



WORKING EDGE

We took the comprehensive design studio brief--an eco-tech high-rise in Uptown Charlotte--as a research opportunity speculate on the current ecological possibilities of concrete as an alternative to steel and glass.

Setting up a design experiment:

Client:

UN Department of Economic & Social Affairs

ASPIRATIONS

Sustainability

The UN DESA leads the world's 2030 challenge which translates into a deep commitment to sustainable development.

Social Space

As an international NGO, DESA should set world standards for public space.

Institutional Presence

DESA's importance should be reflected in strong aesthetics and iconic presence.

21st Century Workplace

DESA should set the example in work environment solutions and innovation.

Longevity

A legacy building that serves for at least 100 years.

Design Interest:

Concrete

PROPERTIES

Structural

Space Enclosing

Thermal Mass

Strong Aesthetics

Durability

Maleability

Typology:

**Exo-skeleton
Urban Office
Highrise**

GOALS

Low-energy

Climate specific strategies:
Maximize daylighting and cross-ventilation potential in all floors.

Spatial Diversity

Create framework for a diversity of enclosed and semi-enclosed work areas.

Performance

Maximize thermal resistance, shading, and on site energy generation.

Public Space

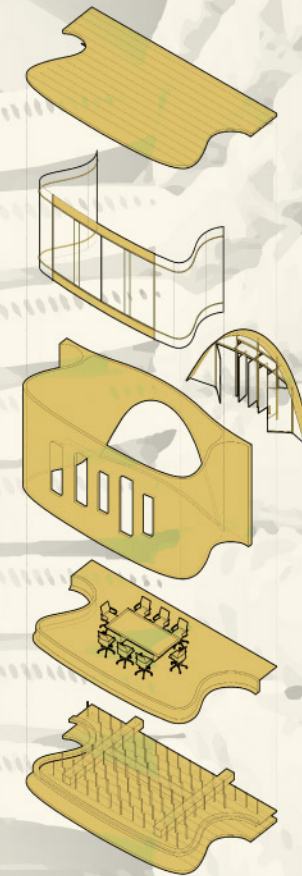
Provide public transportation support and abundant open public space.

Architectural Statement

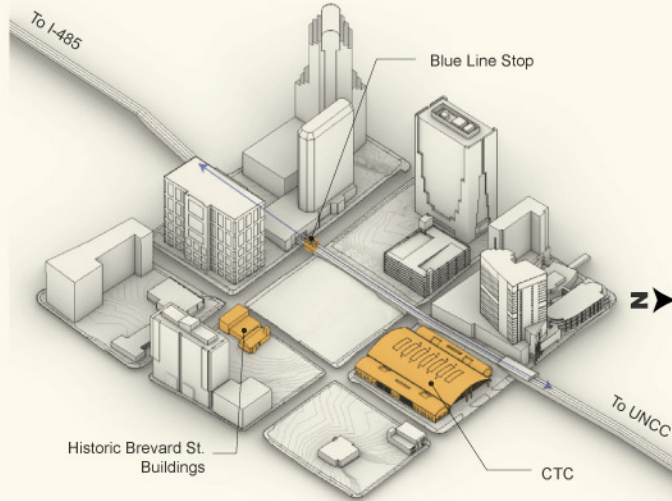
Striking aesthetic power in Uptown Charlotte.

Proposal:

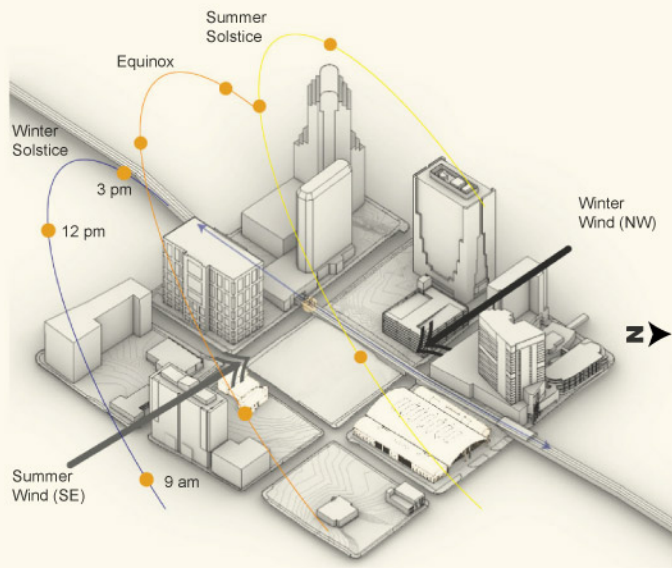
Working Edge



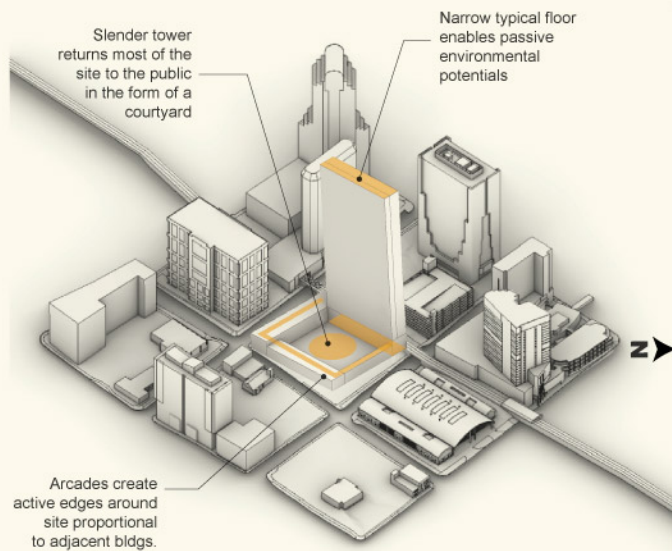
A slender tower framed by a space enclosing concrete exo-skeleton weaving structure, thermal performance, spatial diversity, and circulation into a thick, inhabitable edge.



