The Legacy of 1960's University Buildings

Case Studies

HIGHER EDUCATION FUNDING COUNCIL FOR ENGLAND
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Contents

Higher Education Sector

King's College, Strand Campus

Project Summary:
- **Part of a masterplan for Strand Campus**
- **Building located in an urban conservation area adjacent to Somerset House**
- **Complete refurbishment of top 3 floors**
- **Conversion of laboratory to cellular and open plan office accommodation**

Before Regeneration

Long-term adaptability
- High floor to ceiling heights allow for relatively good daylight potential
- Inflexible blockwork partitions require extensive works to reconfigure use

Aesthetics and brand
- Unpopular with lecturers
- Tired looking façade

Environmental sustainability and impact
- Negative occupant feedback regarding internal environment (noise, air pollution)
- Leaky façade – water ingress and air infiltration
- VAV dual duct ventilation with openable windows – High energy consumption

Functionality
- Poor Environmental Performance ④Laboratory facility not simply flexible for administrative use

Financial sustainability
- High running costs
- High demolition and rebuilding cost due to site constraints/conservation area

Legislative compliance/risk
- DDA and fire compliance issues
- It was anticipated that planners would not allow for same or greater accommodation on site if demolished and rebuilt

After Regeneration

Long-term adaptability
- Refurbishment will provide necessary flexible academic office space

Aesthetics and brand
- Masterplan for campus addresses access and prominence of building along 'The Strand'.

Environmental sustainability and impact
- Refurbishment achieved BREEAM Very Good
- Influenced by Kings College environmental policy
- Low energy mixed mode ventilation with energy efficient cooling
- Solar attenuation from new façade, increased thermal insulation and reduced air infiltration

Functionality
- Provide enhanced access to entire building
- Flexible for future adaptation
- High quality academic accommodation

Financial sustainability
- Anticipated reduced running costs

Legislative compliance/risk
- DDA access was brought up to legislative compliance with provision of refuge space, additional lift services to refurbished floors and a bridge across to an adjacent building

Continued

Strand building: Built 1967

Refurbishment planned for Aug '08

Higher Education Sector

King's College, Strand Campus

Project details

Building and project details:

- 13 storey concrete framed structured including 4 basement levels.
- Built in 1967 in the centre of London, adjacent to King's Building and Somerset House, both Grade 1 listed buildings
- Top three floors are being completely gutted and refurbished to convert from chemistry laboratories to flexible office space, including new link bridge between the King's and Strand Buildings, a total of 2450m^2
- Previous façade build-up included glazed infill cladding
- Works began in March 2007 and the completion is planned for August 2008
- Lift refurbishment to enhance access for fire escape and fire brigade

Costs and funding:

- Includes mesh screen-cladding on south face to reduce solar gain
- Main construction contract value: £11,356,040 (including VAT).
- Construction cost of £4635/m^2

The decision to **refurbish**

Decision-making processes:

- Feasibility study addressed different potential re-uses of redundant laboratory and office space, predominantly addressing legislative compliance issues and creating modern, flexible open plan and cellular admin space.
- Masterplan for campus addresses the visibility of the Strand building on 'The Strand' and establishing a stronger presence from the street.
- Cost analysis demonstrated that equivalent academic office space could not be obtained in local area for comparable rate

Key decision-making factors:

- Previous use for chemistry department made redundant
- Suitability of location important in maximising potential use of building stock and avoiding costly office lets.
- Façade, building services and DDA access was not compliant and required major refurbishment to address.
- Perceived planning limitations on site should the University attempt to demolish as in conservation area and adjacent to Somerset House

Lessons learnt

- Refurbishment can provide opportunity for re-branding / aesthetic improvements of existing buildings with cost effective, phased delivery of masterplan. Phased refurbishment of building successfully delivered while rest of building remained in use.
- Previously highly serviced environment can be refurbished to maximise use of large ceiling voids for benefit of natural ventilation, increased daylight and new energy efficient technologies such as chilled beams
- Opportunities exist for exposing heavy weight structures for internal environmental benefit, making use of thermal mass thus reducing reliance on energy consuming systems to maintain high internal environmental comfort

Continued

Higher Education Sector

King's College, Strand Campus

Further information

The Kings College Strand Building is part of a tight urban campus located in central London, one of five campuses run by Kings College. The building is bordered to the North by the Strand, a London thoroughfare connecting the city with the popular west end, while the south façade is exposed to a central courtyard bordering Grade 1 Listed King's Building and Somerset House.

The project was undertaken as part of a masterplan for the Kings College Strand Campus, and coincided with the closing of the chemistry department on the Strand Campus, and the requirement for new flexible office accommodation. Under the masterplan for the campus, the project will address the deterioration of the building's façade and building services. An external brass perforated screen will be fixed to the new cladding system to provide solar attenuation while at ground level the masterplan establishing the buildings frontage as a destination along The Strand with retail offering and greater pedestrian amenity and access.

The refurbishment of the top three floors of the building was undertaken to provide flexible, modern accommodation with low energy services. The building was stripped back to its structure to achieve this.

Due to the height of the building and its limited lift capacity, and requirements of complying with Section 20 of the London Building Ac, lower occupancy uses were designed for in the top three floors.

The original function that this space was constructed to house should have made the cost of conversion into open plan office accommodation a very cost effective solution. However, risks relative to decontamination and removal of asbestos would have a significant impact on overall price.

Costs are not really in sufficient detail to make a full appraisal, but given the level, there would appear to be significant abnormal costs over and above what might be expected for this type of project.

The overall cost of the project was high, but relative costs and risks associated with demolition overweighed this. As the building is located in central London, and sensitivities concerning it's proximity to Grade 1 listed Somerset House, the College had been advised by the Planning Authority that demolishing the existing building would not result in greater gross area being made available for a new building. Decanting costs to temporary accommodation in central London were also considered cost prohibitive and the refurbishment project allowed the College to maintain use of the rest of the building during works. Greatly reduced running costs are anticipated as the new design has opted for a low energy approach to services.

The previous building suffered from noise and atmospheric pollution, whilst the south façade was fully exposed and suffered from lack of solar control, leading to overheating. It was noted that the roof and façade were experiencing water ingress and high levels of air infiltration with correspondingly poor internal environment.

The refurbishment project will employ natural ventilation with chilled beams operating during peak summer periods. The original dual duct VAV ventilation system will be replaced by energy efficient chilled beams which deliver minimum fresh air and heating/cooling as required.

As the previous dual duct system took up a large space in the floor ceiling void, large floor to ceiling heights are achievable in the refurbished space which will compliment the passive approach to servicing the environment.

Higher Education Sector

King's College, Guys Hospital Tower

Project Summary:
- **The laboratory is 'embedded' space; i.e. within an NHS estate building.**
- **The 9th floor was stripped back to the frame and refurbished to provide new laboratory**
- **The project was 'need-driven' i.e. cutting edge research space with close links to the hospital was required.**

Before Regeneration

Long-term adaptability
- Previous use as 'Evelina' Children's Hospital Intensive Care Ward means that good floor to ceiling heights were already provided.
- Relatively shallow depth allowed good daylight potential
- Open plan space within the original ward layout.

Aesthetics and brand
- The Evelina Children's Hospital was provided with a brand new building and moved out in 2005 as Guy's Hospital tower was no longer suitable.

Environmental ssustainability and impact
- The building had a poor internal environmental quality – e.g. additional portable electric heaters required – not suitable for a modern hospital.
- Single glazing and poor thermal fabric performance.

Functionality
- No specific information of functionality is available, although it is understood that the ward was reasonably well-liked by staff despite its poor condition.

Financial sustainability
- No specific information on financial sustainability of the previous hospital is available.

Legislative compliance/risk
- When originally built, the project had crown immunity and was non-compliant with a number of regulations – notably fire regulations.

Guy's Hospital Tower: Built 1974

After Regeneration

Long-term adaptability
- The refurbishment project has been designed with future adaptability and flexibility of use within the laboratory space in mind. Modular system with 'Trespa' bench tops used.

Aesthetics and brand
- The refurbishment was an important factor in raising the research profile of the College particularly with regards to having close links with the hospital.

Environmental sustainability and impact
- These factors were not main drivers to the project.

Functionality
- It has been possible to integrate the laboratory services requirements within the floor to ceiling heights without problem as adequate allowance was available.

Financial sustainability
- Carrying out the refurbishment works in a live hospital environment is a relatively high capital cost process.

Legislative compliance/risk
- The thermal fabric of the façade to this floor was not required to be upgraded to building regulation standards.
- Fire safety measures have been upgraded.

Continued

Refurbishment completed: Summer 2007

Higher Education Sector

King's College, Guys Hospital Tower

Project details

Building and project details:

- Building constructed as in-situ cast concrete structure with steel reinforcement.
- Change of use from an intensive care hospital ward into a research laboratory with writeup space, the floor is approximately 1200m^2 with 70 occupants. The laboratory will be open 24 hours-a-day, 7 days-a-week.
- Main services infrastructure remain in place and are owned by the NHS Estate.

Costs and funding:

- The project was SRIF III funded
- Projected final expenditure of £2.3M construction value including demolition and strip out – approximate cost per m^2 of £2000/m^2 seems relatively high for refurbishment.
- Issues relating to working in a live hospital environment have impacted significantly on the cost of the projec – e.g. live services running through the space.
- Remedial works to remove of hazardous waste e.g. needles and syringes from traps and removal of asbestos components from the building, contributed significantly to cost of works.

The decision to **refurbish**

Decision-making processes:

- No formal feasibility study was carried out for this project.
- Due to the legacy of the existing building and existing services supplies there was limited opportunity to address the sustainability agenda.
- The project was not delivered as part of a masterplan, although the College has strategic targets in place to strengthen links with Guy's Hospital. Generally decisions have been made on the basis of what facilities can be accommodated where and when – an 'as and when' approach.

Key decision-making factors:

- The decision to go ahead with the project was largely driven by the need for high-quality laboratory space in close proximity to Guy's Hospital, and the shortage of available options in central London.

Lessons learnt

- Working in embedded space within the NHS Estate has high cost implications but the benefits are seen to outweigh this where the availability of such space is limited.
- In contrast to 'traditional' university laboratory fit-out practice, which is often bespoke in accordance with a specific professors wishes, this laboratory has been designed to a generic, modular layout and has future adaptability and flexibility of use in mind.

