

Elegant Efficiency: Doing more with less

Ed Daines – WilkinsonEyre Architects

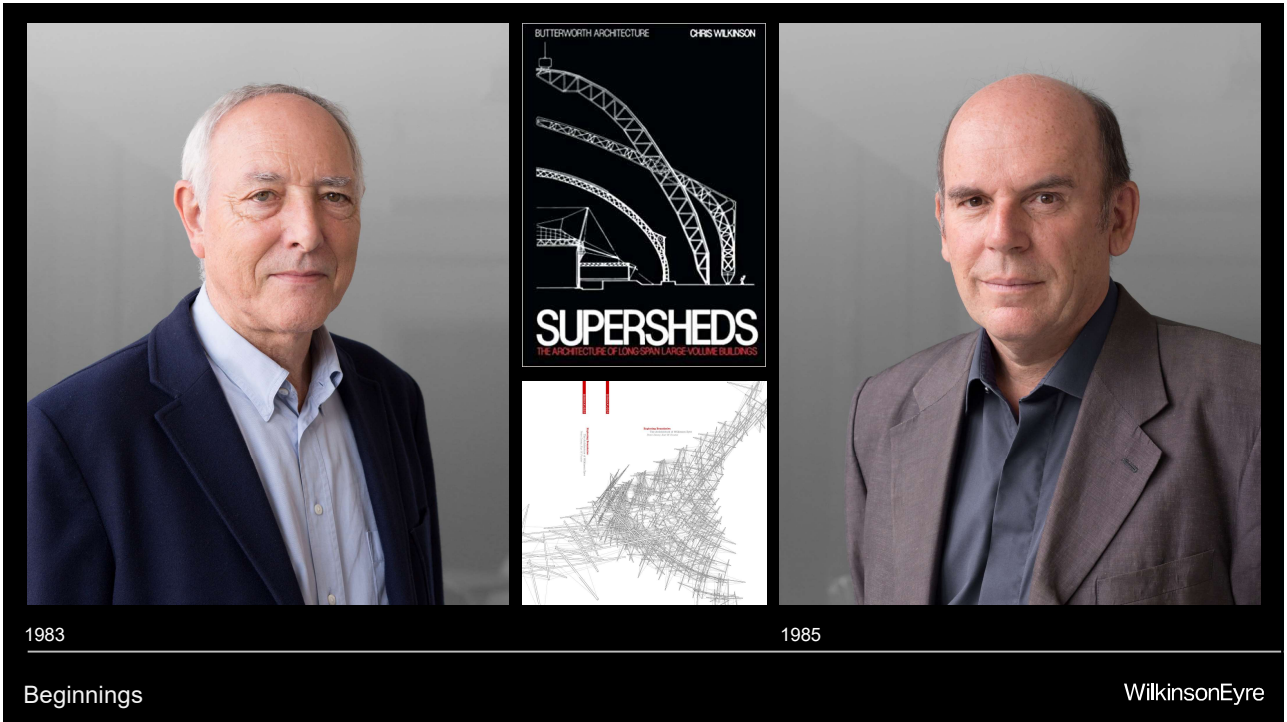
13 September 2024

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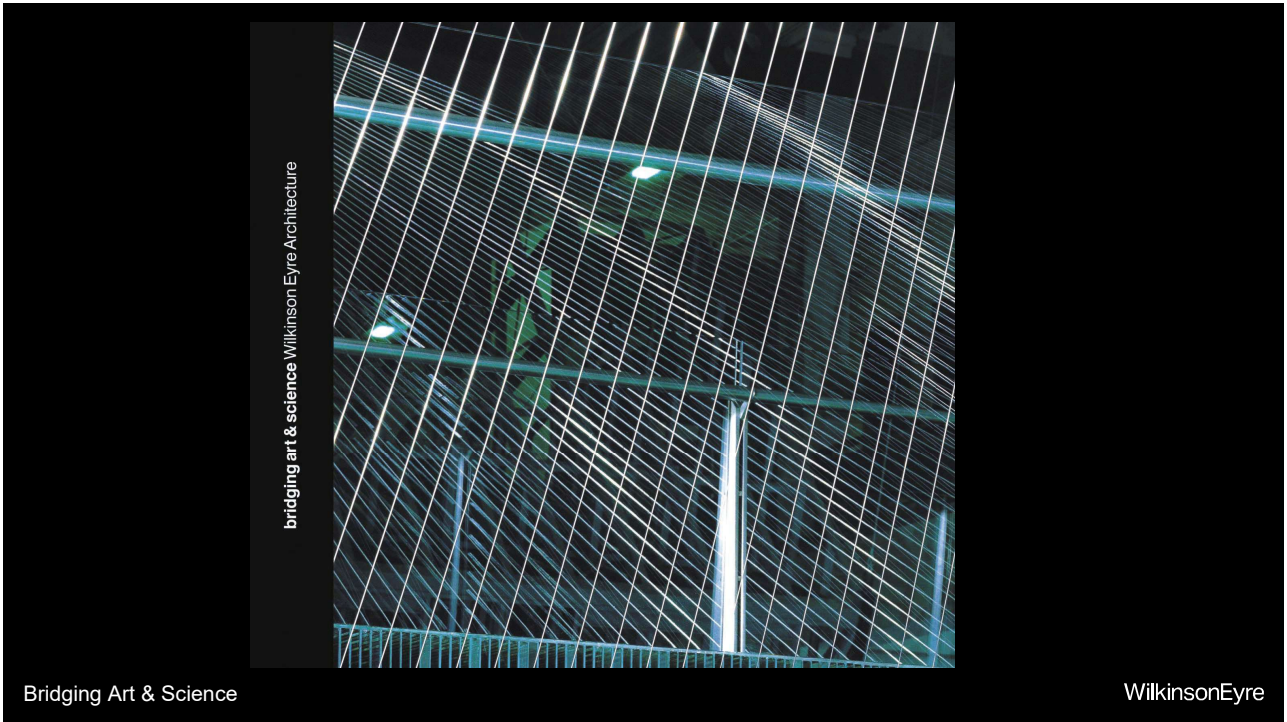
*I would like to respectfully acknowledge the Traditional Owners of the land on which we gather today, the Wurundjeri People of the Kulin Nation, and their Elders past, present and emerging.*

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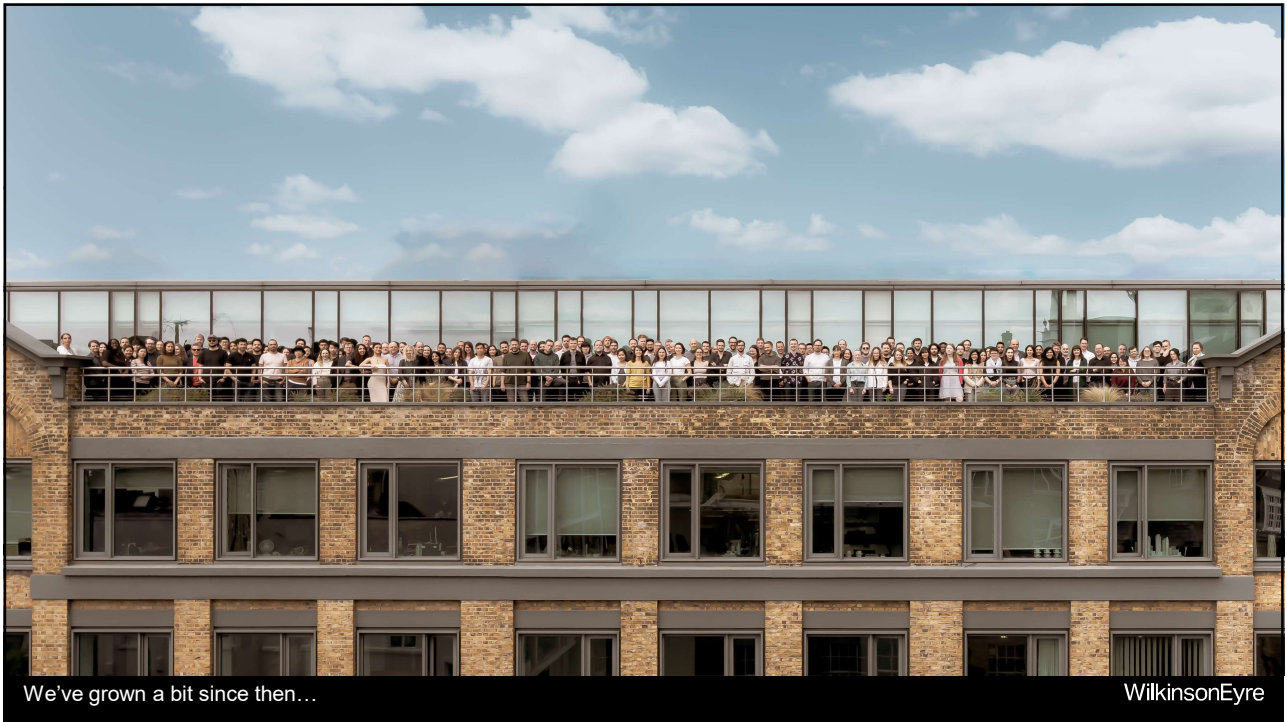


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Crown Barangaroo

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Brisbane West End Green Bridges

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Napoleon Bridge, Sydney

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And of course... Swinburne University of Technology – Happy Birthday!

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*Frustra fit per plura quod potest fieri per pauciora*

William of Occam - 1323

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*Frustra fit per plura quod potest fieri per pauciora*

*It is futile to do more things than that which  
can be done with fewer*

William of Occam - 1323

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*Less is more*

Perhaps Mies put it better?

