

G2 Scoping the environmental impacts of animal feed manufacture

Explanatory note

For projects which require Environmental Impact Assessment (EIA), a scoping exercise should be undertaken early in the planning stages of the project. This enables the project to be designed to avoid or minimise negative environmental impacts and provides an opportunity to incorporate positive environmental enhancements into the project. Early consultation with all interested parties, including the Environment Agency, is an essential part of scoping. Even if a project does not require EIA under EIA legislation, it may be advisable (and in some cases necessary) to undertake a scoping exercise in any case (e.g. to support applications for other relevant consents and authorisations needed to carry out the project).

This guidance note aims to promote a good practice approach to scoping as part of the EIA process which in some respects goes beyond the statutory EIA requirements. When scoping a project, developers, or their consultants, should satisfy themselves that they have addressed all the potential impacts and the concerns of all organisations and individuals with an interest in the project.

This guidance note provides information on the most likely potential environmental impacts of animal feed manufacture. However, each project must be considered on a case-by-case basis as the detailed characteristics of the proposal and the site will determine the potential impacts.

This guidance is based on the main legal requirements on EIA stemming from the EC Directive and the UK Regulations. However, developers should seek independent legal advice to ensure that the proposed development is carried out in compliance with the requirements of this and any other relevant legislation relating to planning as well as to pollution control.

This guidance note must be read in conjunction with the *Scoping Handbook*, which provides general guidance on the EIA process and the scoping of projects.



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In addition, the following scoping guidance notes are relevant to *all* animal feed manufacture projects:

- A1** Construction work
- A4** Vegetation management and conservation enhancements

The following scoping guidance notes *may* be relevant in certain circumstances:

- A3** Redevelopment and clean-up of contaminated land
- G1** Abattoirs
- G3** Chemical manufacture, processing and storage
- G4** Food and drink manufacture
- G5** Industrial estates for light manufacturing
- L3** Sewage treatment works

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1 Introduction

- 1.1 This guidance note, in conjunction with the *Scoping Handbook* and the notes listed on the previous page, seeks to help developers and other interested parties identify the potential impacts of animal feed manufacture on the environment as a whole. It should be emphasised that the list of impacts is by no means exhaustive and that a full investigation into positive and negative impacts should be undertaken. Early consultation with the Environment Agency and other relevant organisations will enable the identification of environmental issues and constraints and the avoidance of sensitive areas, thus reducing the need for redesigning and mitigating avoidable impacts at a later stage.
- 1.2 Following this brief introduction, an overview of the legal requirements for EIA in relation to animal feed manufacture is provided. The potential environmental impacts of such projects are identified in Section 3. The text and summary table in this section will enable the reader to begin to identify the likely impacts arising from the particular proposal under consideration. The subsequent sections present the mitigation measures that may be relevant to animal feed manufacture, followed by key references and further reading.

Background to development type

- 1.3 Animal feed manufacture covers a variety of materials, products and processes. Raw materials are derived from plants and animals, which may be produced within the UK or may be imported. Plant-derived raw materials include cereals, beans, high oil seeds, peas, grasses, vegetable oils, sugar, molasses and by-products such as sugar beet pulp. Animal-derived raw materials include fish meal, blood and bone meal, fat, other rendered products and milk. Additives such as vitamins, minerals and

antibiotics may also be added. Raw materials are processed by grinding, mixing, cooking and forming into a final product such as pellet or cake, by extrusion, moulding and similar techniques. Some petfoods are canned, followed by final cooking. The final product is packaged in bags, sacks or delivered in bulk tanker. Animal rendering plants are sometimes directly associated with animal feed manufacturing facilities. In addition to process operations, a variety of services will be present such as boilers for steam generation; chillers and freezers; compressed air production; and odour abatement equipment. All of these processes have associated releases to all media. A thorough scoping exercise and careful consideration of alternatives are therefore of prime importance.

2 Development control and EIA

Development control

- 2.1 New facilities for the manufacture of animal feed will fall under the control of the town and country planning system. Developers should therefore contact their local planning authority to confirm whether or not their proposals require planning permission. Reference should also be made to other planning-related legislation.

