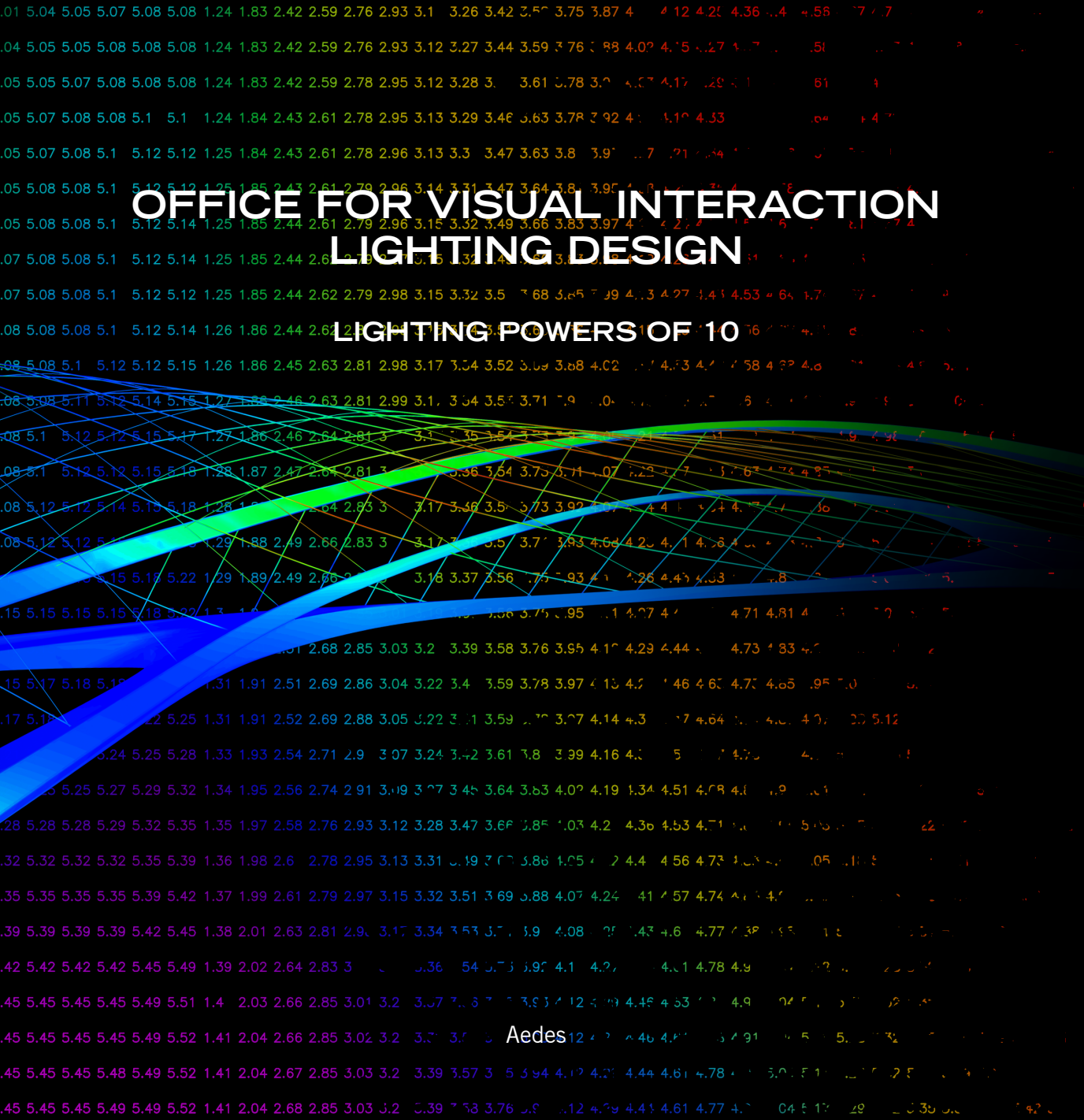

OFFICE FOR VISUAL INTERACTION
LIGHTING DESIGN
LIGHTING POWERS OF 10
Aedes

OFFICE FOR VISUAL INTERACTION
LIGHTING DESIGN

LIGHTING POWERS OF 10

Aedes

LIGHTING POWERS OF 10

Office for Visual Interaction is founded on a powerful vision: using light as a primary architectural material, which through its interaction with surfaces can dramatically transform spaces. Our practice constantly investigates and engages the compelling potential of light at many scales of design.

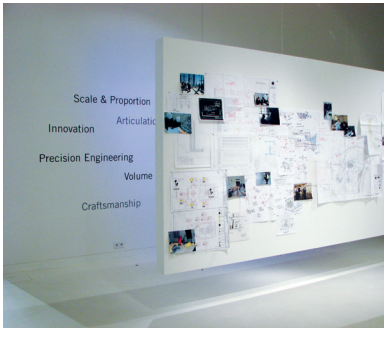
We start each project by looking at the big picture – the spirit of a city, the narrative of a building – and translating it into a corresponding lighting concept. Step by step, we develop that idea down to its smallest component. Our lighting becomes meticulously attuned to the architecture it illuminates, from its largest conceptual aspirations to its tiniest details.

Lighting Powers of 10 offers insight into our approach through a close examination of four projects: an LED streetlight for New York City currently in prototyping, lighting for the Scottish Parliament Building complex and grounds, an energy-efficient scheme for the New York Times headquarters, and illumination of the United States Air Force Memorial.

A mix of photos, working drawings, and full-scale models trace the development of each project through a range of scales – from regional considerations spanning hundreds of kilometers (10^{+5}), to nano-scale wavelength manipulations (10^{-7}). At each scale, we find new opportunities for invention, which we explore and develop through in-depth research and precision engineering. The resulting work integrates lighting seamlessly with architecture.

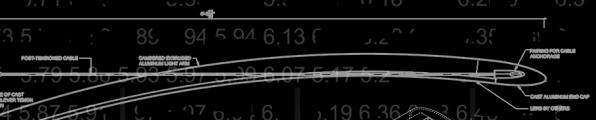
Jean Sundin and Enrique Peiniger

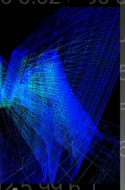

10^{-5}
10^{-3}

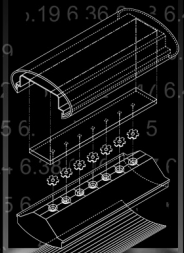

Scale & Proportion
Innovation
Articulatic
Precision Engineering
Volume
Craftsmanship

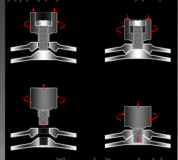

OVI
OFFICE FOR VISUAL INTERACTION
LIGHTING DESIGN

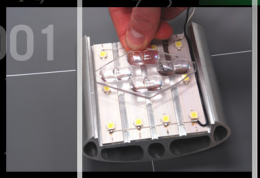

100000
10000
1000
100
10
1
0.
10^{+5}
10^{+4}
10^{+3}
10^{+2}
10^{+1}
10^{0}
10^{-1}
Metropolitan Area
Masterplan
Cityblock
Building
Interiors
Surfaces
Mat
Lighting Masterplan
Light Massing
Calculation
Cultural Context
Lighting Concept
Aiming
Building Study
Sustainability
Light &

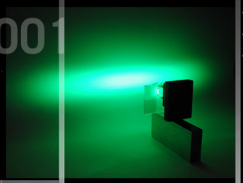


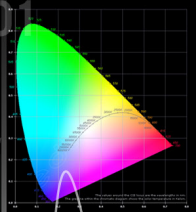


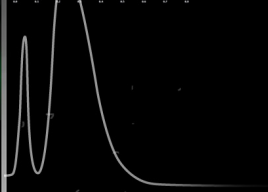












0.01

0.001

0.0001

0.00001

0.000001

0,0000001

10^{-2} 10^{-3} 10^{-4} 10^{-5} 10^{-6} 10^{-7}

erials Details Luminaires Components Light sources Optics Spectral properties

Volume & Transparency

Wavelength

Scale & Proportion

nishes

Integrated Solutions

Technology

Nanocoating

adow

Precision Engineering

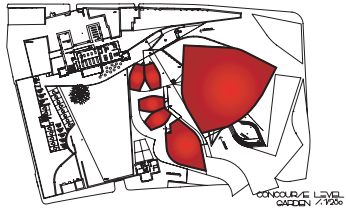
The Scottish Parliament
Edinburgh, Scotland
Architect: Enric Miralles Benedetta Tagliabue (EMBT)
1998 - 2004

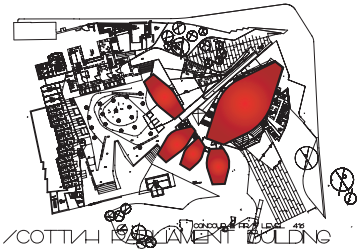
10^{+4} MASTERPLAN

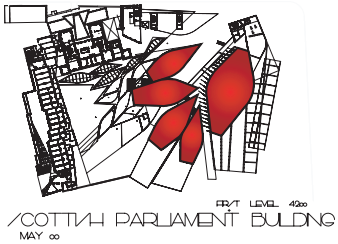
A coherent lighting masterplan unites the exterior appearance of the Scottish Parliament's pavilion-like buildings. Nighttime illumination reinforces the feeling of a parliamentary 'village' by accentuating the light that individual buildings emit from within.

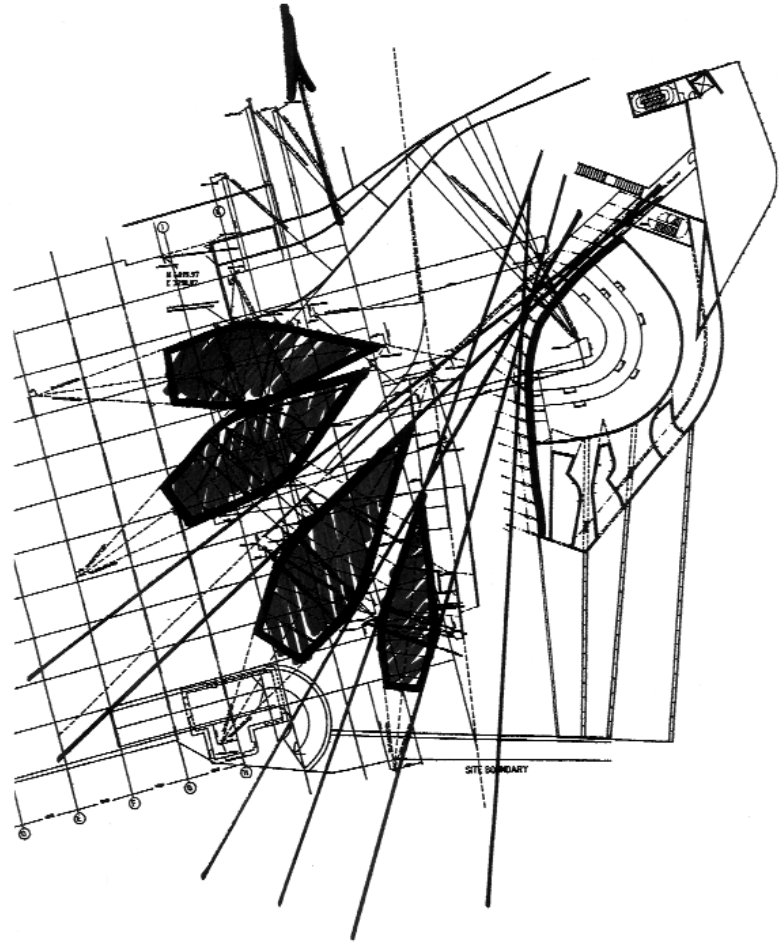
10[+4] MASTERPLAN

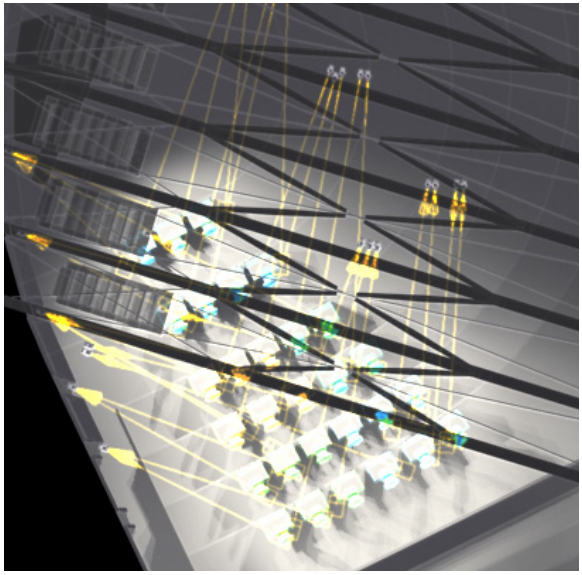
Direct sunlight from the Debating Chamber's large windows potentially interfered with the stringent lighting requirements for televising debates. At the design's master-planning stage, we suggested rotating the debating chamber and positioning the adjacent leaf-shaped towers so that they would act as giant louvers in plan. We worked closely with the architects in precisely situating and shaping the buildings to optimize shading angles. In the finely-tuned final configuration, the buildings shield the chamber from direct sunlight during broadcast hours, without the need for additional shading devices.

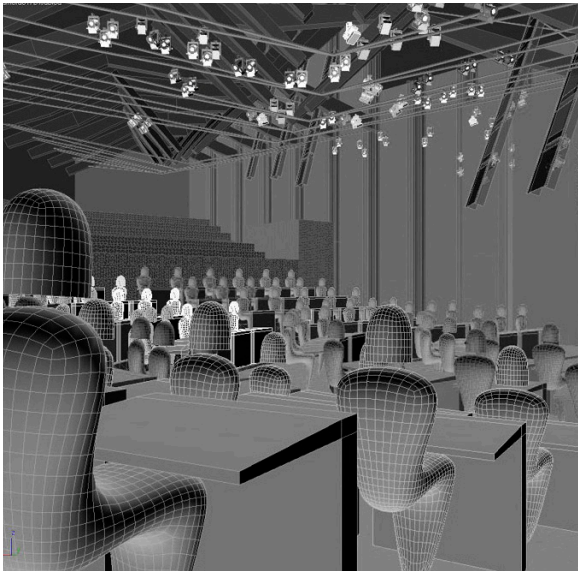






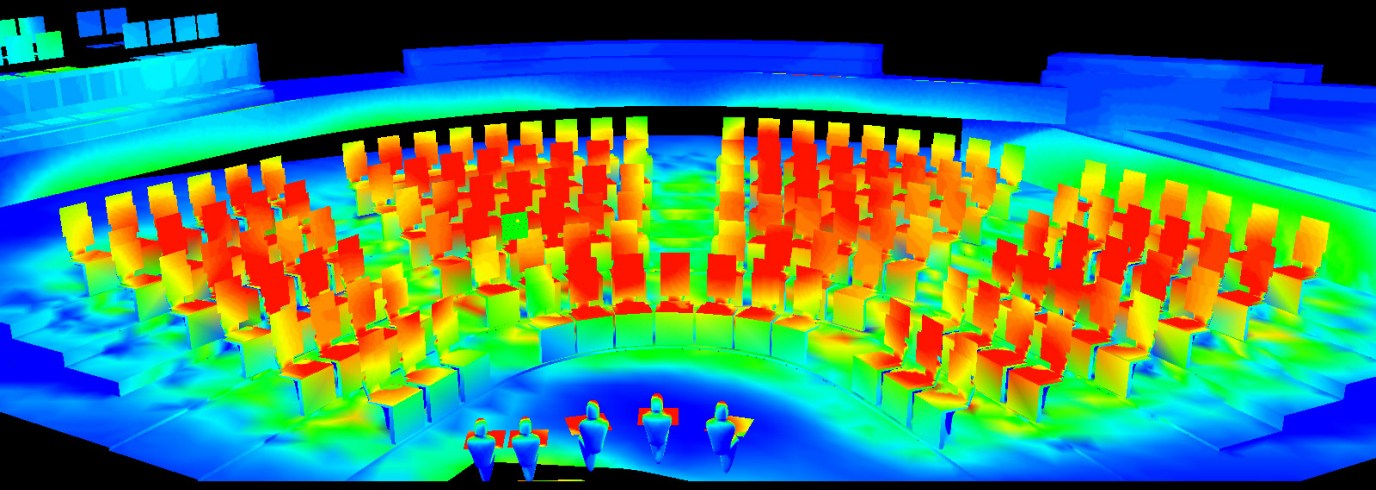






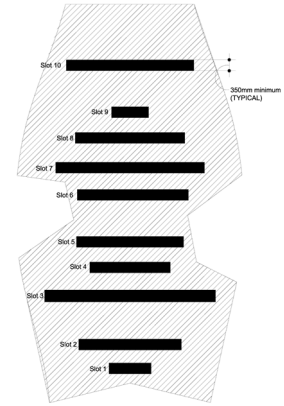
10^{-2} CALCULATIONS / DETAILS

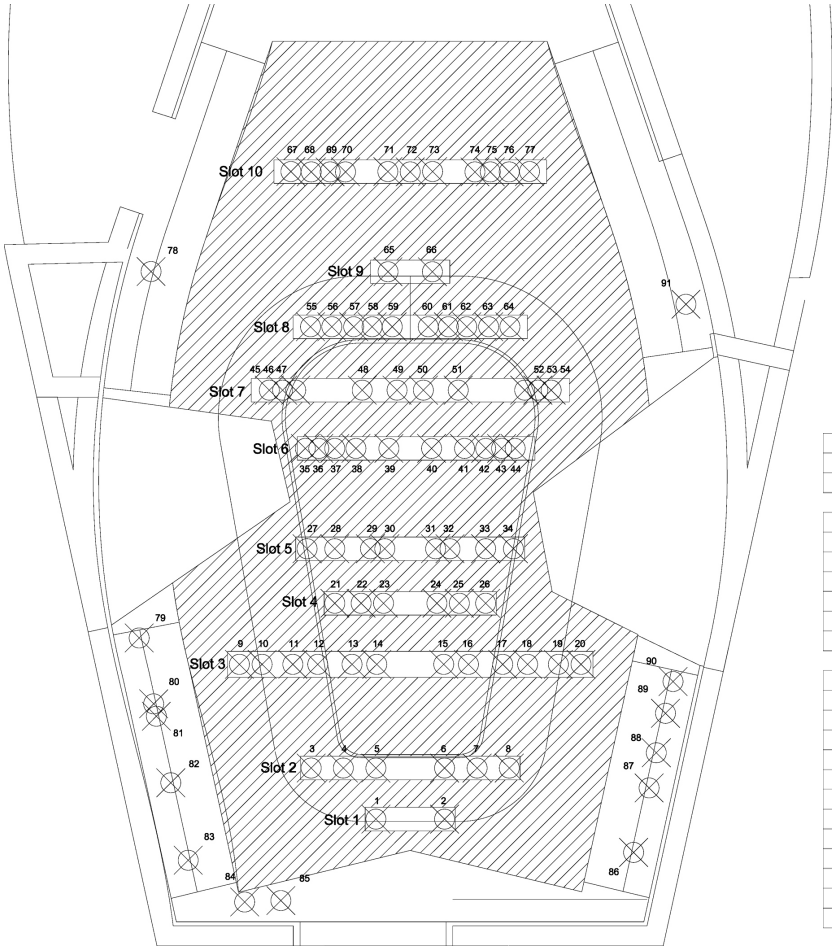
Detailed 3D computer models and lighting calculations were used to ‘virtually’ position and aim each individual luminaire within the asymmetrical, open ceiling of the debating chamber. Vertical and horizontal light levels were calculated, and lights adjusted as the model progressed. This method was used to simulate hundreds of luminaires, all with different positions in plan, aiming orientations, and heights above the floor.



