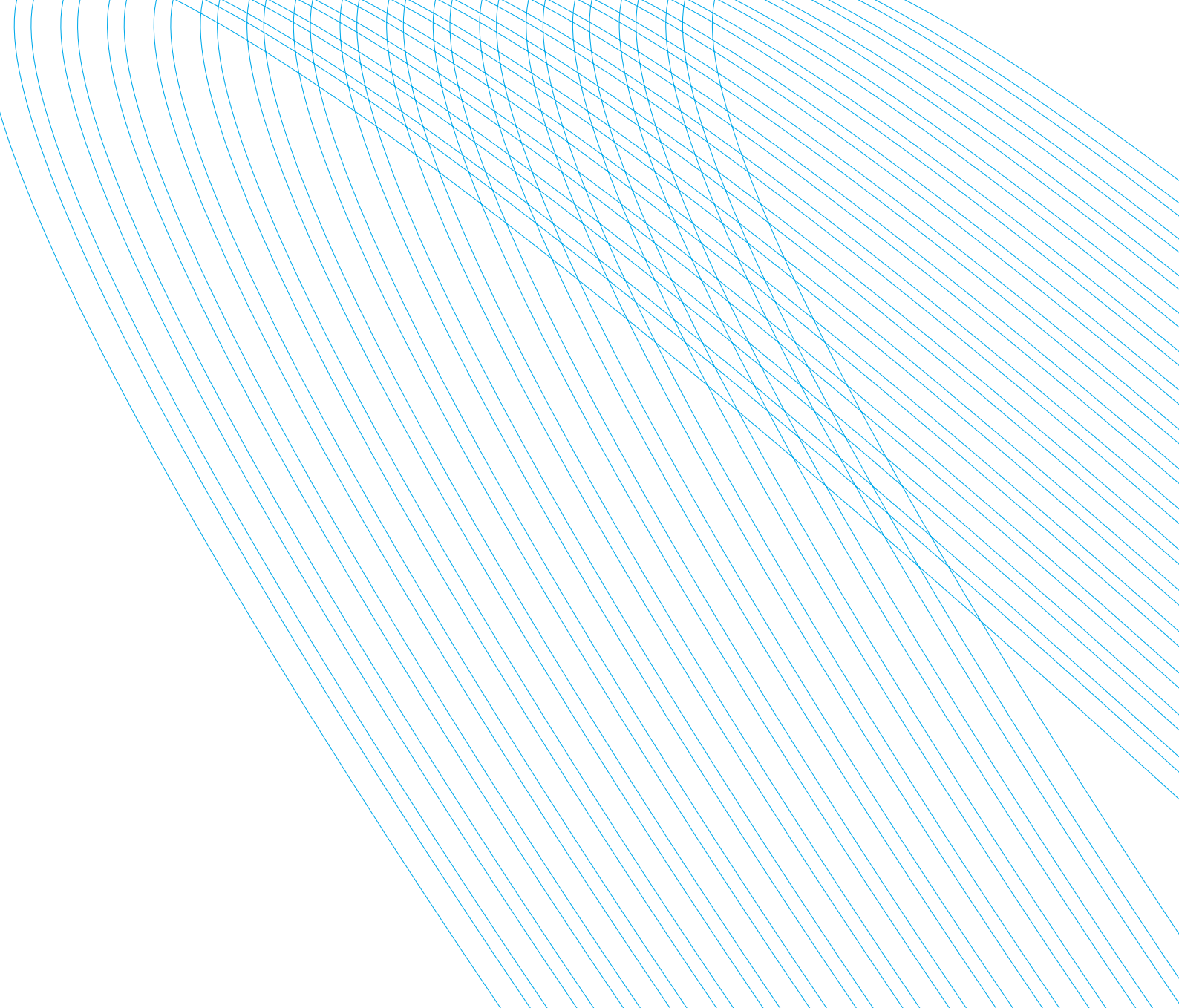




COST MODEL - FURTHER EDUCATION

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Cost model Further education

England's tired further education colleges need about £5bn of work to bring them up to date. **Simon Rawlinson** of **Davis Langdon** explores the design, procurement and cost issues

01 Introduction

Further education (FE) colleges cater for post-school students of all ages, providing a range of general education and training. These include sixth-form education, vocational training and formal and informal community-based learning, as well as work-related training in partnership with local employers. FE colleges also serve the 14-16 age group, delivering education alongside local schools.

