|  |
| --- |
|  |
| ONR Technical Assessment Guide  The Assessment of the Nuclear Reactors (Environmental Impact Assessment for Decommissioning) Regulations Submissions |



ONR Technical Assessment Guide (TAG)

The Assessment of the Nuclear Reactors (Environmental Impact Assessment for Decommissioning) Regulations Submissions

Authored by – Technical Support Contractor

Approved by – Professional Lead – Nuclear Liabilities Regulation (NLR)

Issue No.: 1

Publication Date: Jun-23

Next Major Review Date: Jun-28

Document Ref. No.: NS-TAST-GD-105

Record Ref. No.: 2023/35062

Table - Revision commentary

|  |  |
| --- | --- |
| Issue No. | Description of Update(s) |
| 1 | New document. |

Contents

[1. Introduction 5](#_Toc138410833)

[2. Purpose and Scope 6](#_Toc138410834)

[3. Relationship to Licence and other Relevant Legislation 9](#_Toc138410835)

[4. Relationship to SAPs, WENRA Reference Levels and IAEA Safety Standards Addressed 12](#_Toc138410836)

[5. Advice to Inspectors: General Advice 15](#_Toc138410837)

[6. Advice to Inspectors: Detailed Advice 49](#_Toc138410838)

[7. Terrestrial and Freshwater Ecology 51](#_Toc138410839)

[8. Marine Ecology 58](#_Toc138410840)

[9. Noise and Vibration 66](#_Toc138410841)

[10. Air Quality 76](#_Toc138411059)

[11. Soils, Geology and Contaminated Land 86](#_Toc138411318)

[12. Climatic Factors 93](#_Toc138411319)

[13. Socio-economics 105](#_Toc138411638)

[14. Health 113](#_Toc138412013)

[15. Traffic and Transport 121](#_Toc138412413)

[16. Radiological Effects 131](#_Toc138412846)

[17. Material Resources and Waste 138](#_Toc138413325)

[18. Water Resources and Flooding 148](#_Toc138413831)

[19. Geomorphology and Coastal Processes 159](#_Toc138414372)

[20. Landscape and Visual Amenity 167](#_Toc138414959)

[21. Cultural Heritage 175](#_Toc138415572)

[Appendix A – Regulation 13 183](#_Toc138416220)

[References 185](#_Toc138416221)

[Glossary and Abbreviations 192](#_Toc138416222)

List of Tables

[Table 1 - Environmental Themes, Topics, and Receptors 24](#_Toc138410806)

[Table 2 - Aspects an ES should contain 30](#_Toc138410807)

[Table 3 - Example criteria for determining the value/sensitivity of a receptor 38](#_Toc138410808)

[Table 4 - Example criteria for determining magnitude of change 39](#_Toc138410809)

[Table 5 - Guidance on types of mitigation 40](#_Toc138410810)

[Table 6 – Mitigation [29] 42](#_Toc138410811)

[Table 7 - Typical Impact Evaluation Matrix 46](#_Toc138410812)

[Table 8 - Structure and Content of Topic Specific Guidance 49](#_Toc138410813)

[Table 9 - Example of decommission activities, impact and effects of sensitive reactors 55](#_Toc138410814)

[Table 10 - Example of decommission activities, impacts and effects on sensitive receptors 62](#_Toc138410815)

[Table 11 - Example thresholds of potential significant effects at dwellings 70](#_Toc138410816)

[Table 12 - Example Levels of Significance of Noise and Vibration Impacts 70](#_Toc138410817)

[Table 13 - Example of decommission activities, impacts and effects on sensitive receptors 73](#_Toc138410818)

[Table 14 - Air quality objectives, limit values and critical level 80](#_Toc138410819)

[Table 15 - Example of decommission activities, impacts and effects on sensitive receptors 84](#_Toc138410820)

[Table 16 - Example of decommission activities, impacts and effects on sensitive receptors 91](#_Toc138410821)

[Table 17 - Example likelihood descriptions for climate hazards [57] 100](#_Toc138410822)

[Table 18 - Example of decommission activities, impacts and effects on sensitive receptors 103](#_Toc138410823)

[Table 19 - Example of decommission activities, impacts and effects on sensitive receptors 105](#_Toc138410824)

[Table 20 - Example of decommission activities, impacts and effects on sensitive receptors 126](#_Toc138410825)

[Table 21 - Example of decommission activities, impacts and effects on sensitive receptors 145](#_Toc138410826)

[Table 22 - Example of decommission activities, impacts and effects on sensitive receptors 153](#_Toc138410827)

[Table 23 - Example of decommission activities, impacts and effects on sensitive receptors 157](#_Toc138410828)

[Table 24 - Example of decommission activities, impacts and effects on sensitive receptors 164](#_Toc138410829)

[Table 25 - Example of decommission activities, impacts and effects on sensitive receptors 172](#_Toc138410830)

[Table 26 - Example of decommission activities, impacts and effects on sensitive receptors 180](#_Toc138410831)

[Table 27 - Glossary of Terms 194](#_Toc138410832)

# Introduction

1. The Office for Nuclear Regulation (ONR) is the competent authority for the Nuclear Reactors (Environmental Impact Assessment for Decommissioning) Regulations 1999 (as amended) (EIADR) [1].
2. The ONR inspects and assesses compliance with licence conditions, and the arrangements made under them, to judge the suitability of the arrangements made and the adequacy of their implementation.
3. To support Inspectors undertaking compliance inspections, and in their technical assessment work in support of making regulatory judgements and decisions, ONR has provided a suite of inspection and assessment guides. This Technical Assessment Guide (TAG) is one such guide.

# Purpose and Scope

1. This TAG provides guidance to ONR Inspectors in relation to assessing applications made by licensees under the EIADR.
2. The content of this TAG takes into account relevant national and international good practice, including relevant International Atomic Energy Agency (IAEA) safety standards for the decommissioning of nuclear facilities.
3. The TAG is written as guidance for ONR inspectors to carry out their regulatory duties, it is not written for licensees and although it may be used by licensees as a source of guidance or good practice, it should not be interpreted by licensees as a set of prescriptive legal requirements.

## Nuclear Reactors (Environmental Impact Assessment for Decommissioning) Regulations 1999 (EIADR)

1. Nuclear Reactors (Environmental Impact Assessment for Decommissioning) Regulations 1999 (EIADR) (as amended) [1], implemented the EIA Directive (European Council Directive 2011/92/EU [2], as amended by Council Directive 2014/52/EU [3]. Following the UK’s exit from the European Union (EU), EIADR has remained in UK domestic legislation as retained EU law[[1]](#footnote-2).
2. The EIADR apply to all decommissioning projects that began after they came into force on 19 November 1999 as well as existing decommissioning projects (those that commenced prior to 19 November 1999) that are subject to a change or extension, which may have significant adverse effects on the environment under Regulation 13.
3. Regulation 3 defines the application of EIADR and the ONR Guidance Document on the topic provides further information [4].
4. For a nuclear power station, the EIADR are concerned with the dismantling and decommissioning of the station i.e., everything that could be reasonably be considered as being part of the power station on the licensed site, and any off-site structures related to the operation of the power station. For other nuclear reactors, EIADR is concerned only with the dismantling and decommissioning of what can reasonably be considered to be part of the reactor. In addition to the dismantling and decommissioning work carried out on the reactor or power station, the EIADR project will also apply to the management of contamination and waste arising as part of the dismantling and decommissioning [5].
5. In the case of the application of EIADR to the decommissioning of nuclear submarines, the EIADR applies to the nuclear reactor and associated plant within the reactor compartment, where that decommissioning work is carried out on a nuclear licensed site, since EIADR does not apply to the Crown and therefore does not apply on Authorised Defence Sites.
6. Duty holders may apply to the Secretary of State for an exemption in the case that certain conditions, described in Regulation 3 of the EIADR, are met. In which case, ONR will be informed of the Secretary of State’s decision.

## Purpose of Environmental Impact Assessment

1. Environmental Impact Assessment (EIA) is an established tool to support decision making in order to safeguard and enhance the environment. EIA is central to the iterative design process of projects and for the decision maker (ONR), it provides a systematic examination of the environmental implications of a proposed action, and its alternatives, before a decision is taken on whether consent should be granted for a decommissioning project to commence.
2. Through the EIA process, the potential effects of development proposals on the biophysical and social environment are identified, evaluated and mitigated prior to major decisions being taken and commitments made. The findings of an EIA are reported in an Environmental Statement (ES) (also referred to as an Environmental Report or an EIA Report). Whilst the EIA considers the potential effects and identifies mitigation measures to avoid or reduce adverse effects, the aim of the ES is to report the potential significant effects that may arise as a result of the project, thereby providing sufficient yet succinct information for the decision maker, in this case ONR.
3. An EIA should not be carried out in isolation from other legislation and assessment. Section 3 outlines other key legislation that the Inspector should be aware of, and Section 4 outlines associations with nuclear safety that may need to be considered when assessing EIADR submissions. Inspectors should satisfy themselves that where environmental design measures are proposed as mitigation in the decommissioning project, this is deliverable and compatible with nuclear safety.

## Aid to Decision Making

1. Under the EIADR ONR has the statutory duty to assess the adequacy of an ES and determine if consent should be granted for a decommissioning project. The ONR also has responsibility for determining whether an EIA is required for a proposed change or extension to a project under Regulation 13. Whilst the EIADR does not require licensees to prepare a Pre-application Opinion report and request a Pre-application Opinion prior to the submission of an ES, this pre-application stage in the EIA process is considered good practice. For completeness, this TAG provides guidance to Inspectors to support:

* Determination of Regulation 13 applications for any extensions or changes to a decommissioning project that may cause significant adverse impacts on the environment.
* Assessment of Scoping Reports (submitted by licensee) and production of a Pre-Application Opinion (by ONR).
* Assessment of ES submissions to inform the regulatory decision on whether to grant consent under EIADR.

1. During determination or assessment, if insufficient or inadequate evidence has been provided to enable a determination or decision to be made, the Inspector can request further information.

## Navigating this document

1. This TAG is split into two main sections – General Advice in Section 5 and Detailed Advice in Section 6 onwards. The General Advice sets out the key principles of EIA and how to assess an ES. This section should be the main source of reference when reviewing an ES. For further technical guidance on each topic, the Detailed Advice should be referred to.

# 

# Relationship to Licence and other Relevant Legislation

## Other Planning and EIA Legal Regimes

1. EIA regulations exist within a number of development consent regimes. Devolution has meant that there are specific EIA regulations relevant to England, Scotland, Wales and Northern Ireland (however, as Northern Ireland has no reactors, no further mention will be made). As a consequence, there are over 20 sets of EIA Regulations and numerous amendments that apply across the UK’s development consent regimes.
2. Activities within the decommissioning project may fall under other EIA Regimes, and therefore multiple submissions to different authorities may be required for elements of the same project. Duty holders must comply with the relevant regulations for their project. A majority of EIA activity is undertaken within the land use planning regime. For example, the construction of a waste store on the licensed site to support decommissioning activities may require development consent under the Town and County Planning Act 1990 and an EIA under the Town and County Planning (Environmental Impact Assessment) Regulations 2017 or   
   The Town and Country Planning (Environmental Impact Assessment) (Wales) Regulations 2017. Off-shore developments, for example a marine off-loading facility, may also require separate consent under the Marine and Coastal Act 2009 and an EIA under The Marine Works (Environmental Impact Assessment) Regulations 2007.
3. ONR will consult with the local planning authority during the Pre-Application Opinion and Application for Consent stages of EIADR. Appendix 2 of ONR Guidance Document on EIADR [4] provides further guidance on the interfaces between EIADR and the Town and Country Planning EIA Regulations.

## Environmental Legislation

1. The Inspector should be satisfied that where applicable, wider assessments have been co-ordinated - submissions made under the EIADR should be consistent with applicable wider assessments; baseline data should be common, and assessment findings consistent. Assessment reports produced for other purposes can be cross referenced in the EIADR ES, however sufficient information should be provided to put the findings into context to allow the Inspector to assess the ES under EIADR.
2. Through the EIADR consultation process, ONR will engage with various statutory consultees, and ONR will be consulted with through other regulatory requirements as highlighted below. The ONR will consider stakeholder comments as part of the determination for EIADR consent.

### Permitting Requirements

1. In England and Wales, the Environmental Permitting Regulations 2016 provides a single, streamlined environmental permitting and compliance framework.   
   The Environmental Authorisations (Scotland) Regulations 2018 aims to deliver a similar integrated authorisation framework in Scotland. The Environment Agency (EA) in England, the Scottish Environment Protection Agency (SEPA) in Scotland and Natural Resources Wales (NRW) in Wales are the environmental regulators. Operators should ensure that assessments are developed mindful of existing and foreseeable relevant environmental issues, and the existing requirements of permits on the site.
2. On decommissioning projects, a number of new or variations to permits (England and Wales) and authorisations (Scotland) may be required from the relevant environmental regulator for activities that could harm the environment or human health, including, but not limited to:

* Water discharge activities.
* Groundwater activities.
* Flood risk activities.
* Waste operations, including any disposal of radioactive and non-radioactive wastes.

1. ONR will consult with the relevant environmental regulator during the Pre-Application Opinion and Application for Consent stages of EIADR. Inspectors on sites undertaking decommissioning should familiarise themselves with ONR’s Memoranda of Understandings (MoUs) with the environmental regulators[[2]](#footnote-3) and associated supporting guidance documentation[[3]](#footnote-4) [6] [7] [8] as well as the joint guidance document, “The management of higher activity waste on nuclear licensed sites” [9]. In addition to this, Appendix 2 of ONR Guidance Document on EIADR [4] provides further guidance on the interfaces between EIADR and environmental legislation.

### Conservation of Natural Habitats and of Wild Fauna and Flora (the Habitats Directive)

1. The Conservation of Habitats and Species Regulations, 2017 (in England and Wales) and Habitats Regulation 1994 (as amended) (in Scotland) requires Competent Authorities for the regulations to make an appropriate assessment of the implications of a project or plan on a European Designated Site.
2. The Regulations define two important roles – that of the Competent Authority and the Statutory Nature Conservation Body. The role of the Competent Authority   
   (in this case, ONR), is held by the body responsible for determining the legal permission for the plan or project. The relevant Statutory Nature Conservation Body is, for England – Natural England, Scotland – Scottish Natural Heritage and Wales – NRW.
3. A Habitats Regulations Assessment (HRA) is a process that must be followed prior to consent for a plan or project not directly connected with, or necessary to the management of the site which may give rise to significant effects upon European Designate Sites. Where required an Appropriate Assessment will be undertaken. Whilst the scope, level of detail, required scientific rigour and terminology of the assessment will vary from the EIA, there is a direct relationship between them; an Appropriate Assessment requires sufficient detail of the project to enable assessment, which includes identifying committed mitigation. Under the EIADR the Inspector must be satisfied that the assessments have been co-ordinated and conclusions of the HRA been considered in the EIA, where applicable.
4. For further information, refer to [4] and [10].

### The Water Environment (Water Framework Directive) (England and Wales) Regulations 2017

1. The Water Framework Directive is an EU Directive which established a framework for maintaining and improving the quality of the coastal, estuarine, river, lake and ground waters and water bodies throughout the EU. It is enforced in the UK through the Water Environment (Water Framework Directive) (England and Wales) Regulations 2017 and the Water Environment and Water Services Act 2003 in Scotland; following the UK’s exit from the EU these regulations continue to be UK domestic law as ‘retained EU law’. Under these Regulations, a proposed project needs to consider the implications on the WFD objectives and compliance against the Directive. The relevant competent authorities in the HRA section also apply [refer to paragraph 29].
2. As per the HRA, there is a direct relationship between the WFD and the EIA. Under the EIADR the Inspector must be satisfied that, where applicable, the assessments have been co-ordinated and conclusions of the WFD been considered in the EIA.   
   It is important that the Inspector recognises that WFD impacts are assessed in a different way from the EIA approach.
3. For further information, refer to [4] and [11].

# Relationship to SAPs, WENRA Reference Levels and IAEA Safety Standards Addressed

## Safety Assessment Principles

1. The Safety Assessment Principles (SAPs) provide ONR Inspectors with a framework for making consistent regulatory judgements on the safety of activities and reference the legal duty to reduce risk so far as is reasonably practicable (SFAIRP).
2. The considerations of EIADR are broad-ranging and it should be noted that the SAPs relate only to nuclear safety, radiation protection and radioactive waste management; conventional hazards are excluded except where they have a direct effect on nuclear safety or radioactive waste management. Whilst the SAPs are concerned with nuclear safety rather than the assessment of environmental impacts, a section of the SAPs covers decommissioning (principles DC.1 to DC.9) and the following in particular has relevance to EIADR:
3. DC.3 refers to relevant factors that may apply to the timing of decommissioning, including (b) environmental impact, and (i) the presence of radioactively contaminated land, its potential impact on the site and the wider environment.
4. The following principles may also be of relevance to EIADR:

* EHA.1 to EHA.19 relate to natural or man-made external hazards to a facility.
* ENM.1 to ENM.8 relate to control of nuclear matter.
* RW.1 to RW.7 relate to management of radioactive waste at all stages of the lifecycle of a facility.
* RP.1 to RP.7 relate to radiation protection and control of areas to limit spread of radioactive contamination.
* RL.1 to RL.9 relate to land quality management which will likely become more prominent as decommissioning progresses towards final site clearance and release from regulatory control.

1. TAGs support the SAPs, and the following may be of particular relevance to EIADR:

* NS-TAST-GD-013 - External Hazards [12]
* NS-TAST-GD-024 - Management of Radioactive Material and Radioactive Waste on Nuclear Licensed Sites [13]
* NS-TAST-GD-026 - Decommissioning [14]
* NS-TAST-GD-038 - Radiological Protection [15]
* NS-TAST-GD-083 - Land Quality Management [16]

## International Atomic Energy Agency

1. Relevant IAEA documents to EIADR include:

* NG-T-3.11 - Managing EIA for Construction and Operation in New Nuclear Power Programmes [17] (**Note:** Whilst not specifically related to decommissioning, this describes the EIA process and subsequent utilization of the EIA)
* GSG-10 - Prospective Radiological Environmental Impact Assessment for Facilities and Activities [18]
* SSG-47 - Decommissioning of Nuclear Power Plants, Research Reactors and Other Nuclear Fuel Cycle Facilities [19]
* GSR Part 6 - Decommissioning of Facilities [20]

1. When reviewing submissions made by licensees under EIADR, Inspectors should satisfy themselves that assessments and consideration of mitigation have not been carried out in isolation of nuclear safety and security requirements. An integrated management system that prioritises safety and adequate quality management arrangements is required under Licence Condition 17 (Management Systems).
2. External hazard assessments undertaken for nuclear safety purposes may be informative to some environmental impact assessments. For example, the flood risk assessment required for the Water Resources and Flooding chapter of the ES may use information and results from the site external hazard flooding assessment. However, the purpose of external hazards assessments is different to the assessments required for EIADR and should not therefore be considered as a direct replacement for environmental impact assessment.

## EIA Relevant Good Practice

1. A wide range of material exists on EIA. The following good practice has been used for the development of this TAG, which could be referred to for further information and guidance on EIA:

* EU EIA Guidance [21] [22] [23]
* Planning Inspectorate Advice Notes [10] [11] [24] [25] [26] [27]
* Institute of Environmental Management and Assessment (IEMA) Environmental Impact Assessment Guide to: Delivering Quality Development [28]
* IEMA Environmental Impact Assessment Guide to: Shaping Quality Development [29].
* IEMA Special Report – The State of Environmental Impact Assessment Practice in the UK [30].
* Introduction to Environmental Impact Assessment [31].
* Methods of Environmental and Social Impact Assessment (Natural and Built Environment Series) [32].

1. To aid the Inspector’s assessment of an ES, topic specific guidance is provided in Section 6 onwards. Further guidance on the specific environmental topics, including the ‘conventional’ aspects of decommissioning such as noise and vibration, is referenced in each of these sections. The detailed guidance sections also refer to legislation and policy specific to each of those topics.

# 

# Advice to Inspectors: General Advice

## Principles of EIA

1. The following key stages are typical in an EIA. Whilst the terms are different to those used under the EIADR, it is useful to know these terms when reviewing other EIA good practice:

* Screening – under the EIADR this is only applicable as part of Regulation 13
* Scoping – this is referred to as Pre-application under the EIADR
* Impact assessment and identification of mitigation measures
* Submission of ES
* Decision making
* Post-decision monitoring

1. Core activities typically undertaken iteratively through the EIA process and forming the ES content include:

* Developing an understanding of the baseline environment and potential receptors that could be affected (people, human health, fauna and flora, soils, land use, material assets, water quality and hydrology, air quality, climate, noise and vibration, the landscape and visual environment, historic and cultural heritage resources, and the interactions between them, and use of natural resources, the emission of pollution, creation of nuisances and the elimination of waste).
* Assigning the sensitivity of those receptors (sensitivity of the receiving environment to change, including its capacity to accommodate the changes the Projects may bring about).
* Identification of activities and the impacts they could cause.
* Assessment of the effects through considering the characteristics of change (timing, scale, size, and duration of the impact) on each receptor as a result of the impact.
* Calculating the significance of effect accordingly through taking the receptor sensitivity and the magnitude of change.

1. The fundamental activity in EIA, which should be clearly presented in the ES for each topic, is therefore to identify the source of the impact and identify if there is a pathway between the source and the receptor (source-pathway-receptor model). Through this, the effect on a receptor can be assessed and significance identified.
2. Throughout the EIA process, if the Inspector considers that insufficient information has been provided to enable a determination or decision to be made for that stage (Regulation 13 Submission, Pre-Application Opinion or final Consent (ES)), further information can be requested. The Inspector should only make a request when they consider that further information is necessary to complete their assessment and provide a determination or decision.

## Regulation 13

1. Due to long decommissioning timescales, changes or extensions to a decommissioning project are likely. Regulation 13 requires the licensee to consider any change or extension to the decommissioning project to determine if the change/extension may have significant adverse effects on the environment. Where there is potential, the licensee should apply to ONR for a determination as to whether an EIA is required.
2. When determining an application under Regulation 13, the Inspector should be satisfied that the licensee has considered the characteristics of the change or extension and the sensitive environmental receptors that could be affected by that change. This is discussed in more detail in the subsections below.

### Scope of Change or Extension of a Project

1. The licensee should:

* Demonstrate that the alteration to the decommissioning project is considered as a change or extension under the EIADR. Appendix A provides a list of what could be considered as a change or extension. Further guidance on Regulation 13 is also provided in the ONR Guidance Document on EIADR [4].
* As a minimum provide the project information stipulated in Schedule 2 and 3 of the EIADR, which includes:
  + Physical characteristics including size, design, magnitude and complexity of the activities.
  + Duration and frequency of the activities.
  + Use of resources and production of waste, pollution and nuisances.

### Sensitive Environmental Receptors and Areas

1. The licensee should provide a high-level description of the location of the proposed extension or change and the surrounding environment, identifying sensitive receptors and areas that could be affected by the works, as stipulated in Schedule 2 and 3 of the EIADR.
2. The environmental effects of a change or extension are likely to require EIA if it is located in or close to a sensitive area, including Sites of Special Scientific Interest (SSSIs)[[4]](#footnote-5), especially those which are also international conservation sites; classified and potential Special Protection Areas (SPAs)[[5]](#footnote-6); designated and candidate Special Areas of Conservation (SACs)[[6]](#footnote-7); Ramsar sites (wetlands of international importance); National Parks[[7]](#footnote-8); a property on the World Heritage List[[8]](#footnote-9); Scheduled Monument[[9]](#footnote-10); an area of Outstanding Natural Beauty[[10]](#footnote-11). Environment and social themes that should be considered during the screening process include population, fauna, flora, soil, water, air, climatic factors, material assets, including architectural and archaeological heritage, landscape and the inter-relationship between these factors. Receptors or areas that could be sensitive to the works could include statutory or non-statutory designations.
3. Another consideration is whether any national or international environmental standards are already being approached or exceeded. For example, where a proposed change might adversely affect air quality in a designated Air Quality Management Area (AQMA).
4. Licensees should present updated baseline information, where previous survey data or assessment is out of date. Guidance on ‘shelf life’ for survey data is presented in the topic specific sections in Section 6.

### Determination of Potential Significant Effects

1. When screening against Regulation 13, ONR’s determination of whether or not a change or extension will cause a significant effect should be based on professional judgement which considers the licensee’s screening of the Project’s activities and impacts and the sensitive environmental and social receptors that could be affected. The licensee should provide evidence to support the conclusions; however, it would be expected to be high level and need not have applied the full EIA methodology.
2. When assessing if the change or extension has the potential to cause a significant effect, three broad criteria should be considered: characteristics of the change or extension; location and extent of the change or extension and sensitive environmental receptors that can be impacted; and the characteristics of the potential impact, which are as follows:

* Magnitude of change and spatial extent of the impact (change to the baseline and the geographical area or size of the affected receptor e.g. population/ habitat/ species).
* Nature of the impacts (i.e. direct, indirect, secondary, cumulative, short, medium and long-term, permanent and temporary, positive and negative).
* Intensity and complexity of the impact.
* Probability of the impact.
* Expected onset, duration, frequency and reversibility of the impact.
* Cumulation of the impact with the impact of other existing or approved projects.

1. What is in question at this stage is the broad significance of the likely environmental effects of the change or extension, to confirm whether an EIA is required.
2. A high-level environmental assessment should be undertaken to support a Regulation 13 application. The licensee should document how the assessment was undertaken; any uncertainties that were recognised; and identify the approach used to manage uncertainties within the application. A precautionary approach could be applied - where uncertainty exists, the assumption could be that the effect is significant and therefore the need for EIA is triggered.
3. When making a determination of a Regulation 13 application, the Inspector should also take into account the results of any other assessments (referred to as relevant EU environmental assessment under the EIADR which could include an HRA or WFD) that are reasonably available at that time.
4. If considered in isolation, a change or extension may not cause significant adverse effects, however when considered in combination with other activities, significant adverse effects could occur. An application under Regulation 13 should therefore consider potential combined or cumulative effects caused by the change or extension and other activities, which could include for example the decommissioning project as a whole; other normal site arrangement activities; or other projects in the surrounding area. In addition to this, multiple ‘small’ changes to the Decommissioning Project, should not be considered in isolation as they may cumulatively result in a significant change and potential significant adverse effects on the environment.”

## Pre-Application Opinion

1. A request for a Pre-Application Opinion is not a legal requirement, however it is good practice as it allows the licensee, ONR and stakeholders to determine and agree the key environmental issues that should be assessed further as well as the assessment methodology to be applied, with an overall aim of having a proportionate and focussed ES.
2. A Pre-Application Report should not be a draft ES. As a minimum, the Inspector should expect the following information as required under Article 5(2) of the EIA Directive:

* Specific characteristics of the project, including its location and technical capacity[[11]](#footnote-12).
* The project’s likely impacts on the sensitive receptors and the potential significant effects.

1. There are no formal requirements regarding the content of a Pre-Application Report, therefore the format and detail will likely vary. However, the Inspector should therefore be satisfied that:

* Sufficient information has been provided so that the Inspector understands the scope of decommissioning project.
* Sufficient evidence (to the best of the licensee’s ability) has been provided so that sensitive receptors across a range of relevant environmental topics and how they could be impacted is understood.
* The potential significant effects for relevant topics have been clearly identified so the Inspector can determine whether the licensee has undertaken a robust assessment and is focussing on the key environmental issues.
* The proposed assessment methodology for each topic included in the EIA has been set out so that the Inspector can determine if suitable methods and good practice will be applied to evaluate the environmental baseline conditions, make accurate impact predictions, and formulate adequate mitigation measures and monitoring procedures.
* Any further work as part of the EIA is set out so the Inspector can be confident that the EIA and ES will be suitably comprehensive and will provide sufficient information to support the decision making.

1. ONR will seek early engagement with the relevant environmental regulator to understand any current issues on the site that may be identified during the pre-application opinion stage. The Inspector will consult with the consultation bodies and such other appropriate bodies and will review the Pre-Application Report provided by the licensee. During the consultation, the inspector should engage with the consultation bodies to ensure that the comments received from consultees are properly understood and addressed in the Pre-Application Opinion. The Inspector should provide a Pre-Application Opinion guiding to the licensee on what ONR (and consultees) considers should be included in an ES.
2. The Pre-Application Opinion stage, and consultation with the consultation bodies, is particularly useful for identifying the interfaces between EIADR and existing permits and consents on the site, for example, existing environmental issues on the site or existing environmental permits.
3. It is important to note that the EIA is an iterative process and findings may change at the assessment stage due to availability of environmental baseline information, development of the decommissioning plan, concerns raised by statutory consultees, or changes to good practice. The scope of the EIA could therefore alter or be refined, e.g., potential effects could alter in severity or new effects could be identified that were not identified and reported in the Pre-application Report.
4. Article 5(1) of the EIA Directive states that when an opinion is provided, the ES should be based on the Opinion. However, where a variation to the scope of the assessment may change through the EIA process, it would be beneficial for the Inspector and licensee to agree an approach on how to manage a change, which can be documented in the Pre-Application Report. Depending on the significance of the variation to the EIA, one approach could be for the licensee to provide an addendum to a Pre-Application Report, another option could be a simple letter. The Inspector should review and assess the document provided in the same manner as a Pre-application Report and engage with the licensee. The ES should document the Pre-application process and the final scope of the assessment.

### Assessing Uncertainty

1. A Pre-Application Opinion tends to be undertaken early on in the EIA process which relies upon early Project information and may be based on limited environmental baseline information. Due to long decommissioning timescales, the amount of detail which can be reasonably provided by the licensee for the whole of the project’s programme may also be limited.
2. It is acceptable to have uncertainty during this phase and to recognise uncertainty will be applicable through the EIA process. At the Pre-application stage, the licensee should clearly set out the uncertainties encountered during the Pre-application process as well as how uncertainties will be managed in the detailed assessment and ES.

### Scope of Decommissioning Project

1. During the pre-application process, the licensee should consult with the Inspector to gain a common understanding of the project, temporal and spatial scope of the decommissioning project. If there is any ambiguity in the scope of the decommissioning project, the Inspector should seek legal advice.

#### Project Scope

1. Other activities on the site not associated with decommissioning could continue in parallel with the decommissioning project. It is therefore important to distinguish what activities are within the scope of the EIADR. The decommissioning project will include structures, systems and any associated infrastructure (both on site and off site) that are part of the power station, or that could reasonably be considered to be part of the nuclear reactor (i.e., a reactor not part of a power station) [1].

#### Temporal Scope

1. A decommissioning project commences when activities occur that disable or remove equipment for the purpose of permanently preventing the operation of the power station or reactor. The Inspector should determine the ‘purpose’ of the activities in order to assess if they fall under the EIADR. For the EIADR to apply, the first disabling or removal of plant or equipment would not in itself have to permanently prevent the continued operation of the power station or reactor, as long as it was done for that purpose [4].
2. The timescales, phases and end state of the project and criteria for the completion should be clearly defined in the Pre-Application Report. The regulations do not define what the ‘end state’ of the decommissioning project should be, however, from ONR’s perspective this will consider the point at which there is no longer a practical need to enforce EIADR. The end date will likely be when decommissioning activities have completed and there are no longer significant environmental effects. Further guidance on the end of the decommissioning project under EIADR is available in ONR’s EIADR guidance document [4].
3. Due to the long duration of the decommissioning project the amount of detail that can be reasonably provided by the licensee regarding dismantling and final site clearance may be limited at both the Pre-Application and the ES stages. How future phases will be assessed and reported in the ES should be considered in the Pre-application Report.

#### Spatial Scope

1. The area to be used for the decommissioning project should be defined in the Pre-application Report and should include all areas to be used for the Project, which could be both on and off-site structures. This will inform the spatial area for the assessment (which will likely differ per environmental topic).
2. The ONR’s position on off-site infrastructure is that the disabling or removal of equipment applies to structures, systems and any associated infrastructure situated off a licensed nuclear site, that was an integral part of the normal operation of the nuclear reactor or power station, e.g., a discharge pipeline.

### Project Description

1. A project description should be provided setting out the characteristics of the Project and should align to the Decommissioning Plan. This should enable the Inspector to understand the activities that could impact sensitive environmental and social receptors. Whilst not defined in the EIADR, Schedule 2 of the EIADR can be used as guidance for the provision of project information. The following information is usually provided at a high level in a Pre-application Report:

* Brief description of the site and surroundings.
* Alternatives for decommissioning activities (or changes or extensions).
* Physical characteristics of the project including size, design, magnitude and complexity.
* A high-level programme for the Project, including the key decommissioning phases.
* A high-level description of the main activities and their duration and frequency.
* A high-level description of construction / demolition methods, anticipated work force and resource use, management of waste, pollution and nuisances.
* Information on mitigation methods that are being considered.

1. The scope of a decommissioning project may include construction and operation activities (for example the construction and operation of waste stores) and therefore these should be considered in an EIA. Whilst the scope of an ES under the EIADR is associated with the decommissioning phase, construction and operation has been referred to in this TAG, in particular in the Detailed Advice sections, therefore when these terms are used, they are seen as interchangeable with ‘decommissioning’.

### Sensitive Environmental Receptors and Areas

1. Sufficient information on the sensitive receptors across a wide range of environmental topics that could be affected by the project should be provided in the Pre-Application Report.
2. It should be noted that at the Pre-Application stage environmental baseline data will likely be desk based rather than field surveys, will unlikely be comprehensive and should focus on those aspects of the environment that may be affected.   
   Through the EIA process further data will be obtained and Pre-application estimates and decisions should be reassessed in light of new baseline data.
3. A spatial scope for each relevant topic should be provided, which is the area where receptors could be affected by the proposed works. Where activities are considered unlikely to affect certain receptors, either because the receptor is not present in the spatial area of impact or the activities will have limited impact due to their nature or distance from the receptor, then it is appropriate to scope them out of the assessment. It may be relevant to scope out impacts on certain receptors during different phases of decommissioning, for example noise and vibration affects could be scoped out of the Care and Maintenance phase (or similar phase), when activity levels on the site are likely to be much lower.
4. The Inspector should be mindful that there will likely be gaps in the baseline information at this early stage of the EIA. Where this exists, the report should set out how these gaps will be filled as part of the EIA.
5. Where a lot of baseline information exists, the Pre-application Report should not be used to document the full environmental baseline and instead provide a consolidated summary.
6. The EIA Directive also includes the requirement for developers to outline the likely natural changes from the environmental baseline that would occur without implementation of the project as far as can be assessed with reasonable effort on the basis of currently available environmental information and scientific knowledge. Due to the length of a decommissioning project, it is inevitable that the surrounding environment will alter over the course of the project, for example from climate change, coastal processes, vegetation growth or human behaviours such as changes in traffic levels or local population demographics. In order to fully assess the potential effects of future activities of a project, a future baseline needs to be established, which must reflect the situation at the time of such activities. This will allow the magnitude of change to be assessed and determination of significance of effect to be made.
7. The licensee will need to consider the future environmental baseline over the duration of the decommissioning project, and it is likely that multiple future baselines, most likely aligned with discrete phases of the project, will need to be established. The year or phase of when future baselines will be developed may vary topic by topic or may be aligned to specific phases such as Care and Maintenance Entry, the end of Care and Maintenance, and Final Site Clearance.
8. Whilst there is no set guidance on how to establish a future baseline, various approaches could be used which could be quantitative (e.g., use of modelling to predict future scenarios) or qualitative (e.g., understanding future development and strategic policy). The Pre-application Report (and the ES) should set out how a future environmental baseline will be provided and assessed, including recognition of any uncertainties. The Inspector should be confident that the approach is appropriate and suitable to determine significant effects.

### Potential Significant Effects

1. The licensee should report the potential significant effects that will be taken forward for further assessment. To aid the Inspector’s assessment of a Pre-Application Opinion Report and guide the Inspector on what is considered a significant effect, the guidance on Regulation 13 should be applied [Section 5.2].
2. The Inspector should be satisfied that the assessment has considered those factors and identified the receptors / topics which could be significantly affected and thus taken forward to be assessed as part of the EIA. These factors may be assessed under different topic chapters depending on the approach chosen by the licensee. Potential topics and receptors that could be considered are provided in Table 1.
3. There will be potential overlaps between topics and the effects on receptors, therefore there is a risk that the assessment may have been omitted or inconsistently duplicated. For example, an increase in traffic could result in severance on pedestrian movements; one effect could be on a pedestrian’s journey and the other affect could be impact of a pedestrian accessing community facilities. The socio-economic topic may have assumed these effects would be reported in the traffic and transport topic, or vice versa. The Inspector should utilise the Pre-application process as an opportunity to ensure the scope of the assessment is clearly set out which will be taken forward to the ES.
4. In addition, the licensee should demonstrate that they have considered transboundary effects; cumulative effects; and effects from major accidents or disasters accordingly [refer to Section 5.4.4 for further information].

Table - Environmental Themes, Topics, and Receptors

| Environmental Theme | Potential Topics | Potential Receptors/Aspects |
| --- | --- | --- |
| Population | Socio-economic | People – Employment |
| People – Businesses |
| People – Land use |
| Community | People – Access and severance to residents, business and community facilities |
| Pedestrians, cyclists and equestrians’ access and use of public rights of way and other public routes |
| People – Provision of services/ public services i.e., health services or education |
| People – Recreation and amenity |
| Human Health | People |
| Landscape and Visual Amenity | Visual amenity – local residents, users of public rights of way |
| Landscape designations (National/Regional/Local) and seascape |
| Public open space and recreational facilities |
| Access | Traffic and Transport | Motorised vehicle drivers |
| Cyclists |
| Pedestrians |
| Navigation | Fishing and maritime recreation |
| Maritime commercial services |
| Biodiversity | Terrestrial Ecology | Designated sites |
| Terrestrial Fauna and protected species |
| Terrestrial Flora and habitats |
| Freshwater Ecology | Freshwater Fauna and protected species |
| Freshwater Flora and habitats |
| Marine and Coastal Ecology | Marine/Intertidal Fauna |
| Marine/Intertidal Flora and habitats |
| Designated sites/areas |
| Land and Resources | Contaminated Land | People, flora and fauna |
| Water and land |
| Geology and Soils | Soil quality |
| Geological designated sites and geological material |
| Agricultural land use |
| Materials and Waste | Resource use |
| Non-radiological solid waste |
| Contaminated material |
| Radiological solid waste |
| Water | Water Quality | Aquifers and groundwater resources i.e. abstraction |
| Groundwater quality |
| Surface water hydrodynamics, water quality and quantity |
| Geomorphology | Surface water geomorphology |
| Coastal processes | Sediments and sediment quality |
| Hydrodynamic processes |
| Marine/intertidal water quality |
| Floor Risk and Drainage | Floor protection i.e., Changes to flooding capacity to land and people |
| Existing drainage i.e., agricultural field drains/marine discharge outfalls |
| Material assets | Archaeology | Archaeological remains |
| Heritage Landscapes |
| Marine archaeology and shipwrecks |
| Built Heritage | Built heritage assets i.e., listed buildings and conservation areas (built environment) |
| Climatic Factors | Climate Change Resilience | Resilience i.e., sea level changes, weather events i.e. storm surges |
| Adaptation |
| Carbon and GHG Emissions | Transboundary receptors |
| Pollution | Noise and Vibration | Residents |
| Ecological Receptors |
| Local amenity and community facilities |
| Air Quality | Residents |
| Ecological Receptors |
| Local amenity and community facilities |
| Radiological effects | People |
| Surface water, groundwater, and aquifers |
| Flora and fauna |

### Assessment Methodology

1. The proposed assessment methodology should be set out for topics where potential significant adverse effects may occur. Method selection should consider:

* The impact and component receptors on which the studies will focus, and the accuracy and precision required.
* The most appropriate methods for collecting, analysing and presenting information; the resource requirements and timing considerations, especially for field surveys.
* Constraints such as the time and resources available.