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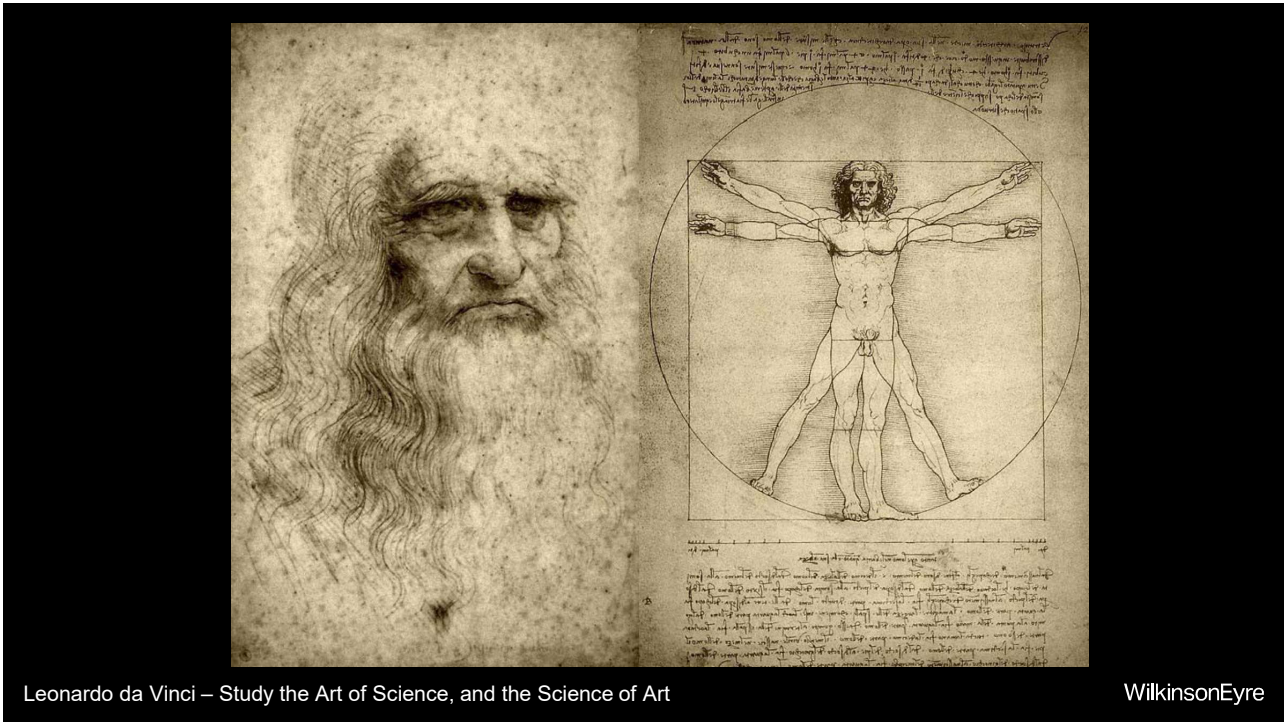


*Less is a bore*

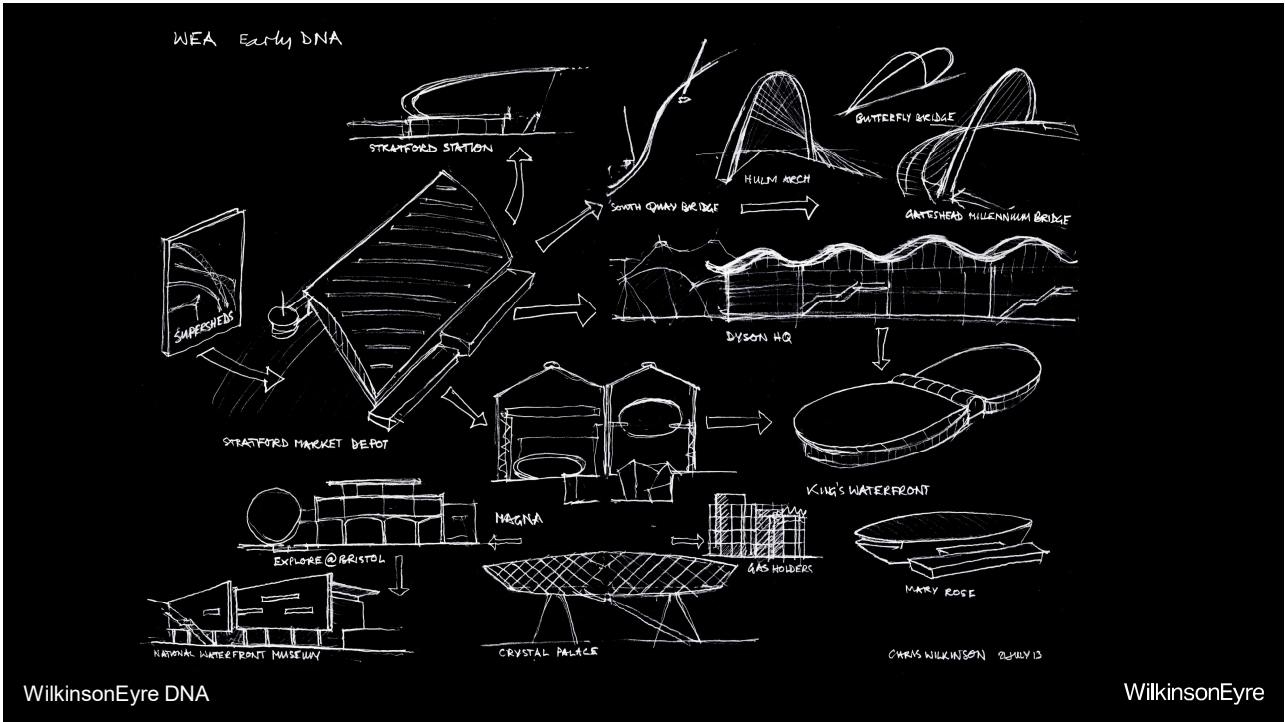
Is there room for art and for joy

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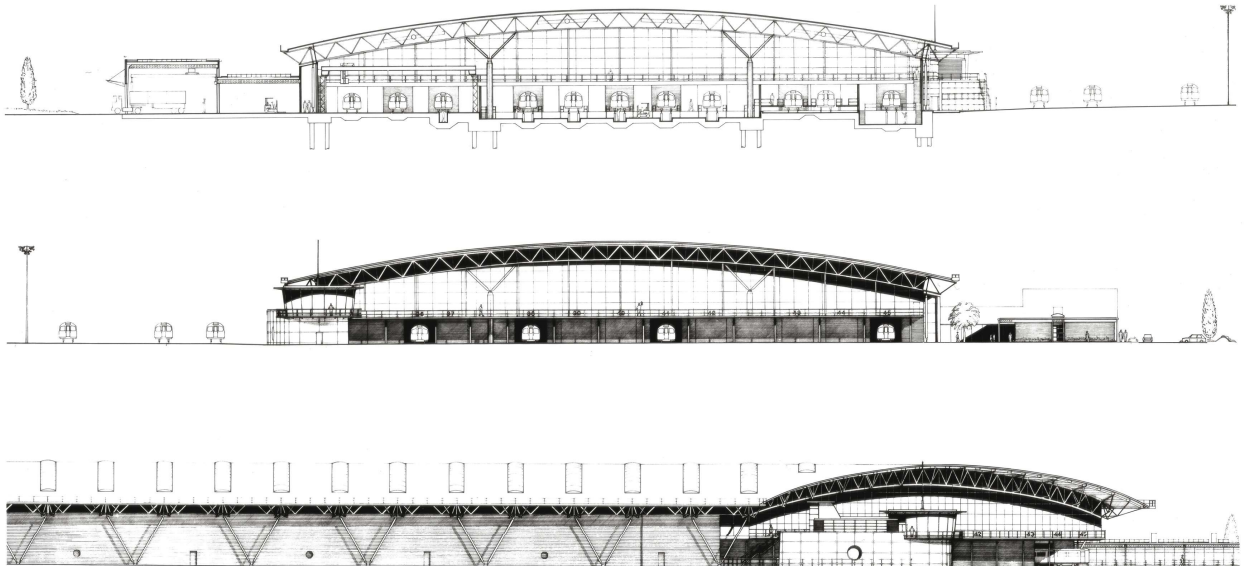




Stratford Market Depot

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Stratford Market Depot

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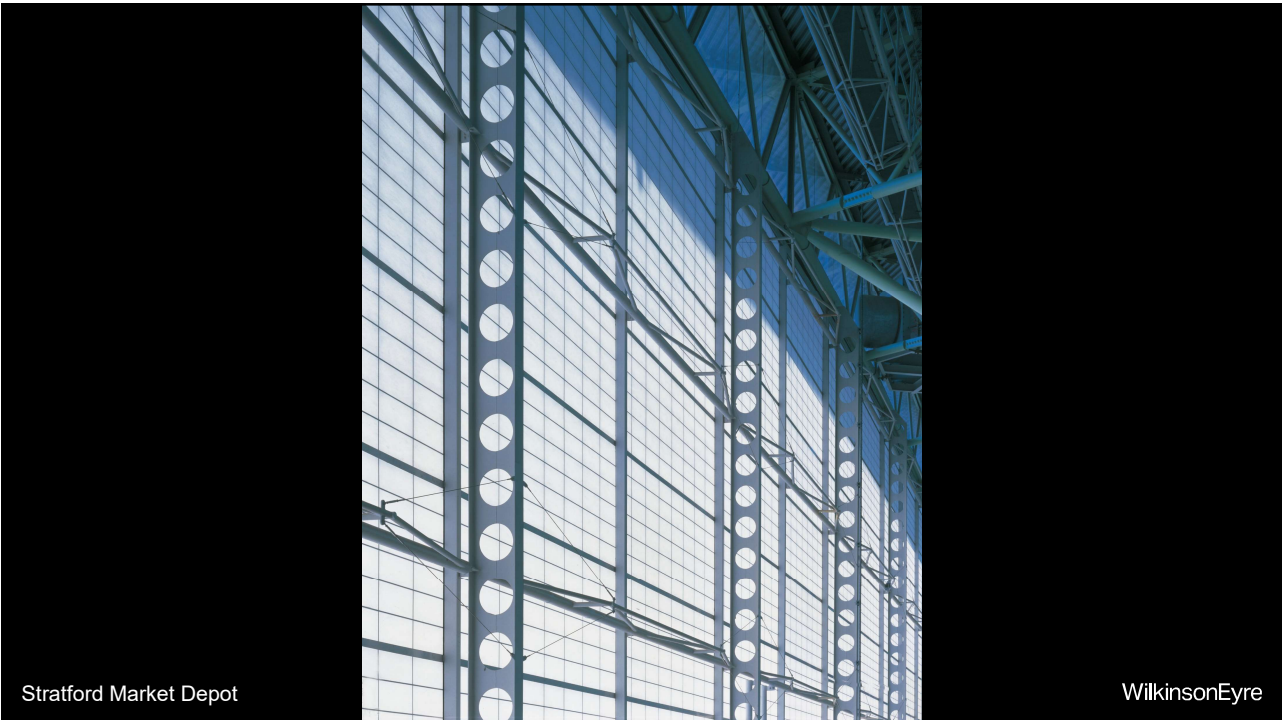
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Stratford Market Depot

