



Creating excellent primary schools

A guide for clients



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Foreword


Good school design matters. It is about the education and life chances of young people. Evidence shows a clear link between well-designed schools and pupil performance and behaviour. Good design alone doesn't raise standards, but bad design impacts on the quality of teaching, the aspirations and self-perception of pupils, and the sustainability of a school.

Successful school design is the result of hard work and collaboration between designers, contractors and visionary, committed clients. You also need to involve the people who will use the buildings. This means talking to both teachers and pupils about what they want, and giving pupils the chance to express themselves creatively and understand how buildings work.

This guide has been produced especially for primary schools receiving new capital investment. It shows what can be achieved when clients know how to get the best from the process of building or refurbishment. Taking you step by step through the process, it provides practical tools and a dozen case studies that we hope will inspire you.

Despite the challenges presented by a tough financial climate, we must not lose focus on the quality of the places where young people learn. To do so would mean failing generations of pupils, their families and the communities of which are schools are such an important part.

Paul Finch
Chair, CABE



Long view: successful school design needs collaboration between designers, contractors and visionary, committed clients

Introduction



Dairy Primary School, by North Ayrshire Council © Dirk Buwalda

Good design is fundamental to the delivery of the primary capital programme – and an informed school client is vital for successful school building projects

Many primary schools will soon be involved in a building project, thanks to the primary capital programme (PCP). The programme is making additional funding available to enable local authorities to rebuild or take out of use the worst 5 per cent of primary school buildings and to significantly improve at least half of all primary schools. Local authorities are being advised to take a strategic approach to rebuilding, refurbishing or remodelling their primary schools to bring them up to 21st-century standards.

Good good design is fundamental to the delivery of this programme. An informed school client is vital for the success of a school building project.

This guide has been written for school communities to explain the processes involved in a primary school building project and advise how to get the best from it, particularly in terms of design. We have tried to make it concise, straightforward and jargon free. It is not intended to be read from cover to cover in one sitting. Rather, it is designed as a reference guide and is divided into sections roughly relating to the different stages of a project.

You can learn a lot from visiting schools that have already been through a building programme. We have included a selection of schools in section 7.4 that may be worth visiting.

We hope you will find this publication useful, and that it results in better primary school buildings.

The importance of good design

Well-designed buildings lift the spirits and aspirations of everyone who uses them, and provide facilities that are fit for purpose, inclusive and built to last.

Research from the UK and abroad proves that high-quality educational buildings can:

- promote the performance of students, making it easier for them to learn effectively. One research project found that test scores in well-designed buildings were up to 11 per cent higher than in poorly designed buildings¹
- help recruit and retain staff, cutting the costs of staff turnover. A UK study found that capital investment in school buildings had a strong influence on staff morale, as well as pupil motivation and effective learning time²
- provide facilities that are flexible enough to respond to evolving thinking about teaching and learning.

Design alone cannot raise achievement, but poor design can be an obstacle to raising educational standards above a certain level. A recent research paper, *Do School Facilities Affect Academic Outcomes?* by Mark Schneider, professor of political science at New York State University, concluded:

School facilities affect learning. Spatial configurations, noise, heat, cold, light,



Golden Lane Campus, London, by Nicholas Hare Architects © Peter Durant

High performance: test scores in well-designed buildings are up to 11 per cent higher

and air quality obviously bear on students' and teachers' ability to perform.³

In the same vein, a research paper commissioned in 2007 by Estyn,⁴ Her Majesty's Inspectorate for Education and Training in Wales, on school performance in new or refurbished buildings, found that:

- ageing school buildings that are in a poor state of repair cannot meet modern teaching and learning methods
- inadequate buildings make improvements in standards of achievement more challenging
- in nearly all the schools with new or refurbished buildings that were surveyed, pupils' attainment and achievement had improved.



Larmehier and Sacred Heart Catholic Primary School, by Studio E © Kilian O'Sullivan

About this guide

CABE is the government's advisor on architecture and the built environment. Our chief objective is to help and empower clients to achieve the best buildings and public spaces. We believe that informed and dynamic clients are vital for the creation of successful school building projects.

For many school communities – staff, parents, students and other people who use the school facilities – embarking on a building project may feel daunting. This publication is intended to guide and inspire these communities through this complex but rewarding process. It explains what is involved in primary school building projects and advises on getting the best from them, particularly in terms of design.

Case studies and practical examples are included wherever possible, and the material is divided into sections relating to the different stages of a project, for ease of reference.

Much has already been written about designing new school buildings. You will find references for the most useful publications in the appendix at the end of the guide.

Built to last: schools should take a sustainable approach to design, construction, environmental servicing and travel



Can design quality be measured?

Measuring design quality will never be an exact science. What is right for one site and one school may be quite wrong for another. However, CABE believes that by evaluating exactly what is needed from a particular building and looking carefully at the design solutions available, it is broadly possible to measure design quality.

CABE, in association with the Construction Industry Council (CIC), has developed a methodology for evaluating the design of buildings, known as design quality indicators (DQIs).⁵

DQIs evaluate three main components: **build quality**, **functionality** and **impact**.

These components are broken down into 10 sub-sections, each of which have a further 10 criteria. Therefore, around 100 factors are considered to determine the overall design quality of a building. CABE and the CIC have developed a version of DQIs specifically for use on school buildings, known as DQI for Schools.⁶ This works on the same principles and can be used to determine the priorities of different stakeholders:

- **build quality** access, space, uses
- **functionality** performance, engineering, services, construction
- **impact** the school in its community, within the school, form and materials, character and innovation.

For more information see www.dqi.org.uk

Outside learning: well-designed external spaces offer settings for leisure, learning and sport

How to recognise a well-designed primary school

CABE has developed a simple checklist to keep the brief and the design process going in the right direction. These are explained in more detail in section 3.4.

- a.** A high-quality design that inspires users to learn and is rooted in the community
- b.** A sustainable approach to design, construction, environmental servicing and travel to school
- c.** Good use of the site, balancing the needs of pedestrians, cyclists and motorists, and enhancing the school's presence in the community
- d.** Buildings and grounds that are welcoming, safe and secure, and inviting to the community while protective of the children
- e.** Good organisation of spaces in plan and section, easily legible and fully accessible
- f.** Internal spaces that are well proportioned, fit for purpose and meet the needs of the curriculum
- g.** Flexible design to support transformation, allowing for short-term changes of layout and use, and for long-term expansion or contraction
- h.** Good environmental conditions throughout, including optimum levels of natural light and ventilation
- i.** Well-designed external spaces offering a variety of different settings for leisure, learning and sport
- j.** A simple palette of attractive materials, detailed carefully to be durable and easily maintained, and to age gracefully

How to achieve good design

The local authority and the school should follow clear processes to achieve a well-designed school. They need:

- a **clear vision** for how education will be delivered in the future in the school
- a **client design advisor** who can help to translate their vision into a brief; help them to challenge design proposals that fall short of their aspirations; and evaluate designs as an 'expert client'
- a **well-thought-through approach to sustainability** in terms of both the construction and the use of the building
- a **clear idea** of functional requirements and quality
- a **thorough brief**, developed in consultation with the school, that sets out these requirements and takes account of the need to provide flexibility and adaptability for future patterns of learning and other uncertainties
- **skilled designers** who can engage in a constructive dialogue with the public sector procurer, suppliers, manufacturers and end users
- **providers (builders and managers)** who will deliver the building, rise to the challenge of the design and work well with their clients, engaging them in the process

- a **programme that provides sufficient time** for the designers to achieve a good solution
- a **realistic and robust budget** that is sufficient to build a school of appropriate construction quality.

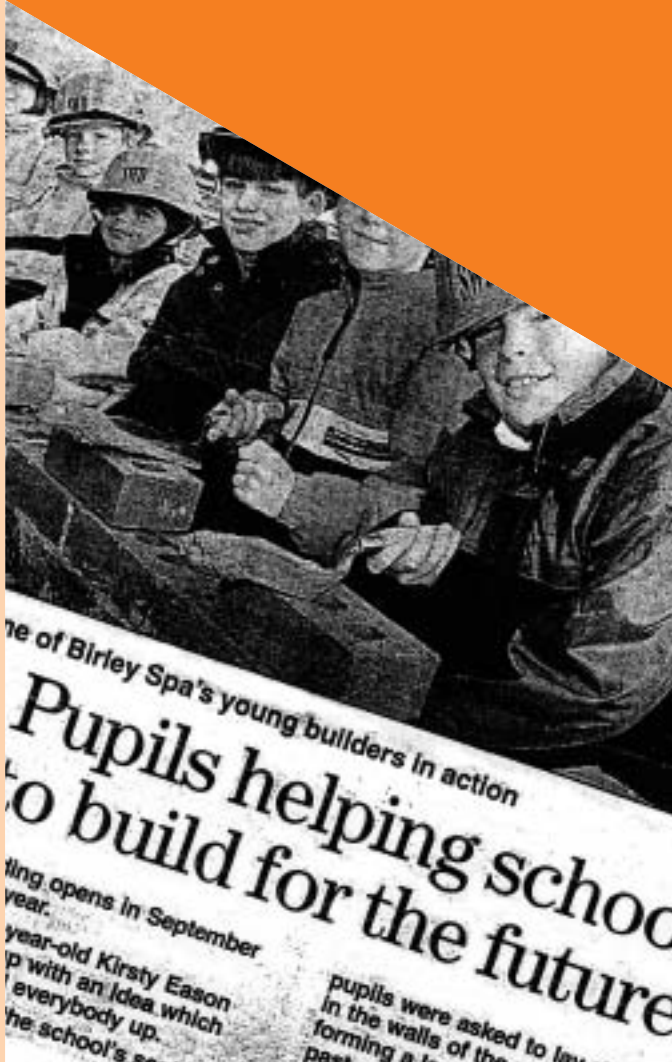
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- 2 *Building Performance: An Empirical assessment of the Relationship Between Schools Capital Investment and Pupil Performance*, PricewaterhouseCoopers Research Report No 242, 2000
- 3 Mark Schneider is professor of political science at New York State University, Stony Brook. *Do School Facilities Affect Academic Outcomes?*, 2002, www.cabeurl.com/b
- 4 *An evaluation of performance of schools before and after moving into new buildings or significantly refurbished premises*, Jan 2007, www.cabeurl.com/c
- 5 See www.cabeurl.com/d for full details of the methodology.
- 6 DQI for schools is explained at www.dqi.org.uk. The CAFE publication and CD *Picturing school design* (2005) explains how the methodology can be used to achieve well-designed schools, www.cabe.org.uk/publications



Case study

Using good design as a catalyst for change



Birley Spa Primary School, Sheffield

Birley Spa Primary is a two-form entry school in a deprived area of south-east Sheffield, set in a low-rise 1960s council housing estate.

The school was well run and had reasonable levels of attainment, but by the early 1990s the timber-framed structure had developed severe structural problems, including a leaking flat roof. According to former headteacher Geoff Mawson, the building was a serious barrier to learning, both in terms of condition and design.

In the mid-1990s the decision was taken to rebuild the school. It soon became apparent that the building project provided an excellent opportunity to thoroughly review the way the school worked.

Working groups were made up of the leadership team, staff volunteers, parents, pupils and members of the local community.

Having established new policies, the school community sought to embed this thinking in the design of the new school. The community wanted:

- all the facilities under one roof, so pupils would not have the disruption of going outside to move between different activities
- easy access to outdoor learning spaces from each classroom
- flexibility of use in the larger spaces, such as the dining area
- community involvement, reflecting the fact that local people had very few community facilities in the area.

In the news: residents and pupils were heavily involved in the design of their new school



A courtyard plan, with a safe play area at the heart of the school, emerged as the best solution. Local residents and pupils were heavily involved in the planning and even construction of the new building. Children were given bricklaying lessons by the contractor to give them an understanding of the trade.

By summer 2000, after just one academic year in the new building, key stage 2 SATS results had risen dramatically. The average score in 1999 was 65.5 per cent and by 2003 this had risen to 96 per cent. This was undoubtedly a result of the educational changes developed during the planning and construction of the new building.

It was not just the education that had been transformed. There was also a major shift in the attitude of parents and the community towards the school. In the words of Geoff Mawson, 'the building project was a catalyst for positive change'.

Further information

Architect: Sheffield Design and Project Management, Sheffield City Council

Catalyst for change: academic results have improved dramatically since the rebuilding

Case study

Blended learning styles in an open plan learning environment

Canning Street Primary School, Newcastle upon Tyne

Canning Street Primary is in inner-city Newcastle. Many pupils speak English as an additional language and a high number of children have special educational needs. However, in 2007 Ofsted commented that 'this outstanding school is a harmonious working community where every pupil is accepted and valued, no matter what their background or ability'.

The open plan 1970s building had been used very successfully, but was starting to create limitations for teaching as the class bays were too small. The building was also susceptible to over-heating because of the rooflight running its full length. As a result, the school was extensively refurbished as part of the Newcastle Building Schools for the Future (BSF) programme, and re-opened in September 2008.

The environmental problems were resolved, the teaching spaces enlarged, and the large teaching area remodelled to provide a greater range of accommodation to support the innovative teaching methodology, described below.

The teaching space now consists of a single, very large curved area with no fixed partitions in the centre. A central circulation route runs the full length of the space, separated from the teaching areas by low storage cupboards. Behind this is a shared area used by all the classes in a variety of ways. Beyond this are the classroom bays, divided only by fixed screens that do not reach fully to the ceiling. Toilets are in small extensions beyond the classroom bays.

Innovative design: Canning Street Primary was extensively refurbished



Canning Street Primary School, Newcastle upon Tyne, by Parsons Brinckerhoff, all photos © Keith Paisley

On the other side of the circulation route, there are various group teaching rooms and a library area.

The staff adapt the layout to suit individual lessons. For subjects such as maths and literacy, the teachers tend to teach their own class within their own bay, and the teaching assistants will support small groups within the class where necessary. For other subjects there may be a more thematic approach, and the year group is split up into smaller groups involved in two or three different activities, making use of the shared space as well as the classroom area.

This method of teaching is clearly successful at Canning Street, and is popular with staff. They find the open plan arrangement supportive, and it is particularly appropriate for newly qualified teachers who can work in a co-operative environment and learn from more experienced colleagues.

To the visitor, the design of the school and the way it is used can look anarchic, and some express concern about the potential for disturbance from noise. However, the reality is a calm environment where learning is enjoyed and where older children provide support for younger ones, and welcome new pupils. It is also apparent that the unique design makes a significant contribution to the inclusive character of the school.

Further information

Architect: Parson Brickenhoff




Learning curve: the teaching space consists of a single large curved area with no fixed partitions

1 New patterns of learning and the implications for design



Ashmole Primary School, Lambeth, by Greenhill Janner Architects © Charlotte Wood



The design of new school buildings needs to provide facilities that can change with the times, so more flexible spaces will be needed

Teaching and learning in primary schools continues to be a process of evolution.¹ The design of new school buildings needs to reflect this, and provide facilities that can change with the times.

Research and investigations into early years teaching continue to develop new thinking on best practice for primary school education. For example, the Rose review of the primary curriculum², which reported in April 2009, focused on the benefits of cross-subject teaching and improving transition from early years to key stage 1 through a more play-based approach. These changes will have implications for design in that more flexible spaces will need to be considered.

By designing flexible buildings, schools are able to respond to new thinking quickly and efficiently, without further disruptive construction work.

Changing times: new primary schools should offer a better transition from early years through more informal play spaces



Daily Primary School, by North Ayrshire Council © Gary Woodley

1.1 Future learning – educational transformation

How educational transformation affects design

The Department for Children, Schools and Families (DCSF) has identified the goals of educational transformation as follows:

- deliver high standards in world-class schools
- narrow achievement gaps and tackle the effect of poverty and disadvantage
- enhance school diversity and parental choice
- increase access to community services delivered by and through primary schools
- deliver creative, flexible designs supporting the best thinking on teaching and learning
- secure effective use of new technologies
- produce places for learning that are exciting, flexible, healthy, safe, secure and environmentally sustainable.³

Many of these transformational goals have clear implications for the design of primary schools, whether they are new-build, remodelling or refurbishment projects. School buildings will have to become more accessible and adaptable for community use, the change in learning patterns and the implications of increased ICT use. At the same time the buildings still need to be durable, and secure but welcoming.

A strategic approach to transformation

In 2008 local authorities produced primary strategy for change (PSfC) documents, setting out and prioritising their PCP funding strategically.⁴

Each PSfC document considers:

- the needs of all eligible schools across the whole of the primary school estate, including primary-age special schools, voluntary-aided, foundations and trust schools
- how the PCP investment can join up with other investment programmes, such as that for community health provision
- achieving best value for money
- standards of design quality and monitoring.

Schools should familiarise themselves with the approved PSfC documents submitted by their local authority. These will contain details of:

- **The local perspective** The authority's aims and objectives for primary education in the 21st century
- **Baseline analysis** The authority's starting point, both in terms of what is good about primary education now and what needs to improve
- **Long-term aims** The investment priorities for the next 14 years to transform education through better facilities and the pattern and type of school
- **Approach to change** How your authority will run the primary capital programme. It will cover issues such as: governance, staffing and resources, criteria for choosing projects, consultation and capacity building, design, sustainability, ICT, procurement and value for money
- **Initial investment priorities** The specific priorities for investment during the first four years of the programme (five years for pathfinders), showing how these contribute to the long-term aims. It should also specify the school projects to be delivered up to 2011.

Dalry Primary School, by North Ayrshire Council © Gary Woodley



New concept: the design of the Dalry Primary School in Ayrshire involved artist Bruce McLean. The school's ICT room is an inflatable silver space

1.2 Personalised learning in primary schools

Personalised learning involves:

- knowing pupils better as individuals and learners
- pupils understanding what they are trying to achieve
- matching teaching and learning more closely to the needs, aspirations and learning styles of pupils
- creating a flexible curriculum that meets all children's needs
- creating a positive ethos in which pupils' welfare is nurtured
- valuing the knowledge, skills and experience pupils bring to the classroom.

The DCSF has published detailed guidance⁵ and has also commissioned DEGW to undertake a new research project called *Space for Personalised Learning*.⁶ This research is aimed at supporting schools to change or evolve the physical environment in response to personalised learning.

Good design can help the delivery of personalised learning, providing conditions in which staff and students can shape teaching around the way different children learn. Some of the practical issues to consider include:

- the size, shape and furnishing of classrooms being sufficiently flexible to meet a variety of teaching needs

Multi-purpose: the space at the heart of St Luke's Primary School in Wolverhampton can be used for one-to-one teaching, group work or library use

- additional spaces provided for smaller groups and individual learning, both with and without adults
- school grounds providing outdoor spaces for small groups and individual learning
- capacity for using ICT in a variety of ways within the learning environment
- appropriate illumination, acoustics, ventilation and heating to support a range of learning activities.



St Luke's Primary School, Wolverhampton © Leigh Simpson

1.3 The extended school agenda and its design implications

In *Extended Schools: Access to Opportunities and Services for All*,⁷ the government sets out its ambition that by 2010 extended services will be available, including:

- high-quality 8am-6pm year-round childcare
- a range of study support activities
- parenting support, including family learning
- swift and early referral to a wide range of specialist support services
- wider community access to learning and recreational facilities for adults.

From 2008 to 2011, the government will provide over £1 billion to support the development of extended services. Extended facilities could potentially be part-funded from other sources, such as Sure Start or primary care trusts. The TeacherNet website has information and case studies about funding for extended services.⁸

Providing for extended services should be considered from the beginning of the design process. In some cases, extended services can be offered through the flexible use of spaces such as the hall, dining area or specialist music or ICT rooms. However, wherever possible children should not be located in the same room or environment from 8am-6pm, but rather move around the building for out-of-school-hours facilities. This could be problematic for smaller schools and for schools wishing to provide facilities for other clubs and activities. Flexible divisions within the school hall could be a solution. By considering these issues early in the design

process, the best possible provision can be made for all children.

Some of the key considerations when designing for extended services are:

– **Stakeholder involvement**

Community stakeholders should be involved in the project as early as possible to create an inclusive process, but should understand that the running of the school is the top priority, and design solutions should work for everyone.

– **Accessibility and security**

Be clear about which areas of the building will be accessible to the community during the school day. The entrance is key to creating an inclusive, welcoming building while also maintaining security and child protection.

– **Flexibility**

The arrangement of spaces needs to take into account how the building will work in a range of different situations, at different times of the day and week.

– **Management and running costs**

A school that is used intensively all day, every day, will get a lot of wear and tear. The building fabric and external landscape should be designed to be durable and easy to maintain, perhaps adding to the initial cost, but saving money in the long term. Running costs should be split between different users in advance.

These and other issues are considered in more detail in the DfES publication *Designing Schools for Extended Services*, which also includes a practical checklist.⁹

1.4 Encouraging parental involvement in children's education

Evidence shows that when parents are involved in their children's education and their school, children get more out of their schooling and their attainment is greater.

The design of primary schools can positively help this process by encouraging parents to come into the building and, once inside, making the experience enjoyable and making them feel positive about returning.

Parents can be prompted to become involved by:

- making the school entrance welcoming and easy to find
- providing a comfortable reception area
- creating parent facilities within the school, such as a dedicated room for adult education classes (such as English lessons), governors' meetings or other community activities, to be used both during and outside normal school hours.

The DCSF Standards website lists a selection of case studies where schools have successfully encouraged parents to be involved with the school and children's learning.¹⁰

Getting involved: Reading's Coombes School uses outside spaces for teaching, learning and play – and it encourages community involvement.



