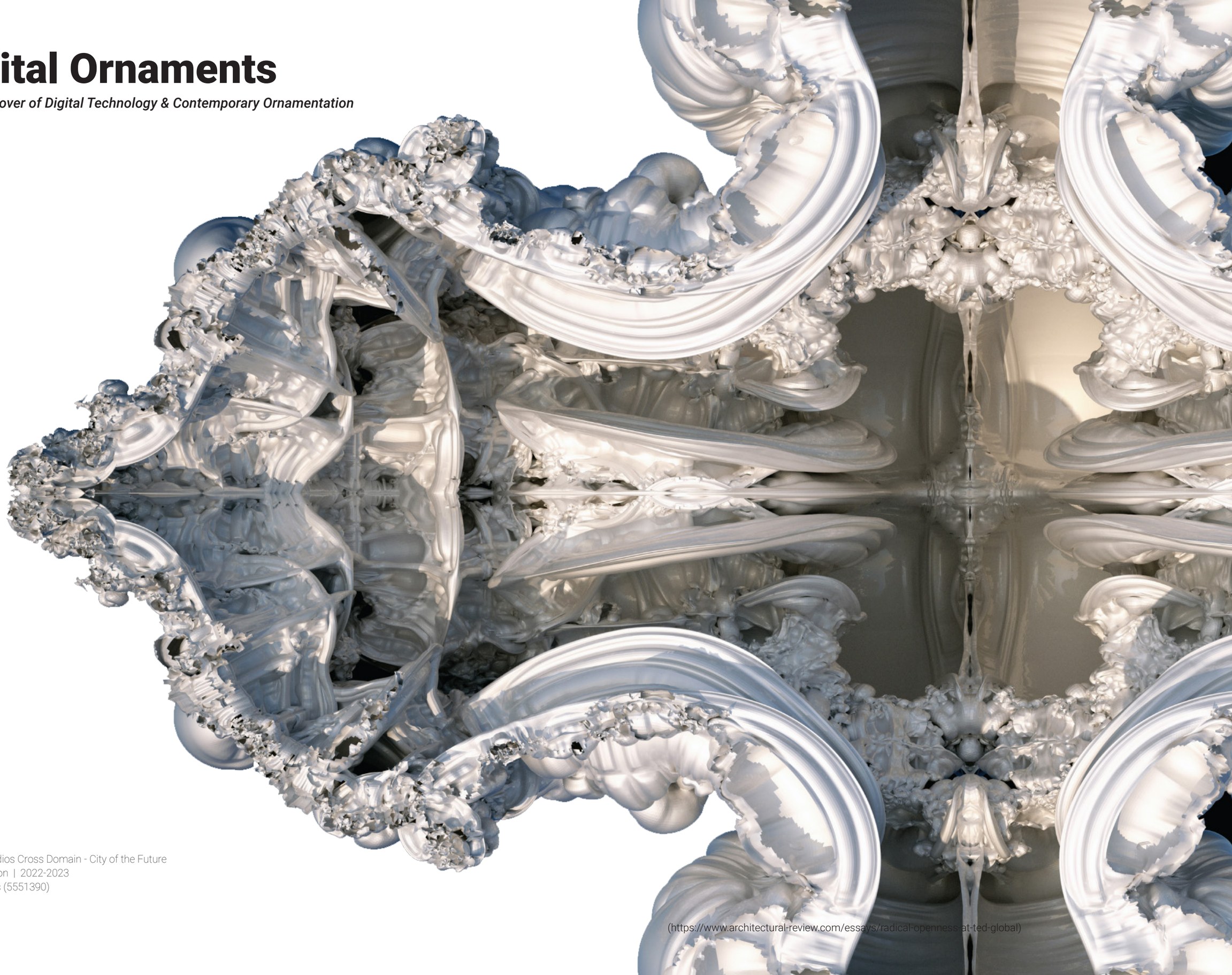
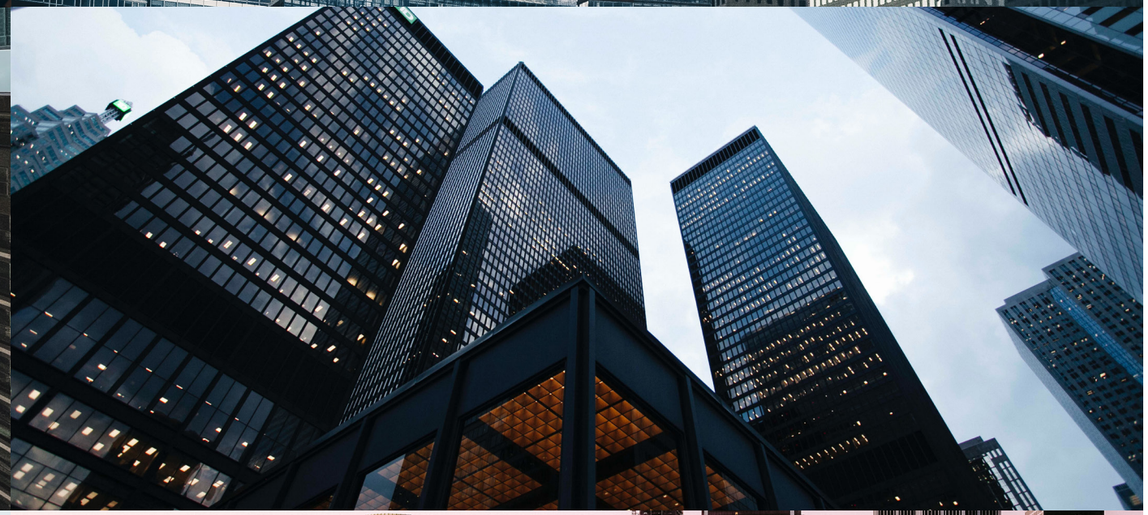
Digital Ornaments

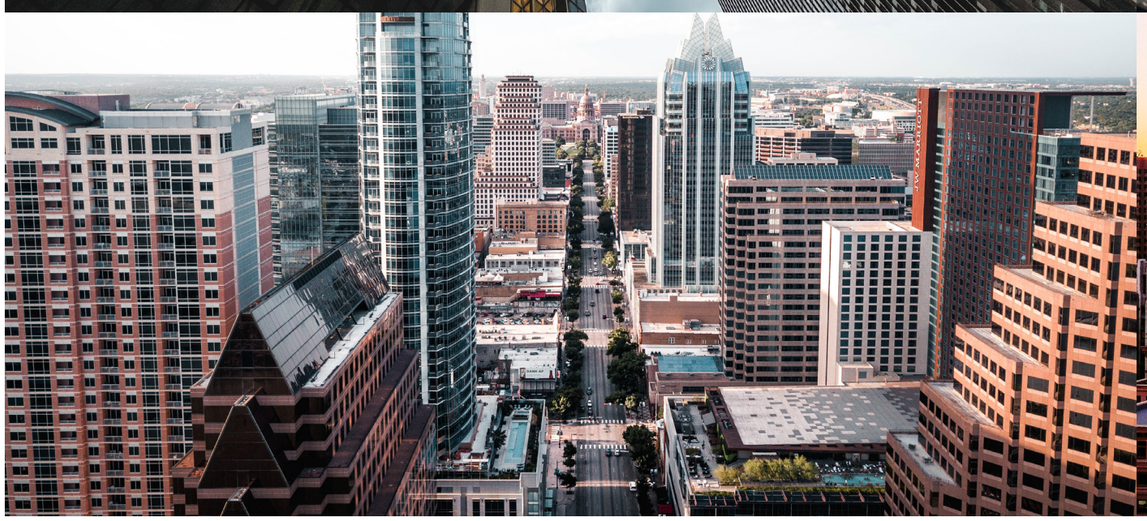
The Crossover of Digital Technology & Contemporary Ornamentation

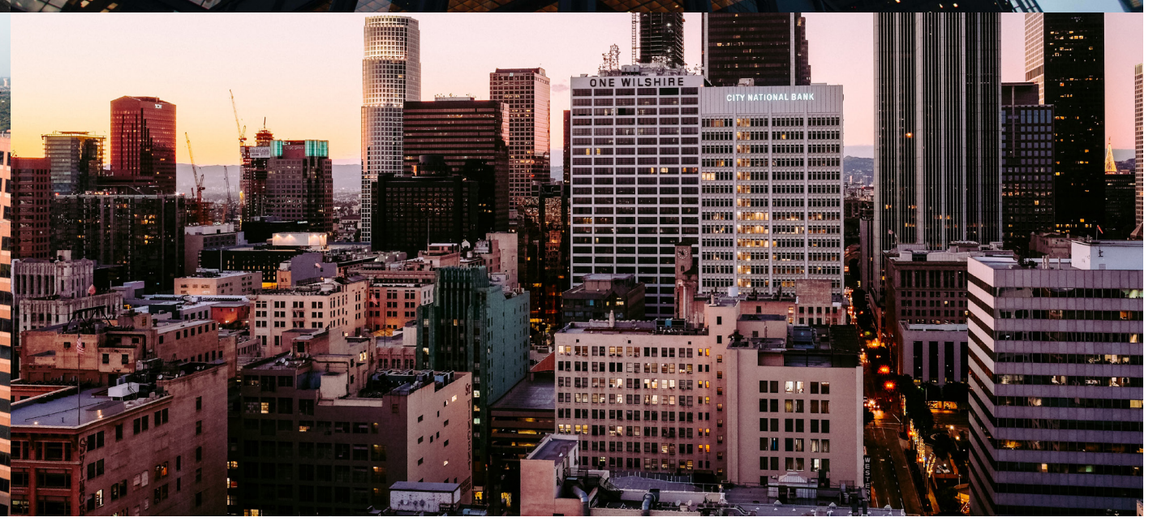


(https://www.architectural-review.com/essays/radical-openness-at-ted-global)

Graduate Studios Cross Domain - City of the Future
P5 Presentation | 2022-2023
Paulina Panus (5551390)






ONE WILSHIRE
CITY NATIONAL BANK


TORONTO, CA


NEW YORK, US


VANCOUVER, CA


CHICAGO, US


CALGARY, CA


ONE WILSHIRE
CITY NATIONAL BANK
LOS ANGELES, US

Problem Statement

Digital technology has immense **potential.** It is being **under-utilized.** The main focus lies on the methods of **mass-production**, **standardization**, and **efficiency,** generating an architecture that has become un-ornamental.

Modern Fully Glazed High Rise Building
Source: https://unsplash.com/photos/GJwsxN9PhEI

Relevance

Contemporary ornament serves as a tool to a very image and **digital driven society**. It is an instrument of **impression and expression**. It expresses the **symbolic dimension** of the form it holds. It creates a **bond between people** and their surroundings.

AI is the **future.** It is **enriching and accelerating** our cities, within out last decade. **Wealth in its applications** across different scales.

Midjourney Explorations
Source: https://www.facebook.com/Architecturesideass/posts/3376804099229893/?paipv=0&eav=AfbEde-DUMTrW5h8isiomTmycAd4FzwJhjJdjpqMCH7OIeIEU3nXpGS1Mza2CuhR5M04&_rdr

Research Questions

Why should ornaments be reintroduced into architecture, if they are seen as time-consuming, non-functional, and only a form of decoration?

How can AI and digital technology change the way we design and think about ornamentation?

What are the potentials of AI/digital technology and how will they change the fabrication process of ornaments? What should contemporary ornament aim to contribute/communicate to current, as well as future architecture and audiences?

Definitions

Ornament or·na·ment (noun)

'Ornament' is defined as ***"a useful accessory that lends grace or beauty"***[1]. It is ***"a thing used or serving to make something look more attractive but usually having no practical purpose"***[2].

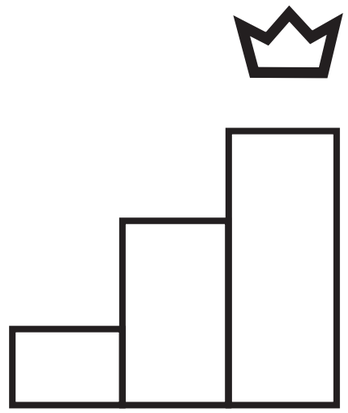
1 Ornament [Def. 2]. (n.d.). In Merriam-Webster online. Retrieved from http:// Merriam-Webster.com.
2 Ornament [Def. 1]. (n.d.). In Oxford English Dictionary online. Retrieved from http:// www.oed.com.

Purpose of Historical Ornaments

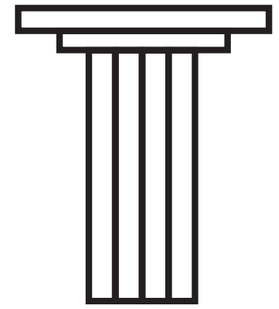
In a historical context, ornament was integral in creating a **sense of craft** in the design. The historical conception of ornament was interwoven with the **history of style**, each of which produced its own ornaments per se with a clear definition and **set of rules** for its design, production, and application.

01 | Beauty

02 | Wealth



03 | Hierarchy



04 | Order

Historical Ornament

Throughout history, ornament was predominantly used as an expression of culture or hierarchy. Ornament has been either **integrated** into the design of the building or **applied** as a decoration.

01 | Integrated

02 | Applied

Integrated Ornament; Source: https://unsplash.com/photos/er00p3S4us4
Applied Ornament; Source: https://unsplash.com/photos/mgLX9vQhxc8

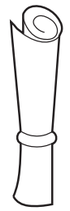
Ornament vs Technology

2580 BC - 1800

Historical

Decorative Ornament

Analogue

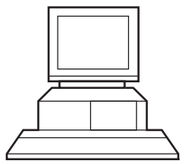


1800 - 2008

Industrial Revolution

No Ornament

CAD & Machinery

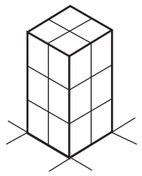


2008-2020s

Digital Revolution

Functional Ornaments

BIM & 3D Printing

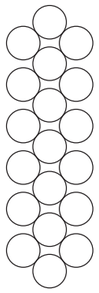


2020s

Contemporary

Parametric Ornaments

Data Interstice

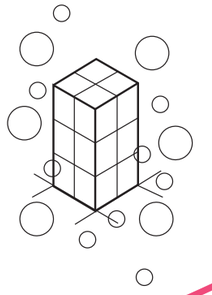


2030s

Future

?

AI / ML



Level of Precision

Degree of Automation

Technology Involvement

Resolution & Precision

More

Visualization/Representation

1 | **TEXT** | Ornament

2 | **TEXT** | Ornamented Structure

3 | **TEXT** | Ornamented sculpted structure, ancient stone work with intricate carvings, fractal, symmetric, elegant, highly detailed, ornate.

4 | **TEXT** | angelic purity, heaven gate, hyper detailed ornament, 8 k, realistic, holy lights, cinematic, eerie, fantasy, sharp focus, with ornamented sculpted structure, ancient stone work with intricate carvings, fractal, symmetric, elegant, highly detailed, ornate.

Text-to-Image

Visualization/Representation

Image 01 | Content Image

Image 02 | Style Image

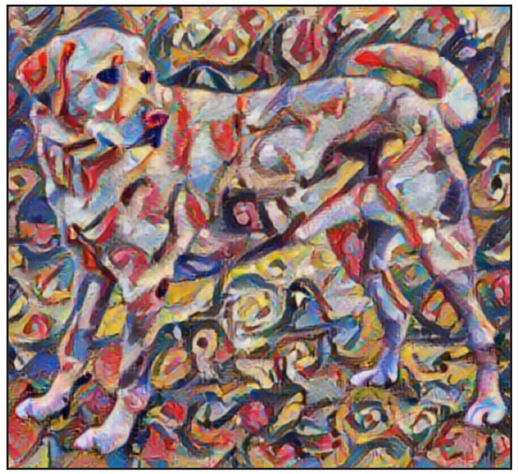


Image 03 | Resulting Image

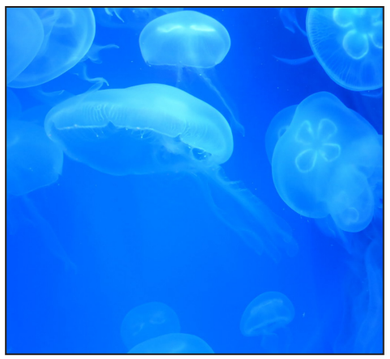
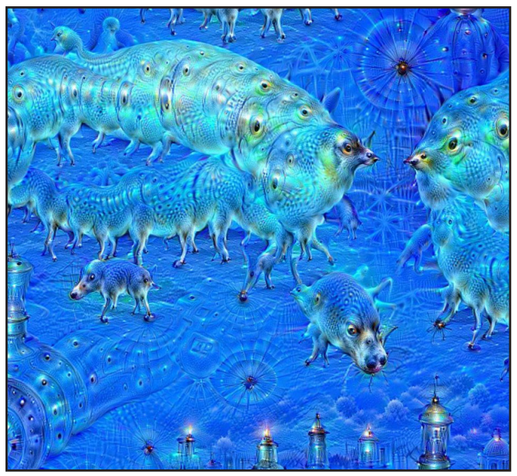


Image 01 |
Original Image

Image 02 |
Original Images

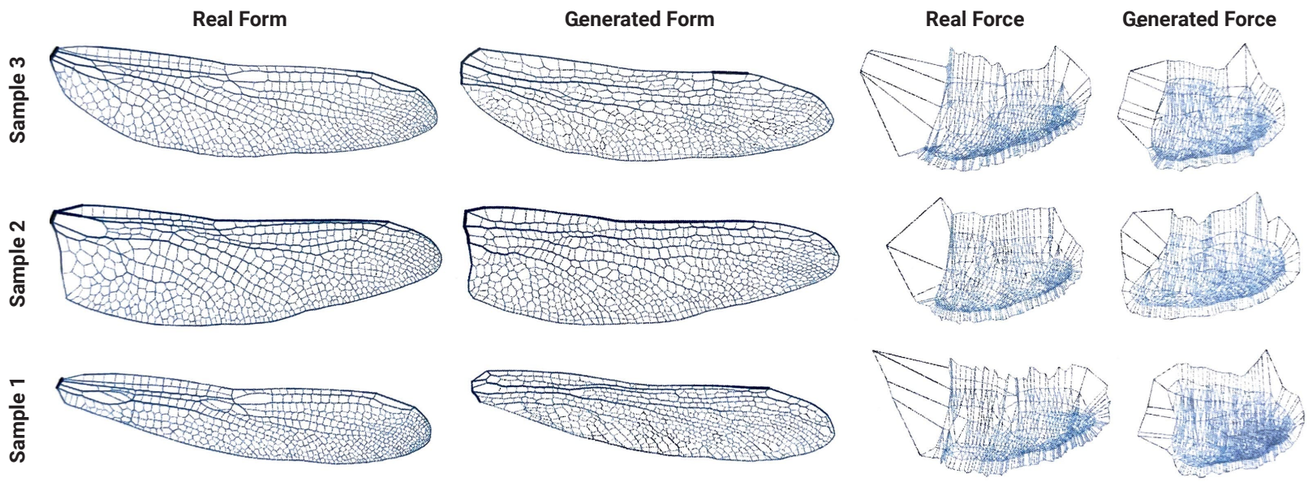


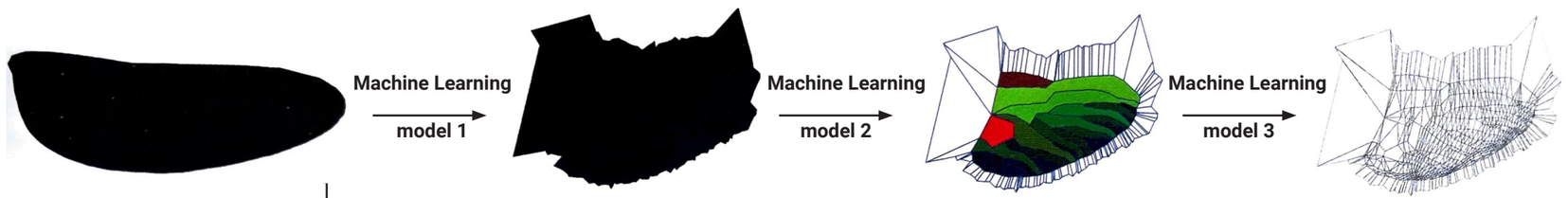
Resulting Image | 10 iterations of applying DeepDream

Resulting Image | 50 iterations of applying DeepDream

Image-to-Image

The Dragonfly Wing Project



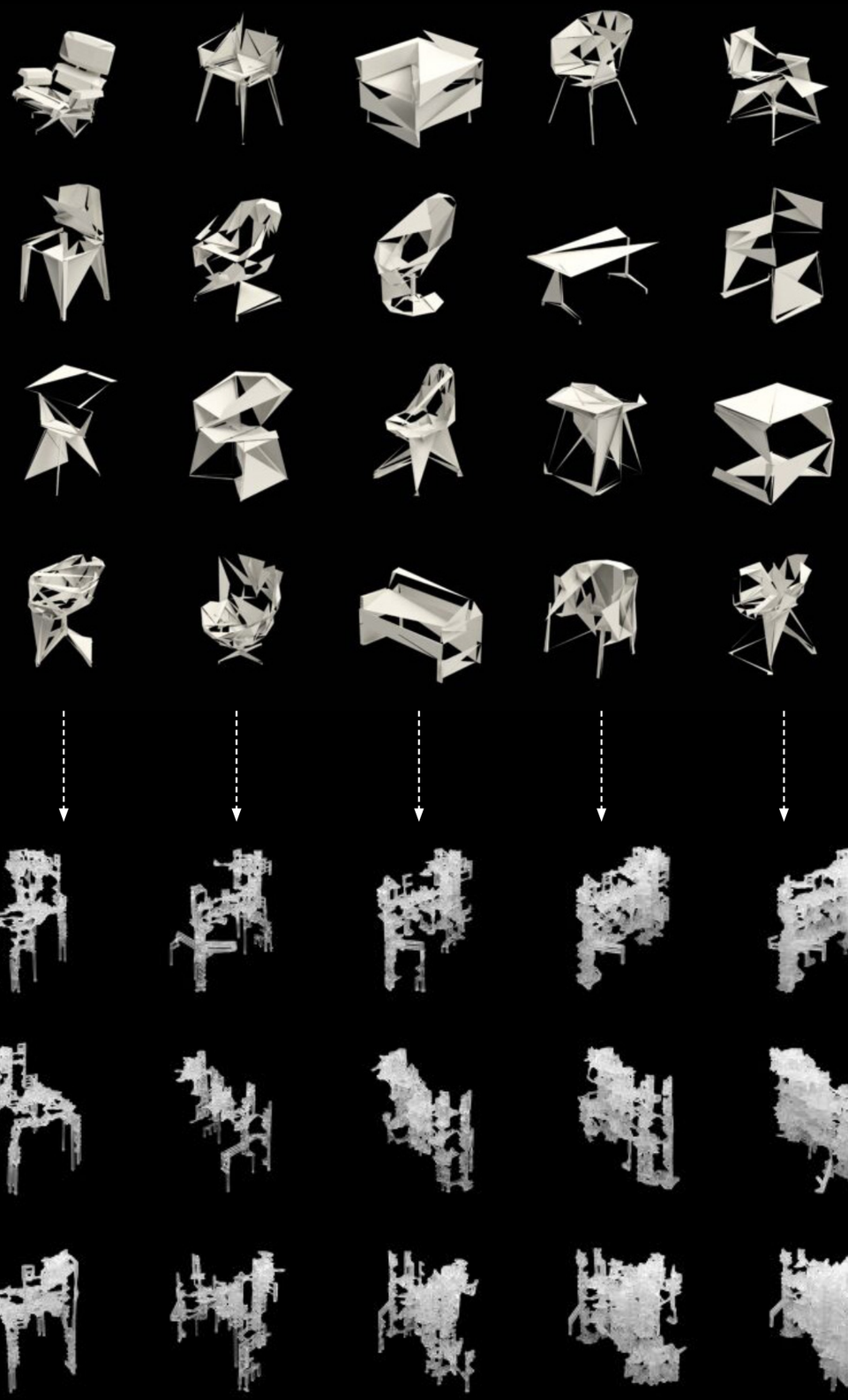


1	57058.35	1731.832	57141.91	1721.781	27.20294
2	57058.35	1731.832	57030.27	1711.309	51.92625
3	57160.95	1699.875	57141.91	1721.781	34.4093
4	57165.48	1738.787	57141.91	1721.781	22.02104
5	57165.48	1738.787	57035.32	1759.191	58.61116
6	57138.74	1675.192	57160.95	1699.875	44.40721
7	57076.82	1676.738	57138.74	1675.192	18.11077
8	57030.27	1711.309	57076.82	1676.738	49.31286

3D-GAN-Ar-Chair-tecture

"Deep neural networks in contemporary AI are machines of **automaticity that imitate brain plasticity.** There are therefore able to **'receive'**, **'give'** and **'explode'** form, yet are also inscribed with a conceptually similar **'fallibility'** for their capacity to generate forms".

- Immanuel Koh

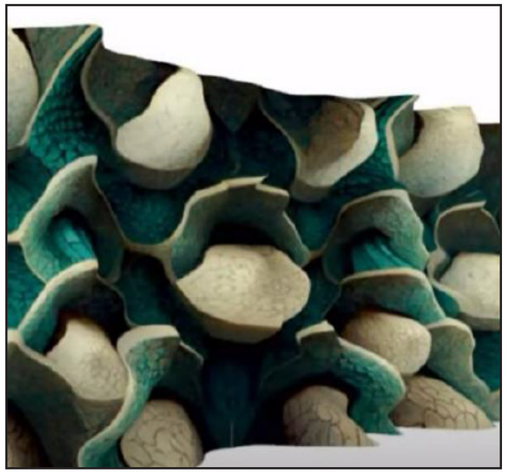


Contemporary Ornament

Contemporary Ornamentation should seek **functionality** and **express the symbolic** dimension of form it holds. Should strive to be the **equilibrium** of all things.

