5. THE PROPOSED DEVELOPMENT

5.1 Introduction

This chapter of the Defence Exempt Environmental Appraisal (DEEA) explains the purpose and design of the Proposed Development. Further detail can be found in the drawings included in the Planning Application. This chapter has been prepared by the RPS Group and URS Corporation. A description of the construction phase activities associated with the Proposed Development is provided in *Chapter 6: Construction Phase*.

The Proposed Development will consolidate existing hydrodynamics research experiments, which are presently undertaken in separate buildings at AWE Aldermaston, to a single customised building. The Proposed Development allows rationalisation of the floor space currently used by existing operations, creating an opportunity to improve working conditions for employees and the overall environmental performance of the facility. No new research functions will be undertaken and there will be no increase in staff numbers. The Proposed Development is required to provide suitable workspace in a secure environment for the workforce that is necessary to service the continuing work of AWE.

Under normal operating conditions the Proposed Development will be occupied by 50 operational staff transferred from existing facilities at AWE Aldermaston.

5.2 Existing Site

The Application Site comprises two parts and covers a total area of 14.03 hectares (ha). Both parts of the Application Site lie wholly within the established boundary of AWE Aldermaston and is shown in *Chapter 1: Introduction, Figure 1-1*. The eastern part of the Application Site is located in the north-east of AWE Aldermaston and comprises the proposed Hydrus Development Site, a temporary construction laydown area known as the Central Area Construction Enclave (CACE) and an access road from the A340.

The Hydrus Development Site covers an area of 6.47ha and is centred at National Grid Reference SU 150 270. It is located within an explosives area licensed by the Health and Safety Executive (this function was performed previously by the Ministry of Defence Ordnance Safety Group (DOSG)). The Hydrus Development Site comprises previously developed land that was cleared as part of an on-going demolition and clearance programme. It is mainly covered by grassland and sparse short vegetation. A small surface water ditch crosses the southern part of the Hydrus Development Site and a permanent water borehole with an associated head works chamber is located in the north-east. There are several individual trees scattered across the Hydrus Development Site and a small area of woodland is located in the south-east.

The western part of the Application Site is currently used as temporary construction enclave, known as the West End Construction Enclave (WECE). It lies approximately 1.2 kilometres (km) to the south-west of the Hydrus Development Site. Further details of these areas are located in *Chapter 1: Introduction* of this DEEA.

AWE Aldermaston and the surrounding area is fully described in the Site Development Context Plan 2008 (SDCP08) (Ref. 5-1).

5.3 The Proposed Development

The Proposed Development consists of the following main elements:

1) The permanent operational facilities;
2) The use of two existing construction enclaves; the CACE and WECE. Further details of the construction enclaves, can be found in *Chapter 6: Construction Phase* of this DEEA; and
3) The permanent external works which include landscaping and Sustainable Drainage System (SuDS).

The permanent features of the Proposed Development will be located in an area known as the Hydrus Development Site. This comprises 6.47ha of the 14.03ha Application Site. The Proposed Development Masterplan and landscaping proposals are shown in Figure 5-1, a three-dimensional view of the Hydrus Development Site is shown in Figure 5-2, and the Hydrus Development Site sections are shown in Figure 5-3. The remaining parts of the Application Site will continue to be used as currently – to support construction activities. "Development" therefore will only take place in about 46% of the Application Site.

5.3.1 Permanent Features

The permanent features of the Proposed Development comprise four main components:

1) An Operations Building with an external Lightning Protection System (LPS);
2) A Support Building for administrative and welfare facilities;
3) An Electrical Substation; and
4) External works which include a sustainable drainage system (SuDS), landscape scheme, access / circulation routes and lighting.

The Operations Building and Support Building will together provide a research facility for hydrodynamics experiments, to be known as Hydrus Facility. The Hydrus Facility will replace the existing research buildings, although the two facilities are expected to run in tandem for a number of years whilst decommissioning of the existing buildings occur.

The Hydrus Facility will be regulated by the Environment Agency, under the Radioactive Substances Act 1993 (RSA93) (Ref. 5-2), and the Nuclear Installations Inspectorate (NII) of the Health and Safety Executive (HSE), under the Nuclear Installations Act 1965 (NIA65) (Ref. 5-3).

The Proposed Development will safeguard approximately 50 jobs at AWE Aldermaston. Further details of employment levels are provided in *Chapter 12: Socio Economics* of this DEEA.

Construction Design and Management (CDM) Regulations (Ref. 5-4) requirements have been taken into account in the design of the building and choice of materials, which have been selected to be low in maintenance.

5.3.1.1 Operations Building

The Operations Building will comprise an eight-sided structure beneath a circular shallow-domed roof with a maximum roof height of 20.0m Above Ground Level (AGL) (120.3m AOD). It will have a diameter of 115m and will cover a gross external area (GEA) footprint of 9,621m^2 providing floor space of approximately 14,176m^2. This will be achieved through the incorporation of a 1,755m^2 mezzanine floor and 2,800m^2 on the first floor. Elevations of the Operations Building are shown in Figure 5-4.

The layout of the Operations Building is the result of balancing the requirement for cutting edge hydrodynamics research and maintaining the need to provide a desirable place to work, alongside operational safety. A footprint based on an octagon has been adopted which will be constructed in two halves; north and south.

The southern half of the Operations Building comprises the Induction Voltage Adder (IVA) hall and will house three IVA machines (x-ray machines). The mass of the IVA machines has been accommodated for in the design by integrating three externally protruding bays on the southern elevations. Beneath each IVA machine is a large trench containing a traction system which will be used to position the IVA machine during experiments. The trenches will comprise reinforced concrete and will be constructed by excavating down to a depth of 4 metres (m) below ground level (BGL). The remainder of the IVA hall will be constructed using steel framework with cladding overlying reinforced concrete ground slab foundations. An internal view of the IVA hall is shown in Figure 5-5.

The northern half of the Operations Building will house a hardened structure and supporting laboratory, plant and waste management facilities. The hardened structure will be constructed from reinforced concrete with reinforced concrete ground slab foundations and an overlying steel framework with cladding. The substructures of both halves of the Operations Building will be separated by a 100mm isolation joint and will have a Finished Floor Level (FFL) of 100.3m Above Ordnance Datum (AOD). The main pedestrian entrance for staff and visitors will be sited on the northern façade within a distinctive curved lobby. Access for vehicles and loading / unloading will occur at various points around the building with a total of 8 roller shutter doors being provided.

Three exhaust stacks and an array of air extract vents will extend through the roof. The exhaust stacks will be the tallest elements extending to a maximum height of 23.5m AGL (123.8m AOD). The exhaust stacks located on the south and south-west of Operations Building roof are connected to the local exhaust vents (fume cupboard) within the IVA hall. The exhaust stack located on the north-east of the roof is connected to a separate system which vents the hardened structure. The exhaust stack above the hardened structure incorporates a wet scrubber and a two stage High Efficiency Particulate in Air (HEPA) filter system and will incorporate statutory monitoring requirements, as dictated by the RSA93.

