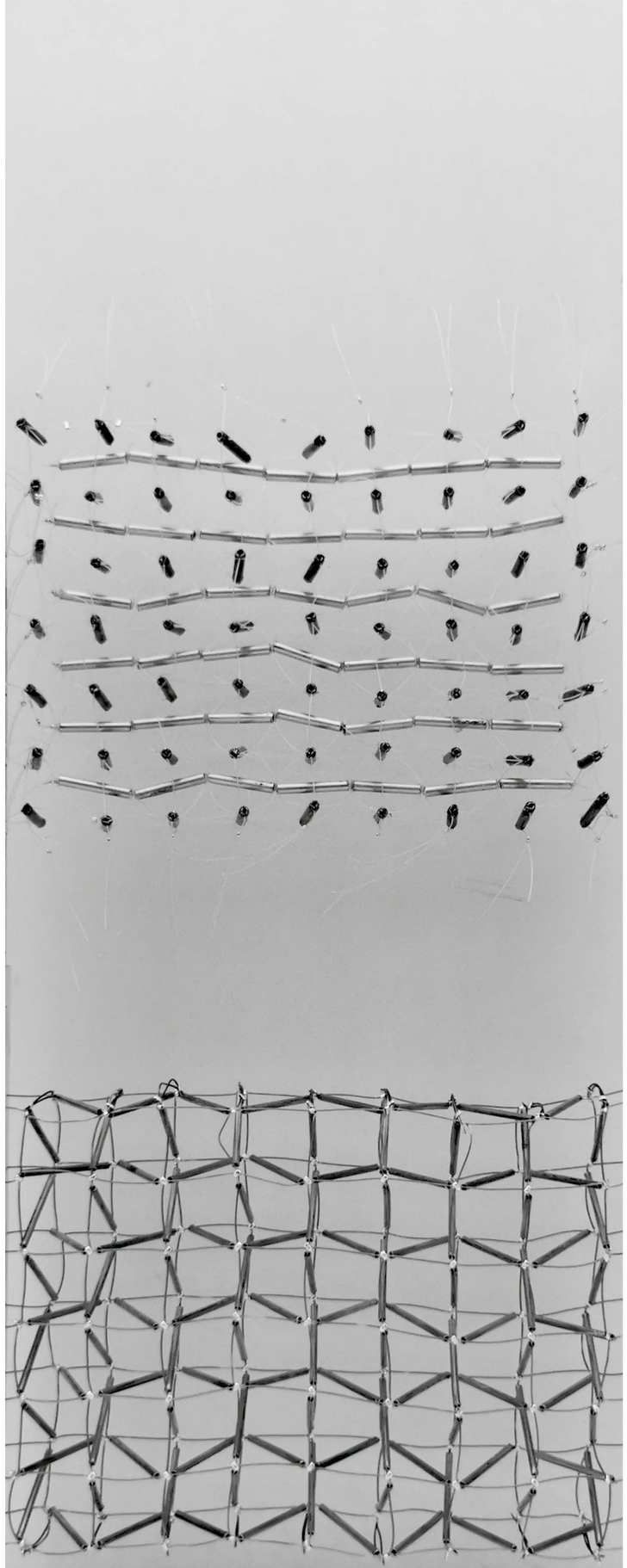


Urban Fabrications

Tensile Tectonics of Labor

Transient Liquidities along the New Silk Road

Graduation Studio Borders & Territories 2022/23

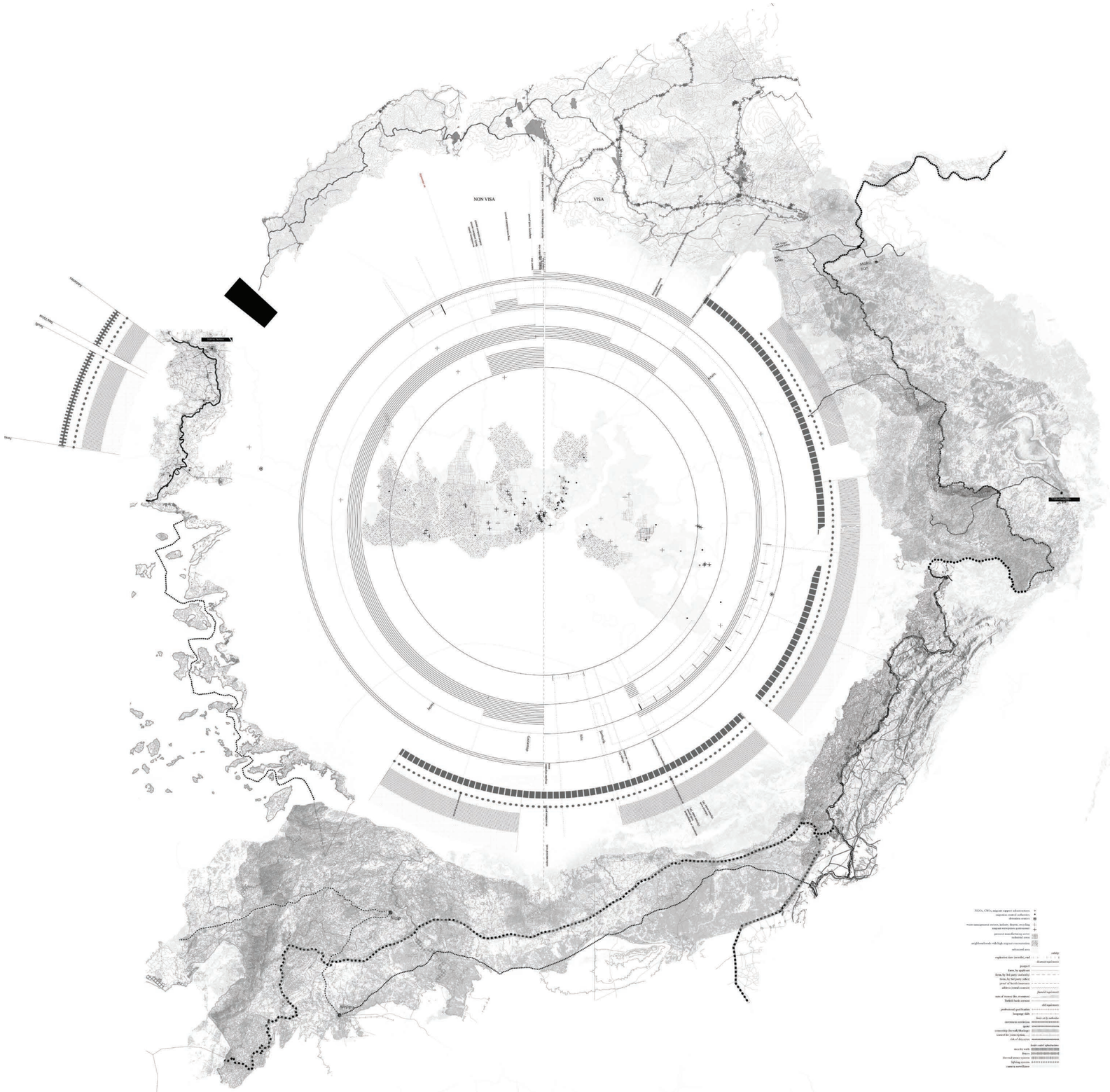
Mentors: Oscar Rommens, Filip Geerts
Author: Myrto Klimi

Thematic Context and Location

Connection with Borders and Migration

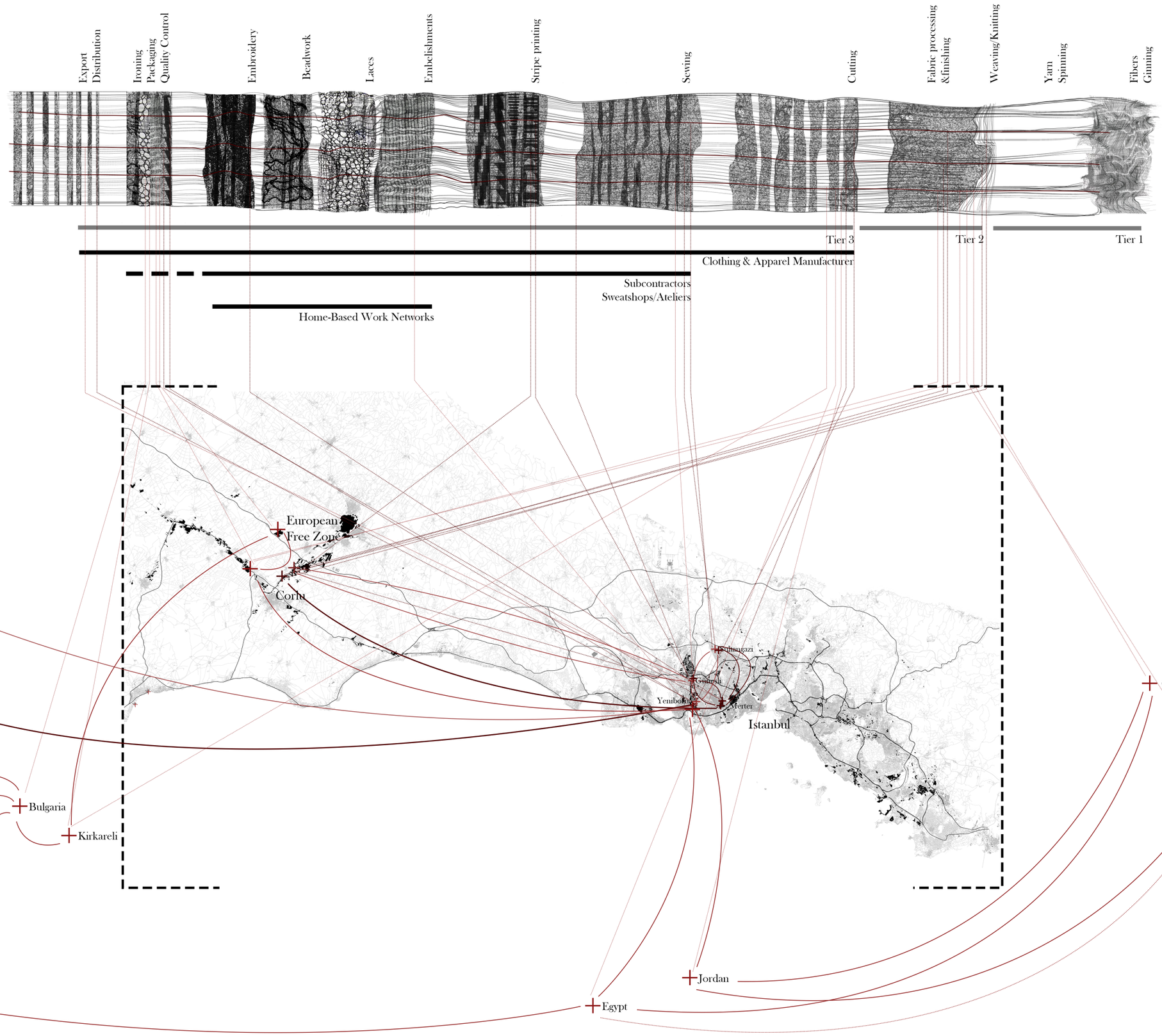
Introduction of the labor issue in function of borders, migration and global production chains

Mapping Migration Control Mechanisms

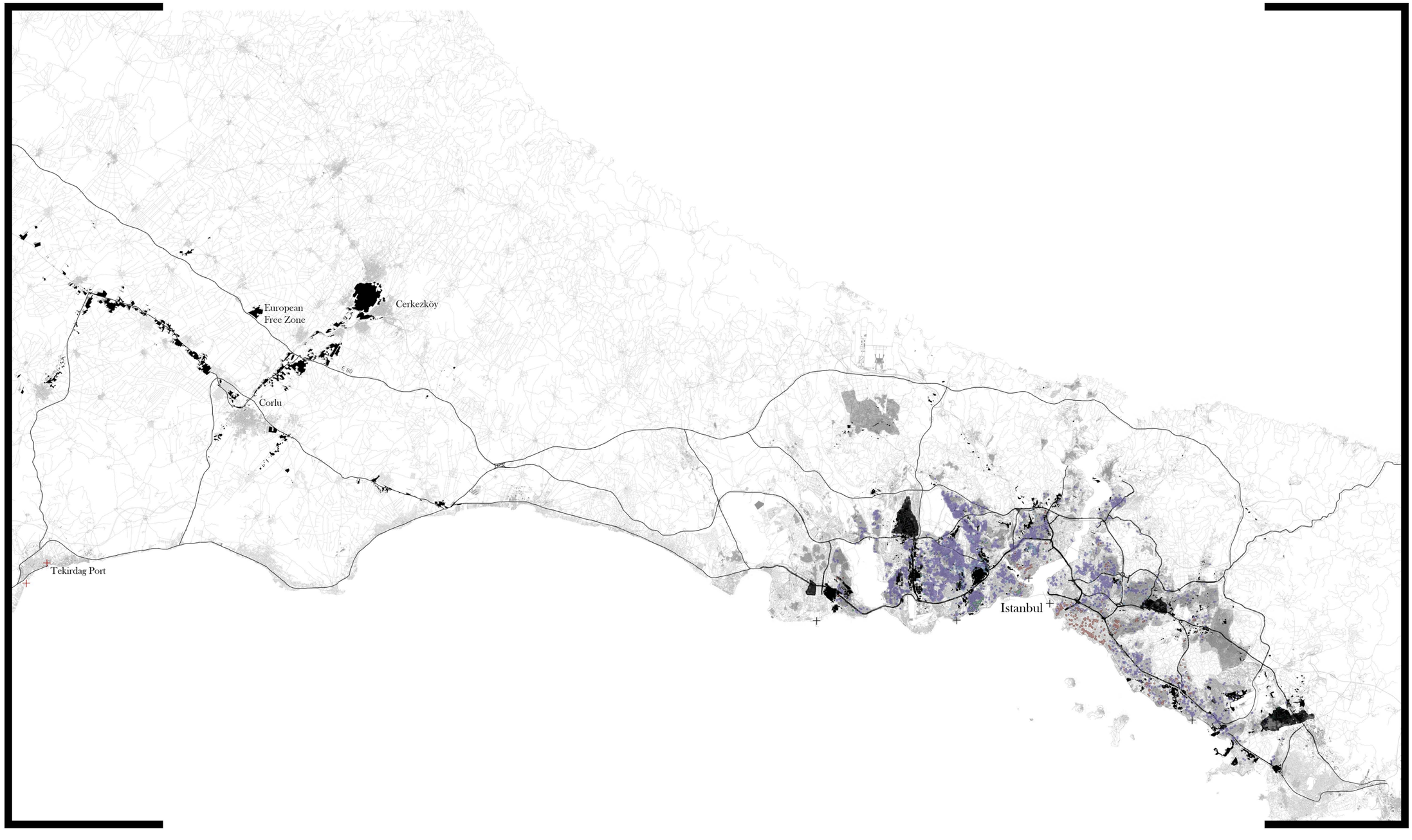


The systems of global production

Tracing the relationships between the spaces, the agents involved, the multiplicities of organization of labor and industrial practices.



Tracing the spatial footprint of garment and textile production spaces in the Istanbul region



- Organized industrial areas
- Informaly developed residential areas

Clothing manufacturers by sector

- Ready-to-wear clothing
- Underwear and Outwear
- Leather

- Ports
- Motorways

City Within The City

Urban Territories of Textile and Clothing Production

Textile Factories

Clothing Factories Big scale

Sweatshops Home-Based Work

Clothing Factories Small scale

Sweatshops Home-Based Work

Clothing Factories Small scale

Wholesale malls - reduced production

Wholesale malls



Corlu - Cezerkoy

Bagcilar - Yenibosna

Sultangazi - Esenler

Merter

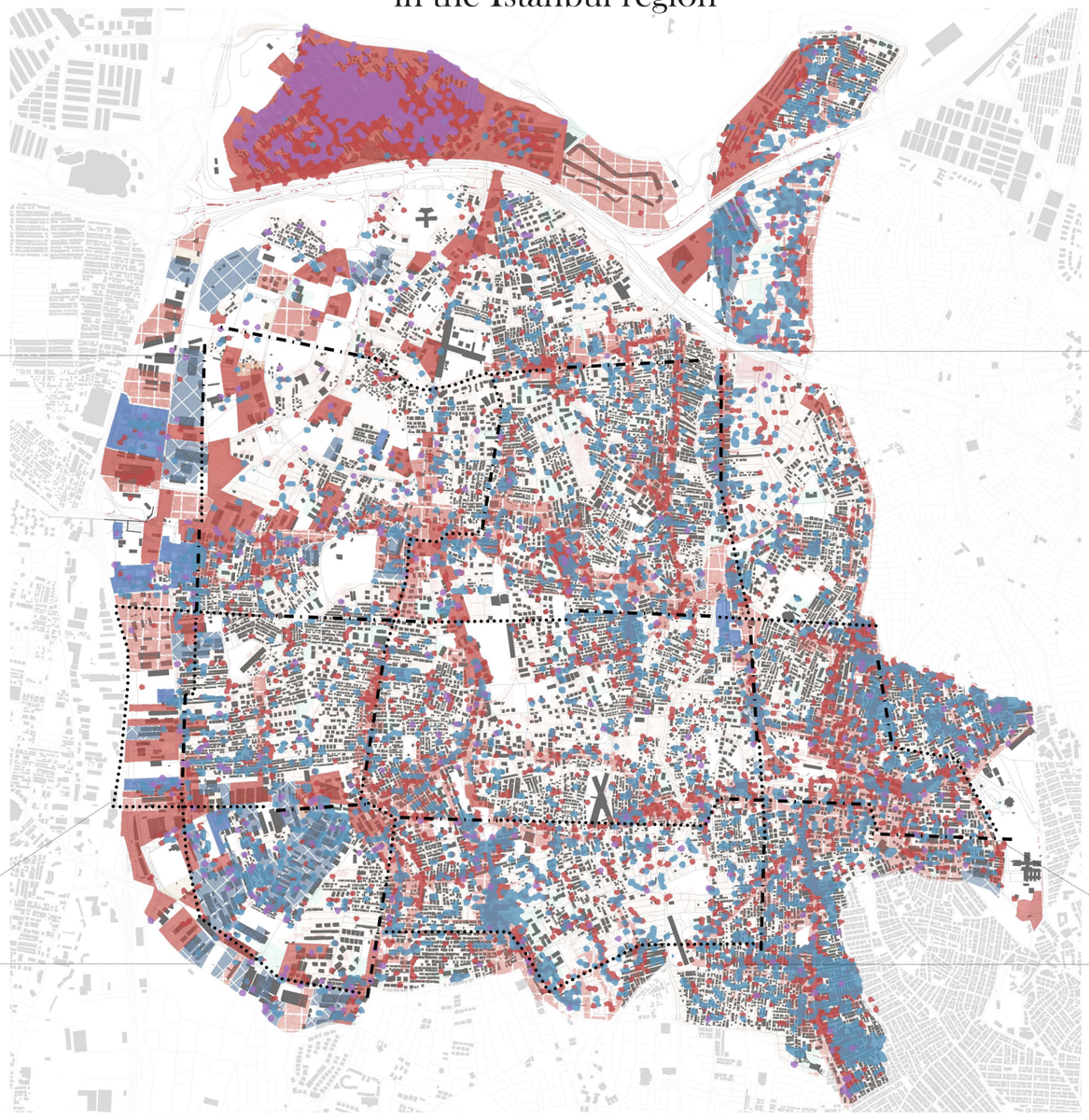
Tekstilkent-Giyimkent
Laleli - Osmanbey

Raw Material Processing — Finished Garments

Hinterlands — Periphery - New center — Center

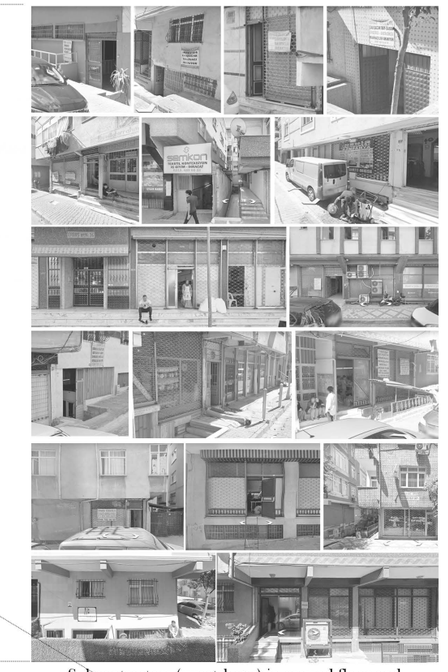
A Survey on Global Production Locations

Tracing the spatial footprint of garment and textile production spaces in the Istanbul region





Factories HQ, Production and Wholesale



Subcontractors (sweatshops) in ground floor and basement of residential buildings



Small-scale retail

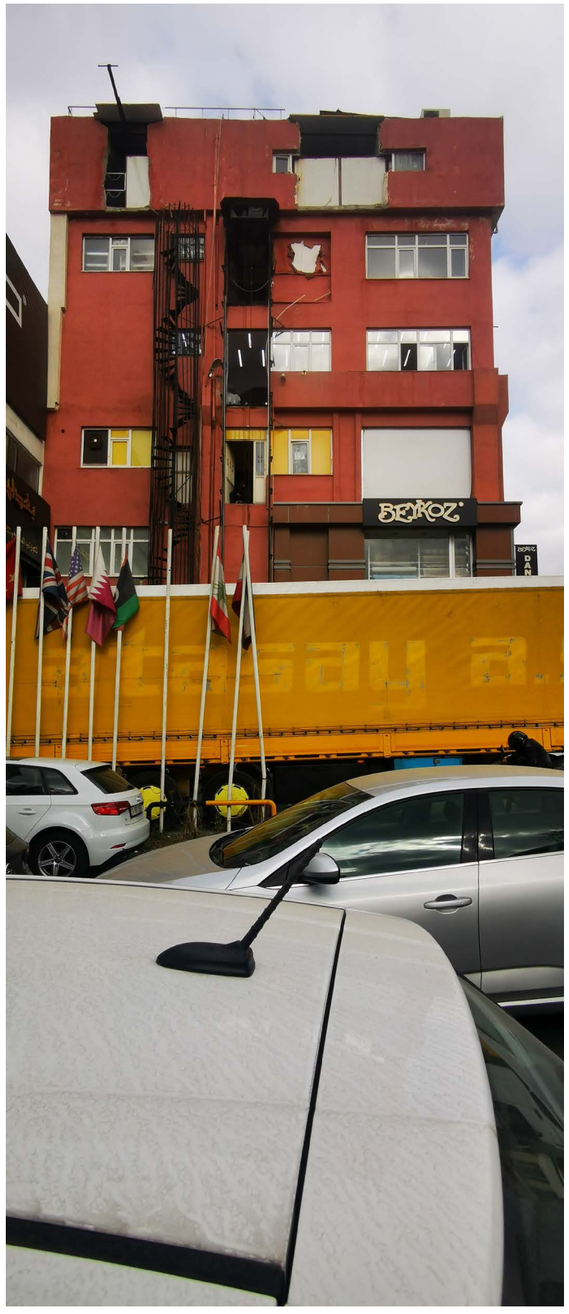
- Trade factory area (wholesale)
- Commercial zones residential area
- Production in factories
- storage and transport
- Production in residential area (small enterprise/sweatshops)
- Retail residential area

