The Legacy of 1960's University Buildings

Toolkit – User Guide

HIGHER EDUCATION FUNDING COUNCIL FOR ENGLAND

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Contents

Introduction

This document has been produced as guidance on using the **Filter Tool** and **Options Appraisal Matrix Tool**. This supporting information has been provided to ensure that relevant project individuals or groups have sufficient understanding to be able to make informed judgements about the key issues identified in the Toolkit Filter and Options Appraisal Matrix Tool. A clearer understanding of the key issues will result in effective use of the toolkit in assessing the most sustainable solution for the re-use of existing 1960's and 70's buildings.

The toolkit ensures that Estate Directors take a balanced approach to sustainability as each of the 'Vision', 'Social', 'Economic' and 'Environment' categories are incorporated, with each category given a minimum weighting of 20%. This gives flexibility to Estate Directors to rate the importance of individual categories to reflect the overall strategies of individual Universities – matching their aspirations and approach to sustainable management and development of buildings within their estates.

To give a brief introduction of the categories;

- Social issues involve how the feasibility options affect building users in terms of comfort and usability,
- Economic issues relate to the cost implications of feasibility options and potential management choices,
- Environmental issues involve consideration of the impact that the feasibility options may have on the natural environment – locally and globally.
- The category of vision covers issues that are concerned with the future ambition of the university – these issues may be apparently external to the core sustainability criteria but still be significant to decisions of the university. Feasibility options are rated on how they respect this 'vision'.

The toolkit is designed to facilitate an iterative approach to determining the feasibility of refurbishment or other redevelopment options. It is envisaged that following the use of the 'filter' tool, the estates team will have been guided towards investigating the feasibility of some different development options that may range from a minimal refurbishment to a full rebuild solution. The options appraisal matrix offers a more detailed framework for scoring the sustainability of the different development options using a list of key criteria, some of which are qualitative and some quantitative.

Extract from the report

1. Introduction to Toolkit
The toolkit has been developed as an output from the case study research and with reference to other relevant publications. The purpose of the toolkit is to provide assistance to Directors of Estates and their teams in identifying the key issues that will need to be considered in making informed decisions and recommendations regarding the future of 1960-1970's university estate.
It is intended to provide support at two different strategic levels and stages within the decision-making process have been identified.

1.1. The first component of the toolkit has been developed as a 'filter' that assesses the potential for refurbishment of an existing building based upon the need to meet an accommodation brief. It is envisaged that this tool will be used by Estates Directors and key decision makers within the university.

1.2. The second component of the toolkit has been developed as an options appraisal matrix to be used to compare different option proposals for refurbishment intervention (including consideration of a demolition and rebuild option if appropriate). It is envisaged that this tool will be primarily completed by design team consultants on behalf of the Estates director during a more detailed options appraisal stage.

1.3. Both the 'filter' tool and options appraisal 'matrix' have been developed based upon the key issues concerning 1960's and 1970's estate relating to social, economic and environmental sustainability. In addition a further category entitled 'vision' has been incorporated in order to allow for assessment of how a proposed refurbishment or rebuild development would fit the university identity, growth and masterplan aspirations. The key criteria that have been identified are as shown opposite:

1.4. The 'Filter' Tool

1.4.1. The 'filter' tool has been developed as a pre-feasibility study workshop facilitator. It is envisaged that the tool will be used by the University estates team for an internal meeting during the initial stages of considering the suitability of a required accommodation brief to fit potential existing accommodation. It is a tool that encourages consideration of re-use of the existing building stock and helps to identify the potential for this.

1.4.2. The purpose of the 'filter' tool is to ensure that the estates team are engaging with the key practicality and sustainability considerations during the workshop and clearly guided towards an understanding of the refurbishment potential for the building.

1.4.3. The tool is comprised of a series of questions relating to university's 'vision' and the social, economic and environmental sustainability of the proposed refurbishment - the same issues as listed above. For some of the questions, the university estates team may not have all the required information, but it is assumed that an informed selection can be made. The questions are simply 'yes' or 'no' answers in order to simplify the process.

1.4.4. It is envisaged that the tool will be used as a paper copy at the 'workshop' meetings. The 'filter' tool sheets have flow charts that are designed to be drawn over to plot the potential for a sustainable refurbishment. The sheets may then be kept as a record of the review workshop and will inform the next stage of project by providing a clear steer towards either a refurbishment or re-build solution. Where there is no clear steer towards either end of this scale it may be that a hybrid solution of part-refurbishment/ part-re-build or varying levels of intervention might be considered.

1.4.5. A steer such as this will be valuable to the estates team in planning the next steps of project development, e.g. initial project programming, refinement of the brief or selecting design consultants with appropriate experience for the likely intervention type.

1.5. The Options Appraisal Matrix Tool

1.5.1. The second component of the toolkit, the options appraisal matrix, is designed to be used as a briefing pack to consultants that sets out a best practice framework for carrying out an options appraisal. It is envisaged that following the use of the 'filter' tool, the estates team will have been guided towards investigating the feasibility of some different development options that may range from a minimal refurbishment to a full re-build solution. The options appraisal matrix offers a framework for scoring the sustainability of the different development options using a list of key criteria, some of which are qualitative and some quantitative. The options appraisal matrix comes complete with guidance notes (included in Appendix 5) on how to score against these criteria.

Extract from the report

Categories	Sub-Categories	Notes
Vision		
	Space Accommodation	A measure of how well a brief may be accommodated.
	Branding	A measure of how a development suits the university 'brand' or identity.
	Listing / Heritage	A measure of the impact that Listed status places upon redevelopment options.
	Masterplan	A measure of how well a development proposal will integrate with the wider university masterplan.
	Development Restrictions	A measure of the impact that planning restrictions will impose upon the development options.
Social		
	Occupant Comfort Satisfaction	A measure of likely occupant comfort satisfaction.
	Flexibility	A measure of how flexible the building is in terms of adaptability to future change of use and education needs.
	Good Building Design	A measure of how much users like the building.
	Accessibility	A measure of the buildings accessibility to all users.
Econimic		
	Whole Life Costs	A measure of the project WLC including NPV capital and operational costs.
	Benefit	A measure of the project financial benefits including fee income, rental income, research income and residual value.
	Risk	A measure of the risk posed by uncertainties such as existing structural condition.
	Funding Potential	A measure of the capital funding potential available for development options.
	Asbestos Management and Legislative Compliance	A measure of the success of proposed development strategies to mitigate against outstanding health and safety issues including asbestos and legislative compliance.
	Constructability	A measure of the ease of constructability, including consideration of ease of deconstruction if considered.
	Programme and Phasing	A measure of the ease with which development can be delivered according to shortest programme and ease of phasing and associated decant.
Environment		
	Environmental Servicing	A measure of how easily a solution for low-energy consumption, practical environmental servicing solutions can be implemented.
	Lifecycle	A measure of the future building life.
	Best Practice Environmental Performance	A measure of how well the development can perform in relation to current best practice environmental standards.
	Carbon Emissions	A measure of how well the building will perform with relation to carbon emissions.
	Embodied Environmental Impact	A measure of how well the building will perform in terms of the embodied environmental impact.
	Water Consumption	A measure of how well the building will perform in terms of water consumption.

Extract from the report

1.5.2. The purpose of this component of the tool is to promote a balanced approach to sustainability thinking, when considering options for the redevelopment of 1960-1970's university estate buildings and allow an accurate reflection of the benefits and dis-benefits of each option to be compared.

1.5.3. The matrix ensures that the university takes a balanced approach to sustainability as each of the 'Vision', Social, Economic and Environment categories are incorporated into the assessment and each category has a minimum weighting value of 20%. This gives some flexibility to the user to rate the importance of certain categories more highly than others but not to the extent where others can be entirely ignored.