Figure 5-1: Application Masterplan

Figure 5-2: Three Dimensional View of Hydrus Development Site

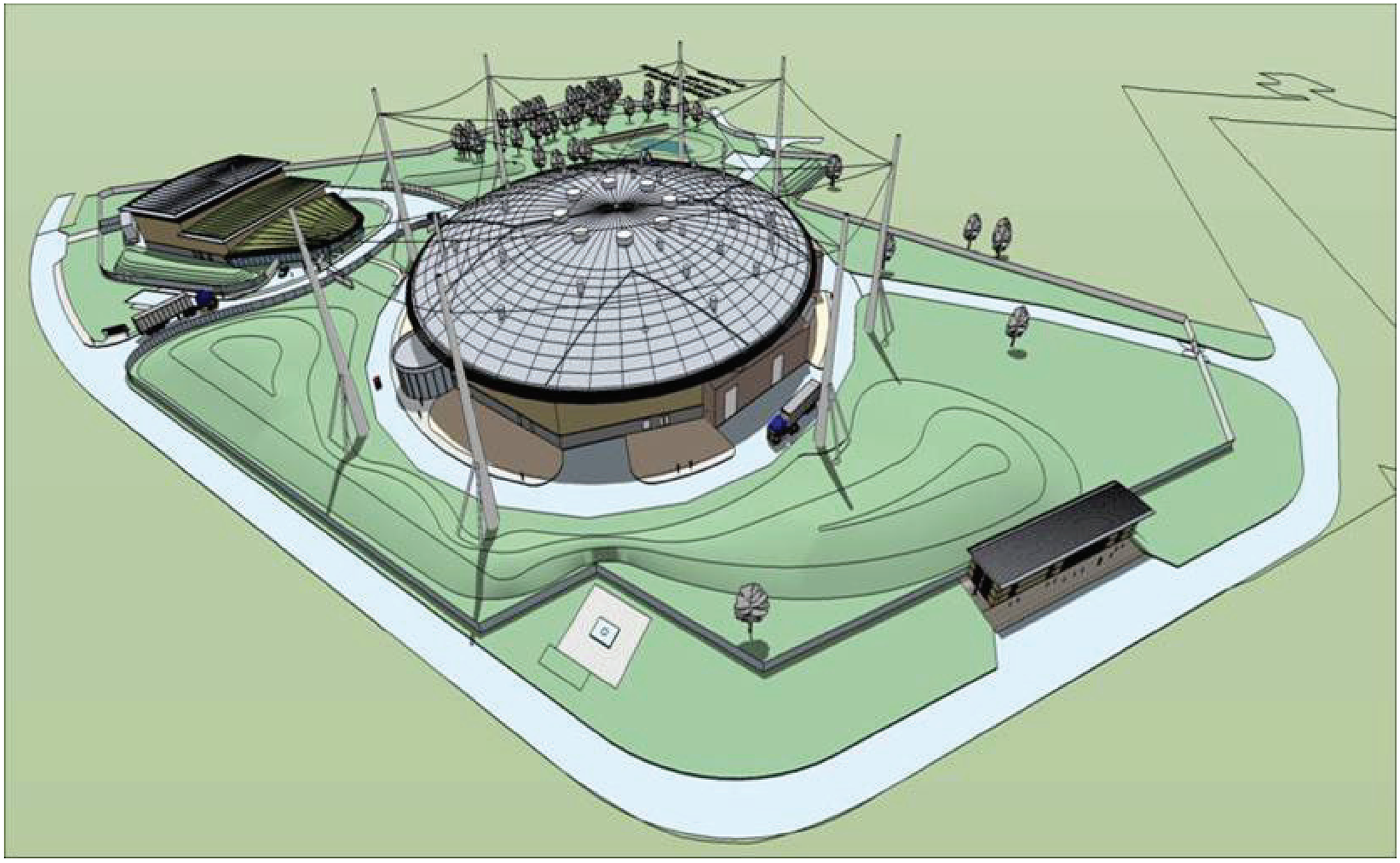


Figure 5-3: Hydrus Development Site Sections

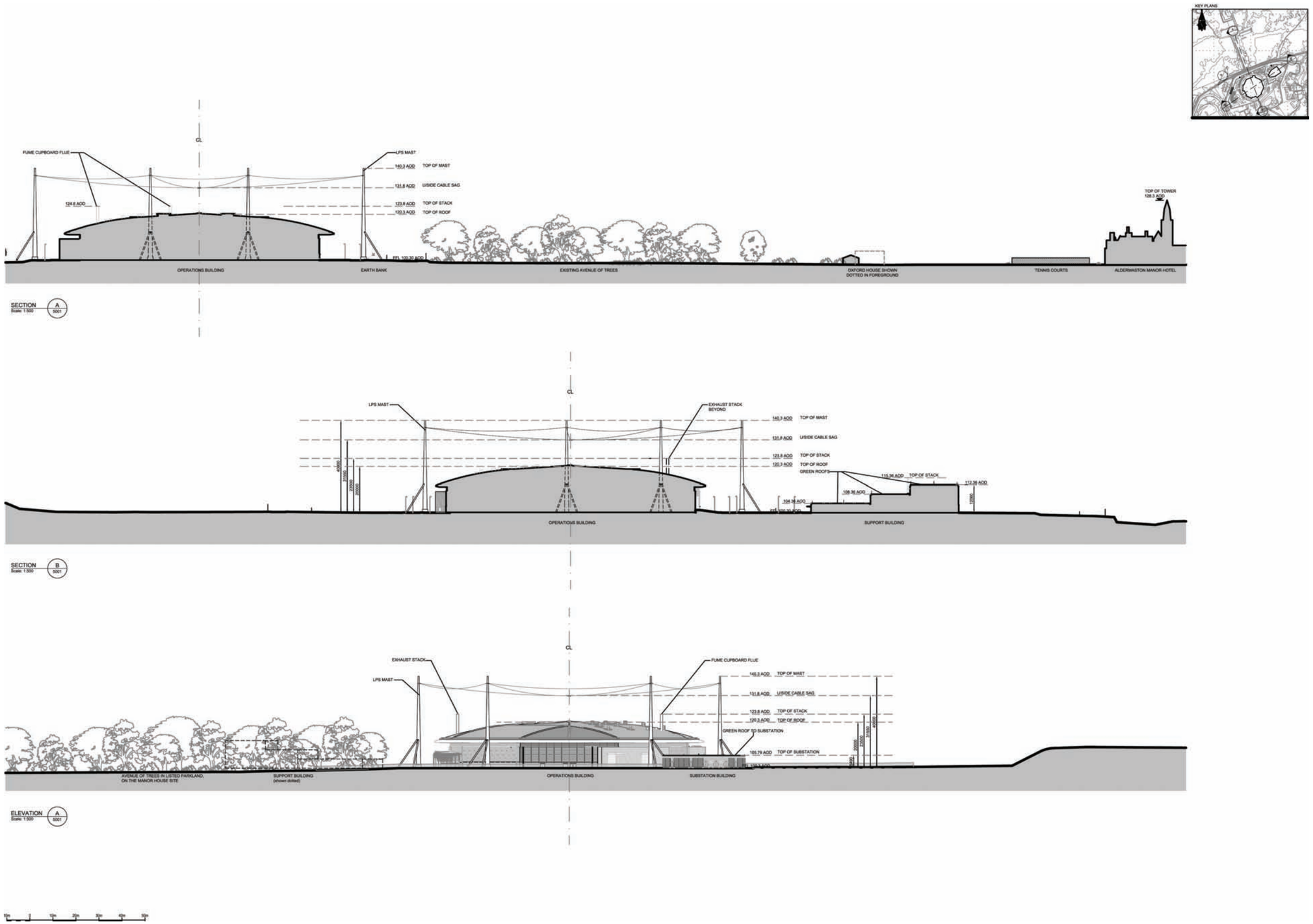


Figure 5-4: Operations Building Elevations A and B

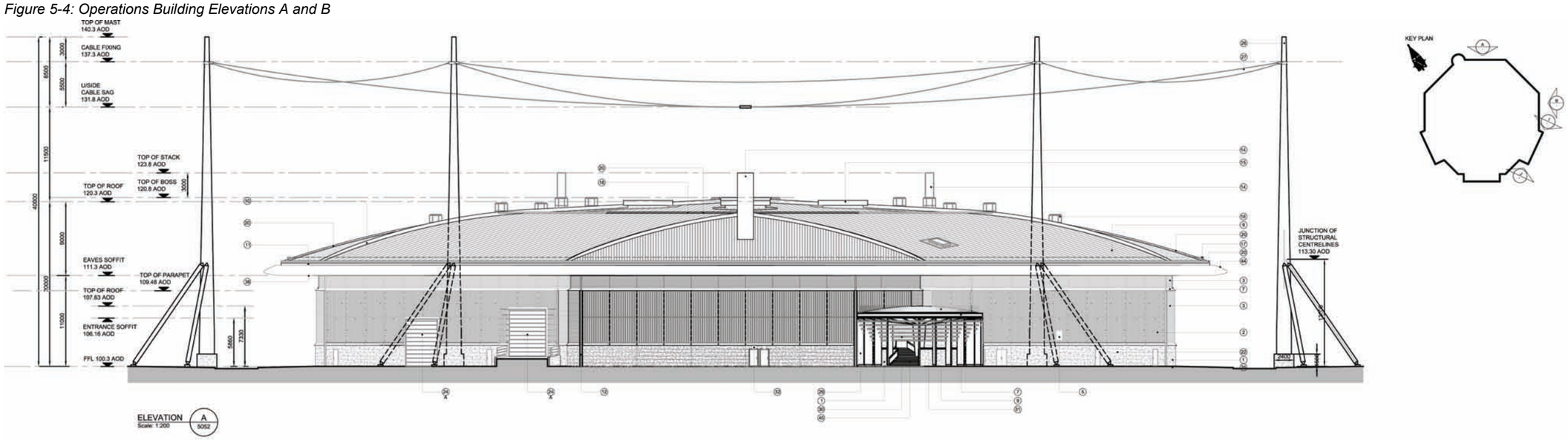
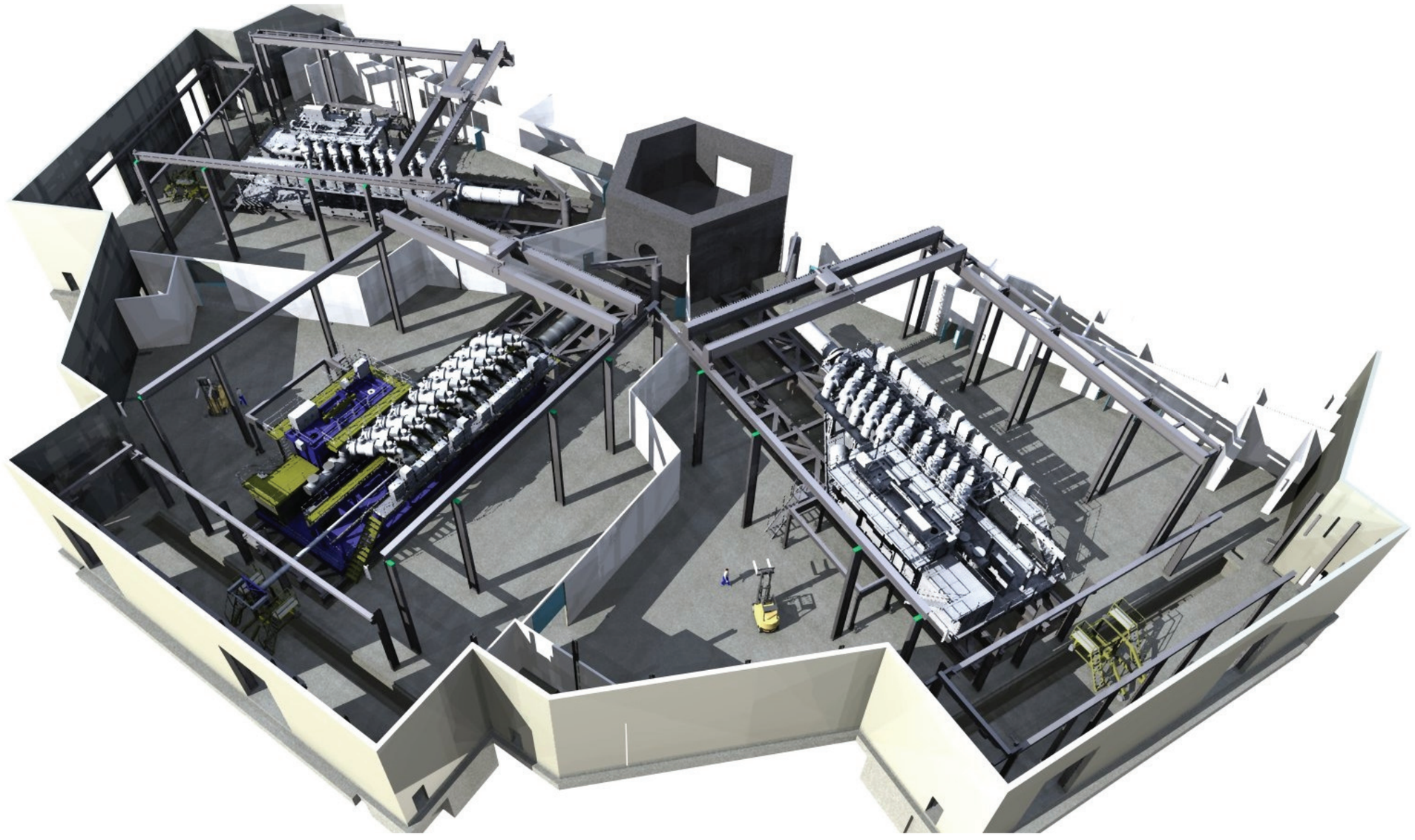


Figure 5-5: Internal View of IVA Hall



The air extract vents will have a maximum height of 20.5m AGL (120.8m AOD). The air extract vents on the Operations Building are divided into two categories; roof vents and smoke vents. The roof vents will be used to vent air which has been circulated around the building through the Heating, Ventilation and Air Conditioning (HVAC) system. The proposed HVAC system is a standard industrial system which incorporates HEPA filters. The smoke vents on the Operations Building will only be used in case of fire and will be opened to release smoke if this occurs.

