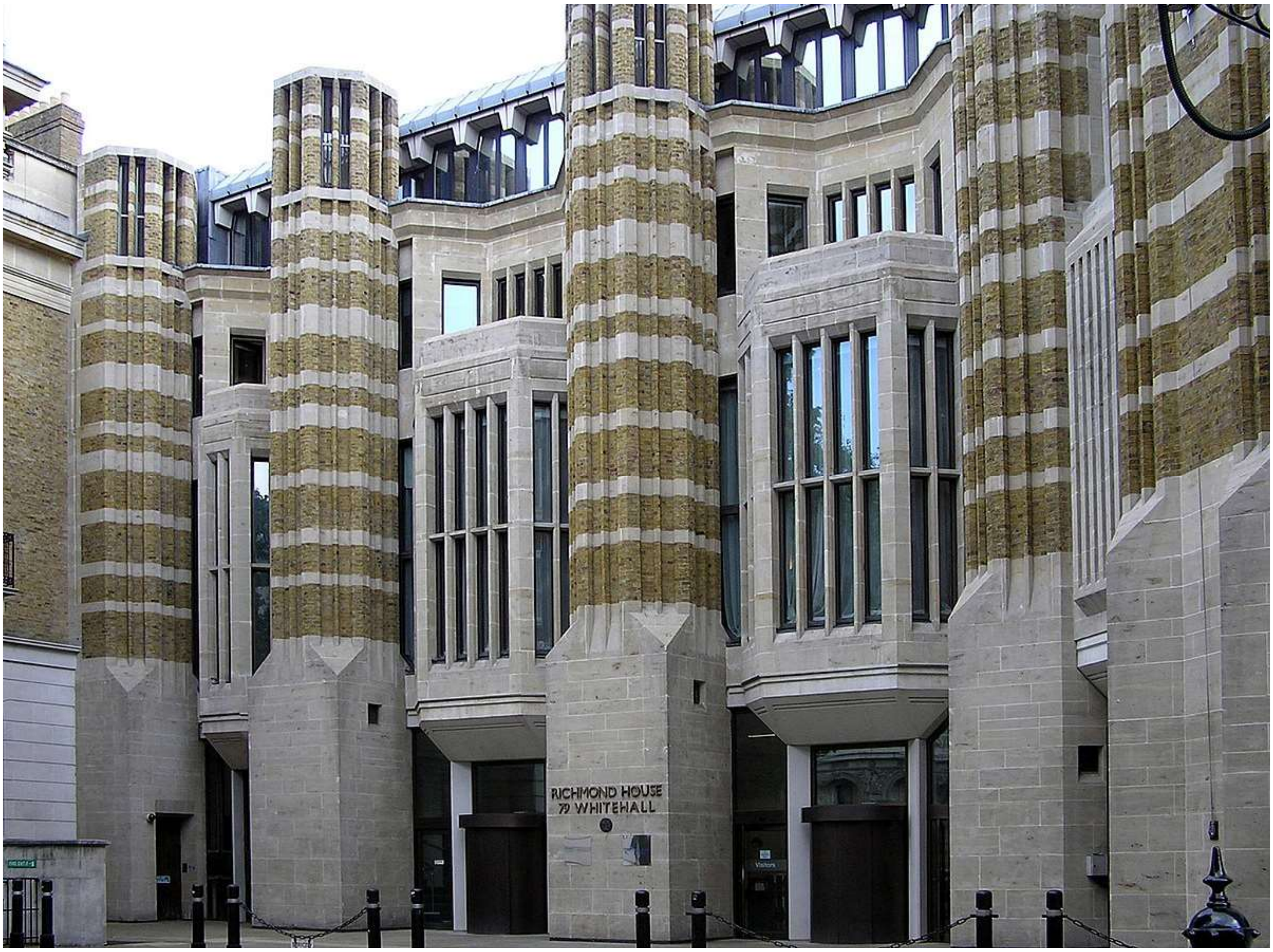


# RICHMOND HOUSE:
# THE CASE FOR RETENTION

Mark Hines Architects

# EXECUTIVE SUMMARY

*Mark Hines Architects is an architectural practice specialising in the remodelling and creative reuse of historic buildings. Mark Hines was the project director responsible for the repair and conversion of the BBC's grade II* listed Broadcasting House. He is a former scholar with the Society for the Protection of Ancient Buildings.*

