Sectorial EIA Guidelines - Slaughterhouse

Environmental Management Strengthening
former Yugoslav Republic of Macedonia

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<tr>
<th>Acronym</th>
<th>Description</th>
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<tbody>
<tr>
<td>BAT</td>
<td>Best available technique</td>
</tr>
<tr>
<td>BOD</td>
<td>Biological Oxygen Demand</td>
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<tr>
<td>BREF</td>
<td>BAT Reference Documents</td>
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<tr>
<td>BSE</td>
<td>Bovine Spongiform Encephalopathy</td>
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<tr>
<td>COD</td>
<td>Chemical Oxygen Demand</td>
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<tr>
<td>EAR</td>
<td>European Agency for Reconstruction</td>
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<tr>
<td>EC</td>
<td>European Council</td>
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<td>EEC</td>
<td>European Economic Community</td>
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<td>EIA</td>
<td>Environmental Impact Assessment</td>
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<td>EIS</td>
<td>Environmental Impact Statement</td>
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<tr>
<td>EU</td>
<td>European Union</td>
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<tr>
<td>HACCP</td>
<td>Hazardous area critical control point</td>
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<tr>
<td>IPPC</td>
<td>Integrated Pollution Prevention and Control</td>
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<tr>
<td>MoEPP</td>
<td>Ministry of Environment and Physical Planning</td>
</tr>
<tr>
<td>NGO</td>
<td>Non-governmental organization</td>
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<tr>
<td>O.G.</td>
<td>Official Gazette</td>
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<tr>
<td>SEA</td>
<td>Strategic Environmental Assessment</td>
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<tr>
<td>SRM</td>
<td>Specified Risk Material</td>
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<tr>
<td>TSE</td>
<td>Transmissible Spongiform Encephalopathy</td>
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1. Introduction

1.1 Background

The whole EIA process in general is an information gathering exercise involving and requiring:

- EIA Procedures & Guidelines
- EIA Sector Guidance Notes

These guidelines on slaughterhouses have been prepared as part of the Project: “Environmental Management Strengthening”, and have been tailored to the specific situation in the fYR of Macedonia”.

The development of sector EIA guidelines must take into consideration the requirements of the EU EIA Directive and also the Integrated Pollution Prevention Control Directive – IPPC, where appropriate. There is a considerable degree of overlap between the two pieces of legislation, namely.

It is important irrespective of the type of sector EIA process being undertaken, that a standard or generic approach is adopted regarding the information to be contained in an environmental impact statement – EIS.

This approach is applicable to Macedonia given that Macedonia is in the process of approximating key EU EIA Directive with Macedonian environmental legislation.

Clear guidance is required to maintain Environmental Impact Assessment as a practical application of sound technical and specialist knowledge.

EIA provides environmental information and guidance to the decision making process. An Environmental Impact Statement (EIS) is the document produced within the EIA process. Where effects are identified as an unacceptable, these must be avoided or reduced during the design process.

The EIA procedure commences at the project design stage where it is decided whether an EIS is required. If it is required, the scope of the study is determined after which the EIS is prepared as part of the application for development consent.

The competent authority evaluates the EIS, circulating copies to statutory consultees, while also making it available to the public. The competent authority then makes its decision to grant or refuse permission or to seek additional information, having regard to the information contained in the EIS and any information submitted by the public and consultees.

Guidelines for the environmental impact assessment procedures for slaughterhouses development are described herein. The guidelines focus on providing guidance for the EIA procedure concerning slaughterhouses.

The guidelines are meant for use by operators, authorities, the public and consultants.

The guidelines include the principal of cumulative collection of environmental information for subsequent use in the preparation of the EIS.

Essentially the guidelines provide guidance on how to ensure that the EIA process is directed towards the protection of the environment during and after the development in question.
EXAMPLE OF EIA PROCESS

1. Screening to determine if the project requires an EIA

2. Scoping to determine extent & details of the EIA

3. Developer conducts an assessment of the proposed project modifying the proposal where required in the light of EIA

4. Developer prepares EIA on finalised draft of proposed project & submits it in support of the application for authorisation an application for approval by the competent authority

5. EIA / EIS is made available to environmental authorities & public for information & comment

6. Competent authority incorporates all relevant information + EIS & consultation comments into account in reaching a decision on the proposed project

7. Provisions for monitoring implementation of the project and its environmental impact
Animals slaughtered at slaughterhouses include full-grown bovines, calves, sheep, pigs and poultry. The animals are transported to pens at the slaughterhouse. At that point the slaughtering process starts, consisting of slaughter, incision and blood draining, removal of the skull and legs, evisceration (removal of the abdomen and chest organs), splitting and trimming. In case of pig slaughter there are also the steps of scalding, scarring, singeing and brushing. Additional processes include tripe-dressing, salting of hides and offal disposal. Washing, cleaning and disinfection agents are used in the processes as well as refrigerants, chemicals for water purification and lubricants.

The major impacts associated with slaughterhouses are mainly related to waste water discharges. Other environmental disturbances are caused by discharge of unpleasant odours, noise and the disposal of offal and waste.

The major challenge is to try and balance the positive impacts of slaughterhouses with potentially negative impacts generated by its operation.

The significance of impacts is also dependent on the proximity of the facility to dwellings and other places of human activity.

For the purposes of preparing these guidelines, the information sources used are listed in Annex 1.

1.2 EIA – Legislative Context EU & Macedonian

Slaughterhouse developments and operations come within the scope of Annex II of the EIA Directive and Annex II of the Macedonian Decree that prescribes the projects for which an environmental impact assessment is required.

In EU Member States, the requirement for undertaking an EIA for projects set out in Annex II of the EIA Directive is determined either on a case by case basis or on the basis of thresholds or other criteria (such as site sensitivity), or a combination of these approaches.

In some EU Member States, in addition to transposing the mandatory requirements applicable to Annex I projects, the member states have chosen to set thresholds for each of the project types in Annex II.

The thresholds are set at levels that distinguish between the projects which by virtue of their nature, size or location, are likely to have a significant impact / effect on the environment, and those which are not.

It maybe that in some cases an EIA will be required for projects that fall below the thresholds because of the environmental sensitivity of the location of the project.

The key legislation which is of relevance to the Slaughterhouse Guidelines is as follows:

2. EIA Stages

The environmental impacts of projects are usually determined during the early phases of project planning, site selection and design. The procedure for project cycle management addresses when to use environmental tools such as EIA, SEA, Environmental Management Programmes and Environmental Audits.

To assist in the production of Environmental Impact Statements that achieve the objectives of impact anticipation and avoidance, it is important to consider the relevant issues as they arise during each of the principal stages of EIA, such as screening and scooping.

The EU Directive 85/337/EEC amended by Directive 97/11/EC, the latter made provision for guidance to be provided reflecting current EU legislation, and the current state of good practice as it relates to the EIA process.

This approach is reflected in documents published by the EU and relating to screening, scooping and EIS review, with reference to these three specific stages in the EIA process.

The EIA process represents a systematic analysis of the proposed development in relation to the existing environment. It is conducted at a stage in the design process where changes can still be made to avoid adverse impacts, schematically shown as follows overleaf.

2.1 Screening

The process by which the competent authority determines whether or not an EIA is required is known as screening. Despite extensive and highly specific EIA legislation there will still be circumstances where a determination is be required as to whether or not an EIS is mandatory. Where legislation or other official guidance is inconclusive it may be useful (err on the side of caution) to consider the following issues:

- Could the development significantly affect more than one significant or sensitive environmental resource?
- Is the project of a large size and effect and does it involve emerging technologies or techniques?
- Are there significant levels of unpredictability about the effects arising from the methods, technologies or because of the absence of data on the receiving environment?
- Is there reason to believe that there may be significant and reasonable levels of public concern about demonstrable effects on environmental resources?

If YES is the clear and immediate answer to any of these questions, then it is reasonable to anticipate that an EIA is required.

In such an evaluation, however, it is important to clearly examine whether concerns (public or expert) arise on account of:

- a single or very specific environmental topic, e.g. archaeology
- a single or very restricted characteristics of the development e.g. noise emissions
- uncertainty or data limitations about a single aspect of the development.

If any of these concerns exist in the absence of clear requirements for an EIS (under Macedonian legislation) consideration should be given to preparing a detailed evaluation (EIA) of the single or restricted topic, issue or uncertainty as an appropriate evaluation. This could arise where there is a likelihood of significant effects on the environment by reference to the nature or location of a project, e.g. potential impact on a designated conservation site or sensitive environment(s).