1.5.4. Each sub-category within the matrix has also been given a weighting ranging from 1 to 10; it is recommended that these weightings remain at the default values provided as these figures represent the relative importance of each of the sub-categories. Further explanation of the recommended default weightings is provided within the supporting guidance notes included in the appendix.

1.5.5. Finally, there is also the field for scoring how each development option performs under each sub-category, ranging from 1 to 5; these are the fields that are to be used for options appraisal scoring by members of the project team.

1.5.6. Guidance notes have been developed to provide background information that will assist in completing this appraisal. Some notes explaining the key considerations for each category and the method of benchmarking the category have been outlined. The notes also provide a method of score calibration so that a maximum score of '5' relates to optimum performance; while a score of '1' relates to lowest performance under that category.

1.6. It is envisaged that this tool will be used as an Excel spreadsheet by the design team that are undertaking the options appraisal study and could be used as the basis for a workshop event, involving Estates Directorate, architect, building services engineer, and cost consultant. The suggested team member responsible for scoring each category is as follows:

- **Vision** – Estates Director, supported by planning, strategy and marketing team members.
- **Social** – Architect,
- **Economic** – Cost Consultant, supported by facilities management and finance team members.
- **Environment** – Building Services / Environmental Engineer.

1.6.1. The spreadsheet is designed to be completed and included within the options appraisal study report together with the resultant radar diagrams demonstrating the sustainable potential of each option against the 'vision', social, economic, environment categories.

Extract from the report

Categories	Sub-Categories
Vision	
	Space Accommodation
	Branding
	Listing / Heritage
	Masterplan
	Development Restrictions
Social	
	Occupant Comfort Satisfaction
	Flexibility
	Good Building Design
	Accessibility
Econimic	
	Whole Life Costs
	Benefit
	Risk
	Funding Potential
	Asbestos Management and Legislative Compliance
	Constructability
	Programme and Phasing
Environment	
	Environmental Servicing
	Lifecycle
	Best Practice Environmental Performance
	Carbon Emissions
	Embodied Environmental Impact
	Water Consumption

Vision

Vision

Space Accommodation

FILTER

Key Issue

Can the assessed building fit the desired space accommodation, and is this in a desirable location, as required by the proposed future tenant(s)?

Supporting Information

Accommodating a modern brief in a building built for a previous era can be problematic. Physical limitations may be imposed by architectural trends prevalent at the time along with construction methods employed. Opportunities may exist in the refurbishment of 1960's and 70's buildings for adding additional floors or increasing the net: gross ratio through conversion of cellular space into open plan. Replacing cladding systems also considerably extend the buildings lifespan and may also allow increased space around the perimeter. Should the building not provide the space requirements of the brief, opportunities exist to meet the brief through a combination of refurbishment and new build.

In considering refurbishment, the basic requirements of the brief in terms of physical accommodation needs and desirable location should be deemed to be adequate.

OPTIONS APPRAISAL

Measurement Method

This criterion assesses the suitability of the refurbishment/rebuild option to meet the accommodation needs. Quantitative comparators such as % provision of desired brief floor area or net:gross ratio:

- The accommodation needs identified in the brief should be able to fit within the proposed building. The extent to which the proposals fulfil the accommodation needs of the brief should be assessed on the scale below.
- A high net to gross ratio should also be viewed as positive: A target of 80% net: gross ratio should be defined as 'Excellent'. A net: gross ratio of 60% should be regarded as 'Very poor'.

Performance

- Score in terms of how the option addresses the SPACE ACCOMMODATION needs as set out in the brief:

Benchmark	Very Poor ◄——————►				Excellent
Score	1	2	3	4	5

Vision

Vision

Branding

FILTER

Key Issue

Can the assessed building fit the desired space accommodation, and is this in a desirable location, as required by the proposed future tenant(s)?

Supporting Information

Accommodating a modern brief in a building built for a previous era can be problematic. Physical limitations may be imposed by architectural trends prevalent at the time along with construction methods employed. Opportunities may exist in the refurbishment of 1960's and 70's buildings for adding additional floors or increasing the net: gross ratio through conversion of cellular space into open plan. Replacing cladding systems also considerably extend the buildings lifespan and may also allow increased space around the perimeter. Should the building not provide the space requirements of the brief, opportunities exist to meet the brief through a combination of refurbishment and new build.

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OPTIONS APPRAISAL

Measurement Method

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- A high net to gross ratio should also be viewed as positive: A target of 80% net: gross ratio should be defined as 'Excellent'. A net: gross ratio of 60% should be regarded as 'Very poor'.

Performance

- Score in terms of how the option addresses the SPACE ACCOMMODATION needs as set out in the brief:

Benchmark	Very Poor ◄——————————► Excellent				
Score	1	2	3	4	5

Vision

Vision

Listing/Heritage

FILTER

Key Issue

Does the building have or is likely to be awarded a listed status that will strongly support refurbishment and create a planning risk for a non-refurbishment option?

Supporting Information

The listing process, administered by English Heritage, establishes the historical and cultural importance of a building and ensures that any demolition, alteration or extension of the building is managed by the planning process. There are 370,000 or so list entries currently protected by listing. Of those, over 92% are Grade II. Grade I and II buildings may be eligible for English Heritage grants for urgent major repairs.

Buildings of particular architectural uniqueness which represent the best of a particular era of construction are often listed. A listed status or potential future listing can completely restrict the options available so that remodelling or demolition options cannot be considered. Therefore it becomes a case of recognising that refurbishment will be the development solution. In this case the optimum potential will be realised if the requirements of the refurbishment brief are considered alongside the principles of the original design to assess the scope for both addressing the need for change working alongside a respect for the design heritage. Conservation Development Plans are an emerging process that may allow additional flexibility in the modernisation of 1960's and 70's buildings in line with the original architectural intent of the design while ensuring the heritage of the building is maintained.

OPTIONS APPRAISAL

Measurement Method

This is a qualitative measure of how well the proposal respects the design heritage value of the building or the estate and mitigates against any potential planning risk.

- Reference should be made to the appropriate organisation e.g. 20th Century Society or English Heritage which represents listing interests and what their requirements are. To maintain this link with society, developments within buildings of significant heritage importance should respect existing links with society and address these in new proposals.
  A number of organisations, such as the Historic Environment Local Management (HELM), aim to share best practice, and build capacity and confidence in those dealing with the historic environment.

Performance

- Score in terms of how the design option addresses the heritage value of the building and mitigates any potential planning risk. To be assessed by the architect or member of the Estates Directorate:

Benchmark	Very Poor ◄——————►				Excellent
Score	1	2	3	4	5

Further Guidance

- English Heritage- http://www.english-heritage.org.uk/server/show/nav.1374
- Listed Buildings Online- http://lbonline.english-heritage.org.uk/Login.aspx
- Something worth Keeping? Post-War Architecture in England- English Heritage, 1996.
- Consult with local architectural heritage groups/umbrella organisations such as Historic Environment Local Management (www.helm.org.uk)
- The Twentieth Century Society - www.c20society.org.uk

Vision

Vision

Masterplan

FILTER

Key Issue

Does the assessed building and proposed brief have a good potential to engage with and compliment the current University Masterplan?

Supporting Information

This key issue is concerned with how the building compliments/engages with the current master plan for the estate, maximising opportunities for connectivity, departmental relationships, infrastructure, and improvements to public realm and projected growth in appropriate location.

OPTIONS APPRAISAL

Measurement Method

This is a qualitative measure of how well the proposal 'fits' with the masterplan for the site or estate, it is recommended that this is assessed by the architect or member of the Estates Directorate.

- Reference should be made to the appropriate document which establishes the Masterplan aspirations for the Estate and assessment made of how the proposed scheme 'fits' into this master plan vision.
- Consult government guidance on the future of higher education institutes, as laid out in publications such as 'The Future of Higher Education'- Department for Education and Skills, 2003.

