

schools for the
future



Transforming Schools



an inspirational guide to remodelling
secondary schools

department for

education and skills

creating opportunity, releasing potential, achieving excellence

'I think that it has made a big improvement to my learning. It has become a much happier environment to work in and there is much better equipment to use'

Sarah, Year 11

'The building project has helped by giving us a wider range of facilities. I think that the school is a lot more motivated. Everyone gets to use the facilities'

Katie, Year 11



'It makes a big difference working in rooms that have new furniture and have been painted properly'

Michael, Year 11

'The old dining room was too hot, noisy and crowded. The new restaurant is great and I'll start staying at school to eat now'

Katie, year 9

'There is always a place to rehearse if you need to stay after school for GCSE'

Jenny, Year 10

'The facilities for the sixth form are impressive and make us feel more valued by the school.

I believe more students will now want to stay on into our sixth form'

Suzi, Year 12

Key to plans

1	store	39	resistant materials workshop
2	chair store	40	resistant materials preparation room
3	lockers for personal storage	41	electronics control technology
4	office	42	constructional textiles
5	lift	43	graphics room
6	server	44	learning resources area
7	kiln room	45	3D art room
8	interview room	46	general art room
9	music group/practice rooms	47	music recital room
10	music ensemble room	48	music classroom
11	recording/control room	49	drama studio
12	caretaker's office	50	main hall
13	maintenance store	51	sports hall
14	central stock store	52	PE store
15	head's office	53	activity studio/gymnasium
16	meeting room	54	pupil changing rooms and showers
17	general office	55	PE staff changing
18	entrance/reception/foyer	56	library resource centre
19	staff work room	57	librarian
20	staff room	58	sixth form study area
21	reprographics	59	sixth form social
22	medical inspection room	60	dining area
23	SEN case conference/tutorial	61	kitchen (including staff and stores)
24	SENco/wheelchair and appliances store	62	plant (e.g. boiler or electrical intake)
25	small group room	63	void
26	English classroom	64	bicycle racks
27	modern foreign languages classroom	65	bin store/deliveries
28	humanities or other classroom	66	social health education classroom
29	mathematics classroom	67	Learning support
30	business studies classroom	68	Adult Education Centre
31	seminar room	69	parent's room
32	information technology room	70	crèche
33	ICT technician	71	English as an additional language classroom
34	ICT cluster	72	stage
35	science laboratory	73	theatre/auditorium
36	science preparation room	74	fitness centre/multi-gym
37	chemical store		
38	food room		

foreword

Annual investment of around £2 billion in our Building Schools for the Future programme will allow us for the first time to remodel and modernise all our secondary schools, with up to half of school buildings brand new.

In February 2004, I had the pleasure to introduce a book of exemplar designs, concepts and ideas of what brand-new schools for the future might look like. Now we have the opportunity to consider the other side of the coin: the potential for remodelling existing school buildings. There are lots of examples of good design and planning in schools today, but this latest book of great ideas concentrates on secondary schools that have had a wholesale transformational change, through a series of new building and remodelling projects.

One thing that comes through very strongly from the case studies is that a mixture of new buildings and remodelling is not second best, not some 'poor relation' to schools with entirely new buildings. It is a powerful message – that really tailoring the buildings and their components to what children and

communities need, keeping and modifying the best of what schools already have and replacing that which is no longer suitable to the school of the future, can be every bit as uplifting and transformative, with an earlier impact and sustainable approach, as starting from scratch.

Now the funding is there, the challenge is for schools, local authorities, businesses and local communities to come together and 'think big', to engage with the possibilities of change now – and the guidance in this document is aimed at helping that happen. For instance, which buildings should remain and which should be replaced? How will the school's educational vision be best accommodated? How can school facilities be fully inclusive?

I hope and I am confident that you will take the opportunity to engage with the designs in this book, showcasing some of the best and achievable approaches, and that they will stimulate debate and ideas every bit as rich and rewarding as those inspired by our previous exemplar designs.



David Miliband MP
Minister of State for School Standards
DfES Ministerial Design Champion

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introduction

What is Remodelling?

We have referred loosely to remodelling buildings throughout this book, but in practice this can include any combination of redecoration, refurbishment and adaptation.

- **Minor remodelling** will range from simple redecoration – repair and maintenance of the existing rooms and infrastructure – to adding ICT cabling and outlets, new floor coverings and loose furniture and equipment.
- **Major remodelling** will also include major repairs such as completely new wiring and electrical outlets, heating systems, ceilings and windows or cladding, and fixed furniture and equipment (for instance in science laboratories) and may include some adaptation – removing internal walls, adding new ones and perhaps making alterations to suit extensions.

In the last section *Cost Implications* sets out these types of work and their cost in more detail.

Over the next 15 years, subject to future public-spending decisions, all secondary schools in England will have been rebuilt or remodelled. Capital funding for all schools has risen sharply over the past few years, and many secondary schools have already been renewed (for instance under PFI projects) or replaced by new Academies. Continued capital funds over the next 15 years will be sufficient to provide the remaining secondary schools with buildings to twenty-first-century standards and specifications. Whether through new buildings or remodelling, a secondary School for the Future will meet the needs of inclusion, workforce reforms and community use, and will be flexible enough to adapt to changes in the curriculum, teaching methods and the developing 14 to 19 agenda.

This transformation will be funded mainly through the Building Schools for the Future (BSF) programme, for which £2 billion per year is currently committed. These capital resources will be significantly enhanced to establish 200 Academies, planned to be open or in development by 2010. Other capital funds, such as devolved capital paid directly to schools, or the specialist-schools capital grants, will also continue.

Many schools will need to have their buildings completely replaced. Others may be moved to a single or different site, or merged. Some local authorities may take this opportunity to reorganise their secondary-school system, as others have already done. The vast majority of secondary schools, though, will stay on the same site and will need a mixture of new and replacement buildings, adaptations and refurbishment.

This book is aimed at all those involved with secondary schools, from heads and governors to local-authority building officers, dioceses and sponsors. Using case-study examples of real schools that have had recent transformational projects, it aims to:

- highlight the benefits of refurbishing some buildings and replacing others;
- show how the basic budget for each school will be set;
- give some guidance on how schools can make the best use of their budget and identify the option that best suits their vision and ethos; and
- highlight what schools and local authorities can do now to ensure that all the available capital funding is used as effectively as possible – whether they are due for major funding soon or later.

how to use this book

If you are a teacher or pupil:

As the real clients of any improvements to school buildings, pupils and staff need to have an active role in the development of the design brief – from the masterplan for the whole school to the detail of what is needed in each room. Many of the benefits of consistency (keeping the best of what you already have) and time (getting quick results from small but early projects) are worth considering.

The schools discussed in the book have involved a member of staff in the key role of project manager during the design and construction process – providing a single point of contact for the architect and contractor and ensuring everyone is informed and aware of what is going on. There is also evidence in many of the case studies of how on-site construction can be used to enhance the curriculum.

If you are a head or governor:

A key theme throughout this book is how head and governors can use the opportunity of major building work to enhance their vision for the school's future, in terms of both teaching and ethos.

By using the expertise of the local authority and building professionals, most of the case-study schools were able to consider a number of options which addressed the deficiencies of the current facilities, local strategies for places and extended-school provision, and the head's and governors' vision for the school. As well as addressing these factors, the final plans chosen can often address a wider range of issues that are important to the school.

The importance of being involved from an early stage, testing ideas and consulting with as many people as possible before agreeing a final design, is demonstrated in many of the schools shown here. Once the design has reached 'scheme design' stage, decisions are effectively 'frozen' and further changes will be possible but costly.

If you are a local authority or diocese:

Apart from the City Academy case-study, all of the building projects shown in this book demonstrate the vital role of the local education authority. The LEA ensures that each school addresses the needs highlighted in the Asset Management Plan, as well as wider local strategies and vision in areas such as inclusion, current or future specialism, leisure and sports provision and other extended-schools facilities. Some LEAs have taken the opportunity to move a school to a single site, add more places or reorganise the entrance and floor plan.

The BSF programme requires each local authority to work with partners and other stakeholders to create a masterplan for the remodelling of each secondary school. This can be done sooner rather than later in order to join the programme up with other sources of funding, such as for health and childcare opportunities. The design quality of subsequent projects also needs to be put high on the agenda – for instance through the appointment of a 'Design Champion'.

If you are an architect or building professional:

All the designs in this book, whether bold and innovative or more pragmatic, have evolved through the input of a variety of building professionals. This book highlights many issues that all contractors need to understand, particularly the imperative to phase or programme the work to avoid examination times so that occupied schools can continue to work successfully. But most important, perhaps, is the sheer volume of school building work that the Government's spending plans will bring, by a variety of procurement routes, and the need for many more architects and others to become involved.

This expertise is needed now, to ensure the quality of design and construction that will make a real difference to learning. There will be increasing opportunities for skilled teams to develop their educational expertise in educational buildings. This is especially true for medium-sized and smaller firms that can contribute local knowledge and experience to enhance their communities.

If you are an extended-school stakeholder:

The reorganisation of the school within an overall masterplan can ensure that appropriate facilities, such as sports halls and ICT rooms, can be located and serviced to be easily available to the local community outside the school day.

Although some of the schools highlighted in this book have not yet taken up the extended-schools opportunities available, they and many others could easily harness further funding and linked-up strategies to provide for more wide-ranging 'non-school or support' provision such as multi-agency centres for health and social services, childcare and adult learning during the school day.

This book concentrates on mainstream secondary schools, although middle-school and further-education examples are used where relevant to highlight design approaches. Many of the issues discussed are equally applicable to projects in other educational sectors as well.

The book is divided into four sections. The first section, 'Benefits: Reaping the Rewards of Remodelling', shows how a programme of remodelling can have a number of advantages over total replacement. These include:

- **identity:** retaining and remodelling older or distinctive buildings, for instance those of an original Victorian school, gives a successful school a character and gravitas valued by staff and pupils and recognised in the community;
- **consistency:** staff and pupils can be certain that what works best in the current school buildings will remain, while what is less suitable will be replaced or improved;
- **conservation:** many buildings of all ages have a timeless design quality that should not be lost, and planning issues such as listed buildings, work in conservation areas and Tree Preservation Orders can be addressed more easily through remodelling;
- **regeneration:** schools can form a key element in the regeneration of a larger local area, perhaps with a relocated entrance offering a more welcoming link to the community;
- **involvement:** pupils have a useful contribution to make to the briefing process, and ongoing work can be used to enhance many parts of the curriculum;
- **sustainability:** reusing existing buildings uses smaller quantities of new materials, expends less energy in manufacture and transport, and avoids landfill. Some existing buildings also offer effective natural ventilation;
- **space:** because a remodelled building is inevitably a looser fit to the brief than a new building, which will match requirements with little to spare, schools can benefit from increased area or volume; and
- **time:** although building work will usually be phased, minor work in early phases can often be done quickly with funds already available, so that benefit can be felt by the current pupils and staff.

To make the most of these advantages, it is important that every local authority and secondary school develop a strategic masterplan to ensure that all building work supports the educational aims and vision of the school and is not misdirected. This is particularly important in schools that may receive BSF funding later in the programme, as other funding, such as devolved capital, specialist-school capital or targeted capital, can be used to develop the first phases of a longer-term development plan for the entire school premises.

This masterplan is discussed in the second section of this book, 'Making it Happen: Preparation and Implementation', which identifies key stages in the process of remodelling a secondary school. If a masterplan is to be worthwhile, it must be based on a strategic brief agreed with the local authority, incorporating:

- 'top-down' issues, such as planned pupil numbers, school type (including the existing or planned specialism) and other local strategies (for instance concerning childcare and leisure provision across the authority); and
- 'bottom-up' issues, including the vision for the school and its role in the local community, signed up to by the head, the governors and all relevant stakeholders in the school.

An initial 'control' option will identify the simplest approach to bringing each school's buildings up to a suitable standard, and the budget will be based on this. The final masterplan should be the best of a number of further options professionally designed within the same budget.

The last part of this section looks at the issues to address when implementing the masterplan – using the lessons from various case studies to highlight what to consider and what to avoid when work begins.

A number of recent case studies from around the country are used throughout these sections to illustrate relevant points. Some of these projects are examined in more detail in the third section, 'Case Studies', where the architects of projects that have recently

transformed seven secondary schools describe the following issues:

- **background:** the school's situation and circumstances and the reasons why building work was done, plus a summary of the requirements of the design brief;
- **site and existing buildings:** the size and type of site and any constraints, including issues of access and the suitability and location of the existing buildings;
- **design strategy:** how the vision for the school was translated into the design philosophy and how recent building work fits into the masterplan for the whole site;
- **phasing and timescale:** when the work took place, how it was phased to suit term dates, holidays and exam periods, and how the work to date and future phases fit into a dynamic but considered masterplan for the whole site; and
- **environmental performance:** how the design achieves acoustic, ventilation and heating requirements and how it aims to be sustainable.

The final section of the book includes 'Cost Implications', which discusses the costs involved in some of the case-study examples and in school buildings more generally, both remodelled and new. It covers some of the implications of decanting, planning and conservation, phasing and VAT, and briefly summarises the options for procurement, whether through partnering, PFI, design and build, or traditional methods.

Various references are made throughout this book to organisations and publications that may be useful in the remodelling or renewing process. These are listed, with more details, in the Glossary and Further Reading reference pages at the back of this book.



Architects' impression of proposed scheme

Penoyre and Prasad have proposed adding a six-storey building to this tight urban site, to replace an extensive area of single-storey buildings and run-down modular accommodation. The 'light links' to the existing four- and five-

storey building on one side of the new building, and the (unseen) three-storey building on the other, combine stairs, 'sky gardens' and social spaces while linking all the school's facilities within one set of buildings.



The school as existing



Possible upper floor terrace



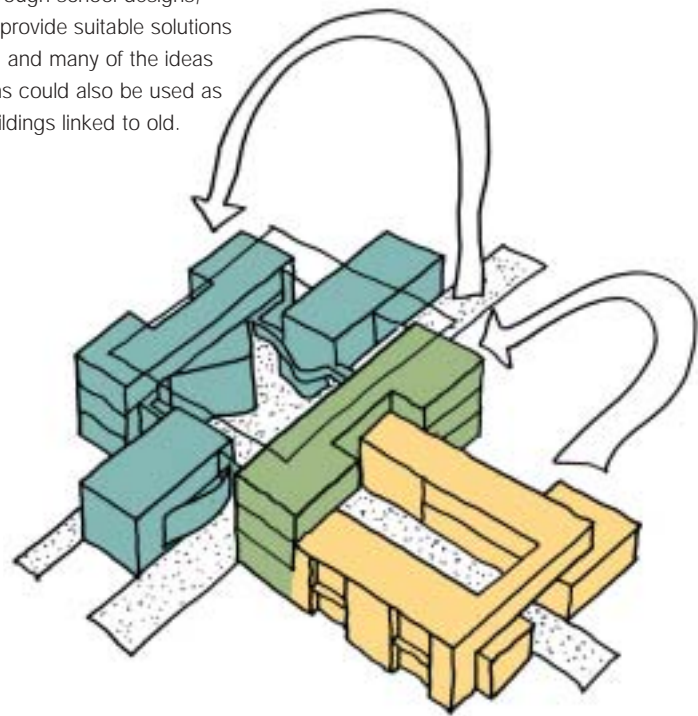
Possible sixth form social space in 'light-link'

remodelling with exemplar designs

As a sister document to the recent compendium of *Exemplar Designs: ideas and concepts*, this book highlights similar ideas for school design, but within two areas not covered in that exercise: remodelled buildings and real examples. Like the exemplar designs, the case-studies in this book are intended to show the reader what can be achieved within the funding available. In fact, the budget for many remodelled schools in the future will be higher than that for the completed case-studies illustrated, and Building Schools for the Future funding will allow the early completion of the work that is needed, rather than it being provided in many phase of a longer period.

To show how the ideas and concepts of the original Exemplar Designs can be used to address schools that need some remodelling and some new building work, within the funds now available, three of the design teams involved have illustrated how their Exemplar Designs might be used to transform existing secondary schools through new build combined with adaptation.

While these three designs may be the easiest to use to link refurbished and new buildings on existing sites, elements of the other secondary and all-through school designs, shown below, could provide suitable solutions with further variation, and many of the ideas in the primary designs could also be used as the basis for new buildings linked to old.



Elements of Feilden Clegg Bradley's all-through Exemplar Design can be linked to existing buildings



dRMM extended the approach used in Kingsdale for their Exemplar Design



RTK/MACE's dining space can be added to an existing school



Aerial view of proposed scheme



Aerial view of existing school

The 'learning clusters' developed by Wilkinson Eyre Architects for the Exemplar Designs project could be used to replace a number of unsuitable buildings in poor condition. These blocks and those that have been retained and

remodelled in their proposal are united by means of a central 'agora'. This gives a protected circulation route to all parts of the school and provides a secure social area for the whole school and, outside the school day, the wider community.



Inside a new 'cluster'



Three dimensional section through proposed scheme, with the remodelled building on the left

Alsop have proposed the remodelling of an existing school by creating a new atrium space between a run-down teaching block and a new two-storey extension. The existing block would be extensively refurbished, with the façade set back to create a series of circulation galleries looking onto the atrium.

High-level bridges connect the galleries to the new accommodation and a series of lily-like structures suspended within the atrium create sixth-form study and break-out areas. The extension delivers a new learning resource centre with access to an outdoor deck, as well as music and drama studios.



View of existing school



Architect's impression of same view in proposed scheme



benefits:

reaping the rewards of remodelling



Over the next 15 years, most secondary schools will be transformed through a nationwide programme of refurbishment, adaptations and new buildings. On average, the capital funding available will be enough to replace about half of a school's buildings and to upgrade the remainder to the standards and specifications of a School for the Future. This section aims to show the benefits of the remodelling approach over total replacement.

identity

The character and ethos of a successful school is often signified by some of its key buildings. These may be new buildings, but are often older ones that embody the historical context of the original school on the

site. Many schools have buildings that they would be keen to keep as they are recognised by the staff, pupils and local community as representative of what is best about the school and its history.

If these buildings were originally designed to house a school, they may have appropriate accommodation that can be easily adapted to the needs of a modern school. Even if the spaces no longer meet current curricular needs they can often be remodelled to accommodate a different function. For example, small classrooms can provide a learning resource centre or sixth-form provision that can have the added benefit of historical character and architectural details.

The historic significance of a site, as well as the buildings, can also mean that many schools may want to stay put, even when the site is confined. As ICT access increases, such constraints may be balanced by the opportunity to place schools at the heart of the community.

City and Islington FE College used an existing Victorian school as part of its Centre for Lifelong Learning at Finsbury Park. The architect says:

'The decision to retain the Victorian building at the core of the scheme, while requiring more bravery, engagement and constant monitoring by client and consultant team in terms of cost and contingency planning, has emotional rewards – the long history of educational use on the site and its place in the collective consciousness of the local community has been reinterpreted rather than swept away wholesale. Many of the building's users, who have a long association with it, are very pleased about this.'



Bishop Wordsworth's School is located on a very cramped site in a conservation area in Salisbury. It has started a long-term improvement plan to replace temporary classrooms in poor condition and address suitability shortcomings. Relocation, even on a temporary basis, was not seen as an option by the school. The headmaster says:

'The school is located in what is arguably the most beautiful Cathedral precinct in the United Kingdom. The traditional Christian ethos of the school, together with the very strong ties with the Cathedral through the school's founder, means that a move to an alternative site would not be a viable or desirable option.'



consistency

While there is always room for improvement, there will usually be elements of the buildings and the way that they can be used that staff and pupils already like.

Rather than starting with a clean slate, they can be reassured that what works best in the current school buildings will remain, while what is less suitable will be replaced or amended. When so much in education is changing, this can help to bring some stability.

Where the site is restricted in size or access (with playing fields elsewhere), replacing all of the buildings would mean that the entire school would need to be decanted to a temporary site while the work was done. Depending on the location of available temporary sites, this may cause more disruption to pupils than if remodelling work were phased around them while they stayed on site, especially where there are existing

issues of pupil disengagement or where pupils might be particularly sensitive to disruption.

Although the potential disturbance needs to be carefully managed, the benefits of building work nearby or adjacent to facilities that are in use can be understood by both pupils and staff. This also means they can communicate their concerns to the school's single point of contact with the contractors if necessary.



South Camden Community School (above) favoured phased remodelling over a total rebuild which would have involved major decanting. The head teacher says:

'Routine is vital to ensure that students feel secure and confident in their learning environment. When routine is disrupted learning suffers and behaviour management becomes more of an

issue. It is not only students who are adversely affected by the disruption of routine; it massively increases both workload and stress levels for staff and this also needs to be factored in.'

At Tiffin School in Kingston, the new learning resources centre (below) not only provides an inspirational library and mezzanine ICT facilities, but also links two existing buildings with contrasting styles (one dating from the 1930s and one built in

1986) which, together with a listed Georgian house, represented the traditional ethos of the school. IID Architects' design complements the existing buildings whilst also reflecting the spirit of the age and combining a sense of excitement

with the calm that independent learning requires. The new circulation areas and lift have provided access for the disabled to both floors of the adjoining buildings and have served to further enclose the courtyard.



© IID Architects

conservation

Many buildings of various ages are worth preserving and if necessary remodelling, because of their historic or architectural character and detailing. Victorian and Edwardian buildings often have unique design qualities and features which would be very difficult or prohibitively expensive to include in buildings today.

Spaces that may once have been designed for a specific purpose will often have been used for other and perhaps less appropriate purposes since. Within a project that reorganises the whole school, however, such spaces can be ideal for modern learning activities: from small halls becoming libraries

to large classrooms with high ceilings being used for music rooms.

Adaptations and refurbishment of listed buildings can be difficult, but will often be worth the extra effort. Planning issues such as work in conservation areas and Tree Preservation Orders can be addressed more easily through projects which aim to substantially remodel existing buildings rather than replace them.

Sometimes, however, existing buildings may never easily provide teaching and learning facilities that are large or adaptable enough to

suit the modern curriculum. While the historical significance of, for instance, the original house on the school site may be recognised by the local planning authority and conservationists, the cost of repair and allowing full access may be too high for the school if the end result is still not suitable. Depending on the location and access of such a building, and its importance to the ethos of the school, careful decisions need to be made as to whether it is best used by the school, within the ideal masterplan, or whether it may be better used by others – perhaps for wider educational uses such as teacher training or for other community uses.



City and Islington College created a new atrium in an adapted 1880's Victorian London Board School. The architect says:

'The new and old mixture, while making the project complex to deliver efficiently on site, has other advantages. Working within the tight budget constraints, the dynamism created by juxtaposing the old building with the new gives a richness of spatial diversity which would be otherwise unaffordable. The detailing of the Victorian building – bas-relief carving formerly high above the playground and barely noticed – now has an enhanced status as students and staff pass close by on the bridges of the new building.'

Following an extensive conversion and extension programme, the Wolverhampton City Learning Centre at Wednesfield High School is housed in the school's disused swimming pool.

Although the distinctive late 1950s building formed an integral part of a larger building, Wolverhampton City

Council Property Services has allowed it to offer a self-contained facility on the school campus.

The original pool is now a citywide, shared ICT resource area, with a new opaque glazing system set back behind the existing structural columns to enhance the sculptural effect of the 'folded slab' roof.



regeneration

Some existing school buildings may be recognised as a key part of the local environment. Where past resources may have been insufficient to keep these buildings in good repair, their refurbishment and upkeep can help instil and reinforce upward aspirations within both the school and the wider community.

Schools can form a key element in the regeneration of a larger local area that might also include leisure, sport, health and housing facilities. The Government's commitments to extended schools and joined-up approaches to public services mean that major organisational changes in secondary schools can provide an opportunity for partnership

working with other local services undergoing reorganisation or improvement.

The wholesale reorganisation of the school's site and the layout of the buildings often offer the opportunity to alter its 'centre of gravity' and reorientate the entrance to offer a more welcoming link to the local community.



Brompton Manor School's governors initiated a site and premises study of their school which involved not only the school community but also council officers, local businesses and healthcare organisations.

The resultant strategy report was then absorbed into a wider regeneration proposal for the area, encompassing road and transport infrastructure improvements, as well as new medical, social, lifelong-learning and housing facilities.

At Charter School in Southwark (below), one of the key aims of major remodelling was to present a new and welcoming entrance to the

community, to signify the school's rebirth. The entrance is dramatic, landscaped and highly visible, with new ramps ensuring full access.

The entrance leads directly to a multi-purpose atrium space (formed by covering a former courtyard) which is used as a meeting and social

space for pupils and visitors. This atrium space is seen as the heart of the new school.



© Dennis Gilbert/VIEW



© Dennis Gilbert/VIEW

involvement

It is widely recognised that the involvement of all stakeholders in the briefing process is vital to creating the best design solutions. Organisations such as School Works and the Sorrell Foundation are involved in various projects that demonstrate this, and the use of the Design Quality Indicator (DQI) tool mentioned earlier can help to ensure that stakeholders are involved at key stages in the brief and design.

If pupils have had an involvement in the briefing for the project, and if it involves a number of relatively short phases, they can often see their ideas come to fruition while they are still in school. They can then feel that their efforts have helped their own year groups as well as those to come. Relatively immediate action effectively rewards those involved, and encourages further input because they can see that it has an effect.

Building work on the school site can be used to enhance many parts of the curriculum, such as design and technology, physics, English and art. Contractors' involvement and allowance for the health and safety implications of organised visits to the building site can be agreed within the contractual arrangements.

Clacton County High School used not only the building work but also the contractors themselves to enhance teaching in subjects such as

science, design and technology and art. For instance, during the installation of new windows in the general-teaching block, the contractors

were involved in demonstrating thermal insulation to Year 10 pupils studying combined science.



Campsmount Technology College is half way through a series of remodelling projects which are a key part of a successful programme of measures to raise standards. The head says:

'At first the building work was programmed into the school holidays, but we realised that we were missing a learning opportunity. Now, without hesitation, building work goes on during

term time as well, not only because of cost but also so that we can use the work to involve students in the concept of school improvement and, of course, to improve their knowledge of health and safety in the workplace.

'Students have adapted to the changes as a circumstance of the building work and appreciate the direct and immediate investment the school has placed in improving the

environment for learning. The building work has enhanced the feeling of community and belonging in the school to such an extent that tradesmen often share the school dining hall with students. This attempt to work like a family in a home undergoing improvements is paying dividends with students.

'The school council has been vocal in its support for this course of action.

Careful planning has limited disruption to the delivery of the curriculum and examinations have not been disrupted at all.

'A student recently commented: "We can see this building work is for us, not someone else."

'We are confident that there is a direct link between the improvement of the learning environment and raising standards of achievement.'



At Chaucer School (above), the deputy head did not teach for two years so that he could act as project manager. This close involvement helped to build excellent relationships. Assemblies involving contractors were held and students were offered tours of the site at all stages, with

some carrying out projects based on the work. This engaged the students and contributed to the good relationships with the contractor and the lack of vandalism or damage during the project.

Children from all the feeder primary schools contributed

to the 'jigsaw' mural which is displayed in the central atrium of the new block. This has given them a connection to the project which, it is hoped, will encourage them also to respect the building when they, in their turn, come to the school.

sustainability

If refurbished to suitable environmental standards, existing buildings can provide very sustainable design solutions. Reusing existing buildings uses smaller quantities of new materials, and expends less energy in manufacture and transport, as well as avoiding landfill and the taxes that go with it. Using existing sites often brings the advantage of transport plans that can involve a tighter catchment area, which may be linked to better bicycle routes and greener, safer, healthier routes to school. There can also be benefits in terms of avoiding green-field sites and protecting playing fields from development.

The higher ceilings and windows that are often a feature of buildings built in the early twentieth century and before can have implications for the recurrent costs of heating, but may also offer generous daylighting and an opportunity to ensure sufficient natural ventilation through the 'stack' effect of warm air rising. Along with the thermal mass of solid walls, this can also provide effective night cooling to prevent summertime overheating. This is proving to be a system often used in modern buildings to provide sustainable ventilation and passive cooling.

The Government is committed to improving the environmental performance of existing schools. The Sustainable Development Action Plan for Education and Skills was launched in 2003 and addresses the sustainability of schools in terms of both premises and the curriculum through education for sustainable development. The Framework for Sustainable Development for Schools, a web-based resource promoting sustainability in all schools, was introduced in 2004. And in 2005, the Building Research Establishment Environmental Assessment Method (BREEAM) for schools will be available.



Blenheim High School encourages sustainable travel to school, and used the new roof of the existing hall to provide an entrance canopy that also accommodates

bicycle storage, overseen by the reception staff. More bicycle racks have since been added along the front of the building, overseen from the classrooms.



Birchensale Middle School, Redditch had to increase its capacity from 300 to 600 pupils. New classrooms were added and areas of the existing 1970s SCOLA building were remodelled. Achieving improved environmental standards was a key part of the brief (although the strategy was driven primarily by pedagogical needs). Daylight and thermal modelling techniques were used in both the new and existing buildings. The main aim was to improve the thermal performance of the existing single-

glazed, over-heating building and wherever possible to achieve naturally ventilated classrooms with good daylight levels while controlling solar gain. Changes to the existing classrooms included adding roof lights to improve lighting and ventilation and introducing presence-detector lighting to reduce energy-consumption. Light switches also have pictures on that encourage children to turn them off on brighter days. On the new building a brise-soleil diffuses the effects of solar gain.



space

While the size of many rooms in existing buildings will fall within the range of area recommended in Building Bulletin 98, others will not. Adaptations may therefore be required, for instance to create two new classrooms from three existing ones. The spaces resulting from the adaptation may be larger in area or volume than they would be in a new building, although any spare space offers the opportunity to add an accessible store, office or small-group room.

In buildings with higher ceilings, the larger volume can often provide better ventilation (as discussed earlier) or can be used to accommodate a mezzanine. Besides any practical considerations, increased height can in itself enhance a space from its occupants' point of view.

The overall gross area of remodelled buildings is likely to be up to 15% higher than new buildings providing the same schedule of accommodation – partly for the reasons above and partly to allow for greater area for circulation areas and internal walls.

If budget allows, there may be the further possibility of creating an atrium or covered street. This can add a much-needed large space to make up for a shortage of halls, provide a covered area for social and informal groups in break times, or, for a bold and usually cost-effective transformation, create a new heart to the school where once there was a dark and uninviting space between buildings.



