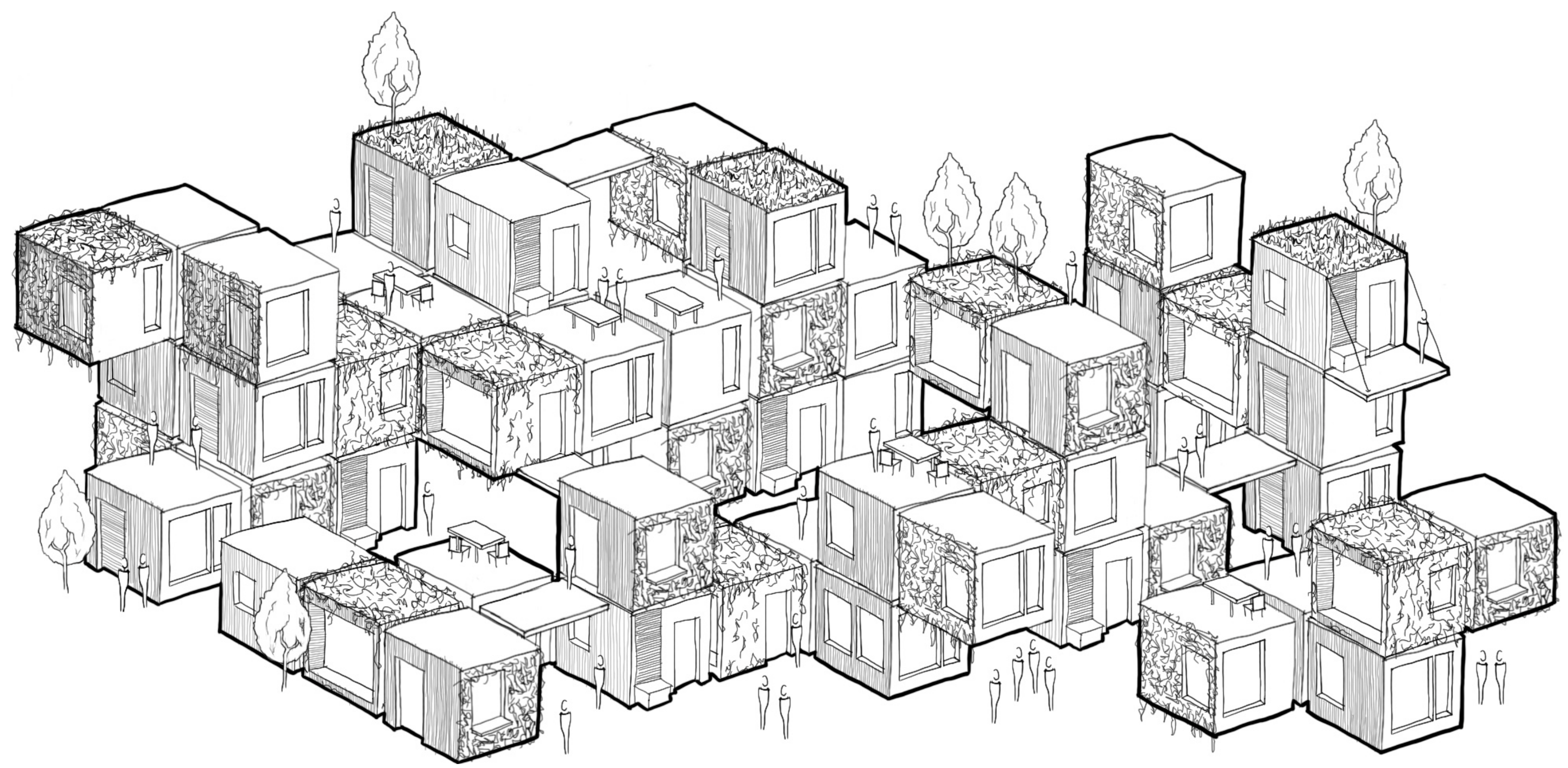
Benjamin Bomben | 5511585

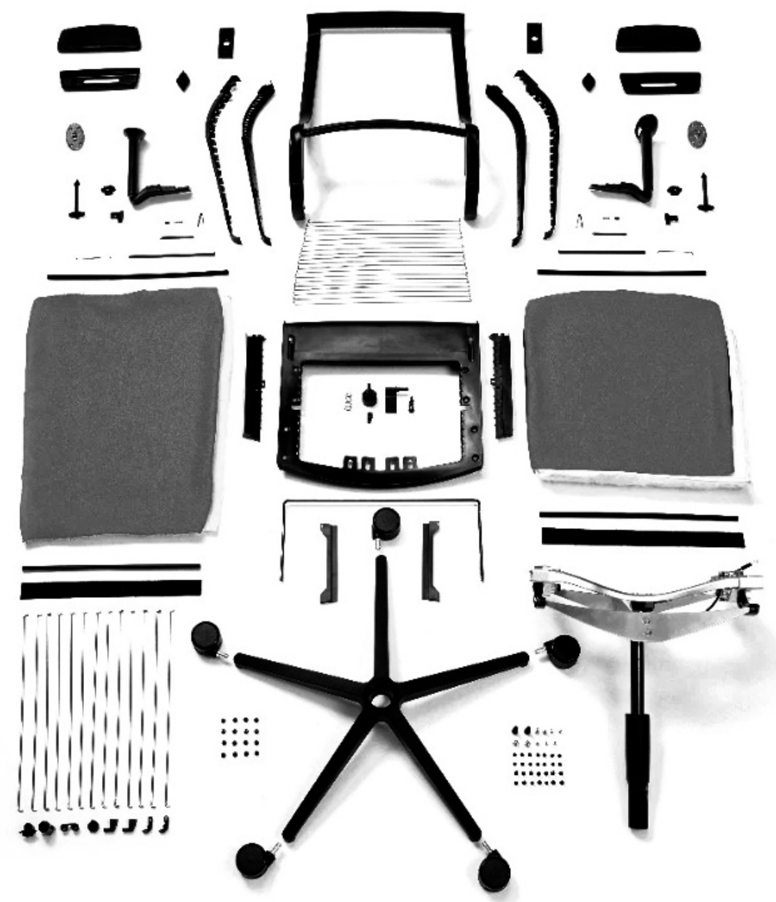
HYBRID_ADAPTIBILITY

Transforming single use parking lots into hybrid buildings

CONTENTS



DESIGN TO BE RECONFIGURED

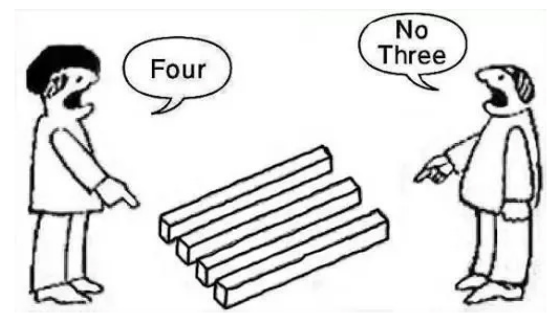


KIT OF PARTS ASSEMBLY

Take inspiration from other industries for their ease of assembly, repairability and disassembly by designing a kit of parts for the built environment.

GENERAL CONTEXT

THE CONSTRUCTION INDUSTRY



STUBBORN

[adjective]

A determination not to change one's attitude or position on something, especially in spite of good arguments or reasons to do so.

INCREASED DEMAND

LACK OF INNOVATION

DEPENDENCY ON RENNOVATIONS
AND DEMOLITIONS

INCREASING DEMAND

Over the next 10 years, the demand for global construction is expected to increase by 70%"(PWC)

INCREASING DEMAND

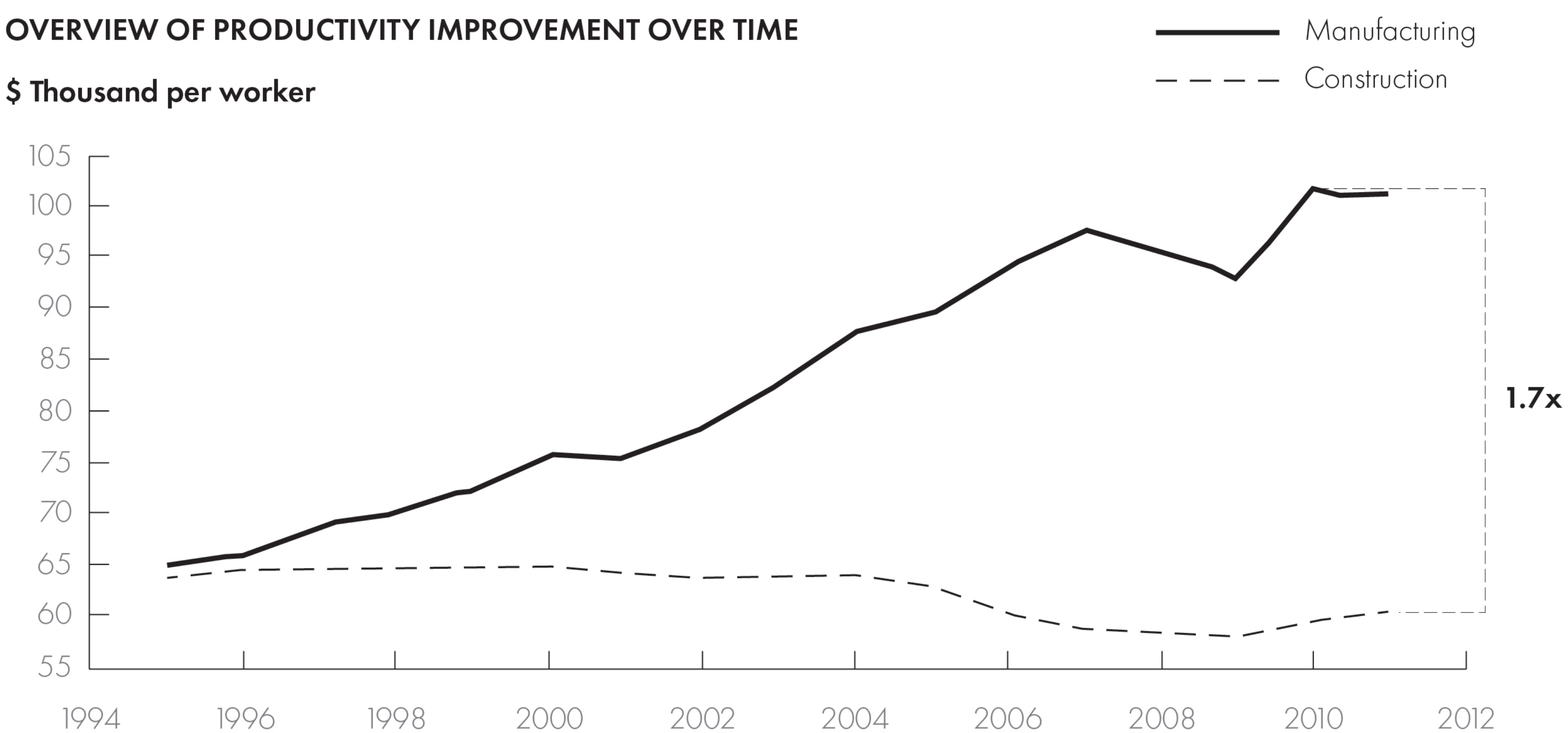
Demand for residential construction services has grown at a rate of 6% every year from 2020 to 2030. Due to increased need for affordable housing, and changing lifestyles resulting in more people living alone or with fewer family members than ever before.

LACK OF INNOVATION

High levels of risk aversion are due to the fact that the industry's overall profitability is about 5 percent, and lower in certain parts of the value chain. Moreover, construction projects typically take 20 percent longer to finish than scheduled and can be up to 80 percent over budget

OVERVIEW OF PRODUCTIVITY IMPROVEMENT OVER TIME

$ Thousand per worker



LACK OF INNOVATION

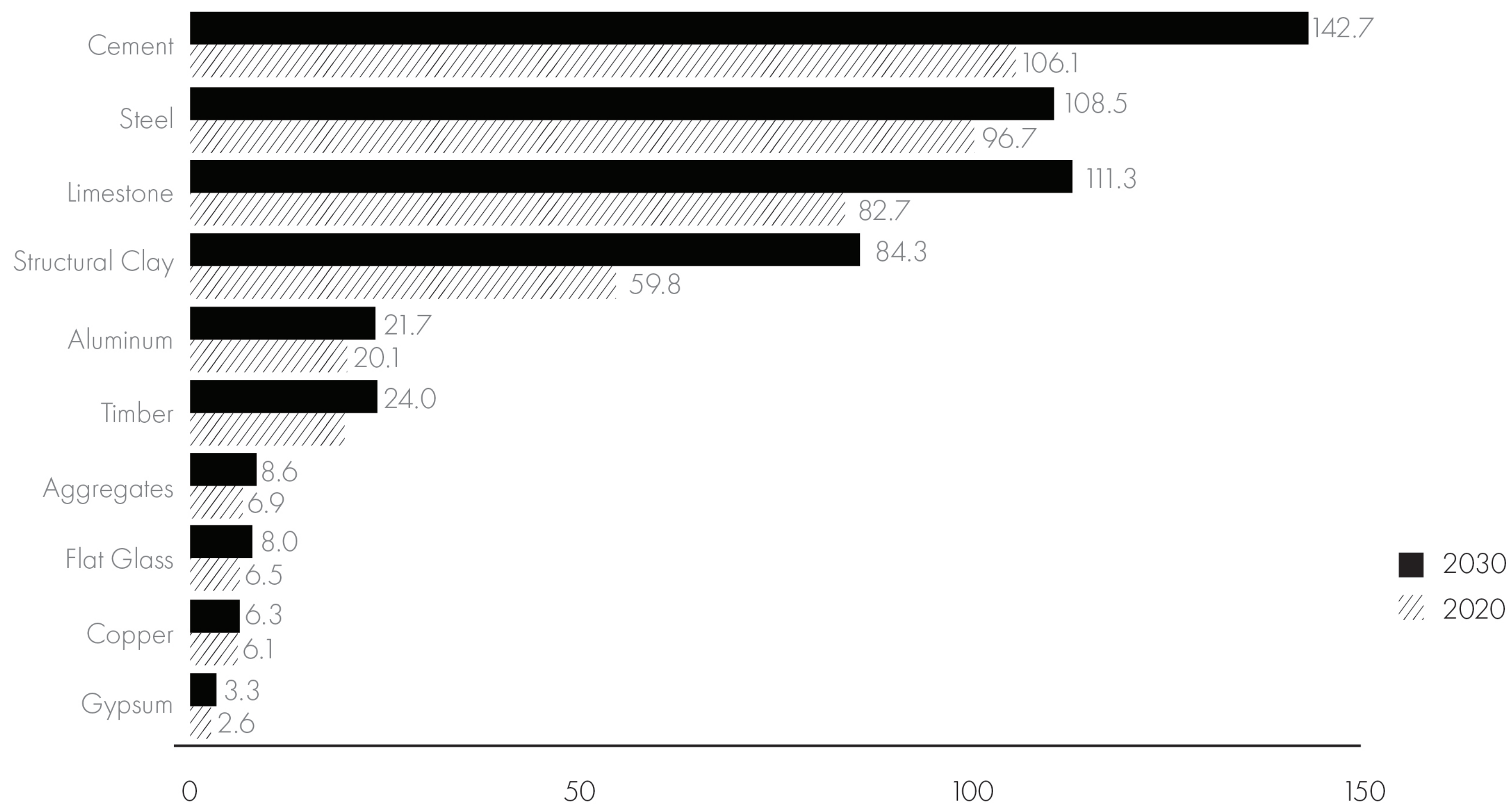
Annual productivity growth over the past 20 years was only a third of total economy averages. Risk aversion and fragmentation as well as difficulties in attracting digital talent slow down innovation. Digitalization is lower than in nearly any other industry. (Mckinsey)

DEPENDENCY ON RENOVATION/ DEMOLITION

According to the US EPA (Environmental Protection Agency) 92% of all construction related waste produced annually in the US is the result of renovations & demolitions, with only 8% produced from new construction

EU28 CONSTRUCTION MATERIALS GHG EMISSIONS 2020 & 2030

Construction Materials Consumed in EU28
Mn Tonnes



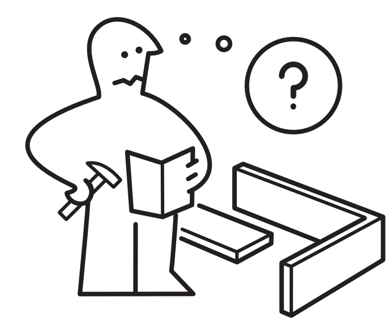
Source: Pinsent Masons, Strabag, European International Contractors and Oxford Economics

DEPENDENCY ON RENOVATION/ DEMOLITION

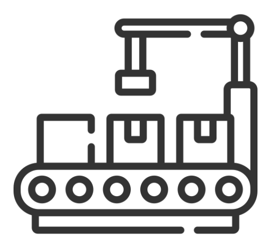
Concrete has one of the longest useful lives among building materials, but concrete structures account for the most demolition projects by far. (Tampere University of Technology)

GENERAL CONTEXT
PROBLEM STATEMENT

The built environment is unable to easily adapt to future social, environmental and economic contexts. Producing a significant amount of waste in order to try and upgrade the past, rather than trying to design for the future. With the world changing more than ever, there is a major problem with how we generate our built environment.



WHAT TO DO ABOUT IT?

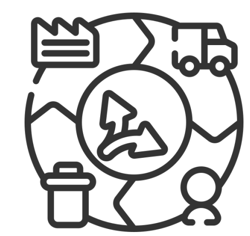


Pre-Fabrication

Generating building compontents more sustainably while mitigating on-site construction time

Material

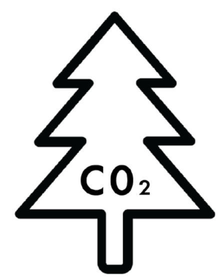
In a year 500 million cubic meters is harvested from European Forests



Circularity

Ability to reconfigure buildings, transforming them into material banks for future use

WHY TIMBER?



CARBON NEGATIVE

± 95% of a tree's material comes from the air. Resulting in it being a carbon negative material

WEIGHT

Timber weighs 20% of Brick and 25% of Concrete

CIRCULARITY

Timber is considered a high quality and valuable product that can be repeatedly processed into lower quality products.

SPRUCE

WORKABILITY/ AVAILABILITY

Due to its good workability and high availability, it is the most widely used construction timber in Europe.

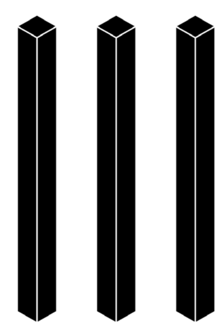
LOAD-BEARING CAPACITY

Due to its low weight, its elasticity, its soft structure and its load-bearing capacity, spruce wood can be processed very well both by hand and by machine.

1D/2D/3D SYSTEMS

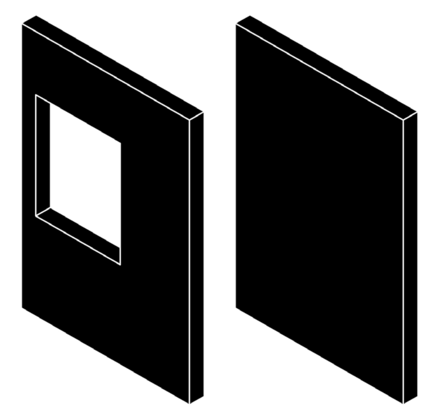
Spruce is light and elastic at the same time. Spruce can be glued very well and holds screws and nails very well. Allowing for it to be used for all 1D, 2D and 3D systems.

PRE-FAB. SYSTEMS



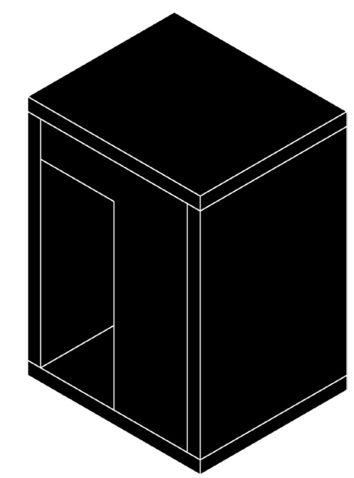
1D SYSTEMS

Linear timber members such as columns and beams. Typically made of Glue laminated timber



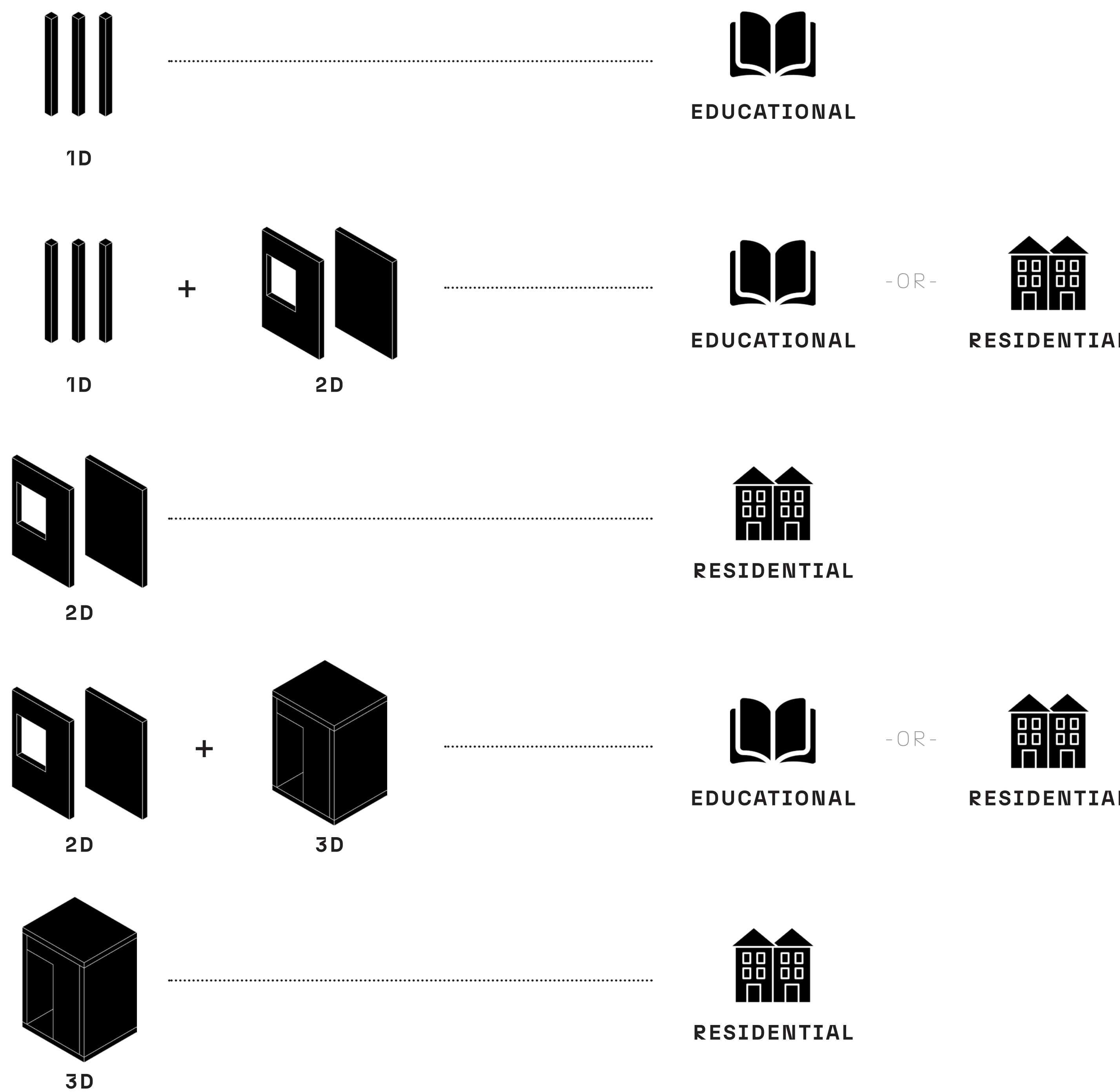
2D SYSTEMS

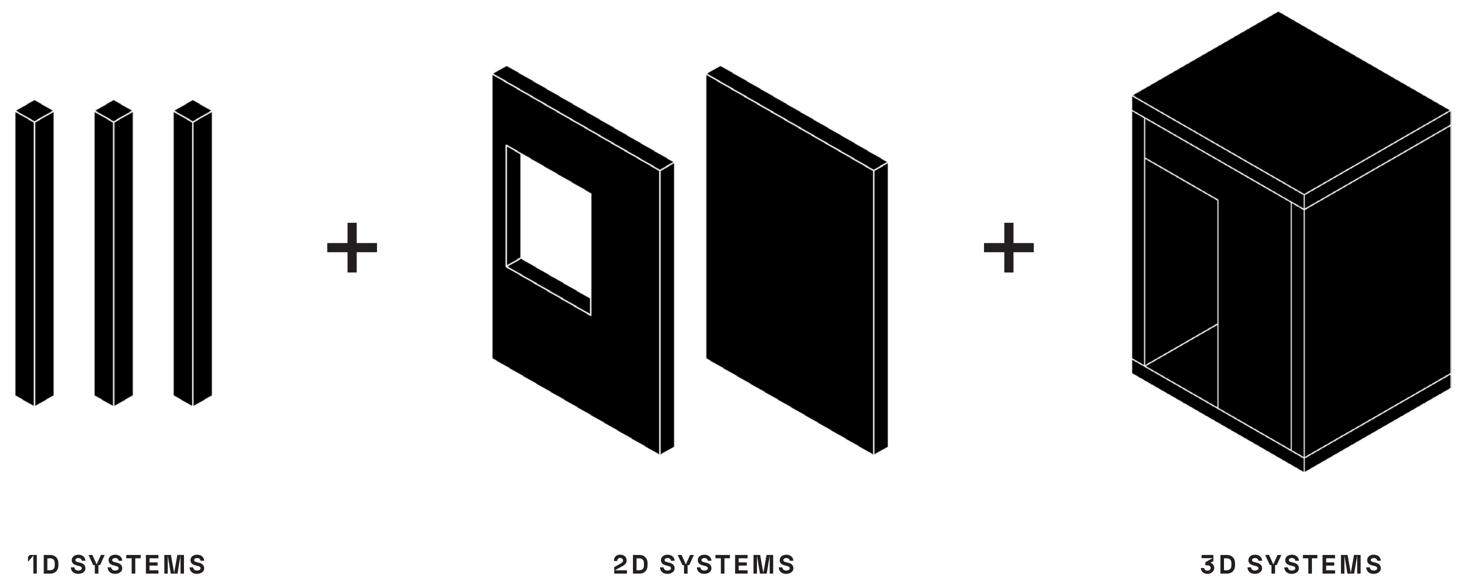
Typically cross laminated timber (CLT) floor and wall panels.