1.5 Inclusion

Providing for a range of abilities in every school

Every school should be built to inclusive design principles. The design process should be inclusive, involving children who are currently at the school and perhaps recent leavers, parents, local people, specific groups such as young mothers and older people, and people with learning disabilities and neurological conditions, including those with sensory and physical impairments.

Making a mainstream school more inclusive will create advantages for all the children taught there. For example, an amplification system provided in all classrooms (called a sound field system) will specifically assist children with hearing impairment, and will also help audibility for all other children. It sends a clear message that all children are equal, regardless of their needs, encouraging greater understanding and tolerance throughout the whole school community.

The government is committed to including children with disabilities, both cognitive and physical, in mainstream schools, unless their specific educational need would be better met in a special school.

There are various approaches to inclusion:

- Special schools for pupils with greater needs can be located on the same site as a mainstream primary school. For example, West London Academy, Northholt, London, is an ‘all-through’ school from primary to secondary stages. It incorporates the John Chiltern SEN school that is located in the middle of the academy.

- Specialist areas, for example for children with hearing impairment and communications difficulties, can allow children to be taught partly in the mainstream school and partly in the specialist facilities.

New Bewerley Community School, Leeds, has a special inclusive learning centre (SILC) included in the school.¹¹ Children with specific needs use the SILC in the morning and join mainstream classrooms in the afternoon. The food technology room is adapted for specific needs by having a workbench, sink and cooker with adjustable heights. The school works in partnership with Broomfield SILC in giving children with specific needs the opportunity to be taught in a mainstream school.¹²

- Mainstream schools can be made more inclusive throughout so that children with specific needs can participate fully.

Pinewood Infant School, Farnborough, Hampshire, is a small, one-form entry school. It has an integrated resource for 15 children with speech and communication difficulties. The design allows classrooms to be a generous size which all children benefit from.¹³

Design considerations for special educational needs can be complex and need to be thought through from the outset of the project. The DCSF's *Building Bulletin 102: Design for disabled children and children with special educational needs* provides detailed guidance.¹⁴ CABE's publication *Inclusion by design* offers everyday examples from various settings demonstrating how good design can help create places that work for everyone.¹⁵



Signing in: the Dalry Primary School includes sign language graphics on the classroom wall

Key considerations include:

- **access** clear, simple layouts, with accessible circulation routes, suitable for wheelchair users; ergonomic details, such as door handles at the right height; means of escape designed to take account of people with a range of physical and cognitive disabilities
- **space** more space for the use and storage of specialist equipment
- **sensory awareness** visual contrast and texture; avoidance of glare; good-quality acoustics
- **enhanced learning** sound amplification systems; accessible workstations, furniture and fittings; easy access to ICT resources, aid and mobility equipment
- **flexibility and adaptability** movable partitions to create differently sized spaces; adjustable environments, in terms of lighting; movable furniture for different activities
- **health and well-being** additional personal care facilities and specialist medical and therapy facilities may be needed
- **safety and security** minimising the risk of harm can be important where children have more challenging behaviour
- **social sustainability** in addition to environmental and economic sustainability, social sustainability involves schools developing as models of social inclusion, enabling all pupils to participate in school life, irrespective of their culture, race or special educational needs.

1.6 ICT in primary schools

ICT is a rapidly changing area, fundamental to the transformation process of primary schools. It is vital that the school has a clear, long-sighted vision of how ICT is going to be used, which will inform the design of the learning spaces. As computer densities have increased, air conditioning has been installed in more classrooms to prevent overheating. Both ICT and air conditioning have served to increase the energy requirements and thus CO₂ emissions of schools over recent years. Design teams therefore need to consider carefully how these can be

minimised, for example by using natural ventilation systems to remove excess heat and specifying low-energy equipment.

Guidance, standards and specifications for the implementation of ICT are available from BECTA in its *Technical Specification: Institutional Infrastructure*.¹⁶ BECTA can also advise on the strategic development and delivery of e-learning. There is also useful information to be found in guidance material from the zero carbon schools taskforce.¹⁷

Some of the issues to consider are:

- portable or fixed equipment? whiteboards, PCs, tablets or laptops?
- wireless or hard-wired networks?
- is a dedicated ICT suite required?
- will other media be used, such as palm tops, video or mobile phones?
- should raised floors be provided in some areas to provide maximum possible flexibility for installing cabling in the future?
- storage for equipment
- location of whiteboards to avoid glare or reflection
- off-site server provision
- extension of ICT services to the wider community.¹⁸

It is difficult to predict future advances in ICT, so flexibility is sensible. For example, wireless should not be ruled out in the future, even if wired networks are used initially.

Shared network: Kingsmead Primary School uses laptops in its classrooms rather than having one ICT room



Case study

Creating an inviting and welcoming school

Sharrow Primary School, Sheffield

Sharrow Primary School is a new school, built on a tight urban site in a dense inner-city area. Previously two separate infant and junior schools, the new school was built on the infant school site, next to a small community park.

The school and the architects agreed that the new building should face the park, encouraging families to walk to school and avoiding vehicle access to the main entrance. The orientation of the school takes maximum advantage of space, light and the park. The classrooms facing the park have attractive views over the valley, which is especially refreshing in such a built-up area.

Bright pink gates greet children and families as they enter the school grounds from the park, making a bold and welcoming statement. Curved wooden seating, for children and parents, and a pergola are two interesting features in the school grounds. These were commissioned from artist Andrew Skelton who also made pieces of furniture for the reception area from timber reclaimed from the old school.

The reception area is a warm and inviting space which opens out into a larger atrium, rising to the first floor and flooding the central space with natural light. This atrium enabled corridors to be omitted from the school plan. The lift shaft in the middle of the atrium is painted pink, adding colour and linking this entrance area to the gates. The space is designed to encourage people to linger, especially at the end of the day when children are being

Bright start: Sharrow Primary has distinctive pink entrance gates and a large wooden walkway to the main door

collected. An open plan library is for the community as well as the school children.

As 80 per cent of the school's pupils speak English as an additional language, literacy is very important, not just for pupils but also for their families.

Architect Cath Basilio is delighted that this central area has become a hub of activity at certain times of the day, where people of different cultures and ages interact. 'Pupils gain great experience from meeting and listening to the many visitors, developing social, language and citizenship skills,' she says.

The school is visually striking and makes a statement, giving it an identity in its community. It is inviting and welcomes families, carers and the wider community into the heart of the school.

Further information

Sharrow construction bodies: www.cabeurl.com/2c

School website: www.sharrowprimary.ik.org

NCLSCS case study video: www.cabeurl.com/2d

Architect: Sheffield Design and Project Management, Sheffield City Council



In the pink: a large panel covers the back of the lift shaft and makes a decorative piece that links the design of the school gates and entrance



© Cath Basilio



Case study

Remodelling a primary school to improve accessibility



Burnham Copse Primary School, by Hampshire County Council © Dan Keeler

Burnham Copse Primary School, Hampshire

Hampshire County Council has invested £2.7 million refurbishing, remodelling and extending the former Burnham Copse Junior School in Basingstoke to create a one-form entry primary school building.

The junior school building was built in the 1950s and started life as a secondary school. The original layout was three separate buildings that were joined only at ground level by a continuous corridor. This made it inadequate for disabled access to upper levels.

The plan was to extend, remodel and refurbish the building to make it fully accessible and provide pre-school accommodation, seven classrooms, a library/resource area, a music and drama classroom, ICT suite, food technology and craft rooms, a small group tutorial room, and administration and storage areas.

The aims of the brief were to:

- improve accessibility throughout the school
- improve the environmental conditions within the classrooms
- produce a scheme which celebrates outside learning
- reorganise the dynamics of the school to ensure the entrance and staff areas are at the heart of the school
- create a new identity from the tired existing school
- provide a scheme that is cost effective and is easy to maintain.

Educational transformation: this 1950s building has been turned into a fully accessible school building with the addition of the walkway on the upper level

The response to the brief was to remodel the internal space, build a specialist teaching extension and provide an external walkway at first floor level to link all three existing blocks.

The walkway acts as a balcony for all upper level classrooms, enabling full access with the addition of a fire evacuation lift located in the heart of the school. The canopy of the walkway provides shade that prevents overheating and glare in the classrooms and provides sheltered outside teaching spaces.

Attention was paid to the material and colour palette for the building, both inside and out. Colours were chosen so that its appearance would change subtly throughout the day. The positioning of the walkway structure was designed to offer uninterrupted views from the classroom. These detailed decisions have all made for a more pleasant learning environment.

The project was completed on time and the construction period was 38 weeks. An advanced enabling contract facilitated asbestos removal and compliance with a Natural England bat licence.

The overall strategy to reuse, refurbish, extend and adapt the existing building proved to be a more economic and sustainable solution than demolition and new build. Both children and staff are very pleased with the result. The response to client's brief has led to an innovative and attractive school building that performs well both operationally and environmentally and represents value for money. The school won a RIBA Award in 2009.

Further information

Architect: Hampshire County Council

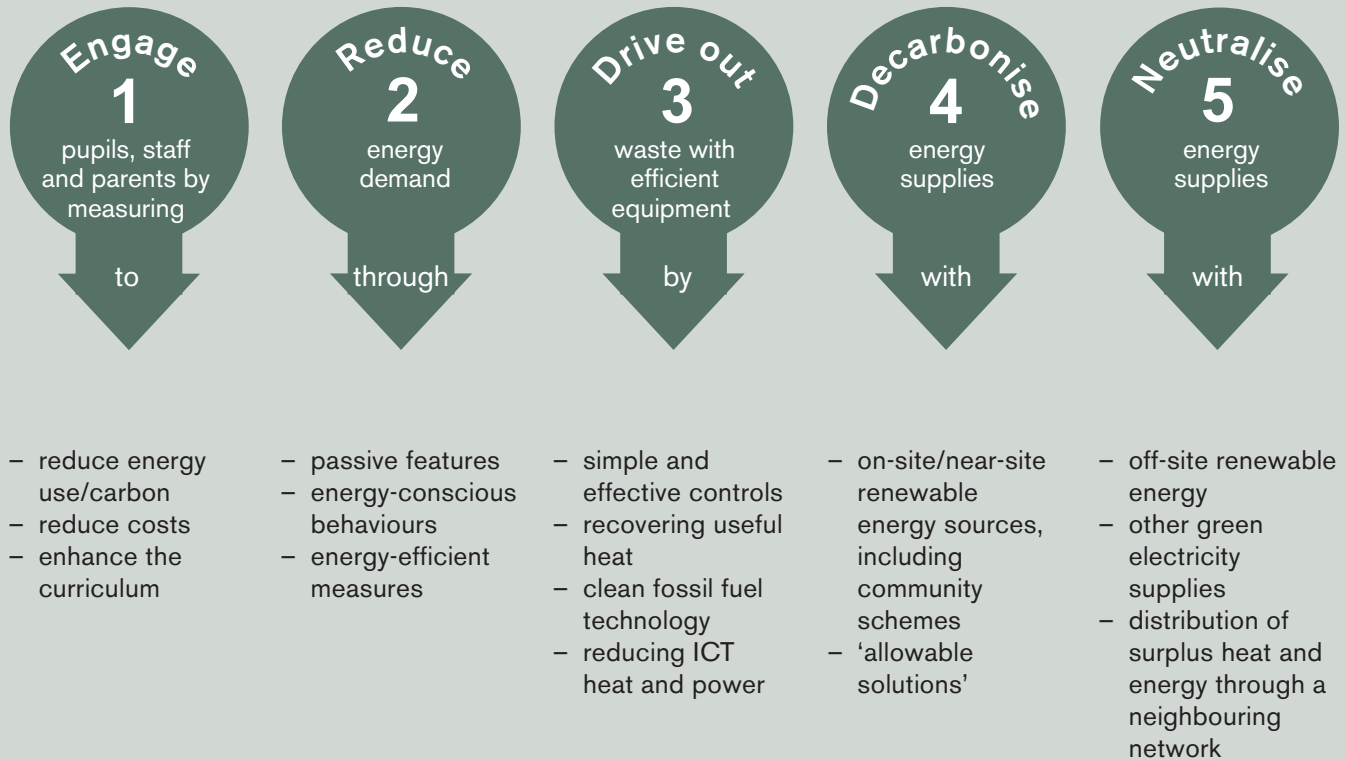


Burnham Copse Primary School, by Hampshire County Council © Dan Keeler

Shading: The walkway provides essential shading for classrooms on the ground floor

The carbon/energy hierarchy

Summary approach of zero carbon schools taskforce



'Halve the demand, double the efficiency, and halve the carbon in the supplies, and you are down to one-eighth of the emissions' Taskforce member Bill Bordass

Figure 1

The hierarchy diagram shows that saving energy and carbon is first a question of behaviour change and then one of designing and making better schools with better controls and lower energy equipment, properly managed; beyond that zero carbon requires 'allowable solutions' such as zero carbon district power and heat networks

1.7 Sustainable schools

Schools have an important role to play as models of good practice in the design of sustainable buildings. As places of learning, they can physically demonstrate to students and the wider school community our impact on the planet, and encourage them to take steps towards living more sustainably.

Sustainable design is complex and about far more than simply building with a low carbon footprint or using environmentally friendly materials. CABE defines sustainable design as:

*a dynamic process that enables all people to realise their potential and improve their quality of life in ways which simultaneously enhance and protect the Earth's life support systems.*¹⁹

All aspects of sustainability, including energy and water use, food consumption, modes of transport for students and teachers and the grounds around the school buildings should be considered in the design of primary school buildings. Sustainability also requires local inclusion and participation in the whole life of the school.

The DCSF has published a useful resource for local authority clients, called *Delivering Sustainable Communities through Sustainable Schools*.²⁰ It introduces the national framework that has been established to guide schools towards being sustainable.

The framework comprises three parts:

- **a commitment to care** – extend existing commitments to new areas such as caring about energy and water usage, food consumed at school and traffic generated by schools
- **an integrated approach** – explore sustainable development through curriculum, campus and community
- **a selection of 'doorways' or sustainability themes** – these are entry points for schools to establish or develop their sustainability practices. Buildings and grounds are listed as one of the doorways.

The DCSF has also appointed a taskforce to advise on how new school buildings could become zero carbon by 2016. The zero carbon schools taskforce²¹ is chaired by leading architect Robin Nicholson, and has a panel of experts from the construction, sustainability and education sectors. They aim to overcome the technical, design and construction challenges that will be faced by schools and their design teams leading up to 2016.

The Children's Plan recognised that school building programmes must support government aims to reduce carbon emissions. This long-term goal builds on the DCSF's immediate requirement that all new school buildings reduce their carbon emissions by 60 per cent compared with those designed to the energy efficiency standard set out in the 2002 building regulations.

Case study

A sustainable school



St Luke's Primary School, Wolverhampton, by Architype. All photos © Leigh Simpson

St Luke's Primary School, Wolverhampton

This is a new-build primary school in the heart of the Blakenhall estate regeneration area. It opened in April 2009. Originally the school was located on two sites and one of the key requirements was that the new building would bring everyone together on one site. Ninety per cent of the pupils speak English as a second language and the turnover of pupils is very high.

The school demonstrates an integrated approach to sustainable development through:

- **curriculum** using the building and its sustainable credentials as resource material for lessons
- **campus** the design of the building uses sustainable material throughout
- **community** the school has additional areas for community use.

The school's aspiration was to have a modern, low-energy building with cutting-edge sustainability credentials. The school had a specific focus on reducing energy consumption and set the design team a challenging BREEAM excellent target, which it achieved in July 2009.* The architects, Architype, have a strong track record in sustainable design.

Timber is used in every aspect of the construction of the building and all other materials used are sustainably sourced including:

- UK-grown Douglas Fir wood for external cladding
- cedar roof shingles
- recycled cellulose insulation

Material difference: a main requirement for the design of St Luke's was that it should be sustainable. The structure is timber framed and sustainable materials were specified throughout the building

- high-performance timber windows
- a timber frame made of pre-fabricated panels and laminated timber structural frames
- linoleum, rubber and recycled carpet flooring
- ply built-in furniture and linings treated with natural oils.

The form and section of the building reduces energy consumption by maximising natural daylighting, using a passive ventilation system, and carefully controlling solar gain. A large canopy running along south-facing classrooms provides extended teaching space as well as shade from summer sun. Every classroom is cross-ventilated with a combination of manual low-level windows and automatic clerestory windows (ie a line of windows above eye level) linked to the building management system. North-facing clerestory windows introduce additional daylight without glare to classrooms and large open-plan spaces. Good daylighting throughout the school minimises the need for artificial lighting. The underfloor heating is powered by a biomass woodchip-burning boiler.

Simple cartoon guides are displayed in each room to explain to users how the building works and the

best way to control the environment in each room to minimise energy use. Specialist software is being installed to provide minute-by-minute monitoring and feedback of energy and water consumption. Results are displayed in a prominent position in the school and are accessible from all computers on the network.

Extended school and community facilities have been provided as part of the school. There is generous space for parents, carers and the wider community to attend activities during the school day. There is a kitchen area for community use that is also available for breakfast and after-school sessions. This part of the school can be accessed via the reception area while the rest of the school is locked. This is a place for parents to come and mix with other community members and to participate in training sessions that help with language and parenting skills. The school is very keen to support the whole family and the building has provided facilities to enable this to take place.

Further information
 Architect: Architype

*www.cabeurl.com/9u



1.8 Outside spaces in education

Investing in the design of school grounds can create stimulating and creative places, which support curriculum learning and give children rich and varied experiences that may not be available to them at home.

You should consider:

– The outdoor classroom

This can be used for many teaching activities in good weather. It might be a paved area, with enough seating space for a whole class, perhaps directly outside the classrooms and possibly with shelter from the weather. Or it might be a quiet area with seating for small groups and individuals for independent study and socialising.

– Environmental education

Opportunities for studying nature, growing food and observing climate can be integrated even into tight urban sites.

– Sport

Grass sports pitches and hard games courts are needed to satisfy the curriculum requirements for PE, as well as the Education (School Premises) Regulations.²² More information is available in the DfES *Building Bulletin 99*.²³

– Socialising and imaginative play

Fundamental to primary-age education, the imaginative design of outdoor spaces can

encourage creative play and help children develop social skills. Excellent examples can be found on the Play England²⁴ and Learning through Landscapes²⁵ websites.

– Sustainability

School grounds can help make the school more sustainable. Deciduous trees can provide shade to internal spaces in summer while allowing sun to penetrate the classrooms in winter. In urban areas, tree canopies can help to reduce the urban heat island effect, which sees warmer temperatures in built-up areas caused by buildings and heat emissions.

– Engaging the school community

Some schools have successfully engaged pupils and the wider community in the design of their grounds. West Sussex County Council's sustainable schools Engage initiative is an example of how local authorities can instigate a sustainable programme throughout all schools, including working with school grounds.²⁶

Safe play: Pinewood Infant School has a variety of play spaces including wooden climbing equipment with bark floor



Pinewood Infant School, Farnborough, by Hampshire County Council © A&M Photography

1.9 Healthy eating

There are many new initiatives focused on encouraging healthy eating in schools. The government policies are listed on the TeacherNet website.²⁷ The government's Food in Schools Programme is a joint venture between the Department of Health and the DCSF and its objective is to transform the quality and provision of school food. The programme aims to:

- raise the nutritional value of school food
- increase the number of children choosing to eat a school meal
- improve the health of children through the quality of their diet
- encourage children, through their experience of food, to develop attitudes and understanding that will support healthy eating.

Well-designed primary schools can support these objectives. For example:

- full service kitchens can produce tasty and nutritious food on the premises, rather than reheating food brought in from elsewhere. The DCSF has produced guidance material to help with school kitchen design²⁸
- dining areas should be designed to encourage social interaction and provide an interesting setting for the enjoyment of eating, as well as being flexible enough to be used for different activities at other times of the day and to encourage parents and extended family members to share in school meals on special days

Light lunch: Northbury Primary School has a glass roof that provides excellent daylighting

Northbury Primary School, Barking, by Greenhill Jenner Architects © Charlotte Wood



- outdoor dining spaces, ideally located adjacent to the indoor dining hall, can provide additional dining capacity as well as an alternative dining experience in fine weather
- growing fruit and vegetables can enhance curriculum learning. Many primary schools that have allotment areas within the school grounds involve children in growing their own food.

The School Food Trust has been working closely with the DCSF and other key stakeholders to highlight the important issue of providing adequate kitchen and dining space in schools.²⁹ It encourages consultation with catering staff and pupils when designing or redesigning catering facilities. The trust is working with stakeholders to improve the supply and quality of school meals through improved efficiency, infrastructure and skills and ensuring their sustainability. Its website covers a range of healthy eating case studies in both primary and secondary schools.

Case study

Healthy eating

Redbrook Hayes Community Primary School, Rugeley, Staffordshire

Located in a former mining community, up to 20 per cent of pupils at Redbrook Hayes Primary are eligible for free school meals.

The school wanted to use its new design to forge closer links with the local community and get parents more involved in school life, including its healthy eating programme. A core design principle was to hold as many activities as possible in the heart of the school, in the new, light-filled dining areas.

Each term, parents and other family members are invited to share school lunch, cooked on site. There is also a grandparents' day for each class. These are popular and the children enjoy showing their families around. The family events are seen as a very positive step, opening the school to the wider community. Family picnic lunches in the summer term give parents/carers an insight into the important role the school grounds play as outdoor classroom areas.

The bistro area, used by children who bring packed lunches, is also used for curriculum-related activities such as cooking and family learning projects. Screens between the dining hall and bistro can be opened to create a large space: great for celebration events. Healthy schools meetings are also held in the bistro for children, staff and parents/carers. It also acts as the refreshment area at parents' evenings, celebration assemblies and shows.

