

# Effluent Treatment Plant Best Available Techniques (BAT) Assessment

**Client:** Dovecote Park Ltd

**Project:** Ferry Lane, Skellingthorpe, Lincoln, LN6 5TX

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## 1. Introduction

## 1.1 Scope

WSPCC Ltd has been instructed by Dovecote Park Ltd to prepare a permit variation application for their existing permit (Ref EPR FP3830BX) for the addition of an Effluent Treatment Plant to treat abattoir wastewater and the discharge of treated wastewater to surface water.

This report covers an assessment of Best Available Techniques (BAT) from the most relevant Best Available Technique Reference Document (BREF). Also considered is any effect the variation may have on the BAT for the Slaughterhouses and Abattoir industries.

The document is to ensure that Best Available Techniques at this site is the main objective of its operations and clear operating procedures are in place in line with best practice.

The existing operation relating to the abattoir is unaffected by the variation other than for the addition of a Waste Water Treatment Plant and the discharge to surface water, therefore a review of the Best Available Techniques in 'The Red Meat Processing (Cattle, Sheep and Pigs) Sector (EPR 6.12)' and 'Common Waste Water and Waste Gas Treatment/Management systems in the Chemical Sector' have only been reviewed in so far as the changes applied for.

## 1.2. Assessment Approach

'The Red Meat Processing (Cattle, Sheep and Pigs) Sector (EPR 6.12)' Environment Agency guidance has been reviewed. Please refer to section 2 for the justification against each applicable BAT requirement as set out in the Environment Agency guidance document. Section 3 also focusses on additional BAT requirements/considerations.

## 2. Waste Water Treatment Plant Overview

### 2.1 Technical Operations

The diagram below (Figure 1) shows the indicative layout of the Waste Water Treatment Plant at Dovecote Park Ltd.