Organization and Informality




MODA ALA
MODA ALA
HEWES
GLX


Marsteks TEKSTİL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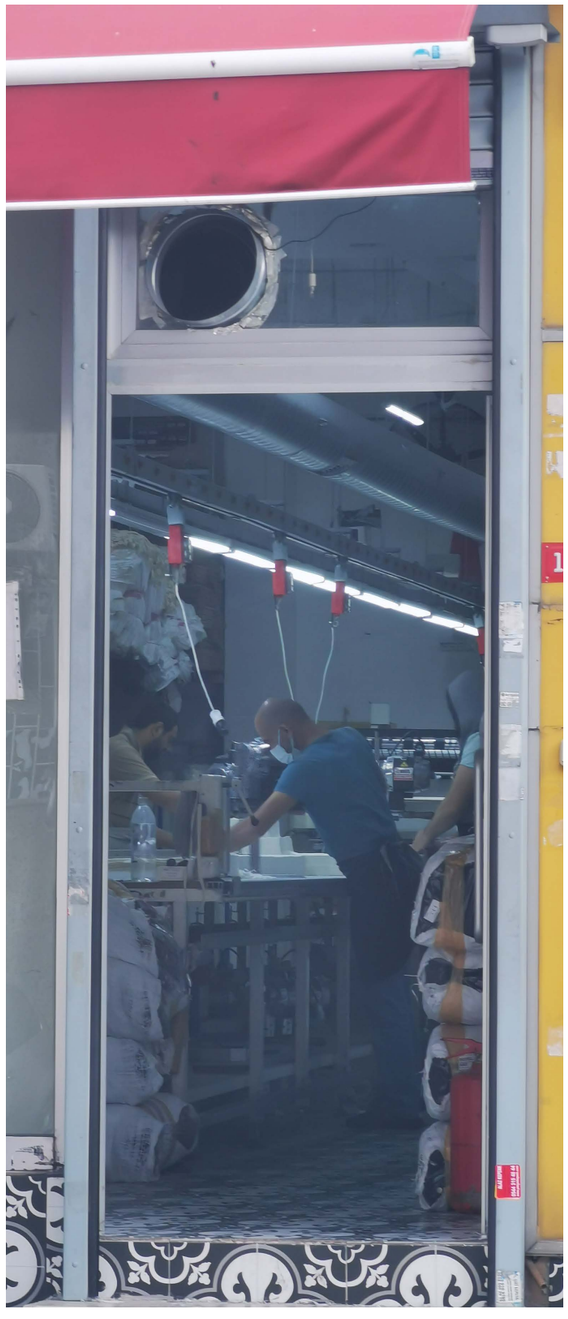
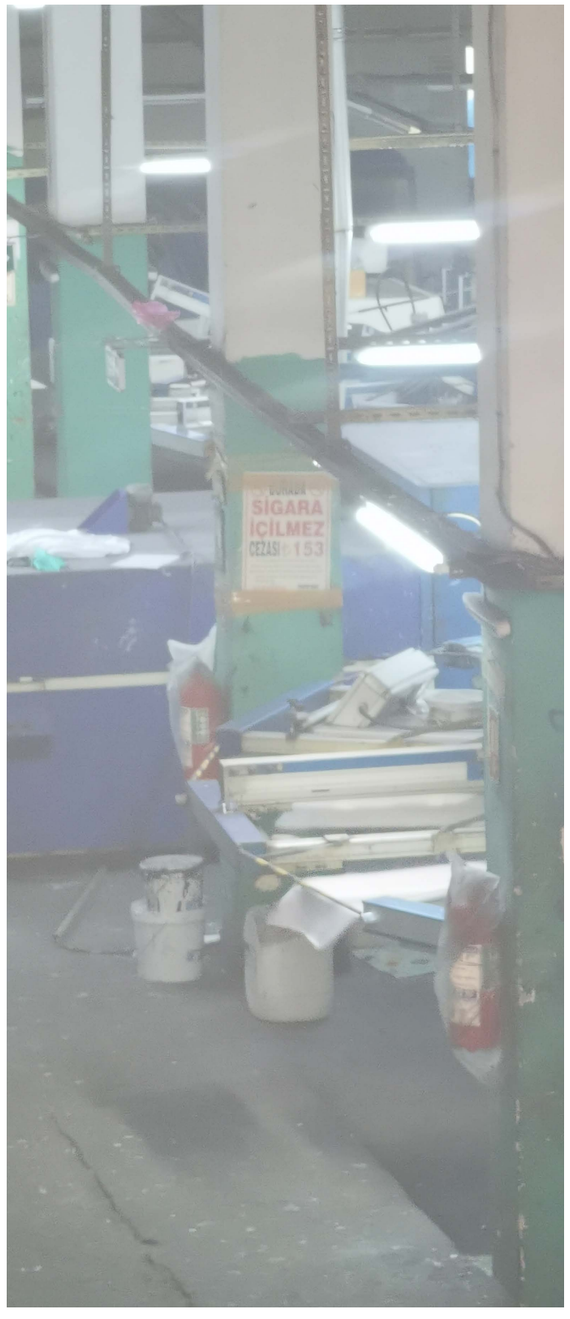
AMATO

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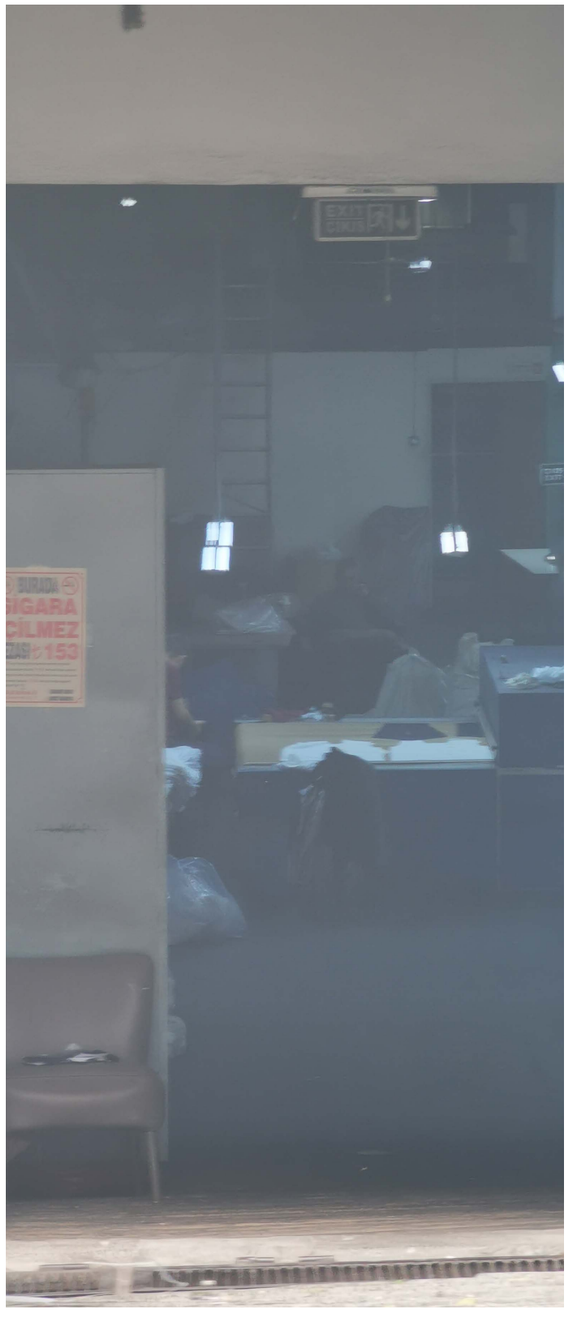
İÇİLMEZ
CEZASI 153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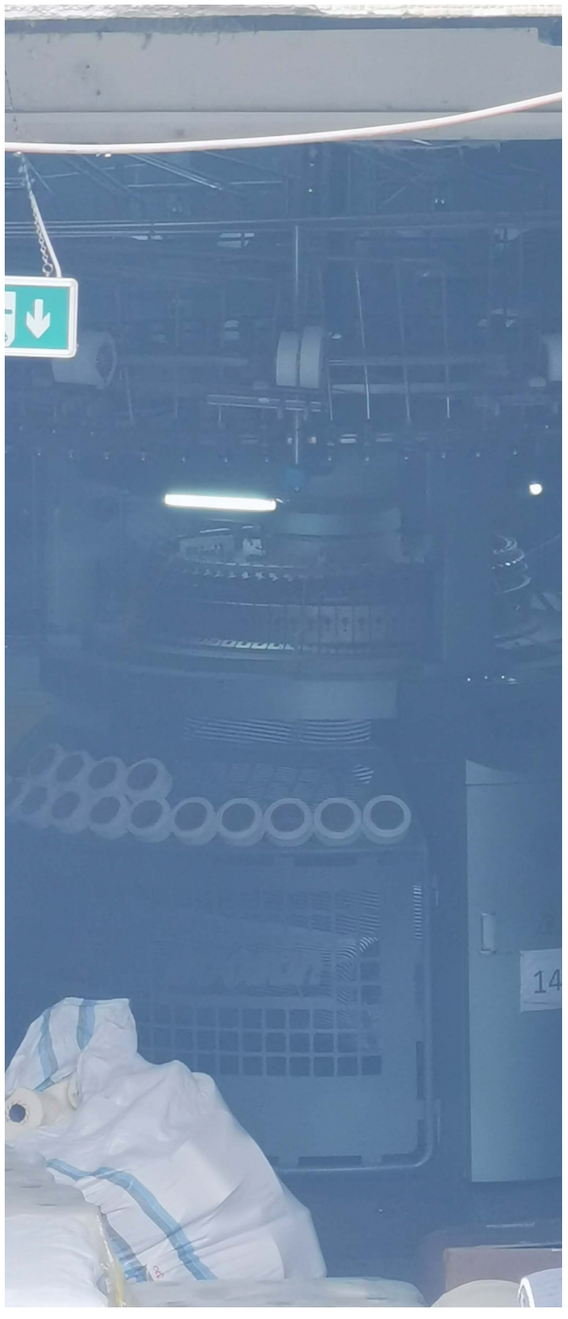
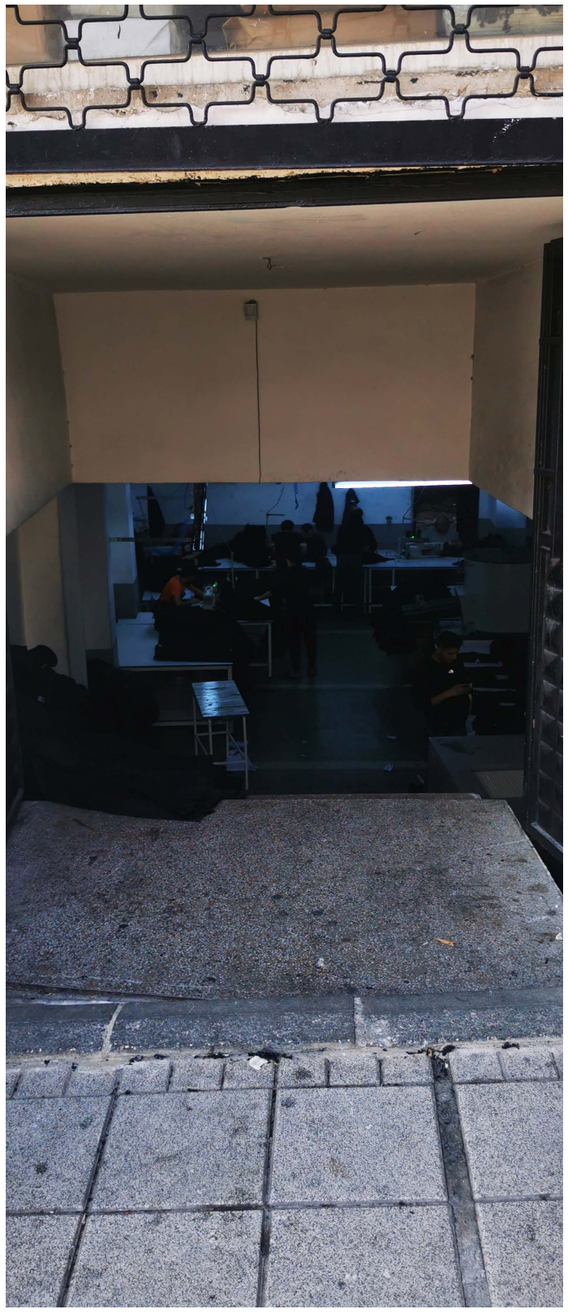
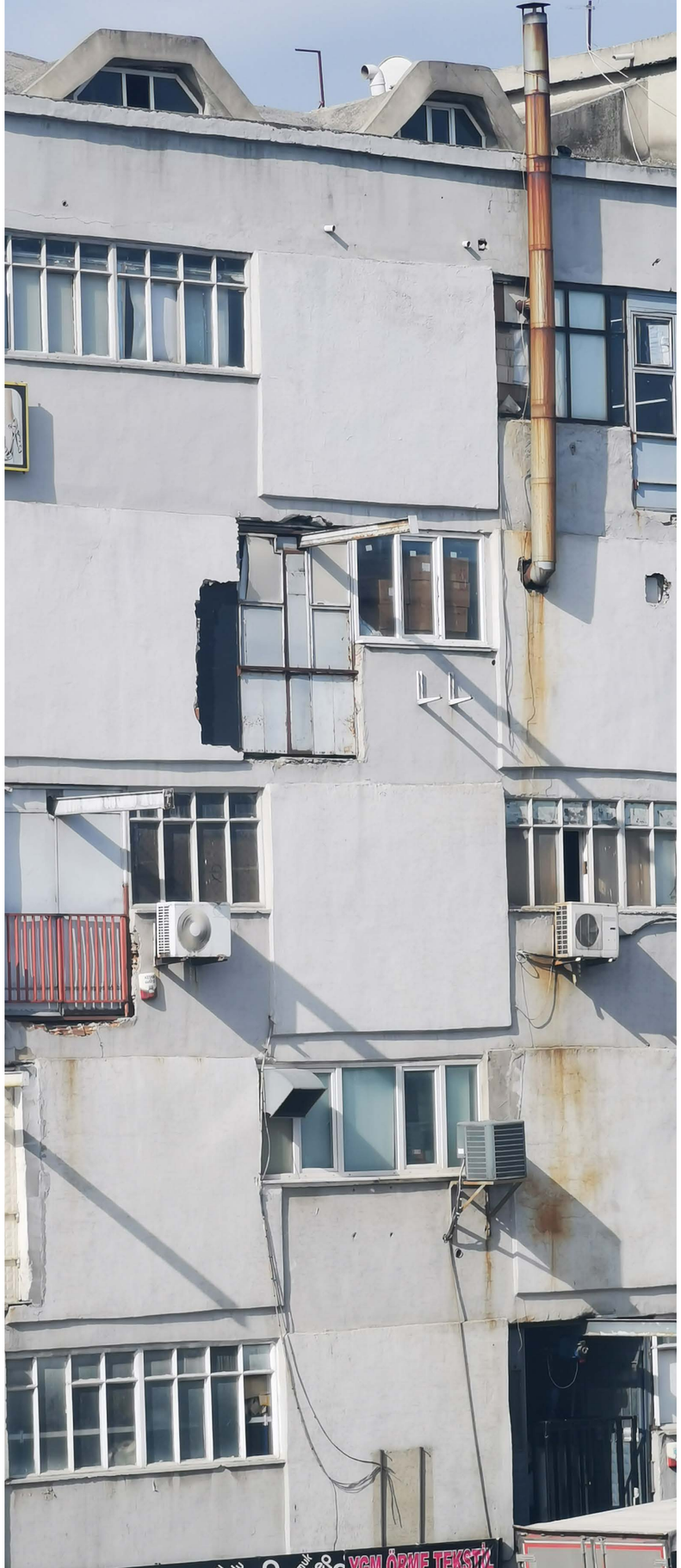


