

2.2 Slurry pit construction

See slurry pit specification Buildings Designs Section 2.5.

2.3 Slats

- Five rows of 1.22m x 2.5m x 100mm smooth finish slats with 18mm slot to BS EN 12737:2004+A1:2007
- Supporting piers and lintels

2.4 Side and gable wall construction

- Bonded panel with:
  - 1.5mm GRP external skin
  - 75mm x 50mm framing
  - 70mm polyurathane insulation
  - 6mm HD Minerit internal skin
- Two external doors of similar construction.

2.5 Roof

- Fibre cement roof sheets supported on timber purlins and trusses
- Bonded roof insulation panels fixed and sealed between purlins
- Construction consists of:
  - 1.0mm plastic laminate external skin
  - timber framed to all sides and apertures
  - 75mm x 50mm framing
  - 70mm polyurathane insulation
  - 6mm HD Minerit internal skin
- PVC gutters and fall pipes to manufacturer’s specification discharging to soakaway (soakaway is site specific and not included).
2.6 Penning and gating

- Thirty plastic cellular pen divisions – 1.0m x 5.54m x 50mm
- Thirty-two plastic cellular pen front incorporating gates 1.0m x 3.67m x 50mm
- Stainless steel brackets and bolts

2.7 Feeding system – dry feed

- Two 18-tonne bulk feed bins – in tandem
- Two R75 centreless feed augers with telescopic drop-tube feeders.

2.8 Feeders

- Sixteen tube feeders suitable for pigs from 30 -110kg
- Thirty-two pen division bracket sets.

Note: If using a liquid feed system, replace with relevant items.

2.9 Plumbing

Mains intake: One stopcock, one draincock and one check valve as compliant with Water Supply Regulations to prevent contaminative backflow (see Section 5.5 for more details).

System:

- Four tank stands and 225 litre tanks with float, drain, service valves and overflow sets
- 22mm lagged speed fit pipe to tanks and 15mm speed fit pipe to drinkers
- 72 drinking bowls with stainless steel pipe
- Two 12mm double check bibtaps
- One medication unit
- Soaking system with 60 sprinklers in 3 rows of 20 sprinklers with 250mm drops (minimum three-bar main supply required)

Misting system for cooling air integral to ventilation system

- Power-washer line in 15mm stainless pipe (four outlets).
2.10 Electrics

Supply
It is the client’s responsibility to bring mains electricity to the building
The installation does not cover connection to Network Alarm or Auto Dialler System

- Main distribution board fitted with:
  - all ancillary drivers
  - MCB circuit protection
  - RCD circuit protection
- Three 13 amp splash-proof switched sockets
- All metalwork bonded to earth
- All in UPVC conduit
- All splash proof to a minimum of IP 44
- All installed to current edition of IEE/NAPIT.

Lighting
- Twenty-eight 1.5m vapour proof fluorescent fittings – 6 operate as pilot lights
- Two 18 watt bulkhead lights over access doors
- Two two-way switches by end doors
- Two light switches by end doors.

Electric devices
- One ventilation control computer and ancillary devices
- Winch motor(s)
- Eight 630mm diameter fans or equivalent capacity units with duct and fixings
- One alarm system with siren
- Two feed auger motors and controls (dry feed system only)
- Soaking system controller.
3.0 Detailed specification: 990 place slatted building

Portal frame building design

3.1 Earthworks
- Building pad stripped of topsoil
- Pits excavated to half required pit depth
- Building pad covered with a minimum of 150mm of levelled and compacted hardcore.

3.2 Slurry pit construction
See slurry pit specification Buildings Designs – Section 2.5.

3.3 Slats
- 720m² of concrete slats 1.22m x 3.353m x 150mm smooth finish with 18mm slots to BS EN 12737:2004+A1:2007
- Five rows of piers and lintels.

