

Achieving Design Quality in Fire and Rescue Service Buildings



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“Many people speak of good quality as if it were made up of good workmanship and good materials alone: but without good design it is impossible to make the most of these qualities. Good design, indeed, is an essential part of a standard of quality...”

We can learn something of the meaning of good design by considering what it is NOT. To clear away one elementary misconception, let me say that good design is not precious, arty or highfalutin’.”

Sir Gordon Russell, *‘What is Good Design?’*, Design 1
Design Council, London 1949

Foreword

The general perception of fire stations tends to be one of large bay doors, usually red and usually closed. Few people would say that fire stations are inviting places.

But just as the role of the Fire and Rescue Service is changing to meet the challenges of the 21st century, so too does the role of fire stations need to change and with it the public's perception.

There has been greater emphasis over recent years on the Fire and Rescue Service becoming more involved in and open to the communities they serve. Today, the Fire and Rescue Service is required by law to engage with communities on fire prevention work. They also run other initiatives like those for young firefighters and work in partnership with other services on issues like crime prevention.

Since 2000 all Fire and Rescue Service Private Finance Initiative projects have had to comply with the Government's 'Better Public Buildings' initiative. The aim has been to achieve high-quality design in all new public buildings. It is based on the premise that good design in the public sector enhances the environment and the community, revitalises cities and neighbourhoods, results in buildings that work well and retain a human dimension, and makes the delivery of services easier and more efficient. All Fire and Rescue Service building projects should work towards these aspirations.

This means that good design is just as important for Fire and Rescue Service buildings as for any other public building. It is essential that the buildings themselves do not work against what the Service is trying to achieve by presenting a daunting or intimidating aspect. And herein lies the challenge for all Fire and Rescue Authorities. The more Fire Stations are located within the community, the more likely they are to be subject to the unwanted attention of vandals and others. A balance has to be found between the need for operational security and the need to encourage greater dialogue with the community.

This guidance outlines to Fire and Rescue Authorities how good design works for everyone, it is inclusive and results in places where the diverse workforce can carry out their everyday activities equally and confidently.

The Guide also seeks to establish how strong environmental credentials can be embedded into a building's design from the outset at a time when we recognise the need to mitigate the effects of climate change.

The aim of this guidance is not to differentiate between what is good and what is bad design but to ensure that projects have in place the necessary conditions for achieving good design. There have been some very successful public buildings built in recent years and some innovative Fire and Rescue Service buildings. I look forward to seeing more of them in the future.

Parmjit Dhanda

Parliamentary Under Secretary of State
Communities and Local Government

Chief Fire Officers Association Endorsement

The Fire and Rescue Service is going through a period of unprecedented change. To meet the challenges this presents, the Service is finding new and innovative ways of working. Providing the facilities to work effectively in our communities and the right working environment for our staff, who are our most valuable asset, has to be an important part of achieving our objectives. Modern fire stations must meet the needs of a more diverse workforce, more closely reflecting the communities we serve. Our buildings also need to facilitate our interaction with the public and enable us to work more effectively with other public services and partners. Consequently they need to reflect a Fire and Rescue Service that is approachable and which exists to help protect and meet the needs of the community. New fire stations should be built on a 'human' scale, they need to be able to incorporate new technology and equipment and help the Service play its part in protecting the environment. These are wide ranging objectives but I believe this guidance is an important contribution in helping us take this forward.

Steve McGuirk

President of the Chief Fire Officers Association

1 Summary



The Fire Service occupies many fine buildings. This one at Euston was built in 1902.

The Fire and Rescue Service (FRS) needs well designed buildings in the right locations in order to perform its functions, fulfil its responsibilities and bring the Service into the 21st Century and beyond. Many older buildings, while perhaps no longer serving functional needs adequately, are civic buildings of distinction by good architects. The Service should continue the tradition of seeking the best that design can offer. Without suitable buildings, performance and service will suffer and, at the same time, costs will be higher than necessary.

To achieve best value a building should:

- make good use of the right site for Fire and Rescue Authorities, public and community needs
- provide and enhance good urban and public realm design both within and beyond the site boundaries
- be functionally and operationally efficient throughout their life
- provide good working conditions for fire fighters and other staff
- provide for community access and use and/or be able to accommodate other public services as appropriate
- be easy and cost effective to build, maintain and adapt
- be sustainable with minimal environmental impact – e.g. achieve high BREEAM¹ rating ('good' or 'excellent')
- meet all statutory requirements and regulations such as DDA² and
- be a pleasure to use, visit and observe.

1 Building Research Establishment Environmental Assessment Method – BREEAM

2 Disability Discrimination Act – DDA



Northmoor Community Fire Station

Why good design matters

Quality determines that buildings will stand the test of time as well as fulfil current requirements. Good design is not merely a matter of style or opinion. Without it a building may suffer from functional limitations, convey a poor or inappropriate image of the organisation, be expensive to run, made of materials that need replacement sooner than they should or cost a lot to repair. A well designed building can provide a comfortable and efficient place to work, a building for users and the public to enjoy and be proud of and one that can be adapted to inevitable changes over a long and effective life. Quality matters in the smallest details, from the architraves and the handles on the lockers, to the major elements of a building. A well-designed building provides good value for money over its whole life.

Ultimate responsibility for achieving well-designed, effective FRS buildings lies with Fire and Rescue Authorities and Chief Fire Officers (CFOs), so the messages in this guide are for them as well as the project teams charged with delivering the accommodation.

“Design depends on a meaningful and sustained dialogue between designers and clients, users and communities.”

Scottish Executive *A policy on architecture for Scotland, 2001*

Well designed FRS premises contribute to:

- effective incident prevention and operational response
- adaptability and flexibility for operational and organisational change
- training facilities that can respond to new problems as they arise
- operational cost efficiency
- recruitment and retention of high quality, committed staff
- increased visibility and public access leading to better prevention of incidents
- more effective community engagement
- increased public confidence and a community service image; and
- a good return on investment and responsible use of public funds.

The shift in emphasis to prevention of fires introduces a changed role for the FRS in the community to which their buildings must respond. FRS buildings have a complex role to fulfil. They have to accommodate a number of highly specialised facilities for firefighters, and for storage and maintenance of equipment and vehicles. They also house more routine activities, such as offices and staff amenities which should be designed to the best contemporary standards found in other building types.



De la Warr Pavilion, Bexhill Sussex. A high quality building will continue to find new uses, as well as inspire affection and respect, many many decades after it was built.

Buildings that embrace the community should be welcoming in approach and aspect, well sited, and with attractive, suitable internal spaces effectively separated from the secure operational areas of the building and site. FRS buildings need up to date technology and special security for some areas as well as encouraging interaction with the community. They must also meet the aspirations of public buildings for sustainability and value. They must be more than merely 'good enough'; they need to be of high quality design that will provide best value to the FRS and their communities over time. In addition, FRS services may need to co-locate with other public services such as police, ambulance or local authority services, with similar requirements for location and access. Such opportunities and challenges should be taken into account from the start of a project.

Attaining a well designed project

To meet all these needs is a challenge. The distinction between a functional building providing whole life value for money, achieved to time and budget, and one displaying a “degree of innovation, imagination, and/or stimulus providing some aesthetic pleasure and enhancing the corporate image”³ is not simply achieved by employing a well known or *avant-garde* designer. It is a matter of team work started well before any design or implementation group has been selected.

Important actions that will help achieve the necessary design quality:

- have the right internal team and client project manager and use a robust project management system;
- consult fully, and understand user and other stakeholder needs
- recognise the messages about the FRS that the building conveys and aim to be in the forefront of innovative service provision
- allocate sufficient funds and other resources, especially time
- realise that most value is added – or lost – by decisions made at the start
- embed sustainability throughout – it is not an add-on
- choose a design and implementation team capable of carrying out the work well
- think carefully before making changes once any stage is signed off – the brief, the concept design and the detailed design – late changes cost more
- ask for feedback – ask users what they think of both existing and new facilities; and
- set clear design criteria and ensure that proposals meet them.

To achieve all these things in the right balance, projects need the commitment, vision and support of FRAs, elected Members, Chief Fire Officers, Senior Officers/Managers and station managers. The design and project team cannot provide a really good building without good support from the top.

³ as described in the 4ps procurement pack due to be published in 2007

2 The role of this document

Who this document is for?

Chief Fire Officers, Fire and Rescue Authorities (FRAs), senior officer managers, station managers, and their Design Champions⁴ need to understand the significance of good design, what it consists of, and their own role in ensuring that their teams get the benefit of well designed premises. Their main tasks are summarised in the preceding section. It is also important that others such as advisors and bidders/contractors have an understanding of what FRAs are trying to achieve and the processes involved.

Every project is different – there is no universal ‘best’ design – but there are processes that can help to achieve high quality. For Private Finance Initiative (PFI) and similar PPP projects, the 4ps procurement pack sets down important rules and advice for ensuring that major building projects are well planned and carried out. This document supplements that guidance and is also relevant to smaller or more traditionally run projects where PFI processes are not used. It aims to help ensure that the need for projects with high design quality is understood and accepted, especially by those with control of resources. It also seeks to clarify what is involved, and when, in order to achieve the desired results. Project teams and stakeholders are encouraged to consider the procurement pack in detail.