1. The licensee should also set out how the level of significance will be determined, which may vary from topic to topic, and which can be quantitative or qualitative. Assessment methods should define thresholds or criteria for determining whether an effect is significant, based on the characteristics and nature of an impact and the sensitivity of the receptor.
2. Engagement with stakeholders will help inform the Inspector if the assessment approach is adequate. Section 5.4.6 provides further guidance on assessment methodology and Section 6 onwards provides further information on available industry guidance for each topic.

### Other Assessments

1. As stated in Section 3.1, whilst ONR does not have a statutory duty to review the scope of other assessments such as an HRA or WFD assessment, the Pre-application Report should include consideration of other assessments that are required for the decommissioning project. The Inspector should be satisfied that the licensee has identified all applicable assessments relevant to the decommissioning project and sets out how the EIA and those assessments will be co-ordinated and how the interfaces will be utilised within the Pre-application Report.

## Application for Consent: Environmental Statement

1. When an application under the EIADR has been received, the Inspector shall examine and assess the adequacy of the ES and ensure sufficient information has been provided to aid a decision. The Inspector shall carry out a separate assessment of the decommissioning project’s significant effects using the information provided; the Inspector should not simply rely on the licensee’s assessment.
2. The effectiveness of the EIA procedure relies upon high-quality ESs that can be properly reviewed and evaluated by competent experts, and which can contribute to sound decision-making. In order for this to be possible, the competent experts must be involved in both the preparation and in the review of the EIA Report   
   [23].
3. Through the examination and assessment, the Inspector/ONR should:

* Check the structure and logic of the ES, as well as the overall quality of the data, judgements and conclusions presented.
* Consider whether the ES is compliant with the EIADR.
* Consider whether the ES is complete and of good quality.
* Consider whether the information and estimates of significant effects are in a proportionate manner and identifies how effects will be avoided and minimised through mitigation and monitoring measures; and
* Ensure it has, or has access as necessary to, sufficient expertise to examine the ES [2] [3].

1. In considering whether the information is complete and sufficient the Inspector should consider whether there are any omissions in the information and whether these omissions are vital to the consultation or decision-making processes. If these omissions are not vital, then it may be unnecessary to identify or request further information. This will avoid unnecessary delay to the EIA process. Factors to consider include:

* Both the legal provisions that apply and the factors that the decision-maker is required to take into account at this stage in the consent process for the decommissioning project.
* The decommissioning project’s scale and complexity and the sensitivity of the receiving environment.
* Whether the environmental issues raised by the decommissioning project are high profile.
* The views of the public and consultees about the decommissioning project and the degree of controversy [23].

1. In reaching decisions and stipulating conditions, ONR should ensure that the principles of ‘as low as reasonably practicable’ (ALARP) are being adopted by the licensee, i.e., adverse effects should be avoided or minimised so far as is reasonably practicable, which should be documented in the ES.

### Reporting Requirements

1. As a minimum the ES should contain the information listed in Regulation 5(1) which enables stakeholders and decision makers to form opinions and to take decisions regarding the decommissioning project:

* A description of the decommissioning project comprising information on the site, design, size and other relevant features of the project.
* A description of the likely significant environmental effects.
* A description of mitigation measures that aim to avoid, prevent or reduce and, if possible, offset, any likely significant adverse effects on the environment.
* A description of the reasonable alternatives considered for the decommissioning project.

1. An ES typically comprises three volumes: Non-Technical Summary (NTS), the Main Text, and Technical Appendices. The ES should be written in a digestible and accessible manner so that stakeholders including the public can understand the proposals and potential effects.
2. A NTS should contain a summary of the information in the ES that makes up its statutory content in accordance with the Regulations. It should contain a brief description of the decommissioning project, the measures anticipated to mitigate any identified significant effects, and a summary of any significant effects that remain. The document is designed to provide anyone with an interest in the proposed development with an accessible, concise and transparent version of the assessment’s findings, in a language that non-technical people not regularly involved in the EIA process can understand [30]. The Inspector should be satisfied that the NTS presents the information objectively and concisely.
3. Inspectors should satisfy themselves that competent environmental professionals are employed or contracted by the Licensee to implement and manage environmental aspects of the Decommissioning Project. Academic records, industry experience and industry accreditation can all be used as measures of expertise.
4. If the licensee seeks a Pre-Application Opinion from ONR, indicating the scope and level of detail of the information they are required to supply, the ES must be based on this information. If the EIA scope alters through the assessment process, the ES should document the changes and provide the final scope of the EIA.

### Typical ES Contents

1. While there are no formal requirements stipulating the format and the presentation of an ES, good practice qualities of a good ES include:

* A clear structure with a logical sequence that describes, for example existing environmental baseline conditions, predicted impacts, scope for mitigation, proposed mitigation / compensation measures, significance of unavoidable / residual impacts for each environmental factor.
* Reads as a singular document with appropriate cross referencing.
* Is concise, comprehensive and objective.
* Is written in an impartial manner without bias.
* Makes use of effective diagrams, illustrations, photographs and other graphics to support the text.
* Uses consistent terminology with a glossary.
* References all information sources used.
* Has a clear explanation of complex issues.
* Contains, where relevant, a reference list detailing the sources used for the description and assessments included in the report.

1. In terms of ES content, key aspects (with associated standards/good practice) are presented in the Table 2.

Table - Aspects an ES should contain

| ES content aspect | Good practice and standards |
| --- | --- |
| Legislation, Policy and Guidance | A description of the consenting procedure and how EIA fits in with it should be provided.  The licensee should ensure the assessment has been carried out with due regard for relevant legislation, government policy and good practice. Typically, each topic chapter of the ES should list the key pieces of legislation, policy and guidance relevant to their topic and demonstrate that the project:  a) Does not contravene any provisions of UK or EU law;  b) Does not prevent the achievement of government objectives under national and regional policy; and  c) Takes into account local and regional government plans that may affect the baseline, potential for cumulative effects and proposed mitigation strategies.  Each topic section of this TAG provides further guidance (see Section 6 onwards).  This may include discussion of:   * National and international legislation, such as European Directives and UK Acts of Parliament. These govern the minimum legal requirements placed on development to protect people and the environment and guide the requirement to consider significant effects (for example, effects on the status of water bodies in line with the requirements of the Water Framework Directive); * National, regional and policy, which sets out government priorities on particular environmental issues, such as the government’s 25yr Environment Plan, which identifies biodiversity net gain and improving air quality as development priorities. Decommissioning projects seeking consent should demonstrate how they contribute to these priorities.   Local government policy and development plans, which set out plans and aspirations for future development, approaches to environmental protection and resource management that may affect the site and its surroundings. The licensee should demonstrate where the likely implementation of these policies has relevance to their assessment (for example, areas allocated for nature conservation projects could support ecological mitigation proposals). |
| Consultation | Provides evidence of effective consultations (if some consultations have already taken place).  Provides basis for effective consultations to come. |
| Project Description | The project description should set out the scope of the works that the EIA has assessed in as much detail as can be reasonably provided for the various phases of the Project. The information provided should meet the requirements set out in the EIADR.  The project description should clearly describe the parameters of the project and set out all primary mitigation – mitigation that is embedded into the design that has contributed to avoiding or minimising environmental effects as well as tertiary mitigation. |
| Design evolution & consideration of alternatives | The Inspector should be satisfied that the licensee has carefully considered how the project will be implemented and has considered alternatives thereby demonstrating the application of ALARP.  A section in the ES should describe the evolution of the design and describe how environmental effects have been avoided or reduced through the design process. Alternatives considered should be documented including the reasons for the preferred choice.  An alternatives hierarchy that could be followed is as follows: need or demand – is the project necessary? mode or process – alternatives to how it could be done, e.g., different technologies; location – site alternatives; and timing and detailed implementation – when, in what form and in what sequence, should the project be developed [33].  There may be uncertainty over activities in the later stages of decommissioning, therefore it may not be possible to be definitive and the ES should cover the strategic intention for eventual completion of decommissioning. Details should be given on the range of options being considered for future activities, describing the environmental effects of each option. Where there is any uncertainty in the later stages of the decommissioning project, the licensee should indicate this within the ES. |
| Environmental Baseline | Section 5.3.4 in the Pre-Application section provides initial guidance and should be read in conjunction with the below.  The environmental baseline forms the foundation upon which the EIA will rest. An overview of the environmental baseline may be presented in an upfront chapter of the ES to provide context, and each topic chapter will provide more detailed environmental baseline.  Developing a robust baseline will serve two purposes:   * It provides a description of the status and trends of environmental factors against which significant effects can be compared and evaluated; and * It forms the basis on which ex-post monitoring can be used to measure change once the Project has been initiated.   The environmental baseline should provide:   * A description of the current state of the environment (within the study area for the topic); * An outline of what is likely to happen to the environment should the project not be implemented (a future environmental baseline); * Description of how the baseline was collected and set out the data sources used; * A clear presentation of methods and results; * Indications of limitations and uncertainties, e.g., in relation to data accuracy and completeness; and * An assessment of the value of key receptors and their sensitivity to change.   Sources of information and data can be classified as:   * ‘hard’ data from reliable sources which can be verified, and which are not subject to short-term change, such as geological records; * ‘Intermediate’ data which are reliable but not capable of absolute proof, such as water quality, land values, traffic counts and vegetation condition which have variable values; and * ‘soft’ data which are a matter of opinion or social values, such as opinion surveys, visual enjoyment of landscapes and numbers of people using amenities, where the responses depend on human attitudes and the climate of public feeling [31].   A description of how the baseline was collected should be presented, which includes the methodology for site surveys or monitoring. A clear presentation of the information should be included. The baseline can be presented in various forms, for example:   * Tables * Maps * Diagrams * Charts and graphs   Uncertainty over the environmental baseline conditions both current and in future phases of decommissioning is likely to result in assumptions which should be reported. The Inspector should expect a commitment from the licensee to update the assessment at appropriate intervals throughout the project delivery over the Project lifetime. Appropriate intervals may include annual site surveys to check for changes to the site conditions, or upon the release of new legislation or guidance which may stipulate new or different receptors and impacts to be considered. |
| Technical Chapters | The ES should only contain those chapters needed to report on likely significant effects arising from the project.  Technical chapters should refer to the main project description and design evolution and should briefly summarise key mitigation relevant to the topic. The topic chapters should present the assessment findings of potential effects arising from the final design, incorporating all primary and tertiary mitigation, and should only identify pre-mitigation effects and residual effects where secondary mitigation is required. The focus should be on significant effects.  Should contain a good description of the methods used for the studies of each environmental factor and should cover each environmental factor in a way which is proportionate to its importance. |
| Mitigation | A clear description of mitigation required for the project will be presented. Mitigation measures may be included within each topic chapter and within a consolidated manner such as a Schedule of Environmental Commitments or a Mitigation Route Map. |
| Conclusion | The ES should provide a concise conclusion. Good practice is to focus on those effects that are material to the decision making. |

### Cumulative Effects

1. Regulation 5(e) of the EIADR requires an EIA to include an assessment of cumulative effects. Cumulative effects can result from multiple effects on the same receptor from the same project (synergistic effects) or the combined effect of multiple developments giving rise to multiple effects (additive effects). Whilst the effects from a single development may not be significant on their own, when combined with others the resultant effects could be significant.
2. The Pre-application Report and the ES should clearly set out methodology for determining the cumulative effects and level of significance. The following should be considered:

* **Spatial boundaries** – should take account both of the relevant spatial scales for the individual receptors (such as foraging distances, migratory routes) and the spatial extent of environmental changes introduced by developments (area of influence), so that all potential impact pathways can be identified in line with the source-pathway-receptor model.
* **Temporal boundaries** – should take account of the project life cycle, the duration of environmental changes introduced by the project at different phases of the life cycle, and the life cycles and recovery times of potentially affected receptors.
* **Additive effects** – also referred to as inter-project effects. This form of cumulative effect occurs as a result of the likely impacts of the proposed development interacting with the impacts of other developments in the vicinity. Past, present and reasonably foreseeable future projects should be considered. It is important a list of projects is agreed between ONR and licensee during the Pre-application process or early on in the EIA. Two examples of additive effects are as follows, ONR should also consider existing operations on the site:
  + Increased noise from demolition activities during the decommissioning project in addition to changes to the landscape from the use of cranes on a nearby new power station site will cause combined adverse effects to a local resident within the area of influence.
  + Increased construction traffic to and from the decommissioning project together with increase construction traffic to a nearby new power station site will cause combined effects on the local air quality and affect sensitive receptors such as residents along the highway.
* **Synergistic effects** – also referred to as intra-project effects. These effects occur between different environmental topics within the same proposal, as a result of that development’s direct effects. An example is the combination of effects on a local resident from an increase in noise levels, reduced air quality and reduced access to local community facilities during a construction phase of a project.

1. Assessing cumulative effects can be complex and there is no set methodology. Methods can vary across sectors and impact assessments. The source-pathway-receptor model provides a robust evidential base and transparent methodology for identifying effects.
2. The significance of effects is determined through professional judgement and can apply the same assessment as per the EIA method set out for each topic: Sensitivity + Impact Magnitude = Significance of effects (see Impact Identification, Prediction and Evaluation section [Section 5.4.6]).
3. The Planning Inspector’s Advice Note Seventeen [27] provides further guidance on cumulative impact assessments.

### Transboundary Effects

1. Schedule 1 and 2 of the EIADR requires transboundary effects to be considered within the EIA. The Pre-application process and the EIA should consider if the decommissioning project could give rise to significant effects on the environment in European Economic Area Member States (EEA States). ONR is required to send a copy of the ES to the Secretary of State stating whether or not in its opinion the project is likely to have significant effects on the environment of an EEA State[[12]](#footnote-13).
2. At the Pre-application stage, transboundary effects could be scoped out if early assessment can provide sufficient evidence.
3. Potential transboundary impacts could be for example, changes in air quality; changes in radiation dose levels; changes in marine water quality; or alteration of coastal processes and hydrodynamics.
4. The EIA should consider all potential environmental effects from the decommissioning project on all environmental receptors and identify any that are both likely and would be significant. Potential significant transboundary effects should be considered for individual topic areas based upon available information and professional judgement. There is no set guidance on how to assess the impact and determine the significance of effect. The same principles for the assessment apply to that discussed in Section 5.4.2.
5. The Planning Inspector’s Advice Note twelve [26] provides further guidance on transboundary impacts.

### Dealing with Uncertainty and Limitations

1. Uncertainties and assumptions are likely to occur within an EIA, in instances such as:

* Baseline data collection – limitations to available data.
* Uncertainties over the design, in particular in later stages of a decommissioning project.
* Uncertainties and assumptions applied to the assessment, for example assumptions regarding human behaviour.

1. Where they occur, the licensee should present them and provide the approach or method taken to manage them within the detailed assessment, so that the Inspector can consider this in their decision making.
2. A common and established approach for managing uncertainty is to apply a realistic worst-case scenario. For example, where a project design is not fixed, the ‘Rochdale Envelope’ or parameter approach can be applied. The principles of the Rochdale Envelope are that where there are clear reasons why it would not be possible to define a project fully in the short term (thereby significantly delaying submission of an application), then an applicant should be afforded a degree of flexibility, within clearly defined and reasonable parameters. These parameters should be no greater than the minimum range required to deliver the project effectively and applicants will have to justify these parameters to the Secretary of State [34]. Where this occurs, the licensee must provide sufficient information to enable the main or the likely significant effects on the environment to be assessed and the mitigation measures to be described. Proposed scheme parameters should therefore not be so wide ranging as to represent effectively different schemes [33].
3. If flexibility is sought, then it is essential that licensees ensure:

* that the approach is explained clearly for the purpose of consultation and publicity at the Pre-application stage.
* that the ES explains fully how the flexibility sought has been taken into account in the assessments and why it is required.
* that there is consistency across the application documents, including any other relevant environmental assessments.

1. Approaches to dealing with uncertainty should be clearly set out, easy to convey to stakeholders and informed by appropriate consultation. The following key principles should be considered when determining the appropriateness of the approach:

* The application documents should explain the need for, and the timescales associated with, the flexibility sought, and this should be established within clearly defined parameters.
* The clearly defined parameters established for the project must be sufficiently detailed to enable a proper assessment of the likely significant environmental effects and to allow for the identification of necessary mitigation, within a range of possibilities.
* The assessments in the ES should be consistent with the clearly defined parameters and ensure a robust assessment of the likely significant effects.
* The ONR must not permit the project to extend beyond the ‘clearly defined parameters’, which have been requested and assessed. The ONR may choose to impose requirements to ensure that the project is constrained in this way.
* The more detailed the application is, the easier it will be to ensure compliance with the Regulations.

1. The Inspector should satisfy themselves that the assessment also adequately defines the parameters which are likely to result in the maximum adverse effect (the worst-case scenario) and that the assessment is undertaken accordingly to determine significance. There should be a plan for ensuring there is a process in place for dealing with future uncertainty through the Environmental Management Plan (EMP).

### Impact Identification, Prediction and Evaluation

1. The licensee should clearly set out how an impact has been identified and assessed, what receptors are affected, and the level of significance assigned to each resultant effect. The evaluation of significance in EIA is often subjective. In order to provide justifiable results, the licensee should provide evidence to inform and explain the evaluation of the individual impact and its effect. The methods applied should be readily understood. EIA does not tend to discuss significance in absolute terms, instead, effects are regularly presented on a scale of significance (e.g., major, moderate, minor, etc) [26].
2. The next sections provide guidance on impact identification, prediction and evaluation. A simple model to bear in mind through this process is:

Sensitivity of Receptor + Impact Magnitude = Significance of Effect

1. Impact identification brings together project characteristics and baseline environmental characteristics. Once identified the prediction and assessment of the impact can be undertaken. To aid the Inspector in their assessment, impact identification and prediction requires:

* A good understanding of the nature of the proposed project, including project design, construction activities and timing (Project Description – refer to Sections 5.2.1 and 5.3.2.3 for further guidance).
* Adequate information about the relevant receptors, and knowledge of how these may respond to changes/disturbances (baseline information, the sensitivity of receptors and magnitude of change).
* Knowledge of the outcomes of similar projects and EIAs, including the effectiveness of mitigation measures.
* Knowledge of past, existing or approved projects that may cause interactive or cumulative impacts with the project being assessed.
* Predictions of the project’s impacts on other environmental and social components that may interact with that under study.

1. The likely impacts of a project should be considered for all ‘scoped in’ environmental and social themes, topics and receptors, in line with the Pre-application Opinion. Impact assessment is an objective exercise and should include assessment of [32]:

* Positive (beneficial) or negative (adverse) impacts.
* Direct / primary impacts – that are a direct result of the project.
* Indirect / secondary impacts – that may be ‘knock-on’ effects of (and in the same location as) direct impacts, but are often produced in other locations and-or as a result of a complex pathway.
* Cumulative impacts – that accrue over time and space from a number of developments or actions, and to which a new project may contribute.

1. An additional possibility is impact interaction – between different impacts of a project, or between these and impacts of other projects - that result in one or more additional impacts (this could also be considered as cumulative).
2. The object of prediction is to identify the magnitude and other dimensions of identified change in the environment with the project, in comparison with the situation without that project. Predictions also provide the basis for the assessment of significance.
3. The environmental baseline will demonstrate which receptors could potentially be affected by impacts from the decommissioning project, which would result in an effect. A value or sensitivity grading should be applied to each receptor. Sensitivity is understood as the value or sensitivity of the receiving environment to change (e.g., fragility and recoverability of a receptor), including its capacity to accommodate the changes the decommissioning project may bring about. This is an integral stage in the EIA process towards determining the significance of effects.
4. In an ES the sensitivity of a receptor may be assigned a rating such as negligible, low, medium or high. For guidance, an example of sensitivity rating and criteria that could be applied is provided in Table 3. A general rating may be provided in an ES or in some cases, each topic could provide the criteria for sensitivity ratings.

Table - Example criteria for determining the value/sensitivity of a receptor

|  |  |
| --- | --- |
| Value/Sensitivity Rating | Criteria |
| Very High / High | Of value, importance or rarity on a national scale, and with very limited potential for substitution; and/or  Very sensitive to change, or has little capacity to accommodate a change |
| Medium | Of value, importance or rarity on a regional scale, and with limited potential for substitution; and/or  Moderate sensitivity to change, or moderate capacity to accommodate a change. |
| Low | Of value, importance or rarity on a local scale; and/or  Not particularly sensitive to change or has considerable capacity to accommodate a change. |
| Negligible | Of value, importance or rarity on a very local scale; and/or  Not sensitive to change or has very considerable capacity to accommodate a change. |

1. The magnitude of change, or ‘impact’, measures the scale or extent of the change from the baseline conditions, irrespective of the value or sensitivity of the affected receptor (noting that impact is subsequently applied to receptor sensitivity to assess significance of effect). The determination of magnitude will differ for each environmental topic. As per Sensitivity, a general rating may be provided in an ES or in some cases, each topic could provide the criteria for magnitude ratings. Section 6 provides further information on how topics may determine this.
2. The prediction of the magnitude of an impact should be an objective exercise, as it normally involves value judgements. Magnitude considers the characteristics of the change – positive or negative, timing, scale, size, duration (short-, medium-, or long-term), permanent or temporary, and reversibility (reversible or irreversible) of the impacts, which would probably affect the target receptor as a result of the decommissioning project. In determining magnitude, the extent of the physical changes is considered in the context of other factors such as existing long-term trends. The magnitude of some changes may therefore alter over time; the assessment should take account of any potential temporal variation.
3. The assessment of impact magnitude may be qualitative or quantitative.   
   Qualitative assessments usually employ ratings such as neutral, slight, moderate, large, an example of which is provided in Table 4. Quantitative assessments involve the measurement or calculation of numerical values.

Table - Example criteria for determining magnitude of change

|  |  |
| --- | --- |
| Magnitude rating | Criteria |
| Large | Loss of resource or quality and integrity of resource; severe damage to key characteristics, features or elements; or  Large scale or major improvement of resources quality; extensive restoration or enhancement; major improvement of attribute quality. |
| Medium | Loss of resource, but not adversely affecting its integrity; partial loss of or damage to key characteristics, features or elements; or  Benefit to, or addition of, key characteristics, features or elements; improvements of attribute quality. |
| Small | Some measurable change in attributes, quality or vulnerability; minor loss of, or alteration to, one or more key characteristic, feature or element; or  Minor benefit to, or addition of, one or more key characteristic, feature or element; some beneficial effect on attribute or a reduced risk of negative effect occurring. |
| Negligible | Very minor loss or detrimental alteration to one or more characteristic, feature or element; or  Very minor benefit to, or positive addition of, one or more characteristic, feature or element. |

1. Once the impact magnitude is determined, the significance of effect can be assessed on all affected receptors based on their sensitivity.

### Mitigation

1. Under Regulation 5(1) of the EIADR, the licensee must provide a description of features or measures envisaged to avoid, prevent or reduce and, if possible, offset, any likely significant adverse effects on the environment.
2. Through the EIA process, where effects occur, the mitigation hierarchy should be applied. Preventative action is preferable to remedial measures, and that environmental damage should be rectified at source, the best mitigation measures involve modifications to the project rather than containment, or repair at receptor sites, or compensatory measures such as habitat creation [32].
3. It is good practice that where there is uncertainty in the assessment, the precautionary principle should be applied, i.e., mitigation should be based on the possibility of a significant impact even through there may not be conclusive evidence that it will occur [32].
4. It is not intended in this TAG to specify all types of mitigation measures that could be applied to a decommissioning project; however, general topic examples are provided in Section 6 and a description is provided in Table 5. Mitigation measures are not always physical measures; operational or management controls can avoid or reduce effects. On a nuclear site, existing arrangements should be considered and identified in the EIA.

Table - Guidance on types of mitigation

| Type of Measure | Description | Examples [23] |
| --- | --- | --- |
| Avoid | To prevent or avoid adverse effects as far as possible by designing out (primary mitigation) or by using preventative measures during the construction / operation process (secondary or tertiary mitigation). | Impact avoidance by:  Changing means or techniques, not undertaking certain projects or components that could result in an adverse effect;  Changing the site, avoiding environmentally sensitive areas; or  Putting in place preventative measures to stop adverse effects from occurring. |
| Reduce | To minimise adverse effects as far as possible by improvements to the design (primary mitigation) or using reductive (but not fully preventative measures due to technical infeasibility without excessive cost) during the construction / operation process (secondary mitigation). | Impact minimisation by:  Scaling down or relocating the project;  Redesign elements or the project;  Using different technology; or  Taking supplementary measures to reduce the impacts either at the source or at the receptor. |
| Compensate / offset | To offset or compensate for adverse effects where it is not possible to avoid effects, or where the effect has been already reduced (minimised) as far as technically feasible (without excessive cost). With offsetting and compensation effects may not be fully neutralised. | Offset or compensate for residual adverse effects that cannot be avoided or further reduced in one area with:  Site remediation/rehabilitation / restoration;  Resettlement; or  Monetary compensation. |

1. As part of the iterative EIA process, enhancement measures could be considered as good practice and can be applied throughout the hierarchy. Enhancement focusses on the positive impacts and opportunities associated with design and implementation throughout the project life cycle. This means going beyond pure mitigation of impacts and recognising a lasting positive future legacy.   
   More emphasis is being placed on environmental enhancement by Government and as an example, biodiversity net-gain (an approach which aims to leave the natural environment in a measurably better state post-development than beforehand) is a useful tool that can be applied to a project when determining enhancements measures. Enhancement can include biophysical actions, for example creating a nature reserve on the site of a decommissioned nuclear power station, which will lead to increased green spaces, improved biodiversity, improved landscape character and restored ecosystems.
2. Mitigation measures tend to fit into three categories which are summarised in   
   Table 6. It is good practice to classify and itemise mitigation measures within the ES. This aids clarity and also assists consideration of post-consent design development or amendments by identifying what can and cannot be changed without requiring reassessment, and what needs to be done to deliver mitigation during the post-consent stages. It aids clear identification of the secondary mitigation measures which could be secured within management plans   
   (for example an EMP, materials management plan or traffic management plan) that will be inspected as per the approval conditions [29].
3. A good approach for itemising mitigation could be a Schedule of Environmental Commitments or a Mitigation Route Map. Both provide an effective means to ‘audit’ how the ES demonstrates environmental effects would be mitigated, and how commitment to those mitigation measures would be secured. These measures can then be easily transferred into an EMP.

Table – Mitigation [29]

| Mitigation | Description | Examples |
| --- | --- | --- |
| Primary mitigation | Also referred to as embedded mitigation within the design.  Forms an intrinsic part of the project design and is identified through the iterative EIA and design process.  Should be described in the design evolution narrative and included within the project description.  This form of mitigation should be a commitment and delivered as part of the scheme. | Reducing the height of a development to reduce visual impact.  Identifying a key habitat or archaeological feature that should remain unaffected by the development’s layout and operation: e.g., retaining an unimproved grassland area in situ as part of an open space strategy.  Developing a transport strategy that reduces trips, avoiding the need for junction improvements.  In some instances, primary mitigation – through the design – may be sufficient that it is judged that one or more topics, initially scoped into the EIA, no longer require assessment through the remainder of the EIA process. This is because the primary mitigation means that any likely impacts on the topic’s receptors resulting from the development will no longer lead to significant effects. Where this arises, these topics could be scoped out and the ES should provide a brief summary. |
| Secondary mitigation | Also referred to as additional mitigation.  Usually identified through the EIA process to further avoid or reduce effects.  Typically, these will be described within the topic chapters of the ES, but often are secured through management plans that will be monitored as part of consent conditions.  A flexible form of mitigation that can be proposed at any point within the EIA process, including during the decision-making process.  Tend to operate in the middle of the mitigation hierarchy, focusing on reducing the significance or likelihood of adverse effects.  While they would be integrated into the application for consent, this form of mitigation requires additional action post-consent, beyond the core function of the development, to be implemented.  Carry a greater risk of non-implementation or ineffective application post-consent than primary or tertiary mitigation.  Best managed through an environmental management plan | Describing certain lighting limits, which will be subject to the submission of a detailed lighting layout. |
| Tertiary mitigation | Also referred to as good practice.  Will be required regardless of any EIA, as it is imposed, for example, as a result of legislative requirements and/or standard sectoral practices.  Can be identified at any point during the design and EIA process.  The least flexible form of mitigation – either they exist, or they do not.  It is helpful, but not strictly necessary, to include tertiary mitigation related to construction or decommissioning activities, within an EMP (or similar) included in the ES, to ensure that these actions are highlighted to the principal contractor.  This form of mitigation should be a commitment and delivered as part of the scheme. | Considerate contractors’ practices that manage activities which have potential nuisance effects.  Applying emission controls to an industrial stack to meet the requirements of the Industrial Emissions Directive (Directive 2010/75/EU). |

1. Mitigation measures must be planned in an integrated and coherent fashion to ensure they are effective, that they do not conflict with each other and that they do not merely shift a problem from one medium to another [31].
2. As part of the EIA process and determining significance, there are various methods when considering the mitigation. The most common approach that is seen as good practice is a narrative-led approach where both primary and tertiary mitigation should be clearly included in the project description and should be considered when determining the magnitude of change. The basis for the EIA should be that both these forms of mitigation definitely will be delivered: thus, any effects that might have arisen without these forms of mitigation do not need to be identified as ‘potential effects’, as there should be no potential for them to arise. Therefore, the difference in significance between potential effects and residual effects only requires consideration where secondary mitigation is involved – resulting in a simpler and more proportionate ES [29].
3. In some instances, primary mitigation – through the design – may be such that one or more topics, initially scoped into the EIA, no longer require assessment through the remainder of the EIA process. This is because the primary mitigation means that any likely impacts on the topic’s receptors resulting from the development will no longer lead to significant effects. Where this arises, consideration should be given to scoping these topics out, or providing brief summary chapters or a single chapter summarising a number of topics – again, resulting in a more proportionate ES [29].
4. Mitigation will likely involve environmental monitoring throughout the project. Monitoring can include [32]:

* Baseline monitoring – can be carried out over seasons or years to quantify ranges of natural variation and / or directions and rates of change that are relevant to the impact prediction and mitigation.
* Compliance monitoring – aims to check that specific conditions and standards are met.
* Impact and mitigation monitoring – aims to compare predicted and actual (residual) impacts and determines the effectiveness of mitigation measures.

1. Monitoring requirements or proposals should be proportionate to the nature, location and size of the project and its effectiveness on the environment. Monitoring measures need to be enforceable and should be part of the feedback loop of informing the scope of future EIA and what needs to be assessed.
2. The ES should clearly outline monitoring arrangements for the lifetime of the decommissioning project and should take into consideration existing monitoring arrangements on site. It is good practice for monitoring arrangements to be provided in a standalone document that can be updated and amended as required through the decommissioning project life, without the need to update the ES, for example an EMP.

### Effect Evaluation – Determination of Significance

1. The most common methodology used to evaluate significance of effect is to compare the magnitude of the predicted impact with the sensitivity of the receptor. Whilst applying the magnitude and sensitivity, additional factors that should be considered when determining the significance of each effect, may include [25]:

* The duration, frequency and extent of effect.
* The reversibility of the effect.
* The practitioner’s knowledge and experience of significance evaluation from previous assessments.
* Feedback from Pre-application and consultation, often including opinions from the local community.
* The wider legal and policy context, which offers protection to the environment and community.

1. ESs often set out a generic methodology at the start of the document indicating that significance has been assessed using a standard matrix style approach, with magnitude on one axis and receptor sensitivity on the other. An example is provided in Table 7. A definition of the level of significance may also be provided in the upfront chapter. Despite this, it remains relatively common for one or more ES topics to use an alternative approach, which may include defining level of significance specifically for that topic. In some cases, significance may be linked to whether the predicted effect passes a quantified threshold established in a relevant standard [30].
2. A threshold can be defined as a quantitative or qualitative standard against which the significance of a given environmental effect may be determined. Thresholds are generally derived from scientific knowledge and are frequently included in regulatory standards. Thresholds can help to determine the significance of environmental effects but are not necessarily certain. While it is easy to quantify how some effects perform against a legislative or scientific standard (such as changes in traffic volumes or noise levels) for other effects, such as wildlife habitats, it is difficult to quantify this and qualitative descriptions must be relied on. In any case, thresholds should be based on legal requirements or scientific standards that indicate a point at which a given environmental effect becomes significant. If no legislation or scientific standards are available, the EIA practitioners can then evaluate impact significance in a more subjective way [23].

Table - Typical Impact Evaluation Matrix

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Value of Sensitivity | Magnitude of Change | | | |
| Large | Medium | Small | Negligible |
| Very High | Major | Major/moderate | Moderate | Moderate/minor |
| High | Major/moderate | Major/moderate | Moderate/minor | Minor |
| Medium | Moderate | Moderate/minor | Moderate/minor | Minor/negligible |
| Low | Moderate/minor | Minor | Minor/negligible | Negligible |

1. The ES should clearly document the significance level of each effect and evidence to support that conclusion. Where this is not clear, the Inspector should consider whether further information is required to inform the final regulatory decision.
2. A significant environmental effect should be considered as part of any regulatory decision. An environmental effect may be considered significant if it meets a least one of the following criteria:

* It leads to an exceedance of defined guidelines or widely recognised levels of acceptable change.
* It is likely that the consenting authority will reasonably consider applying a planning condition, requirement or legal agreement to the consent to require specific mitigation to reduce or overcome the effect.
* It threatens or enhances the viability or integrity of a receptor or receptor group of concern.
* It is likely to be material to the ultimate decision about whether or not the consent application should be approved.

1. Where there may be disagreement with the significance criteria allocated to an effect, the Inspector could challenge the licensee, but consideration should be given as to whether this will materially change the Inspector’s decision making for the scheme.

## Stakeholder Engagement and Consultation

1. The ONR must notify and consult with the consultation bodies listed in Regulation 2 of the EIADR and any other bodies who may be concerned by the project by reason of their specific environmental responsibilities or local and regional competences. Consultation with three different groups on the content of the ES are referred to in the EIA Directive: the public concerned must always be consulted with; public authorities must be consulted with when they are likely to be concerned; and EEA States must be consulted for Projects with transboundary impacts. ONR will engage with consultees to ensure that comments received during the consultation process have been understood and appropriately taken into account in ONR’s regulatory decision on EIADR consent.

## Granting Consent

1. Once ONR has made a decision, it must provide a Reasoned Conclusion, based on the consultation, environmental effects presented in the ES and on other relevant information provided. In developing a Reasoned Conclusion, Inspectors should:

* Examine and justify the different tools and methods used during the preparation of the ES, and subsequent consultations.
* Examine the information and data provided in the ES and during consultations. Key messages of the baseline conditions, significant effects, predicted impacts of the decommissioning project, suggested monitoring and mitigating measures, and other relevant information should be highlighted.
* Clearly discuss the evidence with a view to reaching a conclusion, allowing for any additional arguments which may arise.
* State clearly what the Reasoned Conclusion is and the arguments on which it relies.

1. Different elements must be integrated into the consent decision including the Reasoned Conclusion, environmental conditions and monitoring measures.
2. ONR attach standard conditions to the consent for the decommissioning project. One of the standard conditions required the licensee to prepare and implement an environmental management plan that identifies mitigation measures, describes the implementation and effectiveness of mitigation measures, and describes changes to mitigation measures and reasons for changes in light of experience.

## Post-Consent Responsibilities

1. After consent has been provided and the decommissioning project commences, a key role for the Inspector will be to ensure the licensee is being compliant with the conditions set out in the consent. The key areas to consider are as follows:

* Mitigation measures are implemented and are effective.
* Monitoring regime is implemented, and reporting is undertaken.
* Management measures are implemented into operational arrangements.

1. NS-INSP-GD-035 [35] provides guidance to Inspectors for compliance inspections under EIADR.

# Advice to Inspectors: Detailed Advice

## Presentation of Topic Specific Guidance

1. To aid the Inspector’s assessment of an ES, topic specific guidance is provided. This guidance is applicable to all stages of the EIA process including scoping.   
   Each section is structured as illustrated in Table 8. Topics include:

* Terrestrial and Freshwater Ecology.
* Marine Ecology.
* Noise and Vibration.
* Air Quality.
* Soils, Geology and Contaminated Land.
* Climatic Factors.
* Socio-economics.
* Health.
* Traffic and Transport.
* Radiological Effects.
* Material Resources and Waste.
* Water Resources and Flooding.
* Geomorphology and Coastal Processes.
* Landscape and Visual Amenity.
* Cultural Heritage.

Table - Structure and Content of Topic Specific Guidance

| Section | Content |
| --- | --- |
| Scope of assessment | Identifies what an assessment would typically cover, including potential receptors and resources that would be considered in this topic. It presents guidance on suitable parameters for defining a spatial and temporal scope for the assessment, referencing relevant industry guidelines where appropriate. |
| Legislation, Policy and Guidance | Legal instruments that require a minimum level of environmental protection are reported for each topic where they are relevant to the classification of sensitive receptors and/or significant effects. For example, if legal protection is afforded to certain ecological receptors or there are legal pollution limit values which cannot be exceeded, these are noted here. The licensee should discuss each instrument in detail and demonstrate that the project meets the minimum legal requirements.  Policy instruments which set objectives for certain topics are also listed. The licensee should provide an extensive review of relevant policy, ranging across the national, regional and local level.  Relevant guidance that licensees may use to undertake their assessment is provided here, although it should be noted that these are subject to periodic changes and the Inspector should be satisfied that the latest industry guidance has been followed. |
| Assessment methodology | Provides guidance available for ascribing significance to potential effects on sensitive receptors. For some topics where prescriptive methodologies are not available, and decision making is based on professional judgement, this section outlines key considerations that the licensee may use to inform their assessment, to help Inspectors determine whether the approach to identifying significant effects is logical and in line with best practice. The licensee should ensure that any specialist studies that may be required to assess impacts on certain receptors are undertaken by a competent person. This section also highlights where effects identified for the topic may give rise to cumulative effects in combination with other environmental topics, to assist the Inspector in reviewing potential linkages. |
| Environmental Baseline and Future Baseline | Specific topic good practice for data collection, including guidance on how to judge the validity and quality of baseline data.  Further information on the future baseline is provided and how topics might deal with uncertainty in the future. |
| Potential Impacts and Effects | An indication of likely activities, their impacts and the effects caused on sensitive receptors are provided. The list is not exhaustive and should not be used as a checklist. |
| Interface with other EIA Topics | Consideration of intra-project effects arising from interaction with other environmental topics should draw on impacts reported in the relevant ES Chapters, and the effects on sensitive receptors considered in the cumulative effects assessment. Possible interactions with other EIA topics relevant to each topic that should be considered in the cumulative impact assessment (both additive and synergistic effects) are presented. |
| Mitigation | Sets out the approaches and principles for mitigation measures for each topic. The general advice should be read in conjunction with these sections.  Provides examples of appropriate mitigation measures following the mitigation hierarchy as discussed in Section 5.4.6. |

# Terrestrial and Freshwater Ecology

## Scope

1. Ecological receptors are likely to be impacted by decommissioning activities where physical changes to the site and structures occur, such as clearance of the site vegetation, trees, demolition of buildings and removal of culverts or pipes in watercourses. Demolition of buildings may result in loss of habitat. Any noise or dust generating activities have the potential to cause disturbance to ecological receptors, and there is potential for contaminated material to affect food and water supply for terrestrial and riparian receptors if not properly managed.

