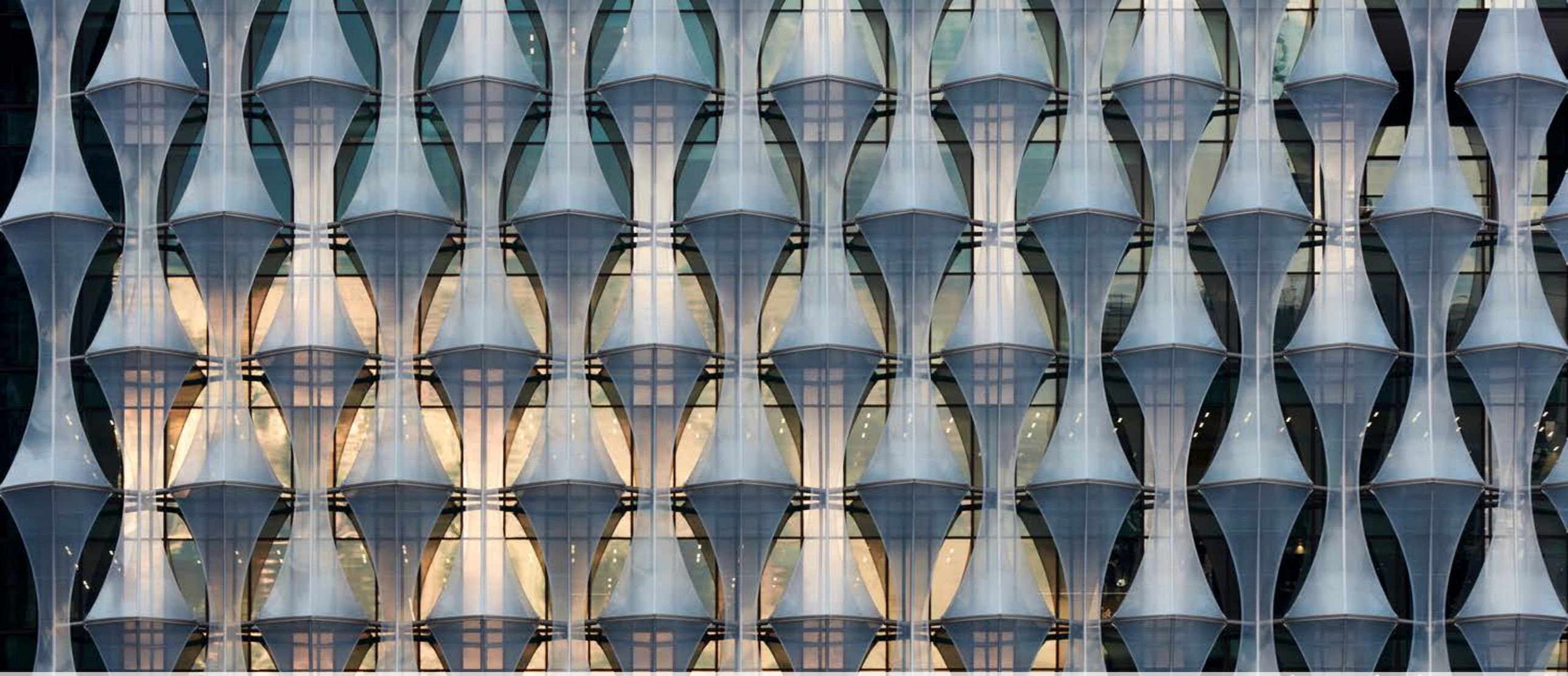


US Embassy, London

James Timberlake, FAIA, LEED Fellow

Partner, KieranTimberlake

03 May 2018

DESIGN ADVOCACY GROUP

KIERANTIMBERLAKE

PROJECT TEAM

Owner	US Dept of State, Bureau of Overseas Buildings Operations (OBO)
Site/Project Feasibility w/OBO	Zimmer Gunsul Frasca (ZGF)
US Lead Contractor	BL Harbert Int'l (BLHI)
UK Lead Subcontractor	Sir Robert McAlpine (SRM)
Architect	KieranTimberlake
Landscape Architect	OLIN
Intr Workplace Architect (in assoc w/KT)	Gensler (Wash. DC)
Structural & Physical Security Engr	Thornton Tomasetti
MEP, Civil, Facade and Sustainability Engr	Arup (Wash. DC, NY and London)
Cost Estimator	AECOM
Technical Security Design	Sako & Associates

PROJECT TIMELINE

FeasIbility/Planning/Real Estate Transaction 2002-2007 (ZGF w/OBO)
(40 sites; real estate transaction; no public funds/no Congressional approp)

Qualifications/Competition 2008-2009
(39 Firm Submissions > 12 interviews > 4 competitors)

Project Award/Announcement London February 2010

SD/DD/CD Early Mockup Phases 2010-2014
(CM at-risk contract award; US contractor, UK subcontractor)

Site Construction/Mockups/Testing 2012-2015

Substantial Completion 2017

US Embassy Move February 2018

PROJECT BUDGET

$1B (site acquisition, fees, soft costs, hard costs)


KieranTimberlake

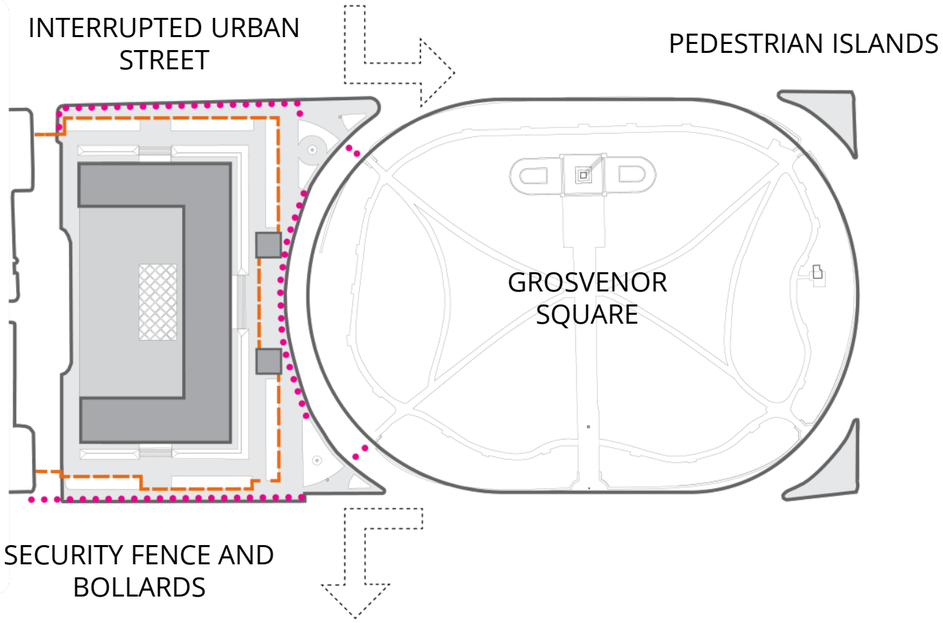

Morphosis

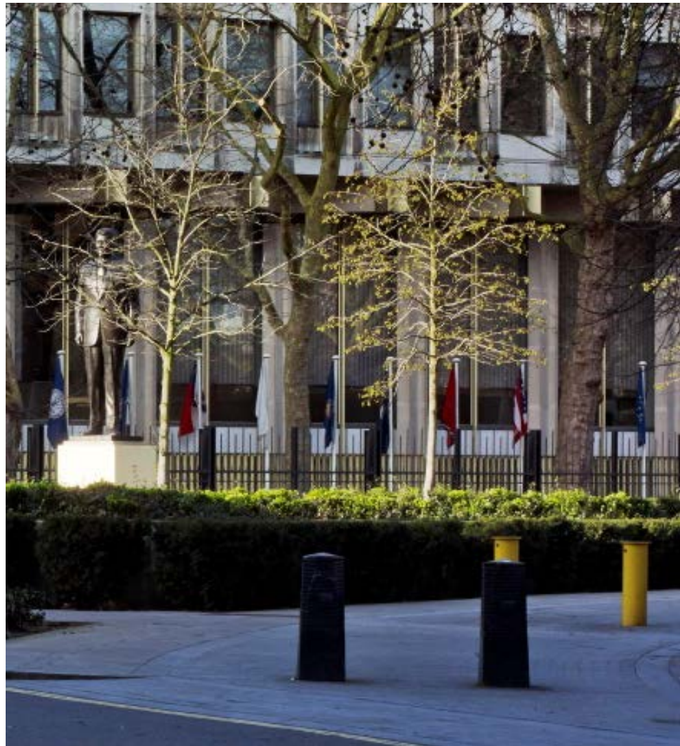

Richard Meier & Partners


Pei Cobb Freed

EERO SAARINEN, 1960 US EMBASSY, LONDON GROSVENOR SQUARE

DESIGN ADVOCACY GROUP





US EMBASSY, LONDON, GROSVENOR SQUARE

DESIGN ADVOCACY GROUP

DIPLOMACY
Create an iconic, timeless design that symbolizes democracy and the strength of the US-UK relationship

EFFICIENCY
Design functional, flexible space that meets program requirements now and into the future

ENVIRONMENT
Establish leading edge international standards for energy efficiency and environmental sustainability

EXCELLENCE
Demonstrate US leadership in design and construction excellence

PLACE
Respect British culture and context; establish paradigm for Nine Elms development

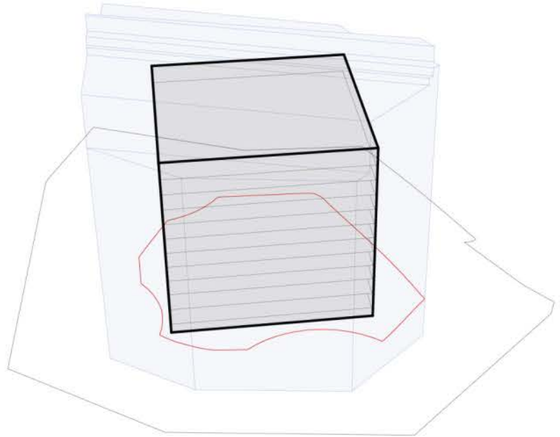
SECURITY
Ensure a safe, secure landscape and building, while minimizing visual presence of security measures

WELCOME
Design an open, transparent landscape and building that welcome visitors and staff

WORKPLACE
Create quality workspaces with daylight, views and spaces that engender communication among all staff

FLOOR AREA : FAÇADE

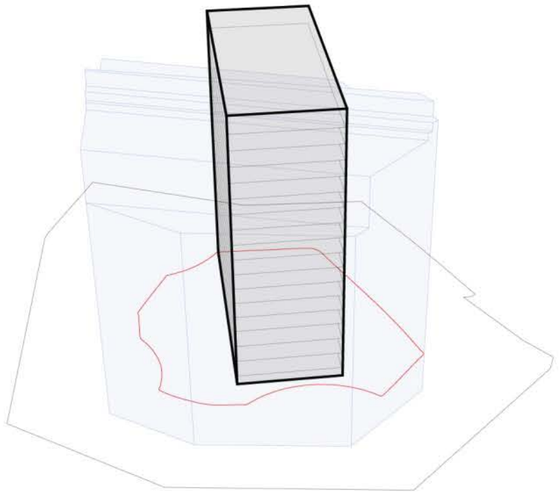
(per current SRP)



CUBE
(CURRENT DESIGN)

1 : 0.54

19,950 m^2 FACADE

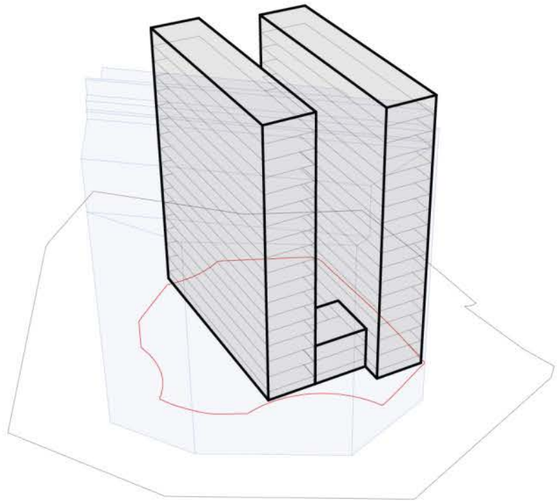


DOUBLE-LOADED
CORRIDOR*

1 : 0.59

21,950 m^2 FAÇADE

ADDED CURTAINWALL COST
10% INCREASE OVER CUBE



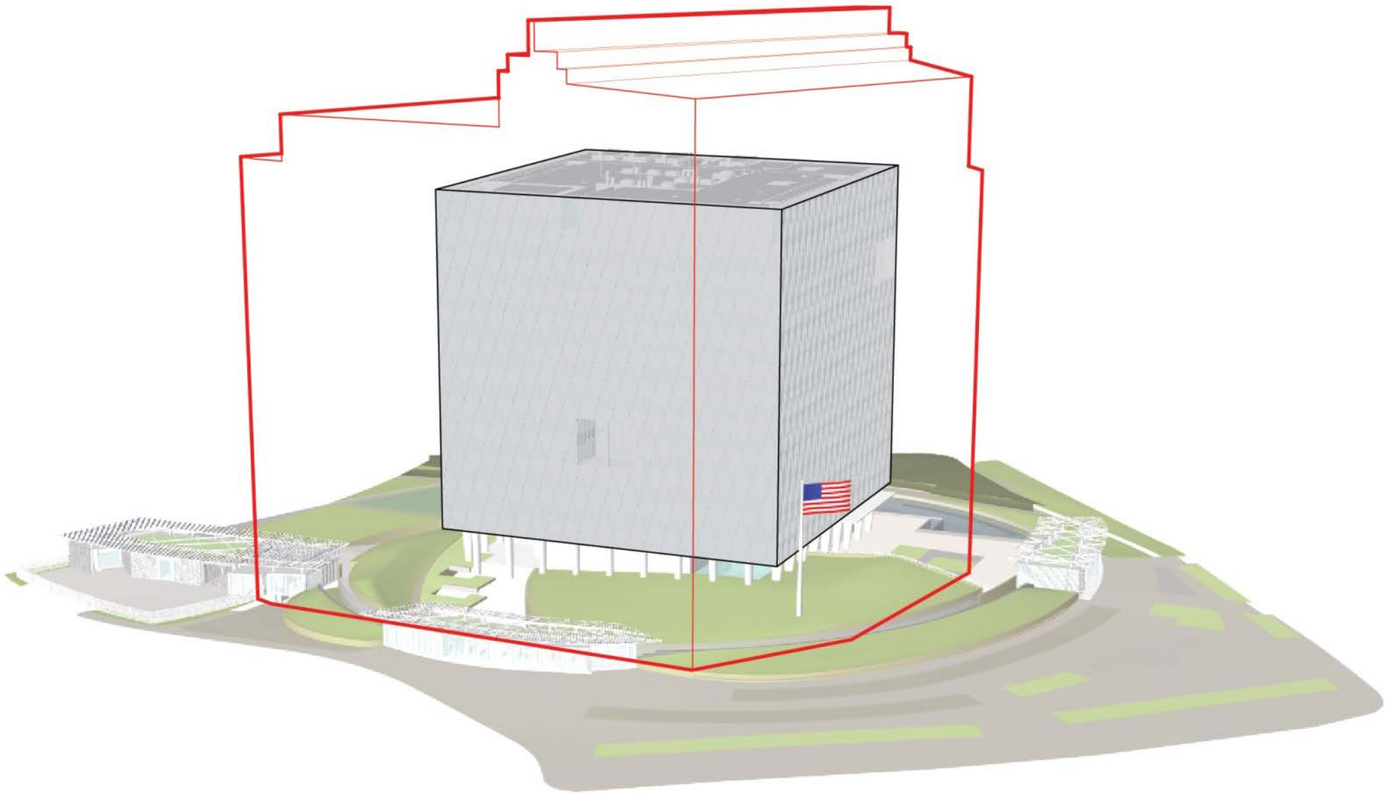
STANDARD EMBASSY
DESIGN*

1 : 1

37,330 m^2 FAÇADE

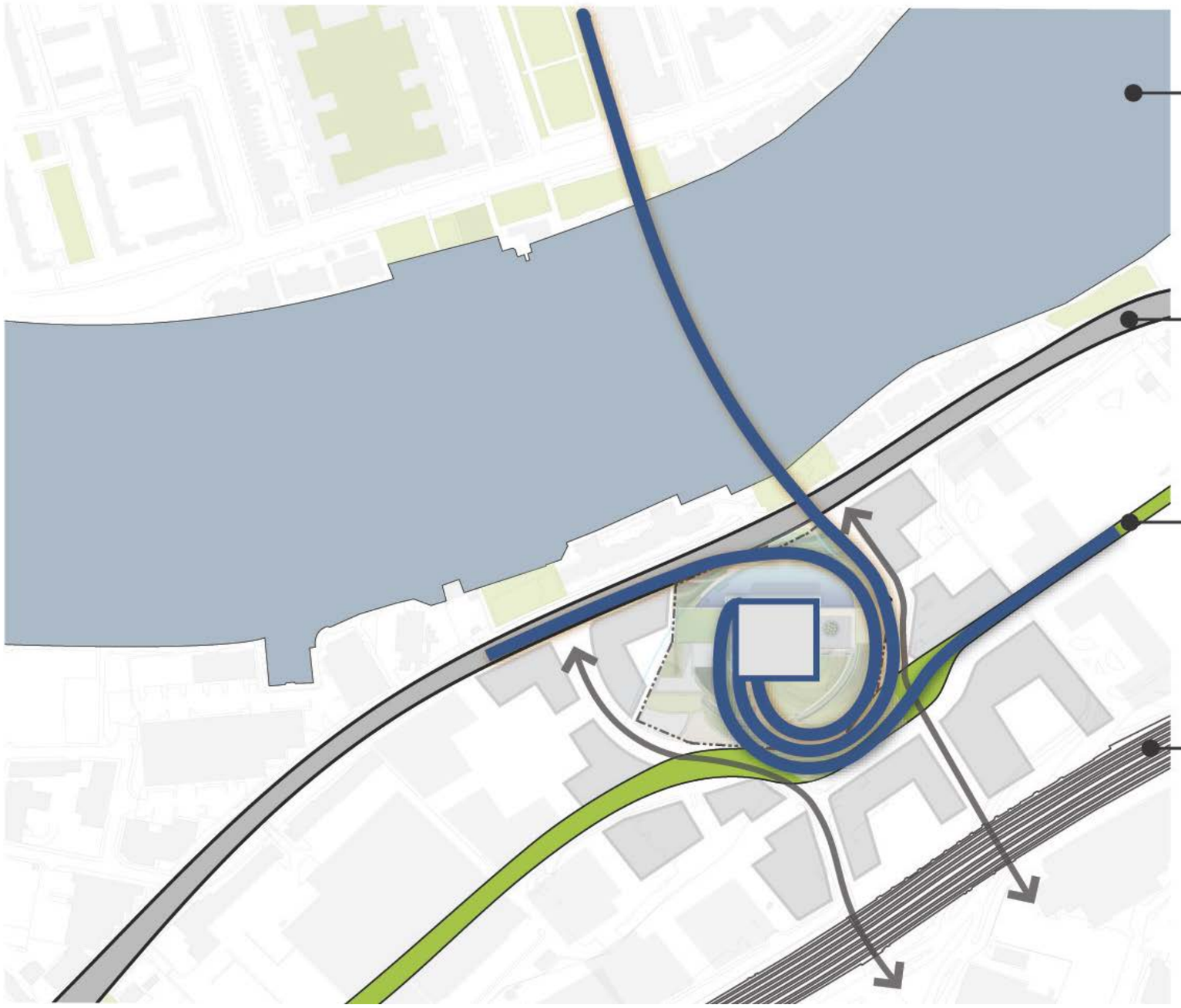
ADDED CURTAINWALL COST
87% INCREASE OVER CUBE