10^{-3} CALCULATIONS / DETAILS

Working through each space in turn, similar models helped situate luminaires in the geometrically complex committee rooms. To meet broadcast lighting requirements, we developed a hybrid strategy of lights recessed in ceiling slots and clustered, hanging pendants.

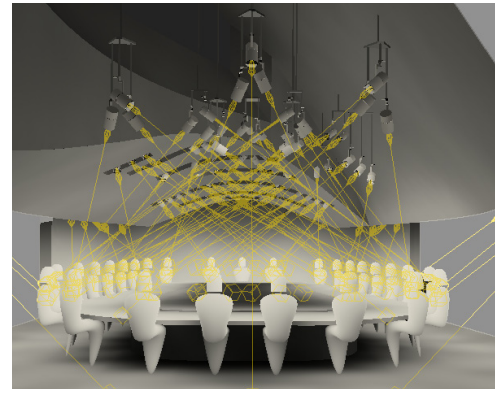


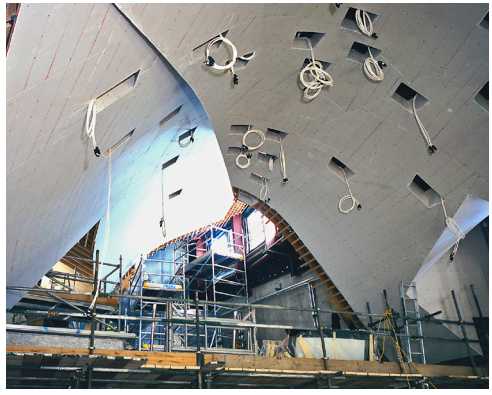


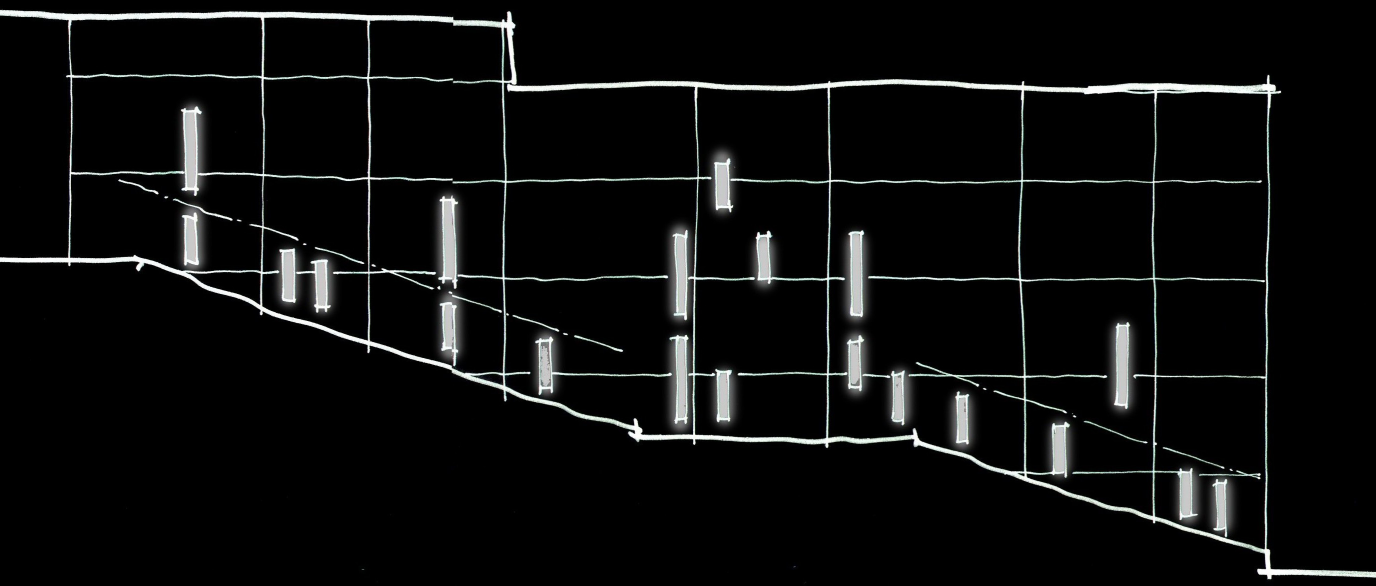
Location	ID	Lamp Type	Mounting Height
slot.01	01	50w.24deg	3385.0
slot.01	02	50w.24deg	3385.0

Location	ID	Lamp Type	Mounting Height
slot.02	03	50w.10deg	3100.0
slot.02	04	50w.24deg	3370.0
slot.02	05	50w.24deg	3515.0
slot.02	06	50w.24deg	3515.0
slot.02	07	50w.24deg	3365.0
slot.02	08	50w.10deg	3100.0

Location	ID	Lamp Type	Mounting Height
slot.03	09	50w.24deg	2680.0
slot.03	10	50w.24deg	2895.0
slot.03	11	50w.24deg	3145.0
slot.03	12	50w.24deg	3345.0
slot.03	13	50w.24deg	3515.0
slot.03	14	50w.24deg	3655.0
slot.03	15	50w.24deg	3655.0
slot.03	16	50w.24deg	3515.0
slot.03	17	50w.24deg	3345.0
slot.03	18	50w.24deg	3145.0
slot.03	19	50w.24deg	2895.0
slot.03	20	50w.24deg	2680.0





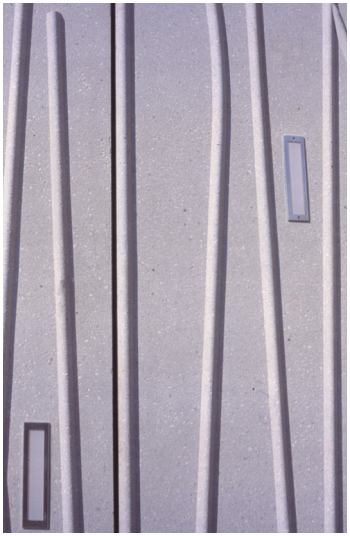


10^{+1} INTERIORS

Individual luminaires integrate tightly with the architecture. Alongside the grand staircase in the main lobby, glowing glass bands were created using standard fluorescent ceiling fixtures, turned vertical and inset into concrete openings. The playful pattern recalls an architectural motif that recurs in EMTB's work, including their Barcelona office.

10^{-3} LUMINAIRES

Small luminaires illuminate the broader landscape, extending the sense of an intimate scale to the exterior. In-grade illumination softly catches the face of columns and the underside of sculpted canopies at key entrances. Traditional steplights, mounted vertically and cast into retaining walls, create a rhythmic design echoing interior motifs.



Rosenthal Center for Contemporary Art
Cincinnati, Ohio / USA
Architect: Zaha Hadid Architects
2000 - 2003

10^{0} SURFACES

In the lobby, fluorescents are integrated into the handrails and oblique side of a cantilevered staircase, dramatically silhouetting the dark form against the neutral concrete back wall.

10^{+3} CITY BLOCK

Innovative lighting reinforces the Rosenthal Center's dynamic presence in downtown Cincinnati. Instead of traditional floodlighting, energy-efficient fluorescent strips concealed in the exterior parapets outline the building's stacked volumes.


DO NOT
BLOCK

Refer to OVI detail

OVI-1& (RECESSED TRACK) with OVI-1& (FIXTURES) (Allow Qty. 150 fixtures)

Gallery #102

THIS AREA NOT IN OVI SCOPE OF WORK

OVI-5 (at ceiling lighting the walls)

OVI-29 (TYPICAL)

OVI-29 (TYPICAL)

OVI-29 (TYPICAL)

Allow provision for incandescent lighting approx 4W per sq.ft. this area

Allow provision for inc approx 4W per sq ft. t

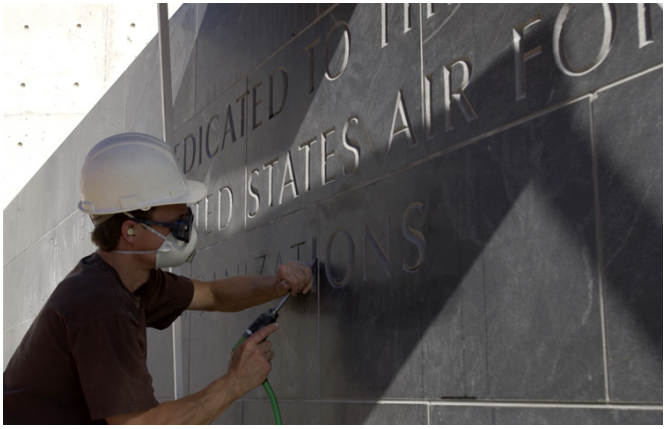
10^{+1} INTERIORS

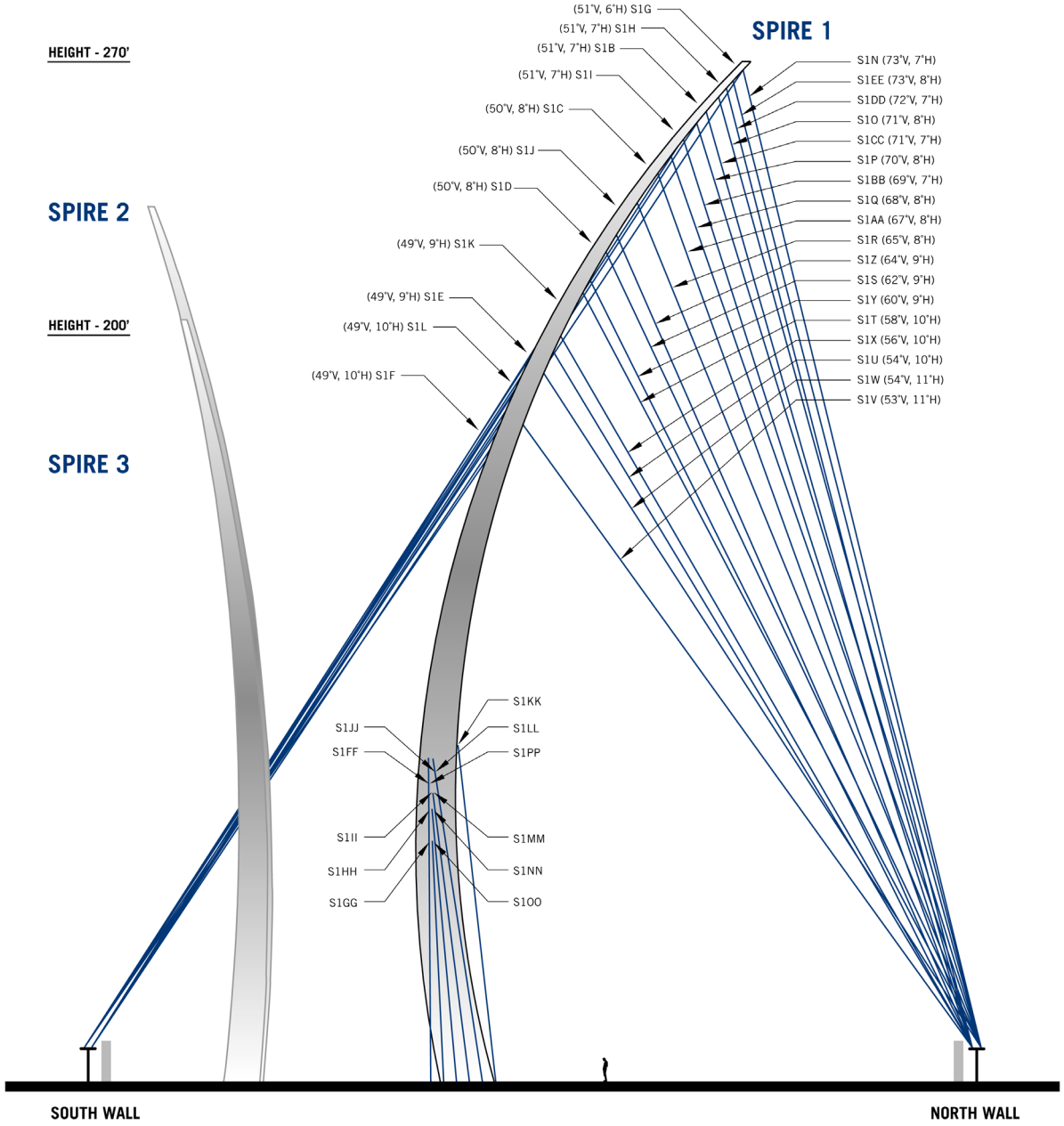
Linear fluorescent lights, arrayed in an accelerated pattern on the interior office ceilings, echo the architecture's sense of movement.

The United States Air Force Memorial
Arlington, Virginia / USA
Architect: Pei Cobb Freed & Partners
2002 - 2006

10^{+2} BUILDING

Lighting plays a critical role in establishing the nighttime identity of the United States Air Force Memorial, which overlooks the Pentagon and monumental Washington D.C. from the crest of a high-visibility promontory. Illumination appears to emanate from within the monument itself, reinforcing the architectural agility of the structure and bursting into the night sky.



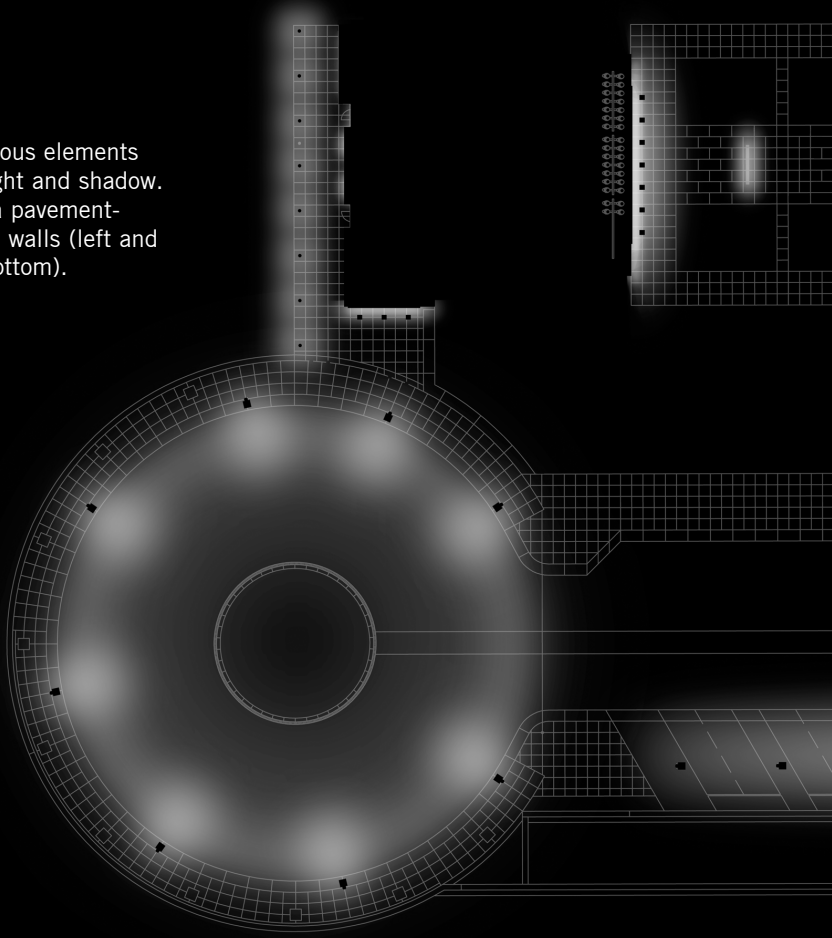

SPIRE 1
SPIRE 2
SPIRE 3
HEIGHT - 270'
HEIGHT - 200'
(51"V, 6"H) S1G
(51"V, 7"H) S1H
(51"V, 7"H) S1B
(51"V, 7"H) S1I
(50"V, 8"H) S1C
(50"V, 8"H) S1J
(50"V, 8"H) S1D
(49"V, 9"H) S1K
(49"V, 9"H) S1E
(49"V, 10"H) S1L
(49"V, 10"H) S1F
S1N (73"V, 7"H)
S1EE (73"V, 8"H)
S1DD (72"V, 7"H)
S1O (71"V, 8"H)
S1CC (71"V, 7"H)
S1P (70"V, 8"H)
S1BB (69"V, 7"H)
S1Q (68"V, 8"H)
S1AA (67"V, 8"H)
S1R (65"V, 8"H)
S1Z (64"V, 9"H)
S1S (62"V, 9"H)
S1Y (60"V, 9"H)
S1T (58"V, 10"H)
S1X (56"V, 10"H)
S1U (54"V, 10"H)
S1W (54"V, 11"H)
S1V (53"V, 11"H)
S1KK
S1LL
S1PP
S1JJ
S1FF
S1II
S1HH
S1GG
S1MM
S1NN
S1OO
SOUTH WALL
NORTH WALL

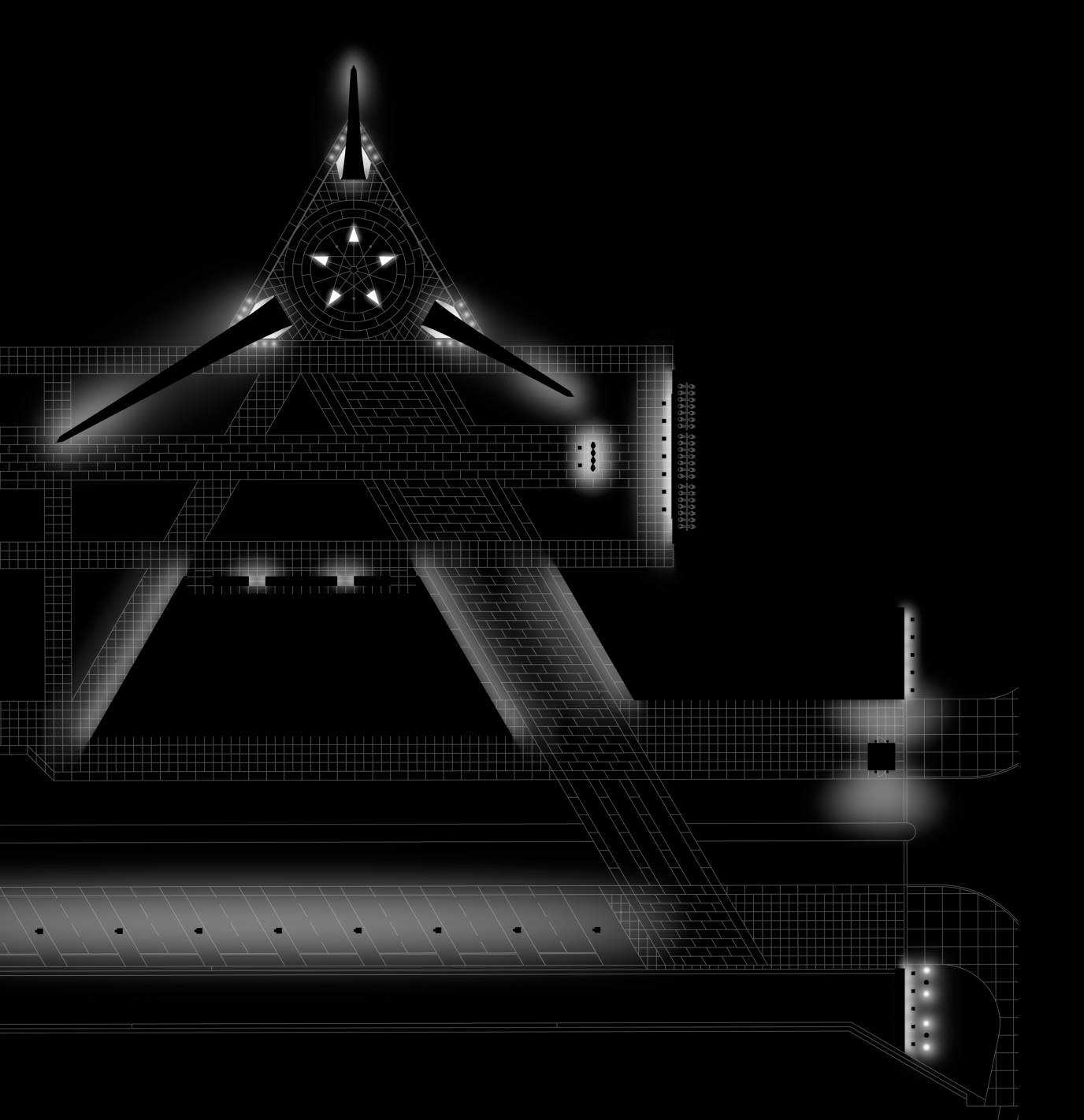
10^{-2} CALCULATIONS

Because the monument is located on a commercial flight path, red beacons would typically need to be placed at the mid-point and tip of each spire. Instead, we creatively met the regulations by brightly lighting the top third of the structure. Powerful floodlights with narrow beam optics and excellent glare shielding are concealed behind the flanking granite inscription walls, and are precisely aimed along the narrow contour of the spires.