Bishop Wordsworth's School has used mezzanine floors in high spaces more than once: creating a resources centre, a suite of art rooms and an ICT suite.

The head teacher, Dr Smallwood, says: 'Having a school situated in a Cathedral Close is a great benefit, but also brings problems. The limitations on space of the site meant that there was an imperative for efficiency in the use of space in the design phase.'

'Wherever possible, existing buildings have been adapted to meet the requirements of the learning environment by, for example, adding mezzanine floors to provide additional office accommodation and storage. Further refurbishment of another Victorian building will result in new accommodation for the technology department, with mezzanine additions at either end of the block.'



Clacton High School created an exciting new dining and social area by enclosing an external courtyard between the existing hall and gymnasium. The gymnasium was remodelled to become the main dining area and the courtyard formed a social and circulation space which linked two parts of the building more efficiently. By making the link two storeys high, a mezzanine link corridor could be introduced at first-floor level.



Alder Grange Community and Technology School, Lancashire (above) is nestled in a valley and suffers from a paucity of natural light. Working with the Design Council and the University of Newcastle, the school decided to explore whether improving light and colour within the school would help to improve concentration.

A team combining architects and lighting experts was appointed and briefed by the school to develop lighting and interior design solutions. Corridors have now been repainted and new lighting has been installed to encourage a natural progression between departments. Classrooms in

different departments are now colour-coordinated to reinforce subject focus, along with new furniture and layouts to support different learning styles. The lighting and internal design solutions within the classrooms allow for a reduction in reflection, more natural diffusion and energy savings. The cost of the improvements was small and they were

implemented quickly, but the effect has been significant. The school also encouraged pupils to become actively involved in a programme of workshops to explore the problems and develop solutions, and these pupils have been able to see their ideas come to fruition within a short time.

When remodelling occupied schools, the project will usually need to be phased to allow building work to go on in one part of the school while the remainder continues to be used. However, minor works in the early phases can often be implemented quickly to bring early gains and visible evidence of progress. Simple refurbishments and adaptations can often be completed over a holiday period to avoid major disruption to the school.

Schools that are not likely to receive major funding in the near future can still agree a feasible masterplan for the school with the local authority. In most cases the masterplan will include remodelling some of the current buildings on the same site. This offers the opportunity for the school to use any smaller funds available now, such as a specialist schools grant or devolved capital funding, for a first phase of minor work that will complement the later developments.

Projects do not have to be big or expensive to significantly improve the learning environment. For example glazing in internal walls can increase visual links and potential supervision and give coherence to a suite of rooms in a department. Improved lighting can lift a room and may improve pupils' attention spans.

Kingsdale School (below) gained an imposing central atrium created by roofing over two existing courtyards. The major remodelling work was phased to

ensure that the most significant parts were completed early to offer the greatest benefits. The school also decided to carry out a smaller project with a big impact in

advance of this work: creating a state-of-the-art ICT suite providing early, visible evidence of progress to give staff and pupils a foretaste of the exciting developments

that were to follow. This also had the advantage of testing design ideas relating to flexible teaching layouts, improved servicing and new furniture.

New furniture and equipment (F&E) can be a very effective way to transform the learning environment. Furniture can be chosen to create a particular 'feel' – for instance an office-like atmosphere in business studies or a 'studio' feel for design and technology. F&E that can perform a number of different functions and be moved to a variety of layouts will provide flexibility and efficiency.

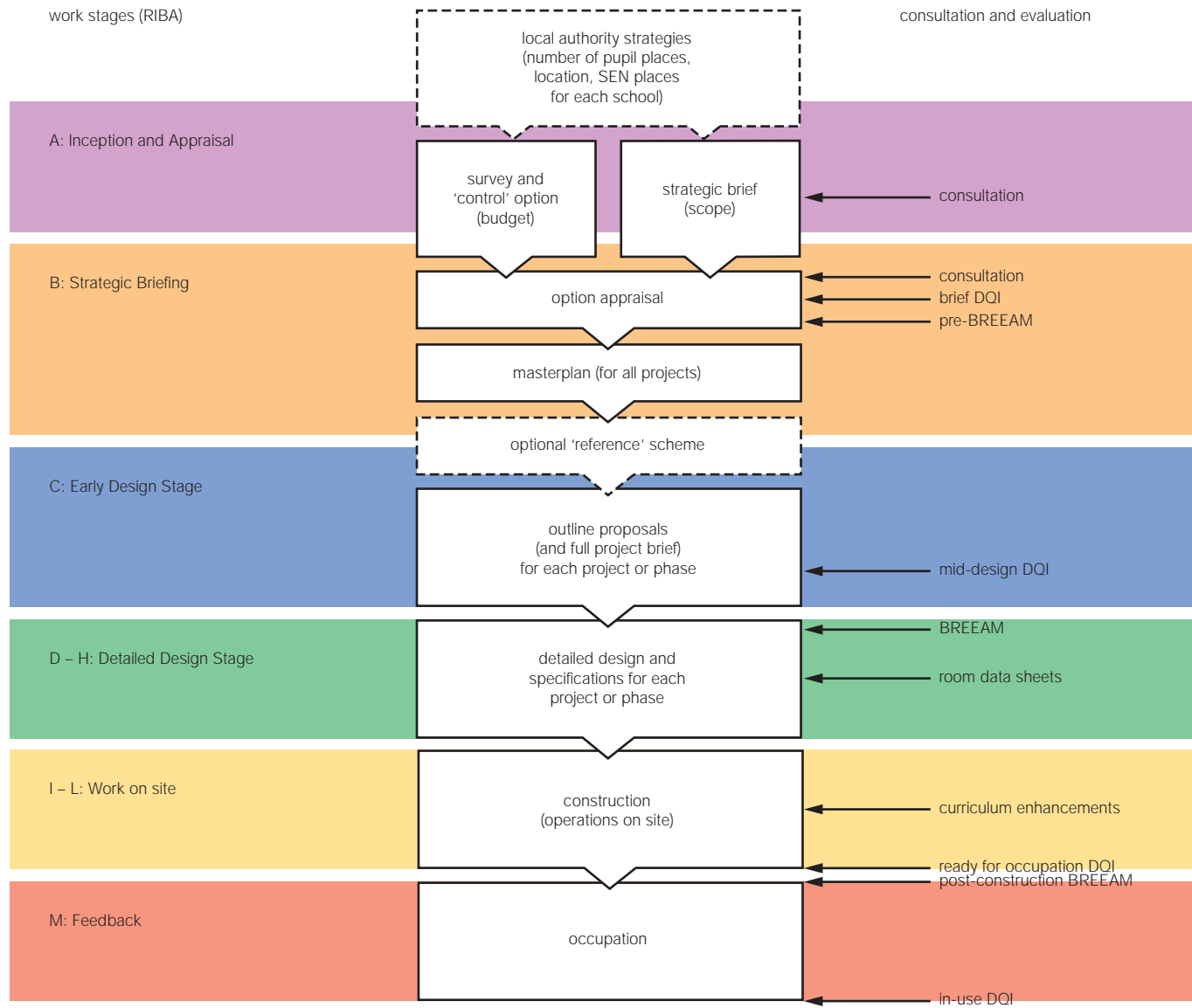


making it happen:

preparation and implementation



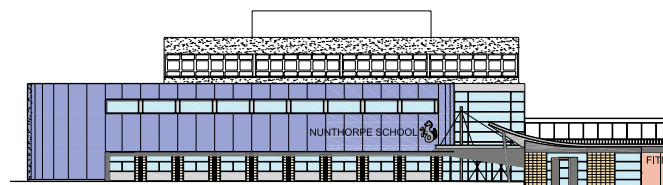
This section summarises the process involved in identifying the best option for each school, and the issues that need to be addressed. The first step is to define a strategic brief for the whole school. This will inform a 'masterplan' to which all future projects will relate, whether large or small, immediate or long-term. The masterplan will be moulded by various factors including the strategic and local context ('top-down') and the school's unique vision ('bottom-up').



In Redcar and Cleveland, the PFI programme includes one secondary-school refurbishment project and several new-build schools. One of the first tasks of the CABE enabler who supported it was to assist the local authority in appointing a client design adviser. Following a competitive process to select an experienced schools architect, it was agreed that the client design adviser should prepare a 'reference scheme' for the

refurbishment of Nunthorpe secondary school (below). This work helped check the financial viability of the project and clarify the brief, and demonstrated how several of the deficiencies in the existing layout of the school could be remedied. The reference scheme was made available to both of the bidding teams, and although neither chose to follow it precisely, both accepted the proposed new circulation principles.

The client design adviser has since been working very closely with the local authority and schools, assisting with the evaluation of bids and selection of the preferred bidders. The DQI was used to evaluate both of the schemes submitted for Nunthorpe, and helped representatives of the school and the local authority to appreciate the relative merits of each design.



School Works was developed in 1998 by the Architecture Foundation, in association with Demos, to encourage an effective and broad participatory process, involving all key members of the school community in producing solutions to capital-build projects.

At Kingsdale School, School Works aimed to establish new connections between the built environment and academic achievement, and to stimulate innovation in educational design which would influence policy thinking.

The project had three phases: the

participatory process and design planning; construction; and evaluation and dissemination. The participatory process took place over three months, and included several one-day workshops with various stakeholder groups. Pupils made a collage (above) in their workshop.

the process

A remodelled school will be the end result of a number of stages, from identifying the need for modifications, building on the results of Asset Management Plans, through to the occupation of the finished buildings. Whatever the timescale for major funding, it is worth starting to plan now

Design Checks and Balances

There are a number of evaluation tools available to help ensure that good design quality is achieved; these are supported by various bodies listed at the back of this book, including OGC, CIC, CABE, 4ps and School Works. There is also benefit in appointing professional advisers and identifying a Design Champion at a senior level in the authority to ensure design quality is high on the agenda.

A Design Quality Indicator (DQI) online tool has been developed for all buildings by the CIC, and a school-specific version is being developed for 2005. The DQI has been designed to improve both value to stakeholders and the quality of buildings, and involves a simple, non-technical questionnaire. This is filled in by all stakeholders at various stages in the design process (as shown in the diagram opposite), and serves to evaluate the design's functionality, build quality and impact.

A client design adviser can be a key ingredient in developing any successful school project, but can be particularly useful in developing the brief and assessing the designs proposed in PFI projects. An architect with a good track record in schools design can understand all the complex design issues involved and, with further professional support, advise on all aspects of projects. An adviser is most commonly used at the start of the process, but can be equally useful at various further stages, for instance as a DQI facilitator.

BREEAM for Schools (see glossary) should be used to check the sustainability of the design at various stages. A baseline standard of 'very good' will usually be a requirement for most major school building projects. This will lead to a substantial improvement in environmental standards in remodelled schools.

Design quality is crucial – good design inspires pupils to learn and staff to teach, and has a positive effect on the local community and environment. In ensuring design quality, it is important that all stakeholders feel that they know what they will get from the building work and have the opportunity to influence the brief and the design.

The diagram opposite summarises the various stages involved in the process of rebuilding and remodelling schools. These will be broadly similar for any project, although they may vary in detail and timescale depending on the type of procurement:

- Projects in schools that are not in the BSF programme, such as Academies, will generally be provided through traditional contract arrangements.
- Projects in the BSF programme are likely to be funded through Local Education Partnerships (LEPs), which will be appointed to provide, and in some cases maintain, all the schools in an authority through either PFI or design and build contracts.
- Some local authorities will use other partnering arrangements for schools in the BSF programme, for instance where such arrangements are already set up for other funding routes.

These different procurement routes are discussed further in 'Cost Implications' in the last section.

It is the responsibility of local authorities to ensure that there are enough pupil places, in the right locations, to suit the predicted numbers of pupils in the area. With the major funding now available, the first step in the planning process is to establish the size, type and location of all the schools in the authority, as well as the authority-wide requirements for extended-school facilities or specially resourced supplementary provision for pupils with specific special educational needs or disabilities.

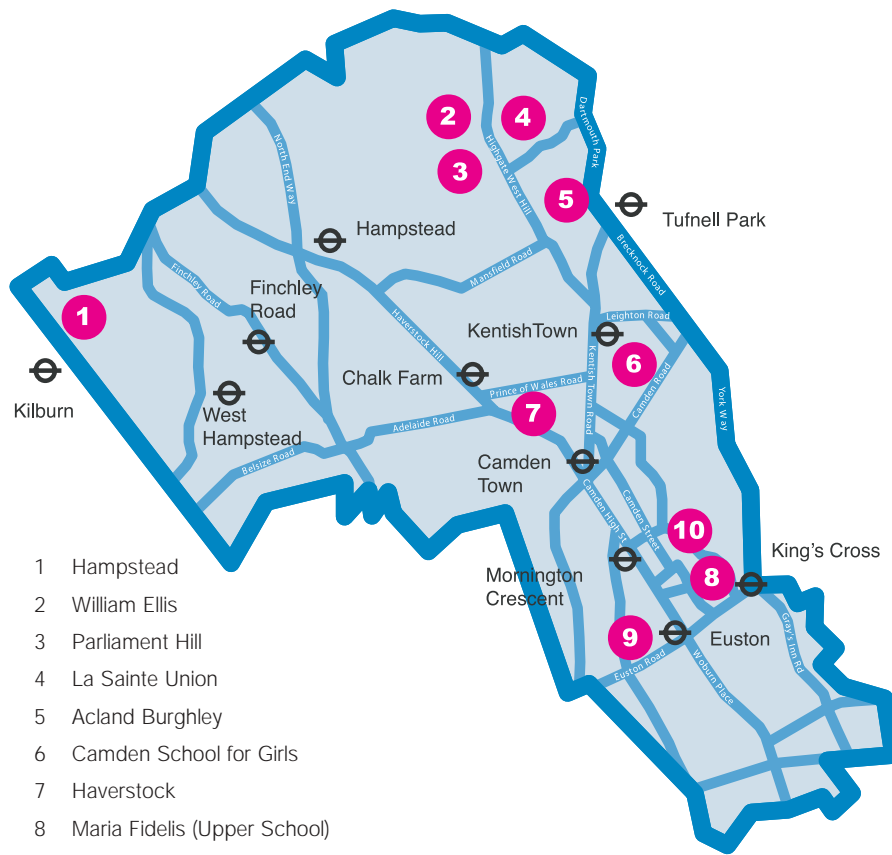
The scope of the changes or building work required for a particular existing school should be set out in a strategic brief which encapsulates both the school's own educational vision and that of the authority (as discussed on page 27).

An initial 'control' option will identify the work needed to make the facilities suitable for the number and type of pupil places identified in the strategic brief; this determines the budget required. Within this budget, a number of other options may be explored before the best one is chosen as the 'masterplan' for the school (as discussed on page 29).

'Masterplan' is a term generally used to describe an overarching design for a number of buildings which need to be planned in a strategic way, for instance in a town centre. In the same way, the masterplan for a school needs to be a feasible outline design for the layout and accommodation of the different parts of the school, considered as a whole.

For most schools, the timing of the major remodelling and rebuilding programme will depend on the BSF waves that the authority is in, with those authorities where there is greatest deprivation and educational need receiving funding earlier than others. However, whatever the timescale for major BSF or other funding, it is worth trying to identify a feasible masterplan early so that any funding that becomes available in the meantime (such as devolved capital, specialist school capital or targeted capital) is used to support the educational aims and vision of the school, as the first phases of the masterplan, and not wasted on inappropriate projects (as discussed earlier on page 21).

Whatever the timescale or size of the project, there will need to be a detailed brief, a detailed design, a construction period and a 'fit-out' of furniture and equipment (F&E) before occupation. There are a number of issues to consider during these stages (as discussed on page 31).



- 1 Hampstead
- 2 William Ellis
- 3 Parliament Hill
- 4 La Sainte Union
- 5 Acland Burghley
- 6 Camden School for Girls
- 7 Haverstock
- 8 Maria Fidelis (Upper School)
- 9 Maria Fidelis (Lower School)
- 10 South Camden Community School

Ellis Guilford School in Nottingham has involved pupils in the briefing process from the start. For the past two years pupils from the school council have been closely involved with the first phase of a plan to upgrade the school using targeted capital funding of over £4.7 million. Among the issues that concerned the pupils were safety, lighting and toilets.

The first option proposed did not fit with the school's own vision. A series of workshops and meetings was held, and resulted in a masterplan for the redevelopment of the entire school. The involvement of all members of the school community was felt to have been vital in the creation of a shared vision.

Even before its completion, the new building has been the catalyst for a new approach to teaching and learning, which has been further supported by the school's participation in the Arts Council's Creative Partnerships programme. The process has also bred a culture of confidence and enhanced awareness among the pupils, who now really believe that their voice counts.

South Camden Community School worked closely with the local authority to identify schools' needs in the context of authority-wide strategy for schools and the community. Ian Patterson, Head of Property and Contract Services, Camden LEA, says:

'We have development plans for all nine of our secondary schools which make use of information gleaned from AMP surveys. The plans are developed with the heads and governors of each school but within the context of a borough-wide strategy. Of the nine schools, two are total replacements and the remainder are a combination of remodelling and new

building. Remodelling has been the preferred approach for a variety of reasons.

The first is practicality – the kind of major decanting that is necessary for a replacement can be incredibly dislocating and difficult on restricted inner-city sites.

Secondly, there's conservation – some schools have listed buildings or are in conservation areas.

Finally, there's the question of not wasting past investment – we have had a programme of improvements over the recent past and have some new buildings in good condition and remaining suitable.'

Chaucer School was originally built as a split-site boys' and girls' school, with the two sites separated by around 200m and broadly the same facilities on each. This meant that there was considerable duplication of facilities. There were also significant management problems, particularly during class changeover. The main aim of the scheme was to consolidate all the

facilities onto a single site, with improved subject adjacencies and suites.

It was also considered important to establish a self-contained and secure teaching environment to overcome the problem of pupils using the unsupervised journey between the two sets of buildings as an opportunity to leave the site during the school day.



the brief

The clients of any building project need to create a brief to explain what they need. For a complex project like the remodelling of a school, an initial strategic brief sets out the overall 'masterplan', which may involve a number of phases or separate projects

What is the brief?

At its simplest, the brief can be a list of rooms and their preferred relationship, with details of the services outlets, fixtures and fittings required added as the design progresses.

In practice, there is a lot more that can be identified to ensure that the final design matches not only the schedule of spaces and fittings required but, more crucially, the working practices, overall organisation and ethos of the school.

The client and design teams should work together to stipulate key design criteria in the brief, including:

- flexibility to allow for day-to-day changes;
- adaptability to allow for future change;
- suitability for the inclusion of pupils with SEN and disabilities;
- safety and security; and
- environmental performance.

It is also important to draft the brief in terms of desired outcomes rather than setting out exactly what you think is the best option. If, for instance, you state in the brief that you need 'a number of art rooms in a suite', rather than 'an infill to the courtyard as a new art room', the design team may propose options which better suit your requirements.

Before a project brief is finalised, room data sheets identifying every need, including services outlets, fittings and F&E, need to be produced, specifying those responsible for their procurement and for their fitting. This information should be written into the brief before contracts are signed.

BB98, *Briefing Framework for Secondary School Projects* sets out advice on briefing clearly (see 'Further Reading').

The masterplan will be based on the strategic brief for the school, which needs to be developed by the local authority (and the diocese where applicable), school head and governors, and various other key stakeholders, to address both national and local strategies and the vision and priorities of the school.

Top-down

It is important that the strategic brief addresses various 'top-down' concerns, including:

- national programmes, for instance for BSF, Academies, specialist schools, and extended schools;
- local education authority vision and strategies for inclusion and the expansion, moving or merging of schools;
- the local authority's Children and Young People's Plan (CYPP) and operational asset management plan (AMP); and
- other local authority strategies, for instance for accessibility, community and sport.

The funding that is now available from the Government is calculated to allow for these issues to be addressed. For instance, capital funds for the BSF programme have been calculated to be sufficient to build to at least the increased area standards set out in BB98, which allow space to accommodate:

- the inclusion of pupils with all but the most complex and severe SEN and disabilities;
- the increasing needs of the school workforce;
- community use outside the school day; and
- provision for the particular needs of each individual secondary school, including those arising from specialist status.

Within local strategies and an overarching vision, local authorities may address issues such as inclusion and the 14 to 19 agenda in many and varied ways. Local policy can have ramifications for the suitability of existing buildings as well as for new designs, particularly where it has regard to pupils with severe or complex SEN or disabilities.

Bottom-up

From the 'bottom up', the strategic brief needs to take into account the circumstances of the individual school and should clearly identify the issues that will have implications for the design, including:

- what pupils and staff need and have a right to in order to achieve their potential – including comfort (temperature, lighting and acoustics), access for all, F&E, toilets and pastoral care systems;
- the planned curriculum and the activities needed to teach it, allowing for personalised learning, departmental organisation, ICT policy, and so on;
- the vision and ethos of the school, its organisation and its current or future extended school potential;
- the use of F&E and technology; and
- location policies, such as whether staff or ICT resources are to be centrally located or based within each department or faculty.

This part of the planning process will result in a schedule of accommodation for the whole school, with the flexibility to adapt to change. It is important that the schedule of spaces and their shape and size is based on an 'inside-out' approach, identifying:

- the number of rooms demanded by the curriculum likely in the future (a curriculum analysis);
- the activities to be done in these rooms;
- the F&E and space needed for these activities;
- the range of possible layouts of F&E that may need to be accommodated (for instance from groups of tables to a horse-shoe arrangement); and
- the longer term potential use.

Project Brief

Once the masterplan is broken down into discrete building projects (or phases), each individual project will then have its own, more detailed project brief.



At Hayes School, Bromley (above), the head (now retired) and governors at the time had a clear vision for a whole school without disparate blocks.

PCKO, the architects chosen, translated the school's vision into reality by linking various existing buildings with a new 'street' and entrance.

At Blenheim High School (left), most of the existing buildings were in reasonable condition, so the original funding was not generous, allowing a budget sufficient to cover the remodelling and modernising of all the buildings, plus the cost of adding the extra area required for an 1100 place 11 to 18 school. However, many of the buildings were neither suitable

nor adaptable for contemporary educational needs, or were uneconomic in their design. Within the overall budget, therefore, it was decided that the better buildings could be refurbished at a lower cost, while the less suitable buildings could be demolished and replaced with new accommodation to suit the demands of a school for the future.



At Greig Academy (left), the new science laboratories were built around the existing sports hall, creating a new and visually stimulating façade as the street frontage and sending a completely different message to that of the previous blank façade of the sports hall. The sports hall and ancillary areas

were suitable to be kept, however, and have now been refurbished to provide excellent facilities in keeping with the ethos of the new Academy. A new corridor and roof-lit stairwells are located between the existing sports hall and the new science laboratories.

the masterplan

The budget for each school will be based on the estimated cost of a 'control' option designed to bring all its existing building stock up to standard. Further and better options within the budget can then be assessed to identify the 'masterplan'

Asset Management Plans

Over the past few years Asset Management Plans (AMPs) have been created for every school, in order to assess the condition, suitability and sufficiency (net capacity) of their premises.

Local authorities will generally use AMPs, along with other surveys such as access audits (noting what needs to be done to allow access for the disabled), to make an authority-wide comparison of the suitability of each school and the work required to bring the buildings up to an appropriate standard. This can be used to identify which schools might need to be replaced (perhaps with an Academy), merged onto one site, significantly remodelled or left alone with only minor refurbishments.

Depending on the projected growth or change in the capacity requirements of the school, this data can also highlight the overall timescale required.

AMP data has shown that most schools have some buildings that are suitable for today's teaching needs, but will need some remodelling to suit increasing inclusion and the demands of the future. Some buildings are already appropriate, but many others will need so much work that it will be more cost-effective to knock them down and build new.

The body responsible for deciding the strategy for maintained secondary schools will generally be the local authority, with agreement from the School Organisation Committee and other stakeholders such as dioceses. For Academies, this body will be the DfES and in voluntary-aided schools much of the responsibility rests with the governing body.

Identifying the 'Control' Option

In any case, the responsible body will generally use AMPs and further detailed surveys to identify what work is needed to bring each school's buildings up to nationally accepted standards, such as the regulations and guidance in DfES Building Bulletins. The budget will then be based on an initial feasibility study which addresses all these needs. A school with dilapidated and unsuitable accommodation will have a budget that is far higher than that for a school with recently built buildings that are suitable for modern teaching and inclusion.

This initial feasibility design, or 'control' option, will be based on the simplest logical process of:

- adapting and refurbishing existing facilities to address any suitability or access needs;
- demolishing buildings that need to be removed because they are surplus or beyond economic adaptation or repair;
- providing new buildings to address any shortfall in gross area compared to that recommended for the planned capacity (allowing for further area where existing buildings require adaptations); and
- allowing for any possible or necessary acquisition or disposal of land.

From Control Option to Masterplan

The 'control' option may not provide the best or most cost-effective solution when compared to the requirements of the strategic brief – including the vision of the school. The next step is to appraise some further options for the whole school, within a similar capital

budget and using the expertise of architects and other building professionals, as well as drawing on the local authority, diocese or educational consultants. These further options may range from complete replacement to the remodelling of buildings alone.

The options appraisal should compare both the capital costs and the whole-life costs of the alternative designs, and also take into account the less measurable but nonetheless significant issues of design quality, relationship to the school's vision and the opportunity to address other core aspects (such as moving the entrance or the centre of gravity of the school, or providing a secure and complete circulation system).

The options for the overall masterplan for the school might include:

- a 'do nothing' or 'minimum' option, to highlight how the current accommodation would cope with future scenarios;
- options which reorganise the existing building fabric, with different levels of replacement (and disruption); and
- a total or substantially new-build option.

Other kinds of option could be:

- accommodating the whole school on one site (if the current site is split or constrained); and
- incorporating extended-schools facilities or a greater age range, using additional funding from other sources.

All the options considered should be developed and investigated sufficiently to ensure they are truly feasible (allowing for ground conditions and compliance with regulations and planning restrictions, for instance) and to compare their educational advantages, the likely levels of disruption to the school, and longer-term maintenance implications.

Three schools in Harrow were due for replacement and remodelling, so the new buildings for one school were used to temporarily house the pupils from the others while those schools were remodelled and rebuilt.

The original schools involved were a secondary special

school, Kingsley, a first-and-middle special school, Woodlands, and, on another site, a mainstream middle school, Little Stanmore (A). The sequence of work was designed to minimise the need for temporary accommodation and limit the number of moves for pupils with SEN and disabilities.

Phase 1: a new Woodlands School (B) is built next to Little Stanmore, with shared facilities in the link block between the two (below).

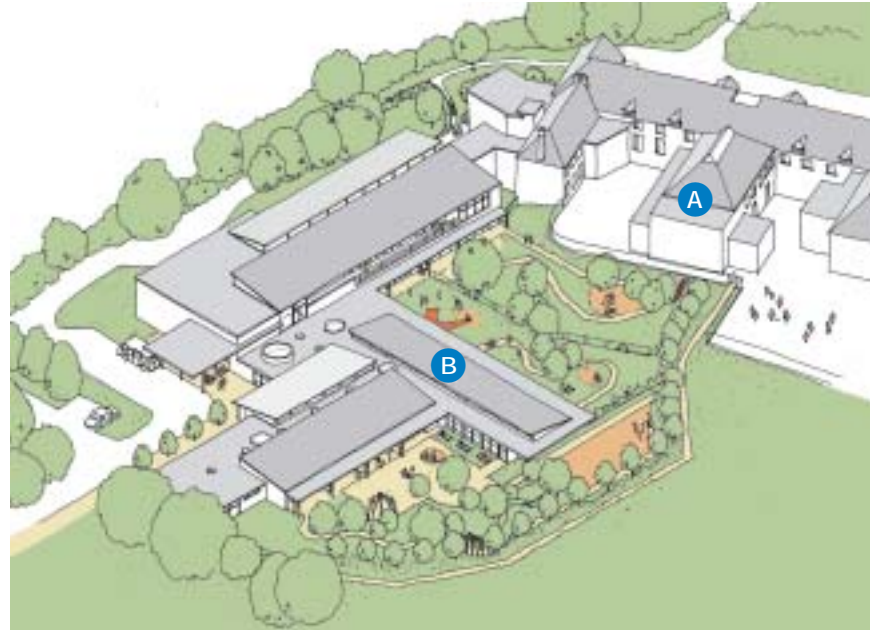
Phase 2: Little Stanmore pupils are then moved into the new school, while their 1930s building is extensively remodelled to improve accessibility

and exploit the positive qualities of the original building (right).

Phase 3: Once the Little Stanmore pupils return, all the Woodlands pupils move to the new school, while Kingsley School is rebuilt on its original site.



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At Kingsdale School pupils were decanted into two kinds of temporary building: typical modular units and a specially designed prefabricated system building (above) that was put together in two weeks over the

summer holiday. When the two solutions were compared at the end of the project, the specially designed block compared favourably over time with renting the more usual unit.

Bishop Wordsworth's School has recently built a new classroom block (below) to replace temporary units as part of a whole-school development plan. Classrooms had to be available for the beginning of the autumn term, but with a very tight site there was no room for decanting. The solution was to work

on site during the summer holidays and prefabricate classroom shells off-site on a nearby farm. Once complete, the shells were craned onto the site. The remainder of the building was completed on-site while in use. Health and safety issues necessitated careful planning and supervision.



Blenheim High School has provided adjustable furniture for disabled pupils in all of its science laboratories. These tables, which are sited around central serviced bollards like the rest of the furniture in the

laboratory, can be raised and lowered to different heights using a removable handle. This adjustability accommodates different students carrying out a variety of activities.

issues to address

Many issues need to be thought through in advance to ensure a smooth transition to the new school environment. It is important that disruption is minimised and teaching and learning is enhanced by any building work, and F&E should be carefully considered from the start

Getting F&E Right

Some of the questions to ask when planning the renewal of F&E are:

- **Is it appropriate?** Will it meet specific needs yet be adaptable for a wide variety of users and teaching styles?
- **Has the market been fully explored?** Has background research been carried out, such as talking to other schools, to ensure that the most appropriate products have been identified?
- **Will it fit?** Drawing layouts of the F&E in the room will ensure that the size and type of F&E chosen will fit and suit the teaching environment required.
- **How will it be paid for?** Funds for F&E will often come from different budgets, both capital and recurrent. Fixed F&E is usually procured through building work contracts. If no building work is taking place, separate fitting contracts may need to be arranged.
- **Have all categories been considered?** Fixed F&E such as benching and sinks will generally be provided through the contractor. Loose F&E is likely to be provided by separate suppliers. Small items of equipment may be already available in the school. It is important, therefore, to list every item and who is providing it in the 'room data sheets' for each space.
- **How will it be bought?** Various options are available, including direct purchasing from the manufacturer, using commercial educational suppliers or local authority supplies departments. Best value must be ensured in all purchasing routes.
- **Is it fit for purpose?** Schools are obliged to ensure this. New and renovated F&E must comply with current standards. Is it the right height and size for the users? Is it suitably robust?