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Stratford Market Depot

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Stratford Market Depot

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Stratford Station

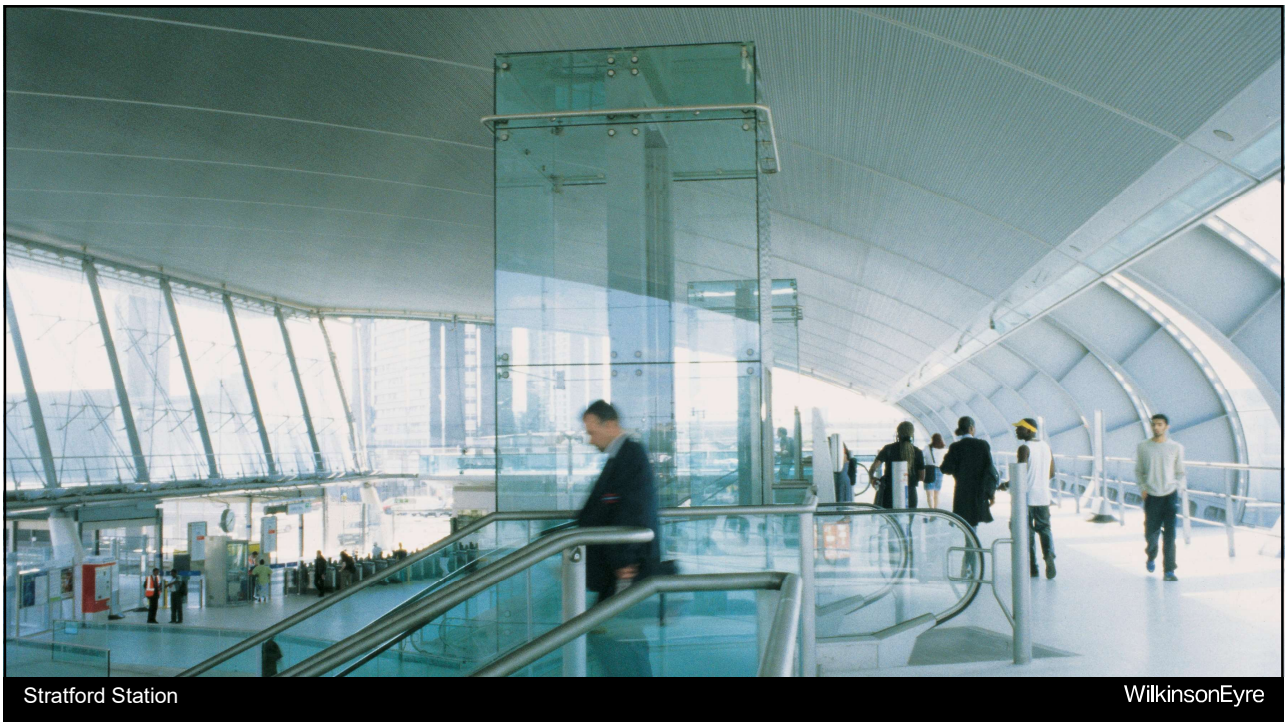
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Gateshead Millennium Bridge

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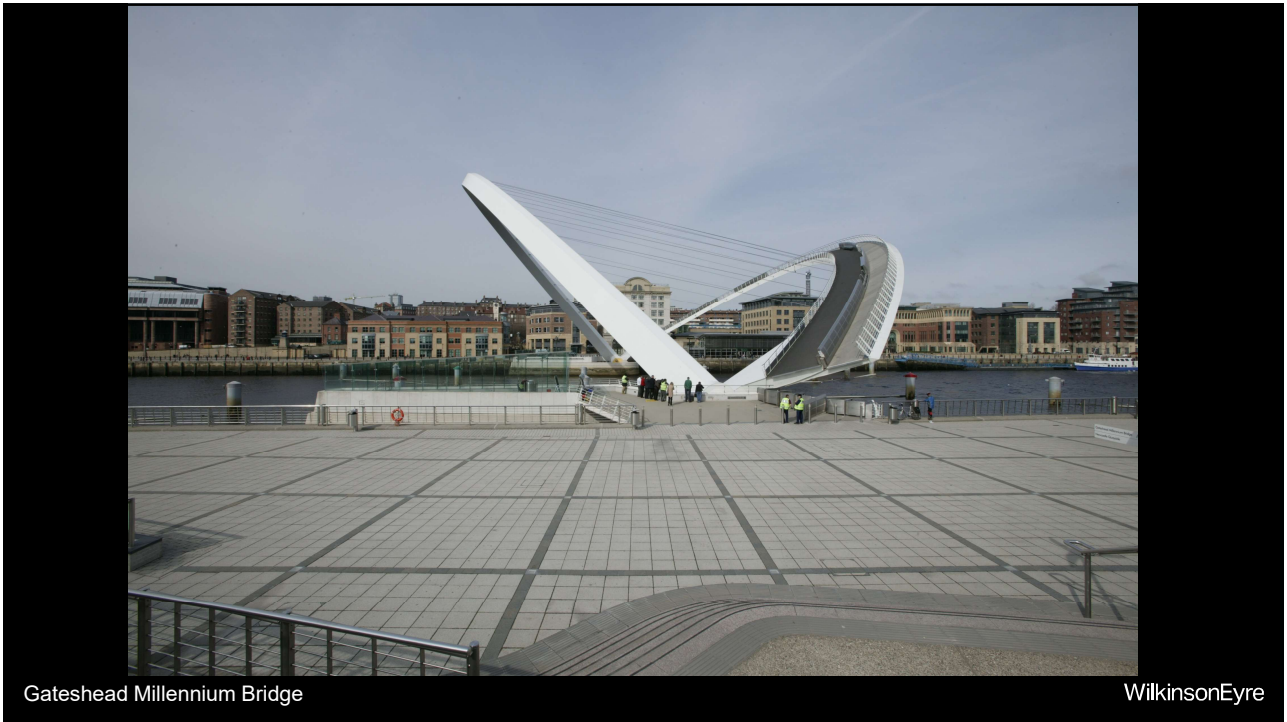
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Gateshead Millennium Bridge

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Gateshead Millennium Bridge

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Gateshead Millennium Bridge

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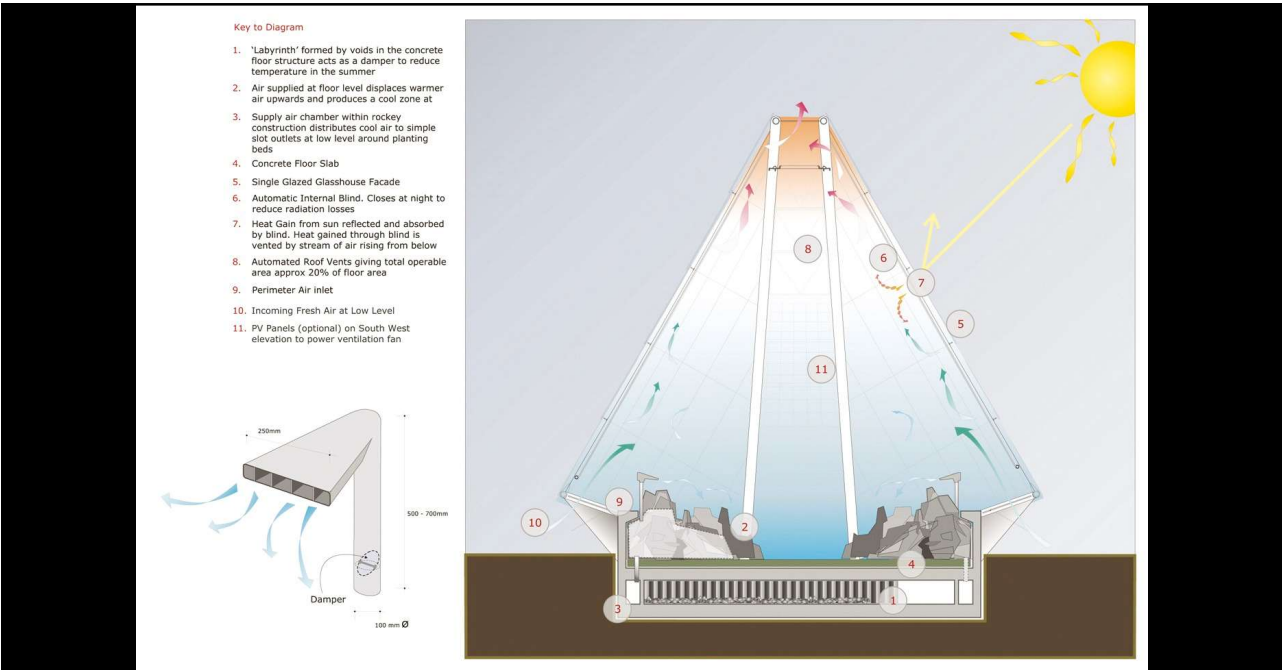
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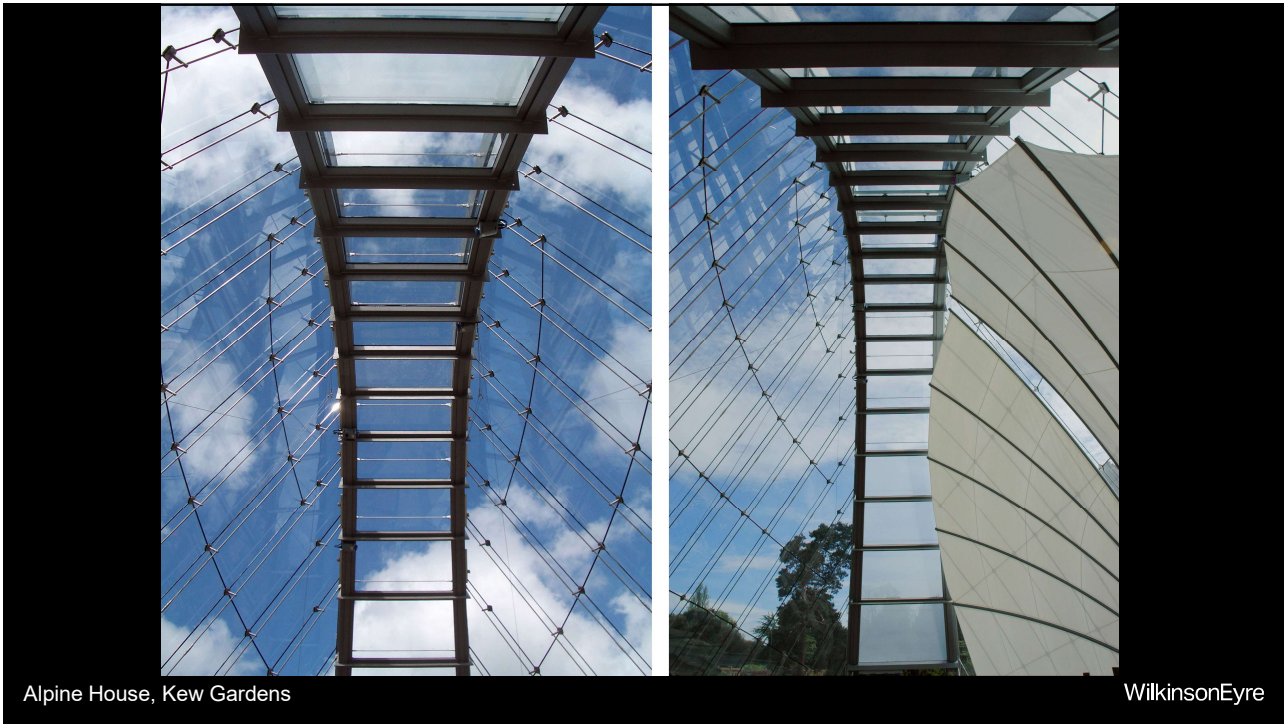
Alpine House, Kew Gardens

