

**Guidelines for the scoping and environmental
assessment of water resources projects**

**The environment and water resources projects
Volume 1**

October 1996

**Version 1
Working document for region**

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1.0 INTRODUCTION

The following brief is to ensure standard criteria and format are used for the scoping and environmental assessment of water resources projects leading to the production of an environmental report or Environmental Statement. This volume is one of a series giving guidance on water resources projects.

The water resources projects will predominantly comprise drought orders and permits, time limited and permanent licences. Smaller projects, such as spray irrigation licences, will not require an environmental assessment. This document forms the basis for discussions between the Environment Agency North East Region, consultees and the applicant. The process aims to produce a thorough assessment.

Each section addresses consecutive elements of the assessment process. Section 2 outlines the structure for a scoping document, section 3 outlines the structure for an Environmental Statement and section 4 gives guidance on the role of an Environmental Action Plan.

Appendices 1 and 2 should be used in conjunction with the scoping process and cover a wide range of aspects. However, some projects may not require all of them to be included, whilst for others, the inclusion of additional factors may be appropriate.

Once scoping is completed, and if the need for an Environment Assessment is confirmed, part three of the brief should be used as the template for the Environmental Statement. **Where a non-statutory assessment is undertaken, best practice dictates that section 3 should be followed as far as is practicable to produce an environmental report.**

1.1 Definitions and Terminology

Environmental assessment is a process designed to identify and evaluate all potential impacts of proposals, and their mitigation and enhancement through appropriate site selection, design and working practice.

Formal Environmental Assessment is required by law for certain types of project which by virtue of their nature size or location are likely to give rise to significant impacts. A list of these projects and guidance on special procedures required has been issued by the DoE (1989). Formal Environmental Assessment is required for major projects and can only be requested for projects specified by the Environmental Assessment Regulations.

Environmental Report is the outcome from a non-statutory environmental assessment, this should ideally follow the outline for an Environmental Statement. The size of the project will determine the depth and coverage of the environmental report.

Environmental Statement is the document produced at the completion of the Formal Environmental Assessment.

Scoping is a crucial part of the environmental assessment process which helps to identify key issues of concern at an early stage, primarily through consultation with interested parties and ensures that they are subject to assessment at an appropriate level.

1.2 Legal Context

1.2.1 The Role of the Agency and the supporting legislation

The Environment Agency has advisory, operational and regulatory roles in environmental assessment. This means it can be a consultee for some projects, a developer for others as well as having powers to issue or refuse consents and licences for certain activities. In the context of this document the Environment Agency is only involved in the consenting, licensing and consultation process.

As a licensing body the Environment Agency is in a position to request reasonable information from an applicant prior to considering an application for abstraction. In addition the Environment Agency has a duty, with regard to its functions other than pollution control, to further the conservation and enhancement of flora, fauna, geological and physiographical features. This provides a route to obtaining information for projects which are not covered by the environmental assessment regulations, yet may still have a potentially detrimental effect upon the environment. In this respect the Environment Agency is acting as a competent authority and may require some form of informal environmental assessment from a developer. Section 37 (1) of the Environment Act states the Agency "may do anything which in its opinion is calculated to facilitate or is conducive or incidental to the carrying out of its functions".

Under EC directive 85/337 developers are required to carry out formal Environmental Assessment for projects likely to have a significant impact upon the environment. The Town and Country Planning (Assessment of Environmental Effects) Regulations 1988 No 1199 (SI 1199) implements this directive and requires a formal Environmental Assessment if planning permission is to be granted. Permitted development and activities which do not require planning permission are exempt from SI1199 but may be covered by other sets of regulations with similar requirements.

The Environment Agency is a statutory consultee for certain types of development and consulted voluntarily or through agreement on a wider range of issues.

Many projects are not covered by the legislation outlined above. In such cases the Environment Agency asks applicants to ensure good practice by following the environmental assessment process to evaluate the potential impacts of the proposed

project.

1.2.2 The Habitats Directive

If the scoping and development of the environmental assessment is for a project (Drought Order or Drought Permit) in relation to a European site as defined by the Habitats Directive then the environmental assessment must provide sufficient information for the Environment Agency to assess:

- (1) Whether the water resource project is likely to have a significant impact on the site.
- (2) Whether there are implications for the site conservation objectives (i.e. the reasons for which the site was designated or classified).
- (3) Whether it adversely effects the integrity of the site. The integrity of the site is the coherence of its ecological structure and function, across its whole area, that enables it to sustain the habitat, complex of habitat and/or the levels of populations of species for which it was classified.

The scope and content of the environmental assessment will depend on the location, size and significance of the proposed project.

1.2.3 Legal References

Legislation relevant to the scoping and environmental assessment of water resources projects is listed, together with references in Appendix 4.