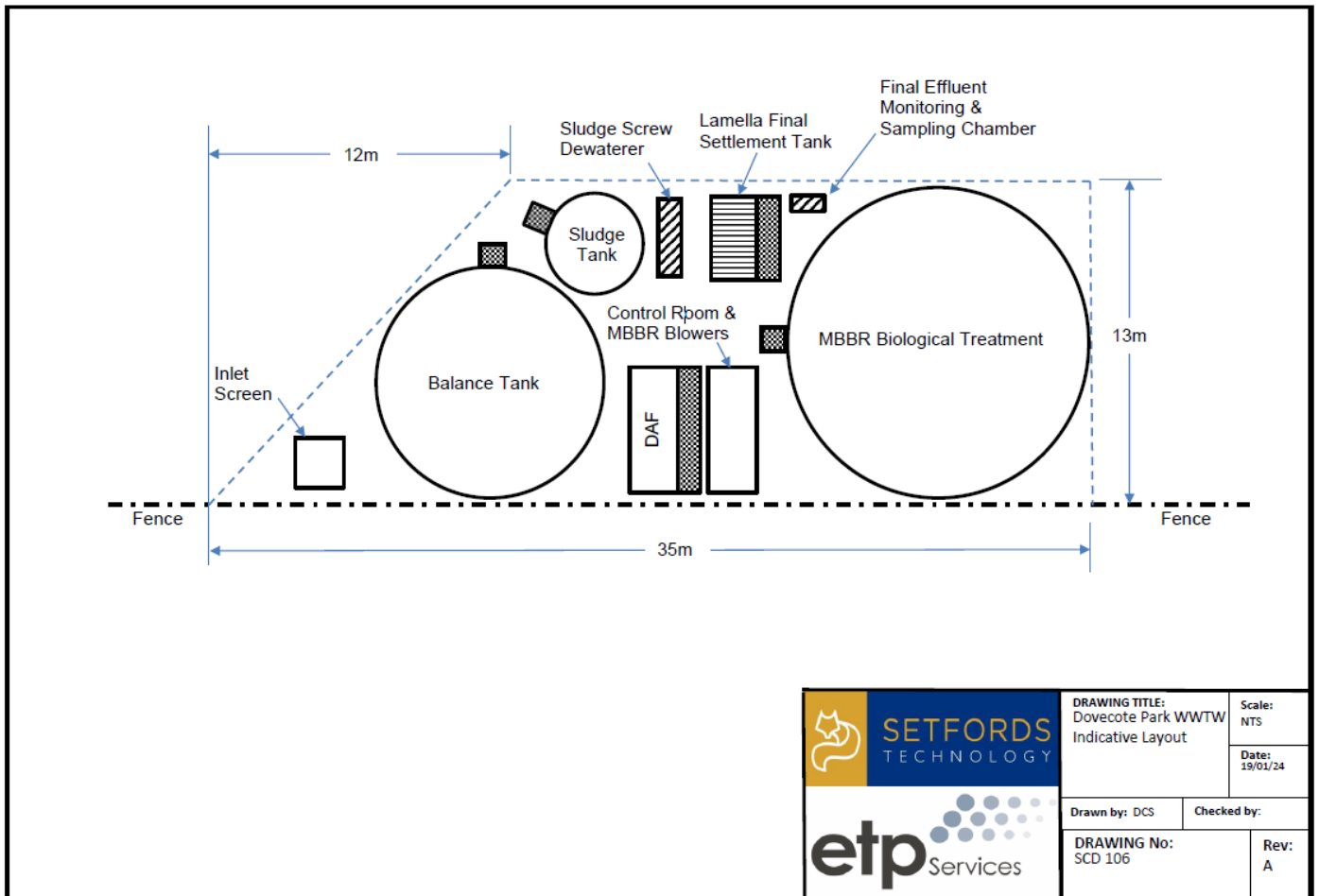


Figure 1: Waste Water Treatment Plant indicative layout.

### 3.0 BAT Assessment

#### 3.1 BAT Assessment

This BAT assessment has been produced using the Environment Agency EPR guidance document: “The Red Meat Processing (Cattle, Sheep and Pigs) Sector (EPR 6.12)” which focuses on the management, operation, emissions and monitoring of the site.

### 3.1.1 Accident Management

BAT requirements	Comments
<ol style="list-style-type: none"> <li>1. Ensure that fat, oil and grease (FOG) does not block drains.</li> <li>2. Identify the major risks associated with the effluent treatment plant (ETP) and have procedures in place to minimise them.</li> <li>3. Ensure adequate containment of blood storage tanks.</li> </ol>	<p>Environmental risk assessment updated to include effluent treatment plant and discharge of treated abattoir water into surface water. Potential risks and magnitude of risk with management identified in environmental risk assessment as low or very low.</p> <p>FPC-11 and Maxichlor are cleaning detergents for the plant to enhance the DAF process (Data safety sheets: Document references- DP-SK-011 and DP-SK-012). These containers will be stored within a bunded container. Training given to staff on spillage procedures.</p> <p>Any risks identified have procedures and mitigation measures in place.</p>

### 3.1.2 Energy Efficiency

BAT requirements	Comments
<p>1. Consider the following techniques to reduce energy consumption:</p> <ul style="list-style-type: none"> <li>• in pig abattoirs, recovering useable heat from the exhaust from the singeing unit</li> <li>• minimisation of water use. Typically about half of the total water usage at an abattoir is heated to between 40oC and 60oC. Heating this water requires substantial energy consumption, and adds a significant cost</li> <li>• efficient operation of the refrigeration system – consider heat recovery from refrigeration system, reducing heat load, efficient operation on part load and fast closing doors/alarms on chilled storage areas.</li> </ul> <p>2. Pig scalding</p> <ul style="list-style-type: none"> <li>• If you operate a pig abattoir, you should consider using humidified air as the scalding process. Shower scalding has a very high water and energy consumption and is not BAT. Pig singeing</li> <li>• pig singeing ovens should be insulated, with automatic doors</li> <li>• fuel consumption can be reduced by using solenoid switches to initiate the flame only when carcasses are passing through.</li> </ul> <p>4. You should meet the energy benchmarks shown in Table 1</p>	<p>Not applicable to the Effluent Treatment Plant installation.</p>

