



Defence Equipment and Support Submarine Dismantling Project

Interim Intermediate Level Waste Storage Site Selection: Strategic Environmental Assessment Non-Technical Summary

November 2014



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1 Introduction

1.1 Strategic Environmental Assessment

This is the non-technical summary (NTS) of the Strategic Environmental Assessment (SEA) of the Intermediate Level Waste (ILW) element of the Ministry of Defence's (MOD's) Submarine Dismantling Project (SDP).

SEA supports decision-making by helping to ensure that environmental issues are considered effectively in the preparation of plans and programmes. The requirement for SEA is derived from Directive 2001/42/EC of the European Parliament and of the Council "on the assessment of the effects of certain plans and programmes on the environment", known as 'the SEA Directive'. SDP is a UK central government project, and so this SEA has been undertaken in accordance with the Environmental Assessment of Plans and Programmes Regulations 2004 (Statutory Instrument 2004 No.1633), 'the SEA Regulations'¹. The Scottish SEA guidance², produced by the Scottish Government (with support and input from the Scottish Environment Protection Agency, Scottish Natural Heritage and Historic Scotland), has also been considered.

The Consultation Document on the Site for Interim Storage of Intermediate Level Radioactive Waste (November 2014) is considered for the purpose of this SEA to be the 'draft plan'. However, it should be noted that SEA is an iterative process and the SDP is still evolving. It is anticipated that a further iteration of the ER and 'draft plan' may be required to address any uncertainty, inconsistencies, and the consultation responses before the 'draft plan' is adopted.

1.2 The Submarine Dismantling Project (SDP)

The SDP aims to carry out a timely, cost-effective, safe, secure and environmentally responsible solution for the dismantling of 27 of the UK's nuclear-powered submarines after they have left service and been defueled. Currently, 19 defueled submarines are stored afloat at Rosyth and Devonport. The remaining eight submarines are yet to leave service.

The SDP consists of five elements, not all of which are assessed in this SEA.

SDP elements not assessed in this SEA:

- Removing all radioactive materials remaining after defueling, including the Reactor Pressure Vessels (RPVs) from the submarines. This will be done in their existing place at both Rosyth and Devonport. This is known as 'initial dismantling', and is not assessed in this SEA.
- Dismantling the submarines at a conventional UK ship recycling facility. This will be done after initial dismantling and radiological clearance has been approved by the regulator. As much of the submarines as possible will be reused or recycled, in line with the UK Ship Recycling Strategy. This element of SDP is not assessed in this SEA.

SDP elements that are assessed in this SEA:

- Provision of a land-based interim storage facility for the 27 RPVs, which are classified as Intermediate Level Radioactive Waste (ILW). This store is required because, unlike low-

¹ <http://www.legislation.gov.uk/ukSI/2004/1633/schedule/1/made#pageTitle>

² The Scottish Government (2013). *Strategic Environmental Assessment Guidance*. <http://www.scotland.gov.uk/Publications/2013/08/3355>

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 geological disposal facility (GDF)³, becomes available, sometime after 2040.

- Transportation of the RPVs from the initial dismantling facilities at Devonport and Rosyth to the interim ILW storage sites. However due to uncertainties, transport to a size reduction facility, and onward transport to the planned GDF for disposal, are not assessed.
- The decommissioning of the interim ILW store once it is no longer required.

1.3 What this SEA covers

This SEA covers the transport and interim storage of SDP ILW. It also covers the decommissioning of the interim ILW store once it is no longer required.

A previous SEA was undertaken for the SDP in 2010/2011 which covered all the elements of the SDP described in Section 1.2 above. However, at that time, the assessment was not able to consider potential locations for the interim storage of ILW. This SEA builds upon the 2010/2011 SEA by considering specific candidate sites for the interim storage of ILW. Figure A highlights where this SEA sits in terms of a hierarchy of environmental assessment work undertaken, or to be undertaken, for the SDP.

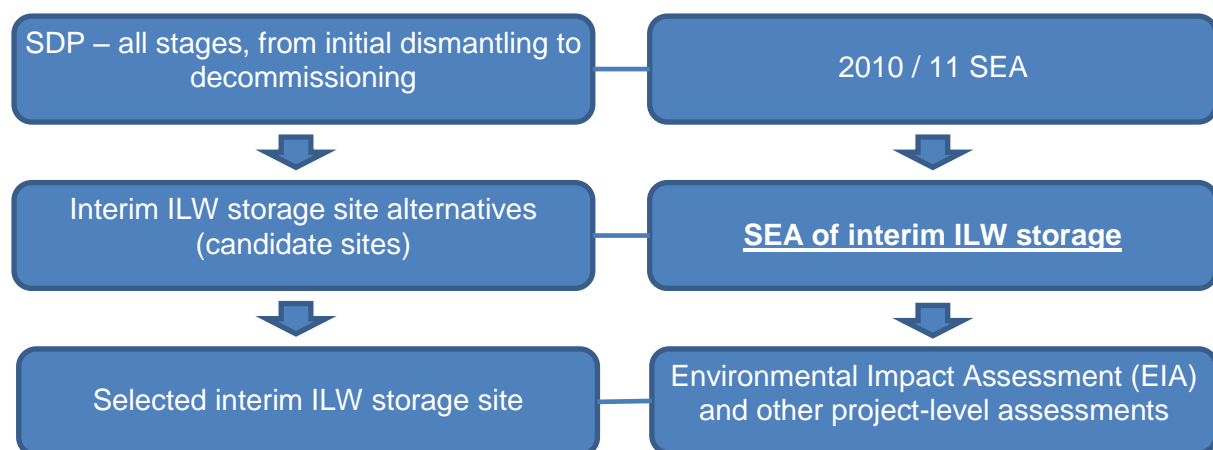


Figure A: Hierarchy of SDP environmental assessments (current SEA highlighted in bold, underlined font)

2 How the SEA has been undertaken

This SEA has been undertaken through desk-based studies and information obtained from the candidate interim ILW storage sites.

³ 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. 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>

2.1 SEA stages

This SEA has been undertaken according to the five standard stages as set out in *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”*⁴. These stages are:

- Stage A: Setting the context and objectives, establishing the baseline and deciding on the scope;
- Stage B: Developing and refining alternatives and assessing effects;
- Stage C: Preparing the Environmental Report;
- Stage D: Consulting on the draft plan or programme and the Environmental Report; and
- Stage E: Monitoring the effects of implementing the plan or programme on the environment.

Stage A, scoping, was undertaken between October 2013 and March 2014. Information on environmental protection objectives contained in other relevant plans and programmes, together with information on the current environmental conditions at and surrounding the candidate sites, were set out in a scoping report. This scoping report highlighted key issues and set out the proposed approach for, and proposed breadth of, the SEA. It was consulted upon in February and March 2014, some amendments to the approach to the assessment were made in response to the consultation responses, and these are reported in the SEA Environmental Report.

Stage B, assessment, is complete. This SEA identifies the likely potential significant effects of developing and operating an interim ILW store at each of the candidate sites, and envisages mitigation to minimise negative effects and opportunities for positive effects.

Stage C, reporting is complete and presented in the SEA Environmental Report and this NTS.

Stage D, consultation, is the current SEA phase, giving the authorities with environmental responsibility and the public the opportunity to express their opinion on the draft proposals for SDP interim ILW storage and the accompanying environmental report before the adoption of the proposals. The environmental report and opinions expressed during consultation will be taken into account in decision-making, and reported in a post-adoption report.

Stage E, monitoring, will take place once the interim ILW storage has been implemented. The measures envisaged for monitoring are summarised in this NTS.