Performance

- Score in terms of how the option addresses the MASTERPLAN:

Benchmark	Very Poor ◄——————————►				Excellent
Score	1	2	3	4	5

Further Guidance

- Higher Education Gateway: Department for Children, Schools and Families- http://www.dfes.gov.uk/hegateway/
- The Future of Higher Education'- Department for Education and Skills, 2003 (http://www.dfes.gov.uk/hegateway/uploads/White%20Pape.pdf)

Vision

Vision

Development Restrictions

FILTER

Key Issue

Is there a planning restriction on increasing the footprint of the building or on increasing the overall built area of the campus?
i.e. conservation area limitations.

Supporting Information

Local planning authorities can have considerable influence over the ability of university campuses to expand their built footprint, and may also be exercise restrictions on the scale and visual appearance of new remodelled or refurbished buildings. Conservation areas are typically subject to tighter development restrictions.

Where such planning restrictions are in place, refurbishment of the existing building is likely to be an attractive option as it may mean retaining more floor area than if a rebuild project were proposed on the same site, at best a like- for-like floor area of equivalent new-build may only be possible.

Not relevant to Options Appraisal

Social

Social

Occupant Comfort Satisfaction

FILTER

Key Issue

Does the building have the potential to provide a high quality internal environment for building occupants?

Supporting Information

Occupant comfort is subject to many factors, and a building's ability to deliver a high performance of these factors may be limited by its structure, orientation and environment. The likely comfort satisfaction of building occupants of 1960's and 70's buildings will be subject, but not limited to, poor thermal fabric, low floor to ceiling height and deep depth of plan (low levels of natural daylight), leaky façades, single glazed windows, poor occupant temperature control, overheating of internal environments. These factors should be addressed under refurbishment to ensure that occupancy comfort issues associated with this era of buildings are addressed. Refurbishment may also have hidden opportunities for improving internal comfort such as the removal of a suspended ceiling, increasing floor to ceiling height and exposing thermal mass beneath. Additional clerestory glazing may be added to improve daylighting in some cases.

OPTIONS APPRAISAL

Measurement Method

At the options appraisal stage this should be assessed as a qualitative judgement of how the building will perform with regards to providing a comfortable healthy internal environment for occupants.

Lighting/Views

- "Lighting requirements are determined by the satisfaction of three basic human needs: visual comfort, visual performance and safety" (CIBSE/SLL Code for Lighting 2004).
- A room that does not have an outside view, and where one could be expected, will be considered unsatisfactory by its users. Unless an activity requires the exclusion of daylight, a view should be provided. (CIBSE/SLL Code for Lighting 2004).

Temperature

- In the workplace, a temperature range for comfort should be 21-23ºC in winter and 22-24ºC in summer (depending on building type) (CIBSE Guide A: Environmental design)

Acoustics

- Rooms for residential purposes shall be designed and constructed in such a way that they provide reasonable resistance to sound from other parts of the same, and adjoining, buildings (Requirement E1, Approved Document E)

Ventilation

- "There shall be adequate means of ventilation provided for people in the building"- (Approved Document F).

Performance

- Score in terms of how the option is likely to address the OCCUPANT COMFORT SATISFACTION, it is recommended that this is completed by the architect or the environmental engineer:

Benchmark	Very Poor ←				→ Excellent
Score	1	2	3	4	5

Further Guidance

- CIBSE Lighting Guide 10: Daylight and Window Design
- Code for Lighting- CIBSE/Society of Light and Lighting (SLL), 2002
- Approved Document Part E (Resistance to the passage of sounds, 2003)
- Approved Document Part F (Ventilation)
- Refurbish of Concrete Buildings: Designing Now for Future Re-use, BSRIA GN9/99 1999

Social

Social
Flexibility

FILTER

Key Issue

Does the structural frame/grid of the assessed building allow the desired spatial configuration and future flexibility?

Supporting Information

Construction methods used during the 1960's and 70's can often lead to limitations in the potential for re-arranging internal layouts to meet current market demands. Limitations may exist in the floor to ceiling height, depth of plan and structural grid including cellular cast concrete or blockwork partition walls, location and spacing of fenestrations units and locations and size of risers. With the move towards en-suite facilities in student accommodation and open plan and mixed mode ventilated administrative spaces, buildings must be assessed against their potential for delivering the quality of space required by today's tenants. For example, buildings previously designed as Laboratory spaces may prove successful in meeting current market expectations when re-used as open plan, naturally ventilated administrative spaces, due to the inherent flexibility built into the tall floor to ceiling heights and services zones.

OPTIONS APPRAISAL

Measurement Method

The suitability of the spatial configuration within the building to meet the user's educational, administrative or residential needs should be assessed through a qualitative value judgement. Consideration should also be given to future trends in user's space requirements and whether the scheme will offer adequate long-term flexibility.

- "Whilst some elements are not changeable, such as location, other aspects can be readily upgraded to improve working and organisational conditions, as well as to maximise asset/rental income value" (Refurbishment of Concrete buildings- Designing now for future reuse, BSRIA, 1999)

Performance

- Score in terms of how the option addresses the desired spatial configuration needs and future FLEXIBILTY. It is recommended that this is appraised by the architect:

Benchmark	Very Poor ◄——————————►				Excellent
Score	1	2	3	4	5

Further Guidance

- Refurbishment of Concrete Buildings- BSRIA GN7/99, GN8/99, GN9/99, 1999

Social

Social

Good Building Design

FILTER

Key Issue

Do occupants enjoy using the building?

Supporting Information

Buildings may have a unique identity that is enjoyed by all, and can be attributed to the quality of space experienced within and around the building. This may be due to the original architectural intent of the design and its successful implementation or simply a response building users experience based a special sense of place that the building fosters.

OPTIONS APPRAISAL

Measurement Method

This is a qualitative measure of how well users are likely to enjoy the building following refurbishment or redevelopment and is recommended to be assessed by a member of the Estates Directorate with a good understanding of user feedback and the measures that would be required to improve user's appreciation of the building.

In research conducted by the Commission for Architecture and the Built Environment (CABE):

- Approximately 60 per cent of students and staff indicated that the quality of the building design had a positive impact on their decision to study or work at their chosen university
- When asked to identify specific features of buildings that would most influence their decision to work in a particular institution, just over half of all staff identified cosmetic and environmental features as being most influential. These included cleanliness, a feeling of space and bright working areas. Most students identified structural/functional features, including the quality of the facilities, the library, sports centre, atriums and lecture rooms
- The research suggests that the way people feel and behave while studying or working within buildings is linked to their overall satisfaction rates and level of happiness. This will clearly have an impact upon retention rates.

Performance

- Score in terms of how the option addresses the GOOD BUILDING DESIGN and how much users enjoy the experience offered by the building. It is recommended that this appraisal is carried out by the architect:

Benchmark	Very Poor Building Design ⟷				Excellent Building Design
Score	1	2	3	4	5

Further Guidance

- Commission for Architecture and the Built Environment (CABE)- Design with Distinction: The Value of Good Building Design in Higher Education (2005)

Social

Social

Accessibility

FILTER

Key Issue

Can the building be brought up to current best practice in respect to accessibility, at minimum complying with all current accessibility legislation?

Supporting Information

Ensuring that buildings are accessible to all students, staff and members of the public is important in establishing university estates as inviting and inclusive places and is enforced under the Building Regulations Part M. Buildings built during the 1960's and 70's may have inflexible internal layouts due to structural grid constraints and partition construction types which may reduce the ability of these buildings to be brought up to current standards in regards to accessibility. In addition access cores may need significant refurbishment and redesign, including upgrade of lift sizes and remodelling at ground floor level to create better accessibility to more 'public' building uses at ground and first floor levels e.g. student services etc. Access to the building from the public realm, horizontal and vertical circulation and refuge space are all considered.

OPTIONS APPRAISAL

Measurement Method

This is a qualitative measure of how well the appraised scheme will provide 'Access for All'. It is recommended that this appraisal is carried out by the architect.