### 3.1.3 Efficient use of raw materials and water

BAT requirements	Comments
<ol style="list-style-type: none"> <li>1. Use recirculating systems to recycle water. (Once-through cooling systems should not be used.)</li> <li>2. Interlock chemical dosing pumps with cleaning operations, so that dosing does not continue after cleaning is complete.</li> <li>3. Meet the water consumption benchmarks in Table 2 below</li> </ol>	<p>The slaughter wastewater comes from the pre-slaughter washing water, the post-slaughtered meat and viscera cleaning water, and the slaughter equipment and workshop floor flushing water. The slaughter and production wastewater produces large changes in quality with the seasons, high organic content, good biodegradability, solid suspended solids content. The slaughter wastewater contains some blood (majority collected separately), grease, hair, meat scraps, partial contents from washed internal organs, and is organically biodegradable through a wastewater treatment system.</p> <p>The wastewater does not contain any hazardous chemicals as defined by the EA. There is no ammonia or phosphorous in the discharge. Using 'H1 annex D2: assessment of sanitary and other pollutants in surface water discharges' EA guidance document, Biochemical oxygen demand in the wastewater is treated to ensure the discharge does not cause more than 10% deterioration in the water quality of Skellingthorpe Main Drain.</p>



### 3.1.4 Raw material use

BAT requirements	Comments
<ol style="list-style-type: none"><li>1. Monitor for leaks of refrigerant.</li><li>2. Ensure planned maintenance of the refrigeration system is carried out.</li><li>3. Optimise dosing of disinfectants and detergents.</li><li>4. Ensure that staff are trained in the handling, making up of working solutions and their application, in particular not setting the concentration of the chemical agent too high.</li></ol>	<p>Regular monitoring and inspections of effluent treatment plant. Key staff are aware of the impacts or possible impacts to the environment of the activity for which they are responsible, and of their responsibilities. Training is developed to ensure that all staff are environmentally aware.</p> <p>The operation and maintenance of the effluent treatment plant will be outsourced to the winning process contractor. Cleaning agents are kept in a locked store equipped with a spillage kit.</p>

### 3.1.5 Avoidance, recovery and disposal of wastes

BAT requirements	Comments
<p>You should where appropriate::</p> <ol style="list-style-type: none"> <li>1. Demonstrate that the chosen routes for recovery or disposal represent the best environmental option considering, but not limited to, the following:               <ol style="list-style-type: none"> <li>a. all avenues for recycling back into the process or reworking for another process</li> <li>b. composting</li> <li>c. animal feed (if allowed under animal by-product legislation)</li> <li>d. other commercial uses</li> <li>e. landspreading, but only under the following circumstances:                   <ul style="list-style-type: none"> <li>– you can demonstrate that it represents a genuine agricultural benefit or ecological improvement</li> <li>– you have identified all the pollutants likely to be present. These may be substances from the process, from the materials of which your plant is constructed (e.g. reaching the waste by corrosion/erosion mechanisms), from materials related to maintenance (e.g. detergent). You should consider all these possibilities, for both normal and abnormal operation of the plant. You should validate your conclusions by chemical analysis of the waste</li> <li>– you have identified the ultimate fate of the substances in soil</li> </ul> </li> </ol> </li> </ol> <p>Note: un-processed meat scraps collected from screening equipment are not listed as a waste which can be exempted and therefore cannot be sent for application by landspreading.</p> <ol style="list-style-type: none"> <li>2. You may collect screened waste water and pump it to neighbouring agricultural land for soil injection as a fertiliser (subject to certain restrictions). You can only do this under a landspreading exemption. If you do this, you must take care that surface water run-off from the agricultural land does not cause contamination of local controlled water courses during extremely wet weather. You should ensure that you have adequate storage capacity to store waste water during these conditions, and you must be able to make alternative arrangements if the wet weather persists and the storage capacity at the abattoir is in danger of being exceeded.</li> </ol>	<p>Target standards for ensuring water quality does not deteriorate more than 10% were provided by the EA to calculate the allowable discharge concentration for the parameters that are of concern: ammoniacal nitrogen, phosphorus and BOD. Due to the nature of the wastewater, only BOD is present in the treated wastewater.</p> <p>A BOD concentration of 22mg/l with a flow rate of 2.31l/s over 24 hours remains within acceptable limits, causing no more than a 10% deterioration in water quality. This concentration is considered permissible for discharge according to the EA guidance, H1 Annex D2.</p> <p>The wastewater does not contain any hazardous chemicals as defined by the EA. FPC-11 and Maxichlor are cleaning detergents for the plant to enhance the DAF process. These containers will be stored within a bunded container. Training given to staff on spillage procedures.</p> <p>Treatment Plant has a final effluent sampling and measurement chamber and is continuously monitored before entering surface water. A flow recorder and logger will be installed to ensure the daily flows are not exceeded and provide a record for EA inspection. Regular samples will be taken monthly and analysed for all final effluent parameters.</p>