The document sits alongside others relating to the procurement of FRS buildings and is consistent with the policy objectives of Planning Policy Statement 1: Delivering Sustainable Development (PPS1). The focus here is on design **quality**: what it depends on and how to achieve it. This document is not a ‘design guide’ in the traditional sense – it does not set down detailed information about design requirements in each relevant type of building. It sets out the preconditions for achieving high quality and best value when the design process is undertaken.

FRS buildings vary from small rural retained premises to urban fire stations, large headquarters and major training facilities. This document generally describes projects in terms of new buildings, often large complex projects, but its principles apply to small and refurbishment projects too. It covers material relevant to all projects, including buildings procured through PFI (which are required to comply with the Better Public Buildings initiative). It is inevitable that only some parts are relevant to smaller projects and refurbishments. Whatever their size and function, the success of new or renovated buildings depends on an intelligent and determined client, a powerful vision, the right brief and a skilled designer.

The guide has been prepared in consultation with Communities and Local Government, the Commission for Architecture and the Built Environment (CABE), and corporate staff from fire and rescue authorities in different areas of England. This guidance should be read in conjunction with the 4ps Procurement Pack for Fire and Police PFI/PPP projects.

⁴ Design champions are members of the organisation who help support the ultimate goal of good design – see page 29, Government policy is that each FRA should assign design champions to building projects of significance.



The symbolism of the Fire and Rescue service is always reassuring

Project teams, and their professional advisors will each find different aspects of this document relevant at different stages in the project depending on their role, their previous experience and whether the project is large or small, new or refurbishment. The document is targeted at both PFI and other capital build projects. Their cost patterns and out-turns will be different and this should be taken into account when using the document.

Is a building project needed?

This document is intended to help the FRS achieve good design in building projects. However it should not be assumed that a new building, or even renovation of an existing one, is needed. Problems may in some cases be solved by other means such as changes in management patterns, reassessing use patterns in existing buildings, rearrangement of furniture or purchase of new items of equipment. Where the need for an FRS presence in a new location is identified, consideration may be given to temporary provision in association with other services, or, especially in rural areas, provision of a community function with subsidiary FRS content. Many of the issues discussed below can be helpful in considering whether a building project will be better than some alternative approach.

The main messages

The main messages in this document focus on the early part of a project and have been emphasised in many discussions on achieving high quality design. The important thing is to use these messages from the start and throughout the project, and ensure that all those with a part to play take them seriously. The messages are that:

- good design embraces much more than operational efficiency and sound construction. It must consider costs and flexibility, the range of stakeholders and their needs, the short and long term and is fundamental to best value
- the whole site matters, not just the building: landscaping, fitting into the urban context, perceived and real safety, and connections to access routes for pedestrians and vehicles
- early decisions both create and constrain later opportunities and must be based on good information – feasibility and option appraisal studies are essential
- time, resources and expert advice are needed, especially in the early stages
- a well considered brief – aspirational, strategic and detailed – is fundamental to success; it evolves into more detail over time and should have inputs from a wide range of stakeholders
- design can be used to convey positive messages to the community and failure to take this into account may lead to inappropriate messages being transmitted
- feedback from experience on other FRS projects and review of other completed buildings will help avoid unnecessary mistakes
- all stakeholders must be involved, including representatives of the local community
- the planning authority's local requirements must be understood from the beginning; and
- the procurement methods must suit the project – different approaches or emphasis will be needed, for example, for small versus large projects, for renovation versus new build, for stand alone versus shared premises.

3 Attaining high quality design

Meeting changing operational needs of the FRS

A new building always seems a great improvement on an out-of-date, tired or inappropriate one, but beware of accepting designs that merely improve the operational functionality rather than creating a high quality, robust, environmentally friendly, community focused, future-ready environment. The FRS PFI programme exists in the context of the Government's aims both for the 'modernisation' of the FRS and to create 'Better Public Buildings', and provides an opportunity to rethink design in the light of new needs. All of this effort takes place in a construction context of new construction technologies, working techniques and procurement methods such as PFI and PPP, which are still evolving. These latter procurement strategies introduce unfamiliar and sometimes complex requirements into projects, which are covered in the 4ps guidance. Here the emphasis is on those aspects of the project that have the most influence on design quality.

The changes that are currently taking place in the FRS emphasise that it will always be necessary to be prepared for future changes to which buildings must respond.



Gallery Oldham entrance – a building that has been planned for future adaptability and built as an integral part of a regeneration scheme

Why good design is important

A well designed FRS building is one that:

- makes good use of the right site for operational, public and community needs
- considers its impact both within and beyond the site boundaries
- is functionally and operationally efficient throughout its life
- has training facilities that can respond to new problems, demands and expectations as they arise
- provides good working conditions for firefighters and other staff
- provides for community access and use and/or is able to accommodate other public services as appropriate
- is easy and cost effective to build, maintain and adapt
- is sustainable with minimal environmental impact – eg achieves high Building Research Establishment Environmental Assessment Method (BREEAM) rating ('excellent' or at least 'good')
- meets all statutory requirements and regulations such as those of the Disability Discrimination Act; and
- provides a 'motivational' workplace and is a pleasure to use, visit and observe.

These characteristics will help achieve efficient operations through appropriate access, spaces, adjacencies and materials. Good design aims for cost effective construction, maintenance and adaptability which are of prime importance in achieving whole life value for money. The right design can also encourage public confidence in the Service, assist in the development of public awareness of fire prevention in particular and community safety in general.

A strong client representative or project sponsor is essential

A building has many stakeholders including the funders, the users and the public. Someone on the client side within the FRS, a client representative, must take responsibility for how it turns out. The client representative is the person closest to the project – the Senior Responsible User⁵ – who controls the budget, and has the best idea of the overall requirements the building must meet. Often these responsibilities are divided among many different people but, to achieve a well designed building, a single individual must have ultimate responsibility. This person need not be involved on a day-to-day basis with the project, but must have the interest, information and authority to support or challenge important decisions, signing off each stage and maintaining the momentum towards the goal of a well designed building.

To be successful and achieve high quality the client representative must:

- have and keep a vision;
- understand the benefits of good design;
- be credible to all stakeholders;
- appoint the right team including someone with time to handle the project without distraction from other responsibilities;
- be able to step in and redirect the project if it seems to be going awry; and
- recognise the importance of communicating to all parties involved.

“Isolating the value added by good design is not necessarily simple”

CABE, June 2006, The Cost of Bad Design

5 From the Prince II project management methodology.

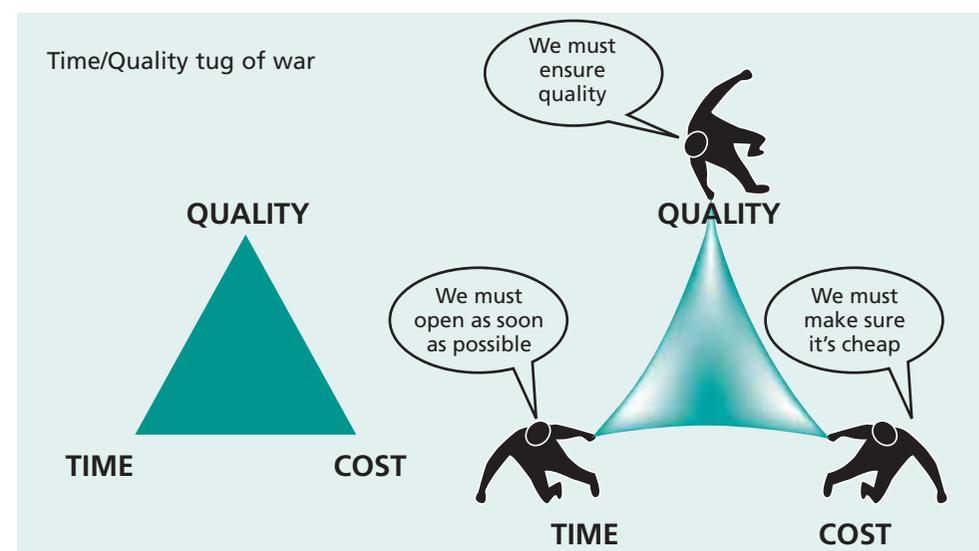
Lifetime best value is the goal

Money spent on design quality – for example, by taking more time to consider different design options or using better quality products or finishes – is usually assumed to be in conflict with meeting a tight budget or time-scale. But time and cost need not be jeopardised, provided design quality is considered from the very start. This becomes even clearer when the long view is taken. The extra cost that might be involved in developing a better design is usually a very small part of the cost of design time, and a minor part of the construction cost. Together these represent only a tiny fraction of the overall cost of the building over its life, and if properly targeted, can enable savings to be achieved in that longer time span. For example they can lead to reduced maintenance costs, improved efficiency of the operations, better prevention of fires and other emergency incidents through communication with the public, or the recruitment and retention of the best staff. A building that is a pleasure to work in will not only mean that good staff can be recruited and will stay but also that they will be motivated to work more effectively. The FRS will gain great benefits from this over the life of the building, which will well repay extra initial costs to achieve high quality.

Assessing design quality

It is relatively easy to assess time and cost. Design quality, on the other hand, may appear to be a matter of personal opinion. However many aspects of design quality can be measured using tools that provide objective information. The issue is not simply what 'looks pretty' but

how a particular combination of design decisions affect, for example, function, maintenance and adaptability. Quality is defined and can be assessed in several ways. Examples are the Design Quality Indicator (DQI), design reviews and systematic feedback on previous projects. These are used to inform the process from the start and avoid repeating mistakes. Whatever method is used, do it early on. There is far more opportunity to add value to a project at the early stages. As decisions are taken the options are narrowed down and opportunities for a better project may be lost.