3.4 Portal frame
Steelwork
- Clear span portal frame 20.2m wide x 36.0m long in 6.0m bays
- Stanchions, rafters and gable/door posts sized to manufacturer’s specification
- Stanchions pre-drilled for fixing bonded panel walls
- All steelwork to be manually cleaned and painted with High Build Zinc Phosphate primer.

3.5 Roof
- Fully treated timber roof purlins to manufacturer’s specification
- External roof cladding fixed to timber purlins
- 60mm white aluminium laminate panels fitted into H profile supports fixed to the underside of the timber trusses
- PVC Gutters and fall pipes to manufacturer’s specification discharging to soakaway (soakaway is site specific and not included).
3.6 Side and gable wall construction
- Bonded panel with:
  - 1.5mm GRP external skin
  - 75mm x 33mm framing
  - 75mm Styrofoam insulation
  - 2.0mm GRP internal skin
- Three external doors of similar construction
- 12 White PVC failsafe windows
- 24 openings for air inlets in side walls.

3.7 Penning and gating
- 40mm plastic panel penning system
- Stainless steel channels, posts, brackets and bolts.

3.8 Feeding system – dry feed
- Two 18 tonne bulk feed bins – in tandem
- 2 R75 centreless feed augers with telescopic drop-tube feeders.

3.9 Feeders
- 18 tube feeders suitable for pigs 30-110kg weight
- 36 pen division bracket sets.
Note: If using a liquid feeding system, replace with relevant items.

3.10 Plumbing
**Mains intake:** one stopcock, one draincock and one check valve as compliant with Water Supply Regulations to prevent contaminate backflow (see Section 5.5 for more details).

**System:**
- One tank stand and 1000 litre tank with float, drain, service valve
- and overflow set
- 50mm PVC hard plastic supply pipe and 15mm speed fit pipe to drinkers
- 72 drinking bowls with stainless steel pipe
- Two 12mm double check bibtaps
- One medication unit
- Soaking system with 60 sprinklers in 6 rows of 10 sprinklers with 250mm drops (minimum three-bar main supply required)
- Misting system for cooling air integral to ventilation system
- Power-washer line in 15mm stainless pipe (four outlets).
3.11 Electrics

Supply
It is the client’s responsibility to bring mains electricity to the building
The installation does not cover connection to Network Alarm or Auto Dialler System

- Main distribution board fitted with:
  - all ancillary drivers
  - MCB circuit protection
  - RCD circuit protection
- Two 13 amp splashproof switched sockets and two 16 amp splash proof switched sockets – one of each on either end of the building
- All metalwork bonded to earth
- All in UPVC conduit
- All splashproof to a minimum of IP 44
- All installed to current edition of IEE/NAPIT.

Lighting
- 15 1800mm vapour proof fluorescent fittings
- Three 18 watt bulkhead lights over access doors
- Three light switches by end doors.

Electric devices
- One ventilation control computer + ancillary devices
- Winch motors (if applicable)
- Eight 630mm diameter Fans or equivalent capacity units with housings and fixings
- One alarm system with siren
- Two feed auger motors and controls
- Soaking system controller.
## Appendix 4

### Inflation Straw bedded system cashflow

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<td>15372</td>
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<td>16902</td>
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### Value of pig farmyard manure (FYM):

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1,000 finishers on straw would typically produce 1413 tonnes of FYM per annum.
### Slatted system cashflow

