



# **Defence Equipment and Support Submarine Dismantling Project**

## **Intermediate-Level Waste Storage Site Selection: Strategic Environmental Assessment Scoping Report**

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# 1 Introduction

## 1.1 Overview

The overarching objective of the Submarine Dismantling Project (SDP) is to develop and implement a timely solution for the dismantling and ultimate disposal of the UK's 27 defueled nuclear submarines at the end of their life. This report presents the proposed scope of the Strategic Environmental Assessment (SEA) for the transportation and interim storage of the submarine Reactor Pressure Vessels (RPVs) as part of the SDP. This SEA builds upon the previous, overarching 2011/12 SEA which considered the end-to-end process of submarine dismantling but was not able to consider any specific locations for potential storage of the RPVs, which are classified as Intermediate-Level radioactive Waste (ILW).

## 1.2 Context

The SDP, formerly known as Project ISOLUS (Interim Storage of Laid-Up Submarines), was established in 2000. It extends over a 60-year period, and encompasses the provision of facilities, personnel and processes to dismantle the defueled nuclear submarines, up to and including Vanguard Class<sup>1</sup>.

Three public consultations on the project have been held to date. The most recent of these was undertaken between October 2010 and February 2011 in conjunction with the technical assessment of the options for submarine dismantling, including how the radioactive materials should be removed from the submarines, and where this should be done.

As part of this assessment process, an SEA was undertaken on the potentially significant whole-life environmental effects of submarine dismantling. This was undertaken at both a generic level and at a site-specific level for the locations of the candidate initial dismantling sites. The resulting SDP Environmental Report<sup>2</sup> was one of the key consultation documents.

The findings of the previous SEA and stakeholder comments received<sup>3</sup> were then used to inform decision-making on the way forward. The assessment of comments received can be found in MOD's Response to Consultation<sup>4</sup>, whilst the SEA Post-Adoption Report<sup>5</sup> provides greater detail about how the previous SEA took the findings of the assessment into account in coming to its decisions.

Following approval of the project's first Main Gate Business Case (MGBC1), the MOD announced in March 2013 that the RPVs will be removed from the submarines and stored intact. All radioactive materials will be removed from the submarines in situ, at Rosyth

<sup>1</sup> i.e. not including the new Astute class or the next planned class of submarine (known as 'Successor') – see Section 2.1.

<sup>2</sup> Amec Environment and Infrastructure (2011). *Submarine Dismantling Project: Strategic Environmental Assessment: Environmental Report*. Issue 1.0. Available from: [https://www.gov.uk/government/uploads/system/uploads/attachment\\_data/file/34113/20111021SDP\\_SEA\\_Reportv1\\_0WEB\\_U.pdf](https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/34113/20111021SDP_SEA_Reportv1_0WEB_U.pdf) plus non-technical summary: Amec Environment and Infrastructure (2011). *Submarine Dismantling Project Strategic Environmental Assessment: Non-Technical Summary*. Available from: [https://www.gov.uk/government/uploads/system/uploads/attachment\\_data/file/157989/20111000SDP\\_SEA\\_NonTechSummaryWEBU.pdf](https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/157989/20111000SDP_SEA_NonTechSummaryWEBU.pdf)

<sup>3</sup> Defence Equipment and Support and Ministry of Defence (2012). *Submarine Dismantling Project: Post Consultation Report: Environmental Report*. Available from: [https://www.gov.uk/government/uploads/system/uploads/attachment\\_data/file/35911/post\\_consultation\\_report.pdf](https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/35911/post_consultation_report.pdf)

<sup>4</sup> Ministry of Defence, March 2013. *Submarine Dismantling Project: MOD's Response to Consultation*. Available from: [https://www.gov.uk/government/uploads/system/uploads/attachment\\_data/file/229356/20130322-MODs\\_Response\\_for\\_web\\_correct.pdf](https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/229356/20130322-MODs_Response_for_web_correct.pdf)

<sup>5</sup> Defence Equipment and Support (2013). *Submarine Dismantling Project: Post Adoption Statement*. Issue 1.0. Available from: [https://www.gov.uk/government/uploads/system/uploads/attachment\\_data/file/229357/20130315-SDP\\_SEA\\_PAR\\_V1\\_0\\_updated-U.pdf](https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/229357/20130315-SDP_SEA_PAR_V1_0_updated-U.pdf)

(where seven boats are stored) and at Devonport (where 11 boats are stored and where the remaining nine boats, which are still in service, will be stored once they have left service). The first submarine will be dismantled at Rosyth as a demonstration of the radioactive waste removal process. The completion of this demonstration, however, is subject to a storage solution being agreed for the RPVs and any necessary planning approvals obtained.

In the first instance, the low-level waste (LLW) will be removed from the submarines and sent for disposal at existing licensed facilities such as the UK LLW repository (LLWR). Once the necessary approvals and permits have been received for the construction of the interim intermediate-level radioactive waste (ILW) storage facility, the RPVs will be removed intact so that they can be sent there for storage until the UK's planned Geological Disposal Facility (GDF) is developed, in accordance with the Government's policy on the long-term management of higher-activity radioactive waste<sup>12</sup>.

The original intent had been to propose a specific interim ILW storage site in the MGBC1 submission. However, it was decided not to compare specific storage sites at that stage because of the different contexts and developing strategies affecting different types of site. For example, the NDA was at a sensitive stage in its exploration with stakeholders of the opportunities to consolidate ILW across its current and planned storage facilities.

Only the type of site could therefore be factored into the option assessment at that stage (i.e. differentiated by ownership and its proximity to an initial dismantling site). Joint economic assessment with the NDA, however, revealed relatively little difference in cost and performance between these different types of site, so no recommendation about site type could be made as part of the business case submission.

Now that MGBC1 decisions have been taken, a further stage of analysis and public consultation is necessary to determine the specific interim ILW storage site. Stakeholders recommended that the SDP's analysis must consider all potential ISS, including NDA sites, on a 'level playing field'. The SDP received legal advice that this would also be the most robust approach in demonstrating a rational and transparent site selection process, and so the Screening and Option Assessment processes described below have been designed on that basis.

### 1.3 Requirement for SEA

At the time of the overarching SDP SEA, it was not possible to identify individual candidate ILW storage sites. As a result, the previous SEA could only consider generic ILW storage options, and the lack of site-specific information was noted as an uncertainty in the Environmental Report.

The SEA Regulations in England<sup>6</sup> and Wales<sup>7</sup> and SEA Act<sup>8</sup> in Scotland require that an SEA develops alongside and influences the plan or programme it is assessing. At the time of the previous SEA, it was acknowledged that the assessment would need to be revisited to consider alternative ILW storage sites, once these were identified.

As part of the interim ILW storage site selection process, the previous SEA is therefore being reviewed and applied to assess the potentially significant environmental effects of developing, operating and eventually decommissioning ILW storage facilities for the RPVs at

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<sup>6</sup> *Environmental Assessment of Plans and Programmes Regulations 2004*, S.I. 2004 No. 1633. <http://www.legislation.gov.uk/ukSI/2004/1633/contents/made>

<sup>7</sup> *The Environmental Assessment of Plans and Programmes (Wales) Regulations 2004*. S.I. 2004 No.1656 (W.170). <http://www.legislation.gov.uk/wsi/2004/1656/contents/made>

<sup>8</sup> *Environmental Assessment (Scotland) Act 2005*. <http://www.legislation.gov.uk/asp/2005/15/contents>

each candidate site, and to consider the wider effects that this could have on the other elements of the submarine dismantling process (and hence the conclusions of the original assessment).

This SEA will again follow the statutory process as detailed in the 2011 Environmental Report<sup>2</sup>, but focuses upon ILW storage. The results will be presented in an Environmental Report and published in support of the forthcoming public consultation which forms an integral part of the site selection process. This Scoping Report should be considered in the context of the 2011 SDP Environmental Report<sup>2</sup>.

## 1.4 Purpose of this Report

This Scoping Report sets out the proposed scope and level of detail of the information to be included in the SEA assessment of ILW storage and associated transport, and in the subsequent Environmental Report. The purpose of this report is to:

- Set out MOD's proposed approach for undertaking the SEA; and
- Provide scoping consultees with sufficient information to enable them to comment on whether the scope and level of detail are appropriate and comply with the statutory requirements<sup>9</sup>.

It includes relevant contextual information on those 'existing' Licensed or Authorised Nuclear sites which have been assessed (through a separate site screening process) as being potentially able to store the 27 RPVs.

This Scoping Report includes the following key information:

- An updated review of generic and site-specific plans and programmes;
- A site-specific evidence base for the assessment of ILW storage site alternatives;
- A proposed assessment methodology and technical scope for the assessment, to ensure that the SEA is focussed on potentially significant issues; and
- The proposed geographical (spatial) and temporal (approximate timescale) scope for the SEA.

## 1.5 ILW storage Scoping Report Structure

This Scoping Report is structured as outlines in Table 1.1 on the following page.

**Table 1.1: Structure of this SEA Scoping Report**

Section	Description
Section 1: Introduction (pp 1 - 5)	Summarises the context in which the SEA is being produced, and explains how to respond to the scoping consultation.
Section 2: The Submarine Dismantling Project (pp 6 - 12)	Outlines the evolution of the SDP in more detail.

<sup>9</sup> EU Directive 2001/42/EC on the assessment of certain plans and programmes on the environment, enacted through national legislation in England and Scotland – see Section 1.3.

Section	Description
Section 3: Approach to Scoping the SEA (pp 13 - 17)	Summarises the approach taken to develop the proposed technical, geographical and temporal scope of the SEA (assessment stage).
Section 4: Review of Plans, Programmes and Environmental Protection Objectives (pp 18 - 19)	Details relevant national and regional documents and describes how these are relevant to ILW storage.
Section 5: Baseline Information and Local Context (pp 20 - 71)	Details relevant plans, programmes and baseline conditions at the candidate ILW storage sites, and the likely evolution of baseline conditions following a 'business as usual' model.
Section 6: Proposed Scope of the SEA (pp 72 - 81)	Outlines how the MOD proposes to assess and report on the potentially significant environmental effects of ILW storage proposals.
Section 7: Summary and Next Steps (pp 82 - 84)	Provides the conclusion of the Scoping Report and details the next steps in the assessment process.
Annexes	Provide supporting detail as referred to in the main body of the Scoping Report.

## 1.6 How to Comment on this Scoping Report and Key Questions

This Scoping Report has been sent to the UK Statutory Consultees identified under the SEA Regulations<sup>10</sup>. Other relevant central Government departments and agencies will also be invited to provide input. Comments are invited during the five-week SEA scoping consultation period, which starts on 13<sup>th</sup> February and finishes on 21<sup>st</sup> March.

This comment period is part of the project's broader 'pre-engagement' programme, which starts alongside but will continue beyond the SEA scoping consultation period. Pre-engagement gives stakeholders and the wider public an early opportunity to understand how the process is developing and – by commenting on published project documents - a chance to help shape the site comparison studies and the main Public Consultation.

At the same time, MOD is taking the opportunity to set out any provisional conclusions reached concerning sites that are not being taken forward for detailed assessment because they are either unavailable or unsuitable for an ILW store.

The documents available with this Scoping Report on the SDP web pages<sup>11</sup> include:

- *Approach to Decision-Making* – an overview of the decision process for selection of an Interim ILW Storage Site;

<sup>10</sup> The Environment Agency, English Heritage, Natural England, Northern Ireland Environment Agency, Scottish government, Historic Scotland, Scottish Natural Heritage, Scottish Environment Protection Agency, Welsh government, Cadw (Welsh Historic Monuments), Natural Resources Wales.

<sup>11</sup> <https://www.gov.uk/government/publications/submarine-dismantling-project-interim-storage-of-intermediate-level-radioactive-waste>



- *Provisional Criteria and Screening Report (CSR)* – a description of the work done to date on ILW storage site screening; and
- *Approach to Public and Stakeholder Engagement* – overview of how MOD intends to engage the public and stakeholders as part of its decision making process.

The shortlist and SEA scope will be confirmed once any feedback has been considered. Comments relating to the SEA scope, the screening process or the decisions made to date will be assessed at the end of the comment period. If they cannot be addressed until more detailed analysis has been carried out, or if they relate to wider technical or socio-technical aspects of radioactive waste, they will be considered when the relevant analysis starts and then added for reporting purposes to the comments received during the main ILW storage site consultation period.

A formal Consultation Document will be issued as part of the public consultation currently planned for late 2014, which will be the main opportunity for members of the public to comment on MOD's decision process and assessment of the shortlisted sites, including the SEA.

We would welcome your views on this Scoping Report. The consultation period will run from Thursday, 13<sup>th</sup> February to Friday, 21<sup>st</sup> March 2014. We are particularly interested to receive your views on the following:

- 1. Do you have any comments on the proposed alternative options outlined for the SDP?** These are presented in Section 2.
- 2. Are there additional plans, programmes or environmental protection objectives which should be considered in the SEA?** The national and regional-level documents are presented in Section 4; the site-specific documents are included in the baselines at Section 5. If there are any additional plans, programmes or objectives identified, please state their source, how they are relevant to the assessment of the SDP and what objectives they contain. Please also state whether the objectives they contain are captured by other documents already reviewed.
- 3. Do you agree with the baseline information?** The baseline assessments for the candidate sites are presented in Section 5. Is the information accurate, and is there any relevant information still missing? If so, please forward details.
- 4. Do you agree with the updated SEA objectives and assessment questions?** These are shown in Section 6. Are there topics which should be scoped in or out of consideration during the assessment stage? If so, please describe the reasons for this and state what additional objectives (if any) would be relevant.
- 5. Do you have any further suggestions regarding the proposed approach to SEA?**

Please provide comments by 5pm on Friday, 21<sup>st</sup> March 2014. Comments should be sent to:

Mark Sanderson

**Email:** [mark.sanderson976@mod.uk](mailto:mark.sanderson976@mod.uk)

## 2 The Submarine Dismantling Project

### 2.1 Background

The overall aim of the SDP is to deliver a timely and cost-effective solution for the dismantling of the UK's defueled nuclear-powered submarines which is safe, environmentally responsible, secure and cost-effective, and which inspires confidence. The MOD established the SDP (formerly known as 'ISOLUS') in 2000 to dismantle the Royal Navy's 27 defueled nuclear-powered submarines (from 'Dreadnought' up to and including Vanguard Class) after they have left service, including the 18 currently stored afloat at Rosyth and Devonport, and a further nine yet to leave service.

Dismantling of the new Astute class, currently being brought into service, and the next planned class of submarine (known as 'Successor') will be subject to future decisions and are not within the scope of the SDP, although the project is required, where possible, to retain the flexibility to be able to extend facilities in the future should a decision be taken to accommodate further classes.

Of the 11 submarines stored at Devonport, seven await defueling. The seven submarines at Rosyth are all defueled.

SDP, which will provide an alternative to the continued afloat storage of the defueled submarines, consists of the following elements, all of which were assessed by the previous overarching SEA:

- Removing all radioactive materials from the submarines in situ at both Rosyth and Devonport. This is known as 'initial dismantling' and will be subject to specific regulatory approvals from the Office of Nuclear Regulation (ONR), the Environment Agency (EA) and the Scottish Environment Protection Agency (SEPA) as appropriate before work can begin.
- Dismantling the submarines at a conventional UK Ship Recycling facility, once initial dismantling has been completed and radiological clearance has been approved by the Regulator. As much of the residual material as possible will be reused or recycled, in line with the UK Ship Recycling strategy.
- Provision of a land-based Interim Storage facility for the 27 Reactor Pressure Vessels (RPVs), which are classified as ILW. This facility is required because, unlike low-level waste (LLW), there is currently no national disposal route available. The RPVs will be held in the interim store until the proposed UK ILW disposal facility, referred to in this report as the GDF<sup>12</sup>, becomes available, sometime after 2040. ***This element is the subject of this SEA.***
- Transportation of the RPVs from the initial dismantling facilities at Devonport and Rosyth to the interim ILW storage facility, with eventual RPV size reduction to packaged waste and transportation to the planned GDF for disposal. There may be an opportunity to dispose of the RPVs directly to the planned GDF without further size reduction; this is being investigated by the UK government but cannot be assumed as a certainty. ***Transport will be included in the scope of this SEA, but not size reduction, which***

<sup>12</sup> Details of the planned GDF programme can be found at [http://mrws.decc.gov.uk/en/mrws/cms/home/What\\_is\\_geolog/What\\_is\\_geolog.aspx](http://mrws.decc.gov.uk/en/mrws/cms/home/What_is_geolog/What_is_geolog.aspx). Note that the Scottish Government position differs from the UK government position and is that of 'near site, near surface' long-term storage. Further information can be found at <http://www.scotland.gov.uk/Topics/Environment/waste-and-pollution/Waste-1/16293/higheractivitywastepolicy>

**was considered at a generic level as part of the previous SEA and would be covered under a future environmental assessment by the relevant authority/ies, if required.**

- The decommissioning of the ILW storage facility once no longer required. **This element will be included in this SEA.**

## 2.2 2011 SEA and Public Consultation

Recognising the importance that public acceptability would play in the development of any solution, Ministerial commitments were made that public consultation would be undertaken before any major decisions are taken.

Three previous public consultations on the project have been held to date. The most recent of these was undertaken between October 2010 and February 2011 on the strategic options for submarine dismantling, including how the radioactive materials should be removed from the submarines, and where this should be done.

Although the strict applicability of the SEA Directive to the SDP remains unclear, the MOD undertook an assessment fulfilling the requirements of the SEA Regulations<sup>9</sup> to inform the public about the environmental effects of the SDP proposals as part of this public consultation and to inform MOD's decision-making processes.

This 2010/11 SEA<sup>2</sup> covered the end-to-end process of submarine dismantling. It firstly assessed the direct, indirect and cumulative effects associated with each of the seven generic SDP stages, including a generic assessment of developing SDP facilities on undeveloped, previously developed and existing Licensed/Authorised sites. The generic assessment was followed by a determination of the potential environmental effects arising from implementing the reasonable alternatives for each of these stages. The results of both assessments were used to determine the MOD's recommended options at public consultation, and to make decisions about the recommended way forward following the consultation.

Following the Ministerial Announcement in March 2013 that the RPVs will be removed *in situ* at Devonport and Rosyth and stored intact, an SEA Post-Adoption Report<sup>5</sup> was produced to demonstrate how the MOD took the findings of the previous SEA into account.

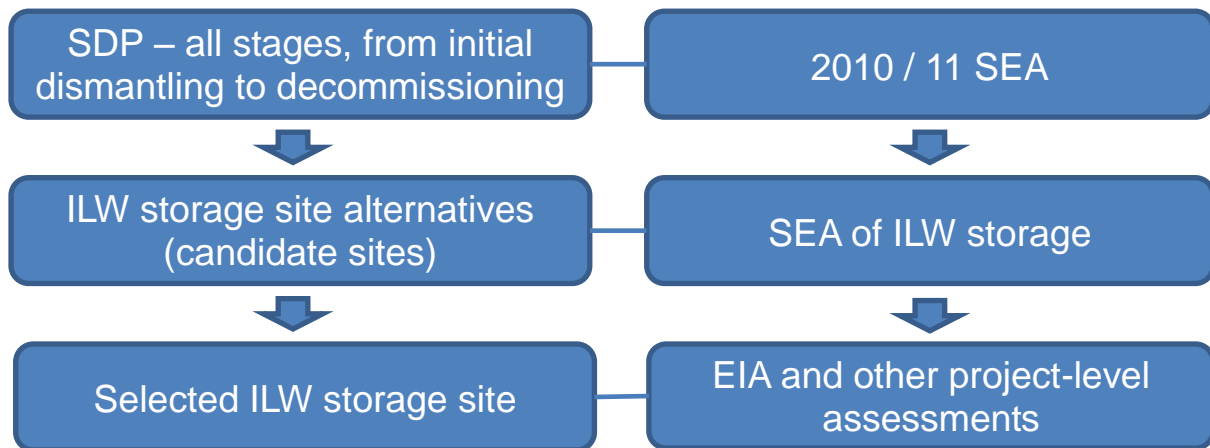
Annex 1 summarises the comments received from statutory consultees about ILW storage during the 2010/11 SEA. A full summary of the feedback received on the previous SEA from the public consultation can be found in the SDP Post-Consultation Report<sup>3</sup>; the results of MOD's assessment of the responses and its response to them can be found in the SDP Response to Consultation report<sup>4</sup>.

## 2.3 Aim and Scope of the Current Stage of the SDP

As discussed, it was not possible to identify individual candidate ILW storage sites during the original assessment. The aim of the current stage of the SDP is to assess the benefits and dis-benefits of developing an ILW storage facility – alone or in combination with pre-existing storage facilities – at one of a number of candidate UK-licensed sites. The aim of this SEA is therefore to assess the potentially significant environmental effects of developing, operating and eventually decommissioning this facility. The rationale for the indicative site selection can be found at <https://www.gov.uk/government/publications/submarine-dismantling-project-interim-storage-of-intermediate-level-radioactive-waste>.

In addition to assessing the candidate ILW storage sites, SEA studies will - where relevant - assess any wider effects that RPV storage at a specific location could have on the other elements of the submarine dismantling process (and hence the conclusions of the original assessment).

This SEA forms part of a hierarchy of environmental assessments on the SDP, which started with the 2010/11 SEA, as shown in Figure 2-1. The environmental assessments are progressing from broad coverage of the entire SDP to specific phases of the SDP, and also to specific sites. Proportionately, they assessments provide increasing levels of detail on potential environmental effects, as SDP proposals are defined in increasingly greater detail.



**Figure 2-1: Hierarchy of SDP environmental assessments**

Figure 2-2 below, which was originally used in the 2011 SEA Scoping Report<sup>13</sup>, has been updated to show how both the previous and current SEA processes inform the various stages of the SDP and where further environmental assessment will be undertaken.

This SEA's findings will be consulted upon during the forthcoming public consultation. The previous public consultation sought views on the MOD's proposed choice of dismantling approach and site, and type of storage site. On that occasion, the Consultation Document provided information on the options and their performance against the assessment criteria and set out the provisional decision logic.

However, for the storage site selection, no proposal on the specific storage site can be made at this stage because the SDP believes it will not be in a position to make a proposal until stakeholder and wider public views are better understood. The findings of this SEA will therefore be used to inform the public consultation on the options and then subsequently to inform the selection of the ILW storage option once public consultation has been completed.

<sup>13</sup> Entec UK Limited and Defence Estates for Defence Equipment and Support, Ministry of Defence (2011). *Submarine Dismantling Project – Strategic Environmental Assessment: Final Scoping Report*. Available from: [https://www.gov.uk/government/uploads/system/uploads/attachment\\_data/file/34133/StrategicEnvironmentAssessment\\_Final\\_Scoping\\_Report.pdf](https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/34133/StrategicEnvironmentAssessment_Final_Scoping_Report.pdf)

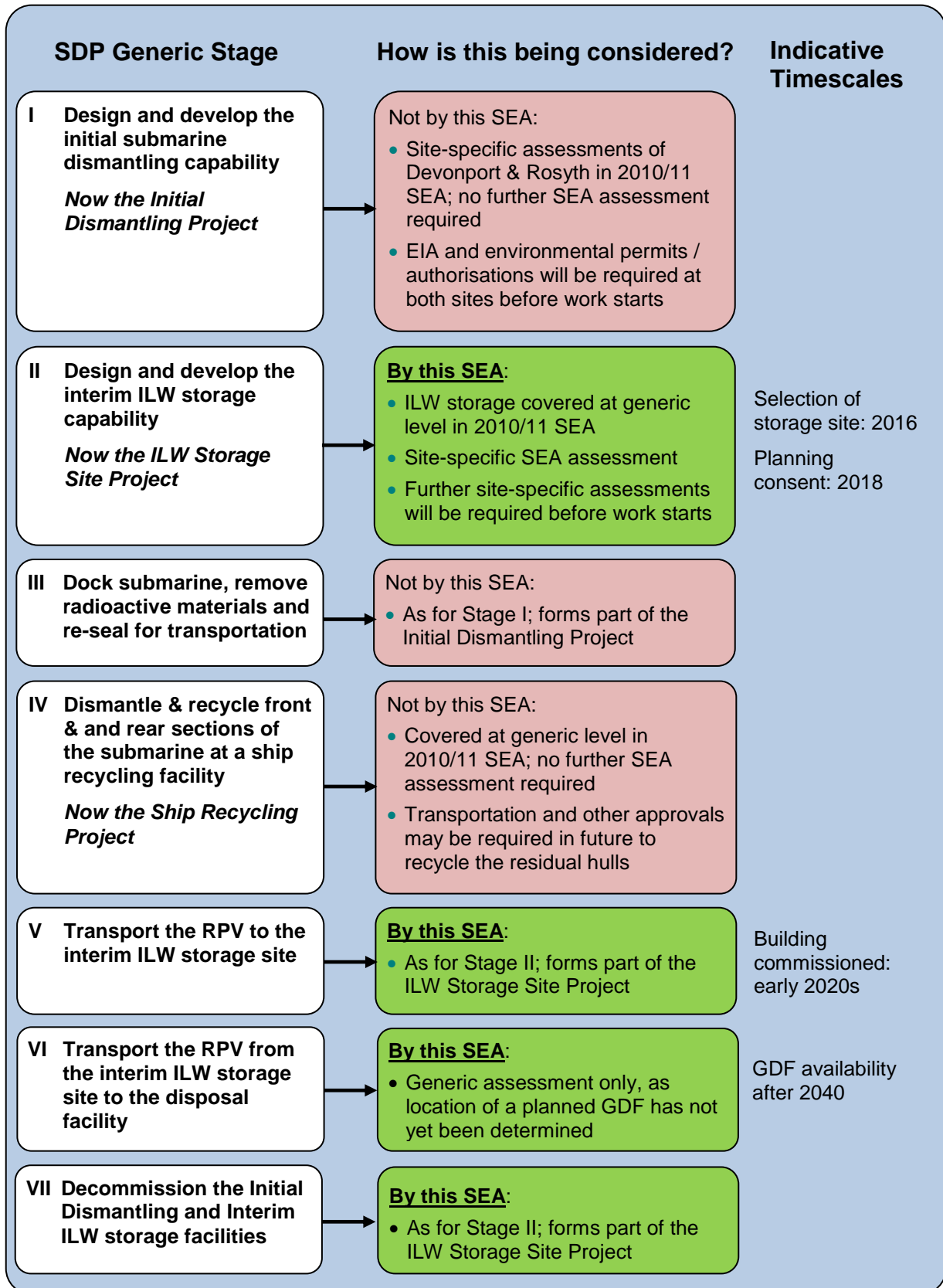


Figure 2-2: Stages of the SDP and relevance to this SEA

## 2.4 Shortlisted Sites for ILW Storage

The sites to be considered by this SEA were shortlisted by the SDP from the ‘long list’ of UK nuclear-licensed and/or authorised sites<sup>14</sup> on the basis of its own analysis and information submitted by site owners (including MOD, NDA and commercial site owners). The process for down-selecting candidate storage sites is detailed in the SDP Criteria and Screening Report<sup>14</sup>, which has been published on the SDP web pages alongside this Scoping Report. Note that the sites at Rosyth and Devonport are not proposed for further consideration of ILW storage.

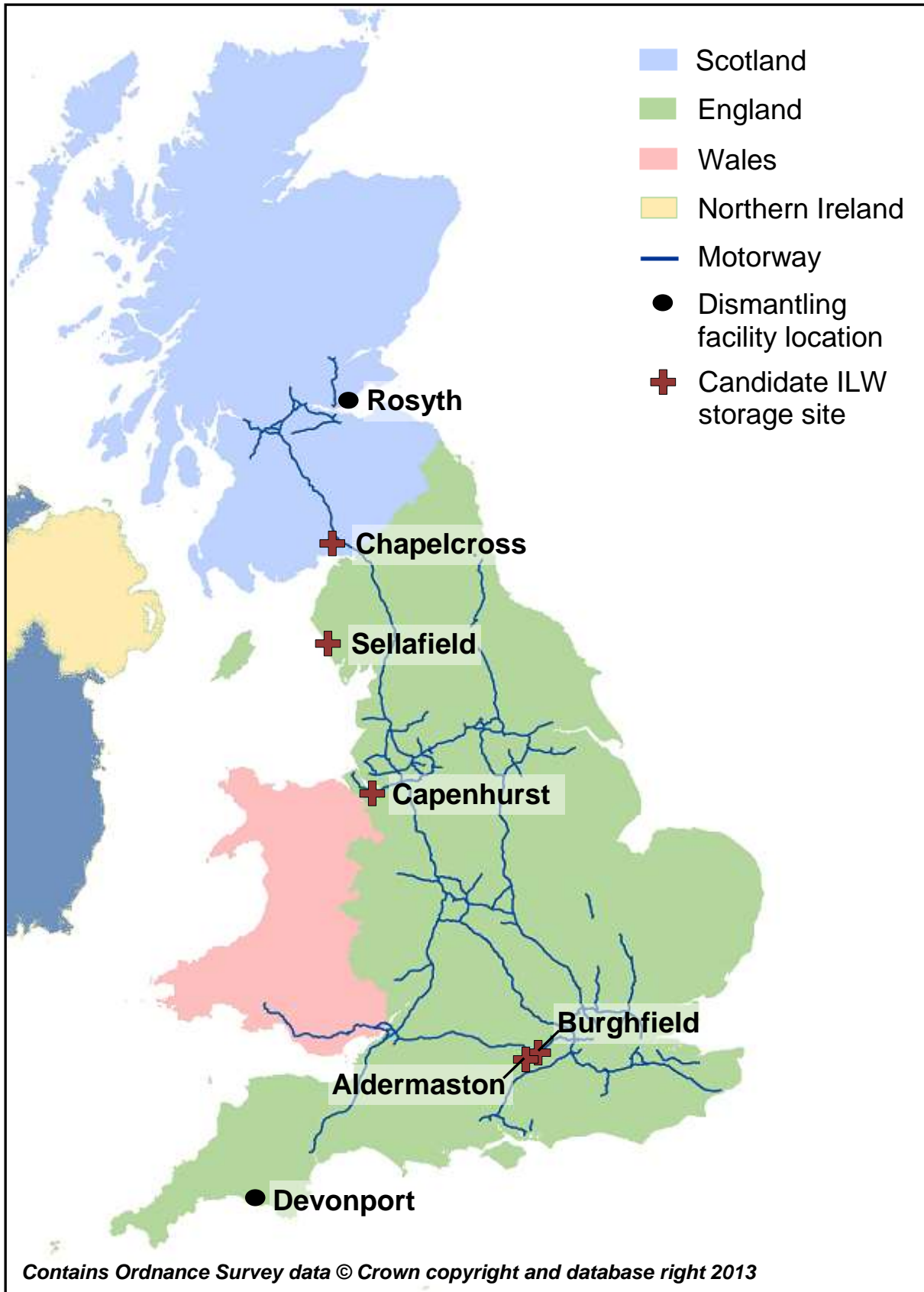
The sites, which have been put forward as feasible alternatives are as follows.

- AWE Aldermaston (Berkshire, England): the Atomic Weapons Establishment (AWE) provides and maintains the fundamental components of the UK’s nuclear deterrent (Trident). The site includes existing ILW storage, and capacity increases are already planned (see Section 5.3.18).
- AWE Burghfield (Berkshire, England): a ‘sister’ site to Aldermaston, 7.5 km to the northeast, which hosts facilities for the final assembly and decommissioning of nuclear warheads.
- Capenhurst Nuclear Services (CNS) Capenhurst (Cheshire, England)<sup>15</sup>: CNS operates as a tenant of URENCO UK Ltd. which owns part of the site and currently leases the rest from NDA. CNS offers storage, decommissioning and recycling of uranic and other materials. There are also three plants producing enriched uranium on the site.
- NDA Sellafield (Cumbria, England): This site is owned by the NDA and operated by Sellafield Limited. Site activities include fuel reprocessing at the Magnox Reprocessing Plant and Thermal Oxide Reprocessing Plant (THORP); decommissioning and clean-up of redundant nuclear facilities (including Calder Hall Magnox and Windscale power stations); and radioactive waste treatment and storage.
- NDA Chapelcross (Dumfries and Galloway, Scotland): Chapelcross was Scotland’s first commercial nuclear power station, and after 45 years of operation, electricity generation ceased in 2004. The station is now being decommissioned.

The sites’ locations in the context of the proposed initial dismantling facilities and national boundaries are shown in Figure 2-3. Maps showing the site locations and the key environmental features / constraints in the vicinity of each can be found in Annex 2.

<sup>14</sup> MOD (2013). *ILW Storage site selection – Criteria and Screening Report*.  
<https://www.gov.uk/government/publications/submarine-dismantling-project-interim-storage-of-intermediate-level-radioactive-waste>

<sup>15</sup> Capenhurst Nuclear Services operates as a tenant of URENCO UK Limited.



**Figure 2-3: Candidate ILW storage site locations**

## 2.5 Key Aspects of Implementing ILW Storage

As shown in Figure 2-2 above, the activities associated with the ILW Storage Site element of SDP are Stage II: design and develop interim ILW storage; Stage V: move the RPV to the interim storage site; Stage VI: move the RPVs to the proposed GDF and size reduce to packaged waste if required; and Stage VII: decommission the facilities. Table 2.1 below summarises key project assumptions about the proposals for ILW storage. (Further information on assumed activities is described in Section 6.1.)

**Table 2.1: Key Project Assumptions for SDP ILW Storage**

Factor	Assumptions
ILW storage facility	<ul style="list-style-type: none"> <li>• Building currently estimated to be approximately 20 m tall</li> <li>• Building footprint will be less than 1,840 m<sup>2</sup> initially (with possibility for expansion by approximately 760 m<sup>2</sup> to less than 2,600 m<sup>2</sup>)<sup>16</sup></li> <li>• Adjacent 11 kV electricity sub-station</li> <li>• Services, e.g. water, drainage, telecommunications, etc.</li> <li>• 100-year design life</li> <li>• Limited operational staff</li> <li>• RPVs stored in shielded containers; store itself unshielded</li> <li>• Use of lifting machines or overhead crane to move RPVs within the store</li> </ul>
Transport	<ul style="list-style-type: none"> <li>• Transport of an RPV package weighing up to 135 tonnes by a specialised road vehicle</li> <li>• Delivery of one RPV to the interim ILW storage facility per year (maximum of three RPVs at initial placement)</li> </ul>

It should be noted that a number of the assumptions above have changed since the 2010/11 SEA was produced. The key changes are as follows.

- Rail transport of the RPVs is now seen as unlikely to be feasible for most rail routes, due to the size of the transport container. Sea transport of the RPVs is not currently planned, although potentially feasible. The assumption is currently that road transport will be used.
- The estimated footprint of the ILW storage facility has changed from around 800 m<sup>2</sup> for a shielded storage vault, to 1,840 m<sup>2</sup> including space for handling and individually shielded containers. A contingency of around 760 m<sup>2</sup> of additional floor space is also now included in the project assumptions, although it is not yet known whether this will be required.

Decommissioning was originally assumed to be limited to a non-developed land use, but this SEA must include the potential for either industrial or continued nuclear operation of the site.

<sup>16</sup> This is the maximum size envisaged, assuming that a new store is required (rather than extension of an existing, shared store), and that the detailed size can only be ascertained by the site license contractor during detailed design. The figures presented represent current 'best estimate' sizes.



## 3 Approach to Scoping the SEA

### 3.1 Stages of SEA

The UK-wide guidance on SEA is *A Practical Guide to the Strategic Environmental Assessment Directive*<sup>17</sup>. This sets out five stages for SEA as used in the 2010/11 SDP assessment:

- **Scoping (Stage A):** establishes the data and information considered adequate to enable the later assessment stage, as well as the method proposed;
- **Assessment and development of alternatives (Stage B):** this SEA will identify the likely significant effects of developing an ILW store at each of the candidate sites (the 'reasonable alternatives')<sup>18</sup>, and make recommendations (where appropriate) for mitigation measures to minimise adverse effects and enhance positive ones;
- **Reporting (Stage C):** documenting the process and results of the SEA in a form suitable for public consultation and use by decision-makers in an Environmental Report;
- **Consultation (Stage D):** consulting the public and statutory consultation bodies on the Environmental Report, integrating the SEA findings and the feedback received into the decisions on how to proceed with ILW storage. This is followed by providing information to the public about the decision and the extent to which the SEA and consultation findings have been taken into account; and
- **Monitoring (Stage E):** monitoring the environmental effects of the preferred alternative throughout its development and operation, to ensure that any unforeseen effects are managed and mitigated.

We are also considering the Scottish SEA guidance<sup>19</sup>, produced by the Scottish Government (with support and input from SEPA, Scottish Natural Heritage and Historic Scotland), throughout this SEA. This follows a very similar set of stages and tasks.

### 3.2 Elements of SEA Scoping

The following activities have been undertaken to conduct the scoping stage of this SEA and produce this Scoping Report.

- **Identifying relevant plans and programmes:** A review has been undertaken of relevant regional and sub-regional plans and programmes to establish how the candidate RPV storage sites could be affected by outside factors, and to help identify any relevant environmental protection objectives which need to be taken into account. This can be found in Section 4.
- **Collecting baseline information:** A desk-based review has been undertaken of current baseline environmental conditions on and around each candidate site, and also as predicted to occur should the SDP not take place. This provides an evidence base for

<sup>17</sup> Office of the Deputy Prime Minister, Scottish Executive, Welsh Assembly Government and Department of the Environment, Northern Ireland (2005). *A Practical Guide to the Strategic Environmental Assessment Directive: Practical guidance on applying European Directive 2001/42/EC "on the assessment of the effects of certain plans and programmes on the environment"*. Available from: [https://www.gov.uk/government/uploads/system/uploads/attachment\\_data/file/7657/practicalguidesea.pdf](https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/7657/practicalguidesea.pdf)

<sup>18</sup> A preferred site will be selected after the SEA Environmental Report is published for consultation. 'Next steps' are described further in Section 7.

<sup>19</sup> The Scottish Government (2013). *Strategic Environmental Assessment Guidance*. <http://www.scotland.gov.uk/Publications/2013/08/3355>

current environmental problems, prediction of effects and proposals for monitoring. This can be found in Section 5.

- **Identifying environmental problems:** The baseline has been used to identify key environmental issues to help show where this SEA should be focussed. This can be found in Sections 5.8 and 6.2.
- **Developing SEA objectives and guiding questions for the assessment:** Whilst the objectives and scoring regime from the over-arching SEA have been adopted for this SEA, the assessment questions have been refreshed to better reflect the nature of this element of the SDP. These will be used to assess the benefits and disbenefits associated with the different site options. These can be found in Section 6.2.

### 3.3 Information Used to Set the Scope

The proposed scope of this SEA (as set out in this report) has been established through a review of the following information:

1. Comments on the previous SEA scoping and environmental reports.
2. The site-specific policy context and baseline for each candidate ILW storage site, laid out in Section 5;
3. The 2011 SEA Environmental Report<sup>2</sup>, and in particular the likely significant effects, assumptions and uncertainties of this previous SEA; and
4. ILW storage design, stages of implementation and activities set out in Sections 2.5 and 6.1.

Desk-based baseline information has been limited to publicly available information and that from site licensees.

### 3.4 Habitats Regulations Assessment

The Defence Infrastructure Organisation (as the MOD Competent Authority) undertook a plan-level Habitats Regulations Assessment<sup>20</sup> of the SDP proposals alongside (but separate to) the previous SEA, in 2010. This was consulted upon with the relevant Statutory Bodies, in accordance with the EC Habitats Directive (92/43/EEC) and transposing regulations, ahead of the Ministerial Announcement on the way forward in March 2013.

It was determined that, although both Rosyth and Devonport are close to a number of Natura 2000 sites, the activities in the dockyards would be unlikely to have significant effects on the integrity of those sites and associated “designating” species (i.e. species which are a reason for designating those sites).

The MOD has determined that the Plan-level HRA does not require updating, since the general stages of submarine dismantling are unchanged, and it is assumed that the ILW store will be built on previously developed land within or immediately adjacent to an existing nuclear-licensed site. None of the candidate sites are on or immediately adjacent to Natura 2000 sites. The findings of the SEA of ILW storage will be used to inform MOD’s decisions on whether the candidate sites need to be screened for HRA at the project level during the detailed assessment.

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<sup>20</sup> Defence Infrastructure Organisation (2011). *Submarine Dismantling Project – Draft Habitats Regulations Assessment*. Issue 1.

## 3.5 SEA Categories

Annex I of the SEA Directive<sup>9</sup> requires that the Environmental Report should include information on the likely significant effects of the plan or programme on the environment, including on issues such as: biodiversity; population; human health; fauna; flora; soil; water; air; climatic factors; material assets; cultural heritage, including architectural and archaeological heritage; landscape; and the inter-relationship between them.

Table 3.1 presents how the categories used in this report are consistent with the SEA Directive<sup>9</sup> requirements, and sets out what each one covers (including key links with other topics). This reflects the structure used in the 2010/11 SEA, which used the MOD's Sustainable Development<sup>2</sup>, categories set out in the MOD Appraisal Tools Handbook<sup>21</sup>.

**Table 3.1: Range and description of proposed SEA categories, with links to SEA Directive topics**

<b>SDP SEA Category</b>	<b>Annex I SEA Directive Issue</b>	<b>Proposed Scope of SEA Category</b>
<b>Radiological Discharges / Emissions</b>	Air, water, soil	Potential effects of ILW storage and transport on radiological discharges and emissions, including from construction (e.g. any contaminated land), transport and operational discharges / emissions.
<b>Population</b>	Population	Potential effects of ILW storage and transport on local communities, including socio-economic impacts and the extent to which proposals present opportunities for community benefit, e.g. through skills development. (Note that assessment of economic effects is not an environmental issue and is not required by SEA, but has been included to reflect the importance of these issues to the wider public).
<b>Biodiversity and Nature Conservation</b>	Biodiversity, flora and fauna	The potential effects of ILW storage and transport on the natural environment, including fisheries and areas protected for their wildlife and conservation importance.
<b>Health and Well-Being</b>	Human health	The potential effects of ILW storage and transport on people's health, including recreation (which in turn can be provided by biodiversity, landscapes and the historic environment) will be assessed. This will include issues related to any radiological and non-radiological discharges or emissions.
<b>Noise and Vibration</b>	Human health, biodiversity, fauna	The potential effects of ILW storage and transport on noise and vibration levels relative to established standards and potential receptors.
<b>Geology and Soils</b>	Soil	Potential effects of ILW storage and transport on soil extent and quality (including contamination and the potential of ILW storage to disturb historic contamination). The potential effects on protected/ important geological features will also be considered.
<b>Water</b>	Water	Potential effects on surface waters, groundwater systems and the marine environment, including the effects of Licensed and unplanned discharges to water.

<sup>21</sup> Ministry of Defence (2009). *The Environmental and Sustainability Appraisal Tool Handbook for the MOD Estate (Volume Two: SEA)*. [https://www.gov.uk/government/uploads/system/uploads/attachment\\_data/file/33341/SEAT\\_handbook\\_section\\_2.pdf](https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/33341/SEAT_handbook_section_2.pdf)

SDP SEA Category	Annex I SEA Directive Issue	Proposed Scope of SEA Category
<b>Air</b>	Air	Potential effects on air quality, including construction, transport and the effects of licensed and unplanned discharges to the atmosphere.
<b>Climate Change and Energy Use</b>	Climatic factors	The potential effects of ILW storage and transport on energy use and greenhouse gas emissions. <i>The likely impacts of climate change, such as storminess and water availability will be accounted for within the other relevant categories (e.g. climate change and flood risk, water and health and well-being) as part of the future baseline.</i>
<b>Coastal Change and Flood Risk</b>	Climatic factors, water	Existing and future flood risks, as well as the effects on coastlines of projected sea level rise and a possible increase in storm intensity. The effects of land instability and erosion will also be considered.
<b>Material Assets (Transport)</b>	Material assets, human health	ILW storage will necessarily involve dismantled components and materials being transported to and from an ILW storage site, as well as construction and operational transport. Consideration will be given to the potential effects of vehicle movements on the transport network itself. <i>The effects of transport on other receptors, such as noise effects, emissions or community access, will be considered under other relevant categories (e.g. noise and vibration, population and health and well-being).</i>
<b>Material Assets (Waste Management)</b>	Material assets, soil	The generation of new waste volumes and the effects this may have on current waste management infrastructure and landfill. The extent to which ILW storage and transport represents good practice (e.g. reduce, re-use, recycle, dispose) will be considered. <i>The SDP is essentially a waste management programme, and RPV management will not be considered as an impact (but rather as baseline, as the waste either exists or will exist regardless of SDP, as does the Government's commitment to eventual geological disposal of this waste).</i>
<b>Land Use and Materials</b>	Material assets, soil	The potential effects of ILW storage and transport on how people use or manage the land, and also effects on finite resources such as minerals. The quality and environmental performance of buildings and facilities will be considered. <i>Fossil fuels and water resources will not be considered under this category, but rather under climate change and energy use, and water, respectively.</i>
<b>Cultural Heritage</b>	Cultural heritage, including architectural and archaeological heritage	The potential effects of ILW storage and transport on the historic environment, including cultural heritage resources, historic buildings and archaeological features.
<b>Landscape and Townscape</b>	Landscape	The potential effects of ILW storage and transport on the quality and attractiveness of landscapes and townscapes, including visual amenity.

