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Adaptive Assemblies: A Scalable Solution to Atlanta's Housing Crisis

Claudia Aguilar

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ADAPTIVE ASSEMBLIES

[A SCALABLE SOLUTION TO ATLANTA'S HOUSING CRISIS]





The Future of Multi-Family Development Typology: an
Adaptive Assembly Approach...

ADAPTIVE ASSEMBLIES

[A Scalable Solution to Atlanta's Housing Crisis]

Approval of Thesis Research
Project Book is Presented to:

Ameen Farooq

and to the
Faculty of the Department of Architecture
College of Architecture and Construction Management
by

Claudia Aguilar

In partial fulfillment of the requirements for the Degree :

Bachelor of Architecture

Kennesaw State University
Marietta, Georgia

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Thesis Advisor: Ameen Farooq

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KSU Department: Faculty & Staff

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ABSTRACT

Among other cities in the US, Atlanta, Georgia is experiencing levels of growth that surpass anything we have witnessed in the last century. It is projected that within the next ten years the city of Atlanta will grow by 2.5 million people to a current population of 7 million. With the surge of population influx reaching a record high of 2% growth per year, the available housing is practically bursting at the seams. Supply is low and demand is high. In effect, the average one-bedroom apartment runs for 1,800 dollars per month. The city is desperately seeking new opportunities for providing affordable housing at an expeditious rate. This has been made evident by the recent updates to the city's zoning. With the city's recent influx in the housing market, young professionals, in particular millennials, are desperately looking for alternatives to stay within the city to be part of urban life besides seeking professional jobs within metropolitan Atlanta.

To aid in competing with the rising demand for housing in Atlanta, the new legislation aims to incentivize affordable housing in Atlanta. Recently, the city of Atlanta is planning to introduce forty thousand new affordable housing units. Further rezoning in parts of the City of Atlanta is being enacted to encourage the development of accessory dwelling units on existing plots to accommodate the fast-paced needs of millennials and migrants from other states. To achieve the urgent need for more affordable housing, the architectural response has shifted to a more non-traditional means of constructing and supplying homes of varying scales, from ADU [accessory dwelling units] to multifamily developments.

A method that has proven successful in modern housing is to practice modular means of development, The modular system led to the development of standardized housing that was optimized for the constructability of standardized forms of housing developments. The design has been constrained to the dimensions of the max load for an eighteen-wheeler. This approach has diluted the architect's ability to produce site-specific, responsive, informed design and rather contributes to the "cookie cutter" stigma that the method has been labeled with.

This paper explores the design methodology for modular housing by revisiting its constructability, affordability, flexibility, and adaptability to accommodate the living standards and lifestyle of millennials, today. This research focuses on a modular housing type that could break away from the constraints of transport¹ and deliver new adaptive assemblies. These adaptive assemblies are reconfigurable² in form of structure, and constructive materials [flooring, wall panels, ceiling, and other finishes] that allow spaces to be more flexible, interchangeable, affordable, and constructible being more responsive to the 21st-century living patterns. To achieve this, an integrated design strategy for assembling dwelling units requires that the accessory dwelling units³ by the City of Atlanta need to be revisited and should be further broken down into more adaptive assemblies.

To address this issue, this research investigates the current housing assembly methodologies, which take advantage of modular construction methods on a component-based system. The goal of this paper is to explore a scalable solution to modular housing to simplify the traditional approach of a one-and-done" designed unit. This proposal aims more specifically to design a kit of parts that are made to be easily transported and assembled but also gives the ability to customize the use of components to benefit all unique conditions. The benefits of this concept could include decreased construction time, cost, and on-site labor/disruption while providing quality housing with affordable and flexible options for young professionals [millennials] within the urban setting of Atlanta.

¹Typical truck bed of 8.5 ft W x 40 ft L.

² Kit of parts methodology will allow for a flexible layout with interchangeable structure components and material finishes.

³ "Accessory Dwelling Unit (ADU) is a legal and regulatory term for a secondary house or apartment that shares the building lot of a larger, primary home."

01 CHAPTER

THESIS BASIS

1.1 OVERVIEW

[Summary]

Atlanta, Georgia is experiencing unprecedented growth, with a projected increase of 2.5 million people in the next decade, resulting in a severe shortage of affordable housing. To address this, the city is introducing new legislation to incentivize the development of affordable housing, including the construction of 40,000 new units. Modular housing has proven successful in meeting the demand for affordable housing, but its “cookie-cutter” design is a drawback. This paper explores a new design methodology for modular housing that allows for more adaptability and flexibility, breaking away from the constraints of transport to create more responsive housing. The goal is to design a scalable kit of parts that can be easily transported and assembled, providing affordable and customizable housing options for young professionals in Atlanta’s urban setting.

[Definitions]

ADU: Accessory Dwelling Units

Kit of Parts: Design concept where a product or system is broken down into individual components or modules that can be easily assembled or configured in different ways to create a variety of different solutions

2%

The city of Atlanta's population peaked in 1970 at 496,973. As the region grew dramatically over the next two decades, the city's population shrank to 394,017 by 1990. And over the next 20 years the population grew a mere 0.85 percent. That shrinking pattern has now changed.

12%

The census indicates that in 2016 Atlanta's population was 472,522: a 12 percent increase in a six-year span from 2010 to 2016. This magnitude in growth has not been seen in Atlanta in the last 50 years. There is no reason to believe this trend will not continue and accelerate. Between July 2016 and July 2017, the city of Atlanta permitted more than \$4 billion in construction: more than any other 12 months in the city's history.

**+2.5
million**

Atlanta is experiencing levels of growth that surpass anything we have witnessed in the last century. It is projected that within the next ten years the city will grow by 2.5 million people to a population of 7 million.

THESIS STATEMENT

The intent of this thesis is to redefine the architectural approach to modular housing. This thesis asks “What if modular housing could break from the constraints of transport, and deliver new adaptive assemblies which could benefit the occupant, environment and urban fabric in which the product exists. What if rather than a holistic strategy for assembling dwellings, that instead the current unit were to be further broken down into the essential components of architecture. If the construction method was treated as a kit of parts.

QUESTIONS

Define how or where can the current model for modular construction be improved and where is it failing?

How can a revitalized model of modular construction contribute to the solution of the housing crisis in Atlanta?

How can the current model of modular construction can be challenged in terms of affordability, scale, and accessibility?

What factors have contributed to the stagnation of development of construction methods?

What design strategies /technologies could be implemented to respond to the stagnant methods of construction?

A high-speed photograph of a water splash against a blurred city skyline. The water is captured in mid-air, forming a complex, crystalline shape with several droplets suspended above it. The background shows a dense urban landscape with various building heights and windows, all rendered in a light, desaturated tone.

02 CHAPTER
THEORY

2.1 SUPPORTING DATA

Main issues:

The issue at hand is the severe shortage of affordable housing in Atlanta, Georgia due to unprecedented growth. The city is expected to see a surge of 2.5 million people in the next decade, resulting in a significant increase in demand for affordable housing. To tackle this problem, the city is introducing new legislation to incentivize the development of affordable housing, including the construction of 40,000 new units.

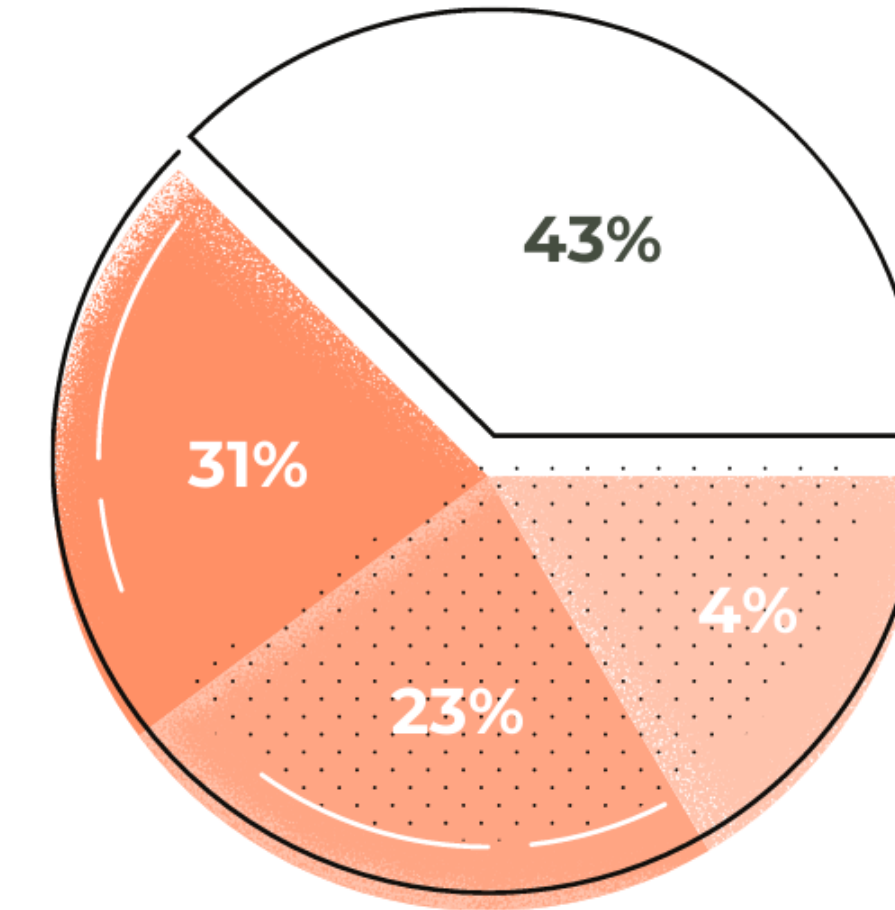
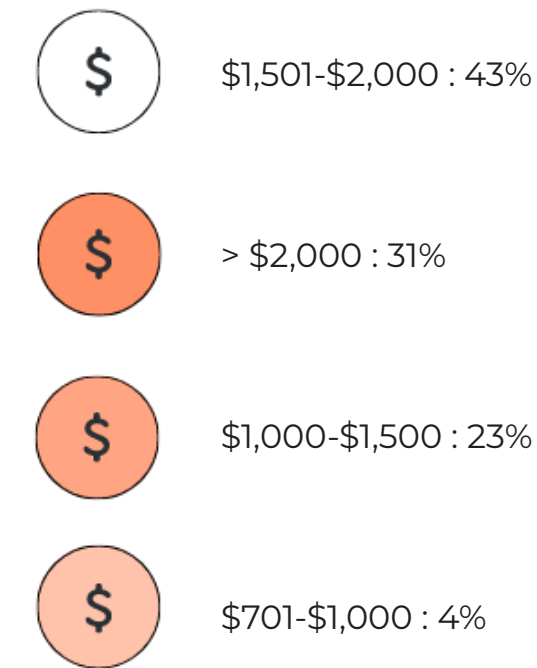
The average size of an apartment in Atlanta is 971 square feet, however, this can vary significantly depending on the type of unit. Studio apartments are the smallest and most affordable option available, followed by one-bedroom apartments which are closer to the average size. Two-bedroom and three-bedroom apartments, on the other hand, offer a more generous square footage.

Additionally, there are both cheap and luxury options available for both houses and apartments, further increasing the variance in size and cost. The discrepancy in size and cost of living spaces in Atlanta can make it challenging for individuals and families to find a living arrangement that suits their needs and budget.

Atlanta's Rental Market

CITY	AVERAGE RENT
Atlanta	\$1,861
Marietta	\$1,649
Douglasville	\$1,518
Lawrenceville	\$1,665
Lithonia	\$1,476
Stone Mountain	\$1,348
Decatur	\$1,545
Augusta	\$1,129
McDonough	\$1,695
Jonesboro	\$1,349
Snellville	\$1,471
Riverdale	\$1,319
Sandy Springs	\$1,845
Kennesaw	\$1,941
Duluth	\$1,804

Atlanta, Ga Apartment Rent Ranges



What is the average apartment size in Atlanta?

> The average size for a Atlanta, Ga apartment is 971 square feet, but this number varies greatly depending on unit type, with cheap and luxury alternatives for houses and apartments alike. Studio apartments are the smallest and most affordable, 1-bedroom apartments are closer to the average, while 2- bedroom apartments and 3-bedroom apartments offer a more generous square footage.

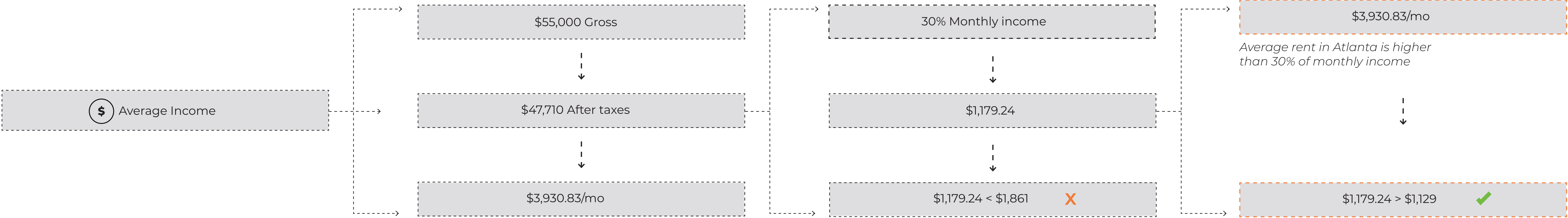
> 118,669 or 55% of the households in Atlanta, Ga are renter-occupied while 96,480 or 45% are owner-occupied.

AVERAGE INCOME | AVERAGE UNIT SIZE

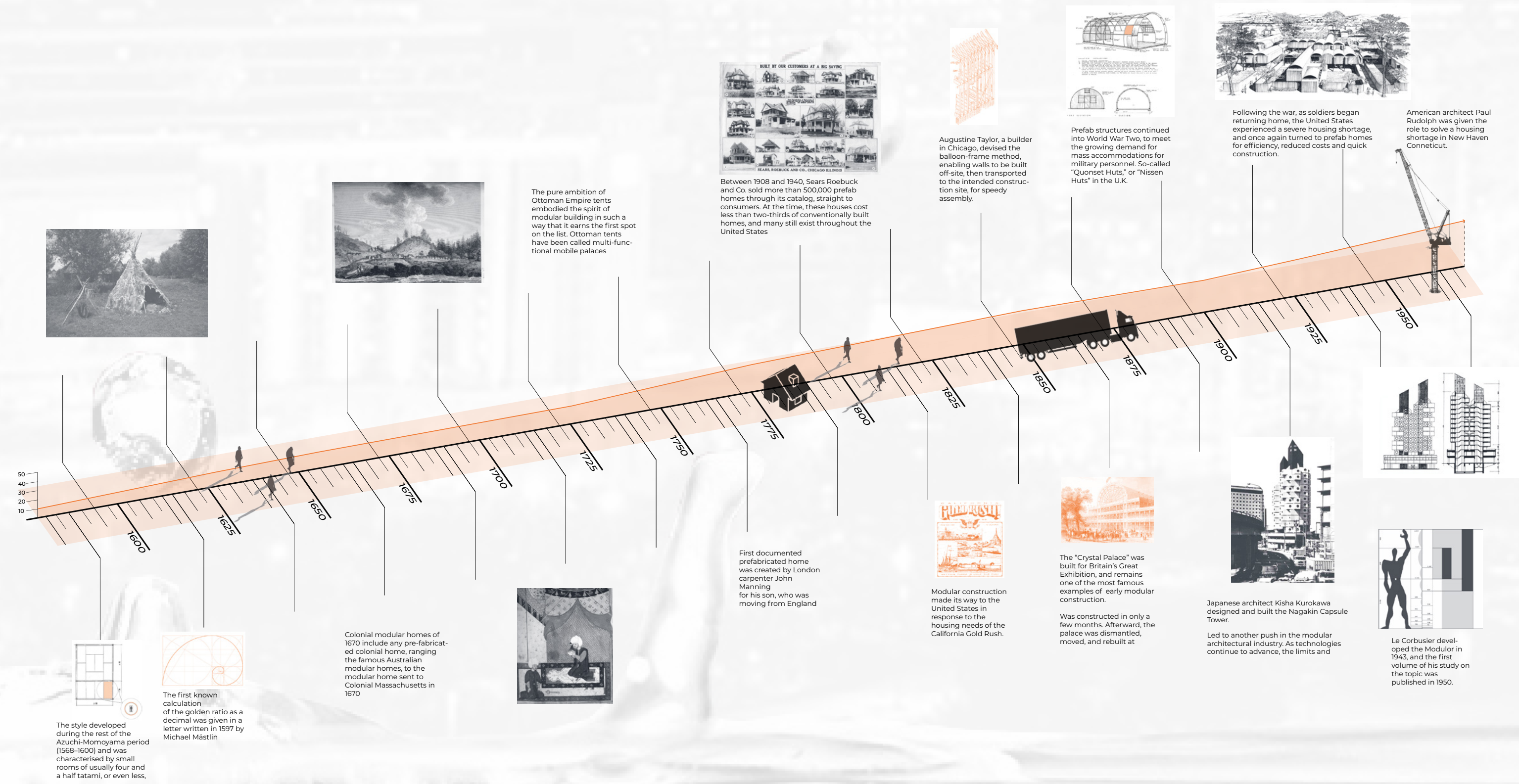
Atlanta's Average Rent for a 1 Bedroom Apartment



Atlanta's Average Rent Calculation - Average Income



03 CHAPTER MODULARITY

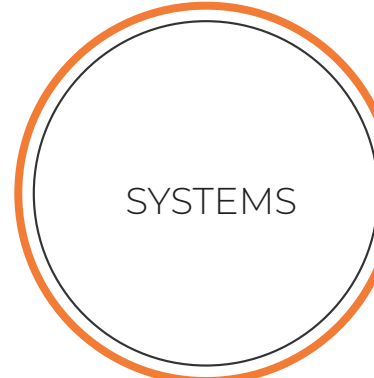
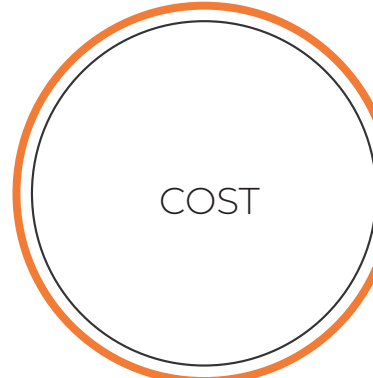
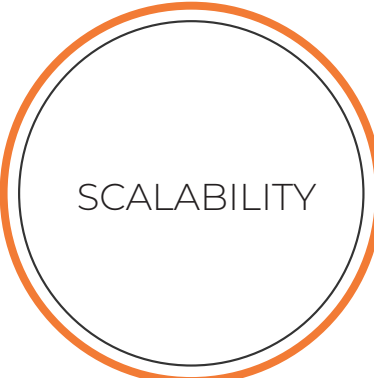


3.1 MODULARITY OVERVIEW

Issues with modular means of development

Although modular housing has proven to be a successful method of development, it has its drawbacks. It involves creating standardized housing optimized for standardized forms of housing developments, which limits the architect's ability to produce site-specific, responsive, and informed designs. The maximum load for an eighteen-wheeler also restricts the design dimensions, which can lead to a perception of a lack of uniqueness, also known as the "cookie-cutter" stigma.

Modular housing faces issues with transportation due to the constraint of standardized dimensions for transportation. This has led to a limitation in the adaptability of the design to the site-specific needs. In addition, although the cost of modular housing is generally lower than traditional construction, the upfront costs can be significant, making it less affordable for some potential buyers or renters.



