

HUMBER MANAGEMENT SCHEME

Industry, Water and Waste Management Water Quality

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The water quality of the Humber has improved greatly over the last 15 years or so. Recent measures have included two stage sewage treatment facilities for the major settlements, regulation under Integrated Pollution Control for prescribed industrial processes (“potentially most hazardous” ones) and improvements to discharges to the freshwater rivers draining to the estuary. The Humber east of the bridge is in Class A “Good” of the Saline Water Quality Classification scheme. The upper Humber and tidal rivers are Class B “Fair” except for the Ouse between Boothferry Bridge and the confluence with the River Don (Class C “Poor”). The worse quality class in this scheme is D “Bad”.

As part of the implementation of the European Water Framework Directive new classifications systems are being developed based on chemical and ecological status - “good ecological status” must be maintained or where this is no the case at present achieved by 2015. There will be provision for specified “heavily modified water bodies” required “good ecological status”. Where applicable, such as the Humber water bodies should be protected and restored to achieve the water objectives for protected areas (SAC - SPA) established under community legislation.

The poorest water quality was found in the tidal rivers with the pollution being progressively diluted by seawater as the mouth was approached. The Humber has great capacity to assimilate contaminants. However, the tidal rivers are more vulnerable and the Ouse still suffers from depleted levels of dissolved oxygen at times of low freshwater flows and warm weather. The Humber has naturally high turbidity and large variations in salinity over the tidal cycle, which makes it a harsh habitat for some organisms. The turbidity maximum is in the tidal Ouse and it contributes to the lowering of oxygen levels. Microbiological contamination is particularly relevant in relation to the Cleethorpes beach, which is designated under the European Bathing Waters Directive.

Effluent from sewage works and industry, is discharged either directly into the estuary or via the rivers, is the principal source of contaminants in the Humber. The operation of combined sewer overflows is an intermittent source of pollution. They mostly affect the inland rivers but much investment was put into their improvement in the Cleethorpes-Grimsby area to ensure compliance with the Bathing Water Directive standards. Some trace organic pollutants pass through sewage treatment processes and into the aquatic environment. The principal concern for the Humber is the release of chemicals from the West Yorkshire wool textile industry, including sheep dip scoured residues from wool and mothproofers.

Oil and chemical pollution from ships and port installations is a potentially serious threat to water quality and wildlife (Shipping & Navigation section).

Non point sources of pollution can be categorised as:

- Diffuse runoff or seepage from the land and paved areas – including farmland, woodland, roads and car parks, premises, other hard areas and contaminated land
- One-off pollution incidents – including spillages or leakages of oil, chemicals, products and farm wastes whether from operational activities, storage or transport, including sewer or pipeline failures. These types of incident may be caused accidentally, negligently or deliberately. Spillage of oil and chemicals from shipping and harbour installations is covered in the Navigation and Ports section of the Scheme.
- Contaminated sediments in the Humber, its tidal rivers resulting and along the banks, which are largely from past pollution – erosion, channel movements and dredging may redistribute such contaminants, as well as elevating the concentration of solids in the water column.

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- Washout of atmospheric emissions
- Flytipping of waste and wind blown rubbish
- Debris from the erosion of the Holderness coast
- Rubbish from ships and fishing
- Anti-fouling paint from ships' hulls

Non-point source pollution is found throughout the Humber system. Generally it has little impact on the chemical quality except in respect to nutrients from the land. The Humber is hypereutrophic as a result of the input from land runoff and treatment water discharges although the high sediment concentration inhibits light penetration and, hence, algal nuisance. Unsanitary rubbish can be found along the shoreline all around the estuary.

Over the decades the Humber has received large inputs of nutrient, metal and organic pollutants, which are absorbed on to the sediment. In relative terms the level of contaminants in Humber sediments does not seem to be high but in some cases there is little information on their bioavailability and eco-toxicological significance. There is some evidence of the re-release into the water column of copper and tributyltin (TBT).