In most remodelling projects in schools some, if not all, of the building work has to take place while the school is in use. The key points below, based on the publication *Good Practice Guidance for Refurbishing Occupied Buildings* (see 'Further Reading'), should be addressed to ensure the smooth running of any major project.

Project Planning

Careful planning involving all those concerned with the project is essential from its inception. To benefit from their practical experience, contractors should be in the process, alongside the design team, as early as possible.

If decanting is necessary, this needs to be planned well in advance to ensure minimum disruption. A widely accepted rule of thumb is that no-one should be asked to move more than twice during a multi-phase refurbishment.

Unless detailed information is already available, it is advisable to commission pre-contract surveys of existing buildings as early as possible. The remodelling of a building is an opportunity to deal with any outstanding maintenance work at the same time. It is also worth thinking ahead and considering carrying out work that will be of benefit in the future, such as installing ductwork for cabling.

The brief should be flexible enough to allow adjustments should new information be revealed during the building work.

Timing and Programming

It is essential to establish a practical and efficient project programme that is coordinated with the school's activities. This may mean planning as much work as possible during school holidays (taking account of the fact that there is greater pressure on contractors at these times). It pays to be cautious in planning completion and handover dates; work to existing buildings often takes longer than expected, since not all eventualities can be predicted.

The building work will generally be done in phases. A greater number of phases usually means less decanting but more time spent on-site.

Off-site construction may provide a solution to the problems of decanting. It can shorten the time that the contractors spend on-site and can therefore reduce disruption and minimise safety risks.

Communication

Because so many people are affected by occupied refurbishment projects, effective communication within the project team and between the project team and the school is essential. All parties should make a named individual responsible for communication.

Health and Safety

Health and safety management is particularly important when building work takes place in or near an occupied building. Communication in the early stages is essential, and the health and safety plan should be discussed at an early project meeting. If normal fire-escape routes are unusable, alternative routes must be established, and approved by the local-authority fire officer before they take effect.

Site Access

Site access needs to be agreed before work begins on-site. Contractors' routes onto the site and around the buildings must be separated from those used by staff and pupils.

Furniture and Equipment

To ensure everything is in place ready for occupation, the procurement, timing and fitting of furniture and equipment (F&E) should be well organised in advance. The various types of F&E will usually be provided by different people from different budgets, both capital and recurrent.



case studies:

reaping the rewards of remodelling



Over the next 15 years, most secondary schools will be transformed through a nationwide programme of refurbishment, adaptations and new buildings. On average, the capital funding available will be enough to replace about half of a school's buildings and to upgrade the remainder to the standards and specifications of a School for the Future. This section aims to show the benefits of the remodelling approach over total replacement.



Two new classroom blocks, one replacing poor quality workshops enclose a newly landscaped courtyard, once occupied by shabby and unsuitable buildings



The open walkway of the new modern-languages classroom block with the original Victorian school building (not currently used by the school) and the extended dining room in the background

South Camden Community School

A phased building programme to extend and improve an inner city school, creating a unified site whilst retaining buildings of various ages

1100 place Arts College
Camden, London
900 11-16 pupil places
200 post-16 places

Local Authority
Camden

Cost of projects to date
£6 million

Architects
Gollifer Langston Architects (all projects)

Quantity Surveyors
Mellish and Lynch (Dining Hall, CLC/
Technology Building)
Measur (Modern Languages and Sixth
Form Building, Science Refurbishment)

Structural Engineers
Michael Hadi Associates (all projects)

Environmental Engineers
Arup (Dining Hall)
SEA (CLC/Technology Building)
e+m tecnica (Modern Languages and
Sixth Form Building, Science
Refurbishment)

Landscape Architects
Cracknell Ferns Associates (Modern
Languages and Sixth Form Building)

Planning Supervisor
Quinton Associates (all projects)

South Camden is an urban school which acquired specialist status in the visual and performing arts in September 2004. It shares its site with a new City Learning Centre (CLC), which is a community facility open to all local schools through a booking system.

A development analysis was carried out for the LEA in 1998 in response to the fact that South Camden's intake was predicted to increase from five to six forms of entry by 2004, raising the total school population from 900 to 1100. An assessment of the condition and suitability of the existing buildings was made, and curriculum analysis was used to identify shortfalls in teaching space. The most appropriate areas for development were also identified. Key issues and potential solutions were summarised in an outline development proposal.

A phased approach was chosen because funding was more likely to be available in a series of small tranches. A remodelling rather than rebuild solution was considered appropriate because the majority of the existing buildings were structurally sound and generally suitable. It was also felt that the disruption of decanting pupils during a major renewal programme would be damaging to the school's equilibrium.

There were three major work phases identified as follows:

Phase 1 (May – Dec. 1998)

Dining room alterations and extension;

Phase 2 (Jan. 2001 – April 2002)

New CLC and replacement technology building;

Phase 4 (Jan. 2003 – March 2004)

New teaching block, sixth-form centre and landscaping of new courtyard.

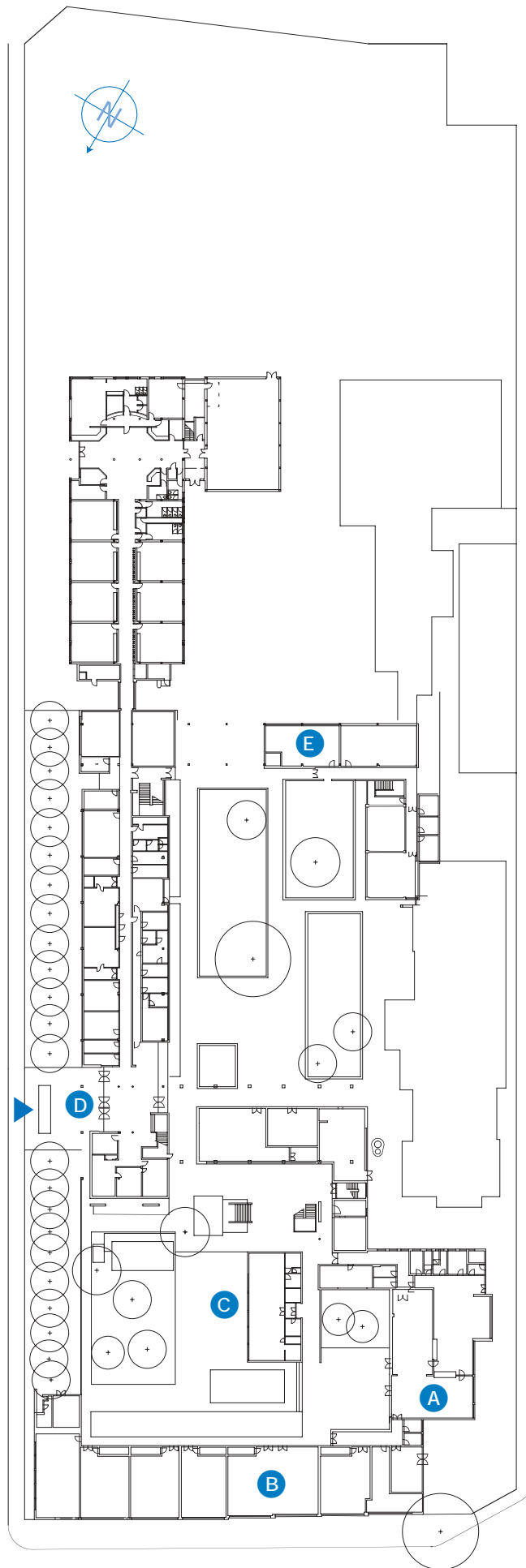
These major redevelopment phases are now complete. Nearly £5 million (including furniture and equipment) has been spent on a new dining hall, the City Learning Centre,

technology accommodation, a sixth-form centre, language-teaching spaces and the creation of a new landscaped courtyard.

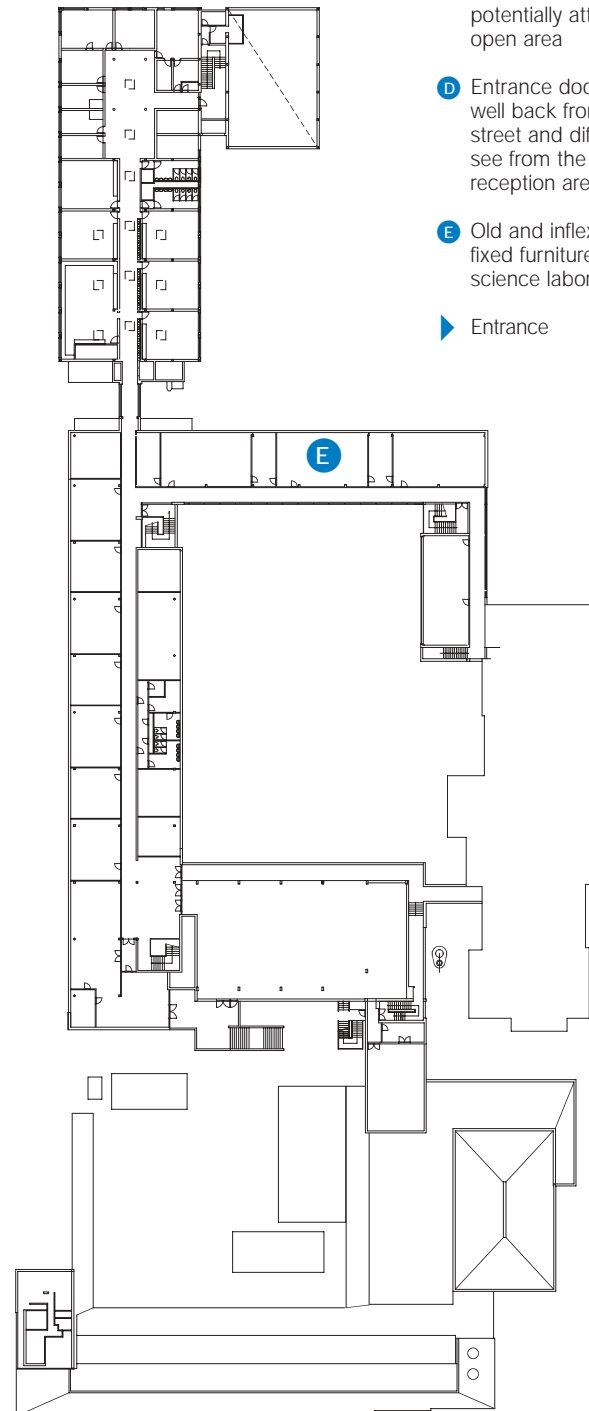
Identifying these major works in a robust and flexible outline development plan provided an essential framework, particularly for directing resources in a concerted way towards an agreed outcome. It also enabled the school and the Local Authority to respond quickly to opportunities such as the City Learning Centre initiative, because the possibilities for developing the school premises had already been explored.

Within the development plan, further phases of smaller-scale refurbishment and remodelling were also identified. Works to existing science-teaching areas are in progress, and other improvements such as a new entrance, alterations to offices and new landscaping have been completed. All of these have been considered as part of a unified approach linked to the curriculum and are designed to deliver significant improvements to the existing buildings and surroundings. They have been referred to as Phases 3 and 5 on drawings. Around £700,000 has been spent on these works. The next phase of redevelopment – the conversion of an existing nursery to provide two additional performing-arts spaces – has been triggered by the school's recent designation as a specialist arts college.

Funding for the works came from various sources. The dining hall was funded under Basic Need to accommodate increased pupil numbers. The Local Authority received funding of £1.1 million for the City Learning Centre through the DFES Standards Fund, and itself funded the technology part of the CLC/technology building and the science laboratory remodelling through capital receipts. The school used its devolved capital to fund the entrance hall improvements. The key elements of the brief are set out below.



Site and ground floor plan



First floor plan

Plans of original site and buildings

- A** An undersized dining room necessitating frequent sittings and queuing outside
- B** 1960s design and technology workshops with numerous building defects and poor security
- C** A small and unsuitable sixth form building and a hutted classroom in a potentially attractive open area
- D** Entrance doors set well back from the street and difficult to see from the reception area
- E** Old and inflexible fixed furniture in the science laboratories
- ▶ Entrance

'Working with the local authority on a programme of refurbishment, linked to borough-wide planning, has been extremely helpful. It has been possible to link school-initiated developments – such as the remodelling of the administration areas to create additional work spaces to accommodate the growth in support staff numbers – to an overall development plan for the school.'



Rosemary Leeke, Headteacher

Dining Hall

The prime aims were to increase the size of the dining hall to take 400 pupils at a sitting, to enlarge and rationalise the kitchen and servery area to speed up throughput and to create indoor areas for queuing.

CLC/Technology Building

The building brief for the CLC was to develop a drop-in ICT facility with a public entrance capable of separation from the school. Key features were to be accessibility for other schools and the local community, and flexibility to respond to changes in usage and upgrades in technology. An important aspect was also that the centre should be distinctive in design to differentiate it from other school buildings. Four design and technology spaces (two resistant materials, one graphics and one textiles) were to be provided for the school.

Sixth Form and Modern Languages

Relocating the modern-languages department from the 1960s teaching block was a key move in the initial development plan in order to create space for growth in other departments. Providing a new, well-equipped area for the sixth form with its own distinct identity was seen as important in raising aspirations in this part of the school.

New Entrance

The main aims were to increase the visibility of this entrance, enhance security and create a calm, welcoming introduction to the school, including a generous seating area for visitors and a display area.

Science Remodelling

The curriculum analysis indicated the need for a total of nine laboratories – an increase of four. The overall aim was to achieve a relatively compact science department in the existing building within reasonable cost and time constraints.

Site and Existing Buildings

The site is in an inner-city area and is constrained by roads and pathways on all sides. All development had to take place within the site, whilst preserving the open space that already existed. The existing school buildings on the site were mainly developed in the early 1960s by the London County Council's Department of Architecture. The planning of a strongly linear site was well-considered and the arrangement of blocks around three external courtyards gives a strong relationship between internal and external areas

and helps to break a large building down into smaller zones. However this original concept had been obscured by insensitive additions and the use of temporary classrooms.

The main teaching building is a two-storey, concrete framed, flat-roofed block approximately 85m long. It is set back from the street behind trees and forms the main public face of the site onto Charrington Street (the main access road). This building is faced with Portland stone at first-floor level, with ribbon windows and cantilevers over the brick and glazing of the ground floor. At its southern end is a two-storey teaching block built in the early 1990s. This block and the majority of the 1960s buildings were in a reasonable condition, but other parts of the school had problems of condition and/or suitability (see annotated plan opposite).

The school entrance was set well back from the street and appeared dark and unwelcoming. Visitors had to cross the flow of pupils to approach reception and there was no designated seating area. Security was a significant issue because it was difficult to monitor use of the entrance from the reception area. Signage and display were poor.



The 1960s main teaching block with cantilevered upper floor. The scale and strong articulation of this elevation have been continued in the new buildings



Above: The extended dining room opens out onto a landscaped courtyard, providing much needed social space for pupils

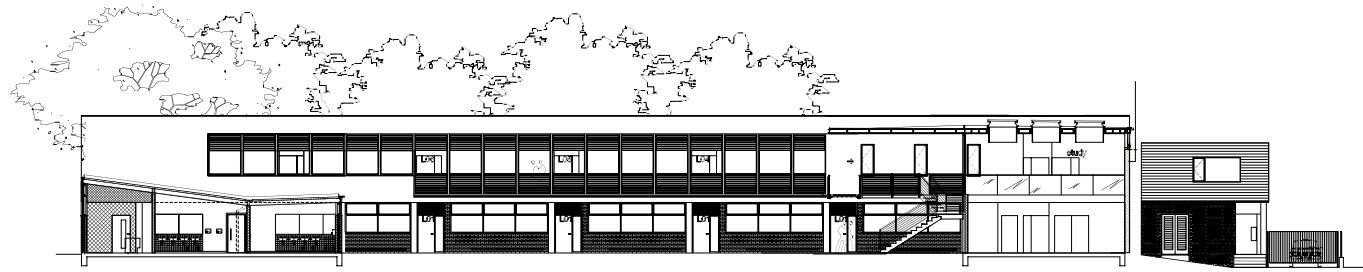


Left: The façade of the CLC continues the spirit of the existing 1960s street frontage but has a distinct identity and a separate community entrance

Below: Metal grilles provide shading to the first floor walkway and first and ground floor classrooms in the new modern-languages block

© Ben Luxmore





Design Strategy

The challenge was to reinstate clear patterns of organisation throughout the school and to accentuate the positive qualities of the existing site and buildings. The predominantly two-storey scale of the original buildings has been maintained in the new developments and helps to relate the old and new parts of the school. The different phases of work are described further below.

Dining Hall

The existing hall was retained but extended to provide a light, spacious dining hall with a larger servery area. The kitchen was completely replanned and re-equipped. 'Curtain walling' forms a transparent façade and emphasises the hall as an important social focus within the school. Additional lighting was provided to allow the hall to be transformed to suit different uses, such as performances and assemblies. To facilitate community use, a second entrance accessible from the street was included, together with sufficient toilet facilities and provision for the area to be closed off from the remainder of the school.

The extension has its own steel-framed structure, its dominant element being a sweeping curved roof which gives the hall a generous volume. This roof rests on the

parapet of the existing building and a new run of opening clerestory windows at this junction allows cross-ventilation and articulates the interface between old and new. The design of the dining hall established a new range of materials which were applied in the following buildings to give consistency in feel and a strong connection between the new developments.

CLC/Technology Building

The new building uses the same plan and elevation parameters as the existing building and continues the cantilevered first floor along the front of the site. Separating the two buildings is a double-height glazed entrance lobby which provides access between them, as well as a separate external entrance which allows the City Learning Centre to be managed independently from the rest of the building outside school hours. A lift gives disabled access to the centre and also across to technology classrooms. High visibility and transparency highlight the work taking place within and the openness of access to the centre.

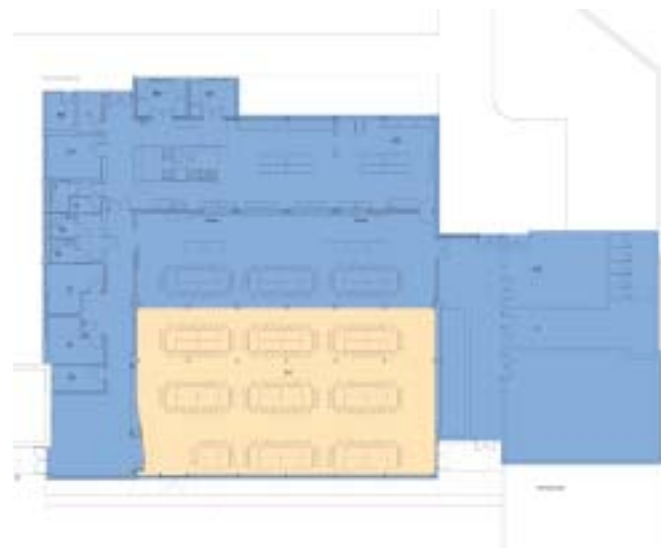
New Sixth Form and Modern Languages

The new building provides new teaching spaces, resource areas and a sixth form centre in a two-storey wing at the north end of the site, replacing poor quality single-storey technology workshops.

The building adopts the scale and strong articulation of ground and upper storeys of the original school buildings on Charrington Street and reflects the CLC/technology building with which it was designed to link. Large window openings to the upper floors provide even, natural light and an open aspect, reinforcing links between building and context. Soffits to the concrete frame are exposed to contribute to cooling, but also provide extra floor to ceiling height within the rooms. The classrooms are generously sized to allow flexibility, particularly in language teaching where different teaching scenarios were anticipated. The internal walls are non-load-bearing partitions where possible to allow future change.

The new building forms the northern edge of a cloistered and landscaped courtyard that is an integral part of the development. This open area has been reinstated, having been encroached upon by buildings since the school was originally planned.

A sixth-form area with a strong visual identity has been formed by retaining and remodelling the former caretaker's flat on the corner of the plot (necessitated by the electricity substation below), and cladding it with cedar weatherboarding in an update of its original treatment.



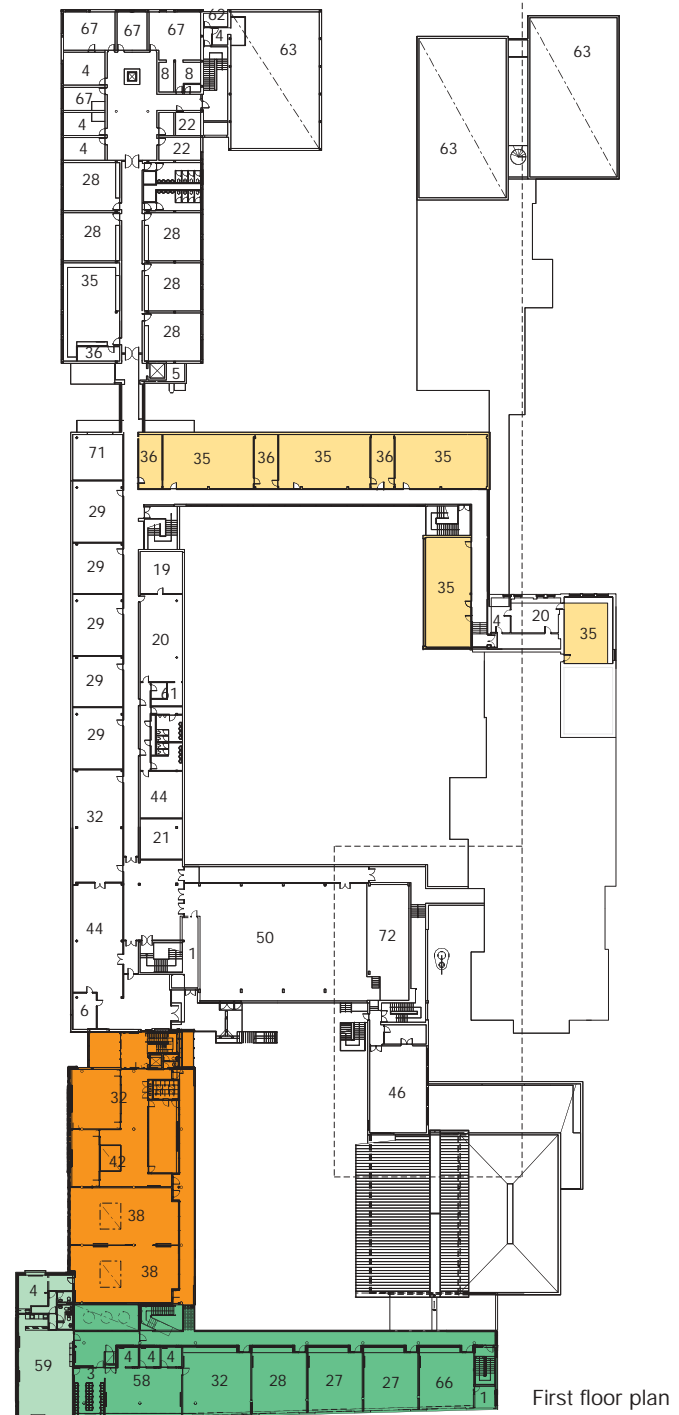
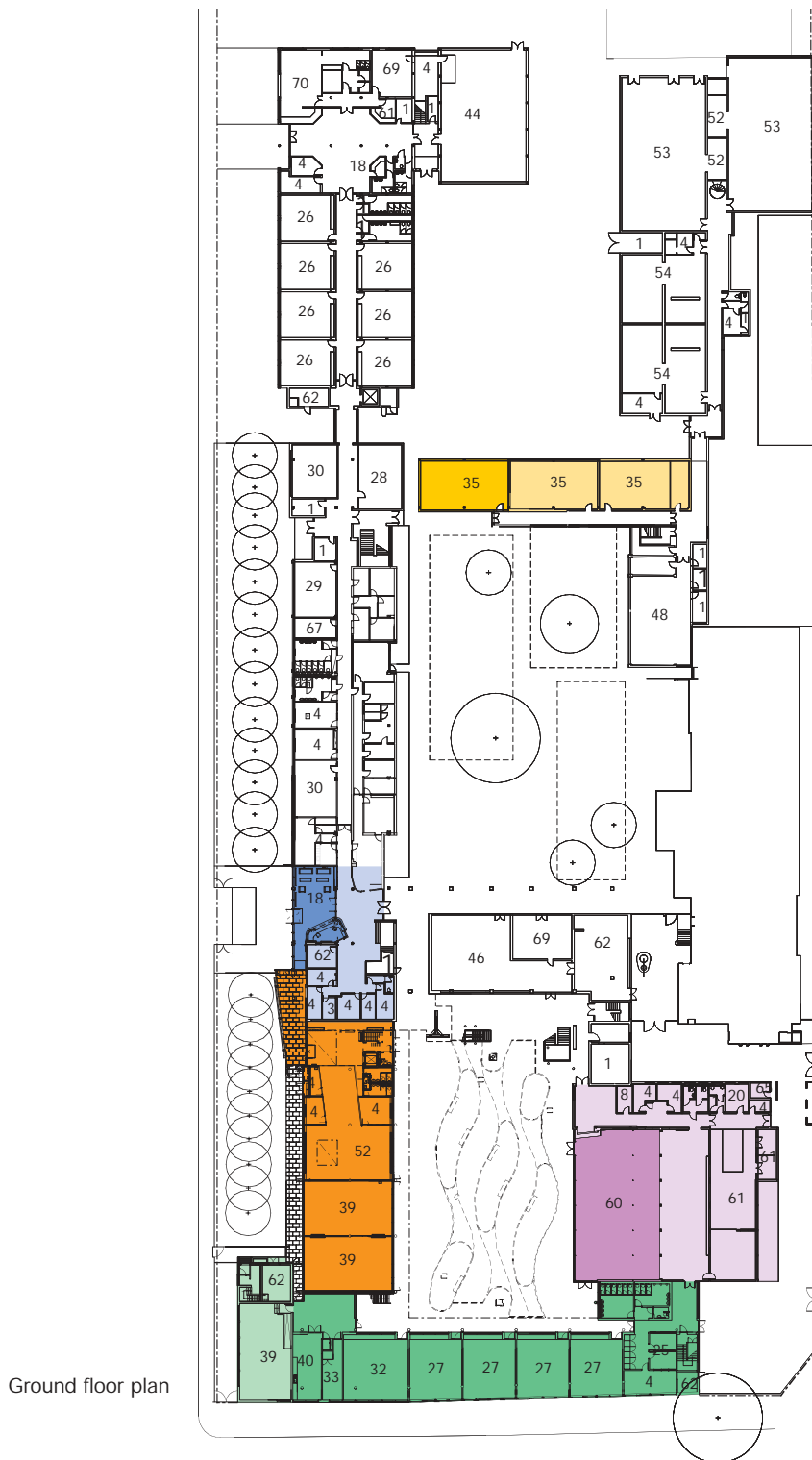
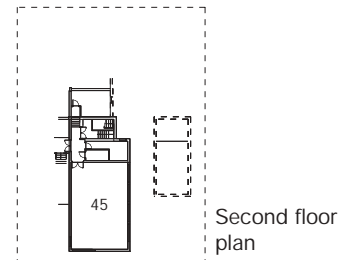
The dining room extension has been ingeniously knitted into the existing building creating a light and spacious environment

- Remodelled existing dining hall and kitchen
- Extended dining hall

Plans of remodelled and new buildings and site, showing phasing

remodelling
new build

- Phase 1: Dining Hall Extension (May to Dec 1998)
- Phase 2: CLC/Technology Building (opened Apr 2002)
- Phase 3: New Entrance (Sep to Dec 2002)
- Phase 4: New Sixth Form and Modern Languages (Jan 2003 to Mar 2004)
- Phase 5: Science Remodelling (due for completion Nov 2004)



The extended and remodelled entrance brings the reception area closer to the main entrance doors providing a welcoming environment and increased security



New Entrance

The main feature of the new entrance is a glazed wall that is well forward of the original position to give greater visibility from the street approach. This increased transparency brings daylight into a deep plan and allows observation of the approach from a new reception position. By bringing the entrance screen forward, a spacious reception area with a generous area of seating has been achieved. Large-scale signage draws attention to the school entrance.

Science Remodelling

The approach to the remodelling and refurbishment of science areas has been to create a suite of rooms that is consistent in design and quality of fittings. The aim has been to achieve a brighter and more flexible environment that suits current and future learning needs. All laboratories have been re-planned and are now networked and equipped with electronic whiteboards and data projectors. The additional laboratories have been created by converting two large teaching rooms into laboratories and infilling an external covered area next to these converted labs.

Phasing and Timescale

The remodelling programme focused on the logistics of developing the site in readiness for an increase in pupil numbers whilst minimising disturbance to curriculum activities. The northern end of the site was identified as a key area: by creating additional capacity there, the whole modern-languages department could be relocated. The space remaining would allow other departments to expand.

The phasing plan had the flexibility to respond to availability of funding and to the school's ability to operate whilst building works were in progress. The architects wanted to retain the central concept of a cloister of buildings

around a courtyard even if the work was to take place over a number of years. Because the larger-scale development was confined to one end of the site it meant that disruption, whilst unavoidable, was less significant than it would be if the works were in the heart of the site. The construction-site entrance and exit has always been on Chalton Street (the street behind the school) where it is less likely to conflict with pupil movements. All works were competitively tendered as single-stage tenders and procured under traditional forms of contract. The contract for the CLC/technology building was split into:

- an initial 'shell and core' contract with foundations, frame, core services, roofing, etc.; and
- a fitting-out contract of services, finishes, partitions, furniture, etc.