| Year | Inflation | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 |
|------|------------|---|---|---|---|---|---|---|---|---|----|----|----|----|----|----|----|----|----|----|----|----|
| Fees | 24000 | 24240 | 24482 | 24727 | 24974 | 25224 | 25476 | 25731 | 25989 | 26248 | 26511 | 26776 | 27044 | 27314 | 27587 | 27863 | 28142 | 28423 | 28708 | 28995 |
| Bonuses | 7000 | 7070 | 7141 | 7212 | 7284 | 7357 | 7431 | 7505 | 7580 | 7656 | 7732 | 7810 | 7888 | 7967 | 8046 | 8127 | 8208 | 8290 | 8373 | 8457 |
| Value of slurry | 5.890 | 5949 | 6009 | 6069 | 6129 | 6191 | 6253 | 6315 | 6378 | 6442 | 6506 | 6571 | 6637 | 6704 | 6771 | 6838 | 6907 | 6976 | 7045 | 7116 |
| Income | 1% | 36890 | 37259 | 37632 | 38008 | 38388 | 38772 | 39160 | 39551 | 39947 | 40346 | 40750 | 41157 | 41569 | 41984 | 42404 | 42823 | 43257 | 43689 | 44126 | 44567 |
| Finance | 6% | -11,400 | -10,476 | -9,493 | -8,448 | -7,336 | -6,155 | -4,900 | -3,568 | -2,154 | -654 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Net return | 15393 | 16383 | 17426 | 18527 | 19687 | 20911 | 22203 | 23565 | 25002 | 26517 | 27180 | 27180 | 27173 | 27156 | 27131 | 27097 | 27054 | 27000 | 26936 | 26862 |

### Value of pig slurry:

**Assumptions**

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<tr>
<td>34%</td>
<td>46%</td>
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<table>
<thead>
<tr>
<th>Nutrient value per kg:</th>
<th>N</th>
<th>P</th>
<th>K</th>
</tr>
</thead>
<tbody>
<tr>
<td>£0.87</td>
<td>£0.79</td>
<td>£0.53</td>
<td></td>
</tr>
</tbody>
</table>

1,000 finishers on slatted floors would typically produce 1452m³ of undiluted slurry per annum

Total slurry value £5,890 per annum
6.0 Feed components

6.1 Nutrients

There are five major nutrient groups:

6.1.1 Protein

The production of lean meat is the key objective of modern pig production. Lean meat is composed of amino acids which are the component elements of protein. Some of these are known as non-essential amino acids and can be synthesised by the pig itself. Other amino acids, known as the ‘essential’ amino acids, cannot be readily synthesised by the pig and so these must be provided in the feed and correctly balanced with respect to each other. The essential amino acids include:

- Lysine – which is normally the ‘first limiting’ amino acid and is declared in purchased diets
- Methionine
- Cystine
- Threonine
- Tryptophan.

During feed formulation, the digestibility of amino acids is also taken into account as this ranges from 100% for the pure crystalline material, to as low as 60-70% in raw materials such as rapeseed and wheatfeed.

Pig feeds are generally formulated to be as low as possible in crude protein (nitrogen content) because as protein is broken down into constituent amino acids, nitrogen is excreted via urine and faeces. This is costly and has implications for environmental pollution (1% crude protein can affect nitrogen excretion by 10%).

6.1.2 Carbohydrates and fats

In order of preference, starch, sugars and fats are used in pig diets and are required for energy production. Cereal grains are a major source of carbohydrates in pig diets. Finishing pigs will eat to maintain a particular energy intake, eg if they are fed a low energy feed they will eat more and vice versa.

Until recently, dietary energy was measured as Digestible Energy (MJ/kg) but this has now been largely superseded by the more accurate Net Energy that additionally takes account of energy losses in urine and heat as well as faecal energy loss.
6.1.3 Minerals

Macro minerals: calcium and phosphorus are particularly important in skeletal development. Sodium and potassium, usually as chlorides, maintain the electrolyte balance of cells. Iron is required for haemoglobin which carries oxygen in the blood, and zinc is important for the skin. The micro mineral selenium is an important antioxidant. Other added micro minerals include manganese, cobalt and iodine.

6.1.4 Vitamins

Vitamins are the body’s catalysts as they speed up chemical reactions in the cells of the pig and have a wide range of effects. Vitamin A is involved in reproduction and sight; Vitamin D in bone formation; Vitamin E as an antioxidant. A further eight to nine B vitamins are typically added to a pig finishing feed.

6.1.5 Water

Water should be freely available at all times. Pigs should drink, as an absolute minimum, 3.5 times the amount of feed consumed, i.e. with a 2kg feed intake pigs require at least 7 litres of water. See Section 7 for details on water provision and management.