Management

The control of point source effluent discharged to estuaries was introduced in the early 1960s although some industrial and sewage discharges were exempt until the mid 1980s. Water quality management is now largely based on the requirements of European Directives and associated UK legislation. The ones of most importance for the Humber are:-

- Dangerous Substances in Water (a number of Directives for specific pollutants)
- Titanium Dioxide Directives
- Urban Waste Water Treatment
- Nitrates from Agricultural Sources
- Bathing Waters (in respect to the Cleethorpes bathing beach)
- Integrated Pollution Prevention and Control
- Control of Major Accident Hazardous
- Habitats Regulations 1994
- Water Framework Directive

The management principles relevant to the Humber and its catchment are:

- Environmental objectives and standards for the water body set to protect various uses, including wildlife. Many of these standards are given in the Dangerous Substances Directives and related UK Regulations. Discharge consent conditions for point sources are set to achieve compliance with the environmental standards.
- Regulation based on the use of "Best Available Techniques Not Entailing Excessive Cost" (BATNEEC) for prescribed industrial processes (the potentially "most hazardous" ones) under the Environmental Protection Act 1990 and associated secondary legislation. Integrated Pollution Prevention and Control (IPPC) under the Pollution Prevention and Control Act 1999 is replacing Integrated Pollution Control (IPC) in a phased manner in the period up to 2006. IPPC is based on "Best Available Techniques" for preventing and minimising pollution in an economical and technically feasible manner.
- The provision of levels of sewage treatment as defined by the Urban Waste Water Treatment Directive. This sets levels of "sensitivity" in respect to the nature of the water body and its susceptibility to eutrophication. The Humber is in the "normal" category, i.e., two stage treatment for the principal sewage treatment works without specific removal of nitrogen and phosphorus nutrients. The European Commission has recently questioned this designation, although the matter has not yet been resolved.

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Two-stage sewage treatment was provided at Cleethorpes, Goole, Grimsby and Hull in recent years. In addition there have been major improvements to discharges in the Ouse and Trent catchments. Further investment is in progress under the Water Companies Third Asset Management Plans (AMP3), e.g., at Immingham and for the Brough area.

The management system is developing by the implementation of the Water Framework Directive. The Directive establishes a framework for Community action on water policy and seeks to resolve some of the conflicting approaches and implementation procedures of previous water Directives. This will be through a new integrated approach to river basin management encompassing the protection, improvement and sustainable use of Europe's rivers, lakes, estuaries, coastal waters and groundwaters. The UK has transposed the Directive into domestic law.

The principles of the Directive are:

- Environmental objectives based on use
- Ecological objectives
- Chemical and ecological quality classification schemes
- Implementation programmes to achieve objectives
- Monitoring
- Aim to maintain water quality/ecology or to restore it to "good status" by 2015

The Environment Agency is the principal regulator of water quality using the duties and powers of the Water Act 1991, Environmental Protection Act 1990, and Pollution Prevention and Control Act 2000. Both the Agency and local authorities have powers in respect to flytipping, which is the subject of a memorandum of understanding between the Local Government Association and EA. In general local authorities act in respect to the dumping of rubbish while the Agency is involved when hazardous substances or large quantities of waste are involved.

Water companies regulate trade discharges to sewer, the EA being the co-regulator when IPC/IPPC processes and/or prescribed "dangerous substances" are involved. The Agency regulates the discharges from the sewage treatment works, as referred to above.

The regulation of radioactive substances is a minor issue in relation to the Humber as there are no category 1 or 2 installations (i.e., nuclear power stations or production plants) on the estuary or in its catchment.

The Agency aims to prevent pollution happening in the first place. In addition to the exercise of its statutory powers of regulation and enforcement, work is undertaken to provide awareness and guidance on good environmental practices. This includes providing advice to industry, agriculture and developers on measures to minimise the risk. Waste minimisation is promoted and there is a comprehensive series of Pollution Prevention Guidance Notes plus videos and training materials. It seeks as appropriate conditions in planning consents of measures such as the bunding of tanks and firewater runoff storage. Sustainable urban drainage systems (SUDS) are also advocated for new and re-developments and provide as benefits for reducing storm runoff as well as water quality. The Agency undertakes campaigns to promote awareness of particular risks, eg on the containment of oil and disposal of tyres. It has regular programmes of inspection, including of permitted discharges. The EA and the fire services participate with the agrochemical industry on the inspection and registration of agrochemical stores as part of the industries self regulatory BASIS Scheme under the Food and Environmental Protection Act 1985 (FEPA).