Further information

Kings College London has important links with Guy's Hospital that are essential to the medical research profile and funding of the university. It is a general ambition of the university to maintain good links with the hospital and this is addressed in the estates strategy as a requirement for research laboratory space that is located in close proximity to the hospital. When the Evelina Children's Hospital at Guy's Hospital was provided with a new state of the art building in 2005, the previous accommodation on the 9th floor of Guy's Tower became vacant and was well-suited to the combined research needs of the College and Hospital.

The College and the Hospital therefore agreed that this could be converted into medical research laboratory space for use by King's College on a leasehold basis. As this is 'embedded' College estate, it resulted in the refurbishment of this floor having abnormal constraints compared to other case studies. Firstly the work to refurbish the floor was carried out in a live hospital environment, i.e. it was essential that services including power, hot and cold water and natural gas and medical gases passing through the floor, remained active as this was essential for the other hospital floors. Secondly the work was carried out within NHS estate rather than College estate, meaning that all heating and cooling services to the building were outside the scope of this project. Supplementary cooling was provided by an independent VRV system.

When previously occupied as the Evelina Hospital, staff had a lot of pride in the facility and it's reputation as a top paediatric intensive care unit. In winter, additional portable electric heater units were used to counteract heat losses from the poorly insulated building fabric.

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Higher Education Sector

King's College, Guys Hospital Tower

The refurbishment laboratory fit-out has been designed to provide optimum future flexibility of operation in contrast to the traditional approach to fitting out a laboratory space in accordance with a particular professor's or department's bespoke research needs. This has been achieved through the use of a laboratory that has been fitted out using a proprietary 'Trespa' system. This allows components to be rearranged easily within the space for future adaptation to research needs.

It should be noted that when the building was originally constructed, it had exemption from building regulations as it was a hospital building, this particularly applied to fire regulations. Also, for the refurbishment of the 9th Floor from a hospital into a laboratory, compliance with Part L2 was complied with where possible.

Given the constraints of this project, the costs reflect the fact that the works have been carried out to an upper floor in a live hospital located in an inner city site. This is further complicated by the fact that the space is embedded within the hospital and KCL are restricted by the space and services that surround them.

As a result of the above there is very little opportunity for capital investment to improve the energy efficiency of the space or take advantage of sustainable design solutions. This is further supported by the fact that the engineering services element of the works represents over 50% of the cost of this project.

However, the real cost benefit to this scheme is in the layout and flexibility built in, by designing generic laboratory space that can be adapted to suit other functions, with specialist spaces for microbiological safety cabinets and fume cupboards centralised in a core area.

The decision for the College to embed a laboratory within the Hospital was very much driven by need, rather than through economic considerations. The requirement to carry out the strip-out and decontamination of the 9th Floor in a live hospital building meant that the work had to be very carefully carried out. Live services feeding through the floor had to be protected. All isolations had to be carried out by the Hospital Trust Works Department. All materials for the project were delivered by an external hoist. Such factors have meant that the refurbishment was relatively expensive compared to a similar project carried out on normal university estate.

The main cooling and heating for this project is provided via central hospital plant which serves the whole of the Tower. All services serving the 9th floor have secondary metering.

Environmental issues were not considered as drivers of this project. Nevertheless some energy efficiency has been considered with high efficiency light fittings with daylight and occupancy linked control to minimise wastage.

Higher Education Sector

University of Birmingham, School of Sport and Exercise Science

Project Summary:
- **Building previously used as laboratory, administrative and lecture space**
- **Part demolition, complete refurbishment and some new build laboratory space**
- **SRIF Funding linked to refurbishment element of project**

Before Regeneration

Long-term adaptability
- Robust structure suitable for re-use, but façade and services required upgrading.
- Reasonable floor to ceiling heights to allow for various re-uses of space.

Aesthetics and brand
- Building façade had deteriorated significantly.
- Site soon to be exposed to new highway running along boundary of campus.

Environmental sustainability and impact
- Building naturally ventilated.
- Single glazed, poor thermal fabric.
- Ingress of rain through concrete panels, damp throughout.

Functionality
- Did not meet requirements of civil engineering department which migrated to other buildings on campus.
- Lecture theatres met basic requirements of campus.

Financial sustainability
- High maintenance and operation costs.

Legislative compliance/risk
- Asbestos, DDA and structural noncompliance issues.

After Regeneration

Long-term adaptability
- Building has been refurbished to high standard with flexible breakout and meeting space.
- Bespoke laboratory facilities included in new build, while refurbished element provides flexible administrative space.

Aesthetics and brand
- Flagship building to house a high RAE performing Sportex department.
- New façade provides modern look, drawing from current architectural pallets of aluminium and timber.

Environmental sustainability and impact
- Thermal insulation standards increased within façade.
- Mechanically ventilated with heat recovery and openable windows to cellular offices for local control.
- Energy consumption was a lower priority than user requirements for control.
- Future energy running cost not considered as high priority.

Functionality
- Refurbishment provides high quality administrative, lecture and laboratory space, while new build element provides bespoke laboratory facilities.
- Lecture theatres in demand by users from across the campus.

Financial sustainability
- Refurbishment of building to accommodate school in modern facilities.
- High level of funding made available from SRIF for refurbishment element.
- Sportex required a high quality facility to retain RAE funding status.

Legislative compliance/risk
- NA

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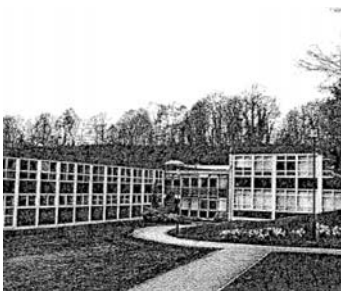


Before regeneration

After regeneration

Higher Education Sector

University of Birmingham, School of Sport and Exercise Science

Project details

Building and project details:

- 2 storey concrete and steel framed building with block rendered skin
- 5,100m^2 gross floor area including; 1700m^2 demolition, 2500m^2 new build, 2500m^2 refurbishment
- Built in 1965 on main campus and housed civil engineering facilities and administrative space
- Demolition and Refurbishment works commenced in 2004 with the buildings official re-opening in 2007, providing bespoke laboratory, administrative and lecture theatre accommodation
- Lucabond system was used in new façade including zinc panels and sto render
- Occupied from 8:00-19:00, 5 days per week

Costs and funding:

- Gross project cost of £16.4m
- SRIF funding accounted for approximately 75% of project cost
- £3,200/m^2 project cost

The decision to **refurbish / demolish**

Decision-making processes:

- Feasibility study undertaken to relocate the Sportex Facility from temporary accommodation in prefab huts to new permanent home.
- Options considered included part and total refurbishment, adding additional stories and locating facilities on other parts of campus.
- Cost analysis of options demonstrated SRIF funding favoured refurbishment element and that Sportex requirements could be met with mix of new build and refurbishment, resulting in the cheapest option to accommodate department on the site.

Key decision-making factors:

- A high RAE performing department required improved accommodation.
- Could make use of redundant space while stimulating the growth of dormant section of campus
- Regional highway expansion project soon to expose the south end of campus, putting previous poorly maintained, tired building at forefront of campus public visibility.

Lessons learnt

- Refurbishment can provide opportunity for re-branding / aesthetic improvements of existing buildings
- Integrity of main structural frame is critical to potential for refurbishment – façade system may be replaced
- Previous building floor to ceiling height sufficient for current administrative requirements for cellular, semi-private office space but not for laboratory which required new build to facilitate.
- In hindsight, it is felt that agreeing the appropriate environmental standards first and then designing the building to suit would have resulted in lower energy consumption, but end user is very satisfied with resulting internal environmental conditions.

Further information

The School of Sport and Exercise Sciences (Sportex) required a new rationalised facility that brought together occupants from its disjointed and poor quality, temporary accommodation across the campus, to a new bespoke facility. The building that was selected for part refurbishment, part demolition and part new build was 1960's office and laboratory building on the south western corner of the campus. The building was in need of extensive maintenance to a failing façade, structure and services. The project to refurbish this particular building was driven by a requirement to provide modern, high quality accommodation for Sportex, and a need to regenerate the south west area of the campus and take advantage of an opportunity to re-use redundant facilities. The aim was to increase activity and vitality and address the visual appearance of the estate, in an area soon to be exposed to new highway developments bordering the campus and an increased level of public awareness.

The refurbished building made use of the existing frame, foundations and floor slabs while providing a modern façade, cellular offices and large lecture spaces. A new atrium space was built to join the refurbished accommodation with new, bespoke laboratory facilities which have surpassed Sportex's expectations in performance. The project provided bookable spaces for use by other departments (lecture theatres, computer labs etc) while providing bespoke laboratory space for Sportex.

The refurbishment project benefited from reduced capital costs, and of the options considered for meeting the Sportex brief was the most economic and provided the optimum benefits to the department and the greater university campus. The retention of the existing structure and floor slabs, and minor upgrades to infrastructure serving the building reduced costs significantly over those of a complete new build solution.

Environmental performance was addressed through quality of space rather than reduced operational impact. The new façade incorporates minimal glazing to office and teaching accommodations, thereby reducing demand for cooling but allows good quality daylight into the new atrium linking space.

Higher Education Sector

University of Birmingham, Muirhead Tower

Project Summary:
- **The tower building has been stripped back to the concrete frame and access cores have been significantly remodelled to provide improvement.**
- **Non–listed iconic building improved and restored to former glory.**

Before Regeneration

Long-term adaptability
- The building is reasonably flexible to adapt. Constraints that exist are the increased/ reduced floor height and significantly reduced glazing area on every third floor – due to bracing beam integrated into floor depth.
- Open plan arrangement is possible.

Aesthetics and brand
- The building had bad publicity, voted the '7th worst in the country'.
- On the plus side it has an iconic form and provides a focal point to the campus.

Environmental sustainability and impact
- Existing building was poor performing with regards to energy consumption. Overheating in summer and insufficient heating in winter was common.

Functionality
- Originally a paternoster lift allowed a good level of mobility and access to all floors. This was removed for health and safety reasons in the 80's, thus impacting on the access performance.

Financial sustainability
- The existing building had significant backlog maintenance cost just to keep operational at minimum performance requirements.

Legislative compliance/risk
- The existing building had a number of significant health and safety risks including falling concrete and glass.

After Regeneration

Long-term adaptability
- The refurbishment project has been designed as cellular teaching and admin space although it is envisaged that this can be adapted to open plan as required.