PHYSICAL CONTEXT

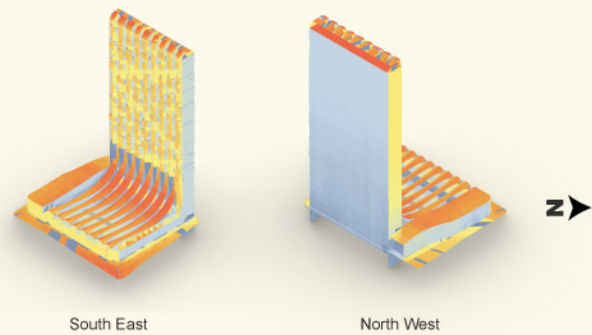


ENVIRONMENTAL CONTEXT



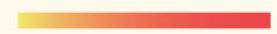
MASSING

SITE CONTEXT DIAGRAMS



EFFECT OF CORRUGATED CONCRETE FACADE ON SOUTHERN RADIATION EXPOSURE

Radiation Range on Flat South Wall



1069 < Radiation < 1565

1,565 kWh/m² 1,069 kWh/m²

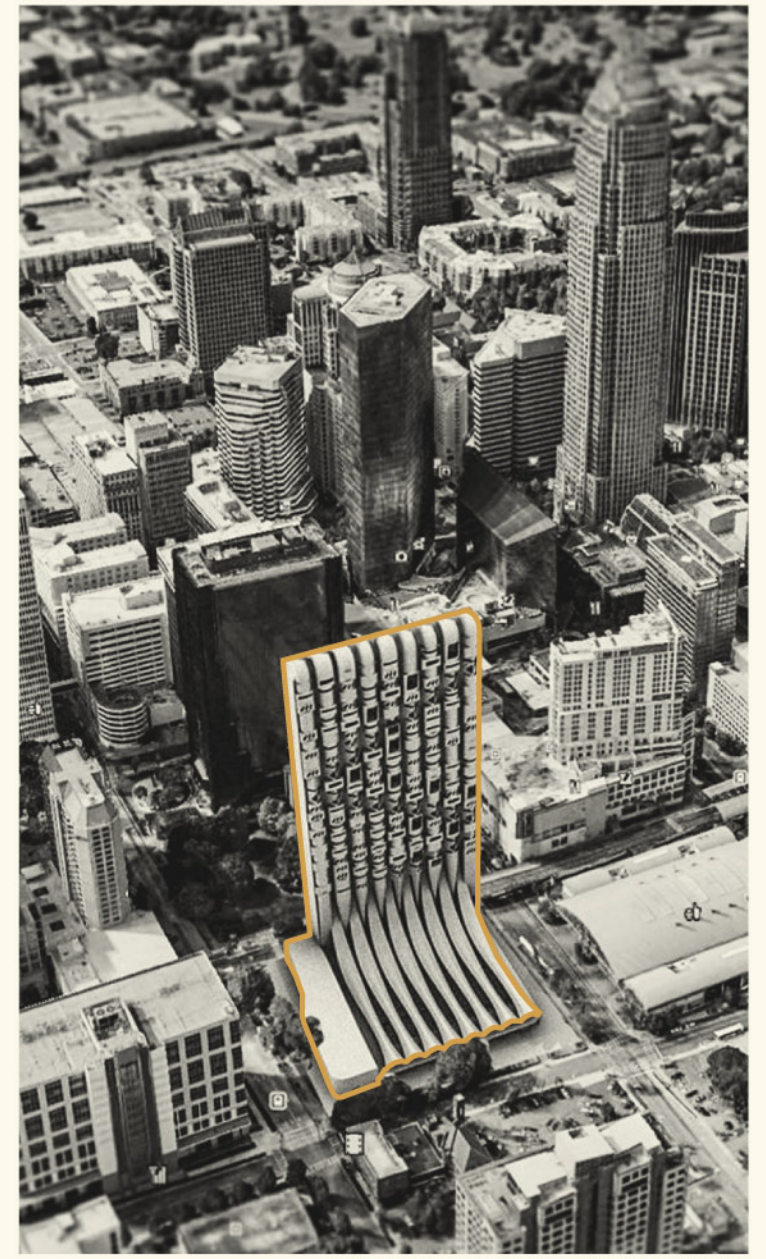
Radiation Range on Ondulating South Wall