FE colleges are autonomous institutions in terms of the mix of syllabus they choose to teach, their sources of income and management of expenditure. The Learning and Skills Council (LSC) provides strategic support in terms of management, planning and funding to 384 FE colleges in

England. Similar bodies support the sector in Scotland, Wales and Northern Ireland.

The LSC's support naturally extends to the management and planning of the FE estate. This is a huge challenge, with significant issues of fitness for purpose and outstanding maintenance.

The poor condition of many FE colleges reflects a legacy of under-investment going back to the regime of polytechnics and technical colleges. Recent surveys of the FE estate in England have found that nearly half of the buildings require significant renewal and modernisation. The LSC estimates that this will cost about £5bn.

The objective of this ambitious programme, which has been

earmarked for about £750m a year in government funding until 2011, is to create an FE estate that is fit for purpose, sustainable and efficient, and that aims to improve the recruitment, retention and performance of students and staff.

In a large number of cases, where a college's estate is unfit for purpose, spread over multiple sites or in a particularly poor physical condition, the preferred strategy will be to consolidate the estate into a smaller number of purpose-built facilities, preferably on a single campus.

Investment in FE colleges can gain additional impetus where campus redevelopments are part of wider urban regeneration initiatives, and will sometimes

provide the public sector anchor of the initial phase.

While this opportunity can lever access to land and funding, involvement in an urban regeneration scheme can have a wider impact on a college's operation. It may affect funding and access to industry partners, short-term and long-term stakeholders, curriculum development and expectations of what the college should deliver.

Most FE colleges are infrequent construction clients, so the LSC is developing guidance on design quality, design assessment and sustainability; cost and performance benchmarking; and procurement based on contractor and consultant frameworks.

02 Development

An FE college's property strategy defines the scope of all capital expenditure related to its estate. The strategy outlines the various property options to enable a college to meet the remit of its curriculum and identifies the best value options. The strategy is updated every three years.

An approved property strategy is a prerequisite for capital funding from the Learning and Skills Council (LSC) and will give the project team a clear brief as to the scope of the project and the client's requirements.

The options available to deliver the college's property strategy are influenced by a series of

factors. These include:

- The condition of the estate, the location of facilities and their ability to meet the needs of staff, students and industry partners
- Current and forecast development of the curriculum, such as facilities for new subject areas with specialist requirements
- Current and forecast opportunities for linking up with local employers to provide work-related training
- Constraints related to the physical estate, such as plot size, that might affect refurbishment or redevelopment options
- The availability of surplus land that might provide opportunities for disposal

and consolidation

- The effects of disruption to college activity caused by the implementation of each option
 - Sources of extra funding available beyond that provided by the LSC.
- Where the college is part of an urban regeneration masterplan, other factors to consider in the property strategy include:
- Co-ordination with other public sector partners to provide co-investment
 - Responding to the needs of business and the local community in terms of extra facilities that the college estate could provide
 - Meeting the area's aspirations as stated in the local authority development plan.



Sheppard Robson designed Dagenham's "super-college", combining further and higher education in a suitably iconic building

03 Funding

When a college undertakes a development, it has a particularly close working relationship with the public sector funder.

In England, the college will consult the Learning and Skills Council's (LSC) local partnership team, its regional provider financial management team and its regional property adviser on the project's key education, finance and property dimensions.

In terms of funding, consultation will mean considering the options for borrowing from the private sector, the potential for a PPP or PFI, joint ventures and so on. Capital funding provided by the LSC will cover the public sector contribution to the following heads of cost:

- Construction costs
- Loose furniture, fixtures and equipment, IT and so on
- Professional fees
- VAT.

Additional allowances are made in the construction budget for investment in sustainability features, as well as for the

usual site-related expenditure on abnormalities.

In setting the level of capital grant, the LSC's objective is to provide enough money to deliver a project that meets its quality, durability, fitness for purpose and affordability criteria. While additional funds are available to promote significantly better-quality design and more durable construction, budgets continue to be focused on delivering long-term value for money.

