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VOLUME 5

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BACKGROUND

Note: Text in this document that is highlighted is guidance only and shall be removed when this document becomes Schedule 1 of the D&B contract.

Status of this Document

This document is the Generic Design Brief which, together with the School-specific Brief and the Generic ADSs, forms the Facilities Output Specification (FOS) for the EFA Contractors Framework. Initially the FOS forms part of Volume 5 of the documents ITT for the local competition but will become, with minimal redrafting, Part of Schedule 1 (Authority's Requirements) of the D&B Contract.

Document Structure

The FOS sets out the requirements for the School known as [name], and is structured as shown in the diagram below

Generic Design Brief				
1: Background and Context and Overarching Requirements	2: Buildings and Grounds	3: Fittings, Furniture and Equipment (FF&E)	4: ICT Design Guide	Annex 1: Statutory Requirements and Guidance Annex 2: Generic Area Data Sheets
School-specific Briefs				
School-specific Background and Context	School-specific Buildings and Grounds	School-specific FF&E	School-specific ICT	Annex I: Local Authority Requirements and Guidelines Annex II: School-specific Schedule of Accommodation

The Schedule of Accommodation (SoA) list the spaces required for the School and Area Data Sheets (ADS) give details for each space, as described below.

1. OVERARCHING REQUIREMENTS

1.1 Definitions

This paragraph identifies and explains the defined terms and acronyms used throughout this document:

Access Statement

a description of how inclusive design principles have been incorporated into a development, to be produced in conjunction with a planning application;

Alternative Provision

education provided outside of school for Pupils who are unable to attend a normal school. Provision can range from a pupil referral unit (PRU) or a further education college to a voluntary or private-sector facility;

Area Data Sheets

excel spreadsheets identifying the requirements for each generic space listed in the School Schedule of Accommodation (SoA), including gross area, services and environmental performance and fixed FF&E and ICT;

Balance Areas

areas serving the whole School that are not associated with a particular Suite of Spaces, such as a Secondary School dining area;

Basic Teaching Area

the aggregate of all timetabled teaching spaces in a School (except for halls): including General Teaching spaces, Classrooms, Practical Teaching spaces and Performance Spaces;

Building Services

gas and water services, heating, ventilation, air conditioning and electrical plant and installations including pipework, ductwork and cabling;

Calming Room

a small room provided in some special schools for Pupils to calm down, designed to safeguard against self-harm;

Classroom

a space designed to accommodate a form or class of Pupils in a Primary School or a Special School for the purposes of General Teaching, which may also be their base;

Complex Needs

a pupil has “complex needs” if the pupil has profound and multiple learning difficulties in addition to other significant difficulties, such as a physical disability

or sensory impairment, which require provision which is additional to or different from that generally required by children of the same age in mainstream schools;

Department

a department or faculty within a Secondary School based on a subject (eg English) or a group of subjects (eg humanities);

Designated Unit

means separate facilities for Pupils with SEN located within a mainstream school;

Design and Technology (D&T)

a blanket term for a number of practically based subjects requiring specialist equipment and associated space for safe operation eg: resistant materials, textiles and electronic control;

Employment and Skills Strategy

the Strategy set out in Annex 2 of this FOS;

Extra-curricular

activities that take place outside the normal school curriculum, such as after-school sports;

Fittings, Furniture and Equipment (FF&E)

FF&E is a blanket term which includes fittings, which are those items which are permanently fitted to the fabric of the building, and furniture and equipment which may be fitted, fixed or loose. Fixed or loose furniture and equipment does not form an integral part of the building

General Teaching

Secondary School teaching that typically doesn't involve practical activities or specialist equipment, for example English, Maths or Humanities;

Gross Area

the overall area of the buildings, taken to the inside face of the external walls and measured over internal walls. This excludes the area of voids in atria and lightwells;

Hydrotherapy Pool

a warm water pool, used principally for the treatment and exercise of Pupils with physical and/or sensory disabilities;

Hygiene Room

a specially equipped room for changing and showering Pupils who require assisted changing

ICT Infrastructure

means passive ICT infrastructure - cabling infrastructure for data and voice services, including data outlets, containment, patch panels and cabinets; active ICT infrastructure, including cabling switching and wireless and associated components; Network Active Equipment – Core and Edge network switches and associated network switches and routers, including support for Power over Ethernet; Wireless Active Equipment – Controllers and Access Points for an enterprise whole-school wireless network; and Telephony, Internet and TV signal. Details of which are set out in section 4 of this FOS;

Learning Aids

specialist equipment required by some Pupils with SEN, for example an adapted computer;

Learning Resources

material that supports learning including printed material and equipment;

Legacy

items which have been used at the previous School site which are considered suitable for use on the new or refurbished site;

Local Exhaust Ventilation (LEV)

local ventilation of a practical activity such as a fume cupboard or a wood dust extract system, or a heat bay fume extract system;

Loose Equipment Purchase Protocol

the protocol which will form part of the Contractor's Proposals to be agreed between the Authority and the Contractor for the procurement of loose equipment;

Mobility Equipment

means a wheelchair, a motorised wheelchair, a walking stick or a standing frame or any other mobility aid required to be used within the School;

Multi-use Games Area (MUGA)

a fenced area with an all-weather surface designed to accommodate a range of sports;

National Curriculum

the curriculum that applies to Pupils of compulsory school age (5 to 16 years) in maintained schools. It sets out what Pupils should be taught, but schools can choose how they organise their school curriculum;

Net Area

comprising all spaces in the Gross Area except for: toilets, Hygiene Rooms, showers, changing rooms, kitchens, circulation, plant area and the area taken up by internal partitions;

Non-net Area

comprising all spaces in the Gross Area not included in the Net Area;

Performance in Use (PIU) Targets

a set of easily measurable criteria, related to the indoor environmental conditions and building performance, used to assess the performance in use of the building;

Performance Space

an (often) large space designed with acoustic properties to accommodate performance to an audience. Also designed to accommodate other activities as well;

Personal Emergency Egress Plans (PEEPs)

a plan developed in consultation with a disabled individual in relation to their escape from a building in an emergency where such person is not capable of making his/her way out of a building without assistance;

Practical Teaching

teaching that involves Pupils doing (or watching) practical activities and often requiring access to services and specialist equipment, for example science;

Primary School

generally a mainstream school for Pupils aged 4 to 11 covering 3 educational stages: foundation (up to 5 years), key stage 1 (5 to 7 years) and key stage 2 (7 to 11 years). For the purposes of this FOS, a Primary School includes Middle-deemed Primary Schools that provide for Pupils aged 8 to 12;

Profound and Multiple Learning Disabilities (PMLD)

people with profound and multiple learning disabilities have a profound learning disability as well as other disabilities such as sensory or physical disabilities, complex health needs or mental health difficulties;

Secondary School

generally a mainstream school for Pupils aged 11 to 16 or 19 covering 2 or 3 educational stages: key stage 3 (11 to 14 years), key stage 4 (14 to 16 years) and in some cases the sixth form). For the purposes of this Design Brief, a Secondary School includes middle-deemed Secondary Schools that provide for Pupils aged 8 to 13;

Schedule of Accommodation (SoA)

an Excel spread sheet listing all the spaces required in the School, the size of each space and (for teaching spaces) the maximum group size they will accommodate. Spaces are listed under Net and Non-net Area (ref). Net Area in all SoAs is organised into the following categories of space: Basic Teaching Area, large spaces, Learning Resources areas, staff and admin areas and storage areas. The SoA also indicates the number of Pupils and the school type;

SEN

special educational needs;

Small Group Room

a teaching space designed to accommodate an individual or a part of a class that is a discrete, quiet spaces for learning support, behaviour management or private counselling. Small Group Rooms designed for individual or small group music activities are sometimes called music practice rooms;

Soft-play Room

a therapy space for Pupils with SEN or disabilities, usually lined with soft padded mats and housing soft play shapes;

Special School

a school organised specifically for children and young people with a statement for a specific type of SEN (ref). Special Schools cater for various age ranges including primary, secondary and all-age, and various types of SEN. Pupils are taught in very small classes, and support staff and health professionals work alongside teaching staff;

Specially Resourced Provision

where places are reserved at a mainstream school for Pupils with a specific SEN to learn alongside their peers. Additional support facilities such as a learning base are usually provided;

Suite of Spaces

a group of spaces, which could be teaching or non-teaching, associated by type of activity, such as General Teaching or Practical Teaching, and supported by smaller support spaces such as store rooms and toilets. Spaces can be grouped in different ways to form a suite.

1.2 Precedence of Documentation

The Contractor shall consider and address all elements of the Facilities Output Specification, including the Generic Design Brief, the School-specific Brief, the SoA and the ADS, and will need to provide its own versions of the SoA and ADS, using the standard format, in the Contractor's Proposals. In the event that there is any inconsistency between the Generic Design Brief and the School Specific Brief the Generic Design Brief will take precedence.

1.3 Compliance

The Contractor shall ensure that the Buildings, grounds and FF&E provided for all the Schools comply with all relevant and current regulations, British and European standards and policies. Many of these, but not all, are referenced in footnotes and/or listed in Annex I and in the annexes to the School-specific Briefs (local and planning for each School).

1.3.1 Where specific references are made to the parts of the Building Regulations, they are usually denoted as Part L, Part M etc. Where references are made to Approved Documents, they are noted as AD A, AD B etc.

1.3.2 Where guidance documents are referenced or listed, it is to assist the Contractor, but compliance is not required.

1.3.3 FF&E manufacturers used by the Contractor shall have current BS EN ISO 14001 compliance.

The specification for refurbished or retained building elements may be lower than that for New Building elements in some cases, either in line with the requirements of the ADS, or in accordance with lower statutory requirements for refurbishment work (eg energy performance), or may be agreed as a derogation against the standard expected in the FOS for new build. The Contractor may derogate against non-statutory requirements on cost grounds where it can demonstrate that it would be uneconomic to refurbish to new-build standards.

1.3.4 Schedule of Accommodation (SoA), Area Data Sheets (ADS) and FF&E Layouts

The School-specific Briefs include:

- (a) the School SoA, based on the organisation and curriculum model preferred by the School, and providing an appropriate capacity for the School;
- (b) School specific requirements
- (c) FF&E Matrix;
- (d) ICT Solution Summary.

1.3.5 The Contractor shall provide, [as part of the design proposals] within the Contractor's Proposals:

- (a) the Contractor's SoA, using the same format, showing the spaces proposed;
- (b) Contractor's ADS, using the supplied format, showing detailed proposals for each space and identifying any items that are different from the requirements set out in this FOS. The Contractor shall make these available to the relevant School so that School Users may understand what is provided for in each space, environmental comfort criteria and means of control;

- (c) Contractor's FF&E Layouts for all spaces in which the Contractor is providing Group 2 fixed F&E, and for any spaces that do not comply with this FOS or the generic ADSs.

1.4 Key Principles

The Contractor shall ensure that the design and construction of all Schools, and any FF&E procured by the Contractor, meets the following five overarching outcomes.

1.4.1 Functionality

The Buildings, grounds and FF&E provided by the Contractor shall be suitable for their intended purpose and provide an environment appropriate to a School, which supports the generic educational principles outlined in paragraph 1.5. The design shall also meet the educational and organisational requirements of each School-specific Brief, taking account of the age ranges of the Pupils and of the constraints of each School Site.

1.4.2 Health and Safety

The layout and design of the Site, the Buildings, including Building Services and FF&E, are to provide a safe and secure environment for Pupils and staff. People with disabilities or SEN, including those using Mobility Equipment and those with a visual or hearing impairment, must not be placed at a disadvantage by the design of the Buildings or grounds, or by the FF&E provided by the Contractor.

1.4.3 A Standardised Approach

The design solution should be capable of being replicated for similar types of schools, including the use of off-site construction where feasible, so that best practice can be assured without the need for whole new designs.

- (a) This could be achieved in a number of ways, including:
 - (i) whole school / parts of Schools / modules;
 - (ii) kit of parts / components;
 - (iii) standard dimensions / dimensional coordination / grids;
 - (iv) process / procurement (including FF&E);
 - (v) supply chain / other (including Briefing).
- (b) The standardised design should result from an intelligent integration of the Site and Building plan (including standardised dimensions), structure and fabric, Services and ICT Infrastructure. It should include an intelligent integration of FF&E.

1.4.4 Future Proofing and Minimum Life Expectancy

The Buildings, grounds and any FF&E provided by the Contractor shall be designed, constructed or procured so that later changes can be achieved easily and cost-effectively. These would be in response to changes in curriculum priorities, organisation, technology and, where required in the School-specific Brief, pupil numbers. Essential changes in the sizes of teaching rooms in the future should be achievable without major building work.

- (a) Minimum Life Expectancy and Residual Life.
- (b) The Buildings (where new build) shall be specified as having a life of 60 years or more.
- (c) The table at 1.4.4.7 sets out the minimum life expectancy of key building elements, the purpose of which is to reduce the frequency at which the Asset Lifecycle Replacement takes place for overall replacement of each element. Where the minimum life expectancy requirement is deemed to have a significant impact on capital expenditure which is disproportionate to the benefit, the Contractor is encouraged to offer best value components to achieve optimum solutions. Where alternative minimum life expectancy is proposed by the Contractor this shall be accompanied by an assessment of how the disruption and impact on the operation of the School is balanced and justified against the overall whole life cost benefit to the School.

(d) **Minimum Life Expectancy and Minimum Residual Life Table**

Building Element	Min Life Expectancy to limit frequency of replacement
Substructure	60 years
Frame, Upper floors and stairs, roof structure	60 years
Underground Drainage	60 years
Windows and External Doors	25 years
Engineering Services (Major Components)	In accordance with CIBSE Guide M Table Appendix 13.A1
Sanitary and Catering Fittings	20 years
Lifts (including controls)	15 years
Roof coverings	30 years and easily overlaid, over-coated, upgraded or replaced without affecting the deck below

Building Element	Min Life Expectancy to limit frequency of replacement
Floor Finishes	10 Years
Internal door sets	20 years
Sprinklers	50 years
External walls / cladding	40 years

1.4.5 Sustainable Design and Construction

A sustainable approach to the design, construction and production of all facilities provided by the Contractor, including FF&E, must deliver a cost-effective and resource-efficient School that:

- (a) optimises passive design measures, including fabric first principles;
- (b) minimises the use of all resources;
- (c) reduces the demand for energy and water use during the Works Period minimises waste and CO2 emissions during the Works Period;
- (d) allows opportunities for recycling during the Works Period. The Buildings, grounds and FF&E (including ICT) should optimise the use of low-energy solutions and be designed and constructed to respond to specific Site constraints and opportunities, and to the future impact of climate change¹. The Contractor shall provide the means for the effective measuring and monitoring of the performance of the Building in operation;
- (e) the Contractor's design and construction teams shall design and build the facilities in accordance with BS EN ISO 14001 and shall prepare operational plans for the Authority to operate facilities that record all targets for the key aspects of environmental performance as identified in this FOS. This may include assessment against BREEAM New Construction Education criteria. If BREEAM rating are used the aim should be to achieve a rating of "very good";
- (f) the Contractor shall ensure that the design facilitates an efficient approach to maintenance, life cycle replacement and facilities management, so that these can be provided in a cost effective way. There should be no inaccessible areas which are either difficult to clean or difficult to supervise.

¹ See CIBSE TM 36, Climate Change and the Indoor Environment.

1.5 Educational Drivers

1.5.1 Educational Background and Context

The Contractor shall ensure that the design of each School meets the educational drivers of this Generic Design Brief and the relevant School-specific Brief.

How the Generic Design Brief addresses national educational policy is set out here.

The new policy direction of travel is towards schools as autonomous institutions collaborating with each other, with greater freedoms to innovate and raise standards. Every school will be able to shape its own character, frame its own ethos and develop its own specialisms. In good and successful schools with quality teachers, there will be flexibility in the curriculum and clearly established accountability measures, and as much day-to-day decision-making as possible will be devolved to the front line. These decisions can be achieved within some standard parameters, depending on the type and size of the School, as long as they allow for a wide range of options.

Each School is unique, partly because its intake reflects the community it serves. Each School-specific Brief explains the culture, values, beliefs and purposes of each School, how they promote health and well-being through their pastoral systems, and how they work with parents, community organisations and local agencies to create environments in which Pupils can thrive. The School-specific Brief identifies the SoA, adjacencies and any particular specifications that are needed to satisfy these educational requirements.

1.5.2 Curriculum and Organisation

The curriculum is and will be the heart of a school. All schools aim to provide a broad range of curriculum options relevant to the population they serve, including academic and vocational pathways. The new National Curriculum will set out only the essential knowledge that all Pupils should acquire. This will give schools and teachers more freedom to decide how to teach this most effectively and to design a wider school curriculum that best meets the needs of their Pupils.

Individual schools take varied approaches to create a personalised and individualised curriculum, particularly, but not exclusively, for those Pupils with SEN and disabilities. Such approaches can involve regular 'learning conversations' with each pupil and their parents or carers, to discuss progress and agree targets.

The Key Stage 3 curriculum is developing as an increasing series of options, each of which places demands of varying degrees on the suitability, range and flexibility of space provided. Year groups may need the support of a home-base and an integrated curriculum. At KS4 and post-16, Pupils may learn off-site in different settings for part of their time, including in colleges and the workplace.

- (a) The Contractor shall design each School to provide for Suites of Teaching Spaces, each with enough adaptable space to be able to accommodate a range of learning scenarios, both now and in the future. These Suites of Spaces should allow for teams of teachers and teaching assistants to work together. The Contractors should also provide enough staff and small group rooms to enable discussions to take place between staff and Pupils, and their parents or carers.
- (b) The Contractor shall also provide accommodation that supports and encourages learning outside the formal timetable through innovative and thoughtful design of the outdoor space and dining and social area.

1.5.3 Teaching and Pedagogy

Nothing matters more in improving education than giving every child access to the best possible teaching. A highly skilled workforce is able to motivate and inspire Pupils. A focus on delivering effective education is crucial if better outcomes are to be achieved by all Pupils. This is particularly relevant for Pupils with SEN and disabilities.

Individual teachers will need the flexibility within their teaching environment to use a wide range of teaching styles, including team teaching, project based learning and cross curricula study, for a variety of group sizes and pupil abilities, and to use new and innovative approaches to education. This can also include being able to use a variety of learning settings if they are nearby, not just those in the timetabled space or classroom.

An 'open-classroom' culture, in which teachers and other staff have opportunities to observe and be observed, will create the right kind of environment for teachers to learn from other professionals and enable, for example, focused teacher training and professional development to take place. Teaching staff also need to be able to maximise the time earmarked for preparation, planning and assessment, and to share knowledge across faculties or Departments.

ICT also plays a key part in supporting and shaping learning across all the subjects and ages. Whilst many Pupils are already being taught in innovative ways, a school's ICT facilities can support effective teaching, alongside a full range of teaching approaches, within an e-confident culture.

The Contractor shall design each School to create an environment conducive to effective teaching through the provision of:

- (a) flexible teaching space in adaptable Suites of Spaces, so that different teaching styles can be accommodated and, in Secondary Schools, various types of space will be available to a team of teachers should they require;
- (b) work-space in each suite that enables teachers to plan and prepare in groups and individually;

- (c) Learning Resource space in each suite for small group work and for staff to have individual discussions with Pupils so that feedback can be given to them on their progress;
- (d) ICT Infrastructure and building design which allows the best use of the ICT available now and in the future;
- (e) designs which allow a range of potential furniture and equipment layouts, which is well co-ordinated with equipment and ICT and, in Practical Teaching spaces, with Building Services;
- (f) some internal transparency between the central circulation and teaching spaces, wherever possible, so that users are visible to others in that suite;
- (g) a design that allows users to engage and interact with the external environment, where possible, so as to create practical hands-on learning, with a direct connection to the outdoors in early years in Primary Schools and for some Special School settings.

1.5.4 Behaviour and Pastoral Care

All Pupils, including those with SEN and disabilities, need to feel welcome, safe and secure, so that they can give their full attention to learning. Their comfort can affect their behaviour and self-esteem and their willingness and ability to learn, which ultimately affects performance. They should feel that their needs are respected and met, not only in teaching and learning spaces, but in other areas such as toilets, corridors and school grounds. Pupils also need to feel safe and secure, not only while they are in lessons, but at lunch and break times, and when they walk onto and leave a school's premises at the beginning and end of the school day.

The intelligent placement of staff offices and work areas can do much to ensure that all parts of a school are places where adults and Pupils mix freely in a calm and relaxed manner. The design and type of spaces is important because they can enhance and extend the pastoral care structures in schools, encouraging better behaviour and creating a sense of belonging, particularly important for younger and for vulnerable children. Thoughtful design can have a positive impact on Pupils' behaviour and discourage bullying.

Secondary schools and large Primary Schools can feel intimidating, particularly for Pupils in their first year. It is therefore important to develop ways for the design to allow, through discreet groups of spaces, Pupils to get to know the buildings and each other gradually. Distinct Suites of Spaces can enhance pastoral care to a year group or a vertical year group, and allow a gradual use of the rest of the school.

The points above reinforce the principle of all schools being organised in suites of teaching spaces. They also highlight the need for each suite of teaching spaces to include staff work areas and to have easy access to a set of toilets that are positioned so as to allow some passive supervision by staff.

Pupil movement around school may be minimised by scheduling lessons differently. Creating longer learning sessions would mean fewer lesson changeovers and therefore less movement around the building, resulting in less pressure on circulation space. This is particularly helpful at KS4/5. The available circulation space can be more useful if it only serves the spaces in each suite, rather than being part of main thoroughfare through the school. It should also give the opportunity for display or decoration that enhances the 'ownership' of the suite to a pastoral group, if relevant.

1.5.5 SEN and Disabilities

All Pupils, including those with SEN and disabilities, should be able to access the full curriculum and be provided with appropriate support and intervention when necessary. This support will come from a number of people, including specialist teachers and health and social care professionals, whose needs must also be considered. This should encourage all Pupils to feel secure and welcome in school so that they can concentrate on learning and making a positive contribution to the school community. All Pupils should then be ready to make the transition to further education, employment or social care when they leave. They should also feel that their needs are respected and met, not only in learning spaces and circulation spaces, but in other areas such as toilets and the school grounds.

Pupils with low level SEN may require a dedicated space or classroom in which additional support can be provided, whether educational, social or medical. Facilities may be needed for meetings between parents, carers, staff and professionals to discuss individual children's needs, and specific issues, in a case conference setting. This is particularly relevant in special schools.

- (a) The Contractor shall make every space in a suite accessible, for an accessible toilet to be available from each Suite of Spaces, and (if required) for an SEN resource space to be available in a central location, to avoid any potential stigma for Pupils being seen to go there. The School-specific Briefs identify any further SEN facilities needed for each School.
- (b) Specially Resourced Provision is required in some mainstream Schools for SEN. The Contractor shall provide a supplementary area, over and above the area needed for the main school to accommodate this. This provision will be specified in the School-specific Brief.

1.5.6 Health and Well-Being

The health and comfort needs of Pupils and staff are recognised through providing a healthy working environment that encourages self-esteem and motivation. Good schools understand the connection between children's physical and mental health and their educational achievement. The Generic Design Brief therefore requires an effective healthy indoor environment to support educational attainment with good daylight, ventilation, thermal comfort and acoustics.

Good schools promote healthy eating by ensuring that all Pupils have access to healthy food and drink, locally sourced and prepared either on site or brought in from outside providers. They may also work with parents, community organisations and local agencies to offer wide Extra-curricular activities outside the core day which enhance local community engagement

The Contractor shall provide a healthy, safe environment with an area that can accommodate a civilised dining experience, linked to a Catering Area within which healthy meals can be prepared and delivered. The Contractor shall ensure that sport facilities may be open to the community outside the Required Period without adversely affecting the School's security. The Contractor shall provide outdoor environments, with space available, where possible for future use by the School for food growing or as a habitat area.

[The School-specific Brief may also require the opportunity for parents and others to access one or two spaces during the Required Period, particularly in a Primary or Special School.]

As with healthcare establishments, the effective landscape design and 'greening' of the School environment can have a significant positive influence over a child's well-being, including sensory stimulation for SEN and learning disabilities. Opportunities for Pupils to produce their own food can also contribute to the development of good personal health awareness at a young age.

Education outcomes are strongly affected by the internal environment in teaching spaces. A good internal environment is provided by achieving thermal, visual and auditory comfort. The Generic Design Brief sets out the performance requirements for controlling internal temperatures and air quality, for achieving good levels of natural light and good acoustics.

2. BUILDINGS AND GROUNDS

2.1 Overarching Requirements

This paragraph gives the generic requirements for Buildings and Grounds which apply to each School. In producing the Contractor's Proposals, the Contractor shall consider and address all elements of the Generic Design Brief, together with the School-specific Brief, the Schedules of Accommodation (SoA) and the Area Data Sheets (ADS).

Although the Contractor may suggest alternative approaches, it is intended that these Authority's Requirements shall only be changed to the extent that:

- any guidance text or notes needs removing; and
- any changes are pre-agreed with the Authority.

- 2.1.1 Regarding works to existing buildings, the Contractor is to work to these Authority's requirements, except where it is stated that a different requirement is applicable.
- 2.1.2 Generally the following applies to existing buildings (except where altered specifically below):
- (a) **Remodel**
all requirements of the FoS must be met;
 - (b) **Major Refurbishment**
all elements of the construction amended by the contractor must comply with the FoS;
 - (c) **Light Refurbishment**
where possible elements of the construction amended by the contractor should comply with the FoS. Improvements to thermal and acoustic aspects of the environment should be prioritised;
 - (d) **Refresh**
the Contractor should target to improve the existing buildings moving towards the requirements of the FoS. New finishes should be compliant with the FoS. If improvements to acoustics can be incorporated within the framework rates this would be beneficial.

2.2 Site Plan – Overarching Requirement

The Contractor shall ensure that the design maximises the potential use of the Site, locating and orientating any new Buildings in a manner that will create suitable internal and external spaces and allow possible future extensions. All users must be able to find their way safely and easily around Buildings and grounds. The Contractor shall ensure that the design makes good use of the Site, balancing the needs of pedestrians, cyclists and vehicles and dealing with any Site-specific constraints.

2.2.1 Site Layout

The Contractor shall ensure that the Site layout:

- (a) takes account of the character of the area and topography of the Site, including its shape, contours and subsoil; and the local ecology and micro-climate;
- (b) wherever possible, orientates School Buildings on the site to optimise passive design principles;
- (c) mitigates the effects of adverse environmental conditions, such as traffic noise, including any highlighted in the School-specific Briefs;

- (d) locates quieter activities away from noisier activities and neighbourhood noise, wherever possible;
- (e) takes into account the needs of neighbours in close proximity;
- (f) provides clearly defined boundaries which discourage trespass and vandalism and provide good visibility to facilitate surveillance across the site;
- (g) provides car parking, in line with the School-specific Brief;
- (h) (for **Secondary Schools** in particular) provides easy movement between changing rooms and outdoor PE facilities, and between parking areas and parts of the Buildings and grounds likely to be used outside the Required Period.

2.2.2 **Site Access**

The Contractor shall ensure that the Site design takes account of access needs of the Emergency Services and seeks to resolve potential conflicts between different movements, ensuring the safety and security of Pupils, staff and visitors. The landscape and layout shall be designed to give priority to pedestrians while allowing appropriate access for vehicles.

The Contractor shall ensure that the design of each Site provides for:

- (a) safe and convenient access for pedestrians, cyclists and vehicles, including emergency vehicles, balancing the demands of different users and keeping vehicular movement within the grounds to a minimum, and as far as possible separate from pedestrian routes;
- (b) fire and emergency escape routes (on existing sites, the construction project should maintain or improve the accessibility for emergency vehicles on and around the site);
- (c) access to and through soft landscape areas along defined pathways that do not require special footwear and are easily maintained, with any all-weather surfaces provided being located so that users do not have to cross grass to reach them;
- (d) safe access for service vehicles and secure storage for goods and waste awaiting collection;
- (e) deliveries and collections from site, appertaining to the execution of the Works;
- (f) the Contractor shall produce and comply with a monitored process of entry and exit agreed with the School, either through security or physical barriers to entry or exit with acknowledgement and authorisation processes;

- (g) Contractor deliveries to site and collections from Site must be managed so as not to interfere with the delivery of education at the School or the Pupil movement of School Users about the Site;
- (h) Pupils with SEN are likely to be less aware of traffic risks and may not see or hear vehicles, and the Contractor shall make relevant adjustments when designing access routes to accommodate their particular needs;
- (i) main and secondary Site entrances are located to take account of pedestrian and vehicular routes adjacent to the Site (including public transport). The entrances shall incorporate controlled access and allow clear visual supervision in order for the School to manage the movement of Pupils and visitors onto and off the School Site.

2.2.3 The Contractor shall ensure that there shall be no more than two easily controlled access points to each School site where possible (and other access points as specified in the School-specific Briefs), located so that they are visible from public areas.

2.2.4 Updates to security systems, for example number plate recognition shall be provided as required at reasonable cost.

2.2.5 The Contractor shall design the Site for accessibility and this shall be reflected in the Access Statement that the Contractor shall provide. All main access routes including roads, paths, ramps and entrances shall be fully negotiable, including by people with limited mobility. Where existing barriers to mobility exist, where practical, the contractor should seek to amend the external areas to improve accessibility

2.2.6 The Contractor shall provide a clear hierarchy of circulation routes with easily-supervised and clearly identified entry points to the Buildings and signage directing visitors from the entry of the site to the visitor's reception. The Contractor shall ensure that entry/exit points for Pupils are controllable either within the Building or within the overall Site.

2.2.7 Where a nursery classroom is provided, the contractor shall ensure that parents and/or carers can gain access to the Nursery to collect and drop off children without crossing any external play space, including the nursery play area.

2.3 Organisation and Layout – Overarching Requirement

The Contractor shall ensure that all spaces are located so that there is a clear spatial diagram for the Building that is appropriate for the curriculum and organisation of each School, in line with any adjacency diagrams in the School-specific Briefs. Spaces shall be linked by well organised circulation space that suits the likely movement and numbers of Pupils.

2.3.1 Typical Organisation

The Contractor shall ensure that the Building's layout provides the right balance and distribution of space, in line with the SoA and the adjacency diagrams in the School-specific Briefs. Each School will comprise

appropriate Suites of Spaces depending on the type of school. The SoA for each School will be organised in a number of Suites of Spaces, avoiding small independent groups of rooms wherever possible. Any exceptions to this generic requirement will be identified in each of the School-specific Briefs.

In existing buildings the Contractor should follow the adjacencies diagram where possible and practical, where overheating of rooms could be a problem the Contractor should adjust the adjacencies such that where possible rooms which are likely to overheat are used for 'non-occupied' rooms (eg storage).

2.3.2 The Contractor shall ensure that all internal spaces are numbered with recognisable labels and shown on the School Buildings and grounds layout plans. They shall also include the identification of spaces identified for the delivery of the Services along with a statement of their function (eg, office, cleaning stores etc.).The door signs shall be updatable, eg, for change of staff names.

2.3.3 The Contractor shall ensure that the design and layout of School Buildings and grounds will include the space requirements to deliver the Soft Services including storage and office space as defined in the ADSs. They will be organised to enable delivery of the required services, to the service levels required to positively support the School's curriculum delivery.

2.3.4 Typical number of Suites of Spaces per School

Types of suite (typical number of spaces per suite)	Number of suites per School		
	Primary Schools	Secondary and all-age Schools	Special Schools and Alternative Provision
Classrooms	1 – 3	-	1 - 3
General Teaching	-	3 - 4	-
Practical Teaching	-	2 - 3	1 if secondary
Music	-	1	-
Hall, Performance and Dining	1	1	1
Sports Hall	-	1	-
Administration	1	1	1

- 2.3.5 The Contractor shall design these Suites of Spaces to accommodate the model of education that each School is proposing in the School-specific Brief, taking into account the possibility of future changes. In particular:
- (a) each Suite of Spaces shall provide the right number of spaces;
 - (b) each suite of teaching spaces, other than a hall and Performance Spaces or heavy Practical Teaching areas, shall be adjacent to other similar spaces wherever possible;
 - (c) each suite of teaching spaces shall be able to be linked to, or expanded into, an adjacent suite of teaching spaces in the future;
 - (d) the configuration of spaces must be able to expand, contract and reform in as many ways as is economically feasible.
- 2.3.6 The Contractor shall provide teaching spaces that are visible from the circulation area in that Suite of Spaces, for instance by providing vision panels in doors. Any exceptions to this shall be specified in the School-specific Briefs. The Contractor shall ensure that all but the smallest spaces may be accessed from an adjacent circulation area.
- 2.3.7 The Contractor shall not design long lengths of dark or narrow corridor with teaching spaces on both sides. Where long corridors are needed, the Contractor shall relieve the impact by introducing light and views through teaching spaces, glazed offices and staircases.
- 2.3.8 In designing the Buildings (or carrying out alterations to existing buildings), the Contractor shall comply with Part M, Access to and Use of Buildings. The Contractor shall ensure that all new Buildings are fully accessible to all people including those with impaired movement or other disabilities. Where Buildings are to be refurbished the Contractor shall ensure that all Pupils have full access to the curriculum. There shall be clarity in the arrangement and location of entrances, main circulation routes and key spaces. The Building layout shall be clearly organised to enable ease of circulation for Pupils, visitors and staff, and to aid orientation and ease of movement to external areas – particularly in event of emergency. This shall be achieved through the layout of the Building and not just rely on signage.