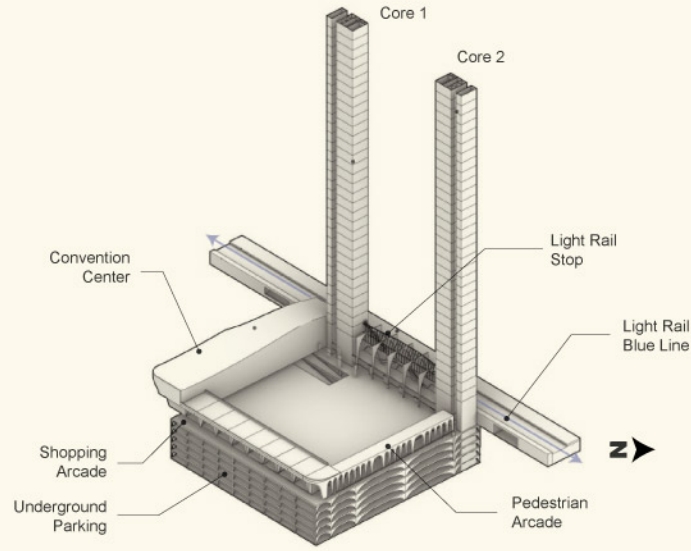
469 < Radiation < 1069

782 kWh/m² 469 kWh/m² 156 kWh/m²

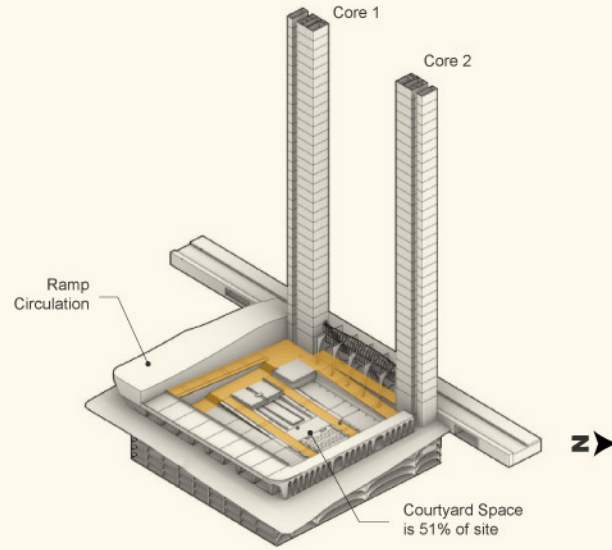
RADIATION



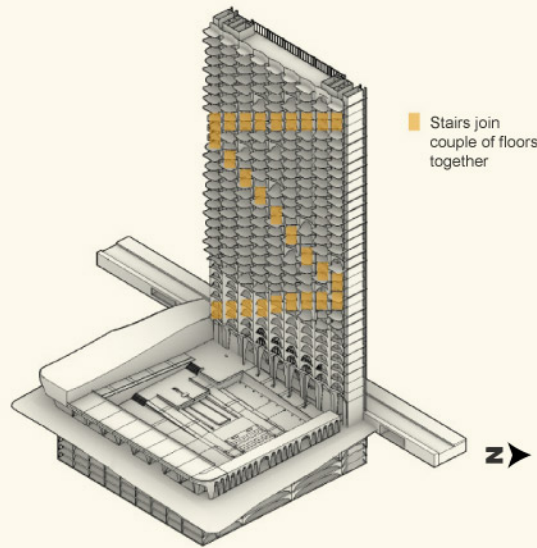
BIRD'S EYE VIEW OF THE TOWER IN UPTOWN



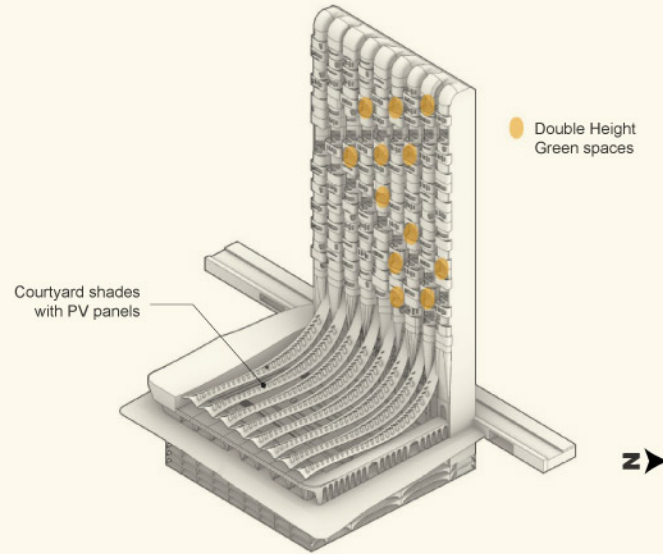