Café culture: Redbrook Hayes Primary brings community activities and healthy eating into the school



The hall and bistro act as a window to the whole school, allowing the children to see each other, their friends and family members learning together. Teachers spot any potential misbehaviour. It is a hub of activity and there is a strong community and pastoral feel.

Headteacher Mandy Chaganis believes that the design has worked well, raising aspirations and creating a positive culture shift that is evident throughout the school. It provides a highly functional environment on a domestic scale.

Further information

CABE case study: www.cabeurl.com/2e

Architect: Walters and Cohen Architects

Community focus: the school has a public library on site.
Parents join children for lunch in the bistro



© A&M Photography

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- 25 Learning through Landscapes, www.cabeurl.com/z
- 26 West Sussex sustainability programme: Engage – sustainability in schools, www.cabeurl.com/11
- 27 This TeacherNet resource page lists policies on food and drink in schools, www.cabeurl.com/12
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2 Background to school projects



2.1 People involved in primary school building projects

The client

There is no standard model or structure, but the following groups may have important client roles:

- **The local authority**

The local authority usually owns the land and buildings, employs the designers and the building contractor and signs the contract with them. Funding is often channelled through the children's services department of the local authority. In the case of voluntary-aided schools, the voluntary organisation takes on this role. For example, the Diocesan Board of Education is the client for Church of England and Catholic schools.

- **School governors**

Governors have considerable responsibility for their school premises through local management arrangements. Usually they must formally agree any building proposals before work starts on site, as they have responsibility for maintaining the premises after completion. The governors have responsibility for educational standards in their school, and therefore they should be satisfied that the designs of any new buildings or refurbishment will fully support their educational vision.

- **Headteachers**

The headteacher will lead the client team within your school and push forward the vision for the project. You and your staff will have a key role in

Creative solutions: clients have a critical role to play in designing the building

making sure that the design of the building will support your school's educational vision.

- **Pupils and parents**

It is good practice to consult and involve parents and children as much as possible. The school council can provide a useful conduit.

- **Community**

School buildings are an important community resource, so community groups and other potential users of the building can be regarded as indirect clients.

- **Local education partnerships (LEPs)**

These are partnership bodies set up as part of the BSF programme. The majority shareholders are private sector consortia, and in some cases local authorities may use them to deliver building projects in primary schools. The LEP may be the contractual client on behalf of the local authority, but this should not diminish the role of the other school clients in the process.

In most cases, several different individuals and organisations together make up the client body. You should discuss the extent of your involvement with the local authority so you are clear from the outset about which areas of the project you will have responsibility for.

Client advisors

During the last decade of rapidly expanded school building programmes, several techniques have been developed to help clients achieve high-quality design. These generally involve design experts, not actively involved in the project, to provide independent advice at various stages.

– **CABE enablers**

CABE has a panel of some 300 experts, from all the built environment professions, who are available to give free advice to clients. CABE Space, which deals with parks and external spaces, also has a large panel of enablers who may be able to advise on the design of school grounds. For more information visit www.cabe.org.uk/enabling

– **Design review panels**

These groups of design experts assess projects during or at the end of the design stage, and form an opinion on the design quality. CABE has used design review panels since its inception, and the system has found increasingly wide acceptance, particularly by clients and local planning authorities. In addition to the national CABE panels, there are now many design review panels at local and regional level, often run by the local authority.¹

The CABE schools design review panel normally only considers secondary schools. Primary school projects are more likely to be considered at a local level. Planning applications for a primary school project may be referred to a local design review panel for comment, but a school can also request a review from its local panel. CABE is affiliated with eight independent regional design review panels and works with them to provide consistent and good-quality design advice across England. To find out if you have a local panel, contact your nearest architecture centre, or ask the Architecture Centre Network for advice.²

– **Client design advisor**

Mandatory for the BSF secondary school programme, a client design advisor (CDA) is a skilled construction professional with a sound

knowledge in designing education buildings who advises the local authority and the school. This person must not only be an expert in school design but also be extremely competent at communicating and working with stakeholders. Although not mandatory for primary school clients, the CDA provides high-level knowledge and experience of the design and construction process, helping to ensure clients are adequately prepared, clear about their requirements and able to make the most of the opportunities that the school building presents. The CDA can help at all stages of a project by:

- promoting awareness of design quality among stakeholders and the design team
- carrying out option appraisals and feasibility studies before the architect is appointed
- helping to develop the vision for the project
- assisting with brief preparation
- reviewing and evaluating design proposals at key stages
- checking the design proposals against the technical requirements of the brief, with assistance from other specialist advisors if necessary.

– **Design champion**

Ideally someone in a senior role within the client body, a design champion takes responsibility for ensuring design excellence throughout the development of the project. The design champion might be a local authority officer or an elected member who is sufficiently detached from the project to take an objective view of design quality and who has sufficient authority to intervene if he or she feels standards are in danger of falling. There are no rigid rules about how design

champions should carry out the role. Some suggestions are set out by CABE in *Building Schools for the Future: the role of a design champion*.³

Design team

Building projects require a range of professional skills provided by consultants from several different disciplines. For everyone to work together effectively and creatively, they need to be co-ordinated as a design team.

The design team should meet regularly to co-ordinate its work and produce an integrated design. Design is an iterative process, with the proposals being reviewed and re-worked by team members as progress is made. At set points in the process the team should produce a design report for the client to sign off before the team progresses to the next stage.

The roles of the usual members of a design team can be summarised as follows:

– **Design team project manager**

The design team needs a clear structure, a well-organised and effective team leader, traditionally the architect or the project manager, and agreed processes and timescales.

– **Architect**

The architect has overall responsibility for designing a building, including all the construction detail, and makes sure that the requirements of all the other disciplines are properly addressed in the design.



St Luke's Primary School, Wolverhampton, by Architype © Leigh Simpson

Team work: at St Luke's the design team worked closely with pupils on their new school



Gateway Primary School, London, Extension by Shepherd Epstein Hunter © Dennis Gilbert

Building bridges: at the Gateway Primary School, a new extension is joined to the Victorian building by use of a large staircase

- **Landscape architect**

The landscape architect makes sure that the natural features of a site are exploited and enhanced, to create an attractive external environment.

- **Building services engineers**

Mechanical engineers deal with heating and ventilation; electrical engineers are responsible for electrical power, lighting, alarms and ICT networks. Both should develop effective environmental designs for the building, in parallel with the architectural design. Their design solutions will have a significant impact on the sustainability of the building and its energy efficiency.

- **Structural engineer**

The structural engineer is responsible for all advice on the structure of a building, including detailed designs for the steel or concrete frame, floors and roof structures and foundations.

- **Quantity surveyor**

The quantity surveyor is the cost advisor for a project. In the initial stages he or she will advise on the budget; during the design stages the job involves preparing costs estimates to make sure the project is still viable. When the design is complete, the quantity surveyor may produce a bill of quantities to obtain competitive quotations from building contractors.

- **Construction design and management (CDM) co-ordinator**

For projects that last more than 30 days on site or involve more than 500 person days of construction work, the client has a legal obligation to appoint a person to this role. The primary duty of the CDM

co-ordinator is to consider all health and safety aspects of the design work and prepare a health and safety file.⁴

– **Artists**

There has been great success in bringing artists into primary schools to use the building project and the wider built environment as a tool to aid curriculum and cultural learning. Their involvement can produce exciting artworks, to be displayed inside or outdoors in the school, and which are often a source of great pride for the children who were involved in the project. Examples range from mosaics on a wall or in a floor to drawings etched into glass windows.

Some organisations might contribute towards the cost of employing an artist, including:

- Arts Council England⁵
- Royal Society of Arts⁶
- CABE Education⁷
- Creative Partnerships⁸
- *Find your Talent* pathfinders⁹
- arts officers at your local authority.

– **Access consultant**

Access consultants are responsible for making sure there is inclusive access to the school's services. They can help clients meet their duties under the Disability Discrimination Acts 1995 and 2005, and may also be involved in meeting planning requirements and building regulations for new and extended buildings.

– **Other disciplines**

These might include interior designers, acousticians or highway engineers.



Larmenier and Sacred Heart Primary School, by Studio E © Kilian O'Sullivan

Art lessons: decoration throughout
Larmenier and Sacred Heart Primary School
includes canopies shading the classrooms

Case study

Public art programme

Barton Hill Primary School and Children's Campus, Bristol

Replacing three schools that were spread across three sites and provided cramped accommodation, the new school provides integrated services for children from 0-11 years and is open from 8am to 6pm. The new school is a landmark building in its surroundings and has strong links with the community.

As part of the rebuilding scheme, the funding and delivery organisation Community at Heart put aside £40,000 for public arts projects. From the outset there was a clear objective to include the pupils in the programme. A steering group was set up which included teachers, pupils and stakeholders and they drew up a project proposal plan.

A children's art group was formed with pupils from both the infant and junior schools. They helped to select a facilitator for phase 1 of the public arts programme and commissioned Reckless Orchard, funded by Creative Partnerships, who helped them commission artists Annie Lovejoy and Mac Dunlop through a competitive interview process.

The brief for the artists was to develop and produce public artwork to be integrated into the new school, and to collaboratively develop work that would be relevant to the community.

The children's art group visited the architect's studio and made regular visits to the site to talk to the construction team, make sketches and take photos. Despite the complex logistics and the health and

Art history: artists worked with children from Barton Hill Primary to tell the story of their role in the design of the new school



Barton Hill Primary School, Bristol, by Architype. All photos © Annie Lovejoy and Mac Dunlop

safety issues, these visits were immensely rewarding, providing much of the subject matter for the art work.

It was decided that the new building should display the pupils' drawings as decoration on windows and glazed panels. The glazing along the internal corridors shows images of children and sunflowers, inspired by the golden section, the mathematical relationship found in natural growth patterns. The façade at the front entrance to the school provides a striking street presence, using brightly coloured, abstract glass panels inspired by images found in the art archives of the old school buildings.

The nursery window design reworked children's artwork to create an abstract and intricately patterned composition.

Involving pupils closely in the building project gave them an opportunity to observe different professionals at work, including architects, builders, craftspeople and artists.

This was a collaborative project, and presented challenges in terms of communication and schedule. A blog was set up for progress reports and individual comment, and a booklet about the project was produced by the artists, and these helped with dialogue and dissemination.



Further information

Public Art online: www.cabeurl.com/2f

Architects: Architype

Artists: Annie Lovejoy and Mac Dunlop

2.2 Being an excellent client

A strong, informed and involved client is more likely to create a successful building. To quote a successful commercial client:

*You must have a client...that has to be single-minded and must be a patron. He or she has to be the individual in the organisation who has the authority, the vision and the financial muscle to make the project happen.*¹⁰

This principle is especially true in primary schools, where an individual providing strong leadership, supported by a good team, can bring out the full potential of the building project.

Strong leadership is about vision, good decision-making and effective communication, all supported by a robust project management structure. Local authority officers, headteachers and governors have all demonstrated excellent leadership, creating exemplary buildings.

One common feature of successful projects is a clear client structure, where all the different client stakeholders have a defined role and where there are specific arrangements for them all to be kept informed and involved in decision-making.

CABE's *Creating excellent buildings* is a detailed guide for clients on how to achieve successful buildings.¹¹ The general principles it explains can be readily applied to primary school projects.

2.3 The role of the local authority

In the majority of primary school projects, the local authority will take the lead on technical and procurement issues. In most cases it will:

- arrange the funding
- decide the method of selecting the design team
- co-ordinate production of the brief
- co-ordinate with the local planning authority on planning applications
- monitor the design work as it proceeds
- procure the building contract
- sign all contracts.

The local authority will be familiar with European Union rules for procuring goods and services, and the council standing order relating to the letting of contracts. These are complex issues, and the council's specialist knowledge will be invaluable to schools.



2.4 Integrating the project into wider regeneration plans

Investment in primary schools can often fit into wider regeneration plans. Indeed, linking a primary school project to other initiatives, such as children's centres, Sure Start projects, health centres or other local authority service delivery points, can be mutually beneficial, although sometimes complex to deliver. This approach will need advanced strategic planning by the local authority before the building process begins.

In addition, there is an emerging trend to co-locate primary schools with secondary schools and/or special schools, creating all-age through schools. In educational terms, these arrangements can bring advantages, and they may be more economical because of the capacity to share management facilities for buildings and grounds.

For primary schools there are several design issues to address, including:

- Can the primary element be segregated sufficiently to provide adequate security and safety for the children?
- Will the design make sure that primary children do not feel intimidated by the older children, for example when using the dining area?
- Can the primary school use facilities in the other institutions on the site without causing disruption?

Community benefit: St Luke's Primary in Wolverhampton features a community area that can be used without having to enter the school, so allowing use out of hours

- Can the children from a co-located special school integrate with the primary school for some of their education?
- Can the special school be made to feel equal to the primary, for example, by sharing the entrance?



St Luke's Primary School, Wolverhampton, by Architype © Leigh Simpson

Case study

New school as catalyst for regeneration



Kingfisher Primary School, Solihull, by ADP LLP. Photo right and opposite © Martin Cleveland

North Solihull Partnership regeneration project

The sprawling former council estate around Chelmsley Wood, Solihull, houses approximately 45,000 people in 16,000 homes. In 2004, Birmingham City Council formed a public-private partnership, the North Solihull Partnership, to raise the quality of life for local people and improve outsiders' perceptions of the area.

At the heart of this programme was the creation of 10 new extended primary schools, as well as providing new homes, village community centres and health facilities. The proposal responded to the government's Children's Plan, which urges local authorities to provide services that are integrated, local and accessible to all. The local primary school is often an ideal location for this provision.

Funding for the new schools came from a variety of sources, including:

- PCP funding
- money from land sales, including the sale of five existing primary schools
- the schools themselves
- devolved formula capital
- targeted capital fund
- extended schools
- a parish council
- Arts Council England.

The project was pump-primed using a loan from the partner developer: good schools help to sell local houses.

Regeneration role: Kingfisher Primary has played a part in reviving Chelmsley Wood

The first new school, Kingshurst, was completed in early 2008. It includes a children's centre, and wraparound care and adult learning facilities linked to the local post-16 college. By having the children's centre on site, there is an improved relationship between early years providers and the staff in the school's foundation stage. The building was designed to allow staff from partner organisations to integrate, whilst being mindful of the need to keep the pupils safe during the school day.

The second school, Kingfisher, opened in February 2009. This school is at the heart of the first of the village centres, with the school, health services, leisure and retail opportunities easily accessible. The parish council worked with the partnership to provide a community meeting space and supervised access to keep-fit and sports activities. When the whole village centre is complete, there will be a community café in the new High Street, providing the public with easy access to the leisure and learning facilities both during and beyond the school day.

The North Solihull Partnership recognises that it is more important than ever to link area regeneration with school building and that a wide partnership approach is effective. By involving colleagues in education, social care, health and housing, as well as wider council services, the community and voluntary sector, capital investment can be maximised and the resulting improvements in the community are more likely to be sustained over time.

Further information

Regenerating north Solihull: www.northsolihull.co.uk

Architect: ADP



Break-out space: the central area between classrooms is lit by natural daylighting from above



Community centered: the primary school is located close to local amenities

© ADP LLP



2.5 The role of the school

There is a wealth of expertise within every school community, from the headteacher to the caretaker, which all needs to be marshalled to ensure the building project succeeds. It is important that everyone has the opportunity to contribute in some way, and that the whole school has a sense of ownership of the project.

A structure needs to be established so that people know when and how they can have their say. It is often difficult for one person to take on the role of co-ordination while getting on with their normal day-to-day duties. The amount of time and effort required by the school to ensure that they get the building they want should not be underestimated. It is worth talking to other schools that have recently completed projects.

Some local authorities provide additional funding or support and some schools choose to bring in extra support to relieve the designated project manager for the duration of the project. Whatever the solution, it is best to plan so that the project is not compromised by a lack of capacity in the school to get involved and make decisions at the critical stages.

Music time: the new extension to the Lee-on-the-Solent Infant school provides additional space for music lessons

2.6 Involving stakeholders in projects

Involving stakeholders from an early stage improves the satisfaction with completed projects.

Successful consultation techniques include:

- **Design festivals**

Workshops are run by experienced facilitators, who lead discussions on a wide range of themes. A written report sets out key local issues, priorities and recommendations, which can be useful when writing the brief.

- **Tours of inspirational architecture**

Fostering creative thinking about what is possible in school design, these can be tailor made for different stakeholder groups, including pupils, linking to the curriculum.

- **Workshops with the school council**

These are useful for getting the views of pupils and engaging them in the variety of trades and skills involved with a new school build or refurbishment project. Members of the school council can feedback progress and outcomes to the rest of the school through presentations.

For more information about involving stakeholders, we recommend CABE's *Being involved in school design*¹² and the British Council for School Environments (BCSE) *The School Works Approach*.¹³ CABE's publication *Our school building matters* helps teachers to make the most of the learning opportunities created by a new school building project.¹⁴



Coombes C of E Primary School, Reading © Fiona McClean

Grounds for change: Coombes Primary School has a long tradition of using its school grounds as spaces for learning and fun

Case study

Design festival and impact on school design



North Road Primary School, Darlington. All photos © BCSE

North Road Primary School, Darlington

This large primary school is an improving school. It has a significant number of children with English as an additional language, or with special educational needs. The school looks out to the community: they are partners and learners together.

When the school was allocated funding for a new building as a PCP pathfinder, the council and school decided to commission the British Council for School Environments (BCSE) to run a design festival. They wanted a clear analysis of key issues that could inform the design process, and advice on building community participation into the building project.

The first step was to explore how pupils and staff experienced the school environment and the school day, and translate this into a design brief owned by the school. BCSE developed a process which uncovered issues, explored possible solutions and built consensus among stakeholders. The key elements were:

- working with the school to establish its priorities and to gather a data pack about the project to inform those involved
- holding a workshop with the school council to find out what the children wanted from their new school
- delivering a one-day design festival for 45 stakeholders from the school and the local authority, identifying critical issues and working towards creative design solutions through themed discussion sessions

Joint effort: staff and children were involved in writing the brief for their new school design

- holding an evening community drop-in, so that parents and community users could meet governors, staff, BCSE facilitators and local authority representatives, to put forward their own questions and suggestions and to see outcomes from the design festival
- producing a report, capturing key messages and pulling together conclusions.

Clear messages emerged. Stakeholders wanted a new school that:

- made them feel safe and secure
- was welcoming and accessible to their community
- was ICT-rich
- created an inspirational learning environment in which the children could achieve and flourish
- had classrooms in clusters, with external verandas
- was energy efficient and sustainable
- had external spaces that linked beyond the boundaries, such as allotments
- that valued the past and the history of the school.

All these issues were fed into the design brief, and the architects have tried to incorporate them into the design. For example, the design incorporates garden spaces, garden terraces and indoor-outdoor teaching spaces to support the school's educational vision.