2.4 Internal Space - Overarching Requirement

The Contractor shall ensure that each School has sufficient teaching and support spaces to suit the School's curriculum and organisation for the number of Pupil places planned, as specified in the SoA. The Contractor shall ensure that all such spaces are the right size, proportions and design for their functions, as defined in the ADS, and that areas for catering, dining and social space are sufficient to allow for healthy and civilised eating and recreation.

The Gross Area of buildings can be separated into two categories:

- Net Area, or usable area, plus any agreed supplementary net area; and

- *Non-net Area*, such as circulation, which will be more variable than net area depending on the overall design, the configuration of existing buildings and site constraints.

Non-net areas include school kitchens and ancillary areas, toilets, changing rooms (with showers where specified), entrance and circulation areas (including primary circulation routes through open-plan areas), plant areas (including ICT server rooms and hubs), and the area of all internal walls.

Suites are described below, including Non-net Areas where applicable. The spaces that make up the Net Area in each suite generally consist of small support spaces (up to 35m²), General Teaching and other medium-sized spaces (35m² to 115m²) and large spaces (over 115m²) such as halls and Performance Spaces. The Balance Areas to be provided include libraries and entrance areas.

The Generic Design Brief includes only limited additional facilities or specification for the community use of School facilities. However the design of the building layout, zoning of services and security should take account of the fact that most Schools will provide some use of their premises outside of the Required Period, particularly the sports facilities in Secondary Schools.

- 2.4.1 The Contractor shall ensure that the design of the building layout, zoning of the Building Services and security shall contemplate that the School will be used outside of the core hours, for example by the community

2.4.2 **Dimensions and Proportions**

- (a) The Contractor shall ensure that the School is designed to meet or exceed the minimum area for each space as specified in the ADS and as set out below:
- (i) for teaching spaces (and medium-sized spaces such as a staff room or library) between 35m² and 115m², a minimum floor-to-ceiling height of 2.7m, and minimum clear height of 2.7m in workshops and resistant materials prep rooms;
 - (ii) for halls, drama, dance and activity studios over 90m², a minimum floor-to-ceiling height of 4.5m.
 - (iii) for halls over 180m², a minimum floor-to-ceiling height of 6.9m, or 7.5m for a sports halls over 300m².

Where each space is part of a New Building, the sizes shown in the SoA and ADS are generally based on the following standard dimensions which allow a range of room sizes to be accommodated, alongside a circulation area:

- *for large spaces such as halls over 115m², a depth of 10m, 15m or 18m. This allows some large spaces to be adjacent within a single block with the same structural span;*
- *for Primary School and Special School teaching spaces in between 35m² and 70m², a depth of 7.2m from the inside face of*

the external wall to the internal face of the opposite wall, and perpendicular partition walls on a 900mm grid;

- *for Secondary School teaching spaces (and medium-sized spaces such as a staff room or library) between 70m² and 115m², a depth of 7.8m from the inside face of the external wall to the internal face of the opposite wall, and perpendicular partition walls on a 900mm grid.*

- (b) Where the space is expected to be in refurbished or redecorated buildings, the area and dimensions of the space may be based on the existing size or on column centres.
- (c) Using the FF&E layouts described in 3.3 the Contractor shall demonstrate in the Contractor's Proposals that:
- (i) the activities and FF&E required in the ADS can be accommodated (FF&E layout options shall be provided to demonstrate functionality);
 - (ii) the daylight and the ventilation requirements of the Generic Design Brief and the ADS can be met;
 - (iii) the range of dimensions proposed is limited, supporting a standardised approach;
 - (iv) the associated structural grid and the fenestration system will allow adaptability in all teaching spaces.
- (d) The Contractor shall ensure that spaces are an appropriate shape as well as size to accommodate the Authority's Requirements. Except where the Contractor can identify specific advantages to designing otherwise, any teaching spaces specified in the SoA will generally be orthogonal in plan, of the proportion indicated in the ADS, and in any case no narrower than 2:1 in either direction. The proportion of any non-teaching space will be suitable for the required activities to take place.
- (e) The proportions of any Performance Space must allow the audience a clear view of the performance area.
- (f) The net area of any space should be at least that required in the SoA and not include the area of any circulation to other adjacent spaces

2.4.3 Suites of Spaces

- (a) The Contractor shall design each School to a standardised approach involving a number of Suites of Spaces, each of which will contain different types of space. Seven Suites of Spaces are described:
- (i) Classrooms (Primary Schools, Special Schools);

- (ii) General Teaching;
 - (iii) Practical Teaching (art, science, Design and Technology etc);
 - (iv) Music;
 - (v) Hall, Performance and Dining;
 - (vi) Sports Hall;
 - (vii) Administration.
- (b) There are also a number of Balance Areas.
- (c) There are common issues that need to be addressed within each Suite of Spaces. The Contractor shall take into account the following points in conjunction with the more detailed requirements set out in the ADS and the School-specific Briefs:
- (i) Classrooms, General Teaching and Practical Teaching Suites of Spaces, together with differing levels of support spaces, need to be accommodated within adaptable zones. These need to have a suitable consistent depth (from external wall with windows to internal wall) and an uninterrupted length sufficient to allow a number of rooms of differing sizes and types;
 - (ii) where possible, Classrooms, General Teaching and Practical Teaching spaces should be standardised sufficiently so that the function of these spaces can be altered to suit changes in Pupil numbers or curriculum need, without structural change;
 - (iii) in Secondary Schools, staff accommodation within teaching Suites of Spaces, such as work-rooms and pastoral office, should be located so that it facilitates passive (informal) supervision of the suite and preferably any space outside toilets;
 - (iv) teaching storage in any Suite of Spaces (in addition to local storage in furniture) should be designed to be in secure, enclosed and separate store rooms of the area required in the SoA;
 - (v) storage space should be provided for personal items, such as coats and bags, Mobility Equipment and other appliances. These spaces are identified in the SoA and must be additional to, and not impede, circulation space, although they will often be directly 'off' the circulation route.

2.4.4 Classroom Suites

- (a) Each School will have Suites of Spaces, typically comprising Classrooms, and Practical Teaching spaces. These may include the option of shared teaching areas, able to accommodate a broad

range of teaching activities and subjects as well as providing a registration base for a class group. They should be designed to suit the age range of the Pupils using them and to allow staff to arrange furniture and equipment to meet the varying needs of Pupils.

- (b) The requirements for services are specified in the ADS, but will typically include power, ICT Infrastructure and water.
- (c) Classroom Suites of Spaces will have the following support spaces (unless specified otherwise in the SoA):
 - (i) storage space for coats and bags and, where required, Mobility Equipment or other specific aids required by pupils with disabilities;
 - (ii) a store for Learning Resources, close to the Classroom;
 - (iii) toilets (and where required changing facilities), with appropriate access from Classrooms;
 - (iv) Small Group Rooms - discrete, quiet places for learning support, behaviour management or private counselling - within easy reach of Classrooms; and
 - (v) direct access to the outdoors where possible, particularly for nursery and infant Pupils.
- (d) In a Special School or Designated unit with secondary age Pupils, there should be practical spaces designed to suit the range of SEN at the School. For example, where there are Pupils working to a mainstream curriculum, the Practical Teaching spaces will require services and specialist furniture and equipment similar to a mainstream school. Where there are non-ambulant Pupils with Complex Needs, the spaces are likely to be simpler and less heavily serviced, being suitable for a range of General Teaching and Practical Teaching activities, often changing over time.
- (e) Practical Teaching spaces in Special Schools and Designated Units should have the flexibility to accommodate an individual's specialist equipment where necessary; and the adaptability to be used in other ways in the future. A room used for teaching food technology may also be used for some aspects of life skills training.

2.4.5 **General Teaching Suites (Secondary Schools)**

- (a) The Contractor shall design each Secondary School with Suites of Spaces able to accommodate a range of General Teaching activities and subjects as well as providing a registration, and perhaps social, base for a year or mixed-age group. While they are not usually expected to be serviced with more than power and ICT Infrastructure, the option to easily add water and drainage services in some rooms at a later date, to enable some light practical activities, would be an advantage.

- (b) General Teaching spaces shall have the following support spaces (unless specified otherwise in the SoA):
 - (i) a store for Learning Resources, close to the General Teaching spaces;
 - (ii) toilet facilities easily accessible from the Suite of Spaces;
 - (iii) Small Group Rooms.
- (c) Some Schools with a sixth form (usually those with a large post-16 cohort) will have a distinct General Teaching suite accommodating teaching and study activities as well as providing a registration, and perhaps, social base for sixth form Pupils. This will be supported by storage and toilet facilities. Alternatively sixth-form seminar rooms will be distributed around the General Teaching suites with study areas attached to the library. The Contractor shall ensure that the provision meets the requirements described in the School-specific Briefs and as shown on the SoA.

2.4.6 Practical Teaching Suites (Secondary Schools)

- (a) The Contractor shall ensure that Practical Teaching suites for Secondary School Pupils will include light and (for Design and Technology) heavy Practical Teaching spaces that provide a larger area for each workplace and are serviced, at least with power and water, as identified in the ADS.
- (b) The Contractor shall ensure that the shape and proportions of these spaces should allow flexibility in the range of possible FF&E layouts and enough space should be provided around FF&E for Pupils to work safely.
- (c) The Contractor shall ensure that all Practical Teaching spaces are designed to meet the requirements of the ADS and to support safe practices.
- (d) Some Practical Teaching spaces have specific ventilation and extraction requirements, and the Contractor shall ensure that these are provided in accordance with the requirements of this FOS and the ADS. The Contractor shall ensure that any services in Practical Teaching spaces are fitted with sufficient local master controls, as specified in the ADS, to control services in lessons and for cutting off supplies in an emergency. Such master controls should not isolate fridges, freezers, ICT equipment and 13A sockets provided for cleaners.
- (e) Light Practical Teaching spaces should be usable for non-practical activities, such as registration. Heavy Practical Teaching spaces that are fitted with fixed, serviced equipment such as lathes or cookers are unlikely to be usable as registration bases, and may provide less flexibility than other teaching areas.

- (f) Practical Teaching spaces should have the following support spaces (unless specified otherwise in the SoA):
- (i) teaching stores (additional to storage in furniture in the room itself) adjacent to the Practical Teaching space, for resources and (where specified in the ADS) for work in progress;
 - (ii) preparation/storage rooms to service science, resistant material and food spaces;
 - (iii) toilet facilities easily accessible from the suite.
- (g) In addition, any rooms used predominantly for Art should have:
- (i) good daylight (ideally from the North) and views out (for instance from upper floors);
 - (ii) space for both horizontal and vertical display of two- and three-dimensional work.
 - (iii) Any Suite of Spaces used for Science should have appropriately positioned central preparation room(s), with an easy route for the delivery of hazardous materials and to Practical Teaching spaces, but not limiting adaptability between laboratories. Separate, secure storage should be provided (as specified in the ADS) for:
 - hazardous chemicals and other dangerous material, in a dedicated chemical store, ideally within the preparation area;
 - gas cylinders; and
 - radioactive sources.
- (h) Any Practical Teaching spaces used for working with wood, metals and plastics should have suitable local exhaust ventilation, in accordance with the requirements of paragraphs 2.8.24 to 2.8.25 on LEV systems, and the ADS.
- (i) Fume cupboards should be of the ducted type and should be fixed in position in the preparation rooms and able to be pulled out from the wall on flexible connections in the teaching spaces for demonstration purposes. If the School Specific Brief requires the use of re-circulatory fume cupboards the rooms in which they are located will need to be ventilated at the higher air change rate of five air changes per hour whenever the fume cupboards are in use.
- (j) Storage for resistant materials or engineering should be provided in a preparation room designed with appropriate proportions, accessibility and safety, such that materials can be delivered, stored and cut to size. This room should be located to allow easy and level access to the Practical Teaching spaces it serves.

2.4.7 Music Suites

The Contractor shall ensure that any rooms used for music are designed to avoid sound disturbance to and from neighbouring spaces (including the outside), taking particular account of other spaces used for examinations. Rooms used for music should have acoustic properties that satisfy the requirements of the ADS, including, in small rooms, the reduction of standing waves from parallel walls. The following support spaces will be provided for music in Secondary Schools (unless specified otherwise in the SoA):

- (a) secure instrument storage, positioned to allow access from a circulation area;
- (b) small group/practice rooms, easily accessed and supervised from the main music rooms while being acoustically discrete;
- (c) One large group/practice room, designed to accommodate a drum kit, located to minimise disturbance and directly accessible from a circulation area; and
- (d) In Special Schools there is usually a combined music and drama space which may be used for multi-sensory work and physiotherapy, and the requirements are set out in more detail in the School-specific Briefs.

2.4.8 Hall, Performance and Dining Suites

- (a) The Contractor shall provide each School with a hall, Performance Space and dining suite, easily reached from the main entrance and reception, main kitchen and other support spaces. Each School should have a main hall and, where specified in the SoA, there should be a second space that may be predominantly for dining or indoor PE. These spaces may also be used outside the Required Period, for events such as performances and parent evenings. Smaller teaching spaces for music and drama, and associated support spaces such as for storage, may also be required.
- (b) The main hall should be designed to accommodate the specified activities, which may include assemblies, religious worship and (in a Secondary School) examinations, as well as presentations and activities for large groups, such as projects for a year group.
- (c) Halls should have the following support spaces (unless specified otherwise in the SoA):
 - (i) storage spaces for equipment, furniture and costumes;
 - (ii) an adjacent control room (in Secondary Schools) which provides a view over the performance area;
 - (iii) easy access to toilet facilities, including an accessible toilet.

- (d) Halls and any spaces used for performance should have the specific attributes of volume and/or acoustics identified in the ADS. Where a hall is used for a wide range of activities such as performance, PE and dining (most often in a Primary School or a Special School) the Contractor shall ensure that it is designed so that these functions are not unduly compromised by the different uses.

2.4.9 Dining

- (a) The Contractor shall ensure that the areas of the main dining space or spaces are as identified in the SoA and are sufficient to meet the catering arrangements of the School as set out in the School Specific Brief. Specific requirements, including whether dining will be in a single location or dispersed around the School, are given in the School-specific Briefs. Where a specific dining area is required in the SoA, the Contractor shall design it to suit appropriate alternative uses during the Required Period where specified in the School-specific Briefs. Where dining takes place in a hall or other area, such spaces should be able to accommodate all activities specified. As well as responding to the specific requirements in the School-specific Briefs, the Contractor shall ensure that any area used as a dining space will:
 - (i) be easily accessible from all areas, conveniently positioned in relation to the kitchen and serving areas and be designed so that the space can be used during timetabled lessons without disturbing Pupils who are working nearby;
 - (ii) accord with other general requirements in this FOS;
 - (iii) have sufficient circulation or other space next to the dining area for queuing and circulation at meal times, including for those using Mobility Equipment, without impinging on the dining tables;
 - (iv) have an efficient layout with adequate seating capacity;
 - (v) provide enough space to allow people (including those using Mobility Equipment) to move between tables freely without disturbing those eating.
- (b) The Contractor shall provide a flow diagram to demonstrate that the logical flow of movement around the dining space meets the specified requirements in the School-specific Briefs.
- (c) Where a specific dining area is required in the SoA, the Contractor shall ensure that it is designed so that there is adequate space for till points and serving areas to service the number of diners in any sitting, as given in the School-specific Briefs. Where required in the School-specific Briefs, the Contractor shall also design the space to facilitate the requirements for distribution of food to dining areas in other areas of the school.

- (d) Where re-locatable furniture is used in dining spaces, the Contractor shall provide storage for it when not in use.
- (e) Dining spaces should provide privacy for those that need it.
- (f) The Contractor shall involve a specialist consultant in the design and location of the main kitchen/Catering Area and associated areas, including office, toilets, changing and staff areas. The design should encompass the specialist consultant shall liaise with the relevant School (and its catering provider) to determine the requirements:
 - (i) catering equipment, in the kitchen area, necessary for the preparation of hot and cold meals in a cost effective and efficient manner both in terms of staffing and energy use to allow the School to deliver the number of meals in accordance with the preparation model, at the frequencies required as specified in the School Specific Brief;
 - (ii) a functional layout that allows for efficient operations and any special dietary requirements, by arranging the main activity areas of delivery, storage, preparation, cooking and wash-up in a logical sequence to ease work flows;
 - (iii) a sensible 'flow' from the self-clearing facility linking to the kitchen pre-clean area and dish wash, and from dishwasher to crockery/cutlery/tray storage;
 - (iv) adequate but secure servicing access for deliveries of ingredients and equipment and disposal, recycling and collection of waste;
 - (v) the capability to prevent unauthorised access when required;
 - (vi) minimal impact on the School's educational functions, including avoiding noises and smells in adjacent areas;
 - (vii) durable, hygienic, easily cleanable materials;
 - (viii) adequate ventilation (see paragraph 2.8);
 - (ix) design in accordance with best practice as described in CIBSE TM50 Energy Efficiency in Commercial Kitchens;
 - (x) the provision of adequate staff accommodation.
- (g) The Authority may agree with the Contractor to re-use items of legacy equipment where they are in good condition, within warranty, fit in with the kitchen design solution and do not compromise the energy performance or functionality of the kitchen design. If appliances are to be re-used the Contractor shall arrange for them to be fully serviced prior to re-installation.

2.4.10 Sports Hall Suite (Secondary Schools)

- (a) The Contractor shall provide each Secondary School with a sports hall with changing areas and showers (located for easy access to internal and external sports spaces) as well as associated support spaces including storage. Where additional PE and sports spaces are required, such as an activity studio, these are included in the SoA.
- (b) The Contractor should assume that all sports facilities are available to the local community outside the school day, so they should be designed to be accessed and used safely and easily by members of the community. The Contractor shall design storage in PE and sport areas to ensure that:
 - (i) storage adjacent to the sports hall, if specified, is easily accessible for storage of large items of equipment;
 - (ii) in a Special School a convenient and secure store shall be provided for sports Mobility Equipment where required.

2.4.11 Administration Suite

- (a) The Contractor shall design the School so that accommodation for administration staff and some senior management, such as a general office and head teacher's office, is centrally located yet close to the front of the School and the reception area. There are usually other staff offices located locally in teaching suites, as specified in the School-specific Briefs. The staff room does not need to be within the administration suite. Within existing buildings, where practical, the contractor should work to improve the administration areas to match requirements below.
- (b) The Contractor shall design the school so that:
 - (i) the general office is next to the main entrance/reception area/reception desk, as well as being close to other administrative staff offices or work areas;
 - (ii) the main entrance is clearly defined, accessible and secure;
 - (iii) unauthorised access to the main School buildings should not be possible beyond the main entrance lobby, with visitors being subject to some form of access control operated by reception staff;
 - (iv) visitors in the entrance/reception area are able to access a toilet and, where specified in the SoA, an interview room without having free access to pupil areas;
 - (v) the main entrance suits visitors as well as the School, taking account of disabled users, including those requiring Mobility Equipment.

2.4.12 **Balance Areas**

The Contractor shall ensure that all Schools have the following Balance Areas.

2.4.13 **Library**

- (a) Unless specified otherwise in the School-specific Briefs, each School shall have at least one library, positioned for easy access by all Pupils. This will be additional to the learning resource spaces, such as small group rooms, located locally in other Suites of Spaces.
- (b) The Contractor shall ensure that the library is designed:
 - (i) to accommodate formal and informal learning including individual study (using ICT and printed material) and reading;
 - (ii) to be accessible to all including those using Mobility Equipment;
 - (iii) with good sight lines for easy supervision;
 - (iv) so that mezzanine areas are avoided, unless there is a specific purpose for them that can be utilised without needing supervision from the main area;
 - (v) to accommodate a whole class within a Secondary School whilst part of the library should be capable of remaining to a quiet space;
 - (vi) to accommodate half a class within a Primary School;
 - (vii) so that lighting illuminates both vertical and horizontal surfaces, with a means to control sunlight - both to avoid solar gain and damage to books;
 - (viii) to be close to any central ICT resource, and may be adjacent to sixth form and other study areas within a Secondary School;
 - (ix) to have an adjacent secure store room; and
 - (x) to have one entrance and exit via a security system, unless otherwise specified in the ADS.

2.4.14 **SEN and Medical Spaces**

- (a) The Contractor shall design all Schools to have medical and therapy facilities and support spaces for SEN. These should be located for easy access whilst maintaining privacy for Pupils.
- (b) The Contractor shall design each School with:

- (i) a medical/therapy room for the medical examination and treatment of Pupils, which includes a washing facility. This accommodation may also be used for other purposes, except teaching, when not required for its primary function;
 - (ii) a sick bay or sick room for the short term care of sick and injured Pupils, which should be near to a toilet.
- (c) In a Special School, Designated Unit or Specially Resourced Provision the Contractor shall provide one or more of the following specialist facilities, as contained in the SoA and School-specific Briefs:
- (i) **a physiotherapy room**

which will be a functional space designed to accommodate a range of physiotherapeutic activities, including lifting of children by the use of ceiling-mounted equipment. There should be space for the use and storage of Mobility Equipment, while direct access to a secure and sheltered outdoor space is an advantage. There should be an accessible toilet/changing room nearby;
 - (ii) **a Soft-play Room**

which allows children to move without inhibition and fear of injury. It should be naturally lit and ventilated, wherever possible, and internal spaces should be avoided. There should be clear circulation space for Mobility Equipment and the ceiling height should allow for a ceiling-mounted hoist. The room should be fitted out by a specialist;
 - (iii) **a multi-purpose Therapy Room**

which is designed to provide a quiet private place for a range of therapies including speech and language and occupational therapy. There should be an equipment store and an accessible toilet/hygiene room nearby;
 - (iv) **a Calming Room**

which will provide a quiet place with good sight lines. Materials, fittings and finishes should be chosen to safeguard against self-harm;
 - (v) **a sensory room**

which will be an internal room equipped for a variety of multi-sensory experiences which will have sufficient space to allow a choice of equipment to be used;

- (vi) **a medical/nurse's office**
which should provide a hygienic environment and include secure and appropriate storage for medicines.
- (d) Where a store for medical gases is specified, it should be:
 - (i) close to its point of use with clear access for delivery;
 - (ii) clearly marked, well ventilated, lockable and not vulnerable to vandalism;
 - (iii) ideally located at ground level, not underground (for example in a basement);
 - (iv) fitted with outward opening doors.
- (e) The Contractor shall obtain specialist advice on the use and storage of medical gas cylinders.
- (f) Where a Hydrotherapy Pool is specified in the SoA, the Contractor shall ensure that its design and water treatment complies with the recommendations in the standards published by the Pool water Advisory Group (PWTAG)². The Contractor shall also ensure that it is designed and installed by specialists, in close consultation with School staff. It should be safe and accessible and designed to minimise the risk of infection. The Contractor shall design the pool area to have:
 - (i) "wet" changing rooms from which Pupils can move directly to the pool, with hoisted assistance where necessary;
 - (ii) staff changing areas, adjacent to the pool;
 - (iii) a separate pool plant room with a bunded area for chemical storage.

2.4.15 Storage

- (a) The Contractor shall provide central and secure stores which are lockable, for instance for Pupils' records. Where this is for examination papers it shall be accessed from a lockable office and securely located, such as on an upper floor. In addition to this, and the storage included on the ADS, storage should be provided for the following:
 - (i) waste materials, including facilities for separation and recycling;

² Publicly Available Specification PAS39 2003 Management of public swimming pools – Water treatment plant and heating and ventilation systems – Code of Practice (orders@bsi-global.com)

- (ii) external equipment, eg for maintenance;
 - (iii) combustible waste materials, securely located in accordance with relevant legislation.
- (b) The Contractor shall identify the size and location of the above provision, to demonstrate that it will provide easy access and be efficient to use.

2.4.16 Toilets

- (a) The Contractor shall ensure that the following requirements, which apply to toilets in all Schools³, are met (including when creating a new toilet area within an existing building or working within an existing toilet area):
- (i) the toilets are designed and fitted out to a standard that discourages anti-social behaviour and vandalism;
 - (ii) toilets are located in areas around the School that provide easy access by Pupils and allow for informal supervision by staff, without compromising Pupils' privacy;
 - (iii) staff toilets are provided separate from Pupils' toilets, according to the SoA. Some of these will be located near the administration facility and staff room and they may be used by visitors. Any additional visitor toilets specified in the SoA should be close to the main entrance;
 - (iv) where sports facilities are used by the community, sufficient toilets should be accessible to community users without breaching School security.
- (b) The Contractor shall provide that each School has sufficient toilets for disabled Pupils, as specified in the SoA and School-specific Briefs. Each toilet for disabled Pupils should contain one toilet and one washbasin and, where specified in the School-specific Brief, a shower or other wash down facility, and have a door opening directly onto a circulation space (other than a staircase) which can be secured from the inside. These facilities may also be used by other Pupils, staff and visitors whether disabled or not.
- (c) Where a hygiene room is specified in the SoA it should suit a mix of pupil disabilities, with a shower, toilet, wash hand basin, suitable handrails, a changing bed and space for assistance. The ceiling shall be designed to accommodate ceiling hoist tracking which must take the weight of a pupil using the hoist
- (d) The Contractor shall provide for the following additional requirements in relation to toilet provision in **Secondary Schools**:

³ Statutory requirements for toilets and washing facilities are included in the school premises regulations and in *Standards for School Premises* – see Annex I

- (i) except where individual toilets are specified, hand-washing facilities should be made visible by being located as a direct extension to the circulation space, separate from the cubicle area. At least one set of toilets should be positioned to allow easy access from outdoor spaces used during lunch and break times and for sports events, as well as from indoor sports facilities and spaces used for examinations or performances;
 - (ii) each suite of teaching spaces should contain a suite of toilets.
- (e) The Contractor shall provide for the following additional requirements in relation to toilet provision in **Primary Schools**:
- (i) the toilets should be located for easy access from the classrooms and from the playground;
 - (ii) toilets for reception and nursery Pupils should be adjacent to or located directly off the Classroom as required in the school specific brief as well as being easily accessible from the playground;
 - (iii) the design of the partitions in toilets for nursery and infant Pupils should give children privacy whilst allowing teachers to supervise them. The SoA includes one wider cubicle in each group of nursery and infant toilets to allow staff to give assistance, if required.
- (f) The Contractor shall provide for the following additional requirements in relation to toilet facilities in Special Schools and Designated Units:
- (g) Provision should meet the particular needs of the children at the School and the School's specified approach to managing toileting arrangements, as outlined in the School-specific Briefs:
- (i) sufficient hygiene rooms shall be provided to suit the mix of pupil disabilities. Hygiene Rooms shall be provided with a shower, sluice, toilet, a changing trolley and space for assistants. Where ceiling hoists are specified, the ceiling will have to be designed to accommodate the tracking which must take the weight of a pupil using the hoist.
 - (ii) increased extract ventilation may be needed;
 - (iii) in all-age Schools, separate facilities for younger and older children;
 - (iv) the provision of a self-contained laundry, where specified in the SoA;
 - (v) the provision of somewhere to store waste (for soiled nappies/liners, sanitary products or soiled dressings) prior to

collection, unless a macerator is specified. Unless specified otherwise in the School-specific Briefs, accessible toilet and changing facilities in Special Schools should be conveniently located around the School, with suitable way-finding and clear sightlines. In early years, toilets and changing areas should be located directly off the play space. A unisex accessible toilet should be provided close to the main entrance to allow a carer of either sex to provide assistance. There should be a toilet facility immediately available to Pupils on arrival into the School building.

2.4.17 Entrances and Circulation

- (a) The Contractor shall ensure that in relation to entrances and circulation people with disabilities must be able to use the same entrances and circulation routes as able-bodied users. Separate access shall be provided for deliveries, maintenance vehicles and waste removal.
- (b) The Contractor shall also ensure that circulation and linking areas work efficiently and that they comply with the following requirements:
 - (i) suitable access control mechanisms are provided externally to the main reception area;
 - (ii) corridors are of a suitable width to support the activities they serve, with main circulation routes being not less than 1.8m. Narrower widths may be acceptable to access individual rooms, depending on circumstances and traffic flow, except in corridors used by Pupils in a Special School;
 - (iii) sufficient space is provided either side of doors to allow for operation by Mobility Equipment users;
 - (iv) all users are able to find their way safely and easily around the School Buildings. There is clarity in the arrangement and location of entrances, main circulation routes and key spaces;
 - (v) frequently used external doors have draught lobbies configured to avoid draughts and heat loss from the Building.

2.5 External Space – Grounds – Overarching Requirement

- 2.5.1 The Contractor shall ensure that the grounds of each School are a safe and attractive environment for children and young people, offering a variety of different settings for sports, outdoor teaching, social and recreational activities.
- 2.5.2 The Contractor shall ensure that the external spaces provide facilities for physical and non-physical activities to meet Pupils' needs. All areas accessible to Pupils must be capable of being easily supervised and/or overlooked from internal spaces, and links between indoor and outdoor

spaces are optimised. Attention must be given to disabled access, including provision of level thresholds. In Schools where there are Pupils with complex health needs, there must be adequate shelter from the sun and from prevailing winds.

2.5.3 Generally, the Contractor shall take account of climate change adaptation measures in planning transitional and external spaces, to reduce internal temperatures and provide outdoor shelter. Transitional spaces range from unheated atria and covered walkways to more minor spaces, such as covered verandas and porches⁴. Shelter for outdoor space can be provided by planting as well as structures such as canopies.

2.5.4 **Typical Organisation**

- (a) The Contractor shall contemplate the following types of outdoor space in his design, to accommodate the formal curriculum and the informal and social activities of Pupils:
 - (i) informal and social areas, including soft grassed/planted areas and hard-surfaced recreational space;
 - (ii) hard-surfaced games area, marked out for games such as netball and tennis, in the form of a MUGA wherever possible;
 - (iii) sports pitches to meet the School's curriculum needs;
 - (iv) access areas, including paths, cycle routes, roads, delivery and bin storage areas, drop-off and parking.
- (b) The layout of the Site should allow for some overlap in the use of these areas. For example, the spaces around hard surfaced games courts may be used for informal and social activities.
- (c) The design and layout of these areas should take account of the hierarchy of outdoor sports facilities identified by each School in the School-specific Briefs.

2.5.5 **Informal and Social Areas**

The Contractor shall ensure that informal and social areas cater for Pupils according to their age and needs. The Contractor shall provide the following in relation to the Informal and Social areas:

- (a) hard surfaces are marked out for activities such as games courts, preferably within a single enclosed area to assist with supervision. A Special School may also have an area providing a sensory experience or be laid out for mobility training; this is covered in the School-specific Briefs. There must be areas of shade for the summer months;

⁴ "Passive Solar Schools: A design Guide" includes a variety of transitional spaces, including examples of unheated atria and streets, and provides guidance on suitable depths of overhangs.

- (b) hard surfaces must be flat and well drained, be at a safe distance from windows and avoid physical barriers such as external fire escapes. Hard surfacing materials must meet the standards relevant to the proposed use. Playgrounds in mainstream schools are laid out to avoid small enclosed spaces and areas that make supervision difficult. They are of a size and shape to allow playtime games to carry on unhindered and allow supervisory staff to deal quickly with any instances of bullying or undesirable behaviour. Any outdoor FF&E provided shall be positioned for ease of access and supervision, and to minimise the risk of theft and vandalism.;
- (c) where possible, the specification and location of seating in social areas is suitable for use by Pupils with physical disabilities. Any planted areas should both conserve and enhance biodiversity where possible, and be designed to allow site management without the use of hazardous pesticides. A portion of the informal and social area should not be developed, but provide a framework to allow schools to develop parts of their grounds gradually in the future, with the participation of Pupils. Outdoor areas in Primary Schools, are accessed easily by Pupils, but located so that activities do not disturb teaching in ground floor classrooms or in outdoor areas directly outside classrooms

2.5.6 **Hard Surfaced Games Courts**

The Contractor shall ensure that hard surfaced areas for games courts, and any adjacent or overlapping skills practice areas, accord with any areas identified in the school specific briefs. Surfaces must comply with the evenness requirements of BS7044 part 4⁵. They must be level, drain well and have an even surface, which is free of obstructions. Unless otherwise specified in the School-specific Briefs, areas are of a shape and size suitable to allow courts to be marked out, with reasonable margins.

2.5.7 **Multi-Use Games Areas) MUGAs**

The Contractor shall ensure that where several courts are provided, these are combined wherever possible to provide a multi-use games area and are of appropriate dimensions to suit a wide range of sports, including five-a-side football, basketball, hockey, netball, tennis (or short tennis) and volleyball. Where some sports require a higher priority this is reflected in the School-specific Briefs.