EDGE CONDITION



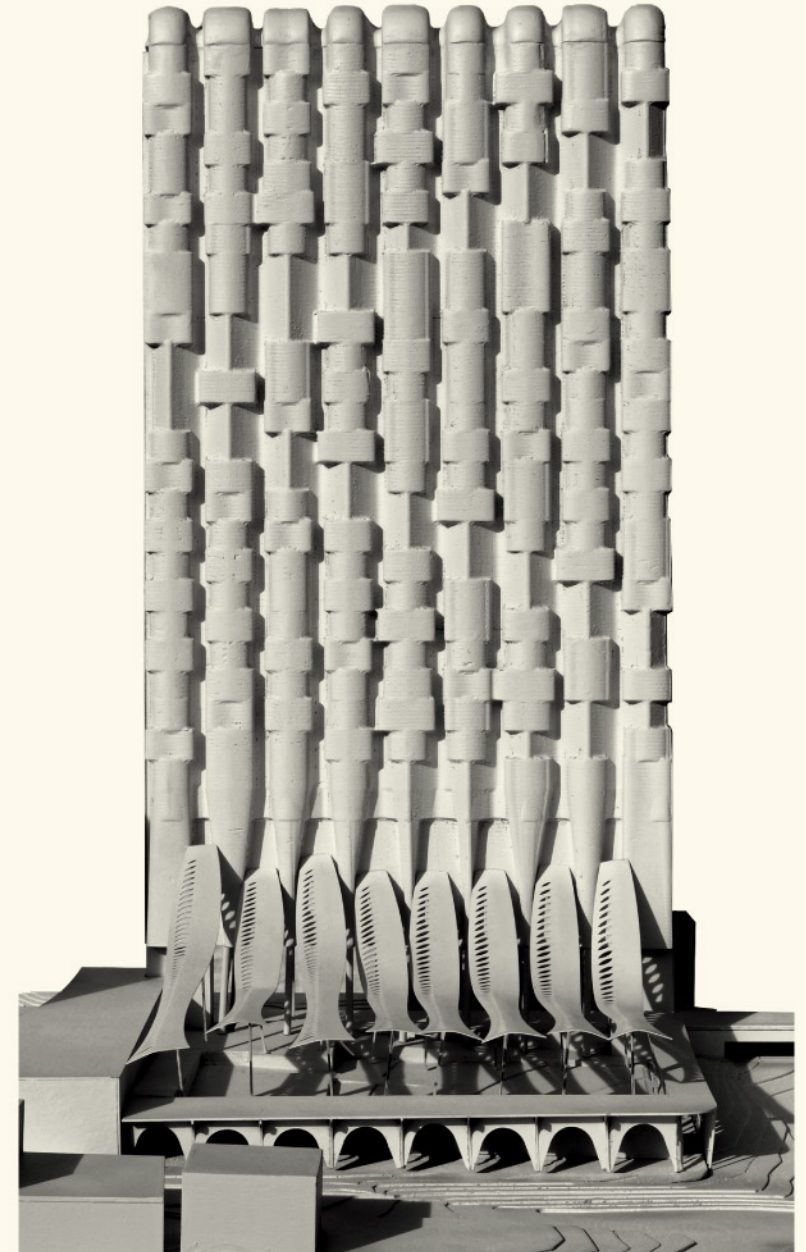
COURTYARD CONDITION



COMMUNICATING STAIRS



DOUBLE HT. GREEN SPACE



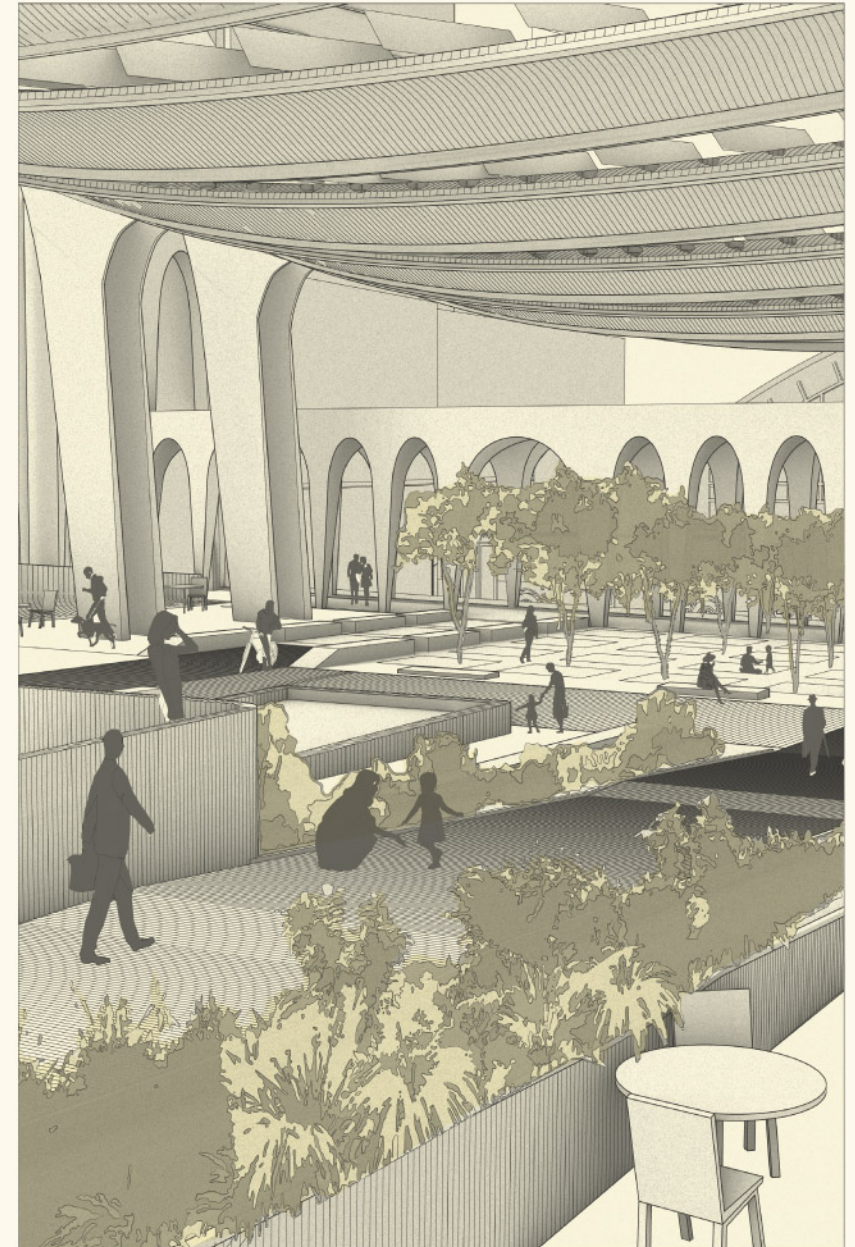
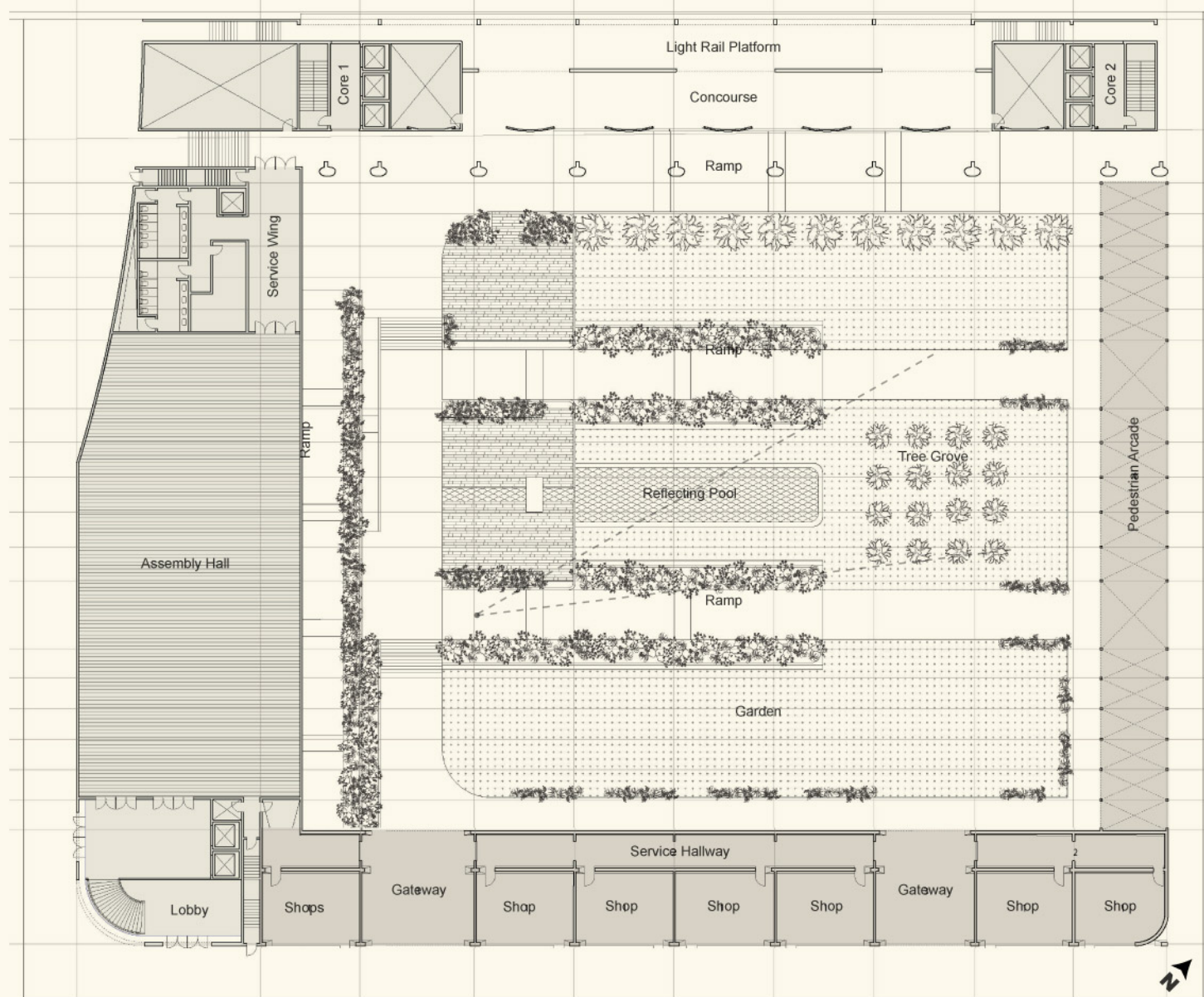
PERSPECTIVE OF THE SHADED COURTYARD

