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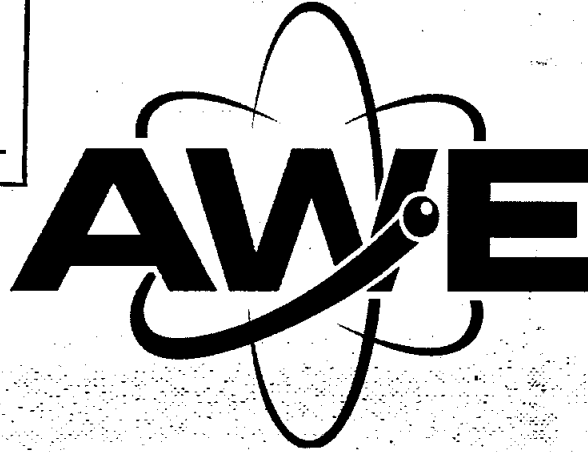
ISSUE : 07

DATE : 12 August 2005

05/02003

BASINGSTOKE & DEANE
BOROUGH COUNCIL
12 SEP 2005
DEVELOPMENT CONTROL

APPLICATION No.
BDB 61865



SUBMISSION UNDER DOE CIRCULAR 18/84

NOTICE OF PROPOSED DEVELOPMENT ON BEHALF OF THE
MINISTRY OF DEFENCE

AWE ALDERMASTON

REPLACEMENT LASER RESEARCH FACILITY (ORION)

FULL PLANNING CLEARANCE

WEST BERKSHIRE DISTRICT
COUNCIL
02 SEP 2005
PLANNING AND TRANSPORT
STRATEGY

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DSD01/B/CV/NOPD/HAA13000/001

ISSUE : 07

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DSD01/B/CV/NOPD/HAA13000/001

ISSUE : 07

DATE : 12 August 2005

Originated By _____ Date _____
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Approved By _____ Date _____
 Name _____
 Organisational Area Directorate Infrastructure

Amendment Record

Amendment Number	Date Issued	Date inserted	Amended by (signature)	Pages Affected
	03			All
Draft B of Issue 04	16/09/03	11/09/03		All
Draft C of Issue 04	22/09/03	20/09/03		All
Draft D of Issue 04	02/10/03	02/10/03		All
Issue 04	03/10/03	03/10/03		All
Issue 05	01/07/05	01/07/05		All
Issue 06	04/08/05	04/08/05		All
Issue 07	12/08/05	12/08/07		All

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1. INTRODUCTION

AWE submitted an outline planning clearance for a replacement Laser Research Facility (Orion) in October 2003 (Ref 1). This was considered by the Local Planning Authority, and received No Objections in both December 2003, Planning Reference 03/02313OUT, and June 2004, Planning Reference 04/00945OUT.

This document has been updated and is submitted for a Full Planning Clearance. The matters that were reserved in the outline submissions have been addressed.

2. BACKGROUND.

AWE plc is in the process of modernising the facilities and improving the visual impact of the Aldermaston site through a major investment programme which will result in the removal and replacement of a large number of outdated and inefficient buildings and the creation of a modern and efficient technology environment. The aim is to provide world class science and technology facilities, to create a more attractive place to work and at the same time lessen the physical and visual impact on the local area.

AWE proposes to build a replacement laser research facility at the western end of the site. The development will replace an existing laser research facility on site, which is now 25 years old. The development will include research facilities, offices, workshop areas, and laboratories.

The development will be designed to meet modern standards and to accommodate approximately 50 staff, transferred from the existing facility on site. No increase in staff is anticipated and there will be no new jobs created. The development will be designed to be highly energy efficient, with a 50 year minimum design life.

3. DESCRIPTION of PROPOSED DEVELOPMENT.

The proposed building will be in keeping with the current overall development of the Aldermaston site and will be located in an area which was formerly populated with industrial buildings of similar height and mass.

The building will be 26 metres high on the eastern elevation. The western elevation, most immediately visible to the public, will be 21 metres in height. The footprint dimensions are 100 metres long and 60 metres wide. The drawings (Ref 2) provide further information.

The development will comprise space for laser generation plant, a target hall for the laser experiments, preparation rooms, laser diagnostics, laser development, optical coating and photometry. There will also be general office areas, a conference room, a control room, clean rooms, and a visitor/ exhibition area all contained in the same building.

In addition there will be 5 minor buildings and compounds to house plant immediately adjacent to the main building. These are; a transformer compound size 13m x 10m, chiller compound size 11m x 8m, two bottle stores each 6m x 4m and a cycle shed size 4m x 2.5m.

The replacement laser facility will be used to conduct experiments on minute particles of matter for the study of plasma physics. Further information is provided (ref 3, clause 4.2).

4. LOCATION of PROPOSED DEVELOPMENT.

The proposed location is shown on the drawings (Ref 2). This is a brownfield site with no other beneficial use. The development will be visible from the public road, A340, at Paices Hill, for a short distance approximately 90 metres from the proposed building at its closest point. However the building will be well screened by existing trees on the site perimeter, further enhanced by new planting ensuring minimal visual impact.

5. ENVIRONMENTAL IMPACT.

As the development falls outside the description and scope of developments covered in either Schedule 1 or Schedule 2 of The Town and Country Planning (Environmental Impact Assessment) Regulations 1999, a formal Environmental Impact Statement (EIS) for the proposed development has not been provided.

The Environmental Information provided with the outline planning consent has been reviewed and updated, and is included for information. (Ref 3). A sustainability assessment has also been carried out and can be found in ref 3.

Environment Agency Conditions

The Environment Agency Conditions imposed on the outline planning consent (Ref 4) have been addressed separately. (Ref 5)

6. RESERVED MATTERS

In the outline planning submission (ref 1) the following matters were reserved:

- Height
- Size of the buildings
- Final siting within the identified area
- External appearance and material selection
- Amenity features
- Landscaping

These matters are addressed below. Colour illustrations and material samples will be made available prior to the planning meeting to provide further information.

Height and size of the building

The building will be 26 metres high on the eastern elevation. The western elevation, most immediately visible to the public, will be 21 metres in height. The footprint dimensions are 100 metres long and 60 metres wide.

In addition there will be 5 minor buildings to house plant immediately adjacent to the main building. These are a transformer compound size 13m x 10m, chiller compound size 11m x 8m, two bottle stores each 6m x 4m and a cycle shed size 4m x 2.5m.

Full information is provided on the attached drawings (Ref 2).

Final siting within the identified area

The Orion Laser Research Facility will be situated at the West End of AWE(A) site. Please refer to the attached drawings (Ref 2).

External appearance and material selection

The building has a curved profile throughout its length, penetrated by the rectangular Target Hall. At ground level vertical walls around the building serve to visually anchor it to the ground. Although the function of the building requires a variety of separate volumes and spaces, the introduction of a continuous curved profile creates a simple unified building form. The strong singular form of the building is complemented by the selection of materials.

The west elevation runs parallel with the Recreation Society playing fields and features a cut back roof profile filled with flat light blue panels either side of a glazed feature entrance.

The north (A340 side) and south (site) elevations feature recessed vertical flat light blue panels emphasising the architectural form.

The east (site) elevation allows for the practical servicing and external storage needs of the facility.

The target hall walls that penetrate the curved profile are of dark blue panels with silver infill panels on the east elevation.

The ground level vertical walls comprise flint coloured polished masonry block. The roof is of natural aluminium throughout, which after a period of initial weathering will be of low visual impact when seen against the sky.

All panel joints and fixings will be concealed and all accessories such as louvres and flashings will be bespoke to the system so that the finished result is of an integrated facade to each of the building elevations.

Please refer to the attached drawings (Ref 2)

Amenity features and landscaping

Externally staff and visitor car parking and a bicycle store are included in the scheme.

Internally the facility has amenity features for visitors, including a exhibition area and viewing gallery. The facility has also been designed to serve the needs of both AWE and the wider academic community.

The site of the Orion Project will be considerably "softened" by the planting of grassed areas around the building. All pedestrian footpaths will be of interlocking concrete blocks and the use of these blocks for parking and unloading areas means that there is little tarmac utilised in the external landscape scheme. Further variety has been introduced by the employment of two colours for the interlocking blocks.

The building will be well screened by existing trees on the site perimeter, further enhanced by new planting ensuring minimal visual impact. New planting will be implemented as part of the site-wide landscaping project currently under development.

Please refer to the attached drawings (Ref 2)

7. PROGRAMME

The updated programme for the construction of the New Laser Facility is shown below:

Site Preparation	June 2005 through to December 2005
Earthworks, excavation, sub-structures and superstructure	December 2005 through to April 2007
Handover	April 2007 through to June 2007

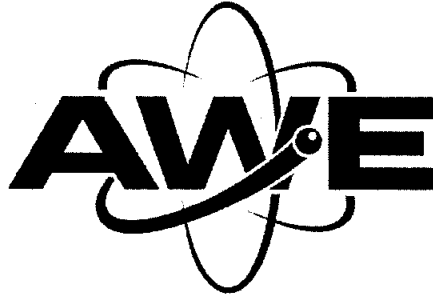
APPENDIX A: FURTHER INFORMATION

- Ref 1 Submission under DOE Circular 18/84. Notice of Proposed Development on behalf of the Ministry of Defence, AWE Aldermaston. Proposed Laser Research Facility. Outline Planning Clearance. Document reference DSD01/B/CV/NOPD/HAA13000/001, Issue 04, dated 03/10/03
- Planning References 03/02313OUT and 04/00945OUT
- Ref 2 Facility drawings:
- Site Plan, ref A/P/0001, rev B dated 15/07/05
- Roof Plan, ref A/P/0006, rev A dated 15/0705
- North and South Elevations, ref P/0011, rev A dated 10/08/05
- East and West Elevations, ref P/0012, rev A dated 10/08/05
- Orion Facility Location Plan, dated 12/08/05
- Ref 3 Additional Environmental Information, document reference HA/HAA14/A/3/AS/1000373, issue 5, dated August 2005
- Ref 4 Environment Agency letter reference WA/2004/009482-1/1, dated 09/06/04
- Ref 5 AWE letter to West Berkshire District Council ref WBC 106R dated 23/06/05

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05/02003

APPLICATION No.
BDB 61865



WEST DEVON DISTRICT
COUNCIL
02 SEP 2005
PLANNING AND TRANSPORT
STRATEGY

BASINGSTOKE & DEANE
BOROUGH COUNCIL
12 SEP 2005
DEVELOPMENT CONTROL

Additional Environmental Information
For The Proposed
Replacement LASER Research Facility (Orion)
at AWE (A)

Originated by: _____
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Approved by: _____
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DOCUMENT ISSUE RECORD

Issue	Description of Issue	Author	Approved	Authorised for Issue	Date
Issue 01	First issue	G Parkes			October 2003
Issue 02	Title changes to reflect that this is not a statutory EIS submission . Clarifying notes with further information added to text	I Ward			March 2004
Issue 03	Clarifying notes with further information added to text	G Parkes			July 2005
Issue 04	Following MoD comments	I Ward			August 2005
Issue 05	Following Sustainability Appraisal	G Parkes			August 2005

AMENDMENT RECORD

Amendment Number	Date Issued	Date Inserted	Amended by (signature)	Pages Affected

Amendments must be recorded in the table above.