EXPLORATIONS

Types of Explorations

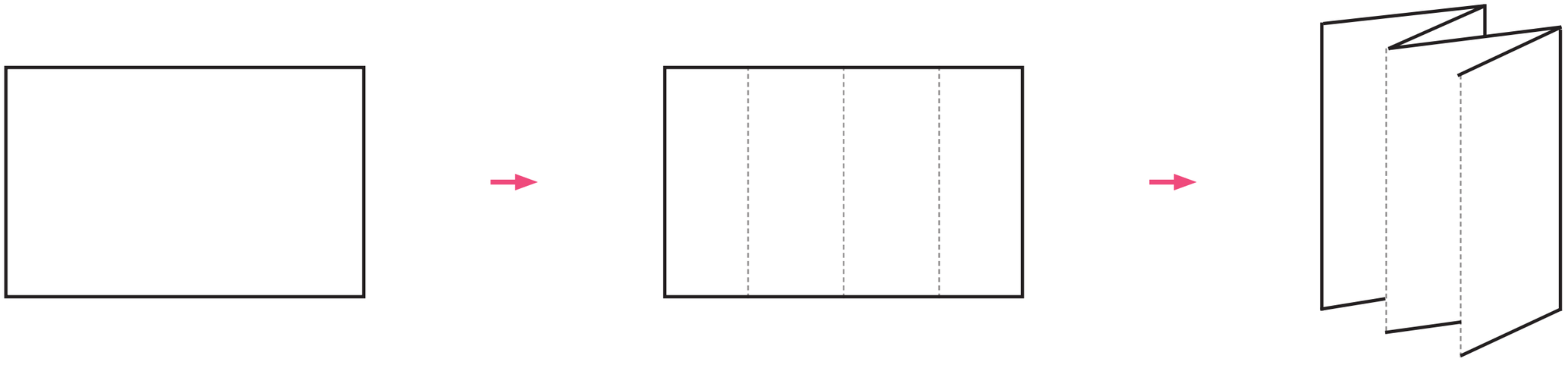


Method 01

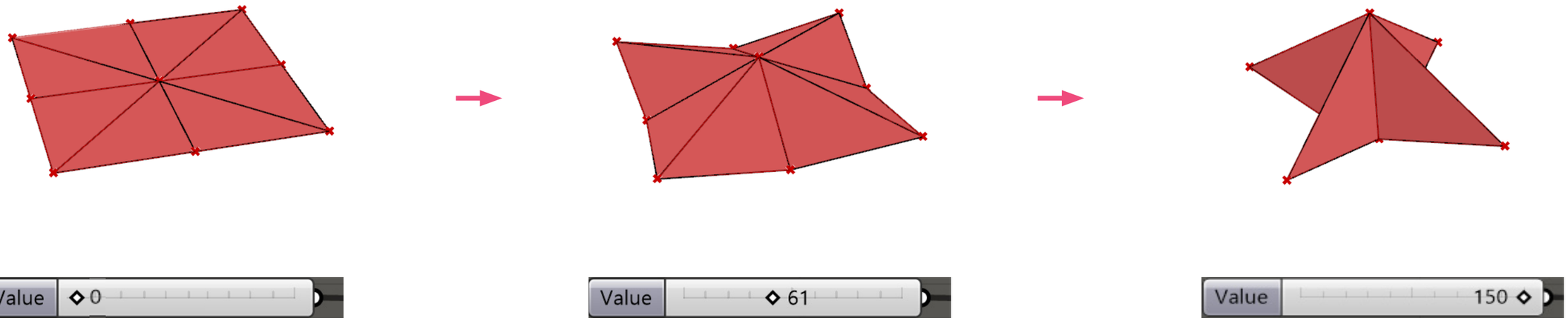
Method 02

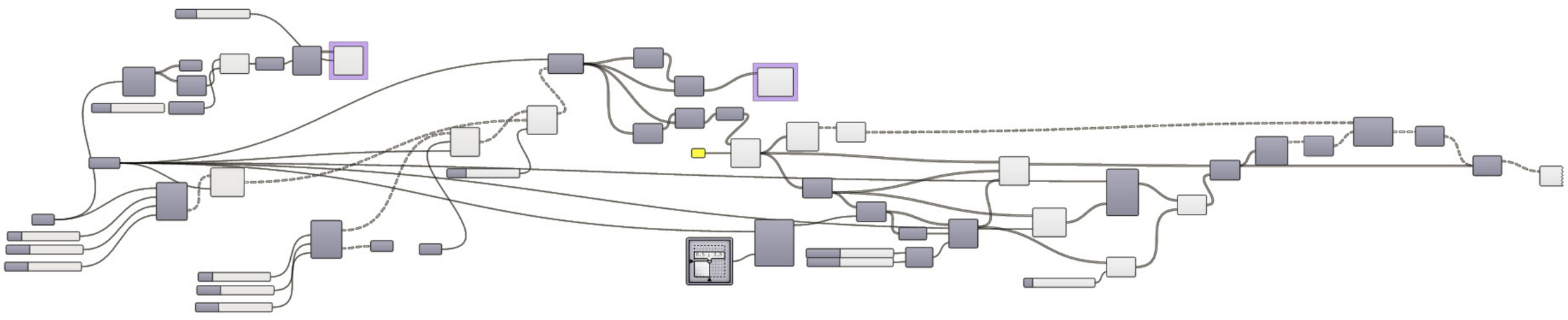
Method 03

Exploration



Exploration

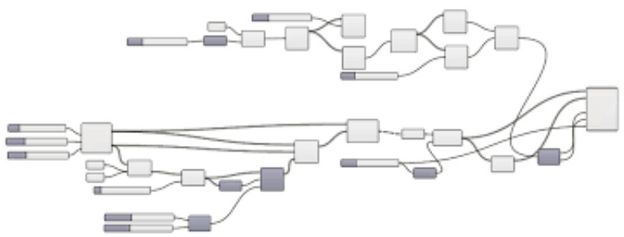


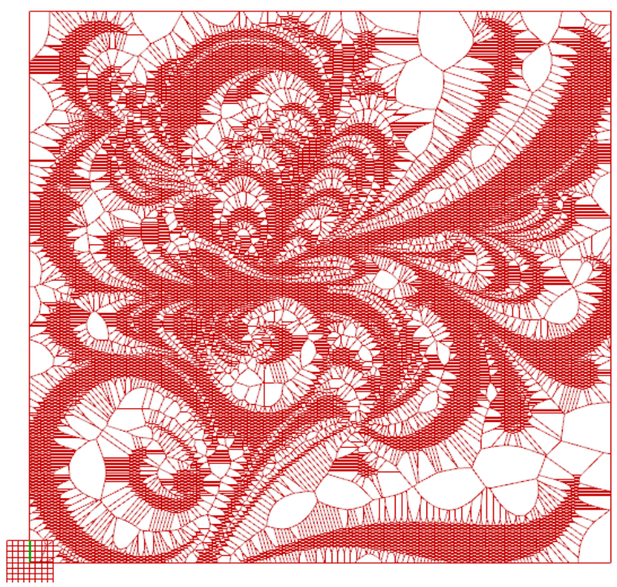


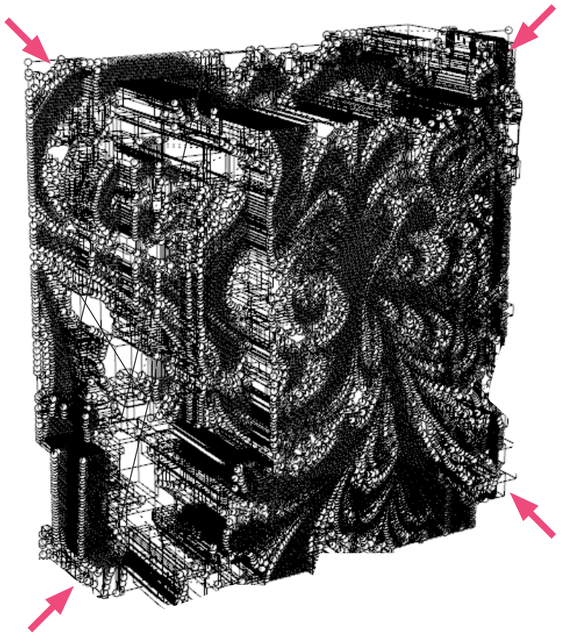
Method

{TEXT PROMT}

complex pattern, black, white, advanced, detailed, white background, line drawing, simple illustration, flat design, ornamentation, unrepetitive

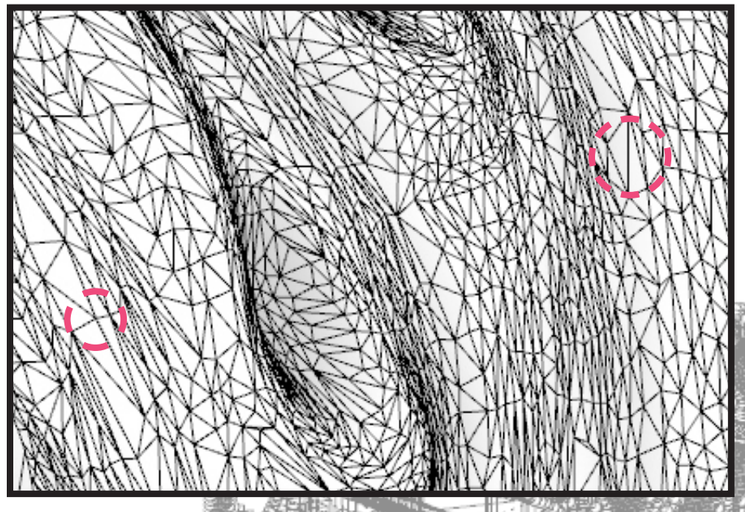




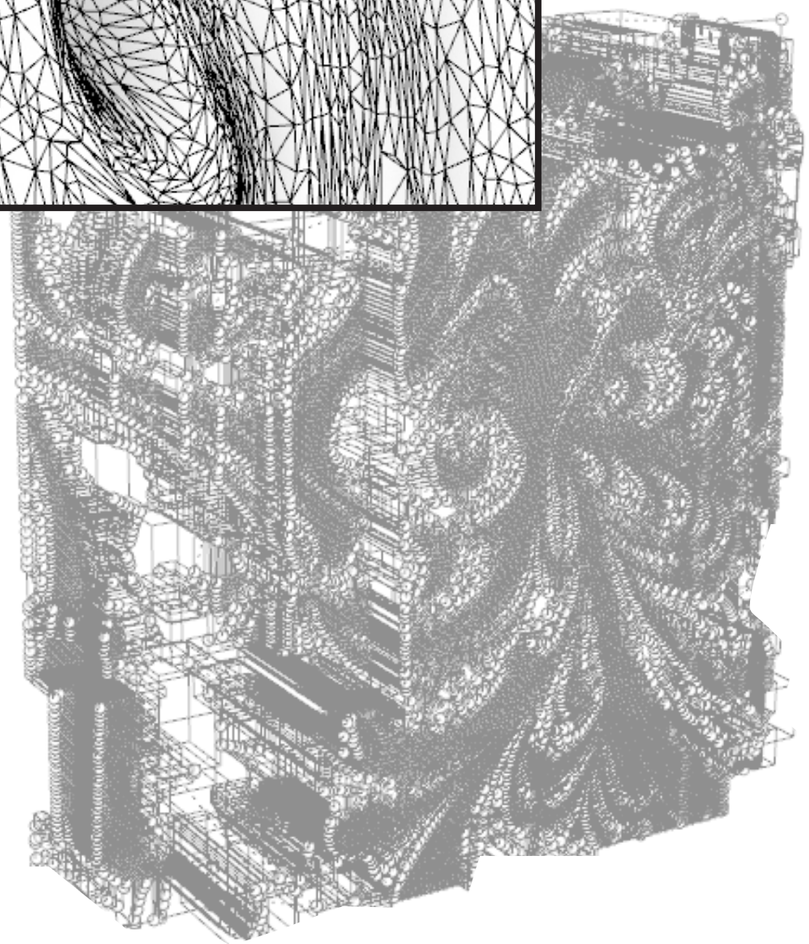


Structural Optimization in Karamba

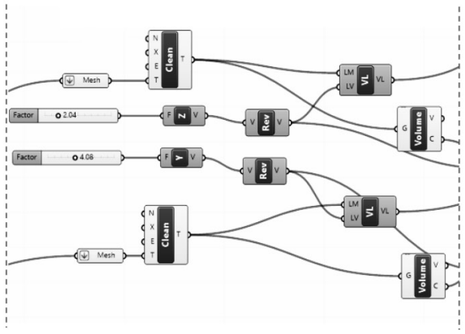
Node B



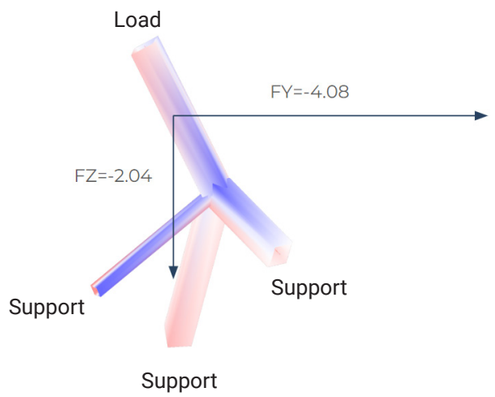
Node A

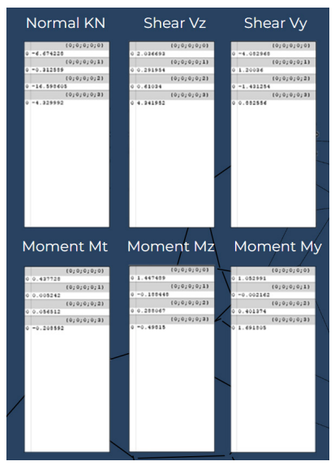


Node A

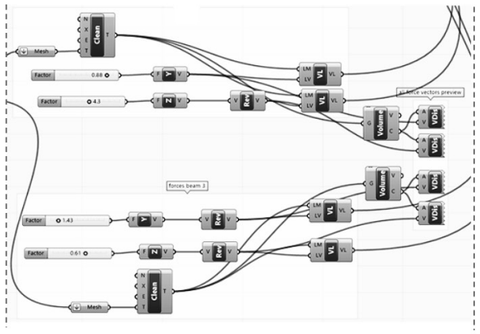


Forces from Karamba
for Topos optimization

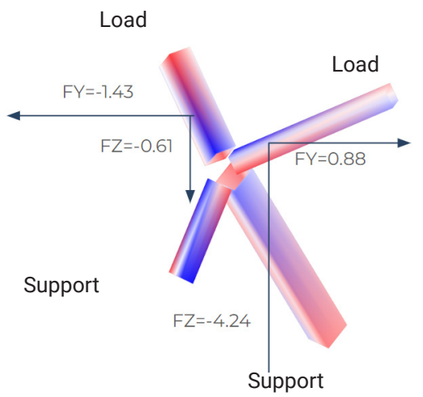


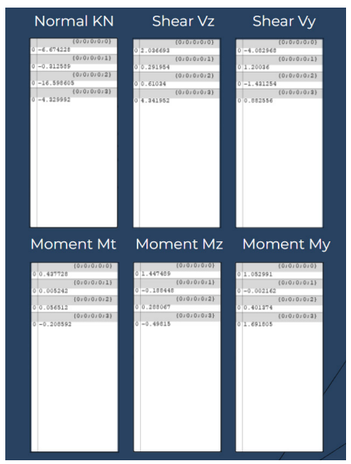


Node B

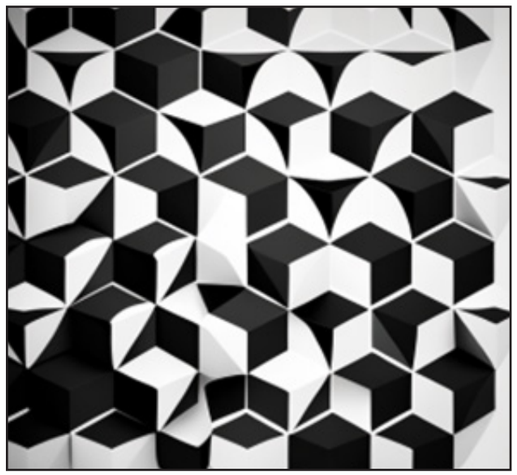


Forces from Karamba
for Topos optimization

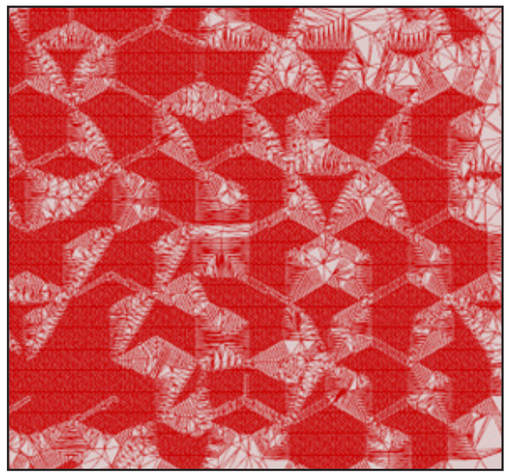




Level of Complexity

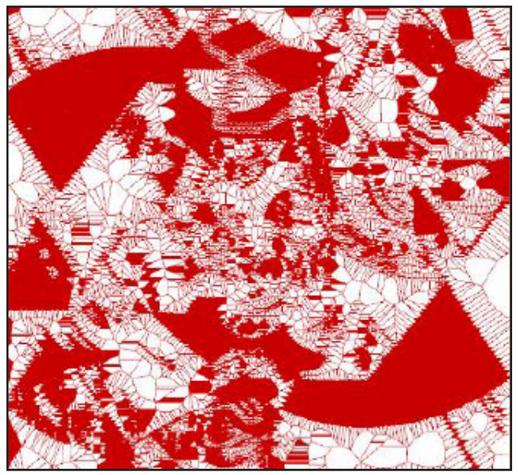


Output Image | AI Generated
- Black and White Geometry



Output Image | Grasshopper Script

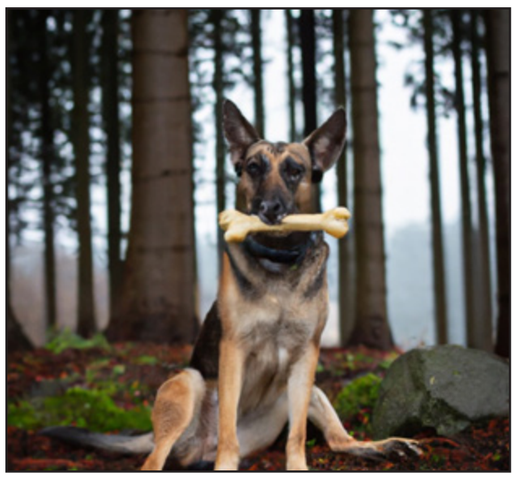
Output Image | AI Generated
- Colourful Geometry



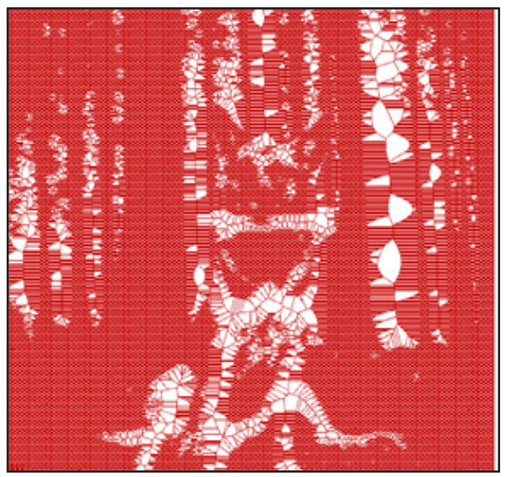
Output Image | Grasshopper Script

Output Image | AI Generated
- Faces

Output Image | Grasshopper Script



Output Image | AI Generated
- Complex Scenery



Output Image | Grasshopper Script

Existing Ornament Comparison

Image 01 | Photograph of David

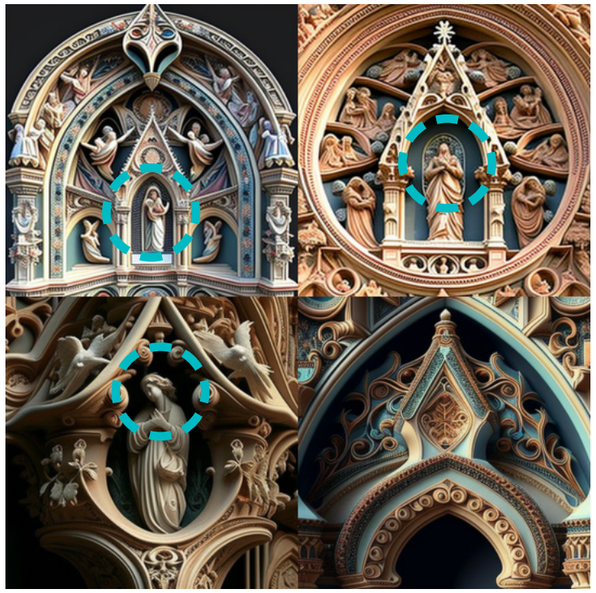
Image 02 | AI generated image of David

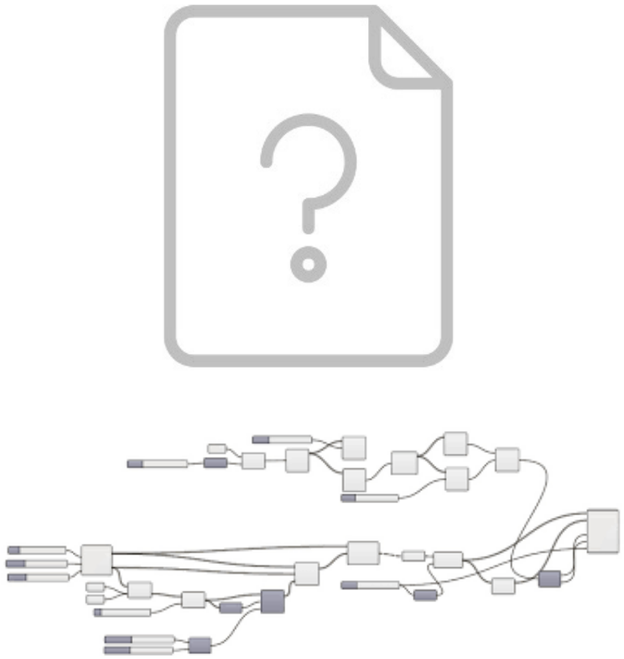
Image 03 | Resulting Image from Grasshopper Script

Implementation into Design

Religious Spaces

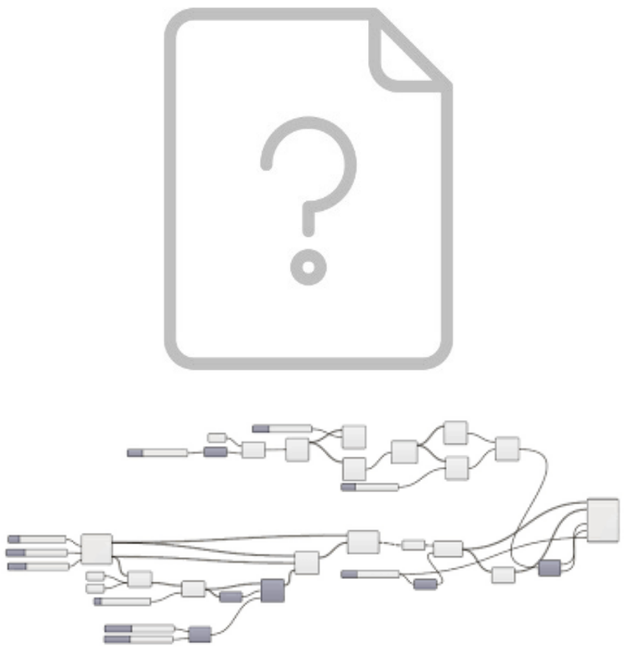
{TEXT PROMT}



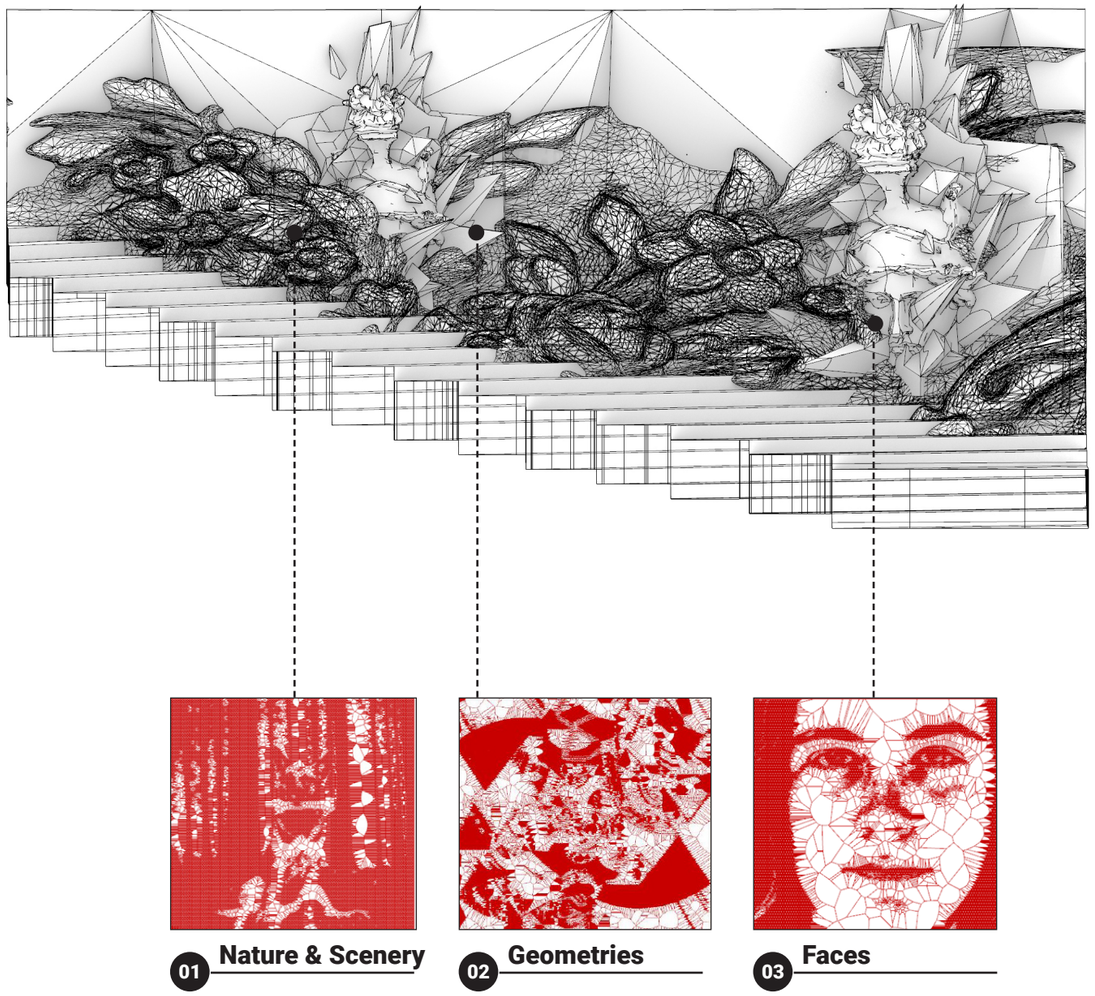


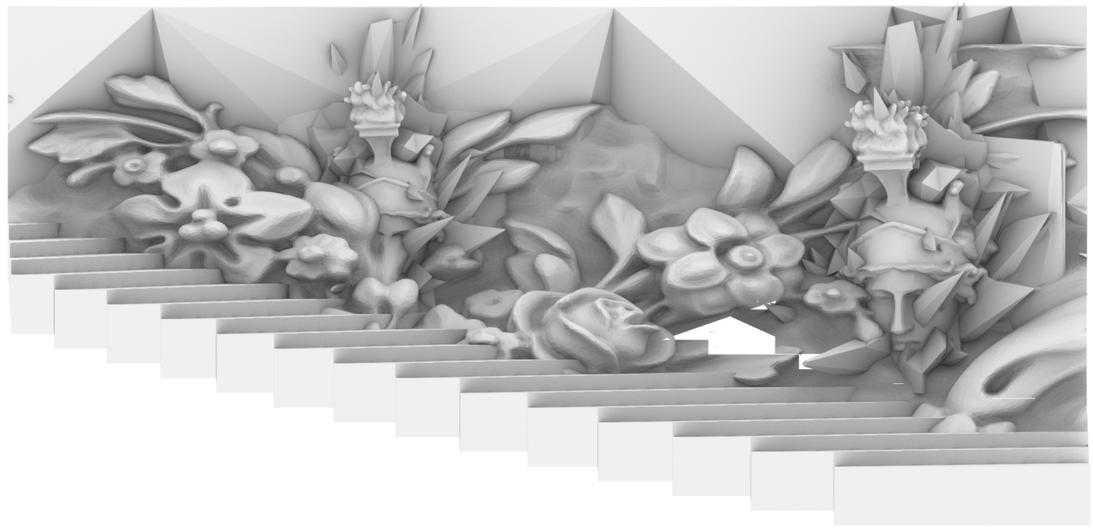
Communal Spaces

{TEXT PROMT}



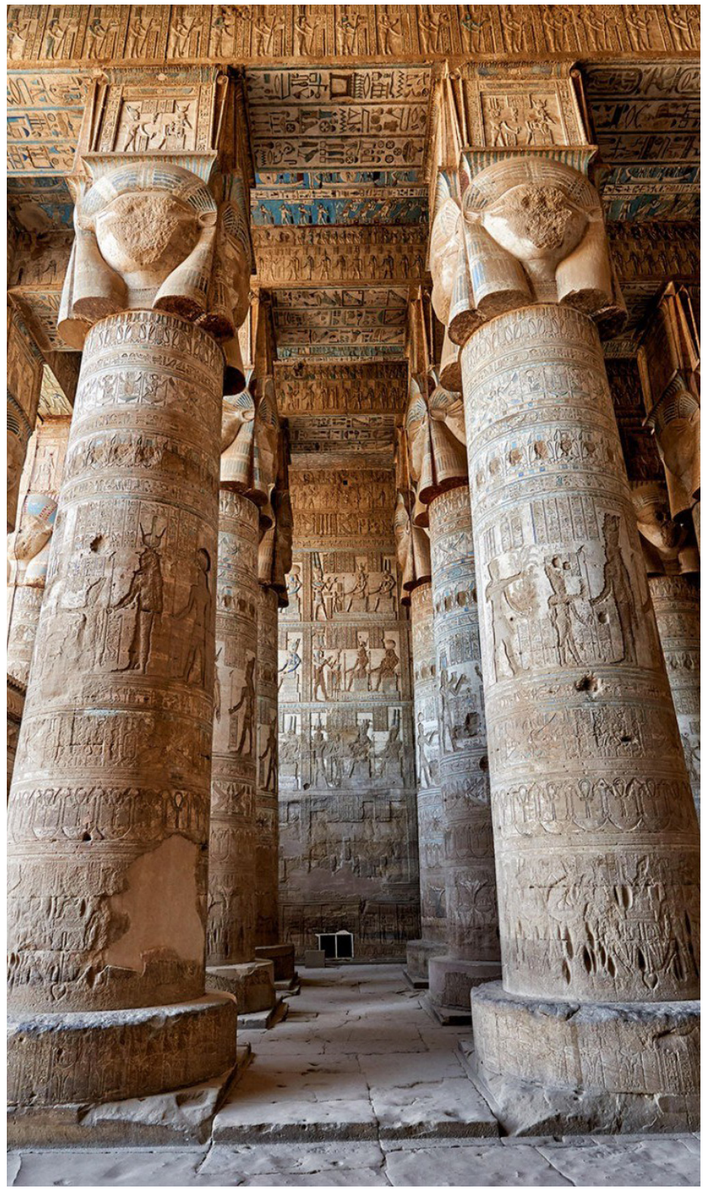
Ornament Wall

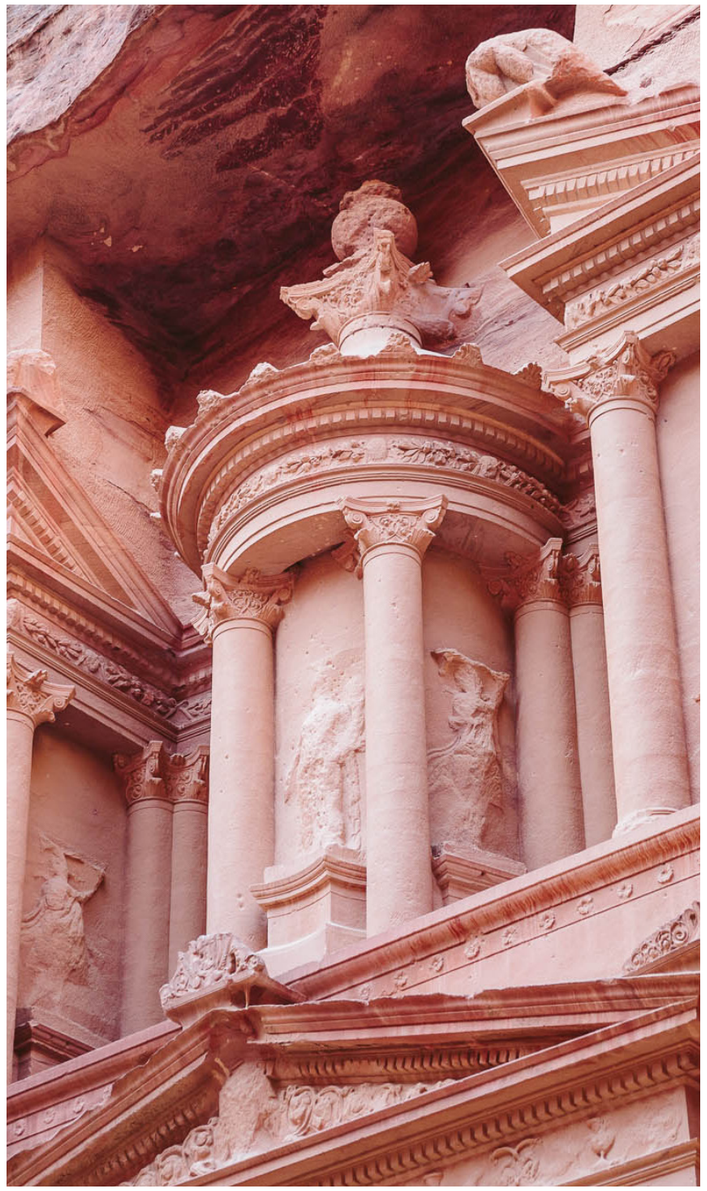




DESIGN

Original Ornament





The first ornaments appeared in **Ancient Egypt.** They were found within **temples** inteded to worship their gods. From then, ornaments have been incorporated in various **cultures, religious buildings** and **places of Worship.**

Urban Plan - Places of Worship

Religion Statistics of New York

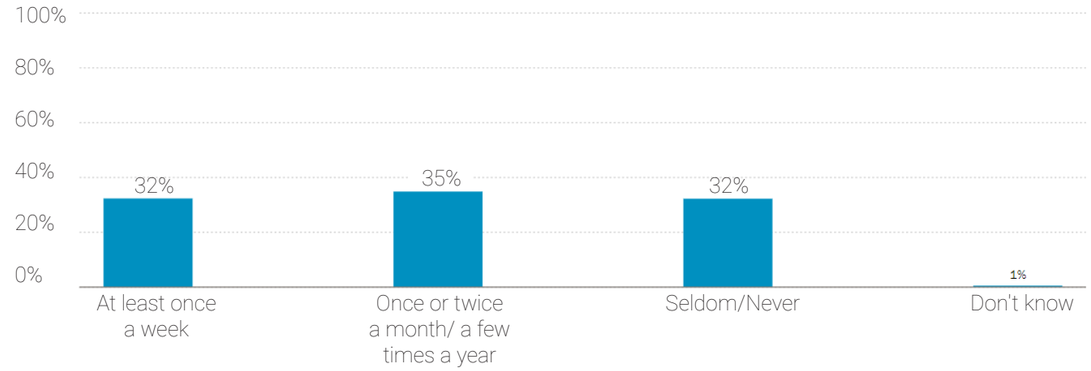
New York County is diverse religiously and ethnically. There's a place of worship every two blocks. There are about 350 Catholic Churches in NYC. And that doesn't count Baptists, Presbyterians, Lutherans, Orthodox, all other Christians and non-Christians.