BUILDING ASSEMBLY DIAGRAMS

To I-475

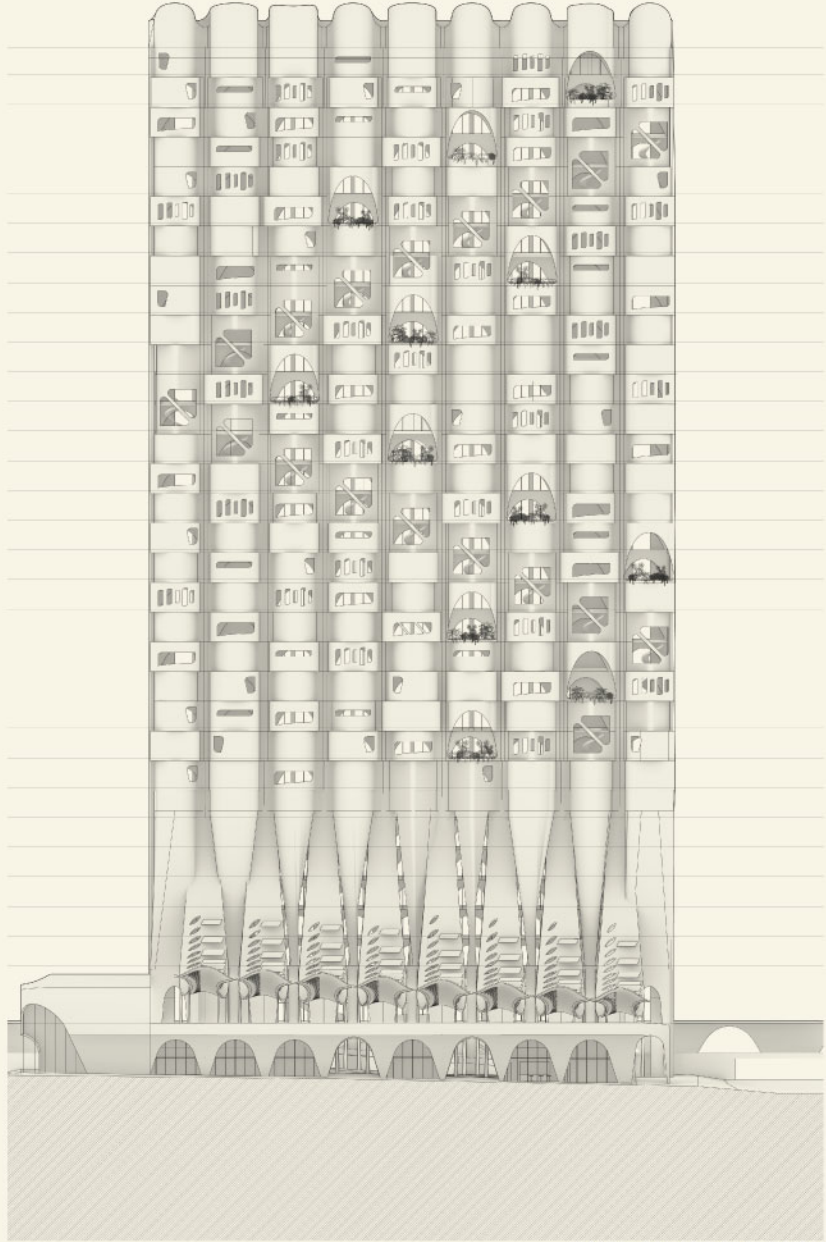
Light Train Rail Lines

To UNCC

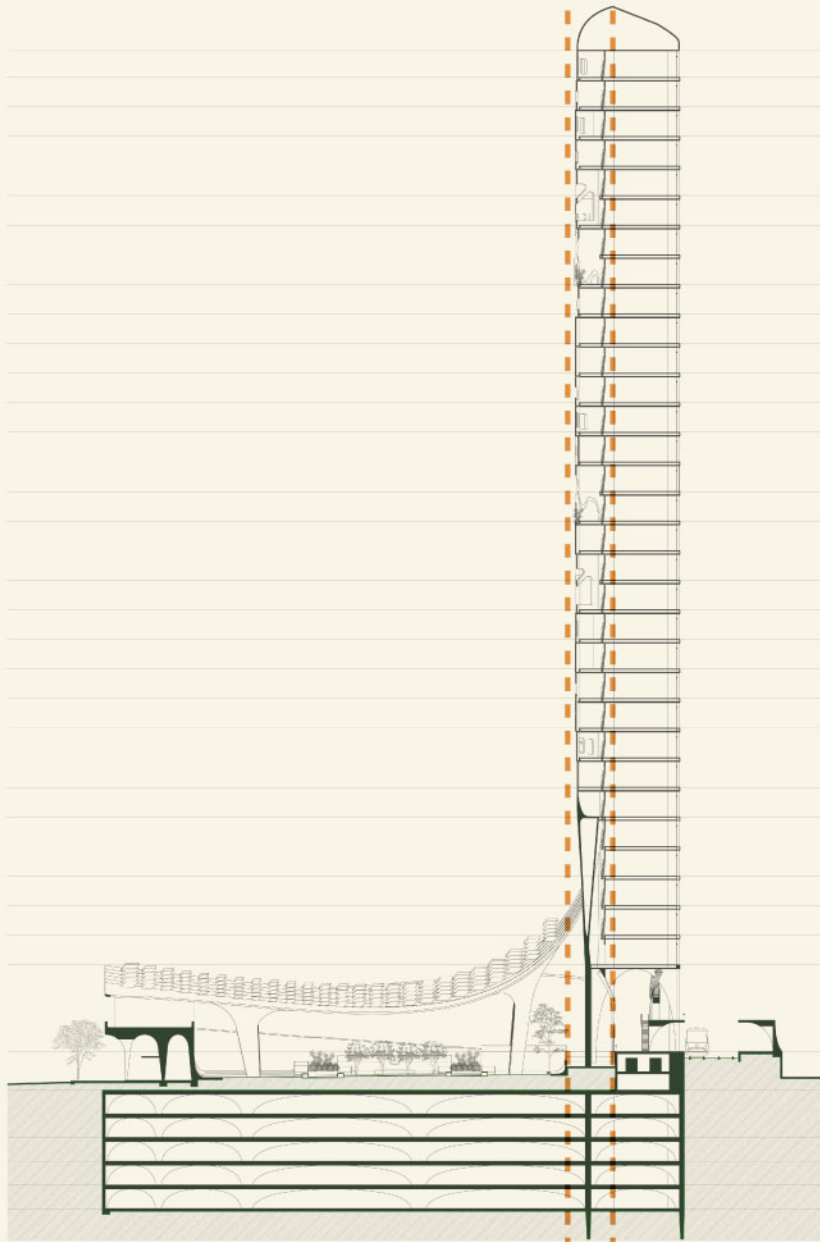


MAIN COURTYAD FLOOR PLAN

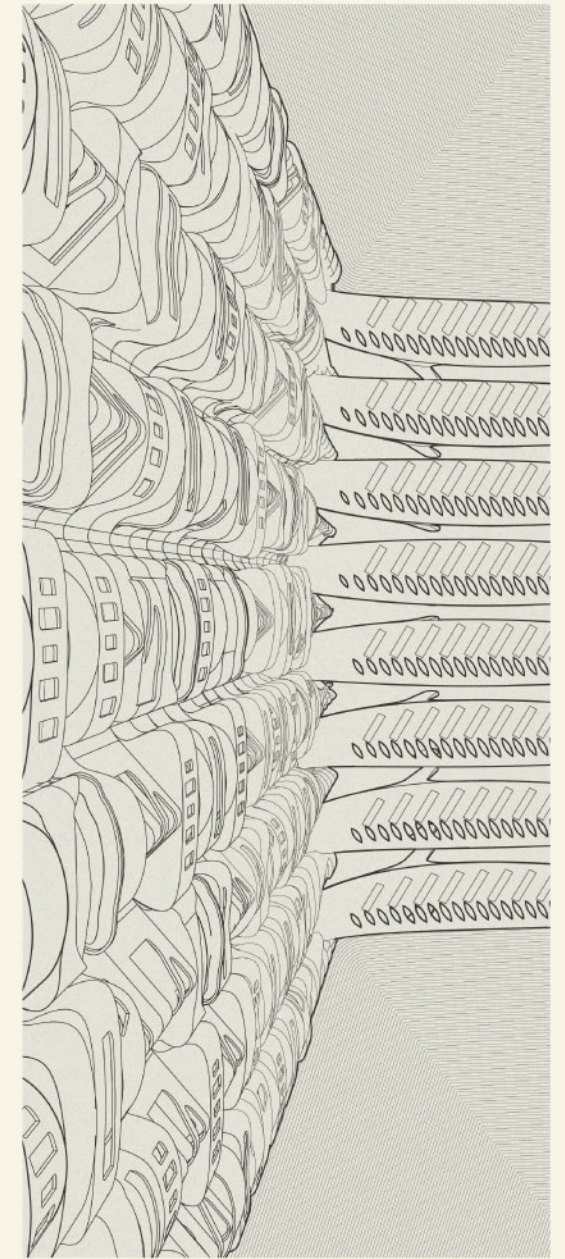
PERSPECTIVE VIEW OF THE COURTYARD



SOUTH FACADE ELEVATION



BUILDING SECTION



SOUTH FACADE LOOKING DOWN

1 Light Rail Platform
for LINX Blue Line

2 Light Rail Concourse
for commuters and primary
access to Tower

3 Escalators to Tower Lobby
provide access to building
via security desk

4 Primary Ramp to Rail Concourse
provides street and courtyard
access to public transport

5 Soft Ground Courtyard Area
73% of site is returned to the
public and largely soft scaped

6 Ramp to Terrace
two primary ramps provide
access to soft scaped terraces

7 Tree Grove
vegetation within the courtyard help
create a microclimate cooling the space

8 Water Feature
a running water feature helps to regulate
humidity within the courtyard

9 Soft Ground Terrace negotiates
negotiates the change in grade from
Brevard St. to the Light Rail Platform

10 Ramp to Public Roof Terrace
primary ramp providing access
to the public roof terrace

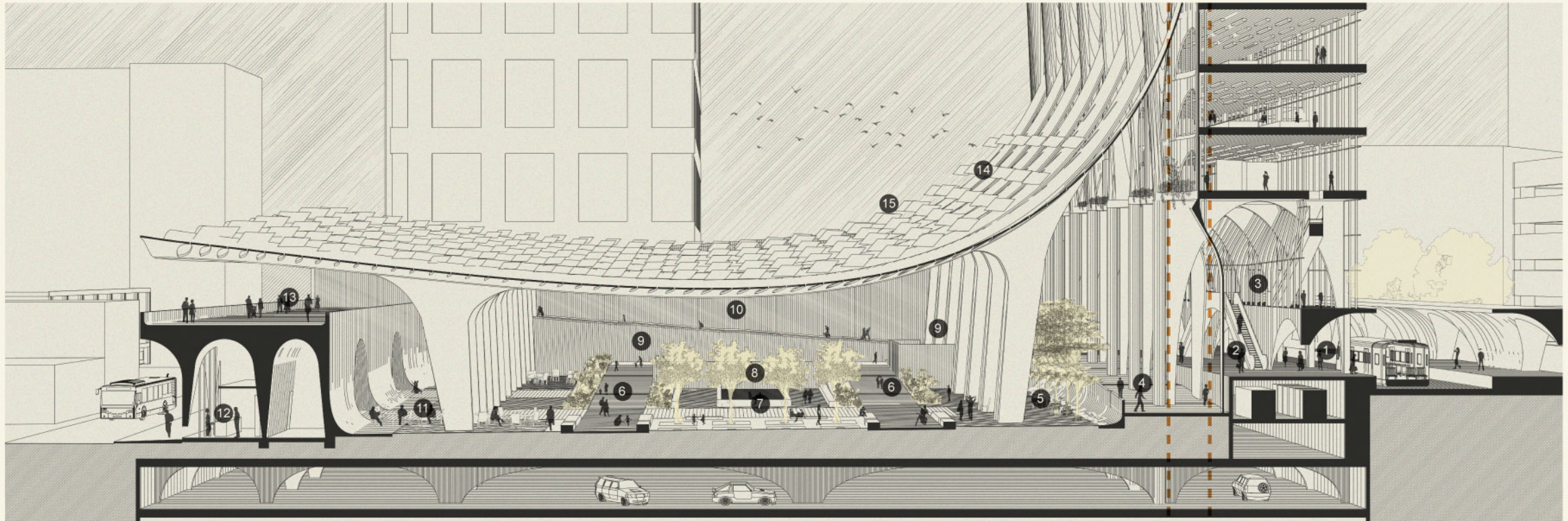
11 Soft Ground Public Seating Area
provides space for the public and
tower workers with seating spaces

12 Shopping Arcade
shopping arcade facing Brevard St.

13 Public Roof Terrace
overlooks Historic buildings
located on Brevard St.

14 Courtyard Roof
perforated concrete shells provides
shading to south facing courtyard

15 Solar Panels located on Courtyard Roof
provide 10 kBtu/ft²/yr overall
reduction in building EUI



COURTYARD AND URBAN CONTEXT SECTION

Three-dimensional quality of facade, while being an aesthetic counter-point to the typical smooth glazing facade, also distributes radiation over larger surface and casts shadows onto itself, lowering air temperatures outside

