

LONDON CITY HALL

A case study of sustainable solutions

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Context :

Introduction

Location Of The Building

General data

Maps , Plans , Sections , Elevations & Perspectives

Sustainable Solutions For The Building

Conclusions

Introduction

This Building is the headquarter of the Mayer of London and the great London Assembly (GLA) .



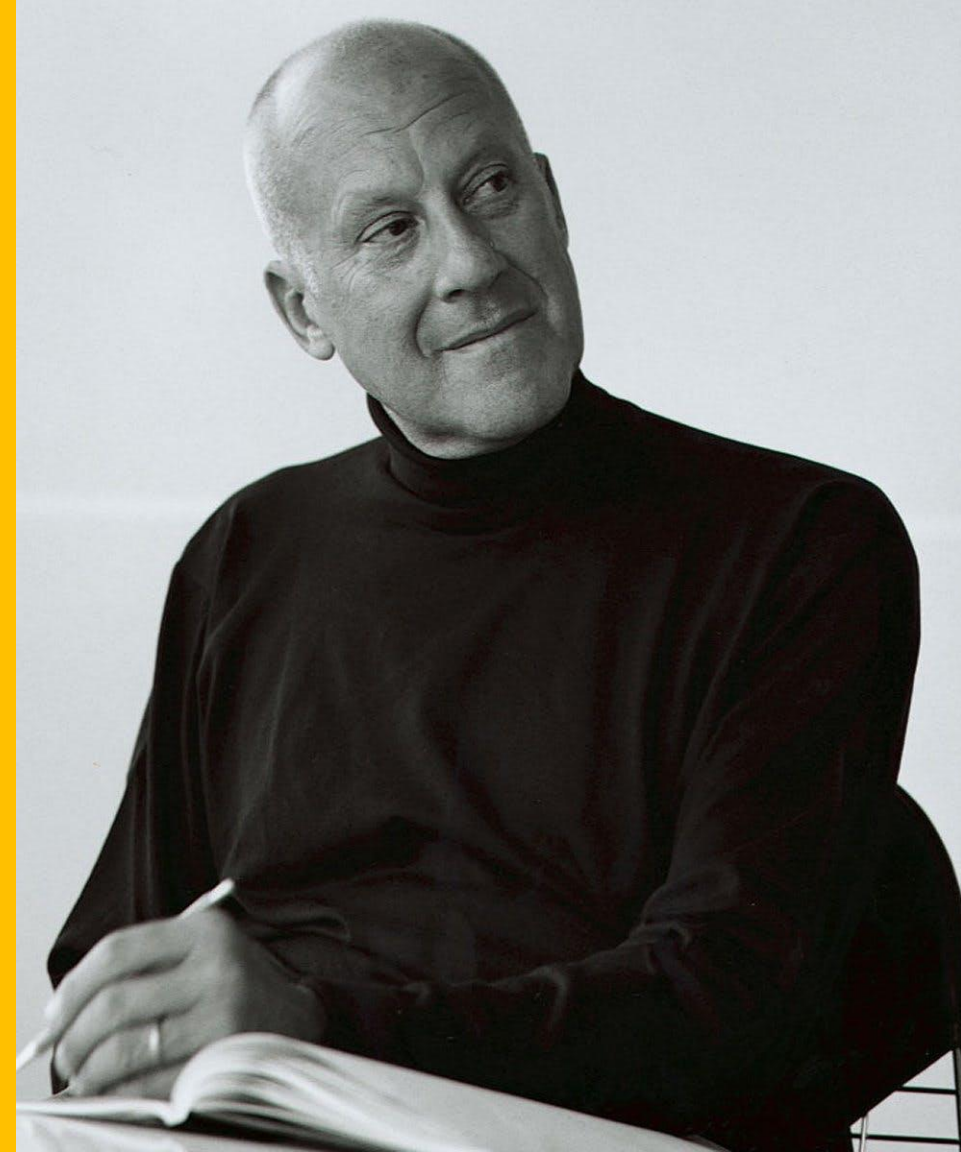
Location

The Building is located on south bank of the river Thames in the London Brough of Southwark , 10 minutes walking form London Bridge Underground and National Rail Station .



General Data

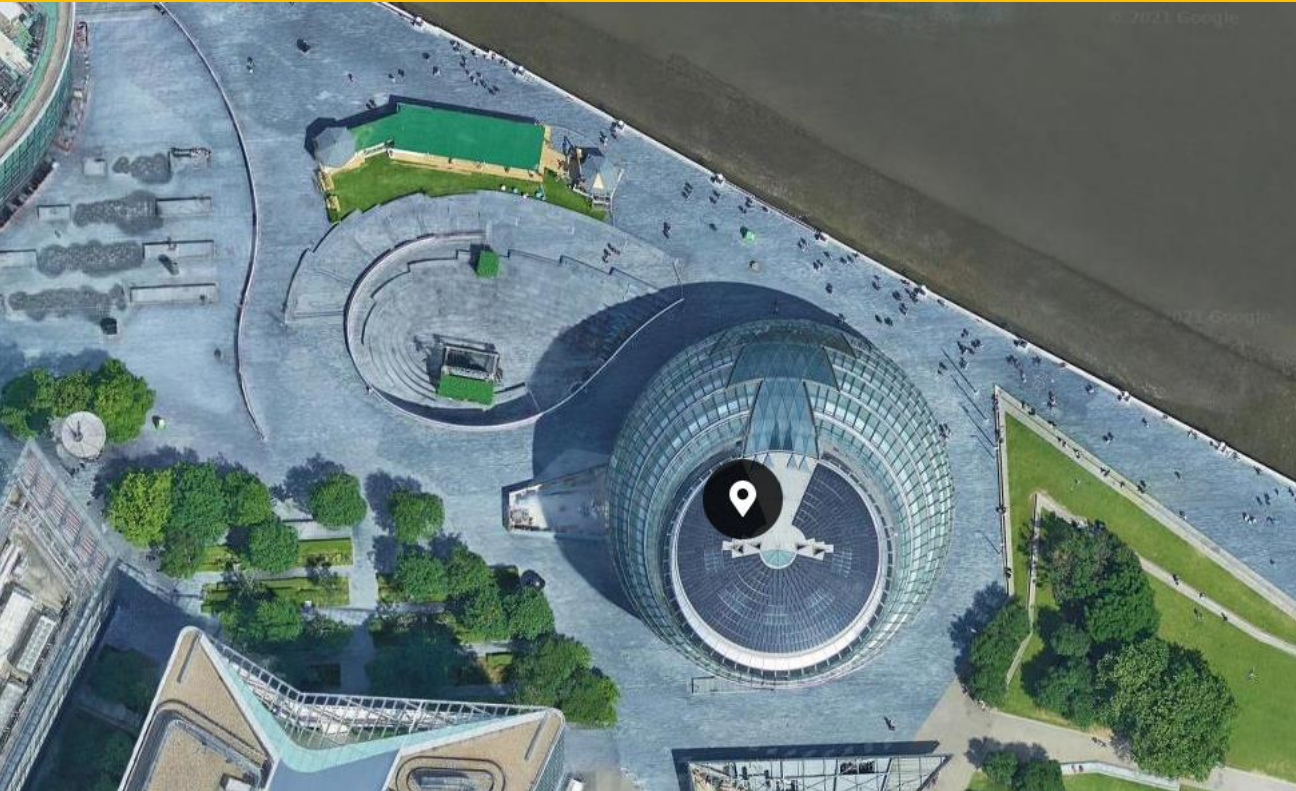
- **Designed By** : Foster + Partners
- **Appointment** : 1998
- **Begun** : May 2000
- **Completed** : May 2002
- **Opened** : 23.07.2002
- **Gross Floor Area** : 17,187m²
- **Total Building Surface Area** : 5202 m²
- **Sectors** : Civic, Education, Office, Public realm
- **Total cost** : £50M
- **Height** : 45 m
- **No. Of Floors** : 10 Floors