The safe undertaking of hydrodynamic research experiments within the Operations Building is paramount and is subject to rigorous analysis at all stages of the design life of the building.

External Finishes

A palette of muted colours is proposed for the walls and ground level features of the Operations Building. The external cladding of the Operations Building will comprise a light grey reconstituted stone pre-cast plinth with textured finish, below a combination of timber rainscreen cladding and milled finish aluminium louvres. The timber cladding will comprise the middle section of the façade and will have a natural self-finish. The IVA bays will be finished in a white textured synthetic render. The curved lobby of the main pedestrian entrance will be clad with vertical white painted metal fins and curved horizontal tube detail. The delivery doors positioned at various points around the Operations Building will be metal-faced.

The roof edge will be finished in smooth zinc and will form a continuous panel from the soffit to the gutter line. Above the gutter, the main roof will be finished in zinc standing seam producing a fine texture of lines, set out to a pattern responding to the positions of the four pairs of lightning masts which will surround the Operations Building. The domed roof form will be self-coloured and non-reflectant. The proposed colour and finish of the Operations Building roof has also been carefully considered in relation to longer distance views from the North Wessex Downs Area of Natural Beauty (AONB) (see *Chapter 13: Landscape and Visual*).

The zinc, natural metal and timber finishes will patina and weather over time to tones of muted silvers and greys which will result in the creation of varying light / dark areas across the Operations Building's surface, helping to reduce its perceived mass.

A sample board of all external materials has been prepared and submitted as part of the planning application.

Lightning Protection System

A Lightning Protection System (LPS) is required by the Joint Service Publication 482 (Ref. 5-5) and British Standard EN 62305 (Ref. 5-6). The LPS will comprise eight masts (arranged in four pairs) finished in an off-white or very pale grey colour, supporting a catenary structure made up of steel cables. The masts will be a maximum height of 40.0m AGL (140.3m AOD), measuring 1.8m in diameter at their base and tapering to 0.5m in diameter. The catenary cable fixing height will be at 37.0m AGL (137.3m AOD) with a likely lower cable sag height of approximately 31.5m AGL (131.8m AOD). Each mast will be supported on piled concrete pad foundations measuring 2.4m in diameter and will have two tubular steel braces that connect to the masts at a height of 12.7m AGL (113.0m AOD). Eight 15m deep by 0.6m diameter bored piles will be constructed per mast.

Operations Building Function and Capability

The Operations Building will be in use throughout the year and will generally operate during normal working hours (08.00 to 17.00 hours Monday to Friday), although occasional operation outside normal working hours may be necessary. It will be used to conduct typically 10 hydrodynamic research experiments per year, which entail firing of controlled explosions within a hardened structure. A typical sequence of activities during research experiment will include:

- Sounding of directional audible warning devices prior to and following experiments;
- A rapid ventilation system operated either during or following an experiment (equating to a maximum of 25 hours operation per year); and
- An experiment comprising detonation of conventional explosives within the hardened structure, simultaneously with operation of the IVA machines (x-ray machines).

The experiments will take place between 09:00 and 17:00 Monday to Friday only. However, it is anticipated that the Operations Building will be operated until 22.00 hours for an estimated 20 evenings per year and at weekends between 08.00 and 17.00 hours for an estimated 12 weekends per year.

The Operations Building will house five main functions; Industrial, Plant, Laboratory, Personnel and Waste Management. The Table 5-1 details the GEA for each function housed within the Operations Building.

Table 5-1: Total GEA for each function housed within the Operations Building

Function	**Gross External Floor Area (GEA) (m^2)**			
	Ground Floor	**Mezzanine**	**First Floor**	**Total**
Industrial	4410	-	-	4410
Plant	1370	1340	2539	5249
Laboratory	2370	275	-	2645
Personnel	456	-	-	456
Waste Management	1015	140	261	1416
Total	9621	1755	2800	14176

The majority of the floor space of the Operations Building will be dedicated to industrial functions and plant accommodation. The industrial area comprises the IVA hall which is located in the southern half of the Operations Building. The IVA hall is designed to provide a safe clean environment to operate and maintain the three IVA machines. Beneath each IVA machine is a large trench containing a traction system which will be used to position the IVA machine at required distances for undertaking experiments. In addition, the IVA hall will provide a diode preparation area to refurbish / build anode and cathode components. The building walls also provide attenuation of ionising radiation and a barrier for the purpose of personnel access control.

Plant for the Operations Building occupies the majority of the mezzanine and first floor levels, as well as parts of the ground floor. These areas incorporate the functioning plant for the Operations Building which includes the HVAC systems, ducting and vents, power supply and electrical switches. The HVAC systems will operate permanently due to the climate control requirements within the Operations Building.

The northern half of the Operations Building houses the laboratory and incorporates the hardened structure within which experiments are undertaken together with associated support facilities such as experiment preparation rooms. There are two types of experiments that will be undertaken in the Operations Building; these are known as "open firings" and "contained firings". Open firings are conducted within the purpose built hardened structure with integrated safety control mechanisms and waste management systems. High purge fans will be operated after an open firing experiment. Contained firings are conducted within a containment vessel which is placed within the hardened structure. The containment vessel will provide additional safety and waste management control of hazardous and radioactive materials. The containment vessel will be constructed of steel with an integrated HEPA filter system.

Materials required for experiments within the Operations Building will be brought to the facility on a 'just in time' basis, from other facilities on the AWE Aldermaston Site in accordance with current site transport arrangements.

The function of the experiments within the Operations Building is the same as those currently undertaken at the AWE Aldermaston site. However due to the enhanced diagnostic capability of the IVA machines there will be fewer in number and consequently a significant reduction in waste generation.