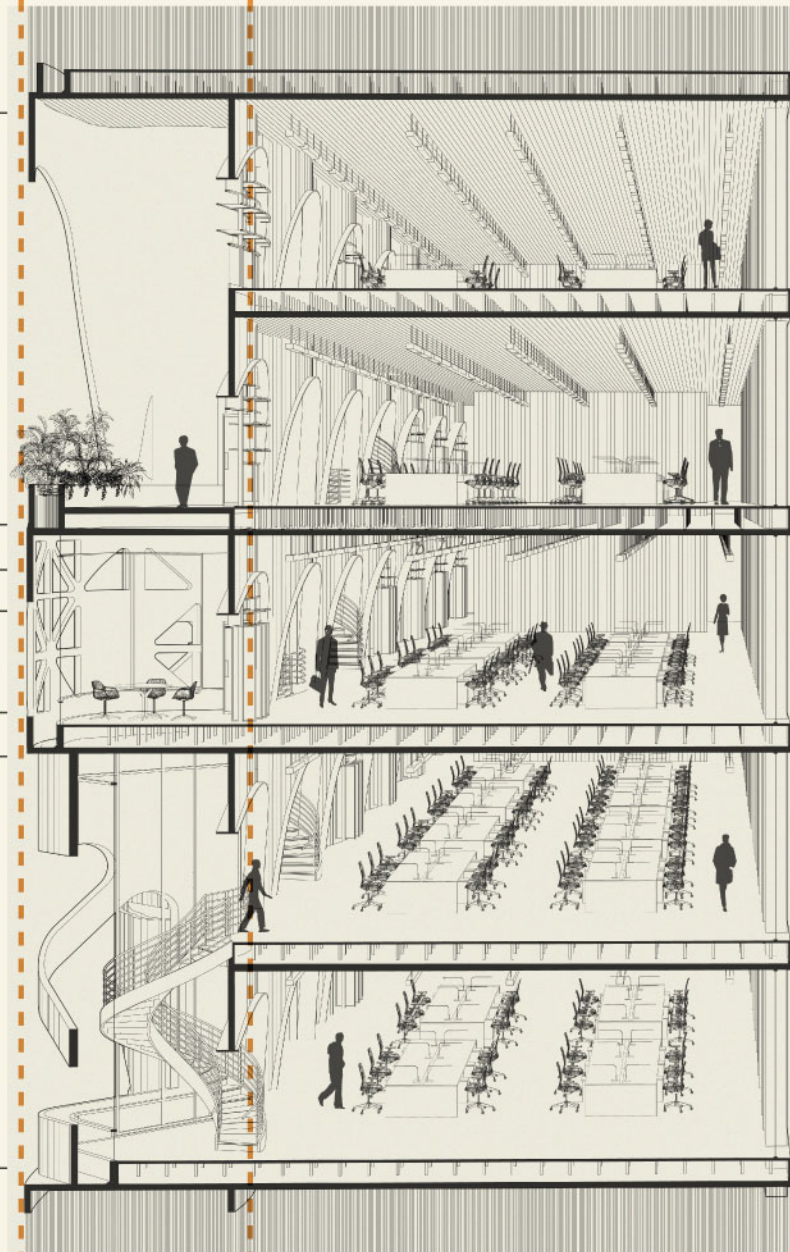
Double-height green spaces enhance cross ventilation and provide natural respite and fresh air to workers inside

Operable glass partitions in the concrete wall enable cross ventilation

Multiple rough opening geometries in the concrete create diverse lighting conditions as well as block most solar radiation

250 to 300 sq ft rooms of variable shape & character provide diverse, enclosed work settings on every floor

Communicating stairs on every floor enable constant social and professional interaction between floors and encourage mobility while reducing elevator use



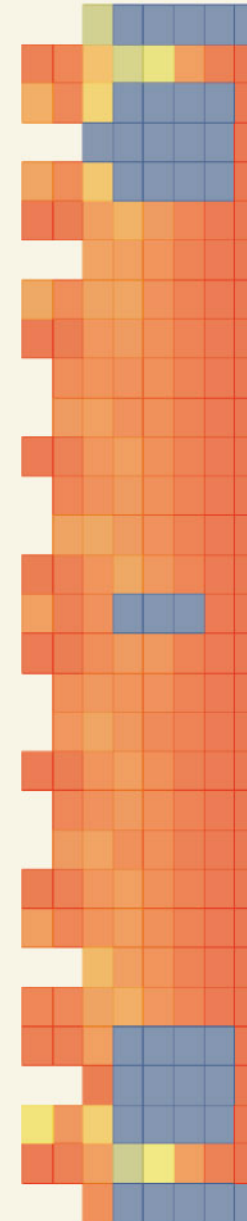
Clear views of the city provide a window to the outside conditions of the city

15' ceiling heights and a crystal clear, minimal structure North side enable constant daylight of most of the office floor plate, reducing cost and heat from artificial lights

Orientation of light fixtures parallel to the North curtain wall enable environmental controls to be synced to light conditions outside

Typical open floor space still provides with much needed work areas for employees, as well as a personal "base" within the office