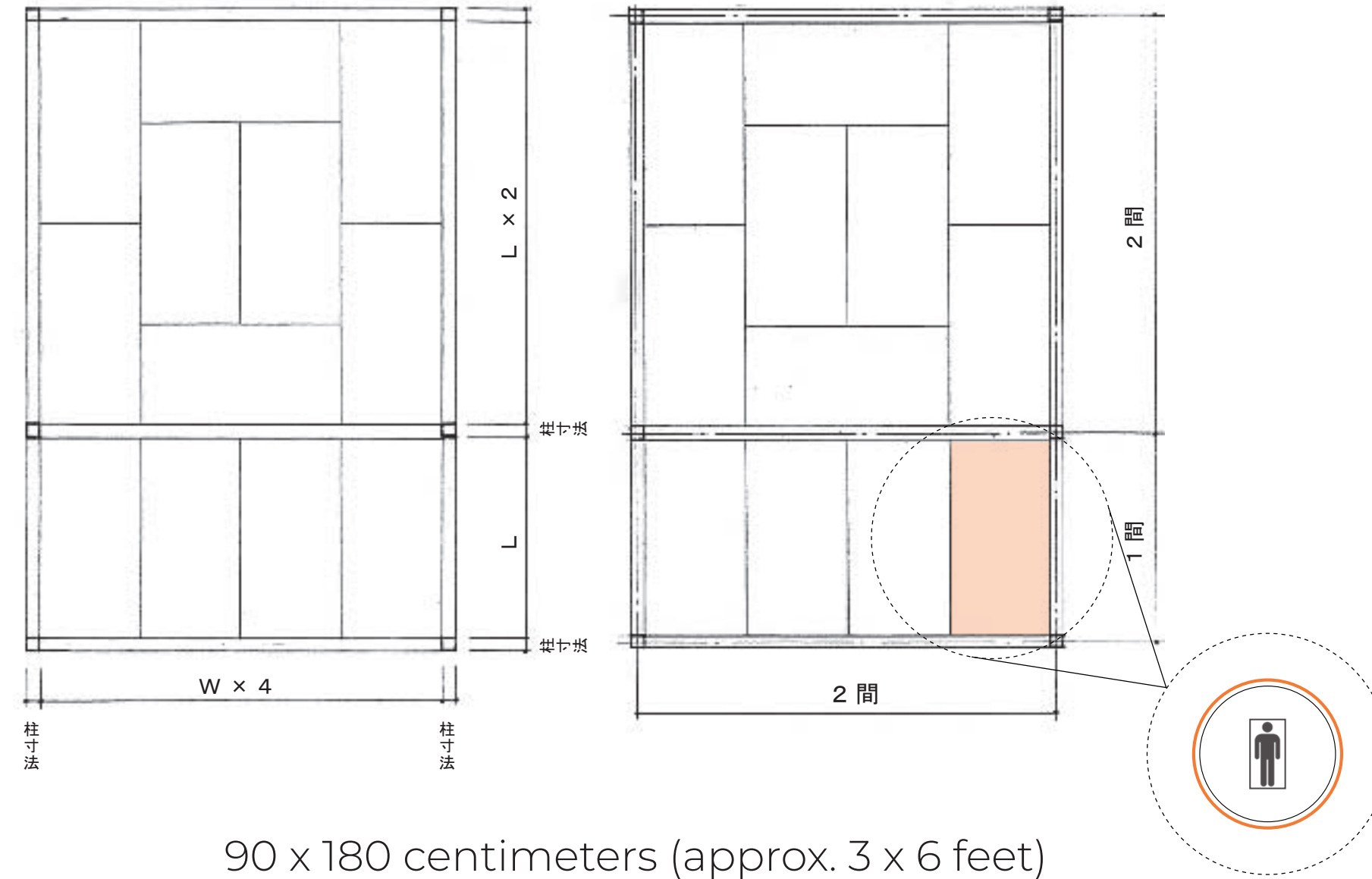
3.2 PRECEDENTS

Japanese Tea House

Modularity refers to the quality of being able to combine or arrange separate parts or units in a variety of ways to create a larger, more complex structure. In the case of a tatami mat, modularity refers to the ability to combine individual mats to create a larger flooring system.

A tatami mat is traditionally made up of a core of rice straw, covered with a woven rush straw covering, and bound with decorative cloth edges. The mat's dimensions are standardized and typically measure 1.82 meters by 0.91 meters. This standardized size allows tatami mats to be combined and arranged in various configurations to create larger flooring systems that fit a particular space.

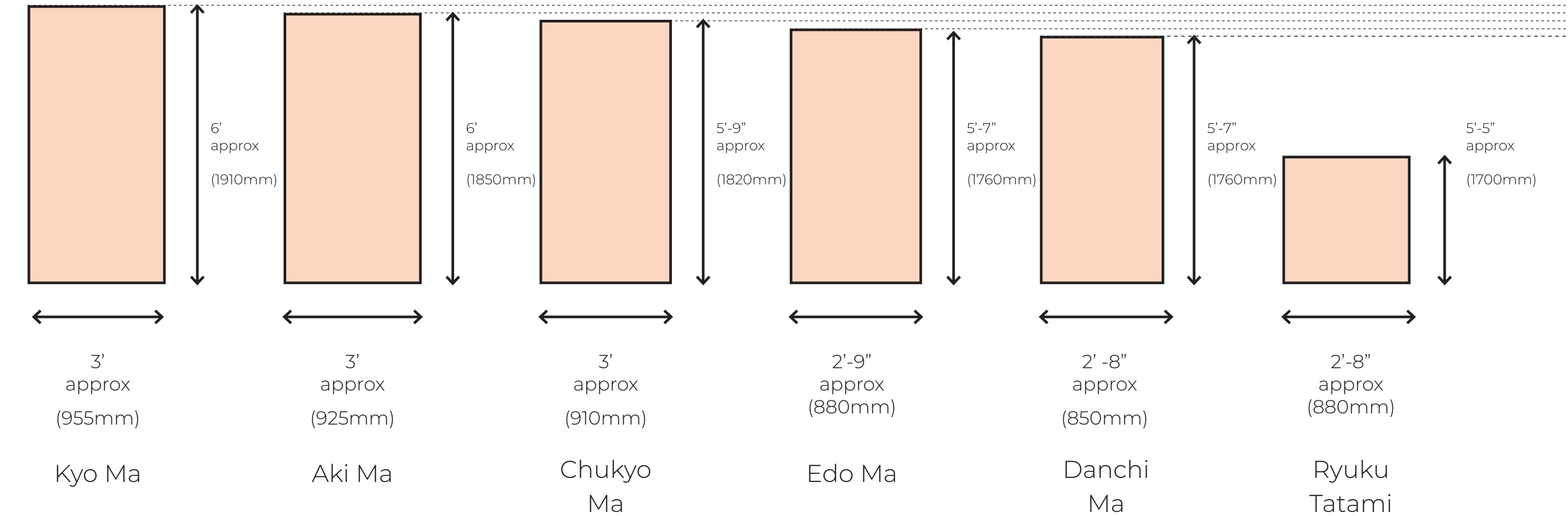
The modular nature of tatami mats makes them a versatile flooring option that can be adapted to a wide range of architectural and design styles. This flexibility has made them a popular flooring option in traditional Japanese homes, as well as in contemporary spaces that embrace the aesthetic and practical benefits of tatami flooring.



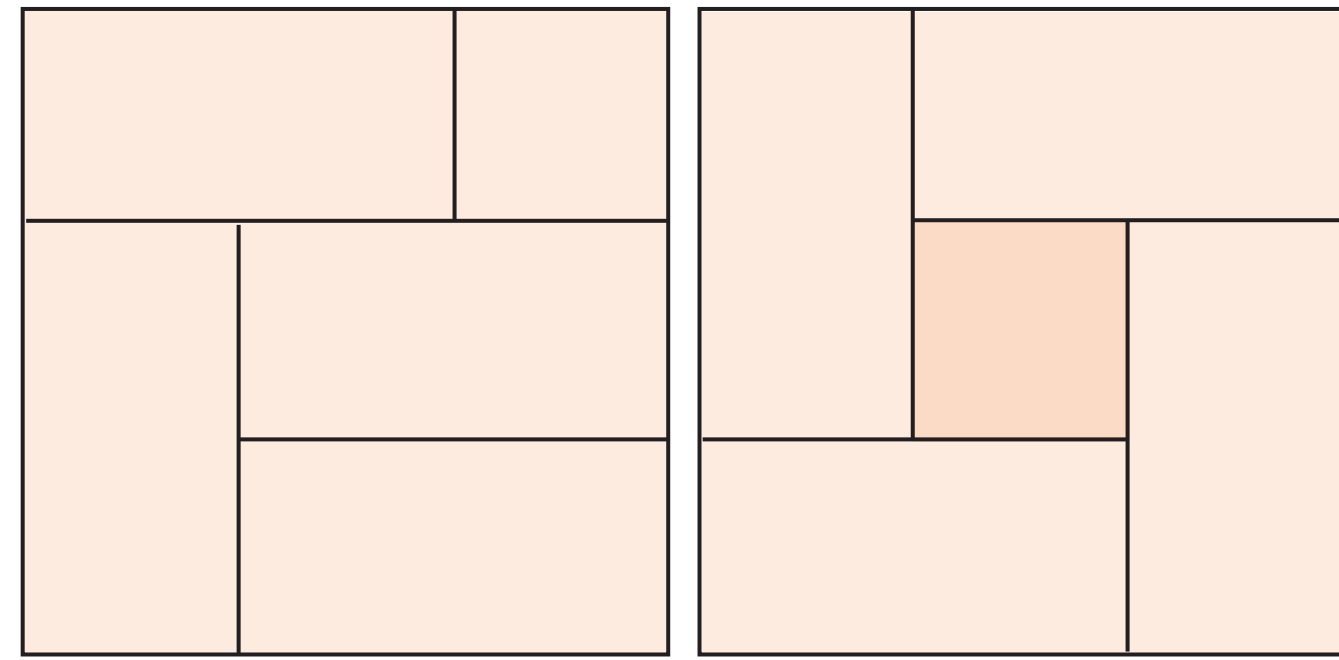
“From ratio to overall concept”

STANDARD SIZING

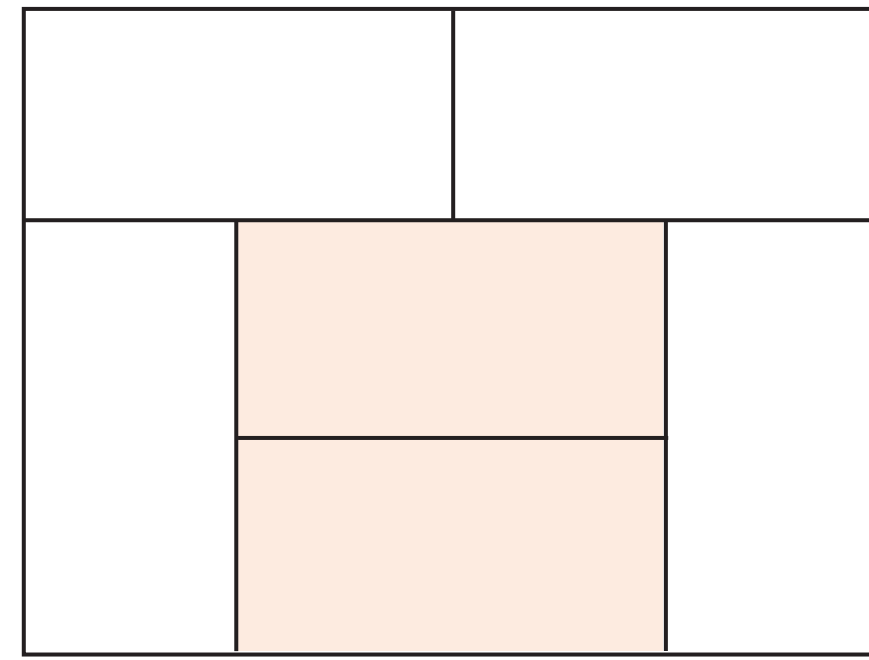
Tatami mat size variations & naming conventions



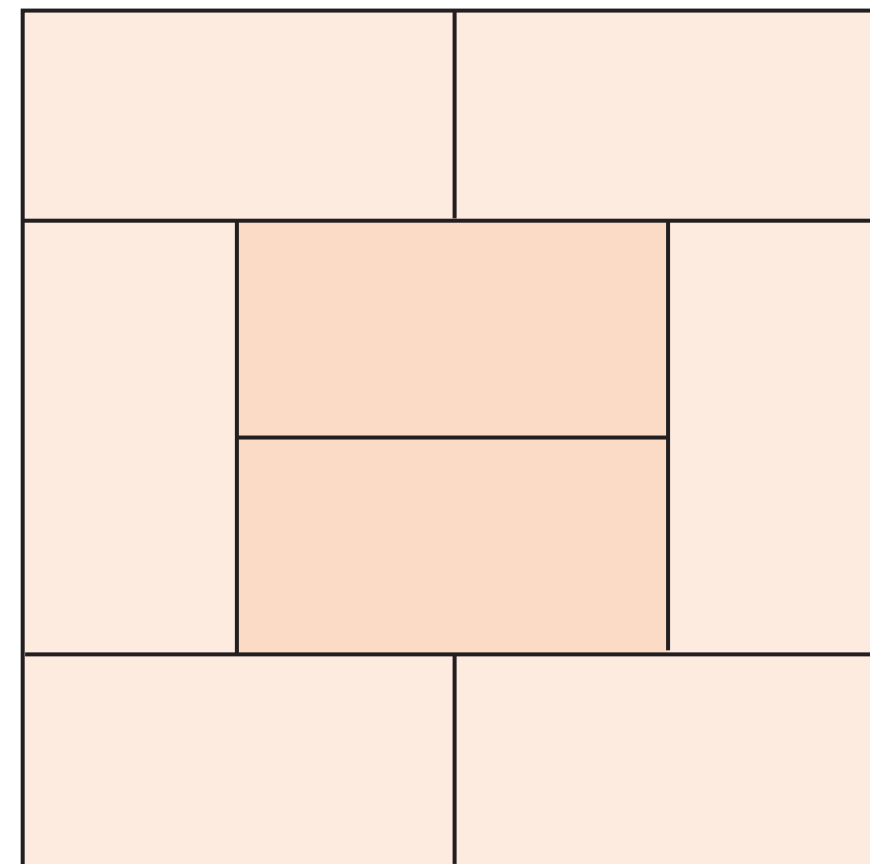
Tatami mat floor plan arrangements & patterns



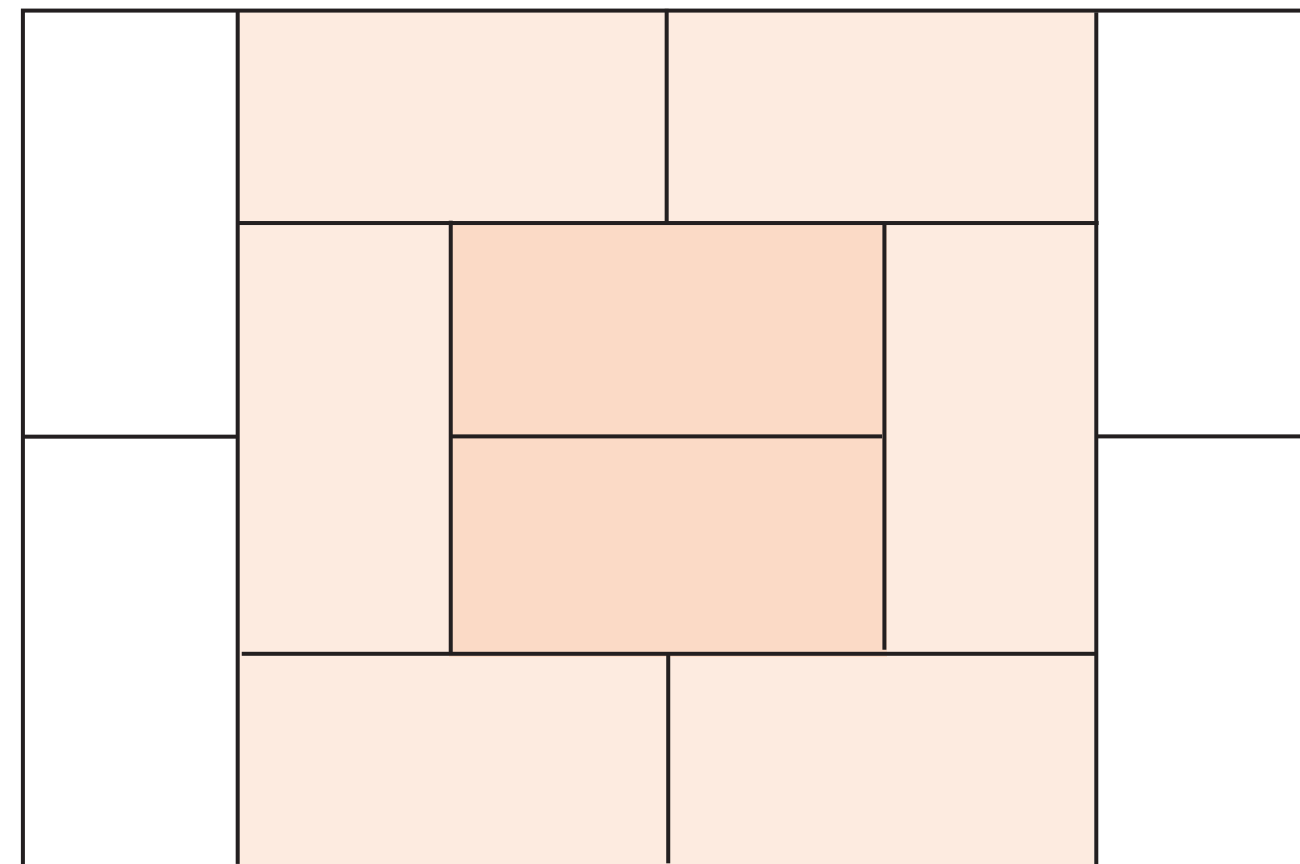
4.5 Tatami mat: about 7.5m (24'-6")