2.5.8 **Sports Pitches**

- (a) The Contractor shall wherever possible ensure that, as well as meeting the requirements of the School-specific Briefs, the sports pitches:
 - (i) have sufficient margins built into the design to allow for the pitch location to be moved annually to reduce wear;

⁵ BS7044 part 4: 1993 gives detailed guidance on surface evenness and other aspects, such as finished profile.

- (ii) are designed and constructed to a standard that allows the minimum use specified in the School-specific Briefs for each School's year-round curriculum needs;
 - (iii) are economic to maintain, with easy access for maintenance equipment (and for irrigation if needed).
- (b) The Contractor shall provide that the location, size and shape of individual pitches, courts and practice areas are based on a number of considerations, including:
- (i) safety, providing sufficient pitch margins and allowing for the direction of play (for example for cricket nets);
 - (ii) gradient (a uniform fall of about 1:100 is ideal, but an even fall of up to 1:60 is allowable, or more if it is across the line of play);
 - (iii) orientation of pitches (a roughly north-south direction is generally desirable for most games).
- (c) Where no Works are to be carried out to the pitches the Contractor shall ensure that the pitches are in the same or a better condition than prior to the commencement of the Works.

2.5.9 **Soil Condition**

The Contractor shall undertake a detailed soil condition analysis of the areas to be used for playing fields to enable provision of pitches capable of sustaining both summer and winter use. Specialist advice should be sought to ensure an adequate pitch construction is provided.

2.5.10 **All-Weather Pitches**

The Contractor shall ensure that where specified, the construction and performance of artificial surfaces for sport, such as synthetic turf pitches, comply with the relevant British Standard. The choice of surface is based on performance, safety and durability, through:

- (a) the properties best suited to the types of games to be played, such as the 'ball bounce';
- (b) slip resistance and abrasiveness;
- (c) wear resistance;
- (d) ease of maintenance.

2.5.11 **Access Areas**

The Contractor shall ensure that all access roads are of sufficient width and have geometry to give easy and safe access to all car parking areas and delivery points without risking the safety of Pupils, staff or visitors to the School.

2.5.12 **Emergency Access**

The Contractor shall ensure that when the building is some way back from the public highway, road access for fire appliances is provided. Any entrance through which appliances may need to pass shall be a clear 3m in width with minimum 3.7m headroom and there must be adequate space to enable appliances to turn.

2.5.13 **Paths, Roads and Delivery Areas**

- (a) The Contractor shall ensure that pedestrian routes and cycle routes are separated from vehicular access routes and that they are obvious, well lit and visible, with clear lines of sight, and, where possible, not be surrounded by high vegetation or outbuildings.
- (b) The Contractor shall provide access and turning facilities to suit delivery vehicles, buses and cars for staff and visitors. The Contractor shall seek appropriate advice in respect of road widths, turning radii and adequacy of construction from the relevant authority. Roadways are arranged to eliminate reversing movements in the vicinity of Pupils, wherever possible.

2.5.14 **Drop-off and bus turn around provision**

The Contractor shall ensure that:

- (a) a clear drop-off point is provided at each School entrance area. The Contractor shall ensure that the Works are acceptable to Highways and Planning Authorities. The boarding and disembarkation of School buses shall be sited away from other traffic movements. Any specific requirements of individual Schools are covered in the School-specific Briefs;
- (b) any pick up/ drop off area is visible from the highway to enable drivers to estimate whether there is space for them to enter. However, car parking and the pick-up/drop off area should not be the main feature of the vista of the Site.

2.5.15 **Parking and cycle storage**

The Contractor shall design the Site so that:

- (a) parking is segregated wherever possible from other traffic movements;
- (b) to meet local requirements, parking space numbers are specified in the School-specific Briefs. The parking area is carefully positioned so that it does not dominate the main arrival area and entrance points round the building, while being open and visible, where possible, from the main entrance;
- (c) separate bays are provided for disabled users and visitors;

- (d) cycle storage is easily accessible to cyclists and include means of securing bikes but the storage should be located so that it is overseen from buildings, ideally including from the School office. It should be accessible without crossing vehicular routes wherever possible.

2.6 Environment and Fabric

Paragraphs 2.6 to 2.11 identify the requirements for building structure, form and fabric; as well as acoustics, lighting, heating and ventilation, Building Services and energy efficiency.

- 2.6.1 The Contractor shall ensure that external envelope and structure should be used to achieve the internal environment required based on a passive approach, that is building fabric and orientation first before active (mechanical and electrical) systems are considered. The principles being for a passive approach to assist the achievement of the internal environment by:
 - (a) choosing optimum building orientation for the Site;
 - (b) building shape;
 - (c) building mass to achieve an efficient envelope-to volume ratio;
 - (d) material selection; and
 - (e) optimising the benefits of daylight and natural, hybrid or mixed-mode ventilation.
- 2.6.2 The Contractor shall ensure that the Building Services and components of the Building which are being installed or amended are well co-ordinated, work well in full use and are easy to operate. The users should be able to easily adjust or operate components that affect their comfort, such as lighting switches, ventilation controls and opening windows. Wherever possible, systems should default to 'off'.
- 2.6.3 The Contractor shall ensure that the Building, structure and services being installed as part of the works are designed to allow for changes in configurations to be made easily and economically, in particular that:
 - (a) the partitions most likely to change, which are likely to be perpendicular to the external wall, are not load-bearing;
 - (b) columns in the middle of spaces are avoided;
 - (c) lighting systems are suitable for different partition positions, with minimal change to switching circuits and luminaire positions (see section on Lighting) and do not interfere with Classroom AV technology;
 - (d) heating and other services are suitable for different partition positions with minimal change;

- (e) fenestration, shading devices and any ventilation chimneys or ducts proposed, do not obstruct daylight or the use of AV technology or ventilation or the repositioning of partition walls (for instance against mullions);
- (f) noise reduction between rooms is not adversely affected by adaptation works, and where possible improved, taking account of sound travelling through ductwork, openings, screeds and ceilings;
- (g) sound absorption in each room continues to provide a suitable reverberation time, following any adaptation works and where possible improved;
- (h) internal door sets are suitable for different plan arrangements with minimal change;
- (i) floor and other finishes are suitable for different plan arrangements with minimal adaptation work;
- (j) replaceable components must be easy and safe to replace when necessary.

2.6.4 Form and Structure - Overarching Requirement

- (a) The Contractor shall ensure that the Building is well composed, with form and massing appropriate to the site and passive design principles. The Contractor shall design the Building to have an efficient structure that allows future adaptability; weathers well and withstands wear and tear in use, including minor vandalism.
- (b) The Contractor shall ensure that the new building structure meets the following requirements:
 - (i) the structural grid or layout must allow adaptability in all General Teaching spaces and light Practical Teaching spaces;
 - (ii) projections such as structural columns and piers in large spaces (such as halls) and circulation routes should be limited. Where these are unavoidable appropriate measures should be in place to ensure safety; the structural design and choice of materials should take account of potential future changes to mechanical and electrical services, so far as can reasonably be foreseen, and to their potential impact on changes to ICT systems, such as the introduction or expansion of wireless technology.

2.7 Building Fabric and Materials - Overarching Requirements

- 2.7.1 The Contractor shall ensure that the design of both new buildings and when working in existing buildings includes a simple palette of robust materials and finishes that are durable and weather and wear well. In Special Schools the Contractor shall take account of the possibility of accidental or deliberate damage, including the wear and tear caused by

Mobility Equipment, the affect that certain colours, patterns and textures can have on some people, and the higher risk of harm and infection for the most vulnerable children and young people (refer to the School-specific Briefs).

- 2.7.2 Where the building fabric (external walls, ground floor and roof) are the primary means of controlling the internal environment, the Contractor shall ensure that the design follows the fabric first principles through:
- (a) minimising the use of all resources;
 - (b) reducing the demand for energy and water use during the Works Period;
 - (c) minimising waste and carbon dioxide emissions during the Works Period.
- 2.7.3 The Contractor shall ensure that products and materials are not specified that do not comply with:
- (a) The Montreal Protocol;
 - (b) British Standards or equivalent European industry standards as amended.
- 2.7.4 The Contractor shall not specify products and materials that:
- (a) are generally known within the European Union at the time of specification to be deleterious to the environment, and/or health and safety, or diminish the durability of other structures, finishes, plant and/or machinery;
 - (b) are on the lists of banned materials available from the European Commission's Enterprise and Industry website (<http://ec.europa.eu/enterprise>) or the Health and Safety Executive (www.hse.gov.uk) websites;
 - (c) contain substances that deplete the ozone layer, as identified by the United Nations Development Programme.
- 2.7.5 All internal finishes and fittings be such that levels of Volatile Organic Compounds in the air do not exceed 300µg/m³ averaged over eight hours.
- 2.7.6 The Contractor shall ensure that all materials are selected with due regard to their suitability for purpose and performance, durability, ease of maintenance and repair, resistance to accidental or malicious damage and to their environmental impact. The materials used must also take account of any particular local requirements or planning conditions specified in the School-specific Briefs. In **Special Schools** where there are Pupils with complex health problems, particular account must be taken of safety and hygiene. The Contractor shall ensure that robust materials and finishes are used that stand up well to the prevailing weather conditions, the ingress of ground and surface water and heavy

use, whilst maintaining acceptable appearance over the long term. All areas of the building must be easily and safely accessible for cleaning and maintenance whilst preventing unauthorised access.

2.7.7 Roofs

- (a) The Contractor shall ensure that the chosen roof system satisfies the following minimum acoustic, thermal, fire, durability and safety performance requirements:
- (i) the thermal performance of roof coverings are to be as specified in the latest version of AD L2;
 - (ii) where possible the increase in the indoor ambient noise levels in teaching and examination spaces for noise intrusion from external sources during 'heavy' rainfall, calculated using laboratory test data with 'Heavy' rain noise excitation as defined in BS EN ISO 140-18, in accordance with Acoustic Design of Schools, shall be no more than 25 dB LAeq,30 mins above the appropriate indoor ambient noise level given in the ADS;
 - (iii) fire - internal surfaces are to be Class 1 to BS 476⁶ Part 7 or EU Class C-s3, d2 or better;
 - (iv) fire - external surfaces are to be AA, AB or AC to BS 476 Part 3 or EU Class B roof (T4) to ENV 1187 Part 4;
- (b) Roofs are to be capable of being easily overlaid, over-coated, upgraded or replaced without affecting the deck below.
- (c) The Contractor shall ensure that roof construction and design address movement, compatibility of components and lightning protection and comply with the following requirements:
- (i) any roof system shall include insulation, and an underlay is provided for discontinuously supported slate or tiled roofs;
 - (ii) in cold roof constructions, the eaves must have a proprietary continuous ventilator in accordance with AD C; Roof drainage should be designed to have a simple layout, with free flowing, short and direct routes to rainwater outlets, which are fully accessible for maintenance and replacement; All penetrations through the roof and roof level plant are co-ordinated at an early stage in the design and are provided so as to minimise roof penetrations. Access required to the roof is designed to minimise the possibilities of damage to the roof; where any green roofs are proposed the maintenance involved should be assessed, and the Contractor shall make these requirements clear to the Authority in its proposals. The Contractor shall clarify with the Authority the performance it

⁶ BS 476-7: 1997: Fire tests on building materials and structures.

- requires from any green roof: whether it is in response to storm water mitigation, biodiversity, or planning constraints;
- (iii) ethylene tetrafluoroethylene (ETFE) should not be used at low level, be easily accessible or used in situations where it is likely to be subject to malicious damage.
- (d) In line with the CDM regulations⁷ and HSE guidance, the Contractor shall design roof access systems to ensure safety on roofs during the life of the building. For example by:
- (i) designing out unnecessary access to the roof;
 - (ii) providing glazing that can be cleaned from inside the building;
 - (iii) providing guard railing or parapet to perimeter and stairs/door access.
- (e) The Contractor shall also ensure that roof design and construction comply with the following requirements:
- (i) rainwater should be discharged externally where possible. The discharge of rainwater through any discharge systems shall not be audible inside the building;
 - (ii) overhanging eaves and canopies should not provide shelter for animals or birds, or cover for intruders And they should be formed with non- combustible materials;
 - (iii) adequate fire barriers are maintained to ensure an externally-set fire cannot enter the roof space through the eaves or elsewhere, or that an internal fire does not spread;
 - (iv) the overall design of roofs and surrounding elements shall not allow unauthorised access;
 - (v) the positioning and use of access hatches, inspection points, control gear, valves etc. is such that it minimises disruption to the everyday running of the Schools. Roof light design must comply with BS 8206 part 2⁸. Openings are robust, vandal-resistant and secure against entry by intruders. Measures should be taken to minimise solar overheating and glare from roof lights.
 - (vi) roof void ventilation is in accordance with relevant codes of practice.

⁷ The Construction (Design and Management) Regulations 2007

⁸ See National Association of Rooflight Manufacturers' (NARM) guidance supporting AD L2A and AD L2B.

- (vii) ventilators are installed in accordance with manufacturer's instructions and in accordance with relevant codes of practice and British Standards at date of construction.
- (viii) thermal insulation in the roof void must:
 - not impede roof void ventilation;
 - be free from damage and breaks in continuity and integrity;
 - provide acoustic insulation and fire protection no less than that specified by current standards.

2.7.8 Rainwater Goods

- (a) The Contractor shall ensure that guttering and rainwater pipe work provision complies with the following requirements:
 - (i) gutters are located so that the eaves do not obstruct access for maintenance;
 - (ii) all joints are to be sealed and secured, in accordance with relevant British Standards;
 - (iii) roof drainage, including gutter outlet and pipe dimensions is calculated using guidance in BS EN 12056⁹;
 - (iv) on flat roofs, box gutters within the roof area are to be avoided;
 - (v) all gutters are laid to falls, and be provided with overflow pipes to discharge in an obvious place to give an early warning of blocked rainwater outlets;
 - (vi) mechanically fixed leaf guards are provided to all outlets. These will also act as a guard against balls and foreign objects blocking the outlets;
 - (vii) no part of the roof is to rely on one outlet alone.
- (b) The Contractor shall ensure that rainwater pipes are detailed and arranged so that they:
 - (i) are not vulnerable to vandalism;
 - (ii) prevent climbing;
 - (iii) are easy to maintain;

⁹ BS EN 12056: 2000: Gravity drainage systems inside buildings.

- (iv) have uniform finishes and do not show signs of oxidation on their external surfaces at completion;
- (v) are robust enough to withstand accidental damage (for instance from ladders) during maintenance works, as well as vandalism;
- (vi) prevent water discharge from being audible from within the building;
- (vii) have minimum bends with all horizontal runs being laid to fall;
- (viii) all down pipes must have rodding eyes at floor level, positioned so that a blockage between the down pipe and the surface water drainage system can be easily cleared.

2.7.9 Stairs and Ramps

- (a) The Contractor shall ensure that the planning and design of each stairway:
 - (i) contribute to an efficient and balanced circulation provision, with fire escape stairs (especially enclosed ones) being available for normal usage (unless otherwise agreed with the Authority);
 - (ii) take account of the effect of the staircase locations on potential for future expansion;
 - (iii) provide fire escape stairs with a level exit directly to the outside of the building;
 - (iv) reduce travel times between lessons;
 - (v) reduce congestion by providing the greatest widths where pupil flows will be highest and avoiding single stairs and/or corridors in locations where it is likely that a majority of Pupils will circulate during class changeovers;
 - (vi) allow carry-down evacuation for Mobility Equipment users where necessary;
 - (vii) support passive surveillance and the feeling of security;
 - (viii) assist navigation so that stairs are easy to find and clearly differentiated.
- (b) The Contractor shall ensure that the design and construction of all stairs comply with the following requirements:
 - (i) all aspects of the design (including handrail height, colour and texture) are to meet the needs of a wide range of disabilities, including reduced mobility and visual impairment,

to comply with The Equalities Act 2010, Part B, Part M and BS 8300¹⁰;

- (ii) materials for handrails/balustrades are to be self-finished and chosen to contrast with the background against which they will be viewed, and not be highly reflective;
- (iii) Building Services within stairway enclosures are minimised. Where they are unavoidable, their presence should not lower the required performance of the stairway, particularly in terms of sound insulation and fire resistance;
- (iv) if wall-mounted heat emitters or lights are required, they are robust, and located so as not to obstruct use of the stair, the landings, the refuge or the designated escape route. They should also be easy to maintain;
- (v) fire refuges are provided in each fire-protected stairway on each upper storey, as required by AD B.

2.7.10 External Walls

The Contractor shall ensure that external walls and the materials chosen for them are designed and constructed to:

- (a) be secure, robust, vandal-resistant and suitable for the particular circumstances their use and superimposed loadings applied;
- (b) allow for the easy removal of graffiti;
- (c) require minimum maintenance, to avoid future disruption to the Schools;
- (d) prevent unauthorised access to roofs or secure or restricted areas.

2.7.11 External Doors and Windows

- (a) The Contractor shall ensure that the positions of external doors, windows and vents are co-ordinated with the ventilation strategy and general requirements for daylight in spaces.
- (b) Where significant areas of external glazing are exposed to direct sunlight, measures are taken to reduce the effects of direct sunlight (see paragraph 2.8.5 to 2.8.9).
- (c) Where required by the ADS the Contractor shall provide external doors in accordance with the following requirements:
 - (i) be robust enough to withstand heavy usage, with minimal maintenance, and to maintain the safety and security of the facility;

¹⁰ BS 8300: 2009: 'Design of buildings and their approaches to meet the needs of disabled people.'

- (ii) to take into account the different ages and abilities of all users;
 - (iii) to be vandal-resistant and incorporate appropriate controls and/or fittings to discourage misuse, but afford safe operation and adequate security;
 - (iv) to allow disabled access, including access for motorised electric wheelchairs;
 - (v) to have flush door thresholds suitable for wheelchair access.
- (d) The Contractor shall ensure that external door ironmongery:
- (i) includes locks for all doors, including those to stores, with a suited key system or other system (eg card access) that shall be agreed with the School;
 - (ii) is robust and heavy duty;
 - (iii) includes letterboxes, where appropriate, of a style and type (anti-arson) to be agreed with the School.
- (e) Where door closers are used, the Contractor shall ensure that they are be suitable for the age and needs of the Pupils operating the doors.
- (f) Where the ADS specify security shutters, grilles or bars on external doors or windows, these must comply with BS 8220¹¹ or have Loss Prevention Certification Board (LPCB) approval.
- (g) The Contractor shall ensure that windows, vents and shading are designed and constructed to:
- (i) provide sufficient light and natural ventilation (or supplement other ventilation as required in paragraph 2.8 and the ADS);
 - (ii) take account of the acoustic requirements set out in paragraph 2.8.26 and have regard to local acoustic conditions;
 - (iii) prevent/ minimise glare on computer screens, electronic whiteboards etc;
 - (iv) be safe in closed or open positions, and not be hazardous to persons passing by windows internally or externally;
 - (v) prevent children from falling out at all levels;
 - (vi) be fitted with restrainers or similar devices as necessary;
 - (vii) allow for the safe and efficient cleaning of windows;

¹¹ BS 8220: 2000: Guide for security of buildings against crime.

- (viii) require minimum maintenance to avoid future disruption to the Schools;
- (ix) not compromise the security of the building.
- (h) The Contractor shall ensure that ironmongery and shading and ventilator actuators or mechanisms are robust and tamper proof and shall be easy to operate from floor level. Any specific requirements for ironmongery for **Special Schools** are identified in the School-specific Briefs. The Contractor shall ensure that window shading shall be of a type that does not create a noise nuisance.

2.7.12 Window Restrainers

Some lower level windows will require restricted openings for health and safety or security reasons. In this case louvre vents can be provided that offer a much larger openable free area for ventilation. High level opening windows should not require restrictors to be fitted for health and safety and can be designed to overcome the security risks and can therefore be designed to open fully under summertime conditions. Building Regulations Approved Document K, Requirement K4 requires consideration of restriction of opening windows or other means to prevent collision with open windows.

There is no requirement in health and safety legislation to fit window restrictors on all buildings.

2.7.13 Internal Walls

- (a) The Contractor shall ensure that new or replaced partition walls are fit for their intended use, that their finishes comply with the requirements of the ADS, and that the design and construction of internal partition walls comply with the following requirements:
 - (i) the robustness duty rating for corridors is to be 'severe duty' (SD) as defined by BS 5234-2¹²: Table 1, to withstand impact damage from equipment and Mobility Equipment. For all other spaces it should be 'heavy duty';
 - (ii) the minimum support for fixtures and fittings is to be 100N for pull out and 250N for pull down (as measured in accordance with BS 5234) and be able to support the finishes, fixtures and equipment specified in the ADS;
 - (iii) the hygrothermal performance is to be Code n = Normal, Code h = Humid, Code w = Wet as defined for the wall finish in the ADS (as measured in accordance with DD171 test 10 and 11);
 - (iv) the acoustic insulation in the partition wall of new or remodelled areas will be suitable to satisfy the requirements

¹² BS 5234: Part2: 1992 – Partition Grading.

- of the acoustic performance standards for schools and this FOS. Where the rating of the wall is different, depending on which room is the source room, the higher of the two acoustic specifications should be provided;
- (v) the abutment of a partition to adjacent walls, floors or structural soffits must not reduce the overall required acoustic performance of the wall or reduce its fire performance;
 - (vi) surface spread of flame rating and fire resistance are to be as specified in Approved Document B (in support of the Building Regulations). Where refurbishment is being carried out, the Contractor shall assess the existing construction and report to the Authority any areas which do not meet current regulations. All new partition construction must comply with Approved Document B;
 - (vii) the partition fire ratings specified in the ADS should not be taken in isolation. If the adjoining room has a fire resistance or is a protected stair/fire escape route, or the partition forms a fire compartment, then the partition is appropriately fire rated. In all cases, the most onerous fire rating must be applied to the partition.
- (b) If a moveable partition is used, the Contractor shall adhere to the following general specifications:
- (i) the wall must not be a fire compartment, nor need any fire rating;
 - (ii) the surface spread of flame rating must meet class 1 or class O if the wall forms part of an escape route;
 - (iii) the partition shall wherever possible meet the sound insulation required between the room types. In the case of classrooms a $D_{nT,w}$ of at 45-50dB is achieved and in the case of large volume spaces such as sports halls $D_{nT,w}$ 40-45 dB is achieved, depending on the room types and their intended uses;
 - (iv) where there is an operable wall between a drama studio and a hall the minimum $D_{nT,w}$ between the spaces is to be 45dB;
 - (v) for heavier higher rated moveable walls the locking mechanism should not be of a spring loaded type, which can cause injury when released;
 - (vi) the partition must have removable key locks to prevent unauthorised people from casually dismantling or tampering with it.
- (c) The Contractor shall ensure that the finishes of all internal walls, and the internal face of external walls, shall:

- (i) conform to the specification in the relevant ADS;
- (ii) be resistant to heavy use and easy to clean and maintain;
- (iii) be adequately protected from damage, especially on corners vulnerable to impact by Mobility Equipment and teaching equipment.

2.7.14 Internal Door Sets

- (a) The Contractor shall ensure that the minimum standards defined in the ADS are achieved in all new internal door sets, and that the performance specifications, as set out in the seven types of door set and the seven types of hardware, are achieved for the relevant type of door set and hardware specified for the room or space. The Contractor shall ensure that internal door sets comply with the following general requirements.
- (b) Materials and finishes must:
 - (i) not prevent the door set providing the performance defined in the ADS;
 - (ii) be from sustainable sources, wherever possible, and able to be recycled at the end of the product's life.
- (c) Surface finishes must:
 - (i) be suitably robust and perform their necessary protective and decorative functions. Surface finishes shall have a resistance to marking of at least class 3 when tested to methods 2 to 6 in BS 3962-6: 1980 and shall be capable of withstanding cleaning with hot water containing mild non-abrasive detergents and disinfectants as part of a regular cleaning programme;
 - (ii) not create any reflections likely to disturb Pupils or affect visually impaired people's ability to use the door set.
- (d) The Contractor shall take measures to prevent damage to door edges, especially in high traffic areas or when there is regular movement of equipment and materials, for example in kitchens, workshops and laboratories.
- (e) The Contractor shall ensure that:
 - (i) the door sets have good perimeter sealing in order to provide the desired airborne sound insulation;
 - (ii) the size of any gaps between doorframes and the walls in which they are fixed are minimised by the use of manufactured door sets;

- (iv) gaps between door frames and the surrounding walls are filled and sealed in a manner to satisfy the requirements for fire safety, security and acoustic performance specified in this FOS and the ADS; Wherever possible, door sets are not be located in partitions between rooms requiring sound insulation values above 35 R_w dB, for example between music rooms; The interface between the door sets and surrounding substrate do not reduce the fire performance of the partition; Door sets that achieve higher fire and smoke classifications than those specified in the ADS are used if they are to be needed in areas of higher fire risk or to provide greater protection to emergency escape routes; The capability of the user (in terms of dexterity, strength and visual acuity) is taken into account;
 - (v) visual clutter is avoided and elements should contrast visually with one another by the minimum differences in light reflectance value (LRV) specified in BS 8300: 2009¹³;
 - (vi) doors are wide enough to allow Mobility Equipment access (where specified in the ADS), with good visibility maintained on both sides of the door.
- (f) The Contractor shall ensure that vision panels are fitted to all door leaves wider than 450mm, except those leaves on door sets leading into: changing rooms; medical inspection rooms/'sick bays'; plant rooms; service ducts; and store cupboards. The Contractor shall ensure that vision panels provided must:
- (i) be located towards the leading edge of the door;
 - (ii) provide effective zones of visibility, to comply with AD K and AD M;
 - (iii) comply with BS 8300 and incorporate glazing in accordance with BS EN 12600¹⁴;
 - (iv) be covered by the evidence of conformity provided for the door set in relation to the performance requirements contained in BS EN 12600, such as those relating to fire, acoustic and security.

Vision panels adjacent to a door may be deemed to have the same minimum R_w as the door set, provided that the total area of vision panel is no greater than that of the opening leaf of the door set.

13 BS 8300: 2009: Design of buildings and their approaches to meet the needs of disabled people.

14 BS EN 12600: 2002: Glass in building.

2.7.15 Internal Door Hardware

The Contractor shall ensure that the hardware/ironmongery to internal door sets is in accordance with the requirements of the ADS, and that the following general requirements are met:

- (a) all doors to rooms, stores etc. are to be lockable, with a suited key system or other system (such as card access) as agreed with the School;
- (b) the detail of the locking and suiting requirements to individual rooms is agreed with the School, and evidence of this is given to the Authority and Contract Manager;
- (c) controlled (staff operated) emergency release locks should be provided for toilet cubicle doors;
- (d) nameplates and numbers are fitted to all internal doors. The detailed requirements for individual rooms are described in the Contractor's ADS;
- (e) The Contractor shall ensure that the design and installation of hardware to door sets comply with the following requirements:
 - (i) all hardware must provide functionality and performance appropriate to that door set's intended use and must not undermine the performance of the door sets to which they are fitted;
 - (ii) door leaves that are veneered or painted are provided with protection plates that shall be sufficient to protect the doors from damage from Mobility Equipment and, where relevant, trolleys;
 - (iii) door stops are fitted such that they prevent the door leaf damaging adjacent surfaces and prevent damage to the door leaf itself;
 - (iv) hinges must meet the requirements of BS EN 1935¹⁵. Account should be taken of any door closers that will affect the specification of the hinge.
- (f) The Contractor shall ensure that door closers must meet the requirements of BS EN 1154¹⁶ as well as the following additional requirements:
 - (i) door closers (and door seals) must take account of the age of the Pupils operating the doors;

15 BS EN 1935: 2002: Building hardware. Single-axis hinges.

16 BS EN 1154: 1994: Building hardware. Controlled door closing devices.

- (ii) the closer is set such that the door provides optimum fire resistance and acoustic performance when closed and as far as possible the operating forces are within the limit permitted in BS 8300;
 - (iii) any delayed action closers should not delay the closing action more than that required for its use (for example, for the ease of disabled people). Where the device is fitted to a fire door, this delay must not exceed 25 seconds, as specified in BS EN 1154;
 - (iv) for any new, remodelled or major refurbished areas any door closers fitted on fire door sets on circulation routes must incorporate electro-magnetic hold-open devices linked to (and compatible with) the automatic fire detection and alarm system.
- (g) The Contractor shall ensure that electro-magnetic hold-open devices must meet the requirements of BS EN 1155 and should not be fitted to door sets required to be self-closing in order to provide appropriate privacy, such as door sets to changing rooms. Electro-magnetic devices shall only be provided on self-closing fire doors, and only on those devices which release automatically. Measures are taken to prevent accidental impact with the leading edge of the door leaf, when in the open position.
- (h) The Contractor shall ensure that lever handles on doors in new, remodelled or major refurbished areas must meet the requirements of BS EN 1906¹⁷, be compatible with the locks with which they are to be used and satisfy the requirements of BS 8300: 2009 (to ensure they are suitable for people with reduced manual dexterity or visual impairment).
- (i) The Contractor shall ensure that any access control device shall:
- (i) not undermine the performance provided by the door sets on which they are fitted;
 - (ii) not inhibit escape in the case of a fire or other emergency;
 - (iii) comply with relevant directives for electronic devices;
 - (iv) be able to be operated by disabled users;
 - (v) offer appropriate durability;
 - (vi) offer the range of functionality required;
 - (vii) be easily repairable or replaceable.

¹⁷ BS EN 1906:2010: Building hardware. Lever handles and knob furniture.

2.7.16 Floor Finishes

- (a) The Contractor shall ensure that the choice and installation of floor finishes comply with the following requirements in all internal areas of the buildings:
- (i) **Durability**
able to maintain its characteristics and performance for at least 10 years under normal conditions;
 - (ii) **Resilience**
able to support the furniture and equipment listed in the FF&E Matrix and generic ADS; withstand pedestrian traffic without undue deformation or permanent marking; able to accommodate thermal and structural movement in both the finish and the sub-floor;
 - (iii) **Continuity**
having minimal joints, and flush joints between different finishes.
- (b) The Contractor shall ensure that the floor finishes in new or areas within the existing building subject to construction works conform to the performance specifications set out in the five types of floor finish in the technical annex of the ADS, taking account of all British and European standards relevant to the material type and where there is under-floor heating, floor finishes are able to withstand the effects of temperatures up to 27°C. (ref BS 8203, CP 1018, BS EN 14041)¹⁸.
- (c) The Contractor shall ensure that the floor finish is appropriate to the activities taking place in the space it serves, and any particular needs of the Pupils, in terms of:
- (i) ease and frequency of cleaning, taking account of levels of hygiene required;
 - (ii) smoothness, with minimal abrasion characteristics against the skin;
 - (iii) sound absorption and transmission, ensuring good acoustic properties and performance;
 - (iv) impact resistance;
 - (v) slip resistance, ensuring minimal tripping hazards;

¹⁸ BS 8203: 2001: Code of Practice for the installation of resilient floor coverings.

BS EN 14041: 2004: Resilient, textile and laminate floor coverings.

- (vi) chemical and heat resistance, where the need is identified in the ADS;
 - (vii) static resistance, where the need is identified in the ADS, for example in the server room;
 - (viii) suitability for Mobility Equipment users and others with a physical disability or sensory impairment;
 - (ix) colour and pattern – in terms of maintenance, way-finding and in special schools, sensitivity;
 - (x) having a low Volatile Organic Compounds (VOC) finish.
- (d) The Contractor shall provide and maintain suitable barrier matting at external entrances to assist with cleanliness of internal floor coverings.

2.7.17 Ceilings and Soffits

Exposed Soffits in teaching and other densely occupied spaces will normally be exposed to provide thermal mass to absorb heat and provide night cooling.

- (a) The Contractor shall ensure that exposed soffits and ceilings in new or existing areas subject to construction works are finished such that:
 - (i) they have a light surface with reflectance of more than 70%;
 - (ii) where an exposed soffit is to be unpainted then the reflectance of the finished surface shall be used in the lighting calculations. It is likely an unpainted surface will have a lower reflectance than a painted surface;
 - (iii) any finishes to the soffit should not comprise the thermal performance of the surface in relation to the radiant heat exchange;
 - (iv) where a concrete soffit is painted a high emissivity paint finish is required with emissivity >0.85.
- (b) The Contractor shall ensure that:
 - (i) services runs should be neat and tidy and typical services coordination and layout drawings for generic room types shall be provided at ITT;
 - (ii) services and horizontal surfaces shall be accessible for cleaning.
- (c) The Contractor shall ensure that where suspended ceilings are designed, specified and installed they will:

- (i) be level and flush at joints, adequately secured and provide surface spread of flame performance in accordance with the relevant statutory codes;
 - (ii) not be readily damaged by impact or be easily defaced;
 - (iii) use insulation that is non-combustible, where provided;
 - (iv) be easy to maintain;
 - (v) have a low VOC finish.
- (d) The Contractor shall provide moisture resistant ceilings in new build, remodelled or major refurbished areas such as kitchens, changing rooms, showers and toilets, as specified in the ADS.
- (e) The Contractor shall ensure that ceilings in new build, remodelled or major refurbished areas within toilets and changing rooms are robust, moisture resistant, easy to clean and inaccessible to Pupils.
- (f) In **Special Schools**, the Contractor must comply with the following additional requirements, where specified in the School-specific Briefs:
- (i) where specified in the ADS, ceilings are robust and inaccessible to Pupils;
 - (ii) where ceiling-mounted hoists or physiotherapy equipment are provided, tracking shall be coordinated with other ceiling services and the ceiling structure is able to support the equipment and the person using the equipment;
 - (iii) where specified in the ADS, ceilings in medical treatment rooms are homogeneous with recessed light fitting;
 - (iv) ceilings in pool areas are designed to avoid mould growth.