The remainder of the ground floor in the northern half of the Operations Building will be occupied by supporting waste management facilities and a small personnel area on the northern side of the building adjacent to the main pedestrian entrance. The waste management areas contain the facilities for processing of radioactive solid, liquid and gaseous wastes. For further information on waste management see section 5.3.1.6. The personnel area provides the principal access into the facility as well as toilet facilities.

5.3.1.2 Support Building

The prime function of the Support Building is to allow the safe control and operation of the processes within the Operations Building. It will be located approximately 45m to the northeast of the Operations Building. The Support Building will comprise a six sided structure providing a floor area of 2,226m^2 and will encompass a partial first floor of 289m^2. It will have a maximum length of 64m (extending north-east to south-west) and a maximum width of 39.6m (extending north-west to south-east).

The Support Building will comprise a steel framed structure with weather proof cladding. This will be constructed over mass pad foundations and will have a FFL of 100.30m AOD. The Support Building will be covered by a stepped 'extensive'

green roof over three levels. Personnel access to the Support Building will be gained through a revolving door on the north-west elevation. The Support Building will have 15 roof-mounted LPS masts; four will be 1.5m in height and 11 will be 1m in height. These masts will be located at the corner of the building, equally spaced along a central line through the centre of the roof.

The stepped roof will descend from a maximum roof height of 12.06m AGL (112.36m AOD) over the eastern extent of the building, through an intermediate height of 8.06m AGL (108.36m AOD), to the lowest roof height of 4.06m AGL (104.36m AOD) over the western extent of the building. The green roof will reduce the rate of rainwater run-off and will limit visual impact of the building in longer distance views, as well as providing biodiversity benefits (see *Chapter 8: Water Resources*, *Chapter 13: Landscape and Visual* and *Chapter 15: Ecology*). An exhaust stack will project through the tallest roof section, with a maximum height of 15.0m AGL (115.36m AOD). This will be connected to a local exhaust vent (fume cupboard). Sun pipes will be provided on the two lower roof sections to increase natural lighting within the building. Elevations of the Support Building are shown in Figure 5-6.

The Support Building will house four main functions; Maintenance, Plant, Welfare and Office. The Table 5-6 details the GEA for each function located with the Support Building.

Table 5-6: Total GEA for each function located within the Support Building

Function	**Gross External Floor Area (GEA) (m^2)**		
	Ground Floor	**First Floor**	**Total**
Maintenance	1050	-	1050
Plant	234	289	523
Welfare	114	-	114
Office	828	-	828
Total	2226	289	2515

The majority of the floor space within the Support Building will be used for maintenance functions. The maintenance workshop will be located in the eastern extent of the building where the roof height allows for the incorporation of an overhead travelling crane for moving equipment.

The central portion of the Support Building will comprise plant, welfare and office uses with office provision filling the remaining floor space in the western extent. The central control centre and administrative activities of the Hydrus Facility will be located within the office accommodation.

External Cladding

External finishes to the three sections of the Support Building will comprise:

- Western Section, comprising office uses – fully glazed up to 3.3m height above FFL to north, south and west, including glazed pedestrian doors;
- Central Section, comprising plant, welfare and office uses - The north elevation comprises part masonry to 3.3m height above FFL with zinc coated cladding above. The southern façade comprises in part, a glazed wall to 3.3m height, with timber rainscreen above. Door finishes vary according to function and include glazed, steel painted or natural metal finished louvres; and
- Eastern Section, comprising maintenance uses - The north, south and east elevations comprise a concrete plinth of 3.3m height, with timber rainscreen above. Two flat panel painted metal-faced vehicular doors are provided, one each to eastern and southern elevations. Two painted metal faced pedestrian doors are also provided to the north and east elevations.

Further information on external finishes and detailing is provided on the planning application drawings. In addition a sample board of all external materials has been prepared and submitted as part of the planning application.

5.3.1.3 Electrical Substation

The Electrical Substation will be located approximately 45m to the west of the Operations Building and will be located outside of the Hydrus Facility's safety fence line (which will isolate the Operations Building and Support Building from the surrounding area). It is proposed that the Electrical Substation will serve the Proposed Development and neighbouring uses such as the AWE Dog Kennels.

The Electrical Substation will measure 36.0m (extending north-east to south-west) by 6.0m (extending north-west to south-east) providing a floor area of 216 m^2, with a maximum roof height of 5.49m AGL (105.79m AOD). The Electrical Substation will be a steel structure with weather proof cladding. This in turn will be constructed on pad foundations with a FFL of 100.30m AOD.

Externally the Electrical Substation will comprise a low-level light grey reconstituted stone plinth with a combination of timber rainscreen cladding and milled aluminium finish louvres above. The roof will be an extensive 'green' roof to complement the Support Building. The Electrical Substation will have ten LPS masts all at a height of 1m, evenly spaced along the edge of the building roof (5 on each side). The proposed Electrical Substation is shown in Figure 5-7.

5.3.1.4 Utilities and Drainage

The Proposed Development requires a domestic water supply to provide suitable water for sinks, hand basins, showers and toilets; this supply will be taken from the AWE Aldermaston potable water system.

Drainage from the hand wash basins, sinks and toilets will be routed to the AWE Aldermaston Site foul drainage system. This system discharges to the Thames Water sewerage system. No trade waste connections will be made; any minimal operational or accidental trade effluent generated will be managed and disposed of via the existing trade waste route. Surface water will be managed using SuDS which will ensure that discharge rates from the Application Site are limited to greenfield runoff rates. Further details are located within section

5.3.1.5 Energy

Energy usage throughout the lifecycle of the Proposed Development has been considered from design, through construction to operation.

The Operations Building and the Support Building will comply with Part L of the Building Regulations (Ref. 5-7). To this end, building elements have been designed to deliver energy efficiency. A Defence Related Environmental Assessment Method (DREAM) appraisal has been undertaken for the Proposed Development and it has achieved an 'excellent' rating. Further details of this report can be found within the Planning Support Statement which accompanies this planning application. The likely energy demands of the Proposed Development and the potential to use zero and low carbon technologies at the Application Site are presented in the Project Hydrus Energy Resources Statement which is appended to *Chapter 16: Sustainability (Technical Appendix H)*. Specifically air source heat pumps will be utilised within the Support Building – these will deliver 25% of the energy demand for this building through the use of renewable energy sources.

5.3.1.6 Waste Management

The Proposed Development aims to be sustainable whilst maintaining high standards of safety, security and environmental performance. As such, due consideration has and will continue to be given to the waste generated by the Proposed Development during all phases, from design, construction and operation, through to its eventual decommissioning. The Proposed Development aims to achieve the following:

- Wherever possible, to contribute towards achieving current and long-term government vision for waste minimisation, recycling and reuse;
- To ensure that all legal requirements for handling operational waste management are complied with; and
- To provide a clean and efficient waste management system that enhances the operation of the Hydrus Facility and promotes waste minimisation and high levels of recovery and recycling.