### Receptor Scope

1. Typical ecological receptors that would be considered within an EIA include:

* Designated sites of international, national, and local importance in England, Scotland and Wales (e.g. SSSIs, SACs, SPAs, National Nature Reserves, Ramsar wetlands, local sites, and sites in the process of becoming SACs or SPAs).
* Protected species (e.g. bats, great crested newts, badgers, hazel or common dormice, water voles, otters, wild birds, reptiles, protected plants, white-clawed crayfish, invertebrates, freshwater fish, natterjack toads, ancient woodland and veteran trees).
* Priority species and habitats identified through national legislation and Biodiversity Action Plans.

1. Receptors are likely to include marine ecological receptors if the decommissioning site is on the coast, and freshwater ecological receptors if situated by a river.   
   The licensee should ensure that overall, the ecological assessment is proportionate to the receptors likely to be affected. More information on Marine Ecology is provided in Section 8.

### Spatial Scope

1. A Zone of Influence (ZoI) is usually applied for each ecological receptor that is to be assessed within the Ecology Impact Assessment (EcIA). The Zol will vary according to the value of the ecological receptor and its sensitivity to environmental change. Considerations may include its abundance and distribution within the area, its ability to move away from potentially harmful activities, its dependency on biophysical processes that may be impacted, and the level of legal protection afforded to the site or species (e.g., international vs. local designation).
2. The Zol not only includes the areas directly affected by the project, but also areas in ecological connectivity such as habitats associated with rivers and estuaries some distances downstream.
3. If the activities proposed as part of the decommissioning are considered unlikely to affect certain receptors, either because the receptor is not thought to be present within the Zol (e.g., no suitable bat habitat is identified) or the activities will have limited impact due to their nature or distance from the receptor (e.g., there are no SSSIs within 5km), then it is appropriate to scope them out of the assessment.

### Temporal Scope

1. It may be relevant to scope out impacts on certain ecological receptors during different phases of a decommissioning project, for example during a Care and Maintenance phase, when activity levels on the site would likely be much lower. However, the Pre-application Report should justify this decision using appropriate information which may include species data, field survey results and project information.

## Legislation and Policy

### Legislation

1. The primary objective of legislation relating to terrestrial and freshwater ecology is to protect biodiversity through the conservation of key species and habitats.
2. Certain sites and species have legal protection under the Conservation of Habitats and Species Regulations 2017, which transposes the Habitats Directive into UK legislation. These Regulations apply to internationally significant ecological habitats and require a Habitat Regulations Assessment to be undertaken separately to the EIA, the results of which should be considered in the EcIA.
3. Other relevant legislation protecting habitats and species in the UK may include:

* The Wildlife and Countryside Act 1981 (as amended).
* Section 2 of the Nature Conservation (Scotland) Act 2004.
* Section 41 of the Natural Environment & Rural Communities Act 2006.
* Section 7 of the Environment (Wales) Act 2016.
* The Invasive Non-native Species (Amendment etc.) (EU Exit) Regulations (England and Wales) 2019.
* The Wildlife and Countryside Act 1981 (Prohibition on Sale etc. of Invasive Animal and Plant Species) (Scotland) Order 2019.

1. International and multilateral agreements and conventions may also be stipulated in the ES where they may affect the assessment, for example the Ramsar Convention on Wetlands of International Importance 1971.

### Policy

1. Policy instruments relevant to ecology may include:

* Overarching National Policy Statement for Energy (EN-1).
* UK Post-2010 Biodiversity Framework.
* UK 25yr Environment Plan.
* Local Biodiversity Action Plans.

## Assessment Methodology

### Guidance

1. The licensee should undertake the assessment in accordance with relevant good practice guidance, including but not limited to:

* Guidelines for Ecological Impact Assessment in the UK and Ireland: Terrestrial, Freshwater, Coastal and Marine [36];
* The Handbook for Phase 1 Habitat Survey [37]; and
* Design Manual for Roads and Bridges (DMRB) - Biodiversity [38].

1. In addition, specific UK government advice for protected sites and species should be followed where relevant [39].

### Assessing significance of ecological effects

1. An EcIA should include direct, indirect and residual impacts on populations, species and ecosystems and ecosystem services which may be affected in the Zol.
2. Potential impacts should be identified for the Zol, taking into account the location and scale of project activities, the project’s proximity to areas of known biodiversity value or areas known to provide ecosystem services; and the type of technologies used.
3. The magnitude of an impact needs to be assessed in relative terms, for example would the residual animal population still be viable if a proportion of its suitable habitat is lost, or would an ecosystem still function if it is polluted? Impacts lasting for a certain time period might have a long duration when considered from different receptors’ lifespan. The significance of the same environmental change therefore varies depending on the ecological characteristics of the affected feature.
4. There are a number of approaches for determining the significance of effects on ecological features. This includes methods for scoring and ranking impacts on the basis of subjective criteria. As far as possible, the significance of effects should be based on quantifiable scientific evidence relating to the extent of affected designated sites, habitats, species, and the magnitude, duration and frequency of likely impacts. Deviation from standard methods must be reported in accordance with British Standard 42020:2013 [40].
5. The licensee should make a clear distinction between evidence-based and value-based judgements so that the Inspector and other stakeholders are aware of the level of subjective evaluation that has been used.
6. Specific guidance should be followed for considering the likely effects on protected species, where applicable .

## Baseline and Future Baseline

1. Adequate ecological information is defined as being appropriate (i.e., the right type of surveys for the site and the receptors likely to be found) and sufficient (i.e., there is sufficient effort in view of the time, size, complexity of the site to ensure all likely receptors are adequately accounted for – such as abundance and distribution) [40].

### Desk Study

1. Desk study data should be obtained from a variety of sources including national biodiversity lists, local environment data records, online maps, aerial photographs, etc. Where there are gaps in the data, these should be acknowledged and, where possible, should be filled by survey data.

### Surveys

1. Habitat surveys should follow a published and recognised habitat classification system that is appropriate for the site’s location. Typically, a Phase 1 habitat survey, River Habitat Survey or equivalent will be undertaken to establish which species surveys may be required. Where necessary, these should be followed up by the appropriate Phase 2 ecology surveys, following species-specific guidance.
2. Any limitations of surveys, such as information, access or seasonal constraints, should be outlined [40]. However, these limitations should be avoided by undertaking additional surveys where possible. For example, if access to private land can be gained at a later date, survey findings should be updated. Where the licensee has deemed this not possible, the precautionary principle should be applied.
3. CIEEM recommend that ecological survey data remains valid for up to three years, but any data older than 18 months should be reviewed by a qualified ecologist to determine if any surveys need to be repeated [41]. If survey data is older than 18 months, and no review of this data has been undertaken by an ecologist, the Inspector should seek advice from an ecologist to determine if there is likely to be a need for surveys to be repeated.

### Future Baseline

1. The future baseline should be predicted as far as possible within the parameters of the assessment. This should be based on projections developed from an understanding of trends in species population and distribution; current and predicted management practices (for example, in the EMP); conservation plans; trends in habitat quality and environmental trends (e.g., climate change).
2. The ecological baseline should be continuously monitored during each phase of decommissioning, to account for changes brought about by earlier stages of the works. For example, if a new population of species has moved onto the site during a period of inactivity. This should not be used in lieu of a complete baseline and future baseline being developed for the ES, rather, it should be supplementary to monitor changes.

## Potential Projects Impacts and Effects

1. Table 9 provides examples of the causal relationship between typical decommissioning activities that could generate ecological impacts, and the possible effects upon sensitive ecological receptors.

Table - Example of decommission activities, impact and effects of sensitive reactors

| Typical decommissioning activities with potential to generate impacts | Possible typical impacts arising from these activities | Possible effects upon sensitive receptors |
| --- | --- | --- |
| Site clearance, including vegetation removal | Habitat loss | Mortality or protected species, loss of important habitat, loss of shelter and food sources for protected species, fragmentation of habitat leading to loss of corridors. |
| Demolition and removal of buildings, infrastructure | Increase in noise and vibration, dust, and habitat loss (e.g., for birds and bats) | Mortality or protected species, disturbance to protected species (e.g., foraging activity), loss of important habitat, loss of nesting and roosting sites, loss of shelter and food sources for protected species, fragmentation of habitat leading to loss of corridors, etc. |
| Construction of temporary facilities, including buildings and haul roads | Noise and vibration, dust, lighting | Disturbance to protected species (e.g., foraging activity). |

## Interface with other EIA topics

1. Possible interactions with other EIA topics relevant to terrestrial and freshwater ecology may include:

* Noise and vibration.
* Air quality.
* Landscape and visual amenity.
* Water resources and flooding.
* Radiological effects.
* Geomorphology and coastal processes.
* Soils, geology and contaminated land.
* Marine Ecology.

## Mitigation

### Avoid and Reduce

1. The assessment should demonstrate that effects on ecological receptors have been avoided as far as practicable and where this is not possible to reduce effects. Avoidance and reduction mitigation types can be through mitigation by design, for example, minimising the site footprint or planning the site layout to avoid impacts on important ecological features, or through mitigation by management, for example planning decommissioning activities to avoid seasonal effects on breeding species.
2. Consideration of alternatives should take account of the potential ecological effects.

### Compensate

1. If habitat loss is unavoidable, compensatory habitat should be provided. Compensation should:

* Ensure no more habitat is lost than is replaced (achieving no net loss).
* Provide for like-for-like habitat replacements, which are located next to or near existing species population (distances are given in the relevant species standing advice) and in a safe position to provide a long-term home.
* Provide for a better alternative habitat in terms of quality or area, compared to what will be lost.
* Include proposals to make sure habitats are still connected to allow normal species movement.

1. The Inspector should be satisfied that compensation is appropriate and that the licensee has committed to implementing and monitoring the effectiveness of the compensatory measures (further guidance can be found in reference [36]).

### Offset

1. To achieve biodiversity net gain in line with national and local policy objectives, it may be necessary to offset some habitat loss caused by the decommissioning project. When establishing the baseline, habitat classification can be used to develop a picture of the habitat value, according to various metrics. Any habitat loss can then be accurately valued to ensure an equivalent value of habitat is provided if compensation is not achievable within or near the site.
2. The recommended metric is the Natural England Biodiversity Metric [42]. The metric considers other ecosystem services that contribute to the value of ecological features, improving the ability of the assessment to quantify and report improvements in habitat provision. If an alternative metric is used, the Inspector must be satisfied that the licensee has appropriately valued the habitat loss in order to recommend appropriate net gain solutions.

# Marine Ecology

## Scope

1. Marine ecology is relevant to any decommissioning sites that could have impacts upon coastal or estuarine ecological habitats through their proximity to the coast, or through activities which discharge into the sea.
2. Typical activities likely to impact receptors and to require assessment (as appropriate to the scope of the decommissioning phase) may include, but not be limited to:

* Removal or demolition of coastal and offshore infrastructure – e.g. effluent discharge pipes, cooling water system infrastructure (especially intake and outfall heads), temporary structures such as jetties, platforms, pontoons, and other structures.
* Excavation activities – e.g. as part of the removal of structures, if required.
* Dredging activities – e.g. to facilitate removal of offshore structures.
* Temporary stockpiling and storage of rock or materials on the beach or intertidal areas.
* Vehicle movements on beach and intertidal areas – e.g. vehicle to support the removal of infrastructure activities.

1. Given the broad scope of marine ecology and the in-depth specialist knowledge required to undertake an impact assessment on certain receptors, it may be appropriate for the licensee to group the impact assessment according to the receptors likely to be affected, which allows receptors to be assessed independently and to the appropriate scale.

### Receptor Scope

1. Receptors that would likely be considered in the marine ecology assessment include:

* Designated sites, collectively termed in the UK Marine Protected Areas, including:
* [SACs](https://jncc.gov.uk/our-work/sacs-with-marine-components/) – designated to protect habitats and species of European importance.
* [SPAs](https://jncc.gov.uk/our-work/spas-with-marine-components/) – classified to protect bird species of European importance and regularly occurring migratory birds.
* [Marine Conservation Zones](https://jncc.gov.uk/our-work/marine-conservation-zones/)  and [Nature Conservation Marine Protected Areas](https://jncc.gov.uk/our-work/nature-conservation-mpas/) – designated to protect nationally important species, habitats, ecological processes and features of geological/geomorphological importance.
* [SSSI](https://jncc.gov.uk/our-work/guidelines-for-selection-of-sssis/)  – designated to protect any area of special interest for its flora, fauna, geological or physiographical features. These are coastal (and terrestrial) designations with some sites protecting marine features.
* [Ramsar sites](https://jncc.gov.uk/our-work/ramsar-convention/) – wetlands of international importance designated under the Ramsar Convention. These are coastal (and terrestrial) designations with some sites protecting marine features.
* Marine, coastal and intertidal habitats such as reefs, sandbanks, muds, estuaries, submarine structures and subtidal sediments.
* Marine fauna such as fish, plankton, marine birds, marine mammals.
* Benthic ecological species such as anemones, sponges, corals; and any species that live on the seabed and are affected by sediment changes.
* Coastal and offshore commercial fisheries (if relevant).

### Spatial Scope

1. The spatial scope, or the ZoI, will vary and should be determined by professional judgement. It can be much broader than the terrestrial and freshwater ecology scope, for example due to the potential for pollutants to be distributed more widely in the marine environment. The licensee should consider using different spatial scopes depending on the mobility of receptors, the extent of designated habitats, and how they would be likely to respond to potential impacts.
2. The spatial scope should be informed by modelling of changes to water flows, sediment loading and turbidity, undertaken as part of the coastal processes and water resources assessments as appropriate.

### Temporal Scope

1. The temporal scope should cover all phases of the decommissioning works scoped into the EIA, as agreed through the Pre-Application Opinion. The assessment should also include consideration for the change to the ecological baseline once the decommissioning works are completed and all infrastructure is removed. The licensee should also consider any seasonal or migratory patterns that would result in potentially significant effects occurring.

## Legislation and Policy

### Legislation

1. The Marine Management Organisation (MMO) is responsible for regulating activity within the marine environment in England. Marine Scotland and fulfil equivalent roles in Scotland and Wales respectively.

* The Marine Strategy Framework Directive (2008/56/EC).
* Water Framework Directive (2000/60/EC).
* The Water Environment (Water Framework Directive) (England and Wales) (Amendment) Regulations 2015.
* Water Environment and Water Services (Scotland) Act 2003 (WEWS Act).
* Marine and Coastal Access Act 2009.
* The Marine Works Act 2017.
* Marine (Scotland) Act 2010.
* The Marine Environment (Amendment) (EU Exit) Regulations 2018.
* The Conservation of Offshore Marine Habitats and Species Regulations 2017.

### Policy

1. Policy instruments relevant to marine ecology may include:

* NPS EN-1.
* UK Marine Policy Statement.
* Scotland’s National Marine Plan.
* The Welsh National Marine Plan.

1. In addition, the following should be reviewed by the licensee where relevant:

* Local development plans.
* Shoreline Management Plans developed by Coastal Groups with members mainly from local councils and the Environment Agency.

## Assessment Methodology

### Guidance

1. Good practice in the field of marine ecology should be referenced by the licensee, citing sources including:

* The Marine Monitoring Handbook [43]. This contains best practice for data collection and methodology; and,
* CIEEM - Guidelines for Ecological Impact Assessment in the UK and Ireland: Terrestrial, Freshwater, Coastal and Marine [36].

### Assessing significance of marine ecology effects

1. As far as possible, the significance of effects should be based on quantifiable scientific evidence relating to the extent of affected sensitive designated sites, habitats, species, and the magnitude, duration and frequency of likely impacts. There are no specific threshold values to be applied, therefore the rating of magnitude and sensitivity criteria will be based on value judgements made by a competent person.
2. Within marine and estuarine environments, the broad principles of assigning magnitude and sensitivity criteria to determine significant effects should align to those outlined in reference [39] on terrestrial and freshwater ecology. However, the assessment of impacts and the evaluation of significance have some distinct considerations that are not always associated with terrestrial or freshwater habitats. Marine environments can exhibit high levels of physical and ecological connectivity and are also generally less visible and accessible for observation and monitoring. These factors influence the potential nature, scale and extent of environmental changes as well as the way in which marine and estuarine species and habitats are sensitive or vulnerable to these changes.
3. The licensee should demonstrate use of the precautionary principle where uncertainty exists over the presence or absence of potentially vulnerable/sensitive species; the likely scale and nature of impacts associated with the decommissioning works, and the significance of anticipated effects. Consultation with the MMO (or equivalent body in Scotland or Wales) will be beneficial in determining an appropriate level of assessment.
4. Specific guidance should be followed for considering the likely effects on protected species, where applicable [39].

## Baseline and Future Baseline

1. Due to the potential spatial scope of effects on marine ecology, it is not feasible for most assessments to collect baseline data across the entire ZoI. Therefore, sampling is likely to be the most appropriate way to develop an understanding of the existing baseline conditions.
2. The inspector should be satisfied that the data used for the assessment has been collected within a suitable time period. It is recommended that baseline data is from within five years of the assessment being undertaken. However, deep sediment data is unlikely to change significantly over time, and so older data may be suitable.
3. If currently available data is older than 5 years, it is recommended that further surveys are undertaken within the ZoI to inform the assessment.

### Future Baseline

1. The future baseline should present what the marine environment would be like if decommissioning did not go ahead. This should give consideration to predicted changes to the marine environment arising from climate induced sea-level rise, storm surges and changes to ocean currents, which may include changes to species migratory patterns and breeding periods.
2. The assessment should also consider changes to coastal processes such as wave patterns and sediment movement that would occur naturally over time affecting marine, oceanographic and physical-chemical processes, including wind and weather patterns, wave and tidal conditions and sedimentary processes.   
   Any assumptions about the future baseline should be consistent with the other ES topics that are relevant to the assessment, such as Terrestrial and Freshwater Ecology, Coastal Processes, Climatic Factors and Water Resources.

## Potential Impacts and Effects

1. Impacts upon marine ecology will vary according to the location of the decommissioning project and the associated coastal infrastructure requirements offsite, which will be unique to each project. Table 10 provides examples of the causal relationship between typical decommissioning activities that could generate marine ecology impacts, and the possible effects upon sensitive receptors.

Table - Example of decommission activities, impacts and effects on sensitive receptors

| Typical decommissioning activities with potential to generate impacts | Possible typical impacts arising from these activities | Possible effects upon sensitive receptors |
| --- | --- | --- |
| Removal of underwater or coastal infrastructure (e.g., cooling water intake and outfall heads) | Changes to the composition and features of designated marine sites  Increase in noise and vibration from activities  Disturbances to seabed and changes to water quality  Changes to underwater habitat from the removal of infrastructure  Changes to wave and sediment flow rates | Changes to key features of designated marine sites  Loss of habitat, shelter and food for marine species, mortality |
| Underwater noise and vibration | Disturbance to breeding and feeding cycles of marine and coastal species; mortality (in extreme cases) |
| Removal of cooling water abstraction requirement | Changes to water temperature and sediment deposition  Cessation of warm water discharge and chemical dosing, improved water quality | Loss of habitat, shelter and food for marine species  Provision of habitat |
| Dredging activities | Changes to seabed, sediment and wave movements, mobilisation of contaminants, reduction in water quality | Loss of habitat, shelter and food for benthic species |
| Disturbance of waste and sediments onsite | Pollution incidents, effluents being discharged into the sea, impacting water quality | Mortality, loss of habitat and loss of food for marine species |

## Interface with other EIA Topics

1. Consideration should be given to in-combination effects arising from interaction with other environmental topics. Possible interactions with other EIA topics that could be considered relevant to marine ecology include:

* Terrestrial and freshwater ecology.
* Geomorphology and coastal processes.
* Water resources and flood risk.
* Radiological effects.
* Climatic factors.
* Noise and vibration.

## Mitigation

1. CIEEM recommends the use of adaptive mitigation and monitoring strategies (Adaptive management) to resolve residual uncertainties about the significance of effects of impacts in the marine environment and to provide necessary assurances as to the absence of negative effects. Adaptive management promotes flexible decision making that can be adjusted in the face of uncertainties as outcomes from management actions and other events become better understood. This will be particularly important given the long-term nature of decommissioning activities and the general vulnerability of coastal and marine ecology to climate change.
2. The licensee should demonstrate that the assessment comprehensively details any measures that would be implemented through an adaptive management approach, and should record these through the EMP. More detail is given in the section on monitoring below.
3. Recommended mitigation measures that could be incorporated as best practice alongside an adaptive management approach include:

### Avoid

* Leave some underwater infrastructure in situ, if removal is considered likely to generate negative ecological effects and it can be demonstrated that its presence provides benefits to underwater ecosystems.
* Adopt a decommissioning plan which minimises the use of boats and marine-based equipment to deconstruct the site, and conduct all works from landward side as far as possible.

### Reduce

* Time works to avoid impacts on breeding species, migration patterns and high tide.
* Avoid 24hr working and use appropriate lighting that is directed away from sensitive receptors if night working is required.

### Offset/Compensate

1. Compensatory habitat should be provided as far as practicable in accordance with CIEEM recommended EcIA methodology. This may include restoration of coastal and underwater habitats through replacement underwater infrastructure using naturally occurring features.
2. Any compensatory habitat should be discussed in detail by the licensee, and the Inspector should be satisfied that due diligence has been applied to ensure no adverse effects on other marine species or ecosystem functions will be impacted by the provision of compensatory habitat (if different from that which is being lost).

### Monitor

1. If adopting an adaptive management approach, the licensee should clearly define monitoring measures that will be implemented through an ongoing plan, which should typically include:

* Identification of receptors likely to be affected by upcoming decommissioning activities e.g. fish, overwintering birds.
* Detail on the type of data collection methods being used and justification for their adequacy, particularly in relation to birds and fish species due to their protections and potential commercial status respectively.
* Confirmation as to the frequency of data collection to monitor potential changes in the baseline, including a mechanism for reducing the monitoring effort if no effects are detected over an agreed time period.
* Mechanisms for halting works if it is identified that potentially significant effects will arise as a result of decommissioning activities currently underway.
* Ensure that staff working on site are trained to identify potential issues and have a clear process in place to report these if required.
* Mechanisms for engaging in ongoing consultation with relevant authorities, including the MMO and EA.

# 

# Noise and Vibration

## Scope



1. Noise and vibration have the potential to cause disturbance to people and wildlife, and in some cases, cause damage to property. The effects upon receptors from changing noise and vibration levels are subjective and can vary according to perceived sensitivity of the receptor and the existing acoustic environment.   
   The scope of the assessment of the extent and quality of data required to determine the baseline noise environment should be proportionate and include:

* The risk of a likely significant effect occurring.
* The stage of the project.
* The availability of previously collected data.

1. If works affecting coastal or underwater infrastructure is planned as part of the decommissioning project, then an assessment of underwater noise and vibration impacts on aquatic ecology (both marine and freshwater) should be made.   
   The effects of these impacts on underwater flora and fauna should be reported in the Marine Ecology or Terrestrial and Freshwater Ecology chapter of the ES.

### Receptor Scope

1. Those receptors considered likely to be sensitive to changes in noise and vibration levels would typically include:

* Noise sensitive receptors including dwellings, hospitals, healthcare facilities, education facilities, community facilities, adjacent operational nuclear facilities, designated quiet areas or potential designated quiet areas, international and national or statutorily designated sites, public rights of way and cultural heritage assets.
* Vibration sensitive receptors including dwellings, hospitals, healthcare facilities, education facilities, community facilities, adjacent operational nuclear facilities, buildings containing vibration sensitive equipment and cultural heritage assets.

1. Normally, the objective is to identify those locations most sensitive to or likely to be adversely affected by the construction and operation of a proposed development.   
   It should be noted that not all receptors would necessarily have the same degree of sensitivity and may be more, or less sensitive depending on the timing of the works (for example if undertaken at night, or during school holidays). This variation should be accounted for during the assessment process.

### Spatial Scope

1. There is no prescriptive method available for determining a suitable study area for noise and vibration impacts, and the assessment should consider all distances at which an effect may occur. The DMRB Guidance suggests that 300m from construction generating activities is generally sufficient to identify receptors likely to be adversely affected by a development [44]. However, the potential for significant noise and vibration effects for a decommissioning project is likely to differ from the levels anticipated to affect receptors near to a road scheme, which DMRB Guidance is based on, and some consideration should be given to construction traffic impacts on local roads away from the site. Adjustments to the study area should be made according to the noise levels likely to be generated by particular decommissioning activities. This should be informed by professional judgement.

### Temporal Scope

1. For decommissioning, the phases of development will differ from standard construction and operation and the assessment should therefore plan the scope according to the nature and extent of construction, demolition and maintenance activities at each phase of the project. This may include:

* Construction of any temporary or permanent structures.
* Demolition and deconstruction of on and offsite infrastructure.
* Changes to local road traffic conditions.
* Changes to site activity levels at various stages of decommissioning.

1. The licensee should demonstrate due consideration for the various decommissioning phases and the peak activity levels within the study area and on surrounding road networks. A judgement should be made as to the activities generating noise and vibration having potential to giving rise to significant effects at sensitive receptors during peak activity, in order to build a proportionate assessment scope.

## Legislation and Policy

### Legislation

1. Regulatory regimes relevant to noise and vibration include:

* The Environmental Protection Act 1990.
* Noise and Statutory Nuisance Act 1993.
* The Control of Noise at Work Regulations 2005.
* The Control of Vibration at Work Regulations 2005.
* The Environmental Noise (England) (Amendment) Regulations 2018.
* The Environmental Noise (Wales) (Amendment) Regulations 2018.
* The Environmental Noise (Scotland) Amendment Regulations 2018.
* The Control of Noise (Code of Practice for Construction and Open Sites) (England) Order 2015.
* The Control of Noise (Codes of Practice for Construction and Open Sites) (Scotland) Order 2002.
* The Control of Noise (Codes of Practice for Construction and Open Sites) (Wales) Order 2002.

### Policy

1. Policy instruments relevant to noise and vibration may include:

* National Policy Statement Nuclear Power Generation EN-6.
* Overarching National Policy Statement Energy EN-1.
* National Planning Policy Framework (NPPF).
* Planning Practice Guidance (PPG) 2019.
* Noise Policy Statement for England (NPSE) 2010.
* Government’s 25 Year Environment Plan 2019.

## Assessment Methodology

### Guidance

1. Noise and vibration assessments should be based on the relevant standards for acceptable noise and vibration limits set out in the following guidance:

* [World Health Organisation Regional Office for Europe Environmental Noise Guidelines for the European Region 2018](https://www.euro.who.int/en/publications/abstracts/environmental-noise-guidelines-for-the-european-region-2018);
* [Guidance in the Design Manual for Roads and Bridges LA111: Noise and Vibration.](https://www.thenbs.com/PublicationIndex/documents/details?DocID=329426)
* [British Standard BS 5228-1 Noise: 2009+A1: 2014 – Code of Practice for noise and vibration control at open construction sites – Noise](https://shop.bsigroup.com/ProductDetail/?pid=000000000030258086);
* [British Standard BS5228-2 Vibration: 2009+A1: 2014 – Code of Practice for noise and vibration control at open construction sites – Vibration](https://shop.bsigroup.com/ProductDetail/?pid=000000000030258089); and
* [IEMA Guidelines for Environmental Noise Impact Assessment (version 1.2) 2014](http://programmeofficers.co.uk/Preston/CoreDocuments/LCC393.pdf).

### Assessing significance of noise and vibration effects

1. When approaching noise measurement, the various features of the noise that are likely to affect the subjective reaction must be considered [45].   
   These include:

* The type of noise: for example, is it continuous at a constant level, or continuous but fluctuating in level, or is it intermittent?
* The frequency content of the noise: is it broad band, or is there a prominent frequency (that is, a tonal quality).
* The time of day and/or day of the week it occurs.

1. Noise and vibration uses quantitative threshold values to assign magnitude to potential impacts in order to identify significant effects. Significant effects are defined in terms of a combination of more than one factor such as noise exposure, the number of occurrences of the noise in a given time period, the duration of the noise and the time of day the noise occurs.
2. Noise can be described with a range of parameters, and it is important to understand the differences between them. The cited standards above provide helpful definitions of each parameter that is used. The most common used parameter is the LAeq, T, which is the equivalent continuous A‑weighted sound pressure level, in decibels (dB), determined over a time interval T.
3. BS5228-1 sets out an example approach to defining construction noise thresholds for the purposes of EIA for residential dwellings (reproduced here in Table 11). Dwellings should be categorised according to their pre-existing baseline noise levels prior to works commencing, although it is recommended that this is established after the station to be decommissioned has stopped operating.   
   A similar but less restrictive approach should be used for less sensitive receptors.

Table - Example thresholds of potential significant effects at dwellings[[13]](#footnote-14)

|  |  |  |  |
| --- | --- | --- | --- |
| Assessment category and threshold value period | Threshold value, in decibels (dB) (LAeq, T) | | |
| Category A | Category B | Category C |
| Night-time (23.00−07.00) | 45 | 50 | 55 |
| Evenings and weekends | 55 | 60 | 65 |
| Daytime (07.00−19.00) and Saturdays (07.00−13.00) | 65 | 70 | 75 |

1. Alongside the construction threshold values, consideration of the Lowest-observed-adverse-effect Level (LOAEL) and Significant-observed-adverse-effect Level (SOAEL) is also required.
2. Significance of noise and vibration impacts are usually determined using the concepts of LOAEL and SOAEL introduced in the NPSE and elucidated further in Planning Practice Guidance (PPG) and the IEMA Guidelines [45]. Examples of LOAEL and SOAEL for each parameter are set out in Table 12.

Table - Example Levels of Significance of Noise and Vibration Impacts

|  |  |  |
| --- | --- | --- |
| Parameter Assessed | LOAEL and SOAEL | Source Guidance |
| Construction Noise | LOAEL LAeq,T 50dB (free field)[[14]](#footnote-15) | WHO guideline value for moderate annoyance in outdoor living areas |
| SOAEL LAeq,T 65 dB (free field) | BS 5228-1 threshold for potential significance of day-time construction noise |
| Construction Vibration | LOAEL peak particle velocity (PPV) 0.3mm/s | BS 5228-2 threshold at which vibration “might be just perceptible in residential environments” |
| SOAEL PPV 1.0 mm/s | BS 5228 threshold at which vibration is likely to cause complaint within residential environments “but can be tolerated if prior warning and explanation has been given to residents” |

1. Exceedance of SOAEL is not in itself to be regarded to constitute a significant adverse effect. The assessment of likely significant effects at sensitive receptors should consider the sensitivity of the receptor and the magnitude, duration and frequency of change. The threshold values may represent noise levels above which exceedance for a given period of time (typically, for major schemes, +5dB above the threshold for a period of 10 in 15 days) may be considered a significant effect.
2. The licensee should demonstrate that the significance criteria are appropriate to the nature of the works and the overall duration of the activity. For decommissioning projects, with longer activity timescales than a typical construction site, it may be appropriate to have significance criteria for each phase.
3. It should be noted that during the works, the significance criteria do not apply and instead the mitigation and monitoring measures should refer to the limits set by the local authority responsible for noise disturbance.

## Baseline and future baseline

1. A noise baseline should be determined via one or more of the following methods:

* Noise measurements, based upon actual survey data.
* Predicted noise levels (noise model outputs).
* Existing noise mapping undertaken by public bodies or as part of other developments (if available).
* Or a combination of all three.

1. Noise measurements may include, for example, noise arising from generation of nuclear power if a site is operational at the time of baseline noise monitoring. Therefore, the usual approach to assessing noise impacts (by comparing noise levels as a result of the works to a baseline without the works) may not represent the actual change in the noise baseline once the site stops generating.   
   The assessment could account for this by:

* Using proxy locations away from the influence of the power station to predict likely noise levels (suitable for locations where background noise levels are considered representative of the site without power generating activities).
* Direct measurement of noise levels at a number of representative locations around the site while the site is generating. The measured values are then reduced by the amount which the power station influences them (predicted using appropriate noise modelling software), leaving what can be considered the true background noise in the absence of any generating noise.

1. Whichever approach is taken, the Inspector should be satisfied that the noise baseline has been developed with due regard for the cessation of power generating activities, and the impact this may have on the baseline noise measurements.

### Survey

1. Noise monitoring surveys, specifically for the purposes of construction and demolition noise baseline data collection, should be undertaken where data from other sources is not sufficient to enable production of a proportionate noise assessment.
2. Consideration should be given to the timing of works likely to generate noise and vibration impacts, and the baseline developed accordingly. For example, if decommissioning activities will require night working, or work near sensitive receptors at the time they are in use (for example, churches and schools), then the baseline noise measurements should be taken at these times.
3. The Inspector should be satisfied that the baseline noise measurements are representative of typical conditions (e.g., a normal weekday, not during school holidays). Further advice on appropriate monitoring procedures set out in reference [46].
4. Possible receptors that may need to be considered when determining the baseline noise levels include:

* Residential properties
* Schools/Colleges
* Hospitals
* Especially sensitive commercial/industrial installations
* Commercial premises
* Community facilities (including libraries, surgeries, health centres)
* Places of worship
* Retail premises
* Open air amenities
* Cemeteries
* Light industrial sites
* Farms, kennels
* Wildlife sites.

1. The Inspector should be satisfied that the sensitive receptors identified for assessment have been justified and, where possible, agreed with the local planning authority’s Environmental Health Department.

### Future Baseline

1. Baseline noise levels may be developed for different years to reflect anticipated changes in background noise levels. Typically, where the baseline includes sources of noise from road traffic, levels may be expected to increase over time without the project. Conversely, the closure of the power station may permanently reduce certain noise levels for the surrounding receptors. A future baseline may be developed for a ‘design year’, which may be some years from the start of decommissioning works (for road schemes, 15 years from opening is typical).   
   It may though be appropriate to assess future baseline years that represent key stages of decommissioning, where reasonable assumptions can be made as to the likely noise and activity levels at that time.
2. If the licensee can demonstrate that noise and vibration levels are likely to be lower during certain stages of decommissioning than they are during existing site operations, it may be appropriate to scope this out of the assessment and rely on the established baseline. The Inspector must be satisfied that assumptions relating to the future baseline have been set out clearly, objectively and are informed by as much detail as is available from the decommissioning plan.
3. Additional methodology on predicting baseline noise can be found reference [46].

## Project Impacts and Potential Effects

1. Impacts affecting noise and vibration receptors would likely arise from the following decommissioning activities, however the site-specific impacts will vary according to the nature of the chosen decommissioning strategy and site location and context:

Table - Example of decommission activities, impacts and effects on sensitive receptors

|  |  |  |
| --- | --- | --- |
| Typical decommissioning activities with potential to generate impacts | Possible typical impacts arising from these activities | Possible effects on sensitive receptors |
| Transport of plant, equipment and waste to and from the site; | Vehicle movements generating additional noise along access routes | Noise and vibration effects on sensitive receptors |
| Demolition of terrestrial and underwater structures; | Demolition noise and vibration occurring | Noise and vibration effects on sensitive receptors |
| Use of construction or demolition plant; | Noise and vibration from generators and impact to structures | Noise and vibration effects on sensitive receptors |
| Excavation or piling for new temporary structures | Construction noise and vibration | Noise and vibration effects on sensitive receptors |

## Interface with other EIA topics

1. Consideration should be given to in-combination effects arising from interaction with other environmental topics. The noise and vibration assessment is likely to be informed by data from the traffic and transport assessment, and in turn is likely to inform other topic assessments such as:

* Terrestrial and freshwater ecology;
* Marine ecology;
* Cultural heritage;
* Landscape and visual amenity;
* Health; and
* Socio-economics.

1. Where committed developments within the study area are likely to introduce additional sources of noise or vibration through their construction or operation during the decommissioning works, for example, the construction of a new nuclear reactor at an adjacent site occurring at the same time as demolition works, the assessment should also consider how this will affect noise and vibration levels at identified receptors and recommend appropriate mitigation strategies.

## Mitigation

1. The application of the mitigation hierarchy for noise and vibration effects is reliant on avoidance, reduction and compensation. Mitigation must demonstrate that best practicable means have been employed to mitigate potential significant noise effects.
2. Section 72 of the Control of Pollution Act 1974 [47] defines what is meant by "best practicable means" and requires that regard be had to relevant codes of practice, one of which is British Standard BS5228, parts 1 and 2 [48] [49].

### Avoid and Reduce

1. Embedded mitigation should be incorporated into the project proportionately to the level of identified risk, ideally through the consideration of alternatives during development of the decommissioning plan. This may include:

* Avoiding impacts on particularly sensitive receptors by carefully siting haul routes and noise generating activities.
* Timing the hours of operation to avoid major impacts on receptors, including avoiding the breeding seasons of sensitive fauna.
* Limiting the generation and impact of noise from construction and demolition activities through limiting the number of different sources operating concurrently.
* Limiting the duration of noise generating activities.

1. Best practice noise reduction techniques may include the following measures:

* Selection of low noise generating plant.
* Specific measures to reduce the noise impact from activities which result in moderate or major magnitude of effect, such as the installation of noise barriers close to particularly sensitive receptors.
* Training of site personnel to raise awareness of noise and nearby noise sensitive receptors.
* Provision of information to the public on expected construction noise, including duration, especially to those likely to be exposed to moderate and major magnitude of effect.

### Compensate/ offset

1. Compensation may include measures applied outside of the development area, such as fitting double/secondary glazing to affected properties. In certain cases, legislation provides for financial compensation for the loss of value of properties affected by noise. It also may be possible to offer compensation in the form of the provision of alternative or additional community facilities. Liaison with the relevant local authority or affected community groups might assist in identifying a suitable form of alternative compensation.
2. In some circumstances, the offer of temporary relocation of those badly affected during the noisiest phases of the construction or demolition might be considered. Further guidance on this can be found in reference [48].
3. The benefits to be achieved from mitigation should be quantified wherever possible, and the methods employed should have the full commitment of the developer.   
   The methods should be feasible and effective and should be enforceable by a programme of inspection or monitoring.
4. The Inspector must be satisfied that every effort to reduce noise and vibration effects through the application of “best practicable means” (as defined in reference [48]) has been made.

# Air Quality

## Scope



1. Air quality assessments tend to assess activities associated with combustion related or construction related emission sources, such as road traffic, construction plant, fugitive dust and traditional power generation, and exclude air quality with respect to radioactive emissions, which tends to be covered in a separate assessment and ES chapter; refer to Section 16 on ‘Radiological Effects’.
2. Decommissioning projects can have significant air quality effects which can lead to impacts on human health and designated habitats. Impacts on ambient air quality can cause exceedances of environmental quality standards such as air quality objectives and limit values which can affect the UK's reported ability to comply with the Air Quality Directive [50] in the shortest timescales possible.
3. The intent of an air quality assessment is to demonstrate the likely changes in air quality as a result of a proposed development. Often these changes will be quantified, although in some instances a ‘simple’ qualitative assessment will be sufficient. A simple assessment provides sufficient information to confirm that the project will not result in any exceedances of air quality thresholds, result in significant effects and complies with international, national and regional legislation and policy.
4. In determining the level of detail required, consideration should be given to the following:

* Size and complexity of the development.
* Compliance with national air quality objectives and EU Limit Values[[15]](#footnote-16).
* Is the proposed development within or has the ability to affect AQMA.
* Whether the development will materially affect any air quality action plan or strategy.
* The overall degradation (or improvement) in local air quality.
* Whether the development will introduce new public exposure into an area of existing poor air quality.