2.7.18 Decorations and Finishes

- (a) The Contractor shall comply with the wall and floor finishes specified in the ADS. The Contractor will need to consider acoustic properties and noise reduction capabilities in line with paragraph 2.8.26 when choosing wall and floor finishes.
- (b) The Contractor shall ensure that decoration and finishes:
- (i) fulfil the requirements in the ADS;
 - (ii) take account of safety and fitness for purpose;
 - (iii) are relevant to the area, use and age of occupants;
 - (iv) are able to withstand heavy usage and potential vandalism;
 - (v) are resilient to impact and minimise noise;

- (vi) are easy to clean and maintain;
 - (vii) have a low VOC finish.
- (c) The Contractor shall also take account of the requirements of Pupils with SEN and all those with disabilities, such as providing suitable colour schemes, textures and contrasts on walls, floors, stairs and doors to assist those with visual impairments to orientate themselves. Where children are especially vulnerable to infection, all surfaces shall be smooth and easy to clean to minimise the collection of dust and pathogens. Any specific requirements are given in the School-specific Briefs.
- (d) Additionally, the Contractor shall ensure that external finishes shall:
- (i) be durable and resistant to weathering;
 - (ii) enable the easy removal of graffiti; and internal finishes should contribute to the level and quality of light in a space.
- (e) The Contractor shall ensure that minimum surface reflectance levels are to be as follows:
- (i) walls: 0.5;
 - (ii) ceiling: 0.7;
 - (iii) floor: 0.2. Where areas of the room are carpeted the average surface reflectance of the floor can be reduced [Note: Daylight and visual amenity calculations should include light reflectance values for the actual carpets chosen and for horizontal reflective surfaces which can be of higher reflectance than the floor. In most cases it should be possible to achieve a minimum carpet LRV of 0.07 depending on the colour and type of carpet].
 - (iv) The Contractor shall ensure that floor finishes have surface reflectance not higher than 0.4 to avoid scuff marks.
- (f) The Contractor shall consider that lighter surface finishes will improve the visual quality of the space and will aid in delivering daylight deeper into the rooms where lit from one side. For any analysis undertaken in relation to daylight the 70/50/20 reflectances shall be used unless alternative reflectances are known at the time of the design. The preference is always to use actual reflectances in place of the 70/50/20 criteria.
- (g) The Contractor shall ensure that the 60° Gloss factor of window sills, furniture and flooring is less than 15%. This information shall be sourced from the manufacturers of the window sills, furniture or floor coverings.
- (h) The Contractor shall ensure that ceiling and wall brightness is adequate to allow for visual comfort. In order to achieve this,

ceilings should be lit such that the ceiling luminance is at least 30% of the illuminance on work surfaces. The light on the ceiling shall be delivered from a combination of direct and reflected light. Walls should be lit such that the wall illuminance is at least 50% of the illuminance on the work surfaces.

- (i) Where circumstances preclude the use of water-based paints, the Contractor shall ensure that appropriate risk assessments and method statements are prepared to ensure the safety of Pupils, staff and operatives exposed to solvent-based materials.

2.8 Indoor Environmental Requirements

2.8.1 The Contractor shall ensure that the design provides suitable, comfortable environmental conditions for all new build, remodelled and major refurbished occupied spaces, including good lighting with optimum use of daylight, good air quality and acoustics, unobstructed ventilation and suitable temperatures throughout the year.

2.8.2 The Contractor shall ensure that in new build, remodelled or major refurbished areas there is an appropriate level of local control over ventilation, heating, glare and light levels, and the needs of very young and vulnerable children and young people (for example those in a special school) shall be taken into account.

2.8.3 The Contractor shall develop the environmental design strategy in parallel with planning the Site and designing the Building form and fabric to deliver comfort to the users in both winter and summer. The Contractor shall employ an integrated design approach which takes account of local site conditions and exploits natural resources like daylight, ground temperature, night time air temperature, solar energy, rainfall and wind. The Contractor shall choose environmental strategies that are appropriate for the level of expertise of the School users, the School Premises Team and the Soft Services Provider.

2.8.4 In Special Schools and Designated Units, the Contractor shall take account of the particular needs of the Pupils, as specified in the School-specific Briefs. For example, some children may be more sensitive to light or to infection, or need higher levels of sound insulation.

2.8.5 Daylight and lighting

- (a) The Contractor shall ensure that the lighting design meets legislative requirements¹⁹ and takes account of best practice guidance²⁰ within new build, remodelled and major refurbished areas. In addition the Contractor shall ensure that the design provides good visibility for all teaching activities, in particular for whole class presentations using the whiteboard, which is one of the most demanding visual tasks. The Contractor's design shall provide

¹⁹ Part L, AD L2A and AD L2B, and The Non-domestic Building Services compliance Guide.

²⁰ Lighting Guide 5 (LG 5): Lighting for Education, available from the society of Light and Lighting.

that the visual environment is under the control of the teacher and light shading devices and dimming controls are important to achieve this.

- (b) The Contractor shall ensure that within new build, remodelled and major refurbished areas the design:
 - (i) integrates the design of daylight and electric light to provide a comfortable environment and minimise energy use;
 - (ii) provides controls for daylight and electric light to suit activities and control glare, that are easy to use and effective;
 - (iii) provides ways of controlling the effects of direct sunlight, to create a balance of useful internal illuminance in the teaching space and avoid excessive summertime overheating;
 - (iv) provides ways of allowing the whiteboard to be viewed clearly and without reflections whilst retaining a space which is predominantly daylit;
 - (v) provides ceiling and wall brightness adequate for good visual comfort;
 - (vi) provides an electrical lighting solution which creates a bright ambient lighting level and in particular good lighting levels on the faces of the teachers and Pupils;
 - (vii) provides views from occupied rooms to the outside or, where this is not possible, across an internal space (without obstructions) to a distance of at least 10m to help avoid eye strain;
 - (viii) incorporates energy efficient lighting and controls to reduce energy use;
 - (ix) includes emergency lighting, where specified in the School Specific Brief.

2.8.6 Daylight Design

- (a) The Contractor shall optimise the building form and orientation with respect to daylight provision, views out and views of the sky. In doing this the design should maximise the number of spaces where daylight is provided from two or more sides, or by roof lights, since it is possible for these spaces to be substantially daylit for the majority of the School year.
- (b) In rooms with single sided daylighting it may be necessary to increase the ceiling heights to achieve the daylight performance specified below.
- (c) The Contractor shall ensure that the annual provision of daylight in a space is to be predicted directly using climate-based daylight

modelling (CBDM) as described in Section 3.3.1 of LG5²¹, or similar methods that take into account the effects of direct and indirect sunlight and can provide better modelling of daylight than daylight factor calculations. The Contractor must produce calculations for main spaces designed to be substantially daylit, eg halls and each Classroom type and orientation.

- (d) CBDM provides two key measures on which spaces will be assessed as compliant. Daylight Autonomy (DA) and Useful Daylight Index (UDI).

Note: CBDM takes precedence over any requirement for daylight factor based design, eg as referred to in BREEAM. Further guidance on climate based daylight design is available in the EFA Daylight Modelling Guide available on the DfE website

2.8.7 Daylight Autonomy

- (a) This is the percentage of time a point in a space can expect to reach or exceed a target illuminance level on the working plane.
- (b) The Contractor shall ensure that the design meets the following criteria in respect of DA in 80% of teaching and learning spaces: DA of more than 50% for more than 50% of the working plane for the target illumination (typically 300 Lux in teaching spaces), for the hours of operation from 8.30am to 4.00pm. The working plane should be considered as the desk/bench height. The area boundary of 500mm from walls may be excluded from the calculation.

2.8.8 Useful Daylight Index (UDI)

- (a) UDI is defined as the annual occurrence of illuminances, for the hours of operation, across the work plane that are within a range considered “useful” by occupants. The UDI measurement is divided into three elements:
 - (i) UDI-s = UDI-supplementary, ie additional task lighting may be required;
 - (ii) UDI-a = UDI-autonomous, ie the daylight illuminance should be sufficient for task;
 - (iii) UDI-e = UDI-exceeded, ie daylight illuminance may be higher than preferred causing occupants to lower blinds.
- (b) The Contractor shall ensure that the new building design meets the following criteria in respect of UDI in 80% of teaching and learning spaces: UDI-a (100 Lux – 3000 Lux) will be achieved for an average of 80% of the time over the working plane within a space. That is to say that the level of illuminance provided below 100 Lux (UDI-s) and above 3000 Lux (UDI-e) will occur for no more than 20% of the time.

²¹ Lighting Guide 5 (LG 5): Lighting for Education, available from the society of Light and Lighting.

The working plane should be considered as the desk/bench height. The area boundary of 500mm from walls may be excluded from the calculation

- (c) The Contractor shall also ensure that the new building, remodelled and major refurbished area design allows for the following:
 - (i) window ventilation openings should not be obstructed by blinds or curtains when these are opened;
 - (ii) where dim-out blinds are required, they should provide a suitable daylight illuminance in the space and should not restrict ventilation; Where acoustic panels are placed in the room then the panels shall not negatively interfere with the daylight distribution and in particular they shall not restrict the distribution of daylight to the rear of the room. Sports halls and main halls shall be daylit.
 - (iii) in refurbishment projects the CBDM analysis should be carried out for sample rooms and the aim should be to achieve the UDI-e for a new building, ie illuminance above 2000 Lux for no more than 20% of the time, whilst achieving as good UDI and DA as is feasible given the constraints of the existing building.

2.8.9 Glare

- (a) The Contractor shall ensure that the design minimises glare as this is very important for accomplishing difficult visual tasks such as viewing whiteboards or projected images and for viewing screens. The Contractor shall ensure that the design enables control of daylight glare on computer monitors, whiteboards and projection screens and to ensure that the teacher or speaker need not face glare sources or be seen against a glare source. If this is not done the familiar “blinds down - lights on” scenario will result in poor visibility, high lighting energy consumption and minimal use of daylight.
- (b) The Contractor shall also take account of any special requirements that Pupils may have, such as having a visual impairment.
- (c) The Contractor shall ensure that the design of the space should first take into account the position of the whiteboard, smart board or projector. The daylight design and control of the daylight should then respond to the display equipment positions and the viewing angles of the Pupils. The Contractor shall meet the requirements for day-lighting and not provide a “blinds down, lights on solution”.
- (d) In designing the building, the Contractor shall also consider the following and advise the school on the type of equipment to purchase and the limitations of legacy equipment:

- (i) the intensity and contrast ratio of the smart board or projector will play a big role in the clarity and comfort for the viewer. Equally the viewing angle is critical;
 - (ii) the brighter the screen, the higher the ambient lighting can be before blinds need to be closed. However, brighter screens generally mean more powerful lamps with consequent increases in energy consumption. For new installations, the brightness of the screen when presented with a white image should be in the range of 300 to 600 cd/m². The brightness from any seated viewing position in the room should not be less than 300 cd/m². The diffuse and specular properties of the screen material need to be carefully considered to ensure that there is not a direct view of the light source which would wash out the image, nor that the brightness and clarity of the surface reduces with acute viewing angles;
 - (iii) for existing installations the brightness may be as low as 50-80 cd/m² and the preference would be to replace the equipment. If this is not possible, control of the daylight and ambient light needs to be considered to ensure the presentation is not washed out and unclear;
 - (iv) the contrast ratio of new equipment should be at least 3000:1.
- (e) The Contractor shall ensure that wherever possible, to improve visual contrast, ceilings are to be light coloured and window frames, bars and reveals are to be light coloured or white and splayed. . A light colour would be in the range of reflectance of 0.7 to 1.0. The window wall in particular should be light in colour.

2.8.10 Internal lighting systems

- (a) The Contractor shall ensure that the maintained illuminance levels should comply with CIBSE LG5 within new and remodelled areas. Calculations of the maintained illuminance shall utilise maintenance factors which are relative to the Site, the rooms, the luminaires and the lamps selected. Default software maintenance factors shall not be used simply to avoid calculating the actual figures.
- (b) The Contractor shall ensure that luminaire layouts are co-ordinated with ceiling and structural planning grids to facilitate the relocation of partition walls within each Suite of Spaces. Switches are easily reconfigurable and luminaires easily repositioned.
- (c) The Contractor shall also design the Building so that:
 - (i) teacher's boards shall be adequately lit to ensure good visibility when used for whole class presentation;
 - (ii) the number of different types of luminaires shall be limited to ease maintenance;

- (iii) lighting should not be located over pools, where it is difficult and more costly to repair and replace.
- (d) Where higher levels of illuminance are identified in the ADS or School-specific Briefs for more visually demanding tasks, such as for office desks, task lighting should be provided, wherever possible. Task lighting includes a ceiling recessed, surface or suspended luminaire dedicated to a particular task, a floor standing luminaire local to the task or a table mounted luminaire local to the task.
- (e) Where a number of functions take place in the same space the Contractor shall ensure that the lighting is suitable for the range of activities specified. Where the activities have conflicting lighting requirements, priority should be given to the main function of the space.
- (f) The Contractor shall provide switching for sports halls where some activities require higher lighting levels so as to achieve both higher and lower lighting levels and the default shall be the lower level.
- (g) As an alternative to totally enclosed luminaires, the Contractor may use fragment retention lamps in:
 - (i) food preparation and storage areas such as kitchens and food technology rooms;
 - (ii) areas where there is likely to be an impact such as sports facilities; and
 - (iii) areas where Pupils could be in bare feet such as changing rooms.
- (h) The Contractor shall ensure that fragment retention lamps must:
 - (i) be guaranteed by the manufacturer for the service life of the lamp;
 - (ii) reduce lamp lumen output by less than 1% in the case of fluorescent lamps and less than 5% for all other lamp types;
 - (iii) be guaranteed for impact from at least 6m height.
- (i) Fragment retention fluorescent lamps shall meet the IEC 61549 standard.

2.8.11 Lighting Efficiency

- (a) The Contractor shall produce Lighting Energy Numeric Indicator (LENI) predictions for the energy performance of the buildings in accordance with the methodology described in BS EN 15193²² with a total LENI for all internal lighting and separate LENI calculations for each of the room types identified in the ADS The Lighting Energy

²² BS EN 15193: 2007 – energy performance of buildings – energy requirements for lighting.

Numeric Indicator (LENI) prediction figures form the basis for auditing the performance in use of the internal lighting systems, and will be used by the Contractor to compare performance in use with the design intent, and will be reported to the Schools as part of the breakdown of the annual energy performance figures provided to the Schools and used for the purposes of producing a predicted design stage Display Energy Certificate (DEC).

- (b) The Contractor shall ensure that the maximum lighting energy load in Classrooms and Practical Spaces shall be less than 2.4W/m² per 100 lux of illumination.
- (c) The Contractor shall ensure that:
 - (i) general lighting luminaire efficacy shall be demonstrated to be greater than 55 luminaire lumens per circuit Watt or as required by Building Regulations, whichever is the higher performance;²³
 - (ii) fluorescent lighting must use high frequency control gear that avoids flicker. Control gear for any fluorescent lamp shall be type A (1A, 2A, 3A) as defined by a CELMA11 energy class;²⁴
 - (iii) in order to monitor the maximum lighting load and the LENI, the internal lighting is separately metered.

2.8.12 Lighting Controls

- (a) In order to meet the maximum allowable LENI energy consumption for internal lighting in the School, the Contractor shall provide controls. In existing buildings, controls are to be added where lighting is replaced or amended beyond re-positioning of the existing fittings within the room.
- (b) The Contractor shall ensure that controls and switching suit both the operational requirements of each School and the energy efficiency requirements. In general the Contractor shall ensure that lighting does not switch on automatically. However, in toilets, the lights may be switched on automatically.
- (c) The Contractor shall ensure that daylight level and presence detection controls and systems are designed to suit the intended occupancy patterns and to take account of daylight calculations. In addition, the Contractor shall ensure that the design allows for:
 - (i) automatic absence detection or time controls to switch lights off in unoccupied rooms;
 - (ii) short term manual overrides and their function are clearly indicated;

²³ CLG plan to introduce a requirement for efficacy greater than 60 luminaire lumens per circuit watt in the 2013 revision to Part L.

²⁴

- (iii) the organisation of the lighting circuits to relate to the daylight distribution and to the use of the space;
 - (iv) occupancy sensing controls sensors should be provided for each row of lights in Basic Teaching spaces. Sensors should be positioned to ensure that hand movement of occupants is picked up in all areas of the room. Light switches to be located adjacent to doors from corridors, and to be operable by users. Short term manual over-ride facilities to be provided for any automatic lighting controls. Dimming to be provided to reduce the lighting level in spaces fitted with data projectors or interactive whiteboards.
- (d) Automatic dimming and daylight control will usually be needed to meet the required LENI.
- (e) Where lighting is renewed or amended the Contractor shall provide luminaires switched in rows away from windows so as to be dimmed in response to the availability of daylight up to a point where they can then be switched off during the daytime. The dimming of daylight requires separate control for each row of lights parallel with the window wall up to a room depth where daylight illuminance reduces to less than 100 lux. Daylight control sensors shall be located where they correctly sense the levels of daylight in the room.

2.8.13 Emergency Lighting

- (a) The Contractor shall ensure that functional and serviceable emergency lighting is provided to ensure safe evacuation in an emergency and/or in the event of mains power failure, and that it is integrated with escape routes and doors.
- (b) The Contractor shall take account of guidance and carry out a risk assessment as required by BS 5266 on emergency lighting²⁵ and fire safety²⁶ and the extent of out of hours community use. The emergency lighting design is based on the fire and emergency evacuation risk assessments carried out for the building and details included in the Fire Safety Management Plan produced by the Contractor for each School.
- (c) As a minimum, the Contractor shall provide emergency lighting in specified areas including:
 - (i) escape routes, stairways and corridors; areas with dangerous machinery;
 - (ii) areas identified in the ADS that are accessible to the public in the hours of darkness, including the main hall.

²⁵ BS 5266 –1: 2005, 'Emergency lighting – Part 1: Code of practice for the emergency lighting of premises'.

BS EN 60598-2-22: 1999, 'Luminaires for emergency lighting'.

BS EN 50172: 2004, 'Emergency escape lighting systems'.

Lighting Guide 12 (LG 12) Emergency lighting design guide.

²⁶ BB 100

- (d) The Contractor shall ensure that the emergency lighting shall be of the switched maintained type, meaning that the lamps contained in a luminaire operate from the normal supply or from the emergency supply at all times.

2.8.14 External and Specialist Lighting

- (a) The Contractor shall provide external lighting systems for new build, remodelled and major refurbished areas that:
 - (i) ensure safe pedestrian and vehicular access;
 - (ii) are designed in accordance with LG5, covering car parks, sports facilities, walkways and roads, entrances, particular building features and security requirements;
 - (iii) are fitted with both time controls and daylight level photocell controls;
 - (iv) have minimum lamp and gear efficacy of 80lm/W for colour rendering $R_a \leq 60$ and 70lm/W for light sources $R_a > 60$;
 - (v) minimise light pollution (for example due to sports facilities or security lighting) and ensure light levels are kept within the limits as required by BS 5489²⁷ and avoid nuisance to the adjacent neighbourhood. Lighting levels for CCTV cameras (where provided) shall be limited to 2 lux.
- (b) The Contractor shall provide at least 3 stage lighting bars in the hall and 24 circuits in Secondary Schools and 1 stage lighting bar and 4 circuits in Primary Schools for stage lighting equipment to be provided by the School and as described in the School-specific Briefs.

2.8.15 Lighting of Special Schools and Designated Units

The Contractor shall ensure that the lighting design in Special Schools and Designated Units meets the particular requirements of the School-specific Briefs, which take account of Pupils' individual needs, such as:

- (a) Pupils with a hearing impairment needing higher light levels/clear visibility for lip-reading and signing:
 - (i) Pupils with a visual impairment needing higher light levels to facilitate way-finding and minimise the risk of accidents;
 - (ii) Pupils being very sensitive to glare from direct or reflected sunlight;
 - (iii) automatic sensors that switch off lighting when no movement is detected not being suitable for children with limited

²⁷ BS 5489 Code of practice for the design of road lighting.

mobility. Light fittings are low glare, avoiding any flicker and unwanted noise.

- (iv) light sources shall not give off any disabling glare over changing beds or therapy couches.

- (b) The Contractor shall ensure that advice from a lighting specialist is used where there are Pupils with complex visual needs²⁸.

2.8.16 Thermal comfort

- (a) The Contractor shall demonstrate by thermal modelling how all parts of the buildings will comply with the minimum and maximum temperature requirements as shown in the ADS. The Contractor should demonstrate for remodelled areas of the existing buildings how these areas are being altered to improve the thermal comfort of the rooms. If practical, Contractors should aim to make remodelled area of the building comply with the minimum and maximum temperature requirements as shown in the ADS.
- (b) For new, remodelled and heavy refurbished areas the Contractor shall ensure that there are sufficient temperature control mechanisms provided to enable the staff and Pupils to adjust their environment and maintain a satisfactory level of thermal comfort throughout each term. This is especially important in spaces subject to high heat gains.
- (c) In naturally ventilated spaces, the Contractor shall provide mixing of ventilation air with room air to avoid cold draughts in the occupied zone during wintertime. In wintertime the minimum air temperature of air delivered to the occupied zone at 1.4m above floor level shall be not more than 5°C below the normal maintained air temperature given in paragraph 2.8.19(a).

2.8.17 Maximum summertime temperatures

- (a) The Contractor shall design the new Building and remodelled areas of the existing building so as to limit the maximum internal temperature. The Contractor shall assess its design for overheating using the most relevant weather files from CIBSE's Reference Design Summer Years
- (b) The Contractor shall ensure that mechanical ventilation is not the sole method of summer-time ventilation in occupied spaces and that occupied space should wherever possible also have opening windows or vents, with an effective opening area equal to at least 5% of floor area. The Contractor should also provide controls in each new or remodelled room to switch the mechanical ventilation on or off as required.

²⁸ The Royal National Institute for the Blind (RNIB) or similar organisations can advise on specialist environments for children with visual or multiple impairments.

- (c) The Contractor shall design the building to allow the air movement to be increased during the summer through opening windows or vents, switching on fans, or increasing the rate of mechanical ventilation systems. The Contractor may use ceiling fans, except in a Special School accommodating, for example, Pupils who are visually sensitive to the flickering reflections from such fans. Any such requirements will be set out in the School-specific Briefs.

The CIBSE Overheating Task Force have proposed new criteria to assess overheating in free-running buildings, based on the adaptive comfort model, to replace the existing criteria given in Guide A (2006). The requirements set out in this FOS are based on these new criteria. Free running buildings are defined as those that are not mechanically cooled.

This new approach follows the methodology and recommendations of European Standard EN 15251 to determine whether a building is overheated, or in the case of an existing building whether it can be classed as overheating. The new criteria are based on a variable (adaptive) temperature threshold that is related to the outside running-mean dry-bulb temperature.

- (d) The Contractor shall carry out an Overheating Risk Assessment (ORA) of free running designs by following the procedure set out in CIBSE Technical Memorandum 52, and outlined below. The design of mechanically cooled buildings should be in accordance with the CIBSE guidelines for air-conditioned buildings.
- (e) The Contractor shall calculate the indoor temperature for each of the months where the building is in free-running mode. The simulation tool used should be capable of calculating Operative Temperature, Top and Running Mean Temperature, Trm. Calculations should realistically account for the occupancy pattern of the building, heat loads of the building and the adaptive behaviour of the building occupants.
- (f) For all New Buildings designs, including major extensions and remodelled areas of the existing buildings the recommendations of EN15251 should be used by the Contractor to establish whether a problem of overheating is likely to occur.
- (g) For all free-running School Buildings the ORA will be carried out based on a type II building, (other than Special Schools with vulnerable Pupils which should be based on a type I building), as given in the table below, with the values for the maximum acceptable temperature (Tmax) being calculated from the running mean of the outdoor temperature (Trm) and the suggested acceptable range as given in the table below, as follows:
- (i) $T_{comf} = 0.33T_{rm} + 18.8$ and $T_{max} = T_{comf} + (\text{acceptable range } ^\circ\text{K})$

Therefore for a category II building as defined in the table below where the acceptable range is 3K: $T_{max}=0.33T_{rm}+21.8$

- (h) Table of suggested applicability of the categories and their associated acceptable temperature range for free running buildings (from BS EN 15251:2007):

Category	Explanation	Suggested acceptable range °K
I	High level of expectation only used for spaces occupied by very sensitive and fragile persons	± 2K
II	Normal expectation (for New Buildings and renovations)	± 3K
III	A moderate expectation (used for existing buildings)	± 4K
IV	Values outside the criteria for the above categories (only acceptable for a limited periods)	>4K

- (i) The three criteria for overheating are all defined in terms of ΔT the difference between the actual operative temperature in the room at any time (T_{op}) and T_{max} the limiting maximum acceptable temperature. ΔT is calculated as:

$$\Delta T = T_{op} - T_{max} \text{ (°K)}$$

ΔT is rounded to the nearest degree (ie for ΔT between 0.5 and 1.5 the value used is 1K, for 1.5 to 2.5 the value used is 2K and so on)

- (j) **Criteria 1 - Hours of Exceedence (He):**

For schools, the number of hours (H_e) that ΔT is greater than or equal to one degree (K) during the period May to September inclusive shall not be more than 40 hours.

An understanding of how often a building in any given location is likely to exceed its comfort range during the summer months (May-September) can provide useful information about the building's thermal characteristics and potential risk of overheating over the range of weather conditions to which it will be subjected. Simple hours of exceedence are something that designers are familiar with and provide a good first assessment of acceptability. The standard suggests a maximum H_e of 3% of occupied hours. This is relaxed slightly here for schools as they are not often occupied in the height

of summer and the working day is considerably shorter than most offices and similar buildings.

(k) **Criteria 2 – Daily Weighted Exceedance (We):**

To allow for the severity of overheating the weighted Exceedance (We) shall be less than or equal to 6 in any one day.

$$\text{Where } W_e = \sum h_e \times wf = (h_{e0} \times 0) + (h_{e1} \times 1) + (h_{e2} \times 2) + (h_{e3} \times 3)$$

Where the weighting factor $wf = 0$ if $\Delta T \leq 0$, otherwise $wf = \Delta T$, and h_{ey} = time in hours when $wf=y$

This criterion sets an acceptable level for the severity of overheating, which is arguably more important than its frequency, and sets a daily limit of acceptability and is based on Method B – 'Degree hours criteria' in BS EN15251; 2007. It is the time (hours and part hours) during which the operative temperature exceeds the specified range during the occupied hours, weighted by a factor which is a function depending on by how many degrees the range has been exceeded. The value of the weighting factor is based on the observed increase in the percentage of occupants voting 'warm' or 'hot' on the ASHRAE scale (overheating risk) with each degree increase in ΔT , the temperature above the comfort threshold temperature.

The value of 6 is an initial assessment of what constitutes an acceptable limit of overheating on any single day. This initial assessment was made from observations of the temperature profiles from case studies of a range of free-running buildings that are perceived to perform well at one end of the range and poorly at the other in regards to limiting overheating. For further information see CIBSE TM 52.

(l) **Criteria 3 - Upper Limit Temperature (Tupp):**

To set an absolute maximum value for the indoor operative temperature the value of ΔT shall not exceed 4K.

The threshold or upper limit temperature is fairly self-explanatory and sets a limit beyond which normal adaptive actions will be insufficient to restore personal comfort and the vast majority of occupants will complain of being 'too hot'. This criterion covers the extremes of hot weather conditions and future climate scenarios.

(m) These criteria shall be the basis of the thermal modelling of the building.

The building will be deemed to fail the overheating design criteria if any two of the three criteria are exceeded.

In addition, the asymmetric radiation from hot ceilings in single storey teaching spaces shall be less than 5°C in summertime and 10°C in wintertime.

In order to achieve this hot air must not be trapped at ceiling level and there must be an adequate openable ventilator area within 200mm of ceiling level, usually at least 1.2% of the floor area.

- (n) The Contractor shall employ passive measures, such as thermal mass with night ventilation and external shading, where possible to reduce the possibility of overheating. Consideration shall be given to minimising heat load by the use of efficient equipment, including ICT Infrastructure.
- (o) Where, after consideration of such measures, and taking account of other factors that could restrict the use of natural ventilation (eg air pollution, traffic noise) the Contractor deems that the heat load is such that cooling is required, the Contractor should consider low carbon cooling systems in preference to conventional air conditioning. Such systems include use of reversible heat pumps, using cool water from bore holes and drawing in air through earth tubes.
- (p) Where the Contractor decides to use mechanical cooling, for example at times of peak summertime temperatures in areas of particularly high equipment heat load, the Contractor shall justify its use on heat load and energy efficiency grounds in the ITT Environmental Strategy Report. The Contractor shall not use mechanical cooling in teaching areas with equipment gains of less than 15W/m² or practical spaces where the equipment gains are less than 25W/ m².
- (q) **Overheating - Performance in Use**
 - (i) The Contractor shall ensure that the design for New Buildings and where possible for remodelled or major refurbished buildings achieves an acceptable standard of thermal comfort in each teaching space over the year. The Performance in Use criteria designed for use by the School to assess whether the Building is overheating that shall be included in the Post Occupancy Building Performance Evaluation Template that the Contractor shall supply as part of the Handover Documents is the average internal air temperature does not exceed the average external air temperature by more than 5°C, both temperatures being averaged over the time period when the external air temperature is 20°C, or higher.
 - (ii) The Contractor shall achieve temperatures within the acceptable range when windows, fans and ventilation systems are operated to reduce summertime temperatures, the space has the intended number of occupants and the internal heat gains from teaching equipment, including computers and data projectors, does not exceed 15 W/m² in teaching spaces and 25 W/m² in spaces for computer based music and art or graphics where there are significant numbers of powerful desktop PCs.

2.8.18 Temperatures and Humidity in ICT suites and Server rooms

- (a) The Contractor shall provide ICT cabinets that are mesh fronted to allow good air flow. The Contractor shall ensure that Server room power loads are separately metered. The Authority and the Contractor shall aim for a target annual Power Utilisation Efficiency (PUE) for the ICT server installation of better than 1.5. Power Utilisation Efficiency is the ratio of the total power consumed by the server room equipment including UPS and any remote air handling or cooling equipment divided by the power consumed by the ICT equipment in the server room. The ICT equipment load should be metered after any uninterruptible power supply (UPS) units and the intake power to the IT server room shall be measured before the UPS units.
- (b) The Contractor shall liaise and collaborate with the Authority and the School in relation to the ventilation design of ICT server rooms, procurement of new ICT equipment and operation of server rooms. Equipment heat loads and equipment operating temperature and humidity ranges, and noise levels from equipment will need to be considered. Account should be taken of "ASHRAE TC 9.9 2011 Thermal Guidelines for Data Processing Environments"²⁹ which gives guidance on temperature and humidity ranges. The Contractor shall provide adequate cooling to ensure that any server infrastructure deployed by the School, new or Legacy, can be kept within environmental conditions as stipulated by the associated ICT equipment warranty.
- (c) The Contractor shall supply background ventilation to server rooms at 0.3 air changes an hour to allow for ICT staff who are servicing equipment to work in the server room; or as required by UPS systems for the safe operation of the batteries to allow for the release of inflammable or corrosive gases; whichever is the higher ventilation rate.
- (d) The Contractor shall ensure that:
 - (i) in wintertime outside air is provided at a temperature above 10oC.
 - (ii) inlet air to server rooms must be filtered to prevent dust problems. Sufficient ventilation must be provided to comply with the UPS battery manufacturers' requirements covering off-gassing under fault conditions.
- (e) The Contractor shall design the server room ventilation and cooling to cater for the server room equipment heat loads. Typical secondary server room heat loads will be in the range of 1.2kW - 4kW for a secondary schools and 400W – 1kW in Primary Schools.

²⁹ASHRAE TC 9.9 2011 Thermal Guidelines for Data Processing Environments, published by the American Society of Heating, Refrigerating and Air-Conditioning Engineers (ASHRAE)

These are not fixed upper limits as schools may have a range of legacy survey equipment which may require different treatment.