Further information

Case study: www.cabeurl.com/2g

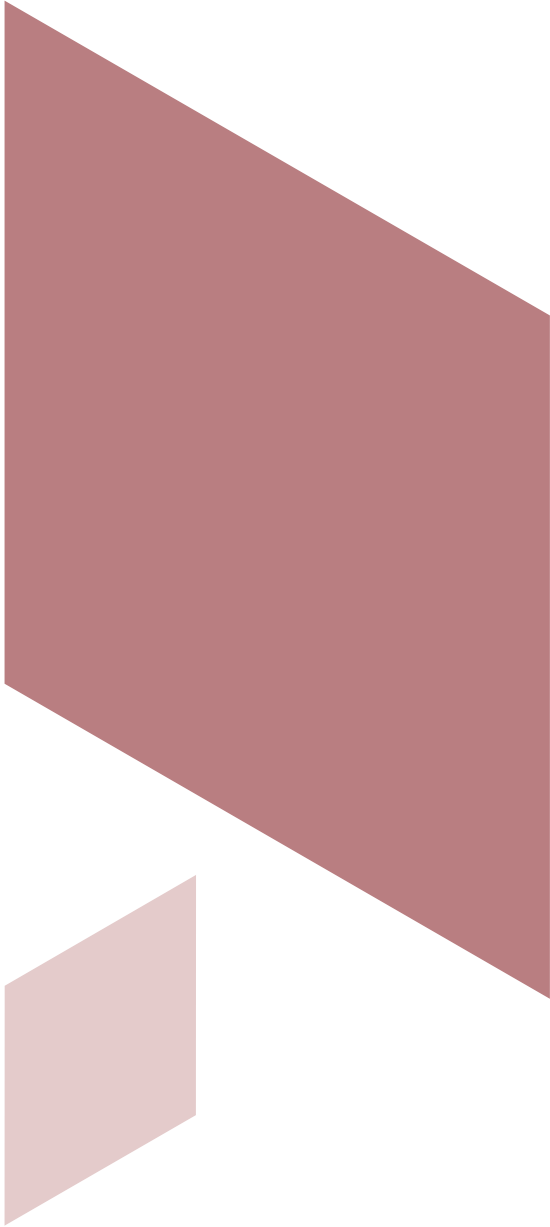
Further information: British Council for School Environments



Views wanted: a design festival was held to feed what the staff and pupils wanted into the design process

Section 2 – references

- 1 See CUBE design review, www.cabeurl.com/14
- 2 See Architect Centre Network, www.cabeurl.com/15
- 3 *Building Schools for the Future: the role of a design champion*, CUBE, 2007, www.cabeurl.com/7b
- 4 The Construction (Design & Management) Regulations 2007 are supported by an *Approved Code of Practice*, www.cabeurl.com/7a
- 5 www.cabeurl.com/17
- 6 www.thersa.org
- 7 www.cabe.org.uk/education/grants
- 8 www.creative-partnerships.com
- 9 www.cabeurl.com/1b
- 10 Rogers, Peter, The Client and the Design Team in Spence, R et al, *Interdisciplinary Design in Practice*, Thomas Telford, London, 2001
- 11 *Creating excellent buildings, a guide for clients*, CUBE, 2003
A brief summary with the 10 key points to being a successful client is also available, www.cabeurl.com/7c
- 12 *Being involved in school design: A guide for school communities, local authorities, funders and design and construction teams*, CUBE, 2004, www.cabeurl.com/2b
- 13 www.bcse.uk.net and www.schoolworks.org
- 14 *Our school building matters*, www.cabe.org.uk/education



Showing the way: Kingsmead Primary School in Cheshire wanted to create an exemplar of sustainable design and construction



3 Creating a brief



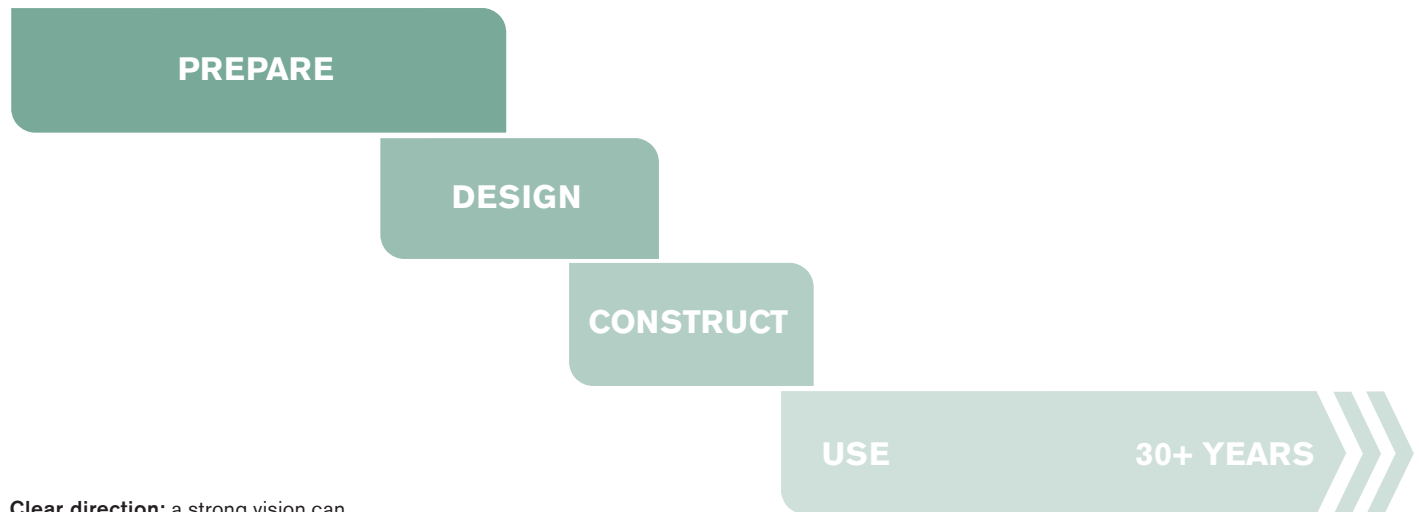
Red Hill Primary School, Worcestershire, by Worcester County Council © A&M Photography

3.1 The importance of a vision for a school building project

A clear vision is often the driving force behind a successful building project. It sets out the direction that the school wishes to take, highlighting its aspirations, its educational philosophy and its desires for the future.

Such a vision is the result of careful, collaborative thinking from every part of the school community. It is a vital part of the preparation stage, before any design work begins.

The four key stages in any project are simply represented in Figure 2 below which is taken from CABE's *Creating excellent buildings: a guide for clients*.¹



Clear direction: a strong vision can drive a successful building project

The vision will take into account:

- local circumstances, including the current approach to education in the school, and the aspirations of the school
- the relationships and the behaviours that headteachers, teachers, pupils and parents want to promote in the future
- the role of the school in the local community
- strategic issues that will be addressed through the educational transformation agenda.

Once building projects are complete, it is difficult and expensive to change them, so getting the vision right from the start is vital.

3.2 Developing the vision and translating it into a brief

The brief is the document in which the client explains their aspirations and requirements to the design team. Getting it right is vital for the success of the project.

The brief will contain:

- **the vision for the future of the school, setting out strategic objectives and the pedagogical ideas:** for example, the school may wish to create:
 - a welcoming environment that is not intimidating to young children
 - an exemplar of sustainable design and construction, which will introduce children to environmental issues
 - an atmosphere where children of all ages learn to socialise and support each other.
- **practical requirements:** for example, the school could describe:
 - the different activities that will take place, where they will happen and at what times of the day
 - a 'day in the life' of different year groups, giving a feel for the range of activities and their accommodation requirements
 - relationship diagrams or adjacencies, indicating each of the activity areas or zones as a circle, with arrows indicating which spaces need to have strong links or close proximity, and which may have occasional links. Figure 3 shows an example of a relationship diagram.²



Interesting features: coloured storage cupboards and ceiling acoustic panels can produce stimulating learning spaces

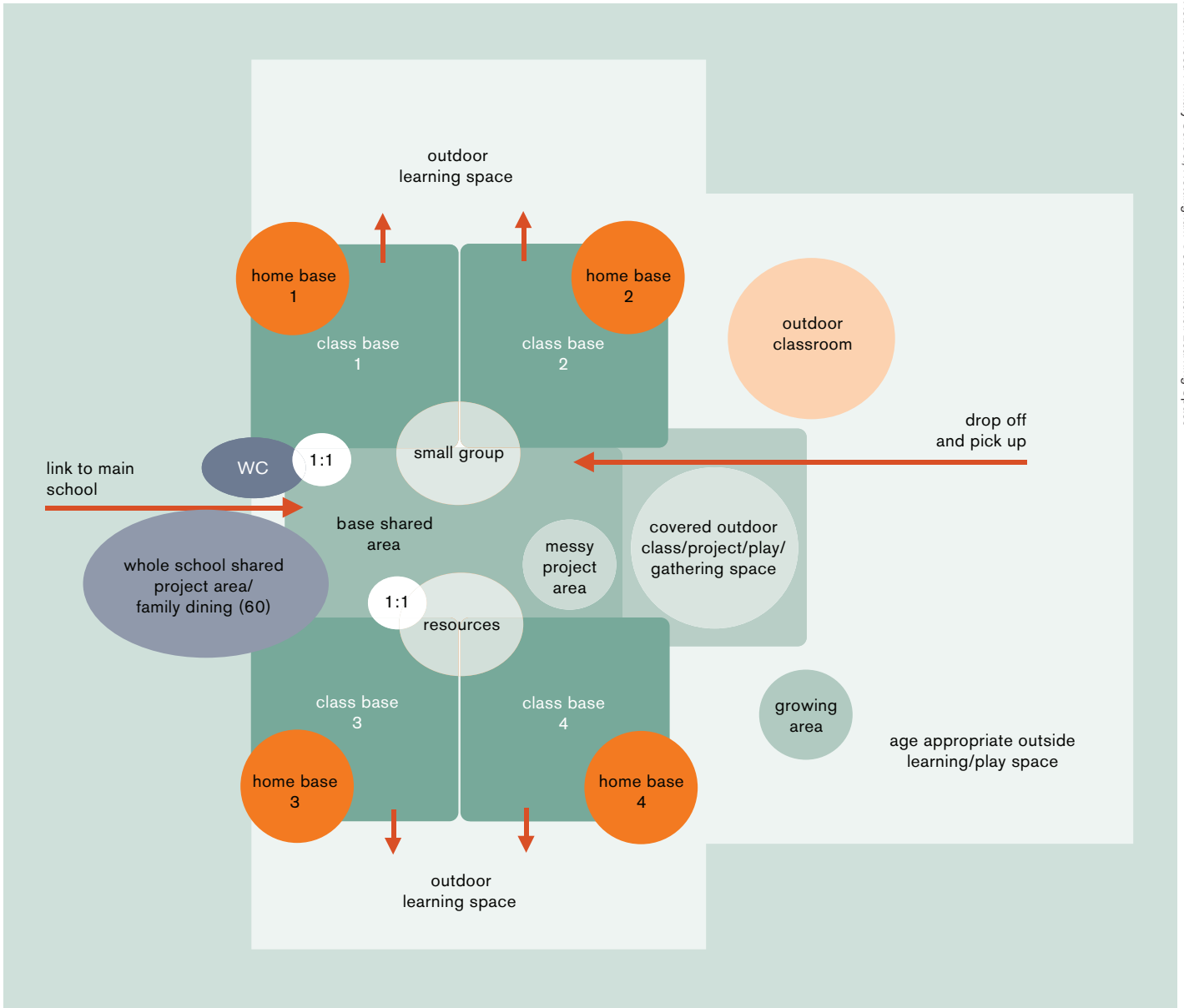


Figure 3
 Relationship diagrams setting out the links between different spaces and activities can help clients to make practical design decisions

- **technical requirements:** for example, these could include:
 - client contact names
 - target programme
 - budget available
 - site boundaries and planning contexts
 - target or maximum floor area³
 - schedule of accommodation
 - minimum sizes of rooms
 - outdoor facilities required
 - number of pupils, teachers and other staff
 - environmental standards, such as minimum and maximum room temperatures, required day lighting, artificial lighting levels and ventilation requirements,
 - legislation and codes of practice
 - sustainability requirements eg BREEAM rating⁴
 - specific finishes for certain areas, such as carpet or linoleum.

Professional advice will be needed to write this part of the brief. The local authority may have a standard brief for schools that can be adapted.⁵ DCSF *Building Bulletin 99* has extensive guidance on primary school design, to assist with writing the brief.⁶ The local authority children's services or property department may help, or an external consultant could be contracted.

Getting to the final version of a brief is likely to be an iterative process. The document will go back and forth to the design team, getting more refined each time. At the end of this process the detailed brief must be signed off by the client. Make sure that you fully understand what is outlined in the document, and ask the design team for clarification if any parts

of the document are unclear. This is extremely important – it is difficult and costly to redesign aspects of the building once the design stage is properly under way.



Excellent example: St Luke's C of E primary school in Wolverhampton was the first in Britain to be awarded a BREEAM rating of 'excellent'



Case study

Developing an excellent brief



© Capita Architecture

Southwark Primary School, Nottingham

A large school, with three forms of entry, Southwark Primary serves Bulwell in Nottingham's inner city. As part of Nottingham's BSF programme, and using an established LEP, a new school is being built to combine the juniors and infants, currently on different sites, and including a 90-place nursery.

The brief was developed with the full participation of the school. Starting with conversations with staff about learning in the school, the discussion evolved into a full day conference for all staff, held on an INSET day. Staff working groups were then held over a period of three months. Initially only for the school leadership team and site manager, these were opened up to all staff as work progressed. Consultations with parents and the community took place in parallel, and the school council fed back to the rest of the school.

The conclusions of these discussions were brought together in the brief. Different formats conveyed the spirit of the discussions. The brief was divided into:

- technical facts, such as site surveys and town planning constraints
- school strategy and vision
- accommodation requirements.

The school strategy and vision section gave information about:

- overall objectives
- the nature of teaching and learning in the future
- enthusing and nurturing staff
- working together with the community

Likely scenarios: day-in-the-life descriptions of feelings as well as activity helped inform the school design

- a series of day-in-the-life scenarios, written from the perspectives of the headteacher, the juniors, the infants, the administration office and the site team.

This extract from the day-in-the-life briefing by the headteacher gives a flavour:

At 8.45 I entered the calm, serene and spacious hall in big school, marvelling at the quality of light created by the coloured glass panels, even in November. I set up the IWB for my presentation on school memories and booted up the sound system so Vivaldi would play in the hall and the shared spaces leading to it.

Later that morning I went down to the community zone to meet our parent support worker and we reviewed the fête arrangements. The shrubbery was full of birds enjoying the shelter and the range

of plants provided colour and scents, even at this time of year. The community zone was in full swing with an ICT course taking place in one building, and the pre-school group meeting in the other.

The accommodation requirements were explained in the form of spatial requirement diagrams (see Figure 4) and then a general description of each zone. The descriptions were not prescriptive, but show the function of the space and the range of activities that will need to take place within them.

The school and local authority were delighted with the way the brief expressed what they wanted from their new school. It led to discussions with the design team which they are confident will translate into a high-quality design for their new school.

Further information

Nottingham City Council

www.cabeurl.com/2h

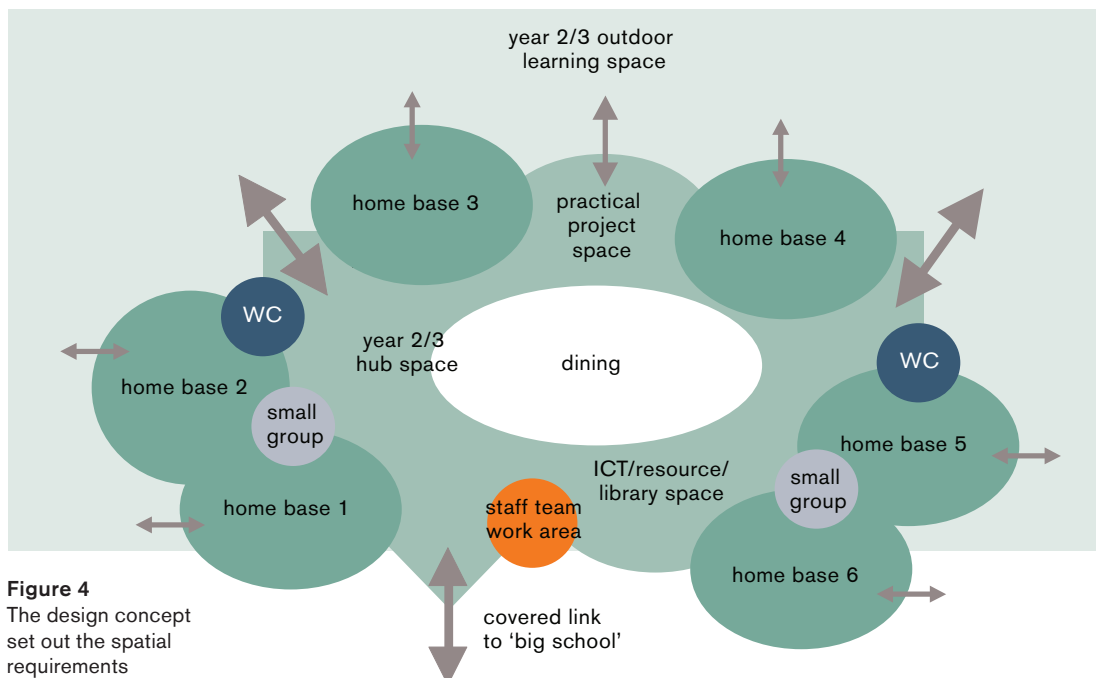
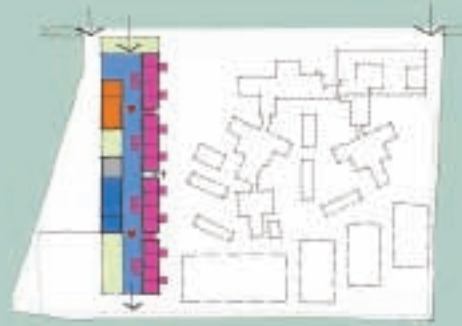


Figure 4
The design concept set out the spatial requirements

Primary school typologies

There are many options for primary school layouts and the choice will depend on factors such as the constraints of the site and the preferred teaching method of the school. These drawings show different options prepared for an inner-city London site by architect Walters and Cohen, for discussion with the school.



Street model 1: classrooms and other spaces off central corridor



Street model 2: classrooms and other spaces off central corridor



House model 1: classrooms off both sides of four corridors



House model 2: classrooms off one side of four corridors



Small courtyard model: classrooms arranged in four squares



Large courtyard model: classrooms arranged in one large square

- classroom and toilets
- corridors
- shared spaces
- children's centre

3.3 Learning from other schools

Studying completed school buildings can expand your understanding of primary school design. Much can be learned from both good and less successful examples. It is tempting to go and visit all the recently built schools within easy reach, but this may not be productive: every school design is a response to a different site and a different community. Before you start organising visits, you can find out which completed examples will be most relevant from the comfort of your desk. We recommend:

- reading published case studies. Relevant information sources in appendix 7.1 include Partnerships for Schools and Open House
 - thinking about the specific issues that you want to investigate. You may want to compare the way the buildings have been planned (for example, courtyard versus linear plans), or specific aspects, such as toilets or school grounds. Look for examples that take innovative approaches
 - trying to arrange to meet the headteacher, who will be able to tell you more about how the building works in practice than anyone from the design team
 - visiting with an expert – a specialist schools architect can help you interpret what you are seeing, and point out technical aspects of the design
- planning your visit carefully, taking a list of prepared questions, so that you can compare the answers you get at different schools
 - photographing, recording or writing up your visits, so that you can explain ideas to your stakeholders, and also show the design team what you want (and don't want!) at a later stage
 - not limiting yourself to the UK – there are some excellent examples of educational transformation and personalised learning in other European countries. You can find overseas case studies online via the Imagine website⁷, and the British Council for School Environments arranges study tours abroad.⁸

3.4 How to recognise a well-designed primary school – 10 examples

In the introduction we gave a checklist of key features to help clients keep the brief and design process moving in the right direction. Here we demonstrate those key features with examples of real school buildings.

Section 3 – references

- 1 *Creating excellent buildings: a guide for clients*, CABI, 2003, www.cabeurl.com/7c
- 2 Figure 3 taken from *Building Bulletin 99* (2nd edition), DfES
- 3 The budget will probably have been calculated using an estimated cost per square metre and a notional floor area derived from DfES *Building Bulletin 99*. Exceeding this floor area without additional funding is likely to compromise the quality of the finished building.
- 4 A method of assessing the performance of buildings in the following areas – management, energy use, health and well-being, pollution, transport, land use, materials and water, www.breeam.org
- 5 A typical standard school brief, as used by Devon County Council, can be found at www.cabeurl.com/7d
- 6 *Building Bulletin 99* (2nd edition), *Briefing Framework for Primary School Projects*, DfES, www.cabeurl.com/k
- 7 Imagine inspirational school design website www.cabeurl.com/7e
- 8 See www.bcse.net.uk



a. A high-quality design that inspires users to learn and is rooted in the community

Lanlivery Primary School, Cornwall

A shortage of funding led to this extension to the small village school being designed on a voluntary basis by the chair of governors with help from two architectural students and the local community. Without local support, this highly sustainable, inspirational teaching space would not have been achievable. The children are thriving.

b. A sustainable approach to design, construction, environmental servicing and travel to school

Red Hill Primary School, Worcester

This new primary school is designed for minimal energy use and built with sustainable materials, in keeping with Worcestershire County Council's strong sustainability agenda. Ground source heating from 33 bore holes feeds an underfloor system. Heat pumps, run on electricity purchased on a green tariff, raise the temperature to the level where it can feed the underfloor heating system and provide domestic hot water. Cooling in the ICT suite is provided by running the ground source heat pumps in reverse.

Overall, the school reduces carbon dioxide emissions by 20 tonnes each year compared with using fossil fuels. In addition, the design addresses climate change adaptation: for example it has a natural drainage system to prevent flooding in storms.



Lanlivery Primary School © Andrew Beard



Red Hill Primary School © A&M Photography

c. Good use of the site, balancing the needs of pedestrians, cyclists and motorists, and enhancing the school's presence in the community

Wembley Primary School, London borough of Brent

This is an unusually large four-form entry primary school with a nursery. The brief called for extended use to make it a 'community school' with a number of shared facilities. The architects have placed the school at the front of the site, close to the road, to make it feel part of the street scene, and also to make it feel accessible to the community. Pedestrians, service vehicles and cars all have separate entrances onto the site for safety reasons. The planning of the site maximises the amount of land available for outdoor use.

d. Buildings and grounds that are welcoming, safe and secure, and inviting to the community while protective of the children

Pinewood Infant School, Farnborough

Primary school buildings can be one of the few community facilities in a neighbourhood, so it is important for them to be accessible and welcoming, while also providing security for the children. Pinewood Infant School has been designed with a fully glazed entrance hall to allow visitors to see into the reception area and through to a central courtyard beyond. This hall in the centre of the school has ample seating for parents waiting to collect their children, making them feel part of the school community.



Wembley Primary School © Walters and Cohen Architects



Pinewood Infant School, Farnborough, by Hampshire County Council © A&M Photography

e. Good organisation of spaces in plan and section, easily legible and fully accessible

Cobblers Lane Primary School, Pontefract

School can be an intimidating place, especially if it is difficult to find your way around. At Cobblers Lane, a 'street' runs the length of school, with classrooms opening off both sides. The roof of the 'street' has been raised to bring maximum light into the school and specialist areas are arranged along it, including cookery, ICT, the library and quiet rooms. The layout is easy to understand, gives good flexibility and creates a real heart to the school.



Cobblers Lane Primary School, by Walters and Cohen © Andrew Beard

f. Internal spaces that are well proportioned, fit for purpose and meet the needs of the curriculum

Pinewood Infant School, Farnborough

The design of primary school classrooms is particularly important as children and teachers spend much of the school day in the same place. They need to be flexible enough to support a range of teaching styles, and should feel good. The high ceilings of the Pinewood Infant School's classrooms are attractive and give an airy feel to the room. The interior design is simple, with coats and toilets hidden in an alcove and built-in storage avoiding a cluttered appearance. The square shape of the rooms allows a variety of furniture layouts.