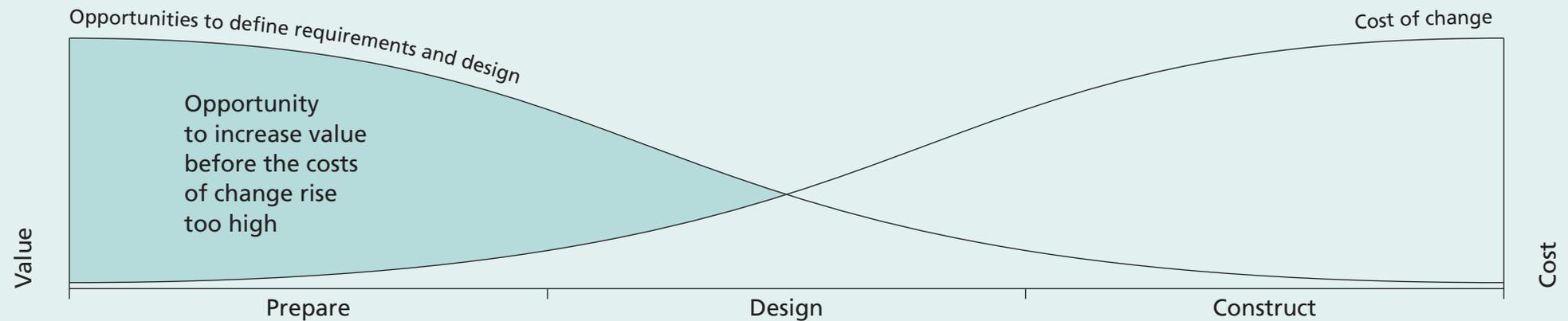


Source: CABE

“The ratios relating finance, capital cost, facilities management costs and business operating costsdiffer between building types (but) it is always true that staff costs will be an order of magnitude greater than facilities ownership and operating costs. The basic message is that facilities should support occupier performance and that minimum cost facilities may not do that.”

Richard Saxon, *Be Valuable – A guide to creating value in the built environment* (published by Constructing Excellence)

As time passes it is harder to change things without incurring great cost.



Source: CABE

The DQI

The DQI is a tool created with government support and managed by the Construction Industry Council (CIC) to help stakeholders to consider the wide range of factors that go towards a well designed building. All FRS PFI projects supported by Communities and Local Government funding are required to use this process which has identified three main strands that contribute to quality:

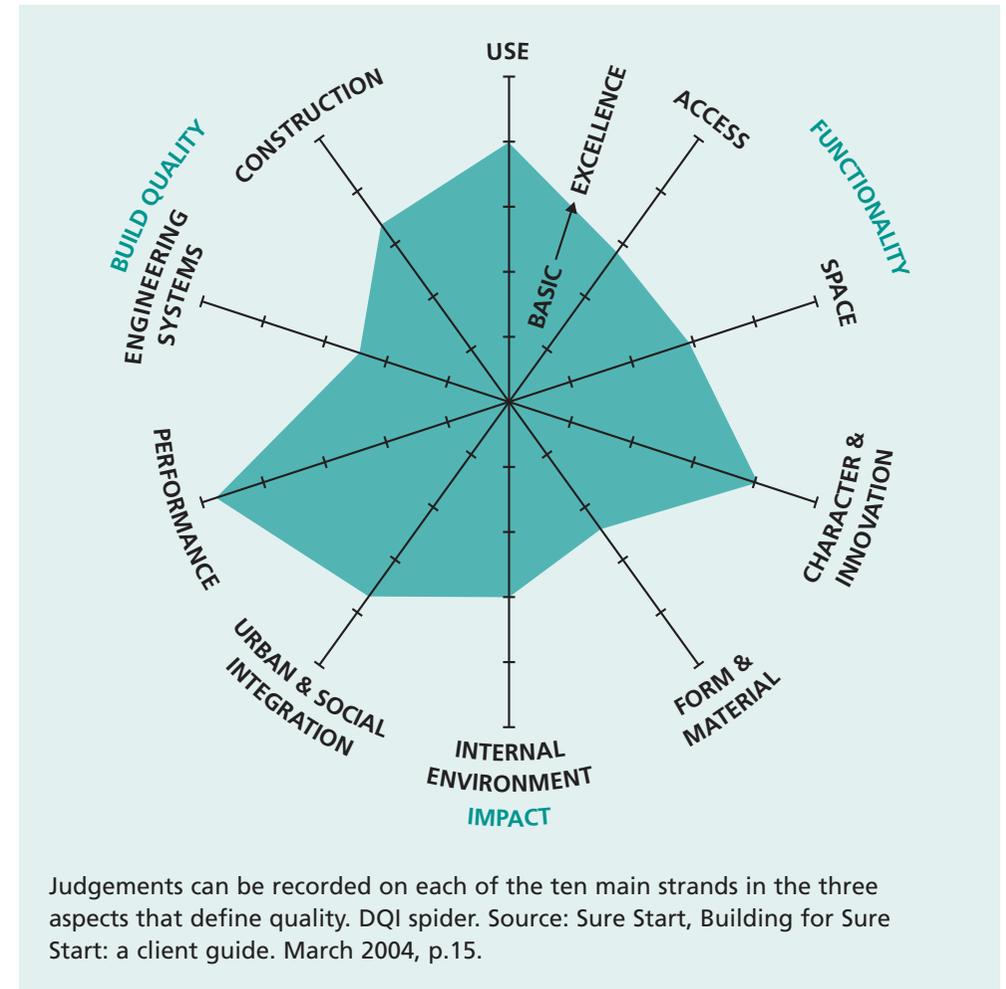
- functionality – how well the building meets all user and stakeholder requirements
- build quality – the soundness of construction and engineering systems for long term robustness and sustainability; and
- impact – overall character and how it feels to use and experience the building in its context.

The tool has now been used on several hundred buildings and has been demonstrated to play a useful role. It is intended to be used at each key stage, from initial concept to post-occupation evaluation:

- to help define and clearly articulate design objectives in the brief
- to review design throughout the process – through design and construction; and
- when the building is finished, for project and user feedback.

The DQI is a simple questionnaire that can be used by the many people involved: funders, users, architects, designers, builders and other stakeholders. It allows them, from inception to completion and occupation, to assess and appraise design outcomes, including construction quality. Using accredited facilitators should be seriously considered. They can help project teams and their stakeholders to manage the DQI assessment, process and analyse the results and compare different views. Their involvement ensures that best use is made of the process and ensures that agreed objectives are created and pursued. Contact information for facilitators can be obtained from the CIC (www.cic.org.uk).

At the very beginning of a project, the DQI helps to establish shared concepts and a shared vocabulary for the project team and stakeholders. It can help setting the parameters by which the building should be judged – essential in establishing what is meant by design and quality. This is when high aspirations can be captured and translated into information to be used by the design team. It can form a good basis for developing a 'design quality statement' that expresses the shared priorities and aspirations for all the important aspects of the project. Following the first DQI review, these agreed priorities and values can be used as an evaluation tool by the project team in considering proposals from bidders. This approach will give an objective basis to otherwise subjective criteria and can be used in debriefing and in the defence of any challenge by unsuccessful bidders.



The Design Quality Indicator

The DQI consists of about 100 simple questions clustered under ten headings, which are divided into three groups. Under each heading, about ten statements, with which you can agree or disagree on a scale of one to five, define aspects of what the building could be like.

The weight and importance allocated to the various issues depend on the priorities for each particular project.

A Impact

- 1 Character and innovation
- 2 Form and materials
- 3 Internal environment
- 4 Urban and social integration

These refer to whether the building will create a sense of place and have a positive effect on the local community and environment, and to its potential impact on the arts of building and architecture.

B Build quality

- 5 Performance
- 6 Engineering systems
- 7 Construction

These relate to the performance of a building, such as structural stability and the integration, safety and robustness of the systems, finishes and fittings.

C Functionality

- 8 Use
- 9 Access
- 10 Space

These assess whether the building is designed to be useful and allow the required functions to be carried out smoothly and to evolve over time. They are used to evaluate the arrangement, quality and interrelationship of spaces with function in mind.

More information about DQI can be found through the Construction Industry Council, which developed the tool with the support of CABE and others See www.dqi.org.uk.

Design Review

Design review is carried out on some major public projects by CABE⁶. Various local authorities and government departments, as well as some design firms, have established their own design review panels and processes. Such reviews should ideally take place as soon as designs have started to take shape. The focus is on the full range of design issues, not simply on aesthetics. The review involves an explanation of the design and the rationale that has led to the specific proposals being considered, followed by a critique by a group of experienced designers and users. The dialogue that takes place during design review can be followed up to improve the design. If this process is carried out at an early stage, it allows beneficial design modifications at minimal cost to the project; sufficient time, however, must be added into the procurement timetable to facilitate the process.

“Day in the life”

A helpful technique for reviewing how well a design concept or detailed design will work is to consider a ‘day in the life’ of a user. Think through the places and sequence of activities that different users – an office worker, a fire-fighter, a cleaner, representative members of the community – will go through from first approaching the building to carrying out their designated role and leaving afterwards. Ask questions to test how it would feel to be a user such as: How would you feel if you were an elderly member of the public coming to get a free smoke alarm and information about how to use it? How would you feel on your first day in the building if you were the only woman firefighter on a watch? Does the building convey confidence in the Service as you pass by?