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Alpine House, Kew Gardens

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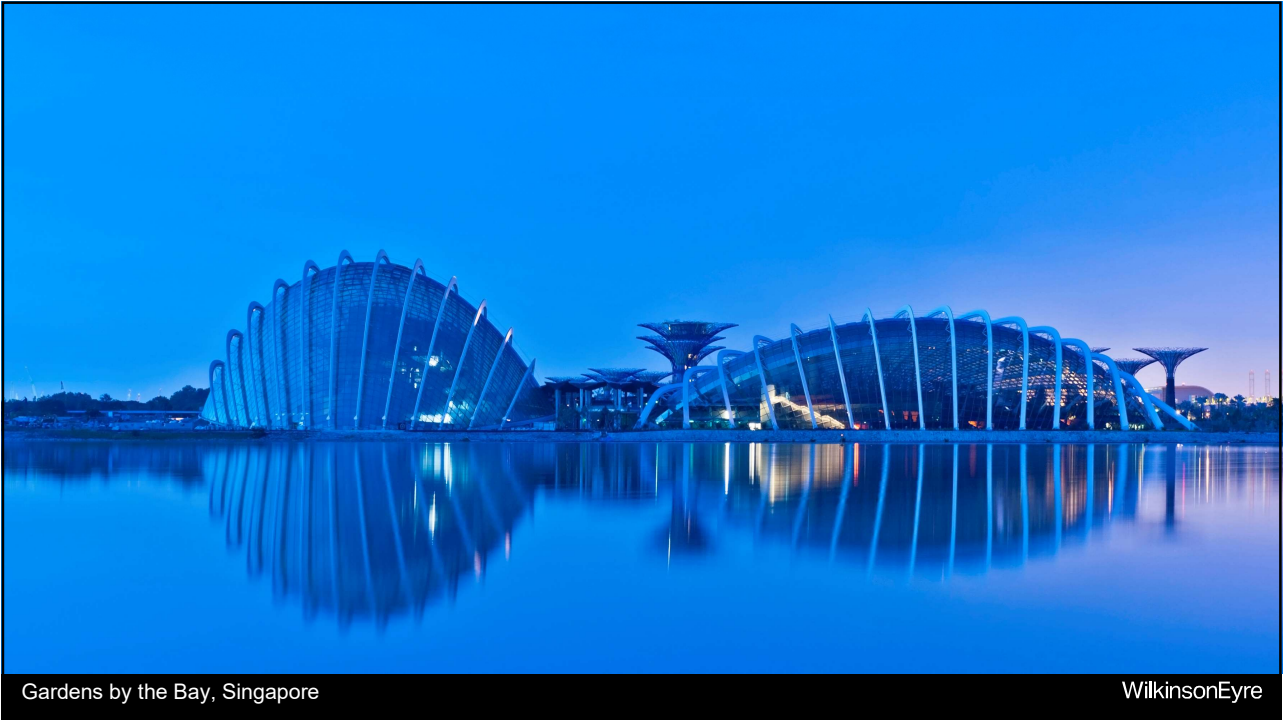


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Gardens by the Bay, Singapore

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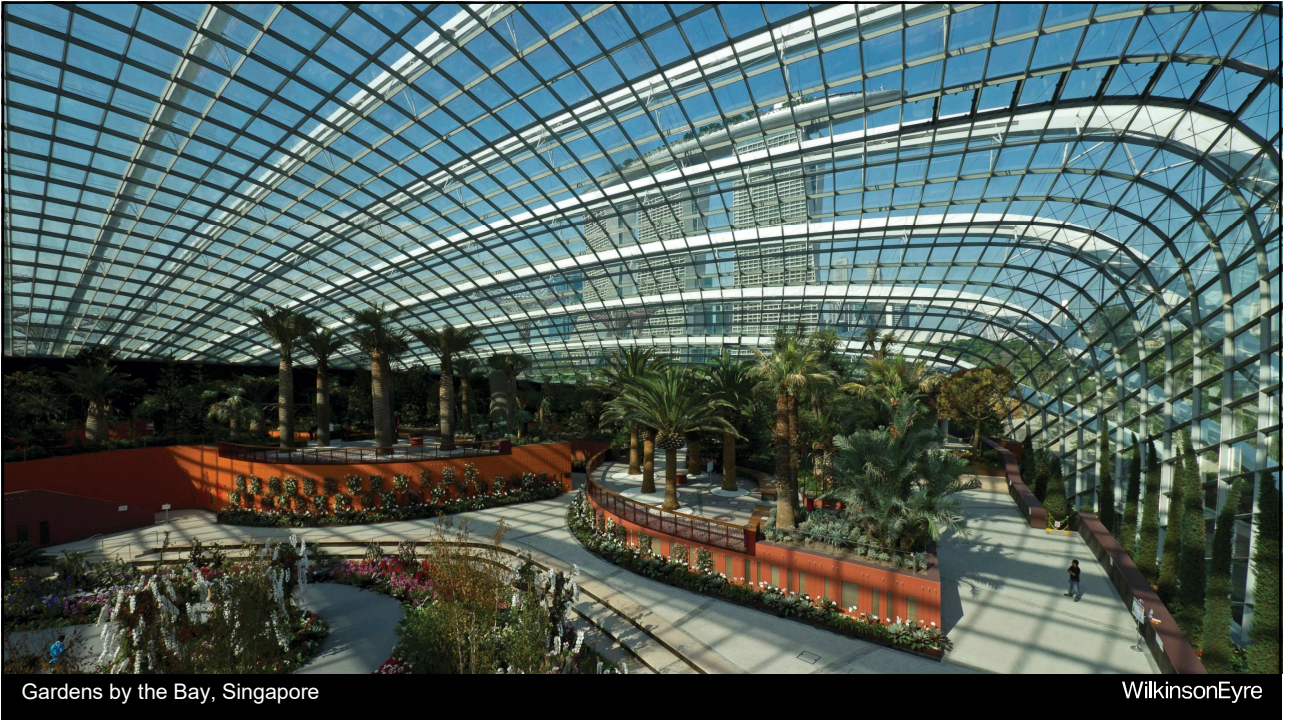


Gardens by the Bay, Singapore

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Gardens by the Bay, Singapore

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Gardens by the Bay, Singapore

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Olympic Basketball Arena, London 2012

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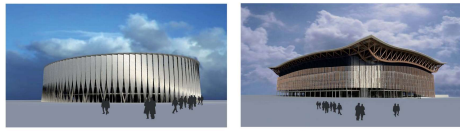
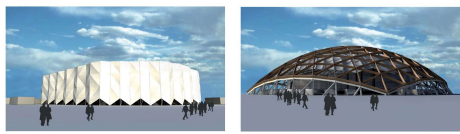
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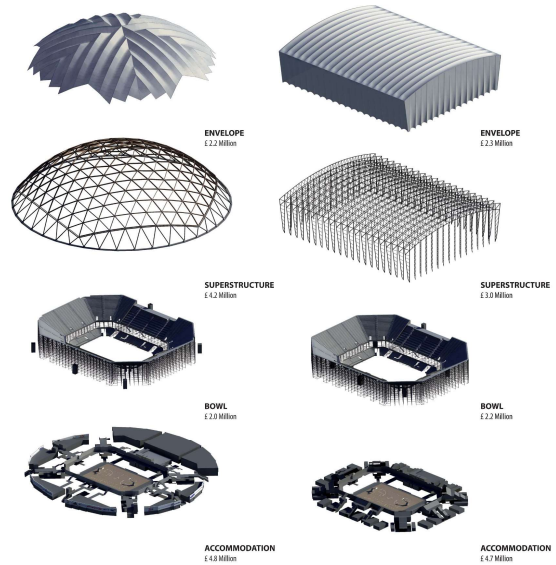
Olympic Basketball Arena, London 2012