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0 EXECUTIVE SUMMARY

This report has been prepared in support of the Notice of Proposed Development to be submitted on behalf of the Secretary of State for Defence for the development of a Research Facility at AWE Aldermaston.

The requirements of the Town and Country Planning (Environmental Impact Assessment) (England and Wales) Regulations 1999, and subsequent amendments to date, have been used as a basis for determining the requirements of this report and to consider environmental impacts resulting from the construction and operation of the proposed facility.

The proposed building will constitute a Laser Research Facility. The building will replace most of the current facilities excluding target fabrication and amplifier testing.

The new facility is to comprise the following:

A new laser facility including associated offices and laboratories (6200m² footprint). During construction the facility will have its own security fencing and access gates, during operation the facility will be included within the AWE site fence and accessed through the current gates. The new facility will include laser equipment housed in a laser hall, a target hall, control room and supporting offices and laboratories.

The Facility will comply with the Site Licence Conditions, as regulated by the Nuclear Installations Inspectorate (NII, an arm of the Health and Safety Executive HSE), whilst environmental issues are regulated by the Environment Agency (EA). AWE currently operates an Environmental Management System which has been independently accredited by LRQA to ISO 14001. A sustainability appraisal has been carried out in accordance with the MoD Sustainability Appraisal Handbook For the MoD Estate (October 2003).

The environment, both local and regional, into which it is proposed to locate the facility, is described, including the location of population centres, geology, hydrogeology, surface water quality, location of landfills and the location of sites of nature significance. The report concludes that the immediate on-site area of the proposed development is heavily industrialised and not of notable environmental significance. The local area surrounding the site is generally rural in nature and contains good quality surface waters and notable assemblages of flora and fauna, and Sites of Special Scientific Interest. There is some solvent contamination present in the soil close the site of the proposed development.

Consequences of construction, operational and decommissioning activities are considered. The report concludes that the proposed Facility will not cause a significant negative impact to the local environment.

The volumes of liquid and solid effluent estimated to arise from the facility are not likely to be significant compared with the site total [Appendix 8: Operational Phase PREA]. Aerial discharges will be within EA consents, whilst secondary potential impacts, such as associated additional traffic movements, will be limited to the construction phase and will not cause any discernible additional environmental impacts once the facility is in operational mode.

1 INTRODUCTION

This document presents environmental information, in accordance with the requirements of the Secretary of State for Defence's Policy regarding environmental assessment, and AWE internal procedures to minimise the environmental impact of new facilities constructed at AWE.

This Environmental Report has been prepared to support a Notice of Proposed Development (NOPD) on behalf of the MoD for a Replacement LASER Research Facility at AWE Aldermaston.

This Report of the environmental impacts of the proposed development has been carried out in accordance with the requirements in Schedule 3 of Town and Country Planning (Environmental Impact Assessment) (England and Wales) Regulations 1999 (Ref. 1) and in line with Department of the Environment guidance (Refs. 2, 3 and 4).

This Environmental Report reviews the proposed facility and the operation of the facility in order to identify those features which have the potential to give rise to environmental effects. The report considers the materials which will be used during normal operations and their possible routes of entry into the environment and other potential environmental impacts.

Detailed safety considerations associated with the construction of the Facility and its operation will be assessed within the Environment, Health and Safety Plan for the project, and in detail as part of the Safety Case, which will be prepared in support of this development, in line with AWE Company Policy and requirements of the Nuclear Site Licence.

The new Laser Research Facility at AWE will provide a UK facility serving the needs of both AWE and the wider academic community. In the absence of testing, and in the light of the Comprehensive Test Ban Treaty, plasma physics provides the assurance required for safety and reliability.

The new facility will provide data in novel High Energy Density regimes for material properties studies, and will provide an opportunity to perform leading edge science across a broad range of relevant areas of research.

The new facility will include laser equipment housed in a laser hall, a target hall, control room and supporting offices and laboratories.

The next stage of mandatory safety documentation will report on the design options, safety principles and acceptance criteria. The optimum technical and safety solutions are being developed to fully engineer the preferred option. Safety justification for this will be included in future safety documentation and will be approved in accordance with AWE Safety Management Procedures.

The overall building will be constructed in-line with the relevant building regulations and to modern standards.

The location for the facility has been decided upon by taking into account the operational requirements of the site as a whole and is as shown in figures appended to the NOPD (Ref. 5).

AWE is a Nuclear Licensed Site, regulated by the NII. The site operates in line with 36 Licence Conditions. These conditions, specifically Licence Condition 19 (Construction or Installation of New Plant) and Licence Condition 20, (Modification of Plant Under Construction) exist to cover the development of new facilities. The proposed facility is to be designed and operated in line with these and other Licence Conditions.

Within this document 'the AWE site' refers to the 250 hectares covered by AWE (Aldermaston), whilst the 'proposed location' refers to the hectare on which it is proposed to build the Facility.

2 FACILITY DESCRIPTION

The replacement Laser Research Facility at AWE will provide a UK facility serving the needs of both AWE and the wider academic community.

2.1 Structure

The proposed facility will include laser equipment housed in a laser hall, a target hall, control room and supporting offices and laboratories.

The facility is to be equipped with suitable ventilation systems and utilities to meet the safety, environmental and operational requirements. The building is to be constructed in line with all relevant Building Regulations and reviews will be carried in accordance with the AWE Safety Management System (SMS) at all stages of the design, construction, operation and eventual decommissioning.

The building footprint dimensions are 100 metres long by 60m wide with a maximum height of 26m on the eastern elevation and 21m on the western elevation (most visible to the public). Building drawings can be found in the NOPD [Ref. 5].

The facility will contain a Heating and Ventilation and Air Conditioning (HVAC) system to control the atmosphere within the facility.

The facility is designed to operate for a 50 year life span.

2.2 Waste Disposal

2.2.1 Trade Wastes

The facility will generate hazardous wastes which will be kept as low a level as is reasonably practicable and handled using industry best practice techniques and processes in accordance with the Environmental Protection

Act (1990) and under the duty of care imposed by the waste management licensing regime. The wastes are likely to consist of oil, metals, hazardous and non-hazardous chamber washings (note: any oil requiring removal from site will be subject to disposal to a registered oil treatment organisation). The amount of hazardous waste produced during routine cleanings will be negligible. Hazardous waste will include:

- Lead
- Beryllium
- Solvents
- Oils

Small amounts of lead may arise from disposal of PPE used in the movement of lead blocks and from redundant diagnostics equipment used in the facility.

The preparation of beryllium components will be undertaken in a dedicated fume cupboard, which will have a filtered extract system to prevent aerial discharges. Beryllium disposal routes are available on-site. Experience from the HELEN, the existing laser research facility, has shown that beryllium contamination has not been an issue.

The main sources of trade waste will be from chemicals and solvents used in the laboratories and darkrooms. It is expected that the quantities of liquid trade waste will not exceed those currently produced at HELEN, which has a trade waste agreement of 2000 litres per month.

2.2.2 Radiological Waste

Various target materials are used in laser experiments. These can be made radioactive by the laser / target interaction. Exact quantities of radioactive materials produced are currently being assessed, however this will be in the order of milligrams per year.

For example a typical gold target used in Orion has a mass of 10 milligrams. A minute quantity of the target can be made radioactive by the laser. The estimated quantity of low level radioactive gold which will be produced per year is less than 1 microgram (1.0×10^{-6} grams)

The low-level radioactive particulate produced will either be collected by the vacuum pump filters or collected onto tissues when the target chamber is cleaned. It is these filters and tissues containing minute traces of radioactive material that will enter the controlled Low Level Radioactive Waste stream.

Small target support structures that are very close to the target also are made radioactive by the interactions of the protons generated by the laser / target

interaction. These support structures are stored locally and returned to service after a few days when the radioactivity has reached background levels.

Very small amounts of tritium may be used in the facility. The annual discharge of tritium will be orders of magnitude less than the existing site authorisation.

There will be some activation products in the target area from neutron releases. All radioactive waste generated will be subject to the Radioactive Substances Act 1993 which requires that waste is minimised according to Best Practical Means (BPM).

All radioactive discharges will be below consent limits and authorisations imposed under the Radioactive Substances Act (1993).

3 ENVIRONMENTAL IMPACT DURING CONSTRUCTION ACTIVITIES

A Pre-Tender Environment, Safety and Health Plan (ESH) (Ref. HA/HAA12/A/3/SC/100253) has been prepared in support of the proposed development of the Facility, in line with the requirements of the Construction, Design and Management Regulations, 1994. This outlines potential environmental impacts associated with the construction, the successful contractor will augment this with a Construction Phase Health and Safety Plan, prior to the commencement of the construction activities. The ESH plan will be used to make the construction team aware of potential impacts and to define any specific procedures that are required to ensure that construction activities do not cause adverse environmental impacts. In addition to the ESH plan a Project Register of Environmental Aspects (PREA) will also be prepared for the construction and operational phases of the project. This is a specific requirement of CSI 1601 to ensure compliance with the AWE Environmental Management System (EMS). The construction phase and operational phase PREAs are presented in Appendix 7 and Appendix 8.

3.1 Traffic

AWE has undertaken a traffic survey and transport strategy (AWE/CD09/B/03-04/GFR11); this document projects the expected increases in traffic due to the construction of all major projects including Orion. Orion will only contribute a relatively small increase in traffic to the cumulative total, approximately 13 HGV's plus a maximum of 200 workers per day. The majority of vehicle movement will be during the normal working day (7am-6pm). Following an option study, the project management team have decided to bring the concrete into site via ready mixed concrete trucks, this will entail continuous 24-hour operation for up to one week for major elements, i.e. one truck arriving directly after another.