DQI facilitation event



⁶ Projects are selected for CABE reviews on the basis of their significance for example in relation to scale, use, site.

Planning the long-term use of the FRA/FRS estate

Every building is part of the overall estate of the FRA or region and its design brief will be influenced by overall needs and by what has been achieved or omitted in earlier projects. FRAs need to develop and maintain strategies for their entire estate. Asset management is an important part of best value and high quality service provision overall. It is fundamental to achieving quality, operational efficiency and enhanced public confidence with each building project. Decisions about prioritising what is needed, where and when, should be based on the long-term plan for managing and developing the whole estate. These decisions then define individual projects. This long-term view helps safeguard against changes in objectives or personnel that often occur over the long gestation of many projects.

The keys to successful estate planning are similar to those for creating excellent buildings. Although the process uses some different skills and expertise, it requires the same amount of dedication, determination and commitment to quality.

For strategic planning of an entire estate, good information must be available about the existing stock. A property database is considered in Communities and Local Government planning guidance on asset management as a critical success factor. A comprehensive approach to the information required in such a database is needed in order to promote design excellence in its widest interpretation.

The database should include:

- where buildings are
- their size and space efficiency (gross internal, net internal and net usable areas and ratios – see glossary)
- what they are being used for and how well they are utilised
- their age, condition and history
- their capacity and that of their sites
- their maintenance and running costs
- accessibility – for vehicles, pedestrians, people with disabilities
- sustainability – energy efficiency, overall environmental impact, and role to improve economic and social conditions of the area
- inherent possibilities and values in alternative uses.

“Asset management aims to ensure that local authorities have the right space, at the right time, in the right place and at the right cost so as properly to support their strategic corporate and service goals and objectives. It is a vital process for identifying property implications of corporate and service needs and then ensuring their delivery to support the achievement of successful corporate and service outcomes”

RICS, Nov 2004, *Asset management in Local Government: Guidelines in Outline, ODPM*

Some of this information may be readily available, but it is likely that some specific research will be needed to obtain it all. The information is important to ensure that all buildings are as effective and useful as possible and the database should be kept up to date. It will then help effective asset management and in formulating the business case for any new project. Formal evaluation should be undertaken on existing buildings and completed projects, which will give an invaluable understanding of how to provide the best buildings for FRS needs.

It should be noted that the concept of the estate or asset must also take into account that, increasingly, the Service is engaging with local communities who may use their buildings, and sharing premises with other emergency services or different services. The impact these changes will have on asset management should be carefully considered.

Buildings that meet community fire and emergency safety objectives

The emphasis on engaging with the community means that traditional ideas about FRS buildings must be reconsidered. While there is now a statutory requirement to engage with the community on fire prevention, not all fire stations will need community facilities, but there is still a need to consider how it appears in respect of its surroundings and approachability by members of the public.

The buildings must:

- meet the specific needs of the Service;
- take into account how the public will perceive the building and, through it, the character of their local FRS;
- maintain operational safety and security at the same time as creating welcoming public access;
- have funds to manage and maintain public/community spaces.

This shift of perspective demands more than identifying what the Service wishes to communicate about community safety, fire prevention, and how that may be dealt with through, for example, shared use of some spaces. It also requires seeing the site and the building from the point of view of an individual wholly un-involved with the Service and in some cases considering the community's 'stake' in the building as defining its character. This increases the importance of including community representative stakeholders.

A good community building should be both welcoming in the way it looks and is sited – using devices such as clear and well positioned signage, hard and soft landscaping to help movement patterns, orientation – and the way it fits into the neighbourhood. It must also be demonstrably accessible to all. It should solve the need to separate public access and use from the secure areas of the building and the site without creating feelings of exclusion. It should communicate the important messages of community safety and fire prevention directly, not only relying on, for example, provision of leaflets or free smoke alarms. Use of display screens, or glazed areas allowing views of the fire appliances, can attract the interest of the community and provide them with a sense of security knowing that the service is ready for action.

Differentiating areas with colour – red for operational, blue for community areas



Multifunctional spaces for use by the community as well as station staff need to be carefully located



The design process should consider which community activities can be incorporated on the site. Stations in Cheshire, Tyne and Wear, London, Birmingham and many others are demonstrating possibilities and providing community space that is heavily used by a broad cross section of community users. Many ideas are being tried – for example:

- Young Firefighters Association training schemes
- meetings for local groups – Primary Care Trust, joint services consultations, youth services, tenant associations
- information and communications technology satellites eg for local further education colleges and training groups
- parking facilities for a village
- delivery of community safety and fire prevention messages and equipment
- performance spaces and art display opportunities; and
- cash-points and remote access to local authority services in entrance lobbies.



Meetings for a wide range of community organisations can be well catered for – particularly welcome in rural areas with few high quality public spaces.

There has always been the potential for the Service to share premises with other services such as the police or ambulance. Suitable sites for shared premises will be needed and will have to be carefully assessed for the needs of each user. In shared projects, whether new build or in existing premises, it is essential for the objectives to be clear, and mechanisms to assist cooperation throughout the project are needed. The challenge for designers to make the best possible environment is greater under these more complex circumstances.

The necessity for sustainable design

There is increasing awareness of the need for social, economic and environmental sustainability. Goals for sustainability have to be set high. This places an obligation on clients and their designers to ensure that environmentally friendly buildings place minimal pressure on resources by avoiding excessive energy use, waste, pollution, (including greenhouse gas emissions), and resource depletion, (eg water use), while making the best possible long term contribution to the local environment and community.

The Building Research Establishment Environmental Assessment Method (BREEAM) considers a range of issues by which to evaluate construction sustainability. A full assessment can only be provided by certified assessors, however, a checklist for estimating a BREEAM score is available from the BRE.

The categories to review include:

- construction management – to reduce waste and pollution
- health and well being of occupants – including provision of daylight and energy efficient lighting, measures for thermal comfort, air quality and noise control
- energy efficiency – CO₂ emissions, sub-metering, sensor control of lighting
- transport – awareness of travel consequences and provision for cyclists
- water – economy of use, leak detection, reuse of grey water
- materials – use of responsibly sourced construction materials and finishes with low embodied energy
- land use – monitoring of, and minimal negative impact on, local ecology; and
- pollution – minimal pollutant emissions and maximum control.



Solar Panels, Richmond Fire Station



Use of natural non-toxic materials



Energy saving and fitting with the natural surroundings

The goal of achieving an 'excellent' BREEAM rating should always be considered in the budget and the brief. Additional construction costs may sometimes be required to reach this level over the cost of 'good' or a mere pass but these may be offset by future savings in running and maintenance costs. The many ways in which the design of buildings contributes to sustainability must be considered in the brief. As well as the detailed issues raised in the BREEAM assessment, other considerations include:

- Can the building orientation be exploited to help in providing views and managing heat gains and losses?
- Does the site offer potential for geothermal techniques using land or water mass for heat management?
- Have green roofs and other benefits of landscaping been considered, particularly in relation to parking areas?
- Have alternative energy sources such as photovoltaic cells, solar panels, wind turbines, combined heat and power, etc been considered? Is energy conservation being attended to in the vehicle bays?
- Has the Authority maximised the opportunities for funding or grant by adopting alternative energy provision?
- Is attention being paid to water management, reduction of waste, collection and recycling of grey water wherever possible, bearing in mind the specific problems associated with washing fire appliances and equipment?
- Is appropriate solar shading being used?
- Have reuse and recycling been considered and provided for after, as well as during, construction?
- Is pollution from toxic wastes, exhaust fumes and other sources being controlled?
- Has development of a user manual been considered to describe measures taken and assist in making best use of sustainable features?

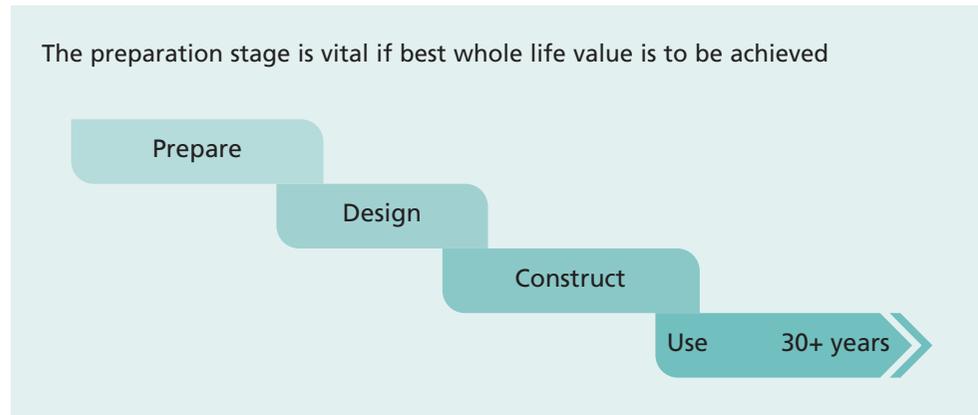


Environmentally friendly techniques should all be explored. Green roofs are one of many options. Seminar II building, Olympia State College, Washington State USA

4 Good preparation is needed for a good project

Project stages

At its simplest a project can be thought of as going through four broad stages: preparation, design, construction, and use.