The criteria to be adopted in relation to undertaking an EIA for a Slaughterhouse Development should be based on the following:

- operation of slaughterhouses with a carcase production capacity greater than 50 tonnes / day;
- slaughter of animals in installations where the daily capacity exceeds 1,500 units and where units have the following equivalents:
  - 1 sheep = 1 unit
  - 1 pig = 2 units
  - 1 head of cattle = 5 units

2.2 Scoping

The prior determination of the nature and detail of the information to be contained in an EIS is one of the most critical stages of the process. This stage is known as scoping. This may be a formal or informal process but essential from the point of view of establishing full and effective communication between the various parties involved in the EIA process.
Scoping is aimed at identifying the likely areas of potential impact and the appropriate methods by which to evaluate them prior to the commencement of detailed collection or assessment.

The above referenced scoping activities which are discussed and agreed between the developer, competent authorities to such as planning and regulatory bodies provides an invaluable overview of what activities must be undertaken in order to produce a good quality Environmental Impact Statement.

All of the information obtained in the scoping activity phase serves as input material for the environmental studies subsequently conducted as part of the overall environmental impact assessment process.

Good scoping at the outset of a project will reduce time, effort and expense required to prepare and evaluate environmental impact statements and should facilitate public participation in the EIA process.

Any scoping or pre-application consultations which may have taken place will be referenced in the compilation of the EIS as well as specifying the bodies consulted.

**Methodology**

Scoping is best carried out by personnel having relevant experience of the particular project type, in this case wastewater treatment plant development and who have knowledge of the proposed receiving environment.

**Guidelines**

These relate to the scope of EIA for various EIA projects and contain guidance on the description and analysis of impacts on specific environmental media and in accordance with the requirements of the EU 85/337 EEC Directive (as amended by Directive 97/11/EC). The level of detail provided is determined by the circumstances of each project.

**Role of Participants**

The scope may emerge from a number of sources but most commonly emerge from a dialogue between or all of the participants.

The **Consultant** acting on behalf of the EIA applicant may propose an initial outline of the scope on the basis of knowledge of the project and the site.

The **Competent Authority** (MoEPP) will have a detailed knowledge of the procedural and legal requirements by the Law on environment, as well as a more extensive knowledge of both the context and local issues and concerns. The Competent Authority may be asked by applicant to scope the EIA and in such cases the Competent Authority must respond. Competent Authority may subsequently reject an EIS as being inadequate even though it has scoped the EIA although scoping should reduce the likelihood of any such rejection.

The **Public** either individually or in groups, who are likely to have either thematic or area specific concerns.

Other **Specialist Agencies** (including NGO's) who will have a detailed understanding of a particular aspect of the environment affected.
2.3 On – Going Scoping

**Design Review**

The prevention of environmental degradation and associated impact on human beings, flora and fauna etc. is the principal objective of the EIA process. This can only happen where the design is informed and reviewed by environmental criteria emerging from an appropriate assessment of the receiving environment. There is a need for the project designers (in this case slaughterhouses designers) and the environmental specialists to maintain a regular dialogue throughout the design development to ensure that this objective is achieved. Therefore regular EIA project team meetings are important.

**Document Review**

Experience in practice, particularly on large and time – critical projects has shown that considerable benefits accrue to all parties when the EIA Report or EIS is subjected to timely review by outside parties such as the Competent Authority, who may examine structure, overall coverage, findings and the likely acceptability of the residual impact levels or of the mitigation proposals. Consultation may take place on narrower issues with specialist agencies or occasionally with concerned or even potentially hostile third parties.

A document review has the following advantages particularly in the EIA scooping process phase as follows:

- avoidance of requests for additional information at a later stage in the process;
- testing of the acceptability;
- discovering interaction or conflicts that were not evident at the earlier scooping stage.

2.4 Conditions and Monitoring

EIA related conditions that are imposed by the competent authority will form part of the Impact Anticipation and Avoidance strategy.

**Conditions**

*Conditions* are mainly used to ensure that mitigation measures are secured by explicitly stating the location, quality, character, duration and timing of the measures to be implemented as they relate to a proposed slaughterhouse development.

A secondary role of EIA related conditions is to ensure that resources e.g. bonds / insurance will be available to the Competent Authority and properly directed for mitigation, monitoring or remedial action, in the event that the impacts of the slaughterhouse activities exceed the predicted levels.

**Monitoring**

*Monitoring* of the effectiveness of mitigation measures proposed in the EIS is an integral part of the EIA process. Monitoring of environmental media and indicators arise either from undertakings or conditions specified in the EIS, both by the competent authorities and the developer is an integral part of the EIA process.

Monitoring of environmental media (air, water etc) and indicators arise either from, undertakings or conditions (e.g. as specified in a planning permit / environmental permit). In either case it is important for all parties to be aware of the administrative, technical, legal and financial burdens that can accompany inflexible or unresponsive monitoring regimes. It is important to ensure that, where monitoring is provided for, it is clearly related to thresholds, which if exceeded cause a clearly defined set of remedial actions to be implemented.
3. Project Description – Slaughterhouse Development

Slaughterhouses (abattoirs) require good transport links and suitable lorry parking and unloading areas. Adequate means must be provided for dealing with dung and urine so as to prevent contamination of surface and subsurface waters.

By-products of the slaughtering process must be handled properly, either via proper storage facilities prior to removal or by an on-site facility.

There may also be requirements for the following on-site facilities:

- effluent treatment plant;
- rendering plant;
- composting and/or incineration facilities;

Other slaughterhouse issues are nuisance due to odour, noise and visual impact of the process giving rise to distress to residents proximal to such a facility.

This Section provides specific guidance on the information to be included in an EIS in relation to the description of the proposed slaughterhouse development based on the EIA process.

Typical Slaughterhouse Layout
In describing the proposed development, all relevant phases of the project from construction through existence and operation to decommissioning and site restoration are considered.

This description should include the following topics such as:

- alternatives examined;
- characteristics of the project;
- existence of the project;
- description of other developments

### 3.1 Alternatives Examined

Alternatives where relevant may be described at three ways indicating the main reason for selecting the proposed slaughterhouses development, namely consider alternative locations, designs and processes.

The purpose of this section is to summarise the various alternative options relative to the selection of a proposed slaughterhouses site, waste collection system, treatment system, and outfall location.

Information on the economic, engineering, and environmental evaluation conducted during the selection process is provided in this section.

Given the nature of slaughterhouse activities the consideration of alternatives are therefore of prime importance.

#### 3.1.1 Description of Alternative Locations

In terms of location selection this is one of the main factors, which have to be considered in relation to the proposed slaughterhouses development. Site selection is usually conducted prior to establishing a final developmental site. Some locations have more inherent environmental problems than others. Such sites can usually be avoided in favour of sites, which have fewer constraints and the maximum capacity to sustainably assimilate the development.

Engineering and economic evaluations will largely determine the location of a slaughterhouse so that it will serve the area designated to the best advantage. The final location will be based on economic and engineering justifications. Issues dealt with in the economic and engineering evaluations are as follows:

- site topography
- location access
- proximity to other developments
- Development plans for the proposed location
- Environmental Action Programme – such as sustainable development, precautionary principle and integration of environmental considerations into all policy areas.

#### 3.1.2 Description of Alternative Designs

Most problems will be capable of a number of design solutions involving variations the site layout. Where designers are briefed at an early stage about environmental factors, these can usually be incorporated along with other design parameters for the slaughterhouses.

Typical approach towards alternative slaughterhouse designs can include the following:

- Minimisation of environmental impacts including, noise, odour and aspect;
- Optimum capital and running costs;
• Utilisation of biogas from slaughterhouse sludge digestion tanks for electrical and heating purposes,

• Land area requirements.

3.1.3 Description of Alternative Processes

Within each design solution there can be a number of different options as to how the slaughterhouses development can be conducted. These can include, for example, management of emissions, animals, residues, and traffic. Consideration of environmental factors can influence the selection of the type of slaughterhouse operation to mitigate any adverse impacts.

3.2 Project Characteristics

In providing a description of the project development, issues such as site layout, design and size / scale, as well as any existing development on site, are considered.

3.2.1 Description of Site Layout

The description of the slaughterhouse development includes such issues as follows:

• location of the development – local and site context;
• distance of development to other significant features on and off-site;
• extent of the proposed development in relation to existing features;
• extent of site coverage / use and size of site;
• plan of the existing site accompanying the proposed site plan at an appropriate scale.