3D SYSTEMS

A prefabricated assembly of 2D CLT members to create a module to be brought and place at site.


1D
EDUCATIONAL
1D
+
2D
EDUCATIONAL
-OR-
RESIDENTIAL
2D
RESIDENTIAL
2D
+
3D
EDUCATIONAL
-OR-
RESIDENTIAL
3D
RESIDENTIAL



1D SYSTEMS
2D SYSTEMS
3D SYSTEMS

CAMPUS CONTEXT

TU DELFT CAMPUS

HOUSING ON CAMPUS

There are **2144** Housing Units on Campus while there are more than **25,000** students currently attending TU Delft.

REALISED STUDENT ACCOMODATION THROUGHOUT DELFT FROM 2017 - NOW

Location	Units	Year of completion	Developer
Prof. Schermerhornstraat	332	2017	Duwo
Kanaalweg 3a	47	2017	Duwo
Deltares/Stieltjesweg	665	2017	Duwo
Prof. Schoemakerstraat 97	289	2017	Camelot
Van Bleyswijkstraat	25	2017	Villex
A. Veerstraat 1-15	118	2017	Xior
Abtswoude (tijdelijk)	110	2018	SHS
Phoenixstraat	100	2018	Xior
The Student Hotel	240	2020	The Student Hotel
Campus 015 Pauwmolen	143	2021	Camelot
Balthasar van der Polweg	136	2023	Duwo
Totaal	2205		

Student seeking accomodation expected to increase to **23,000**

FREE ZONES

FREE ZONES

FREE ZONES

There are only 6 isolated 'free zones' on Campus to promote the living-lab ambition

CAMPUS PARKING LOTS

SELECTED PARKING LOTS

Parking Lot Areas

1: 6410m²

2: 3810m²

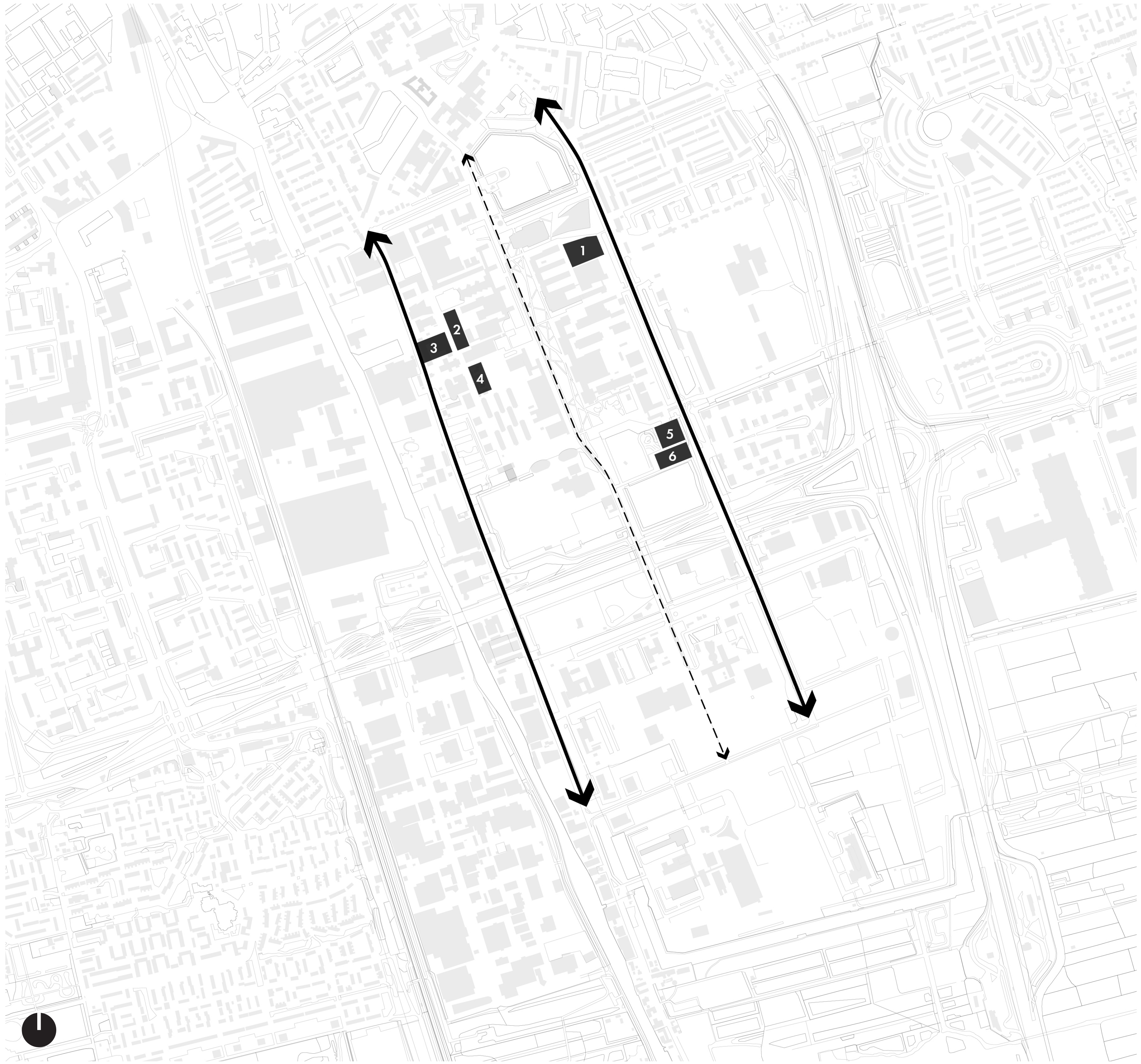
3: 4013m²

4: 3451m²

5: 3865m²

6: 3324m²

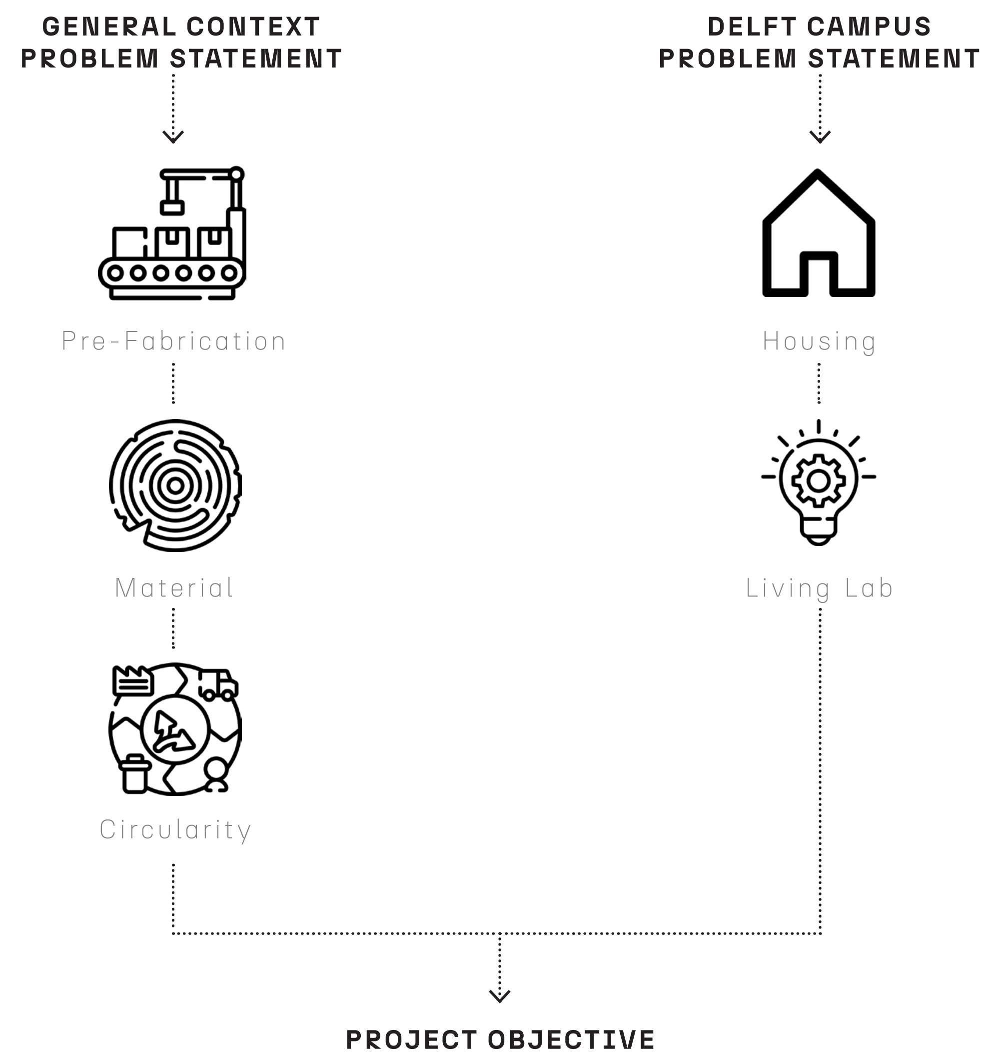
Total Unoptimized Area: 28738m²

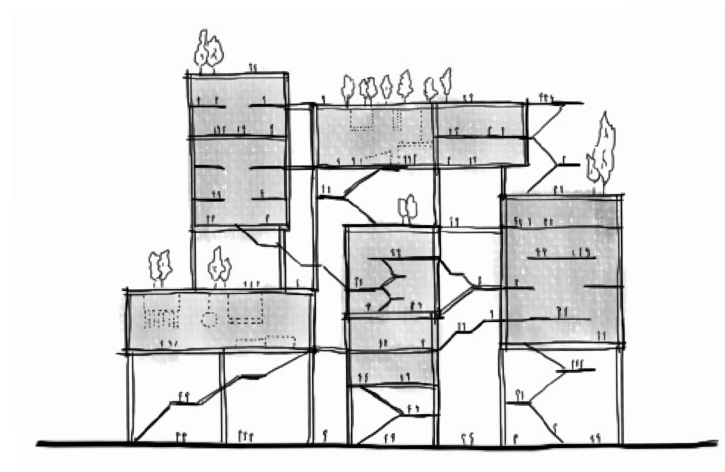


POTENTIAL CAMPUS CIRCULATION

DELFT CAMPUS
PROBLEM STATEMENT

There is a lack of high density, adaptable programming on Delft Campus to facilitate a living-lab for experimentation, collaberation and innovation. With the number of students and faculty increasing, there is currently not enough mixed-use accomodation provided on campus.


GENERAL CONTEXT
PROBLEM STATEMENT
DELFT CAMPUS
PROBLEM STATEMENT
Pre-Fabrication
Housing
Material
Living Lab
Circularity
PROJECT OBJECTIVE

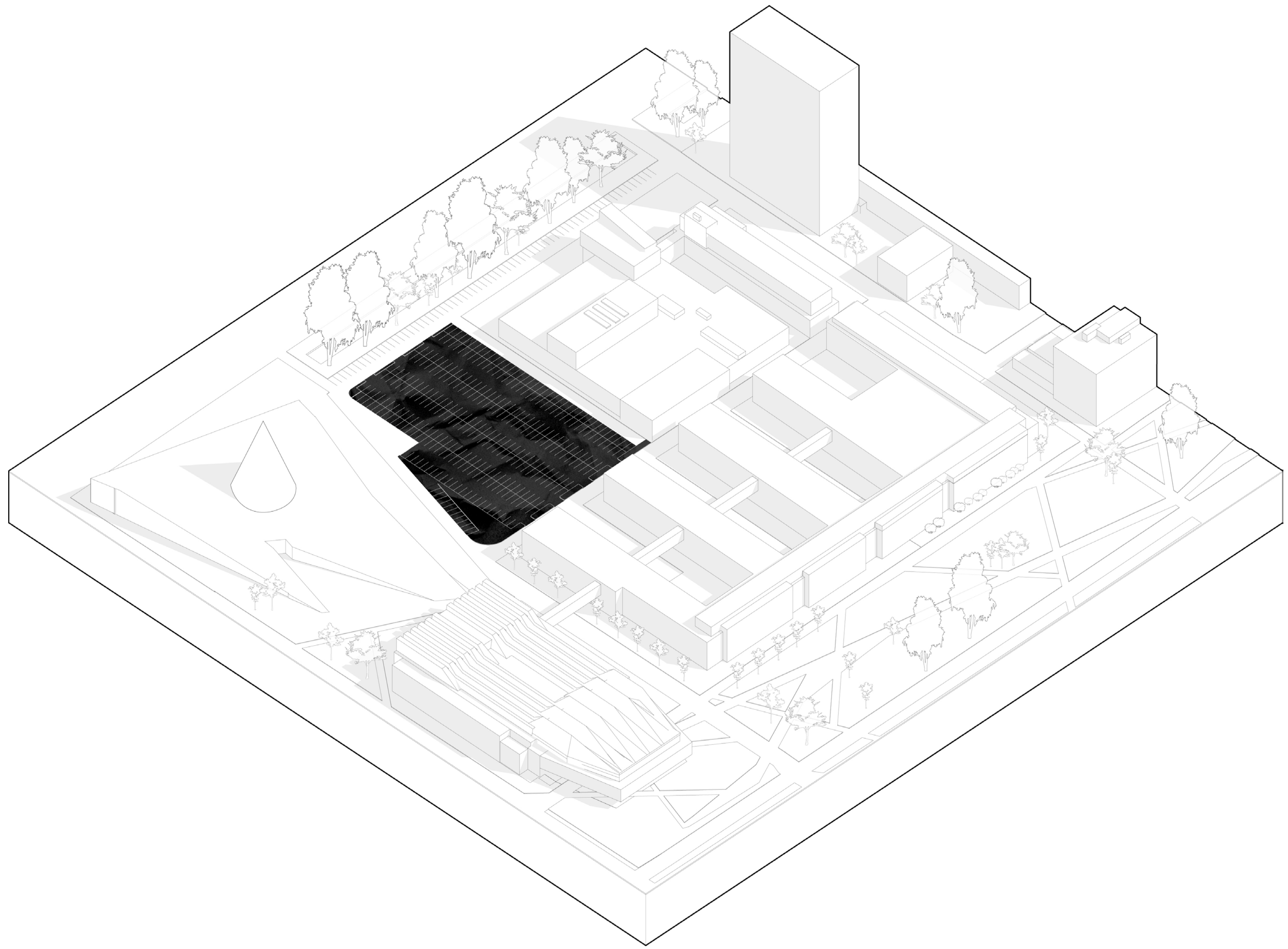


PROJECT OBJECTIVE

Transform the underused locations of existing parking lots into an active hybrid environment by integrating temporary high density residential and educational uses. Exceeding TU Delft's need to accommodate 23,000 students by 2029, through an optimized pre-fabricated timber kit of parts configuration.