Religious Affiliation of New York City Residents by Borough

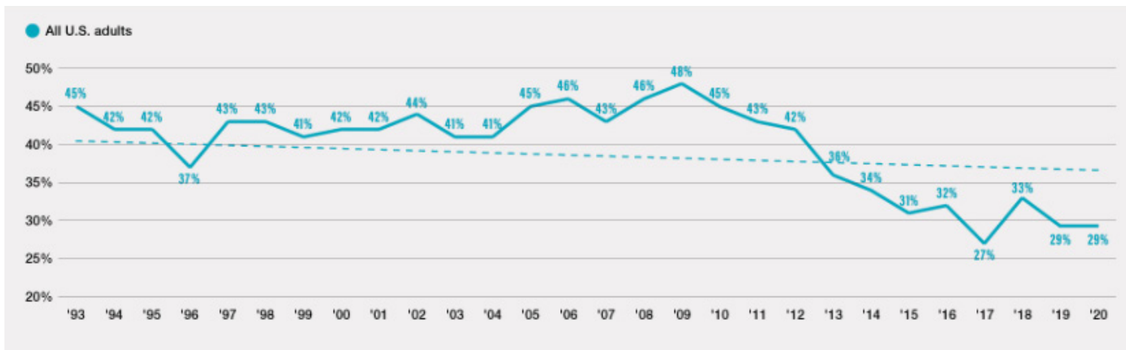
	All Americans	All New York City Metro Area	New York City	Manhattan	Bronx	Brooklyn
N=	81,970	5,183	2,304	525	452	695
White evangelical Protestant	17.3	2	1	2	1	1
White mainline Protestant	13.3	4	2	3	1	2
Black Protestant	7.9	12	14	8	18	17
Hispanic Protestant	3.8	5	6	4	12	6
Other non-white Protestant	3.1	2	3	2	2	3
White Catholic	12.1	17	9	8	4	6
Hispanic Catholic	7.3	14	17	13	30	11
Other non-white Catholic	1.8	3	4	1	4	6
Jehovah's Witness	0.7	1	1	*	1	1
Mormon	1.9	*	*	1	*	*
Orthodox Christian	0.6	1	1	2	1	2
Jewish	1.5	6	7	8	2	11
Muslim	0.9	3	3	1	2	4
Buddhist	0.7	1	1	1	1	1
Hindu	0.6	2	1	1	*	1
Unaffiliated	22.7	22	25	38	20	24
Unitarian/Universalist	0.2	*	*	*	*	1
Other religion	1	1	1	*	*	1
Don't know/Refused	2.6	3	3	5	1	2

Attendance at religious services among adults in the New York City metro area

% of adults in the New York City metro area who attend religious services...



Weekly Church Attendance: 1993-2020



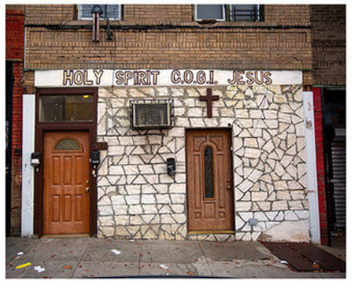
Urban Plan - Density

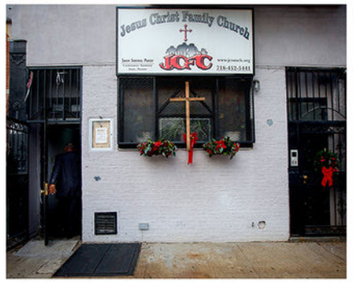
Where New Yorkers Worship

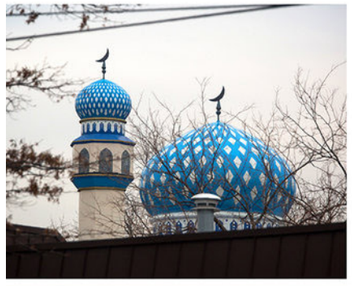




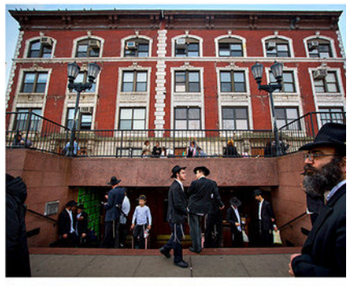




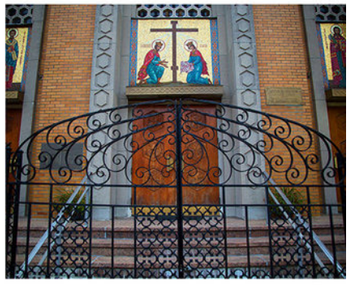




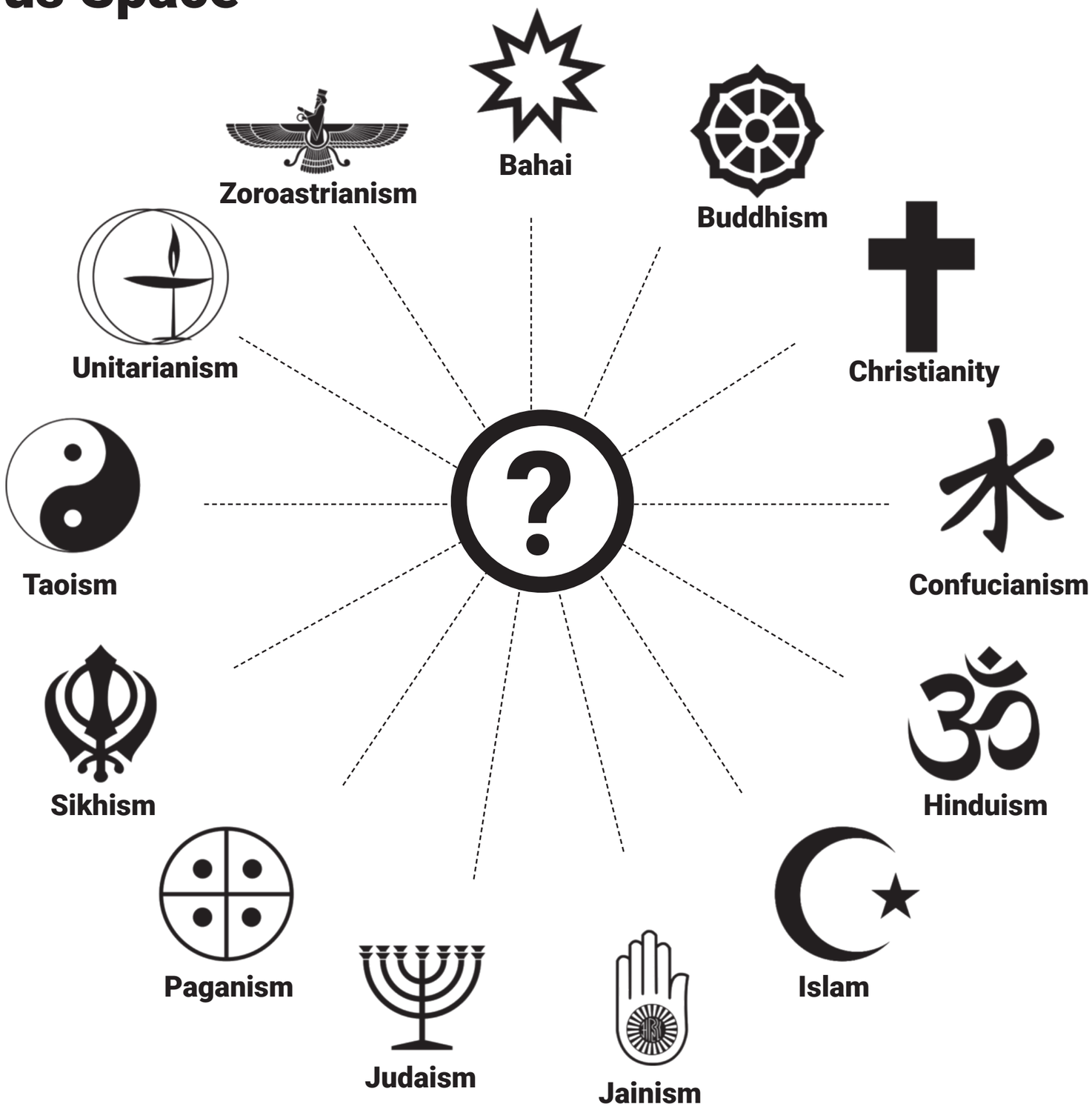




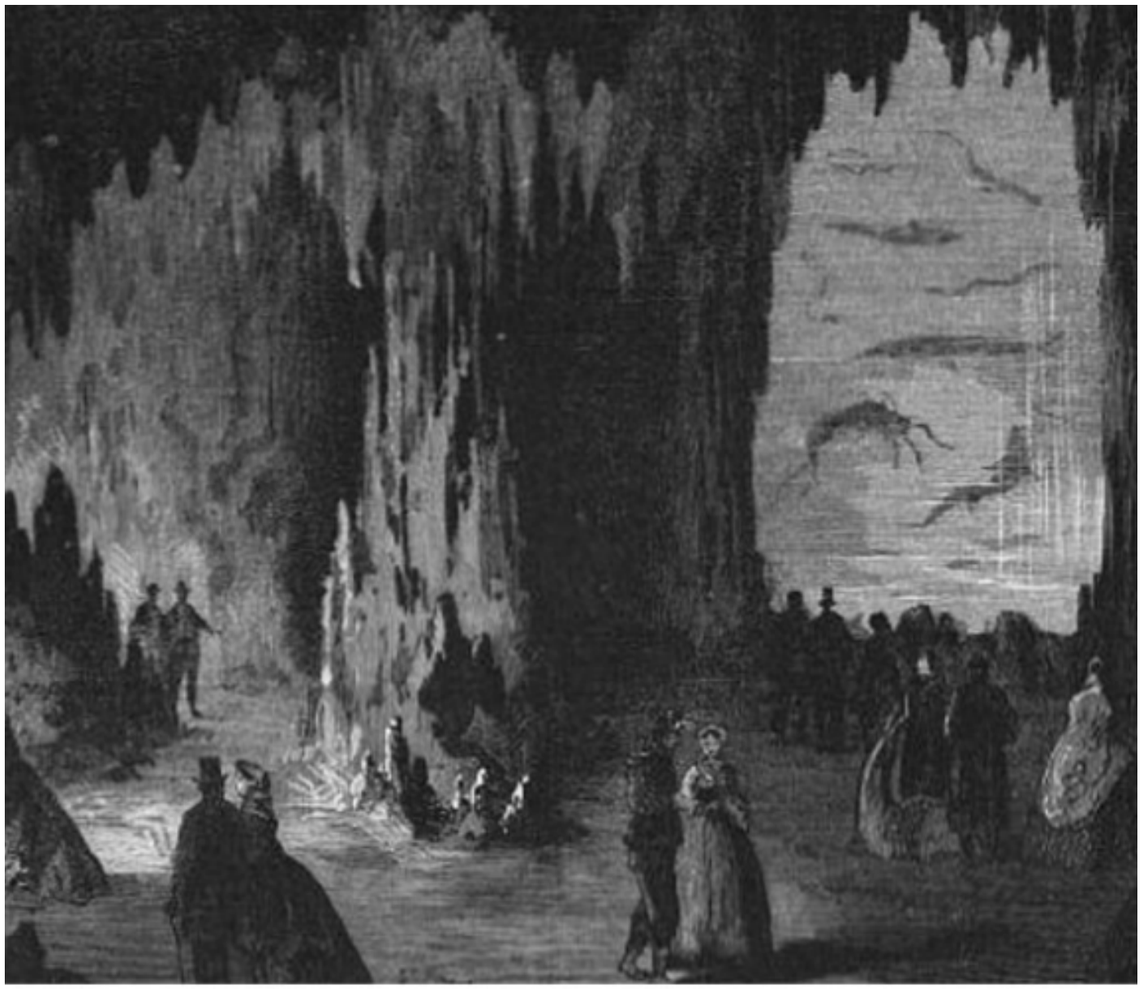





New Religious Space

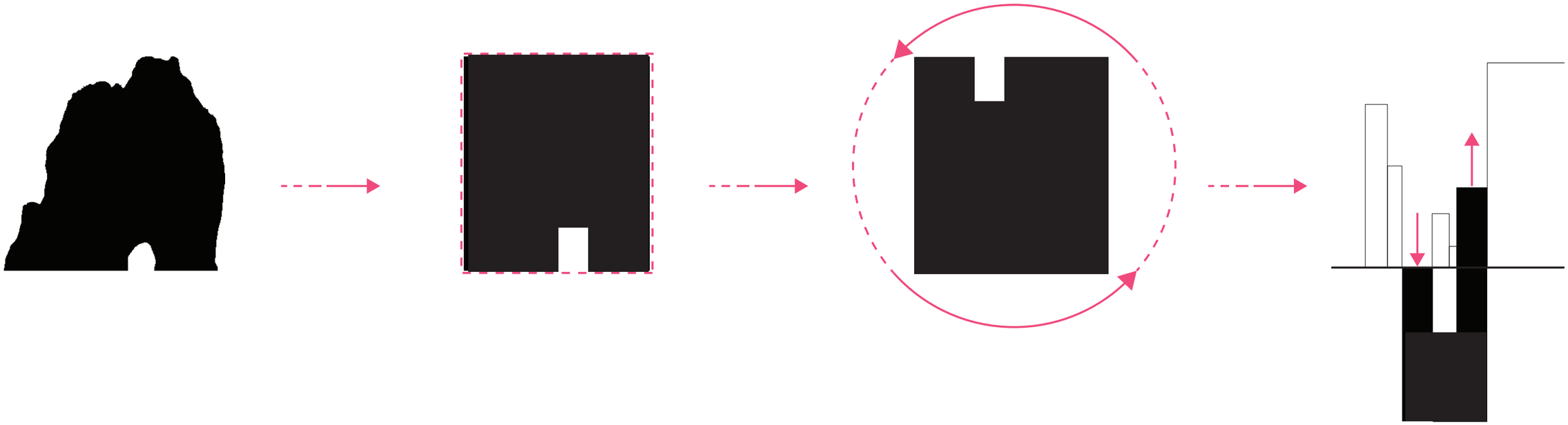


Grotto



The grotto has historically been architecturalized as a hybridization of **built space** and **ornamented landscape** and were regarded in antiquity as **dwelling places of divinities.**

Parti



Natural Grotto

Simplified

Flipped

Expanded

Site

1ST. AVENUE

E 38TH ST.

0 50 100 200

History of Site

The primary purpose of the neighbourhood was **"to provide refuge",** it **"entertained at various times almost every foreigner of distinction who came to the American shores".** It was once an abrupt, steep-sided mound of glacial till - **"a hill of the rudest and most heterogeneous mixture of stone and gravel and boulders".**

Site - Demographics

Murray Hill

Hispanic

Hungarian & Italian

United Nations

1ST. AVENUE

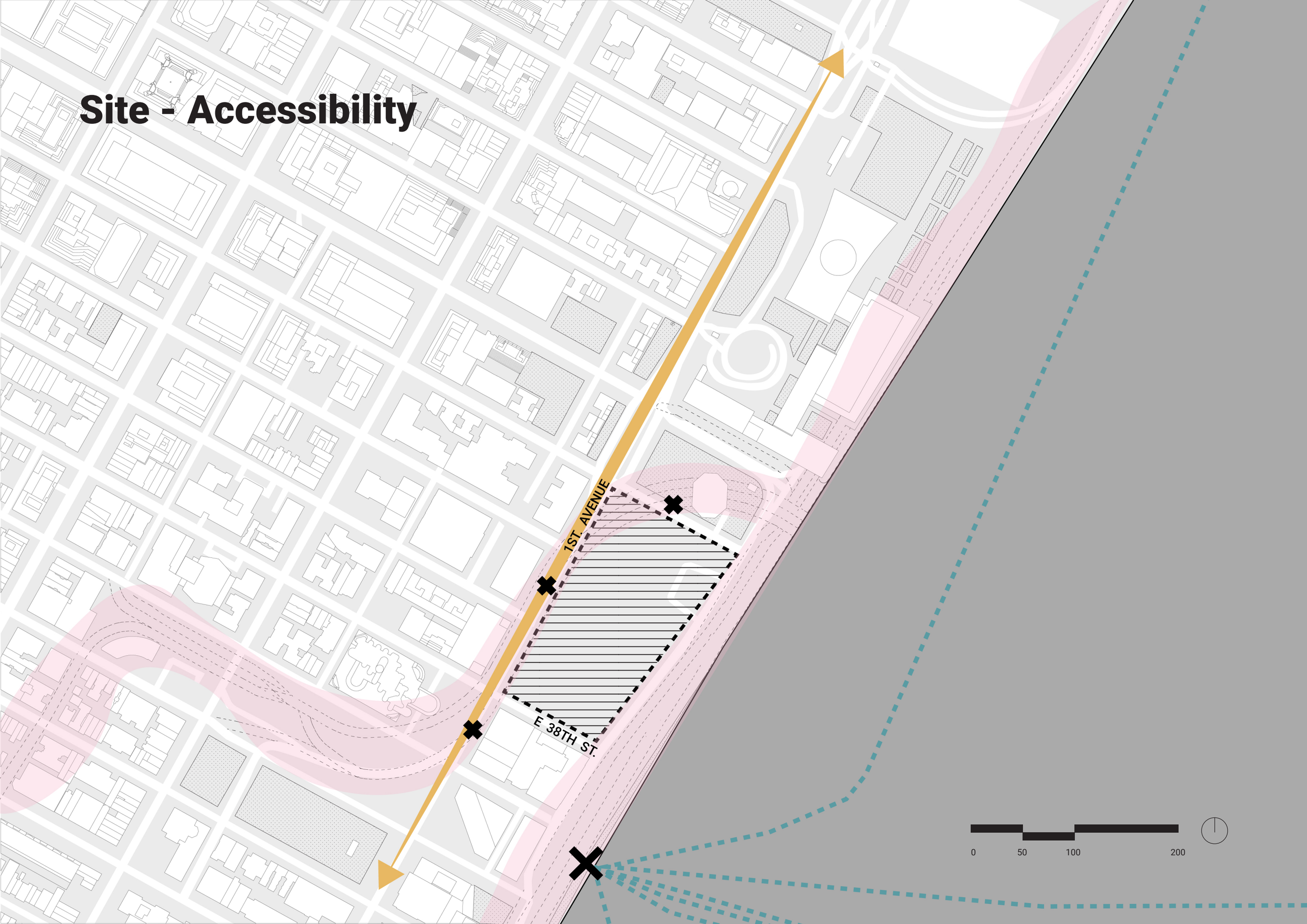
E 38TH ST.

German & Jewish

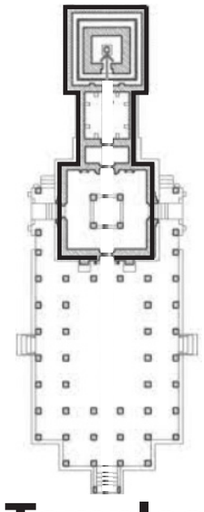
0 50 100 200

Public Program & Community Spaces

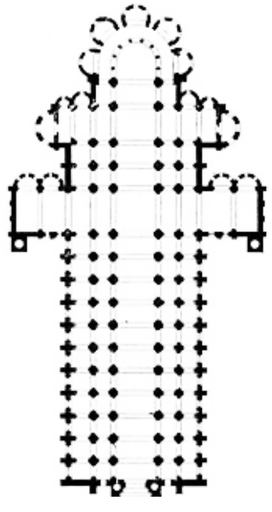
Site - Accessibility



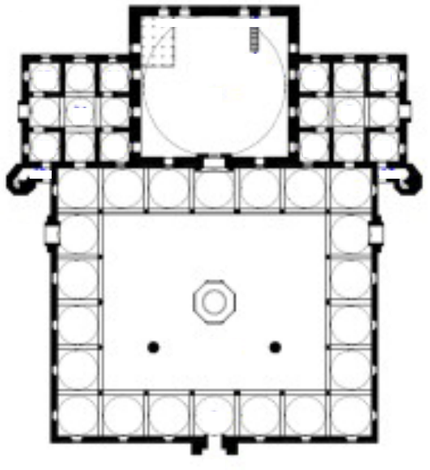
Programme



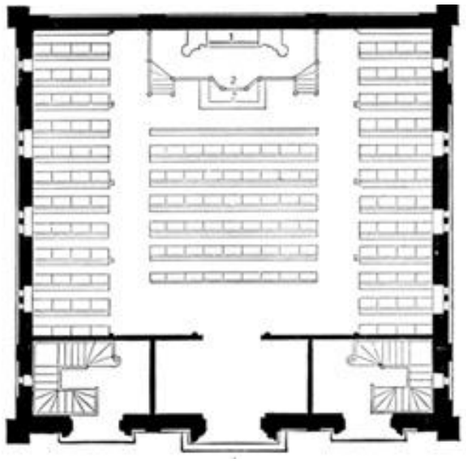
Temples



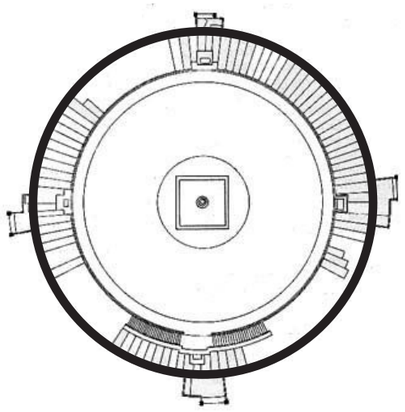
Churches



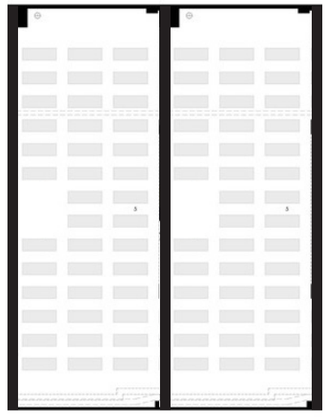
Mosques



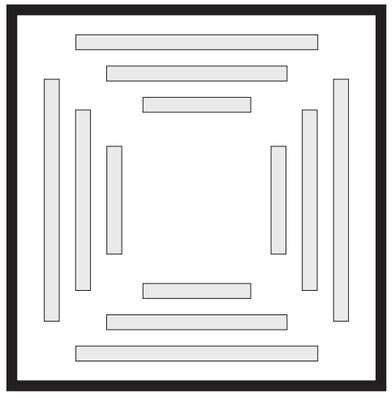
Synagogues



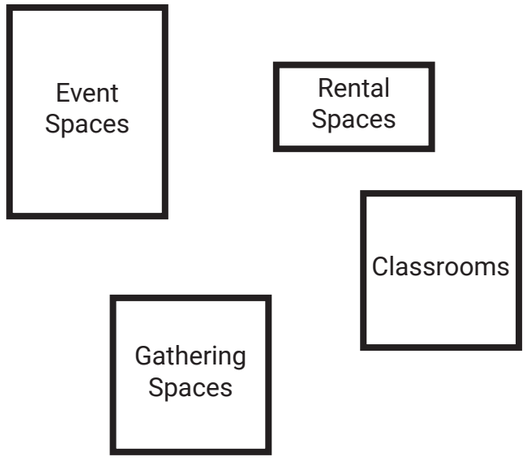
Stupas



Meditation Spaces



Collective Spaces



Other

Building Program

Mosque Spaces

- Main prayer hall for men
- Main prayer hall for women
- Open prayer hall
- Courtyard/garden
- Men entrance/lobby
- Women entrance/lobby
- Ablution area for men
- Ablution area for women
- Sabeel drinking water
- Library
- Ta'mir room
- Mihrab
- Lockers/ shoe rack
- Dinning/ Kitchen
- Imam's room
- Storage/ services
- Offices

Hindu Temple Spaces

- Sanctum
- Linga
- Dhyan Kaksh/ meditation place
- Garcha gnha
- Mandapa
- Archamanda
- Garden/courtyard
- Storage/ services

Synagogue Spaces

- Main prayer space
- Social hall
- Entrance/lobby
- Garden/courtyard
- Classrooms
- Room for Rabis
- Offices
- Storage/ services

Church Spaces

- Main prayer space
- Choir space
- Social hall
- Zachestry
- Entrance/lobby
- Garden/courtyard
- Classrooms
- Kitchen
- Accommodations for Priests
- Chapel
- Storage/ services
- Offices

Buddhist Temple Space

- Monks living quarters
- Main prayer hall
- Communication center
- DHarma Hall
- Abbols living quarter
- Kuti
- Meditation garden/courtyard
- Drawing room
- Meeting room
- Ossuary
- Ancillary space

Meditation & Other Worship Spaces

- Entrance/ lobby
- Quiet spaces
- Body meditation spaces
- Yoga /fitness spaces
- Prayer spaces
- Zen meditation spaces
- Meditation Gardens
- Therapy/ Counselling
- Green spaces
- Empty spaces
- Dark rooms
- Censorial rooms
- Individual meditation spaces
- Waiting rooms
- Locker rooms
- Offices
- Storage/ services

Gathering Spaces

- Event spaces for religious celebrations
- Event spaces for alternative events
- Cultural interaction spaces
- Cafeteria
- Kitchen

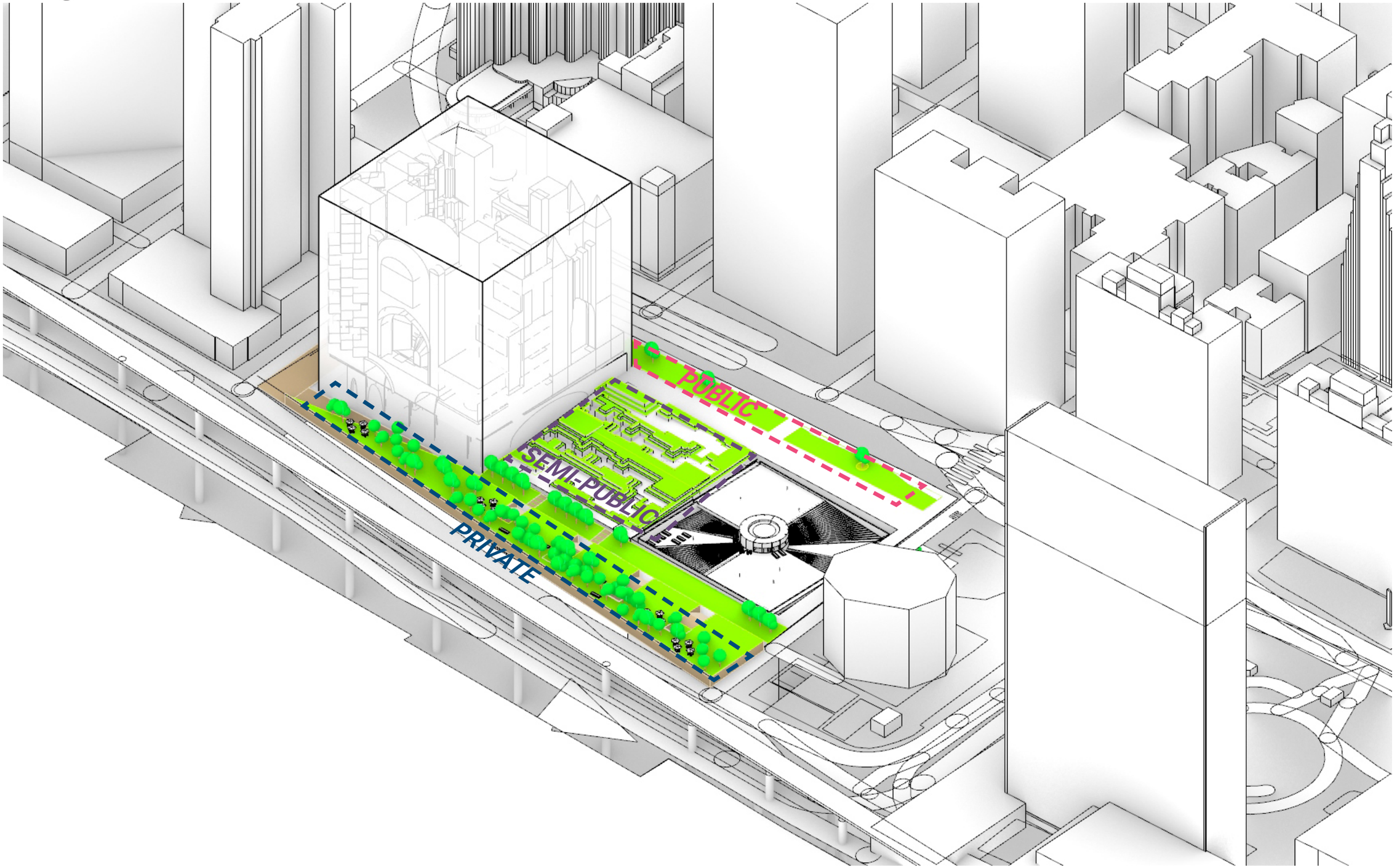
Learning Spaces

- Auditorium
- Lecture halls
- Classrooms for religious education
- Classrooms for language education
- Classrooms for music, choirs, vocals
- Daycare
- Bible Study
- Performance Spaces