- (f) The Contractor shall design the server room assuming that all UPS systems and any legacy server room ICT equipment are capable of operating continuously in an A3 classification environment as defined within ASHRAE TC 9.9 2011 Thermal Guidelines for Data Processing Environments, ie, at room temperatures of up to 27°C measured above the server racks, with occasional periods of up to 200 hours per year at up to 30°C, and up to a maximum temperature of 35°C. For new equipment higher temperatures may apply as specified by the manufacturers
- (g) The Contractor shall design an energy efficient ventilation system and minimise the hours of operation of any mechanical cooling provided. Cooling using outside air, high efficiency fans, and plate heat exchangers is likely to be the most economical solution in the majority of UK locations.
- (h) The Contractor shall ensure that, where possible, and more energy efficient than mechanical cooling; Server equipment is cooled by natural ventilation, or forced draft air with cross flow heat exchangers. This will require server rooms and server cabinets to be located so that outside air can be ducted in to provide cooling. The Contractor shall ensure that server room cooling units provided are sized on the sensible heat loads provided by the manufacturers of the equipment to be installed or the actual measured power consumption of the equipment. Where this information is unavailable half the nameplate ratings of the equipment can be used. The Contractor should not normally need to provide more than 250 Watts of cooling per square metre of floor area of the server room. This is not a fixed limit as legacy server equipment varies as does the server room size. Simple split based cooling systems will suffice.
- (i) Where possible, the Contractor shall locate server rooms so that in winter heat from server rooms can be used to heat adjoining parts of the building.

2.8.19 Heating systems

- (a) The Contractor shall ensure for new, remodelled and major refurbished areas that the air temperatures during the heating season meet those specified in the ADS and the following table, and that these temperatures are measured at 1m from the floor in the centre of the room:

	Normal maintained air temperature to be achieved by the heating system in less than 20 minutes after closing any external doors - °C³⁰	Minimum maintained air temperature provided by heating system during occupancy at the CIBSE outside design conditions³¹ - °C	Maximum air temperature during wintertime at maximum occupancy - °C
Stores	5°C	N/A	N/A
Areas where there is a higher than normal level of physical activity (such as sports halls) and sleeping accommodation	17°C	15°C	23°C
Toilets, circulation spaces and store rooms that are normally occupied	17°C	15°C	26°C
Kitchen preparation areas	20°C	15°C	N/A
Spaces with normal level of activity, teaching, study, exams, admin and staff areas, prep rooms	20°C	18°C	26°C
Spaces with less than normal level of activity or clothing, including sick, isolation rooms, changing rooms	21°C	19°C	26°C

³⁰ This temperature is to be used as the baseline for the energy model.

	Normal maintained air temperature to be achieved by the heating system in less than 20 minutes after closing any external doors - °C³⁰	Minimum maintained air temperature provided by heating system during occupancy at the CIBSE outside design conditions³¹ - °C	Maximum air temperature during wintertime at maximum occupancy - °C
	Normal maintained air temperature to be achieved by the heating system in less than 20 minutes after closing any external doors - °C³²	Minimum maintained air temperature provided by heating system during occupancy at the CIBSE outside design conditions³³ - °C	Maximum air temperature during wintertime at maximum occupancy - °C
Special schools and resourced provision, where needs of Pupils tend to be complex and varied, including Pupils with physical difficulties or profound and multiple learning difficulties.	23°C	21°C	25°C
Where Pupils or adults may be wet and partially clothed for a significant length of time, such as swimming pools; and Dance and Movement studios	23°C in changing rooms and no more than 1°C above or below that of the water temperature in pool halls subject to a maximum of 30°C	21°C in changing rooms and no more than 1°C below that of the water temperature in pool halls	28°C in changing rooms and no more than 1°C above that of the water temperature subject to a maximum of 30°C in pool halls

³² This temperature is to be used as the baseline for the energy model.

	Normal maintained air temperature to be achieved by the heating system in less than 20 minutes after closing any external doors - °C³⁰	Minimum maintained air temperature provided by heating system during occupancy at the CIBSE outside design conditions³¹ - °C	Maximum air temperature during wintertime at maximum occupancy - °C
Where young children or those with SEN or physical disabilities may be wet or partially clothed for a significant length of time Rapidity of air movement can lead to chilling by evaporation and to compensate, a higher design temperature may be required.	25°C The air speed in these environments should not exceed 0.1 m/s at 25°C	23°C	30°C

- (b) For new, remodelled and heavy refurbished areas the Contractor shall ensure that the heating system is designed so that:

in single storey spaces, the vertical air temperature difference in the space during the heating season shall be < 2km-1 and the asymmetric radiant temperature difference to hot ceilings shall be <10oC except for a short recovery period after the doors are closed (Ref:CIBSE Guide A, 1.5.6 and 1.5.9)

Comment [A1]: ??

account is taken of heat gains to spaces so that heat emitters are not over-sized.

- (c) If under-floor heating is used, the Contractor shall be able to demonstrate that all spaces will neither take too long to recover their temperature following sudden heat losses, nor overheat due to increased heat gains following sudden heat loss (for example where external doors are opened), changes in occupancy or equipment heat load.
- (d) For New Buildings and where there are nursery-age children, children with complex health needs, the Contractor shall ensure that the maximum surface temperature of floors with under-floor heating shall be 26oC ± 2oC, the comfort temperature for low activity. and

that this temperature shall not be exceeded where children are likely to be sitting on the floor.

- (e) The Contractor will not use under-floor heating in large areas are covered with mats (used for some activities with children with SEN) or where regular spillages occur (for hygiene and odour control) nor in areas where the positions of partition walls are likely to change.
- (f) The Contractor shall pressure test all pipe work systems.
- (g) The Contractor shall include details of the water treatment regime to prevent corrosion and sludge formation in heating systems in the O&M Manual³⁴, together with details of commissioning tests and routine tests and dosing. The Contractor shall also provide a means of dosing the system.
- (h) The Contractor shall ensure that the design and installation of the heating system to new, remodelled and heavy refurbishment areas:
 - (i) is robust and durable, particularly in a Special School to withstand deliberate or accidental damage;
 - (ii) includes duty and standby boilers and pumps, to ensure that the School can function when minor failures of the system occur. Two boilers sized at 66% of the full load and twin head pumps are adequate provision;
 - (iii) is flexible enough to provide multi-functional use, including third party use of the buildings (where specified in the School-specific Briefs), without loss of energy efficiency and the use of complex control and operating systems;
 - (iv) routes heating pipes in co-ordination with other services and the building structure so that major disruption to the School is avoided as a result of Reactive Maintenance or Routine Maintenance;
 - (v) routes piped water services so as to avoid rooms or areas where leaks would cause considerable disruption and financial loss;
 - (vi) ensures surface temperatures of heat emitters and associated pipework are safe (see below);
 - (vii) includes valve isolation such that isolation of circuits/ sub-circuits does not disrupt heating to the remaining building;
 - (viii) includes frost and anti-condensation protection;
 - (ix) for standard radiators in schools, a surface temperature of 60-70°C is commonly used. If this is proposed for a project,

³⁴ Or the building logbook required by Part L of the Building Regulations.

the Contractor shall carry out a risk assessment for young children and children with SEN. Pupils' additional requirements are described in the School-specific Briefs. Where there are nursery-age children, children with severe and profound learning difficulties or those with Complex Needs, the Contractor will provide low surface temperature radiators (not greater than 46°C) and protection from hot pipework where they are within reach of Pupils;

- (x) the Contractor shall provide zoned systems matched to occupancy areas. Occupied zones must have variable temperature controls and permit zoning for out of hours use. Individual thermostatic control shall be provided to each occupied room or space, eg, by thermostatic radiator valves.

2.8.20 Heating and thermal comfort in Special Schools and Designated Units

- (a) Where children are non-ambulant, or have low activity rates, the Contractor shall provide individual tamper-proof room controls, in any space that is used for more than a transitory period. Where Pupils are likely to overheat at a lower temperature than other Pupils, or are vulnerable to the effects of dust and to infection, this will be noted in the School Specific Brief and the Contractor shall take measures to ensure Pupils remain comfortable.
- (b) The Contractor shall provide:
 - (i) localised supplementary heating and cooling if necessary to achieve the required temperatures; and
 - (ii) measures to control heat gains, such as shading devices for solar control.
- (c) The Contractor shall take account of any specialist equipment that could raise the temperature of a space.
- (d) The Contractor shall ensure that heating, ventilating and air conditioning (HVAC) systems are suitable for the needs of the children, for example, where children are particularly sensitive to background noise, or vulnerable to the effects of dust and to infection. (Where Pupils are vulnerable to the effects of dust and to infection this will be noted in the School-specific Brief) See paragraph 2.8.23(b) on Infection Control.
- (e) The Contractor shall not leave services exposed where they would be difficult to clean for example cable trays, horizontal pipe runs and horizontal ductwork or upper surfaces of horizontal acoustic baffles.

2.8.21 Ventilation

Ventilation of densely occupied spaces, such as classrooms, needs careful consideration as raised carbon dioxide levels have been shown to significantly reduce educational performance.

- (a) The Contractor shall ensure that where mechanical ventilation is used or when hybrid systems are operation in mechanical mode , ie the drawing force is provided by a fan, in new build, remodelled and heavy refurbished spaces enough fresh air is provided to achieve a daily average concentration of carbon dioxide during the Required Period of less than 1000ppm and so that the maximum concentration does not exceed 1,500ppm for more than 20 minutes each day.
- (b) The Contractor shall ensure that where natural ventilation is used or when hybrid systems are operating in natural mode, ie the driving force is either buoyancy or wind,, the system is capable of providing enough fresh air so that the average concentration of carbon dioxide during the Required Period is less than 1500ppm and so that the maximum concentration does not exceed 2000ppm for more than 20 minutes each day.
- (c) The Contractor shall endeavour to design natural, mechanical or hybrid ventilation systems to meet the space heating and thermal energy targets given in the Energy and Utilities paragraphs of this FOS.
- (d) The Contractor should also incorporate thermal mass and night cooling into the design where necessary to prevent summertime overheating.
- (e) The Contractor shall position carbon dioxide sensors to ensure that the readings are approximately representative of the occupied zone, eg, not situated adjacent to doors, vent openings, etc.
- (f) The Contractor shall maintain the required ventilation during room dim-out / blackout for new, remodelled or heavy refurbished areas, and it shall not be impaired by security or safety requirements. The Contractor shall ensure that when outside air is introduced into a teaching space ventilation air and room air will be mixed to avoid cold draughts during wintertime. In wintertime the minimum air temperature of air delivered to the occupied zone at 1.4m above floor level shall be not more than 5°C below the normal maintained air temperature given in paragraph 2.8.19(a).
- (g) The Contractor shall ensure that the control of natural ventilation systems in densely occupied spaces such as classrooms is provided by means of:
 - (i) an indoor air quality or carbon dioxide sensor that provides a clear and easily understood indication of indoor air quality to alert the teacher and possibly the Pupils to the need to increase the ventilation by opening windows or vents; or
 - (ii) an indoor air quality or carbon dioxide sensor linked to a ventilation system or an automatic window or vent opening system.
- (h) The Contractor shall ensure that all ventilation systems are:

- (i) capable of dealing with localised conditions and responding to changes in demand;
 - (ii) integrated into the Building, whether natural, passive or mechanical, and co-ordinated with the fire alarm, (eg, for smoke control) and gas supplies where required; and
 - (iii) easily controllable to allow reduced ventilation rates when required, for example with low occupancy or out of hour's use, and to allow for increased ventilation in summertime.
- (i) In naturally ventilated teaching spaces the Contractor shall provide sufficient natural ventilation and night cooling, preferably by cross flow ventilation, to minimise ventilation opening sizes and to eliminate the need for mechanical cooling. Smaller ventilation openings will also make it easier to meet the acoustic requirements for sound insulation of the building envelope.
- (j) The Contractor shall position any discharge air terminals to prevent re-circulation into the building.
- (k) The Contractor shall ensure window and vent operating mechanisms in classrooms are virtually silent to avoid distraction during lessons. To be acceptable in classrooms, the noise of actuators (at normal speed) when measured in the occupied zone in the middle of the room shall not give rise to more than a 3 dB increase in the Indoor Ambient Noise Level specified for the space.
- (l) The Contractor shall ensure that the School is designed so that the air speed flowing across occupants in winter is <0.3 m/s in all teaching spaces. Where Pupils may be partially clothed this should be reduced to < 0.15 m/s.
- (m) In naturally ventilated classrooms, the Contractor shall provide effective coupling of the ventilation air any with thermally massive elements intended to provide passive cooling through use of thermal mass. This will prevent summertime overheating of the room and excess asymmetric radiation from a warm ceiling. The Contractor shall design a free opening area of at least 1.5% of the floor area within 200mm of ceiling level, and ventilating the ceiling area is required for effective summertime ventilation and night cooling of the soffit. The Contractor will not include downstand beams which prevent this. The Contractor shall control the night cooling of thermal mass in ceilings to prevent over-cooling of the thermal mass, for example, by means of a temperature sensor embedded in the first 70mm of the surface.
- (n) The Contractor shall ensure that the rejection of energy laden warm or cool air is minimised in the building through the use of ventilation systems which limit the pre-heating of ventilation air and exploit the heat gains from occupancy and equipment and by control of the ventilation heat loss through external doors. The Contractor shall provide all main entrance doors with draft lobbies.

- (o) The Contractor shall ensure that HVAC systems are easily accessible for maintenance, so that measures can be taken to ensure children are not exposed to the bacteria found in moist conditions in ductwork.

2.8.22 Local Extract Ventilation

- (a) The Contractor shall provide intermittent extract ventilation in accordance with Table 6.1a of AD F1 and the ADS, to:
 - (i) sanitary accommodation and washrooms;
 - (ii) rooms containing printers and photocopiers in substantial use;
 - (iii) food and beverage preparation areas.
- (b) The Contractor shall ensure that the minimum intermittent air extract rates are: 6l/s per WC/urinal and 15l/s per shower/bath.
- (c) The Contractor shall ensure that extract ventilation is taken to the outside and provided with appropriate time and occupancy controls and where possible, extract ventilation shall include a means of heat recovery.
- (d) The Contractor shall ensure that ventilation to offices is in accordance with AD F1 Table 6.1b, which requires the total outdoor supply rate for offices to be 10l/s/person. The Contractor shall take into consideration the appropriate CIBSE guidance for the ventilation of various types of accommodation including, assembly halls, atria, plant rooms, laboratories³⁵, sports centres and swimming pools.³⁶

2.8.23 Ventilation in Special Schools and Designated Units

- (a) The Contractor shall ensure that:
 - (i) laundries, soiled holding or waste, and cleaners' rooms shall be ventilated at a minimum of 5 air changes per hour by means of mechanical extract with natural or mechanical make-up air;
 - (ii) toilets and hygiene rooms shall be capable of being ventilated at 10 air changes per hour by means of mechanical extract to outside, with make-up air, heated and filtered. Control of ventilation rate, occupancy control and heat recovery shall be provided;
 - (iii) toilets, showers, changing areas, laundries, cleaners' rooms and spaces holding soiled clothes or clinical waste shall be mechanically ventilated to achieve a slight negative pressure relative to adjacent spaces;

³⁵ See also CLEAPSS guide G14 Designing and planning laboratories (05/09), www.cleaps.org.uk.

³⁶ Refer to Table 6.3 of Approved Document AD F1 2010

- (iv) physiotherapy, medical and sick rooms shall be ventilated at a minimum of 8 litres per second/person or 2 air changes per hour, whichever is the greater, when occupied;
- (v) ventilation design must not compromise acoustic performance, particularly where children have additional sensitivities to external sources of noise.

(b) Infection control

- (i) For schools where there are children with complex health needs, the Contractor shall design ventilation systems for infection control and to maintain standards of hygiene. The Contractor shall ensure that staff are able to control ventilation for comfort, and draughts shall be minimised so as not to affect vulnerable and immobile Pupils. Due to the risks of harbouring legionella, the Contractor may not use cooling towers in these schools.
- (ii) In these schools where mechanical ventilation is specified in the ADS the Contractor shall provide filtration at grade G6 or M5 or M6, depending on external air quality and design exposure levels.

2.8.24 Specialist ventilation

The Contractor may need to supply additional ventilation in spaces such as laboratories, server rooms, food technology rooms and kitchens, to remove fumes and heat from equipment. See paragraph 2.4.6(i) on fume cupboards.

2.8.25 Local Exhaust Ventilation (LEV) Systems

- (a) The Contractor shall ensure that Local Exhaust Ventilation (LEV) systems are provided, in accordance with the ADS, in some science laboratories (sometimes in the form of fume cupboards) and other spaces to remove noxious fumes and to extract dust from wood working machinery. In some cases LEV will be Legacy equipment, but the risk assessments still need to be carried out in consultation with the School.
- (b) The Contractor shall take account of HSE guidance on LEV systems and specifications³⁷ and shall comply with HSG 258³⁸. In particular the LEV specifications shall identify the processes, contaminants, hazards, sources to be controlled and exposure benchmarks. Exposure benchmarks shall be based on EH40³⁹ and on CLEAPSS guidance on risk assessments for Science and Design and Technology⁴⁰.

³⁷ See Annex X

³⁸ HSG 258 "Controlling airborne contaminants at work, A guide to local exhaust ventilation".

³⁹ EH40/2005 "Workplace exposure limits"

⁴⁰ See Annex X

- (c) The Contractor shall ensure that make up air shall not create draughts or disturb the airflow into LEV hoods and fume cupboards. The Contractor shall design ventilation openings to minimise such effects and they shall be sited away from LEV hoods and fume cupboards.
- (d) The Contractor shall design LEV systems to minimise noise levels so that indoor background noise levels do not disturb educational activities. Where possible, the Contractor shall run extract ducts in bulkheads or above suspended ceilings to minimise noise in teaching spaces. The Contractor shall position fans remotely from the rooms served, both for acoustic reasons and to place as much ductwork as possible under negative pressure.
- (e) The Contractor shall ensure that:
 - (i) extract air from laboratories and similar spaces are ventilated directly to the outside and not through other spaces;
 - (ii) air flow indicators shall be fitted to all LEV systems;
 - (iii) a user manual and logbook is provided for every LEV system;
 - (iv) the design and installation of the LEV systems should be included in the CDM⁴¹ documentation.

2.8.26 Wood dust extract systems

The Contractor shall provide dust extract systems to woodworking machinery in the Design and Technology prep room and practical areas such that:

- (a) the dust collection unit and extract fan are located so that the unit can be used quietly and can be easily and quietly emptied without disturbing class activities. Ideally this unit would be located in a separate room. The shaker and fan and main branch ducts can also be located in this space so that noise ingress into teaching spaces is minimised;
- (b) the air inlet to the plant room is acoustically attenuated to prevent noise causing significant disturbance to teaching areas via open windows, and to outside areas;
- (c) vacuum hose connections are provided, instead of having a 'sweeping up' arrangement, and inertia type reels for vacuum hoses are provided in the prep room and the Pupil's work area;
- (d) automatic fire dampers are provided in the dust extract system and the associated plant room;
- (e) the system is fitted with a variable speed fan and machinery dampers and interlocks, so that the system changes the flow rate

⁴¹ The Construction (Design and Management) Regulations 2007

when machines are switched on and off and allows hand tools to be connected. The interlocks shall provide automatic shut off of the extract system when the waste bag is full and a warning shall be provided to the prep room when the bag is nearly full;

- (f) all branch ducts are designed for low resistance as described in HSG 258.

2.8.27 Acoustics

- (a) The Contractor shall ensure that the design of new, remodelled and major refurbished spaces:
 - (i) complies with sound insulation, reverberation time and internal ambient noise levels, in the acoustic performance standards for schools⁴², unless alternative performance standards (APS) are proposed and agreed with the Authority;
 - (ii) complies with the 'acoustic performance standards for schools' for speech intelligibility and STI⁴³ standards in all open plan teaching areas;
 - (iii) limits noise intrusion through the external envelope from traffic, pedestrians, nearby industry and weather related noise;
 - (iv) takes into account site and internal room layout, provision of noise attenuation barriers and choice of ventilation systems;
 - (v) accommodates the needs of Pupils with SEN and disabilities such as hearing impairments, where additional requirements are highlighted in the School-specific Briefs.
- (b) The Contractor shall ensure that the maximum indoor ambient noise level including noise from Building Services plant and equipment and internal drainage shall not exceed the levels given in Table 1.1 of the 'acoustic performance standards for schools' and included in the ADS.
- (c) The Contractor shall carry out pre-completion and post-completion testing in accordance with the Good Practice Guide for the acoustic testing of Schools published by the Association of Noise Consultants and provide all test certificates and submit other details in order to demonstrate compliance with the acoustic requirements. The Contractor will be required to remediate problems and retest if the required design standards are not met.
- (d) The Contractor shall liaise with the School on the specification of data projectors, ICT equipment and other equipment that the School

⁴² 'The Acoustic Design of Schools – Performance Standards for Schools and prior to their publication the Acoustic Performance Standards for the Priority Schools Building Programme v1.7 May 2013, published by the Education Funding Agency, supersede and takes precedence over BB93 2003 for the purposes of this building contract. The tables and key information from this document are included in the ADS in summary form.

⁴³ Speech Transmission Index

will be running during teaching activities with the aim that the unoccupied operational background noise levels⁴⁴ do not exceed the IANL levels given in the draft 'acoustic performance standards for schools' and the ADS by more than 5dB. If a School has Legacy equipment which leads to the background noise levels in the Classroom exceeding the recommended IANL levels by more than 5dB, the Contractor shall advise the School how to improve the performance of spaces, for example, by fitting acoustic absorption and acoustic barriers or by providing partial enclosures.

- (e) The Contractor shall not be entitled to any lower performance standard than those given for refurbishment in the 'acoustic performance standards for schools other than in exceptional circumstances; in which case the Contractor shall put forward a full and proper case, clearly outlining the practical implications of the suggested alternative.

2.8.28 Acoustics for Special Schools and Designated Units

The Contractor shall ensure that the acoustic design takes particular account of the needs of any children with communication difficulties, hearing impairment or sensitive hearing. Where necessary, specialist advice shall be sought from acousticians or audiologists specialising in hearing impairment, teachers of the deaf, and/or other specialists. Specialist provision such as radio aids shall be provided as specified in the School-specific Briefs. Where a Special School is co-located with a new Secondary School or Primary School, the acoustic performance of shared spaces in the mainstream school shall be suitable for all Pupils and all planned activities.

The acoustic requirements in Special Schools vary considerably depending on the needs of the Pupils. It is therefore essential for the Contractor to identify the needs of the Pupils; to take expert advice on the necessary acoustic criteria to meet their needs; and where necessary to propose Alternative Performance Standards to those given in the acoustic performance standards for schools and the ADS.

2.9 Energy and utilities

- 2.9.1 The Contractor shall deliver Energy and Utilities Services that are compliant with all relevant Legislation and regulations including the Environment Protection Act 1990.
- 2.9.2 The Contractor shall comply with Utility Company requirements in relation to infrastructure work including requirements for service intakes and meters.
- 2.9.3 The Contractor shall negotiate new agreements with utilities companies to deliver the School's requirements.

⁴⁴ 'Acoustic Performance Standards for the Priority School Building Programme' published by the Education Funding Agency defines the background noise level as the indoor ambient noise plus the noise from fixed equipment such as data projectors and ICT equipment that is normally in use during teaching activities and cannot therefore be easily switched off. This does not include noise from building occupants or noise from intermittent activities taking place in the space.

2.9.4 The Contractor shall provide all necessary diversions, reinstatements and the like, without undue disruption to School activities.

2.9.5 Summary of approach to energy modelling

- (a) Prior to producing the initial baseline energy model, the contractor shall ensure that the early stage design concept takes into consideration the requirements to meet the daylighting, overheating, ventilation and acoustic requirements in this specification.
- (b) The Contractor shall produce two energy models. These models are the Initial Baseline Energy Model and the Final Baseline Energy Model. The final model being used to inform the Authority of the Contractor's intent to deliver a school that meets the energy end use targets.
- (c) The Initial Baseline Energy Model shall be included in the IPDSB and uses a set of default input data parameters covering, weather, standard equipment profiles and use patterns. This set of input data parameters is provided by the Authority on a standard modelling input data set for the particular school type. The Contractor will input its design specifications together with the default input data parameters to demonstrate it can meet or better the maximum energy consumption targets given in this FOS. This is a whole building model using the design standards set out in this Facilities Output Specification. This model is used by the Authority to understand the Contractor's intent to deliver a school that meets the end use benchmarks.
- (d) The Final Baseline Energy Model - Once demonstration has occurred that the Initial Baseline Model meets or betters the theoretical energy performance required; the Initial Baseline Model will be adjusted to reflect: final design specifications; the actual School and Site particulars including weather files for the location, loads of legacy and new equipment; and School use patterns; to produce the Final Baseline Energy Model at handover. This model will allocate to the various meters to be installed in the building the anticipated energy usage values and will be used to predict the energy consumption and carbon emissions of the School in the format of a Display Energy Certificate (DEC) rating for the school.
- (e) The Contractor shall upload the predicted DEC and the predicted end use loads to Carbon Buzz.

2.9.6 The Contractor shall provide systems for the School and Authority to monitor the energy use against the installed meters using on line data and benchmark information on at least a monthly basis and a daily basis when required. The Contractor shall set up the reporting system for the School to exchange data with the iSERVcmb continuous monitoring and benchmarking website⁴⁵ or similar benchmarking system approved by the Authority.

45 See www.iservcmb.info

2.9.7 **Weather Station**

- (a) The Contractor shall either provide a weather station at the School that will be in a location regarded as suitable for collecting weather data and/or where available may propose to the Authority that local met office data is used.
- (b) The weather data will be used by the school to record and report weather variations to understand variations in fuel consumption.
- (c) As a minimum the following weather data is required; Outdoor Dry Bulb Temperature, Outdoor Humidity, Wind Speed, Wind Direction, Dew Point and Solar Radiation over a maximum of 1 hour averages.
- (d) The weather data shall be available for curriculum use by the school.

2.9.8 **Energy and water efficiency plan**

- (a) The Contractor shall develop an Energy and water efficiency plan which will initially form part of the Environmental Strategy Report at ITT stage. The Energy and water efficiency plan shall form part of the Contractor's Proposals and be developed and implemented from early design stage, and be a tool for the School/Authority to continuously monitor and benchmark the energy and water efficiency of the as-built installations.
- (b) The plan will include effective monitoring of energy and water to influence user behaviour and ensure efficient operation over time.
- (c) The plan will include key design parameters by which the energy and water consumption target will be achieved, eg by reducing the risk of uncontrolled water use, minimising the risk of leakage and by minimising the energy associated with the generation, storage and supply of hot water.
- (d) The Contractor shall ensure that the design allows for the predicted water use in the new and remodelled buildings and grounds (together with areas where sanitaryware is completely replaced) to be less than 2.8m³/person per annum total use for a School without a pool. Cost-effective project specific targets for hot and cold water consumption shall be developed by the Contractor at ITT stage.
- (e) Water meters shall be provided for the school to measure the annual water consumption and, if applicable, the amount of rainwater harvested.
- (f) The Contractor should take account of the fact that water consumption per annum in a Special School can be up to four times the consumption of that in a mainstream School. This means that additional water storage may be needed in Special Schools, for example because of higher water use needed for healthcare, laundry and hydrotherapy.

- (g) The Contractor shall provide Building logbooks and Energy Performance Certificates as required by AD L and its associated guidance 'Non-Domestic Building Services Compliance Guide', 2010 edition(8).
- (h) The Contractor shall ensure that any on-site energy generation or water recycling and harvesting included in the solution is appropriate and proportionate to the needs of the School. Any on-site energy generation shall ensure energy efficiency and low carbon output. The Contractor shall ensure that the overall hot water service operating efficiency (defined as energy contained in the hot water exiting from the tap or shower head, related to the supply side energy used for hot water generation) shall not be less than 45% when main plant has been replaced as part of the works.
- (i) The Contractor shall ensure that standing losses for electrically heated hot water services for hand washing do not exceed 10W/basin (for new installations) and that heating of hot water by trace heating of pipework is not used for legionella prevention.
- (j) The Energy and water efficiency plan shall include:
 - (i) the design stage energy and water end use analyses;
 - (ii) a template to collate annual energy and water consumption data so that in use data can be easily uploaded to Carbon Buzz by the School/ Authority;
 - (iii) actions to be taken in design, specification, construction, commissioning and occupancy to reduce water and energy consumption and carbon emissions, with clearly identified responsibilities of relevant parties.

At Handover the Energy and water efficiency plan will be updated to include the:

- (iv) Final Baseline Energy Model (produced before Handover);
- (v) completed iSERVcmb facility and services description spreadsheet detailing activity zones, meters and equipment installed; and
- (vi) predicted operational energy water use and energy use and associated carbon emissions for the school site in a format similar to a DEC rating (including regulated and unregulated emissions);
- (vii) the Contractor shall produce integrated continuous benchmarking, measurement and verification, and reporting protocols based on best practice tools, methodologies and reporting procedures for the school to use as part of the metering and monitoring strategy and the Contractor shall test these during commissioning and train the School Staff in their use as part of the planned soft landings phases.

2.9.9 The Initial Baseline Energy Model

- (a) The Contractor's Initial Baseline Energy Model shall demonstrate that the design of the Building is capable of meeting or improving upon the EFA Design Energy Targets for new build and remodelled areas of the school (see paragraph 2.9.5(c)). The Design Energy Targets and input data parameters are published in the EFA "Energy input parameters and modelling guide".
- (b) The set of input data parameters that are used to produce the Initial Baseline Energy Model shall be generally in accordance with the default set of input parameters given in the EFA "Energy input parameters and modelling guide" (see paragraph 2.9.5(c)).
- (c) The Contractor and School shall work together to limit energy end uses to best practice benchmarks for new and remodelled areas. For refurbished areas and the remainder of the school the Contractor should work with the school to establish a strategy for reducing energy demands to the end use benchmarks below. These benchmarks for large (>10,000m²) secondary schools are currently:
 - (i) Lighting 12 - 24 kWh/m²/annum;
 - (ii) Heating 55 kWh/m²/annum;
 - (iii) Hot water 10 kWh/m²/annum;
 - (iv) Fans and pumps (depends massively on extent of HVAC, figures normalised across school total floor area, however range is) 6-15 kWh/m²;
 - (v) Server rooms 8 kWh/m²;
 - (vi) IT circa 8-10 kWh/m² (although depends on Pupil to PC/laptop ratio and charging method);
 - (vii) Miscellaneous and small power 5-10 kWh/m²;
 - (viii) Catering 7-14kWh/m² (This includes hot water energy use).
- (d) As Schools come on line the iSERVcmb benchmarks for the various energy end uses should be used.
- (e) The Initial Baseline Energy Model will include the results from design stage modelling and/or simulation of energy performance. The Contractor shall amend these design stage models as the design develops and the contractor understands the schools FF&E and ICT requirements to produce the Final Baseline Energy Model.
- (f) The Initial Baseline Model shall include the predicted energy end use breakdown and the Contractor must show how this is related to the sub-metering that the school will use for monitoring energy end use consumptions.

2.9.10 **The Final Baseline Energy Model**

- (a) The Contractor shall develop the Initial Baseline Energy Model throughout the design to produce the Final Baseline Energy Model that includes all the design information for the School including actual profiles, predicted equipment performance and management factors for the actual school. The Contractor shall provide the Final Baseline Energy Model to the Authority at handover, together with supporting design simulation assumptions, information on the software used and results.
- (b) The Final Baseline Energy Model will include an energy analysis of the equipment to be installed, based on predictions and equipment surveys. Before handover, the Contractor shall use the Final Baseline Energy Model to predict the energy consumption and carbon emissions of the School in the format of a DEC rating for the School. This predicted DEC shall be exported to the Carbon Buzz website.
- (c) The Contractor shall aim for this rating to be at least equivalent to a DEC Rating of C. Where the use of Legacy equipment means that initially this is not possible, the Contractor should identify means for the School to achieve the equivalent of a C Rating in future by implementation of efficiency measures, for example by recommending replacement equipment to the School to improve energy efficiency.

2.9.11 **The In-Use Energy Model and Energy Reporting**

2.9.12 As part of handover the Contractor shall set up energy and water consumption monitoring and reporting processes for the School/Authority.

2.9.13 These shall include monthly exception reporting to identify and isolate incidences of avoidable utilities consumption. The reporting system should be able to identify instances where energy consumption exceeds the predicted end use or established benchmarks, eg, by more than 15% and additional energy or water payments are likely to be incurred. Examples would be when: all lights in corridors are left on all night; loads are left on during holiday periods, or there is high consumption overnight or during holiday periods.

2.9.14 **Energy and water monitoring**

(a) The End Uses for which the Contractor shall predict the annual energy and utilities consumptions are:

(i) **Space Heating**

The temperatures to be used for predicting the initial baseline heating consumption are the normal maintained air temperatures given in the table in paragraph 2.8.19(a) of this FOS. The minimum room temperature in any serviced area shall be 5°C at which temperature the heating system will be

automatically switched on for a minimum of 30 minutes for frost protection. Adjustments can be made where the School chooses to run parts of the building at higher temperatures. This energy end use shall be separately metered.