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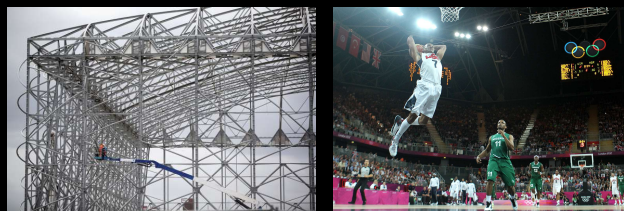
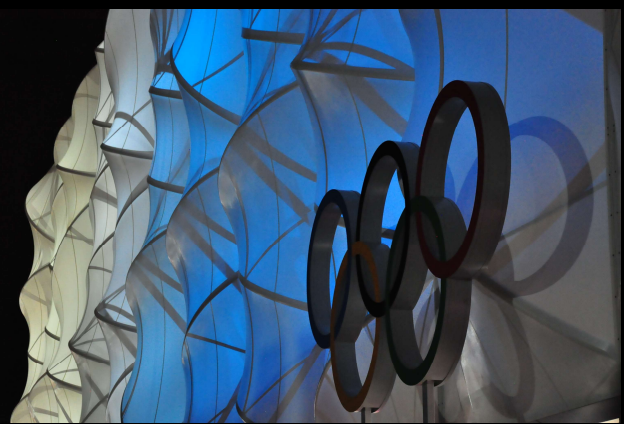
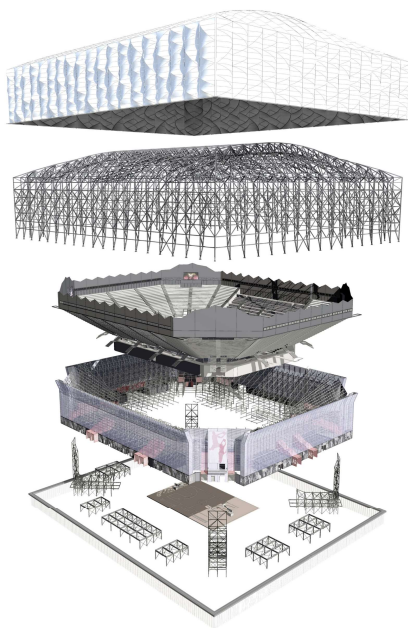
LEVEL	SOIL CORROSION	SECTIONAL ARRANGEMENT	SPRINKLING PRINCIPLE	STRUCTURAL MATERIAL
1				
2				
3				
4				



Olympic Basketball Arena, London 2012

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Olympic Basketball Arena, London 2012

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Component	Details	Reduce, reuse or recycle
<b>Portal frame steelwork</b>	<ul style="list-style-type: none"> <li>Re-use strategy – contractor to sell on.</li> <li>Corrosion protection avoided where steel not needed longer than 2 years</li> </ul>	<ul style="list-style-type: none"> <li>Re-use</li> <li>Reduce</li> </ul>
<b>Membrane Cladding (Single Skin)</b>	<ul style="list-style-type: none"> <li>No requirement for second skin – no sound, thermal insulation. Summer mode only</li> <li>Membrane to be re-used on part of 'sell-on' strategy.</li> <li>Membrane can be re-ground into pellets for re-use.</li> </ul>	<ul style="list-style-type: none"> <li>Reduce</li> <li>Re-use</li> <li>Recycle</li> </ul>
<b>Seating System &amp; Sports Equipment</b>	<ul style="list-style-type: none"> <li>Buy back deal with suppliers for continued use in the rental market</li> <li>70% of seats made from recycled seating</li> <li>Precast concrete footings to be used complete with seating system</li> <li>Lighting, Sports Floor &amp; Scoreboards hired</li> </ul>	<ul style="list-style-type: none"> <li>Re-use</li> <li>Re-use</li> <li>Re-use</li> <li>Re-use</li> </ul>
<b>Plenum</b>	<ul style="list-style-type: none"> <li>'Scaffold wrap' can be ground down and re-extruded</li> <li>AHU's hired for test events and games</li> <li>Fresh air supply can be used if exterior air temperature drops below 18° C</li> </ul>	<ul style="list-style-type: none"> <li>Recycle</li> <li>Re-use</li> <li>Reduce</li> </ul>
<b>Transfer Structure &amp; Foundations</b>	<ul style="list-style-type: none"> <li>Bespoke steelwork may be reused by seating supplier</li> <li>Shallow foundations – no site piling</li> <li>Sheet piles extracted and returned to contractor</li> <li>Field of play slab is ground bearing – no deep foundations</li> <li>In situ concrete easily extracted, crushed and reused</li> </ul>	<ul style="list-style-type: none"> <li>Re-use</li> <li>Reduce</li> <li>Re-use</li> <li>Reduce</li> <li>Recycle</li> </ul>
<b>Accommodation</b>	<ul style="list-style-type: none"> <li>WC cubicles to go back into hire market</li> <li>Integrated plumbing systems base</li> <li>Olympic Family Lounge structure is hire-tent</li> <li>Athletes Changing Accommodation is modular 'Portakabin' assembly</li> <li>All dry lining is material made from 80% recycled gypsum fibres</li> </ul>	<ul style="list-style-type: none"> <li>Re-use</li> <li>Re-use</li> <li>Re-use</li> <li>Re-use</li> <li>Reduce</li> </ul>

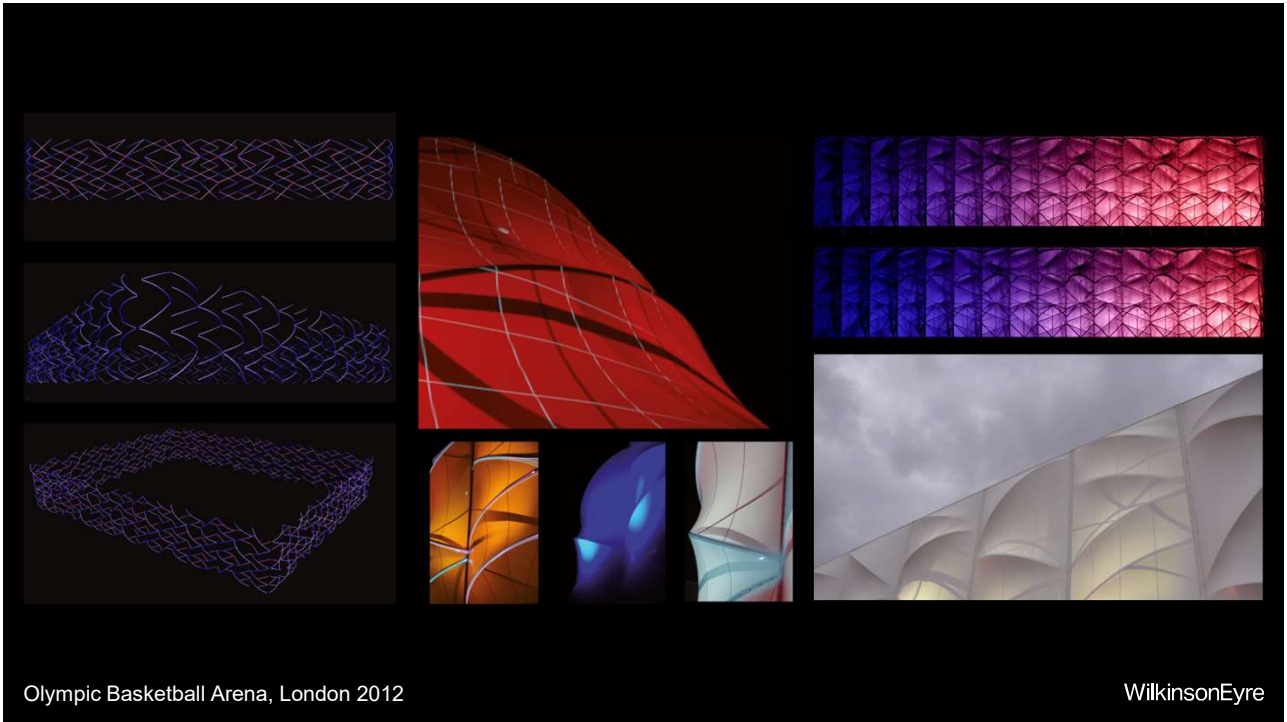
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Substructure	Superstructure	Wall Partitions	Seat Terracing	Seating
<p>Concrete</p> <ul style="list-style-type: none"> <li>33% bound recycled content in loose aggregate</li> <li>95% of material to be recycled</li> </ul>	<p>Steel</p> <ul style="list-style-type: none"> <li>60% Recycled content (industry average)</li> <li>100% recyclable</li> </ul>	<p>Fermacell</p> <ul style="list-style-type: none"> <li>4:1 gypsum: paper</li> <li>80% recycled gypsum</li> <li>20% recycled paper</li> <li>Uses recycled water in production process</li> <li>100% recyclable</li> </ul>	<p>Plywood</p> <ul style="list-style-type: none"> <li>FSC and PEFC certified</li> <li>Planned 100% reuse in the hire market</li> </ul>	<p>Polypropylene</p> <ul style="list-style-type: none"> <li>Black seats use 98% recycled PP</li> <li>4% virgin material</li> <li>Total recycled content of all 12,000 seats = 70.5%</li> <li>100% recyclable</li> </ul>
<p>Galvanised Steel</p> <ul style="list-style-type: none"> <li>60% Recycled content (industry average)</li> <li>Planned 100% reuse in hire market</li> </ul>	<p>Metal sheeting Polycarbonate Plywood Aluminium framing Envirowrap</p> <ul style="list-style-type: none"> <li>60% Recycled content (industry average)</li> <li>100% recyclable</li> <li>Planned 100% reuse in hire market</li> </ul>	<p>Steel</p> <ul style="list-style-type: none"> <li>60% Recycled content (industry average)</li> <li>100% recyclable</li> <li>Planned 100% reuse in hire market</li> </ul>	<p>PVC Membrane</p> <ul style="list-style-type: none"> <li>Some recycled content</li> <li>Recyclable</li> <li>Used standard widths for cut to size reuse.</li> <li>Planned 100% reuse in hire market with portal frame</li> </ul>	