6 Tatami mat: about 10m (35'-8")

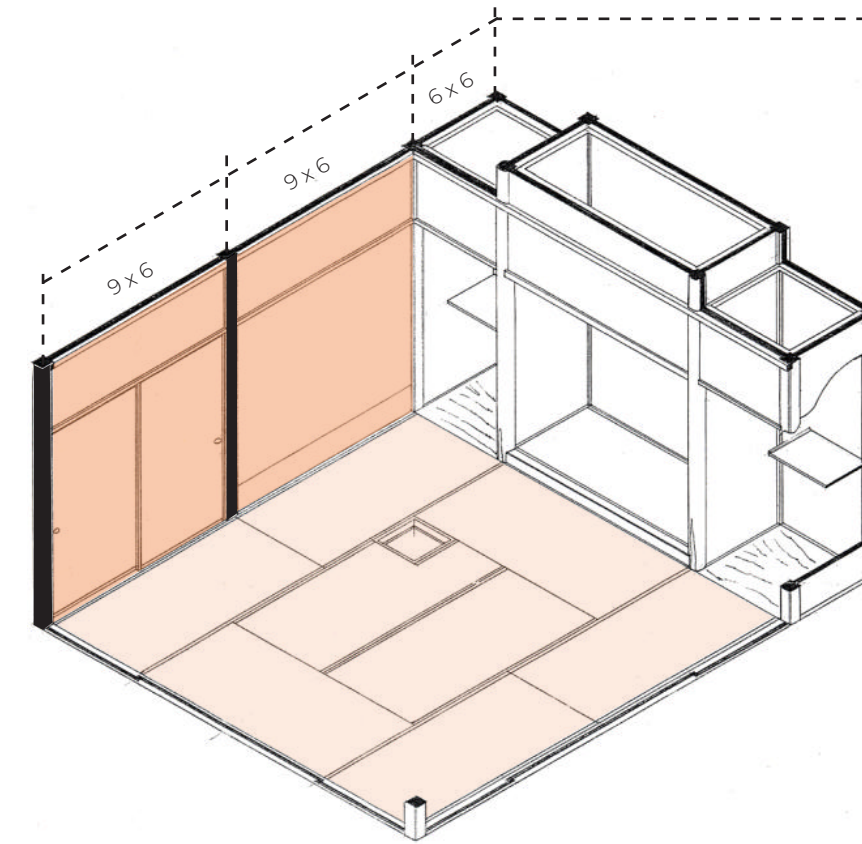


8 Tatami mat: about 14m (45'-9")

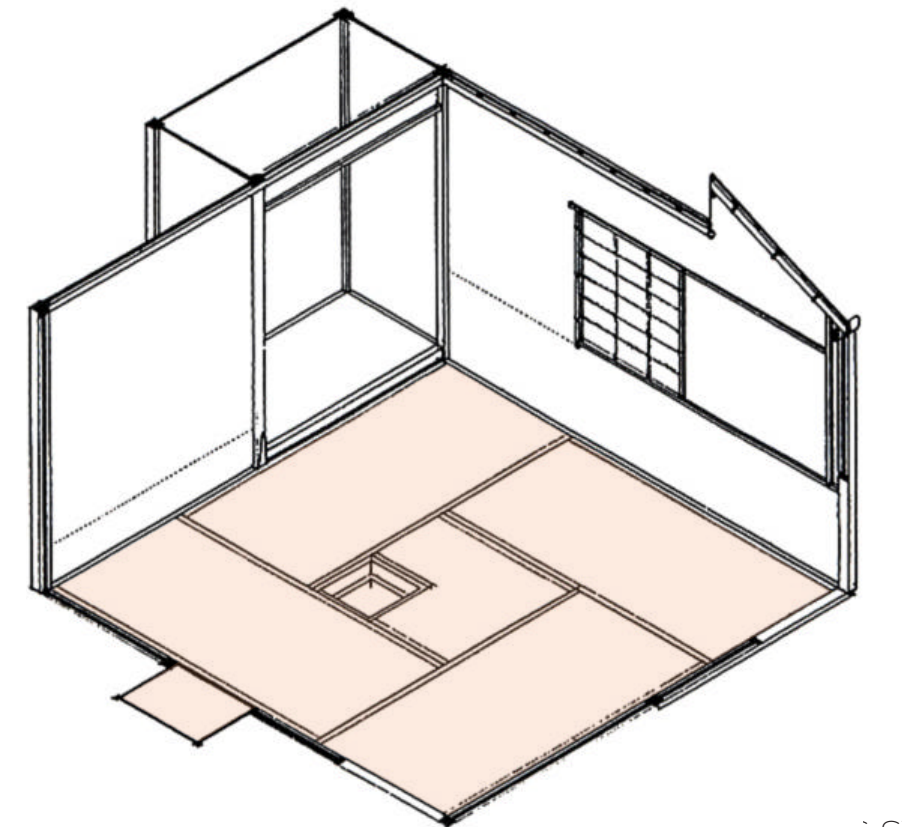
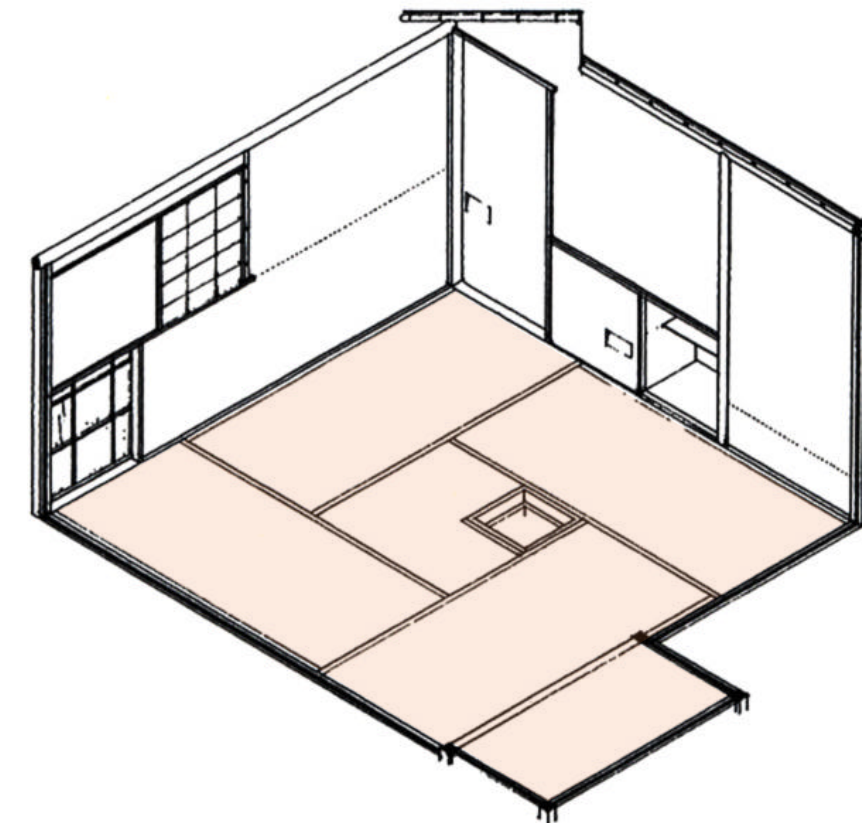
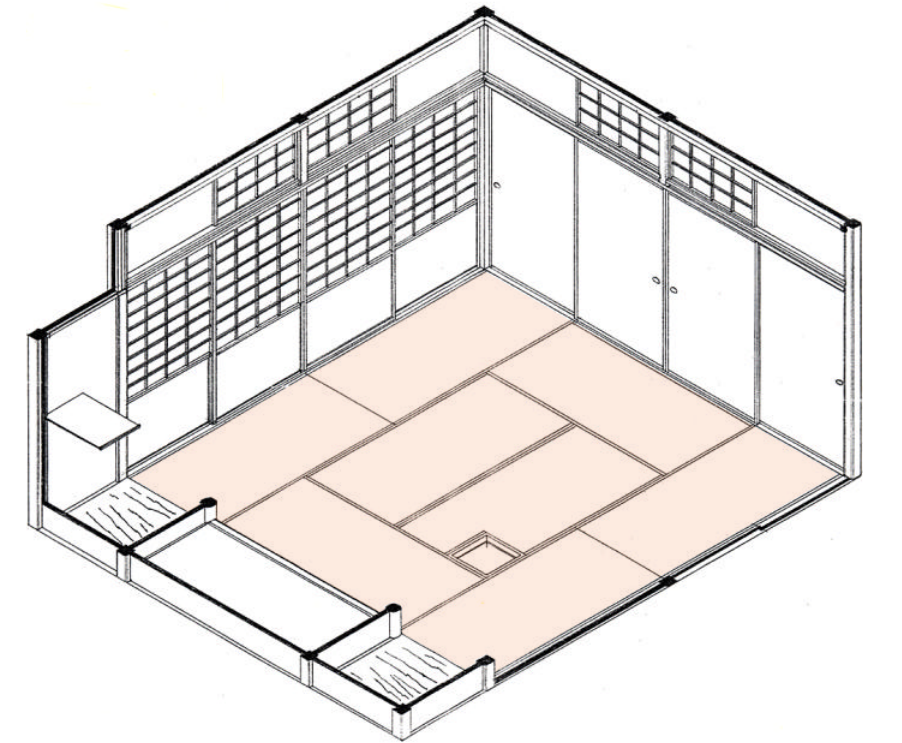


12 Tatami mat: about 20m (65'-6")

Three dimensional configurations



the distance between pillars used in the construction of buildings had to be standardized. So the distance between pillars was fixed as 6 shaku 5 sun



Main elements derived from the Japanese Tea House



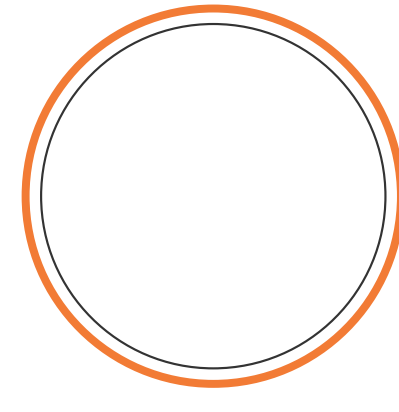
NATURE

Adjacency to nature
Minimal transitions
Sense of balance



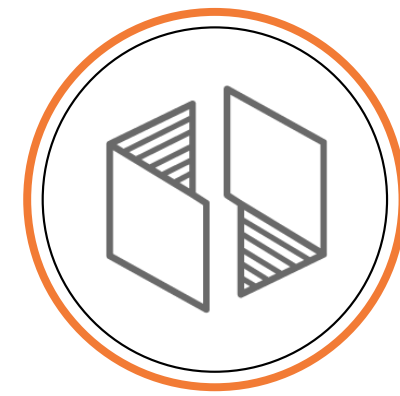
RATIO

90 x 180 centimeters
(approx. 3 x 6 feet)
"From ratio to overall concept"



MINIMALISM

Honshitsu "real essence"



FLEXIBILITY

Flexible program
Multipurpose spaces

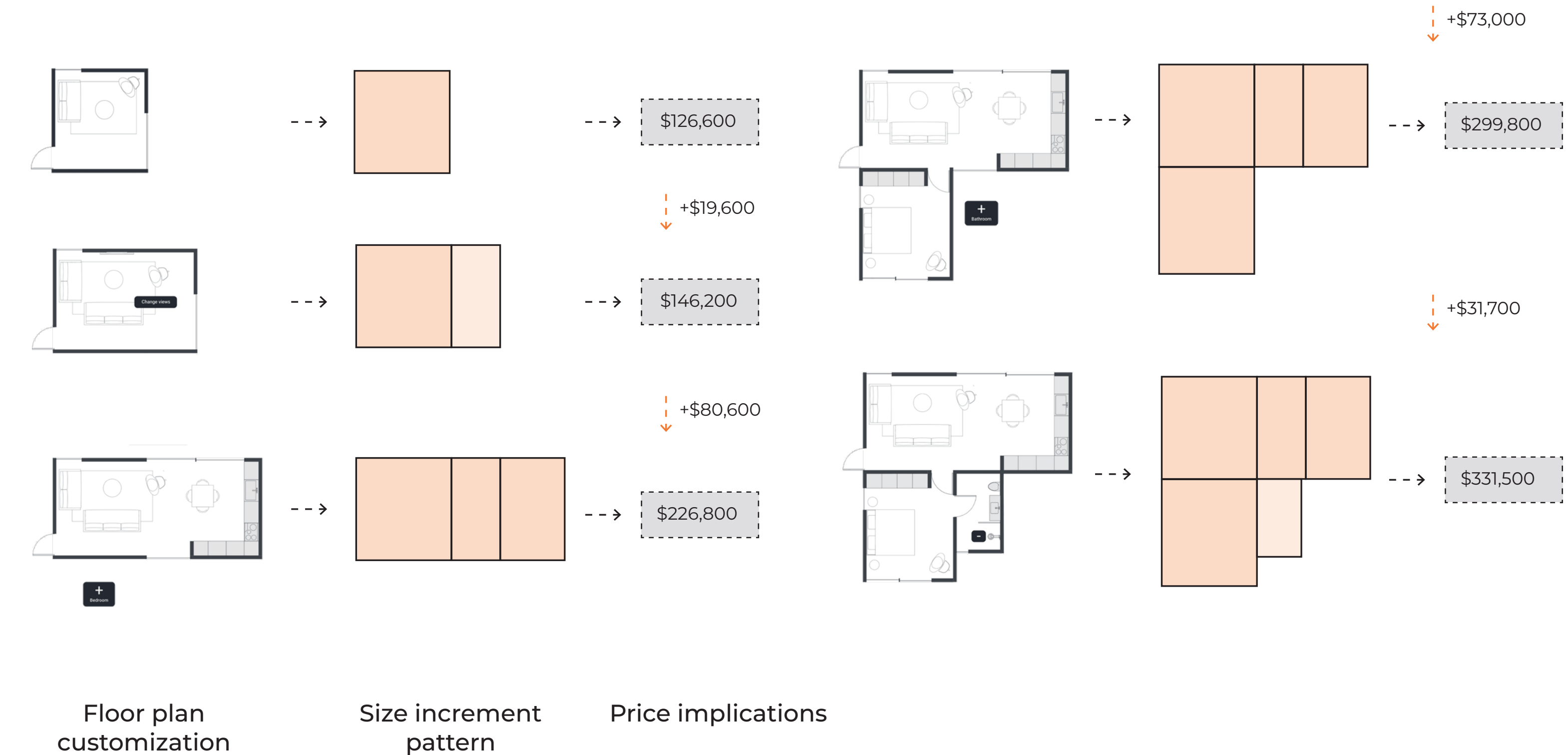
Japanese Tea House Overview

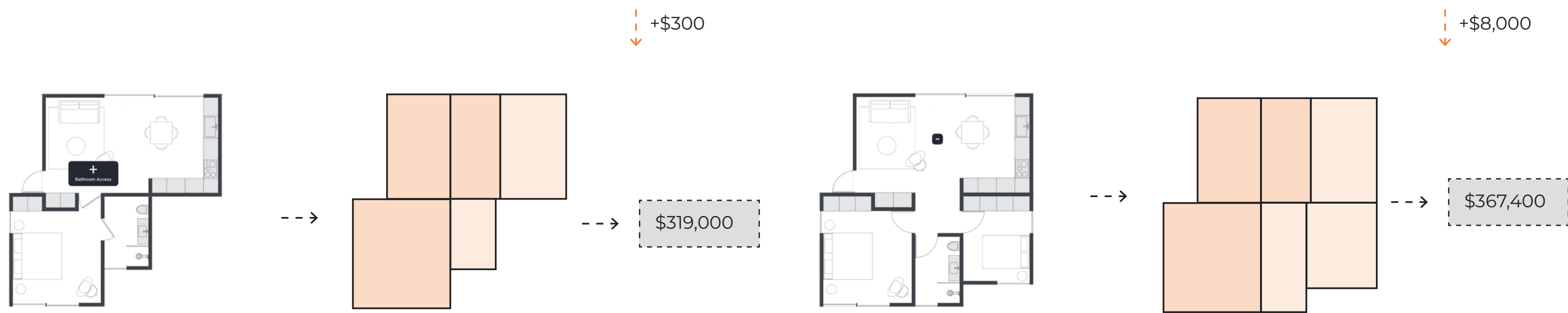
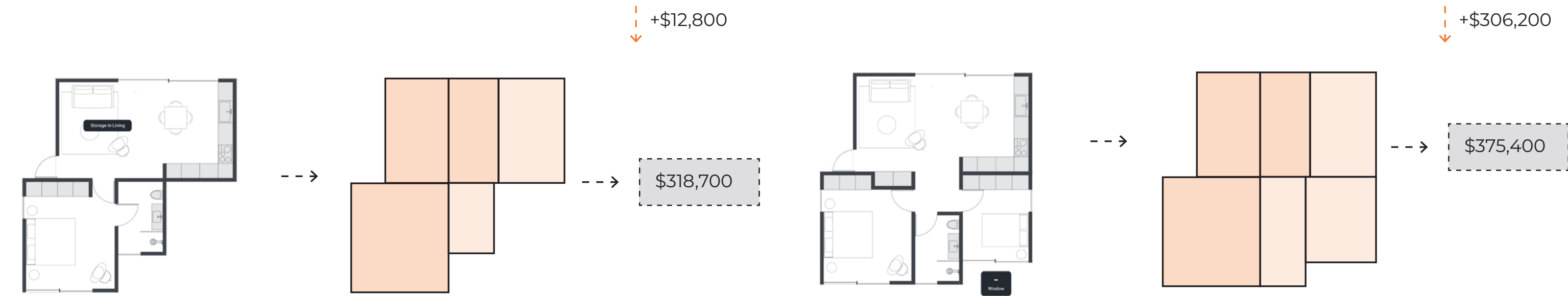
PROS	
Compact Space	Reconfigurability
Flexibility	Adaptability
Sustainable	Reconfigurable
Modular	Minimal

CONS	
Limited space	Cosly materials
Maintanecce	Lack of privacy
Limited functionality	Acquired lifestyle
Climate limitations	Limited accessibility

3.3 PRECEDENTS

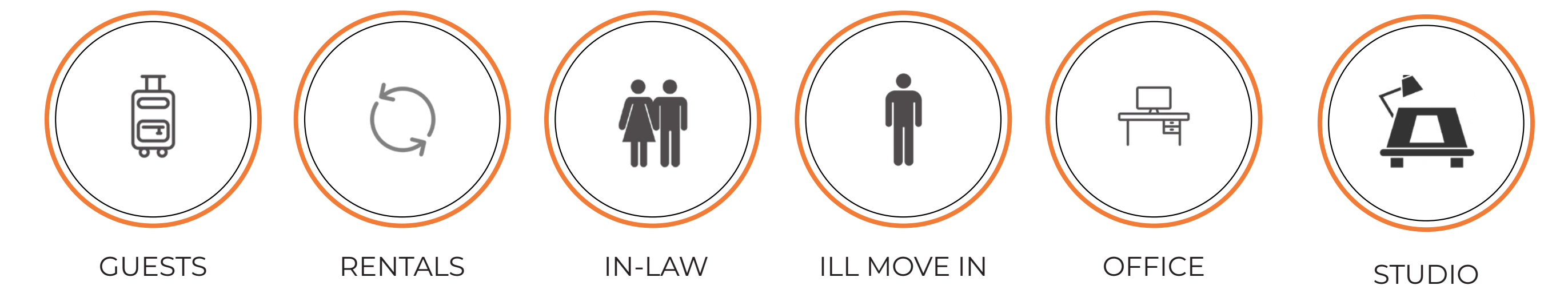
Cover Business Model





Floor plan customization Size increment pattern Price implications

Intended use of space



Cover business model overview

PROS		CONS	
Compact Space	Reconfigurability	Avg cost per panel	<1k
Flexibility	Adaptability	Non-scalable	Niche market
High end	Reconfigurable	Not affordable	Materials
Site specific	Customizable	Significant upcharge for added sf	

3.4 TARGET MARKET

Developer's Profile

A construction developer has several priorities when managing a project, including delivering the project within the scheduled timeframe, staying within the allocated budget, ensuring the quality of the final product meets the expected standards, and generating a satisfactory return on investment. These priorities must be balanced and managed effectively to ensure project success and profitability.



TIME

Schedule
Transportation



BUDGET

Schedule
Transportation
Scale
Cost estimating



QUALITY

Supply & demand
Performance levels



ROI

Budgeting (without compromising design excellence)
Rental rates > cost of construction

Millennial's Profile

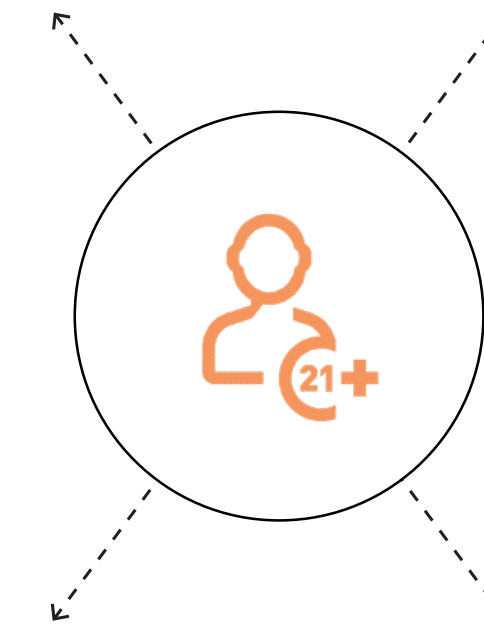
Millennials prioritize several factors when looking for an apartment, including location, budget, community, and flexibility. Location is important, as millennials often seek walkable neighborhoods with access to public transportation. Budget is also a significant consideration, with many millennials seeking affordable housing options.

Community is important, with many millennials valuing shared spaces and amenities that promote social connections. Finally, flexibility is key, as many millennials seek apartments with lease terms that allow for short-term commitments or the ability to sublet.