### 3.1.6 Emissions to water

BAT requirements	Comments
<p>1. Keep raw materials and product out of the wastewater system wherever possible. Waste water from process areas at abattoirs is normally screened to remove hairs, meat scraps and gross solids to reduce BOD and prevent drains becoming blocked. e.g. The outlets from the pig scald tanks should pass through a screen or sedimentation trap before discharge to the waste water treatment system as whole, to reduce the loading and in some cases shock loading of the discharge of this unit.</p> <p>2. Use a balancing tank or pond (equalisation or balancing), with a hydraulic retention time of 6 – 12 hours, which can improve treatment in the following ways:</p> <ul style="list-style-type: none"> <li>• by allowing waste streams to be combined e.g. acid and alkali streams from the regeneration of deionisers; or high BOD and low BOD waste streams. This can reduce consumption of reagents</li> <li>• by making the flow rate less variable. This can reduce the size of the treatment plant needed, as it only has to handle the average flow and not the peak flow.</li> </ul> <p>3. Provide contingency measures to prevent accidental discharges from overloading or damaging the treatment plant. These will often include providing a diversion tank into which potentially damaging wastewater can be diverted. This should typically have a capacity of 2 – 3 hours at peak flow rate. The wastewater should be monitored upstream of the treatment plant to allow automatic diversion to the tank. The contents of the diversion tank may be gradually re-introduced into the wastewater stream or removed for off-site disposal. If you do not provide a diversion tank, you must tell us what equivalent measures you use to protect your treatment plant.</p> <p>4. If you operate an activated sludge plant, you must manage the following issues carefully:</p> <ul style="list-style-type: none"> <li>• the development of bulking sludges</li> <li>• the carrying of excessive biomass inventories</li> <li>• the formation of biologically stable foam</li> <li>• the inhibition of microbial activity by biocidal substances from cleaning/sterilising agents.</li> </ul> <p>5. At sites with biological treatment plant ensure the surface water drains are not routed to the treatment plant.</p>	<p>Cleaning accounts for the majority of water usage at the plant. The volume of water is minimised through good practices in cleaning techniques.</p> <p>The slaughter wastewater contains some blood (majority collected separately), grease, hair, meat scraps, partial contents from washed internal organs, and is organically biodegradable through a wastewater treatment plant.</p> <p>Contamination of process water is reduced through BAT cleaning (Section 4.3) and process techniques (BAT 9 ii, iv, v, vi Appendix 1) whereby the quantity of waste meat product entering the drainage system is reduced through dry cleaning the area before wet cleaning and through the use of mesh catch-pots in the drains. Further screening is achieved through an Aqua-rake in the drainage system (BAT 11 vi, Appendix 1).</p> <p>Process and lairage wash water goes to the effluent treatment plant which has an inbuilt chamber for monitoring pollutant levels before discharging into surface water. A flow recorder and logger will be installed to ensure the daily flows are not exceeded and provide a record for EA inspection.</p>