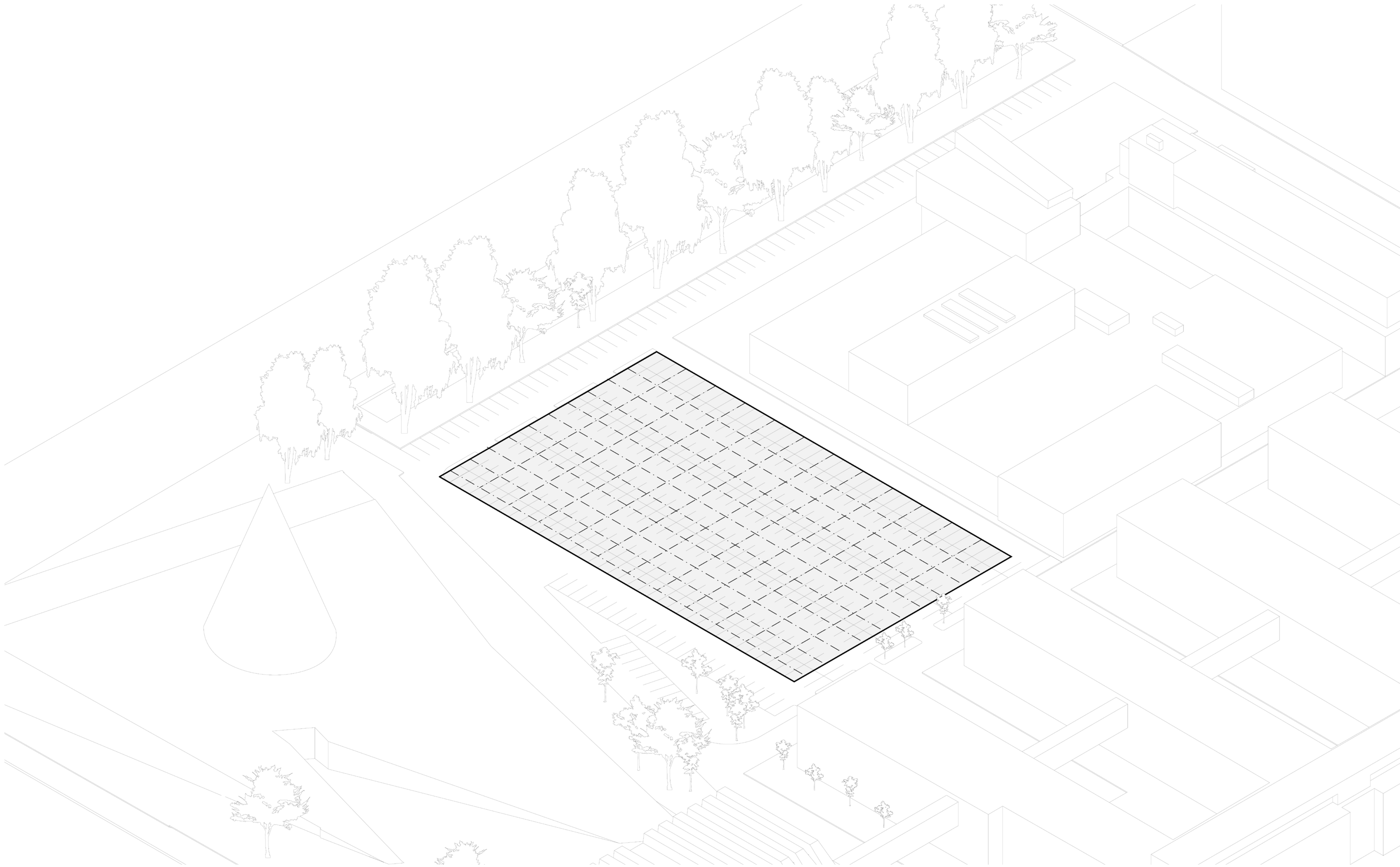
EXPERIMENTS & OUTCOMES

PARKING LOTS



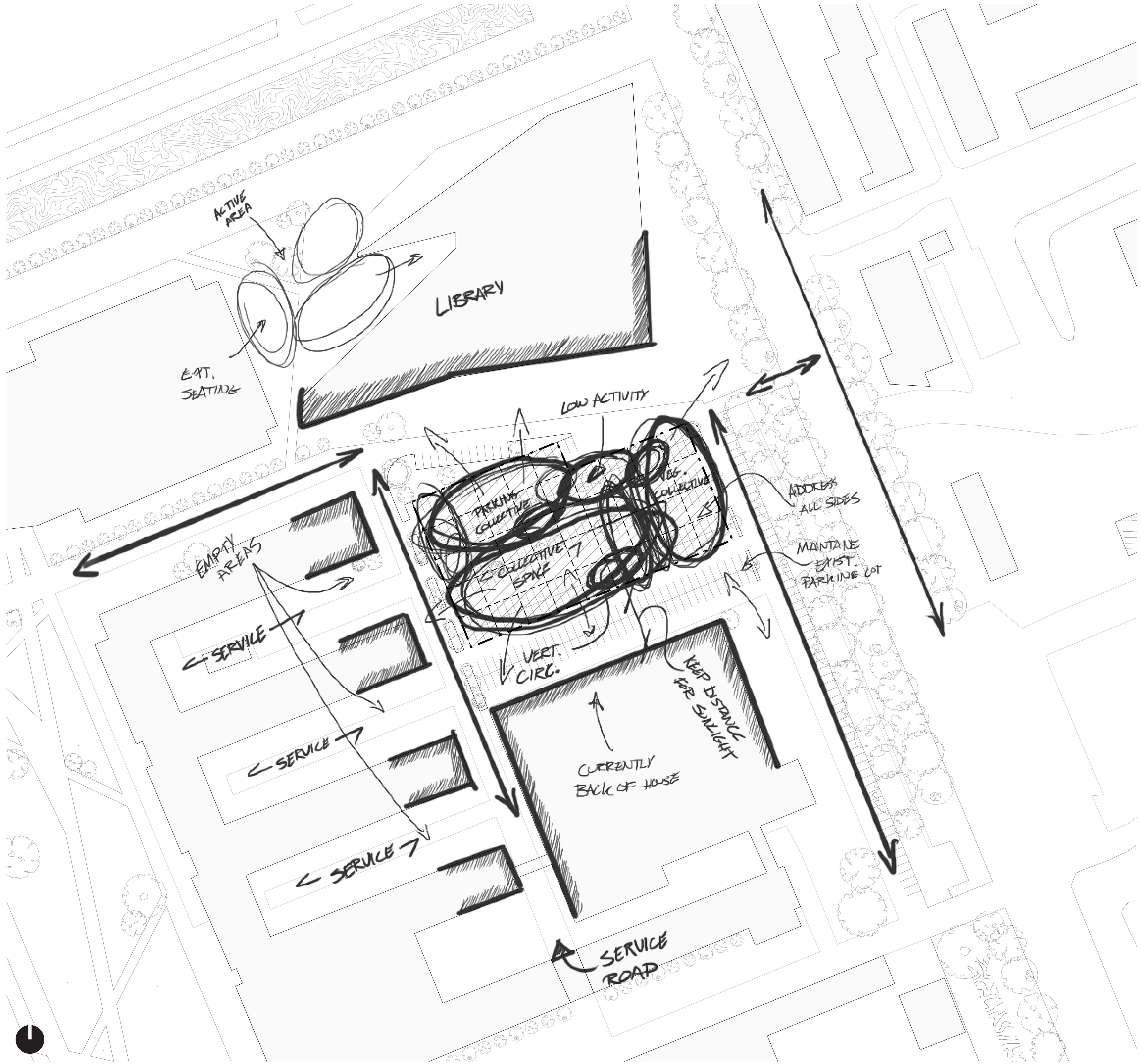
SELECTED PARKING LOT

PARKING SPACE PROPORTIONS

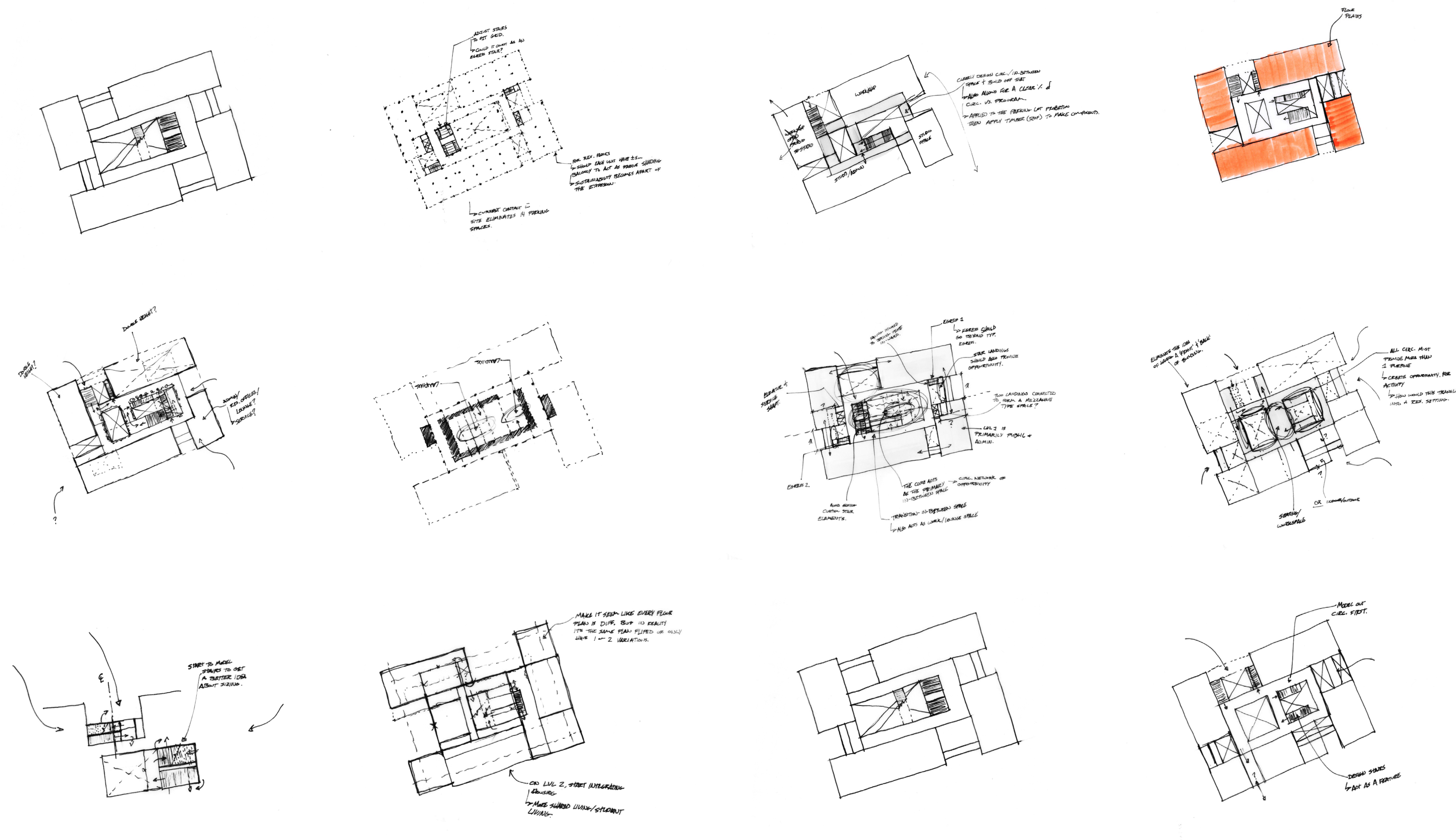


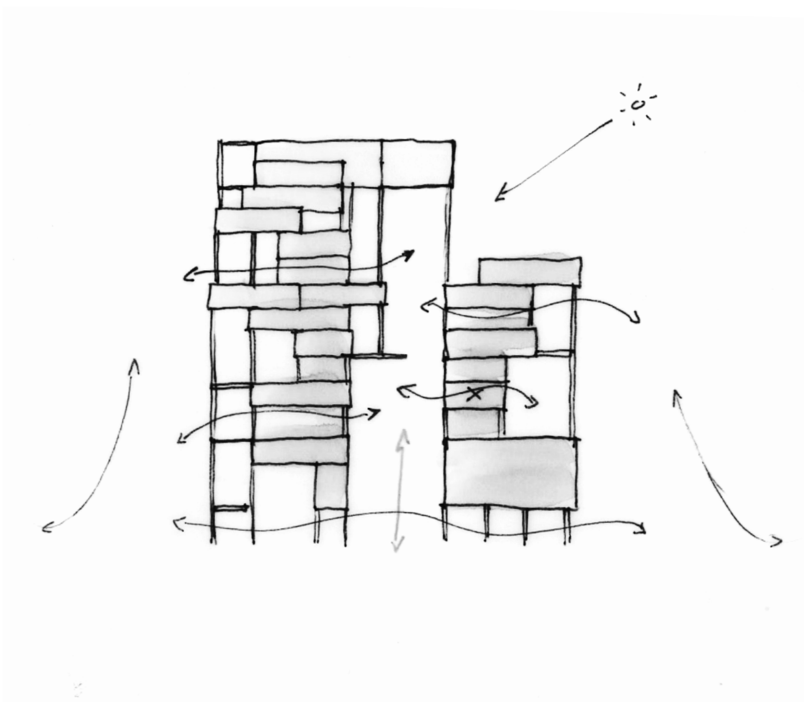
PARKING LOT GRID

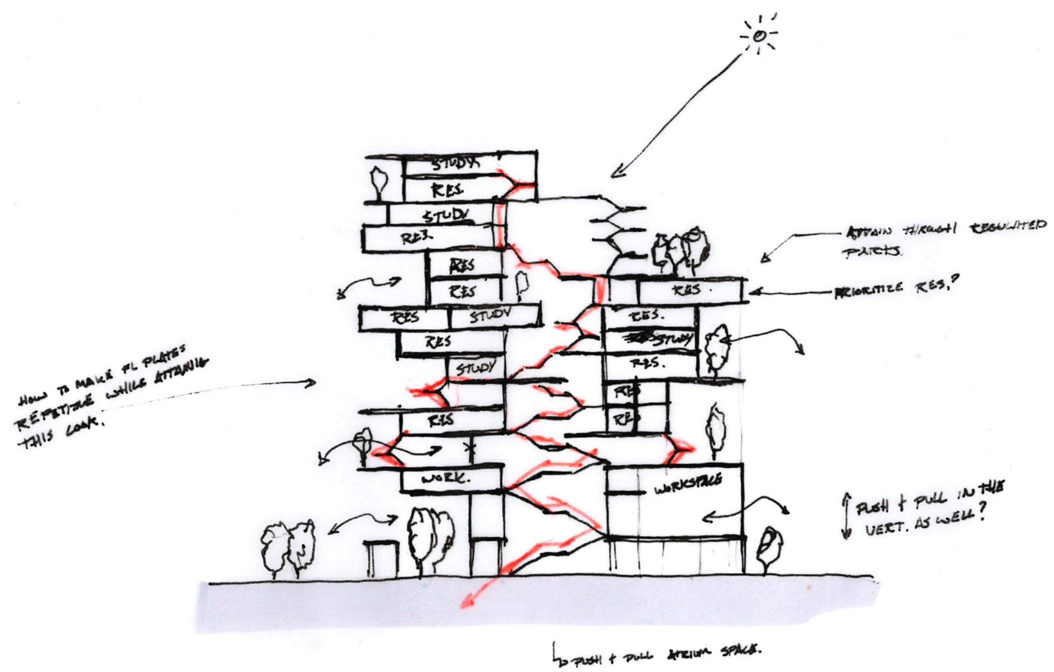
5 x 7.5 meter grid

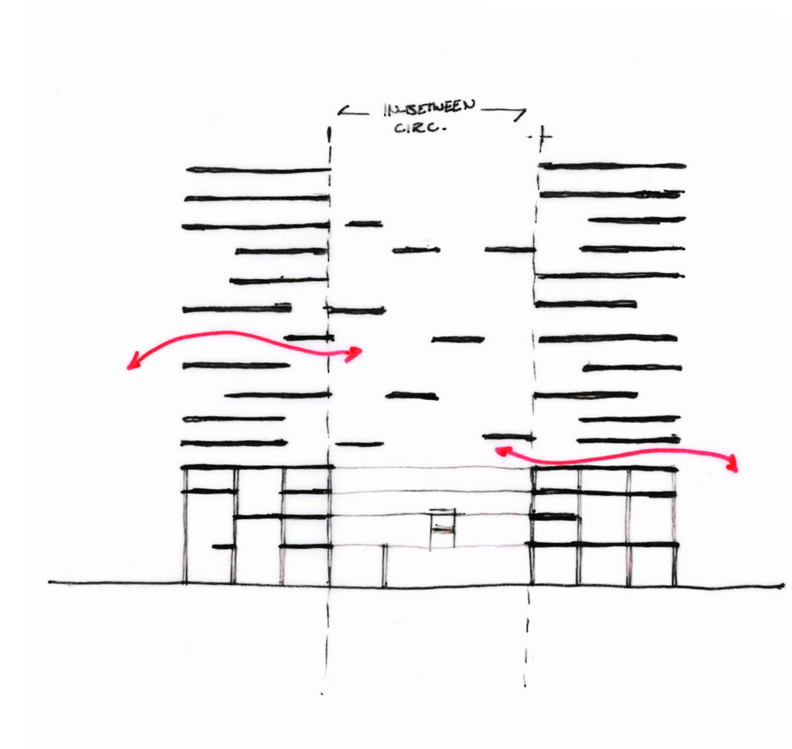

ACTIVE AREA
LIBRARY
EXT. SEATING
LOW ACTIVITY
PARKING COLLECTIVE
RES. COLLECTIVE
COLLECTIVE SPACE
ADDRESS ALL SIDES
MAINTANE EXIST. PARKING LOT
EMPTY AREAS
SERVICE
SERVICE
SERVICE
VERT. CIRC.
KEEP DISTANCE FOR SUNLIGHT
CURRENTLY BACK OF HOUSE
SERVICE ROAD

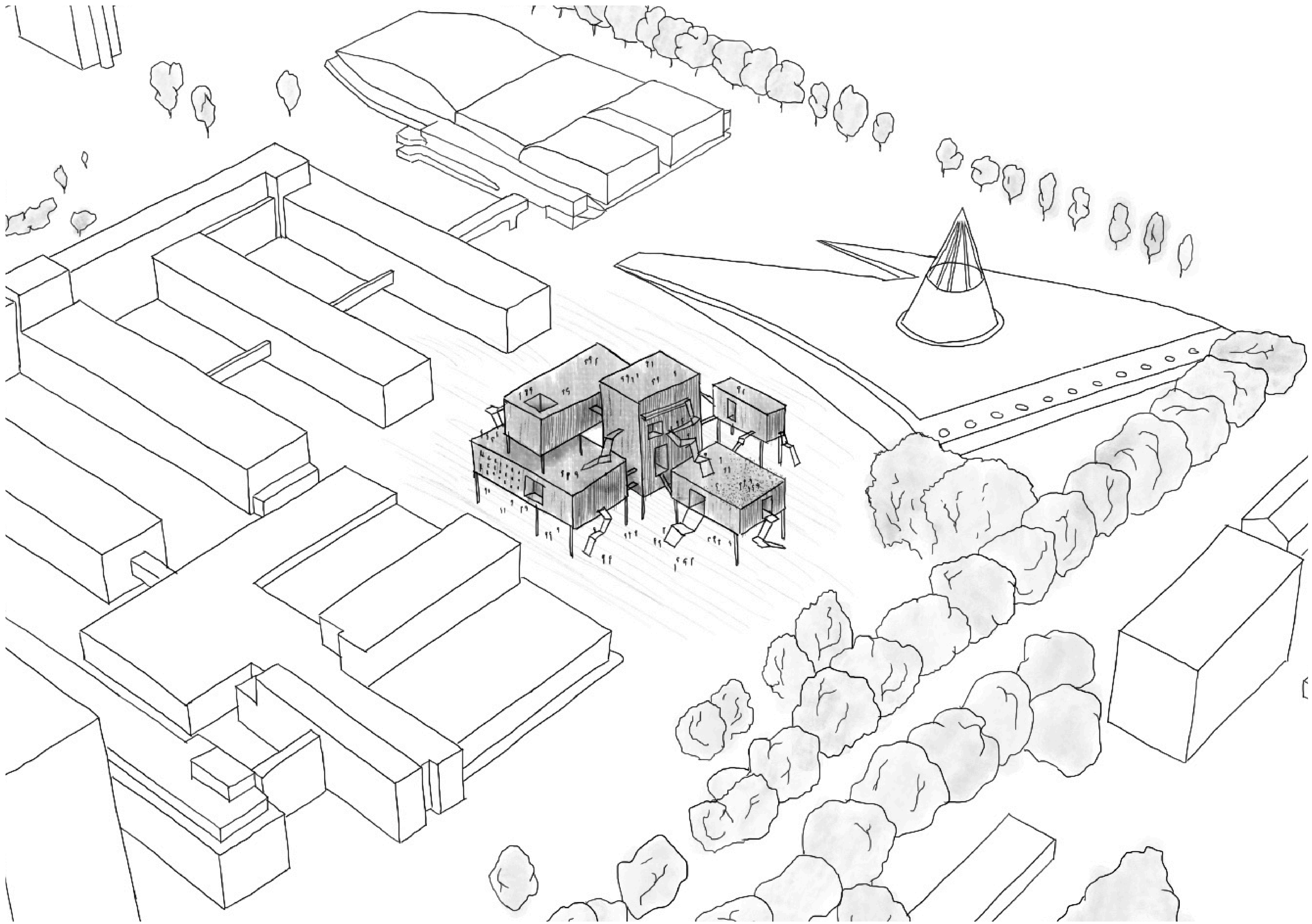
SITE PLAN

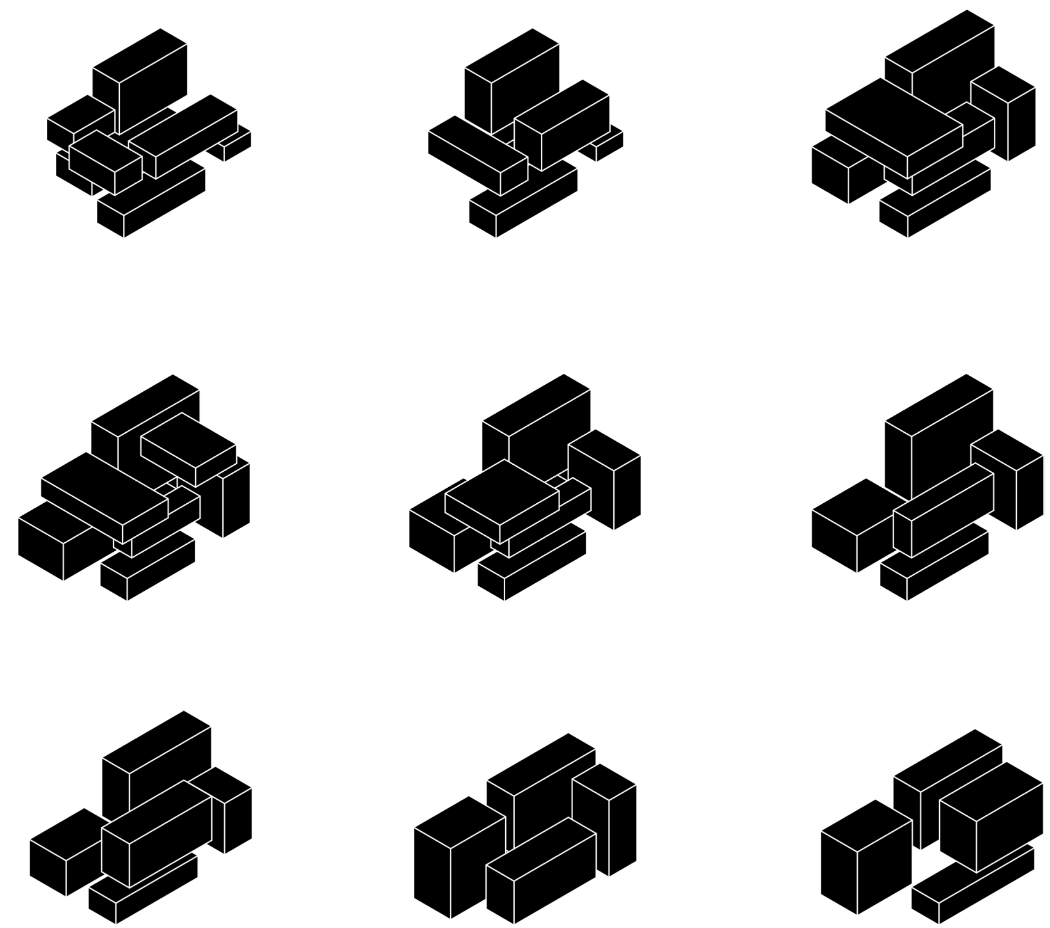




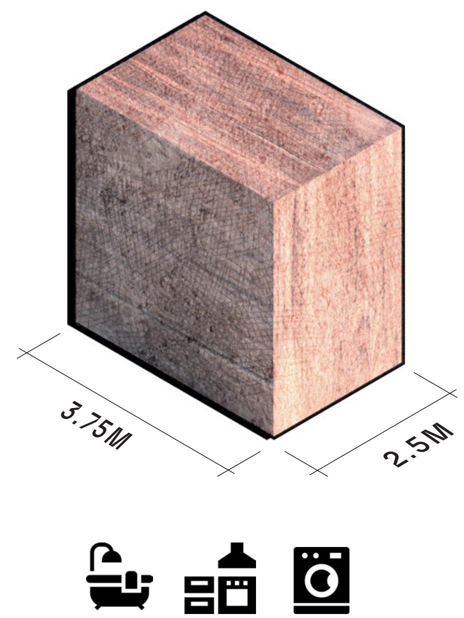

STUDY
RES.
STUDY
RES.
RES
RES
RES
STUDY
RES
STUDY
RES
WORK.
WORKSPACE
RES.
RES.
STUDY
RES.
HOW TO MAKE FL PLATES REPETITIVE WHILE ATTAINING THIS LOOK.
ATTAIN THROUGH REGULATED PARTS.
PRIORITIZE RES.?
PUSH + PULL IN THE VERT. AS WELL?
PUSH + PULL ATRIUM SPACE.


IN-BETWEEN CIRC.



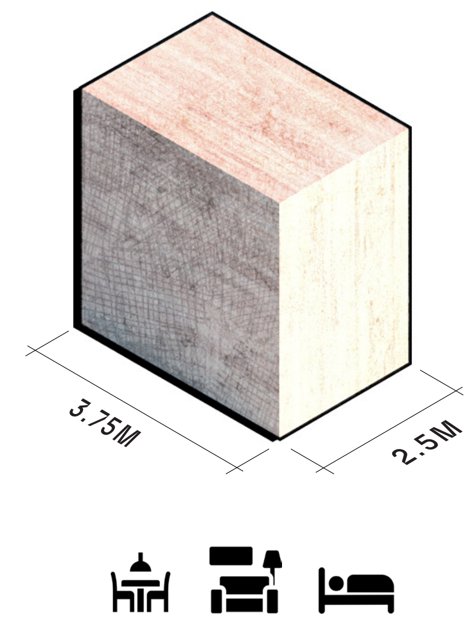


MASSING EXPLORATION



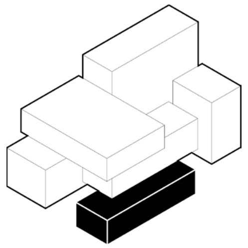
‘WET’ MODULE

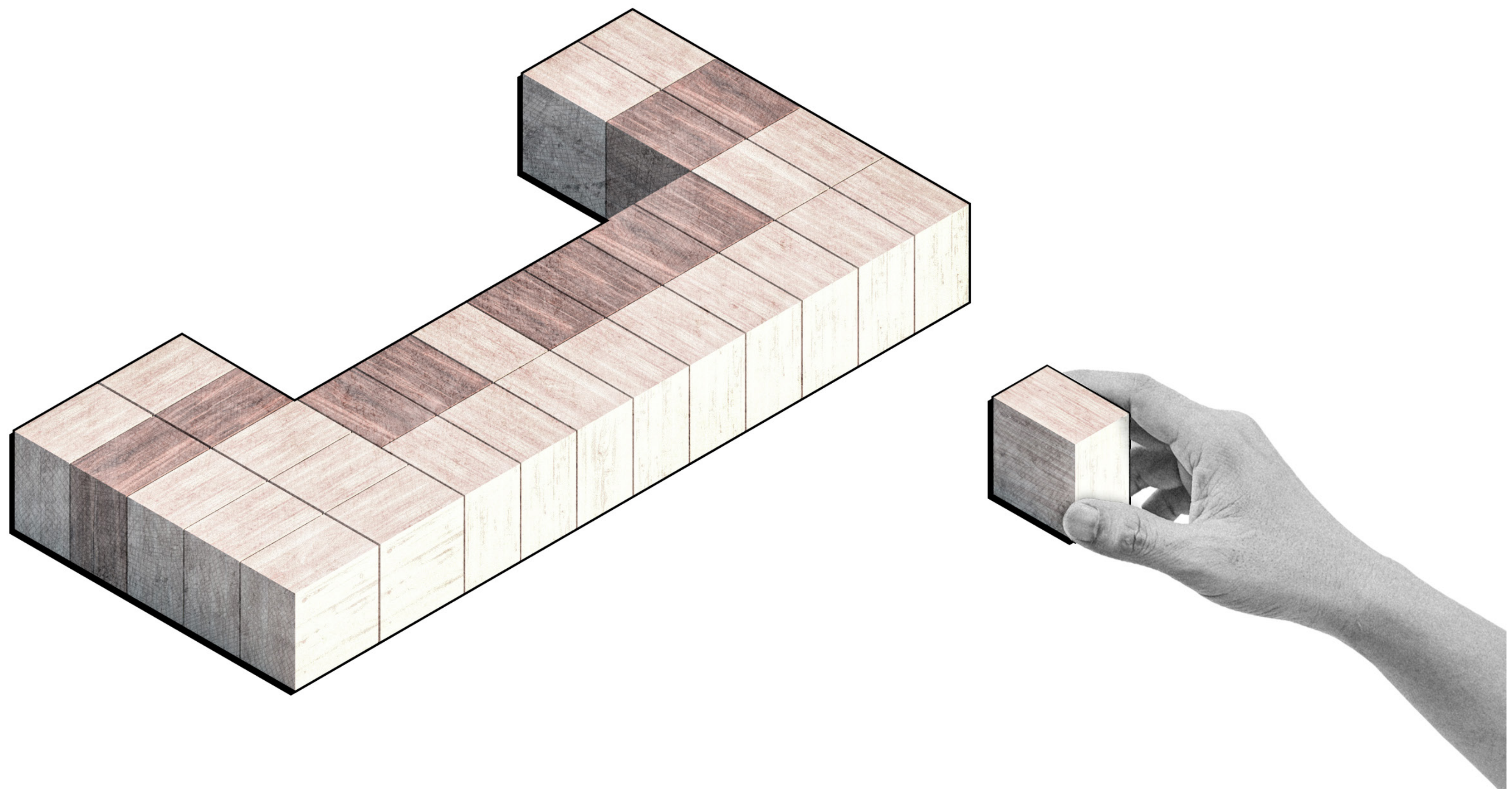
Wet Modules containt functions such as kitchens, washrooms, laundry rooms, etc. These modules also house the mechanical services and should be stacked on top of each other.



‘DRY’ MODULE

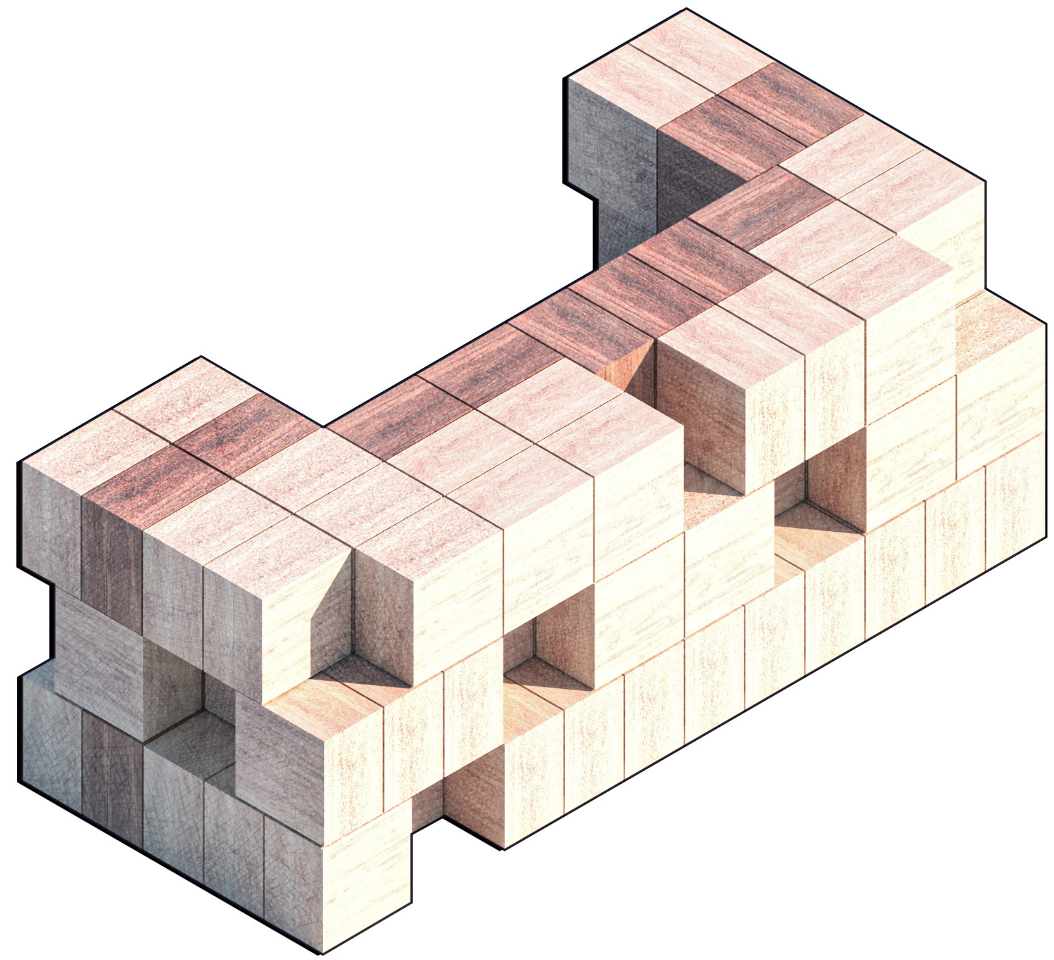
Dry Modules are utilized for living rooms, class rooms, bedrooms, etc. They can also contain mechanical services but typically that is left to the wet modules.





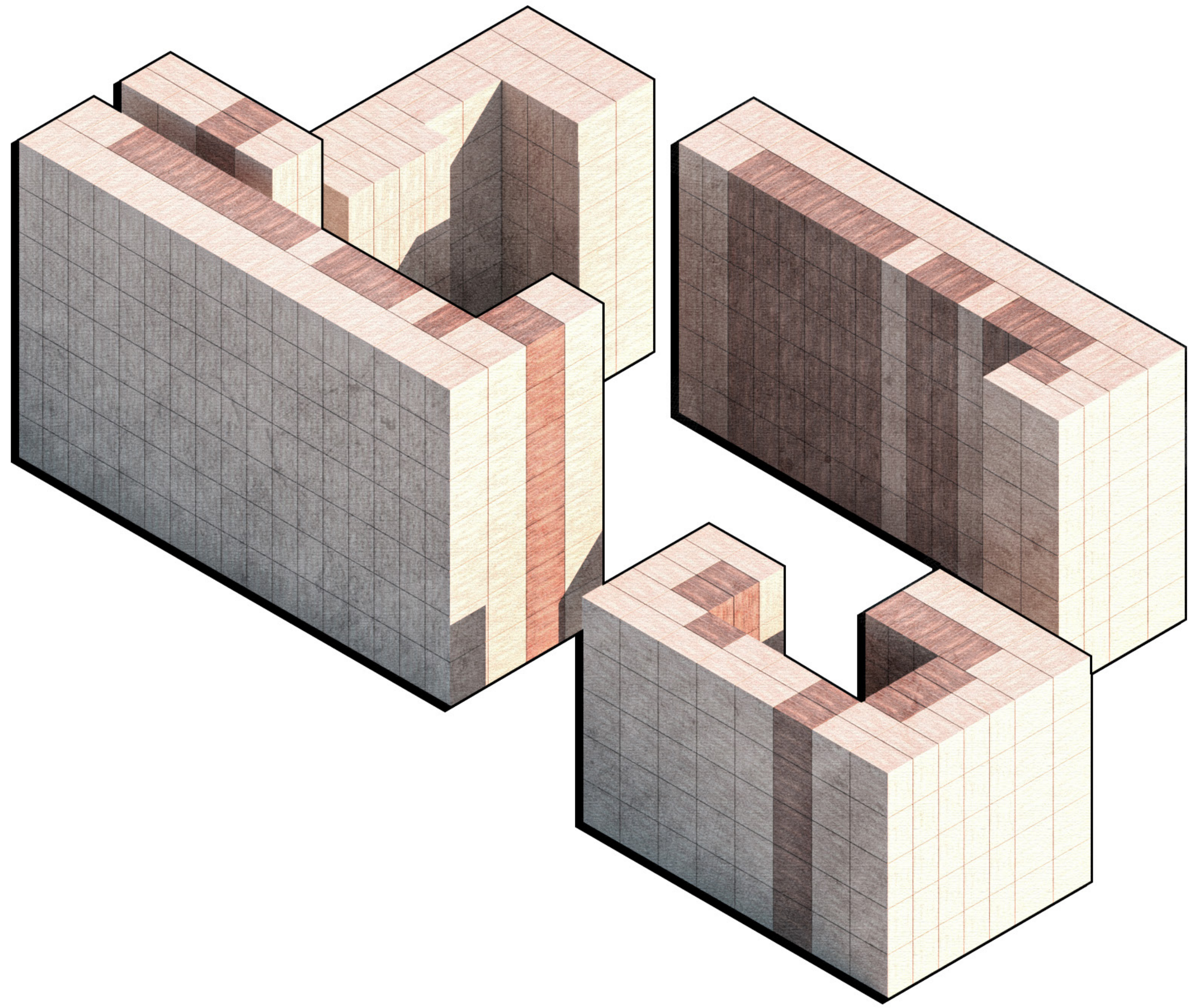
MODULE LAYOUT

Utilizing a 2.5x3.75m module. Different configurations were developed to re-shape the initial massing. The 3D modules were layed out first as they were the more rigid of the 3 timber systems.