In order to proceed to detailed design and construction, the college must submit a funding application to the LSC. According to council procedures, funding approval is given at two levels. Below a £10m threshold, approval in principle is required. This requires that the project has been developed to about Stage C of the RIBA plan of work. For projects worth more than £10m, there is a further stage of approval in detail, based on criteria including design development beyond RIBA Stage D, receipt of planning permission, tendered

construction costs and satisfactory completion of a financial appraisal of PPP and PFI options.

Public funding available to colleges for the main capital expenditure can range from 35% to 80%, depending on the circumstances of the scheme, its educational priority and the financial health of the institution. Colleges need to generate matched funding from a number of sources. These can include:

- Land disposal, although this requires LSC consent where the total value exceeds £1m or 5% of the college's annual revenue. Some colleges based in urban locations have sold valuable sites to fund high-quality consolidation projects.
- Regional development agencies and other public bodies. By careful alignment of their relocation proposals with an agency's economic and education priorities, colleges may be able to access additional public funding.
- Commercial loans, although the LSC must assess and approve

these on the basis of the college's ability to afford repayments.

■ Third-party capital funding through a PPP or PFI. These could be based on a unitary charge mechanism or on some form of capital transfer of assets as part of a larger development scheme.

The council's requirement for a reasonable degree of design and cost definition ahead of detailed approval helps to enforce a high degree of project discipline on the client and project team. This serves a number of purposes:

- Helping to ensure that all key design issues have been resolved and signed off ahead of procurement, particularly if the project is design and build.
- Enabling the college and its funders to assess the affordability of the proposal by examining firms' construction costs, forecasts of running costs and finance costs, and any revenue that might be generated from third-party use of facilities.
- Helping to ensure that the new building responds to the funder's design quality agenda.

04 Procurement and planning

Devising a procurement route to match the management capacity of the client body is a key issue. Typically, most of the management team will come from an education background and have little experience of the challenges of delivering such projects. It is important the project team is set up in such a way as to help the client body to carry out its role, without distracting it from the key business of managing the college.

As with all schemes, the selection of a procurement route should be carefully considered at the outset, taking into account the college's requirements for project control, cost certainty and risk management, and aligning with the funding body's approval requirements.

Given the disciplined funding regime, limited internal project management resources and requirements for absolute certainty of delivery to coincide with the academic calendar,

design-and-build routes are commonly adopted on FE projects. Colleges can adopt alternative approaches so long as they can align with the funder's approval processes, which require priced tenders in advance of final approval of funding.

For an FE college, the advantages of design and build are relatively early cost and programme certainty, with simplified project management and governance. The potential downsides of design and build are well known and the college needs to run a well managed system if it is to preserve its design intent, particularly if the contractor is appointed at a relatively early stage in the design programme.

Similarly, cost and programme certainty will depend on the college being able to manage its own internal stakeholders, keeping tight control on scope changes during both design development and construction.

A key aspect of procurement

strategy is packaging a project to appeal to the current, active contractor market. Two-stage tendering, which limits contractor risk and arguably obtains contractor input on buildability, has become very common as fewer contractors have been prepared to bid competitively for projects on a single-stage basis. Early engagement with contractors in order to secure resources is also important.

In designing a two-stage competition, it is good practice to include the pricing of some high-value elements of the works, such as the substructure and frame, in the first stage, as well as preliminaries, overheads and profit. Furthermore, maintaining the client's involvement in the second-stage bidding, possibly through the employer's agent or client's quantity surveyor, may help to encourage competitive pressure.

Given the complexity of managing the financial planning

of an FE college development, the programme must take into account the full range of project activities. These can include:

- Providing sufficient time at the outset for designer and contractor input, together with decision-making by the client body
- Allowing time for consultation with third parties as required, and developing programme sequences that take into account known approval requirements and procedures
- Allowing sufficient time for the Official Journal of the European Union's tendering procedures to be followed
- Establishing key academic dates in the programme including term times and examinations
- Fully planning all aspects of move management that might be necessary to meet opening dates, including furniture and fit-out works that might not be included within the scope of the construction contract.