LOCATION

Urban setting
Job opportunities
Entertainment



BUDGET

Avg. of 30% of monthly income



COMMUNITY

Sens of belonging
Social sceneries

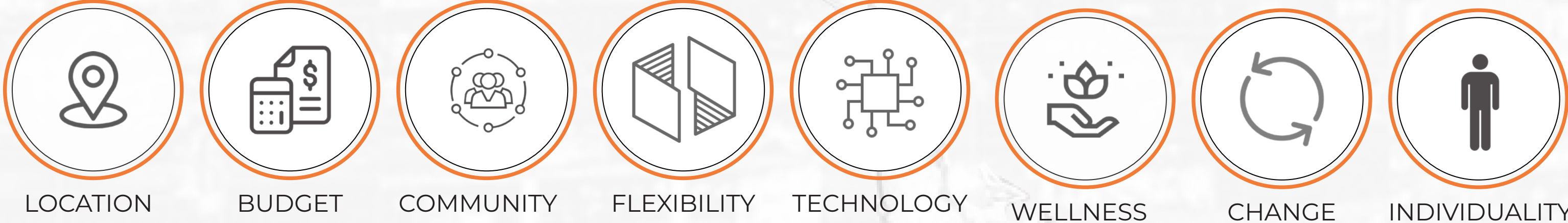


FLEXIBILITY

Reconfigurable spaces
Remote working




MILLENNIAL PROFILE [1981 - 1996]

pewresearch.org



04 CHAPTER

SITE SELECTION

No	Proposed Sites Surroundings	Constraints	Potentials	Priorities	Opportunities
1		8 acres. 3590 Pleasantdale Rd, Atlanta, GA 30340	- Multifamily housing/ Mixed use development	- Mixed income community - Housing - Mixed use commercial development	- Extensive side affords exploration of different residential scales of modularity
2		4 acres. 229 Holtzclaw St SE, Atlanta, GA 30340	- Multifamily housing/Mixed use development	- Housing development - Millennial target lifestyle - Urban activity	- Connection to beltline - Urban scenery - Activity -Workability around a compact site
3		2 acres. 170 Boulevard SE, Atlanta, Ga 30312	- Multifamily housing/Mixed use development	- Housing development - Millennial target lifestyle - Urban activity	-Historic district - Urban scenery - Activity -Workability around a compact site

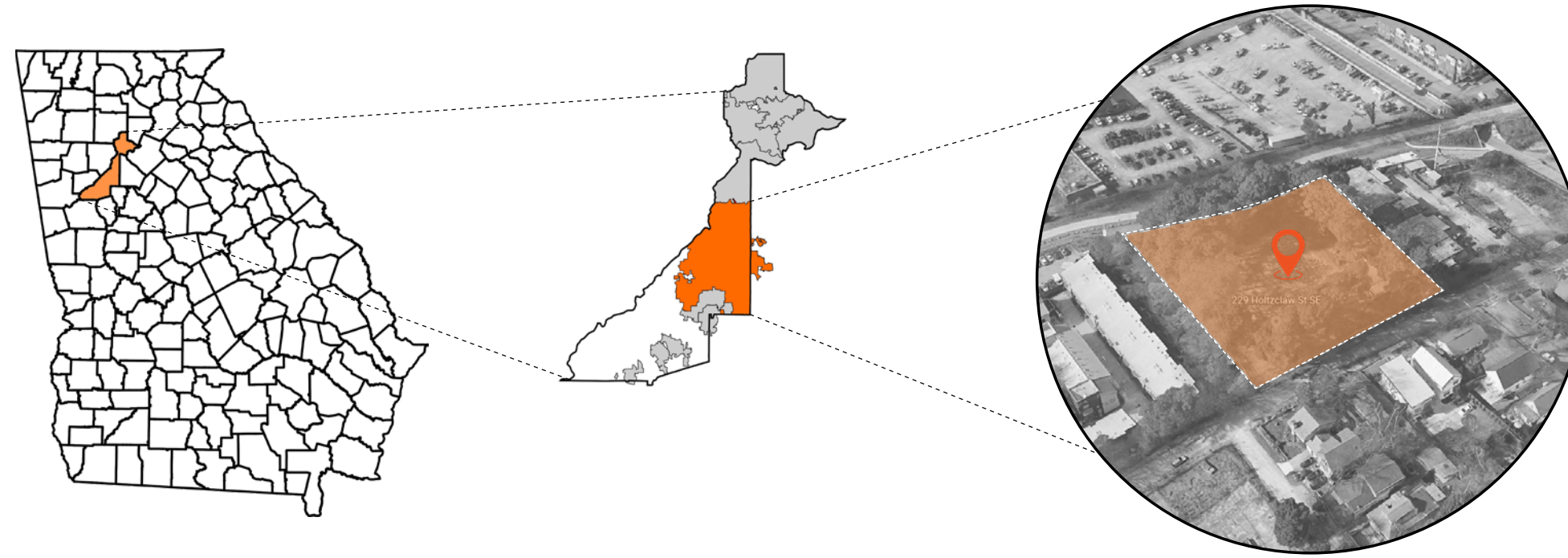
4.1 SITE

The chosen site located at **229 Holtzclaw St SE, Atlanta Ga** was selected for several reasons, including interactivity, connection to the Beltline, being an up-and-coming area for development, and being a millennial hub.

[Interactivity] One of the main reasons for selecting the site is its interactivity. The location is easily accessible and well-connected, with a lot of foot traffic, which makes it an ideal spot for a millenials.

[Up-and-coming area] Cabbage Town, where the site is located, is a historic district that is undergoing revitalization. The area has seen significant investment in recent years, with new shops, restaurants, and housing developments.

[Millenial Hub] Millennial hub: Finally, the site is also a millennial hub, attracting a lot of young and urban professionals. According to research, millennials are one of the largest users of modern style housing.



CIRCULATION



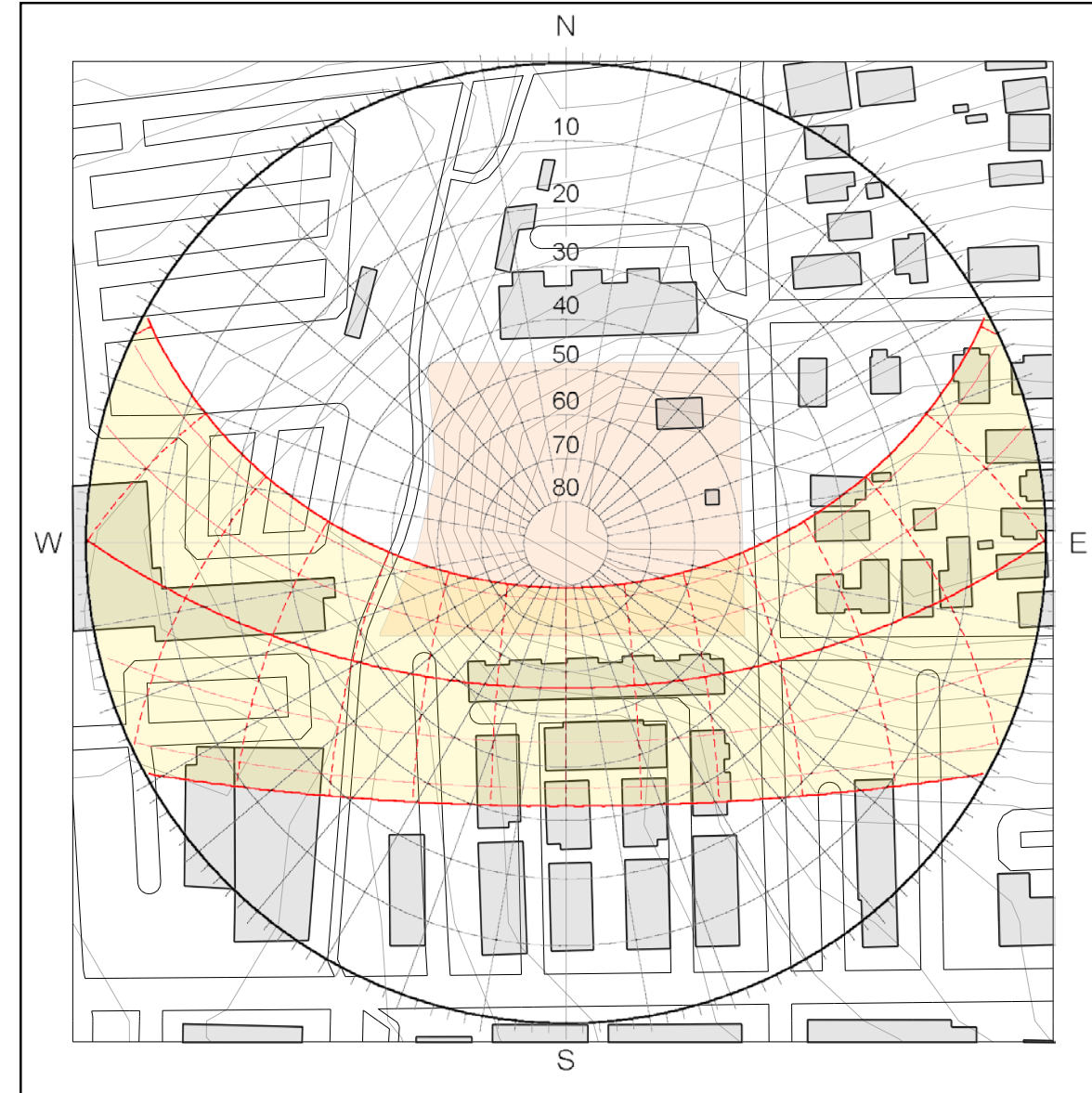
- Primary Roads
- Secondary Roads
- Beltline

OCCUPANCY

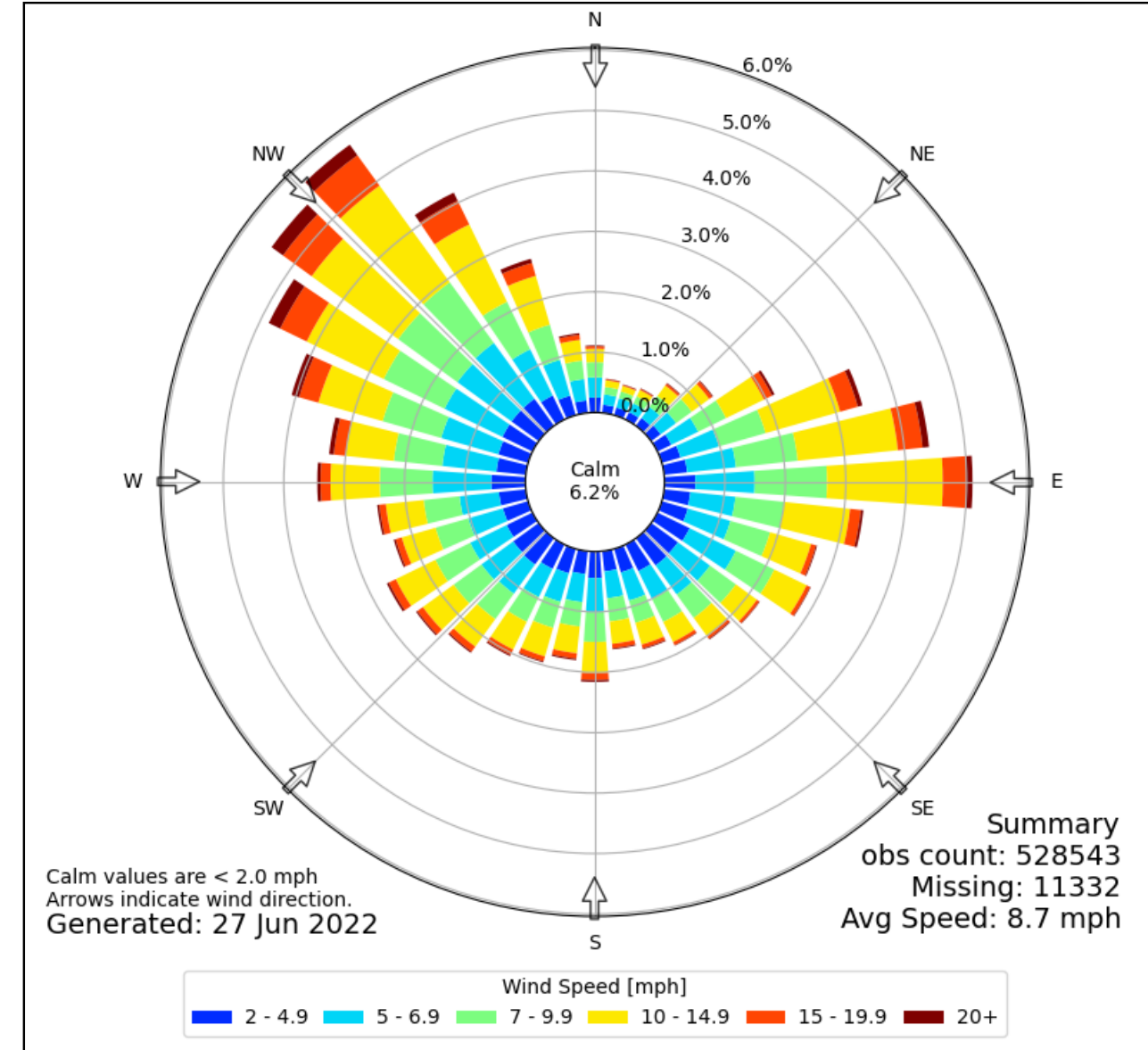


- Commercial - Residential
- Commercial
- Industrial
- Religious
- Residential
- Service Buildings
- Education

SOLAR



WIND



ACCOUSTICS



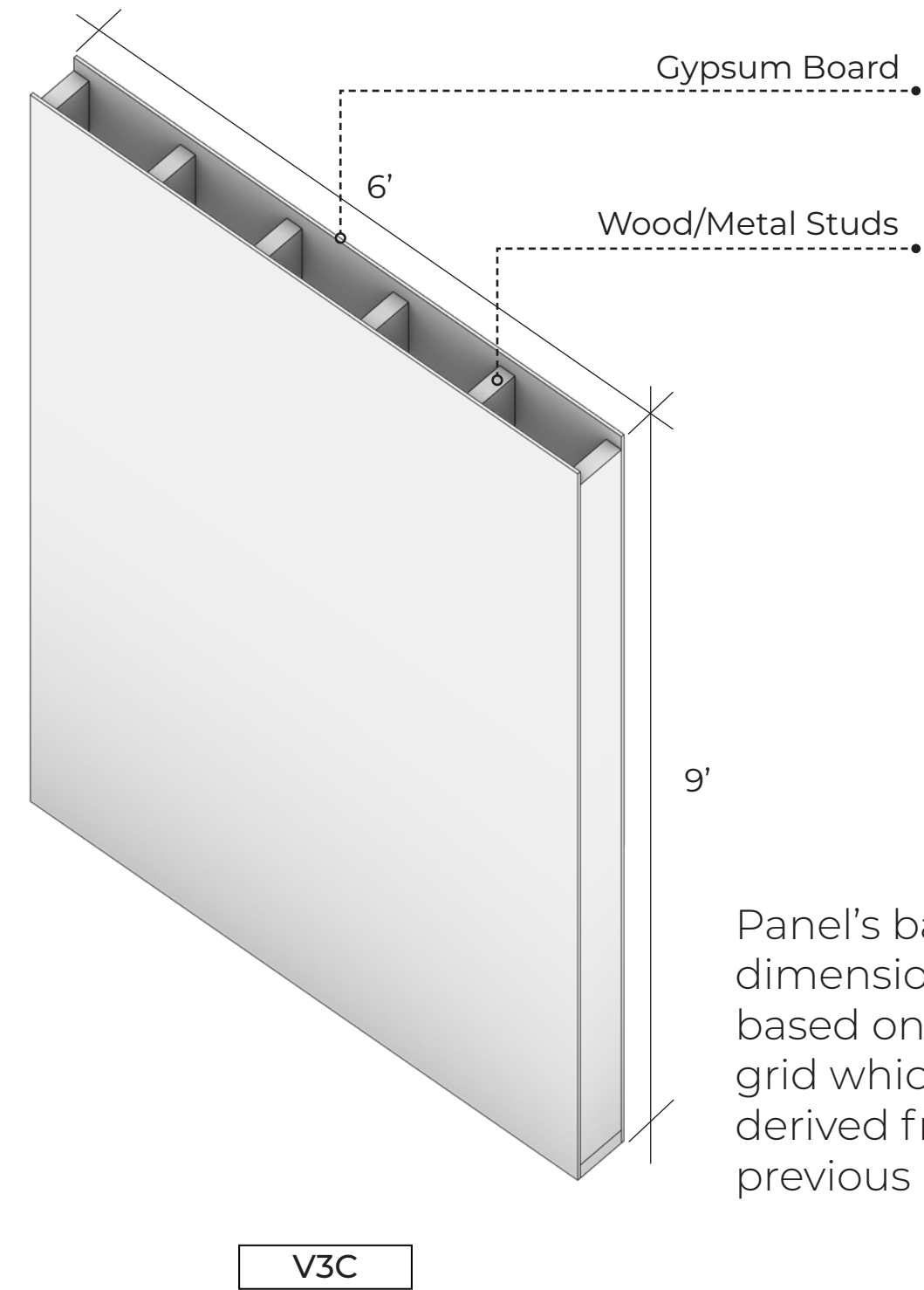


05 CHAPTER
ASSEMBLY

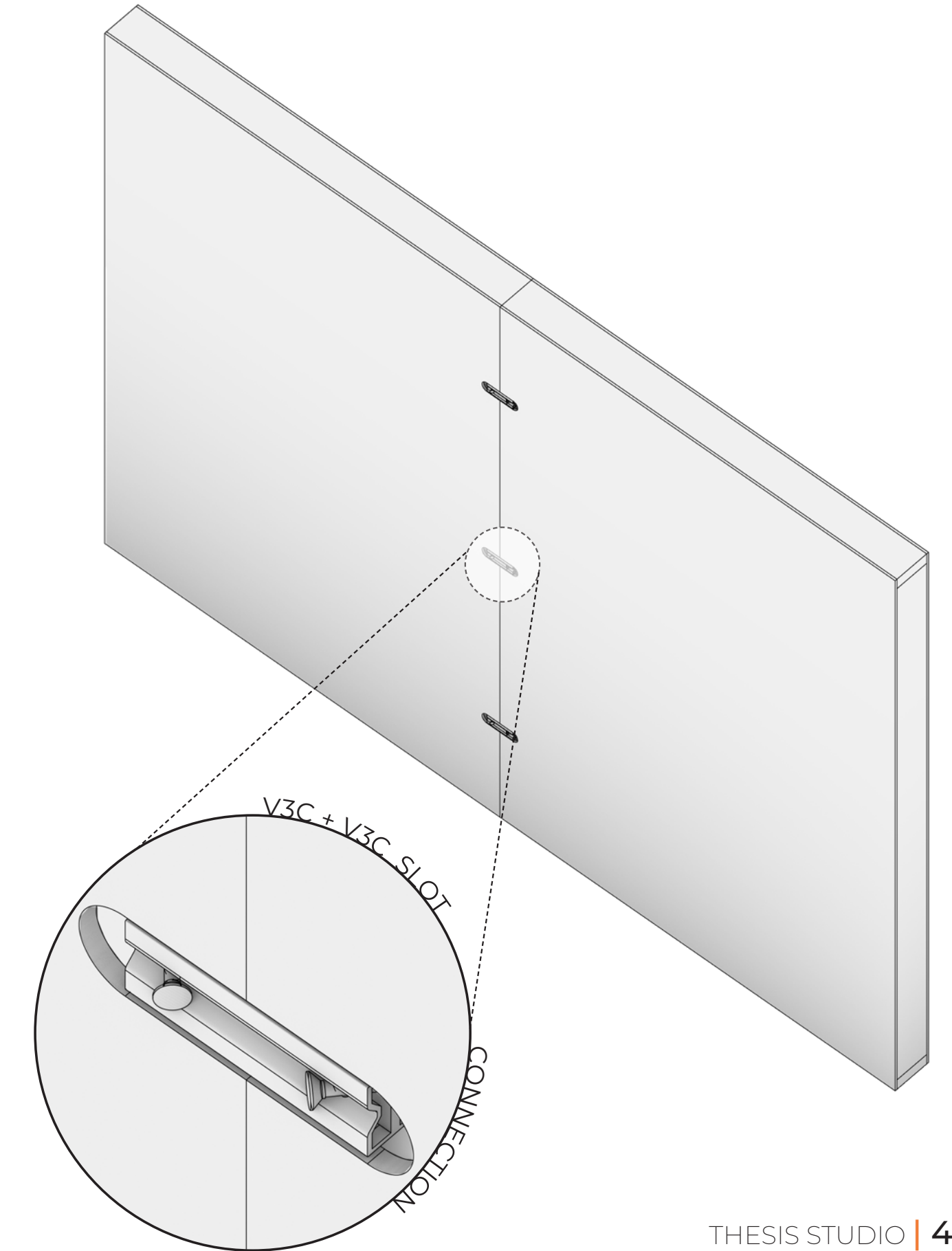
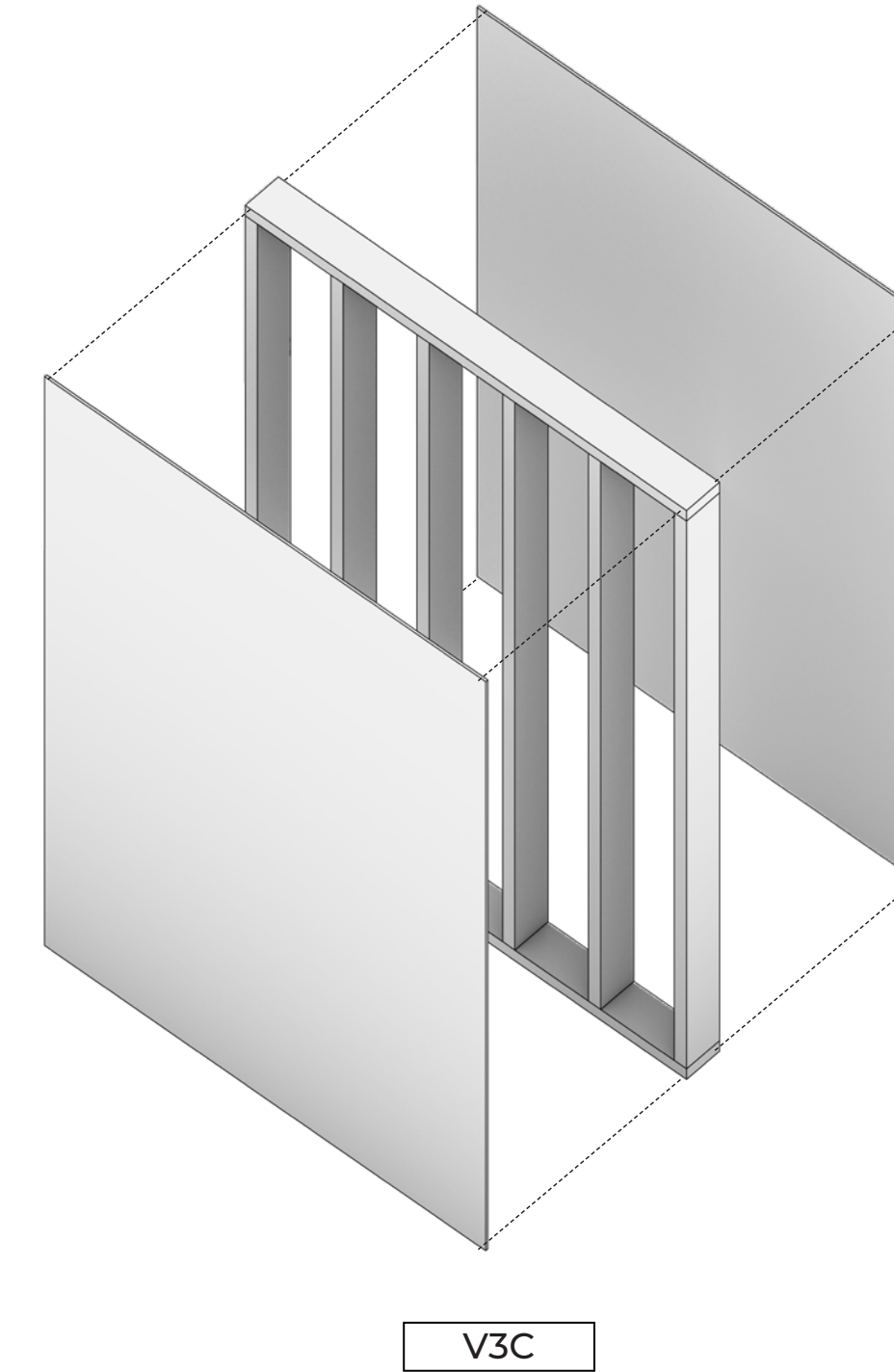
5.1 VERTICAL ASSEMBLIES