Environmental Impact Assessment

- 2.2 Developments for animal feed manufacture are included in Schedule 2 of the Town and Country Planning (Environmental Impact Assessment) (England and Wales) Regulations 1999 (SI 1999 No. 293). The Regulations list applicable thresholds and criteria which apply to Schedule 1 and Schedule 2 developments. If the thresholds are not exceeded, then EIA is not required and so these thresholds and criteria are termed “exclusive criteria”. In cases where the thresholds are exceeded, Schedule 1 developments require an EIA (mandatory) but Schedule 2 developments only require an EIA if the development is likely to have significant effects on the environment by virtue of factors such as its nature, size or location. The exclusive criteria for Schedule 1 developments are taken from the EIA Directive, but those for Schedule 2 developments have been laid down in the UK Regulations, as provided for by the Directive. In addition to the specific criteria and thresholds set out in Schedule 2, all developments listed in Schedule 2 may require an EIA if any part of the development is to be carried out in a sensitive area.
- 2.3 The former DETR published guidance (referred to in the *Scoping Handbook*) which helps in the decision on whether, in respect of

Schedule 2 projects, impacts are significant and whether EIA should be required. The guidance thus contains “indicative criteria”, although area sensitivity and project-specific issues must be taken into account and the decision is still discretionary. The following threshold criteria apply.

- Exclusive criteria

Under Schedule 2, Paragraph 7, the following food industry developments may require EIA if the area of new floor space exceeds 1000 square metres: (a) the manufacture of vegetable and animal oils and fats; (b) the packing and canning of animal and vegetable products; (c) the manufacture of dairy products; (d) brewing and malting; (e) confectionery and syrup manufacture; (f) installations for the slaughter of animals; (g) industrial starch manufacturing installations; (h) fish-meal and fish-oil factories; (i) sugar factories.

- Indicative criteria

Concerning industrial and manufacturing development, Annex A, paragraph A16, of the Department of the Environment, Transport and the Regions Circular 02/99, *Environmental Impact Assessment*, states that, “New manufacturing or industrial plants of the types listed in the Regulations may well require EIA if the operational development covers a site of more than 10 hectares. Smaller developments are more likely to require EIA if they are expected to give rise to significant discharges of waste, emission of pollutants or operational noise. Among the factors to be taken into account in assessing the significance of such effects are:

- whether the development involves a process designated as a “scheduled process” for the purpose of air pollution control;
- whether the process involves discharges to water which require the consent of the Environment Agency;
- whether the installation would give rise to the presence of environmentally significant quantities of potentially hazardous or polluting substances;
- whether the installation would give rise to radioactive or other hazardous waste;
- whether the development would fall under Council Directive 96/82/EC on the control of major accident hazards involving dangerous substances.”

Furthermore, EIA may be required for any change to or extension of animal feed manufacturing installations already authorised, where the change or extension may have significant adverse effects on the environment. Responsibility for determining whether an EIA is required lies initially with the local planning authority.

- 2.4 Whether or not the formal EIA of a proposed animal feed manufacturing installation is required, the Environment Agency and other statutory consultees and regulators may request environmental information concerning the proposal. An EIA may provide the most appropriate method for a developer to collate the necessary information.

Other licenses, consents and authorisations

- 2.5 Certain aspects of a development for animal feed manufacture may require prior permissions from the Environment Agency. These may include, for example, land drainage consents, abstraction licences, impounding licences and discharge consents. It is recommended that the developer seek independent legal advice and liaise with the Environment Agency during project design and subsequent stages to identify the consents, licences and authorisations that will be required.