(ii) **Hot water energy consumption**

In Secondary Schools where centrally supplied this energy end use shall be separately metered and the hot water flow rate shall be separately metered.

(iii) **Total cold water consumption**

This shall be separately metered.

(iv) **Internal lighting and emergency lighting including internal security lighting**

This energy end use shall be separately metered. Hours of use are those in the input parameter data set for the type of school type but can be adjusted for actual hours of use where the School chooses to use the lighting out of hours, for example, they may leave all the corridor lights on all night for security purposes.

(v) **Swimming and Hydrotherapy Pools**

Including pump and water treatment, and pool related heating, ventilation and air conditioning loads.

(vi) **Building related services**

Including protection systems, fire alarm, sprinkler and intruder alarm systems - major ventilation plant including ventilation of toilets, boiler plant and pumps and other plant and air conditioning loads.

(vii) **External sports lighting**

This energy end uses shall be separately metered.

(viii) **External security, amenity and flood lighting**

This energy end use shall be separately metered.

(ix) **Catering gas, cold water, hot water and electricity consumptions**

Including dishwashers and ventilation equipment. Initial estimates based on number of meals and number of plates predicted by the school. Gas and electricity use shall be separately metered.

- (x) **Server and hub room loads**

Including all ICT equipment, internal lighting and ventilation and air conditioning equipment. Electrical loads to server rooms shall be separately metered.
- (xi) **Miscellaneous power loads**

Including local extract ventilation, dust and fume extract, ICT related room cooling systems, ICT equipment outside server rooms and power and equipment loads such as hand driers, kilns, and theatre.
- (b) The School shall be able to compare the actual building end use loads with the predicted figures and iSERVcmb benchmarks by means of the metering and monitoring processes set up by the Contractor.
- (c) The energy consumption of Legacy facilities and Buildings or parts of Buildings which may be let out to the community on a commercial basis such as sports or leisure facilities shall be separately accounted for in energy prediction calculations and shall be separately zoned. This will allow the School to apportion payments for third party rental use of the premises and sports facilities.
- (d) Automatic Meter Reading (AMR) must be provided on all incoming services and sub-metering to report energy end use consumptions.
- (e) The Building Management and energy control systems shall be capable of providing energy, heating, hot water, lighting and water consumption metering data. At least the last two years' historic data shall be available in a suitable on-line format designed to be understood by school premises staff. The Contractor shall agree with the School the level and type of real time data to be provided for curriculum use.
- (f) Energy and utility use data shall be able to be acquired and stored every 15 minutes. The data shall be able to be uploaded every month, or preferably every day, to the iSERVcmb continuous monitoring and benchmarking application or similar system approved by the Authority for energy management purposes. This process shall be set up by the Contractor and tested before Handover and the school premises staff shall be trained to use the reporting system.
- (g) The energy use data should have separate data streams (usually meters) for all the meters identified above and for each of the following HVAC components that are installed:
 - (i) boiler energy use (electrical and fossil fuel separated);
 - (ii) space heating and hot water pumps;
 - (iii) any separate heat rejection fans;

- (iv) packaged a/c systems, eg split systems;
 - (v) air handling units; and
 - (vi) heat pumps.
- (h) The data is usually provided by meters but many HVAC components, eg, pumps are now fitted with in-built sensors and meters which can be connected to the internet and data collected from them directly. Duplicate metering and data collection systems should be avoided where the components can already provide the required data.
- (i) The Contractor shall ensure that data from the AMR system and headline output data from the Building Controls and Energy Management Systems, for example room temperatures and heating and hot water flow/return temperatures, is able to be uploaded to the iSERVcmb or similar system so that it can be available to the School and the Authority via the web for use in energy management and monitoring of performance in use.
- (j) Software may be installed on PCs and laptops to monitor energy consumption and transmit this data via the internet. There may therefore be no need to meter this equipment where software can act as a virtual meter.
- (k) The energy consumption in run and standby conditions for all equipment shall be estimated by the Contractor for the purposes of calculation of energy end use loads. For this purpose the Contractor shall obtain Information on Legacy equipment, including name plate loads, manufacturers' and serial numbers and shall provide the information to the Authority.
- (l) As part of the contract submission the Contractor shall complete the iSERVcmb facility and services description spreadsheet. This will be completed during the Works Period and will be completely filled in by the handover date. As part of handover the Contractor will upload the initial end use data and meter readings to the iSERVcmb continuous monitoring and benchmarking website using this spreadsheet, or to a similar benchmarking system approved by the Authority. The intention is that the School and Authority will subsequently continue to use this system. www.iservcmb.info

2.10 Building Services

- 2.10.1 The Contractor shall ensure that the Building Services are designed to meet Legislation⁴⁶ The Contractor shall ensure that they are designed to be energy efficient, safe and easy to operate, taking account of the particular needs of each School. The Contractor shall ensure that the

⁴⁶ see CIBSE^(10, 11, 12) and DfE⁽¹³⁾ and the Worcestershire County Council Trade Preambles for Mechanical and Electrical Services which provide a source of good practice guidance for installations in Schools and other public buildings⁽³⁴⁾

following requirements are met in new build and areas where services are replaced:

- (a) services are to be located and routed in order to provide flexibility and choice for room layout;
- (b) pipe work, cables and equipment are easily accessible for maintenance, while allowing that in Special Schools services may need to be concealed;
- (c) all connections, distribution systems, components and containment systems are safely protected, tamper-proof, correctly insulated, free from exposed contacts and clearly labelled;
- (d) all visible pipe work and cable containment finishes are complete, clean and hygienic;
- (e) all plant, machinery and switchgear is guarded and locked where appropriate;
- (f) locks and interlocks are fitted as required by the appropriate statutory bodies;
- (g) the integrity of fire breaks within ceiling and roof voids cannot be breached by the installation of services;
- (h) services default to 'off'.

2.10.2 **Boiler plant**

The Contractor shall ensure that:

- (a) all boiler loads are based on the results of an hourly heat demand model for the building⁴⁷;
- (b) all tanks are designed for future use with bio-fuel;
- (c) all burners are commissioned by an engineer employed by the burner or boiler manufacturer;
- (d) carbon monoxide (CO) detection equipment interlocked with safety shut-off valves is installed in all boiler rooms;
- (e) all chimney flue systems except those serving direct gas fired boilers operate under negative pressure without flue fans.

2.10.3 **Commissioning/Acceptance/Annual Tests for boiler/flue systems**

- (a) For all boiler plant and direct-fired hot water generators of output greater than 4kW, the Contractor shall carry out commissioning and annual performance tests for emissions and combustion efficiency

⁴⁷ An example is the heat demand model used in the carbon trust biomass boiler sizing tool. The Contractor shall ensure that the following requirements are met:

and record the results in a logbook. Tests shall be in accordance with professional-level guidance such as that published by the Carbon Trust and the Chartered Institution of Building Services Engineers (CIBSE).

- (b) The Contractor shall ensure that the boiler/flue system is tested during commissioning once the boiler can be brought up to full fire for a sustained period as follows:
- (i) by Flue Gas Analysis with an EN 50379:2⁴⁸ compliant instrument;
 - (ii) at full fire and at low fire;
 - (iii) for O₂, CO, CO₂, HC measured in mg/m³;
 - (iv) to record the temperature of the incoming combustion air and of the flue gases;
 - (v) for pressure differential to verify the performance of the flue. The flue system are tested to ensure that its leakage rate does not exceed that designated according to EN1443⁴⁹ for the particular flue type;
 - (vi) the flue gas loss % (ie - % energy loss up flue [Siegert Formula]), lambda (the degree to which the fuel air mix approaches the ideal), boiler efficiency and dew point shall be recorded.
- (c) Where there is no permanent monitoring of flue-gas analysis, flue-gas temperature, mass flow, flue gas velocity and draft there is an opening with readily removed, gas-tight cap into the side of the primary connecting flue of 12 – 22mm for a Flue Gas Analysis probe. This is within 500mm of the boiler connection and according to the boiler manufacturer's instruction and upstream of any draft stabiliser or anything which might alter the temperature or composition of the flue gas.

(d) **Annual monitoring**

The Contractor shall design the system to enable annual repetition of the above test to provide an independent check on the system's efficiency and its emissions.

(e) **Biomass and biofuel systems**

The Contractor shall assess the feasibility of using any Biomass boiler systems using the Carbon Trust Biomass Boiler sizing tool. The tool should be used to prove that the heating system balance temperature, the utilisation factors for the boilers, the sizes of buffer vessels and/or thermal stores and the seasonal heating system efficiency justify the use of Biomass as a fuel and justify the key

⁴⁸ BS EN 50379.2

⁴⁹ EN 1443 Flue leakage

parameters of the system design. Account shall be taken of legislation and design advice⁵⁰.

- (f) For biomass and biofuel systems to function efficiently, a reliable and consistent supply of quality controlled fuel is required⁵¹.
- (g) The feasibility assessment and planned fuel supply shall be recorded in heating strategy in the ITT stage Environmental Strategy report.

2.10.4 Water supplies

The Contractor shall comply with the School Premises Regulations for drinking water facilities and for hot and cold water supplies.

(a) Drinking water

The Contractor shall ensure that wholesome supplies of fresh palatable drinking water are provided around the School, both internally and externally, and that these outlets:

- (i) are adequate for the number of pupil places;
 - (ii) are located in line with the School-specific Briefs; are positioned to be easily accessible by all Pupils at all times, but physically separate from toilets and hand washing areas; and
 - (iii) are clearly and correctly marked as drinking water.
- (b) The Contractor shall ensure that, due to the difficulties of meeting all the conditions for water quality, wherever possible drinking water supplies in Schools shall be connected directly to the cold water main and that water supplies fed from storage tanks not designed for potable water provision shall be clearly labelled as “not drinking water”.
- (c) The Contractor shall ensure that:
- (i) drinking water outlets and fountains should be located to avoid misuse, spillages and waste;
 - (ii) Drinking water installations should be designed to permit users to recharge water bottles using spigots and the supply system should incorporate a ‘dead’ handle system to minimise spillages and prevent the water supply being left on;
 - (iii) Drinking fountains must have appropriate drainage facilities and be sufficiently robust to deter casual vandalism;

⁵⁰ Guidance on what load is suitable to be met with which type of biomass system, burning which fuel and on system design is available from CIBSE and the Carbon Trust.

⁵¹ BS EN 15234-1:2011 Solid biofuels. Fuel quality assurance. General requirements

- (iv) Details of drinking water provision are included in the Energy and water efficiency plan as part of the ITT stage Environmental Strategy Report.

(d) Hot and cold water services

- (i) The Contractor shall ensure that hot and cold water supplies installed or amended by the contractor shall:
 - (A) be chosen to fit with each School's requirements as set out in the School-specific Briefs, considering such issues as storage availability, pressure and emergency provision;
 - (B) be provided with automatic meter reading on incoming supply and a metered supply to the kitchen;
 - (C) provide mains or tanked cold water to external areas, for grounds maintenance, landscaping and fire fighting;
 - (D) provide mains water or tanked potable water direct to internal areas, including kitchens, staff/rest rooms, technology rooms, vending machines and medical rooms, as detailed in the ADS;
 - (E) provide water service to outlet points that comply with BS670052 and BS6465⁵³.
- (ii) Hot water temperatures at the point of use must not pose a scalding risk to users. Generally this means that for baths and showers, and in all cases where the occupants are severely disabled, the hot water should not be above 43°C.
- (iii) Hot water supplies to washbasins in nursery and Primary Schools should also be limited to 43°C.
- (iv) Where domestic hot water is supplied without local thermostatic control, all taps shall be appropriately labelled and shall not be located in areas where Pupils have unsupervised access.
- (v) Particular care shall be taken to avoid problems which might be caused when cold water pipe work shares a distribution route (such as a ceiling void) where it can be warmed by adjacent heating and hot water pipe work to an unacceptably warm temperature.
- (vi) Water tanks, where required, shall have the minimum possible capacity to prevent stagnation and are suitably located to allow for cleaning.

⁵² BS 6700 Design, installation, testing and maintenance of services supplying water for domestic use within buildings and their curtilages

⁵³ BS 6465 Sanitary installations. Code of practice for the design of sanitary facilities and scales of provision of sanitary and associated appliances

- (vii) Hot water loads and annual energy consumption figures shall be based on accurate predictions of all water consuming appliances with their predicted use profiles and actual efficiencies of the hot water generation systems used including predictions of standing losses. They shall not be based on benchmark figures or default figures.

(e) Prevention and control of Legionellosis

- (i) The Contractor shall ensure that hot and cold water systems shall be installed, commissioned and maintained in accordance with the provisions of the HSC Approved Code of Practice for the Prevention and Control of Legionellosis, L8. Particular account should be taken of the vulnerability of some Special School Pupils.
- (ii) A written scheme shall be produced for controlling the risk of exposure to legionella bacteria in accordance with HSC Approved Code of Practice L8⁵⁴.
- (iii) The Contractor shall produce a Water Quality Policy document setting out the guidance and strategy that will be followed to protect staff, Pupils and visitors against the risk of legionella infection. It shall include the framework of the procedures designed to achieve this aim. It shall specify the management, operational and specialist responsibilities and lay down a clear management and communication structure to ensure that it is fail safe.

(f) Water supplies in Science Accommodation

- (i) Water supplies in new science accommodation serving sinks and dishwashers used for science equipment shall be designed to cater for Fluid Category 5. This requires a separate circuit served from a tank with an air gap. Or the Contractor must agree the Fluid Category and the protection against back-syphonage with the local Water Company and a Fluid Category 4 type installation may be acceptable [1](preferred method). When refurbishing science accommodation the Contractor must agree the Fluid Category and the protection against back-syphonage with the local Water Company and a Fluid Category 4 type installation may be acceptable⁵⁵.
- (ii) Water supplies in science labs shall be provided with central isolation by the teacher.

⁵⁴ See Appendix 9 of Worcestershire County Council Water Quality guide.

[1] More details can be obtained for the Water Regulations Advisory Scheme, www.wras.co.uk

⁵⁵ More details can be obtained for the Water Regulations Advisory Scheme, www.wras.co.uk

(g) Water supplies in Special Schools and Designated Units

- (i) The Contractor shall ensure that all hot water delivered at outlets such as basins, sinks and showers used by vulnerable Pupils shall not be above 43°C. This shall be achieved through the use of local fail-safe thermostatic mixing valves.
- (ii) The Contractor shall ensure that any hydrotherapy and warm water pools provided should be designed and installed by specialists, having regard to their previous reliable performance and the guarantees or warranties available.

(h) Drainage installations

- (i) The Contractor shall ensure that the drainage systems provided:
 - (A) achieve hygienic conditions and the effective disposal of wastewater, surface water and all liquid waste from the Schools and their facilities' activities; and
 - (B) are designed in accordance with current codes of practice.
- (ii) In addition, the Contractor shall ensure that:
 - (A) all drainage runs (including land drainage) shall be clear of obstructions, set in line to the necessary falls and show no signs of pipe displacement;
 - (B) all manholes shall be designed to receive the relevant imposed load, whether it is pedestrian or vehicular;
 - (C) all internal manholes shall be double sealed.
- (iii) The Contractor shall ensure that:
 - (A) prior written agreement is obtained from the relevant authorities for discharge into the public system. Such written agreement shall include confirmation that the existing system has the capacity to accept the increased discharge, and shall include the negotiation of any way leaves required;
 - (B) all necessary detailed surveys, inspections and appraisals of all existing systems are carried out by the Contractor, including the use of CCTV where required;
 - (C) adequate provision is made for the diversion of any existing below ground drainage or other services, if necessary;

- (D) the efficiency and sound condition of any existing drainage, to be utilised; and
- (E) the Environment Agency has agreed the planned methodology for surface water drainage.
- (iv) The Contractor shall ensure that in Special Schools, the design of the site surface water and foul drainage systems shall take account of any specific requirements identified in the School-specific Briefs.
- (v) The Contractor shall design and construct drainage to playing fields and all weather pitches to ensure that the Schools are able to use them as regularly as required to meet their curriculum requirements.

(i) **Sanitaryware and fixtures**

The Contractor shall ensure that the following requirements for newly installed sanitary ware are met:

- (i) low-level cisterns to WCs are to be concealed, where possible, and designed and installed to resist unauthorised access and for ease of maintenance;
- (ii) WC seats are to have strong fixings to pans and be of a size appropriate to the relevant user age group:
 - (A) The sizes and fixing heights of sanitary ware are appropriate for the relevant user age groups and take account of the needs of disabled persons;
 - (B) plugs are not required for wash hand basins in Pupils' toilets and should not be provided;
 - (C) robust and tamper proof mixer taps should be fitted, with timed delivery or infra-red control;
 - (D) fixtures and fittings in the Pupils' toilet areas are sufficiently robust to avoid vandalism;
 - (E) showers are self-draining and allow users privacy;
 - (F) where provided, urinals are to be individual rather than trough to allow privacy for users;
 - (G) female toilets for Pupils over the age of 8 are to be provided with sanitary disposal units.
 - (H) Specific requirements for Special Schools are given in the School-specific Briefs.

2.10.5 Gas and compressed air installations

- (a) The Contractor shall ensure that gas and compressed air installations and appliances are provided where stated in the ADS and that they are designed, commissioned and maintained in accordance with the requirements of the Institute of Gas Engineers and Managers (IGEM)⁵⁶.
- (b) The Contractor shall ensure that:
 - (i) Gas supplies to kitchen equipment are interlocked with the mechanical ventilation system as appropriate;
 - (ii) Gas and CO detection equipment interlocked with safety shut-off valves are installed in all boiler rooms;
 - (iii) Gas installations are certified on completion to comply with all HSE and IGEM recommendations and requirements;
 - (iv) Central Automatic emergency shut off valves without leak detection shall be provided on gas supplies in each science laboratory and science prep room and as specified in the ADS. These shall preferably be positioned near the teacher's desk/board, next to main light switches or at the entrance to the laboratory. Gas valves shall comply with Gas installations for educational establishments, IGEM/UP/11 Edition 2 published by IGEM, www.igem.org.uk.

2.10.6 Building Control Systems and Building Energy Management Systems (BEMS)

- (a) The Contractor shall install controls to allow automatic operation of systems and plant; a BEMS or controls of similar sophistication. Systems must include facilities for remote monitoring, optimisation, weather compensation, scheduling, time extension, frost protection and holiday setting with simple user interfaces. Local control systems shall be IP compatible for future remote connection which may not be supplied initially.
- (b) Details of the Building control systems and energy management systems shall be included in the ITT Environmental Strategy Report.
- (c) A stand-alone control system is provided for all small HVAC systems of limited complexity, which do not warrant being remotely monitored.
- (d) Headline output data, for example temperatures and heating and hot water flow/return temperatures, is available via the web, interfaced with the AMR data, for use in energy management and in the School curriculum.

Gas installations for educational establishments⁵⁶, IGEM, *IGEM/UP/11 Edition 2, 2010*
www.igem.org.uk

(e) The Contractor shall provide:

- (i) detailed specifications and commissioning schedules for the BEMS;
- (ii) centralised monitoring of mechanical systems through the BEMS;
- (iii) a web based interface to control systems;
- (iv) structured security access coding to prevent unauthorised access to the system;
- (v) provisions for remote dial in by a third party; and
- (vi) control zones which match the building and system operational zones.

(f) **Controllers/control equipment**

The Contractor shall specify all of the controllers, sensors, thermostats, emergency/safety buttons, links, and any other control equipment required to complete the scheme. A schedule for the control equipment shall be required to form part of the specification for the controls systems⁵⁷.

(g) **Local environmental controls**

- (i) The Contractor shall provide local control for teaching staff over their immediate environment for lighting, heating and ventilation in new build, remodelled and major refurbished areas. All user controls shall be easily comprehensible, accessible and quiet in operation⁵⁸.
- (ii) The Contractor shall ensure that:
 - (A) controls are clearly labelled, easy to use by untrained School staff, reliable and as far as possible automatic (while allowing for some degree of local override – see below);
 - (B) thermostats and room sensors are tamper-proof, as required by AD L;
 - (C) where specific controls are required to be operated by authorised personnel only, they will be located accordingly;

⁵⁷ The Contractor may wish to consult Worcestershire County Council's guidance and specification. See Section 8 of the Mechanical Services Trade Preambles on BEMS systems, which has proved suitable for Local Authority maintained Schools.

⁵⁸ Controls for End User, a guide for good design and implementation, Building Controls Industry Association, <http://www.bcia.co.uk/documents/Controls%20for%20End%20Users%20guide.pdf>

- (D) all controls should be located so as to deter unauthorised use by Pupils;
 - (E) controls must suit the operational requirements of the Schools;
 - (F) control systems shall be provided with the facility for remote monitoring of the system;
 - (G) local control for building users should not be provided over heating temperature set-point, start time, finish time, regular day omission, or holiday days omission.
- (iii) Temperature set-points for zones of the building shall only be changed by the Contractor. However control systems are to be designed to be centrally operable by the School Premises Team to allow short-term time and temperature overrides, defaulting to automatic operation once a pre-determined period (of up to 24 hours) has elapsed. Changes to the main heating and cooling system temperature set-points and time schedules must be carried out by the Contractor in consultation with the School/Authority.
- (iv) There will be fine trim control provided for room users to change room temperatures by providing approximately +/- 2°C differential from the temperature set centrally, eg, by operation of a thermostatic radiator valve or room controller.
- Maximum and minimum wintertime room temperatures are given in the ADS.**
- (v) Ventilation systems are easily controllable to reduce or increase ventilation rates in response to room temperature and occupancy.
- (vi) All space temperature control sensors and thermostats shall be positioned and arranged so that the maximum difference to the air temperature in the centre of the room at 1m above the floor is always <3°C. (This does not apply to sensors in under-floor heating systems that are embedded under-floor to sense floor surface temperature.)

2.10.7 Electrical Installations

The Contractor may wish to consult the Worcestershire County Council's trade preambles for standards of electrical installations that have proved suitable in local authority maintained schools⁵⁹.

(a) Mains Distribution

The Contractor shall ensure that:

⁵⁹ The Worcestershire County Council Trade Preambles for Electrical Services provide a source of good practice guidance for installations in Schools and other public buildings. See <http://www.worcestershire.gov.uk/cms/community-and-living/property-services/useful-documents.aspx>

- (i) main switchboards, sectional switchboards and distribution boards satisfy all electrical and mechanical criteria And that the switchgear provides for future extension affecting cabling and electrical loads up to a minimum of 20% above the base load for the completed Schools;
 - (ii) all switchboards are installed in secure locations;
 - (iii) where distribution boards are located in accessible locations, such as corridors, they are tamper proof and fitted with a lockable door;
 - (iv) all equipment shall be provided with durable labels, clearly marked with details of the equipment's function and designation.
- (b) Where a new supply is being provided to a building (or where the electrical services within the building are being renewed), the Contractor shall provide a main switch panel for the incoming supply that has:
- (i) full metering and BEMS connections for monitoring and controls;
 - (ii) sufficient switch fuses / moulded case circuit breakers (MCCBs) for sub-main distribution, lifts, heating, ventilation and air conditioning (HVAC) and fire alarm along with a minimum of 10% spare capacity;
 - (iii) Automatic Power Factor correction shall be provided where necessary to achieve a Power Factor of at least 0.95;
 - (iv) local panel boards for larger loads that are remote from the main incoming panel are fitted with sub-metering and have a minimum of 10% spare capacity and shall have BEMS connection for monitoring and control;
 - (v) local power and lighting distribution boards shall have a minimum of 10% spare load capacity to allow for future expansion of the system.
- (c) The Contractor shall ensure that:
- (i) in all science labs, prep rooms and design technology practical teaching rooms, automatic central isolation of electrical supplies is provided which isolates all circuits except those provided for ICT equipment;
 - (ii) the following rooms and spaces shall be fed by dedicated distribution boards :ICT-rich teaching rooms, Practical Teaching rooms with emergency shut off on electrical supplies, large offices and, in particular, the communications centres, server rooms , kitchens and stage lighting rigs.

- (iii) the server room distribution board serving IT equipment is on a separate supply from the main distribution board so that the server room can be left running while other areas are shut down for maintenance;
- (iv) the server room power consumption is separately metered and monitored by the BEMS;
- (v) ICT equipment in the server room is metered after the UPS so that the PUE can be calculated for energy monitoring purposes. Data projectors and local ICT equipment in teaching spaces should be on the same phase as all other small power.

(d) **Power Circuits**

Where new electrical circuits are being installed, or existing circuits rewired, the Contractor shall ensure that power circuit systems comply with the following requirements:

- (i) RCBO / RCD / earth leakage protection are to be provided on all circuits serving socket outlets. This will normally be 30mA rated;
- (ii) the power circuit system is designed to minimise electromagnetic interference to the computer systems and nuisance tripping due to earth fault leakage currents;
- (iii) sufficient numbers of appropriately positioned sockets are to be provided, together with the others required for general maintenance and functions such as cleaning the total number of sockets provided shall be 1.2 sockets per pupil place, location as agreed with the Authority;
- (iv) surge protection is to be provided for ICT equipment where required to meet compliance with BS EN62305 for lightning protection;
- (v) sockets are to be located to support differing room layouts and usage;
- (vi) outlets for computer equipment must comply with BS7671⁶⁰; all sockets shall be sited safely away from potential hazards, such as water outlets;
- (vii) all cabling installed in fire escape routes are low smoke and halogen type;
- (viii) specific proposals for power circuits, such as the number of sockets in a room, emergency cut-off switches or 3-phase supplies, is as detailed on the ADS.

⁶⁰ BS 7671 Chapter 54, earthing arrangements for high leakage equipment

2.10.8 Lift Installations

Lifts are not required for general Pupil and staff movement, but for ensuring access is available to all areas by those with physical disabilities and for assisting with the distribution of heavy furniture and equipment.

- (a) The Contractor shall ensure that the lifts provided:
 - (i) can be restricted to disabled Pupils, staff and visitors only, using a close proximity fob or key operation;
 - (ii) contain alarm communication devices, such that the School is aware of a trapped person and communication can be made with a 24 hour help line, via a direct link, to arrange their release;
 - (iii) have a lift capacity appropriate for their expected use.
- (b) Where lifts are required, the Contractor shall carry out a lift traffic analysis to identify the speed of the lift, its size and the waiting time. The minimum waiting time shall not be less than “good” as defined by CIBSE lift traffic analysis.
- (c) The Contractor may use platform lifts if no other suitable alternative means is available, but they should not reduce the effective width of corridors or stairs.
- (d) The Contractor shall ensure that lifts that are used as a means of escape should be fire resistant and have a separate electrical supply⁶¹.
- (e) **Lifts in Special Schools**⁶²
 - (i) In Special Schools, arrangements for lifts will require detailed consideration with the School staff - see the School-specific Briefs.
 - (ii) The Contractor shall ensure that in Special Schools:
 - (A) full evacuation lifts should have a separate secure electrical supply and are recommended for means of escape in multi-level Special Schools;
 - (B) where required in the School-specific Brief lifts with very wide doors and very large lift car sizes may be needed to ensure all children can be evacuated quickly and safely.

⁶¹ Guidance on design and use of evacuation lifts is given in BS 5588-8:1999.

⁶² Further guidance is available on Designing for disabled children and children with SEN, lifts and evacuation of disabled people – see Annex I

2.10.9 Communication Systems

(a) Period Bell and PA Systems

The Contractor shall ensure for new and remodelled areas that:

- (i) where bell systems are specified in School-specific Briefs to denote the start of the daily School session and to identify the end of various periods, they shall be flexible enough to deal with changes to the timetable;
- (ii) where possible, class changes shall be by a lower decibel rated system to that of the fire alarm, which may use local telephones as sounders;
- (iii) the tones/bells shall in any case be easily distinguishable from the tones/bells used for raising the fire alarm;
- (iv) the class change systems must have pre-set timings with manual override. All systems shall cater for hearing impaired building users. Audio systems shall be provided where required in the ADS. These will be of the sound field type where specified in the School Specific Brief;
- (v) an emergency voice communication system shall be provided at each fire refuge point (see 2.7.9 Stairs and Ramps). This enables occupants of each refuge to alert others that they are in need of assistance and to receive reassurance that this shall be forthcoming.

(b) Audio Systems

- (i) Audio systems shall be installed in Drama, Dance, Halls, Music and Performance spaces and where required in the Area Data sheets and the School-specific Briefs.
- (ii) Audio cabling will be required for connecting equipment supplied by the school including:
 - (A) speakers and amplification systems in halls;
 - (B) equipment in control rooms and halls and other performance spaces.
- (iii) Where sound field systems are required in the School-specific Briefs these shall be provided and commissioned by the Contractor.

(c) ICT Infrastructure

- (i) The Contractor shall provide an ICT Infrastructure to meet the requirements set out in paragraph 0.

- (ii) The Contractor shall provide, maintain and lifecycle the 'passive' infrastructure as part of the Works and Services.
 - (iii) Reference should be made to paragraph 3, which provides the generic requirements for FF&E including the allocation of responsibilities in relation to lifecycle replacement of equipment.
 - (iv) The Contractor shall ensure that the use of technology is fully integrated into the design. The following will need to be considered to ensure that the building supports the full integration of ICT.
- (d) The Contractor shall ensure that the design allows for the specific circumstances of each School, as specified in the School Specific-Brief.

(e) **The ICT solution**

The ICT solution installed in the New Building will rely heavily on existing ICT equipment. During design, the Contractor shall take account of the type of ICT solution contemplated by the School, its possible future evolution, and the impact that this will have on design requirements, including; space allocation for infrastructure, mechanical and electrical requirements, including power, data and heating, ventilating and air conditioning.

(f) **Data cabling and telecommunications**

- (i) The Contractor shall when positioning data points within teaching spaces take account of the teaching and learning activities proposed for each space and provide the most appropriate means of data access, including, but not limited to, dado mounted, furniture mounted, floor box mounted or wireless.
- (ii) The Contractor shall ensure that the scope of the provision shall include the whole School Site and all ICT data and telecommunications equipment, cabling systems and containment, from core patching to connection point for the School equipment.

(g) **TV Installation**

The Contractor acknowledges that it is anticipated that all Schools will require an incoming digital television signal; the method of reception will vary from site to site and could be DTT (Digital terrestrial television), digital cable or digital satellite. The Contractor shall consider the most appropriate method of receiving a television signal for the geographical location of a School and take into account existing methods used by the Schools.

The distribution of the signal around the site could be via dedicated TV signal cabling or via a TV streaming solution that will use the IP

network (IPTV). Each School's ICT Solution Summary will indicate if IPTV will be used, and ADS will indicate the number of data points this will require. If a more traditional, dedicated TV signal cabling is to be used, this will also be reflected in the ICT requirements and ADS and may require signal amplification and distribution equipment.

(h) **Installations for Pupils with SEN**

The Contractor shall provide additional installations specific to Pupils with SEN are given in the School-specific Briefs, for example:

- (i) intercom, assistance alarms and access control systems;
- (ii) panic alarms and/or staff-call systems, subject to risk assessment, where staff need to call for rapid assistance.

(i) **Area data requirements**

The Contractor shall comply with the ADS and paragraph 0 in relation to specific School requirements for power, data and audio visual or sound field system cabling.

2.11 Safety and Security

- 2.11.1 The Contractor shall ensure that the buildings and grounds are designed to be safe and secure, and for Pupils and staff to feel safe and secure, and that all statutory requirements for fire safety and evacuation are met. Whilst security of both buildings and occupants is clearly paramount it shall not be to the detriment of the overall appearance of buildings; a 'fortress' appearance should be avoided.

Security

Schools need clear, well-defined and secure boundaries to help control who gains access to their sites and buildings, and to ensure that vulnerable Pupils do not wander off. However, having a secure boundary does not have to mean creating a fortress. The level and type of boundary treatment will vary from site to site and will need to be appropriate to the location as well as the level and type of security risk(s). A security risk assessment will help here and should take account of the merits of different types of fencing, hedges and defensive landscaping. In some cases buildings may form part of the boundary. On large sites it will be more economical to enclose an inner perimeter, perhaps excluding team game playing fields, if practical.

Where a school is co-located on a site with another school or a community building, secure access arrangements applicable to each school or building needs to be clearly defined.

- 2.11.2 Keys shall be suited and always available. Where possible, the School shall be able to obtain replacement keys direct from the manufacturer at cost price. The School shall be able to issue access passes to visitors

and staff. The School will be responsible for programming passes if an access control system is installed.