- People, regardless of disability, age or gender should be able to:
  - Gain access to buildings and to gain access within buildings and use their facilities, both as visitors and as people who live and work in them
  - Use sanitary conveniences in the principle storey of a new dwelling

(Approved Document M)

- Create an 'Access Statement' to assist in providing disability access throughout the build. Access Statements can be provided to assist building control officers in making judgements about whether proposals make reasonable provision at all stages

Performance

- Score in terms of how the option addresses the ACCESSBILITY:

Benchmark	Very Poor Access Provision ←				→ Best Practice Access Provision
Score	1	2	3	4	5

Further Guidance

- BS 8300: Design of buildings and their approaches to meet the needs of disabled people, BSI, 2001
- Approved Document M- Access to, and use of, buildings
- Approved Document B- Fire Safety
- Code of Practice for Providers of Post-16 Education- Disability Rights Commission , 2002
- Designing for Accessibility- RIBA/Centre for Accessible Environments (2004)

Economic

Economic

Whole Life Cost

FILTER

Key issue

Is refurbishment likely to offer low Whole Life Cost?

Supporting Information

Whole life costing ties capital investments to long term benefits to address the overall affordability of projects considered.

For a typical project, relevant costs might include:

- Capital costs – such as equipment, land, demolition, construction or refurbishment costs, fees and expenses, commissioning and handover costs.
- Running costs – such as staff costs, consumables, maintenance, rates, water and sewerage charges, power, heating, lighting, and payments for contracted-out services.
- Costs of other features affected. These may be associated with ease and availability of access, operational convenience, ease of communication, flexibility, environmental factors, and costs of retaining and disposing of vacated accommodation.

A refurbishment project generally requires less up-front capital costs than an equivalent rebuild project since there are savings to be made in the use of an existing structure and minimisation of materials and time on site during construction. In this context a low capital cost should be seen as less than 70% of the cost of an equivalent new build project.

Building running costs will be largely affected by the ability to upgrade the building thermal fabric and replace services so that energy and water efficient operation can be achieved. If there are restrictions that would not allow the improvement of building fabric and services up to modern standards, then it is likely that running costs will be relatively high.

OPTIONS APPRAISAL

Measurement Method

At options appraisal stage each of the development options should be appraised in terms of the whole life cost. In accordance with HEFCE good practice this should include capital and running costs together with other related costs that may not be direct project costs. This appraisal should be carried out by the cost consultant.

Performance

- Score in terms of how the option meets lowest WHOLE LIFE COST objectives as outlined by HEFCE Good Practice:

Benchmark	Very High Whole Life Cost ◄				► Very Low Whole Life Cost
Score	1	2	3	4	5

Further Guidance

- Investment Decision Making: A Guide to Good Practice - HEFCE, 2003

Economic

Economic
Benefit

FILTER

Key issue

Can a positive increase in revenue through fee, research or rental income be accrued?

Supporting Information

Unlike other academic accommodation, residential projects may be linked to increase in rental incomes through student residential and conference guest markets and can often justify greater initial investment.

Projects linked to academic and administrative facilities are likely to encounter greater difficulty in demonstrating a potential income stream associated with investments. Therefore, these types of uses tend to favour lower cost refurbishment solutions.

In some cases refurbishment can lead to an increase in future revenue and this benefit adds to the case for refurbishment. In other cases however, the increase in revenue may not be significant benefit and the business case for refurbishment will need to be carefully considered.

OPTIONS APPRAISAL

Measurement Method

At options appraisal stage each of the development options should be appraised in terms of the whole life benefits as outlined below. It is recommended that this review is carried out by the cost consultant:

- Relevant benefits would typically include:
  - Fee income from further student enrolment
  - Research income
  - Rental or conference income
  - Income from third party use of facilities
  - Capital receipts – such as proceeds from disposal of the building being replaced
  - Residual value at the end of the appraisal period
  - A reduction in rental payments if a leased building is no longer required, and can be surrendered.

(HEFCE, 2003)

Performance

- Score in terms of how the option provides a RETURN ON INVESTMENT:

Benchmark	Very Poor Return on Investment ◄——————————► Excellent Return on Investment				
Score	1	2	3	4	5

Further Guidance

- Investment Decision Making: A Guide to Good Practice- HEFCE, 2003

Economic

Economic

Risk

FILTER

Key issue

Can contractor risk associated with refurbishment be mitigated through initial investigative survey work?

Supporting Information

Constraints in the original construction of 1960's and 70's buildings can lead to difficulties in assessing where likely faults in the building may be located, for instance system built facades, the extensive use of asbestos and the condition of reinforcement bar embedded in the slab. This significant risk can lead to refurbishment projects being rejected due to inflated risk contingency fees being set by contractors for undertaking site works.

This risk can significantly be reduced if initial site investigation survey work is undertaken to provide additional confidence to contractors tendering on the project. This could involve core-drilling to investigate typical slab construction or system build component sample disassembly to demonstrate how easy or difficult the process is.

In some cases it may be deemed that there are too many unknowns or difficulties associated with works on the existing structure for risk to be entirely mitigated.

OPTIONS APPRAISAL

Measurement Method

This criterion assesses the likely risk elements in the proposed works and could be measured through a risk assessment process. In the context of this project risk not only covers health and safety issues but also the risk to contactors costs being elevated above normal and the risk of time delays on site due to unknown factors discovered during the works process. For a 1960's or 70's building this might typically include contamination including asbestos, difficulty in the disassembly or remodelling of certain building elements or failing structural components.
It is recommended that this assessment is made by the project manager or cost consultant.

Performance

- Score in terms of how the each option addresses the RISK:

Benchmark	Very Poor ◄			►	Excellent
Score	1	2	3	4	5

Economic

Economic

Funding Potential

FILTER

Key issue

Does preferential funding exist (both internal and external) for a refurbishment of the building?

Supporting Information

Funding for projects addressing existing and proposed new buildings on university estates may be from different sources, and may favour re-use of existing buildings over new build or vice versa depending on funding institutions criteria at the time of application and the internal policy of the institution.
HEFCE funding requires demonstration that the university is making the best use of the existing facilities; a refurbishment project is a good way of demonstrating this.
Typically, approval of SRIF funding may be suited to projects which demonstrate that the building facilities provided will support academic excellence; and this may be easier to demonstrate for a new or remodelled building rather than a refurbishment.

OPTIONS APPRAISAL

Measurement Method

This quantitative criterion can be assessed through comparison of the amount of funding that is available for each development option. It is recommended that this appraisal is carried out by the cost consultant or project manager.

Performance

- Score in terms of how the option addresses the FUNDING POTENTIAL:

Benchmark	Very Poor ◄——————►				Excellent
Score	1	2	3	4	5

Economic

Economic

Legislative Compliance and Asbestos Management

FILTER

Key issue

Can the building be made to comply with all current relevant legislation?

Supporting Information

Basic health and safety legislative compliance need to be complied with in order that the university does not contravene any law through the provision of its estate that may endanger human health or the environment. For most 1960's or 70's buildings there will be a backlog of issues that need addressing in order for the facility to meet modern legal standards. Typically, the issues that will need addressing are:

- Failing building components which may fall from height
- Building Regulations
- Asbestos Removal
- Fire Safety

A refurbishment project should at the very minimum address all such issues so that there are no outstanding future costs required to meet the legislative compliance. Ideally, the opportunity to redevelop the building should be seen as a chance to future proof the building from further increase in legislation in the future. A building that cannot easily be refurbished and future-proofed in this way represents significant risk and likely cost going forward.

Where asbestos is known to be present in a building, it is recommended that all floors are vacated during any serious refurbishment works as vibration work in one part of the building can cause hidden asbestos components to release fibres elsewhere in the building.

The above factors all have financial cost implications.