05 Architecture

Expectations of the design quality of FE colleges have steadily grown and there is a body of completed projects that set challenging benchmarks for clients and designers alike.

In an education sector where the "client" is as likely to be a large-scale local employer as college staff or students, accommodation must meet quality standards informed by the private sector.

Buildings are increasingly required to communicate the range of activities taking place within a college and represent the institution as dynamic, modern and inclusive.

However, given the constrained nature of many of the sites on which FE colleges are located, the shape and form of the building will owe much to the plot aspect, shape and size, the context of the surrounding area and access.

Cabe's recent report on the value of good design in education has added further impetus to the campaign to deliver high-quality college buildings.

The Learning and Skills Council (LSC) explicitly places importance on the procurement of good-quality buildings and

focuses on the longevity and flexibility of the building fabric and the provision of good quality social and meeting space for students and staff. In recognition of this, the council can grant a further 10% of grant for high quality sustainable features tied to an aim to achieve a BREEM "excellent" rating (see M&E design and sustainability, right).

The curriculum defines the overall spatial requirements, the size of the teaching spaces and the functional relationships that need to be accommodated.

However, teaching space is only one aspect of the mix. In order to ensure that colleges get the right balance of accommodation, the LSC has recently redefined the ideal allocation of floor area across four space types. It has added a new category of atrium space, which of course has a knock-on effect on building areas and costs.

The introduction of atriums helps the planning of assembly spaces, departmental adjacencies and circulation and support space, making the organisation of FE

a How a college floor plan should be divided up

Component	Definition	% of gross internal area
Teaching/learning	Excludes admin, social, catering, communal, storage and balance space	50%
Other	All usable space excluding teaching and learning space. Typically includes rooms for admin, social, catering, communal, storage and assembly rooms	20%
Balance	"Non-usable" space typically includes corridors, stairwells, lifts, plant rooms and space occupied by internal walls and services	30%
Atriums	Fully enclosed, usually glass-covered spaces that are a minimum of double-floor height and of sufficient width to be used as multi-functional space	10%

Source: Management of Floorspace, LSC 2007



A central atrium will act as a hub in this proposed building for City of Westminster College, designed by Schmidt Hammer Lassen

college buildings more logical and welcoming.

Within the space allocated for teaching and learning (see table, below left), a wide range of subjects may need to be accommodated. Each subject type requires an allocation of floor area per student ranging from 1-2.5m² for a lecture theatre or computer terminal to 7.5m² for large-scale vocational subjects such as motor engineering workshops.

In addition to getting the key planning right, visual messages communicated by

the building are also an important way of inspiring and motivating existing students and staff, as well as potential recruits.

Themes such as pride, openness or accessibility can be communicated by the general level of design and specification of the project, or by specific elements such as a feature entrance or atrium, which can act symbolically and literally as a “gateway to learning”.

The flexibility afforded by multi-functional spaces such as atriums is of the utmost

importance for many FE institutions. They need to ensure that their building is future-proofed at a reasonable cost against changes in teaching methods, the curriculum and the organisation of the college itself.

These requirements should be captured in the brief, which should cover future modification. This includes vertical or horizontal expansion and the capability to reconfigure teaching space to accommodate organisational changes with minimal impact on the building fabric.

06 M&E design and sustainability

The drivers of M&E design in FE colleges are:

- Catering for current and future curriculum needs. This may require specialist systems to provide environmental control for vocational disciplines such as catering or dental nursing.
- Flexibility in the main plant configuration and the design of the distribution network, to accommodate changes arising from departmental changes or new teaching methods.
- Sufficient capacity to support planned increases in student density due to rising demand for certain subjects.
- Incorporation of specialist services, such as installations for catering and so on.

- Design of controls systems based on the principles of building “self-management” to avoid giving discretionary control over settings to users.

- Low, predictable running and maintenance costs based on static rather than active ventilation systems.

- Integrated electronic teaching facilities, such as smartboards, electronic timetabling and IT-intensive learning resource centres.

Sustainability has moved rapidly up the agenda and funding bodies are responding to the growing expectations of support for investment in green building features. In general, new FE college buildings are expected

to achieve a minimum BREEAM rating of “very good” with an “excellent” rating being required to lever additional funding.