The main routes to be used are expected to be the A4 and A340 through Aldermaston Wharf and Village and the A340 through Tadley (the main routes from the M4 and M3). These routes will see a small increase in the number of vehicles using them during peak times. The primary entrance used for this traffic will be the West end of site; this will increase the congestion in this area by a minor amount.

During the peak of development work there is expected to be a 9% increase in the number of vehicles on site (approximately an additional 130 vehicles per hour during peak working hours (7-8am & 4-5pm), when compared with the current number of vehicles. Site traffic currently accounts for 61% of traffic on the surrounding roads during peak hours.

3.2 Noise

The noise from construction of Orion is not expected to be excessive. However it is a construction site and some noise will be generated. Most work will be carried out during working hours (7am – 6pm) so no disturbance is expected offsite. A construction noise assessment has been undertaken in accordance with the relevant British Standards. The model was based on a pessimistic assumption of the numbers of plant and running time (based on 5.5 day working). The noise modelling has indicated that the combination of construction plant and traffic is unlikely to lead to any complaints (in accordance with BS 4142 Method for rating industrial noise affecting mixed residential and industrial areas). There is predicted to be a <1dB(A) increase in noise level at the site boundary, nearest neighbour and the likely construction traffic routes. There will be a slightly higher increase at Aldermaston Court (Manor House and Portland House) however this increase is still below levels likely to cause complaints.

3.3 Surface Water Runoff

Surface water runoff will be captured from the new facility via the surface water drainage system and discharged through one of the surface water outfalls, which is approved and consented by the EA. The facility will be using 'grey' water for its domestic facilities.

See paragraph 4.8 for further information on water saving schemes, which will be used during normal operations.

3.4 Ecology

The proposed Facility is not being developed on an area of ecological significance. The existing site is considered to be brownfield as it lies within the boundary of Aldermaston site and is a paved area. The general area is already developed as part of the AWE (A) site and contains buildings with supply roads and paving. Intervening areas are grassed. The area is poorly colonised and receives only basic ground maintenance. As such the impact upon flora and fauna has been identified as minimal in preliminary assessments. However the ecology issues arising during the pre-construction

phase will be dealt with e.g. a mature tree is located on the site of the proposed development and its removal will need to be timed to minimise disruption to habitats that currently depend on it. All nesting birds are protected, so a survey will be required before removal of this tree. All tree removals will be carried out during the autumn. The project has funded the planting of six semi-mature trees around the AWE site to replace those removed.

3.5 Soil

EDGE Consultants UK LTD conducted an intrusive soil and groundwater contamination and geotechnical investigation on the proposed location. The investigation found elevated levels of lead in one soil sample; this exceeded Contaminated Land Exposure Assessment (CLEA) guidance for Industrial/Commercial Use. In Groundwater tests of four boreholes levels of Volatile Organic Compounds (VOCs) were found to be present above Environment Agency Environmental Quality Standards. The proposed location is adjacent to the A12Q area where VOCs are known to be present in relatively high levels, a remediation project is currently underway and the levels of VOCs found at the Laser Facility Site is expected to reduce. Due to the low levels of contamination, any contamination will be dealt with as part of AWE's site wide remediation commitment. Radiological testing has not identified any areas of concern to human health or soil disposal.

Any areas of made ground containing chemical contamination will be removed and disposed of in accordance with the requirements of Part 2 of the Environmental Protection Act 1990 and the associated waste statutory instruments such as the Waste Management Licensing regulations 1994, Special waste regulations 1996. The potential for the creation of dust due to wind-blown soil / building material particles is considered minimal, due to the limited potential area of exposed soil, the short time of exposure and adopting measures such as water damping as necessary. Thus the excavation of material from the area of the proposed Facility will have no adverse environmental impacts.

3.6 Groundwater

The strategy for the disposal of groundwater abstracted during construction is under development and will be discussed with the relevant authorities in due course.

4 ENVIRONMENTAL IMPACT DURING ROUTINE OPERATIONS

Each key environmental area has been identified and the interactive impacts of the proposed building during normal operations are reviewed below.

The decommissioning of the facility at the end of its life will be undertaken once a specific decommissioning safety case has been produced. At this stage only the general method of decommissioning of the facility, and any

potential environmental impacts, are known. However, the facility is being designed with decommissioning issues in mind. The generation of neutrons will lead to the activation of some equipment in the target area which will generate additional volumes of radioactive waste during eventual decommissioning. To reduce the amount of radioactive waste a six-month delay will be applied, this time period and associated decay will increase the amount of waste which can be sent as clean, free release. Radioactive waste remaining after this period will be the target chamber and pipework, vacuum pumps and chryso coils. A BPM for decommissioning will be produced as appropriate. An initial BPM study has been completed, this will be followed by a final BPM study to identify the final design requirements.

4.1 Humans

The proposed Facility is designed to operate in a safe manner, to protect both the local population and staff working within the facility and within the AWE site. It will be subject to a justification on safety grounds at each stage of its life cycle, i.e. design, construction, operation and decommissioning. This will be achieved through the production of Safety Cases for the various phases. All requirements of the Nuclear Site Licence will be met prior to construction commencing, throughout construction, commissioning and the operation of the Facility, and during decommissioning.

All requirements of building regulations will be met by the design, along with compliance with other statutory regulations including the Health and Safety at Work etc. Act, 1974. Due to AWE security requirements the fire safety requirements will be designed into the building e.g. specialist safety spaces and low fire hazard corridors, The plans have been approved by the HSE and MOD Fire Authorities.

A Facility Emergency Response Plan (FERP) will be prepared for site workers, during construction, and for staff during operations. The FERP will also contain details of contingency plans for accidental environmental discharges.

4.2 Radiation

Certain areas of the Facility will be designated for control under the Ionising Radiation Regulations, 1999. The area outside the facility will not require designation under the Ionising Radiation Regulations, 1999.

Experiments are conducted in a controlled and enclosed environment with shielding up to 1.5metres thick. This shielding is designed to limit the maximum gamma dose outside the experimental area to 0.5mSv per year.

This means that the remainder of the building is categorised as being suitable for general access, as is the area immediately outside the building adjacent the experimental area.

The lasers will focus on a target chamber, a sealed vessel housing the ~~laser~~ targets. The action of the lasers when fired at the target will generate a burst of intense ionising radiation, including gamma and fast neutrons.

These bursts will occur over a very short duration, but require that the walls of the Target Hall be capable of acting as shield walls to ensure that as far as is possible, no radiation escapes outside of the Target Hall. For this reason the walls of the Target Hall will be 1.5 metre thick reinforced concrete.

The Orion laser target area will be provided with an electrically shielded enclosure to control the emission of the electromagnetic transients generated by the laser target. This will ensure the environment in the remainder of the Orion building and immediately outside will meet the limits given in BS EN 61000-6-3, Generic Standard - Emission Standard for Residential, Commercial and Light-Industrial Environments.

Since electromagnetic radiation falls rapidly with distance (roughly inverse square law) then adherence to this standard will ensure there is no environmental impact outside the AWE site. Compliance with BS EN 61000-6-3 is required within the Orion building to enable the use of low cost commercial/domestic equipment and ensure the safety of personnel. Compliance with BS EN 61000-6-3 will also ensure compliance with the European EMC Directive, Wireless Telegraphy Act and NRPB Restrictions on Exposure to Electromagnetic Fields.

Further control measures will be applied to prevent conducted EMP from being a problem both to the rest of the AWE site and to services external to AWE.

The facility will also be designed to modern standards for laser safety (non-ionising radiation). The design will be in accordance with British Standards 60825 series of documents.

4.3 Noise

The facility will be designed in order to minimise the impact of any noise at the site boundary.

Ambient and specific noise level surveys were undertaken in September 2001 and compared against WHO guidelines for nuisance and do not represent a pollution problem.

A Noise Survey was carried out in March 2005 in accordance with British Standards, the results were assessed against the likelihood of complaints. At perimeter locations during the daytime it was found that the noise from the AWE site, although audible at a few locations, is not the dominant noise source, this can be assigned to local traffic. At night plant noise is more noticeable but still unlikely to cause complaints.

4.4 Traffic

The operational traffic for the facility is expected to be 50 staff per day (existing HELEN staff) plus visitors, a relatively minor increase in vehicles. The number of visitors will be a maximum of 12 per day for 60 days of the year. The main routes used will be the A340 through Aldermaston and Tadley. There will be an impact on the West Gate entrance due to the increase in staff using that gate for access to other facilities. The Orion Facility is not expected to be commissioned until early 2010.

4.5 Surface / Groundwater

The foul and surface water drainage systems for the proposed site will be designed to ensure integrity and all effluent will be removed by piped systems. Water discharged into the surface water drainage system will pass into one of the surface water outfalls, where water is monitored by chemical analysis and released to local surface water courses under EA consent.

The construction of the proposed Facility should have no impact upon the direction of groundwater flow beneath the building. The Facility will require limited volumes of water for domestic and cleaning activities during operation, and therefore will not place additional demands upon the volume of groundwater abstracted by AWE (A) from the Chalk aquifer. In summary, the potential for radioactive or other contamination of the surface or groundwaters is negligible during routine operations.

4.6 Air Quality

All toxic gaseous emissions will be subject to filtration using scrubbers, carbon filtration or High Efficiency Particulate Air (HEPA) filtration before discharge to the environment. These discharges will be assessed and the methodology documented including all assumptions. All discharges from the facility will remain within EA agreed limits for the AWE site.

On the existing laser research facility, HELEN, amplifiers and mechanical components are cleaned using a solvent (HFE7100) in a high-pressure spray booth and ultrasonic tank. This cleaning facility reclaims a proportion of the solvent for reuse.

There are 2 circumstances under which Amplifiers and mechanical components require cleaning:

- Prior to initial assembly
- When components require replacing

The major consumption of HFE7100 occurs during initial assembly. Components are replaced infrequently (about every 5 years) so the day-to-day use of HFE7100 is not significant.

If the HELEN cleaning facility were used to clean all the new ORION amplifiers prior to initial assembly, it is estimated that 900 litres of HFE 7100 would be required. (50 Amplifiers x 1 barrel of solvent each at 18 litres solvent per barrel). Additional solvent would be required for cleaning mechanical components. Total consumption of HFE7100 for initial cleaning could be in the region of 1000 - 1500 litres.

The component replacement programme is likely to need about 1 barrel (18 litres) of HFE7100 every 2 –4 months.

