



# Portcullis House



## 1. Project Basics

Location: Bridge St, Westminster, London SW1A 2LW

Latitude/Longitude: 51.5°N/0.12°E

HDD: 3,000/CDD: 100/Annual Precipitation: less than 24"

Building Type: Office and Assembly (Parliamentary Building)

Square Footage/Stories: 23,000 square meters/7 stories

Completion Date: 18 August 2000

Client: Parliamentary Works Directorate

Design Team: Michael Hopkins and Arup & Partners

## 2. Background and Context

**Goals:** The design team's goals were to design an ultra-low energy building whose systems were integrated with the structure. Hopkins also wanted a building that would fit into the site's context. Norman Foster's New Scotland Yard is across the street, while two historical monsters (Big Ben and the Palace of Westminster) are also in the neighborhood.

As for experimentation prior to construction, Hopkins and Arup designed the six buildings for the Inland Revenue Headquarters in Nottingham. These buildings served as testing grounds for many of the concepts seen in Portcullis House.

**Economics:** Reportedly the most expensive "office block" in the UK, Portcullis House cost £235 million or about £1 million/each MP's office. The initial budget was £165 million; the difference between the proposed cost and actual, final cost is the source of criticism.

**Building Construction:** The floors, granite columns, fenestration, waveform slabs, services risers, and roof were all prefabricated—in other words, this building was essentially all prefabricated, then assembled on-site.



Portcullis House  
Google Earth



Portcullis House and Big Ben  
from galinsky.com

# The best intentions ...

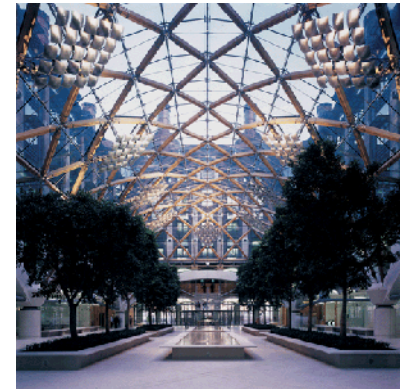
## Design Intent and Validation

Portcullis House is organized around a central atrium. This atrium is directly above the Westminster Tube stop. The atrium has “hired” fig trees as well as reflecting ponds. This configuration allows the maximum number of offices to be daylighted and a central gathering area that resembles a park.

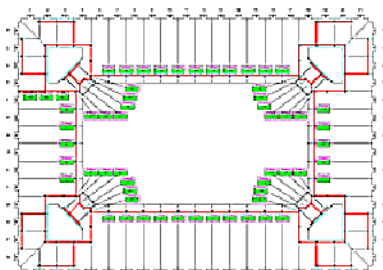
The energy use goal was 90kWh/m/y (for the offices). Target CO<sub>2</sub> emission was 750 tonnes/year.

Portcullis House uses one-third less energy and emits about 2,600 fewer tonnes of CO<sub>2</sub> than a conventionally air-conditioned building.

At this time, I have been unable to find actual energy and CO<sub>2</sub> emissions data.



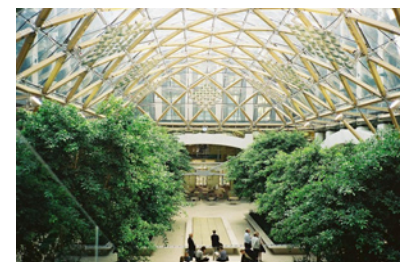
*publications.parliament.uk*



*slopeindicator.com*



Portcullis House in Context

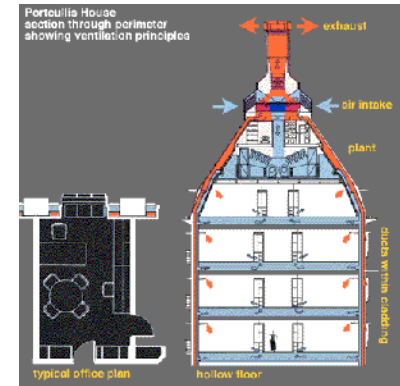


*andrewland.org*

## Key Design Strategies

**Natural ventilation towers:** Thirteen of these towers/chimneys are used for natural ventilation. Fresh air is brought in through vents under the windows, heated by solar radiation. The hot air rises to the top and is then directed either to be cooled or directly to the offices: no air is recirculated; all the air in the building is fresh. In the winter, this air is heated by solar radiation, and in the summer the air is cooled by water. After conditioning, air is pumped down the sides of the building into the floor void of each office. Each vent can be manually controlled. The fourteenth chimney is a flue for mechanical systems.

**Uses groundwater for cooling:** Bore holes are used to pump cool groundwater into the top of the building. This water is then used to cool the hot air (which had been heated by the windows). There is no refrigeration plant in Portcullis House. This cooling technique further reduces CO<sub>2</sub> emissions.



[architecturelink.org](http://architecturelink.org)



[copperconcept.org](http://copperconcept.org)

# Performance Studies

## Award

2002 Stirling Prize

I have been unable to find any performance studies done on Portcullis House. I did a Regeneration-Based Checklist for Design and Construction (from SBSE) and found Portcullis to be degenerating only “sometimes.” The overall score was -75.

Portcullis House pollutes air much less than contemporary buildings, pollutes water (no living machine or composting toilet), dumps untreated waste, is built mostly of virgin materials, and imports energy. Total negative score of 700.

On the other hand, Portcullis House is built to last 200 years, can be recycled, uses daylight, uses passive heating and cooling, creates pure indoor air, is a good neighbor, and is beautiful (in my opinion). Total positive score of 625.

## Further Information

There is a lot of controversy over the cost of Portcullis House. I believe nonprofessionals don't really understand that well-constructed, durable, energy-efficient buildings cost more initially, but more than pay for themselves over the building's life. The £150,000 fig trees are a bit much though.

Web sites I found helpful are included in the References section; there was a Portcullis House web site that has been dismantled. Hopefully it's just down for maintenance ([www.portcullis-house.com](http://www.portcullis-house.com)).



*mikelongphoto.com*



*striguil.co.uk*

The background image shows the interior of Portcullis House, featuring large, light-colored concrete columns and a complex network of pipes and ducts. The ceiling is a glass and steel structure with recessed lighting. The overall atmosphere is industrial and modern.

## References

<<http://news.bbc.co.uk>>

<<http://www.architecturelink.org.uk>>

<<http://www.bsjonline.co.uk>>

<[http://en.wikipedia.org/wiki/Portcullis\\_House](http://en.wikipedia.org/wiki/Portcullis_House)>

<<http://www.publications.parliament.uk>>

## Other Sites

<<http://www.geocities.com/londondestruction/portcullis.html>>. This site provides a non-architectural opinion of Portcullis House.

# How to Get There

Case Study by Sara Ferrell,  
Spring 2006

From ISH:

Go to the Baker Street Tube Station, get on the Jubilee Line. Get off at the Westminster stop ... or walk—it's only 2.2 miles.

Portcullis House is only open to the public on "Open House Days" ... in September. Sorry.