OPTIONS APPRAISAL

Measurement Method

This criterion is a quantitative measure of how successfully the development proposal deals with outstanding legislative compliance and health and safety issues. As a minimum it would be expected that all of these matters should be dealt with through a proposed refurbishment or redevelopment option. In addition, some assessment should be made in terms of the likely future developments in legislation and health and safety standards in order that the proposals are future-proofed against upcoming changes in standards

Performance

- Score in terms of how well the option addresses LEGISLATIVE COMPLIANCE and HEALTH AND SAFETY issues both now and in the future:

Benchmark	Very Poor ◄——————————►				Excellent
Score	1	2	3	4	5

Further Guidance

- Current and future Building Regulations and Health and Safety requirements.

Economic

Economic

De-constructability / Ease of Delivery

FILTER

Key issue

Would de-construction / demolition of the building be difficult due to the building construction type and location and proximity of neighbouring buildings?

Supporting Information

Buildings constructed in the 1960's or 70's often used in-situ concrete slab construction and may be multi-storey type. This can mean that deconstruction of the building will require the breaking up of an inherently strong structure, which will produce a lot of noise and dust and create a great deal of waste material. This has obvious disadvantages compared to a steel framed building system such as the CLASP system which can be more easily disassembled and re-used or recycled.

Often, other buildings have now been added in the surrounding campus or city centre site making very difficult to access the site but also means that the noise and dust generated will cause serious disruption to other activities.

In this context it will be favourable to refurbish and avoid the extent of disruption that a de-construction / demolition project would cause.

OPTIONS APPRAISAL

Measurement Method

This criterion is a qualitative measure of how much disruption and disturbance to other university functions that may result in the loss of revenue or impact on performance.
This criterion should also consider how easily the building can be deconstructed and re-used, recycled or disposed of in the most sustainable way. The methods of material re-use or disposal may also have economic implications. It is recommended that this is assessed by the project manager or cost consultant.

Performance

- Score in terms of ease of 'delivery' of the project through demolition/deconstruction and construction:

Benchmark	Very Poor ◄——————————► Excellent				
Score	1	2	3	4	5

Economic

Economic

Programme and Phasing

FILTER

Key issue

Can refurbishment of the building allow for a shorter programme of project delivery in terms of decant etc.?

Supporting Information

Refurbishment projects will generally have a speed of programme advantage over a re-build project as all the main structure and fabric elements are in place. This will not only be an advantage in terms of a reduced construction cost but will impact less on operations elsewhere on the campus, thus reducing other costs, e.g. the requirement for temporary accommodation on site.

In terms of phasing there are also some advantages to a refurbishment, as it may be possible to refurbish the building one floor at a time and allow continuous occupation in other areas. This will have significant overall logistical and cost benefit as temporary accommodation will not need to be provided. (As stated previously, it should be noted that the risk of asbestos dust being disturbed in occupied areas through vibration work should be mitigated where possible)

OPTIONS APPRAISAL

Measurement Method

This is a measure of the length of the project program and the convenience with which operations can be phased to allow optimum use of accommodation across the estate. This criterion should be completed by the project manager.

Performance

- Score in terms of how the option allows shortest PROGRAMME time and optimum use of accommodation through PHASING :

Benchmark	Very Poor	◄———		———►	Excellent
Score	1	2	3	4	5

Environmental

Environmental

Environmental Servicing

FILTER

Key issue

Can the building provide the desired functionality in terms of depth of floor plan and floor to ceiling height to facilitate appropriate sustainable servicing solutions?

Supporting Information

Construction methods used during the 1960's and 70's can often lead to limitations in the potential for allowing buildings to be services in an efficient manner, and allow for a reduced operational carbon footprint. Limitations may exist in the floor to ceiling height and depth of plan which may limit the potential for passive operation using natural ventilation and daylighting. In addition, a low floor to ceiling height will adversely affect the ability to distribute services including ventilation ducts, or raised floors for ICT distribution if required. The ability to expose the thermal mass of existing concrete soffits is an advantage that should be exploited for providing reduced peak loads and improved thermal comfort. Depending on the orientation of the building, the construction type, the external cladding system used, the external surrounding microclimate and the availability of space for services location and distribution, a refurbished building may be operated with a greatly reduced environmental impact.

OPTIONS APPRAISAL

Measurement Method

This is a measure of the potential that the building has to allow successful passive operation, through the use of natural ventilation, good daylighting and exposed thermal mass. In addition this criterion should be used as a measure of how easily servicing requirements such as ICT infrastructure and ventilation ducts and cooling where necessary can be accommodated. Where possible the building fabric should allow low energy approaches to environmental servicing e.g. low-velocity displacement ventilation or cooling systems such as passive chilled beams. It is recommended that the sustainability and practicality of current and future services systems should be assessed by the environmental engineer according to the assessment scale below:

- 'It is expected that raised floors will remain in the foreseeable future due to the flexibility provided. Current practice uses raised floors, typically 100mm in small buildings and 150mm to 300mm in larger buildings, but reduced height systems are starting to be used. Exposed soffits are becoming popular for passive cooling.'
- Natural ventilation or a mixed mode of natural ventilation with low energy mechanical ventilation should be used. Under floor voids may increasingly be used for ventilation.
- Openable windows can increase natural ventilation and therefore reduce requirement for mechanical ventilation. They can be combined with a night cooling strategy to pre-cool the space during summer

(BSRIA GN9/99)

Performance

- Score in terms of how the option has potential for sustainable and functional ENVIRONMENTAL SERVICING

Benchmark	Very Poor ◄——————► Excellent				
Score	1	2	3	4	5

Further Guidance

- Refurbishment of Concrete Buildings- BSRIA GN7/99, GN8/99, GN9/99, 1999

Environmental

Environmental

Lifecycle

FILTER

Key issue

Does the predicted lifespan of the building structural frame meet with the project lifespan requirements?

Supporting Information

The structural frame of buildings built during the 1960's and 70's may be susceptible to failure, due to the carbonisation of concrete and steel rebar and failure of specific components in system construction methods used at the time. The structural frame life is critical as this determines the overall building life. A refurbishment project should take into account the anticipated extended lifespan of the building structure in line with that of the refurbishment. Ideally the building structure should have a future life of 50 to 60 years, but this may not be a realistic expectation for a 1960's or 70's building. An important consideration will therefore be that the refurbishment will have a lifespan that is longer than the anticipated requirement in the brief e.g. to meet a certain departments accommodation needs for the next 20 years.

Should the façade or roof have only a limited life or need urgent repair or replacement, then a remodelling project should be considered, whereby the existing structural frame can be retained and re-clad.

OPTIONS APPRAISAL

Measurement Method

The project brief should have an anticipated operation life for the future department or institution that will be moving into the accommodation. Within this projected operational period it is essential that the fundamental performance of the building in terms of integrity of structural frame is sound. The life of other fabric elements such as façade and roof is important and the performance of these elements should be addressed during the refurbishment or remodelling works. This criterion is an assessment of the future integrity of building structure and fabric elements and should be assessed by the architect or structural engineer.

- In setting the design brief, the life of the building, including the building services, must be considered in terms of timescales for replacement. The life of the structure may be 50 or 60 years, but the life of the services is generally 25 years. Therefore building services are commonly refurbished during the lifetime of a building.

(Refurbishment of Concrete Buildings- BSRIA GN7/99, GN8/99, GN9/99, 1999)

Performance

- Score in terms of how the option provides building structure and fabric performance that will meet the required building LIFECYCLE without future failure.

Benchmark	Short life cycle: 15 years ←			→ Long life cycle: 60 years
Score	1	2	3	4	5

Further Guidance

- Refurbishment of Concrete Buildings- BSRIA GN7/99, GN8/99, GN9/99, 1999

Environmental

Environmental

Best Practice Environmental Performance

FILTER

Key issue

Can the building be brought up to current best practice standards (beyond the statutory minimum) with or do development constraints such as listing or planning restrict opportunities?