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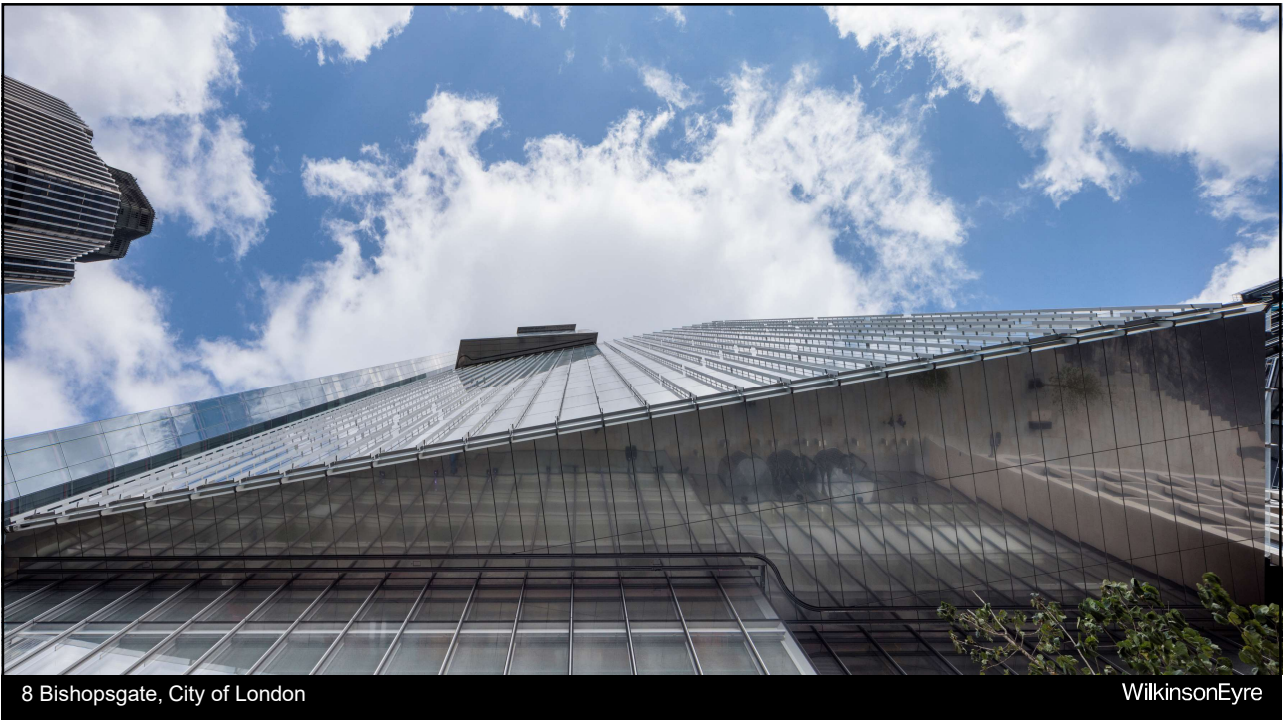




8 Bishopsgate, City of London

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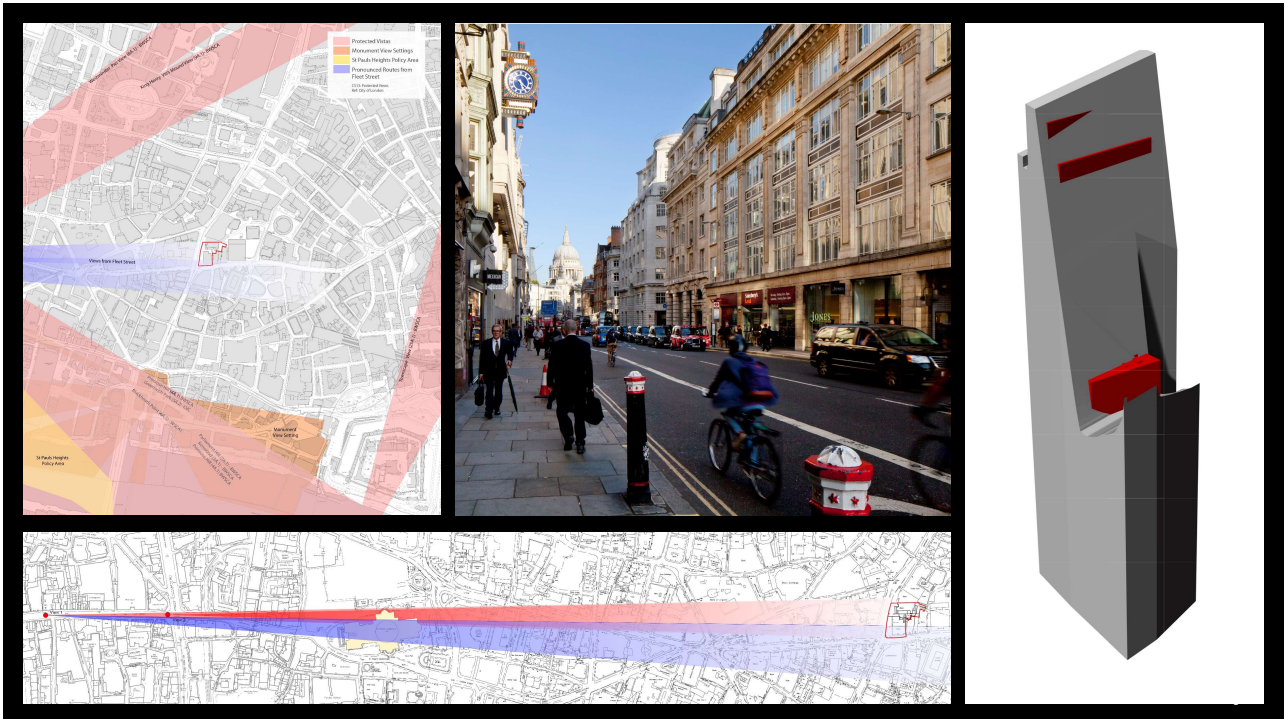
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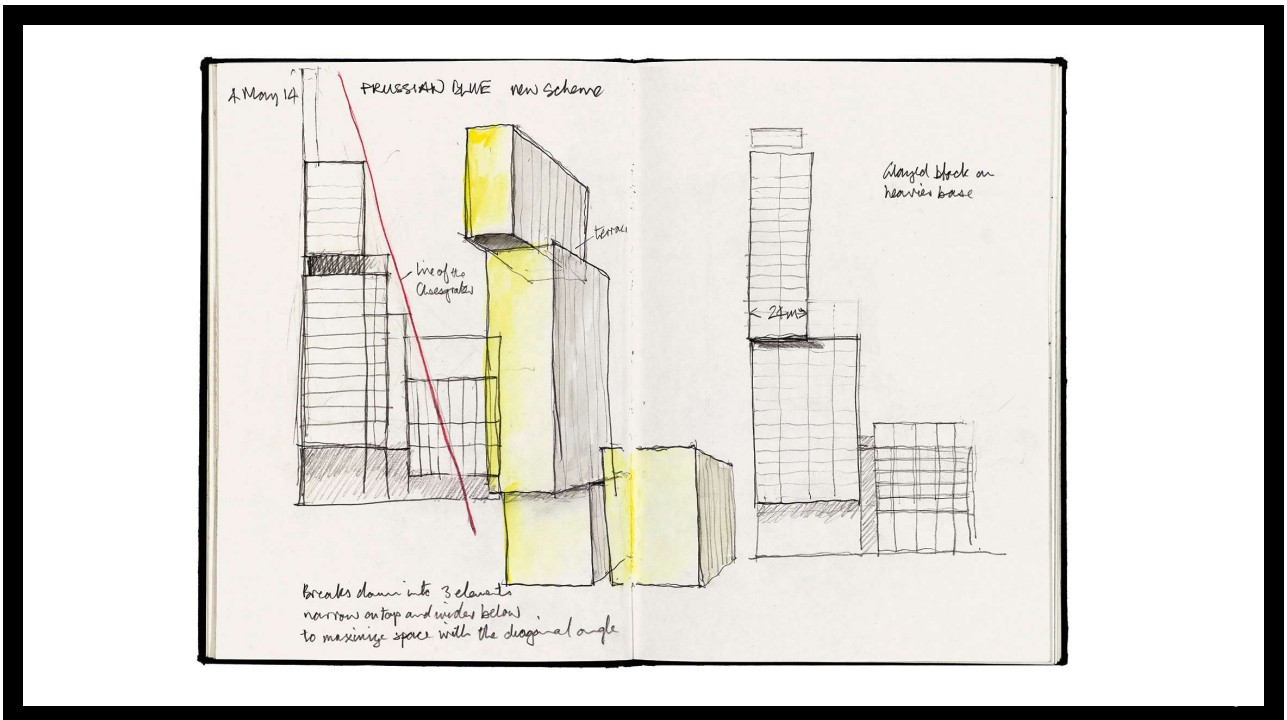
8 Bishopsgate, City of London