Projects may not follow the simple pattern of the diagram. Integrated processes such as PFI aim to bring design and construction thinking together as early as possible, for maximum understanding, good joint working and the opportunity to create the most cost-effective and buildable designs.

For any project, whatever the procurement options chosen, the activities in the table below are the responsibility of the commissioning client representative.

Essential client activities

Prepare

- Define aims/objectives
- Set up client team
- Set out business case
- Visit other projects
- Consult stakeholders
- Prepare outline brief
- Initiate DQI process
- For PFI, commission a reference scheme from a first class designer
- Arrange site appraisals
- Arrange feasibility studies, option appraisals
- Appoint designer/ implementation team – for PFI, select short-list of bidders and issue Invitation to Competitive Dialogue

Design

EARLY DESIGN STAGE

- Contribute to developing detailed brief
- Agree sketch concepts
- Check that approvals have been considered and are likely

DETAILED DESIGN STAGE

- Check that developed design is suitable (in terms of quality, cost and time)
- Ensure permissions are obtained
- Select constructors if not already part of the selected implementation team
- Plan fit-out and move
- Fix construction costs prior to contract signature

Construct

- Hand over site to contractor
- Visit site, with permission
- Demonstrate progress to the stakeholders, users, community
- Finalise fit-out and commissioning
- Implement decant plans

Use

- Welcome the users
- Train and / or inform the users in any new systems (security, lighting and heating controls etc)
- Let the building 'settle down'
- Carry out evaluation and feedback

Help with carrying out these tasks can be sought from client advisors – the Royal Institute of British Architects (RIBA) maintains a list of suitable practitioners – and ultimately from the project design team, who must be carefully chosen.

Preparation is where effort is needed most

It is at the first stage, preparation, that the most value can be added. It is in the early part of a project that the project team can make the most positive impact, (or, through inadequate experience, time or resource, make the most damaging mistakes). It is at this stage that the foundations are laid for future success. If the brief, the process and the resources are all properly established, the project has the best chance of achieving or exceeding expectations – the mark of a successful project.

This stage is crucial and must lead to the right brief and selection of the best design and construction teams. While design is carried out during the bidding stage in PFI projects the client's project team must make it clear that without high quality design, an otherwise cost effective project bid cannot be awarded the contract. These issues should be described in either the Pre-Qualification Questionnaire or the Invitation to Submit Outline Solutions.⁷ The main characteristics of a high quality FRS building are set out in the summary and the quality questions in section 5 of this document should be reviewed before starting and throughout this preparation stage.

The key concepts and design principles should be established at the start and, in the case of PFI, worked through with a reference scheme. Poor decisions or omissions early on in the client's thinking can lead to disasters. New ideas and changes of direction are costly or even impossible once design is well underway – and even more so once construction has started.

A building that is too large, too small, non-functional or unadaptable is likely to be one where:

- the brief was not well researched; or
- the brief was poorly communicated; or
- goals were not agreed; or
- goals were changed during the project; or
- stakeholders were not effectively consulted.

⁷ See the Procurement Pack for more details

Problems with finished buildings are often the result of not giving enough time at the beginning to collecting, understanding and communicating information. The extended gestation period for some projects means that some features may be overtaken by events, so the brief must make this possibility clear and request appropriate adaptability – an important feature of good design. The reasons behind the requirements in the brief must be set down for the design and construction team to understand, together with how these relate to the way the estate strategy supports the objectives of the Service. This will ensure that, if the context changes, the project can respond more effectively. Where late changes in the brief or the design seem essential, there will be consequences to time and cost which must be evaluated and explained and for which support from the highest level must be obtained. **If this happens, resist the tendency to try to recoup any of the added cost through reduced design quality.**

The following sections describe crucial tasks that the client must carry out early on, regardless of the procurement method, to help achieve a functional, high performance and inspiring building.

State the vision and agree objectives

A short, memorable and inspiring statement of the project vision should underpin the project objectives and the brief. The vision must remain clear and relevant as the project develops. It should be a constant point of reference for the client and the implementation teams, so that the design concepts and details can be related to it. It should be used to communicate with all the stakeholders so that they can relate their needs to the overall concept for the building and see how they fit in and contribute positively to the process. Eventually, it can appear on the invitation to the opening of the new building.

VISION STATEMENT – Promoting Community Safety, enhancing service delivery, improving efficiency and effectiveness

A project may have a number of objectives, which should be prioritised, costed and agreed by the Project Board, the Project Team and other relevant stakeholders. They should be recorded, referred to regularly, amended only if essential, and used as the basis for project development and establishing evaluation criteria. They will contain, as a minimum, an indication of:

- the main activities to be accommodated
- the design priorities to be considered; and
- the desired image to be projected, such as ‘efficient’, ‘friendly’, ‘community based’.

Confused or unclear objectives are frequently a source of dissatisfaction with the outcome of a project, particularly in rapidly changing organisational and operational environments.

Select the project team

Whatever the size of a project, there are a number of important roles to fill. Many people will play distinct parts in large projects, carrying out specific tasks or supporting the project over a long period. In smaller projects, one person may take on several of these tasks. Roles and responsibilities need to be clearly defined and each person's accountability must be understood and accepted. The appointment of the right team is critical to the success of the project and the client must be aware of the importance of each role and the type of person needed to fill it. The following sections cover these roles, some of which are referred to in Part 2 of the 4ps procurement pack.

Project board

A project board may be drawn from the main stakeholders to support the project. This board needs to meet and agree the project direction as it evolves. It must be able to review the project at critical stages and raise any concerns and requirements. For a large project, the board will be formally constituted, meet regularly and include people not directly concerned with the development of the project. For a small one, it may be less formal and consist entirely of people on the project team. Support from the Fire and Rescue Authority (FRA) is needed. An FRA representative on the project board can be an excellent way of securing that support.

Client team structure

Source: Office of Government Commerce, 2003, *Achieving Excellence in Construction 2 – Project Organisation – roles and responsibilities*, OGC, London

Key roles under an integrated procurement route



Project Director

Arguably the most important appointment, it is important that the project director is given the delegated authority to 'do the deal'. The project director will be responsible for directing, leading and managing the project team overall, and must have sufficient time to deliver the project, recognising the complexities and time consuming nature of many aspects of a project.

Project owner

Each project should also have a project owner – ideally this should be the Chief Officer or Assistant Chief Officer with overall responsibility for the service. The project owner will have overall responsibility for a successful outcome, and should be someone that can broker relationships with external stakeholders, and have a good understanding of the business issues associated with the project.

The internal project leader

This role goes by different names in different organisations, but is most generally known as project manager. An internal project leader needs to balance and manage all aspects of the project to achieve its objectives. An independent professional project manager may be brought in as part of the client team, especially for large projects, but an internal project leader with suitable skills, support and time to spend on the project is still needed. The project leader needs to:

- understand the overall objectives of the project and policy context;
- understand the value of good design and recognise when good decisions have been reached;
- identify what makes good and bad FRS buildings;
- know what is needed in detail for FRS operations;
- be able to win support from the Fire and Rescue Authority;
- ensure the right criteria are used to select the design team;
- know when design champions (required on large projects) should use their influence;

- lead, motivate and use the skills of the team;
- communicate well, inside and outside the organisation;
- work within budgets; and
- understand value and risk for the construction project and how to relate these to the FRA's integrated risk management plans.

A user-client

Someone must speak on behalf of functional user needs. The user client should:

- be an experienced fire officer, with broad experience of operational areas and community safety;
- have the knowledge and authority to decide between 'needs' and 'wants';
- have regular involvement throughout briefing and design stages;
- have adequate time – availability may be needed over a long period. Full-time involvement will be needed for a large project; and
- plan and manage formal opportunities for exchange of information with the wider user groups, organise communication and check that all parties understand the context and reasons for decision.

It is often helpful to form a panel of representatives of users and this may be helped by early use of the DQI process to develop the initial priorities for the brief. Such a group can remain involved and ensure that the way the building can support operations is communicated in both directions.

A design champion

A design champion needs authority and the knowledge base to be able to convince people of the importance of quality and inspire the appointed project designers to maximum creative input. It may be necessary to exert authority to protect quality when time, budget or inertia threatens it. The design champion appointed for the project must have enough time to carry out the role. The client and the whole team must see this champion as equally relevant to the project as the finance and purchasing lead, or the property specialist. The champion should be responsible to the organisation that benefits from the project and may be part of the project board.

It is essential to appoint someone other than the project leader as design champion to avoid potentially conflicting priorities. While someone with building experience has the advantage of being familiar with the construction process and of understanding drawings; a design champion with experience unrelated to property or construction can add new perspectives and enrich the project. To judge the likely outcome of different design approaches, even a property professional may sometimes need special training and assistance.

The project design champion needs to attend key meetings and communicate regularly with the team throughout the project. He or she should be available from the earliest preparation stage to scrutinise documents, play a role in consultant selection – helping to devise the criteria as well as participate in interviews and visits – and examine design proposals, always questioning whether appropriate quality is being achieved.

Independent client advisors

Design advice should be provided by members of the design team as the project develops. However, additional support and advice may be valuable, especially if the internal project personnel have no professional training or experience in design or construction. Independent advice should come from a professional with appropriate experience and with no other stake in the project, for example, from a member of the RIBA register of Client Design Advisors (CDA). The internal project leader should question and understand fully the reasons for advice given by any advisor, to be sure that the advisor really appreciates the functional needs of the project. Landscape advice may be useful to suggest how to enhance people's experience of the building in its context.