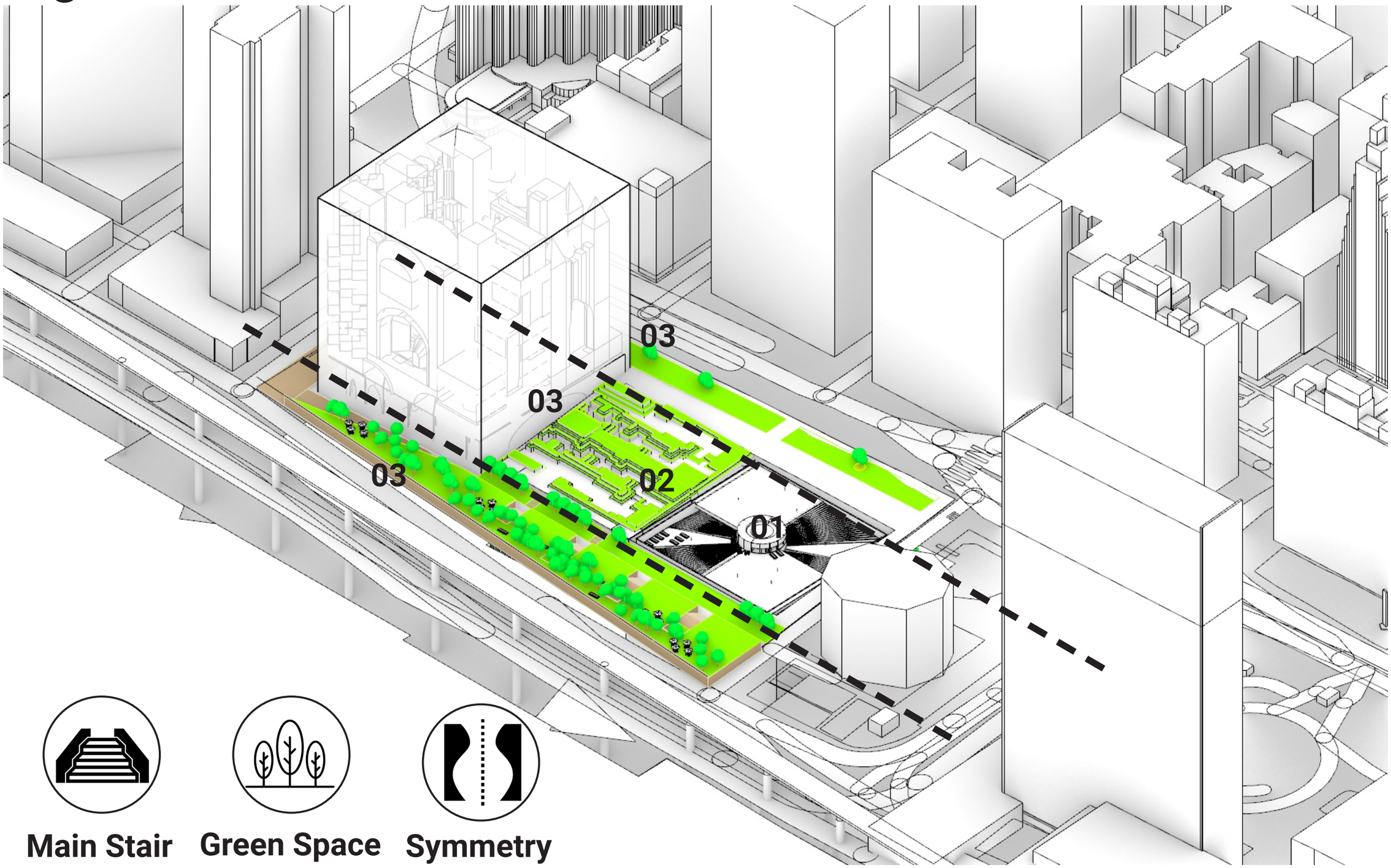
Other Spaces

- Facilities and Housing for Religious Clergy
- Religious shops
- Other Shops
- Book/ Gift store
- Flex spaces
- Rental Spaces
- Library /Study hall
- Storage

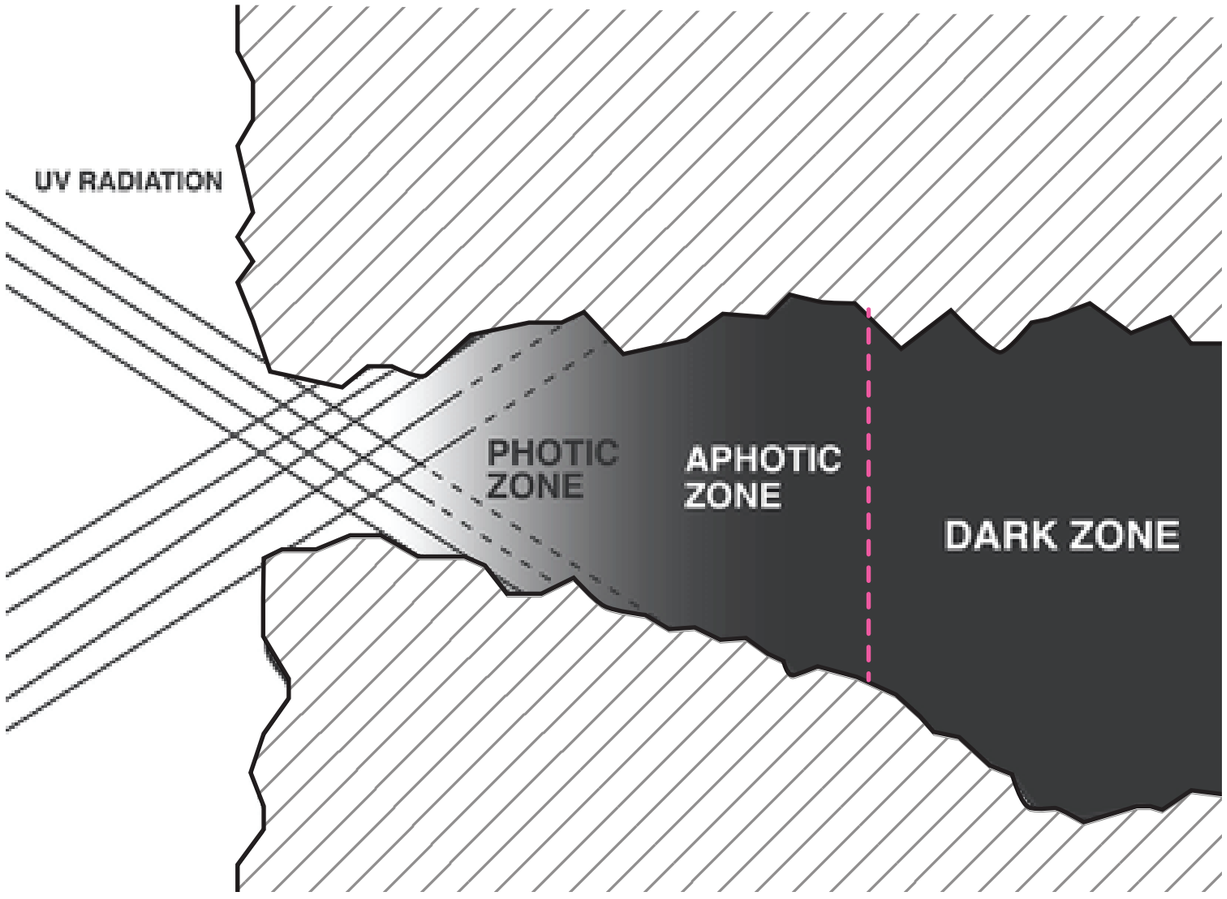
Organization of Site

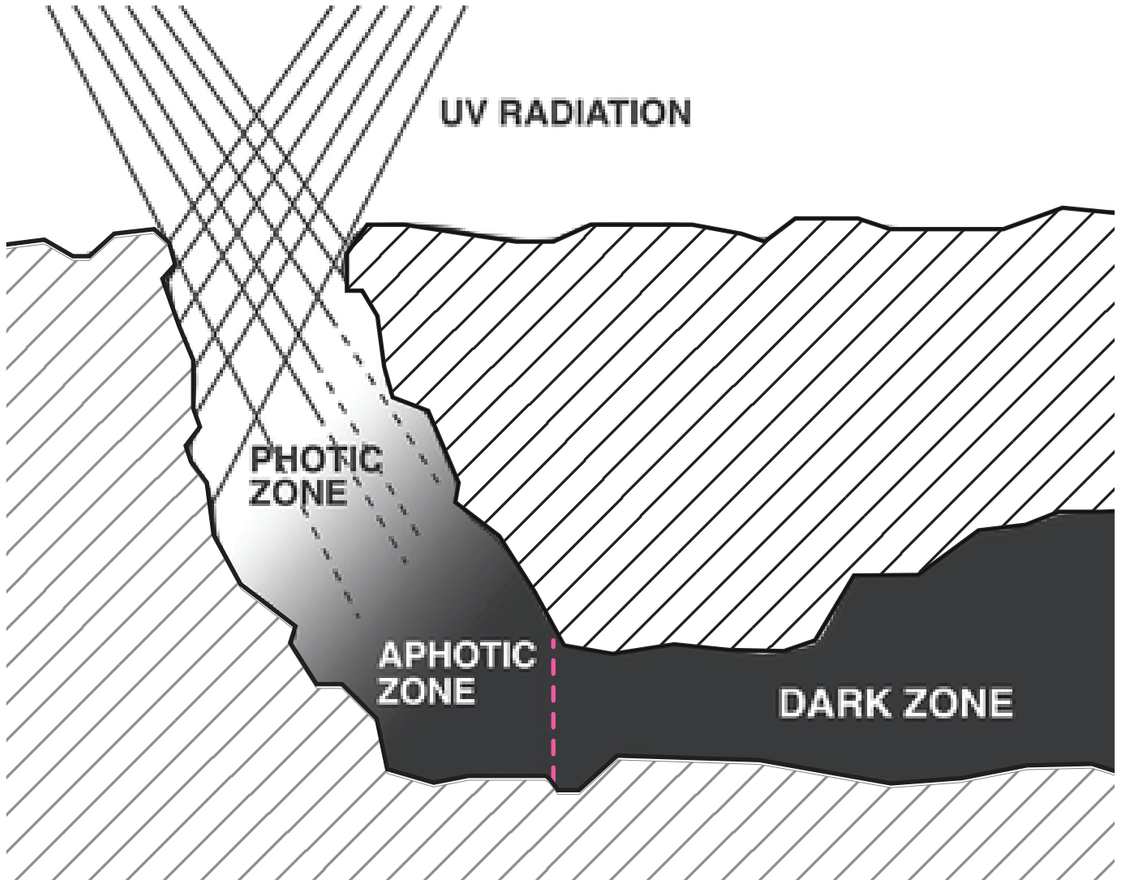


Organization of Site

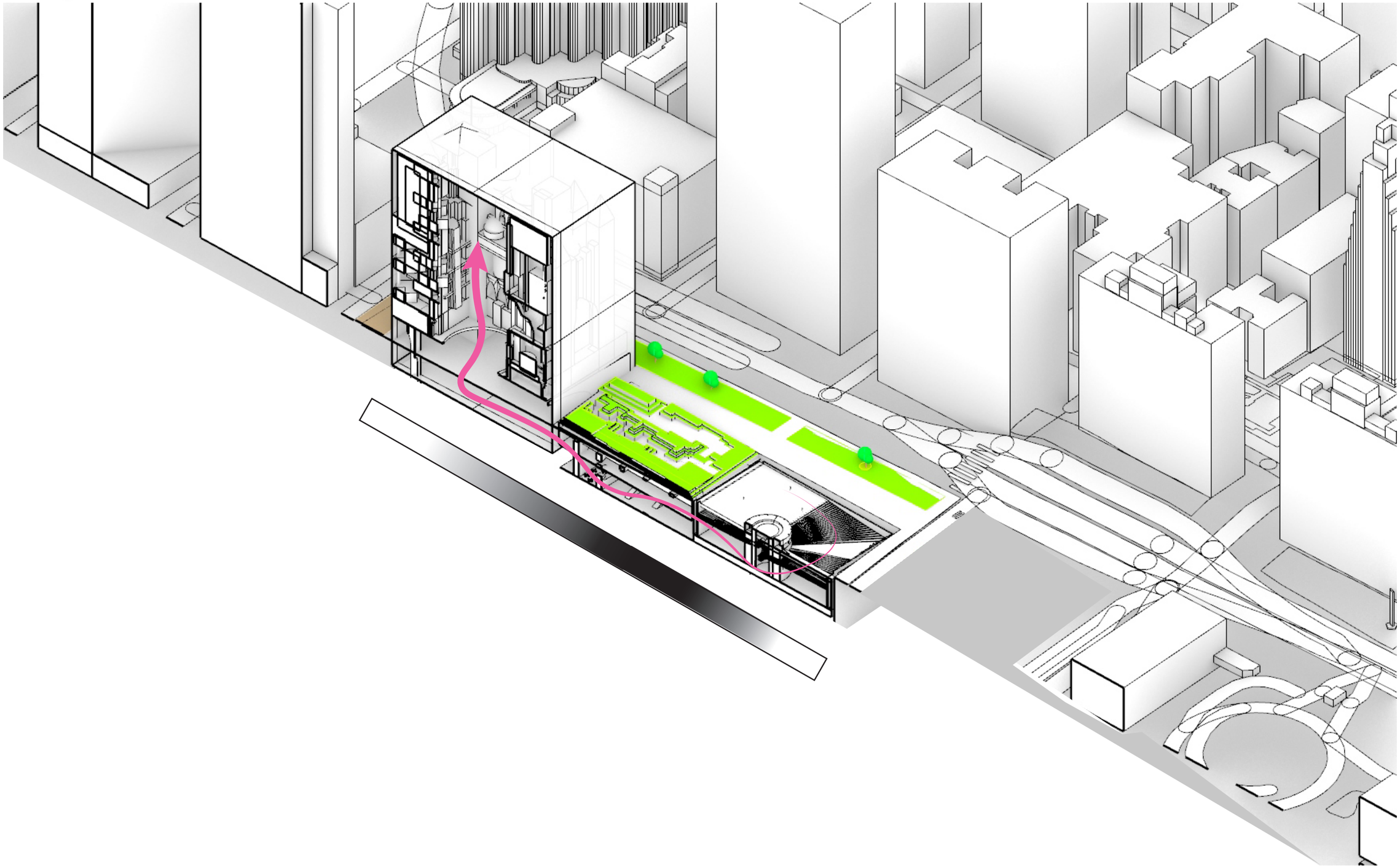


Grotto Section

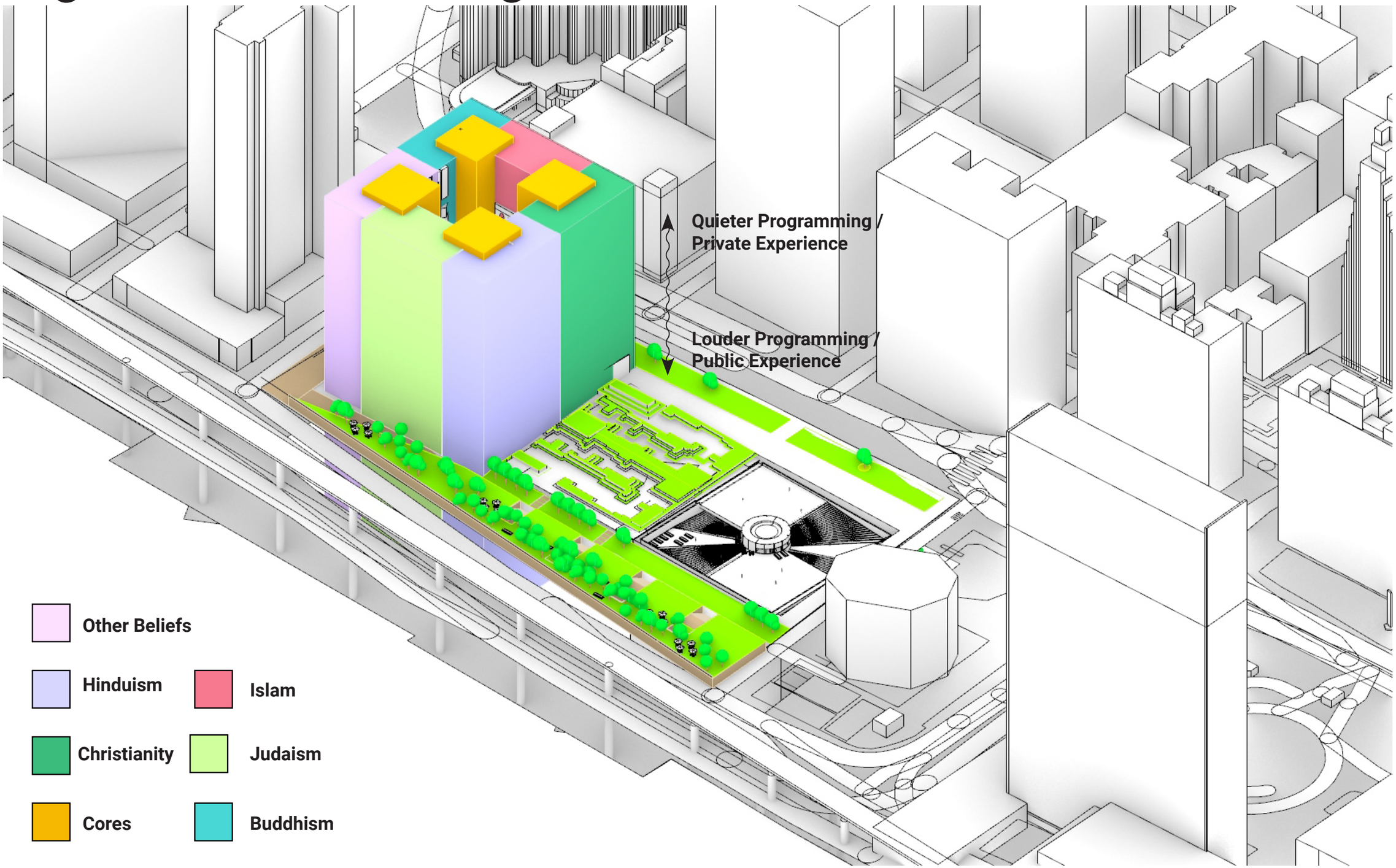




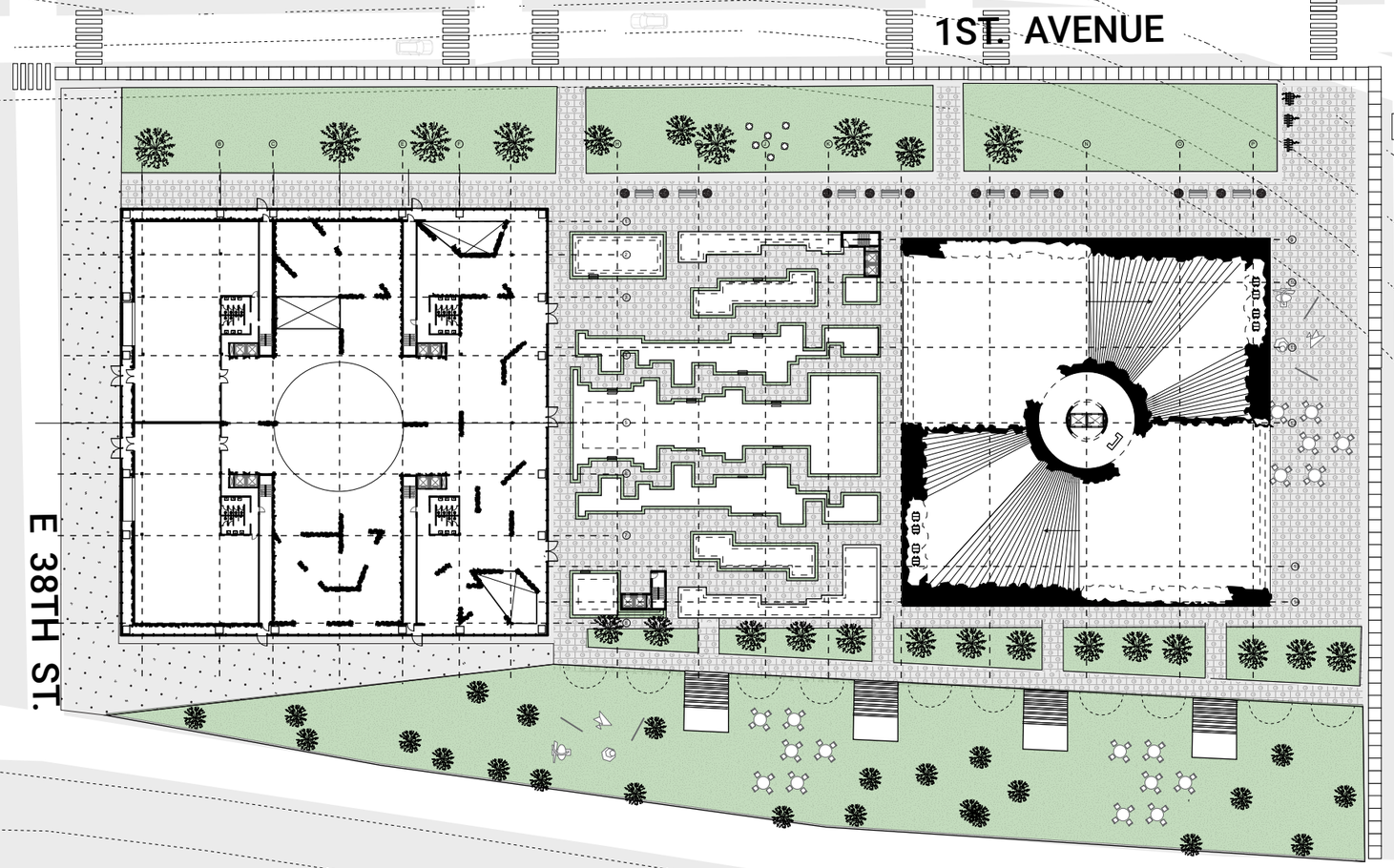
Organization of Building



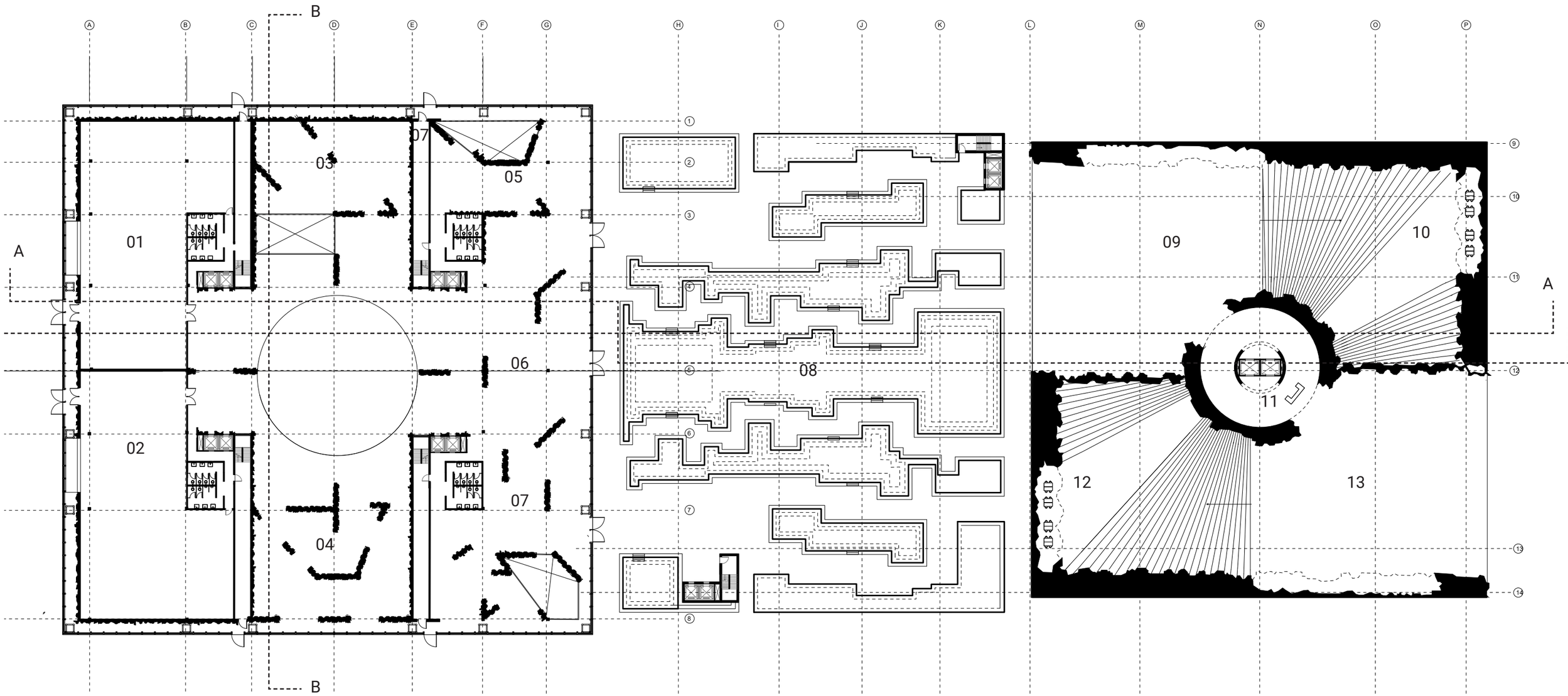
Organization of Building



Plan - Ground Floor Plan 1:500



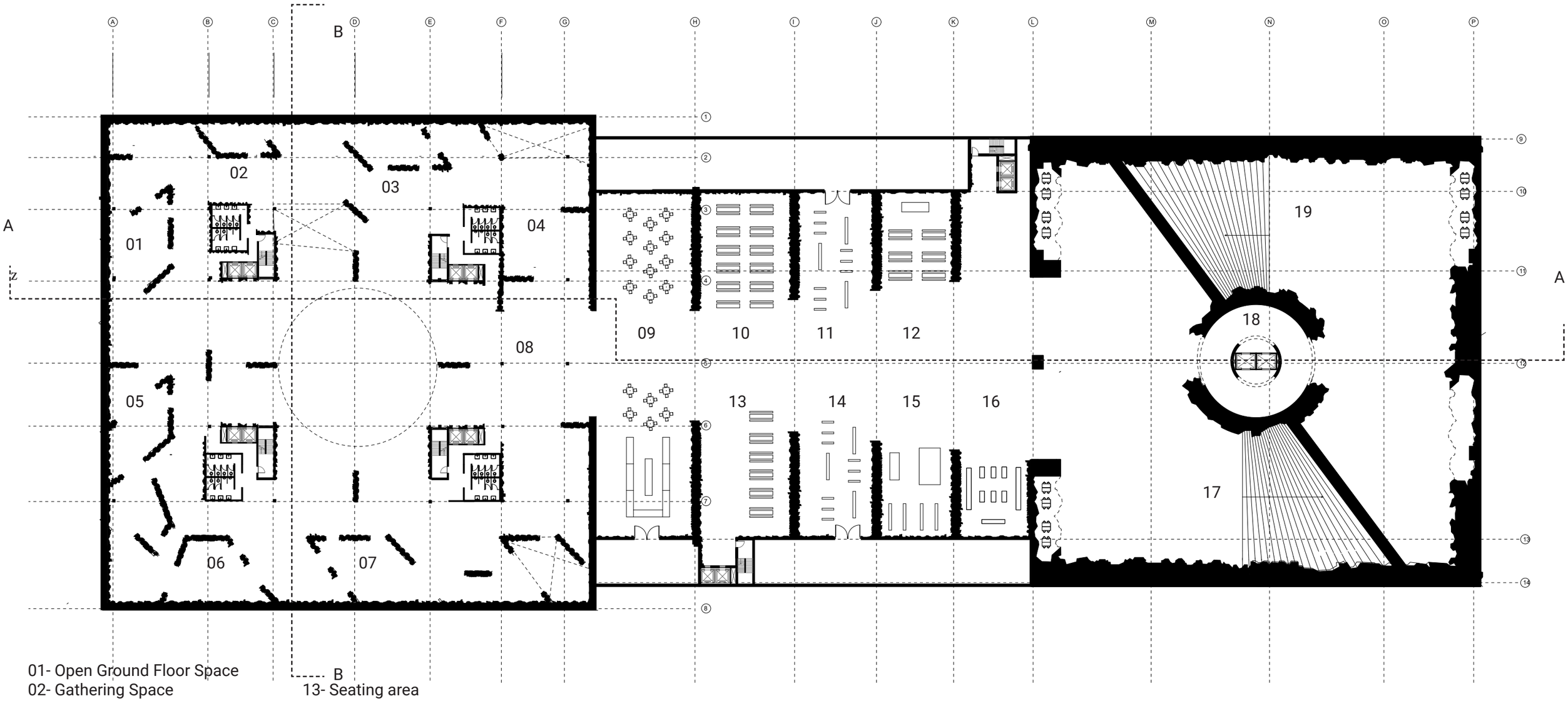
Plan - Ground Floor Plan



01- Delivery and storage space
02- Waste management
03- Meeting Area
04- Gathering spaces
05- Flexible space
06- Main entrance space 02
07- Exhibition space
08- Garden walkways a outdoor prayer spaces
09- Main exit space
10- Seating area
11- Lobby space and elevators
12- Stair programming - cafe
13- Main entrance space