INITIAL CONFIGURATION

When playing around with the module layout, there is that initial idea of rotating, pushing and pulling the modules as much as possible to create an interesting form. However, this makes structural and mechanical aspects of the project increasingly difficult.



REFINED MASSING

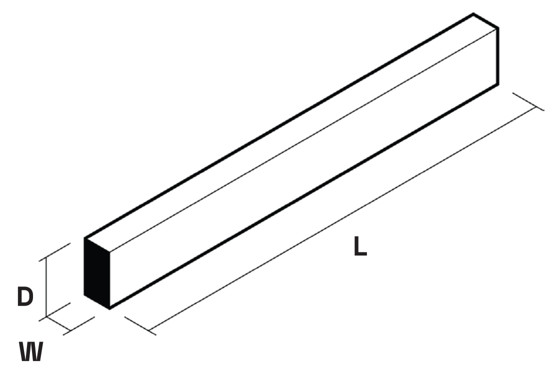
Laying out the modules help to refine the overal massing and as a result, better relate to the proportions of the parking lot.

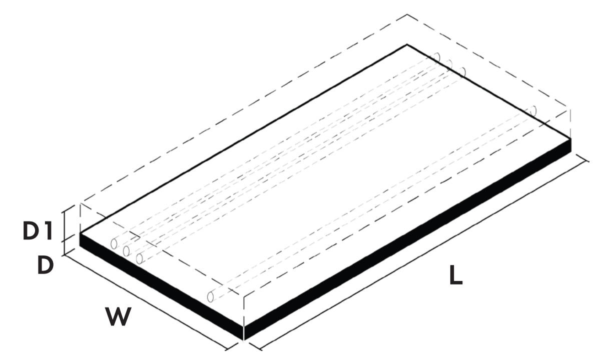
DESIGN TOOL

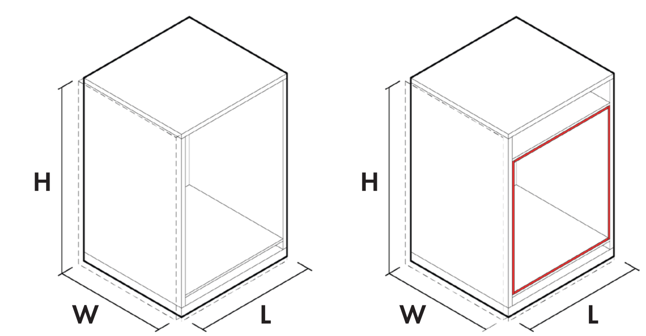
TIMBER SYSTEM	MANUFACTURING	TRANSPORTATION	ASSEMBLY	STRUCTURE	FIRE	ACOUSTICS
1D RES.	• D = Depth: 114mm - 2128mm typ. • W = Width: 365mm typ. However, if a greater width is desired, then it can be manufactured in 50mm increments, i.e) 415mm, 465mm, etc... Memberss then become exponentially more expensive. • L = Length: Determined by the desired span from the designer. Should take transporation and assembly rules of thumb into consideration.	• Transporting a 1D system is most cost effective if they are stacked regularly and compactly with no wasted space and no requirements for wide or long loads. • The same rule applys to 2D panels as well. • To ensure trasnportation is most effective, prefabricated members should be as typical as possible, avoiding custom or one-off memebrs.	• Try to use standard sizing for all components wherever possible in order to simplify on site assembly, resulting in faster construction. • Requires simple lifting equipment. • Simplify connection details between elements. • Typically uses wrap around straps for beams.	• The use of 1D systems are rarely utilized in Residential construction as 2D and 3D systems are better optimized for those typologies. • Instead of using 1D systems, it is recommended to use 2D, 3D or a combination of both for multiple residential units where repetition of units is likely to occur	Class 4 (height of the uppermost floor = 13 meters) and class 5 (height of the uppermost floor = 22 meters) buildings require longer fire resistance durations of 60 and 90 minutes because fires are harder to extinguish in taller buildings.	It is important to note that in general, for residential typologies the impact sound requirement should be L'n, w≤ 50 dB where the lower the value the better. Moreover, a residential unit must have an airborne sound reduction index of R'w≥ 54dB, where the higher the value the better. Typically, if a project is well designed for impact sound it will also perform well for airborne sound requirements
2D RES.	• D = Depth: 500mmmm typ. • D1 = Depth of Assembly: 60mm-215mm typ. • W = Width: 3500mm Maximum • L = Length: 16500mm Maximum Typically CLT panels with a depth from 60mm-100mm consist of 3-layers. Where as CLT panels with a depth from 120mm-180mm consist of 5-layers. In order to attain its structural properties, CLT panels always need to have an odd number of layers. i.e) 3-Layers, 5-Layers, 7-Layers, etc...	Transport Sizes with no additional requirements: • H = Maximum Height: 4m • W = Maximum Width: 2.55m • L = Length of Standard Semi-Trailer: 13.5m Transport Sizes if there is an escort vehicle on Urban and country roads: • H = Maximum Height: 4m • W = Maximum Width: 3m • L = Length of Standard Semi-Trailer: 13.5m Transport Sizes if there is a Police escort vehicle on Urban and country roads: • H = Maximum Height: 4m • W = Maximum Width: 3.5m • L = Length of Standard Semi-Trailer: 13.5m	• The large format components enable a fast assembly and ensure the building is well braced • Avoid custom sizes/ one-off cuts to ensure fast construction. • Depending on the final design. The pick points used to life the panels into place may be exposed. The designer should then take this into consideration into the final design. • However, if the facade and other final finishing are completed on site, then these pick point will be hidden within the assembly.	CLT Floor Spans for Residential Program: • One can use the calculation **L/27 = D** to determine the depth (D) of a panel. • Where L = the span in millimeters • Some typical span to depth ratios include (Manual of multi storey timber): • Span 4m = 140mm Depth • Span 5m = 180mm Depth • Span 6m = 220mm Depth	• The required corridors and staircases must be kept free of fire loads by means of paneling with non-combustible cladding. • If the ceiling and floor are made of visible wood, the walls should be paneled with a non-combustible material, or if two walls are not lined, then either the ceiling or floor may be made of visible timber. In principle, increased requirements for fire resistance can be compensated by the following measures: • Increase the thickness of the CLT element • Increase the number of layers of the CLT element • Clad CLT member with fire rated gypsum board	• For 2D systems, in both residential and educational typologies it is imperative that the detailing of CLT panels takes flanking into consideration during the design. To mitigate this, there must be an acoustical break between CLT panel members. Typically 5mm-10mm thick. • On average, 2D floor assemblies utilize **30mm-40mm** of impact sound insulation in addition to thermal insulation • Providing an airspace between the wall finish and the CLT member helps to mitigate impact
3D RES.	• H = Height: ±3000mmmm typ. • W = Width: 3500mm Maximum • L = Length: 16500mm Maximum Note that the 2D manufacturing of CLT panels also has an influence on the dimensionality of 3D modules. Within the 'wet' module, the red represents finishing for wet conditions and below the ceiling CLT member is a drop ceiling for mechanical installations. Alternatively this can be located against one of the walls of the module or in the raised floor system	Transportation of 3D modules follows the same size conditions as 2D systems. However, since 3D modules contain a lot of dead space within themselves while being transported, as opposed to stack panels, beams and columns. Depending on the size of the 3D module, the more trips are required to bring everything to site, affecting overall construction time. However, this is to be balanced with assembly rules of thumb.	• The larger the modules, the more cost-effective this structure will be. • In some cases, the ceiling can be completely omitted from the module so that when stacked, the underside of the floor becomes the ceiling. The same idea can be applied to the walls of the module. i.e) Two 3m wide modules come together to create a 6m room. • It is ideal to separate 'wet' modules from 'dry' modules to increase construction speed. • To optimize the use of the factory setting, integration of technical installation can increase on site construction speed.	For determining spans of 3D modules, it is recommended to reference the rules of thumb for 2D Spans as well as 2D manufacturing and transportation to ensure an easy combination of 2D and 3D systems • For 3D modules, use 2D rule of thumb to calculate for the floor panel first. To determine the 'ceiling' depth of a CLT panel in a 3D Module: • The ceiling panel is typically **±50% thinner** than that of the CLT Floor panel in a residential module	For 3D systems, follow the rules of thumb stated for 2D systems. However, for 3D systems: • The double stacking of CLT panels increases the fire resistance rating of the project • Resulting in the potential for thinner CLT Panels Important to keep in mind of the double stacking of floor to ceiling and wall to wall	• 3D module provides the opportunity to develop airtight details • Use of insulation to separate modules • Acoustic breaks/ seals where modules connect to mitigate impact sound • Double stacking of CLT walls helps to improve the acoustical rating.
1D EDU.	• D = Depth: 114mm - 2128mm typ. • W = Width: 365mm typ. However, if a greater width is desired, then it can be manufactured in 50mm increments, i.e) 415mm, 465mm, etc... Memberss then become exponentially more expensive. • L = Length: Determined by the desired span from the designer. Should take transporation and assembly rules of thumb into consideration.	• Transporting a 1D system is most cost effective if they are stacked regularly and compactly with no wasted space and no requirements for wide or long loads. • The same rule applys to 2D panels as well. • To ensure trasnportation is most effective, prefabricated members should be as typical as possible, avoiding custom or one-off memebrs.	• Try to use standard sizing for all components wherever possible in order to simplify on site assembly, resulting in faster construction. • Requires simple lifting equipment. • Simplify connection details between elements. • Typically uses wrap around straps for beams.	Glulam Beam Depth calculation for Office/ Education Program: • One can use the calculation **L/16 = D** to determine the depth of a beam. Where L = the span in millimeters	As a result of Glue laminated timber being rarely used in multi-storey residential units, there are no specific fire rules of thumb for this condition. As stated previously, it is recommended to utilize 2D, 3D or a combination of both for residential units.	• Mitigating impact sound as much as possible with assembly • Use of acoustic breaks • Accommodating for Airborne sound is achieved through the infill of insulation between members • Utilizing acoustic tiles or drop ceiling in a beam system
2D EDU.	• D = Depth: 500mmmm typ. • D1 = Depth of Assembly: 60mm-215mm typ. • W = Width: 3500mm Maximum • L = Length: 16500mm Maximum Typically CLT panels with a depth from 60mm-100mm consist of 3-layers. Where as CLT panels with a depth from 120mm-180mm consist of 5-layers. In order to attain its structural properties, CLT panels always need to have an odd number of layers. i.e) 3-Layers, 5-Layers, 7-Layers, etc...	Transport Sizes with no additional requirements: • H = Maximum Height: 4m • W = Maximum Width: 2.55m • L = Length of Standard Semi-Trailer: 13.5m Transport Sizes if there is an escort vehicle on Urban and country roads: • H = Maximum Height: 4m • W = Maximum Width: 3m • L = Length of Standard Semi-Trailer: 13.5m Transport Sizes if there is a Police escort vehicle on Urban and country roads: • H = Maximum Height: 4m • W = Maximum Width: 3.5m • L = Length of Standard Semi-Trailer: 13.5m	• The large format components enable a fast assembly and ensure the building is well braced • Avoid custom sizes/ one-off cuts to ensure fast construction. • Depending on the final design. The pick points used to life the panels into place may be exposed. The designer should then take this into consideration into the final design. • However, if the facade and other final finishing are completed on site, then these pick point will be hidden within the assembly.	CLT Floor Spans for Residential Program: • One can use the calculation **L/47 = D** to determine the depth (D) of a panel. • Where L = the span in millimeters	• The required corridors and staircases must be kept free of fire loads by means of paneling with non-combustible cladding. • If the ceiling and floor are made of visible wood, the walls should be paneled with a non-combustible material, or if two walls are not lined, then either the ceiling or floor may be made of visible timber. In principle, increased requirements for fire resistance can be compensated by the following measures: • Increase the thickness of the CLT element • Increase the number of layers of the CLT element • Clad CLT member with fire rated gypsum board	• For 2D systems, in both residential and educational typologies it is imperative that the detailing of CLT panels takes flanking into consideration during the design. To mitigate this, there must be an acoustical break between CLT panel members. Typically 5mm-10mm thick. • On average, 2D floor assemblies utilize **7mm-30mm** of impact sound insulation in addition to thermal insulation • Providing an airspace between the wall finish and the CLT member helps to mitigate impact and airborne sound reverberations
3D EDU.	• H = Height: ±3000mmmm typ. • W = Width: 3500mm Maximum • L = Length: 16500mm Maximum Note that the 2D manufacturing of CLT panels also has an influence on the dimensionality of 3D modules. Within the 'wet' module, the red represents finishing for wet conditions and below the ceiling CLT member is a drop ceiling for mechanical installations. Alternatively this can be located against one of the walls of the module or in the raised floor system	Transportation of 3D modules follows the same size conditions as 2D systems. However, since 3D modules contain a lot of dead space within themselves while being transported, as opposed to stack panels, beams and columns. Depending on the size of the 3D module, the more trips are required to bring everything to site, affecting overall construction time. However, this is to be balanced with assembly rules of thumb.	• The larger the modules, the more cost-effective this structure will be. • In some cases, the ceiling can be completely omitted from the module so that when stacked, the underside of the floor becomes the ceiling. The same idea can be applied to the walls of the module. i.e) Two 3m wide modules come together to create a 6m room. • It is ideal to separate 'wet' modules from 'dry' modules to increase construction speed. • To optimize the use of the factory setting, integration of technical installation can increase on site construction speed.	For determining spans of 3D modules, it is recommended to reference the rules of thumb for 2D Spans as well as 2D manufacturing and transportation to ensure an easy combination of 2D and 3D systems • For 3D modules, use 2D rule of thumb to calculate for the floor panel first. To determine the 'ceiling' depth of a CLT panel in a 3D Module: • The ceiling panel is typically **±25% thinner** than that of the CLT Floor panel in a residential module	For 3D systems, follow the rules of thumb stated for 2D systems. However, for 3D systems: • The double stacking of CLT panels increases the fire resistance rating of the project • Resulting in the potential for thinner CLT Panels Important to keep in mind of the double stacking of floor to ceiling and wall to wall	• 3D module provides the opportunity to develop airtight details • Use of insulation to separate modules • Acoustic breaks/ seals where modules connect to mitigate impact sound • Double stacking of CLT walls helps to improve the acoustical rating.

MANUFACTURING

General Rules of Thumb:







'Dry' Module 'Wet' Module

1D Systems:

- D = Depth: 114mm - 2128mm typ.
- W = Width: 365mm typ.

However, if a greater width is desired, then it can be manufactured in 50mm increments, i.e) 415mm, 465mm, etc...
Memberss then become exponentially more expensive.

- L = Length: Determined by the desired span from the designer. Should take transporation and assembly rules of thumb into consideration.

2D Systems:

- D = Depth: 500mmmm typ.
- D1 = Depth of Assembly: 60mm-215mm typ.
- W = Width: 3500mm Maximum
- L = Length: 16500mm Maximum

Typically CLT panels with a depth from 60mm-100mm consist of 3-layers.
Where as CLT panels with a depth from 120mm-180mm consist of 5-layers.
In order to attain its structural properties, CLT panels always need to have an odd number of layers. i.e) 3-Layers, 5-Layers, 7-Layers, etc...

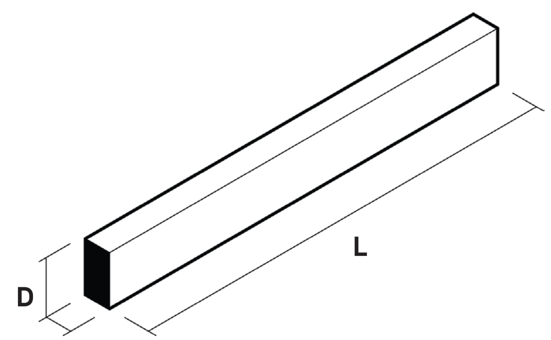
3D Systems:

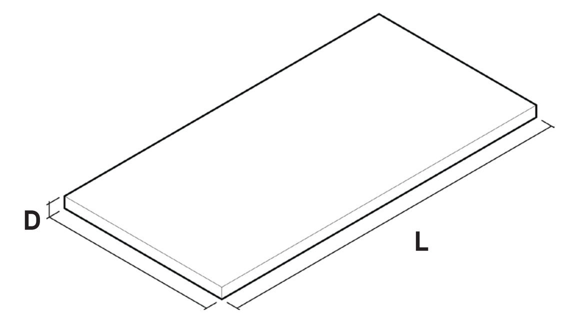
- H = Height: ±3000mmmm typ.
- W = Width: Dependent on transportation and assembly rules of thumb
- L = Length: 16500mm Maximum

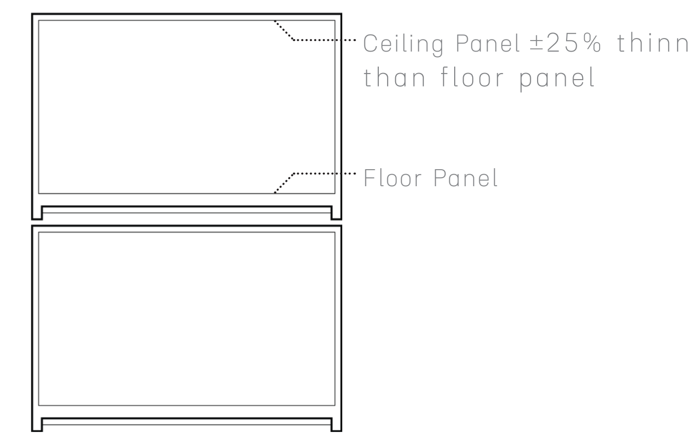
Note that the 2D manufacturing of CLT panels also has an influence on the dimensionality of 3D modules.
Within the 'wet' module, the red represents finishing for wet conditions and below the ceiling CLT member is a drop ceiling for mechanical installations. Alternatively this can be located against one of the walls of the module or in the raised floor system

EDUCATIONAL TYPOLOGIES:

Structure Rules of Thumb:







1D Systems:

Glulam Beam Depth calculation for Office/ Education Program:

- One can use the calculation **L/16 = D** to determine the depth of a beam. Where L = the span in millimeters

2D Systems:

CLT Floor Spans for Residential Program:

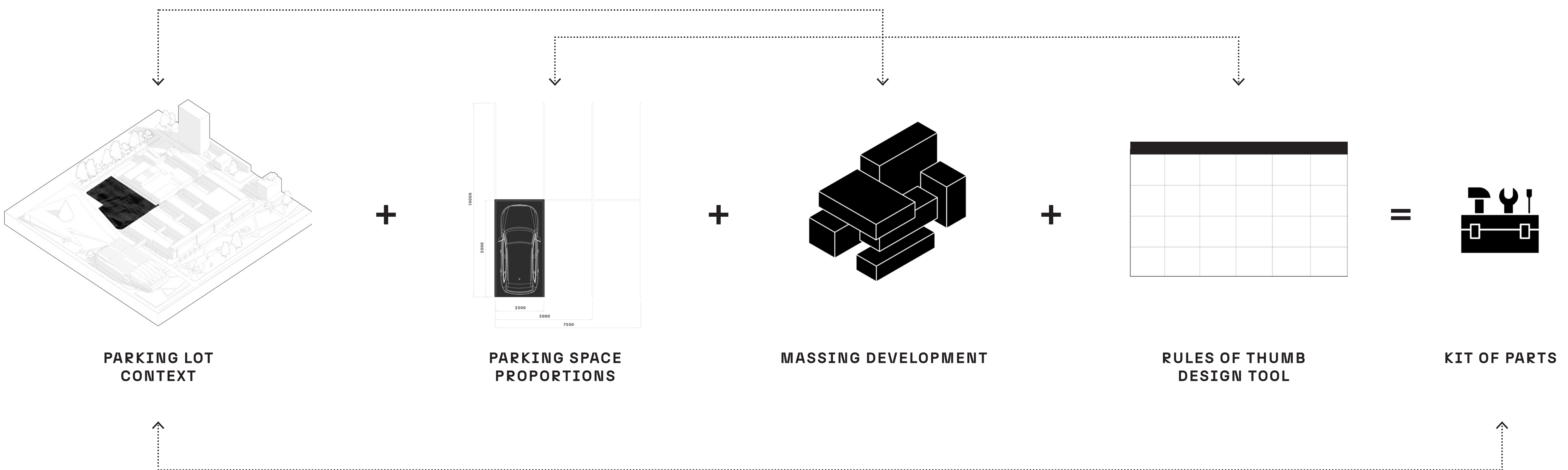
- One can use the calculation **L/47 = D** to determine the depth (D) of a panel.
- Where L = the span in millimeters

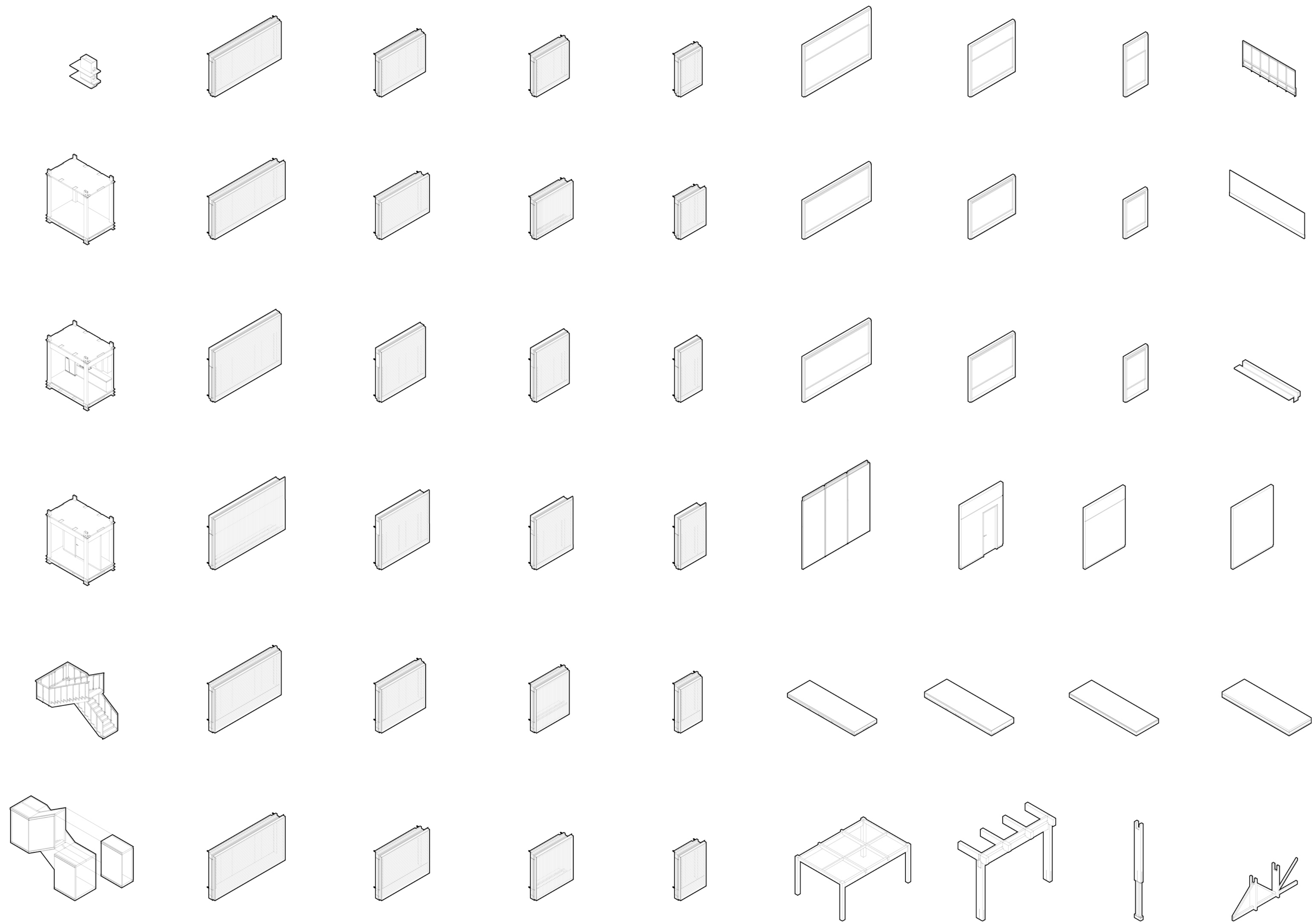
3D Systems:

- For 3D modules, use 2D rule of thumb to calculate for the floor panel first.