6.2 Raw materials

The pig is well adapted to grow on a wide range of feedstuffs. In practice, however, the majority of finishing pigs are fed on the following major raw materials.

6.2.1 Wheat

Wheat is typically used as a source of energy in pig diets up to an inclusion rate of 50%. Higher levels can reduce feed intake and the risk of dung looseness.

Fine grinding increases digestibility as it breaks down the indigestible cell walls making greater surface area of the starch available for digestion. However, gut ulceration may increase with fine grinding. A compromise is an average screening of 4mm which offers a good balance between starch availability and gut health, but the optimum screen size will vary from farm to farm dependent on milling hammer speed, wear, wheat variety (hard or soft), etc. which all influence actual particle size. A particle size ranging from 700-800µm is a good compromise between gut health and digestibility.

Roller grinders produce a narrower range of particle sizes while avoiding the very fine wheat particles that may lead to digestive problems.
6.2.2 Barley

Barley is also primarily an energy source, but is higher in fibre and lower in energy and protein content than wheat. Barley can be used up to very high inclusion rates (80% plus) with no ill effects. But, at harvest and approx. six to nine weeks after harvest, ‘new crop’ barley contains an anti-nutritive factor called beta-glucans, a form of non-starch polysaccharide which can cause scour and digestive upsets in pigs and poultry. The negative effect of beta-glucans can be prevented by including a widely available enzyme called beta-glucanase.

6.2.3 Wheatfeed

Also known as ‘Midds’ ‘Sharps’ and ‘Mill-Run’, this is produced during the flour milling process. Wheatfeed is the fraction after the flour has been removed. It is relatively high in fibre but contains 18-24% starch and 15-16% protein. Typically, it is used at inclusion rates of up to 20%. Higher levels may reduce intake in younger pigs due to the effect on gut fill.

6.2.4 Fats

Fats are the most concentrated source of energy but in recent years have become more expensive. Inclusion rates ranging from 0.5-3.5% are added to increase energy and reduce dustiness. Soya oil is the most commonly used fat. Some manufacturers use fat blends mainly composed of acid oils that are by-products of the soap and cosmetics industries.

6.2.5 Mineral and vitamin supplements

These supplements may contain a mixture of some 15 ingredients. Compound feed mills incorporate low-level inclusion products (about 5kg/tonne) but home-mixer supplements also contain limestone, phosphorus and amino acids and so have higher inclusion rates, typically around 25kg/tonne.

6.2.6 Soya meal

Often known as ‘hipro’, soya meal is what is left after soya beans are ground and the oil extracted. Soya is the only vegetable that is high in digestible lysine and other limiting amino acids.

It is typically 46-48% protein and can be used at inclusion rates of up to 25% in pig finishing feeds. It contains indigestible but fermentable sugars which can be a cause of diarrhoea, particularly in young pigs as well as gut enzyme inhibitors which also reduce protein digestibility.
6.2.7 Alternative sources of protein

**Synthetic amino acids:** lysine, methionine and threonine are manufactured, largely by fermentation, and are routinely added to most pig feeds to improve and balance amino acid levels and reduce reliance upon other protein sources. Tryptophan may also be added to starter and young grower diets and may benefit the appetite of all growing pigs.

**Vegetable proteins:** rapeseed meal and field beans and peas can be used as a form of home-grown crude protein replacing some soya. However, they are limiting in amino acid balance so require supplementing with synthetic amino acids to make up the deficiency.

**Animal proteins:** fish meals and milk by-products such as dried skimmed milk powder and whey powders are excellent raw materials for pigs and are widely used for pigs up to 15kg.

6.2.8 Products from the food industry

**By-products:** considerable quantities of food destined for human consumption are never consumed for that purpose, often because sell by dates have been exceeded or as a by-product of manufacture. These materials are often perfectly acceptable for pig feeding and include:

- Biscuits and crisps – these are high in oil and, therefore, energy
- Dried bread and dough – also high energy products
- Breakfast cereals
- Dried Distillers Grains with Solubles (DDGS) from the distilling industry.