HFE7100 is manufactured by 3M and replaces traditional ozone depleting solvents. It is non-ozone depleting, has low global warming potential (GWP) and is not a volatile organic compound (VOC). This grade has one of the lowest toxicological profiles of the new CFC replacement materials. Nevertheless, in the detail design phase, the project team will use Best Practicable Means (BPM) studies to substantiate the cleaning facility design.

Alternatives, which could be considered, include:

- Improved solvent recovery
- Use of a water-based system (uses a solution of demineralised water and surfactants)

4.7 Visual Impact

The building will be built to modern standards and be in keeping with surrounding developments. The overall building envelope is described in section 2.1.

The facility will not have an adverse effect on visual impact, when mitigating factors such as external treatment and landscaping are considered. Planting at the perimeter of the site will rapidly obscure the view from the perimeter at Paices Hill. In addition, views from inside the perimeter when at the Recreation Society for example, will be made more attractive by the proposed external treatment.

4.8 Energy Usage

The following will be developed to reduce energy usage in non-experimental areas:

- High efficiency thermal insulation of the building
- High efficiency, low NOx boilers
- Air to Air plate heat exchangers on all ventilation equipment.
- Variable speed pumping on LPHW, Chilled water and De-mineralised water systems.
- Optimised control, night set back (taking into account condensation calculations). This relates to air & water heating systems & ventilation system air volumes including clean rooms.
- Variable speed drives on ventilation system fans, i.e. speed invertors.
- Energy efficient motors and fans
- Lighting management systems and the use of energy saving lamps and tubes with high frequency switchgear.
- Grey water system for toilet and urinal flushing. (Collection of rainwater from building roof)
- Improvement of power factor correction.
- Use of active harmonic filters.
- Use of percussion spray taps with auto shut off on wash hand basins.
- Showers with flow rates between 9 and 6 litres/min.
- WC's with 6.0 litre flush.
- Proximity infra red controls for urinal flushing.

5 OPERATIONS DURING ACCIDENT CONDITIONS

AWE has in place emergency procedures designed to respond to incidents, as required by Site Licence Condition 11, Emergency Arrangements. A Safety Case will be produced which identifies the hazards and quantifies risk within the facility and the mechanisms to be put in place to control accident conditions. The emergency response plans deal with the specific or generic hazards identified within the safety case and how the impacts can be minimised.

AWE Aldermaston is a Control of Major Accident Hazards (COMAH) site and is regulated under this by the EA /HSE. The company has its own Major Accident Prevention Policy (MAPP) [Ref.AWE/DSDG/A/PS/AD/007] and all facilities are required to keep inventories of chemical holdings and identify potential Major Accidents to the Environment (MATTE). All MATTE scenarios will have a contingency plan as part of their Facility Emergency Response Plan.

ENVIRONMENTAL SETTING

6.1 General

The AWE (Aldermaston) site is located on the border between Hampshire and Berkshire, approximately 10 miles south east of Newbury and 11 miles south west of Reading. The Aldermaston site covers an area of approximately 250 hectares and is located on an upland plateau, at an elevation of about 100 metres above Ordnance Datum. The AWE site is generally level, with little natural relief. The AWE site lies to the south of the valley of the River Kennet, between Brimpton in the west and Burghfield Common to the northeast.

The AWE site is roughly triangular in shape. A dense network of roads, buildings and paved areas covers the central and much of the western part of the site. The eastern half of the site is more open, with wooded and grassed areas. An open area of playing fields is present on the western section of the site.

Land use in the surrounding area is predominantly rural, with the exception of the small village of Aldermaston to the northwest and the larger conurbations of Heath End and Tadley to the south. The remainder of the immediately surrounding area consists of deciduous and coniferous woodland. Wasing Wood and Paices Wood are located to the west, Benyon's Enclosure to the east and Aldermaston Court to the north. To the west of the site, adjacent to Wasing Wood, is located an area of historic gravel extraction which is currently utilised as a public waste amenity site (garden waste only). Young's Industrial estate is located upon part of the former area of gravel extraction. This comprises light industrial premises and plant associated with the former gravel extraction activities.

6.2 Geology

Information about the geology beneath the AWE site has been obtained from the British Geological Survey 1:50,000 map for the area, and from numerous intrusive investigations that have been undertaken across the site by the company. The geological sequence (from the surface) is described below;

- Made ground is present on parts of the site, generally consisting of re-located natural materials of orange - brown, silty, sandy clay and silty sand with gravel - size fragments of flint, brick, tile and concrete. Where present the made ground is often less than 3m in thickness.
- The Plateau Gravels consist of coarse grained gravels, which vary in thickness from about 1m in the north west of the AWE site to between 3 and 4 m in the east, with deposits of up to 6m in certain areas. The base of the Plateau Gravels is undulating in nature.
- The Bagshot Beds consist of sands, silts and silty sands to silty clays. They are variable in depth across the site, due to their fluvial nature, and in a number of areas comprise a thin upper clay unit, underlain by a sand unit, underlain by a lower, thicker clay unit. They are approximately 15m to 18m in thickness.

- The uppermost beds of the London Clay comprise alternations of fine sand and silty clay which pass down into a compact blue grey clay. These uppermost beds of the London Clay are often difficult to distinguish from the overlying Bagshot Beds; however, at two locations on AWE site a siltstone gravel layer has been proven between the Bagshot Beds and the London Clay. The London Clay has been shown to be between 80 and 90m in thickness within the AWE site water supply boreholes.
- The Reading Beds, formed of mottled grey green silty clays and sands, underlay the London Clay, and are about 10m in thickness.
- The Upper Chalk is a very fine grained, consolidated, but relatively soft, white pure limestone containing vertical fissures and horizontal bedding planes and containing nodules and tabular layers of flint.

6.3 Hydrogeology

6.3.1 Regional

The Chalk is a major aquifer of national importance, with significant groundwater abstractions via boreholes by Water Utilities, Water Supply Companies, industry and private individuals within the Berkshire / Wiltshire area and eastwards towards London. In addition to groundwater supplies the Chalk provides spring sources and baseflow to streams from the Marlborough, Berkshire and North Hampshire Downs and Chiltern Hills which feed the Thames and maintain water abstractions in the London area.

The Plateau Gravels and the Bagshot Beds form shallow aquifers (such as that beneath the AWE site), which may be locally extensive. Domestic and agricultural abstractions from the shallow aquifers have declined in number and a few remain, mainly for agricultural purposes. There are no public supplies drawn from these beds within the Berkshire / Wiltshire area.

6.3.2 Local

Two minor aquifers, contained within the Plateau Gravels and the Bagshot Beds, and one major aquifer, the Chalk, are present beneath the site. The Groundwater Vulnerability Map for the Upper Thames and Berkshire Downs (Ref. 8) indicates that the Plateau Gravels are highly vulnerable to contamination where present at the surface, whilst the Bagshot Beds are of intermediate vulnerability where they outcrop. The London Clay is of hydrogeological significance, as it confines the underlying Chalk and also reduces its vulnerability to contamination, as the London Clay is generally an aquiclude, preventing the migration of contaminated groundwater from the surface. The Chalk is the most permeable of the deposits and is used as a major water supply source.

Hydrogeological studies undertaken within the AWE site indicate that groundwater tables are present within both the Plateau Gravels and the Bagshot Beds. The elevations of the respective water tables vary seasonally, with a range of approximately 0.5m to 1m. It is considered that groundwater

within the Plateau Gravels flows radially beneath the AWE site from a 'high point' near the southwestern corner of the site.

The groundwater within the Chalk is considered to flow generally towards the east, but may be influenced locally by the abstraction of groundwater by AWE (A).

Groundwaters within the Plateau Gravels flow radially from beneath the site, and are discharged either at springs located at the junction of the Plateau Gravels and the Bagshot Beds, or as baseflow into surface waters and streams. In a similar fashion, groundwaters within the Bagshot Beds will either discharge at springs that form at the junction of the Bagshot Beds and the London Clay, or will form baseflow into surface waters and streams. The greater hydraulic conductivity of the Plateau Gravels means that the majority of the recharge to the AWE site in the form of precipitation will remain within the Plateau Gravels, with approximately 2% recharge of groundwater from the Plateau Gravels into the underlying Bagshot Beds.

6.3.3 Groundwater Quality

The quality of the groundwater in the Chalk of the western end of the London Basin (in particular the area between Lambourne and Basingstoke) has been the subject of detailed investigation by the British Geological Survey. The survey shows the Chalk groundwater to be of good quality but with local evidence of contamination.

6.3.4 Groundwater Abstractions

There is a large public supply borehole within 4km of AWE (A); Thames Water Utilities abstract groundwater from the Chalk 3km north west of the AWE site at Ufton Bridge.

Groundwater abstractions require licensing by the Environment Agency if the abstraction exceeds $50 \text{ m}^3 \text{ yr}^{-1}$. Abstractions of a lesser volume are recorded by the Local Council's Environmental Health Department. There are six licenced groundwater abstractions located within a 3km radius of the site. These are listed within Appendix 1. There are nine private, unlicensed groundwater abstractions located within a 3km radius of the site. These are listed within Appendix 2.

6.4 Hydrology

The Environment Agency lists eight surface watercourses within 3km of the centre of the AWE site. Of these four are classified under the Environment Agency's (EA) General Quality Assessment (GQA) Scheme. The GQA scheme was introduced in order to quantify surface water quality and to identify water quality trends over time. The scheme classifies the surface waters with regard to biological oxygen demand (BOD) dissolved oxygen and total ammonia, with there being six categories. These are A - very good (water suitable for any abstraction and very good salmonid and cyprinid fisheries), B - Good, C - fairly good (potable supply after advanced treatment

and a natural ecosystem, D - fair, E - poor, F - bad (very polluted river which may cause nuisance and severely restricted ecosystem).

The eight watercourses are listed below:

- Fishermans Brook
- Aldermaston Stream
- River Enborne
- Wasing Stream
- Westend Brook
- Padworth Stream
- Silchester Brook
- Church Brook

Appendix 3 contains the classifications of the four of these local surface waters which are recognised within the GQA scheme. The Environment Agency has indicated that there are five surface water abstractions within 3km of the proposed location. These are listed within Appendix 4.