The new sixth-form and modern-languages building had a sectional completion to allow the early release of classrooms to accommodate increased intake. Timetable changes required during building works were carefully planned by the school and design team. Enabling works to demolish the existing technology building were carried out as a separate contract ahead of the main contract. Restricted site access meant that the final section – the dining hall link – could only be completed once ground works associated with the landscaped courtyard had been carried out.

Environmental Performance

A principal aim of the new teaching spaces is that they should make the best use of daylight without suffering from solar gain. Classrooms in the new block are entered directly from external walkways with large overhangs that form shading to their windows. Fixed shading panels of metal grille provide additional solar shading.



The caretaker's flat (which has been extended and remodelled to provide a sixth form common room) alongside the new CLC/technology building

© Ben Luxmore

Upper areas in the CLC/technology building also have roof lights with electrically opening windows and high-level clerestory windows to assist the stack effect and allow night-time purging of warm air from the building in summer.

Planting is an important feature of the scheme, with new trees being introduced to this part of the site. Existing trees in front of the building also give shade in the summer. As part of a general energy-conscious approach the new buildings are naturally ventilated, using the mass of the concrete structure and night-time ventilation to mitigate heat gain. Cross-ventilation is achieved in the classroom block by windows opening on each side. Raised floors in the CLC are used as heating and cooling plenum but also allow flexibility for re-planning and rewiring using busbar systems for power and ICT cabling in the void.



© Ben Luxmore

The double height entrance to the new City Learning Centre which sits alongside the former external wall of the 1960s school

Kingsdale School

An ETFE roof over two existing courtyards has created a spectacular new 'inside-outside' space that acts as a focus for the school and its community

1200 place mixed community school,
Dulwich, London
1200 11-16 pupils

Local Authority
Southwark

Cost of projects to date
£11 million

Project Managers
Southwark Building Design Services

Architects
de Rijke Marsh Morgan Architects

Quantity Surveyors
Appleyard and Trew

Structural Engineers
Michael Hadi Associates

Environmental Engineers
Fulcrum Consulting

Acoustic Engineers
Fleming and Barron

Artist
Atelier van Lieshout

Contractors
Galliford/Try Ltd

Specialist Contractors:
Roof Steelwork
SH Structures
Roof Membrane
Vector Special Projects
Structural Timberwork
Cowley Structural Timberwork

Kingsdale school, once a struggling, unpopular and 'failing' comprehensive school, is sited in an otherwise affluent sector of Dulwich, south-east London.

Kingsdale was selected in 1999 by the Architecture Foundation as the site of the first School Works scheme. The aim of this ambitious demonstration project was to assess whether the quality of architecture in school buildings could directly influence educational performance. Standards were to be measured not just in terms of pupil grades but more holistically: behaviour modification, staff management, pedagogic change, general social integration and lifelong learning were to be included in the long-term assessment of improvements.

A year-long consultation programme, which engaged in many different ways with the school population and the local community, was organised by School Works. From this process the architects developed a flexible brief for various improvements to the existing buildings. The design team proposed to retain and refurbish most of the existing accommodation, whilst transforming the central school environment by remodelling two underused open courtyards. Funding came from the DfES, Southwark local authority and the school.

Site and Existing Buildings

The existing buildings are typical of generic and problematic post-war modernist architecture, and the head welcomed the idea of intense School Works scrutiny followed by radical change. A strategy for engaging with the local community and offering access to school facilities had to be included in the redesign concepts.

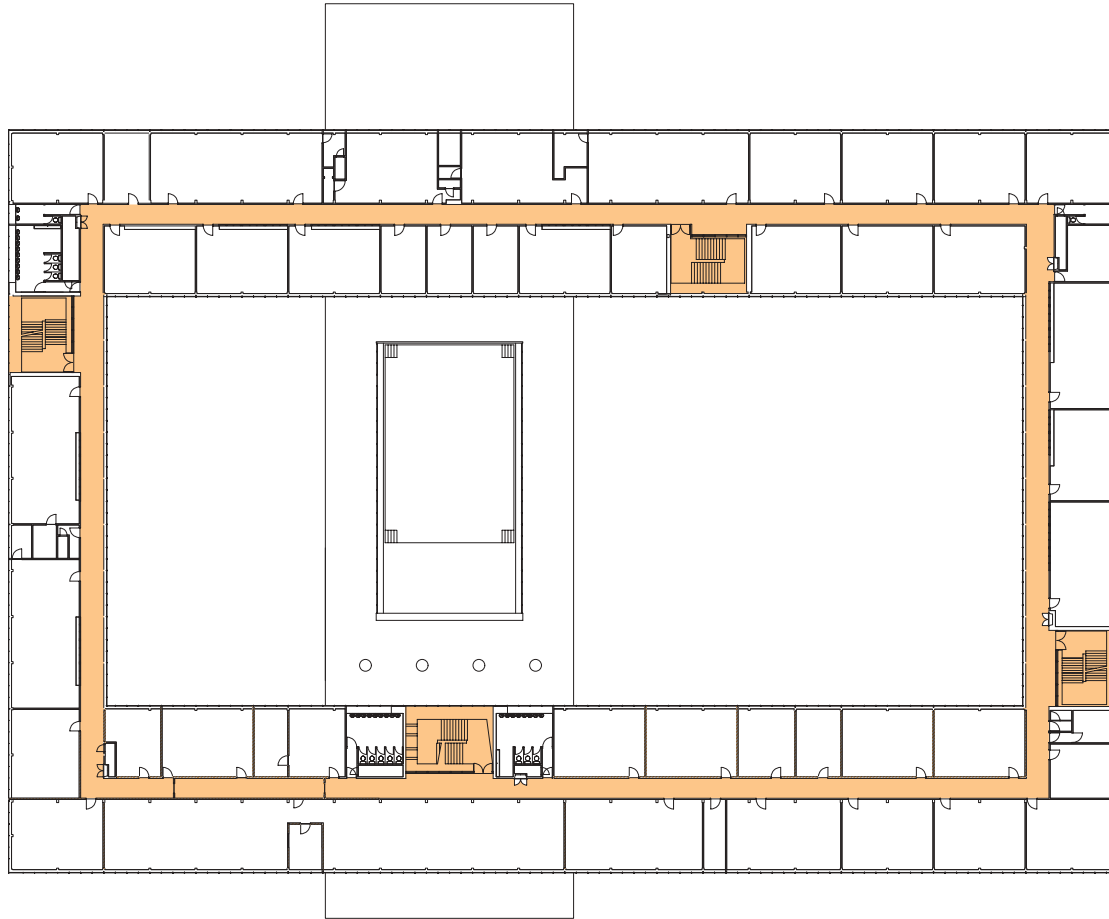
The original school buildings, designed in 1959 by Leslie Martin at the London County Council architect's department, are a steel-framed, fully glazed precursor of the 'CLASP System'. The main building, built around a large courtyard divided in two by the school hall, was in bad shape generally. Problems included broken services, large quantities of asbestos and the inevitable environmental problems of a single glazed envelope. A ring circulation system with long narrow corridors led to congestion. The gym building is an interesting freestanding glass cube consisting of two double-height gymnasia stacked on top of changing rooms. Unfortunately the gymnasia were too small and the changing rooms were substandard. Many areas of the school failed to meet contemporary curriculum requirements. These and other issues came to light during the consultation process.



© dRMM

A collage created in one of the consultation workshops when pupils explored their feelings about the school environment

The first floor plan before remodelling, showing the ring circulation system



An aerial view of the school before remodelling



- Block A**
- A poorly lit and badly ventilated dining space too small for the school population
 - Stretches of 90m long corridors, mostly without daylight
 - Lack of social spaces for pupils
 - Some classrooms hot in summer, cold in winter and poorly ventilated
 - An unwelcoming entrance and reception area

- Block B**
- Undersized gymnasium
 - Inadequately ventilated changing rooms in poor condition with no toilets

- Block C**
- Music rooms with very little sound insulation, inadequate classroom space and no ventilation other than opening windows (causing neighbours to complain of noise)

© dRMM

'My vision for the school was to have an acoustically isolated auditorium within a voluminous space, large enough to contain the school population and provide a socially uplifting facility for dining, inclement weather, rest, play, work; and community activity. Through a multi-disciplinary approach, the prime objectives of educational functionality, raising standards and architectural originality have been beautifully realised.'



Steve Morrison, Headteacher

The typical daily experience reported by pupils included getting squashed or lost between hot, cold or noisy classrooms, standing up to eat and getting wet and muddy at lunch time. Staff felt the environment was having a detrimental effect on pupils' behaviour and achievements.

Design Strategy

The design approach emerged out of the consultation process. At this stage demolition was considered but not recommended. The need to keep the school population on site as a stakeholding community, the great potential of the large existing building, and the project's ambition to improve not erase, all pointed to radical intervention rather than demolition.

The architects were interested in the school building as 'incomplete Modernism', and recognised the possibility of creating a very special space, such as would not normally be realisable in a new building. Surveys

Long narrow corridors became congested at lesson change-over and affected pupils' behaviour



© dRMM

The dining area was undersized and poorly lit



© dRMM

confirmed the building to be sound structurally, and the orthogonal grid-based plan with no load-bearing walls allowed for replanning of classrooms and corridors alike.

Although there was a need to deal with the most urgent condition issues such as asbestos removal, new toilets, wiring, heating and general refurbishment of classroom stock, the brief was open enough to invite options for various levels of intervention. The design team were interested in a strategy which would allow the school to teach new vocational courses in larger specialist classrooms, whilst simultaneously creating an adjacent central learning space which could unlock circulation and social needs.

Three primary design options were developed, the first two concentrating on the main building, showing what could be done for £5 million and £9 million respectively, and the final as an overall holistic school and site masterplan for £15 million. The middle option was chosen. The focus of the design approach was the demolition of a centrally placed assembly hall in order to create a new 40m x 80m x 12m+ high quadrangle, which could work as a mixed use 'inside-outside' space of spectacular character.

The proposal exploits the potential of the existing building, and superimposes a new ETFE (ethylene tetrafluoroethylene) roof to create a court offering new dining facilities, assembly/performance space, improved circulation, and social and house-based activities. Taking some circulation into the central space released corridor space in the surrounding building, allowing many classrooms to be enlarged. Some classrooms were also reorientated, and some were given dual aspect as well as improved acoustics, lighting and ventilation. The super-lightweight ETFE roof pioneers the development of 'variable-skin' technology, allowing controlled light to bathe the courtyard in a play of sun and shadows.

A Sustainable Roof

ETFE represented the most sustainable construction technique possible for so large a clear span with the requirement of good daylight. Whilst not providing internal space in

the traditional sense, the ETFE canopy provides a very large and usable atrium which is heated only by heat loss from the old building, occupancy and controlled solar gain. The lack of energy inputs in use is paralleled by the low energy input in its (water-extruded) production. The new roof required no foundations, being simply superimposed onto the existing column structure and tied to the ground with a bracing frame in the courtyard. The process of craning in the prefabricated steelwork, followed by installing the ETFE 'cushions', took 50 days. The whole building now has a 40% smaller external surface area, with less susceptibility to weather and lower maintenance requirements.

Space for All and for Art

Within this largest space ever created in a British school, informal learning is encouraged to go beyond the curriculum, and yet security and orientation is improved in that everybody and everywhere is visible from the now-occupied central space. To further define a sense of collective identity, a new auditorium 'building-within-a-building' defines the heart of the school, and includes a ground-level library. This geodesic timber structure accommodates music, performance, cinema, house-meeting and community uses. To complement an existing 1960's sculpture in the courtyard some 'useful art' in the form of a sculptural air/light duct now forms a contrasting feature to the computer-cut plywood interior of the auditorium.

Other Changes

The main school entrance now leads directly into the new courtyard space. New glazed doors have been added, providing a transparent but secure lobby area.



A concept cartoon

© dRMM

The auditorium interior showing the practical art work which acts as a ventilation duct and lighting boom



© dRMM



The auditorium is used for assemblies, performances and community gatherings



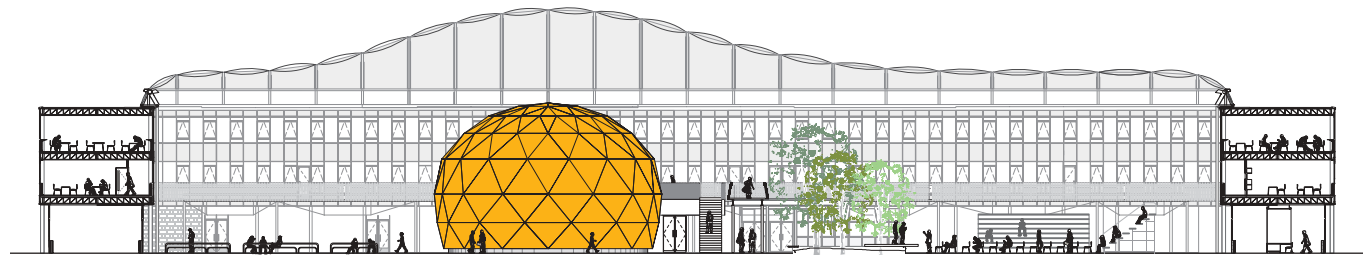
The new ICT suite was done ahead of the main contract, giving the school a foretaste of the exciting changes that were to come

The new library is on two levels. The upper level is accessed directly from the ground floor courtyard and a ramp leads to a lower level below the raked auditorium seating



The specially designed pre-fabricated building (used for decanting) under construction

© dRMM



Long section through the main teaching block

The main classroom block has been re-planned to either omit corridors or to widen them and provide local office/meeting rooms. Fully glazed partitions and windows into classrooms create a sense of transparency. Other improvements include:

- new heat emitters where required;
- high-efficiency fluorescent lighting;
- two-compartment dado trunking for data and power distribution and ceiling-mounted power supplies for interactive whiteboards;
- floor trunking or power poles in ICT classrooms;
- modernised toilets with mechanical extract ventilation and water-saving measures.

Phasing and Timescale

The school had to remain in occupation throughout reconstruction works. From the outset, the contractor consulted closely with the school to programme the works in phases. Demolitions and noisier work corresponded with holidays and occasional weekend work, with quieter classroom fit-out works taking place in secure zones during term-time, typically annexing one quarter of the building.

Temporary classrooms were provided to house pupils during building work on particular areas. Two kinds of building were used: typical modular units and a specially designed block, planned as a temporary building. The dRMM-designed decant block was a prefabricated, super-insulated, plywood-clad building – the first ever use of a structural-insulation-panel system for a school building. The design provided large simple classrooms, accessed directly from an external canopied veranda with a ramp. It was installed in two weeks in August. When comparisons were made between the two temporary solutions, the larger windows, higher ceilings, durability and very low running costs of the specially designed block compared favourably over time with renting more vulnerable steel-frame and plasterboard modular accommodation.

The phasing of work has the disadvantage of disruption and related inconvenience to the ongoing operation of the school, and having consecutive contracts also means there is no single handover. However, the advantages of phased work are that the design can continue to develop as feedback from the users can inform subsequent works, and the school, witnessing the construction unfold, has a learning spectacle on site.

Future Plans

As an early part of the BSF programme, further funding has subsequently been allocated for additional works to upgrade more of Kingsdale's building stock. This will include the provision of new music and sports facilities as satellite buildings, offering facilities beyond the school day to the community, and allowing the school to manage part of the site autonomously. The original vision of a holistic and radical refurbishment of the site is happening slowly, over timescales determined by funding schedules and the academic year.

Environmental Performance

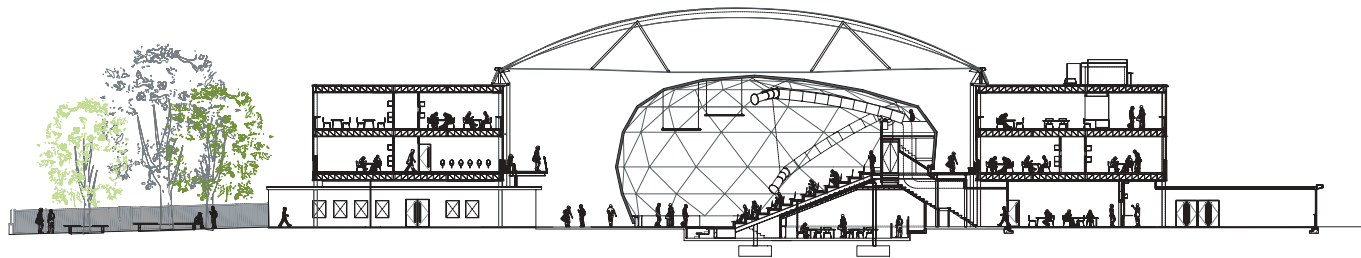
Low energy use is key to the environmental design. Lighting, ventilation and heating are achieved by natural means wherever possible.

Courtyard

Covering the courtyard space was a fundamental part of the design. Budgetary and energy considerations dictated that the courtyard should be an 'inside-outside' space relying on natural ventilation and passive solar heat gain. The challenge was to achieve appropriate environmental conditions in the central space and the surrounding classrooms that opened onto it.



Existing corridors have been transformed by improved lighting, views into classroom activities and a lively colour scheme



Section through the main teaching block and auditorium

A preliminary analysis showed that the 80m x 40m courtyard provided a huge collection area for solar irradiance. The design solution had to control solar gains in summer, allow beneficial solar gains in winter and maximise daylight to the courtyard space and the surrounding classrooms.

The final design solution was a variable ETFE skin which allowed light transmission to be varied to suit external conditions. The detailed design was developed with the aid of dynamic thermal analysis and involved complex modelling to achieve the desired solution. Ventilation-opening areas were determined within the constraints of the existing building. It was established that a 95% solar-shading factor (i.e. 5% light transmission) would be needed to limit summertime temperatures to an acceptable level. The characteristics of the graphic pattern that was chosen and the form of the cushions set the lower shading limit at 50%. The cushions operate at either 95% or 50% shading, but have been divided into three zones to provide modulation.

Low-level ventilation is provided by existing doors into the courtyard and motorised dampers at ground-floor ceiling level. At high level, three massive electrically driven ETFE flaps at each end of the clerestory were installed as part of the roof package.

Temperature sensors feed into the control panel. The control system is programmed to

activate the ventilation controls before the ETFE cushions because shutting the cushions reduces daylight. Manual overrides are provided to enable the school to control conditions should they wish.

Temperatures within the courtyard space will be dictated by external ambient conditions but for a large proportion of the school year the space will be comfortable.

Summertime overheating within the surrounding classrooms will reduce considerably due to the shading provided by the new roof, and in winter fresh-air ventilation rates for the classrooms are anticipated to increase as manually openable windows face into the sheltered courtyard space.

Mechanical ventilation is being added to first- and second-floor classrooms facing onto the courtyard to supply them with outside air rather than the warm stratified air from the courtyard in the summer. Specialist ICT classrooms have split-system-type cooling with a heat-rejection plant mounted on the existing roof.

The construction of the climatic envelope allows the recolonisation of a forgotten space which provides the school with a facility large enough for their varied needs. It improves conditions within the existing classrooms and insulates the internal facades of the main block, generating a subsequent net energy saving to the existing building.

While daylighting will provide sufficient light to the courtyard space even with the roof at the 5% transmission limit, a series of high-bay metal halide luminaires provide general lighting. Additional feature lighting and emergency lighting is provided.

A syphonic rainwater installation draws water from wide, shallow gutters running down the long sides of the new roof. The rainwater is piped into the existing drainage system via a series of buried tanks to slow outflow to the main sewer and avoid the need to upgrade the existing infrastructure.

Auditorium

The surrounding courtyard is classed as an external space, so the levels of insulation for the auditorium and library construction had to meet building-regulation standards.

The ventilation installation is a low-energy solution, as the air drawn in from the courtyard is, for much of the school year, close to the required supply temperature. If necessary, it is conditioned in the air handling unit. Air is supplied through slots beneath seats at low level and vitiated air is extracted at high level via the artist designed 'cannon', with heat recovered at the air handling unit. Additionally, motorised dampers exhaust air to either the outside or the courtyard depending on courtyard and exhaust-air temperature so that, for example, warm exhaust air is discharged back into the courtyard during the winter.



The ETFE roof from above

© dRMM



A new courtyard created by the addition of the gym block has been landscaped to operate as a social space as well as circulation to the pupils' main entrance



Glazing in the two storey link block creates a light and airy space lessening the problems usually associated with long corridors

Clacton County High School

A phased programme of building improvement and expansion, particularly of social and leisure spaces, which addresses the needs of an increasing number on roll

1630 place Performing Arts College
Clacton, Essex
1450 11-16 places
180 post-16 places

Local Authority
Essex

Cost of projects to date
£6.7 million

School's Project Manager
Jeff Brindle

Architects
Architects Co-Partnership

Structural Engineers
Faber Maunsell

Environmental Engineers
Faber Maunsell

Landscape Architects
The Landscape Partnership

Contractor
Wates Construction

Clacton County High School has seen a significant increase in the number of students on roll over the last decade: from seven forms of entry (7FE) to 10FE. The expansion of the school has necessitated the extension and improvement of the school's accommodation, particularly in terms of social and leisure spaces.

Like many mature secondary schools, Clacton has evolved over time into an amalgam of extensions, adaptations and temporary buildings that have created imbalances in circulation around the school, numerous bottlenecks and excessive travel distances.

The scheme was part of a private finance initiative (PFI) project, awarded by Essex County Council to the QED Education Environments Consortium, who will be responsible for the maintenance of the buildings and providing all non-teaching services at the school for a period of 25 years.

The brief was prepared jointly between the school and the local authority, and gave an affordable, prioritised list of works combining refurbishment, remodelling and new build. First priorities were:

- overall refurbishment of the school, mainly through AMP condition-related work;
- extension of dining facilities and kitchen;
- new two-storey link corridor;
- refurbishment of classrooms off new link corridor;
- improved and relocated staff facilities;
- improved sixth-form study and associated social facilities; and
- improved site access and external circulation.

Second priorities consisted of refurbishment of existing changing rooms and improved access for disabled users. Third priorities were a new block housing a gymnasium, two additional general teaching classrooms and

new staff facilities with kitchen and toilet. Refurbishment of the swimming pool was also in this category.

A joint-services centre (JSC), funded by the Office of the Deputy Prime Minister, is planned as a final stage, to provide 600m² of community space additional to that provided by the PFI bid which financed the other works. This will involve drama and arts spaces with provision for the community.

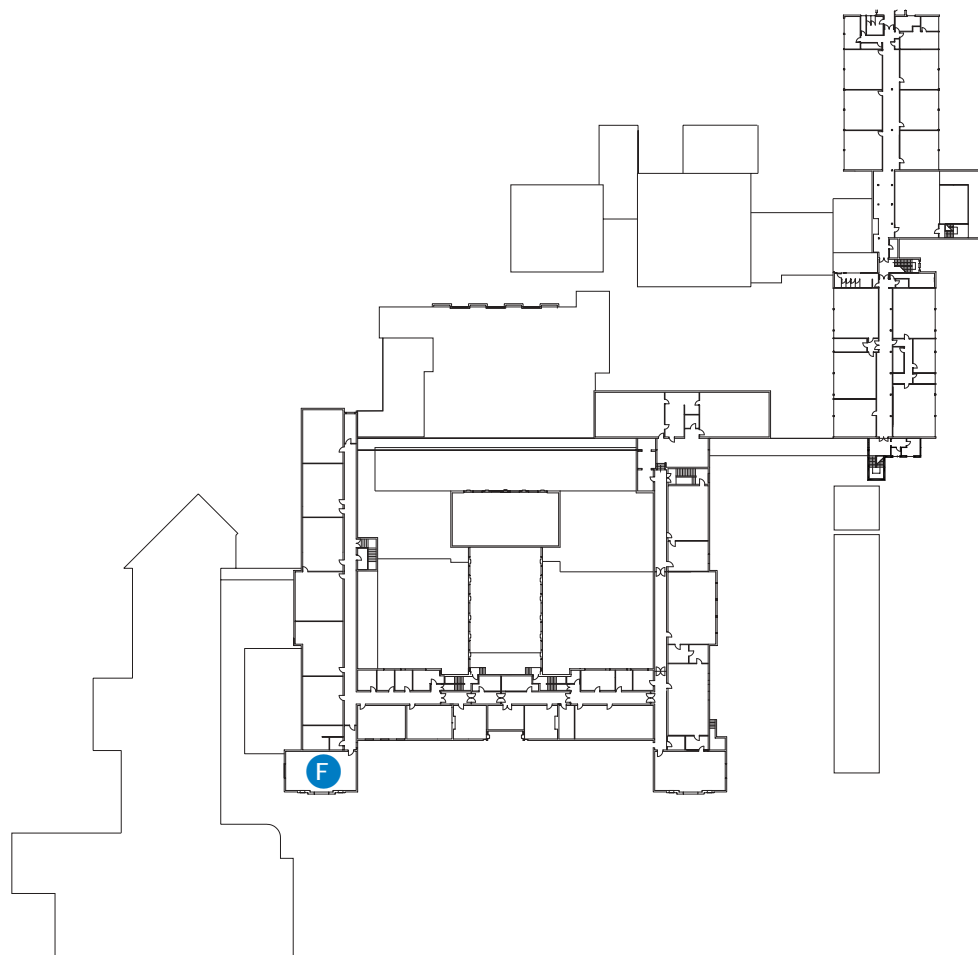
The building team worked very closely with the school from the outset to gain a detailed understanding of how it operates. AMP data were used to gauge the scope of the works, as were invasive surveys of the building's structure and services.

All design proposals and works packages were discussed with the school, which had already consulted with staff and pupils through the school council. It was decided to remodel rather than rebuild certain buildings for a variety of reasons, including:

- the good quality of some existing buildings;
- the higher capital cost of new build;
- the cost of temporary teaching accommodation;



Improving site access and external circulation offered the opportunity to create new landscaping for the approach to the 1920s building



Plans of original buildings

A Temporary buildings housed the sixth formers which left them isolated from the rest of the school

B The gymnasium did not provide the range of facilities the school required

C Changing rooms were inadequate to be used for both swimming and PE

D The courtyard between the gym and the hall was dull and uninspiring

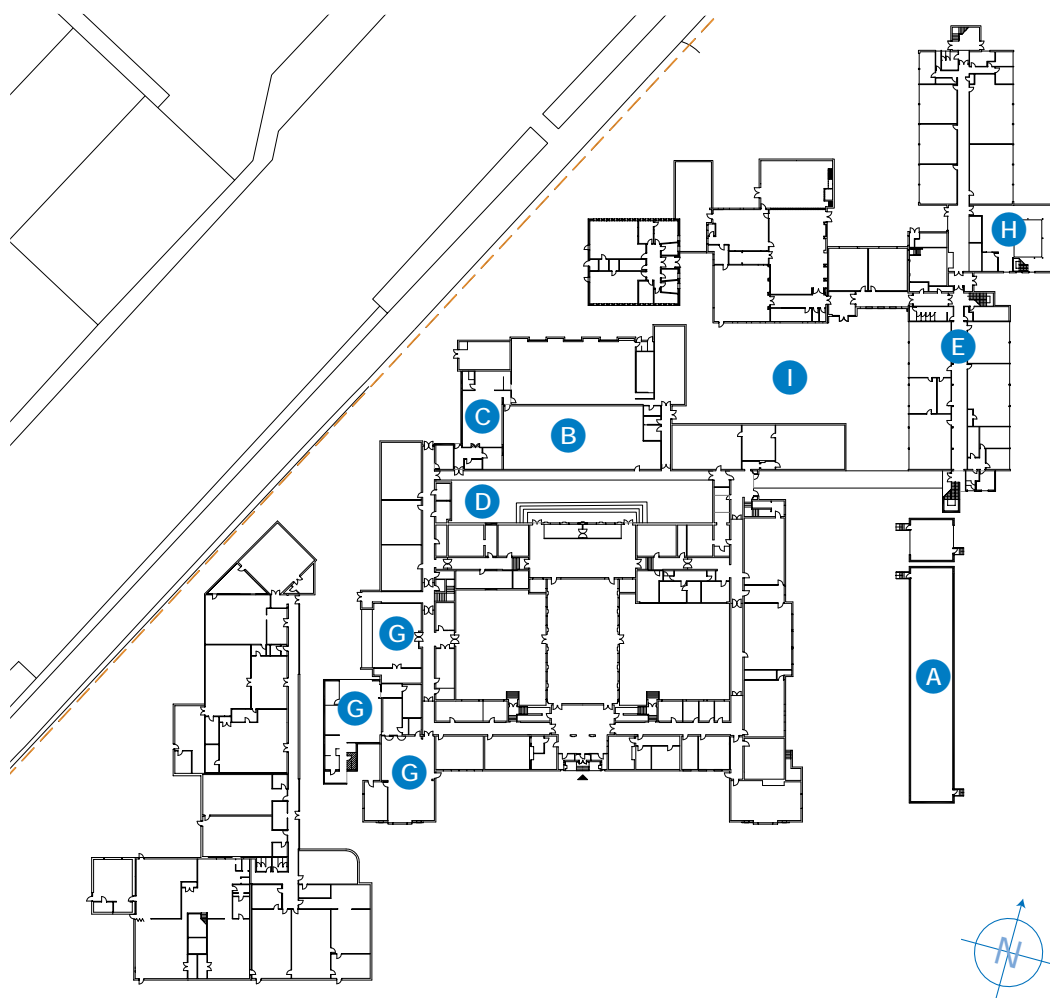
E The 1970s classroom block was badly in need of refurbishment; corridors were dark and gave the impression of overcrowding

F The staff room was positioned at the far end of the school which discouraged some from using it

G The kitchen and dining rooms were inappropriate for the size of the school and delivery access was difficult

H The library is an attractive space but was insufficient for the numbers using it

I Access was external from the main block to general teaching and the performing arts, which was less than ideal



Ground floor plan



'The combination of refurbishment, remodelling and limited new build was an ideal one for the school. It gave us the opportunity to address circulation issues, to create space for the students to relax and to improve significantly the learning environment of the school.'



John Clay, Head

- the longer time involved in a programme to demolish and rebuild;
- the lower level of disruption than if pupils were moved to a temporary site;
- sustainability considerations (wastage, landfill tax, etc.); and
- the community's affection for the 1920's building.

Site and Existing Buildings

The school site is surrounded on three sides by residential properties, with narrow access to the main entrance down either side of the caretaker's house. The fourth side of the site fronts onto a local leisure centre.