## 4 Review of Plans, Programmes and Environmental Protection Objectives

### 4.1 Introduction

This section highlights updates to the review of relevant plans, programmes and environmental protection objectives established at International, European and National level which was originally conducted for the 2011 SEA. The key environmental protection objectives identified through this review can be found in Annex 3.

A review has also been conducted of local planning policy relevant to each of the candidate ILW storage sites. This is reported alongside each site's baseline in Section 5.

Aside from updates presented in the section below, the full review of national plans and programmes (including those for devolved administrations) is provided in Annex B of the 2011 SEA Scoping Report<sup>13</sup>.

The purpose of this review is to outline the nature of the project's relationship with these documents in order to guide the SEA of the SDP and better identify potential significant effects on the environment and communities, including opportunities for beneficial effects.

### 4.2 Updates since the 2011 SEA

Since 2011, there have been three key updates to international and national policy. Arguably the foremost of these was the introduction of the National Planning Policy Framework (NPPF) in March 2012<sup>22</sup>. It replaces all of the policy documents which were included in the 2011 Scoping Report, with the exception of the following which remain in force:

- Planning Policy Statement 10: *Waste Management* (May 2006);
- Marine Minerals Guidance 1: *Extraction by dredging from the English seabed* (July 2002);
- Marine Minerals Guidance 2: *The control of marine minerals dredging from British seabeds* (July 2002);
- Mineral Planning Guidance 4: *Revocation, modification, discontinuance, prohibition and suspension orders* (August 1997);
- Mineral Planning Guidance 8: *Interim Development Order Permissions* (October 1991);
- Mineral Planning Guidance 9: *Planning and Compensation Act 1991: Interim Development Order Permissions (IDOs)* (March 1992);
- Mineral Planning Guidance 14: *Environment Act 1995: Review of Mineral Planning Permissions* (October 1995); and
- Mineral Planning Guidance 15: *Provision of Silica Sand in England* (September 1996).

The summary objectives and policy messages presented in Annex 3 have been reviewed, and no significant changes have been found. However, a small number of additions have been made to reflect the NPPF.

<sup>22</sup> Department for Communities and Local Government (2012). National Planning Policy Framework. Available from: <https://www.gov.uk/government/publications/national-planning-policy-framework-2>

It is noted that the national Scottish Planning Policy (SPP) is currently under review, and a draft SPP was consulted upon earlier in 2013. However, the final revised SPP is not expected until 2014.

The Localism Act came into force in 2011, amending and updating some of the aims identified in the previous SEA from the 'Strong and prosperous communities' White Paper (2006). It has devolved more decision-making powers from central government to local government, as well as local communities and individuals. This includes new community rights enshrined in law, as well as statutory neighbourhood planning<sup>23</sup>.

The European Union's (EU) 7<sup>th</sup> Environmental Action Programme (EAP)<sup>24</sup> was proposed in 2012, and agreed in June 2013. The four priority areas from the 6<sup>th</sup> EAP (climate change; nature and biodiversity; environment and health; and natural resources and waste) have been consolidated into three thematic priority objectives, which are:

- Protect nature and strengthen ecological resilience;
- Boost sustainable resource-efficient low-carbon growth; and
- Effectively address environment-related threats to health.

Targets of the 7<sup>th</sup> EAP have been somewhat modified; however, the overall aims and objectives remain in line with those identified in the previous 2010/11 SDP SEA<sup>2</sup>.

The scope of this SEA set out in this report includes an approach and criteria which cover the above issues.

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<sup>23</sup> Department for Communities and Local Government (2011). *A plain English guide to the Localism Act*. Available from: <http://www.local.gov.uk/localism-act>

<sup>24</sup> The European Commissions Proposal for a new EU Environment Action Programme to 2020. Available from: <http://ec.europa.eu/environment/newprg/intro.htm>

## 5 Baseline Information and Local Context

### 5.1 Introduction

This section provides baseline information on the state of the environment at each of the alternative ILW storage sites which have been down-selected through a process which is explained in the SDP Criteria and Screening Report<sup>14</sup>. Note that Rosyth and Devonport are not under consideration for ILW storage. Baseline information more general to the SDP can be found in the 2011 Scoping Report<sup>13</sup>. The baselines presented in this section (and accompanying site constraints maps in Annex 2) have been used to inform the proposed scope of this SEA presented in Section 6.

A summary of key issues and constraints for each site is provided in Table 5.11.

In a few areas, data gaps have been identified, and where required in order to enable assessment, the MOD and site licensees will be seeking to fill these gaps appropriately with suitable data during the next stage of this SEA.

### 5.2 Baseline Context for All Nuclear-Licensed Sites

Nuclear safety is promoted both through independent regulation, and also a number of principles and standards which have been set by and followed throughout the nuclear industry.

Nuclear safety is regulated and controlled by the Office for Nuclear Regulation (ONR), which is an agency of the Health and Safety Executive (HSE). ONR is now working towards becoming an independent statutory corporation. The Environment Agency in England and Scottish Environment Protection Agency (SEPA) in Scotland regulate the receipt of radioactive waste onto nuclear sites and the disposal of radioactive waste on or from nuclear sites. They also regulate certain aspects of the keeping and use of radioactive sources on nuclear sites.<sup>25</sup>

Nuclear-licensed sites are inspected by suitably qualified and experienced ONR nuclear safety inspectors, who check that licensees comply with their license conditions (of which there are 36<sup>26</sup>), according to information provided in a site Safety Case and other operational intelligence.

Each site's Safety Case is produced by the licensee and justifies safety during the design, construction, manufacture, commissioning, operation and decommissioning phases of facilities on the site. Safety Cases are reviewed and must be approved by the ONR, including any alterations or amendments. They are also subject to periodic review by the ONR, which also seeks to obtain improvements in areas which are difficult to regulate, such as safety culture, leadership and vision.<sup>26</sup>

The Environment Agency grants site permits for all discharges under the Environmental Permitting (England and Wales) Regulations 2010. SEPA grants discharge authorisations under the Radioactive Substances Act 1993 and also PPC permits for non-radioactive discharges. These set out limits and conditions on the amount and methods of disposal of

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<sup>25</sup> For more information, see Environment Agency (2013). *Nuclear*. <http://www.environment-agency.gov.uk/business/sectors/32517.aspx>, and also HSE (accessed 2013). *ONR: How we regulate*. <http://www.hse.gov.uk/nuclear/regulation-and-licensing.htm>

<sup>26</sup> For more information, see <http://www.hse.gov.uk/nuclear/silicon.pdf>.

radioactive and non-radioactive waste. They also operate a site inspection system similar to that used by ONR to audit and assess compliance of site environmental aspects.

In addition, ONR has a Radioactive Materials Transport (RMT) team which, combined with the Office of Rail Regulation, Maritime and Coastguard Agency and Civil Aviation Authority (for railways, sea and air transport respectively) is responsible for the enforcement of The Carriage of Dangerous Goods and Use of Transportable Pressure Equipment Regulations 2009 (as amended)<sup>27</sup>. These regulations concern the transport and security of radioactive material.<sup>28</sup>

Site licensees are required to use “Best Available Techniques” (BAT) to minimise the generation and disposal of radioactive waste such that the resulting radiological impact to members of the public is reduced to a level that is as low as reasonably achievable (ALARA) and the environment is protected.<sup>29</sup> The environmental case is the mechanism used by operators to demonstrate the application of BAT. In Scotland, SEPA require operators to demonstrate that operations use best practicable means (BPM) to minimise the generation of radioactive wastes over the entire lifecycle of a plant and embed this requirement in site authorisations.

The Radiation Emergency Preparedness & Public Information Regulations (REPPPIR) place a duty on local authorities to prepare, and keep up-to-date, an off-site emergency plan for each licensed nuclear installation in its area. These are reviewed every three years, and aid the effective management of the off-site response to an emergency at any site, ensuring that all parties involved are prepared for action at all times. They do not set out detailed responses to events, but maintain a process that prepares managers for emergencies and enables them to adopt the most appropriate response to prevailing conditions at the time of an emergency.<sup>30</sup>

Sites also operate under environmental management systems (EMS), which track environmental performance and identify opportunities for improvement, with an aim to achieve continuous improvement year-on-year. Most of the companies which operate each of the sites (i.e. AWE, Sellafield Ltd. and Magnox) have Environmental Management Systems accredited to ISO 14001 standard. As a new company, CNS operates its own EMS as a basis for its environmental performance, and is committed to achieving the ISO 14001 standard. CNS was audited in November 2013 against the ISO 14001 standard and was recommended for accreditation, although receipt of the certificates is still awaited from the awarding body. The EMSs are accompanied by environmental monitoring programmes which track performance.

## 5.3 AWE Aldermaston

### 5.3.1 Site Background

AWE Aldermaston is situated near to the southern boundary of West Berkshire district, and neighbours the town of Tadley in Hampshire (Basingstoke and Deane borough) to the south. The site was initially developed in 1942 as a World War II RAF airfield. The airfield was

<sup>27</sup> RMT is not responsible for the security of material which falls within scope of the Nuclear Industries Security Regulations 2003.

<sup>28</sup> For more information, see ONR (2013). *Licensing Nuclear Installations*. <http://www.hse.gov.uk/nuclear/licensing-nuclear-installations.pdf>

<sup>29</sup> Environment Agency (2012). *Criteria for setting limits on the discharge of radioactive waste from nuclear sites*. <http://a0768b4a8a31e106d8b0-50dc802554eb38a24458b98ff72d550b.r19.cf3.rackcdn.com/geho0612buqp-e-e.pdf>

<sup>30</sup> Dumfries and Galloway Council (2009). *Chapelcross off-site emergency arrangements*. <http://dgrsp.co.uk/CHttpHandler.ashx?id=3919&p=0>



taken over in 1950 as a site for the UK's nuclear weapons programme. The site was officially named as the Atomic Weapons Research Establishment in 1952. In 1987, the word 'Research' was dropped and 'AWRE' became 'AWE'. The site extends to 285 hectares (ha).

A map of the site can be found in Annex 2. Figure 5-1 below provides an aerial view.



**Figure 5-1: Aerial view of AWE Aldermaston**

### 5.3.2 Local Planning Context

The West Berkshire Core Strategy is a central document of its Local Plan, which was adopted in July 2012<sup>31</sup>. As a document which itself has accounted for international and national plans and programmes, it implements at a local level objectives consistent with those laid out in Annex 3.

Policy CS9 lists AWE as one of three existing employment sites which are strategically important for the district's economy. The policy goes on to state that the Site Allocations Development Planning Document will "...Assess the role and function of these three sites to determine whether they should be designated as Protected Employment Areas or an alternative bespoke designation consistent with their importance to the local economy...".

There is also a specific policy for the AWE Aldermaston and Burghfield sites, which sets out consultation zones for proposed development within 3 km, 5 km and 8 km of AWE Aldermaston in the interests of public safety, to assist in the management of the unlikely event of an accident involving the spread of radioactive materials beyond the nuclear site boundary. Proposals must consider, amongst a number of criteria, the impact on emergency services and the emergency off-site plan.

Aldermaston is shown in the Core Strategy as a service village, providing a range of services to the surrounding area, and it also is stated to have some limited development potential.

<sup>31</sup> West Berkshire Council (2012). *West Berkshire Local Plan. West Berkshire Core Strategy (2006-2026) Version for Adoption*. Available from: <http://www.westberks.gov.uk/index.aspx?articleid=25436>

The applicable development policy in Tadley, to the south, is the saved policies of the adopted Local Plan for Basingstoke and Deane Borough Council (1996 – 2011)<sup>32</sup>. Under this Local Plan, Tadley has been a focus for new development, due to its good provision of community services.

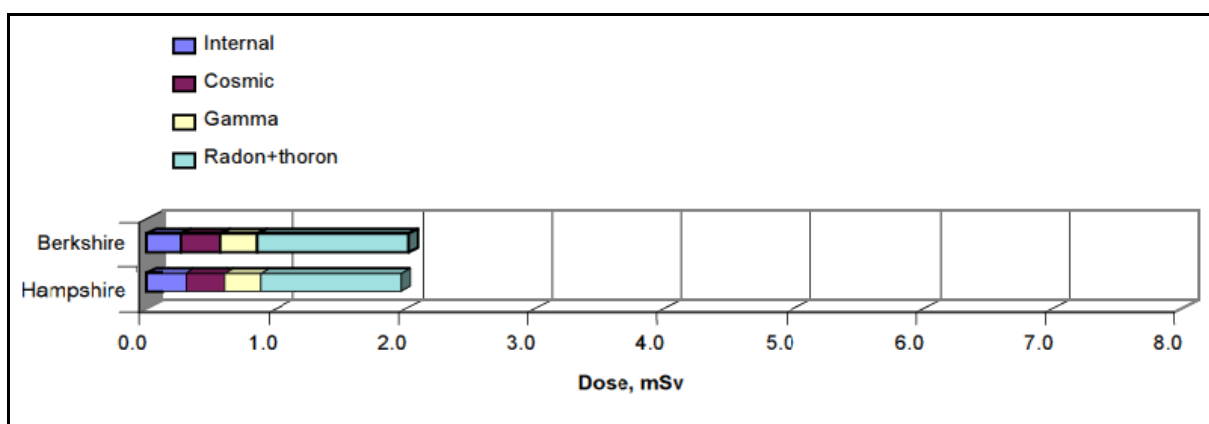
The site is also partly designated under the Berkshire Biodiversity Strategy as a Biodiversity Opportunity Area across its eastern part, with further area surrounding the site (all part of the Burghfield to Tadley Plateau area), which shows where biodiversity improvements are likely to have the most beneficial results at a strategic scale. Each area has specific targets, which can be found at the Berkshire Local Nature Partnership website<sup>33</sup>.

The site is also subject to the Public Right of Way (PROW) Improvement Plan corridors, which aim to create public access around the site in order to restore connectivity between residents and the countryside.

The West Berkshire Local Transport Plan 2011 – 2026<sup>34</sup> proposes to improve safety and reduce the impact of the A340 through Aldermaston, and to discourage longer-distance traffic, especially freight, from using the A340.

### 5.3.3 Radiological Discharges / Emissions

Ionising radiation exposure from **natural sources** in the vicinity of AWE Aldermaston is estimated to be less than 2 mSv per year<sup>35</sup>. Figure 5-2 below presents an excerpt from the 2005 review of ionising radiation exposure of the UK by the HPA<sup>35</sup>, illustrating the average annual doses to residents from different natural background sources.



NOTE: “internal” refers to radiation originating from terrestrial sources which, via the food chain, end up in our bodies, and “gamma” radiation is received externally from mainly terrestrial sources (rocks, soil and building materials such as stone). Source: extract of figures in HPA, 2005, p.76<sup>35</sup>

**Figure 5-2: Annual exposure to natural background radiation in Berkshire and Hampshire**

<sup>32</sup> Basingstoke and Deane Borough Council (2006). *Basingstoke and Deane Borough Adopted Local Plan 1996 – 2011 (Adopted July 2006)*. Available from: <http://www.basingstoke.gov.uk/browse/environment-and-planning/planning/adopted-local-plan/>

<sup>33</sup> Berkshire Local Nature Partnership website, available from: <http://berkshirelnp.org/index.php/what-we-do/strategy/biodiversity-opportunity-areas>

<sup>34</sup> West Berkshire Council. *Local Transport Plan for West Berkshire 2011-2026*. Available from: <http://www.westberks.gov.uk/index.aspx?articleid=18646>

<sup>35</sup> Health Protection Agency (2005). *Ionising Radiation Exposure of the UK Population: 2005 Review*. Available from: [http://www.hpa.org.uk/webc/HPAwebFile/HPAweb\\_C/1194947389360](http://www.hpa.org.uk/webc/HPAwebFile/HPAweb_C/1194947389360)

Activities at AWE Aldermaston which can result in radiological discharges comprise:

- Gaseous emissions to air;
- Discharge of liquid waste to Aldermaston Stream;
- Discharge of liquid waste to Silchester sewage treatment works, and subsequently into the River Kennett; and
- The current and/or planned removal of a historic legacy of radioactive waste and/or decontamination of groundwater.

Table 5.1 below summarises the discharges or emissions to air and water from AWE Aldermaston relative to the permitted levels authorised by the Environment Agency. The latest Environment Agency monitoring data available for 2011 indicates that emissions have remained within their respective limits for 10 years (zero notifiable releases)<sup>36</sup>.

**Table 5.1: Radiological discharges / emissions at AWE Aldermaston (2012)**

Discharge / emission	Discharge Limit (annual equivalent)	Discharges during 2012	
		Measured annual discharge	% of Annual Limit
Air: alpha	165 kBq	27.2 kBq	17
Air: particulate beta	600 kBq	10 kBq	1.7
Air: tritium	39 TBq	710 GBq	1.8
Air: carbon-14	6 MBq	Nil	Nil
Air: activation products	NA	20 kBq	NA
Air: volatile beta	4.4 MBq	290 kBq	6.6
Water (Silchester): alpha	10 MBq	2.69 MBq	27
Water (Silchester): other beta emitting radionuclides	20 MBq	3.51 MBq	18
Water (Silchester): tritium	25 GBq	140 MBq	<1
Water (to stream): tritium	NA	560 MBq	NA

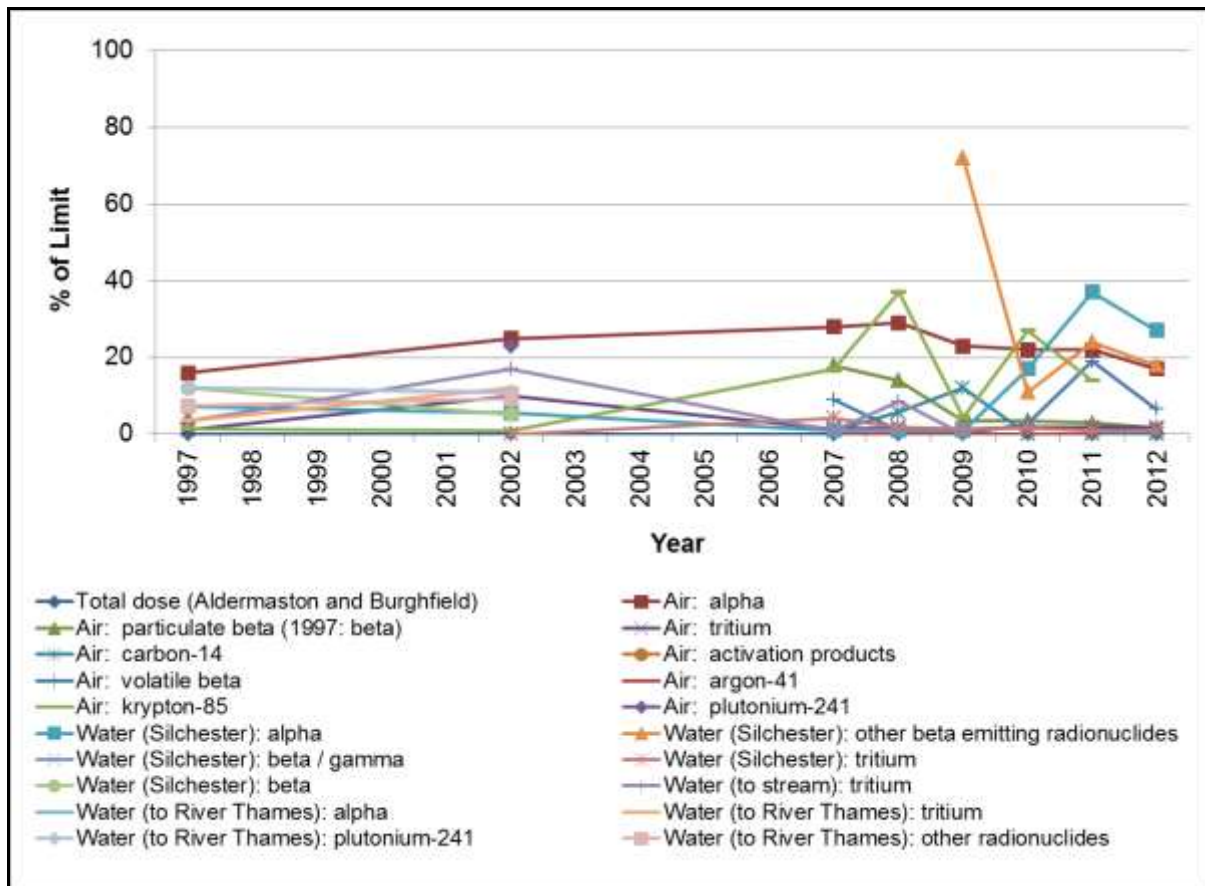
According to the 2012 RIFE report<sup>37</sup>, the radiation total dose from all pathways and sources at AWE Aldermaston and Burghfield sites was less than 0.005 mSv, which is less than 0.5% of the legal dose limit.

The RIFE report notes that historical groundwater contamination at the site has been reduced in recent years by radioactive decay and dilution by natural processes<sup>37</sup>.

Figure 5-3 below shows the available RIFE report radiological discharge and monitoring data for the years 1997, 2002 and each of the past five years from 2007 to 2012. (Note: the specific discharges requiring monitoring at the site have changed over time, and hence data for every discharge is not available for every year.) The data shows the discharges and dose to the public have remained well within their respective limits over the past 15 years.

<sup>36</sup> Environment Agency (2013). *Interactive Maps*. Available from: [http://maps.environment-agency.gov.uk/wiyby/wiybyController?ep=maptopics&lang=\\_e](http://maps.environment-agency.gov.uk/wiyby/wiybyController?ep=maptopics&lang=_e)

<sup>37</sup> Environment Agency, Food Standards Agency, Northern Ireland Environment Agency and Scottish Environment Protection Agency (2013). *Radioactivity in Food and the Environment, 2012*. Available from: <http://www.food.gov.uk/science/research/radiologicalresearch/radiosurv/rife/radioactivity-report2011/#.UIOVzIDYjpU>



Source: RIFE reports<sup>38</sup>

**Figure 5-3: Radiological discharges and dose over time at AWE Aldermaston**

### 5.3.4 Biodiversity and nature conservation

The AWE Aldermaston site is located in the London Basin Natural Area, which is “a large, trough-like basin which was formed around 50 million years ago”, drained by the River Thames and its extensive network of tributaries<sup>39</sup>. The London Basin is characterised by islands of habitats which include large areas of woodland and notable areas of heathland, alongside a number of other important habitats.

Table 5.2 below lists the key biodiversity features within 5 km of AWE Aldermaston. Figure A2-2 also provides a wider radius around the site, and shows that there are three Special Areas of Conservation (SAC), one Special Protection Area (SPA) and no Ramsar sites within 20 km of the site.

**Table 5.2: Biodiversity / nature conservation features within 5 km of AWE Aldermaston**

Features	Notable Types / Examples
11 SSSIs	See text below
1 NNR	Ashford Hill NNR, approximately 2 km to the west of the site.

<sup>38</sup> RIFE reports 1 through 18: [http://sepa.org.uk/radioactive\\_substances/publications/rife\\_reports.aspx](http://sepa.org.uk/radioactive_substances/publications/rife_reports.aspx)

<sup>39</sup> Natural England (2013). *Natural Areas: 66 London Basin*. Available from: [http://www.naturalareas.naturalengland.org.uk/SCIENCE/NATURAL/NA\\_DETAILS.ASP?NA\\_ID=66&S=&R=6](http://www.naturalareas.naturalengland.org.uk/SCIENCE/NATURAL/NA_DETAILS.ASP?NA_ID=66&S=&R=6)

Features	Notable Types / Examples
UK BAP priority habitats	Lowland heathland; Lowland meadow; Deciduous woodland; Fens; Traditional orchard
15+ Ancient woodland areas	More than 15 distinct areas
15 LWSs	See text below.

Designated nature conservation near to the site's boundaries include West's Meadow, Aldermaston Site of Special Scientific Interest (SSSI) approximately 200 m south, Decoy Pit, Pools and Wood SSSI approximately adjacent to the east and Wasing Wood Ponds SSSI approximately 250 m west. All three are in overall favourable condition. There are also two woodland Local Wildlife Sites (LWSs) near to the site's boundary both north and south (one of which comprises Ancient Woodland). In total within 1 km there are three Ancient and Semi Natural Woodlands and one Ancient replanted Woodland. Wasing Wood Ponds is also partly covered by a non-statutory Important Bird Area (IBA) (which also covers habitat outside of the SSSI from 100 m west of the site), showing its significance to birds. Another extensive IBA begins approximately 350 m to the east, and extends for nearly five kilometres.

The UK Biodiversity Action Plan (BAP) priority habitats in proximity to the site's boundaries are deciduous woodland and lowland heathland. Deciduous woodland borders approximately 70% of the site boundary to the north, east and west, sections of which are also classified as ancient woodland. To the north and south of the site, the deciduous woodland is also within the site boundary. Also within the eastern boundary is lowland heathland. There are traditional orchards nearby, but not within or adjacent to the site.

Within 1 km of the site and within the site are several fish ponds. A large area extending across the northeast boundary of the site is locally designated as a Biodiversity Opportunity Area, which is for the creation and enhancement of habitat and networks of habitats.

Known protected species within the site comprise a variety of birds, with most sightings on the heathland in the northeast of the site. There are a number of protected and notable plant and animal species within 2 km of the site.<sup>40</sup>

### 5.3.5 Population

The settlements in the near vicinity include the residential area of Tadley to the south, the small village of Aldermaston to the north of the site (opposite a woodland and wildlife area), Brimpton Common village to the west, and Old Warren village to the east. The main roads connecting into motorways both north and south of the site are the A340 and A4, which pass through the towns of Basingstoke, Theale and Tadley, and a number of villages including Aldermaston Wharf and Aldermaston.

The site is situated within a Lower-layer Super Output Area (LSOA) which includes the village of Aldermaston to the north. The area has low deprivation across economic and related issues (i.e. domains) of the Indices of Multiple Deprivation (IMD). However, access

<sup>40</sup> AWE, 2005. *Sites Development Strategy Update 2005*. Available from: <http://www.awe.co.uk/Contents/Publication/1567930Site%20Development%20Strategy%202005.pdf>

to services is poor as measured by the sub-domain ‘geographical barriers’, whereby the area is within the 10% most deprived LSOAs in England<sup>41</sup>.

Areas (as broken down into LSOAs) surrounding the site perform very similarly with regard to deprivation, except that LSOAs to the south in and around Tadley have high accessibility to services.

AWE employs approximately 4,500 staff between Aldermaston and Burghfield, which lies approximately 7.5 km to the north-east. The relative financial contribution of the site to the local economy is not currently known.

To the west of the site, there is a small area of ‘protected employment land’ designated in the West Berkshire Local Plan, and an area of ‘committed development’ to the east on the other side of Soke Road.

Known community services and facilities within 1 km of the site include a number in Tadley to the south – three Post Offices, three places of worship, four educational facilities, a library, a police station and a fire station – and also two places of worship to the east and north, and two schools in the village of Aldermaston to the north.

### 5.3.6 Health and Well-Being

As for ‘Population’, the site is situated within an LSOA which includes the village of Aldermaston to the north and has low deprivation across health, disability and related issues (i.e. domains) of the IMD. It is amongst the 40% least deprived nationally for health and disability, 20% least deprived for crime and 50% least deprived (thus about average) for living environment. LSOAs surrounding the site perform similarly, with crime rates higher to the east, beyond Old Warren village<sup>41</sup>.

Designated recreational features within 1 km of the site include Burnt Common and Padworth Common Registered Common Land over 700 m to the northeast. Padworth Common is also classed as CROW Act Open Access Land.

Other recreational features within 1 km include Public Rights of Way (PROWs) through open countryside, several of which terminate at or near the site’s boundary, and a local cycle route running east-west to the north of the site. West Berkshire has allocated a ‘Public Right of Way Improvement Plan’ which traverses the AWE site, and which indicates that there is a desire to connect PROWs to the south of the site with PROWs to the north. To the south, within approximately 1 km, are a leisure centre, a football ground, a recreation ground and Bishopswood Golf Club.

### 5.3.7 Noise and Vibration

There are a number of potentially sensitive receptors to noise and vibration in the vicinity of the site. The residential area of Tadley is directly to the south, and there are farms, isolated dwellings and villages in all directions. Within 1 km of the site, six schools, one community centre, five places of worship, one library and a hotel have been identified. There is also a residential home for young people with physical and learning disabilities.

Noise levels were measured at potential sensitive receptors to the north of the site for a planning application in 2011, which was approved in 2012. The data showed that without the proposals of the 2011 planning application, noise levels during the day at potential sensitive receptors to the north and northeast were below 50 L<sub>Aeq,12h</sub> and 50 L<sub>Aeq,16h</sub> during

<sup>41</sup> DCLG – Department of Communities and Local Government (2011). *English indices of deprivation 2010*. Available from: <https://www.gov.uk/government/publications/english-indices-of-deprivation-2010>

the day, and below 44  $L_{Aeq,8h}$  during the night.<sup>42</sup> This is below the outdoors limits for noise established by the World Health Organisation (i.e. levels predicted to have an increased probability of annoyance).<sup>43</sup> Noise levels were higher at a receptor near to the A340, due largely to traffic noise. The proposed development was not expected to lead to any significant noise effects during operation.

No records of the site causing any vibration problems in the local area or otherwise.

### 5.3.8 Geology and Soils

The site sits on sedimentary bedrock of the London Clay Formation (majority being sand), with superficial deposits of sand and gravel.<sup>44</sup> The main soil type of the area is loamy / sandy which drains freely. There is a mixture of low fertility areas and moderate to high fertility areas. There are no Grade 1 or 2 ('best and most versatile') soils known to be within or adjacent to the site, with data showing Grade 3 soils to the north and west, plus 'non-agricultural' (woodland) soil to the east.

There are no designated geological sites within or in close proximity to site. There are locally designated 'mineral preferred areas' within 1 km to the southwest and east of the site, which may currently, or in the near future, accommodate mineral workings.

AWE Aldermaston is located on ground which has low potential for land stability hazards of any type. There is known contamination of soil within the site, including low levels of radiological (tritium) pollution which is not considered to pose a significant risk to future site users. There are also known and suspected chemicals such as solvents, hydrocarbons and asbestos. In a recent planning application, all of the risks presented by pre-existing contaminants were considered low with mitigation, with the exception of asbestos (low to moderate) due to its potential health effects on workers<sup>45</sup>.

### 5.3.9 Water

The River Kennet is approximately 2 km to the north of the site, and two tributaries of the river originate from an area close to the northern boundary and flow northwards. The River Enborne is approximately 3 km to the west, and it flows northward into the River Kennet. To the south is Upper Moor's Gully, which flows eventually into West End Brook, Foudry Brook and then the River Thames (at Reading).

The southern part of the site drains into a pond which then drains into Upper Moor's Gully. There are several other ponds on-site, and many more in the wider area. The wider surface water drainage of the site includes outfalls to various streams, including West End Brook, Aldermaston Stream and Fisherman's Brook.

The latest Environment Agency monitoring data available for 2011 indicates that authorised discharges *to sewer* include lead, chlorides and previously (prior to 2010) trichloroethylene, and these have remained within their respective limits for all records available (zero notifiable releases)<sup>36</sup>.

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<sup>42</sup> RPS (2011). *Technology Development Centre Defence Exempt Environmental Appraisal*.

<sup>43</sup> WHO – World Health Organisation (2009). *Night Noise Guidelines for Europe*. [http://www.euro.who.int/\\_data/assets/pdf\\_file/0017/43316/E92845.pdf](http://www.euro.who.int/_data/assets/pdf_file/0017/43316/E92845.pdf) and WHO (1999). *Guidelines for Community Noise*. <http://www.who.int/docstore/peh/noise/guidelines2.html>

<sup>44</sup> British Geological Survey (accessed 2013). *Geology of Britain viewer*. <http://mapapps.bgs.ac.uk/geologyofbritain/home.html>

<sup>45</sup> RPS (2012). *Site Setting Report: AWE Aldermaston*.

Water quality in these watercourses is 'moderate' ecological quality / potential, good chemical quality for tributaries flowing northwards to the River Kennet, and classified as failing for chemical quality in Foudry Brook (into which West End Brook flows). This failure in chemical quality is due to tributyltin compounds, which are not known to be associated with AWE Aldermaston (and tend to be associated with pesticide use).

A small part of the southeast corner of the site and land directly to the south of it is in a nitrate vulnerable surface water zone.

Regarding water resources, the site is within a confined aquifer groundwater management unit, within which the predominant assessment of water availability is 'over-licensed'<sup>46</sup>. The site lies within a groundwater source protection Zone 3 (total catchment). It has a groundwater abstraction which has been in use since 1983, for drinking, cooling, sanitary purposes and washing. There is also a new water supply borehole near to the northern boundary<sup>45</sup>.

There is currently no information available to this SEA for AWE's annual water consumption.

### 5.3.10 Air Quality

In addition to transport emissions, AWE Aldermaston has licensed (non-radiological) discharges of NO<sub>x</sub>, CO and PM<sub>10</sub> through combustion of gas and oil. Its licensed limits of discharge (i.e. at source) are NO<sub>x</sub>: 180 mg/m<sup>3</sup>; CO: 100 mg/m<sup>3</sup>; and PM<sub>10</sub>: 25 mg/m<sup>3</sup>.<sup>47</sup> The latest Environment Agency monitoring data available for 2011 indicates that these emissions have remained within their respective limits for all records available. It also indicates licensed discharges of sulphur oxides, ammonia, beryllium, HFCs, inorganic chlorine compounds, methane, hydrogen chloride, hydrogen cyanide, trichloroethylene, tetrachloroethylene, methylene chloride and carbon dioxide, all of which have remained within their respective limits<sup>36</sup>.

Estimates of total pollutant concentrations in the area of the site are 15.0 µg/m<sup>3</sup> for NO<sub>x</sub> and 15.5 µg/m<sup>3</sup> for PM<sub>10</sub>, well within the NAQS objectives. There are no Air Quality Management Areas in near proximity to the site.

### 5.3.11 Climate Change and Energy Use

The latest Environment Agency monitoring data available for 2011 indicates that carbon dioxide emissions from combustion plant were about 43,000 tonnes in 2011, and the level of emissions has been similar since 2008<sup>36</sup>. However, this is only a partial picture of the site's total CO<sub>2</sub>e (carbon dioxide and equivalents) emissions. AWE has a target of reducing its emissions by 25% against the 1999/2000 baseline by end March 2014<sup>48</sup>.

AWE has a Combustion Activity Permit (issued by the Environment Agency) which includes four 22 megawatt (MW) boilers primarily fuelled by gas, four 3.5 MW gas turbine generators fuelled by gas oil, various distributed gas boilers totalling 11.83 MW and various backup electrical generators totalling 11.97 MW. Future energy production includes three planned 377 kW gas-fired boilers at a new manufacturing facility, a new 440 kW backup diesel generator at the new process facility under construction,

<sup>46</sup> Environment Agency (2004). *The Kennet and Pang Catchment Abstraction Management Strategy*. Available from: <http://a0768b4a8a31e106d8b0-50dc802554eb38a24458b98ff72d550b.r19.cf3.rackcdn.com/geth0404bhhx-e-e.pdf>

<sup>47</sup> AWE (2011). *Sustainability Plan 2010 – 2030*. Available from: [http://www.awe.co.uk/publications\\_b667d6b.html](http://www.awe.co.uk/publications_b667d6b.html)

<sup>48</sup> AWE (2012). *Sustainability Plan 2012 – 2030*. <http://www.awe.co.uk/contents/Publication/SustainabilityPlan2012Final.pdf>



### 5.3.12 Coastal Change and Flood Risk

The site is not within an identified flood risk area. The A340, which is a main road passing adjacent to the site and heading to the north of Aldermaston, passes through the wide floodplain of the River Kennet. The A340 southwards is relatively free of flood risk, although there are smaller areas of flood risk here and on roads in the wider area.

### 5.3.13 Transportation

The A340 is adjacent to the east of the site, and leads to the A4, which in turn connects into the national road network via the M4. To the south of the site, the A340 leads to the A339 and A33, which also connect to the M4.

Most of the Aldermaston workforce lives within the surrounding three local authorities, with four main clusters in Tadley directly to the south, Reading to the northeast, Newbury / Thatcham to the north / northwest, and Basingstoke to the south. There is also a smaller cluster living in Andover to the southwest.<sup>45</sup>

A traffic survey carried out as part of a recent planning application indicates that there is AM and PM peak hour congestion on roads in the vicinity, and that perhaps the most sensitive roads to additional traffic are the B3051 and A340 heading south through Tadley. Operational traffic at the site has different peak hours from the baseline peak traffic flows. There are also a number of known restrictions to heavy and large lorries on local roads in the area, while the A340 remains adequate for HGVs.<sup>45</sup>

To the north of site and Aldermaston, there are two local rail stations, Aldermaston and Midgham. Cycle routes and footpaths are addressed under the SEA category 'Health and Well-Being'.

### 5.3.14 Waste Management

There are currently no data publicly available for the amount of waste disposed of from AWE Aldermaston. Environment Agency data indicates licensed waste transfers off-site for recovery (including for use as fuel, of inorganic and organic material, of metals and compounds, of catalyst components and for land treatment), and for disposal "in/on land", by incineration and by physio-chemical treatment.<sup>36</sup> It is reported that approximately 60% of controlled waste from the site is diverted from landfill to more sustainable management methods, and AWE has targets to achieve 70% for both construction / demolition waste and controlled waste<sup>47</sup>.

No known non-radiological waste management facilities have been identified within 5 km of the site.

### 5.3.15 Land Use and Materials

Most of the site is an existing, developed site, and the land cover of the site ranges from what would be classed as industrial development (urban) to heathland and woodland (including remnants of a former part of Aldermaston Park, now part of the site). The surrounding area is varied, with Aldermaston Registered Park directly to the north, Harbourhill Copse LWS and ancient woodland to the northwest, the A340 bounding the site to the west and partly to the south, and minor roads, woodland, wildlife areas, dwellings and a relatively new commercial development to the south and east.

Opposite the A340 are two commercial areas, an apparently disused wasteground, a wildlife area, a farm and a community allotment.

Planning allocations in the vicinity include two protected employment areas (existing development) to the west of the A340, and a committed development area to the east of the site.

### 5.3.16 Cultural Heritage

Aldermaston is a former RAF airfield which, since the Second World War, has been central to the UK's role in the Cold War and the development of the UK's Strategic nuclear deterrent.

There is one **Scheduled Monument** within the boundary of AWE Aldermaston: 'Grim's Bank: section extending 430 m in Little Heath', an early Dark Age to Medieval earthwork of no precise dating. It is noted as being extremely well preserved<sup>49</sup>, and is actively managed by AWE. Further sections of Grim's Bank (two additional sites) exist to the east, severed by a road junction. 'Round barrow cemetery at Brimpton Common' is another Scheduled Monument over 600 m to the west.

There is one Grade I **Listed Building** within 1 km of the site: Church of St. Mary, approximately 500 m to the north, within Aldermaston Park. There are three Grade II\* Listed Buildings within 1 km – one in Aldermaston village, one in Aldermaston Park, and the third in Old Warren to the east. There are 37 Grade II Listed Buildings within 1 km, with a concentration of them in the village of Aldermaston to the north. The nearest are two Grade II houses to the west of the site, along the opposite side of the A340. The majority of Aldermaston village is also designated as a Conservation Area.

Aldermaston Court is a Grade II **Registered Park and Garden** directly to the north of the site. The entirety of the site was once a part of a manor estate, but its majority from the western boundary was developed into the RAF airfield. Therefore, whilst the park does not extend into the site, it still contains signs of its former connection to the Registered Park, such as mature specimen trees and walking paths.

Wasing Place Grade II Registered Park and Garden is approximately 750 m to 1 km to the west of the site.

The former line of a Roman Road runs diagonally across the site (northwest to southeast), largely through the eastern 'Aldermaston Park' section. There have been several archaeological finds on the site, but little purposeful archaeological investigation has been undertaken within the site. There is potential for Iron Age, Roman and Medieval / Post-Medieval archaeology, in addition to finds associated with the WWII airfield and Cold War features<sup>45</sup>.

### 5.3.17 Landscape and Townscape

AWE Aldermaston is a large, mainly industrial site which is undergoing periodic development. The site itself sits within the Thames Basin Heaths National Character Area, which is described as a "particularly diverse landscape unified by the high incidence of heathland and coniferous forestry, the open unenclosed nature of which is unusual within the context of the south-east region"<sup>50</sup>.

<sup>49</sup> West Berkshire Council (2012). *West Berkshire HER* (Grim's Bank – Little Heath (AWE)). Available from: [http://www.heritagegateway.org.uk/Gateway/Results\\_Single.aspx?uid=MWB1350&resourceID=1030](http://www.heritagegateway.org.uk/Gateway/Results_Single.aspx?uid=MWB1350&resourceID=1030)

<sup>50</sup> Natural England (2004). *Thames Basin Heaths*. Available from: [http://www.naturalengland.org.uk/Images/jca129\\_tcm6-5326.pdf](http://www.naturalengland.org.uk/Images/jca129_tcm6-5326.pdf)

The site lies to the south of the Kennet River valley on a flat plateau. The northeast of the site includes fragmented groups of parkland trees and individual exotic specimen trees, while the southeast of the site contains heathland with characteristic associated tree species. Central and western areas of the site are industrial and urban, surrounded by office-type development, with little vegetation.

North Wessex Downs Area of Outstanding Natural Beauty (AONB) is over 2.5 km to the north of the site. There are no locally designated landscape areas in proximity to the site.

The site is largely visually contained by surrounding woodland, though larger buildings and stacks are visible above the tree canopy. On-site woodland in the south of the site provides effective visual screening to the residential areas of Tadley, to the south. The site is visible from certain residential properties, workplaces and roads in the near vicinity, as well as from PROWs both nearby and up to 10km away, (including from the AONB).

At night, the site is lit mainly by sodium lighting, which is non-directional and domestic in scale. From distant views, it forms part of a contiguous lit ridgeline with Tadley and lights at Aldermaston Court.

### 5.3.18 Evolution of the Baseline

In July 2005, the then Secretary of State for Defence announced a major capital investment programme at AWE of some £350 million over the next 3 years "...to ensure that we [the UK] can maintain the existing Trident warhead stockpile throughout its intended in-service life...".

Following the Government announcement of investment into the facilities at AWE Aldermaston and AWE Burghfield, a Site Development Context Plan (SDCP) was published in November 2005. The primary purpose of the SDCP is to define the broad parameters of the Government's investment programme, announced in July 2005, in land use terms and to facilitate early discussion and consultation with the relevant planning authorities and other stakeholders. The overall approach to the modernisation of AWE Aldermaston and AWE Burghfield in the SDCP is based on refurbishing and replacing facilities constructed principally in the 1950s and 60s. It is proposed that capacity will be increased to existing stores for containing ILW, which have approximately 6 years' capacity remaining at the current rate of generation. AWE aims to provide additional capacity through to 2025, or potentially further into the future.<sup>51</sup>

The SDCP was accompanied by a Strategic Sustainability Appraisal (SSA) that identified the main environmental and related issues that were likely to arise in the course of implementation of the programme.

Both documents provided the context in which elements of the investment programme would be brought forward over the following three years. The programme as a whole is expected to be completed by 2015. The SDCP was updated in 2008 and incorporates progress made, as well as including some new development.

The first SDCP included 10-year Illustrative Site Development Framework Plans for each of the two sites at Aldermaston and Burghfield. These plans set out the principal land use proposals that were the subject of the investment programme at an end date of 2015.

Since November 2005, considerable progress has been made towards the programme as set out in the SDCP 2005 and 2008. Over 2 million square metres of development is currently under construction at the two sites to meet this need. These investments are and

<sup>51</sup> ONR (2013). *Quinquennial review of AWE's strategy for nuclear decommissioning at Aldermaston and Burghfield as submitted December 2012*. <http://www.hse.gov.uk/nuclear/documents/2013/quinquennial-review-awe.pdf>

will continue to influence the physical view of the sites to the outside world. The new investments will be matched by the demolition and clearance of the facilities which have been replaced by the new developments.