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Large parts of the Humber catchment are now designated as Nitrate Vulnerable Zones under the Nitrates from Agriculture Directive. The areas excluded are the North York Moors/Yorkshire Derwent catchment, Aire/Wharfe/Ouse catchments and some of the land immediately bordering the estuary. Measures are required by agriculture to reduce the risk of the leaching of nitrate into surface or underground waters. These zones are designed to protect inland waters and public water supply sources rather than the estuary.

Local authorities have the responsibility to identify contaminated land and to gain remediation “fit for purpose” except in the case of “Special Sites”. These are ones where there are IPC/IPPC processes or where the contamination results in a breach of environmental quality standards for surface or underground waters. The Environment Agency is the competent authority in such cases.

The Environment Agency undertakes co-regulation with HSE of “Control of Major Accident Hazard sites” (COMAH Regulations 1999). The off-site contingency plans take into account the environmental impact and the requirements of SSSIs, SPAs and SACs.

The use of TBT in anti-fouling paints is now prohibited (from 2003).

The Agency is partner with Maritime and Coastguard Agency, maritime local authorities, English Nature, Defra, harbour/navigation authorities, etc for contingency planning for and response to pollution from vessels (Shipping & Navigation section). The Agency has a comprehensive programme of chemical and biological monitoring of the Humber and its catchment. It also monitors compliance with permits for consents, authorisations and licences.

A breach of permit conditions or discharge without a permit is a criminal offence. The Agency (and local authorities for litter and flytipping, Local Authority Air Pollution Control and certain aspects of contaminated land) has permissive powers to prosecute offenders. The Agency believes in firm but fair regulation. Its prosecution policy sets out the principles based on proportionality in applying the law and in securing compliance, consistency of approach, transparency about how the Agency operates and what those regulated may expect from it and targeting of enforcement action. Matters taken into account before enforcement action is instigated include mitigating circumstances and the quality of the evidence. The courts can impose fines or terms of imprisonment, and the Agency always tries to recover its cost from offenders. For less serious offences a warning letter or formal caution may be used. The Agency also has powers to issue Prohibition Notices in certain circumstances.

There are powers for the Agency to require the remediation of pollution or to undertake the work itself and recover the cost. Many pollution incidents are reported by the emergency services, industry, other organisations or the public and result in a response by the Agency.

Current management objectives

The Environment Agency has a statutory duty in discharging its functions to protect and enhance the environment to make a contribution towards achieving sustainable development. It must also further, wherever possible, conservation when carrying out its water management functions and have regard to conservation when carrying out its pollution prevention and control tasks. The Agency in exercising its functions must take into account the costs which are likely to be incurred (by itself and others) and the benefits which are likely to accrue as a result.

These statutory principles and the Agency’s functional tasks are embodied in its Vision, which provides the high level policy for the management of the water quality of the Humber system:

“A healthy, rich and diverse environment in England and Wales for present and future generations:”

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- *Fundamental goals-*
 - A better quality of life*
 - An enhanced environment for wildlife*
- *Environmental outcomes-*
 - Cleaner air for everyone*
 - Improved and protected inland and coastal waters*
 - Restored, protected land with healthier soils*
- *Changes sought-*
 - A 'greener' business world*
 - Wiser, sustainable use of natural resources*
- *Risks and problems to manage, prevent and overcome-*
 - Limiting and adapting to climate change*
 - Reducing flood risk*

For the Humber this means:

- An unpolluted estuary
- A healthy fishery
- Thriving wildlife
- Effective flood defences
- Prosperous ports, industry and agriculture with environmental impacts minimised
- A landscape with outstanding archaeological and historic features
- A tourist economy that benefits from the Humber
- A vibrant community that cares for and enjoys the estuary.

Current management for nature conservation

Environmental quality objectives and standards take into account the requirements of wildlife including fish.

Regulation 50 of the Habitats Regulations 1994 requires a review of permits for discharges, authorised processes, atmospheric emissions, waste management and radioactive substances (and for abstractions), which could have an impact on a designated site. The Environment Agency and English Nature completed the screening stages of this exercise in 2002. The appropriate assessments for those permits, which may impact adversely on the site, are to be undertaken by 2006. The details of this work are not described further in this section.