3 Potentially significant environmental effects

- 3.1 The EIA Directive requires the EIA to “identify, describe and assess...the direct and indirect effects of a project on the following factors: human beings, fauna and flora; soil, water, air, climate and the landscape; material assets and the cultural heritage; [and] the interaction between the factors”. Socio-economic issues, health and safety in the workplace, material assets and cultural heritage are all considered in EU *Guidance on Scoping* (ERM, 2001b) but are not impact categories for which the Environment Agency is the principal competent authority. Advice on these issues is presented in this guidance note without prejudice to the advice of the relevant competent authority, but the relevant competent authority should be consulted for each of these categories in all cases (further advice on the appropriate competent authority to contact is given in the *Scoping Handbook*).
- 3.2 Animal feed manufacture has the potential to affect the environment in many ways. Facilities differ widely in terms of their mode of operation and location, and key issues are likely to vary from site to site. Therefore, it is recommended that expert advice on detailed technical issues be obtained. The issues arising for all environmental receptors will change over time as the project moves from construction through to operation, and future modifications to process and facilities. Developers and site operators should therefore consider the impacts arising from construction, short-term and long-term operation.
- 3.3 Potential impacts are discussed here in broad terms only as their nature and intensity will depend on the physical characteristics of the project and the composition of any polluting materials. An EIA of proposed animal feed manufacture should take these factors into account in assessing potential impacts on the environment.
- 3.4 The following paragraphs should be read in conjunction with Table G2. This details the activities involved in the development of animal feed manufacturing facilities, ongoing management and the impacts arising from them.
- Water environment**
- 3.5 Surface water hydrology can be affected during both construction and operation of animal feed manufacturing facilities. The creation of the site and access roads can result in compaction of soils and an increase in impermeable (or slowly permeable) surfaces. The subsequent increase in surface runoff (where it occurs) may, in turn, increase the risk of flooding. The handling of soils, particularly near watercourses during construction, is likely to increase suspended solids in the watercourse.
- 3.6 Surface water quality could be affected by a number of factors during animal feed manufacture. Raw materials such as milk and molasses have high biological oxygen demand/chemical oxygen demand (BOD/COD) which can seriously affect water quality if spilled and allowed to flow into watercourses. Washing of vessels and other equipment can lead to contaminated water discharges, especially if effluent treatment is not well managed (contaminants can include food remains, cleansing agents and vegetable oils). Some animal feed processes produce effluent of very high BOD/COD. Mineral oils will be present for lubrication and fuel. Failure of containment of these materials, or of the effluent treatment plant function, could lead to serious pollution of surface waters.

- 3.7 Animal feed manufacture may have significant impacts on groundwater hydrology and quality. The various sources of potential surface water pollution described in the previous section are also relevant to groundwater.
- 3.8 In order to protect vulnerable groundwater resources it is the policy of the Environment Agency to encourage new developments to locate in areas of low vulnerability to groundwater pollution. However, this policy does not imply an automatic prohibition on animal feed manufacture projects within source protection zones.

Land

- 3.9 Animal feed manufacture projects will have some implications for the physical characteristics, land-take and land use of the site. There will be a need for sites to be covered with an impermeable layer and equipped with a secure drainage system to avoid soil contamination via runoff. Storage and containment measures will be needed for fuel oil and hazardous chemicals. Visual impact will have to be carefully considered, especially in the case of large developments.

Air and climatic factors

- 3.10 Animal feed manufacturing has the potential to release a variety of substances to the air, though few are harmful; the prime impact is odour in most cases. The main potential release from processing is steam with entrained volatile components. Process heat and steam generation will probably come from combustion of fossil fuels, which will lead to the release of greenhouse gases and contributors to acid deposition such as sulphur and nitrogen oxides. The use of evaporative cooling towers and condensers has the risk of Legionella transmission. Storage of dusty raw material either outside or in open-walled barns can lead to significant particulate release.

Ecology

- 3.11 The removal of native vegetation to enable development of the site will cause direct damage to, or loss of, terrestrial and aquatic habitats. Runoff may affect flora and there is potential for harm to aquatic ecosystems due to surface runoff entering watercourses. Imports of raw materials may carry foreign plant and animal species, which could compete with local species if allowed to escape.
- 3.12 The potential for damage to ecological communities from disposing of contaminated soil upon decommissioning of the development should be given consideration, as should the likelihood of permanent damage occurring to habitats during the construction phase.

Human environment

- 3.13 The potential impacts of an animal feed manufacture development on the human environment may take a variety of forms. They are divided here into sections covering socio-economic and health issues; amenity, visual impact and nuisance issues; and culture, heritage and archaeology.
- 3.14 The potential for socio-economic and health impacts (real and perceived) arising from animal feed manufacture developments will be dependant on scale. A large plant can employ hundreds of staff and so the local economic impact could be high. There will also be a short-term positive impact during the construction phase. There is potential for negative health impacts by disease due to a poorly designed or managed process.
- 3.15 The identification of which of these issues are significant or are perceived to be significant is an important function of public involvement during the scoping exercise. Understanding likely public concerns is a key issue and reference to experiences from other similar developments and any public representations to the local planning authority should be made.