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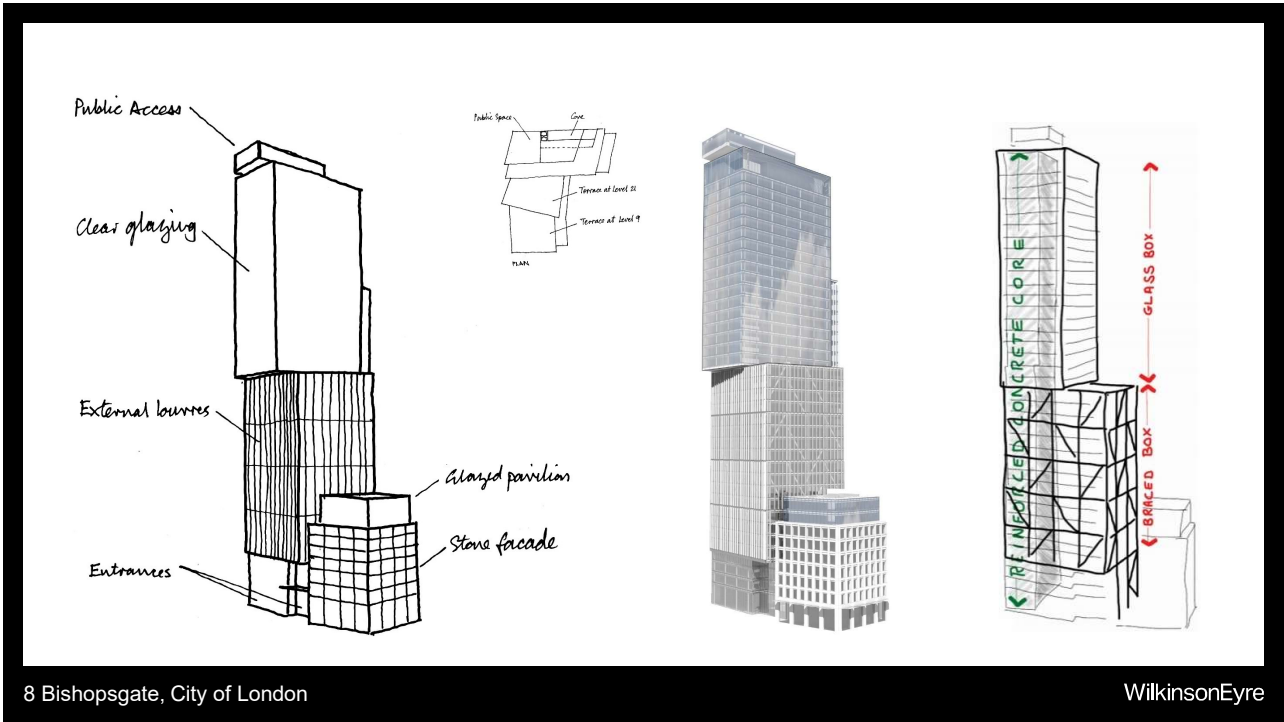


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8 Bishopsgate, City of London

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From 89 to 28 piles...

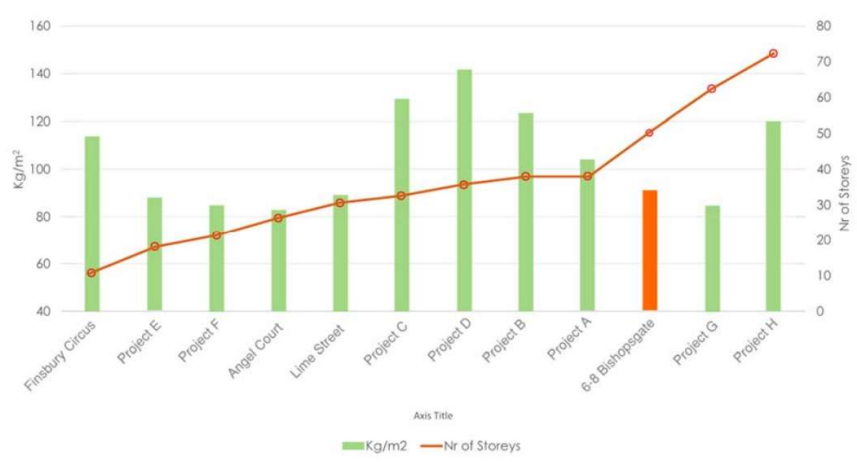
Ground breaking basement design using FE modelling to justify raft foundation for low and mid-rise.

Fabricated sections, each individually optimised for unique load.

INNOVATION

Material efficiency

ARUP



2550 tonnes of steel saved, 5000 tonnes of CO2 .....or 500x Average UK citizen annual Carbon Footprint

INNOVATION

Material efficiency

ARUP

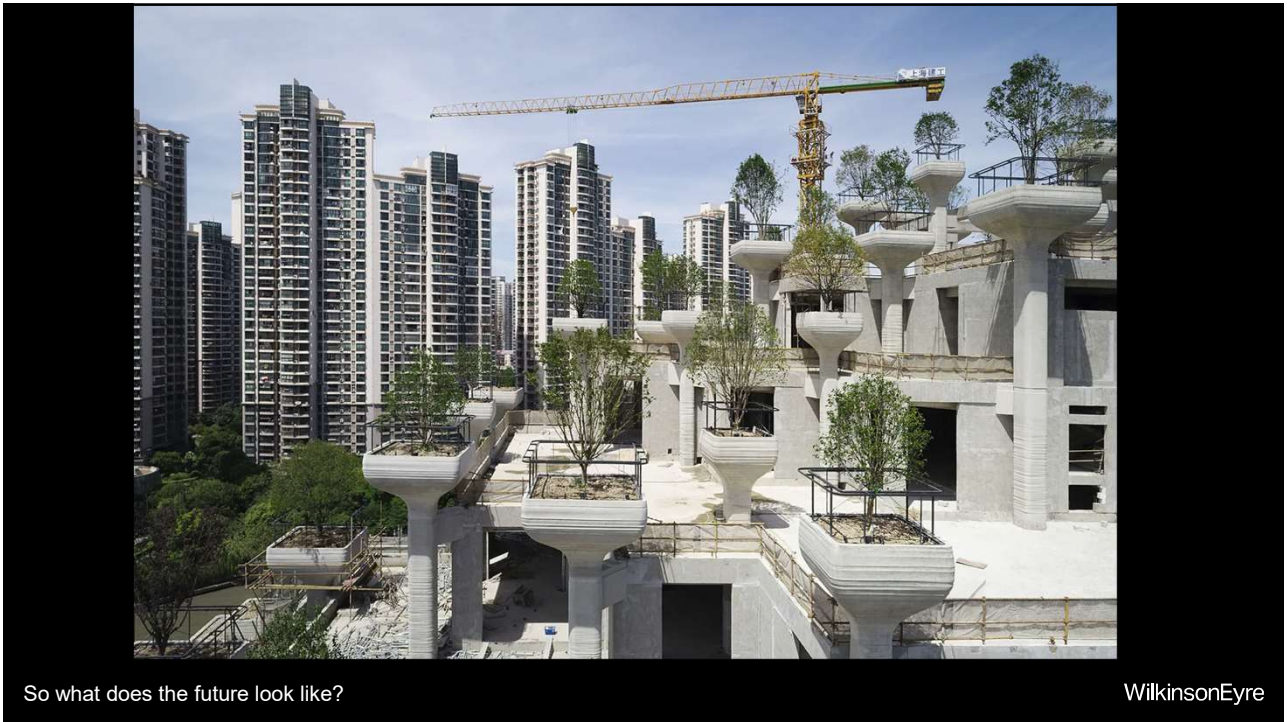
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Conclusion

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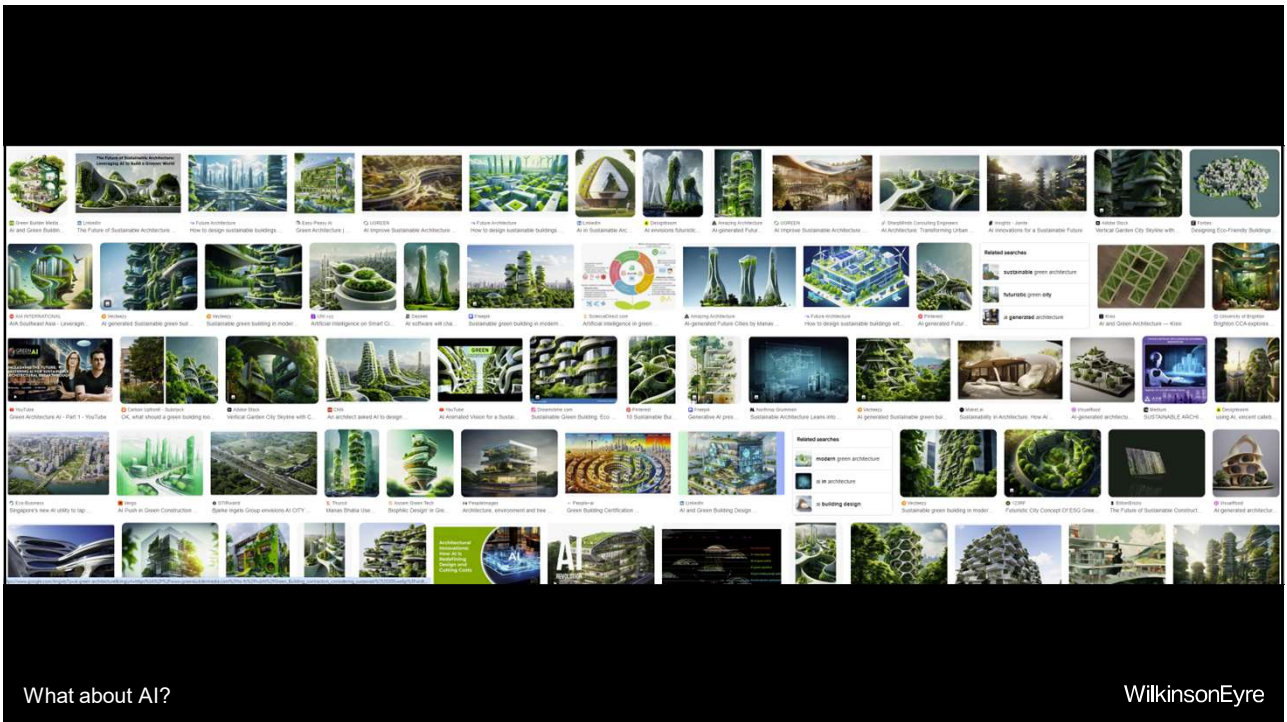




So what does the future look like?

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What about AI?