10^{+3} CITY BLOCK

Illumination levels of the monument's various elements are coordinated to achieve a balance of light and shadow. These include the spires themselves and a pavement-embedded Air Force Star (top), inscription walls (left and right), and approach and parking areas (bottom).





10^{-4} COMPONENTS

Custom wallwash luminaires, mounted in-grade, are equipped with protective metal hoods that reduce their aperture size and minimize potential glare. The result: even illumination of the vertical inscription walls. Instead of standard bronze hardware, the hoods are custom-cast in stainless steel to match the spires.

10^{-1} MATERIALS

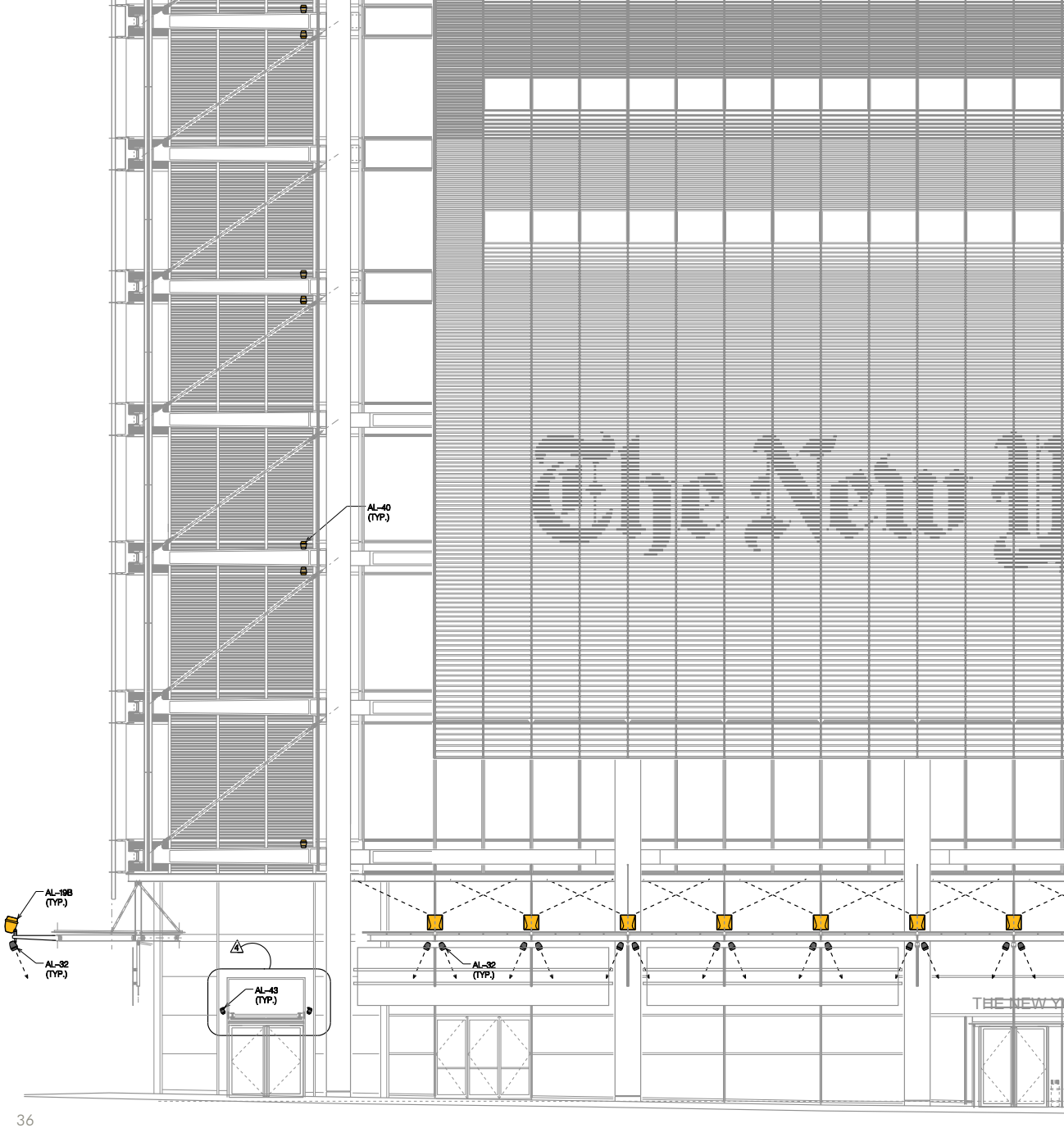
In-grade lighting from below dramatically illuminates the honor guard enhancing the sculptural quality and texture of the bronze statues. Soft backlighting generates a subtle depth of space between the grouping and the granite inscription wall.

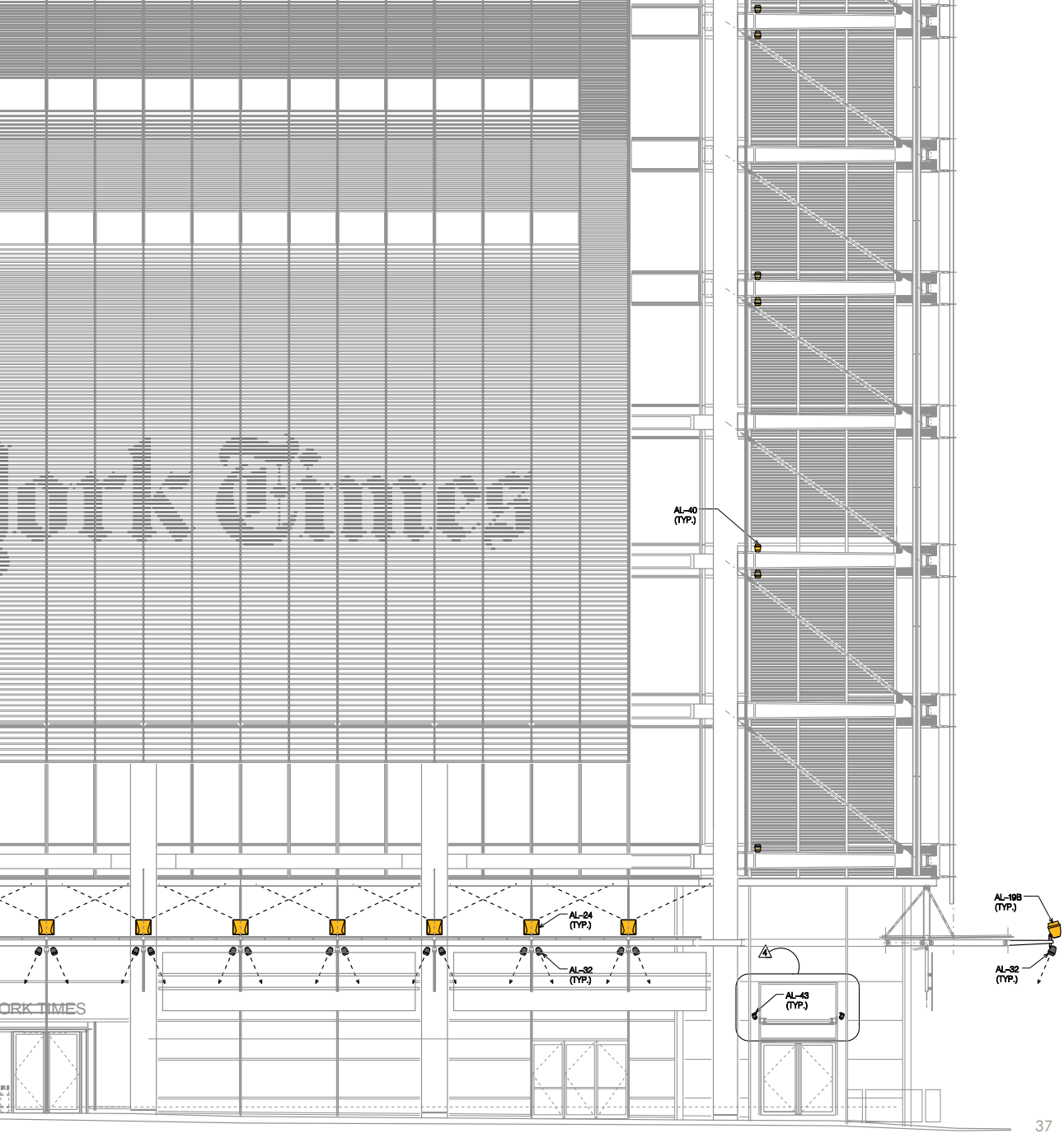

INTEGRITY
SERVICE

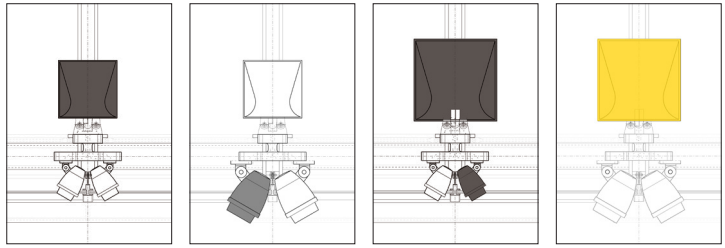
The New York Times Building
New York, New York / USA
Architect: Renzo Piano Building Workshop
2001 - 2008

10^{+3} CITY BLOCK

Nighttime lighting reinforces the New York Times Building's elegance through a precise gradation of light, brightest at the base of the tower and tapering to a soft glow at its summit. The lighting scheme utilizes the reflectance value of the building's off-white ceramic screen to give the visual impression of achieving light levels comparable to the structure's Times Square neighbors, while consuming very little power.


AL-40
(TYP.)
AL-19B
(TYP.)
AL-32
(TYP.)
4
AL-43
(TYP.)
AL-32
(TYP.)

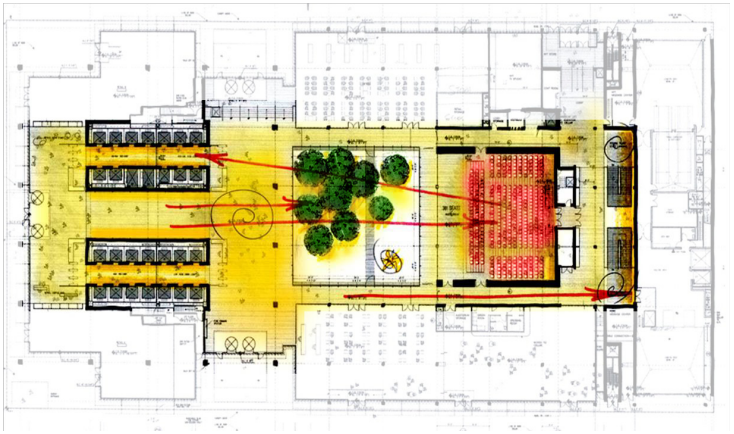

AL-40
(TYP.)
AL-24
(TYP.)
AL-32
(TYP.)
AL-43
(TYP.)
AL-19B
(TYP.)
AL-32
(TYP.)
4



10^{-4} COMPONENTS

Mounted as direct extensions of the façade's modular bays, custom-designed light clusters integrate precisely with architectural detailing. A taxicab yellow finish on selected luminaires adds visual punctuation to the building and contributes to the animated streetscape.