To determine the 'ceiling' depth of a CLT panel in a 3D Module:

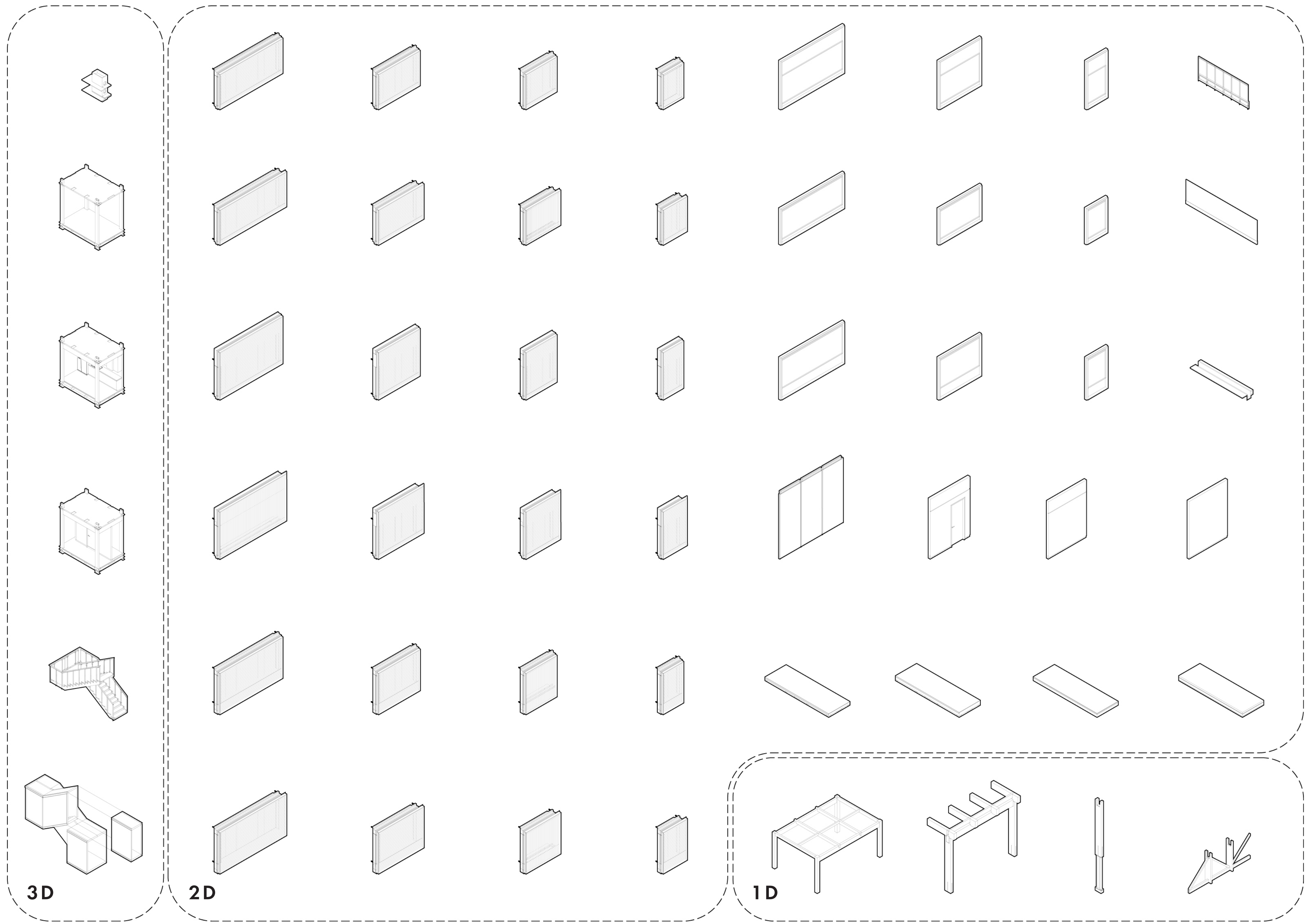
- The ceiling panel is typically **±25% thinner** than that of the CLT Floor panel in a residential module


PARKING LOT CONTEXT
+
PARKING SPACE PROPORTIONS
+
MASSING DEVELOPMENT
+
RULES OF THUMB DESIGN TOOL
=
KIT OF PARTS



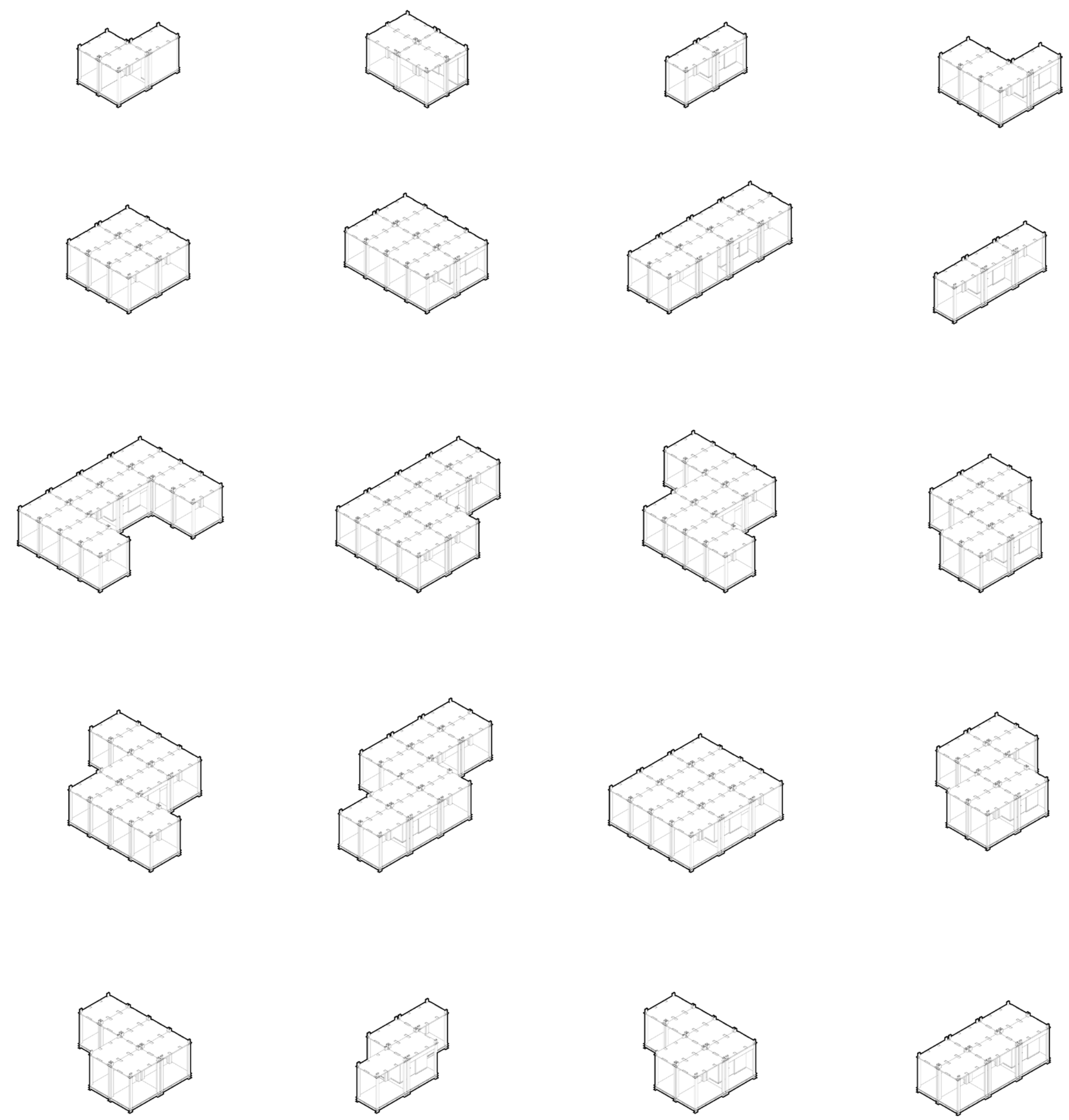
KIT OF PARTS

UTILIZED



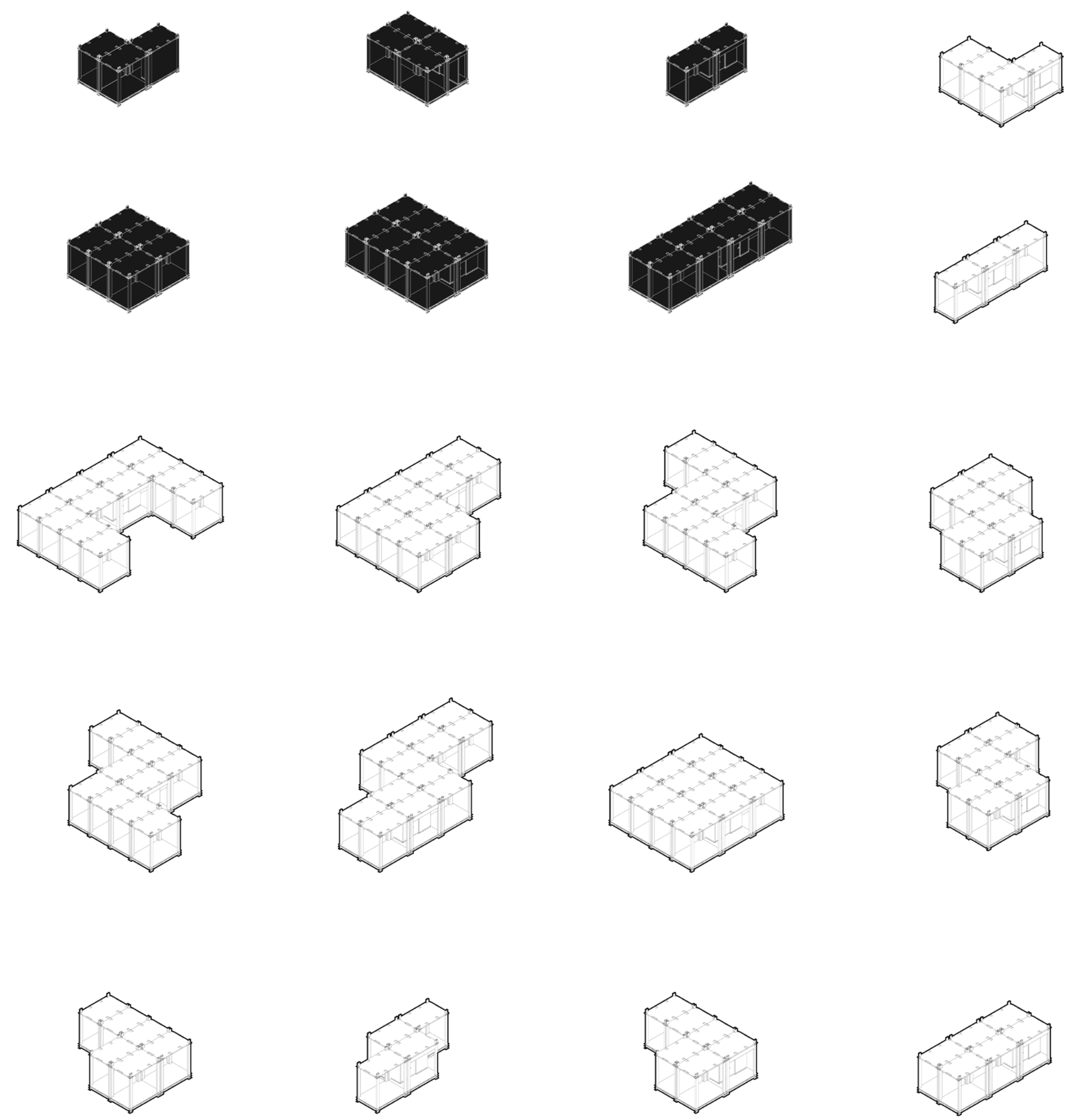
KIT OF PARTS

1D/2D/3D SYSTEMS



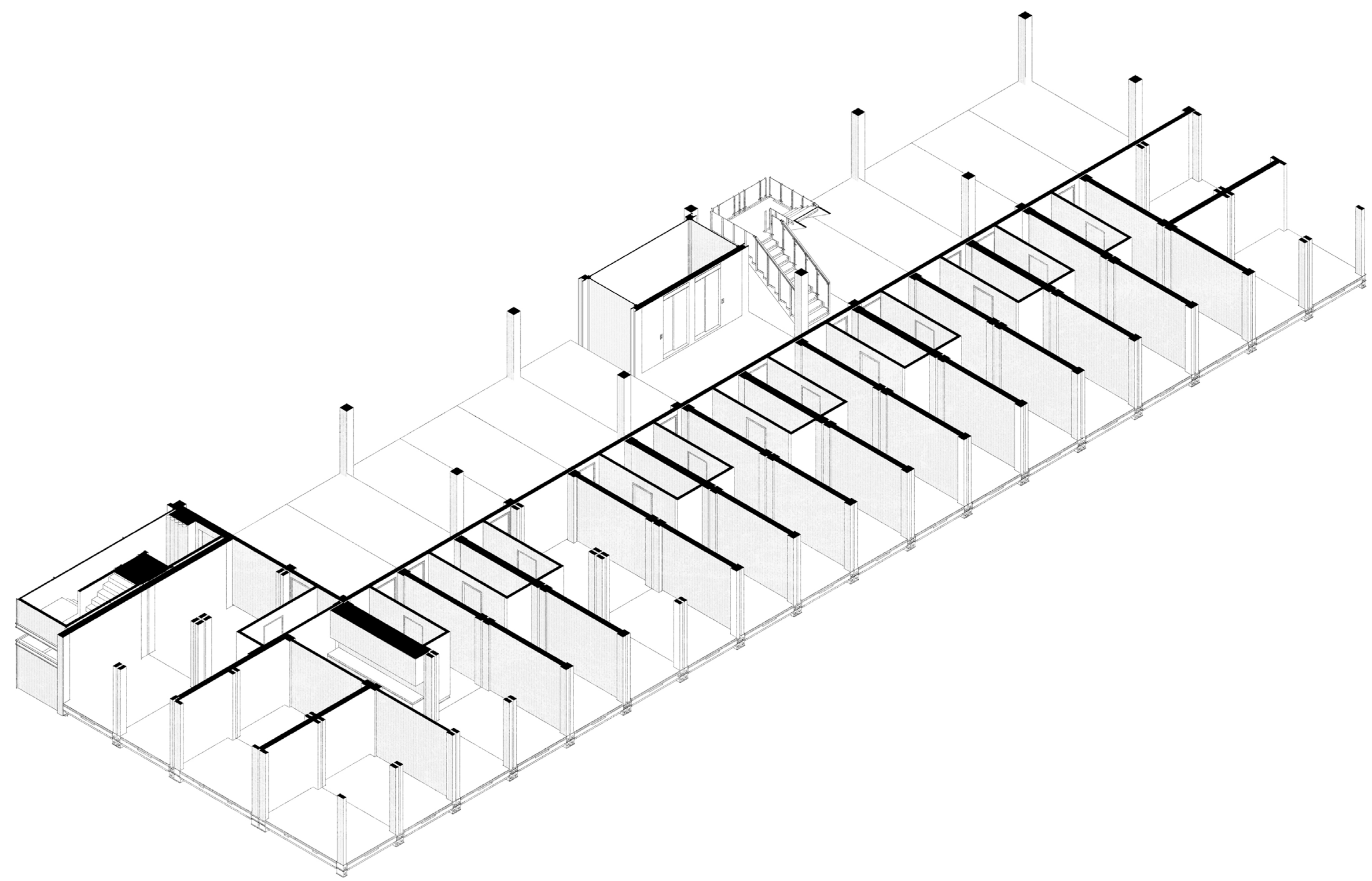
UNIT TYPES

POSSIBILITIES

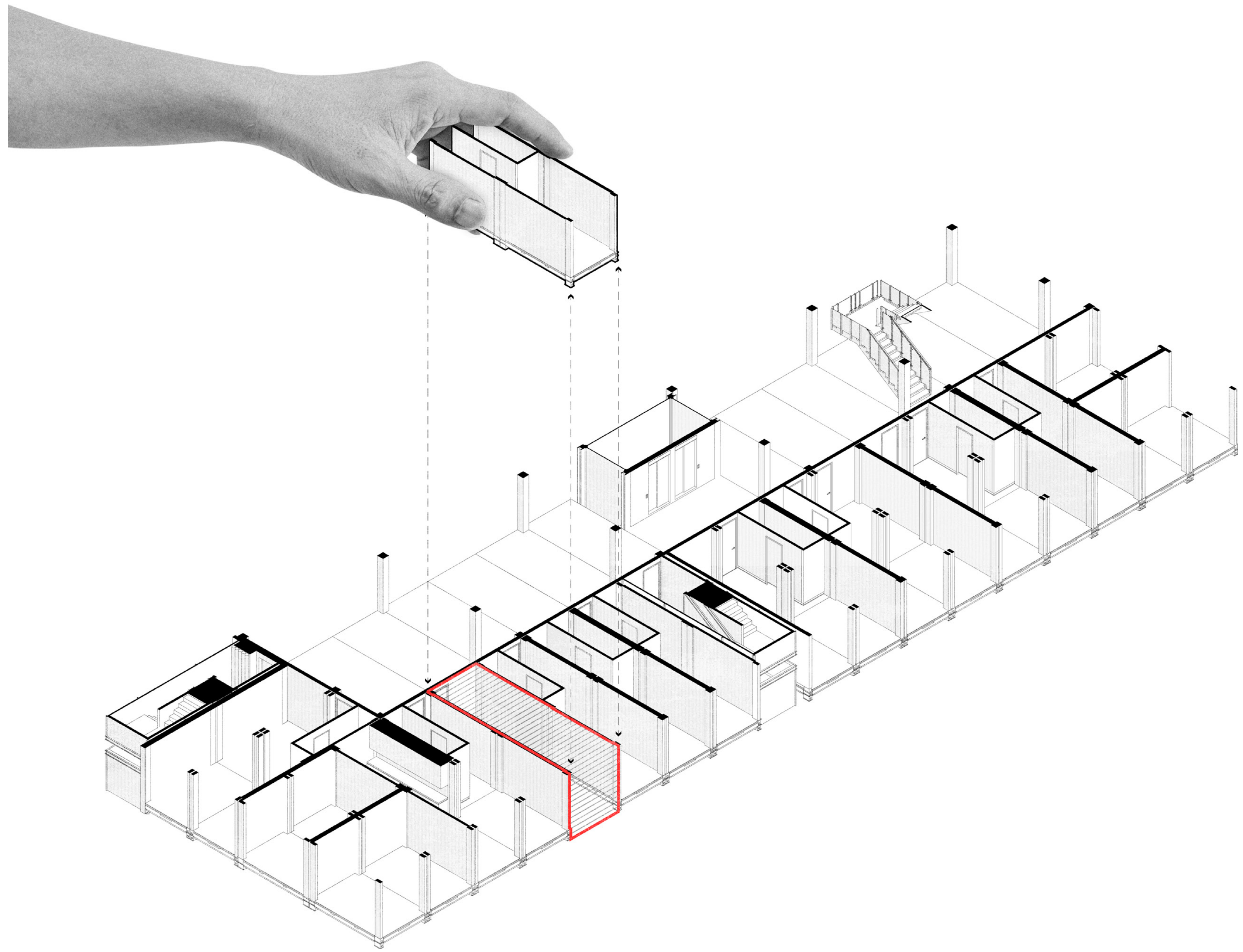


UNIT TYPES

SELECTED



RECONFIGURABILITY



RECONFIGURABILITY

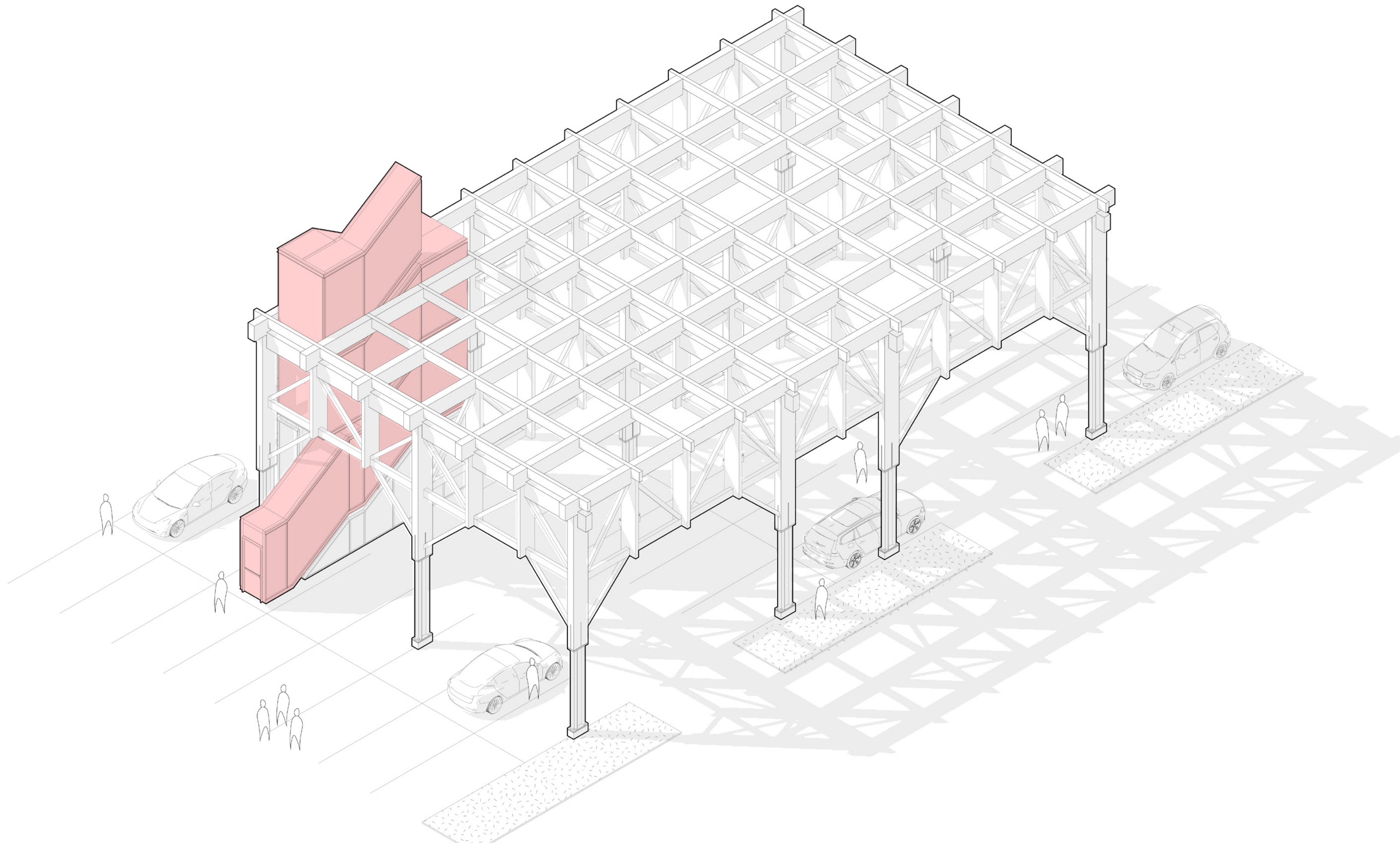


TABLE AXONOMETRIC

Making contact with the ground while maintaining the
function of the existing parking lot

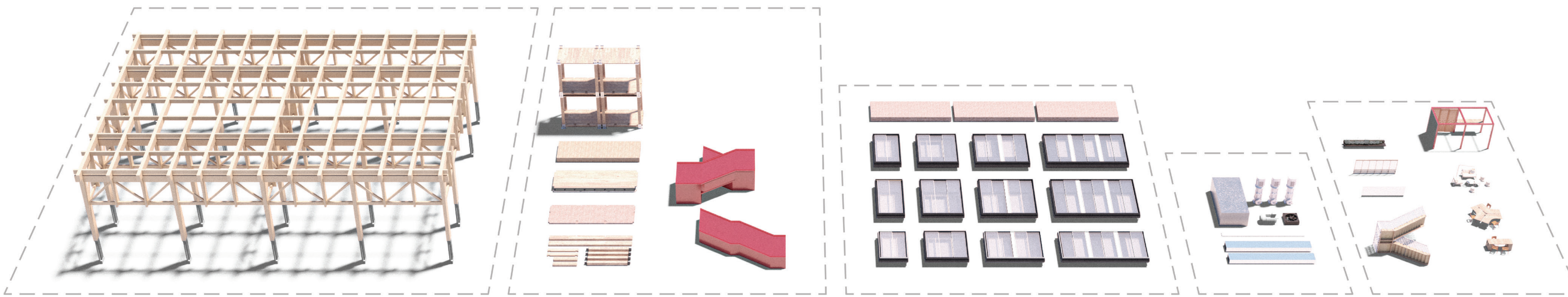
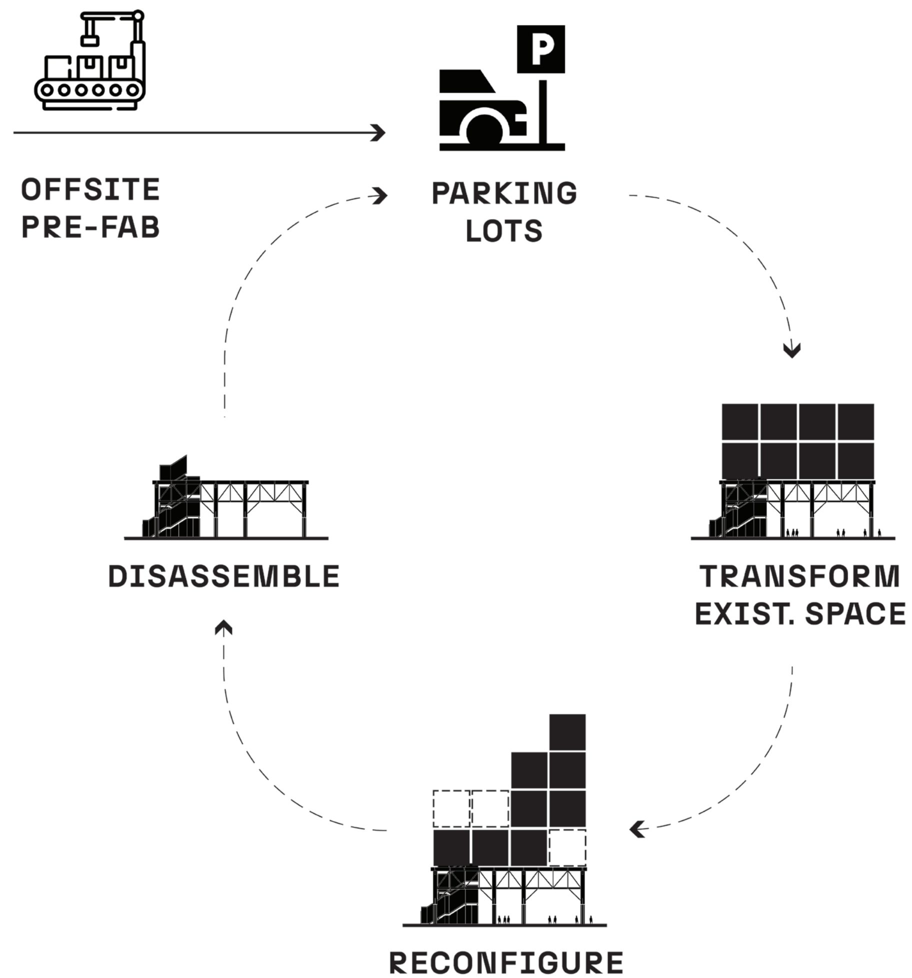
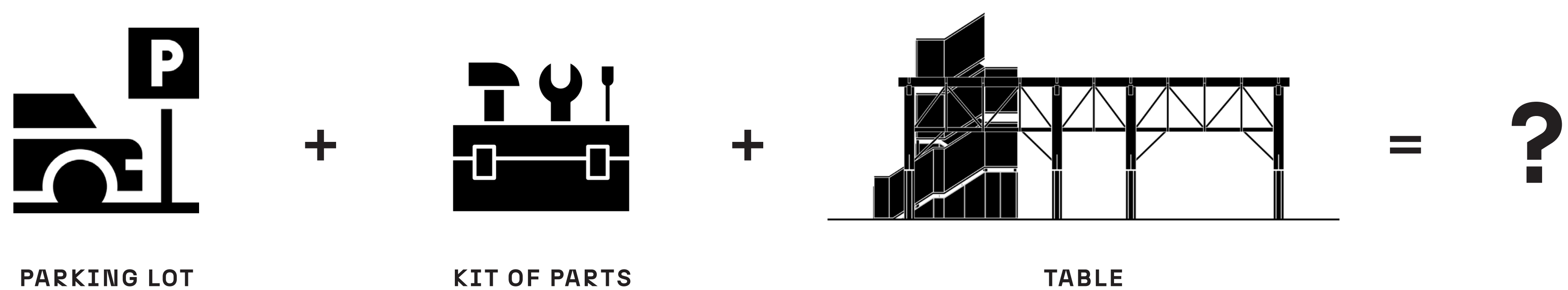
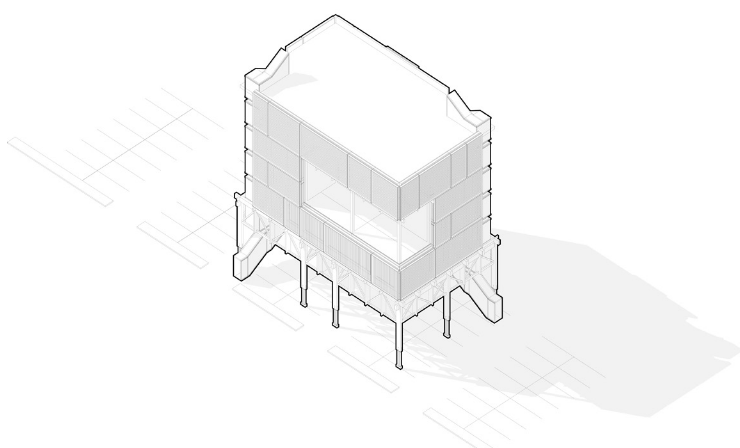