** Both options exceed height restrictions for buildable area*



MAXIMUM BUILDABLE ENVELOPE

Allowable volume: 569,541 m3
Proposed volume: 206,341 m3


THE RIVER THAMES
NINE ELMS LANE
LINEAR PARK
RAILWAY VIADUCT

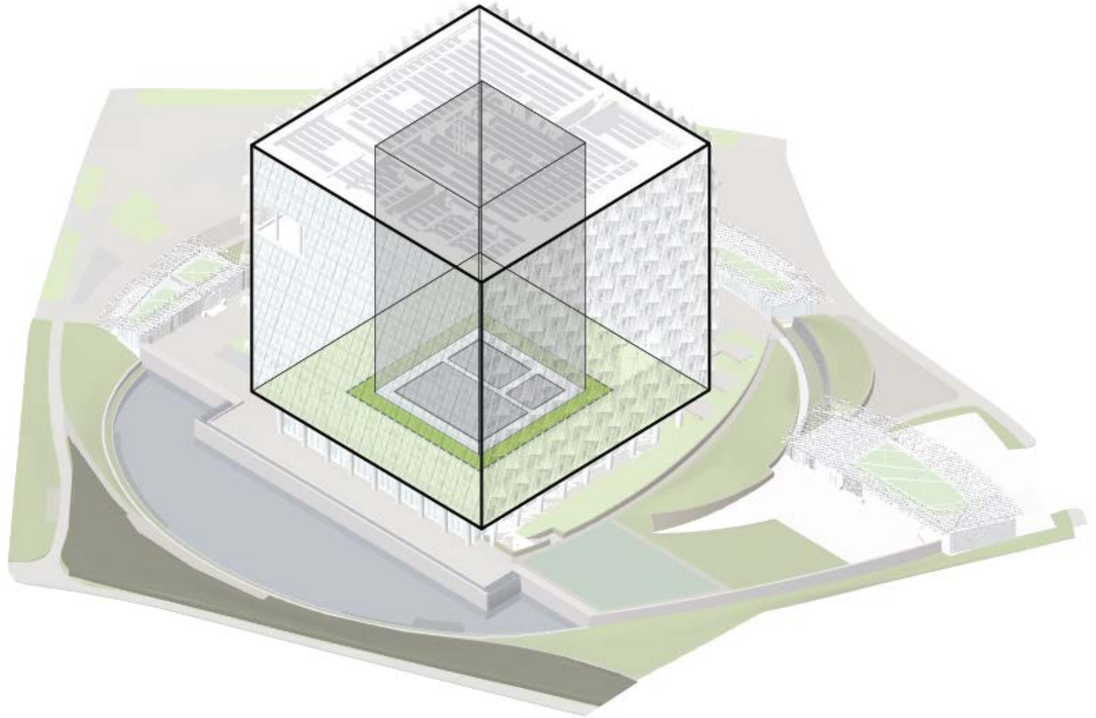
KEY

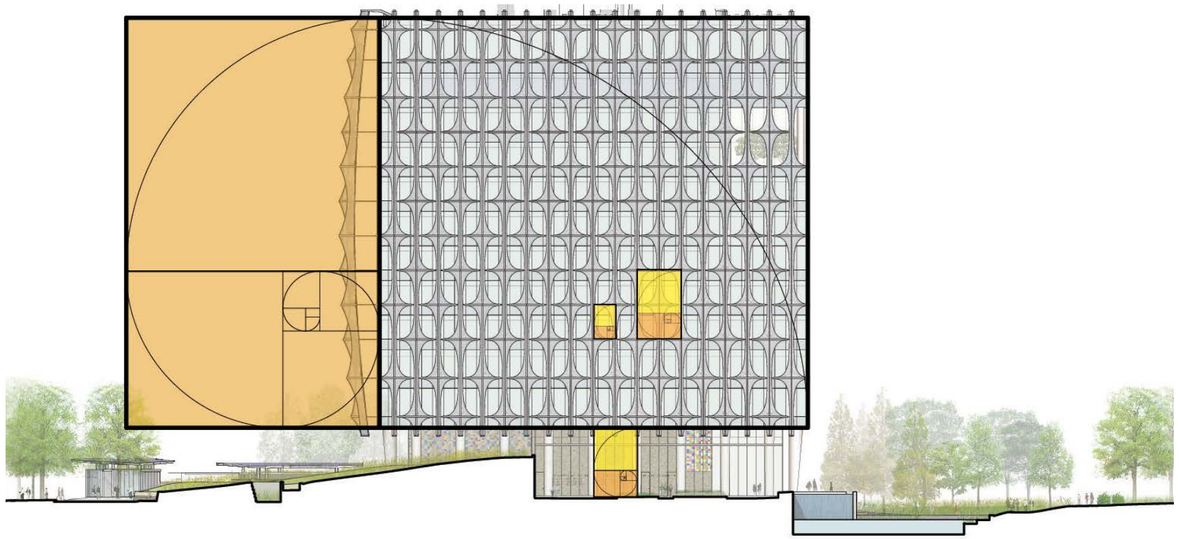
Open Office Space

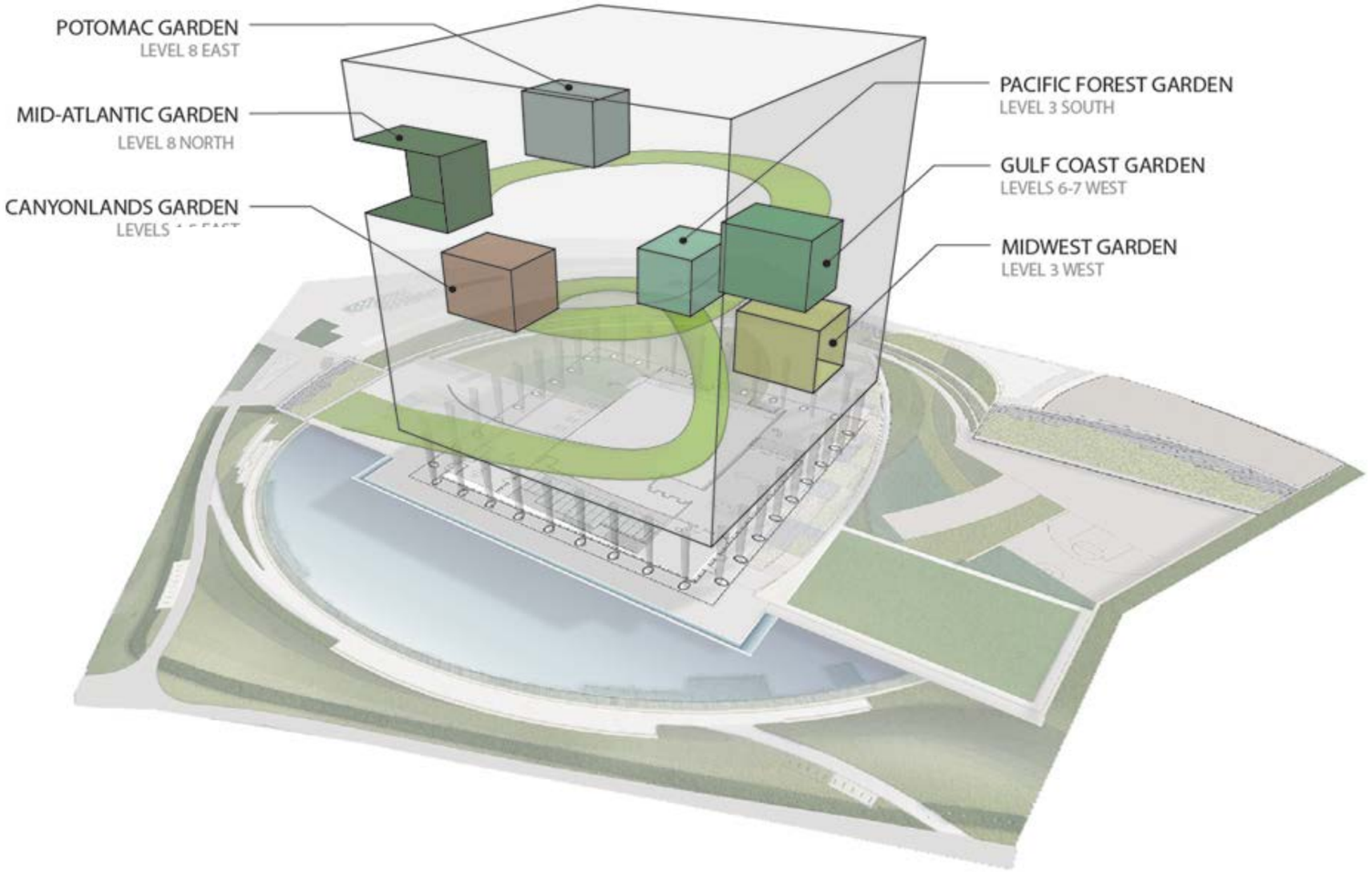
Closed Offices

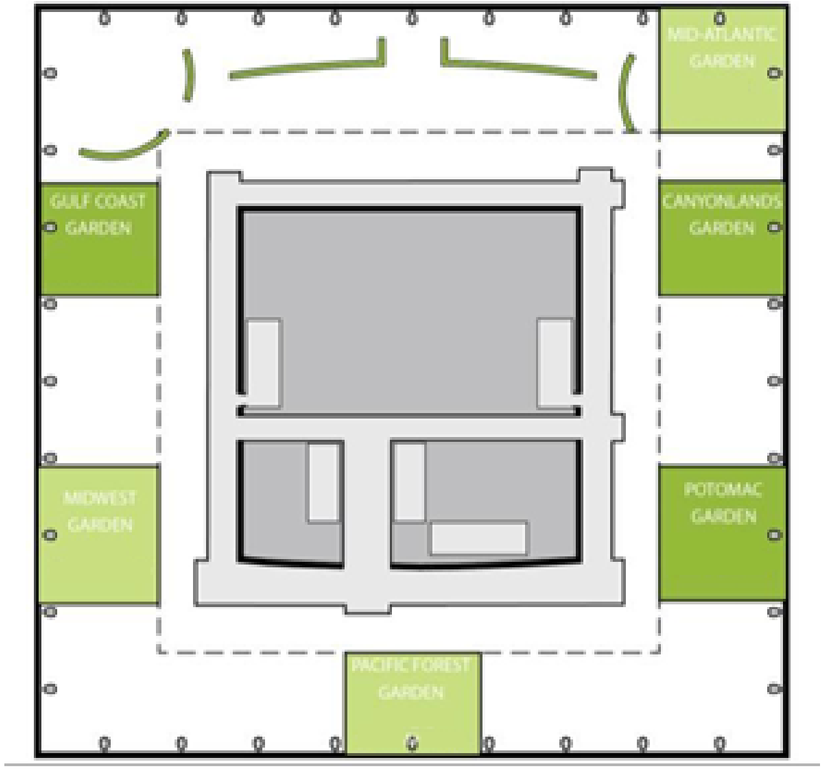
Circulation Space

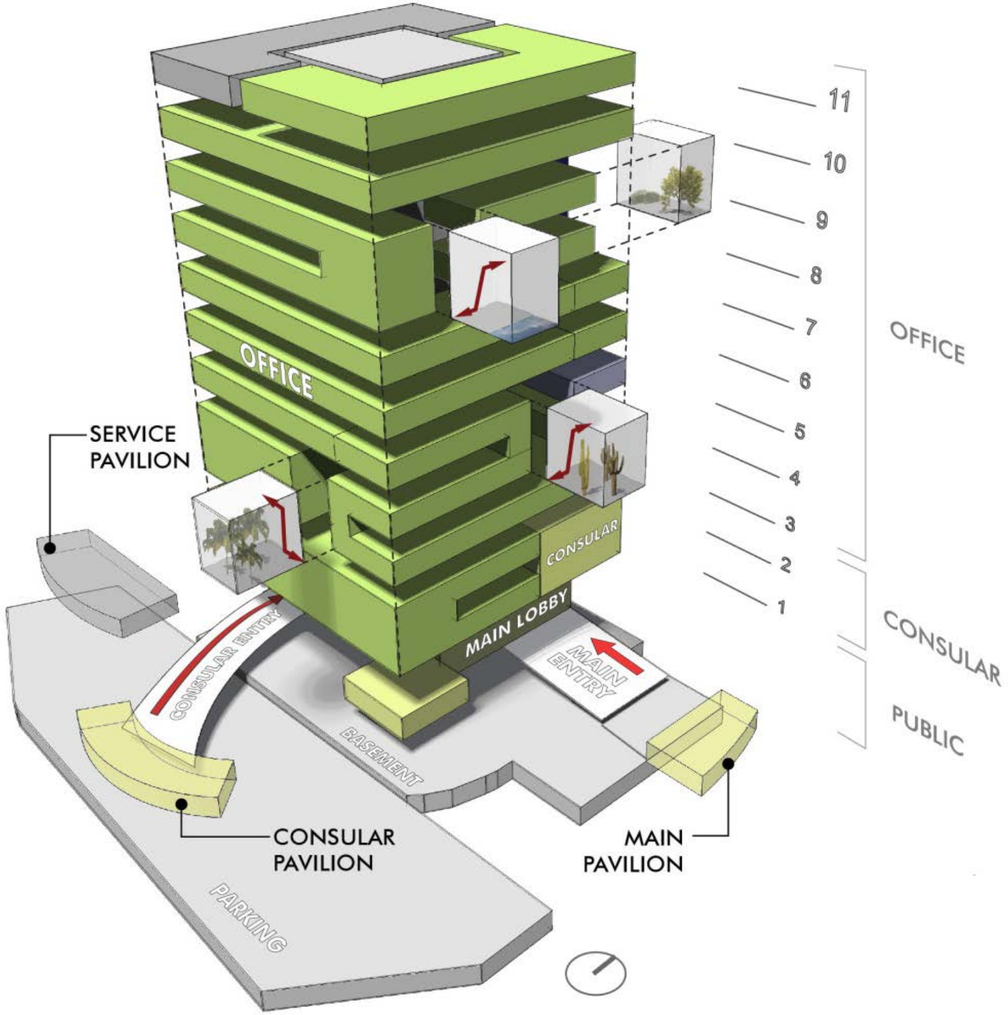
Building Core



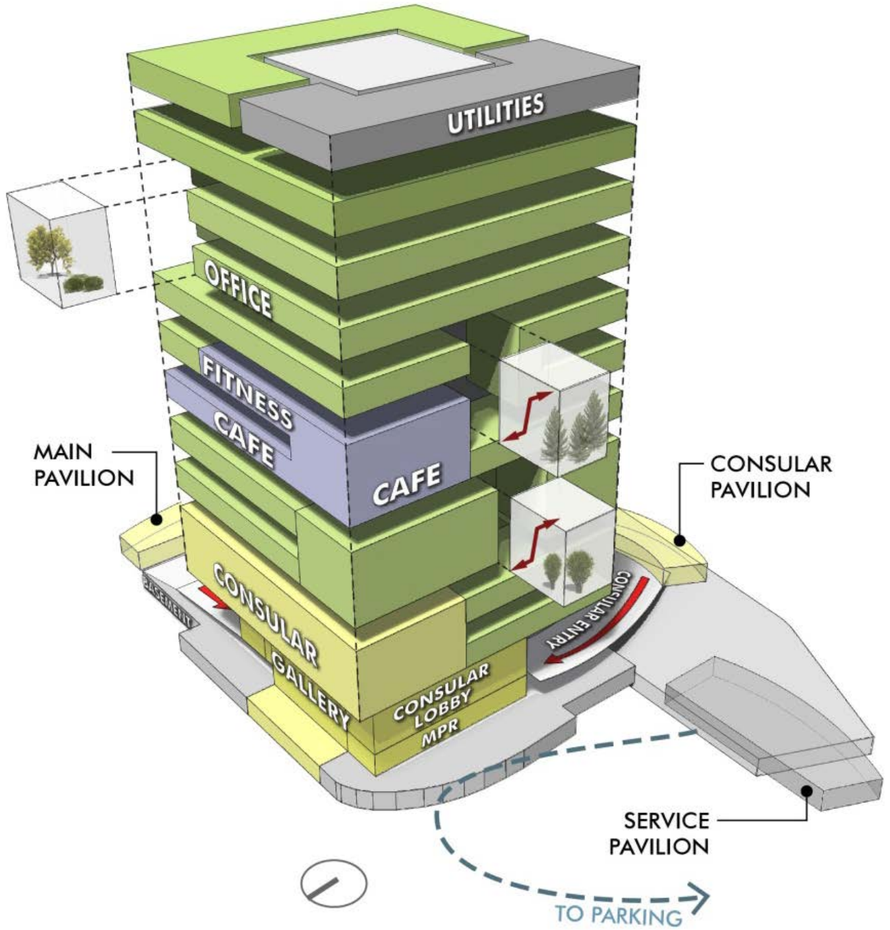



POTOMAC GARDEN
LEVEL 8 EAST
MID-ATLANTIC GARDEN
LEVEL 8 NORTH
CANYONLANDS GARDEN
PACIFIC FOREST GARDEN
LEVEL 3 SOUTH
GULF COAST GARDEN
LEVELS 6-7 WEST
MIDWEST GARDEN
LEVEL 3 WEST

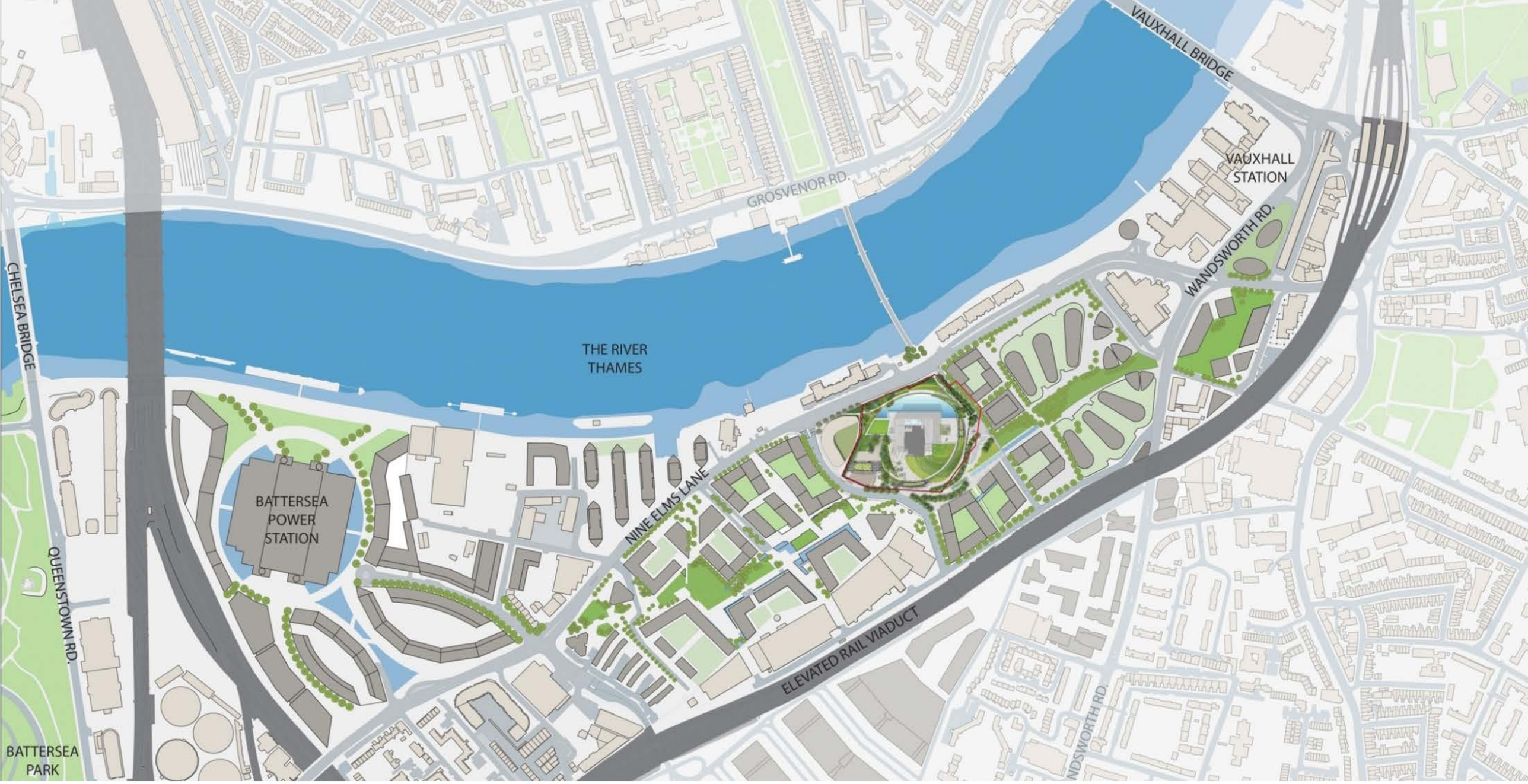

MID-ATLANTIC GARDEN
GULF COAST GARDEN
CANYONLANDS GARDEN
MIDWEST GARDEN
POTOMAC GARDEN
PACIFIC FOREST GARDEN

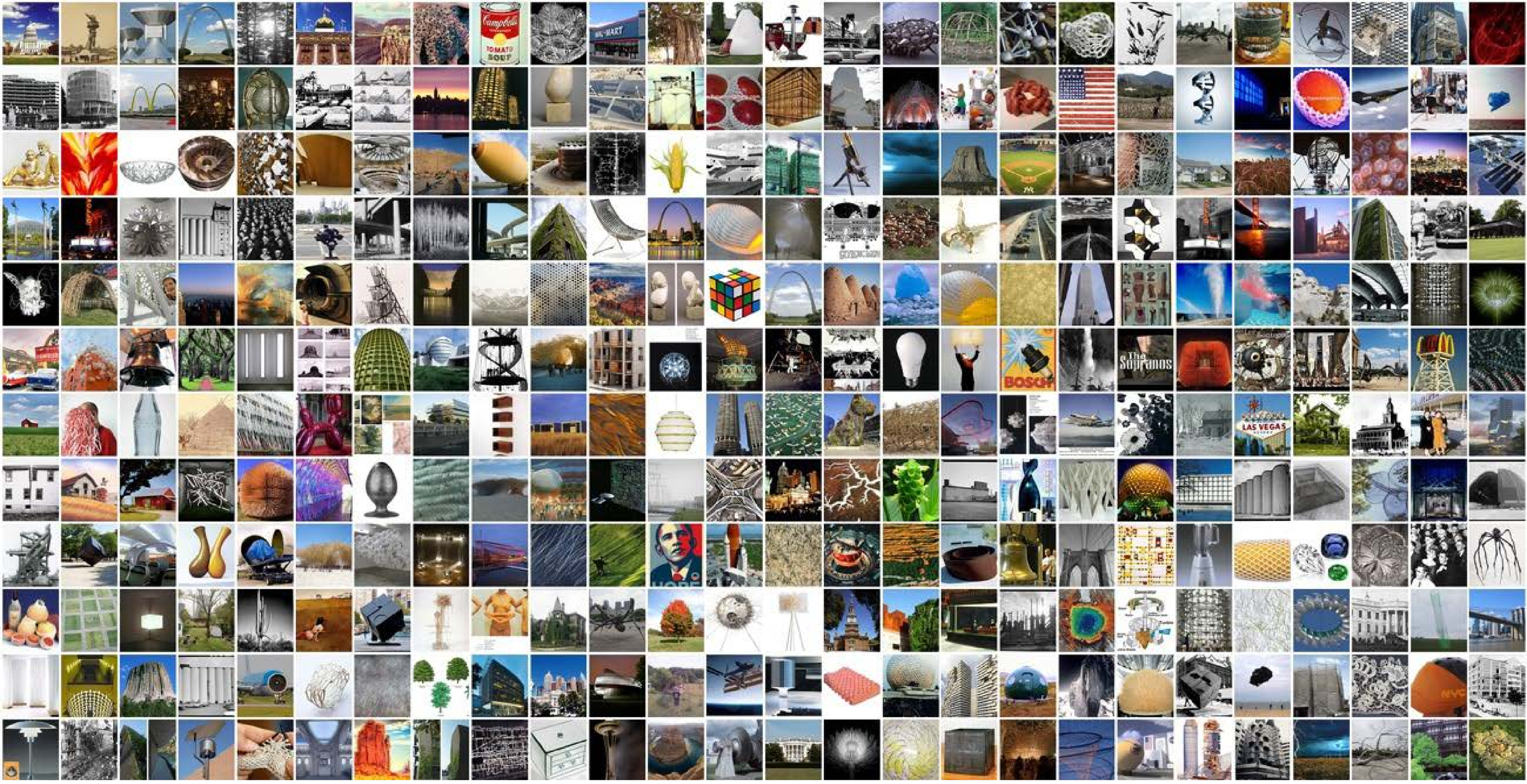


SOUTHEAST



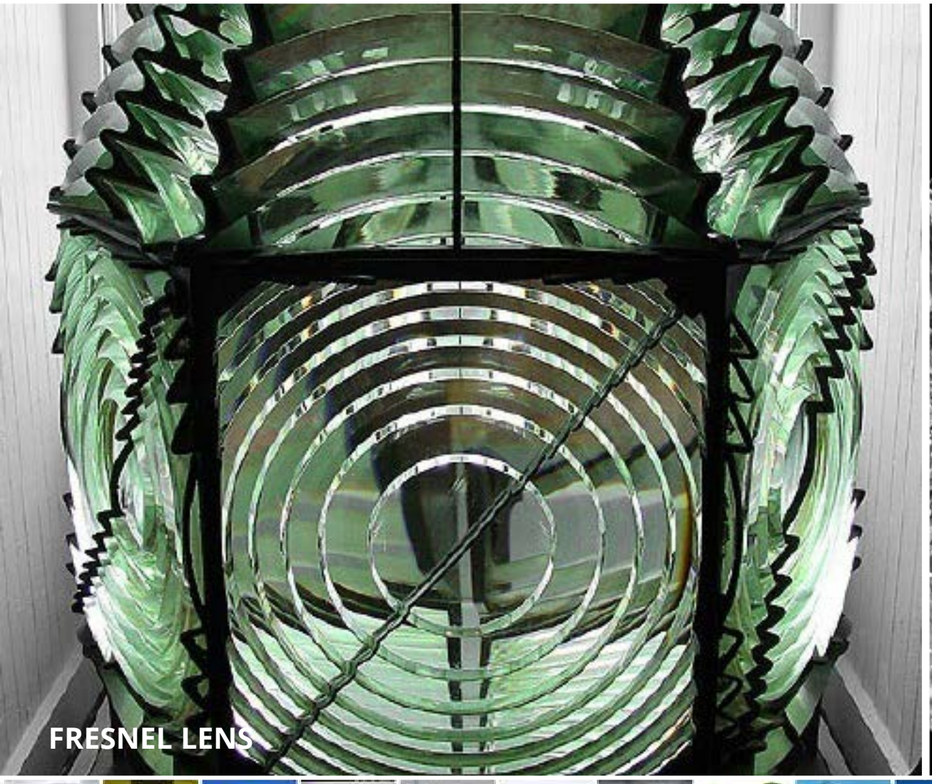
NORTHWEST


VAUXHALL BRIDGE
VAUXHALL STATION
GROSVENOR RD.
WANDSWORTH RD.
CHELSEA BRIDGE
THE RIVER THAMES
BATTERSEA POWER STATION
NINE ELMS LANE
QUEENSTOWN RD.
ELEVATED RAIL VIADUCT
BATTERSEA PARK