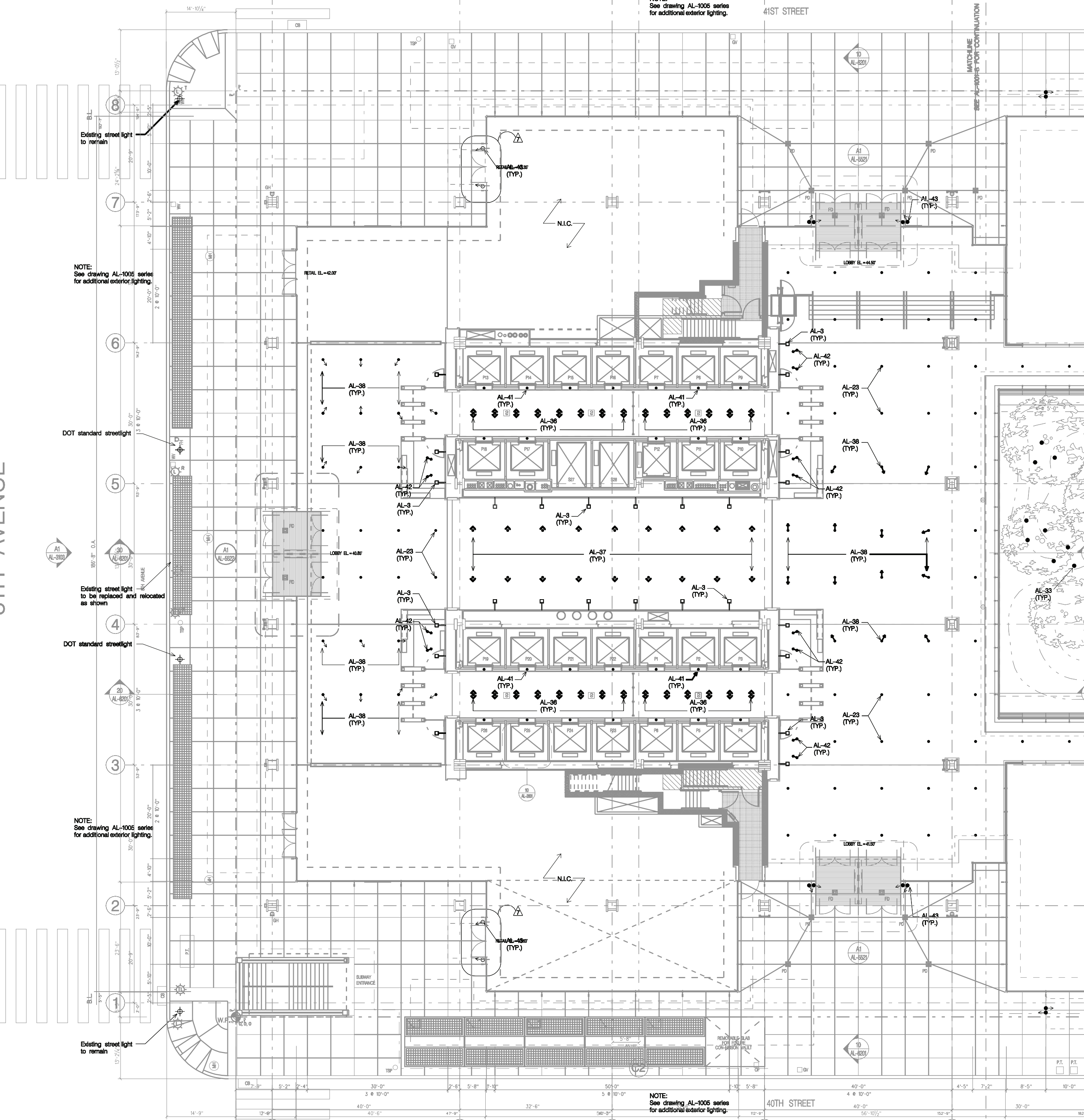

The New York Times



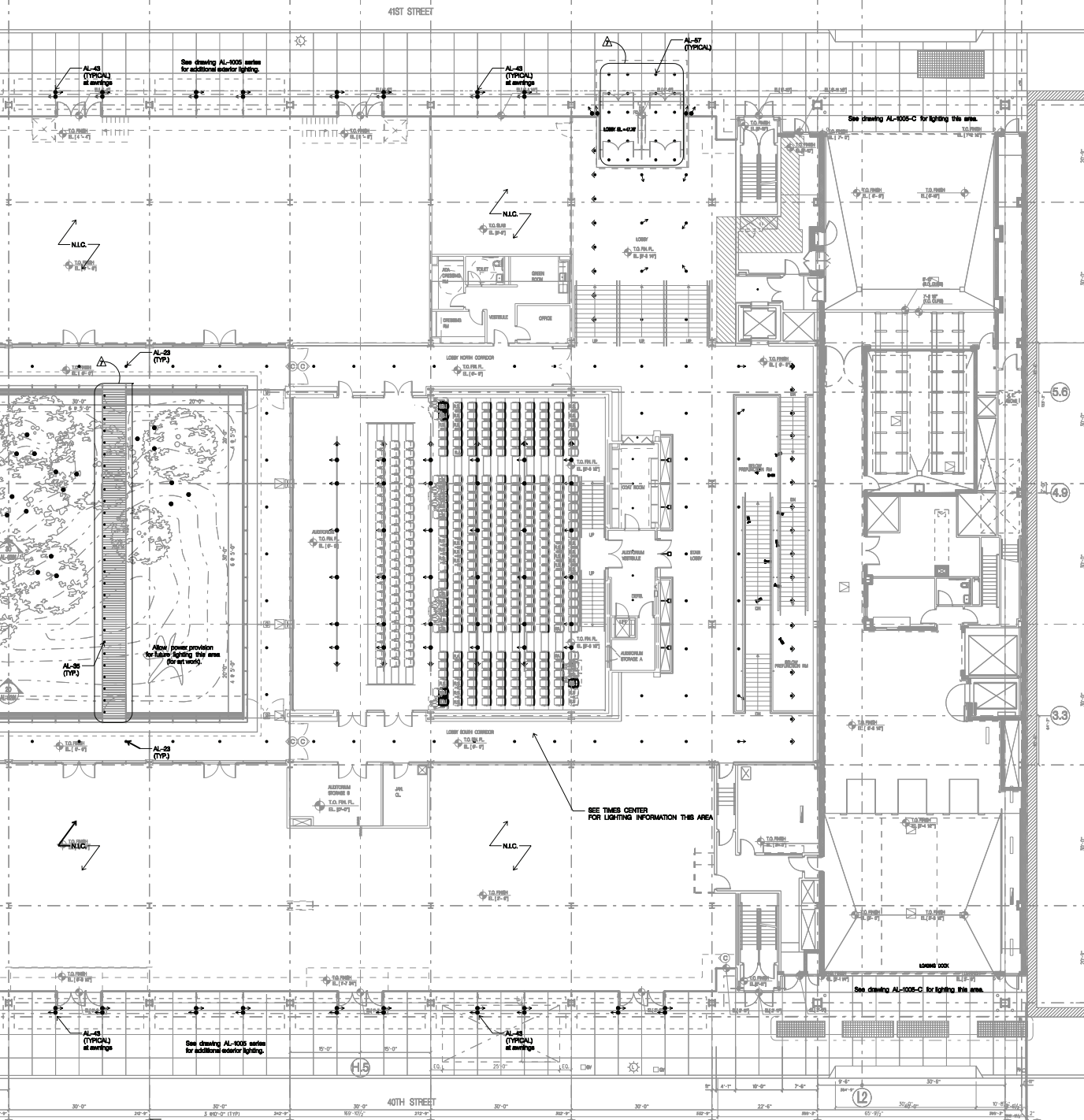
10[+1] INTERIORS

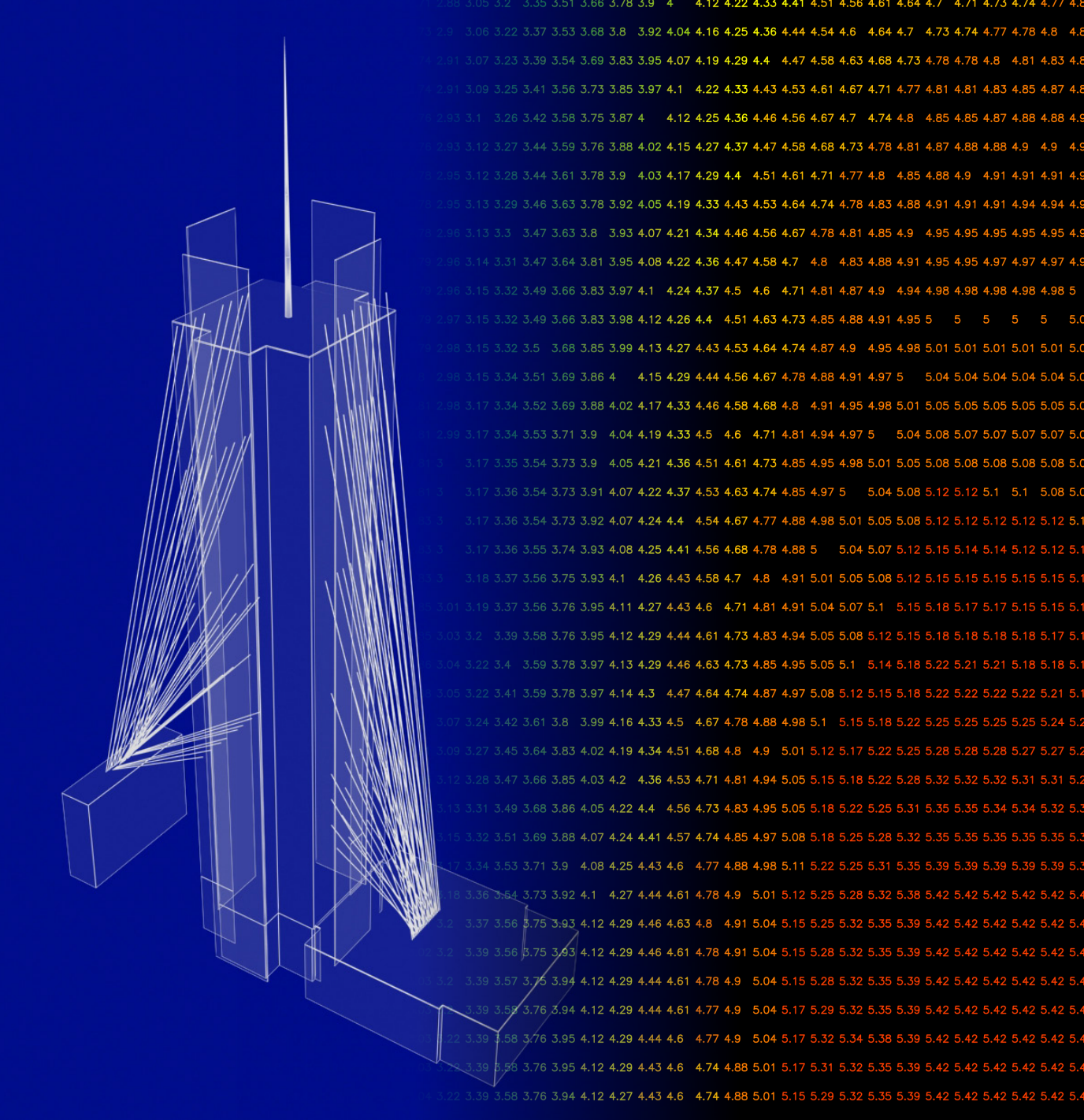
Within the lobby, illumination levels are balanced to promote glare-free views through a succession of transparent spaces. A hierarchy of light levels and focal points visually activates and connects the lobby, a central open-air garden, and a glass-fronted auditorium.

In the foreground, lobby walls glow with illumination from halogen downlights and wallwashers, while uplights on custom brackets create soft clouds of light on the ceiling. Inside the garden, a minimal number of carefully positioned lights visually model the white birch trees, rendering the area simultaneously visible, yet transparent.



NOTE:
See drawing AL-1005 series for additional exterior lighting.
41ST STREET
MATCHLINE
SEE AL-1001-B FOR CONTINUATION
Existing street light to remain
NOTE:
See drawing AL-1005 series for additional exterior lighting.
RETAIL EL.=42.00'
N.I.C.
LOBBY EL.=44.50'
AL-43 (TYP.)
AL-3 (TYP.)
AL-42 (TYP.)
AL-38 (TYP.)
AL-41 (TYP.)
AL-36 (TYP.)
AL-23 (TYP.)
DOT standard streetlight
LOBBY EL.=40.85'
AL-37 (TYP.)
AL-33 (TYP.)
Existing street light to be replaced and relocated as shown
NOTE:
See drawing AL-1005 series for additional exterior lighting.
LOBBY EL.=41.50'
SUBWAY ENTRANCE
REMOVABLE SLAB FOR FUTURE CON EDISON VAULT
Existing street light to remain
NOTE:
See drawing AL-1005 series for additional exterior lighting.
40TH STREET

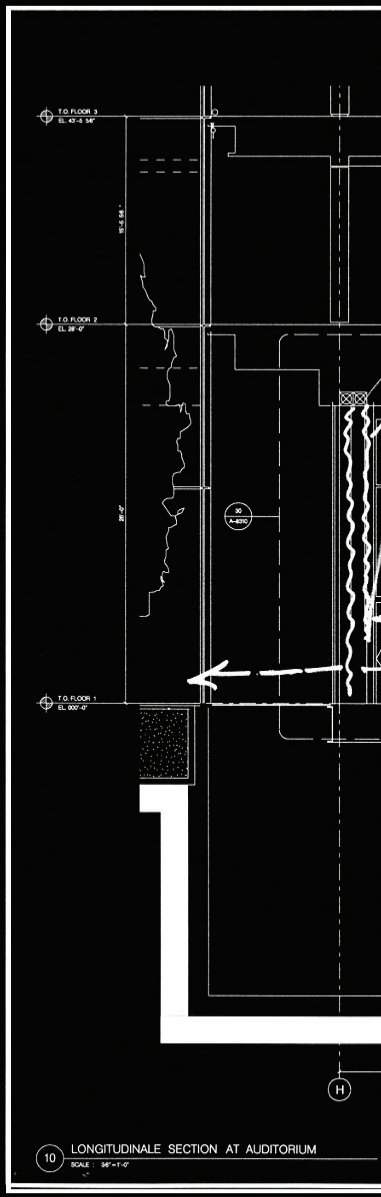

41ST STREET
AL-43 (TYPICAL) at awnings
See drawing AL-1005 series for additional exterior lighting.
AL-43 (TYPICAL) at awnings
AL-57 (TYPICAL)
See drawing AL-1005-C for lighting this area.
N.I.C.
N.I.C.
LOBBY
LOBBY NORTH CORRIDOR
AL-23 (TYP.)
AUDITORIUM
AUDITORIUM VESTIBULE
AUDITORIUM BRONZE A
AUDITORIUM BRONZE B
IOWA LOBBY
IOWA PRESENTATION RM
IOWA PRESENTATION RM
IOWA ROOM
Allow power provision for future lighting this area (for art work).
AL-35 (TYP.)
AL-23 (TYP.)
LOBBY SOUTH CORRIDOR
SEE TIMES CENTER FOR LIGHTING INFORMATION THIS AREA
N.I.C.
N.I.C.
LOADING DOCK
See drawing AL-1005-C for lighting this area.
AL-43 (TYPICAL) at awnings
See drawing AL-1005 series for additional exterior lighting.
AL-43 (TYPICAL) at awnings
40TH STREET
5.6
4.9
3.3
H.5
L2

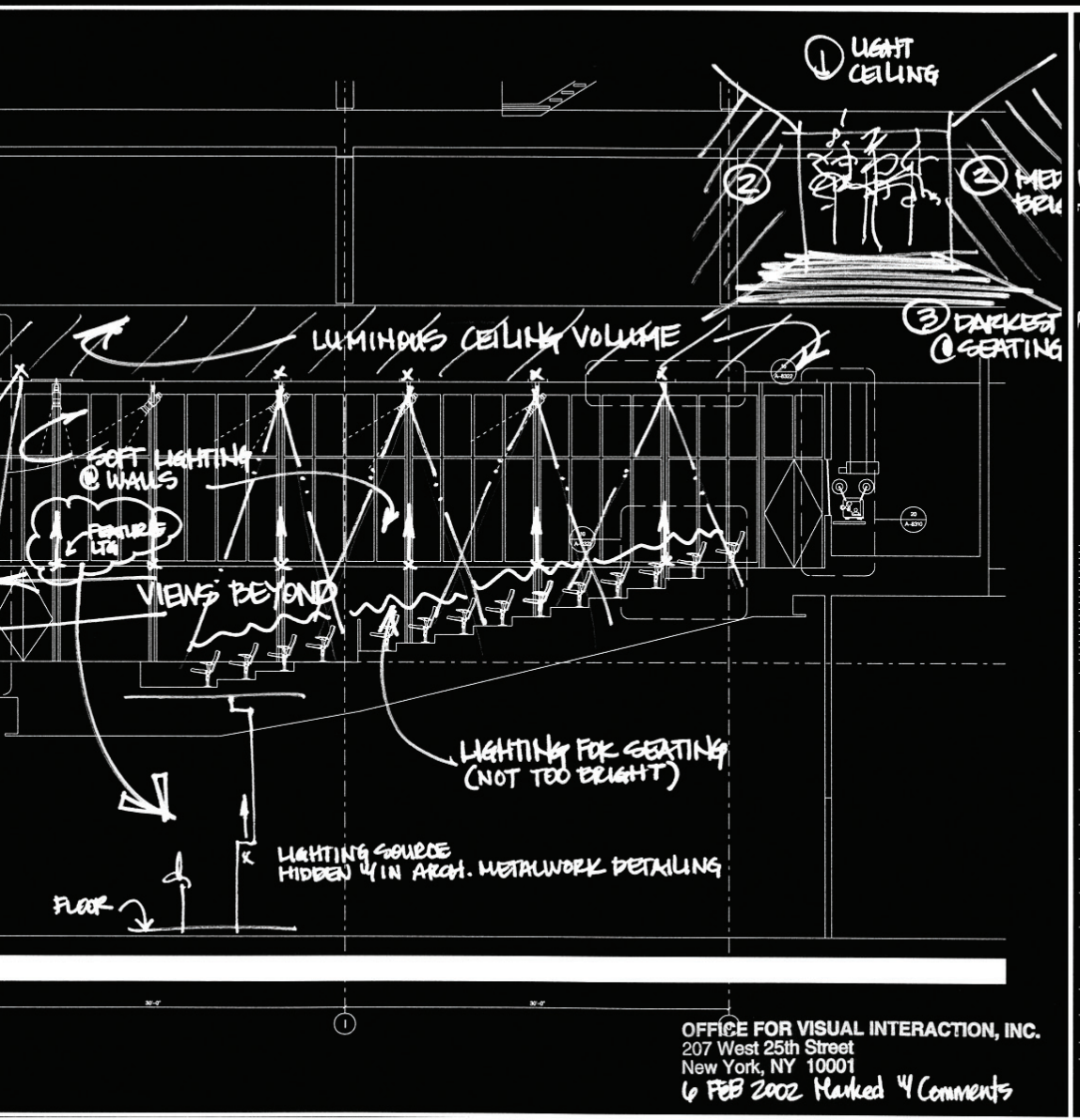


10° SURFACES

The facades presented a formidable technical challenge, since there are no ledges or setbacks on which to conceal lighting equipment. Lights equipped with state-of-the-art optics, positioned on a podium and atop an adjacent structure, stretch illumination across the entire 259 m (850') tall screen façade.

The Times Center
New York, New York / USA
Architect: Renzo Piano Building Workshop
2001 - 2007





PRELIMINARY-NOT FOR CONSTRUCTION

NO. REVISION DATE

THE NEW YORK TIMES BUILDING
NEW YORK, NEW YORK

DESIGN DEVELOPMENT

A000

TITLE LONGITUDINALE SECTION AT AUDITORIUM

DATE 01.20.2002

SCALE 3/16"=1'-0"

DRAWING NO. A-8301

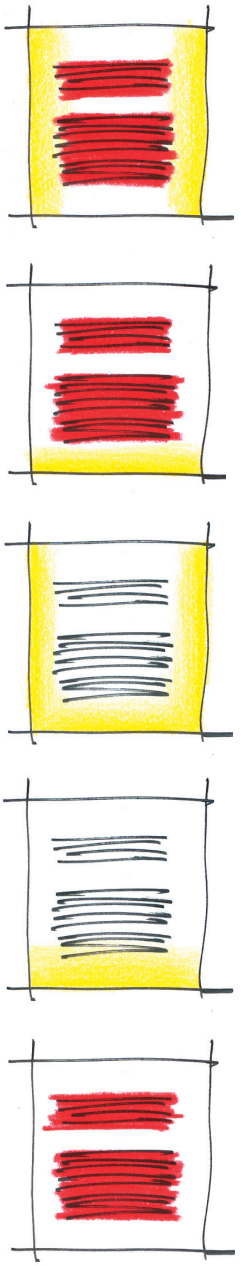
OFFICE FOR VISUAL INTERACTION, INC.
207 West 25th Street
New York, NY 10001

6 FEB 2002 Marked Up Comments


EXIT

10° SURFACES

Auditorium lighting highlights the red seats and cherry-wood sidewalls, drawing in views.

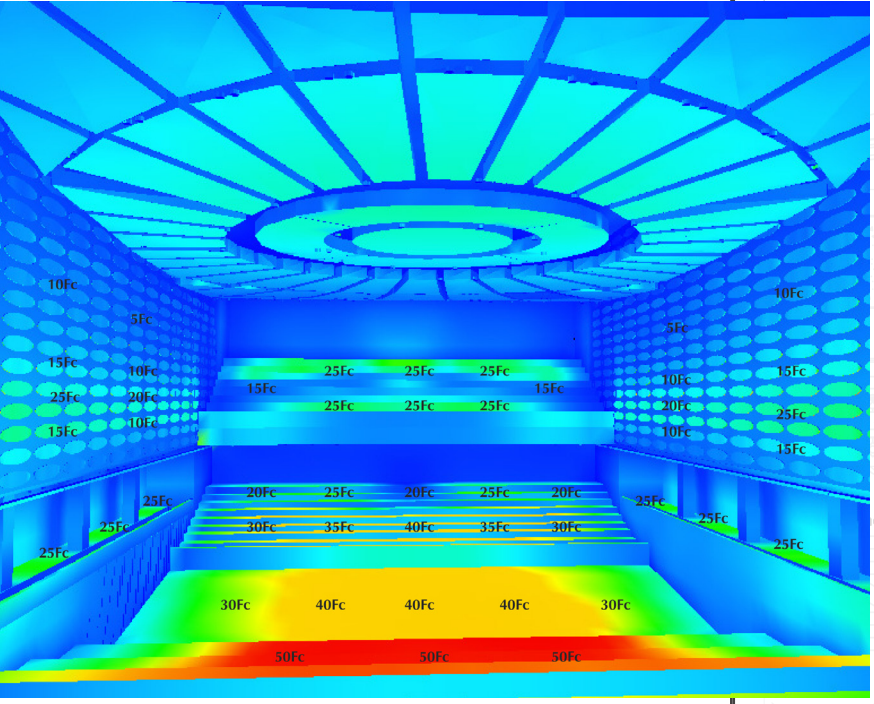


Rensselaer Polytechnic Institute -
Experimental Media and Performing Arts Center
Troy, New York / USA
Architect: GRIMSHAW
2001 - 2008

10^{+2} BUILDING

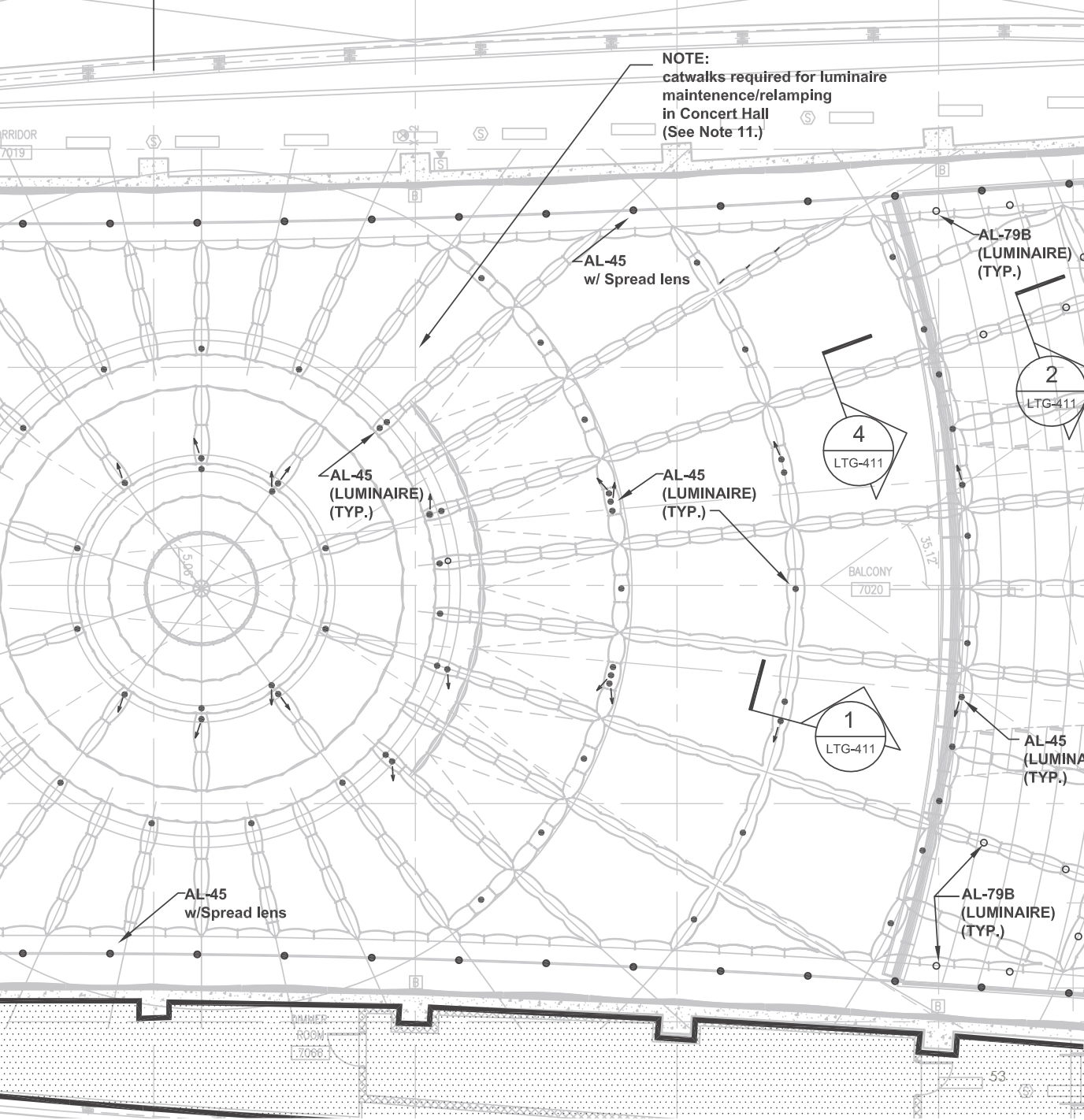
From the street, the wooden hull of RPI's new concert hall glows behind an elegant glass façade. A satin finish was applied to the wood, rather than the typical gloss finish, to minimize reflected glare of light sources. Large-scale mockups and material samples were used to verify its color and sheen under the proposed illumination. The dramatically lit structure is the centerpiece of a 20,439 m2 (220,000 square foot) complex of performance venues, studios, and creative labs.