The Proposed Development will generate solid, aqueous and gaseous forms of radioactive and non radioactive waste. All opportunities for waste minimisation, segregation, recovery and/or re-use will be considered within the design, construction and operational phases of the Proposed Development, according to established AWE procedures.

The RSA93 is the formal basis of control of radioactive discharges and other aspects of the control of radioactive materials in the UK. Authorisations issued under RSA93 require operators to minimise the impact of the volume and activity of waste discharged to the environment. RSA93 is regulated and enforced by the Environment Agency. The Health & Safety Executive's (HSE) Nuclear Installations Inspectorate (NII) regulates the storage of radioactive waste through nuclear site licence. The nuclear site licence conditions regulate the control of radioactive material and waste on the site. This includes controls to minimise the accumulation of material and to ensure appropriate storage and control of

Figure 5-6: Support Building Elevations

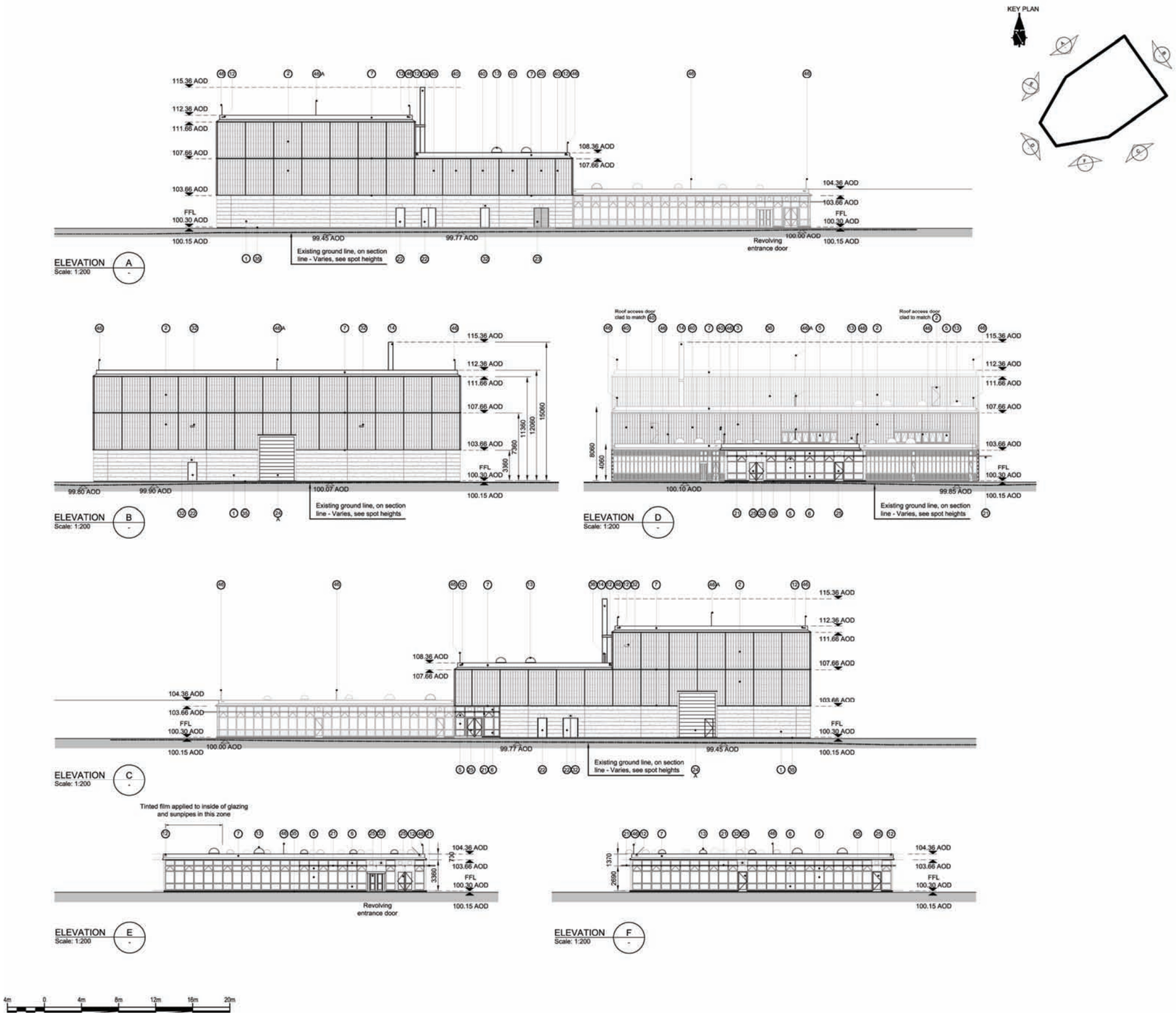
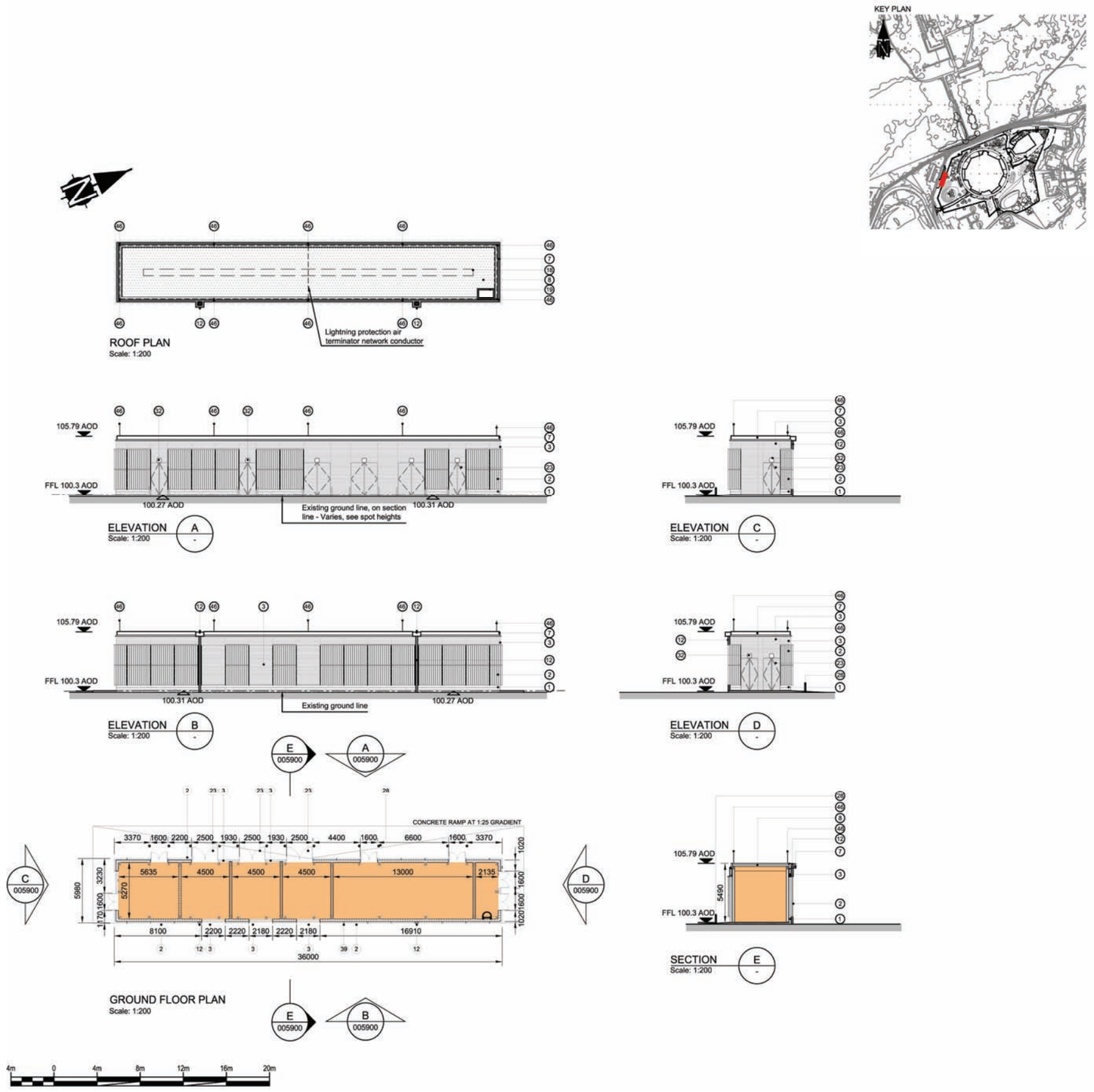