### Receptor Scope

1. Typical sensitive receptors include:

* Residential and other properties, schools and hospitals close to the decommissioning works (including any ancillary development required offsite).
* Residential and other properties, schools and hospitals alongside roads significantly affected by the project, typically known as the affected road network, even if well away from the decommissioning site, and especially if within AQMAs.
* The affected road network is defined by absolute changes in Annual Average Daily Traffic and heavy-duty vehicle flows. Both Highways England’s DMRB [51] and the Environmental Protection UK/Institute of Air Quality Management (EPUK/IAQM) [52] set criteria at which a road is affected . DMRB is typically used for large scale projects that can affect the strategic road network or where a strategic transport model is applied, whereas EPUK/IAQM is used for projects that would affect local traffic.
* Designated sites of ecological importance, and flora and fauna near the site or affected road network.

### Spatial Scope

1. DMRB guidance recommends receptors identified within 200m of the site or the affected road network are included within the assessment for assessment of transport related emissions.
2. The IAQM recommends that assessment of construction dust is normally required where there is:

* A ‘human receptor’ within:
  + 350m of the boundary of the site.
  + 50m of the route(s) used by construction/demolition vehicles on the public highway, up to 500m from the site entrance(s).
* An ‘ecological receptor’ within:
  + 50m of the boundary of the site.
  + 50m of the route(s) used by construction/demolition vehicles on the public highway, up to 500m from the site entrance(s).

### Temporal Scope

1. The licensee should demonstrate due consideration for the various decommissioning phases and the peak activity levels on the site and surrounding road networks. A judgement should be made as to the potential risk of air pollution giving rise to significant effects at sensitive receptors during peak activity, in order to build a proportionate assessment scope. However, vehicle related emissions are expected to improve year on year and therefore consideration should also be given for the worst-case assessment year from an emission perspective.

## Legislation and policy

### European

1. EU Directive on ambient air quality and cleaner air for Europe (hereafter referred to as the ‘Air Quality Directive’) was adopted in May 2008 [53].   
   This Directive defines limit values and times by which they are to be achieved for the purpose of protecting human health and the environment by avoiding, reducing or preventing harmful concentrations of air pollutants.
2. The Air Quality Directive sets out that the limit values apply everywhere with the exception of:

* any locations situated within areas where members of the public do not have access and there is no fixed habitation.
* in accordance with Article 2(1), on factory premises or at industrial installations to which all relevant provisions concerning health and safety at work apply.
* on the carriageway of roads and on the central reservations of roads except where there is normally pedestrian access to the central reservation.

### National

1. Part IV of the Environment Act 1995 [54] requires that every local authority shall periodically carry out a review of air quality within its area, including likely future air quality. As part of this review, the authority must assess whether air quality objectives are being achieved, or likely to be achieved within the relevant periods. Any parts of an authority’s area where the objectives are not being achieved or are not likely to be achieved within the relevant period, must be identified and declared as an AQMA. Once such a declaration has been made, authorities are under a duty to prepare an Air Quality Action Plan (AQAP) which sets out measures to pursue the achievement of the air quality objectives within the AQMA.
2. The licensee should identify any AQMAs and associated AQAPs within the study area.
3. Other legislation relevant to air quality includes:

* Ambient Air Quality Directive 2008 (2008/50/EC).
* Fourth Air Quality Daughter Directive 2004 (2004/107/EC).
* Air Quality (Standards) Regulations 2010.
* Air Quality (England) Amendment Regulations 2002.
* Air Quality (Scotland) Amendment Regulations 2016.
* The Air Quality Standards (Wales) Regulations 2010.
* The Air Quality Standards (Wales) (Amendment) (EU Exit) Regulations 2019.
* The Air Quality (Amendment of Domestic Regulations) (EU Exit) Regulations 2019.

### Policy

1. Relevant policy includes:

* Clean Air Quality Strategy 2019.
* Air Quality Plan for Nitrogen Dioxide (NO2) 2017.
* National Planning Policy Framework.
* Local planning policy.

1. The Clean Air Strategy [55] establishes the UK framework for air quality improvements. Although the Clean Air Strategy does not set legally binding objectives, the Clean Air Strategy instead has targets for reducing total UK emissions of nitrogen oxides (NOx) and fine particulate matter (PM2.5) from sectors such as road transport, domestic sources and construction plant (non-road mobile machinery).
2. The air quality objectives and limit values relevant to demolition activities and road traffic are summarised in Table 14.

Table - Air quality objectives, limit values and critical level

| Pollutant | Averaging Period | Concentration | Allowance | Attainment Date | |
| --- | --- | --- | --- | --- | --- |
| Air Quality Objectives | EU Limit Values |
| Nitrogen dioxide (NO2) | Annual | 40 μg/m3 | - | 31 December 2005(a)(b) | 1 January 2010(b) |
|  | 1 Hour | 200 μg/m3 | 18 (equivalent to 99.8th percentile) | 31 December 2005(a) | 1 January 2010(b) |
| Particulate Matter (PM10) | Annual | 40 µg/m3 | - | 31 December 2004(a) | 1 January 2005(c) |
|  | 24 Hour | 50 µg/m3 | 35 (equivalent to 90.41st percentile) | 31 December 2004(a) | 1 January 2005(c) |
| Particulate Matter (PM2.5) | Annual | 25µg/m3 | - | 1 January 2015(a) | - |
|  |  | 20µg/m3 | - | - | 1 January 2020(b) |
| Nitrogen Oxides (NOX)(c) | Annual | 30 μg/m3 | - | 31st December 2000(a) |  |

**Notes:**

(a) Air Quality (England) Regulations 2000 as amended

(b) The Air Quality Directive [50] on ambient air quality and cleaner air for Europe and The Air Quality Standards Regulations 2010. Derogations (time extensions) have been agreed by the EU for meeting the NO2 limit values in some zones/agglomerations

(c) PM10 refers to particulate matter with a diameter of 10 microns or less, and PM2.5 refers to particulate matter with a diameter of 2.5 microns or less

(d) Designated for the protection of vegetation and ecosystems and also referred to as the ‘critical level’ for NOx. The policy of the UK statutory nature conservation agencies is to apply the annual mean NOx criterion in internationally designated conservation sites and SSSIs on a precautionary basis, as the Limit Value applies only to locations more than   
20 km from towns with more than 250,000 inhabitants or more than 5 km from other built-up areas, industrial installations or motorways. On this basis the limit values have been excluded from this assessment.

## Assessment Methodology

### Guidance

* [Defra (2016), Local Air Quality Management Technical Guidance 2016](https://laqm.defra.gov.uk/technical-guidance/).
* [Defra and Environment Agency (Published Online – last updated 2016), Air emissions risk assessment for your environmental permit](https://www.gov.uk/guidance/air-emissions-risk-assessment-for-your-environmental-permit).
* [Environmental Protection UK (EPUK) and Institute of Air Quality Management (IAQM) 2017 Land-Use Planning & Development Control: Planning For Air Quality](http://www.iaqm.co.uk/text/guidance/air-quality-planning-guidance.pdf);.
* [IAQM (2014), Guidance on the assessment of dust from demolition and construction](http://iaqm.co.uk/text/guidance/construction-dust-2014.pdf).
* [Highways England (2019), Design Manual for Roads and Bridges Sustainability and Environment Appraisal LA 105 Air Quality](https://www.ihsti.com/CIS/document/329495).
* [Ministry of Housing, Communities & Local Government (Published Online – last updated 2019) National Planning Policy Framework Planning Practice Guidance – Air Quality](https://www.gov.uk/guidance/air-quality--3).

### Assessing Significance and Air Quality Effects

1. Any judgement on the overall significance of effect will need to consider factors such as:

* The existing and future air quality in the absence of the development.
* The magnitude of changes that will take place, even where air quality objectives or limit values are not exceeded.
* The extent of current and future population exposure to the impacts.
* The influence and validity of any assumptions adopted when undertaking the prediction of impacts.

1. Typically, for projects affecting road traffic, air dispersion modelling is undertaken to predict concentrations of NO2 and particulate matter (PM10 and PM2.5) both with and without a development and is based on traffic data provided by a traffic and transport consultant. Significant effects may be identified by referring to air quality objectives or EU limit values as quantitative thresholds for assigning magnitude criteria.
2. The assessment of dust from demolition and construction activities is typically assessed using a qualitative risk-based approach. The approach, as guided by IAQM, involves screening the need for a dust assessment based on the presence of receptors. If screened in, the potential dust emission magnitude and sensitivity of the area are defined and combined to give the risk of dust impacts. Finally, appropriate and proportionate site-specific mitigation measures are identified to lower the risk of dust impacts including any guidance on measures issued by the local authority.
3. Professional judgement must be relied upon when determining the significance of air quality impacts and the following points should be considered:

* Impacts during the Care and Maintenance Preparation and Final Site Clearance phases (usually on dust soiling, PM10 and PM2.5 concentrations from construction and demolition activities).
* Impacts on existing receptors during the Care and Maintenance phase (usually on concentrations of NO2, PM10 and PM2.5).
* Any exceedances of the air quality objectives arising as a result of the decommissioning activities, or any worsening of a current breach (including the geographical extent).
* Whether the works will compromise or render inoperative the measures within an Air Quality Action Plan, where the development affects an AQMA.
* The significance of the effect of any impacts identified.
* Any apparent conflicts with planning policy.

1. Reference [51] provides detailed guidance for identifying significant effects arising from changes to road traffic. General guidance on ascribing significance relating to air quality is available in the guidance from [Environmental Protection UK](https://www.environmental-protection.org.uk/) and the [IAQM](https://iaqm.co.uk/).

## Baseline and Future Baseline

1. The following baseline information should typically be gathered to inform the air quality assessment:

* Air quality monitoring data e.g. obtained from the existing nuclear site, local authority, and Defra.
* Local authority air quality reports including the locations of any AQMAs within, or close to the border of the assessment area.
* Local AQAPs.
* Information regarding compliance with the EU Directive, zonal / agglomeration exceedance status including local air quality plans prepared to support the Government's National Air Quality Plan for achieving compliance with the Air Quality Directive.
* Background maps for NOx concentrations and nitrogen deposition, where designated habitats are included in the assessment.
* Planning applications for any future developments that could introduce new receptors that could be affected by the project in the relevant phases of the decommissioning scope.

1. This data collectively represents the baseline scenario from which predicted changes in air quality will be assessed against.

### Air quality monitoring

1. In the absence of sufficient air quality monitoring data, it may be necessary to carry out specific monitoring to inform the baseline and to support any modelling activities. Where monitoring data are included in the report, it will be important to include details of the monitoring locations, the monitoring method, sampling period, data capture and any adjustments applied to the data, such as diffusion tube bias adjustment factors.
2. Where monitoring is carried out for less than a year, the results will need to be adjusted to an annual mean equivalent using the methodology described in the Technical Guidance provided by Defra[[16]](#footnote-17). This will add to the uncertainty associated with any model verification and adjustment, and this should be recognised.

### Future baseline

1. The future baseline scenario should be developed from modelled pollutant concentrations that would be likely to occur irrespective of the decommissioning works being undertaken (the ‘do nothing scenario’)[[17]](#footnote-18). The future baseline should reflect the selected baseline year and an appropriate future year where background concentrations of pollutants can be predicted with reasonable accuracy.
2. The current best available modelling and forecasting tools allow comparison of future baselines up to the year 2030. Although decommissioning activities will likely have peaks in activity in years after this, 2030 will represent the current worst-case ‘do-nothing scenario’. The assessment should acknowledge this, and a precautionary approach should be applied to the assessment of significant effects during the latter decommissioning phases where uncertainty is greater.

## Project Impacts and Potential Effects

1. Examples of potential impacts affecting air quality receptors would likely arise from the decommissioning activities are provided in Table 15, however the site-specific impacts will vary according to the nature of the chosen decommissioning strategy and site location and context.

Table - Example of decommission activities, impacts and effects on sensitive receptors

|  |  |  |
| --- | --- | --- |
| Typical decommissioning activities with potential to generate impacts | Possible typical impacts arising from these activities | Possible effects on sensitive receptors |
| Transport of plant, equipment, waste and workers to and from the site | Vehicle emissions, increasing levels of air pollutants, track out | Effects on ecological and human receptors relating to respiratory health |
| Demolition of terrestrial structures, earthworks | Dust and debris released into air | Effects on ecological and human receptors relating to respiratory health |
| Use of construction or demolition plant powered by petrol or diesel | Exhaust emissions, including measured pollutants | Effects on ecological and human receptors relating to respiratory health |

## Interface with other EIA topics

1. Likely interactions with other EIA topics relevant to air quality may include:

* Climatic factors.
* Terrestrial and freshwater ecology.
* Traffic and transport.
* Radiological effects.
* Materials resources and waste.
* Human health.

## Mitigation

### Avoid and reduce

1. Examples of mitigation measures that could be employed to avoid or reduce effects on air quality sensitive receptors are as follows:

* Maintaining adequate separation distances between sources of air pollution and receptors.
* Controlling dust and emissions from construction, operation and demolition.
* Appropriate means of filtration and ventilation.

### Offset

1. Typical measures that may be considered to offset emissions may require liaison with local transport authorities to influence local and regional emissions. This may include:

* Including infrastructure to promote modes of transport with a low impact on air quality (such as electric vehicle charging points).
* Financial support to low emission public transport options.
* Improvements to local cycling and walking infrastructure.

1. Additional examples of mitigation for air quality effects are available from: Ministry of Housing, Communities & Local Government (Published Online – last updated 2019) National Planning Policy Framework Planning Practice Guidance – Air Quality.

# Soils, Geology and Contaminated Land

## Scope

1. It is typical for ground related topics to be captured in a single chapter.   
   These broadly relate to the following sub-topics:

* Land contamination – interaction of contamination sources, pathways and receptors.
* Geodiversity – e.g. geological SSSI, regionally or locally important geological sites or non-designated outcrops/features of interest. Where no such sites can be found by a desk study review then this may be scoped out.
* Soils – e.g. agriculture grade soils. Where this is likely to be significant then it is usually treated in its own chapter (e.g. agriculture). Where the site is urban or hard cover, then this element may be scoped out.
* Minerals and mining – e.g. sand and gravel deposits, limestone etc. Where sites do not fall within a minerals safeguarding area or contain other resources (actively worked or otherwise) as detailed in an adopted minerals plan, then this element may also be scoped out.

1. This section excludes land quality with respect to radioactive contamination of soil, groundwater and in ground structures. These tend to be covered in a separate assessment and ES chapter (refer to Section 16 ‘Radiological Effects’).

### Receptor Scope

1. Typical receptors that would be considered during scoping are:

* Soil quality – considering its function and its availability as a resource.
* Groundwater bodies and their quality – such as aquifers, abstraction sites, identified through applying sensitivity criteria consistent with the Water Resources assessment.
* Surface waters – such as rivers, lakes or other surface water bodies with reference to their Water Framework Directive status (both current and objective).
* Agricultural land – particularly if considered best and most versatile   
  (classified as Grade 1 and 2) identified through review of published mapping.
* Sites of geological importance – such as Regionally important geological and geomorphological sites, SSSI and local geological sites.
* Non-radioactive discharges – identified through review of site records and EA data for the surrounding area.
* Human health - likely to relate to sensitive land uses such as residential properties, public green spaces, site end users and any surrounding land users.
* Mineral resources – such as active extraction, minerals safeguarding zones, identified through a review of local planning authority adopted mineral plans.

1. If the activities proposed as part of the decommissioning project are considered unlikely to affect certain receptors, either because the receptor is not thought to be present within the ZoI or the activities will have limited impact due to their nature or distance from the receptor (e.g., there are no minerals safeguarding zones within 250m of the site), then it is appropriate to scope them out of the assessment. Robust justification for doing so should be provided in the Pre-application opinion request provided by the licensee.
2. Site workers involved in the decommissioning project may also be excluded from the assessment as that they would be subject to separate health and safety protocols and legal requirements embedded within the project.

### Spatial Scope

1. The spatial scope should comprise the site and an agreed ZoI (typically land within 250m of the site boundary for soils and geology and up to 1km from the site boundary for groundwater related assessments). This will define the scope of information review for the baseline assessment.

### Temporal Scope

1. For decommissioning projects, the temporal scope should reflect all phases of activity as per the agreed scope of the EIA.

## Legislation and policy

### Legislation

1. There is no national legislation, policy or statutory guidance on completion of soils, geology and contaminated land aspects in respect of an EIA. The relevant environment agency has lead responsibilities on nuclear licensed sites for regulating aspects of non-radioactive land contamination and ONR should engage with the relevant environment agency on these matters relevant to EIADR, in line with the [MOUs](http://www.onr.org.uk/agency-agreements-mou.htm) and supporting guidance between ONR and each of the environmental regulators [6] [7] [8].
2. The UK legislation on land contamination is principally contained in Part IIA of the Environmental Protection Act 1990.
3. This legislation endorses the principle of a “suitable for use” approach to contaminated land, where remedial action is only required if there are unacceptable risks to health or the environment, taking into account the use of the land and its environmental setting.
4. This statutory guidance describes a risk assessment methodology in terms of “significant pollutants” and “significant pollutant linkages” within a source-pathway-receptor conceptual model of a site. The model comprises:

* The principal pollutant hazards associated with the site (the sources).
* The principal receptor(s) at risk from the identified hazards.
* The existence, or absence, of plausible pathways which may exist between the identified hazards and receptor(s).

1. For land to be determined to be statutorily “contaminated” and require remediation or a change to a less sensitive use, all three elements (source-pathway-receptor) of a significant pollutant linkage must be present and a significant possibility of significant harm to one or all of a number of identified receptors should be demonstrated.
2. Other legislation relevant to soils, geology and contaminated land includes:

* Contaminated Land (England) (Amendment) Regulations 2012.
* Water Framework Directive, 2000.
* The Environmental Damage (Prevention and Remediation) (England) Regulations 2015.
* Environmental Liability (Scotland) Regulations 2009.
* Water Resources Act 1991.

### Policy

1. The National Planning Policy Framework (NPPF) (revised in February 2019) aims to contribute to protecting and enhancing our environment, by:

* Protecting and enhancing valued landscapes, geological conservation interests and soils.
* Preventing both new and existing development from contributing to or being put at unacceptable risk from, or being adversely affected by unacceptable levels of soil pollution or land instability.
* Remediating and mitigating despoiled, degraded, derelict, contaminated and unstable land where appropriate.

1. Local planning policy should be reviewed on a site-by-site basis.

## Assessment Methodology

### Guidance

1. Best practice in the UK is detailed within a number of guidance documents including the following:

* [Land Contamination: Risk Management, Environment Agency, 2020](https://www.gov.uk/guidance/land-contamination-how-to-manage-the-risks);
* [British Standard BS10175, Investigation of potentially contaminated sites. 2011 + 2017 update](https://shop.bsigroup.com/ProductDetail?pid=000000000030362551);
* [NHBC R&D 66, Guidance for the safe development of housing on land affected by contamination, 2008](http://www.nhbc.co.uk/NHBCPublications/LiteratureLibrary/Technical/filedownload,33595,en.pdf);
* [Construction code of practice for the sustainable use of soils on construction sites, DEFRA, 2009](https://www.gov.uk/government/publications/code-of-practice-for-the-sustainable-use-of-soils-on-construction-sites);
* [Definition of Waste: Development Industry Code of Practice CL:AIRE, 2014](https://www.claire.co.uk/projects-and-initiatives/dow-cop);
* [Highways England Design Manual for Roads and Bridges, Sustainability and Environment Appraisal LA109 Geology and Soils (2019);](https://www.thenbs.com/PublicationIndex/documents/details?DocID=327777) and
* [Land Quality Management: Nuclear Safety Technical Assessment Guide. ONR, 2018](http://www.onr.org.uk/operational/tech_asst_guides/ns-tast-gd-083.pdf).

### Assessing significance of soil, geology and contaminated land effects

1. The traditional methodology for assessing effects assigns a sensitivity to the receptors identified at baseline and identifies criteria for assessing the magnitude of potential impacts to these receptors. Sensitivity can be based on a number of guidance documents and data sources including Environment Agency designations and agricultural land classifications. The effect is calculated based on a qualitative judgement informed by a matrix which takes into account both sensitivity and magnitude. This would typically be used for minerals, soils, and geodiversity and may also be used for land contamination.
2. An alternative approach to assessing significant effects for land contamination uses the conceptual site model (CSM), source-pathway-receptor assessment as a basis. A number of conceptual site models and associated risk assessments are constructed for significant milestones in the project and risk levels directly compared. The significance of the effects is related to the magnitude of change in risk levels for each pollutant linkage. The CSMs would usually be related to baseline, construction and operation. However, in the case of long-term developments such as decommissioning, all stages may be sub-divided in terms of main milestones or identify peak activities at each development stage.
3. Temporary and permanent effects and whether such effects are neutral, beneficial or adverse should be clearly identified in all cases.

## Baseline and future baseline

1. The baseline for the soils, geology and contaminated land ES chapter should, as a minimum, be set based on a comprehensive desk study undertaken by a competent person. The desk study should include a review of available information which may include:

* Historical and current mapping of the site and ZoI.
* Previous site-specific ground investigations and/ or soil survey data.
* British Geological survey mapping and borehole logs.
* Hydrogeological maps.
* Environment Agency data on pollution incidents, abstraction licences, waste facilities and discharge consents within the ZoI.
* Site specific data on operational history including any pollution incidents, environmental permits and on-site disposals.
* Agricultural land classification mapping.
* Discussions with the local planning authority regarding any sites designated as ‘contaminated land’ under Part IIA of the Environmental Protection Act (1990) within the ZoI.

1. The desk study should also include a CSM, and preliminary risk assessment based on this information in line with UK guidance. The Inspector should be satisfied that the desk study is based on the latest available data.

### Soil Surveys

1. Contaminated land assessment follows a phased approach in line with UK guidance and best practice. Therefore, if required following the desk study, site-specific ground investigations and soils surveys should be undertaken to confirm the baseline conditions. This is likely to be important for decommissioning works at sites which may have had a long history of contaminative events. The conceptual site model and risk assessment would be updated based on this additional information.

### Future baseline

1. Future baseline would be set by considering the location and nature of the decommissioning project activities, and any changes to soils and geology (as a result of earthworks) during construction and demolition. Changes to receptors would be assessed and the conceptual site model considered on this basis.
2. Due to the long-term nature of decommissioning activities, the assessment should acknowledge that baseline conditions are expected to change over the lifetime of the project and explain how the assessment has accounted for this. The predicted future baseline conditions for each of the decommissioning phases identified in the project description should be discussed.

## Project Impacts and Potential Effects

1. Potential impacts affecting soil, geology and contaminated land receptors would likely arise from the decommissioning activities listed in Table 16. Site-specific impacts will vary according to the nature of the chosen decommissioning strategy and site location and context.

Table - Example of decommission activities, impacts and effects on sensitive receptors

|  |  |  |
| --- | --- | --- |
| Typical decommissioning activities with potential to generate impacts | Possible typical impacts arising from these activities | Possible effects on sensitive receptors |
| Demolition activities | Disturbance of contaminated material  Release of contaminated material to air, water and groundwater | Pollution of watercourses, groundwater, damage to human and ecological health |
| Remediation of contaminated ground | Spread of contamination | Pollution of watercourses, groundwater, damage to human and ecological health |

## Interface with other EIA topics

1. There are a number of interfaces between the soils, geology and contaminated land ES chapter and other chapters within the ES:

* Water resources and flooding.
* Terrestrial and freshwater ecology.
* Marine ecology.
* Radiological effects.
* Material resources and waste.

## Mitigation

1. For soils, geology and contaminated land, there are typically a number of mitigation measures within the pre-construction and construction phases of development which would be included as standard for construction projects. For decommissioning, these measures should be implemented for any relevant phases of site activity deemed to have potential for significant effects. It is recommended that these are considered as embedded mitigation measures and are taken into account during the assessments of effects. These mitigation measures may include:

* Code of Construction Practice or an EMP that outline the steps that will be undertaken to minimise the spread of contamination during construction activities, e.g. oil spillages, dust creation, waste storage. **Note:** there will be some overlaps with other topics in this regard, in particular: water resources, air quality and waste.
* Soil management plan.
* Unexpected contamination protocol.
* Environmental monitoring.
* Ground investigation and associated contamination risk assessment.
* Remediation strategy including options appraisal (consideration of options to either remove or control/encapsulate contamination)[[18]](#footnote-19).

1. The Inspector should be satisfied that sufficient detail regarding the content of these documents has been included, and the licensee has demonstrated commitment to ongoing implementation and monitoring of the measures they set out.

# Climatic Factors

## Scope



1. Schedule 1 (5)(f) of the EIADR requires the impact of the project on climate (for example, the nature and magnitude of greenhouse gas (GHG) emissions) and the vulnerability of the project to climate change to be reported in the ES. These can be grouped under the broad category ‘climatic factors’ and, depending on the approach taken to the EIA, may be presented as one or multiple chapters in an ES and should include the assessment of:

* Carbon and greenhouse gas emissions.
* Climate change resilience.

## Legislation and Policy

1. The legislation, policy and guidance relevant to climate change has significant overlap between both the impacts on climate change, and the need to adapt to climate change impacts. For conciseness, this is presented under one heading covering both carbon and GHG emissions and climate resilience.

### Legislation

1. Relevant legislation that should be considered during an EIA includes:

* The Paris Agreement 2016.
* Climate Change Act 2008.
* Climate Change Act 2008 (2050 Target Amendment) Order 2019.
* Department for Environment, Food & Rural Affairs, UK Climate Change Risk Assessment 2017, January 2017.
* EU Environmental Impact Assessment Directive (2014), 2014/52/EU, amending the previous EIA Directive 2011/52/EU.
* UK Town and Country Planning (Environmental Impact Assessment) Regulations, May 2017, which together with other regulations in the UK[[19]](#footnote-20), transposed the EU EIA Directive (2014) into UK law.

### Policy

1. Policy instruments relevant to climate change may include:

* The National Adaptation Programme and the Third Strategy for Climate Adaption Reporting (2018).
* HM Treasury Infrastructure Carbon Review, 2013.
* A Green Future: Our 25 Year Plan to Improve the Environment (2018).
* National Planning Policy Framework, 2019.
* National Planning Practice Guidance (PPG) Climate change.

1. Local and regional governments also produce their own climate change adaptation plans and set their own GHG and carbon reduction targets in Local Plans and strategies. These should also be reviewed by the licensee for the relevant site locations.

## Carbon and GHG emissions

1. As a topic that is recognised as increasingly important to achieving global and national commitments to combat climate change, the effects of GHG emissions are integral to the understanding of a project’s impact upon the environment and should be factored into the decision-making process accordingly.
2. Any potential for GHG emissions arising from the decommissioning project should be considered and reported by the licensee, however the level of detail may vary according to the likelihood of GHG emissions being considered significant compared to the [UK’s carbon budgets](https://www.gov.uk/guidance/carbon-budgets).
3. The licensee should clearly define the scope of their assessment in terms of the sources of emissions to be covered. Typically, emissions sources can be grouped into:

* **Scope 1**: Direct emissions generated by the consumption of fuel, e.g. for onsite plant, equipment or transport of goods to and from the site.
* **Scope 2**: Indirect emissions generated by electricity, heat or cooling purchased from the energy grid, e.g. for the lighting and heating in site offices.
* **Scope 3**: All other indirect emissions associated with the works, such as the embodied carbon in materials required for temporary site infrastructure.

1. The extent to which scope 3 emissions are included may be dependent on the licensee’s ability to account for these emissions, for example based on the carbon accounting data used, but the inspector should be satisfied that the scope has been adequately defined and justified.
2. Typically, a GHG impact assessment will report the tonnes of carbon dioxide equivalent (tCO2e) attributed to the project, with consideration for the seven gases defined in the [Kyoto Protocol](https://unfccc.int/resource/docs/convkp/kpeng.pdf):

* Carbon dioxide (CO2).
* Methane (CH4).
* Nitrous oxide (N20).
* Sulphur hexafluoride (SF6).
* Hydrofluorocarbons (HFCs).
* Perfluorocarbons (PFCs).
* Nitrogen Trifluoride (NF3).

1. In order to ensure a proportionate assessment, the licensee should demonstrate that the scope of the GHG assessment covers the decommissioning project elements likely to give rise to the largest carbon emissions. This may include (but not be limited to):

* Embodied carbon in materials required for construction of any temporary facilities required for decommissioning.
* Direct emissions from plant and equipment.
* Vehicle emissions from transporting materials, waste to and from the site.
* Any stored emissions released from any waste stores or vegetation that may be impacted by the works.

### Receptor scope

1. GHG emissions do not have a local receptor as, once they are emitted, they are not limited to geographic boundaries, and therefore the global atmosphere is the receptor. All GHG emissions contribute to climate change.

### Spatial scope

1. Sources of GHG emissions should not be limited by their spatial extent, rather the scope of the assessment should be determined by the activities or materials required to deliver the project, and their associated emissions potential.

### Temporal Scope

1. The assessment should be consistent with the temporal scope of the EIA as agreed through the Pre-application Opinion.

### Carbon and GHG emissions - Assessment Methodology

#### Guidance

1. The licensee should undertake the assessment in accordance with relevant good practice guidance, including but not limited to:

* [IEMA The Environmental Impact Assessment Guide to: Assessing Greenhouse Gas Emissions and Evaluating their Significance (2017](https://www.iaia.org/pdf/wab/EIA%20Guide_GHG%20Assessment%20and%20Significance_IEMA_16May17.pdf)).
* [Publicly Available Standard (PAS) 2080: 2016 Carbon Management in Infrastructure.](https://www.designingbuildings.co.uk/wiki/PAS_2080_Carbon_management_in_Infrastructure)
* [PAS 2060: 2010 Carbon Neutrality](https://www.bsigroup.com/en-GB/PAS-2060-Carbon-Neutrality/).
* [ISO15686-1:2011 Buildings and Constructed Assets – Service life planning – Part 1: General Principles and Framework](https://www.iso.org/standard/45798.html).

#### Assessing significance of GHG emissions

1. The expected GHG emissions arisings and baseline emissions are typically estimated using the following equation:

Activity data x GHG emissions factor = GHG emissions

1. The licensee may follow a different approach and should make reference to appropriate quantification approaches, typically set out in GHG accounting guidance from the GHG Protocol, or PAS2080, for example.
2. GHG emissions factors should be derived from national data sources as required, including:

* BEIS UK Government GHG Conversion Factors for Company Reporting.
* The Inventory of Carbon & Energy (ICE) Database.

1. There is currently no nationally accepted threshold of GHG emissions which, if exceeded, can be defined as significant from an EIA perspective. There are various forms of guidance and industry standards available, and the licensee should justify that the approach they’ve selected is appropriate.
2. The most broadly recognised UK guidance on evaluating significance of GHG, which is relevant regardless of sector, is that published by IEMA. The guidance advises that all GHG emissions should be considered significant, regardless of the scale of the emissions [56].
3. The approach to assigning significance of effect relies on reasoned argument, professional judgement and taking on board the advice and views of appropriate organisations. The guidance also focuses on mitigation efforts, regardless of the assessment of significance.
4. Within the IEMA guidance, it is also recommended to contextualise the project’s carbon footprint using local or sector-based budgets where possible. To date, sector or regional carbon budgets have not often been available, although this situation is beginning to change. An increasing number of local and regional authorities are developing budgets in response to national Net Zero legislation and Climate Emergency declarations. Where this is not available, it may be appropriate for the licensee to refer to the [UK Governments carbon budgets](https://www.gov.uk/guidance/carbon-budgets.) for context.

### Interface with other EIA topics

1. The Carbon and GHG emissions chapter should be informed by data from the following assessments:

* Traffic and Transport.
* Materials and Waste.

### Baseline and Future Baseline

1. Current baseline represents existing GHG emissions from the project boundary site prior to the commencement of the decommissioning project under consideration. This may include emissions from existing projects (e.g., energy consumption from a building which is scheduled for refurbishment, demolition or replacement) and infrastructure (e.g., current operational and use emissions).
2. Other approaches to developing the current baseline are emerging that follow a baseline scenario, which is a projection that the project’s GHG emissions are compared to. Further information on this approach can be found in the [GHG protocol for Projects](http://ghgprotocol.org/project-protocol).

### Project Impacts and Potential Effects

1. In accordance with IEMA guidance, all project activities that generate GHG emissions could be considered to generate a significant effect in EIA terms. In this case, activities that would be considered to generate GHG emissions are described in Section 12.3.

### Mitigation

1. Mitigation for greenhouse gas emissions should be implemented following the mitigation hierarchy of avoid, minimise, monitor and offset. This may include:

* **Avoid** emissions through consideration of conceptual alternatives.   
  For decommissioning, this may be achieved through selection of strategies that require less transportation and maximise the potential reuse of site-won material.
* **Minimise** the need for materials with a high carbon footprint through efficient design of the site and decommissioning facilities, and selection of energy efficient equipment and low-carbon materials.
* **Monitor** the actual emissions against the projected emissions throughout the phases of decommissioning. This should incorporate reasonable flexibility but ensure that any changes to the project delivery are considered with respect to their potential impact on the actual carbon emissions generated.
* **Offset** any residual carbon emissions by incorporating carbon sequestration and storage into the decommissioning project, either by creating onsite carbon sinks or contributing to regional or national carbon offset schemes.

## Climate Resilience

1. The consideration of climate change resilience is different to most other EIA topics because, rather than assessing the impact of the project on an aspect of the environment, the purpose of this assessment topic is to consider the potential effects upon the project arising from future climate change. This relates to the vulnerability of the project to climate-related hazards and effects, usually assessed through a climate change risk assessment, and presented in a climatic factors chapter. The effects of climate change are projected to increase over time therefore this is particularly relevant to decommissioning projects, which in some cases may have a delivery timeline of up to 100 years, and so are likely to experience greater uncertainty and potential threats from projected changes to the climate.
2. If a pre-application opinion has been sought, this is where the extent to which climate adaptation and resilience issues should be considered in the EIA process is agreed. The exclusion of explicit consideration of climate adaptation and resilience issues may be acceptable if it is agreed that existing design codes or standard assessment methodologies contain adequate in-built consideration of climate resilience issues. For decommissioning projects, which will be subject to an external hazards risk assessment as part of the safety reporting requirements.
3. The pre-application report should also explain how climate considerations will be included in the other technical assessments being carried out within the EIA process, typically as part of an assessment of intra-project cumulative effects.   
   This relates to the potential for climate change to exacerbate effects of the scheme reported in other EIA topics, for example where soil degradation due to site clearance may be worsened by projected future increases in extreme heat and prolonged drought events.

### Receptor Scope

1. Typically, a climate resilience chapter will consider the likely effects of short-term weather and long-term climate effects upon aspects of the project (receptors), which will include:

* **Building and infrastructure** receptors (including elements of structures, equipment, roads and storage facilities).
* **Human health receptors** (e.g. risks to decommissioning site workers, occupants and site users of adjacent operational or new nuclear development sites from climate-related hazards).
* **Environmental receptors** (e.g. if future climate change will exacerbate the effects of the project on environmental receptors, by e.g. increasing the vulnerability of habitats or species. For example, if the decommissioning project reduces water availability affecting habitats, and climate change leads to a risk of drought, then climate change is going to exacerbate the impact of the project on the environmental receptor).

### Spatial Scope

1. The spatial scope of the assessment should include the site, and any offsite works required to facilitate the decommissioning process. The site’s dependency on external services such as power and telecommunications should also be considered when assessing potential future climate change impacts. This relates to the extent to which the decommissioning project is reliant on the provision of these external services, and whether the vulnerability of those services to climate change may have a material impact on the ability of the project to operate.

### Temporal Scope

1. The assessment should be consistent with the temporal scope of the EIA as agreed through the Pre-application Opinion. It is likely that climate hazards will be of greater significance for decommissioning projects which are expected to take up to 100 years, compared to those that may take only 10 years to complete.   
   A proportionate approach should be taken to the assessment to reflect this.
2. In addition, it may be appropriate to consider the planned end stage and how this may be affected by future climate change, using available information on climate projections for that timeline to inform the assessment.

### Climate Resilience - Assessment Methodology

#### Guidance

1. The licensee should undertake the assessment in accordance with relevant good practice guidance, including but not limited to:

* [IPCC Fifth Assessment Report (AR5) Synthesis Report.](https://www.ipcc.ch/report/ar5/syr/)
* [European Commission Guidance on Integrating Climate Change and Biodiversity into Environmental Impact Assessment.](https://climate-adapt.eea.europa.eu/metadata/guidances/guidance-on-integrating-climate-change-and-biodiversity-into-environmental-impact-assessment)
* [IEMA Environmental Impact Assessment Guide to: Climate Change Resilience & Adaptation (2020).](https://www.iema.net/resources/reading-room/2020/06/26/iema-eia-guide-to-climate-change-resilience-and-adaptation-2020)

#### Assessing Significance of Climate Resilience Effects

1. The licensee should demonstrate that the methodology is proportional to the evidence base available to support any assessment. It is worth noting some topics will be able to incorporate the impact of climate change relatively easily, for example, the methodology for assessing impacts of climate change on flood risk is well developed, whereas other topics will be challenged to develop any kind of quantitative assessment.
2. In ascribing the sensitivity of receptors in relation to potential climate change effects, the following factors must be considered as well as the value or importance of the receptor:

* Susceptibility of the receptor (e.g. ability to be affected by a change).
* Vulnerability of the receptor (e.g. potential exposure to a change).

1. Magnitude is based on a combination of:

* Probability, which would take into account the chance of the effect occurring over the relevant time period (e.g. lifespan) of the development if the risk is not mitigated.
* Consequence, which would reflect the geographical extent of the effect or the number of receptors affected (e.g. scale), the complexity of the effect, degree of harm to those affected and the duration, frequency and reversibility of effect.

1. This method is widespread within the climate change resilience assessments carried out by projects, including infrastructure projects and their EIAs, and cities to date.
2. Table 17 presents an example of how likelihood categories can be defined within a project. These are the definitions of likelihood used by Highways England in assessing climate change resilience for its projects. These are provided as an illustration of a potential approach, likelihood categories should be revised or defined by the assessor to ensure they are tailored to the lifespan of the decommissioning project.

Table - Example likelihood descriptions for climate hazards [57]

|  |  |
| --- | --- |
| Likelihood Category | Description (probability and frequency of occurrence) |
| Very high | The event occurs multiple times during the lifetime of the project (60 years), e.g., approximately annually, typically 60 events. |
| High | The event occurs several times during the lifetime of the project (60 years), e.g., approximately once every five years, typically 12 events. |
| Medium | The event occurs limited times during the lifetime of the project (60 years), e.g., approximately once every 15 years, typically 4 events. |
| Low | The event occurs during the lifetime of the project (60 years), e.g., once in 60 years. |
| Very low | The event may occur once during the lifetime of the project (60 years). |

1. There is no legislative definition of ‘significance’ for climate resilience effects, therefore significance needs to be defined on a project-specific basis by the assessor. This reasoning behind assessment of significance should be clearly set out and justified.
2. IEMA’s guide to climate change resilience and adaptation [58] suggests significant effects would typically be reported if the assessment concludes that the function of the project is affected by the reported impacts.
3. The licensee may refer to other assessments (e.g., ONR external hazard assessments undertaken as part of the nuclear safety case) to inform on the potential vulnerability of on-site and off-site receptors to climate risks such as flooding. These other assessments should not be used as a replacement for the climate risk assessment, as the criteria used, and purpose of the assessments will be different.