A recent study of college buildings examining the relation of quality, cost and design has underlined this trend by identifying aspects of building specification where expenditure should be focused to improve sustainability.

The building envelope is a good example, where improved insulation, solar performance and reduced air leakage can make a significant contribution to the reduction of building-related carbon emissions.

Where additional funding is being made available to improve

sustainability performance, the LSC increasingly favours low-tech solutions – relying on building orientation, passive ventilation and thermal mass – rather than highly visible technology, such as wind turbines and photovoltaic cells, with long payback periods. Solar gain can also be mitigated through landscaping, which can contribute to the creation of a high-quality campus environment.

Other aspects of college design that can be adopted to emphasise an institute’s sustainability credentials, or to respond to the higher priority of the sustainability agenda, include altering the external facade material from aluminium to timber and using green roofs.

07 Cost breakdown

The cost breakdown is based on a four-storey college building with space arranged around an atrium.

The scheme has a number of sustainability features including displacement ventilation, a high-performance external envelope and a green roof.

The building is specified to be highly robust and the rates for partitions, doors, finishes and

building services reflect this.

The rates are based on a design-and-build contract, procured via a two-stage tender. Rates are current in 2nd quarter 2007 for a south-east location

The specification and rates in this model reflect a high-quality scheme that addresses the Learning and Skills Council's (LSC) design-led agenda. The

variation in cost between schemes can be wide because of the college's discretion with regard to design standards in response to location, affordability and so on. Costs for the scope of work described in this model can range from about £1,700/m² to more than £2,200/m².

However, the following items excluded from the breakdown

must be included in the submission to the LSC:

- Demolition and site preparation

- External works and services
- Loose furniture, fittings and operating equipment

- Decant costs

- Professional fees and VAT.

These will typically increase the cost to more than £3,000/m².

b Cost breakdown

	Total cost £	£/m ² gifa	%		Total cost £	£/m ² gifa	%
Substructure	1,832,500	130.89	6.52	Cladding; metal-faced composite cladding panels; cladding rails: 2490m ² @ £410			
Piled foundations; 600 diameter rotary bored piles; pile caps; ground beams: 4,250m ² @ £310				Curtain-wall; stick system with double-glazed windows and metal-faced spandrel panels: 1,090m ² @ £470			
Ground slab; 250 thick; excavation and disposal: 4,250m ² @ £100				Powder-coated aluminium double-glazed ribbon windows; window boards: 2,270m ² @ £350			
Lift pits: 6 nr @ £15,000				Extra over curtain wall and ribbon windows for opening lights; automatic actuators included in controls: 850m ² @ £200			
Frame and upper floors	2,995,500	213.96	10.65	Solar shading; fixed aluminium louvres: 600 m @ £200			
Structural steelwork; UB and UC sections: 820t @ £1,700				Allowance for soffit cladding, insulated metal panels: 400m ² @ £350			
Structural steelwork; hollow sections: 50t @ £2,500				Allowance for column cladding, curved metal panels: Item @ £40,000			
Fire protection to steelwork: 16,150m ² @ £20				Glazed main entrance doors; revolving door with pass doors: 2 nr @ £35,000			
Allowance for column encasement: 2,100m @ £85				Fire escape doors; steel-faced double doors in powder-coated frames; ironmongery: 16 nr @ £2,000			
Upper floors, thermodeck hollowcore planks: 9,750m ² @ £100				Loading bay doors: Item @ £7,000			
Roof	2,031,500	145.11	7.22	Aluminium louvres to plant rooms etc: 400m ² @ £400			
Insitu concrete roof slab; metal deck and insitu concrete: 3,450m ² @ £90				Internal walls and partitions	1,245,300	88.95	4.43
Flat roof, single-ply membrane including screed, insulation, trims, upstands, flashings, linings to gutters, paving slabs to 30% of area: 3,450m ² @ £115				Single-glazed screens to atrium: 380m ² @ £350			
Extra for green roof construction; strengthening to roof slab; sedum blanket; filter fleece and drainage layer: 1,500m ² @ £135				Blockwork; average rate for thickness ranging from 100 to 190mm: 5,530m ² @ £45			
Atrium roof; hollow section framing, aluminium-framed double-glazed units: 1,200m ² @ £800				Extra for twin-leaf acoustic wall construction: 3,050m ² @ £14			
Extra for upstands and fascia cladding: 400m @ £80				Drywall partition; 1 hour FR; heavy duty boarding: 7,630m ² @ £70			
Extra for soffits to roof overhangs: 240m ² @ £55				Glazed screen partitions: 610m ² @ £340			
Mansafe system: Item @ £34,000				Allowance for folding partitions: Item @ £40,000			
Roof-level drainage installation; symphonic: 4,250m ² @ £10				Toilet cubicles: 56 nr @ £700			
Allowance for plant platforms, walkways etc: Item @ £40,000				Internal doors	651,800	46.56	2.32
Stairs	468,500	33.46	1.66	Solid core fire-rated doors and hardwood frames; stainless steel ironmongery (average rate per leaf for single and double doors): 270 nr @ £1,200			
Feature stairs to atrium; projecting steel stairflights with semi-circular half landings; glass balustrades with stainless steel handrails (rate per flight): 8 nr @ £16,000				Doors and hardwood frames; non fire-rated; stainless steel ironmongery (average rate per leaf for single and double doors): 270 nr @ £900			
Precast concrete internal staircases with half landings; painted steel handrails and balustrades; including allowance for wall, floor and ceiling finishes (rate per flight): 20 nr @ £13,000				Glazed access doors to atrium walkways: 6 nr @ £3,400			
Glazed feature balustrade with stainless steel handrail to part atrium edge: 100m @ £700				Extra for magnetic catches to double fire doors: 46 nr @ £1,400			
Miscellaneous access stairs and cat ladders: Item @ £10,500				Wall finishes	599,600	42.83	2.13
External walls, windows and doors	3,814,600	272.47	13.56	Emulsion paint: 19,500m ² @ £4			
Rendered blockwork and architectural blockwork; insulation, lightweight steel framing: 2770m ² @ £270				Plasterboard lining and emulsion paint to wall surfaces generally: 5,040m ² @ £40			
				Ceramic tiling: 2,700m ² @ £50			
				Allowance for acoustic treatments: Item @ £85,000			
				Allowance for column casings: Item @ £100,000			