The Water Framework Directive should facilitate the integration of the requirements of the Habitats Directive with the other aspects of water management.

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Further Information

Legislation

Conservation (Natural Habitats & c.) Regulations 1994.
Contaminated Land Regulations 2000.
Control of Major Accident Hazards (COMAH) Regulations 1999.
Countryside and Rights of Way Act 2000.
Environmental Act 1995.
Environmental Protection Act 1990
Food and Environmental Protection Act 1985.
Pollution Prevention and Control Act 1999.
Radioactive Substances Act 1993.
Water Industry Act 1991.
Water Resources Act 1991.
Water Resources, England and Wales Statutory Instrument No. 3242, 2003.

Public Registers

Environmental Protection Act 1990 (Environment Agency and Local Authorities)
Water Resource Act 1991 (Environment Agency).
Pollution Prevention and Control Act 1999 (Environment Agency and Local Authorities).

References

Department of the Environment Food and Rural Affairs & Environment Agency, various dates from 2002, Consultation papers on the Water Framework Directive.
Environment Agency, 1999, Humber State of the Environment Report.
Scottish Environmental Protection Agency & Environment Agency, 2003, Sustainable urban drainage, an introduction.

Factors arising from the activity

Activity	Location	Present /historic levels of activity	Existing management Responsible Organisation	Relevant Authority Bold = Lead	Possible effect on features	Significant Effects
D1/ Effluent Discharges & Atmospheric Emissions from Prescribed Processes *	Around estuary and throughout catchment	See text Box	AW EA YW	AW EA YW	Physical damage: Siltation, Abrasion.	YES
					Toxic contamination: Introduction of synthetic compounds. Introduction of non-synthetic compounds. Non-toxic contamination: Changes in: nutrients, organic and thermal loading, turbidity and salinity. Biological disturbance: Introduce microbial pathogens.	YES YES
* Applications for new or to vary existing permits, Existing permits, Breaches of permit. Big improvements in effluent discharges over past decades and impact continues to reduce. Less known about atmospheric emissions although most contaminants from this source will be washed off the land and enter the estuary via rivers.						
D2/ Outfall maintenance	Around estuary	Low level of activity	AW YW + Industry	AW YW	Physical disturbance: Siltation, Abrasion. Non-physical disturbance: Noise, Visual presence. Non-toxic contamination: Changes in nutrient and organic loading.	NO NO NO
D3/ Agricultural run-off from rivers	Throughout area	Medium	EA EN Farmers	EA EN	Physical disturbance: Siltation Possible effect on saltmarsh and subtidal sandbanks. Little if any evidence that siltation directly attributable to agriculture has an adverse impact on the Humber system, given the naturally high turbidity of the estuary. Toxic contamination: Introduction of synthetic compounds. Introduction of and non-synthetic compounds.	NO YES If spillage

Activity	Location	Present /historic levels of activity	Existing management Responsible Organisation	Relevant Authority Bold = Lead	Possible effect on features	Significant Effects
D3/ Agricultural run-off from rivers Continued					<p>Possible effect on the site. Environmental Quality Standard not exceeded from this source and lack of evidence on other adverse effects on estuary. Spillages: regulations on storage and handling strengthened in recent years and much effort put into getting good practice adopted.</p> <p>Non toxic contamination: Changes in nutrient loading Possible effect on all features. Nutrients in Humber derived from sewage/sewage treatment works discharges and the leaching of fertilisers. The extension of Nitrate Vulnerable Zones should stabilise the trend of increased nitrate levels in the estuary over the last 30+ years. EQS is met for levels of ammonia.</p> <p>Non toxic contamination: Changes in organic loading Possible effect on all features. Virtually all the organic matter from agriculture comes via the freshwater river systems. This input is small compared with that from effluent discharges. The Humber has a large assimilative capacity. Regulations on storage and handling strengthened in recent years and much effort put into getting good practice adopted.</p> <p>Non toxic contamination: Changes in turbidity Possible impact on subtidal sandbanks but limited and localised.</p>	<p>NO</p> <p>NO</p> <p>NO</p>