Aesthetics and brand
- The concrete has been cleaned and a new glazing system will enhance the building. Maintaining the original aesthetic was keenly considered in the new design.

Environmental sustainability and impact
- Thermal fabric of the building enhanced to meet current performance standards where possible. Building is connected into energy efficient combined heat and power plant.
- Retention of existing fabric has resulted in significantly lower environmental impact and reduced project programme.

Functionality
- New additional lift will be added to improve access.
- Intelligent lift management system installed to optimise use.

Financial sustainability
- SRIF funding and environmental considerations favoured the re-use of the existing building.

Legislative compliance/risk
- New additional lift will improve access and comply with current standards.

Continued

Image of Muirhead Tower, built late 1960's

Muirhead Tower – Architect's image

Higher Education Sector

University of Birmingham, Muirhead Tower

Project details

Building and project details:

- The building was designed by Sir Philip Dowson of Arup Associates and completed in 1971. It is a building of high architectural quality and was originally designed to be built from pre-fabricated concrete components. It was actually constructed on site using in-situ methods but retains an appearance of pre-fabrication.
- The approximate gross floor area of the building is 14,000m^2 over 14 floors with approximately 1,700 building users.

Costs and funding:

- The total construction cost for the project was £24M
- An indicative capital cost comparison of different options was carried out at the feasibility stage and an equivalent new-build had a construction cost of £29M. Therefore the refurbishment solution was approximately 83% of the cost of new-build.
- The project received funding from SRIF and the Teaching and Learning fund. Additional funding provided by the University and sponsorship by the Edward Cadbury Trust.

The decision to **refurbish & remodel**

Decision-making processes:

- A formal feasibility study was carried out to assess the different options available. A range of intervention options were considered ranging from a minimal refurbishment to a full new-build solution.
- A workshop was held with the client and project team and a decision-making matrix was used to assess the merits of each option.

Key decision-making factors:

- The 20th Century Society have shown interest in the heritage value of the building and the local authority indicated that the development would be proceeding at risk of not achieving approval during the planning process if demolition was proposed.
- Demolition would be problematic on this site due to surrounding constraints. Underpinning of the adjacent buildings would have been required.
- As part of the decision-making matrix it was noted that the refurbishment option performed well in terms of lower environmental impact compared to a new-build solution.

Lessons learnt

- The decision to carry out the works in two distinct stages was successful. The first stage was an initial enabling contract to strip back the building to the concrete frame and investigate the structure. The second stage is the construction contract for the refurbishment. This has proven successful in eliminating risk and allowing a more accurate tendering process for the works.
- The enabling contract also included an allowance for core-drilling of structure and demonstrating how various elements of the building could be de-constructed, e.g. the original window framing system was shown to easily come free of the concrete up-stand once the bolts were removed.

Further information

Although the Muirhead Tower building had gained a bad reputation, this was probably due to the fact that it had become in need of refurbishment internally and externally, the stair core had been covered in scaffolding for a number of years and the lift service was also poor. On the positive side it is fair to describe the building as 'iconic' and one which creates a good focal point and hub at the centre of the university campus. It is also a building that plays a significant role in the identity of the university to past alumni and present students. The 20th Century Society and English Heritage had expressed an interest in the building due to its architectural quality although no it was not subject to any formal listing. This represented a risk to the project, as planning permission for any scheme involving demolition may have been refused or, resulted in 'spot-listing'.

The proposed refurbishment / remodelling project has recognised the importance of retaining the original aesthetic of the building was particularly the perceived transparency through the building floor plates.

In the context of the overall campus masterplan, significant improvements were required to the building at podium level to provide an improved relationship between the building and surrounding activities and a through-access to meet DDA requirements.

Continued

Higher Education Sector

University of Birmingham, Muirhead Tower

The existing building was performing poorly with regards to access, circulation and health and safety issues. The refurbishment was able to address these issues through the replacement of existing lift services, provision of additional lifts and remodelling of the stair core and circulation to provide improved access and WC provision. The health and safety concerns of falling glass and concrete were addressed through the replacement of the original glass curtain wall surrounding the stair core and repair of failing concrete.

The internal environment benefits from good daylighting on most floors due to a narrow floor plan on each wing and large windows, this quality has benefited the re-use as academic administration space. Where the original design has a concrete bracing beam on every third floor, the level of daylight is poor.

Also the future flexibility of the building has been improved by the refurbishment through the use of demountable lightweight stud partitions to replace the original blockwork.

Remodelling of this nature is the most that can be done to an existing building produce what is effectively a new building incurring the full costs of a new build project. In considering the question of remodel or redevelop, factors that need to be considered are the gross floor area that would have to be replaced by a new building, the cost of demolishing a tower block in the middle of a live campus environment.

The Stage 1 Report: Option Appraisal by Fitzroy Robinson included a review of capital cost expenditure and 'value for money' against a number of criteria, including aesthetics, working environment, capital and construction costs. A new-build solution was viewed as having the best value for money overall with the minimal 'do nothing' refurbishment option viewed as having lowest value for money. Therefore if value-for-money had been the primary criteria by which the decision to redevelop the building had been made, it is likely that the new-build option would have been selected.

The contractor's tendering costs associated with the risk of dealing with an existing building were intelligently managed during the procurement process, through the use of a two stage process. The enabling contract allowed the building to be stripped back to the frame and deal with asbestos removal issues. Also allowance was made within the enabling contract for key structural investigations and some disassembly of building components to demonstrate how this could be best achieved, The refurbishment/remodelling contract therefore involved much less risk to the tendering contractors – whereas they would have previously been less willing to commit a competitive tender for the project.

The key factors which swayed the decision towards the refurbishment/ remodelling solution on this building, and which outweighed the economic appraisal, were the risk associated with planning approval for a demolition option, and the difficulty of demolition and general disruption that this option would cause to the campus, coupled with a desire to regenerate an iconic structure.

The environmental benefit of retaining the existing building was a consideration within the Option Appraisal report and was used as decision making criteria at the team decision-making workshop.

In general the refurbishment project will bring the building up to current part L2 standards where possible through the provision of replacement double glazing and sensitively integrated external solar control shading on the southerly elevation. In addition the external wall panel areas had insulation applied internally where possible. These improvements will greatly improve the energy efficiency and internal comfort. The building is also proposed to have a mixed-mode ventilation solution for natural ventilation as the primary mode where possible and mechanical ventilation to provide adequate air change and cooling during peak load conditions.

In summary, the project was steered away from the replacement option due to the planning risk and disruption involved. The essential remodelling of the stair core will remove the primary problems associated with the building and will allow an iconic building to be restored to its former glory whilst providing a good standard of accommodation provision.

Higher Education Sector

University of York, Vanbrugh Block

Project Summary:
- **Refurbishment of CLASP system collegiate residential buildings and change of use into teaching and administration space for Language Department.**
- **Building stripped back to frame with minor remodelling of cellular plan.**

Before Regeneration

Long-term adaptability
- CLASP system building is difficult to remodel or adapt due to the constraints of the structural system. High number of columns and wind-bracing elements. Therefore cellular space the only suitable solution.

Aesthetics and brand
- Student rooms did not meet with modern accommodation aspirations. Buildings have bland, aged external appearance.

Environmental sustainability and impact
- Existing residential buildings perform poorly with regards to internal environmental conditions and energy use.

Functionality
- Shared kitchen and no en-suite bathroom facilities are low specification compared to modern standards.

Financial sustainability
- Built for low cost they have outlived their original design life with relatively low failure rate of panel system.
- Single glazing and poor thermal fabric likely to have high energy bills.

Legislative compliance/risk
- Extensive use of asbestos as for fire protection
- Building access was non DDA compliant.
- Poor thermal fabric.

After Regeneration

Long-term adaptability
- The project has had an aspiration to extend the life expectancy of the building by a further 15-20 years.

Aesthetics and brand
- Changing the external appearance of the college blocks had previously been a consideration of the university in a separate feasibility study. This is difficult and costly to achieve due to constraints of CLASP system. Therefore windows only upgraded in current refurbishment.

Environmental sustainability and impact
- These factors were not main drivers to the project.
- Due to retention of the existing structure and façade system the environmental impact of the project is significantly reduced relative to a new-build.

Functionality
- The new teaching spaces do not have good acoustic performance relative to the previous language teaching areas.
- Overheating and 'stuffiness' are also issues.

Financial sustainability
- Refurbishing within the constraints of the CLASP system have meant that the project has a high capital cost (approx. 80% new-build costs) relative to the projected extended life. Legislative compliance/risk
- New DDA compliant access core with new stairwell provided with stand alone structure.

Continued

Vanbrugh Block adjacent to lake: Built 1967

Refurbishment completed

Higher Education Sector

University of York, Vanbrugh Block

Project details

Building and project details:

- Vanbrugh block was built as the third college in a construction programme delivering CLASP system buildings. Generally it is known that cost-cutting measures during this programme progressively reduced the build quality. Derwent College (the first built) is the best example of this system on the campus and most likely to receive heritage listing.
- Refurbishment of blocks B and C to provide change of use from residential space to teaching space. Block A has been retained as residential.
- Approximately 1900m² of refurbished admin and teaching space.º

Costs and funding:

- The total capital cost for the project was £3,119,000 total cost including VAT.
- It was estimated by the project team that the refurbishment cost amounted to approximately 80% of the cost of an equivalent new-build facility.
- Asbestos removal and re-felting operation have formed a significant proportion of the final cost of the works. (asbestos removal accounts for approximately 10% of cost of works)
- A whole life costing exercise was not carried out at feasibility stage.

The Decision to **refurbish**

Decision-making processes:

- Feasibility studies had been carried out prior to this project, investigating the potential for upgrading the external appearance of the CLASP system buildings and the potential for refurbishing and remodelling these blocks. It was known prior to commencement of this project that the decision to refurbish the CLASP buildings would result in limited remodelling potential due to structural constraints and relatively high cost vs. a new build facility.

Key decision-making factors:

- The decision to carry out the refurbishment of these blocks was based upon factors dictated by other campus accommodation needs. The refurbishment project is seen as a necessary stop gap measure to facilitate these other projects. These external influences on the project can be described as follows:
- Restrictive planning allowances cover the main campus site– only a maximum of 20% of site area can be developed.
- Languages Dept. building was demolished to make space for new HERC building.
- Vanbrugh Block students were decanted from residential blocks B and C to new improved residential blocks (with en-suite facilities) built outside the main campus site.
- Vanbrugh blocks B and C were refurbished to accommodate Languages Department.