Trend data available for radiological discharges / emissions from Aldermaston (which includes data from AWE Burghfield) shows that they declined significantly between 2005 and 2006, and have been at steady, low levels since that time. Plans for the site do not indicate any change in radiological discharges / emissions in the future. However, AWE has identified historic land contamination as a potential issue, and is developing appropriate management strategies through an Environmental Operations Land Quality programme. The recently published quinquennial review (QQR) of AWE's strategy for nuclear decommissioning (2013) describes the future management of operational and legacy radiological waste.<sup>52</sup>

Climate change in the region is expected to lead to the following impacts of most relevance to the site: increased scarcity of water, such as frequency of drought in the summer months – this is accounted for to some extent in the water resource status reported in Section 5.3.9; increased intensity of rainfall and frequency of intense rainfall events, leading to increased flood risk; changes in woodland species, with possible increases in pests and disease; increased wildfires, affecting in particular gorse, heath and grass; and increased risk of the spread of invasive species.<sup>53</sup>

As a baseline assumption, the nature conservation sites and notable habitats around Aldermaston and Burghfield are not predicted to change in area / boundary significantly into the long term. However, there are a number of threats to biodiversity generally, which may contribute towards a decline in condition. This includes the effects of climate change, which may drive changes in vegetation cover and increase vulnerability to certain impacts, such as drought and spread of invasive species. For the assessment, it will be assumed that designated or priority habitats maintain or improve their overall nature conservation value into the future.

Population projections for West Berkshire are for an approximately 10% increase between 2011 and 2021. The age profile is expected to change significantly, with a notable increase in people aged 65 and over<sup>54</sup>. As stated in Section 5.3.2, Tadley and Burghfield have been a focus for new development, which may place additional pressure on resources such as water and biodiversity in the area. Policy indicates it will be accompanied by an increased provision of services and facilities in Tadley. Also, as a result of the Local Transport Plan 2011 – 2026, the A340 may see additional improvements and a reduction in freight traffic.

## 5.4 AWE Burghfield

### 5.4.1 Site Background

AWE Burghfield is approximately 0.5 km east of Burghfield village in West Berkshire district, and also approximately 3 km southwest of Reading. The site was initially developed in 1938 as a filling factory for shells and bombs, and has been in use by the nuclear industry since 1954. In 1987, the word 'Research' was dropped and 'AWRE' became 'AWE'. The site

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<sup>52</sup> <http://www.hse.gov.uk/nuclear/documents/2013/quinquennial-review-awe.pdf>

<sup>53</sup> ClimateUK (2012). *Summary of Climate Change Risks for South East England*. Available from: [http://www.climatesoutheast.org.uk/images/uploads/South\\_East\\_LOW\\_RES.pdf](http://www.climatesoutheast.org.uk/images/uploads/South_East_LOW_RES.pdf)

<sup>54</sup> West Berkshire Council (2013). *Population Projections (2011-21)*. Available from: <http://www.westberks.gov.uk/index.aspx?articleid=19553>

covers approximately 89 hectares. The maps in Annex 2 show the environmental and cultural setting of the site.

A map of the site can be found in Annex 2. Figure 5-4 below provides an aerial view.



**Figure 5-4: Aerial view of AWE Burghfield**

### 5.4.2 Local Planning Context

The West Berkshire Core Strategy applies to AWE Burghfield<sup>31</sup> as well as to AWE Aldermaston. As a document which itself has accounted for international and national plans and programmes, it implements at a local level objectives consistent with those laid out in Annex 3.

Policy CS9 lists AWE as one of 3 existing employment sites which are strategically important for the Districts' economy. The policy goes on to state that the Site Allocations Development Planning Document will "...Assess the role and function of these three sites to determine whether they should be designated as Protected Employment Areas or an alternative bespoke designation consistent with their importance to the local economy..."

There is also a specific policy for the AWE Aldermaston and Burghfield sites, which sets out consultation zones for proposed development within 1.5 km, 3 km and 5 km of AWE Burghfield in the interests of public safety, to assist in the management of the unlikely event of an accident involving the spread of radioactive materials beyond the nuclear site boundary. Proposals must consider, amongst a number of criteria, the impact on emergency services and the emergency off-site plan.

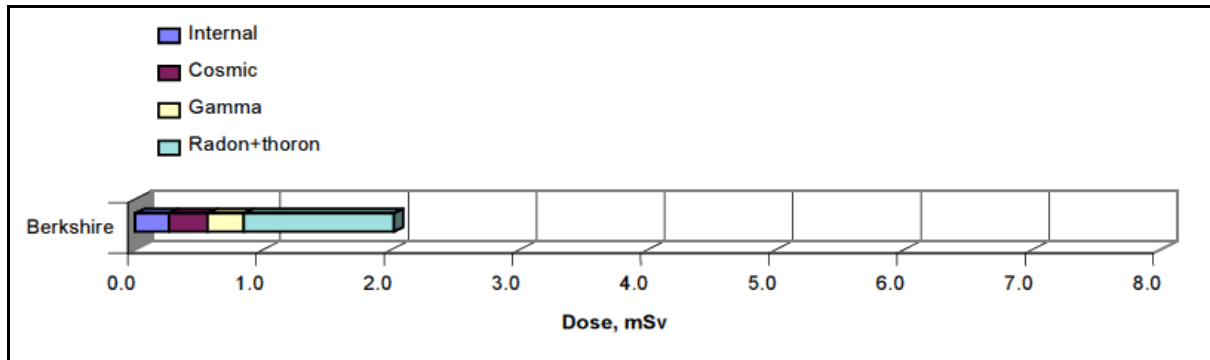
Burghfield Common is shown in the Core Strategy as a rural service centre, providing a range of services to the surrounding area and public transport provision, with opportunities to improve the range of services.

The West Berkshire Local Transport Plan 2011 – 2026<sup>34</sup> encourages opportunities to improve connectivity between Burghfield Common and nearby employment and essential

services and facilities, reducing reliance on cars. This includes improved safety for pedestrians and cyclists while preserving local access routes for freight traffic.

### 5.4.3 Radiological Discharges / Emissions

Ionising radiation exposure from **natural sources** in the vicinity of AWE Burghfield is estimated to be less than 2 mSv per year, given county-level data available<sup>35</sup>. Figure 5-5 below presents an excerpt from the 2005 review of ionising radiation exposure of the UK by the HPA, illustrating the average annual doses to residents from different natural background sources.



NOTE: “internal” refers to radiation originating from terrestrial sources which, via the food chain, end up in our bodies, and “gamma” radiation is received externally from mainly terrestrial sources (rocks, soil and building materials such as stone).

Source: extract of figures in HPA, 2005, p.76<sup>35</sup>

**Figure 5-5: Annual exposure to natural background radiation in Berkshire county**

Activities at AWE Burghfield which can result in radiological discharges comprise:

- Gaseous emissions to air;
- Discharge of liquid waste to Burghfield Brook; and
- Discharge of liquid waste to Silchester sewage treatment works, and subsequently into the River Kennett.

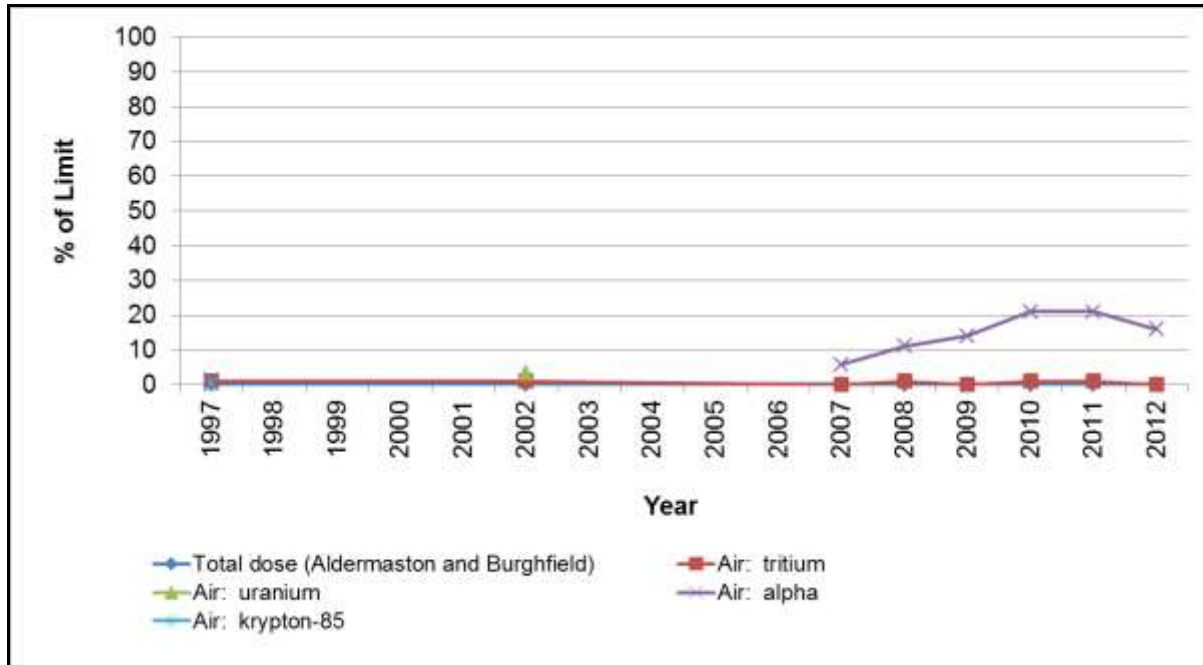
Table 5.3 below summarises the discharges or emissions to air and water from AWE Burghfield relative to the permitted levels authorised by the Environment Agency. The latest Environment Agency monitoring data available for 2011 indicates that emissions have remained within their respective limits for 10 years (zero notifiable releases)<sup>36</sup>.

**Table 5.3: Radiological discharges at AWE Burghfield (2012)**

Discharge	Discharge Limit (annual equivalent)	Discharges during 2012	
		Measured annual discharge	% of Annual Limit
Air: tritium	10 GBq	Nil	Nil
Air: alpha	5 kBq	0.82 kBq	16

According to the 2012 RIFE report<sup>37</sup>, the radiation total dose from all pathways and sources of radiation at AWE Aldermaston and Burghfield sites was less than 0.005 mSv, which is less than 0.5% of the legal dose limit. The most exposed people in the vicinity are estimated to be infant milk consumers.

Figure 5-6 below shows the available RIFE report radiological discharge and monitoring data for the years 1997, 2002 and each of the past five years from 2007 to 2012. (Note: the specific discharges requiring monitoring at the site have changed over time, and hence data for every discharge is not available for every year.) The data shows the discharges and dose to the public have remained well within their respective limits over the past 15 years.



Source: RIFE reports<sup>38</sup>

**Figure 5-6: Radiological discharges and dose over time at AWE Burghfield**

#### 5.4.4 Biodiversity and nature conservation

The AWE Burghfield site is located in the London Basin Natural Area, which is “a large, trough-like basin which was formed around 50 million years ago”, drained by the River Thames and its extensive network of tributaries<sup>39</sup>. The London Basin is characterised by islands of habitats which include large areas of woodland and notable areas of heathland, alongside a number of other important habitats.

Table 5.4 below lists the key biodiversity features within 5 km of AWE Burghfield. Figure A2-4 also provides a wider radius around the site, and shows that there are two SACs, one SPA but no Ramsar sites within 20 km of the site.

**Table 5.4: Biodiversity / nature conservation features within 5 km of AWE Aldermaston**

Features	Notable Types / Examples
2 SSSIs	Pincents Kiln and Standford End Mill & River Lodden
4 LNRs	See text below.
UK BAP priority habitats	Deciduous woodland; Traditional orchard
Ancient woodland areas	More than 10 distinct areas
20+ LWSs	See text below.

The designated nature conservation sites near to AWE Burghfield are locally designated LWSs, including Pinge Wood c.300 m to the north and Pitchkettle Wood over 600 m to the

south. There are three ancient woodland areas within 1 km of the site, including Pinge Wood.

The UK BAP priority habitats in proximity to the site's boundaries are deciduous woodland and traditional orchards. A small area of deciduous woodland borders the site to the southeast, and Amner's Wood is within 100 m to the north. Altogether, there are 18 distinct areas of deciduous woodland within 1 km of the site. A traditional orchard lies adjacent to the western boundary of the site.

There is little semi-natural habitat within the site. There are a number of notable species recorded within 2 km of the site.

### 5.4.5 Population

AWE Burghfield is approximately 0.5 km east of Burghfield village in West Berkshire district, and also approximately 3 km southwest of Reading.

The settlements in the near vicinity include Burghfield and the larger village of Burghfield Common to the west, the small villages of Grazeley Green (directly south), Poundgreen and Grazeley (opposite the railway southeast), and Reading to the north/northeast. The main roads connecting into the M4 motorway directly to the north are local, minor roads, which pass through the named villages, as well as a few others.

The site crosses the boundary between two LSOAs, both of which have low deprivation across economic and related issues (i.e. domains) of the IMD. However, access to services is poor as measured by the sub-domain 'geographical barriers'<sup>23 55</sup>.

Areas (as broken down into LSOAs) more widely around the site perform very similarly with regard to deprivation, except that LSOAs to the west in and around Burghfield Common have relatively high accessibility to services.

AWE employs approximately 4,500 staff between two sites – Burghfield and Aldermaston approximately 7.5 km to the southwest. The relative financial contribution of the site to the local economy is not currently known.

The only known community service / facility within 1 km of the site is a place of worship in Burghfield.

### 5.4.6 Health and Well-Being

As for 'Population', the site crosses two LSOAs, and these have mixed levels of deprivation across health and related issues (i.e. domains) of the IMD. The LSOAs are amongst the 20% least deprived nationally for health and disability, 50% least deprived (thus about average) for living environment, but one is within the 30% most deprived for crime. LSOAs surrounding the site perform similarly, with crime rates lower in Burghfield and further into the countryside to the south<sup>23</sup>.

Designated recreational features within 1 km of the site include Grazeley Green Village Green over 350 m to the south, and The Triangle Village Green over 900 m to the northeast.

Other recreational features within 1 km include PROWs through open countryside, several of which terminate at the site's boundary, and a national (NCN 23) and local cycle route running north-south, about 1 km to the east of the site. West Berkshire Council has

<sup>55</sup> Specifically for the sub-domain 'geographical barriers', the area is within the 10% most deprived LSOAs in England. See Appendix 4 for background information on the IMD and how deprivation is measured.



allocated a 'Public Right of Way Improvement Plan' which indicates extensions to the PROW network near the site.

### 5.4.7 Noise and Vibration

There are a few potentially sensitive receptors to noise and vibration in the vicinity of the site, being residential properties adjacent to the west of the site, in Grazeley Green and Burghfield; isolated dwellings around the site; and a place of worship in Burghfield to the west.

Noise levels were measured at potential sensitive receptors around the site for a planning application in 2010. The data showed that noise levels during the day were between 50 and 59  $L_{Aeq}$ , and during the night between 40 and 46  $L_{Aeq,8h}$ . This is slightly above the outdoors limits for noise established by the World Health Organisation (i.e. levels predicted to have an increased probability of annoyance).<sup>43</sup> Noise levels were higher to the north and near Burghfield, to the west of the site, due largely to local traffic noise, including HGVs not associated with the site. The M4 was also a significant contributor to local noise levels. Audible sources from the site included security vehicle patrols, low transformer hum, and a PA system test.

No records of the site causing any vibration problems in the local area or otherwise.

### 5.4.8 Geology and Soils

The site sits on sedimentary bedrock of the London Clay Formation (clay, silt and sand), with the majority having no recorded superficial deposits, but with a line of alluvium (clay, silt, sand and gravel) along the former course of Burghfield Brook (see 'Water' below).<sup>44</sup> The main soil type of the site is loamy / clayey soil with impeded drainage and of moderate fertility. There are no Grade 1 or 2 soils known to be within or adjacent to the site, with data showing Grade 3 and 4 soils surrounding the site.

There are no designated geological sites within or in close proximity to the site. Mineral working for sand and gravel has been occurring on a site approximately 1 km to the northeast.<sup>56</sup>

AWE Burghfield is located on ground which generally has low potential for land stability hazards, with the exception of the path of a former watercourse which once traversed the site (now diverted), having moderate potential. There is known contamination of soil within the site, including a former site tip. In a 2008 planning application, the risks presented by pre-existing contaminants were not considered to raise any significant issues<sup>57</sup>.

### 5.4.9 Water

The River Kennet (combined in places with the Kennet and Avon Canal) is over 2 km to the north of the site. Burghfield Brook flows southwest to northeast, but around the southern edge of the site (having previously been diverted), on its way to Foudry Brook to the east and eventually the Kennet and Avon Canal. An unnamed watercourse c.100 m to the north also flows east to Foudry Brook. The site has outfalls to Burghfield Brook and the unnamed watercourse.

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<sup>56</sup> RPS (2011). *Site Setting Report: AWE Burghfield*.

<sup>57</sup> RPS (2008). *AWE Burghfield: Conventional Manufacturing Rationalisation: Defence Exempt Environmental Appraisal*.

AWE has a license to discharge to Burghfield Brook, including runoff, effluent and trade waters. There is currently no monitoring information available to this SEA for AWE's licensed discharges to water.

Water quality in Burghfield Brook is 'moderate' ecological status and good chemical quality, as is Foudry Brook from its confluence with Burghfield Brook downstream to the canal.

Regarding water resources, the site is within a confined aquifer groundwater management unit, within which the predominant assessment of water availability is 'over-licensed' (Environment Agency, 2004). The site lies within a groundwater source protection zone, Zone 1 (inner zone) and Zone 2 (outer zone).

The site has a groundwater abstraction operated by the MOD for the purposes of drinking, licensed for up to 700 m<sup>3</sup>/day.<sup>57</sup> There is currently no monitoring information available to this SEA for AWE's annual water consumption.

#### 5.4.10 Air Quality

In addition to transport emissions, AWE Burghfield has licensed discharges of NO<sub>x</sub>, CO and PM<sub>10</sub> through combustion of gas and oil. Its licensed limits of discharge (i.e. at source) are NO<sub>x</sub>: 180 mg/m<sup>3</sup> (gas combustion), 280 mg/m<sup>3</sup> (oil); CO: 100 mg/m<sup>3</sup>; and PM<sub>10</sub>: 25 mg/m<sup>3</sup>.<sup>47</sup>

Estimates of total average pollutant concentrations in the area of the site are 19.3 µg/m<sup>3</sup> for NO<sub>x</sub> and 20.8 µg/m<sup>3</sup> for PM<sub>10</sub>, well within the NAQS objectives.<sup>57</sup> There is currently no monitoring information available to this SEA for AWE's discharges, or for CO background levels. There are no Air Quality Management Areas in near proximity to the site.

#### 5.4.11 Climate Change and Energy Use

There is currently no data publicly available for the greenhouse gas emissions associated with transport or operation of AWE Burghfield. AWE has a target of reducing its emissions by 25% against the 1999/2000 baseline by end March 2014<sup>48</sup>.

#### 5.4.12 Coastal Change and Flood Risk

Parts of the AWE Burghfield site are within an area of high flood risk (1% probability of flooding in any given year), namely the area which follows the path of the former Burghfield Brook – the Brook was diverted when the site was developed before the Second World War. AWE has developed flood management measures since a flood event which occurred in 2007. AWE has developed flood management measures since a flood event which occurred in 2007.

#### 5.4.13 Transportation

The site is surrounded by a network of minor rural roads, which connect into the A33 and then the M4 to the north or M3 to the south.

Most of the AWE Burghfield workforce (about 85%) lives within the surrounding four local authorities, with a cluster to the southwest, which is thought mainly to be in Burghfield Common. About 97% of the workforce is postulated to travel by car, given the isolated location of the site. There are bus services available to the site, and a rail station about 4 km to the northwest.<sup>57</sup>

A traffic survey carried out as part of a recent planning application indicates that there is AM and PM peak hour congestion on roads in the vicinity, and that perhaps the most sensitive road to additional traffic is Burghfield Road, which connects into Reading to the north (crossing the M4). Operational traffic at the site has different peak hours from the baseline peak traffic flows. There are also a number of known restrictions to heavy and large lorries on a number of the local roads in the area.<sup>57</sup>

Cycle routes and footpaths are addressed under the SEA category 'Health and Well-Being'.

#### 5.4.14 Waste Management

There is currently no data publicly available for the amount of waste disposed from AWE Burghfield. Environment Agency data does not indicate any licensed waste transfers off-site.<sup>36</sup> It is reported that approximately 60% of controlled waste from the site is diverted from landfill to more sustainable management methods, and AWE has targets to achieve 70% for both construction / demolition waste and controlled waste<sup>47</sup>.

There are several recycling facilities indicated within 5 km of the site.

#### 5.4.15 Land Use and Materials

The vast majority of the site is an existing, developed site, and therefore the land cover of the site could be classed as industrial development (urban). The surrounding area includes minor roads, farmland, woodland and dwellings.

There are no identified planning allocations in the near vicinity.

#### 5.4.16 Cultural Heritage

There are no Scheduled Monuments in proximity to AWE Burghfield, the nearest being approximately 3.5 km to the northwest. There are four Grade II Listed Buildings within approximately 1 km, separated from the site by fields and some amount of hedgerow.

There have been several archaeological finds in the vicinity of the site, including Neolithic flint flakes and evidence of Bronze Age settlement and agriculture. There are visible signs of the area's Bronze Age history, as well as the site's association with a farm which likely originated in Medieval times. Its greatest potential is considered to be finds associated with the WWII filling factory.<sup>56</sup>

#### 5.4.17 Landscape and Townscape

AWE Burghfield is a large, mainly industrial site which is undergoing periodic development. The site sits within the Thames Basin Heaths National Character Area, which is described as a "particularly diverse landscape unified by the high incidence of heathland and coniferous forestry, the open unenclosed nature of which is unusual within the context of the south-east region"<sup>50</sup>.

The site is near the edge of the Kennet River valley on relatively flat land. The site is largely industrial and urban, with some amenity grassland and mature trees, and includes a number of engineered earth mounds. The site has extensive hard surfaces and buildings from the 1940s which are degraded and appear worn.<sup>56</sup> Surrounding the site are agricultural fields, woodland areas and hedgerows. Dwellings adjacent to the west are semi-vacant, and interspersed with vacant MOD land from demolished dwellings.

North Wessex Downs Area of Outstanding Natural Beauty is over 7 km to the north of the site. There are no locally designated landscape areas in proximity to the site.

Due to tree cover, views into the site are largely obscured, but there are intermittent views into the site from the surrounding area. While there is rising topography to the southwest, tree cover at AWE Burghfield and in intervening land and properties limits views to the site, even in winter.

At night, the site is currently lit mainly by sodium lighting, which is non-directional and domestic in scale. While visible lighting at night 'blends in' with urban lighting in the vicinity, the site's lighting may add a small contribution to sky glow associated with Reading and the M4.<sup>56</sup>

### 5.4.18 Evolution of the Baseline

Section 5.3.18, the evolution of the baseline for AWE Aldermaston, accounts also for AWE Burghfield. Please refer to Section 5.3.18.

## 5.5 Capenhurst (Capenhurst Nuclear Services)

### 5.5.1 Site Background

CNS's site neighbours the town of Ellesmere Port in Cheshire, within the Cheshire West and Chester Council boundary. It is approximately 10 km north of the town of Chester and 4km from the Welsh border. The site was originally developed during World War II as a Royal Ordnance factory and began its involvement in the production of enriched uranium in 1949, though production did not begin until 1952. CNS involvement in operating its part of the site began in 1993. In late 2012, the NDA completed the transfer of its part of the site to CNS, making CNS's operational site 70 ha in size.

A map of the site can be found in Annex 2. Figure 5-7 below provides an aerial view.



**Figure 5-7: Aerial view of Capenhurst (CNS)**

### 5.5.2 Local Planning Context

The relevant adopted Local Plan for the site is the Ellesmere Port & Neston Local Plan (prior to a change in local government to Cheshire West & Chester Council), adopted 2002<sup>58</sup>. As a document which itself has accounted for international and national plans and programmes, it implements at a local level objectives consistent with those laid out in Annex 3.

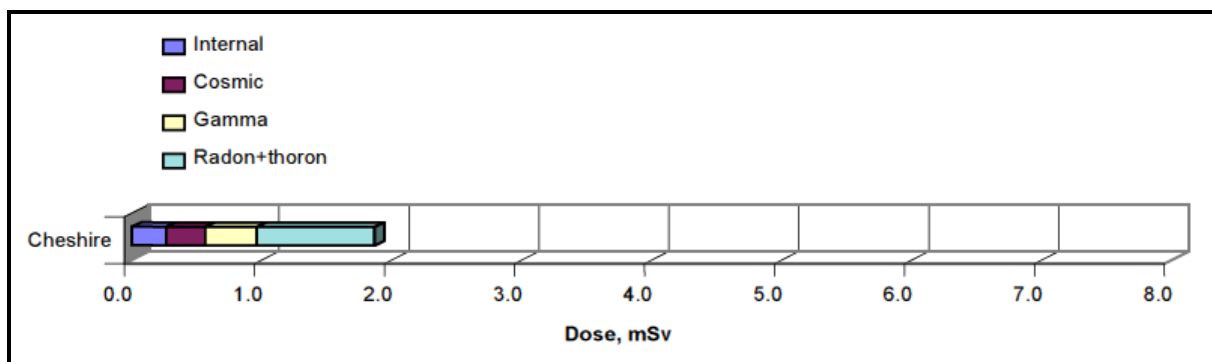
The emerging replacement Local Plan<sup>59</sup> is at a draft stage and references the URENCO Capenhurst site only to state that waste management policy does not cover radioactive wastes, as they are addressed within the nuclear sector and by national government policy.

Other than conservation and broad socio-economic issues for the borough (see baseline), policies addressing the site or near vicinity include one which classifies the site as a hazardous installation, whereby proposals to extend such installations would only be permitted if it does not increase risk to the general public or prejudice other policies by placing constraints on allocated land.

The Cheshire West & Chester Local Transport Plan 2011 – 2026<sup>60</sup> notes that recent upgrades to motorway standard along the A550 / A5117 corridor have significantly improved congestion in the borough, and connections into Wales.

### 5.5.3 Radiological Discharges / Emissions

Ionising radiation exposure from **natural sources** in the vicinity of the Capenhurst site is estimated to be less than 2 mSv per year, given county-level data available<sup>35</sup>. Figure 5-8 below presents an excerpt from the 2005 review of ionising radiation exposure of the UK by the HPA, illustrating the average annual doses to residents from different natural background sources.



NOTE: “internal” refers to radiation originating from terrestrial sources which, via the food chain, end up in our bodies, and “gamma” radiation is received externally from mainly terrestrial sources (rocks, soil and building materials such as stone).

Source: extract of figures in HPA, 2005, p.76<sup>35</sup>

**Figure 5-8: Annual exposure to natural background radiation in Cheshire**

<sup>58</sup> Ellesmere Port and Neston Borough Council (2002). *Ellesmere Port and Neston Local Plan*. Available from: [http://www.cheshirewestandchester.gov.uk/your\\_council/policies\\_and\\_performance/council\\_plans\\_and\\_strategies/planning\\_policy/current\\_local\\_plans.aspx](http://www.cheshirewestandchester.gov.uk/your_council/policies_and_performance/council_plans_and_strategies/planning_policy/current_local_plans.aspx)

<sup>59</sup> Cheshire West and Chester Council. *Emerging Local Plan*. Accessed December 2013 from: [http://www.cheshirewestandchester.gov.uk/your\\_council/policies\\_and\\_performance/council\\_plans\\_and\\_strategies/planning\\_policy/emerging\\_local\\_plan.aspx](http://www.cheshirewestandchester.gov.uk/your_council/policies_and_performance/council_plans_and_strategies/planning_policy/emerging_local_plan.aspx)

<sup>60</sup> Cheshire West and Cheshire Council. *Local Transport Plan: Integrated Transport Strategy 2011 – 2026*. Available from: [http://www.cheshirewestandchester.gov.uk/your\\_council/policies\\_and\\_performance/council\\_plans\\_and\\_strategies/local\\_transport\\_plan\\_200.aspx](http://www.cheshirewestandchester.gov.uk/your_council/policies_and_performance/council_plans_and_strategies/local_transport_plan_200.aspx)

Activities at Capenhurst which result in radiological discharges comprise the gaseous emission of radioactive waste, and the discharge of liquid waste to Rivacre Brook.

Table 5.5 below summarises the discharges of emissions to air and water from the Capenhurst site (both the site leased from NDA and that owned by CNS Limited) relative to the permitted levels authorised by the Environment Agency. It can be seen that in 2012, emissions were well within their respective limits.

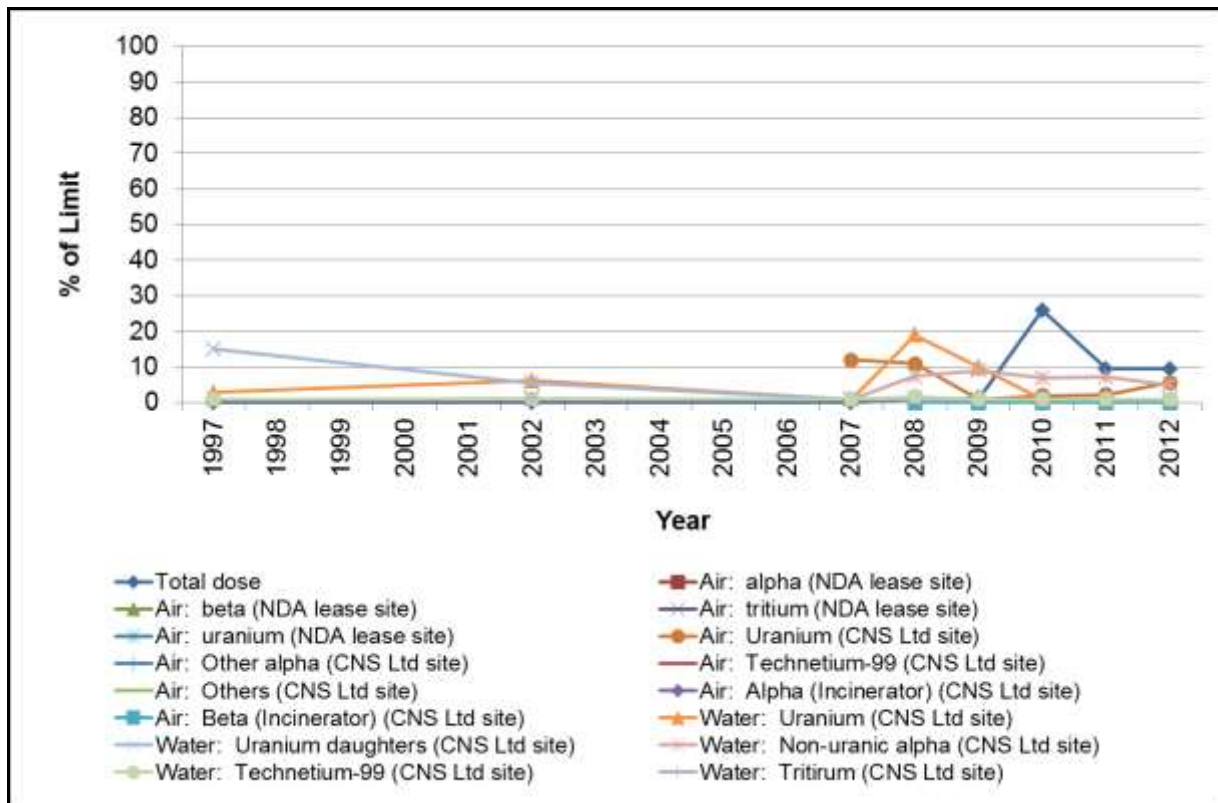
**Table 5.5: Radiological discharges at Capenhurst (2012)**

Discharge	Discharge Limit (annual equivalent)	Discharges during 2012	
		Measured annual discharge	% of Annual Limit
<b>Capenhurst (leased from NDA)</b>			
Air: alpha	BAT	361 kBq	NA
Air: beta	BAT	678 kBq	NA
<b>Capenhurst (CNS Limited)</b>			
Air: Uranium	7.5 MBq	423 kBq	5.6
Air: Other alpha	2.4 MBq	Nil	Nil
Air: Technetium-99	100 MBq	Nil	Nil
Air: Others	2.25 GBq	Nil	Nil
Air: Alpha (Incinerator)	200 MBq	Nil	Nil
Air: Beta (Incinerator)	250 MBq	Nil	Nil
Water: Uranium	750 MBq	3.8 MBq	<1
Water: Uranium daughters	1.36 GBq	4.19 MBq	<1
Water: Non-uranic alpha	220 MBq	11 MBq	5.0
Water: Technetium-99	1 GBq	1.27 MBq	<1

According to the 2012 RIFE report<sup>37</sup>, the total dose from all pathways and sources of radiation at the Capenhurst site was approximately 0.085 mSv, which is less than 10% of the legal dose limit. The most exposed people in the vicinity are estimated to be local adult inhabitants, with the main contribution being direct radiation.

The RIFE report notes that, “In future UUK is expecting to increase the enrichment of reprocessed uranium, which may lead to increases in discharges of technetium-99 and neptunium-237. However, no increase in the discharge limits is expected”<sup>37</sup>.

Figure 5-9 below shows the available RIFE report radiological discharge and monitoring data for the years 1997, 2002 and each of the past five years from 2007 to 2012. (Note: the specific discharges requiring monitoring at the site have changed over time, and hence data for every discharge is not available for every year.) The data shows the discharges and dose to the public have remained well within their respective limits over the past 15 years.



Source: RIFE reports<sup>38</sup>

**Figure 5-9: Radiological discharges and dose over time at Capenhurst (CNS Ltd.)**

### 5.5.4 Biodiversity and nature conservation

The Capenhurst site is located in the Urban Mersey Basin Natural Area, which is “the Rivers Mersey and Irwell with an associated network of canals, rivers and valleys, around which the major cities and industries have developed”<sup>61</sup>. The Urban Mersey Basin is characterised by a varied assortment of habitats and species, with many of the habitats modified and created by human activity, including ponds and canals. Table 5.6 below lists the key biodiversity features within 5 km of the Capenhurst site. Figure A2-6 also provides a wider radius around the site, and shows that there is one SAC, two SPAs and three Ramsar sites within 20 km of the site.

**Table 5.6: Biodiversity / nature conservation features within 5 km of Capenhurst**

Features	Notable Types / Examples
1 Ramsar site	Mersey Estuary
2 SSSIs	Mersey Estuary and Hallwood Farm Marl Pit
2 RSPB Reserves	Dee Estuary and Mersey Estuary
4 LNRs	Stanney Wood and Whitby Park are directly to the east within Ellesmere Port
UK BAP priority habitats	Lowland meadow; coastal and floodplain grazing marsh; mudflat; deciduous woodland; intertidal substrate foreshore; fens; traditional orchard; wood pasture and parkland

<sup>61</sup> Natural England (2013). *Natural Areas: 26 Urban Mersey Basin*. [http://www.naturalareas.naturalengland.org.uk/Science/natural/NA\\_Details.asp?N=&R=2&NA\\_Id=26](http://www.naturalareas.naturalengland.org.uk/Science/natural/NA_Details.asp?N=&R=2&NA_Id=26)

Features	Notable Types / Examples
5 Ancient woodland areas	5 distinct areas.
30+ LWSs	See text below.

There are locally designated nature conservation sites south of the site, including an LWS directly to the southeast (opposite a local road), four LWSs over 400 m to the south / southwest and another over 400 m to the east (opposite a railway). Hallwood Farm Marl Pit SSSI is over 1.5 km to the northwest, and there are two LNRs within the urban area of Ellesmere Port, over 2 km to the east.

The UK BAP priority habitats in proximity to the site's boundaries are deciduous woodland and traditional orchard; there are three of the latter between 600 m and 1 km from the site (two east, one south). There are small areas of deciduous woodland within the site, and approximately 10 more within 1 km.

There is currently no survey information available to this SEA for the Capenhurst site's habitat interest, other than the above.

Protected species have been found close to (but not within) the site<sup>62</sup>.

### 5.5.5 Population

The settlements in the near vicinity include the town of Ellesmere Port, within 500 m to the east; the small village of Capenhurst, to the southwest of the site; Ledsham village, directly to the west; and villages on the other side of several A Roads to the north, west and south such as Burton, Puddington and Saughall.

The site is situated within an LSOA which includes rural area to the southeast and has low deprivation across economic and related issues (i.e. domains) of the Indices of Multiple Deprivation (IMD). However, access to services is poor as measured by the sub-domain 'geographical barriers', whereby the area is within the 10% most deprived LSOAs in England<sup>23</sup>.

Areas (as broken down into LSOAs) surrounding the site perform very similarly with regard to deprivation, except that LSOAs to the north and south, in and around Ellesmere Port and Chester respectively, have high accessibility to services. LSOAs further away in central Ellesmere Port, west Chester and north Wales show pockets of economic deprivation.

The Capenhurst site is estimated to provide over 1,500 jobs and contribute approximately £2 million to the local economy. There is no known allocated or designated employment land adjacent to the site, but it is surrounded by towns in England and Wales (e.g. Connah's Quay) with significant employment centres.

Known community services and facilities within 1 km of the site include two educational facilities (the nearest a primary school next to the site in Capenhurst village), two places of worship and a nursing home next to the site and primary school in Capenhurst village.

### 5.5.6 Health and Well-Being

As for 'Population', the site is situated within an LSOA which is largely rural and extends to the south, and has low deprivation across health, disability and related issues (i.e. domains)

<sup>62</sup> Nuclear Decommissioning Authority (2010). *Strategic Environmental Assessment: Site Specific Baseline: Capenhurst*.



of the IMD. It is amongst the 40% least deprived nationally for health and disability, 50% least deprived for crime and 50% least deprived for living environment. LSOAs surrounding the site perform similarly, with crime rates higher to the east, beyond Old Warren village (DCLG, 2011). There are also pockets of deprivation in health, community safety and physical environment across the border in Wales<sup>63</sup>.

There are no statutorily designated recreational features within 1 km of the site. Nearby features include National Cycle Network Route 56, which passes on the roads directly west and south of the site (through Capenhurst village), PROWs between Ellesmere Port to the east and open countryside to the west and south, and a football and sports ground adjacent to the site's south-western boundary. PROWs passing next to the site include the routes of the North Cheshire Way, a long-distance trail.

### 5.5.7 Noise and Vibration

There are a number of potentially sensitive receptors to noise and vibration in the vicinity of the site. The residents of Capenhurst village are directly to the south, and there are farms, isolated dwellings and villages in all directions. Within 1 km of the site there are two schools, two places of worship and a nursing home, the last of which is next to the site.

A recent baseline report for the site notes that, "There is limited data relating to noise and vibration levels near the site. However, there are one or two enquires per year relating to noise levels from the combined site"<sup>62</sup> (NDA, 2010a). No baseline vibration issues have been identified for this site.

### 5.5.8 Geology and Soils

The site sits on sedimentary bedrock of the Chester Pebble Beds Formation (sandstone, pebbly and gravelly), with the majority having superficial deposits of till (Devensian – Diamicton), which is unsorted glacial sediment of clay, sand, gravel and/or boulders.<sup>44</sup> The main soil type on the site is loamy / clayey soils. The general geological makeup of the site is drift-covered Sherwood sandstone. There are no Grade 1 or 2 soils estimated to be within or adjacent to the site, though small patches of Grade 2 soils occur in the general area. The site and immediately surrounding area are shown to be Grade 3 soil.

### 5.5.9 Water

Rivacre Brook originates from an area close to the southern boundary of the site and flows northwards through Ellesmere Port into the Mersey Estuary approximately 4.5 km to the northeast. The site has a single outfall into a discharge ditch, which then meets Rivacre Brook over 1 km to the east within the residential area of the town.

The latest Environment Agency monitoring data available for 2011 indicates that authorised discharges to the Rivacre Brook include fluorides, arsenic, cadmium, chromium, copper, lead, nickel and zinc. Authorised discharges *to sewer* include arsenic, chromium, copper, lead, mercury, nickel, zinc, fluorides and cadmium. All discharges have remained within their respective limits for all records available (zero notifiable releases)<sup>36</sup>.

Rivacre Brook is a heavily modified water body, and is of 'bad' ecological potential, but good chemical quality for its entire length. This failure in ecological quality is due to poor diversity of macro-invertebrates, which in turn may be due to high levels of phosphates.

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<sup>63</sup> Statistics for Wales (2011). *Welsh Index of Multiple Deprivation*. Available from: <http://wales.gov.uk/docs/statistics/2011/110831wimd11summaryen.pdf>

Regarding water resources, the site is within a catchment zone assessed as 'water not available' for abstraction from surface waters and 'restricted water available' from groundwater<sup>64</sup>. The site does not hold an abstraction license.

In 2007, 3,260 m<sup>3</sup> of water was consumed at the combined site (i.e. including Sellafeld Limited).<sup>65</sup> Water consumption at the CNS site decreased per unit of output between 2005 and 2007<sup>66</sup>.

The site lies within a groundwater vulnerability zone of a major aquifer with intermediate vulnerability.

### 5.5.10 Air Quality

In addition to transport emissions, the Capenhurst site has licensed discharges of carbon dioxide, inorganic fluorine compounds, HCFCs and HFCs. The latest Environment Agency monitoring data available for 2011 indicates that these emissions have remained within their respective limits for all records available, although the actual limits and discharge values are not known<sup>36</sup>. There are no Air Quality Management Areas in near proximity to the site.

### 5.5.11 Climate Change and Energy Use

Data on energy consumption for the CNS site shows a steady decline in usage per unit of output between 2005 and 2007<sup>66</sup>.

### 5.5.12 Climate Change and Flood Risk

The Capenhurst site and key components of the road network around it are outside of the main flood risk areas. The site is not currently at risk of coastal change, being approximately 4.5 km from the estuary.

### 5.5.13 Transportation

The site is surrounded by minor roads, but with several A Roads just a short distance away. Southwards, they connect into the A540 and A5117 towards the M56 and M53. Northwards, they connect into the A550 and then directly onto the M53.

There is currently no information available to this SEA for the residency profile of CNS's staff and thus travel to work patterns.

To the east of the site is Capenhurst Rail Station. Cycle routes and footpaths are addressed under the SEA category 'Health and Well-Being'.

### 5.5.14 Waste Management

In 2007, CNS Capenhurst received deliveries of approximately 70 m<sup>3</sup> of solid radioactive waste for processing<sup>66</sup>. It produced approximately 27 tonnes of hazardous waste, 177 tonnes of non-hazardous waste for disposal, and 790 tonnes of trade effluent. Approximately 330 tonnes of waste was recycled.

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<sup>64</sup> Environment Agency (2013). *Lower Mersey and Alt abstraction licensing strategy*. Available from:

[http://a0768b4a8a31e106d8b0-50dc802554eb38a24458b98ff72d550b.r19.cf3.rackcdn.com/LIT\\_7881\\_35d3ed.pdf](http://a0768b4a8a31e106d8b0-50dc802554eb38a24458b98ff72d550b.r19.cf3.rackcdn.com/LIT_7881_35d3ed.pdf)

<sup>65</sup> NDA (2010). *SEA: Site Specific Baseline: Capenhurst*. <http://www.nda.gov.uk/documents/upload/SEA-Site-Specific-Baselines-Capenhurst-June-2010.pdf>

<sup>66</sup> Urenco (2008). *Health, Safety and Environment Report 2007*.

<http://www.urencocom/custom/509/search/default.aspx?keywords=health,%20safety%20and%20environment>

Recycling centres have been identified in the nearby towns; however, none have been identified in close proximity to the site. There is also one authorised landfill site at Hooton Brickworks.

### 5.5.15 Land Use and Materials

Most of Capenhurst is an existing, developed site, and the land would be classed as industrial development (urban). The surrounding area to the south and west of the site is predominantly mixed agricultural land with areas of improved pasture, arable farming and market gardens interspersed with residential development. To the east is Ellesmere Port, including Great Sutton, a large residential area.

### 5.5.16 Cultural Heritage

Within 1 km of site, there are eight Grade II Listed Buildings. To the south of the site lies the Church of the Holy Trinity and the Old Pinfold in Capenhurst village. To the west are Court Farmhouse and Barn, and the northern barn to Holly Bank farm. The majority of Capenhurst village to the south is also designated as a Conservation Area, as is essentially all of Ledsham to the west.

There are no known records of archaeological finds at or in near proximity to the site. Heritage interest on or in near proximity of the site includes potential remnants of the World War II Royal Ordnance Small Arms Ammunitions Factory, Capenhurst Train Station's 19<sup>th</sup> Century origins, and signs of Medieval activity at Capenhurst<sup>67</sup>.