HORIZONTAL PANEL VERTICAL PANELS

Assembly Number	L	W	D	Cost Per Panel
V1A	9'	2'	4 3/4"	\$101.62
V2B	9'	3'	4 3/4"	\$111.17
V3C	9'	6'	4 3/4"	\$237.30
V4C	9'	6'	4 5/8"	\$264.2
V5D	9'	6'	6"	\$309.30
V6E	9'	6'	6"	\$314.47
H1A	6'	18'-6"	15"	\$687.56
H2B	6'	18'	15"	\$675.56
H3C	6'	24'-6"	15"	\$902.32
H4C	6'	24'-0"	15"	\$890.32



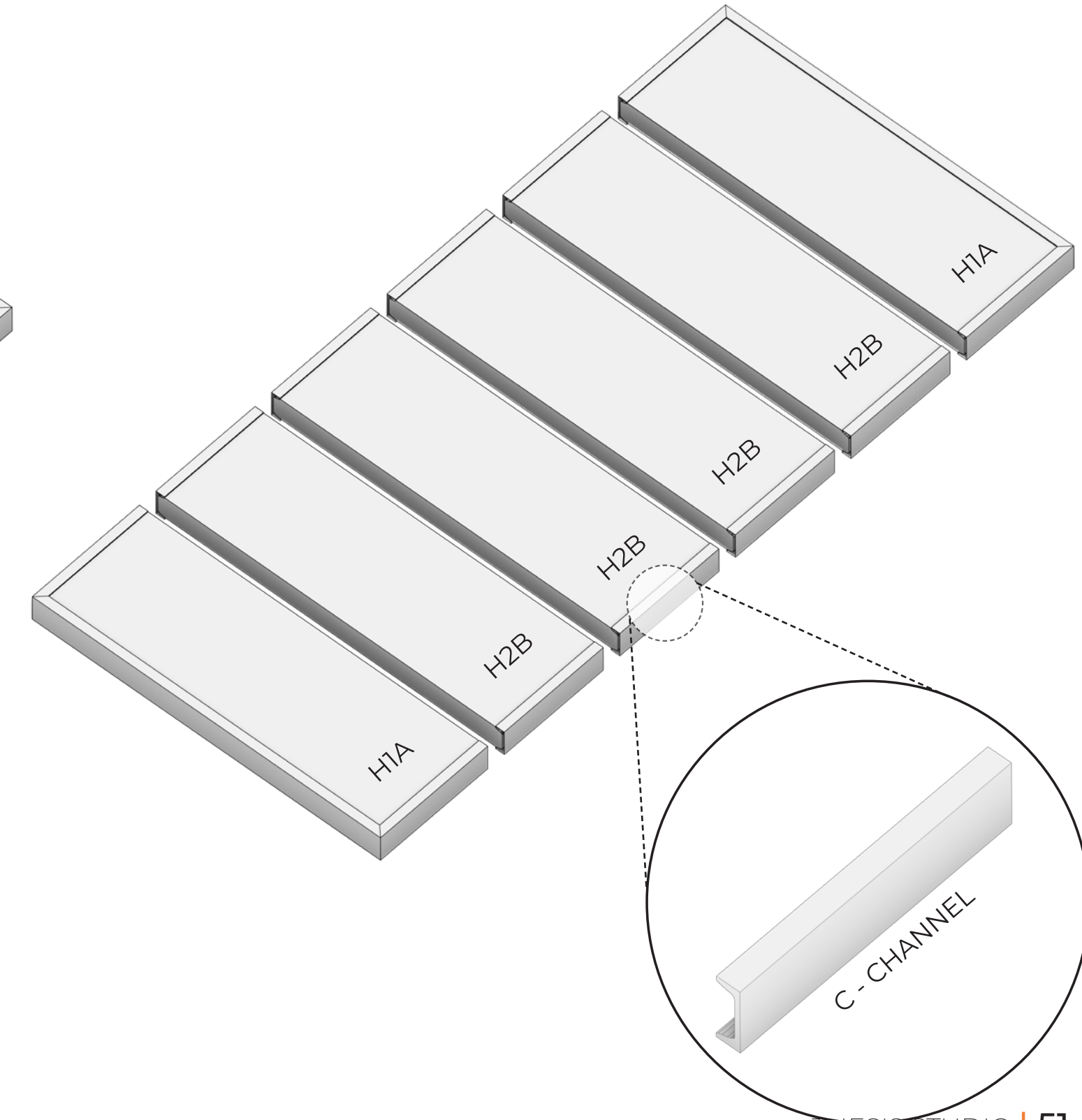
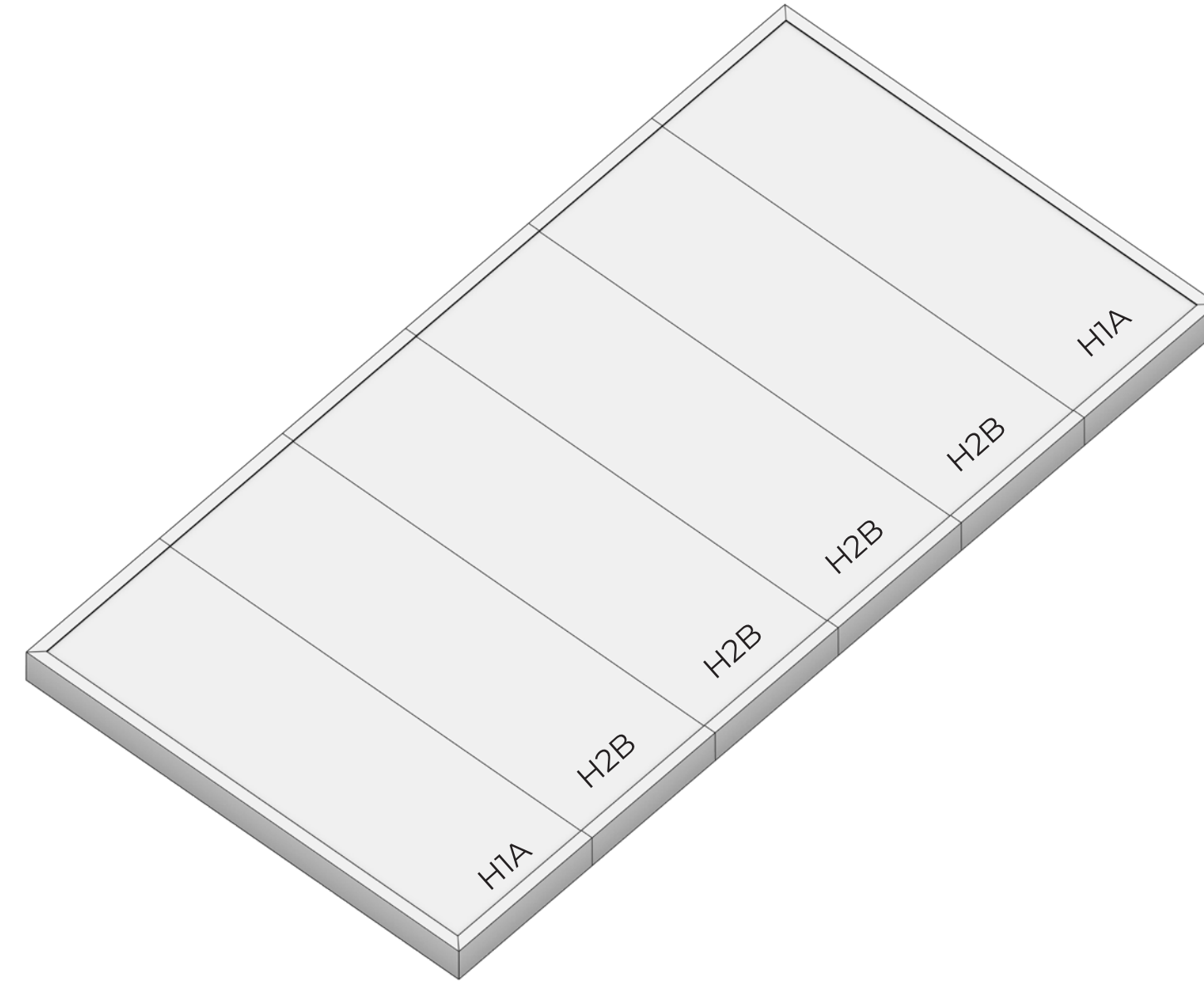
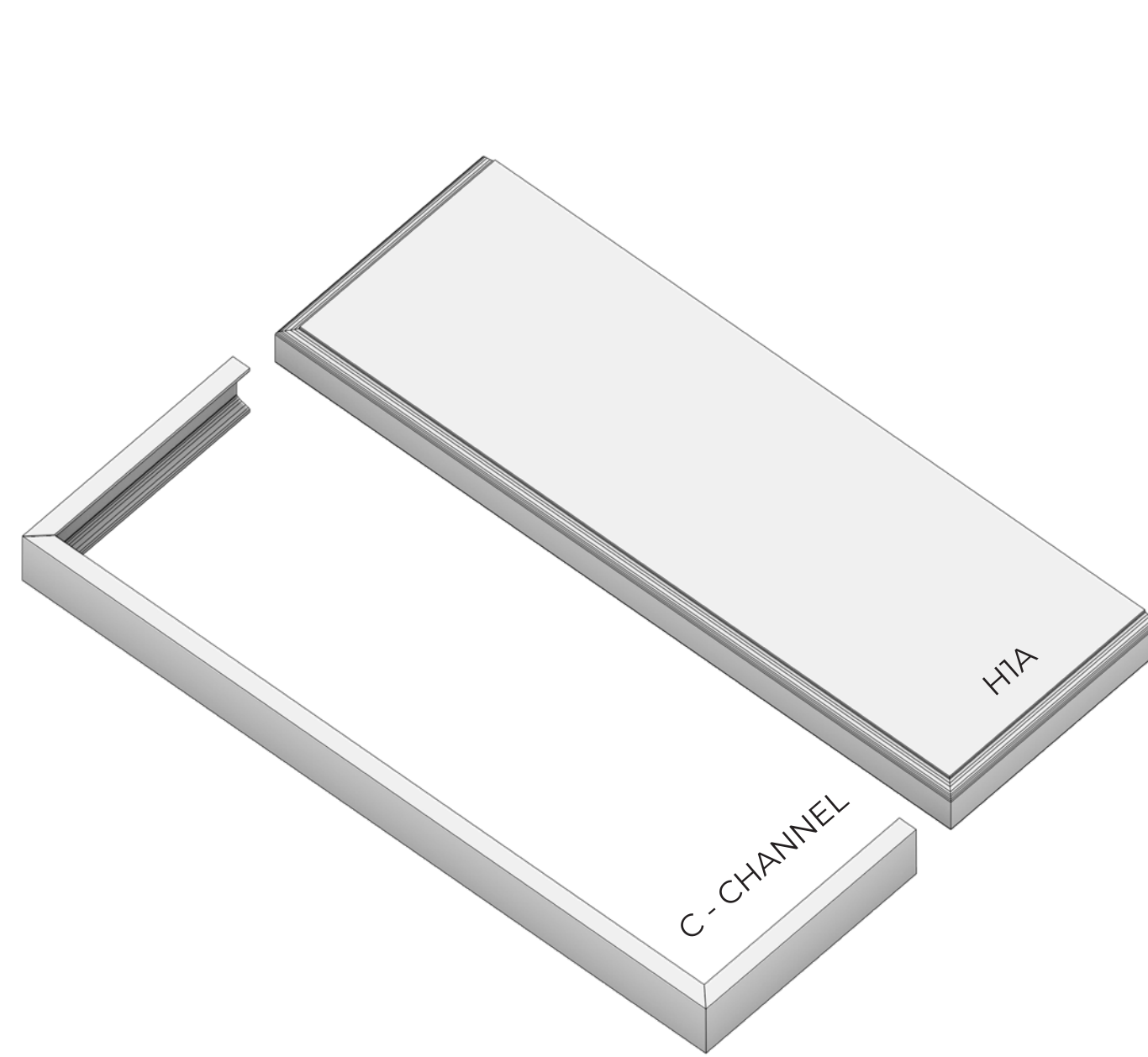
Panel's base dimensions are based on a 3' x 3' grid which was derived from previous research



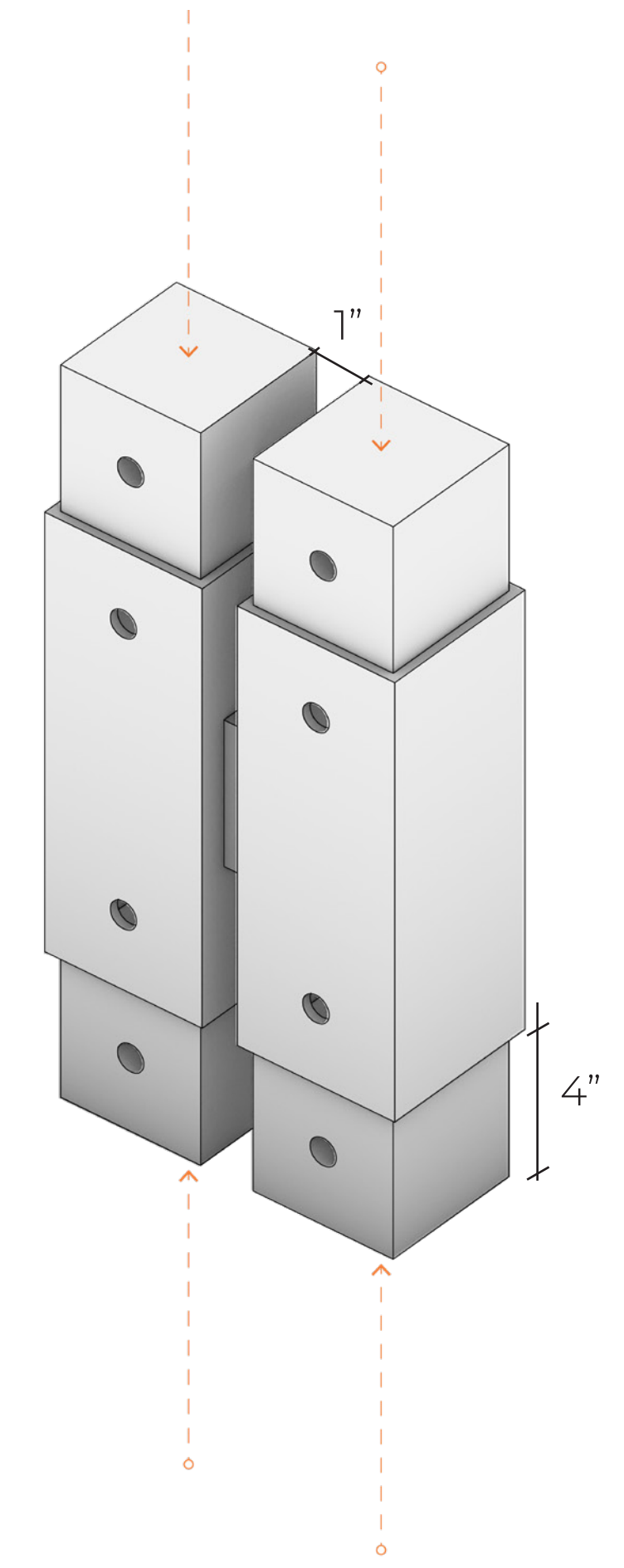
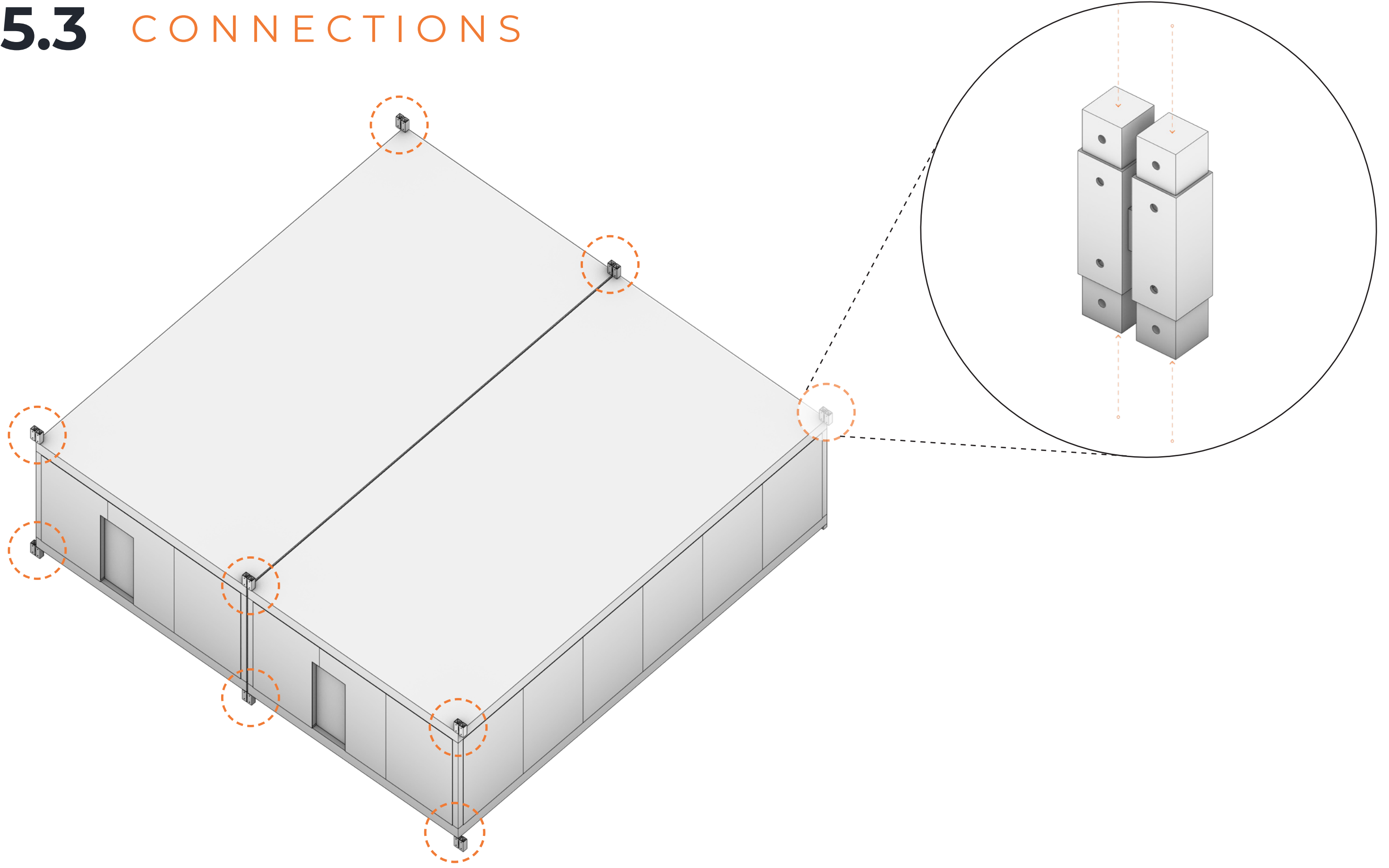
5.2 HORIZONTAL ASSEMBLIES