Pinewood Infant School by Hampshire County Council © A&M Photography

g. Flexible design to support transformation, allowing for short-term changes of layout and use, and for long-term expansion or contraction

Dalry Primary School, North Ayrshire

New approaches to teaching and learning, and the ever-changing possibilities of ICT, make it difficult to predict what type of school buildings will be needed. Population movements also make it difficult to predict the future size requirements for neighbourhood schools. Scope for short-term flexibility and longer term adaptation are therefore essential. This school is conceived as a learning prototype, offering multiple opportunities to engage with different organisational and teaching methods, utilising or modifying the facilities and spaces.

h. Good environmental conditions throughout, including optimum levels of natural light and ventilation

Kingsmead Primary School, Cheshire

Children learn more effectively in environments that are the right temperature, well ventilated and illuminated, and that have good acoustics. Creating spaces with these qualities at all times of the year is a complex task. Kingsmead Primary has a simple but effective environmental design. The tall, north-facing windows give excellent daylight without solar glare and overheating. The roof lights provide additional daylight at the back of the rooms, and help with ventilation. The high timber ceilings improve air quality and create good acoustic properties.



Dalry Primary School by North Ayrshire Council © North Ayrshire Council



Kingsmead Primary School, Cheshire by White Design © Torben Eskerod

i. Well-designed outside spaces offering a variety of different settings for leisure, learning and sport

St Mary and St Pancras C of E Primary School, Camden, London

External spaces are important not just for sports and exercise, but also for environmental studies, play, socialising and growing food. At St Mary and St Pancras, an all-weather sports pitch and a quiet garden have been incorporated into a tight inner-London site. The design ingeniously uses the limited space to provide sheltered play for the nursery, well-equipped play areas for older children and a garden with a lawn and raised planting beds.

j. A simple palette of attractive materials, detailed carefully to be durable and easily maintained, and to age gracefully

St Bede's C of E Primary School, Winchester

Many of the best school buildings in use today are Victorian or Edwardian, still fit for purpose because they were solidly built, carefully detailed and are straightforward to maintain. Their high ceilings, tall windows and heavyweight construction provide good internal environmental conditions. St Bede's is a fully refurbished 100-year-old school with a new extension. The project vividly demonstrates that resisting pressures to carry out building work cheaply and quickly, and investing in high-quality design and materials at the outset, mean lower maintenance and running costs over the life of the building.



St Mary St Pancras C of E Primary School by Shephard Epstein Hunter © Peter Durant



St Bede's C of E Primary School © Dan Keeler

4 From vision to reality: seeing the project through



Pinewood Infant School, by Hampshire County Council © A&M Photography

4.1 Funding for primary school projects

Over the last decade, we have witnessed a tenfold growth in funding for school buildings. This is a once-in-a-lifetime opportunity to create a new environment for the education of future generations.

Funding for primary school projects can come from a variety of sources, notably the recently established primary capital programme (PCP). This major initiative will see £1.9 billion invested in primary schools by 2012, and a total of some £7 billion by 2022/23.¹ The PCP challenges local authorities to think long term and strategically about teaching and learning in the 21st century and how capital investment can support wider transformation.² Its purpose is to:

- rebuild, remodel or refurbish at least half of all primary schools
- create primary schools equipped for 21st-century learning, at the heart of the community, with a range of children's services in reach of every family
- deliver a strategic approach to capital investment, supporting national policy aims, achieving world-class standards and giving access to joined-up services for children and families, and addressing local needs and priorities
- focus resources on deprivation nationally and in every authority
- reconfigure the primary capital stock to account for demographic change.

21st-century designs: the primary capital programme is injecting £7 billion by 2022/23

In Table 1 overleaf we list the funding streams available for primary schools projects. It is worth noting that about a third of national funding for school buildings goes directly to schools in the form of 'devolved formula capital'. The annual allocation to a typical two-form entry primary school is currently about £45,000, and schools can save it over several years to fund larger projects. These other sources of funding can also be joined with additional funding from the PCP.



Water Hall Primary School, Milton Keynes by Architecture MK © David Thrower, Redshift Photography

Funding source	Recipient of funding	Method of calculation	Purpose of funding	Type of project
Primary capital programme (PCP)	Local authority	Pro-rata to pupil numbers in local authority	Transform primary education, in accordance with priorities in primary capital strategy	New-build schools, rebuilding of parts of schools, refurbishment and remodelling projects
Devolved formula capital	School	Pupil numbers but reduced for new or refurbished schools	Provide new buildings and other facilities, including ICT, or other capital repairs or refurbishments in accordance with priorities of school	To address school's own capital priorities in accordance with school development plan or masterplan. Schools can carry over funds for several years to make larger projects possible
Modernisation programme	Local authority (forms part of the single capital pot)	Pupil numbers in the LA, excluding VA schools	Improve the overall school estate	To upgrade and build new buildings in line with the local authority's asset management plan
New pupil places (basic needs)	Local authority	Pupil numbers and forecast increase in numbers	Enable local authorities to provide additional school places where numbers are growing	New schools' extensions or remodelling
School access initiative	Local authority	Pupils numbers in the LA	Enable the local authority to improve access to school buildings for people with disabilities	Alterations, lifts, ramps etc
Targeted capital funding (TCF)	Local authority (for VA schools, direct from DCSF)	By application (currently closed for new applications)	Specific government programmes/priorities, such as new federations or kitchens for schools without them	Works to support the identified programmes

Table 1
Funding streams available for primary schools projects

Project management	Decision-making body	Procurement implications	Implications for voluntary-aided (VA) schools
Local authority (LA) or by local education partnership (LEP) where in existence and LA wishes to use it	Local authority in consultation with schools	Traditional competitive tendering or negotiated with LEP partner	Diocese must contribute 10 per cent of capital cost
School	School governors	Generally competitive tendering	No difference
Local authority	Local authority in consultation with the schools	Competitive tendering or through a local authority framework agreement for building works	Forms part of LCVAP ³ allocation
Local authority	Local authority in consultation with the schools	Competitive tendering or through a local authority framework agreement for building works	Forms part of LCVAP allocation
Local authority	Local authority in consultation with the schools	Competitive tendering or through a local authority framework agreement for building works	Forms part of LCVAP allocation
Local authority	Local authority in consultation with the schools	Competitive tendering or through a local authority framework agreement for building works	See recipient

Case study

Procuring projects through a framework agreement

Alfred Sutton Primary School, Reading

Government guidance recommends that local authorities use existing frameworks or partnership agreements to procure larger construction projects. One example is the Improvement and Efficiency South East (IESE) regional construction framework covering projects over £1 million in all authorities in the South East, including the London boroughs. This framework aims to achieve efficiencies through shared learning and repeated design, procurement and construction solutions.

The framework comprises 10 major building contractors, selected in accordance with EU procurement rules. Authorities can therefore select contractors without lengthy advertising, and start working with them early in the project design stage, leading to a collaborative approach to project delivery.

The replacement of buildings at Alfred Sutton Primary, Reading, was a demonstration project using the framework, and was completed in June 2007. The accommodation includes early years facilities and nursery classes; a multi-use space for music, drama and community events; offices and a new entrance. It involved fitting a new building into a tightly constrained site that continued as an operational school throughout the construction period. The full involvement and co-operation of the building contractor was vital.

Reading Borough Council worked with Hampshire County Council's project services team, including its architects and other design team members. The

In keeping: a high-vaulted ceiling gives a sense of space within the classroom and fits with the older parts of the school



Alfred Sutton Primary School, Reading, by Hampshire County Council. All photos © Dominic Cole

brief was developed by the regional consortium through the county council with the full involvement of Reading Borough Council. The contractor was selected from the framework following a mini-competition.

The consortium led workshops through briefing, pre-construction and project delivery phases, promoting collaborative working. The workshops were attended by construction directors, principal client contacts and the design team. The discussions led to a cost plan, identifying the allocation of the overall budget to different elements of the building, and a project programme, including the phasing.

The project was completed on time and within budget, and exhibits a high standard of design quality. The key advantages of using the IESE framework and a partnering approach to procurement are:

- earlier identification of project risks, creating more effective management and more predictable outcomes
- removing any adversarial approaches with early engagement of the building contractor, giving the team common goals
- saving considerable time using the call-off process as opposed to the full process through the *Official Journal of the European Union* (OJEU)
- early involvement of the contractor, Kier, bringing added expertise to the preliminary design stages and giving safer, more predictable construction.

The collaborative approach created an overall project team, rather than separate design and construction teams.

Further information

IESE framework: www.cabeurl.com/a7

Case study: www.cabeurl.com/2j

Architect: Hampshire County Council



Old and new: Alfred Sutton Primary is a modern learning environment in keeping with the original school design

4.2 Differences between small and large projects

The range and scale of projects carried out in primary schools is likely to be very varied. The table below identifies some of differences.

Small projects	Large projects
May be funded directly by the school and be managed by the school independently. However, some may be funded and managed by the local authority.	Likely to be funded by the local authority, with different project management arrangements.
Not necessarily less complex. There may be structural or services implications that require statutory approvals. It is always worth getting professional advice in the initial stages.	Often extremely complex, requiring a number of statutory approvals. New-build projects may be more straightforward than alterations, and involve less disruption.
Not necessarily less disruptive or lengthy – the six-week summer holiday may be insufficient to complete many projects. Also note project that reliable builders often get booked up for the school holidays well in advance, so it is essential to plan even for small projects.	Likely to require careful programming to minimise disruption to the school. It is important to plan the programme for the whole (including design and approvals) at the initiation stage.
For the smallest projects you may not need any consultants other than an architect. Detailed drawings and a specification can be sent direct to builders to obtain competitive quotations.	You will need a range of consultants, organised by a project manager, perhaps from the school or local authority, and a client design advisor where these skills are not available in-house.
You should get fixed price tenders from three or more builders. In addition, there should always be a contract clearly stating provisions for situations where things go wrong. These are all matters that an architect will advise on. You can obtain publications from RIBA on employing architects ⁴ and developing school buildings. ⁵	EU procurement regulations must be followed where projects are above a certain value. Any contract for services (eg an architect) where the fee is over about £90,000 has to be advertised in advance in OJEU. Similarly, building contracts over about £3.5m building contracts over about £3.5 million require EU advertising. Local authorities have arrangements for placing these advertisements.

Table 2
Differences between small and large projects



4.3 Types of procurement and when to use them

The method of procuring a building depends on the size of the project, the type (new build or refurbishment), time scale, method of funding and the level of cost certainty required by the client.

It is generally best to take professional advice, and your local authority or architect (or quantity surveyor, if appointed) should be able to make recommendations based on the particular circumstances.

Here we briefly describe each procurement type:

- **Using a local education partnership (LEP)**
The LEP provides the design team and arranges the whole procurement process. Most local authorities in the BSF programme for secondary schools will establish a LEP following an extensive selection process. The majority shareholder in a LEP is a private sector consortium, usually including a building contractor (more information can be obtained from Partnerships for Schools⁶). The government is encouraging local authorities to use a LEP, if they have one established, to deliver PCPs, but ultimately it is for the local authority to decide if this is the best method.
- **Local authority frameworks**
Many local authorities competitively select panels of building contractors and/or design teams for different types and sizes of project. The contractors may submit 'schedules of rates', giving prices for different building tasks and items, and these are then used to negotiate a

Community-initiated school extension:
procured traditionally, supplemented by using local volunteer labour

contract sum. An advantage of these frameworks is that they can enable projects to be started quickly, by avoiding lengthy and costly tendering processes.

– **Design and build**

The building is designed to a certain level of detail by a design team selected by the client group. Tenders are obtained from several contractors who make their own decision about the structural solution and the construction detail. The contractor's design team will develop the design and the contractor will construct the building. Design and build can reduce costs and construction time but the client loses control of some of the detail.

– **Partnering contracts**

The client selects the contractor before the design is complete, based on its abilities and experience, plus indicative cost estimates. The contractor then participates in the design process with the rest of the design team, and provides advice on how to get best value for money. The contract price is negotiated, and may include a guaranteed maximum price, as well as a method of sharing any savings achieved between the client and building contractor. This method is encouraged by the government as a way of reducing conflict and disputes in the building process.

Project partners: the Sharrow Primary School team on the school's sedum roof

– **Traditional tendering**

The building is fully designed by the design team and competitive tenders are sought from several contractors. It is normal to select the lowest tender and sign a fixed-price contract. This method is now less common but can be a cost-effective method for smaller projects.



Sharrow Primary School, by Sheffield Design and Project Management, Sheffield City Council © Cath Basilio

4.4 Choosing a design team

Depending on the choice of procurement route for your project, the client group may need to select a design team. Many local authorities have existing frameworks in place. If yours does, it is likely that you will be expected to use a design team from this list. A number of design teams may be asked to tender for the work in a mini-competition and the client group will select its preferred team. If the local authority has formed an LEP as part of the BSF programme, it may have first refusal on delivering the scheme.

If your local authority does not have either a framework or LEP, you will need to select an architect for the project. You will be looking for an architect who has good design skills, is appropriate for the size and nature of the project, and is a person with whom the client can form a good working relationship.

To find the right designer or team, it is best to use a structured selection process. There are several techniques for selecting an architect.

1. Competitive interviews

These are the quickest and cheapest approach, and if carried out thoroughly, can be effective. If the fee will be over the EU threshold (currently £156,000, depending on the euro/sterling exchange rate) you must advertise in OJEU. Smaller projects can be advertised in the local press or technical journals (eg *Building Design* or *The Architects Journal*).

The RIBA Clients' Advisory Service will provide a long list of suitable practices free of charge.⁷ If you have prior knowledge of a good practice, you could send them a copy of the advertisement and invite them to apply.

You should prepare details of the project to send to people who express an interest, and ask them to submit details of their practice, previous projects and the names of referees. You should stress your ambitions for design quality.

You will then need to choose a shortlist of between three to six firms to interview. Research the practices before you hold the interviews and talk to their previous clients. It can also be useful to visit a completed project, preferably one that is similar in size and character to your own.

It is quite normal to request a fee proposal as part of a competitive interview process. You might make the fee count for 20 per cent of the scoring criteria in the selection process.

2. Design competition

This can be a rewarding experience for a client, and has the advantage that you will get a good idea of the design concept being proposed by the architect before you make your choice.

The disadvantages are that it takes a bit longer than the competitive interview process, and is more expensive. You will have to offer financial prizes for the runners up, as well as paying the competition organisers for their work. The RIBA has a competitions office that can arrange a competition for you, and provide an estimate of the costs.⁸

3. In-house local authority architect

Some local authorities still employ architects in-house, although many have disbanded their architects' departments or outsourced the service to a private firm. In-house teams often have lots of experience of school design, and some have a reputation for excellent design, winning design awards for their projects.

Some local authorities insist that design work is offered, in the first instance, to the in-house team, so the school may not have a choice about who will be given the job. However, even where there is no choice over the provider, you should meet the proposed project architects and look at examples of their work, and decide whether you will be able to form a good working relationship with them.

4. Fee tendering

Sometimes it is suggested that obtaining competitive fee quotations is an appropriate method of selecting a design team. CABE strongly advises clients against selecting designers based on cost alone: most of the fee cost is staff time, and a low fee bid implies that the architects will try to minimise the amount of time spent on design, or staff salaries will be low.

The design fee has been calculated to be approximately 0.5 per cent of the cost of building and running a building for 30 years,⁹ and economies in design time can result in poor-quality buildings that cost many times more over their lifetime than the fee saving.

4.5 The design process

The design process starts with an outline stage (often called a sketch design) and moves to a detailed design stage. During both these stages, the design will go through different versions where ideas are tried out, tested and altered. At the end of each design stage, the client should sign off the design to confirm that they agree the proposals at the level of detail that has been achieved. This will avoid unnecessary extra work and costs.

Remember, the client needs to be entirely happy with the work at the sign-off point of each stage.

You may hear building professionals referring to a more detailed breakdown of the stages in a project, known as the RIBA plan of work.¹⁰ An outline of the stages can be obtained from the RIBA bookshop website¹¹ or the TeacherNet website.¹²

The following is a summary of the RIBA stages:



CABE stage	RIBA stage	
Prepare	Stage A Appraisal	Feasibility studies and option appraisals
	Stage B Design brief	Initial design brief
Design	Stage C Concept	Outline design. Final design brief, sketch designs and cost estimates
	Stage D Design development	Scheme design. Develop design including structure and building services. Submit detailed planning application
	Stage E Technical design	Prepare detailed design including specification of materials
	Stage F Production information	Prepare detailed construction drawings and specifications sufficient to obtain tenders. Obtain Building Regulations approval
	Stage G Tender documentation	Preparation of documents to be sent to building contractor to obtain tenders. Where there is a quantity surveyor, prepare bills of quantities
	Stage H Tender action	Obtain tenders from building contractors and select contractor
Construct	Stage J Mobilisation	Sign contract, issue information, hand-over site
	Stage K Construction to practical completion	Administer building contract. Inspect work on site. Confirm practical completion
Use	Stage L Post-practical completion	Make final inspection. Provide user manuals to occupants. Identify and arrange making good defects at end of defects liability period. Review project in use

Case study

Using a design competition



Michael Faraday School, by SMC Alsop Architects © SMC Alsop Architects

Southwark primary schools, London

Southwark Council believes that outstanding communities need outstanding schools, and has embarked on three high-quality primary schools at Southwark Park, Eveline Lowe and Michael Faraday.

The council decided that a design competition, organised jointly with RIBA, would be the best way of ensuring innovative and sustainable design. The competition was advertised in the architectural press, online and in OJEU. Ninety architectural practices responded and 12 teams were shortlisted, four for each school. The three schools had prepared detailed briefs explaining their educational vision and specific accommodation requirements, and each competing practice was awarded a small fee to develop a concept design for its appointed school.

Running for 12 weeks, the competition enabled the shortlisted architects to explore early ideas with staff and pupils. Each architectural team was invited to hold workshops and Q&A sessions with pupils, staff and others in the school community, such as adult learners. The submitted concepts were then exhibited to each school community, before a final presentation and assessment by the panel of judges. The winning architects for each school were:

- Eveline Lowe School: HKR/John Pardey Architects
- Michael Faraday Primary School: SMC Alsop Architects
- Southwark Park School: Birds Portchmouth Russum Architects.

In the development stage, through ongoing consultation, design reviews and value engineering,

each winning team translated its competition concept into a deliverable design. All three received planning permission, as well as listed building consent for two of them, and building work started on site in 2009.

The competition was not about finding a finished design. It was about matching the most appropriate architectural team with the vision for each school. Headteachers might know they could not afford the chosen design, but they knew they were buying into a concept and project team, not an actual building.

For Southwark Council, the design competition method of selecting design teams has been a huge success. For a modest investment of approximately £10,000 per school (0.1 per cent of the project cost), they had an extended list of architects interested in working on the schools, and a choice of four outstanding designs for each school from which to select a team.

They were able to select design teams with the benefit of understanding what sort of ideas they

had, and be confident that they could establish a strong working relationship. The design development stage was stimulating and rewarding; the whole school communities got involved and the council feels the finished designs are inspired and fitting.

Further information

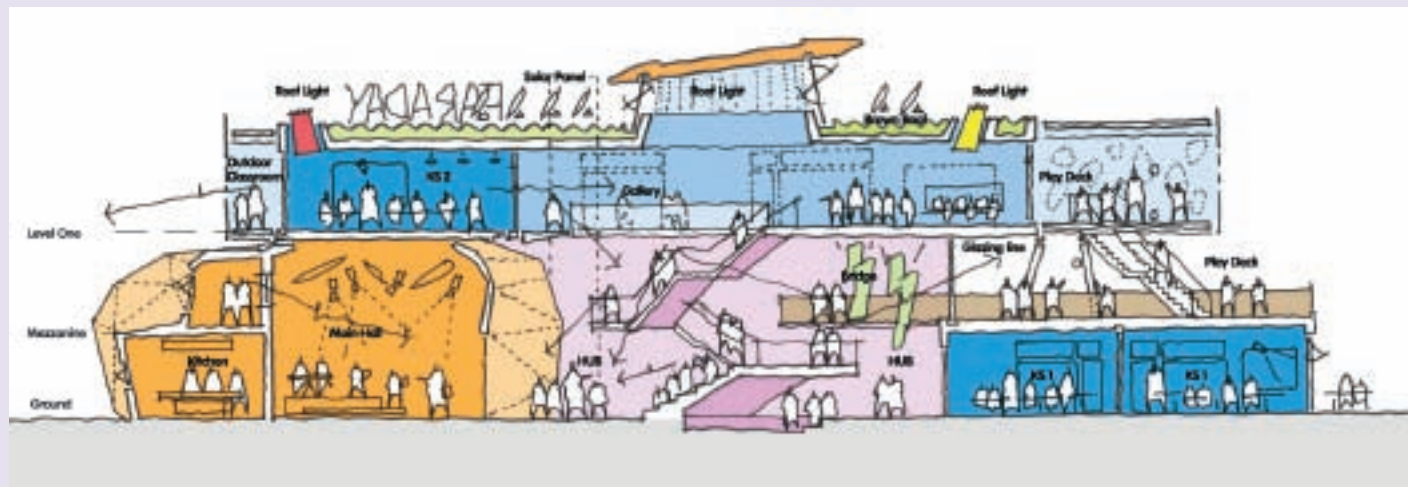
Design lessons – shortlisted schemes for Southwark primary schools, BD online: www.cabeurl.com/2i

Architect: SMC Alsop



© SMC Alsop

Architectural ambition: the design submission external view (above) and section (below)



© SMC Alsop

4.6 Contingencies

However well a building is designed, unforeseen issues will crop up during construction. This is more likely for a refurbishment project where the poor condition of the original building may become more apparent when stripping out or demolitions have taken place. A sum of money should be set aside, unallocated in the contract, to pay for these or any other unforeseen extra works (the 'contingency sum').