⁴ 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

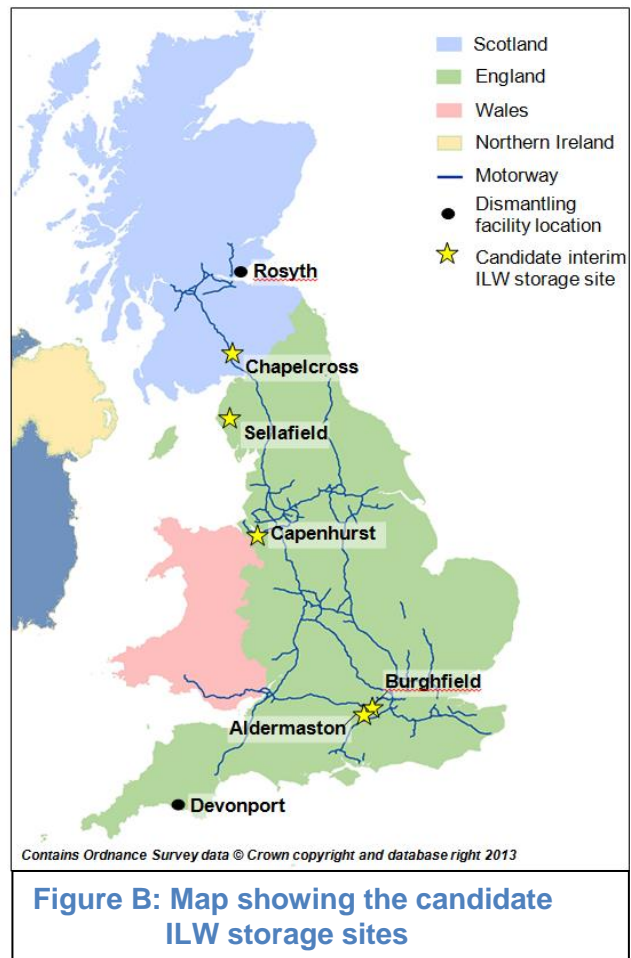
2.2 Alternatives considered

The reasonable alternatives considered in this SEA are the five shortlisted candidate interim ILW storage sites. These have been selected through SDP screening from a 'long list' of UK nuclear-licensed and/or authorised sites⁵. The five candidate interim ILW storage sites are shown in Figure B, and are as follows:

- AWE Aldermaston, Berkshire, England
- AWE Burghfield, Berkshire, England
- Capenhurst Nuclear Services (CNS), Cheshire, England
- NDA Sellafield, Cumbria, England
- NDA Chapelcross, Dumfries and Galloway, Scotland

The 2010/2011, SEA considered a range of alternatives including continued afloat storage, types of potential initial dismantling sites, types of potential interim ILW storage sites, technical dismantling options, etc.

This SEA follows on from the 2010/2011 SEA and is undertaken to consider interim ILW storage site selection. It only considers the five candidate sites as reasonable alternatives and assesses each site to the same level of detail.



3 General Assumptions about the Proposed Interim ILW Storage

3.1 Project timescales

The timescales assumed by this SEA are as follows:

- **Planning and Construction:** 4 years;
- **Operation:** 4 – 32 years including receipt, storage and forwarding RPVs to the GDF;
- **Decommissioning:** following removal of the RPVs to the GDF; and

⁵ MOD (2013). *Interim ILW storage site selection – Criteria and Screening Report*. <https://www.gov.uk/government/publications/submarine-dismantling-project-interim-storage-of-intermediate-level-radioactive-waste>

- **Extended operation:** if GDF availability is delayed significantly beyond 2040, up to 70 additional years of operation may be required and are assessed in this SEA. It is assumed a GDF will become available.

3.2 Design, Construction, Operation and Decommissioning of the Interim ILW Storage Facility

Table A sets out SDP's assumptions about how the proposed interim ILW store would be designed and constructed, how the ILW would be transported to the site and how the interim ILW store would be operated and eventually decommissioned. These assumptions are common for all sites and have formed the basis of what has been assessed.

Table A: General Assumptions about Interim ILW Storage

Activity	Generic Assumptions
Store design and construction	<p>Store design:</p> <ul style="list-style-type: none"> • Building currently estimated to be approximately 20 m tall. • The store must be large enough to take the 27 RPVs in their Containers, with a contingency of 50% spare floor area in case of delays and to allow space for possible repackaging. RPV containers are too heavy to stack, so this will require a floor area equivalent to about 56 x 56m • Adjacent 11 kV electricity sub-station may be required subject to power requirements and existing site infrastructure availability and capacity • 100-year design life of the interim ILW store, with allowance for periodic intervention and upkeep (e.g. replacement of cladding) • Construction of the facility would take in the region of one year. Typical construction activities associated with a large industrial-type storage building. These may include: <ul style="list-style-type: none"> • Heavy machinery and plant (e.g. bulldozers, dumper trucks, cranes), small-scale on-site power generation and powered equipment / tools • Temporary accommodation during construction • Arrival and presence of construction site staff (assumed to be fewer than 100 full-time equivalent staff) • Deliveries of construction materials • Site / vegetation clearance and exposure of bare earth, plus excavation • Materials storage mounds and fenced-off areas • Erection of the interim store • Transport for removal of construction wastes
Transportation of the RPVs	<ul style="list-style-type: none"> • Transport of an RPV package weighing up to 135 tonnes by a specialised road vehicle • The MOD will be responsible for moving the RPVs to the storage site. Detailed container design work is not yet complete but road, rail and sea options have been provisionally assessed. The indications are that the RPV Containers are almost certainly too wide for the railways and the complexities and costs of sea transport would be a big disadvantage, especially since some shortlisted sites are inland. Economics and practicality therefore currently favour road transport but whichever solution is finally adopted, it will have to be shown to be a safe choice. • It is envisaged there would be one delivery per year on average but with a maximum of three deliveries in any one year • No road closures are anticipated on strategic highway network. However there may be some restrictions on local roads close to site • Due to regulation and transport planning it is currently assumed that the effect

Activity	Generic Assumptions
	<p>transport on major roads will be minimal.</p> <ul style="list-style-type: none"> • Transport will be managed to minimise effects on the environment. Nuclear and security aspects of RPV transport will be subject to strict regulation
Operation/ Extended Operation	<ul style="list-style-type: none"> • RPV transport (see above) and placement of shielded containers using lifting machines or overhead crane • Limited operational staff (employment generation at the site would be minimal – fewer than 10 full-time equivalent jobs per year) • Commuting of limited operational staff – potential use / reallocation of existing site staff • Small numbers of HGVs delivering materials or for site waste collection • Building maintenance, assuming a 100-year design life including allowance for periodic intervention and upkeep (e.g. replacement of cladding). • The majority of operational period will be passive storage (closed and locked facility) • Connection into existing site drainage if required. With exception of electricity, minimal services required. Requirements for water, drainage, telecommunications, etc. would be to service basic welfare facilities • Shielding of the RPVs: Some interim stores need thick walls to keep radiation levels on site low. However, the RPVs and Containers will already provide a significant degree of shielding and would potentially also be placed into shielded bays inside the store. The RPV Store will therefore probably be of steel-framed construction with intrusion-resistant cladding rather than, for instance, reinforced concrete and its main function will be to protect its contents from adverse weather and minimise any potential corrosion. • Conditions in the store will be continuously monitored and the containers will be checked to a schedule agreed with the regulators. The RPVs containers will be designed to store the RPVs for the design life of the store (at least 100 years) but the design will allow for visual inspection of the RPVs if required and for repackaging • Potential for occasional maintenance of the RPV transport containers involving them being moved within the facility. • It is assumed that the RPV transport/ container will not be suitable for onward transport and repackaging of the RPVs will be required at the end of interim storage. The 50 % footprint contingency (mentioned above) will provide the capacity to repackage RPVs if required. The discarded package will not be radioactive: in the absence of neutrons from a working reactor, there can be no radioactive ‘activation’ of the transport/storage package. Similarly, since the RPV will be sealed and the outside surface of the RPV will be clean, the package should not become contaminated in use. The emptied package should therefore be able to be consigned as clean scrap at end of life. • Use of mobile lifting plant such as a straddle carrier to move RPVs within the store • Loading of the repackaged RPVs onto road vehicles for transport to the size reduction facility or GDF (near end of operation) • Under normal operation there would be no discharges to air, water or soil from the ILW interim store and therefore there would be no requirement to vary existing site permits / authorisations.
Decommissioning (assuming facility will be removed)	<ul style="list-style-type: none"> • Disconnecting existing services (e.g. electricity, drainage and water supply) • Set up demolition site compounds / areas • Transport (arrival / departure) of demolition equipment, e.g. dumper trucks and hydraulic excavators • Commuting site staff • Removal of superstructure and substructure • Reinstatement of footprint area for subsequent use

Activity	Generic Assumptions
	<ul style="list-style-type: none"> • Collection and removal of demolition waste for disposal or recycling • Identification of an appropriate after use for the site

3.3 Regulation

The interim ILW store will be subject to regulation and permissions irrespective of which candidate site is chosen.