EMPAC



10^{-2} CALCULATIONS/DETAILS

Inside the concert hall, a first-of-its kind ceiling composed of suspended fabric panels presented unique challenges. Lighting needed to consider both the translucency of the fabric and its complex configuration: contoured in both the north-south and east-west directions, and held in place by radiating cable supports. In the final configuration, clamp-mounted halogen downlight luminaires are precisely located to provide the differential illumination required for the stage, seating and balcony areas.


NOTE:
catwalks required for luminaire
maintenence/relamping
in Concert Hall
(See Note 11.)
AL-45
w/ Spread lens
AL-79B
(LUMINAIRE)
(TYP.)
2
LTG-411
4
LTG-411
AL-45
(LUMINAIRE)
(TYP.)
AL-45
(LUMINAIRE)
(TYP.)
BALCONY
7020
1
LTG-411
AL-45
(LUMINA
(TYP.)
AL-45
w/Spread lens
AL-79B
(LUMINAIRE)
(TYP.)
53

New York City Streetlight
New York, New York / USA
Competition Architect: Thomas Phifer Architects

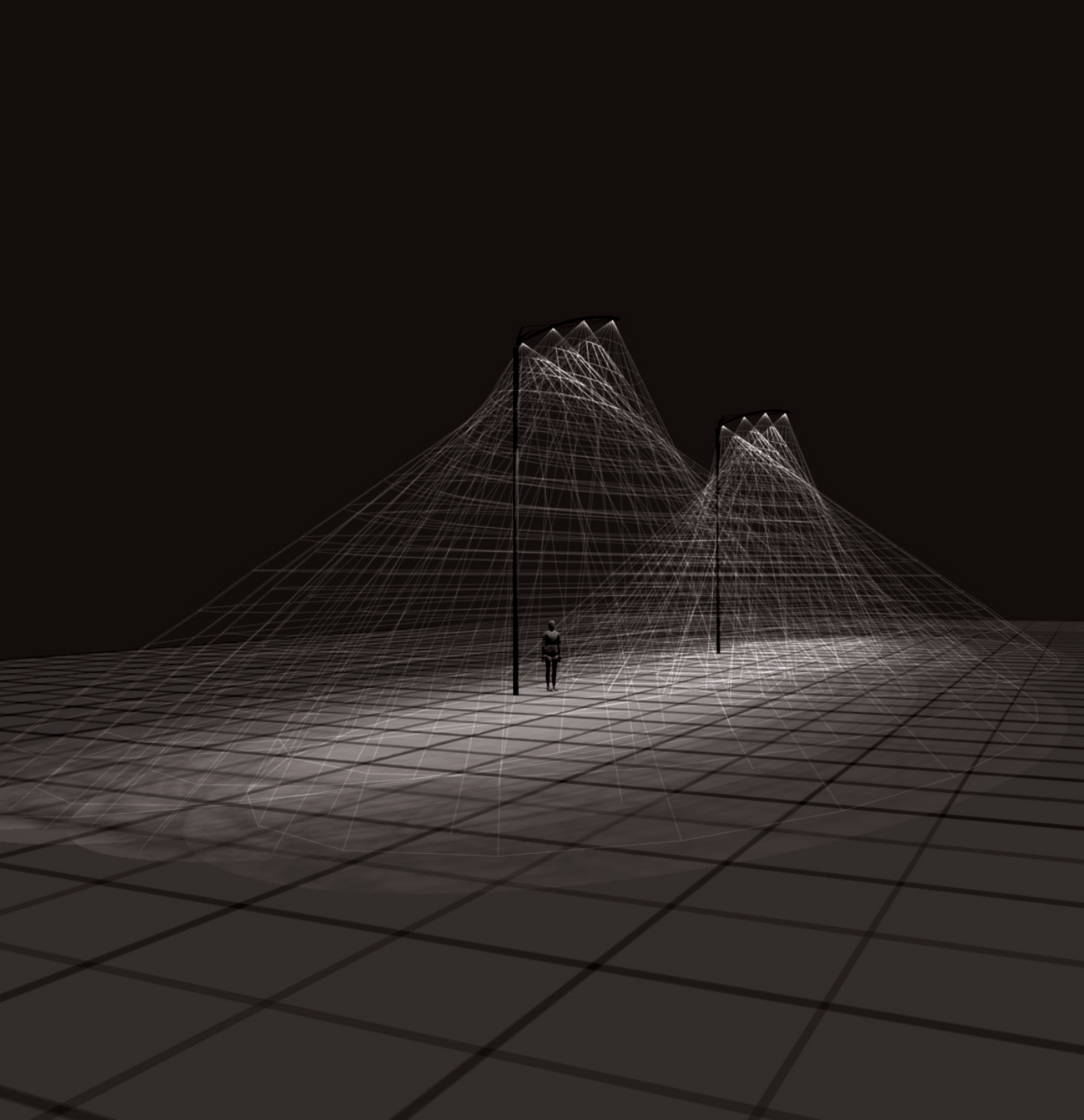
2004 - Competition Winning Design
2004 - present - Design and Fabrication of Prototypes

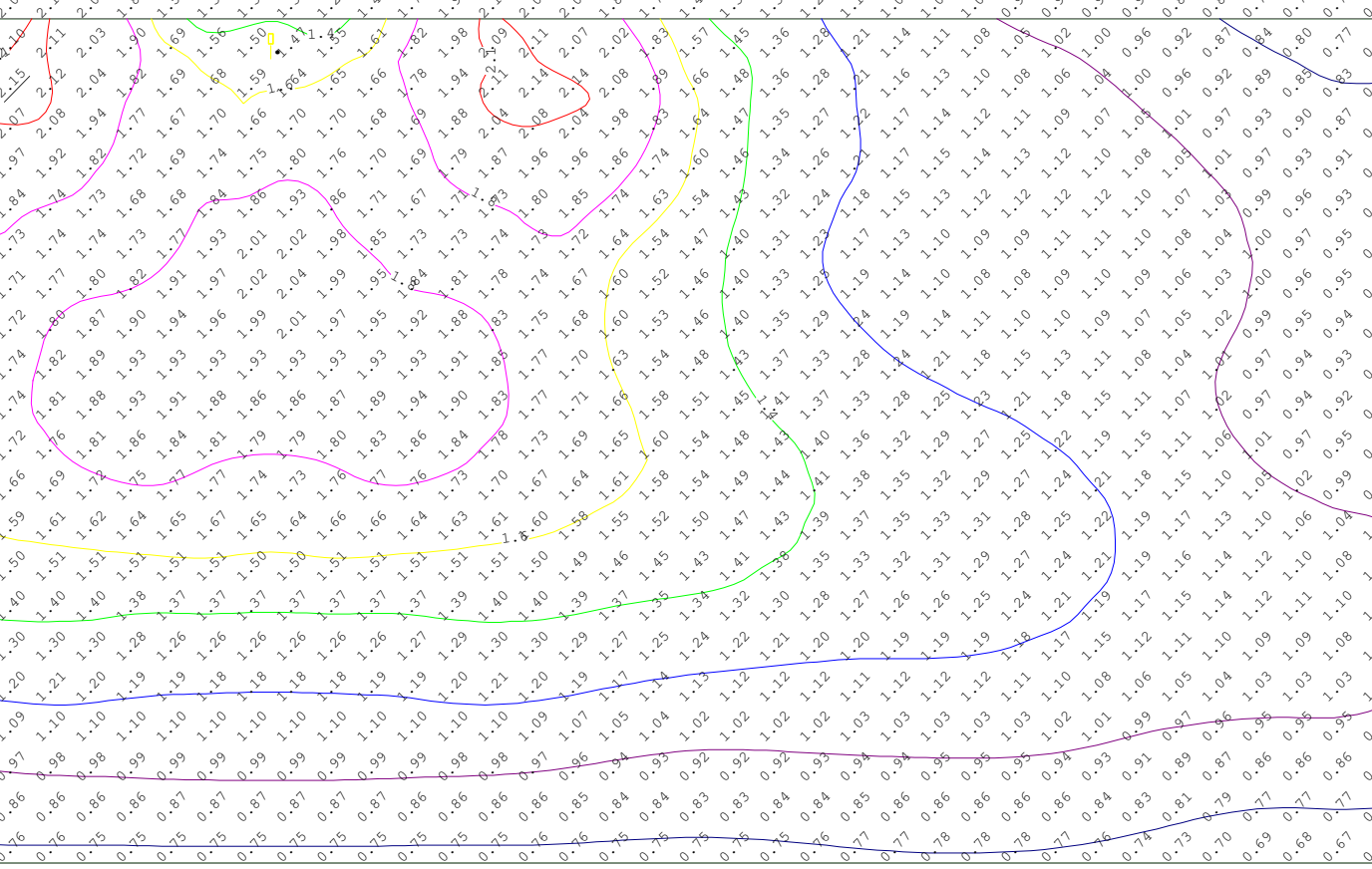
10^{+5} METRO AREA

The award-winning LED streetlight design, currently in prototyping, will provide a widespread lighting model for streets, sidewalks and parks throughout New York City – and will influence urban lighting strategies around the globe.

10^{-3} LUMINAIRE

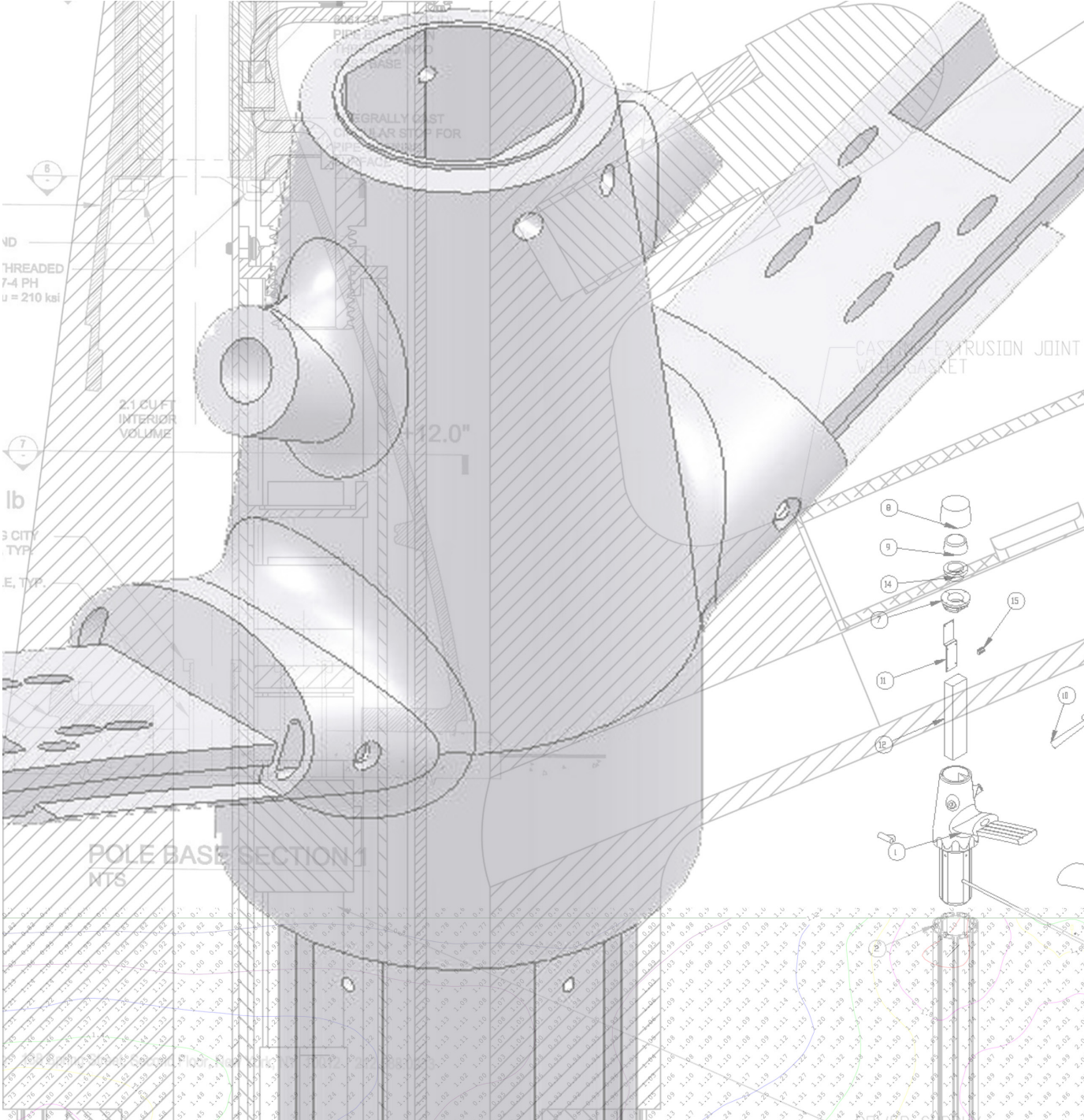
Starting from an early choice of LED light sources, the sleek form of the streetlight is specifically derived from the requirements and possibilities of the lighting technology. The tiny light source does not require a hefty decorative enclosure, so the streetlight takes on a slim, elongated profile. The thin arc of the luminaire itself provides the necessary surface area for housing and cooling the LEDs.

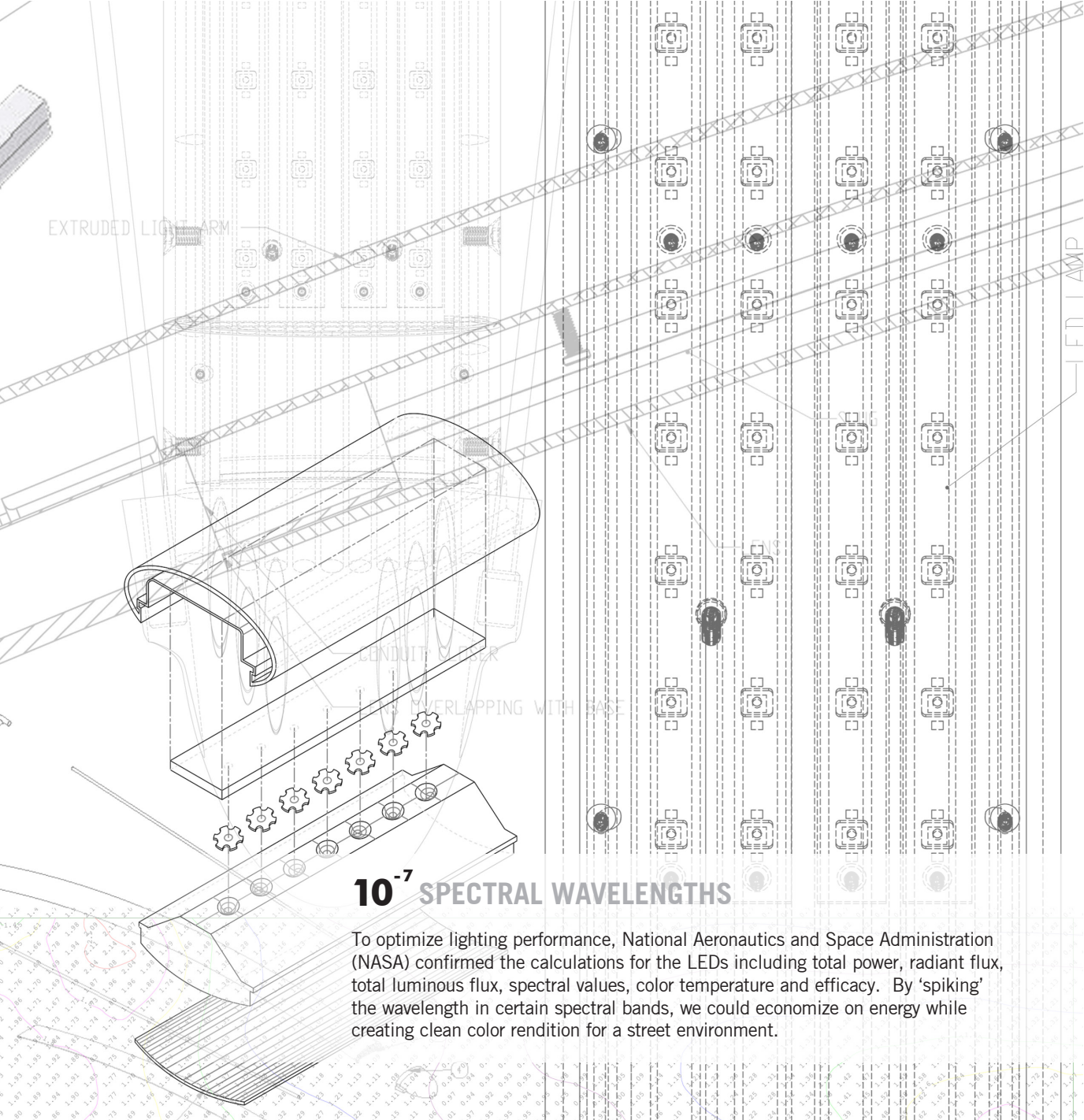




10^{-2} CALCULATIONS / DETAILS

Extensive calculations and laboratory measurements were undertaken to demonstrate the new streetlight's ability to provide the light levels and distribution required for street-scale coverage. Compared to the standard cobra head, the LED streetlight provides a much more even and controlled distribution of light, free of lighting 'hot-spots' and neatly directed along the length of the street.


POLE BASE SECTION
NTS



10^{-7} SPECTRAL WAVELENGTHS

To optimize lighting performance, National Aeronautics and Space Administration (NASA) confirmed the calculations for the LEDs including total power, radiant flux, total luminous flux, spectral values, color temperature and efficacy. By 'spiking' the wavelength in certain spectral bands, we could economize on energy while creating clean color rendition for a street environment.