1.3 The Consultation Process

Consultation is a two way process which lies at the heart of effective environmental assessment. Discussions with consultees should continue as the developer gathers information on issues, assesses that information, draws conclusions and produces a report. It is essential for key consultees to be involved repeatedly as the study develops, assisting the applicant or their agent in identifying impacts, assessing their significance and future requirements. This should be an open relationship resulting in a robust statement that is more likely to be supported by consultees.

2.0 STRUCTURE OF SCOPING DOCUMENT

2.1 Executive Summary

This will cover the key issues and should use non-technical language. A range of options should be considered including the 'do nothing' option.

2.2 Introduction

2.2.1 Purpose of report

This will state why the report has been produced and give the general background.

2.2.2 Future planning

This will put environmental assessment and scoping in the wider context of long term plans and processes.

2.2.3 Need analysis

This will outline the requirement for the scheme and alternatives (including do nothing) to solve the problem.

2.2.4 Legal context

The developer should include reference to the relevant legislation.

2.3 Identification of the Impacts of Activities

The main body of the report will deal with the identification of the impacts of various activities. Appendices 1, 2 and 3 provide a framework to achieve this objective.

The following sequence can be used to arrive at the set of potential impacts which may arise from specific actions associated with developments.

development→context→primary change→impact consideration

where,

development denotes the nature of the action e.g abstraction

context is the situation of the development which defines the particular impact, e.g river

primary change is the direct change or disturbance caused to the environment arising from the **development and context**
e.g. downstream water quality

impact consideration is the foreseeable potential consequence to, or reaction of, any aspect of the environment arising from the **primary change**. e.g. instream ecology

These principles have been applied in the production of Appendix 1 where **data considerations** emerge as the features about which information is required for the purpose of assessing the **impact consideration**.

Potential sources of data and the nature of investigations and surveys which might be required are given in Appendix 2. The Proforma in Appendix 3 is provided to report the current work available and further work needed, together with timescales and responsibilities.

This should be regarded as a prompt where appropriate additional factors should be included.

NB. It is the applicant who is responsible for the provision of an Environmental Statement or Environmental report

2.4 Mitigation measures

These should be developed in outline to the best available knowledge at the time and be assessed for potential adverse impacts.

2.5 Draft Environmental Statement headings

These should be listed to give an outline of areas the statement will cover.

2.6 List of Consultees

This should cover both statutory and non-statutory consultees.

3.0 STRUCTURE OF ENVIRONMENTAL STATEMENT

An Environmental Statement will normally consist of three separate documents:

- Part I The Non-technical summary
- Part II The Environmental Statement
- Part III Appendices for the Environmental Statement

For small projects these three separate documents may be combined. Where a non-statutory assessment is undertaken, best practice dictates that this section should be followed as far as is practicable to produce an environmental report.

3.1 Non-technical summary

This summary is a stand alone document which should summarise the Environmental Statement, in a very clear and concise manner using non-technical language. It should contain a synopsis of major conclusions, areas of controversy and issues to be resolved and options selected.

3.2 The Environmental Statement

The Environmental Statement is a public consultation document which should clearly and objectively describe and evaluate the project, the options within the scheme, impacts, mitigation measures, and enhancements proposed. The Environmental Statement should also outline the reason for the scheme being promoted instead of the alternatives.

3.2.1 Introduction.

This will cover the legislative background, policy, and consultation arrangements.

3.2.2 Description of the Scheme

To describe key processes and operational features of the proposed scheme, during construction, operation and maintenance. Outline the options (including do nothing) compare their environmental impacts and provide justification for the final choice.

3.2.3 Development Location

A general description of the natural, built and wider environment and its setting in a local/regional context. All descriptions should summarise the existing situation, important features and current trends. Any detailed survey data should be included in the technical appendices.

3.2.4 Identification and Evaluation of Impacts

This should include direct and indirect, secondary, cumulative, short, medium and long-term, permanent and temporary, positive and negative effects of the project. All assessment should be quantified where possible, showing the change from the base-levels and the range of uncertainty. Terminology used should be consistent and defined.

3.2.5 Risks of Accidents and Hazardous Development

When the proposed project involves materials which could be harmful to the environment in the event of an accident, the environmental assessment/statement should include preventative and response measures.

3.2.6 Mitigating Measures

Where adverse effects are identified, a description of the measures to be taken to avoid, reduce or remedy these effects should be included. The likely effectiveness and associated impacts of such measures should also be described.

3.2.7 Enhancement Opportunities

Any opportunities for enhancement should be identified and assessed.

3.2.8 Monitoring

Details of environmental monitoring, auditing and quality assurance systems must be programmed.

3.2.9 Appendices

Appendices should include relevant baseline survey data, details of methodologies, copies of consultation correspondence, copies of all relevant engineering drawings or relevant parts of drawings, etc.