### Interface with other EIA Topics

1. Climate change will interface with the majority of EIA topics due to the potential for climate change to affect the future baseline, or possible mitigation strategies to be employed in the long term. For example, the future baseline for marine ecology may need to account for increases in sea temperatures as part of the future baseline. In particular, the climate chapter should inform:

* Terrestrial and freshwater ecology.
* Marine ecology.
* Landscape and visual amenity.
* Water resources and flooding.
* Human Health.

### Baseline and Future Baseline

1. Historic climate conditions and prevailing weather conditions should inform the baseline for the current baseline, e.g., in the first 10 years of decommissioning. Historic weather data can be obtained from the Met Office, who provide regional historic weather averages freely.
2. Identifying suitable climate scenarios from which to develop the future baseline should be informed by the most recently published scientific data. In the UK climate projections are developed by the UK Met Office Hadley centre. Where there is concern about very long-term effects (i.e., timescales beyond the end of the century) relating to climate change, then the licensee should be engaging with relevant government agencies (e.g., the Met Office) to obtain additional advice.
3. The [UK Met Office Hadley Centre](https://www.metoffice.gov.uk/research/approach/collaboration/ukcp/index) published their latest set of climate projections for the UK in 2018 (UKCP18). These superseded UKCP09 and should be used as the best available information on UK climate projections.
4. UKCP18 has moved away from the use of low, medium, high emissions scenarios, and instead uses Representative Concentration Pathways (RCPs). These are named according to the concentration of greenhouse gas modelled to occur in the atmosphere in 2100. There are 4 RCPs available in the UKCP18 climate projections: 2.6, 4.5, 6.0 and 8.5. RCP 8.5 is the most conservative, highest-impact scenario.
5. The industry standard, as recommended by IEMA’s guide to climate change resilience and adaptation [58], is to use the most conservative scenario, RCP 8.5, unless there is good reason to use a less conservative scenario. If an assessment is undertaken using a less conservative scenario, then this must be well justified, and the Inspector must be satisfied that this has not led to the potential for significant climate change impacts being underestimated.
6. In defining the baseline and future baseline, the assessment should consider the following climatic factors:

* Extremes in short-term weather events that produce sudden shocks that can have substantial effects on some baseline receptors, such as:
  + heat waves.
  + extreme flooding and freezing conditions.
  + gales and hurricane force windstorms.
  + storm surges along coastlines.
* Extremes in longer-term climatic variability including:
  + Variations in precipitation over one or more seasons resulting in drought or extremely wet conditions.
  + Variations in average temperature.
  + Potential sea level rise affecting flood risk and erosion along coastlines.
  + Potential changes in prevailing wind directions.

### Potential Impacts and Effects

1. The climate risk assessment is not concerned with the potential for the decommissioning project to give rise to climate change effects (this should be addressed through the GHG emissions assessment (refer to Section 12.3).   
   Instead, it focusses on the impact of climate changes on the decommissioning project and its receptors/elements. Table 18 illustrates some typical climate hazards and their potential impacts and effects upon sensitive receptors.

Table - Example of decommission activities, impacts and effects on sensitive receptors

|  |  |  |
| --- | --- | --- |
| Climate hazards with potential to cause impacts on the project | Potential impacts | Potential effects on sensitive receptors |
| Increased frequency and duration of extreme weather events | Reduced site access due to extreme weather events, forced halt to decommissioning activities due to extreme weather; extreme high temperatures. | Health and safety risk to site workers due to storm of extreme high temperatures, damage to onsite infrastructure due to extreme weather events, increased maintenance requirements for equipment and buildings due to accelerated degradation linked to high temperatures. |
| Increased precipitation and intense rainfall | Surface water flooding, soil degradation | Damage to onsite equipment, increase risk of pollution incidents, health and safety risk to site workers |
| Heat waves and prolonged drought | Damage to landscaping, soil degradation, increased pressure on safe material storage | Reduced viability of mitigation strategies, health and safety risk to workers, increased risk of combustible materials overheating |

### Mitigation

1. Mitigation measures proposed to address possible impacts from climate change hazards should be proportionate to the scale of potential effects. For example, where uncertainties remain as to the likely climatic conditions in the later stages of decommissioning, it may be appropriate to monitor anticipated effects until such time as more reliable information becomes available, or the effect starts occurring, to avoid overly onerous measures increasing the cost of the initial phases.   
   This may be subject to the requirements of Regulation 13 if changes to the baseline are considered to be significant.
2. Following the mitigation hierarchy, mitigation measures may typically include:

#### Avoid

1. Ensure that resilience to significant climate risk is built into the design of the decommissioning strategy, for example by:

* Designing site drainage to account for increases in precipitation and extreme rainfall events during the life of the project.
* For coastal sites, including an allowance for storm surges and sea-level rise in the design or on-going management of coastal flood defences [59].

#### Reduce

* Selecting appropriate landscaping to be resilient to temperature changes and extreme weather events.
* Selecting resilient equipment and materials for any temporary works.
* Designing the site layout to maximise shade and soft landscaping, to limit the impact of extreme heat on site operations.

#### Monitor

1. Adaptive management approaches typically recommend monitoring to update findings of the climate risk assessment with the most recent climate data, and to continuously assess the project’s susceptibility to climate hazards as more certainty over future climate scenarios becomes available. Adaptive management could mean keeping the frequency of site vegetation management under review and amending it if in future it becomes clear that the growth season has extended (due to milder wetter winters), rather than pre-emptively increasing the frequency of vegetation management before it is observed to be needed.
2. Climate baseline data should, at a minimum, be updated when new UK Climate Projections data are published by the Met Office, which is approximately every ten years; or if other new significant data becomes available, e.g., if new sector specific guidance on the consideration of climate change is published at a global level.

# 

# Socio-economics

## Scope



1. The scope of the Socio-economic Impact Assessment (SeIA) contained within the ES should be clearly defined and proportionate to the scale of the decommissioning activities. It would typically include an assessment of effects related to direct economic impacts, indirect/wider economic/expenditure impacts, demographic impacts, impacts on housing and private land, impacts on community infrastructure, socio-cultural impacts and distributional effects [60].
2. Typical receptors that should be considered when scoping the SeIA are listed in Table 19.

### Receptor scope

1. The socio-economic receptors outlined in Table 19 are likely to be relevant to decommissioning activities and should be considered as part of an SeIA.   
   The reasons for potentially including these receptors within the scope of the socio-economic assessments are also provided.

Table - Example of decommission activities, impacts and effects on sensitive receptors

| Receptor | Rationale for relevance of receptor to decommissioning activity |
| --- | --- |
| **Private property and housing** (including all tenures and types, shared housing, residential care homes) | There may be property requirements of the decommissioning in terms of land take (both permanent and temporary).  Potential impacts from changes to access to private property and amenity (from effects such as noise and air quality).  Changes in demand for permanent housing and effects on the local housing market |
| **Community land and assets** (healthcare, education, religious facilities, post offices, community centres, village halls and pubs) | Changes population levels as a result of decommissioning activities will impact in demand for community assets and services from changes to population levels.  Potential changes in access to the assets. This includes physical access to the asset as well as changes in walking, cycling and traffic routes which people use to travel to the asset.  Potential changes to amenity of community resources, from other environmental effects such as noise and air quality. |
| **Development land sites** (sites earmarked for developments within the Local Development Plan) | The influence which decommissioning may have on the ability to develop land earmarked in the development plan |
| **Businesses** | Potential changes to economic activity and population numbers resulting in potential reduced footfall for businesses near to decommissioning activities. |
| **Agricultural land holdings** (land which is used for agricultural, horticultural and forestry activities for economic gain such as farms and orchards[[20]](#footnote-21)) | Relevant if there are permanent and temporary property requirements associated with decommissioning activities that requires the use of agricultural land. |
| **Open space and recreation** (common land, village greens, parks and open green space, allotments, sports pitches, and walking and cycling routes, including Public Rights of Way, Long Distance Paths and National Cycling Routes) | Construction activity which may require routes to be diverted or reduce amenity for recreational receptors.  Connectivity to other recreational routes may also be relevant and the impacts of these changes on people’s ability to access places, community infrastructure, goods and other key services. |
| **The local economy** | Decommissioning activities will require labour and will ultimately result in the permanent loss of employment upon completion. Where this labour comes from will influence local, regional or national labour markets as well as changes to economic activity from direct, indirect and induced employment effects. |
| **Tourism** (key tourism attractions and features which encourage people to visit an area | If the existing nuclear development is located near to existing tourism developments, whether decommissioning activity will influence people’s willingness to visit the tourism sites. |

### Spatial Scope

1. There is no set way to determine the spatial scope of an SeIA. The impact area, which represents the spatial scope of the SeIA, will vary according to the type of receptor and its sensitivity to change. The DMRB LA112 [61] provides guidance on how to define an appropriate spatial scope for ‘population’ receptors. While this is primarily applicable to road and other linear infrastructure schemes, the guidance states that the study area should be based on the construction/ operational boundary plus 500m. Where likely effects are identified outside of the 500m impact area, the impact area should be increased accordingly, accompanied by an explanation of the basis for the extension. The spatial scope will vary according to the type of socioeconomic receptor,
2. If the activities proposed as part of the decommissioning are considered unlikely to affect certain types of receptor, it may be appropriate to scope them out of the assessment. This may be because there is no evidence that a type of receptor is present within the impact area and/or the activities will have limited impact due to their nature or distance from the receptor. It may be relevant to scope out impacts on certain receptors during different phases of decommissioning, such as the Care and Maintenance phase, when activity levels on the site are likely to be much lower. However, the Pre-application Report should justify this decision using appropriate information which may include baseline demographic information, the location of receptors and project information.

### Temporal Scope

1. The temporal scope should align with the duration of the decommissioning activities or anticipated changes to the baseline environment. The phasing of work is likely to be a relevant consideration given the scale and duration of potential decommissioning activity.

## Legislation, Policy and Relevant Guidance

### Legislation

1. There is no legislation which specifies the detailed content for a SeIA. Relevant legislation to consider when undertaking a SeIA includes:

* The Energy Act 2004 – this sets out the general duties of the NDA when carrying out functions. Relevant elements of the legislation are listed below.
  + There is recognition that general duties can include anything that is done for the purpose of giving encouragement and support to activities benefiting social or economic life of communities living near the installation, site or facility (Section 5(a) of reference [62]).
  + When the NDA is proposing to enter into a contract with any person to discharge responsibilities, a strategy will need to be produced for the procurement of goods and services. The effects of the implementation of the strategy shall consider the economic life of communities living near the installation, site or facility (Section 6(b) of reference [62]).
  + The NDA is required to create a strategy to carry out its functions.   
    The contents of the strategy must set out how it proposed to give encouragement or support to activities that benefit social or economic life of communities living near designated installations (Section 12 of reference [62]).
* The Equality Act 2010 – this sets the public sector equality duty regarding equality of opportunity and identifies protected characteristics.
* Legislation governing the registration and protection of public footpaths, bridleways, byways open to all traffic and restricted byways[[21]](#footnote-22).
* The Planning Act 2008 – this Act sets out requirements on the compulsory acquisition of land including allotments and common or open space, and its replacement/relocation as mitigation.

1. Where relevant, reference should be made to these pieces of legislation as well as analysis as to how the effects from decommissioning are impacted by the requirements of these pieces of legislation.

### Policy

1. Policy instruments at the national, regional and local level give direction to the assessment parameters and mitigation strategies for SEIA. For example, the National Policy Statement for Nuclear Power Generation (EN-6) requires that that the socio-economic assessment demonstrate “potential pressures on local and regional resources, demographic change and economics benefits”. At a minimum, it would be expected that analysis is provided of relevant aspects of the policy documents listed as follows:

* National policy instruments such as National Policy Statements and NPPF.
* Regional plans and strategies relevant to employment, open space, community facilities, tourism and future developments. Of particular relevance will be the Nuclear Decommissioning Authority Strategy 2016 [63].
* Local plans and strategies such as Local Development Plans, open space strategies and public right of way improvement plans.

1. The Inspector should be satisfied that relevant policies and objectives have informed assessment methodologies and the development of mitigation. Decommissioning activities should be demonstrated to be consistent with the aims and ambitions of the respective policy documents.

## Assessment Methodology

### Guidance

1. There is no UK government guidance that specifies the detailed content required for socio-economic assessments or provides appropriate standards and thresholds for the assessment of significance of effects. The DMRB LA112 [61] provides guidance on how to assess impacts on population and human health receptors. However, this guidance is primarily applicable to road and other linear infrastructure schemes and is a recent publication.
2. For calculating employment effects from decommissioning activities, best practice follows methodologies outlined in the existing HM Treasury Green Book [64], and Homes England (formerly the Homes and Community Agency) Additionality Guide [65].

### Assessing Significance of Socio-economic Effects

1. Effects should be derived from the interaction between the magnitude of impact and the sensitivity of the resources and receptors in accordance with EIA methodology. Professional judgement should be used to assign sensitivities and magnitude of impacts given the lack of formal guidance available. However, the rationale for coming to assessment conclusions should be justified and documented.
2. Criteria for assigning a sensitivity to a receptor or resource should be included within the assessment methodology. How the sensitivity criteria have been applied to receptors should be justified and specific to the type of receptors. For example, there should be different justifications for the rationale for the sensitivity assigned to a community asset compared to a residential property. The following factors should be taken into consideration, but may not all be applicable to each type of receptor:

* How frequently the resource is used (frequently, moderately or infrequently).
* The vulnerability of the receptor and its ability to absorb change.
* Whether there are alternative resources, access arrangements or opportunities available.

1. The licensee should demonstrate a logical, evidence-based approach to assigning magnitude and focus should be on the characterisation and justification for the assigned level of impact. Typically, magnitude of effects may be influenced by:

* The number of receptors affected within the study area.
* The duration over which the impact is experienced.
* The extent to which inequality may change as a result of the impact.

## Baseline and Future Baseline

1. A socio-economic baseline should be established as early as possible in the EIA process and should be used to inform the development of the decommissioning strategy. The baseline should be organised according to the different aspects included within the technical scope of the assessment and should contain sufficient information to provide a profile of the existing population and land uses within the impact area, as well as describe the location, type and use of any socio-economic receptors identified. Characterisation of sensitive groups within the impact areas should be demonstrated. The use of figures and plans to show the location of the receptors in proximity to decommissioning activities is recommended.
2. The level of detail included within the baseline should be proportionate to the assessment being undertaken but should include reference to all receptors that will potentially experience significant effects.
3. It is expected that the baseline information will be obtained from a range of reputable sources such as the Office for National Statistics, Ordnance Survey and local authority data sets. The most up to date data sets should be used at the correct scale. Desk-top data collation should be supplemented with consultation, and preferably a site visit, to inform the baseline position and aid with assessment conclusions.

### Future Baseline

1. Bespoke population projection modelling is not required to establish the future baseline. Instead, long-term plans and national, regional and local authority policy instruments should be reviewed and used to report on key trends that are likely to influence the future profile of the community. The focus should be on understanding how development plans may impact the proportion and geographic distribution of the population and the associated demand for community assets. The emphasis should be on establishing key trends that will change demand rather than quantifying what the change may be.

## Interface with other EIA Topics

1. Consideration should be given to in-combination effects arising from interaction with other environmental topics. Topics likely to create in-combination effects relevant to socio-economics include:

* Health.
* Landscape and visual amenity.
* Air quality.
* Noise and vibration.
* Traffic and transport.

## Potential Impacts and Effects

1. Given the scale and scope of decommissioning activities associated with nuclear power plants, the following types of effects are likely to be reported within the SeIA:

* Increases or decreases in economic activity as a result of decommissioning works, resulting in changes to employment or unemployment. The economic impact analysis is expected to include assessment of the changes to direct, indirect and induced employment and the extent of the wider economic effects, including the geographical extent to which these benefits or disbenefits are likely to realised (i.e. local, regional, national).
* Changes to the population, such as from people moving to the area due to employment opportunities, and the associated decreases or increases in demand for community resources (schools, GPs, accommodation (both temporary and permanent) open space and recreational areas). It is expected that if there is likely to be a change in population numbers, the potential effects on social assets and the profile of the community are also articulated.
* The introduction of construction activities (both on-site and off-site) as part of decommissioning works has the potential to result in a reduction in amenity for receptors. This is due to changes in factors which contribute to amenity value, such as noise, air quality and landscape and visual effects. These individual effects will be reported within their respective chapters of the EIA.   
  Where reported residual significant effects combine to affect a receptor, as a result of receptors being exposed to changes all aspects which contribute to amenity in a particular location, it is expected that this combination of effects are assessed within the SeIA.

## Mitigation

1. Where mitigation measures are proposed, the Inspector should be satisfied that the mitigation hierarchy has been followed:

* Avoidance/prevention – identify ways in which the decommissioning activities avoid or prevent adverse effects on receptors.
* Reduction – identify ways in which the potential effect could be minimised through design interventions and/or management measures.
* Remediation – where there is likely to be a significant change, replacement facilities, access arrangements or other design/management measures are identified.

1. Where effects are mitigated by management measures identified by other technical disciplines, such as noise, air quality and landscape and visual, the mitigation which is being relied upon should be specified.
2. Examples of potentially relevant mitigation are listed below. This is not an exhaustive list as mitigation should be tailored to the specific decommissioning activities.

* Requiring the use of local contractors and local labour to minimise the leakage of economic benefits to the local community.
* Requiring the site operator to make use of locally sourced labour, materials and services as far as practicable.
* Working with community infrastructure providers (such as schools, early childcare centres, GPs and hospitals) as well as the local authority to understand how any change in provision may impact on demand for these services. If there is a shortfall in provision, as a result of decommissioning activities, a commitment to how this will be managed should be made by the organisation undertaking the decommissioning activity.
* Development of a strategy which articulates how the community will benefit from decommissioning, including evidence of how consultation has been used to influence the outcomes. This will be important for realising the potential benefits from utilising local contractors and labour, but also for developing wider enhancement opportunities for communities. It is also consistent with the aspirations of the NDA Strategy [63] which sets out objectives for the NDA to fulfil their socio-economic requirements under the Energy Act (2004) by supporting economic development organisations within communities.
* Replacement or re-provision of land which is permanently required for decommissioning activities. Appropriate compensation from direct loss of property or land.
* Maintenance of access to private properties including businesses.   
  Where access is disrupted, alternative routes provided and publicised to the public to mitigate potential business impacts if a reduction in footfall is likely to occur.

1. The Inspector should be satisfied that the Applicant has identified the mechanism to achieve the desired level of mitigation. For example, if the mitigation is a commitment with the EMP or part of the conditions for EIADR consent.   
   Mitigation that includes third party land or collaboration with other organisations should specify how the desired outcomes will be achieved.

# Health

## Scope



1. Health impact assessment is a multi-disciplinary process designed to identify and assess the potential health effects (both adverse and beneficial) of a project, plan or programme, and to deliver evidence-based recommendations that maximise health gains and reduce or remove potential negative impacts or inequalities. Health is defined as the state of complete physical, mental and social wellbeing and not merely the absence of disease or infirmary [66].
2. Aspects of decommissioning activities which are likely to be relevant to the health assessment include (but are not limited to) effects of:

* Construction activity, such as noise and vibration, air quality and changes in visual amenity.
* The loss or gain of employment and training opportunities, affecting the health consequences of access to employment.
* Increases or decreases in population numbers and associated demand and access to community infrastructure such hospitals and schools.
* Changes to access to formal and informal open spaces affecting opportunities for physical activity and active lifestyles.
* Changes in how people feel about their local community, sense of place and wellbeing.
* The public’s understanding of risks associated with the decommissioning activity and health and wellbeing outcomes as a result of the potential uncertainty and understanding of risk factors.

1. The focus of the assessment should be on quantifying the magnitude, distribution and likelihood of health and wellbeing outcomes (both adverse and beneficial) which are directly attributable to decommissioning works. This is achieved by using a source-pathway-receptor model which is discussed further in Section 5.1.   
   The identified health effects should be clearly defined and proportionate to the scale of the decommissioning activities.

### Spatial Scope

1. The spatial scope should be specific to each type of health pathways and will be driven by the location of the population who may experience health effects due to decommissioning activities. The geographic scope needs to be large enough to sufficiently account for the potential effects from both on-site and off-site activities.
2. The determinants of health, which are defined as the social, economic and environmental factors which determine the health status of individuals or populations [66], are varied and the range of activities associated with the decommissioning activity will differ in their effect and therefore influence on health determinants. It is possible for each health effect to affect people living in different locations; people living in the same location may also experience the same health effect differently.
3. Factors which will influence the geographic extent of likely health impacts from decommissioning activity are listed below.

* Land and property temporarily required for decommissioning activities.
* Changes to the distribution and scale of traffic movements influencing changes in local air quality pollutants, noise levels and road safety risks.
* Communities benefitting from community development initiatives associated with the existing operation of the facility.
* The area affected by employment associated with the existing operation of the facility (e.g. Travel to Work Area).

1. The geographic scope will be influenced by the study areas from other assessments within the EIA including air quality, noise and vibration, socio economics, landscape and visual amenity and traffic and transport. The Inspector will need to be satisfied that the geographic area in which health effects are considers sufficiently covers the full extent of potential effects which the health assessment relies on.

### Temporal Scope

1. The temporal scope should align with the duration of the decommissioning activities and the duration of effects, as per the scope of the EIA determined via the Pre-Application Opinion. The Inspector should be satisfied that the short term, medium term and long-term health effects are considered for each activity, distinguishing between acute and chronic health outcomes. If the duration of potential effects differs depending on the receptor, this should be expressly stated.

## Legislation, Policy and Relevant Guidance

### Legislation

1. The licensee will be required to meet the requirements of health and safety legislation, such as the Health and Safety at Work etc. Act 1974. Some of the minimum requirements will be relevant to managing potential health effects. The Inspector will need to be satisfied that the applicant has demonstrated how health and safety legislation is relevant and how it sufficiently manages some of the identified potential health effects.

### Policy

1. The National Policy Statement for Energy [67] states that ‘where the proposed project has an effect on human beings, the ES should assess these effects for each element of the project, identifying any adverse health impacts, and identifying measures to avoid, reduce or compensate for these impacts as appropriate’.
2. The policy document also recognises that ‘generally, those aspects of energy infrastructure which are most likely to have a significantly detrimental impact on health are subject to separate regulation (for example for air pollution) which will constitute effective mitigation of them’. Therefore, there is recognition that in some circumstances it may be appropriate for direct health impacts to be addressed by other EIA topics (such as noise, air quality, water and traffic and transport) and are subject to separate regulation (such as hazardous waste and substances and exposure to radiation).

## Assessment Methodology

### Guidance

1. IEMA have published ‘Health in Environmental Impact Assessment: A Primer for a Proportionate Approach’ [68] which provides a high-level introduction to considering public health in EIA, but this does not constitute formal guidance.
2. DMRB LA112 [61] provides guidance on how to assess impacts on population and human health receptors. This guidance is primarily applicable to road and other linear infrastructure schemes and is a recent publication, however, can be used as good practice to aid the definition of an assessment methodology.
3. The key points from these guidance documents are outlined within the sections below which explain key components of the assessment methodology.

### Establishing Health Pathways

1. It is important that the Inspector is confident that credible health pathways have been established. These trace the relationships between decommissioning activities and potential health effects. Given the potential range of health determinants, a source-pathway-receptor model should be applied. The model requires all three aspects to be in place for a plausible effect to be considered.   
   In addition, if it is improbable that the effect would occur (for example, as it would require breaking the law to do it), then the potential effect is not considered to be ‘likely’; therefore, it would not give rise to a ‘likely significant effect’. The endpoint of human health analysis should, where possible, describe the predicted health and well-being outcomes.

### Assessing Significant Health Effects

1. The purpose of the assessment section is to investigate each of the identified potential health pathways to determine the plausibility of the health outcome and the significance of the effect, based on the sensitivity of the receptor and the magnitude of change.
2. There are numerous issues which inform sensitivity of the receptor and magnitude of change.
3. To establish the sensitivity (high, medium or low) of the population, an assessment of the relevant characteristics of the population should be demonstrated to determine whether the population or a portion of the population is vulnerable. Relevant characteristics include:

* Children and young people.
* Older people.
* People (and their carers) with existing poor health (physical and mental health), including where this is due to disabilities.
* People who are unemployed, on low incomes, have regular shift worker, have low job stability, or have few progression prospects (including those unable to work due to ill health).
* People living in areas known to exhibit poor economic and/or health indicators.
* People who may experiencing social isolation, discrimination or social disadvantage.
* People experiencing barriers in access to services, amenities and facilities (including barriers experienced by service providers).

1. When considering the magnitude of change, a qualitative scale should be applied and the following factors are likely to be relevant:

* Direction - Whether the effect is positive, negative or neutral.
* Relationship - Whether the effect is a direct relationship (for example, exposure) or an indirect relationship (for example, access to services), affecting physical and/or mental health and wellbeing.
* Severity: the type of health outcome effected (for example, affecting mortality, disease, nuisance, wellbeing), the type of effect (for example, onset of new conditions, affecting existing conditions, change to day-to-day functioning) relative to the baseline conditions.
* Exposure: the degree of exposure which could affect health outcomes (for example, low concentrations over a long period, high concentrations over a short period), variation in exposure based on their proximity to the source and existence of existing regulatory standards.
* Extent: the size of the population likely to experience the health effect or the extent of usage of a particular facility or service.
* Frequency, duration and permanence: the time period over which the effect will occur Resilience: the ability to absorb the effect, as influenced by the population’s adaptability, outlook (views about the decommissioning activities), life stage and ability to access alternatives, how often the population would be affected and how that may change over time, and the extent to which the health effect is reversible.
* Health status: the existing health status and deprivation of the population   
  (see Section 14.4.1 for more information), including conditions that would make the population more susceptible to the change.

1. A matrix is used to categorise effects, using the sensitivity and magnitude criteria and the valuation of significance is based on a qualitative assessment made by a competent person. It is recognised that some stakeholders may hold the view that any effect on health is significant. It is important to note that the assessment focuses on population health, rather than individual health outcomes. Given this, the typical characteristics relevant to significant effects are:

* A strong evidence base (sufficient strength of evidence from sufficiently high-quality studies) that risk factors for a permanent, progressive or irreversible health condition (including health related states or events) would be affected (positively or negatively).
* Permanent sustained or irreversible exposure.
* A substantial change (positive or negative) from the baseline position.
* A change in whether regulatory standards are met or exceeded.
* Majority of the communities affected have high levels of deprivation.
* A large widening or narrowing of inequalities.
* Most people in a community affected (positively or negatively).
* A direct and large contribution (positive or negative) to a recognised health priority.
* A strong and consistent theme of engagement by both health stakeholders and the public on the issue (positive (support) or negative (concern or uncertainty)).

## Baseline and Future Baseline

### Baseline

1. Communities have varying susceptibilities to health impacts as a result of social and demographic structure, behaviour and relative economic circumstance. Therefore, the purpose of the baseline is to identify the general health of the population in areas impacted by decommissioning activities.
2. The baseline information should be obtained from a range of reputable sources such as the National Institute for Health Protection, as well as information collated by the former Public Health England, Scotland or Wales, local authority data and specific data from Clinical Commissioning Groups. The most up to date data sets should be used at the correct scale. Desk-top data collation should be supplemented with consultation inform the baseline position and aid with assessment conclusions. While general health profile data is important to inform consideration of issues affecting stakeholders and ratings of sensitivity, additional baseline data should focus on information that relates to the potential health effects that may arise from decommissioning activities.
3. Data informing public health profiles includes:

* Life expectancy and causes of death.
* Injuries and ill health such as rates of cardiovascular disease and respiratory diseases.
* Behaviour risk factors such as physical activity levels.
* Child health indicators such as physical activity rates and obesity rates.
* Inequality data such as relative deprivation rates.
* Wider determinants of health such as educational attainment, employment rates and the proportion of a population with a limiting long-term health problem or disability.

1. A health baseline should be established as early as possible in the EIA process and be used to inform the development of the decommissioning strategy. The baseline should be organised according to the different aspects included within the technical scope of the assessment and should contain sufficient information to provide a profile of relevant health indicators. The Inspector should be satisfied that enough information is included within the baseline to establish how potential health pathways may impact disproportionately upon communities and sensitive receptors.

### Future Baseline

1. This future baseline should set out the major trends in public health within the defined spatial parameters across the scope of the health assessment.   
   National trends and regional trends should be discussed qualitatively and applied to the spatial scope of the assessment to show the main directions of change. Where appropriate these should be supplemented with further sources on specific issues.

## Potential Impacts and Effects

1. The types of impacts that are likely to be relevant to decommissioning activities, and determining health and wellbeing outcomes, include (but are not limited to) potential changes in:

* Construction activity (including use of construction vehicles) resulting in changes in noise and vibration, emissions to air (including dust and odour), HGV vehicle movements and changes in visual amenity.
* The requirement for a construction workforce, changes in the number and configuration of the permanent workforce and potential training opportunities, affecting the health consequences of access to employment. Information could be obtained from the socio-economics chapter, but the health consequences as a result of these changes should be reported within the health chapter.
* The demand created by the construction workforce and procurement of local goods and services affecting local livelihoods through changes to local economic conditions.
* Increases or decreases in population numbers and associated demand and access to community infrastructure such hospitals and schools which may affect the viability of these services.
* Displacement of, or change in access to, formal and informal open spaces affecting opportunities for physical activity and active lifestyles.
* Changes in how people feel about their local community, sense of place and wellbeing.
* The public’s understanding of risks associated with the decommissioning activity and health and wellbeing outcomes as a result of the potential uncertainty and understanding of risk factors.

1. It is recognised that there is likely to be anxiety and uncertainty associated with the removal, transport and storage of radioactive waste. The Inspector will need to be satisfied that the health impact assessment has demonstrated how the potential risks are managed, even if these are guided by other organisations, and that the health outcomes associated with the potential fear and perceptions of safety have been sufficiently addressed.

## Interaction with other EIA Topics

1. For some impacts, such as air quality, noise, and changes in traffic flows, the outputs of other chapters of the EIA will be used to determine whether there is a predicted health and well-being outcome, and the significance of the effect. For other impacts, additional analysis will be required to determine relevant impacts, including consultation with key stakeholders, including Local Authorities, relevant Clinical Commissioning Groups and primary health care providers and communities.

## Mitigation

1. Where mitigation measures are proposed, the Inspector should be satisfied that the mitigation hierarchy has been followed:

* **Avoidance/prevention** – identify ways in which the decommissioning activities avoid or prevent adverse effects on receptors.
* **Reduction** – identify ways in which the potential effect could be minimised through design interventions and/or management measures.
* **Remediation** – where there is likely to be a significant change, replacement facilities, access arrangements or other design/management measures are identified.

1. Where effects are mitigated by management measures identified by other technical disciplines, such as noise, air quality and traffic and transport, the mitigation which is being relied upon should be specified or referenced.
2. Enhancement opportunities should be identified and reported. It is recommended that there is a separate strategy is developed that identifies how the community will benefit from decommissioning (and / or the provisions in place to manage the withdrawal of existing benefits), including evidence of how consultation and engagement has been used to influence the outcomes.
3. The Inspector should be satisfied that the Applicant has identified the mechanism to achieve the desired level of mitigation. For example, if the mitigation is a commitment within a Health Action Plan or part of conditions of the application. Mitigation that includes third party land or collaboration with other organisations / agencies should specify how the desired outcomes will be achieved and evidence of acceptance of responsibility for actions of other organisations / agencies should be demonstrated.
4. The ongoing technical engagement with local health stakeholders and ongoing assessment of the need for appropriate mitigation (such as through supporting service planning and providing high quality occupational care to the construction workforce) is expected to reduce the potential for adverse health effects.

# 

# Traffic and Transport

## Scope



1. A traffic and transport assessment is often undertaken as part of the EIA process to assess the impact of a development on people travelling on the transport network. Impacts can be associated with changes on or to the transport network. Depending on the location of the decommissioning site, the scope may cover impacts on the public highway network, public rights of way, ports and coastal areas, and local rail connections.
2. The following sections cover the traffic and transport effects that might typically be assessed as part of an EIA for decommissioning works, followed by a short summary of considerations that may be relevant to navigational impact assessment (NIA) in relation to coastal and marine activities associated with decommissioning in section 15.8.
3. Impacts arising from decommissioning works have the potential to cause traffic and transport effects through changes to transport infrastructure, which may be directly caused by physical changes, such as the construction of temporary access routes which may sever an existing right of way or increase the risk of collisions. Impacts may also arise from changes in traffic flows due to changes in the number of vehicles (including Heavy Goods Vehicles (HGVs)) travelling to and from the power station or reactor site either during the decommissioning phases or upon completion. The scope of a traffic and transport assessment will typically consider the following potential impacts:

* Severance of existing transport routes.
* Driver delay and the impact on journey times.
* Pedestrian delay and the impact on journey times.
* Pedestrian amenity.
* Fear and intimidation to users of the transport network (for example people walking besides or crossing roads with increased HGV movements).
* Accidents and safety (related to collisions).
* Hazardous loads (e.g. trucks moving hazardous materials, including radioactive waste and spent nuclear fuel, from the site in the vicinity of other users of the transport network).

1. If transport is not assessed within its own chapter in the EIA, the issues outlined above may be reported in chapters such as population, human health, socio economics, and landscape and visual amenity. The assessment should be proportionate to the scope of the decommissioning activities.

### Receptor Scope

1. Receptors would typically include:

* Walkers, cyclists and horse-riders (WCH)
* Drivers and passengers of motorised vehicles using the local highway network and public transport

1. The determination of receptor sensitivity is based on the criteria of value, adaptability and tolerance. Given that all persons are deemed to be of equal value, sensitivity to changes in transport conditions is focussed on vulnerable user groups who are less able to tolerate, adapt to or recover from changes. Therefore, receptor sensitivity may be high where there is vulnerable user activity in a particular area, for example adjacent to a school or in an area with an existing accident issue, but low in an industrial area with small numbers of non-vulnerable movements.

### Spatial Scope

1. The spatial scope of the traffic and transport assessment should cover the area within the application limits (including new highway infrastructure and existing infrastructure around the site that will be subject to physical changes), together with the area over which the project is expected to have influence.
2. When considering marine navigation, the spatial scope should extend to the planned sailing routes to and from the facility, including the ports and/or harbours which vessels transporting decommissioned materials will visit.
3. The study area should be proportionate to the works and the likely potential for significant effects. If the anticipated impacts on the road network and/or vessel navigation routes are expected to be wider than the study area, or if the site is in a location where provisions for WCH are unlikely to be affected, then the study area should be adapted accordingly. The spatial scope should include areas of works undertaken at all stages of decommissioning that are scoped into the EIA.

### Temporal Scope

1. The licensee should demonstrate due consideration for the various decommissioning phases and the peak activity levels on the site and surrounding road networks. A judgement should be made by the licensee as to the potential risk of traffic movements giving rise to significant effects at sensitive receptors during peak activity, in order to build a proportionate assessment scope.

## Legislation, Policy and Relevant Guidance

### Legislation

1. There is no national or international legislation relevant to the assessment of traffic and transport impacts. Nonetheless, the Carriage of Dangerous Goods and Use of Transportable Pressure Equipment Regulations 2009 is relevant for the transport of radioactive wastes and radioactive materials.
2. Data from transport models are often required to inform detailed assessments of other legally protected environmental topics, such as air quality. Where this is the case, due regard should be paid to the legal limit values and requirements for those topics, discussed in the relevant chapters of this guidance.

### Policy

1. Relevant policy includes:

* National Policy Statement for Energy [67].
* The NPPF 2019, Section 9 –
  + Paragraph 102 states that transport issues should be considered from the earliest stages of plan-making and development proposals, so that: ‘d) the environmental impacts of traffic and transport infrastructure can be identified, assessed and taken into account – including appropriate opportunities for avoiding and mitigating any adverse effects, and for net environmental gains...’
  + Paragraph 108 notes that in assessing sites it should be ensured that: ‘c) any significant impacts from the development on the transport network (in terms of capacity and congestion), or on highway safety, can be cost effectively mitigated to an acceptable degree...’
  + Paragraph 109 states: ‘Development should only be prevented or refused on highways grounds if there would be an unacceptable impact on highway safety, or the residual cumulative impacts on the road network would be severe.’

1. Local authorities will also typically have their own Local Plans and Transport Strategies, which set out policy considerations relevant to the transport assessment. The licensee should demonstrate that these have been reviewed in the relevant site context.

## Assessment Methodology

### Guidance

1. All traffic and transport assessments undertaken as part of the EIA should be prepared in accordance with IEMA guidelines for the Environmental Assessment of Road Traffic published by the Institute of Environmental Assessment in 1993   
   (now IEMA) [69].
2. Supporting guidance is available from Highways England [61].   
   This document provides supplementary guidance on the assessment of pedestrian, cyclist and equestrian effects, to be considered as appropriate.

### Assessing Significance of Traffic and Transport Effects

1. The traffic and transport assessment will require professional judgement to determine the potential for significant effects using a matrix in line with EIA methodology. Unless the predicted impacts of the decommissioning project on people using the transport, network are judged to be very minor, the traffic and transport assessment should be based on detailed modelling of the anticipated changes to the road network and marine navigation arising as a result of the works. The licensee should provide sufficient justification for modelling not being undertaken.
2. The intention of the traffic and transport assessment is to determine the impact of changes to the road network on vulnerable groups, including walkers, cyclists and horse-riders, and to a lesser extent, drivers and motorcyclists.
3. The traffic and transport assessment should consider different scenarios to determine the likely impact of changes to the baseline over the decommissioning works:

* The baseline scenario.
* The future baseline without the project (do nothing scenario).
* The future with the project (do something scenario).

1. These are discussed in further detail in Section 15.4.1. The licensee should justify the selected number of future assessment years, and these should be appropriate to the temporal scope of the EIA.

## Baseline and Future Baseline

1. The development of the baseline should consider:

* Accident and collision data from within the study area.
* The type, availability and capacity of public transport provision within the study area.
* The highway network.
* The type, location and extent of WCH provision (e.g. public rights of way) within the study area.
* The frequency of use of the WCH provision within the study area.

1. Where required to inform the baseline scenario and assessment conclusions in the absence of available information, targeted consultation and surveys should be undertaken by the licensee to obtain data. Where this is not possible, national data may be available to inform the baseline for accidents and collisions, for example.
2. The baseline should represent a realistic existing case scenario, and as such the licensee should utilise recent data representing peak traffic flows and user counts for all transport modes. Typically, this would be achieved by avoiding school holidays, weekends and bank holidays for any surveys required, when peak use is likely to be below average. Industry standard best-practice should be followed in deciding the timing of any surveys undertaken.

### Future Baseline

1. In the Future Baseline scenario background traffic levels are projected to increase in line with nationally published forecasts, regardless of potential changes in traffic from the decommissioning project. Therefore, it is typical for a traffic and transport assessment to forecast background traffic growth for a number of future scenarios as part of the future baseline. For decommissioning, the licensee should demonstrate that the selected design years align with the peak activity levels, to represent the ‘worst case scenario’ likely to give rise to the most significant adverse effects. This should be set according to best available modelling data and professional judgement as to the certainty with which assumptions about future decommissioning phases can be made.
2. Nationally published background traffic growth factors are published by the Department for Transport periodically and should inform development of the future baseline.
3. Currently, Road Traffic Forecasts 2018 (RTF18) present the latest forecasts for traffic demand, congestion and emissions in England and Wales up to the year 2050 [70]. These are produced using the Department for Transport’s National Transport Model.