Lessons learnt

- The known limitations of the CLASP building system (limited structural loading capacity, number and distribution of structural columns and wind-bracing elements) have proven to limit the scope of what is achievable in the refurbishment and have impacted on cost.
- The building thermal fabric has been improved, which although reduces winter heat loss, does not help to mitigate against overheating during summer months. The lightweight nature of the building means that it has little thermal stability.
- The acoustic performance of the lightweight frame and building fabric is not ideal for the requirements of languages teaching and learning.
- Refurbishment rather than rebuild or replacement has resulted in a low environmental impact project, although the projected life extension is limited.

Further information

The centre of York University campus is predominated by the original CLASP system campus buildings that leave an interesting yet challenging historical legacy. The CLASP system is a form of construction comprising a lightweight steel frame with concrete cladding panels. One original concept for this construction method was that it was suitable for construction on former coalmining sites where lightweight construction is an advantage.

The Estate Department recognise the importance of the original buildings in terms of their character and setting around the central lake. This character is something that is part of the university experience and brand that is important to the university alumni and current students. This may be something that is related to the scale and layout of the original master plan rather than an affection for the buildings themselves. The fabric of these residential buildings is now tired and represents a poor standard relative to the expectation of modern students. The university also has a good profile as a conference university and it is important that it can provide a high quality of residential accommodation to this market.

Continued

Higher Education Sector

University of York, Vanbrugh Block

Although none of the CLASP system buildings are listed, they are of historical interest and it is likely that Derwent College may attract listed status in the future. This is because this block was

the first constructed and best example of this type of construction. Vanbrugh block has therefore not been affected by these considerations. The university recognise that the existing 1960's residential portfolio is part of a range of accommodation types that are offered across the estate. They represent a lower rental value relative to the modern accommodation on offer and this is an important factor in providing choice to meet a range of student financial needs.

Despite the CLASP colleges age and poor condition they are reasonably satisfactory to students who accept that they pay a lower rental rate. Most problems associated with thermal comfort are typical of a lightweight poorly insulated building i.e. overheating in summer and cold in winter. Students who live in the blocks also tend to feedback positively about the communal nature of the shared facilities, even though they do not have an en-suite bathroom.

Key drivers in the decision making process for Vanbrugh blocks B and C have been general university masterplan considerations for the campus. The central campus site has a very strict development footprint allowance which has meant that most new development is taking place elsewhere. A new residential and academic extension to the campus Heslington East is currently under design development. This will contribute significantly to the quality of residential accommodation available at the university. In addition new residential developments have been constructed to the north of the campus site with up to date accommodation with en-suite facilities.

A new HERC facility was planned for the central campus site and to accommodate this, it was decided to demolish the Languages department building and build the new facility in the same footprint. This resulted in the Languages Department needing alternative accommodation for its teaching and administration activities. The Vanbrugh blocks B and C were selected for this as the residents could be decanted to other new accommodation outside the central campus.

Previous studies had been carried out by York University Estates department to investigate the potential for integrating en-suite facilities into the college buildings. This was deemed to be cost prohibitive due to the complications of working with the structural grid of the CLASP system.

The conversion of the Vanbrugh Blocks B and C into teaching and accommodation required significant internal stripping back to the structure, replacement of services and realignment of the central corridor. Additionally, the thermal fabric was improved to meet current regulations as best as possible, including replacement of windows. The overall capital cost of the project was therefore relatively high and noted to be around 80% of the cost of a new-build project while the expected lifeexpectancy of the refurbished buildings is 15 years. The Estate Department recognised that the decision to refurbish had not been made on capital cost grounds, but on providing the required teaching and administrative accommodation within a tight time frame and with minimal disruption to the central campus)

One of the biggest cost risks in 1960s buildings is asbestos. Whether refurbishing or redeveloping it has to be either controlled or more likely removed. Where buildings are to be demolished, removal can be dealt with more easily, than in a live environment typical of refurbishment projects. For the cost of the refurbishment the University have got a refreshed building, but due to the structural limitations of this type of building, if there had been a need for major structural improvements, then the cost of refurbishment is likely to have been equivalent to redevelopment, which would have produced a far more sustainable and energy efficient building.

The refurbished buildings have not proven to provide an ideal environment for languages teaching as they do not perform well acoustically. The buildings have kept the original single-sided natural ventilation solution and suffer from the same original problems of summertime overheating and stuffiness during peak summertime conditions. As the buildings have been refurbished rather than demolished and rebuilt, there has been a significant environmental benefit. This results from reduced energy and environmental impact due to the process of demolition and re-building, though this was not a major factor in the decision making process.

In summary, the project to refurbish and change use within the Vanbrugh blocks was largely driven by external master planning factors and the need for replacement teaching and administration accommodation within a short time frame. The project demonstrates what can be achieved within the difficult physical constraints of the CLASP system though it may not always provide ideal accommodation standards.

Higher Education Sector

University of Bath, Building 4 West

Project Summary:
- **Demolition of 1960's laboratory building to provide new-build general teaching and lecture theatre accommodation on the same site.**

Before Regeneration

Long-term adaptability
- Original science building had good floorto- ceiling height but required major stripout and re-modelling.
- Deep floor plan limited daylighting and ventilation opportunities.

Aesthetics and brand
- Architectural quality of building, internally and externally, unremarkable.

Environmental sustainability and impact
- The existing building had poor environmental performance, no insulation, redundant plant.

Functionality
- Chemistry department had moved from building leaving rooms unused and unsuitable for other purposes.

Financial sustainability
- Building unused therefore financially unsustainable.
- Uncertainty in assessment of structural life gave grounds for concern

Legislative compliance/risk
- Existing building required significant upgrade to meet with current standards for thermal performance.
- Use of limpet asbestos created a major management problem.
- Building access did not comply with DDA 1995.

After Regeneration

Long-term adaptability
- New building provides additional floor & enlarged footprint.
- New building has been designed to allow further development phases to connect within the extent of the site created.
- The building plan has been developed to give both flexible and efficient floor space at all levels suitable for academic use.

Aesthetics and brand
- University wanted a higher quality appearance—beyond scope of refurbishing.
- New build proposals adopt a similar aesthetic to the existing building stock with exposed pre-cast concrete panels

Environmental sustainability and impact
- The new building has been designed and constructed along current best practice standards to meet the BREEAM ' Excellent' Rating.
- High thermal mass and concrete core cooling.

Functionality
- Positioning of internal columns allows flexibility

Financial sustainability
- Savings in cost of use considered to justify additional cost of new build

Legislative compliance/risk
- Addresses all compliance issues.

Continued

Higher Education Sector

University of Bath, Building 4 West

Project details

Building and project details:

- Existing 4-storey plus basement 1960's chemistry laboratories replaced by new-build general academic and seminar space. The new build floor area is 3946m^2.
- The new-building was constructed from an in-situ concrete frame with pre-fabricated concrete cladding panels, maintaining the original aesthetic of the original 1960's Parade area of the campus.
- New building has been designed with mechanical ventilation and comfort cooling throughout. The refurbished Nucleus building areas are to be naturally ventilated under manual occupant control.

Costs and funding:

- The total project cost including the new-build, nucleus refurbishment, external works, fit-out and fees was £17.225M which equates to £3483/m^2
- The refurbishment of the Nucleus area cost circa £1,700/m^2 and the new-build element costs £2,100/m^2, both are net construction costs and exclude fees and VAT.

The decision to **rebuild**

Decision-making processes:

- Feasibility study carried out examining two different refurbishment and phasing options with comparison against typical new build costs.
- Initially, refurbishment was the recommended option considered by the Estates Committee.

Key decision-making factors:

- The decision to demolish and rebuild was not the recommended option within the feasibility study but was adopted by the University as the level of uncertainty and risk, remaining with the refurbishment option, out-weighed the additional cost of demolition and replacement.
- Additionally, new build provided the opportunity to enhance the image of the building.

Lessons learnt

- Costs are likely to be finely balanced, decisions are likely to rest on areas of uncertainty and assessed risks.
- Risks and costs relating to the management and removal of asbestos in similar buildings, and the implications for refurbishment or demolition, warrant detailed consideration.
- The cost of demolition, scope for re-cycling of materials and all related costs justify close consideration as well as adequate allowance in the overall project programme.
- An interesting observation that can be made from the information available for this case study is that the difference between the cost of the new build and the cost of the refurbishment is not as much as one might expect, but this may relate to the structural work done to create the new lecture theatre.

Higher Education Sector

University of East Anglia, Ziggurat Residences

Project Summary:
- **Two residences blocks of a total of ten towers, refurbished to upgrade failing building services and ablutions**

Before Regeneration

Long-term adaptability
- Inflexible insitu-concrete construction limited any change or re-configuration of room sizes and uses
- Bathroom / toilet facilities were designed for single-sex occupation of each level.
- Building changed to mixed occupancy in 2000, and not meeting user requirements

Aesthetics and brand
- Alumni associate strongly with the architecture of the buildings, and are respected as iconic by the institution
- Buildings were listed in 2003 and are now subject to UEA Conservation Development Strategy in consultation with English Heritage

Environmental sustainability and impact
- Building part naturally / part mechanical ventilation.
- Large south facing single glazed windows were upgraded to double glazed units in 1992. Internal environment difficult to control—hot in summer and cold in winter
- High energy use

Functionality
- Building services failing.
- Bathroom / toilet facilities difficult to maintain and unpopular with residents

Financial sustainability
- High maintenance and operation costs
- High cost to refurbish due to listed status.

Legislative compliance/risk
- Asbestos, DDA and non-compliance issues.

After Regeneration

Long-term adaptability
- Rooms refurbished in line with Conservation Development Strategy— refurbishment will not affect future adaptation
- Bathroom / toilet facilities upgraded to be in line with current market standards
- conic architecture and interior layout preserved

Environmental sustainability and impact
- High quality minimal refurbishment has resulted in greatly reduced environmental impact relative to a new build accommodation being provided.

Functionality
- Bathroom / toilet facilities remodelled to provide increased access to multi-sex occupants and maintenance staff
- Refurbishment priorities facilitated future maintenance—particularly internal drainage and plumbing.