The site is of approximately five hectares and is generally flat. Although the school has a large area of open playing fields, the external areas of the school were uninteresting, and some areas were bland or even harsh in appearance. There was, however, considerable potential for their enhancement in line with the principles advocated by the school-grounds charity Learning Through Landscapes.

The original school was a two-storey teaching block built in the 1920s, with the hall in the centre connecting directly to the main entrance and creating quadrangles to either

side. It is a fine-quality brick building with many distinguishing architectural features. Subsequent extensions are of a much lesser architectural quality.

Additional accommodation built in the 1960s included a gymnasium, a swimming pool and an art and technology department. In the 1970s, a linear block was added to house a large number of general teaching classrooms and the library. A projecting wing from the 1970s building contains the music and drama department. The music department could only be accessed externally.

The sixth form was housed at the end of the linear 1970s building, in a series of temporary cabins in very poor condition.

The four separate blocks of accommodation that comprised the existing school had no rational overall circulation pattern. The construction of the general teaching block moved the centre of gravity of the school to the east and caused a circulation imbalance which has been exacerbated by the extension of the music and drama department. The dining room and the staff facilities were far from their desired position at the centre of the school. The kitchen was inefficiently laid out and inadequate for the needs and size of a modern school, and delivery access was difficult.

The existing buildings created courtyard spaces in real need of improvement, particularly the long courtyard between the gymnasium and the back of the stage, and also the space between the main building and the technology building occupied by the kitchen.

Of the four blocks of accommodation, the only one that was clearly of no long-term value was the sixth-form centre. The original 1920s main school building, although in need of comprehensive refurbishment, was worthy of retention. The 1970s general teaching block and the gym/swimming pool and drama spaces, although not of similar architectural quality, were considered suitable for continued use (subject to various levels of refurbishment and remodelling).

Design Strategy

The key objective was to develop a master plan that would address the works identified in the brief in order to improve the efficiency of circulation routes, improve departmental links and raise the quality and suitability of internal and external environments. Safety, affordability and the need to minimise disruption to the school were fundamental constraints on the design approach.



A long thin courtyard along the back of the hall and old gymnasium which subsequently formed the dining room did little to enhance the site



An artist's impression of the dining room, social space and circulation route created in the courtyard (left)

An ICT centre created from the old staff room is a pleasant space despite the intensive level of technology



The link block created by the new first floor level corridor allows the school to be fully accessible

Roof lights and high level windows in the dining and social space (here under construction) flood the space with natural daylight



The new dining and social space (near completion) will form a link to buildings which surround it on all four sides

A computerised image of the dining and social space





Elevation of new gymnasium block

Overall Refurbishment of the School

On the basis of the AMP, surveys were carried out to determine the extent of the works necessary during both the construction and life-cycle phases. Taking into account previous drainage and asbestos surveys, they included:

- a structural survey: focusing primarily on roofs but also addressing elevations, and internal and external paving;
- a general condition survey: focusing on the condition of the existing fabric, to determine the life cycle funding and any specific elements which are in breach of health and safety legislation; and
- a mechanical and electrical survey: to ascertain the condition of the existing services installation.

Extension of Dining Facilities and Kitchen

Converting the gymnasium put the new dining facility at the centre of the school. Remodelling existing changing rooms into an adjacent kitchen enabled direct service access.

A long thin courtyard between the old gymnasium and the hall was enclosed, transforming it into a two-storey internal atrium space that will provide supplementary dining area, and a space for socialising or independent learning. The space also improves circulation at ground and first-floor levels by linking two legs of the main school building. It is lit by high-level windows where the atrium adjoins the single-storey accommodation on either side and has a feature roof-light in the central section.

A new glazed link is provided between the assembly hall and the new atrium space, with views into the quadrangle. This link will enable the audience for a performance or social event to make full use of the atrium and dining room.

New Two Storey Link Corridor

The two-storey link is an enclosed, heated space which forms a major new pupil entrance to the school and links the 1920s

and 1970s buildings. It passes through the new atrium and along the face of the new dining room to a new central vertical-circulation node where the levels have been adjusted to allow lift access to the whole upper floor.

All parts of the school are now linked by the enclosed corridor network, with the exception of the art and technology block, which will remain linked by a covered way. Parents and community users can enter the building at the main entrance, the community entrance or the student entrance, which give good access to the main hall, the dining room, the sports facilities and the community facilities.

As part of the scheme, classrooms off the link corridor were refurbished with new decoration, windows, carpet and doors. The effect was dramatic, giving corridors off the classrooms the appearance of being bigger and classrooms lighter and more airy.

Relocated Gymnasium and Staff Facilities

A substantial new extension to the 1970s building (in the area previously occupied by the temporary sixth-form buildings) contains the new staff facilities, two additional teaching bases, a new gymnasium and changing facilities. The location of the new gymnasium allows the community to enter directly from outside via the changing rooms.

The provision of a new gymnasium and additional facilities, though not increasing the capacity of the on-site sports provision, will make them considerably more attractive to the students and the community.

The new staff facilities are located on the first floor, with direct access from the new two-storey link giving easy access to all areas of the school. A balcony affords views over the playing fields.

Sixth Form Study and Social Facilities

A new sixth-form centre has been created in the spaces previously used as dining rooms. The centre includes a study area, social base, a small kitchen, toilets, an ICT room and

some small study areas. A refurbished adjacent quadrangle has been designated for sixth-form use only.

The centre will give the sixth-formers a separate identity and status, yet is clearly part of the school. It has released space within the two-storey library which can now be used by the main school.

Improved Site Access and Circulation

Significant improvements to site access and circulation have been achieved by the creation of a one-way vehicular circulation system. The main entrance route will be enhanced with new surfacing to the pedestrian and cycle paths, and with additional tree planting.

Additional visitor parking has been provided adjacent to the main entrance area, organised to ensure that vehicles will not dominate the front entrance of the building. The new pupil entrance and gymnasium dramatically improve the courtyard. Various types of new paving define different reception and seating areas, and planting has been added to soften the visual appearance. A large tree with a low retaining wall is placed within a circular feature at the southern end of the courtyard to provide informal seating.

Refurbishment of Changing Rooms

The original changing rooms were inadequate for both school and community use; this compromised the use of the swimming pool. The demolition of the male changing area to make way for the new kitchen meant that the female changing area was converted to provide changing facilities for males and females, but for swimming only. Refurbishment made them more suitable for community use.

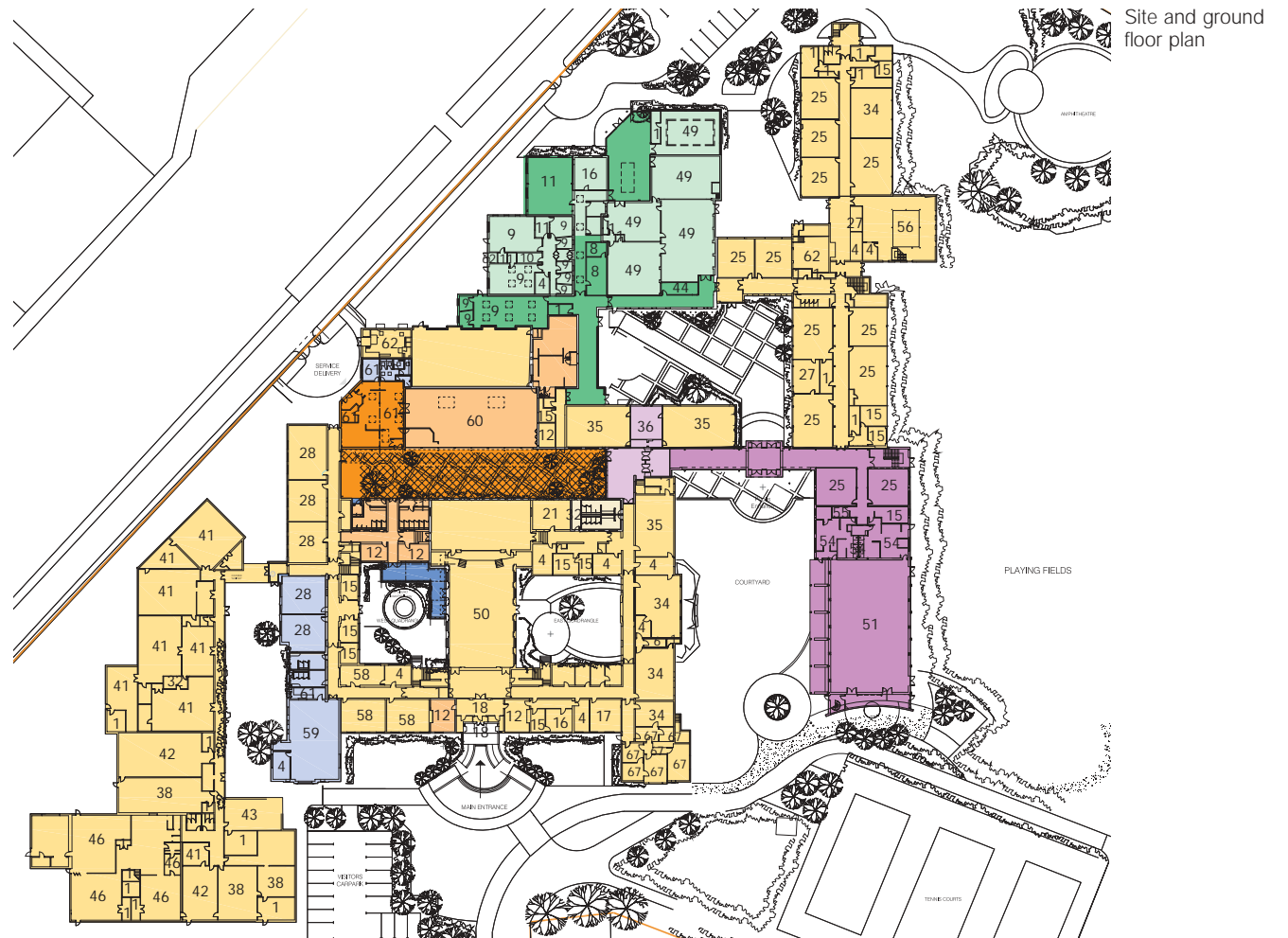
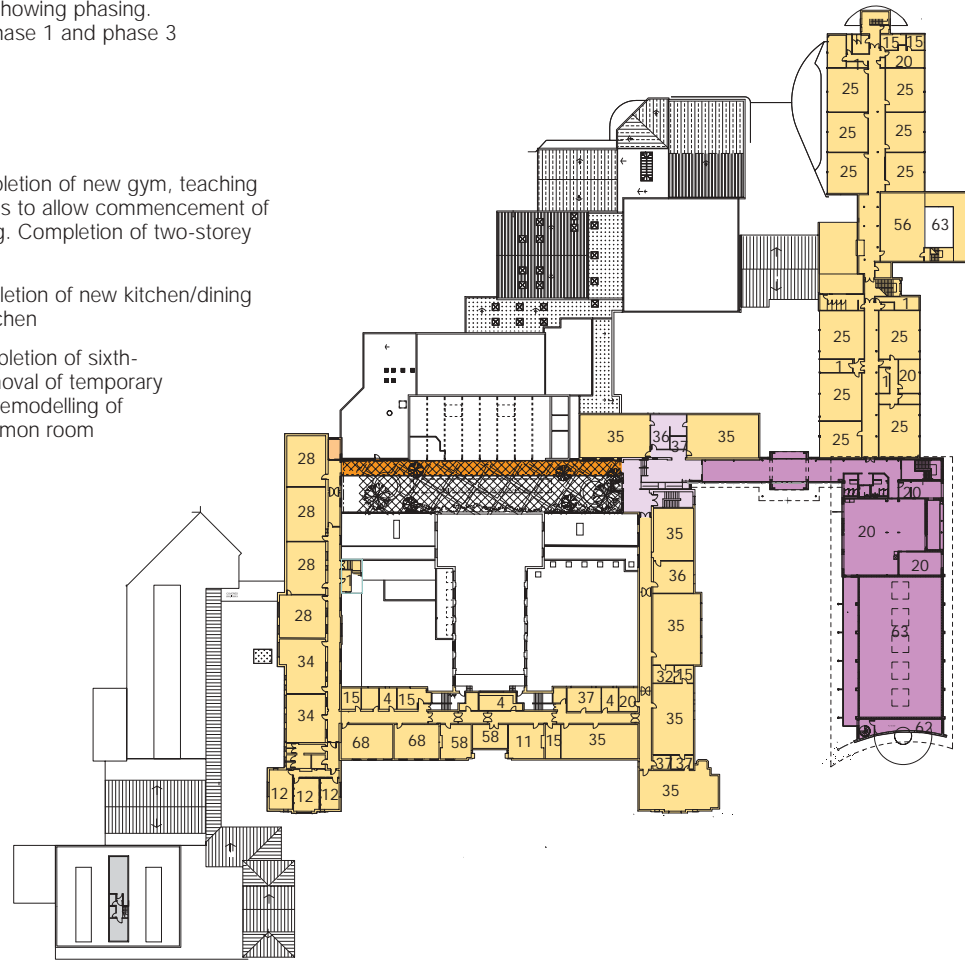
Access for Disabled Users

The remodelled accommodation makes it possible for disabled users to gain access to all parts of the school. The new main student entrance leads directly into the new two-storey cross-link and a new eight-person lift, suitable for assisted wheelchair access. The

Plans of remodelled and new buildings, showing phasing.
 Enabling work was carried out prior to phase 1 and phase 3

First floor plan

- remodelling
- new build
- Phase 1 Oct 03 – Sep 04: Completion of new gym, teaching accommodation and staff facilities to allow commencement of existing gym conversion to dining. Completion of two-storey link corridor
- Phase 2 Oct 03 – Oct 04: Completion of new kitchen/dining prior to demolition of existing kitchen
- Phase 3 Nov 04 – May 05: Completion of sixth-form common room to allow removal of temporary sixth-form accommodation and remodelling of existing dining to sixth-form common room
- Phase 4 Sep 04 – Mar 05: Joint Services Centre and pool changing
- Phase 5 Sep 03 – Mar 05: General refurbishment work throughout the school



Site and ground floor plan

'I can't imagine there are many schools which would need or want to knock everything down. The community would have been horrified if we had demolished the 1920s grammar school building which forms around a third of the building stock. It is an attractive building which forms the identity of the school.'



Jeff Brindle, Senior Vice Principal

original main entrance has also had a ramp added. There are specific disabled changing rooms for both sexes for the pool and the gymnasium.

Joint Services Centre

The JSC community facilities are centred on the existing music and drama department, and will have a new site entrance for community users with eighteen dedicated car-parking spaces. The design team felt it was important that the scheme had a clear identity and contributed to the school's presence in the community.

A new-build entrance foyer will serve as an exhibition space and cybercafé. A connecting drama-rehearsal room will lead to the rest of the drama and music department, the swimming pool and the new atrium courtyard and dining hall.

Adjacent to the foyer is a new conference room, a media studio with editing suite, and a new photographic studio and darkroom. A new music room will be accessed from the cybercafé. These new facilities will be created out of external access routes and will be flanked by a landscaped sensory garden.

Phasing and Timescale

A phasing strategy was drawn up in order to minimise the disruption to the school. Careful planning was backed up by continuous consultation with the school.

The work was split into five phases (see page 56). The first phase was preceded by enabling work during the summer holidays. This included moving the sixth form and boys' changing into temporary accommodation. Further enabling work occurred after phase 2 to complete the remodelling necessary to accommodate the sixth form.

The considerations that had to be addressed as part of the planning exercise included:

- circulation routes;
- security between the school and the changing site areas;
- services design, given the phasing programme;
- fire-alarm strategy;
- access to other areas of the school in order to route services.

Environmental Performance

Although safety issues had to be addressed, it was considered financially prohibitive to upgrade the whole of the existing building to all current standards. A series of discussions were therefore held with the client to establish their priorities and to agree a schedule of derogations from the current standards.

Sustainability issues were also taken into consideration when determining whether to refurbish or rebuild the school. The thermal performance and the carbon emissions of the existing building will be significantly enhanced by improvements such as replacing the windows and introducing more efficient plant equipment, but there is a limit to what can be achieved. Nevertheless, it can be easily demonstrated that the additional energy required to heat the refurbished building over its given life would be far outweighed by the energy required to demolish and dispose of the old structure and to rebuild with newly manufactured and delivered materials.

Where spoil was dug out for new build it will be used to make an outside amphitheatre, as this is cheaper and more energy-efficient than having it taken away.

The mix of traditional and new building is sensitively handled in terms of materials and scale



The large courtyard, flanked by new and old buildings, provides a meeting and social area for pupils at breaks, and the beginning and end of school

The materials and form of the new building at the rear of the site blend with those of the existing two- and three-storey buildings (left of picture), while enclosing a central courtyard used by Year 7 pupils in break and by the whole school for circulation



The canopy over the main entrance was created in the first phase as a continuation of the new curved roof to the existing dining hall. This gave the school a new identity from the start, as well as offering supervised and sheltered space for bicycle storage



Blenheim High School

In this suburban school, new and existing buildings seamlessly combine around a central courtyard. Sweeping roofs and atria help to create an identity completely different to what was there before

1450 place Science College
Epsom, Surrey
1200 11-16 pupil places
250 post-16 places

Local Authority
Surrey

Cost of projects to date
£9.7 million

School's Project Manager
Rob Isaac

Architect
DfEE Architects and Buildings Branch
(to RIBA Stage C/D)
Grasby O'Neill (phases 1 to 4)
Norfolk Property Services (phase 5)

Quantity Surveyors
Dobson, Boulcott White (phases 1 to 4)
Norfolk Property Services (phase 5)

Structural Engineers
Richard Jackson Partnership (phase 1)
Elliot Wood Partnership (phases 2 to 4)
Norfolk Property Services (phase 5)

Environmental Engineers
Elliot Wood Partnership (phases 1 to 4)
Norfolk Property Services (phase 5)

Landscape Architect
Pearson Landscape Design

Blenheim High School was opened in September 1997 as a new school, but was housed on the site of an existing school which had been closed and whose buildings were being used as an annexe to the local college of further education. Projections of population growth for the area predicted a need for many more secondary-school places. To meet this increased demand, some existing schools were expanded and Blenheim High School was planned as a new comprehensive school with six forms of entry (6FE) and a sixth form, with the possibility of expansion to eight forms of entry (8FE) in the longer term.

The new governors and head wanted to create a new identity for the school to break any local preconceptions linked to the previous school and to boost the morale of staff and pupils from the outset – particularly pupils from within the catchment area who had deprived backgrounds. A key part of the first phase was therefore a new entrance and foyer, with a new sweeping roof over the existing dining hall forming an external canopy to announce the new school's identity.

The basis of the original budget was a simple allowance for most of the existing buildings to be significantly remodelled and updated, and for some further new buildings to be added to increase the capacity. The final design involved the replacement of more of the existing buildings, generally because of their suitability and access problems. The buildings

that remain had been well maintained and had an efficient plan form, and their fabric did not need replacement in the short term.

The existing buildings were identified as eight blocks of accommodation, although some were physically linked. On the basis of condition and suitability surveys for each block, five were replaced with new buildings. In some cases, this decision was taken because the cost of refurbishment to modern standards was almost as high as rebuilding, whereas in others it was prompted by unsuitable level changes and shape, or an uneconomic single-storey form or location. In these cases, the replacement buildings offered more suitable, energy-efficient designs with up-to-date specifications. They could also be designed to match the demands of the initial brief exactly, while being adaptable enough to be changed to suit a variety of future scenarios.

The brief for the project was developed in conjunction with the new head and senior staff (who were employed for two terms before the school opened), based on four phases to match the rising school population up to 6FE, with an optional fifth phase to bring the school to 8FE.

The school prepared a proposed curriculum, including sixth-form subjects. This was used to carry out a curriculum analysis, which in turn identified the schedule of teaching spaces that would be needed each year as the school grew in size.

The link block at the west end of the retained two-storey building was unsuitable and inaccessible; it was demolished to make way for the new sports hall

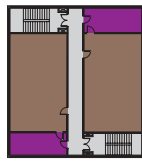


The original entrance foyer on the east end of the retained two-storey building was rebuilt under the new curved roof (on opposite page)

Plans of original site and buildings, showing departments

- General teaching
- Science
- Design and technology
- Art
- Music/drama
- Learning resources/ICT
- Staff and administration
- Storage
- Dining, social and halls
- Entrances

Second floor plan



First floor plan



Site and ground floor plan (blue line shows route of main drains)



'All schools should be like this. All children deserve to learn in a stimulating environment like ours, where each subject area has its own character, rooms are bright and airy and visitors comment that the entrance is like a hotel.'



Teresa Leech, Headteacher

The plans at each phase were designed to suit the calculated schedule of spaces, but sufficient flexibility was incorporated into the final design to allow a range of options to be accommodated. The final 8FE schedule was predicted to have changed significantly before the last phase was built, so these areas of building were designed to be flexible and were positioned carefully to allow a number of permutations.

Site

The school buildings had to be confined to a central 2.6 hectare area next to the main road. This was surrounded by playing fields that were still owned by the local authority, so the total site area of 7.55 hectares was sufficient for the planned 6FE school with sixth form. An all-weather pitch (equivalent to two grass pitches when calculating the statutory requirement for playing fields) would then be required if the site were to accommodate an 8FE school.

To enhance the school's value to the local community, the governors were keen to provide the all-weather pitch as soon as possible, so it was agreed that this would be built early in lieu of some of the area in phase 4. This 'missing' area was then to be added in phase 5 when the school became 8FE.

Because of the size of the school site, all buildings except halls and gymnasias needed to be at least two storeys high to allow the

gross area of building required for an 8FE school and the associated external areas which needed to be accommodated on the school site. There was also a main foul-water sewer running across the south-west corner of the part of the site where building was allowed, so the new sports-hall block was positioned to avoid this.

A further site constraint was the slope of approximately 1.5m from the upper south-west corner to the lower north-west corner. The existing buildings were built at different levels, so access for the disabled to these levels was a key concern.

The design keeps the three levels of the existing buildings, and uses ramps in the main entrance foyer to link them. A double-sided lift in the pupil entrance at the south end of the complex affords a link to two different floor levels at ground floor and first floor. A ramp in phase 5 completes the accessible circulatory route around the courtyard.

Design Strategy

The overall design strategy incorporates the design priorities and other demands of the brief, whilst also working within the constraints of the retained buildings and the shape and slope of the school site.

Layout of Buildings

The school's desire to provide a secure environment with limited and controlled

access, the position of existing buildings and the need for an economic plan form with internal circulation all pointed to the disposition of buildings around a central courtyard, with large spaces and later phases projecting from the main circle.

This has a number of advantages, already proven in existing schools visited by the head teacher and governors during the development of the brief. These included Brooke Weston CTC, Corby and Bishop Fox's Community School, Taunton. Positive design aspects include:

- a predominantly hard-surfaced courtyard area providing a secure informal social area and, in the Blenheim design, an external amphitheatre;
- a circulation system in which one corridor acts as the main route around the school as well as giving access to all rooms. It also offers access to the courtyard at various points and enlarged areas for lockers around the school, near to those rooms used for registration;
- a 'sense of place' for the occupants, as rooms either face into the courtyard or out to the playing fields or the landscaping at the front of the school; and
- access to all parts of the school without the need to go outside, as all the buildings are physically linked, although 'short-cut' routes through the courtyard mean that the internal ground floor circulation routes need not be used as a through route in good weather.

The new entrance foyer links two existing levels with stairs and a ramp, but offers access at both levels



The remodelled two-storey building offers ICT 'clusters' at various points, with occasional supervision from adjacent classrooms through internal windows. At ground-floor level, a door to the courtyard provides a shortcut to other blocks

The new building at the rear of the site, built over phases 2 to 5, is stepped to follow the edge of the school site, avoid long corridors and add atria at pivotal points



The design of the window openings in the new rear block allows for new internal walls to be built at various points in the future

Remodelled Buildings

A review of the condition and configuration of the existing stock showed that certain buildings had suitable room proportions for particular types of accommodation and offered a sustainable case for refurbishment. The two-storey block at the front of the site suits general teaching classrooms, study areas and administrative facilities. The three-storey block behind had more servicing and large rooms suitable for use as specialist spaces, so a food room and a textiles room were accommodated on the ground floor and ICT rooms were provided on the two floors above.

Assembly and Dining Halls

The existing assembly hall and catering facilities continued to serve the same purpose, with a new roof above the dining hall offering a higher volume. The existing opening between the two halls was enlarged to allow them to be used together for performances and open evenings. The sports hall was created in a new building at the other end of the two-storey block, linked to an adjacent activity studio on the first floor by shutters to allow it to be used by spectators. These two blocks act as 'bookends' to the front two-storey block, and both have curved roofs signposting entrances.

New Two-Storey Block

The new two-storey block at the back of the site is based on 8.1m wide rooms, either around a central atrium or on either side of a corridor. The stepped plan form allowed the final building (built in three of the five phases) to:

- follow the edge of the school site;
- avoid long corridors; and
- add atria in the circulation route at the pivotal locations of each 'step'.

Design and technology rooms were positioned around a central design-resource area in one of the atria, with science laboratories and a central preparation room above. The position of the first phases of this block allowed them to be central to the other specialist facilities, including the food room and textiles room in the three-storey building, and also allowed extensions to be built at either end when the school expanded to 8FE.

It was agreed that this rear block should be seen from the playing fields as a protective enclosing wall zig-zagging along the site, so this elevation has the roof set behind a parapet wall.

The materials used in all the new blocks, including brick and render, were chosen to raise and modernise the image of the school

whilst complementing the existing buildings. Although the various blocks were of different scales, a family of materials and details was common to them all. Future adaptability was allowed for in steel framing and the fenestration, with sufficient wall space between windows to allow for a variety of internal wall positions, and sill heights at 1050mm above floor height to allow fixed benching to pass underneath.

Entrances and Community Use

An early decision in the briefing process was to have two entrances, one for visitors and pedestrian access and one for the bulk of the pupils, opposite the coach set-down area. Both can be used by the community: the south entrance for access to the sports hall and other PE facilities, the north for use of the hall, catering facilities and amphitheatre.

Phasing and Timescale

The overall project was deliberately phased over a number of years to allow a gradual increase in the area of buildings, broadly following the increase in the number on roll. To allow an early opening (within 18 months of the project's approval by the Secretary of State), the first phase was to demolish the unsuitable buildings and refurbish the existing

The new entrance to the west of the remodelled two-storey block is for pupils (it is opposite the coach drop-off area) and for the community using sports facilities out of school hours



The new entrance to the east of the remodelled two-storey block is the main entrance for visitors and the community entrance to the assembly and dining halls out of school hours



Phase 1 included a new social area with access to an amphitheatre in the courtyard. Phase 2 added practical rooms in the new rear block (left) and phase 3 remodelled the existing two-storey block (right)

Openable shutters in the activity studio offer the option of a spectators' gallery to the adjacent four-court sports hall



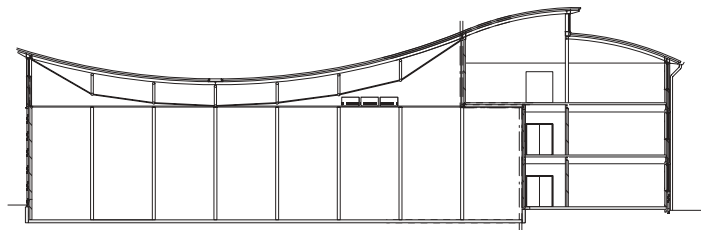
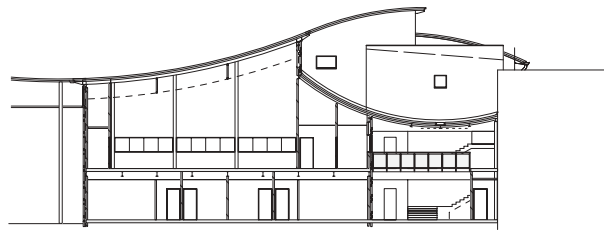
The new rear building incorporates atria at three points where the plan 'steps'; each is used as a resource area for the practical technology and art spaces that surround it



Landscaping played an important part in creating a well-used courtyard that is at the centre of both new and existing buildings



Phase 5 includes facilities for the sixth form, including their own entrance



Two sections through the new block to the west of the retained two-storey building show the activity hall, with changing rooms below (left) and the sports hall with library above (right)

hall and dining hall. Replacing the roof over the dining hall and adding an adjacent new entrance foyer created an inspirational heart to the new school. The school buildings then grew in area as the numbers of pupils increased, ensuring that only the building area that was needed incurred the recurrent costs of heating, lighting, cleaning and rates during the first years.

The following phases were agreed:

- Phase 1: to be partially complete for the opening in September 1997 and completed by October 1997, including demolitions, temporary use of the existing two-storey teaching block for both general and practical teaching rooms (with relocatable furniture used in a new science laboratory and technology room later), and minor refurbishment of the assembly and dining halls, including a new roof to the dining hall and creation of a new entrance foyer. Landscaping, including an amphitheatre in the courtyard, added a vital feeling of permanence.
- Phase 2: to be completed by September 1998, including adaptations to the three-storey block, a new sports hall, dance studio and changing rooms and the central part of the new two-storey block for science and design and technology.
- Phase 3: to be completed by September 1999, including revisiting the existing two-storey block for adaptations (creating two classrooms where the temporary science laboratory had been) and a new performing-arts wing (although this was reduced in lieu of the all-weather pitch, as described above).
- Phase 4: to be completed by September 2002, including a further section of the new two-storey block to complete the courtyard. This phase was actually completed earlier to suit funding availability.

Phase 5 added further wings to each end of the rear two-storey block. It opened in September 2004, following approval by the local authority and local Schools Organisation Committee that the school capacity should be increased to 8FE, as originally envisaged.

Environmental Performance

The existing buildings to be retained were completely stripped of their existing mechanical and electrical installations. They were then upgraded to meet modern standards that made adaptation uneconomical.

The original heating system was oil-fired. Cost forecasts showed that the projected savings from changing to natural gas were considerable, despite the fact that a new mains supply would be required. The existing central boilerhouse was therefore used to house the new gas-heating boilers and hot-water generators. The stepped growth of the new school allowed the boilerhouse to be completely cleared of existing equipment and new boilers to be installed phase by phase as the school grew and the heating demand increased. The first phase included installing the major distribution pipework, for instance for heating and water, to accommodate supplies required for future phases.