TABLE
30 - 300 YEARS
KIT OF PARTS
30-50 YEARS
SKIN
10-50 YEARS
SERVICES
7-15 YEARS
FLEXIBILITY
MONTHLY/ YEARLY

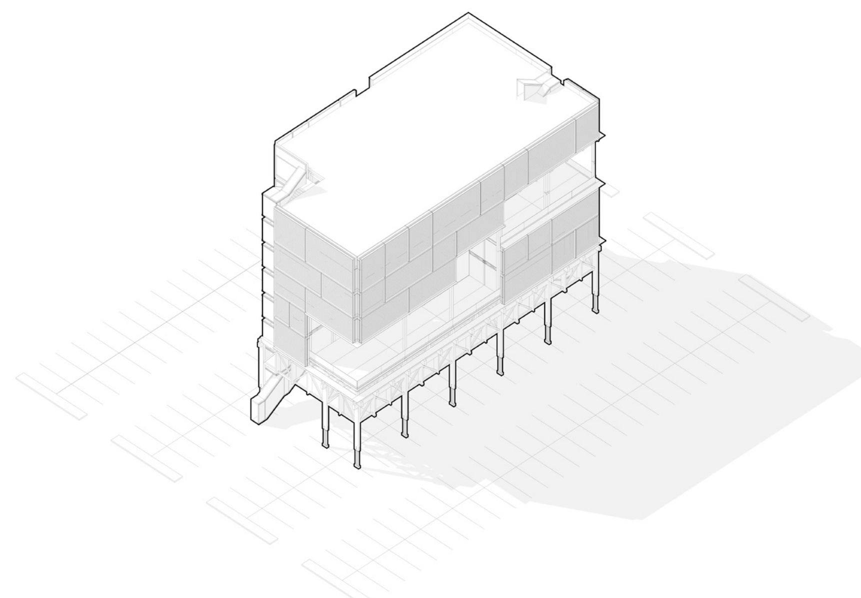

OFFSITE
PRE-FAB
PARKING
LOTS
TRANSFORM
EXIST. SPACE
RECONFIGURE
DISASSEMBLE


PARKING LOT
+
KIT OF PARTS
+
TABLE
=
?



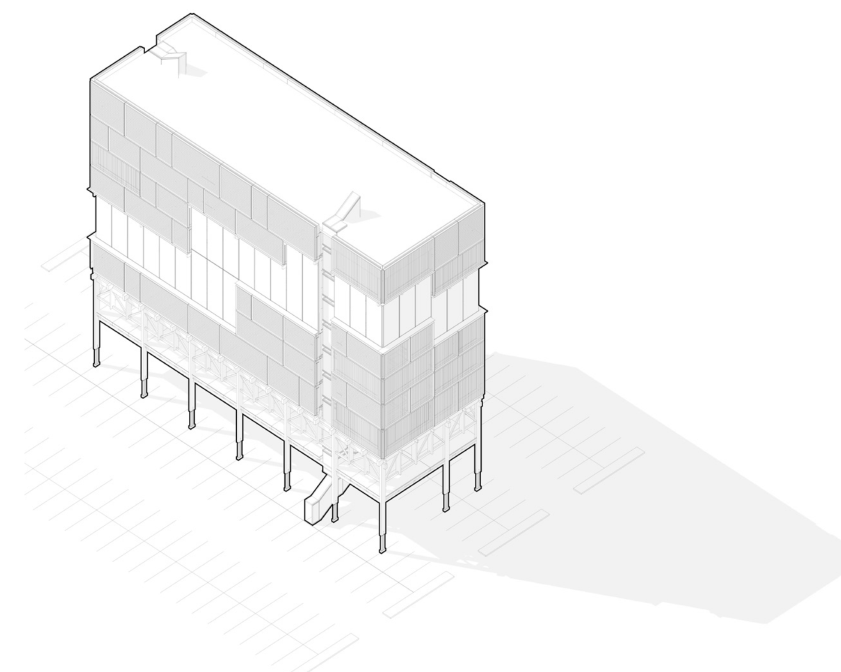
S

GFA: 39321 m²
±26 Units
±8 People
4 Floors



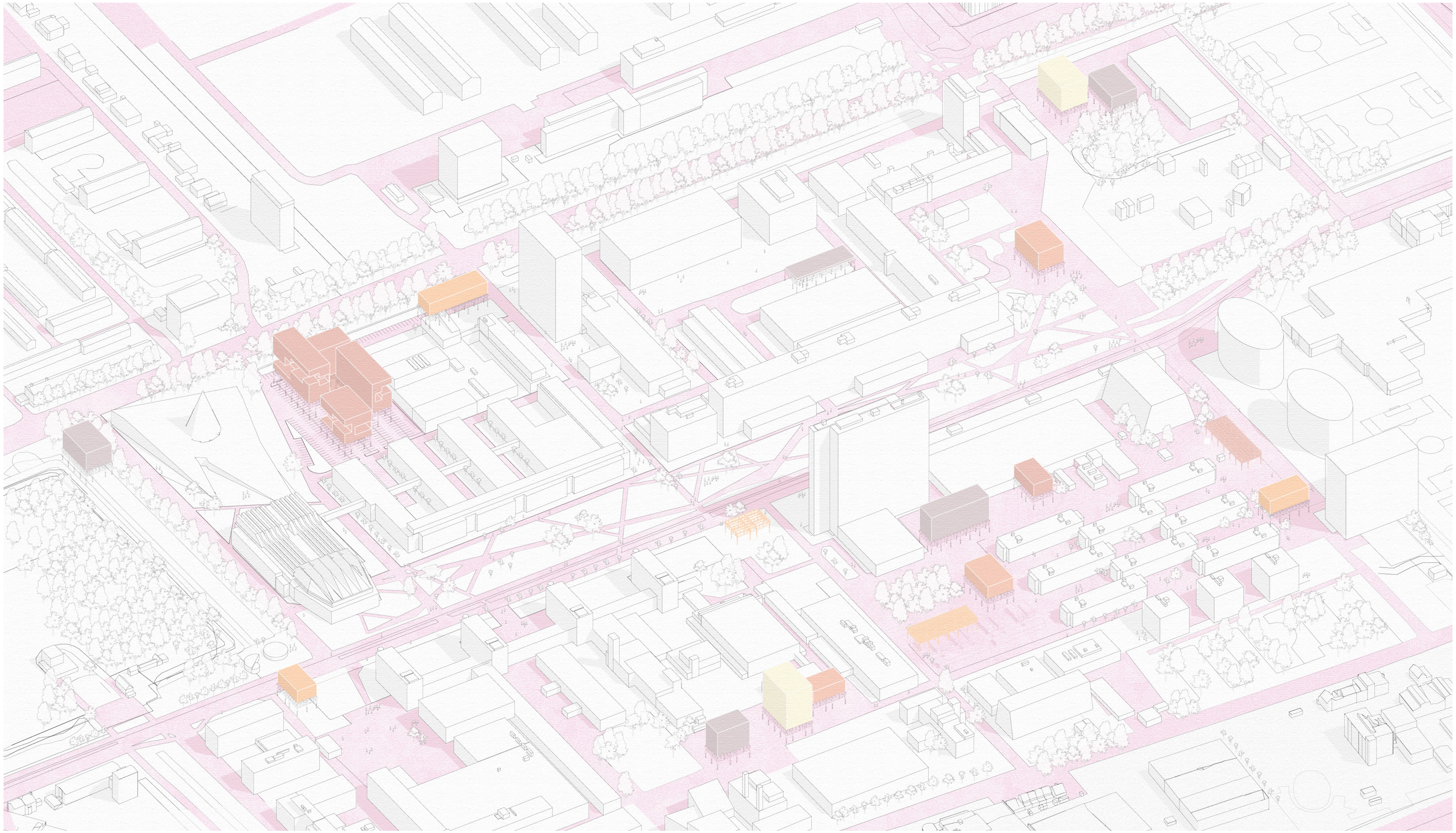
M

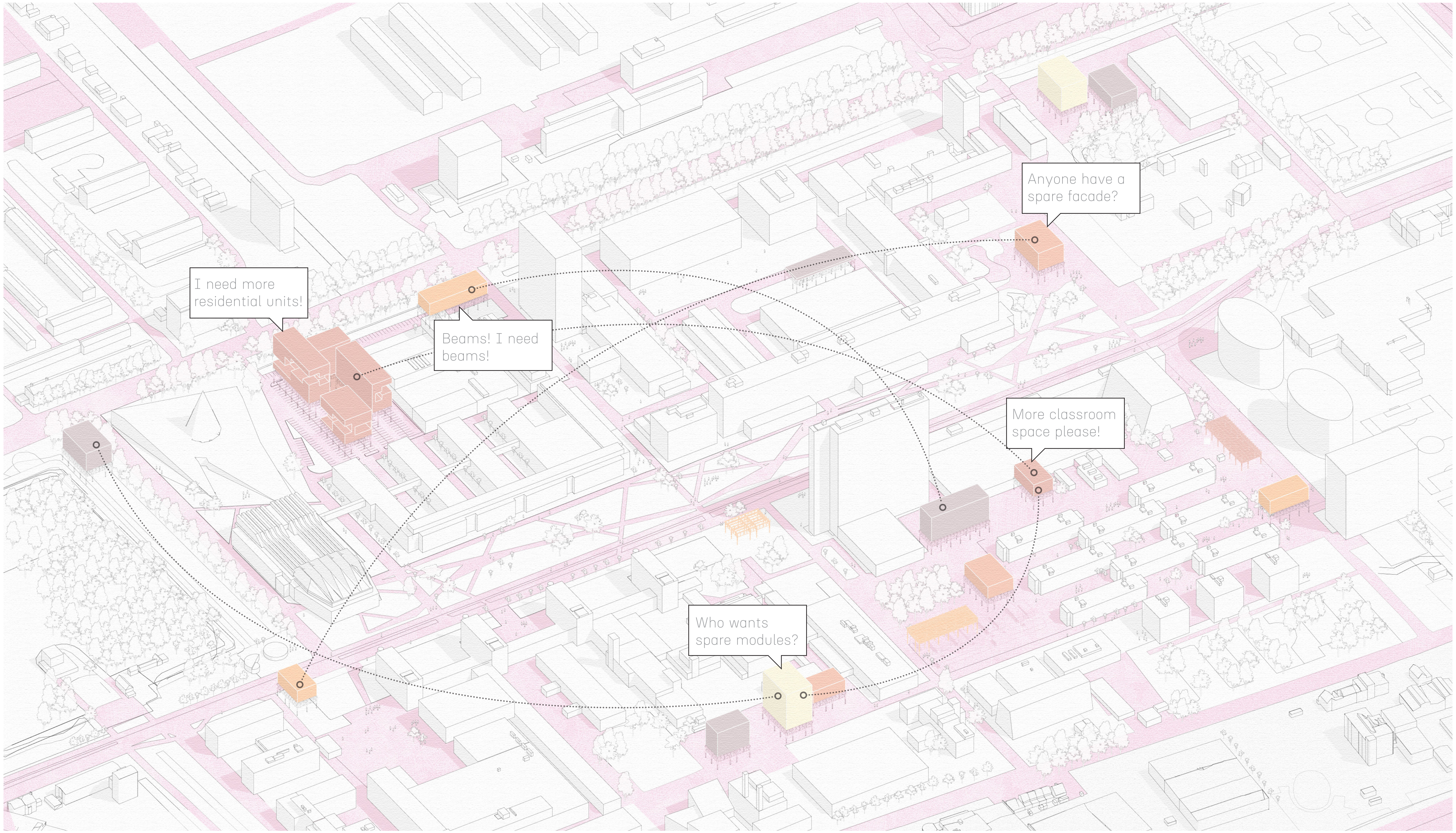
GFA: 78243 m²
±40 Units
±50 People
5 Floors

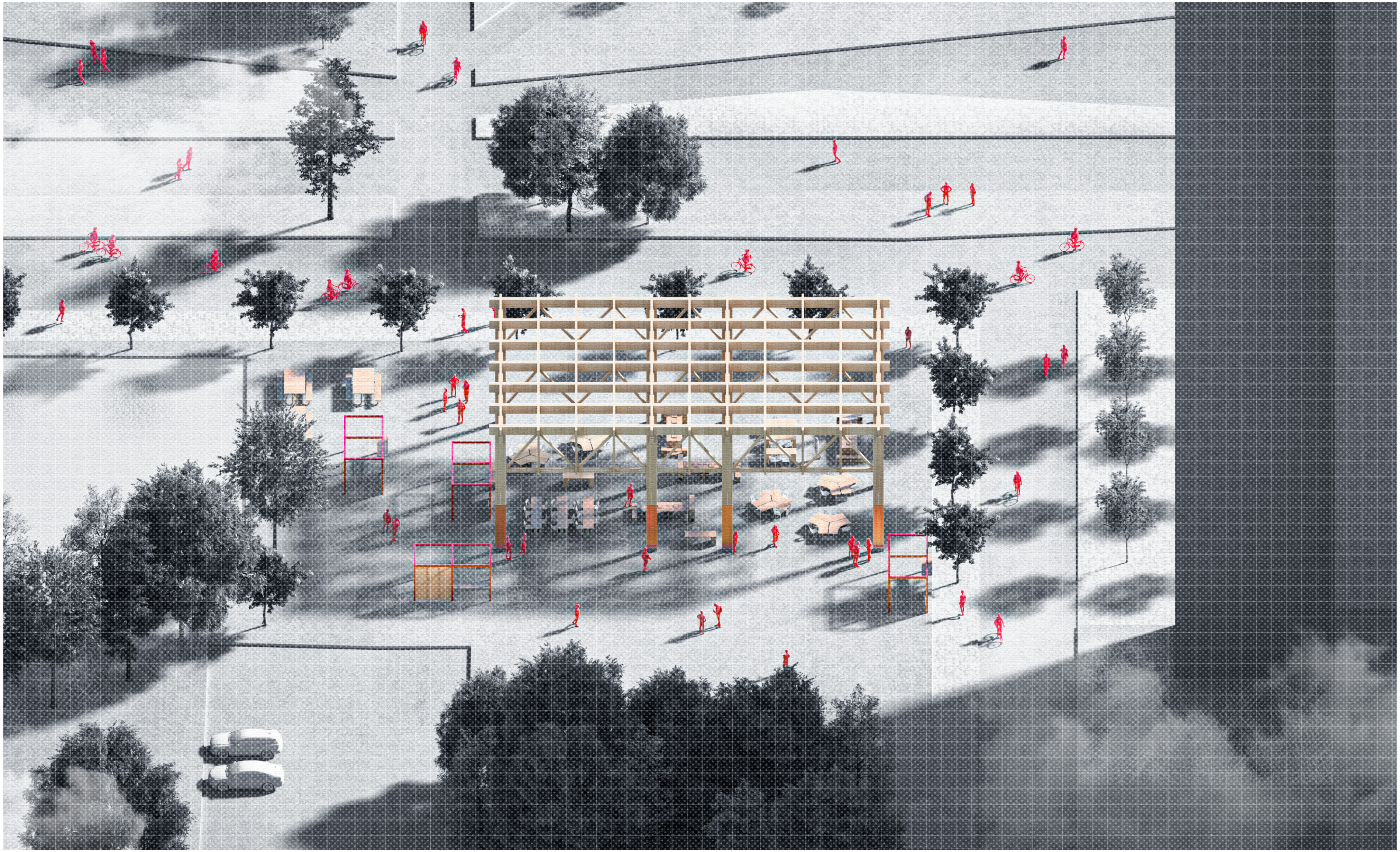


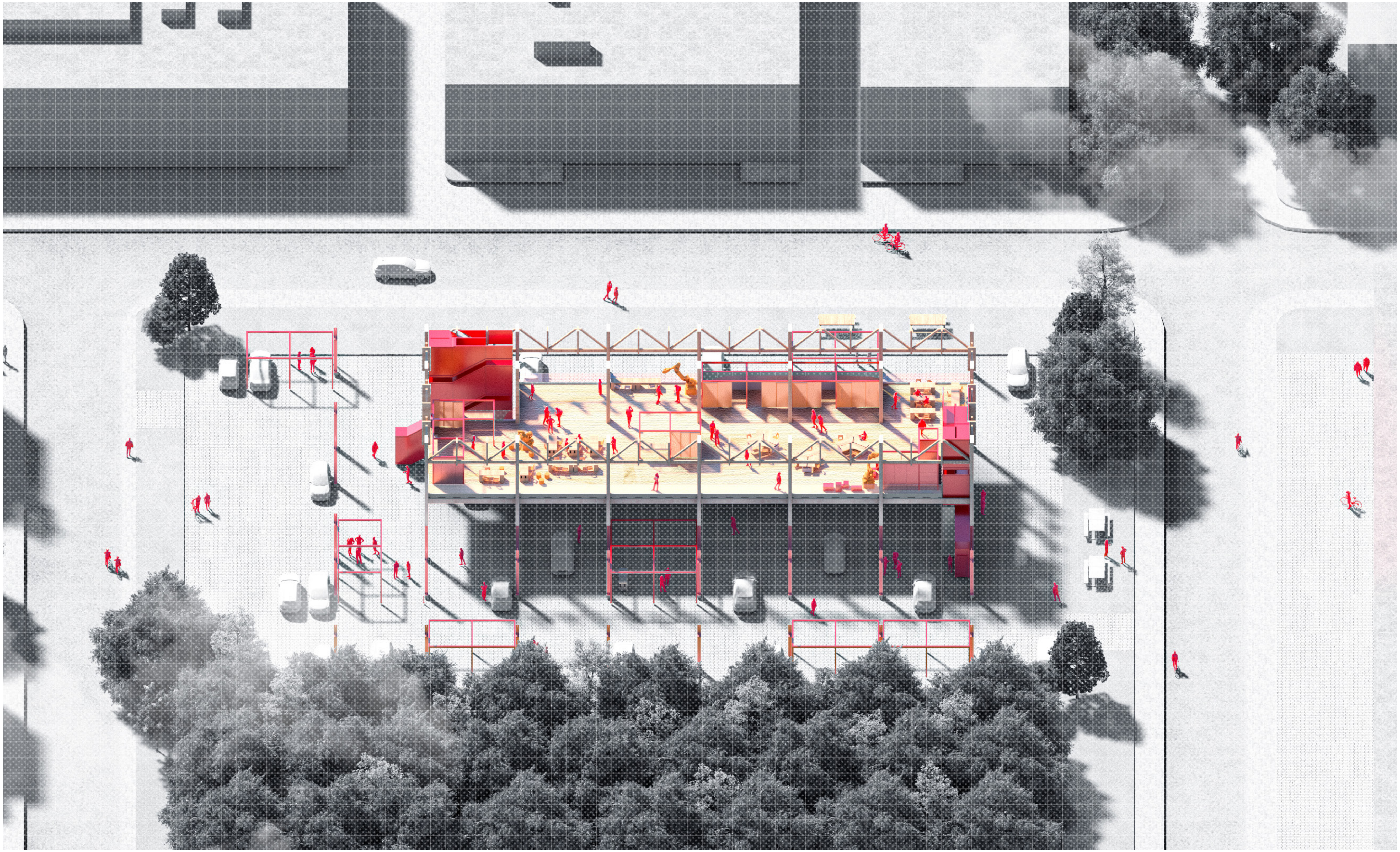
L

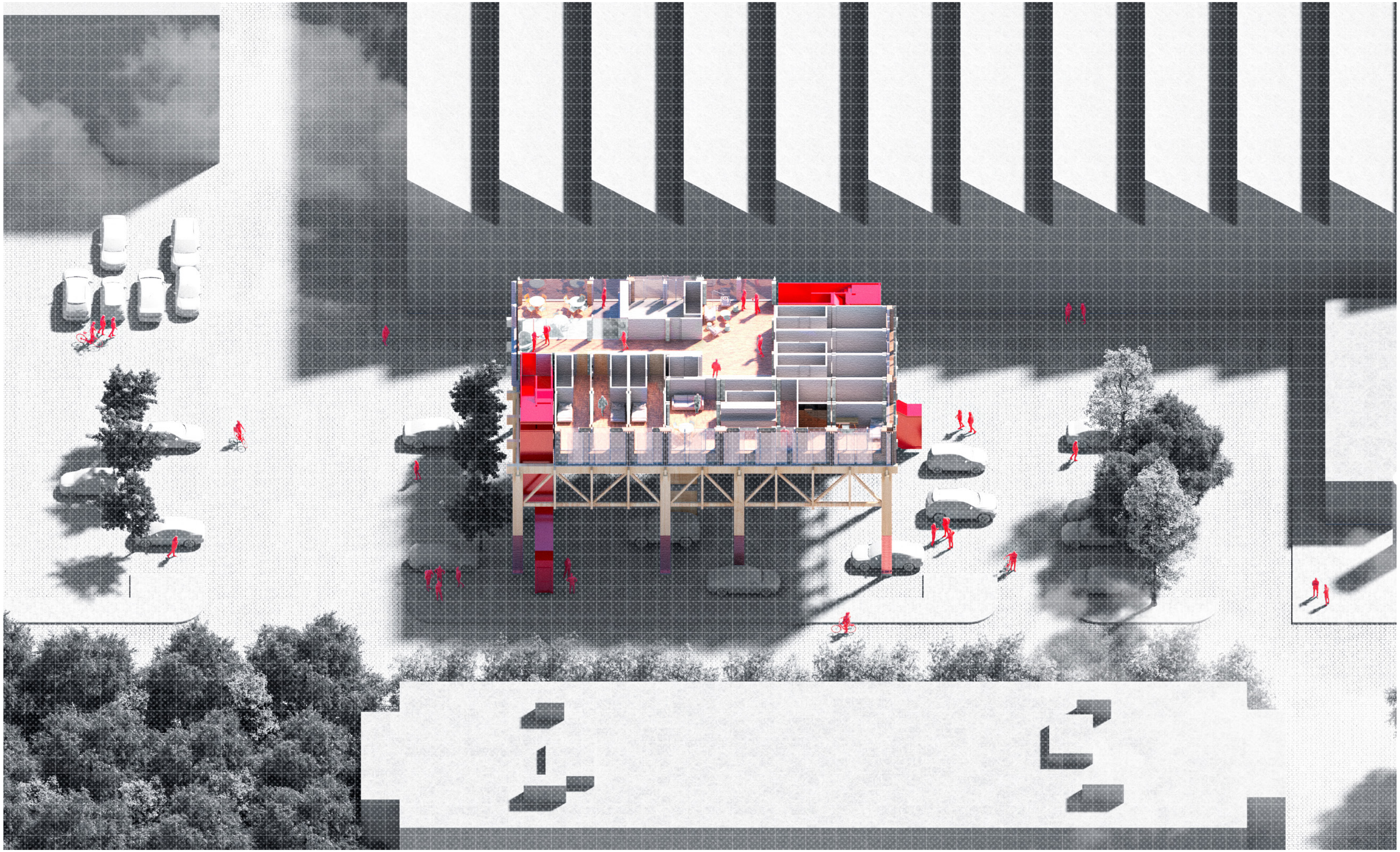
GFA: 71121 m²
±64 Units
±70 People
7 Floors



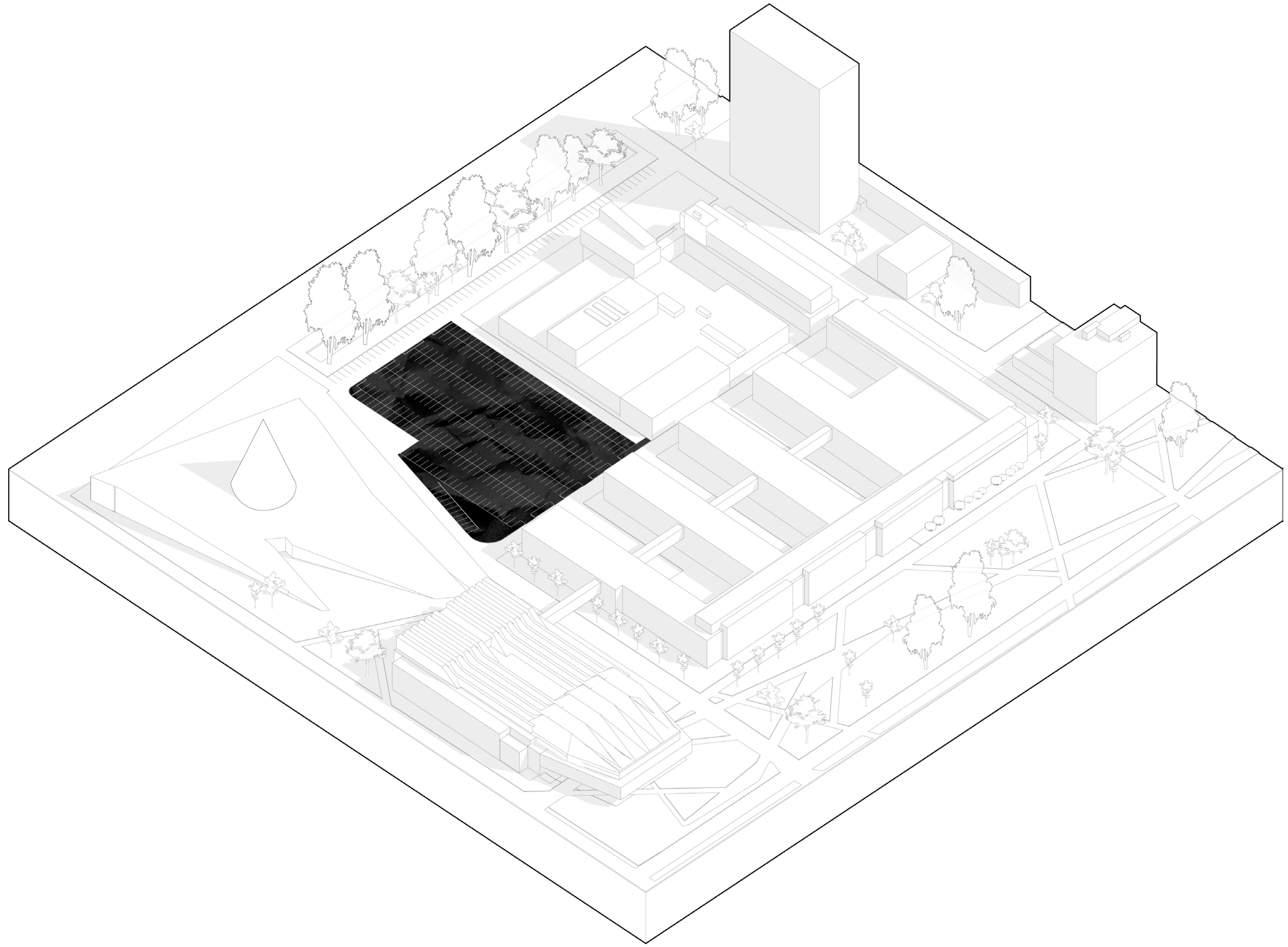

I need more residential units!
Beams! I need beams!
Anyone have a spare facade?
More classroom space please!
Who wants spare modules?