Financial sustainability
- Refurbishment led to increased rental income being obtained

Legislative compliance/risk
- Asbestos, and non-compliance issues

Continued

Higher Education Sector

University of East Anglia, Ziggurat Residences

Project details

Building and project details:

- Two concrete accommodation blocks totalling ten towers, built between 1964-1967
- Built with a combination of pre-cast concrete and in-situ concrete elements
- Total accommodation of 483 single and 79 double bedrooms and related facilities.
- Project subject to the UEA Conservation Development Strategy (allowing development within set parameters) in respect of building's grade 2* listing (2003)
- Remodelling of the ablution blocks, replacement of desks, replacement of washbasins and drainage, upgrading of extract air handling plant, removal of water tanks, upgrading of external drainage.

Costs and funding:

- Project cost £8.57m
- Construction cost £13,369 / bedspace

The Decision to **refurbish**

Decision-making processes:

- Feasibility study undertaken to investigate a range of refurbishment options
- Project scope focused on improvements to student bedroom and ablution facilities and ease and cost reduction of maintenance.
- Project instigated by Accommodation Department wishing to provide services and bathroom / toilet facilities in line with the level of provision at other universities.

Key decision-making factors:

- Estate requirement to maintain integrity and use of listed status building within constraints of Conservation Development Strategy.
- Rental increase justified project refurbishment costs
- Reduced level of complaints from students anticipated

Lessons learnt

- Cellular concrete structure limits future adaptability and refurbishment must be undertaken within constraints
- Listed status on 1960's building stock must be addressed through consultation with government bodies and project stakeholders in order to meet current market requirements while resulting in a rent which is still affordable by students
- Building services replacement with maintenance requirements and access key to realising sustainable design solutions
- Targeting maintenance issues in project ensures higher occupant satisfaction as well as reduced maintenance demands
- DDA compliance may be addressed on a site wide basis, making reference to other more compliant buildings, when dealing with listed status building stock.
- Internal demolition possible as shown to be within original design philosophy.

Further information

The University of East Anglia originally erected their Denys Lasdun designed 'Ziggurat Residences' in 1967. A series of 10 repeated towers with a total of 562 bedrooms, facing south over a man-made water feature onto a private wood, the residences form a large part of the University brand and share the same brutalist architectural style as much of the campus. The buildings are renowned worldwide and respected as one of the best contemporary examples of the ziggurat building style. Important to the reputation of the University, the maintenance and preservation of these buildings plays a key part in the expansion of the campus with new, modern academic and accommodation buildings.

The buildings were given Grade II* listed status in 2003 to protect their significant heritage value, while the estate has since adopted a Conservation Development Strategy in conjunction with English Heritage to guide the development of new, and refurbishment of existing buildings, across the estate.

Continued

Higher Education Sector

University of East Anglia, Ziggurat Residences

Unlike Royal Holloway, whilst the intent was to upgrade existing accommodation ,the constraint ofhaving a listed and 'iconic' building, dictated that a refurbishment solution had to be found. The building was recognised as having poor flexibility and while this has imposed limitations on remodelling,these have been deemed acceptable in the wider context. Again, increased revenue from student rents, while not the main driver, has underpinned the business case.

The Ziggurats were originally designated for single sex occupancy on a corridor by corridor (or level) basis, but were re-designated as mixed accommodation in 2000. Due to the heavy weight inflexible internal partitions, this meant that the rationalisation of ablution blocks to co-ed use became problematic. Inflexibility of the structure and the conservation strategy made the provision of lifts for access to upper floors problematic but, this was not pursued as many other residences do have full access.

The individual rooms, which do not boast the en-suite services found in other residences on the campus, are still sought out and desired by students, and are referred to in high regard by past alumni. The 2006 refurbishment project focussed on addressing student complaints and easing maintenance which were both predominantly linked to the degradation of services in the buildings.

The business case for the project was driven by the improved quality of accommodation, which would generate a rise in rental income, and a decrease in maintenance costs. A project cost of £21m was assessed to fully update the building, while a reduced scope (£8.6m) was taken forward, focusing on increasing the desirability of buildings for students and lowering maintenance duties and associated costs. This equated to a cost of circa £13,369 / bedspace.

The University Estate is known for its commitment to the environment and has a made a strong move towards energy efficient buildings since the end of the 20th century and is home to the widely known Elizabeth Fry Building. The ability to include further environmental improvements and initiatives in the project were limited by cost considerations, although double glazing had been installed in a previous refurbishment in 1992.

Higher Education Sector

Royal Holloway, Residential Halls

Project Summary:
- **Athlone Hall, Cameron Hall and Williamson House (the Halls) were demolished to make way for new residential buildings with improved social groupings and en-suite facilities.**
- **Long-term financial sustainability and branding are key drivers.**

Before Regeneration

Long-term adaptability
- The buildings were inherently inflexible and difficult to adapt due to the nature of their cellular construction with heavyweight concrete blockwork internal walls

Aesthetics and brand
- The original aesthetic of the building was for fair-faced concrete block throughout. This was a raw aesthetic and had aged poorly
- No longer deemed suitable to modern student accommodation and conference market standard.

Environmental sustainability and impact
- The buildings performed poorly with regards to heating and lighting energy consumption.
- Small windows, ageing services and fabric

Functionality
- The lack of en-suite facilities and poor quality shared bathroom and kitchen facilities did not meet prospective student or conference accommodation requirements.

Financial sustainability
- The business case was reviewed for refurbishing the blocks. This could not have resulted in increased future revenues from the market and therefore no return on investment nor ability to sustain improvements made.

After Regeneration

Long-term adaptability
- The building design does not really allow for future change of use from residential as the rooms are cellular, 'tunnelform' construction. Can be used for student & conference facilities.

Aesthetics and brand
- The provision of the new residential buildings adds aesthetic value and increases the university brand – particularly to the conference market.

Environmental sustainability and impact
- The new residential developments have had BREEAM /Eco Homes assessments carried out and have achieved a 'Very Good' rating.
- Demolition has high environmental impact.

Functionality
- The rooms are arranged into social groupings of eight persons per 'unit', thus resulting in better student welfare and management. Each room has ensuite facilities.

Financial sustainability
- Extensively analysed through the feasibility process. The option to demolish the Halls was taken primarily on the back of optimum life-cycle cost and future revenue streams.
- 98% of demolition material recycled.

Legislative compliance/risk
- The new buildings are fully compliant with modern standards.

Continued

The Halls

Residences New-Build

Higher Education Sector

Royal Holloway, Residential Halls

Project details

Building and project details:

- The Halls were constructed in 1967 as 5 storey residential wings comprising part of a development that connected onto central dining hall and student union /bar facilities, constructed at the same time.
- The buildings had a very 'raw' aesthetic, using exposed concrete and fair-faced concrete block work throughout. The rooms and fittings and services had become in need of major refurbishment.
- A new site on campus in the East Field was available for development for new-build residential halls –this allowed the Halls to be demolished without an interim loss of bedrooms.
- The Halls sites are now being redeveloped using the same new-build residential model as was used on the East field site. The façade aesthetic has been varied to give a more 'urban' look. The student capacity has thereby been increased in line with university growth plans.
- The project has resulted in an increased efficiency in net floor area and number of bed spaces.

Costs and funding:

- Forecast in 2000, the cost of rebuilding the blocks was estimated at £26.3M for the residential blocks, £11.8M to provide a new-build amenities building, £11.4M abnormal costs and a further £15M for the East Field construction. Refurbishment options cost approx. £20M excluding other works.
- Preferred option resulted in provision of greatest number of bed spaces best value in terms of cost per bed space and optimum Net Present Value.

The decision to **rebuild**

Decision-making processes:

- The decision making process was initiated due to urgent action required to maintain and refurbish the Halls due to age, weather ingress, failing services, failing structure and roof, poor access and out-of-date services. The cost of this was deemed prohibitive and other options were investigated. It was established the that refurbishment would not allow for increased returns on rental values over long term.

Key decision-making factors:

- Aesthetics and profile of the university campus
- Requirement for high quality residences for students (primarily) and other guests
- Financial sustainability through improved revenue from the Halls

Lessons learnt

- The Halls replacement project, creating 466 en-suite bedrooms (1031 including the East Field site), is seen as very successful in terms of the improved quality and numbers of accommodation units on the campus.
- Options for refurbishment / remodelling of the existing halls was investigated thoroughly through feasibility studies– it was understood and documented that the requirement for ensuite facilities could not viably be met within the remodelled blocks, whilst meeting the requirement for increased student numbers. Relative to new-build options this resulted in a higher expenditure per bed space and would not realise an increase in rental values sufficient to make the investment sustainable.
- The element of the existing halls that has been retained has been refurbished to a high specification as hotel accommodation for visiting lecturers or wider public. This accommodation is, however, a successful albeit small scale refurbishment, and demonstrates that quality can be achieved through re-use of the existing fabric.

Further information

Royal Holloway has been able to benefit from its location on the edge of London with an attractive campus rich in natural features and close to Heathrow airport, to become an important centre for academic and business conferencing. The brand and profile of the College is therefore not only important to students and alumni but also to the conference market. The College has also has an expansion plan that has been considered through the provision of additional residential accommodation across the campus. This has been met in part through increased bed numbers in the redevelopment of the Athlone and Cameron Halls sites.

The Athlone and Cameron Hall Buildings were perhaps typical of a late 1960's residential block aesthetic with bare blockwork walls and simple wooden fitted storage. This accommodation had degenerated to a poor condition and was not popular with students. In addition to the low aesthetic appeal of the accommodation, the blocks performed poorly with regards to providing environmental comfort due to poor building fabric and glazing. In addition the halls did not have en-suite facilities which are an expectation of modern students and conference guests.

Continued

Higher Education Sector

Royal Holloway, Residential Halls

The Facilities Management Department commissioned a comprehensive economic review of numerous options through a market and detailed financial analysis of 13 different development options for meeting the College's accommodation expansion needs. These options included additional development of the East Field site on the campus as well as refurbishment and rebuild options with varying levels of intervention for Athlone and Cameron Halls. Investigation into the potential for refurbishing the existing buildings had been undertaken but the main difficulty with this was the ability to provide en-suite facilities within the inherently inflexible blockwork wall arrangements.

The financial analysis included a Net Present Value (NPV) calculation for each of the options based on a 25 year period. Whereas nearly all options demonstrated a negative value of more than £10M, the preferred option showed a negative value of only £60K i.e. minimal net cost over 25 years. The 'actual' build projects however were developed against revised financial models which showed positive NPVs. A key factor in the analysis had been the market view that simply refurbishing the Athlone and Cameron Halls would not support an increase in rental income – either from the student residential or conference markets. The provision of new-build accommodation was deemed to significantly raise the standard of service to residents (including en-suite facilities) and therefore a higher rental income could be achieved.