Quality and consistency of these raw materials can be variable and products need to be routinely tested before they are incorporated into pig diets. They are typically used at 7.5-10% but higher levels can be used where the quality is consistent and known.

**Co-products:** a number of liquid products are available from food processing such as:

- Wheat starch syrup from starch manufacturing
- Whey from the dairy products industries
- Pot ale from brewing processes
- Sweets and jams.

Acceptable performance can be achieved on these co-products but their nutritional qualities can be variable and supply is not always guaranteed. Costs are relatively low although have increased in recent years. Because of their liquid form the use of these products is normally limited to wet feeding systems.

Both co-products and by-products need to be carefully formulated into a balanced ration to achieve good performance and carcase grading. If not, both efficiency and carcase grading can worsen dramatically. A professional pig nutritionist should be employed for all diet formulation work.
6.3 Feed additives

There are a wide range of additives available for effective incorporation into finishing feed. The effectiveness of which depends on the age of the pig and the herd health.

6.3.1 Feed acidification

Acidification techniques are becoming more popular and are increasing in use. These modify the gut microflora increasing growth rate and improving feed conversion. Gut health is improved and salmonella incidence reduced. Both liquid acids and dry products are available.

6.3.2 Enzymes

Enzymes are biological catalysts and are added into feed to improve digestion. They help break down some of the raw material nutrients to increase nutrient availability. The enzyme phytase is routinely added to all pig feeds to improve phosphorus and calcium digestibility which helps reduce manure/slurry phosphorus levels.

6.3.3 Yeast products, probiotics and essential oils

These are available and may be useful in specific circumstances for improving gut health. Each unit is unique in terms of its bacterial load and population and gut health. In some instances, these products have been beneficial but, in others, shown no effect.

6.3.4 Zinc oxide and copper

Antibiotic growth promoters are banned in the UK. Legally, both copper and zinc are limited in their use to young pigs only. Therapeutic levels of copper (175ppm) are limited to pigs up to 35kg; therapeutic levels of zinc oxide (25ppm zinc), which is used in control and treatment of diarrhoea, is limited to pigs up to 10 weeks of age. Both of these minerals have an effect on gut health which in turn will help growth and performance.

6.3.5 Mycotoxin binders

Mycotoxin binders can also be added to prevent pigs from absorbing toxins from contaminated feed.
6.4 Product form

Raw materials are ground in a hammer or roller mill to decrease particle size and increase their digestibility. Once mixed, the finished feed can be fed as a meal or further processed into a pellet.

Pelleting feed involves conditioning the meal with steam and then forcing it through a die to produce pellets typically of 2.5-5mm diameter. Pelleting tends to:

- Increase digestibility
- Reduce feed wastage
- Reduce dust
- Improve feed conversion ratio by 0.1-0.3 :1 over meal forms
- Aggravate gut health
- Increase the likelihood of higher salmonella scores.

Wet feeding can be very effective, resulting in efficient feed conversion and improved gut health. It may provide opportunity for reducing raw material costs by incorporating co-products where these can be obtained at competitive prices. However, the capital and maintenance costs of wet feeding equipment are relatively high.

Feed wastage occurs on all pig farms to some extent. It is unlikely to be less than 2% but, at extremes, can be as high as 10% where meal is floor fed. Feed wastage can be reduced by correct feeder adjustment and good feed bin/store management.
7.0 Veterinary Health Plan

The VHP aims to minimise the risk of new infections entering the unit by establishing good biosecurity protocols. In addition it aims to control infections present in the unit through management, principally hygiene and pig flow, in conjunction with preventative medication programmes where necessary.

7.1 Herd health security

Ordinarily, on-going monitoring of the source of replacement breeding stock, semen supply, acclimatisation procedures and vaccination policies will have been agreed previously for the breeding unit supplying a finisher facility. This will help to maintain herd health security but the following are also required.