US DEPARTMENT OF STATE US EMBASSY, LONDON

DESIGN ADVOCACY GROUP



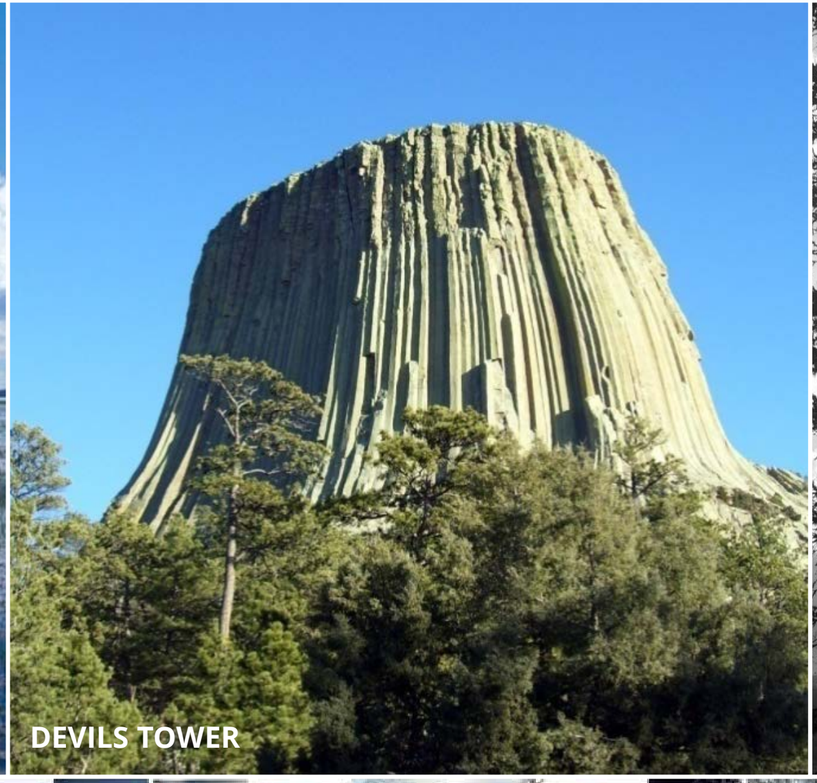
FRESNEL LENS

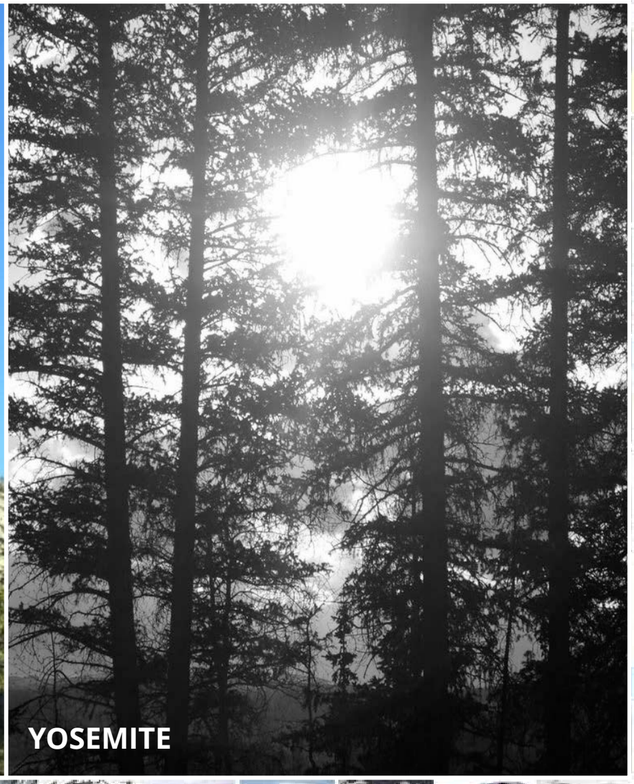
AMERICAN CRYSTAL

CELLOPHANE HOUSE

US DEPARTMENT OF STATE US EMBASSY, LONDON

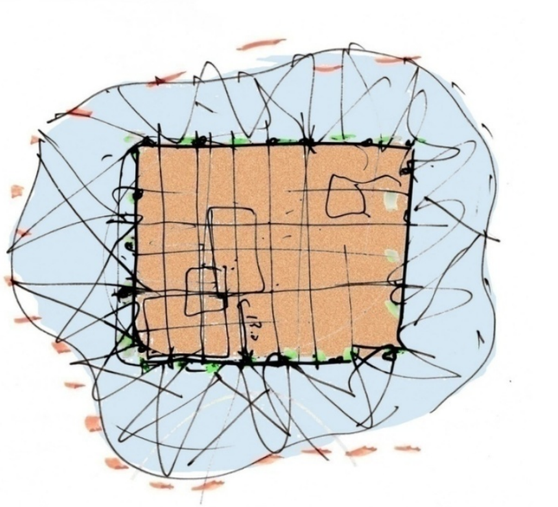
DESIGN ADVOCACY GROUP

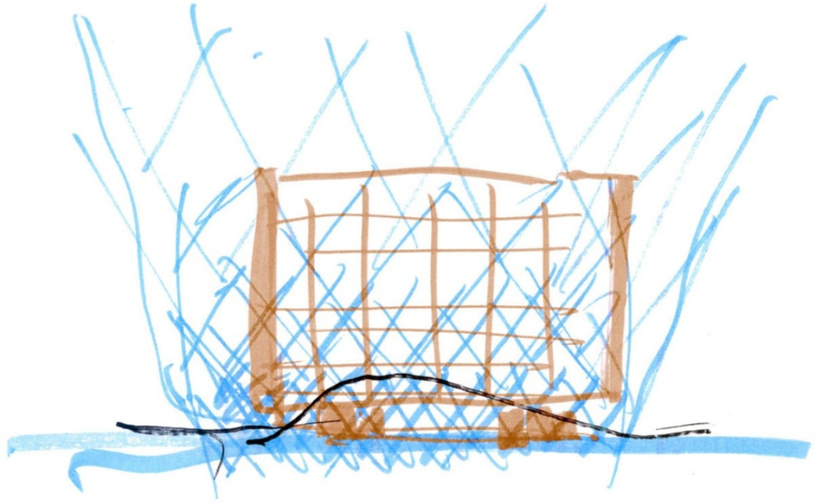


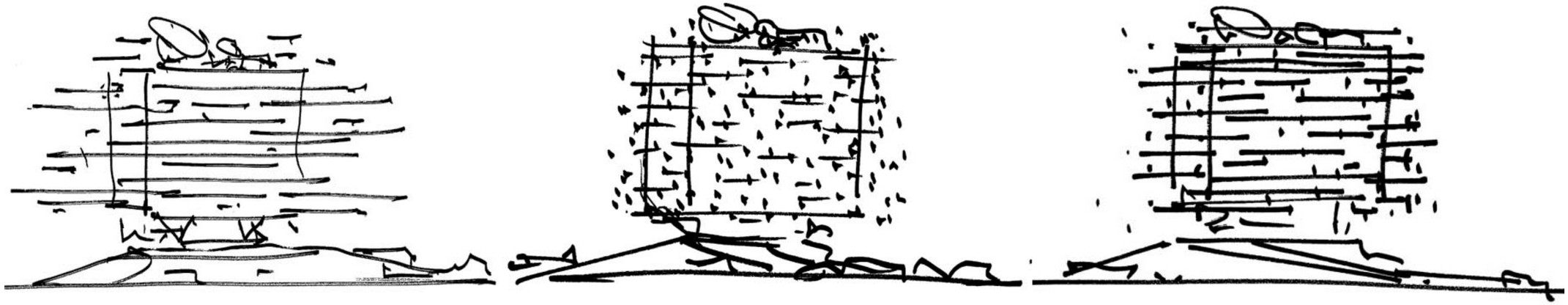


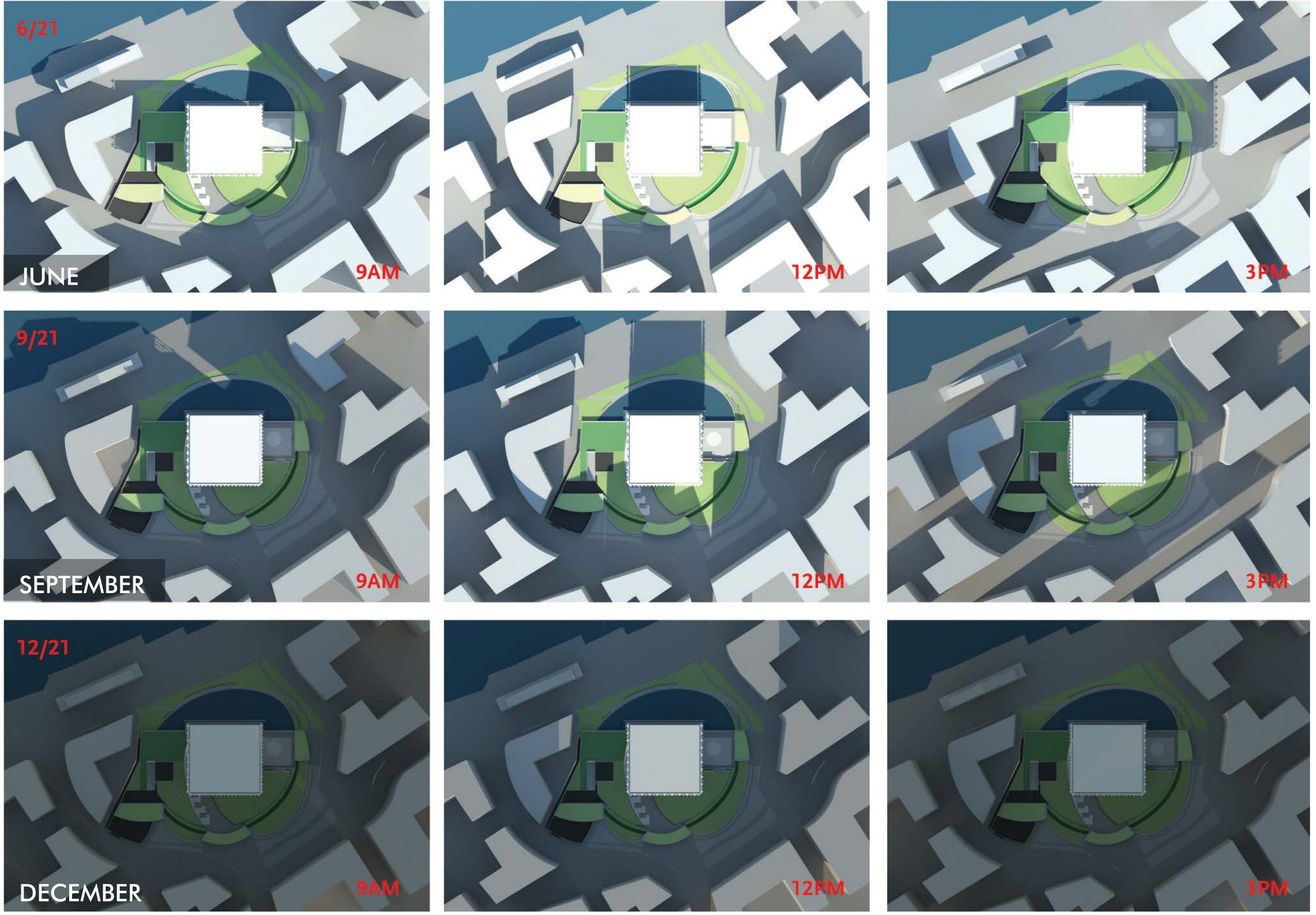
US DEPARTMENT OF STATE US EMBASSY, LONDON
DESIGN ADVOCACY GROUP

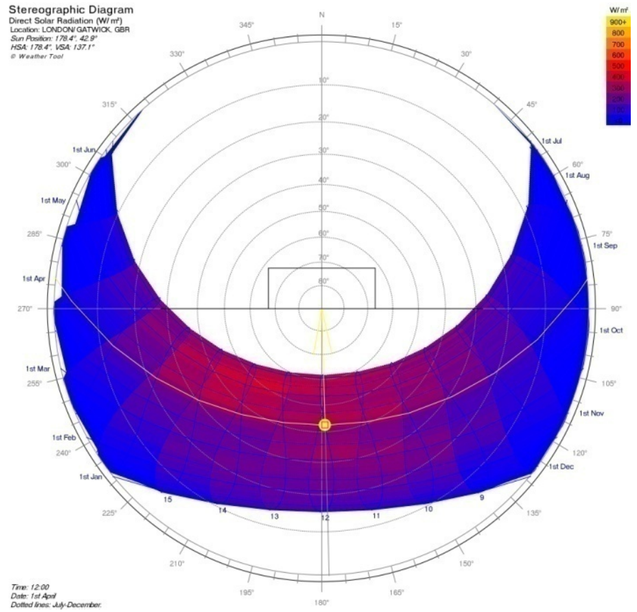
03 MAY 2018 | © KIERANTIMBERLAKE

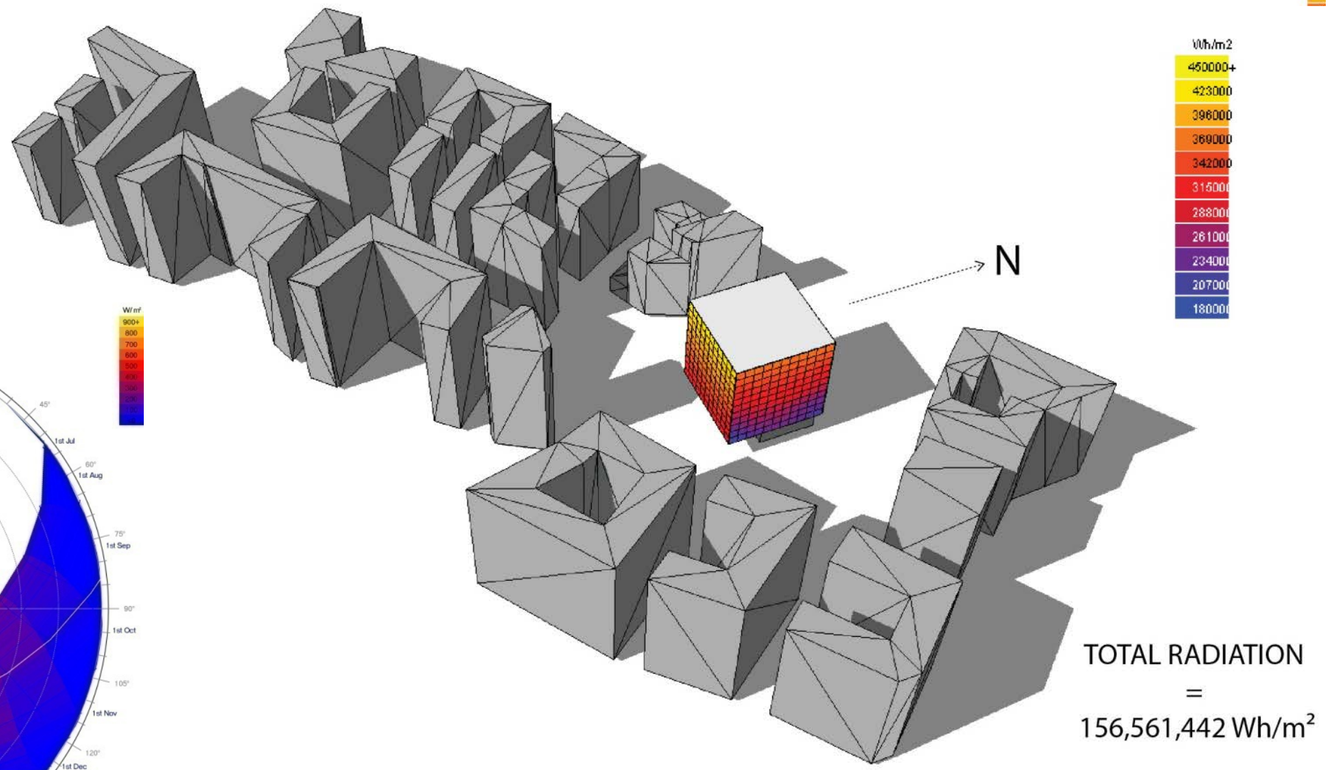







6/21
JUNE
9AM
12PM
3PM
9/21
SEPTEMBER
9AM
12PM
3PM
12/21
DECEMBER
9AM
12PM
3PM

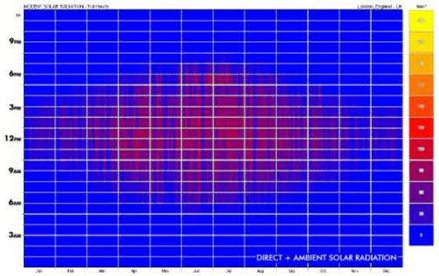




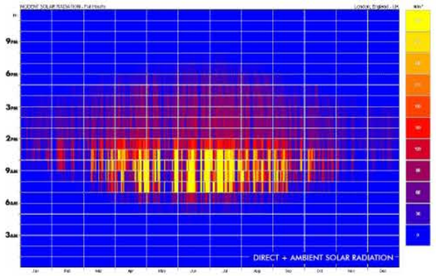
TOTAL RADIATION

=

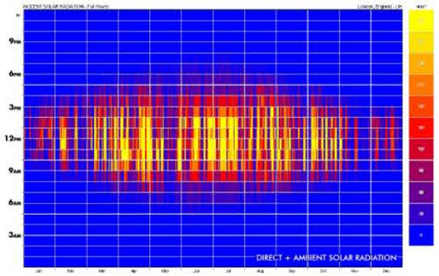
156,561,442 Wh/m²



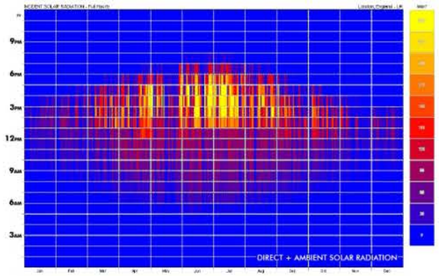
NORTH FACADE



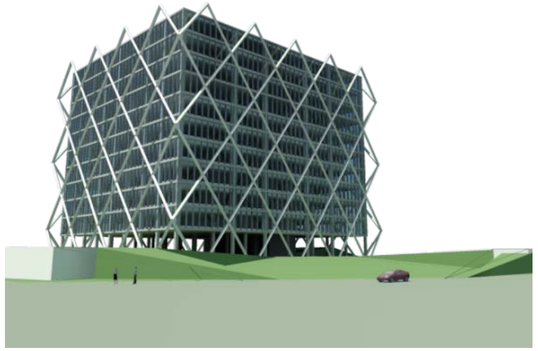
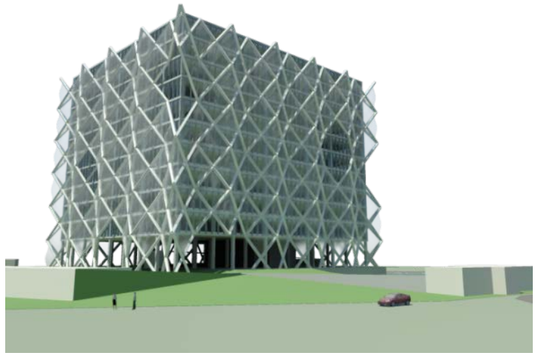
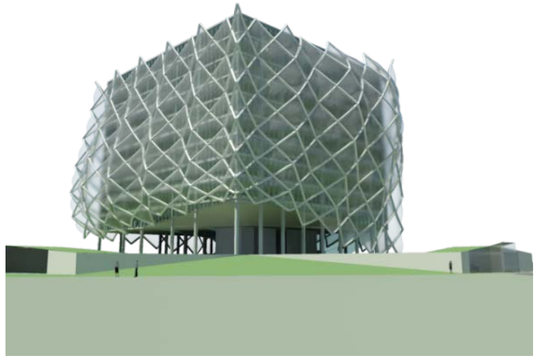
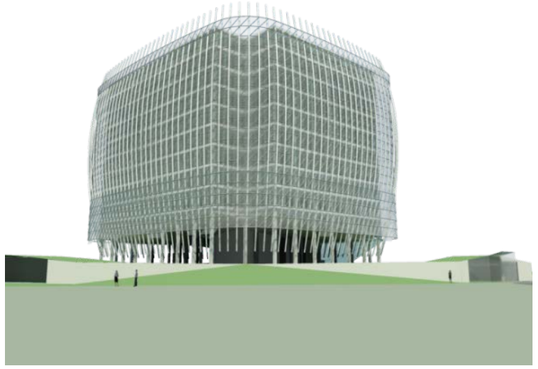
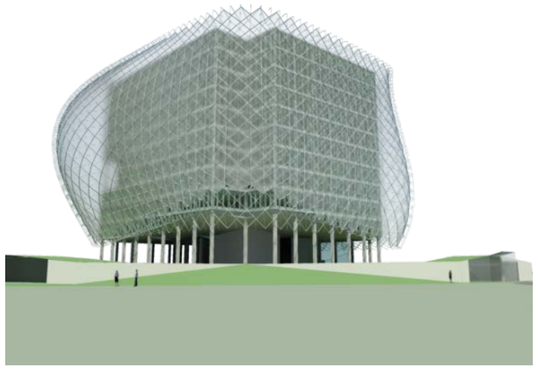
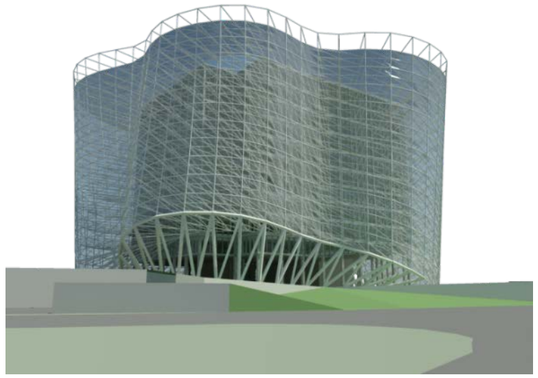
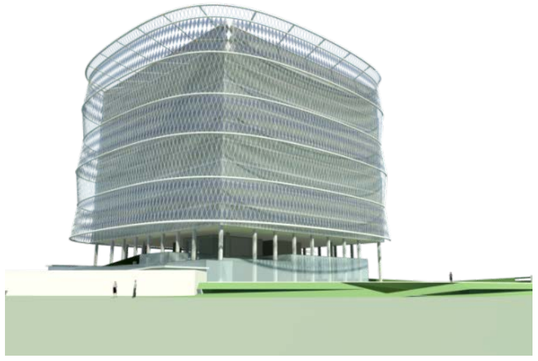
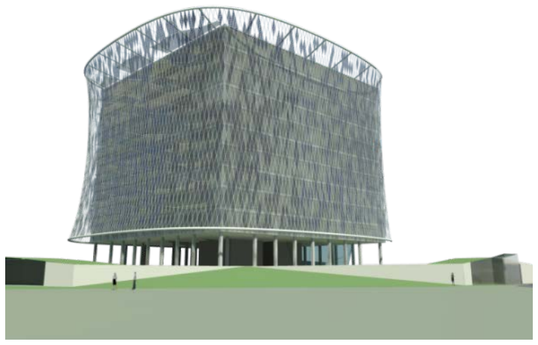
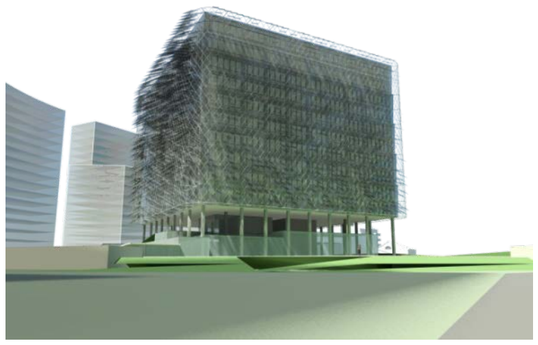
EAST FACADE