It can be tempting to be optimistic when setting the contingency sum but this is unwise, as savings are hard to find once building work has started and omissions can compromise the original design intentions. The design team can advise on the percentage of the contract sum that should be reserved for contingencies.

Section 4 – references

- 1 For a summary of PCP funding allocations, see www.cabeurl.com/9
- 2 There are useful PCP case studies on TeacherNet, including refurbishment projects as well as new-build schools. www.cabeurl.com/a
- 3 Local education authority co-ordinated voluntary-aided programme.
- 4 *A Client's Guide to Engaging an Architect*, RIBA, January 2009. Available from www.ribabookshops.com
- 5 *Client Guide to Developing School Buildings for School Governors* (3rd edition), RIBA, November 2007
- 6 See www.partnershipsforschools.org.uk
- 7 Contact the RIBA Clients' Advisory Service on 020 7307 3700, www.cabeurl.com/1h
- 8 Contact RIBA Competitions Office, 6 Melbourne Street, Leeds LS2 7PS, telephone 0113 2341335, www.cabeurl.com/1i
- 9 *The Long Term Cost of Owning and Using Buildings*, Royal Academy of Engineering, 1998, www.cabeurl.com/7f
- 10 *Plan of Work: Multi-Disciplinary Services*, Roland Phillips, RIBA Publishing, 2008
- 11 See www.cabeurl.com/7g
- 12 See www.cabeurl.com/1j

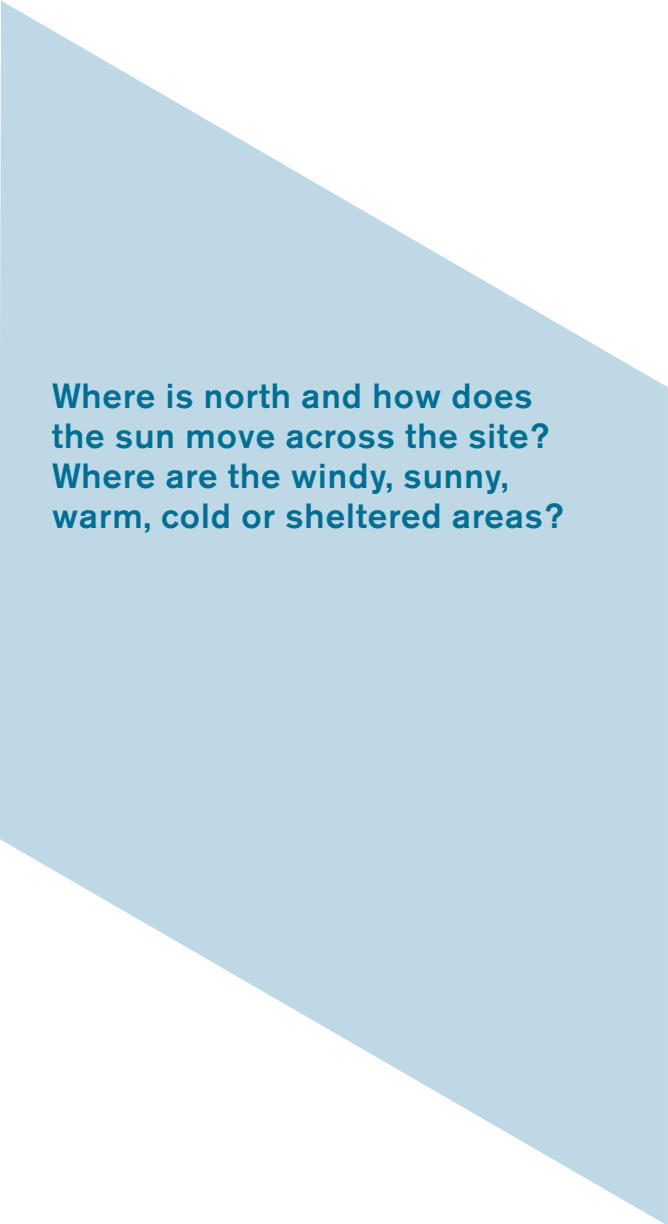


Oban Campus, Argyll, by JMI Architects © Andrew Lee

5 Getting the design right



Kingsmead Primary School, Cheshire by White Design © Torben Eskerod



Where is north and how does the sun move across the site?
Where are the windy, sunny, warm, cold or sheltered areas?

Child's play: sustainable design and inventive outdoor space create stimulating outdoor environments

5.1 Understanding what you have

Once your school's vision has been developed, the first stage in getting the design right is to understand your site. You should evaluate the characteristics to emphasise and discover any constraints, such as a main sewer running through the site or any contaminated land. Your design team will help you to assess the site and existing buildings.

Site conditions that should be considered:

- **Planning or heritage constraints:** How does the site relate to its surroundings? Are there any height constraints for new buildings?
- **Transport and highways:** Is it easy to get to the bus, shops and local facilities? Are access points to the site likely to change?
- **Existing vegetation and wildlife:** Are there any signs of wildlife habitats?
- **Site drainage:** Are there areas of water, or where water collects?
- **Topography:** Is the site sloping or flat?
- **Environmental conditions:** Where is north and how does the sun move across the site? Where are the windy, sunny, warm, cold or sheltered areas?
- **Land ownership or covenants:** Does the local authority own the whole site? Are there any public rights of way?
- **Condition of existing buildings:** Are there any prefabricated buildings on the site? Are any buildings likely to contain asbestos? Which buildings will be retained?

Case study

A masterplan for phased improvements to a school



Firs Hill Primary School, Sheffield © Richard Hanson

Firs Hill Primary School, Sheffield

Located in Burngreave, Firs Hill Primary was formed in 2002 by the amalgamation of nursery/infant and junior schools, located at opposite ends of a single site. It is a large, popular school, where 75 per cent of pupils speak English as an additional language, and 90 per cent come from British minority ethnic groups. The school has an extensive lifelong learning programme for parents and adults in the community.

The school is housed in solid Victorian buildings, some seriously out of date. A large timber mobile classroom block, located in the middle of the playground and providing many of the extended school activities, is in very poor condition. The school wanted to replace this building, as well as upgrade the other buildings, but had difficulty deciding how best to prioritise investment using the annual 'devolved capital' that it receives from the government.

Therefore, the school decided to commission a masterplan to provide a route map for gradually transforming the buildings into a school fit for education in the 21st century. Several architects were interviewed, and a team led by DSDHA was selected.

DSDHA prepared options for reorganising the existing accommodation, relocating the community building and adapting the external spaces to create an improved outdoor learning environment. These were discussed with the school, governors and parents, and a preferred option was selected.

The final proposals were published in a document that now serves as a masterplan of how the school wants to develop its buildings to realise its vision.

It takes into account that the work will have to be carried out in stages, as funds become available. Proposals now exist for:

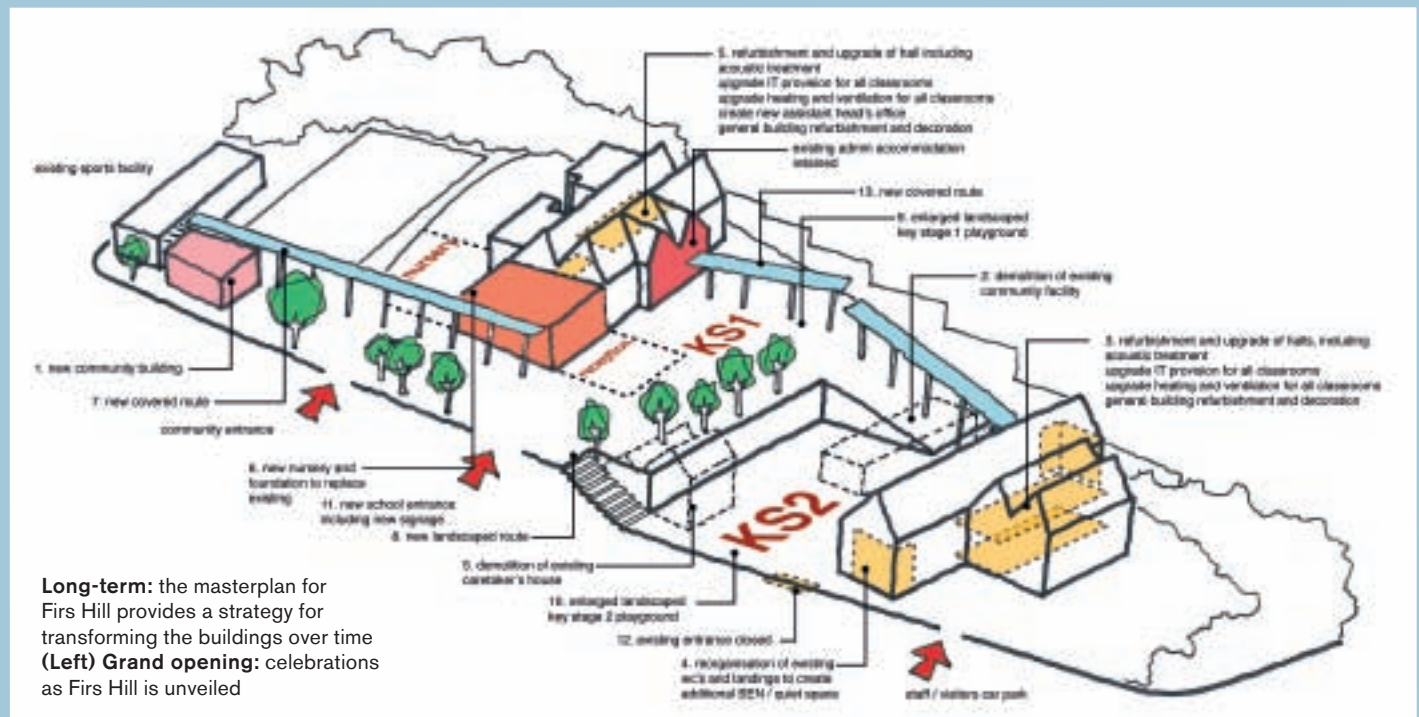
- a new community building that links to an existing lottery-funded community sports building
- rationalising the three school halls to provide break-out spaces for key stage 2 children to develop personalised learning skills
- redeveloping the foundation accommodation to create a better, larger nursery linked to new reception classrooms
- achieving disabled access to all levels
- upgrading the key stage 2 toilets from their unpleasant, squalid state.

The amount of funding available to date has been limited, but what has been obtained has been invested in accordance with the plan. An ICT suite has been relocated to a position that is more accessible to pupils and the community, the toilets have been upgraded to provide open-plan unisex cubicles and a shared central wash fountain, and the caretaker's house has been refurbished as a community facility.

Unfortunately, the mobile block is still deteriorating. But should further money become available, perhaps through the PCP, the school is well placed to bid for projects that can contribute to the eventual achievement of a 21st-century school for the future.

Further information

Architects: DSDHA



5.2 Masterplanning

In many circumstances, schools may not be able to realise all their ambitions for their buildings in the first project. In this situation they should consider preparing a masterplan for their school. This involves making provision for the transformation of their buildings in a number of steps or phases. This masterplan can then be used to set the context of each separate phase, and ensure that a unified overall development is created in the long term. This can avoid a series of short-term solutions and provide a coherent vision.



5.3 Getting the learning environment right

Common environmental problems in schools include:

- overheating and solar glare in summer
- lack of sufficient daylight, requiring frequent use of artificial lighting
- inadequate ventilation, resulting in a stuffy environment and drowsy children
- acoustic problems, such as reverberant, echoing rooms or ones that suffer from noise disturbance from elsewhere.

These problems can affect the concentration of children and teachers, and are counter to the principles of inclusive design.

The most comfortable classrooms tend to be those that have good daylight and natural ventilation, and include features such as high ceilings, direct views and links to the outside, and windows that minimise direct sunlight penetration and associated heat and glare problems. The following basic principles can be applied to modern classrooms to ensure a good environment:

- **Maximise ceiling heights**, ideally at least 3 metres from floor to ceiling, and more if possible. Rooms with a pitched roof space can be an effective way of introducing high-level daylight and natural ventilation into the depth of a building plan and can be particularly attractive.
- **Orientation of classrooms** has a crucial effect on users' comfort. There is no simple panacea for

deciding the direction windows should face, but in many refurbishment schemes the designers will be constrained. Table 3 outlines some of the basic principles.

- **Make classrooms reasonably square** to maximise flexibility of use. In rectangular classrooms, the windows should be on the longer wall. You should ensure that you are never more than 7 metres from daylight and ventilation. Alternatively, additional windows or rooflights at the back of classrooms can give double-sided daylighting and through ventilation. Taking the top of the windows to ceiling level will help to throw daylight to the back of the classroom, while low cills (ie window sills) will allow children to see out.
- **Create through ventilation** wherever possible. When it is not possible to provide windows on both sides of rooms, ventilation shafts can draw stale air out of the back of the classroom. (These are often known as stacks and they draw air up naturally). Ventilation inlets can be provided at the side of, or below, windows so they do not get blocked by blinds.
- **Use heavy building materials** providing thermal mass for the main structure of the building to stabilise temperatures in periods of extreme weather, both hot and cold. The exposed underside of concrete floors and roofs (that is the ceilings) is the most effective. Exposed brick or blockwork walls will also provide thermal mass, but floors covered with carpets are of little benefit. Suspended ceilings and lightweight wall coverings should be avoided.

Orientation	Solar heat gain	Solar glare	Ventilation
North	No problems, but any attached outdoor teaching spaces will probably be in the shade most or all of the time.	No problems.	Opening windows suitable because blinds are not needed to control sunlight (but may be needed when data projectors in use).
South	High summer sun can be controlled by external horizontal louvres (<i>brise soleil</i>) and/or solar control glass*. Low winter sun is less powerful, and can provide useful warmth. Teaching areas outside the classroom will be sunny for much of the day.	Shading needed for winter when sun is low, and in summer if solar glass is only form of control.	Good ventilation essential as some solar gain is probably unavoidable. Make sure adequate ventilation is not prevented by opening windows being blocked by blinds.
East	Low sun in the early morning in summer unlikely to cause significant solar gain problems. Good orientation for younger classes where outdoor teaching spaces connect to classroom.	Low sun can cause glare in early morning in summer – shading (such as vertical blinds) may be needed.	Natural ventilation through windows works satisfactorily, as sun is not facing them for the hotter times of the day.
West	Low sun in the summer is difficult to control and solar gain can be a problem. Adjustable external vertical louvres and/or solar control glass are best solutions.	Shading needed in summer (eg vertical fins), preferably externally so it does not block ventilation through windows.	Good ventilation essential as some solar gain is probably unavoidable. Make sure adequate ventilation is not prevented by opening windows being blocked by blinds.

*Solar control glass works by reducing heat at the same time as maximising daylight.

Table 3
Basic principles of orientation to consider

5.4 Flexibility and adaptability in primary schools

Flexibility and adaptability are paramount for new school buildings. Flexibility is the opportunity to make modifications quickly to a school building to enable it to be used differently, sometimes changing the way it is used several times a day. Adaptability is concerned with longer-term changes and may involve remodelling rooms for new activities, extending the school to provide for additional children or new services, or changing the use of part of the school in response to fewer children on roll. It is essential that the brief sets out the need for flexibility and adaptability from the start.

Design considerations:

- changing technologies are likely to have a major impact on everyday classroom learning
- thinking about the best ways to teach and learn is constantly evolving
- making a building highly flexible (for example with large numbers of movable walls or sliding partitions) can be very expensive
- flexibility can be achieved economically by providing larger spaces that can be divided by movable screens
- the choice of furniture can improve flexibility, for example by using mobile furniture or storage with wheels
- some construction systems or plan forms can be more suitable for adaptation in the future, such as steel or timber-framed buildings.

Flexible space: the extension at Coldfall Primary School opens out onto a decked area on one side and onto the playground on the other

Case study

Achieving an excellent environment for teaching and learning

Northbury Primary School, Barking, London

Northbury Primary was extended to create a four-form entry school with 840 pupils. The original school building dates from 1897 and all three floors have been extended so that the new classrooms are directly accessible from the existing circulation areas.

The building has been designed as an exemplar of low-carbon development. It uses materials that are sustainable and efficient to assemble. It has a green roof with solar hot water collectors, a natural ventilation system for warm weather and full heat recovery in the winter. The structure is a timber frame with timber floors.

The classrooms have been designed to create a high-quality teaching and learning environment. They allow for flexible layouts for teaching and learning. Tall windows (3 metres high by 8 metres wide) ensure that daylight reaches the back of the room, thus minimising the need for artificial lighting.

Generous floor-to-ceiling heights allow a large internal volume, which helps to maintain good air quality in the classrooms. Through ventilation is provided by manually operated double-glazed louvre windows and 'ventilation stacks' connected to the back of the room. The louvres open to a horizontal position, providing the maximum possible opening area. Manual operation gives the teachers full control of their environment.

Class design: the extension at Northbury Primary provides comfortable learning environments with excellent daylighting and attention to detail on materials



Heating is through warm air units fed by hot water from condensing boilers. Passive infra-red motion sensors ensure that the room is not heated when not in use. In winter, heat is recovered from the exhaust air that goes up the stacks and is fed back into the system to reduce energy consumption. Solar filtered glass allows most daylight through but restricts solar gain, thus preventing excessive heat gain in sunny weather. Vertical blinds retract to the sides and are fully adjustable to control glare.

A good acoustic environment, without excessive reverberation, is achieved with an acoustic plasterboard ceiling and upper wall linings, and carpeted floors. Light fittings are unobtrusive and services are well integrated – ie there are no unsightly cables or pipes.

Storage is provided below the window cills and in full-height cupboards with sliding doors to ensure an unobstructed floor area. The walls and storage

Side by side: old and new parts of the school have contrasting facades. The new extension uses large windows and natural materials



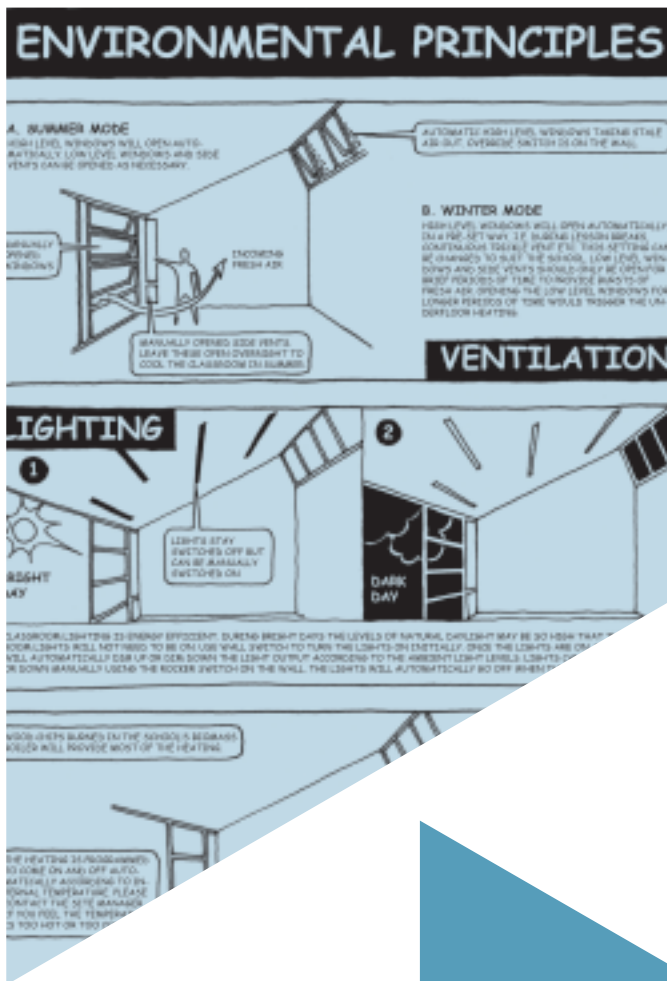
are covered in pinboard to allow full use of the space for displaying work.

All these features result in an environment that is attractive and calm. The good ventilation and daylight help pupils to maintain concentration. The good acoustics ensure that teachers don't need to strain their voices, and that pupils can hear well.

Further information

Architect: Greenhill Jenner www.greenhilljenner.co.uk





5.5 Getting the building services right

Building services include heating, ventilation, electrical power and lighting, and ICT networks. They can account for as much as 30 per cent of the total budget, and therefore it is vital that they are correctly specified.

Unfortunately, building services are the most common cause of complaint on completion of a project. They can be:

- difficult to control and not user friendly
- not integrated into the design and unsightly
- difficult to maintain and costly to repair
- too complicated, especially in the case of some centrally controlled computer systems, known as building management systems. If it is difficult to control the environment of the school, and the building may consume more energy than the design team anticipated, fuel bills can be higher than necessary.