7.1.1 Security fence

Security fences and barriers help control the movement of people, vehicles and larger wild animals and minimise the risk of pig contact. Specific locked loading and delivery points allow the controlled arrival or dispatch of pigs, feed, straw, slurry and supplies.

7.1.2 Security fence

Production staff must not live on another farm where pigs, poultry or other production livestock are kept, nor share residence with anyone who works with pigs, poultry or other production livestock.

Visitors, including maintenance personnel, should only be allowed access by prior appointment.

Recommended downtimes:
- Free from pig contact for two nights
- Away from other livestock premises for one night
- Away from other pig people, industry meetings, etc. for one night.

All visitors should be asked to sign a visitors’ book showing their name, company, reason for entering the unit, time of entering the unit and the last date and location of pig contact.

All people entering the unit must remove outside (dirty) footwear before entering the changing area.

Wash hands thoroughly using the soap and warm water provided.

All people entering the unit must wear clothes, coveralls, hats and boots provided.

All boots must be dipped in the chosen disinfectant prior to entry on the farm.
7.1.3 Changing room

A change of clothing and footwear plus strict hand washing, or possibly showering, go a long way towards preventing the majority of diseases from entering the unit.

Essentials of a suitable changing room are:

• One entrance with coded lock
• Separate heated changing rooms for men and women
• Distinct ‘dirty’ and ‘clean’ changing areas with showers (if required by the VHP) forming the ultimate barrier between the two zones
• Individual lockers in both clean and dirty areas
• Wash room with heavy duty washing machine/s, dryer/s and storage racks
• Two sets of clothing for each employee and spare sets for visitors
• Separate boxes in storage area for each employee’s spare clothes
• Separate toilets and washbasins for men and women
• Storage room for supplies
• Kitchen/dining area for farm staff
• Clean area/farm office with hatch to porch area where visitors report.

7.1.4 Staff room policy

All food and drink must be restricted to the staff room only and must be stored in the raised cupboards provided. Waste food MUST NOT be fed to pigs under any circumstances.

No food containing any kind of pork product must be brought onto the premises.

Food and drink must not be stored in the drugs’ refrigerator.

Wash hands thoroughly after meals, visits to the toilet and before and after handling pigs.

7.1.5 Hand tools

It is strongly recommended that the unit has a selection of hand tools available in order to minimise the number of tools which need to be brought onto the unit by service personnel. Extension leads which may become contaminated with faeces and urine could become a particularly high disease risk, hence these should always be supplied. Any specialist tools required to be brought onto the unit should be inspected and wiped or dipped to disinfect.
7.1.6 Feed supplies

Feed should come from an accredited source which has been made fully aware of the health status of the unit and the supplier should take precautions to prevent the spread of disease from one unit to another.

A lorry-mounted flexible feed blow-in pipe, connecting the feed truck to the feed bin, can easily become contaminated. It must be cleaned and disinfected before arrival and all feed suppliers must be made aware of this important need.

A preferred alternative is for the farm to have its own flexible blow-in pipe.

In the absence of a security fence, the feed delivery driver must dip his/her footwear near to the feed bin prior to any activity on the farm or use boots provided by the farm.

7.1.7 Straw and bedding

Straw and bedding materials should only come from known verified sources.

If straw is used, an access gate will be required next to the storage area. Straw deliveries can pose a threat to herd health and the preferred option is for the contractor to park trailer loads of straw outside the perimeter fence but adjacent to the storage area for subsequent transfer into the unit by farm staff and machinery. The access gate should remain locked outside working hours.

Other bedding materials, eg shavings and peat, should again be transferred into the unit by farm staff.

7.1.8 Loading ramp

All pigs must enter/leave the unit by the loading ramp.