The interim ILW store will need planning permission under the Town and Country Planning Acts. The planning application will be required to be accompanied by an environmental impact assessment (EIA) which will outline alternatives studied by the applicant and the reasons for the choice made, taking into account the environmental effects and mitigation. The local planning authority will be obliged to consult with a wide range of statutory consultees and the public on the planning application and EIA.

In addition to securing planning permission for the proposed interim ILW store, regulatory consent will be required by the Office of Nuclear Regulation (ONR) before the facility can be built, commissioned or operated.

Nuclear site licensees require environmental permits in England, or authorisations in Scotland, for any emission or disposal of radioactive waste. There are not anticipated to be any discharges from the ILW site that would require amendment to the existing permits or authorisations.

The transport of the ILW will be regulated by the Defence Nuclear Safety Regulator (DNSR) to ensure that risks to public and the environment are As Low As Reasonably Practicable/Achievable (ALARP/ALARA).

Emergency planning will be a requirement under the Radiation (Emergency Preparedness and Public Information) Regulations 2001 (REPPPIR).

4 The SEA Scope and Environmental Protection Objectives

4.1 Geographic scope of assessment

The geographic scope of this SEA includes the national strategic highway network from Devonport and Rosyth to each candidate site as well as relevant local roads. It addresses the likely zone of influence around candidate interim ILW storage sites for each topic assessed. It does not consider the geographic areas of the initial dismantling sites, Rosyth and Devonport, as these were assessed in the overarching SDP SEA and will be subject to project-level consenting and permitting. This SEA does not assess the transport of the RPVs from the interim ILW storage site to the planned GDF, as the GDF's location is not known.

4.2 Environmental scope and assessment framework

SEA categories within the scope of this SEA are itemised in Table B and the environmental protection objectives and assessment framework are set out in Table C.

Table B: SEA Categories within the Scope of this SEA

SDP SEA Category	Scope of SEA Category
Radiological Discharges / Exposure	Potential effects on radiological discharges and emissions, including from construction (e.g. any contaminated land), transport and operational discharges / emissions.
Biodiversity and Nature Conservation	The potential effects of interim ILW storage and transport on wildlife and habitats, including sites protected for nature conservation.
Population	Potential effects on local communities, particularly in relation to employment opportunities
Health and Well-Being	The potential effects on people's health, including recreation. This includes issues related to any radiological and non-radiological discharges or emissions.
Noise and Vibration	The potential effects on noise and vibration levels relative to established standards and people likely to be affected.
Geology and Soils	Potential effects on soil extent and quality (including the potential to disturb historic contamination). The potential for effects on protected/ important geological features have also been considered.
Water	Potential effects on surface waters, groundwater systems and the marine environment, including the effects of licensed and unplanned discharges to water.
Air	Potential effects on air quality, including construction, transport and the effects of licensed and unplanned discharges to the atmosphere.
Climate Change and Energy Use	The potential effects on energy use and greenhouse gas emissions.
Coastal Change and Flood Risk	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 have also been considered.
Transportation	Interim ILW storage will involve RPVs being transported to the interim ILW storage site, as well as construction and operational transport.
Waste Management	The generation of new waste volumes and the effects this may have on current waste management infrastructure and landfill.
Land Use and Materials	The potential effects of interim ILW storage and transport on how people use or manage the land.
Cultural Heritage	The potential effects of interim ILW storage and transport on the historic environment, including cultural heritage resources, historic buildings and archaeological features.
Landscape and Townscape	The potential effects of interim ILW storage and transport on the quality and attractiveness of landscapes and townscapes, including visual amenity.

Table C: Environmental Protection Objectives and Assessment Framework

SEA Framework	
Category & Objective	Assessment Questions <i>Will the SDP Proposals...</i>
A. Radiological Discharges / Exposures Ensure that the exposure of people and the environment to radiation and radioactivity is as low as reasonably achievable.	Lead to an increase in the risks to people and/or the environment from actual or potential exposures to radiation or radioactivity?
B. Biodiversity and Nature Conservation Protect and enhance habitats, species and ecosystems.	Affect habitats, including designated nature conservation sites (accounting also for designating species) and non-designated habitat?
	Affect animals or plants outside of designated sites, including protected species and fisheries?
C. Population Promote a strong, diverse and stable economy with opportunities for all; minimise disturbance to local communities and maximise positive social impacts.	Affect the number or types of jobs available in local economies, and levels of deprivation in surrounding areas?
D. Health and Wellbeing Protect and enhance health, safety and wellbeing of workers and communities; minimise any health risks associated with interim ILW storage and transport.	Affect the health, safety and well-being of local communities?
E. Noise and Vibration Minimise disturbance and stress to people, wildlife and historic buildings caused by noise and vibration.	Significantly increase levels of noise and vibration?
F. Geology and Soils Minimise threats to the extent and quality of soils and geological resources.	Affect soil quality, variety, extent and/or compaction levels?
G. Water Maximise water efficiency, protect and enhance water quality.	Affect water availability as a resource for abstraction or other use?
	Affect the quality of surface or sea water?
	Affect the quality of groundwater?
	Affect hydrology / geomorphology, including the distribution and quality of freshwater or marine sediments?
H. Air Minimise emissions of pollutant gases and particulates and enhance air quality	Affect air quality?
I. Climate Change and Energy Use Reduce energy consumption, minimise greenhouse gas emissions	Affect the amount of carbon dioxide and other greenhouse gases emitted?
J. Coastal Change and Flood Risk Minimise the risks from coastal change and flooding to people, property and communities.	Affect levels or the extent of flood risk?
	Be at risk of flooding from any source?
K. Material Assets (Transport) 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?
	Increase or decrease traffic congestion between and around SDP sites?
L. Material Assets (Waste Management) 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?
	Affect the amount of hazardous waste to be disposed of?

SEA Framework	
Category & Objective	Assessment Questions <i>Will the SDP Proposals...</i>
	Affect the amount of non-hazardous wastes produced?
	Affect the capacity of existing waste management systems, both nationally and locally?
M. Land Use and Materials Contribute to the sustainable use of land and natural and material assets.	Affect any existing or proposed redevelopment/regeneration programmes?
	Lead to the loss of undeveloped land or green spaces?
	Increase the burden on limited natural resources such as aggregates or wood (but excluding water or fossil fuels)?
N. Cultural Heritage Protect and where appropriate enhance the historic environment including cultural heritage resources, historic buildings and archaeological features.	Affect designated or locally important archaeological features?
	Affect the fabric and setting of historic buildings, structures or spaces?
	Affect the historic landscape, including its distinctive context and character?
O. Landscape and Townscape Protect and enhance landscape and townscape quality and visual amenity.	Affect landscapes?
	Have significant visual impacts?

4.3 Uncertainties

Given that the final design of the interim ILW store will be determined by the operator of the site yet to be chosen, it is not possible at this stage to consider detailed proposals. In order to deal with this uncertainty, this SEA has been based upon a series of general assumptions provided by the SDP team. These were considered in Section 3.2 above.

Given that the interim ILW storage site has not been selected, detailed transport requirements have not been refined and route planning has not been undertaken. Therefore, it has not been possible to assess detailed effects of transport on major trunk roads and motorways. However, due to regulation and anticipated security and transport planning, it is currently assumed that the effect from transport on major roads will be minimal. Local roads linking the candidate ILW storage sites to the major road network have been considered in this SEA.

Due to uncertainty regarding the locations of the planned GDF and potential size reduction facilities, it has not been possible to assess transport from the candidate ILW stores to final disposal.

There is also uncertainty as to when the GDF will be available. To account for this uncertainty, this SEA has also assessed an 'extended operation' scenario to consider the likely effects of operating the interim ILW store for an extended time, up to its design life of 100 years, if availability of the GDF is delayed significantly beyond 2040.

5 Environmental Context

The existing environmental conditions on and surrounding each of the candidate sites has been considered. The likely evolution of the environment, relevant to each site, has also been considered to understand how the site conditions may change over time.

Following a review of the existing and likely development of environmental conditions present on and surrounding the sites, the following environmental overviews cover site specific aspects of the environmental context identified by the SEA.