Supporting Information

Overall environmental performance can be measured by an assessment tool such as BREEAM which covers a wide range of environmental impact issues related to management and operation, health and well-being, energy use, water use, land-use, ecology and pollution.
The HEFCE recommendation is for all higher education projects to achieve a minimum of BREEAM 'Very Good' and aim to achieve the 'Excellent' target – which should be viewed as current best practice.
The potential to achieve the 'Excellent' rating may be limited for a refurbishment project where listed status does not allow adequate improvement or inherent difficulties such as a deep floor plan do not promote best practice working conditions with regards to health and well-being, e.g. good daylight and views out.
A refurbishment project will however achieve best practice with regards to reducing the embodied environmental impact through re-use of existing façade and structure and minimising input of virgin materials

OPTIONS APPRAISAL

Measurement Method

This criterion is a measure of the overall environmental performance of the project and is related to a wider set of issues than limited to consideration of carbon emissions or water use.

Developments should aim to achieve Best Practice Environmental Standards as highlighted by a method such as the BRE's BREEAM methodology e.g. 'Excellent' or equivalent. These include, but are not confined to the following wider ranging sustainability issues:

- Waste management on site and in-use
- Best practice policies in respect to air pollution
- Best practice policies in respect to water (ground and surface) pollution
- Health and well-being
- Sustainable transport considerations
- Enhancing site ecology and land use
- Sustainable Urban Drainage Systems
- Responsible sourcing of materials

Performance

- Score in terms of how each option addresses BEST PRACTICE ENVIRONMENTAL STANDARDS:

Benchmark	BREEAM Pass Equivalent				BREEAM Outstanding Equivalent
Score	1	2	3	4	5

Further Guidance

- BREEAM: http://www.breeam.org/
- HEEPI, High Performance Buildings 1. The Business Case for Universities and Colleges
- HEEPI, High Performance Buildings 2. The Process of Delivery for Universities and Colleges

Environmental

Environmental

Carbon Emissions

FILTER

Key Issue

Can the building be brought up to current best practice standards (significantly beyond the statutory Part L minimum) with regards to energy consumption and associated CO_2 emissions?

Supporting Information

The built environment accounts for up to 50% of UK Carbon Dioxide (CO_2) emissions, a greenhouse gas most strongly linked to climate change. The potential for a building to have a reduced impact on the environment and a correspondingly lower rate of CO_2 emissions must be considered from the feasibility stage.
A refurbishment or remodelling project that can be brought up to the same level of energy performance as new-building will have a high sustainable refurbishment potential. In most cases this will be difficult to achieve as the building fabric will need to be significantly upgraded to current standards- including air-tightness performance. A full replacement of existing services is also likely to be required to meet this performance objective.

OPTIONS APPRAISAL

Measurement Method

The option must be assessed by the environmental engineer against typical, good practice and best practice Carbon Emission benchmarks appropriate to the building and its end use. Predicted energy consumption figures along with CO_2 emission factors used in Approved Document Part L2 of the Building Regulations should be used in this calculation.

Building category	Fossil Fuel Performance				Electricity Performance kWh/m2			
	Best		Worst		Best		Worst	
	kWh/m2	Kg CO_2/m2	kWh/m2	Kg CO_2/m2	kWh/m2	Kg CO_2/m2	kWh/m2	Kg CO_2/m2
Admin/support	88	17	166	32	28	12	90	38
Sports centres	138	27	325	63	88	37	199	84
Libraries	73	14	176	34	73	31	186	78
Residences	126	24	240	47	35	15	57	24
Teaching	46	9	240	47	31	13	118	50
Labs –medical & biosciences	75	15	256	50	177	75	325	137
Labs – Engineering – phys sciences	15	3	148	29	66	28	130	55
Labs – chemical sciences	97	19	242	47	156	66	287	121
Computing - Maths	40	8	105	20	114	48	106	45

HEEPI, "HE Building Energy Benchmarking Initiative 2003-4", 2006

Performance

Benchmark	High Energy Consumption ←				→ Low Energy Consumption
Score	1	2	3	4	5

Further Guidance

- Carbon Trust, 1997, Energy Efficiency in Further and Higher Education, ECG054
- Approved Document Part L2A & B – Conservation of Fuel and Power
- HEEPI, "HE Building Energy Benchmarking Initiative 2003-4", 2006

Environmental

Environmental

Embodied Environmental Impacts

FILTER

Key issue

Does the building have the potential for being refurbished with minimal embodied environmental impact?

Supporting Information
The embodied environmental impact of the materials used in the construction of a building can be quantified through cradle to grave examination. This may be assessed by examining the environmental impact of extracting raw materials, processing these materials into building products, transporting the materials to the building site, construction site impacts and the end demolition and disposal or recycling following the end of the buildings useful life.

The existing 1960's and 70's building stock already contains a significant amount of embodied energy that wherever possible should be re-used through refurbishment or remodelling. In this context, refurbishment projects will tend to have environmental benefits relative to a re-build project, as they lead to reducing the use of new virgin materials by retaining elements of the existing building.

Where refurbishment is considered, material specifications such as sustainable sources of timber or high recycled content steel should be used. Where possible, deconstruction or demolition waste should be re-used on site.

OPTIONS APPRAISAL

Measurement Method

At initial options appraisal stage the embodied environmental impact can be carried out through assessment of the extent of demolition, de-construction or re-use of materials together with the relative volume of new materials that will be employed on the project. In addition the sustainability of the proposed construction methods and materials need to be appraised. The table below gives an indicative method of assessing the relative embodied environmental impact for each option:

Level of intervention	Demolition / Deconstruction impact	Embodied impact of construction works
Refurbishment 1: Strip out and replacement of internal services and partitions	Minimal deconstruction required. Likely to produce mixed waste in small quantities. Limited potential for reuse of existing materials.	Small embodied impact of works. Restricted space for segregation and reprocessing of materials.
Refurbishment 2: • Strip out and replacement of internal services and partitions • Upgrade of thermal fabric to comply with current Part L (replacement of windows and addition of insulation)	Minimal deconstruction required. Likely to produce mixed waste in small quantities. Limited potential for reuse of existing materials.	Small embodied impact of works. (significantly outweighed by benefits of improvements to building fabric and services)
Remodelling 1: As refurbishment 2 with complete façade and roof replacement.	Moderate deconstruction required/waste produced –potential for reuse of existing materials.	Good potential to replace façade and roof elements with materials of low embodied energy. Potential for reuse/recycling of materials onsite.
Remodelling 2: As refurbishment 2 with complete façade and roof replacement. Partial demolition and rebuilding of floor plates and access core.	Significant disturbance to site. Moderate deconstruction required/waste produced – potential for reuse of existing materials.	This level of intervention is more likely to require elements being constructed of insitu concrete. Floor plates often have a significant embodied energy.
Complete demolition / deconstruction and re-build	Significant deconstruction required/waste produced. Good potential for reuse of existing materials, but no guarantee. Greater risk of air/dust pollution.	Vast majority of materials used to construct new building will be sourced offsite and so will contribute significantly to the embodied energy.

- Score in terms of how the option addresses EMBODIED ENERGY:

Benchmark	Very Poor	◄	►		Excellent
Score	1	2	3	4	5

Further Guidance

- The Sustainable Building Association- http://www.aecb.net
- International Initiative for a Sustainable Built Environment- http://www.iisbe.org

Environmental

Environmental

Water Consumption

FILTER

Key issue

Can the building be brought up to current best practice standards with regards to water consumption?

Supporting Information

Reducing the use of mains fed water is a real concern when considering the impacts of climate change on the UK. The use of potable water in buildings can be reduced significantly through the installation of low flow sanitary ware and flow regulating devices on wash hand basins and WC's to reduce consumption. Additionally, non-potable water demands may be met through rainwater or grey-water systems.

Where a refurbishment will allow the replacement of sanitary fittings to allow the use of water efficient devices or the retro-fitting of rainwater harvesting tanks there is significant potential to bring water consumption in line with current best practice. Other strategies include consideration of on-site borehole supply or control measures such as leak detection or occupancy-linked automatic supply shut-off.