### 5.5.17 Landscape and Townscape

Capenhurst (CNS) is a medium-sized, mainly industrial site which is undergoing periodic development. The site sits within the Wirral National Character Area, which is described as “generally separated from the industrial/residential development of the Merseyside Conurbation, which includes Birkenhead, Bebington and Bromborough, by a dramatic sandstone ridge”, and “based upon the formal landscapes of former large country estates, rural areas, natural coastal scenery and wooded sandstone ridges”.<sup>50</sup>

The site is flat and surrounded by narrow country roads. The site is largely industrial and urban, with some amenity grassland and mature trees. Surrounding the site are playing fields, dwellings, amenity grassland, agricultural fields and woodland areas.

Due to tree cover, views into the site are largely obscured, but there are intermittent views into the site from the north.

### 5.5.18 Evolution of the Baseline

There is a decommissioning strategy in place for future redundant facilities at Capenhurst that includes both near term decommissioning activities for facilities owned by the Nuclear Decommissioning Authority and longer term plans for those operational plants owned and operated by URENCO UK Ltd.. The strategy includes the progressive refurbishment, decommissioning and demolition of a range of nuclear facilities and the appropriate treatment and disposal of wastes. Ultimately, the strategy may lead to the eventual de-licensing of land from facilities for an appropriate after use, such as commercial

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<sup>67</sup> English Heritage (2012). *PastScape*. Available from: <http://www.pastscape.org.uk/default.aspx>

development<sup>68</sup>. However, de-licensing of the site is an activity not envisaged for at least 100 years and the current end state agreed within the NDA stakeholder engagement process is for the site to remain as a licensed nuclear facility for the foreseeable future.

Trend data available for radiological discharges from Capenhurst shows that they have declined significantly and steadily since 2003, and were at their lowest levels in the last recorded year (2012). Plans for the site do not indicate any significant increases in operational radiological discharges in the future, although as new facilities are commissioned, new discharge points are expected to be Permitted under the Environmental Permitting regime. However, given historic land contamination at the site and future decommissioning, it can be assumed that there is potential for slight increases in solid radioactive waste emissions in future years as a result of any on-site remediation.

Climate change in the region is projected to lead to the following relevant impacts: increased scarcity of water resources and increased frequency of droughts - this is accounted for to some extent in the water resource status reported in Section 5.5.9; increased intensity of rainfall and frequency of intense rainfall events, leading to increased flood risk; sea level rise increasing coastal flood and erosion risk; sea level rise, and resulting habitat degradation, particularly around urban areas; landscape degradation around urban areas; and increased risk of the spread of invasive species<sup>69</sup>.

The Environment Agency coastal management policy for the area is generally to hold the line (defend the coast), with the exception of an area 'no active intervention' to the northwest near Neston and Heswall.

As a baseline assumption, the nature conservation sites and notable habitats around Capenhurst are not predicted to change in area / boundary significantly into the long term. However, there are a number of threats to biodiversity generally, which may contribute towards a decline in condition. This includes the effects of climate change, which may drive changes in vegetation cover and increase vulnerability to certain impacts, such as drought and spread of invasive species. For the assessment, it will be assumed that designated or priority habitats maintain or improve their overall nature conservation value into the future.

Population projections for West Cheshire are for an approximately 3% increase between 2011 and 2021. The age profile is expected to change significantly, with a notable increase in people aged 70 and over, and a reduction in people aged 35 to 50<sup>70</sup>. As a major conurbation in the borough, Ellesmere Port will be a focus for new development, which may place additional pressure on natural resources (e.g. water, biodiversity) in the area. It may be accompanied by an increased provision of services and facilities in the town.

There is a planning application currently being determined for approximately 1,500 new dwellings from 300 m to the northeast of the Capenhurst site, on the opposite side of the railway line that runs alongside the site, plus retail floor space, a new primary school, a community building, a new linear park, playing fields, new allotments, other public open space, and related infrastructure.

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<sup>68</sup> Health & Safety Executive (2004). *A review by HM Nuclear Installations Inspectorate Urenco (Capenhurst) Ltd's strategy for decommissioning its nuclear licensed site.*  
<http://www.hse.gov.uk/nuclear/uclqqr.pdf>

<sup>69</sup> ClimateUK (2012). *Summary of Climate Change Risks for North West England.* Available from:  
<http://climatechangenorthwest.co.uk/sites/default/files/00112a%20CCRA%20NW%20Pack.pdf>

<sup>70</sup> DORIC (2013). *Dataset: Population Projections Interim 2011-2021 (ONS).* Available from:  
<http://www.doriconline.org.uk/Viewdata.aspx?P=Data&referer=%2fBuildDataView.aspx%3fDataSetID%3d721%26VariableID%3d2519>

## 5.6 Sellafield (NDA)

### 5.6.1 Site Background

NDA Sellafield is situated in west Cumbria, on the coast of the Irish Sea, covering approximately 276 hectares. The site was originally constructed in 1942 as ROF Sellafield, producing explosives to supply the military during World War II. The site was adapted for nuclear sector work after the war ended, with the construction of new facilities in 1947. It began producing nuclear power in 1956, and the nuclear power station began being decommissioned in 2003. It has been owned by the NDA since 2005. The maps in Annex 2 show the environmental and cultural setting of the site.

A map of the site can be found in Annex 2. Figure 5-10 below provides an aerial view.



Figure 5-10: Aerial view of Sellafield

### 5.6.2 Local Planning Context

The adopted Local Plan for the area is the Copeland Local Plan 2001-2016, which was adopted in June 2006<sup>71</sup>. As a document which itself has accounted for international and national plans and programmes, it implements at a local level objectives consistent with those laid out in Annex 3.

There are specific policies for Sellafield, which:

- identify the site as a hazardous installation (with associated safeguarding zone);
- require that proposals within the site contribute towards a long-term strategy for the site's future management;

<sup>71</sup> Copeland Borough Council (2006). *Copeland Local Plan 2001 – 2016*. Accessed from: <http://www.copeland.gov.uk/attachments/csdmp-ldflocalplan2001-2016fullpdf>

- set out the need to reduce radioactive waste discharges over time from the site, and
- identify the requirement for green travel planning due to the impact of traffic over a wide area.

The policies will only support long-term storage or disposal of radioactive waste in the Borough if such proposals meet certain environmental and socio-economic criteria, including being shown as the Best Practicable Environmental Option and commanding community support.

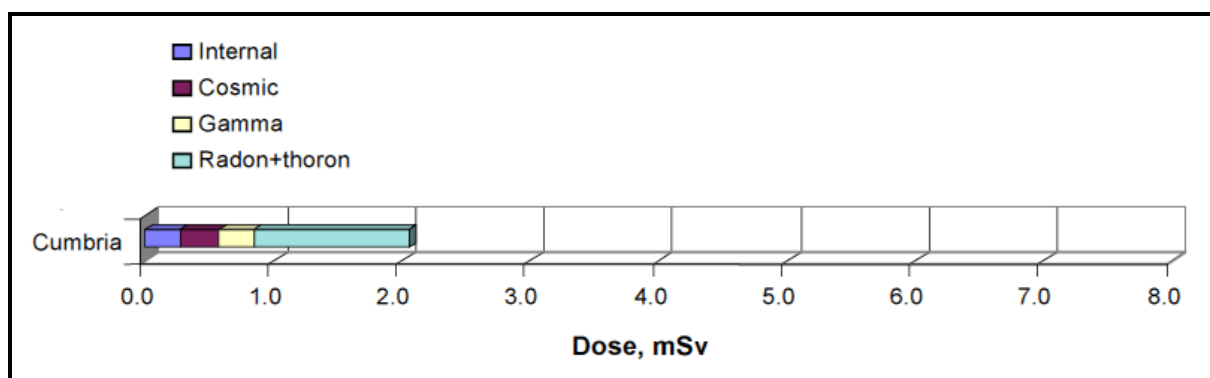
Seascale is identified in the adopted Local Plan as appropriate for small-scale development.

The emerging replacement Local Plan (including ‘main modifications’ from the iterative plan development process) is at a draft stage<sup>72</sup>, and it includes policies for nuclear sector development at Sellafield, nearby Moorside to the north, and Drigg to the south. These policies state that Moorside has been selected as the location for a new nuclear power station, while Sellafield is supported both as a centre of research and development in nuclear decommissioning, and in new nuclear fuel reprocessing within existing site boundaries. Also, policy includes acceptance in principle of any major nuclear energy-related expansion. Such development must be accompanied by appropriate contributions to mitigate any detrimental impacts of development.

The Cumbria Local Transport Plan 2011 – 2026<sup>73</sup> proposes to seek improvements to the A595, which is the main medium and long-distance road route to the site, by working with the Department for Transport and the nuclear industry.

### 5.6.3 Radiological Discharges / Emissions

Ionising radiation exposure from **natural sources** in the vicinity of Sellafield is estimated to be less than 2 mSv per year, given county-level data available<sup>35</sup>. Figure 5-11 below presents an excerpt from the 2005 review of ionising radiation exposure of the UK by the HPA, illustrating the average annual doses to residents from different natural background sources.



NOTE: “internal” refers to radiation originating from terrestrial sources which, via the food chain, end up in our bodies, and “gamma” radiation is received externally from mainly terrestrial sources (rocks, soil and building materials such as stone).

Source: extract of figures in HPA, 2005, p.78<sup>35</sup>

**Figure 5-11: Annual exposure to natural background radiation in Cumbria**

<sup>72</sup> Copeland Borough Council (2012). *Copeland Local Development Framework. Core Strategy and Development Management Policies DPD (Pre-submission Draft)*. Accessed from: <http://www.copeland.gov.uk/attachments/core-strategy-and-development-management-policies>

<sup>73</sup> Cumbria County Council. *3rd Cumbria Local Transport Plan (2011-2026)*. Available from: <http://www.cumbria.gov.uk/roads-transport/public-transport-road-safety/transport/transportplan/3rdcumbriatransportplan.asp>

Activities at Sellafield which can result in radiological discharges comprise:

- Gaseous emissions to air;
- Discharge of treated liquid waste to the Irish Sea;
- Discharge of liquid waste to the Ehen Estuary; and
- The current and/or planned removal of a historic legacy of radioactive waste and/or decontamination of land.

Table 5.7 below summarises the discharges of emissions to air and water from Sellafield relative to the permitted levels authorised by the Environment Agency. It can be seen that in 2011, emissions were well within their respective limits.

**Table 5.7: Radiological discharges at Sellafield (2012)**

Discharge	Discharge Limit (annual equivalent)	Discharges during 2012	
		Measured annual discharge	% of Annual Limit
Air: alpha	880 MBq	98.6 MBq	11
Air: beta	42 GBq	1 GBq	2.4
Air: tritium	1100 TBq	102 TBq	9.3
Air: carbon-14	3.3 TBq	0.378 TBq	11
Air: krypton-85	44000 TBq	38500 TBq	8.8
Air: strontium-90	710 MBq	32.5 MBq	4.6
Air: ruthenium-106 <sup>2</sup>	23 GBq	702 MBq	3.1
Air: antimony-125	30 GBq	545 MBq	1.8
Air: iodine-129	70 GBq	7.82 GBq	11
Air: iodine-131 <sup>2</sup>	37 GBq	240 MBq	<1
Air: caesium-137	5.8 GBq	141 MBq	2.4
Air: radon-222 <sup>2</sup>	500 MBq	42.6 GBq	8.5
Air: plutonium alpha	190 MBq	19.8 MBq	10
Air: plutonium-241	3 GBq	239 MBq	8
Air: americium-241 and curium-242	120 MBq	14.9 MBq	12
Water (sea pipelines): alpha	1 TBq	142 GBq	14
Water (sea pipelines): beta	220 TBq	9.49 TBq	4.3
Water (sea pipelines): tritium	20000 TBq	1050 TBq	5.3
Water (sea pipelines): carbon-14	21 TBq	4.09 TBq	19
Water (sea pipelines): cobalt-60	3.6 TBq	53.5 TBq	1.5
Water (sea pipelines): strontium-90 <sup>2</sup>	45 TBq	1.19 TBq	2.6
Water (sea pipelines): Zirconium-95 + Niobium-95 <sup>2</sup>	2.8 TBq	103 GBq	3.7
Water (sea pipelines): Technetium-99	10 TBq	924 GBq	9.2
Water (sea pipelines): Ruthenium-106 <sup>2</sup>	51 TBq	645 GBq	1.3
Water (sea pipelines): Iodine-129	2 TBq	214 GBq	11
Water (sea pipelines): Caesium-134	1.6 TBq	55.5 GBq	3.5
Water (sea pipelines): Caesium-137	34 TBq	3.58 TBq	11
Water (sea pipelines): Cerium-144	4 TBq	246 GBq	6.2
Water (sea pipelines): Neptunium-237 <sup>2</sup>	730 GBq	35.3 GBq	4.8
Water (sea pipelines): Plutonium alpha	700 GBq	140 GBq	20
Water (sea pipelines): Plutonium-241	25 TBq	3.01 TBq	12
Water (sea pipelines): Americium-241	300 GBq	17.8 GBq	5.9
Water (sea pipelines): Curium-	50 GBq	18.4 GBq	3.7

Discharge	Discharge Limit (annual equivalent)	Discharges during 2012	
		Measured annual discharge	% of Annual Limit
243+244 <sup>2</sup>			
Water (sea pipelines): Uranium	2 kBq	0.339 kBq	17
Water (factory sewer): alpha	300 MBq	128 MBq	43
Water (factory sewer): beta	6.1 GBq	4.1 GBq	67
Water (factory sewer): tritium	68 GBq	10.8 GBq	16

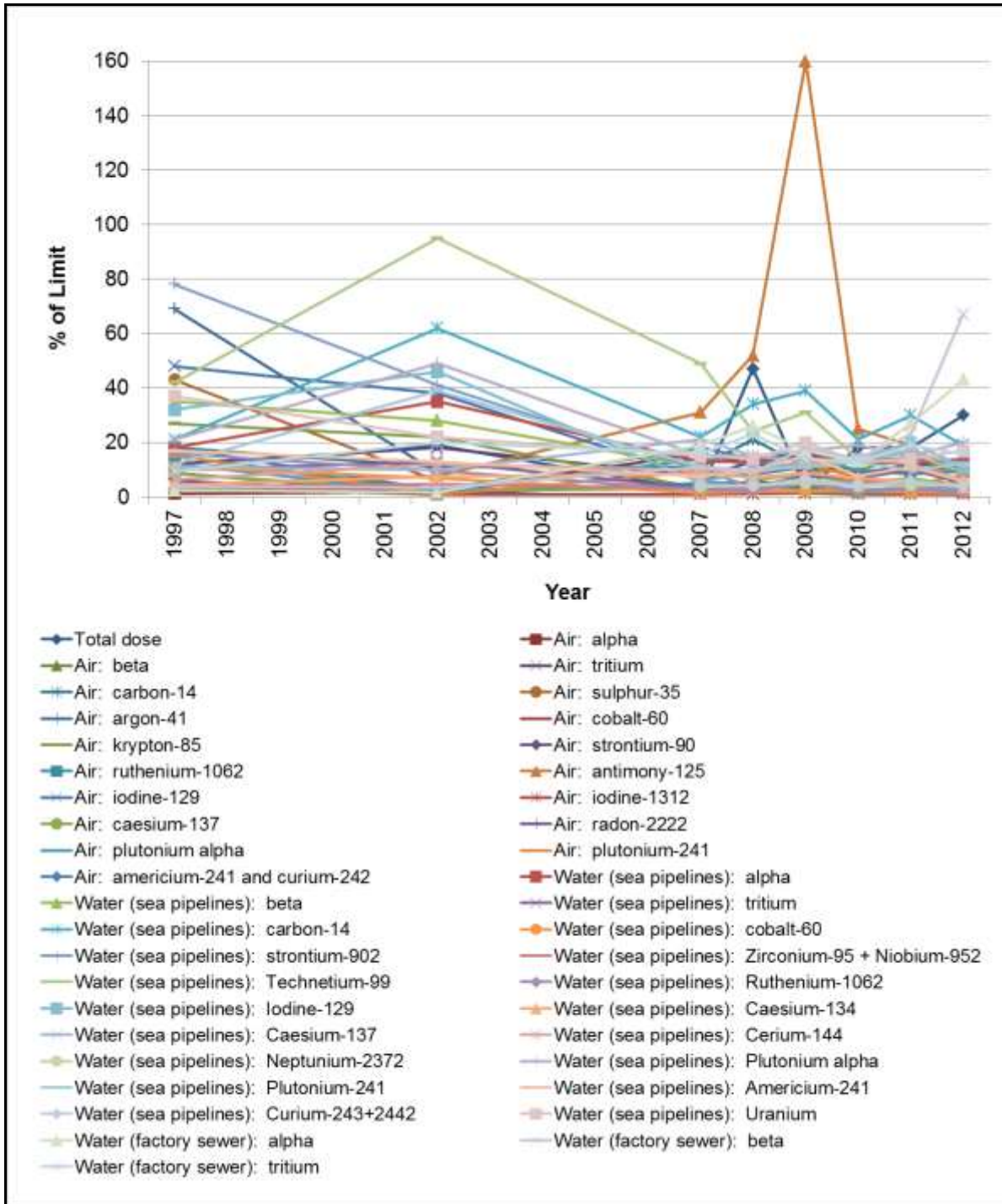
According to the 2012 RIFE report<sup>74</sup>, the total dose from all pathways and sources of radiation at Sellafield, Whitehaven and LLWR was 0.30 mSv, which is approximately 30% of the legal dose limit.<sup>37</sup>

The 2012 RIFE report notes that decommissioning activities at Sellafield may result in brief periods of increased radiological discharges; however, these would then be expected to return to current or lower levels<sup>74</sup>.

Figure 5-12 on the following page shows the available RIFE report radiological discharge and monitoring data for the years 1997, 2002 and each of the past five years from 2007 to 2012 (note that the specific discharges requiring monitoring at the site have changed over time, and hence data for every discharge is not available for every year.) The data shows the annual public dose has remained well within the statutory limit of 1 mSv. Discharges have also remained within their license limits over the past 15 years, with the exception of antimony-125 in 2009, when discharges breached the annual limit by 60%. Notwithstanding this, the dose from this discharge of antimony-125 was less than 0.005 mSv, and total dose from the site was also well within limits that year. As a result of this, the Environmental Agency agreed with Sellafield's proposal to increase the discharge limit (accounting for the fact that Sellafield was using the Best Practicable Means to reduce discharges), and the increase came into force from 1st April 2010.

74 Environment Agency, Food Standards Agency, Northern Ireland Environment Agency and Scottish Environment Protection Agency (2012). Radioactivity in Food and the Environment, 2011. Available from: <http://www.food.gov.uk/science/research/radiologicalresearch/radiosurv/rife/radioactivity-report2011/#.UIOVzIDYjpU>





Source: RIFE reports<sup>38</sup>

Figure 5-12: Radiological discharges and dose over time at Sellafield (NDA)

### 5.6.4 Biodiversity and nature conservation

The NDA Sellafield site is located in the West Cumbria Coastal Plain Natural Area, which is “a largely rural landscape ... situated between the high fells of the Lake District and the Irish

Sea”, where there are valuable coastal habitats along its western edge<sup>75</sup>. Habitats include coastal tarns, basin mires, wet grasslands, rivers and lagoons.

Table 5.8 below lists the key biodiversity features within 5 km of Sellafield. Figure A2-8 also provides a wider radius around the site, and shows that there are four Special Areas of Conservation (SAC), no Special Protection Areas (SPA) and no Ramsar sites within 20 km of the site.

**Table 5.8: Biodiversity / Nature Conservation Features within 5 km of Sellafield**

Features	Notable Types / Examples
1 SAC	Drigg Coast
5 SSSIs	See text below
1 NNR	Hallsenna Moor NNR
UK BAP priority habitats	Maritime cliffs and slopes; coastal sand dune; coastal and floodplain grazing marsh; lowland meadow; purple moor grass and rush pasture; blanket bog; reedbed; lowland heathland; upland heathland; fens; deciduous woodland; traditional orchard
10+ Ancient woodland areas	More than 10 distinct areas

Designated nature conservation near to the site’s boundaries include Low Church Moss SSSI approximately 1.2 km northwest, and Drigg Coast SAC and SSSI approximately 2.7 km south of the site.

The UK BAP priority habitats in proximity to the site’s boundaries are deciduous woodland, intertidal substrate foreshore, and coastal / floodplain grazing marsh. Deciduous woodland borders approximately 30% of the site boundary to the north, east, west and southwest, and is within the site in some of these areas. There is an ancient woodland site approximately 400 m to the north, and coastal / floodplain grazing march 700 m to the west. Immediately south of the site is a railway line, followed by the foreshore.

The River Ehen meets the River Calder just to the south of the site. It is noteworthy that upstream areas of the River Ehen are designated as an SAC mainly for freshwater pearl mussels, though it also qualifies by supporting salmon, showing the importance of its connection with the sea at Sellafield (past which salmon migrate). Also, the site has a main abstraction from Wast Water (a lake approximately 11 km east), which is designated as an SAC.

South of the site is a habitat managed by the Amphibian and Reptile Conservation Trust for natterjack toads, which are protected by European legislation.

### 5.6.5 Population

The site is located over 1 km north of the village of Seascale and nearly 3 km west of Gosforth. Both are small villages which are predominantly surrounded by farmland. The site does not have a direct link to a motorway, and the local roads to the A595 to the east passes the settlements of Pelham Ho to the east, the outskirts of Beckermest to the north and the outskirts of Seascale to the south.

The site crosses the boundary between two LSOAs, both of which have low deprivation across economic and related issues (i.e. domains) of the IMD. However, access to services

<sup>75</sup> Natural England (2013). *Natural Areas: 11 West Cumbria Coastal Plain*. Available from: [http://www.naturalareas.naturalengland.org.uk/SCIENCE/NATURAL/NA\\_DETAILS.ASP?NA\\_ID=11&S=&R=2](http://www.naturalareas.naturalengland.org.uk/SCIENCE/NATURAL/NA_DETAILS.ASP?NA_ID=11&S=&R=2)

is poor as measured by the sub-domain 'geographical barriers', whereby the area is within the 10% most deprived LSOAs in England<sup>23</sup>.

Areas (as broken down into LSOAs) more widely around the site perform very similarly with regard to deprivation, except that LSOAs to the north between Thornhill and Nethertown have relatively high deprivation across all economic and access to services categories.

Sellafield employs approximately 10,000 personnel and is estimated to spend more than £800 million each year in the supply chain, with almost 30% retained within West Cumbria<sup>76</sup>.

The only known community service / facility within 1 km of the site is a place of worship at Calder Bridge, to the north.

### 5.6.6 Health and Well-Being

Both of the LSOAs have low deprivation across health, disability and related issues (i.e. domains) of the IMD. It is amongst the 50% least deprived nationally (thus about average) for health and disability, 10% least deprived for crime (in fact, one LSOA can be noted to have the 6<sup>th</sup> lowest crime of all LSOAs in the country out of over 32,000) and 50% least deprived for living environment. LSOAs surrounding the site generally perform similarly, with crime rates higher to the north, in the area between Thornhill and Nethertown<sup>23</sup>.

Designated recreational features within 1 km of the site include an area of Registered Common Land immediately to the west of the site, and High Sellafield Bank Registered Common Land about 350 m to the west. Both areas are also classed as CROW Act Open Access Land.

Other recreational features within 1 km include PROWs towards and along the beach to the south and west, and also next to the site to the east and north, and national cycle route NCN 72 which uses the road to the west and passes along the coast southwards.

### 5.6.7 Noise and Vibration

Potential noise-sensitive receptors within 1 km of the site include small clusters of properties, and isolated farmhouses, but there is no substantial residential area. There is a place of worship to the northeast.

In 2005, noise surveys were carried out at a number of receptors located around the site perimeter, and the results found that noise levels from the site were so low that for several of the locations, the noise readings were dominated by local sources such as farm animals, machinery or passing traffic. The follow-on noise assessment indicated that noise levels around the installation are unlikely to be a cause of public concern. Also, a number of noise surveys carried out throughout the year, and associated reports have concluded that there has been no significant change in the noise levels from the site since then<sup>76</sup>.

Although noise is generally low, there have been complaints about Sellafield due to sudden noise relating to steam releases from plant. Sellafield Ltd has engaged with the local community and is attempting to minimise disturbance<sup>76</sup>.

No baseline vibration issues have been identified for this site.

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<sup>76</sup> NDA, Sellafield Limited and Nuclear Management Partners (2011). *Sellafield Plan*. Available from: [http://www.sellafieldsites.com/publications/sellafieldplan/Sellafield\\_Plan.pdf](http://www.sellafieldsites.com/publications/sellafieldplan/Sellafield_Plan.pdf)

### 5.6.8 Geology and Soils

The site sits on sedimentary bedrock of the Calder Sandstone and Sellafield Member Formations (sandstone), with a mix of different superficial deposits including till (Devensian – Diamicton), which is unsorted glacial sediment of clay, sand, gravel and/or boulders, glaciofluvial deposits (Devensian, sand and gravel), river terrace deposits (sand and gravel) and alluvium (clay, silt, sand and gravel).<sup>44</sup> The main soil type within 1 km of the site is loamy with low to moderate fertility. Agricultural land around the site is estimated to be of Grade 3 soil quality, and thus potentially ‘best and most versatile’.

The Sellafield site has an estimated 1,600 m<sup>3</sup> of soil contaminated with radioactive material. Contamination is mainly located in the centre of the Sellafield site<sup>76</sup>.

There are no known land stability issues at the site.

### 5.6.9 Water

Within 5 km of the site are several watercourses, New Mill Beck, Ponsonby Tarn, River Ehen, the Irish Sea and the River Calder, which runs through the site.

As stated above, the confluence of the River Ehen and the River Calder lies just to the south of the site. Newmill Beck flows past the site directly to the south. These flow generally southwestwards to the sea. The Sellafield site has two licensed discharges, one into the Ehen Estuary and another into the Irish Sea, as described above.

The latest Environment Agency monitoring data available for 2011 indicates that authorised non-radiological discharges to sea include ammonia, arsenic, cadmium, chromium, lead, mercury, organic carbon, zinc, chlorides, halogenated organic compounds, nitrogen, phosphorus and nickel, and these have remained within their respective limits for all records available (zero notifiable releases). Historic discharges to the estuary (data up until 2006) include chlorides, halogenated organic compounds, copper and zinc, and again no notifiable releases have been identified<sup>36</sup>.

The site also overlies an aquifer in the underlying sandstone geology which is known to be significantly contaminated to the southwest due to the migration of contamination from the site.<sup>77</sup>

Water quality in these watercourses is ‘good’ ecological quality / potential, with some local tributaries of ‘moderate’ quality. There is good chemical quality where assessed.

Regarding water resource / quantity, the site is within the West Cumbria Aquifer groundwater management unit, within which the assessment of water availability is ‘water available’ for future, further abstraction. However, the surface water management units at the site are currently over-licensed, showing water may be available at high flows only<sup>78</sup>. The site has a main abstraction from Wast Water (a lake approximately 11 km east), which is assessed as ‘no water available’ at low flows for new abstraction, as well as abstractions from the Rivers Calder and Ehen.

In 2011, approximately six million cubic meters of water was abstracted from the above sources. The net amount of water used by the Sellafield site was 3.16 million m<sup>3</sup>.<sup>77</sup>

<sup>77</sup> Sellafield Ltd. and NDA (2012). *SEA: Site Specific Baseline: Sellafield*.

<sup>78</sup> Environment Agency (2007). *The Derwent, West Cumbria and Duddon Catchment Abstraction Management Strategy*. <http://a0768b4a8a31e106d8b0-50dc802554eb38a24458b98ff72d550b.r19.cf3.rackcdn.com/genw0407blxi-e-e.pdf>

### 5.6.10 Air Quality

Non-radioactive emissions at Sellafield occur through the use of plant and vehicles. The latest Environment Agency monitoring data available for 2011 indicates that emissions of nitrogen oxides, dust and carbon monoxide have remained within their respective limits for all records available. It also indicates licensed discharges of ammonia, arsenic, benzene, beryllium, cadmium, carbon dioxide, chloroform (trichloromethane), chromium, ethylbenzene, formaldehyde (methanal), lead, manganese, mercury, nickel, phenol, selenium, toluene, hydrogen chloride, sulphur oxides (as SO<sub>2</sub>), nitrous oxide, HCFCs, sulphur hexafluoride, inorganic chlorine compounds, VOCs (NMVOCs) and antimony, all of which have remained within their respective limits<sup>36</sup>. There are no Air Quality Management Areas in near proximity to the site.

### 5.6.11 Climate Change and Energy Use

In 2011, the Sellafield nuclear-licensed site used 281,000 MWh of energy and produced 281,000 tonnes of CO<sub>2</sub>e (carbon dioxide and equivalents). This was an increase from 2010.<sup>77</sup>

### 5.6.12 Coastal Change and Flood Risk

The site is located along the Irish Sea coastline, but is protected from coastal flooding by cliffs and a railway embankment, the site being 5 m to 50 m above ordnance datum (AOD). The risk of flooding from the River Calder which runs through the Sellafield site is negligible, and the only modelled flood risk zones are outside of the developed part of the site. However, the flood risk zones indicate that an extreme flood could sever access to the site from the north (local roads and the A595).

The Environment Agency policy for coastal erosion in this area is to hold the existing defence line, and thus maintain and, when necessary, replace existing defences (see maps in Annex 2). Currently there is revetment defence, and without it, the southern end of the Sellafield site could be affected by coastal erosion in the next 100 years.<sup>77</sup>

### 5.6.13 Transportation

The M6 is the nearest motorway, within a minimum 85 km (52 mile) drive mainly along the A595, either north or south, and then east. Southbound, the A595 connects to the A5092 and A590 before joining the M6. Northbound, access to the M6 from the A595 can be had via the A66. The site is also served by Sellafield train station, adjacent to the west. Cycle routes and footpaths are addressed under the SEA category 'Health and Well-Being'.

Approximately 80% of Sellafield employees live locally in Allerdale and Copeland, with a further 4% in neighbouring Barrow-in-Furness and Carlisle. Commuting is largely along the main A595.

### 5.6.14 Waste Management

Sellafield is host to the only high-level waste (HLW) storage in the UK, and also provides storage for ILW.<sup>79</sup> As of 2012, the radioactive waste for disposal (in packaged volume) included 1,780 m<sup>3</sup> of HLW, 74,900 m<sup>3</sup> of ILW and 4,030 m<sup>3</sup> of LLW in storage.

<sup>79</sup> NDA (2012). *An Overview of NDA Higher Activity Waste*. <https://www.nda.gov.uk/documents/upload/An-overview-of-NDA-higher-activity-waste-February-2012.pdf>

In 2011, the site produced 2,600 tonnes of non-hazardous waste, of which approximately 16% was reused or recycled, and 116 tonnes of hazardous waste, of which 38% was reused or recycled. Approximately 40 tonnes of inert waste was disposed of by landfill.

There are no known non-radiological waste management sites within a 1 km radius of the site.

### 5.6.15 Land Use and Materials

The site is entirely developed or previously developed land, with several demolished structures. There is both a short- and long-term programme for further decommissioning and structure demolition, which includes demolition of further structures by 2018.<sup>77</sup> The adjacent and surrounding land uses are shoreline, grassland and arable farming.

### 5.6.16 Cultural Heritage

There is a Scheduled Monument approximately 250 m to the south of the site: 'Stone circle NW of Seascale How Farm', which is a ring of stones approximately 30 m in diameter which may date back to the Bronze Age.<sup>80</sup> There are additional Scheduled Monuments further away, including one over 1.7 km to the northwest and four 2 km to the northeast.

There are five Listed Buildings within 1 km, including one Grade II\* building, around 1 km to the northwest.

In terms of on-site archaeology, it is considered likely that any pre-industrial remains will have been destroyed during construction of the deep basements and foundations of the current and historic facilities.

### 5.6.17 Landscape and Townscape

Sellafield is a large, mainly industrial site which is undergoing periodic development. The Sellafield site falls within the West Cumbria Coastal Plain and Cumbria High Fells. It is an area of coastline mudflats, shingle and pebble beaches with localised sections of dunes, sandy beaches and sandstone cliffs. Parts of the site can be seen from Seascale, the Cumbria Coastal Way and publicly accessible viewpoints (Sellafield Limited and NDA, 2012). The area is of national importance for its extensive mineralisation and the resultant mining heritage.

There are no Areas of Outstanding Natural Beauty in proximity; however the boundary of the Lake District National Park is 11 km to the northeast. There are open views of the site from the National Park, for example including Scafell approximately 15 km to the east.

### 5.6.18 Evolution of the Baseline

The NDA and Sellafield Limited have several strategies and plans applying to the long-term management of the site. The combined picture is that Sellafield will operate, build replacement 'new generation' plant and infrastructure, and simultaneously be subject to decommissioning, land and groundwater remediation of historic contamination over the next approximately 110 years, with full demolition of the site by 2120. The planned end state for the site is at least partial remediation (addressing the most significant site risks), followed by indefinite institutional control to manage the remaining risks<sup>81</sup>.

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<sup>80</sup> VisitCumbria (2013). *Grey Croft Stone Circle*. Available from: <http://www.visitcumbria.com/wc/grey-croft-stone-circle/>

<sup>81</sup> <http://www.sellafielddisposal.com/solution/>

It is estimated that the eventual decommissioning of Sellafield will result in the generation of 1,260 m<sup>3</sup> of HLW, 282,000 m<sup>3</sup> of ILW, and 503,000 m<sup>3</sup> of LLW (of which a proportion will be diverted from LLWR through the use of decontamination and material recovery techniques). It is intended that this waste will eventually be retrieved and stored temporarily until a national off-site repository is established, or for LLW, until it is disposed of at the LLW repository at Drigg, as appropriate<sup>76</sup>.

NuGen is currently pursuing an application through the National Infrastructure Planning process for a new nuclear power station at Moorside to the north of Sellafield.

Trend data available for radiological discharges from Sellafield shows a general trend of declining discharge and dose from the site, with some fluctuation due to changes in industrial processes and abatement regimes and monitoring methods in recent years. Plans for the site do not indicate any significant changes in operational radiological discharges in the future, although there are clear uncertainties linked to decommissioning (including the clean-up of contaminated land) and the processing of legacy materials from the site.

Climate change in the region is projected to lead to the following impacts: increased scarcity of water resources and more frequent droughts – this is accounted for to some extent in the water resource status reported in Section 5.6.9; greater intensity of rainfall and frequency of intense rainfall events, leading to increased flood risk; sea level rise and more frequent storm surges, causing coastal erosion and flood risk; sea level rise causing habitat degradation; increased risk of the spread of invasive species and plant diseases.<sup>82</sup>

There are a few key baseline assumptions of this SEA for Sellafield, including that the terrestrial nature conservation sites and notable habitats around Sellafield are not predicted to change in area / boundary significantly into the long term. Coastal habitats outside of the defended area at Sellafield will be predicted to gradually move inland with natural erosive processes. The 'hold the line' coastal management policy at Sellafield is assumed to lead to the maintenance and/or replacement of coastal defences, as required to implement this policy effectively and protect the site.

Population projections for Copeland are for an approximately 1% increase between 2011 and 2021. Without the influence of major new developments, the age profile is expected to change significantly, with a notable increase in people aged 65 and over, and a decline in the working-age population<sup>83</sup>. Settlements in the vicinity of Sellafield are not expected to grow significantly. However, the proposed NuGen Moorside power station may alter the projection and/or growth of settlements somewhat, due to both short-term construction workers and long-term employment. The proposals are at an early stage and therefore it is not possible to identify the scale of that impact.

## 5.7 Chapelcross (NDA)

### 5.7.1 Site Background

NDA Chapelcross site is situated close to the village of Creca approximately 2 km north of the town of Annan in Dumfries and Galloway, South West Scotland. The location is a rural area which was originally an RAF airfield converted for use as a Magnox nuclear power station in 1955. The site is approximately 5 km from the northern coast of the Solway Firth.

<sup>82</sup> ClimateUK (2012). *Summary of Climate Change Risks for North West England*. Available from: <http://climatechangenorthwest.co.uk/sites/default/files/00112a%20CCRA%20NW%20Pack.pdf>

<sup>83</sup> NHS Cumbria et al. (2012). *Copeland Health & Well Being Profile 2012*. <http://www.cumbria.nhs.uk/YourHealth/PublicHealthInformation/Copeland-Health-Wellbeing-Profile-2012.pdf>

The site is an inland location at the top of the valley of the River Annan (to the west); the nuclear-licensed site covers approximately 92 hectares. The maps in Annex 2 show the environmental and cultural setting of the site.

A map of the site can be found in Annex 2. Figure 5-13 below provides an aerial view.



**Figure 5-13: Aerial view of Chapelcross**

### 5.7.2 Local Planning Context

The adopted local plan for the area around the site is the Annandale and Eskdale Local Plan, which was adopted in October 2006<sup>84</sup>. As a document which itself has accounted for international and national plans and programmes, it implements at a local level objectives consistent with those laid out in Annex 3.

There is no specific policy for the Chapelcross site, although the end of its operation is noted as a lost source of employment opportunity.

Creca is shown in the Local Plan as a ‘small building group’, which is only suitable for limited housing development subject to a range of criteria.

The Dumfries and Galloway Local Transport Strategy 2011 – 2026<sup>85</sup> focuses on the scope for promoting sustainable travel in the area of Annan.

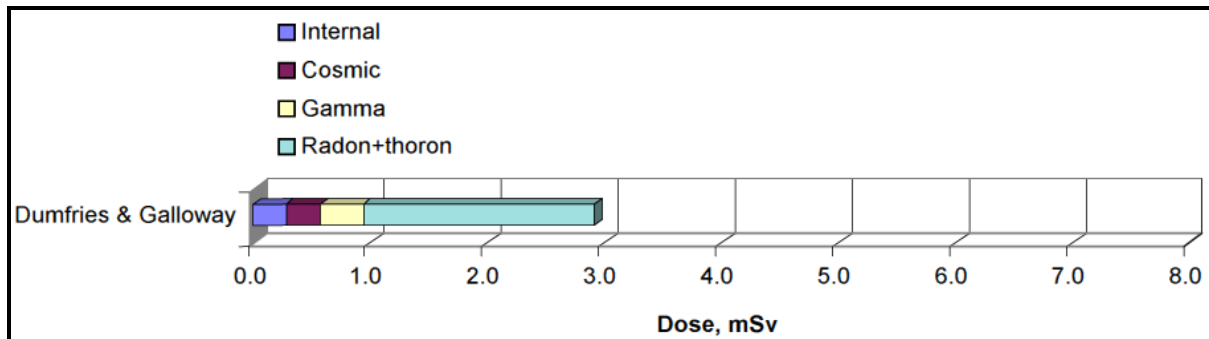
<sup>84</sup> Dumfries and Galloway Council (2006). *Annandale and Eskdale Local Plan*. Available from: <http://www.dumgal.gov.uk/index.aspx?articleid=3738>

<sup>85</sup> <http://www.dumgal.gov.uk/CHttpHandler.ashx?id=8209&p=0>



### 5.7.3 Radiological Discharges / Emissions

Ionising radiation exposure from **natural sources** in the vicinity of Chapelcross is estimated to be less than 3 mSv per year, given county-level data available<sup>35</sup>. Figure 5-14 below illustrates the average annual doses to residents from different natural background sources.



**NOTE:** “internal” refers to radiation originating from terrestrial sources which, via the food chain, end up in our bodies, and “gamma” radiation is received externally from mainly terrestrial sources (rocks, soil and building materials such as stone). Source: extract of figures in HPA, 2005, p.78<sup>35</sup>

**Figure 5-14: Annual exposure to natural background radiation in Dumfries and Galloway**

Activities at Chapelcross which result in radiological discharges comprise the emission of radioactive gasses, and the discharge of liquid waste to the Solway Firth.

Table 5.9 below summarises the discharges of emissions to air from Chapelcross relative to the permitted levels authorised by the Scottish Environment Protection Agency (SEPA). It can be seen that in 2009, emissions were well within their respective limits.

**Table 5.9: Radiological discharges at Chapelcross (2012)**

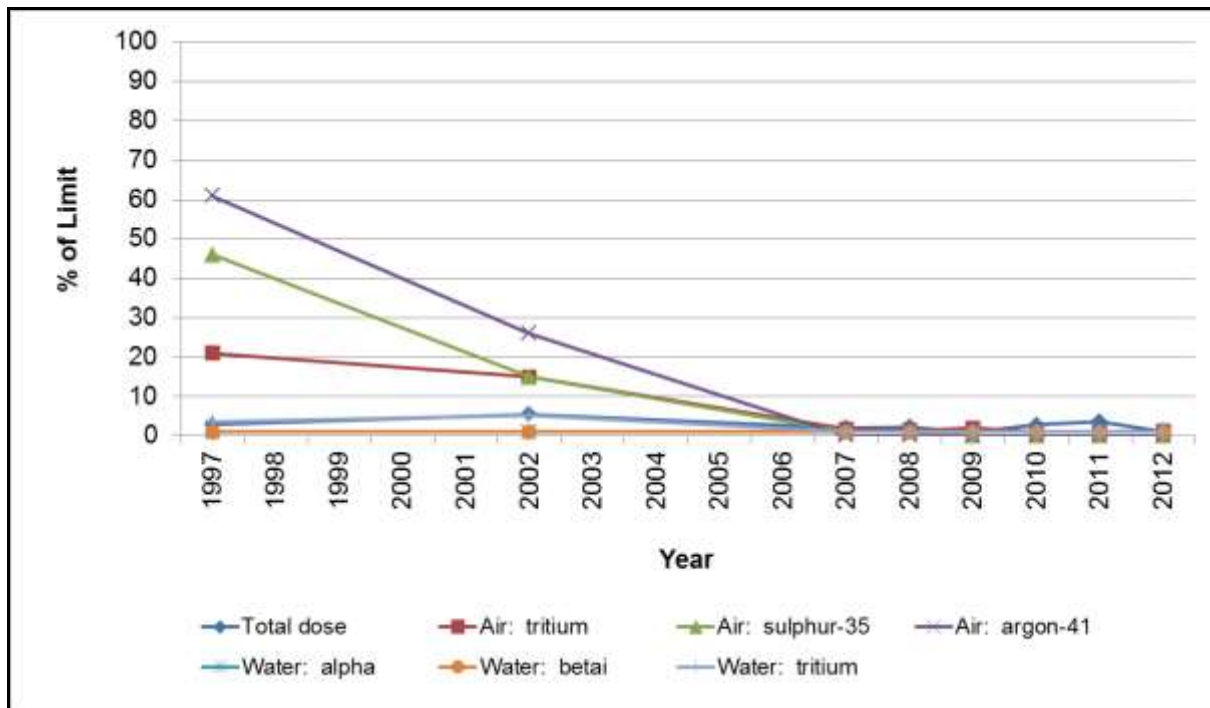
Discharge	Discharge Limit (annual equivalent)	Discharges during 2012	
		Measured annual discharge	% of Annual Limit
Air: tritium	5000 TBq	60.5 TBq	1.2
Air: sulphur-35	50 GBq	Nil	Nil
Air: argon-41	4500 TBq	Nil	Nil
Water: alpha	100 GBq	7.71 MBq	<1
Water: beta	25 TBq	5.99 GBq	<1
Water: tritium	5.5 TBq	3.17 GBq	<1

According to the RIFE report for 2012<sup>37</sup>, the radiation total dose from all pathways and sources of radiation at Chapelcross was 0.011 mSv, which is just over 1% of the legal dose limit.

The RIFE report notes that electricity generation at Chapelcross ceased in 2004, and the station has been preparing for decommissioning. It states: “Defuelling of the reactors began in 2008 and was completed is during 2013. The major hazards on the site will now be decommissioned early, by 2017” (Environment Agency *et al.*, 2012, p.128)<sup>37</sup>.

Figure 5-15 below shows the available RIFE report radiological discharge and monitoring data for the years 1997, 2002 and each of the past five years from 2007 to 2012. (Note: the specific discharges requiring monitoring at the site have changed over time, and hence data

for every discharge is not available for every year.) The data shows the discharges and dose to the public have remained well within their respective limits over the past 15 years.



Source: RIFE reports<sup>38</sup>

Figure 5-15: Radiological discharges and dose over time at Chapelcross (NDA)

### 5.7.4 Biodiversity and nature conservation

Chapelcross site is situated in the Solway Tweed River basin, between the Rivers Annan and Kirtle Water (a river), but in the River Annan valley. The River Annan is over 1 km west of the site, and flows from the montane uplands through woodland, farmland and lowlands.

Table 5.10 below lists the key biodiversity features within 5 km of Chapelcross. Figure A2-10 also provides a wider radius around the site, and shows that there are two Special Areas of Conservation (SAC), one Special Protection Area (SPA) and one Ramsar site within 20 km of the site.