Figure 5-7: Electrical Substation Plan and Elevations



radioactive waste prior to disposal (regulated separately under RSA93). The Hydrus Facility will be operated in-line with the requirements of NIA65 and RSA93.

In accordance with its nuclear licence, AWE produced an Integrated Waste Strategy (Ref. 5-8) which defines how it will optimise its approach to sustainable waste management across the AWE Aldermaston Site. The document addresses the management of all wastes produced by AWE and sets objectives to ensure that the Strategy will be uniformly delivered across all operations. Consequently, waste generation is minimised through implementing the principles of the waste hierarchy as outlined within the Integrated Waste Strategy. This ensures that where possible waste is managed in the most environmentally sensitive manner.

Radioactive Discharges

The generation of all radioactive waste by the Hydrus Facility will be managed in accordance with AWE waste management procedures which were developed in-line with NIA65 and RSA93 requirements. Management and disposal of radioactive waste will be undertaken in accordance with Nuclear Decommissioning Authority (NDA), NII and EA approval. Prior to any experiments being undertaken within the Hydrus Facility full operational licences will be required from the regulatory bodies.

The overall quantity of radioactive waste generated, within the Proposed Development will be significantly less than that produced within the existing facilities. This is due to the implementation of the waste hierarchy within the design and in particular a reduction in the number of experiments which will take place. In particular, the proposed Hydrus Facility will result in a reduction in the quantity of Low Level Waste (LLW) produced per open firing and contained firing. Approximately 1400m^2 of the Operations Buildings is dedicated to ensuring that the waste generated within the Operations Building will be processed to maximise re-use, recycling and appropriate disposal. The Hydrus Facility's waste management processes will ensure that radioactive waste is characterised and segregated on the basis of its physical and chemical properties. Storage of the waste will be in accordance with environmental and safety principles prior to final disposal.

The majority of the radioactive waste produced by the Hydrus Facility will be LLW. This is mainly produced during open firings but is also produced during contained firings. Wherever possible, the containment vessel used during the contained firings will be decontaminated for reuse within the facility. Reuse of other materials used within the Hydrus Facility has been integrated into the waste management strategy. This will include wall plates, protection rings and ducting used within open firings. Where LLW cannot be recovered or decontaminated to allow for disposal via non radioactive routes, it will be consigned to the existing LLW repository (LLWR) near Drigg, for final disposal.

Very low quantities of Intermediate Level Waste (ILW) waste will be generated within the Hydrus Facility during certain very infrequent contained firings. The UK strategy for management of ILW has been reviewed by the Committee on Radioactive Waste Management (CoRWM). In July 2006 CoWRM published its recommendations (Ref. 5-9) in favour of geological disposal with safe and secure interim storage until such a time as a repository is available. Disposal of ILW waste will be undertaken in accordance with NDA, NII and EA approval.

Water used within the Hydrus Facility waste management processes will be sourced from the AWE Radioactive Aqueous Waste Treatment Plant (RAWTP). Use of water has been minimised as far as practicable within the waste management process. Any radioactive waste water generated will be held temporarily within settlement tanks in the Hydrus Facility prior to characterisation and then transfer to the RAWTP facility for treatment and final disposal.

Aerial discharges from the Hydrus Facility will be minimised through the use of a wet scrubber followed by a two stage HEPA filter system. All radioactive aerial discharges will be monitored in accordance with the statutory requirements, as dictated by the RSA93. This methodology will provide the most appropriate safety and environmental controls.

Non Radioactive Discharges

The Proposed Development will generate a number of controlled wastes Controlled waste can comprise inert, non-hazardous and hazardous wastes which are separated into office, construction and demolition, hazardous waste and asbestos waste streams at AWE Aldermaston. The majority of waste produced by the Hydrus Facility will be non-hazardous and classified as general office waste i.e. paper, cardboard, plastics, cans and glass. In order to maximise the capture and recycling of this material, dedicated containers will be provided for the separation and storage of these waste streams, prior to disposal via recycling/ recovery routes.

Hazardous wastes, such as oils, chemicals, fluorescent tubes, batteries etc will also be recycled/ recovered where practicable. These will be stored during use and prior to disposal in appropriate containers within safe and secure areas. Those which cannot be recycled or recovered will be disposed of through the most appropriate route.

Disposal of any controlled waste generated by the Hydrus Facility will be undertaken in accordance with the relevant waste regulations including specifically the Environmental Protection (Duty of Care) Regulations 1991 (Ref. 5-10). AWE has a list of approved disposal sites which will be used by the Hydrus Facility for all waste consignments.

Foul water will be discharged from the Hydrus Facility into the existing AWE Aldermaston foul water system. This water is discharged from the AWE Aldermaston Site to an off site local water treatment works under authorisation.

It is not anticipated that any trade effluent will be generated from the Hydrus Facility under normal operations. In accident scenarios any effluent generated will be contained and disposed of via a tanker arrangement to the AWE Trade Effluent facility. For further information on waste water see *Chapter 8: Water Resources*.

5.4 External Works

5.4.1 Operational Safety Fence

External works will include the provision of a weld mesh perimeter safety fence 2.4m in height and will be in accordance with BS1722: Part 10 Fences (Ref. 5-11), which also conforms to relevant Ministry of Defence security measures.