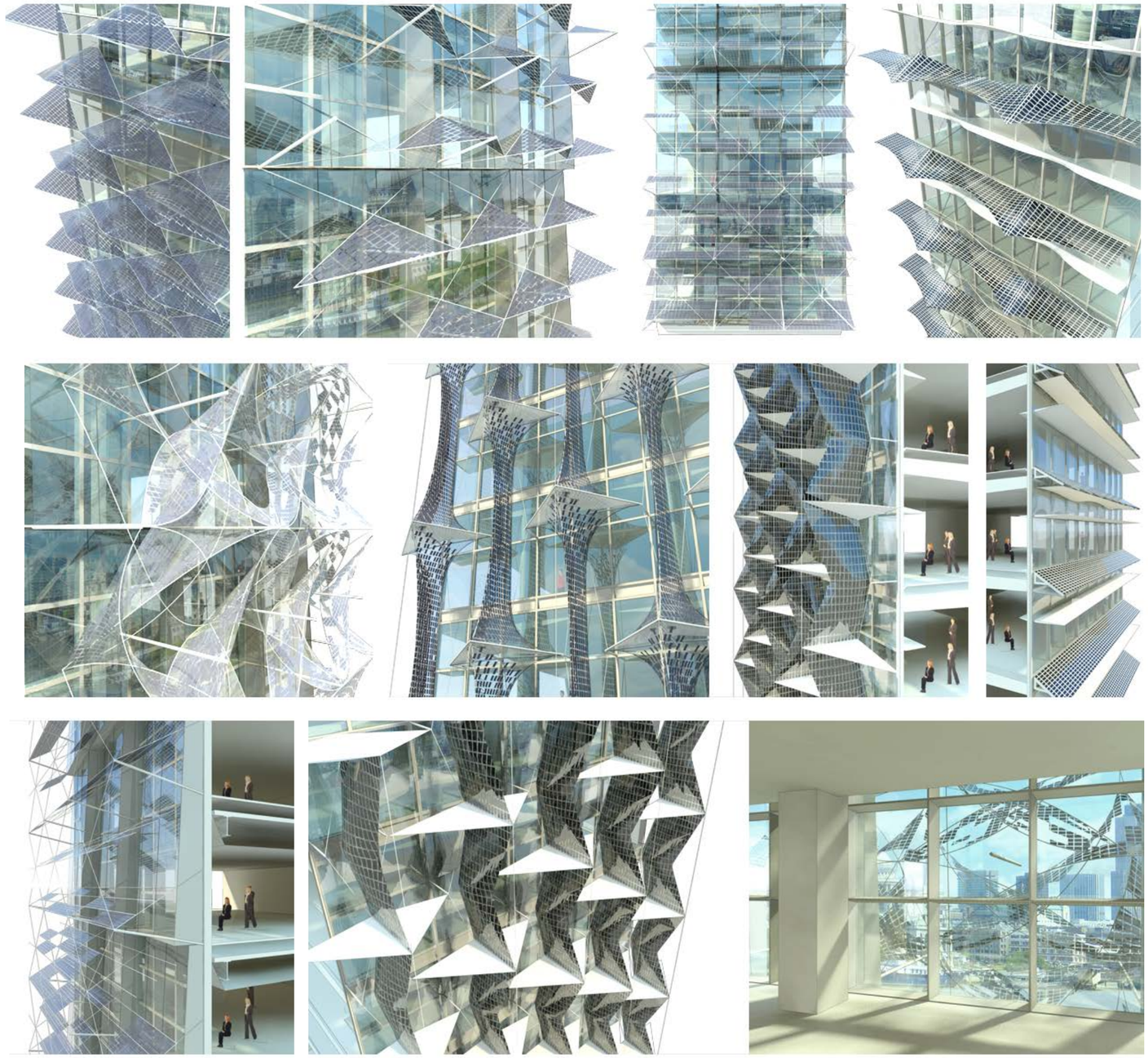


SOUTH FACADE



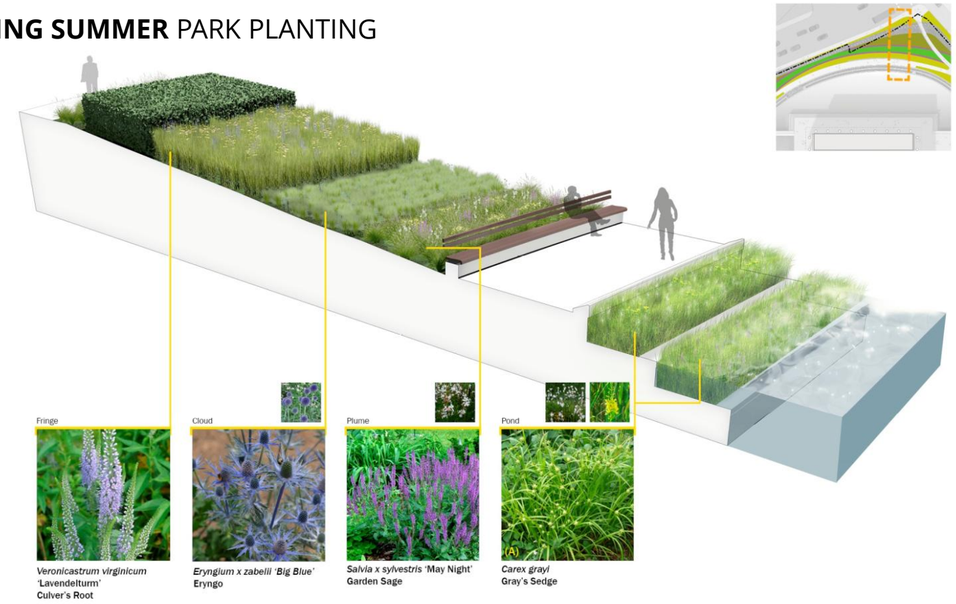
WEST FACADE

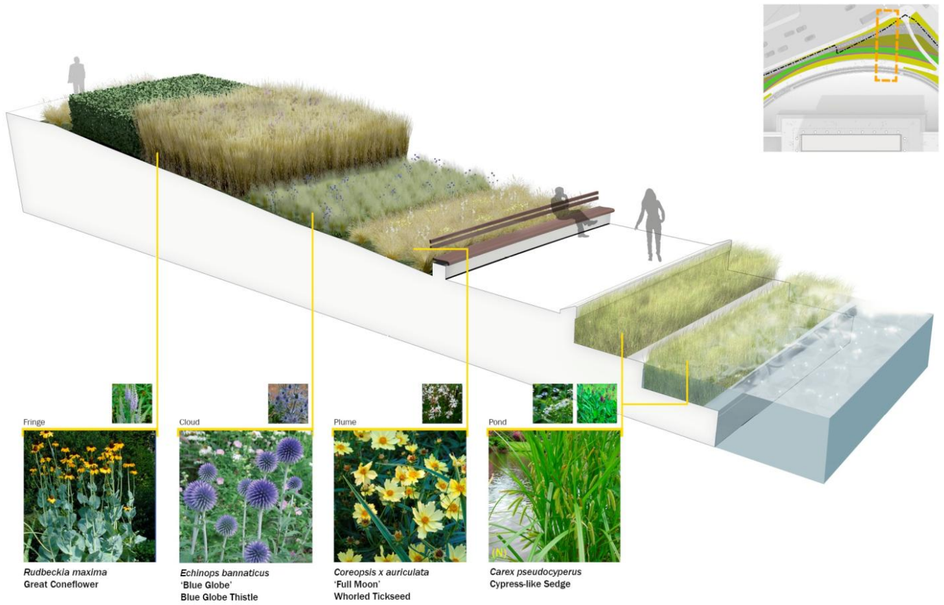


PLANTING SPRING PARK PLANTING

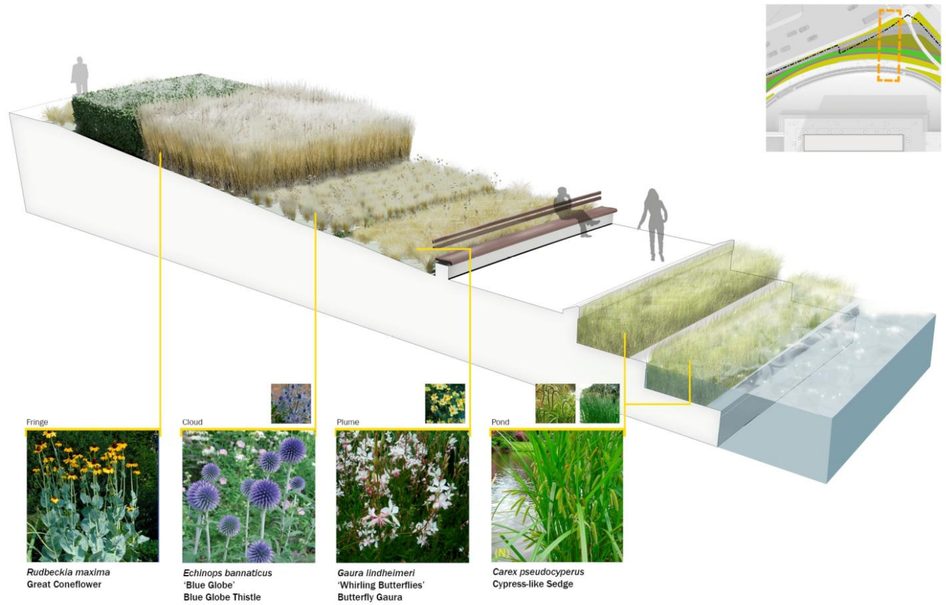
PLANTING SUMMER PARK PLANTING

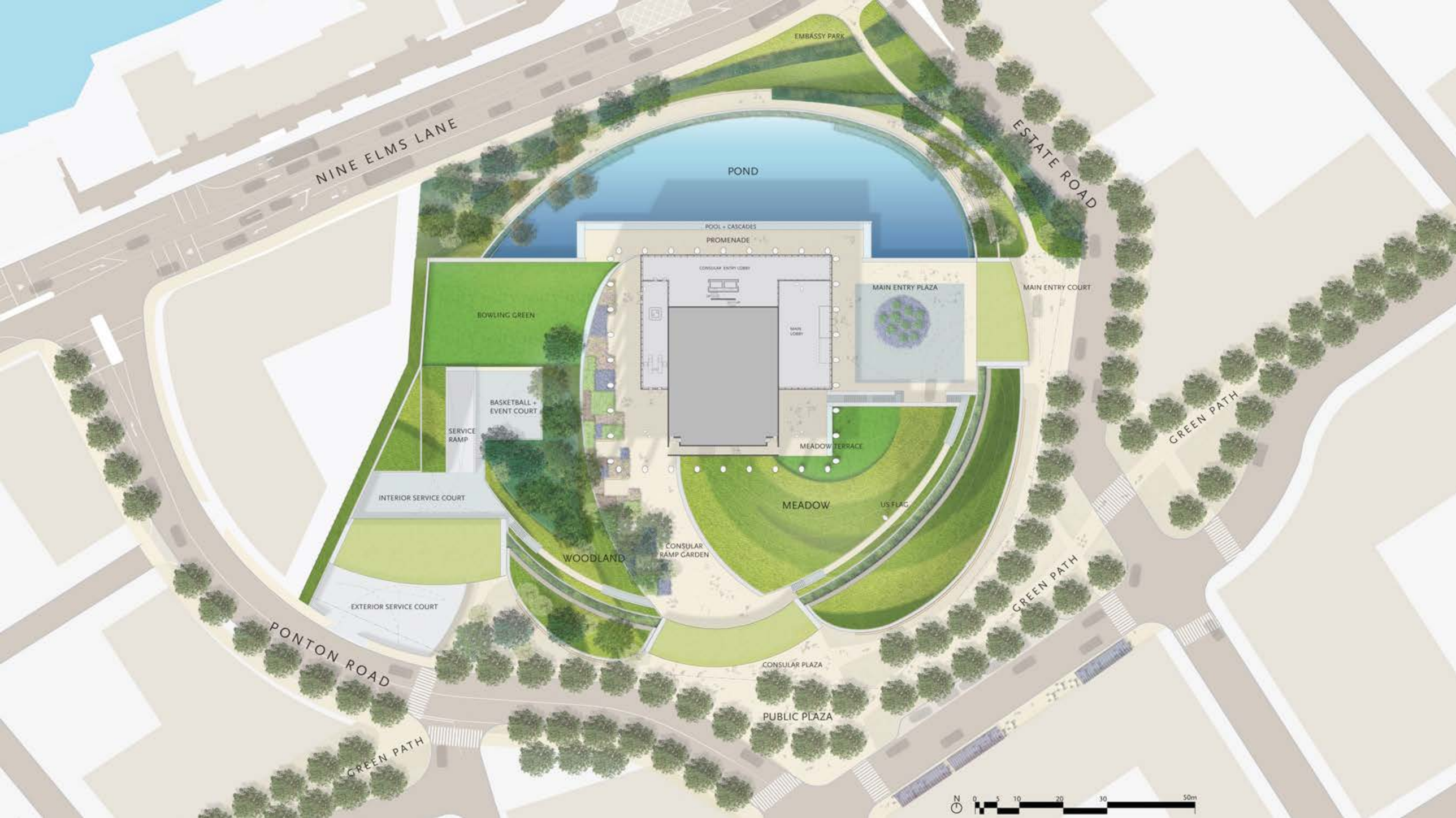


PLANTING FALL PARK PLANTING

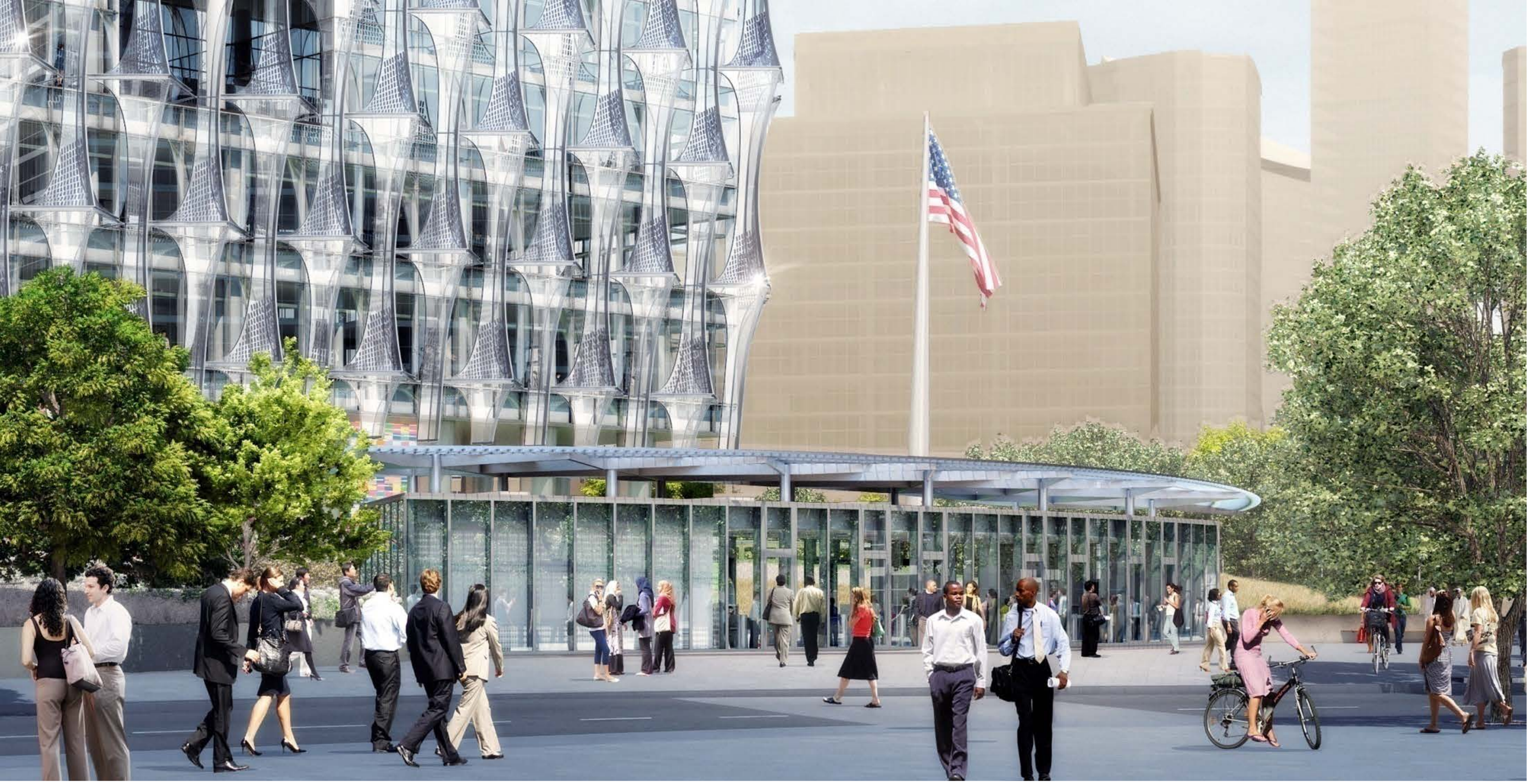


PLANTING WINTER PARK PLANTING




EMBASSY PARK
NINE ELMS LANE
ESTATE ROAD
POND
POOL + CASCADES
PROMENADE
CONSULAR ENTRY LOBBY
MAIN LOBBY
MAIN ENTRY PLAZA
MAIN ENTRY COURT
BOWLING GREEN
BASKETBALL + EVENT COURT
SERVICE RAMP
MEADOW TERRACE
INTERIOR SERVICE COURT
MEADOW
US FLAG
WOODLAND
CONSULAR RAMP GARDEN
EXTERIOR SERVICE COURT
GREEN PATH
GREEN PATH
GREEN PATH
PONTON ROAD
CONSULAR PLAZA
PUBLIC PLAZA
N
0
5
10
20
30
50m

US DEPARTMENT OF STATE US EMBASSY, LONDON
DESIGN ADVOCACY GROUP



US DEPARTMENT OF STATE US EMBASSY, LONDON
DESIGN ADVOCACY GROUP

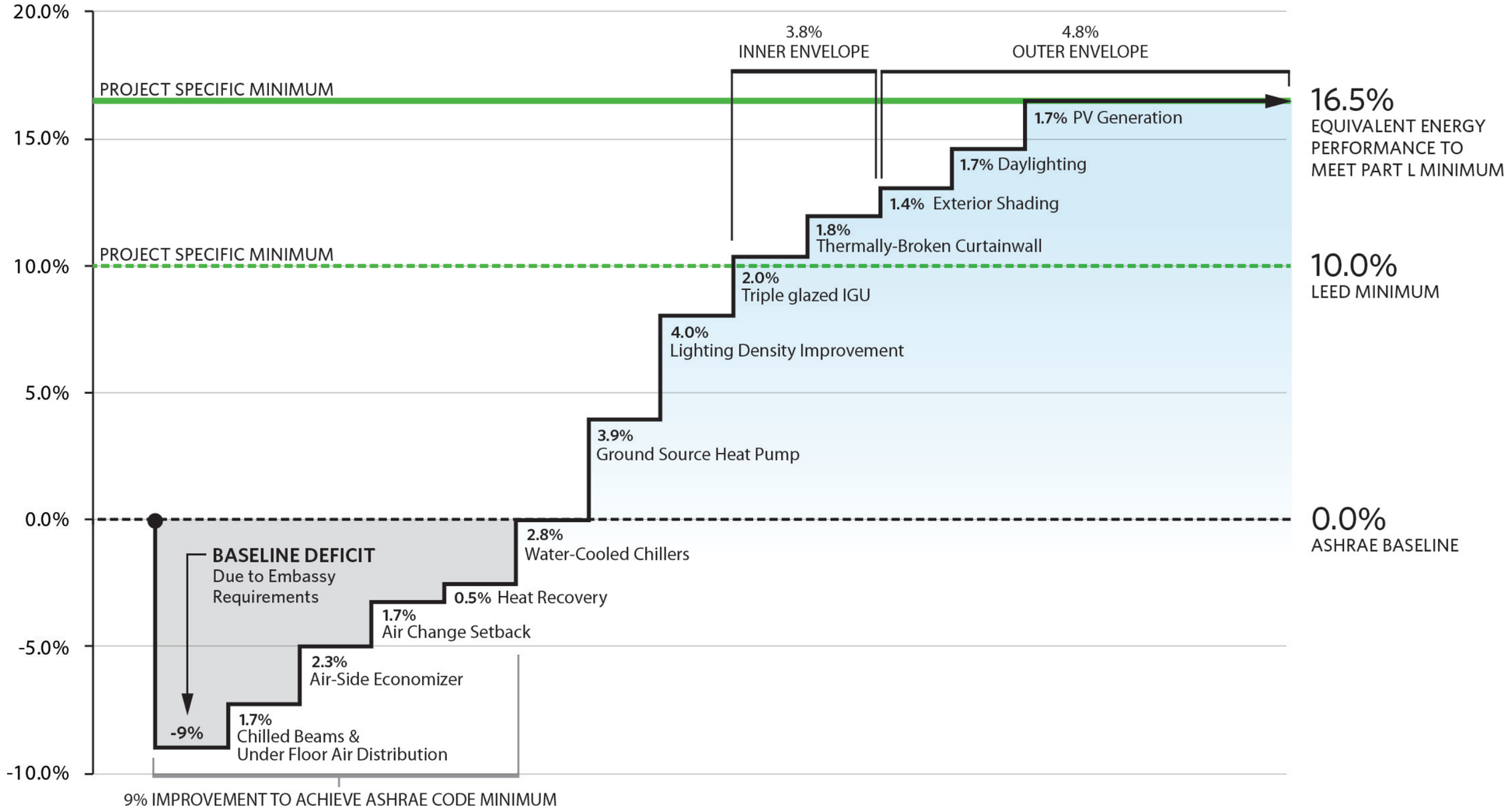
US DEPARTMENT OF STATE US EMBASSY, LONDON