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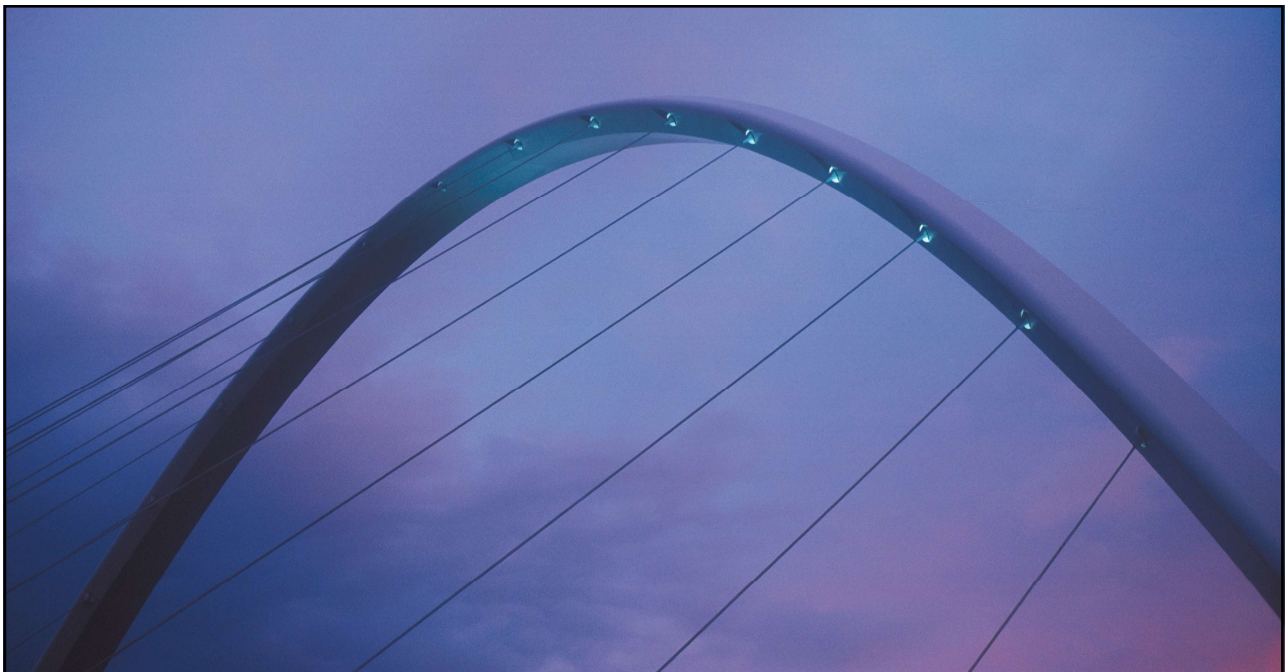


Which will it be, the one on the left or the right?

Lloyd Alter – What do Green Buildings look like?

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Refinement of detail – Millennium Bridge

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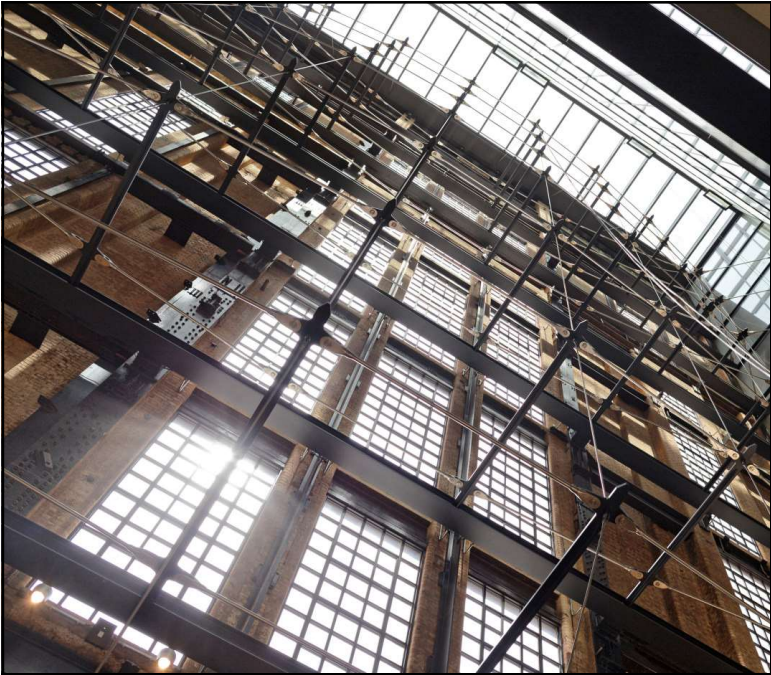




Lightness of structure – Tintagel Bridge, Cornwall

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A light touch, and using what's there – Battersea Power Station



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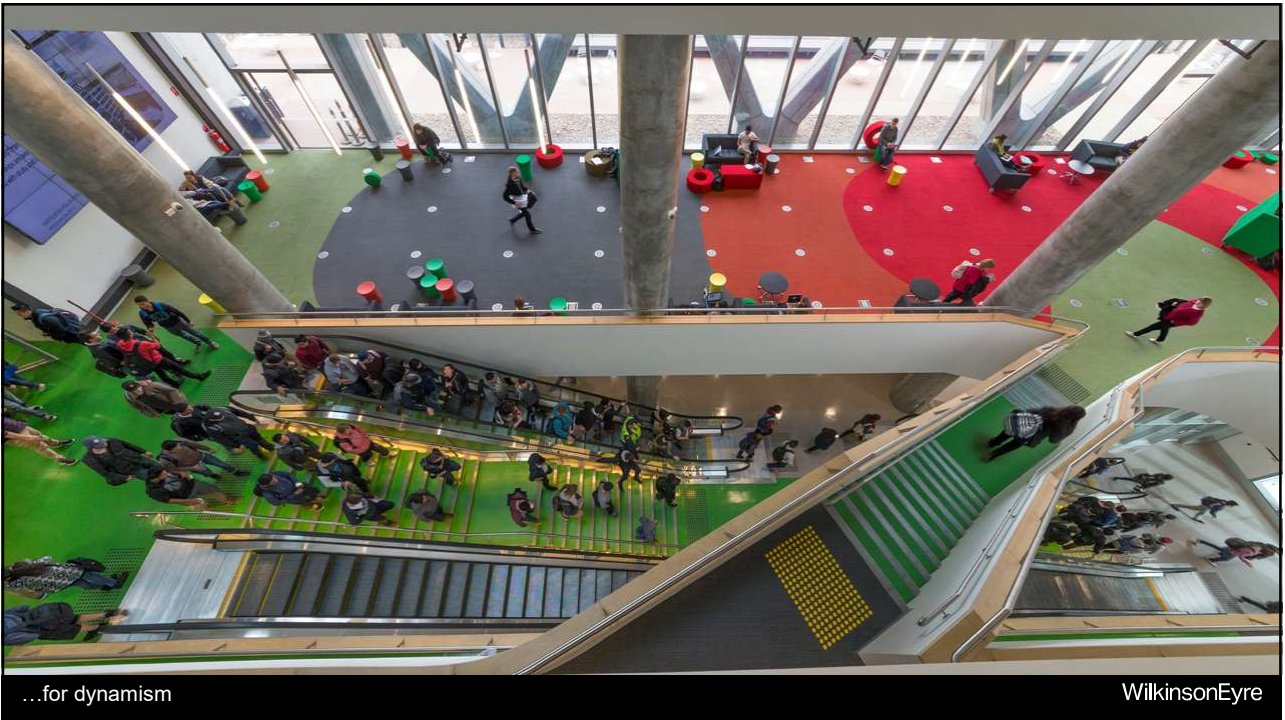


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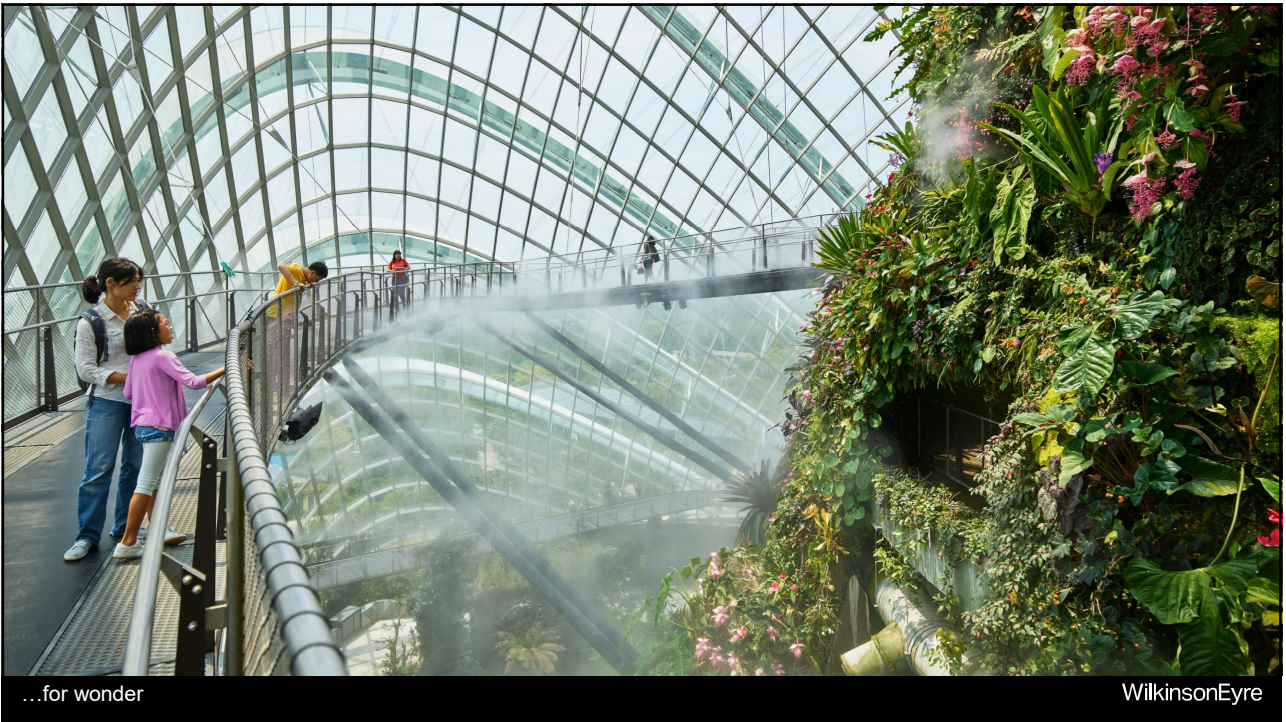


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*Lightness is not a technical term and cannot be measured in a finite way. It can be neither quantified nor specified but is a qualitative ingredient of modern architecture which is gaining momentum.*

*Chris Wilkinson 1945 - 2021*

Final thought

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Thank you

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