Table 5.10: Biodiversity / Nature Conservation Features within 5 km of Chapelcross

Features	Notable Types / Examples
Ramsar site	Upper Solway Flats and Marshes
SPA	Upper Solway Flats and Marshes
SAC	Solway Firth
SSSI	Upper Solway Flats and Marshes
1 IBA	Upper Solway Flats and Marshes
UK BAP priority habitats	Intertidal substrate foreshore

There are no designated nature conservation sites within 2 km of the site, but a number in the wider area (see text and Table 5.10 below). There are also no known BAP priority habitats in the near vicinity. The site has an effluent pipeline which discharges directly to the European designated Solway Firth SAC, approximately 5 km to the south.

Within the site, small numbers of protected species have been recorded. Also, peregrine are known to regularly breed at the site<sup>86</sup>.

### 5.7.5 Population

The largest residential settlement within 5 km is Annan, south of the site. A number of smaller settlements surround the site including the hamlet of Creca, immediately east of the site, as well as smaller hamlets such as West Bretton to the north and Blackhills to the south.

The Scottish Index of Multiple Deprivation (SIMD) shows that the area within which the site sits, which covers much of the surrounding rural area, experiences low levels of deprivation across economic and related issues. However, access to services is poor as measured by the domain 'geographic access', whereby the area is within the 20% most deprived in Scotland<sup>87</sup>.

Areas surrounding the site vary with regard to deprivation, with a highly economically deprived area in the north of Annan (south of the site) and slightly lower overall economic performance to the north and west. The area to the north of the site (Boreland and Ecclefechan) is listed as being amongst the 30% most deprived for education.

There are no identified community facilities or services within 1 km of the site.

Access from the site to the A74(M) motorway is via local, rural roads which pass a few hamlets and isolated dwellings.

### 5.7.6 Health and Well-Being

The SIMD shows low deprivation levels for health and crime. The area is amongst the 40% least deprived nationally for health and the same for crime<sup>87</sup>.

There are no identified recreational features within 1 km of the site.

### 5.7.7 Noise and Vibration

Potential noise-sensitive receptors include relatively isolated dwellings or small groups of dwellings and the hamlet of Creca, which consists of approximately 15 residential properties.

Previous studies show there have been no vibration issues caused by activities at the site<sup>86</sup>.

### 5.7.8 Geology and Soils

The site sits on sedimentary bedrock of the Sherwood Sandstone Group, with superficial deposits from the Gretna Till Formation (Diamicton), which is unsorted glacial sediment of clay, sand, gravel and/or boulders.<sup>44</sup> Soil in the area surrounding the site is classified as lowland brown earth soils of high agricultural value. There are no designated geological sites within or in close proximity to site.

Due to the nature of and historical activities at Chapelcross, there is radioactive and non-radioactive land contamination present. Land and groundwater throughout the site has

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<sup>86</sup> NDA (2010). *Strategic Environmental Assessment: Site Specific Baseline Chapelcross*. Available from: <http://www.nda.gov.uk/documents/upload/Strategic-Environmental-Assessment-Site-Specific-Baseline-Chapelcross-May-2010.pdf>

<sup>87</sup> Scottish Neighbourhood Statistics (2012). *Scottish Index of Multiple Deprivation*. Available from: <http://www.sns.gov.uk/Simd/Simd.aspx>

varying levels of tritium contamination as a result of fall-out from authorised discharges to air, as well as historic spills and storage of radioactive material and leakage from the effluent pipe, prior to the start of decommissioning. Non-radioactive contamination mainly results from historically acceptable practices of disposing of both liquid and sludge waste in the ground. Contamination has been detected in groundwater outside of the site. There is also a high water table on-site, which has a high pH and contamination of shallow groundwater<sup>88</sup>.

### 5.7.9 Water

The site is in the catchment of the River Annan. The river is 1 km to the west, whilst Kirtle Water (river) is approximately 2.5 km northeast, and the Solway Firth is approximately 5 km to the south of the site. Running through the site, although culverted, is Gullielands Burn. Dornock Burn flows approximately 2.5 km to the east of the site.

The ecological and chemical status of Gullielands Burn is not known. The Solway Firth is of 'moderate' ecological status, and assessed as 'pass' for chemical quality.

The site is located on Solway bedrock and localised sand and gravel aquifers, and is a drinking water protected zone.

The site has had a licensed effluent discharge to the Solway Firth via a 6 km pipeline. Discharges are made at high tide. Radioactivity levels are projected to decrease upon the completion of the defuelling and the dispatch of all the spent fuel to Sellafield<sup>88</sup>.

The site has a licensed abstraction from the River Annan, which was once estimated as 7 million gallons per day. SEPA does not have an assessed status of water availability for the River Annan; however, groundwater has been indicated as showing long-term stability at present<sup>89</sup> (SEPA, 2007). Although the infrastructure remains, surface water abstraction has stopped since closure of the power station. The site used approximately 31,000 m<sup>3</sup> of mains water in 2010<sup>88</sup>.

### 5.7.10 Air Quality

Current sources of non-radiological emissions at Chapelcross include vehicles and diesel generators, with emissions including oxides of nitrogen, oxides of sulphur, ozone and dust / particulates. These sources run only intermittently, and due to the rural nature of the site, average levels of these pollutants are likely to be low<sup>88</sup>. There are no AQMAs in proximity to the site.

### 5.7.11 Climate Change and Energy Use

In 2010, the site used 7,500 MWh of energy, resulting in direct emissions of 8,800 tonnes of CO<sub>2</sub>e (carbon dioxide and equivalents). Indirect greenhouse gas emissions from energy consumption, and sources other than energy consumption were less than 10 tonnes<sup>88</sup>.

### 5.7.12 Coastal Change and Flood Risk

The Chapelcross site does not fall within any relevant coastal erosion or flood risk areas.

<sup>88</sup> Magnox (2013). *Strategic Environmental Assessment: Site Specific Baseline Chapelcross Site*. <http://www.magnoxsites.com/UserFiles/File/publications/environmental%20reports/ChapelcrossSEABaselineV2formatted.pdf>

<sup>89</sup> SEPA (2007). *The Annan Catchment Co-ordination Project*. Available from: [https://www.google.co.uk/url?sa=t&rct=j&q=&esrc=s&source=web&cd=6&ved=0CEkQFjAF&url=http%3A%2F%2Fwww.sepa.org.uk%2Fwater%2Fwater\\_publications%2Fidoc.ashx%3Fdocid%3De882b6cb-d5df-418b-b2cf-1ca12e296523%26version%3D-1&ei=bW5vUrf6GNep4AOTi4CIDq&usq=AFQjCNHRK7ZppqmOHJYp1UNd0Lv2wjB-w](https://www.google.co.uk/url?sa=t&rct=j&q=&esrc=s&source=web&cd=6&ved=0CEkQFjAF&url=http%3A%2F%2Fwww.sepa.org.uk%2Fwater%2Fwater_publications%2Fidoc.ashx%3Fdocid%3De882b6cb-d5df-418b-b2cf-1ca12e296523%26version%3D-1&ei=bW5vUrf6GNep4AOTi4CIDq&usq=AFQjCNHRK7ZppqmOHJYp1UNd0Lv2wjB-w)

### 5.7.13 Transportation

The A74(M) motorway is 2.7 km to the north of the site (as the crow flies). The main roads connecting into the motorway are the B722 if connecting to the north, and minor roads to the B6357 eastwards through Hollee. Cycle routes and footpaths are addressed under the SEA category 'Health and Well-Being'.

### 5.7.14 Waste Management

Waste production at the site varies with phases of decommissioning. In 2010/11, the site produced 10 m<sup>3</sup> of solid ILW, 185 m<sup>3</sup> of compactable LLW and 568 m<sup>3</sup> consigned to a Low Level Waste Repository (LLWR). The site also produced 125.74 tonnes of general waste, 423.56 tonnes of hazardous waste (most of which was asbestos), 61.76 tonnes of inert waste, 101.34 tonnes of metals, and 8.96 tonnes of electronic waste. Of 228.11 tonnes of waste of an unspecified nature (presumably including general waste and metals), over 80% was reused or recycled<sup>88</sup>.

There are no known non-radiological waste management facilities in near proximity to the site.

### 5.7.15 Land Use and Materials

The total NDA estate covers 188 hectares, with the area outside of the nuclear-licensed site (the 'North Site') incorporating the former RAF airfield. The site has disused power plant structure, administrative and office buildings, access roads, areas of hardstanding, multiple aircraft hangars, miscellaneous airfield buildings, and grassy areas (including over reclaimed land). Inert rubble produced from the demolition of the cooling towers was used to infill the subsurface voids resulting from the removal of these structures, and further demolition activities will likely lead to similar reuse of materials on- or off-site as infill material, or similar<sup>88</sup>.

The surrounding area is rural in nature and is used primarily for agricultural purposes. Notable land features in proximity to the site include woodland, and the route of the disused railway that alongside which the effluent discharge pipeline runs<sup>88</sup>.

### 5.7.16 Cultural Heritage

There are no Scheduled Monuments in proximity to the site. There are scattered Listed Buildings in the area, including one listed as Outertown, approximately 600 m to the south.

Kinmount, approximately 5.5 km to the west, is on the Register of Landscapes, Parks and Gardens of Special Historic Interest in general proximity to the site. This is Kinmount, which is approximately 5.5 km to the west.

No known sites of archaeological interest are present on the site, and remnants from the WWII era are likely to have been destroyed during station construction (although may be intact in the wider airfield)<sup>88</sup>.

### 5.7.17 Landscape and Townscape

NDA's Chapelcross site is a partly industrial, partly derelict site, undergoing gradual decommissioning, with some active facilities. The site is located inland, within a broad, gently undulating lowland plain surrounding the Solway Firth. The surrounding area contains several copses and small areas of woodland that are visually important within the local

landscape. The site contains several prominent structures that are visible at medium to long distances, including venting stacks on top of existing reactor buildings which are approximately 50 m high and thus visible from surrounding areas. These will be decommissioned in due course.

### 5.7.18 Evolution of the Baseline

The NDA has produced a decommissioning strategy for the Chapelcross Magnox site. The cooling towers were demolished in 2007, and the reactors were defueled in early 2013. Between now and 2023, Magnox (as the Site Licensed Company) will focus on demolition, removal of buildings and high hazard reduction works in preparation for the Interim Care and Maintenance phase, a semi-quiescent state with a much reduced maintenance schedule. The site will continue to be decommissioned until the full Care and Maintenance phase commences between 2023 and 2028. Final site clearance is scheduled to commence at the end of the Care and Maintenance phase, with all remaining structures on the site are scheduled to be cleared by 2095.<sup>90</sup>

The planned end state for the site is defined in the NDA Strategy Document 2011, which states that “...contamination will be reduced to meet the requirements of the relevant regulatory regime for the next planned use of the site and the current use of adjacent land. Where the next planned use no longer requires a nuclear site licence, radioactive contamination will be reduced to meet the criteria for de-licensing, with any remaining radioactive substances being subject to the relevant environmental permitting regime. The physical state designated land will be made suitable for the next planned use of the site; structures and infrastructure will be made safe or removed where necessary, having first explored opportunities for their re-use.”

Trend data available for radiological discharges from Chapelcross shows a similar total dose between 2004 and 2012, at very low levels. Given historic land contamination at the site and continuing decommissioning and remediation, it can be assumed that there is potential for periodic but slight increases in emissions in future years as a result of the various phases of remediation on-site.

Climate change in the region is projected to lead to the following impacts: increased scarcity of water resources and more frequent droughts; increased intensity of rainfall and frequency of intense rainfall events, leading to increased flood risk, particularly in the winter months, but also ‘flash’ floods in summer; coastal retreat in the wider area, combined with land use change; and increased risk of the spread of invasive species<sup>91</sup>.

Population projections for Dumfries and Galloway are for an approximately 1% decrease between 2008 and 2033. The age profile is expected to change significantly, with a notable increase in people aged 65 and over, and a decline in the working-age population<sup>92</sup>. Settlements in the vicinity of Chapelcross are not expected to grow significantly.

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<sup>90</sup> Magnox (2013). *SEA Site Specific Baseline: Chapelcross Site*.  
<http://www.magnoxsites.co.uk/UserFiles/File/publications/environmental%20reports/ChapelcrossSEABaselineV2formatted.pdf>

<sup>91</sup> Adaptation Scotland. *Adapting to Climate Change*. Available from:  
[http://www.adaptationscotland.org.uk/Upload/Documents/IntrotoadaptationforpublicsectorFINAL\\_2.pdf](http://www.adaptationscotland.org.uk/Upload/Documents/IntrotoadaptationforpublicsectorFINAL_2.pdf)

<sup>92</sup> Democratic Working Group Webpage: <http://www.dumgal.gov.uk/complan/index.aspx?articleid=10865>

## 5.8 Summary of Key Issues and Opportunities at Each Site

Table 5.11 below presents a summary of the key pre-existing issues identified through the review of the current and projected future baseline for each candidate site. It also presents 'baseline opportunities', which represent particular features or policies related to sites which require or actively seek improvement. The below table is not a list of advantages and disadvantages relative to one another; it is based purely on the baseline.

**Table 5.11: Summary of key baseline environmental and socio-economic issues**

Candidate Site	Baseline Constraints and Issues	Baseline Opportunities
AWE Aldermaston	<ul style="list-style-type: none"> <li>• Scheduled Monument on-site</li> <li>• Aldermaston Court Registered Park and Garden adjacent to site</li> <li>• Aldermaston Conservation Area and Listed Buildings along A340 (main road to site)</li> <li>• Lowland heathland UK BAP habitat within the site</li> <li>• Ancient woodland adjacent to the site</li> <li>• Path of Roman Road – particular archaeological potential</li> <li>• LTP discouraging HGV traffic on the A340</li> <li>• Villages and other residents along local transport routes</li> <li>• Known road infrastructure constraints</li> <li>• Localised peak-time road congestion</li> <li>• Flood risk on key roads in wider area</li> <li>• Increasing temperatures and water resource constraints due to projected climate change</li> <li>• Traffic noise from the A340</li> </ul>	<ul style="list-style-type: none"> <li>• Biodiversity Opportunity Area – habitat creation likely to have most impact at a strategic scale</li> <li>• PROW Improvement Plan corridor nearby</li> <li>• Existing ILW storage on-site (non-SDP) with planned capacity increases</li> </ul>
AWE Burghfield	<ul style="list-style-type: none"> <li>• Flood risk on-site</li> <li>• Known physical transport infrastructure constraints</li> <li>• Villages and other residents along local transport routes</li> <li>• Residential properties in close proximity</li> <li>• Increasing temperatures and water resource constraints due to projected climate change</li> <li>• Localised peak-time road congestion</li> <li>• Possible concurrent construction project: cumulative effects</li> </ul>	<ul style="list-style-type: none"> <li>• Policy to improve transport connectivity between nearby settlements and employment</li> <li>• PROW Improvement Plan corridor nearby</li> </ul>

Candidate Site	Baseline Constraints and Issues	Baseline Opportunities
Capenhurst (CNS)	<ul style="list-style-type: none"> <li>• Capenhurst Conservation Area to south of site</li> <li>• Recreational facilities adjacent to the site</li> <li>• Close proximity of nursing home, certain residential properties and a school</li> <li>• Rivacre Brook is of 'bad' ecological potential</li> <li>• Water resource constraints</li> <li>• Groundwater vulnerability – major aquifer</li> <li>• National Cycle Network route adjacent to the site</li> <li>• Proposed major residential / mixed use development in close proximity</li> </ul>	<ul style="list-style-type: none"> <li>• No particular opportunities of net environmental enhancement identified.</li> </ul>
Sellafield (NDA)	<ul style="list-style-type: none"> <li>• Scheduled Monument in close proximity</li> <li>• Registered Common Land adjacent to the site</li> <li>• Open views from National Park</li> <li>• Multi-faceted decommissioning / remediation programme: impacts on this programme or cumulative effects of site activities</li> <li>• Main abstraction from Wast Water, which is designated as an SAC</li> <li>• Surface water resource constraints</li> <li>• Coastal location: erosion risk and need to maintain defences</li> <li>• Public Rights of Way adjacent to the site</li> <li>• National Cycle Network route near to the site</li> <li>• Proposed new nuclear build in close proximity: cumulative effects</li> </ul>	<ul style="list-style-type: none"> <li>• Cumulative benefits with proposed new nuclear build: transport, coastal defence</li> <li>• Existing ILW storage on-site (non-SDP)</li> </ul>
Chapelcross (NDA)	<ul style="list-style-type: none"> <li>• Effluent discharge to the Solway Firth, with its associated designations as SPA, SAC and Ramsar site</li> <li>• Drinking water protected zone</li> <li>• Known road infrastructure constraints (hamlets and other residents along roads)</li> </ul>	<ul style="list-style-type: none"> <li>• Future ILW storage planned on-site (non-SDP)</li> </ul>



## 6 Proposed Scope of the SEA

### 6.1 Introduction

This chapter presents the proposed scope of the future assessment stage of the SEA, which will follow consultation on this Scoping Report. It is structured as follows:

- Section 6.2 presents the proposed technical scope of the SEA, including an SEA Framework made up of SEA objectives and guiding questions and a proposed method of assessment;
- Section 6.3 presents the proposed timescales to be covered by the SEA, in terms of when any effects could occur; and
- Section 6.4 presents the proposed geographic scope of the SEA, which is the area over which the potential for effects will be considered.

The technical scope has been informed by a review of potential activities required in order to implement and operate ILW storage (Section 6.2.1), the policy review (Section 4) and baseline (Section 5), as well as the timescales and geographic scope of *ILW storage and transport* (relative aspects outlined in Section 2). Once a proposed technical scope was established, the timescales and geographic scope of *potential effects under the SEA* (i.e. to be considered during assessment) were defined.

Table 6.2 presents the proposed SEA objectives and guiding questions for this SEA. This is the central component of this Scoping Report, as it sets out the environmental and socio-economic issues proposed to be scoped in and out. The issues scoped in will be considered during the assessment stage at the level of detail indicated in Table 6.2.

### 6.2 Technical Scope

#### 6.2.1 Assumptions about Implementing ILW Storage and Transport

The SEA is of necessity based upon a number of assumptions about how ILW storage and transport of RPVs are expected to occur. These assumptions reflect current intentions by the MOD, and are provided in order to allow stakeholders to provide informed opinions on the scope of the SEA. Table 6.1 below sets out a roughly sequential sequence of key activities expected in the implementation and operation of ILW storage and transport, and more detailed elements of each activity which could lead to an impact on the environment or local community without mitigation.

**Table 6.1: Assumptions about implementing ILW Storage**

Activity	Elements of Each Activity Which Could have an Environmental Impact
Store design and construction	<p>Typical construction activities associated with a large industrial-type storage building. These may include:</p> <ul style="list-style-type: none"> <li>• Heavy machinery and plant (e.g. bulldozers, dumper trucks, cranes), small-scale on-site power generation and powered equipment / tools</li> <li>• Temporary accommodation during construction</li> <li>• Arrival and presence of construction site staff</li> <li>• Deliveries of construction materials</li> </ul>

Activity	Elements of Each Activity Which Could have an Environmental Impact
	<ul style="list-style-type: none"> <li>• Site / vegetation clearance and exposure of bare earth, plus excavation</li> <li>• Materials storage mounds and fenced-off areas</li> <li>• Erection of the (unshielded) interim storage facility</li> <li>• Transport for removal of construction wastes</li> <li>• Presence of the new facility – see Table 2.1 for basic assumptions</li> </ul>
Transportation of the RPVs	<ul style="list-style-type: none"> <li>• Transport of the RPV – see Table 2.1 for basic assumptions</li> <li>• Potential for temporary highway closures during transport</li> </ul>
Operation	<ul style="list-style-type: none"> <li>• RPV transport (see above) and placement of shielded containers using lifting machines or overhead crane</li> <li>• Commuting of limited operational staff – potential use / reallocation of existing site staff</li> <li>• Small numbers of HGVs delivering materials or for site waste collection</li> <li>• Building maintenance, assuming a 100-year design life, noting that the majority of operational period will be passive storage (closed and locked facility)</li> <li>• Connection into existing site drainage</li> <li>• Potential for occasional re-packaging of RPVs, requiring lifting into a secure, shielded area within the facility</li> <li>• Shielded RPV loading onto road vehicles for transport to the size reduction facility or GDF (near end of operation)</li> <li>• Potential for licensed discharges to air or water (site drainage or ventilation)</li> </ul>
Decommissioning (assuming facility will be removed)	<ul style="list-style-type: none"> <li>• Disconnecting existing services (e.g. electricity, drainage and water supply)</li> <li>• Set up demolition site compounds / areas</li> <li>• Transport (arrival / departure) of demolition equipment, e.g. dumper trucks and hydraulic excavators</li> <li>• Commuting site staff</li> <li>• Tearing down of structure (assumed no controlled explosions needed)</li> <li>• Removal of foundations (e.g. concrete)</li> <li>• Fill / cover of foundation area with hardcore material and/or soil</li> <li>• Collection and removal of demolition waste for disposal or recycling</li> <li>• Identification of an appropriate after use for the site, which is assumed to involve either continuing nuclear-related activity or industrial-type development</li> </ul>

## 6.2.2 Proposed Changes to the SEA Categories, Objectives and Guide Questions Since 2011

This SEA will be based on the SEA categories, objectives and guide questions of the previous 2010/11 SEA – the ‘SEA Framework’. The SEA categories are described in Table 3.1 (Section 3.5). However, certain changes are being proposed within this existing framework in order to better focus this SEA on ILW storage and transport.

Since this SEA will be reporting on potential effects at five specific sites, the assessment will be set out by assessment question. Unlike the previous SEA, it will be able to refer to potential effects on certain particular features or types of features within a locality. As a

result of this, it is very important to minimise repetition and to focus the guide questions on potential receptors.

Annex 4 explains the proposed amendments to the SEA Framework, including a rationale for each proposed change.

### 6.2.3 Proposed Technical Scope of the SEA for ILW Storage

The review of project activities listed in Table 6.1 and the site baseline assessments in Section 5 have informed the development of the draft SEA scope which is presented in Table 6.2. In doing this, temporary, reversible<sup>93</sup>, direct / indirect, primary / secondary, permanent, positive and negative effects have been considered.

The decision is determined also by considering single sources of effect, and potential combined sources. For example, in considering the potential to affect habitats, the SEA should account for the potential combination of landtake, radiological discharges, non-radiological discharges, noise and light pollution effects.

The results of the 2010/11 SEA have also been considered in terms of the level of detail of further assessment which is necessary. Rather than ‘scope out’ issues which have been addressed adequately by the previous SEA, it is thought to be more compliant with the legislation to review and summarise this information again in this SEA.

It should be noted that not all issues scoped into this SEA have a potential to be significant for all sites. An issue is scoped in even if only one site has the potential to cause a significant effect without mitigation.

Table 6.2 below presents the proposed technical scope in terms of the questions scoped in or out of this SEA, and also level of coverage required in order to identify the ‘likely significant effects’ of ILW storage and associated transport on the environment and local communities. The detailed rationale for this technical scope is provided in Annex 5.

**Table 6.2: Proposed SEA Framework and level of detail**

SEA Framework		Scoped In for further assessment?	Proposed Level of Assessment
Category & Objective	Assessment Questions <i>Will the SDP Proposals...</i>		
A. Radiological Discharges / Emissions Ensure that radiological discharges to people and the environment remain as low as reasonably achievable.	Increase the emission of radiological discharges (including in combination with existing discharges) to levels which may cause immediate or long-term harm?	✓	New assessment considering all potential pathways.

<sup>93</sup> i.e. whether or not it *will* be reversed – if the SDP or another proposal does not include for reversing it, the effect will be assumed to occur.

SEA Framework		Scoped In for further assessment?	Proposed Level of Assessment
Category & Objective	Assessment Questions <i>Will the SDP Proposals...</i>		
<b>B. Biodiversity and Nature Conservation</b> Protect and enhance habitats, species and ecosystems.	Affect habitats, including designated nature conservation sites (accounting also for designating species) and non-designated habitat?	✓	New assessment considering all potential pathways.
	Affect animals or plants outside of designated sites, including protected species and fisheries?	✓	New assessment considering all potential pathways.
<b>C. Population</b> Promote a strong, diverse and stable economy with opportunities for all; minimise disturbance to local communities and maximise positive social impacts.	Affect the social infrastructure available to local communities, such as community centres and places of worship?	✗	N/A
	Affect local population demographics in surrounding areas?	✗	N/A
	Affect opportunities for education and skills development?	✗	N/A
	Affect the number or types of jobs available in local economies, and levels of deprivation in surrounding areas?	✓	Cursory review – consider the conclusions of the previous SEA relative to alternatives sites and relative deprivation levels, if applicable, and report the potentially significant effect at each site.
	Affect how diverse and robust local economies are, including through maintaining and improving the image of areas as locations to live, work and invest?	✗	N/A
<b>D. Health and Wellbeing</b> Protect and enhance health, safety and wellbeing of workers and communities; minimise any health risks associated with ILW storage and transport.	Affect the health or safety of SDP workers, or other people working at the proposed sites?	✗	N/A
	Affect the health, safety and wellbeing of local communities?	✓	New assessment considering all potential pathways.
	Affect local healthcare infrastructure and provision?	✗	N/A
	Affect recreation and other amenities available to local communities, including public access to areas of wildlife interest?	✗	N/A

SEA Framework		Scoped In for further assessment?	Proposed Level of Assessment
Category & Objective	Assessment Questions <i>Will the SDP Proposals...</i>		
<b>E. Noise and Vibration</b> Minimise disturbance and stress to people, wildlife and historic buildings caused by noise and vibration.	Significantly increase levels of noise and vibration?	✓	New assessment considering all potential pathways, but focusing on potential for highway closures during RPV transport.  Will provide generic coverage of other noise and vibration issues, as the baseline shows that there are no particular noise issues associated with the sites, and temporary construction impacts are better dealt with (and typically can be managed to within acceptable levels) at the project level.
<b>F. Geology and Soils</b> Minimise threats to the extent and quality of soils and geological resources.	Affect soil quality, variety, extent and/or compaction levels?	✓	Cursory review – consider site-specific baselines and the conclusions of the previous SEA.  Assessment will be largely generic, as any impacts are better dealt with (and typically can be managed to within acceptable levels) at the project level.
	Affect geological conservation sites and important geological features?	✗	N/A
	Affect land stability?	✗	N/A
<b>G. Water</b> Maximise water efficiency, protect and enhance water quality.	Affect water availability as a resource for abstraction or other use?	✓	New assessment considering all potential pathways.
	Affect the amount of waste water produced?	✗	N/A
	Affect the quality of surface or sea water?	✓	New assessment considering all potential pathways.
	Affect the quality of groundwater?	✓	New assessment considering all potential pathways.
	Affect hydrology / geomorphology, including the distribution and quality of freshwater or marine sediments?	✓	New assessment considering all potential pathways.
<b>H. Air</b> Minimise emissions of pollutant gases and particulates and enhance air quality	Affect air quality?	✓	New assessment considering all potential pathways.

SEA Framework		Scoped In for further assessment?	Proposed Level of Assessment
Category & Objective	Assessment Questions <i>Will the SDP Proposals...</i>		
<b>I. Climate Change and Energy Use</b> Reduce energy consumption, minimise greenhouse gas emissions	Affect the amount of carbon dioxide and other greenhouse gases emitted?	✓	New assessment considering transport differences only.  Will otherwise only provide generic data which is available or able to be estimated.
	Affect levels or the extent of flood risk?	✓	Cursory review – consider generic flood risks and associated mitigation measures.
<b>J. Coastal Change and Flood Risk</b> Minimise the risks from coastal change and flooding to people, property and communities.	Be at risk of flooding from any source?	✓	New assessment considering all potential pathways.
	Affect coastal processes and/or erosion rates?	✗	N/A
	Be affected by coastal processes and/or erosion?	✗	N/A
	Affect transport infrastructure, such as through increased heavy loads and possible damage?	✓	New assessment considering construction and RPV transportation.  Operational employee, materials delivery or general waste collection traffic is unlikely to be significant, and thus will not be covered.
<b>K. Material Assets (Transport)</b> Minimise the detrimental impacts on travel and transport within communities, whilst maximising positive effects.	Increase or decrease traffic congestion between and around SDP sites?	✓	New assessment considering all potential pathways.
	Increase the amount of radioactive waste to be disposed of?	✓	Cursory review – consider the conclusions of the previous SEA relative to alternatives sites, land use and land contamination information.
<b>L. Material Assets (Waste Management)</b> Minimise waste arisings, promote reuse, recovery and recycling and minimise the impact of	Affect the amount of hazardous waste to be disposed of?	✓	
	Affect the amount of non-hazardous wastes produced?	✓	

SEA Framework		Scoped In for further assessment?	Proposed Level of Assessment
Category & Objective	Assessment Questions <i>Will the SDP Proposals...</i>		
	Affect the capacity of existing waste management systems, both nationally and locally?	✓	
<b>M. Land Use and Materials</b> Contribute to the sustainable use of land and natural and material assets.	Change patterns of land use on or around SDP sites?	✗	N/A
	Affect any existing or proposed redevelopment/regeneration programmes?	✓	New assessment considering the potential impact on site after use relative to long-term strategies.
	Lead to the loss of undeveloped land or green spaces?	✓	New assessment considering all potential pathways.
	Increase the burden on limited natural resources such as aggregates or wood (but excluding water or fossil fuels)?	✓	Review / confirm previous SEA's conclusions.
<b>N. Cultural Heritage</b> Protect and where appropriate enhance the historic environment including cultural heritage resources, historic buildings and archaeological features.	Affect designated or locally important archaeological features?	✓	New assessment considering all potential pathways.
	Affect the fabric and setting of historic buildings, structures or spaces?	✓	New assessment considering all potential pathways.
	Affect the historic landscape, including its distinctive context and character?	✓	New assessment considering all potential pathways.
<b>O. Landscape and Townscape</b> Protect and enhance landscape and townscape quality and visual amenity.	Affect landscapes?	✓	New desk-based study and assessment considering all potential pathways.
	Affect townscapes?	✗	
	Have significant visual impacts?	✓	

### 6.2.4 Method of Assessment for Site-Specific Effects

The assessment of the alternative ILW storage site options will be undertaken by testing the proposals against the baseline information for each site, using the detailed assessment questions presented in Table 6.2. Commentary on the likely effects will include:

- the nature and scale of the potential environmental effects (what is expected to happen);
- when the effect could occur (timing);
- what mitigation measures might be appropriate for potentially significant negative effects;

- what options there are to create or enhance positive effects;
- assumptions and uncertainties that underpin the appraisal; and
- what additional information will be required to address uncertainties and to undertake more detailed project-level assessment.

Effects will be characterised as short, medium or long-term. The proposed timescales are described in Section 6.3 below. For each relevant timescale (from construction to decommissioning, and also the 'extended term'), the assessment will include:

- pre-existing mitigation which can reasonably be expected to be implemented (e.g. site nuclear safety case and compliance with site license conditions);
- the 'likely significant effects' on that basis, without any additional mitigation;
- recommended mitigation measures, which focuses on actions additional to the above minimum requirements which can avoid, reduce, remedy or compensate for adverse effects;
- the likely significant residual effects with recommended mitigation; and
- the potential beneficial effects or enhancements.

The predicted likely significant effects will be recorded in tables which outline the above steps taken. Table 6.3 below provides an outline example of how the assessment may be presented in detailed form. Note that the "Neg." and "Pos." columns are intended to show potential adverse effects and potential benefits separately.

**Table 6.3: Example of a potential SEA assessment table**

	Construction		Operation		Decommissioning		Extended Operation	
	Neg.	Pos.	Neg.	Pos.	Neg.	Pos.	Neg.	Pos.
<b>Pre-existing / committed mitigation</b>	Legislative controls. Construction site best practice.		Legislative controls. Site safety case		Construction site best practice		Design-life commitment: 100 years	
<b>Effect with pre-existing / committed mitigation</b>	-	0	0	0	-	+	-	0
<b>Recommendations</b>	Avoid X, Y, Z.		None.		Continued research / review of construction best practice.		Commit to after use as X.	
<b>Residual effect with SEA recommendations</b>	0	0	0	0	-	+	-	+

A set of guideline scoring criteria for each SEA category was developed for the 2010/11 SEA. This has been modified, as presented in Annex 6. Table 6.3 and the assessment questions in Table 6.2 will be used to record the assessment of the effects associated with each candidate site. Consideration will be given to the various types of effect, including temporary, reversible<sup>93</sup>, direct / indirect, primary / secondary, permanent, positive and negative effects.

To enable an even and clear assessment, proposals for ILW storage and transport will be assessed against the baseline conditions at each site, thereby allowing this SEA to focus on local, as well as regional and national issues.



## 6.2.5 Method of Assessment for Cumulative Effects

The SEA Directive requires an analysis of "...the likely significant effects on the environment... These effects should include secondary, cumulative, synergistic... effects". There are main types of cumulative effect:

- **Additive:** the sum of all the effects (e.g. another project in the vicinity leading to loss of greenfield land, combining with loss of greenfield land from the project);
- **Neutralising:** where effects counteract each other to reduce the overall effect (e.g. a road improvement scheme which increases road capacity to levels which can accommodate the project); and
- **Synergistic:** where effects interact to produce a total effect greater than the sum of the individual effects. Negative synergistic effects often happen as habitats and resources get close to capacity: for instance a wildlife habitat can become progressively fragmented with limited effects on a particular species until the last fragmentation makes the areas too small to support the species at all.

Cumulative effects to be considered comprise the combined effects of activities arising from the SDP (including ILW storage and transport) which could affect sensitive receptors or locations; the combined effects of ILW storage and transport with effects from other proposed infrastructure projects or developments located in proximity to the sites, which may magnify the effects. An example of the latter would be the increase in localised effects on traffic, nuisance and air quality where two or more major projects are constructed at the same time.

Potential combined effects within the SDP will be considered through the assessment of each candidate site.

Potential combined effects with other proposals will be considered separately. These will account for any adopted organisational plan or programme (e.g. an Area Action Plan or Site Allocation document) or a proposal for development that is of sufficient scale to be subject to Environmental Impact Assessment as a part of the planning process. This is to ensure that there is sufficient maturity to the proposals to enable an adequate level of assessment to be completed, and to avoid unnecessary assessment for projects which are not funded or are merely aspirational.

## 6.3 Assessment Timescales

The following timescales have been estimated and will be assumed by this SEA:

- **Construction** (short term): 4 years;
- **Operation** – fill, store and empty (medium term): 4 – 32 years;
- **Decommissioning** (long term with GDF availability after 2040): approximately 36 years onwards, after store has been emptied; and
- **Extended operation** (long term with GDF availability delayed significantly beyond 2040): up to 70 additional years of operation. Note that eventual GDF availability is a project assumption. The assessment will reflect, where appropriate, any implications of the 'delayed planned GDF' scenario on decommissioning.

## 6.4 Geographic Scope

Given the location of the candidate ILW storage sites, the geographic scope of this SEA will include the national strategic highway network from Devonport and Rosyth to each candidate site as well as relevant local roads. It will address appropriate areas around candidate ILW storage sites for each SEA category (e.g. visual effects including the extent of significant views to the site, and archaeological effects including local site boundaries).

As stated in Section 2.5, rail transport and sea transport will not be considered further in this assessment.

## 7 Next Steps

### 7.1 SEA Scoping

This Scoping Report will undergo consultation with the statutory consultees and a number of non-statutory consultees, as identified in Table 7.1 below.

**Table 7.1: SEA Scoping Consultees**

Type of Consultee	Consultee Organisation
Statutory (as required by SEA legislation)	Environment Agency English Heritage Natural England Scottish Government Historic Scotland Scottish Environment Protection Agency Scottish Natural Heritage Welsh Government Cadw (Welsh Government historic environment service) Natural Resources Wales Department of the Environment's Environment and Heritage Service (Northern Ireland)
Non-statutory	Office for Nuclear Regulation (ONR) Department for Communities and Local Government (CLG) Department of Energy and Climate Change (DECC) Department of Environment, Food and Rural Affairs (Defra) Department of Health (DoH) Department for Transport (DfT) Public Health England Nuclear Decommissioning Authority (NDA)

The statutory scoping period is scheduled to take place between January and February 2014 as part of the wider SDP pre-engagement phase, whereby discussions will take place with local authorities and key stakeholders on the site screening process.

Following scoping consultation, comments will be collated and considered, and the SEA scope updated as appropriate. On this occasion, the MOD does not intend to produce a further final scoping report, but will incorporate the findings into the SEA assessment itself.

### 7.2 Purpose and Proposed Structure of the Environmental Report

The purpose of the Environmental Report is to:

- Ensure that the significant potential environmental effects associated with ILW storage at the Candidate sites are identified, characterised and assessed;
- Propose measures to mitigate the adverse effects identified and, where appropriate, to enhance potential positive effects;
- Provide a framework for monitoring the potential impacts identified;
- Provide a framework for any further site-specific environmental assessments which may be required before work can begin (such as EIA and Environmental Permitting); and

- Provide sufficient information to help the SDP achieve its stated aims with respect to public consultation and stakeholder engagement.

In accordance with the requirements of Schedule 2 of the SEA Regulations<sup>9</sup> (which reproduce the SEA Directive Annex I issues), the SEA Environmental Report will cover the following:

- The scope and purpose of the assessment;
- The main objectives of the SDP ILW Storage Project and its relationship to other relevant plans and programmes;
- The proposed approach to assessment including the relevant environmental protection objectives;
- Key baseline constraints and issues at each candidate site;
- The likely significant environmental effects of developing an ILW storage facility at any of the candidate storage sites, including cumulative effects, mitigation measures, uncertainties and risks. This will also include issues associated with ILW transport and the eventual decommissioning of the storage facility;
- Recommended measures to monitor predicted effects and enable early identification and response to any unforeseen effects;
- A summary of the assessment and main recommendations;
- An Annex, structured by each candidate site, will set out the more detailed baseline conditions and its likely evolution (without SDP ILW storage), key issues, plans and programmes, along with the detailed site-specific assessments; and
- An Annex outlining responses to the Scoping Report and MOD's response.

## 7.3 Public Consultation on the SDP and Environmental Report

The assessment of ILW storage will then be undertaken and the SEA Environmental Report produced. This will provide a transparent account of the assessment undertaken, the likely significant effects, and the recommended mitigation and monitoring measures. In parallel with the development of the SEA, an initial comparison of the shortlisted sites will also be carried out on the basis of whole life cost and operational effectiveness. A 12-week public consultation will follow, including dissemination of a Public Consultation Document and the SEA Environmental Report plus events for communities associated with shortlisted sites, national stakeholders, and the wider public.

After the public consultation, responses will be considered and the analyses will be completed. The SDP will publish a summary of the comments received while retaining the comments received in full, for any interested parties to review.

The Business Case Review Note and supporting documents will then be prepared, bringing together all the information and arguments and recommending an ILW Storage Site. After approval, feedback will be given to stakeholders and the wider public. MOD will publish a Post-Adoption Report, setting out how the SEA and consultation responses have been taken into account in decision-making.

More information is given in the SDP's *Approach to Decision Making* and *Approach to Public & Stakeholder Engagement* reports.<sup>94</sup>

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<sup>95</sup> The Scottish and Welsh national planning policy has not changed since the previous SEA.

## **Annex 1: Statutory and Governmental Department Comments on ILW Storage from the Previous SEA**

During the 2010/11 public consultation, a number of comments were received from statutory bodies, other Governmental departments, councils, industry bodies, NGOs/CVOs and the public relating to the previous SEA. Both these, and comments on the wider SDP consultation, have been summarised in the MOD SDP Post-Consultation Report (July 2012) and in the MOD *Response to Consultation* (March 2013)<sup>4</sup>.

The comments received from statutory consultees and other Governmental departments at the time specifically about interim ILW storage are as follows:

- Several respondents reiterated the need for further assessment and public engagement on the assessment of ILW storage sites, once individual locations became known. *This is the subject of this SEA.*
- The Environment Agency and NHS respondents supported the use of shared Intermediate Level Waste (ILW) storage facilities where practically possible rather than the development of a bespoke MOD facility.
- Natural England commented that alternatives to the planned GDF should be explored in greater detail for SDP, given the inherent uncertainties. *The SDP programme assumes eventual GDF availability; however, the facility will have a 100-year design life to accommodate potential delays in GDF delivery.*
- The Northern Ireland Environment Agency commented that should Northern Ireland be considered as a potential location for ILW storage, any location-specific issues should be addressed in the Environmental Report. *No sites in Northern Ireland are being considered for SDP ILW storage.*
- The Health Protection Agency commented on the need to minimise the exposure of both workers and the general public to radiation during ILW transportation.