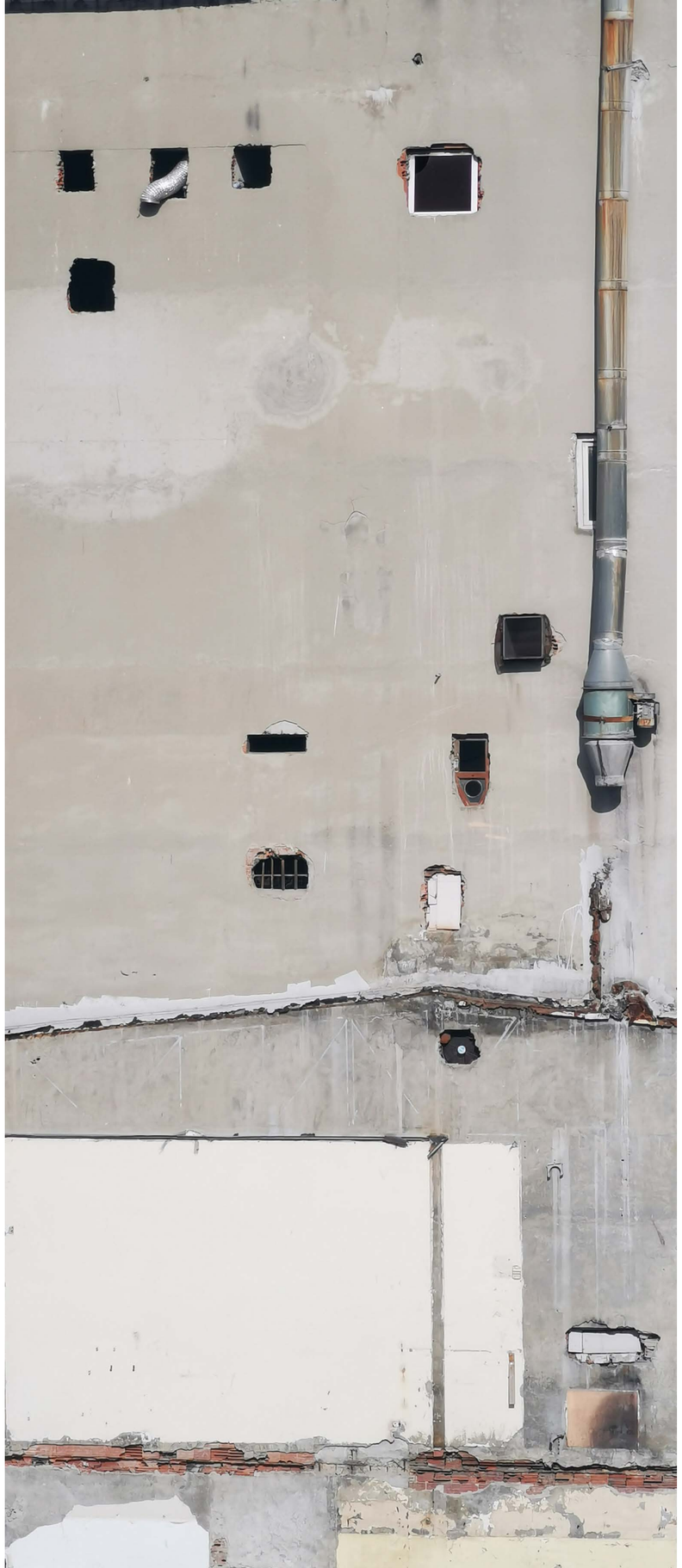

KEREM
Tekstil





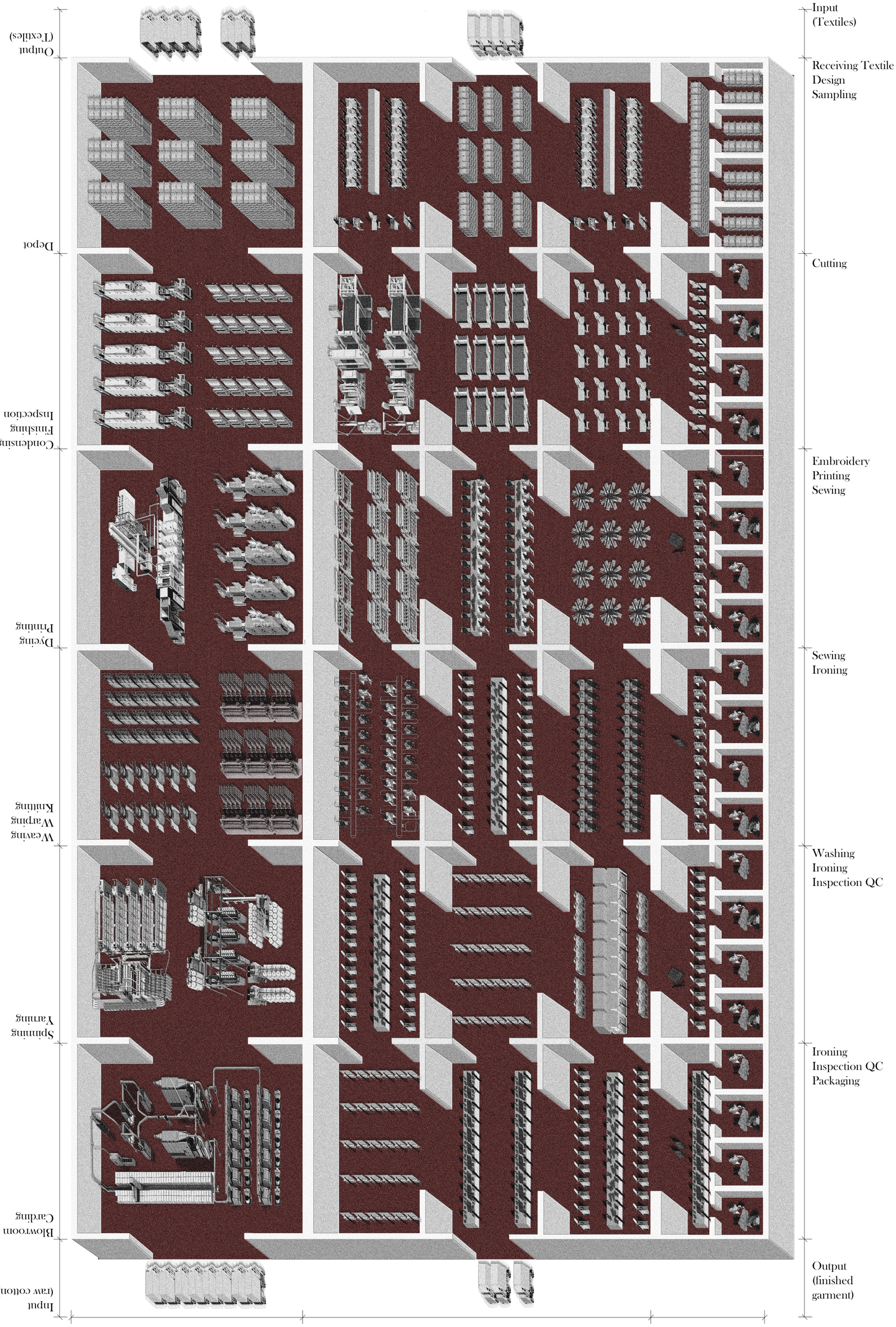




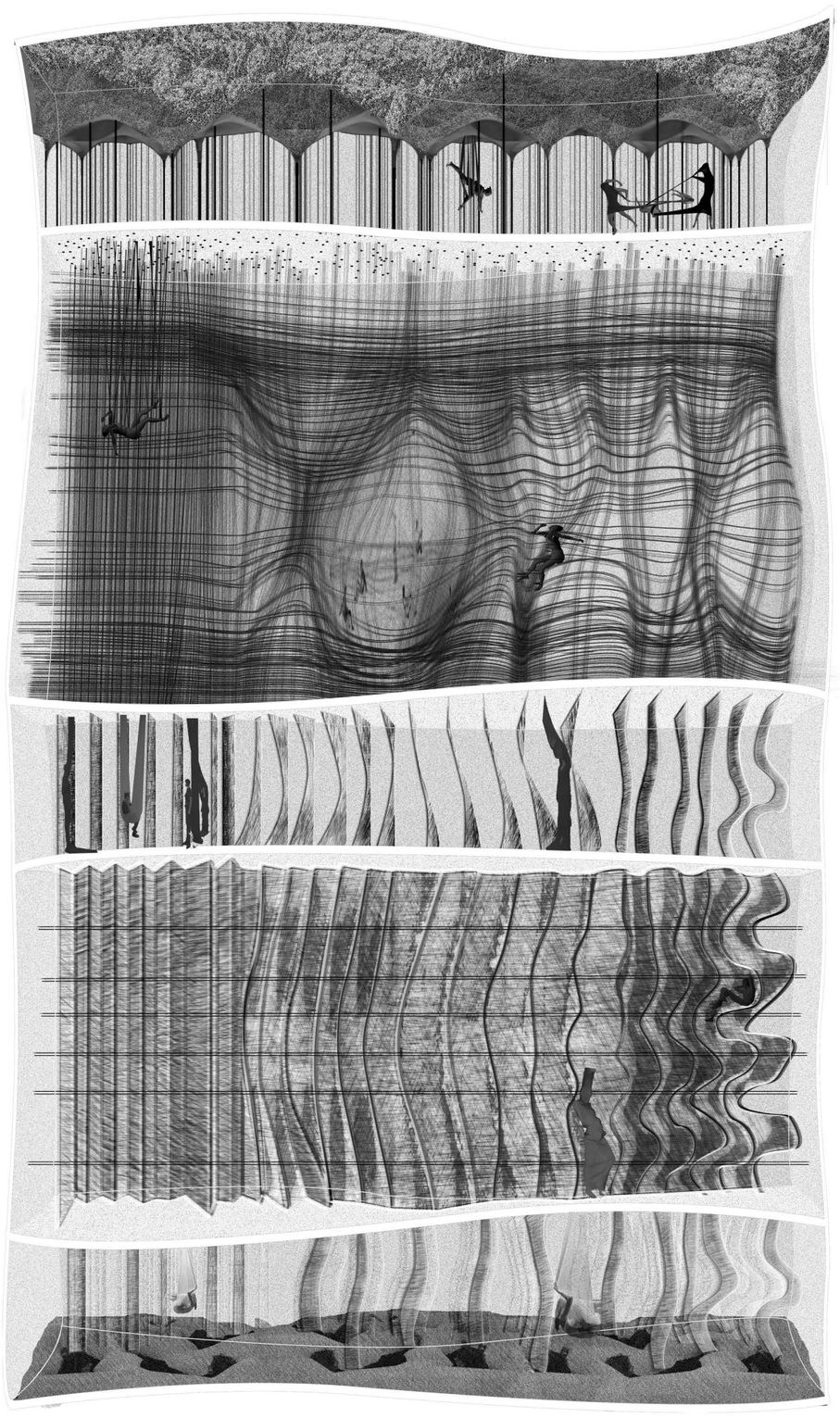


The Spatial Genericness of Labor Division

From raw cotton to finished garment - System overview



In the Material



Raw Cotton Fibre

Yarning
Structuring Space

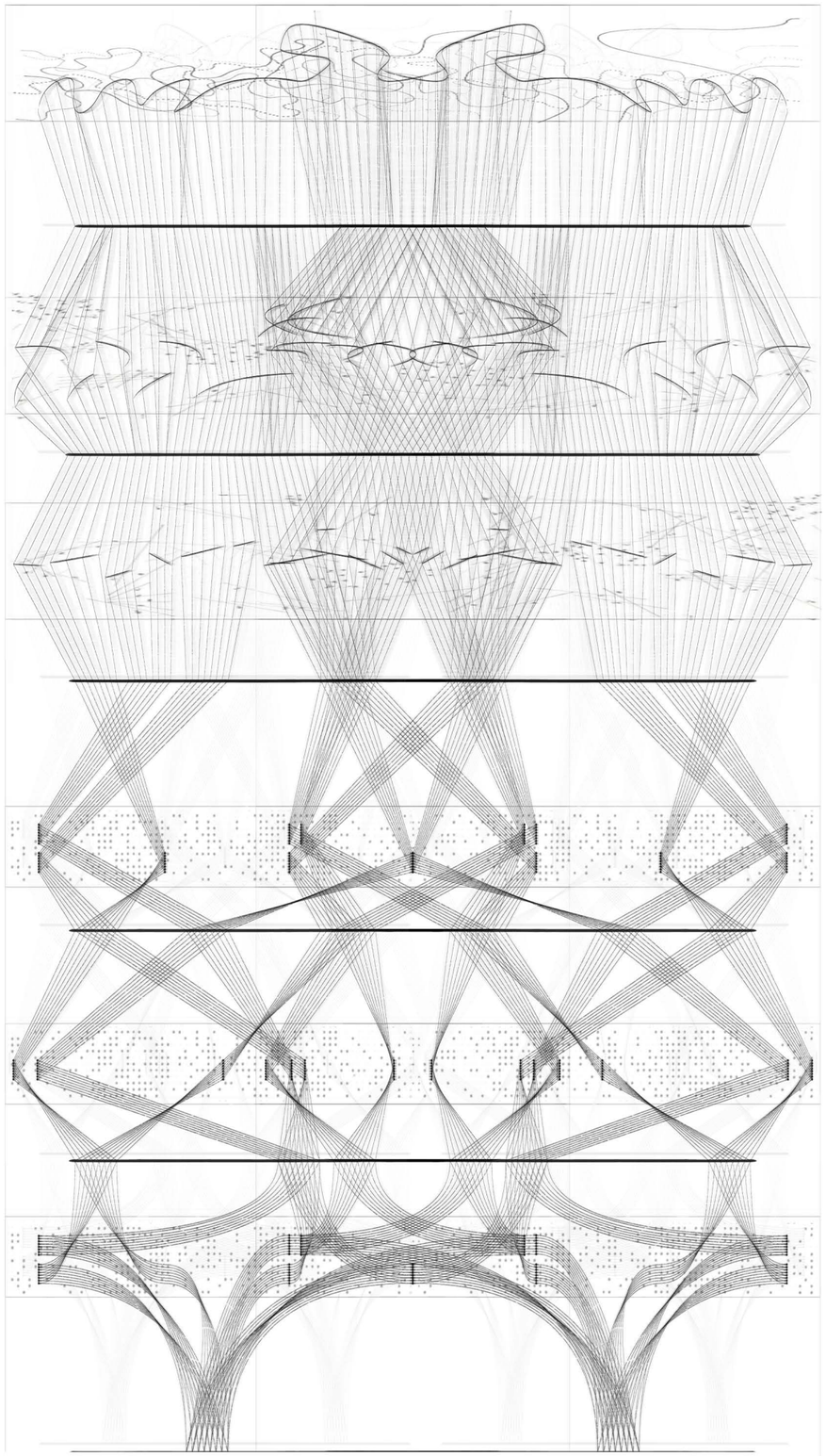
Weaving/Knitting
Structuring Space
Line Manipulation

Finished Textile
Cutting
Dividing Space

Sewing
Surface Manipulation

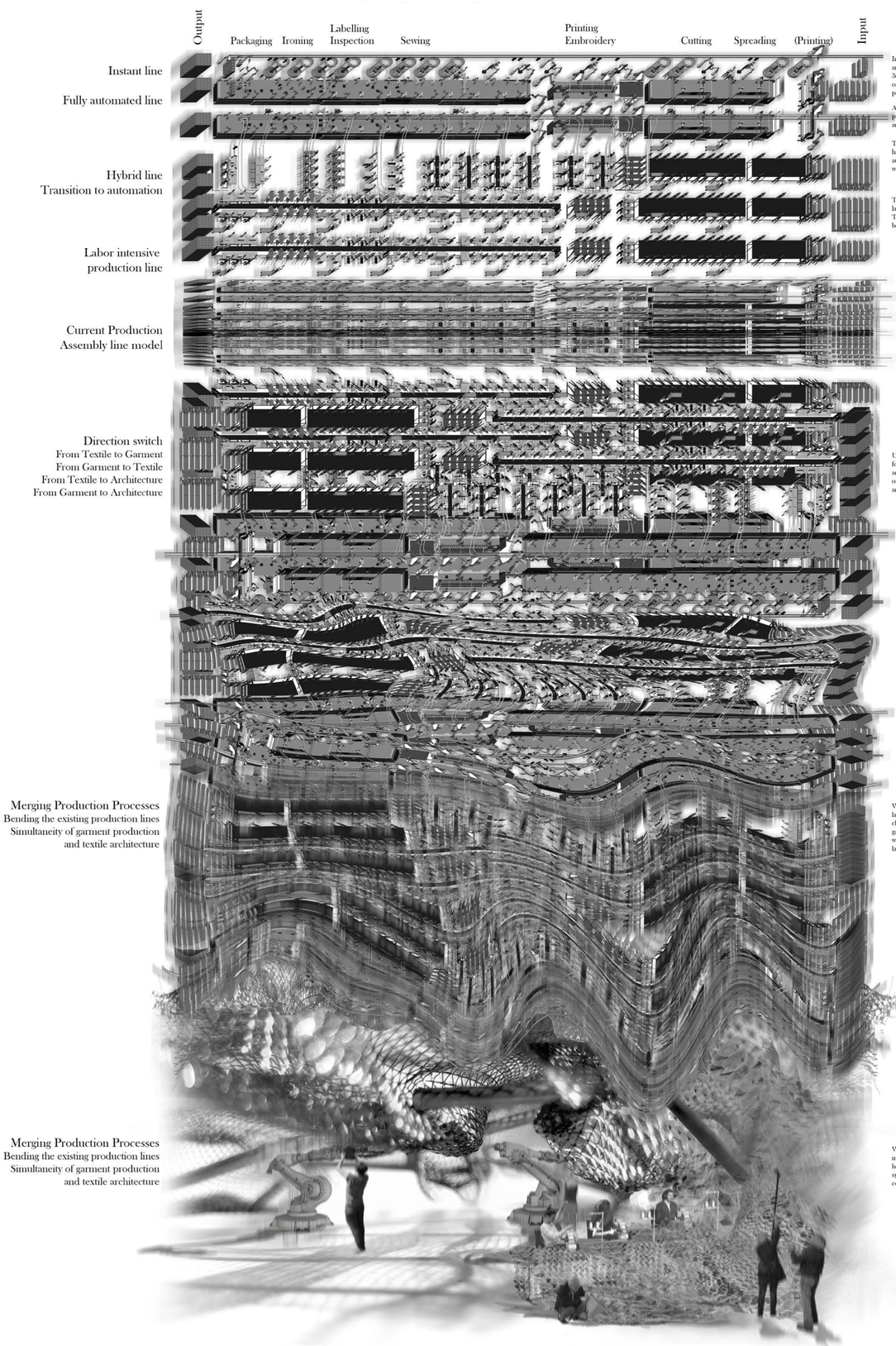
Finished Garment
Fitted Enclosure
Wraping the Body

In the Machine



Sewing Architecture

Creating a unity of architecture and garment production



Instant line

Fully automated line

In the near future mass customization and automation as well as technology such as 3d printing will enable instant production on demand merging textile and garment production in one process.

Automation and digitalization shift towards a new production model: mass customization, reducing waste and increasing quality.

Hybrid line
Transition to automation

The transition to fully automated production will happen gradually including different degrees of automation on each production stage and will coexist with labor intensive systems.

Labor intensive
production line

The garment industry relies heavily on human labor due to the difficulties in handling fabrics. The existing ready to wear system creates clothing before demand resulting in overproduction and waste.

Current Production
Assembly line model

Direction switch
From Textile to Garment
From Garment to Textile
From Textile to Architecture
From Garment to Architecture

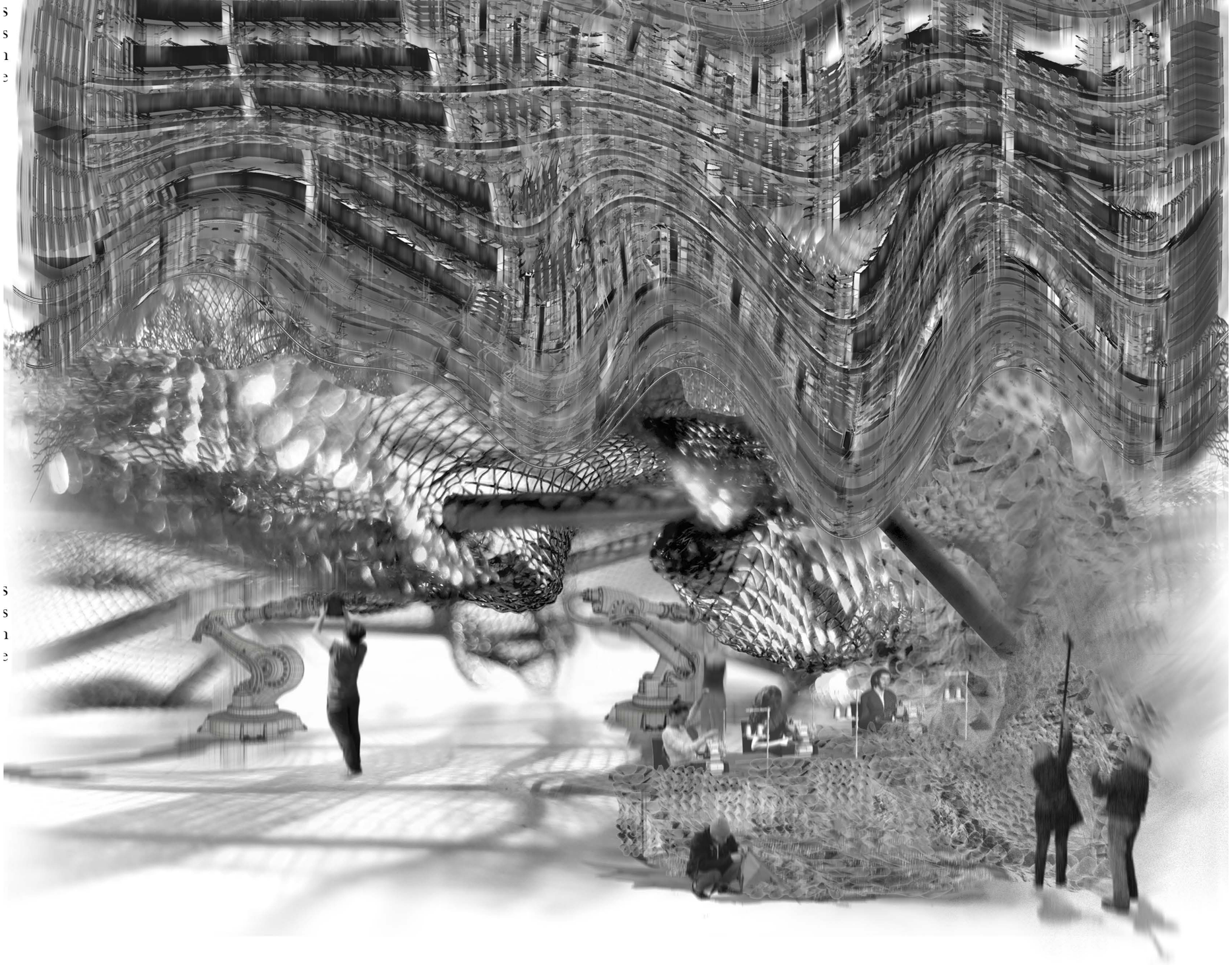
Using existing and future production lines for the creation of garments as well as architectural structures will allow a cross hybridization of two fiels traditionally influencing each other since archaic times.

Merging Production Processes
Bending the existing production lines
Simultaneity of garment production
and textile architecture

While automation will increasingly lead to better labor conditions the transitioning period creates challenges. By unifying architecture and garment production while increasing automation workers evolution and safety is achieved in a synergy of labor between humans and robots.

Merging Production Processes
Bending the existing production lines
Simultaneity of garment production
and textile architecture

While robots need to be trained into mimicing human activity, humans need to learn how to work with robots. Structures created in a synergy of garment workers and robots will contribute to a smooth transition



In Transition

Genericness

Flexibility

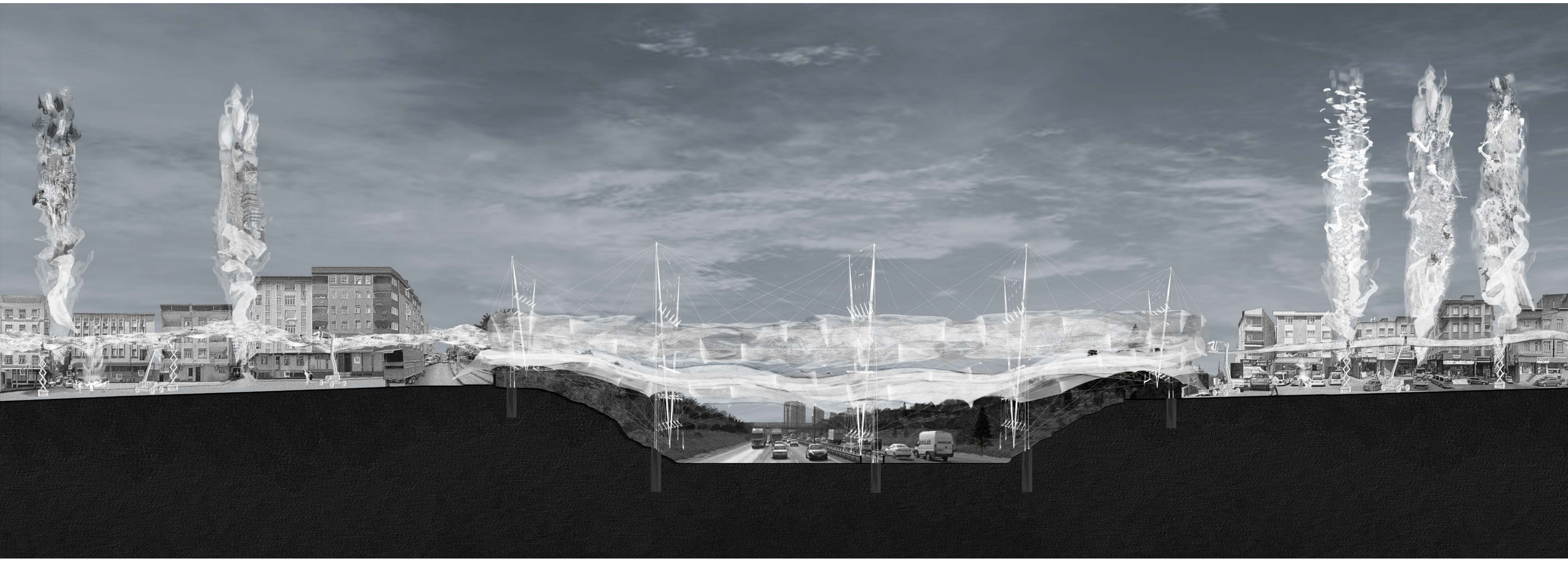
Mass Customization

High Tech vs Low Tech

Transition

Urban Strategy

Machining the link
Linking the Machines




JeansLab

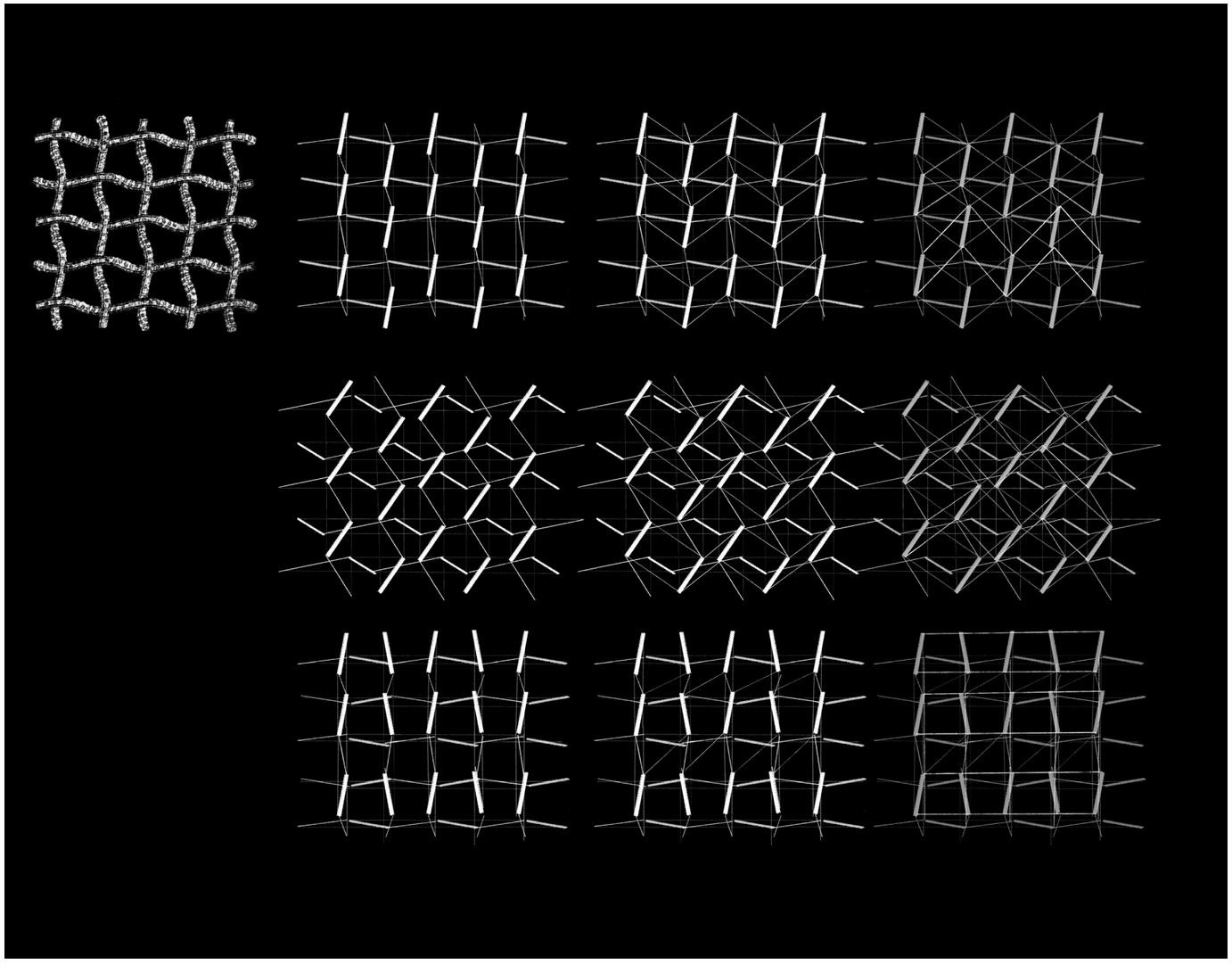
Urban Strategy 1:5000



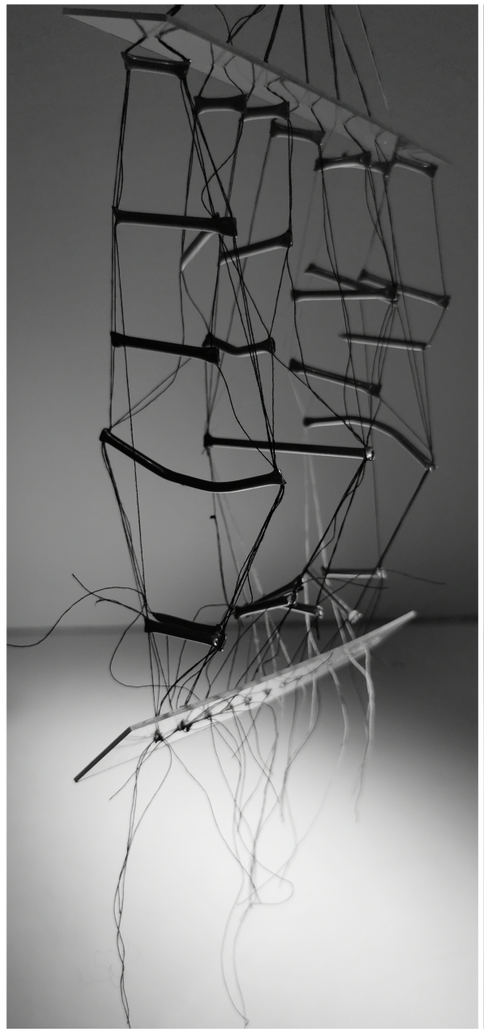
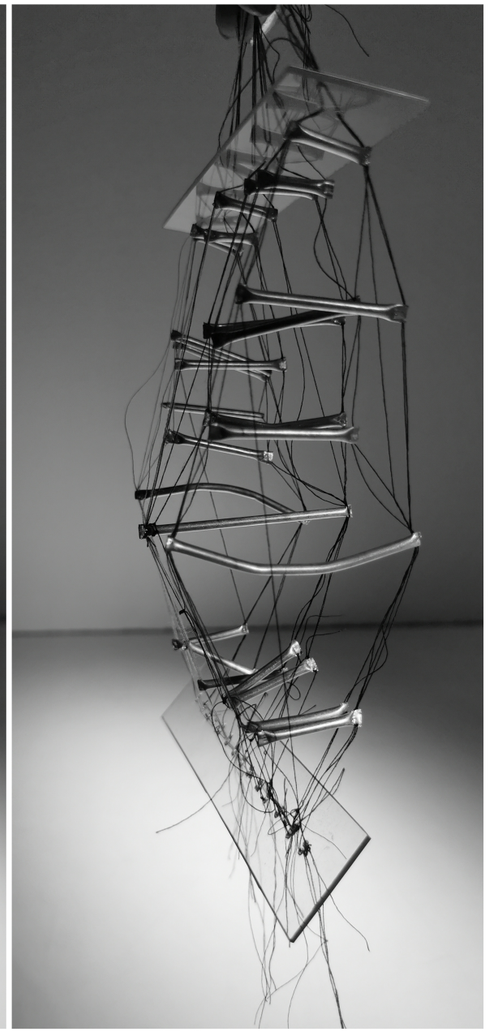
Form follows Assembly