0 5 10 20

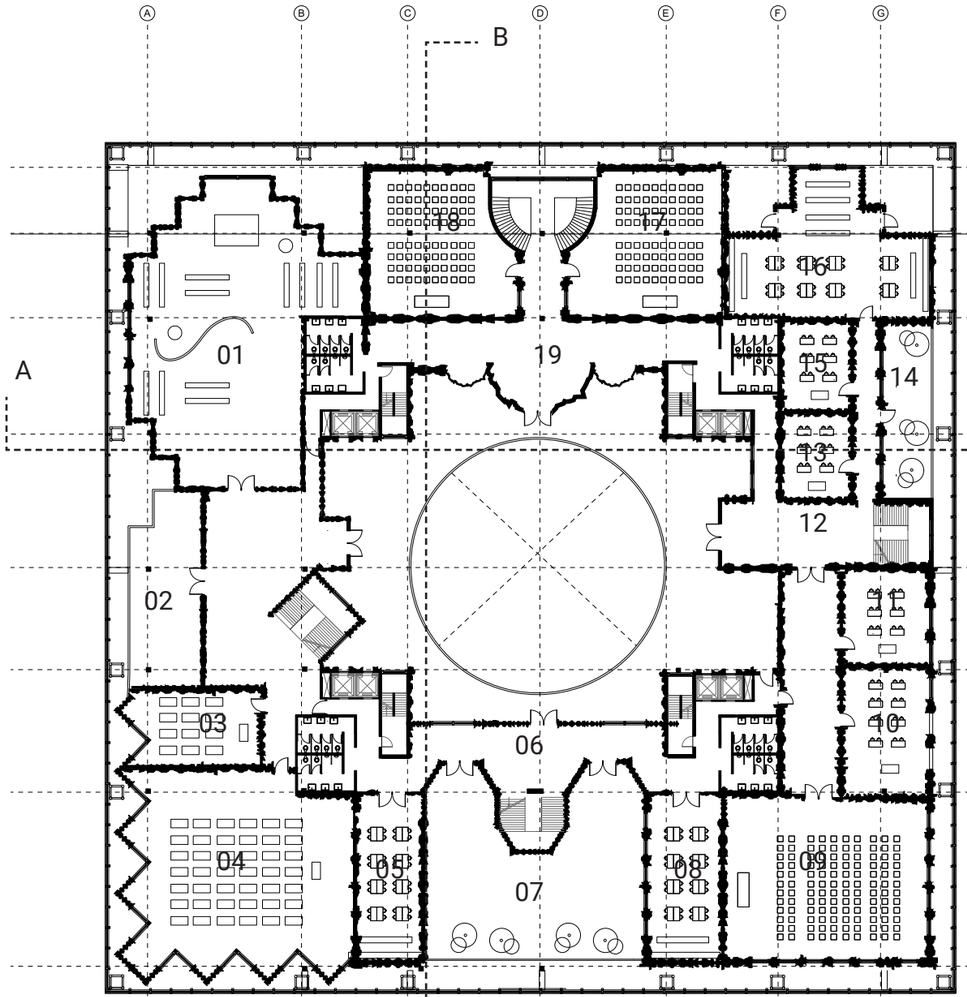
Plan - Lower Level

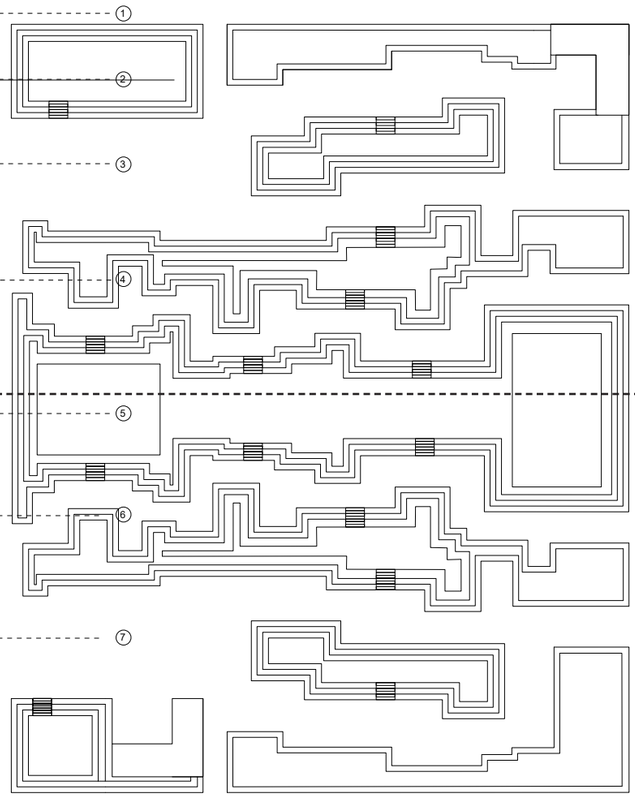


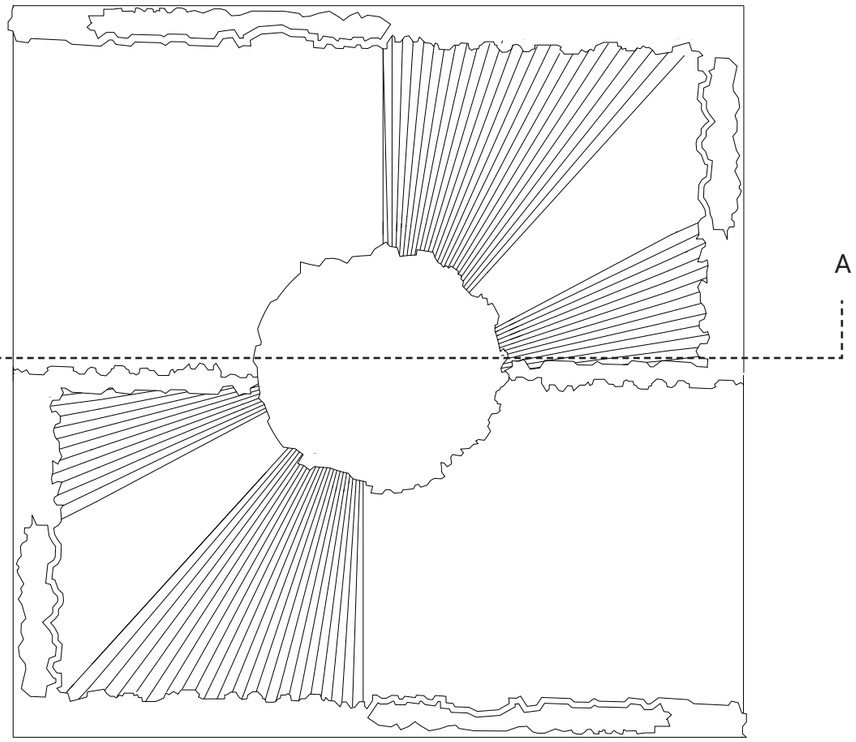
01- Open Ground Floor Space
02- Gathering Space
03- Lounge area
04- Lounge area
05- Meeting space
06- Shop
07- Shop
08- Entry space
09- Cafeteria
10- Seating space
11- Exhibition space
12- Meeting space
13- Seating area
14- Rental space
15- Gift shop
16- Bookstore
17- Descent into the building
18-Main circulation space
19- Ascent to Ground level

0 5 10 20

Plan - Upper Level A

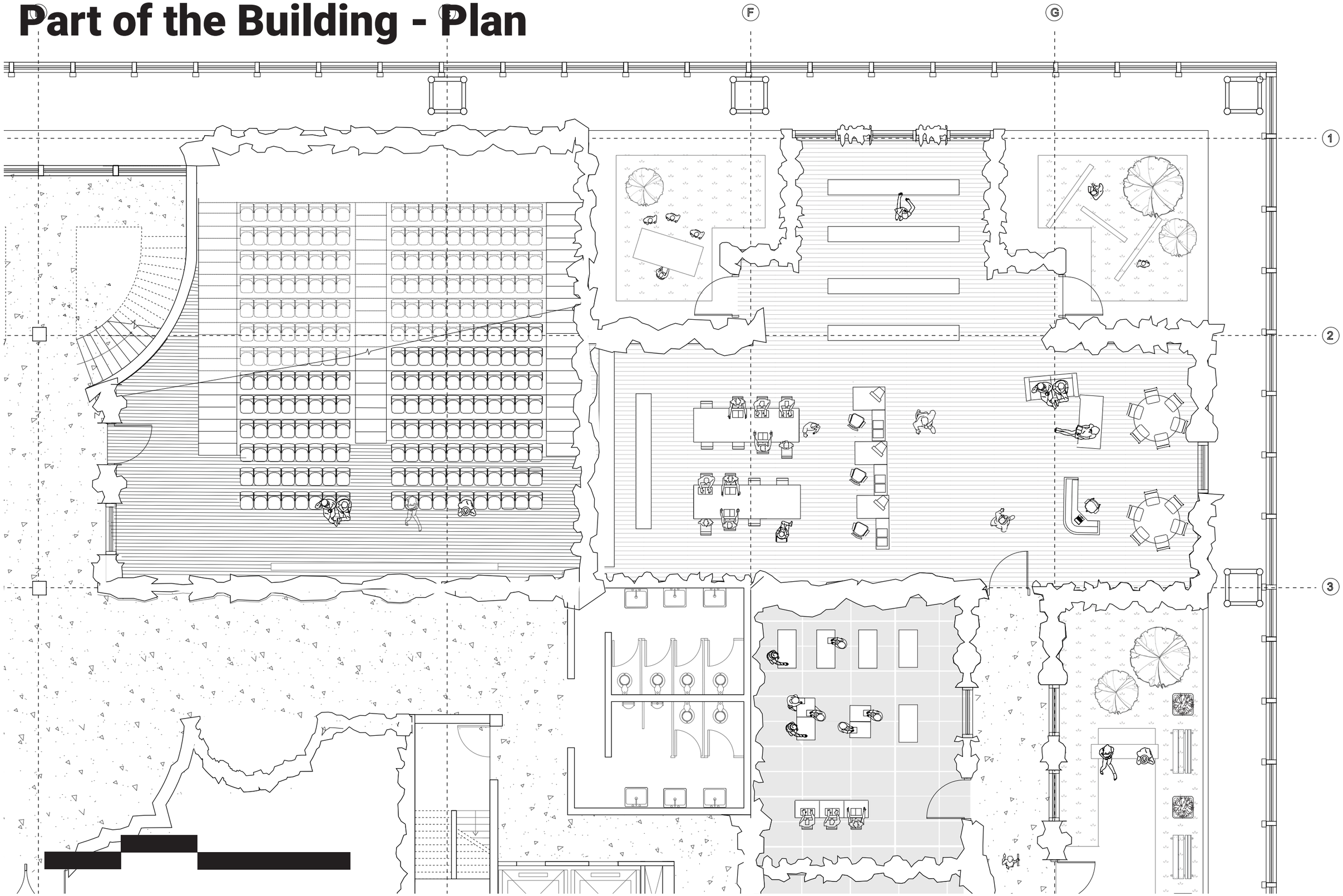




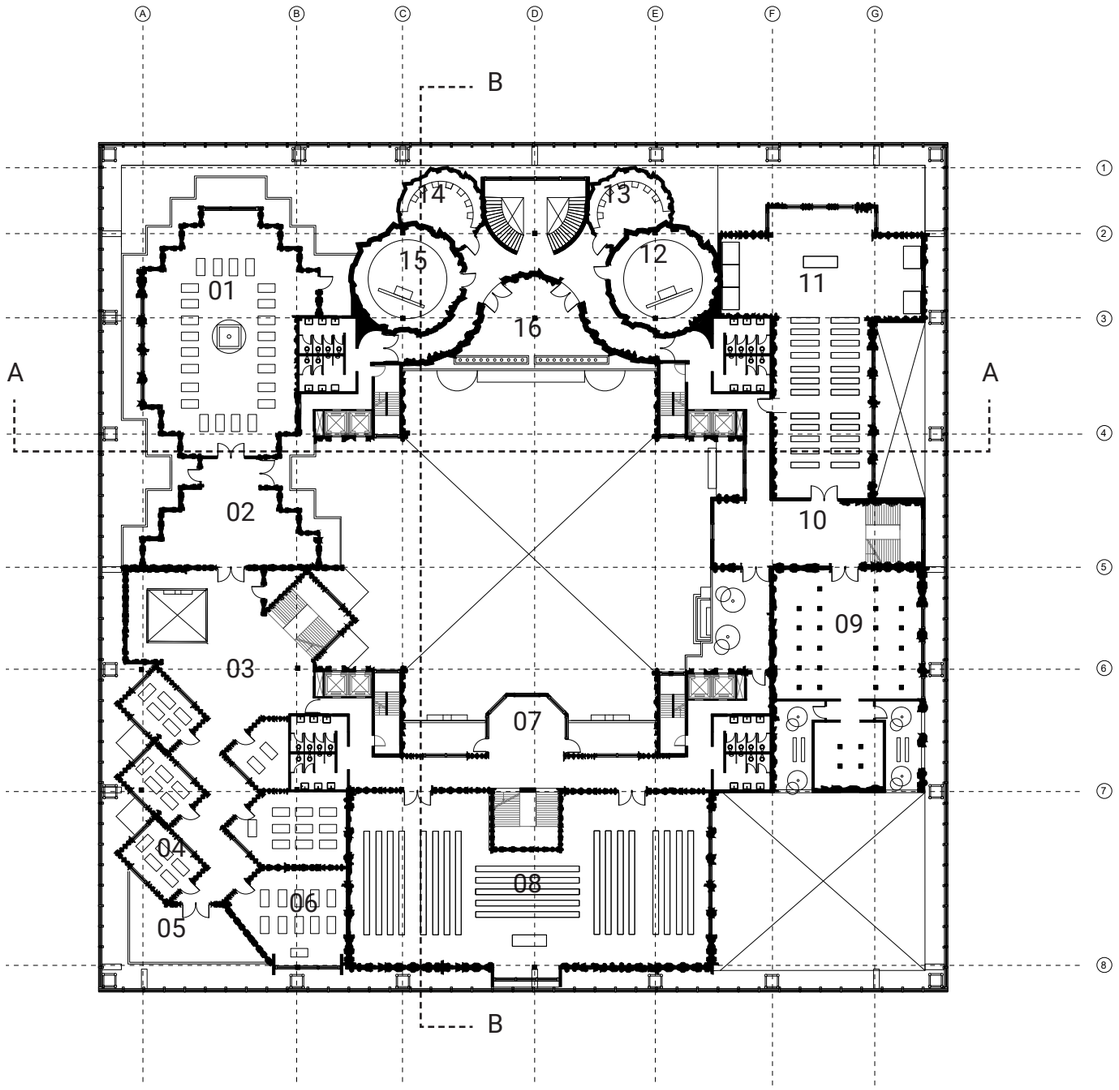


01- Gallery Space
02- Outdoor Garden
03- Small group studio space
04- Large group studio space
05- Meeting room
06- Lobby space
07- Outdoor Space
08- Classroom
09- Lecture hall
10- Classroom
11- Meeting room
12- Lobby Space
13- Classroom
14- Outdoor Space
15- Classroom
16- Library
17- Multipurpose space
18- Multipurpose space
19- Lobby Space

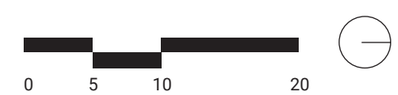
Part of the Building - Plan



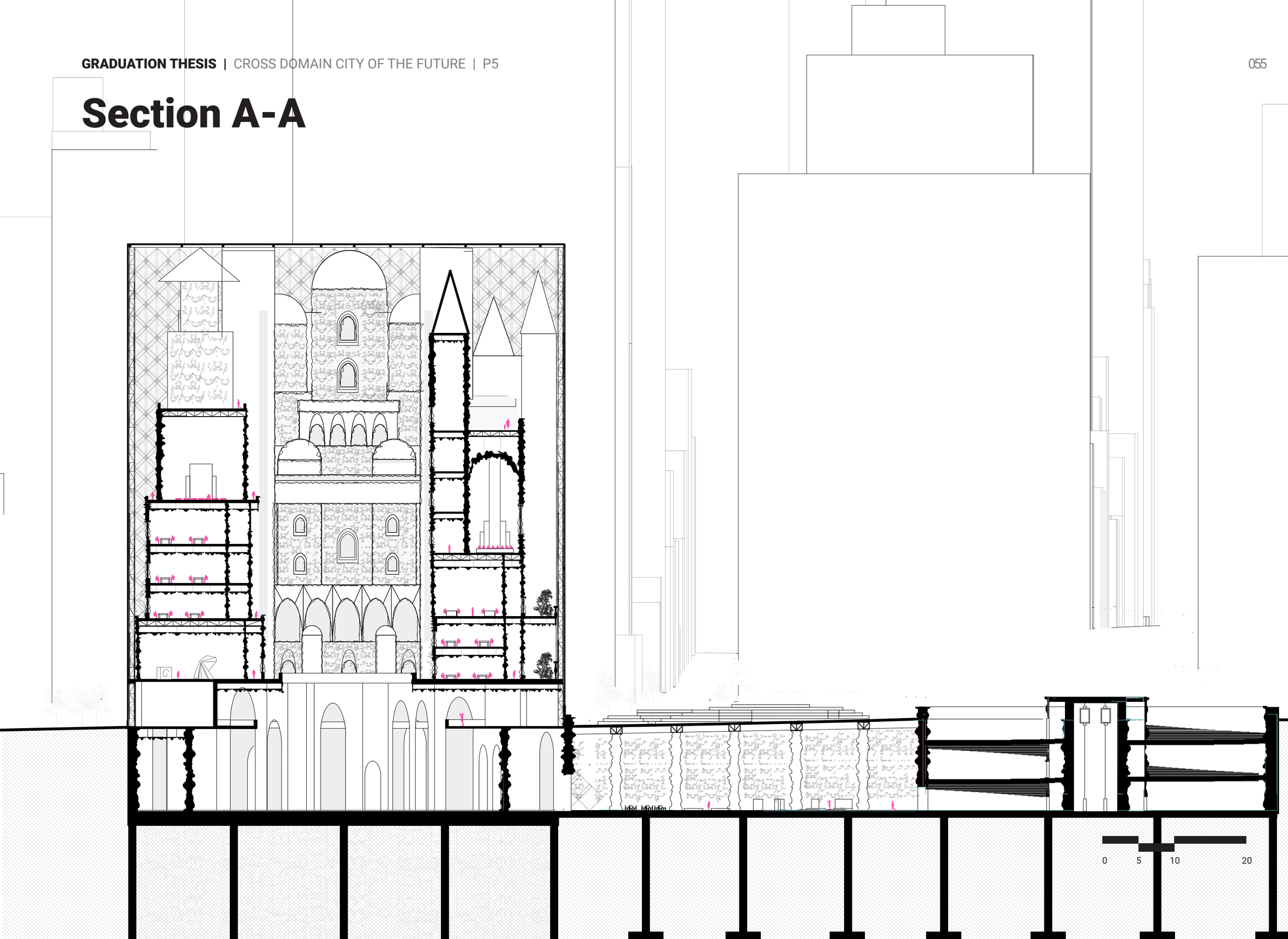
Plan - Upper Level B



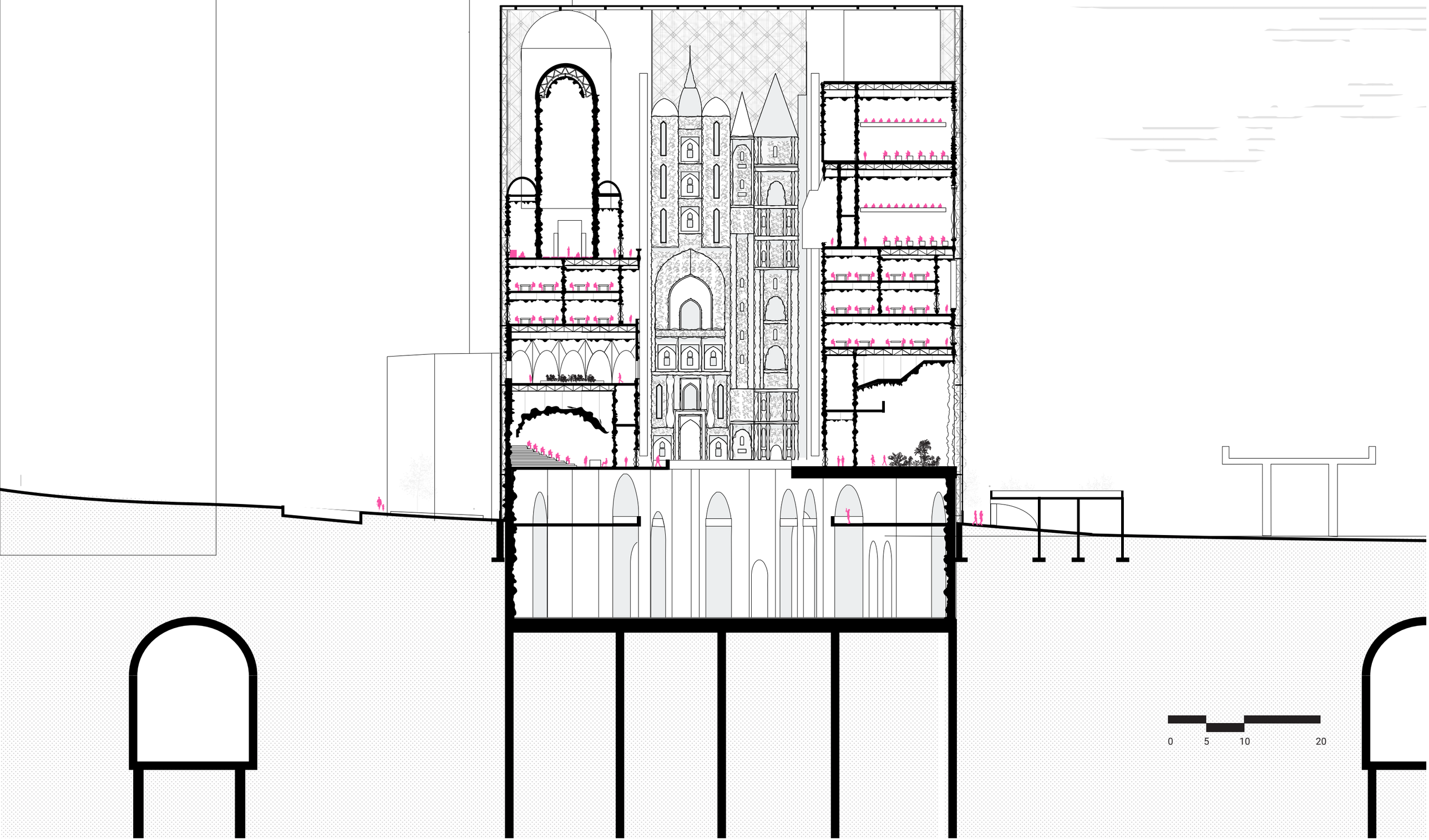
01- Buddhist Prayer Space
02- Open Meditation Space
03- Open Lobby space
04- Individual Meditation Area
05-Outer Meditation Area
06- Group Meditation Area
07- Open Lobby space
08- Synagogue Main Prayer Space
09- Hindu Temple Main Prayer Space
10- Open Lobby space
11- Church Main Prayer Space
12- Men Prayer Space in Mosque
13- Men Ablution Area
14- Women Ablution Area
15- Women Prayer Space in Mosque