5.1 AWE Aldermaston

AWE Aldermaston is situated near to the southern boundary of West Berkshire District and neighbours the town of Tadley in Hampshire to the south.

The site was initially developed in 1942 as a World War II RAF airfield. The airfield was taken over in 1950 as a site for the UK's nuclear weapons programme. The site extends to 285 hectares (ha). There are a number of other developments within the site recently constructed or under construction, including Project Pegasus, which will provide a new single facility for the storage and handling of enriched uranium to replace the existing, ageing facilities at the site.

There are important habitats close to the site, including Sites of Special Scientific Interest (SSSIs). There are UK Biodiversity Action Plan (BAP) priority habitats around and extending into the site, including lowland heath and deciduous woodland. There is also ancient woodland adjacent to the site.

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 and Brimpton Common village to the west. The area is defined as having low deprivation across economic- and health-related domains of the Indices of Multiple Deprivation (IMD).

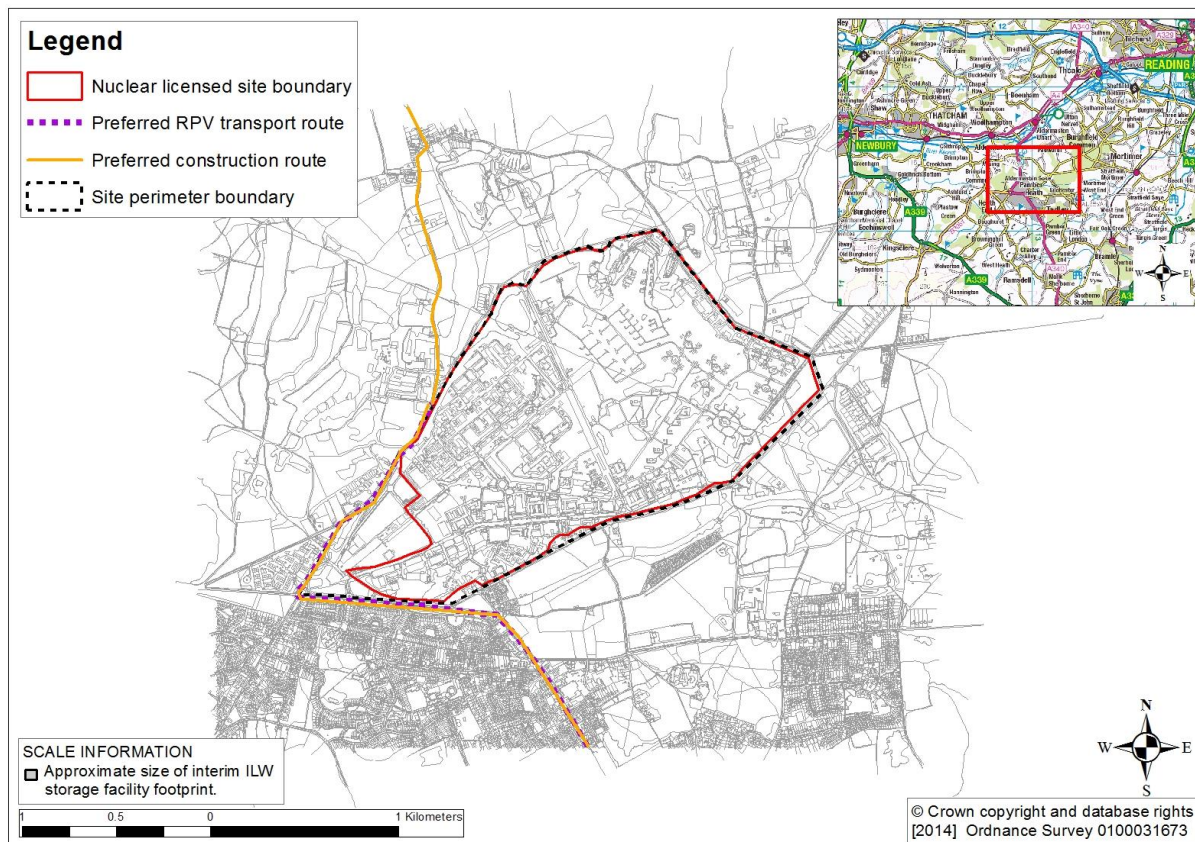


Figure C Map of AWE Aldermaston indicating nuclear-licensed boundary and likely construction and RPV transport routes.

There is contamination of soil within the site, including low levels of radiological (tritium) pollution which is not considered to pose a significant risk. AWE has also identified non-radiological contamination for which it is developing and implementing management strategies.

The Environment Agency advised in its scoping that “Over the last 4-5 years, both AWE sites have experienced challenges to limits for suspended solids and pH in their aqueous discharges. These have usually been as a result of high rainfall at a time when major construction activities were being undertaken, particularly during major concrete works. At AWE Aldermaston regular exceedance of pH limits in one or two site ponds has occurred caused by major algal blooms during periods of very sunny weather.”

The local road network suffers from traffic congestion at peak times. West Berkshire Freight Strategy requires access to AWE to be either from the M3 Junction 6 and the A340 or from the M4 junction 12 via the A4 and A340.

There is a Scheduled Monument on the site (well-preserved) and the path of a Roman Road. The potential for Iron Age, Roman and Medieval / Post-Medieval archaeology, in addition to finds associated with the WWII airfield and Cold War features is recognised. An historic park and garden (Aldermaston Court) is located adjacent to the site. There is a Conservation Area in Aldermaston village and there are several listed buildings in the surrounding area.

5.2 AWE Burghfield

AWE Burghfield is located approximately 0.5 km east of Burghfield village in West Berkshire district and approximately 3 km southwest of Reading. The site extends to approximately 91 hectares (ha).

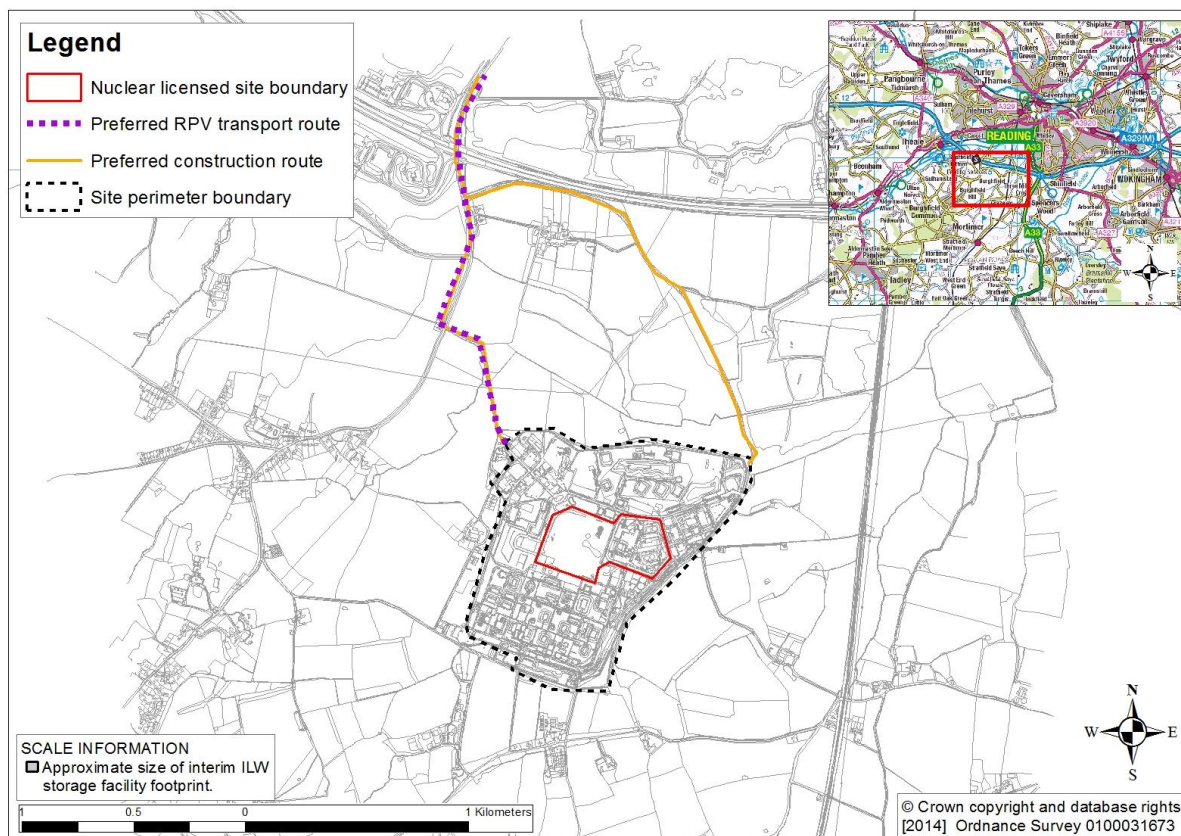


Figure D Map of AWE Burghfield indicating nuclear-licensed boundary and likely construction and RPV transport routes.