HORIZONTAL PANEL VERTICAL PANELS

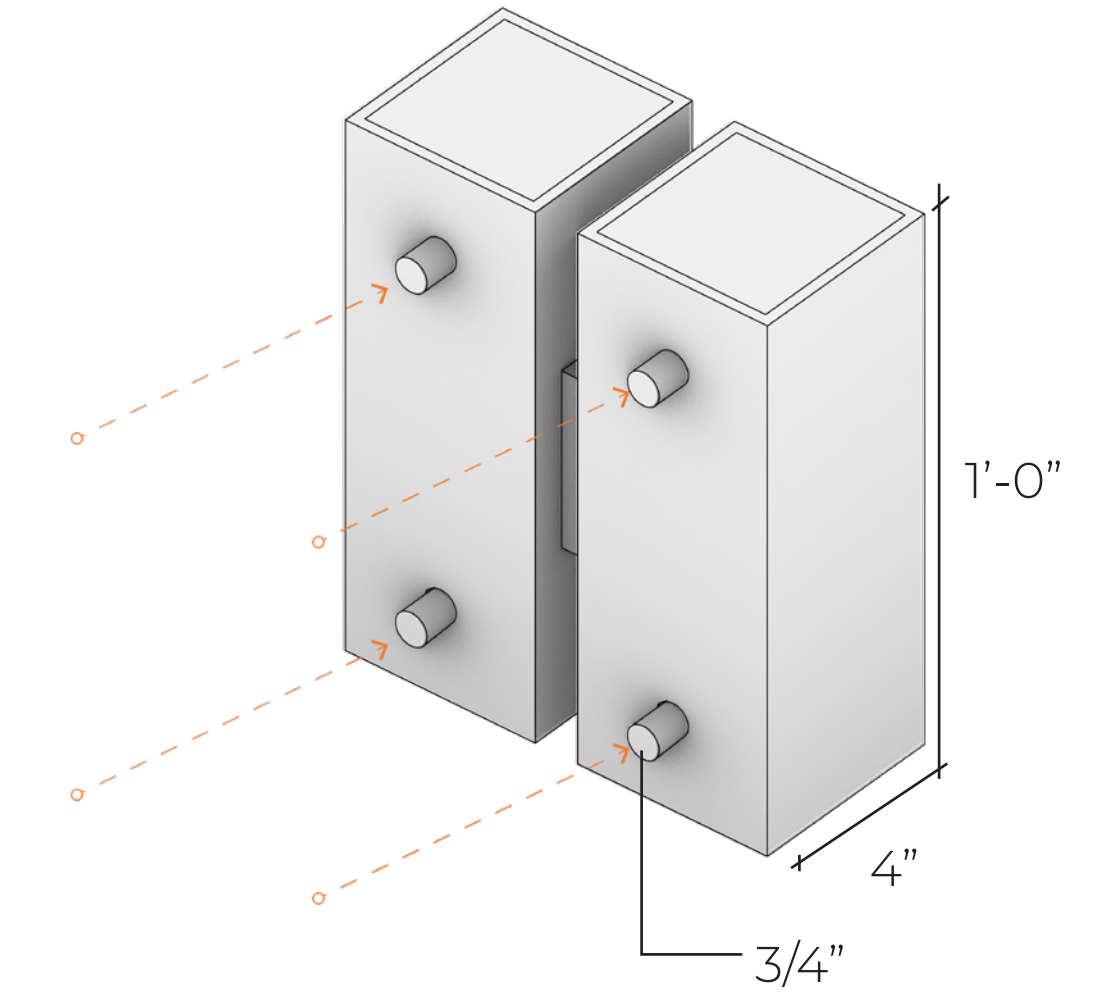
Assembly Number	L	W	D	Cost Per Panel
V1AD	9'	2'	4 3/4"	-
V2BD	9'	3'	4 3/4"	-
V3CD	9'	6'	4 3/4"	-
V4CD	9'	6'	4 5/8"	-
V5DD	9'	6'	6"	-
V6DD	9'	6'	6"	-
V3CW	9'	6'	4 3/4"	-
V4CW	9'	6'	4 5/8"	-
H5D	6'	36'-6"	15"	\$1,391.15
H6D	6'	36'-0"	15"	\$1,371.80



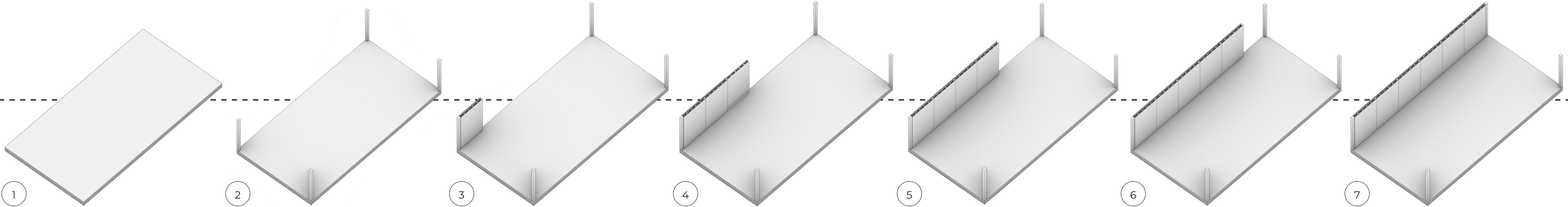
5.3 CONNECTIONS

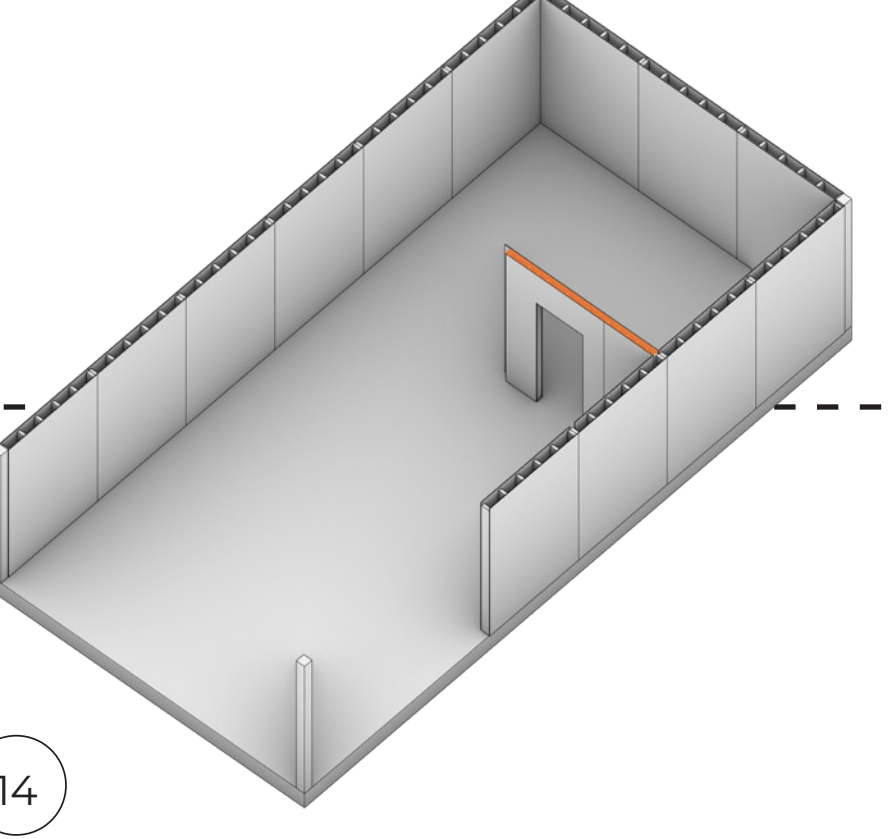
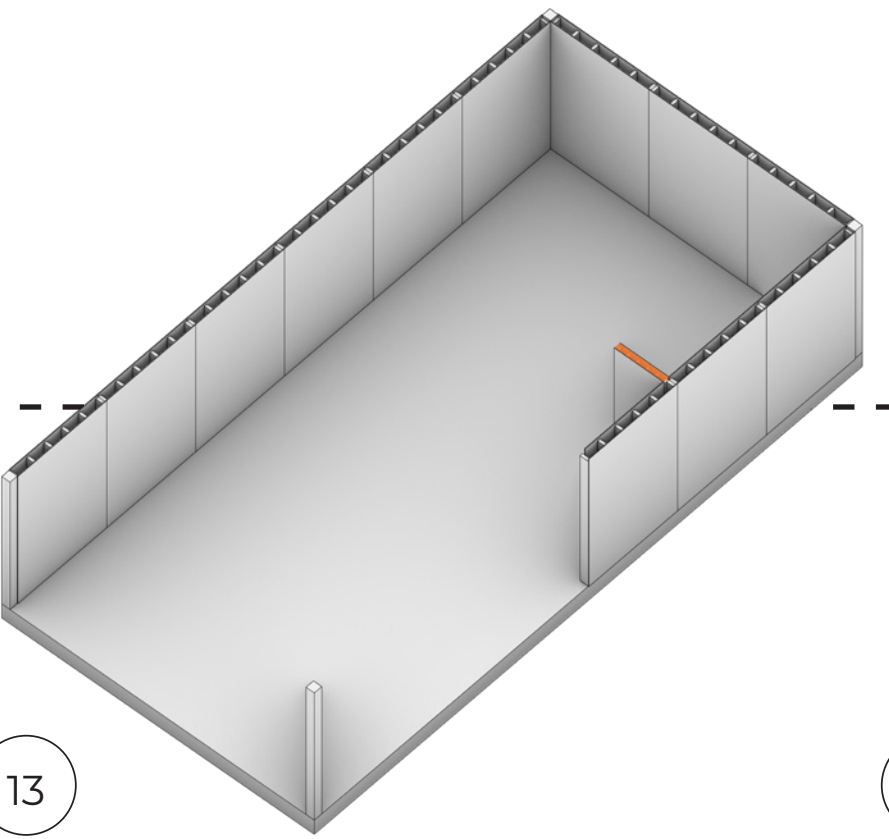
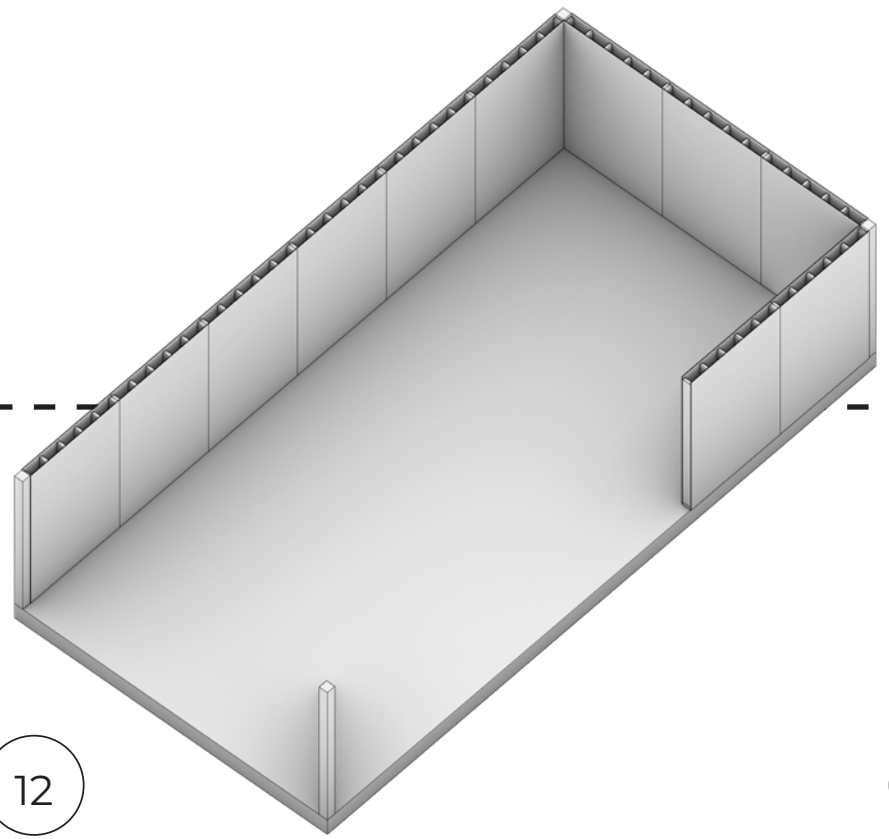
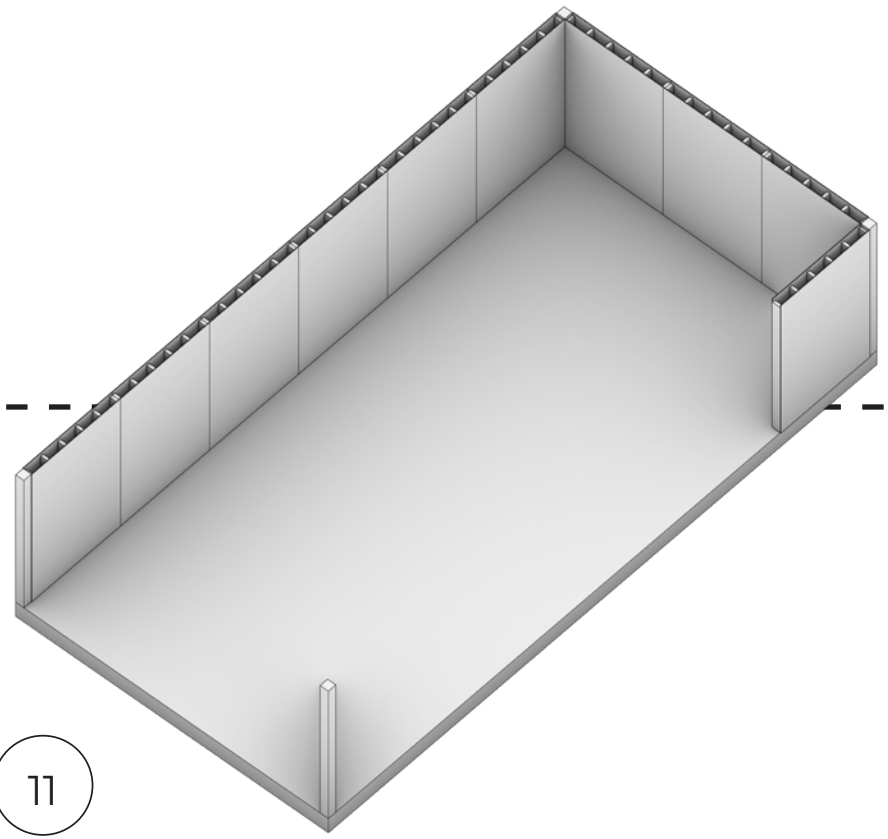
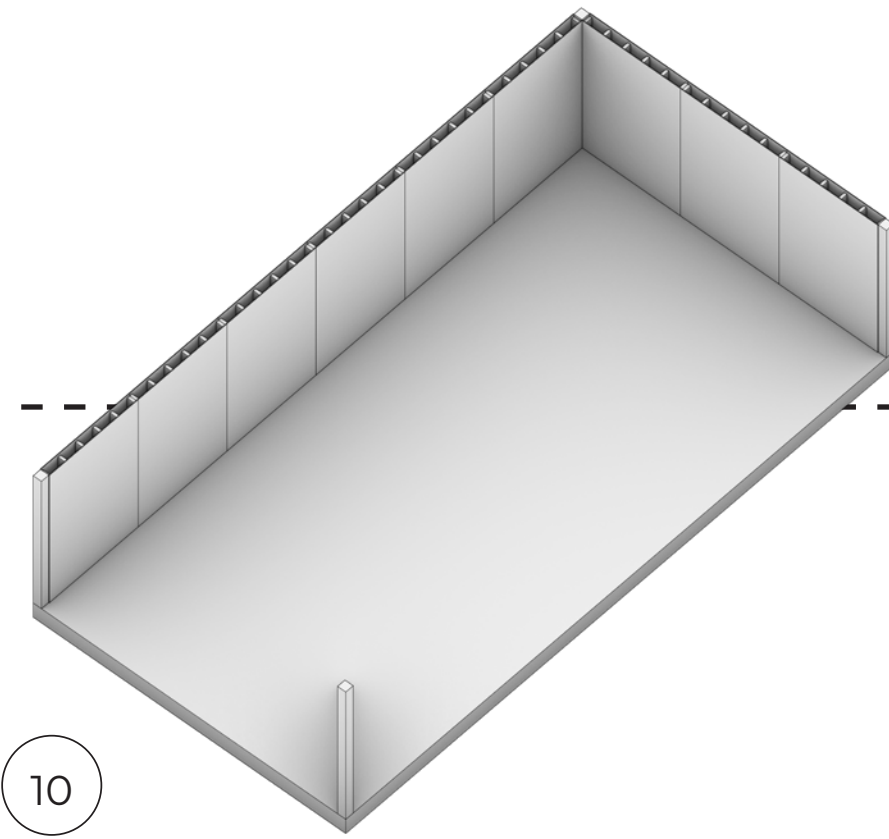
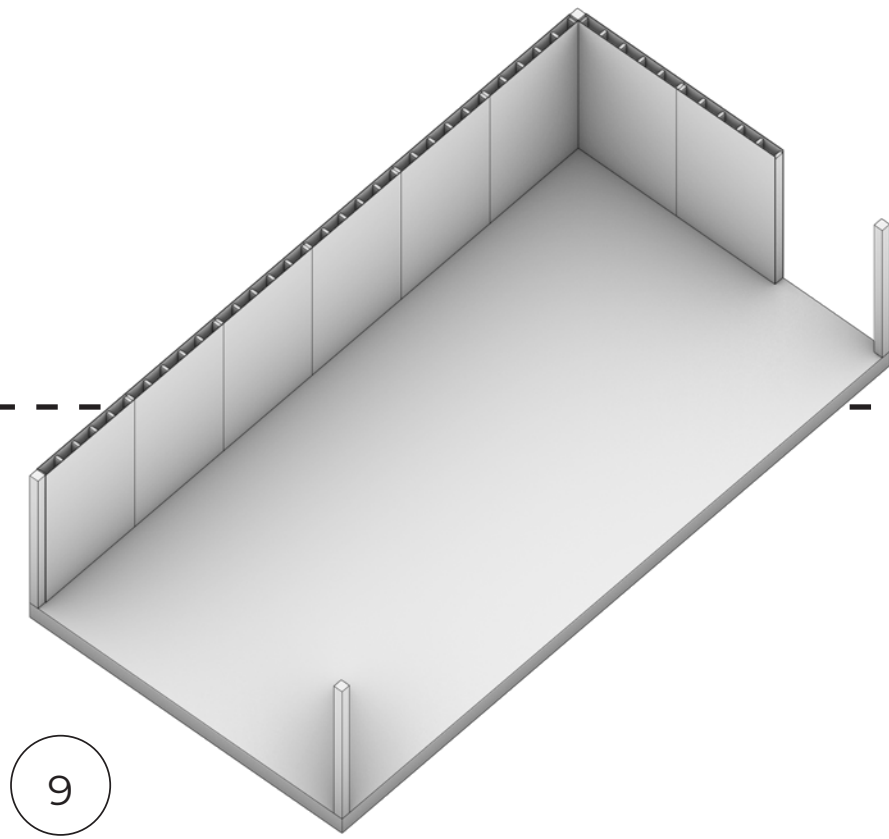
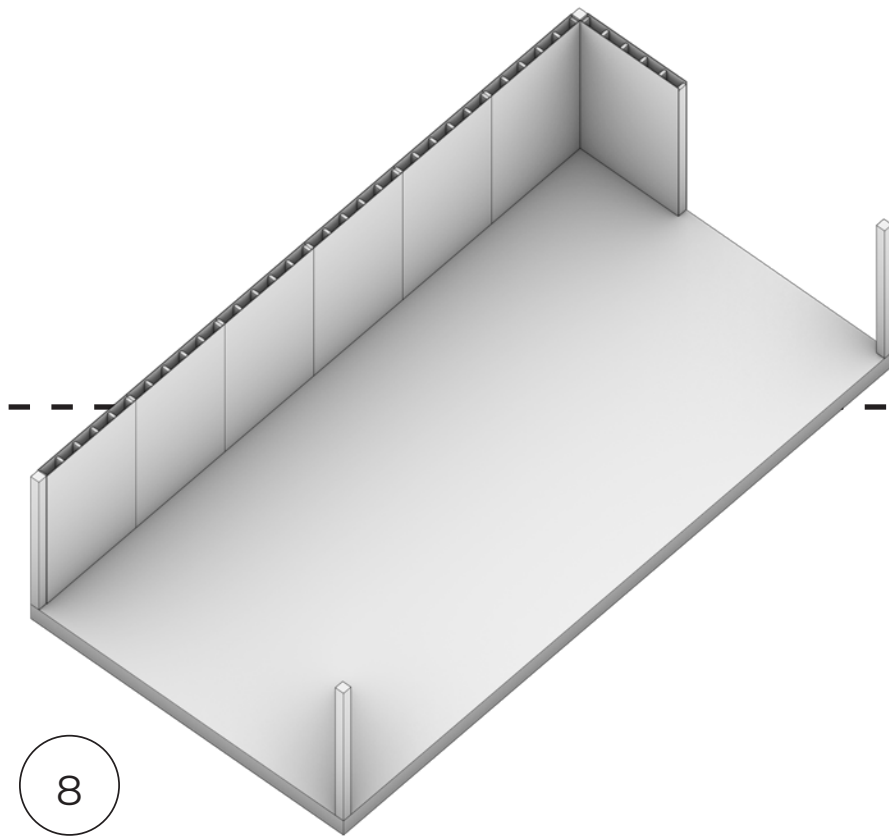