6.5 Sites of Nature Importance

Information has been obtained regarding the location of sites of nature importance within 3km of the proposed location. This has indicated that there are two sites of nature significance within 1km of the proposed location. Within 3km of the proposed location are 9 statutory Sites of Special Scientific Interest, 1 Local Nature Reserve and 1 National Nature Reserve. Information on the SSSIs has been provided by English Nature, and the SSSIs are listed within Appendix 5. An indication of the reason for the SSSI notification is included.

6.6 Location of Landfill Sites

Seven landfill sites have been identified within 1km of the proposed location. None of these landfills have valid operating licences, indicating that the licences have either been surrendered, returned, expired, lapsed or revoked, or the landfill was operated prior to the requirement for licensing under the Control of Pollution Act, 1974. Six of these landfills were associated with the large gravel works located 500m southwest of the proposed location. The landfills are listed within Appendix 6. geotechnical information.

6.7 Summary of Environmental Setting

The proposed location of the Facility is within a developed area of the AWE site. The area is presented in the NOPD (Ref 5) and will be almost completely surrounded by existing AWE buildings and facilities. The surrounding land comprises woodland and agricultural land, with local populations within the village of Aldermaston to the northeast and Tadley to the south.

The immediate area surrounding the proposed location of the Facility is not considered environmentally sensitive, due to the heavily industrialised nature of the AWE site. However, the general area surrounding the AWE site is considered sensitive, due to its rural nature with good quality groundwaters, surface waters and sites of nature conservation significance.

It is considered that the sensitive environment in the area surrounding the AWE site will not be impacted upon by the construction or operation of the proposed Facility.

7 SUSTAINABILITY APPRAISAL

A sustainability appraisal has been undertaken in accordance with the Sustainability Appraisal Handbook – For the MoD Estate (Version 3.1, October 2003). The appraisal team consisted of representatives from the MoD, the Orion Project and AWE Planning and Environment Departments. This section of the AEI document summarises the findings of the appraisal – the impacts of Project Orion during construction and operation phases and the mitigation measures which the project team have put into effect. It also identifies the following further actions which will be undertaken:

- The strategy for the disposal of abstracted groundwater to be finalised and discussed with and presented to the relevant authorities prior to implementation
- A plan to be drawn up for accommodating the potential for unexpected features to be discovered with the advice of the MoD's archaeology specialists.
- A specialist ecologist to be employed to inspect the only area with the potential to provide a habitat for protected species.

The sustainability assessment can be found in Appendix 9.

8 CONCLUSION

The Assessment demonstrates that the operations to be undertaken within the proposed Facility do not represent a significant environmental impact. The construction, operation and eventual decommissioning will be carried out in accordance with the AWE SMS and EMS which will ensure adequate controls are in place to manage safety and environmental impact. The factors outlined below are considered important in displaying the low environmental impact of the proposed facility:

- *Construction activities will cause limited increases in traffic volumes over the construction period, and noise effects will be minimal during construction.*
- *During normal operations environmental impacts are insignificant with respect to site totals and the new facility will present an improvement over the existing arrangements.*
- *The visual impact of the facility will be minimised, and there will be no significant increase in noise levels background levels within the area.*
- *Other local developments will be built to harmonise with the facility .*

The potential for release of material into the environment and consequent contamination is extremely low, given the systems and procedures in place. The construction and normal operations of the proposed Facility are therefore considered to have the potential for minimal environmental impact. The construction of the proposed replacement LASER facility will improve the overall environmental impact of the AWE Aldermaston site.

References

1 Town and Country Planning (Environmental Impact Assessment) (England and Wales) Regulations 1999.

2 Environmental Assessment- A Guide to the Procedures. Department of the Environment, HMSO 1989

3 Preparation of Environmental Assessments for Planning Projects that Require Environmental Assessment - A Good Practice Guide. Department of the Environment, 1995.

4 Department of the Environment Circular 02/99 'Environmental Impact Assessment'

5 NOPD Submission DSD01/B/CV/NOPD/HAA13000/001, issue 07, 12th August 2005.

Appendix 1: Licensed Groundwater Abstractions within 3km of AWE (A)

- Mrs J Rayner is licensed to abstract $1,659 \text{ m}^3\text{yr}^{-1}$ from the Bagshot Beds for agricultural purposes at Pamber Heath, 800m south east of the proposed location.
- W Owen is licensed to abstract $1,659 \text{ m}^3\text{yr}^{-1}$ from River Gravels for agricultural purposes at Fronds Farm, Aldermaston, 2km north of the proposed location.
- The Old Mill Hotel is licensed to abstract $909 \text{ m}^3\text{yr}^{-1}$ from the Chalk 2km north of the proposed location.
- The Environment Agency is licensed to abstract $55,000 \text{ m}^3\text{d}^{-1}$ from the Chalk for flow augmentation 900m south east of the proposed location.
- Blue Circle plc are licensed to abstract $22,457 \text{ m}^3\text{yr}^{-1}$ from the chalk for university spray irrigation 500m north of the proposed location.
- Padworth Trout Farm Ltd is licensed to abstract $935,859 \text{ m}^3\text{yr}^{-1}$ from the River Gravel for fish farming 1.75km north east of the proposed location.

Appendix 2: Unlicensed groundwater abstractions within 3km of AWE (A).

- Groundwater is abstracted from the River Gravels at Padworth Mill, 2.5km north east of the proposed location for domestic use.
- Groundwater is abstracted from the River Gravels 2km north of the proposed location at Aldermaston Bridge for domestic use.
- Groundwater is abstracted from the River Gravels 2km north of the proposed location at Aldermaston Bridge for domestic use (at the same point as above).
- Groundwater is abstracted from the River Gravels on Mill Lane, Padworth, 2.5km north east of the proposed location for domestic use.
- Three groundwater abstractions are located within Baughurst, approximately 3km south west of the proposed location.
- Two groundwater abstractions are located within Silchester, approximately 3km south east of the proposed location.

Appendix 3: General Quality Assessment of watercourses

Watercourse	Stretch	GQA Classification		
		1998-2000	1999-2001	2000-2002
River Enborne	West Woodhay - Bishops Green STW	A	B	B
River Enborne	Bishops Green STW - Baughurst Bk.	A	B	B
River Enborne	Baughurst Brook - Kennet	A	A	B
Fishermans Brook	Source - Padworth Stream	C	C	C
Padworth Stream	Old Warren - Kennet	B	B	B
Silchester Brook	Tadley - Silchester STW	B	B	B
Silchester Brook	Silchester STW - Foundry Brook	B	C	B

Appendix 4: Surface Water Abstractions Within 3km of AWE (A).

- Wasing Farm are licensed to abstract 9,092 m³yr⁻¹ from a lake and the River Enborne for agricultural spray irrigation, located 1.5 km west of the proposed location.
- 2.3 m³yr⁻¹ is abstracted from unnamed inland water within Tadley, 2.2 km south of the proposed location for non-agricultural lake filling.
- Fosters Farm is licensed to abstract 22,730 m³yr⁻¹ from unnamed inland water 1km north west of the proposed location for lake filling.
- Mill Lane, Padworth, is licensed to abstract 39,528,000 m³yr⁻¹ from the River Kennet 2km north east of the proposed location for fish farming.
- 5,800 m³yr⁻¹ is abstracted from unnamed inland water within Paices Wood, 600m west of the proposed location, for spray irrigation.

Appendix 5: Sites of Special Scientific Interest Within 3km of AWE (A).

- Brimpton Pit, located 3km west north west of the site, is a working gravel pit of very considerable importance to geologists because of evidence which it provides for environmental change during the Ice Age, the warm phase named the 'Brimpton Interstadial'. It is also a key site in elucidating the history of the development of the River Thames.
- Woolhampton Reed Bed, 3km north west of the site, consists of dense reed bed with smaller areas of tall fen vegetation and carr woodland, is notable for its nesting bird population and diverse insect population. The site supports a large colony of reed warblers and over 300 species of moth, many of which are rare or uncommon, and 160 species of flies.
- Aldermaston Gravel Pits, 3km north of the site, consists of mature flooded gravel workings surrounded by dense fringing vegetation, trees and scrub, affording a variety of habitats for breeding birds and a refuge for wildfowl. The surrounding marsh and scrub are important for numerous birds including 9 breeding species of warbler, water rails, kingfishers and an important breeding colony of nightingales.
- Decoy Pit, Pools and Woods, located adjacent to the east of the site, comprises a mosaic of habitats including woodland, heathland, grassland and small waterbodies. The special interest of the site is twofold, firstly it supports the greatest number of breeding dragonfly and damselfly species in Berkshire, and secondly it includes alder woodland types which are nationally uncommon and a declining habitat. 23 species of dragonfly and damselfly breed within the site, including three nationally scarce species. Other nationally uncommon species include the woodlark, the silver-studded blue butterfly and the Devon carpet moth
- Wasing Wood Ponds, 800m south west of the site, includes a group of ponds, wet ditches and marshy areas partly in Wasing Wood and partly on open ground formerly excavated for gravel. The site is especially important for dragonflies, some of the species being very uncommon.
- West's Meadow, Aldermaston, 300m south of the site, comprises two small fields of pasture bounded by hedgerows and a small stream. The meadows consist of neutral to acidic herb-rich grassland including both well-drained areas and wetter areas of base-poor marsh. The meadow contains over 80 species of grassland plant, which is a high figure for this type of rare and rapidly declining unimproved meadow.
- Ron Ward's Meadow and Tadley Pastures, 3.5km south of the site, comprises a main meadow of unimproved, herb-rich grassland, managed traditionally as a hay meadow. There are 28 species indicative of ancient grassland present, of which a number are uncommon, making it one of the finest surviving hay meadow / pasture complexes in Hampshire.
- Pamber Forest and Silchester Common, 2km south east of the site, consist of extensive ancient oakwood, two heathland commons and a series of unimproved wet meadows. This association of ancient woodland, heath and grassland supports a diverse range of plants and animals, including many nationally rare species and three species of bird

listed in Annex 1 of the EC Directive on Conservation of Wild Birds, the woodlark, nightjar and Dartford warbler.

- Ashfold Hill Woods and Meadow, located 3.5km southeast of the proposed location, comprises an extensive and varied complex of woodlands and agriculturally unimproved meadows. The site is remarkable in its habitat quality, diversity of communities and number of rare and threatened species, and is without comparison in central southern England. The meadow supports 31 species of butterfly and over 400 species of moth.