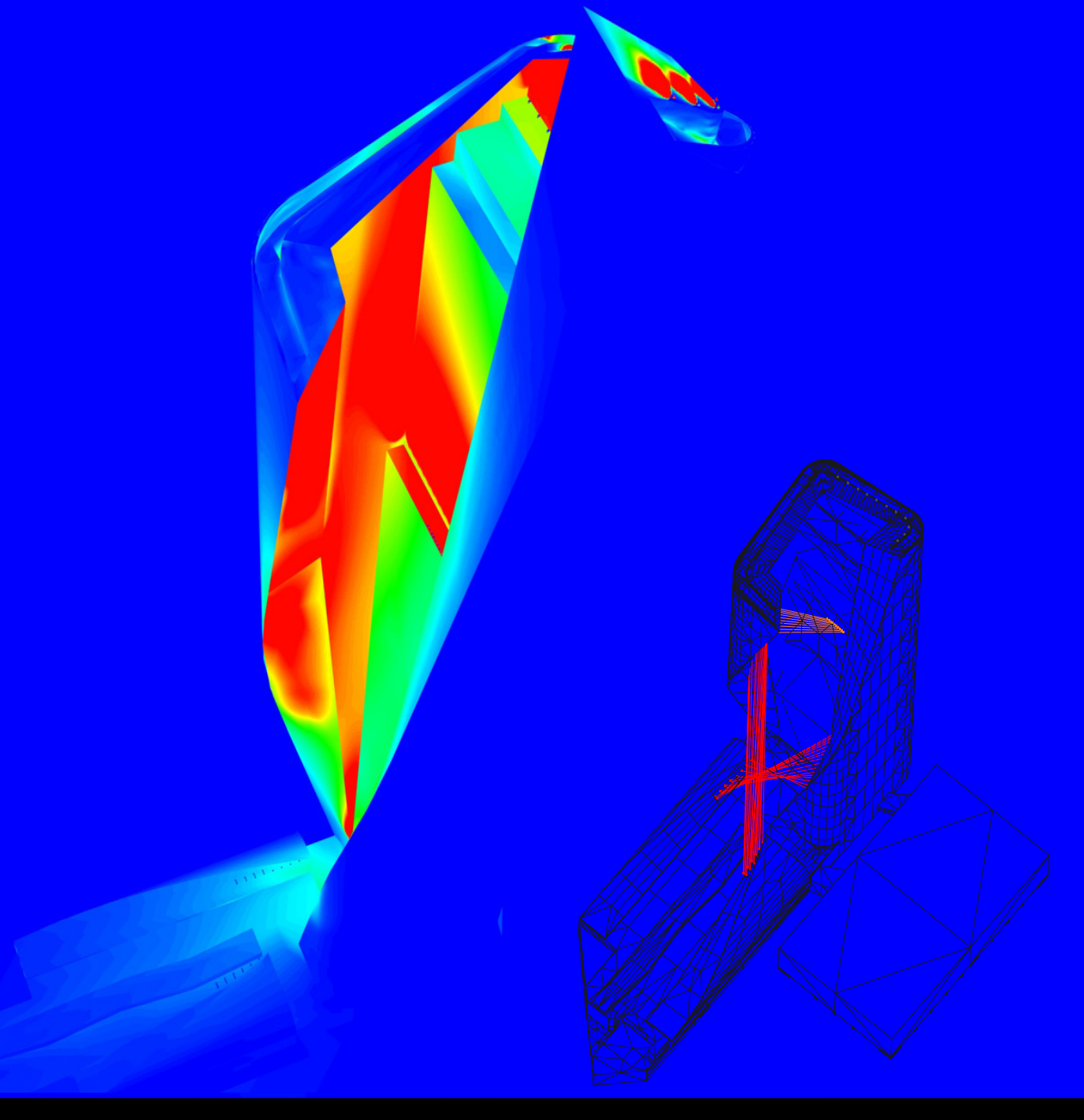
Al Hamra Firdous Tower
Kuwait City / Kuwait
Architect: Skidmore Owings & Merrill - New York

2006 - 2010

10^{+2} BUILDING

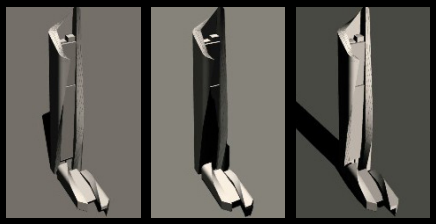
Standing 410m (1350 ft) high, Al Hamra Firdous is the tallest skyscraper in Kuwait City and the world's highest sculpted tower. The mixed-use complex forms a dramatic focal point visible throughout the city and from the adjacent Arabian Gulf. Carefully configured lighting gives the tower a spectacular skyline presence.

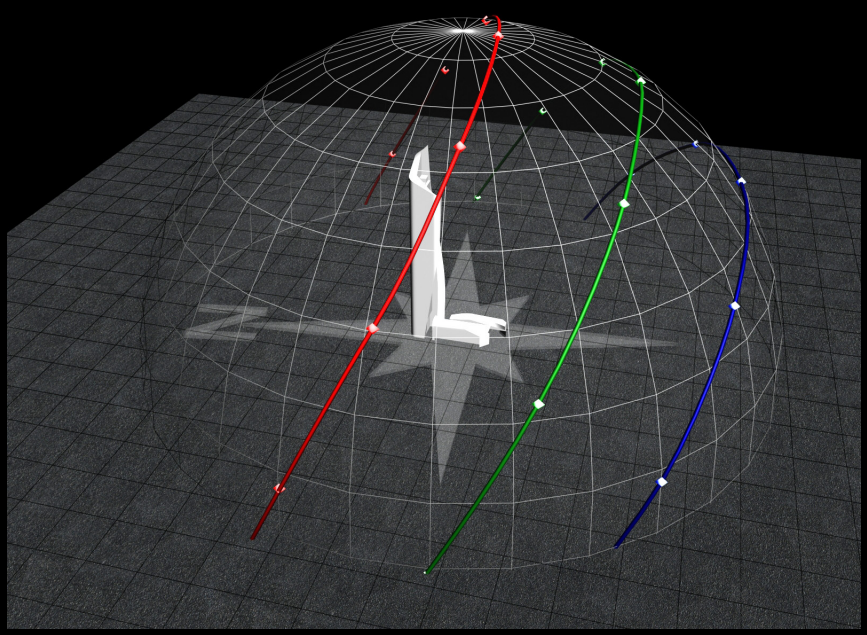
At night, brilliantly lit vertical ribbons of concrete are sculpted with light. Variations in brightness and controlled bursts of illumination are used to articulate the curvilinear forms and draw the eye up to the tower's delicate tip, enhancing the skyscraper's unique architectural identity.

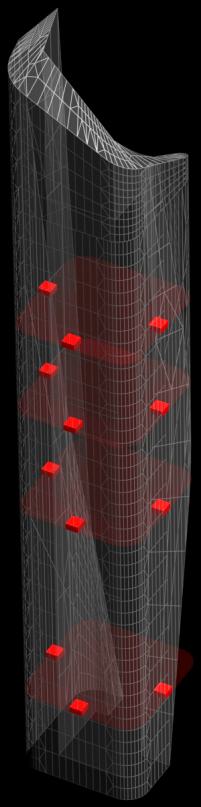


10^{+4} MASTERPLAN

The effects of solar heat gain on interior spaces was a critical consideration because of the glass facades. To verify the effectiveness of a ceramic fritting treatment, daylighting studies were carried out for a selection of offices representing typical tower conditions. Illumination was modeled and analyzed during different seasons, times of day, and sky conditions, employing the proposed glass types, transmission values, and fritting patterns.







AL-16

AL-11
(@floor)

AL-16

AL-11
(@floor)

AL-16

AL-11
(@floor)

AL-16

AL-11
(@floor)

AL-16

AL-18

AL-10 AL-17

3
LTG-571

AL-10 AL-17

AL-18

AL-10 AL-17

1
LTG-571

AL-17

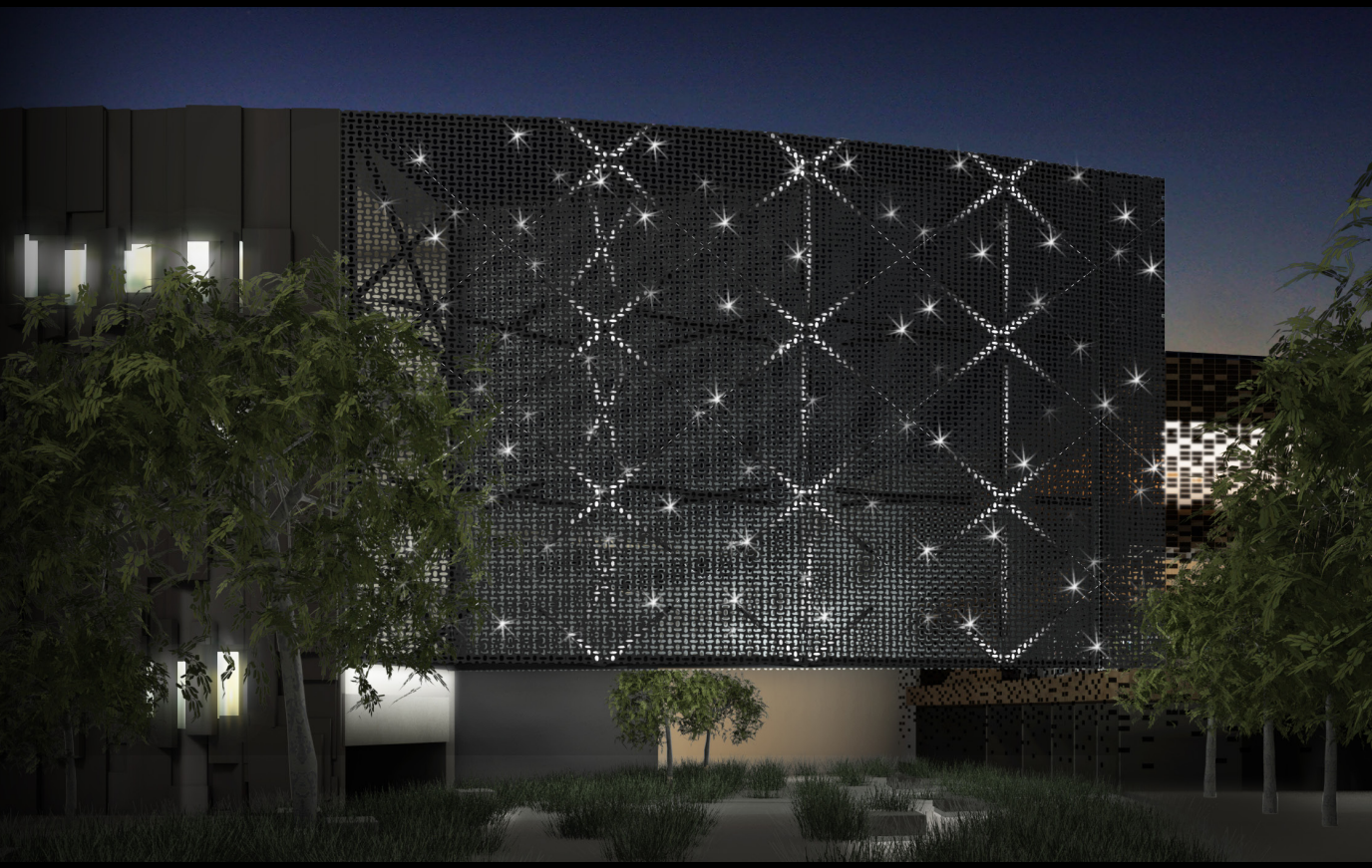
AL-10

AL-18

@ Above ceiling
(Typical)

AL-10 AL-17

Qatar College of Media and Communications
Education City, Doha / Qatar
Architect: Antoine Predock Architects
2008 - present



10° SURFACES

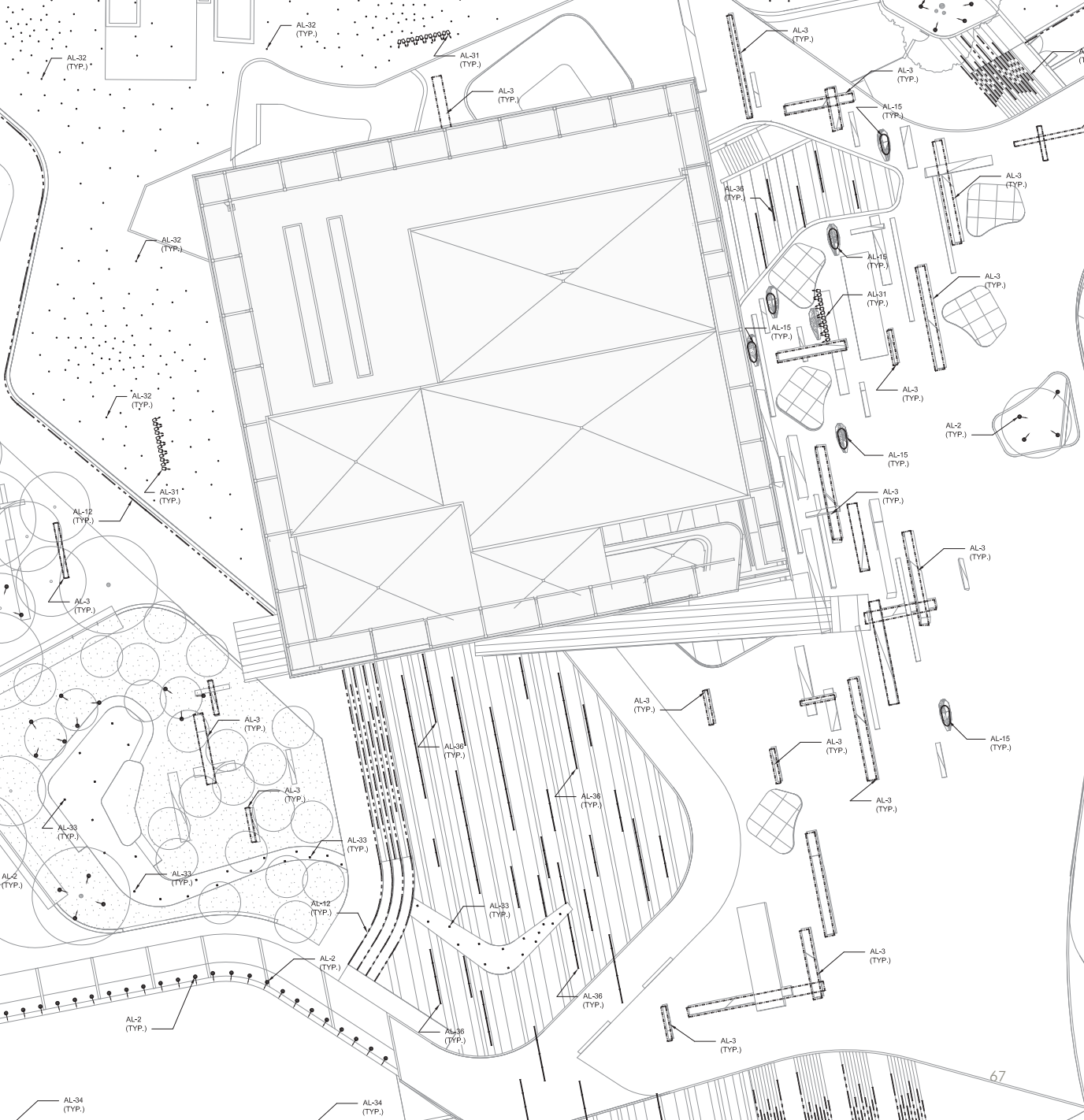
Illumination from within the scimitar screen structure creates the nighttime identity for the building. Luminaires with narrow beam optics create diagonal patterns accentuating the structural volume.

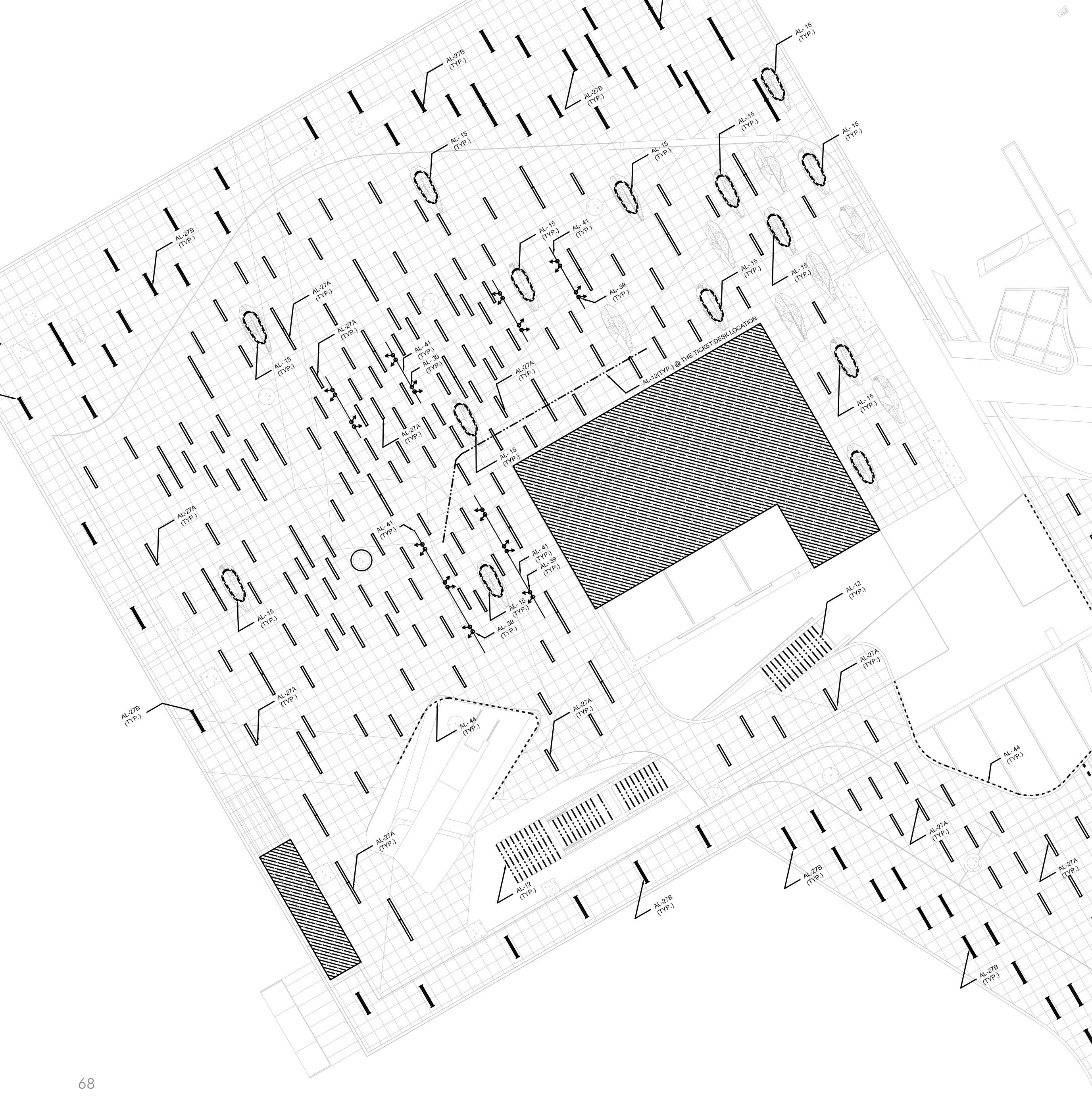
In the main entry, the layered metal panel ceilings reflect media images while pinspots concealed between the panels provide scale and sparkle.

Museum of Nature and Science
Dallas, Texas / USA
Architect: Morphosis
2009 - present

10^{+2} BUILDING

Dynamic lighting gives visual punch to this distinctive museum, conceived as an immersive, curiosity-stimulating environment. At night, light fills the crevice-like central atrium, spilling into the surroundings and emphasizing the building's sculpted form and sharp lines.

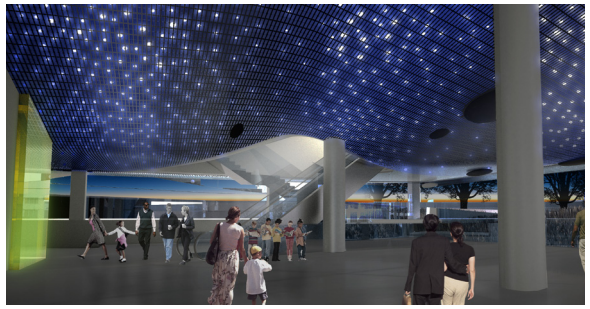

AL-32 (TYP.)
AL-31 (TYP.)
AL-3 (TYP.)
AL-15 (TYP.)
AL-36 (TYP.)
AL-12 (TYP.)
AL-33 (TYP.)
AL-2 (TYP.)
AL-34 (TYP.)