- **The retention and refurbishment of Richmond House wins in four key ways – it retains and compliments the architectural qualities of the existing building, generates significantly less carbon emissions than a new building, reduces current operating energy use and is cost effective. Refurbishment represents an enormous opportunity for the Government to create a landmark, low energy, best practice office building**

- In order to meet current Government energy targets, the **reuse of existing buildings** must be a national and global priority

- **Demolition and rebuilding has significant energy, carbon and financial cost implications.** Retaining existing buildings and seeking to enhance their energy performance in sensitive ways is in keeping with building conservation, sustainability and progress towards a low carbon society

- Using standard industry guidance (The Royal Institute of Chartered Surveyors (RICS) benchmark figure) we estimate that **10,500-24,000 tonnes of $CO_2$ emissions** – the equivalent of **15,450 flights from London to New York - would be lost as a result of the demolition of Richmond House**

- Richmond House remains an attractive building and thirty years after its completion it **meets and exceeds many guidelines for modern day offices.** The most effective way to ensure carbon emissions are minimised is to **refurbish Richmond House to the highest possible standard**

- Depending on the scope of works**, a refurbishment project may be between 20-50% more cost effective than the demolition and construction of a new building**. A cost study should be carried out to confirm the potential savings

- Refurbishment will be **quicker than redevelopment**, **reducing site overhead costs, interest charges, permitting earlier occupation and income flow**. Refurbishment work could be phased with office users remaining in place, resulting in further cost savings

- **The case for complete demolition of Richmond House appears unsubstantiated.** Repeated requests to see the analysis and costs of alternative sites for the chamber on the parliamentary estate that have been considered in this decision making process have been made. This information has not been forthcoming.

- **Richmond House is listed grade II*** (the second highest grade of listing) for its outstanding architectural and historical quality. It falls within the top 5 % of all listed buildings in England. **Demolishing it before the end of its design life would represent a significant cultural and artistic loss**

## RICHMOND HOUSE TODAY

**The British Council for Offices (BCO) was set up in 1990 (three years after Richmond House was completed) and represents best practice for the design of offices in Britain. Although some expectations have changed, Richmond House still achieves many of the current BCO criteria for good practice design**.

Thirty years on, the building still possesses many desirable features of a well-designed office building. We can see that in the majority of respects, the building either still meets current best practice criteria, or can be improved in order to meet required levels**.** See Annexe 1.

Richmond House is potentially still attractive to the market today, because of:

- good quality construction
- a Grade II* listing which underlines its architectural quality and creates value
- a flexible and adaptable layout, with a structure and service core arrangement able to meet a range of space and servicing requirements
- a primarily open plan layout, suitable for contemporary working practices
- the provision of a healthy, comfortable and productive working environment
- direct user contact with the outside world- the shallow floor plates allowing good daylighting, views and ventilation
- an impressive reception area and function space

The architectural qualities of the building and its grade II* listing should secure its retention. However, Richmond House was also designed to be a building with a long life, using good quality, durable, low maintenance materials. It remains a high quality and thoughtful building, representing a significant investment of money and energy.

## OFFICE ACCOMMODATION

In total, approximately 15,000m$^2$ of office accommodation was originally provided for 450 staff. The floor plans and service cores are efficiently planned and overall floor plate sizes typically compare well with requirements today, where contiguous floor areas of between 500m$^2$ and 2500m$^2$ still provide the most usable office spaces.

**The offices remain the most successful spaces in Richmond House and still provide a high quality, working environment. The building was designed to be simply serviced and naturally ventilated. The narrow floor plans and continuous fenestration ensure that the desks are close (generally within 7 metres) of natural light and ventilation, in accordance with today's best practice.**

Ceiling heights are typically 2.9m high to the ceiling and 2.48m to the underside of the coffer. The window heads extend into the painted precast concrete ceiling soffits to create a sense of greater height and generosity. This ensures excellent daylighting conditions for the occupants and good views out. Heating is concealed behind ash veneered panels beneath the windows.