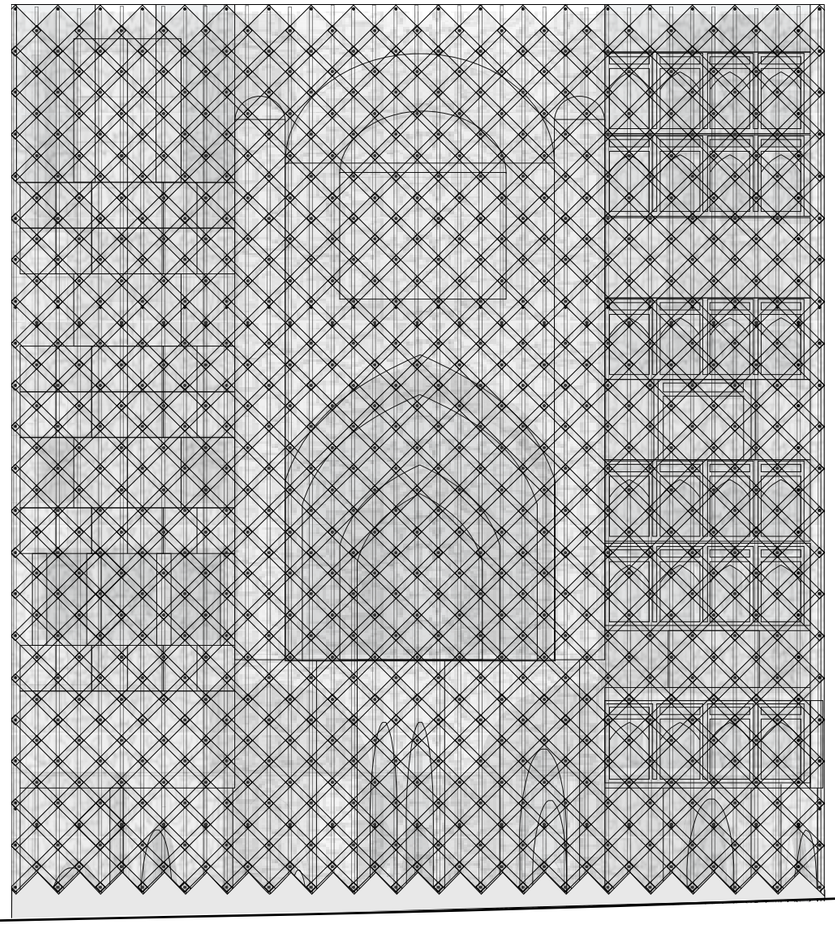
Section A-A

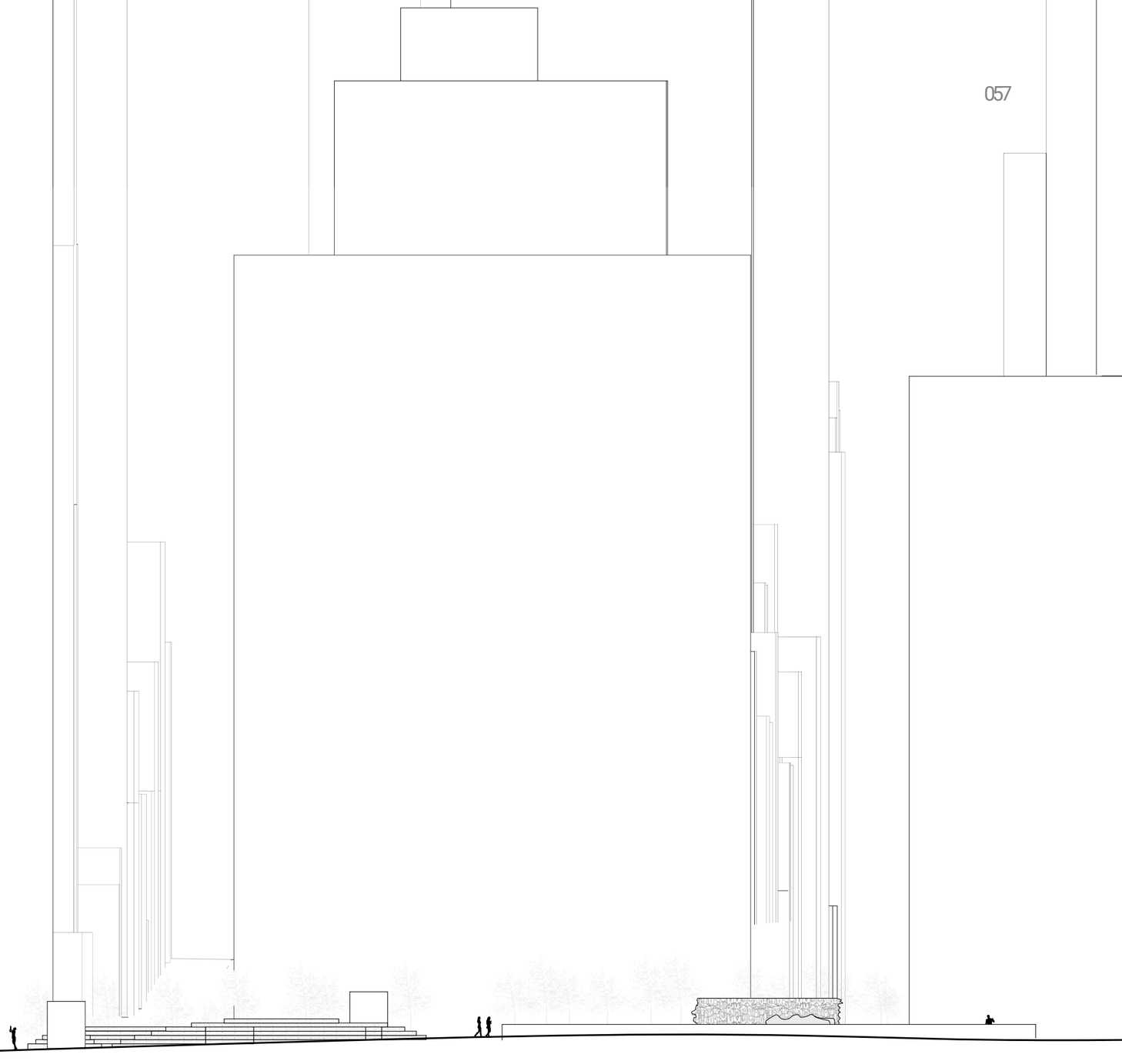


Section B-B



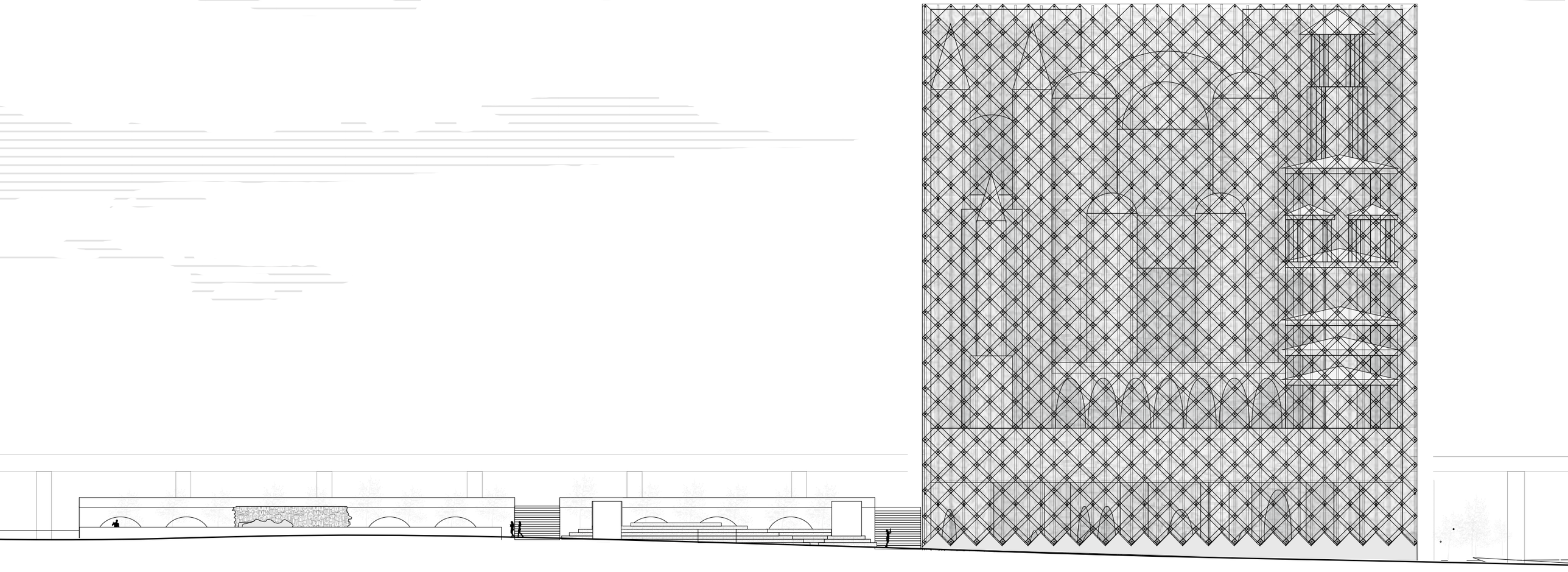
East Elevation





0 5 10 20

West Elevation



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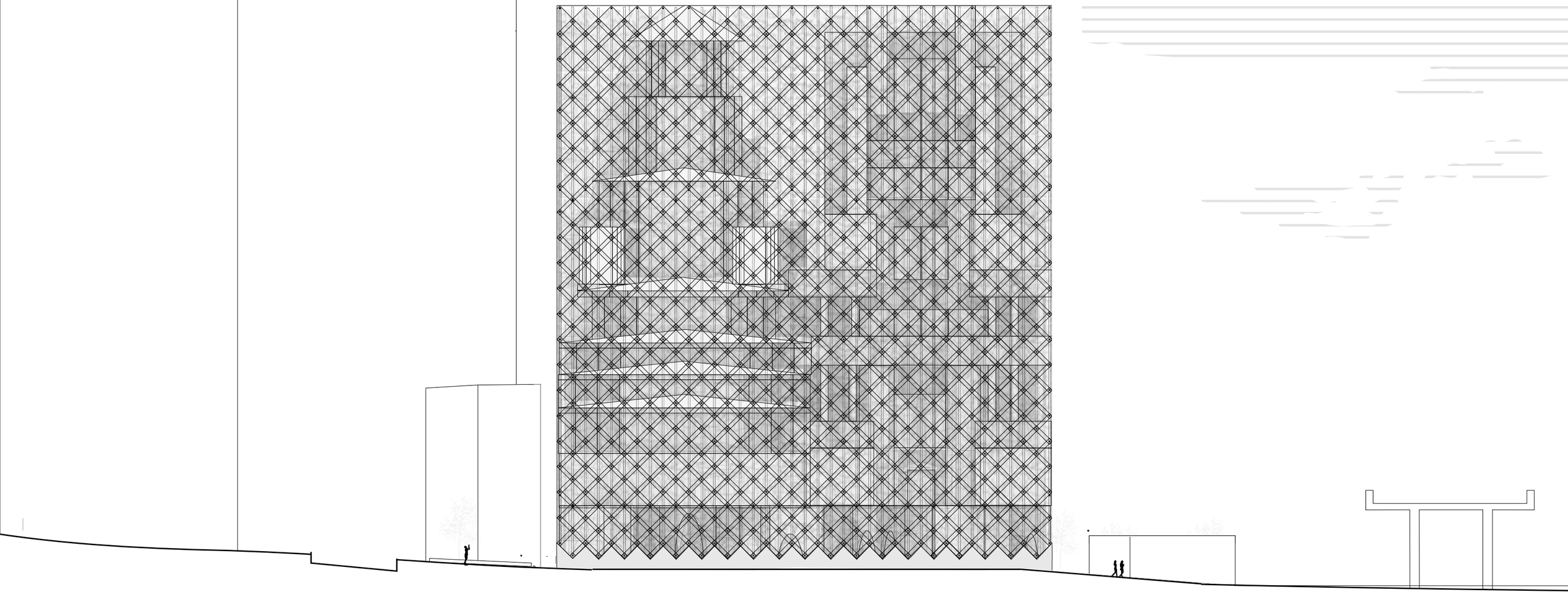
South Elevation



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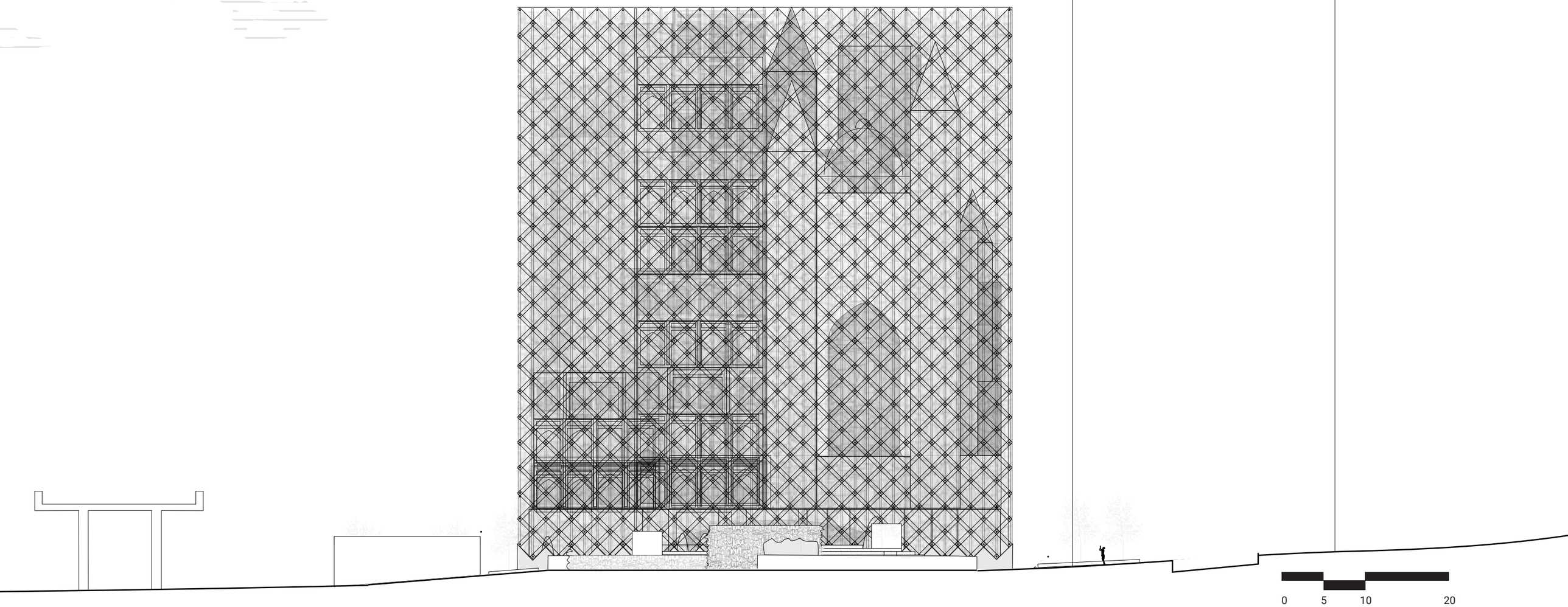
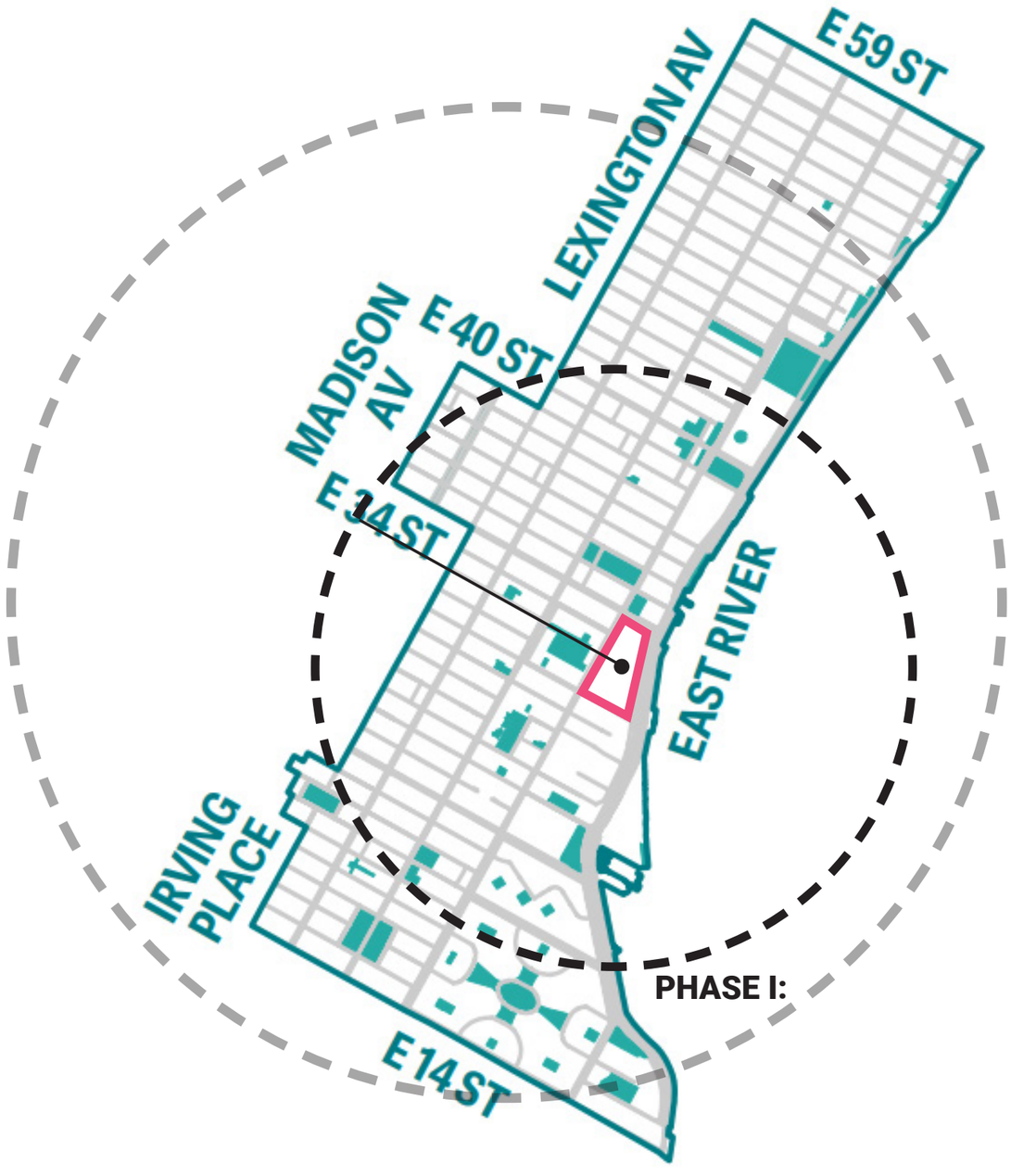
North Elevation



Future Phasing



PHASE I:

5 min. car / 20 min. walking

Churches: 15 buildings

Synagogues: 16 buildings

Mosques: 3 buildings

Hindu Temples: None

Buddhist Temples: 5 buildings

Other religious spaces: 8 buidlings

PHASE II:

15 min. car / 40 min. walking

Churches: 22 buildings

Synagogues: 20 buildings

Mosques: 8 buildings

Hindu Temples: 4 buildings

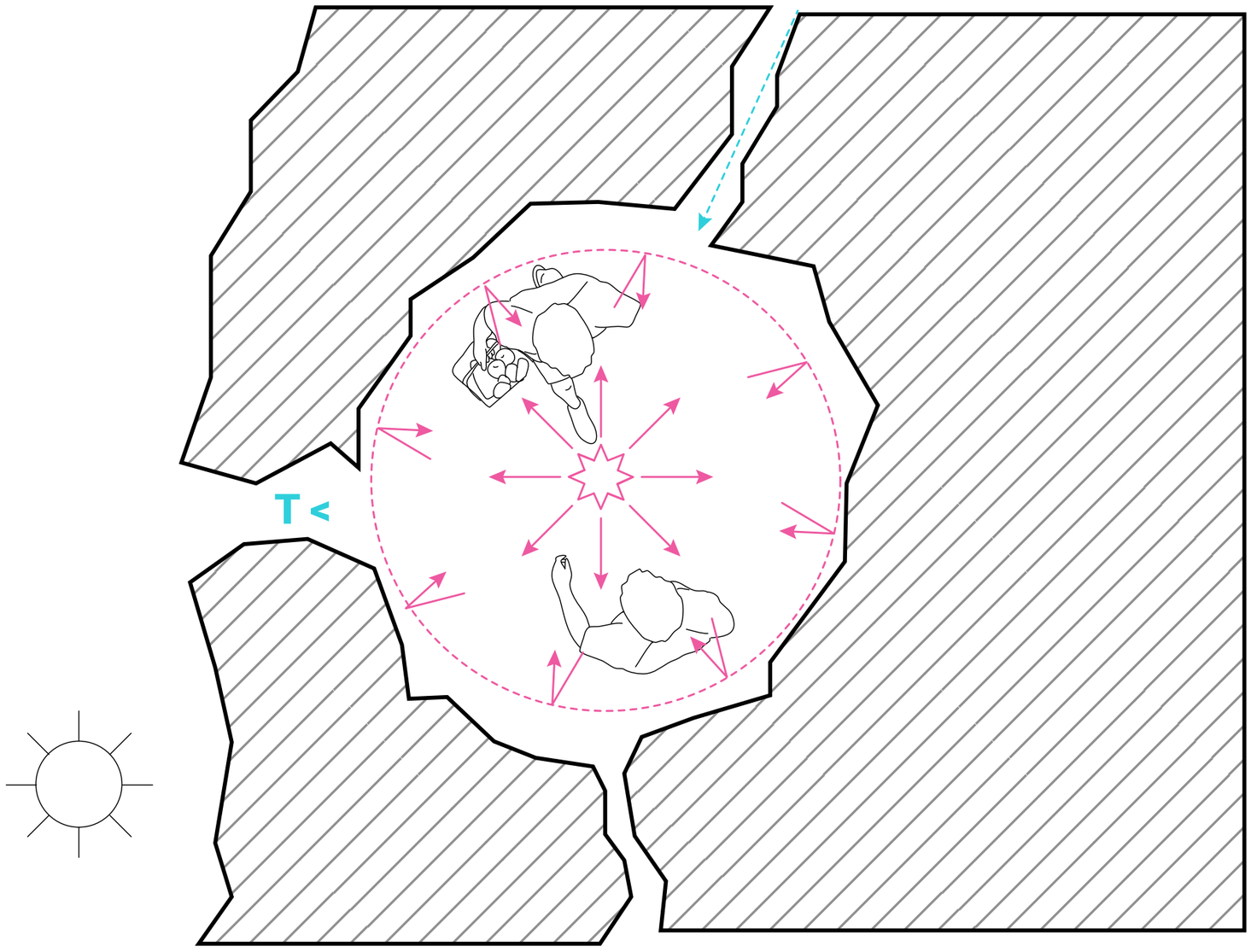
Buddhist Temples: 10 buildings

Other religious spaces: 15 buidlings

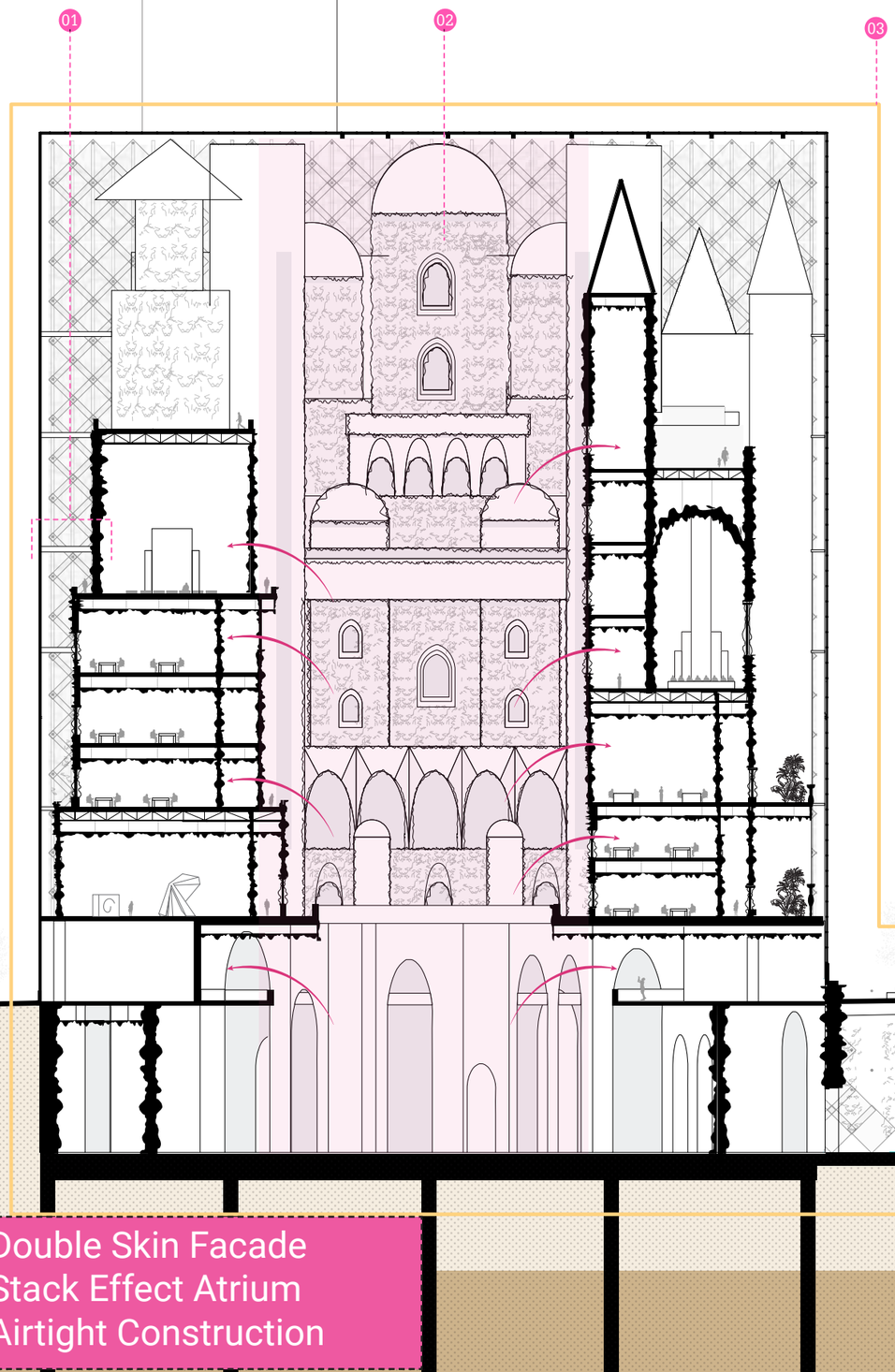
PHASE II:

etc.....