Appendix 6: Locations of Landfills Within 3km of the Proposed Location

- Budd's Plantation, 1.2km south east of the proposed location, accepted construction and demolition wastes and excavated natural materials.
- Paices Hill, 920m north west of the proposed location, contained controlled wastes, excavated natural materials, hardcore and rubble.
- Young's Development (3), 940m south east of the proposed location, accepted excavated natural materials and inert builders / demolition waste.
- Paices Hill, 800m north west of the proposed location, accepted excavated natural materials and inert builders / demolition waste.
- Young's Development (2), 1km west of the proposed location, contained construction and demolition wastes, excavated natural materials, soil and high-density/hard/bonded/cement asbestos.
- Silt Ponds, Paices Hill, 750m west of the proposed location, accepted Berkshire Type A non-decomposing waste and small volumes of hard asbestos.
- Court Farm, Aldermaston, 1.4km north east of the proposed location, accepted excavated natural materials, inert builders/demolition waste, paper/cardboard waste, plasterboard and wood.

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Appendix 7: Construction Phase PREA

Corporate Significance	ASPECT	Contribution. Y/N	Significant S / NS	DESCRIPTION	ENGINEERED SYSTEMS	MANAGERIAL SYSTEMS
Releases To Air						
High	To Air – Radioactive Materials	N	N/A	No radioactive materials will be used during the construction phase. Some legacy radioactive material may be in the ground that will be remediated under controlled conditions prior to construction.	Any legacy material present in the ground will be remediated under controlled conditions using containment systems. There will be no aerial discharges.	
Medium	To Air – Ozone Depleting Substances	N	N/A	ODS material may be present in some of the refrigerators used by construction personnel. However these will be sealed and will not present a risk under normal conditions.		
Medium	To Air – Greenhouse Gases	Y	NS	Portable generators will contribute to this aspect, as will road vehicles. Compared to the site total this is not considered to be a significant contribution.		
Low	To Air – PPC Main Polluting Substances beryllium	N	N/A	beryllium is not used or discharged during the construction phase.		

Corporate Significance	ASPECT	Contribution. Y/N	Significant S / NS	DESCRIPTION	ENGINEERED SYSTEMS	MANAGERIAL SYSTEMS
Low	To Air – PPC Main Polluting Substances Acids	N	N/A	Acids are not used or discharged during the construction phase.		
Low	To Air – PPC Main Polluting Substances Lead	N	N/A	Lead is not used or discharged during the construction phase.		
Low	To Air – Volatile Organic Compounds	Y	NS	Solvent-based paint may be used for decorating purposes. The contribution is not considered to be significant. There may be some solvent contamination present in the ground which could be released during construction.	Appropriate PPE will be used to protect operatives. Site survey is being undertaken to determine the presence of solvent contamination.	Work will be carried out by trained operatives under a safe system of work.
Releases to Water						
High	To Water – Radioactive Material	N	N/A	Radioactive effluent will not be routinely discharged during the construction phase. Any legacy material in the ground may result in contaminated groundwater that may have to be pumped out and discharged during excavation operations.	Precautions as defined in the BPM study and safety documentation will be followed to minimise radioactive effluent discharges.	Contaminated groundwater will be discharged in accordance with the Radioactive Substances Act 1993 according to a BPM study.

UNCLASSIFIED

Corporate Significance	ASPECT	Contribution. Y/N	Significant S / NS	DESCRIPTION	ENGINEERED SYSTEMS	MANAGERIAL SYSTEMS
High	To Water – Engineered Surface Water e.g surface water drains	N	N/A			
High	To Water – Unengineered Surface Water	N	N/A			
Medium	To Water – Trade Effluent	Y	NS	A small quantity of trade effluent may be generated during the construction phase. This is likely to arise from trenching operations and excavations that expose legacy solvent contamination in the ground. Groundwater will be pumped into bowzers, sampled and discharged via Trade Waste. Any rainwater that fills the excavations will have to be pumped and disposed of as Trade Effluent. The contribution is not considered to be significant.	A site survey specifically for the Orion project has been completed no contamination was found.	A waste service agreement will be prepared and approved to allow for the collection and disposal of trade effluent.

UNCLASSIFIED

Corporate Significance	ASPECT	Contribution. Y/N	Significant S / NS	DESCRIPTION	ENGINEERED SYSTEMS	MANAGERIAL SYSTEMS
Low	To Water – Domestic Effluent	Y	NS	<p>Domestic effluent will be generated by the construction team throughout the duration of the project.</p> <p>Based on a team of 100 using approximately 50 litres a day for 18 months gives a contribution of 1875000 litres. This is less than 10% of the site contribution and is therefore not considered to be significant.</p>		The Head of Construction will provide recommendations for minimising water use.
Releases to Waste						
High	To waste – Radioactive Waste	Y	N/S	<p>Radioactive waste will not be generated as part of the routine construction phase. However any legacy contamination in the ground will have to be remediated and may generate some radioactive waste.</p>		<p>Safe Systems of Work will be followed.</p> <p>A BPM study in accordance with the Radioactive Substances Act 1993 will ensure discharges are kept to a minimum should any contamination be found.</p>

Corporate Significance	ASPECT	Contribution. Y/N	Significant S / NS	DESCRIPTION	ENGINEERED SYSTEMS	MANAGERIAL SYSTEMS
Low	To Waste – Hazardous (including toxic) Waste	Y	NS	<p>Toxic waste is not expected to be generated during routine construction phase work. Note: Solvents from groundwater will be disposed of via trade effluent. Any soils which are contaminated with solvents will need to be disposed of as hazardous solid waste through the company system.</p> <p>Empty paint tins, oil residues and some construction waste may be toxic waste. The overall contribution is not considered to be significant.</p>		<p>Safe Systems of Work will be followed.</p> <p>A waste service agreement will have to be prepared and approved to allow waste to be disposed of via waste management group using the form 43 system. This type of waste will be classified as special waste in accordance with the 1996 regulations. A 3 day notice period to the Environment Agency is required for transfers of Special Waste.</p>
Low	To Waste – Domestic Waste	Y	NS	<p>Domestic waste including rubble, waste building material, food wrappings, empty drink containers and paper will be generated during construction of the new facility. The contribution is not considered to be significant compared with the rest of the site.</p>		<p>The site has a policy of re-use and recycling where possible. Blue bins will be made available for recycling paper waste. Onyx run a yard for the collection of wood and metal assets.</p>
Resource Use						
High	Resource Use – Special Nuclear Material use and storage.	N	N/A	<p>SNM will not be used or stored during the construction phase of the project.</p>		

Corporate Significance	ASPECT	Contribution Y/N	Significant S / NS	DESCRIPTION	ENGINEERED SYSTEMS	MANAGERIAL SYSTEMS
Medium	Resource Use - Chemical and Oil Storage and Use	Y	NS	Various paints, chemicals and oils will be used during the construction phase. Diesel and petrol fuel may be used to power generators for various power tools. The contribution is not considered to be significant.	All oil and fuels will be stored in fully bunded enclosures. Spill kits and contingency plans in the event of leakages will be prepared.	
Medium	Resource Use -Water on site	Y	NS	The construction staff will use water from the on-site boreholes. The contribution is estimated at 1875000 litres in total for the period of construction. This is less than 10% of the site annual total and not considered to be significant.		The Head of Construction will provide recommendations for minimising water use.
Low	Resource Use -Water off site	N	N/A	Off-site water supplies will not be required		
Low	Resource Use - Other	N	N/A			

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Corporate Significance	ASPECT	Contribution. Y/N	Significant S / NS	DESCRIPTION	ENGINEERED SYSTEMS	MANAGERIAL SYSTEMS
Low	Resource Use - Electricity and Gas	Y	NS	Some temporary electrical installations will be required to power portakabins and temporary accommodation for construction workers. Over the 18-month construction period the contribution is not considered to be significant compared with the site total contribution of 4 E8 kWh.		General awareness campaign and environmental training as part of the site induction process.
Land Quality						
High	Land quality - Radioactive	N	N/A	Land quality is a corporate issue. Any legacy contamination may have to be remediated prior to commencement of construction activities	EDGE Consultants carried out a project specific investigation, no major contamination was found. It will be dealt with as part of Awe's site wide Land Quality program.	
High	Land Quality - Solvents	N	N/A	Land quality is a corporate issue. Any legacy contamination may have to be remediated prior to commencement of construction activities	EDGE Consultants carried out a project specific investigation, no major contamination was found. It will be dealt with as part of Awe's site wide Land Quality program.	
Medium	Land Quality - Metals	N	N/A	Land quality is a corporate issue. Any legacy contamination may have to be remediated prior to commencement of construction activities	EDGE Consultants carried out a project specific investigation, no major contamination was found. It will be dealt with as part of Awe's site wide Land Quality program.	
Nuisance						

Corporate Significance	ASPECT	Contribution. Y/N	Significant S / NS	DESCRIPTION	ENGINEERED SYSTEMS	MANAGERIAL SYSTEMS
Low	Nuisance - Odour	Y	NS	Some odours from construction are inevitable although this is not expected to cause any nuisance.		
Low	Nuisance - Noise	Y	NS	Some noise during construction activities is expected. The contribution compared with the rest of site is considered to be significant, as the noise will not be attenuated by a building fabric, except where those affected are in surrounding buildings. The excavations required for the facility are expected to be significant.		Normal working hours of 7am – 6pm will be used. Noise surveys will be periodically carried out. A construction noise assessment is being completed.
Low	Nuisance - Light	Y	NS	Some lighting will be required for construction work that is carried out in winter months or during silent hours. The contribution is not considered to be significant.	Two main types of lighting will be used floodlighting and festoon lighting.	Normal working hours will be used where possible.