4.0 ENVIRONMENTAL ACTION PLAN

The environmental action plan should be produced as part of a contract document and should be a stand alone and site reference document. All key personnel will sign to indicate that they have read and understood the plan before commencing work on site. The environmental action plan must include the non-technical summary of the Environmental Statement and should emphasise environmental constraints, objectives, monitoring and targets. Any environmental specifications included in the contract document should have been copied to the environmental action plan.

5.0 ENVIRONMENT AGENCY REQUIREMENTS

- 5.1** The Environment Agency requires six bound, full colour, copies of the scoping report, environmental report or the Environmental Statement delivered to the Senior Water Resources Planner at Rivers House, Park Square. The final document will be considered to be in the public domain.

The Environment Agency reserves the right to respond publicly to any of the above documents.

APPENDIX 1 - Impact & Data Considerations for Water Resources Developments

| Development | Context | Primary Change | Impact Considerations | Data Considerations |
|----------------|---|------------------------------|----------------------------------|---|
| 1. Abstraction | 1.1 Groundwater - borehole well rising GW | 1.1.1 Construction & Testing | Nuisance from construction plant | Nearby properties Adjacent land use Present access condition |
| | | | Visual intrusion | Landscape character Line of sight from surrounding properties |
| | | | Subsidence | Drift geology data |
| | | | Aquifer integrity | Solid & drift geology data Hydrogeological data |
| | | | Site drainage & containment | Potential for discharge Pipeline routes Likely quality of pumping test water |
| | | | Effects on ecology | Presence, of conservation sites Site & neighbourhood inventory |
| | | | Archaeology | Schedule of Ancient Monuments, Sites & Monuments Record Presence of archaeological features |
| | | | Groundwater levels | (See 1.1.3) |
| | | 1.1.2 Permanent Works | Visual intrusion | Landscape character Line of sight from surrounding properties |

| Development | Context | Primary Change | Impact Considerations | Data Considerations |
|----------------|---|---|----------------------------|---|
| | | | Access intrusion | Nearby properties Present access condition Likely vehicular movements |
| 1. Abstraction | 1.1 Groundwater - borehole well rising GW | 1.1.2 Permanent Works | Effects on ecology | Presence of conservation sites Site & neighbourhood inventory |
| | | 1.1.3 Groundwater Levels or Piezometric heads | Spring flow reduction | Hydrogeological data Hydrological data Inventory of sites Inventory of site ecology Present amenity value |
| | | | Protected right | Borehole & well inventory Hydrogeological data |
| | | | Wetland/open water sites | Hydrogeological data Hydrological data Inventory of sites Inventory of site ecology Present amenity value |
| | | | Groundwater chemistry flux | Hydrogeological data Hydro geochemical data |
| | | | Subsidence | Drift geology data, confining layer geology, nearby properties |
| | | | Downstream flow regimes | (see 1.2.3) |

| Development | Context | Primary Change | Impact Considerations | Data Considerations |
|----------------|----------------------------------|------------------------------|----------------------------------|--|
| 1. Abstraction | 1.2 River, Canal, Standing water | 1.2.1 Construction & Testing | Nuisance from construction plant | Nearby properties Adjacent land use Present access condition |
| | | | Visual intrusion | Landscape character Line of sight from surrounding properties |
| | 1.2 River, Canal, Standing water | 1.2.1 Construction & Testing | Channel disturbance | Levels of natural turbidity Species tolerance in affected reach Construction programme Inventory of other users |
| | | | Erosion | Site geomorphology Local flow characteristics |
| | | | Fish migration | Nature of fishery |
| | | | Angling | Riparian rights Level of local activity |
| | | | Recreation, amenity & navigation | Rights of way Navigation rights Frequency of use |
| | | | Effects on ecology | Conservation sites Site & neighbourhood inventory |
| | | 1.2.2 Permanent Works | Visual intrusion | Landscape character Line of sight from surrounding properties |

| Development | Context | Primary Change | Impact Considerations | Data Considerations |
|----------------|----------------------------------|-------------------------------|--------------------------|--|
| 1. Abstraction | 1.2 River, Canal, Standing water | 1.2.2 Permanent Works | Access intrusion | Nearby properties Present access condition Likely vehicular movements |
| | | | Fish migration | Nature of fishery |
| | | | Fish behaviour | Species populations & preferences |
| | | | Fish mortality at intake | Species vulnerability to entrainment Species distribution |
| | | | Angling | Riparian rights Level of local activity |
| | | | Upstream drainage | Upstream land use Riparian drainage characteristics Flood hydrology & channel hydraulics Inventory of marginal & riparian ecology |
| | | 1.2.3 Downstream regimes flow | Effects on ecology | Conservation sites Site & neighbourhood inventory |
| | | | Reduced flow/levels | Hydrological time series (extended if necessary) Channel hydraulics data Present abstraction locations Actual & licensed abstractions |
| | | | Channel morphology | Areas of sensitive bed morphology Sediment dynamics |
| | | | Change in saline limit | Present saline regime |