Loading bay design

- The loading bay should consist of a unit (clean) area and truck (dirty) area with a one-way ramp gate between the two areas
- The whole area should be constructed of easy-clean materials which must be thoroughly cleaned and disinfected after use. Wood should not be used for construction of gates or pens
- The top part of the loading ramp and the lorry area of the loading bay should drain away from the pig unit.
Appendix 7

Loading and unloading pigs

- All pigs must enter/leave the unit via the loading bay
- Unit personnel responsible for loading the pigs must change into dedicated loading bay boots by the foot dip which should be used at all times during loading procedures
- If necessary the disinfectant in the foot dip should be replenished
- The lorry driver must put on clean protective clothing and boots which must be dipped immediately after descending from the lorry cab
- Unit personnel should stay within the farm section of the loading bay during the loading process and must not make foot contact with the lorry zone of the loading bay, ie the top part of the ramp or the lorry tailboard
- The lorry should be inspected on arrival, paying particular attention to the tailboard for cleanliness and any evidence of dung contamination. If contaminated the lorry must be sent away for cleaning
- The lorry driver must remain in the lorry zone of the loading bay during the loading process
- Once a pig for dispatch has entered the top part of the ramp it must go onto the lorry and should never re-enter the unit. If a problem arises, the pig should be isolated off the unit
- After the lorry has left, any bedding material from the top section of the loading bay must be cleaned outwards for disposal outside the unit. Manure from the holding pens or remainder of the loading bay area may be disposed of within the unit
- The top section of the loading bay should be washed outwards away from the unit. The remainder of the loading bay may be washed to drainage points within the unit
- The whole loading bay area should then be disinfected with a Defra-approved disinfectant.

7.1.9 Bird control

Birds may carry diseases into pig units and efforts should be made to deter them from visiting the unit. Control measures involve preventing bird access to all sources of feed and securely bird-proofing all buildings so that no roosting places are available.

7.1.10 Rodent control

Mice tend to become resident within a single pig unit and do not typically travel from farm to farm. They may carry diseases such as swine dysentery and salmonella and may, therefore, be responsible for disease carrying over from an old herd to a new herd following depopulation. Rats, however, will travel several kilometres between farms and typically enter farms when external feed sources become scarce.

Depopulation of a dirty herd poses a serious threat to surrounding units since rats usually desert the farm during the clean down and search for a new source of feed. They also carry and shed salmonella so they may also physically transfer disease from one pig farm to another.
7.1.11 Fly control

The fact that insects may be carried long distances on the wind or even in vehicles should be regarded as a disease threat. On a pig unit, flies have access to both live and dead pigs which might be carrying diseases. Flies can carry pig diseases within their digestive system. Although not proven, there is likely to be a threat of spreading pig diseases when flies vomit on feed prior to ingesting it.

Flies thrive in situations where general housekeeping is a problem.

7.1.12 End-of-batch cleaning

Continuous use of pig buildings allows pathogenic organisms to build up to infectious levels and may result in carry-over of disease from one batch of pigs to the next.

Disease has an adverse impact on subsequent growth rates, feed conversion efficiency and mortality in the nursery and finishing departments. Although medication may be required to help control a disease problem, strong emphasis must be placed on management and hygiene procedures to break the disease cycle.

End-of-batch cleaning procedures using modern detergents, sanitisers and disinfectants have been developed to reduce bacterial contamination to below the threshold levels which can cause disease.

7.1.13 Deadstock disposal

Carcases should be disposed of safely and promptly in accordance with current legislation. Incineration is the only method available for on-farm disposal and off-farm disposal must be by a licensed contractor.

7.2 Medication

All water medication must be recorded in the medicine book.

Permitted medicines and relevant medicines withdrawal period documentation will be provided by the attending vet, reviewed each quarter and the list modified accordingly.

Staff should always read the label for up-to-date information on withdrawal period and dosage or refer to site-specific veterinary guidance on usage.
7.3 Key Performance Indicators (KPIs)

Data should be provided at least quarterly as indicated below.

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7.4 Microclimatic and general assessment

Quarterly Veterinary Visit Reports and other written advice should be provided by the contractor or associated vet practice. It should include comments on the thermal and physical environments and their interaction with the health and welfare of pigs, with particular reference to lameness and behavioural problems.