Good detailed site investigation, selection and design can substantially reduce impacts caused by slaughterhouse development. Important factors for consideration include:

• geological conditions – permeability and uniformity of strata;
• proximity to sensitive surface or ground water bodies including drinking water resources
• desirability of having clay to prevent seepage of gas or leachate

Of key importance is the location of the proposed slaughterhouse development and with reference to the following:

• proximity to local communities with the aim of not being so remote as to induce excessive transport costs and impacts;
• avoid being too close to residential areas and structures due to the risk of gas accumulation, fires and explosions;
• good transport links;
• availability of sites sterilised by other uses, such as quarries or brick / clay pits;
• availability of appropriate materials, technology and skilled labour force for construction and management;
• optimisation of potential economic values from waste recovery or from methane gas extraction;
• consideration of potential current and future land use conflicts (e.g. tourism)
3.2.2 Description of Design

In providing a description of the significant physical characteristics of the proposed slaughterhouse development, the following aspects may be included:

- layout of the development on the proposed site;
- shape, surface and characteristic features of each element;
- principle activities proposed;
- associated or secondary developments.

Slaughterhouse design must address the following design principles:

- determining the nature of waste to be disposed of and its variability in order to establish site design and operation that minimises the environmental risks;
- where relevant, enabling the prior separation and recovery of materials e.g. disposal to knackers yards;
- eliminating risks of ground and water contamination from slaughterhouse activities;
- provision of on-site firewater containment;
- providing wastewater treatment or sewerage facilities for slaughterhouse effluent;
- odour removal facility
- minimising the risks of nuisance from noise and operational vehicles;
- providing adequate space for delivery and operational vehicles;
- measures enabling site restoration and reuse after closure;
- application of BAT procedures for slaughterhouse operational and environmental control.

3.2.3 Description of Size or Scale

The description of the proposed slaughterhouse in terms of size and scale indicates the magnitude or intensity of the development when in operation, and includes such issues as:

- area, length, width and height of each major development;
- relative size and scale of the development in its context;
- extent of the slaughterhouse activities proposed;
- volume, magnitude or intensity of slaughterhouse process;
- number of features clearly indicated where relevant such as proximity to nearest dwelling.

3.2.4 Description of an Existing Slaughterhouse Development(s)

Where consent (e.g. planning permission etc) is required for a slaughterhouse development, involving an extension or expansion of an existing installation, the description of the existing environment includes those parts of the slaughterhouse development already in place.

3.3 Existence of the Slaughterhouse Development

The description of the existence of the proposed slaughterhouse development considers all aspects of the life-cycle of the development and includes construction, commissioning, operation and any changes to the proposed slaughterhouse project.

3.3.1 Description of Construction Phase

Construction of slaughterhouse entails site preparation and extension of infrastructure such as water and power access. Provision must be made for temporary waste storage or handling areas (e.g. for materials recovery). The length of the construction phase will depend on the scale and complexity of the proposed slaughterhouse and the nature of the environment (particularly the geological structure). In general the construction phase of a slaughterhouse will involve the following aspects:
Land Use Requirements

- Land take;
- Soil impermeability;
- Drainage diversions and areas affected – roads / hardstanding area;
- Storage and containment – fuel and hazardous chemicals;

Construction Activity

- Site sourcing, site preparation and pre – construction activities;
- Location of proposed slaughterhouse operation;
- Construction parking, office, canteen and storage;
- Duration, phasing / sequencing of construction activities;
- Major temporary features, construction equipment, holding ponds, stockpiles;

Significant Effects

- Landtake;
- Odour and noise;
- Machinery, plant and traffic;
- Effluents, sewage runoff, spillages;
- Emissions.

Environmental Protection Measures

- Monitoring;
- Firewater containment;
- Operational procedures;
- Contingency measures.

3.3.2 Description of Commissioning / Decommissioning

In relation to the proposed commissioning of slaughterhouses, issues such as phasing, testing and commissioning and establishing of mitigation measures are evaluated.

Phasing

This relates to the phased development of the slaughterhouses facility according to a well – defined design. The description of such phasing becomes relevant if significant impacts or mitigation measures do not form part of the initial phase. The description clearly identifies when each such impact or mitigation measure will become apparent.

Testing & Commissioning / Decommissioning

It may transpire that a hiatus occurs between the end of the slaughterhouses development and the commencement of the slaughterhouses operations. Such delays and any interim effects, which may be different from those of normal operations, should be described.

In the case of plant decommissioning consideration should be given to reuse of slaughterhouse structures.

Establishment of Mitigation Measures

Some mitigation measures are not fully effective at the time of commissioning, e.g. measures which are dependent on biotic processes such as the establishment of a screen of trees. The time required for such measures to become effective must be described. The likely slaughterhouses mitigation measures required are listed as follows:
• Integration of the slaughterhouses facility with Macedonian national waste management strategy / plan;
• Detailed site selection based on a number of site alternatives;
• Fail – safe isolation from groundwater intrusion;
• Site layout to minimise proximity to sensitive receptors;
• Early installation of screening (vegetation);
• Effective monitoring and management of effluent, groundwater and gases;
• High standards of site management including control of waste acceptance.
• Best Practices as they relate to slaughterhouses
• Vermin and pest control.

Mitigation measures relating to environmental effects are addressed in detail in Section 5.0 below.

Decommissioning

Slaughterhouses usually operate over many years and during this time it may be possible to restore parts of the site. Completed sites and parts of sites may be used for a number of purposes such as recreation, agriculture or construction.

Consequently, the project description must include a detailed account of the decommissioning proposal, and include:

• Rehabilitation strategy
• Post – closure land use capability
• Post – closure monitoring / management
• Post – closure treatment (gases)

Where decommissioning is specifically proposed for the slaughterhouse as a mitigation measure, the Environmental Impact Statement indicates the following:

• financial, technical and administrative provisions to ensure that the measures can and will be implemented;
• effective contingency mitigation measures should the planned measures fail;
• monitoring provisions, action thresholds and remedial strategies for potential impacts arising;
• aftercare requirements and post closure management.

3.3.3 Description of Operation of a Proposed Slaughterhouse Facility

When describing the operation of the slaughterhouse project, it is important to include comprehensive, accurate description of the activities, any materials utilised and the effects, residues and emissions anticipated by the operation of the facility.

Principal Processes or Activities

The core processes or activities which characterise the slaughterhouse activities must be described.

The salient features of slaughter process description are as follows:

Slaughter of Large Animals

• Animal reception, lairage, slaughter, bleeding;
• Steps for cattle / sheep e.g. – hide, skin, head and hoof removal;
• Steps for pigs e.g. scolding, hair and toenail removal, singing, rind treatment;
• Eviseration, splitting, chilling, cutting;
• Viscera, hide and skin treatment, fat melting (rendering).

Slaughter of Poultry

• Reception of birds;
• Stunning, bleeding, scalding, de-feathering, evisceration, chilling, maturation, cutting etc.;

Scope

The scope of the slaughterhouses development must be described indicating the limits of the types, quantities or intensity of the slaughterhouses activities. Where a wide or changing range of activities is anticipated, an attempt should be made to define the parameters of the slaughterhouses development and associated activities.

Operations

The extent and detailed nature of environmental impacts during the operational phase will depend upon the scale of the site, design of the facility, sensitivity of surrounding area (presence of potential receptors and pathways), types of wastes deposited and the operational management practices adopted.

Slaughterhouse operations and issues should be described in general terms which are summarised as follows:

- Transportation, handling, storage of animals;
- Type, quantity, season and duration of operations;
- Type, quantity, season and disposal of waste residues and emissions;
- Transportation types and routes for animals;
- Location and design of animal lairage and management;
- Storage areas for products and wastes;
- Health hygiene and safety management;
- Distances from residences, boundaries, water table, surface water and conduits;
- Disposal of diseased animals;
- Location, design and operation of main mechanical plants
- Environmental monitoring and maintenance programme;
- Perimeter security / control / access
- Phasing;
- Capacity and life span of facility;
- Management procedures, equipment, staffing;
- Litter, scavenging, pest and bird nuisance;
- Odour control;
- Animal health and disease issues;
- Wastewater treatment disposal.

Where there are significant variations in the intensity of the various slaughterhouses operations, these must also be described.

Processes

Processes as they relate to slaughterhouse operations / activities must be described in sufficient detail to facilitate the scope for environmental effects such as materials used, containment, and control and monitoring systems used.

The elements can be divided into stages or streams of activity as appropriate, as well as descriptions of contingency measures.

Activities

Activities associated with all aspects of the slaughterhouse development should be described under the following headings:

- **Arrivals** – employees, materials, customers;
- **Sorting** – parking, weigh bridge, stockpile, waiting, lairage;
- **Process** – indoor, outdoor – day and night, peak times;
- **Staff numbers, shifts, times and duration of occupation.**

Occasional Activities

Occasional, but regular, activities should be described where any potential exists for additional significant impacts such as:

- **Annual or regular refit or maintenance operations**;
- **Emergency, fire and evacuation drill**;
- **Emergency venting in relation to slaughterhouses odours**;
- **Holiday times and shut down.**

Occupants

Occupants should be described in appropriate classes such as:

- **Staff**;
- **Visitors, customers**;
- **Maintenance, security and monitoring personnel or agencies**

Materials Used

Materials which, by their nature, quantity, state or potential for combination, represent a potential hazard to health or environment are identified, drawing particular attention to any formal designation of the hazard. All materials with hazard potential should be described in terms of the following:

- **quantity on-site and annual use**;
- **state – gas, frozen or containerised**;
- **biogas from manure**
- **storage and handling locations and conditions**;
- **use, processing and consumption**;
- **transportation routes: to – and on – site.**

An inventory of all materials used, on site is made to allow for an accurate assessment of eventual residues, emissions and wastes and their impacts.