BAT requirements	Comments
<p>Common Waste Water and Waste Gas Treatment/Management systems in the Chemical Sector (CWW BAT):</p> <p>BAT 9: In order to prevent uncontrolled emissions to water, BAT is to provide an appropriate buffer storage capacity for waste water incurred during other than normal operating conditions based on a risk assessment (taking into account e.g. the nature of the pollutant, the effects on further treatment, and the receiving environment), and to take appropriate further measures (e.g. control, treat, reuse).</p> <p>BAT 11: In order to reduce emissions to water, BAT is to pretreat waste water that contains pollutants that cannot be dealt with adequately during final waste water treatment by using appropriate techniques.</p>	<p>The slaughter wastewater contains some blood (majority collected separately), grease, hair, meat scraps, partial contents from washed internal organs, and is organically biodegradable through a wastewater treatment system.</p> <p>A double skinned emergency buffer tank will ensure there is adequate storage capacity and appropriate buffer storage capacity of wastewater should other than normal operating conditions arise.</p> <p>The quantity of waste meat product entering the drainage system to the effluent treatment plant is reduced through dry cleaning the area before wet cleaning and through the use of mesh catch-pots in the drains. Further screening is achieved through an Aqua-rake in the drainage system.</p> <p>No pretreatment is required as it is highly biodegradable wastewater. This will be treated adequately during final wastewater treatment.</p> <p>The ETP will have a remote monitoring system including a final effluent sampling chamber enabling daily flow to be measured. This remote monitoring ensures flow can be stopped at any time with turbidity and ammonia meters installed with alarms to provide remote effluent quality monitoring, ensuring compliance with permit conditions.</p>

### 3.1.7 Fugitive emissions

BAT requirements	Comments
<p>Regularly inspect pipe joints, shaft seals and gaskets in the refrigeration plant using proprietary leak detection equipment.</p> <p>2. Ensure that a system log book is kept which records: • quantity of refrigerant and oil added to or removed from the system(s) • leakage testing results • location and details of specific leakage incidents</p>	<p>The operation and maintenance of the wastewater treatment works will be outsourced to the winning process contractor. Management systems and risk analysis will be in place.</p> <p>Any incidents to be logged in the system log book.</p>

### 3.1.8 Odour

BAT requirements	Comments
<p>In addition to good housekeeping, the key factors in controlling odour from the storage of blood / by-products are exposure time and temperature. For example the storage of solids below 50C and blood below 100C is reported to reduce odour problems.</p> <p>In addition to the requirements in “Getting the basics right”, the following should be used where appropriate in this sector:</p> <ol style="list-style-type: none"> <li>1. Minimise manure production by controlling feeding rate prior to transportation of animals to site</li> <li>2. Storage of putrescible waste /by-products/ in sealed containers</li> <li>3. Frequent cleandown of waste containers to prevent build-up of malodorous material</li> <li>4. Frequent e.g. daily removal off site of blood/ by-products</li> <li>5. Refrigeration of blood/ animal by-products / putrescible material if extended on-site storage is carried out.</li> <li>6. Enclosure of potentially odorous operations e.g. <ul style="list-style-type: none"> <li>• macerator equipment used to chop and wash inedible offal</li> <li>• effluent treatment plant</li> </ul> </li> <li>7. Install odour abatement e.g. activated carbon filter on the blood storage tank vents.</li> <li>8. Back vent road tankers through the odour abatement unit during blood collection</li> <li>9. Use of screens/catchpots to prevent meat scraps / fats from entering drainage system</li> <li>10. Ensure that effluent treatment plant is adequately maintained . Where present, aeration tanks should be kept aerated and mixed at all times except where maintenance necessitates shut-down of the aeration system. Implement alternative operational arrangements during shut-down to avoid odour nuisance.</li> <li>11. Control of hydraulic retention times and desludging in effluent systems to prevent malodours.</li> </ol>	<p>Odour management plan identifies procedures for monitoring odour.</p> <p>Wastewater is already produced on site and therefore the odour risk remains unchanged. Abattoir wastewater will be directed to the onsite effluent treatment plant for treatment.</p> <p>Operational procedures and contingency plans in the event of shutdown will be followed to ensure effluent treatment plant is adequately maintained.</p> <p>The receptor sensitivity is low as prevailing wind direction is south-westerly and therefore odour emission would be predominantly blown away from nearby sensitive receptors.</p>