- 3.16 Other issues that commonly need to be addressed include the visual impact of the development, odour and dust nuisance, persistent steam plume, noise and vibration nuisance from the operational process, and traffic during both the construction and the operation of the site. Any restrictions to access that may arise as a result of the development should also be considered.
- 3.17 Impacts on architectural and archaeological heritage may occur, and it may be advisable to employ a watching brief during the construction phase. The likelihood of there being any unrecorded sites and their potential for discovery should be examined.

Table G2

- 3.18 The impact identification table highlights:
- sources of impact (development activities);
 - potential impacts;
 - receptors for these impacts.
- 3.19 It is recommended that the table is annotated and used during consultations with other interested parties. Reference should be made to prompt lists detailing impacts and sources of impacts in the *Scoping Handbook*.

Table G2 Summary of key potential impacts of animal feed manufacture

Potential receptors of impact		Activities and potential impacts		
		Construction phase	Operation phase/ongoing site maintenance	Decommissioning/post-operation
WATER	Surface water hydrology and channel morphology	<p>Use of vehicles and machinery</p> <ul style="list-style-type: none"> • Increase in surface runoff from soil compaction <p>Works next to or near watercourses</p> <ul style="list-style-type: none"> • Change in flow velocities • Increased erosion and subsequent changes in bed and bank stability • Increased flood risk <p>Earthworks</p> <ul style="list-style-type: none"> • Increased sedimentation of watercourses • Reduced floodplain storage <p>Buildings and ancillary structures</p> <ul style="list-style-type: none"> • Changes to runoff characteristics and infiltration rates 	<p>Surface runoff</p> <ul style="list-style-type: none"> • Rapid transfer of rainwater to watercourses via drains • Minor changes to flow regimes of watercourses downstream of the development • Change in deposition regime, caused by changes in flow and possible increase in sediment input from soil erosion 	<p>Works next to or near watercourses</p> <ul style="list-style-type: none"> • Change in flow velocities • Increased erosion and subsequent changes in bed and bank stability • Increased flood risk
	Surface water quality	<p>Earthworks</p> <ul style="list-style-type: none"> • Pollution from suspended material • Disturbance of contaminated soil and subsequent pollution of watercourses <p>Materials management</p> <ul style="list-style-type: none"> • Pollution from spills or leaks of fuel, oil and construction materials 	<p>Water and chemicals management</p> <ul style="list-style-type: none"> • Decrease in water quality from sudden releases (e.g. from tank failure or yard washing) or gradual seepage of contaminated water (high BOD/COD untreated effluent) into nearby watercourses 	<p>Materials management</p> <ul style="list-style-type: none"> • Contamination from spills or leaks of fuel and oil

Potential receptors of impact		Activities and potential impacts		
		Construction phase	Operation phase/ongoing site maintenance	Decommissioning/post-operation
WATER <i>continued</i>	Surface water quality <i>continued</i>		Materials management <ul style="list-style-type: none"> • Pollution from poorly managed process chemicals (e.g. food preservatives, organic solvents, biocides); spills and leaks of fuel and oil; rain water on open skips; dust Emergency provision <ul style="list-style-type: none"> • Pollution from failure of critical equipment (e.g. effluent treatment plant, wet scrubbers) • Pollution from water runoff in the event of a fire 	
	Groundwater hydrology	Earthworks and site drainage <ul style="list-style-type: none"> • Reduction in water table • Changes to groundwater distribution and flow 	Physical presence of infrastructure <ul style="list-style-type: none"> • Possible continued alteration of groundwater flow 	Removal of infrastructure <ul style="list-style-type: none"> • Continuing alterations to ground water flows
	Groundwater quality	Earthworks <ul style="list-style-type: none"> • Disturbance of contaminated soil and subsequent groundwater pollution Materials management <ul style="list-style-type: none"> • Pollution from spills or leaks of fuel, oil and building materials 	Water/dung/urine/blood management <ul style="list-style-type: none"> • Decrease in water quality through gradual seepage of contaminated water into ground Materials management <ul style="list-style-type: none"> • Pollution from treatment chemicals (e.g. flocculators, biocides, tanning agents), spills or leaks of fuel and oil 	Materials management <ul style="list-style-type: none"> • Contamination from spills or leaks of fuel and oil