A glass wall and concrete columns mark the "gateway to learning" in Wilkinson Eyre's refurbishment of City and Islington College

b Cost breakdown (continued)

	Total cost £	£/m ² gifa	%		Total cost £	£/m ² gifa	%
Floor finishes	1,104,500	78.89	3.93	Sanitary installations	140,000	10.00	0.50
70 deep screed: 4,100m ² @ £20				WCs and fittings: 50 nr @ £410			
Fully accessible raised floor: 8,700m ² @ £40				Extra for disabled fittings: 8 nr @ £270			
Edge fixed carpet; hardwood skirtings: 7,500m ² @ £35				Urinals and fittings: 20 nr @ £340			
Limestone tiling: 1,200m ² @ £160				Wash handbasins and fittings: 70 nr @ £410			
Ceramic tiling: 500m ² @ £70				Shower in cubicle, tray, fittings complete: 8 nr @ £1,400			
Vinyl flooring, coved skirtings: 3,000m ² @ £50				Classroom sinks: 20 nr @ £470			
Epoxy floor paint: 600m ² @ £15				Laboratory sinks: 15 nr @ £270			
Entrance matting and matwells: Item @ £26,000				Cleaners sinks: 4 nr @ £680			
				Drinking fountains: 8 nr @ £680			
Ceiling finishes	516,300	36.88	1.84	Allowance for IPS panels; pre-plumbed: 140 nr @ £350			
Plasterboard ceilings on MF framing, emulsion paint finish: 2,900m ² @ £27				Service equipment	310,000	22.14	1.10
Mineral fibre concealed grid ceiling; plasterboard margins and bulkheads; generally: 8,700m ² @ £40				Kitchen, servery and bar fit-out; complete: Item @ £310,000			
Extra for acoustic treatments: Item @ £90,000				Disposal installations	168,000	12.00	0.60
Furniture and fittings	971,700	69.41	3.46	Waste, soil and vent pipework: 14,000m ² @ £7			
External and internal identity, directional and statutory signage: Item @ £150,000				Rainwater installation; syphonic drainage: 14,000m ² @ £5			
Reception furniture: Item @ £80,000				Hot and cold water installations	300,000	21.43	1.07
IT work benches to general teaching spaces: 750 m @ £540				Mains water service, treatment: Item @ £30,000			
Laboratory work benches: 250 m @ £270				Hot water storage and distribution: Item @ £120,000			
Allowance for fume cupboards and other laboratory fittings: Item @ £26,000				Cold water storage and distribution: Item @ £150,000			
Allowances for lockers, shelving and storage racks: Item @ £78,000							
Allowance for whiteboards, pinboards and other teaching room fittings: Item @ £105,000							
Window blinds: 870m ² @ £45							
Vanitory units (cost per basin): 60 nr @ £350							