### 3.1.9 Noise and Vibration

BAT requirements	Comments
<p>Although cattle and sheep are generally fairly quiet, pigs may be noisy, particularly during unloading and marshalling operations. If there is a potential for impact on the neighbours then these operations should be carried at reasonable hours of day.</p>	<p>Not applicable to the Effluent Treatment Plant installation.</p>

### 3.1.10 Monitoring

BAT requirements	Comments
<p>The following should be used:</p> <ol style="list-style-type: none"> <li>1. Identify process variables that may affect the environment and monitor as appropriate</li> <li>2. Assess whether monitoring the parameters in Table 4 below would enable you to minimise your environmental impact or reduce the risk of an accident.</li> </ol> <p>Effluent quality: Many DAF plants include continuous monitoring of effluent quality, out of specification alarms and automatic by-pass systems routed to a stand-by effluent sump which can be used to store effluent if the DAF plant breaks down. Continuous and recorded.</p>	<p>Treatment Plant has a final effluent sampling and measurement chamber and is continuously monitored before entering surface water. A flow recorder and logger will be installed to ensure the daily flows are not exceeded and provide a record for EA inspection. Regular samples will be taken monthly and analysed for all final effluent parameters.</p> <p>Contingency plans will be in place in the event of effluent plant shutdown/breakdown.</p>

## **4 Additional BAT Considerations**

### **4.1 Operation of the effluent treatment plant**

The effluent treatment plant will be operated during normal operating hours. The effluent treatment plant will be undergoing maintenance and/or downtime according to the management systems provided by effluent treatment plant contractor.

#### **4.1.1 Monthly test regime:**

The effluent treatment plant will undergo regular testing to ensure optimum operating efficiency.

### **4.2 Future expansion**

It is unlikely that the site will expand due to geolocation and logistics but in the event of such plans, the BAT document will be reviewed and amended according to the most recent BREF or relevant guidance document.

### **4.3 Noise**

Noise from the site is usually from other sources and a noise impact assessment has been carried out for planning purposes and identified the sensitive receptors around the site. Since the site is an operating abattoir, noise is generated through operations and movement of the animals to site. The effluent treatment plant is unlikely to cause high levels of noise at the sensitive receptors.

Engines that do not significantly exceed the background day / night-time noise levels by more than 10dB, are considered to be BAT.

### **4.4 Slaughterhouses and Abattoir BAT**

The BAT REF document for the Slaughterhouses and Abattoir Industries (May, 2005) states that “For slaughterhouses, the key environmental issues are generally water consumption; the emission of high organic strength liquids to water and the energy consumption associated with refrigeration and heating water. For animal by-products installations, the main issues are related to the energy consumption associated with drying animal by-products; the emission of high strength organic liquids to water; infectivity, especially related to the controlling, the handling and the destruction of TSE material and odour.”

The application to vary the existing permit does not affect the water consumption, emissions of high organic strength liquids to water, infectivity, or odour. Operations remain the same on site, but with an addition of an effluent treatment plant to treat abattoir wastewater onsite reducing the need to store and wait for a registered contractor to remove from site.

Whilst noise is an issue for slaughterhouses and abattoirs, the BAT REF document cites this as being predominantly from animals. See section 4. 6 Noise.



## 5 Conclusion

BAT documents have been considered for this permit variation application. Comment has been made to demonstrate compliance with the BAT requirements where these are relevant to the installation.

## 6 References

Environment Agency (2014) *H1 Annex D2. Assessment of sanitary and other pollutants within Surface Water Discharges*. Available at:

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