A design advisor is particularly useful at the early stages and can help:

- a less experienced design champion, project leader or client leader to discover the best ways to get quality;
- the project leader to check that the brief is complete and clearly communicated; and
- the client team choose the right designer, for example by devising the interview questions on quality and a scoring system for the selection of the implementation team.

Preliminary studies

Feasibility studies and option appraisals, a business plan, funding and procurement proposals are all needed at an early stage and underpin the strategic brief. These are described in more detail in the 4ps procurement pack. Some of these will have been carried out before an internal project team has been created, others will be the responsibility of that team. In all cases, the entire team must be aware of the rationale and constraints behind the project and must be committed to revisiting these to ensure that they are still relevant and that their objectives are being met. The strategic requirements on which they are based must be clear in all requests for design concepts. The existing policy objectives and

the FRAs Integrated Risk Management Plans, accommodation strategy, and any Regional Management Board Strategy must be incorporated in these preliminary studies and appraisals. The public transport routes should be reviewed at this stage to ensure that there is adequate community accessibility and a Green Travel Plan should be prepared.

Consult stakeholders

This must start early and continue so that information about plans and progress is communicated. The political and local contexts are important. Consultation must cover users, the local community, representative organisations and the regional management board and national FRS.

Understand the local planning context

The Local Authority will have a strategic plan or local development frameworks and various specific requirements for any site. Their views and requirements should be well understood before a commitment is made to a particular direction. If there will be great difficulty, within these constraints, in achieving the desired accommodation on the site, it is better to revise the site or the project requirements before embarking on the design stage. These issues need to be resolved at the feasibility and consultation stage and help may be needed from specialists in urban planning. For PFI projects, all land and planning issues need to be resolved at the Outline Business Case stage.

Visit other buildings, FRS and others

Visits to completed buildings, made with in-house team members and other user representatives and possibly accompanied by an independent design advisor are an important part of creating a good final outcome. Some should be FRS buildings but there are relatively few appropriate new FRS buildings and so visits to other types of well designed buildings are also needed, which can help demonstrate ideas that have not yet found expression in FRS projects. The operational aspects of the building are only a small part of what needs to be understood and communicated about good design. These visits can offer new or better ideas than had been generated hitherto, or may show examples of unforeseen pitfalls. Above all, they will help to create a shared understanding of what is felt to be good or less successful design and why, so that these ideas can be more clearly expressed in the brief. It is useful to have building plans available, to ensure that these can be related to impressions of the building. A formal assessment checklist (such as the DQI) will help to establish and compare people's views and make it possible to create specific briefing statements that will help lead to high quality design. A photographic record of these visits will be helpful to the proposed design team(s).

“Taking time to look at other recently completed Community Fire Stations with key stakeholders in our project such as our staff, has been extremely beneficial. You have to accept that the needs of different communities vary, however we have found examples of good practice and innovative design, such as the approach to a training facility at St Albans Community Fire Station, (see section 4) as well as identifying some ideas that worked better on paper than in practice”

Simon McMillan – Gloucester FRS



Meeting regulations and guidance

Compliance with all existing technical guidance including the 4ps procurement pack for the Fire and Rescue Service and Police and its standard output specifications, and all national and local regulations is a legal obligation and therefore essential. Such compliance should be specifically requested, but it is the responsibility of the design team to understand and fulfil available guidance and current regulations. However, strict compliance is not always enough. The requirement to create good design must always accompany the need to meet regulation. For example, although inclusivity and accessibility is a vital part of FRS buildings, especially with the increased focus on community use and communication, the requirements of the Disability Discrimination Act (DDA) for inclusive access, especially in an existing building, can result in a proliferation of ramps, rails and moving platforms. The design of these is critically important, especially at the main entrance. They should not look like an afterthought or a concession to the law. Provision of community facilities at ground level is one possible solution to general design of such facilities.

The different ways in which sustainability criteria may be considered has been discussed above. The same design rigour is required here and may offer opportunities for justified emphasis and interest.

Uses of natural lighting



Designer selection – criteria

Towards the end of the preparation period, the implementation team must be selected. This is probably the most critical decision relating to design quality and the process must be thorough and well informed. For large projects it can be lengthy and should be planned well in advance. For a PFI project the design team is likely to be part of the contractor's offering, in other situations the choice of contractor is also important. Other consultants may be selected individually, or a multidisciplinary team may be brought together by the design or design and build team. A competitive process may be used to select consultants for a 'framework' or partnering arrangement for several projects, or for a specific project.

Where appropriate the project leader must ensure that the process for choosing the external team members is clear, well understood and agreed by the client team.

The selection should consider the following:

- relevant track record for design quality – though not necessarily experience in FRS buildings
- how to balance quality against cost – the value of greater skills, experience or capabilities of external specialist advisors may outweigh the higher costs of using them
- a set of pre-qualification criteria should be drawn up prior to advertising for interest or inviting possible teams
- the project team will be working with the implementation team for a considerable period and must feel that a comfortable working relationship will be possible – for example will the people being interviewed be on the design team? – Will they change over time?
- the same people should interview and judge all candidates, to ensure consistency

Holland Park School – a proposal for a flexible, dynamic, landmark building



Design of ramps needs care

- buildings designed or built by the short-listed teams or candidates should be visited
- the interviewed teams should identify other projects that they consider to be well designed
- previous clients and users of these buildings should be asked for their views of the process and the finished project
- the offices of the short-listed candidates should be visited
- an ability to listen to the client's needs and respond with flair is essential; and
- financial stability and an ability to work on the required scale should be demonstrated.

The evaluation method must be agreed and laid down at the outset. For instance, are scores arrived at independently and then averaged, or are they arrived at through discussion and consensus? Weighting quality against cost can still present problems. For example does the lowest cost automatically get the maximum score available for this element, even if it may actually appear somewhat unrealistic? How much is the possible score reduced if the cost difference is large rather than small? The DQI tool or other systematic assessment methods can be incorporated into this process.

Design and briefing issues to resolve

The early preparation stage is when strategic issues about the use of the building MUST be resolved. These should not be left dormant and therefore ambiguous till design is well underway. Leaving them to a later stage will be likely to involve costly adjustments. Examples of a few such issues are given below.

- 1 The site – there is considerable pressure for activities on an FRS site – vehicle movement, training – but landscaping still plays a role (planting, ground surfaces for routes) in a number of ways e.g. defining areas directing traffic/pedestrians, leading the eye etc.



- 2 Open plan offices – who should have enclosed offices and why? Is this likely to change in the future? What are the standards and best practice approaches to open plan office design? How much storage will be needed and where? Are they designed to be a motivational work area?



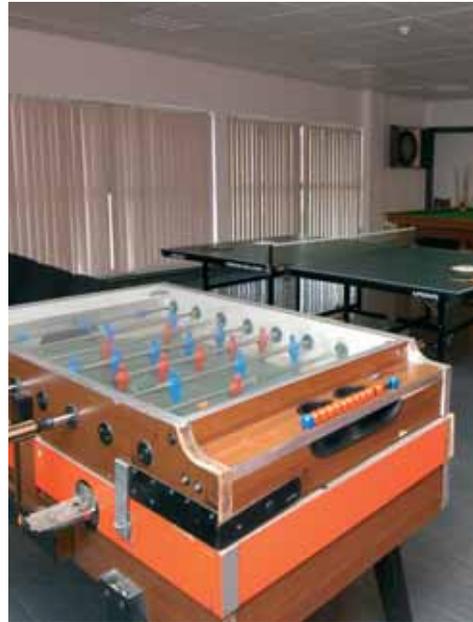
- 3 The 'wakeful watch' – In specifying the design on the basis of the use of the building, a clear decision needs to be taken over whether sleeping/private study resting accommodation will be provided.

FRAs need to ask why should sleeping accommodation be provided in a fire station? How does this make the FRS look to the public? Will it be a cost effective use of space with shift patterns and gender balance change in future? What other options are there? The use specification needs to be based on business need, including an assessment of equality and diversity impact and health and safety.

- 4 Lockers – What is the best design for lockers? How permanent should they be? Is a unisex locker room taken for granted? How should sanitary provision be managed here?
- 5 Hierarchy – What, if any, personnel hierarchy should be reflected in the design of offices, rest space, amenities with the accompanying loss of flexibility?



6 Amenities and recreation – Will the recreation facilities anticipated create the best image of how firefighters spend their time? Have a thorough examination of all such resources and the frequency of their use been undertaken? How often are they used? Could better use be made of the space it fills? FRAs need to think about what recreation space/facilities they supply. They should have a strategy on work/rest balance, fitness and the cost of including additional space.