Unlike teaching and administrative buildings, residential accommodation has a clear revenue stream and improved quality of accommodation will support increased income from both student and conference markets.

The poor flexibility of the original buildings and the objective to provide en-suite facilities make the case for refurbishment unsupportable. Introduction of en-suite to bedrooms would have required the creation of a large number of service ducts through the building for the domestic services and ventilation.

The environmental impact of demolition and waste disposal of demolition spoil from the existing buildings was not a factor that was high on the agenda in the decision making process although, a 98% level of recycling was achieved during this phase of the project. Best practice BREEAM environmental standards were however a key consideration in the development of the new residential buildings developed both on the East Field site and in replacement of the Athlone and Cameron Halls.

Whereas the previous buildings were poorly performing with regards to energy use, weather-ingress and air-tightness, the new buildings are constructed to be well insulated to current regulations and through using 'tunnel-form' concrete construction have an inherently high-level of air-tightness to minimise heat loss. They are therefore more comfortable and economic to operate.

In summary, it may have been possible to refurbish the existing halls to meet with modern standards but, the inclusion of en-suite facilities would have been disproportionately expensive and would have led to a considerable reduction in bed spaces for the College. Therefore, primarily from a business case perspective and, a desire to significantly increase the number of rooms available and improve the quality of provision to residents, it was decided that re-building was the best option. The work that has been carried out, successfully meets the College's aims and objectives. Considered from an environmental perspective there has been significant environmental impact from the demolition and disposal of the existing building material and embodied environmental impact in the development of the equivalent new-build accommodation to replace the old. On-going energy use per bed space will decrease significantly in the new building compared to the old, but water use is likely to increase in total because of the increase in facilities but losses and wastage should be reduced.

Higher Education Sector

University of Surrey, AC & AY Buildings

Project Summary:
- **Remodelling and refurbishment of 1960's laboratory buildings.**
- **Substantial strip-out and re-modelling, new services and fenestration.**

Before Regeneration

Long-term adaptability
- Existing building had good adaptability with high floor to ceiling height.
- Deep floor plan imposed restrictions
- Good sized vertical service risers
- Terrace areas offered scope to increase floor area at low cost.

Aesthetics and brand
- Not a key issue
- The campus has other landmark buildings.

Environmental sustainability and impact
- The existing structure and envelope were retained thus reducing the environmental impact of the project.

Functionality
- Building did not suit new requirements resulting from space rationalisation exercise.

Financial sustainability
- There was a range of LTM items to be addressed.
- No single source of funding was able to meet the cost of the projects

Legislative compliance/risk
- There were outstanding DDA issues.

After Regeneration

Long-term adaptability
- The refurbishment project largely focuses on providing large spaces such as lecture theatres, seminar rooms and laboratories.

Aesthetics and brand
- There is no significant change.
- Some internal areas achieve a much enhanced 'feel'.

Environmental sustainability and impact
- The structure is estimated to have a least a further 40 years of life.
- The building is capable of meeting future requirements by providing ease of adaptation.

Functionality
- The buildings' position in a central location is ideal for concentrating teaching facilities and reducing travel time.

Financial sustainability
- In addition to using the University's own resources, 5 separate funding streams were utilised.

Legislative compliance/risk
- Access shortcomings have been addressed.
- Services meet updated standards

Continued

Higher Education Sector

University of Surrey, AC & AY Buildings

Project details

Building and project details:

- The existing 5 storey buildings were constructed in 1966.
- Works to AC Building, formerly laboratories, involved replacement of fenestration, electrical services, ventilation, sanitary facilities and adaptation of heating, + remodelling of space
- Work undertaken in phases due to nature of funding mechanism
- Work undertaken with AC Building completely un-occupied, works in AY undertaken on a floor by floor basis with continued occupation of the other floors.
- AY Building now provides updated facilities for laboratory based teaching and research.

Costs and funding:

- The total cost of refurbishing the AC Building was £5.254m.
- For comparison, a new build cost, ignoring decanting and removal costs, was estimated to be £10.691m
- In addition to University resources, HEFCE 'Poor Estates', Capital and CETL initiatives were used to meet the total costs

The decision to **refurbish**

Decision-making processes:

- Following detailed evaluation of options by the Estates Department, and approval by the Estates Committee, full approval was granted by the Finance Committee.

Key decision-making factors:

- Evaluation of the building's condition with particular reference to its remaining life of components.
- An assessment was made of expenditure to bring the building back to condition 'B' (approx £2m)
- Functionality and usability of the space within the building
- Planning constraints
- Location and logistics
- Funding sources

Lessons learnt

- Original design decisions play a major part in the flexibility to remodel space in the course of a building's life.
- Floor to ceiling height and size & location of service risers are critical
- Double height spaces may not be capable of efficient adaptation
- Interior design can have a significant effect on resulting aesthetics.
- Major works in occupied buildings can be adequately managed, albeit with some additional costs..

Further information

The AC Building, constructed in 1966 had accommodated the Materials Science and Physics laboratories as well as the Management Science department. Following a rationalisation exercise, the areas formerly occupied by these departments became vacant.

It was appreciated that there would be significant advantages from concentrating teaching facilities, in one centrally located building, rather than them being spread across the campus in individual academic departments. Refurbishment and adaptation of the AC Building allowed this aim to be achieved.

Typically, cost of refurbishment/re-modelling is linked to the base architecture of the building being considered. Often, laboratory/science buildings tend to be most flexible due to their generous storey heights.

Five individual HEFCE funding initiatives were used, in addition to University resources, to meet the cost of the full project. Because of the rules relating to expenditure against each initiative, work was undertaken in phases and took approximately four years to complete.

The resulting facilities are well regarded by staff and students and have achieved their objective in providing centrally located teaching and support facilities. The utilization of teaching space is improved as a result of co-location and central control.

One limitation has been that it has not always been possible to achieve efficient use of all the originally double height spaces.

With regard to the AY Building, work has mainly related to the extensive refurbishment of laboratory facilities. This has demonstrated that by effective planning and management, along with a degree of tolerance on the part of the occupants, significant works can be undertaken without the need to totally vacate a building.

Higher Education Sector

University of Liverpool , Proudman Oceanographic Laboratory

Project Summary:
- **Remodelling of existing 1920's university building for new tenant client, Proudman Oceanographic Laboratory**
- **Building stripped back to frame. Façade and part of roof demolished and replaced**
- **Insertion of new-build block to provide entrance foyer, circulation core and meeting**

Before Regeneration

Long-term adaptability
- Existing building had good adaptability with high floor-to-ceiling height and narrow floor plan

Aesthetics and brand
- Consideration not relevant to this case study. Building disused prior to remodelling.

Environmental sustainability and impact
- The existing structure and floor plates were retained thus reducing the environmental impact of the project.

Functionality
- Consideration not relevant to this case study. Building disused prior to remodelling.

Financial sustainability
- Existing building had structural defects in the façade. The façade, due to impending instability, had been condemned for demolition—therefore a minimal cost basic refurbishment was not an option.

Legislative compliance/risk
- Existing building required significant upgrade to meet with current standards.

After Regeneration

Long-term adaptability
- Natural ventilation and good day-lighting have been achieved with a flexible open plan main office.

Aesthetics and brand
- The development has a sleek, modern appearance and enhances the profile of Liverpool University and the Proudman Institute.

Environmental sustainability and impact
- The project scored BREEAM 'Very Good' rating. Passive design minimises energy use.
- Re-use of structure has good environmental benefit.

Functionality
- The building meets the brief requirements of the Oceanographic Laboratory well. A workshop area has been accommodated into the basement area.

Financial sustainability
- The new facility has greatly improved running cost performance relative to the Institutes previous headquarters.

Legislative compliance/risk
- New-build standards have been addressed along with access requirements.

Continued

View of site prior to development showing gap between buildings

Replaced façade and new-build extension

Higher Education Sector

University of Liverpool , Proudman Oceanographic Laboratory

Project details

Building and project details:

- Existing 3-storey plus lower ground floor 1920's Thornley Building (previous use as timber storage warehouse) stripped back to structural frame and floor plates, new façade and roof built.
- New-build extension added into adjacent vacant plot including new circulation core, foyer, café and meeting room spaces.
- Workshop provided within lower ground floor space – primarily used for marine research instrumentation production.

Costs and funding:

- The project was funded through Proudman Laboratory, and Natural Environment Research Council not through University funding streams.
- The Proudman Laboratory carried out their own running cost analysis – looking at a comparison of utility bills in their previous building (a Victorian building located on the Wirral) to the proposed new building, the improved performance of the new facility was considered as a whole life cost benefit.

The decision to **rebuild**

Decision-making processes:

- Structural investigation of condition and loading capacity of frame and foundations was carried out to determine the capability and life-expectancy of the existing building frame for future re-use.
- A feasibility report was written by ADP architects comparing the two main development options. The recommended solution was for the remodelling of the existing building with a new-build extension; this was compared against a proposal for complete demolition and rebuilding on the same site.

Key decision-making factors:

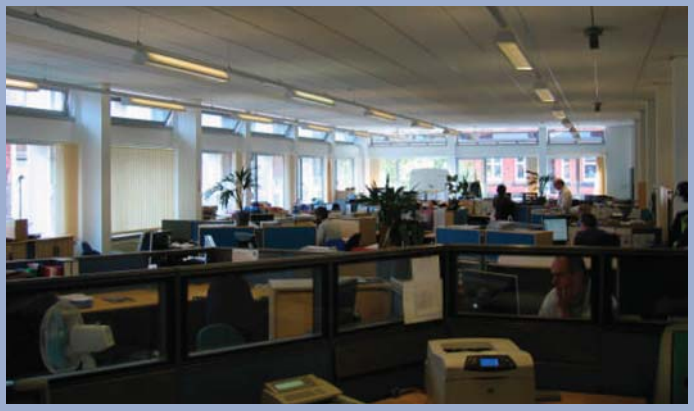
- The building façade had become unsafe and needed to be rebuilt but other structural elements remained sound. The façade brick and stonework were carefully dismantled for sale as re-usable materials.
- Complete demolition and re-building of the whole structure would have created much noise, dust and disturbance to neighbouring academic buildings and run the risk of delay in obtaining planning approval.
- Basement foundation structure and existing university services did not need to be disturbed and diverted.
- The remodelling option offered savings on cost of new works and structure and offered improved programme.
- Remodelling offered the most environmentally friendly solution relative to re-build options.