5.4.2 Access & Parking

The Hydrus Facility main entrance will be from the perimeter access road, known as Cwm Road, which forms the northern and north-western boundaries of the Hydrus Development Site. There will be a further two access points which will be for emergency access only; these are located from the south and west of the Operations Building and join existing AWE Aldermaston internal roads. These are shown in Figure 5-1.

The Hydrus Facility access road connects the Operations Building with the Support Building and provides adequate external hardstanding for the temporary parking of delivery vehicles at the north-eastern end of the Support Building. There will be a drop-off point to allow vehicles to drop disabled personnel off at the main entrance, and ramped access to the Support Building. There will be no provision for staff to park at the Proposed Development.

A pedestrian route will be provided between Cwm Road and the personnel entrances of the Operations Building and the Support Building. A shelter for the parking and weather protection of 12 bicycles will be provided outside of the Hydrus Facility safety fence, adjacent to Cwm Road.

The proposed Electrical Substation will be accessed directly from a new lay-by on Cwm Road.

5.4.3 Sustainable Drainage Strategy

A sustainable drainage system (SuDS) will form an integral part of the operational Hydrus Site. This will be based on an existing site ditch and the sustainable drainage system that will be established during construction. Operational surface water drainage will comprise two distinct regimes; drainage to swales and drainage to buried attenuation. Both will flow into a detention basin before final discharge into the existing storm water sewer/culvert leading to the Fish Pond, located approximately 90m to the north-east of the Hydrus Development Site. The Fish Pond flows via a feeder stream into Fisherman's Brook, which subsequently discharges northwards to the River Kennet.

The Support Building and associated drainage will drain to the eastern swale, whilst the Electrical Substation, associated roads and landscape areas will drain to the western swale. The volume of each swale is designed to enable the full capacity to be used during short duration storms and to assist with delaying flows to the detention basin during longer duration storms.

The Operations Building, road drainage and vehicle waiting area will drain to buried attenuation beneath the access road which is designed to restrict flow. The attenuation volume is designed to enable full capacity to be used during short duration storms and assist with delaying the flow to the outfall during longer duration storms.

All flows will pass through a hydrodynamic separator before entering the detention basin, to capture any silts or residual oils to protect the basin. The detention basin volume is designed for long duration storms and will be of approximately 2,600m^3 capacity.

Petrol/oil bypass interceptors will also be located wherever there is a risk of contamination of surface water such as parking areas, in accordance with The

EA's Pollution Prevention Guidance 3 (Ref. 5-12). The perimeter ditch around the Hydrus Development Site will remain and will act as a swale draining the landscaped areas only. More information on the surface water drainage of the site is provided at *Chapter 8: Water Resources*. The detailed design drawings for the SuDs scheme is contained within the pack of drawings submitted with the planning application.

5.4.4 Landscape Proposals

A comprehensive landscape scheme plan has been designed for the Proposed Development within the context of the AWE Aldermaston site-wide landscape strategy which will ensure continuity of design. The Proposed Development will incorporate the existing copse of trees, located to the south east of the site, and other retained trees nearby.

A series of sculpted bunds will surround the Operations Building, broadly following its circular form. These will be planted with native broadleaved hedging along their tops. Groups of predominately native broadleaved trees will be planted at various locations around the proposed buildings.

The existing and proposed tree planting, bunds and hedges form part of the comprehensive landscape scheme that will also include ornamental shrub planting, close mown grassland, low maintenance conservation grassland, and a wet grassland mix in and around the SuDS swales and detention basin. Further details regarding the landscape proposals are included in *Chapter 13: Landscape and Visual*. The detailed Landscape Scheme including Phasing, Tree Protection, Arboricultural Method Statement and Landscape and Biodiversity Management Plan are included within the planning application.

5.4.5 Lighting Scheme

Lighting will be provided to all external roads and pedestrian circulation areas. All road surfaces will be illuminated to an average of 20 lux at ground level and an average of 5 lux at ground level for footpath areas. This will be achieved using a combination of four different types of directional luminaires on 6m steel columns and one type of illuminated bollard.

The column luminaires are mainly used for lighting the access / circulation routes around the Operations Building and Support Building. The column luminaires will be located approximately every 15-60m and will use a combination of 70W and 100W lamps with aluminium canopies. This will result in the elevations of the Operations Building being illuminated to approximately 3m AGL and 6m AGL around the main entrance area. All column luminaires will be hinged near the base for easy maintenance.

Illuminated bollards will be used to light the footpath along the northern extent of the Support Building. The illuminated bollards will be 1.05m in height with 18W lamps and will be located approximately every 5m.

All lighting will be operated from dusk till dawn. The lighting scheme has been designed based on the requirements of the Chartered Institution of Building Services Engineers (CIBSE)/ Society of Light and Lighting (SLL) '*Guide to Outdoor Lighting*' (Ref. 5-13). Particular attention has been given to eliminating upward light and also to controlling the intensity of light in sensitive directions. All lighting luminaires will be high pressure sodium to minimise potential impacts upon Bats (see *Chapter 15: Ecology*). Details of the proposed lighting scheme for construction and for the operational facility are provided within the drawing pack submitted as part of this planning application.

5.5 References

Ref. 5-1 Atomic Weapons Establishment (2008). AWE Aldermaston & Burghfield: Site Development Context Plan 2005-6015. AWE, Aldermaston.

Ref. 5-2 Her Majesty's Stationery Office (HMSO) (1993). Radioactive Substances Act 1993. HMSO. London.

Ref. 5-3 HMSO (1965). Nuclear Installations Act 1965. HMSO. London.

Ref. 5-4 HMSO (2007). Construction Design and Management Regulations

Ref. 5-5 Ministry of Defence (Unknown). JSP 482: Safety Standards For Electrical Installations And Equipment In Explosives Facilities.

Ref. 5-6 BSi (2006). BS EN 62305:2006 Protection Against Lightning.

Ref. 5-7 ODPM (2005) Building Regulations – Part L: Conservation of Fuel and Power.

Ref. 5-8 Atomic Weapons Establishment (2007). Integrated Waste Strategy. AWE, Aldermaston.

Ref. 5-9 CoRWM (2006). Managing our Radioactive Waste Safely, CoRWM's Recommendations to the Government.

Ref. 5-10 HMSO(1991). The Environmental Protection (Duty of Care) Regulations, 1991, HMSO.

Ref. 5-11 BSi (2006) BS1722: Part 10: Fences – Specification for anti-intruder fences in chain link and welded mesh.

Ref. 5-12 Environment Agency (2006). PPG 3: Use and Design of Oil Separators in Surface Water Drainage Systems

Ref. 5-13 Society of Light and Lighting (1992) LG06: The Outdoor Environment, Chartered Institution of Building Services Engineers (CIBSE).