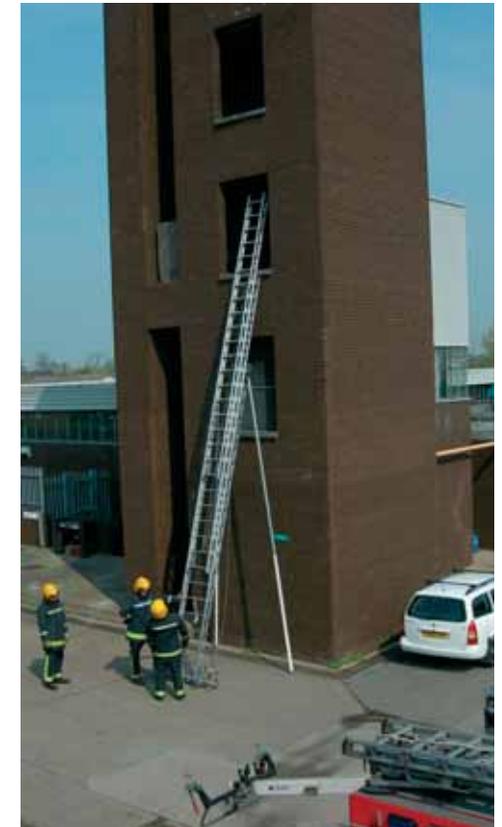
7 Diversity – Have all the appropriate design issues related to gender, disability and ethnicity been considered? Are facilities and amenities suitable for varied proportions of male and female users over time? Will provision be made for a quiet room, prayer room or other specialised facilities? Is there to be provision for infant changing and feeding in community spaces?

8 Security and public access – How is public access and community use reconciled with operational integrity and security? What facilities will be available for public use? Will these be shared by the operations teams? How is the public being welcomed? What is the image presented?

Will functions be removed from, or added to, the building in the current project as the functional split between fire stations, HQs and national level alters over time? What mobility is required for any temporary, associated facilities? The estate planning considerations should cover regional needs and consider such issues as the location and design of retained fire stations.

9 Links with other services – What impact will this have on design requirements?

10 What specialised fire fighting requirements need to be specified in detail eg training towers?



The Design stage

With the basic decisions about going ahead accepted, the procurement route, site, and budget agreed, all the client team on board, and the outline brief understood, the project can be further developed.

The detailed brief and a schematic response

Whether the detailed brief is prepared before or after choosing the implementation team depends on the procurement route chosen. Buildings always need to adapt to changes as the organisation evolves new methods, new alliances and new structures. The brief should include consideration of likely trends and request the designers to indicate how such potential changes could be accommodated.

Input should come from the main stakeholders, user representatives with operational and facilities management knowledge and the project team. The brief should be tested to ensure it covers everything, for example by considering how different users with specific objectives or tasks to carry out will move through the site and the building.

Early design work will raise issues that can inform the brief and it will normally take several iterations to reach a fully detailed brief and a concept that can be successfully developed into the final design, as proposals are reviewed and amended. By working together at this stage, the design team and the client can build up a shared understanding of opportunities for the project. Joint development of the detailed brief should be specified as the way in which the selected team will be expected to work, and both parties should make allowances for the time, cost and personnel this will require. For PFI schemes, this process should only take place with the designers of the reference scheme, which should be as fully developed as possible.

Monitor and evaluate quality

Specification of design quality starts at the briefing stage and assessing quality starts at sketch design stage, reviewing:

- spatial diagrams for the site as a whole;
- adjacency diagrams for the functions within the building;
- a three-dimensional vision of the building bulk, style, appearance; and
- indication of the impact on, and relationship to, neighbours.

The DQI process (see section 3) should be used to consider whether the design meets the vision, and whether the specific elements and qualities asked for in the brief have been provided. Qualitative aspects, including interior space, natural and artificial light, volume, visibility and finishes, should be assessed.

It is always helpful to carry out a formal review of designs based on agreed criteria for success, so a checklist of questions covering the original aspirations and objectives will be needed. This can supplement the DQI process.

“Question your own needs, the processes, the way things have always been done/stored – is this still the best, or habit?”

Kim Gleinster – Wiltshire

A design review should look at:

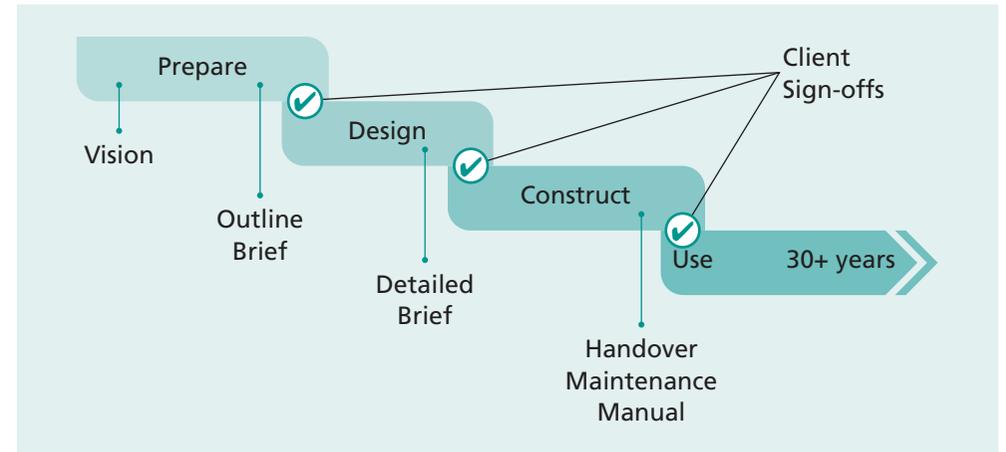
- the site, the project context and its contribution to the local area
- aesthetics, image
- handling of enclosure of external and internal space
- potential for off-site fabrication, use of standard materials and achieving economic and efficient construction
- health and safety risks likely to arise on site
- access for everyone of all abilities
- landscaping and building orientation
- how well the organisation will be able to function in the building
- site planning and car parking provision
- how the building and site will look in various conditions of light and weather
- adaptability, suitability for different uses, future proofing
- access to natural light, management of air quality and temperature
- control of noise nuisance internally and with respect to neighbours
- planning and adequacy of storage and 'back-of-house' areas
- suitability and maintainability of materials
- spatial efficiency, including circulation and security
- ease of running and managing the building and its equipment;
- how well the parts of the building or open space relate to each other
- integration of mechanical and electrical solutions within the design process
- green travel plans; and
- sustainability/ energy efficiency proposals.

(This is not an exhaustive list but indicates the main concerns that should be reviewed).

More details can be found in CABE's 'Design Review' (2006).

Sign off each important stage

The client team, and for large projects the senior client representative, must thoroughly check each stage in the design process before signing it off. There are no short cuts here. Every aspect of the vision, the objectives and the brief must be reviewed to ensure that the quality of the design and the solutions proposed are appropriate. The DQI can be used to help make judgements in the context of the priorities originally established.



Source: CABE



Fitting out the appliance bay

Fit out

Planning for occupation should start very early during the design phase by considering in detail how the building will be used, creating room data sheets and room layout plans, and arranging for installation of furniture and equipment. This may seem premature, but it will help the designers reach the most appropriate solution. The input of facilities management practitioners should be used at this stage, to ensure that the ease of running and maintaining the building is kept to the forefront of everyone's mind. Specialised equipment or materials may need to be ordered well in advance. Sustainability and manageability all need to be considered alongside the broader concepts to deliver a desirable building fit for a long and useful life.

Using an artist on the design team to advise on appropriate choices for any art works to be incorporated can enhance the building. A building which contributes to the neighbourhood by adding features that can be appreciated by all can enhance public confidence and acceptance.

Fitting out can start as soon as the construction work allows, but is often handled as a separate phase of work after handover and may be planned by a different design team. A working group, representing the different user groups, should be involved in decisions about layouts and furniture, before the process of selecting and purchasing items begins. A period for delivery, installation and decant must be built into the timetable.

Construction

The client is less involved during construction than during other stages. However this is when large sums of money are spent so everyone needs to be comfortable with what is being built. During this period the main responsibilities of the client are to manage the contract it has awarded. This involves ensuring that:

- funds are in place and available as required;
- the plan of works meets the timetable for the operations that will use the completed building;
- the programme does not disrupt those who work in the vicinity during the contract period; and
- construction progress is monitored to ensure the contract requirements are met.

Site visits should be undertaken regularly and users and other stakeholders should be kept informed of construction progress, including any changes. During this phase, skill sets and expertise different to that in previous phases will be needed and consequently an additional or different project manager/team may be needed.

The handover is a formal occasion that marks when the builders move out and leave the building to the users. The building should only be accepted if it meets the required standards as originally agreed. The systems in the building will need to have been thoroughly commissioned to ensure that they work as intended. This applies both to the building systems, such as heating and ventilation, and to the specialist user systems, including IT. Small imperfections can be corrected in the first weeks of occupation. Users should be made aware of this and their support enlisted to ensure that problems are noted and dealt with as soon as possible.



Construction of Northmoor Fire Station, Tyne and Wear

It is nearly always necessary to spend time, sometimes several seasons, fine-tuning services systems such as heating, ventilation, lighting, plumbing, security and specialist features until they meet the required operational standards. The more straightforward the service systems are, the easier it is to get them working to their design standards. The better the Mechanical and Electrical (M&E) services design is integrated with the building design, the better the building is commissioned and the more swiftly it meets appropriate operating standards.

The final design drawings are sometimes not a completely accurate representation of what was built. Any changes made during construction should be recorded and a full set of 'as built' drawings of what was actually built should be prepared for the client's files. The building manual, a final iteration of the brief, and the health and safety file must be given to the client as part of the handover.

As the construction project comes to an end, people will be able to start using the building. If it is well-designed it should meet their needs and exceed their expectations.



Use

Move-in can only take place once the fit-out and commissioning is complete. Information should be provided for all users about any new systems that may have been installed, and about the site and neighbourhood, if it is new to them. Decant specialists may be helpful at this stage.