TYPICAL TOWER FLOORS SECTION



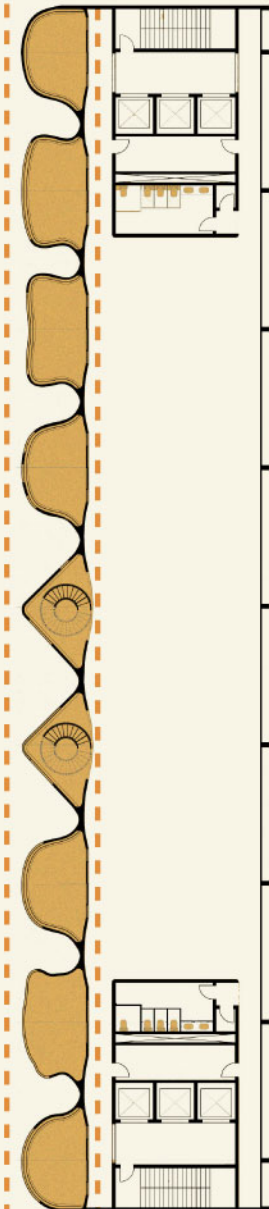
Above 500 lux **82%**

99%

50%

0%

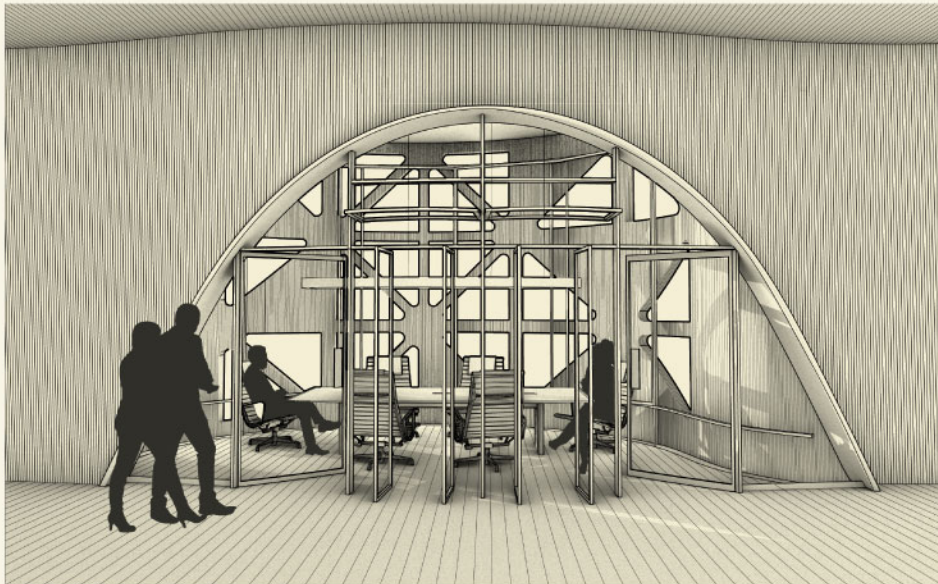
DAYLIGHT AUTONOMY



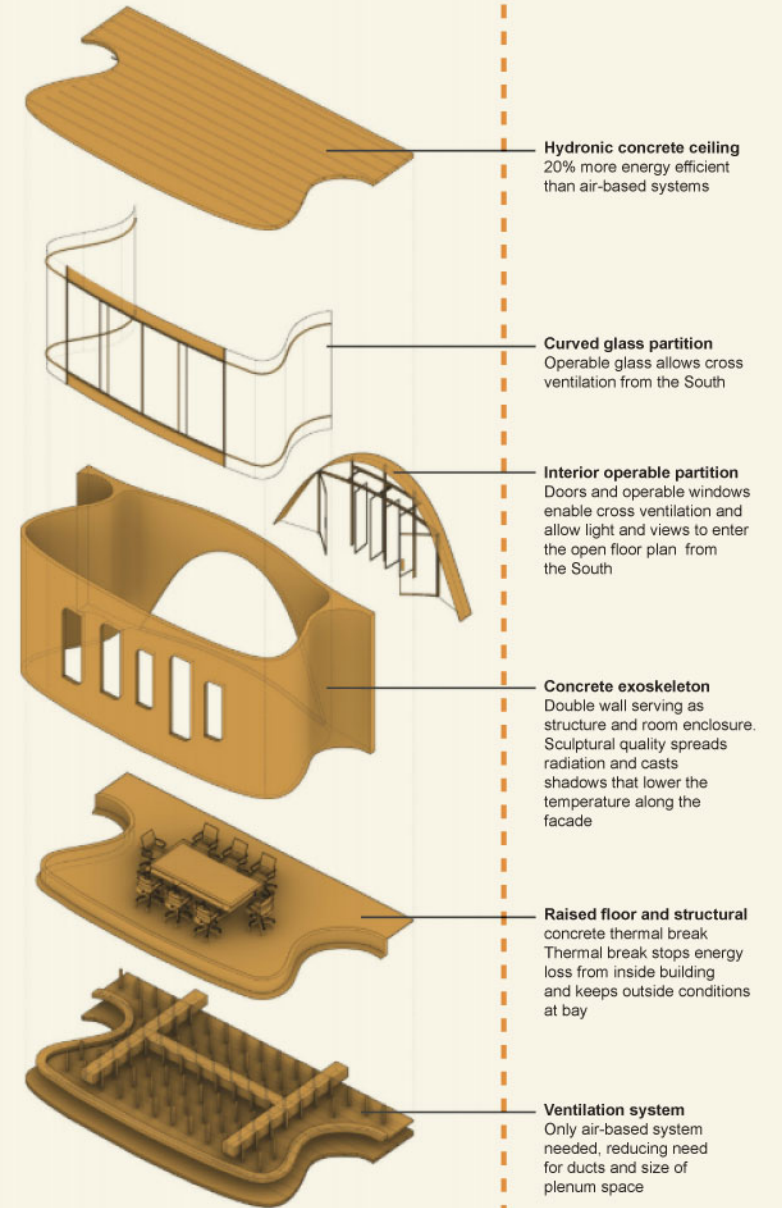
TYPICAL TOWER FLOOR PLAN



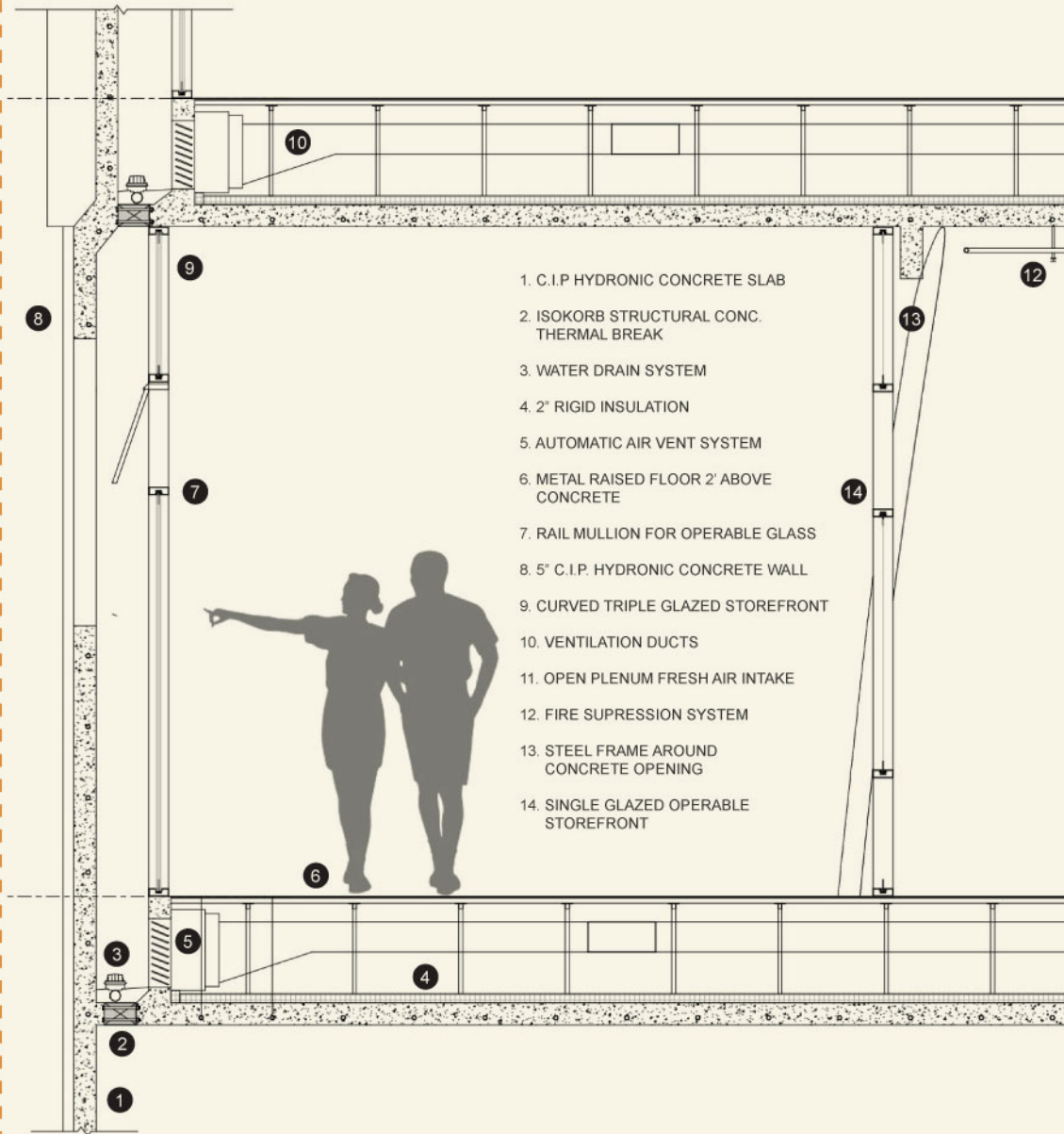
HE SIPPED HIS COFFEE AND STARED OUT OVER THE BUSTLING CITY



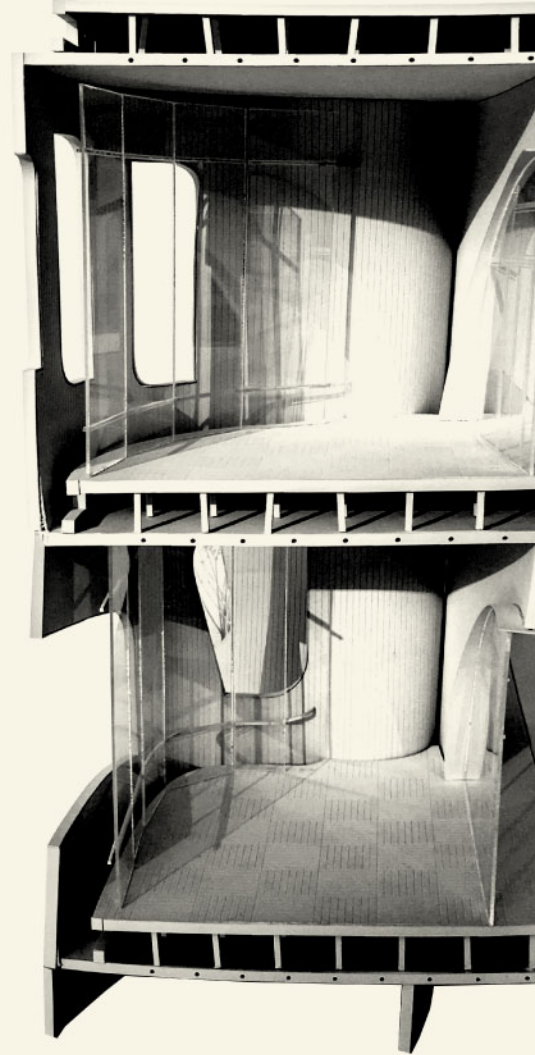
THE SHADOWS PLAYED ACROSS THE WALL IN THE LATE AFTERNOON LIGHT



EXPLODED ASSEMBLY - WORKING EDGE



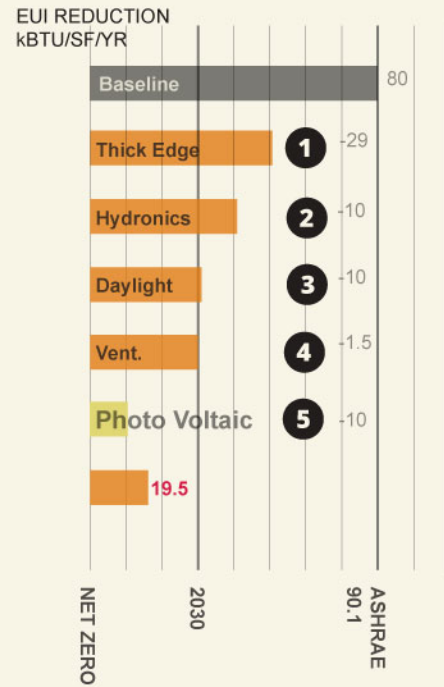
SECTION AT SOUTH FACADE



SECTION MODEL - SIDE



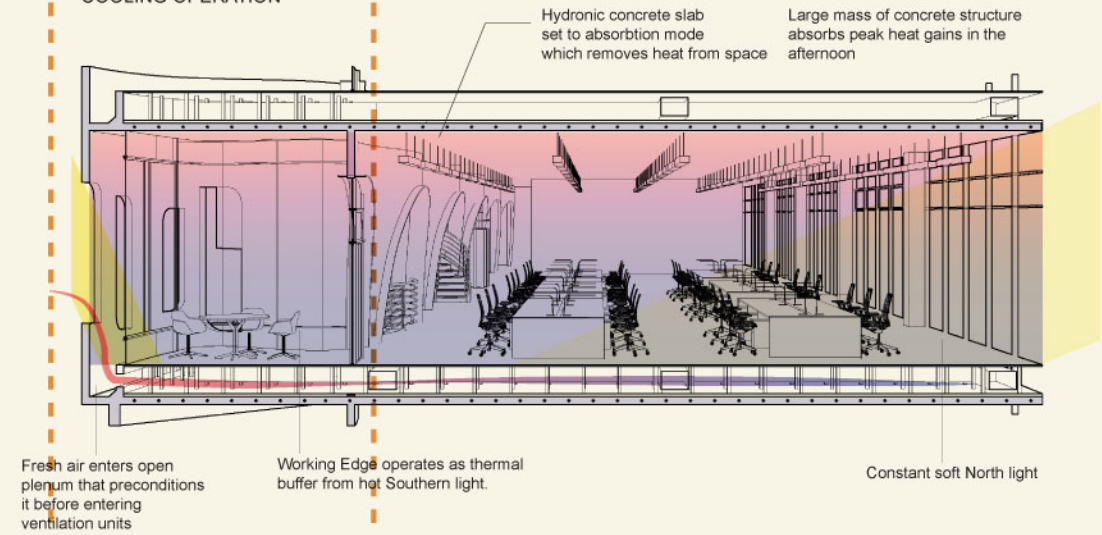
SECTION MODEL - BACK



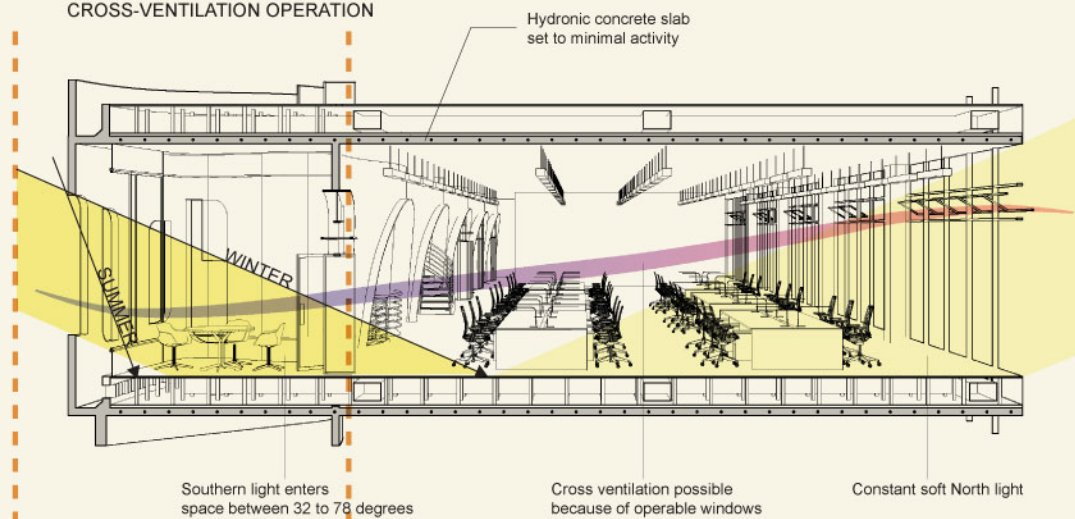
FINAL EUI
19.5
kBTu/sf/yr

- 1 SOUTH CONCRETE WALL | 80% OPAQUE**
Our Southern facade provides shading and thermal mass helping lower the internal heat gain within the building.
- 2 HYDRONIC CONCRETE CEILINGS | 20% MORE EFFICIENT**
We use radiant heating/cooling to maintain a constant temperature in our building with a hydronic concrete system.
- 3 DAYLIGHT OPTIMIZATION | 81% DAYLIGHT AUTONOMY**
Building narrow footprint enables daylighting of entire floorplate throughout the year.
- 4 NATURAL SPACE VENTILATION | 35% OF YEAR**
At only 55 ft, the depth of our building footprint allows for cross-ventilation through the building during 35% of the year significantly lowering our energy use intensity.
- 5 PHOTOVOLTAICS | 70,000 SF**
862 kWh / yr = -10 EUI
The concrete roof providing shade over the public courtyard at the base of the site is covered with photovoltaic panels capable of offsetting energy use intensity by 10 kBTU/SF/YR.

COOLING OPERATION



CROSS-VENTILATION OPERATION



HEATING OPERATION