- 2.11.3 The Contractor shall ensure that building security is enhanced by:
- (a) avoiding overly complex external building envelope forms, which may create areas that cannot be easily supervised;
 - (b) careful positioning of drainpipes and canopies so that they do not provide unwanted access to high level windows and roof lights;
 - (c) avoiding designs incorporating recessed doors and alcoves that could offer refuge for intruders;
 - (d) external lighting optimised for energy efficiency and only used where necessary;
 - (e) positioning windows/glazing to facilitate informal supervision of external areas from inside buildings; ensuring physical barriers do not obstruct views towards or away from school buildings and grounds.
- 2.11.4 The Contractor shall ensure that where use of security technology is agreed by the Authority, it should be discrete wherever possible with the more visible methods being restricted to the more vulnerable areas, where the obvious provision of detection devices may help deter crime. Thick planting areas close to the building that could provide cover from security cameras is to be avoided.
- 2.11.5 The Contractor shall ensure that the School can be capable of zoning to isolate areas that may be used by the Community outside the School Day. Similarly the heating, lighting, ventilation and security systems are zoned to allow for community use while the rest of the School is unoccupied.
- 2.11.6 The Contractor shall provide a security solution that includes controlled entry and exit arrangements for the Site. The access and security systems shall meet requirements of security, health & safety and efficient access for all School Users, taking account of pedestrian access, vehicle access and parking, cycle access (with secure site storage), bus stop facilities or onsite/offsite arrival of dedicated coaches.
- 2.11.7 The Contractor shall install a security system that is subsequently operated by the School. The Contractor shall provide training, a user guide and a logbook to the relevant School Users to ensure that the security system is understood.
- 2.11.8 **Fire safety and evacuation**
- The Contractor shall ensure that means of escape, fire fighting equipment, automatic detection systems and fire signage provisions comply with Part B. AD B refers to DfE guidance for the design of fire

safety in schools⁶³. AD B that Part B will typically be satisfied where the life safety guidance in that document is followed. A written Fire Safety Management Plan shall be produced by the Contractor, as part of the documents to be provided to the School prior to handover, to ensure compliance with Part B⁶⁴ and the Regulatory Reform (Fire Safety) Order 2005⁶⁵.

2.11.9 The Contractor shall ensure that:

- (a) the elements of the structure, finishes, fixtures and fittings must comply with all relevant legislation, guidance and codes of practice;
- (b) a fire strategy is agreed with Building Control;
- (c) building insurers are consulted about fire precautions, to establish whether they have any requirements over and above the Building Regulations;
- (d) any compartmentalisation is maintained throughout the Contract Period; Half hour fire doors on corridors and stairwells, which are subject to heavy usage, must have the facility to be held open by electro-magnetic contacts wired into the fire alarm system (see 2.7.13 Internal Door Sets). In New Buildings such doors shall be of the recessed type.

2.11.10 **Fire detection and alarm systems**

- (a) The Contractor shall ensure that fire alarm systems are provided that comply with the requirements of BS 5839⁶⁶, and new systems are to be intelligent addressable. There are two categories of manual call points:
 - (i) **Type A**
direct operation (one action sets off the alarm);
 - (ii) **Type B**
indirect operation (two actions set off the alarm – double knock), which may be suitable where tamper-proof installations are required, subject to regional Building control agreement.

63 BB 100, "Design for Fire Safety in Schools" – see Annex I

64 Regulation 38 requires that fire safety information is given to the 'responsible person' at the School not later than the date of completion of the work and describes what that information should cover.

65 DCLG has produced guidance for schools – "Fire safety risk assessment – educational premises" – www.firesafetyguides.communities.gov.uk.

66 BS 5839: 2011: "Fire detection and alarm systems for buildings"

- (b) The Contractor shall determine the types of call points, in consultation with each School. Anti-vandal type manual call points shall be provided.
- (c) The Contractor shall provide alternative warning systems to fire alarm sounders in accommodation specifically designed for Pupils with SEN where required and so specified in the School-specific Brief, for example:
 - (i) visual (fixed beacons) alarms in certain areas. Suitable additional visual alarms should be provided in areas where a person may be alone, such as toilets;
 - (ii) vibrating paging systems for hearing impaired and other disabled people.

(d) **Evacuation of Pupils with SEN**

The Contractor shall ensure that the design of the School is capable of accommodating PEEPs⁶⁷ for people with disabilities.

(e) **Sprinkler systems**

- (i) The Contractor should liaise with:
 - (A) the Authority when deciding if a School is to be fitted with a sprinkler system;
 - (B) the local Water Company, when deciding whether the system requires a tanked water supply.
- (ii) Sprinkler systems may be required in the School-specific Briefs.
- (iii) Where a sprinkler system is specified, the Contractor shall ensure that sprinkler protection is provided throughout the building, except in the following cases as identified in BS EN 12845⁶⁸ and TB 221⁶⁹.
 - (A) enclosed staircases and enclosed vertical shafts (ie those areas which cannot contain combustible materials);
 - (B) selected concealed spaces and voids as agreed by the Authority;

67 personal emergency egress plans

68 BS EN 12845 version 11

69 Technical Bulletin 221, "Sprinkler Protection of Schools"

- (C) rooms protected by other automatic extinguishing systems (designed, installed and maintained to recognised British/European standards);
- (D) rooms containing electric power distribution apparatus, such as switchgear and transformers, where the walls, ceiling and floors have at least 120 minutes of fire resistance or have an alternative fire suppression system;
- (E) rooms containing industrial/laboratory processes where water discharge might present a hazard;
- (F) communicating buildings or storeys separated from the sprinklered building by walls of appropriate fire resistance⁷⁰; and
- (G) outbuildings, such as sheds, separated from the sprinklered building by at least 10m.

2.11.11 Lightning protection

The Contractor shall provide suitable tamper proof lightning protection systems to all new Buildings.

2.11.12 Protective systems

The Contractor shall ensure that all protective systems, including Access Control equipment and cabling, is securely installed and tamper-proof. All cabling and communications systems, including Internet connections, shall be provided by the Contractor.

2.11.13 Intruder alarms

- (a) The Contractor shall ensure that a comprehensive intruder alarm system is provided, integrated with access controls, which complements the Building's functions and operations and is enhanced as necessary in designated areas of high risk⁷¹. Alarm systems should be zoned to allow parts of the School to be used outside of the school day without affecting security elsewhere. Where existing buildings also have an intruder alarm system the new and existing areas should function as one system.

⁷⁰ See BB 100 Appendix A, TB 206 and TB 221

⁷¹ It is likely that any new systems will require confirmation technology (the ability to confirm that alarm activation is actually due to an intruder) before being granted Level 1 Police response. Further, any systems that lose Level 1 response due to the number of false alarm activations will require the addition of confirmation technology before Level 1 is reinstated.

- (b) The Contractor shall provide an alarm system that meets the requirements of BS4737⁷² parts 1, 2 and 3, BS EN 50131⁷³ and NACOSS⁷⁴ and:
 - (i) utilises some form of monitored path to the alarm receiving centre, if remote signalling is used;
 - (ii) is capable of remote monitoring;
 - (iii) is installed by an installer certified by an UKAS, (United Kingdom Accreditation Service) accredited certification body, with detectors to cover all accessible perimeter areas.

2.11.14 CCTV

- (a) Where CCTV is required for access control systems, or is required in the School-specific Briefs for the purposes of monitoring entrances or building/site surveillance, the Contractor shall ensure that all systems comply with the requirements of EN50132-7⁷⁵ and be sympathetic to the adjacent land and neighbours and avoid intrusion into private activities not associated with the Schools.
- (b) The Contractor shall ensure that CCTV systems are integrated into the architectural design of the Schools, surrounding grounds and access control systems.
- (c) The Contractor shall provide all hardware connected with CCTV, including fixings, brackets, power and cables (containment, routing, termination and presentation).

Operability, Maintenance and Construction

This paragraph covers the design issues that have implications for durability, maintenance and renewal of components over the life of the buildings. It also covers how the Works can be programmed and phased to ensure the least disruption to the School, if being carried out on the same site.

2.12 Operability

- 2.12.1 The Contractor shall ensure that the all buildings with building works as part of this contract have services, controls and grounds that are straightforward and efficient to operate.
- 2.12.2 The Contractor shall ensure that the School has enough information to enable all operators to understand how the relevant items and systems

72 BS 4737: 1988: Intruder alarm systems in buildings. Code of Practice.

73 BS EN 50131: 2006: Alarm systems. Intrusion and hold-up systems.

74 NACOSS – national Approval Council for Security Systems.

75 BS EN 50132-7: 1995: Alarm systems. CCTV surveillance systems for use in security applications.

are designed to run effectively, efficiently and reduce running and maintenance costs.

2.12.3 The Contractor shall ensure the all school operators are provided with the appropriate level of information and training to satisfy their responsibilities.

2.12.4 The three groups of operators include:

- (a) Technical ie FM and caretaking team with a detailed understanding of the building operation including Building Management System (BMS).
- (b) Operational ie Users who need to understand certain operational systems but require a less technical application of knowledge including Business Managers.
- (c) Functional ie teaching staff and students who need a basic operational understanding of how the building works eg ventilation of teaching spaces, lighting controls in communal teaching spaces
- (d) The Contractor shall ensure that the project is planned and managed to support collaborative working between the client representatives, key design professionals and specialist contractors (such as the commissioning engineer) and that the Soft Landings Framework is adopted⁷⁶ across the contractual process. In doing so, the Contractor shall ensure that the following occur at the key stages of the project:

(i) **Inception and briefing**

Roles and responsibilities are identified across the design team, construction team and client representatives to, for example, clarify on-going responsibilities throughout the Contract Period.

(ii) **Design development**

Project team to carry out reviews of the design to consider usability and manageability, and to review lessons learned from comparable projects eg where legacy ICT equipment is to be installed, the design shall consider the impacts of the loads in the environmental and energy strategy using legacy equipment in the short-term and longer-term with the alternative impacts of new equipment.

(iii) **Pre-Handover, completion and commissioning**

The project team are to develop a building readiness programme , including technical commissioning⁷⁷ and

76 Published by BSRIA

77 BSRIA "Commissioning Job Book"

witnessing by the school's technical operators; technical training on systems and building logbooks, plant and maintenance warranties; non-technical Building Use Guide to enable operators to understand interfaces and systems before occupation.

(iv) **Handover**

By handover, the Contractor shall:

- (A) ensure the school's technical and operational team have a thorough understanding of how the buildings systems work, how to check and adjust building systems and controls, and how to monitor and review the buildings' environmental and energy performance in use;
- (B) train all teaching staff and students on the basic operational understanding of how the building works eg ventilation of teaching spaces, lighting controls in communal teaching spaces. (As detailed in Appendix A of this FOS);
- (C) carry out site walkabouts pre-handover as part of the training to familiarise school staff with the buildings, systems and controls;
- (D) complete all initial training; unless agreed with the Authority when it may be completed in the 3 months following handover and in addition when seasonal variations of systems occur as agreed with the Authority and the Schools.
- (E) During defects liability period - support the school building users in achieving building performance including evaluation and reporting as set out in aftercare services document in the KPI documents at schedule 1 of the Framework Agreement

2.12.5 The Contractor shall hand over full technical operation and maintenance manuals and non-technical building user guides to the Contract Manager including, but not limited to, the following, as appropriate:

- (a) Building Logbook;
- (b) Building Users' Guide;
- (c) Fire Safety Management Plan;
- (d) Fire Safety Risk Assessment;
- (e) Emergency Evacuation Plan;
- (f) Health and Safety File;

- (g) Operation and Maintenance Manuals;
- (h) Maintenance Materials and Waste Efficiency Plan;
- (i) LEV user manual and logbook, including risk assessments and commissioning test certificate;
- (j) User guide to BEMS system;
- (k) Water Quality Policy document including the written scheme for controlling the risk of exposure to legionella bacteria;
- (l) Records of Acoustic Performance Tests;
- (m) Commissioning tests for boiler/flue systems;
- (n) Templates for the school's maintenance staff to carry out seasonal recommissioning of building systems and controls;
- (o) Templates agreed with the Authority to be used by the School and the Authority for Post Occupancy and Building Performance Evaluation;
- (p) Energy and water efficiency plan and Energy Performance Certificates;
- (q) Record Drawings;
- (r) Equipment Schedules;
- (s) Spare parts lists;
- (t) Test certificates, including electrical, gas, drainage tests;
- (u) Certificates for heating system pressure tests and water treatment tests.

2.12.6 The Contractor shall prepare an Access Statement for each School, to assist in the statutory approvals process. The Access Statement shall be prepared according to Authority/School guidelines/requirements (listed in the School-specific Briefs). It shall be updated at every stage of the project.

2.13 Maintenance

2.13.1 The Contractor shall ensure that the Buildings are designed and constructed so that they are easy to clean and maintain, and incorporate materials and components that can be easily and safely replaced when necessary. The Contractor shall ensure that the choice of materials, services and components causes minimum inconvenience and disruption from breakdowns, repairs and maintenance activities.

2.13.2 The Contractor shall ensure that the building's environmental and safety systems are designed, co-ordinated, commissioned and re-

commissioned to respond to seasonal and occupation changes: eg; The design of the window openings and the provision of free opening area for ventilation is an integral part of the Building's environmental systems. Buildings are designed to so that cleaning and repair can be undertaken easily and with the minimum of disruption to the School. The Building shall weather well, and withstand wear and tear and minor vandalism.

2.14 **Planned Maintenance Programme (PMP)**

2.14.1 The Contractor shall provide to the Authority a Five Year Maintenance Plan, and a Schedule of Programmed Maintenance.

2.14.2 The Contractor shall ensure that:

- (a) safety and security measures are provided for internal and external maintenance purposes; including boarding, ladders and handrails within roof spaces;
- (b) measures are incorporated to prevent birds roosting or nesting on the structure, especially around building entrances;
- (c) there are no visible signs of entry to weather caused by a breakdown in the building fabric or its installations;
- (d) there is no discomfort to occupants as a result of weather penetration due to this cause. Any water penetration shall also be measured by electrical conductivity tests;
- (e) the Contractor shall ensure that the design facilitates future maintenance, in particular by:
 - (i) using standard practical detailing of materials;
 - (ii) using construction methods likely to be in use for the foreseeable future;
 - (iii) providing ease of access for maintenance.

2.14.3 **Maintenance Access**

- (a) The Contractor shall ensure that external maintenance access is designed and installed in accordance with current regulations and allow for all necessary access for cleaning and maintenance safely, easily and without disruption to normal School operations. The maintenance programme for a Special School must take particular account of the need to minimise disruption and discomfort to vulnerable children and young people.
- (b) The Contractor shall ensure that any walkways are compliant with all health and safety and manufacturers' requirements. Walkways to roofs shall be adequately secured, free from corrosion, and decorated in accordance with the external decorations paragraph.

2.15 Phasing and Construction

- 2.15.1 The Contractor shall ensure that the Works are planned to ensure safety, to minimise environmental impact and to avoid disruption to the School.
- 2.15.2 The Contractor shall ensure that the Buildings are designed and constructed to optimise low environmental impact materials, in particular:
- 2.15.3 In order to meet the UK Government's timber procurement policy, the material must be (a) either independently verifiable legal and sustainable timber or FLEGT-licensed or equivalent timber or alternatively (b) 'recycled timber'; or (c) a combination of (a) and (b);
- 2.15.4 The Contractor shall implement WRAP practices following DEFRA's waste hierarchy principles of a commitment to halve waste to landfill. The Contractor shall implement a Site Waste Management Plan identifying actions to be taken to reduce waste, increase the level of recovery and increase reused and recycled content, and quantifying the resulting changes. On completion of the Works, the Contractor shall submit a copy of the completed Site Waste Management Plan to the Authority.
- 2.15.5 The Contractor shall also ensure that:
- (a) the buildings are designed so that they can be safely constructed;
 - (b) removal or containment of hazardous materials are managed safely;
 - (c) there is minimal disruption to the School, particularly where the New Buildings are being built on the site of the existing School;
 - (d) a reasonable time is allowed for the placement and installation of F&E and ICT;
 - (e) the Schools are able to occupy the premises at least two weeks before the start of a new term;
 - (f) the proposed timing of the landscaping ensures that sports pitches and hard surfaced games courts are available before, or as soon as possible after, the handover of completed buildings.
- 2.15.6 The Contractor shall be a member of the Considerate Constructor's Scheme (or equivalent), or demonstrate in its Contractor's Proposals that its policies and procedures are comparable to those required by the Considerate Constructor's Scheme.

2.16 Employment and Skills

- 2.16.1 The Contractor shall provide an Employment and Skills Plan and Method Statement as part of the Contractors Proposals that set out compliance with the requirements of the Authority's Employment and Skills Strategy set out at Annex 2 of this FOS.

- 2.16.2 The Contractor shall demonstrate within the Employment and Skills Plan and Method Statement that it complies with the appendix C benchmarks in table 6.0, based upon an aggregated capital value, in The National Skills Academy document “Client – Based Approach to developing and implementing an Employment and Skills Strategy on construction projects, dated June 2011” (as provided by the Contractor at bid stage) indicating how it intends to meet those benchmarks or alternative values when delivering the batched schools.

3. FITTINGS, FURNITURE AND EQUIPMENT (FF&E)

3.1 Status of this paragraph

- 3.1.1 This paragraph gives the generic requirements for fittings, furniture and equipment (FF&E) for all Schools. In producing the Contractors’ Proposals, the Contractor shall consider and address all elements of the Generic Design Brief, together with the School-specific Briefs, the SoA and the ADS.
- 3.1.2 The Contractor shall demonstrate how the FF&E layouts, interior spaces volumes, lighting, heating, ventilation and acoustic strategies work successfully together.

3.2 Allocation of Responsibilities

In all cases, the Contractor shall be responsible for the programming of the FF&E installations in line with the Works, and for the interface of the FF&E with the Building. The Contractor shall ensure that all loose F&E is provided in line with the agreed FF&E layout, and that there is careful co-ordination between fixed F&E suppliers, fitters (if they are different), and M & E sub-contractors. However, the Contractor will not be responsible for the quality or specification of any F&E supplied by the School.

- 3.2.1 FF&E is divided into four groups according to the Contractor’s responsibilities. The table below summarises the responsibilities for each of these groups.
- (a) **Group 1** (Not used under a D&B Contract).
 - (b) **Group 2** covers any FF&E that shall be provided, placed and/or fixed by the Contractor. This would include new loose F&E (normally in Group 3) which is supplied by the Contractor, for example Group 3 items that need to be replaced due to being damaged in transit while under the responsibility of the Contractor.
 - (c) Any loose F&E provided by the Contractor shall be sufficiently standard, using co-ordinated systems and/or modular sizes where appropriate, to be capable of being used in any part of the School (ie interchangeable between curriculum subjects) and in similar types of Schools, and to be straightforward to re-order and replace at a later date.
 - (d) **Group 3** covers any F&E provided by the School and not by the Contractor which is fixed or placed by the Contractor. In these

cases, any fixing or placing required will be part of the Works. The Contractor shall not be responsible for lifecycle or the working condition of the items before they are moved, but shall ensure that it is in the same state once it has been placed and, where relevant, connected. Following the initial decant, the on-going responsibility for the moving and placing of Group 2, 3 and 4 items rests with the School⁷⁸.

- (e) **Group 4** covers small Legacy equipment and consumables that do not affect the room layout, and would typically be stored in cupboards or shelves. These items will be provided, boxed, unpacked and placed by the School, but the Contractor shall be responsible for providing boxes for the decanting of these items and the decant itself. The Contractor shall ensure that sufficient time is given for the School to unpack it and store it appropriately prior to the handover date.

3.2.2 Groups 1 to 4 will comprise all internal fixed and loose F&E that have an effect on the room layout, including Legacy items, specialist items or items specific to each School which will be identified in the School-specific Briefs, and some loose or Legacy items of external F&E not covered by the external works budget.

3.2.3 In line with usual practice, Groups 1 to 4 do not cover:

- (a) fixtures and services specified in paragraph 2, including electrical outlets, public address and alarm systems, passive ICT Infrastructure such as cabling, built-in air extraction systems and sanitary ware;
- (b) the specifications in this FF&E Brief generally do not therefore apply to these items, although some may be shown on the room layouts for information.

3.2.4 The table below gives an indication of the typical types of FF&E in each Group, for reference:

	Group 1 (not used)	Group 2	Group 3	Group 4
Summary of procurement and responsibilities		provided, placed and fitted by Contractor	provided by School but boxed up, moved, placed and, where necessary, fitted by	Provided, boxed and placed by the School but moved by the Contractor

⁷⁸ Except in circumstances where the School moving a fixed item affects the Contractor's responsibilities to maintain.

	Group 1 (not used)	Group 2	Group 3	Group 4
			Contractor	
Supply		Contractor, new [or legacy if Contractor proposes it in some cases]	School, new or legacy	School, legacy
Box up and store if necessary	-	-	Contractor	School
move to new room	-	-	Contractor	Contractor
Place in position, unpack fix and connect		Contractor	Contractor	School
Layout		Contractor	Authority, or Contractor if different room shape / dimensions	-
FM lifecycle		School	School	School

3.2.5 The table below gives an indication of the typical types of FF&E in each Group, for reference:

Examples of FF&E	Group 1 (not used)	Group 2	Group 3
Fittings		Notice boards, teaching sinks, Side benching with integral sinks, signage, curtains, blinds, outdoor seating.	[Any Legacy fitting provided by School but fitted by Contractor]
Fixed F&E		cupboards integral to fixed	lathes, drills, cookers, tall

Examples of FF&E	Group 1 (not used)	Group 2	Group 3
		benching, lathes, drills, cookers, tall shelving units fixed to wall, outdoor play equipment provided by the Contractor	shelving units fixed to wall, goal posts provided by School
Fitted F&E		Catering Equipment in school kitchen	n/a
Loose F&E		chairs, tables and storage provided by the Contractor	chairs, tables and storage, outdoor play equipment provided by the School

3.2.6 Legacy Items

Following an initial survey [using specialist contractors where appropriate] items of Legacy F&E in Group 3 will have been determined and listed in the legacy FF&E summary survey, and coded as such. These items have generally been identified because:

- (a) they are suitable to be used for some years to come with minimal repair;
- (b) they are suitable to be easily or cost-effectively removed, repaired, stored and repositioned eg a CAD/CAM lathe or acoustic piano;
- (c) they have an historical importance to the School and/or;
- (d) their fixed location remains unchanged because they are in existing buildings which will be retained, with minimum refurbishment work carried out;
- (e) other items in Group 3 may be supplied as new by the School.

3.2.7 The Contractor shall confirm the list of all FF&E, both new and Legacy in the Contractor's ADSs, after agreeing with the Authority the provision of FF&E and the viability of using the Legacy FF&E proposed. This shall be based on the Contractors detailed FF&E survey of potential Legacy F&E nearer to the time of transfer to the New Building.

- 3.2.8 As part of the requirement for layouts, the Contractor, with the agreement of the Authority and in liaison with the School, shall identify on their ADS where all Legacy items are proposed to be placed.
- 3.2.9 The Contractor shall be responsible for the packing, moving, placing and connection of all FF&E provided by the School and shall ensure all items are in their original working condition once positioned. If any FF&E is damaged in this process, it shall be repaired or replaced by the Contractor. Repairs and replacements should be in line with the latest standards set out below. For example, where tables and chairs need to be replaced they must meet the ergonomic standard EN1729, which may require all the others in the room to also be replaced to ensure size compatibility.
- 3.2.10 The legacy FF&E summary survey provides a series of code references for FF&E which help to identify clear lines of responsibility for the layout, assessment of quality and safety, storage, placing and fixing of these items. These references shall be agreed between and used by each School and the Contractor.

FF&E Provision

3.3 General Layout Requirements

The FF&E layouts provided by the Contractor for key example teaching spaces shall be used to test the suitability of the Building design proposal within the available space, and to demonstrate that the FF&E listed in the ADS and the Legacy FF&E survey summary can be accommodated.

- 3.3.1 The Contractor's FF&E layouts shall demonstrate that the General Teaching and light Practical Teaching areas, in particular, will allow for short-term changes of layout and use.
- 3.3.2 The Contractor shall illustrate how the requirements below have been met through an example FF&E layout for each different type [or shape] of space in which:
- (a) the Contractor is providing fittings or fixed F&E in Groups 1 or 2 (such as those in Secondary School Practical Teaching spaces);
 - (b) the proposed area or shape of a space differs from the area recommendations in the ADS, to prove that the area is workable with the FF&E identified in the legacy FF&E survey summary, including FF&E in Group 3.
- 3.3.3 In spaces where the Contractor is providing FF&E, there shall be co-ordination between the choice of loose and fixed furniture in terms of size, appearance and function. Where these spaces also have Group 3 items, the Contractor shall ensure that any fixed items they provide suit the School's Legacy items.
- 3.3.4 Where the Contractor is placing or fixing Legacy FF&E, all layouts shall address the following points:

- (a) Legacy FF&E shall be located appropriately in accordance with the requirements in the School-specific Briefs;
 - (b) Legacy FF&E shall be integrated with any new F&E provided by the Contractor;
 - (c) where Legacy items are found to be unsuitable, for instance where they do not fit or match the size and dimensions of the space to be provided in the building, the Contractor shall make appropriate adjustments to the layout detailing the adjustments.
- 3.3.5 The Contractor shall ensure that all FF&E that is provided is capable of being laid out to:
- (a) create spaces which are not cramped or overcrowded for the maximum number of Pupils for the relevant area;
 - (b) meet the needs of the School's curriculum and suit the related activities for each space or Suite of Spaces;
 - (c) allow a number of different layouts within each space type, to suit different teaching styles and the educational objectives of each School;
 - (d) where required, offer more than one teaching position, with good sight lines to and from all Pupils in the space;
 - (e) ensure that no-one is placed at a disadvantage and that all Pupils are able to access all activities effectively and safely;
 - (f) difficulties to access all activities on offer in at least one space of each type or each suite;
 - (g) allow for safe movement by Pupils and easy access to fire escape routes, with no fixed F&E blocking exits;
 - (h) where required, allow space for storing coats and bags near doors;;
 - (i) position equipment safely, away from circulation areas or door swings;
 - (j) integrate with the Building, services and the ICT;
 - (k) take account of the position of other services and Building features such as radiators and window sills;
 - (l) allow fixed FF&E to benefit from both natural and artificial lighting while avoiding glare, particularly in ICT areas [where glare can be a major obstacle to effective working];
 - (m) enable central areas to be clear for moveable items by restricting FF&E to the perimeter of the space where possible;
 - (n) allow easy to supervision of equipment;

- (o) allow sufficient space for the safe operation of machinery and other equipment.
- 3.3.6 The Contractor shall use FF&E layouts to determine the optimum location of servicing outlets such as power and water, and to ensure that these are safely positioned. In all spaces, the layouts shall illustrate that any ICT required can be accommodated.
- 3.3.7 The Contractor shall provide internal wall elevations as part of the detailing of fixed FF&E.
- 3.3.8 The Contractor shall ensure that at both the initial design layout stage and final specification of FF&E, consideration should be given to Pupils with disabilities and SEN by ensuring that:
 - (a) where FF&E is adjustable for variable heights (within a range) it is easily and discretely operable by the user;
 - (b) the appropriate size, colour, finish and height of FF&E is provided. For example, for Pupils with visual impairment, the colour of furniture shall contrast with the carpet and the chair colour shall preferably differ from tables.

3.4 Specific FF&E Requirements

Where the Contractor is responsible for the layout of FF&E, the Contractor shall ensure that the following specific requirements are met, over and above those outlined in the School-specific Briefs.

- 3.4.1 In **General Teaching Rooms and Classrooms**, the Contractor shall ensure that the choice and layout of FF&E shall provide:
 - (a) adequate storage for Learning Resources in furniture, over and above storage in store rooms;
 - (b) at least one position for a wheelchair user, sited in such a way as to achieve a direct view of at least the main teaching position, in at least one space of each type or in each suite;
 - (c) furniture that is sufficiently lightweight to allow for short-term changes of layout and use.
- 3.4.2 In **Practical Teaching Spaces**, the Contractor shall ensure that:
 - (a) safe working distances around FF&E are provided, as identified in relevant best practice guidance from organisations such as DATA;
 - (b) where FF&E is serviced with water or gas, master controls are provided;
 - (c) light Practical Teaching spaces are suitable to be used safely as registration bases;

- (d) sinks are positioned to avoid congestion when used by a number of Pupils;
- (e) specialist fitters fit any specialist equipment;
- (f) the serviced system in a laboratory is suitable for the size and shape of the proposed science space, its service arrangement and the priorities of the School (as identified in the School-specific Brief);
- (g) in art rooms the positions of workstations maximise the use of natural light, and the colours and finishes of fixtures and furniture reflect light without causing glare.

3.4.3 In **Halls and Performance Spaces**, the Contractor shall ensure that:

- (a) specialist suppliers shall be consulted on the most appropriate location and type equipment, taking account of any Legacy items such as lanterns, control equipment, scaffolding, and components such as stage lighting bars shall be fixed by a specialist supplier;
- (b) where it is the responsibility of the Contractor to provide them, chairs in the main hall should be stackable, with the maximum number calculated to determine storage space. There shall be sufficient storage for examination tables, flats and staging when not in use.

3.4.4 In **Dining Areas**, where new FF&E is provided the Contractor shall ensure that the layout, demonstrated with a flow diagram, is produced by a specialist catering company or consultant and shall allow for:

- (a) a logical flow of children round the dining space from arrival, queuing to collect food, both hot and cold, eating and self-clearing;
- (b) sufficient circulation between dining tables to enable Pupils to leave their positions easily and others to access them;
- (c) sufficient space between tables so that chair legs can be seen;
- (d) sufficient circulation to allow a wheelchair user to access some tables and dine alongside other children;
- (e) adequate seating capacity for the allocated amount of time and the number of Pupils, as specified in the School-specific Briefs;
- (f) where the design requires storage of outdoor coats or bags near the dining area, storage furniture with sufficient space around it shall be provided.

3.4.5 In all **Secondary School Libraries** where FF&E is provided by the Contractor, the Contractor shall employ a library specialist to design the layout to provide:

- (a) the most efficient use of the space;

- (b) furniture, particularly shelving units, positioned to allow sight lines from the librarian's desk, where provided, to all parts of the library;
- (c) low shelving or seating positioned near windows in such away so as to maximise natural lighting.

3.4.6 In **SEN support areas**, the Contractor shall ensure that the choice and layout of the FF&E shall contribute to a calming environment. Storerooms shall have enough clear space for any specialist equipment which may be needed, including both teaching resources and aids for Pupils with physical disabilities. Where Special Schools have additional design requirements, these are given in the School-specific Briefs and the SoA;

3.4.7 The Contractor shall ensure that **Personal storage**, including pupil lockers and other appropriate storage for coats and bags, shall be sufficient for the number of Pupils at each School, in line with the SoA and the School-specific Brief. Where provided, the Contractor shall ensure that:

- (a) lockers shall be positioned such that their use does not restrict movement along the main circulation routes;
- (b) layouts allow sufficient space between lockers for safe use;
- (c) lockers are located to avoid long travelling distances between lessons, which can prevent usage;
- (d) banks of multiple lockers are avoided to prevent congestion;
- (e) lockers above 1.2m high are battened back to the wall.

3.4.8 **PE Changing Rooms**

The Contractor shall carefully plan FF&E in changing rooms to provide comfortable and safe conditions for Pupils, with sufficient distances between lockers and benches.

3.4.9 **Integration with ICT**

The use of new and Legacy furniture will need to take account of the Schools ICT solution as outlined in the School-specific Brief, the cabling requirements of user devices and the link between technology and specialist equipment eg CAD CAM systems. Where furniture is used that has not been designed to accommodate computer equipment the Contractor shall ensure that there is adequate space for comfortable and safe use of the technology.

3.4.10 **Signage**

The Contractor shall provide signage throughout the School Buildings and their immediate surroundings to give clear indications of directions for all users, including those new to the School, and defining the purpose

of the Buildings. Signs shall be of a uniform type and be positioned in a similar manner throughout.

- 3.4.11 The Contractor shall provide a main, external School sign detailing the name of the School and other pertinent information. The sign shall be illuminated and of a design that allows for the incorporation of changes when necessary.
- 3.4.12 The Contractor shall fully integrate signage into the design of the Buildings and provide signs for every room and space as detailed in the ADS, denoting its name or purpose and agreed numbering, and to denote Suites of Spaces, such as faculties or Departments.
- 3.4.13 The Contractor shall provide signage that is consistent and clearly visible, especially for visitors in directing them from Site entrance to the main reception. It should also be capable of alteration where appropriate, without being easily tampered with.
- 3.4.14 The Contractor shall comply with any specific requirements of the School-specific Briefs.
- 3.4.15 **External Fittings**

The Contractor shall provide external fixtures and fittings that are:

- (a) safe for children and young people;
 - (b) manufactured from durable materials;
 - (c) suitable for different ages and physical abilities;
 - (d) chosen to allow a number of layouts and easy rearrangements, including movement over distances (for example moving rugby posts to storage at the close of season), but sufficiently robust to withstand rigorous use.
- 3.4.16 The appropriate number and distribution of the following fittings are to be provided, as agreed with the Authority, and specified in the Contractor's ADSs:
 - (a) curtains and blinds;
 - (b) shelves shall be fitted to all store rooms and storage areas sufficient for the number and type of items to be stored therein;
 - (c) fixed benching, with sinks as necessary, shall be provided to ICT – rich and practical areas
 - (d) noticeboards shall be fitted in corridors, teaching spaces and offices.