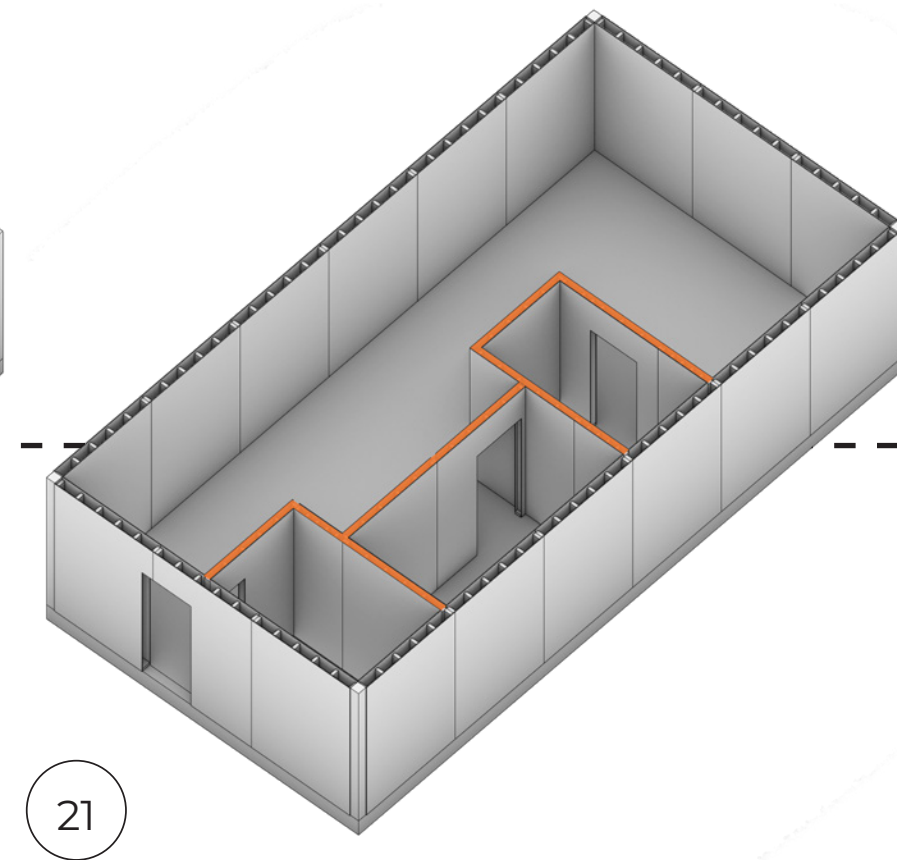
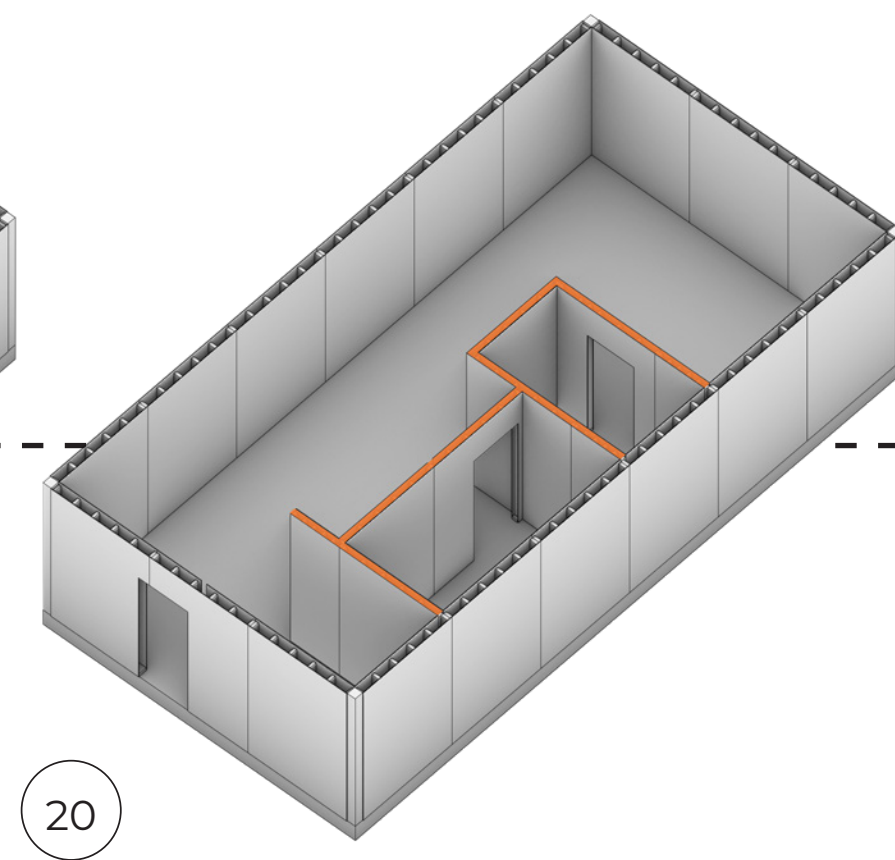
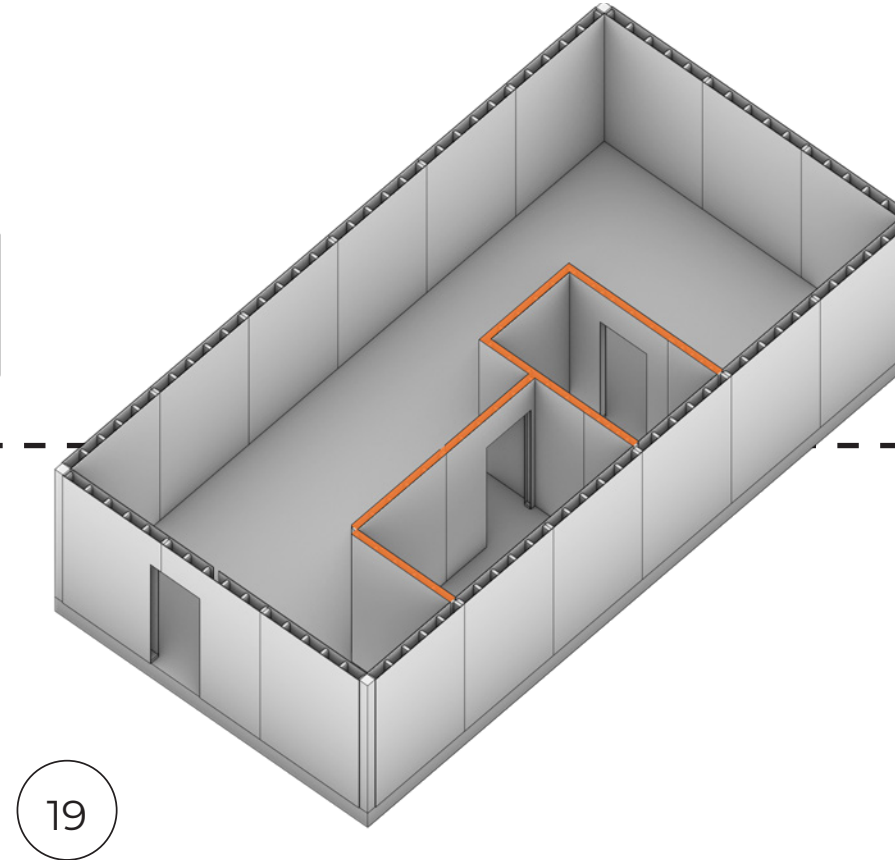
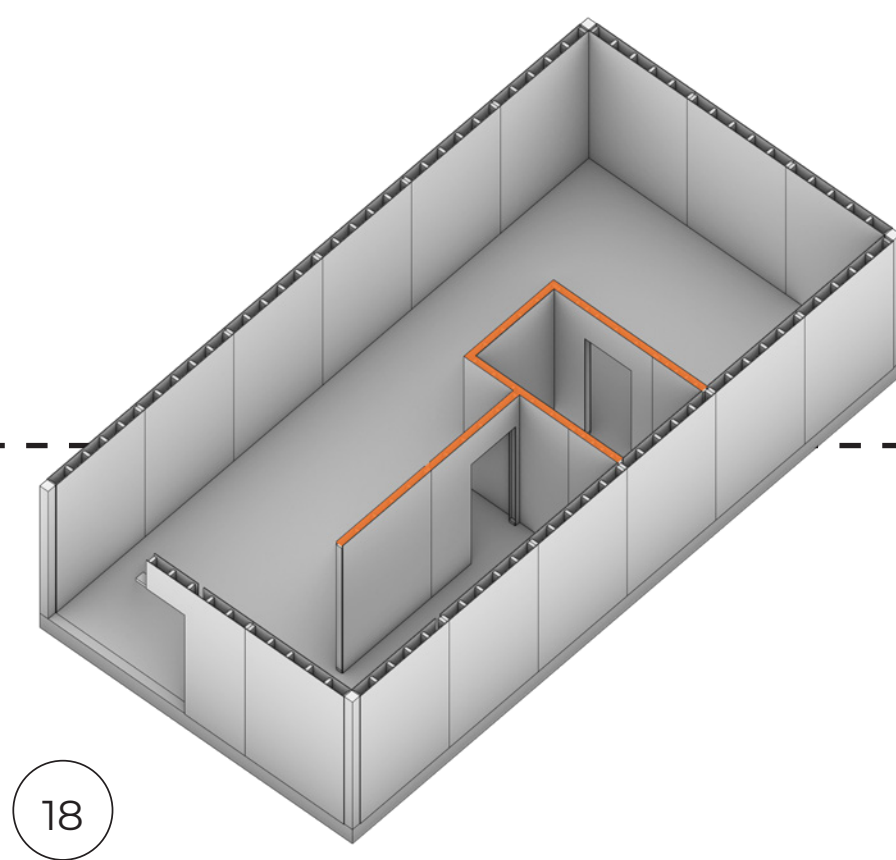
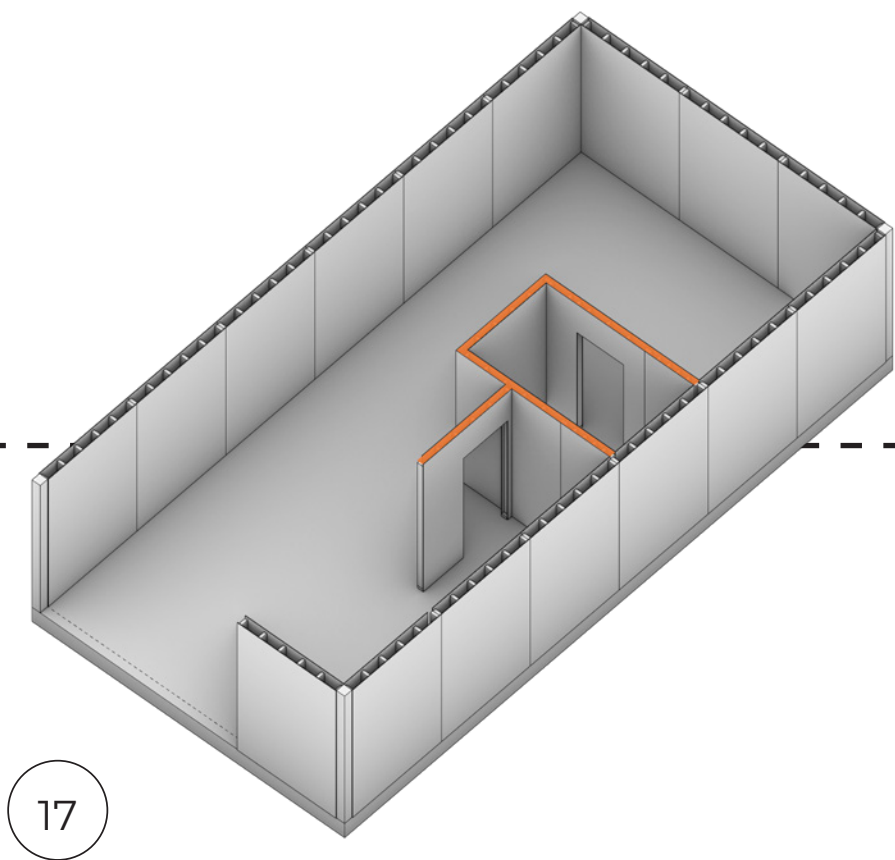
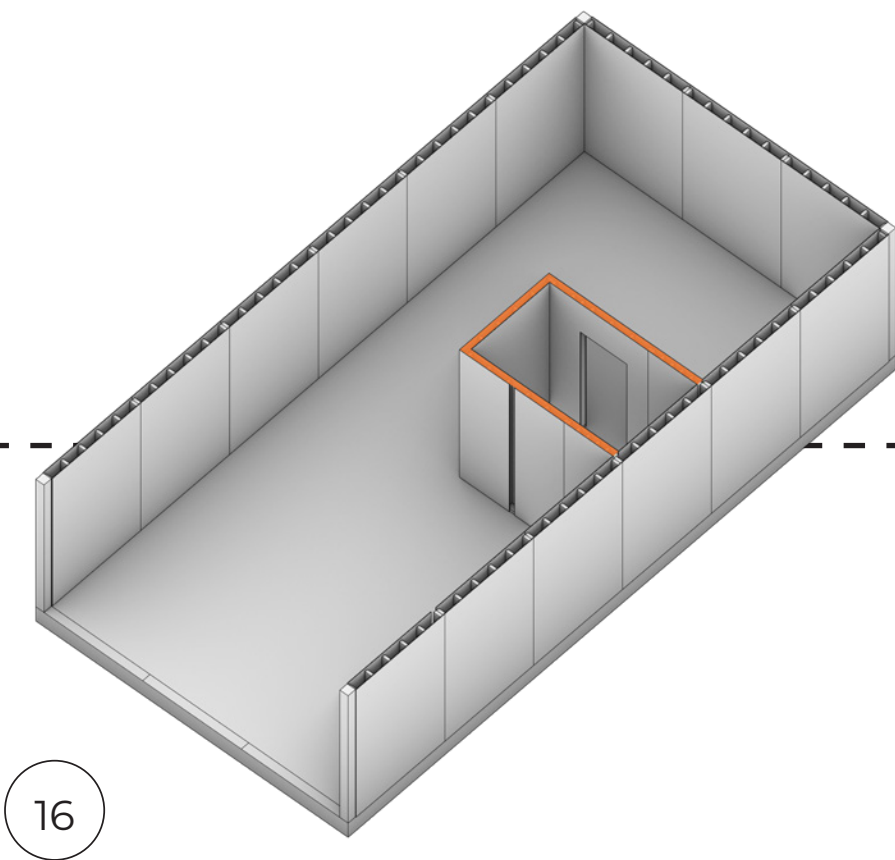
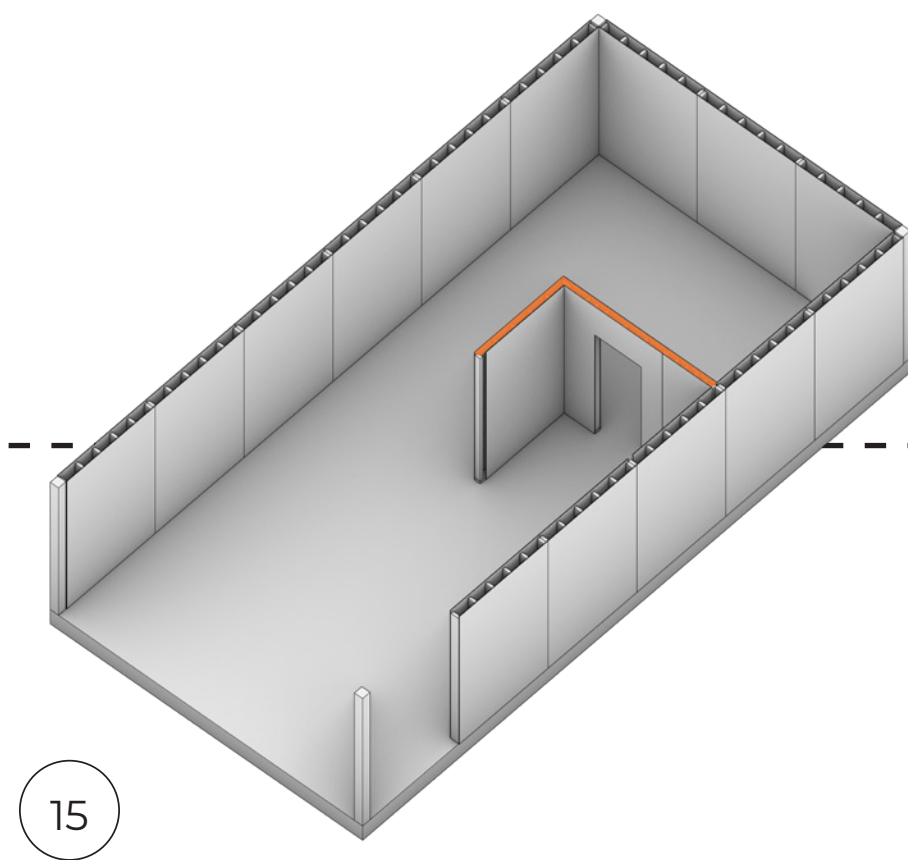
This locking mechanism allows for 1" in airgap between unit demising walls and provides for vertical and horizontal connection between units which then gets supported by metal beams