## Interface with other EIA Topics

1. Traffic and transport will inform not only the assessment of transport network user impacts, but will often also provide data to support the following EIA topics:

* Socio economics.
* Health.
* Air quality.
* Noise and vibration.

## Potential Impacts and Effects

1. Significant effects upon traffic and transport receptors will vary according to the location of the decommissioning project and the associated infrastructure requirements offsite, which will be unique to each project.
2. Due to the isolated nature of many existing power stations, the need to move equipment and large volumes of material on rural roads may generate significant disruption and severance to local communities during peak work phases.
3. Table 20 provides examples of typical decommission activities, the potential impacts arising from those activities, and the possible effects on sensitive receptors.

Table - Example of decommission activities, impacts and effects on sensitive receptors

|  |  |  |
| --- | --- | --- |
| Typical decommissioning activities with potential to generate impacts | Possible typical impacts arising from these activities | Possible effects on sensitive receptors |
| Movement of non-hazardous materials and vehicles | Increased numbers of vehicles (including HGVs) using the public highway | Changes to severance, walking and cycling amenity, walking and cycling delay, fear and intimidation, road safety, and highway network delay. |
| Movement of hazardous materials | Risk of major hazard accident resulting in spillage or leak of toxic material. | To be assessed via a separate analysis which describes the potential environmental effect of any spillage and the recovery procedures that would be adopted. |
| Movement of workers to and from site | Increased patronage of public transport services  Increased numbers of vehicles using the public highway | Changes to severance, walking and cycling amenity, walking and cycling delay, fear and intimidation, road safety, and highway network delay. |
| Temporary decommissioning traffic works including single lane working, diversions and changes to walking and cycling provision | Changes to road layout or functionality  Changes to routings of people walking and cycling. | Changes to severance, walking and cycling amenity, walking and cycling delay, fear and intimidation, road safety, and highway network delay. |

## Mitigation

1. Mitigation measures to avoid, minimise and reduce effects from transport would typically include, in order of preference:

### Avoidance and Prevention

* Identify access route options to and from site that avoid introducing or worsening severance.
* Plan appropriate highway diversionary routes that avoid reducing provision for highway users and WCHs or increasing journey times.
* All physical changes to transport infrastructure to be designed in such a way to take cognisance of all travellers including WCH.

### Reduction

* Develop Construction Traffic Management plans and Workforce Travel Plans to ensure best practice is delivered during each phase of works.
* Plan on-site traffic routes provided across the works for use by construction vehicles, where appropriate, to minimise the need to use the public highway. To maximise the use of such routes, site access points positioned accordingly, accounting for any essential safety considerations in the design and construction of appropriate access points.
* Limit access routes, as far as reasonably achievable, to the strategic and trunk road network and main roads on the local road network. For other local roads, such as town/village centres and high streets, access to be restricted but may at times be necessary; for instance, to enable transport or delivery of locally sourced materials.
* Prohibit access along residential roads. In instances where access on lower class local roads and roads within residential areas is required, access to be managed.
* Place timing restrictions on movements of construction and deconstruction traffic, particularly HGVs, to avoid peak hours such as school drop off and pick up times, and commuting times.

## Navigation

### Scope

1. Where the decommissioning works are expected to have impact on the movement of sea and coastal vessels, for example, if import/export of materials and equipment is also planned to be undertaken via sea, a NIA is typically required as part of the EIA.
2. Changes in vessel traffic flows may be a direct or indirect impact arising from the decommissioning works, due to changes in the number of vessels or barges navigating the waters in the vicinity of the power station and the shipping lanes and ports being used for handling materials associated with the decommissioning phases, or upon completion. For example, if waste is to be transported by barge/vessel from the site to another port, then consideration would need to be given to the potential impact of these movements on the existing and potential future receptors located along the route(s) (e.g., fishing vessels, wind farms etc) and existing and planned receptors at the port(s) (e.g., vessel movements, existing berth facilities).
3. If waste is to be transported from the site to a port/port via land for onward shipment, then the impact on navigation within the port(s) will only likely require assessment if the existing facilities at the port will require amendment/upgrading to handle the waste and/or the waste shipments will increase the frequency of vessel movements within the port i.e., there is a change to the status quo.
4. The scope of the NIA will typically consider the following potential impacts:

* The impact of decommissioning and proposed vessel movements, on:
  + Current commercial navigation, including fishing vessels.
  + Marine leisure activities using small craft, such as sailing dinghies, diving vessels, etc.
  + Interfacing ports and harbours.

### Receptor Scope

1. Where applicable, marine navigation receptors, such as commercial and recreational marine vessels, commercial shipping lanes, offshore anchorages, offshore pipe and cable routes, coastal Ministry of Defence firing ranges, fishing grounds and offshore wind farms may also be considered sensitive receptors.
2. A receptor can only be sensitive if there is a pathway through which a hazard can be transmitted between the source activity and the receptor. When a receptor is exposed to a hazard, the overall sensitivity of the receptor is determined, which is a process which will incorporate a degree of subjectivity.

### Legislation and Policy

1. The MMO is an executive non-departmental public body, set up under the Marine and Coastal Access Act (2009), which regulates marine activities.   
   Its responsibilities cover any section of coastline affected by the decommissioning works. The MMO is the licencing body for marine construction activities.
2. The Maritime and Coastguard Agency (MCA) has been created to prevent the loss of life on the coast and at sea. The MCA is a Statutory Consultee in reviewing plans for marine works and is routinely consulted on marine licence applications in relation to navigational safety. It is recommended that the proposed methodology for the NIA is agreed with the MCA before commencing the assessment.
3. The Merchant Shipping Act 1995 empower the Corporation of Trinity House, who has a statutory duty as the General Lighthouse Authority for England, Wales, the Channel Islands and Gibraltar. One of its main functions includes provision and maintenance of aids to navigation, 'signs of the sea', from lighthouses to radar beacons.
4. The operation and management of marine activities at a marine facility connected to a power station requires the establishment of a competent authority, such as a Navigation or Harbour Authority. For decommissioning, it is likely that an existing Harbour Authority would need to review its responsibilities and if necessary, have its responsibilities changed by applying for a Harbour Revision Order.   
   Consultation with the MMO will be necessary for the licensee to determine what would be required for the decommissioning project under assessment.
5. For port facilities, a Navigation or Harbour Authority would normally be responsible for the marine and navigational safety of the facility. They should be consulted as part of the NIA.

### Assessment Methodology

#### Guidance

1. The [Methodology for Assessing the Marine Navigational Safety & Emergency Response Risks of Offshore Renewable Energy Installations,](https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/372597/NRA_Methodology_2013.pdf) which was produced by the MCA, is a useful reference when developing NIAs. It also provides guidance on assessing the tolerability of risks identified as part of the NIA process.

#### Assessing Significance of Effects

1. The intention of the NIA is to determine the impact of planned vessel navigation associated with the decommissioning works on groups, including commercial vessels, leisure craft and offshore utilities (e.g., offshore wind, cables etc).
2. For the NIA, the scenarios outlined in Section 15.3.2. are also considered.   
   The known and likely hazards (health and safety, operational and business) are identified and their impacts on each of the identified receptors are evaluated. Mitigation measures are developed to eliminate or reduce the impacts and the residual risks associated with the planned activities is then determined by a competent person using a matrix of magnitude and sensitivity in line with EIA methodology.

### Baseline and Future Baseline

1. When developing the baseline for the NIA, existing vessel frequency data should be obtained, while other planned marine developments should also be identified to assess how these may interact with the decommissioning of the power station or reactor.

### Mitigation

#### Avoid

* Prepare detailed works schedules and shipment schedules and issue them to local and regional interfacing ports for comment, to ensure planned activities and movements do not occur simultaneously with other operations.
* Maintain radio contact with local harbour authorities during course of works and/or shipments.
* Notify marinas likely to be affected by decommissioning activities.
* Ensure planned works and/or shipments are coordinated to avoid the need for vessels to be anchored away from the facility.

#### Reduce

* Place timing restrictions on vessel movements to avoid peak periods for shipping and fishing activities.

# Radiological Effects

## Scope



1. Radiological impacts are a key aspect associated with the decommissioning of any nuclear power station or reactor, both external radiation from facility shine and from planned off-site releases of radioactive substances should be considered; as should the implications of any residual radioactivity that is to be left on site.   
   It should be noted that although decommissioning does not automatically mean that there is a reduction in environmental impact from radiological effects, the hazard from radioactivity on the site is significantly reduced following defueling.
2. The radiological impact assessment should consider the potential off-site radiation doses to members of the public (in relation to the legal dose-limit and source and site-related dose-constraints), and also the potential for ionising radiation impacts to populations of non-human biota (NHB). This is primarily related to the environmental regulator’s permit for off-site discharges of radioactivity but may also need to consider ONR’s permissioning which considers faults and consequences (including off-site doses) and activities under The Radiation (Emergency Preparedness and Public Information) Regulations 2019 (REPPIR).
3. During the operational and decommissioning phases of the facility, potential environmental impacts should be appropriately assessed and regulated by the relevant environmental regulator, and therefore considerable information should be available for use in describing the potential radiological impacts associated with the decommissioning process; for example, information related to emissions to the environment and recognised pathway-receptor linkages which will require (re)consideration as part of the decommissioning-specific EIA.
4. The EIA for the decommissioning project will utilise findings from other assessments that are required as part of the nuclear Safety Case or part of the application under Radioactive Substances Regulation (RSR) requirements. A key linkage with the Site-wide Environmental Safety Case (SWESC), as described in the Management of radioactive waste from decommissioning of nuclear sites: Guidance on the Requirements for Release from Radioactive Substances Regulation, is expected.
5. The Radiological Impact Assessment should not normally require new work but should provide sufficient information from RSR permits etc to enable the assessment to be meaningful and support the Inspector’s decision making.

### Receptor Scope

1. The Radiological Impact Assessment should identify groups of individuals (who comprise candidates for the Representative Person) and populations of NHB whose location and behaviour are likely to mean they would receive the highest radiological doses.
2. Typical receptors for consideration in the radiological assessment include the human age groups of adult, child and infant, for instance:

* Residents in local properties (all age groups) and workers on neighbouring land and sites (adults only).
* High-rate consumers of local produce from the land (all age groups).
* High-rate consumers of freshwater and sea foods (all age groups).
* People who spend large amounts of time in or around freshwater or marine environments affected by radioactive discharges (all age groups).

1. There may also be a requirement to assess the future exposure potential to members of the public from contamination of the land (soil or groundwater) under a range of different site evolution scenarios.
2. Populations of NHB should also be consider using reference organisms / Reference Animals and Plants approaches to represent types of animals and plants present in ecosystems of intertest, including, but not necessarily limited to, sites of particular ecological significance.
3. Information on candidate Representative Person groups can be sourced from Habit Survey Reports, which are performed and regularly reviewed for nuclear licenced sites. These contain information on current public occupancies and activities and local food consumption rates around sites. Assumptions about future activities may however have to be made.

### Spatial Scope

1. The geographical area for the assessment of radiological effects on members of the public and on populations of NHB should extend from the Decommissioning Site for as far as is necessary to take account of those likely to be most exposed.

### Temporal Scope

1. Radiological Impact Assessment should cover all phases of the decommissioning works scoped into the EIA, as agreed through the Pre-Application Opinion.

## Legislation, Policy and Guidance

1. The primary pieces of legislation, covering radiation dose limitation and environmental protection associated with decommissioning involving radioactive substances, are as follows:

* COUNCIL DIRECTIVE 2013/59/EURATOM of 5 December 2013 laying down basic safety standards for protection against the dangers arising from exposure to ionising radiation, and repealing Directives 89/618/Euratom, 90/641/Euratom, 96/29/Euratom, 97/43/Euratom and 2003/122/Euratom.
* Nuclear site licensing.
* Environmental Permitting (England and Wales) Regulations 2016/Environmental Authorisations (Scotland) Regulations 2018.
* The Radiation (Emergency Preparedness and Public Information) Regulations 2019 (REPPIR).
* Ionising Radiations Regulations 2017.
* The Convention for Protection of the Marine Environment of the North-East Atlantic (the ‘OSPAR Convention’).
* The Convention of Environmental Impact Assessment in a Transboundary Context (the ‘Espoo Convention’).

1. The current legislative measures relevant to the protection of wildlife from radiation are detailed within the RIFE reports (see below; for example, RIFE 24).   
   In summary, assessment of the potential impacts to wildlife are captured within the EPR/EASR environmental permitting/authorisation process.

### Policy

* National Policy Statement for Nuclear Power Generation (EN-6) (NPS EN-6).
* UK Strategy for Radioactive Discharges (2009).
* The Decommissioning of the UK Nuclear Industry’s Facilities, Statement of the UK Govt and devolved administrations (2004).
* Integrated Waste Management - Radioactive Waste Strategy. NDA (2019).

### Guidance

* NS-TAST-GD-024 - Management of Radioactive Material and Radioactive Waste on Nuclear Licensed Sites [13].
* NS-TAST-GD-026 – Decommissioning [14].
* NS-TAST-GD-083 Land Quality Management [16].
* Regulatory Expectations for Successful Land Quality Management at Nuclear Licensed Sites. ONR and Environmental Regulators (2014).
* Principles for the Assessment of Prospective Public Doses arising from Authorised Discharges of Radioactive Waste to the Environment; Radioactive Substances Regulation under the Radioactive Substances Act (RSA-93) or under the Environmental Permitting Regulations (EPR-10). UK environment agencies, PHE and FSA (2012).
* Management of radioactive waste from decommissioning of nuclear sites: Guidance on requirements for Release from Radioactive Substances Regulation. Version 1.0: July 2018. Scottish Environment Protection Agency, Environment Agency and Natural Resources Wales.
* Statutory Guidance to the Environment Agency Concerning the Regulation of Radioactive Discharges into the Environment, DECC (2009).
* Environment Agency, 2009a. Habitats assessment for Radioactive Substances. Science report: SC060083/SR1, May 2009. Environment Agency, Bristol.
* Other RSR technical and regulatory guidance of the relevant environmental regulator.
* Standards, guides and other publications as relevant of the International Atomic Energy Agency (IAEA) and International Commission on Radiological Protection (ICRP).

## Assessment Methodology

1. The assessment should follow the standard source-pathway-receptor methodology. The ES should clearly demonstrate that the following steps have been undertaken:

* Identification of source terms.
* Identification of exposure pathways to the public and to populations of NHB.
* Identification of representative person and reference organisms / Reference Animals and Plants.
* Assessment of dose to representative person, and dose rates to populations of NHB.
* Comparison of doses/dose rates with the public limit, constraints, and reference levels and other benchmarks as appropriate.
* Assessment of magnitude of impact and the significance of effects.

1. Numerical modelling software packages are routinely used in the assessment of radiological impacts. Commonly used modelling packages include, as example, PC-CREAM (for impacts on humans) and ERICA (for impacts on non-human species). The choice of modelling approach should be explained and justified in the ES.
2. When determining the significance of effect, the criteria set (e.g., major, moderate, minor) will have to consider the public limit, constraints, and reference levels and other benchmarks as appropriate.

## Baseline and Future Baseline

1. The existing levels of radioactivity in the local environment and doses arising from existing operations and other sources of anthropogenic radioactivity in the environment should be provided (retrospective dose assessment).
2. Data on radioactivity in the environment and public radiological exposure around nuclear facilities can be found in the Radioactivity in Food and the Environment (RIFE) series of reports. The reports include measurements of external radiation dose-rates, concentrations of radionuclides in environmental material and biota, and dose assessments, and provide a valuable source of independent baseline data. Operators are also likely to have their own environmental monitoring and assessment data, and this should also be presented.

## Project Impacts and Effects

1. Site-specific impacts will vary according to the nature of the chosen decommissioning strategy and site location and context and may include radiation exposure from facility shine, from radionuclides discharged to the environment and from residual radioactivity in the ground.
2. Impacts affecting members of the public and non-human biota could arise from the following examples of decommissioning activities:

* Management of spent fuel ponds.
* Operation of any active effluent treatment plant (existing or temporary).
* Management of radioactive waste accumulated on site.
* Treatment of radioactive waste on site for interim storage or disposal.
* Decontamination of radioactively contaminated buildings and equipment.
* Dismantling of radioactively contaminated buildings and equipment.
* Treatment of contaminated soil and ground water.
* Dredging of offshore sediments (if required to dismantle cooling water infrastructure).
* Management of radioactive contamination in situ, whether as an interim measure or as a final disposal solution and onsite disposal for a purpose.

1. Typical sources and types of radiological contaminants that may arise from activities likely to require assessment (as appropriate to the scope of the decommissioning phase under assessment) may include:

* Storage of decommissioning wastes / spent fuel close to site boundary leading to an increase in off-site external radiation dose-rates.
* Decommissioning activities and associated aerial and liquid discharges.
* Storage and treatment of radioactive waste and associated aerial and liquid discharges.
* Earthworks and management of buried structures/pipelines, potentially leading to contamination migration.

1. The Materials and Waste section [refer to Section 17] provides more detailed consideration of these activities. Also note these activities will require permissioning under the licensing regime and that the licensee will need to demonstrate that the doses associated with such activities are ALARP. Equally, activities involving aerial or liquid radioactive discharges or disposals will require authorisation under the relevant environmental regulator and demonstration that the doses associated with such activities are ‘as low as reasonably achievable’ (ALARA).

## Interface with other EIA Topics

1. Consideration should be given to intra-project effects arising from interaction with other environmental topics. The likely impacts may be reported in the relevant EIA Chapters, and the effects on sensitive receptors considered in the cumulative effects assessment. Likely interactions with other EIA topics relevant to radioactivity and exposure to ionising radiation will be dependent upon the settings of the site in question, but may include:

* Terrestrial and freshwater ecology.
* Marine ecology.
* Soils, geology and contaminated land (including groundwater).
* Health.
* Materials and waste.
* Transport.

## Mitigation

1. The following requirements of avoid/reduce and monitor should be considered by the licensee / licensee to ensure that radiation doses are also considered from a safety perspective and also relevant to the EPR permit or EASR authorisation applicable to the decommissioning project and are key aspects of the Waste Hierarchy. Consideration of these themes will be required over the lifetime of the project, and in relation to all radioactive wastes generated during decommissioning. The requirements are core considerations in relation to the concepts of Best Available Techniques (BAT) and Best Practicable Means (BPM) (dependent on the site’s location within the UK), which should be considered at all stages of the decommissioning process to ensure that emissions and environmental impacts are prevented or reduced as far as is reasonably practicable.

### Avoid and Reduce

1. Demonstration of BAT / BPM, such that radiation doses to members of the public are (ALARA) such as:

* Gaseous and aqueous emissions are minimised, subsequently treated and abated to reduce as far as possible contamination of the environment and radiological exposure of the public and populations of NHB.
* Controls should be in place to minimise release of contaminated particulates to atmosphere and solids entrained in liquid discharges.
* Controls are sufficient to ensure that dose and risk requirements relative to leaving contamination on site are met.
* Minimising off-site external radiation dose-rates (facility shine) via appropriate shielding (whether associated with the package, building or other features such as earth bunds).

### Monitor

1. Radiation monitoring and characterisation, of both external radiation and contamination of a facility or land, should be an integral feature of the decommissioning plans, and should be performed in order to demonstrate that BAT / BPM are being applied. Examples include:

* Intrusive and non-intrusive site investigations and facility and land characterisation.
* Groundwater sampling and analysis.
* Characterisation of retrieved waste.
* Monitoring of worker radiation doses.

1. Environmental monitoring by the site operator will be a key requirement of the site’s EPR permit / EASR authorisation, which will make generic reference to monitoring requirements, and may also feature a separate specification covering the regulator’s monitoring requirements (which may include off-site sampling/measurements). Further information can be found in the RIFE reports. The ES should utilise this information. Examples include:

* Site perimeter external radiation dose-rate monitoring.
* Site perimeter radioactivity in air monitoring.
* On-site and off-site sediment/vegetation sampling and laboratory analysis.
* Off-site particulates-in-air monitoring and laboratory analysis.

# Material Resources and Waste

## Scope



1. The use of material resources and generation of waste should be considered inherent to a successful decommissioning strategy. The application of the Waste Hierarchy (avoid, reduce, reuse, recycle), proximity principle, and the application of circular economy principles should be considered best practice, and a key step in minimising the environmental impacts of the decommissioning project. The licensee should demonstrate through the decommissioning project that these principles have been followed as far as is reasonably practicable, in an integrated way considering Directive waste (‘conventional waste’), radioactive waste, and where relevant spent fuel.
2. The scope of the Material Resources and Waste Impact Assessment contained within the ES should be clearly defined and be proportionate to the scale of the decommissioning activities. Furthermore, the timing of decommissioning should be understood in relation to material resource requirements and waste arisings.
3. The waste management hierarchy (implemented in the UK through the Waste Regulations 2011) and relevant authorisation under Radioactive Substances Regulations (RSR) and the licensing regime, illustrate the waste management options according to what is best for the environment.
4. It gives top priority to preventing waste in the first place. When waste is created, it gives priority to preparing it for re-use, then recycling, then recovery, and last of all, disposal (e.g., landfill). The waste hierarchy ensures that waste is dealt with in the following order of priority:

* Prevention.
* Preparing for re-use.
* Recycling.
* Other recovery (for example energy recovery).
* Disposal, only as a last resort.

### Receptor Scope

1. Typical receptors that would be considered in the materials and waste assessment include:

* **Materials:** The scope should determine whether the amount of material resource(s) required by the works would impact upon the immediate and (in the case of primary materials) long-term availability and demand for materials locally, regionally, nationally or even internationally. For instance, is there the potential for works to deplete local gravel/sand (for concrete) supplies to the extent that other services may be unable to procure these. Secondary to this, substantial material resource use results in the depletion of natural resources and adversely impacts the environment.
* **Waste:** Particularly, the capacity, suitability and availability of appropriate waste management infrastructure (landfill, incineration, waste transfer stations, composting facilities etc.) to manage the waste generated. Landfill is a finite resource, and hence there is a continued need to expand existing and develop new facilities. This requires the depletion of natural and other resources which, in turn, adversely impacts the environment.

### Spatial Scope

1. The spatial scope of the assessment should be based on professional judgement and informed by best practice guidance. Typically, one would start within the site boundary (this is where waste is created and impact is generated) and then expand to a secondary study area, which needs to be of sufficient size to identify appropriate material resource locations and waste management locations (with capacity to accept the waste). Typically, within 10km from the site for core construction materials, or inert waste could be considered locally available, but could be greater distances for other types of material and waste. One example would be if a specialist hazardous waste facility, or materials supplier, is required. This is particularly where radioactive waste disposal solutions are required.

### Temporal Scope

1. The temporal scope should cover all phases of the decommissioning project that are scoped into the EIA as per the pre-application opinion. In order to deliver a proportionate assessment, it may be relevant to assess only the peak activity years where decommissioning activities are likely to generate large amounts of material resource demands or waste and / or higher activity waste streams, and where relevant spent fuel.
2. For decommissioning activities, an important aspect that should be considered in the assessment is the long-term implications on material usage and landfill / disposal capacity. Should a landfill have significantly less capacity to receive local waste as a result of the amount of waste sent to that facility by the decommissioning project, this could constitute a significant environmental effect in EIA terms. That landfill may then close prior to decommissioning works ending, requiring alternative sites to be used. Therefore, the scope of the assessment may need to consider multiple locations, over time.

## Legislation and Policy

### Legislation

1. The following international legislation is applicable:

* COUNCIL DIRECTIVE 2013/59/EURATOM of 5 December 2013 laying down safety standards for protection against the dangers arising from exposure to ionising radiation, and repealing Directives 89/618/Euratom, 96/29/Euratom, 97/43/Euratom and 2003/122/Euratom.
* The Nuclear Installations Act 1965.
* Ionising Radiations Regulations 2017.
* Waste Framework Directive (2008/98/EC).
* Landfill Directive (1999/31/EC).
* Hazardous Waste Directive (91/689/EEC).

1. National legislation:

* Environmental Protection Act 1990.
* Waste Batteries and Accumulators Regulations 2009.
* The Waste (England and Wales) Regulations 2011 (as amended).
* Environmental Permitting (England and Wales) Regulations 2016 (as amended).
* Controlled Waste (England and Wales) Regulations 2012.
* Hazardous Waste (England and Wales) Regulations 2005 (as amended).
* Environmental Authorisations (Scotland) Regulations 2018.
* The Waste (Scotland) Regulations 2012.

### Policy

1. The following UK Policy is also likely to be relevant, depending on the location:

* Overarching National Policy Statement for Energy (EN-1) [67].
* UK Government’s 25 year Environment Plan.
* UK Government Environment Bill.
* Construction 2025 – Industrial Strategy for Construction.
* Government and Industry in Partnership, 2013.
* The Waste Management Plan for England 2013.
* The Waste Prevention Programme for England 2013.
* NPPF Framework 2019.
* National Planning Policy for Waste 2014.
* DEFRA, 2018 Resources and Waste Strategy for England.
* Scottish Government Circular Economy Bill.
* Towards Zero Waste, One Wales: One Planet.
* The Decommissioning of the UK Nuclear Industry’s Facilities, Statement of the UK Govt and devolved administrations (2004).
* Policy for the Long-Term Management of Solid Low-Level Radioactive Waste in the United Kingdom (2007).
* UK Strategy for the Management of Solid Low-Level Radioactive Waste from the Nuclear Industry (2016).
* Integrated Waste Management – Radioactive Waste Strategy. NDA (2019).

1. Regional and local plans will also contain policies specific to a local authority area which decommissioning projects may be required to adhere to, along with provision of mineral safeguarding sites and an outline of explicit requirements for material use and waste handling. These should be referred to as well as the above.

## Assessment Methodology

### Guidance

* [IEMA’s guidance on Materials and Waste in EIA](https://www.iema.net/engage/policy-horizon/circular-economy/materials-and-waste-in-eia) [69] provides a comprehensive guide for undertaking a materials and waste impact assessment. The guidance outlines the significance criteria as shown in Section 17.3.2. Additionally, the following guidance may be referred to as good practice.
* [DMRB Volume 11 Section 3 Part 13 LA 110 Sustainability and Environment Appraisal. Material assets and waste](https://www.thenbs.com/PublicationIndex/documents/details?DocID=327435).
* [Contaminated Land Applications in Real Environments (CL:AIRE) Definition of waste: Development Industry Code of Practice v2 2011](https://www.claire.co.uk/projects-and-initiatives/dow-cop).
* [Construction Code of Practice for Sustainable Use of Soils on Construction Sites (2009)](https://www.gov.uk/government/publications/code-of-practice-for-the-sustainable-use-of-soils-on-construction-sites).
* [Site Waste Management Plans – Guidance for Construction Contractors and Clients Voluntary Code of Practice (2004).](https://www.thenbs.com/PublicationIndex/documents/details?DocId=267008)

1. In terms of radioactive waste management attention should be given to:

* NS-TAST-GD-024 - Management of Radioactive Material and Radioactive [13].
* Waste on Nuclear Licensed Sites. ONR (2019).
* NS-TAST-GD-026 - Decommissioning [14].
* Principles for the Assessment of Prospective Public Doses arising from Authorised Discharges of Radioactive Waste to the Environment; Radioactive Substances Regulation under the Radioactive Substances Act (RSA-93) or under the Environmental Permitting Regulations (EPR-10). UK environment agencies, PHE and FSA (2012), the Guidance on Requirements for Release of Radioactive Substances Regulation (the GRR).
* The management of higher activity radioactive waste on nuclear licensed sites. Joint regulatory guidance (2015).

1. It is expected much of the radioactive waste management needs will have been collated in the Waste Management Plan (WMP) requirement under the GRR. It should also be noted that the Site-Wide Environmental Safety Case (SWESC) requirement under GRR will include relevant information to EIADR, for example by demonstrating adequate environmental protection.

### Assessment of Significance of Effects on Material Resources and Waste

1. The assessment will seek to deliver outcomes that align with the highest tiers of the Waste Hierarchy and demonstration of ALARP, ALARA and BAT / BPM and should be used to encourage, and evidence transitions towards, a circular economy where relevant.
2. Professional judgement, typical of a range of experts, will drive the assessment, which should start with a list of activities requiring materials as well as those generating waste – with approximate volumes for each. Note that material may be won from, or waste re-used on, the site itself, so modelled arisings and ultimate volumes for further treatment or disposal may be different. For onsite disposal of radioactive waste, see section 16 on Radiological Effects.
3. Significant environmental effects are more likely to arise from those materials or waste which:

* Are associated with the largest quantities.
* Are primary/virgin materials.
* Have hazardous properties (including that associated with ionising radiation).

1. The methodology applied to assess the sensitivity of receptor, magnitude of impact and subsequent significance of effect has no strict guidelines.
2. The assessment of significant effects may typically be based on several factors, including:

* The availability of the material resources.
* The type of materials required, e.g. primary/virgin materials, manufactured materials, recycled materials.
* The type of waste generated, e.g. inert, non-hazardous, hazardous, low-level radioactive waste, intermediate level radioactive waste and high-level radioactive waste.
* The availability of suitable facilities within close proximity, or at distance as appropriate, to the proposed development to treat the waste generated.
* Compatibility of the BAT / BPM for the waste within the context of the waste hierarchy, i.e. whether generation of the waste can be minimised, the waste can be recycled, landfilled.

1. The IEMA guidance, the DMRB LA110 and material resources and waste expertise in EIA, outlined above, provides guidance on appropriate methodologies that could be applied and may act as a source of comparison for the ES being reviewed.   
   The licensee should justify deviation from standard methods as appropriate to the nature of the decommissioning project.

## Baseline and Future Baseline

1. In terms of radioactive waste, the WMP requirements as described in the GRR covers aspects such as:

* Radioactive Waste Inventory.
* Integrated Waste Strategies.
* Decommissioning Strategies and projected future waste arisings.
* Radioactive Waste Management Case(s).
* Engineering reports and asset management surveys of structures expected to become waste.
* Best Available Techniques assessments.
* Existing on-site disposal records.

1. IEMA Guidance on Materials and Waste in EIA [69] recommends the following information should be presented within the baseline information:

### Materials

* Local, regional and/or national availability (stocks, production, sales, other) of the main materials – by volume or weight, as available or deemed appropriate – required for the site preparation, construction and/or operation of a development; information on ‘availability’ can generally be obtained at a national – and sometimes at a regional – level.
* Minerals Safeguarding Areas and Allocated Mineral Sites within or (where a development’s adjacency might preclude future access) adjacent to the red line boundary of a development.
* Where data are available, the planned use or presence of ‘critical raw materials’ (materials that are of high importance within the EU economy, but where security of supply is at great risk) may also be useful baseline information for scoping.

### Waste

* The availability and capacity of regional and – where appropriate – national landfill facilities. Landfill void data should be collated for both inert and non-inert (non-hazardous and hazardous) landfill types, where available. This should be based on the most recent, publicly available information on current waste generation and operational waste facilities, collected through desk-based assessment.
* Historical and future trends in waste processing, treatment, recovery and/or landfill void capacity (especially where increases can be forecast or otherwise ascertained) also offer a useful insight as to the capability of these facilities.

### Future Baseline

1. This information should be extrapolated alongside predicted material resource and waste requirements of decommissioning, to determine the future baseline. That is, the material requirements in any given year with and without the development.
2. An understanding of proposed land use change for the area should also inform the future baseline used for the assessment, based on available local authority data.   
   If significant development is expected to take place within the study area within the temporal scope of the assessment, this could influence the capacity and suitability of available waste management facilities.
3. Given the granularity of information this would generate, and to ensure a proportionate assessment is carried out, a future baseline is often presented for the year(s) of peak material use, or waste arisings, only.

## Project Impacts and Potential Effects

1. Significant effects arising from material resources and waste will vary according to the location of the decommissioning project and the associated infrastructure requirements offsite, which will be unique to each project.
2. The optimisation of site won material is likely to have the greatest influence on the significance of effects, as this will impact the volumes of new materials required and the volumes of waste to be removed and potentially sent to landfill. Where any new construction is required to facilitate the decommissioning project, there is potential for raw materials to be required and thus have potentially significant effects.
3. Table 21 provides examples of the causal relationship between typical decommissioning activities that could generate material and waste impacts, and the possible effects upon sensitive receptors. This is not exhaustive and should not be used as a checklist.

Table - Example of decommission activities, impacts and effects on sensitive receptors

|  |  |  |
| --- | --- | --- |
| Typical decommissioning activities with potential to generate impacts | Possible typical impacts arising from these activities | Possible effects on sensitive receptors |
| Construction of temporary site facilities or access routes | Use of raw materials | Depletion of natural resources |
| Deconstruction and dismantling of power station infrastructure, including site clearance | Generation of waste | Reduction in landfill capacity |
| Transportation of waste to disposal sites | Vehicle emissions from transport | Generation of GHG emissions |

## Interface with other EIA Topics

1. The transport of materials and waste, and interface with other disciplines should be considered with respect to potential in-combination effects. Potential interfaces may include:

* Climatic factors.
* Air quality.
* Radiological effects.
* Soils, geology and contaminated land.
* Water resources and flooding.
* Traffic and transport.
* Socio-economics.

1. In particular, the material resources and waste chapter should inform the assessment of carbon emissions arising from the decommissioning project and reported in the relevant ES chapter.

## Mitigation

1. Mitigation for material resources and waste should principally follow the waste hierarchy. Examples of measures that could be implemented include:

### Avoid

* Using existing site buildings and infrastructure as far as possible to avoid the need for new construction.
* Selecting construction materials for any temporary infrastructure from sustainable sources, e.g. using Environmental Product Declarations.
* Maximise efficient design principles by using modular design for any temporary buildings and selecting materials that can be easily dismantled and repurposed upon completion of the project.

### Reduce

* Reuse site-won materials from the decommissioning process for construction of any new temporary elements.
* Recycle any waste that cannot be reused (as far as reasonably practicable within the limits of UK recycling infrastructure).
* Reprocess non-recyclable waste for different forms of energy, e.g. heat or electricity.
* Limit the distance waste needs to travel to be repurposed or disposed of.

### Monitor and manage

1. A Site Waste Management Plan (SWMP) is a typical sub-plan of an EMP used to implement mitigation and monitor its effectiveness during the works.
2. It should be prepared and implemented prior to the start of any works to ensure that all generated wastes are evaluated against the waste management hierarchy of prevention, reuse, recycling, recovery and disposal. Where waste needs to be taken off-site for reuse, recycling, recovery or disposal, the SWMP would detail information on the waste carriers and the waste management facilities that would be used. The SWMP would also identify waste to landfill targets to work towards the aim of recovering at least 70% by weight of non-hazardous construction and demolition waste in order to reflect current government policy, in addition to the other strategic targets. The SWMP should be continually reviewed, by the appointed contractor, and regularly updated with the relevant information as the Project progresses.
3. The SWMP will also be used to measure and monitor the types and quantities of waste taken off-site, to ensure that the waste hierarchy is being implemented wherever possible.
4. A Materials Management Strategy (or Plan) may also need to be produced, which requires the preparation of Material Management Plans in line with the requirements of the CL:AIRE Definition of Waste Code of Practice or other appropriate standards. This will enable any site-won materials (or identified, imported materials) to be used on site, providing justification and certainty of use and ensuring that the materials comply with an earthwork’s specification.

# Water Resources and Flooding

## Scope



1. The scope of an ES chapter on water resources and flooding may be further subdivided as per the structure of this section. Broad considerations include guidance on the assessment of:

* Water Resources (including water quality and availability).
* Flood Risk.

## Legislation and Policy

### Legislation

1. European legislation:

* Water Framework Directive (2000/60/EC).
* Groundwater Daughter Directive (2006/118/EC, replacing 1980/68/EC).
* Directive on Environmental Quality Standards (Directive 2008/105/EC).

1. National legislation:

* The Environmental Permitting (England and Wales) Regulations 2010.
* Water Resources Act 1991, as amended by the Water Act 2003.
* Water Environment (Controlled Activities) (Scotland) Regulations 2011 (CAR) (Amended 2013 and 2017).
* Environmental Protection Act 1990, Part 2A.
* Environment Act 1995.
* The Water Environment (Water Framework Directive) (England and Wales) (Amendment) Regulations 2015.
* Water Environment and Water Services (Scotland) Act 2003 (WEWS Act).
* Environmental Damage (Prevention and Remediation) Regulations 2009.
* Flood Risk Management (Scotland) Act 2009.
* Flood and Water Management Act 2010.
* Flood Risk Management (Scotland) Act 2009.
* Flood and Water Management Act 2010.

### Policy

1. Flood risk is dealt with at catchment scale, with relevant policies presented in the catchment [Flood Risk Management Plans](https://www.gov.uk/government/collections/flood-risk-management-plans-frmps-2015-to-2021). Other relevant policies include:

* Regional strategies contained within River Basin Management Plans for [England and Wales](https://www.gov.uk/government/collections/river-basin-management-plans-2015), and [Scotland](https://www.sepa.org.uk/environment/water/river-basin-management-planning/the-current-plans/).
* Local Flood Risk Management Strategies that reference specific local policies with which development must comply.
* In England and Wales, the NPPF and associated PPG ([Flood Risk and Coastal Change](https://www.gov.uk/guidance/flood-risk-and-coastal-change)).
* [The Environment Agency’s approach to groundwater protection](https://www.gov.uk/government/publications/groundwater-protection-position-statements) (February 2018 Version 1.2) (England and Wales).
* In Scotland, requirements for developments are set out in [Scottish Planning Policy](https://www2.gov.scot/Resource/0045/00453827.pdf) (2014).
* [Water Environment (Controlled Activities) (Scotland) Regulations 2011 Practical Guide](https://www.sepa.org.uk/media/34761/car_a_practical_guide.pdf) (Scotland).

## Water Resources

### Scope

1. The water resources topic will typically cover water quality, water quantity and availability for use; and will assess both the direct and indirect impact on surface water and groundwater receptors, resulting from direct, physical or chemical effects on the receiving water body (including groundwater). This section excludes water quality with respect to radioactive emissions. These tend to be covered in a separate assessment and ES chapter; refer to Section 16.
2. For example, the decommissioning project could alter the content of discharges released to waterbodies and pose potential risks from unplanned discharges leading to the release of pollutants arising from decommissioning waste, construction and demolition activities. These changes could result in chemical effects on surface water or groundwater resources (the watercourse or aquifer), leading to indirect effects on water supply abstractions taking water from those water bodies. These may then have indirect impacts on dependent ecosystems or nearby water supplies.
3. Some water chapters may consider surface water only, with groundwater being dealt with alongside Contaminated Land, Geology and Soils. In this case it is essential that the two chapters cross-reference each other and cover the full range of potential impacts between them.
4. The potential for impacts on the status of surface water and groundwater bodies, as defined by the EU WFD, should be considered at the water body scale.

### Receptor Scope

1. Some examples of receptors that may be susceptible to water quality or availability impacts are given below:

* Designated aquifers (Principal, Secondary A / B / Undifferentiated).
* Licenced surface water abstractions.
* Non-potable licenced groundwater abstractions.
* Potable licenced groundwater abstractions (with groundwater source protection zones).
* Unlicensed private water supply abstractions.
* WFD groundwater / surface water bodies.
* Water-dependent environmentally designated sites (e.g. SSSI, SPA/Ramsar, SAC, fisheries, local wildlife sites) or amenity sites.
* Commercial aquaculture.