OPTIONS APPRAISAL

Measurement Method

Assess likely water performance using the best practice overall figure for Further/Higher Education Institutes of 0.40m^3/m^2 given by Watermark. This should be assessed by the environmental engineer.

Building Type	Typical Water Use	Best Practice Benchmark
Residence (en Suite)	100 Litres per day/ per person	68 Litres per day/ per day
Offices/Administrative	9.3 m^3/person/yr	6.4m^3/person/yr
Laboratory	0.767 m^3/m^2 floor space/yr	0.612 m^3/m^2 floor space/yr
Library	0.203 m^3/m^2 floor space/yr	0.128 m^3/m^2 floor space/yr
Sports Centres	0.0385 m^3/person/yr	0.035 m^3/person/yr
Teaching Hospitals	1.66 m^3/m^2 floor space/yr	1.33 m^3/m^2 floor space/yr

Performance

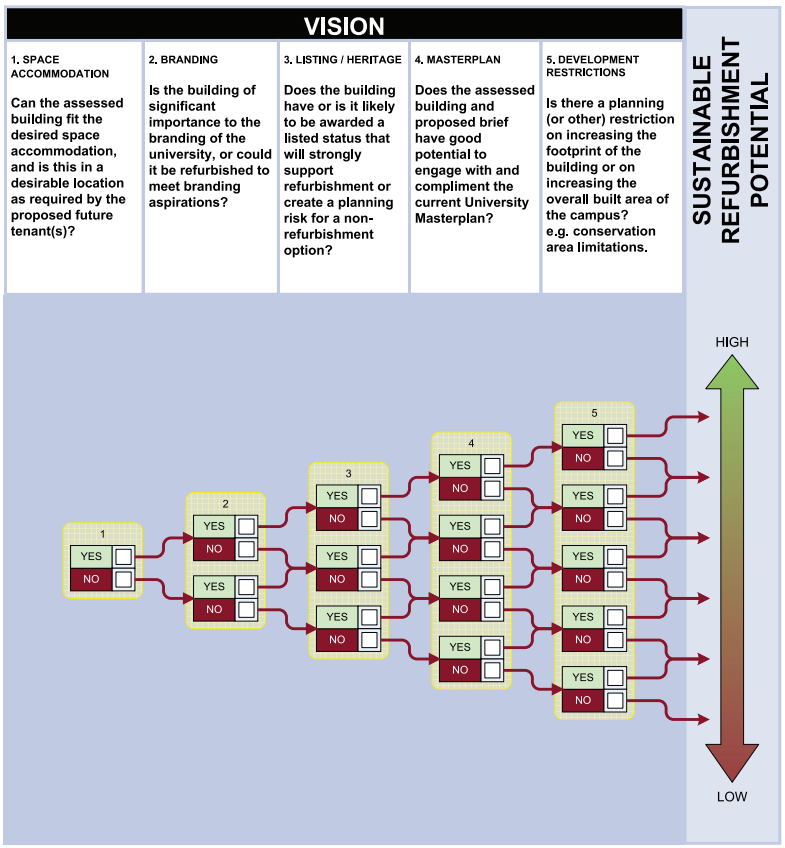
- Score in terms of how the option addresses WATER CONSUMPTION:

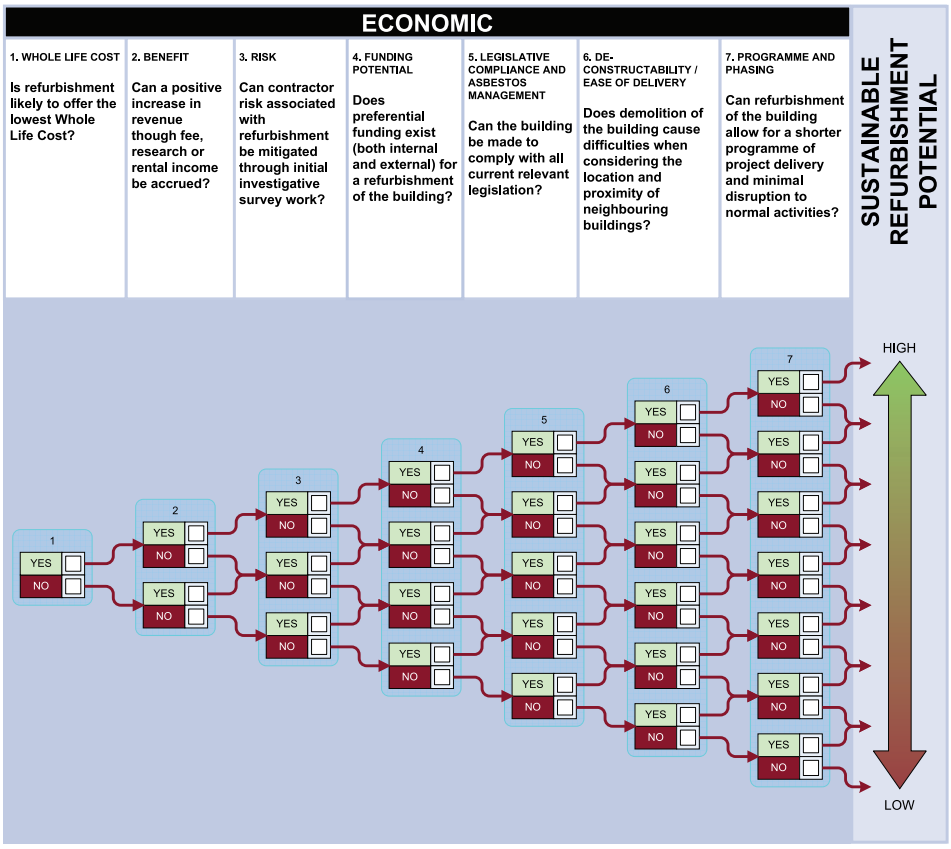
Benchmark	Very High Water Consumption ←				→ Best Practice Water Consumption
Score	1	2	3	4	5

Further Guidance

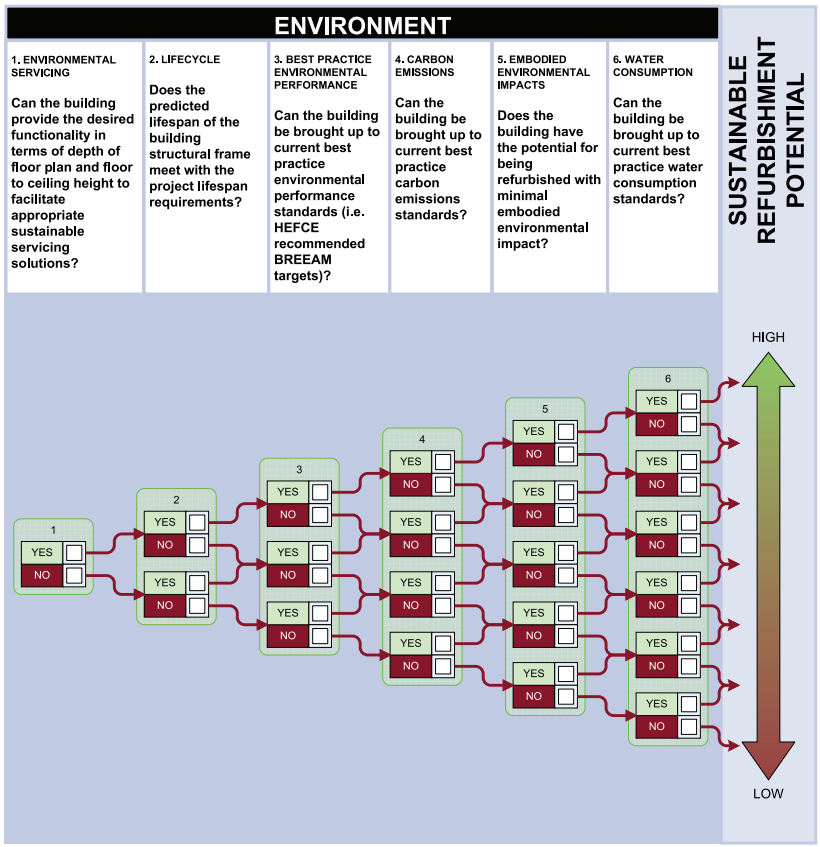
- http://www.ogcbuyingsolutions.gov.uk/energy/watermark
- http://www.environment-agency.gov.uk