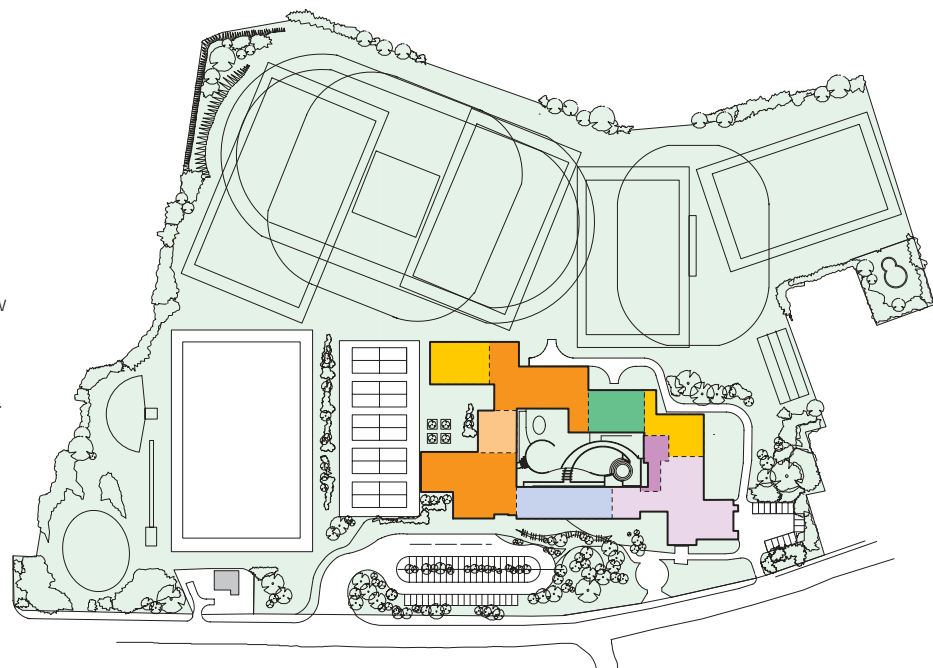
The original design included the often-used underfloor duct to distribute pipework. This had to be retained for the initial legs of the new mains, but full-length access panels were added to allow for future maintenance.

Beyond this, pipework was routed up into the suspended ceilings of the ground floor corridors. A new building-management system was installed to control and manage the new systems.

The design endeavours to optimise daylight-window design and minimise reliance on electric lighting. Simple automatic controls were introduced for controlling lights closest to windows. In toilets and changing rooms, lights are controlled by movement detectors.

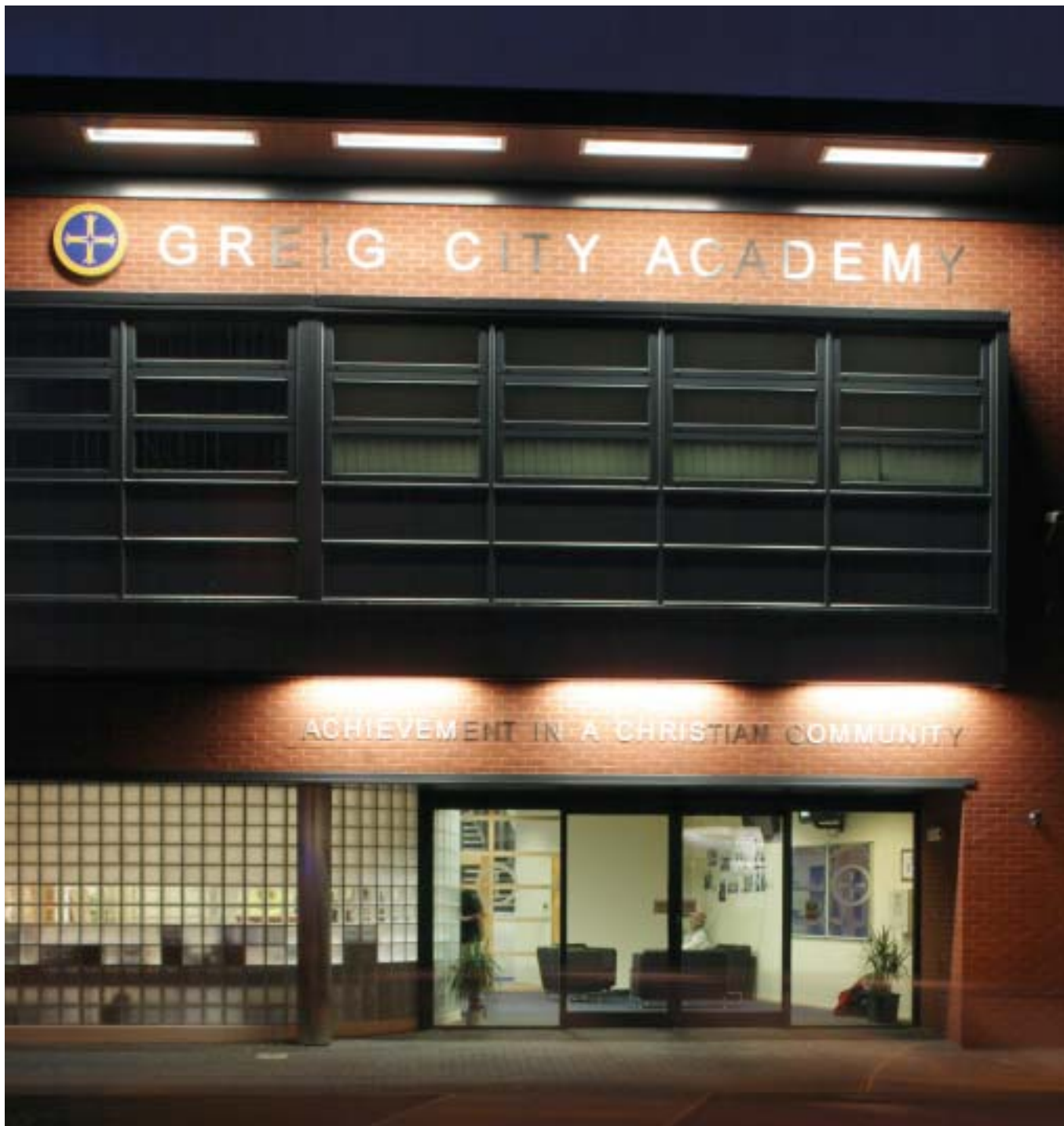
To keep running and maintenance costs to a minimum, mechanical ventilation has only been used in the toilets and changing rooms. Natural ventilation is supplied solely by the conventional means of opening windows. The building was designed to minimise the use of plastics and other materials from non-renewable sources.

Acoustic performance meets the standards current at the time of building. In general, partition walls are double-skin plasterboard on metal studs and rooms have acoustic attenuation provided either by mineral-fibre suspended ceilings or, beneath the new roofs, by web-perforation of the steel structural deck. In general the acoustic performance of individual spaces has proved successful.



Site-plan of final building footprint and landscape design, showing the five phases

- remodelling
- new build
- Phase 1
- Phase 2
- Phase 3
- Phase 4
- Phase 5



© Joe Kent Smith

The new entrance presents a welcoming face to the community



© Joe Kent Smith

Circulation in the new science wing, which wraps around the external wall of the existing sports hall

Greig City Academy

In this remodelled urban school for the community, a wrap-around extension and a series of new link blocks have improved circulation across the site and reorientated the school to present a new and welcoming face to the local community

1275 place Academy with ICT specialism
Haringey, London
1075 11-16 pupil places
200 post-16 places

Cost of projects to date
£11.2 million

Project Manager/Employer's Agent
Fletcher King Howard

Architects
Curl la Tourelle Architects

Pre Contract Cost Consultant
Cook + Butler

Structural Engineers
Budgen Partnership

Environmental Engineers
CJ Design Ltd
Fletcher King Howard
Jonathan Hart Associates

Design Build Contractor
Galliford Try Ltd.

The Greig City Academy, which has a technology specialism, was transformed from a former voluntary-aided school. It was one of the first Academies to open under the first wave of the Academies programme. Despite the fact that its buildings date from 1972 and were thus less than 30 years old, the physical environment at the original school was more of a hindrance than an asset to the fulfilment of the Greig City Academy mission statement: 'Achievement in a Christian Community'. The aim of this project was to address the shortcomings of the site and buildings, helping to transform a previously underachieving secondary school into an Academy where the site and buildings were a positive rather than a negative feature.

Central to the organisation and delivery of the curriculum is the use of specialist ICT resources. An inclusion centre was deemed to be fundamental to an early raising of standards at the new Academy, but it was anticipated that its patterns of use would shift to post-16 provision as the need for support decreases in the future.

The following key objectives were derived from briefing documents, meetings and discussions with the Project Management Group and workshops with the wider school community:

- provide vehicular and pedestrian routes from the High Street;
- improve existing dining and catering provision;

- improve site security, particularly perimeter boundaries;
- provide an inclusion centre in a suitable location;
- provide a new drama theatre in a suitable location;
- provide internal social and recreational areas;
- ensure disabled access to all parts of all buildings;
- consider community use of existing sports facilities;
- build linking blocks to relieve congestion and improve circulation;
- look at the possibility of providing on-site accommodation for newly qualified teachers in a later phase; and
- improve and rationalise the external landscaped areas.

The brief evolved during the design process and the community-use aspect was developed to include:

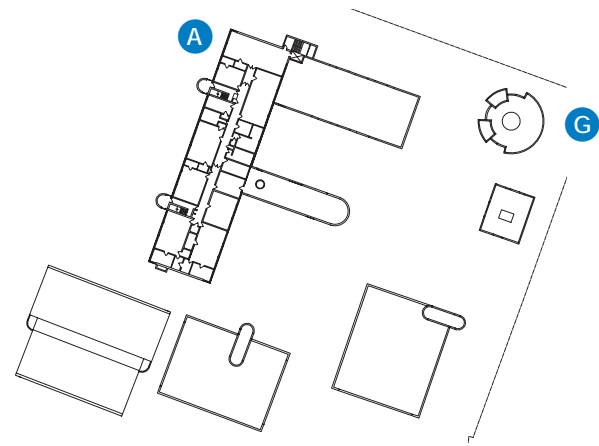
- expansion of community use throughout the Academy – especially specialist resources in ICT, catering and hospitality, art (a specialist kiln room), multimedia ICT lab and the drama theatre; and
- provision of a discrete community learning centre available to both students and the community, with a learning-resources centre, business-conference room, exhibition hall, careers and vocational centre, Internet bar, Cisco laboratory, music-technology lab with recording studio and multimedia presentation room.



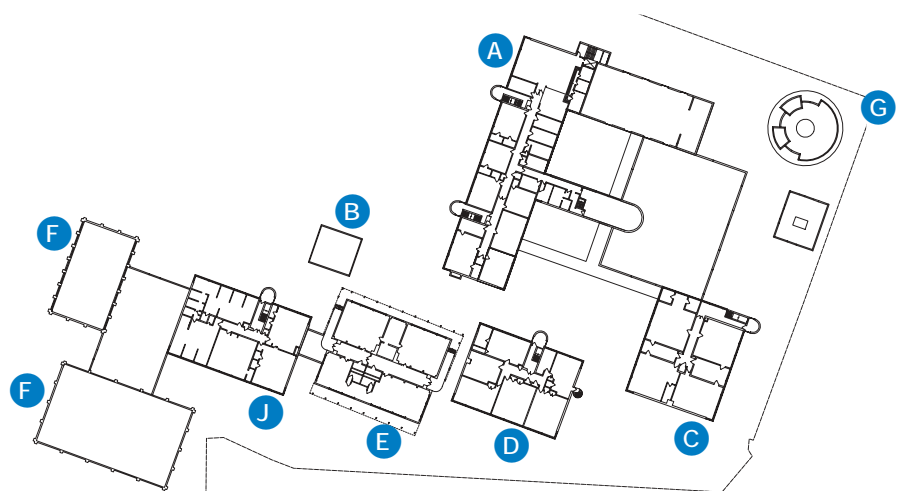
Glazed screens in new and existing buildings increase transparency

Plans of original buildings and site

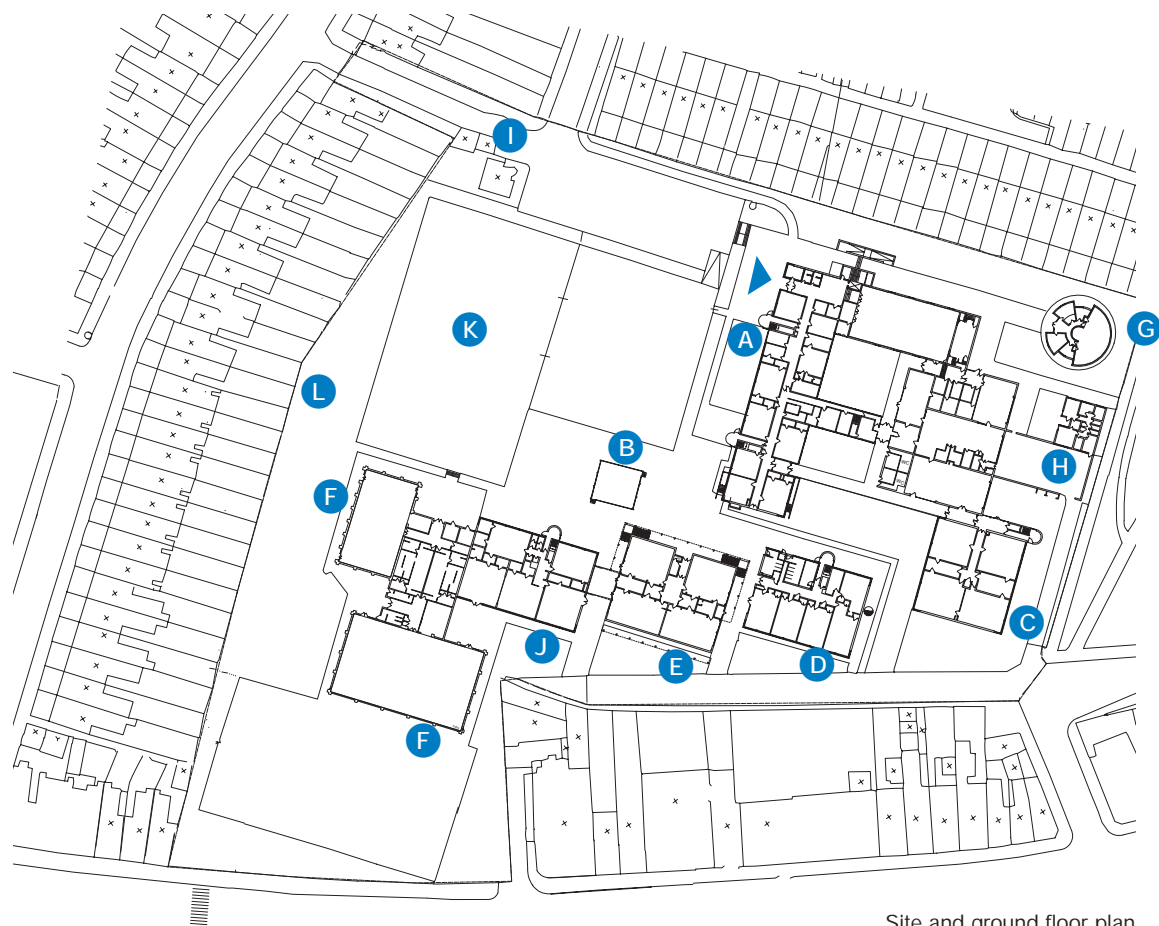
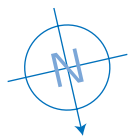
- A** Number of general teaching rooms undersized; kitchen fittings and finishes in poor condition (health and safety issues to be addressed); narrow and steep internal stairs (as in other blocks)
- B** Substandard temporary building currently empty
- C** Old laboratory fittings and furniture in need of replacement; external circulation to block D (as in D, E & F)
- D** General teaching rooms in poor condition; classrooms on north side suffer from noise and visual distraction
- E** Relatively good condition
- F** Sports hall and gymnasium in reasonable condition, changing and showering facilities need refurbishment
- G** Internal refurbishment needed
- H** Internal refurbishment needed
- I** Main school entrance hidden from community down a side street
- J** Internal finishes and fittings in art and food rooms in poor condition
- K** Games courts' surface and inadequate fencing pose serious health and safety risk
- L** Perimeter boundary does not offer school or its neighbours adequate security
- ▶** Entrance



Second floor plan



First floor plan



Site and ground floor plan

'Within the footprint available, it was critical that a blend of new build and refurbishment was employed. This design offers the significant benefits of new-build blocks for science and performing arts, whilst effectively blending in high-quality refurbishment of the existing stock. Students and staff find it almost impossible to distinguish the refurbished existing buildings from the new.'



David Triggs, former Executive Principal

Existing Site and Buildings

The irregularly shaped site of 2.1 hectares is bounded by residential properties to the east and south and communal space to the west. The school's northern boundary is on the local High Street, partly behind the shops.

The site is well served by public transport, making it accessible to students and the wider community. However, with the main vehicular and pedestrian access from a side street, and the blind walls of the sports hall facing the High Street, the school effectively had its back turned to the community.

The original school consisted of seven independent blocks, made of reinforced-concrete frames with precast-concrete or brick-panel cladding, which were structurally sound. All but one of the blocks had flat roofs. A comprehensive window-replacement programme had been carried out by the school over the previous 10 years but the replacement windows were low-performance single-glazed aluminium.

Circulation between the buildings was external. Only one block had a lift, and there was no disabled access to the upper floors of any of the other blocks. Internal stairs were extremely narrow and steep, with inadequate headroom. This created major congestion at lesson-change times, a problem which was compounded by dark, narrow, double-loaded corridors which were impossible to supervise.

The AMP condition and suitability surveys identified a significant amount of internal refurbishment work to all blocks necessary to bring them up to a reasonable standard. This included replacement of mechanical and electrical services, flooring, ceilings and doors and the upgrading of the external works.

The accommodation was insufficient to support the proposed numbers for the new Academy, and the gross area was below DfES area guidelines for the proposed capacity. The AMP suitability survey identified the unsuitability of a number of teaching spaces. The shortage of external social and recreational spaces was also identified as having a negative impact on pupil behaviour.

Design Strategy

During the feasibility stage, a number of strategic design options were considered. The preferred scheme took elements from different options to produce a holistic proposal which was deemed to best satisfy the requirements of the brief. A combination of extension, remodelling and refurbishment was considered the most reasonable solution on a site where the existing buildings were structurally sound and the restricted site area would have made decanting during rebuilding very difficult.

The key to the design proposals was to organise the curriculum areas physically into

suites and to link related areas. For example, the new science block to the front of the school has eight laboratories over two floors with fully equipped ICT resources. The school's preferred teaching methods required ICT rooms within each curriculum area, dedicated to the particular specialist subject requirements.

The scheme includes elements of new build, reorganisation and wholesale refurbishment of most existing blocks. The main features are described below.

New Access

A new pedestrian- and vehicular-access point leads from the High Street directly to a reception area in the new science block. Relocating the main school entrance to this area changed its address and demonstrated, practically and symbolically, a new beginning for the school. A new landscaped car park to the front of the school for staff and visitors releases the area previously occupied by parking for informal hard play, in a more sheltered and appropriate location.

New Science Block

Central to the design is the building of the new science block which runs parallel to the High Street and shows a new face to the community, in strong contrast to the previous featureless wall of the sports hall. This new two-storey block wraps around the existing sports hall, offering the public a glimpse of activity in the new Academy. A lift gives full access with a link to other blocks.



The community's view from the high street before remodelling the back of the sports hall

The new reception area is comfortable and attractive and the glazed screen gives visitors a view of school activity beyond



Plans for the future include enclosing an existing open courtyard to provide a multi-purpose space for breakfast and after school clubs, community gatherings and large scale technology projects

New Drama Studio

A new drama studio, new stairs and a lift are located at a pivotal point in the performing-arts centre, linking and providing access to blocks C and D.

Inclusion Centre

The inclusion centre, catering for 30 pupils, is located in block H. Block G adjacent to it houses the special educational needs (SEN) centre.

Community Learning Centre

The centre is part of the remodelling of block A, close to the former main school entrance.

All Weather Pitch

A new all-weather pitch has replaced a large games court. Floodlighting enables the facility to be open for community use after hours.

Internal Circulation and Access

New unheated atrium-type link blocks act as a unifying element across the campus. They provide additional staircases, taking the pressure off the existing narrow staircases, as well as lifts and ramps to ensure total accessibility. These new links enable all students and staff to move freely in a safe and secure environment and this is recognised as having had a calming effect on the students.

Landscaping

The key elements of the landscape scheme are:

- perimeter security achieved with double fences and interstitial planting;
- a car park to the front of the school, sensitively landscaped to reduce the impact on the High Street; and
- new surfaces replacing uneven and hazardous paving.

Remodelled Blocks

The scheme included at least some refurbishment to all the existing teaching blocks, with new door sets, replacement ceilings, improved lighting, more appropriate floor finishes to create the impression of wider corridors, larger rooms and a softer, more welcoming learning environment. The framed construction of the existing buildings enabled the designers to replan entire floors with a greater variety of spaces.

New furniture and equipment, as well as ICT networking throughout the campus linked to the wider community, transform the learning experience and motivate the students. Toilets and changing rooms have been remodelled and upgraded throughout.

New glazed screens into classrooms have not only made corridors much lighter and improved security but have also increased the sense of openness and transparency.

Programme and Phasing

A design-and-build procurement method was followed because it was felt this would give greater cost certainty and a speedier construction programme. The programme was divided into four phases to keep disruption to the Academy to a minimum, to avoid double decanting of pupils where possible, and to minimise the need to hire temporary classrooms. Tenders were obtained after an OJEC procedure based on phase 1 works plus preliminaries and were negotiated with the successful contractor. The novation of the design architect to the contractor meant that the architect could be working for the contractor on one phase whilst at the same time preparing client's design drawings for the next phase. Within a culture of partnering, it was possible to

involve the contractor in the design phases of the project, resulting in improved buildability and greater cost certainty.

The building programme was largely determined by the need to complete phase 1 in time for the Academy's official opening in September 2002. It was important that the contractor could reasonably resource, access and carry out work in different parts of the school simultaneously.

Further Proposals

The current programme takes the Academy a long way towards the physical transformations required by the overall masterplan. Work identified for the future, funding permitting, includes enclosing the open courtyard adjacent to block A and additional landscaping to soften the external environment.

Environmental Performance

The new science building is naturally ventilated via passive ventilation stacks to the roof. Ventilation improvements such as sun-screening to the southern elevations of existing buildings could be considered in the future.

Although Building Bulletin 93: *Acoustic Design of Schools* was not published at the detailed design stage of the new science building, acoustic ceilings provide good acoustic conditions to all laboratories. Subsequent phases, including the refurbishment works, meet the requirements of Building Bulletin 93.

New buildings meet the requirements of Part L of the Building Regulations. In the existing buildings, window replacement would upgrade thermal performance, but insulation in the building fabric would remain insufficient.



Landscaped central quadrangle, with new science, art and technology link block between remodelled music/drama block on the far right (with new main entrance in between) and refurbished teaching wing to the left

The composite 'jigsaw' mural in the central atrium. Sections were provided by each of the feeder primary schools



Central atrium of new link block, used for display, exhibitions, musical performances, coffee mornings and open evenings, as well as by pupils for socialising during break times

Chaucer School

A combination of remodelled existing accommodation and a light, airy new link block – designed with input from staff and pupils – brings a split site secondary school in a deprived area together on a single site and helps to give it a new sense of identity

1050 place Community School
Sheffield, South Yorkshire
1050 11-16 pupil places

Local Authority
Sheffield

Cost of projects to date
£6.2 million

School's Project Manager
Graham Wells

Architect
Sheffield Design and Project
Management

Quantity Surveyors
Sheffield Design and Project
Management

Structural Engineers
Sheffield Design and Project
Management

Environmental Engineers
Sheffield Design and Project
Management

Landscape Architect
Sheffield Design and Project
Management

Chaucer School is a mixed comprehensive school with 1050 pupils on roll. It is located in an area of acute deprivation in Sheffield. Since the 1970s it had operated from two groups of buildings situated at opposite ends of the school playing fields. This led to significant management problems, particularly during class changeover when pupils moving between the two sets of buildings often left the site. There was also considerable duplication of facilities, with attendant inefficiencies in daily operation and maintenance.

In the Spring of 1999, Sheffield LEA commissioned Sheffield Design and Project Management to develop a scheme to consolidate all the facilities onto the main Wordsworth Avenue part of the site. This provided an opportunity to rationalise the accommodation and establish a secure, self-contained teaching environment.

Funding for this scheme came from a variety of sources: £5.3 million of New Deal for Schools (NDS) funding (from rounds 2, 3 and 4); £1.8 million of Sufficiency and Suitability funding; £0.3 million of NDS Modernisation funding; and £120,000 of the school's devolved formula capital. This included £60,000 brought forward from future funding for additional work that the school requested be included in the contract.

Site and Existing Buildings

The school was originally built as separate boys' and girls' schools, with broadly the same facilities on each site. The overall site is around 10 hectares in size, with the original school buildings separated by approximately 200m. There is a significant slope from the east (Wordsworth Avenue) end of the site up to Halifax Road at the western end. An established public right of way connecting these two roads ran directly through the school playgrounds and across the playing fields. This was diverted around the edge of the Wordsworth Avenue buildings before the main building work was started, to allow the construction of a secure perimeter fence. Generally, car parking arrangements and pedestrian circulation were not well segregated and there was no clear strategy for the use of the school entrances.

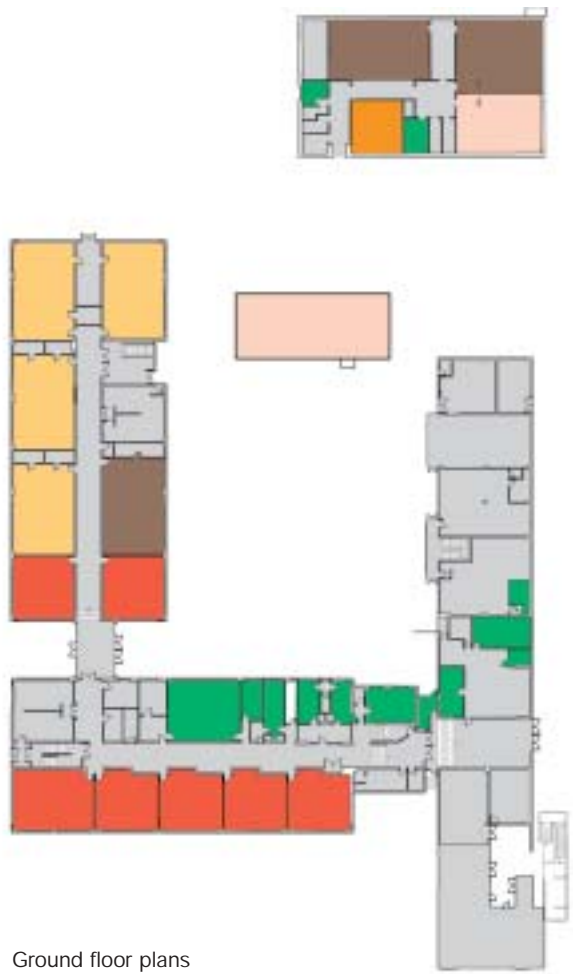
The existing Wordsworth Avenue buildings were designed by architects YRM in the 1960s. They were well designed and constructed, and had some architectural merit. Although becoming rather 'tired' some 30 years after they were built, they were still structurally sound, and teaching rooms were generally of a reasonable size. In contrast, the Halifax Road buildings were of much less substantial construction and had aged poorly.