3.5 Performance and Quality

This paragraph identifies the quality and performance requirements for all FF&E provided by the Contractor, to ensure it is fit for purpose. The Contractor shall ensure that the following quality and performance requirements are adhered to in all FF&E provided by the Contractor, in Group 2:

3.5.1 The Contractor shall ensure that:

- (a) all FF&E materials provided by the Contractor are fit for purpose and comply with current British and, where appropriate, European Standards and with any that are known to be due to come into force;
- (b) certificates and reports of tests carried out shall be seen and stored;
- (c) if a third party is buying FF&E then they must also be able to produce valid test certificates.

3.5.2 Ergonomics, Strength and Stability

The Contractor shall ensure that:

- (a) any new FF&E is ergonomically designed to ensure comfortable use;
- (b) all new tables and chairs to be used by Pupils must comply with the ergonomic European Standard EN1729, which also covers strength and stability. This will therefore be an assurance of ergonomic suitability as well as quality and fitness for purpose;
- (c) storage should comply with BS 5873⁷⁹;
- (d) the dimensions of furniture and fittings are agreed with the Authority/School in line with the sizes set out in the furniture ergonomic website (www.schoolfurniture.com), to ensure the correct specification for the age and size range in the space;
- (e) all new and Legacy FF&E shall:
 - (i) be durable and allow for a variety of postures and activities;
 - (ii) be safe, strong, stable and durable.
 - (iii) not have any sharp edges or corners that may cause injury;
 - (iv) have chair legs that do not protrude so far as to present a tripping hazard;
- (f) where furniture screens are used, they are stable with a suitable mechanism for fixing together. They should also be lightweight

⁷⁹ BS 5873-4: 1998: Educational furniture. Specification for strength and stability of storage furniture.

enough to be re-organised quickly and easily and not present a tripping hazard;

- (g) the Contractor shall identify the availability and, where applicable, the length of guarantees.

3.6 Fabric and Materials

The Contractor shall ensure that the design and specification of fabric and materials of all FF&E provided by the Contractor is fire resistant, fit for purpose and carefully detailed and compliant with the ADS. The colour, texture and finish of materials shall be deployed in a considered way, particularly for those Pupils with disabilities or SEN. Contrasts of colour should be used for Pupils with visual impairment.

- 3.6.1 The Contractor shall ensure that the finish chosen is appropriate for the activities taking place in the room.. Various finishes and applications are available for edgings of table and storage tops. The Contractor shall ensure that edging materials are robust and are not susceptible to misuse. Complicated corners, edges and frames that can trap food should be avoided for dining tables.
- 3.6.2 The Contractor shall ensure that all fittings and furniture in music spaces shall include sound absorbent materials where specified.
- 3.6.3 The Contractor shall ensure that all FF&E provided is to be manufactured to prevent 'off-gassing' pollutants like volatile organic compounds (VOC). F&E is to contain low VOC materials⁸⁰, and to be assembled and maintained with the use of low VOC materials, including, cabling, paints and adhesives.
- 3.6.4 The Contractor shall ensure that fire resistance is compliant with current British and, where appropriate, European Standards and with any that are known to be due to come into force. This is particularly important where a high volume of furniture will be stacked and stored. Upholstered furniture shall meet the relevant British and European standards particularly for flammability, strength and stability (usually general contract) and fabric wear and tear.

3.7 Services

The Contractor shall ensure that all serviced FF&E shall be integrated with the artificial lighting, power and other systems in the Building, and it shall be clear where the responsibility lies for the various fitting and connections in each case.

- 3.7.1 Serviced Equipment.
- 3.7.2 The Contractor shall ensure that all equipment provided addresses the following points to provide an integrated and responsive system of mechanical, electrical, protective and communication installation:

⁸⁰ Levels of VOC not exceeding 300µg/m³ averaged over 8 hours.

- (a) any pipe-work or cables shall be easily accessible for maintenance but, wherever possible, hidden from view, not forming dust traps and made tamper-proof;
- (b) any connections, distribution systems, components and containment systems within FF&E shall be safely protected, tamper-proof, correctly insulated, and free from exposed contacts and clearly labelled.

3.7.3 The Contractor shall ensure that specialist suppliers shall install the relevant equipment, either new or Legacy.

3.7.4 The Contractor shall ensure that School users shall have control over the equipment provided. All user controls on equipment provided by the Contractor shall be comprehensible, accessible and quietly responsive.

3.7.5 Controls such as isolator switches may need to be located on walls or fixed furniture to allow use by authorised personnel only.

3.7.6 Water and Drainage

- (a) The Contractor shall ensure that all FF&E incorporating water and drainage (such as serviced appliances in workshops, food rooms and science laboratories) is installed so as to ensure hygienic conditions and the effective disposal of waste water, surface water and all liquid waste from the School and its activities.
- (b) Where sinks are to be supplied and installed by specialist furniture manufacturers, such as science laboratory manufacturers/suppliers, the Contractor shall ensure coordination between the FF&E and building elements

3.7.7 Gas and Compressed Air

The Contractor shall install any gas and compressed air installations and appliances in accordance with appropriate regulations and guidance.

FF&E Life and Procurement

3.8 Design Life and Maintenance

The structure of all operable furniture provided by the Contractor shall be compliant with all statutory regulations related to maintenance and management as well as provision.

3.8.1 FF&E provided by the Contractor shall be easily cleaned and maintained and all materials and components shall have a suitable design life to ensure minimum inconvenience and disruption from breakdowns, repairs and maintenance activities.

3.8.2 The Contractor shall ensure that all FF&E it provides is:

- (a) durable and reasonably easy to maintain;

- (b) simple in construction, to reduce maintenance and replacement costs;
 - (c) easy to operate where adjustable (but difficult to misuse), repair or replace;
 - (d) housed in such a way that it is easy to access or remove for maintenance purposes.
- 3.8.3 All relevant staff and users shall be provided with adequate training in the use and maintenance of FF&E provided by the Contractor, where necessary.

3.9 Purchasing and delivery

The Contractor shall:

- 3.9.1 provide the Loose Equipment Purchase Protocol as part of the Contractor's Proposals;⁸¹
- 3.9.2 submit a schedule in the Contractor's Proposals listing all new and Legacy fixed and loose FF&E that it is responsible for;
- 3.9.3 be responsible for the supply of new FF&E, and the delivery and fixing of all fixed FF&E as detailed in the Contractor's Proposals;
- 3.9.4 be responsible for the supply, delivery and placing of all loose F&E detailed on the schedules;
- 3.9.5 liaise with suppliers to ensure ordering of new FF&E is in accordance with the required specification;
- 3.9.6 liaise with suppliers to ensure delivery of FF&E is not before the building is ready to receive it;
- 3.9.7 liaise with each School to ensure Legacy items are securely stored for the duration of time they are not in use and are transported to the new site/block when the building is ready;
- 3.9.8 when necessary, ensure that Legacy FF&E is stored and/or moved appropriately, unless the School has agreed to take responsibility for the serviceability and temporary storage of any item;
- 3.9.9 ensure a minimum number of delivery times where the Contractor is responsible for ordering FF&E.

⁸¹ To be worked up during Selected Bidder stage as a minimum it needs to provide the Authority with comfort that value for money will be achieved in the procurement of loose equipment.

4. ICT DESIGN REQUIREMENTS

Introduction

This design guide and ICT responsibility matrix is provided to inform decision making by setting out the scope and the requirements of the ICT included within the building programme and to provide a baseline for responsibilities.

Where the relevant capital programme does not provide separate funding to the schools for new ICT equipment, for example PSBP, schools will need to continue to use their existing ICT solution in the new building. The building contractor will however provide new passive (e.g. the cabling) and active (e.g. the switches and wireless equipment) infrastructure, a support and training package for the new infrastructure, AV installation and where necessary decant of legacy equipment.

Where the relevant capital programme provides separate funding to the schools for new ICT equipment, for example Free Schools and UTCs, schools will procure an ICT solution for the new building. The building contractor will provide new passive (e.g. the cabling) and the necessary active (e.g. the switches and wireless equipment) infrastructure, a support and training package for the new infrastructure, AV installation and permit access ahead of occupation for the deployment of ICT equipment.

The aim of this guide is to elaborate upon the ICT Responsibility Matrix and to clarify the requirements that the ICT elements have of the building design and works. School specific information, for example the type of legacy equipment that will be transferred, is contained within the school 'ICT Equipment Summary' document. Read together, these will provide sufficient information to develop proposals.

The layout of the standard matrix lists the following as major 'aspects' of ICT systems in Schools:

- Server Room & Hub Rooms
- Network infrastructure - passive and active
- Local Technology - Core
- Local Technology - AV
- Automated Systems
- BMS
- Fire Alarm/Detection
- Telephony, Internet and TV signal

These aspects are further broken down into discrete 'items' which constitute each aspect. For example 'Local Technology – Core' includes the following items:

- Servers and Firewalls
- User devices
- Software (Servers and User devices)
- Peripherals

Each 'item' is a single system, or a type of equipment or a service which is assigned to one or more party with regard to responsibility.

The standard matrix sets out six 'responsibilities' for each item. Each responsibility, where possible, is allocated to a single party. Where a party is shown as owning a responsibility for an item this includes all costs associated with the delivery of that responsibility.

DEFINITIONS OF RESPONSIBILITY

The parties identified to accept responsibility are as follows:

BC – Building Contractor
 School – or related party e.g. Authority, Local Authority, School or ICT supplier

The responsibilities allocated within the matrix are as follows:

Specify	determine the technical specification of the solution to meet the stated requirements
Supply	procure the equipment and services to provide the solution
Install	install and commission the equipment
Test	confirm the correct working of the equipment and services to provide the solution
Integrate	School specific configuration, including implementation of any interconnections between systems and applications. Where shared between school and BC, responsibility sits with the school but the contractor will provide support including limited resources. The package of support provided by the contractor is detailed under the relevant sections later in the document.
Maintain	provide day-to-day management, repair and replacement of the equipment and services throughout a contracted period.

Responsibility Matrix Line Items

The technical standards as outlined in this document are correct at the time of drafting and will be updated as required to reflect technology developments and new ratifications.

The Building Contractor is expected to deliver the requirements as specified in the ICT Responsibilities Matrix and the following sections provide additional detail with regard to each item in that matrix.

1. Server Room and Hub Rooms

- 1.1. The Contractor shall provide a dedicated and secure space to house infrastructure and server equipment, to include but not be limited to: servers; cable distribution; telecoms termination and presentation. This will be supplemented by dedicated and secure hub rooms located around the Building to house the infrastructure used to create an effective network topology.

- 1.2. The dimensions of the spaces provided shall be sufficient to accommodate the equipment being installed and to allow adequate circulation space for service and maintenance activities to be performed. Access for any envisaged maintenance purpose must be possible without moving the rack system.
- 1.3. When the size of a building permits, the Contractor may use a single space to house all server and infrastructure equipment without the need for separate hub rooms.
- 1.4. The location of the server rooms and distribution rooms should ensure that they are not adjacent to or below other services in order to avoid the possibility of damage or contamination due to failures in those services. Where this is not feasible, i.e. the size of the building results in copper cabling runs exceeding 90m as per 2.3.4. separate hub rooms will be required.
- 1.5. The location of the server rooms and distribution rooms should ensure that they are not adjacent to or below other services in order to avoid the possibility of damage or contamination due to failures in those services. These services include:
 - Water
 - Electrical supplies
 - Gas mains
 - Air conditioning not supplying the server/hub room
 - Sewage pipes;
- 1.6. All service and delivery access routes to the server and distribution rooms must be designed to allow easy movement and installation of equipment and fittings without dismantling large items.
- 1.7. The Contractor shall provide that the server room is the termination point for any Internet and communications service to the School and any rooftop aerial or satellite dish for receiving digital broadcast transmissions.
- 1.8. The Contractor shall provide a dedicated clean power supply to enable the server room supply to be left running while power in other sections of the Building is switched off. The power supply should be sufficient to support the equipment planned to be housed within the server room together with headroom for future expansion.
- 1.9. The Contractor shall provide power distribution units to support infrastructure, servers and associated components. Power distribution units shall be connected as appropriate for the required capacity, for example via a standard 16A or 32A plug and socket system such as 'Commando'.
- 1.10. The Contractor shall provide server and data cabinet surge protection to prevent damage to equipment.
- 1.11. The Contractor shall provide suitable uninterruptible power supply (UPS), and the relevant software to enable a controlled shutdown (if required) with notification for all servers, rated for a minimum 30 minutes and capable of providing transient over voltage protection.

- 1.12. The contractor shall provide suitable uninterruptible power supply (UPS) for core network switches and wireless controllers, rated for a minimum 30 minutes and capable of providing transient over voltage protection.
- 1.13. The Contractor shall implement environmental control to provide stable conditions (e.g. Air-conditioning) for ICT equipment as required.
- 1.14. The Contractor shall provide sufficient server racks of appropriate dimensions to house the servers that form part of the ICT. Racking design should support the cooling strategy of the room and should incorporate sufficient space and ancillary items so that a good standard of patching cable management can be achieved.
- 1.15. The Contractor shall provide sufficient racks to house patch panels for copper and fibre termination and active network distribution equipment, for example core and edge switching. Racking design should support the cooling strategy of the room.
- 1.16. The Contractor shall provide patch panels for data, telephony and fibre distribution to complete the network topology. All outlets must be appropriately labelled.
- 1.17. The Contractor shall provide patch leads consistent with the cabling specification and warranty. The patch leads should reflect the school specific requirements for any colour scheme so as to support the school in any on-going maintenance and support.
- 1.18. The Contractor shall provide service containment and routing in the form of dado, tray, riser and basket containment to match the cable specification and design aesthetics required. In order to provide redundancy there shall be two separate, independently routed cable/fibres linking each Hub Room to the server room.
- 1.19. The Contractor shall provide anti-static flooring and all extraneous metal parts, including door frames, shall be electrically earth bonded.
- 1.20. Where installed as part of the build, the Building Contractor must ensure the server room fire suppression system meets the requirements of the school's insurance and complies with the British and European standard EN1047 for computer room physical and environment protections. Any employed sprinkler system must have isolation capabilities so that the main system can be triggered without activation within the Server room.
- 1.21. The location of the server room must be such that it is not susceptible to flooding from internal as well as external forces (e.g. not located in the basement of a building).

2. Network infrastructure – Passive

- 2.1. The Contractor shall provide wired infrastructure (cables, ducting, containment, routing, termination, patch and fly leads and presentation) including the passive data

cabling for the ICT and wireless network and integrated systems which rely on data connections to function, for example, cashless catering system, BMS, Digital signage, telephony etc.

2.2. The Contractor shall ensure that where fibre cabling is used:

- 2.2.1. It should be conformant multi-mode OM3 1000BASE-SX fibre with 12 cores as a minimum, and should provide a bandwidth of 2,000Mhz/km to allow future upgrades;
- 2.2.2. It should be installed with different routes back to the Server room to ensure that both cannot be severed at the same time;
- 2.2.3. The maximum length of the fibre should be 300m, and this should be separately contained to avoid interference, with a bend radius controlled in line with the specification of the cable manufacturer;
- 2.2.4. Fibre warning labels should be attached along the length of the cable;
- 2.2.5. Sufficient slack (3m+) should be left at each end of the cable to facilitate re-termination or relocation;
- 2.2.6. No intermediate splices shall be used in the cable runs;
- 2.2.7. Provide a 20 year manufacturer's warranty for the complete cabling system;
- 2.2.8. Provide test results for the performance of 100% of the cables that have been installed. This testing is carried out by the cable installer; and
- 2.2.9. Shall handover to the school all relevant documentation including network topology details, cabling test results, cabling test certificates, cabling warranty information, other network documentation.

2.3. The Contractor shall ensure that where copper cabling is used:

- 2.3.1. It should be Category 6 standard as a minimum, conforming to TIA/EIA 568B standards, with all terminations following the manufacturer installation guidelines;
- 2.3.2. No intermediate splices shall be used and the minimum and maximum bend ratios should be adhered to;
- 2.3.3. 30cm should be provided as slack at each end of the cable run;
- 2.3.4. The length of any individual copper cable must not exceed 90 metres between termination points;
- 2.3.5. All cables must be terminated on appropriately labelled RJ-45 sockets;
- 2.3.6. All data cables shall be low smoke and zero halogen type;

- 2.3.7. Fly leads should be provided for each data point;
- 2.3.8. Provide a 20 year manufacturer's warranty for the complete cabling system;
- 2.3.9. Provide test results for the performance of 100% of the cables that have been installed. This testing is carried out by the cable installer; and
- 2.3.10. Shall handover to the school all relevant documentation including network topology details, cabling test results, cabling test certificates, cabling warranty information, other network documentation.

2.4. The Contractor shall assume that for secondary schools 1.2 data points will be required per pupil, for primary schools 0.6 data points per pupil and for special schools 2 data points per pupil. It is expected that the final number and location of data points will be finalised through the design process.

3. Network Infrastructure - Active

3.1. The Contractor shall ensure that enterprise level Active switching, edge and core, is provided that:

- 3.1.1. Maximises the bandwidth between servers and the core as well as between the core and all edge devices;
- 3.1.2. Provides a minimum of gigabit connectivity to the desktop and all devices (for example WAPs, printers, etc.);
- 3.1.3. Can be configured and managed to support network security and quality of service;
- 3.1.4. Is scalable to accommodate future developments and flexibility of deployment as well as accommodating legacy equipment as required;
- 3.1.5. Can accommodate at least one additional module per chassis (where a chassis is provided) or can otherwise be upgraded when additional capacity is required in future;
- 3.1.6. Has a manufacturer warranty and support arrangement (telephone, email and web), both providing 5 years of cover as a minimum;
- 3.1.7. Includes a system administrator training package;
- 3.1.8. Is Energy Efficient Ethernet compliant to 802.3az standard;
- 3.1.9. Has central management tools that can be used to configure the switching (core and edge), monitor performance and provide alerts in the event of a failure;
- 3.1.10. Can support the elements of the proposed solution that require PoE, in compliance with the IEEE 802.3af/at (as required) standard, including but not limited to; wireless access points, CCTV, Access Control systems, Automated registration points and VOIP;

- 3.1.11. Has sufficient active ports to support connectivity for 100% of terminated data points across the site;
- 3.1.12. Has a core switch design that is resilient against the failure of any single component, including but not limited to redundant power supply; and
- 3.1.13. Is suitable for integration into a wider technical solution or support arrangement if necessary, for example an estate wide solution.

3.2. The Contractor shall provide an enterprise level wireless solution that:

- 3.2.1. Maximises the bandwidth that is available to user devices and provides dual band connectivity to support simultaneous use without degradation in performance;
- 3.2.2. Provides blanket coverage throughout the school building which ensures connectivity is not lost whilst users roam around the building;
- 3.2.3. Uses the fastest ratified and established standard at the time of installation and be backwards compatible with previous standards;
- 3.2.4. Can be configured and managed to support network security and Quality of Service (QoS);
- 3.2.5. Has a manufacturer warranty and support arrangement (telephone, email and web), both providing 5 years of cover as a minimum;
- 3.2.6. Includes a system administrator training package;
- 3.2.7. Provides guest access and automated authentication for authorised users;
- 3.2.8. Provides suitable means of connecting internal APs to external antenna attached to the main building and install such antenna, should the school decide to purchase antenna and associated cables;
- 3.2.9. Can actively manage and load balance user connectivity;
- 3.2.10. Is scalable at the central controller and is able to accommodate future higher bandwidth requirements and/or the implementation of a resilient dual controller system;
- 3.2.11. Minimises the impact of interference from adjacent networks; and
- 3.2.12. Is suitable for integration into a wider existing technical solution or support arrangement if necessary, for example an estate wide solution.

4. Local Technology – Core

4.1. The standard scope of ICT works, as defined by the design guide and responsibility matrix, does not extend beyond infrastructure (passive, active and associated components). However where the authority wishes to extend and fund the works to be carried out by the building contractors ICT supply chain, this will be reflected as an annex to the design guide, for example servers, user devices, software and peripherals.

4.2. Where required the Contractor will decant all Local Technology /Automated systems as set out in the Decant Requirements (section 8) and the Responsibility Matrix.

5. Local Technology – AV

5.1. Where required the Contractor will decant all AV equipment as set out in the Decant Requirements (section 8) and the Responsibility Matrix.

5.2. The Contractor will provide an AV wiring loom into every teaching space, hall and meeting rooms (as required).

5.3. The contractor will ensure that suitable patressing is provided for the teaching wall into all teaching spaces and meeting rooms for AV (as required).

5.4. Provide the connections required between the AV and the teacher's station including faceplates;

5.5. Install and test AV equipment as per the responsibility matrix.

6. Automated Systems

6.1. The Contractor shall install and test any Cashless catering system (to be provided by others).

6.2. The Contractor shall install and test any Automatic Registration System (to be provided by others).

6.3. The Contractor shall install, and test any Internal CCTV (to be provided by others).

7. Telephony, Internet and TV signal

7.1. The Contractor shall provide all necessary cabling and connections (Excess construction and last mile), Routing and ducting.

7.2. The Contractor shall fund and coordinate the ordering and installation of the broadband connection (last mile, on-site equipment and an active connection to the internet etc.) and digital and analogue telephone lines, all including the relocation of existing connections or provision of new.

7.2.1. The orders will be placed by the school, or school related party.

7.2.2. Works will be carried out in a way that minimises disruption to the school.

7.2.3. Capital cost for works sit with the contractor, revenue costs sit with the school.

7.3. The Contractor shall provide an enterprise level telephone system (core and handsets), with sufficient fixed handsets for offices and admin areas with the following functionality:

- 7.3.1. A central switchboard;
- 7.3.2. Mobile handsets for SLT members of staff (each must appear as a separate extension from the central switchboard);
- 7.3.3. Fixed handsets, making use of structured cabling, for all SLT offices and admin staff;
- 7.3.4. Headsets for hands-free operation for reception staff; and
- 7.3.5. Voicemail forwarding as e-mail attachment for all staff.

7.4. The Contractor shall provide a solution to enable the School to make and receive calls in the case of a power failure.

7.5. Contractor shall provide a digital aerial or satellite dish capable of supporting simultaneous access to multiple channels with the feed terminating in the server room.

8. Decant Protocol

8.1. Where decant is required, for example in PSBP projects, the contractor shall provide all resources to decommission, package, store, move and re-commission legacy ICT equipment. NB: The risk of legacy equipment not functioning, beyond that caused by decant damage and excluding failure due to contractor responsibilities e.g. new AV cabling, is a school responsibility.

8.2. The Building Contractor will provide the resources to decommission and decant the legacy ICT equipment and services. This includes:

- Packaging
- Transport
- Storage
- Un-packing
- Installation (as per the responsibility matrix) and sections 1-8 of this document
- Testing (as per the Implementation and User Acceptance Testing Schedule)

8.3. It is the responsibility of the Contractor to co-ordinate and project manage the resources required to ensure that the school can operate with their existing ICT within the new building.

8.4. Where the school has a technical support team or a service provider, the Building Contractor will liaise with them to ensure a smooth transition of the school's ICT solution, including the technical decant process. This needs to be confirmed through dialogue.

- 8.5. The contractor is responsible for any damage caused or ICT equipment failure caused from the point of de-commissioning until it has been tested and accepted by the Authority.
- 8.6. The contractor will ensure relevant conditions for maintaining existing warranties for equipment are adhered to throughout the decant process, for example where a certified installer is required for decommissioning and re-installing a piece of equipment such as an interactive whiteboard.
- 8.7. Where decant by the Contractor is not required and an ICT provider is in place the Contractor will provide the necessary access so that the installation and testing of ICT equipment is not delayed beyond school opening.

9. Local configuration support package

- 9.1. In addition to Decant, the Contractor will provide technical support to help the school configure and administer the ICT equipment in the building. This should include access to a key contact to be available to direct any requests for assistance. The scope of the support will be subject to the school's own capacity, capabilities and type of school and should be confirmed during dialogue. The Contractor shall provide the following support days:

School Type	Pupil numbers	Network Engineer (Switching)	Network Engineer (Wireless)	Server Engineer (MCSE)	Client Engineer (MCSA)
Primary	up to 250	1	2	2	1
Primary	251 to 500	1	2	2	2
Primary	501 +	2	2	2	2
Secondary	Up to 1000	2	2	3	2
Secondary	1001+	3	3	3	3

ANNEX 1 - STATUTORY REQUIREMENTS AND GUIDANCE

1. INTRODUCTION

The Contractor is required to ensure that the designs for all the Schools listed in the group comply with all current relevant regulations, including those listed here in Annex I. It also states that the Contractor should be aware of all current relevant guidance on School premises, including that listed here.

2. STATUTORY REQUIREMENTS

2.1 Legislation applying to School premises only

2.1.1 The School Premises (England) Regulations 2012 (SPRs)

These apply to all existing and new schools maintained by a local authority⁸². They cover toilet and washing facilities, medical accommodation, health, safety and welfare, acoustics, lighting, water supplies and outdoor space.

2.1.2 The Education (Independent School Standards) (England) Regulations 2010 (ISSs)

Part 5 prescribes standards for the premises of independent schools, including Academies and Free Schools. These are currently being revised and will contain the same requirements as the SPRs when issued in 2013. Part 3 of those regulations covers the wider welfare, health and safety of Pupils and includes a standard on fire safety.

2.1.3 The Statutory Framework for the Early Years Foundation Stage (2012)

Sets standards for Pupils under the age of 5 at both maintained and independent schools. It includes requirements for premises, such as minimum space standards and the provision of toilets and wash basins.

2.1.4 The National Minimum Standards for Boarding Schools (2011)

Cover requirements for boarding accommodation at all mainstream boarding schools, for all age groups of Pupils up to 18. There is a separate set of national minimum standards for residential special schools.

2.2 Legislation applying to different types of buildings, including schools

2.2.1 There is a substantial amount of other legislation that applies to all buildings, including schools. Regard should be had to the provisions of this legislation including, but not limited to:

- (a) The Health and Safety at Work etc Act 1974 (HSWA);

⁸² The Regulations apply to nursery, community, community special, foundation, foundation special and voluntary schools and to pupil referral units.

- (b) The Workplace (Health, Safety and Welfare) Regulations 1992, together with its Approved Code of Practice and Guidance (collectively – WRs);
 - (c) The Equality Act 2010 (EQA);
 - (d) The Regulatory Reform (Fire Safety) Order 2005 (RRFO);
 - (e) The Control of Substances Hazardous to Health Regulations 2002 (as amended) (COSHH).
- 2.2.2 As with other building types, developments at schools are bound by normal planning controls, details of which can be found on the government Planning Portal. The Department for Communities and Local Government (DCLG, or Communities) published the National Planning Policy Framework on 27 March 2012, which aims to make the planning system less complex and more accessible, in part by significantly reducing the number of regulations in place. It also aims to promote sustainable development.
- 2.2.3 Construction work at schools is subject to approval under the Building Regulations 2010. Regard should also be had to the Construction (Design and Management) Regulations 2007, which concerns ensuring the safety of the workforce, occupants and the public while construction works are carried out.
- 2.2.4 The Building Regulations set minimum standards for the design and construction of buildings and exist mainly to ensure the health and safety of people in and around buildings, but also cover energy conservation and accessibility. The fourteen technical “Parts” of the Building Regulations are supported by Approved Documents, which show how the requirements of the regulations can be complied with.
- 2.2.5 Developments on school sites are also bound by environmental legislation, such as the:
- (a) Environmental Protection Act 1990;
 - (b) Site Waste Management Regulations 2008.

3. REGULATORY GUIDANCE

3.1 Standards for School Premises

This guidance describes, and advises on meeting the requirements of, the premises regulations for all schools maintained by local authorities in England. When the 2013 ISSs come into force, this guidance will be slightly revised so that it will cover independent schools, including Academies and Free Schools.

3.2 Building Bulletin (BB) 101, Ventilation of school buildings, downloadable only, 2006

This guidance advises on how to meet the requirements of Part F of the Building Regulations as they apply to schools and is cited in AD F. It is being reviewed and revised guidance on the ventilation of school buildings will be issued in 2013.

3.3 BB 100, Design for Fire Safety in Schools, NBS/RIBA 2007

This guidance advises on how to meet the requirements of Part B of the Building Regulations as they apply to schools and is cited in AD B. It is being reviewed and revised guidance on fire safety in schools will be issued in 2013.

3.4 BB 93, Acoustic Design of Schools, TSO 2003

This guidance advises on how to meet the requirements of Part E of the Building Regulations as they apply to schools and is cited in AD E. It also supports the Noise at Work Regulations 1989. It is being reviewed and revised guidance, *Acoustic Design of Schools – Performance Standards for Schools* is in draft form. Until this is published, the Contractor is required to follow the standards in *Acoustic Performance Standards for the Priority Schools Building Programme*, v1.7, May 2013, downloadable from

<http://www.education.gov.uk/schools/adminandfinance/schoolscapital/buildingsanddesign/baseline/b00213595/baseline-designs---how-the-designs-address-the-brief/acoustics> and as listed in the Area Data Sheets instead of those in the existing BB93.

4. DESIGN GUIDANCE

4.1 Listed below is the current design guidance for schools, together with technical guidance, best practice and case studies. Much of this guidance is under review, with the aim of streamlining and consolidating it. Updated versions are likely to be issued during 2013 and 2014. Information and requirements contained in EFA Contractors Framework documentation including the SoA, ADS, FOS supersede and take precedence over any requirements identified in the Building Bulletins.

BB 102, Designing for disabled children and children with special educational needs, TSO 2008

BB 99, Briefing Framework for Primary School Projects, TSO 2006

BB 98, Briefing Framework for Secondary School Projects, TSO 2004)

BB 96, Meeting the educational needs of children and young people in hospital (DES/DOH) TSO 2003

BB 95, Schools for the Future: Designs for learning communities, TSO 2002

BB 92, Modern Foreign Languages Accommodation: A Design Guide, TSO 2000

BB 89, Art Accommodation in Secondary Schools, TSO 1998

BB 88, Fume Cupboards in Schools, TSO 1998 (note – will be revised by CLEAPPS)

BB 81, Design and Technology Accommodation in Schools: A Design Guide, TSO, revised 2004

BB 80, Science Accommodation in Secondary Schools: A Design Guide, downloadable only, revised 2004

BB 79, Passive Solar Schools: A Design Guide, TSO 1995

Design of sustainable schools: case studies, TSO 2006

Designing School Grounds, TSO 2006

Music Accommodation in Secondary Schools: a design guide, NBS/RIBA 2010

Project Faraday - Exemplar designs for science, TSO 2007

4.2 **Standard Specification, Layouts and Dimensions (SSLDs)**

4.2.1 The Standard Specifications, Layouts and Dimensions (SSLD) booklets were developed specifically for the BSF programme, but they also have an ongoing value.

4.2.2 The series sets out the standards for a range of elements in schools and shows how these standards might be delivered through design examples. They aim to disseminate best practice and avoid 'reinventing the wheel' every time a school building is designed.

SSLD Guidance 1: Partitions in Schools, DCSF 2007

SSLD Guidance 2: Floor Finishes in Schools, DCSF 2007

SSLD 3: Toilets in Schools, DCSF 2007

SSLD 4: Lighting systems in schools, DCSF 2007

SSLD 5: Roof coverings in Schools, DCSF 2008

SSLD 6: Internal stairways in schools, DCSF 2008

SSLD 7: Internal door sets in schools, DCSF 2008

SSLD 8: Sprinklers in schools, DCSF 2008

ANNEX 2 - EMPLOYMENT AND SKILLS STRATEGY

Prepared for the Department for Education

By the National Skills Academy for Construction

In respect of the Priority School Building Programme

The Department for Education is committed to using its capital investment under the Priority School Building Programme to demonstrate a meaningful contribution to sustainable skills development and employment opportunities.

The Priority Building School Building programme is a centrally managed programme which will see 261 schools rebuilt or have their condition needs met. The programme will see over £2bn of investment—and will look to improve 261 schools in 81 local authority areas across England.

The Department for Education intend to use this opportunity to boost skill levels both locally and nationally, to support the local communities and businesses through this investment.

The Department for Education is committed to providing opportunities for young people to gain work experience and apprenticeships, aligned to the Government's Supporting Youth Employment strategy as well as supporting the Deputy Prime Minister's Social Mobility Strategy.

The Department for Education is committed to ensuring meaningful apprenticeship opportunities. Aligned to the Sustainable Growth Strategy, the Department advocates the progression to employment in the construction sector through this route.

In partnership with the National Skills Academy for Construction and CITB (the Construction Industry Training Board) the Department for Education is ensuring it works with construction employers to embed skills and employment opportunities; maximising benefit to the sector and to local communities.

Our employment and skills strategy looks to ensure support for the current and future workforce of the construction sector, to ensure a positive experience for the local communities and businesses where our investment is focused.

Our employment and skills strategy focuses on working in partnership with the sector to deliver employment and training interventions that are meaningful and measurable.

Through this procurement process the Department for Education is seeking to create dialogue with contractors, ensuring a successful relationship, creating maximum benefit beyond the construction process.

ANNEX 3 - GENERIC AREA DATA SHEETS

Annex 4 - ICT Responsibility