| Development | Context | Primary Change | Impact Considerations | Data Considerations |
|----------------|----------------------------------|-------------------------------|----------------------------------|--|
| 1. Abstraction | 1.2 River, Canal, Standing water | 1.2.3 Downstream regimes flow | In stream ecology | Inventory of affected reach Species vulnerability to flow changes Instream and adjacent habitats |
| | | | Effluent dilution | Present discharge locations Quantity & quality of present discharges River quality characteristics Concentration of persistent and bioaccumulating substances |
| | | | Fish migration | Nature of fishery Species vulnerability to changes on flow |
| | | | Fish behaviour | Nature of fishery Species vulnerability to changes on flow Species population & preferences |
| | | | Fish populations/spawning | Nature of fishery Species vulnerability to changes on flow |
| | | | Angling | Riparian rights Activity over affected reach |
| | | | Recreation, amenity & Navigation | Flow/level relationships Navigation rights Frequency of use |

| Development | Context | Primary Change | Impact Considerations | Data Considerations |
|---------------------------|--|------------------------------|----------------------------------|--|
| 2. Discharge of raw water | 2.1 - Rivers - Canals - Lakes (From any source) | 2.1.1 Construction & Testing | Nuisance from construction plant | Nearby properties Adjacent land use Present access condition |
| | | | Visual intrusion | Landscape character Line of sight from surrounding properties |
| | | | Channel disturbance | Levels of natural turbidity Species tolerance in affected reach Construction programme Inventory of other users |
| | | | Erosion | Site geomorphology Local flow characteristics |
| | | | Pollution | Inventory of possible contaminants |
| | | | Fish migration | Nature of fishery |
| | | | Angling | Riparian rights Level of local activity |
| 2. Discharge of raw water | 2.1 - Rivers - Canals - Lakes (From any source) | 2.1.1 Construction & Testing | Recreation, amenity & navigation | Rights of way Navigation rights Frequency of use |
| | | | Effects on ecology | Conservation sites Site & neighbourhood inventory |

| Development | Context | Primary Change | Impact Considerations | Data Considerations |
|---------------------------|--|---|------------------------|---|
| 2. Discharge of raw water | 2.1 - Rivers - Canals - Lakes (From any source) | 2.1.2 Permanent Works | Visual intrusion | Landscape character Line of sight from surrounding properties |
| | | | Access intrusion | Nearby properties Present access condition Likely vehicular movements |
| | | | Noise intrusion | Nearby properties nearby activities (susceptible) |
| | | | Fish migration | Nature of fishery |
| | | | Fish behaviour | Species populations & preferences |
| | | | Angling | Riparian rights Level of local activity |
| | | | Increased flows/levels | Hydrological time series (extended if necessary) Channel hydraulic data Likely discharge velocities Potential for extreme discharge events |
| | | | Channel morphology | Areas of sensitive bed/bank morphology Sediment dynamics |
| | | | Change in saline limit | Present saline regime |
| | | 2.1.3 Downstream - flow regimes - (inc. emergency releases) | In stream ecology | Inventory of affected reach Species vulnerability to flow changes Instream and adjacent habitats |

| Development | Context | Primary Change | Impact Considerations | Data Considerations |
|-------------|---------|----------------|----------------------------------|---|
| | | | Marginal ecology | Inventory of affected reach Species vulnerability to flow changes |
| | | | Riparian ecology | Identification of vulnerable sites |
| | | | Effluent dilution | Present discharge locations Quantity & quality of present discharges River quality characteristics Concentration of persistent and bioaccumulating substances. |
| | | | Fish migration | Nature of fishery Species vulnerability to changes in flow |
| | | | Fish behaviour | Nature of fishery Species vulnerability to changes on flow Species populations & preferences |
| | | | Fish populations/spawning | Nature of fishery Species vulnerability to changes on flow |
| | | | Angling | Riparian rights Activity over affected reach |
| | | | Recreation, amenity & navigation | Flow/level relationships Navigation rights Frequency of use |

| Development | Context | Primary Change | Impact Considerations | Data Considerations |
|---------------------------|--|--------------------------------|---------------------------------|--|
| 2. Discharge of raw water | 2.1 - Rivers - Canals - Lakes (From any source) | 2.1.4 Downstream water quality | Physio chemical characteristics | Chemistry of donor source and recipient waters Chemical equilibrium of mixed waters Likely pollutant & nutrient transfer load Thermal regime of donor and recipient waters Suspended solid load of donor and recipient waters Toxicity and direct toxicity assessment |
| | | | In stream ecology | Inventory of affected reach Inventory of species sensitive to physico-chemical changes in stream and adjacent habitats. |
| | | | Marginal ecology | Inventory of affected reach Inventory of species sensitive to physico-chemical changes |
| | | | Riparian ecology | Inventory of vulnerable sites |