## **Annex 2: Maps of Alternative Sites and Key Environmental Features**



Defence  
Infrastructure  
Organisation

**FIGURE A2-1**  
**AWE ALDERMASTON**  
READING  
**AWE Aldermaston**  
**Environmental**  
**Designations**  
**(Map 1)**

- + Listed Buildings Grade I
- + Listed Buildings Grade II\* □ □
- - - National Cycle Route
- Open Country
- Registered Common Land
- Registered Parks and Gardens
- Sites of Special Scientific Interest
- Scheduled Monuments
- Flood Risk
- Ancient Woodland
- MoD Boundary

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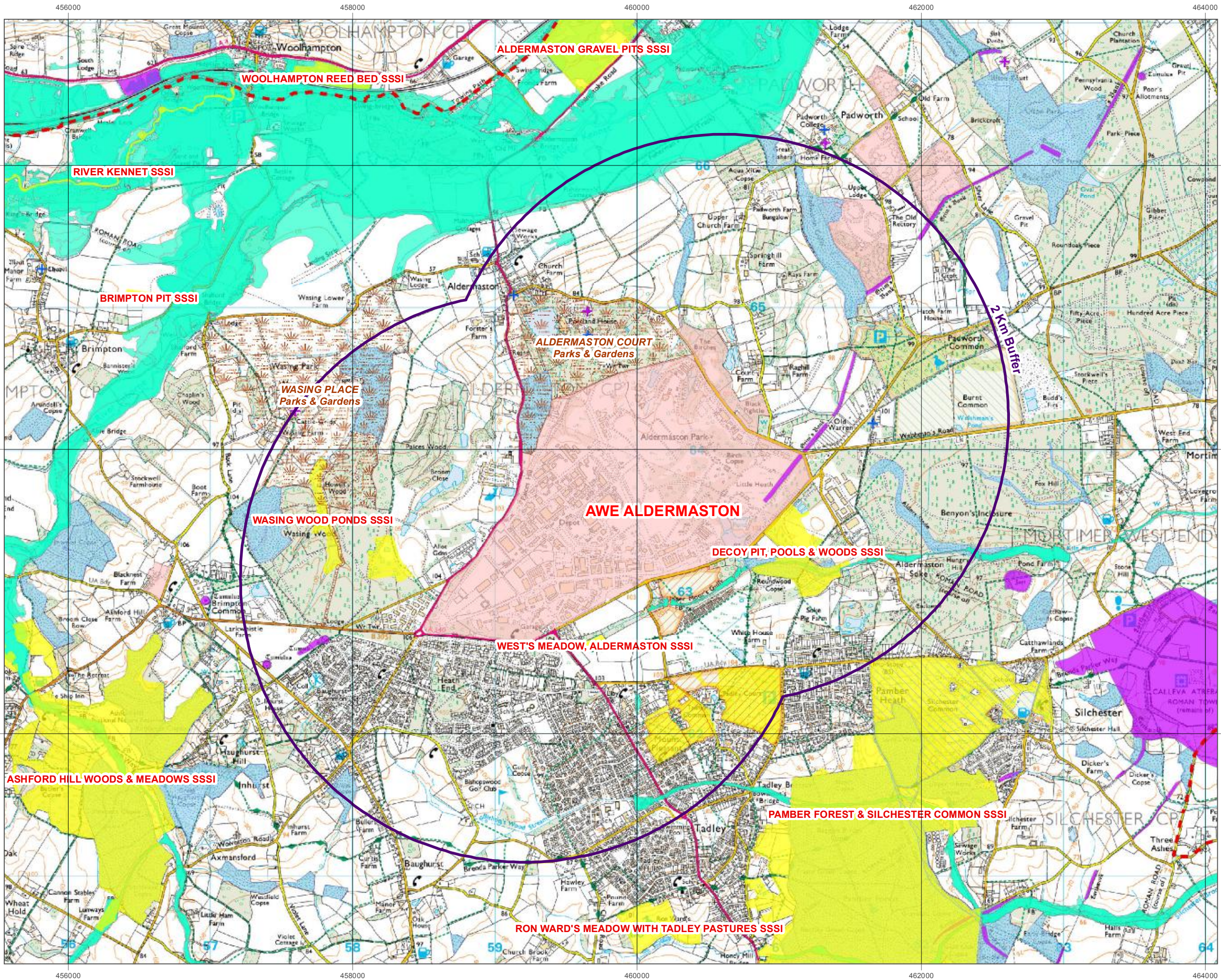
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Defence Infrastructure Organisation

# FIGURE A2-2 AWE ALDERMASTON

READING

## AWE Aldermaston Environmental Designations (Map 2)

-  Registered Parks and Gardens
-  National Parks
-  Special Area of Conservation
-  Special Protection Area
-  National Nature Reserves
-  MoD Boundary
-  Areas of Outstanding Natural Beauty

Scale 1:175,000

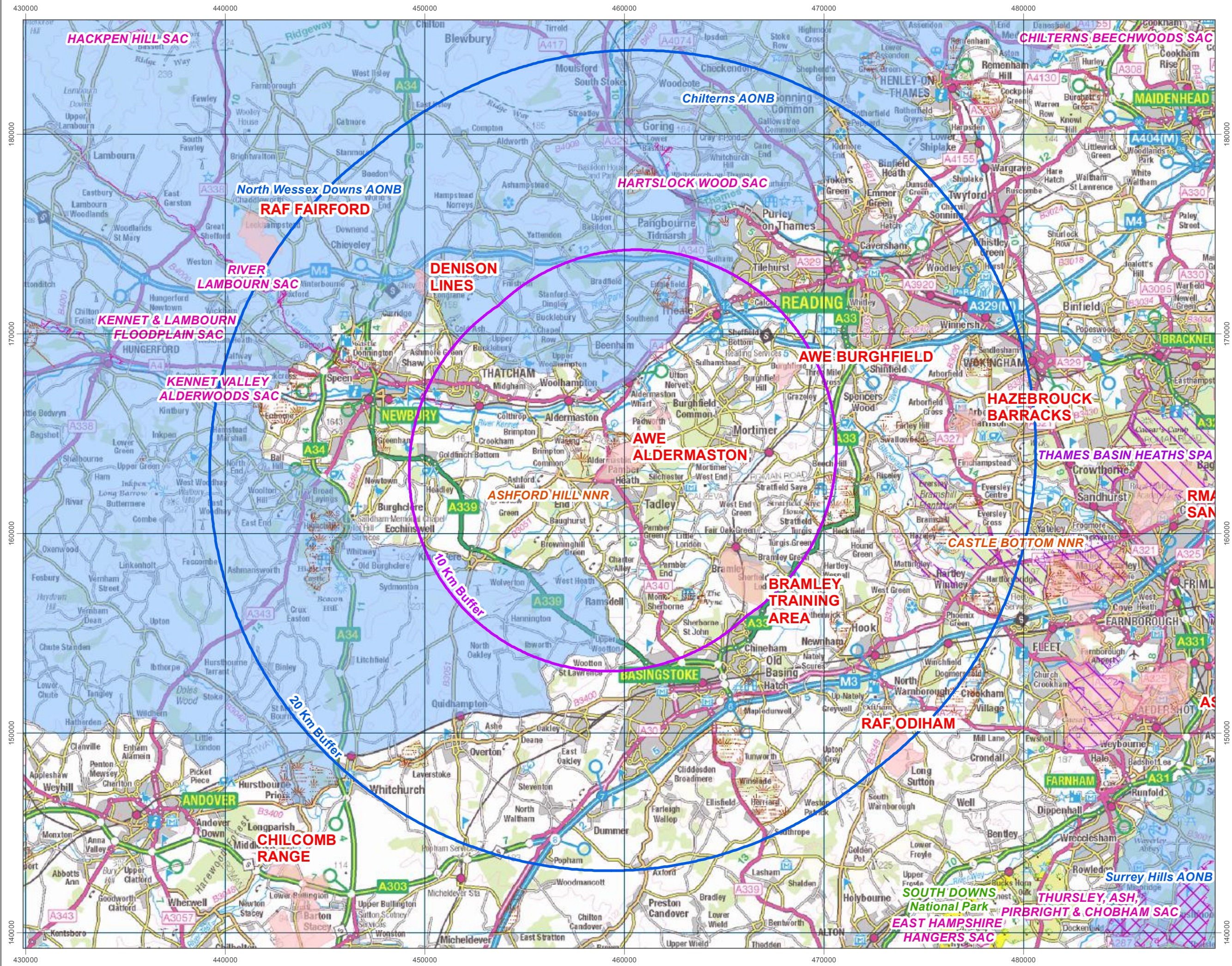
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**FIGURE A2-3**  
**AWE BURGHFIELD**  
**READING**  
**AWE Burghfield**  
**Environmental**  
**Designations**  
**(Map 1)**

- Listed Buildings Grade I
- Listed Buildings Grade II\*
- National Cycle Network Links
- National Cycle Route
- Open Country
- Registered Common Land
- Sites of Special Scientific Interest
- Scheduled Monuments
- Ancient Woodland
- Flood Risk
- MoD Boundary

Scale 1:25,000

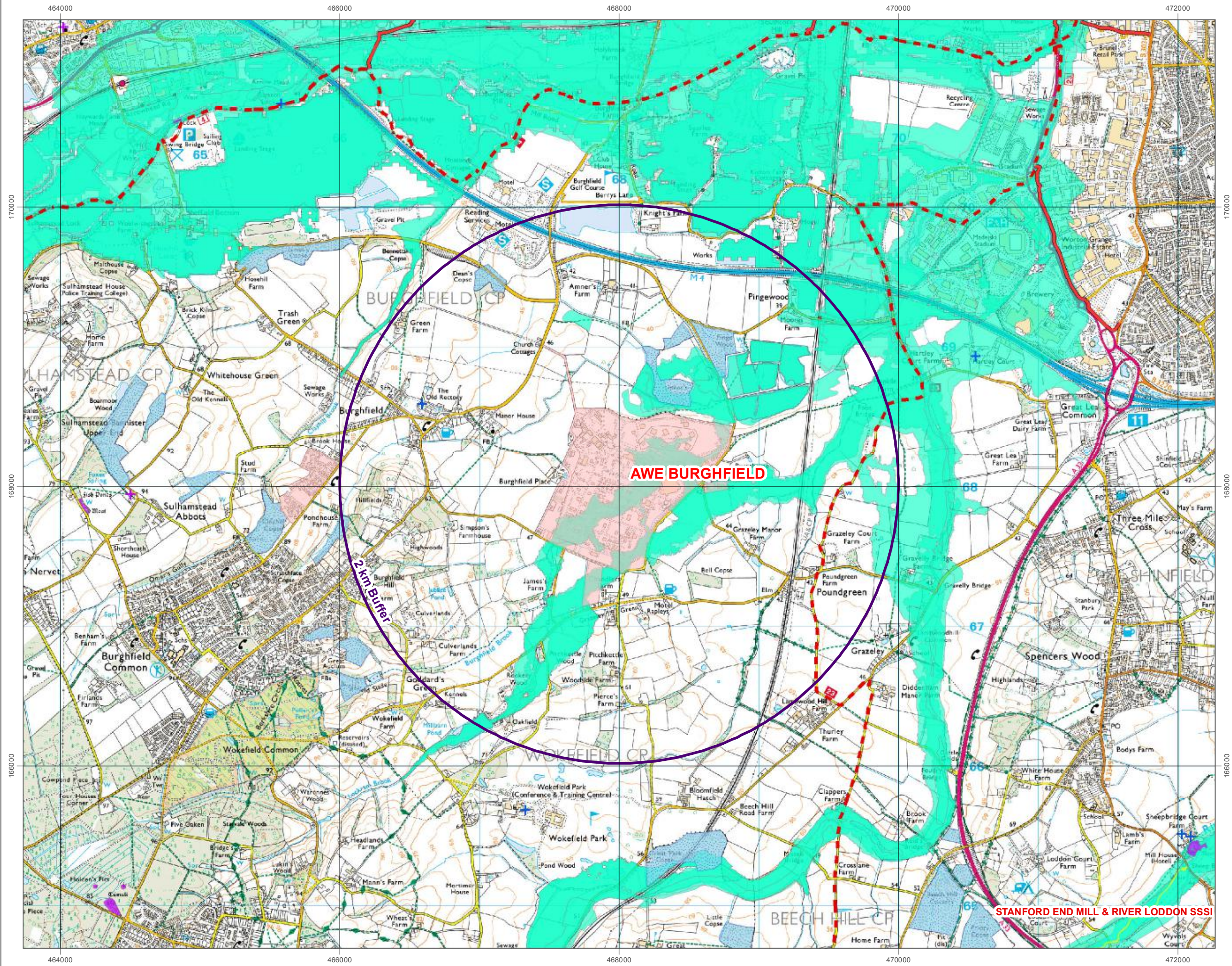
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### FIGURE A2-4 AWE BURGHFIELD

READING

### AWE Burghfield Environmental Designations (Map 2)

-  Special Area of Conservation
-  Special Protection Area
-  National Nature Reserves
-  Areas of Outstanding Natural Beauty
-  MoD Boundary

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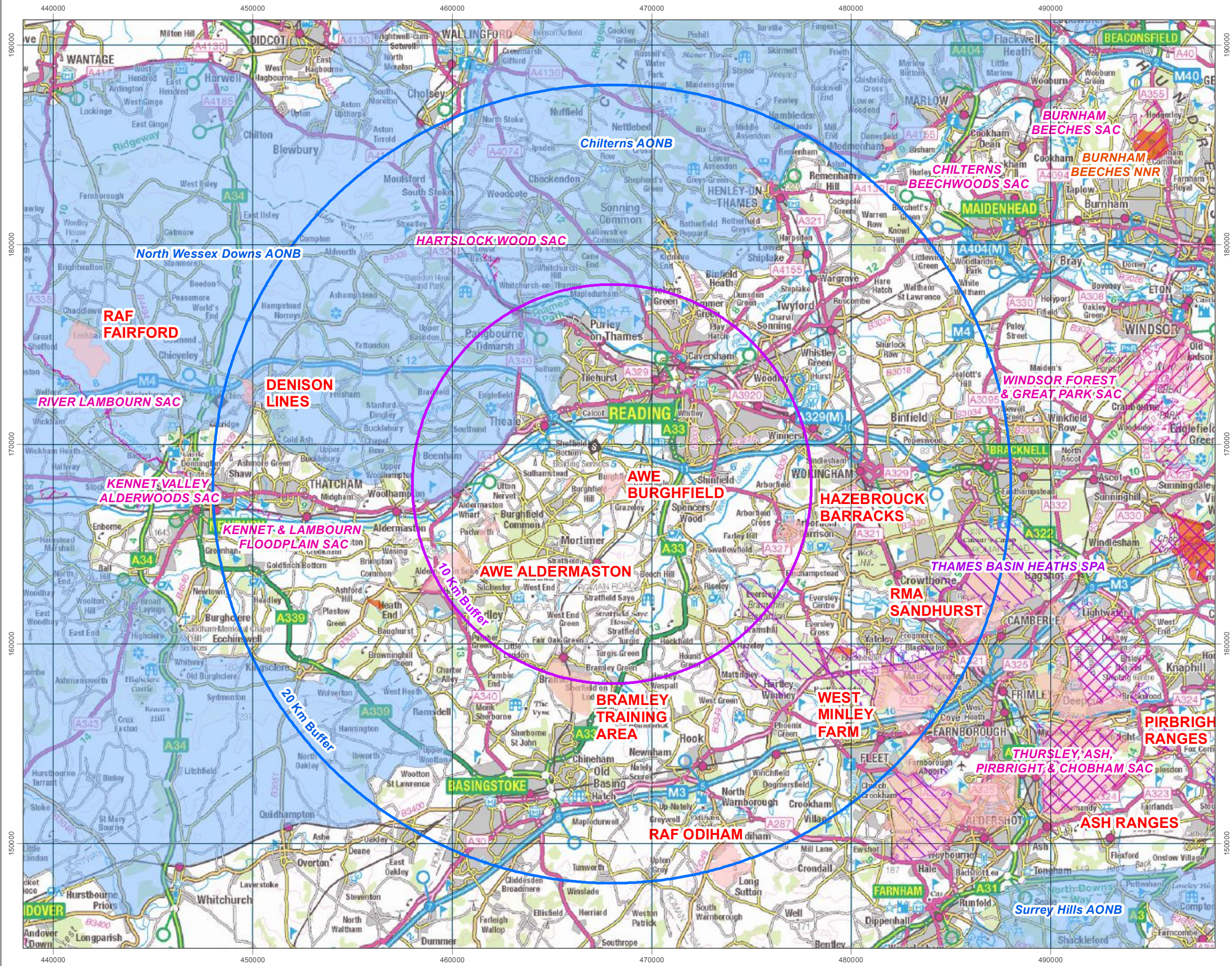
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**FIGURE A2-5  
CAPENHURST SITE**

**CHESHIRE**

**Capenhurst Site  
Environmental  
Designations  
(Map 1)**

- Listed Buildings Grade I
- Listed Buildings Grade II\*
- Regional Cycle Route
- National Cycle Route
- Ancient Woodland
- Sites of Special Scientific Interest
- Scheduled Monuments
- Flood Risk
- MoD Boundary

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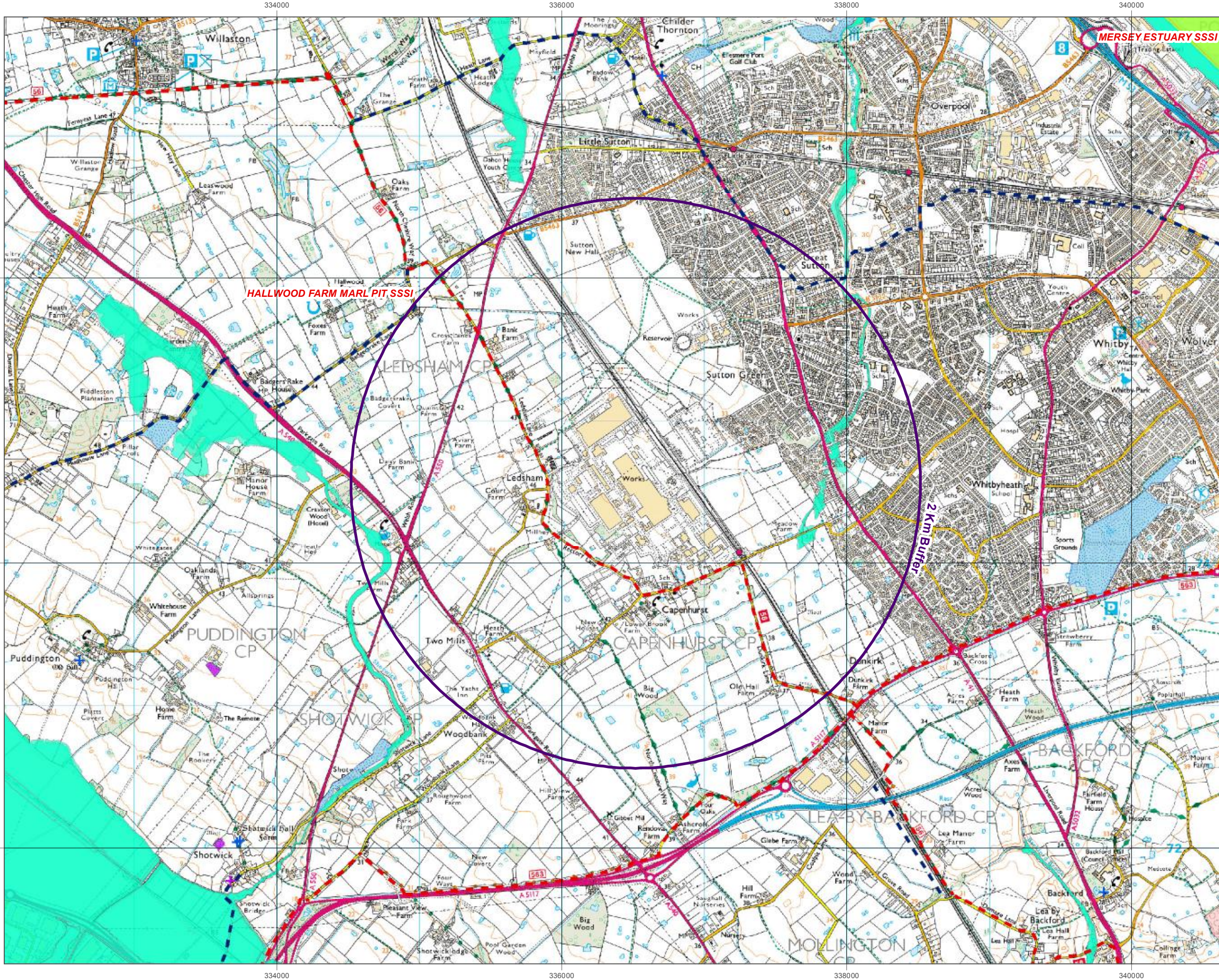
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FIGURE A2-6  
CAPENHURST SITE  
CHESHIRE  
Capenhurst Site  
Environmental  
Designations  
(Map 2)

- Ramsar
- Special Area of Conservation
- Special Protection Area
- Areas of Outstanding Natural Beauty
- MoD Boundary

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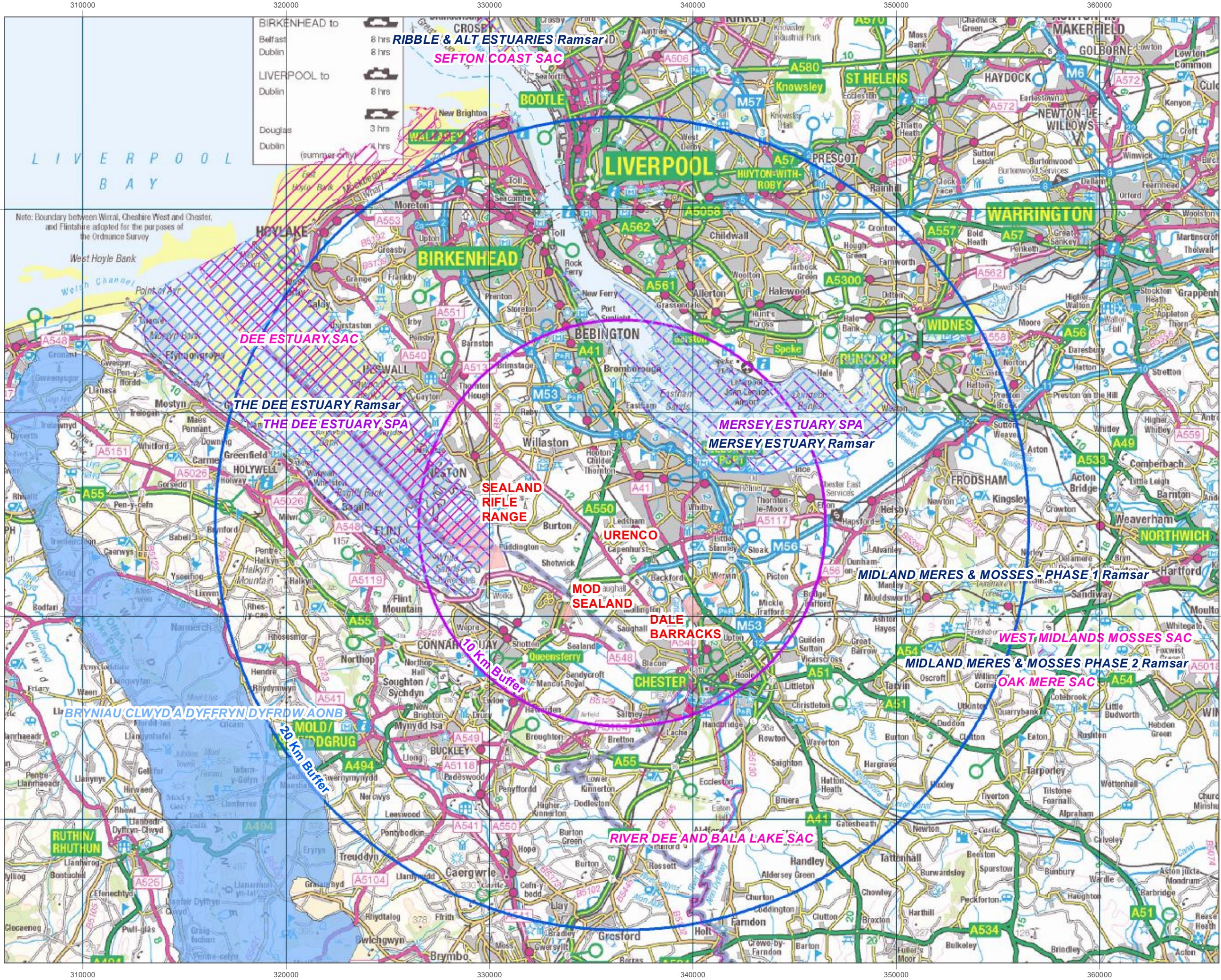
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**FIGURE A2-7**  
**SELLAFIELD (NUCLEAR  
DECOMMISSIONING  
AUTHORITY SITE)**

**CUMBRIA**  
**Sellafield  
Environmental  
Designations  
(Map 1)**

- Listed Buildings Grade I
  - Listed Buildings Grade II\*
  - Regional Cycle Route
  - National Cycle Route
  - National Parks
  - Ancient Woodland
  - Open Country
  - Registered Common Land
  - Sites of Special Scientific Interest
  - Scheduled Monuments
  - Flood Risk
  - MoD Boundary
- Erosion Management Policy**
- Hold the Existing Defence Line
  - Managed Realignment
  - No Active Intervention

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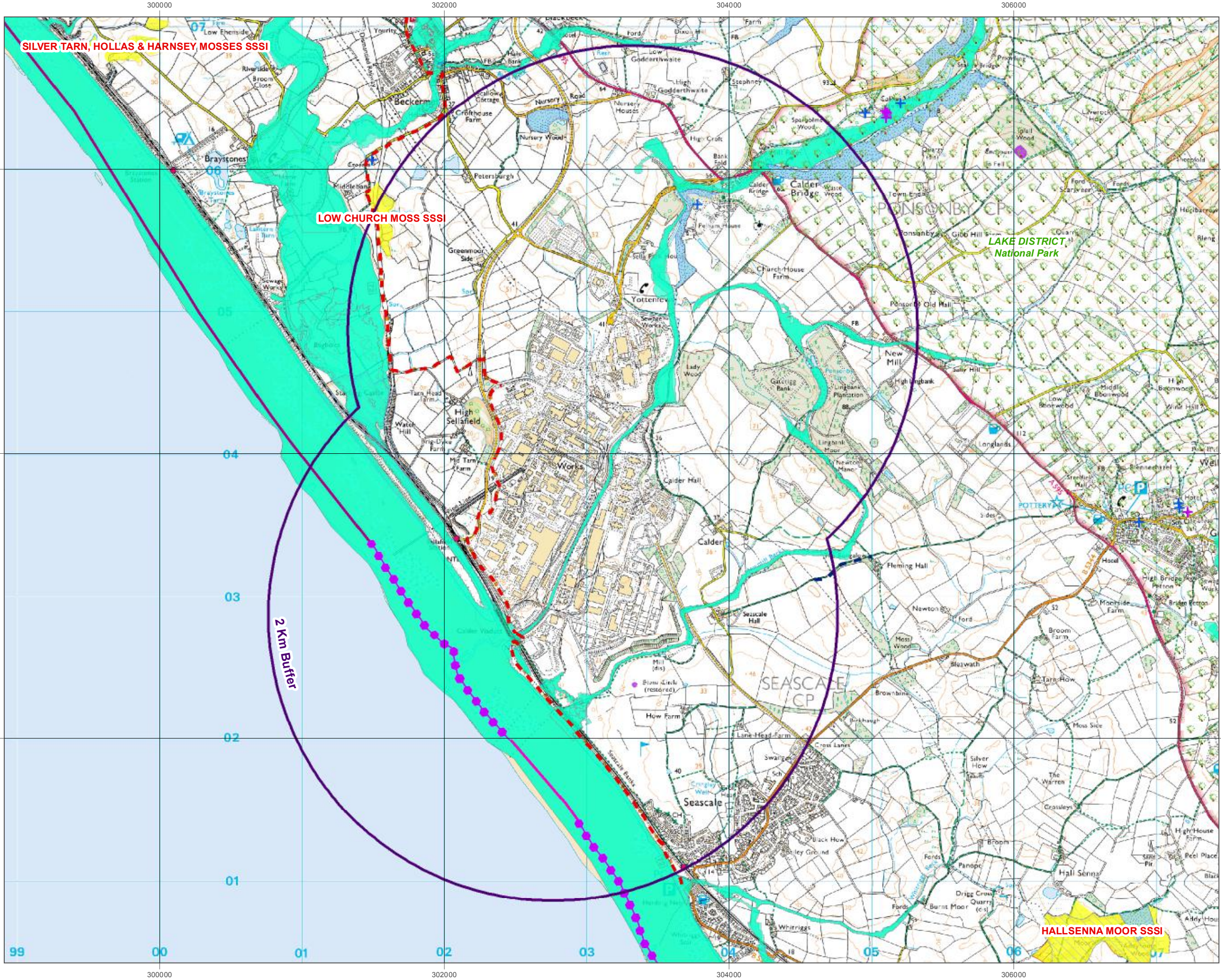
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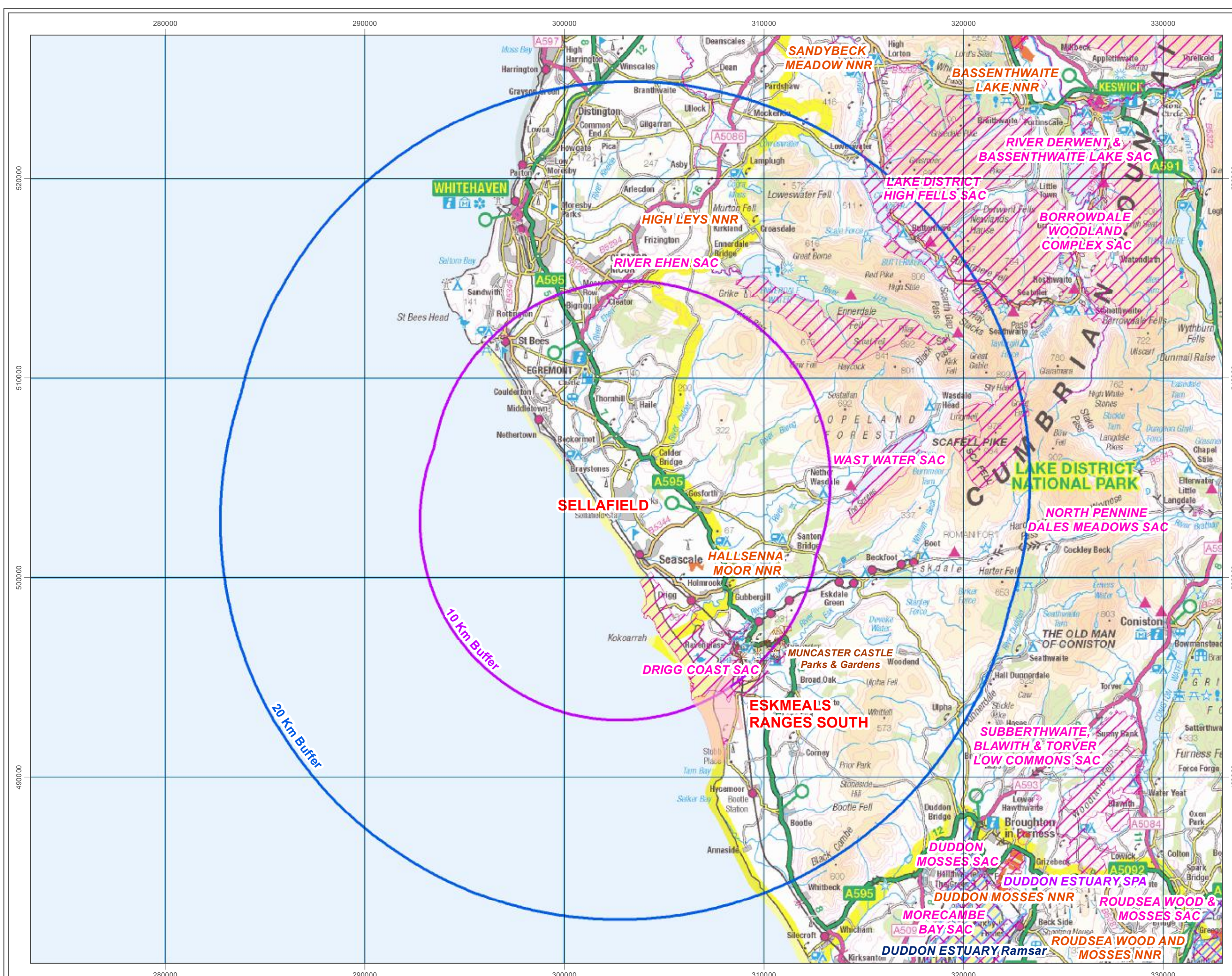
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**FIGURE A2-8**  
**SELLAFIELD (NUCLEAR DECOMMISSIONING AUTHORITY SITE)**

**CUMBRIA**  
**Sellafield Environmental Designations (Map 2)**

-  Registered Parks and Gardens
-  Ramsar
-  Special Area of Conservation
-  Special Protection Area
-  National Nature Reserves
-  MoD Boundary

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**FIGURE A2-9**  
**CHAPELCROSS**  
**POWER STATION**  
DUMFRIES  
AND GALLOWAY  
Chapelcross Power  
Station Environmental  
Designations  
(Map 1)

- Listed Buildings Grade A
- Listed Buildings Grade B
- National Cycle Route
- Scheduled Monuments
- Ancient Woodland
- Flood Risk

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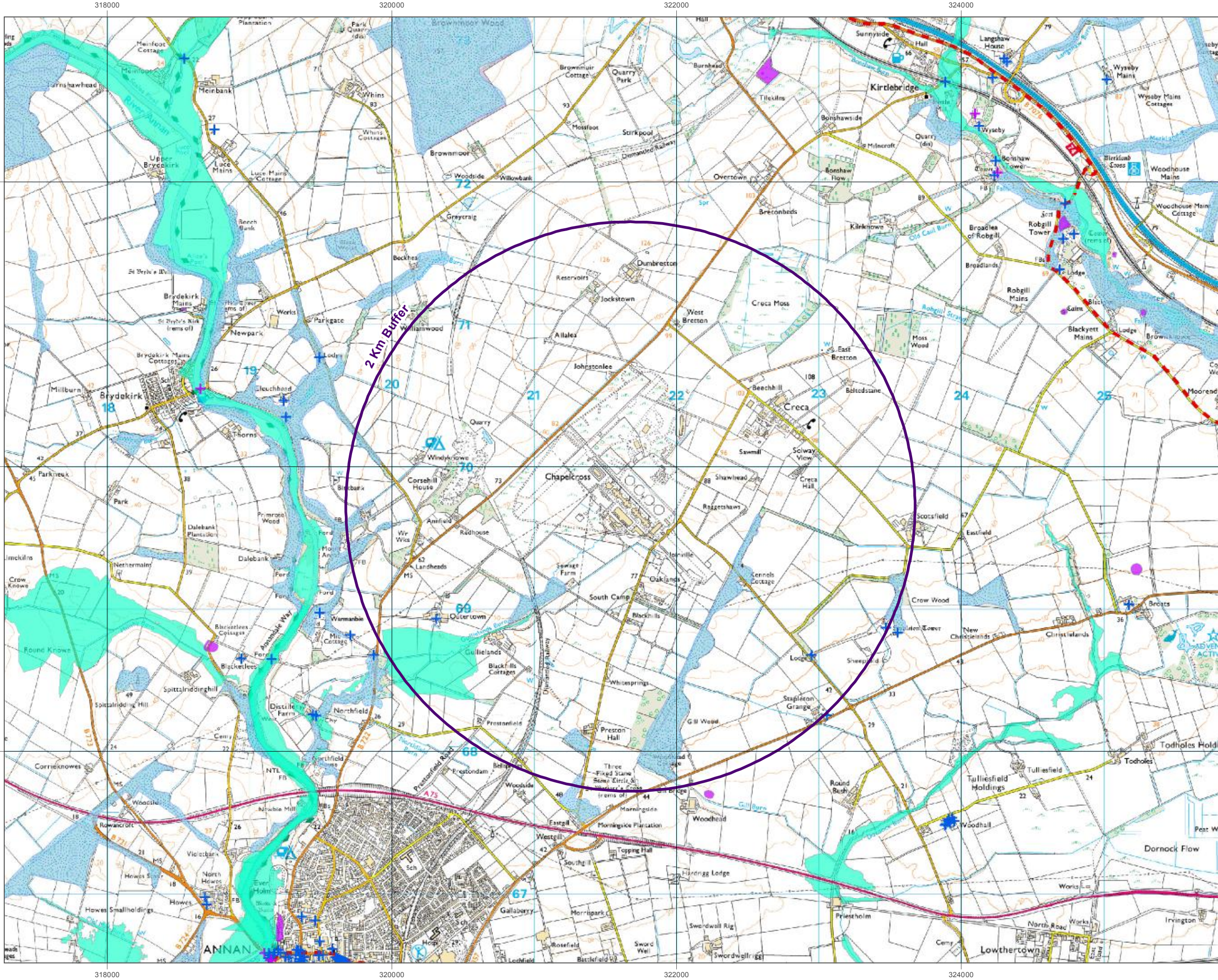
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**FIGURE A2-10**

**CHAPELCROSS  
POWER STATION**

**DUMFRIES  
AND GALLOWAY**

**Chapelcross Power  
Station Environmental  
Designations  
(Map 2)**

-  Historic Gardens
-  Ramsar
-  Special Area of Conservation
-  Special Protection Area
-  National Nature Reserves
-  National Scenic Areas
-  MoD Boundary

Scale 1:175,000

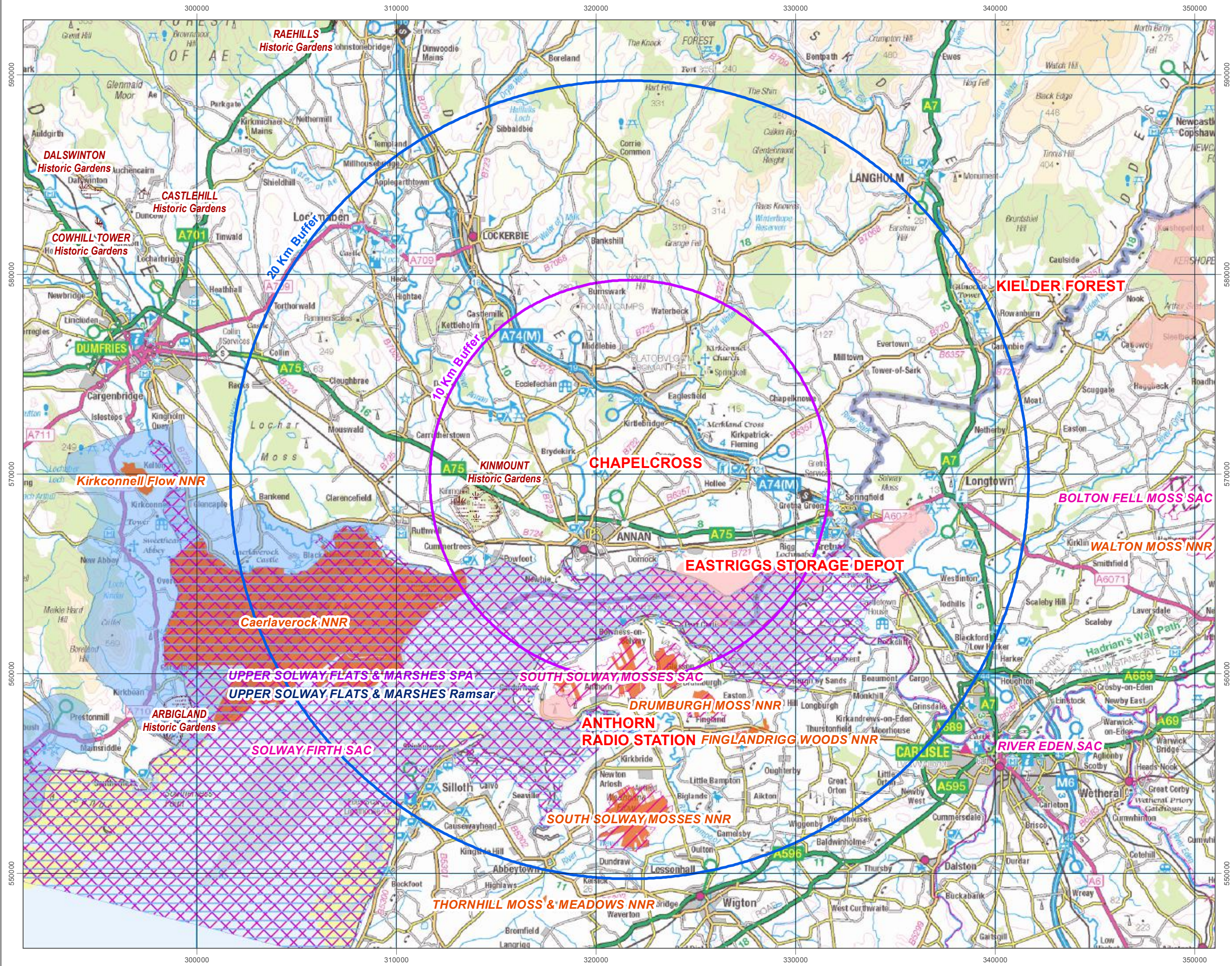
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## Annex 3: Key Environmental Protection Objectives

From the review of international and national plans and programmes carried out for the 2010/11 SEA, a number of key environmental protection objectives have been identified. These are summarised below, structured around the environmental categories taken from SEA Directive Annex I issues (and used to structure the baseline information in the Section 5). Entries in bold and italic are new entries based on the National Planning Policy Framework (NPPF) for England<sup>95</sup>.

SDP SEA Category	Summary Objectives and Policy Messages (Text in <i>bold+italic</i> = new entries from the NPPF.)
<b>Radiological Discharges</b>	See 'Health and Well-Being' below.
<b>Biodiversity and Nature Conservation</b>	<p><b>International</b></p> <ul style="list-style-type: none"> <li>• To protect international/European protected wildlife areas (including SACs, SPAs and Ramsar sites).</li> <li>• To contribute to the conservation of global biodiversity.</li> <li>• To ensure that the conservation and enhancement of natural heritage including wetland conservation is reflected in land use planning.</li> <li>• To protect and enhance the ecosystems and the biological diversity of the maritime areas.</li> <li>• To ensure the conservation of biodiversity in order to continue to harness the derived health and wellbeing benefits for the population.</li> <li>• To identify where operators are financially liable for threats of, or actual damage to, the environment under the "polluter pays" principle.</li> <li>• To anticipate, prevent and act on causes of significant reduction or loss of biodiversity.</li> </ul> <p><b>National</b></p> <ul style="list-style-type: none"> <li>• To conserve and enhance biological diversity within the UK, <b><i>providing net gains in biodiversity where possible.</i></b></li> <li>• <b><i>To recognise the benefits of ecosystem services.</i></b></li> <li>• To ensure that the quality of habitats and biodiversity is enhanced or at least conserved, <b><i>establishing coherent ecological networks that are more resilient to current and future pressures</i></b></li> <li>• To take account of key priority habitats and species in decision-making.</li> <li>• To protect of the network of nationally protected wildlife areas (including SSSIs).</li> <li>• To protect marine biodiversity with UK jurisdiction, both within and beyond UK territorial waters.</li> </ul> <p><b>MOD</b></p> <ul style="list-style-type: none"> <li>• To conserve, and where appropriate, enhance biodiversity as part of estate ownership, to contribute to the UK commitment to halt the loss of biodiversity by 2010 and onwards, whilst ensuring the provision of defence capabilities.</li> <li>• To achieve this aim the MOD will be an exemplar in the management of designated sites where compatible with military requirements; ensure natural environment requirements and best practice are fully integrated into estate management practices; and contribute, as appropriate, to the UK BAP and County biodiversity strategies.</li> </ul>

<sup>95</sup> The Scottish and Welsh national planning policy has not changed since the previous SEA.