Structural Iterations

Translating Weaving

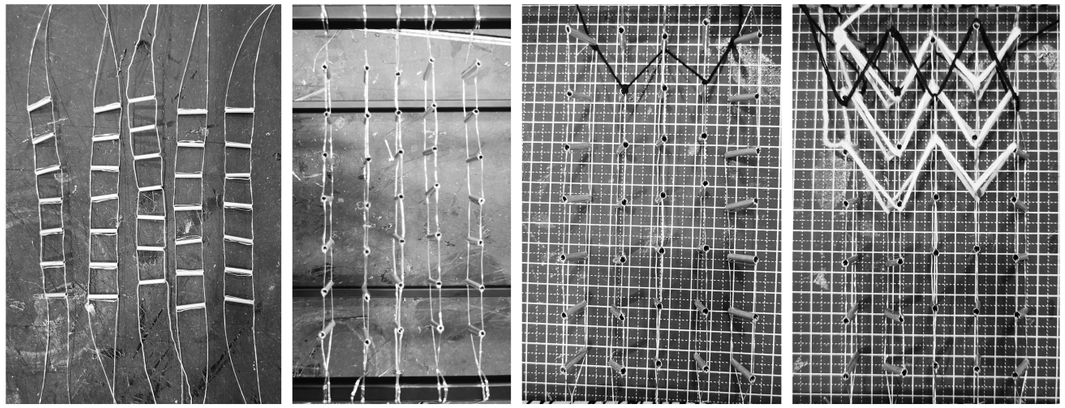


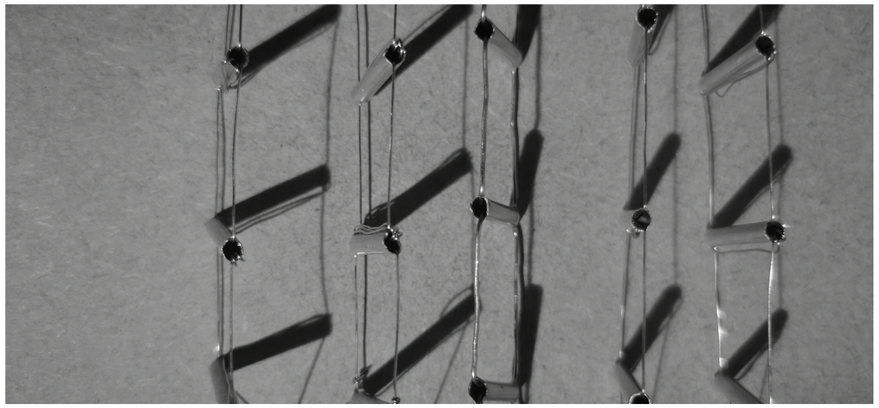
Deployable Structure Test 0 - Modi Operandi Workshop



Test 1

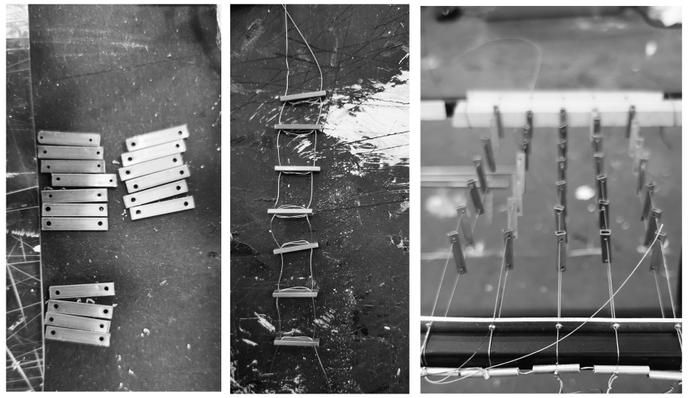


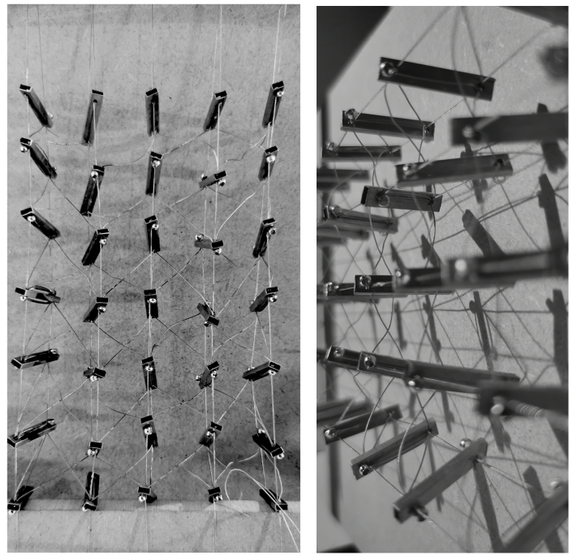


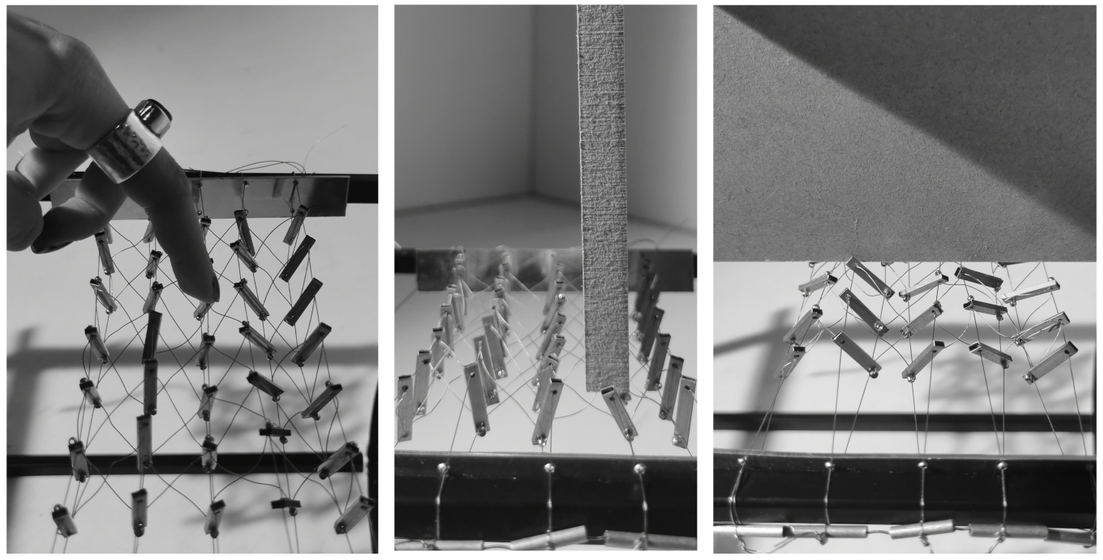
Material: aluminuim profiles, fence wire, woll threads

Conclusions:
wrong Material in terms of scale and behaviour, threading with reliable result impossible
rotation of cable trusses possible through three dimensional diagonal wiring
distance of wires should be fix
Requirement for tensioning mechanism

Test 2





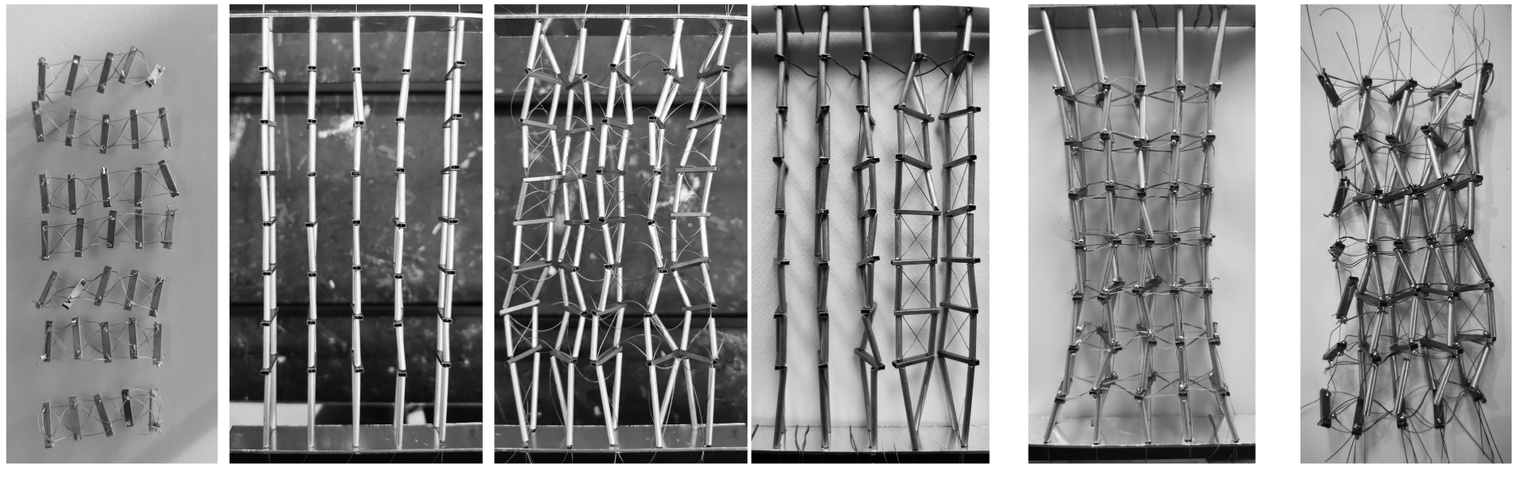


Material: brass profiles, steel jewellery wire, beads

Conclusions:
wiring too complex but connections still unstable
not enough tension
shrinkage

Interesting : the direction of rotation

Test 3

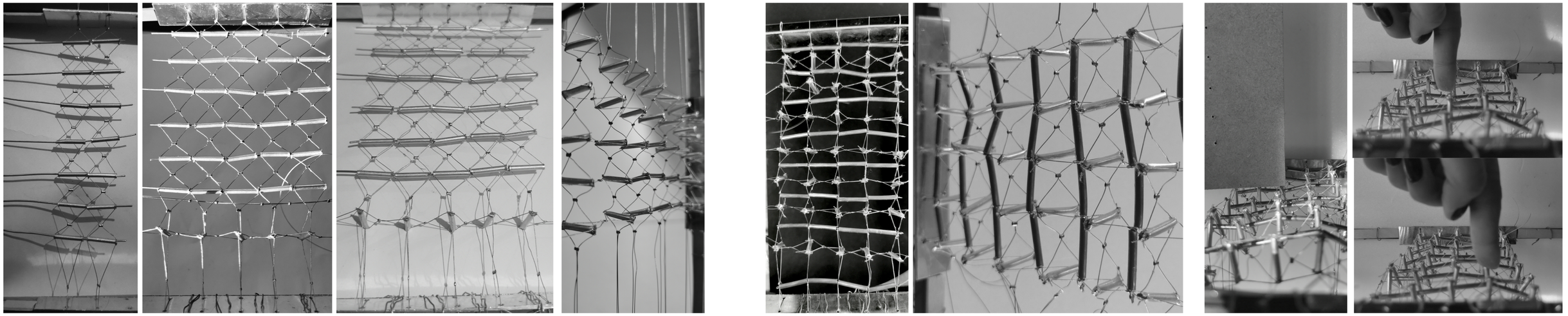


Material: aluminuim profiles, fence wire, woll threads

Assembly method: temporary support, double wiring

Conclusions:
too much tension while making is problematic, shrinkage, too time consuming

Test 4

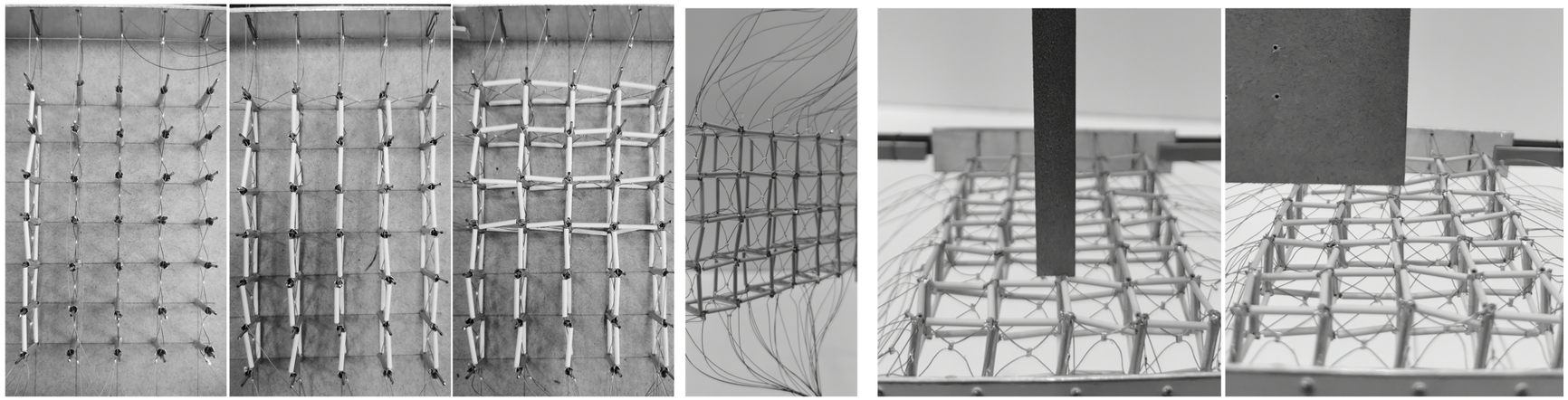


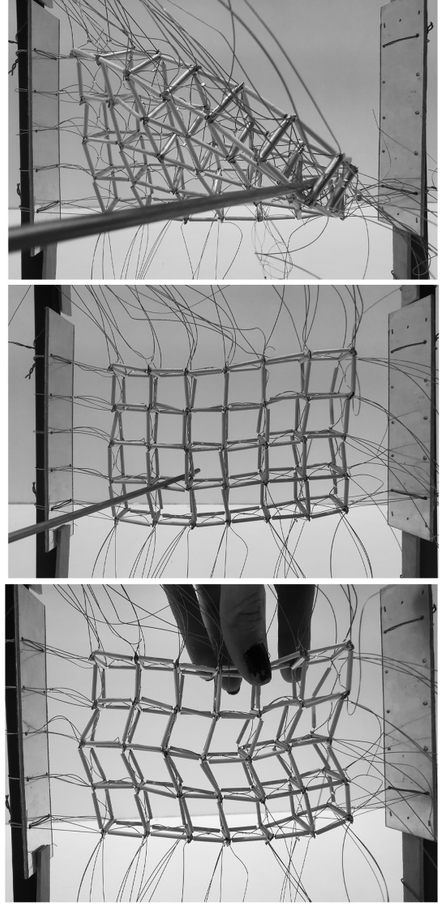
Material: aluminium profiles, steel jewellery wire, beads

Assembly method: first direction flat, temporary support, second direction lifted gradually
Tested introducing horizontal struts

Conclusions:
assembly fast and effective, rotation issue improved with extra struts
Tested introduction of double layer cable net

Test 5



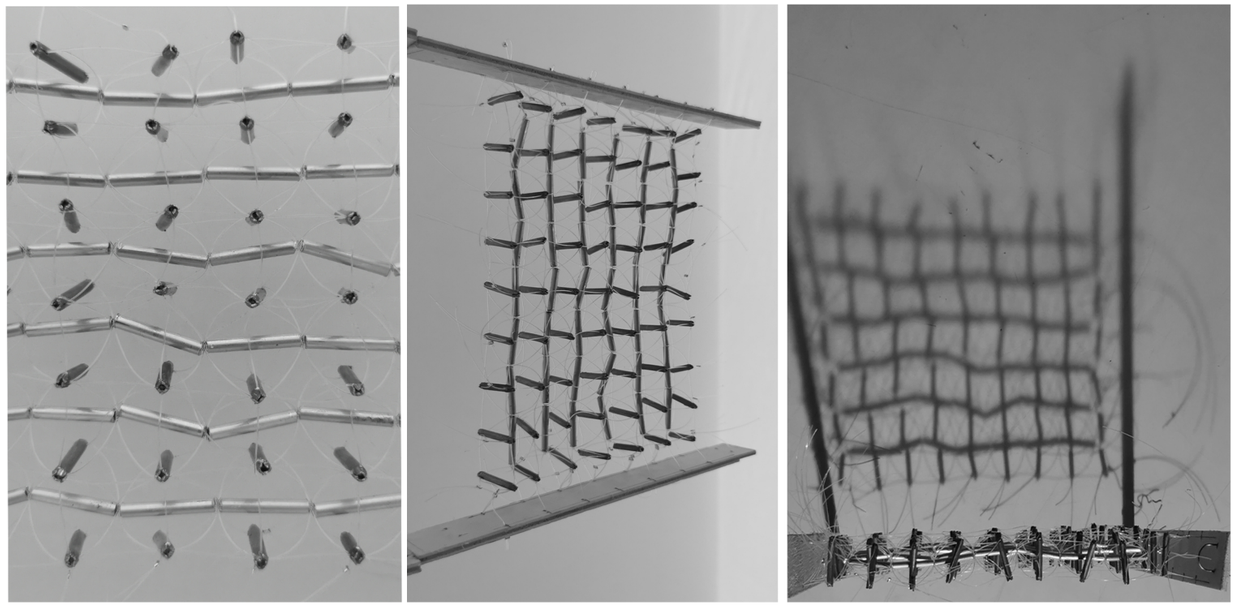


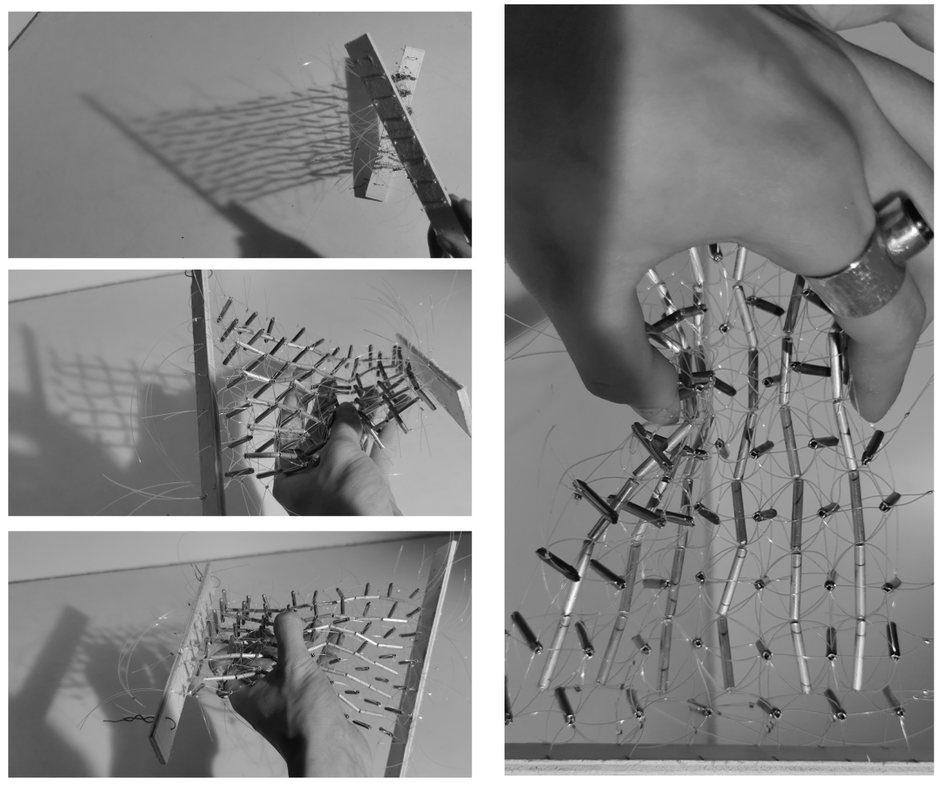
Material: aluminuim profiles, plastic profiles, jewellery wire, beads

Assembly method: temporary support, double wiring

Conclusions:
precision satisfactory
quite stable but too many stiff elements

Test 6



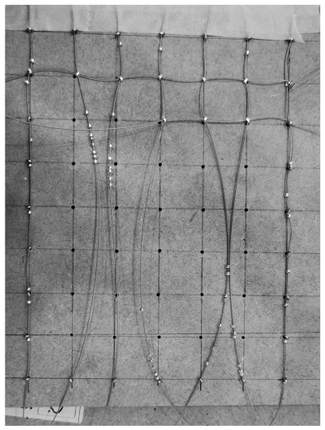
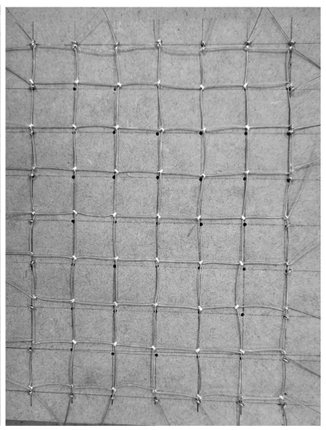