### Spatial Scope

1. There is no specific guidance for defining the ZoI, which will be different for each pathway. Generally speaking, water quality or abstraction impacts will be felt downstream or (in the case of groundwater) down the hydraulic gradient of the source.
2. It is important to note that groundwater flow is not straightforward to predict. Whilst (as noted in Section 11.1.1) 1km around the site boundary is a typical search area for groundwater receptors, the ZoI should be defined based on an understanding of the local hydrogeological regime.

### Temporal Scope

1. The temporal scope of the assessment should cover all phases of decommissioning that are scoped in, according to the agreed scope set out in the Pre-Application Opinion.

### Assessment Methodology

#### Guidance

* Useful guidance on assessment methodology is available in the DMRB (LA 113 - Road drainage and the water environment).
* The Environment Agency’s [Groundwater Protection](https://www.gov.uk/government/collections/groundwater-protection) and [Discharges to surface water and groundwater](https://www.gov.uk/guidance/discharges-to-surface-water-and-groundwater-environmental-permits) web pages.
* The Environment Agency’s [Climate Change Allowance Guidance](https://www.gov.uk/guidance/flood-risk-assessments-climate-change-allowances).
* In Scotland, government guidance is provided in Delivering Sustainable Flood Risk Management, and Surface Water Management Planning.

1. Water quality is normally assessed using the source-pathway-receptor approach to determine whether a linkage exists, based on a CSM describing the hydrological system. If there is a viable pathway between source and receptor the risk is then assessed in terms of likelihood and severity. In order to avoid unnecessarily detailed investigations, it may be appropriate for the licensee to adopt a tiered approach, whereby an initial qualitative assessment is undertaken, based on conservative assumptions. If unacceptable risks are identified a more detailed, semi quantitative or quantitative assessment may be needed to reduce uncertainty in the level of risk or, to inform the design of mitigation measures.
2. Qualitative and semi-quantitative assessments are usually developed based on published information and limited site-specific data. Pollutant concentrations are normally compared to published guidance values such as [drinking water quality standards](https://www.legislation.gov.uk/uksi/2016/614/contents/made) [70] or legislative standards for receiving waterbodies. Quantitative assessments usually involve some level of modelling and may use site-specific target concentrations for key indicator parameters.
3. For the purposes of EIA, risk must then be translated into impact significance.   
   For water quality, assessors may take slightly differing approaches to attributing likelihood/severity of risk and translating this into magnitude of impact and so the methodology should be presented logically and demonstrate a robust evidence base. This should be a value-based judgement made by a competent person.
4. Broadly, the magnitude of risk will be derived from understanding the likelihood of the impact occurring, and the severity of the impact if it did occur. Typically, water quality will be significantly affected where irreversible loss or change to a sensitive water feature were to occur, such as a reduction in WFD status, loss of regionally important water supply or substantial change to a designated site. Positive effects would be realised where there was an improvement in WFD status or the risk of future impacts upon sensitive receptors was reduced, for example through the removal of potential groundwater contamination sources upon removal of site infrastructure.

### Baseline and Future Baseline

1. The current baseline should be established initially from published and available site-specific information, supplemented by survey data (e.g., ground investigations or water sampling). The site and zone of influence should be described in terms of surface water / groundwater quality, fluvial flow, groundwater level, drainage infrastructure, historic flooding, etc., presented with reference to the receptors outlined above.

#### **Future** Baseline

1. Key factors affecting the future baseline are likely to be climate change, long term development or flood risk management strategy and water resources management planning. The availability of water resources in the future may be affected by these factors irrespective of the decommissioning project, and this should be reflected in the assessment.
2. Water Resource Management Plans (prepared by all water companies) set out options to meet projected water demand over a 25-year planning horizon, such as the water transfer schemes, reservoirs or development of new water supply sources. The relevant plans should be reviewed to determine whether there could be any interaction with the site for consideration within the cumulative impact assessment.

### Interface with other EIA Topics

1. Consideration should be given to intra-project effects arising from interaction with other environmental topics. The likely impacts may be reported in the relevant EIA Chapters, and the effects on sensitive receptors considered in the cumulative effects assessment. Likely interactions with other EIA topics relevant to water resources and may include:

* Climatic factors.
* Terrestrial and freshwater ecology.
* Marine ecology.
* Coastal processes and geomorphology.
* Soils, geology and contaminated land.

### Potential Impacts and Effects

1. Impacts upon water resources will vary according to the location of the decommissioning project and the associated infrastructure requirements offsite, which will be unique to each project.

1. Table 22 provides examples of the causal relationship between typical decommissioning activities that could generate water resources impacts, and the possible effects upon sensitive receptors. This is not exhaustive and should not be used as a checklist.

Table - Example of decommission activities, impacts and effects on sensitive receptors

|  |  |  |
| --- | --- | --- |
| Typical decommissioning activities with potential to generate impacts | Possible typical impacts arising from these activities | Possible effects on sensitive receptors |
| Transport of plant, equipment and waste to and from the site; | Contamination of surface water or groundwater from construction equipment and/or vehicle spillages | Degradation in surface water or groundwater quality and any associated habitats |
| Erection of temporary facilities within the site or offsite | Contamination of surface water and underlying and surrounding aquifers | Degradation in surface water or groundwater quality and any associated habitats |
| Removal of buildings and structures within the site | Contamination of underlying and surrounding aquifers | Degradation in surface water or groundwater quality and any associated habitats |
| Removal of below ground structures | Contamination of underlying aquifers  Temporary dewatering of underlying aquifers | Degradation in groundwater quality or quantity and any associated habitats. |

## Flood Risk

### Scope

1. The flood risk topic will assess physical effects of the decommissioning project on surface water or groundwater flow pathways, that could affect the risk of flooding at a particular receptor, including the project site itself. Sites located on the coast or close to tidally affected water bodies will need to consider the additional risk of flooding from the sea.
2. The impact assessment should be based on a Flood Risk Assessment (undertaken in accordance with current guidance) that considers the risk of flooding from all sources.
3. Flood risk impacts may result from activities such as:

* Alteration of site topography and drainage / infiltration pathways.
* Construction or removal of in-ground structures.
* Modifications to existing watercourses (e.g. diversions or impoundments).
* Any work undertaken within a floodplain.
* Discharges to surface water or groundwater; etc.

1. The scope of the flood risk assessment should cover two types of risk: the site and its susceptibility to flood risk, and the potential for the site to exacerbate flood risk to other susceptible receptors.
2. Sources of potential flood risk that should be considered when planning the decommissioning project may include:

* Tidal (coastal and estuarine).
* Fluvial (from rivers and streams).
* Pluvial (surface water flooding).
* Groundwater flooding.
* Infrastructure failure (such as coastal defences being overtopped or reservoir failure).
* Combinations of the above.

#### Receptor Scope

1. Receptors susceptible to flood risk impacts arising from the decommissioning works could include:

* Vulnerable land use (as defined by the NPPF for England and Wales).
* Workers on site.
* Residential properties.
* Critical drainage areas.
* Nationally / locally significant infrastructure, including neighbouring operational nuclear power stations and nuclear new build sites.
* Nationally / locally designated planning policy areas.

#### Spatial Scope

1. Flood risk impacts may occur both upstream/up-gradient and downstream/down-gradient of the site. Professional judgement is required to determine an initial search area for receptors, which may then be refined as the assessments progress to increasing levels of detail.

#### Temporal scope

1. The temporal scope of the assessment should cover all phases of decommissioning that are scoped in, according to the agreed scope set out in the Pre-Application Opinion. In addition, the planned end state should be considered as part of the flood risk assessment, to assess the effect of removing all site infrastructure.

### Assessment Methodology

#### Guidance

* Useful guidance on assessment methodology is available in the DMRB (LA 113 - Road drainage and the water environment).
* The Environment Agency’s [Climate Change Allowance Guidance](https://www.gov.uk/guidance/flood-risk-assessments-climate-change-allowances).
* In Scotland, government guidance is provided in [Delivering Sustainable Flood Risk Management](https://www.gov.scot/publications/flood-risk-management-scotland-act-2009-delivering-sustainable-flood-risk/pages/0/), and [Surface Water Management Planning](https://www.gov.scot/publications/surface-water-management-planning-guidance/pages/0/).

1. Flood risk impact is usually assessed by considering the pre- and post-development level of flood risk, both on and off-site, in the context of national and local planning policy. For decommissioning, the pre-development flood risk on the site should be well documented as the operational site will already have flood risk management measures in place and will require an external hazards assessment to be undertaken as part of the safety case, which should be used to inform the EIA. Pre-decommissioning flood risk off-site may require further investigation to understand the impact of removing any existing flood risk measures such as onsite drainage infrastructure. There should be consistency between the flood risk assessment for EIADR and the external hazards flooding assessment; for example, as far as possible the assessments should draw upon common datasets.
2. The flood risk assessment must consider the risk from all sources of flooding, using available data, including hydraulic modelling output. Site-specific models may be developed to determine the baseline and planned end state flood risk.
3. The Inspector should be satisfied that conservative estimates have been used to determine the appropriate return periods for the study, and that appropriate increases in the level of risk have been applied to assess the likely worst-case scenario. The magnitude of potential impacts should be determined using professional judgement and the licensee should demonstrate that this is based on suitable evidence.
4. The Environment Agency provides comprehensive guidance on Flood risk assessments if you're applying for planning permission [71], for sites located in England and Wales. In Scotland, the requirements for a Flood Risk Assessment are set out in the Scottish Planning Policy [72].
5. Impacts should be assessed in relation to the Environment Agency’s Catchment Abstraction Management Strategy [73].

### Baseline and Future Baseline

1. The current baseline should be established initially from published and available site-specific information. The site and zone of influence should be described in terms of fluvial flow, groundwater levels, drainage infrastructure, historic flooding, etc., presented with reference to the receptors outlined above.

#### Future Baseline

1. Key factors affecting the future baseline are likely to be climate change, long term development or flood risk management strategy and water resources management planning. The availability of water resources in the future may be affected by these factors irrespective of the decommissioning project, and this should be reflected in the assessment.
2. The flood risk assessment should demonstrate due consideration for future climate impacts to affect the potential vulnerability of the site and study area.   
   Climate change projections and long-term strategies are reviewed regularly, so are likely to change before the future baseline arrives. The impact assessment should acknowledge this, and the licensee should commit to undertaking a regular review to capture any changes in these projections and strategies.
3. Climate change and sea level projections should be considered in relation to flood magnitude and frequency, sea level rise and groundwater behaviour; the latter being particularly important where groundwater contamination is present.   
   Further detail on appropriate climate projections for the assessment is provided in Section 12.4.6.

### Interface with other EIA Topics

1. Consideration should be given to intra-project effects arising from interaction with other environmental topics. The likely impacts may be reported in the relevant EIA Chapters, and the effects on sensitive receptors considered in the cumulative effects assessment. Likely interactions with other EIA topics relevant to flood risk may include:

* Climatic factors.
* Terrestrial and freshwater ecology.
* Marine ecology.
* Coastal processes and geomorphology.
* Soils, geology and contaminated land.

### Project Impacts and Potential Effects

1. Coastal or estuarine sites could be particularly vulnerable to flood risk. Any coastal infrastructure that is due for removal has potential to give rise to impacts on coastal flood risk and water quality affecting other sensitive receptors. Discharge pipelines inland or in estuarine environments that may be removed could have potential to impact fluvial flood risk, however this may occur over a period of time as a result of changes to the geomorphology of the watercourse and should be informed by these assessments undertaken as part of the EIA.
2. Table 23 provides examples of the causal relationship between typical decommissioning activities that could generate flood risk impacts, and the possible effects upon sensitive receptors. This is not exhaustive and should not be used as a checklist.

Table - Example of decommission activities, impacts and effects on sensitive receptors

|  |  |  |
| --- | --- | --- |
| Typical decommissioning activities with potential to generate impacts | Possible typical impacts arising from these activities | Possible effects on sensitive receptors |
| Removal of buildings and structures within the site | Change in flood risk to the site or elsewhere | Change in flood risk to people, property or environmental receptors |
| Erection of temporary facilities within the site or offsite | Change in flood risk to the site or elsewhere | Change in flood risk to people, property or environmental receptors |

### Mitigation

1. The assessment should demonstrate that effective engagement with stakeholders, regulators and other relevant authorities has taken place and that embedded mitigations have been discussed and (where possible) agreed in principal.   
   For example, the Lead Local Flood Authority has responsibility for local flooding, including surface water and groundwater, and would need to be informed of the proposals to ensure activities within the decommissioning project have appropriately considered local flood risk management plans. Other key stakeholders the licensee may engage will include (but not be limited to) EA/NRW/SEPA, Local Authorities and Internal Drainage Boards. Typical solutions for water related impacts include:

#### Avoid and Reduce

1. Water resources:

* Groundwater level monitoring.
* Vehicle maintenance/fuelling carried out in designated workshops on site.
* Drainage blankets or in-ground barriers to control groundwater and infiltration.
* Water treatment to manage the quality of discharges.

1. Flood risk:

* Permeable surfacing, natural solutions and sustainable drainage systems (also known as SuDS) to reduce runoff.
* Level for level compensation storage to offset displacement due to development in the floodplain.
* Minimising work in areas known to be at flood risk.
* Any construction activities (or compounds) located in areas at flood risk should have appropriate flood warning procedures in place.
* Construction of raised ground levels or embankments.

#### Monitor and Manage

1. Decommissioning activities present numerous risks to the water environment, which should be controlled through the decommissioning work with an effective environmental management plan. This should include monitoring and reporting requirements, so that the licensee can demonstrate compliance and identify whether any measures are performing as expected.
2. There should also be response or recovery plans that come into effect in the event that any predetermined alerts are triggered by the monitoring. All such plans should be reviewed and updated periodically, on a timescale that is appropriate to keep pace with changes in legislation and guidance.
3. Further examples of suitable mitigation for water resources and flood risk is available in the DMRB ([LA 113 - Road drainage and the water environment](https://www.standardsforhighways.co.uk/dmrb/search/d6388f5f-2694-4986-ac46-b17b62c21727)) [74].

# Geomorphology and Coastal Processes

## Scope



1. Issues relating to changes in hydrodynamic and sediment transport processes that, as a result of the decommissioning activities, may lead to impacts at local and regional scales on fluvial waterbodies or coastal areas are covered in this chapter.
2. The scope of the assessment and the extent and quality of data required to determine the baseline coastal and fluvial processes should be proportionate and include:

* The risk of a potentially significant effect occurring.
* The stage of the project.
* The availability of previously collected data.
* Typical activities likely to impact receptors and to require assessment (as appropriate to the scope of the decommissioning phase) may include, but not be limited to:
  + Removal or demolition of coastal and offshore infrastructure – e.g. effluent discharge pipes, cooling water infrastructure, temporary structures such as jetties, platforms, pontoons, and other structures.
  + Construction of any temporary or permanent structures.
  + Excavation activities – e.g. as part of the removal of structures, if required.
  + Dredging activities.
  + Temporal stockpiling and storage of rock or materials on the beach or intertidal areas.
  + Vehicle movements on beach and intertidal areas – e.g. vehicle to support the removal of infrastructure activities.
  + Changes to site activities at various stages of the decommissioning process.

### Receptor Scope

1. In determining the level of detail needed for an assessment of coastal processes, consideration should be given to the following receptors:

* **Hydrodynamic processes** – these include water levels, tidal currents, nearshore wave climate, wave-induced currents and extreme conditions (storms).
* **Sediment transport** – including longshore and cross-shore sediment transport, sediment budget, banks, bar and spits, suspended sediments and related patterns of sediment deposition and erosion.
* Indirect effects of these on other environmental receptors.

### Spatial Scope

1. The spatial scope of the geomorphological and coastal processes assessment should be determined based on the size of the potentially affected river catchment (where fluvial geomorphology is assessed) or the potential extent of marine and costal works (where coastal impacts are anticipated). It should be informed by the nature and extent of works likely to affect a watercourse. It should be guided by professional judgement.
2. The coastal impact assessment is concerned with the effect of decommissioning works on the littoral and offshore zones. The littoral zone is defined as the area between the seaward limit of terrestrial plants (e.g., above the Mean High-Water Mark) and the subtidal location where seabed sediments are not disturbed by waves. In this area, both tidal-driven and wave-driven sediment transport processes are active. The relative significance of these varies both through the tidal cycle and according to wave conditions at any specific location.

### Temporal Scope

1. It is important to understand how coastal and fluvial changes brought about from various decommissioning activity will affect future work phases. This understanding will assist with assessments concerned with predicting how the site is likely to respond to the decommissioning activities, (e.g., will sediment load return to a more natural velocity once effluent outfalls are removed).

## Legislation, Policy and Relevant Guidance

### Legislation

* Coastal hydrodynamic and geomorphological effects may affect designated European coastal and marine sites, protected under the Conservation of Habitats and Species Regulations 2017.
* The Water Environment (Water Framework Directive) (England and Wales) Regulations 2017.
* The Marine and Coastal Access Act 2009.

1. The relevant environment agency, the Marine Management Organisation (MMO), and the statutory port and harbour authorities also have important roles in managing some aspects of the marine and coastal environment and would usually be involved in any consultative exercise.

### Policy

1. The following policies have specific relevance to the geomorphology and coastal processes assessment:

* Technical Advice Note 14 (TAN14) Coastal Planning - This policy guides mitigation measures to protect the coastal zone from inappropriate developments. Consideration is given to visual amenity, physical processes and ground conditions; sensitivity and conservation of designated marine and coastal sites; the requirement for remedial works and defence works; and recreational resource development.
* [UK Marine Policy Statement](https://www.gov.uk/government/publications/uk-marine-policy-statement) [75].
* [Scotland’s National Marine Plan](https://www.gov.scot/publications/scotlands-national-marine-plan/) [76].
* [The Welsh National Marine Plan](https://gov.wales/marine-planning) [77].

1. In addition, the following should be reviewed by the licensee where relevant:

* Local development plans.
* Shoreline Management Plans developed by Coastal Groups with members mainly from local councils and the Environment Agency.

## Assessment Methodology

### Guidance

1. A number of guidance documents define best practice in the UK, including:

* [UKCP18 Climate Change Projections](https://www.metoffice.gov.uk/binaries/content/assets/metofficegovuk/pdf/research/ukcp/ukcp18-overview-slidepack.ff.pdf).
* [CIEEM (2018) Guidelines for Ecological Impact Assessment in the UK and Ireland: Terrestrial, Freshwater, Coastal and Marine](https://cieem.net/wp-content/uploads/2019/02/Combined-EclA-guidelines-2018-compressed.pdf).
* [EA (2010) Computational modelling to assess flood and coastal risk](https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/292949/geho0310bsbt-e-e.pdf).
* [EA (2017) Standards for modelling and forecasting flooding in large estuaries](https://www.floodandcoast.com/assets/Uploads/Hakeem-Johnson-CH2M-Standards-for-modelling-of-flooding-in-open-coasts-and-large-estuaries.pdf).
* [EA (2003) Guidebook of applied fluvial geomorphology.](https://webarchive.nationalarchives.gov.uk/20050304224858/http:/www.defra.gov.uk/science/project_data/DocumentLibrary/FD1914/FD1914_1147_TRP.pdf)
* [EA and ONR (2017) Principles for Flood and Coastal Erosion Risk Management. Office for Nuclear Regulation and Environment Agency Joint Advice Note](http://www.onr.org.uk/documents/2017/principles-for-flood-and-coastal-erosion-risk-management.pdf).
* [CIRIA (2000) Scoping the assessment of sediment plumes from dredging.](https://www.ciria.org/ItemDetail?iProductCode=C547&Category=BOOK)

### Assessing Significance of Effects on Geomorphology and Coastal Processes

1. Assessing the potential impacts of the decommissioning activities on the local and regional coastal processes requires a detailed review of the existing conditions before the decommissioning. It also needs to consider the likelihood of change and should be based on:

* Identification of the baseline conditions, including coastal processes, water quality information, hydrodynamic conditions and geomorphology through desktop surveys and site reconnaissance.
* Prediction of the impacts on the baseline conditions as a result of the decommissioning works using empirical or numerical approaches.
* Identification of the mitigation measures that may be required to address any potentially significant impacts on coastal processes.
* Assessment of residual impacts on coastal processes in the context of the proposed mitigation measures.
* Assessment of the cumulative impacts concerning adjacent schemes and proposals.

1. Professional judgment will be required to understand the potential effect of the decommissioning activities on the receptors over time as there are no threshold values to be considered. If a significant change to the baseline conditions is expected, numerical modelling will be required to support the understanding of impacts.

## Baseline and Future Baseline

1. The baseline should be determined based on a comprehensive desk study undertaken by a competent person. The desk study should include a review of available information which should consider:

* Historical data including historical maps, beach profiles, aerial photos, Light Detection Ranging (LiDAR) data, bathymetry data, wind, waves and current data.
* Previous studies in the study area or studies with a similar background.
* Site-specific data on the operational history of the site, including but not limited to any incidents and environmental permits, such as erosion problems, and damage to structures due to extreme events.
* Existing site-specific surveys undertaken during the life of the development, including but not limited to: bathymetry and topography, water quality, sediment samples, geotechnical investigations, hydrodynamic and meteorological conditions.
* Existing numerical models developed during the design of the development. The model predictions will define changes expected to the baseline at the time. These results can be used to inform the current baseline and to estimate the potential changes due to the decommissioning of the site.

1. The baseline should be defined in terms of:

* Tides and currents, including tide levels, tide range and tidal currents.
* Wind and wave climate.
* Coastal sediment transport, defining sediment patterns, net littoral drift, areas of accretion/erosion.
* Analysis of extreme values.

1. It is likely that, in order to support their external hazard safety assessments, the licensees will hold much of the data described above. Surveys are required however if the existing data are judged to be insufficient.

### Future Baseline

1. The assessment needs to also consider the future baseline from an understanding of trends in the coastal processes.
2. Similar to the present baseline, the future baseline should include a detailed desktop assessment and expert judgment. If required, the future baseline and the potential impacts of the decommissioning works should utilise a suitable numerical model. EA guidance “Computational modelling to assess flood and coastal risk” should be used, if applicable, to support numerical model selection. Model performance should be referenced to defined metrics (e.g., Williams and Esteves, 2019).
3. The future baseline assessment should predict any changes in the fluvial and coastal processes and the hydrodynamic conditions, such as (but not limited to):

* Changes to littoral and cross-shore transport due to removal of existing structures (e.g. pipes, groynes, jetties).
* Changes to erosion or deposition trends.
* Changes in the nearshore wave climate attributable to the removal of structures that formally provided protection to the coast.
* Changes to hydrodynamic processes.
* Increase of turbidity and suspended sediment concentration due to removal works, excavation in the littoral zone or dredging.
* Changes brought about by the construction of temporary structures.

1. Importantly, the future baseline must consider the effect of climate change, including sea-level rise predictions and changes to waves and wind conditions and other meteorological effects. Climate change impact assessments should refer to the latest available guidance, such as UKCP18 climate change projections.

## Interface with other EIA Topics

1. Consideration of intra-project effects arising from interaction with other environmental areas should draw on impacts reported in the relevant EIA Chapters, and the effects on sensitive receptors considered in the cumulative effects assessment. Possible interactions with other EIA topics relevant to geomorphology and coastal processes may include:

* Terrestrial and freshwater ecology.
* Marine ecology.
* Soil, geology and contamination.
* Water resources and flood risk.
* Climatic factors.

## Potential Impacts and effects

1. Table 24 provides examples of the causal relationship between typical decommissioning activities that could generate coastal processes impacts, and the possible effects upon sensitive receptors. This is not exhaustive and should not be used as a checklist

Table - Example of decommission activities, impacts and effects on sensitive receptors

| Typical decommissioning activities with potential to generate impacts | Possible typical impacts arising from these activities | Possible effects on sensitive receptors |
| --- | --- | --- |
| Removal and/or alteration of underwater or coastal infrastructure | Disturbance of seabed and increase in suspended sediment concentrations and turbidity  Changes to erosion deposition patterns around the removed structures  Changes to littoral and cross-shore transport  Changes in the nearshore wave climate  Changes to hydrodynamic processes | Beach erosion  Increased intertidal erosion  Wave overtopping of defence structures increases flood risk  Excess deposition areas |
| Removal of cooling water system, including intake and outfall heads | Disturbance of seabed and increase in suspended sediment concentrations  Changes to erosion deposition patterns around the removed structures | Localised erosional/or depositional areas |
| Dredging | Increase on suspended sediment concentrations  Increase in deposition rates in adjacent areas  Release and mobilization of contaminants and heavy metals into the water | Areas of excess deposition  Risk of burial and smothering of intertidal species, e.g. eelgrass, shellfish, fish, etc |

## Mitigation

1. Initially, potential geomorphology and coastal process impacts should be mitigated through the adoption of good practice during the decommissioning phase. If possible, mitigation measures should avoid or reduce the impact.

### Avoid

* Avoiding demolition, dredging activities or excavations during peak ebb and flood conditions, or severe waves and wind conditions.
* Avoiding demolitions of structures that are currently providing a service to the coastline, such as coastal defences structures, e.g. coastal walls, breakwaters, embankments, etc.
* Avoiding dredging or disturbance of contaminated materials.

### Reduce

* Programming intertidal and offshore works to the phase of the tide and waves conditions.
* Reduce the infrastructure to be removed, in order to reduce the impacts on the receptors, e.g. it could be potentially possible to leave some of the existing structures, since they are not representing a risk for the site over the years.
* Contain suspended sediments plumes using silt screens during dredging operations.
* Selection of adequate dredging techniques to limit sediment losses and sediment resuspension.

### Monitor

1. The monitoring of river and coastal processes to determine changes to the baseline is highly recommended throughout decommissioning and should be implemented via the EMP. The licensee should demonstrate commitment to carry out monitoring during the decommissioning works
2. Monitoring should help to detect and manage unexpected change such as erosion or retreat of the coastline due to a change to the sediment patterns or increased wave climate. Care must be taken to ensure impacts are contained during this process and should be captured through the EMP.
3. Any remediation strategy required, such as new coastal defences to mitigate erosion, will require detailed planning, modelling and design and will take time to implement. This may be subject to Regulation 13 criteria, as detailed in Section 5.2.
4. Further examples of possible mitigation measures are available from the [Environment Agency](https://www.gov.uk/guidance/flood-risk-and-coastal-change).

# Landscape and Visual Amenity

## Scope



1. The scope of a landscape and visual impact assessment (LVIA) should cover both:

* Effects on the landscape as a resource (the landscape effects).
* Effects on views and visual amenity as experienced by people (the visual effects).

1. Effects on the seascape or townscape may be also appropriate depending on the location of the site. Sometimes there may be likely significant effects on the landscape resource but the decommissioning project may be in a location that does not affect visual amenity, in which case it may be appropriate to scope these effects out of the assessment.
2. Decommissioning has the potential to impact landscape and visual amenity receptors by creating new temporary features in the landscape, using cranes, temporary site buildings and any offsite routes required to facilitate the works. Overall, the removal of a nuclear power station would be expected to result in positive effects by removing a large industrial feature from the landscape.

### Receptor Scope

1. Typical landscape receptors may include:

* International and National designated sites including World Heritage Sites, National Parks (in England, Wales and Scotland), Areas of Outstanding Natural Beauty (in England and Wales), National Scenic Areas (in Scotland).
* Local designated sites such as Special Landscape Areas.
* Undesignated sites including areas of landscape which are judged to exhibit high levels of landscape quality, scenic quality, wildness or tranquillity, where natural or cultural heritage features make a particular contribution to the landscape, or where there are important associations. Consultation with relevant stakeholders should inform the value ascribed to the landscape.

1. Typical visual receptors may include:

* Residents, users of public rights of way, users of roads and of recreational facilities.
* Views from cultural heritage features.

### Spatial Scope

1. There is no defined spatial scope for LVIA, rather the licensee should demonstrate professional judgement to determine the area of landscape that may be affected, and from which the decommissioning works may be visible.
2. The presence of high value landscapes such as designated sites and protected characteristics, and their likelihood to be affected by the works, will influence the appropriate extent of the study area. This should take into account all site works and off-site development as required.
3. A Zone of Theoretical Visibility (ZTV) should be modelled to capture the extent to which the decommissioning works may be visible. This should capture all surface features and will be influenced by factors such as the density of buildings in the area, the topography of the landscape and existing vegetation. The ZTV would illustrate changes to visibility where any existing screening around the site or other surface features which may be removed as part of the works. The ZTV may also change depending on the decommissioning phase under assessment.
4. It is recommended that the extent ZTV and proposed viewpoints are agreed with ONR and relevant local stakeholders as part of the Pre-Application Opinion, to ensure all viewpoints of concern are adequately captured.

### Temporal Scope

1. The temporal scope of the assessment should include all relevant phases of decommissioning that are scoped into the EIA through the Pre-Application Opinion. In addition, the planned end state should be discussed as it is likely to bring significant beneficial effects.

## Legislation Policy and Relevant Guidance

### Legislation

1. The Countryside and Rights of Way Act 2000 protects Areas of Outstanding Natural Beauty and National Parks in the UK. Any decommissioning works likely to impact these areas will be subject to the provisions of this act.
2. Marine and Coastal Access Act 2009.

### Policy

* [NPPF 2019](https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/810197/NPPF_Feb_2019_revised.pdf).
* Planning Practice Guidance: [Natural Environment](https://www.gov.uk/guidance/natural-environment).
* Planning Practice Guidance: [Design](https://www.gov.uk/guidance/design).
* Planning Practice Guidance: [Light Pollution](https://www.gov.uk/guidance/light-pollution).
* [UK Marine Policy Statement](https://www.gov.uk/government/publications/uk-marine-policy-statement).
* [Scotland’s National Marine Plan](https://www.gov.scot/publications/scotlands-national-marine-plan/).
* [The Welsh National Marine Plan](https://gov.wales/marine-planning).
* National Policy Statement for Energy (EN-1).
* National Policy Statement for Nuclear Power Generation (EN-6).

1. For coastal sites in England, [Regional Marine Plans](https://www.gov.uk/government/publications/marine-plan-areas-in-england) may be prepared by the Marine Management Organisation (MMO) that contain an approach to managing and maintaining inshore and offshore areas impacted by the works. Regional and local development plans prepared by the local planning authority will also contain landscape proposals and strategic management plans and may outline explicit requirements for landscaping. These should be reviewed by the licensee and referred to where relevant.

## Assessment Methodology

### Guidance

1. Best practice in LVIA is led by The Landscape Institute, who published the third edition of Guidelines for Landscape and Visual Impact Assessment (GLVIA3) in 2013 [78]. These should be referenced by the licensee in defining assessment criteria and any deviation from this should be well justified.

### Assessing Significance of Landscape and Visual Amenity Effects

1. Assessment criteria should include consideration of value and susceptibility to change in determining receptor sensitivity; and consideration of the scale, extent and duration of the effect in determining magnitude.
2. There is no prescriptive method for assigning significance in LVIA. The licensee should assess the nature of a landscape or visual receptor’s sensitivity by combining judgements about its susceptibility to change arising from the specific proposal with judgements about the value attached to the receptor.
3. When considering the nature of a predicted effect, its magnitude should be determined by combining judgements about matters such as the size and scale of the change, the extent of the area over which it occurs, whether it is reversible or irreversible and whether it is short or long term in duration.
4. Landscape effects should be considered separately from visual effects and the criteria for determining significance for each should be agreed with ONR as the determining authority. The Pre-Application Opinion Report should set out the proposed approach and should be reviewed by relevant stakeholders involved in the consultation process.

### Temporary and Permanent Effects

1. It should be noted that landscape and visual amenity effects may be temporary or permanent, and this would typically influence their significance. Given the duration of some decommissioning projects, effects may be temporary in nature but present over a long-term duration, such as the erection of temporary waste stores, which may be present on site for several years. The licensee should define significance criteria with consideration for the varying significance of possible temporary effects. An example is provided below, however the licensee should develop their own criteria specific to the decommissioning project and agree this with ONR through the Pre-Application Opinion:

* Temporary, short-term effects lasting fewer than five years, such as those caused by the introduction of noisy demolition equipment and visually intrusive site machinery.
* Temporary, medium-term effects lasting more than 5 but fewer than 15 years, such as those caused by the introduction of haul roads or car parks.
* Temporary, long-term effects lasting more than 15 years, such as those caused by the introduction of site offices and waste stores.
* Permanent effects, such as those caused by the final clearance of the nuclear site to the planned end use state.

## Baseline and Future Baseline

1. Baseline studies for assessing the landscape effects require a mix of desk study and field work to identify and record the character of the landscape and the elements, features and aesthetic and perceptual factors which contribute to it, as well as the value attached to the landscape.
2. Many parts of the UK are already covered by existing landscape character assessments (LCA) at varying levels of granularity (depending on whether they are national, regional or local) and the first step in preparing the baseline landscape description should be to review the relevant assessments that may be available (they are usually available in the public domain). LCA is often complemented by and linked to the parallel technique of Historic Landscape Character Assessment (HLCA). These assessments are prepared by the relevant planning authorities and should be reviewed together to build a picture of the baseline landscape character.

### Surveys

1. Surveys should be undertaken at various times of the year to determine the potential visual impact in different conditions. If the licensee is unable to conduct surveys at more than one point in the year, surveys should be undertaken during the winter months when trees are bare, as this will represent the ‘worst case scenario’ visually.
2. Where impacts are anticipated for particularly sensitive visual receptors such as users of national trails and coastal paths, the study may benefit from the addition of photomontages, which overlay the development on the existing landscape to demonstrate the potential impacts on sensitive receptors to stakeholders. The licensee may not consider this to be needed if the visual impact of the decommissioning work is likely to result in beneficial effects due to infrastructure being removed.

### Future Baseline

1. An understanding of proposed land use change for the area should inform the future baseline used for the assessment. If areas likely to be assessed as part of the decommissioning project are allocated for significant land use change, such as residential development or designated as a new landscape resource (e.g., a park or nature reserve), it is likely that new sensitive receptors could be introduced. Equally, if existing green space is earmarked for future industrial or commercial development, the current landscape sensitivity could reduce.
2. A review of local development plans and consultation with the relevant local authority should be undertaken to understand the likelihood of future developments being built, within a reasonably foreseeable timeframe determined by the licensee.
3. For the latter stages of decommissioning, where information on planned developments may not be available, ongoing monitoring of baseline conditions may be an appropriate way to ensure any changes to the landscape sensitivity are captured. This may be implemented through the EMP, as described in Section 5.4.7.
4. Additionally, the future baseline may be impacted by things other than development, such as climate change. The future climate baseline (which should be reported consistently between EIA topic chapters based on appropriate climate projections) may also inform mitigation planting recommendations and should be considered as part of the assessment.

## Interface with other EIA Topics

1. The LVIA is likely to interact with several other EIA topics including:

* Terrestrial and Freshwater Ecology.
* Health.
* Historic Environment.
* Marine Ecology.
* Socio-economics.

## Potential Impacts and Effects

1. Significant effects on landscape and visual receptors will vary according to the location of the decommissioning project and the associated infrastructure requirements offsite, which will be unique to each project.
2. Table 25 provides examples of the causal relationship between typical decommissioning activities that could generate landscape and visual amenity impacts, and the possible effects upon sensitive receptors. This is not exhaustive and should not be used as a checklist.

Table - Example of decommission activities, impacts and effects on sensitive receptors

|  |  |  |
| --- | --- | --- |
| Typical decommissioning activities with potential to generate impacts | Possible typical impacts arising from these activities | Possible effects on sensitive receptors |
| Transport of plant, equipment and waste to and from the site (on land and via marine vessels); | Changes to traffic levels, noise and vibration close to landscape receptors | Loss of amenity and tranquillity in designated or undesignated sites |
| Erection of temporary facilities within the site or offsite | New temporary features introduced into the landscape | Reduction in landscape quality and introduction of detracting features affecting visual amenity |
| Removal of coastal structures, jetties, pipelines and outfalls | Changes to the fabric of the coastal landscape and seascape | Improvement in landscape quality and removal of detracting features affecting visual amenity |
| Removal of buildings and structures within the site | Changes to views of the site from within the ZTV | Improvement in landscape quality and removal of detracting features affecting visual amenity |

## Mitigation

1. For a decommissioning project, it is likely that significant adverse effects would be temporary during the works, and upon completion of the Final Site Clearance Phase, the effects on landscape and visual amenity receptors would be overwhelmingly beneficial as infrastructure is permanently removed.
2. Landscape mitigation measures should be designed to suit the existing landscape character and needs of the locality, respecting and building on local landscape distinctiveness and helping to address any relevant existing issues in the landscape.
3. Mitigation measures for landscape which include new or replacement planting of trees and/or hedgerows will take time to come to maturity and provide the desired mitigation effect. Therefore, it is typical for the LVIA to assess the significance of predicted effects after the first year of planting, and when planting has reached maturity. Depending on the planting chosen, this typically ranges from 10-15 years in the future.
4. Any significant temporary effects identified for the peak activity phases should be addressed through use of the mitigation hierarchy, and may include:

### Avoid

* Careful planning of the location of temporary site facilities and access routes to avoid impacting views from particularly sensitive receptors.
* Maximising the use of existing trees, hedgerows and screening that may already be present on site, by timing works to retain these as long as possible through decommissioning.

### Reduce

* Incorporate landscape works at appropriate locations to screen the decommissioning works from view, using landform, trees, hedgerows or other suitable materials.
* Align landscaping to mitigation for other EIA topics such as noise and ecology.
* Consider the future changing climate and how this may influence selection of the most resilient and suitable planting options.

1. Appropriate locations for mitigation landscape planting should consider the development of planting over time, and ensure it is located at sufficient distance from structures and areas requiring specific accessibility.

### Compensate

1. If replacement landscape planting is not appropriate or viable at the site, the licensee should consider providing additional screening and compensatory landscaping elsewhere, such as at residential properties who may be severely affected by views of the works.

### Monitor

1. A Landscape Management Plan may be developed as part of the Environmental Management Plan to monitor the development of landscape planting over the course of the decommissioning works. This should include periodic reviews of:

* The impacts and effects reported in the ES.
* Changes to the baseline landscape character and sensitivity.
* The suitability of the mitigation that is being implemented.
* Additional examples of appropriate mitigation measures are available from the Guidelines for Landscape and Visual Impact Assessment (GLVIA3).

# Cultural Heritage

## Scope



1. The scope of the cultural heritage assessment should be clearly defined and proportionate to the scale of the decommissioning activities.
2. The term cultural heritage is defined by Historic England as “inherited assets which people identify and value as a reflection and expression of their evolving knowledge, beliefs and traditions, and of their understanding of the beliefs and traditions of others” [79].
3. The National Planning Policy Framework definition further states that in the planning context heritage interest may be archaeological, architectural, artistic or historic. This can be interpreted as follows:

* **Archaeological interest**: As defined in the Glossary to the National Planning Policy Framework, there will be archaeological interest in a heritage asset if it holds, or potentially holds, evidence of past human activity worthy of expert investigation at some point.
* **Architectural and artistic interest**: These are interests in the design and general aesthetics of a place. They can arise from conscious design or fortuitously from the way the heritage asset has evolved. More specifically, architectural interest is an interest in the art or science of the design, construction, craftsmanship and decoration of buildings and structures of all types. Artistic interest is an interest in other human creative skill, like sculpture.
* **Historic interest**: An interest in past lives and events (including pre-historic). Heritage assets can illustrate or be associated with them. Heritage assets with historic interest not only provide a material record of our nation’s history, but can also provide meaning for communities derived from their collective experience of a place and can symbolise wider values such as faith and cultural identity.