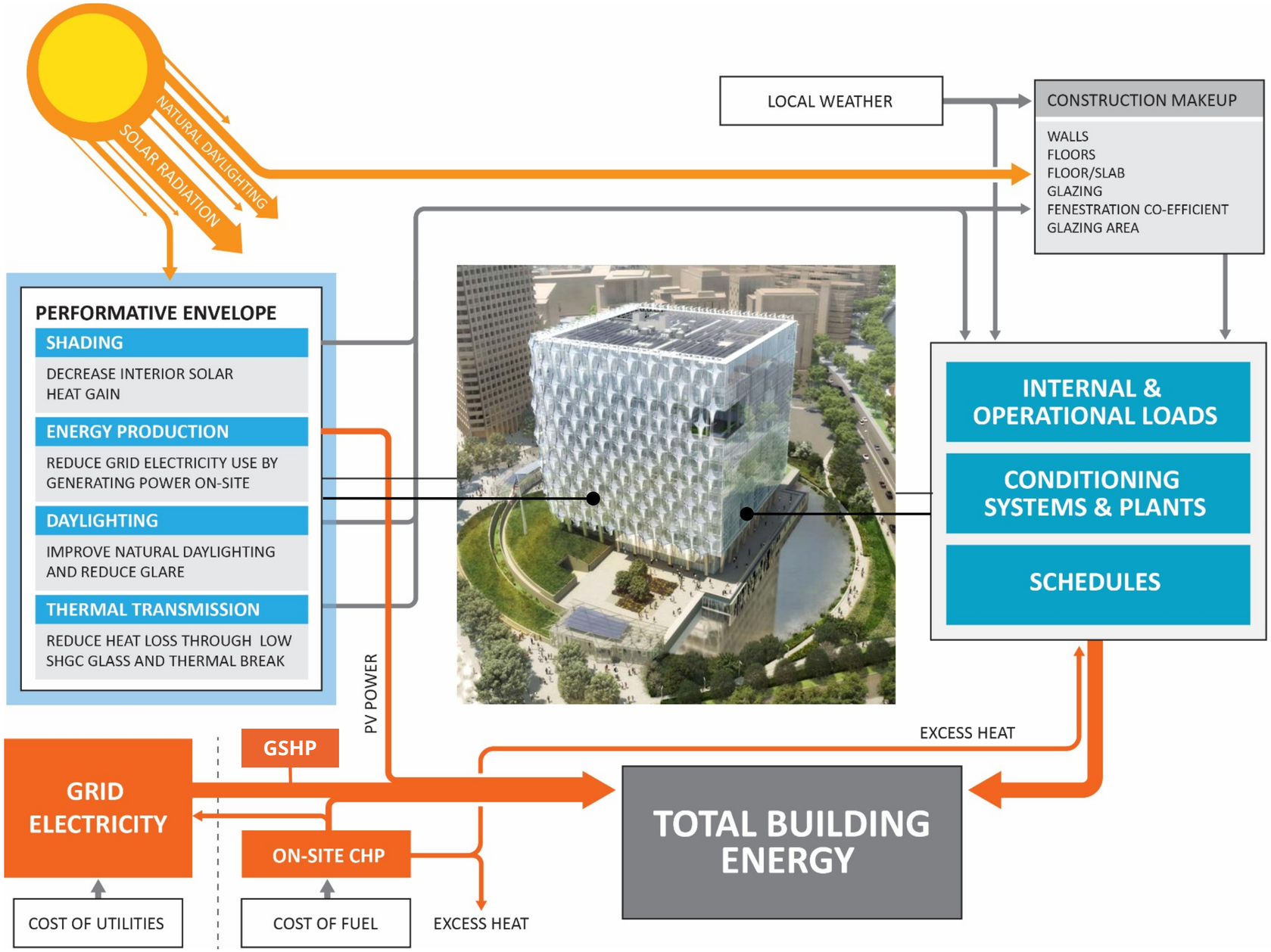
DESIGN ADVOCACY GROUP

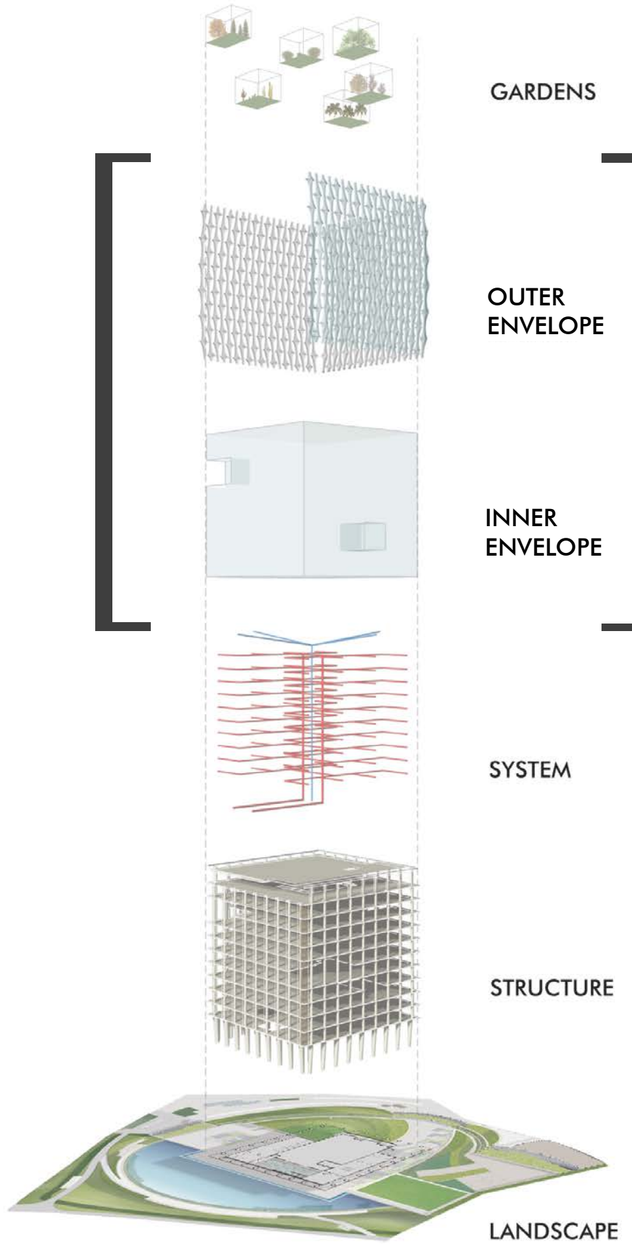
US DEPARTMENT OF STATE US EMBASSY, LONDON
DESIGN ADVOCACY GROUP

US DEPARTMENT OF STATE US EMBASSY, LONDON
DESIGN ADVOCACY GROUP

CUMULATIVE ENERGY STRATEGIES IMPROVEMENT NEEDED TO REACH LEED & BREEAM ENERGY TARGETS



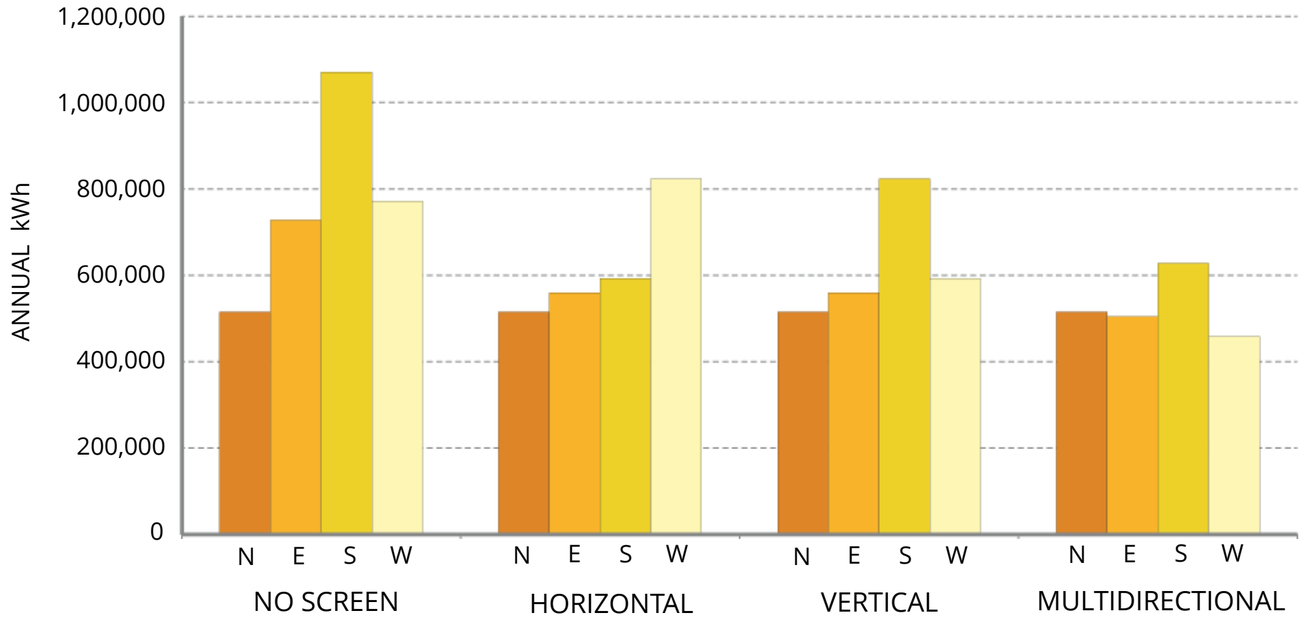

NATURAL DAYLIGHTING
SOLAR RADIATION
LOCAL WEATHER
CONSTRUCTION MAKEUP
WALLS
FLOORS
FLOOR/SLAB
GLAZING
FENESTRATION CO-EFFICIENT
GLAZING AREA
PERFORMATIVE ENVELOPE
SHADING
DECREASE INTERIOR SOLAR HEAT GAIN
ENERGY PRODUCTION
REDUCE GRID ELECTRICITY USE BY GENERATING POWER ON-SITE
DAYLIGHTING
IMPROVE NATURAL DAYLIGHTING AND REDUCE GLARE
THERMAL TRANSMISSION
REDUCE HEAT LOSS THROUGH LOW SHGC GLASS AND THERMAL BREAK
INTERNAL & OPERATIONAL LOADS
CONDITIONING SYSTEMS & PLANTS
SCHEDULES
PV POWER
EXCESS HEAT
GSHP
GRID ELECTRICITY
ON-SITE CHP
TOTAL BUILDING ENERGY
COST OF UTILITIES
COST OF FUEL
EXCESS HEAT

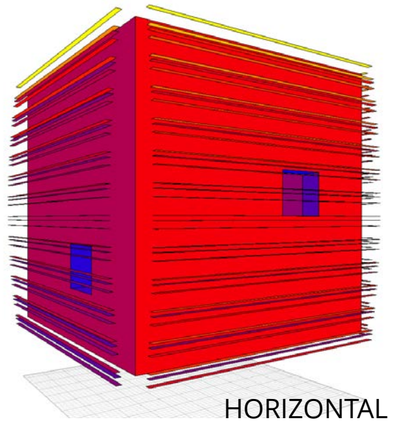


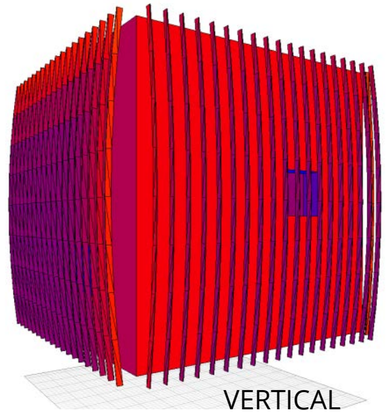
ELEMENTS

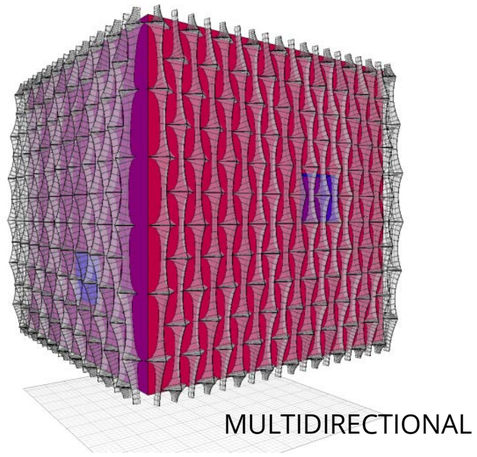
ENVELOPE

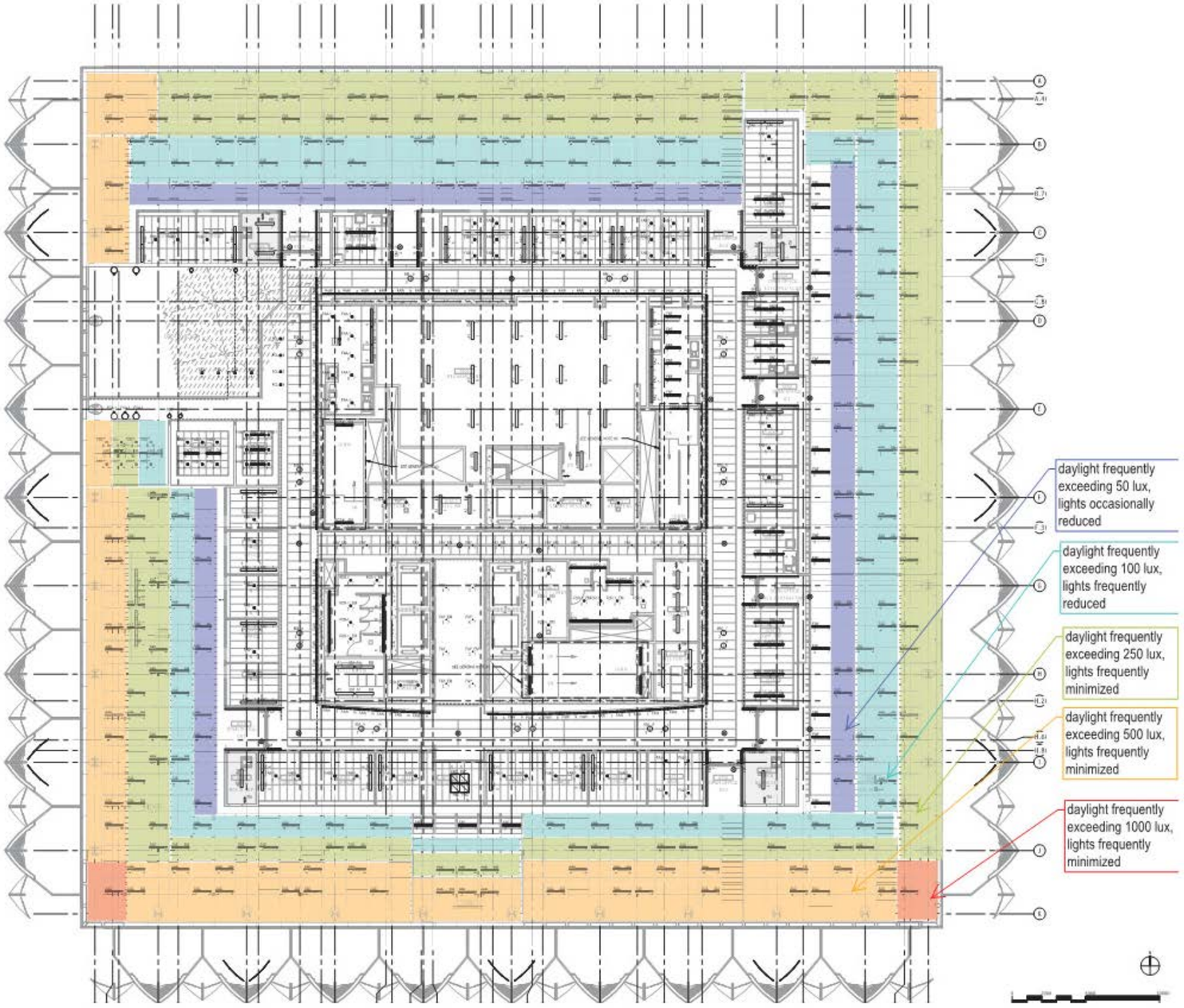
INSOLATION LEVELS ON CURTAINWALL



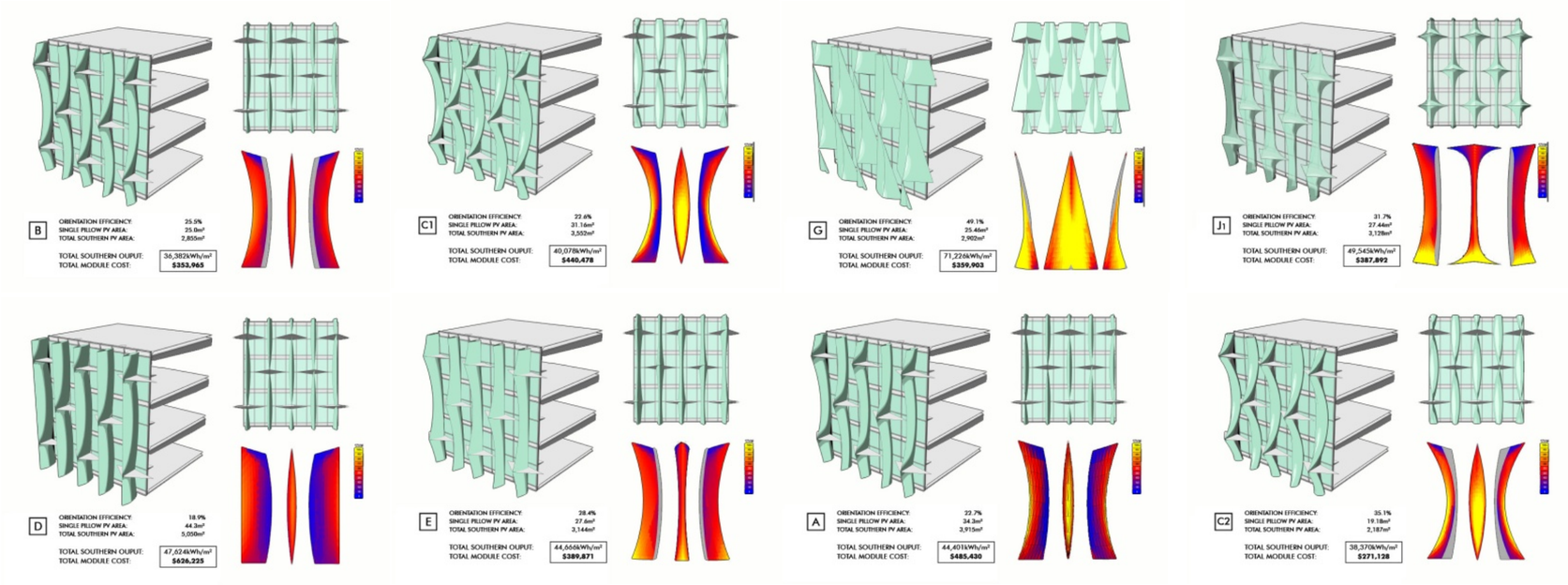


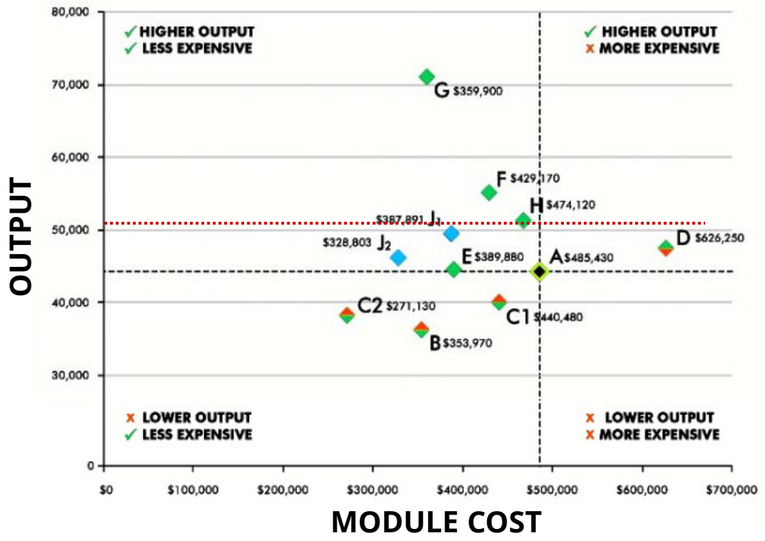


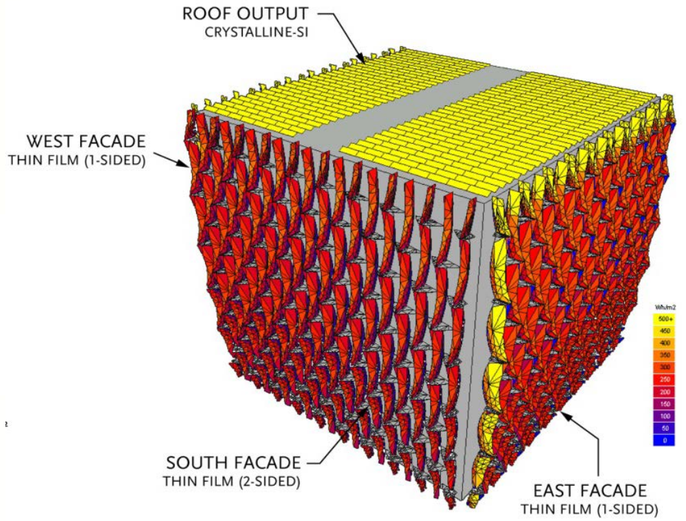



daylight frequently exceeding 50 lux, lights occasionally reduced
daylight frequently exceeding 100 lux, lights frequently reduced
daylight frequently exceeding 250 lux, lights frequently minimized
daylight frequently exceeding 500 lux, lights frequently minimized
daylight frequently exceeding 1000 lux, lights frequently minimized