Potential receptors of impact		Activities and potential impacts		
		Construction phase	Operation phase/ongoing site maintenance	Decommissioning/post-operation
LAND	Landscape	Excavations and earthworks <ul style="list-style-type: none"> • Visual impact of construction works 	Physical presence of development <ul style="list-style-type: none"> • Detrimental effect on landscape character of structures • Land take • Visual impact of development 	Removal of buildings and ancillary structures <ul style="list-style-type: none"> • Improvement to landscape
	Soils	Use of vehicles and machinery <ul style="list-style-type: none"> • Compaction • Erosion Earthworks <ul style="list-style-type: none"> • Further erosion of exposed soil 	Storage of feedstock and wastes on unmade ground <ul style="list-style-type: none"> • Contamination of soils by organic pollutants Use of vehicles and machinery <ul style="list-style-type: none"> • Soil compaction • Soil erosion • Contamination via runoff 	Removal of buildings and ancillary structures <ul style="list-style-type: none"> • Further soil compaction/erosion
	Geology	Excavations <ul style="list-style-type: none"> • Removal of rock by excavation works 		
AIR	Local air quality	Use of vehicles and machinery <ul style="list-style-type: none"> • Emissions from construction site traffic • Dust generation 	Transport of animals, carcasses and processed meat <ul style="list-style-type: none"> • Exhaust emissions Production processes <ul style="list-style-type: none"> • Release of steam, odorous VOCs Effluent treatment <ul style="list-style-type: none"> • Potential for release of very odorous substances to atmosphere (especially where anaerobic processes are employed) Evaporative cooling towers and condensers <ul style="list-style-type: none"> • Potential for Legionella release to atmosphere if cooling towers not managed properly 	Removal of development <ul style="list-style-type: none"> • Emissions from site traffic • Dust generation

Potential receptors of impact		Activities and potential impacts		
		Construction phase	Operation phase/ongoing site maintenance	Decommissioning/post-operation
AIR <i>continued</i>	Regional/ global air quality		Process energy consumption <ul style="list-style-type: none"> • Combustion products contributing to climate change • Contribution to acid deposition via NOx and SOx release 	
	Aquatic ecology	Drainage works and use of vehicles <ul style="list-style-type: none"> • Negative impact on flora and fauna from increased sediment loading of streams Materials management <ul style="list-style-type: none"> • Harm to aquatic flora and fauna from oil, fuel, cement or other substances entering watercourses 	Contaminated water runoff <ul style="list-style-type: none"> • Pollution and consequent damage of watercourses by high BOD/COD effluent, toxic components such as biocides Materials management <ul style="list-style-type: none"> • Direct and indirect effects from oil, fuel or other substances entering the aquatic environment following accident 	Use of vehicles <ul style="list-style-type: none"> • Negative impact on flora and fauna from increased sediment loading of streams Materials management <ul style="list-style-type: none"> • Harm to aquatic flora and fauna from oil or other substances entering watercourses
FLORA AND FAUNA	Terrestrial ecology	Earthworks and excavations <ul style="list-style-type: none"> • Habitat removal, fragmentation or severance • Disturbance to, or loss of, species (including rare and sensitive species) 	Physical presence of building and ancillary structures <ul style="list-style-type: none"> • Alteration or loss of terrestrial habitats Introduction of foreign species <ul style="list-style-type: none"> • Imports of raw materials can harbour foreign plant and animal species, which may escape and unbalance local ecology 	Post-closure land-use <ul style="list-style-type: none"> • Changes in habitat type

		Activities and potential impacts		
		Potential receptors of impact	Construction phase	Operation phase/ongoing site maintenance
HUMAN ENVIRONMENT	Socio-economic ¹	Earthworks and excavations <ul style="list-style-type: none"> • Disruption of services such as electricity, gas, water, or telecommunications due to excavation works • Traffic delays • Construction-related employment 	Operation of animal feed manufacturing facility <ul style="list-style-type: none"> • Long-term employment opportunities • Reduction in local property value 	Decommissioning and removal <ul style="list-style-type: none"> • Disruption of services such as electricity, gas, water, or telecommunications due to the works • Short-term employment
	Health and safety ¹	Earthworks and excavations <ul style="list-style-type: none"> • Risk of injury on construction site Negative publicity <ul style="list-style-type: none"> • Adverse reaction to perceived health issues 	Operation of animal feed manufacturing facility <ul style="list-style-type: none"> • Risk of disease to local population via factors such as Legionella • Increased lorry traffic with consequent risks 	Decommissioning and removal of system <ul style="list-style-type: none"> • Risk of injury on site
	Amenity	Use of vehicles and machinery <ul style="list-style-type: none"> • Temporary barriers to rights of access footpaths and byways 	Presence of buildings and ancillary structures <ul style="list-style-type: none"> • Possible change to rights of way or reduction in access • Reduction in perceived quality of the area, especially if located in area of high scenic value 	