| Development | Context | Primary Change | Impact Considerations | Data Considerations |
|---------------------------|------------------------------------|------------------------------|----------------------------------|--|
| 2. Discharge of raw water | 2.2 To groundwater from any source | 2.1.5 Species Transfer | Ecosystem characteristics | Algal characteristics of donor and recipient waters Fisheries characteristics of donor and recipient waters Macroinvertebrate characteristics of donor and recipient waters Disease & parasite characteristics of donor and recipient waters Macroinvertebrate characteristics of donor and recipient waters Macrophyte characteristics of donor and recipient waters Alien species of donor catchment |
| | | 2.2.1 Construction & Testing | Nuisance from construction plant | Nearby properties Adjacent land use Present access condition |
| | | | Visual intrusion | Landscape character Line of sight from surrounding property |
| | | | Subsidence | Drift geology data |
| | | | Aquifer integrity | Solid & drift geology data Hydrogeological data |
| | | | Site drainage & containment | Potential for discharge Pipeline routes Likely quality of pumping test water |

| Development | Context | Primary Change | Impact Considerations | Data Considerations |
|---------------------------|------------------------------------|--------------------------|------------------------------------|---|
| 2. Discharge of raw water | 2.2 To groundwater from any source | | Effects on local ecology | Presence of conservation sites Site & neighbourhood inventory |
| | | | Archaeology | Schedule of Ancient Monuments, Sites & Monuments register Presence of archaeological features |
| | | 2.2.2 Permanent Works | Visual intrusion | Landscape character Line of sight from surrounding properties |
| | | | Access intrusion | Nearby properties Present access condition Likely vehicular movements |
| | | | Effects on ecology | Presence of conservation sites Site & neighbourhood inventory |
| | | 2.2.3 Groundwater Levels | Change in spring flows | Hydrogeological data Hydrological data Inventory of sites Inventory of site ecology Present amenity value |
| | | | Protected rights | Borehole & well inventory Hydrogeological data |
| | | | Change in wetland/open water sites | Hydrogeological data Hydrological data Inventory of sites Inventory of site ecology Present amenity value |

| Development | Context | Primary Change | Impact Considerations | Data Considerations |
|---------------|-------------------|---------------------|----------------------------------|--|
| | | | Subsidence | Drift geology data Nearby properties |
| | | | Downstream flow regimes | (SEE 1.2.3) |
| | | 2.2.4 Water Quality | Physico chemical characteristics | Chemistry of donor source Chemistry of recipient waters Chemical equilibrium of mixed waters Likely pollutant & nutrient transfer load Thermal regime of donor waters Thermal regime of recipient waters Suspended solid load of donor waters Suspended solid load of recipient waters Toxicity and Direct Toxicity Assessment |
| | | | Geochemical stability | Hydro geochemistry data Hydro geochemical data |
| 3. Reservoirs | 3.1 New or raised | 3.1.1 Construction | Nuisance from construction plant | Nearby properties Adjacent land use Access & likely traffic volume Present infrastructure |
| | | | Visual instruction | Landscape character Line of site |
| | | | Aquifer integrity | Solid & drift geology data Hydrogeological data |

| Development | Context | Primary Change | Impact Considerations | Data Considerations |
|---------------|-------------------|--|-------------------------------------|--|
| 3. Reservoirs | | | Site drainage & contamination | Existing drainage network Hydrogeology Quality of runoff Downstream uses |
| | | | Recreation, amenity & navigation | Rights of way Navigation rights Frequency of use |
| | | | Effects on ecology | Presence of conservation sites Site & neighbourhood inventory |
| | | | Archaeology | Schedule of Ancient Monuments, Sites & Monuments Register Presence of archaeological features |
| | | | Downstream water quality | (SEE 2.1.4) |
| | 3.1 New or raised | 3.1.2 Permanent Works (inc. lake creation) | Loss of wetlands | Site & neighbourhood inventory |
| | | | Loss of terrestrial ecology/habitat | Site & neighbourhood inventory |
| | | | Loss of marginal ecology/habitat | Site & neighbourhood inventory |
| | | | Loss of In stream ecology/habitat | Site & neighbourhood inventory |
| | | 3.1.2 Permanent Works (inc. lake creation) | Loss of riparian ecology/habitat | Site & neighbourhood inventory |
| | | | Loss of properties/land use | Site & neighbourhood inventory |
| | | | Loss of topographical features | Site & neighbourhood inventory |