GEOMETRIC STUDIES W/ PV OUTPUT

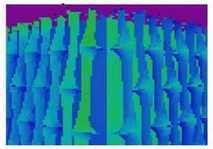






Visible Spectrum Radiation Maps - View 1: Southwest Corner

JANUARY



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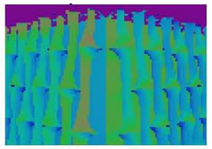
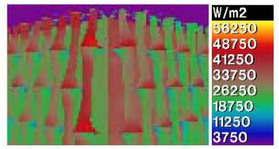
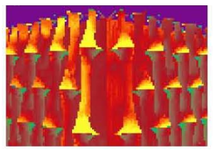


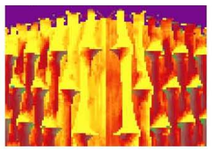
MARCH



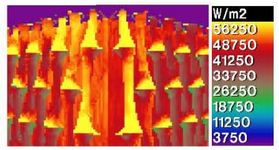
APRIL



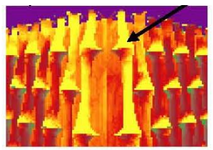
MAY



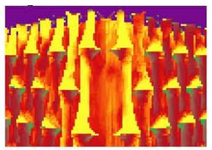
JUNE



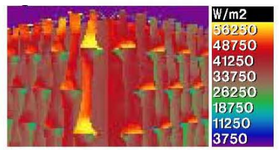
JULY



AUGUST



SEPTEMBER



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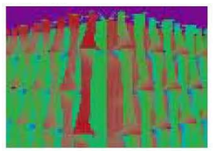
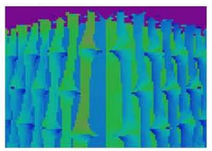
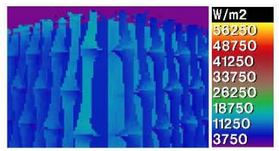


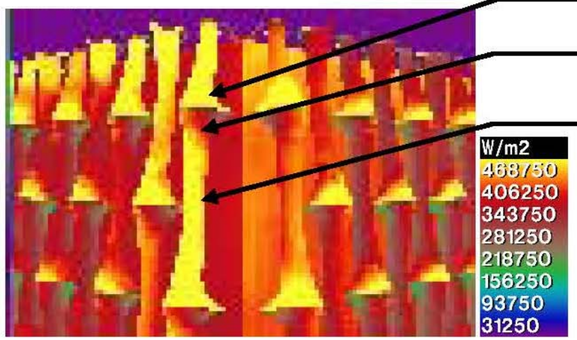
NOVEMBER



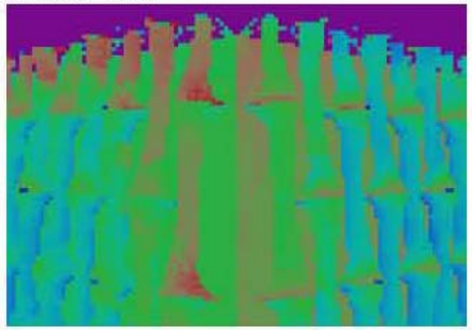
DECEMBER



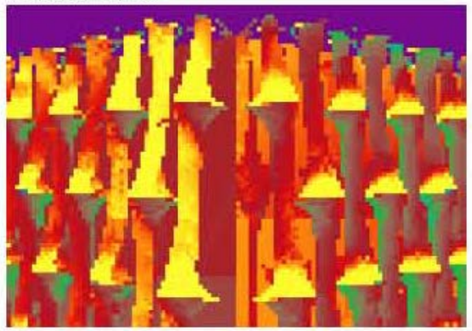
ANNUAL



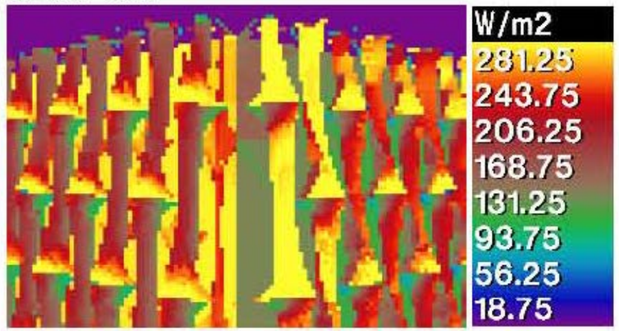
0900 HOURS



1200 HOURS

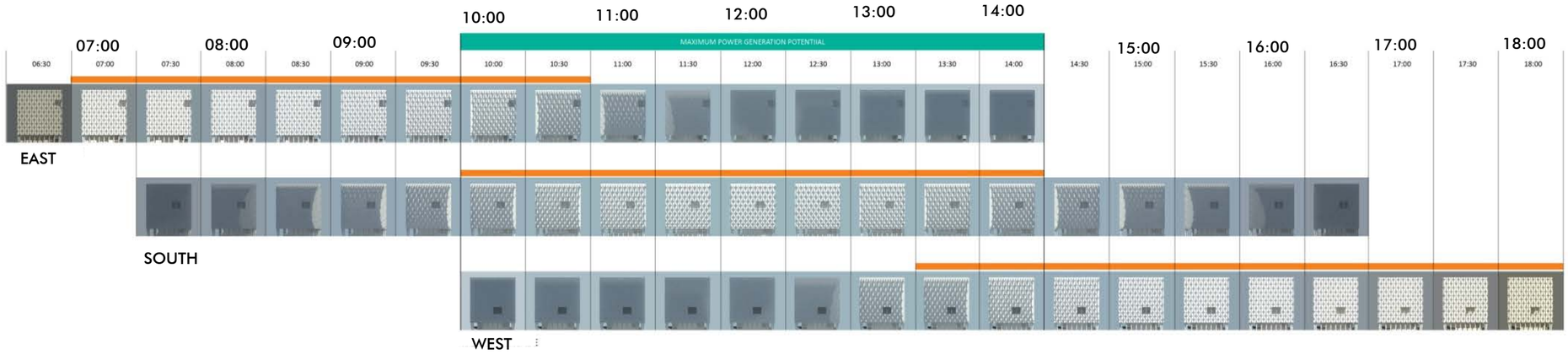


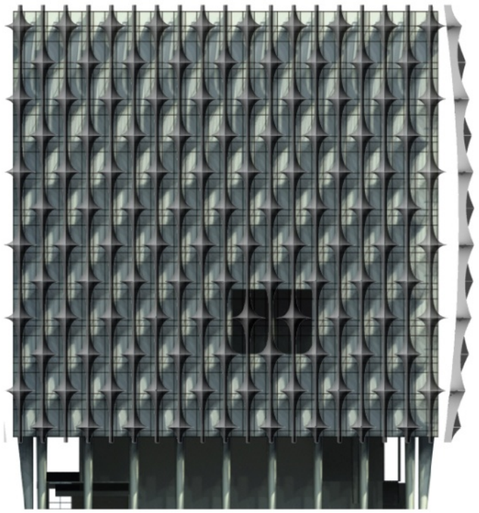
1500 HOURS



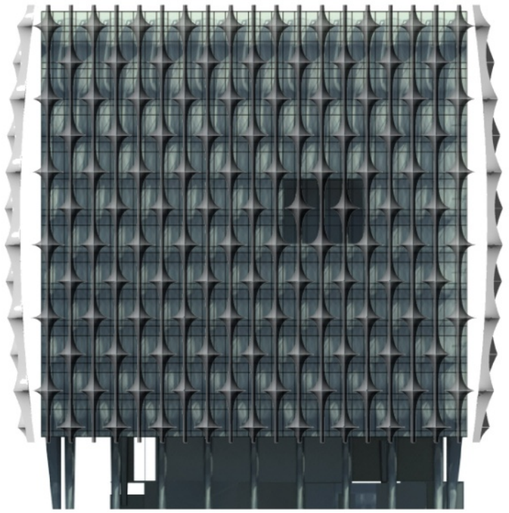
MONTH OF JUNE

SUMMER SHADING VISUALIZED

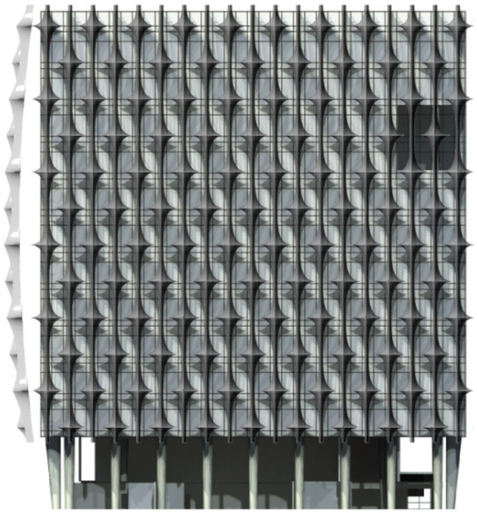




WEST FACADE



SOUTH FACADE

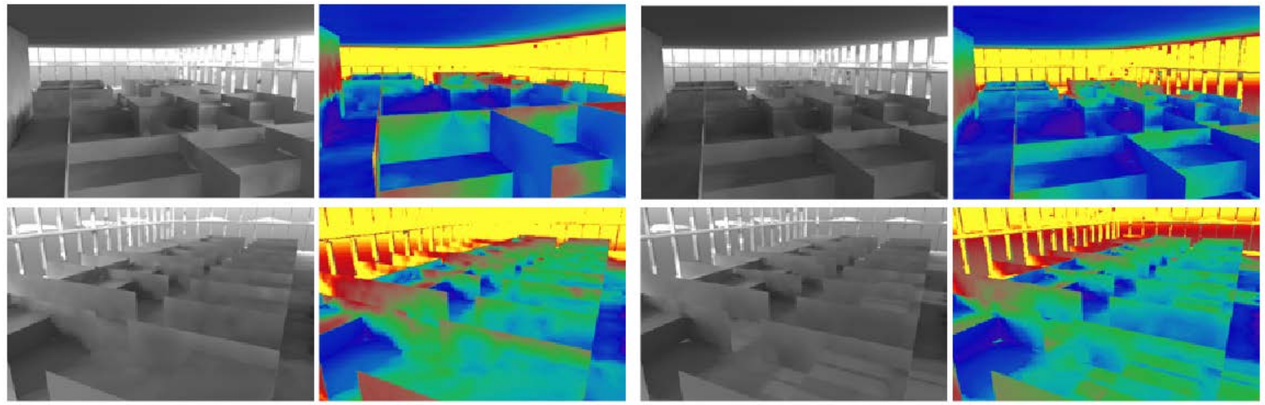


EAST FACADE

DAYLIGHTING STUDIES

JUNE, 1200 HOURS

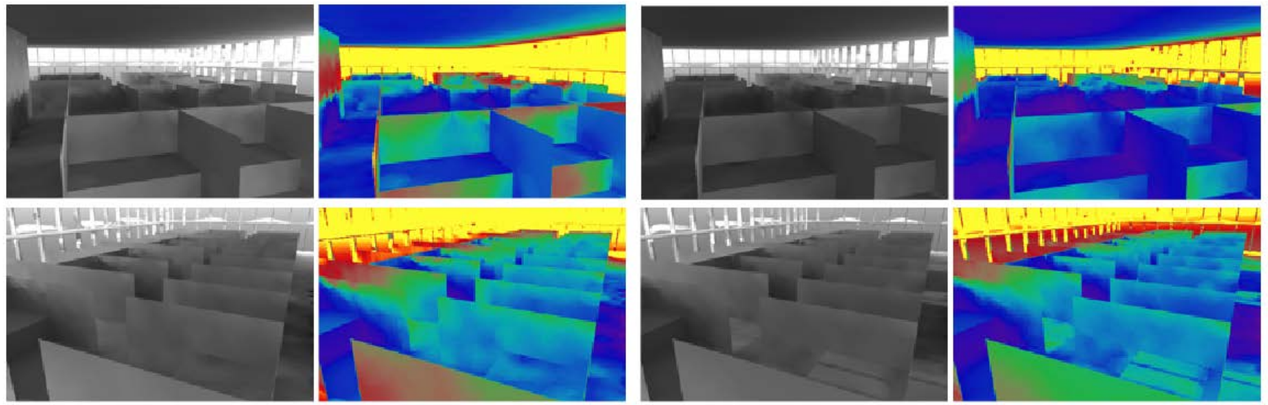
DEC, 1200 HOURS



CUBICLE HEIGHT : 1200mm (4’-0”)

JUNE, 1200 HOURS

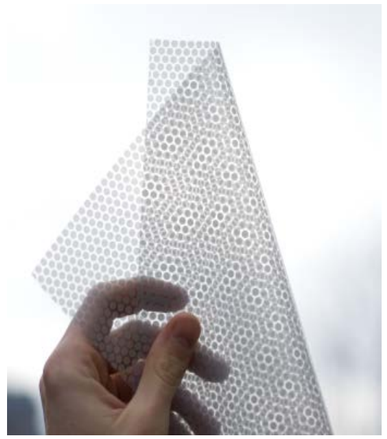
DEC, 1200 HOURS

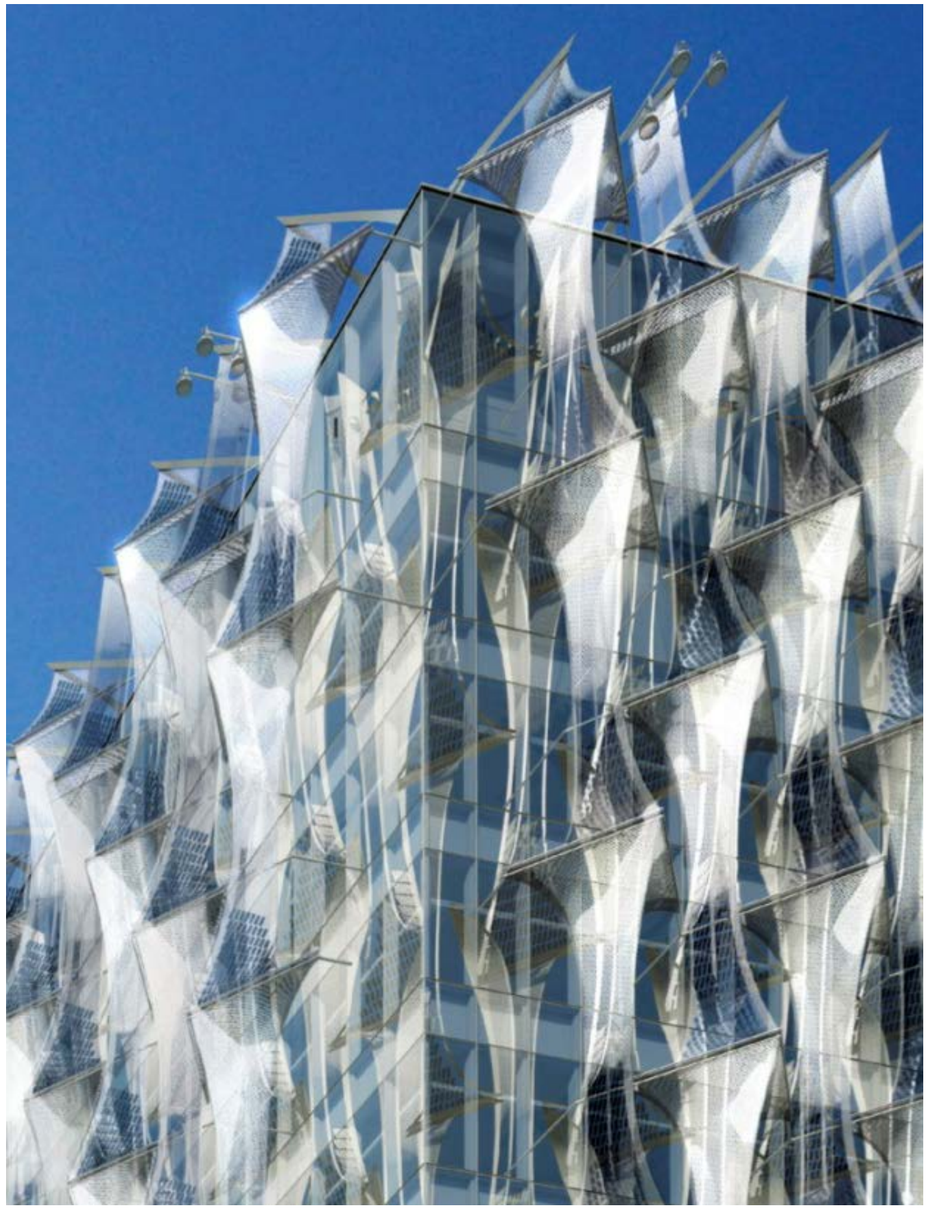


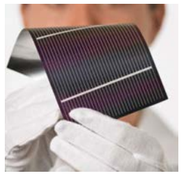
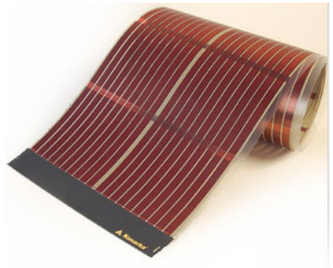
CUBICLE HEIGHT : 1800mm (6’-0”)

20% DECREASE IN ILLUMINANCE AT WORK SURFACE

- **FULL NAME: Ethylene Tetrafluoroethylene (ETFE)**
- **MATERIAL TYPE: Thermoplastic Fluoropolymer**
- **THICKNESS: 200 – 500 microns for building applications**
- **HIGH RESISTANCE TO CHEMICALS**
- **UV STABLE**
- **SELF EXTINGUISHING**
- **LIGHTWEIGHT: 350g/m2**
- **EXCELLENT LIGHT TRANSMISSION: 90 – 97%**
- **SELF CLEANING**
- **DUCTILE**
- **RECYCLABLE**
- **EMBODIED ENERGY: 10 x less energy per m2 than glass**
- **USEFUL LIFE: 25 years and counting**



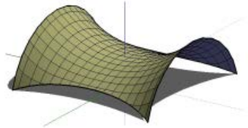


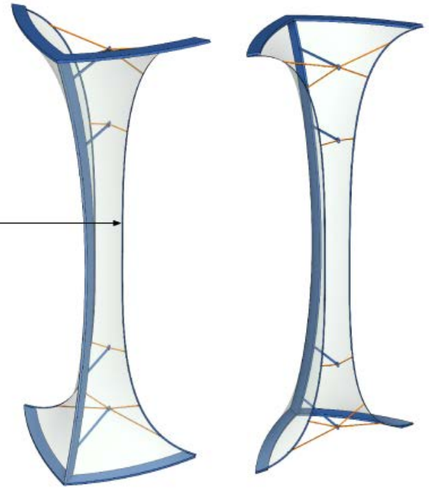
	FLEXIBLE CIGS Copper Indium Gallium Selenide	FLEXIBLE OPV Amorphous Silicon Organic (OPV)	FLEXIBLE CRYSTALLINE SILICON Monocrystalline silicon Polycrystalline silicon	RIGID CRYSTALLINE SILICON Monocrystalline silicon Polycrystalline silicon
CELL:				
MODULE				
EFFICIENCY	*8-14% [10%]*	*3-5% [3%]*	*17%*	*21.5%*
FUTURE EFFICIENCY	*8-18%*	*6-8%*	*19%*	*22%*
TRENDING	*Low cost variations* *Roof applications*	*Different aesthetics, colors* *Transparent cells* *Irregular printed shapes*	*Low cost variations* *Reduced weight* *Increased flexibility*	*Becoming flexible* *Weight reductions*

A2 A1 + WITH DOUBLE RADIUS

The primary problem with the current structural design is that the forces put on the back edge cable by the intermediate cables causes the ETFE to pucker, and as such a relaxed back edge curve must be used.

The modified design replaces the tensioned back-edge cable with segmented or continuous rigid metal plates sandwiching the ETFE edge, smoothing out puckering and evenly distributing the point force from the cable.



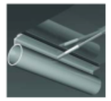


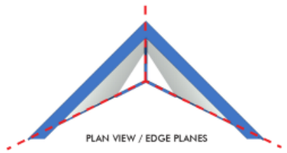
RIGID METAL STRUCTURE TENSIONED CABLES ETFE

C3 RIGID BACK EDGE WITH Y-MEMBER AND TUBE FRONT EDGE

Similar to C1, but with further relaxed curvature to simplify fabrication of the back edge. NOTE: This form represents a significant departure from the design intent. If it is necessary to pursue this strategy, we would continue to refine the design to provide less interior visual obstruction.

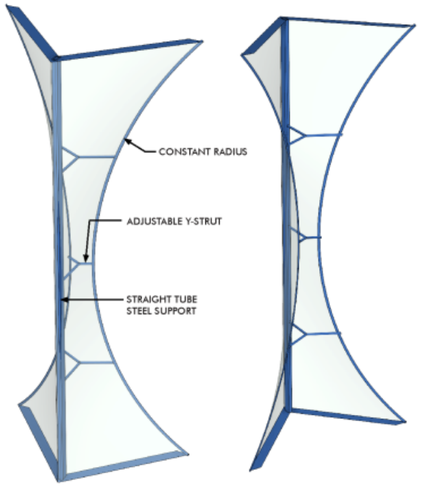
OR





PLAN VIEW / EDGE PLANES

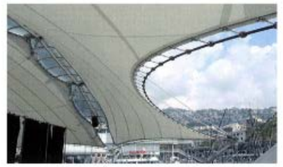
ADJUSTABLE Y-CONNECTION ALLOWS RIGID BACK EDGE TO BE RETENSIONED

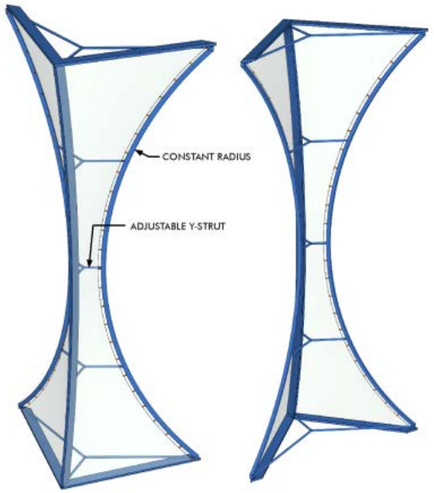


RIGID METAL STRUCTURE TENSIONED CABLES ETFE

D1 CONTINUOUS RADIUS EDGE

An evolution of the C-schemes, this strategy is based on common canopy structuring. The back edge could be either sandwiched plate or round tube steel. NOTE: This form represents a significant departure from the design intent. If it is necessary to pursue this strategy, we would continue to refine the design to provide less interior visual obstruction.