1. For decommissioning projects located in the UK, it is likely that receptors would be limited to immovable, underwater and natural heritage, where features are likely fixed and unable to be moved away from potential impacts from the decommissioning activities. Given the coastal location of many of the UK’s nuclear sites, and the potential for decommissioning activities to impact underwater structures, it may be appropriate to consider marine cultural heritage separately, and present this in a standalone chapter.
2. The licensee should demonstrate through the Pre-Application Opinion process that consultation with relevant bodies, including ONR, the local planning authority, and Historic England, Historic Environment Scotland or Cadw and national amenity societies (as appropriate), has been undertaken to ensure the scope of the assessment is proportionate and includes all assets that are of interest in the area.

### Receptor Scope

1. Sensitive cultural heritage receptors that are likely to be considered include, but are not limited to:

* Designated cultural heritage assets, including World Heritage Sites; Scheduled Monuments; Listed Buildings; Protected Wreck Sites; Protected Military Remains; Registered Parks and Gardens; and Registered Battlefields; Conservation Areas.
* Non-designated cultural heritage assets, including buildings, structures, monuments, sites, places, areas or landscapes identified by plan-making bodies (such as local or regional councils) or identified by heritage specialists during the assessment process as having a degree of heritage significance meriting consideration in planning decisions but which do not meet the criteria for designated heritage assets.

1. Designated heritage assets typically have greater sensitivity to potential effects than non-designated assets, however, in some circumstances there may be non-designated heritage assets of archaeological interest that have not been designated (as set out in the [NPPF](https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/810197/NPPF_Feb_2019_revised.pdf) [80], which may have equivalent value (and therefore, sensitivity) to a designated asset.
2. The licensee should demonstrate that the assessment has considered the sensitivity of heritage assets on a case-by-case basis [81].

### Spatial Scope

1. An appropriate study area, or study areas, agreed with heritage stakeholders should be proposed for the gathering of data and identification of receptors.   
   This will be determined by factors including the location, type and scale of the decommissioning activities and the associated infrastructure requirements.
2. For buried archaeology, the study area should be wide enough to enable an understanding of archaeological potential of the site. This may need to increase or decrease for the later stages of decommissioning, where the exact nature of the works has not yet been decided.
3. In respect of setting impacts on built heritage and historic landscapes, the application of a rigid study area based on distances may not always be helpful.   
   This approach can lead to unreasonably large numbers of assets being considered by the assessment. A proportionate response based on the number and type of assets in the area, topography, and potential for impacts should be taken.

### Temporal Scope

1. The temporal scope of the assessment should reflect the scope of decommissioning activities included in the EIA, as set out in the Pre-Application Opinion. It may be relevant to scope out impacts on certain receptors during different phases of decommissioning. For instance, if the project includes a Care and Maintenance phase, impacts to archaeology may be unlikely if no excavations are expected to take place during this time.

## Legislation, Policy and Relevant Guidance

1. The EIA must be reviewed against appropriate National, Regional and Local policies, with reference made to these where appropriate.

### Legislation

1. National legislation relating to the cultural heritage assessment includes:

* The Ancient Monuments and Archaeological Areas Act 1979.
* The Planning (Listed Buildings and Conservation Areas) Act 1990   
  (as amended).
* Town and Country Planning Act 1990 (as amended).
* The Infrastructure (Decisions) Regulations 2010.
* The Hedgerow Regulations 1997.
* The Protection of Military Remains Act 1986.
* The Protection of Wrecks Act 1973.

### Policy

1. National policy relating to the cultural heritage assessment includes:

* The National Policy Statement (NPS) 2011 sets out the national policy for energy infrastructure. The overarching NPS for Energy (EN-1).
* NPS for Nuclear Power Generation (EN-6) provide the primary policy framework within which the development will be considered”.

1. Regional and Local legislation and policies should be listed, where relevant, and as appropriate.
2. It is worth noting that for assessments of Cultural heritage, planning policy and guidance will be regularly updated. There are also specific guidelines for England, Scotland and Wales, therefore the Inspector needs to be satisfied that assessment is based on latest advice and for the appropriate location.

## Assessment Methodology

### Guidance

1. Guidance for undertaking Cultural heritage impact assessment is available from:

* [Historic England Good Practice Advice in Planning Note 2 of 3: Managing Significance in Decision-Taking in the Historic Environment](https://historicengland.org.uk/images-books/publications/gpa2-managing-significance-in-decision-taking/gpa2/)
* [Highways England Design Manual for Roads and Bridges (DMRB) LA106: Cultural Heritage Assessment;](https://www.standardsforhighways.co.uk/dmrb/search/8c51c51b-579b-405b-b583-9b584e996c80)
* [Chartered Institute for Archaeologists Standard and guidance for commissioning work or providing consultancy advice on archaeology and the historic environment.](https://www.archaeologists.net/sites/default/files/CIfAS&GCommissioning_1.pdf)
* [Chartered Institute for Archaeologists Standard and guidance for historic environment desk-based assessment.](https://www.archaeologists.net/sites/default/files/CIfAS%26GDBA_3.pdf)

### Assessing Significance of Cultural Heritage Effects

1. In the context of cultural heritage impact assessment, the receptors are the heritage assets and impacts will be considered in terms of the change in their significance based on professional judgement of their sensitivity and the magnitude of potential impacts.
2. Decommissioning is likely to give rise to beneficial impacts, for example where the works remove a negative element of the asset’s setting. There is also potential for adverse impacts, for example if any of the assets historical significance is intrinsically linked to nuclear infrastructure at the site. Change in the setting of an asset may be entirely neutral in terms of the resultant change, but this will rarely be the case where the actual fabric is affected.
3. When considering setting impacts, visual change should not be equated directly with adverse impact. Rather the impact should be assessed with reference to the degree that the proposal affects those aspects of setting that contribute to the asset’s cultural significance.
4. The following are the principal impact types affecting the historic environment:

* **Direct Impacts**: These occur where the physical fabric of the asset is removed or damaged as a direct result of the proposal, e.g. destruction of archaeological deposits as a result of piling or demolition or partial demolition of a building of historic interest. Decommissioning works may be limited in their potential to have direct impacts as much of the nuclear site will have been subject to previous excavations during its initial construction, however the licensee should still demonstrate due consideration for archaeological potential at the site.
* **Indirect Impacts:** These occur where the fabric of the asset is lost or preserved through an indirect activity associated with the works. Examples include the degradation of waterlogged deposits as a result of dewatering, and changes in currents resulting in increased/decreased erosion through removal of marine structures.
* **Setting Impacts**: These are generally direct and result from the works causing change within the setting of an asset that affects its cultural significance or the way in which it is understood, appreciated and experienced. Such impacts are generally, but not exclusively, visual, occurring directly as a result of the changes the decommissioning works will create in the surroundings of the asset, such as the increase in traffic to and from the site, or the removal of buildings and structures. However, they may relate to other senses or factors, such as noise, odour or emissions, which could be generated during various stages of the decommissioning process.

1. Some effects may be temporary, such as those that last only during the decommissioning works and have a known end date, although these may last a significant amount of time, and this should be reflected in the assessment. For example, demolition noise or appearance of worksites in the setting of a heritage asset. Permanent effects are those which are irreversible, happen during construction, for example removal of archaeological remains or are ongoing, for example where changes to the current as a result of the decommissioning continue to scour geoarchaeological remains.

## Baseline and Future Baseline

1. An impact assessment for cultural heritage will typically be based on a comprehensive desk study of available study area information. The baseline report will generally be informed by the following data:

* Consultation with the Historic Environment Record, Historic England, Historic Environment Scotland or Cadw as well as local stakeholders, conservation officers and archaeological advisors.
* Information on designated heritage assets in the surrounding area: listed on the [National Heritage List for England](https://historicengland.org.uk/listing/the-list/), [Historic Environment Portal (Scotland)](http://portal.historicenvironment.scot/), or [Royal Commission on the Ancient and Historic Monuments of Wales Portal](https://rcahmw.gov.uk/discover/historic-wales/).
* Information on the known history of the site, informed by historic maps, local conservation group records, local archives etc.
* Known or likely archaeology within the study area. This may be identified through, geophysics, ground investigation, borehole sampling, test pits and/or trial trenching.

1. The baseline should also, where appropriate:

* Identify the potential for previously unrecorded archaeology within the site.
* Identify areas of uncertainty and biases or gaps in the data.
* Describe the cultural significance and value of relevant assets.
* Where relevant, describe the setting of assets and the contribution of setting to cultural significance. This may include a geological and/or topographical assessment.

1. Where subjective statements relating to cultural significance aspects such as aesthetic experience, emotions and expectations of the visitor are made, the assumptions underpinning them should be clearly set out and areas of uncertainty highlighted.

### Future Baseline

1. The future baseline is not typically considered for cultural heritage as it is unlikely that the sensitivity of receptors would change in the future. However, the licensee should demonstrate a commitment to monitor any significant changes to the legislation or policy surrounding the historic environment.

## Project Impacts and Potential Effects

1. Impacts upon the historic environment will vary according to the location of the decommissioning project and the associated infrastructure requirements offsite, which will be unique to each project.
2. The potential for buried archaeology may be limited if sites do not have any previously undisturbed soils present. There is also limited potential for a site to contain built heritage assets within the operational site.
3. Any coastal infrastructure that is due for removal has potential to give rise to impacts on marine archaeology, depending on the method of removal.   
   Discharge pipelines inland or in estuarine environments that may be removed could have potential to impact geo-archaeological deposits, however this may occur over a period of time as a result of changes to the geomorphology of the watercourse and should be informed by these assessments undertaken as part of the EIA.

Table - Example of decommission activities, impacts and effects on sensitive receptors

| Typical decommissioning activities with potential to generate impacts | Possible typical impacts arising from these activities | Possible effects on sensitive receptors |
| --- | --- | --- |
| Transport of plant, equipment and waste to and from the site; | Changes to traffic levels, noise and vibration close to heritage assets | Damage to, and/or changes to the setting of, cultural heritage assets |
| Excavation of previously undeveloped land on site | Disturbance to soils | Damage to and/or loss of buried archaeological deposits |
| Removal of underwater structures, jetties, pipelines and outfalls | Changes to coastal processes, wave patterns, erosion and water temperature | Damage to and/or loss of marine heritage assets |
| Removal of buildings and structures within the site | Changes to and from the site. | Changes to the historic landscape and setting of cultural heritage assets |

## Interface with other EIA topics

1. Consideration should be given to in-combination effects arising from interaction with other environmental topics. Topics likely to create in-combination effects relevant to cultural heritage include:

* Landscape and visual amenity.
* Noise and Vibration.
* Traffic and transport.
* Geomorphology and coastal processes.
* Geology, soils and contaminated land.

## Mitigation

1. The Inspector must be satisfied that all likely effects on the historic environment have been avoided and minimised as far as possible, and that consultation with relevant stakeholders responsible for preserving historic assets has been undertaken.
2. In order of preference, mitigation measures relevant to cultural heritage include:

### Avoid

1. These completely prevent impacts from occurring and should be incorporated in the design of the Decommissioning Strategy. This may include locating any temporary site facilities or access routes so that they are sufficiently far from heritage assets and designing the site layout to preserve potential archaeology in situ. Measures employed during activities such as demolition of site buildings and construction of temporary site infrastructure, such as fencing off assets to prevent damage, are also in this category.

### Reduce

1. These reduce the magnitude of adverse impacts and are again usually implemented at the design stage. Examples include the setting temporary infrastructure back from an asset or providing landscaping as a form of screening to reduce its visibility.

### Compensate

1. Where an impact has not been avoided the impact may be offset or compensated. Most commonly this will involve a programme of archaeological works (e.g., a watching brief including the recording of assets) to offset its physical loss. The degree to which such measures mitigate physical loss of fabric will depend on the asset in question.

# Appendix A – Regulation 13

## Change or extension to the project

1. The term change or extension [to the project] may include any change or extension to an existing decommissioning project that results in any one or more of the following:

* Changes to the commencement of works – delays or advancements in start date - alterations to the rate of decommissioning - speeding up or slowing down the process or programme of work or elements within the process or programme of work.
* Changes in the sequence of decommissioning in terms of individual operations.
* Changes to on-site arrangements in terms of alterations to the location of specific buildings or structures (e.g. waste storage areas).
* Changes or extensions to the size or scale of buildings and structures.
* Changes to any waste transportation arrangements.
* Changes in the use of resources (e.g. energy, water, materials etc).
* Changes to sentencing and waste disposal arrangements.
* Changes to waste treatment arrangements on site.
* Changes to any previously agreed emission rates from the site.
* Changes to the type of material being emitted from the site.
* Changes to the environmental media to which emissions are being released.
* Any other modifications to processes or procedures that will lead to changes or extensions that are likely to have physical effects.

1. In addition to the above, changes or extensions to other non-site factors may give rise to any of the above changes. Such factors may include:

* regulatory change over the period of decommissioning;
* climatic change considerations;
* developments in decommissioning technology over time;
* changes in working practices, including the availability or otherwise of relevant skills;
* contractual changes or relationships, including alterations to funding regimes; and
* research and development.

**Note:** These lists are not exhaustive.

1. Changes or extensions to decommissioning projects which have been issued consent under EIADR will be considered in relation to the baseline of the environmental statement. Changes or extensions to decommissioning projects which started before the regulations came into effect and therefore have not been issued with consent will be considered in relation to the original decommissioning project plan.

# References

|  |  |
| --- | --- |
| [1] | H.M Government, “Nuclear Reactors (Environmental Impact Assessment for Decommissioning) Regulations 1999,” 1999. |
| [2] | European Council, “Directive 2011/92/EU of the European Parliament and of the Council,” 2011. |
| [3] | European Council, “Directive 2014/52/EU of the European Parliament and of the Council,” 2014. |
| [4] | ONR, “Guidance on the Nuclear Reactors (Environmental Impact Assessment for Decommissioning) Regulations,” 2022. |
| [5] | ONR, “Internal Position Statement on the commencement and scope of the decommissioning project under EIADR,” 2020. |
| [6] | ONR, “ONR-INSP-GD-061 - Joint Regulatory Guidance to Support the Overarching MoU - EA and ONR”. |
| [7] | ONR, “ONR-INSP-GD-062 - Guidance to support the Joint Regulatory MoU between ONR and SEPA”. |
| [8] | ONR, “ONR-INSP-GD-063 - Joint Regulatory Guidance to Support the Overarching MoU - NRW and ONR”. |
| [9] | ONR, EA, SEPA, NRW, “The management of higher activity waste on nuclear licensed sites. Joiny guidance from the Office for Nuclear Regulation, the Environment Agency, the Scottish Environment Protection Agency and Natural Resources Wales to nuclear licensees,” Revision 2.1, July 2021. [Online]. Available: https://www.onr.org.uk/wastemanage/waste-management-joint-guidance.pdf. |
| [10] | The Planning Inspectorate, “Planning Inspectorate Advice Note Ten: Habitats Regulations Assessment relevant to nationally significant infrastructure projects,” 2017. [Online]. Available: https://infrastructure.planninginspectorate.gov.uk/legislation-and-advice/advice-notes/. |
| [11] | The Planning Inspectorate, “Planning Inspectorate Advice Note Eighteen: The Water Framework Directive,” 2018. [Online]. Available: https://infrastructure.planninginspectorate.gov.uk/legislation-and-advice/advice-notes/. |
| [12] | ONR, “NS-TAST-GD-013 - External Hazards”. |
| [13] | ONR, “NS-TAST-GD-024 - Management of Radioactive Material and Radioactive Waste on Nuclear Licensed Sites”. |
| [14] | ONR, “NS-TAST-GD-026 - Decommissioning”. |
| [15] | ONR, “NS-TAST-GD-038 - Radiological Protection”. |
| [16] | ONR, “NS-TAST-GD-083 - Land Quality Management”. |
| [17] | IAEA, “IAEA Nuclear Energy Series No. NG-T-3.11 - Managing Environmental Impact Assessment for Construction and Operation in New Nuclear Power Programmes,” 2014. |
| [18] | IAEA, “IAEA Safety Standards Series No. GSG-10 - Prospective Radiological Environmental Impact Assessment for Facilities and Activities,” 2018. |
| [19] | IAEA, “IAEA Safety Standards Series No. SSG-47 - Decommissioning of Nuclear Power Plants, Research Reactors and Other Nuclear Fuel Cycle Facilities,” 2018. |
| [20] | IAEA, “IAEA Safety Standards Series GSR Part 6 - Decommissioning of Facilities,” 2014. [Online]. Available: https://www-pub.iaea.org/MTCD/Publications/PDF/Pub1652web-83896570.pdf. |
| [21] | European Union, “Environmental Impact Assessment of Projects: Guidance on Screening,” 2017. [Online]. Available: https://ec.europa.eu/environment/eia/pdf/EIA\_guidance\_Screening\_final.pdf. |
| [22] | European Union, “Environmental Impact Assessment of Projects: Guidance on Scoping,” 2017. [Online]. Available: https://ec.europa.eu/environment/eia/pdf/EIA\_guidance\_Scoping\_final.pdf . |
| [23] | European Union, “Environmental Impact Assessment of Projects: Guidance on the preparation of the Environmental Impact Assessment Report,” 2017. [Online]. Available: https://ec.europa.eu/environment/eia/pdf/EIA\_guidance\_EIA\_report\_final.pdf. |
| [24] | The Planning Inspectorate, “Planning Inspectorate Advice Note Eleven: Working with public bodies in the infrastructure planning process,” 2017. [Online]. Available: https://infrastructure.planninginspectorate.gov.uk/legislation-and-advice/advice-notes/. |
| [25] | The Planning Inspectorate, “Planning Inspectorate Advice Note Seven: Environmental Impact Assessment: Process, Preliminary Environmental Information and Environmental Statements,” 2017. [Online]. Available: https://infrastructure.planninginspectorate.gov.uk/legislation-and-advice/a. |
| [26] | The Planning Inspectorate, “Planning Inspectorate Advice Note Twelve: Transboundary Impacts and Process,” 2017. [Online]. Available: https://infrastructure.planninginspectorate.gov.uk/legislation-and-advice/advice-notes/. |
| [27] | The Planning Inspectorate, “Planning Inspectorate Advice Note Seventeen: Cumulative effects assessment relevant to nationally significant infrastructure projects,” 2017. [Online]. Available: https://infrastructure.planninginspectorate.gov.uk/legislation-and-advice/advice-notes/. |
| [28] | IEMA, “Environmental Impact Assessment (EIA) guide – Delivering Quality Development,” July 2016. [Online]. Available: https://www.iema.net/download-document/7014. |
| [29] | IEMA, “Environmental Impact Assessment Guide to: Shaping Quality Development,” [Online]. Available: https://www.iema.net/download-document/7018. |
| [30] | IEMA, “Special IEMA report: The State of Environmental Impact Assessment Practice in the UK,” [Online]. Available: https://www.iema.net/articles/special-iema-report-on-eia. |
| [31] | J. Glasson and R. Therivel, Introduction to Environmental Impact Assessment - 5th Edition, New York, NY, US: Routledge, 2019. |
| [32] | R. Therivel and G. Wood, Methods of Environmental and Social Impact Assessment - 4th Edition, New York, NY, US: Routledge, 2017. |
| [33] | The Planning Inspectorate, “Advice Note Nine: Rochdale Envelope, Version 3,” 2018. [Online]. Available: https://infrastructure.planninginspectorate.gov.uk/wp-content/uploads/2013/05/Advice-note-9.-Rochdale-envelope-web.pdf. |
| [34] | H.M Government, “Planning Act 2008: guidance on the pre-application process for major infrastructure projects,” 2015. [Online]. Available: https://www.gov.uk/government/publications/guidance-on-the-pre-application-process-for-major-infrastructure-projects. |
| [35] | ONR, “NS-INSP-GD-035 - LC35 Decommissioning”. |
| [36] | CIEEM, “Guidelines for Ecological Impact Assessment in the UK and Ireland: Terrestrial, Freshwater, Coastal and Marine,” 2018. [Online]. Available: https://cieem.net/wp-content/uploads/2018/08/ECIA-Guidelines-2018-Terrestrial-Freshwater-Coastal-and-Marine-V1.2-April-22-Compressed.pdf. |
| [37] | JNCC, “Handbook for Phase 1 Habitat Survey – A Technique for Environmental Audit (2010),” 2016. [Online]. Available: https://data.jncc.gov.uk/data/9578d07b-e018-4c66-9c1b-47110f14df2a/Handbook-Phase1-HabitatSurvey-Revised-2016.pdf. |
| [38] | Highways England, “Design Manual for Roads and Bridges (DMRB) - LA 108 - Biodiversity,” March 2020. [Online]. Available: https://www.standardsforhighways.co.uk/prod/attachments/af0517ba-14d2-4a52-aa6d-1b21ba05b465?inline=true. |
| [39] | H.M Government, “Protected species and development: advice for local planning authorities,” 2022. [Online]. Available: https://www.gov.uk/guidance/protected-species-how-to-review-planning-applications. |
| [40] | BSI, “BS4202044:2013 - Biodiversity code of practice for planning and development,” London, 2013. |
| [41] | CIEEM, “Advice note on the Lifespan of Ecological Reports and Surveys,” April 2019. [Online]. Available: https://cieem.net/wp-content/uploads/2019/04/Advice-Note.pdf. |
| [42] | Natural England, “Biodiversity Metric 2.0,” December 2019. [Online]. Available: http://publications.naturalengland.org.uk/file/6192854953361408. |
| [43] | JNCC, “Marine Monitoring Handbook,” 2001. [Online]. Available: https://data.jncc.gov.uk/data/ed51e7cc-3ef2-4d4f-bd3c-3d82ba87ad95/marine-monitoring-handbook.pdf. |
| [44] | Highways England, “LA111 - Noise and Vibration (Revision 2),” May 2020. [Online]. Available: https://www.standardsforhighways.co.uk/prod/attachments/cc8cfcf7-c235-4052-8d32-d5398796b364?inline=true. |
| [45] | IEMA, “Launch Webinar: IEMA Guidelines for Environmental Noise Impact Assesment 2014,” [Online]. Available: https://www.iema.net/resources/watch-again/2014/10/06/launch-webinar-iema-guidelines-for-environmental-noise-impact-assesment-2014. |
| [46] | BSI, “BS 7445-1:2003 Description and measurement of environmental noise. Guide to quantities and procedures,” 2003. |
| [47] | H.M Government, “Control of Pollution Act 1974,” 1974. [Online]. Available: https://www.legislation.gov.uk/ukpga/1974/40/section/72. |
| [48] | BSI, “BS 5228-1: 2009+A1:2014. Code of practice for noise and vibration control on construction and open sites. Noise,” 2014. [Online]. Available: https://shop.bsigroup.com/ProductDetail/?pid=000000000030258086. |
| [49] | BSI, “British Standard Institution (2014) BS 5228-2: 2009+A1:2014. Code of practice for noise and vibration control on construction and open sites. Vibration,” 2014. [Online]. Available: https://shop.bsigroup.com/ProductDetail/?pid=000000000030258089. |
| [50] | European Council, “Directive 2008/50/EC of the European Parliament and of the Council of 21 May 2008 on ambient air quality and cleaner air for Europe,” [Online]. Available: https://eur-lex.europa.eu/legal-content/EN/TXT/?qid=1486474738782&uri=CELEX:02008L0050-20150918. |
| [51] | Highways England, “LA105 - Air Quality,” November 2019. [Online]. Available: https://www.standardsforhighways.co.uk/prod/attachments/10191621-07df-44a3-892e-c1d5c7a28d90. |
| [52] | EPUQ and IAQM, “Land-Use Planning & Development Control: Planning For Air Quality - Guidance from Environmental Protection UK and the Institute of Air Quality Management for the consideration of air quality within the land-use planning and development control processes,” January 2017. [Online]. Available: http://www.iaqm.co.uk/text/guidance/air-quality-planning-guidance.pdf. |
| [53] | European Council, “Directive 2008/50/EC of the European Parliament and of the Council - The Air Quality Directive,” 2008. [Online]. Available: https://www.legislation.gov.uk/eudr/2008/50/contents. |
| [54] | Defra, “Policy Guidance (PG09)- Part IV of the Environment Act 1995 - Local Air Quality Management,” February 2009. [Online]. Available: https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment\_data/file/69348/pb13566-laqm-policy-guidance-part4-090302.pdf. |
| [55] | DEFRA, “Clean Air Strategy 2019,” 2019. [Online]. Available: https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment\_data/file/770715/clean-air-strategy-2019.pdf. |
| [56] | IEMA, “Environmental Impact Assessment Guide to: Assessing Greenhouse Gas Emissions and Evaluating their Significance,” May 2017. [Online]. Available: https://www.iaia.org/pdf/wab/EIA%20Guide\_GHG%20Assessment%20and%20Significance\_IEMA\_16May17.pdf. |
| [57] | Highways England, “LA 114 Climate,” June 2021. [Online]. Available: https://www.standardsforhighways.co.uk/prod/attachments/d1ec82f3-834b-4d5f-89c6-d7d7d299dce0?inline=true. |
| [58] | IEMA, “Climate Change Resilience and Adaptation,” 2015. [Online]. Available: https://www.iaia.org/pdf/wab/IEMA%20Guidance%20Documents%20EIA%20Climate%20Change%20Resilience%20and%20Adaptation.pdf . |
| [59] | Environment Agency, “Guidance - Flood risk assessments: climate change allowances,” May 2022. [Online]. Available: https://www.gov.uk/guidance/flood-risk-assessments-climate-change-allowances. |
| [60] | IEMA, “Socioeconomic assessment in improving EIA,” 2014. [Online]. Available: https://transform.iema.net/article/socio-economic-assessment-and-improving-eia . |
| [61] | Highways England, “LA 112 Population and Human Health,” January 2020. [Online]. Available: https://www.standardsforhighways.co.uk/prod/attachments/1e13d6ac-755e-4d60-9735-f976bf64580a?inline=true. |
| [62] | H.M Government, “The Energy Act 2004,” 2004. [Online]. Available: https://www.legislation.gov.uk/ukpga/2004/20/contents. |
| [63] | NDA, “The Nuclear Decommissioning Authority Strategy,” 2016. [Online]. Available: https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment\_data/file/512836/Nuclear\_Decommissioning\_Authority\_Strategy\_effective\_from\_April\_2016.pdf . |
| [64] | H.M Treasury, “The Green Book,” 2018. [Online]. Available: https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment\_data/file/685903/The\_Green\_Book.pdf. |
| [65] | Homes and Communtities Agency, “Additionality Guide,” 2014. [Online]. Available: https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment\_data/file/378177/additionality\_guide\_2014\_full.pdf. |
| [66] | WHO, “WHO Constitution,” 1946. [Online]. Available: https://www.who.int/about/governance/constitution. |
| [67] | Department of Energy and Climate Change, “Overarching National Policy Statement for Energy (EN-1),” July 2011. [Online]. Available: https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment\_data/file/47854/1938-overarching-nps-for-energy-en1.pdf. |
| [68] | IEMA, “Health in Environmental Impact Assessment A Primer for a Proportionate Approach,” February 2022. [Online]. Available: https://www.researchgate.net/publication/358589432\_Health\_in\_Environmental\_Impact\_Assessment\_A\_Primer\_for\_a\_Proportionate\_Approach. |
| [69] | IEMA, “Materials and Waste in Environmental Impact Assessment. Guidance for a proportionate approach,” 2020. [Online]. Available: https://www.iema.net/policy/ce/materials-and-waste-in-eia/. |
| [70] | Department for Transport, “Road Traffic Forecasts 2018,” 2018. [Online]. Available: https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment\_data/file/873929/road-traffic-forecasts-2018-document.pdf. |
| [71] | Defra, “Guidance - Flood risk assessments if you're applying for planning permission,” February 2017. [Online]. Available: https://www.gov.uk/guidance/flood-risk-assessment-for-planning-applications. |
| [72] | Scottish Government, “Scottish Planning Policy,” December 2020. [Online]. Available: https://www2.gov.scot/Resource/0045/00453827.pdf. |
| [73] | Environment Agency, “Collection - Abstraction licensing strategies (CAMS process),” [Online]. Available: https://www.gov.uk/government/collections/water-abstraction-licensing-strategies-cams-process. |
| [74] | Highways England, “LA 113 - Road drainage and the water environment,” [Online]. Available: https://www.standardsforhighways.co.uk/dmrb/search/d6388f5f-2694-4986-ac46-b17b62c21727. |
| [75] | DEFRA, *Statutory Guidance: UK Marine Policy Statement,* https://www.gov.uk/government/publications/uk-marine-policy-statement, 2020. |
| [76] | Scottish Government, *Scotland's National Marine Plan,* https://www.gov.scot/publications/scotlands-national-marine-plan/, 2015. |
| [77] | Welsh Government, *Welsh National Marine Plan,* https://www.gov.wales/marine-planning, 2019. |
| [78] | Landscape Institute, “GLVIA3 survey – The results (November 2021 update),” 2021. [Online]. Available: https://www.landscapeinstitute.org/technical/glvia3-panel/. |
| [79] | Historic England, “Conservation Principles, Policies and Guidance,” April 2008. [Online]. Available: https://historicengland.org.uk/images-books/publications/conservation-principles-sustainable-management-historic-environment/conservationprinciplespoliciesandguidanceapril08web/. |
| [80] | Ministry of Housing, Communities and Local Government, “National Planning Policy Framework,” 2021. [Online]. Available: https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment\_data/file/1005759/NPPF\_July\_2021.pdf. |
| [81] | Ministry of Housing, Communities and Local Government, “Guidance - Historic environment,” July 2019. [Online]. Available: https://www.gov.uk/guidance/conserving-and-enhancing-the-historic-environment#decision-making-historic-environment. |

# Glossary and Abbreviations

|  |  |
| --- | --- |
| ALARA | As Low As Reasonably Achievable |
| ALARP | As Low As Reasonably Practicable |
| AQAP | Air Quality Action Plan |
| AQMA | Air Quality Management Area |
| BAT | Best Available Technique |
| CAS | The Clean Air Strategy 2019 |
| CEA | Cumulative Effect Assessment |
| CEMP | Construction Environmental Management Plan |
| CIEEM | Chartered Institute for Ecology and Environmental Management |
| CSM | Conceptual Site Model |
| DEFRA | Department for Environment, Food and Rural Affairs |
| DMRB | Design Manual for Roads and Bridges |
| EA | Environment Agency |
| EcIA | Ecology Impact Assessment |
| EEA | European Economic Area |
| EIA | Environmental Impact Assessment |
| EIADR | Nuclear Reactors (Environmental Impact Assessment for Decommissioning) Regulations 1999 (as amended) |
| EMP | Environmental Management Plan |
| EPUK | Environmental Protection UK |
| ES | Environmental Statement |
| EU | European Union |
| GHG | Green House Gas |
| HRA | Habitats Regulations Assessment |
| IAEA | International Atomic Energy Agency |
| IEMA | Institute of Environmental Management and Assessment |
| IAQM | Institute of Air Quality Management |
| LVIA | Landscape and Visual Impact Assessment |
| MCA | Maritime & Coastguard Agency |
| MMO | Marine Maritime Organisation |
| NIA | Navigational impact assessment |
| NOx | Nitrogen oxide |
| NO2 | Nitrogen dioxide |
| NPS | National Policy Statement |
| NPPF | National Planning Policy Framework |
| NTS | Non-Technical Summary |
| NRW | Natural Resource Wales |
| ONR | Office for Nuclear Regulation |
| PM2.5 | Particulate matter |
| SAC | Special Area of Conservation |
| SAP | Safety Assessment Principles |
| SEPA | Scottish Environment Protection Agency |
| SeIA | Socio-economic Impact Assessment |
| SFAIRP | So far as is reasonably practicable |
| SPA | Special Protection Area |
| SWMP | Site Waste Management Plan |
| SSSI | Site of Special Scientific Interest |
| TAG | Technical Assessment Guide |
| TIG | Technical Inspection Guide |
| WCH | Walkers, cyclists and horse-riders |
| WFD | Water Framework Directive |
| ZoI | Zone of Influence |
| ZTV | Zone of Theoretical Visibility |

Table - Glossary of Terms

| Glossary of Terms | |
| --- | --- |
| Term | Explanation |
| Alternatives | Different ways of carrying out the Project in order to meet the agreed objective.  Alternatives can take diverse forms and may range from minor adjustments to the Project, to a complete reimagining of the Project, for example options of locations, design (scales / layouts), processes and procedures. |
| Competent Authority (CA) | The organisation that determined whether a project should be consented or not and responsible for performing the duties arising from the EIA Directive – The ONR is the CA for the EIADR. |
| Cumulative effects | Changes to the environment that are caused by activities/projects in combination with other activities/projects. |
| Environmental Baseline | Description of the current status of the environment in and around the area in which the Project will be located. |
| Environmental Effect | The consequences of an impact. |
| Environmental Impact | The changes resulting from an action. |
| Environmental Statement | A document that reports the findings of the EIA process. May also be referred to as Environmental Report or Environmental Impact Assessment Report |
| European Designated Site | European Designated Site (also referred to as Natura 200 sites) are statutory protection designated under the HRA process are Special Protection Areas (SPA’s) which contain habitat of importance for certain wild birds and Special Areas of Conservation (SAC’s) which provide habitat of importance for a range of other fauna and flora. Sites designated as Ramsar (wetlands of international importance) are also subject to the same processes as those for SPA/SAC’s. |
| Future Environmental Baseline | ‘No project’ future state of the environmental baseline both in and around the area in which the Project will be located, taking into account changes resulting from natural events and from other human activities. |
| Indirect impact | Impact that is not a direct result of the project, but that emerge through a complex impact pathway, possibly some distance or time from the Project’s direct impacts. |
| Pre-application | Also known as ‘scoping’. A process that seeks to identify at an early stage, from all of a project’s possible impacts and from all the alternatives that could be addressed, those that are the crucial, significant issues. |
| Pre-application Opinion | The ONRs response to a Pre-application Report / request. |
| Pre-application Report | A document that presents the findings of the Pre-application process, including presenting the content and extent of the information to be submitted to the Competent Authority under the EIA process, generally including geographical and temporal scale, possible methodologies to use, possible alternatives, and whom to consult during the EIA process. |
| Reasonably foreseeable future projects | Projects that are currently known to the planning system or already within the consenting process. |
| Receptor | Any component of the natural or man-made environment that is potentially significantly affected by a development. |
| Reasoned Conclusion | The Reasoned Conclusion (as per the EIA Directive) is the outcome of an assessment undertaken by the Competent Authority that is separate from the Developer’s assessment. It includes an assessment of the information provided in the EIA Report, an assessment of the results of consultations, and, if adequate, the Competent Authority’s supplementary assessment and resulting decision on the environmental effects of the Project. |
| Return Period | Return period is the average interval of time between events that equal or exceed a particular magnitude |

1. Retained EU law is domestic law created at the end of the EU Exit transition period that consists of any EU-derived legislation that was preserved in the UK domestic legal framework by the European Union (Withdrawal) Act 2018. [↑](#footnote-ref-2)
2. A full list of MOUs between ONR and agencies can be found on the ONR website at the following address: [ONR - Agency Agreements, Memoranda of Understanding (MoUs) and working arrangements protocol](https://www.onr.org.uk/agency-agreements-mou.htm) [↑](#footnote-ref-3)
3. Approved copies of ONR inspection and assessment guides can be found on the ONR website at the following address: [Office for Nuclear Regulation (ONR) Permissioning inspection - Technical assessment guides](https://www.onr.org.uk/operational/tech_asst_guides/index.htm) [↑](#footnote-ref-4)
4. Under the Wildlife and Countryside Act, 1981 as amended [↑](#footnote-ref-5)
5. under the Wild Birds Directive (79/404/EEC) [↑](#footnote-ref-6)
6. under the Habitats Directive (92143/EEC) [↑](#footnote-ref-7)
7. Within the meaning of the National Parks and Access to the Countryside Act 1949 [↑](#footnote-ref-8)
8. Under article 11(2) of the 1972 UNESCO Convention Concerning the Protection of the World Cultural and Natural Heritage. [↑](#footnote-ref-9)
9. Within the meaning of the Ancient Monuments and Archaeological Areas Act 1929 [↑](#footnote-ref-10)
10. Designated as such by an order made by Natural England under the Countryside and Rights of Way Act 2000 [↑](#footnote-ref-11)
11. Technologies and processes used within the Project. [↑](#footnote-ref-12)
12. It should be noted that Article 37 of EURATOM requires the transboundary impacts on EEA States as the result of the disposal of radioactive waste associated with certain operations and actions. Following the UK’s exit from the European Union, the requirements of Article 37 have been replaced in UK law by the Transboundary Radioactive Contamination (England) Direction 2020, and the Transboundary Radioactive Contamination (Scotland) Direction 2021. The equivalent direction for Wales is yet to be published. If the licensee has made an assessment of transboundary impacts on EEA States then this should be referenced in the ES. [↑](#footnote-ref-13)
13. **Source**: BS5228-1 2009+A1-2014: Code of Practice for noise and vibration control at open construction sites: Noise. **Note**: A potential significant effect is indicated if the LAeq,T noise level arising from the site exceeds the threshold level for the category appropriate to the ambient noise level. [↑](#footnote-ref-14)
14. The term '**free field**' is used to define noise levels that have been measured or predicted in the absence of any influence of reflections from nearby surfaces, other than the ground. [↑](#footnote-ref-15)
15. EU Limit values are legally binding EU parameters that must not be exceeded. Limit values are set for individual pollutants and are made up of a concentration value, an averaging time over which it is to be measured, the number of exceedances allowed per year, if any, and a date by which it must be achieved. Some pollutants have more than one limit value covering different achievement dates or averaging times. [↑](#footnote-ref-16)
16. Refer to the following address for further information: [Guidance | LAQM (defra.gov.uk)](https://laqm.defra.gov.uk/guidance/) [↑](#footnote-ref-17)
17. Whilst decommissioning of sites must go ahead, the Do-Nothing scenario would be representative of existing air quality and would act as a basis of comparison for decommissioning activities. If unacceptable air quality impacts are predicted, then further mitigation measures would be applicable. These could include, but not limited to, greater dust control, changes in traffic management and routing of road vehicles associated with demolition, changes in programme to smooth peak transport movements of plant, equipment, waste and workers associated with demolition. [↑](#footnote-ref-18)
18. Further guidance on the approach to undertaking remediation options appraisal can be found at the following address: [LCRM: Stage 2 options appraisal - GOV.UK (www.gov.uk)](https://www.gov.uk/government/publications/land-contamination-risk-management-lcrm/lcrm-stage-2-options-appraisal) [↑](#footnote-ref-19)
19. Separate Town and Country Planning regulations for Environmental Impact Assessment were passed in Scotland, Wales and Northern Ireland, all in 2017, transposing the EU EIA Directive of 2014 [↑](#footnote-ref-20)
20. It is noted that the assessment of soil quality and the Best and Most Versatile Agricultural Land is a separate assessment that would be assessed in a soils/geology assessment. [↑](#footnote-ref-21)
21. This includes but is not limited to the Countryside and Rights of Way Act 2000; Land Reform (Scotland) Act 2016.  [↑](#footnote-ref-22)