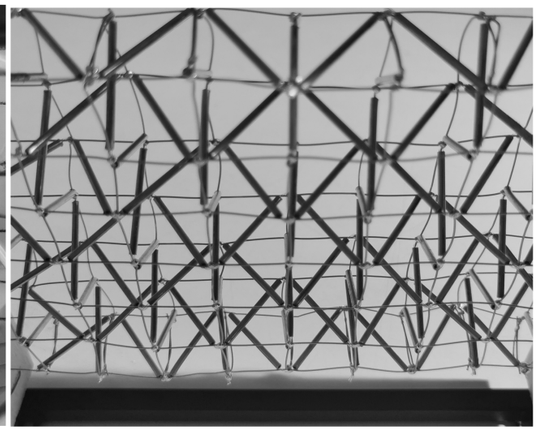
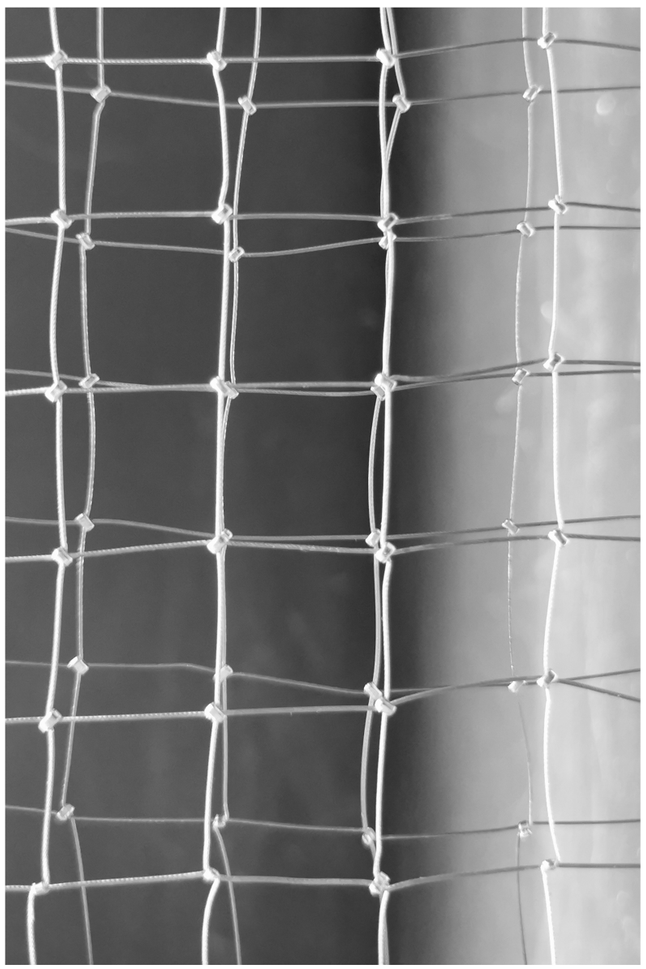
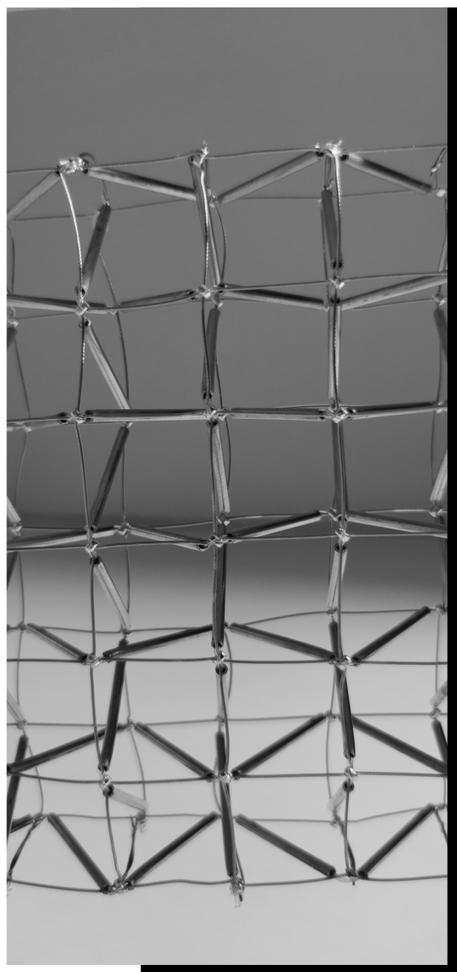
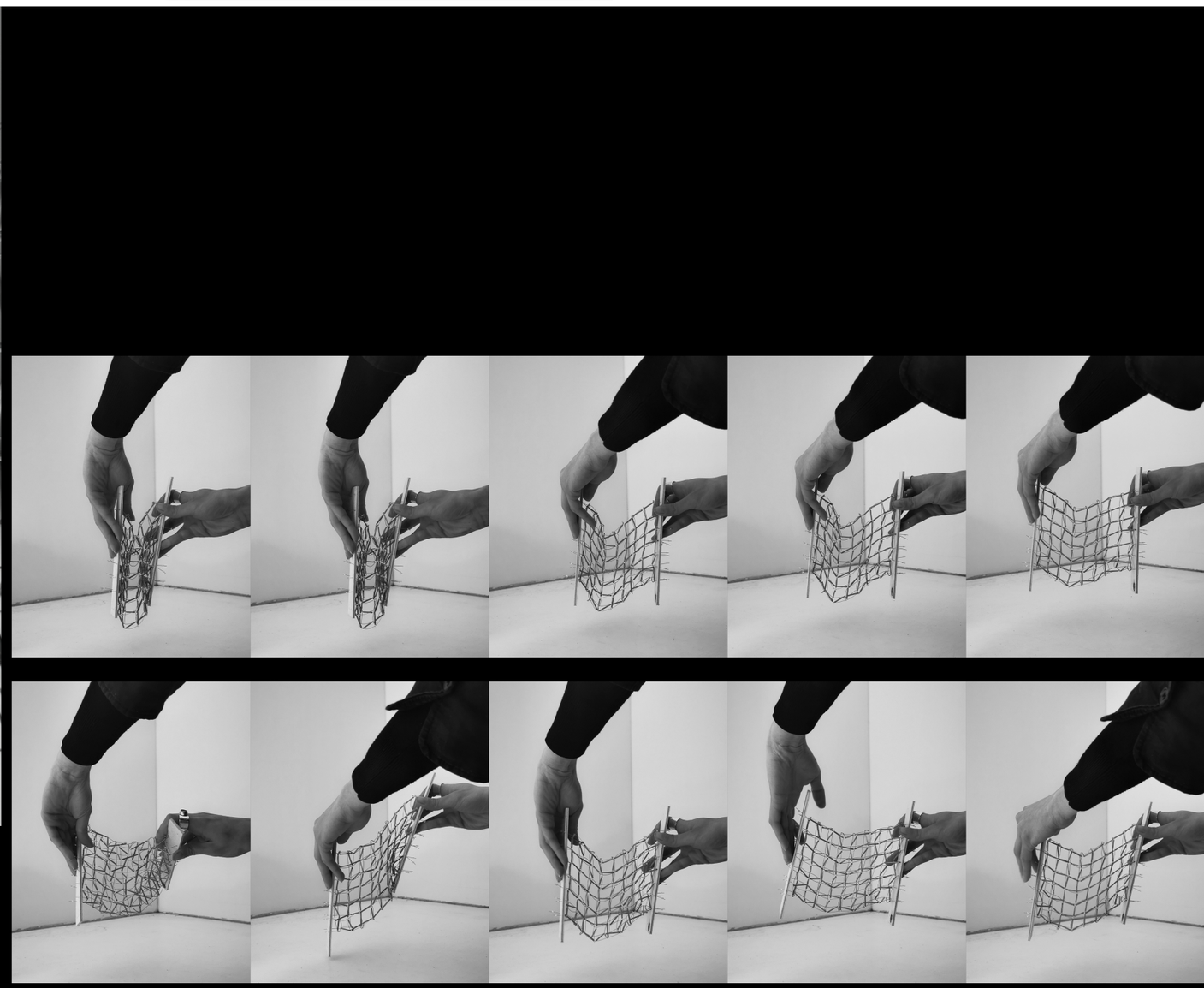
Material: aluminium profiles, brass profiles, fishing wire,

Assembly method: formwork same as test 4, fextremely time consuming due to ammount of diagonals

Conclusions:
successful configuration, stable and deployable

Test 7

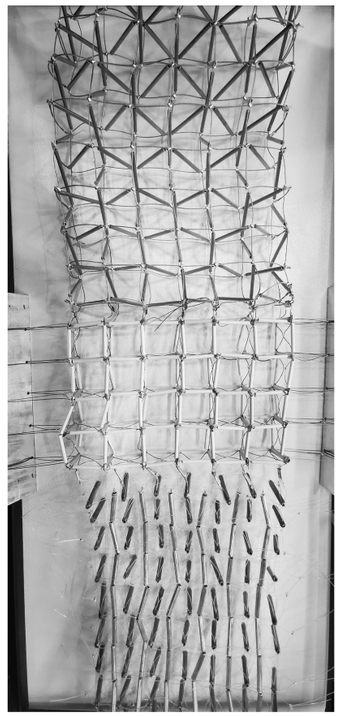





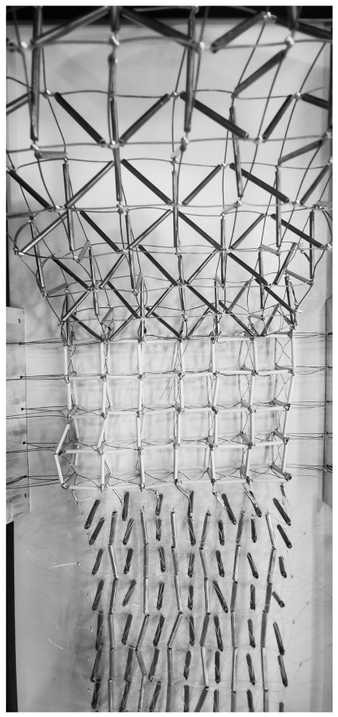
Material: brass profiles, jewellery wire, beads pressed

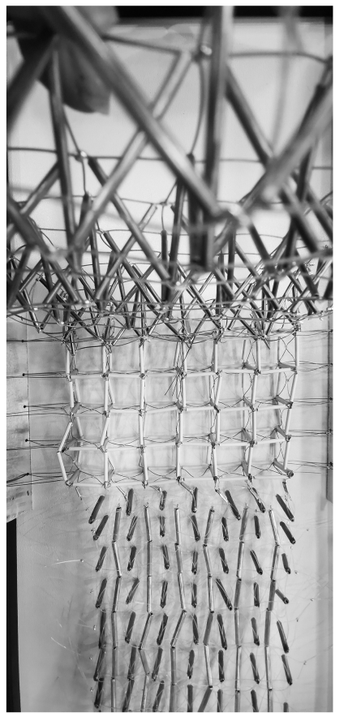
Assembly method: double layer cable net spanned first then struts added

Conclusions:
precision satisfactory
most stable, if vertical cables added becomes tensegrity

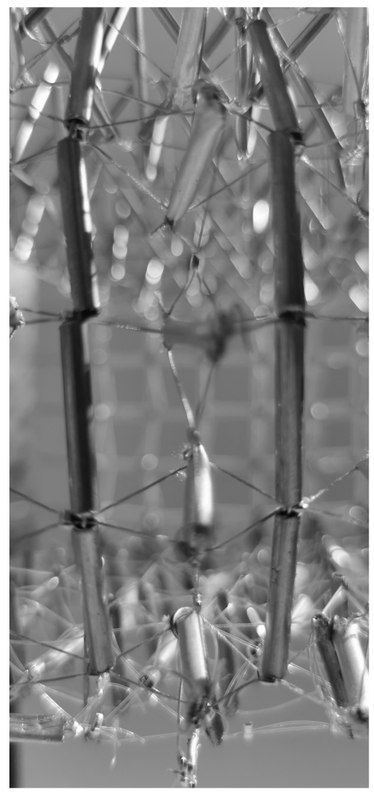
Structural Principle - Corner Workshop



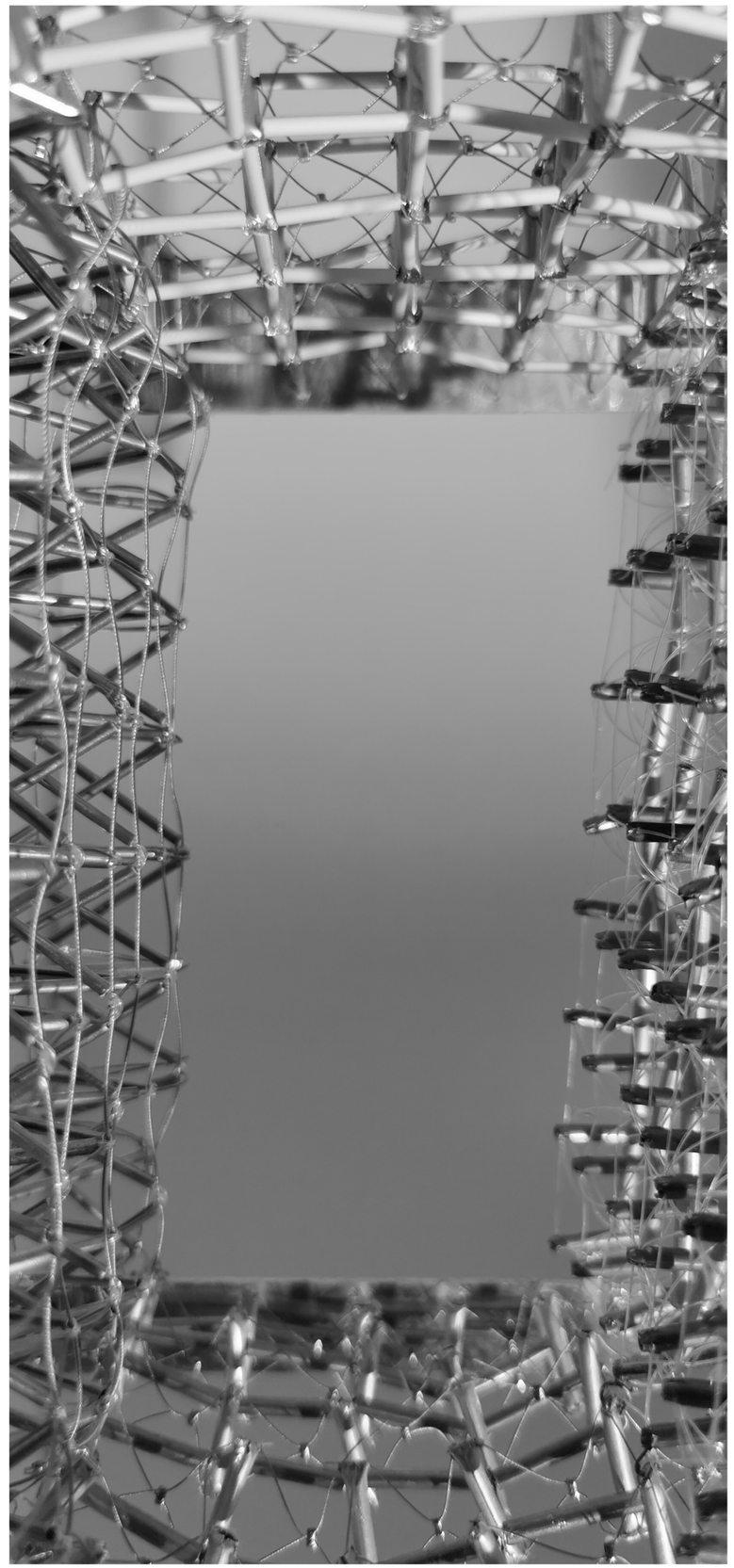




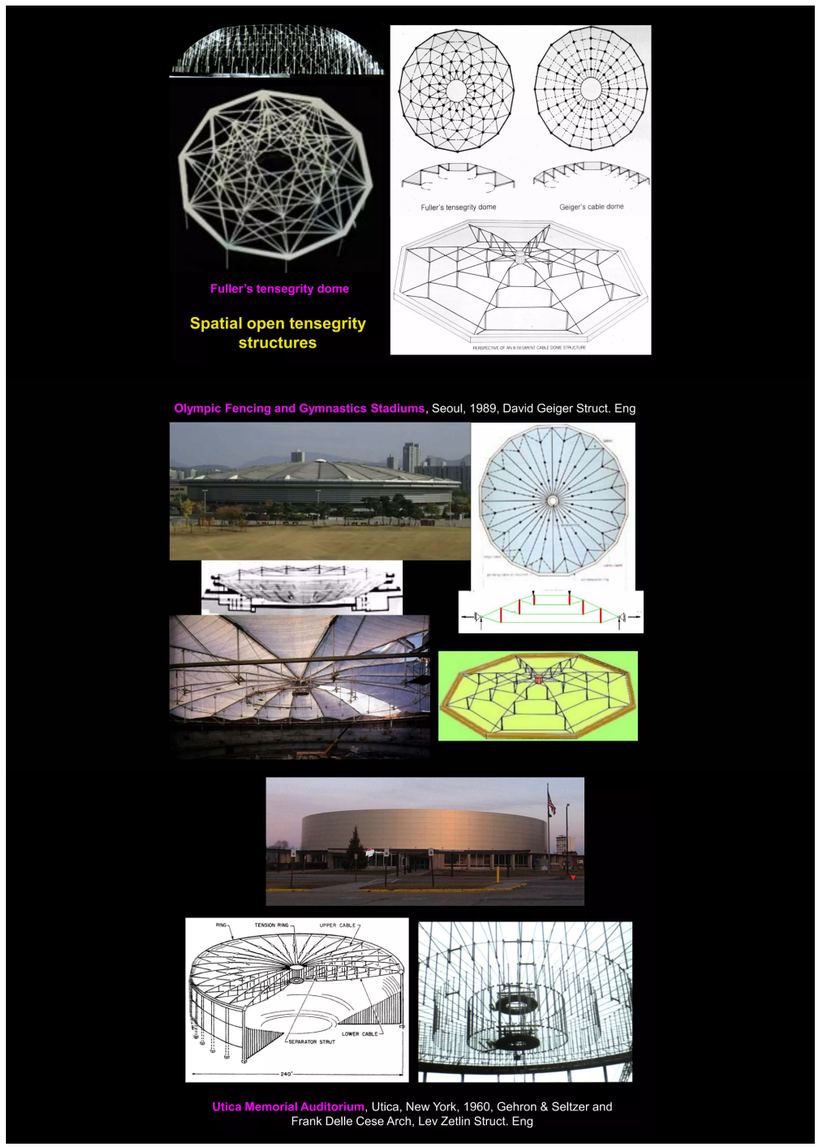








Cable strut net domes



2.1. Types of Round Suspen-Domes

Suspen-domes can be classified into several types based on the characteristics of the upper structure and those of the lower cable bar system as illustrated in Fig. (**4**).

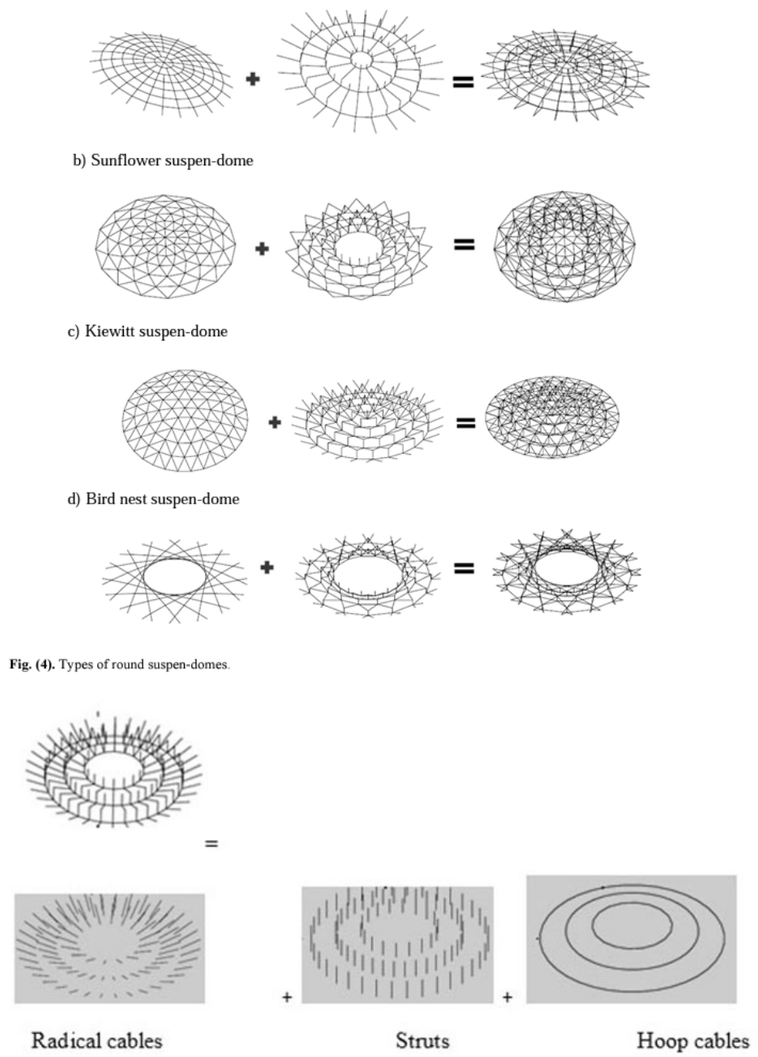


Fig. (4). Types of round suspen-domes.

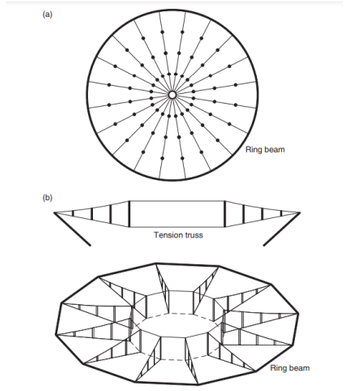


Figure 1.8 Cable girder domes: (a) full-plan form; (b) form with opening.

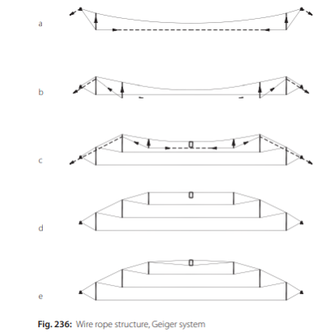


Fig. 236: Wire rope structure, Geiger system

8 *Tensegrity systems*

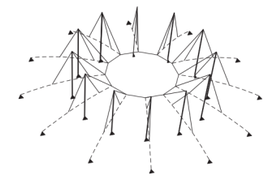
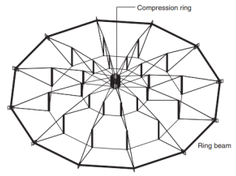
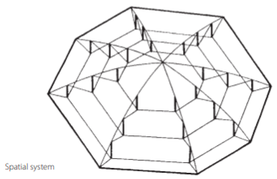


Figure 1.5 Cable-stayed forms with opening.

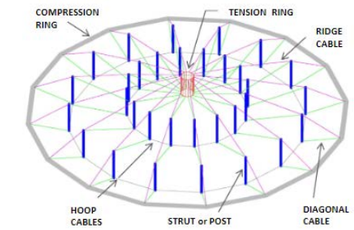


a – e = Erection principle





(a)



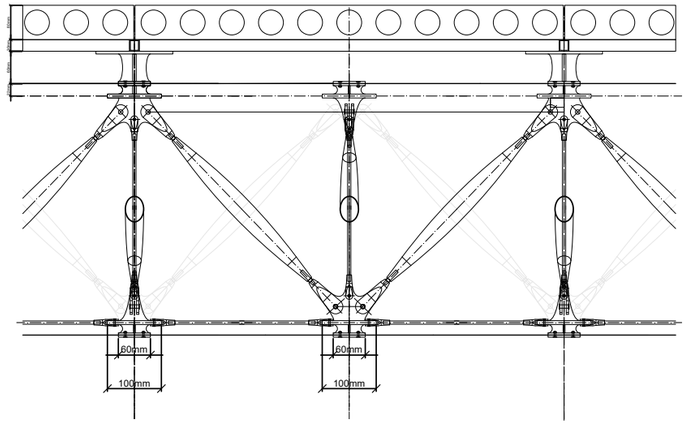
(b)

Fig. 1. (a) Interior of Taoyuan Arena Dome, Taiwan (Courtesy of Birdair, Inc.); and (b) Structural components of the *N2:n16* configuration.