The best way of avoiding these problems is to brief the mechanical and electrical engineers carefully at the outset. You should highlight to them:

- how you will use the buildings and at what times, so the heating can be 'zoned'
- whether you require controls for heating and ventilation in individual classrooms, through manually operated thermostats, for example
- if you would like windows and roof lights to open automatically, or have controls that can be over-riden

User friendly: at St Luke's Primary School simple cartoon guides displayed in each room explain how to minimise energy use

- the levels of illumination that you need in classrooms, bearing in mind the use of whiteboards, the minimum lighting children need to see their work and the needs of classroom users with visual impairments
- how many power and data (computer network) sockets you need and where
- your environmental sustainability aspirations.

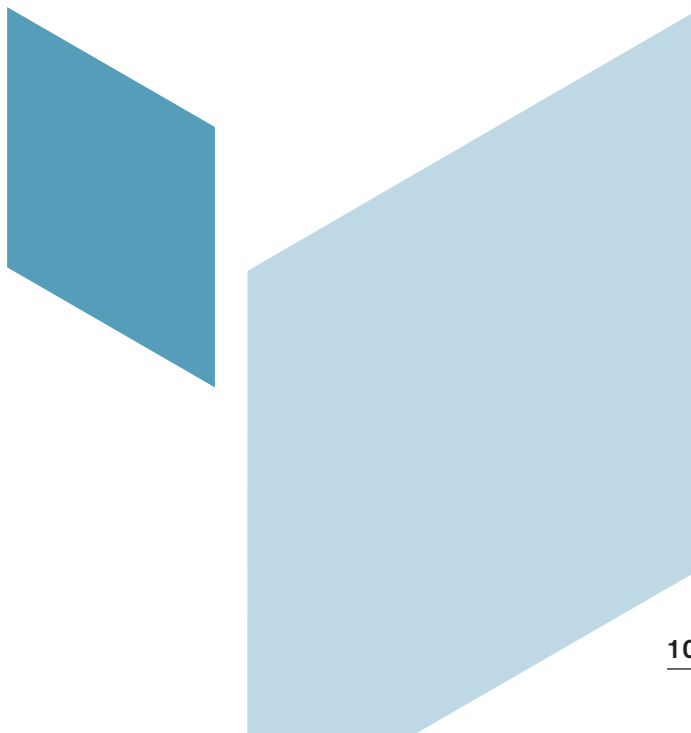
You will need the engineers to provide detailed drawings showing all services for you to sign off before construction begins. In this way you can have total control over the scheme.

School staff should be trained to use the systems, ideally as part of their induction. One person, usually the caretaker, should be trained to become the expert, to whom others can turn for advice when needed. The caretaker should be issued with drawings of all services, including less obvious pipes, steel electrical conduits, radiators, ventilation ducts and sprinklers, which are normally buried in the walls and plastered over. Provision should also be made for training new staff in the future.

Because of the DCSF requirement to reduce CO₂ emissions by 60 per cent,¹ biomass boilers are increasingly common features in new school design. The term 'biomass' refers to an energy resource derived from organic matter. The fuel consists of wood shavings pellets and should be supplied from local sources to minimise the school's carbon footprint. Some teething problems have been highlighted by various schools and below is a list of things to consider.

- Find out about the proposed type and make of the boiler and how it has performed for existing users.
- Scandinavia and Germany have been using biomass boilers in public buildings for many years, so it is worth looking abroad for examples.
- The cheapest boiler may work out more expensive in the long run.
- Make sure that there will be a fuel supply of a consistently good standard available in the future to avoid blockages and extra maintenance.
- Ensure that the hopper holding the biomass fuel is of adequate size to keep deliveries to a minimum.
- Avoid overly complicated operating systems and make sure staff maintaining the boiler have received adequate training in the operation of the equipment.

More information on biomass boilers can be found in guidance from the zero carbon schools taskforce.²



5.6 Investing sufficiently in external areas

The grounds around the school are the first thing the school community and visitors see, and offer a real opportunity to demonstrate the school's vision and credentials, as well as supporting learning across the curriculum.

The grounds should be designed in parallel with the buildings, not as an afterthought. Adequate provision should be made for their construction in the overall budget, and, if possible, this sum should be ring-fenced so that the temptation to scrimp on this part of the project is avoided.

The DCSF's *Designing School Grounds*³ provides excellent guidance, as does *Building Bulletin 71*, dedicated to designing outdoor classrooms.⁴ Basic principles leading to high-quality external spaces include:

- **Carry out a careful analysis of the existing site**
Look at landscape features, orientation and sunlight, shelter, views, access points (pedestrian and vehicle) and desire lines (ie paths representing the shortest or most convenient route from one place to another) across the site. Surveys of the way people use the site are useful, and pupils can be involved in carrying them out.
- **Analyse need**
Identify all the activities that will take place throughout the year. The DCSF⁵ and Sport England⁶ can provide guidance here. This information needs to be included in the brief.⁷

- **Make sure all the spaces in the school grounds have a function**
There is a fixed amount of space on a school site and it should all be put to good use. Grounds should provide at a minimum social spaces, play spaces, sports facilities and external classrooms. Areas left as grass are rarely used and cost money to maintain. Even remote spaces can be used as habitats for wildlife and educational study.
- **Think carefully about security and maintenance**
Fences may be needed to protect some areas of the grounds against vandalism, but are there other areas that can safely be made available for community use out of school hours? What will the cost of maintenance be to the school budget, and can this be reduced by using higher-quality materials? Can the building itself provide a security barrier?
- **Ask the children what they would like**
Many families have limited or no outside space at home, so the school will be one of the few external areas children will have a chance to shape.
- **Commission research**
For example, Merrylee Primary School in Glasgow commissioned the Forestry Commission to analyse what was lacking in the old school grounds and how to make improvements with the new school.⁸

5.7 Security: avoiding the fortress syndrome

Most schools have a positive relationship with their community. However, a feature of modern life is the risk of break-ins and occasional vandalism.

Surrounding the building with steel fences and a locked gate may be effective in security terms, but it is extremely intimidating and runs counter to the concepts of community involvement and inclusion that we have already seen are so important in creating successful schools.



Orleans Nursery and Infant School, Twickenham, Cube Design © Cube Design

To create effective security and a welcoming approach, you will need to consider:

- **Site planning**

Can you differentiate between areas that need to be kept secure and those that can be left open to the public? Can the forecourt be designed to have passive surveillance from neighbouring houses and provide space for parents to wait while collecting children?

- **External lighting**

This is important for evening use of the school.

- **The materials**

Welded wire fencing is impossible to climb and is visually relatively transparent. Traditional park-style fencing is attractive. Industrial-style metal palisade fencing is reminiscent of prisons.

The police provide guidance on security issues in *Secured by Design* publications,⁹ and employ architectural liaison officers to advise clients and designers on these issues. Some insurance companies also have views on how security should be addressed. Sometimes their advice conflicts with other objectives, such as providing a building that is welcoming to the community. In these situations you will need to justify and defend your approach. It is worth checking that the advice being given corresponds with the documented principles of *Secured by Design*.

Be aware that security fences can be hard to spot on plans, as they are often just shown as a solid or dashed line. Make sure you understand how tall the fences will be and how permeable they will look, as this will have a big effect on whether your school will appear welcoming or fortress-like.

Case study

Innovative school grounds

Merrylee Primary School, Glasgow

Merrylee Primary is a newly built school completed in 2009 and located in central Glasgow. It caters for nearly 300 pupils and is an amalgamation of three primary schools onto one site with a nursery school and community facilities. The new school was selected to incorporate a natural play environment within the school grounds.

The idea for the natural play area was instigated by the headteacher and the parent council. Design and funding strategies were established and partnerships formed with the Forestry Commission, Glasgow City Council and Newlands & Auldburn Area Committee. A parent at the school and a landscape architect drew up the initial design that was later developed by Glasgow City Council, which worked with the contractors on site. Pupils from the school were involved all through the process and their ideas were taken on board.

Before designing the natural play area, the school spent a year visiting other external play and learning environments such as Balamaha Park in Stirling.* The children's reactions to the natural play environments they visited were very positive.

The headteacher participated in a training course run by the Forestry Commission which confirmed for her the importance of access to the natural environment for children's development. The Forestry Commission then worked with the school to commission an independent study to create an evidence base on the advantages of creating a natural play area.** The observation study took place over three days in the old school playground and involved talking to children, parents, teachers and playground staff. Children were given cameras to take photos of areas they liked to play in and those



Merrylee Primary School, Glasgow. All photos © Felicity Steers

they didn't like. Some were asked to wear pedometers to capture data on activity levels. A comparison study will be undertaken in the new play area when it is established.

The design of the play area incorporates landscaped hills and hollows with surfaces made of sand and gravel along with numerous shrubs and trees. A grass-covered amphitheatre will be used as an outdoor classroom. Natural materials such as deadwood and boulders have been included to stimulate creative and imaginative play, and areas of tall grass to encourage children to explore. Grassy hills are part of the design to encourage children to run up and roll down them and a rope bridge is suspended across the valley.

The project team strived for this project to be fully inclusive, and engagement with pupils, staff and parents was very successful. The school already rents allotments that border the school site and so take the children out into the community. Future plans are that the play area will be open to the community during out-of-school hours, which is already the case with the school football pitch.

The grounds project at Merrylee Primary School is a pilot scheme that will form a template for future playgrounds at schools throughout Scotland.

Further information

Landscape design: Felicity Steers/Glasgow City Council

* See www.cabeurl.com/2m

** Natural Play Baseline Study for Merrylee Primary School
www.cabeurl.com/2l



Urban jungle: a natural play area that is open to the community during out-of-school hours. A parent at the school drew up the initial plans (below) for the natural play area after consulting staff and pupils



5.8 School halls, dining and other specialist areas

The school hall is often the heart of the building. DCSF *Building Bulletin 99* suggests that about one fifth of the gross area of a typical two-form entry primary school will be taken up by the hall, rising to one quarter of the floor area in a one-form entry school.¹⁰

Whatever the size of school and nature of the project, these basic questions should be answered before writing the brief:

- How will dining space be provided? Will it be in the main hall, or in another multi-purpose space? Using the main hall for dining can take it out of use for up to three hours a day, but may still be the most practical solution given space constraints.
- What activities will take place in the main hall? Has provision been made for potential community use out of school hours? In some circumstances, additional funding may be available to expand space for community activities in a primary school, creating the opportunity to have two larger spaces, one for dining and the other for a conventional hall.
- How can the dining space be designed so that it provides a pleasant dining experience that is not too crowded, noisy or intimidating?
- How can the main hall be designed so that it is an attractive space for assemblies and large

meetings, but also robust enough for PE and community sport?

- Can the large spaces be separated from the rest of the school for secure out-of-hours use? Can they be heated separately from the rest of the school?
- Will the acoustics of the hall be suitable for all the proposed uses? Some Victorian and Edwardian schools were designed with classrooms leading off a central hall, meaning some activities in the hall can be disruptive to the classrooms. Should the location of activities be rationalised to eliminate these conflicts, or can sound insulation be improved?

Crown Lane Primary School by BDP © David Barbour/BDP



5.9 Coats, toilets and storage

The design of cloakroom and toilet areas in primary schools is extremely important. These areas can be intimidating, at best creating a confusing crush where things are lost and at worst being a place where bullies lurk, unsupervised by staff.

New-build schools are often designed so that children enter the school through the playground, directly into the classrooms. The entrance frequently gives access to two classrooms, with coat and bag storage and toilets all located adjacent to the entrance, sometimes forming a lobby. These cloakrooms need to be generously proportioned, with adequate storage space and changing room space.

In other projects, notably refurbishment schemes, a single entrance may be more appropriate, and a few larger toilets shared by several classes can be a more economical and space-efficient solution. Traditionally, these have been single-sex, enclosed rooms accessed from circulation areas. Recently, some schools have experimented with unisex toilets, open plan from the circulation areas and consisting entirely of cubicles with full-height doors. These have proved popular with pupils, partly because they are easier to supervise and reduce the fear of bullying.

Storage is another sometimes contentious area, with teachers having to store increasing amounts of equipment in limited facilities. The design of storage spaces needs imagination: there are some good ideas in *Primary Ideas*.¹¹

Storage solution: functional design combined with colours to produce an interesting result

A useful checklist of the types of storage required includes:

- storage for teaching resources – centralised walk-in stores or stored within classrooms?
- lockable storage in classrooms for valuable or hazardous items
- indoor and outdoor PE equipment
- secure storage for school and personal records
- storage for stationery and bulky stock
- storage for maintenance: cleaners, caretakers and grounds maintenance
- furniture stores for dining tables and chairs, chairs (adult size) for meetings in the main hall, equipment used by community groups
- storage for special needs equipment, for example for children with disabilities
- pupils' coat and bag storage, including provision for packed lunches.

Ashmole Primary School by Greenhill Jenner Architects © Charlotte Wood



5.10 Designing for everyone

CABE is committed to promoting inclusive design. In *The principles of inclusive design*¹² CABE states:

Inclusive design aims to remove the barriers that create undue effort and separation. It enables everyone to participate equally, confidently and independently in everyday activities. An inclusive approach to design offers new insights into the way we interact with the built environment. It creates new opportunities to deploy creative and problem solving skills.

This definition goes beyond the legal requirement that schools should be fully accessible to pupils, staff, parents and visitors with disabilities. For example, locating lifts close to the main staircase so that people with disabilities can follow similar circulation routes around the building compared with able-bodied people is an obvious design intervention. However, to be fully inclusive the design of the lift should also take into account audio and tactile features, to orientate people with visual impairments.

This area of design can be complex. However, there is a lot of advice available. Many local authorities have access officers who can provide guidance on these matters. If there is an access consultant as part of the design team, this person will also be able to advise on this aspect of the scheme. There are also many excellent publications, including *The principles of inclusive design* and DCSF *Building Bulletin 102*.¹³



Millennium Primary School, Greenwich, London © Edward Cullinan Architects

Issues to consider include:

- location of facilities
- moving around
- wayfinding and legibility
- light and illumination
- space use
- internal design
- equipment and furnishing
- acoustic, sensory and tactile environment
- flexibility and adaptability
- the 'like it here' test, which asks different users if they feel 'it's designed with me in mind'.

All welcome: an inclusive class activity in the Millennium school hall

The Disability Discrimination Act¹⁴ does not apply to existing school buildings, and there is no requirement to alter existing schools to make them fully accessible. This means schools do not have to remove or alter physical features as part of the 'reasonable adjustment' duty. Physical alterations are covered by the longer-term planning duties for local authorities and schools.¹⁵

However, existing schools are required to produce a disability equality scheme, which should include a description of a staged process leading to a more accessible building. We strongly believe that striving for full inclusion wherever possible has huge benefits for all school users.

5.11 Furniture and fittings as part of high-quality environments

Well-designed furniture is especially important for refurbishment projects where money may be tight for spending on the building itself. Furniture and fittings should be considered early in the project and have a budget allocated from the outset. Leaving furniture and fittings to the end of the planning process could mean that an excellent building cannot be used to its full potential.

It has been estimated that between the ages of five and 16 a child spends around 15,000 hours sitting down at school, demonstrating the importance of high-quality furniture. Researchers at the University of Surrey's Centre for Health Ergonomics estimate that around 40 per cent of children suffer back pain, with badly designed seating one of the main culprits.

The following checks are useful:

- **Choose appropriately sized furniture** for different ages of children, but make sure there is sufficient adult-sized furniture for other events.
- **Carefully plan room layouts:** irregular room layouts mean moving furniture into more flexible patterns can be difficult. Choosing furniture early is useful in planning storage and internal room layouts.

Easy to see: colourful furniture used in the library can be seen from the school entrance



- **Consider how services will be distributed within the room.** Can power or data supplies be safely accessed in the required locations on all the alternative layouts?
- **Choose furniture for flexibility.** Lightweight, movable furniture can create quickly changing layouts. Co-ordinated or modular furniture can offer advantages, for example, tables where the depth is equal to twice the width join together more conveniently.
- **Consider durability and maintenance.** Furniture should be manufactured to the British Standards BS4875 and BS5873.¹⁶ Can furniture be easily repaired? Are spare parts easily obtainable? Can worktops be sanded down and re-sealed?
- **Use furniture creatively in designing room layouts.** Tall, stable storage units can create space divisions. Low cupboards can create private study areas, while retaining visibility across a classroom.
- **Ensure that there is adequate storage** provided for furniture that needs to be taken out of a room for certain activities.

5.12 Pre-fabrication – providing extra accommodation for expanding pupil numbers

When pupil numbers increase unexpectedly, a solution to capacity problems is pre-fabrication, also known as off-site construction.¹⁷ This can be a useful way of providing new accommodation both quickly and cheaply – but it needs careful research by the client and, ideally, expert architectural advice to find the best option for your school.

Pre-fabrication sees the building, or parts of it, manufactured off site in a factory in sections, then delivered to site and assembled. Site preparation such as foundations and services can be done at the same time as the factory build, so reducing the overall time from start to finish.

There are many different approaches to off-site construction, but systems can be put into one of the following:

- **Complete pre-fabricated buildings** often known as modular buildings, these are typically a series of units that make up a complete building. They are generally fully factory finished inside and sometimes outside. This approach offers the fastest construction times.
- **Panellised pre-assembly** also known as ‘cassette systems’, these are large panels constructed in a factory then assembled on site to form complete buildings. These generally require finishing inside and out on site, reducing time savings.

- **Volumetric pre-assembly** units such as toilet pods or plant rooms that are fully factory finished and installed within or added on to a building structure.
- **Component pre-assembly** smaller-scale items constructed off-site then fitted into the building structure. The time savings for this approach are much less.

Lee-on-the-Solent Infant School, Hampshire © A&M Photography



Possible issues

The costs and quality of off-site construction will vary. Although they are quicker to erect and cheaper than a traditional building, common defects can be found in poorer-quality pre-fabricated classrooms:

- overheating in summer and heat loss in winter
- dimensions of the accommodation have more to do with what fits on an articulated lorry than what makes a good classroom
- the building will not fit neatly onto the site so leave awkward shaped spaces around the buildings that have little use and are difficult to supervise
- costly maintenance is required soon into their life because of poor durability
- prescriptive dimensions do not allow for diverse teaching methods or small group work.

There are a number of different systems offered by manufacturers: many are based on timber-frame or timber-panel construction. Some are much more flexible than others, and the best will allow the client more design freedom so they will have a relatively bespoke building designed to meet their individual needs. Some systems offer flexibility of cladding materials, allowing an outside appearance that fits with existing buildings and the context of the site.

A bespoke design: a new children's centre for Lee-on-the-Solent Infant School, Hampshire, produced in consultation between Hampshire County Architects and the system manufacturer. The building offers attractive and flexible accommodation inside. It uses modular construction, was delivered on lorries from the factory in 13 sections and took only 20 weeks to complete on site

To help ensure that you end up with a successful off-site building, you should consider:

- How long the building is needed for – sometimes it will be for very short periods, but often it is likely to be needed permanently.
- Getting independent professional advice other than from a manufacturer. An architect will analyse your needs and produce an outline design and specifications to help you obtain initial proposals.
- Looking at different systems and manufacturers: to see what is most suitable for your building, and the standards on offer.
- Researching comparisons for a complete programme of work from alternative manufacturers. Check the times they are proposing to allocate to securing planning permission (which you will still need despite the pre-fabrication) and approval of building regulations.
- Taking up references and look at manufacturers' finished projects. Did they provide the clients with what they promised?
- Preparing a masterplan for the future development of your site to ensure that you locate your extension/new building in the best position and in a location that won't compromise future improvements (see the case study on masterplanning on p65).

Remember that the lowest cost is not necessarily best value.

Section 5 – references

- 1 See 1.7
- 2 Zero carbon schools taskforce, www.cabeurl.com/1k
- 3 *Schools for the Future: Designing School Grounds*, DfES, 2006, www.cabeurl.com/1f
- 4 *Building Bulletin 71: the outdoor classroom, educational use, landscape design and management of school grounds*, DfES, 1999 (2nd edition), www.cabeurl.com/1f
- 5 *Building Bulletin 99* (2nd edition), DfES has a section on planning school sites and the requirements for outdoor PE, see www.cabeurl.com/7h
- 6 See *Designing for Sport on School Sites*, Sport England, September 2007, www.sportengland.org
- 7 See 4.2
- 8 Forestry Commission survey for Merrylee Primary School, www.cabeurl.com/2l
- 9 *Secured by Design: Schools*, www.cabeurl.com/1o
- 10 *Building Bulletin 99* (2nd edition): *Briefing framework for primary school projects*, DfES, www.cabeurl.com/7h
- 11 *Primary Ideas: Projects to Enhance Primary School Environments*, DfES, 2006. Available at TSO online bookshop, www.cabeurl.com/7i
- 12 *The principles of inclusive design*, CBE, 2008, www.cabeurl.com/1q
- 13 *Building Bulletin 102: Designing for disabled children and children with special educational needs: guidance for mainstream and special schools*, 2008, DCSF, published by TSO www.cabeurl.com/7k
- 14 The Disability Discrimination Act 1995, Part 3 contains a reasonable adjustment duty to disabled people in general, and applies to the physical features of a school. In determining what are reasonable factors, the cost of the adjustment, practicality and the extent of the service provider's financial and other resources may be taken into account.
- 15 See *A guide for schools: Part 4* of the Disability Discrimination Act 1995 as amended by the Special Educational Needs and Disability Act 2001, Disability Rights Commission.
- 16 A list of manufacturers that comply with these standards can be obtained from the British Educational Supplies Association, www.besa.org.uk
- 17 See www.buildoffsite.org for information about the various types of pre-fabricated buildings available and their applications



6 Design development, construction and evaluation



Uplands Primary School, Baxleyheath by Studio E Architects © Kilian O'Sullivan

6.1 Managing the building works

Once the builder has been selected and the contract signed, construction work can start. A pre-contract meeting should take place between the contractor, architect, design team and the client representative before building works start to agree the arrangements for working on site and establishing effective liaison arrangements between school and building contractor.