Natural Resources Used

The full range of natural resources likely to be utilised, processed or consumed by the proposed slaughterhouses development is given as follows:

- **energy – gas / electricity consumed on-site**;
- **water – various on-site uses**;
- **assimilative capacity of water, soils, air**;

Each of the above must be described in terms of: amount; state; storage & handling; use.
3.3.4 Description of Changes to the Proposed Slaughterhouse Facility

Description of any anticipated changes to the proposed slaughterhouses project are discussed, examining proposed growth, decommissioning and any other changes anticipated or planned

Proposed Growth

In the interests of proper planning and development of an area it is often prudent of a competent authority / planning authority to take into account the potential for the expansion of a proposed slaughterhouses facility. The rationale being to ascertain whether the proposed location will have the capacity to sustainably assimilate the proposed expansion.

A description of the proposed growth can take either of two forms:

- future phases the proposed slaughterhouse expansion for which permission is sought, considers all potentially significant impacts in the EIS
- long – term growth, expansion of the proposed slaughterhouse development. Potentially significant impacts of this aspect of the proposed development are predicted in very general terms.

Associated Developments

Associated developments in relation to a proposed slaughterhouse. These may include the following:

- Waste water treatment works;
- Processing plants;
- Landfill sites.

3.3.5 Description of Emissions

The main emissions arising from slaughterhouses and associated activities are as follows:

- air quality impacts – odours;
- water effluent discharge (high BOD, nutrients) / cooling water discharge from operational activities likely to impact surface waters, groundwater and aquifers;
- oils and fats discharge to land, water bodies;
- animal effluent / manure runoff from lairage and storage areas;
- windblown feathers;
- specified risk material (blood etc.)

The following is an indication of the typical environmental effects, emissions and residues which could be included in this section as and where relevant to the slaughterhouse development.

1. Human Beings
   - Nuisance – vermin, pests and odours;

2. Fauna
   - Birds, vermin, insect as pests and disease vectors;
   - Scavengers;
   - Indirect effects from surface water pollution causing fish kills
3. **Flora**
   - Impacts on aquatic flora from water pollution.

4. **Soils & Geology**
   - Ensure containment of potential for effluent and animal waste infiltration from operations to soil.

5. **Water**
   - Run-off – yards, parking, lairage, truck washes, uncontrolled surface runoff;
   - Contamination of groundwater / aquifers from effluent / runoff from site
   - High BOD content of waste water;
   - Contaminants such as feathers, fats, suspended solids;
   - Temperature increase – hot effluent discharge to receiving waters;
   - Movement / plumes of contaminated ground waters.

6. **Air**
   - Odours
   - Treatment works
   - Paunch and offal storage areas
   - Rendering

7. **Noise**
   - Animals in lairage
   - Refrigerated vehicles
   - Ventilation and cooling plant

8. **Landscape**
   - Perimeter fences, bunds and signs;
   - Access roads, entrances;
   - Flues, cooling tanks
   - Parked refrigerator vehicles
   - Traffic
   - Site structures;

9. **Material Assets**
   - Diminution of amenities for residential and leisure land – uses;
   - Disruption to adjacent agriculture (e.g. due to increased avian population);
   - Contamination of groundwater’s, aquifers, surface amenity waters.
   - High volumes of difficult solid waste paunches etc for landfill disposal;
   - High use of existing waste water treatment plant capacity;
   - High water use requirement.

10. **Interaction of the Foregoing**
    - Air emissions / odours can give rise to airborne impacts and nuisances;
    - High BOD effluent can contaminate surface / groundwater;
    - Landscaping and screening (e.g. tree belts, hedges etc.) can be uncharacteristic of surroundings.
3.3.6 Description of Receiving Environment

An accurate description of the existing environment is necessary to predict the likely significant impacts of a new development. This provides baseline data, which can be used for environmental monitoring of the impacts of the project, once it is in operation. It is important that the methodology used in undertaking baseline investigations is documented so that the results of later monitoring can be referenced.

The following is an indication of the typical environmental effects, emissions and residues, which could be included in this section as and where relevant to the slaughterhouse development, in terms of the receiving environment.

This section identifies and describes the relevant aspects of the existing environment in and around the proposed slaughterhouse development location that could be potentially affected by the construction and operation of a slaughterhouse.

1. Human Beings
   a. Economic activity;
   b. Social patterns;
   c. Land use;
   d. Employment;
   e. Health & Safety;
   f. Settlement patterns;

Impacts to human beings and the human environment from this type of project may typically involve effects on land use and land use patterns, population and housing, recreation and transportation.

2. Air & Noise
   a. Air quality – pollution / suspended particulates
   b. Odours;
   c. Noise / vibration

Ambient odours in the vicinity of a proposed slaughterhouse development would include vehicle exhaust emissions in particular from diesel driven vehicles, burning of fuel for domestic and industrial purposes, emissions from industrial activities, sulphurous odours from estuarine mudflats.

Outdoor noise levels change continually because of the temporal and spatial variations of noise sources. Background noise level determinations will be required in the location (e.g. rural, urban, commercial, industrial) of a proposed slaughterhouse development.

3. Water
   a. Ground / surface;
   b. Physical / chemical attributes;
   c. Biotic;
   d. Beneficial uses.

The attributes of existing water bodies must be considered to ensure that they are not subjected to impacts by a slaughterhouse development. Previous information on water quality will be of use as a source of background information.

4. Flora & Fauna
   a. Habitats / Communities;
   b. Terrestrial / aquatic
c. Breeding grounds
d. Mammals / birds / fish / reptiles / insects;
e. Routes;
f. Protection status / habitat requirements;
g. Seasonality / succession;
h. Critical resources.

The terrestrial / aquatic flora and fauna in the area of a proposed slaughterhouse must be described concentrating on those habitats and their characteristic biota that will most likely be affected by the construction and operation of a proposed slaughterhouse and ancillary facilities.

6. Landscape
   a. Landscape character / context / topography
   b. Views & prospects
   c. Historical landscapes
   d. Manmade landscapes

Landscape attributes of a proposed slaughterhouse location are described in terms of its significance and vulnerability to visual impacts. Of particular relevance will be the above ground features of a proposed slaughterhouse deemed as significant and which may influence existing aesthetic resources.

7. Material Assets
   a. Sustainable development;
   b. Natural resources of economic value

In general the identification of specific material asset (physical resources in the environment – human or natural origin) can be open to interpretation, as to what components of the environment may be regarded by society as being of value for production, development, maintenance, recreation, and well – being.

8. Cultural Heritage
   a. Architecture / settlements
   b. Monuments / features

Those aspects of the environment, which are valued because of their age, history, beauty or tradition.
4. SLAUGHTERHOUSE – EXISTING ENVIRONMENT & ENVIRONMENTAL IMPACTS

The main potential impacts arising from slaughterhouse installations relate to water quality, odours and nuisance. The significance of the impacts is dependent on the proximity of the site to dwellings or other sensitive receptors.

Effective ameliorative or mitigative measures are those that are designed to reduce the known or predicted impacts of specific activities. Mitigative measures can only be effective if they are implemented and, following implementation, periodically monitored to ensure that the measures are resulting in their intended effect.

In many cases, mitigative measures cannot fully avoid all impacts. However, mitigation measures are critical to ensure that construction and operation of proposed slaughterhouses developments will result in minimal environmental impacts.

This section provides technical guidance on the description and analysis of impacts on specific environmental topics in accordance with the requirements of European Communities Directive 85/337/EEC (as amended by Directive 97/11/EC), as well as EU Guidelines for the Assessment of Indirect and Cumulative Impacts and Impact Interactions.

This section examines these topics in terms of the existing environment:

- the context, character, significance and sensitivities, potential impacts and proposed mitigation measures.

The section only addresses issues relating to slaughterhouses development taking into consideration the amount of detail provided for the purpose of a proposed slaughterhouses development – impacts description and analysis. Cognisance is also be taken in this section of the BREF – BAT requirements for slaughterhouses developments.

A requirement of the EIA process is to ensure that an assessment of the likely impacts of a proposed slaughterhouses development are presented in the EIS focussing on:

- Likely effects;
- Significant effects;
- Description of impacts that are accurate and credible.