¹ The Agency considers that key impacts to be identified and assessed are likely to include the following, but further advice and guidance should be sought from the relevant competent authority, as included in the *scoping handbook*.

Potential receptors of impact		Activities and potential impacts		
		Construction phase	Operation phase/on-going site maintenance	Decommissioning/post-operation
HUMAN ENVIRONMENT <i>continued</i>	Nuisance	Use of vehicles and machinery <ul style="list-style-type: none"> Noise from construction traffic and operations Mud on roads Traffic delays 	Operation of animal feed manufacturing facility <ul style="list-style-type: none"> Odour Particulate fallout onto property (cars, washing, etc) Noise and vibration from processing operations and cooling systems Light and noise if operations occur at night Transport <ul style="list-style-type: none"> Noise from lorry movements and fork lift truck warning sirens Increased traffic on local roads 	Use of vehicles and machinery <ul style="list-style-type: none"> Noise from traffic and operations Mud on roads Traffic delays
	Architectural and archaeological heritage ¹	<ul style="list-style-type: none"> Damage to known or unknown features of archaeological or cultural importance 	<ul style="list-style-type: none"> Further damage to archaeological features resulting from any expansion of the site 	

¹ The Agency considers that key impacts to be identified and assessed are likely to include the following, but further advice and guidance should be sought from the relevant competent authority, as included in the *scoping handbook*.

4 Mitigation measures

- 4.1 Following the scoping exercise and the identification of potential environmental effects, mitigation measures should be proposed to avoid or reduce potential negative impacts to air, water, land, ecology and humans, or to introduce positive aspects to the development. For example, such measures could be developed on brownfield sites. Guidance has been provided by the Environment Agency to assist developers on a range of relevant subjects in the form of Pollution Prevention Guidelines (see in the *Scoping Handbook*). Other relevant publications are given in Section 5.
- 4.2 A primary consideration in impact mitigation must be the siting of a facility for animal feed manufacture. The development site should be selected to avoid damage to important ecological sites and high quality landscapes. Also, it is Environment Agency policy to seek the preferential location of developments in areas which are not vulnerable to groundwater pollution (Environment Agency, 1998b). It is strongly recommended therefore that developers undertake an assessment of alternative sites.

Mitigating the impacts of construction activities

- 4.3 Construction activities have the potential to affect all environmental receptors. However, the following list summarises the mitigation measures most relevant to animal feed manufacture developments:
- phasing of construction work to minimise disturbance to wildlife at sensitive times of year, such as during the breeding season or when young are being raised;
 - use of techniques to minimise compaction of soil, such as restricting

access during wet conditions, and using protective boarding and low ground pressure machinery. If necessary, soil should be carefully removed and stored for subsequent reinstatement;

- use of dust control strategies;
- storage of fuel, equipment and construction materials so as to minimise the risk of soil contamination or water pollution (see Environment Agency, 2000c);
- setting the route and timing of construction traffic so as to avoid residential areas or other sensitive human receptors (e.g. schools, hospitals, nursing homes);
- access roads should avoid riparian zones and should be built using appropriate construction materials.

Mitigating the impacts of the operational phase

- 4.4 Although sensitive siting and design of a facility for animal feed manufacture are the primary means for avoiding or reducing its environmental impacts, further measures can be introduced to minimise impacts occurring from the ongoing management of the site. An overall consideration for the proposed development is that its design and operation are in accordance with all other relevant legislation. Developers should seek independent legal advice to ensure that all legal requirements relating to the proposed development are identified and complied with.
- 4.5 The measures have been arranged according to their primary receptor, however it should be noted that many of the following mitigation

measures are inter-related. For example, correct handling and storage of chemicals, plus bunding to contain spills, would serve to reduce the impacts of such an incident on soils, surface and groundwaters, and ecology.