Corporate Significance	ASPECT	Contribution. Y/N	Significant S / NS	DESCRIPTION	ENGINEERED SYSTEMS	MANAGERIAL SYSTEMS
Low	Nuisance - Visual Impact	Y	NS	<p>The building when complete will be approximately 100m long x 40 m wide and 25 m high. Although this is a large structure and on the Aldermaston site fence it will be commensurate with the nearby conference centre and not present a significant visual impact.</p> <p>See paragraph 2.1 for comments on building size.</p>		<p>The final building will be finished to modern standards in keeping with the surrounding site.</p> <p>The development's plans will be subject to scrutiny by the MoD and the Local Authority as appropriate as part of a Notification Of Planning Development (NOPD).</p>
Medium	Nuisance - Congestion	Y	S	<p>Construction traffic is expected to be on site for a period of 18 months. Several lorries per day and heavy machinery will be required to carry out excavations and transfer spoil round the site. The additional traffic is considered to be significant.</p>		<p>A control plan for the movement of vehicles will be developed with the Head of Construction.</p>
Ecology						

Corporate Significance	ASPECT	Contribution. Y/N	Significant S / NS	DESCRIPTION	ENGINEERED SYSTEMS	MANAGERIAL SYSTEMS
Medium	Ecology - Species	Y	NS	Construction work will disrupt species local to the area of the proposed development. All nesting birds are protected so care should be taken when removing the tree that is on the site. Advice should be sought from the Green Line (5753).		An ecology survey will be carried out prior to work commencing. Contact the green line on Extn 5753 for advice about species. <i>Trees to be removed will be removed in the autumn months – trees removed will be replaced at another area of site. 6 semi mature trees will be planted.</i>
Medium	Ecology - Habitats	Y	NS	Construction work will disrupt any habitats local to the area of the proposed development. Advice should be sought from the Green Line (5753).		An ecology survey will be carried out prior to work commencing. Contact the green line on Extn 5753 for advice about species.
Medium	Ecology - Heritage	N	N/A	There is only one known heritage site at Aldermaston – Grimms bank. This site is some distance from the proposed location of the new laser facility.		

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Appendix 8: Operational Phase PREA

Corporate Significance	ASPECT	Contribution. Y/N	Significant S / NS	DESCRIPTION	ENGINEERED SYSTEMS	MANAGERIAL SYSTEMS
Releases To Air						
High	To Air – Radioactive Materials	Y	S	Some laser experiments will involve tiny amounts of radioactive materials. However, any potential impact of radioactive materials is automatically considered as significant	All discharges will be filtered using stages of High Efficiency Particulate Air (HEPA) filtration.	A BPM study will be required to demonstrate that waste discharged is minimised to comply with the RSA 1993. An initial BPM study has been completed which has identified the issues. The BPM needs to be completed in the detail design phase.
Medium	To Air – Ozone Depleting Substances	Y	N/S	ODS material may be present in some of the chillers used for temperature and humidity control in the building. The contribution, released during maintenance and losses is not considered to be significant.	New equipment used in the building will be to modern standards and use less harmful refrigerant gases than those used in older systems.	The design specification will need to specify ozone friendly materials.
Medium	To Air – Greenhouse Gases	N	N/A	The facility will not make any direct discharges of greenhouse gases. The facility will incorporate 2 natural gas powered boilers.		

Corporate Significance	ASPECT	Contribution. Y/N	Significant S / NS	DESCRIPTION	ENGINEERED SYSTEMS	MANAGERIAL SYSTEMS
Low	To Air - PPC Main Polluting Substances beryllium	Y	N/S	A small quantity of beryllium will be discharged in some of the laser experiments. The contribution is not considered to be significant. Note: See paragraph 2.2.1	Filtration will minimise discharges.	
Low	To Air - PPC Main Polluting Substances Acids	N	N/A	Acids are not used or discharged during routine operations.		
Low	To Air - PPC Main Polluting Substances Lead	N	N/A	Lead is not used or discharged during the operational phase.		

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Corporate Significance	ASPECT	Contribution. Y/N	Significant S / NS	DESCRIPTION	ENGINEERED SYSTEMS	MANAGERIAL SYSTEMS
Low	To Air – Volatile Organic Compounds	Y	N/S	<p>Solvents are not used in quantities that will result in aerial discharge. Some minor discharge may result from the use of solvents for cleaning applications but this is considered to be trivial.</p> <p>The optical cleaning methodology is currently being reviewed, however if solvents are used this will entail a higher contribution. When compared to the site contribution to this aspect this is considered to be non-significant.</p> <p>Note: See comments at paragraph 4.6. The solvents used for cleaning amplifiers are not Volatile Organic Compounds (VOC)</p>		Work will be carried out by trained operatives under a safe system of work.

Corporate Significance	ASPECT	Contribution. Y/N	Significant S / NS	DESCRIPTION	ENGINEERED SYSTEMS	MANAGERIAL SYSTEMS
Releases to Water						
High	To Water – Radioactive Material	N	N/A	Radioactive effluent will not be generated on routine basis.		
High	To Surface Water – Engineered Water e.g surface water drains	N	N/A	This aspect is concerned with the operation of the surface drainage network and is not applicable to the Orion project.		
High	To Surface Water – Unengineered Surface Water	N	N/A	This aspect is concerned with the operation of the various consented discharge points and is not applicable to the Orion project.		
Medium	To Water – Trade Effluent	Y	NS	The facility will be connected to the trade effluent drainage system. At this stage of the project the quantities are not known but not anticipated to be significant.		A waste service agreement will be prepared and approved to allow for the collection and disposal of trade effluent.

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Corporate Significance	ASPECT	Contribution. Y/N	Significant S / NS	DESCRIPTION	ENGINEERED SYSTEMS	MANAGERIAL SYSTEMS
Low	To Water – Domestic Effluent	Y	NS	<p>Domestic effluent will be generated by the operational staff.</p> <p>Based on an average team of 40 using approximately 50 litres a day gives an annual contribution of 500000 litres. This is less than 10% of the site contribution and is therefore not considered to be significant.</p> <p>Last sentence should read "This is less than 5% of the site contribution..."</p>		<p>The facility will reuse 'grey' water in the domestic facilities, reducing the amount of water required from the on-site borehole.</p> <p>See comments under paragraph 4.8 concerning water saving schemes.</p>

Corporate Significance	ASPECT	Contribution. Y/N	Significant S / NS	DESCRIPTION	ENGINEERED SYSTEMS	MANAGERIAL SYSTEMS
Releases to Waste						
High	To waste – Radioactive Waste	Y	S	<p>Radioactive waste, both ILW and LLW will be generated on a routine basis.</p> <p>Any contribution to this aspect is automatically significant.</p> <p>Small amounts of radioactive waste, LLW will be generated on a routine basis. No ILW will be produced.</p> <p>However any potential impact of radioactive materials is automatically considered to be significant.</p>		<p>Safe Systems of Work will be followed. A waste service agreement and quality control plan will be produced.</p> <p>A BPM study in accordance with the Radioactive Substances Act 1993 will ensure discharges of waste are kept to a minimum.</p>
Low	To Waste – Hazardous Waste	Y	N/S	<p>Beryllium and lead waste will be generated along with waste oil and solvent. The quantities generated are not known at this stage but are not anticipated to be significant.</p>		<p>Safe Systems of Work will be followed.</p> <p>A waste service agreement will have to be prepared and approved to allow waste to be disposed of via waste management group using the form 43 system.</p>

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Corporate Significance	ASPECT	Contribution. Y/N	Significant S / NS	DESCRIPTION	ENGINEERED SYSTEMS	MANAGERIAL SYSTEMS
Low	To Waste – Domestic Waste	Y	N/S	Domestic waste including, food wrappings, empty drink containers, cardboard and paper will be generated during routine operations in the facility. Based on a staff compliment of 40 people this is not considered to be significant.		The site has a policy of re-use and recycling where possible. Blue bins will be made available for recycling paper waste and other recycling e.g. cans. AWE Assets run a yard for the collection of wood and metal assets.
Resource Use						
High	Resource Use – Special Nuclear Material use and storage.	N	N/A	SNM will not be used or stored during the operation of the facility.		
Medium	Resource Use – Chemical and Oil Storage and Use	Y	N/S	Various paints, chemicals and oils will be used during the routine operations of the facility. The contribution is not considered to be significant.	All oil and fuels will be stored in fully banded enclosures. Spill kits and contingency plans in the event of leakages will be prepared.	
Medium	Resource Use –Water on site	Y	N/S	Water from the on-site boreholes will be used by the facility. The contribution is estimated at 500000 litres. This is less than 5% of the site annual total and not considered to be significant.	Fit Hippo cistern water savers	The facility should be fitted with Hippo, cistern water savers.

Corporate Significance	ASPECT	Contribution. Y/N	Significant S / NS	DESCRIPTION	ENGINEERED SYSTEMS	MANAGERIAL SYSTEMS
Low	Resource Use -Water off site	N	N/A	Off-site water supplies will not be required		
Low	Resource Use - Other	Y	N/A	<p>The building will be connected to the site steam supply and make use of consumable resources including paper.</p> <p>Comment: The building has its own boilers and it is therefore unlikely that it will be connected to the site steam supply.</p>	The building will be constructed to modern standards and be thermally efficient.	

Corporate Significance	ASPECT	Contribution. Y/N	Significant S / NS	DESCRIPTION	ENGINEERED SYSTEMS	MANAGERIAL SYSTEMS
Low	Resource Use - Electricity and Gas	Y	N/S	<p>The building will be connected to electrical supplies. The actual consumption is unknown but expected at this stage not to be significant. The gas use of the facility has been estimated at 1100kwh maximum. This is significantly less than 5% of the site total, therefore the contribution to this aspect is not significant.</p> <p>Note: Electricity usage is expected to be less than 1% of total site usage.</p>	The facility should be equipped with electricity metering.	General awareness campaign and environmental training as part of the site induction process.
Land Quality						
High	Land quality - Radioactive	N	N/A	Land quality is a corporate issue.		
High	Land Quality - Solvents	N	N/A	Land quality is a corporate issue.		

Corporate Significance	ASPECT	Contribution. Y/N	Significant S / NS	DESCRIPTION	ENGINEERED SYSTEMS	MANAGERIAL SYSTEMS
Medium	Land Quality -- Metals	N	N/A	Land quality is a corporate issue.		
Nuisance						
Low	Nuisance - Odour	N	N/A	Odour is not considered to be an issue.		
Low	Nuisance - Noise	N	N/A	Noise is not considered to be an issue.		
Low	Nuisance - Light	N	N/A	Light pollution is not considered to be an issue.		