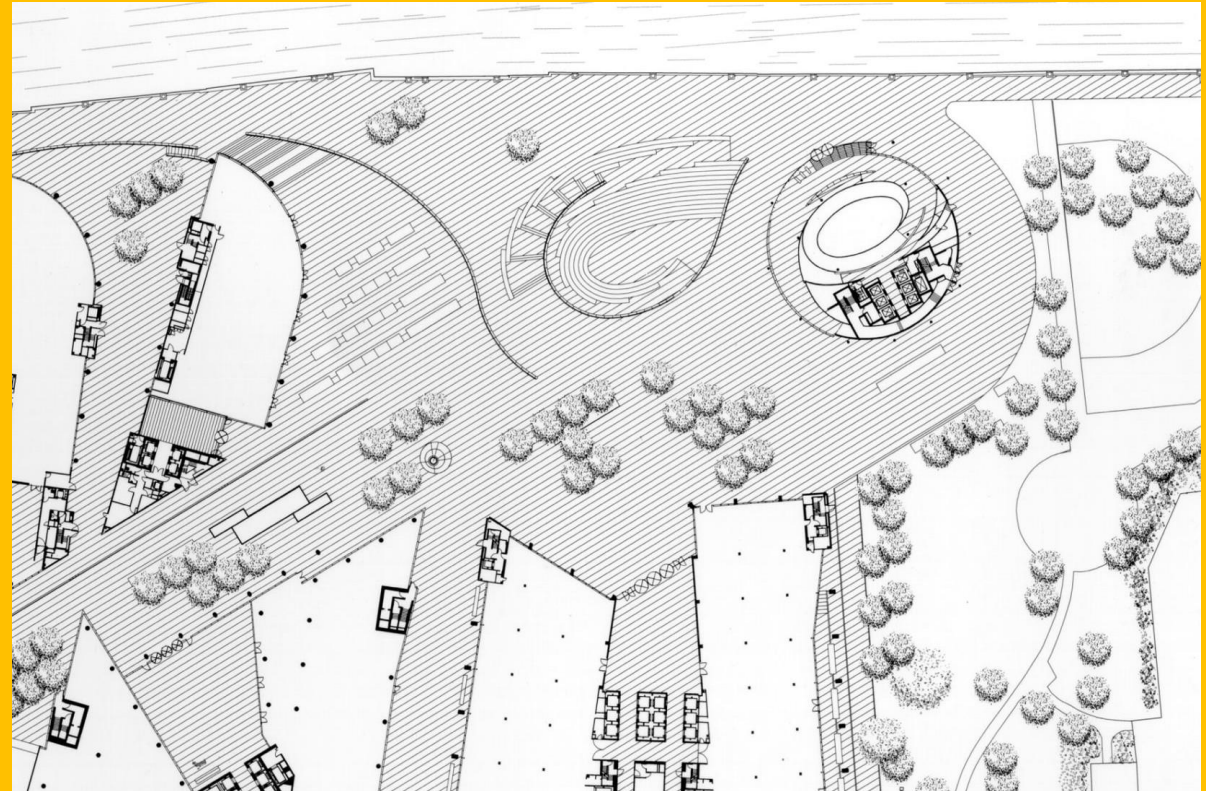
Norman Robert Foster

June 1, 1935 (age 85 years)

Maps , Plans , Sections , Elevations & Perspectives

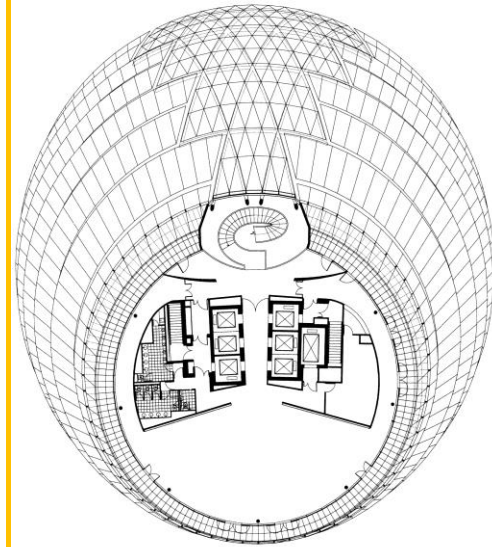
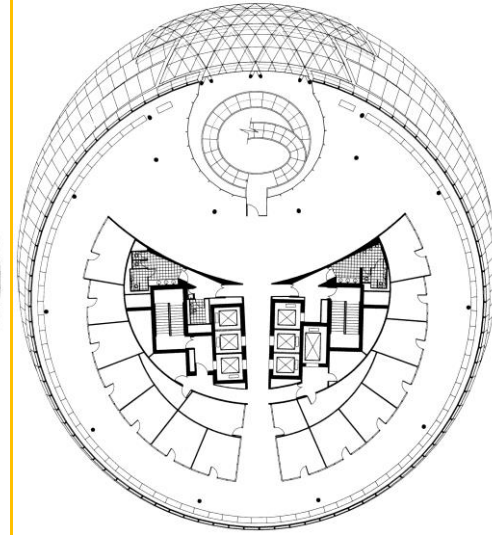
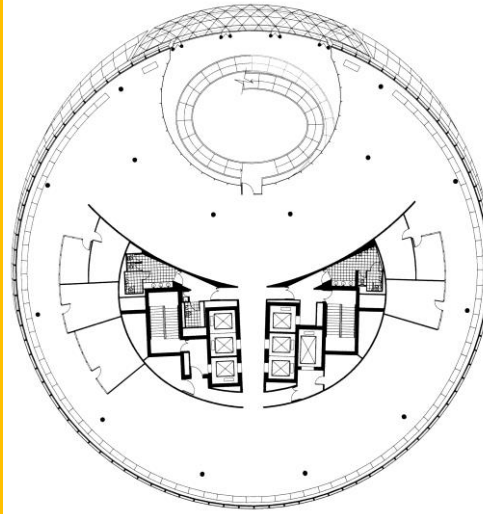
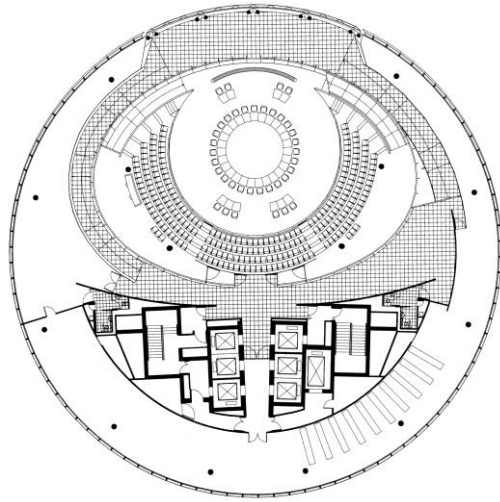
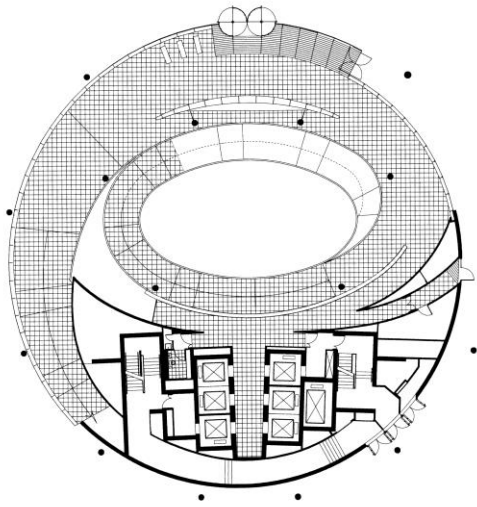