Lessons learnt

- The building had very good potential for adaptability to future use with generous floor to ceiling heights c. 4m and good natural daylight and ventilation potential.
- Building remodelling options offer opportunity for savings on cost and programme.
- The project is a good example of making the most of an existing building with a suitable reuse but remodelling to meet current access requirements and extension to provide additional facilities.

Continued

The use of fins to provide good solar control



High floor to ceiling height and narrow plan allow good daylighting and natural ventilation

Higher Education Sector

University of Liverpool , Proudman Oceanographic Laboratory

Further information

The 1920's Thornley building had remained as a disused part of the University of Liverpool estate for a number of years prior to being remodelled. This development site was as an opportunity to bring the leading UK oceanographic research institution, located on the Wirral, into a closer proximity to the University, with clear synergetic benefits in terms of collaborating on research projects. This proposal was beneficial to both parties in terms of improving their research potential and national profile.

The Proudman Oceanographic Laboratory was previously accommodated within a Victorian estate set in attractive surroundings, on the Wirral. The buildings themselves had character, but although well liked, they were not well suited to provide the type of working environment and facilities required for the Laboratory. The Laboratory was also keen to find a facility that would be more energy efficient and economic to run.

It was a risk in terms of staff retention for the Laboratory to move to the centre of Liverpool because of the increased travel requirements for many. It is therefore a good reflection of the success of the project that staff retention has remained high through the move and staff illness and absenteeism has significantly dropped since the move. This indicates that staff are generally satisfied with the new building.

Internally the building offers tall floor to ceiling heights and good daylight and natural ventilation throughout the main office floor and administration areas. The fins on the front façade provide some good solar control the easterly facing elevation and help prevent overheating in summer. Occupants are generally happy with this environment, although a few peak temperature days in summer were uncomfortable.

The new-build extension, provided 870m^2 and allowed the access and circulation requirements for the building to be properly addressed. The establishment of a shared University/ Laboratory library resource, meeting rooms and a social hub/ café space, help promote interaction between the University and Laboratory staff and students.

In terms of the development costs for this site, a feasibility study carried out by ADP architects recommended that the existing building be retained, offering capital cost benefit through the saving on demolition works, excavation and rebuilding works. Typical of an inner city site, the costs and disruption to the surrounding area that would be associated with the demolition of the existing building would be a significant risk and expense. The ability to re-model the existing building will have made a significant saving in capital cost.

In addition there would be a cost saving on the reduced requirement for the disposal of the demolition waste. In addition to this it was noted that there would be a programme benefit and associated cost saving through taking this approach. This approach reduced the length of time, noise and dust disturbance affected neighbouring academic buildings.

The requirement to replace the existing façade also ensured that the building was brought up to modern Building Regulation thermal fabric and air-tightness standards, ensuring that it will be comfortable and economic in use.

Risk was managed and consequently reduced because extensive investigative works, to establish condition , suitability, load carrying capacity etc, were undertaken in advance of tendering the main contract.

Environmental considerations have been key drivers behind the desire to keep as much of the existing building as possible. The feasibility study highlighted the environmental benefit of reducing waste through retention of the structural frame and recommended the careful dismantling of the existing brick and Portland stone façade for re-use. The benefit of reduced noise and dust pollution were also valued as part of the decision making process.

The remodelled building has reduced environmental impact through making use of the opportunities afforded by the high floor to ceiling height and narrow plan depth, resulting in good passive ventilation and day-lighting which minimise energy use. The scheme also achieved a 'Very Good' BREEAM rating.

Other Sectors

BSkyB, New Horizons Court, Middlesex

Project Summary:
- **Redevelopment of 1980's offices on British Sky Broadcasting's West London Campus for approx 1,000 staff including senior executives.**
- **Ceiling and building services stripped out to increase floor to ceiling height and new servicing**

Before Regeneration

Long-term adaptability
- The existing floor plans were generally a combination of perimeter cellular offices with internal partitions being of dry lined construction.
- The floor to slab height was 3.6m, although the existing floor to ceiling height was only 2.6m due to a suspended ceiling and services zone. This meant that within the confines of the structure there was reasonable potential for future adaptation.

Environmental sustainability and impact
- The facade was poorly built with inadequate insulation and high infiltration. Low floor to ceiling height lead to uncomfortable internal environment.

Financial sustainability
- The existing building had been occupied for 15 years, however the building façade and the building services were in urgent need of upgrading to improve thermal performance and indoor comfort.

Legislative compliance/risk
- Existing building required significant upgrade to meet with current standards for thermal performance.
- Building access did not comply with DDA1995.

After Regeneration

Long-term adaptability
- Freestanding pods that have flexible services connections have been provided for future reconfiguration.

Aesthetics and brand
- The refurbishment provides visually interesting and dynamic space which meets the aspirations of the client.

Environmental sustainability and impact
- Full fresh air ventilation with heat recovery makes use of exposed ceiling soffitscombined with chilled beams to temperinternal environment
- Where possible existing materials wereretained and re-used.

Functionality
- A platform desk system was specified to support new working methods, and increase team interaction and communication. This was facilitated by the structural grid and high exposed floor to ceiling height.

Financial sustainability
- Refurbishment has extended building lifespan while providing a low energy servicing arrangement in line with current market standards.

Legislative compliance/risk
- Fully compliance with fire regulation,DDA 1995 and CDM.

Continued

Before regeneration

After regeneration

Other Sectors

BSkyB, New Horizons Court, Middlesex

Project details

Building and project details:

- Client: BSkyB; Architect: BDP; Service Engineer: Hurleypalmerflatt,
- An extensive £25M refurbishment and fit-out of the 15 year old buildings to create 12,351sqm net internal area and provide accommodation for 967 staff within 12 departments including the executive group.
- The refurbishment involves a full refurbishment of three buildings and a part refurbishment of one building. Full refurbishment involves a complete strip out of the existing partitions, ceilings and floor finishes together with the associated building services installation while part refurbishment included the renewal of some partitions, fit out of the restaurant and servers.

Key decision-making factors:

The key briefing requirements and factors within the decision to refurbish were:

- The project forms part of BSkyB's masterplan to redevelop the Isleworth Campus. A phased occupation of the New Horizons Court buildings was planned to facilitate the remodelling.
- The aspiration of the project is to create an open plan flexible space which has a light and spacious feel in which the fit out components are freestanding objects that allow for future reconfiguration.
- Variety of choice of spaces and working styles within the work environment
- Use of colour to add clarity and individuality
- Quality of space and finish
- Reflect brand values – Sky is an Entertainment provider

After regeneration

After regeneration

Other Sectors

Forty Four Peter Street, Manchester

Project Summary:
- **25,000 sq. ft of Grade A office space.**
- **BDP were commissioned with creating an entrance area to match the high-quality branding aspiration of the client.**

Before Regeneration

Long-term adaptability
- The building was flexible, but only suited to commercial office use.

Aesthetics and brand
- The building façade appears 'lowered' due to low 'A' shaped portico above the entrance doors
- This 'lowering' effect coupled with the use of bronze tinted glazing created a somewhat negative elevation at street level.

Environmental sustainability and impact
- The installation of the canopy and the low glazed area minimized the potential for daylighting.
- As the building was constructed in the late 1980's, little environmental awareness was raised for the project.

Functionality
- The building performed reasonably well, but had poor quality core areas and very poor reception space.

Financial sustainability
- Not addressed

Legislative compliance/risk
- Building was compliant with relevant legislation

After Regeneration

Long-term adaptability
- The first floor slab was cut back to create a double height glazed entrance space, increasing the potential for future adaptability.

Aesthetics and brand
- An aesthetic of organic sculptural planes encapsulate the reception space, drawing the eye in from the street through to the reception desk and lift lobby.
- A slatted timber wall and curved bulkhead form a stunning backdrop accentuated with a combination of subtle concealed illumination and dramatic feature lighting.

Environmental sustainability and impact
- The removal of an existing entrance canopy and the first floor slab being cut back allows natural light to penetrate further into the deep plan interior.

Functionality
- Only positive feedback has been received.

Project details

Building and project details:
- Client: Magnus Ltd; Architect: BDP
- Project value circa £1,000,000, completed 2006

Continued

Before regeneration

After regeneration

Other Sectors

Forty Four Peter Street, Manchester

- Extensive remodelling of the external façade was undertaken which involved the removal of an existing entrance canopy and the first floor slab being cutback to create a double height glazed entrance space.
- Existing window film has been removed from the internal face of the double glazing, which has assisted in brightening the façade and the corresponding internal office space.
- The ground floor entrance lobby has been remodelled and finished so as to create a more transparent, customer friendly façade that the refurbishment of the building elevation at ground and first floor level is proposed.
- The building used to have wide opaque panels at the floor levels and the low 'A' shaped portico above the entrance doors which acted only to lower the apparent height of the façade little above head height.
- This 'lowering' effect coupled with the use of bronze tinted glazing created a somewhat negative elevation at street level.

Key decision-making factors:

- The initial brief was to create a stunning reception area that would establish Forty Four Peter Street as an office building of quality, capable of standing out against its competitors and high profile neighbours, addressing its tired and unwelcoming reception area.
- The intention of the project is to upgrade the building to Grade A Standard B1 office accommodation at all upper floors and to create viable 'A' class ancillary use at ground floor level.
- The approach to the project has been to consider the way in which the building façade interacts with its immediate and important historic context along Peter Street.

Before regeneration

After regeneration

Other Sectors

Halifax Headquarters 4th floor, Halifax

Project Summary:
- **Fast track project converting the 4th floor of the Trinity Road Headquarters Building in Halifax, from executive offices into open plan office space.**
- **Emphasis has been placed on adapting cellular offices to allow for people spaces as a counterpoint to the necessarily high density office space.**

Before Regeneration

Long-term adaptability
- 85% of previous floor area was open plan space which proved adaptable for other uses given structural grid

Environmental sustainability and impact
- The building façade is of double glazed curtain walling designed to meet 1960's standards with correspondingly high infiltration and active servicing requirements.

Functionality
- The existing building provided good working space with very few complaints from the occupant. Emphasis on occupants' demand has been stressed during the design process.

Financial sustainability
- The building structure was well maintained and was well within design life when it was refurbished.
- The building has relatively high energy running costs due to poor thermal performance and air leakage.