4.1 Impact Prediction

Prediction of impacts, are those by definition have not yet occurred. However, the criteria for the presentation of the characteristics of potential impacts sets out that potential significant effects of a proposed slaughterhouses development must be described with regard to:

- extent of the impact (geographical area and size of the affected population);
- magnitude and complexity of the impact;
- probability of the impact;
- duration, frequency and reversibility of the impact;
- transfrontier / transboundary nature of the impact (Espoo Convention)

4.2 Likelihood of Impacts

Any new development can give rise to an infinite number of impacts which are possible while in practice a very limited number are probable. Only probable or likely impacts need only be addressed as these are the type which can arise in the course of the development of a slaughterhouse (e.g. projected emissions, proposed earth-moving etc.) together with those
which can be reasonably foreseen to be inevitable consequences of the normal construction and operation of the slaughterhouses development (operation taken to mean all stages of the lifecycle of the slaughterhouse from commissioning to closure).

Provision for the prevention and control of abnormal operations (accidents) must be regarded as reasonable and prudent. The extent, to which these circumstances (and their impacts) are examined, is guided by an assessment of the likelihood of their occurrence (risk).

This decision can be supported by judgement based on documentation experience elsewhere or by a systematic risk assessment. Such assessments are usually employed only where the worst-case impacts pose significant threats to the environment and / or human health. Such risk assessments should only be undertaken where there is reasonable cause for it as they can be very time consuming, complex and expensive.

**Predicted Impacts**

The description of the impacts, which are expected to occur, should be as accurate and complete as possible. The methods employed should be explained and justified with reference to the slaughterhouses project and environment under consideration. Such methods should be judicious, accurate, complete, and replicable. They should be conducted in accordance with established practice wherever this is applicable.

**Potential Impacts**

In some circumstances, it may be necessary to describe the full extent of the proposed slaughterhouses development’s effects and emissions before the proposed mitigation measures become fully effective. Examples include temporary displacement of wildlife or visual impacts before landscape establishment.

**Residual Impacts**

The final or intended impact is that which occurs after the proposed mitigation measures have taken effect as planned. Examples include regeneration of ecological habitats, commissioning of environmental management systems, and establishment of tree screening.

**Worst Case Impacts**

Where the failure of the slaughterhouse project, or its mitigation measures, could lead directly to profound, irreversible or health and safety consequences then this scenario is described e.g. habitat destruction during earth moving operations, contamination of a significant aquifer. It is important that the likelihood of such a scenario is stated and explained.

**Positive Impacts**

While the principle objective of the EIA process is to identify and mitigate significant adverse effects, it is also appropriate to describe the main positive environmental effects of the project.

**Transboundary Impacts**

The Convention on Environmental Impact Assessment (EIA) 1991, in a transboundary context stipulates the obligations of parties which are signatories to the convention to assess the environmental impact of certain activities at early stages of planning. It also lays down the general obligation of States to notify and consult each other on all major projects under consideration that are likely to have a significant adverse environmental impact across national boundaries.

The 2001 amendment to the Convention makes provision for the public to participate in procedures under the Convention, as well as NGO's. In this context slaughterhouse developments within Macedonia are subject to the requirements of the Espoo Convention.
4.3 Significance of Impacts

The significance of an impact is the second criterion which is used to determine the scope of an Environmental Impact Statement / Report. Significance is usually understood to mean either the importance of the environment that is affected (its sensitivity to change) or the importance of the outcome of the impact (the consequence of change).

Significance is determined by a combination of (objective) scientific and subjective (social) concerns.

Objective Concerns

Topics are included if a development such as a slaughterhouses could cause significant aspects on an aspect of the environment which has been formally or systematically designated as being of importance. They are also included if the potential exists for the slaughterhouses development to significantly change or alter the existing character of some aspect of the environment.

For any developments including slaughterhouses, four objective criteria can be used to determine whether an impact is of significance:

- **Magnitude & Intensity**: A development which can cause effects over a wide area, to a large number of receptors, or effects which are of an intensity which is significantly in excess of those normally experienced.
- **Integrity**: The extent to which the character or attributes of the baseline environmental topics – biotic / abiotic, are continued, enhanced or reduced.
- **Duration**: A development which can cause impacts for a long period of time (more than one generation) or which will cause permanent changes to any aspect of the environment.
- **Probability**: Where the magnitude, intensity, duration or consequence of any change cannot be anticipated within a reasonable level of uncertainty.

Subjective Concerns

Biotic or abiotic entities can acquire significance where society as a whole, community or a significant number of individuals are concerned. This can arise when some aspect of the slaughterhouse development may adversely affect individuals or something (biotic or abiotic), which they value for intrinsic reasons.

4.4 Description of Impacts

The description of impacts is usually subjected to closer scrutiny than any other part of the EIA process. Adherence to a systematic method of definitive impact description is essential.

Language of Impacts

Impacts are clearly and directly described as follows:

The phrase “impact will occur” is always preferable to may, could, or might unless there is uncertainty about the impact.

Use terms consistently usually referring to a glossary of terms.
The description, clearly and consistently identifies four key aspects of the impacts from a slaughterhouse development, namely its character, magnitude, duration, and consequence. These are described as follows:

**Character of Impacts**
- Identify that aspect of the environment affected;
- Describe whether the impact is positive, negative or neutral;
- Highlight significant impacts (positive / negative);
- Indicate whether the impact will be temporary, short / medium or long term;
- Highlight permanent impacts.

**Magnitude**
- Quantify the amount or intensity by which the character / quality of any aspect of the environment will change due to the development (i.e. how much pollution);
- Indicate the spatial extent of the impact as a result of the development (will some, much of all the of the areas proximal to the slaughterhouses development be affected);
- Describe the degree of change associated with the development (i.e. imperceptible, slight, noticeable or significant);
- Highlight profound (i.e. complete) changes of character associated with the development.

**Duration**
- State whether the impact due to the development will be continuous, intermittent or occasional;
- Indicate whether the impact due to the development will be temporary, short, medium or long –term;
- Highlight permanent impacts attributed to the development.

**Consequences**
- Identify the receptors which will be affected by the development, indicating their sensitivity and significance;
- Indicate whether the impact can be avoided, mitigated or remedies;
- State whether compensation (environmental not fiscal) is available, possible or acceptable;
- Highlight irreversible impacts;
- Highlight when the consequence of impacts cannot be determined.

**4.5 Indirect Impacts**

Impacts which are caused by the interaction of effects, or by associated or off – site developments, are classed as indirect impacts. Cumulative and synergistic impacts are often indirect. Prediction of such impacts can be difficult until the full extent of direct impacts has been
established, together with relevant mitigation measures. These in turn can establish secondary
effects which are checked against the sensitivities of the existing environment described earlier.
The importance of considering these types of impacts as an integral part of the EIA process is
given in detail in "Guidelines for the Assessment of Indirect and Cumulative Impact as well as
Impact Interaction, EC XI 1999".

4.6 Transboundary Impacts

Cognisance must be taken of the requirements of the Espoo Convention 1991 (came into force
in 1997) and the Strategic Environmental Assessment Directive 2001, in the context of
transboundary impacts arising from developments, and which may have the potential for cross
border pollution.

Provision must be made in reporting requirements to communicate with the designated
authorities in neighbouring countries, by reason of their specific environmental responsibilities
for the environmental effects of plans and programmes.

4.7 Risk Assessment

Cognisance must be taken of the requirements of the Espoo Convention 1991 (came into force
in 1997) and the Strategic Environmental Assessment Directive 2001, in the context of
transboundary impacts arising from developments, and which may have the potential for cross
border pollution.

Of priority concern in terms of risk are the following:

- infectivity in relation to transmissible spongiform encephalopathy (TSE) risk materials and
  specified risk materials (SRM's);
- odours from animal by – product storage and handling and waste water treatment;.
- seepage of polluted water into potable water supplies can pose a distinct threat with
  pathogens such as cryptosporidium.

Provision must be made in reporting requirements to communicate with the designated
authorities in neighbouring countries, by reason of their specific environmental responsibilities
for the environmental effects of plans and programmes.

This decision can be supported by judgement based on documentation experience elsewhere
or by a systematic risk assessment. Such assessments are usually employed only where the
worst-case impacts pose significant threats to the environment and/or human health. Such risk
assessments should only be undertaken where there is reasonable cause for it as they can be
very time consuming, complex and expensive.

Risk assessment studies involves identifying the source – pathway – receptor link.

Three components need to be present before a risk can be manifest, namely:

| Source | ⇒ | Pathway | ⇒ | Receptor |

If any of the above are missing, then there is no risk.