Evaluation and feedback

At the end of every project a period of assessment is needed as a basic part of achieving quality. An immediate post project review can assess the effectiveness of the process and how far the brief has been met as a first stage. Feedback that reviews how well the building actually meets the needs and expectations of users and whether it is performing as promised, should take place a bit later – say two years after occupation, and regularly thereafter. Many feedback techniques exist, some general and others for very specific elements such as for energy use or the DQI for quality. Whatever approach is used, it should be carried out formally and the results should be acted on as appropriate and fed in to future projects. The feedback should consider the facilities management issues, and the response of the community to and their use of the building, as well as operational issues. Acting on findings from a feedback process can often enhance the quality of the project simply and quickly. Also, a detailed post project review can ensure that in future projects the best elements are repeated and the same mistakes are not made time and time again.

A true test of the success of the project is how far it improves the ways in which the FRS can work with the community, assist in reducing fire and other incidents and respond effectively to those that take place.

5 Quality questions

The following questions should be considered very early in the project. It should be possible to answer most of them before the project has been through the whole of the “Preparation” stage. This will help ensure that the project context, the brief and the designs are clear and based on sound foundations, so that as the project progresses, the outcome delivers the quality needed and gives the FRS best value from the project. It is not enough merely to achieve a cleaner, smarter version of what is here today – what is needed are buildings that will support the FRS in moving confidently to the future with a new agenda and a commitment to providing public value from the money being spent.

Objectives

- What are the objectives and the ‘vision’ for this project?
- Do they reach beyond the FRS today and into the future?
- Does the vision send an inspiring message to the community?
- Who ‘owns’ and will support this vision?
- Does the vision both capture the imagination and reflect functional needs?
- Does the vision incorporate sustainability, inclusive design and life-time value?
- Has the vision been developed into a design quality statement’?

Stakeholders

- Is there a list of stakeholder contacts?
- Has information about their main concerns been collected and recorded?
- Have these been incorporated into the brief?
- Has a process for interaction been defined?

- Who is managing the programme of consultation and communication?
- Which stakeholders are involved in important review stages?
- Is a member of the Regional Management Board on the project board?
- Is an experienced senior operational officer representing users – for the duration?

Feedback

- What other projects, FRS and beyond, have been looked at for insights?
- Has the DQI been used to help establish the brief, and/or to assess the design ideas?
- Is there a process for reviewing design quality regularly during the project?
- What tools or measures are used, who manages the feedback process?
- Is a user manual being created providing targets and explanations to ensure that after completion, the building can be used sustainably and as intended?

Brief

- Who ‘owns’ the brief?
- Who has prepared the strategic or outline brief, and/or the detailed brief?
- How is the vision expressed in the brief?
- Is there a user panel which contributes and checks information?
- Have traditions that no longer support all the FRS objectives – sleeping accommodation, leisure spaces, hierarchical space divisions – been challenged?

- Have the most up to date ideas for operations been incorporated?
- Who will sign off the brief and at what stages?
- Have all stakeholders participated in agreeing the brief?
- Has the technique of describing 'a day in the life of' different users been considered?
- Have other buildings been visited to establish shared views, learn good ideas and understand what to avoid?

Budget

- Is the budget adequate for the quality required?
- Is the budget secure and inflation-proofed?
- How have whole life costs been developed?
- Is construction cost being assessed against possible long term savings in use?

Support and advice

Design champion

- Is there a design champion?
- What arrangements have been made for their involvement?
- Do they need training or support?

Client advisors

- Has any external design advice been sought?
- Are there special problems or opportunities needing specialist advice?
- For what aspects of the project are advisors being used – eg landscaping, sustainable design, access, planning etc?
- What expertise do your advisors need and have?

Project Director

- Does the Project Director have sufficient delegations to make decisions about design alternatives and to bring the project to a satisfactory conclusion?
- Are they a full-time appointment?

Project Owner

- Is the Project Owner sufficiently involved to be able to present the various design options to Council/Cabinet Members and other stakeholders?

Project manager

- Is there a project manager with suitable expertise
- Does (do) the project manager(s) have enough authority to take necessary decisions?

Selecting the design team

- Who has direct control over the choice of designers?
- How has the requirement for quality been expressed in any invitations for interest in the project?
- Is there a tested and monitored framework agreement with design team partners?
- Who is judging the quality of the designers and on what criteria?
- What percentage weight is given to design quality in the selection process?

Design quality evaluations

- Have criteria been established on which to base an assessment of design quality such as a design statement?
- Are time and budget issues cited as major constraints?
- Are the original objectives being revisited as design concepts are developed?

Community interface

- What approaches are being used for welcoming the community?
- Could your building send a more inspiring message?
- Has maintenance and management of well used shared space been considered?
- Will it be possible for such facilities to be used over an extended day and at weekends?

Appendices

Glossary

Many terms are explained in *Creating Excellent Buildings a guide for clients*, CABE, London 2003 and in some of the other books in the bibliography. The ones here may be encountered in other documents about construction, or are used in this guide without full definitions.

Area measurement

Several area measurements are used in buildings The Royal Institution of Chartered Surveyors (RICS) has produced a set of accepted definitions, of which the most common are:

- Gross External Area (GEA):
the area enclosed by the outer surface of the external walls, used for development control and planning permissions
- Gross Internal Area (GIA):
the area enclosed by the inner surface of exterior walls
- Net Internal Area (NIA):
the GIA less internal structure, vertical circulation (stairs and lifts), plant and WCs
- Net Usable Area (NUA):
the area that can actively be used, equivalent to the NIA less horizontal circulation routes

BREEAM

An assessment tool, managed by the Building Research Establishment that evaluates the range of contributions to an energy efficient and sustainable building.

Brief

This is a written description of your aims, the needs of the fire and rescue authority and community users, the quality and value expected and the time and cost limits for the project. A senior fire officer must sign it off so that the project team can use it to develop the final design.

Construction, Design and Management Regulations (CDM)

These regulations require a client to appoint a CDM Co-ordinator to check that construction, site and project health and safety are taken into account throughout the planning and design phases and to coordinate the production of the health and safety file.

Design and Build (D&B)

A procurement method that gives the responsibility for design to the contractor. PFI is a form of D&B. All types of D&B require very clear and well communicates ideas about design quality and expectations about achieving it since the extent of the dialogue between the client team and the designers is generally less than ideal. It is often too short and the designer is responsible to the contractor not to the client.

Design quality statement

A statement covering ways in which it is expected that the desired quality will be expressed in different aspect of the building – eg external, innovation in use, natural light, circulation – and all critical features of the design.

Implementation team

The organisations – design, construction, FM suppliers and others selected to carry out the design, construction and commissioning of the project – as distinct from the client team.

Integrated process

Collaborative techniques to unite the client, designers and builders with the aim of increasing efficiency and harmonising processes. Joint decision-making between separate groups about the integration of IT systems or software is an example. In construction projects this refers to a variety of design-and-build approaches where design benefits from early input by the contractor. The designer, contractor and client work together from the start to achieve the agreed project objectives. PFI is one example of an integrated process.

Official Journal of the European Union (OJEU)

Often referred to as OJ (the 'Official Journal') and formerly known as OJEC. A daily journal advertising the service requirements of all public procurement projects, including construction projects. Publicly-funded projects over a certain size must advertise here for professional teams and builders.

Option appraisal or option analysis

Before agreeing the building project, several alternatives should be appraised to ensure the right strategy is adopted. Typically, between three and five options should be considered, including a 'do nothing' option. Analysis of the options may give different weighting to various qualities. It may be decided during this process that a building project is not the best way to achieve the agreed objectives.

Practical completion

The architect generally issues a certificate showing satisfactory completion of the construction. It normally allows the contractor to invoice the client for all but a small portion of the contract sum. The outstanding portion is called the 'retention'.

Whole-life cost

All costs over the entire life of the building – usually 30 years – including building construction, running, replacement, maintenance, adaptation and repair costs. Sometimes called life-cycle costs.

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“Isolating the value added by good design is not necessarily simple”

CABE, June 2006, The Cost of Bad Design

“Taking time to look at other recently completed Community Fire Stations with key stakeholders in our project such as our staff, has been extremely beneficial. You have to accept that the needs of different communities vary, however we have found examples of good practice and innovative design, such as the approach to a training facility at St Albans Community Fire Station, (see section 4) as well as identifying some ideas that worked better on paper than in practice”

Simon McMillan – Gloucester FRS

“Asset management aims to ensure that local authorities have the right space, at the right time, in the right place and at the right cost so as properly to support their strategic corporate and service goals and objectives. It is a vital process for identifying property implications of corporate and service needs and then ensuring their delivery to support the achievement of successful corporate and service outcomes”

RICS, Nov 2004, Asset management in Local Government: Guidelines in Outline, ODPM

“The ratios relating finance, capital cost, facilities management costs and business operating costsdiffer between building types (but) it is always true that staff costs will be an order of magnitude greater than facilities ownership and operating costs. The basic message is that facilities should support occupier performance and that minimum cost facilities may not do that.”

Richard Saxon, *Be Valuable – A guide to creating value in the built environment* (published by Constructing Excellence)

“Question your own needs, the processes, the way things have always been done/ stored – is this still the best, or habit?”

Kim Gleinster – Wiltshire

“Design depends on a meaningful and sustained dialogue between designers and clients, users and communities.”

Scottish Executive *A policy on architecture for Scotland*, 2001