Grotto Climate

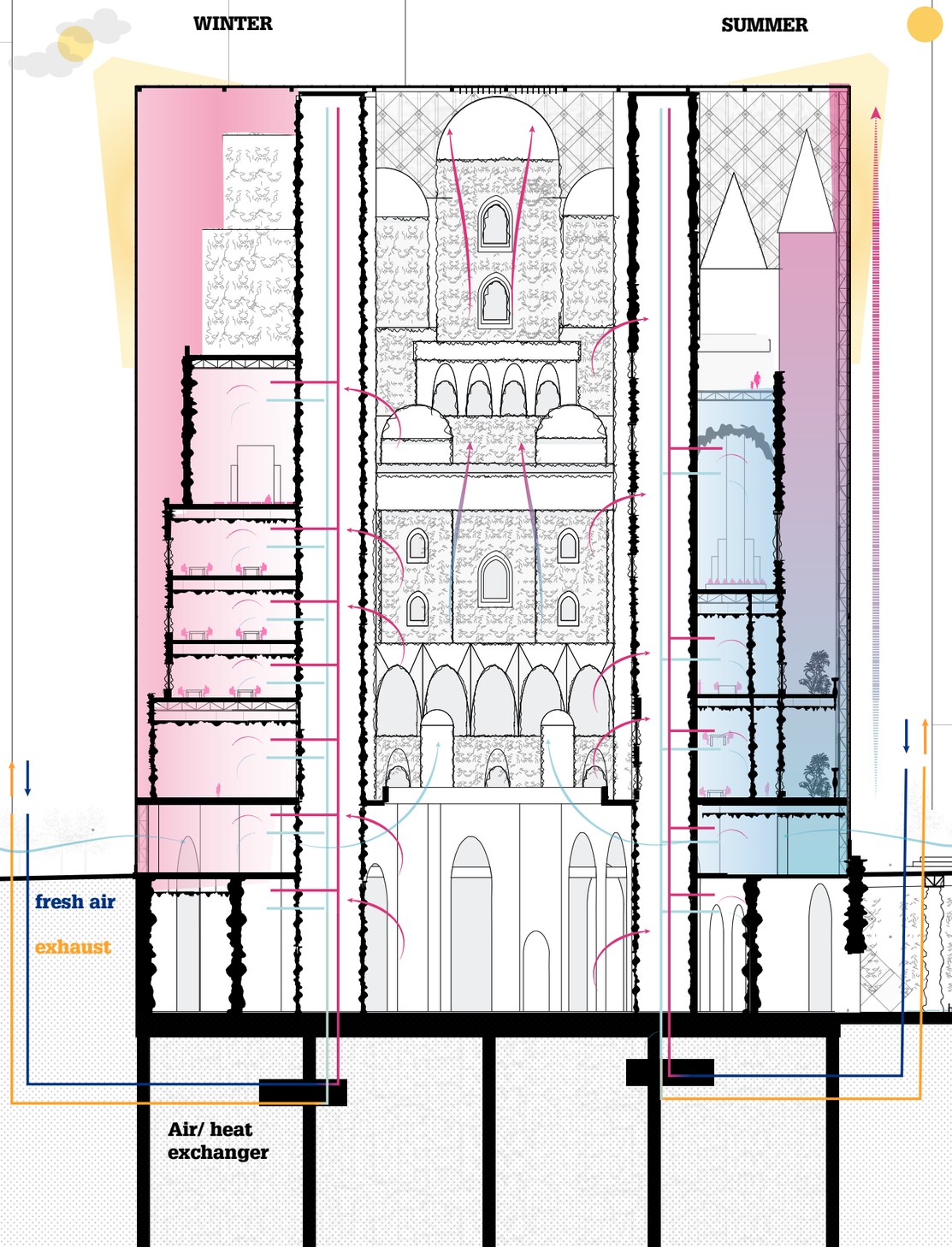


Climate Strategies

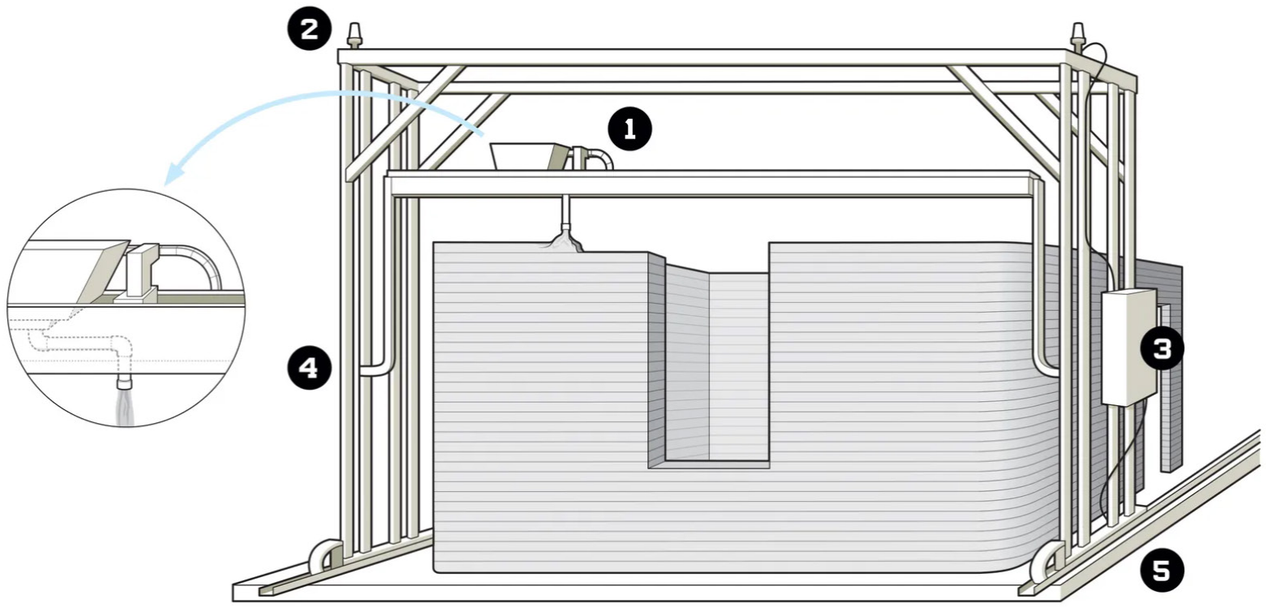


01 - Double Skin Facade
02 - Stack Effect Atrium
03 - Airtight Construction

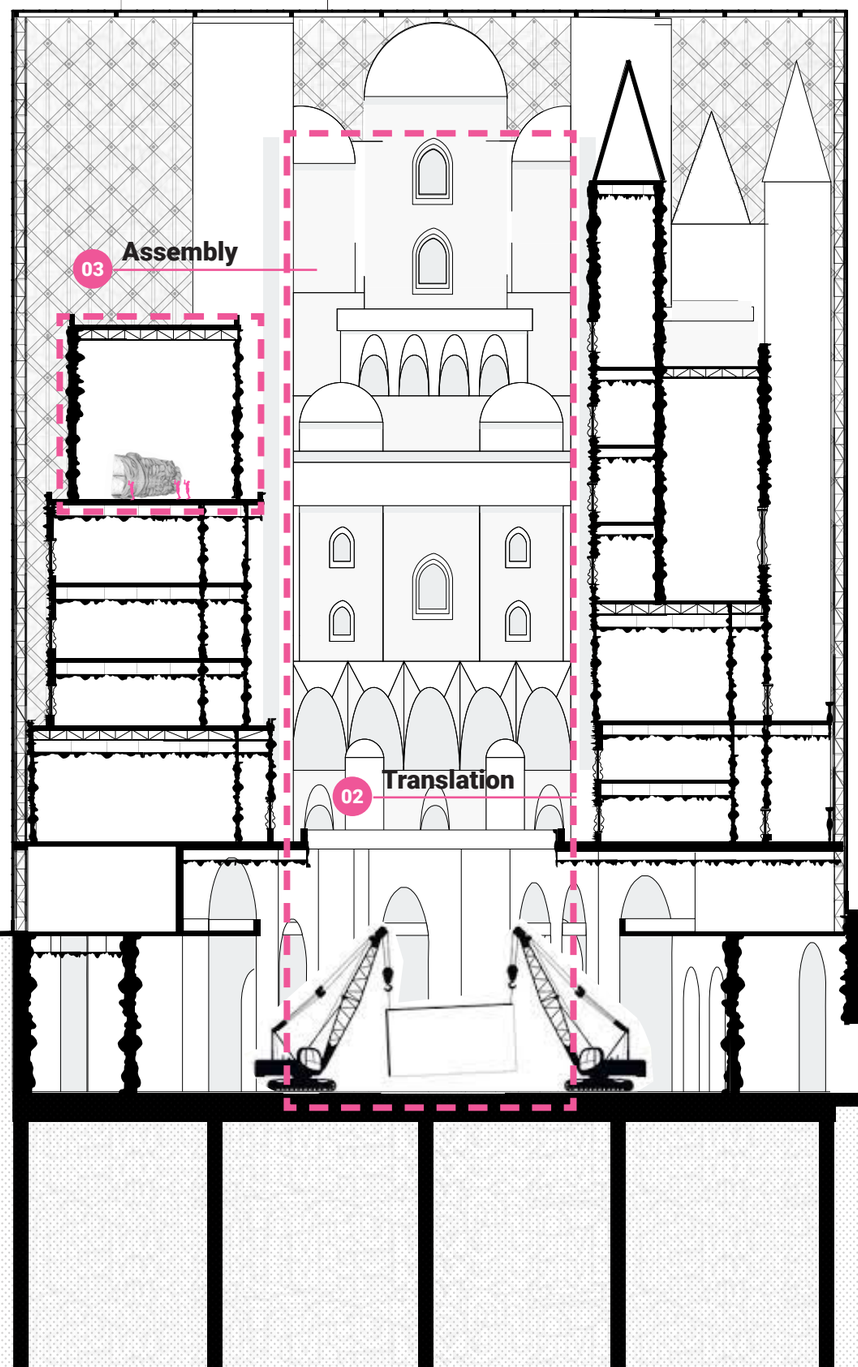
Climate Strategies



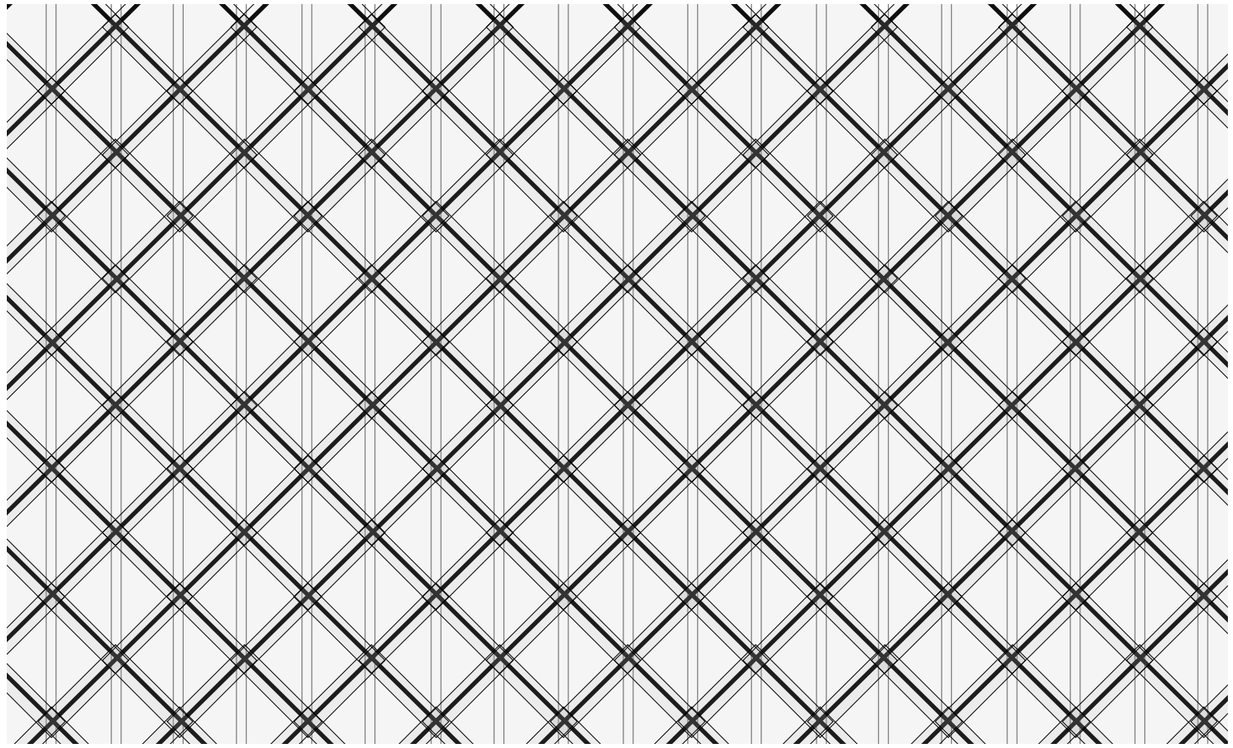
Soil

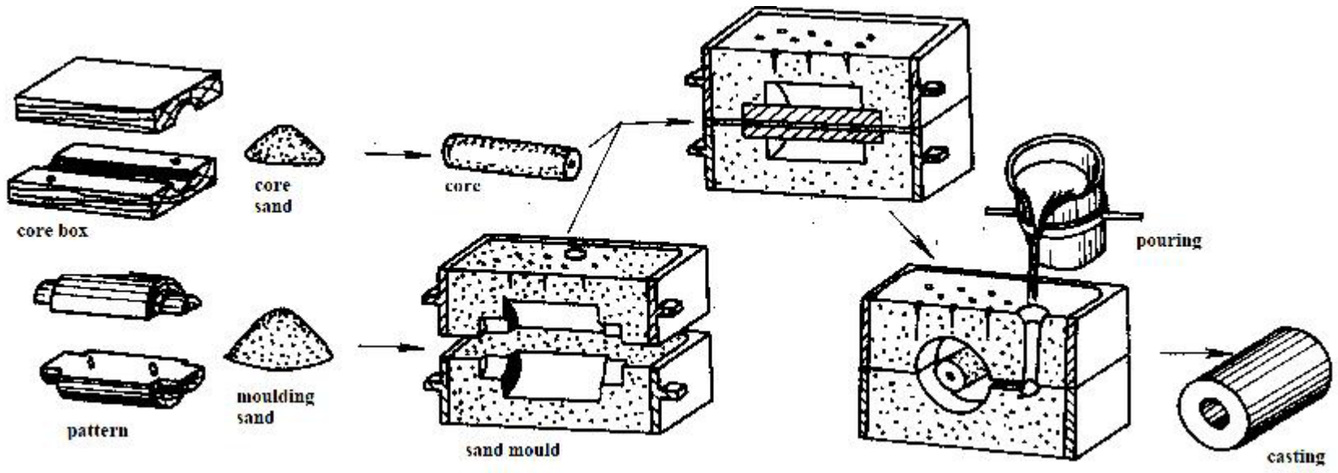


3D-Printing

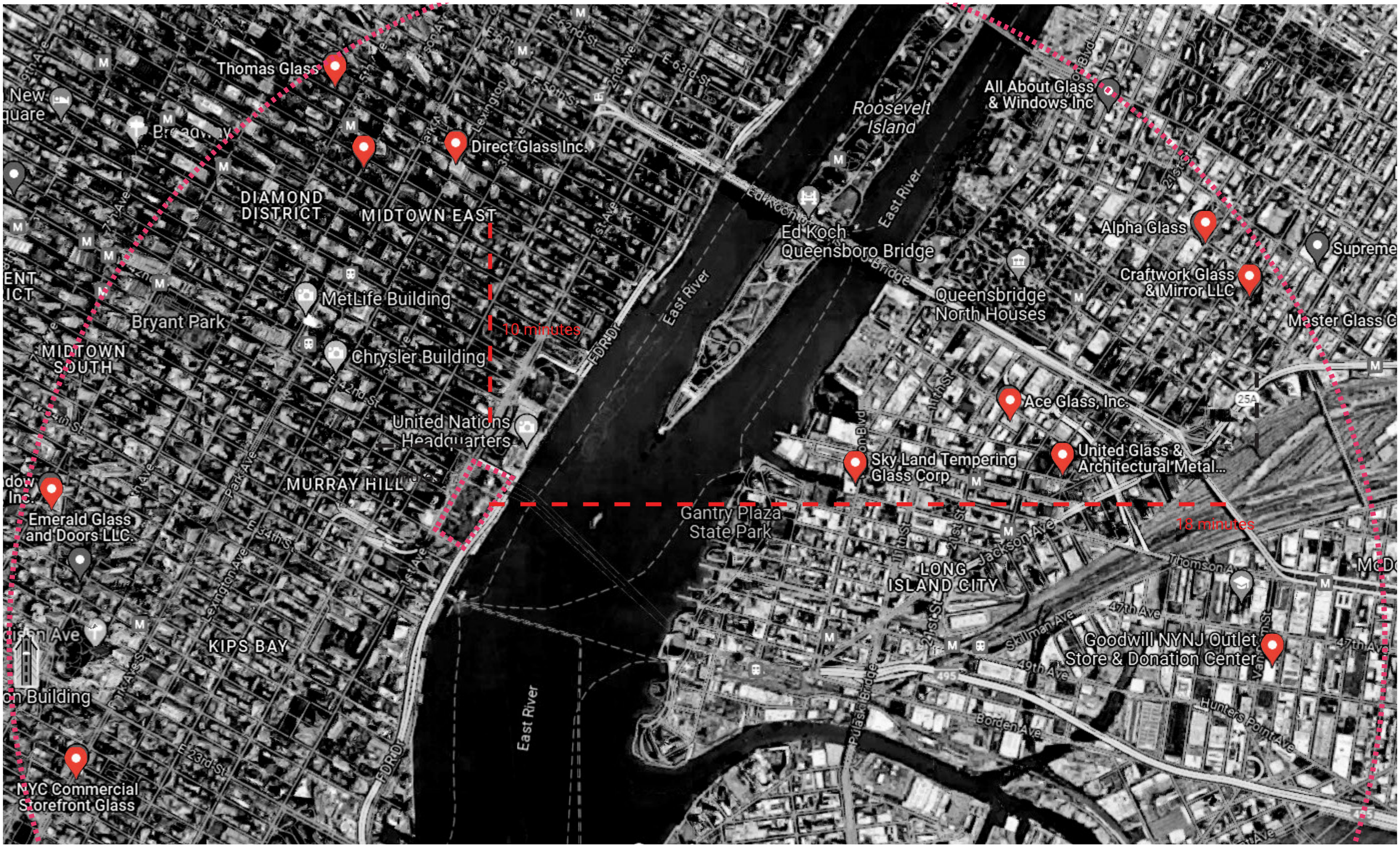


Glass Facade

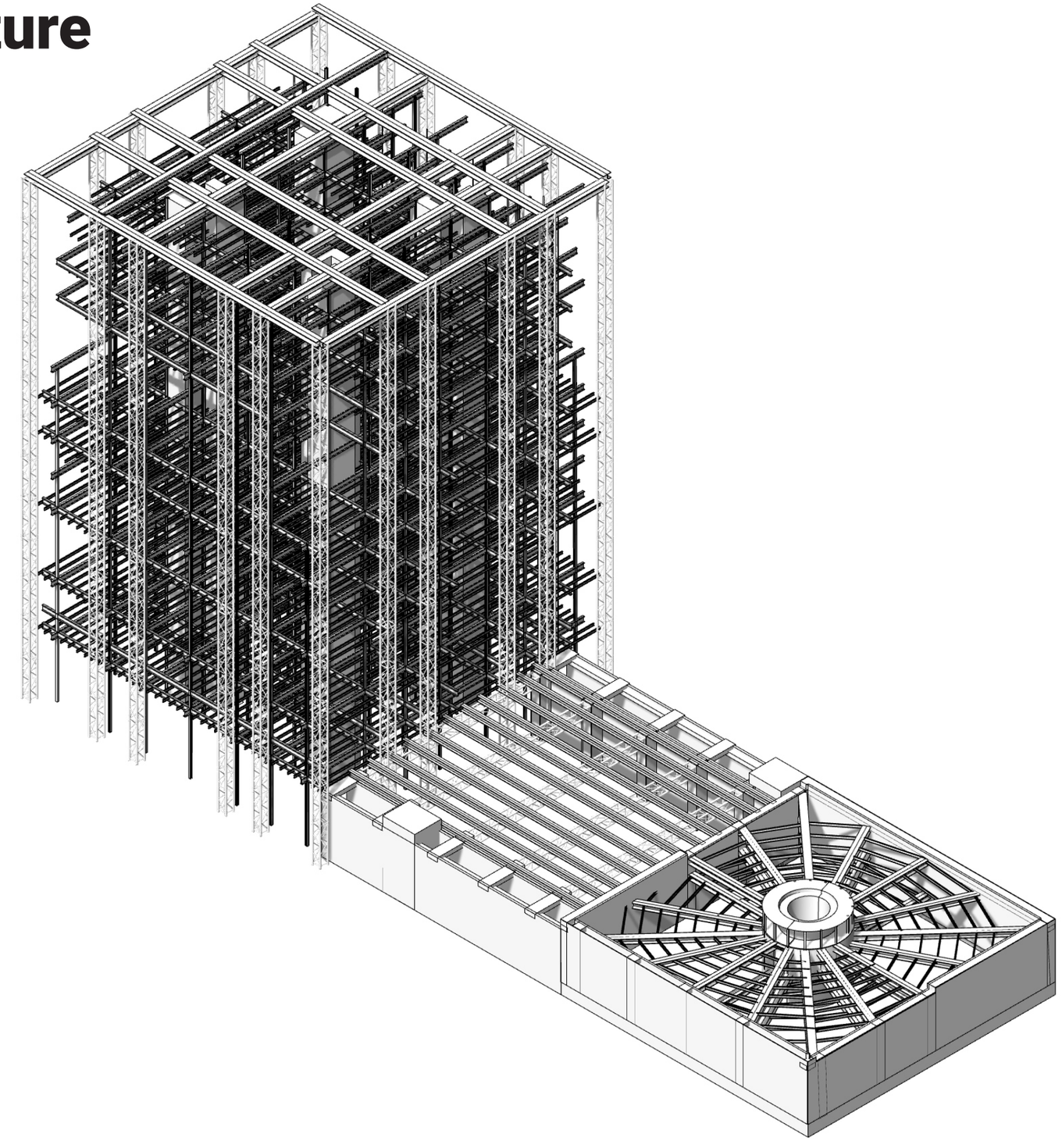




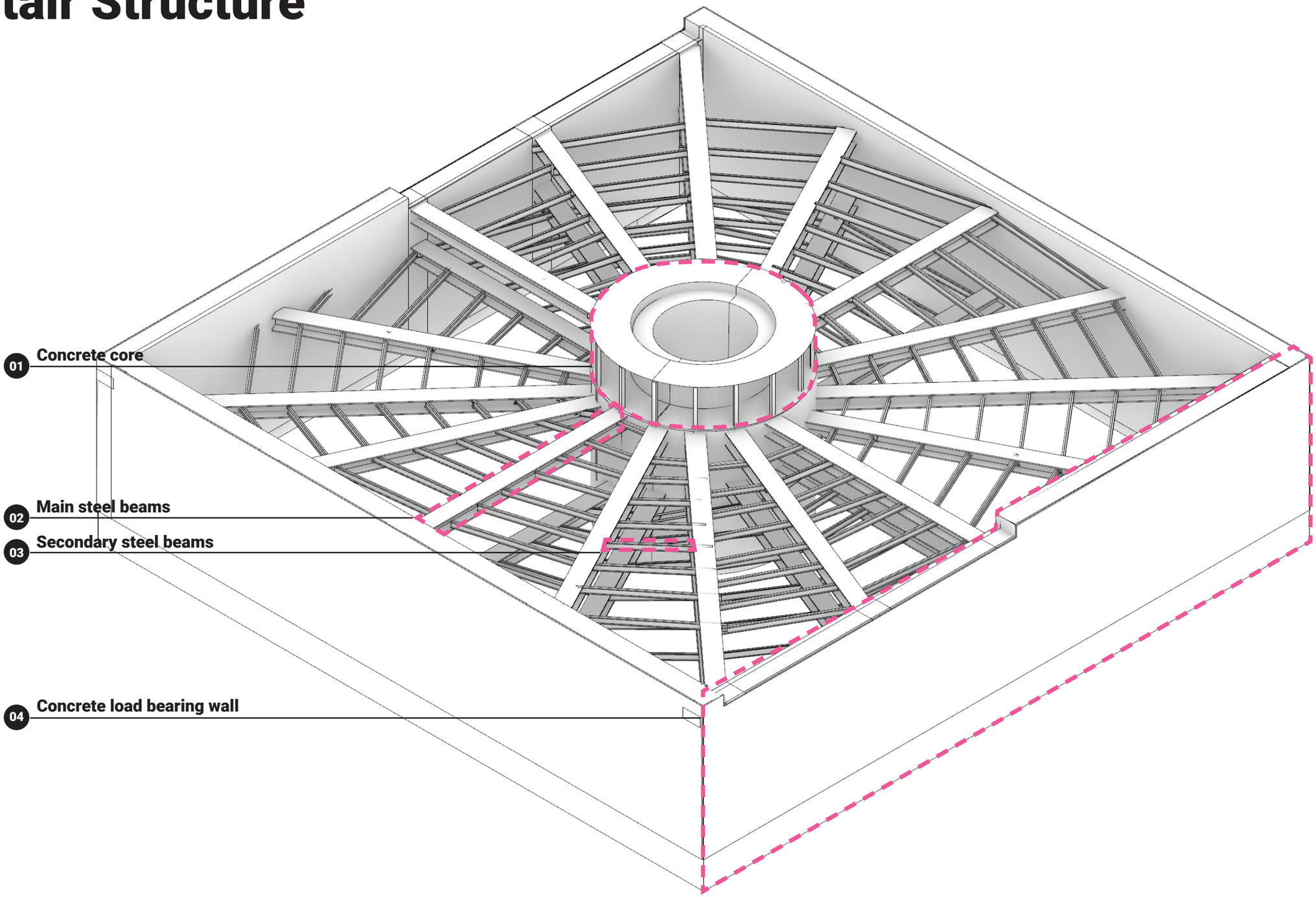
Local Resources



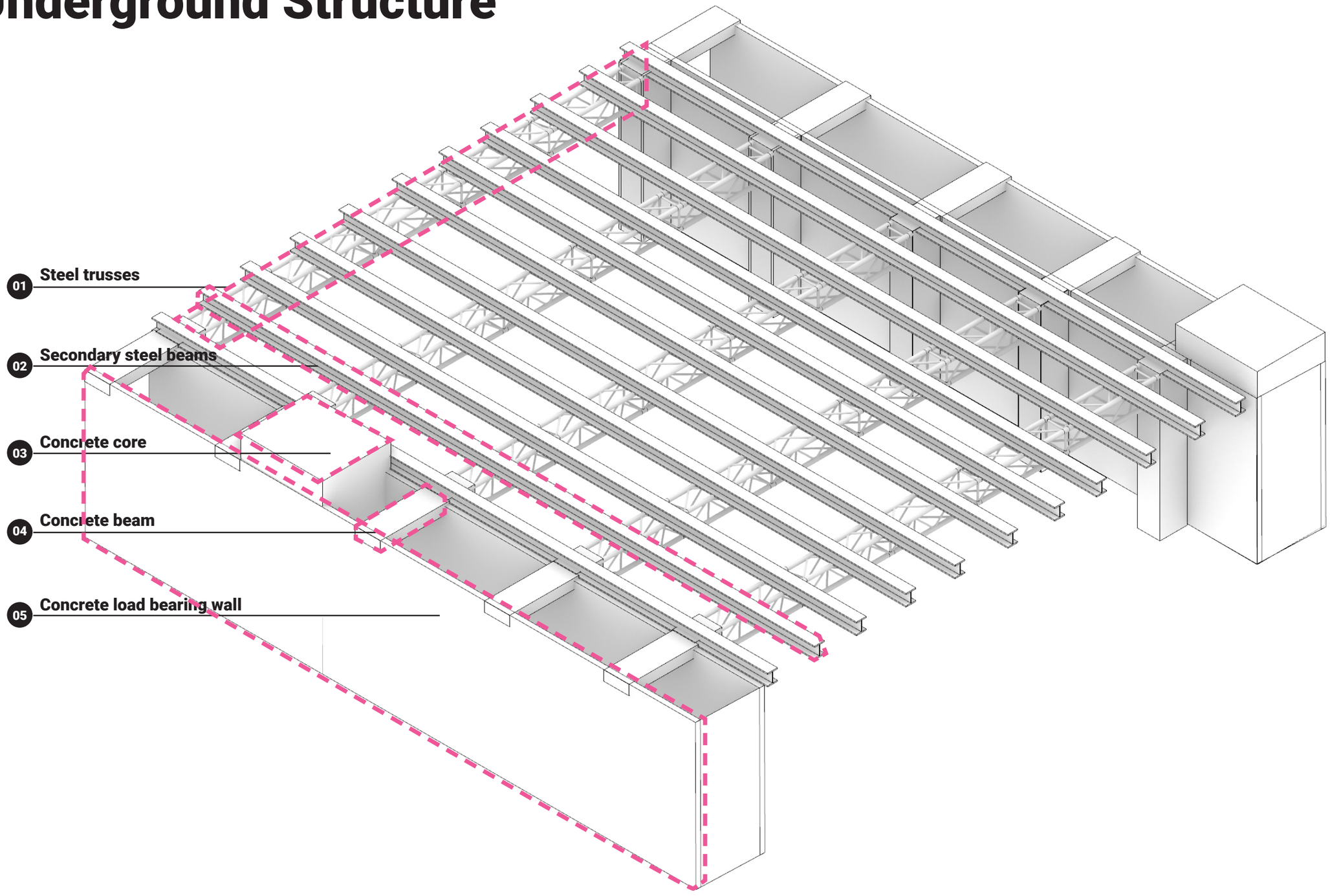
Axo of Structure



Stair Structure



Underground Structure



Tower Structure

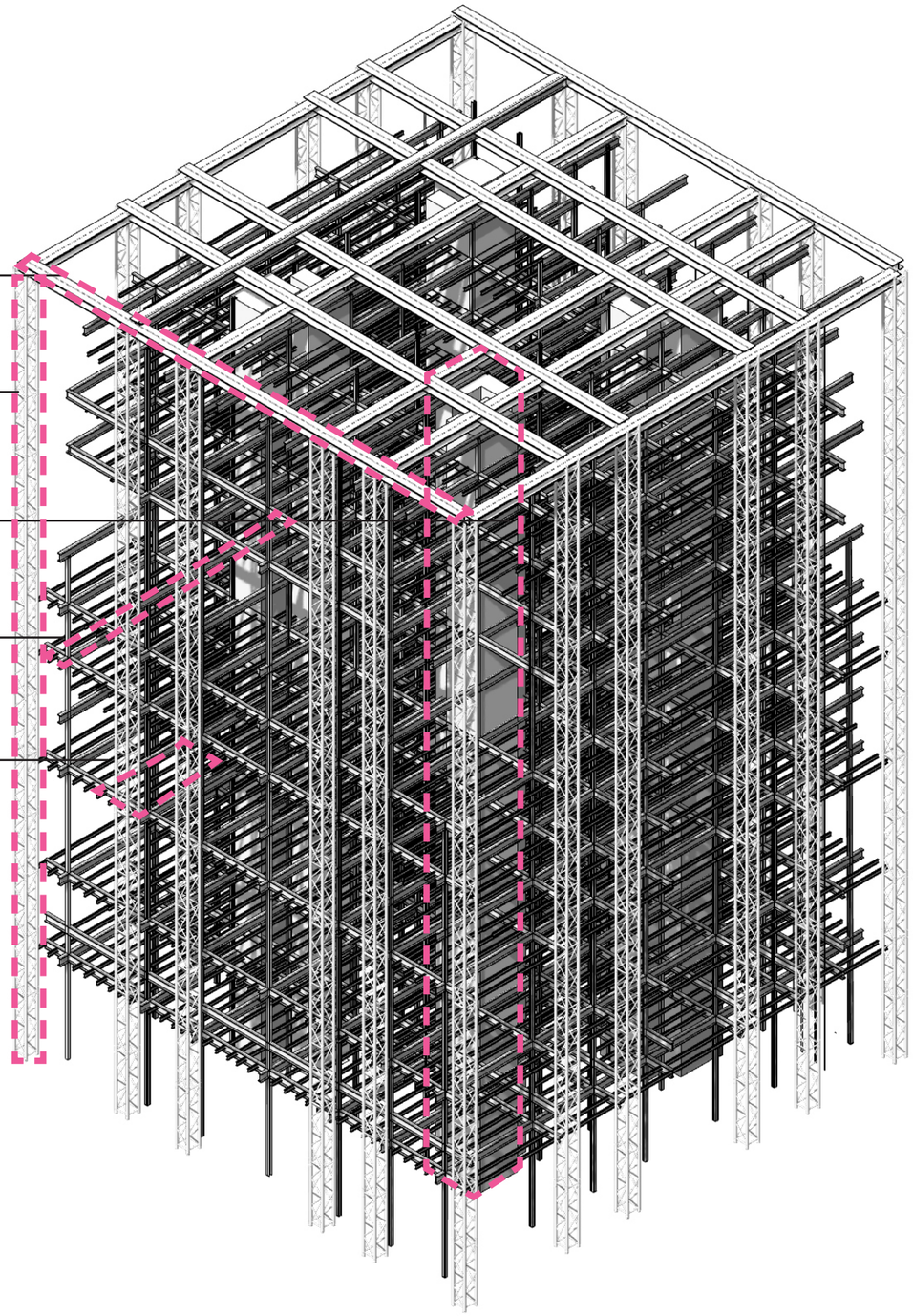
01 Steel beams

02 Steel truss column

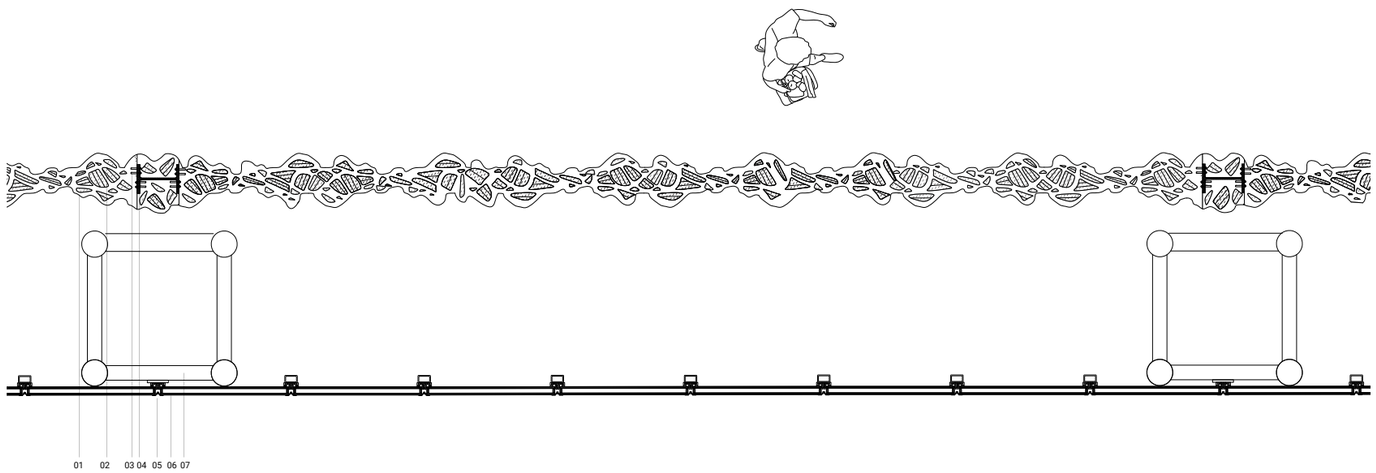
03 Concrete core

04 Steel beam

05 Secondary steel beam

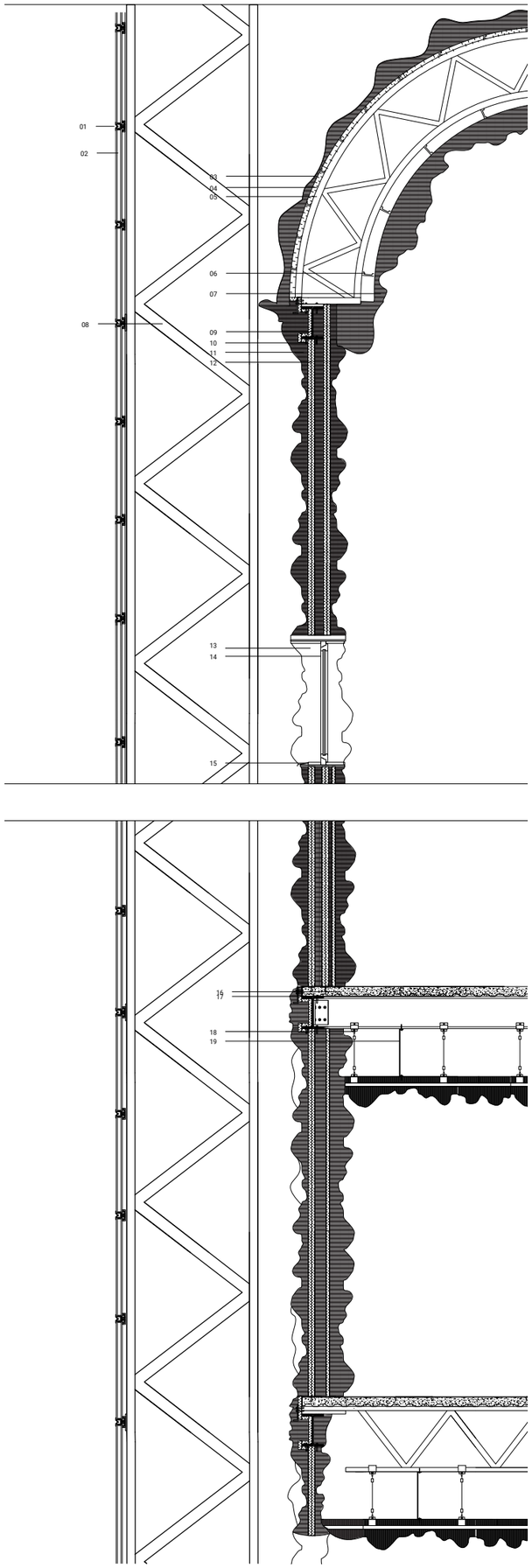


Facade Fragment

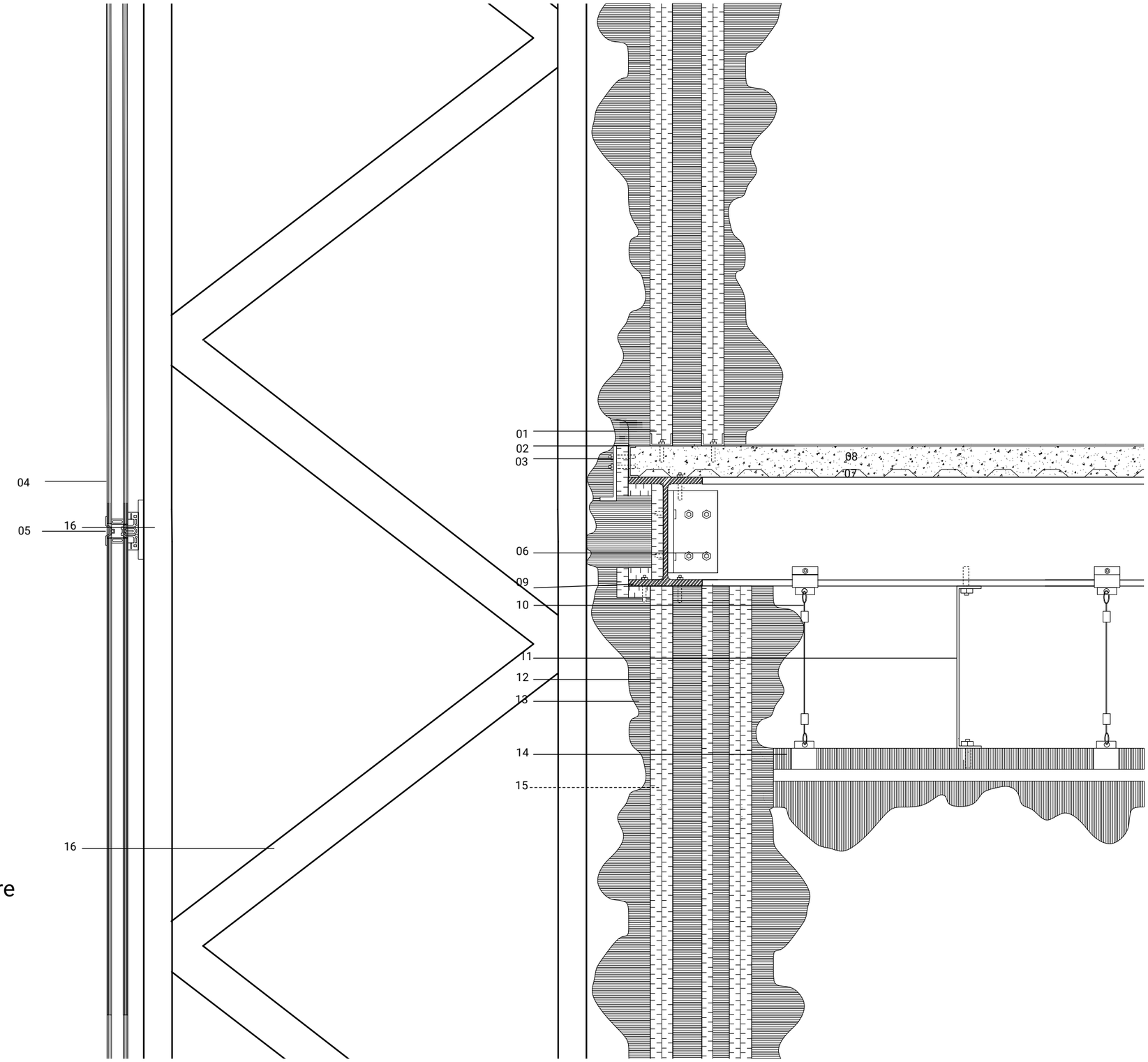


01- 3D printed wall
02- Rigid Insulation
03- Anchor bolts
04- 500mm W-flange steel beam
05- Window panel fastener
06- Glass panel
07- 2m steel truss column

01- Glass panels
02- Window panel fastener
03- 3D printed roof cladding
04- 50mm rigid insulation
05- 1m steel truss
06- Steel c-shaped bracket
07- 3D printed ceiling
08- Steel bracket with bolts
09- 500 mm W-flange steel beam
10- Anchor bolts
11- 3D printed wall
12- 50mm rigid insulation
13- Window frame and sealant
14- window - glass panels
15- Steel window sill
16- 150mm concrete topping, polished
17- Metal decking
18- Load transfer bracket and hanging wire
19- Compasso trim with bolts

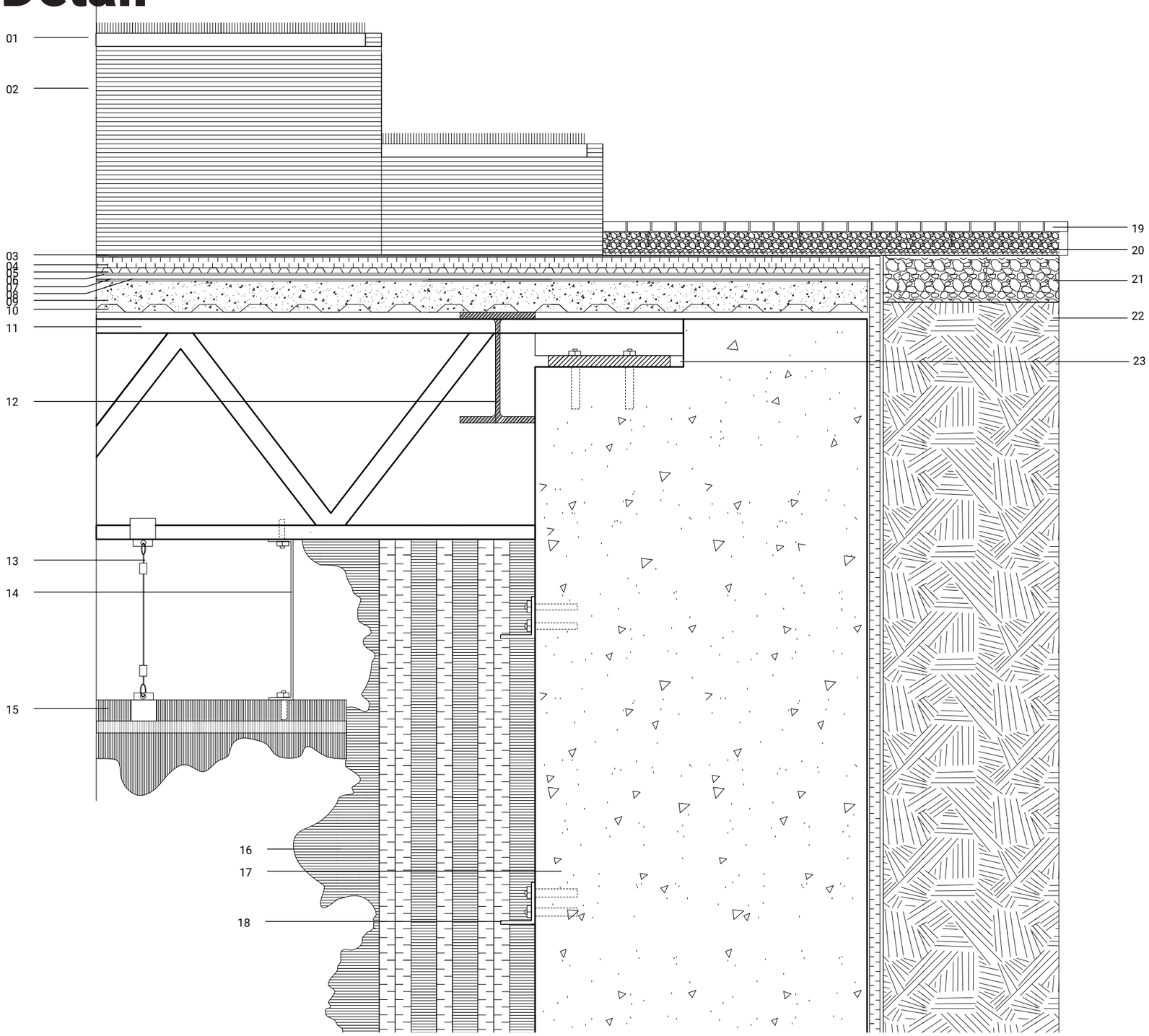


Facade Detail



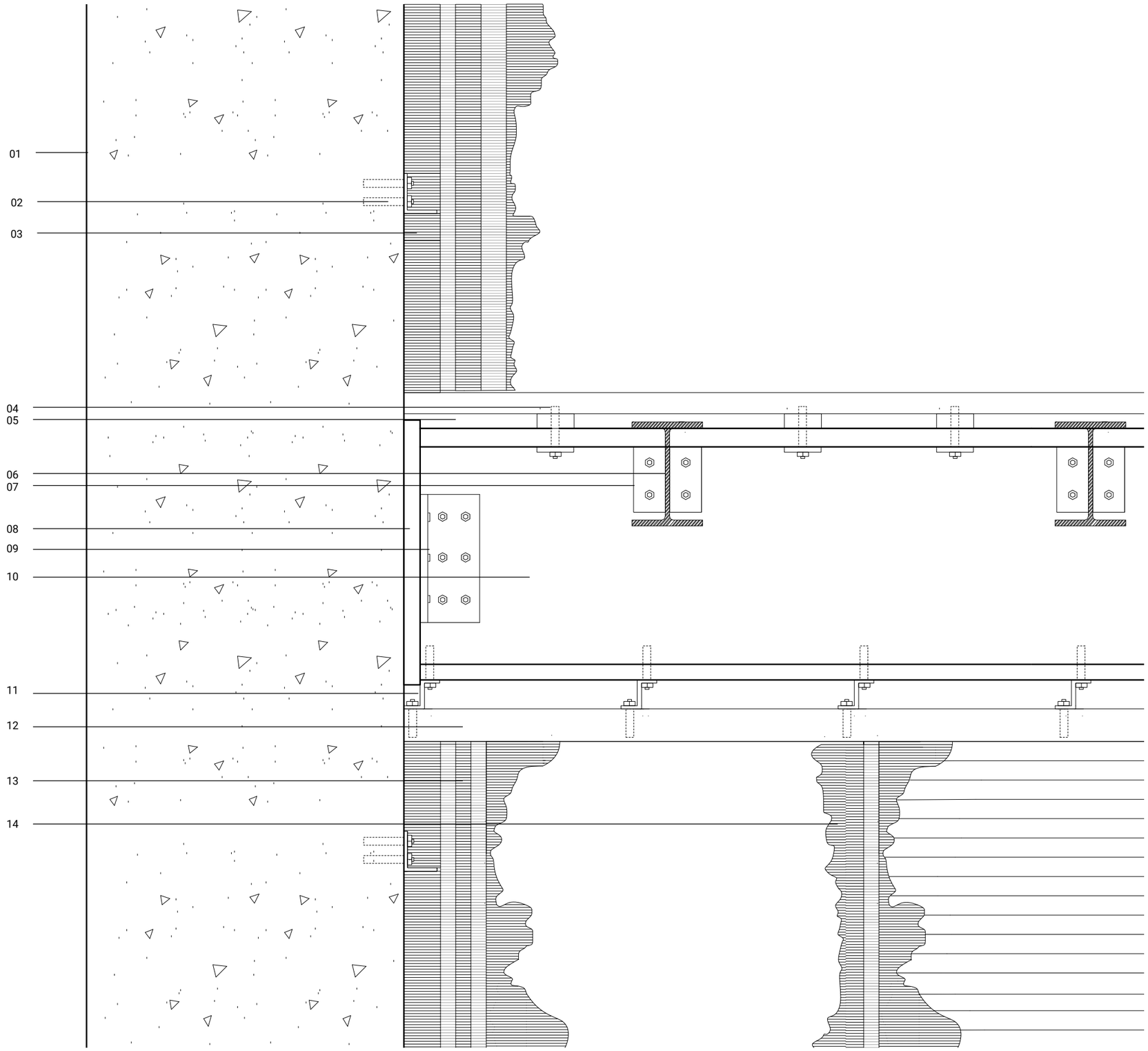
01- Steel deflection channel
02- Resilient floor finish
03- Aluminum bracket with bolts
04- Glass panels
05- Window panel fastener
06- Bracket with bolts