Some hazards can be considered low risk if there is no pathway whereby the contaminant can
travel from its release point to an identified receptor. A pathway analysis is useful to check this,
and would typically include looking at the following factors (where the information is available
from existing site investigations):

- Distances between sources and pathways
• Rate of contaminant movement and time to reach receptor
• Influence of artificial pathways and barriers, e.g. interceptors, sumps, culverts
• Geographical/geological / hydrogeological features that may impede/facilitate escape of contaminant
• Effect of varying weather conditions
• Processes that may affect contaminant concentrations along the pathway, including diffusion/dispersion, dilution, attenuation
• Chemical environment
• Microbiological environment
• Groundwater/surface water interaction
• Potential for transfer between environmentally compartments
• Background water quality.

Any risk assessment undertaken will need to focus in particular on:

• Covering failure of critical equipment;
• Fire;
• Spillage hazards from stores;
• Delivery and pipe failure

4.8 Environmental Impacts - Slaughterhouse Development

The following sections concern environmental impacts, mitigation measures and monitoring requirements that should be considered in the slaughterhouse environmental assessment and management of the proposed slaughterhouse.

1. Human Beings

Construction of slaughterhouses has potential implications for such issues as: land use; population and housing; recreation and transportation.
In selecting a site for a proposed slaughterhouse due consideration must be given to avoiding residential areas, recreation areas to the maximum extent practical, and in particular to avoid densely developed residential areas.
Construction of a proposed slaughterhouse may have impacts in relation to disturbances of land uses such as roads, amenity areas, recreational areas etc.
Provided that the proposed slaughterhouse is remotely located, any impacts to population and housing will be minimised.
Construction of a slaughterhouse will result in an increase in traffic in the vicinity of the site as a result of construction workers and construction vehicles accessing the site. Once a slaughterhouse is operational, this will result in minimal traffic activity associated with the development due to such facilities being extensively automated.
Removal of sludge from a slaughterhouse will necessitate the use of trucks.

2. Air Quality

Ambient Air Quality

Impacts on air quality nature as a result of a slaughterhouse development are usually only short term and minor. Operation of construction equipment results in crankcase emissions, exhaust and fugitive dust being released. Construction equipment utilised will primarily produce
emissions of nitrogen oxides (NOₓ), hydrocarbons, and suspended particulates along with limited quantities of sulphur dioxide (SO₂), which will result from the use of diesel fuel.

During extensive dry periods, fugitive dust emissions could result from clearing and grading activities at the treatment plant site and from wind erosion prior to revegetation of disturbed areas. There is the potential for fugitive dust emissions during trenching and backfilling activities in conjunction with the construction of a slaughterhouses and associated activities such as pumping stations.

**Noise**

Construction of a slaughterhouse may cause temporary, localised increases in background ambient sound. The specific impact will depend on the method of construction and equipment used. Noise levels during construction can by way of example be in the range of 68 to 95dB(A), measured at 16m with the exception of impact equipment which can cause noise levels of up to 105dB(A).

Noise levels emitted during the construction of a slaughterhouse may well exceed the levels that characterise the project area and will depend on whether it is a rural or urban location. This can be attributed to the comparatively greater noise impacts generated, and because of the relatively longer construction period required. The principal noise sources associated with slaughterhouse construction activities include heavy equipment such as bulldozers, scrapers, and trucks. However, these noise sources will only have a temporary impact for the duration of the construction.

Transport to and from the slaughterhouse as well as loading and unloading may cause noise disturbances. Fans, refrigeration equipment and similar machines may also cause this kind of disturbance. Noise disturbances from the holding pens may also occur.

Further more, because noise levels diminish at least 6dB per doubling of distance from the noise source, noise emissions will be localised.

Noise emissions from the operation of a slaughterhouse will be continuous, night –time limits which are more restrictive than daytime limits, should be used as the appropriate noise criteria for evaluating potential impacts to noise sensitive receptors.

It is usual to design such slaughterhouses to meet the nighttime criterion of 45dB(A), thereby minimising impacts of noise emissions. It is also current EU member State practice regarding slaughterhouses development to house blowers in a building, with consequent low noise emissions.

**Odours**

Odours associated with slaughterhouses will mainly be those produced by the operation of the facility. Any odours of a hydrocarbon nature will be those associated with the operation of construction equipment, and will be of a temporary and localised nature.

Operations at slaughterhouses may cause problems with unpleasant odours. Discharges of unpleasant odours come primarily from the disposal of offal and waste, but can also come from parts of the internal waste water treatment and the holding pens. The intensity depends on how much of the contents of the stomach and intestines and the waste, mainly manure, are treated. The ventilation air may also, in some cases, produce unpleasant odours. Discharges from the production of power are dependent on the type of fuel used, among other factors. The discharges are primarily composed of particles and sulphur and nitrogen oxides. Discharges of refrigerants may occur if there is leakage or a breakdown in the refrigerating equipment. Also, exhaust from transport vehicles is discharged to the air.

The main factors affecting the potential impact of odours are:

- proximity of odour – sensitive receptors;
• climatic conditions.

The impact of odours on sensitive receptors will vary depending on the location of the slaughterhouse.

The design of a slaughterhouse must make provision for the following:

• air tight covers on odour – generating plant facilities to minimise release of odourous compounds;
• all sludge treatment and handling areas, including screens, screening treatment, grit treatment, primary sedimentation tanks, enclosed / covered with biological scrubbers for treatment of extracted air / gases to minimise atmospheric odour emissions;
• parallel wastewater stream treatment to ensure flexible operation of the overall plant, and minimise the incidence of odour related problems within individual slaughtering units;
• modular design of sludge treatment system for ease of maintenance and operation and to minimise incidence of odour emissions;
• proper operation and maintenance of the slaughterhouse to minimise odour emissions;
• venting of sewers to prevent build up of sewer gases

3. Water

Under this heading, water here refers to: surface freshwater and groundwater, each of these water bodies having their own distinct sensitivity in relation to emissions during construction of a facility and in the discharge of treated effluent. Excavation and earth movement during construction and operation can cause pollution of surface and groundwater quality and alter hydrological conditions. There are also potential effects during the final stages of capping and restoration, where natural topography of the area may be altered. The main source of pollution from these activities is increased surface runoff and soil erosion from exposed ground causing high turbidity (suspended solids) and sedimentation in water bodies.

Other potential sources are surface and groundwater contamination from fuel or oil or chemical spillage from maintenance and storage areas. Water pollution can affect its suitability form drinking purposes. There are also likely to be additional adverse effects on aquatic ecosystems. The scale or severity of these effects will depend on factors such as the current condition of the water, the purpose for which it is used and its proximity to the slaughterhouses development.

The waste water from slaughterhouses contains large amounts of organic material and nitrogen as well as remains of cleaning agents. The high concentration of pollutants in the wastewater can largely be traced to the tripe-dressing plants and to the treatment of blood waste. The pollutants in the water consist of dissolved and emulsified organic substances. These can not be separated by filtering or in grease or sludge separators.

Discharge of final treated effluent to bottom waters which tend to be of a higher quality than surface waters provides a greater assimilative capacity and result in better mixing as warm effluent will rise, mixing with colder overlying waters.

4. Soil & Geology

Impacts on soil / geology arising from slaughterhouse development activities occur mainly during construction and earthworks during operations and site restoration.

They can include the following:

• soil erosion due to increase runoff or earth movement, during construction / site restoration / clearing of vegetation / site grading;
• compaction of soil due to vehicle movements, causing reduced infiltration of water and difficulty of penetration by plant roots;
• land slips and land slides due to poor embankment grading;
• ground contamination from the spillage of materials such as vehicle fuel, or the release of contaminants already present in the land / soil;
• risk of collapse and subsidence

5. **Flora and Fauna**

**Terrestrial Environment**

The level of detail on flora / fauna required will vary considerably with the ecological significance of the existing environment. Flora and fauna habitats will include as and where appropriate terrestrial and fresh water (wet land) habitats.

Construction a slaughterhouse and associated services such as transmission mains and pumping stations will have an impact on flora and fauna habitats. Their recovery will depend on the predominance of the particular flora and fauna species.

During construction of a slaughterhouse loss of vegetative habitats will occur, while physical site disturbance and noise from construction activities will cause the temporary displacement of most fauna from the vicinity of the construction site and adjacent areas.

Following construction, displaced species tend to resume their normal habits consistent with the availability of post – construction habitats.

Operation of heavy equipment for trenching and pipe installation during construction may result in direct and indirect impacts to benthic fauna. Benthic and pelagic communities may be affected by sedimentation resulting from disturbance and suspension of fresh water sediments in the water column.

However, given the inherent resilience of benthic and pelagic species, recolonisation is usually quite rapid.