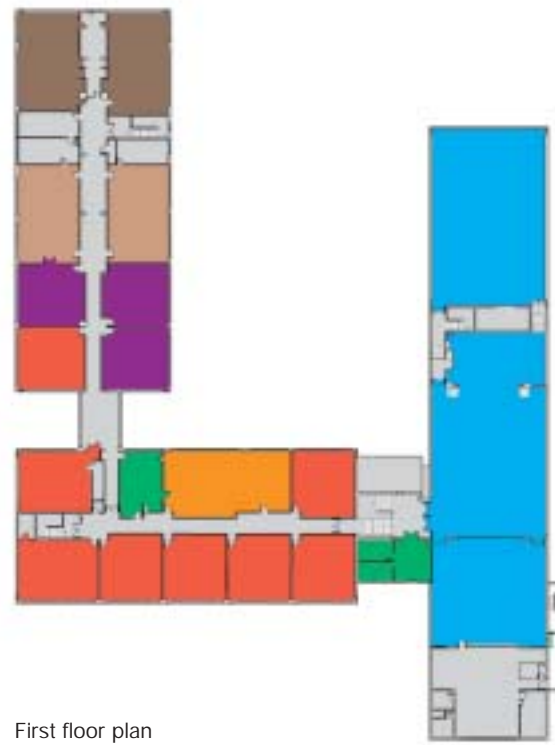
Half of the school was originally located in the buildings at the Halifax Road end of the site (shown here in the distance), separated by around 200m and a significant slope from the Wordsworth Avenue site on which the school has now been consolidated

Plans of original Wordsworth Avenue buildings, showing departments

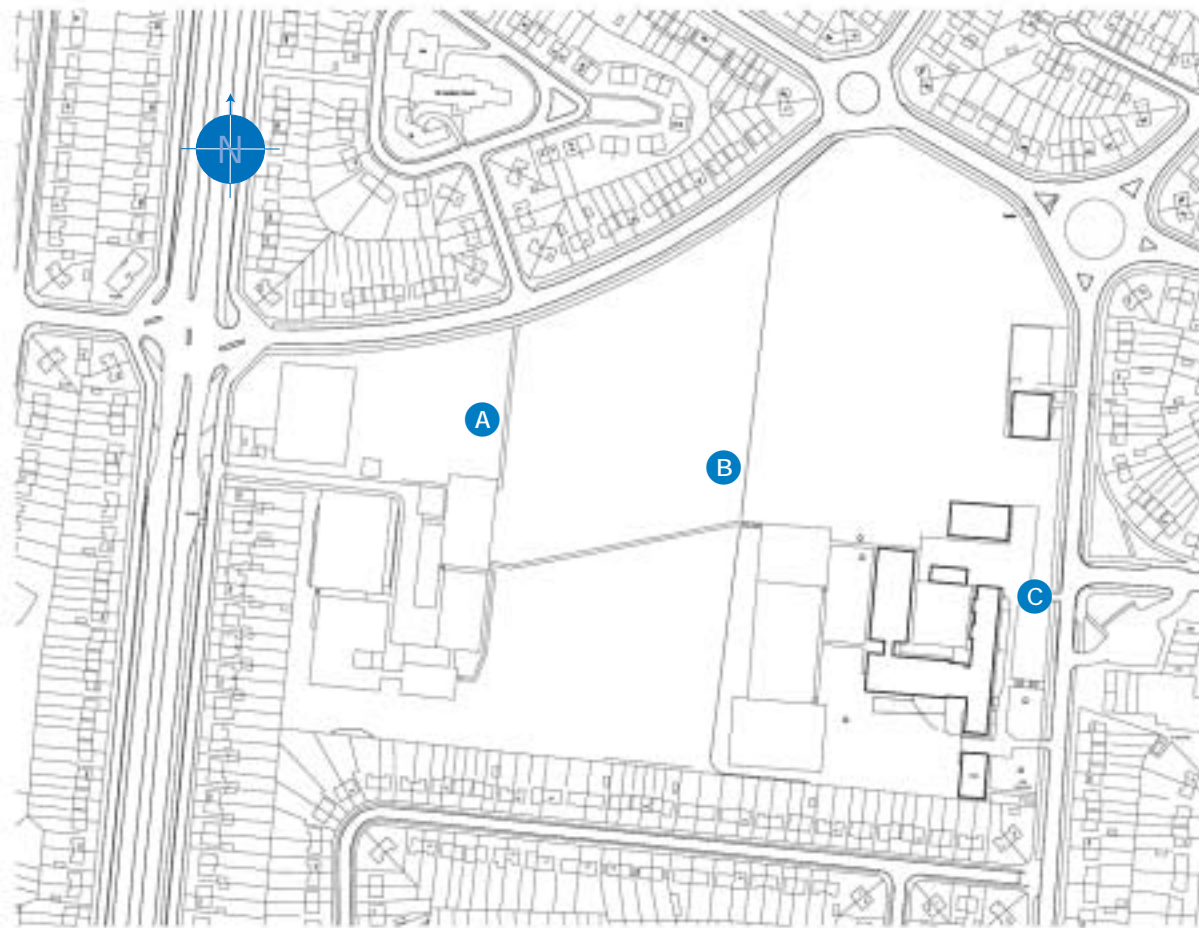
- General teaching
- Science
- Design and technology
- Art
- Music/drama
- Learning resources
- Staff and administration
- ICT
- Halls, PE and dining



Ground floor plans



First floor plan



Site plan showing original buildings

- A** Originally boys' and girls' schools at opposite ends of playing fields – needed to be consolidated on one site
- B** No secure boundary – existing public right of way running through school playground and across playing fields
- C** Unsatisfactory access and entry arrangements – need to establish new public face.

'The school was very satisfied with the design, the building process and, most importantly, the outcome. Two years on, the school still looks good and the educational experience and learning environment has been transformed. The difference is overwhelming!'



Graham Wells, Deputy Head

Design Strategy

A curriculum analysis, based on the planned number on roll and curriculum, was developed and agreed with the school. From this, a rationalised accommodation schedule was agreed in accordance with Building Bulletin 82, *Area Guidelines for Schools* (current at the time).

This information formed the basis for an extended period of discussion between the architects, the head, the school heads of department and representatives of the local authority to determine the vision for the school. A prime feature of this was the desire to establish a new central focus along with a rejuvenated public face, as well as the need to create properly suited teaching departments with appropriate subject adjacencies.

It also emerged from this process that the existing school wings would be best utilised for general teaching rooms, with their relatively low servicing requirements. The existing larger spaces, such as laboratories and workshops, proved ideal for conversion into ICT and food rooms.

The public face of the existing buildings was enhanced by the conversion of the main entrance into a fully glazed library, facing and accessible to the community. Above this, the main dining hall and kitchen were refurbished to cater for contemporary dining needs and to

allow for possible community use in conjunction with the adjacent main hall.

An existing single-storey science block at the front of the school was retained for conversion into a music and drama facility because of its isolation and structural soundness. The drainage arrangements for this block, like the rest of the existing teaching wings, were in the centre of the building. This led to the adoption of the distinctive 'butterfly' form of the refurbished roof. The majority of the existing windows were reduced in size or blocked up to facilitate blackout and reduce noise transmission, and the building was encased in an insulated render system. A vibrant colour scheme, both internally and externally, was felt to be appropriate for the function of this block and has proven popular with the pupils and staff.

These existing buildings were then linked with a new and highly serviced science, art and technology block which also contains the new main entrance and administrative areas. This building is designed around a large central atrium space and forms the new heart of the school. The atrium contains a composite mural with sections provided by each of the feeder primary schools and has been a great success with the school and community. This area has been used for display, exhibitions, musical performances, coffee mornings and open evenings and is a pupil social area during break times. The butterfly-roof theme established for the music and drama facility

was carried through to this building too, and has contributed to the creation of a distinctive landmark building. The cruciform plan form also maximises natural light and provides more varied views from each of the classrooms than a traditional linear block.

Lastly, a new sports hall, with associated changing accommodation, was incorporated as a separate but linked wing with direct access to the playing fields. A dedicated staff entrance was introduced in this area, along with the new school car park and vehicular entrance, separated from the primary pedestrian circulation routes. The main pupil entrance was established in front of the existing quadrangle, where it was easily supervised from the new reception area and controlled by a secure entry system.

New materials were chosen to be robust and durable to suit the rigours of a school environment, and to complement and enhance the existing buildings. Painted fair-faced blockwork was specified internally for the new construction, with the exception of office and sanitary areas, and paint colours and flooring were carried through to existing areas to unify the scheme. Extensive use was made of natural timber for external cladding, roof beams, windows, internal doors, handrails and worktops to soften the overall ambience. The existing buildings were completely rewired to current standards and to allow the installation of electronic whiteboards in every classroom.

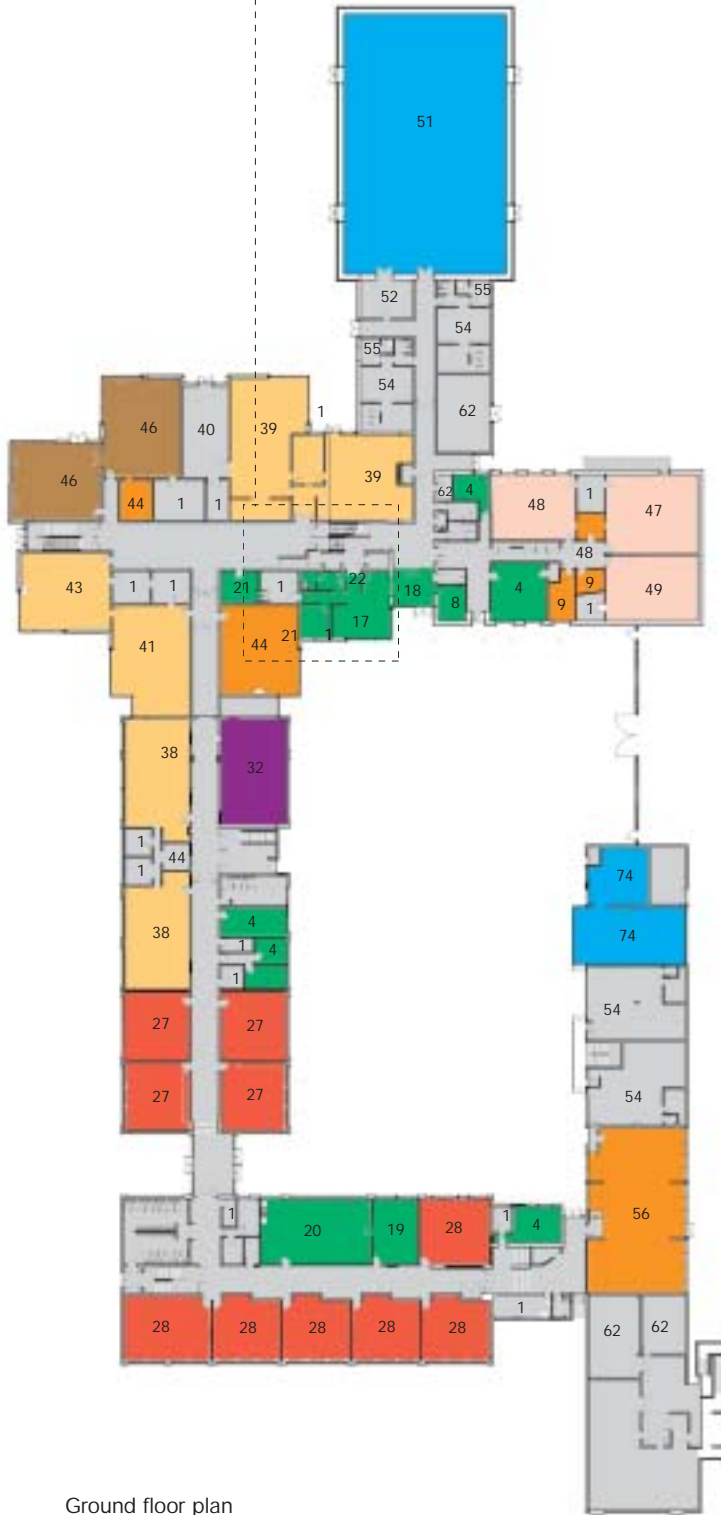
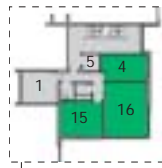


The existing quadrangle was securely enclosed and a new pupil entrance established. This is now easily supervised from the new reception area and controlled by a secure entry system. The use of the school logo and artwork on the gates helps to give the school its own (new) identity

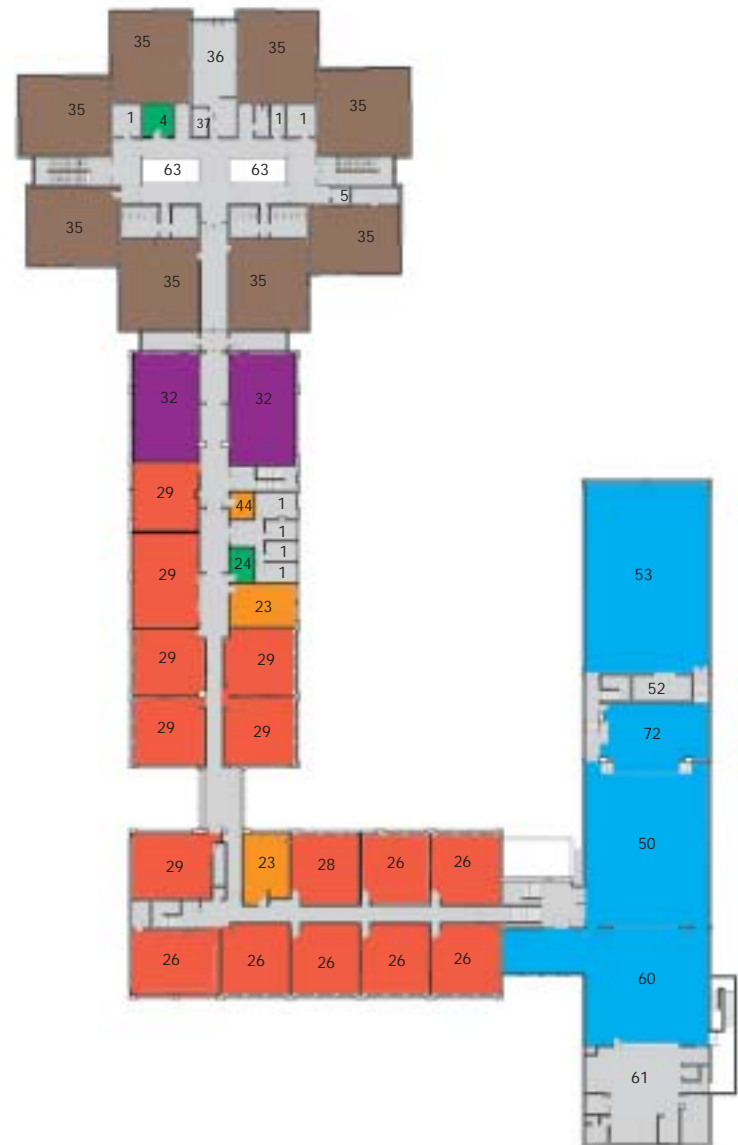
Plans of remodelled and new buildings, showing departments

- General teaching
- Science
- Design and technology
- Art
- Music/drama
- Learning resources
- Staff and administration
- ICT
- Halls, PE and dining

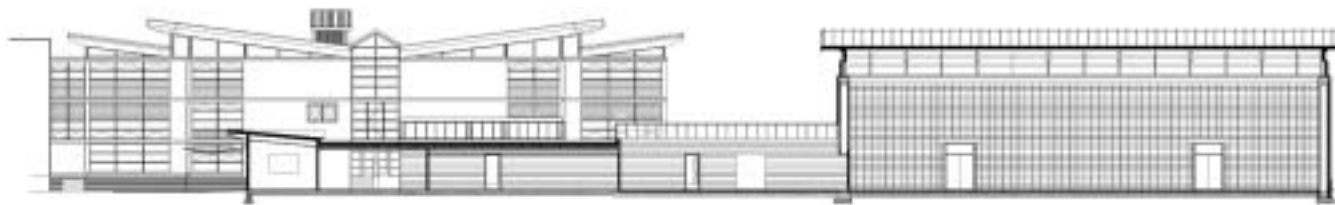
Mezzanine floor plan



Ground floor plan



First floor plan



Section through new sports hall and link block. Drainage for the existing teaching blocks was in the centre of the buildings, which led to the adoption of the distinctive butterfly roof form

Phasing and Timescale

The successful tender was received in February 2001, and agreement was reached with the contractor to trial a partnering approach to achieve 'best value' in the realisation of the project. The project started on site on 28 May 2001 and was completed on 28 February 2003, with the work being handed over broadly in three phases. Phase 1 included work to existing classroom blocks, kitchen and dining room. Work to the music and drama block was completed nine months later. The final phase incorporated the new-build element.

The Partnership Agreement was a key element in the success of the process. It involved the establishment of a stakeholder core team to monitor and control the construction phase, and to apply 'value engineering' principles to all decision making.

In addition to those usually involved in a project of this nature (the architect, a project manager from the contractor and an LEA representative), the deputy head of the school was also part of the core team which met at least once a week throughout the project. He managed the day-to-day contact between the school and the contractor on site and was ideally placed to respond to requests and queries instantly. The result was that relationships with all those concerned in the process, but especially the contractors, were excellent.

The close participation of the deputy head in the project made it possible to programme and sequence the work to the benefit of all parties. Major work, such as demolishing the old music block, and rewiring and replacing worn pipes in the corridors, was timed to make maximum use of holiday periods. This reduced disruption and led to savings in costs. The deputy head's involvement, and the existence of some surplus space in the existing buildings, also allowed flexibility for the school to remain fully operational during the course of the project without the need for temporary accommodation. Some disruption was inevitable but, given the scale of the project, it was minimised considerably by the partnering approach.

Future Plans

The new buildings have been designed to provide a foundation for the future comprehensive refurbishment and remodelling of the existing buildings. This will include completing the refurbishment of the original accommodation, demolition of some poor-quality accommodation superfluous to requirements and new-build extensions to provide linkage and a coherent overall scheme. The outcome of this next phase will be to bring the school up to twenty-first-century standards. This project has been selected as one of the first to be funded through the BSF programme. It is due to commence in 2005 with completion in 2006.

Environmental Performance

Natural-ventilation systems were incorporated into the designs for the new buildings wherever possible. The atrium is ventilated by electrically operated rooflights controlled by a weather station and building energy-management system (BEMS). Supply air to this space is provided via the surrounding ground and first-floor classrooms, the windows of which are also electrically controlled and operated, with manual override in each room. The system is programmed to open the windows for a short period during class changeover in winter, whilst in summer the internal temperatures are the controlling factor. The sports hall is ventilated by an electrically operated system of high-level opening lights and low-level vents which is not linked to the BEMS except for security.

Heating to the new areas is generally provided by underfloor systems, chosen because they can be incorporated into rooms with a high fitted-furniture content, such as laboratories, and their resistance to misuse. The heating system in the original buildings is due to be replaced as part of the future work. Building Bulletin 93: *Acoustic Design of Schools*, had not been published during the design and construction periods, but post-contract modifications have been made to achieve compliant reverberation times. This was carried out with the help of an acoustic consultant and proved surprisingly easy to achieve by the addition of strategically placed acoustic ceiling tiles.

The staff room has been refurbished with new, colour-coordinated carpets, furniture and lockers



The corridor connecting the new link block to the refurbished teaching wing is ramped to improve disabled access. Paint colours and flooring were carried through to existing areas to unify the scheme



The new classroom block is situated at the front of the school to signify a new era of building improvements

Large windows in the link block allow a view of the surrounding existing buildings



The conversion of four classrooms into two fully serviced laboratories provided the school with sufficient spaces for its projected numbers



The external area between the new classroom block and the existing performing arts building forms the main entrance route to the school

Elgar Technology College

A series of linking building projects to address increasing pupil numbers, maintenance issues and the local authority's inclusion agenda

1120 place Technology College
Worcester
1120 11-16 pupil places

Local Authority
Worcestershire

Cost of projects to date
£4.4 million

Project Managers
Vaughan Farebrother

Architects
Property Services, Worcestershire
County Council

Quantity Surveyors
James Nisbet and Partners, Bath

Structural Engineers
Clarke, Nicholls and Marcel, Cheltenham

Environmental Engineers
Property Services, Worcestershire
County Council

Planning Supervisor
Bridgewater and Coulton, Worcester

Over four years to 2004, pupil numbers at Elgar Technology College rose from 700 to 960, with a projected roll of 1120 in 2006. At the start of the building programme in 2002, the capacity of the school buildings was around 850. The clear objective of the building programme was to increase capacity to match current and projected pupil numbers.

Key areas where both teaching and non-teaching accommodation did not meet the future needs of the school were identified through the AMP process. This exercise, along with the need to kick-start a maintenance programme for all buildings, and the school's vision for a more inclusive curriculum and more closely linked departments led to the creation of a brief.

The curriculum areas identified as requiring premises refurbishment, remodelling or new building were PE, science, general teaching, music and drama, ICT and art.

Sports Facilities

The existing gymnasium was small, at only 250m². There was also a shortage of changing-room, toilet, storage and ancillary facilities. The school's aim was to enable PE to be timetabled for 150 pupils at a time. This, and the shortfall in playing field provision brought about by a tight site, meant that a new sports hall was necessary. The need for a dance studio, additional changing rooms and associated ancillary facilities was also identified.

Science

The school had a shortfall of two science laboratories. Four classrooms next to the existing laboratories were identified for remodelling, which allowed science to be in one suite of spaces. This then meant that four additional classrooms were needed.

Classrooms

With the shortfall created by remodelling and the change in pupil numbers, 16 new classrooms were required. Reorganisation stemming from the school's desire to consolidate departments in one location could also address issues of circulation between classrooms

Music and drama

The school was keen to have more control over pupil movement within this area. The existing lobby providing access to the main hall and the music and drama suite was inadequate. The existing music room was undersized and a single room was considered insufficient for projected pupil numbers. Remodelling of the existing facility in conjunction with a new extension allowed for one additional music classroom, a recording studio and a drama studio/green room.

Art

Two undersized rooms had restricted the activities that could be carried out. Extending these spaces meant a greater range of resources could be offered.

ICT

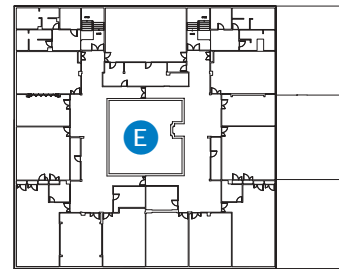
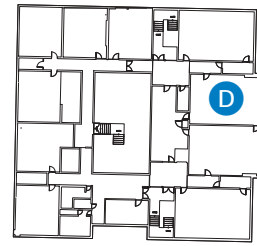
The increase in pupil numbers meant an additional centre was required for Information and Communication Technology (ICT).



Because the architect carefully considered the building materials of the existing blocks, old and new sit comfortably side by side

Plans of original buildings and site

- A** Music and drama facilities were insufficient for the projected pupil numbers and the range of activities that the school wanted to offer
- B** The gymnasium was too small, made worse by the limited outdoor space
- C** The art rooms were poorly lit and inadequate
- D** The number of laboratories was insufficient for the projected increase in pupil places
- E** More general teaching classrooms were required within distinct suites



First floor plan



Ground floor plan

'The project was jointly driven by the need for more area to take on board the increase in school numbers and the need to follow the local authority's inclusion agenda, which resulted in the creation of a resource centre for pupils with moderate learning difficulties'



Anthony James, Headteacher

Learning Resource Centre

Worcestershire County Council is undertaking a programme to relocate pupils with moderate learning difficulties (MLD) into mainstream schools. Elgar will house fourteen pupils with MLD in a centre converted from existing general teaching rooms.

Behaviour Support Unit

This unit was housed in a mobile classroom on the edge of the site, but a specialist facility integrated within the school has been identified by the school as a more appropriate way of engaging pupils. The unit is located close to the resource centre and will share some of its facilities.

External Works

An increase in car parking was necessary in order to meet future requirements. New hard play was created primarily at the rear of the site. A new courtyard was created at the main entrance to the classroom block.

Site and Existing Buildings

The school is situated to the north of Worcester city centre. The gross site area of 4.23 hectares is confined, with only one playing field and little scope for future expansion. The school is surrounded on three sides by a large area of established housing, and a canal runs along its fourth boundary. The site is relatively flat, with access from one end only, via a main estate road in close proximity to a busy transport route.

Built in the early 1970s, the buildings have a concrete-frame structure, with flat roofs and precast concrete cladding panels. Internal partitions are predominately non-load-bearing blockwork. A number of additions were made to the original school in the 1980s, including a small design and technology block and an extension to the main building to provide music and drama facilities. Both are in keeping with the existing buildings and use the same concrete-cladding system.

In 1988 a small library was built in the centre of the site. This, with a pitched aluminium roof and fair-faced blockwork, departs somewhat from the uniform appearance of the other buildings on the site. The additions to the building stock, although relatively coherent in appearance, have meant splits within teaching departments and attendant difficulties in curriculum planning. The problem is exacerbated by an absence of internal linking, with buildings connected by a series of external covered walkways.

Design Strategy

As the existing site was small for the projected pupil numbers, the option of completely relocating the school was explored. However, no sites related well to the catchment area and most had natural barriers such as busy roads or access problems. The present site was too tight to allow the alternative option of building a new school whilst operating in the existing building.

The option of remodelling the existing school was explored. The inherent advantages of this approach included the following:

- the school is ideally located within its catchment area (the majority of pupils walk to school);
- the existing buildings are clustered closely together and relate well to each other;
- the buildings are structurally sound and can be adapted without major structural alteration;
- the cost would be less than that of a new build; and
- there would be less upheaval for the pupils.

A feasibility study was undertaken to determine if the site could accommodate the scale of development required and whether such development could be realised within an acceptable time-frame. The school would not only need to continue to operate during the development, it would also have to accommodate an increase in the number of pupils on roll. It was concluded that these objectives could be achieved if the work was carefully phased to manage the impact on the school.

Locating new buildings at the front of the site allowed the opportunity to transform the image of the school, but a treatment was required that would resonate with the austerity of the existing architecture. A render system with a contemporary palette of colours was used, and the

Aerial view of school prior to building work



The render used for the new block was chosen to soften the concrete panels on existing buildings

Refurbishment has created more pleasant toilets



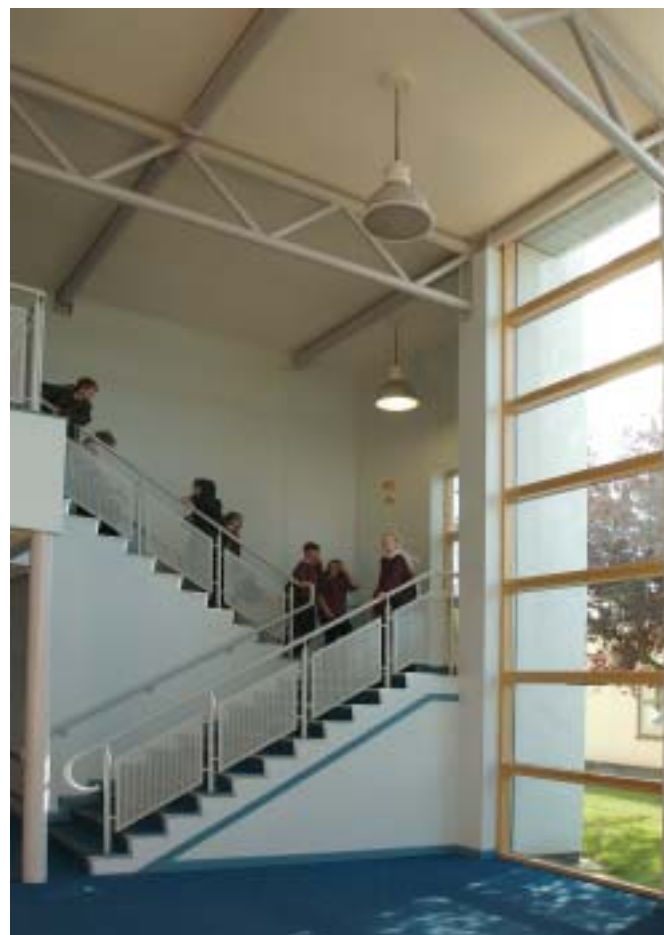
Creating a second music room allowed it to be used primarily for electronic keyboards



A second drama space and green room has been created and links to the refurbished stage, which forms the second drama space



Fitting an electronic whiteboard into the Hall has allowed larger groups to gather for presentations



Full height glazing in the stair blocks gives a feeling of space

The remodelling of four classrooms into two fully serviced laboratories has created a coherent science suite



A small seminar room allows one to one interviews

transition from existing concrete to new render is made with colours that echo the existing concrete panels. These now act as a backdrop to bolder more exuberant colours that signify a new era for the school.

Phasing and Timescale

The first increased intake of 224 pupils was in September 2002, with the school due to reach its full capacity by September 2006. The work was divided into three phases with one design team to work on all three to ensure consistency of approach. School staff were involved in the process and their views on layouts taken on board.

Phase 1: New Hard Play Area and Car Parking

The loss of formal hard play area was recognised early on, with the use of some areas for storage of building materials.

A grassed area to the rear of the site was identified as suitable for use as a games court and as an informal social area. It is isolated from the rest of the playing fields by a steep embankment and is too small on its own to be of use as a playing field. All of the existing hard play area was located at the front of the site and the school soon realised the benefit of having some of this to the rear, in terms of avoiding congestion as pupils make their way from the rear of the site (where the two teaching blocks are located) to the hard play area at the front.

The additional car parking was included in this phase because it is work of a similar nature to the hard play area. The key objective was to ensure that this work was complete before the next phase began.

Phase 2: Changes to Teaching Accommodation

The work within this phase was divided into specific areas, with set completion dates which minimised the time that areas were unavailable to the school. To avoid the risks associated with construction traffic, a separate entrance off the highway was constructed to give the contractor access to their site and compound area for phases 2 and 3.

A separate pedestrian access was required for pupils and visitors. This was particularly important in the early stages of the work when the normal pedestrian route was enclosed within the contractor's site compound.

Extension to Music and Drama Facilities

The music and drama extension is in close proximity to the school hall, one of only two spaces available for examinations. The key objective was to complete the work before the summer examinations began. On completion of this work, the contractor's boundary was reduced, opening up more areas of the site for use by the school.

New General Teaching Block

This block had to be ready for the start of the new school year, in order to accommodate the second intake of pupils, and also to compensate for the four existing classrooms which were in the process of being converted into laboratories. The location of a suite of mathematics classrooms on the ground floor, and a modern foreign languages suite above, allowed the much needed consolidation of general teaching faculties to be completed.

Converted Science Laboratories

The conversion of four existing classrooms into two science laboratories was not complete in time for the start of the new school year. Fortunately, rooms in the newly completed classroom block

accommodated some non-practical lessons temporarily.

Enabling Work for Phase 3

Before phase 3 could begin, the existing changing rooms were refurbished and a mechanical ventilation system installed. The new sports hall was to wrap around the existing changing rooms (which, as the only provision on site, needed to remain in use while the hall was built).

Phase 3: Specialist Accommodation

The specialist accommodation comprises a learning resource centre for pupils with moderate learning difficulties (MLD) and a behaviour support unit.

An area on the first floor of one of the existing teaching blocks was remodelled to create this facility. The remainder of the building was fully occupied during the early stages of the work, and the contractor had exclusive use of one of the two staircases for access to the works, with the proviso that it be kept clear for use as a means of escape. The route to this stair across the contractor's work area also had to be kept clear. Good cooperation between those involved ensured completion without incident.

Refurbishment of Toilets

These toilets are located on the same floor as the learning resource centre. However, because this work was immediately adjacent to the pupils' staircase it had to be carried out during the summer holiday. This gave the contractor unrestricted access and eliminated the risk of injury to occupants. The work was due to be completed at the end of August but overran this deadline. Outstanding work was carried out at the end of the school day.

Art Extensions

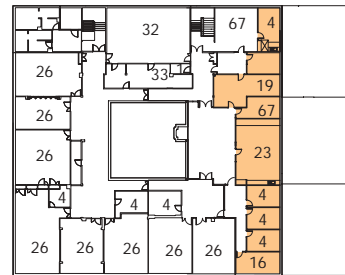
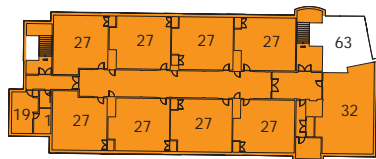
Two existing undersized art rooms were extended and a third room was refurbished.

Plans of remodelled and new buildings, showing phasing

remodelling

new build

- Phase 1: new hard play area and car parking
- Phase 2: changes to teaching accommodation
- Phase 3: specialist accommodation



First floor plans



Site and ground floor plans

'The option of rebuilding on another site and sending children by bus to another part of the area was at odds with the local authority's transport policy. The scheme allowed the school to get traffic calming in the grounds, cycle routes nearby and cycle sheds in the final phase.'