The coffered ceiling design allows for the installation of lighting and additional ventilation (if required) without reducing the overall ceiling heights. Regarding the installation of services of the office spaces, there are alternatives to underfloor cabling, such as trunking along walls or using the existing raised floor. There are plenty of examples of this sensitive approach in other highly graded listed office buildings which show that raising floor levels is not necessary, particularly in highly listed buildings

Artificial up-lighting and acoustic insulation is set into the precast concrete soffits and result in quiet, well lit, pleasant office spaces. High quality Schueco aluminium double-glazed windows are manually operated and internal louvre blinds provid solar shading.  This allows users individual control which is highly prized in a contemporary working environment.  The office areas have subsequently had cooling units set within the coffered ceilings to provide supplementary cooling.

# FLEXIBLE STRUCTURE

**The bones of Richmond House are very good indeed and the building appears to remain suitable for modern office working practices.** The concrete frame is set out to a structural grid which is flexible, able to accommodate change and meet the demands of different user requirements. Space for a demountable and flexible office partitioning system is provided by incorporating carefully detailed recesses in the underside of the coffered ceilings and between window mullions.

The solid feel of the concrete construction, fair-faced finishes and large surface area of the deeply coffered ceilings increases the building's "thermal mass". This reduces heating and cooling needs by evening out diurnal temperature swings and reduces overall energy consumption. It means that **the building heats up much more slowly and is cool and pleasant to work in**.

# TECHNOLOGY AND SERVICES

The building has semi-dispersed service cores and raised floors, which appear to meet current requirements for naturally ventilated office space.

# MATERIALS

The quality of the building materials in Richmond House is good. Externally, the building has been carefully detailed and appears to have weathered well. The external materials – the brick and granite of the service towers and the cascading lead roofs could last for hundreds of years. The aluminium double glazed windows require regular maintenance, as is standard with contemporary glazing systems.

Internally the building has "fair-faced" finishes, with exposed brick and timber used to minimise internal maintenance costs. These are also robust and have generally lasted well. Bomb blast protection using internal curtains or anti-shatter film could be provided.

# LIFESPAN

Whilst we would expect a building completed in 1987 to have had parts of the interior renewed, the structure and parts of the envelope may still have a design service life of at least 18-43 years. Given the quality of the materials, construction and detailing, the real service life of the building could be much longer. For comparison, a typical new office building may have a design service life as follows;

| ELEMENT | ORIGINAL DESIGN SERVICE LIFE (YEARS) |
|---|---|
| Building shell (structure and external envelope) | 30-75 |
| Glazing | 30 |
| Building services (heating, ventilation and cabling) | 15 |
| Scenery (fit-out) ceilings, lighting, finishes | 5-7 |
| Setting (furniture arrangement) | Daily |

According to British Standard BS ISO 15686-1, the Estimated Design Service Life (EDSL) can be calculated using the formula; EDSL = RSLC x A x B x C x D x E x F. This takes into account the Reference Service life of Commercial Buildings (RSLC) which might be 50 years, the quality of materials (A), design level (B): work execution level (C): environmental conditions (D) - in Richmond House's case, low exposure, away from coast and frost: in-use conditions (E) and maintenance conditions (F).

**This suggests that the Estimated Design Service Life of the external fabric of Richmond House is likely to be substantially higher than these figures indicate and for the external fabric (with the exception of the glazing) with regular maintenance, could exceed 100 years.**

The useful life of a commercial building often coincides with the life expectancy of the major building service components. Mechanical and electrical services have a mean life expectancy of just over 20 years (for most of the components) and we would expect an overhaul of the building services to coincide with any major repair of the building fabric (such as the double glazing).

## THE INCREASING IMPORTANCE OF EMBODIED ENERGY

Perhaps the biggest shift since the building's completion in 1987 has been the recognition of the threat of climate change and the emphasis on reducing carbon emissions in the built environment. Much effort over the last thirty years has been spent on reducing on operational energy costs of the UK's building stock. As these emissions are minimised, the embodied energy used in construction materials becomes increasingly important. Research shows that it may begin to equate to perhaps 35% - 65% of a building's total lifetime carbon emissions.

When considering embodied energy in materials, it is not the actual energy figures used in production and transport which matter, but the energy used over time, or to put it another way, the overall carbon impact of the materials during their lifetime. For instance, the higher embodied energy products, (such as a brick and concrete) may have a lower overall impact than a low embodied energy product, such as timber cladding, because brick can last several hundred years and therefore, longer than timber cladding.