Protecting the water environment

- 4.6 In order to minimise potential impacts on the water environment, the design and running of a facility for animal feed manufacture must ensure that:
- an appropriate water management system is used, including, for example, efficient land drainage and the use of constructed ponds for receiving site runoff to reduce the impact of runoff on nearby watercourses;
 - an effective effluent treatment system is in place (including techniques such as aerobic/anaerobic digestion, reed beds, filtration, dissolved air flotation, flocculation, precipitation, ion exchange, adsorption, pH and temperature adjustment) and final water disposal;
 - hazardous or potentially polluting materials such as fuel, oil or wastes destined for 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 other key points around the site, 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 and the Environment Agency should be consulted to identify where this is the case).

Protecting the land environment

- 4.7 Certain measures noted above for protecting the water environment, such as passive spill protection and impermeable hardstanding, will also reduce the likelihood of soil contamination. Impacts on soils and landscape may also be mitigated by the following:
- 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 and grease contaminating soil and groundwater.

Protecting the air environment

- 4.8 Developers should consider the aspects of the development that are likely to lead to emissions to air. Such aspects can include combustion gases, black smoke and particulates, chlorine and VOCs. Suitable mitigation measures may include:
- wet chemical scrubbing of releases;
 - bag filters, absorption, condensation, incineration (of components in gas stream);
 - biological scrubbing to remove odorous substances;
 - good housekeeping: storage of dusty materials under cover;

- fugitive emissions minimised by good design and management controls;
- consideration being given to energy extraction from gaseous streams before release. The possibility of including a combined heat and power (CHP) system on site should be considered.

Protecting ecology

4.9 Measures designed to prevent or reduce impacts to water or land will also help to prevent adverse impacts on ecology. The following list identifies further measures to reduce or avoid impacts to terrestrial and aquatic species and their habitats:

- existing habitat features should be incorporated into site design and protected from change;
- careful sourcing and treatment of imported raw materials to prevent escape of potentially damaging foreign species;
- further habitats should be created to compensate for habitat losses and to improve the landscape and ecological potential of the site;
- restoration plans should incorporate measures to improve the ecological status of the site;
- provision of wildlife corridors and buffer zones.

Protecting the human environment

4.10 Some of the measures noted above can also reduce possible impacts on humans, notably the risk assessment and emergency planning measures. Further mitigation measures more specific to the human environment are listed below:

- 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 References and further reading

- 1 **Construction Industry Research and Information Association (2001)** *Sustainable Urban Drainage Systems – Best Practice Guide*. C523, CIRIA, London.
- 2 **Construction Industry Research and Information Association (2000)** *Sustainable Urban Drainage Systems – Design Manual for England and Wales*. C522, CIRIA, London.
- 3 **Construction Industry Research and Information Association (1994)** *Environmental Assessment. Special Publication 96*. CIRIA, London.
- 4 **Construction Industry Research and Information Association (1992)** *Scope for the Control of Urban Runoff. Report R123/124*. CIRIA, London.
- 5 **Department for Environment, Food & Rural Affairs (2000)** *Integrated Pollution Prevention and Control: a Practical Guide*. Available from: <http://www.defra.gov.uk/environment/ppc/ippcguide/index.htm>. DEFRA, London.
- 6 **Department of the Environment (1995)** *Preparation of Environmental Statements for Planning Projects that Require Environmental Assessment – A Good Practice Guide*. HMSO, London.
- 7 **Department of the Environment, Transport and the Regions (2001)** *Planning Policy Guidance Note 25: Development and Flood Risk*. Stationery Office, London.
- 8 **Department of the Environment, Transport and the Regions (2000)** *Environmental Impact Assessment: A Guide to the Procedures*. Thomas Telford Publishing, London.
- 9 **Department of the Environment, Transport and the Regions (1997)** *Mitigation Measures in Environmental Statements*. DETR, Rotherham.
- 10 **Environment Agency (2001a)** *Storage and Handling of Drums and Intermediate Bulk Containers. Pollution Prevention Guidelines No. 26*. Environment Agency, Bristol.
- 11 **Environment Agency (2001b)** *Environment Agency Policies: Sustainable Drainage Systems. Document Ref. EAS/0102/1/1*. Environment Agency, Bristol.
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