The choice of materials has a high impact on the design and appearance of 201 Bishopsgate. The highly glazed façade allows transparency through the glass and creates a shadow of the metal diagonal strip components. The glass façade forms an important internally and externally focus, externally it has a striking image as for the metal diagonal structure. Also, the rigid persona of the glass gives the façade a very robust and brittle appearance, which is very symbolic to the structure in regard to the context. The form is similar in materials to the surrounding however, the difference of diagonal axis highlights the building. Internally the pronounced appearance is reflected within the spaces as for light reflection. Enhancing the experience of the building externally and internally. Internally the glass components allow public viewing points and enlighten inner open space for users.

Concrete is a very versatile material as it can be altered and manufactured to many forms. In terms of acoustical properties, 201 Bishopsgate is formed by glass within a busy location. My assumption is that the concrete floor within the construction has a high air capacity to prevent noise pollution, in the open space.

The three diagrams explain how light is transferred within the internal space of 201 Bishopsgate, through the double glazed glass façade.

Summer: low-E glass reduces heat gain from the sun whilst allowing visible light shine through the window. Winter: low-E glass allows the warm solar rays in the building whilst keeping heat inside which is coming through outside. The U-value for double glazing windows are predicted to be 1.1 within Pilkington broacher, however the POE report and occupant survey conducted suggests there is a high level of thermal mass within the building around 4.5 margin. The use of metal decking and concrete has not improved the temperature and environment leading to occupant dissatisfaction.

Each of the analysed properties have a direct effect on the building and the occupants. Light and sound are two important environmental aspects that enhance or effect an inhabitable space. As the site is situated in a busy area, sound has to be prevented from entering the internal space for comfortability purposes. This can be done through the use of materials and structural acoustic aspects.

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The building was designed in 1990 and altered in the early 2000’s, standards now to then have dramatically changes and can have a huge contrast on requirements within design and sustainability.

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What is embodied energy?
Embodied energy is the energy consumed by the process of building production, from the beginning to the end stage. These steps begin at the mining of the product, processing of natural resources to manufacturing, transportation of product to the site. Unlike the life cycle approach, embodied energy does not cover operation and disposal. Factors that should be considered to reduce the amount of embodied energy are long life, durability, renovation, maintenance and adaptable buildings. The choice of materials and the construction method often alter the amount of energy embodied within a structure.

Embodied energy and operational energy
Operational energy is entirely dependent on occupants unlike embodied energy, which is manufactured from used materials. Within the structure, embodied energy content occurs once apart from renovation and maintenance, however operational energy is gathered over time and influences the buildings life span. Both, embodied energy and operational energy have an influence on each other as for a higher embodied energy can result to a lower operational energy. This is for the implementation of certain sustainability designs such as, passive solar heating, passive cooling, insulation and more can reduce operational energy accumulation over time. This has a direct correlation to material properties and use for accommodating these design purposes, to reducing the elements of operational functions. Higher embodied energy in London, the reason for this are;
- Transportation
  - Materials would be bought from a further distance
- Site storage
  - As for the density of the area and site constraints, the storage and safe keeping of materials will be limited. However, some space for the materials would be made for the construction period.
- Material resourcing
  - Local materials used due to cost of construction. Material resourcing has a high correlation to the cost of project, local materials parallel to low cost for transportation and time of build.

During the design process the two building, 201 Bishopsgate and Broadgate tower were focused on sustainable features which were integrated within the design. Features of sustainability integrated;
- Heat recovery from ventilation using thermal wheels
- Fan coil fitted with EDC motors, co-ordinated to cooling load
- Speed drivers fitted to all pumps and fans
- Dimming facilities for lighting and daylight control
- Energy metering for water and electrical systems
- Monitoring systems
- Water cooling
- Low-E glass coated with metal oxide used to reduce solar gain and keep cool air inside, decreasing cooling systems and eliminating heating requirements
- Local light zones, for occupants to take control of their own work environment

Concrete manufacturing and resourcing
The material precast concrete used in the construction for the services and floor construction are manufactured within U.K, generally made in the factory, then transported on site. The use of this method accelerates building construction, cost-effective and easily managed. This method commonly uses steel for the framework, reducing the unit-cost of concrete. Resulting in diminishing time for material removal and fabrication of framework. (Figure)

Façade manufacturing and resourcing
The use of low-E glass with metal coating resulted to reducing many cooling and heating systems, making the building energy efficient and decreasing operational energy. The manufacturing and resourcing for this material commonly originates from one of the biggest manufactures, Pilkington. They are based around the whole of the U.K and world resulting in easy resourcing and manufacturing method for this construction.

The stainless steel for the steel structure and A-frames are generally resourced and manufactured within the U.K (see figure). The proximity between London and the manufacturing companies are not to such a great distance, resulting in fast productions and prompt delivery. This would reduce the embodied energy and consider environmental impact from transportation.
ARCH TECH & CONS METHODS
201 BISHOPSGATE
MATERIALS RESOURCING / MANUFACTURING
REFERENCE & BIBLIOGRAPHY


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Figure:

Figure: 201 Bishopsgate and Broadgate tower: http://modernarchitecturelondon.com/buildings/broadgate-tower.php
Figure: steel texture: http://www.psdgraphics.com/textures/metal-textures/
Figure: concrete texture: naemahs photo
Figure: glass texture: http://textureplanet.net/textures/wrinkled-glass/
Figure: Detail of steel floor construction regarding acoustic design: naemahs diagram
Figure: Sound diagram for concrete: naemahs diagram
Figure: Floor detail: naemahs diagram
Figure: Light diagram for low-e glass: naemahs diagram
Figure: Sound diagram for low-e glass: naemahs diagram
Figure: Low-E window detail: naemahs diagram
Figure: Embodied /Operation Energy diagram: naemahs diagram
Figure: Life cycle of a building diagram: naemahs diagram
Figure: Concrete resourcing map: naemahs diagram
Figure: Stainless Steel resourcing map: naemahs diagram
Figure: Pilkington resourcing map: naemahs diagram