**It is cumulative carbon dioxide emissions, over time, that drives climate change. If we can postpone an emission (by not constructing a new office building but improving an existing building to a high standard using low embodied energy materials), we can reduce the amount of time that the carbon dioxide is in the atmosphere, and therefore, reduce the harm done.**

If we are in the last window of opportunity to fend off a climate 'tipping point', it is especially important to reduce emissions in the present time – which is where embodied emissions are concentrated.

The question of embodied energy in buildings is an emerging and complex subject, but research has shown that it can take more than 30 years before any cumulative energy savings is achieved when a building is demolished and replaced; a rough figure that can be modified if renovation focuses on thermal efficiency consistently. Similarly, other case studies have demonstrated that a new building's life span must reach 26 years to save more energy than the continued use of an existing building. It has been found that if a building were demolished and partially salvaged and replaced with a new energy efficient building, it would take up to 65 years to recover the energy lost in demolishing a building and reconstructing a new structure in its place. That's longer than many modern buildings survive.

The Royal Institute of Chartered Surveyors (RICS) benchmark figure for establishing embodied energy in an existing building is 1030 kg $CO_2e/m^2$. Using RICS methodology and a 15000$m^2$ floor area to calculate embodied carbon for Richmond House gives a figure of 15,450 tonnes of $CO_2$ emissions or a range of between 10,500 – 24,000 tonnes of $CO_2$ emissions that would be lost if the building were demolished. This is the equivalent of 15,450 flights from London to New York.

Therefore, it is particularly important to retain high quality buildings like Richmond House, which represent a significant capital investment of carbon, and possibly much more carbon than these benchmark figures suggest. The original investment in high embodied energy materials was mitigated by the original idea of making a flexible building with a long lifespan, using durable, high quality, low maintenance materials. For instance, the exposed concrete ceilings contributes to lower operating energy, obviates the need for additional ceiling finishes and adds to the thermal mass of the building, significantly reducing heating and cooling needs – as the heavyweight construction evens out diurnal temperature swings and so reduces overall energy consumption.

## COUNTING THE ENVIRONMENTAL COST OF DEMOLISHING RICHMOND HOUSE

The embodied emissions in Richmond House represents $CO_2$ already "spent", and cannot be taken directly into account in reducing future carbon emission targets. Instead, it is important to compare the potential energy that would be used in the demolition, construction and operation of any new building

with future operational emissions associated with the existing building, along with an option for refurbishment.
A typical equivalent sized new office building may have the following emissions;

**TYPICAL NEW BUILD OFFICE CARBON EMISSIONS (based on 15,000m² floor area)**

| Office type | kg $CO_2m^2$ emissions per year | $CO_2$ emissions per year (tonnes) | Potential lifetime carbon emissions in tonnes (based on 30 years) |
|---|---|---|---|
| **Natural ventilated** | 45 | 675 | 20,250 |
| **Mechanical ventilated** | 85 | 1275 | 38,250 |

An independent, full Life Cycle Analysis (LCA) would allow a direct comparison between building a new building versus a thorough refurbishment. It would take into account the proposed embodied energy and carbon of a replacement building, as well as that associated with the demolition of the existing structure and the disposal of all materials. The durability and longevity of building materials is of importance when calculating embodied energy and carbon using a LCA. The LCA would help evaluate the carbon investment of a new building, against the potential savings from an upgraded Richmond House.

## THE BENEFITS OF A "DEEP RETROFIT"

Since 1987, statutory insulation levels have more than doubled. Real estate is responsible for 40% of the UK's total emissions and the government is looking towards the developers of new buildings and landlords of existing assets to assist in cutting carbon emissions. The focus has been on new buildings, but there is a growing emphasis on our existing buildings. **Richmond House is not just a good building, it's an opportunity.**

**Richmond House currently has an Energy Performance Certificate (EPC) rating of E. The case for retention can be made even stronger by reducing operational energy costs by making the building more energy efficient. Measures could include increasing thermal insulation and airtightness, reducing thermal bridges, installing secondary glazing, ventilation (with highly efficient heat recovery) and the use of renewable energy sources. There are challenges associated with refurbishment but sensitive internal retrofitting measures could retain the external appearance of the building and result in significant energy savings of potentially up to 75% (compared to the UK average) with a 40% improvement of Building Regulation (Part L) requirements. These improvements would allow the building to achieve an EPC rating of A or B and a BREEAM rating of "Very Good", 'Excellent' or even "Outstanding". There are many examples of recently refurbished office buildings which have met these criteria, such as the grade II* listed Broadcasting House which achieved a BREEAM rating of "Excellent", reduced carbon emissions by more than 45% and estate costs by £736m.**