Final effluents from slaughterhouses’s are subjected to secondary treatment to remove the majority of BOD / COD and some localised impact to fresh water flora and fauna can occur as a result of the discharge. Increased nutrient concentrations in the vicinity of the final outfall can result in a shift in normal phytoplankton populations and minor algal blooms. A significant amount of bacteria and viruses are removed in slaughterhouses, all microorganisms cannot be removed economically and, thus, some will be discharged with the effluent.

6. **Landscape**

Of consideration here are two separate but closely related aspects. The first aspect relates to visual impact, focusing on the extent to which new developments can be seen. The second aspect is impacts on the character of the landscape, evaluating responses, which are felt towards the combined effects of proposed slaughterhouses. The latter aspect is complex because it encompasses many other impacts such as noise, odours, ecology. Other issues which can be cross-reference with landscape include, topography, natural features, man – made features, aesthetic resources.

Construction of a slaughterhouse may have a temporary impact for example on natural features such as wetlands or mud flats. These impacts may only arise during construction and thus are considered short term.

Impacts on man – made features due to construction may relate to roadways and are usually only temporary in nature, short term and will not occur following restoration activities.
The likely construction impacts of a slaughterhouse on aesthetic resources include views, loss of mature trees and vegetation and rolling topography. However, such impacts will be minimised by site rehabilitation and restoration.

7. Material Assets

Material assets are concerned with physical resources within the environment and may be of human or natural origin. Such assets must be used in a sustainable manner, so that they will be available for future generations. The development of a slaughterhouse should result in a positive impact to the concept of sustainable development, and provide a mechanism for accommodating future growth and development.

A key objective to promoting sustainable development is to locate the slaughterhouse facility whereby a larger area e.g. urban / industrial can benefit by being connected to the proposed development.

Construction of related services such as pumping stations and sewerage systems may result in:

- temporary restrictions in access to roadways and public walkways;
- diminution of amenities for residential and land use.

8. Cultural Heritage

Cognisance must be taken of any cultural resources or artifacts within close proximity of a proposed slaughterhouse. Reference must be made to relevant Macedonian Archaeological Regulations as regards features of archaeological importance. Any likely impacts to archaeological sites, monuments, structures must be examined.

5. SLAUGHTERHOUSES - MITIGATION MEASURES

5.1 General Mitigation Measures

The central purpose of the environmental impact assessment process is to identify potentially significant adverse impacts at the planning stage and to propose measures to mitigate or ameliorate such impacts. Below are highlighted a range of methods which are available for mitigation. There are three established strategies for impact mitigation – avoidance, reduction, and remedy.

The efficacy of each is directly dependent on the stage in the design process at which environmental considerations are addressed (i.e. impact avoidance can only be considered at the earliest stages of the slaughterhouses development, while remedy may be the only option available to the fully designed slaughterhouses facility)

5.1.1 Mitigation by Avoidance

Avoidance is usually the fastest, cheapest and most effect form of impact mitigation. Environmental effects and the consideration of alternatives must be taken into account at the earliest stage in the site selection and design process, e.g. realignment of transport corridor to avoid residential property, minimise habitat destruction or reduce agriculture severance.
5.1.2 Mitigation by Reduction

This is a common strategy for dealing with effects, which cannot be avoided not only with slaughterhouses developments but also with other large-scale developments, which have an EIA dimension. It concentrates on the emissions and effects and seeks to limit the exposure of the receptor. It is generally regarded as the “end of pipe” approach because it does seek to affect the source of the problem (as do avoidance strategies above). As such, and as it applies to slaughterhouse development, this is regarded as a less sustainable, though still effective, approach.

Reducing the Effect

This strategy seeks to intercept emissions, effects and wastes before they enter the environment. It monitors and controls them so that acceptable standards are not exceeded. Examples include wastewater treatment for leachate, gas control, odours, groundwater, and noise attenuation from machinery and vehicles.

Reducing Exposure to Impact

This strategy is used for impacts, which occur over an extensive and undefined area. Such impacts may include noise, transport, dust, visual impact or exposure to hazard as they relate to slaughterhouse operations. Mitigation is effected by installing barriers between the location(s) of likely receptor and source of the impact such as barriers, tree screens, security fencing.

5.1.3 Mitigation by Remedy

This is a strategy used for dealing with residual impacts, which cannot be prevented from entering the environment and causing adverse effects.

Principle of Remedy

Remedy serves to improve adverse conditions, which exist by carrying out further works, which seek to restore the environment to an approximation of its previous condition or new equilibrium such as:

- Restoring water or soil quality;
- Reinstating walls or features;
- Recording of landscape features.

5.1.4 Impacts which cannot be Mitigated

It will not always be possible or practical to mitigate all impacts (e.g., felling of mature trees). Where this is the case then the residual impacts are clearly described in accordance with the system of impact description as described above.

5.2 Slaughterhouses – Environmental Impacts & Mitigation Measures

The following sections concern environmental impacts, mitigation measures and monitoring requirements that should be considered for slaughterhouses in the context environmental assessment and management.

Many of the mitigation measures below are interrelated such as:

- correct handling and storage of chemicals, bunding to contain spills thereby reducing impacts on soils, surface and groundwaters and ecology.
5.2.1 Environmental Media Mitigation

AIR

Issues

The main impact on air quality during operation are:

- impacts on local air quality caused by road transport of livestock;
- storage and containment of systems for animal by – products
- generation of odours as a by-product of the decomposition of biodegradable waste, effluent treatment plant, rendering unit, composting, carcass incinerator;

Suitable biofilters should be installed to contain odours either by absorption on a suitable media or incineration.

Monitoring

Gas production and emissions must be monitored, normally through the installation of ambient air quality monitoring instruments, and monitoring to ensure compliance with ELV’s as prescribed for this activity.

Mitigation

Odour containment adopting negative pressure areas can be used to contain noxious odours and combustion gases in the operational areas.

Typical mitigation measures may include:

- biofiltration to remove odorous compounds;
- condensation of cooking/rendering steam, subcooling of condensate; incineration of non-condensables in final gas stream;
- chemical scrubbing of releases;
- good housekeeping: prompt removal of dung, spilt body contents or by-products such as blood and fats;
- all odour producing processes to be performed within buildings so atmospheric releases can be controlled.

WATER

Issues

Other potential sources are surface and groundwater contamination from fuel or oil or chemical spillage, animal waste spillage from maintenance and storage areas. Water pollution can affect its suitability form drinking purposes. There are also likely to be additional adverse effects on aquatic ecosystems. The scale or severity of these effects will depend on factors such as the current condition of the water, the purpose for which it is used and its proximity to the slaughterhouses development.

The main potential impact on ground conditions and on surface and groundwater quality is the high polluting discharge from slaughterhouse activities, which will be produced whenever wastes degrade or decompose.

Typical contaminants are organic acids, ammonia, which pollute groundwater beneath slaughterhouses by percolation, and surface water by seepage and runoff and which have a very high BOD.
Fish and other aquatic life can be very severely affected by slaughterhouse effluent pollution in both rivers and lakes. This has the potential for eutrophication of water bodies making the waters uninhabitable for fish and other aquatic life and unsuitable for irrigation or drinking water purposes.

**Monitoring**

During construction and excavation works during operation and restoration, water quality monitoring should include:

- General visual inspection of water bodies to identify physical pollution or blockages to water flow;
- Measurement of total suspended solids.

**Key parameters should include:**

- BOD / COD, pH, ammonia, suspended discharged and in receiving waters;
- Testing for presence of SRM’s, TSE materials, cryptosporidia;
- Biodiversity indicators such as aquatic macro invertebrates and fish;
- Physical / chemical / microbiological water quality measurements;
- Daily indicators of proper functioning of treatment plant

**Mitigation**

The implementation of a spill contingency plan / containment will reduce the risk of pollution due to slaughterhouse effluent.

Treatment of slaughterhouse effluent before discharge should be undertaken, mainly to reduce ammonia and BOD.

For mitigation purposes, design / operation of slaughterhouses must ensure that:

- Water usage is minimized;
- All contaminated water is collected prior to treatment;
- Hazardous or potentially polluting materials such as fuel, oil or wastes going to landfill must be sited on an impervious base away from water, properly bunded and kept locked when unattended;
- Oil interceptors or drip trays are used in vehicle parking areas, and are inspected and cleaned regularly;
- A risk assessment is carried out for the development covering failure of critical equipment; fire; spillage hazards from stores, delivery and pipe failure;
- An emergency plan is formulated and tested through exercises to ensure that procedures to prevent or mitigate impacts due to accidents or spillages are in place and operate effectively (some developments may require such plans to be formulated).