On many projects, the builder will be working around an operational school, and it is tempting for the client to give instructions direct to people working on site. You should never do this. It can lead to confusion, contradictory information and claims for additional time and money to finish the job. Requests for changes should go to the architect or project manager, who will tell you about any implications of the change, before passing them on to the builder. A weekly liaison meeting with the architect in attendance can record all the decisions taken.

A building contract requires the building contractor to have an individual 'in charge' on the site at all times. This person is normally called the site agent or foreman, and queries about site operations should be channelled initially to them. Building sites can be dangerous places, and no one is allowed to enter them without the consent of the site agent. There are many legal requirements about visitors to building sites, including the use of protective clothing and footwear. For this reason, people should never visit the site without permission,

whether it be while the contractor is working or out of hours.

For larger projects, a clerk of works might be appointed by the client. This is an experienced person with a building background who becomes the architect's representative on site. They will monitor the works and check the quality against the specification, and answer queries from the contractor, referring back to the architect where necessary. The clerk of works can be helpful to the client by answering queries and taking up issues with the contractor on the client's behalf when problems arise.

When the builder considers the works to be ready for hand-over to the client, the architect or clerk of works will carry out a site inspection and issue a list of anything defective or incomplete. This is called the 'snagging list'. Once these items have been put right, and the building is considered by the architect to be capable of 'beneficial use', he or she will issue a 'practical completion certificate'. At this point, the school can take possession of the building, and takes over full responsibility for it, including insurance.

When a building has been occupied for a period, say a full year, the school community may realise that some of the design decisions that were taken in good faith have not worked out as expected, and minor alterations to the building may be desirable. You may wish to consider holding back some of the original building budget, in addition to the contingency sum¹ within the contract, so that there are funds available to deal with these issues. If funding is coming from the local authority or elsewhere, this approach needs to be agreed.

6.2 Whole-life costing: creating buildings that are easy and economical to maintain and operate

The maintenance and servicing costs for a building over 30 years are around five times the initial construction cost.²

'Whole-life costing' is a useful methodology used to test how economical a building will be in the longer term. It measures the entire cost of a building over a period of, say, 30 years, including the construction cost, design fees, furniture and fittings, operating costs, heating and lighting, and maintenance. In many cases this will demonstrate that increased initial investment in the construction cost of a building will reduce running costs, resulting in a more economical building over its whole life. The government advocates that whole-life costs should be calculated for all public buildings, and the Office of Government Commerce (OGC) has issued detailed guidance on the subject.³

There are several types of maintenance:

- **routine maintenance** redecoration and replacement due to normal wear and tear, breakages and damage
- **inspections, testing and servicing** periodic testing is a legal requirement for some services and good management practice
- **cyclical maintenance** depending on the quality of materials used; some will require replacement

in fewer than 30 years, including some flat roof coverings, inferior timber or UPVC windows, or ventilation plant

- **cleaning** regular deep cleaning is needed as well as general day-to-day cleaning. Costs may be incurred if scaffolding is needed to clean internal roof structures or roof lights, for example
- **grounds maintenance** grass cutting, litter collecting, gardening and weeding flower beds, washing down paving to remove algae, pond maintenance, replacement of fencing and outdoor furniture, and so on
- **alterations** where regular changes to the layout of a school are likely, it is worth considering how easy and costly it will be to move partitions or doors, for example.



Marshgate Primary School | Cube Design © Cube Design

6.3 Measuring success after completion

Carrying out a detailed analysis of how a building is performing after it has been in use for at least a full academic year can be a valuable exercise. Post-occupancy evaluation can:

- inform future developments – if the school is one of several PCP projects, lessons from both successes and any problems can help to improve the design quality of later schemes
- assess the extent to which a new building is supporting the school's educational transformation agenda and identify where barriers remain
- inform subsequent changes to improve the environment in the school and help to distinguish between design and management issues
- analyse the reaction of all the different users and stakeholders to the new building and identify how well different groups are catered for.

Post-occupancy evaluations need to be conducted carefully and thoroughly to provide robust and comprehensive results. They require significant resources, both in terms of time and money, potentially up to £10,000 per school.

The process of conducting an evaluation may involve:

- questionnaires to teachers, staff, pupils, parents and community users, which should be straightforward and offer the opportunity to highlight what works well and what works less well
- analysis of questionnaires and identification of key issues

- a series of focused workshops or discussions on the key issues to identify the cause of problems and gather ideas on solutions
- communication to the whole school community on outcomes
- repetition at regular intervals, say every one or two years.

Separate workshops for different groups can flush out different views about successes and concerns. Sessions should balance positives with negatives and should celebrate what is good about the school and the new or improved buildings.

Other methods of carrying out post-occupancy evaluation include design quality indicators⁴ or the design quality method,⁵ produced by the Building Research Establishment.

If you need further help

If you require further information, our appendices starting overleaf offer extra resources. Alternatively, visit the CBE website www.cabe.org.uk, or email enquiries@cabe.org.uk.

Section 6 – references

- 1 See 5.6
- 2 *The Long Term Cost of Owning and Using Buildings*, Royal Academy of Engineering, 1998, www.cabeurl.com/7f
- 3 *Achieving Excellence Guide 7 – Whole-Life Costing and Cost Management*, OGC, 2007, www.ogc.org.uk
- 4 See Introduction p 6
- 5 See Cook, M, *The Design Quality Manual*, Blackwell Publishing, 2007

7 Appendices



Nolley Green Primary School, Essex, by Atford Hill Monaghan Morris © Tim Soar

7.1 Glossary of terms

Abnormals

Extra costs that are a consequence of particular site or location factors.

Accommodation schedule

Document that outlines the number of rooms, their minimum sizes, and any special internal requirements.

Adjacencies

The relationship of rooms or departments to each other.

Brief (outline or detailed)

An initial description of the client's goals and requirements. The detailed brief is a development of this with input from users and the design team.

CABE enabler

A built environment professional, normally an architect, who provides advice to clients for public sector projects.

Client design advisor (CDA)

Construction professional skilled in designing education buildings. They are responsible for advising the local authority and the school stakeholders on design.

Consortium/consortia

The teams bidding for the contract in PPP/PFI. They normally consist of funders and facilities management and construction companies. The design teams are subcontractors to the construction companies.

Contractor

The team that constructs the building.

Design and build (D&B)

Procurement route where the building contractor is partly or entirely responsible for design development and for construction.

Design champion

Senior member of client organisation who advocates good design.

Design team

Responsible for designing the building. Usually led by the architects, the team also includes landscape architects, structural and service engineers and cost specialists.

Detailed design

The last stage in design development.

Design quality indicator for schools

A process for evaluating the design quality of school buildings from the inception of the project through the design stages and once the building is complete.

Exemplar designs

Outstanding school designs developed by leading architectural practices to demonstrate to others what can be done.

Local education partnership (LEP)

A delivery mechanism that allows local authorities to procure all the requirements of their local projects through a single long-term partnership with a private sector partner and Partnerships for Schools in a joint venture company called a local education partnership.

Outline business case

Document that sets out in detail the scope, costs, affordability, risks, procurement route and timetable of the project.

Official Journal of the European Union (OJEU)

The publication where contract notices for procuring projects over a certain value must be advertised.

Options appraisal

Examining your options at the beginning of a project by looking at the relative merits of new build or refurbishment.

Output specification

A detailed description of the functions that the new accommodation must be capable of performing.

Preferred bidder

The consortia that wins the bid and that will form part of the LEP.

Primary capital programme (PCP)

New funding being made available to all local authorities. The aim is to rebuild, refurbish or remodel half of all primary schools in England.

Private finance initiative (PFI)

Procurement route that requires the private sector consortia to raise private finance to fund the project, which must involve investment in assets, and the long-term delivery of services.

Partnerships for Schools (PfS)

Non-departmental public body set up to deliver Building Schools for the Future and the primary capital programme.

Public-private partnership (PPP)

Procurement methods that involve working in partnership with private finance, including private finance initiative (PFI).

Pre-qualification questionnaire (PQQ)

Sent to bidders expressing an interest in the project advertised in OJEU. It obtains information about potential bidders' capacity and ability to deliver the project.

Primary strategy for change (PSfC)

The document that sets out what is to be done and how it will be done, in terms of transforming education and the school estate simultaneously within the authority.

Traditional contract

Process that sees design and construction teams procured separately, one after the other, managed independently by the client. The design is worked up first and used by the contractors to price their construction cost.

Urban heat island

A metropolitan area that is significantly warmer than its surrounding rural areas because buildings and other materials retain heat, or because of waste heat generated by energy use.

Whole-life cost

The full cost of a building over its life, usually taken as 25 years. This includes capital, running, replacement and repair costs.

7.2 Useful organisations

Architecture Centre Network (ACN)

A network of architecture and built environment centres (ABECs) throughout the country that work with communities, the public, professions and the government to explore and interpret the historic and contemporary built environment through compelling, innovative programmes of education, exhibition and advice. www.architecturecentre.net

BECTA

The government agency leading the national drive to ensure the effective and innovative use of technology throughout learning. www.schools.becta.org.uk

British Council for School Environments (BCSE)

Membership organisation made up of local authorities, schools, construction companies, architects and others involved in, and concerned about, the design and build process in the education sector. www.bcse.uk.net

Department for Children, Schools and Families (DCSF)

Government department with responsibility for children's services, families, schools and 14-19 education. Websites offer information on government policy and key design guidance for school buildings. www.dcsf.gov.uk
www.teachernet.gov.uk

National College for Leadership of Schools and Children's Services

Works to develop and inspire school leaders in developing their vision for future learning and managing change. www.nationalcollege.org.uk

National Register of Access Consultants (NRAC)

An independent register of accredited access auditors and access consultants who meet professional standards and criteria established by a peer review system. It is a UK-wide accreditation service for individuals who undertake access auditing and access consultancy. www.nrac.org.uk

Open House

Independent agency promoting popular understanding about architecture, through its annual Open House London event, and an education programme for primary and secondary students and teachers. www.londonopenhouse.org/education

Partnerships for Schools (PfS)

Responsible for delivering BSF and PCP and managing school capital and school buildings policy on behalf of the DCSF. www.partnershipsforschools.org.uk

Royal Institute of British Architects (RIBA)

RIBA's mission is to 'advance architecture by demonstrating benefit to society and promoting excellence in the profession'. The RIBA Client's Advisory Service is a free service that provides long lists of architects (including those experienced as client design advisors) for clients. www.architecture.com

School Food Trust

Agency with a remit to transform school food and food skills, promote the education and health of children and young people and improve the quality of food in schools. www.schoolfoodtrust.org.uk

7.3 Further information

We have organised this section thematically to help you. Each themed section includes both publications and websites.

General design issues

DQI for schools

A process for evaluating the design quality of school buildings from the inception of the project through the design stages and once the building is complete. It can be used by everyone involved the development process to contribute to improving quality.

www.dqi.org.uk/schools

Better public building

Provides the arguments and the evidence that good design makes places work better. It offers practical advice for creating new public building that offer value for money, and are sustainable and a source of civic pride.

www.betterpublicbuilding.org.uk

Inclusion, integration and design implications for schools

Imaginative Minds Group www.cabeurl.com/72

Kitchen and dining spaces: A design note

Teachernet resource www.cabeurl.com/73

School Food Trust Papers

A fresh look at efficient kitchens and dining spaces www.cabeurl.com/1t; *A fresh look at the school meal experience* www.cabeurl.com/1u; *Improving kitchen and dining spaces (support for all stakeholders)* www.cabeurl.com/1v

Designing school grounds

Design for play: a guide to successful play spaces

Shackell A, Butler N, Doyle P, Ball D, DCSF, 2008
www.cabeurl.com/75

Inclusion of Disabled Children in Primary School Playgrounds

Woolley H, et al
Joseph Rowntree Foundation, 2006
www.cabeurl.com/74

Forestry Commission

The government department responsible for the protection and expansion of Britain's forests and woodlands. www.forestry.gov.uk/

Groundwork

A series of trusts, working in partnership across the public, private and voluntary sectors, to support communities in need and help improve the quality of people's lives, their prospects and potential and the places where they live, work and play.

www.groundwork.org.uk

Learning through Landscapes

Charity working with schools, encouraging well-designed school grounds for recreation and learning facilities. www.ltl.org.uk

Learning Outside the Classroom

A website that promotes the benefits of learning outside the classroom, its position as a key component in the organisation of learning and the contribution it can make to raising achievement.

www.cabeurl.com/1y

Play England

Agency working to ensure that all young people in England have regular access and opportunity for free, inclusive, local play provision and play space.

www.playengland.org.uk

Sustainable design

British Research Establishment Environmental Assessment Method (BREEAM)

Method of assessing the performance of buildings in the following areas – management, energy use, health and well-being, pollution, transport, land use, materials, and water. www.breeam.org

Groundwork's One World Schools

Helping deliver the sustainable schools framework. www.cabeurl.com/77

DCSF publications

A range of publications with comprehensive information on a variety of topics. Some are free and there is a charge for others. Some of the most useful include:

Building Bulletins (BB)

BB 77: The outdoor classroom

BB87: Guidelines for environmental design

BB 93: Acoustic design of schools

BB 94: Inclusive school design

BB 95: Designs for learning communities

BB 98: Briefing framework for secondary school projects

BB 99: Briefing framework for primary school projects

BB 102: Designing for pupils with special educational needs and special schools

Schools for the Future publications

Classrooms of the future

Design of sustainable schools: case studies

Designing schools for extended services

Designing school grounds

Exemplar designs: concepts and ideas

Inspirational design for PE and sport sciences

Inspirational design for kitchen and dining spaces

Primary Ideas

A compendium of ideas for improving the environment in school buildings, written for the DCSF by the Bureau of Design Research, University of Sheffield.

Available from The Stationery Office

or www.cabeurl.com/1s

The Lighthouse on Sustainability

Lessons from school buildings in Norway and Germany. www.cabeurl.com/77

Primary School Carbon Footprinting

Rod Bunn & A Leaman, BISRIA, March 2009 – order from BSRIA website. www.cabeurl.com/78

Sust.

Scotland's first dedicated website to sustainable design in architecture and the built environment. www.cabeurl.com/79

Sustainable Schools

www.teachernet.gov.uk/sustainableschools

Sustainable Schools toolkit

www.cabeurl.com/24

Zero carbon taskforce

www.cabeurl.com/79

Involving stakeholders in design

Being involved in school design

A guide for schools, local authorities and stakeholders to being involved in the school building process. www.cabeurl.com/2b

Our school building matters

CABE toolkit to help teachers make the most of the learning opportunities created by building a new school or refurbishing an existing one. www.cabe.org.uk/education

Engaging Places

A resource to support teaching and learning through buildings and places. www.engagingplaces.org.uk/home

Participation Works

Participation Works is run by the Carnegie Young People Initiative and provides advice on involving young people in decision-making processes. www.participationworks.org.uk

School Works

Has expertise in involving users in the design of their schools (now part of BCSE). www.school-works.org

Joinedupdesignforschools

An initiative created in 2000 by the Sorrell Foundation which explores how good design can improve quality of life in schools by listening to the consumers of education, the pupils. www.thesorrellfoundation.com/joinedupdesignforschools.php

Exemplar projects

CABE case studies

A selection of online case studies of primary and secondary school buildings. www.cabe.org.uk/case-studies

Changing classrooms: exemplars of well-designed learning and teaching spaces

The Scottish Parliament/ The Lighthouse, 2008 www.cabeurl.com/26

Design Share (international case studies)

www.designshare.com

Imagine

A database that captures best practice in school design from around the world.
www.imagineschooldesign.org

Learning by Design: England

Two editions featuring 16 exemplary education buildings in London. Both can be purchased from:
www.openhouse.org.uk

PEB Compendium of exemplary educational facilities

The third PEB Compendium features educational institutions from 20 countries selected by an international jury for their exemplary facilities. This work addresses how the design, use and management of physical infrastructure can contribute to the quality of education. Can be ordered from the OECD. www.oecd.org/edu/facilities/compendium

Primary capital project

Information about pathfinder projects.
www.cabeurl.com/27

Public Art Online

Case studies including school projects and list of funding sources. www.publicartonline.org.uk/

SchoolDesigns.com (American designs)

A virtual gallery of *American School & University* magazine's architectural portfolio and educational interiors showcase. www.schooldesigns.com

7.4 Local examples

This is a list of primary schools researched during the writing of this publication. Each one features good design elements. Please look at the CABE website for updated primary school case studies.

South East

Burnham Copse Primary School, Tadley, Hampshire (refurbished)

Good example of a refurbished 1950s building with good access and circulation routes for all children.
www.burnhamcopse.co.uk

Great Binfields, Basingstoke, Hampshire (new build)

Sustainable building with good daylighting.
www.greatbinfields.hants.sch.uk

Pinewood Infant School, Farnborough, Hampshire (new build)

Inclusive design with larger classroom to accommodate integrated places for children with hearing impairment. www.pinewood.hants.sch.uk

Queen's Inclosure Primary School, Waterlooville, Hampshire (new build)

Open plan with flexible spaces.
www.queensinclosure.hants.sch.uk

Whiteley Primary School, Fareham, Hampshire (new build)

Good environments – daylighting and ventilation.
www.cabeurl.com/7a

Woodlea Primary School, Whitehill, Hampshire
(new build)

Good orientation and use of site.
www.woodlea.hants.sch.uk

Waterhall Primary School, Bletchley, Milton Keynes (new build)

Award-winning building opened in 2009 with good daylighting and school grounds.

South West

Exwick Heights, Exeter, Devon (new build)

Curved structure arranged on two levels positioned on a sloping site. www.exwickheights.devon.sch.uk

Pokesdown Primary, Bournemouth, Dorset
(new build)

Good circulation routes and external play areas.
www.cabeurl.com/29

East

Beaumont Community Primary School, Hadleigh, Suffolk (new build)

Very sustainable school.

Howe Dell Primary School, Hatfield, Hertfordshire (new build)

Eco school with many sustainable features.
www.howedell.herts.sch.uk

Westborough Primary School, Westcliff on Sea, Essex (extension)

Interesting extended services provided in additional building made from cardboard built on a school site.
www.cabe.org.uk/case-studies/cardboard-building

London

Fitzjohn Primary School, Camden

(refurbished)

Interesting example of refurbishment of historic building. www.fitzjohns.camden.sch.uk

Golden Lane Campus, City of London

(new build)

Three schools amalgamated onto one site in tight urban area.

Jubilee Primary School, Lambeth (new build)

Tight urban site with amalgamated schools including SEN provision.

Larmenier and Sacred Heart, Hammersmith & Fulham, (new build)

Very sustainable design in tight urban area.
www.cabeurl.com/a0

Millennium Primary School, Greenwich

(new build)

Very sustainable school in tight urban area.
www.millenniumprimaryschool.moonfruit.com

St Mary and St Pancras C of E Primary School, Camden

(new build)

School located under student housing block. Good use of space in tight urban site especially external areas. www.stmarypancras.camden.sch.uk

North West

Devonshire Primary School, Blackpool

(new build)

Interesting use of decked areas for play.

www.devonshire.blackpool.sch.uk

Kingsmead Primary School, Northwich, Cheshire

(new build)

Very sustainable and good environment throughout the building. www.kingsmead.cheshire.sch.uk

Rolls Crescent Primary School, Hulme,

Manchester (new build)

Sits well within the community – tight urban site.

www.rolls-crescent.ik.org

North East

Canning Street Primary School, Newcastle upon Tyne (refurbished)

Interesting refurbishment project of 1970s building and open plan.

Cobblers Lane Primary School, Pontefract,

Wakefield (new build)

Communal heart of school used for many activities and makes visibility very good.

Sharrow Primary School, Sheffield (new build)

Sustainable school with clear identity in an urban setting.

Midlands

Bowbridge Primary School, Northamptonshire

(extension)

Extension to existing school with sustainable credentials. www.bowbridgeprimary.com

Red Hill C of E Primary School, Worcester

(new build)

Sustainable school with many features of the building design brought into the curriculum.

www.redhillprimary.org

Redbrook Hayes Community Primary School, Rugeley, Staffordshire

(new build)

Good community connections, public library attached. www.redbrookhayes.staffs.sch.uk

St Luke's Primary School, Blakenhall, Wolverhampton (new build)

Very sustainable school as part of regeneration project in an urban area. www.e-architect.co.uk/birmingham/st_lukes_ce_primary_school



All-through schools and co-located schools

Chafford Hundred School, Thurrock

Co-located primary and secondary schools.

www.chcprimary.thurrock.sch.uk

Hadley Learning Community, Telford

Primary, secondary and special school.

www.cabeurl.com/a2

Wooldale Learning Centre, Northampton

A community centre that includes the Caroline Chisholm School which in turn contains a primary school and secondary school.

www.ccs.northants.sch.uk

The Campus, Weston Super Mare

Primary, special school and community facilities.

www.cabeurl.com/a3

St Mary Magdalene School, Islington

C of E combined primary and secondary school.



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Waterhall Primary School, Architecture MK © David Threwer, Redshift Photography

There is a clear link between well-designed primary schools and pupil performance and behaviour. Successful school design is the result of hard work and collaboration between designers, contractors and visionary, committed clients. *Creating excellent primary schools* has been produced to help primary school clients, working in either the local authority or the school itself, to make the most of new capital investment in their buildings. It takes readers step by step through the process, offering practical tools and a dozen inspiring case studies to show just what can be achieved.

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