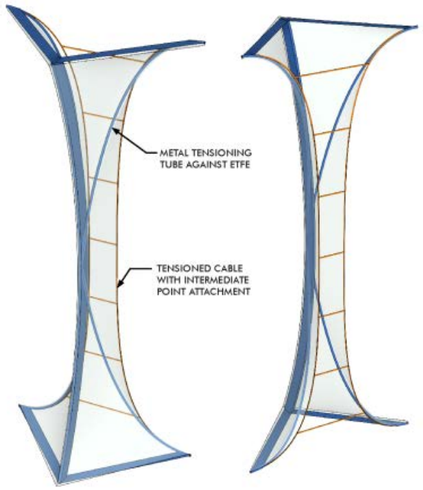




RIGID METAL STRUCTURE TENSIONED CABLES ETFE

E1 TENSION MEMBER

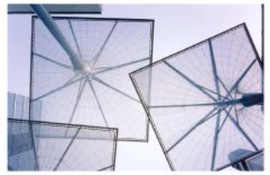
The tight curvature at the back edge is achieved by adding a diagonal rigid bent steel tube to the assembly. The tube provides a means of adding tension to the membrane and distributes the tension on the back cable edge to better achieve our shape.

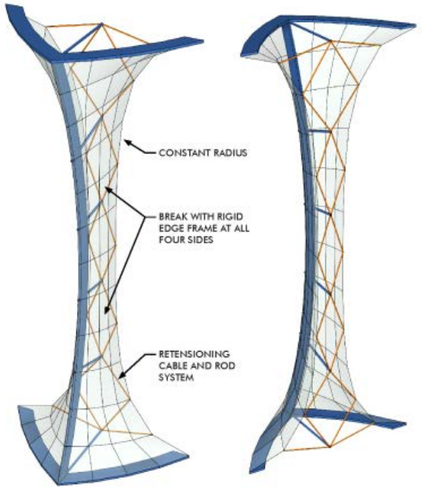


RIGID METAL STRUCTURE TENSIONED CABLES ETFE

G1 MESH CABLE-NET

A constant mesh net segment assists the ETFE membrane in carrying the load and more evenly distributing "pucker points" from tension applied along the back edge cable. Subtle curvature can be added to the top and bottom chevrons if this helps the membrane curve more naturally.



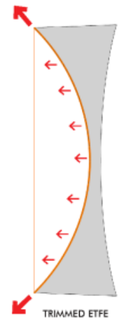


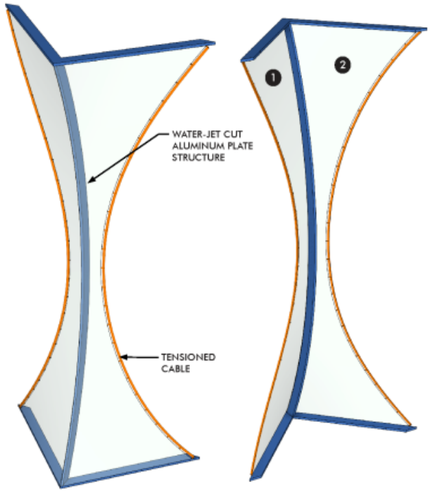
RIGID METAL STRUCTURE TENSIONED CABLES ETFE

I1 ALL-CABLE STRUCTURE

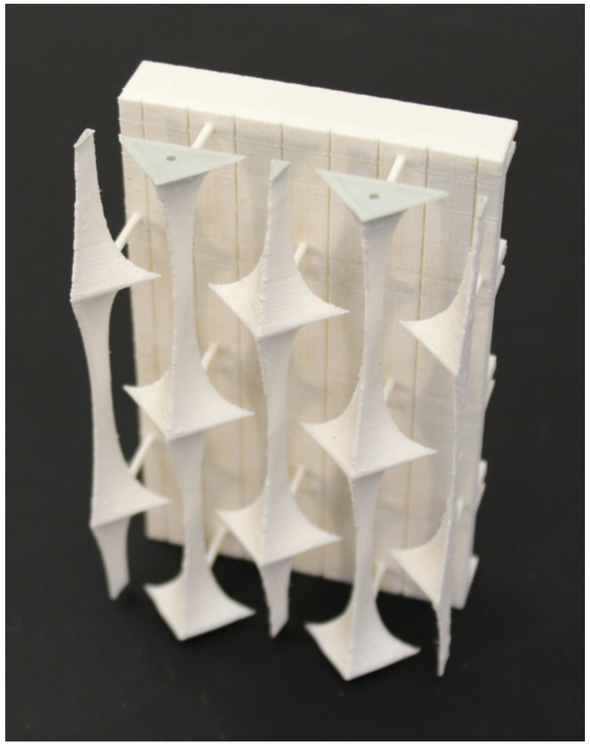
This highly simplified structure uses only a tensioned cable to support the back edge. A surface tensioned between the curved front spine and a straight back edge is trimmed at an even radius, and a cable to affixed at regular intervals (or inserted in a welded edge pocket. This approach should eliminate the need for additional bracing cables.

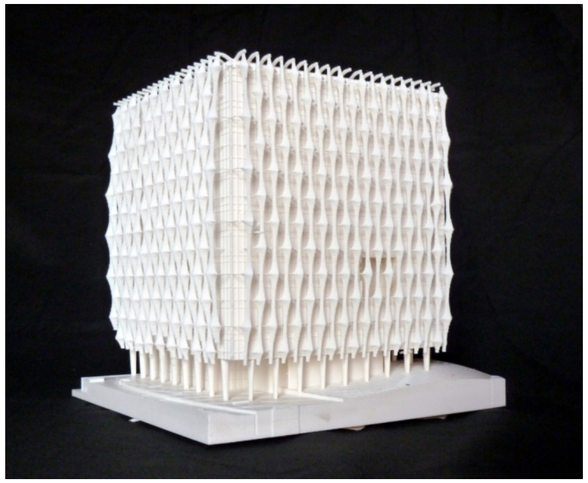
NOTE: This form represents a significant departure from the design intent. If it is necessary to pursue this strategy, we would continue to refine the design to provide less interior visual obstruction.

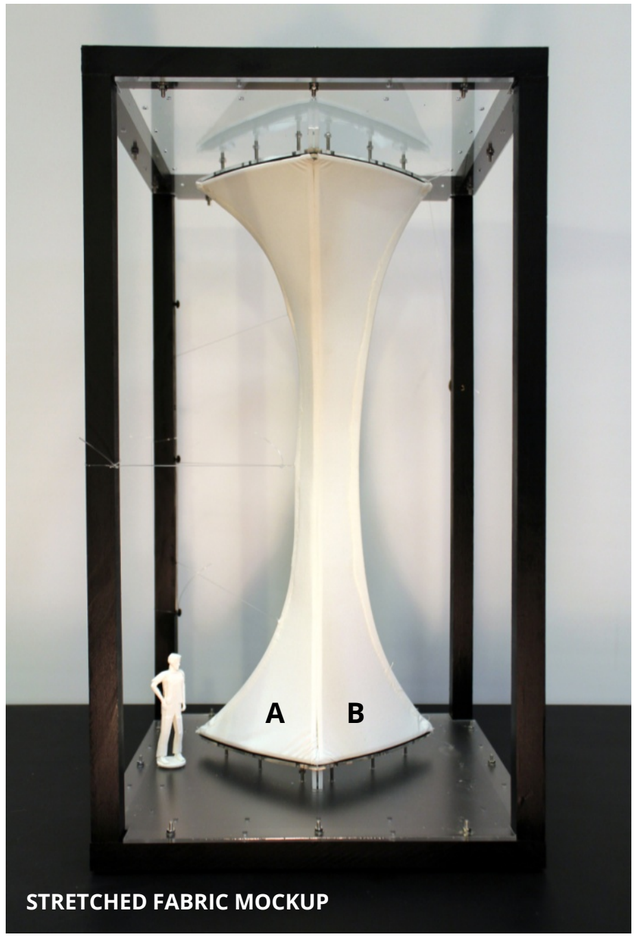




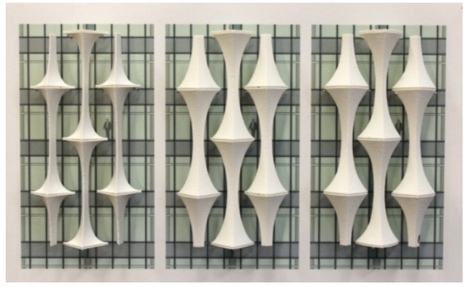
RIGID METAL STRUCTURE TENSIONED CABLES ETFE

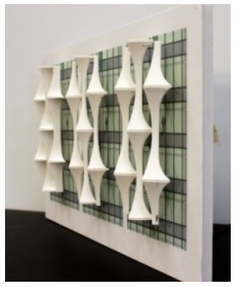




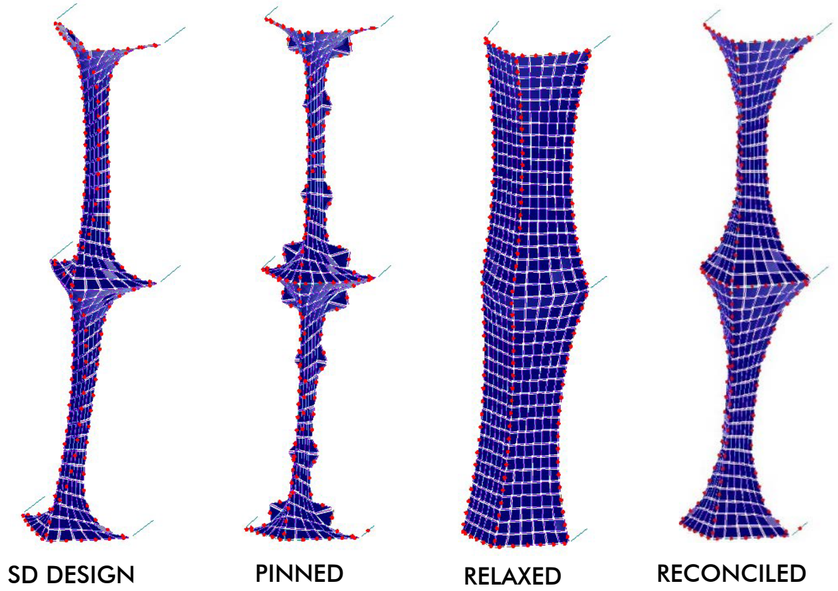


STRETCHED FABRIC MOCKUP





3D PRINTED MODELS


SD DESIGN
PINNED
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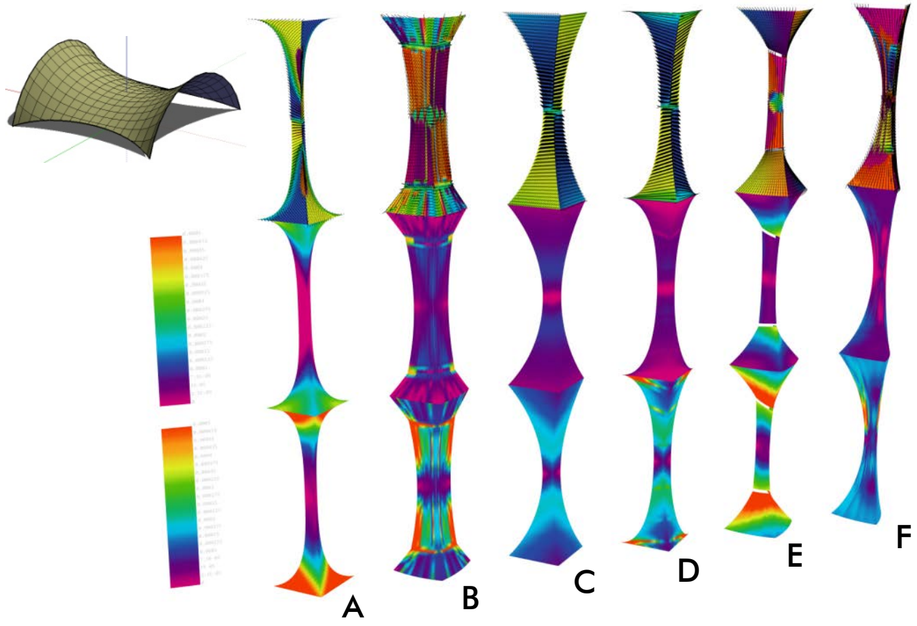
A
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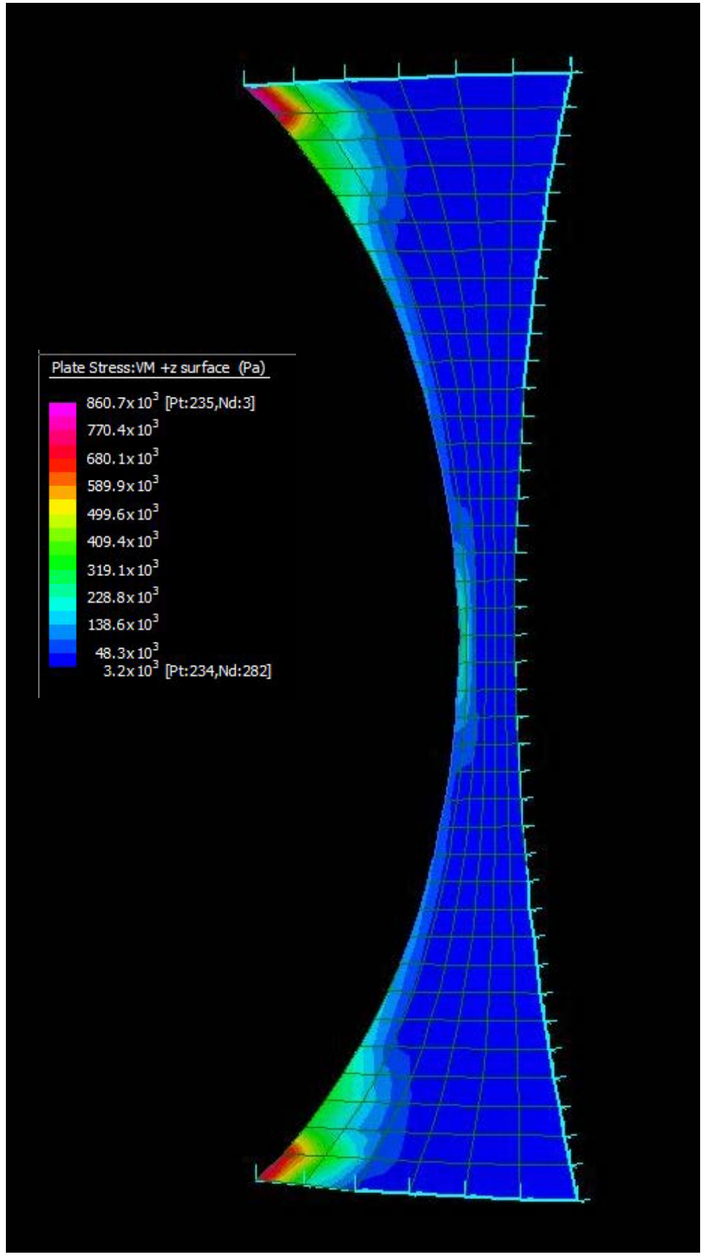
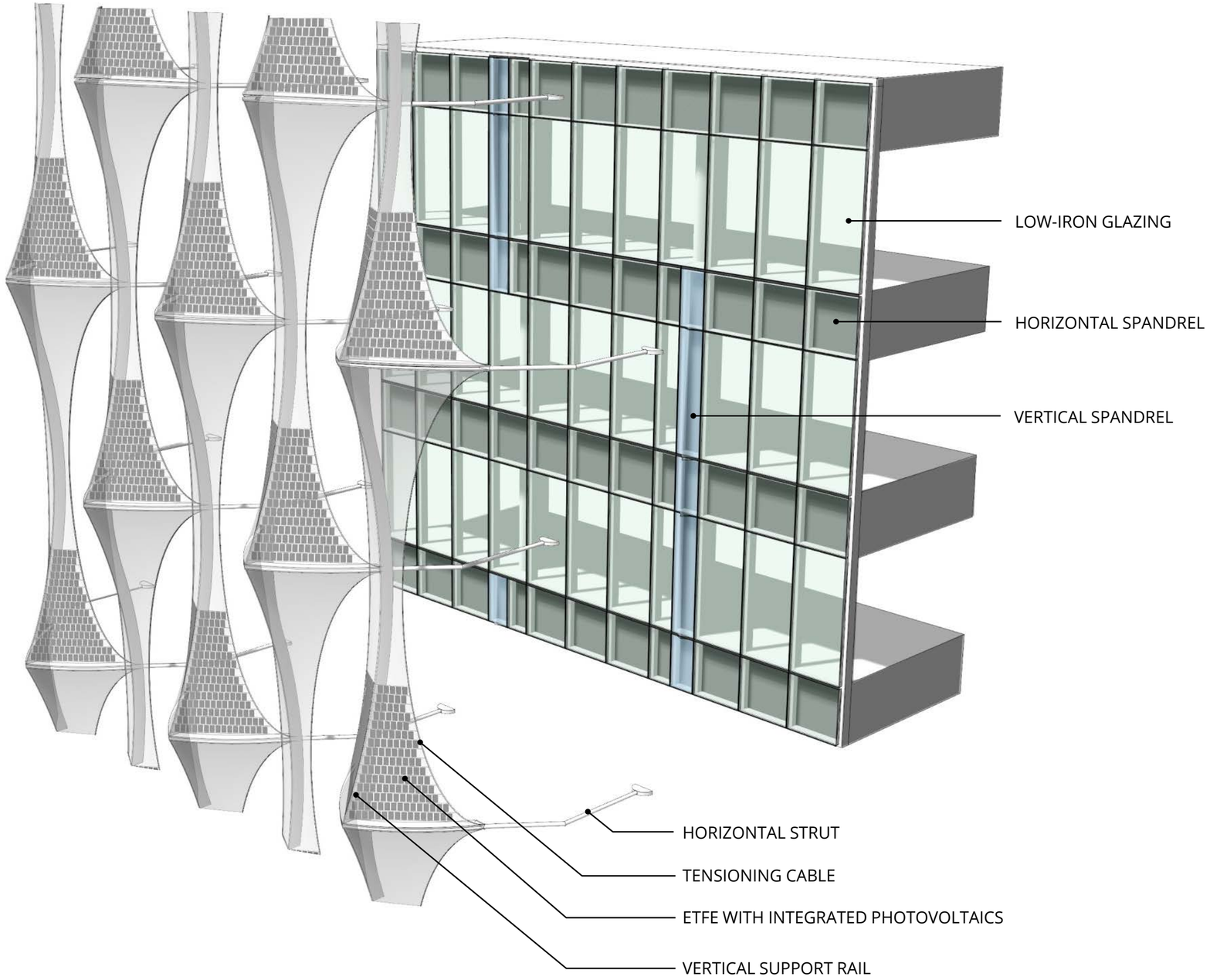


Plate Stress:VM +z surface (Pa)
860.7x10^3 [Pt:235,Nd:3]
770.4x10^3
680.1x10^3
589.9x10^3
499.6x10^3
409.4x10^3
319.1x10^3
228.8x10^3
138.6x10^3
48.3x10^3
3.2x10^3 [Pt:234,Nd:282]


LOW-IRON GLAZING
HORIZONTAL SPANDREL
VERTICAL SPANDREL
HORIZONTAL STRUT
TENSIONING CABLE
ETFE WITH INTEGRATED PHOTOVOLTAICS
VERTICAL SUPPORT RAIL

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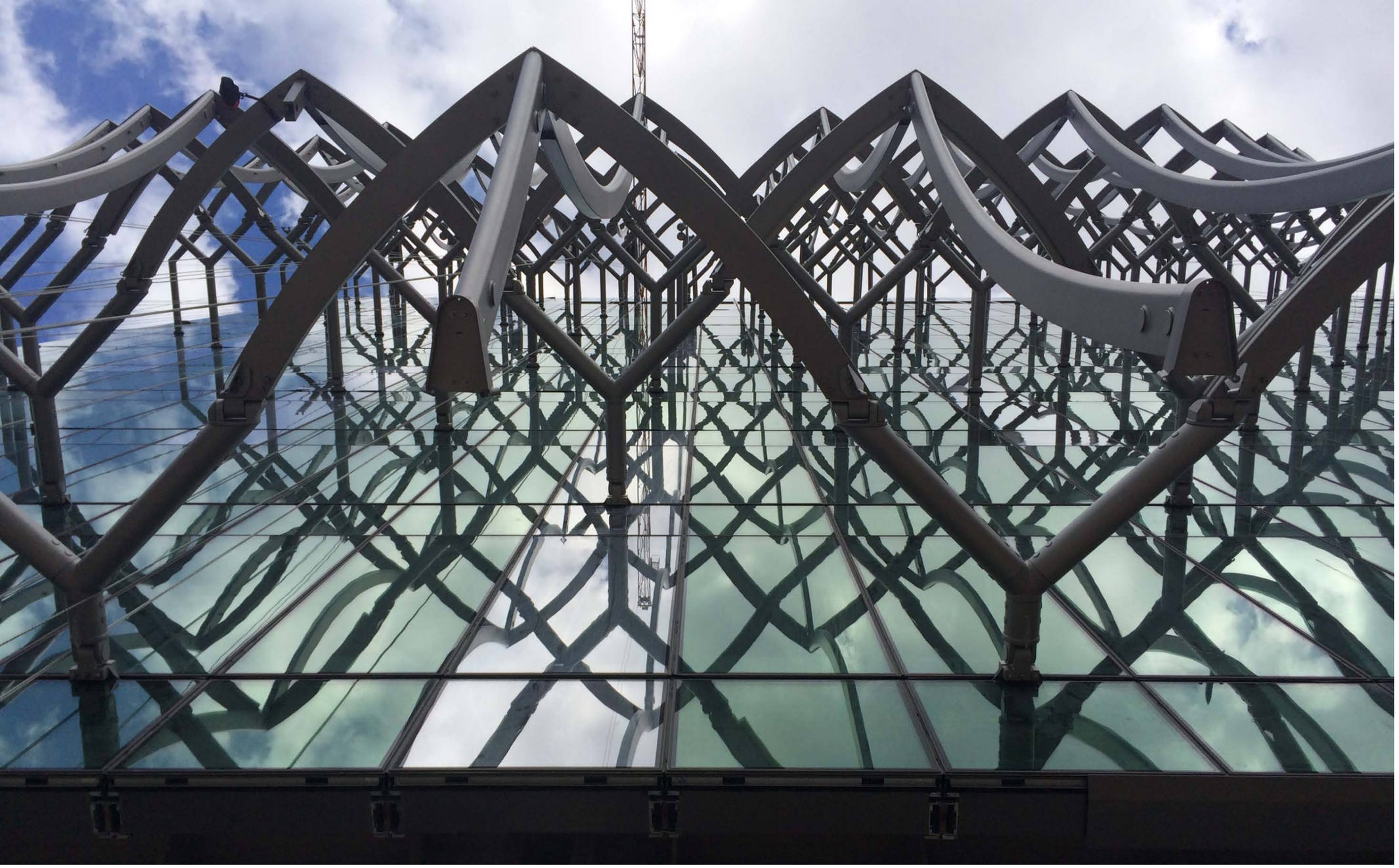