The site was initially developed in 1938 as a munitions factory. Since the 1950s, it has been responsible for the final assembly, maintenance and decommissioning of the UK's nuclear deterrent warheads.

The important habitats in proximity to the site's boundaries are deciduous woodland and traditional orchards but there is little habitat of interest within the site.

A number of villages and residential properties are close by, including Burghfield and Grazeley Green. The area is relatively affluent and has lower than average levels of ill-health and disability.

There is known contamination of soil within the site, but the risks associated with this are not considered to raise any significant issues.

Parts of the Burghfield site are within an area of high flood risk, and AWE is currently developing a proposal for a site flood alleviation scheme which will take potential impacts of climate change into account. The proposal includes an off-site area to provide temporary storage of flood water during extreme rainfall events.

The Environment Agency advised in its scoping comments that over the last 4-5 years, both AWE sites have experienced challenges to limits for suspended solids and pH in their aqueous discharges. These have usually been as a result of high rainfall at a time when major construction activities were being undertaken, particularly during major concrete works.

Access to the site is by a network of rural minor roads, which connect into the A33 and then the M4 to the north, or M3 to the south. There is localised peak-time traffic congestion on the local road network, which is likely to get worse with projected population increases in the area.

There are Cold War heritage interests within the site, and there is potential for World War II finds associated with the munitions factory.

5.3 Capenhurst (CNS)

The Capenhurst site, near Ellesmere Port, was originally developed during World War II as a Royal Ordnance factory. After the Second World War, it was chosen as the location for a Gaseous Diffusion Plant, the purpose of which was to enrich uranium. In 1982, the Gaseous Diffusion Plant was shut down in favour of the gas centrifuge process for producing enriched uranium, and a long-term decommissioning programme was established. The site is now a single nuclear licensed site with URENCO UK Ltd as the site licence holder. Capenhurst Nuclear Services (CNS) operates as a tenant on a distinct part of the Capenhurst licensed site. As part of its work, CNS is commissioned to provide responsible management of uranic materials and decommissioning activities on behalf of the Nuclear Decommissioning Authority (NDA).

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.

The site is urbanised with little of habitat of nature conservation interest present, although there are some areas of deciduous woodland within the wider Capenhurst site (but outside the part of the site occupied by CNS).

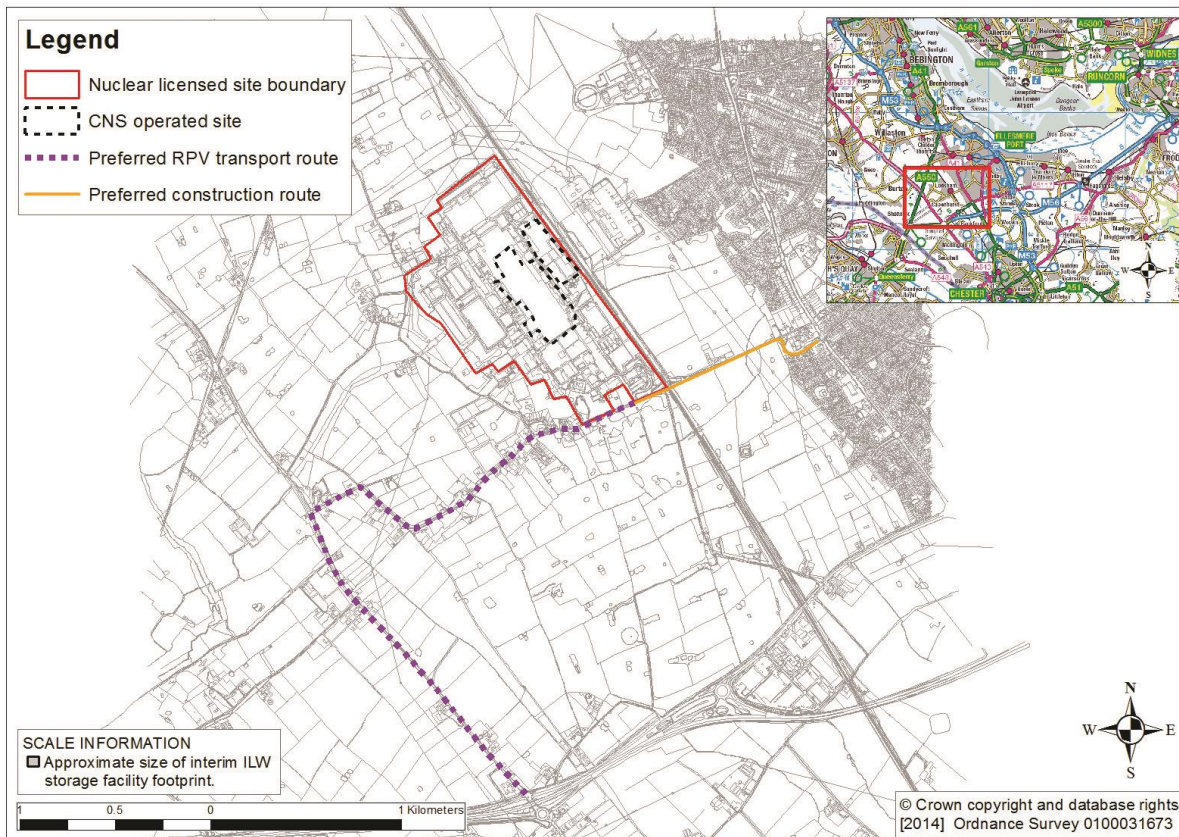


Figure E Map of Capenhurst indicating nuclear-licensed boundary CNS operated site and likely construction and RPV transport routes

The Capenhurst site within which CNS is located is adjacent to the village of Capenhurst, which includes a nursing home, certain residential properties and a school in close proximity. The area has low economic deprivation as well as low deprivation across health, disability and related domains as measured by the Indices of Multiple Deprivation.

There are known soil contamination issues within the wider Capenhurst site for which management options are currently being considered.

The nearest watercourse, Rivacre Brook, has been heavily modified in the past and is of 'bad' ecological potential due to poor species diversity, which may in turn be associated with high levels of phosphate pollution. There are various designated biodiversity/nature conservation features within 5 km of the site, and protected species have been found close to but not within the site.

The Environment Agency has advised in its response to the Scoping Report that there has been a history of copper discharge limit exceedances from the wider Capenhurst site under URENCO UK Ltd's permit and some minor exceedances of other pollutants under URENCO UK Ltd's permit in 2013. The site is within a groundwater vulnerability zone for a major aquifer.

The site is surrounded by minor roads which may impose constraints, but these connect to A-roads within a short distance of the site.

Much of Capenhurst village is designated as a Conservation Area and there several listed buildings within the local area.

There are various designated biodiversity/nature conservation features within 5 km of the site and protected species have been found close to but not within the site.

5.4 Sellafield (NDA)

NDA Sellafield is situated in western Cumbria, on the coast of the Irish Sea, covering approximately 276 hectares. The site was originally constructed in 1942 as Royal Ordnance Factory Sellafield. 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.

From the 1990s onwards, Sellafield began constructing a comprehensive suite of waste management facilities to treat and dispose of the waste arising from the commercial and decommissioning operations of reprocessing.