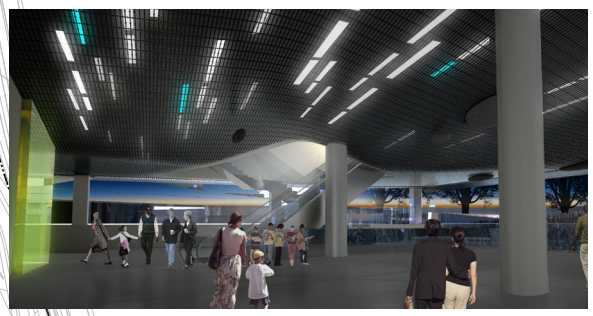


AL-15 (TYP.)
AL-27B (TYP.)
AL-27B (TYP.)
AL-15 (TYP.)
AL-15 (TYP.)
AL-15 (TYP.)
AL-15 (TYP.)
AL-15 (TYP.)
AL-27B (TYP.)
AL-15 (TYP.)
AL-41 (TYP.)
AL-39 (TYP.)
AL-15 (TYP.)
AL-15 (TYP.)
AL-15 (TYP.)
AL-27A (TYP.)
AL-27A (TYP.)
AL-41 (TYP.)
AL-39 (TYP.)
AL-15 (TYP.)
AL-27A (TYP.)
AL-12(TYP.) @ THE TICKET DESK LOCATION
AL-15 (TYP.)
AL-27A (TYP.)
AL-15 (TYP.)
AL-27A (TYP.)
AL-41 (TYP.)
AL-41 (TYP.)
AL-39 (TYP.)
AL-15 (TYP.)
AL-15 (TYP.)
AL-39 (TYP.)
AL-12 (TYP.)
AL-27A (TYP.)
AL-27B (TYP.)
AL-27A (TYP.)
AL-44 (TYP.)
AL-27A (TYP.)
AL-44 (TYP.)
AL-27A (TYP.)
AL-27A (TYP.)
AL-27A (TYP.)
AL-12 (TYP.)
AL-27B (TYP.)
AL-27B (TYP.)
AL-27B (TYP.)

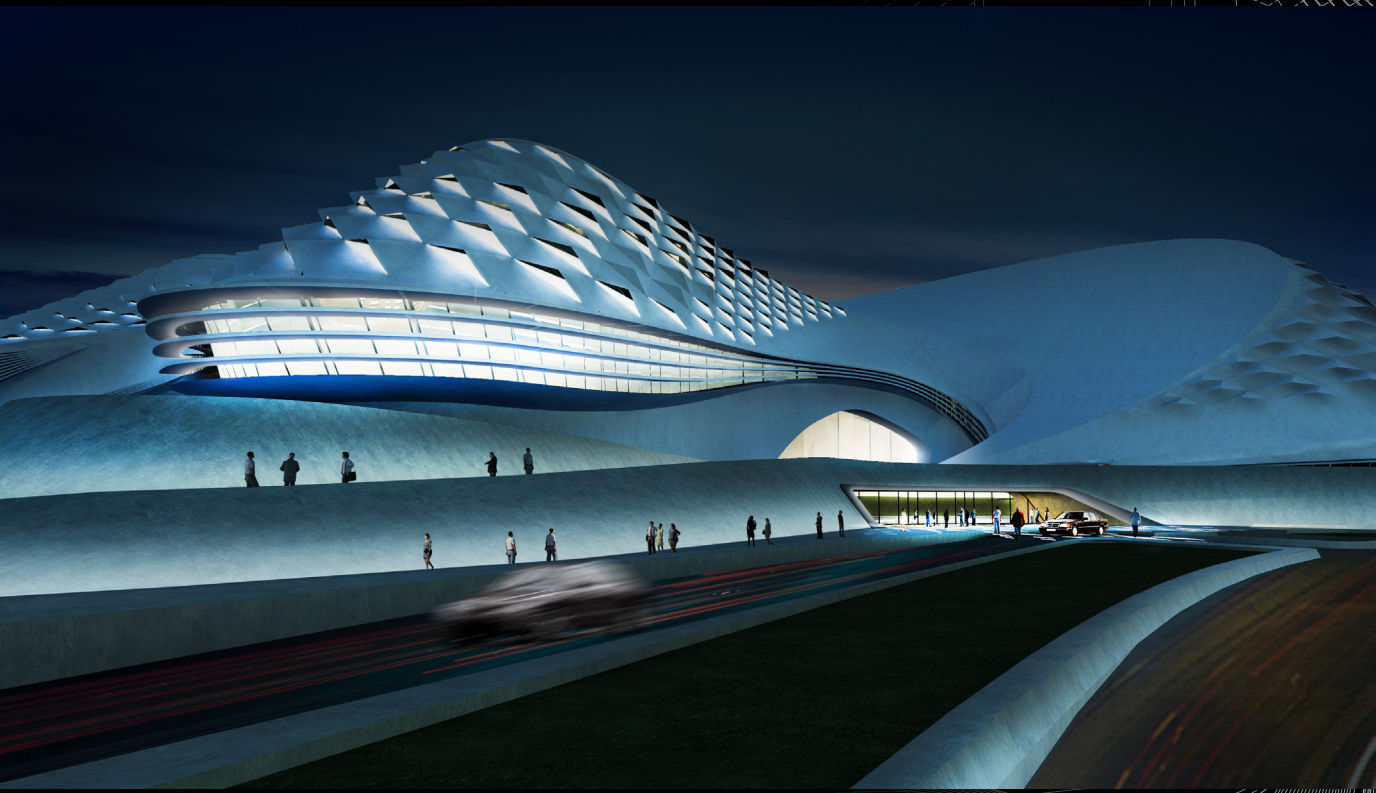
10+1 INTERIORS

Inside, the lobby's undulating metal mesh ceilings are highlighted by interwoven ceiling lights. Proposed interactive technologies will allow these lights to respond to the presence of people in the space, forming dynamic patterns and instantly tracking movements below.



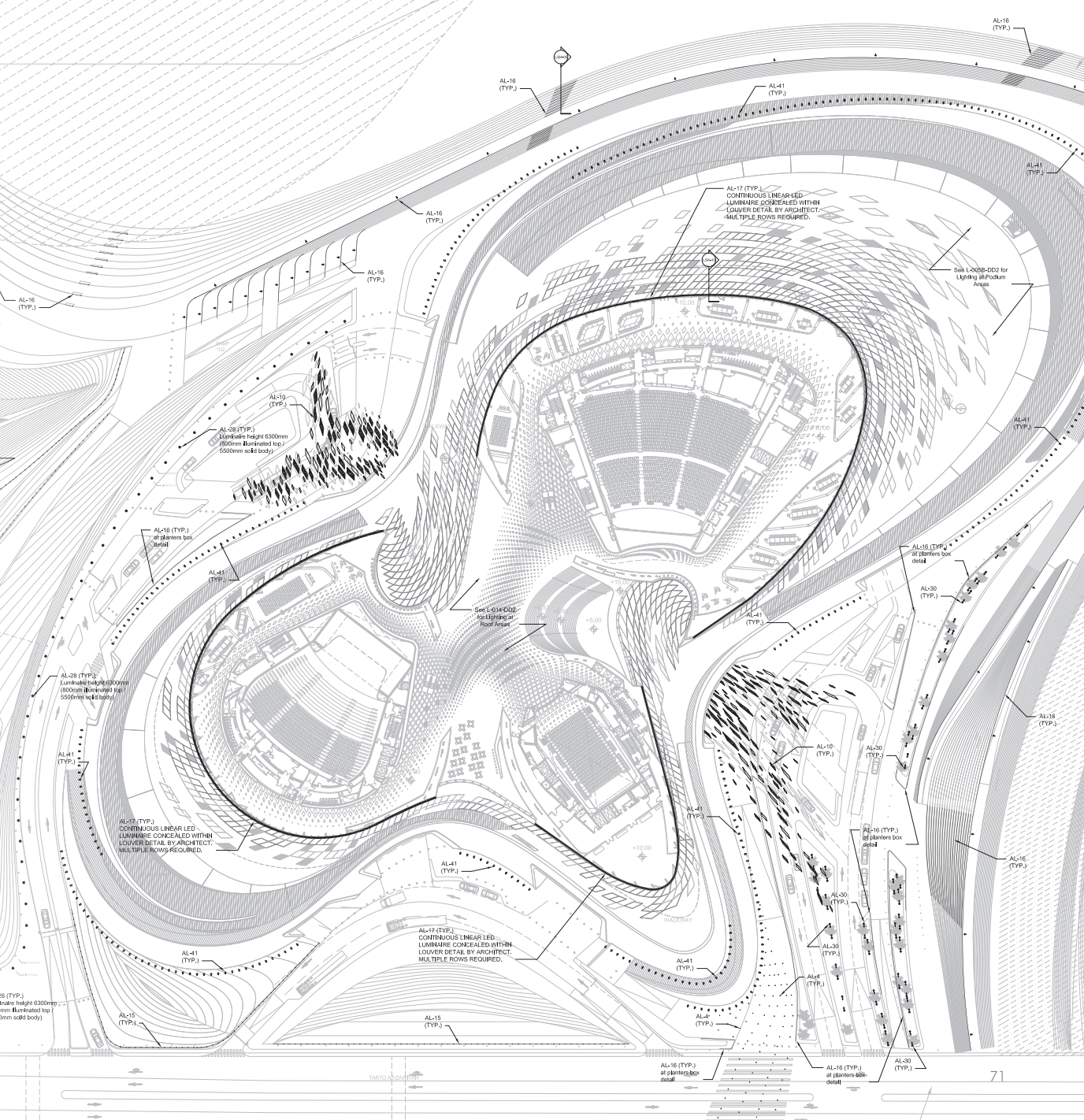


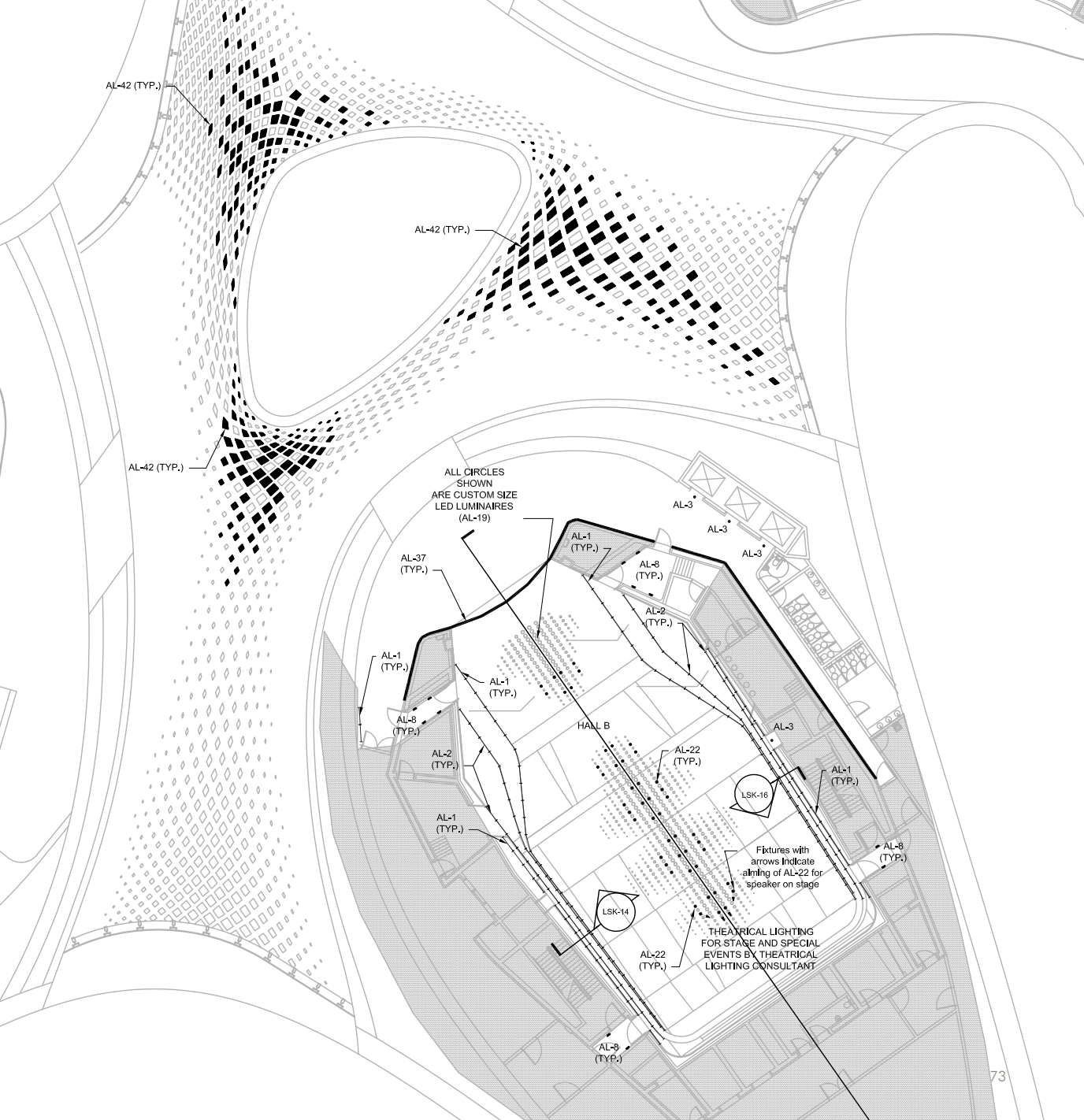
People's Conference Hall
Tripoli / Libya
Architect: Zaha Hadid Architects
2009 - present



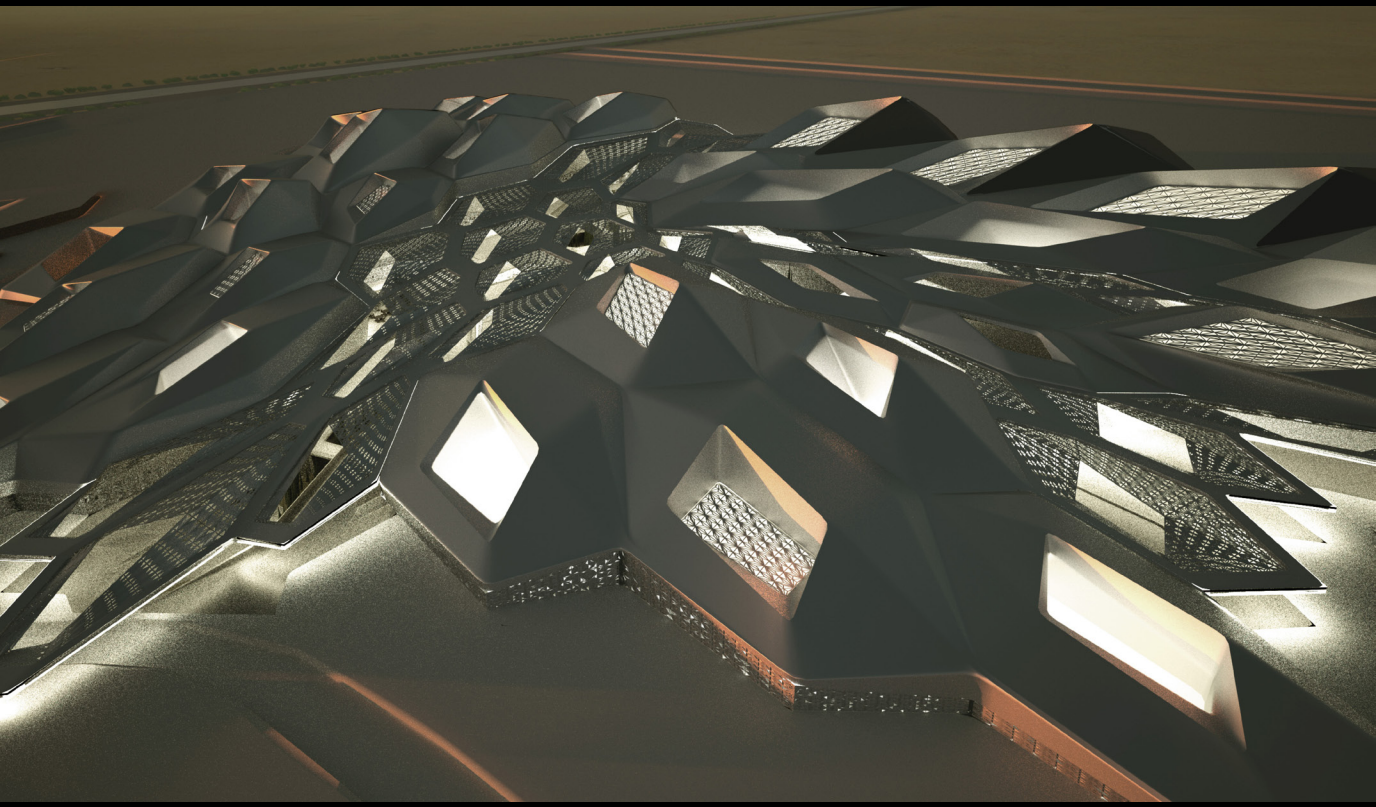
10^{+3} CITY BLOCK

Lighting highlights the sculptural forms of People's Hall, a 5,000-seat venue that will serve as the central meeting place for the fifty-seven African nations. Concealed bands of illumination create a soft, floating effect for the ground-level façade from a distance. Select skylights integrate energy-efficient light sources, forming a swirling pattern that gives texture and movement to the roof at night.