Component Kit

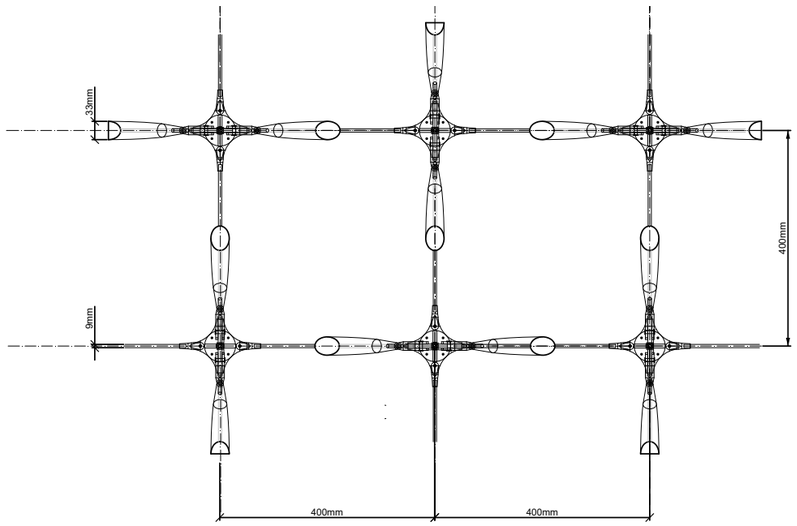
Section 1:5

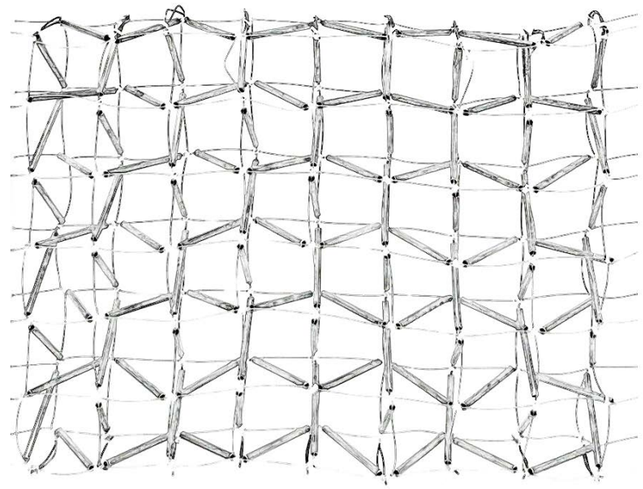
Hollowcore concrete plates
False floor square profiles steel
False floor pedestals steel
PVC coated Polyester 5mm
Support structure
Steel joint for cable rod tension system





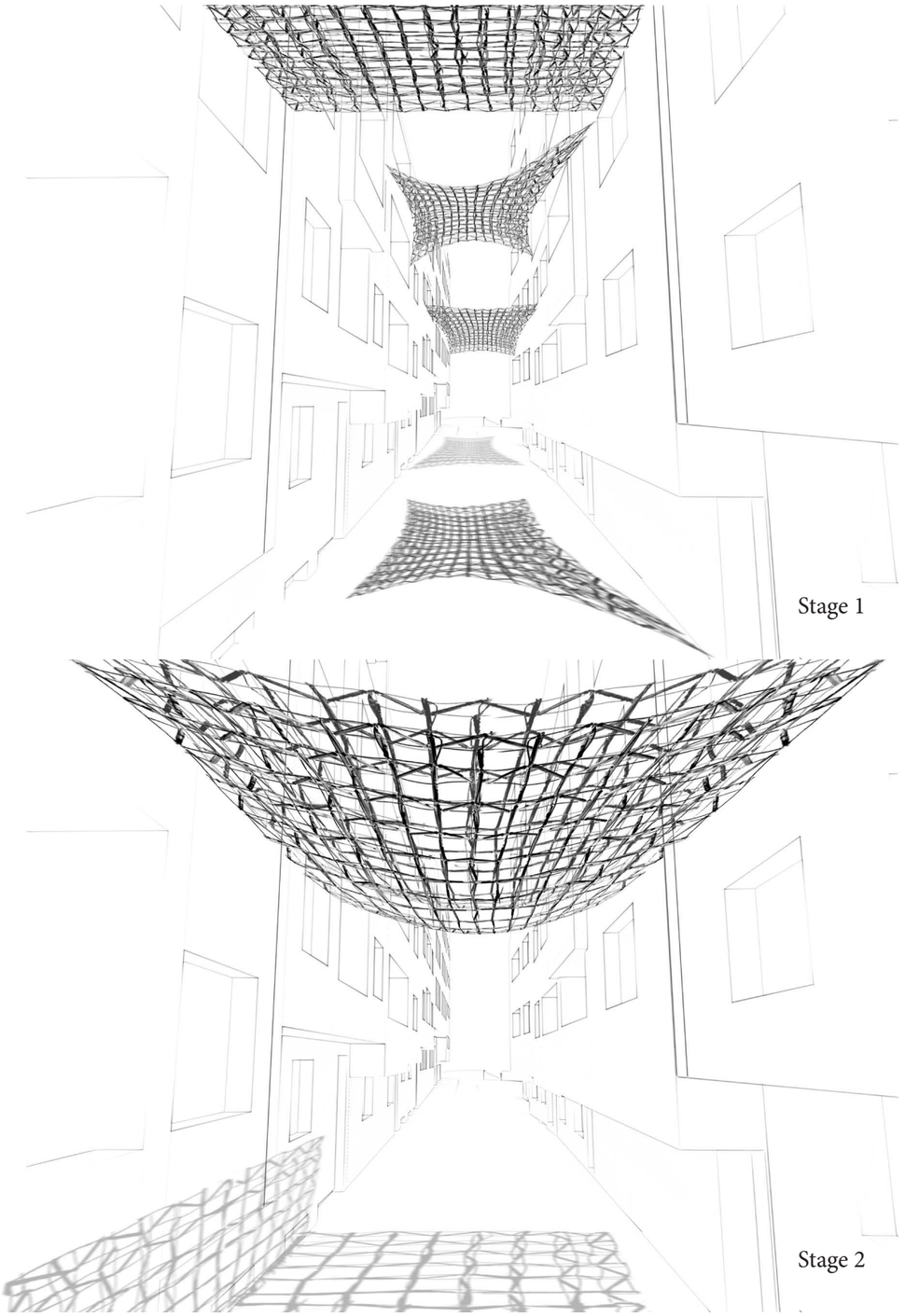
Plan 1:5





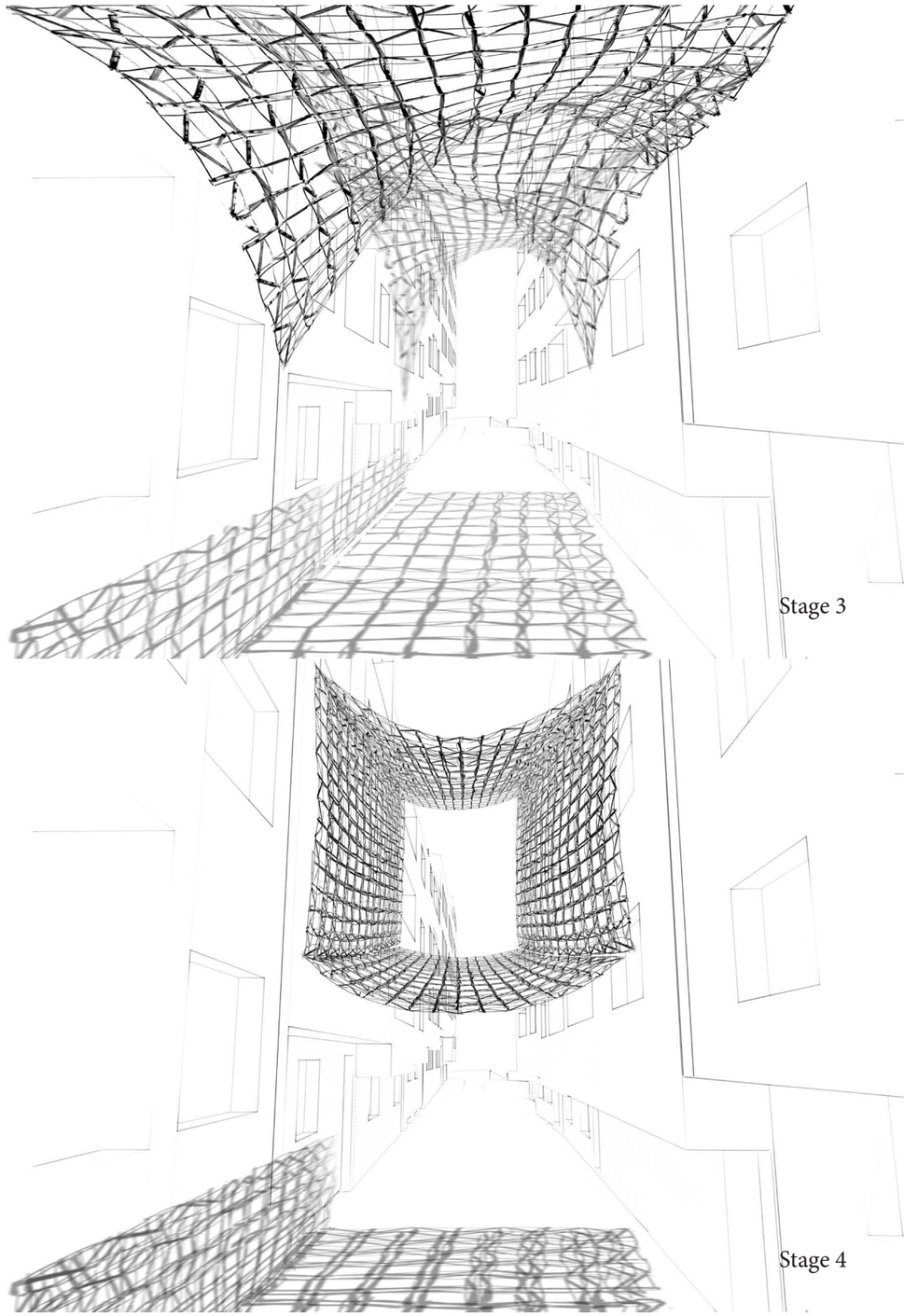
Detailing Scheme - Exemplary Configuration 1:5

The City as a Machine



Stage 1

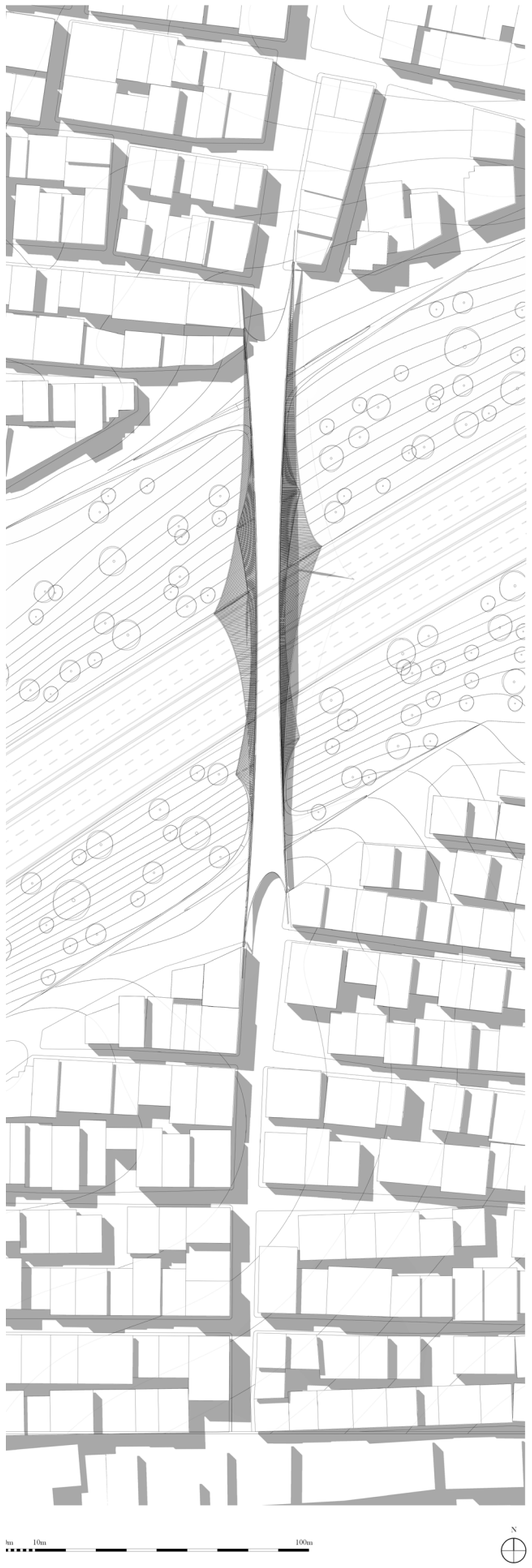
Stage 2



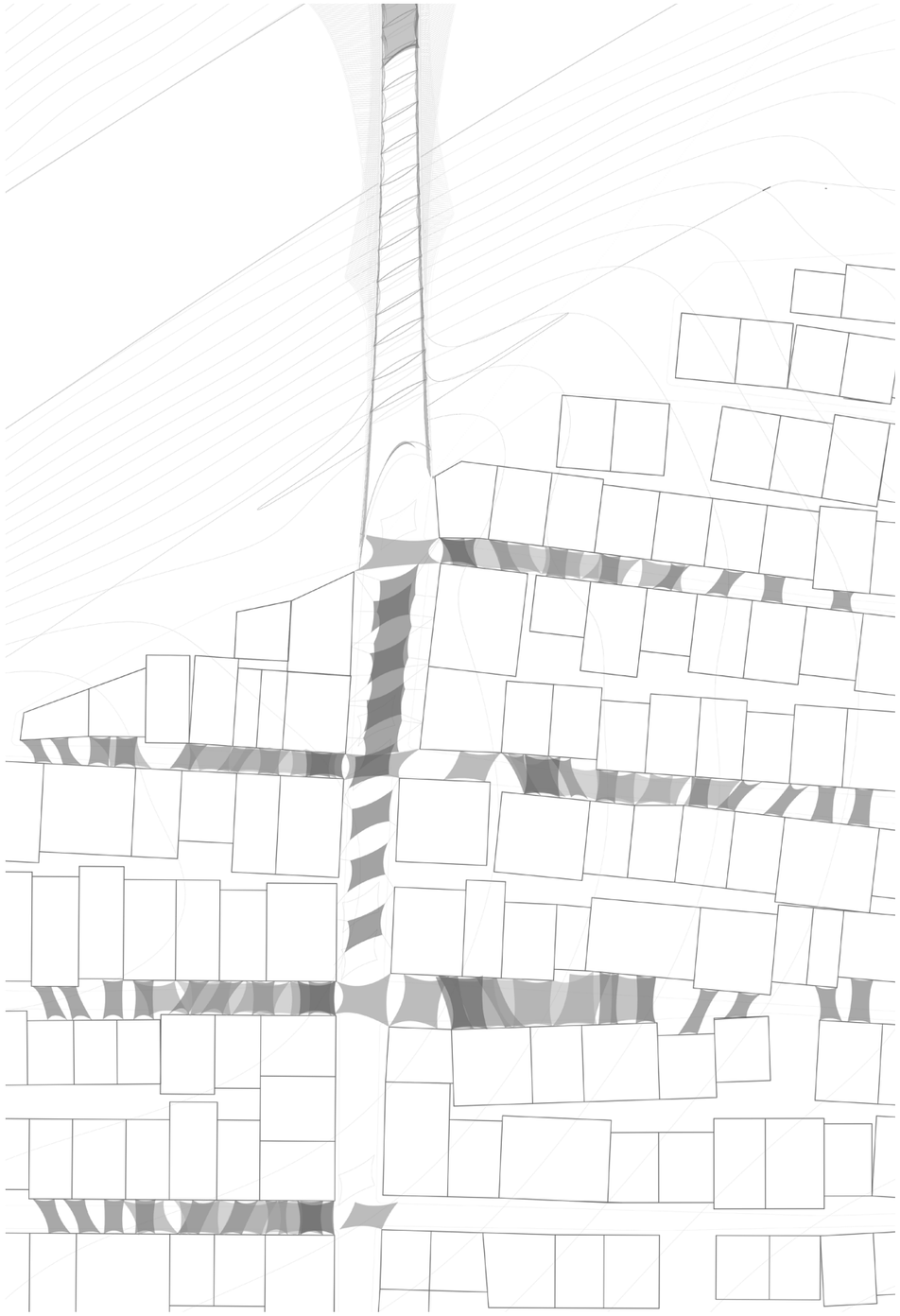
Stage 3

Stage 4

Site Plan 1:500



Assembly Steps



-1. Sourcing of industrial steel cables struts and joints
Sourcing of technical textile in nearby industry
Sewing of skin in ateliers on side and main streets

0. Assembly at home - Side streets

1. Preassembly suspended - Side streets

2. Segment connection - Main Street

3. Bridging - On site

4. Tensioning and anchorage - On site

5. Interior Structure - On Site from the inside of the bridge

6. Skin - Preassembly at home and Inflation or Infil on Site

7. Maintenance - On Site from the inside of the bridge

8.Disassembly and reuse on another location

Stage 6: Connecting all three-dimensional slices

Stage 5: Positioning

Stage 4: Folding of slices

Stage 3: Connection to one membrane - tube

Stage 2: Connection to larger Fragments - four sides of exterior tube

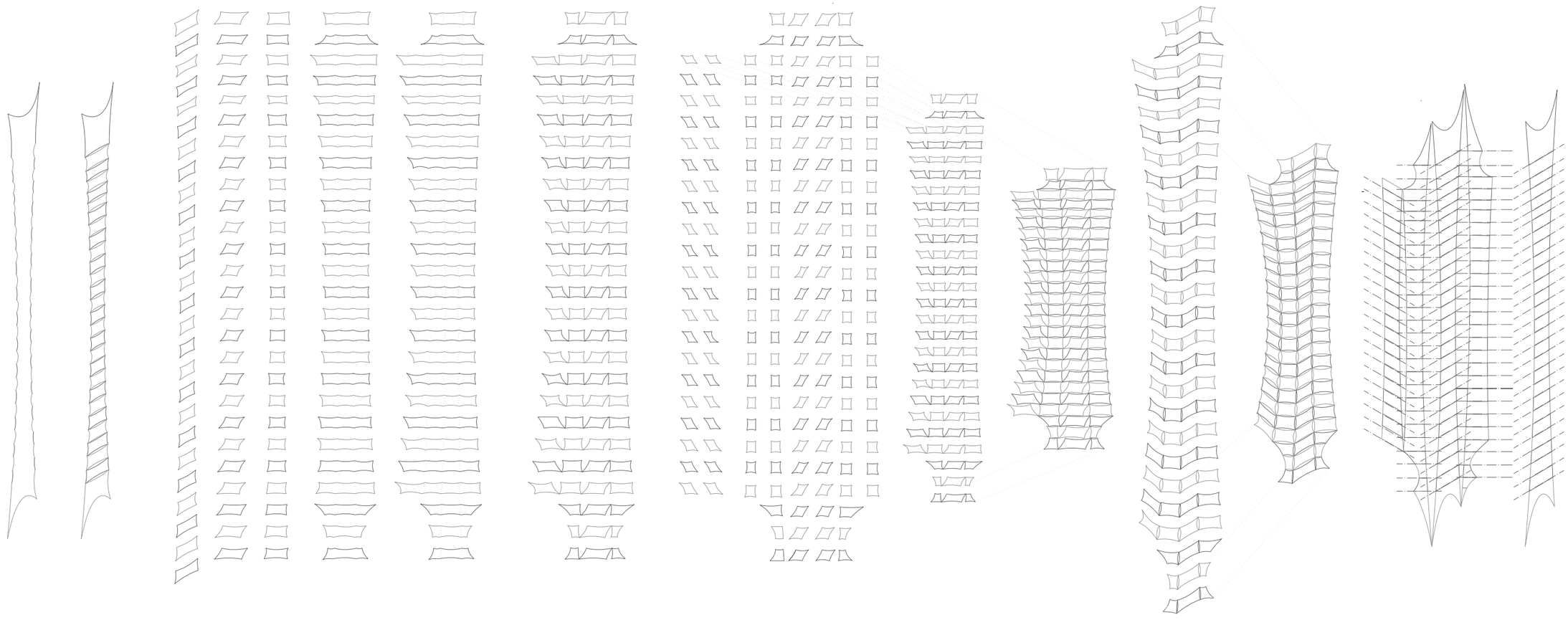
Stage 1: Fragment Subdivision

Organization of Fragments Division

Unfolded Fragments

Unfolding Slicing

Basic Form outline

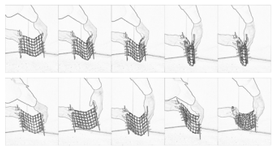


Assembly Patterns

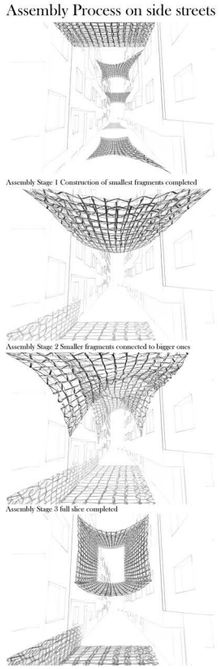


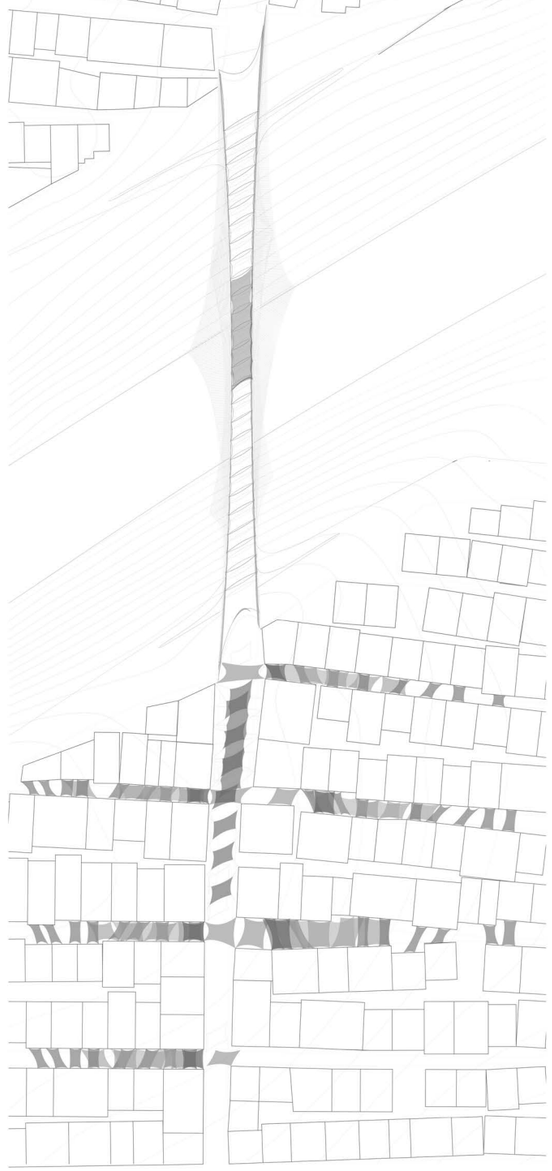
Inside the Machine

Assembly Stage 0: Prefabrication at home



Assembly Process on side streets





0m 10m 100m

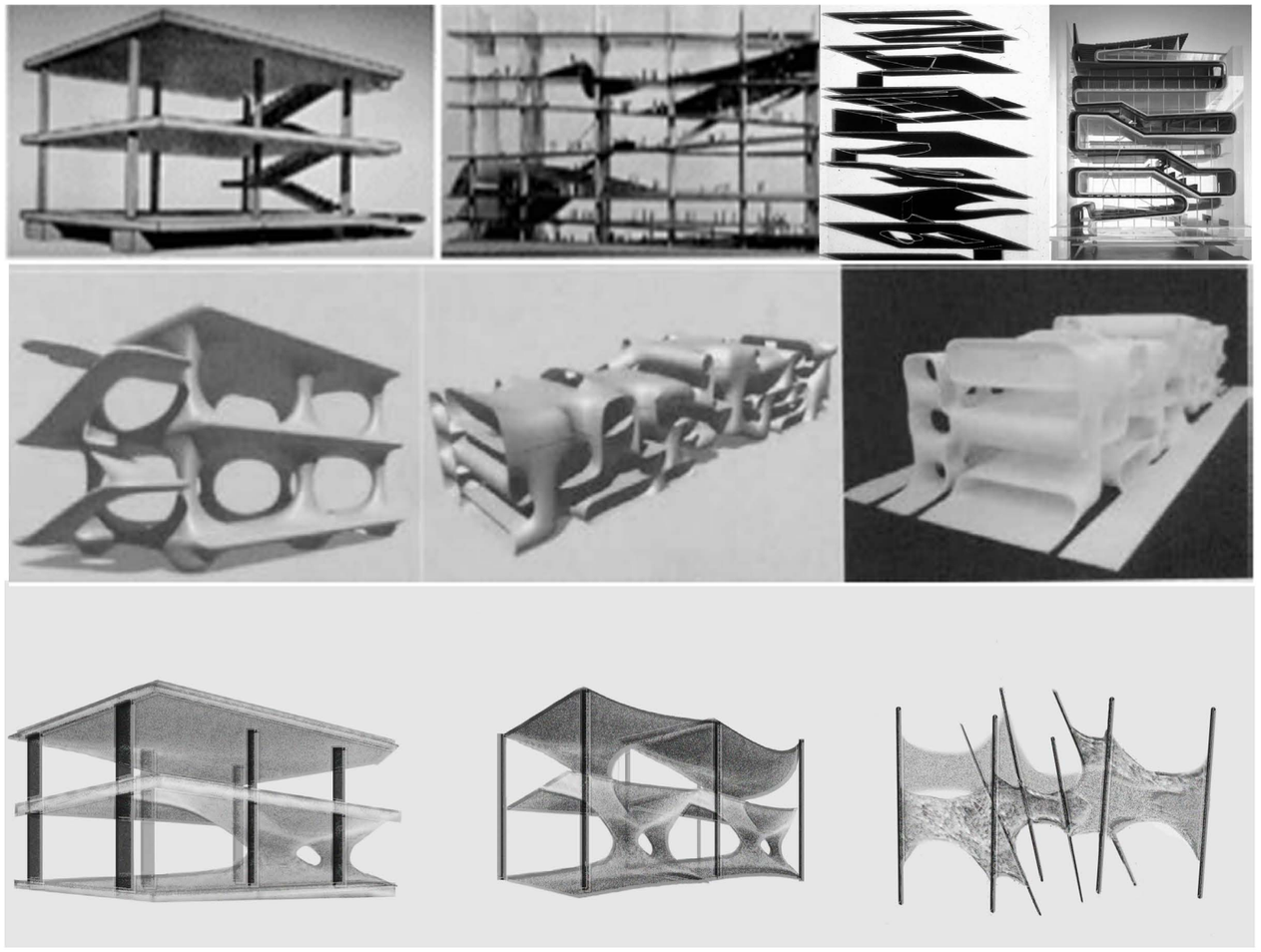
N

Shape follows optimization

Textile Tectonics

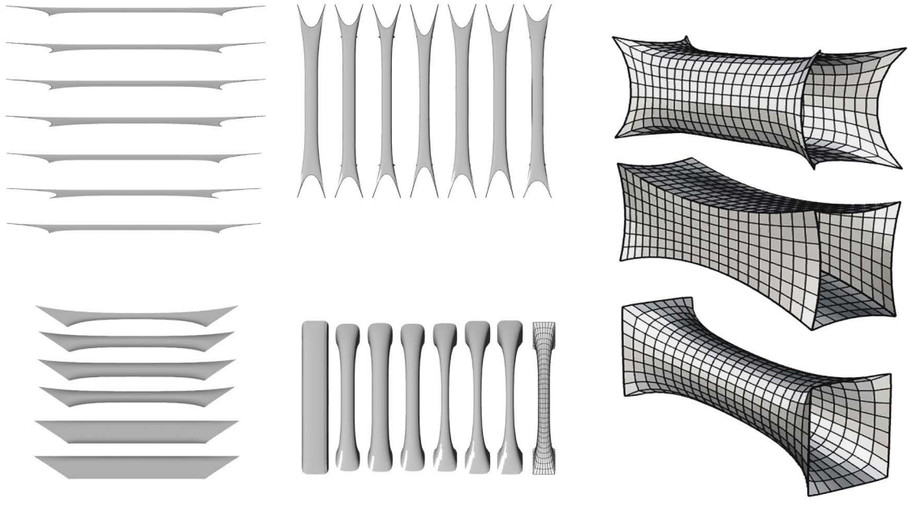


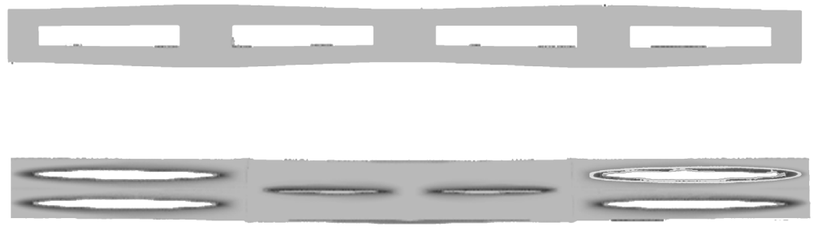
Transferability



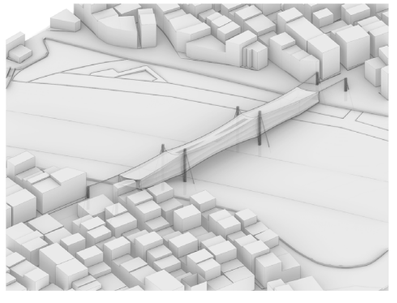
OMA Jussieu library
Diller+Scofidio Eyebeam museum of art and technology
Dagmar Richter Maison Domino
Textile Maison Domino