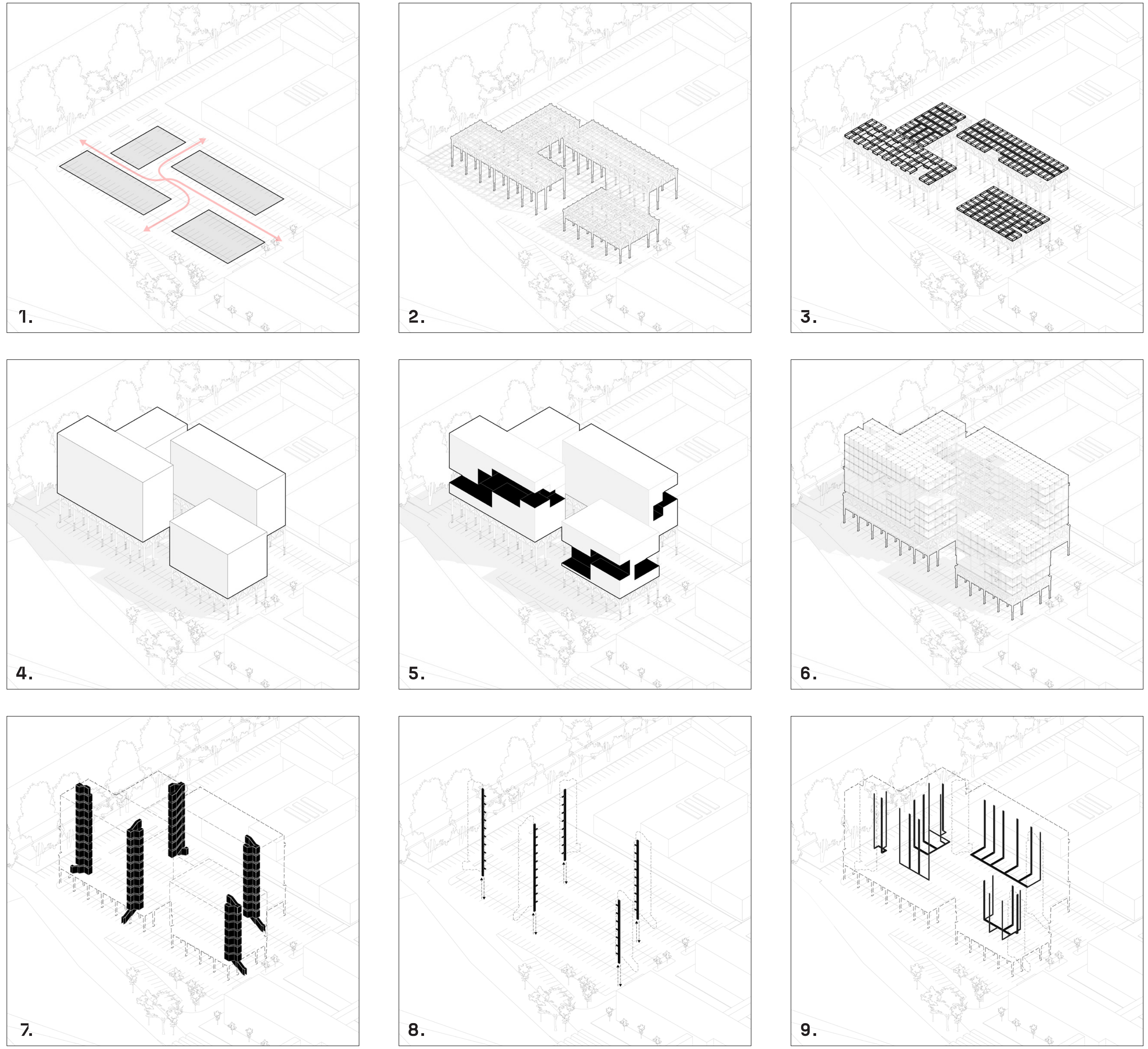


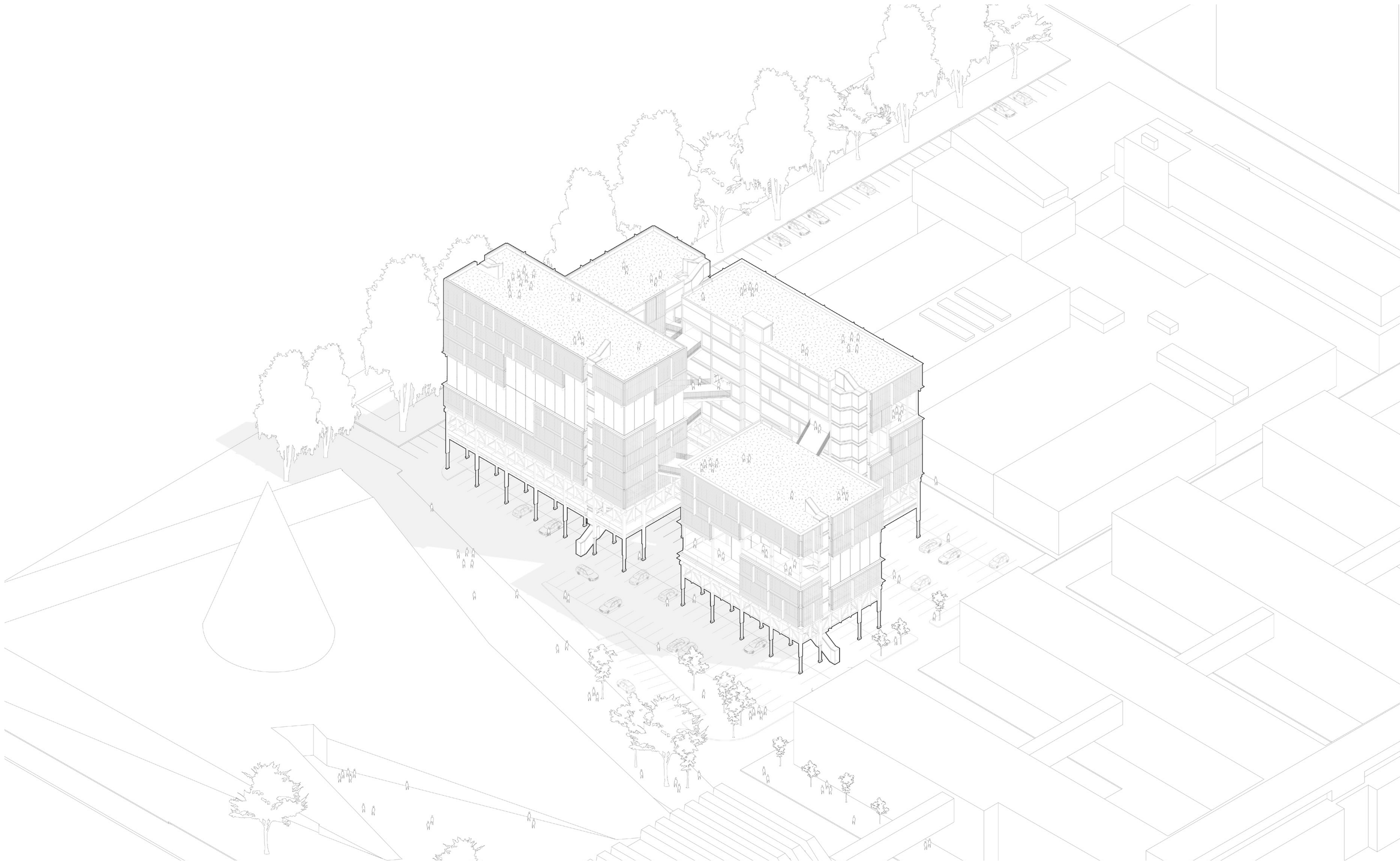


EXTREME PROPOSAL

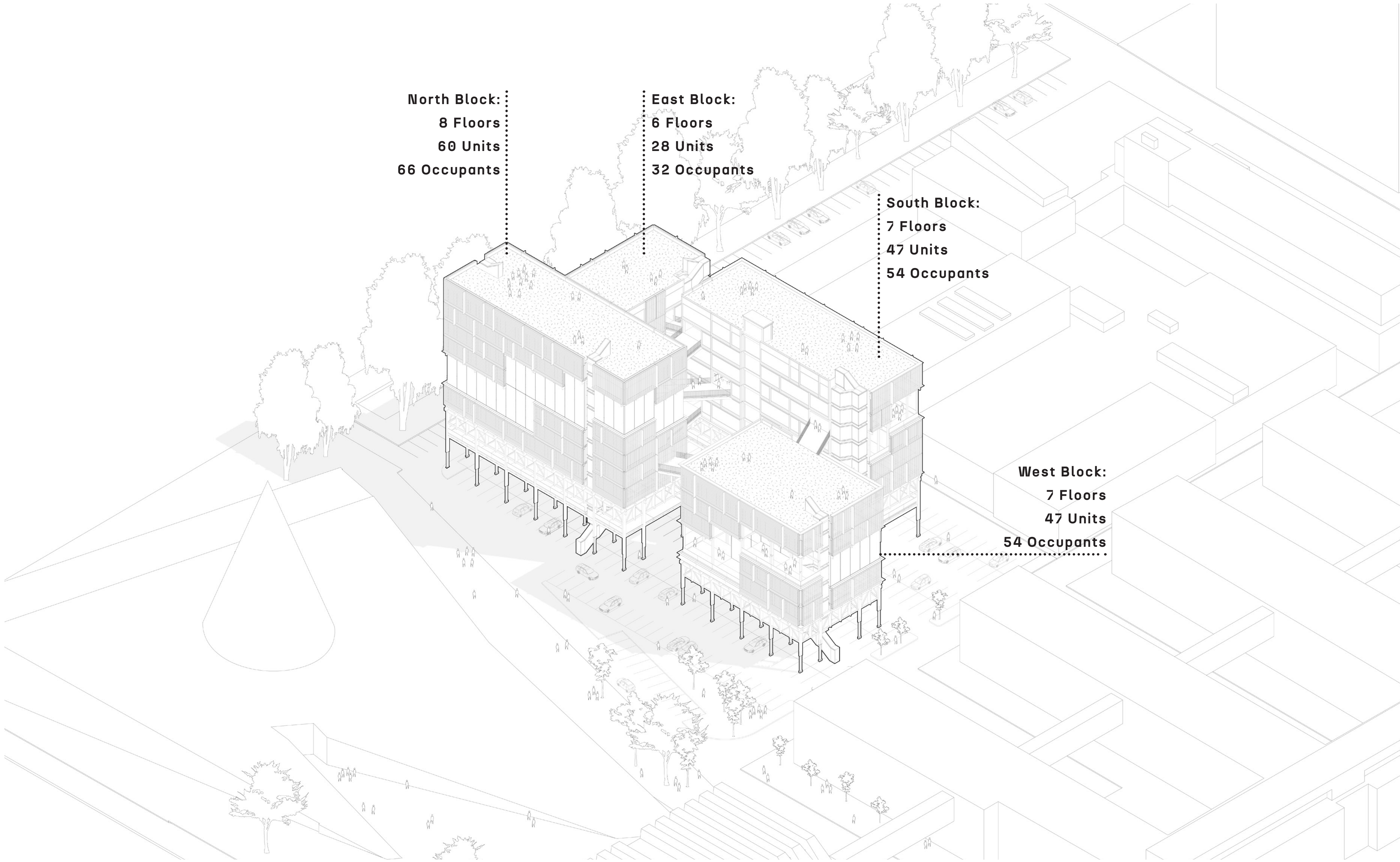


SELECTED PARKING LOT


1.
2.
3.
4.
5.
6.
7.
8.
9.



EXTREME RESULT

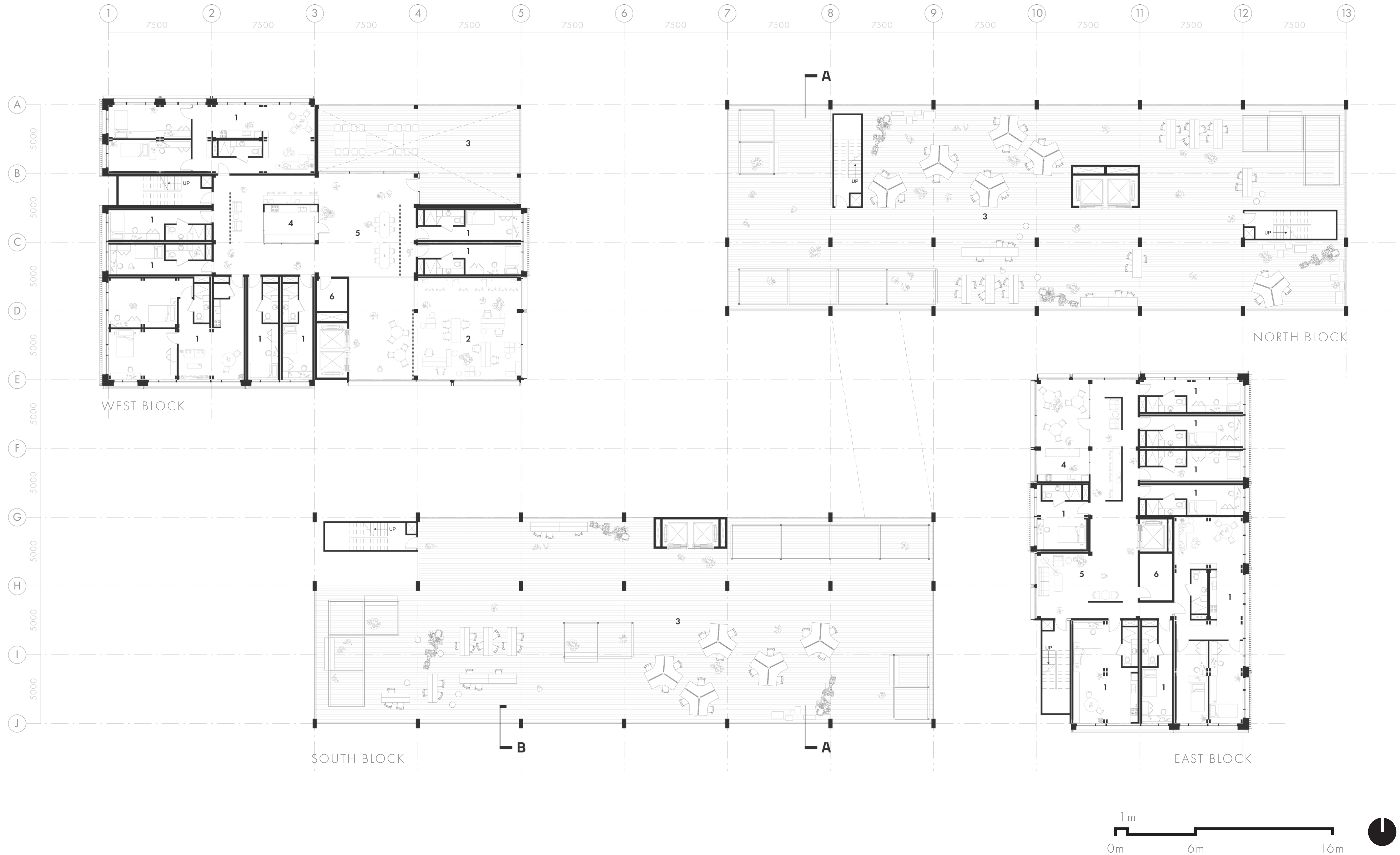


Total: 172 Units with 198 Occupants

LEVEL 1

Scale: 1:300
Extreme Iteration
Version type: P4
Location: Mekelweg 5,
2628 CC Delft
Number of Units: 16
Number of Unit Types: 5

1. Residential Unit
2. Common Work Space
3. Exterior Free Zone
4. Shared Kitchen
5. Shared Living Space
6. Utility Closet



LEVEL 2

Scale: 1:300

Extreme Iteration

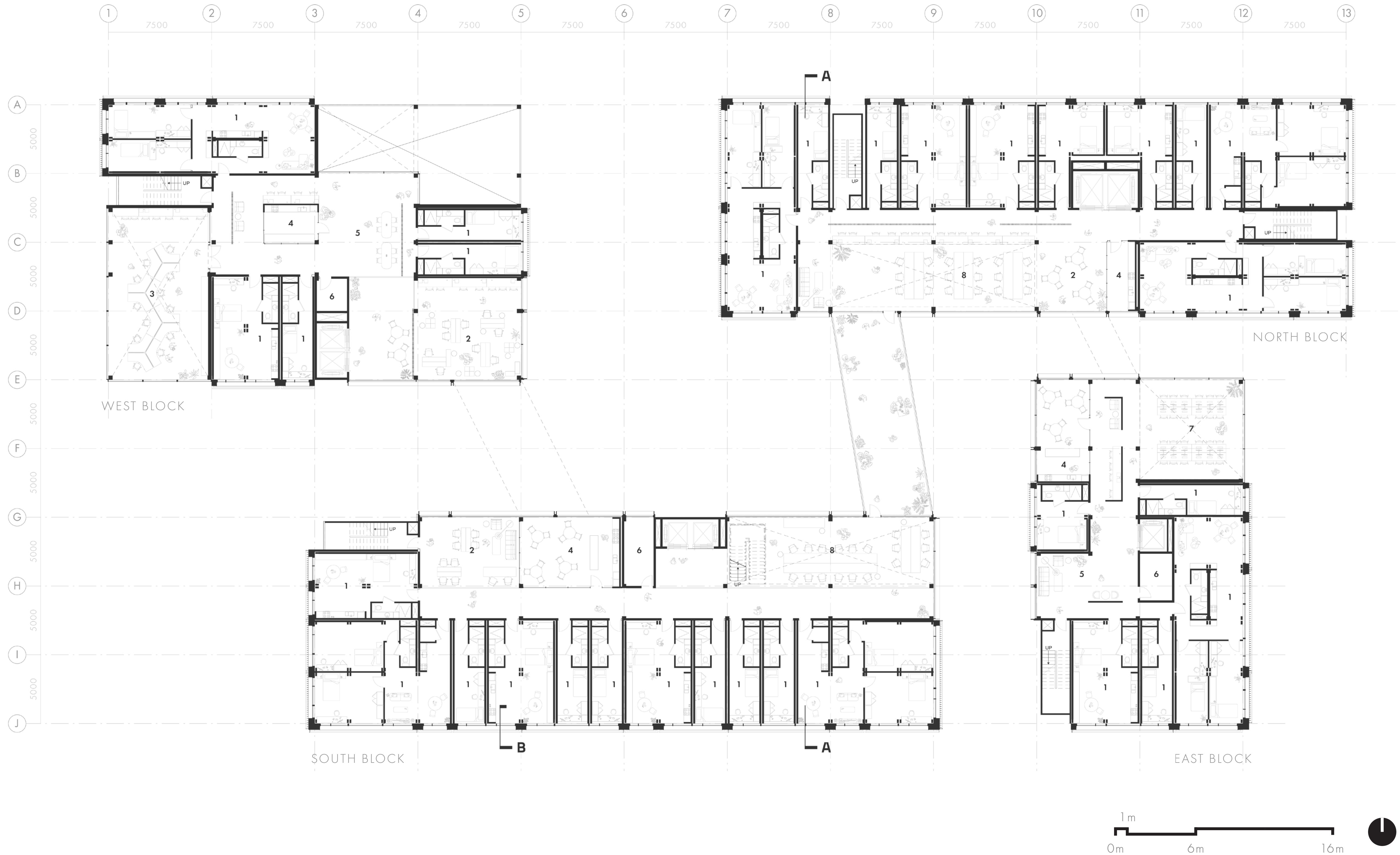
Version type: P4

Location: Mekelweg 5,
2628 CC Delft

Number of Units: 30

Number of Unit Types: 6

1. Residential Unit
2. Common Work Space
3. Prototype Lab
4. Shared Kitchen
5. Shared Living Space
6. Utility Closet
7. Study Space
8. Open Studio Space