SDP SEA Category	Summary Objectives and Policy Messages (Text in <i>bold+italic</i> = new entries from the NPPF.)
Population	<p><b>International</b></p> <ul style="list-style-type: none"> <li>• To grant public rights to information, public participation and access to justice.</li> <li>• To undertake appropriate consultation with consultation bodies and the public during the SEA process.</li> <li>• To achieve economic development and reduction of inequalities whilst adhering to the principles of social and environmental justice and sustainable development.</li> <li>• To promote full employment, quality and productivity at work and promoting inclusion by addressing disparities in access to labour markets.</li> <li>• To promote the economic development of disadvantaged areas within the European Union.</li> </ul> <p><b>National</b></p> <ul style="list-style-type: none"> <li>• To create strong, prosperous communities and deliver better public services.</li> <li>• To narrow the gap between deprived neighbourhoods and the rest of the country.</li> <li>• To achieve economic development and reduction of inequalities whilst adhering to the principles of social and environmental justice and sustainable development.</li> <li>• To create places shaped by their communities where people are proud to live.</li> <li>• To raise the productivity of the UK economy, maximise job opportunities, improve economic performance and reduce the gap in economic growth rates between regions.</li> <li>• To deliver sustainable development; build prosperous communities; promote regeneration; and tackle deprivation.</li> <li>• To ensure more and better jobs as a result of sustainable economic development.</li> <li>• To promote the vitality and viability of town and other centres as important places for communities.</li> <li>• To develop and support successful, thriving, safer and inclusive urban and rural communities.</li> <li>• To create inclusive and locally distinctive rural communities whilst continuing to protect the open countryside for the benefit of all.</li> <li>• To raise the quality of life and the environment in rural areas.</li> </ul> <p><b>MOD</b></p> <ul style="list-style-type: none"> <li>• The delivery of Defence capability will contribute to the creation of more sustainable UK communities, and an environment in which people can fulfil their potential.</li> <li>• To deliver this aim the MOD will: <ul style="list-style-type: none"> <li>○ Help build the skills of young people.</li> <li>○ Create a workforce that is drawn from the breadth of society and ensure that the unique contribution of every individual in that workplace is respected and valued.</li> <li>○ Provide a safe and healthy workplace.</li> <li>○ Manage the social impacts of Defence activities on UK communities (civilian and Armed Forces).</li> </ul> </li> <li>• To improve effectiveness within the context of practicality, achievability and value for money on an ongoing basis.</li> <li>• To provide economic, environmental and social justification for any decision to procure new facilities as opposed to the re-use of existing facilities.</li> <li>• Ensure that procurement strategies take full account of economic, environmental and social impacts.</li> </ul>

SDP SEA Category	Summary Objectives and Policy Messages (Text in <i>bold+italic</i> = new entries from the NPPF.)
<b>Health and Wellbeing</b>	<p><b>International</b></p> <ul style="list-style-type: none"> <li>• To ensure children have safe water and clean air.</li> <li>• To ensure that measures to improve the health and wellbeing of the population are appropriately supported.</li> <li>• To preserve, protect and improve the quality of the environment and to protect human health.</li> <li>• To promote good health throughout the lifespan of the population.</li> <li>• Support Dynamic Health Systems and New Technologies.</li> <li>• To reduce inequities in health.</li> </ul> <p><b>National</b></p> <ul style="list-style-type: none"> <li>• To minimise work-related injuries and ill-health.</li> <li>• To ensure workers and the public are protected from ionising radiation.</li> <li>• To reduce and where possible avoid the effects and causes of statutory nuisance and to comply with all relevant UK environmental legislation.</li> </ul> <p><b>MOD</b></p> <ul style="list-style-type: none"> <li>• In addition to the MOD SD Action Plan targets detailed above in Population, the Secretary of State’s policy statement requires the department to avoid work-related fatalities and minimise work-related injuries and ill-health.</li> <li>• To comply with the letter and the spirit of UK environmental law applicable to ionising radiations so far as is reasonably practicable, regardless of any Crown or Defence Exemptions.</li> <li>• To reduce exposure of the workforce, members of the public and the environment to levels of radiation which are as low as reasonably practicable (ALARP).</li> <li>• To justify the use of ionising radiations before their introduction and to reduce exposure of the workforce, members of the public and the environment to levels which are as low as reasonably practicable (ALARP).</li> </ul>
<b>Health (Noise and Vibration)</b>	<p><b>International</b></p> <ul style="list-style-type: none"> <li>• To prevent critical health effects as a result of high levels of noise in and around dwellings.</li> <li>• To promote transport systems that do not generate noise levels which may have negative effects on human health.</li> <li>• To avoid, prevent or reduce the harmful effects including annoyance due to exposure to environmental noise.</li> </ul> <p><b>National</b></p> <ul style="list-style-type: none"> <li>• To minimise the adverse impact of noise without placing unreasonable restrictions on development or adding unduly to the costs and administrative burdens of business.</li> <li>• To ensure noise reduction occurs where there may be adverse impacts of noise on human health or protected species.</li> <li>• To incorporate noise reduction measures in the construction of rail guided transport systems.</li> </ul> <p><b>MOD</b></p> <ul style="list-style-type: none"> <li>• To reduce and, where possible, avoid the effects and causes of statutory nuisance and to comply with all relevant UK environmental legislation.</li> <li>• MOD establishments are not allowed to create excessive noise liable to cause a nuisance as part of activities not directly connected with the operation of equipment, training of personnel or other military operations.</li> <li>• To make every effort to keep the disturbance to the public caused by the noise</li> </ul>

SDP SEA Category	Summary Objectives and Policy Messages (Text in <i><b>bold+italic</b></i> = new entries from the NPPF.)
	<p>generated by military activity to a minimum. Where possible, activities generating substantial noise will be kept at a distance from residential areas, and night time activity will be limited to achieving training objectives which cannot be met during the day.</p>
<p><b>Soil and Geology</b></p>	<p><b>International</b></p> <ul style="list-style-type: none"> <li>• To ensure that soil resources are protected and that expansion of organic farmland and adoption of sustainable farming techniques can be facilitated.</li> <li>• To protect soil on the basis of the principles of: preservation of soil functions; prevention of soil degradation; mitigation of its effects; and restoration of degraded soils.</li> <li>• To take precautionary measures where soil function may be affected.</li> <li>• To identify areas at risk of erosion, organic matter decline, salinisation, compaction and landslides.</li> <li>• To limit the introduction of dangerous substances into the soil, to avoid accumulation in soil that would hamper soil functions and create a risk to human health and the environment.</li> </ul> <p><b>National</b></p> <ul style="list-style-type: none"> <li>• To ensure development takes a strategic approach to the conservation, enhancement and restoration of geology and, where appropriate, incorporate design features to beneficial geological features.</li> <li>• To ensure contaminated land is identified and remediated, where appropriate.</li> <li>• To protect and preserve the environment and guard against pollution to land.</li> <li>• To preserve, where possible, the best and most versatile agricultural land.</li> </ul> <p><b>MOD</b></p> <ul style="list-style-type: none"> <li>• To establish a complete picture of risks associated with land quality across the Defence Estate and have in place robust mechanisms for managing those risks to an acceptable level.</li> <li>• To maintain a Corporate EMS based on ISO 14001 across the Estate.</li> <li>• To maintain a view of the impacts of MOD activities and the impact of land quality on MOD activities.</li> </ul>
<p><b>Water</b></p>	<p><b>International</b></p> <ul style="list-style-type: none"> <li>• To ensure that the chemical and ecological quality of freshwater and marine environments is, as a minimum, conserved.</li> <li>• To enhance the quality of freshwater and marine environments.</li> <li>• To ensure sustainable use of water resources and reduced pollution and physical impacts.</li> <li>• To facilitate the integrated management of both the coastal zone and River Basin Districts to ensure sustainable use and protection of resources.</li> <li>• To encourage the sustainable use of water resources and protect aquatic ecology, drinking water, and bathing waters.</li> <li>• To provide information to the public on bathing water quality.</li> <li>• To protect the environment from the adverse effects of urban waste water discharges and discharges from industrial processes.</li> <li>• To prevent the pollution of groundwater.</li> <li>• To protect the marine environment across Europe.</li> <li>• To protect the health of European water consumers.</li> </ul> <p><b>National</b></p> <ul style="list-style-type: none"> <li>• To protect the water environment in a way that allows it to adjust flexibly to</li> </ul>

SDP SEA Category	Summary Objectives and Policy Messages (Text in <i><b>bold+italic</b></i> = new entries from the NPPF.)
	<p>changing climate.</p> <ul style="list-style-type: none"> <li>To reduce pressure on the environment caused by water taken for human use; promote water use efficiency; and protect vital water supply infrastructure.</li> <li>To improve the coastal environment particularly in urbanised or despoiled areas.</li> <li>To improve quality of the UK water environment and the ecology which it supports.</li> <li>To prevent pollution of the maritime area covered by the OSPAR Convention from ionising radiation.</li> </ul> <p><b>MOD</b></p> <ul style="list-style-type: none"> <li>To ensure all MOD sites become more water efficient to comply with Government and MOD targets.</li> <li>To conduct activities in accordance with government policy and to comply with the letter and spirit of environmental law.</li> <li>To support the aims and objectives of the UK Marine Bill, with exceptions negotiated solely to support operational capability or retain classified information.</li> </ul>
<b>Air</b>	<p><b>International</b></p> <ul style="list-style-type: none"> <li>To promote cleaner transport technologies and manage the demand for transport to prevent detrimental effects to human health from air pollution.</li> <li>To ensure that air quality is enhanced or at least maintained and ensure that measures are adopted to support continued air quality standards.</li> <li>To monitor and reduce trans-boundary atmospheric pollution.</li> <li>To ensure that information on ambient air quality is made available to the public.</li> <li>To maintain air quality where it is good and improving it in other cases.</li> <li>To attain levels of air quality that do not give rise to significant negative impacts on and risks to human health and the environment.</li> </ul> <p><b>National</b></p> <ul style="list-style-type: none"> <li>To align with the principles of sustainable development and the importance of controlling and minimising pollution.</li> <li>To protect and preserve the environment and guard against pollution to air.</li> </ul> <p><b>MOD</b></p> <ul style="list-style-type: none"> <li>To comply with the provisions of relevant environmental legislation and work towards reducing the Department's contributions to, and impacts of, air pollution. .Crown exemption remains for smoke, but for training and operational purposes only.</li> <li>To ensure all establishments operating prescribed processes (that would require an Environmental Permit) comply with the letter and spirit of the statutory requirements.</li> <li>To minimise gaseous and particulate emissions, particularly where they include heavy metals or other substances on the Red List of substances considered particularly harmful in water.</li> <li>To ensure vehicles comply with emission limits.</li> <li>To ensure vessels in harbour or close to shore comply with Clean Air legislation.</li> <li>To eliminate all sources of fluorinated greenhouse gasses and ozone-depleting substances as soon as is technically and economically feasible.</li> </ul>
<b>Climate Change and Energy Use</b>	<p><b>International</b></p> <ul style="list-style-type: none"> <li>To prevent "dangerous" human interference with the climate system, namely through reductions in the emissions of greenhouse gases.</li> <li>To promote renewable energy sources.</li> </ul>

SDP SEA Category	Summary Objectives and Policy Messages (Text in <i>bold+italic</i> = new entries from the NPPF.)
	<ul style="list-style-type: none"> <li>• To promote sustainable development with regards to: energy development, efficiency and consumption, transportation, industrial development, terrestrial and marine resource development and land use.</li> <li>• To reduce emissions of carbon dioxide and combat the serious threat of climate change.</li> <li>• To help transform Europe into a low-carbon economy and increase its energy security.</li> <li>• To ensure that energy efficiency measures are put in place and, where possible, renewables are employed to contribute to appropriate Climate Change targets.</li> </ul> <p><b>National</b></p> <ul style="list-style-type: none"> <li>• To improve carbon management and help the transition towards a low carbon economy.</li> <li>• To promote climate change risk management in all aspects of business to ensure future resilience for communities, businesses and the environment.</li> <li>• To pursue new development in places that are resilient to climate change; and in ways that are consistent with social cohesion and inclusion.</li> <li>• To conserve and enhance biodiversity, recognising that the distribution of habitats and species will be affected by climate change.</li> <li>• To reduce energy consumption, minimise detrimental effects on the climate from greenhouse gases and maximise resilience to climate change.</li> </ul> <p><b>MOD</b></p> <ul style="list-style-type: none"> <li>• To be a leader amongst UK Government departments and Defence departments in EU and NATO States in the sustained reduction of CO2 and other GHG emissions, and to ensure the continued delivery of Defence capability in a changing climate.</li> <li>• To ensure that the emissions of the GHGs that result from defence activities are continually reduced, such that Defence will eventually not be a significant contributor to the causes of climate change.</li> <li>• To agree and implement an effective process to enable Defence activities to continually adapt to a changing climate, such that Defence capability is not compromised and any potential benefits from the future climate are realised.</li> <li>• To reduce dependency on fossil fuels by ensuring that military equipment, estate and services are energy efficient and use low or zero-carbon energy sources, where practicable.</li> </ul>
<p><b>Coastal Change and Flood Risk</b></p>	<p><b>International</b></p> <ul style="list-style-type: none"> <li>• To reduce and manage the risks that floods pose to human health, the environment, cultural heritage and economic activity.</li> </ul> <p><b>National</b></p> <ul style="list-style-type: none"> <li>• To reduce the threat of flooding to people and their property; avoid inappropriate development in areas at risk of flooding; and sustainably manage risks from flooding and coastal erosion.</li> <li>• To ensure that policies and decisions in coastal areas are based on an understanding of coastal change over time.</li> <li>• To prevent new development from being put at risk from coastal change.</li> </ul> <p><b>MOD</b></p> <ul style="list-style-type: none"> <li>• None identified.</li> </ul>
<p><b>Material assets (Transport)</b></p>	<p><b>International</b></p> <ul style="list-style-type: none"> <li>• To promote renewable energy usage in transport systems.</li> <li>• To promote healthy and sustainable transport alternatives.</li> </ul>

SDP SEA Category	Summary Objectives and Policy Messages (Text in <i>bold+italic</i> = new entries from the NPPF.)
	<ul style="list-style-type: none"> <li>• To improve the quality and effectiveness of transport in Europe.</li> </ul> <p><b>National</b></p> <ul style="list-style-type: none"> <li>• To reduce transport's emissions of CO<sub>2</sub> and other greenhouse gases, with the desired outcome of minimising climate change.</li> <li>• To reduce the risk of death, injury or illness arising from transport, and promote travel modes that are beneficial to health.</li> <li>• To promote greater equality of transport opportunity for all citizens.</li> <li>• To improve journey time reliability on the strategic road network.</li> <li>• To improve experiences of travel and reduce barriers to travel by different modes of transport.</li> <li>• To support national economic competitiveness and growth, by delivering reliable and efficient transport networks.</li> <li>• To ensure radioactive material is safely transported.</li> </ul> <p><b>MOD</b></p> <ul style="list-style-type: none"> <li>• To continually reduce emissions from air, road and rail business admin travel by MOD personnel.</li> <li>• To reduce the use of marine, land and aviation fuels as much as reasonably practicable, without impacting on operational capability, while at the same time assessing the viability of alternatives to these fuels.</li> <li>• To develop a Defence Travel Emissions Strategy with targets and actions for all modes of transport.</li> <li>• The development of a Defence Travel Emissions Strategy in 2009 will bring with it targets and actions for modes of business transport other than road transport.</li> </ul>
<b>Material assets (Waste Management)</b>	<p><b>International</b></p> <ul style="list-style-type: none"> <li>• To ensure that waste reduction is at the forefront of waste management and where disposal is unavoidable ensure a high level of protection for the environment and human health.</li> <li>• To adopt waste management principles such as the “polluter pays principle” and the “waste hierarchy”.</li> <li>• To protect human health and the environment against harmful effects caused by the collection, transport, treatment, storage and tipping of waste.</li> <li>• To help Europe become a recycling society that seeks to avoid waste and uses waste as a resource.</li> <li>• To achieve and maintain a high level of nuclear safety through the enhancement of national measures and technical cooperation.</li> <li>• To establish and maintain effective defences against radiological hazards in nuclear installations in order to protect people and the environment, etc.</li> <li>• To prevent nuclear accidents and limit their consequences.</li> </ul> <p><b>National</b></p> <ul style="list-style-type: none"> <li>• To decouple waste growth (in all sectors) from economic growth and put more emphasis on waste prevention and re-use.</li> <li>• To increase diversion from landfill of municipal and non-municipal waste and secure better integration of treatment for all waste.</li> <li>• To increase recycling of resources and recovery of energy from residual waste using a mix of technologies.</li> <li>• To ensure waste is disposed of as near as possible to the place of production.</li> <li>• To ensure the layout and design of new development should support sustainable waste management.</li> </ul>

SDP SEA Category	Summary Objectives and Policy Messages (Text in <i>bold+italic</i> = new entries from the NPPF.)
	<p><b>MOD</b></p> <ul style="list-style-type: none"> <li>• To recover and recycle more waste than is sent to landfill by 2012.</li> <li>• To become a zero waste to landfill organisation by 2020.</li> <li>• The production of all waste streams (both hazardous and non-hazardous waste) from all units and/or establishments must be reduced and minimised.</li> <li>• To manage waste in accordance with the waste hierarchy, prioritising waste reduction and re-use.</li> </ul>
<p><b>Material assets (Land Use and Materials)</b></p>	<p><b>International</b></p> <ul style="list-style-type: none"> <li>• To adopt a sustainable approach to land use though consideration of: economic development, social inclusion, environmental protection and prudent use of resources.</li> </ul> <p><b>National</b></p> <ul style="list-style-type: none"> <li>• To improve housing affordability in the market sector and ensure appropriate social housing availability.</li> <li>• To promote and enhance existing centres, by focusing development in such centres and encouraging a wide range of services in a good environment, accessible to all.</li> <li>• To encourage well-designed and greener homes, linked to good schools, transport and healthcare.</li> <li>• To promote development of previously developed land.</li> <li>• To achieve a sustainably built and managed central government estate that minimises carbon emissions, waste and water consumption and increases energy efficiency.</li> <li>• To achieve sustainably built and managed properties and roads throughout the public sector.</li> <li>• To implement government supply-chains and public services that are increasingly low carbon, low waste and water efficient, which respect biodiversity and deliver wider sustainable development goals.</li> <li>• To adopt an integrated approach to sustainable development which includes: economic development; social inclusion; environmental protection; and prudent use of resources.</li> <li>• To engage in positive planning and proactive management of development, rather than simply regulation and control.</li> <li>• To have a planning system that is transparent, accessible and accountable.</li> <li>• To promote more sustainable patterns of development.</li> <li>• To raise the quality of life and the environment in rural areas.</li> </ul> <p><b>MOD</b></p> <ul style="list-style-type: none"> <li>• To procure, use and dispose of its estate, equipment, goods and services in a way that meets Government sustainable development objectives and targets, whilst ensuring the continued effective delivery of Defence capability.</li> <li>• To become a national leader in sustainable procurement.</li> <li>• To embed Sustainable Procurement in all aspects of MOD acquisition and throughout the Defence supply chain.</li> <li>• To deliver sustainable defence buildings through the application of Office of Government Commerce (OGC) minimum procurement standards, including the application of BREEAM standards or equivalent.</li> <li>• To improve effectiveness within the context of practicality, achievability and value for money, on an ongoing basis.</li> <li>• To provide economic, environmental and social justification for any decision to</li> </ul>



SDP SEA Category	Summary Objectives and Policy Messages (Text in <b><i>bold+italic</i></b> = new entries from the NPPF.)
	<p>procure new facilities as opposed to the re-use of existing facilities.</p> <ul style="list-style-type: none"> <li>To ensure that procurement strategies take full account of economic, environmental and social impacts.</li> </ul>
<p><b>Cultural heritage, including architectural and archaeological heritage</b></p>	<p><b>International</b></p> <ul style="list-style-type: none"> <li>To identify, protect and preserving potential sites of World Heritage.</li> <li>To protect and sustain the historic environment for the benefit of current and future generations</li> <li>To identify and protect important heritage features.</li> <li>To collect and disseminate scientific information on cultural and archaeological heritage to aid conservation and public awareness.</li> </ul> <p><b>National</b></p> <ul style="list-style-type: none"> <li>To <b><i>sustain and enhance heritage assets, including in particular</i></b> Listed Buildings, Scheduled Monuments and buildings within Conservation Areas.</li> <li>To protect and promote stewardship of the historic environment, <b><i>recognising wider social, economic and environmental benefits brought by conservation.</i></b></li> <li>To promote positive planning and management to bring about sensible solutions to the treatment of sites with archaeological remains and to reduce the areas of potential conflict between development and preservation.</li> <li>To adopt a presumption in favour of the physical preservation of nationally important archaeological remains and their settings, whether scheduled or not.</li> <li>To protect shipwreck features of historical, archaeological or artistic importance.</li> <li>To safeguard internationally and nationally-designated historically or culturally significant sites.</li> </ul> <p><b>MOD</b></p> <ul style="list-style-type: none"> <li>To conserve and enhance the historic environment for the benefit of future generations and to reflect the ethos and heritage of the MOD.</li> <li>To promote the sustainable use of the historic environment, in recognition of its importance as an integral part of cultural heritage and the role it plays in supporting defence capability.</li> <li>Adopt the Department for Culture Media and Sport's Protocol for the Care of the Historic Government Estate. Where responsibility for management of historic property is transferred to the private sector, for example through PPP/PFI arrangements, the Protocol standards will be incorporated into contractual arrangements.</li> </ul>
<p><b>Landscape and Townscape</b></p>	<p><b>International</b></p> <ul style="list-style-type: none"> <li>Ensure that development is 'appropriate' particularly in relation to protected landscapes.</li> <li>To protect, manage and plan landscapes throughout Europe.</li> </ul> <p><b>National</b></p> <ul style="list-style-type: none"> <li>To <b><i>improve</i></b> public access to the countryside and the coast.</li> <li>To retain attractive landscapes, <b><i>and maintain the character of the undeveloped coast, particularly in designated areas (National Parks, Areas of Outstanding Natural Beauty and Heritage Coasts).</i></b></li> <li>To enhance landscapes near to where people live.</li> <li>To improve damaged and derelict land around towns.</li> <li>To retain land in agricultural, forestry and related uses.</li> </ul>

SDP SEA Category	Summary Objectives and Policy Messages (Text in <i>bold+italic</i> = new entries from the NPPF.)
	<p><b>MOD</b></p> <ul style="list-style-type: none"> <li>• To promote the objectives of statutory designated areas (National Parks and Areas of Outstanding Natural Beauty) wherever possible.</li> <li>• Reasonable measures should be undertaken in respect of landscape designations to mitigate the impacts of any development proposals on landscape character.</li> <li>• Management of sites should seek to maintain the character of the landscape by safeguarding and, where practicable, enhancing or developing significant landscape features.</li> </ul>

## **Annex 4: Rationale for Amendment of the SEA Objectives and Guiding Questions**

As stated in Section 6.2.2, this SEA will be based on the SEA categories, objectives and guide questions of the previous 2010/11 SEA – the ‘SEA Framework’. However, certain changes are being proposed within this existing framework in order to better focus the SEA of ILW storage and transport. This Annex explains the proposed amendments to the SEA Framework, including a rationale for each proposed change.

2011 Overarching SDP SEA		Suggested Amendments for the ILW Storage SEA		Justification for Change
Assessment Category and Overall Objective	Proposed Questions <i>Will the SDP Proposals...</i>	Assessment Category and Overall Objective	Proposed Assessment Questions <i>Will the SDP Proposals...</i>	
N/A	N/A	<b>A. Radiological Discharges</b> Ensure that radiological discharges to people and the environment remain as low as reasonably achievable.	Increase the emission of radiological discharges (including in combination with existing discharges) to levels which may cause immediate or long-term harm?	<p><u>Better separation of issues.</u> The previous SEA consultation and knowledge of public interest suggests that radiological discharges are of key concern to stakeholders. This category addresses radiological discharges into the environment (air, water and land). Effects on receptors will be covered under human health and biodiversity.</p> <p>The water, air and land categories below will now exclude radiological discharges to avoid duplication.</p>
<b>A. Biodiversity and Nature Conservation</b> Protect and enhance habitats, species and ecosystems.	Affect designated nature conservation sites?	<b>B. Biodiversity and Nature Conservation</b> Protect and enhance habitats, species and ecosystems.	Affect habitats, including designated nature conservation sites (accounting also for designating species) and non-designated habitat?	<u>Better separation of issues.</u> In a spatial assessment, designation is a factor within the habitats issue. E.g. designation heightens the importance / sensitivity of the baseline for that habitat or area. Therefore, separating designated sites out as a separate issue would lead to unclear outcomes and duplication in the assessment. Also, the amended question is universal to all sites, while the original may apply to some, but not others.
	Affect animals or plants, including protected species?		Affect animals or plants outside of designated sites, including protected species and fisheries?	<u>Better separation of issues.</u> Because species are typically inherent in the designation or a reason for designation, they will be covered under the above question. This question will therefore avoid duplication by considering notable species outside of those sites.
	Affect the structure and function of natural systems (ecosystems)?		(REMOVE ORIGINAL QUESTION.)	<u>Eliminate duplication.</u> Assessing the structure and function of ecosystems is an inherent part of conducting assessment under the above two criteria.
	Affect public access to areas of wildlife interest?		(REMOVE ORIGINAL QUESTION.)	<u>Eliminate duplication.</u> This will be addressed as part of active lifestyles and mental health / well-being in the 'Health and Well-Being' category.
	Have an impact on fisheries?		(REMOVE ORIGINAL QUESTION.)	<u>Eliminate duplication.</u> This will be addressed as part of species effects above, as well as part of socio-economics (see 'Population') and recreation (see 'Health and Well-Being' category).

2011 Overarching SDP SEA		Suggested Amendments for the ILW Storage SEA		Justification for Change
Assessment Category and Overall Objective	Proposed Questions <i>Will the SDP Proposals...</i>	Assessment Category and Overall Objective	Proposed Assessment Questions <i>Will the SDP Proposals...</i>	
<b>B. Population</b> Promote a strong, diverse and stable economy with opportunities for all; minimise disturbance to local communities and maximise positive social impacts.	Affect the social infrastructure and amenities available to local communities?	<b>C. Population</b> Promote a strong, diverse and stable economy with opportunities for all; minimise disturbance to local communities and maximise positive social impacts.	Affect the social infrastructure available to local communities, such as community centres and places of worship?	<u>Eliminate duplication.</u> As recreation will be covered under 'Health and Well-Being', and transport infrastructure under 'Material Assets (Transport)', there is a need to be clearer about the type of social infrastructure covered here. Amenities are considered inherent in effects on active lifestyles, which will be addressed under 'Health and Well-Being'.
	Affect local population demographics and/ or levels of deprivation in surrounding areas?		Affect local population demographics in surrounding areas?	<u>Better separation of issues.</u> Demographics and deprivation are difficult to assess together. Deprivation is more closely linked with economic activity, while many factors can affect demographics.
	Affect opportunities for investment, education and skills development?		Affect opportunities for education and skills development?	<u>Better separation of issues.</u> Investment and education are difficult to assess together. Investment is more closely linked with economic activity, while many factors can affect education and skills development.
	Affect the number or types of jobs available in local economies		Affect the number or types of jobs available in local economies, and levels of economic deprivation in surrounding areas?	<u>Better separation of issues.</u> Deprivation is a baseline situation, upon which we will assess the potential implications of employment and local economic contribution.
	Affect how diverse and robust local economies are?		Affect how diverse and robust local economies are, including through maintaining and improving the image of areas as locations to live, work and invest?	<u>Better separation of issues.</u> These issues are extremely interrelated, and it is sensible to assess them together. It may prove difficult to assess them separately.
	Affect the sense of positive self-image and the attractiveness of surrounding areas as places to live, work and invest in?			

2011 Overarching SDP SEA		Suggested Amendments for the ILW Storage SEA		Justification for Change
Assessment Category and Overall Objective	Proposed Questions <i>Will the SDP Proposals...</i>	Assessment Category and Overall Objective	Proposed Assessment Questions <i>Will the SDP Proposals...</i>	
<b>C. Health and Wellbeing</b> Protect and enhance health, safety and wellbeing of workers and communities; minimise any health risks associated with ILW storage and transport.	Affect the health or safety of SDP workers, or other people working at the proposed sites?	<b>D. Health and Wellbeing</b> Protect and enhance health, safety and wellbeing of workers and communities; minimise any health risks associated with ILW storage and transport.	Affect the health or safety of SDP workers, or other people working at the proposed sites?	(No change.)
	Affect the health, safety and well-being of local communities?		Affect the health, safety and well-being of local communities?	(No change.)
	Affect local healthcare infrastructure and provision?		Affect local healthcare infrastructure and provision?	(No change.)
			Affect recreation and other amenities available to local communities, including public access to areas of wildlife interest?	New issue / better emphasis. Achieving active lifestyles is a key national priority, and effects on recreation and amenity can be clearly separated from other issues.
<b>D. Noise and Vibration</b> Minimise disturbance and stress to people, wildlife and historic buildings caused by noise and vibration.	Significantly increase levels of noise and vibration?	<b>E. Noise and Vibration</b> Minimise disturbance to people, wildlife and historic buildings caused by noise and vibration.	Significantly increase levels of noise and vibration?	(No change.)
	Affect the amount of noise and vibration felt by local communities?		(REMOVE ORIGINAL QUESTION.)	<u>Eliminate duplication.</u> Noise levels relative to established standards and thresholds are considered here, while impacts on people and wildlife will be considered under 'Health and Well-Being' and 'Biodiversity and Nature Conservation', respectively.
<b>E. Geology and Soils</b> Minimise threats to the extent and quality of soils and geological resources.	Have an effect on soil quality, variety, extent and/or compaction levels?	<b>F. Geology and Soils</b> Minimise threats to the extent and quality of soils and geological resources.	Have an effect on soil quality, variety, extent and/or compaction levels?	(No change.)
	Have an effect on soil function and processes?		(REMOVE ORIGINAL QUESTION.)	<u>Eliminate duplication.</u> Soil function /processes and contamination are inherent components of soil quality. Therefore, removing these questions will eliminate duplication.
	Increase the risk of significant soil contamination?		(REMOVE ORIGINAL QUESTION.)	
	Have an effect on any known and existing contamination?		(REMOVE ORIGINAL QUESTION.)	

2011 Overarching SDP SEA		Suggested Amendments for the ILW Storage SEA		Justification for Change
Assessment Category and Overall Objective	Proposed Questions <i>Will the SDP Proposals...</i>	Assessment Category and Overall Objective	Proposed Assessment Questions <i>Will the SDP Proposals...</i>	
	Affect geological conservation sites and important geological features?		Affect geological conservation sites and important geological features?	(No change.)
	Affect land stability?		Affect land stability?	(No change.)
<b>F. Water</b> Maximise water efficiency, protect and enhance water quality.	Affect demand for water resources?	<b>G. Water</b> Maximise water efficiency, protect and enhance water quality.	Affect water availability as a resource for abstraction or other use?	<u>Changed for clarity.</u> Not phrased appropriately for a baseline-led assessment. Demand is a <i>potential</i> source of environmental effects, but increasing demand will not necessarily lead to a significant effect.
	Affect the amount of waste water and surface runoff produced?		Affect the amount of waste water produced?	<u>Eliminate duplication</u> with Topic I (flood risk)
	Cause any changes in radioactive or other hazardous discharges to water?		Affect the quality of surface or sea water?	<u>Eliminate duplication / better separation of issues.</u> Radiological discharges covered under Topic A. Surface water effects are potentially very different from groundwater effects.
	Affect the quality of groundwater, surface waters or sea water?		Affect the quality of groundwater?	
	Affect the distribution and quality of freshwater or marine sediments?		Affect hydrology / geomorphology, including the distribution and quality of freshwater or marine sediments?	<u>New issue / better emphasis.</u> Widened the scope of this question to cover a larger range of site circumstances.
<b>G. Air</b> Minimise emissions of pollutant gases and particulates and enhance air quality	Affect air quality?	<b>H. Air</b> Minimise emissions of pollutant gases and particulates and enhance air quality	Affect air quality?	(No change.)
	Cause a change in radioactive emissions to air?		(REMOVE ORIGINAL QUESTION.)	<u>Eliminate duplication.</u> Radiological discharges covered under Topic A.
	Affect emissions of ozone-depleting substances?		(REMOVE ORIGINAL QUESTION.)	<u>Eliminate duplication.</u> Ozone-depleting substances covered under "affect air quality?" above.
	Create a nuisance for people or wildlife (for example from dust or odours)?		(REMOVE ORIGINAL QUESTION.)	<u>Eliminate duplication.</u> Nuisance to people covered under Topic C ('Health & Well-being') and potential harm to wildlife covered under Topic A ('Biodiversity and Nature Conservation').

2011 Overarching SDP SEA		Suggested Amendments for the ILW Storage SEA		Justification for Change
Assessment Category and Overall Objective	Proposed Questions <i>Will the SDP Proposals...</i>	Assessment Category and Overall Objective	Proposed Assessment Questions <i>Will the SDP Proposals...</i>	
<b>H. Climate Change and Energy Use</b> Reduce energy consumption, minimise detrimental effects on the climate from greenhouse gases and maximise resilience to climate change.	Affect the amount of carbon dioxide and other greenhouse gases emitted?	<b>I. Climate Change and Energy Use</b> Reduce energy consumption, minimise greenhouse gas emissions	Affect the amount of carbon dioxide and other greenhouse gases emitted?	(No change.)
	Be significantly affected by climate change (for example rising temperatures and more extreme weather events)?		(REMOVE ORIGINAL QUESTION.)	Not applicable. This is not possible to assess within an SEA – other than flood risk and coastal change (see Topic I below) it depends entirely upon design-specific factors, which can only be adequately addressed at the project level.
	Affect how climate change might impact on the wider environment?		(REMOVE ORIGINAL QUESTION.)	Eliminate duplication. Flood risk is the only factor able to be accounted for in an SEA, and it is covered under Topic I below
	Promote or impede the use of energy efficiency measures, low carbon and/ or renewable energy sources?		(REMOVE ORIGINAL QUESTION.)	Not applicable. Energy efficiency is mitigation, rather than effect. Any opportunities can be identified as mitigation within the SEA if appropriate. However, it is more appropriate at the project level and design stage.
	Have wider implications for combating the effects of climate change?		(REMOVE ORIGINAL QUESTION.)	Not applicable / eliminate duplication. Climate change is part of the future baseline under all SEA categories and objectives. Any significant benefit to climate change mitigation and adaptation can be captured under other assessment questions.
<b>I. Coastal Change and Flood Risk</b> Minimise the risks from coastal change and flooding to people, property and communities.	Affect existing flood risks?	<b>J. Coastal Change and Flood Risk</b> Minimise the risks from coastal change and flooding to people, property and communities.	Affect levels or the extent of flood risk?	Changed for clarity. Simple re-phrasing.
	Be at risk of flooding from any source?		Be at risk of flooding from any source?	(No change.)
	Affect coastal processes and/or erosion rates?		Affect coastal processes and/or erosion rates?	(No change.)
	Be affected by coastal processes and/or erosion?		Be affected by coastal processes and/or erosion?	(No change.)



2011 Overarching SDP SEA		Suggested Amendments for the ILW Storage SEA		Justification for Change
Assessment Category and Overall Objective	Proposed Questions <i>Will the SDP Proposals...</i>	Assessment Category and Overall Objective	Proposed Assessment Questions <i>Will the SDP Proposals...</i>	
<b>J. Material Assets (Transport)</b> Minimise the detrimental impacts of travel and transport on communities and the environment, whilst maximising positive effects.	Affect the number and frequency of heavy, oversized, radioactive and/ or hazardous loads being transported off-site, particularly through sensitive areas (e.g. population centres, historic areas and vulnerable ecosystems?)	<b>K. Material Assets (Transport)</b> Minimise the detrimental impacts on travel and transport within communities, whilst maximising positive effects.	Affect transport infrastructure, such as through increased heavy loads and possible damage?	<u>Simplify / eliminate duplication.</u> Number and frequency of transport is a potential source of effect, rather than an effect, and sensitive areas would be considered under either 'Population', 'Health and Well-Being' or 'Biodiversity and Nature Conservation', as appropriate. This topic should focus on the transport system (i.e. the material asset).
	Increase or decrease traffic congestion around SDP sites?		Increase or decrease traffic congestion around SDP sites?	(No change.)
	Increase or decrease the risk of traffic accidents around SDP sites?		(REMOVE ORIGINAL QUESTION.)	<u>Eliminate duplication.</u> Accident rates to be addressed under 'Health and Well-Being' for both workers and local communities.
<b>K. Material Assets (Waste Management)</b> Minimise waste arisings, promote reuse, recovery and recycling and minimise the impact of wastes on the environment and communities.	Increase the amount of radioactive waste to be disposed of?	<b>L. Material Assets (Waste Management)</b> Minimise waste arisings, promote reuse, recovery and recycling and minimise the impact of wastes on the environment and communities.	Increase the amount of radioactive waste to be disposed of?	(No change.)
	Affect the amount of hazardous waste to be disposed of?		Affect the amount of hazardous waste to be disposed of?	(No change.)
	Affect the amount of non-hazardous wastes produced?		Affect the amount of non-hazardous wastes produced?	(No change.)
	Affect the capacity of existing waste management systems, both nationally and locally?		Affect the capacity of existing waste management systems, both nationally and locally?	(No change.)

2011 Overarching SDP SEA		Suggested Amendments for the ILW Storage SEA		Justification for Change
Assessment Category and Overall Objective	Proposed Questions <i>Will the SDP Proposals...</i>	Assessment Category and Overall Objective	Proposed Assessment Questions <i>Will the SDP Proposals...</i>	
	Maximise re-use and recycling of recovered components and materials?		(REMOVE ORIGINAL QUESTION.)	Not applicable. Reuse and recycling and achieving targets are mitigation, rather than effect. Any opportunities can be identified as mitigation within the SEA if appropriate. However, it is more appropriate at the project level and design stage.
	Help achieve government and national targets for minimising, recovering and recycling waste?		(REMOVE ORIGINAL QUESTION.)	
	Affect the environmental risks associated with managing radioactive and hazardous wastes?		(REMOVE ORIGINAL QUESTION.)	
<b>L. Land Use and Materials</b> Contribute to the sustainable use of land and natural and material assets.	Change patterns of land use on or around SDP sites?	<b>M. Land Use and Materials</b> Contribute to the sustainable use of land and natural and material assets.	Change patterns of land use on or around SDP sites?	(No change.)
	Affect any existing or proposed redevelopment/regeneration programmes?		Affect any existing or proposed redevelopment / regeneration programmes?	(No change.)
	Lead to the loss of undeveloped land or green spaces?		Lead to the loss of undeveloped land or green spaces?	(No change.)
	Increase the burden on limited natural resources such as aggregates or wood?		Increase the burden on limited natural resources such as aggregates or wood?	(No change.)
	Promote the use of sustainable design and construction practices and help the government achieve its targets for the quality of built environments?		(REMOVE ORIGINAL QUESTION.)	Not applicable. Sustainable design and best use of existing infrastructure / resources is mitigation, rather than effect. Any opportunities can be identified as mitigation within the SEA if appropriate. However, it is more appropriate at the project level and design stage.

2011 Overarching SDP SEA		Suggested Amendments for the ILW Storage SEA		Justification for Change
Assessment Category and Overall Objective	Proposed Questions <i>Will the SDP Proposals...</i>	Assessment Category and Overall Objective	Proposed Assessment Questions <i>Will the SDP Proposals...</i>	
	Make best use of existing infrastructure and resources?		(REMOVE ORIGINAL QUESTION.)	
<b>M. Cultural Heritage</b> Protect and where appropriate enhance the historic environment including cultural heritage resources, historic buildings and archaeological features.	Affect designated or locally-important archaeological features?	<b>N. Cultural Heritage</b> Protect and where appropriate enhance the historic environment including cultural heritage resources, historic buildings and archaeological features.	Affect designated or locally important archaeological features?	(No change.)
	Affect the fabric and setting of historic buildings, places or spaces that contribute to local distinctiveness, character and appearances?		Affect the fabric and setting of historic buildings, structures or spaces?	Eliminate duplication. Local distinctiveness, character and appearance covered under landscape / townscape. The interrelationship with cultural heritage will be taken into account in making that assessment.
			Affect the historic landscape, including its distinctive context and character?	
<b>N. Landscape and Townscape</b> Protect and enhance landscape quality and visual amenity.	Affect protected/designated landscapes or townscapes, such as National Parks or Conservation Areas?	<b>O. Landscape and Townscape</b> Protect and enhance landscape and townscape quality and visual amenity.	Affect landscapes?	Better separation of issues. In a spatial assessment, designation is a factor within the landscape issue. E.g. designation heightens the importance / sensitivity of the baseline for that area. Therefore, separating designated sites out as a separate issue would lead to unclear outcomes and duplication in the assessment. Also, the amended questions are universal to all sites, while the original may apply to some, but not others.
	Have significant visual impacts (including those at night)?		Affect townscapes?	
	Affect the intrinsic character of local landscapes or townscapes?		Have significant visual impacts?	
	Affect public access to open spaces or the countryside?		(REMOVE ORIGINAL QUESTION.)	Eliminate duplication. Access to recreation such as open space and the countryside to be addressed under 'Health and Well-Being'.

## **Annex 5: Rationale for the SEA Technical Scope**

This Annex presents the detailed scoping exercise which is summarised in Section 6.2.3. The table includes potential pathways for effects from ILW storage and transport, which have been reviewed by environmental practitioners in order to determine whether they could potentially lead to a significant effect either alone or in combination within each category.

As stated in Section 6.2.3, the results of the 2010/11 SEA have also been considered in terms of the level of detail of further assessment which is considered necessary. Rather than 'scope out' issues which have been addressed adequately by the previous SEA, it is thought to be more compliant with the legislation to review and summarise this information again in this SEA.

Also as stated in Section 6.2.3, it should be noted that not all issues scoped into this SEA have a potential to be significant for all sites. An issue is scoped in even if only one site has the potential to cause a significant effect without mitigation.

SEA Framework		Potential Pathways for Effects from ILW Storage	Can this SEA say anything significantly different from the 2011 SEA?	Scoped In for further assessment?	Justification for Scoping Decision	Level of Detail Required
Category & Objective	Assessment Questions <i>Will the SDP Proposals...</i>					
<b>A. Radiological Discharges / Emissions</b> Ensure that radiological discharges to people and the environment remain as low as reasonably	Increase the emission of radiological discharges (including in combination with existing discharges) to levels which may cause immediate or long-term harm?	<ul style="list-style-type: none"> <li>- ILW in transport, via direct radiation (i.e. not from a discharge)</li> <li>- ILW in storage, via direct radiation, or via discharges to air, water or soil</li> <li>- accident scenarios (e.g. fire)</li> </ul>	Yes – there are site-specific baselines for radiological discharges at each site, with different communities potentially being affected.	✓	Radiological discharges and emissions are closely regulated and managed through such principles as ALARA. However, the issue is very important to stakeholders and there are different baseline radiological discharges across the alternative sites which may warrant discussion.	New assessment considering all potential pathways.
<b>B. Biodiversity and Nature Conservation</b> Protect and enhance habitats, species and ecosystems.	Affect habitats, including designated nature conservation sites (accounting also for designating species) and non-designated habitat?	<ul style="list-style-type: none"> <li>- radiological discharges</li> <li>- changes to soil extent and quality</li> <li>- changes to water bodies or water quality</li> <li>- changes to non-radiological air pollution levels</li> <li>- land use / landtake (habitat, foraging, species mobility)</li> <li>- artificial habitat creation or habitat restoration</li> <li>- active habitat management and improvement</li> <li>- noise / disturbance (construction and transport)</li> <li>- light pollution</li> </ul>	Yes – there are site-specific baselines for habitats / designated sites, and effects may be different at each site.	✓	Again, radiological discharges and emissions are closely regulated and managed through such principles as ALARA. However, there is potential for protected and valued habitats to be affected by development of the ILW storage facility and associated infrastructure.	New assessment considering all potential pathways.

SEA Framework		Potential Pathways for Effects from ILW Storage	Can this SEA say anything significantly different from the 2011 SEA?	Scoped In for further assessment?	Justification for Scoping Decision	Level of Detail Required
Category & Objective	Assessment Questions <i>Will the SDP Proposals...</i>					
	Affect animals or plants outside of designated sites, including protected species and fisheries?	<ul style="list-style-type: none"> <li>- radiological discharges</li> <li>- noise / disturbance (construction and transport)</li> <li>- changes to soil extent and quality</li> <li>- changes to water bodies or water quality</li> <li>- changes to non-radiological air pollution levels</li> <li>- direct mortality (construction / transport)</li> <li>- light pollution</li> </ul>	Yes – there are site-specific baselines for notable species, and effects may be different at each site.	✓	Similar to the above, there is potential for protected and valued species to be affected by development of the ILW storage facility and associated infrastructure.	New assessment considering all potential pathways.
<b>C. Population</b> Promote a strong, diverse and stable economy with opportunities for all; minimise disturbance to local communities and maximise positive social impacts.	Affect the social infrastructure available to local communities, such as community centres and places of worship?	<ul style="list-style-type: none"> <li>- radiological discharges / fear of discharges reducing rate of use / quality of use of services / facilities</li> <li>- noise and vibration</li> <li>- changes to non-radiological air pollution levels</li> <li>- land use / landtake</li> </ul>	No.	✗	Given the site baselines, it is unlikely that any storage facility would significantly affect use of any social infrastructure (see also recreation under Health and Well-being below).	N/A
	Affect local population demographics in surrounding areas?	<ul style="list-style-type: none"> <li>- in-migration of construction staff</li> <li>- in-migration of operational staff</li> <li>- out-migration of staff upon decommissioning</li> <li>- perception of harm causing out-migration</li> </ul>	No.	✗	Construction staff would be temporary, and permanent staff would be minimal in number. Given the proposal is for storage only on existing nuclear-licensed sites, it is unlikely to have a significant population effect.	N/A

SEA Framework		Potential Pathways for Effects from ILW Storage	Can this SEA say anything significantly different from the 2011 SEA?	Scoped In for further assessment?	Justification for Scoping Decision	Level of Detail Required
Category & Objective	Assessment Questions <i>Will the SDP Proposals...</i>					
	Affect opportunities for education and skills development?	<ul style="list-style-type: none"> <li>- noise and vibration</li> <li>- transport impact on access to educational facilities</li> <li>- land use / landtake</li> <li>- any specific schemes for training and education at each site</li> </ul>	No.	x	Effects on educational facilities or access to them are unlikely to be significant. Even if disturbance effects are identified, they will be covered under 'Health and Well-Being', and any disturbance is unlikely to affect education significantly. An ILW storage facility is unlikely to create new training opportunities above any which already exist.	N/A
	Affect the number or types of jobs available in local economies, and levels of deprivation in surrounding areas?	<ul style="list-style-type: none"> <li>- generation of employment opportunity, direct &amp; indirect</li> <li>- impact on biodiversity (e.g. fisheries)</li> <li>- blight / locational branding</li> <li>- commercial or agricultural landtake</li> <li>- use of derelict land which otherwise could be used for commercial purposes</li> </ul>	No. Even with site-specific baseline, effects are likely to be similar at all site alternatives. However, this SEA can confirm / refute assumptions of the previous SEA, such as whether ILW storage is consistent with the character of the local area.	✓	Although an ILW storage facility will not provide many operational jobs, it will provide additional employment during construction and decommissioning, which may be locally significant, even if temporary.	Cursory review – consider the conclusions of the previous SEA relative to alternatives sites and relative deprivation levels, if applicable, and report the potentially significant effect at each site.