Sources:
https://dsrny.com/project/eyebeam
Dagmar Richter essay

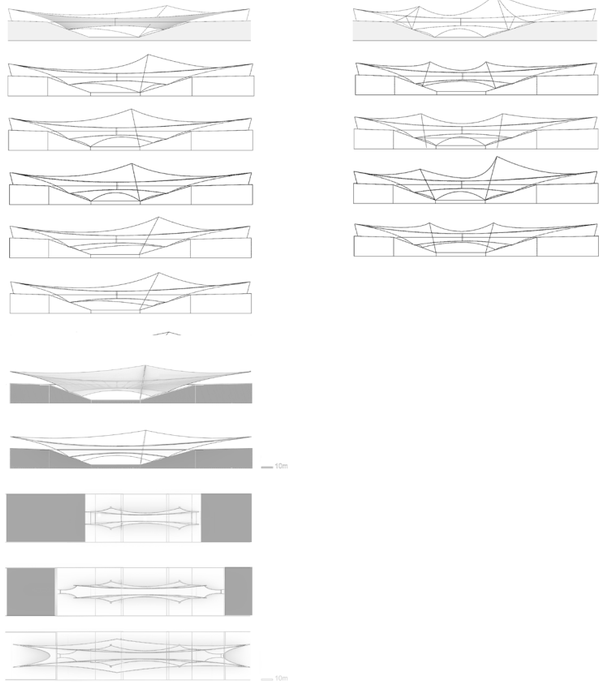


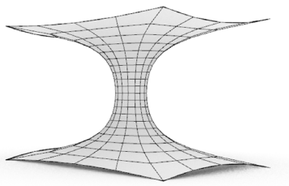


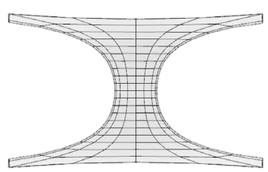


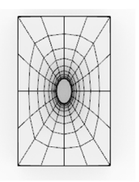


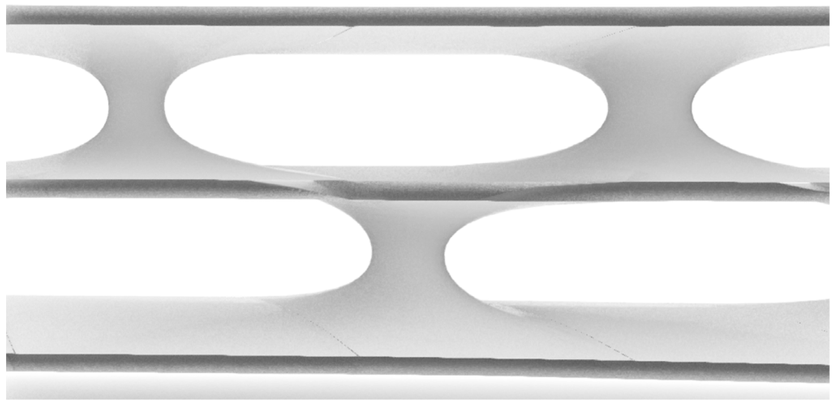




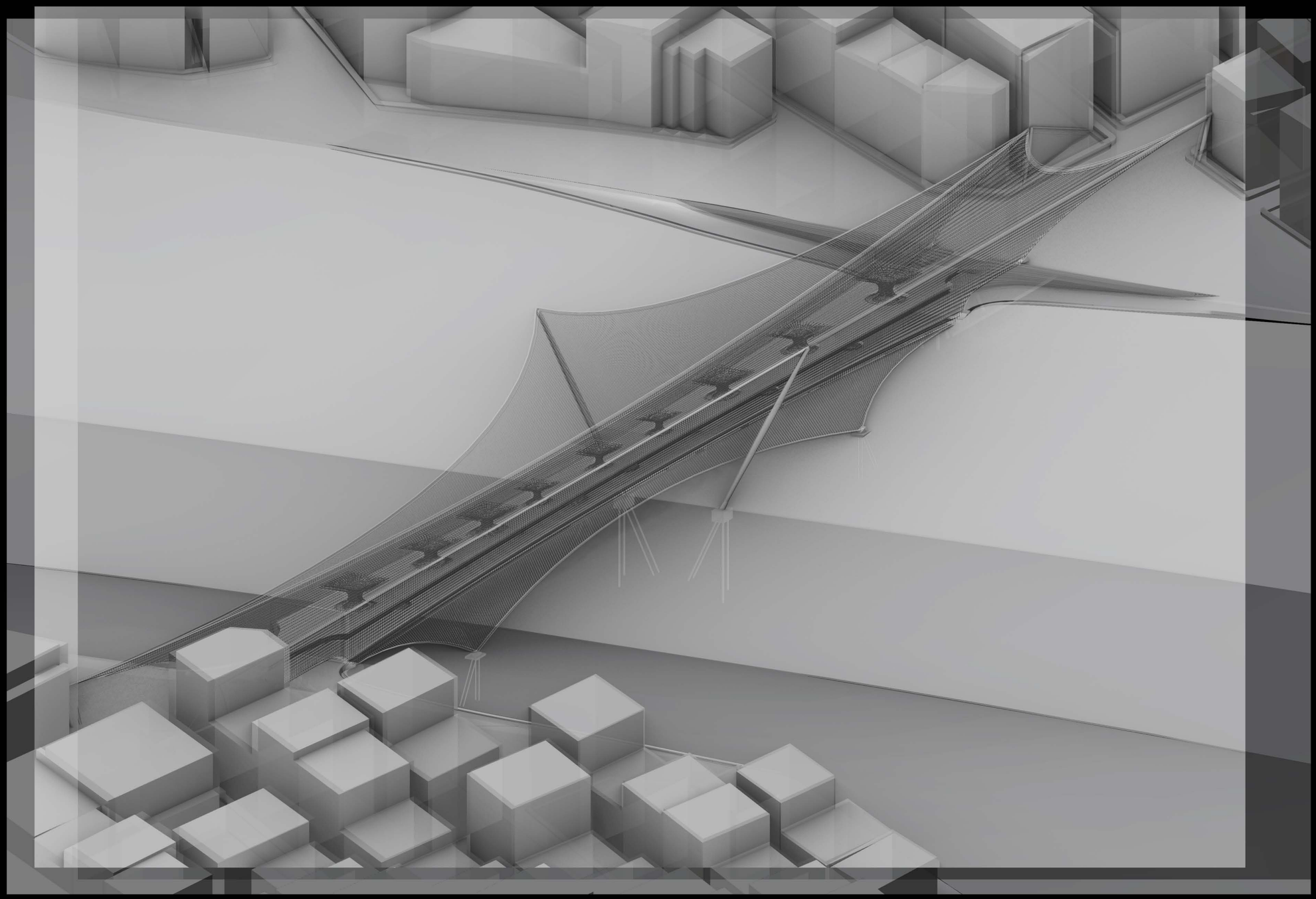






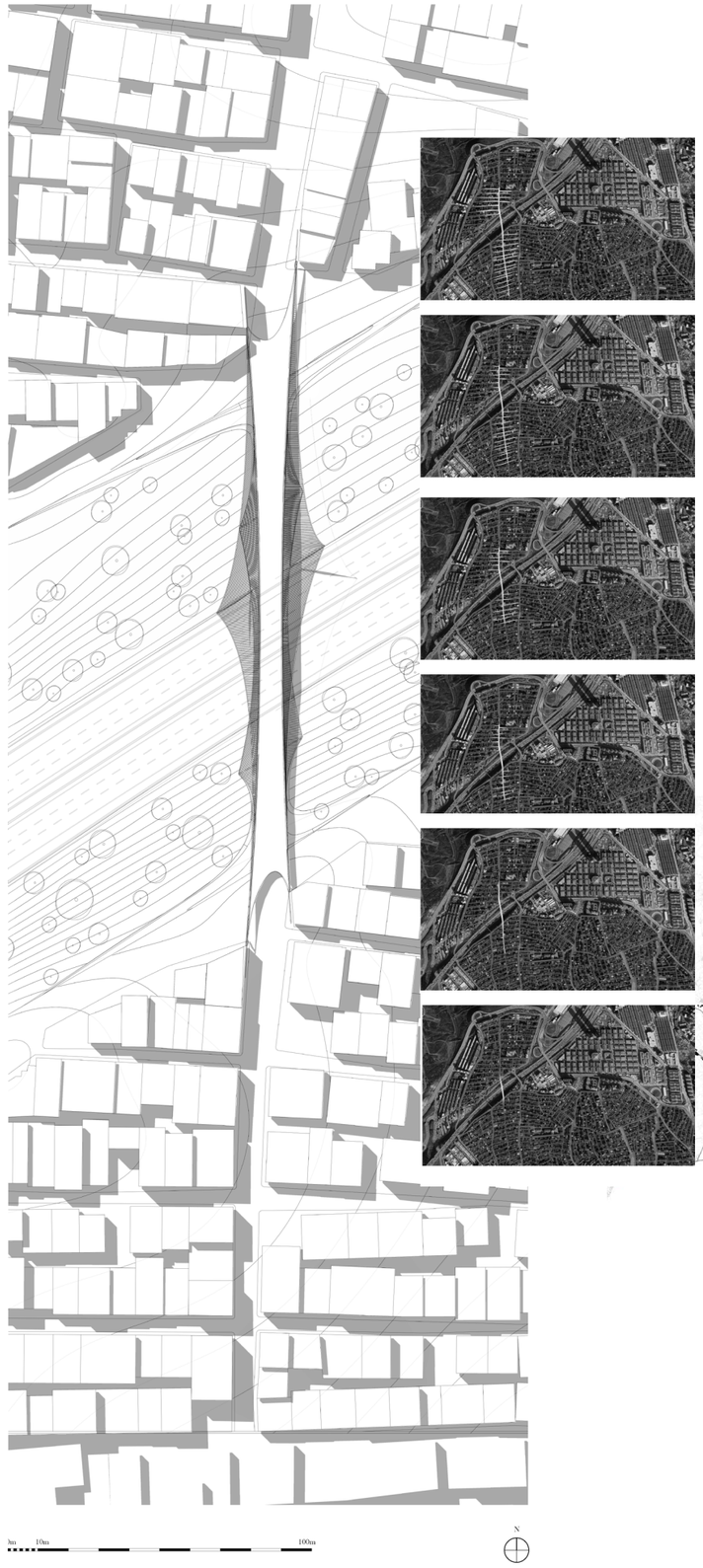


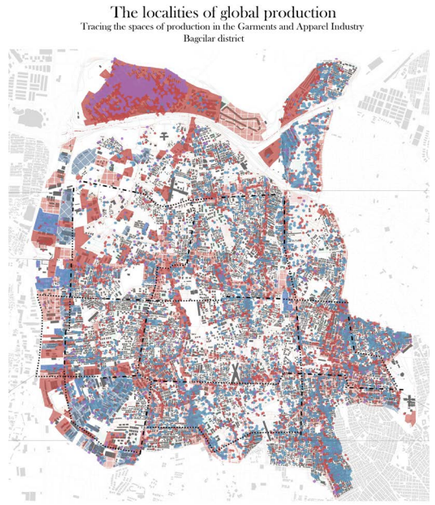
Tensile Connection

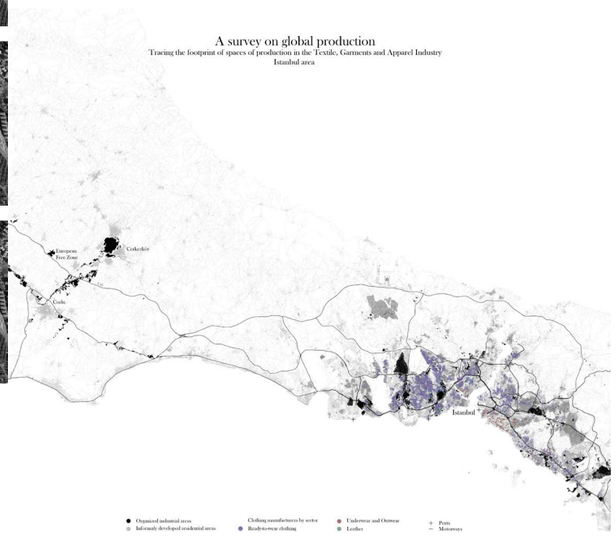


Urban Fabrication

Site Plan 1:500



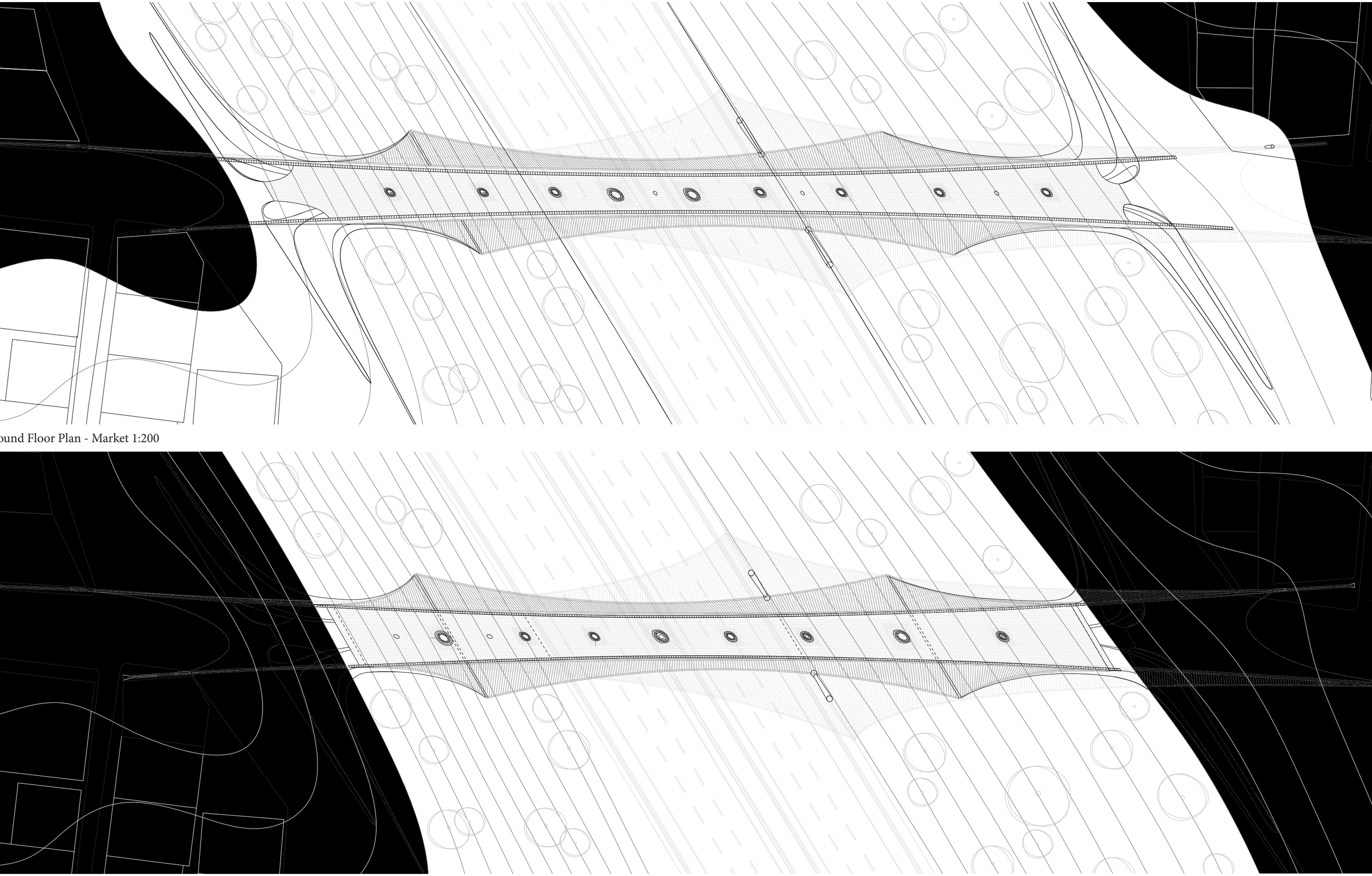




3m 10m 100m

N

Disentangled

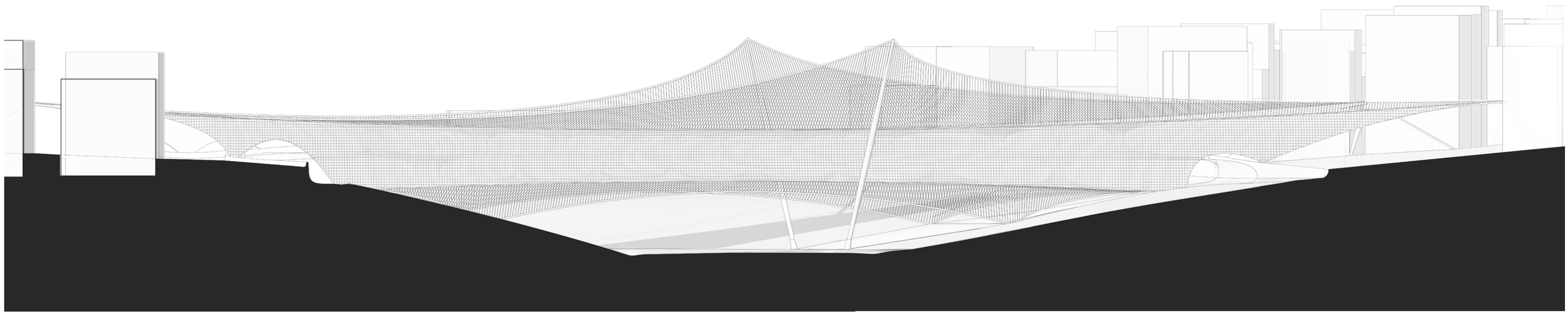


ound Floor Plan - Market 1:200

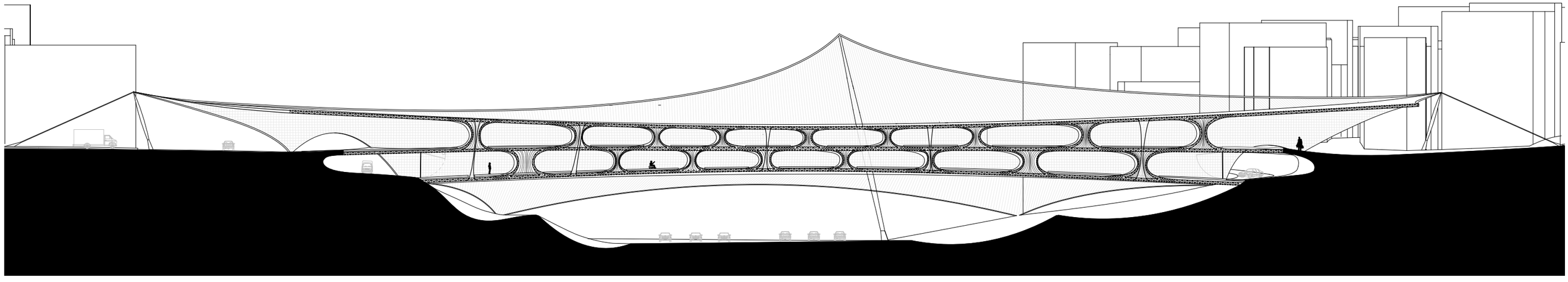
or Plan - Garment Factory 1:200

0m 10m

The Big Span

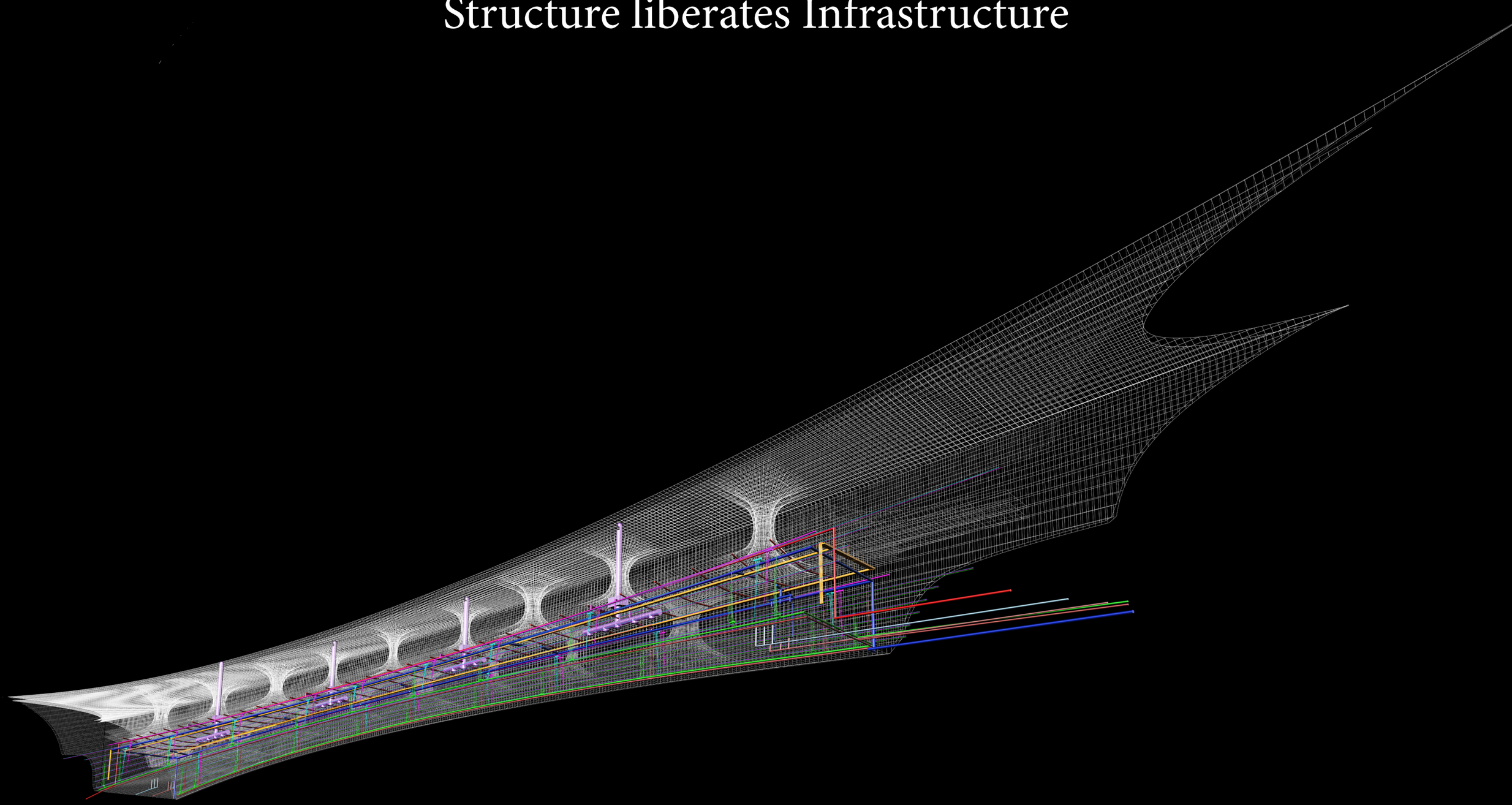


East Elevation 1:200



Longitudinal Section 1:200

Structure liberates Infrastructure



Structure

Cable net

Services

Ventilation

Electricity

Drinkwater

Rainwater

Wastewater

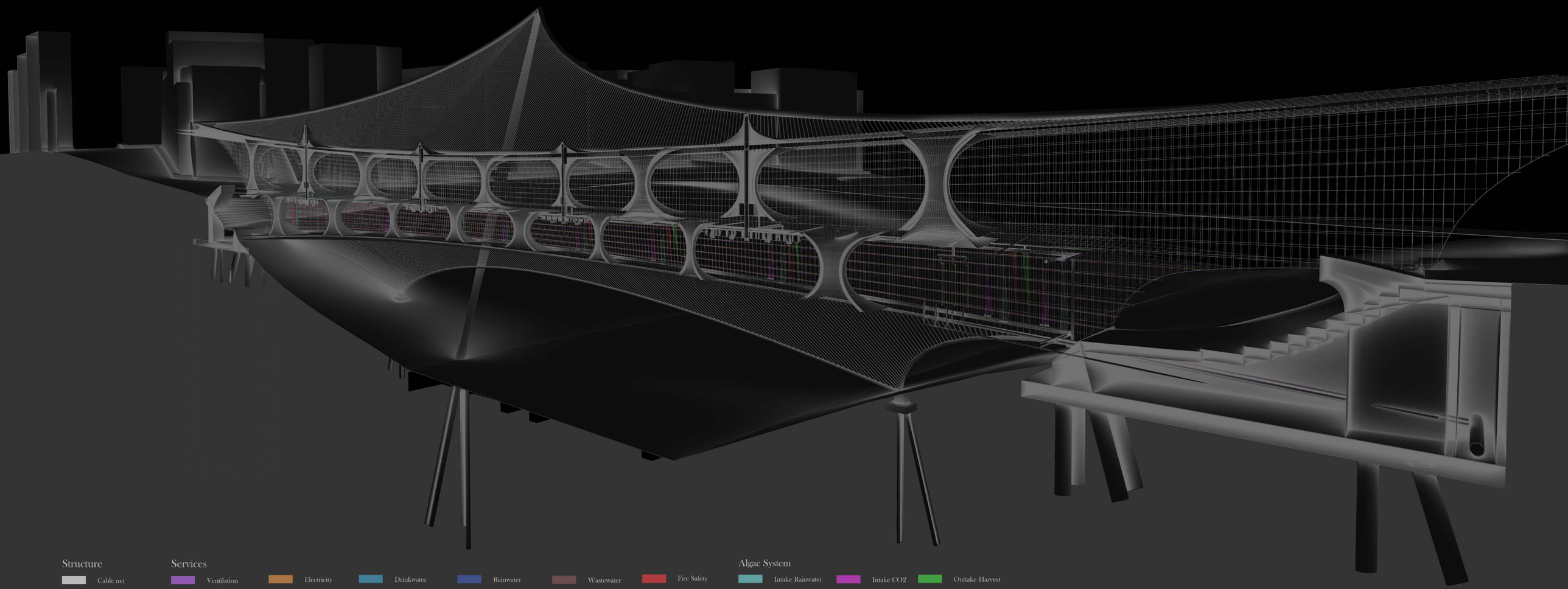
Fire Safety

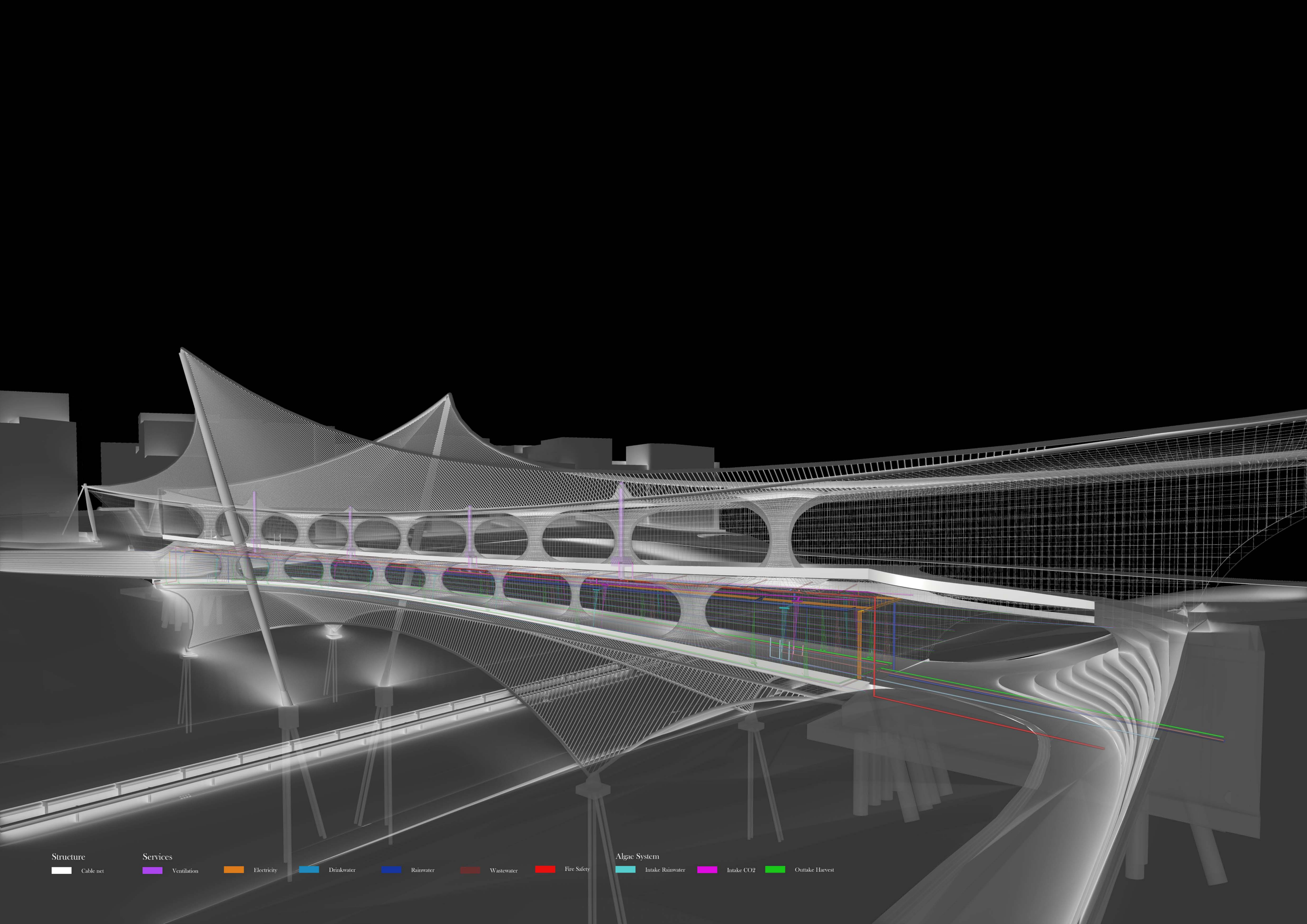
Algae System

Intake Rainwater

Intake CO2

Outtake Harvest


Structure
Cable net
Services
Ventilation
Electricity
Drinkwater
Rainwater