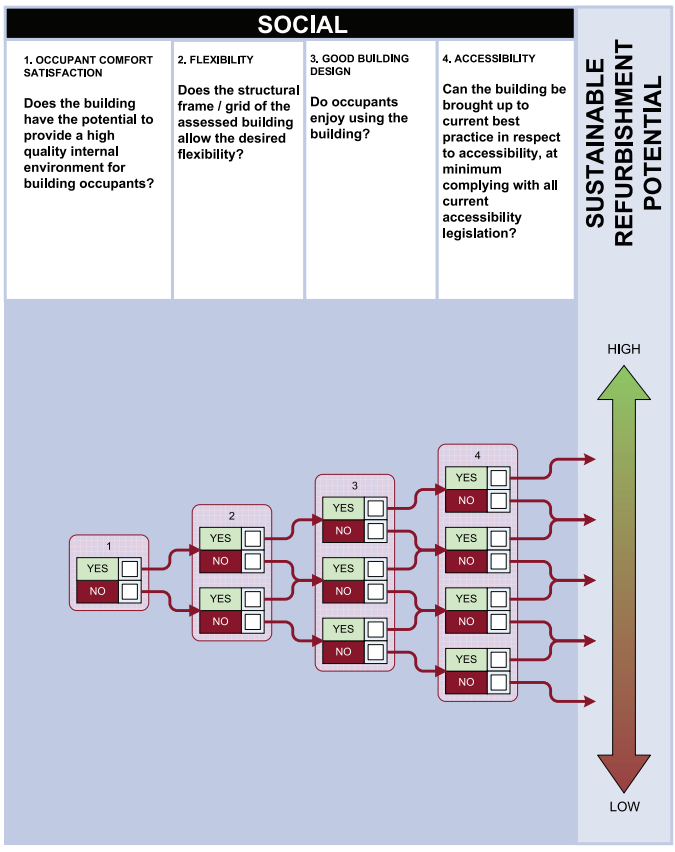
Filter


VISION
1. SPACE ACCOMMODATION
Can the assessed building fit the desired space accommodation, and is this in a desirable location as required by the proposed future tenant(s)?
2. BRANDING
Is the building of significant importance to the branding of the university, or could it be refurbished to meet branding aspirations?
3. LISTING / HERITAGE
Does the building have or is it likely to be awarded a listed status that will strongly support refurbishment or create a planning risk for a non-refurbishment option?
4. MASTERPLAN
Does the assessed building and proposed brief have good potential to engage with and compliment the current University Masterplan?
5. DEVELOPMENT RESTRICTIONS
Is there a planning (or other) restriction on increasing the footprint of the building or on increasing the overall built area of the campus? e.g. conservation area limitations.
SUSTAINABLE REFURBISHMENT POTENTIAL
HIGH
LOW
YES
NO


ECONOMIC
1. WHOLE LIFE COST
Is refurbishment likely to offer the lowest Whole Life Cost?
2. BENEFIT
Can a positive increase in revenue though fee, research or rental income be accrued?
3. RISK
Can contractor risk associated with refurbishment be mitigated through initial investigative survey work?
4. FUNDING POTENTIAL
Does preferential funding exist (both internal and external) for a refurbishment of the building?
5. LEGISLATIVE COMPLIANCE AND ASBESTOS MANAGEMENT
Can the building be made to comply with all current relevant legislation?
6. DE-CONSTRUCTABILITY / EASE OF DELIVERY
Does demolition of the building cause difficulties when considering the location and proximity of neighbouring buildings?
7. PROGRAMME AND PHASING
Can refurbishment of the building allow for a shorter programme of project delivery and minimal disruption to normal activities?
SUSTAINABLE REFURBISHMENT POTENTIAL
HIGH
LOW
YES
NO

Filter


ENVIRONMENT
1. ENVIRONMENTAL SERVICING
Can the building provide the desired functionality in terms of depth of floor plan and floor to ceiling height to facilitate appropriate sustainable servicing solutions?
2. LIFECYCLE
Does the predicted lifespan of the building structural frame meet with the project lifespan requirements?
3. BEST PRACTICE ENVIRONMENTAL PERFORMANCE
Can the building be brought up to current best practice environmental performance standards (i.e. HEFCE recommended BREEAM targets)?
4. CARBON EMISSIONS
Can the building be brought up to current best practice carbon emissions standards?
5. EMBODIED ENVIRONMENTAL IMPACTS
Does the building have the potential for being refurbished with minimal embodied environmental impact?
6. WATER CONSUMPTION
Can the building be brought up to current best practice water consumption standards?
SUSTAINABLE REFURBISHMENT POTENTIAL
HIGH
LOW
YES
NO


SOCIAL
1. OCCUPANT COMFORT SATISFACTION
Does the building have the potential to provide a high quality internal environment for building occupants?
2. FLEXIBILITY
Does the structural frame / grid of the assessed building allow the desired flexibility?
3. GOOD BUILDING DESIGN
Do occupants enjoy using the building?
4. ACCESSIBILITY
Can the building be brought up to current best practice in respect to accessibility, at minimum complying with all current accessibility legislation?
SUSTAINABLE REFURBISHMENT POTENTIAL
HIGH
LOW
YES
NO

AUDE 1960-70's Buildings Matrix Tool Version 1.0 Jan-08		
	Name of Institution:	
	Project Title:	
	Assessment By:	
	Date:	

Categories	Sub-Categories	For each Option, please enter a score between 1 and 5 for each field				
		OPTION 1	OPTION 2	OPTION 3	OPTION 4	OPTION 5
Vision						
	Space Accomodation	1	1	1	1	1
	Branding	1	1	1	1	1
	Listing/Heritage	1	1	1	1	1
	Masterplan	1	1	1	1	1
	Development Restrictions	1	1	1	1	1
Social						
	Occupant Comfort Satisfaction	1	1	1	1	1
	Flexibility	1	1	1	1	1
	Good Building Design	1	1	1	1	1
	Accessibility	1	1	1	1	1
Economic						
	Whole Life Costs	1	1	1	1	1
	Benefit	1	1	1	1	1
	Risk	1	1	1	1	1
	Funding Potential	1	1	1	1	1
	Legislative Compliance and Asebestos Management	1	1	1	1	1
	De-constructability / Ease of Delivery	1	1	1	1	1
	Programme and Phasing	1	1	1	1	1
Environment						
Please Note: Embodied environmental impact related issues ('Lifecycle' and 'Embodied Environmental Impact') have an in-built reduced weighting relative to the operational environmental impact related issues. For both refurbishment and new-build projects the average embodied environmental impact is approximated to 25% relative to operational impact over a 30 year lifecycle. See	Environmental Servicing	1	1	1	1	1
	Lifecycle	1	1	1	1	1
	Best Practice Environmental Performance	1	1	1	1	1
	Carbon Emissions	1	1	1	1	1
	Embodied Environmental Impact	1	1	1	1	1
	Water Consumption	1	1	1	1	1
Category Weightings						
Vision	**25%**	**5%**	**5%**	**5%**	**5%**	**5%**
Social	**25%**	**5%**	**5%**	**5%**	**5%**	**5%**
Economic	**25%**	**5%**	**5%**	**5%**	**5%**	**5%**
Environment	**25%**	**5%**	**5%**	**5%**	**5%**	**5%**
Overall Score	**100%**	**20%**	**20%**	**20%**	**20%**	**20%**