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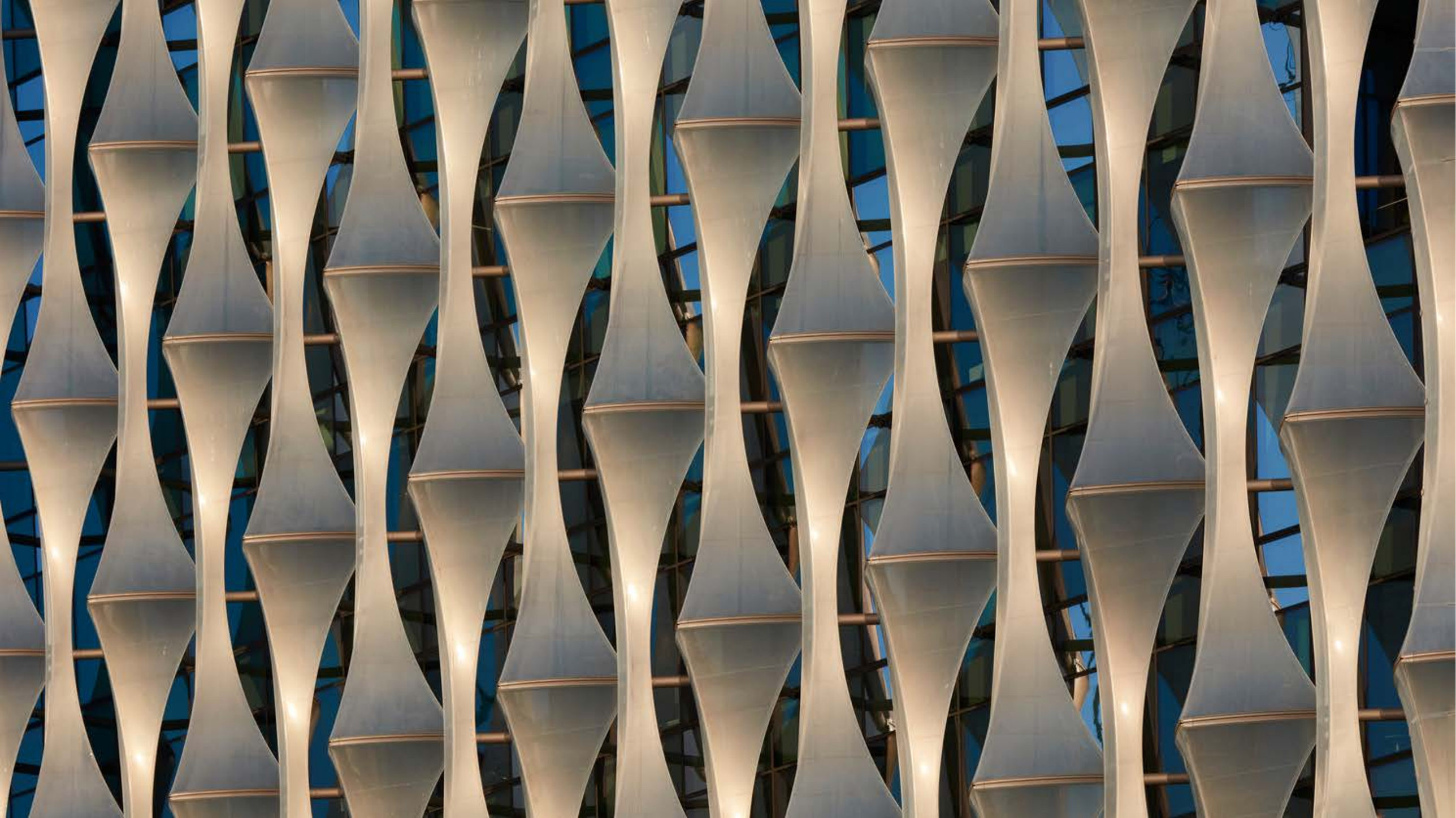

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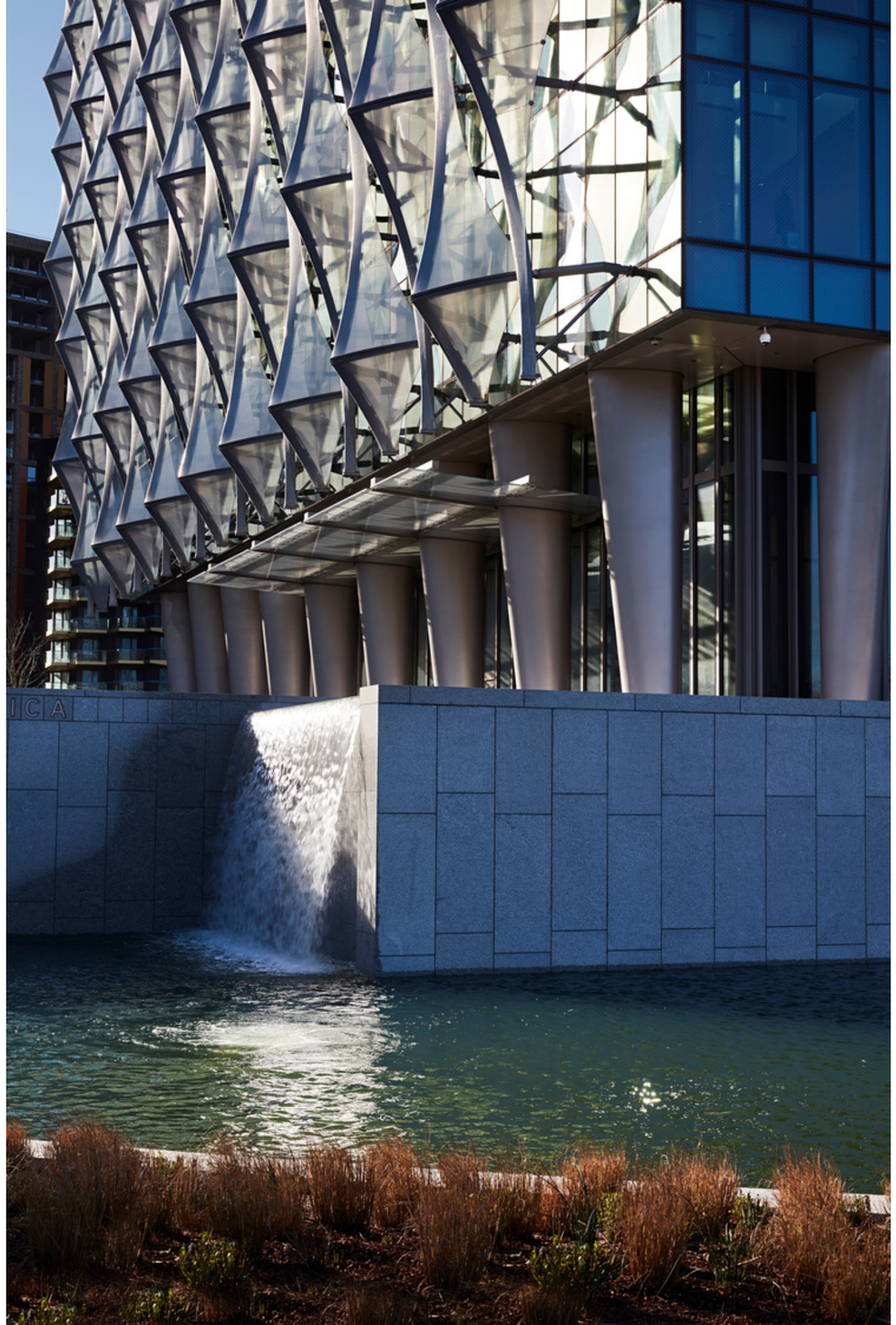

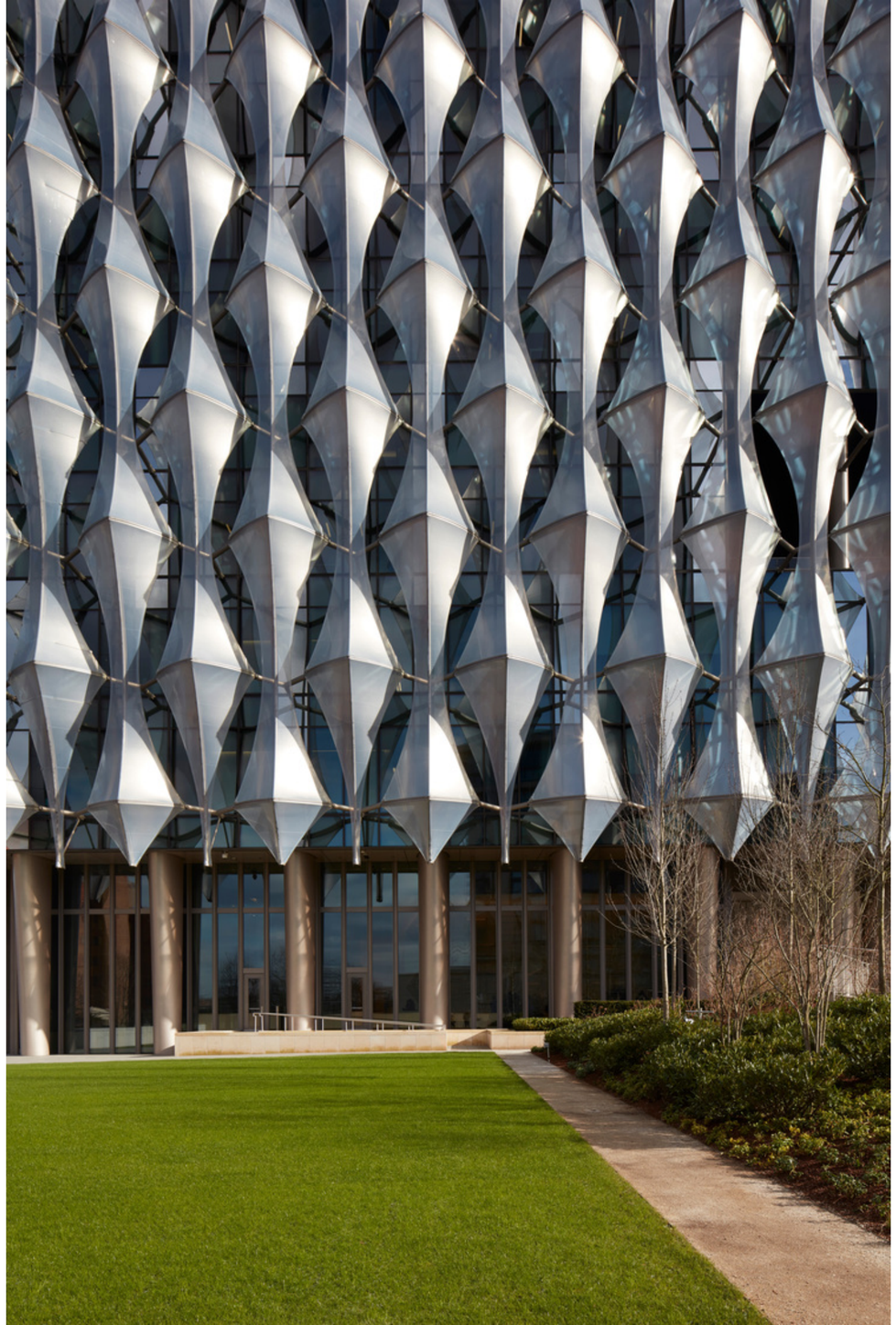

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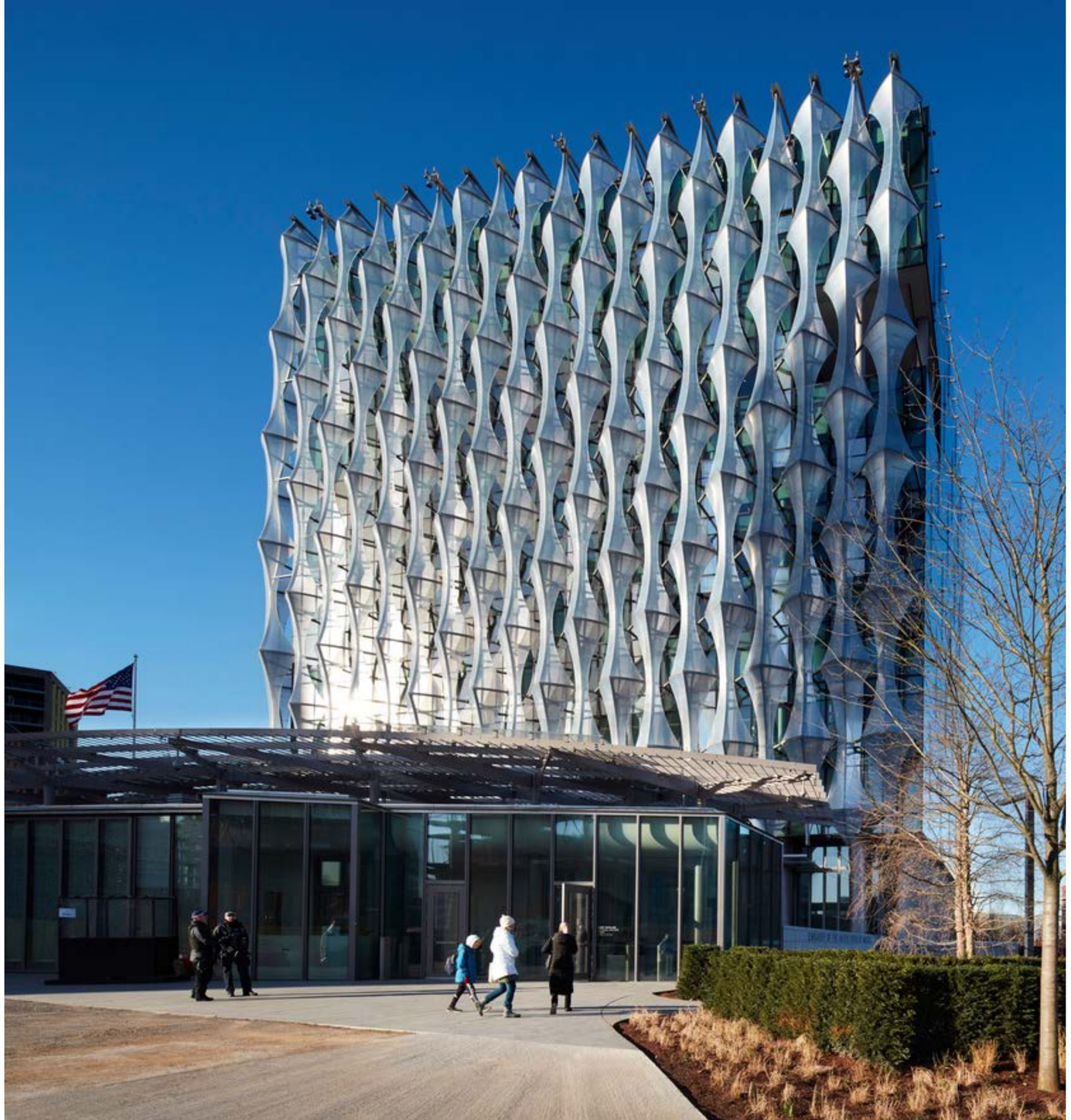


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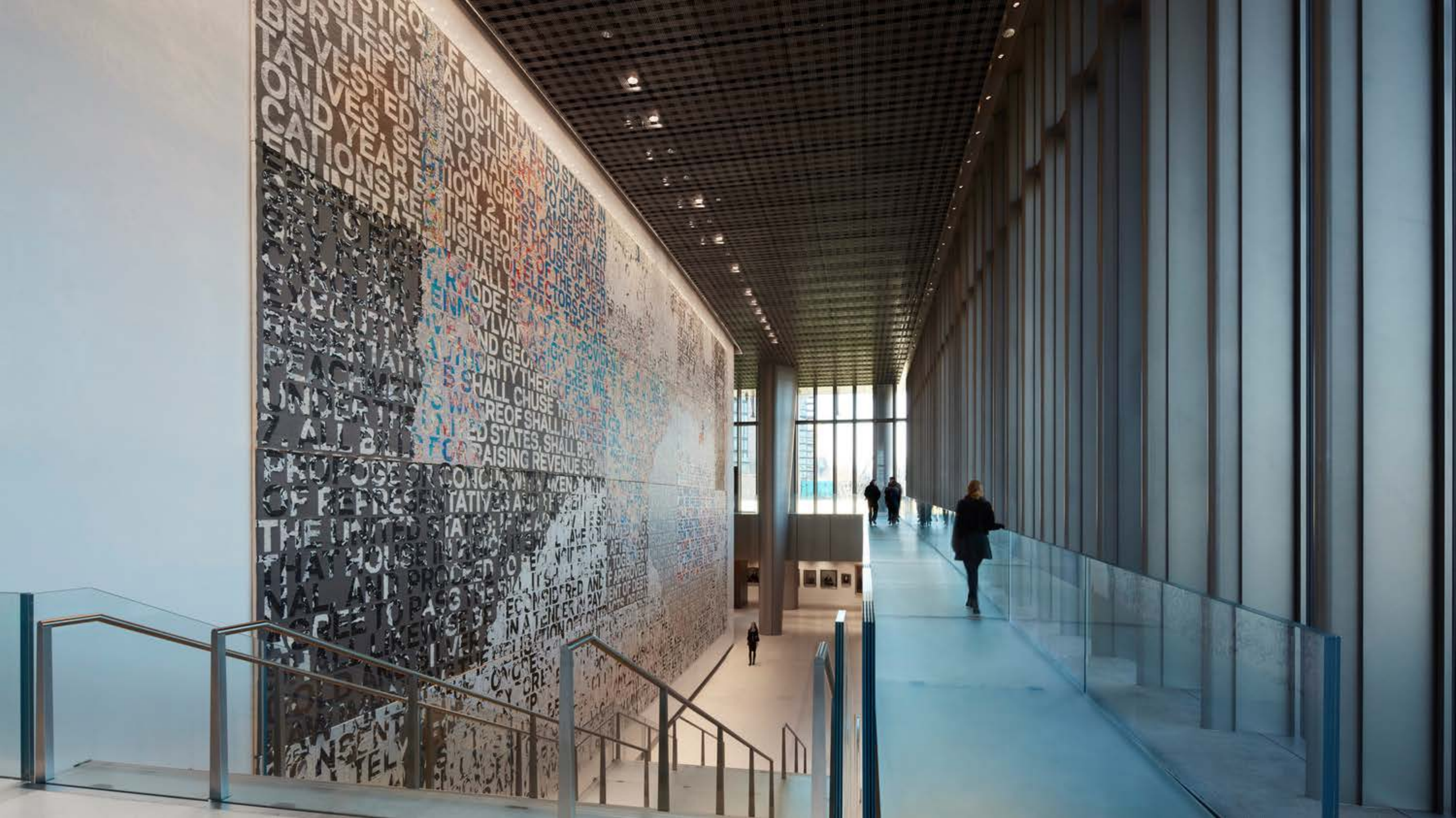


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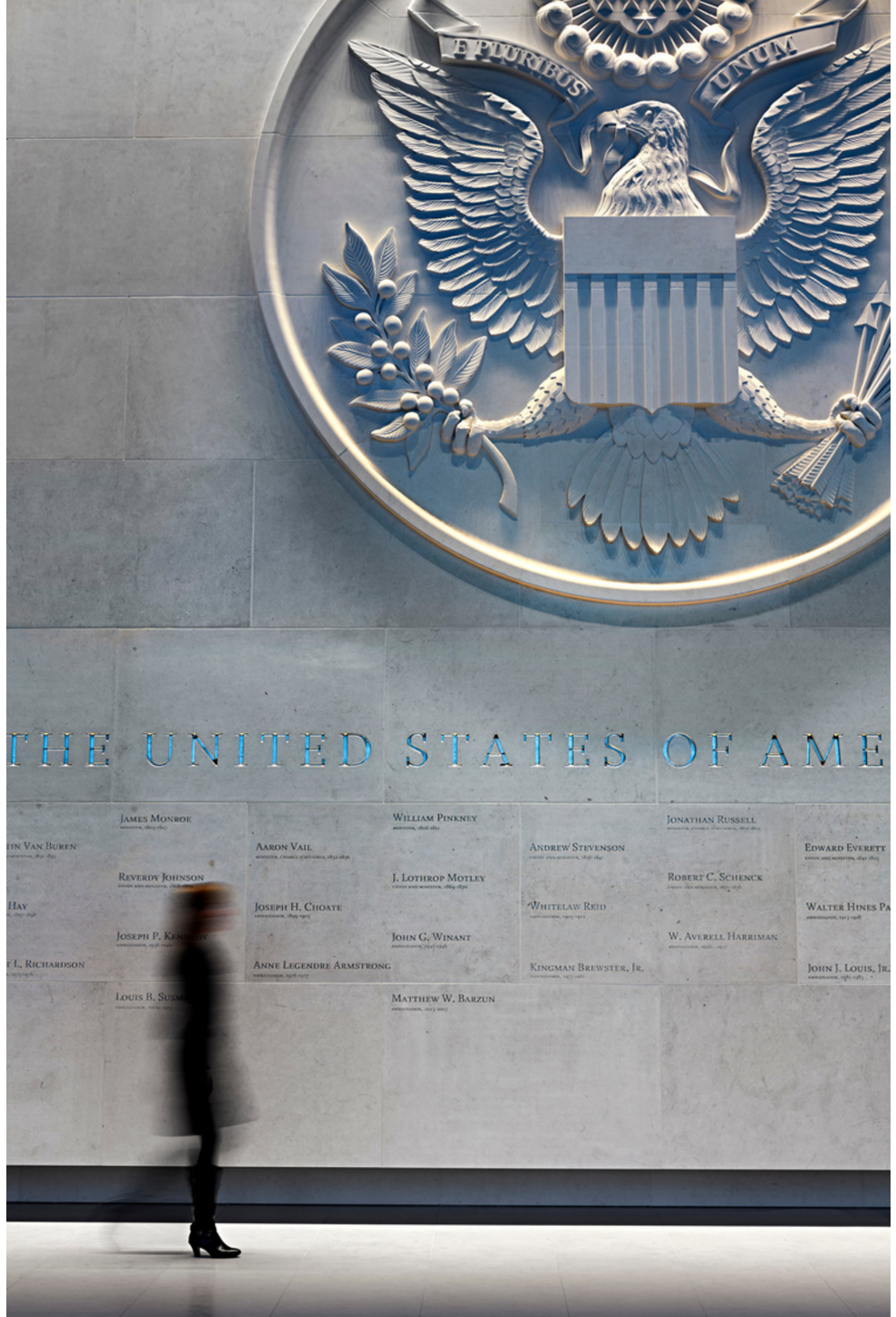

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