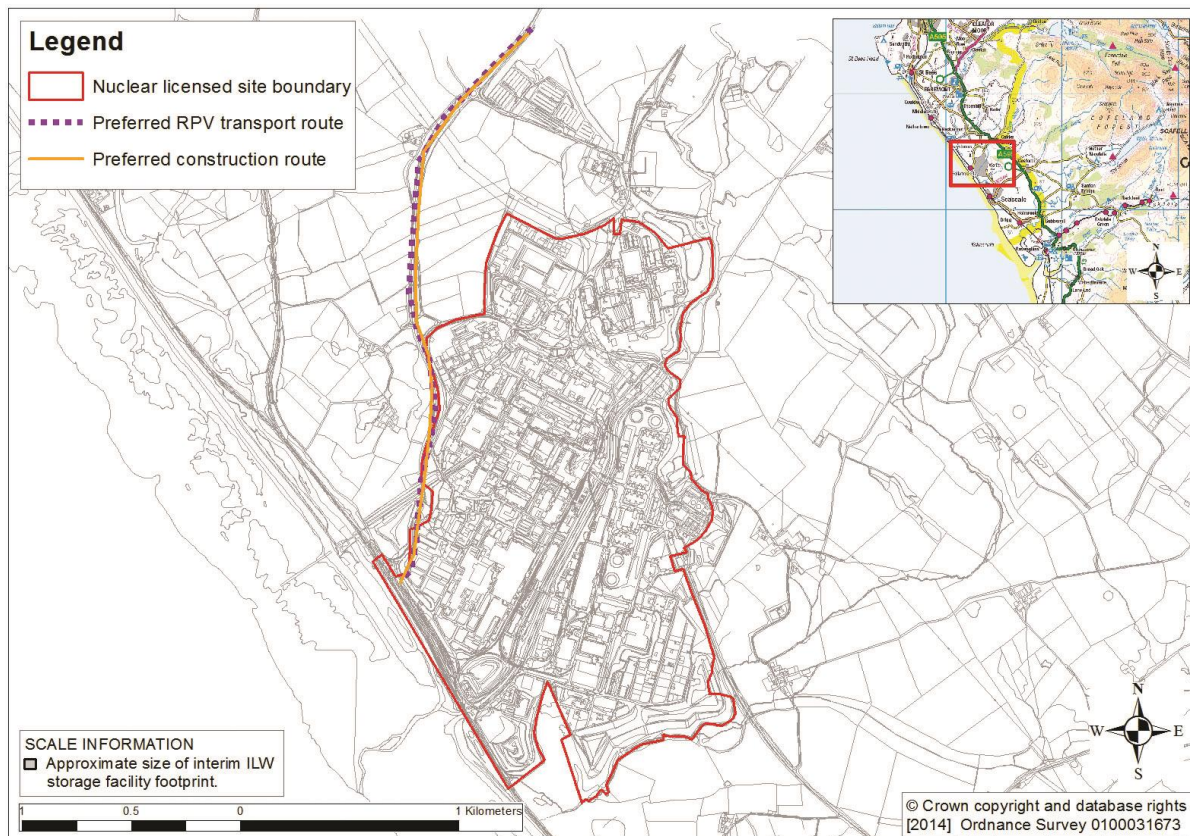


Figure F Map of Sellafield indicating nuclear-licensed boundary and likely construction and RPV transport routes.

The major activities taking place on the Sellafield site are associated with a decommissioning / remediation programme. There is a proposal for a new nuclear build in close proximity. There is well known localised traffic congestion on the A595 between Sellafield and Whitehaven, which is also the main route taken by workers at the Sellafield site.

Important nature conservation interests include the Cumbria Coast Marine Conservation Zone which covers the nearby coastline and the Drigg Special Area of Conservation, a site within 3 km which is protected at European level for nature conservation interests.

The site is approximately 1 km north of Seascale and 3 km west of Gosforth. The area is defined as having low economic deprivation and low average deprivation across health, disability and related domains, as measured by the Indices of Multiple Deprivation.

Sellafield has an estimated 1,600 m³ of soil contaminated with radioactive material which is subject to a long-term land and groundwater remediation programme.

The Sellafield site is in a coastal location, and therefore coastal erosion risk and the requirement to maintain defences are considered in the Environmental Report. The site has two licensed discharges, one into the Ehen Estuary and the other into the Irish Sea.

The site is remote from the motorway network. The closest motorway is the M6, which is circa 52 miles away via A-roads, mainly along the A595.

A stone circle, which is a Scheduled Monument, is located approximately 250 m to the south of the site. There are also open views of the site from the Lake District National Park.

There are a number of public rights of way nearby, and also Route 72 of the National Cycle Network passing the site to the west.

5.5 Chapelcross (NDA)

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, which in turn was converted for use as a Magnox nuclear power station in 1955. The former Magnox nuclear power station is now in the process of being decommissioned.

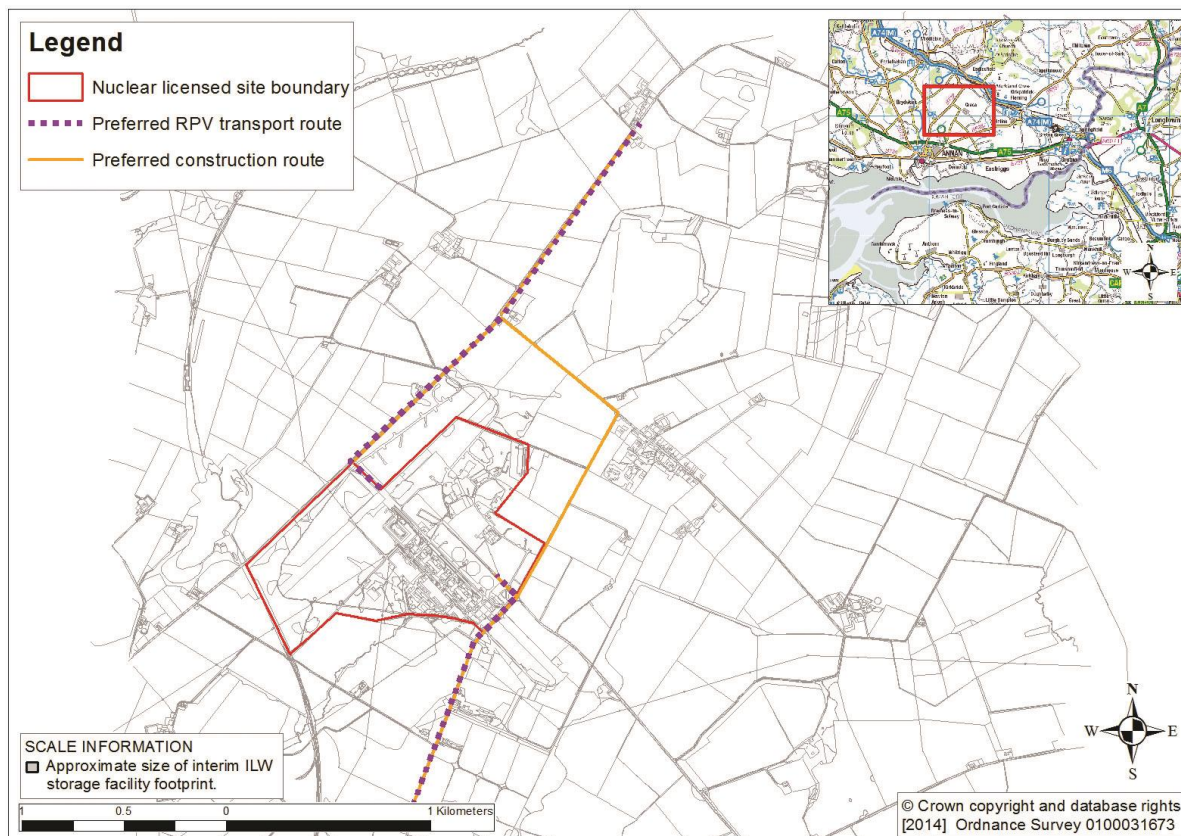


Figure G Map of Chapelcross indicating nuclear-licensed boundary and likely construction and RPV transport routes

NDA is decommissioning the site in accordance with its decommissioning strategy. In 2028, the site will enter its Care and Maintenance phase when the main remaining site buildings will be the four reactor buildings and an ILW store. Final site clearance is planned for 2095.

There are no designated nature conservation sites or priority habitats within 2 km of the site.

The Scottish Index of Multiple deprivation shows low levels of deprivation across economic and related issues, and low deprivation levels for health and crime.