Arial Map



Site Plan

Maps , Plans , Sections , Elevations & Perspectives

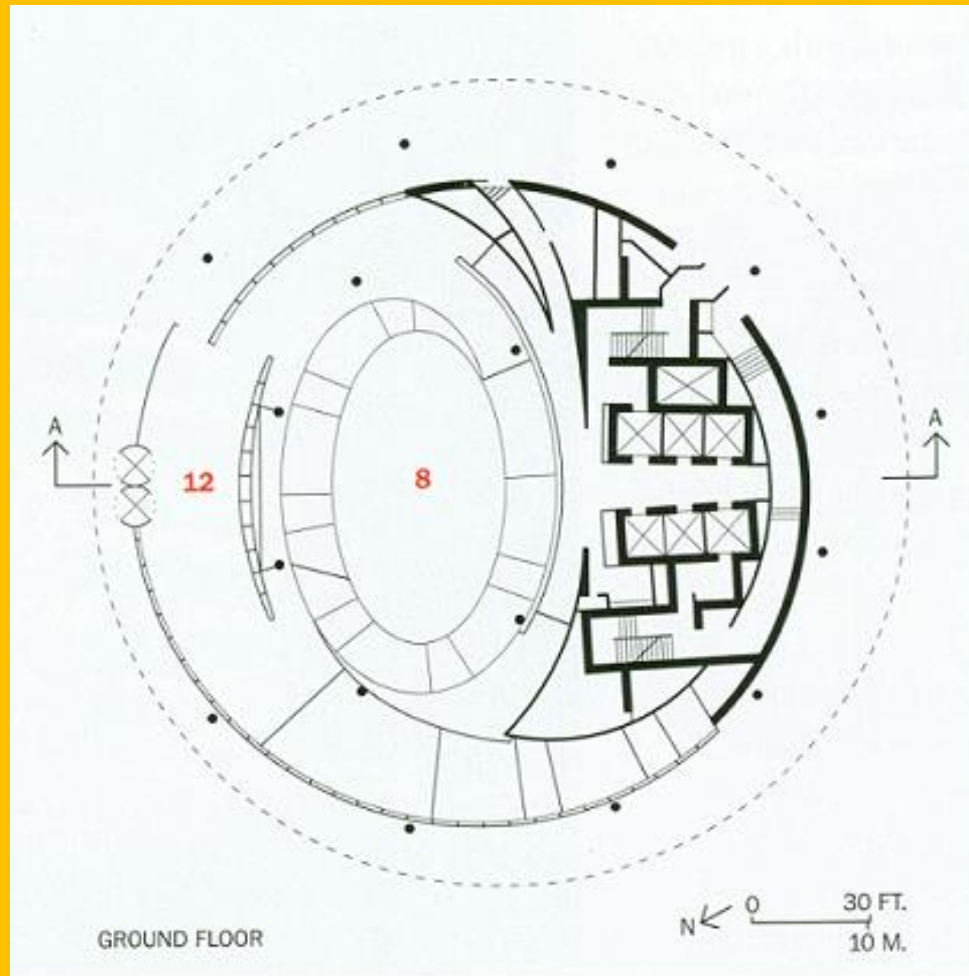


Plans

Maps , Plans , Sections , Elevations & Perspectives

Legend:

1. Parking
2. Storage rooms
3. Physical plant
4. Outdoor amphitheater
5. Cafe
6. Information desk
7. Kitchen
8. Exhibition area
9. Committee room
10. Meeting room
11. Media center
12. Reception
13. Assembly chamber
14. Public viewing gallery
15. Library
16. Reading room
17. IT room
18. Office
19. Open - plan area
20. Terrace
21. London's Room