Activity	Location	Present /historic levels of activity	Existing management Responsible Organisation	Relevant Authority Bold = Lead	Possible effect on features	Significant Effects
D3/ Agricultural run-off from rivers Continued					Biological disturbance: Introduction of microbial pathogens.	NO
D4/ Leaching from contaminated land	Throughout area in specific locations	Medium in a few specific locations*	Industry, landowners, developers, some LA	EA LA	Toxic contamination: Introduction of synthetic compounds. Introduction of and non-synthetic compounds.	YES
		* (decreasing as a result of remediation)			Non toxic contamination: Changes in organic loading. Very small volume.	NO
D5/ Clean up of contaminated land	Throughout area in specific locations. Mostly outside the EMS	Increasing intensity	Industry, landowners, developers, LA EA	EA LA	Physical disturbance: Abrasion There will be people and machinery.	YES
					Non-physical disturbance: Noise and Visual presence There will be people and machinery.	YES
					Toxic contamination: Introduction of synthetic compounds. Introduction of and non-synthetic compounds.	YES
					Non-toxic contamination: Changes in turbidity Possible impact when heavy rain on a site.	YES

Activity	Location	Present /historic levels of activity	Existing management Responsible Organisation	Relevant Authority Bold = Lead	Possible effect on features	Significant Effects
D6/ Mobilisation of contaminated sediments*	Potential throughout tidal system	Medium? - Past industrial activity including mining	EA	EA	Physical loss: Smothering Possible impact but sediments are being mobilised constantly. Physical disturbance: Siltation. Toxic contamination: Introduction of synthetic compounds. Introduction of and non-synthetic compounds.	NO YES YES
*(Clean up could also have an impact unless precautionary measures are taken)						
D7/ Dredging	(Annex I10/15)					
D8/ Waste Management Licensed operations	Throughout area	Generally low level	EA Industry Waste management companies, LA	EA LA	Physical loss: Smothering Physical disturbance: Abrasion. Non-physical disturbance: Noise, Visual presence. Toxic contamination: Introduction of synthetic compounds. Introduction of and non-synthetic compounds. Non toxic contamination: Changes in nutrient and organic loading. Non-physical disturbance: Noise and Visual presence Possible impact if large scale but birds very tolerant to constant noise/visual presence.	YES YES YES YES NO
(Licensed waste management facilities including landfill sites)						

Activity	Location	Present /historic levels of activity	Existing management Responsible Organisation	Relevant Authority Bold = Lead	Possible effect on features	Significant Effects
D9/ Waste Management Illegal waste disposal	Throughout area	Widespread	EA LA Both have powers for enforcement	EA LA	<p>Physical loss: Smothering Possible impact if large scale dumping of waste products.</p> <p>Physical disturbance: Abrasion Possible impact if large objects or large scale – clearance more likely to cause abrasion.</p> <p>Toxic contamination: Introduction of synthetic compounds. Introduction of and non-synthetic compounds. Possible impact from more toxic waste e.g., leaking drums of toxic material.</p> <p>Non-toxic contamination: Changes in turbidity Very limited impact on naturally turbid system.</p>	YES
						(widespread debris from flytipping, windblown rubbish, etc.)
D10/ Leaching of antifouling paint*	Throughout estuary but particularly near ports	Medium	Shipping industry EA	EA	<p>Toxic contamination: Introduction of synthetic compounds</p> <p><i>“Int. Maritime Organisation regulations - International legislation bans application of products with TBT from 2003 with no TBT to be found on hulls by 2008.”</i></p>	YES
* There are potential sources of TBT from timber treatment						

Activity	Location	Present /historic levels of activity	Existing management Responsible Organisation	Relevant Authority Bold = Lead	Possible effect on features	Significant Effects
D11/ Oil and Chemical spillages from vessels and harbour installations	(Annex I1)					
D12/ Spillages/ leakages/ deliberate pollution (other than from ships)*	Where problem occurs	*	EA Industry, Agriculture, Transport	EA	Toxic contamination: Introduction of synthetic compounds. Introduction of and non-synthetic compounds. Possible impact on all features. Pollution from industry on banks of estuary very limited – most incidents occur in the river catchments and dilution and dispersion reduces risk to estuary. Regulations and ongoing action minimise the risk. Non-toxic contamination: Changes in turbidity Very limited impact on naturally turbid system.	YES
* Pollution from plant failure, leakage from storage, fires, transport accidents and illegal disposal of effluent. * Generally low but could be occasionally medium						NO
D13/ Monitoring and surveys * (Annex H)	Throughout system	Mostly not significant	EA, Industry Water companies	EA	Non-physical disturbance: Noise and Visual presence Possible impact but very low level and non intrusive* . * But use of boats and hovercraft can cause disturbance	NO
*Discharges, inspection of installations/ farms/etc. Monitoring and enforcement of abstraction licence conditions						

Internal Natural factors

Salinity and sediment levels vary over the tidal cycle and with freshwater flow.