| Development | Context | Primary Change | Impact Considerations | Data Considerations |
|-------------|---------|----------------|-------------------------------|---|
| | | | Loss of other resources | Site & neighbourhood inventory |
| | | | Mineral Working | Site inventory |
| | | | Visual Intrusion | Landscape character Line of sight |
| | | | Access Intrusion | Nearby properties Present access condition Likely vehicular movements Infrastructure inventory |
| | | | Drainage | Existing drainage networks Seepage potential Hydrogeology Hydrology |
| | | | Lake quality | Soil chemistry Input water quality Surrounding land use |
| | | | Recreation & amenity | Inventory of existing activities Frequency of existing use |
| | | | Archaeology | Schedule of Ancient Monuments, Sites & Monuments Register Presence of archaeological features |
| | | | Changed flood characteristics | Present flood hydrology Extent of flood plain |

| Development | Context | Primary Change | Impact Considerations | Data Considerations |
|--|-------------------------|------------------------------|----------------------------------|--|
| | | | Fish migration | Nature of fishery Scale of upstream fishery Impact on downstream fishery |
| | | | Fish populations | Nature of inundated fishery Scale of inundated fishery |
| Although the Environment Agency is primarily concerned with abstractions to and discharges from pipelines, their river crossings and the impacts of interbasin transfer, applicants may find the following general considerations helpful. | | | | |
| 4. Pipelines & Tunnels | 4.1 Under or overground | 4.1.1 Construction & Testing | Nuisance from construction plant | Nearby properties Adjacent land use Presence access condition |
| | | | Visual intrusion | Landscape character Line of sight |
| | | | Aquifer integrity | Solid and drift geology data Hydrogeology |
| | | | Site drainage & containment | Potential for discharge Pipeline route Quality of test water |
| | | | Effects on ecology | Presence of conservation sites Site and neighbourhood inventory |
| | | | Archaeology | Schedule of Ancient Monuments Presence of archaeological features |

| Development | Context | Primary Change | Impact Considerations | Data Considerations |
|------------------------|-------------------------|-----------------------|-----------------------|---|
| 4. Pipelines & Tunnels | 4.1 Under or overground | | Recreation & Amenity | Rights of way Frequency of use Inventory of sites |
| | | 4.1.2 Permanent Works | Visual intrusion | Landscape character Line of site |
| | | | Access intrusion | Nearby properties Present access condition Likely vehicular movements |
| | | | Effects on ecology | Presence of conservation sites Site and neighbourhood inventory |

APPENDIX 2 - Potential Sources of Information and Investigations Required for Data Consideration

| Data Considerations | Potential Sources | Investigation/Surveys |
|---------------------|-------------------|-----------------------|
|---------------------|-------------------|-----------------------|

| Data Considerations for Abstraction and Discharge | | |
|--|--|--|
| Land Use Adjacent land use Upstream land use Landscape character Likely vehicular movements Line of sight from surrounding properties Nearby properties Present access condition Rights of way | Land Use Maps, OS maps, MAFF, GIS, aerial photographs River Corridor Surveys & landscape appraisal ITE Local Authorities, DoT | Specialist contractor surveys Site visits and surveys (Environment Agency) |
| Water Quantity Present locations of abstraction Existing MAF's or RFO's Quantities requiring protection Flow/level relationships Local flow characteristics Hydrological time series (extended if necessary) Likely discharge velocities Potential for extreme discharge events | Environment Agency Licensing databases No derogation of protected rights Hydrometry Flow data files / archives Modelling of schemes Likely emergency discharges v flood flows | WR Assessment / modelling Hydrometry, site surveys Ecologically Acceptable Flows Modelling - hydraulic & hydrological |

| Data Considerations | Potential Sources | Investigation/Surveys |
|---|---|---|
| Water Quality Present discharge locations Quantity & quality of present discharges River quality characteristics Thermal regime of recipient waters Chemistry of donor / recipient waters Levels of natural turbidity Inventory of possible contaminants Likely pollutant & nutrient transfer load Chemical equilibrium of mixed waters Present saline regime | WQ Archive / consents River Quality monitoring, routine stats Catchment Quality Control Modelling Modelling Routine monitoring | Environmental assessment or specialist modelling Modelling, monitoring of specifications, diet variations, speciation, algal monitoring & modelling. Survey of industrial users, discharges etc. Lab assessment of chemical equilibria Additional monitoring of GW |
| Biology, Conservation & Ecology Inventory of affected reach (In stream) Inventory of marginal & riparian ecology Site & neighbourhood inventory Macroinvertebrate characteristics of recipient/donor waters Algal characteristics of donor/recipient waters Disease & parasite characteristics of recipient/donor waters Inventory of species sensitive to physico-chemical changes Conservation sites Inventory of vulnerable sites and species including Biodiversity targets | RIVPACS, HabScore, River Corridor Surveys, River Habitat Surveys, Ecologically Acceptable Flows Phase 1 and 2 habitat surveys, Designated Sites Environmental assessment Biology databases (macroinvertebrate scores) Routine monitoring to species level Algal monitoring & modelling, linking to WQ Biological monitoring Published research, IFIM EN, County Trust Officers, Conservation Officers, GIS, DoE (Biodiversity targets) | Environmental assessment or specialist contractor surveys Environmental assessment or specialist contractor surveys Additional strategic monitoring Specialist laboratory investigations Physical and WQ modelling and assessment of impacts of fisheries & ecology River Corridor & flood plain surveys |