07- Metal decking
08- 150mm concrete topping, polished
09- 500mm W-flange steel beam
10- Load transfer bracket and hanging wire
11- Compasso trim with bolts
12- 50mm Rigid Insulation
13- 3D printed soil wall
14- 3D printed ceiling
15- Light gauge steel framing
16- 2m steel truss column

Underground Roof Detail

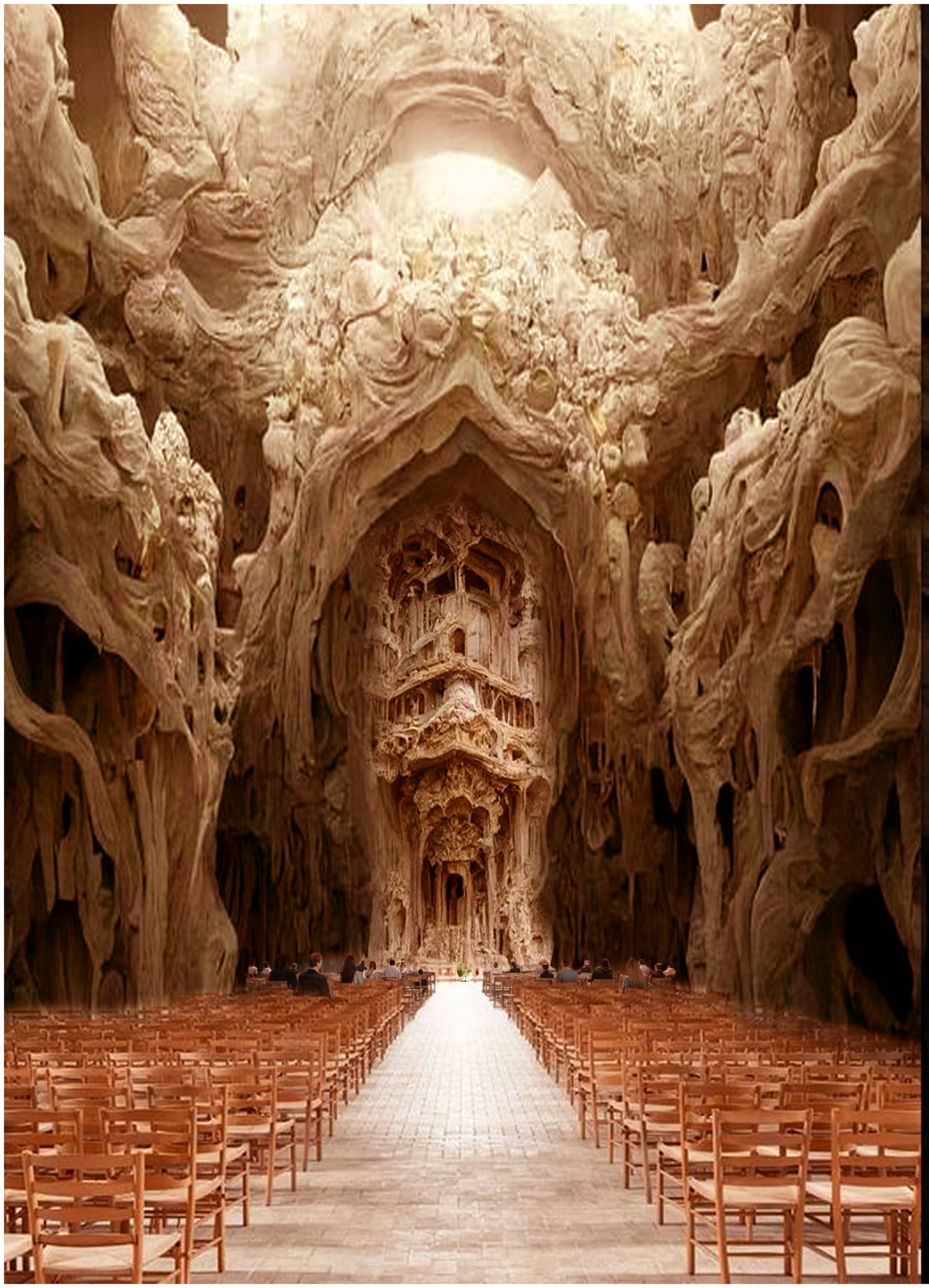


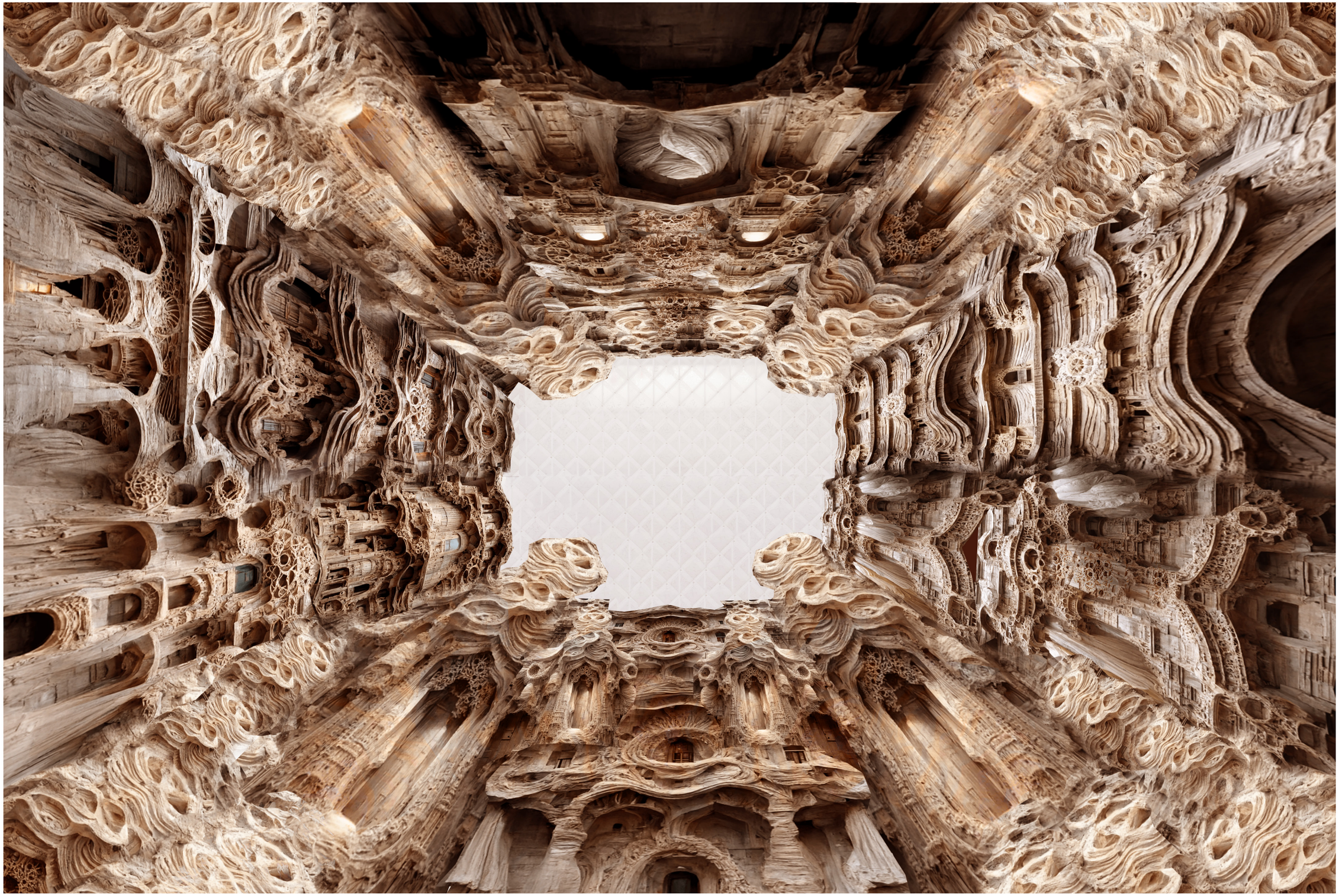
01- Grass & soil
02- 3D printed sand planter benches
03- Filter fabric & moisture retention layer
04- 50mm insulation
05- Drainage layer
06- Root barrier
07- Membrane protection
08- Waterproof membrane
09- 150mm concrete topping, polished
10- Metal decking
11- 1 m steel truss
12- 500mm W-flange steel beam
13- Load transfer bracket and hanging wire
14- Compasso trim with bolts
15- 3D printed ceiling
16- 3D printed wall
17- 1.5 m concrete wall
18- L-shape bracket with bolts
19- Pavers
20 - Wet mortar bed
21 - Gravel
22 - Existing Soil
23 - Sill plate with bolts

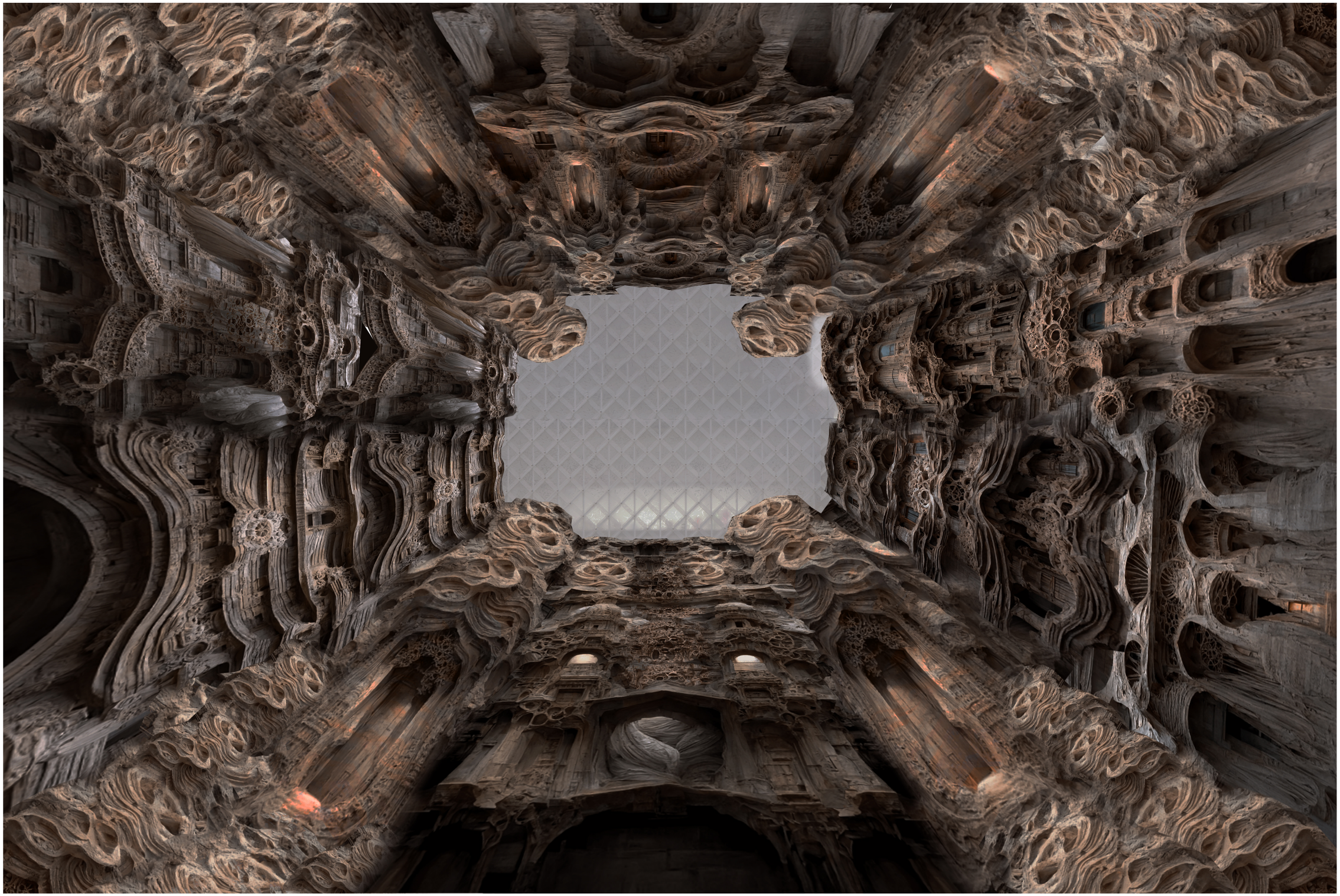
Stair Wall Detail



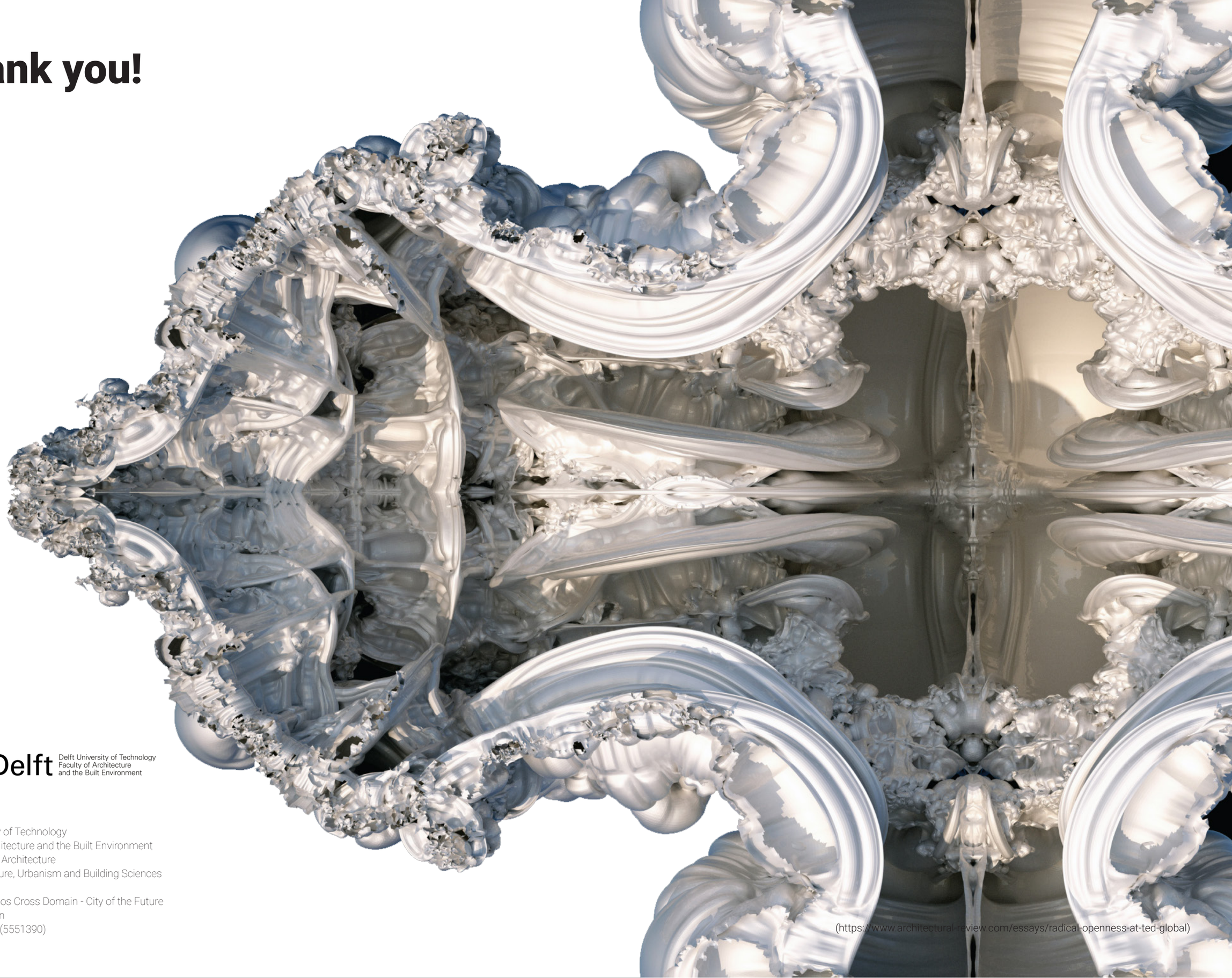
01- 1.5 m concrete wall
02- L-frame bracket with bolts
03- 3D printed wall
04- Metal block with bolts
05- Drainage layer
06- 500 mm W-flange steel beam
07- Steel plate with bolts
08- Sill plate
09- Steel bracket with bolts
10- 1.2m W-flange steel beam
11- Aluminum Z-shaped bar with bolts
12- Suspended ceiling formwork
13- 3D printed wall- inner
13- 3D printed wall- outer







Thank you!



(https://www.architectural-review.com/essays/radical-openness-at-ted-global)

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Faculty of Architecture
and the Built Environment

2022-2023
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MSc. Architecture, Urbanism and Building Sciences

Graduate Studios Cross Domain - City of the Future
P4 Presentation
Paulina Panus (5551390)