External factors

Discharges within the whole Humber catchment are relevant and are included in the Regulation 50 review. A major pollution incident in an inland catchment could also affect the estuary.

Future management

Rationale

The water pollution control legislation is extensive. The main gap is in respect to diffuse pollution although this is a low risk for the Humber. There may be issues concerned with contaminated sediments. There is little direct information on the level of endocrine disrupting substances, although the indirect evidence is that there is a low risk in the Humber.

Management Action

Overall Management objective for Water Quality:

“to ensure a high standard of water quality in the Humber that meets the conservation objectives of the European marine site and complies with the requirements of other European and UK legislation”.

Activity	Factor	Proposed management actions	Timetable	Implementation Bold = Lead RA
D1/ Effluent Discharges & Atmospheric Emissions from Prescribed Processes	F6	Determine permits under Environmental Protection Act 1990, Water Resources Act 1991, Pollution Prevention and Control Act 1999, Habitats Regs. Undertake appropriate assessment where there could be significant impact on site. Set conditions to protect uses including for quality and nature conservation.	Ongoing	EA LA for some
	F5	Enforcement of permit conditions in line with legislation and prosecution policy.	Ongoing	EA
	F6	Review permit conditions where significant impact occurs (Reg. 50 of Habitats Regulations - Applications for new or to vary existing permits, Existing permits, Breaches of permit)	By March 2006	EA

Activity	Factor	Proposed management actions	Timetable	Implementation Bold = Lead RA
D2/ Outfall maintenance	F3	Surveillance of the continuing management.	Ongoing	AW EA YW
D3/ Agricultural runoff from rivers	F3/F5	Implement pollution control powers to reduce the risk of pollution and spillages of agro-chemicals/wastes including measures on storage of silage, slurries, oil and chemicals, promotion of good agricultural practice, influence land use management.	Ongoing	EA
		Enforce the extension of Nitrate Vulnerable Zones over much of Humber catchment.	Ongoing	EA
D4/ Leaching from Contaminated land	F3/F5	Identify “special sites” (i.e., those which could affect the Humber) and gain remediation (e.g., as at Waters’ Edge, Barton).	Ongoing	EA* LA* * Both responsible
D5/ Clean up of contaminated land	F6	Apply Habitats Regulations 48-53.	As sites cleaned up	EA* LA* * Both responsible
D6/ Mobilisation of contaminated sediments	F3/F4/F5	Assess significance and determine whether there is any practical intervention.	Initial desk review using information gained from dredging, monitoring and research studies.	EA
D7/ Dredging*	(See Annex I10/15)			
*(solids and mobilisation of toxic substances from contaminated sediments)				
D8/ Waste Management Licensed Operations	F6	Review existing licences (Reg 50) and determine new application under Habitat Regs.	By March 2006	EA LA

Activity	Factor	Proposed management actions	Timetable	Implementation Bold = Lead RA
D9/ Waste Management Illegal waste disposal	F3/F5	Enforcement action against flytipping and gain removal of waste, identify hotspots.	Ongoing	EA
D10/ Leaching of anti-fouling paint	F4/F5	Enforce international legislation banning application of products with TBT. Enforce international legislation requiring that no TBT to be found on hulls.	From 2003 2008	EA (monitoring) (Defra is responsible for enforcing this task)
D11/ Oil and Chemical spillages from vessels and harbour installations	(Annex I1)			
D12/ Spillages/leakages/ deliberate pollution (other than from ships)	F5	Enforcement of pollution prevention and enforcement powers and conditions on planning consents for bunding, storage, sustainable urban drainage systems, etc. Promotion/education on good practice, waste minimisation, environmental management systems, etc.	Ongoing Ongoing	EA
D13/ Monitoring and surveys	(Annex H)			