Corporate Significance	ASPECT	Contribution. Y/N	Significant S / NS	DESCRIPTION	ENGINEERED SYSTEMS	MANAGERIAL SYSTEMS
Low	Nuisance – Visual Impact	Y	N/S	<p>The building when complete will be approximately 100m long x 40 m wide and 25 m high. Although this is a large structure and on the Aldermaston site fence it will be commensurate with the nearby conference centre and not present a significant visual impact.</p> <p>See paragraph 2.1 for comments about building size.</p>		<p>The final building will be finished to modern standards in keeping with the surrounding site.</p> <p>The development's plans will be subject to scrutiny by the MoD and the Local Authority as appropriate as part of a Notification Of Planning Development (NOPD).</p>
Medium	Nuisance - Congestion	Y	N/S	<p>A total of 40 staff will be employed to operate the new facility and most of these will be existing AWE employees. The number of visitors is expected to be a maximum of 12 per day for up to 60 days per year. Additional traffic is not considered to be significant.</p>		

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Corporate Significance	ASPECT	Contribution. Y/N	Significant S / NS	DESCRIPTION	ENGINEERED SYSTEMS	MANAGERIAL SYSTEMS
Ecology						
Medium	Ecology - Species	N	N/A	Ecology is a corporate issue. The new facility, once built, will not present any routine contribution to this aspect.		
Medium	Ecology - Habitats	N	N/A	Ecology is a corporate issue. The new facility, once built, will not present any routine contribution to this aspect.		
Medium	Ecology - Heritage	N	N/A	Ecology is a corporate issue. The new facility, once built, will not present any routine contribution to this aspect.		

Appendix 9: Sustainability Assessment

Theme	Project Phase	Impact	Mitigation
Climate Change and Air Quality	Construction	<ul style="list-style-type: none"> Dust is likely to be created by the movement of vehicles on and off site. 	<ul style="list-style-type: none"> Wheel washes and covered vehicles will be used to reduce dust from vehicles in accordance with AWE Construction Site Rules.
	Operation	<ul style="list-style-type: none"> Refrigerants used in equipment. Combustion by-products from the Gas Powered Boilers Indoor Air Quality 	<ul style="list-style-type: none"> All refrigerants will comply with Montreal protocol Equipment is to modern standards and therefore more efficient than the existing HELEN supply from the main AWE Boilerhouse. The new system will have a reduced energy loss. However, due to the larger size of Orion more energy will be required. The boilers are designed to be energy efficient with low NO_x (See section 4.8). Indoor Air Quality will be an improvement on the existing HELEN building. The modern heating and vent system gives 'comfort cooling' by chilled air.
Travel and Transport	Construction	Increase in HGV's and construction staff vehicles entering the site.	To mitigate any potential congestion a traffic management plan has been established. An additional gate leading to the Orion construction site will be used, this will reduce congestion and emissions to air by reducing the amount of time engines spend 'idling'. Deliveries will be timed (where possible) to avoid peak traffic hours.
	Operation	Increase in traffic movements.	Existing HELEN staff will be using the Orion facility; therefore the only additional vehicles will be those of visitors using the facility.

Energy Consumption	Construction	Increase in personnel and facilities	During the construction period there will be additional staff and the associated additional welfare facilities on site. These will be connected to the AWE mains supply, energy consumption will therefore increase.
	Operation	Increase in energy use due to comparative size of Orion to the existing facility.	An extensive range of energy-saving devices and strategies will be employed in the Orion facility. See section 4.8 for more details
Noise and Vibration	Construction	Noise from the construction site.	A construction noise assessment has been completed to the relevant British Standards. It concluded that the increase in noise levels from the construction site are likely to be negligible. A vibration assessment of the current use was also completed and found that vibration from the main road adjacent to the site was the main cause of vibration.
	Operation	Increase of noise and vibration	Due to the nature of the activities carried out in the building there will be no vibration from the building. The building layout has been designed to avoid installing equipment likely to cause a noise nuisance on the roof. It will be situated away from the AWE site fence line and abatement technologies will be used with an aim to keep the noise level from the facility to the levels found in the 2001 and 2005 baseline AWE Site Noise Surveys.

<p>Water and Drainage</p>	<p>Construction</p>	<ul style="list-style-type: none"> • Increase in personnel • Potential for polluting matter to enter the drainage system • Proximity to a 'Special Site'. 	<ul style="list-style-type: none"> • During construction the increase in personnel will mean an increase in the amount of water used. • All chemicals, diesel and oil will be stored in either chemical stores or banded. Diesel and oil stores will comply with the relevant legislation. • Any sediment from abstracted groundwater and water pumped from the excavations will be settled out and analysed prior to disposal to the Trade Waste Treatment Plant. The strategy for the disposal of abstracted groundwater is under development and will be discussed with and presented to the relevant authorities prior to implementation • The Orion site is adjacent to a EPA Part 2A Special Site, currently under remediation. A study carried out by EDGE Consultants has found that the dewatering phase of the Orion construction is unlikely to draw groundwater from the remediation zone.
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<p>Water and Drainage</p>	<p>Operation</p>	<ul style="list-style-type: none"> • Runoff from increase in hardstanding • Water Usage • Change to storage of potentially polluting material 	<ul style="list-style-type: none"> • Due to the current land-use and the future layout of project Orion there will be no net increase in the amount of runoff from the area. Moreover, the rainwater harvesting system will reduce the amount of runoff. • The building design incorporates water saving devices to reduce the amount of potable water used. These include rain water harvesting and design features such as auto-shut-off taps and reduced capacity cisterns. The facility will be metered to monitor water usage. • Hazardous liquid waste will be stored, in accordance with current AWE practices, in a holding tank (one month capacity) before being transferred via tanker to the AWE Trade Waste Treatment Plant for treatment prior to disposal via a consented disposal route.
<p>Waste</p>	<p>Construction</p>	<ul style="list-style-type: none"> • Spoil from excavations • Construction Waste 	<p>Both types of waste will be disposed of in accordance with the Waste Management Plan.</p> <ul style="list-style-type: none"> • Spoil will be analysed before being disposed of to the appropriate landfill. • Construction waste will be segregated and recyclable material such as metals and woods will be sent for recycling. • Where possible surplus/ reusable material such as wooden pallets will be returned to the supplier.

	Operation	Waste generated from routine operations.	<p>Recyclable materials will be collected in accordance with current AWE procedures covering office waste, cardboard, cans and glass.</p> <p>Due to the nature of the activities there is not anticipated to be an increase in operational waste.</p>
Land, buildings and Construction Materials	Construction	Construction Materials	Recycled rubble from buildings demolished elsewhere on the AWE site will be used as hardcore.
	Operation	Visual Impact of New Building	<p>AWE is a brownfield site, the chosen Orion location is currently a mix of concrete, tarmac and hardstanding. In previous use, buildings were located on the area. The new building will be designed to modern standards and will be in keeping with future developments. The building design has been refined throughout to improve its impact on the surrounding environment. The new building has allowed for greater resource saving technologies in the forms outlined above and in the increase in insulating materials use. Screening in the form of additional trees will be incorporated into the landscaping. The location of the facility will reduce the distance staff and construction materials are required to travel.</p>

Geology and soils	Construction	<ul style="list-style-type: none"> • Off road vehicle use, construction activities and structural instability • Surplus soil removal and disposal • Development of land with the potential to be contaminated 	<ul style="list-style-type: none"> • Piling rigs will be used on the construction site. To prevent any impact on the underlying soils, a piling pad of hardcore will be installed prior to any works being carried out. • Spoil will be analysed for radiological and chemical content before being disposed of to the appropriate landfill site. • Site investigations have not found the development area to be contaminated. Boreholes still located in the construction area have been covered to prevent the potential for cross contamination but are still available for groundwater monitoring purposes.
	Operation	Impact on Land Quality during operation	No impact is anticipated, the same storage requirements for chemicals which are used in the existing facility will be used in Orion.
Biodiversity and Nature Conservation	Construction	Potential for protected species	Although protected species are present on the AWE site as a whole, there is no record of any in the Orion construction zone. Nevertheless, in view of the inevitable increase in disruption in the construction area, a specialist ecologist will be employed to inspect the only area with the potential to provide a habitat for protected species.
	Operation	Impact on species during operation	No impact is anticipated.

Archaeology and Historic Environment	Construction	Impact on potentially important archaeological areas	There is one archaeological monument on the AWE site, this is not close to the construction site. There is no previous evidence or indication of the construction area containing archaeological features. However, a plan for accommodating the potential for unexpected features to be discovered will be established with the advice of the MoD's archaeology specialists.
	Operation	Impact on historic features during operation.	No impact is anticipated during operation.
Landscape and Townscape	Construction	Impact of construction on the landscape	The construction will impact the landscape for its duration.
	Operation	Impact of Orion on the Landscape	The new building will be designed to modern standards and will be in keeping with future developments. The building design has been refined throughout the project to improve its impact on the surrounding environment. Screening in the form of additional trees will be incorporated into the landscaping. The location of the facility will reduce the distance staff and construction materials are required to travel. Lighting requirements for Orion will be in keeping with current AWE lighting, this is a security requirement.

Health Safety and Crime	Construction	Site Safety and Security	The Orion site is within the current AWE security boundary and the public will therefore be prevented from straying into the construction area. Health and Safety induction and weekly briefings will be carried out throughout the construction phase for all workers attending the site. A Pre-Construction Environment, Health and Safety Plan is in place outlining the AWE Health and Safety arrangements.
	Operation	Facility Safety and Security	There will be a small change in visitor levels and therefore workload. AWE has welfare facilities and support in place to cope with this increase. The safety procedures currently in use in the existing facility will be repeated in the Orion facility, where relevant, and reviewed for opportunities for improvement prior to implementation.
Communities and Social Values	Construction	<ul style="list-style-type: none"> • Increases in personnel • Community 	There will be additional personnel living in and commuting to the area during the construction phase of the project. This will lead to an increase in the use of local services such as B&B and hotel accommodation. This will also bring a small increase in the amount of traffic in the immediate area. The amount of consultation with the local community and AWE has increased over recent years. AWE aim to ensure that this continues, although security issues do constrain some discussion areas.
	Operation	Increase in personnel	There will be no permanent increase in personnel moving to the area. However, there will be visitors e.g. academics to the Orion facility boosting the use of some local services.

Infrastructure and Amenities	Construction	Increase in Personnel	There will be an increase in staff during the construction period and a commensurate increase in the requirement for services in the local area.
	Operation	Changes to building affecting local infrastructure	There will be no permanent increase in personnel travelling to the AWE site due to Orion. The building will be DDA compliant. Orion will provide a unique education facility to support academic research in the UK and internationally.
Economy and Employment	Construction	Increases in personnel	There will be additional personnel living in and commuting to the area during the construction phase of the project. This will lead to an increase in the use of local services such as B&B and hotel accommodation. This will also bring a small increase in the amount of traffic in the immediate area. Both AWE and the Orion construction staff will gain experience from the construction of this unique facility. Due to security requirements, UK Nationals only will be employed on this project.
	Operation		The new facility will continue to provide a diverse range of jobs in the area. It will support the academic community and the future prospective workforce in their university education.