Vaughan Farebrother, School Manager

During the summer half-term, the contractor carried out minor demolition works internally and erected a new partition, enabling continued use of one room until the end of term. The programming agreed with the school was driven by a desire to ensure that students had access to clay-modelling facilities and the existing kilns for their exam work.

New Sports Hall

Earlier work to the existing changing rooms, carried out as part of phase 2, ensured continued use of the gym during the works. However, the temporary loss of both entrances required the school to formulate a strategy for the safe use of the gym during the works. Health and safety strategies were devised by the design team in consultation with the school.

Environmental Performance

Classroom Block

Heating and ventilation in each classroom is provided by fan convectors that draw fresh air in at roof level, providing guaranteed levels of ventilation. The units were made specifically for this project to provide a minimum rate of 8 litres of fresh air per second for each occupant as required by Building Bulletin 87 *Guidelines for Environmental Design in*

Schools. The units are automatically controlled via CO₂ sensors in each room, linked to a centrally controlled energy-management system. An override facility in the form of a simple wall-mounted pad ensures occupants can boost air movement and adjust temperature within set limits.

At night time, cooler outside air can be drawn in to lower room temperatures for the beginning of the following day. Although not required for ventilation, the windows can be opened if desired.

Concrete blockwork partitions with plaster finish help to achieve the required sound insulation between spaces. Sound absorption within rooms is achieved primarily by the use of suspended ceilings at ground-floor level and by a perforated steel liner tray used in conjunction with acoustic insulation as part of the roof structure at first-floor level.

Sports Hall

Underfloor heating is used throughout the sports hall with the exception of the exercise/fitness studio, which has air conditioning. The hall is naturally ventilated via motorised louvres situated at high and low level, at either end of the space. The changing rooms, showers and toilets are mechanically ventilated.

The proximity of this space to the adjacent residential boundary gave rise to concerns about break-out noise. An acoustic consultant was employed to prepare a report for the planners and give advice to the design team. Out-of-hours use for aerobics and other activities involving the use of amplified music was a primary concern.

To meet the requirements of BS 4142, an overall sound reduction of approximately 40 decibels is required. This means all windows will need to be kept closed, so air-conditioning was used. The performance of the building fabric was also upgraded, with additional insulation and mass added to the roof structure and sound-insulating glazing to windows facing the boundary.

Translucent panels at high level to both gable-ends of the hall provide diffused daylight to complement the artificial lighting within the hall, without the risk of glare or solar gain compromising the use of the space.

High-level electrically operated opening windows along the main corridor and the north face of the exercise/fitness studio provide additional natural daylight and ventilation if required.

Extending the art rooms outwards to create bigger spaces enabled new larger windows to be put in



A new sports hall will compensate for the lack of playing fields on what is a tight site

costs and references



This section summarises some of the cost implications of remodelling schools, using the case-studies and wider guidance to identify where funding is available, what costs to allow for and the options for procurement. This section also includes useful references in the form of relevant further reading and a glossary of terms used in this book.

sources of funding

Building Schools for the Future

The BSF programme aims to renew all secondary schools in England in 15 'waves' starting from 2005–06. Authorities may have projects for groups of their secondary schools in one or more than one wave, depending on the size of the authority. Funding of £6.5 billion for the first three waves has now been announced and committed.

Ministers have taken account of a wide range of issues in deciding which local authorities should be in the first waves, giving primary consideration to tackling under-achievement in areas of deprivation. Authorities have been given information on where their projects may expect to be prioritised in the overall programme. All authorities will benefit by 2011 from inclusion in the programme, or from a 'down payment' that will renew their neediest secondary school.

The Academies programme

The innovative Academies programme, launched in 2000, enables sponsors from the private, faith and voluntary sectors to replace failing schools with new all-ability secondary schools whose running costs are met by the state. The Government's target is to have 200 Academies either in development or open by the year 2010.

Delegated LEA funding

All authorities receive substantial capital funding, allocated by formula according to relative need, with which to address their local investment needs as prioritised through their AMPs. To assist with planning, the bulk of this funding is assured for three years. These funding programmes include:

- Modernisation – allocated according to relative building need;
- Basic Need – funding to support the provision of statutory school places. From 2004–5 Basic Need funding is allocated by formula. From 2006–7, it will not include post-16 provision, which will be available from a separate programme administered by the Learning and Skills Council. Extra funding will be available where there is exceptional growth in pupil numbers; and
- School Access – funding under this initiative is allocated by pupil number formula to support provision to meet the requirements of the Disability Discrimination Act 1995.

The Targeted Capital Fund

TCF is aimed at supporting worthwhile projects which meet ministerial priorities and which might not otherwise be funded. Authorities are invited to apply for funding every two years, and guidance includes ministerial priorities against which projects are appraised. This programme is to be enlarged to ensure that more exceptional funding needs can also be supported.

Devolved Formula Capital

DFC is direct funding for schools, and is allocated on a per-school and per-pupil formula. The per-pupil amount varies for primary, secondary and SEN pupils in a 1:1.5:3 ratio, roughly in line with the relative cost of providing a school place for these pupils. For LEA schools, DFC is delivered via local authorities through the Standards Fund: for other schools it is delivered from the Department.

Schools have autonomy on the use of DFC (including, from 2004–05, for ICT equipment), but are expected to invest in the priorities of the local AMP in consultation with the LEA.

Specialist Schools

A one-off capital grant for schools when they are awarded specialist status. Capital funding of £100,000 is available to improve facilities related to the specialism, and must be matched by £50,000 raised locally.

Extended Schools

Support for the provision of multiple-use school facilities that can also be used to extend the services offered to pupils, families and the wider community, and which will provide an educational benefit. This can embrace study support, breakfast clubs, childcare provision, homework clubs, family learning and adult education.

cost implications

Project funding needs to cover not only the building work required, but also contingencies, 'abnormals', fees, F&E and, in some cases, VAT. Different procurement options are available to achieve best value when considering whole-life costs

Whole-life Costs

A theoretical 'whole-life cost model' can be calculated for any design, the principle being to take the initial construction costs and add the running costs and the cost of replacement components over a reasonable 'lifetime', such as 25 to 60 years.

For instance, a temporary structure may be cheaper to build than a traditional building which has a longer lifetime, but it may be far more expensive to maintain and need to be replaced at least once in that time. In a PFI project, the PFI provider is likely to prefer a cost that may be more expensive up-front but cheaper over the longer term.

The use of discounted cash-flow techniques is recommended to compare the whole life of schemes. It can often be more economical over a 25 year period to spend slightly more capital up front in order to save maintenance costs later. To make a usable forecast, it will be necessary to take a view on the life expectancy, maintenance requirements and replacement cost of individual items and finishes. Best value will rarely be gained by selecting the cheapest initial solution.

A school's remodelling works can often take place in stages over a number of years, using funding from a number of the sources listed opposite. However, the BSF and Academies programmes will provide large enough tranches of funding to transform a school in one go, although money is being released on an area-by-area basis over a period of years. As discussed already, it is important in either event to identify a dynamic masterplan and then ensure all projects relate to this, so as to avoid misdirected or abortive work.

The BSF funding each local authority receives from the Government will be calculated to match the cost of bringing existing buildings up to standard where possible and renewing buildings where it is not.

We currently expect that up to 50% of the secondary school stock will be replaced with new buildings and around 15% will need only minor refurbishment. If your secondary school is made up of a typical variety of buildings of different ages, and with different levels of condition and suitability, you are likely to require some replacement buildings, some remodelling and some redecoration.

Contingency Sum

It is important to allow sufficient contingency margins in the costings for any project, in order to cater for unforeseeable events. The project manager will often need to make swift decisions on design changes during construction and will be hampered if a reasonable level of contingency is unavailable. For new building work, it is common to allow 3 or 4% of the tender figure for this. For refurbishment work, where there are greater risks and greater potential for unforeseeable events, it is generally acceptable to increase this to 5 or 6%.

CIRIA (see glossary) give cost advice, and they note that unforeseen problems can often lead to increased costs. Being realistic is essential at the planning stage.

Abnormals

'Abnormal elements' are a characteristic of most school-building projects. Abnormals are foreseeable, but normally beyond the control of designers and they result in additional costs, over and above the basic cost allowances for the execution of the design. The exact definition of what is considered normal or abnormal is beyond the scope of this publication, and a risk assessment will determine the likely extent of certain abnormal elements. Broadly, there are three main categories of abnormal that can be funded with the funding available.

Abnormals associated with the design of the building might include:

- asbestos removal;
- demolition of buildings that are being replaced;
- planning and conservation issues;
- temporary accommodation for decanting;
- phasing.

Abnormals associated with sites might be:

- security;
- poor access;
- site constraints;
- poor ground conditions;
- work in connection with listed buildings.

Abnormals associated with fees might also be:

- archaeological investigations;
- further site surveys, for example concerning drainage;
- a traffic impact assessment.

Most of the case-study schools in this document have encountered abnormal costs of one sort or another, and it is likely that most school-building projects will need to allow for them to a reasonable degree, over and above any contingency figure. The actual determination of the likely cost of abnormals will usually be carried out on a project-by-project basis.

	Greig Academy			Elgar Technology College			Blenheim High School			Chaucer Secondary		
	Cost (£)	Area (m ²)	Cost per m ²	Cost (£)	Area (m ²)	Cost per m ²	Cost (£)	Area (m ²)	Cost per m ²	Cost (£)	Area (m ²)	Cost per m ²
New Build/Extension	5,226,003	2,557	2,044	3,013,235	3,344	901	3,976,010	5,045	788	3,187,178	3,389	0
Refurbishment/Remodelling	3,344,361	6,138	545	530,057	1,366	388	1,593,481	4,925	324	1,321,810	4,935	0
Site Works	1,271,700			326,236			944,292			370,341		
Furniture & Equipment	536,685									332,019		
Professional Fees	789,635						603,680			787,423		
Total	11,168,384			3,869,528			7,117,463			5,998,771		
Number of Phases	4			3			4			3		
Base Date	2002			2002			1997			2001		

Costs compared (above):

This table provides cost details of the building projects to date in four of the major case studies discussed in the central section of this document. The costs

have not been adjusted in respect of either location or current price levels.

The phasing of building operations within the projects has made it difficult to adjust costs to a common base date.

The timescale involved from beginning to end can often span two or three years, and within each phase there will normally be a mixture of new build and refurbishment, together with associated site works.

Although costs are given as average figures, the range of costs in individual phases for new build and especially refurbishment can vary widely.

Type and costs of remodelling:

Building work will be either remodelling, which in this book includes redecoration, refurbishment and adaptation, or new build, whether extensions or separate buildings. The table below shows the work likely to be involved in:

- redecoration, which is likely to cost around 5-15% of new build costs;
- minor remodelling, which may cost 15-40% of new build costs if it includes new floor coverings, adding ICT cabling and outlets and some fixed furniture and equipment;
- major remodelling, which may be

40-80% of new build as it is likely to include major repairs such as completely new wiring and electrical outlets, heating systems, ceilings and windows or cladding, and some adaptation, such as removing internal walls, adding new ones and perhaps making alterations to suit extensions;

- total remodelling, which will cost at least 80% of new and as such will not normally be as cost effective as replacement, particularly if VAT is payable, but may be necessary because of conservation or planning requirements.

	Redecoration	Minor remodelling	Major remodelling	Total remodelling	Likely cost as percentage of new build cost %
Replace Roof Coverings			some	✓	5 - 10
Replace External Doors / Windows		some	✓	✓	3 - 7
Replace External Cladding				✓	15 - 20
Alterations to Internal Walls			✓	✓	5 - 10
Replace Internal Doors/Ironmongery			✓	✓	3 - 7
General Redecoration	✓	✓	✓	✓	3 - 7
Upgrade Floor Finishes	some	✓	✓	✓	3 - 7
Replace/Upgrade Ceilings		some	✓	✓	2 - 6
Replace Fixed F&E	some	some	✓	✓	3 - 7
Rewiring		some	✓	✓	5 - 10
Replace Heating System & Pipework			✓	✓	15 - 20
ICT Cabling	some	some	✓	✓	3 - 7
Possible range of cost (as percentage of new build cost)	5-15%	15-40%	40-80%	80-120%	

Phasing and Decanting

If a building project involves a significant amount of refurbishment work, and the school is required to operate normally during the construction phase, then it is quite likely that there will be some decanting of pupils into temporary accommodation.

The cost of temporary accommodation can be significant, so it is important for the contractor to schedule his work efficiently. The extent of decanting will be dependent upon various issues specific to the school, for example the work required to the existing buildings, the layout of the site and the timescale of the overall work.

Where it is possible to phase the work, the amount of temporary accommodation can be minimised, as the affected area at each phase will be relatively small. However, more phases will often mean more disruption to the school, and the external area taken up while contractors are on-site will also impact on the area available for outdoor activities. The case studies in this book have generally been remodelled in three to five phases, over the same number of years, although some have had more phases (seven or even eleven) in less time.

If a school is being extended, or where new buildings are replacing existing ones, it may be possible to accommodate pupils in the new building before refurbishing or demolishing the existing buildings.

The options appraisal (page 29) will identify the most economical approach to the problem of phasing and decanting.

Implications of Planning and Conservation

As discussed at the end of this section, if the costs of refurbishment are likely to be more than about 80% of the cost of providing the same area in new buildings, then it may be more cost-effective to build a replacement building. However, where the existing building is in a conservation area or subject to other planning restrictions, the cost of refitting the building appropriately may need to rise above the cost of new building.

As mentioned on page 14, such cost implications may in fact point to the use of the building by others instead of the school.

Fees

Fees for building professionals, whose input is vital in all but the most minor works, will generally be higher in remodelling projects because of the difficulties of designing within the constraints of existing structures and services. Funding guidance for BSF schemes, for instance, indicates that fees on new-build projects, covering all disciplines, are expected to be 12.5% of the total building costs, whereas for remodelling projects this rises to 15%.

VAT

Local education authorities can recover VAT in respect of building work at community schools, so this was not an issue for most of the case-study schools. In the Voluntary, Foundation and Independent (including Academy) sectors, however, the situation regarding VAT can be complicated. Usually, any building work in such schools will incur VAT, except in certain circumstances where local Customs and Excise officials can deem a project to be zero-rated. These circumstances can include:

- projects consisting of entirely new buildings;
- annexes to existing schools which are independent of existing buildings (for instance with a separate entrance and structure), even though they may be immediately adjacent;
- work to listed buildings;
- work exclusively to benefit people with disabilities.

Procurement Options

There are several options available for procurement. Traditional competitive arrangements tend to be used for Academies. LEAs often use partnering arrangements for all their schools. It is expected most schools will be provided by PFI or design and build via a Local Education Partnership (LEP).

Single-stage Selective Competition

This is the traditional route, with the advantage of relative cost certainty, although the design has to be well advanced before tenders are sought for a building contractor, and this can take time.

Two-stage Tendering

This involves the early selection of a contractor, and is appropriate when the school wants to start work on site before detailed information is available. The first stage should usually be competitive in terms of the price basis. In the second stage the contract price is determined. It is essential that a cost-control mechanism for use during construction is established.

Partnered Contracts

The Government is currently promoting the 'best-value' approach, and partnering contracts are becoming fairly common. Under these contracts, all stakeholders work as a unit to monitor and control the construction phase. Partnering is particularly appropriate when there is continuity of work in a particular area.

Design and Build

This route involves a relatively small number of contractors developing their own solutions and submitting tenders in response to an outline design and performance specification. The design architect will then usually be novated (linked contractually) to the successful contractor to finalise the design and oversee construction. This approach normally leads to greater cost certainty and tighter programmes, but gives the client less control over design changes during construction. The specification in the contract needs to be detailed enough to ensure all issues are identified before contracts are signed.

Private Finance Initiative

In the central Government sector, the PFI route has demonstrated that it can secure innovative approaches to procurement and achieve value for money. Early school PFI schemes were criticised for the duplication of design by competing providers, each with their own design team. The LEP model identified for the BSF programme addresses this by requiring competition based on sample schemes only, so more design time can be spent on individual projects both before and after the selection of the LEP. Contracts will continue to be of the type 'design, build, finance and operate'; this involves the various responsibilities and risks relating to the procurement and operation of a school being transferred to the private sector.

reference:

The Academies programme

Academies are publicly funded independent schools which cater for local pupils of all abilities. They replace failing schools or are new schools established in disadvantaged communities by sponsors working with partners from the local community. Their admissions policies must comply with the Admissions Code of Practice.

Asset Management Plan (AMP)

The LEA's strategic assessment to identify the building work needed in schools to address deficiencies in condition, suitability and sufficiency (see box on page 29). For guidance see www.teachernet.gov.uk/amps.

Best value

A procurement regime which takes account of other factors in addition to price, including the tendering firm's past experience and financial capacity, as well as the nature and quality of its proposed design. Both central and local government are obliged to obtain best value for their projects.

BREEAM for Schools

The Building Research Establishment's Environmental Assessment Method, which is used to assess the environmental performance of both new and existing buildings, has a version specifically for schools. It will assist in guiding a design, and should be used to assess the environmental performance of new designs in terms of management, energy use, health and well-being, pollution, transport, land use, ecology, materials and water.

Brief

A brief is a structured document produced at key points in a building project to formally identify the client's needs. A **Strategic brief** sets out the vision for the school's future and the needs and priorities of all the key stakeholders, to inform the overall masterplan of the school (see below). A **Project brief** sets out more detail for each project or phase of the masterplan.

Building Bulletins

Priced publications, available from The Stationery Office, produced by the DfES to give design guidance for a wide variety of curriculum subjects, building issues and types of school provision. Some key bulletins are listed in Further Reading.

Building Energy Management Systems (BEMS)

Also known as Energy Management Systems

or Building Management Systems, these are computer systems that use software to control energy-consuming plant and equipment, and which can monitor and report on the plant's performance. Unlike older, purpose-built systems, BEMS are reprogrammable. They can be expected to save at least 20% of the energy consumption of the plant being controlled.

Building Schools for the Future (BSF)

A government programme set up to deliver new and refurbished secondary schools over the next 15 years, using a mixture of PFI and conventional funding with private sector involvement. PFS (see below) will assist LEAs in delivering this programme.

CABE

The Commission for Architecture and the Built Environment (CABE) aims to improve the quality of the built environment. CABE Enablers are experts able to provide client-side advice on certain public projects. In May 2002 the charitable CABE Education Foundation was set up, with the aim of encouraging young people to become interested and engaged in the built environment.

Capital costs

The costs of acquiring or enhancing assets such as buildings or equipment. They can include the cost of site preparation and clearance, construction and installation, and professional fees. See also 'Whole-life costs', below.

CIC

The Construction Industry Council is the representative forum for the professional bodies, research organisations and specialist trade associations in the construction industry. Among its initiatives is the Design Quality Indicator (see below and in Further Reading).

CIRIA

Established as the Construction Industry Research and Information Association, CIRIA works to improve the performance of those in the construction and related industries. It organises projects, enables networking through workshops and conferences, and publishes best-practice guides (such as the one used as the basis of 'issues to address' on page 31).

Client design adviser

An experienced building professional (usually an architect) who works with the client and users to advise them on brief development and the appointment of the design team, and

can have an ongoing role advising the client on design quality. See box on page 25.

Control option

This is the term used in this book to describe an initial hypothetical plan for a school's remodelling, based on the most straightforward way of making the facilities suitable for future needs – borrowing the terminology of a 'control' set up in scientific experiments. The cost of this work can then be the basis on which remodelling budgets are set.

Creative Partnerships

Creative Partnerships is not a funding organisation, but aims to establish partnerships that provide schoolchildren in England with the opportunity to develop creativity in learning and to take part in high-quality cultural activities. It is funded by the Department for Culture, Media and Sport and the DfES.

Curriculum Analysis

The number and type of timetabled teaching rooms required can be calculated with the assistance of a curriculum analysis. See www.teachernet.gov.uk/amps for guidance.

Design and Build

Procurement route where the building contractor is partly or entirely responsible for design development, as well as construction. See page 91.

Design Champion

CABE (see above) has campaigned for every organisation with a responsibility for managing and delivering the built environment to appoint a Design Champion to provide leadership, promote enthusiasm and ensure that design issues are high on the agenda. In the sphere of local government, the Design Champion would ideally be an elected council member or a senior officer.

Design Council

A non-departmental Government body funded by the DTI to help to improve design in various areas including education. See www.designcouncil.org.

Design Quality Indicator (DQI)

An online tool developed by CIC (see above), which serves to evaluate design quality based on consideration of impact, build quality and functionality. Its use involves a leader who arranges access to the materials and manages the process, respondents (drawn from a range of stakeholders) who complete the DQI questionnaire, and a facilitator familiar with the use of the tool. See www.dqi.org.uk and in Further Reading.

glossary

Devolved Formula Capital (DFC)

Direct funding from the DfES to maintained schools for capital building needs. DFC is initially allocated to local education authorities, which are then required to allocate funding directly to schools using a simple formula based on the number of pupils on roll (see page 88).

DfES

Department for Education and Skills.

Exemplar Designs

The DfES commissioned eleven leading architectural practices to develop concepts and ideas for primary, secondary and all-through schools to improve the design quality of school buildings. Exemplar designs, which have been based on a DfES brief for a school of today with the ability to adapt to a school of the future, are intended to create benchmarks for well designed schools. See www.teachernet.gov.uk/exemplars.

Extended schools

An extended school is one that provides a range of activities and services, often beyond the school day, to help meet the needs of its pupils, their families and the wider community. Across the country many schools are already providing extended services, which could for example include adult education, study support, ICT facilities and community sports programmes. See www.teachernet.gov.uk/extendedschools.

Gateway review

The examination of a programme or project at critical stages to provide assurance that it can progress successfully to the next stage. Developed by OGC (below), the process is designed to lead to more effective delivery of benefits together with more predictable costs and outcomes.

joinedupdesignforschools

An initiative of the Sorrell Foundation that aims to inspire creativity in young people by involving them in design, joinedupdesignforschools joins up UK designers with school pupils as the client, to demonstrate how design and creativity can improve the quality of life and learning in schools. See www.joinedupdesignforschools.com.

Local Education Partnership (LEP)

A joint venture partnership involving the LEA, PFS and a Private Sector Partner (PSP) which may be formed to provide all the new and refurbished maintained secondary schools needed in any Authority over a given time.

Masterplan

A spatial plan which sets out feasible and agreed proposals for buildings, spaces, movement strategy and land use in a school. See page 29.

Net capacity

The statutory method for measuring the number of pupil places available in an existing maintained school in England. All schools except special schools and nursery schools will have been assessed with this new system since 2002. For information see www.dfes.gov.uk/netcapacity.

OGC

The Office of Government Commerce, an independent Office of the Treasury, focuses on improving the efficiency and effectiveness of central civil government procurement. It also promotes private sector involvement across the public sector.

Option appraisal

The assessment of various designs that may be proposed as the masterplan for a school within the agreed budget. Steps in an option appraisal are discussed in detail in *Finding the Right Solution: a Guide to Option Appraisal*, available from www.teachernet.gov.uk/amps.

PFS

PFS (Partnership for Schools) is a non-departmental government body funded by the DfES to assist LEAs in providing new and refurbished secondary schools in the BSF programme (above). See www.p4s.org.uk.

RIBA

The Royal Institute of British Architects. A professional organisation dedicated to advancing architecture and promoting excellence in the profession through lectures, events, work in schools, projects and the annual Stirling Prize. RIBA's recommended design stages are a common way of classifying the phases of a building project.

School Works

Core-funded by the DfES, School Works collaborates with a range of partners to explore how existing resources can be used in different ways to create beautiful places designed to raise educational achievement and support lifelong learning in local communities.

Sustainability

The DfES actively supports schools in teaching about and working to the principles of sustainable development. The Sustainable Development Action Plan for Education and

Skills was launched in 2003 (see www.dfes.gov.uk/sd), and in November 2004 the Framework for Sustainable Development for Schools was launched. This is a web-based resource promoting sustainability in all schools and combines information on the environmental management of schools with curriculum resources to produce a non-prescriptive whole-school approach to sustainable development. A variety of resources are available to help schools with issues such as energy, water efficiency and sustainable school travel. See www.teachernet.gov.uk/sd.

Targeted Capital Funding

A Government fund directed towards educational priorities that might not otherwise be supported. Up to £5 million is available to individual LEAs per three-year funding round (see page 88).

Value Engineering

A methodology, also called value analysis or value management, which can be applied to large-scale projects in any sector. A value-management study brings together a team from many disciplines who own a project and work under a facilitator to an established set of procedures designed to reduce costs and maintain or improve performance and quality requirements.

Whole-life, or life-cycle, costs

The full cost of a building over its life, usually taken as 25 years, including the initial capital costs and later running, replacement and repair costs. See page 89.

14 to 19 agenda

The Government strategy to reform learning for 14- to 19-year-olds, including an increased emphasis on personalised learning, the quality of the vocational offer and learning about the world of work. The strategy was published in *14–19: opportunity and excellence* in 2003.

4ps

4ps (Public Private Partnerships Programme), the local government procurement expert body, was established in 1996 and offers comprehensive procurement support to local authorities, including hands-on project support, gateway reviews, skills development and guidance in the form of procurement packs, case studies and extranets. See www.4ps.co.uk.

reference:

A Guide for School Governors: Developing School Buildings

This Royal Institute of British Architects (RIBA) guide looks at school building projects from the client's perspective, offering a handy introduction to architectural issues for those inexperienced in this field. The emphasis throughout is on understanding the architectural process in order to be an informed client and a good steward of public monies entrusted to your care.

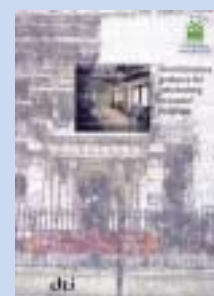
Available from RIBA Policy and International Relations, 66 Portland Place, London W1N 4AD, price £6.50 inclusive of postage and packing. Make cheques payable to RIBA and quote reference WS/GFG. Alternatively, a free download in Adobe Acrobat format is available at 195.171.22.22/site1/cas/FinalGfG.qxd.pdf.



Good practice guidance for refurbishing occupied buildings

Based on interviews with experts who have worked on refurbishment in different sectors, this book describes good practice principles for key issues such as project planning, collaboration and communication, health and safety, security and avoiding nuisance to occupants that come up again and again when occupied buildings are refurbished. Useful advice is provided for all stages of work, with the aim of helping projects to run as smoothly as possible.

Available from www.ciria.org/acatalog/C621.html, £40 plus p&p.



Being Involved in School Design

A CABE (Commission for Architecture and the Built Environment) collection of case studies and guidance on how to involve school communities in the design process. Contains sections relevant to funders, local authorities and design teams as well as to the school communities themselves.

Available free in Adobe Acrobat format from www.cabe.org.uk/publications/.



CIC Design Quality Indicator Online

Developed by the Construction Industry Council (CIC) in association with CABE among other sponsoring bodies, Design Quality Indicator (DQI) is a structured tool using input provided by all parties to a building project to assess the project's success in meeting client needs. DQI is effective from briefing stage right through to when the project is fully occupied and in use. This publication provides a full explanation of DQI and is illustrated by case studies, including one from a London school.

Available free in Adobe Acrobat format from dqi.org.uk/reception/library/DQIonline.pdf.



Sport England Guidance Notes

A variety of Sport England publications are of great value and interest to those involved in the provision of sporting and community facilities as part of a school refurbishment project. Attention is particularly drawn to Access for Disabled People; Sports Halls: Design; Sports Halls: Sizes and Layouts and Village and Community Halls.

All these publications are available free in Adobe Acrobat format from www.sportengland.org/index/get_resources/resource_downloads.htm, under the Design and Technical guidelines heading.



further reading

Building Bulletin 87: Guidelines for Environmental Design in Schools

Information on the evolving standards for various aspects of schools environmental design is available at www.teachernet.gov.uk/energy. The most recently updated version of the above can be downloaded free here in Adobe Acrobat format. Other Building Bulletins relevant to schools include nos. 80, 81, 86 and 89, dealing respectively with Science, Design and Technology, Music and Art accommodation in secondary schools. These can all be bought from www.tso.co.uk/bookshop/bookstore.asp. The ISBNs are 0112710395 (BB80), 0112709176 (BB81), 0112710026 (BB86) and 0112710298 (BB89). Also in this series are:



Building Bulletin 93: Acoustic Design of Schools

Intended to encourage a structured approach to acoustic design throughout the planning and design process, the various sections of this publication are available free in Adobe Acrobat format from www.teachernet.gov.uk/acoustics. It explains the scope of the Building regulations and how they apply to schools in this context, and sets the standard of acoustic performance for new school buildings. Among others, there are sections dealing in detail with noise control, sound insulation and design for hearing-impaired pupils. The bulletin is illustrated with 10 case studies from schools.



Building Bulletin 98: Briefing Framework for Secondary School Projects

Available free in Microsoft Word format at www.teachernet.gov.uk/docbank/index.cfm?id=6381, this is in part an update of Building Bulletin 82: *Area Guidelines for Schools* and gives guidelines for the area to be provided in both school buildings of various kinds and external facilities such as sports pitches and games courts. However, its scope is much wider than the provision of this essential information, as it also provides a detailed guide to the creation of a brief and the design criteria to be applied when planning new or remodelled school buildings and facilities.



Managing School Facilities Guide no. 7 Furniture and Equipment

This document offers a step by step guide to the processes necessary when buying F & E. It is intended as a 'dip in' guide with a comprehensive index. As the document progresses, so does the level of detail. Thus, Sections 1-5 cover the buying process, Appendix A covers quality and aesthetics, B looks at case studies and C gives useful references. Available from www.tso.co.uk/bookshop/bookstore.asp, ISBN 0112710921, £13.95 plus p&p.



Improving Security in Schools

Security of vulnerable pupils and valuable school property and buildings needs to be taken into account during all stages of planning. This guide illustrates various aspects of improving the security of a school site and installations and protecting the safety of pupils and staff.

Single copies available free to schools from DFEE, PO Box 6927, London E3 3NZ. Otherwise £6.95 plus p&p from <http://www.tso.co.uk/bookshop/bookstore.asp>, ISBN 0112709168.