**Richmond House is less reliant on artificial cooling than many contemporary floor-to-ceiling glazed offices.** It has a reasonably balanced window to wall ratio and as such is potentially well placed to be able to cope with predicted future challenges of climate change. Providing further environmental (ie. ventilation, heating, cooling, and lighting) control for users, the installation of a new building energy management system, the upgrading and possible enlargement of service cores and plant areas to allow for additional power, heating, cooling, IT and data requirements and greater intensity of occupation to improve efficiency could all help reduce energy consumption.
Security is understandably a major priority with Government buildings. Such requirements are constantly changing and additional security measures would need to be carefully balanced in relation to the listed status of the building. Possible options include the incorporation of new internal secondary glazing, bomb blast curtains or perhaps the use of external screening protection.

It is likely that a refurbished Richmond House and a new temporary building which is fully recyclable at the end of its life and powered by renewable energy will demonstrate better value in terms of carbon and costs. There are many examples of excellent temporary buildings which are designed to be easily disassembled and recycled at the end of their short lives. Recent examples include the Royal Shakespeare Company's temporary Courtyard Theatre (2006-2010), which was built in 11 months and "The Shed", which was constructed for The National Theatre (2013-2016).

# ANNEXE 1

## INITIAL COMPARISON OF RICHMOND HOUSE WITH CURRENT BCO (2014) SPECIFICATION STANDARDS:

| Key BCO criteria | BCO Recommendation | Richmond House | Comments |
|---|---|---|---|
| **PLAN DEPTH & CEILING HEIGHT** | | | |
| **Window to window** | 12-15m | Yes | |
| **Window to core** | 6-7.5m | Yes | |
| **Finished floor to underside ceiling** | 2.45 min (refurb) | Yes | |
| **GRIDS** | | | |
| **Planning grid** | 1.5m x 1.5m | Varies | Less important in open-plan offices. 1.5m grid allows 3m wide offices and relates better to 600mm module. 1.35m grid allows 2.7m wide offices |
| **Column Grid** | 7.5m, 9m, 12m and 15.0m | | |
| **CIRCULATION** | | | |
| **Circulation to NIA** | 15-22% | Yes | TBC on all floors |
| **WC PROVISION** | | | |
| **WC provision** | 60%/60% | Yes | TBC on all floors |
| **CYCLING PROVISION (SECURE CYCLE SPACES, SHOWERS, SECURE LOCKERS)** | | | |
| **Cycling provision (secure cycle spaces, showers, secure lockers)** | Cycling provision (secure cycle spaces, showers, secure lockers) | Partly provided on site | Can be improved |
| **RAISED FLOORS** | | | |
| **Raised floors 100mm (min)** | 100mm (min) | Yes | |
| **ENVIRONMENT** | | | |
| **Daylighting 2-5%** | 2-5% | Yes | |
| **Airtightness (naturally ventilated)** | Not more than $7m^3$/ $hr/m^2$ for building at 50pa | Not available | Levels can be improved |
| **Airtightness (mechanical)** | Not more than $3.5m^3/hr/m^2$ for building at 50pa | Not available | Levels can be improved |
| **Noise criteria** | (NR 40) | Not available | |
| **Sustainability** | BREEAM Minimum: 'Excellent' or 'Very Good' Best Practice: 'Outstanding' | Not available | It is possible that the building could be improved to meet "Excellent or Very Good" standards. This would need to be confirmed following further detailed design work. See BREEAM Refurbishment and Fit-Out standard for further information. In addition, the new build office market also demands an EPC rating of A or B) |

## About this report

This report has provided an initial overview of the building. Access was limited to certain areas and it is not intended to be a detailed appraisal, condition survey or feasibility study.

## About the author

Mark Hines is a director of Mark Hines Architects, a practice specialising in the remodelling and conservation of historic buildings and a former scholar with the Society for the Protection of Ancient Buildings. He was the project director responsible for the £1.4bn repair and conversion of the BBC's grade 2* listed Broadcasting House.

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