Wastewater
Fire Safety
Algae System
Intake Rainwater
Intake CO2
Outtake Harvest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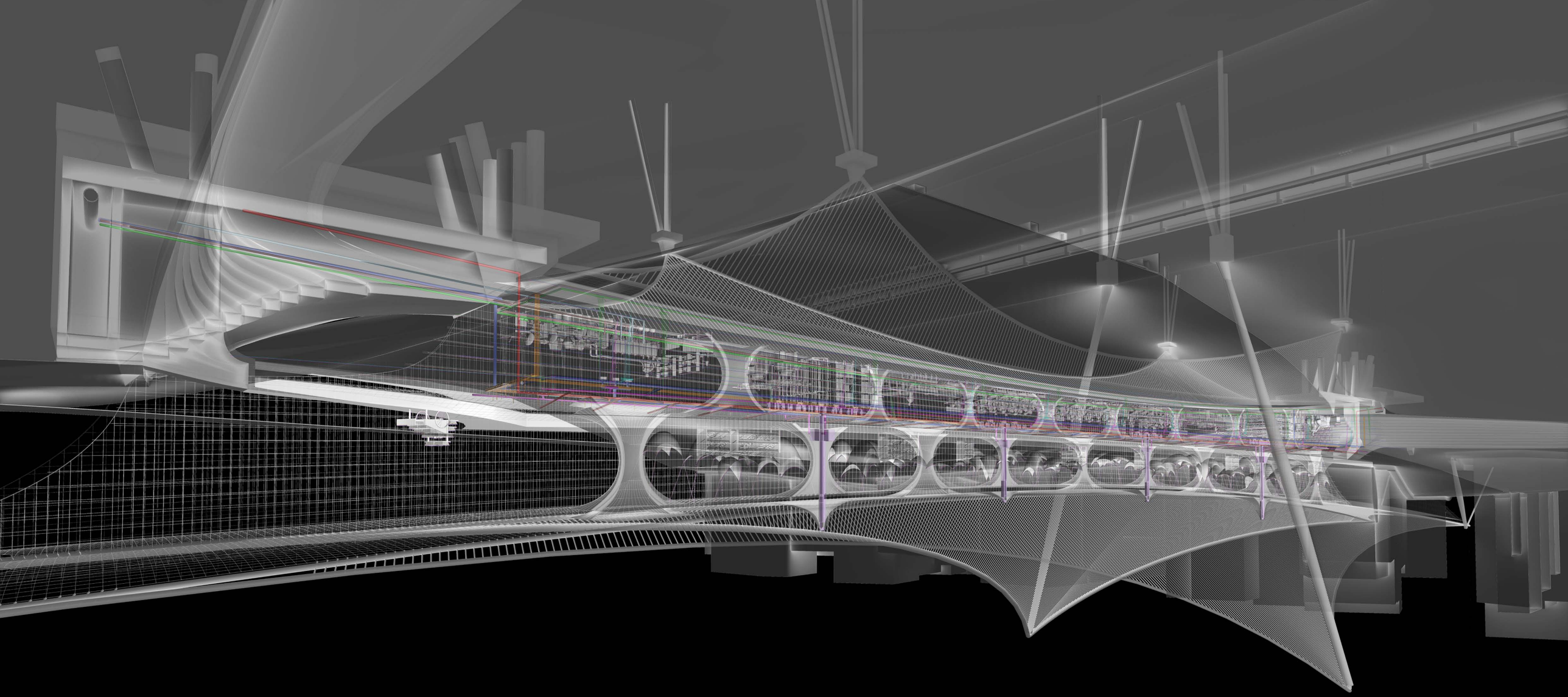
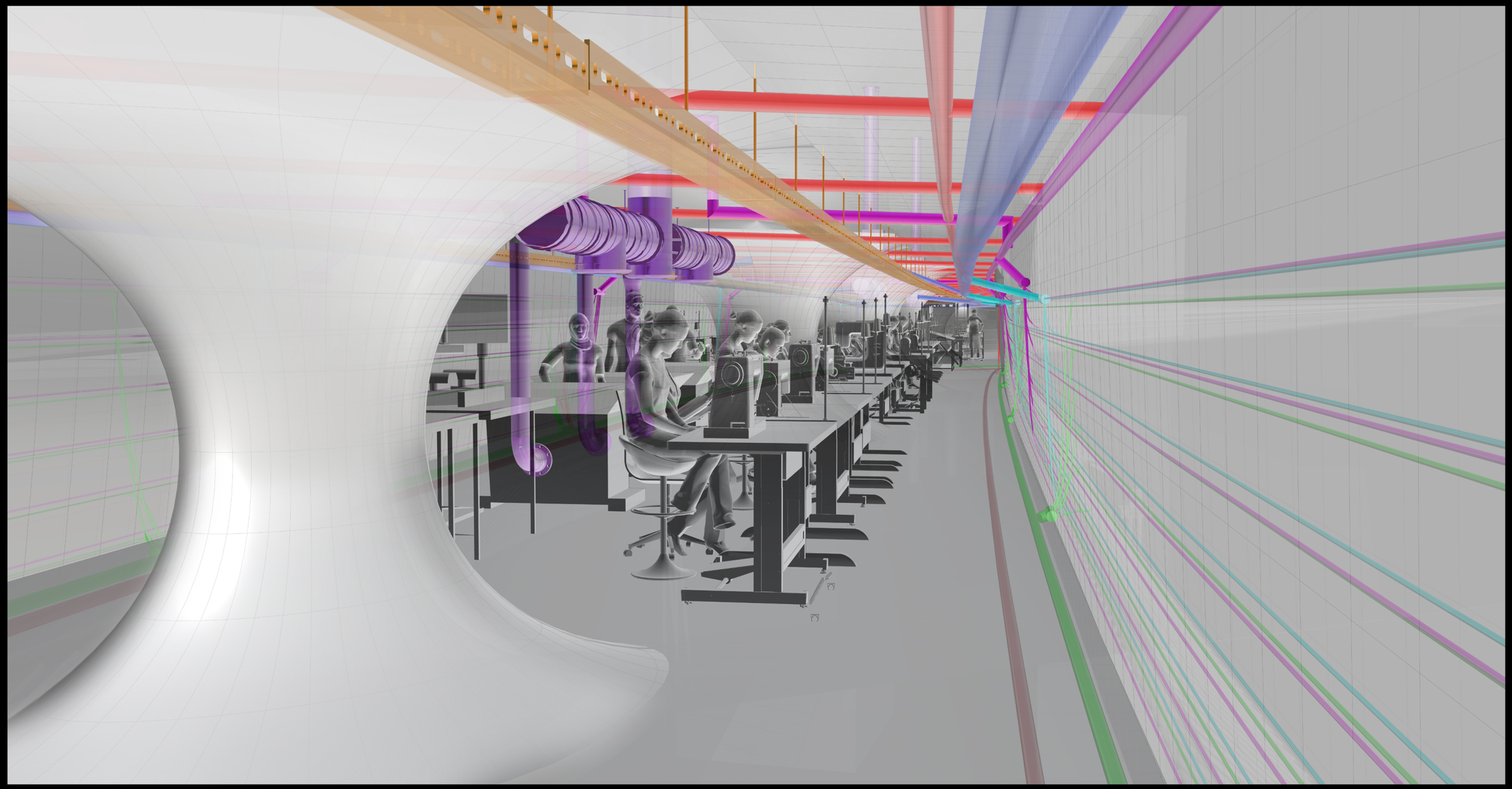




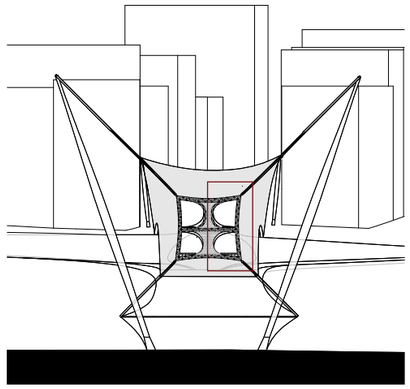
Services

Ventilation
Electricity
Drinkwater
Rainwater
Wastewater
Fire Safety

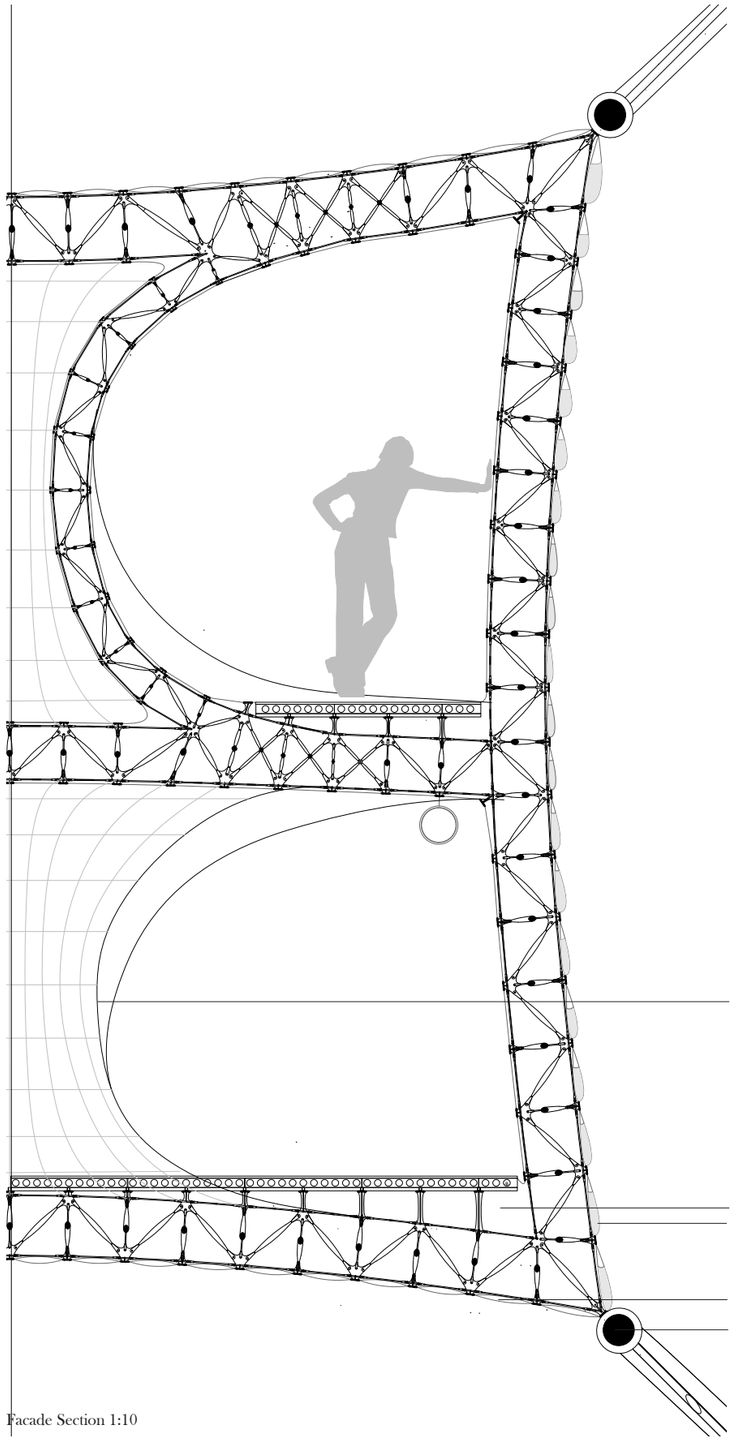
Algae System

Intake Rainwater
Intake CO2
Outtake Harvest

The Inhabitable Lightness of Tension



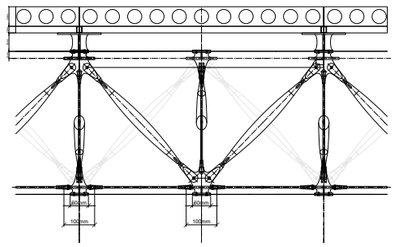
Cross Section 1:200



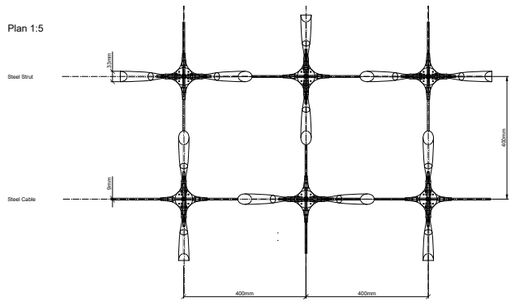
Facade Section 1:10

Section 1:5

Hollowcore concrete plates
False floor square profiles steel
False floor pedestals steel
PVC coated Polyester 5mm
Support structure
Steel joint for cable rod tension system



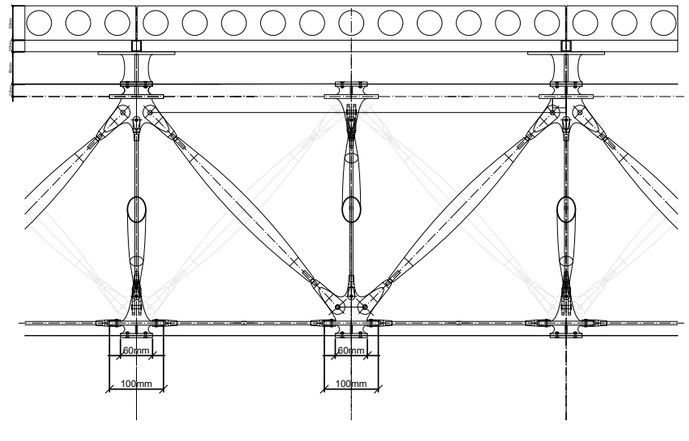
Plan 1:5



Detailing Scheme - Exemplary Configuration 1:5

Section 1:5

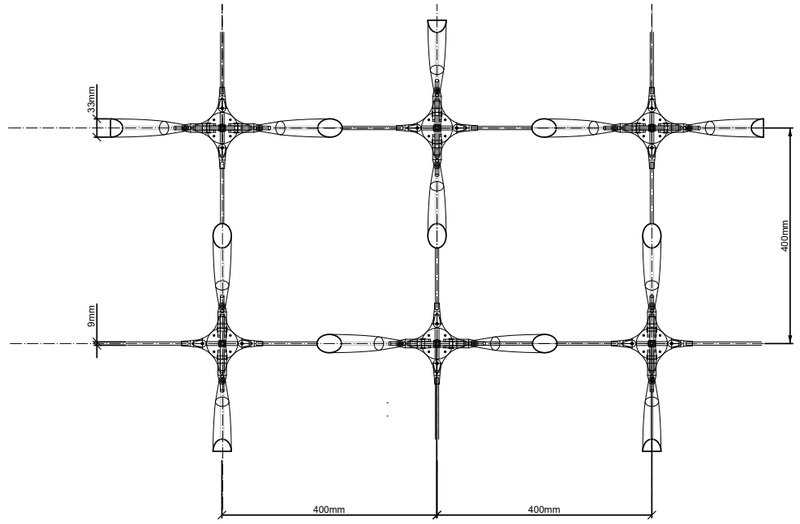
Hollowcore concrete plates
False floor square profiles steel
False floor pedestals steel
PVC coated Polyester 5mm
Support structure
Steel joint for cable rod tension system



Plan 1:5

Steel Strut

Steel Cable



Detailing Scheme - Exemplary Configuration 1:5

Tensile columns