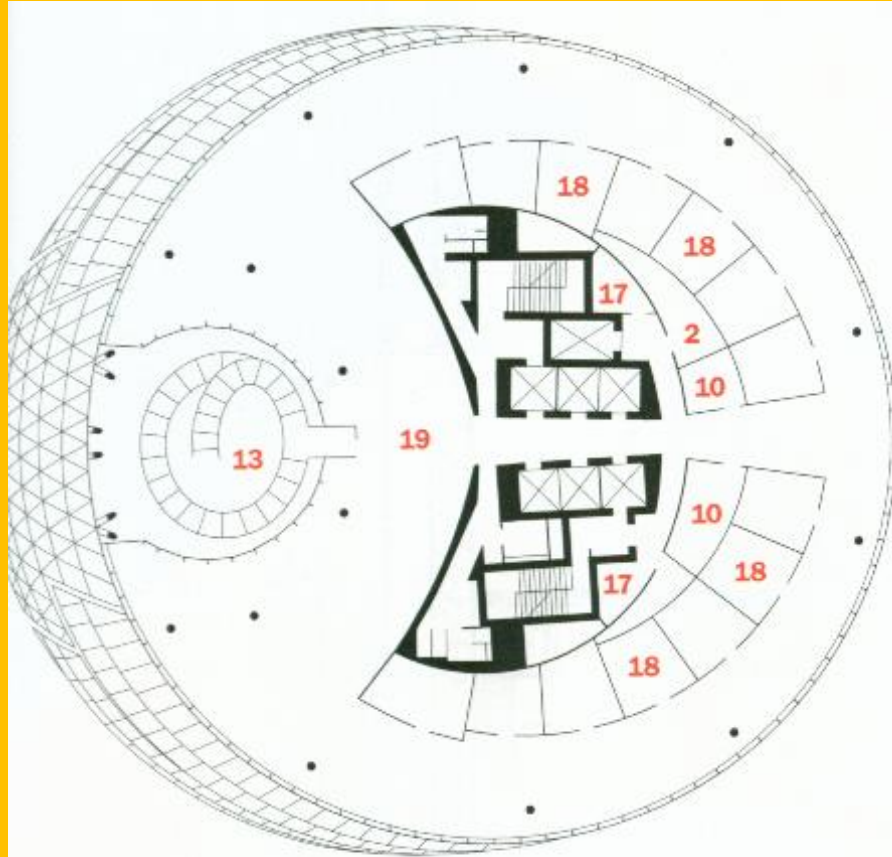


Ground level

Maps , Plans , Sections , Elevations & Perspectives

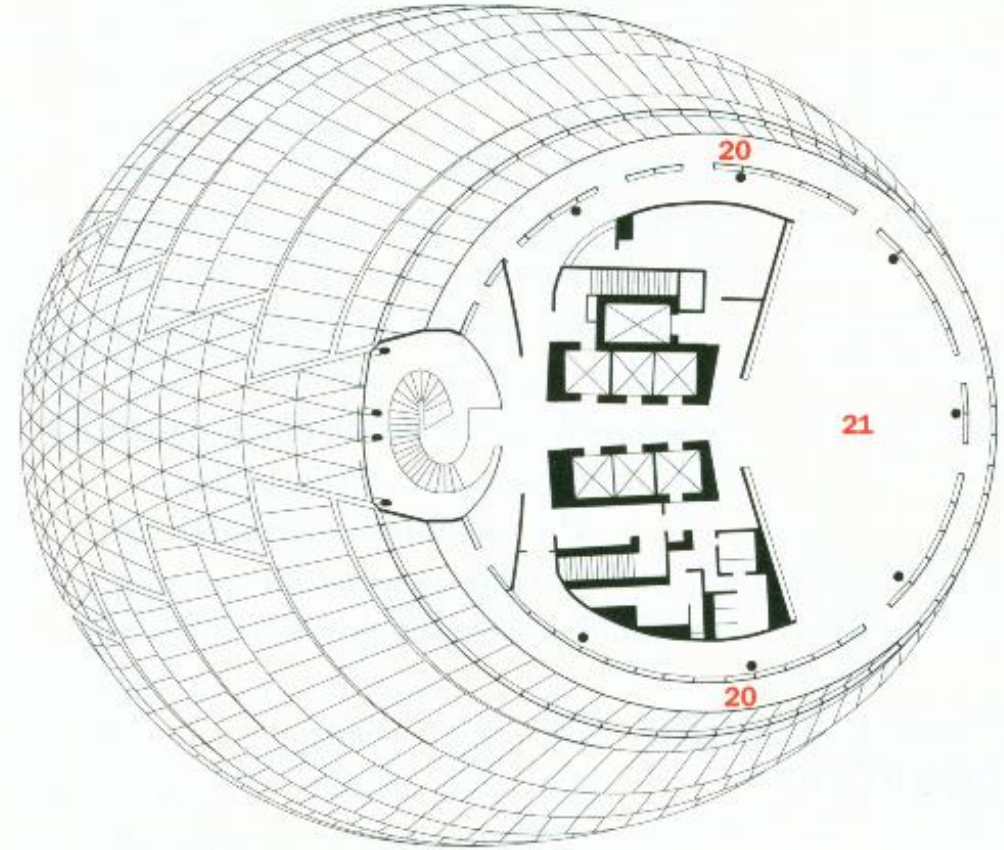
Legend:

- 1. Parking
- 2. Storage rooms
- 3. Physical plant
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LEVEL SIX

6th level



LEVEL NINE

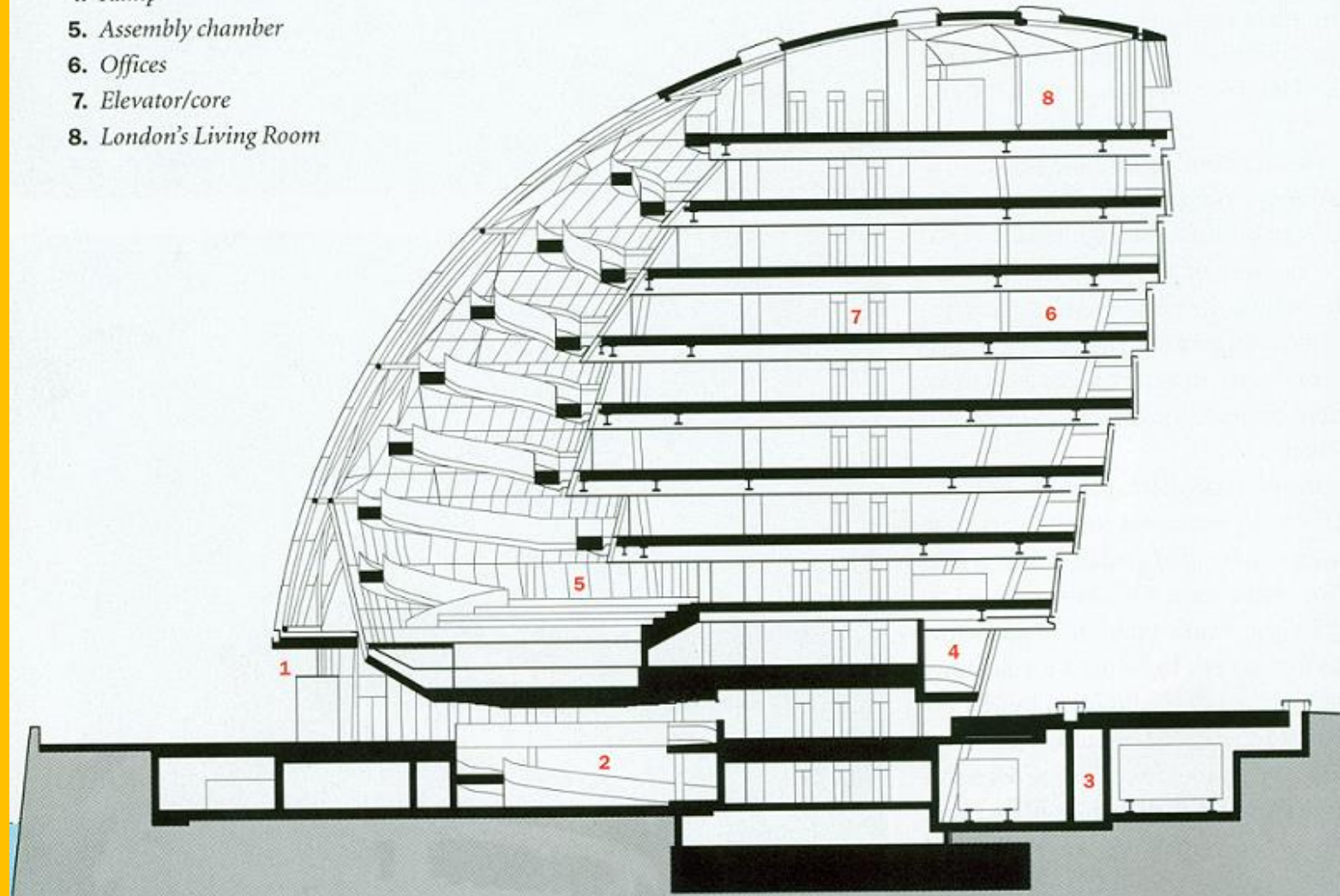
9th level

Maps , Plans , Sections , Elevations & Perspectives

Legend:

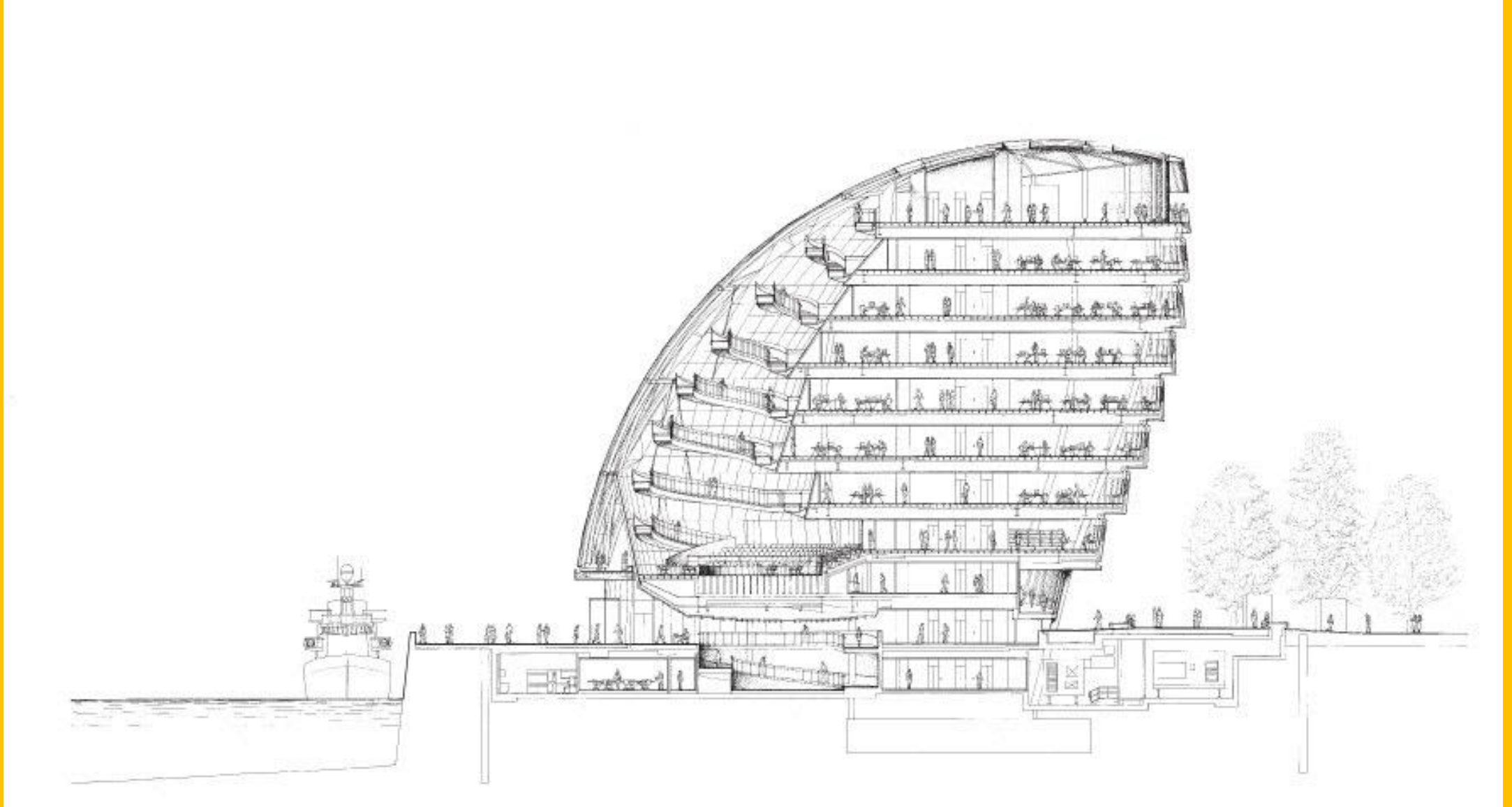
1. Parking
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21. London's Room

1. Main entrance
2. Exhibition space
3. Physical plant
4. Ramp
5. Assembly chamber
6. Offices
7. Elevator/core
8. London's Living Room



Building Section

Maps , Plans , Sections , Elevations & Perspectives



Site Section

Maps , Plans , Sections , Elevations & Perspectives



Side View



Front View



Side View

Maps , Plans , Sections , Elevations & Perspectives



Perspectives

Maps , Plans , Sections , Elevations & Perspectives



Perspectives

Maps , Plans , Sections , Elevations & Perspectives

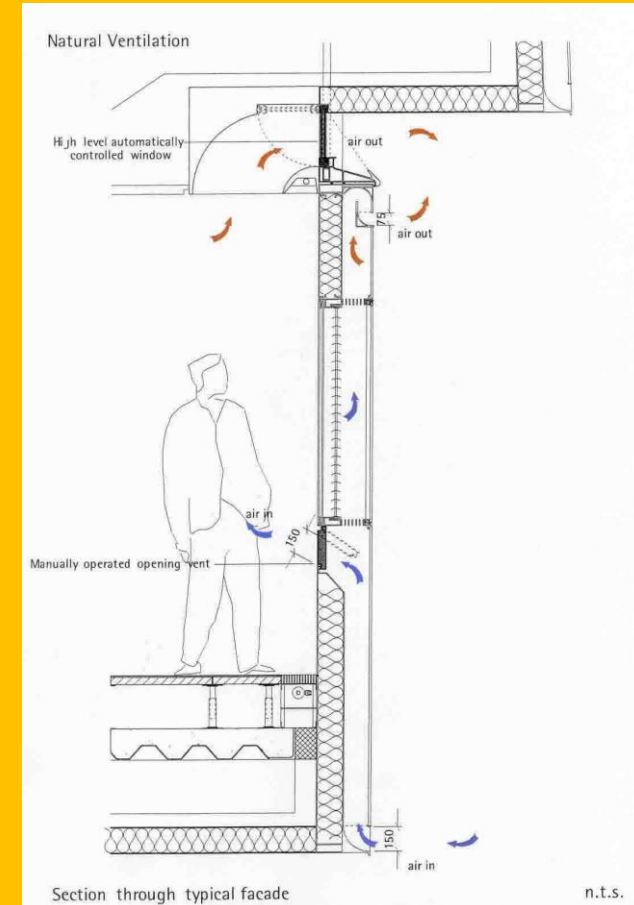
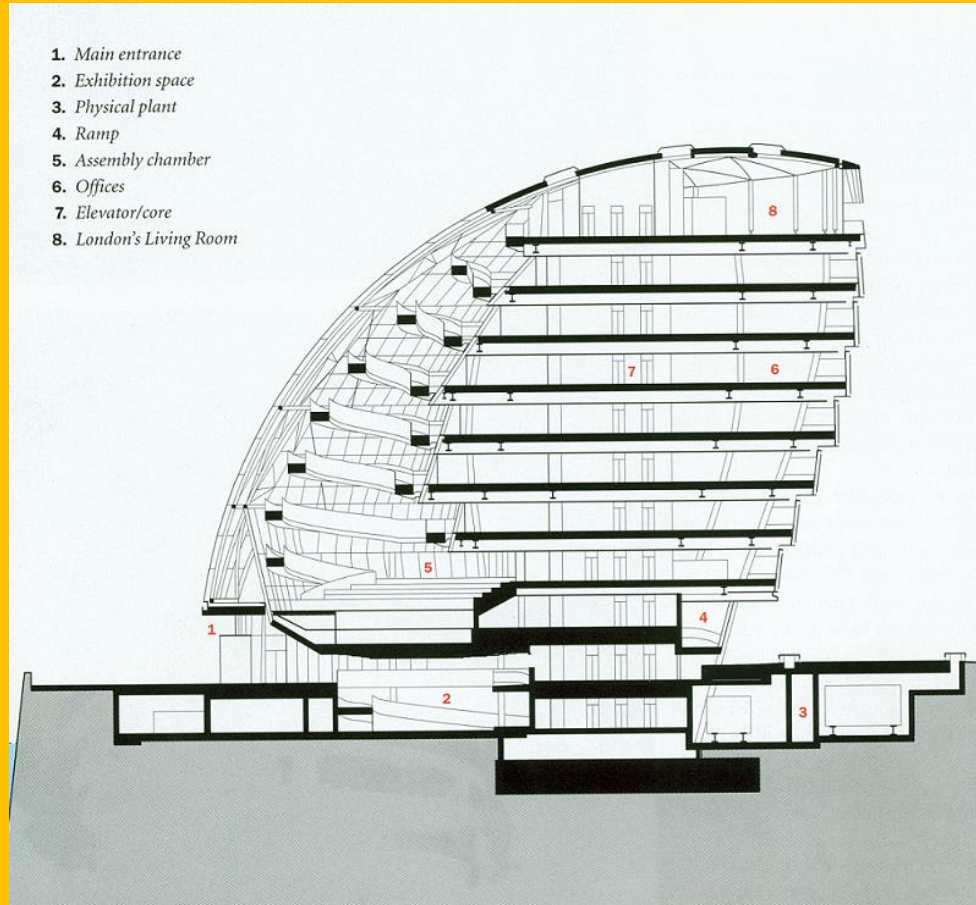