b Cost breakdown (continued)

	Total cost £	£/m ² gifa	%		Total cost £	£/m ² gifa	%
Space heating, air treatment and ventilation	1,890,000	135.00	6.72	Preliminaries	4,810,200	343.59	17.11
Space heating, boilers, flues, pumps, distribution in plantrooms and risers: Item @ £200,000				Management costs, site establishment and site supervision.			
Distribution pipework and radiators: 14,000m ² @ £25				Contractor's preliminaries, overheads and profit @ 17%: Item @ £3,961,200			
Extra for underfloor heating to atrium: Item @ £31,000				Testing and commissioning of building services installations; O&M manuals: Item @ £30,000			
Air handling units; ductwork in plantrooms and risers: 11,200m ² @ £25				Allowance for design reserve @ 3%: Item @ £819,000			
Chillers, pumps and pressurisation units, distribution in plantrooms and risers: 11,200m ² @ £30							
Local supply and extract distribution; displacement ventilation with high level extract: 11,200m ² @ £40							
Ventilation installation to laboratories; vacuum system and fume cupboard extract: Item @ £70,000							
Toilet extract ventilation: Item @ £75,000							
Kitchen supply and extract ventilation: Item @ £50,000							
Allowance for localised cooling to equipment rooms: Item @ £50,000							
Electrical installation	1,857,000	132.64	6.60	Construction cost: building only	28,120,000	2008.56	100.00
Mains and sub-mains distribution: 14,000m ² @ £25				(square metre rate based on GIFA)			
Small power generally: 14,000m ² @ £25							
Electrical supplies to mechanical plant and equipment generally: Item @ £55,000							
Lighting generally: 14,000m ² @ £70							
Emergency lighting: 14,000m ² @ £7							
External lighting generally: Item @ £24,000							
Gas installations	30,000	2.14	0.11				
Incoming gas supply and distribution: Item @ £30,000							
Lift installations	710,000	50.71	2.52				
10-person feature lifts with glass doors and back panels; complete: 2 nr @ £115,000							
21-person traction lift serving 4 floors: 4 nr @ £120,000							
Protective installations	28,000	2.00	0.10				
Lightning protection: 14,000m ² @ £1							
Earthing and bonding: 14,000m ² @ £1							
Communication installations	806,000	57.57	2.87				
Fire alarm and smoke detection; interface with doorhold system; disabled refuge comms system; induction loop alarm interface: 14,000m ² @ £20							
Security system, intruder alarm, CCTV, public address: 14,000m ² @ £25							
Induction loop: Item @ £28,000							
Disabled WC alarm system: Item @ £8,000							
Data network, including containment: 14,000m ² @ £10							
Specialist installations	350,000	25.00	1.24				
BMS controls: 14,000m ² @ £25							
Builder's work in connection	489,000	34.93	1.74				
Framing and access platforms in risers: Item @ £160,000							
Forming holes and chases etc - allowance @ 5%: Item @ £329,000							

c Location factors

Use these factors to adjust the costs for alternative regions

Inner London	1.08
Outer London	1.02
South West	0.94
East Midlands	0.93
West Midlands	0.95
East Anglia	0.95
Yorkshire and Humber	0.98
North West of England	0.95
North of England	1.00
Scotland	0.99
Wales	0.93

d Acknowledgments

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