Past activities at Chapelcross have given rise to radiological and non-radiological contamination of the land and groundwater. This will be remediated in accordance with the agreed end state for the site, as defined in the NDA strategy for the site.

The site has an effluent pipeline which discharges directly to the European designated Solway Firth, approximately 5 km to the south.

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

The A74(M) motorway is approximately 2.7 km from the site. Connections to the motorway are direct via the B722, and via minor roads and the B6357 through Hollee.

There are no designated cultural heritage interests in close proximity to the site. No sites of archaeological interest are known on the site. There may be WWII remains, but any buried remains are likely to have been destroyed in the areas developed for the power station.

6 Effects on the Environment

Table D summarises the environmental effects, and envisaged further mitigation and monitoring.

6.1 Environmental effects, all candidate interim storage sites

The SEA has considered the interim ILW storage proposals and each site's environmental context, including pre-existing mitigation and management measures.

No significant effects are likely to result during construction, operation and decommissioning phases of the interim ILW storage at any of the candidate sites in relation to the following SEA topics:

- **Radiological discharges / exposures:** For SDP interim ILW storage, no radiological discharges are anticipated. Any exposures from interim ILW storage will be managed to ALARP/ALARA, subject to nuclear regulation and monitoring. As a result, it is anticipated that there are unlikely to be any significant environmental effects. More information can be found via the ONR website: www.onr.org.uk⁶ and in the full SEA Environmental Report.
- **Population:** There could be up to a hundred temporary workers during the construction period but as the interim ILW store will be a largely passive (closed and locked) facility, it is not likely to have significant effects on the local population in terms of employment and / or the local economy.
- **Health and Well-being; Water; Air:** No discharges are anticipated, and management to ALARP/ALARA will mean that there are not likely to be significant effects on health and well-being, water and air.

⁶ See also <http://www.onr.org.uk/licensing-nuclear-installations.pdf>.

- **Land use and materials:** The interim ILW store must be located within a nuclear licensed site and within a secure boundary. The operators of all candidate sites, with the exception of AWE Burghfield, have confirmed that an interim ILW store could be located within their existing nuclear site licensed and secure boundary. AWE plc has confirmed that a proposed interim ILW store at AWE Burghfield could be located within the existing site boundary, although an extension to the nuclear licensed site would be required.

Minor adverse temporary effects are anticipated during the construction and decommissioning stages for all candidate sites for the following topics:

- **Biodiversity and Nature Conservation:** The biodiversity assessment has considered the different environments and potential receptors within and surrounding each site, and concluded that there is potential temporary loss or disturbance of habitats and/or wildlife from construction and decommissioning activities.
- **Noise and vibration:** During construction and decommissioning, despite mitigation there will be some noise and vibration generated.
- **Transportation:** To facilitate the infrequent movements of the RPVs, minor changes to local roads may be required; however, these changes (if required) would be temporary and of minor significance.
- **Geology and soils:** Soils will be disturbed, stored and/or transported. There is some potential for mobilising historic contaminants from previous site uses within the soils during earthworks associated with construction and decommissioning.
- **Landscape and townscape:** The landscape and townscape assessment is largely the same for all sites, accounting for the temporary visual effect of the presence of tall plant such as cranes, should they be used, and traffic (particularly HGVs).
- **Waste:** Minor negative effects upon the amount of waste and capacity of waste management facilities are predicted, arising from the construction and demolition stages of the project.

A minor adverse effect is anticipated for all sites and during all stages of the project lifecycle for:

- **Climate Change and Energy Use:** Energy would be consumed during construction, operation and decommissioning, and contribute to the accumulation of greenhouse gases as a result of the project. However, as a passive store, over its lifetime the effect from the project alone would be relatively small.

6.2 Environmental effects that vary between candidate sites

6.2.1 Coastal Change and Flood Risk

AWE Aldermaston, Capenhurst and Chapelcross are not located on the coast and are not within an identified flood risk area. Key components of the road network around the sites are not currently at significant risk of flooding. Therefore it is unlikely that there can be significant effects as a result of coastal change or flood risks.

Sellafield is located on 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 sea level. Flood risk zones are

outside the developed part of the site. The Environment Agency policy for coastal erosion around Sellafield is to hold the existing defence line, and thus maintain and, when necessary, replace existing defences. Future assessment may be required to assess and determine if additional flood risk measures are required to protect the site, whether or not Sellafield is chosen as the site for the ILW store. As such, no significant effects on or from coastal change or flood risk at Sellafield are anticipated in connection with the interim ILW storage.

Parts of the AWE Burghfield site are within an area of high flood risk but significant parts of the site are not. Therefore AWE plc anticipates that a location can be found outside the high flood risk area. For these reasons it is considered that there will be no significant effect related to flooding risk during construction, operation and decommissioning. Future development and climate change may have a minor negative effect within the design life of the interim ILW store.

6.2.2 Cultural Heritage

At AWE Aldermaston, there could be minor negative effects on cultural heritage depending on the location of an interim store. No effects are anticipated on Grim's Ditch, the Scheduled Monument within the site. During construction and decommissioning, there could be disturbance of archaeological remains, and/or effects on Aldermaston Court Registered Park and Garden.

In the event that construction or decommissioning traffic uses the A340 from the north and this local highway needs improvements there is a slight potential to affect the setting of Aldermaston Conservation Area and buildings along this route, although at present it is considered more likely that the route would be from the M3, south of the site.

During operation and extended operation, there could be potential for a negative effect on the setting of Aldermaston Court, depending upon siting of the store and the effectiveness of surrounding vegetation at screening views. However, it should be noted that all of these possible effects can be avoided depending on the location of the store on the site.

At AWE Burghfield, the potential for cultural heritage effects include a slight potential during construction to disturb historic or archaeological remains or affect the setting of Cold War heritage interests.

ILW storage at Capenhurst could have minor negative effects across all phases of implementation. Despite mitigation, during construction and decommissioning, traffic vibration and dust may affect historic structures, although the effect is likely to be minor. During operation and extended operation, the height of the store may affect the setting of historic buildings within Capenhurst and/or the character of the area.

At Sellafield, there could be minor negative effects during construction, decommissioning or extended operation. No significant effect is predicted upon the Scheduled Monument south of the site. Despite mitigation, during construction and decommissioning, traffic vibration and dust may affect historic structures. This may include cumulative effects from other infrastructure projects, including the proposed new nuclear power station. No significant effect is anticipated during operation since the scale of the surrounding Sellafield plant already affects the settings of heritage features within the local area. It is feasible that there may be a negative effect during extended operation, if other parts of the site have been decommissioned over that timescale.

No significant effects are anticipated at Chapelcross.

6.3 Summary of Environmental Effects and Envisaged Further Mitigation and Monitoring

The SEA envisages additional measures to prevent, reduce or offset adverse environmental effects which could arise through construction, operation and decommissioning of an interim ILW store. These measures will be considered in more detail within a future EIA directly related to the detailed design of the interim ILW store. These measures are likely to include avoidance i.e. by determining the best location of the store within the final site chosen and mitigation through modification of established site management systems such as Environmental Management Systems, Construction Environmental Management Plans and Transport Planning. Table D below provides detail of these likely measures along with further monitoring which could be incorporated within these site-wide existing management systems.