Perspectives

Sustainable Solutions

1- Air

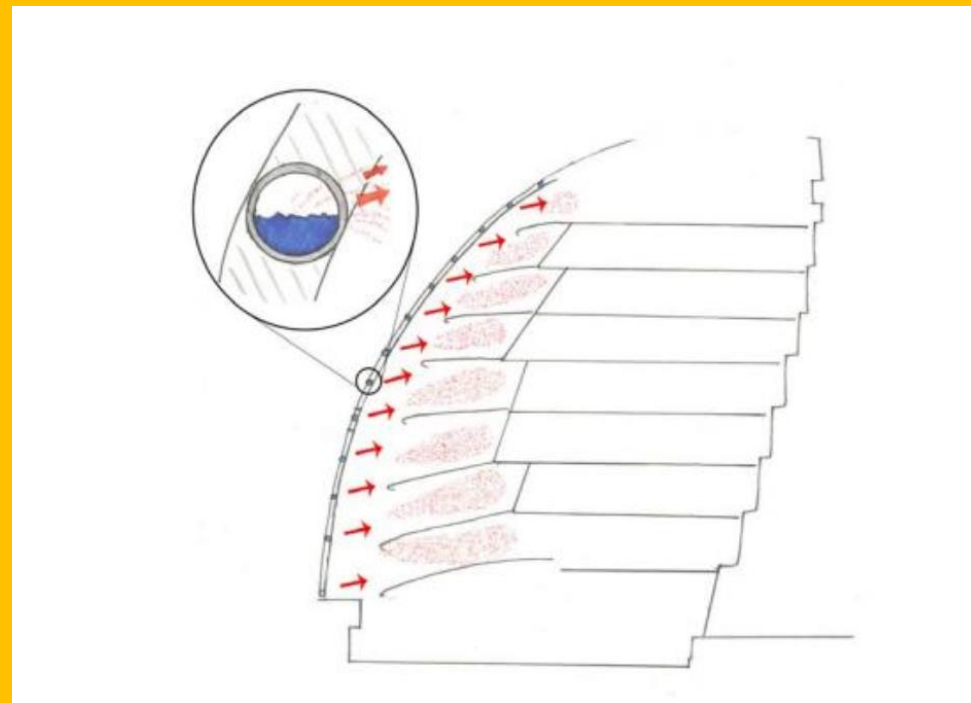
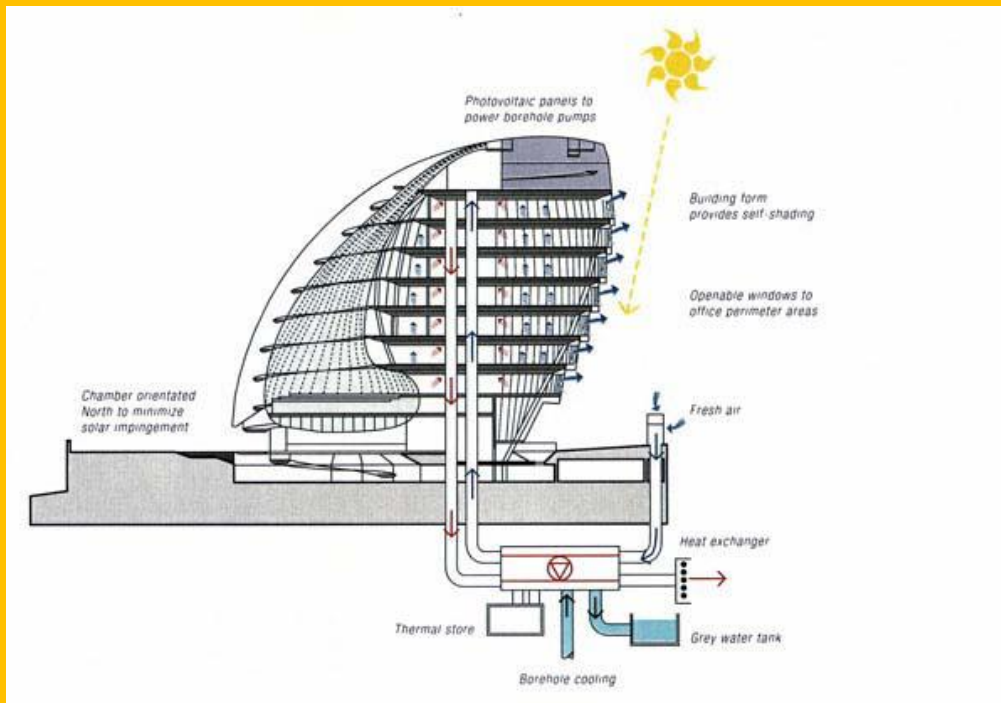
- The Building is naturally ventilated with openable windows in all office spaces .



Sustainable Solutions

2- Heating & Cooling

- Heating and Cooling Chilled beams along with low-level air supply serve as the main forms of cooling. Borehole cooling allows cool groundwater to be pumped up from the ground to chiller beams in the ceilings
- After cooling the building, the borehole water is recycled and used for flushing toilets.
- During the winter, mass amounts of heat are lost through the exposed external wall of the chamber. In order to heat the chamber, the diagrid façade structure is used as a large radiator and convector heater.



Sustainable Solutions

2- Heating & Cooling

- After cooling the building, the borehole water is recycled and used for flushing toilets or used for fountains or for green areas .