**LAND / SOIL**

**Issues**

Impacts on land / soil from slaughterhouse activities occur mainly during during construction and operations.
Monitoring

- Some monitoring of ground conditions (e.g. soil profile, structure and quality, soil pH, temperature and chemical composition) should be undertaken prior to, during and after development.

Mitigation

Containment of slaughter waste materials solid and liquid so as to avoid discharge to land/soil and infiltration to groundwater. This applies to production, storage and lairage areas, similar to the measures for protecting the water environment, and includes the following:

- passive spill protection and impermeable hardstanding;
- appropriate designs for buildings / structures on site;
- appropriate screening and planted buffer zones to reduce visual impacts;
- use of drip trays under stationary machinery to prevent oil / grease spills.

FLORA / FAUNA

Issues
Mainly freshwater marine flora and flora depending upon location of slaughterhouse facilities.

Monitoring

Select measurable range of sensitive species from potential receptor ecosystems for long term monitoring following baseline identification. This often includes macro – invertebrates in conjunction with water quality monitoring but might also include effects on fish species and populations.

Mitigation

- site selection to avoid sites of nature conservation value ensuring adequate survey of flora and fauna of the proposed slaughterhouse location and surrounding area and include consideration of potential impacts from new access roads.
- inclusion in the site management programme of any special precautions to protect areas of high nature conservation value.
- good site design and good management during construction and operation to minimise pollution potential.
- post – operation management to prevent pollution problems arising.
- provision of wildlife corridors and buffer zones

SOCIO –ECONOMICS

Issues
Slaughterhouses in providing for the disposal of otherwise potentially harmful and unsanitary waste has some beneficial advantages such as:

- creating local employment;
- collection and disposal system can allow for waste recovery activities which can be of economic benefit ( mainly to knackers );
- methane can be recovered for energy generation

The main problems associated with slaughterhouse are as follows:
local nuisances such as odours from poorly maintained slaughterhouses operations;
health risks – poor hygiene practices at operational and waste management level;
land use conflicts and depreciation in land values;
visual impact – of the slaughterhouses operating site and final restored site profile.

**Monitoring**

- Long term site monitoring to ensure that the restoration plan is effective;
- Risk monitoring related activities regarding odours and effluent land groundwater contamination;
- Presences of any new receptors / pathways are residential areas built in close proximity to a closed slaughterhouse.

**Mitigation**

- control of times for delivery and vehicle operations, and animal control;
- provision of good slaughterhouses site management, lairage, parking areas, vehicle wheel cleaning prior to departing site, covering loads;
- implementation of good site management on a daily basis and vermin control;
- management operations should aim to minimise disturbance to adjacent residential and recreational uses;
- safety concerns should be addressed by such measures as implementing strict health and safety procedures for staff, and the
- installation of adequate fencing and other site security to prevent trespass and vandalism;
- odour control strategies should take account of varying wind directions;
- sites of archaeological or cultural interest should be preserved in situ where possible. As relocation is rarely feasible, thorough archaeological investigation should be undertaken where damage is unavoidable.

5.2.2 Implementation of Mitigative Measures

The public health and other risks associated with slaughterhouses need to be monitored and managed. There will normally be and need to be a separation between:

- public authority of responsibility for regulating slaughterhouses and enforcing conditions and operations of service providers

**Responsibilities of Management Institutions**

The capacity of institutions to plan, monitor and enforce environmental protection measures is an important factor in ensuring good facility management. This requires knowledge of good practice, sound regulation, adequate monitoring and testing capacity including access to appropriate equipment and analytical facilities.

Decision making capacity at a ministerial level will be improved if the information concerning general monitoring and enforcement is regular, transparent and based on objective collection methods. Public confidence in the efficiency of waste disposal and in the lack of associated risks will be enhanced if such information is generally available.

Enforcement of good hygiene practices and implementation of HACCP as and where appropriate.
6. NON – TECHNICAL SUMMARIES

6.1 Introduction

Under EU EIA legislation a non – technical summary is required as part of the EIA process, in order to ensure that the public are made aware of the environmental implications of any decision about whether to allow a new development such as a slaughterhouses to go ahead.

A non – technical summary can be prepared as a separate and self – contained document, which can be widely distributed to the public, who are likely to be affected by the slaughterhouses development.

The non – technical summary will contain contact details of the Competent Authority to whom submissions may be made within a prescribed time frame regarding the slaughterhouses development.

6.2 Structure and Content

The non – technical summary is in a format similar but condensed format to that of the main EIA report / EIS, describing the project, existing environment, impacts and mitigation measures. It may also include a site location and site layout plan (showing context) together with an easily interpreted graphical representation of the proposed slaughterhouses development, such as a perspective drawing.

6.3 Language and Terms

The non – technical summary is short and easily followed, but it does not omit or understate any impacts, which may be controversial. Significant impacts must be included.

Technical terms, abbreviations, references to jargon are omitted.
ANNEX 1  REFERENCE SOURCES CONSULTED

1. Advice notes on current practice, Environmental Protection Agency, Ireland.
2. EU Guidelines for the Assessment of Indirect and Cumulative Impacts and Impact Interactions, HYDER UK.
3. World Bank, Technical Department, Washington DC.
5. Commonwealth Environmental Protection Agency – Environmental Assessment Branch, Barton, Australia.
7. Environmental Protection Agency Ireland, Waste Water Treatment Manuals, Primary, Secondary and Tertiary Treatment.
10. Department of the Environment, Canberra, Australia.
12. Environmental Protection Authority, Perth, Australia.
15. Environment Canada – Environmental Assessment Branch, Quebec, Canada.
16. EIA Centre – University of Manchester, Manchester, England.
## ANNEX 2  EIA GUIDELINES CHECKLIST

| A GENERAL | A 1 Application Details  
A 2 Location of Slaughterhouses  
A 3 Contact Person Details  
A 4 Planning Authority  
A 5 Sanitary Authority  
A 6 Notices & Advertisements  
A 7 Type of Activity  
A 8 Quantity & Types of Wastes to be Accepted  
A 9 Major Industrial Hazard Regulations |
| --- | --- |
| B EXISTING ENVIRONMENT | B 1 Human Beings  
B 2 Flora and fauna  
B 3 Soils  
B 4 Water  
B 5 Air  
B 6 Climate  
B 7 Landscape  
B 8 Material Assets  
B 9 Cultural Heritage |
| C SITE DESIGN | C 1 Preparatory Works  
C 2 Abatement systems for odour control  
C  Infrastructure |
| D ENVIRONMENTAL NUISIBLES | D 1 Aerosol Control  
D 2 Bird Control  
D 3 Dust Control  
D 4 Fire Control  
D 5 Litter Control  
D 6 Noise Control  
D 7 Odour Control  
D 8 Road Cleansing  
D 9 Traffic Control  
D 10 Vermin Control |
| E WASTE | E 1 Waste Types & Quantities |
| F RESTORATION & AFTERCARE | F 1 Restoration Scheme  
F 2 Aftercare Management Plan |
| G ENVIRONMENTAL IMPACTS & MITIGATION MEASURES | G 1 Human Beings  
G 2 Flora and fauna  
G 3 Soils  
G 4 Water  
G 5 Air  
G 6 Climate  
G 7 Landscape  
G 8 Material Assets  
G 9 Cultural Heritage |
| H CONDITIONING PLAN FOR EXISTING SITES | H 1 Itemised Plan  
H 2 Drawings, Maps etc. |
| I ENVIRONMENTAL MONITORING | I 1 Dust  
I 2 Groundwater  
I 3 Slaughterhouse emissions  
I 4 Meteorological Data  
I 6 Noise  
I 7 Odours  
I 8 Surface Water |
| J CONTINGENCY MEASURES | J 1 Existing or Proposed Measures – Emergency Procedures  
J 2 Documentation, Drawings etc |
| K LEGISLATIVE REQUIREMENTS | K 1 Compliance with Emission Standards  
K 2 Environmental Pollution |
| L ENVIRONMENTAL MANAGEMENT PLAN - EMP | L 1 EMP as Condition of Permit / Licence  
|                                        | L 2 EMP to act as Operating Manual  
| M DECLARATION                          | M 1 Re Permit / Licence Application  
| N STANDARD FORMS                       | N 1 Slaughterhouses Odour Monitoring  
|                                        | N 2 Groundwater Quality Monitoring  
|                                        | N 3 Surface Water Quality Monitoring  
|                                        | N 4 Receiving Water Quality  
|                                        | N 5 Discharge Location  
|                                        | N 6 Site Investigations  

K 3 BAT  
K 4 Offences & convictions  
K 5 Technical Competence & Site Management  
K 6 Financial Provision
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<th><strong>COLOPHON</strong></th>
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<tbody>
<tr>
<td><strong>Client</strong>     : Government of fYR Macedonia - Ministry of Environment &amp; Physical Planning</td>
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