Table D Summary of Environmental Effects and Envisaged Further Mitigation and Monitoring

Key	
Note: full descriptions of effects for each SEA topic are at Annex 4 of the Environmental report	
0	No (neutral effects) on the environment
–	Minor negative effects on the environment. Note: no major negative effects have been identified during the SEA

Assessment Category	Site	Summary Assessment				Further Mitigation or Monitoring Needed?	Further Mitigation or Monitoring Envisaged
		Construction	Operation	De-commissioning	Extended Operation		
A. Radiological Discharges / Exposures	Aldermaston	0	0	0	0	No - existing statutory reporting, associated monitoring and other monitoring regimes (e.g. RIFE) are adequate.	N/A
	Burghfield	0	0	0	0		
	Capenhurst	0	0	0	0		
	Sellafield	0	0	0	0		
	Chapelcross	0	0	0	0		
B. Biodiversity and Nature Conservation	Aldermaston	–	0	–	0	Yes - potential for negative effects to habitats, which could be worse than predicted.	Use of AWE's existing EMS and BAP reporting / management to ensure mitigation is implemented, and consider any relevant habitat / species monitoring (including links with EIA).
	Burghfield	–	0	–	0	No - standard considerations in EIA and CEMP will minimise negative effects.	N/A
	Capenhurst	–	0	–	0	Yes - potential for negative effects to habitats, which could	Use of CNS's existing EMS to consider any relevant habitat / species

Assessment Category	Site	Summary Assessment				Further Mitigation or Monitoring Needed?	Further Mitigation or Monitoring Envisaged
		Construction	Operation	De-commissioning	Extended Operation		
						be worse than predicted.	monitoring.
	Sellafield	-	0	-	0	No - standard considerations in EIA and CEMP will minimise negative effects.	N/A
	Chapelcross	-	0	-	0		
C. Population	Aldermaston	0	0	0	0	No - positive effects only, and unlikely to vary significantly.	N/A
	Burghfield	0	0	0	0		
	Capenhurst	0	0	0	0		
	Sellafield	0	0	0	0		
	Chapelcross	0	0	0	0		
D. Health and Wellbeing	Aldermaston	0	0	0	0	No - see other topics, as relevant (e.g. radiological discharges / exposures, noise and vibration, air quality).	N/A
	Burghfield	0	0	0	0		
	Capenhurst	0	0	0	0		
	Sellafield	0	0	0	0		
	Chapelcross	0	0	0	0		
E. Noise and Vibration	Aldermaston	-	0	-	0	Yes - potential for negative effects, including in combination with other potential noise sources.	Use of existing EMS to ensure mitigation is implemented, and consider any relevant noise monitoring (including links with EIA).
	Burghfield	-	0	-	0		
	Capenhurst	-	0	-	0		
	Sellafield	-	0	-	0		
	Chapelcross	-	0	-	0		Given the lack of an operational EMS, a system for noise complaints / reporting and response should be developed for the site.
F. Geology and Soils	Aldermaston	-	0	-	0	Yes - some uncertainty in the assessment which requires monitoring, as there is a recognised need to ensure implementation of interim ILW storage does not interfere with the management or remediation of any site's historic contamination	EMSs will be effective at monitoring wider site progress in dealing with historic contamination issues.
	Burghfield	-	0	-	0		
	Capenhurst	-	0	-	0		
	Sellafield	-	0	-	0		
	Chapelcross	-	0	-	0		Magnox has an on-going Environmental Management Plan for decommissioning, which addresses legacy issues of contamination and proposed remediation. This will be an effective monitoring measure.

Assessment Category	Site	Summary Assessment				Further Mitigation or Monitoring Needed?	Further Mitigation or Monitoring Envisaged
		Construction	Operation	De-commissioning	Extended Operation		
						issues.	
G. Water	Aldermaston	0	0	0	0	Yes - need to monitor operation to ensure appropriate storage and handling of chemicals or potentially hazardous substances (spill risk).	Use of existing EMS to ensure mitigation is implemented, and consider any relevant water quality / usage monitoring.
	Burghfield	0	0	0	0		Given the lack of an existing operational EMS, a new site Environmental Management Plan would be recommended which records and monitors the transfer and storage of potentially hazardous substances on-site.
	Capenhurst	0	0	0	0		
	Sellafield	0	0	0	0		
	Chapelcross	0	0	0	0		
H. Air	Aldermaston	0	0	0	0	No - whilst there is some potential for cumulative construction transport emissions, AWE has a Code of Construction Practice which requires a construction traffic management plan. The fundamental approach is all construction movements are scheduled outside of local traffic peaks.	N/A
	Burghfield	0	0	0	0	No - standard considerations in EIA and CEMP will minimise negative effects.	N/A
	Capenhurst	0	0	0	0	Yes - some uncertainty in the assessment which requires further consideration of potential cumulative transport impacts on emissions.	A site-wide transport plan would be beneficial for managing emissions associated with potential cumulative transport requirements across construction projects, combined with staff transport.
	Sellafield	0	0	0	0		
	Chapelcross	0	0	0	0	No - standard considerations in EIA and CEMP will minimise negative effects.	N/A

Assessment Category	Site	Summary Assessment				Further Mitigation or Monitoring Needed?	Further Mitigation or Monitoring Envisaged
		Construction	Operation	De-commissioning	Extended Operation		
I. Climate Change and Energy Use	Aldermaston	-	-	-	-	No - standard considerations in EIA and CEMP will minimise negative effects.	N/A
	Burghfield	-	-	-	-		
	Capenhurst	-	-	-	-		
	Sellafield	-	-	-	-		
	Chapelcross	-	-	-	-		
J. Coastal Change and Flood Risk	Aldermaston	0	0	0	0	No - standard considerations in EIA and CEMP will minimise negative effects.	N/A
	Burghfield	0	0	0	-		
	Capenhurst	0	0	0	0		
	Sellafield	0	0	0	0		
	Chapelcross	0	0	0	0		
K. Transportation	Aldermaston	-	0	-	0	See above for 'air quality'.	See above for 'air quality'.
	Burghfield	-	0	-	0		
	Capenhurst	-	0	-	0		
	Sellafield	-	0	-	0		
	Chapelcross	-	0	-	0		
L. Waste Management	Aldermaston	-	0	-	0	No - standard considerations in EIA and CEMP will minimise negative effects.	N/A
	Burghfield	-	0	-	0		
	Capenhurst	-	0	-	0		
	Sellafield	-	0	-	0		
	Chapelcross	-	0	-	0		
M. Land Use and Materials	Aldermaston	0	0	0	0	No - standard considerations in EIA and CEMP will minimise negative effects.	N/A
	Burghfield	0	0	0	0		
	Capenhurst	0	0	0	0		
	Sellafield	0	0	0	0		
	Chapelcross	0	0	0	0		
N. Cultural Heritage	Aldermaston	-	-	0	-	No - standard considerations in EIA and CEMP will minimise negative effects.	N/A
	Burghfield	-	0	0	0		
	Capenhurst	-	-	-	-		
	Sellafield	-	0	-	-		
	Chapelcross	0	0	0	0		
O. Landscape and Townscape	Aldermaston	-	0	-	0	No - standard considerations in EIA and CEMP will minimise negative effects.	N/A
	Burghfield	-	0	-	0		
	Capenhurst	-	0	-	0		
	Sellafield	-	0	-	0		
	Chapelcross	-	0	-	0		

7 Potential Benefits and Opportunities for Enhancement

Positive effects on the environment from the proposed interim ILW store are unlikely without the implementation of additional, optional measures by the site operator.

The following opportunities to achieve net benefits to the environment have been identified.

- Biodiversity and nature conservation: For all sites, it was identified that site operators could implement measures to improve local habitat and biodiversity, if feasible and appropriate. The secure nature of the sites provides opportunities to manage suitable areas for wildlife value, which would be protected from disturbance.
- Population: For all sites, some additional employment opportunities are possible at all stages of the interim ILW project lifecycle.
- Geology and soils: For all sites, site remediation, which may be required during interim ILW store construction, could be positive for soils in the event contaminated land is remediated.
- Water: At Aldermaston and Sellafield, there are potential beneficial effects upon groundwater, where the potential remediation of historic contaminated land may lead to improvements in water quality.
- Transportation: For all sites, it is possible that access to the proposed interim ILW store may require minor adjustments or improvements to the local road network.

8 How to Comment and Next Steps

8.1 How to Comment on the SEA

This NTS forms part of the public consultation on the interim storage of ILW. This is a national consultation, with local events taking place around AWE Aldermaston, AWE Burghfield, Capenhurst, Sellafield and Chapelcross, as well as nationally. MOD would like to hear your views on the SDP proposals and the SEA.

The SEA Environmental Report has been provided to the statutory and non-statutory consultees who were consulted at the Scoping Stage and is available at:

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

8.2 Next Steps

This SEA and opinions expressed during consultation will be taken into account in decision-making. While the SEA is important, other factors may have an equal or greater influence on site selection, including a separate, more detailed consideration of nuclear site safety. More information on this process can be found at the above website.

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.

Once an interim ILW storage site has been selected, after taking into account all relevant information, assessments, comments and opinions, 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 and Stakeholder Engagement* reports.

Please provide comments by **5pm on Friday, 20th February 2015**. Comments should be sent to:

Submarine Dismantling Project

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