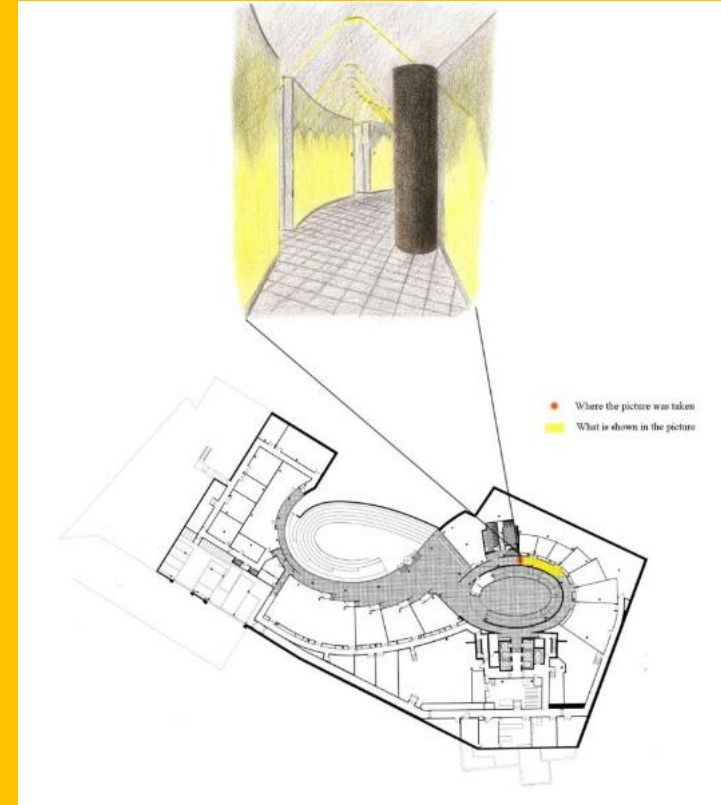
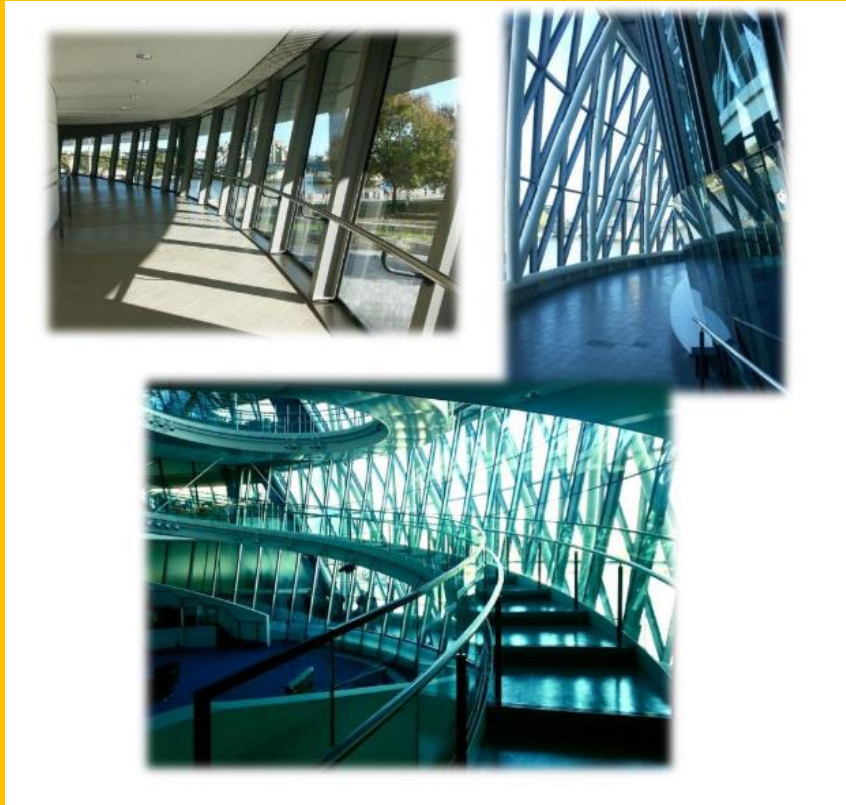


Sustainable Solutions

3- Natural Lighting & Artificial Lighting

•The architect decided to give the building shape which reduce energy consumption .

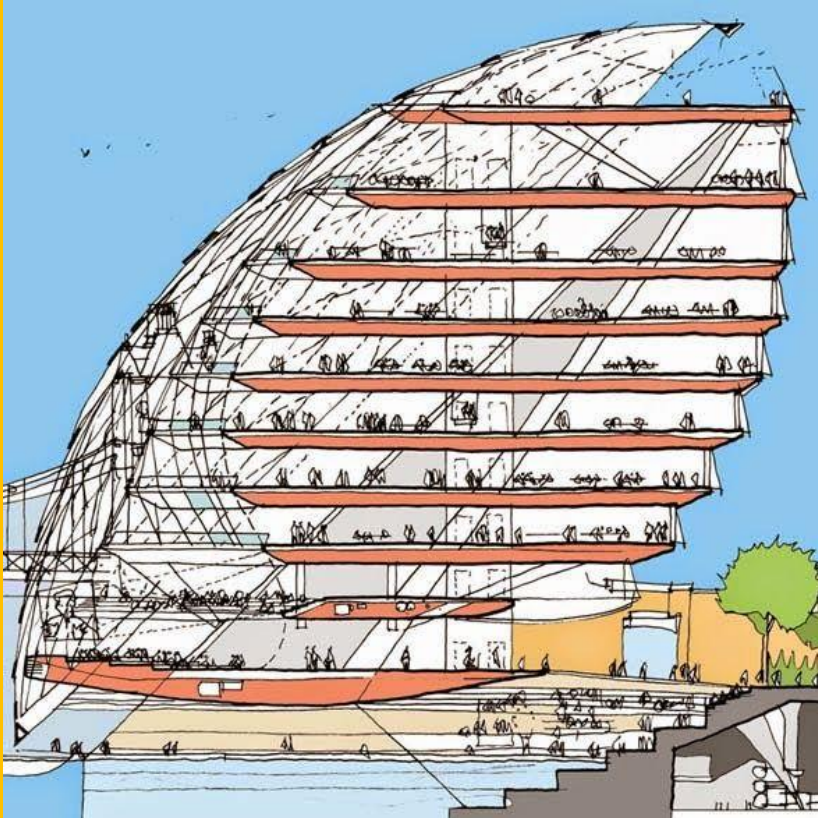
The Shape and Orientation of the building (It is oriented through south) makes natural & artificial lighting be mixed perfectly in all the environments of the building



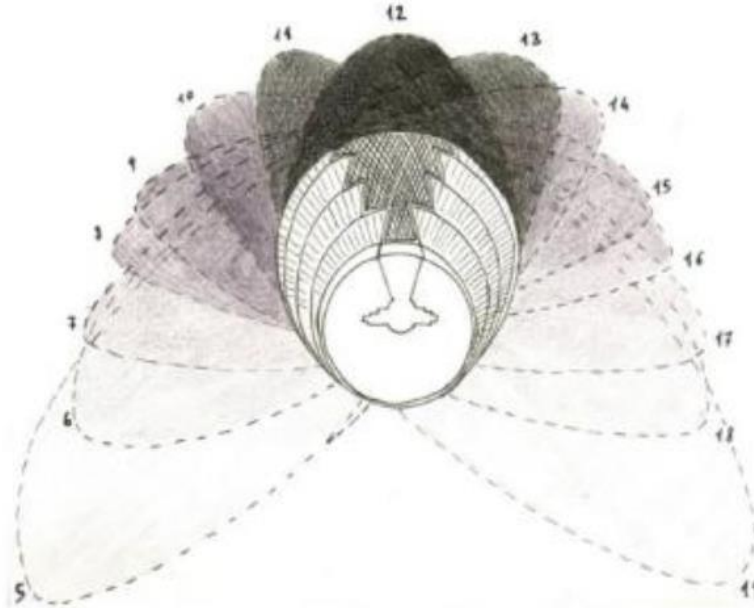
Sustainable Solutions

4- Shadow

- The Building is designed to be self shaded in most of the times . The shape and orientation of the building makes the building a very soft shadow in the noon .