LEVEL 3

Scale: 1:300

Extreme Iteration

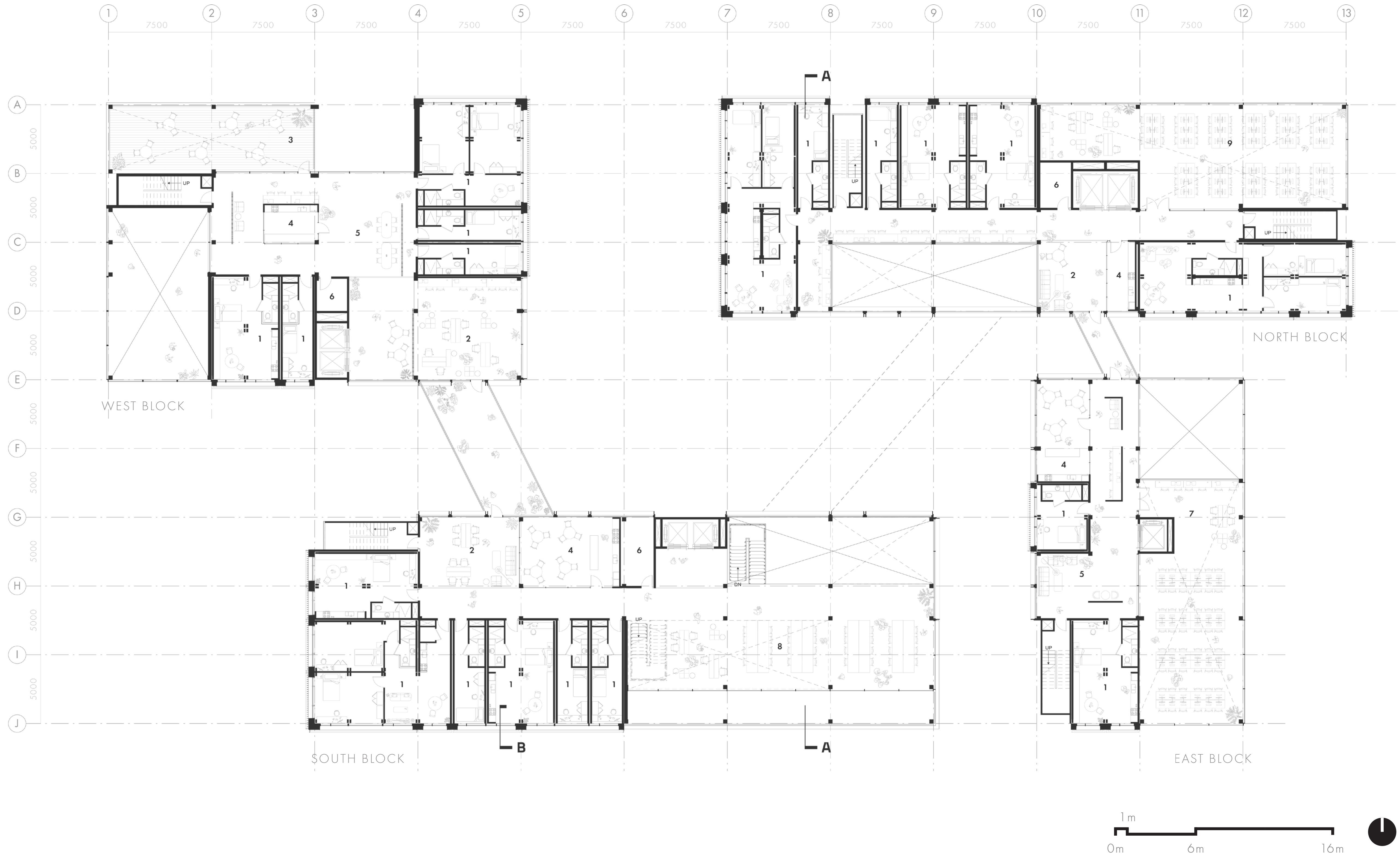
Version type: P4

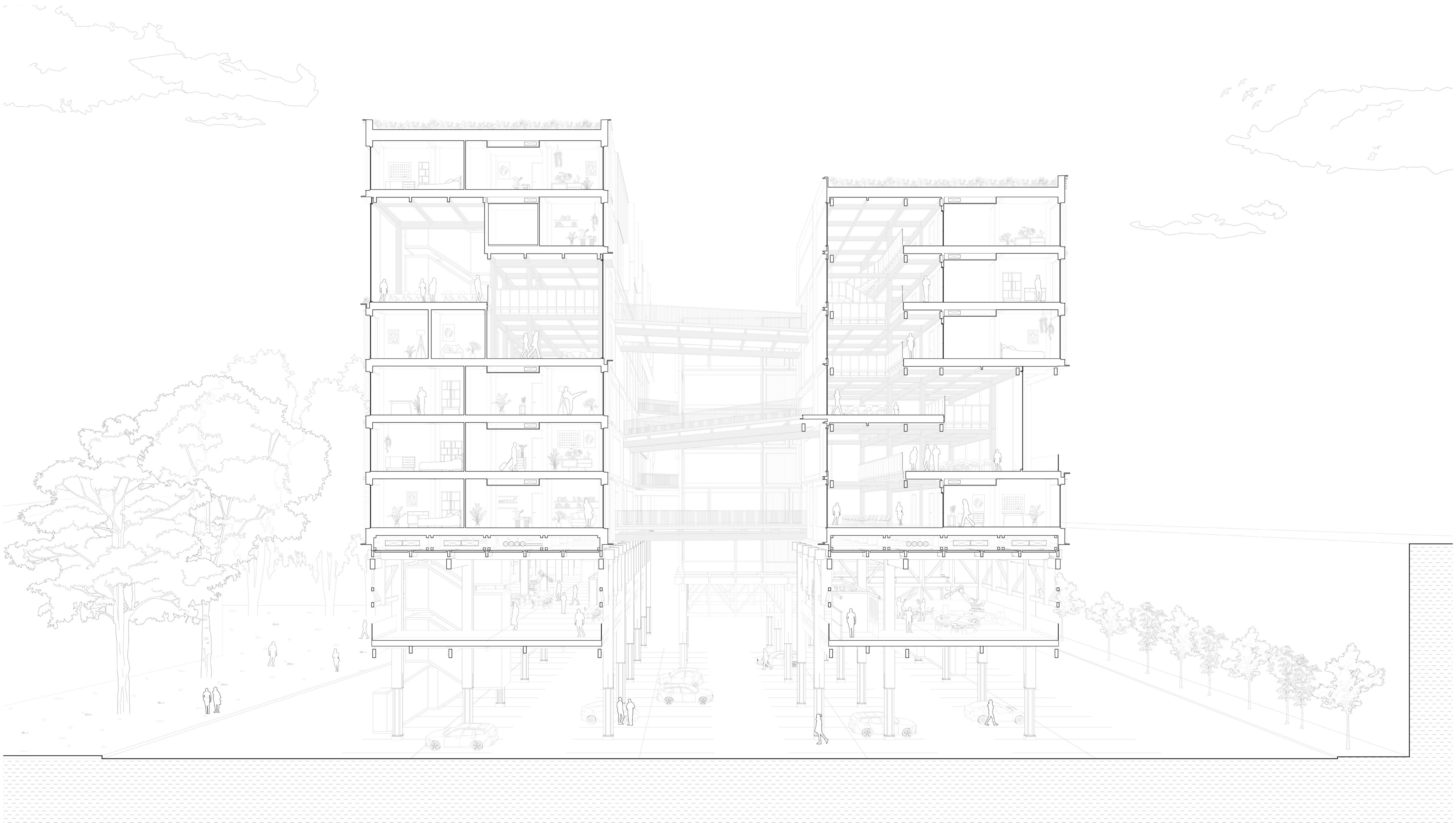
Location: Mekelweg 5,
2628 CC Delft

Number of Units: 19

Number of Unit Types: 5

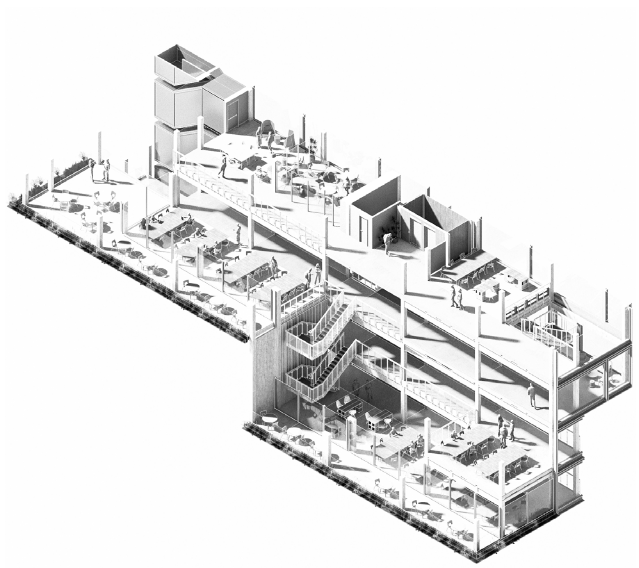
1. Residential Unit
2. Common Work Space
3. Exterior Free Zone
4. Shared Kitchen
5. Shared Living Space
6. Utility Closet
7. Study Space
8. Open Studio Space
9. Computer Lab



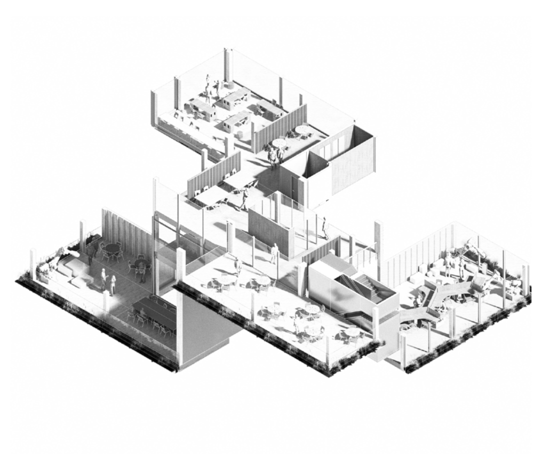


PERSPECTIVE SECTION A-A

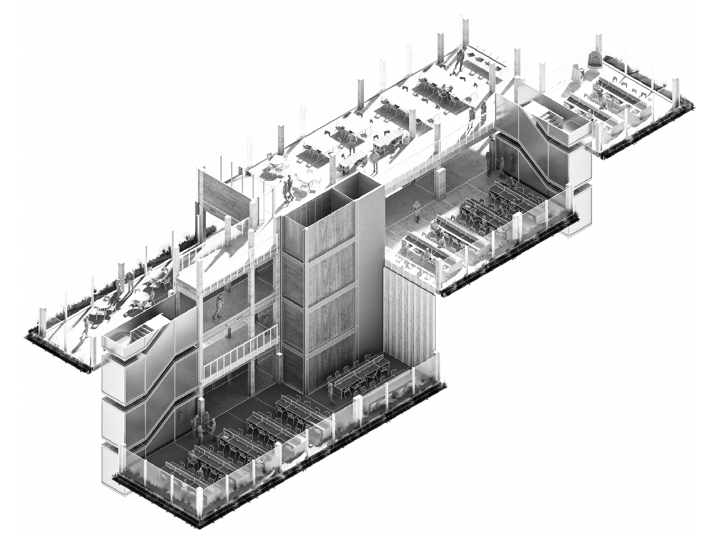
IN-BETWEEN SPACE



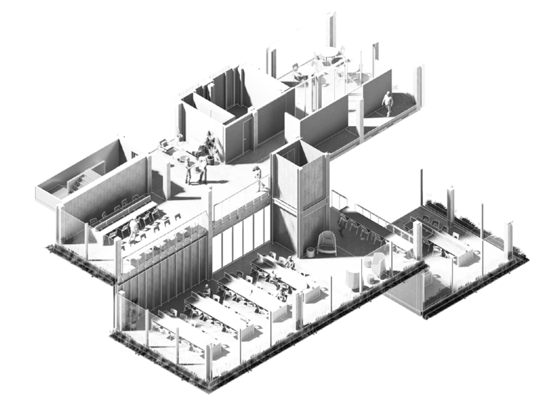
SOUTH BLOCK
Studio Space



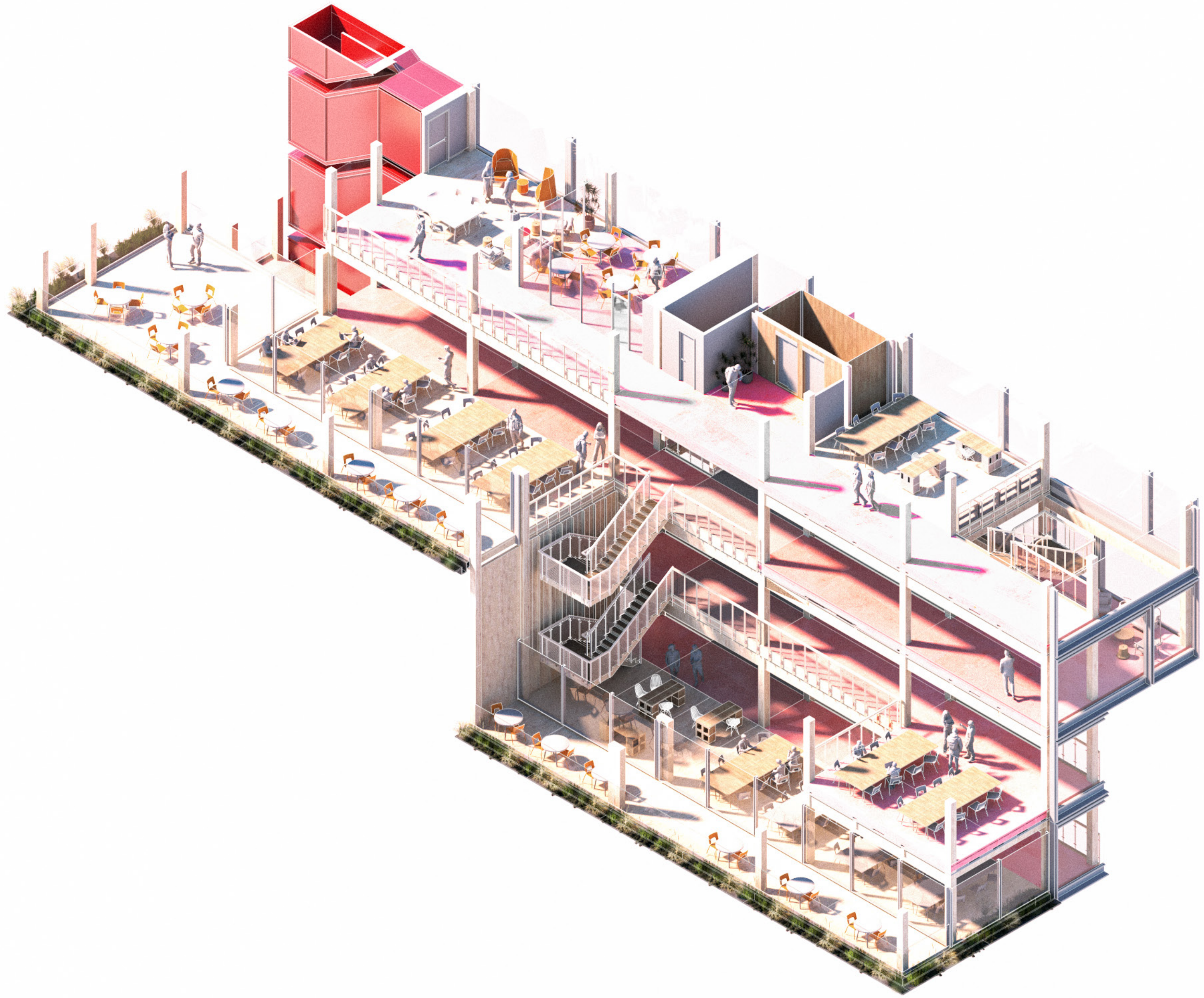
WEST BLOCK
Digital Fabrication Workshop



NORTH BLOCK
Computer Lab

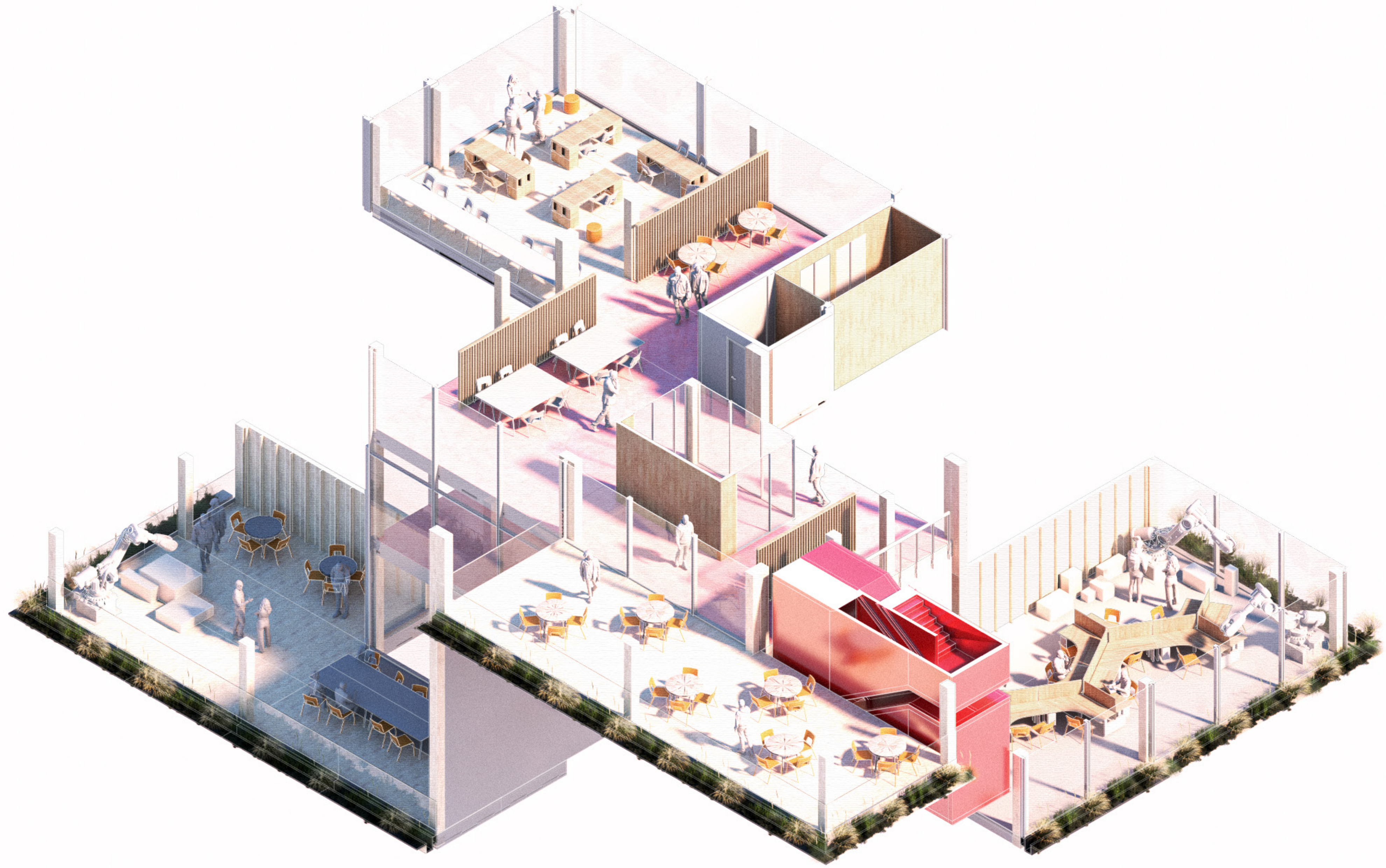


EAST BLOCK
Quiet Study Space



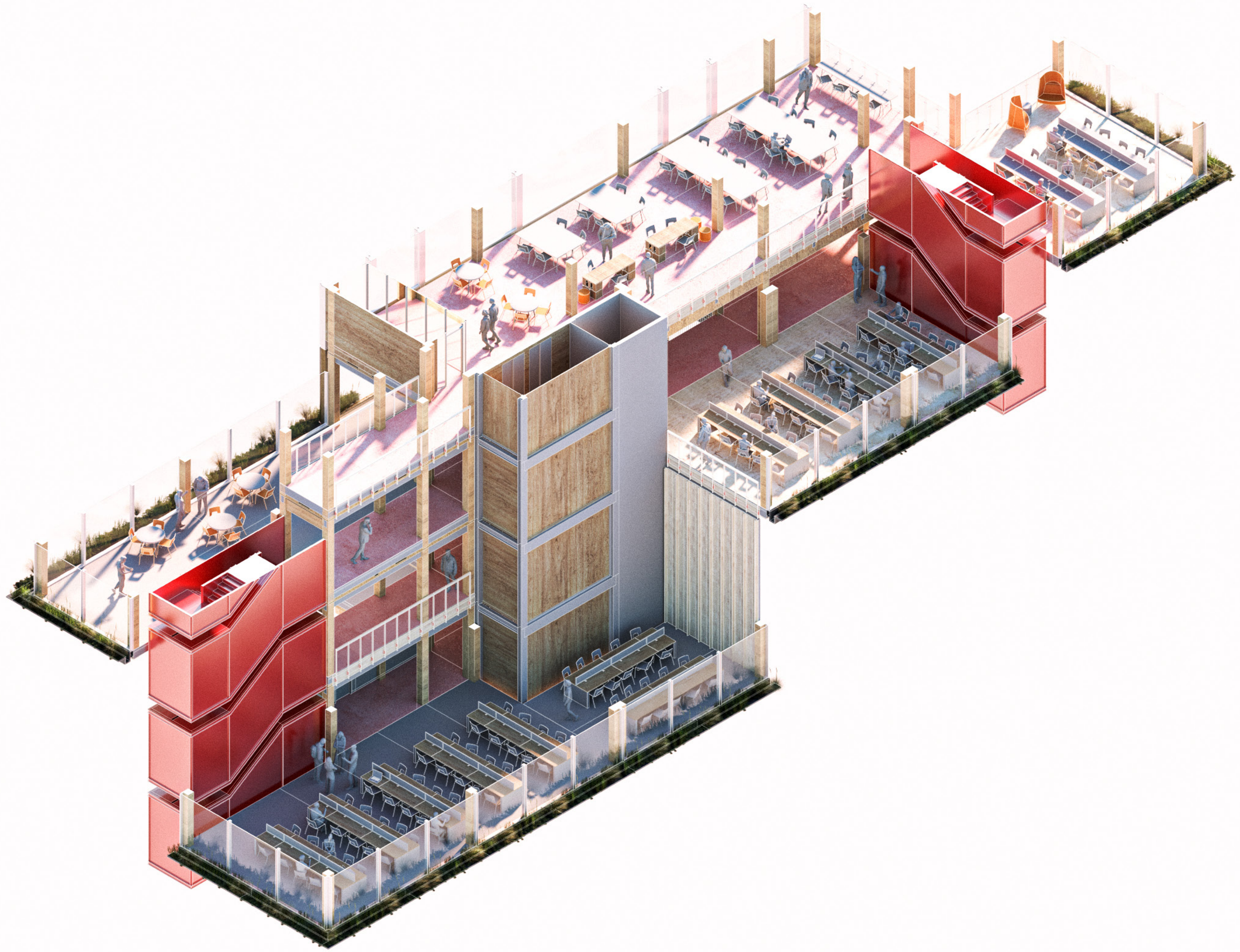
IN-BETWEEN SPACE

SOUTH BLOCK



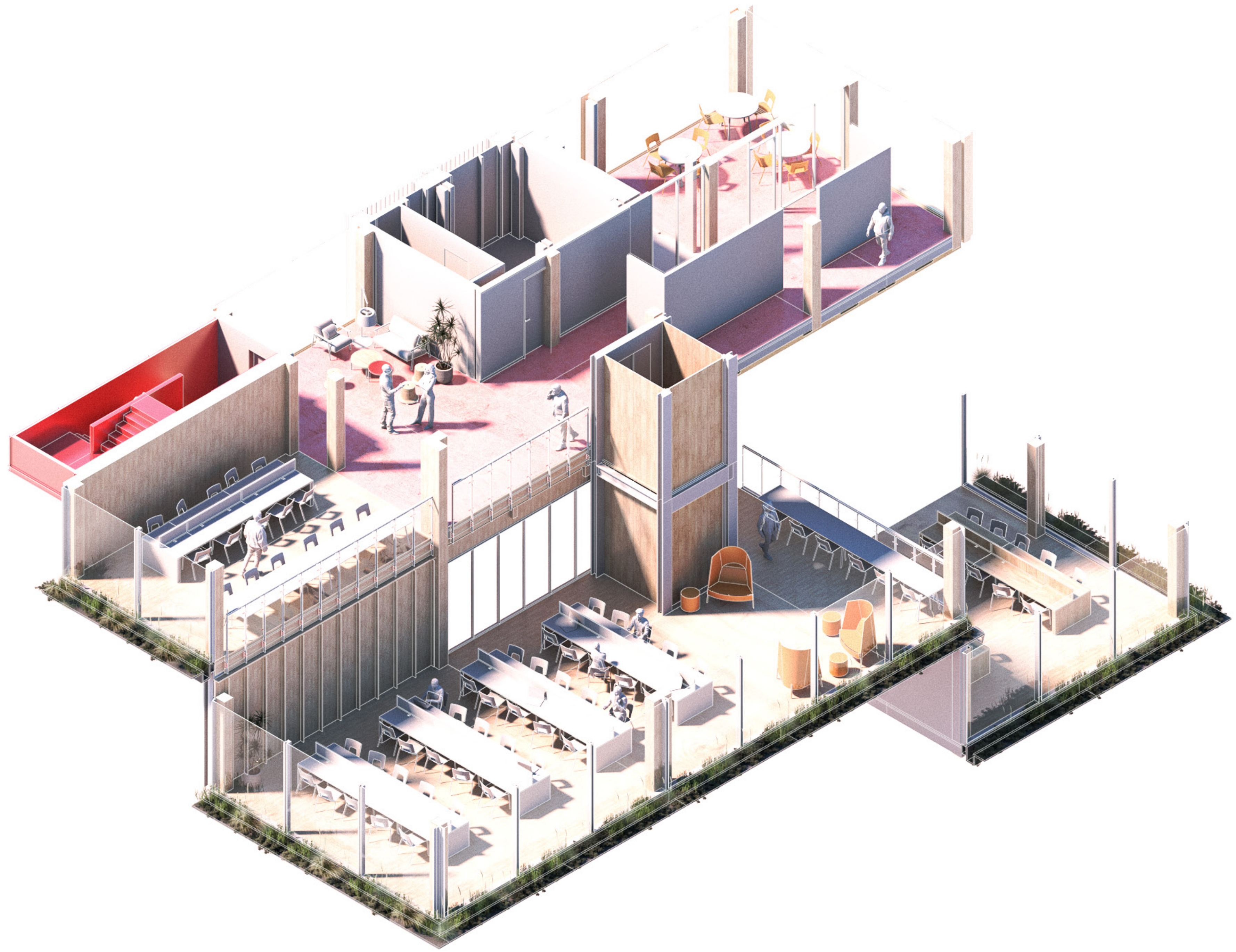
IN-BETWEEN SPACE

WEST BLOCK



IN-BETWEEN SPACE

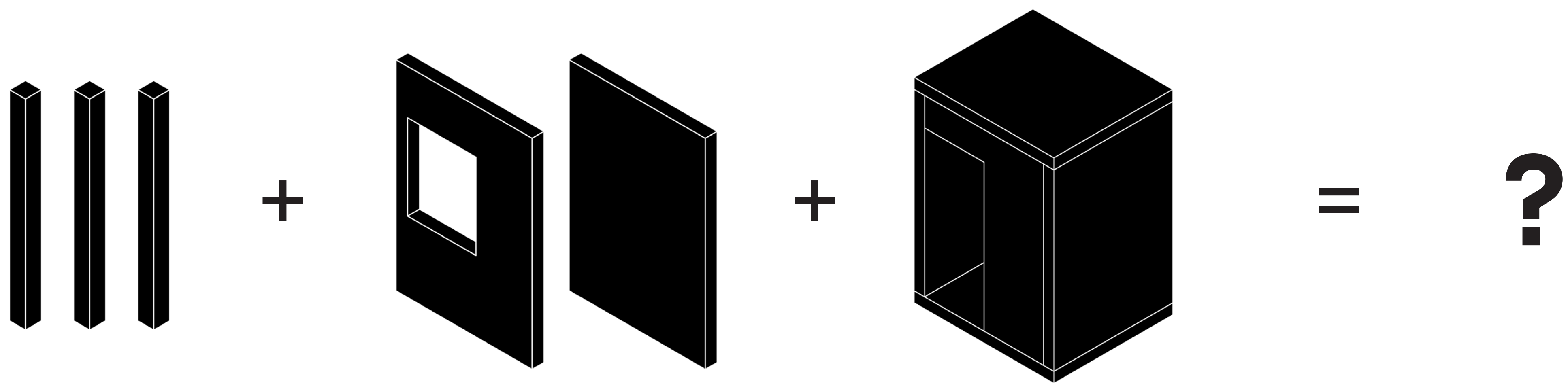
NORTH BLOCK



IN-BETWEEN SPACE

EAST BLOCK

CONCLUSIONS



1D SYSTEMS **2D SYSTEMS**

Utilize these systems for public/ educational spaces as they provide the most amount of flexibility and as a reult, oppourtunity for adaptability

3D SYSTEMS

3D systems make residential plan configurations easy and allow for the designer to quickly iterate.

RESULT

The combination of all three allows for quick design development with more informed decision making throughout the process