Legislative compliance/risk
- Building was designed to meet all the regulations of 1969, but was not in compliance with current energy conservation, fire access and DDA regulations.

After Regeneration

Long-term adaptability
- Cellular offices converted into open plan places which improve the potential for adaptability.
- The building had been assessed against residential conversion, but not thought possible due to structural limitations.

Aesthetics and brand
- To reflect the values of the clients brand, and culture of the people who 'own' it, the design aims to encourage inhabitation and interaction.

Environmental sustainability and impact
- The thermal performance of the building has been upgraded
- Environmental agenda did not form part of the project

Functionality
- Various creative areas have been designed to facilitate people working

Financial sustainability
- The refurbishment of the floor adds more value to the building but doesn't extend the life expectancy of the building.

Legislative compliance/risk
- The floor was refurbished to meet Part L2 regulation, DDA, while the staircase serving the entire building has been brought up to fire regulations compliance.

Continued

Before regeneration

After regeneration

Other Sectors

Halifax Headquarters 4th floor, Halifax

Project details

Building and project details:

- BDP were commissioned to design the new office for Halifax's Retail Banking Team within their existing Trinity Road Headquarters building. The design needed a strong focus on Halifax people, to reflect the personality of the Halifax High Street business by using the building as a showcase for their financial products, and to create an innovative 'retail focused' office environment.
- The Trinity Road Headquarters building was designed by BDP in the late 1960's and in recent years had been the subject of a phased refurbishment. However the 4th floor had been left in its original state - partly due to the quality of the original scheme and partly due to the sheer complexity of building on the top of the building. The demands of the business necessitated that the existing open courtyards and executive offices, should be converted into open plan office space.
- A 'Think Tank' has been provided to generate ideas and innovation. A 'Replenish Pod' where people get refreshments and chill out. An external Zen Garden provides a still, quiet place for reflective thinking.
- The reception area forms a vibrant 'retail street', providing a showcase for various brands, leading visitors past the think tank, replenish and rest pods, to the office area itself.

Key decision-making factors:

- The building interior looked tired and no longer reflected the brand and vision of the tenant, in need of refurbishment.
- The main purpose of the project was to maximise the floors occupancy and consolidate the facilities inside.
- As well as the emphasis on Halifax people there is an emphasis on Halifax products. The reception area forms a vibrant 'retail street', providing a showcase for various brands, leading visitors past the think tank, replenish and rest pods, to the office area itself.
- The design needed a strong focus on Halifax people, to reflect the personality of the Halifax High Street business by using the building as a showcase for their financial products, and to create an innovative 'retail focused' office environment.

Before regeneration

After regeneration

Other Sectors

BBC "Mailbox", Birmingham

Project Summary:
- **Remodelling of form 1960's post office sorting facility to provide 100,000sq ft of commercial space for BBC Birmingham's new production centre, accommodating around 750 staff in the centre of Birmingham.**
- **Insertion of additional floors was required to meet the client brief demand on a floor area in excess of that of the existing landlord floor plates.**

Before Regeneration

Long-term adaptability
- The existing building provided a large floor to ceiling height with an exposed concrete frame construction allowing for potential re-use as double height space.
- Robustness of the building frame and availability of car-parking spaces made the overall building very adaptable to a variety of future uses.

Aesthetics and brand
- Building previously used as major sorting office by Royal Mail with strong presence along canal front

Environmental sustainability and impact
- The large deep plan limited opportunities for natural ventilation strategy and potential for using daylighting.

Functionality
- Previous use as a mail-sorting office which did not accommodate modern standard office facilities and lacked attractive interior design.

Financial sustainability
- Existing building structure was in good condition, therefore refurbishment did not require major structural adaptation.

Legislative compliance/risk
- The under ground structure did not meet the current legislative requirements.

After Regeneration

Long-term adaptability
- Large open plan with discreet areas allowing both adaptability and privacy.
- Meeting rooms include movable partitions

Aesthetics and brand
- Two 'picture windows' have been introduced dramatically changing the existing façade design which 'sign' the BBC presence and also open up space to demonstrate creativity and inspiration.

Environmental sustainability and impact
- No major modification to any existing building structure thus reducing the environmental impact of the project.
- Passive chilled beams & ceilings

Functionality
- The departments are satisfied with the functionality of their working environment
- The quality of the working environment has been maximised for programme makers to facilitate effective teamwork.

Financial sustainability
- The project has delivered a cost effective rate for the tenant.
- The flexibility of the environment has helped to speed up meetings and reduce operating cost.

Continued

Before regeneration

After regeneration

Other Sectors

BBC "Mailbox", Birmingham

Legislative compliance/risk

- Project addressed all outstanding building regulation compliance requirements.

Project details

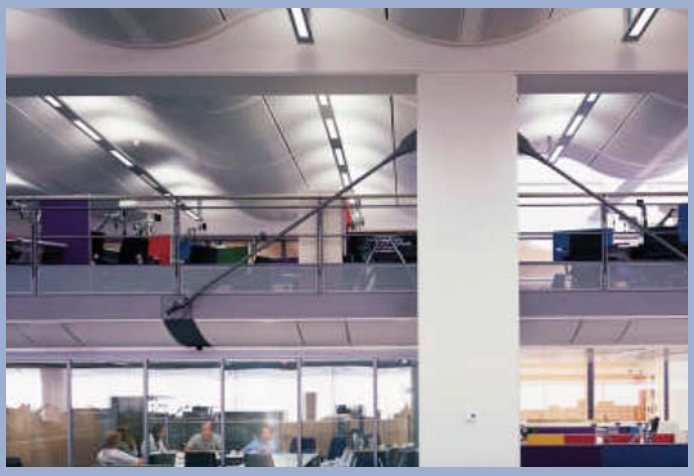
Building and Project details:

- Existing Royal Mail sorting office remodelled to accommodate mixed-use proposals, including 100,000 sq ft new BBC broadcasting studio facilities.
- Client: BBC; Architect, Engineers: BDP • BBC facilities include; office accommodation organised into two wings of open plan space defined by suspended mezzanine floors or 'gondolas', and facing out to the south-east and south-west overlooking the principal external amenity of a Canal side Promenade.
- Upon entering through the BBC 'shop front' the public can see through into broadcasting studios, editing suites, and open plan office areas.
- The design of the integrated waveform ceiling flows the existing structural bays thus exploiting all available height, with the 'troughs' of the waveform ceiling concealing the existing steel structure.
- Building services are routed within the suspended gondolas to provide modern market servicing standards while delivering a clean aesthetic and future flexibility.

Key decision-making factors:

- The decision to refurbish this post-industrial space to house a landmark broadcasting and office space in central Birmingham coincided with the BBC's lease expiring in its previous home at the Pebble Mill broadcasting centre. The BBC aspired to be housed in an open, inspiring and central location in Birmingham at the heart of a new mixed use community, which they found in the Mailbox mixed use scheme.
- The design is of a modern interactive office environment that is 'open' to the public and is able to become a centre for show casing BBC creativity.
- The BBC wanted to promote a creative culture that would help sustain its competitive edge and to re-think its working culture and the impact it was having on its output and costs. Due to the deep plan of the building, natural ventilation and daylight was not possible, but a low energy approach was taken including the use of chilled beams and ceilings to address thermal comfort requirements.
- BBC had a desire to be located in mixed use environment in Birmingham city centre site.
- Through innovative adaptation of existing floor plates, the design was able to accommodate all requirements of the brief, meeting current market standards.

After regeneration



After regeneration

Other Sectors

Witham Wharf, Lincoln

Project Summary:
- **Refurbishment of a 1970's office building into 120 apartments with 1500m² of retail space on ground floor.**
- **Replacement of existing concrete cladding panels with modern high quality, low maintenance materials.**

Before Regeneration

Long-term adaptability
- The concrete frame, existing floor to floor heights and the method by which the existing cladding system had been fixed to the building made it relatively easy to convert into apartments.

Aesthetics and brand
- The building had a dark and rather massive appearance which needed to be addressed to make building more visually attractive for residential use.

Environmental sustainability and impact
- Façade suffered from thermal and acoustic problems.
- Office floor plates were 13 metres deep with windows on opposite sides providing the potential for natural ventilation and good daylight.

Functionality
- The building floor to floor height could not accommodate modern office standards as the 3.0 meters height limited the scope for raised floors.

Financial sustainability
- As the building could not be remodelled to meet current market demands, tenancy rates were down and the property owner was required to change the buildings use to generate a financial return.

After Regeneration

Long-term adaptability
- All new internal partitions are lightweight, to allow for future adaptation.
- The location of internal services for bathrooms is much more widespread after refurbishment which may cause the difficulty in future adaptation.

Aesthetics and brand
- The arrangement of new cladding materials, balconies and roof canopies 'lighten' and shift the unrelieved symmetry of the existing façade.

Environmental sustainability and impact
- The existing structural frame of the building was retained
- Intensive and extensive green roofs have been incorporated to increase the sustainability feature of the project.

Functionality
- Quality emphasis has been placed upon the apartment interiors and adjoining balconies.

Financial sustainability
- Since material quality, maintenance and life expectance were emphasised during the design process, the project has a relatively high building cost for the type of accommodation delivered.

Continued

Before regeneration

After regeneration

Other Sectors

Witham Wharf, Lincoln

Project details

Building and project details:

- Client: Wigford Ltd; Architect: BDP
- A £14M conversion of an eight storey pre-cast concrete office building built in the 1970's into 114 luxury apartments, with space for restaurants at ground floor.
- Existing brick built plant enclosures at roof level had been removed and two new floors of predominantly glass clad penthouses were added.
- The ground floor is converted to provide approximately 1500m^2 of A1/A3 space split into one or two individual units dependant upon market demand.

Key decision-making factors:

- The sensitive location of the building (adjacent to a railway line) makes it extremely difficult to demolish and makes obtaining planning permission for a new building of a similar height difficult to obtain. However, the building overlooks the marina and is close to the High Street which makes it to be an ideal location for converting to apartments.
- The building had a massive and monolithic appearance, therefore, decisions have been made on reducing the building into distinct compositional elements and to use devices that give it a more permeable and open appearance.
- The building didn't have a strong relationship with the surrounding streets and conservation area. The proposals is to improve its relationship with the surroundings.
- Feasibility studies have been produced to explore the development of adjoining properties also owned by the client.

Before regeneration

After regeneration