Shadows on 21st June (summer solstice)



Shadows on 21st Decembet (winter solstice)

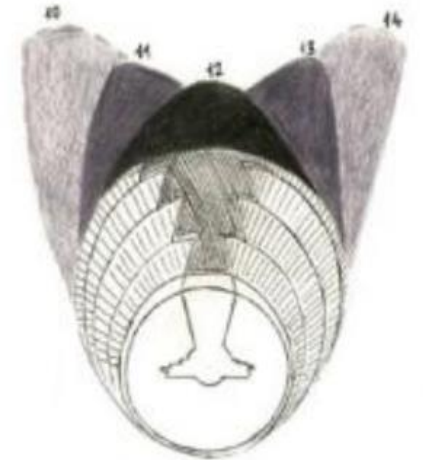
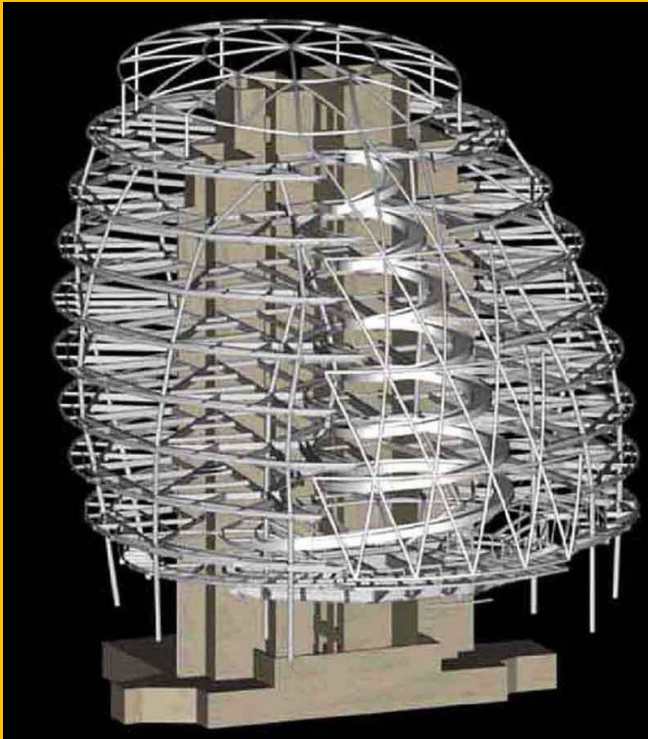


Fig.17

Sustainable Solutions

5- Structure

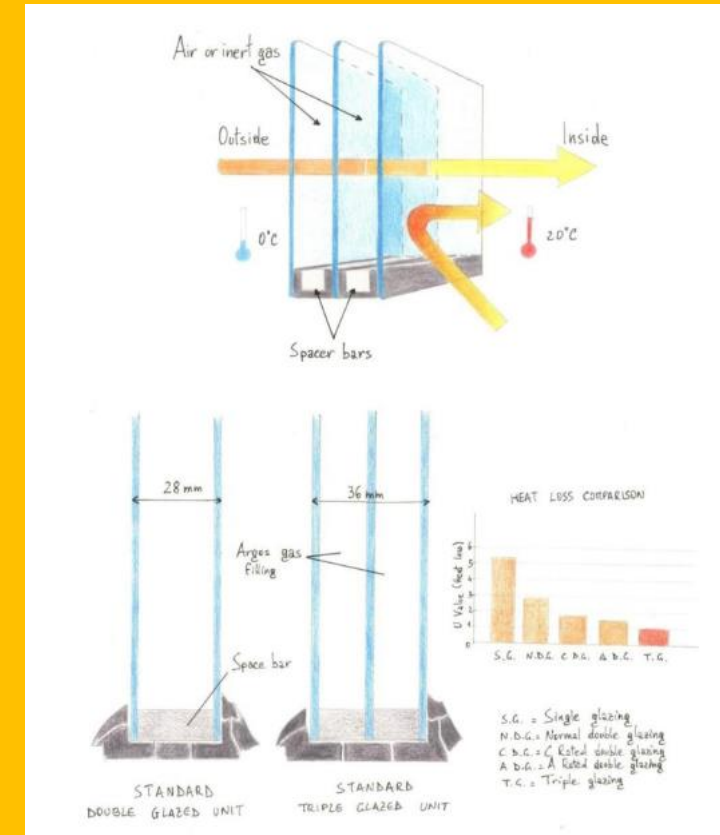
- The Building structure consist of central tower made of reinforced concrete
- The Steel - Diagrid System was use to support only the glass façade while in other buildings it was used to support the structure
- The Steel – Diagrid System requires less steel than other systems and this translate to **environmental saving** .



Sustainable Solutions

6- Glasses

- The Building makes use of four different types of glazing including double glazing and triple glazing using with the specific aim to keep the building warmer , saving relevant quality of energy.



Sustainable Solutions

7- Solar panels & Light Sensors

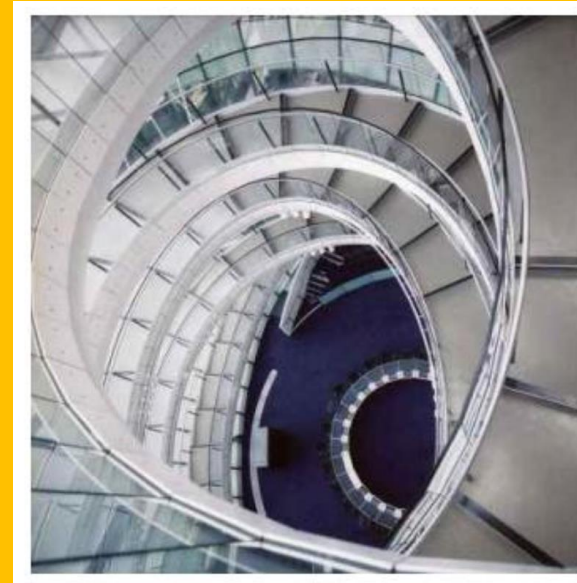
- In 2007 Solar Panels Installed on the roof of the building for reducing cooling and heating costs .
- The Building has numerous light sensors that are software programable to provide an intelligent lighting control system



Sustainable Solutions

8- Recycle

- Many Of The Building elements (floor tiles , doormats , metal , plastic) are made Of recycled materials in order to reduce environmental impacts and improve performance .
- Heat produced by computers is recycled.
- After being used for cooling the building , water used in toilets.



Conclusion

- Even the building had many problems (the break of one of the boreholes and the substitution of the drainage system) during the first 10 years of its life and it is not totally sustainable as expected , Great results have been achieved.
- Some improvements made the building get rate of (D) in (EPC) ([Energy Performance Certificate](#)) which was (E) .
- Some of these improvements are as follows :
- [Solar photovoltaic panels installed](#) in 2007.
- '[Voltage optimization](#) ' [technology](#) was [installed](#) to reduce the [voltage](#) used to the minimum required.
- Changing from 75 [watt](#) bulbs to 16 [watt](#) LEDs where possible, with movement sensors on all [floors](#).
- [Smart meters](#) that allow [energy use](#) to be [measured](#) on a floor-by-floor basis.