AL-16 (TYP.)
AL-41 (TYP.)
AL-17 (TYP.) CONTINUOUS LINEAR LED LUMINAIRE CONCEALED WITHIN LOUVER DETAIL BY ARCHITECT. MULTIPLE ROWS REQUIRED.
See L-005B-DD2 for Lighting at Podium Areas
AL-10 (TYP.)
AL-28 (TYP.) Luminaire height 6300mm (800mm illuminated top / 5500mm solid body)
AL-16 (TYP.) at planters box detail
See L-014-DD2 for Lighting at Roof Areas
AL-30 (TYP.)
AL-18 (TYP.)
AL-4 (TYP.)
AL-15 (TYP.)
AL-16 (TYP.) at planters box detail
AL-30 (TYP.)
WALKWAY
+10.00
+5.00

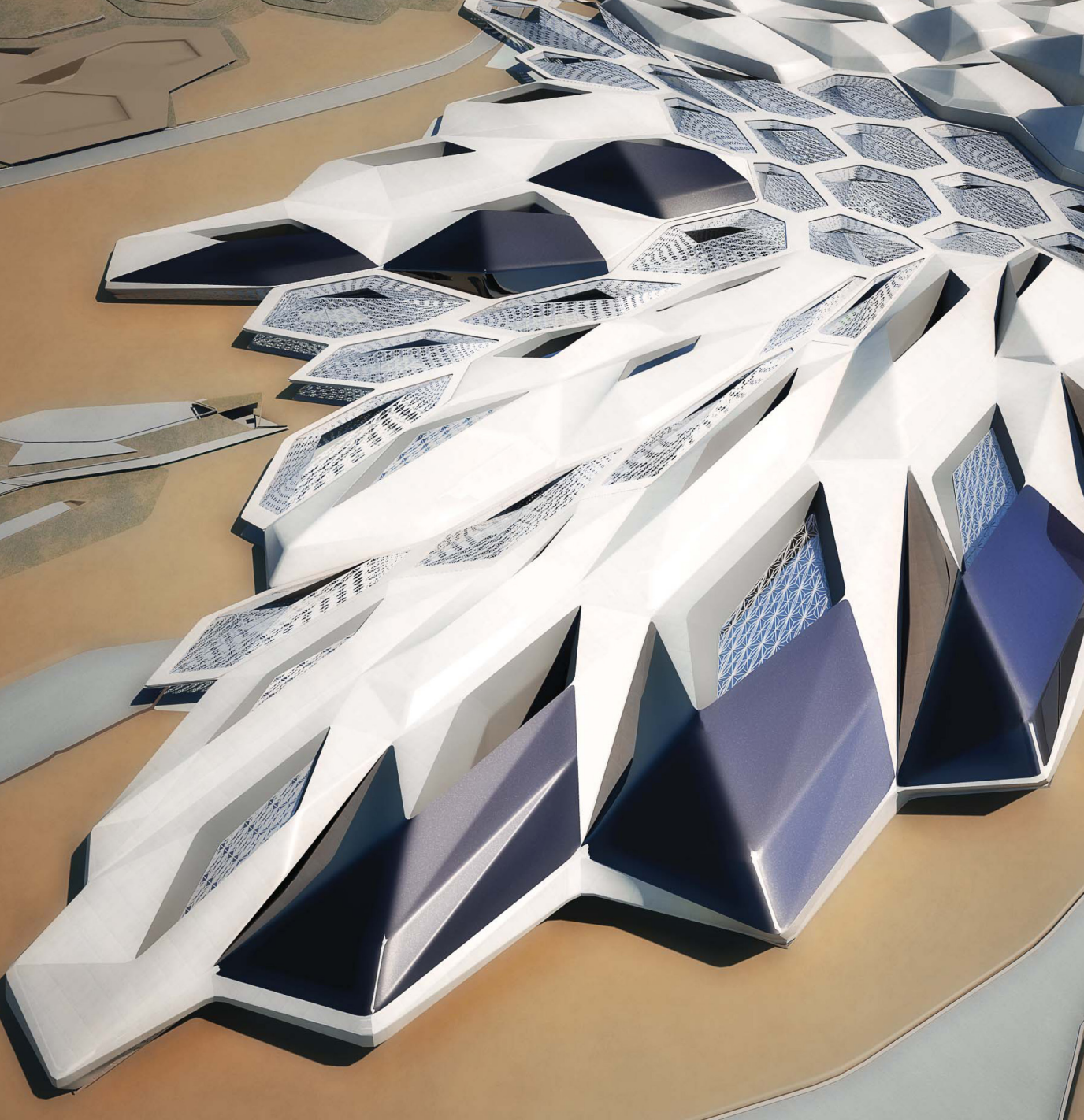

AL-42 (TYP.)
AL-42 (TYP.)
AL-42 (TYP.)
ALL CIRCLES SHOWN ARE CUSTOM SIZE LED LUMINAIRES (AL-19)
AL-3
AL-3
AL-3
AL-1 (TYP.)
AL-8 (TYP.)
AL-37 (TYP.)
AL-2 (TYP.)
AL-1 (TYP.)
AL-1 (TYP.)
AL-8 (TYP.)
HALL B
AL-3
AL-2 (TYP.)
AL-22 (TYP.)
AL-1 (TYP.)
LSK-16
AL-1 (TYP.)
Fixtures with arrows indicate aiming of AL-22 for speaker on stage
AL-8 (TYP.)
LSK-14
THEATRICAL LIGHTING FOR STAGE AND SPECIAL EVENTS BY THEATRICAL LIGHTING CONSULTANT
AL-22 (TYP.)
AL-8 (TYP.)

King Abdullah Petroleum Studies and Research Center
Riyadh / Saudi Arabia
Architect: Zaha Hadid Architects
2009 - present



10^{+4} MASTERPLAN

Cutting-edge, energy-efficient lighting reinforces the iconic architecture of KAPSARC and supports its agenda as a global sustainable energy research center. At night, the multi-dimensional, honeycomb structure is visually articulated by a gradation of light levels. A masterplan of energy efficient lighting and sustainable lighting design solutions have been developed for use throughout the building complex to meet and exceed its LEED-platinum goal, a first-of-its-kind in Saudi Arabia.



Kristin Feireiss in conversation with Jean Sundin and Enrique Peiniger

KF: What does the name 'Office for Visual Interaction' mean, and when did you found your office?

JS: Enrique and I founded Office for Visual Interaction in 1997. For us, the word 'interaction' means the relationship of light with surfaces and materials, and how they interact. Lighting design is not just about placing lighting hardware, but instead integrating lighting seamlessly into architecture. It is about how you feel and experience three-dimensional space.

KF: Jean, what is your background?

JS: I have a Bachelor of Fine Arts in Interior Design. During my studies I was introduced to a lighting internship program, and I discovered how powerful and unique lighting is. Once I started practicing lighting it became a passion for me.

KF: What got you to lighting, Enrique?

EP: I studied architecture at the Technical University of Berlin. I was always fascinated by the social component of architecture and how people perceive and interpret space. I was interested in finding out the practical limits of theoretical ideas, especially in lighting. Lighting is also about technical execution, so this is how my interests came together.

KF: When was the starting point of your cooperation?

JS: We were working together in another lighting office, and we could see that there was a recurring situation of how lighting was being done. We knew there were many more potentials that could be explored.

EP: Normally, at a very late stage of design the architects would ask, 'what about lighting?' What they get at that stage are standard responses. We thought if architects would ask this question earlier, they would get different answers. Our philosophy is to set up a dialogue early on with the architects to create a tailor-made result.

KF: Is collaboration with architects from the very beginning of the project a 'must' for you?
JS: It's not a must, but it's much, much better. When we're involved early, we have the opportunity to do wonderful things. Building is a process and lighting is part of it. If you miss an opportunity you can't go back. I think architects can see that more can be achieved in their projects by having the right expertise involved at the very early stages.

EP: You can see a common line in our lighting design - we do not have and do not want to create only one style. We have expertise and we can shape any solution. It's very important that each time we work with an architect, we develop a unique language. It's all about integrated lighting design which should be a part of the architecture, not disconnected, not an afterthought.

KF: You are running quite a young office, but from the very beginning you worked with famous architects: Zaha Hadid, Renzo Piano, Enric Mirailles and Benedetta Tagliabue, only to mention a few. What is your secret?

JS: It's anyone's secret, really: it's doing very good work. It's paying attention to the architectural idea and inspiration. Lighting is a very unique aspect of architecture. A successful lighting design must be carried through a variety of scales, from masterplan to the small trim that finishes a luminaire in the ceiling.

EP: We have to understand the architectural story of each project and to write the next lines with lighting. It's never disconnected. That's what makes it so much fun for Jean and me - to discover the story and then to think: What does it mean for lighting? Our core concepts are typically based on one or two strong and clear ideas.

JS: In fact if it gets too complicated, we know that something is wrong and we have to go back and take another look.

KF: In the New York Times Headquarters Building with Renzo Piano, your office was involved from the very beginning. Can you talk about the challenges?

JS: The building is about lightness and transparency, to quote Renzo Piano. So we had to find out what this means in lighting terms. For an architect, transparency is glass. For us, we needed to generate focal points with light. To pull the eye through the lobby space means illuminating surfaces so you have a direct view into the garden, and can make your way past, through all these transparent walls.

KF: Can you give another example of a story of a building?

EP: A building with a special story is the Parliament of Scotland. We were sitting with Enric Miralles and Benedetta Tagliabue in their just-renovated office space in Barcelona and trying to come up with lighting solutions that would fit or feel right to them. During the renovation, they intentionally left vertical strips of the historic wall surface exposed, adjacent to the freshly painted wall areas.

JS: We translated these bands into lighting elements for the Parliament of Scotland – abstract luminous bands for the concrete staircases. It was an extension of their architectural vocabulary in lighting terms, which fit to their style and made sense for the project.

EP: When we showed them our sketches, Enric said, "We love stripes. We have them everywhere."

JS: The second part of the story is about where the Parliament is located. Because it's in Scotland, we looked to the historic context – we researched Charles Rennie Mackintosh and how lighting was done in his buildings, and developed a hanging luminaire similar to the Glasgow School of Arts painting studios.

KF: How are you involved in production, and inventing new products?

JS: We do custom lighting solutions all the time: the lighting itself as well as the luminaires, the fixtures. When the product we need does not exist, we simply have to invent it.

EP: A good example is the New York City Streetlight competition. During the first few minutes of our discussion, we asked ourselves: what is the light source of the future? and what is a sustainable solution for a city? We knew that LED technology for a streetlight application made sense. Although it was very pioneering at the time, we could forsee it would become the future industry standard.

JS: Based on the technical requirements of LED technology we developed an optimized shape for cooling and optical lensing which could take advantage of the fact that LEDs are so small.

KF: How do you see your responsibilities as lighting designer?

EP: The use of light is nowadays much more critically tied to energy use. Our designs have a very efficient use of light sources. For example, the debating chamber in the Parliament in Edinburgh was the first debating chamber in the world where energy efficient metal halide sources were used. Other debating chambers use incandescent light. Our solution is very user-friendly and cost-effective.

KF: Research and concern with resource use are important issues for your work in general.

EP: Yes, it's totally embedded in this thinking. How you use resources cannot be thought of at the end. We have to think about the entire system.

We also have a social responsibility to implement sustainable energy solutions as part of our work. Our lighting design for the LED Streetlight for New York City will reduce energy consumption nearly to half, saving millions of dollars and allowing power to be re-routed for other needs.

KF: Your profession has an enormous influence on people's perception of space, architecture and of atmosphere.

JS: Light is the one thing that transforms space without physically changing it. It's a really unique and very powerful thing. That's why we have to really understand what do the architects want to achieve and what is their vision.

Also, we always remind ourselves that although we're lighting designers, sometimes it's not the right thing to light everything. The eye can become overwhelmed. It's just as important to use darkness and shadow as using light.

KF: What makes a good lighting project?

EP: A seamless integration of lighting and architecture, so you cannot really tell where one stops and the other starts. Projects are successful when the architecture is good and lighting supports it in a nice way and adds dimension. Without good architecture, there's usually not good lighting.

At **Office for Visual Interaction (OVI)**, we create lighting designs that seek a balance between art and technology, form and function, beauty and purpose, vision and result. Approaching lighting as an integral part of architecture, we work in constant dialogue with design teams, tailoring solutions to each project's unique architectural language and specific technical demands. Our firm has successfully worked in all phases of design, and illuminated projects of many styles and scales: from Renzo Piano's New York Times skyscraper to Zaha Hadid's Austrian ski jump, from a prototype LED streetlight for New York City to the lighting design and masterplan for the Scottish Parliament complex.

Our clients have access to OVI's worldwide capabilities, professional expertise, and extensive network of industry contacts. Research and development are fundamental to our work, and our solutions use state-of-the-art technology in appropriate ways. When the right lights for a project do not exist, we invent them: we frequently collaborate with manufacturers to develop custom fixtures, incorporate specialized finishes, introduce innovative manufacturing techniques, and advance emerging light sources.

We believe that sustainability is synonymous with good design, and principles of environmental awareness are integral to our work. We recognize and promote conceptual architectural opportunities to incorporate daylight, specify low-energy light sources that enhance aesthetics, and design-engineer layouts to maximize their efficiency. Our solutions use quality materials and prioritize ease of maintenance, ensuring they will endure over time.

JEAN SUNDIN

IESNA, IALD, PLDA
FOUNDER & PRINCIPAL

Jean Sundin's lighting expertise spans several decades of work in the lighting industry. Her skill with cutting edge technologies drives projects that showcase innovative, signature lighting solutions. This enables OVI to embed an engineering logic into its designs.

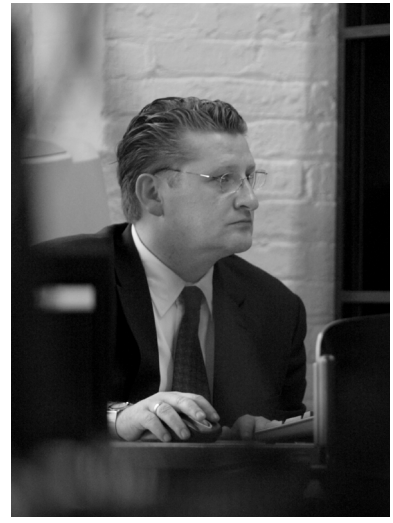
Ms. Sundin is currently Director of Education for the Professional Lighting Designers' Association. She co-authored the International Association of Lighting Designers' 'Guidelines for Specification Integrity,' used by designers worldwide. She is also a professional member of the Illuminating Engineering Society and U.S. Green Building Council. Ms. Sundin has taught and lectured around the globe and is a distinguished faculty member at Parsons School of Design in New York City.

ENRIQUE PEINIGER

Dipl.-Ing., M.A., IESNA, IALD, PLDA
FOUNDER & PRINCIPAL

Trained in architectural engineering, Enrique Peiniger sees his work in lighting as a technical extension of the architectural language. Over the years, he has cultivated an in-depth knowledge of luminaire manufacturing and technology, giving him a high degree of precision in designing lighting that conforms to narrow technical requirements.

Mr. Peiniger is currently treasurer for the Professional Lighting Designers' Association, and a member of the American Institute of Architects, Illuminating Engineering Society, International Association of Lighting Designer's and U.S. Green Building Council. He has taught courses at the Technical University of Berlin and the Parsons School of Design in New York, where he is a distinguished faculty member.



Team | Photo Credits

The Scottish Parliament
Edinburgh, Scotland

Architect: Enric Miralles Benedetta Tagliabue (EMBT)
Architect of Record: RMJM- Edinburgh
Photographer: Roland Halbe (p.12-13,21MR/BR,24), Stewart Guthrie (p.21L), Keith Hunter (p.16-17), Ralph Richter (p.23), EMBT (p.22), Niall Hendrie (p.25)

Rosenthal Center for Contemporary Art
Cincinnati, Ohio / USA

Architect: Zaha Hadid Architects
Architect of Record: KZF, Inc.
Photographer: Roland Halbe (p.26,27,29), John Linden (p.28)

The United States Air Force Memorial
Arlington, Virginia / USA

Architect: Pei Cobb Freed & Partners
Photographer: Thomas Mayer (p.30,31,33,36,37), Getty Images (p.31TL), Centex Construction (p.31BR)

The New York Times Building
New York, New York / USA

Architect: Renzo Piano Building Workshop
Architect of Record: FX Fowle
Photographer: Frieder Blickle (p.4,38,39,42,43,49), Michel Denancè (p.44-45)

The Times Center
New York, New York / USA

Architect: Renzo Piano Building Workshop
Architect of Record: FX Fowle
Photographer: Frieder Blickle (p.50, 52-53)

Rensselaer Polytechnic Institute
Experimental Media and Performing Arts Center
Troy, New York / USA

Architect: GRIMSHAW
Architect of Record: Davis Brody Bond
Photographer: Paúl Rivera (p.54-55,56), Peter Aaron-Esto (p.5)

New York City Streetlight
New York, New York / USA

Competition Architect: Thomas Phifer Architects
Structural Engineer: Werner Sobek New York
Rendering: D-BOX (p.58)

Al Hamra Firdous Tower
Kuwait City, Kuwait

Architect: Skidmore Owings & Merrill - New York
Architect of Record: Al-Jazera Consultants
Rendering: SOM/OVI (p.64,67)

Qatar College of Media and Communications
Education City, Doha, Qatar

Architect: Antoine Predock Architects
Architect of Record: Burns & McDonnell
Rendering: Antoine Predock Architects/OVI (p.68,69)

Museum of Nature and Science
Dallas, Texas / USA

Architect: Morphosis
Rendering: Morphosis/OVI (p.70)

People's Conference Hall
Tripoli, Libya

Architect: Zaha Hadid Architects
Rendering: Zaha Hadid Architects/OVI (p.74,76)

King Abdullah Petroleum Studies and Research Center
Riyadh, Saudi Arabia

Architect: Zaha Hadid Architects
Rendering: Zaha Hadid Architects

All other photographs, drawings, and renderings by OVI unless otherwise mentioned.

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www.aedes-arc.de

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Interview with Kristin Feireiss
Photographer: Erik-Jan Ouwerkerk (p.78-81)

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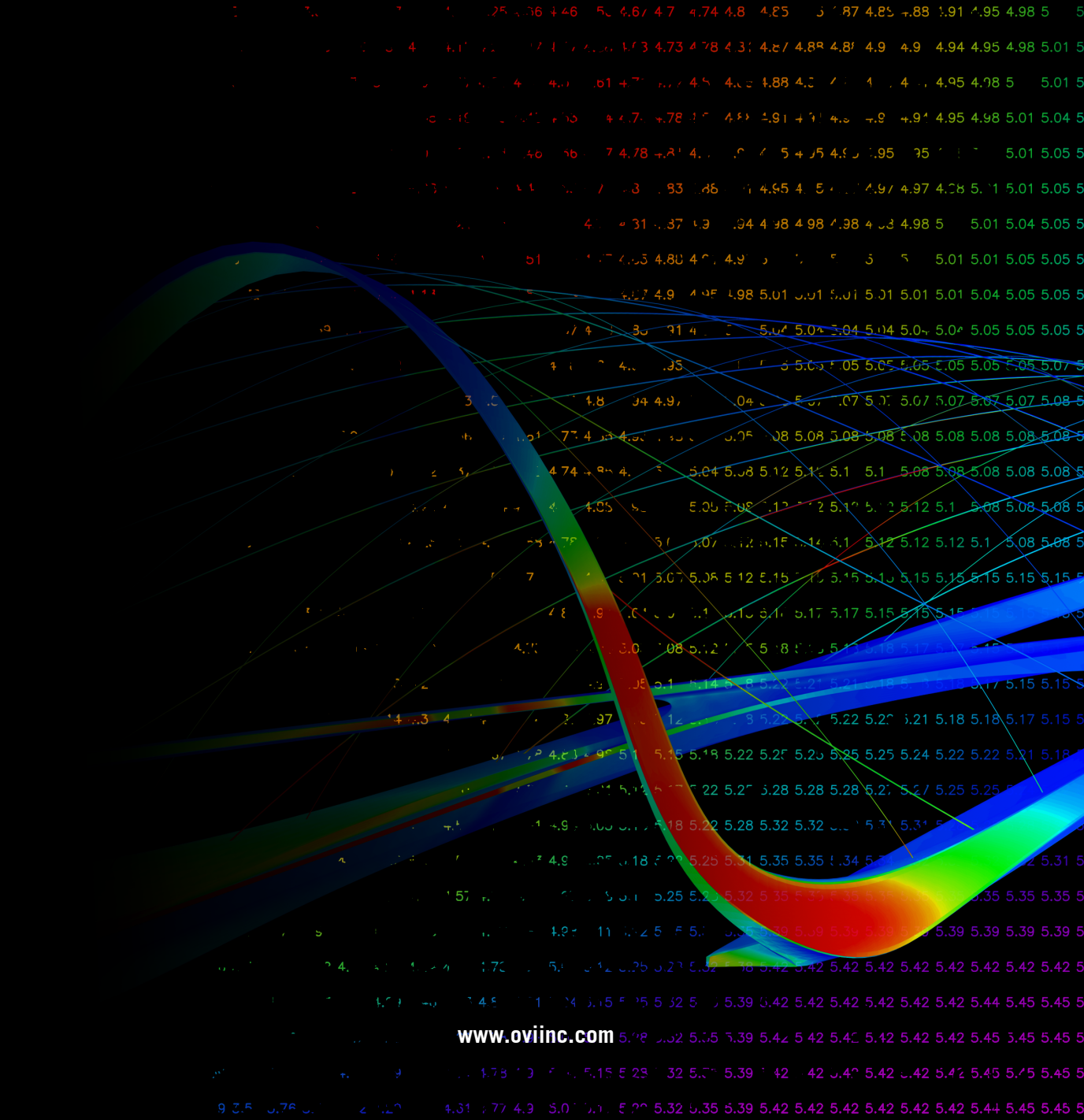
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