| Data Considerations | Potential Sources | Investigation/Surveys |
|--|---|--|
| Fisheries Activity over affected reach Nature of fishery Fisheries characteristics of donor/recipient waters Species distribution Species populations & preferences Species tolerance in affected reach(es) Species vulnerability to entrainment Species vulnerability to changes in thermal regime Species vulnerability to changes in flow | Fisheries, angling clubs Routine fisheries surveys: recruitment/success habitats, trophic interactions migratory fish National Fisheries Classification Published research, ecotoxicology, IFIM R&D report recommendations IFIM | Angler catch/recreational fishing surveys Electrofishing, biosonics, netting Analysis of fish gut/food preferences PHABSIM PHABSIM |
| Land Drainage & Flood Defence Riparian drainage characteristics Riparian rights Channel Form & Hydraulics Channel hydraulics data Flood hydrology Geomorphology Site geomorphology Areas of sensitive bed morphology Sediment dynamics Suspended solid load of recipient/donor waters | Land Drainage, Planning Liaison Officers, Flood Defence databases. Riparian landowners database. Land drainage / Flood Defence, PHABSIM Quantity archive WQ archive, specialist reports | Specialist land drainage surveys Additional site monitoring, modelling Specialist surveys Specialist surveys |
| Recreation & Navigation Navigation Rights Frequency of use Inventory of other users | Environment Agency regional FRCN , BW, navigation authorities, Sport council, Sports Governing bodies (BCU, RYA etc.), LPA's. BCU Handbook | Visitor surveys: pedestrian/boat counters, lock surveys. |
| Data Consideration for Pipelines | | |

| Data Considerations | Potential Sources | Investigation/Surveys |
|--|---|--|
| Land Use Adjacent land use Landscape character Likely vehicular movements Line of sight Nearby properties Pipeline route Present access condition Presence of archaeological features / Schedule of Ancient Monuments | MAFF, Land Use Survey, O.S, aerial photographs. SMR & SAMS register (LPA's), other national "Heritage" organisations | Land Drainage/Land Use Survey Archaeological investigations; |
| Water Quantity Hydrogeology Solid & drift geology data | Regional Groundwater Specialists Geologist maps, BGS | Geotechnical investigations for detail |
| Biology, Conservation & Ecology Presence of conservation sites Site & neighbourhood inventory | AONB, LNR's, SSSI's, SPA, Ramsar, SAC etc. RCS, RIVPACS | Environment Agency or specialist contractor surveys Environment Agency or specialist contractor surveys |
| Fisheries Activity over affected reach Nature of fishery Vulnerability of temporary disturbance or possible loss of habitat | Fisheries, Angling Clubs Fishery surveys | Angler catch/recreational fishing surveys Electrofishing, biosonics, netting, habitat surveys. Fish food source surveys. |
| Land Drainage, Channel Form & Hydraulics & Geomorphology Channel Hydraulics Site Geomorphology & sediment dynamics | Land drainage/flood defence studies, PHABSIM Geomorphology surveys WQ archives | In house/specialist surveys |
| Recreation & Navigation Navigation rights Frequency of use | Environment Agency navigation, BW, or other navigation authorities, LPA's | Pedestrian/boat counters & lock surveys |
| Data Consideration for Reservoirs (bunded and impounded) | | |

| Data Considerations | Potential Sources | Investigation/Surveys |
|--|--|---|
| Land Use Adjacent land use Landscape character Likely vehicular movements Line of sight Nearby properties Pipeline route Access & traffic Rights Presence of archaeological features/schedule of Ancient Monuments Minerals inventory & plans | MAFF, Land Use Survey, Ordnance Survey, aerial photograph surveys Local Authorities SMR & SAMS register (LPA's), other national "Heritage" organisations. CC Minerals Plans | Land Drainage/Land Use Survey Archaeological investigations; need Archaeologist as part of construction team |
| Water Quantity Hydrology of inundated water courses Hydrogeology Solid & drift geology data Seepage potential | Quantity archive Regional Groundwater Specialists Geology maps, BGS | Hydrometry, modelling - hydraulic & hydrologic Geotechnics investigations for detail |
| Water Quality Input WQ Soil Chemistry and Water Interaction Quality of runoff | WQ Archive Soil Survey, BGS Pollution prevention | Additional monitoring, modelling Forward planning, sedimentation ponds |
| Biology, Conservation & Ecology Presence of conservation sites Site & neighbourhood inventory In stream ecology | EN, AONB, LNR's SSSI's, SPA, Ramsar, SAC etc. RCS, RIVPACS, HabScore Routine surveys | Specialist surveys & assessments |