SEA Framework		Potential Pathways for Effects from ILW Storage	Can this SEA say anything significantly different from the 2011 SEA?	Scoped In for further assessment?	Justification for Scoping Decision	Level of Detail Required
Category & Objective	Assessment Questions <i>Will the SDP Proposals...</i>					
	Affect how diverse and robust local economies are, including through maintaining and improving the image of areas as locations to live, work and invest?	<ul style="list-style-type: none"> <li>- attraction of investment to area / robustness against economic decline</li> <li>- community funding and tax generation from additional employment</li> </ul>	No.	✘	All candidate sites are long-established nuclear-licensed facilities, which contribute to their local economies. Low levels of employment are unlikely to result in significant effects to the overall robustness of those local economies.	N/A
<b>D. Health and Wellbeing</b> Protect and enhance health, safety and wellbeing of workers and communities;	Affect the health or safety of SDP workers, or other people working at the proposed sites?	<ul style="list-style-type: none"> <li>- direct radiation</li> <li>- radiological discharges</li> <li>- noise and vibration</li> <li>- changes to non-radiological air pollution levels</li> <li>- hazardous activities</li> <li>- transport accident risk</li> <li>- land stability</li> </ul>	No.	✘	All candidate sites are long-established nuclear-licensed facilities which are closely regulated as described in Section 5.2, and worker health safety is an operational management issue (rather than development planning and SEA).	N/A



SEA Framework		Potential Pathways for Effects from ILW Storage	Can this SEA say anything significantly different from the 2011 SEA?	Scoped In for further assessment?	Justification for Scoping Decision	Level of Detail Required
Category & Objective	Assessment Questions <i>Will the SDP Proposals...</i>					
	Affect the health, safety and well-being of local communities?	<ul style="list-style-type: none"> <li>- radiological discharges (including from transport accidents or operational accidents, such as fires)</li> <li>- fear of radiological discharges</li> <li>- noise and vibration</li> <li>- changes to non-radiological air pollution levels</li> <li>- hazardous construction activities</li> <li>- transport (probability of accidents)</li> <li>- changes to local community mobility or use of land / facilities, accounting for public realm / attractiveness of area</li> <li>- crime and anti-social behaviour</li> <li>- land stability</li> <li>- light pollution</li> </ul>	Yes – there are site-specific baselines for health and well-being issues, and different communities could potentially be affected at each site.	✓	Again, radiological discharges and emissions are closely regulated and managed through such principles as ALARA. However, the issue is very important to stakeholders and there is a need to consider potential cumulative health effects to any receptors at each alternative site, including health issues associated with the perceived risk of harm.	New assessment considering all potential pathways.
	Affect local healthcare infrastructure and provision?	<ul style="list-style-type: none"> <li>- noise and vibration</li> <li>- transport impact on access to facilities</li> <li>- land use / landtake</li> <li>- in-migration of staff and demand for healthcare</li> </ul>	No.	✗	None of the candidate sites are likely to affect the operation of community health facilities in the vicinity.	N/A

SEA Framework		Potential Pathways for Effects from ILW Storage	Can this SEA say anything significantly different from the 2011 SEA?	Scoped In for further assessment?	Justification for Scoping Decision	Level of Detail Required
Category & Objective	Assessment Questions <i>Will the SDP Proposals...</i>					
	Affect recreation and other amenities available to local communities, including public access to areas of wildlife interest?	<ul style="list-style-type: none"> <li>- changes to biodiversity (habitat extent or wildlife populations need for recreation)</li> <li>- changes to water bodies or water quality</li> <li>- changes to geological features</li> <li>- cultural heritage: obtaining or providing an educational resource</li> <li>- access to historic features</li> <li>- radiological discharges</li> <li>- noise and vibration</li> <li>- changes to non-radiological air pollution levels</li> <li>- transport impact on access to or use of facilities</li> <li>- land use / landtake</li> <li>- in-migration of staff and demand for recreation</li> </ul>	Yes – there are site-specific baselines for each site.	✘	The project assumes that an ILW storage facility will be built within the existing site boundary, and therefore not involve landtake which could affect existing community recreational facilities. Any indirect effect such as on visual amenity is unlikely to significantly change usage of recreational features.	N/A

SEA Framework		Potential Pathways for Effects from ILW Storage	Can this SEA say anything significantly different from the 2011 SEA?	Scoped In for further assessment?	Justification for Scoping Decision	Level of Detail Required
Category & Objective	Assessment Questions <i>Will the SDP Proposals...</i>					
<b>E. Noise and Vibration</b> Minimise disturbance and stress to people, wildlife and historic buildings caused by noise and vibration.	Significantly increase levels of noise and vibration?	<ul style="list-style-type: none"> <li>- transport during construction</li> <li>- construction activities</li> <li>- operational transport</li> <li>- temporary night-time highway closures during RPV transport – redirection of traffic</li> <li>- operation of facility</li> <li>- demolition / decommissioning</li> </ul>	Yes – there are site-specific baselines for each site.	✓	<p>Although operational noise is generally unlikely to be significant, temporary highway closures during RPV transport could lead to traffic being redirected through other towns and villages. RPV transport may lead to localised vibration issues.</p> <p>There may be some transient issues during the construction and decommissioning phases.</p>	<p>New assessment considering all potential pathways, but focusing on potential for highway closures during RPV transport.</p> <p>Will provide generic coverage of other noise and vibration issues, as the baseline shows that there are no particular noise issues associated with the sites, and temporary construction impacts are better dealt with (and typically can be managed to within acceptable levels) at the project level.</p>

SEA Framework		Potential Pathways for Effects from ILW Storage	Can this SEA say anything significantly different from the 2011 SEA?	Scoped In for further assessment?	Justification for Scoping Decision	Level of Detail Required
Category & Objective	Assessment Questions <i>Will the SDP Proposals...</i>					
<b>F. Geology and Soils</b> Minimise threats to the extent and quality of soils and geological resources.	Affect soil quality, variety, extent and/or compaction levels?	<ul style="list-style-type: none"> <li>- radiological discharges</li> <li>- vibration</li> <li>- changes to water bodies or water quality</li> <li>- changes to non-radiological air pollution levels</li> <li>- construction processes</li> <li>- land use / landtake</li> <li>- release of pollutants from contaminated ground during construction, such that it spreads to other soils</li> </ul>	Yes – there are site-specific baselines for each site, and proposals for landtake and movement of soil may vary from site to site.	✓	<p>There is a slight risk of soil contamination during the construction phase.</p> <p>There is very little risk of soil contamination during the operation phase due to the nature of the waste and site license conditions.</p> <p>Otherwise, the baseline for the sites includes a ‘worst case’ of loss of Grade 3 soils. Also, existing nuclear-licensed sites are undergoing long-term programmes of remediation where appropriate, which would occur with or without an ILW storage facility.</p>	<p>Cursory review – consider site-specific baselines and the conclusions of the previous SEA.</p> <p>Assessment will be largely generic, as any impacts are better dealt with (and typically can be managed to within acceptable levels) at the project level.</p>
	Affect geological conservation sites and important geological features?	<ul style="list-style-type: none"> <li>- (noise and) vibration</li> <li>- changes to water bodies or water quality</li> <li>- changes to non-radiological air pollution levels</li> <li>- construction processes</li> <li>- land use / landtake</li> </ul>	No.	x	<p>There are no geological conservation sites or significant features of particular relevance to the sites.</p>	N/A

SEA Framework		Potential Pathways for Effects from ILW Storage	Can this SEA say anything significantly different from the 2011 SEA?	Scoped In for further assessment?	Justification for Scoping Decision	Level of Detail Required
Category & Objective	Assessment Questions <i>Will the SDP Proposals...</i>					
	Affect land stability?	- construction: movement of ground / earth - presence of facility (foundations, etc.)	No.	x	A safety case will be required which demonstrates that a facility is constructed on stable and seismically qualified land. A storage facility on such land is unlikely to affect land stability elsewhere.	N/A
<b>G. Water</b> Maximise water efficiency, protect and enhance water quality.	Affect water availability as a resource for abstraction or other use?	- construction water use - operational water use - water quality (see below)	Yes – there are site-specific baselines for water resource issues, and different water bodies could potentially be affected at each site.	✓	Baseline data indicates water resource constraints at some of the sites. Construction of an ILW storage facility could require significant quantities of water, e.g. through concrete pouring. However, operational water use is expected to be minimal.	New assessment considering all potential pathways.
	Affect the amount of waste water produced?	- operational wastewater - surface water runoff to sewer (not overland – see Topic J)	No.	x	Storage of RPVs is unlikely to result in significant quantities of wastewater.	N/A
	Affect the quality of surface or sea water?	- construction runoff / siltation / chemical use - operational storm drainage (e.g. road) - operational wastewater - release of pollutants from contaminated ground into surface or groundwater through disturbance or	Yes – further data on the nature / status of existing discharges and level of proposed discharges can be investigated to determine if any significant adverse effect is possible.	✓	There is potential for construction effects, given the risks of fuel / chemical spills and movement of soil and siltation from surface runoff.  Storage of RPVs is unlikely to result in significant quantities of wastewater.	New assessment considering all potential pathways.

SEA Framework		Potential Pathways for Effects from ILW Storage	Can this SEA say anything significantly different from the 2011 SEA?	Scoped In for further assessment?	Justification for Scoping Decision	Level of Detail Required
Category & Objective	Assessment Questions <i>Will the SDP Proposals...</i>					
	Affect the quality of groundwater?	piling operations during construction	Yes – there are site-specific baselines for groundwater and contaminated land as a potential pathway for effects to groundwater.	✓	There is a possible hazard presented by soil contamination at the sites, whereby consideration is needed of the potential for any groundworks (if needed) to create a pathway for pollutants to enter aquifers.	New assessment considering all potential pathways.
	Affect hydrology / geomorphology, including the distribution and quality of freshwater or marine sediments?	- construction and channelisation of watercourse - presence of facility (foundations, etc.)	Yes – there are baselines which include different water bodies at each site, and different water bodies could potentially be affected at each site.	✓	Several of the sites either include or are adjacent to watercourses or water bodies. Construction and presence of the facility can affect hydrology / geomorphology.	New assessment considering all potential pathways.
<b>H. Air</b> Minimise emissions of pollutant gases and particulates and enhance air quality	Affect air quality?	- construction processes - construction equipment and vehicles - operational emissions - transport - demolition / decommissioning	Yes – there are site-specific air quality baselines, and different receptor groups could potentially be affected at each site.	✓	Construction and decommissioning could affect air quality, although storage and operational transport are unlikely to lead to significant effects.  Although construction emissions are readily mitigated, the potential site-specific receptors can be identified, enabling early consideration of appropriate mitigation measures.	New assessment considering all potential pathways.

SEA Framework		Potential Pathways for Effects from ILW Storage	Can this SEA say anything significantly different from the 2011 SEA?	Scoped In for further assessment?	Justification for Scoping Decision	Level of Detail Required	
Category & Objective	Assessment Questions <i>Will the SDP Proposals...</i>						
<b>I. Climate Change and Energy Use</b> Reduce energy consumption, minimise greenhouse gas emissions	Affect the amount of carbon dioxide and other greenhouse gases emitted?	<ul style="list-style-type: none"> <li>- construction processes</li> <li>- construction equipment and vehicles</li> <li>- embedded carbon</li> <li>- operational emissions</li> <li>- transportation</li> </ul>	Yes, although only regarding RPV transport routes.	✓	Development of an ILW storage site will lead to emissions of greenhouse gases, including embodied carbon. Transport distances for RPVs will vary from site to site.  The impacts of climate change are part of the future baseline under all other SEA categories. There are opportunities to build climate resilience into proposals.	New assessment considering transport differences only.  Will otherwise only provide generic data which is available or able to be estimated.	
	<b>J. Coastal Change and Flood Risk</b> Minimise the risks from coastal change and flooding to people, property and communities.	Affect levels or the extent of flood risk?	<ul style="list-style-type: none"> <li>- construction runoff or discharges to surface water</li> <li>- operational runoff or discharges to surface water</li> <li>- increase in discharges to sewer</li> </ul>	No.	✓	There remains potential for loss of greenfield land and therefore increased runoff without mitigation. However, the type of mitigation required is likely to be generic, e.g. meeting greenfield runoff rates.	Cursory review – consider generic flood risks and associated mitigation measures.
		Be at risk of flooding from any source?	<ul style="list-style-type: none"> <li>- presence within area at risk of flooding</li> <li>- climate change leading to additional or worsened flood risk area at or surrounding site</li> </ul>	Yes – there are site-specific baselines for flood risk, and this could affect each site (including access to the site) differently.	✓	At least one site for an ILW storage facility is shown to be within the modelled flood risk zone or include flood risk areas.	New assessment considering all potential pathways.
	Affect coastal processes and/or erosion rates?	<ul style="list-style-type: none"> <li>- construction processes</li> <li>- land use / landtake</li> </ul>	N/A	✗	Sellafield is the only coastal site, with a coastal defence and a baseline policy of	N/A	

SEA Framework		Potential Pathways for Effects from ILW Storage	Can this SEA say anything significantly different from the 2011 SEA?	Scoped In for further assessment?	Justification for Scoping Decision	Level of Detail Required
Category & Objective	Assessment Questions <i>Will the SDP Proposals...</i>					
	Be affected by coastal processes and/or erosion?	<ul style="list-style-type: none"> <li>- presence within area at risk of flooding</li> <li>- presence within area affected by future coastal erosion</li> <li>- existing coastal defences reaching end of their designed life span and ceasing to function effectively</li> <li>- future sea level rise surpassing effectiveness of existing coastal defences</li> </ul>	N/A	✘	continuation of this defence ('hold the line'). It is assumed that any ILW storage facility would be located within the site boundary. This would not affect the coastline, or risk being affected by coastal change.	N/A
<b>K. Material Assets (Transport)</b> Minimise the detrimental impacts on travel and transport within communities, whilst maximising positive effects.	Affect transport infrastructure, such as through increased heavy loads and possible damage?	<ul style="list-style-type: none"> <li>- Transportation and delivery of construction materials</li> <li>- RPV transportation (assumed to be by road).</li> <li>- operational employee and any materials delivery / general waste collection traffic</li> </ul>	Yes – there are site-specific baselines for the local road network, and both construction and operation could affect each road network differently.	✓	Construction traffic (particularly HGVs) could have temporary effects through transport, but also transport of RPVs could require modifications to the road network, or cause damage which requires repair.	New assessment considering construction and RPV transportation.  Operational employee, materials delivery or general waste collection traffic is unlikely to be significant, and thus will not be covered.
	Increase or decrease traffic congestion between and around SDP sites?	<ul style="list-style-type: none"> <li>- construction traffic</li> <li>- operational staff traffic</li> <li>- operational materials / deliveries / waste collection (HGVs, etc.)</li> <li>- RPV transportation</li> </ul>	Yes – there are site-specific baselines for the local road network, and both construction and operation could affect each road network differently.	✓	Construction and site restoration-related traffic could affect congestion levels, particularly if cumulatively with other projects over similar timescales. Also, transport of RPVs could require temporary road closures and associated lengthening of journeys.	New assessment considering all potential pathways.



SEA Framework		Potential Pathways for Effects from ILW Storage	Can this SEA say anything significantly different from the 2011 SEA?	Scoped In for further assessment?	Justification for Scoping Decision	Level of Detail Required
Category & Objective	Assessment Questions <i>Will the SDP Proposals...</i>					
<b>L. Material Assets (Waste Management)</b> Minimise waste arisings, promote reuse, recovery and recycling and minimise the impact of wastes on the environment and	Increase the amount of radioactive waste to be disposed of?	- soil and materials from site clearance - construction waste (non-hazardous), unable to be reused or recycled	Yes – site-specific baselines for land use and land contamination can determine at least the probability of demolition or land remediation being required.	✓	Construction / decommissioning waste may be considerable, particularly if it involves demolition or decontamination. However, operational waste volumes are likely to be small. There is a possibility of very low-level waste (VLLW) being generated from maintenance / house-keeping.	Cursory review – consider the conclusions of the previous SEA relative to alternatives sites, land use and land contamination information.
	Affect the amount of hazardous waste to be disposed of?	- construction waste from contaminated land		✓		
	Affect the amount of non-hazardous wastes produced?	- construction waste for recycling and disposal		✓		
	Affect the capacity of existing waste management systems, both nationally and locally?	- operational general waste, unable to be reused or recycled - operational waste for recycling and disposal		✓		
<b>M. Land Use and Materials</b> Contribute to the sustainable use of land and natural and material assets.	Change patterns of land use on or around SDP sites?	- radiological discharges - noise and vibration - changes to soil extent - changes to water bodies - changes to non-radiological air pollution levels which impact on land use	N/A	x	As site alternatives are existing licensed sites, it is unlikely that proposals would significantly alter land use patterns.	N/A
	Affect any existing or proposed redevelopment/regeneration programmes?	- construction landtake - operational landtake - decommissioning and suitable after use for land	Yes – there are site-specific future baselines for each site which include proposed after uses.	✓	It is possible that the facility could have an impact on proposed after uses of sites if the delivery of a planned GDF is delayed.	New assessment considering the potential impact on site after use relative to long-term strategies.

SEA Framework		Potential Pathways for Effects from ILW Storage	Can this SEA say anything significantly different from the 2011 SEA?	Scoped In for further assessment?	Justification for Scoping Decision	Level of Detail Required
Category & Objective	Assessment Questions <i>Will the SDP Proposals...</i>					
	Lead to the loss of undeveloped land or green spaces?	<ul style="list-style-type: none"> <li>- construction landtake</li> <li>- operational landtake</li> <li>- decommissioning and suitable after use for land</li> </ul>	Yes – there are site-specific baselines for each site.	✓	The storage facility will be built within the boundary of the existing site, although the nuclear-licensed site boundary therein may need to be extended. At this stage, the facility could be built on developed or undeveloped land within the site.	New assessment considering all potential pathways.
	Increase the burden on limited natural resources such as aggregates or wood (but excluding water or fossil fuels)?	<ul style="list-style-type: none"> <li>- construction</li> <li>- facility maintenance</li> <li>- road repair and maintenance</li> <li>- operational materials</li> <li>- ancillary development requirements</li> </ul>	No – the assessment would ostensibly be the same, as design / material details cannot be determined at this stage.	✓	Construction and operation will use natural resources.	Review / confirm previous SEA's conclusions.
<b>N. Cultural Heritage</b> Protect and where appropriate enhance the historic environment including cultural heritage resources, historic buildings and archaeological features.	Affect designated or locally important archaeological features?	<ul style="list-style-type: none"> <li>- radiological discharges</li> <li>- vibration from construction/ demolition and transport</li> <li>- land stability</li> <li>- changes to groundwater quantity (water environment)</li> </ul>	Yes – there are site-specific baselines for archaeology, and a facility could affect each area differently.	✓	Development of the ILW storage facility has the potential to affect cultural heritage features at each site. It may also affect the historic landscape.	New assessment considering all potential pathways.
	Affect the fabric and setting of historic buildings, structures or spaces?	<ul style="list-style-type: none"> <li>- changes to non-radiological air pollution levels</li> <li>- land use / landtake</li> </ul>	Yes – there are site-specific baselines for architectural heritage, and a facility could affect each area differently.	✓		New assessment considering all potential pathways.
	Affect the historic landscape, including its distinctive context and character?		Yes – there are site-specific baselines for historic landscape, and a facility could affect each area differently.	✓		New assessment considering all potential pathways.

SEA Framework		Potential Pathways for Effects from ILW Storage	Can this SEA say anything significantly different from the 2011 SEA?	Scoped In for further assessment?	Justification for Scoping Decision	Level of Detail Required
Category & Objective	Assessment Questions <i>Will the SDP Proposals...</i>					
<b>O. Landscape and Townscape</b> Protect and enhance landscape and townscape quality and visual amenity.	Affect landscapes?	<ul style="list-style-type: none"> <li>- land stability (geology)</li> <li>- biodiversity / habitat effects</li> <li>- water environment</li> <li>- land use / landtake</li> <li>- presence / design of facility</li> <li>- landscaping / landscape strategy</li> </ul>	Yes – there are site-specific baselines for landscape and townscape, and a facility could affect each area differently.	✓	There is some potential for the ILW storage facility to affect landscape or views close to the sites, although the specific design is not yet known. Given the locations of the sites and general nature of a storage facility, townscape is unlikely to be affected.	New desk-based study and assessment considering all potential pathways.
	Affect townscapes?			✗		
	Have significant visual impacts?			✓		

## Annex 6: Guideline Assessment Criteria by SEA Category

This Annex presents guideline assessment criteria for identifying the ‘likely significant effects’ of ILW storage and transport at any of the candidate sites. These have been developed from those which were applied during the 2010/11 SDP SEA and presented in the 2011 Environmental Report<sup>2</sup>.

As compared to the 2011 Environmental Report, the “++” and “– –” categories have been changed from “significant” positive or negative to “major” positive or negative. This is in order to take advantage of evolving knowledge and practice in the field of SEA, and ensure that only neutral or negligible effects receive a null assessment score. Also, it is proposed that the use of the “?” assessment score will be avoided wherever possible, and where not possible, limited. Instead, the best estimate / prediction of potential effects will be presented, and any uncertainties explained.

The scoring criteria should not be viewed as definitive or prescriptive; as guidelines, they are illustrative of the way in which factors will be considered as part of the assessment process. We are currently inviting comments on this Scoping Report and the criteria held within this Annex.

### Radiological Discharges

Table A5-1 sets out guideline criteria proposed to be used during the assessment to help determine the relative significance of potential effects on levels of radiological discharges. As this is a brand new category, these were drawn from the criteria used for health and well-being within the 2010/11 SEA.

**Table A5-1: Guideline assessment criteria for Radiological Discharges**

Effect	Description	Illustrative Guidance
++	Major positive	<ul style="list-style-type: none"> <li>Option leads to cessation in radiological discharges which results in a significant reduction in the effective dose to the public from current levels</li> <li>Option significantly decreases the risk of accidental discharge of radiological contaminants</li> </ul>
+	Minor positive	<ul style="list-style-type: none"> <li>Option leads to a reduction in radiological discharges, so that the effective dose to the representative group that is most exposed decreases below current levels</li> </ul>
0	No (neutral effects)	<ul style="list-style-type: none"> <li>Option sees radiological discharges largely unchanged, such that there is no significant change to the effective dose to the representative group that is most exposed</li> </ul>
–	Minor negative	<ul style="list-style-type: none"> <li>Option causes radiological discharges to increase, so that the effective dose to the representative group that is most exposed increases above current levels but remains within statutory limits</li> </ul>
– –	Major negative	<ul style="list-style-type: none"> <li>Option causes radiological discharges to increase significantly, so that the effective dose to the representative group that is most exposed equals or exceeds the statutory limit of 0.5 mSv per year from a single site, and/ or 0.3 mSv per year from a single operational source (e.g. a single facility)</li> <li>Option significantly increases the risk of accidental discharge of radiological contaminants</li> </ul>

## Biodiversity and Nature Conservation

Table A5-2 sets out guideline criteria proposed to be used during the assessment to help determine the relative significance of potential effects on biodiversity and nature conservation.

**Table A5-2: Guideline assessment criteria for Biodiversity and Nature Conservation**

Effect	Description	Illustrative Guidance
<b>++</b>	Major positive	<ul style="list-style-type: none"> <li>Option has a particularly valuable positive effect on European or national designated sites and/or protected species (e.g. fully supports conservation objectives on-site or increase in population of species which is under threat)</li> <li>Option has a strong positive effect on local biodiversity (e.g. through removal of all existing disturbance/pollutant emissions, or creation of new habitats leading to improvement to ecosystem structure and function)</li> <li>Option creates a new BAP habitat area of substantial size and interest</li> </ul>
<b>+</b>	Minor positive	<ul style="list-style-type: none"> <li>Option has a noticeable positive effect on European or national designated sites and/or protected species (e.g. supports one of the conservation objectives on-site or some increase in population of designating or protected species).</li> <li>Option has a positive net effect on local biodiversity (e.g. through reduction in disturbance/pollutant emissions, or some habitat creation leading to improvement to ecosystem structure and function)</li> <li>Option enhances areas of wildlife interest</li> </ul>
<b>0</b>	No (neutral effects)	<ul style="list-style-type: none"> <li>Option does not have any significant effects on European, nationally or locally valued habitats and/or populations of notable species</li> </ul>
<b>-</b>	Minor negative	<ul style="list-style-type: none"> <li>Option has a noticeable negative effect on European or national designated sites and/or protected species (e.g. effect which does not prevent the reaching of one of the conservation objectives on-site or some decrease in population of designating or protected species)</li> <li>Option has a negative effect on local biodiversity (e.g. through a minor increase in disturbance/pollutant emissions, or some loss of habitat)</li> <li>Option leads to deterioration in areas of wildlife interest</li> </ul>
<b>--</b>	Major negative	<ul style="list-style-type: none"> <li>Option has a particularly notable effect on European or national designated sites and/or protected species (e.g. prevents reaching a conservation objective on-site or a decrease in populations of designating or protected species which may reduce their distribution more widely)</li> <li>Option has strong negative effects on local biodiversity (e.g. through considerable loss of habitat)</li> <li>Option leads to loss of an entire area of wildlife interest</li> </ul>

## Population

Table A5-3 sets out guideline criteria proposed to be used during the assessment to help determine the relative significance of potential effects on population.

**Table A5-3: Guideline assessment criteria for Population**

Effect	Description	Illustrative Guidance
++	Major positive	<ul style="list-style-type: none"> <li>Option generates in excess of 100 full-time equivalent employment opportunities per annum, a large proportion of which will benefit the local community</li> </ul>
+	Minor positive	<ul style="list-style-type: none"> <li>Option generates some full-time equivalent employment opportunities per annum which may benefit the local community</li> </ul>
0	No (neutral effects)	<ul style="list-style-type: none"> <li>Option does not affect any local employment opportunities/increase local unemployment rates</li> </ul>
-	Minor negative	<ul style="list-style-type: none"> <li>Option leads to a minor increase in local unemployment (e.g. due to the cessation of some activities or rationalisation of activities on sites)</li> </ul>
--	Major negative	<ul style="list-style-type: none"> <li>Option leads to a significant increase in local unemployment (e.g. due to the closure of sites)</li> </ul>

## Health and Well-Being

Table A5-4 sets out guideline criteria proposed to be used during the assessment to help determine the relative significance of potential effects on health and well-being.

**Table A5-4: Guideline assessment criteria for Health and Well-Being**

Effect	Description	Illustrative Guidance
++	Major positive	<ul style="list-style-type: none"> <li>Option has a strong positive effect on local communities and sensitive social groups through improvements to environmental quality and/or a significant reduction in accident risk</li> </ul>
+	Minor positive	<ul style="list-style-type: none"> <li>Option has a positive effect on local communities and sensitive social groups through improvements to environmental quality and/or a reduction in accident risk</li> </ul>
0	No (neutral effects)	<ul style="list-style-type: none"> <li>The health of local communities and sensitive social groups will generally remain as it would be without ILW storage</li> </ul>
-	Minor negative	<ul style="list-style-type: none"> <li>Option has a negative effect on local communities and sensitive social groups through deterioration in environmental quality and/or a potential slight increase in accident risk</li> </ul>
--	Major negative	<ul style="list-style-type: none"> <li>Option has a strong negative effect on local communities and sensitive groups through deterioration in environmental quality and/or a likely notable increase in accident risk</li> </ul>

## Noise and Vibration

Table A5-5 sets out guideline criteria proposed to be used during the assessment to help determine the relative significance of potential effects on noise and vibration.

**Table A5-5: Guideline assessment criteria for Noise and Vibration**

<b>Effect</b>	<b>Description</b>	<b>Illustrative Guidance</b>
++	Major positive	<ul style="list-style-type: none"> <li>Option causes a decrease in noise levels experienced by many local residents against baseline levels</li> <li>Option causes the number of noise complaints concerning transport or site activities to be greatly decreased (known problem resolved)</li> </ul>
+	Minor positive	<ul style="list-style-type: none"> <li>Option causes a decrease in noise levels experienced by a few local residents against baseline levels</li> <li>Option causes the number of noise complaints received concerning transport or site activities to be somewhat decreased (potential problem avoided or resolved)</li> </ul>
0	No (neutral effects)	<ul style="list-style-type: none"> <li>Option does not significantly alter noise from current levels and will have no observable effects on local communities.</li> </ul>
-	Minor negative	<ul style="list-style-type: none"> <li>Option causes an increase in noise levels experienced by a few local residents against baseline levels</li> <li>Option causes the number of noise complaints received concerning transport or site activities to be somewhat increased (potential problem created – some people might complain)</li> </ul>
--	Major negative	<ul style="list-style-type: none"> <li>Option causes an increase in noise levels experienced by many local residents against baseline levels</li> <li>Option causes the number of noise complaints concerning transport or site activities to be greatly increased (potentially leading to statutory nuisance / legal action)</li> </ul>

## Geology and Soils

Table A5-6 sets out guideline criteria proposed to be used during the assessment to help determine the relative significance of potential effects on geology and soils.

**Table A5-6: Guideline assessment criteria for Geology and Soils**

<b>Effect</b>	<b>Description</b>	<b>Illustrative Guidance</b>
++	Major positive	<ul style="list-style-type: none"> <li>Option restores and improves soil quality to conditions beyond current levels and removes all soil contamination so that soil functions and processes would be greatly improved</li> <li>Option restores soils to a site where they had previously been lost, and thus leads to an increase in the versatility of the site so that there are more potential opportunities for different (e.g. agricultural or wildlife conservation) uses</li> </ul>
+	Minor positive	<ul style="list-style-type: none"> <li>Option causes minor improvements in soil quality compared to prior to the development and removes some soil contamination so that soil functions and processes would be improved</li> </ul>
0	No (neutral effects)	<ul style="list-style-type: none"> <li>No or negligible change in soil quantity or quality, such that soil function and processes will not be affected</li> <li>Option would not significantly affect land contamination</li> </ul>

Effect	Description	Illustrative Guidance
-	Minor negative	<ul style="list-style-type: none"> <li>Option leads to an increase in pollutant discharges to soil, however these would be less than permitted limits, such that there will be minor increases in land contamination</li> <li>Option causes small amount of loss of soil, or loss in soil function and processes which affects small areas</li> </ul>
--	Major negative	<ul style="list-style-type: none"> <li>Option leads to a statutory limit being reached or exceeded in relation to pollution to land, such that there would be a major increase in land contamination</li> <li>Option causes considerable loss of soils, or considerable loss in soil function and processes</li> </ul>

## Water

Table A5-7 sets out guideline criteria proposed to be used during the assessment to help determine the relative significance of potential effects on the water environment.

**Table A5-7: Guideline assessment criteria for Water**

Effect	Description	Illustrative Guidance
++	Major positive	<ul style="list-style-type: none"> <li>Option leads to a reduction in water use compared to prior to development of an amount such that the risk of water shortages in the area is significantly decreased and abstraction is at least at a sustainable level</li> <li>Option leads to a decrease in surface runoff and pollutant discharges of an amount such that the quality of that water receptors (including groundwater, surface water or sea water) will be significantly improved and all water targets (including those relevant to chemical and ecological condition) are reached and exceeded</li> </ul>
+	Minor positive	<ul style="list-style-type: none"> <li>Option leads to a notable reduction in water use compared to prior to development</li> <li>Option leads to a decrease in surface runoff and/or pollutant discharges of an amount such that the quality of water receptors may be improved to some noticeable level towards water targets</li> </ul>
0	No (neutral effects)	<ul style="list-style-type: none"> <li>Option does not significantly affect water demand and abstraction levels will not be altered</li> <li>Option does not change amount of surface runoff and/or pollutant discharges and the quality of water receptors will not be affected</li> </ul>
-	Minor negative	<ul style="list-style-type: none"> <li>Option leads to a notable increase in water use compared to prior to development</li> <li>Option leads to increases in surface runoff and/or pollutant discharges of an amount such that the quality of water receptors (including groundwater, surface water or sea water) may decline to some level away from water targets</li> </ul>



Effect	Description	Illustrative Guidance
--	Major negative	<ul style="list-style-type: none"> <li>Option leads to major increases in water use compared to prior to development such that the risk of water shortages in the area is increased and abstraction is beyond sustainable levels</li> <li>Option leads to major increases in surface runoff and/or pollutant discharges of an amount such that the quality of water receptors (including groundwater, surface water or sea water) declines and some water targets are likely to be missed</li> </ul>

## Air

Table A5-8 sets out guideline criteria proposed to be used during the assessment to help determine the relative significance of potential effects on air quality.

**Table A5-8: Guideline assessment criteria for Air**

Effect	Description	Illustrative Guidance
++	Major positive	<ul style="list-style-type: none"> <li>Option improves local air quality through a reduction in concentrations of pollutants from above the limits identified in the national air quality objectives, to below and within those limits</li> </ul>
+	Minor positive	<ul style="list-style-type: none"> <li>Option improves local air quality through a reduction in concentrations of pollutants identified in the national air quality objectives</li> </ul>
0	No (neutral effects)	<ul style="list-style-type: none"> <li>Option would not affect local air quality</li> </ul>
-	Minor negative	<ul style="list-style-type: none"> <li>Option results in a decline in local air quality to a point near to limits identified in the national air quality objectives, such that other potential unforeseen contributors may in future make it a pollutant of concern in the area</li> </ul>
--	Major negative	<ul style="list-style-type: none"> <li>Option results in a decline in local air quality which is likely to include exceedance of air quality objectives</li> </ul>

## Climate Change and Energy Use

Table A5-9 sets out guideline criteria proposed to be used during the assessment to help determine the relative significance of potential contribution towards climate change.

**Table A5-9: Guideline assessment criteria for Climate Change and Energy Use**

Effect	Description	Illustrative Guidance
++	Major positive	<ul style="list-style-type: none"> <li>Option includes the creation (and maintenance / management) of a new carbon sink (e.g. woodland or wetland), absorbing carbon from the atmosphere</li> </ul>
+	Minor positive	<ul style="list-style-type: none"> <li>Option reduces the carbon footprint of the site, such as through provision of on- or off-site renewables</li> </ul>
0	No (neutral effects)	<ul style="list-style-type: none"> <li>Option would not lead to an overall change in energy consumption/efficiency or greenhouse gas emissions</li> </ul>

Effect	Description	Illustrative Guidance
-	Minor negative	<ul style="list-style-type: none"> <li>Option increases the carbon footprint of the site, including through materials usage, additional energy and secondary resource demand, but in line with average industrial activities</li> </ul>
--	Major negative	<ul style="list-style-type: none"> <li>Option presents a major source of carbon emissions which 'stands out' against similar construction and industrial activities</li> </ul>

## Coastal Change and Flood Risk

Table A5-10 sets out guideline criteria proposed to be used during the assessment to help determine the relative significance of potential effects on coastal change and flood risk.

**Table A5-10: Guideline assessment criteria for Coastal Change and Flood Risk**

Effect	Description	Illustrative Guidance
++	Major positive	<ul style="list-style-type: none"> <li>Option is unlikely to be affected by increases in flood risk and is likely to effectively remove existing flooding problems</li> <li>Option removes existing flood problems for other properties / areas</li> </ul>
+	Minor positive	<ul style="list-style-type: none"> <li>Option is unlikely to be affected by increases in flood risk and is likely to decrease risks of flood</li> <li>Option reduced flood risk for other properties / areas</li> </ul>
0	No (neutral effects)	<ul style="list-style-type: none"> <li>Option is unlikely to be affected by increases in flood risk and is unlikely to affect flood risk</li> </ul>
-	Minor negative	<ul style="list-style-type: none"> <li>Option includes new buildings or infrastructure which are partly at risk of flooding</li> <li>Option contributes towards flood risk elsewhere</li> <li>Key transport connections are at risk of flooding, with no equivalent alternative</li> </ul>
--	Major negative	<ul style="list-style-type: none"> <li>Option includes buildings which are entirely within the floodplain</li> <li>Option creates new flood risk</li> </ul>

## Material Assets (Transport)

Table A5-11 sets out guideline criteria proposed to be used during the assessment to help determine the relative significance of potential effects on transport infrastructure.

**Table A5-11: Guideline assessment criteria for Material Assets (Transport)**

Effect	Description	Illustrative Guidance
++	Major positive	<ul style="list-style-type: none"> <li>Option incorporates enhancements to the existing transport network (e.g. junction capacity improvements)</li> <li>Option results in a major decrease in total HGV movements from/to site</li> <li>Option reduces traffic congestion at particular traffic hotspots</li> </ul>

Effect	Description	Illustrative Guidance
+	Minor positive	<ul style="list-style-type: none"> <li>Option enhances maintenance of the existing local transport network (e.g. more frequent inspection and repair)</li> <li>Option results in a minor decrease in total HGV movements from/to site</li> <li>Option reduces traffic congestion, but not at any particular traffic hotspots</li> </ul>
0	No (neutral effects)	<ul style="list-style-type: none"> <li>Option has no observable effects on existing local transport networks</li> </ul>
-	Minor negative	<ul style="list-style-type: none"> <li>Option results in a minor increase in the number and frequency of HGV movements to/from the site (unmitigated potential damage to roads and source of congestion)</li> <li>Option results in an increase in traffic congestion which results in driver delay, loss of pedestrian/cyclist amenity and/or severance</li> </ul>
--	Major negative	<ul style="list-style-type: none"> <li>Option results in a major increase in the number and frequency of HGV movements to/from the site</li> <li>Option results in an increase in traffic congestion which results in a new congestion hotspot or substantially inhibits pedestrian or cyclist mobility</li> </ul>

## Material Assets (Waste Management)

Table A5-12 sets out guideline criteria proposed to be used during the assessment to help determine the relative significance of potential effects on waste production. This SEA category will not assess management of RPVs as either beneficial or adverse, as this is the subject of this SEA.

**Table A5-12: Guideline assessment criteria for Material Assets (Waste Management)**

Effect	Description	Illustrative Guidance
++	Major positive	<ul style="list-style-type: none"> <li>Option creates new waste management infrastructure which services wider waste management demands</li> <li>Option will be sourced primarily from reused or recycled material from local sources, thus preventing that material from being disposed of to landfill</li> </ul>
+	Minor positive	<ul style="list-style-type: none"> <li>Option increases capacity of existing waste management infrastructure</li> <li>Option will be sourced from a proportion of reused or recycled material from local sources, thus preventing that material from being disposed of to landfill</li> <li>Option prevents more material from going to landfill than it generates</li> </ul>
0	No (neutral effects)	<ul style="list-style-type: none"> <li>Option would not create an increase in the volume of hazardous and non-recyclable wastes that require disposal</li> <li>Option will have no effect on the capacity of waste management infrastructure</li> </ul>

Effect	Description	Illustrative Guidance
-	Minor negative	<ul style="list-style-type: none"> <li>Option results in an increase in low-level radioactive waste being produced</li> <li>Option increases volumes of hazardous and non-recyclable waste that would require disposal</li> <li>Option may require the use of existing waste management systems which takes them to or near to capacity</li> </ul>
--	Major negative	<ul style="list-style-type: none"> <li>Option generates high volumes of low-level or greater radioactive waste for disposal</li> <li>Option generates a high volume of hazardous and non-recyclable waste that would require disposal</li> <li>Option requires the use of existing waste management systems which takes them over capacity</li> </ul>

## Land Use and Materials

Table A5-13 sets out guideline criteria proposed to be used during the assessment to help determine the relative significance of potential effects on land use and materials.

**Table A5-13: Guideline assessment criteria for Land Use and Materials**

Effect	Description	Illustrative Guidance
++	Major positive	<ul style="list-style-type: none"> <li>Option delivers a regeneration project alongside new development</li> </ul>
+	Minor positive	<ul style="list-style-type: none"> <li>Option contributes towards a regeneration project alongside new development</li> </ul>
0	No (neutral effects)	<ul style="list-style-type: none"> <li>Option does not use any undeveloped land, but would redevelop a significant area of previously developed or derelict land</li> <li>Option uses existing infrastructure in the majority (e.g. utilities and transport)</li> <li>Option will be made of majority reused or recycled material, thus minimising the need for new primary resources</li> </ul>
-	Minor negative	<ul style="list-style-type: none"> <li>Option inhibits (e.g. delays or causes additional expense to) planned redevelopment / regeneration of a site</li> <li>Option would be partially on previously developed or derelict land, and partially undeveloped land</li> <li>Option uses much existing infrastructure, but significant new infrastructure required</li> <li>Option will be made partially of reused or recycled material, thus requiring a reduced amount of new primary resources</li> </ul>
--	Major negative	<ul style="list-style-type: none"> <li>Option prevents planned redevelopment / regeneration of a site</li> <li>Option would lead to the development of undeveloped land, or land that has reverted to a 'wild' state</li> <li>Option will undermine the attractiveness of the area, and leads to an effective planning blight in the area</li> <li>Option cannot accommodate reused or recycled material in construction, thus requiring entirely new primary resources</li> </ul>

## Cultural Heritage

Table A5-14 sets out guideline criteria proposed to be used during the assessment to help determine the relative significance of potential effects on cultural heritage.

**Table A5-14: Guideline assessment criteria for Cultural Heritage**

Effect	Description	Illustrative Guidance
++	Major positive	<ul style="list-style-type: none"> <li>Option includes an enhancement of a Scheduled Monument, Grade I or II* Listed Building (either its integrity or setting)</li> <li>Option includes the prevention of the loss or severe deterioration of a Grade II Listed Building (e.g. such that it can be taken off of the 'buildings at risk' register)</li> <li>Option includes large-scale enhancement of a Conservation Area or the historic landscape, or removal of a major deteriorating or uncharacteristic feature / aspect of a Conservation Area or the historic landscape</li> </ul>
+	Minor positive	<ul style="list-style-type: none"> <li>Option includes an enhancement of a Grade II Listed Building, Conservation Area or Registered Park and Garden</li> <li>Option includes some enhancement of a Conservation Area or the historic landscape, or removal of a minor deteriorating or uncharacteristic feature / aspect of a Conservation Area or the historic landscape</li> </ul>
0	No (neutral effects)	<ul style="list-style-type: none"> <li>Option would not have any significant effect on any cultural heritage asset</li> </ul>
-	Minor negative	<ul style="list-style-type: none"> <li>Option adversely affects the setting of a Grade II Listed Building, Conservation Area or Registered Park and Garden, (but preserves the integrity of the asset, as well as some heritage context)</li> <li>Option causes deterioration to the historic landscape, though its key features remain intact</li> <li>Option causes the at least partial loss of locally significant cultural heritage assets</li> </ul>
--	Major negative	<ul style="list-style-type: none"> <li>Option causes deterioration to a Scheduled Monument, Grade I or II* Listed Building (either its integrity or setting), or at least partial loss of a nationally significant cultural heritage asset</li> <li>Option causes deterioration to the integrity of a Grade II Listed Building, Conservation Area or Registered Park and Garden, or the complete or near complete loss of its historic setting</li> <li>Option causes the loss of key features of the historic landscape</li> </ul>

## Landscape and Townscape

Table A5-15 sets out guideline criteria proposed to be used during the assessment to help determine the relative significance of potential effects on landscape and townscape.

**Table A5-15: Guideline assessment criteria for Landscape and Townscape**

<b>Effect</b>	<b>Description</b>	<b>Illustrative Guidance</b>
<b>++</b>	Major positive	<ul style="list-style-type: none"> <li>• Option makes a positive contribution to nationally designated landscapes</li> <li>• Option has a positive transformative effect on the attractiveness of local landscapes (e.g. through the replacement of poorly designed/derelict buildings with high-quality development)</li> <li>• Option removes a major detractor from a key view from a public space or opens up a new key view</li> </ul>
<b>+</b>	Minor positive	<ul style="list-style-type: none"> <li>• Option provides some improvement to the setting and attractiveness of local landscapes</li> <li>• Option removes minor detractors from a key view from a public space</li> </ul>
<b>0</b>	No (neutral effects)	<ul style="list-style-type: none"> <li>• Option would not have any effects on landscape or visual amenity</li> </ul>
<b>-</b>	Minor negative	<ul style="list-style-type: none"> <li>• Option harms the setting and attractiveness of local landscapes</li> <li>• Option creates minor detractors to a key view from a public space</li> <li>• Option negatively affects the visual amenity of local residents and communities</li> </ul>
<b>--</b>	Major negative	<ul style="list-style-type: none"> <li>• Option harms a nationally designated landscape</li> <li>• Option fully degrades the attractiveness of a local landscape</li> <li>• Option creates a major detractor to a key view from a public space or removes / severely inhibits a key view</li> <li>• Option would severely affect the visual amenity of local residents or communities</li> </ul>

## Annex 7: SEA Scoping Quality Assurance Checklist

The UK Government's guidance on SEA<sup>17</sup> contains a quality assurance checklist to help ensure that the requirements of the SEA Regulations (England<sup>6</sup> or Wales<sup>7</sup>) and Act (Scotland<sup>8</sup>), as originally set out by the European SEA Directive<sup>9</sup>, are met. However, it should be noted that the only specific requirement for the scoping stage is to agree the scope of the SEA with the statutory consultees. There are no specific requirements for the content of a scoping report. Therefore, they are guideline criteria for this stage, and those relevant to scoping have been included below.

Guidance Criterion	Where Met in this Report
<b>Objectives and Context</b>	
The plan's purpose and objectives are made clear.	Section 2.3
Sustainability issues, including international and EC objectives, are considered in developing objectives and targets.	Section 4 and Annex 3 set out the international and EC objectives used to inform the SEA objectives. Section 5 sets out the full range of baseline issues, while Section 5.8 summarises key issues at each candidate site. Section 6.2.3 and Annex 5 set out how the proposed SEA objectives and guiding questions were determined.
Links to other related plans, programmes and policies are identified and explained.	Section 4 and Annex 3.
<b>Scope of the SEA</b>	
The environmental consultation bodies are consulted in appropriate ways and at appropriate times on the content and scope of the scoping report.	This is the consultation on the scope of the SEA. It is anticipated that workshops will be held during the scoping stage, where all the consultation bodies will be invited.
The SEA focuses on significant issues.	Section 6.2.3 and Annex 5 set out how the proposed SEA objectives and guiding questions were determined.
Technical, procedural and other difficulties encountered are discussed; assumptions and uncertainties are made explicit.	These are stated throughout the report where appropriate.
Reasons are given for eliminating issues from further consideration.	Annex 5.
<b>Baseline Information</b>	
Relevant aspects of the current state of the environment and their likely evolution without the plan are described.	Section 5.
Characteristics of areas likely to be significantly affected are described, including areas wider than the physical boundary of the plan area where it is likely to be affected by the plan (where practical to do so).	Section 5.
Difficulties such as deficiencies in information or methods are explained.	These are stated throughout the report where appropriate.