| Data Considerations | Potential Sources | Investigation/Surveys |
|--|--|--|
| Fisheries Scale & nature of inundated fishery Impact on migratory fish Scale & nature of upstream fishery Nature of reservoir fishery Loss of spawning grounds | Routine fishery survey characteristics Promoter/Environment Agency consent Habitat surveys | Specialist surveys: eg. population characteristics |
| Land Drainage etc. Present flood hydrology Extent of flood plain Channel Form & Hydraulics Existing drainage networks, re-aligned channels Geomorphology | Quantity archive, models FP mapping, modelling, historic flood records Hydrometry, flood modelling Environment Agency/Geomorphology surveys | Additional survey & modelling, monitoring of flood event. Land drainage surveys Specialist surveys |
| Recreation & Navigation Downstream users | Existing uses and assessment of potential impacts. Environment Agency navigation, BW etc., Sports Council, BCU, RYA, ARA etc. | Evaluation of potential impacts arising from changed flow regimes or loss of navigation. |

APPENDIX 3 - Proforma A: Impacts and Data Requirements

| | | | | | | |
|-------------|--|---------|--|-------------|--|--|
| Development | | Context | | Location(s) | | |
|-------------|--|---------|--|-------------|--|--|

| Primary change | Impact consideration | Data consideration | Current work available | Further work needed having made a professional judgement on the adequacy of data available | Time | Responsibility |
|----------------|----------------------|--------------------|------------------------|--|------|----------------|
| | | | | | | |

APPENDIX 4 - RELEVANT LEGISLATION

Principal Legislation

In addition to the benefits of environmental assessment/appraisal outlined in the introduction, there are legal reasons for carrying it out. The law requires environmental assessment/appraisal to be a significant part of the Agency's work. The principal legislation is summarised below:-

- The Environment Act, 1995 - sections 4, 7 - 9 and 37.(1)
- EC Directive 85/337/EEC (1985). The assessment of the effects of certain public and private projects on the environment.
- Statutory Instrument 1199 - The Town and Country Planning (Assessment of Environmental Effects) Regulations 1988, as amended by Statutory Instrument 677 (1994)
- The General Permitted Development Order - Statutory Instrument 418 (1995), The Town and Country Planning (General Permitted Development) Order 1995 (GPDO)
- Statutory Instrument 419 (1995) - Town and Country Planning (General Development Procedure) Order 1995
- Statutory Instrument 417 (1995) - The Town and Country Planning (Environmental Assessment and Permitted Development) Regulations 1995
- EC Habitats Directive 92/43/EEC
- Statutory Instrument 2716 (1994) Conservation (Natural Habitats and Conservation) Regulations
- DoE (1994) Planning Policy Guidance : Nature Conservation PPG9

References:

1. DoE (1989) *Environmental Assessment: A Guide to the Procedures* DoE, Welsh Office HMSO: London
2. NRA Bristol (1995) *Scoping Guidance for the Environmental Assessment of Projects*
3. NRA Bristol (1995) *Further Guidance for the Environmental Assessment of Projects*
4. Environment Agency (1996) *Environmental Assessment : Scoping Handbook for Projects*. HMSO: London

GLOSSARY

| | | | |
|------|---|---------|--|
| AONB | Area of Outstanding Natural Beauty | PHABSIM | Physical Habitat Simulation |
| BCU | British Canoe Union | R&D | Research and Development |
| BGS | British Geological Survey | RCS | River Corridor Survey |
| BW | British Waterways | RFO | River Flow Objectives |
| DoE | Department of the Environment | RIVPACS | River Invertebrates Prediction and Classification System |
| DoT | Department of Transport | | |
| EN | English Nature | RYA | Royal Yachting Association |
| FP | Flood Plain | SAC | Special Area Conservation |
| FRCN | Fisheries, Recreation, Conservation, Navigation | SAMS | Schedule of Ancient Monuments |
| GIS | Geographical Information System | SMR | Sites and Monuments Register |
| GW | Groundwater | SPA | Special Protection Area |
| IFIM | Instream Flow Incremental Methodology | SSSI | Site of Special Scientific Interest |
| ITE | Institute of Terrestrial Ecology | WQ | Water quality |
| | | WR | Water resources |
| LNR | Local Nature Reserve | | |
| LPA | Local Planning Authorities | | |
| MAF | Minimum Acceptable Flows | | |
| MAFF | Ministry of Agriculture, Fisheries and Food | | |
| OS | Ordnance Survey | | |