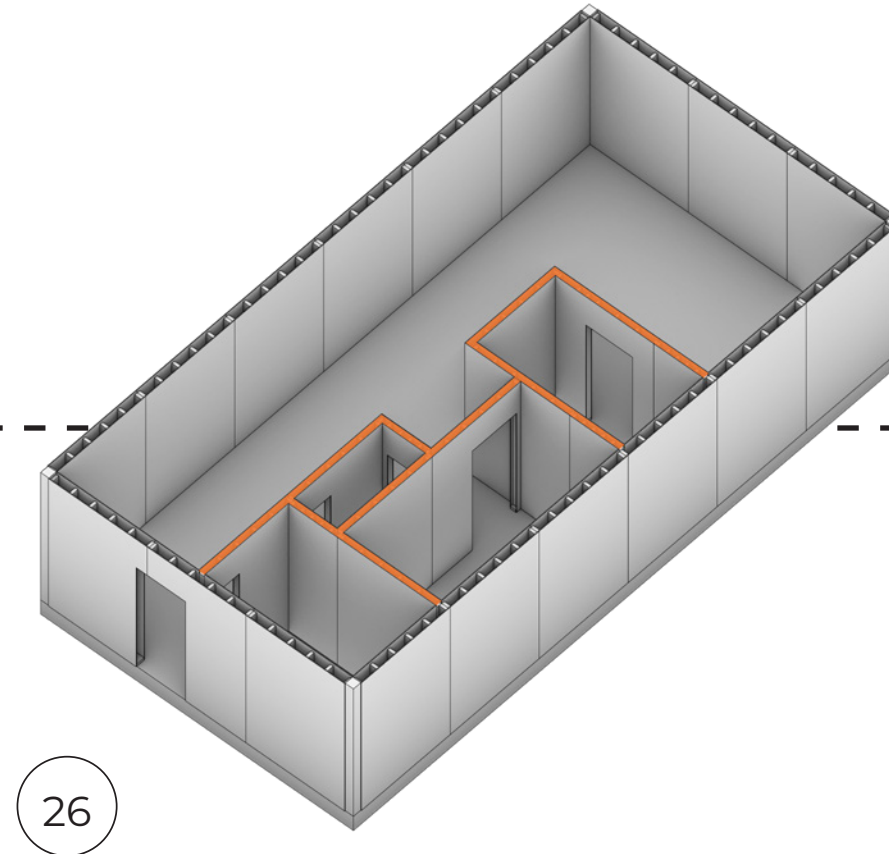
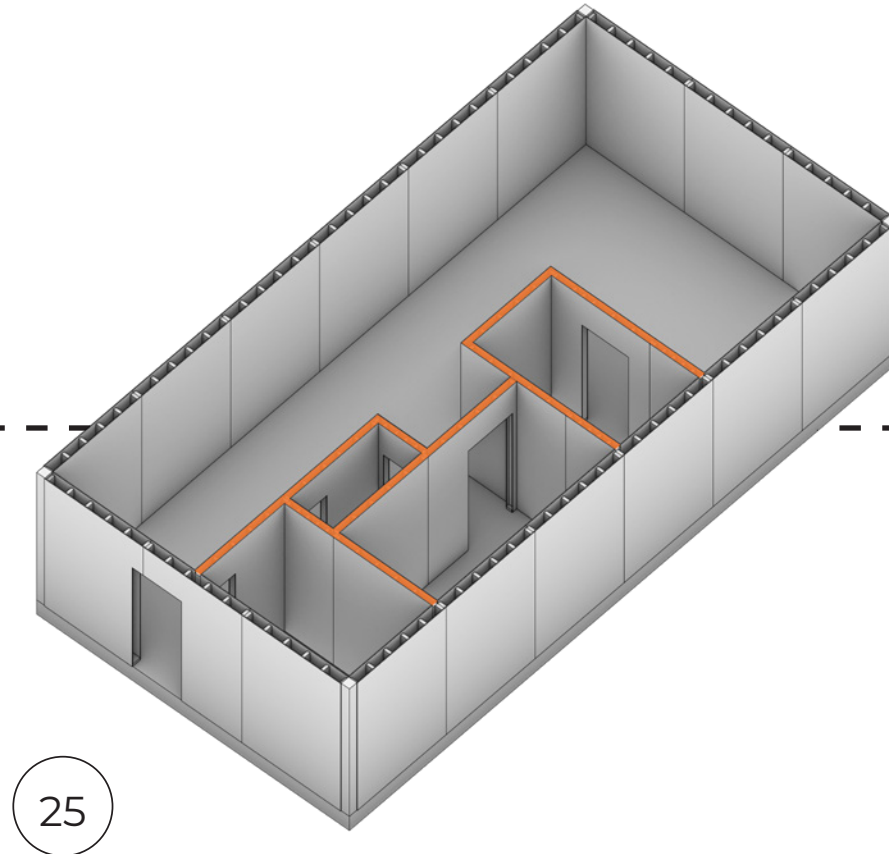
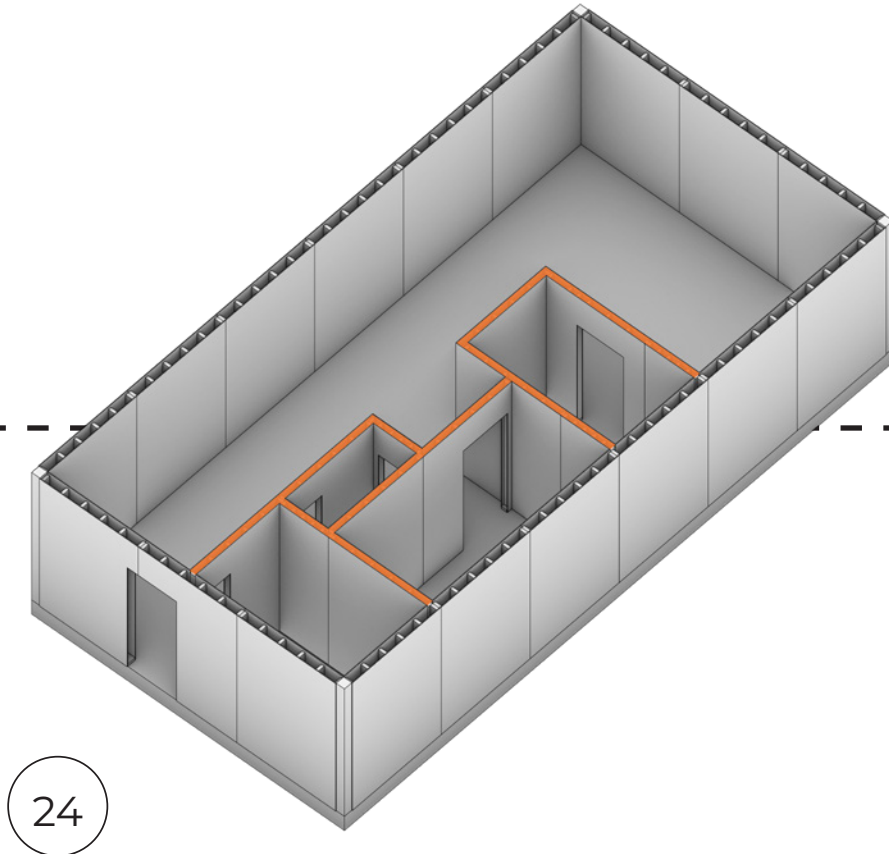
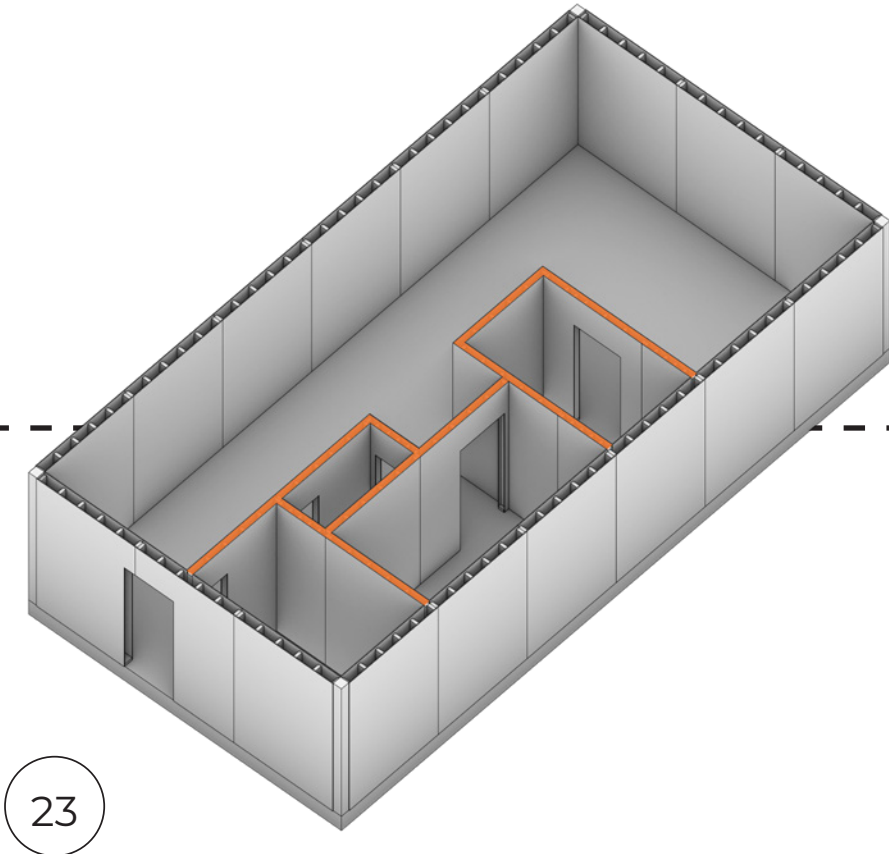
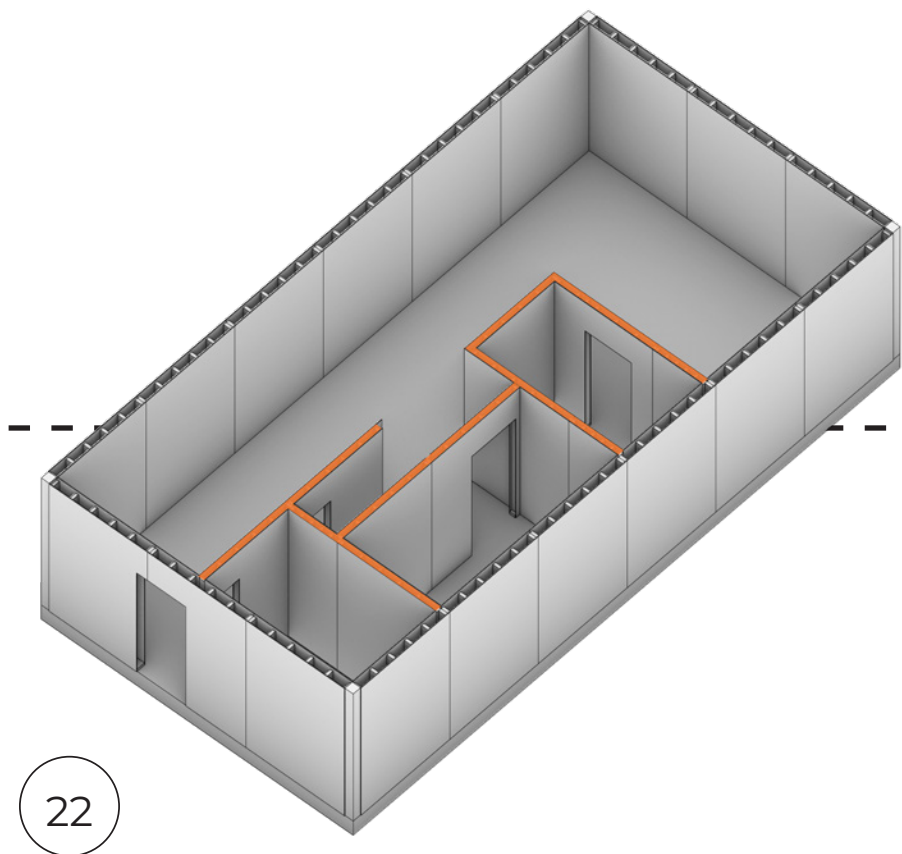


5.4 ASSEMBLY PROCESS





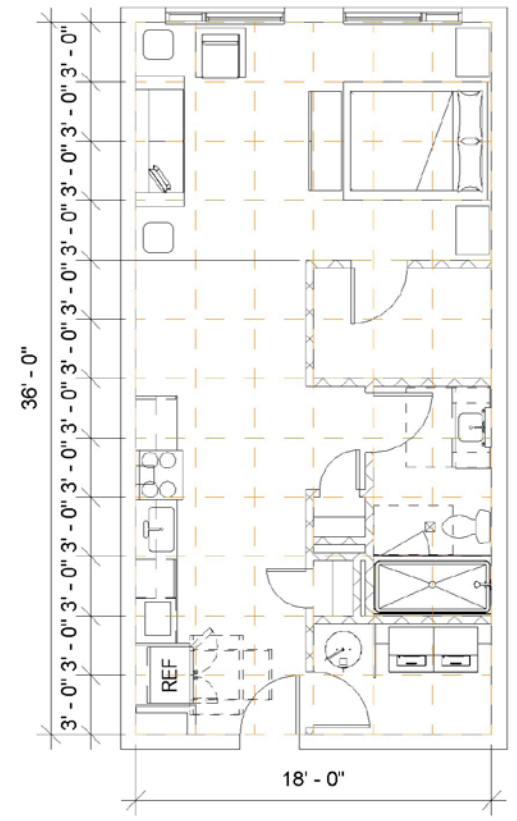




A high-speed photograph of a water splash against a blurred city skyline. The water is captured in mid-air, forming a large, dynamic shape with several smaller droplets floating above it. The background shows a dense urban landscape with various building heights and windows, all rendered in a light, desaturated tone.

06 CHAPTER
CONCLUSION

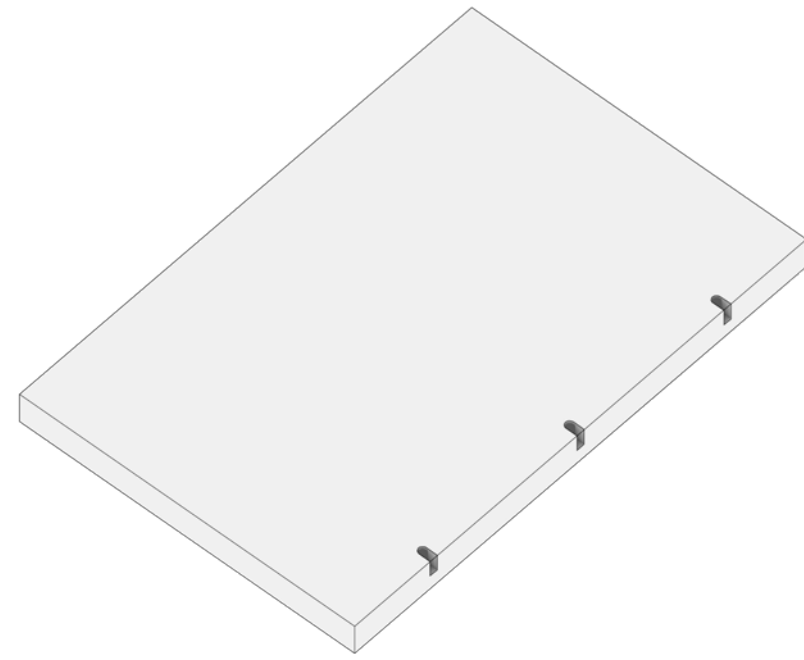
6.1 ENCOMPASSING PROCESS



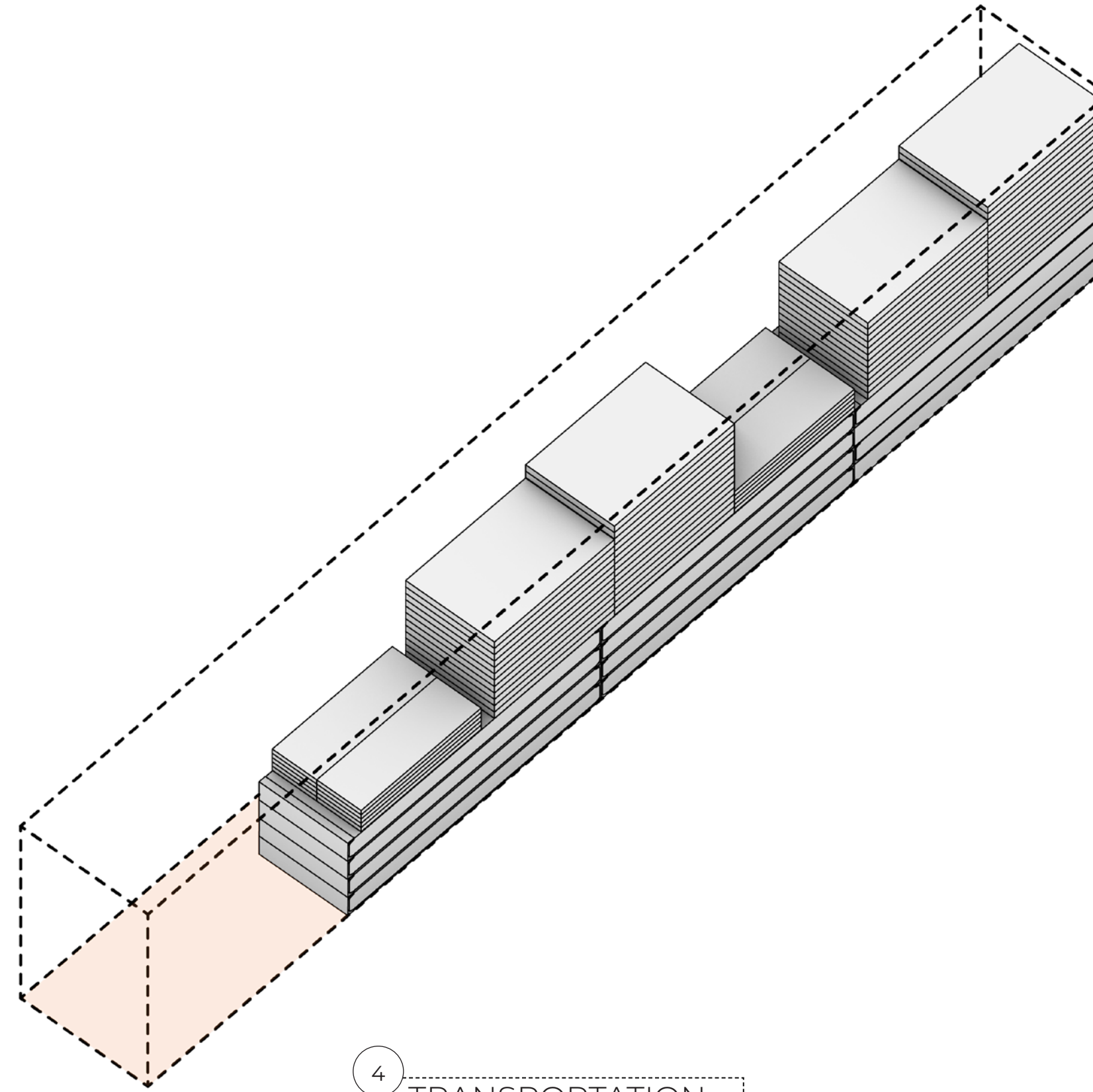
1 SELECT UNIT TYPES:
- sqft
- Type of configuration

Assembly Number
-

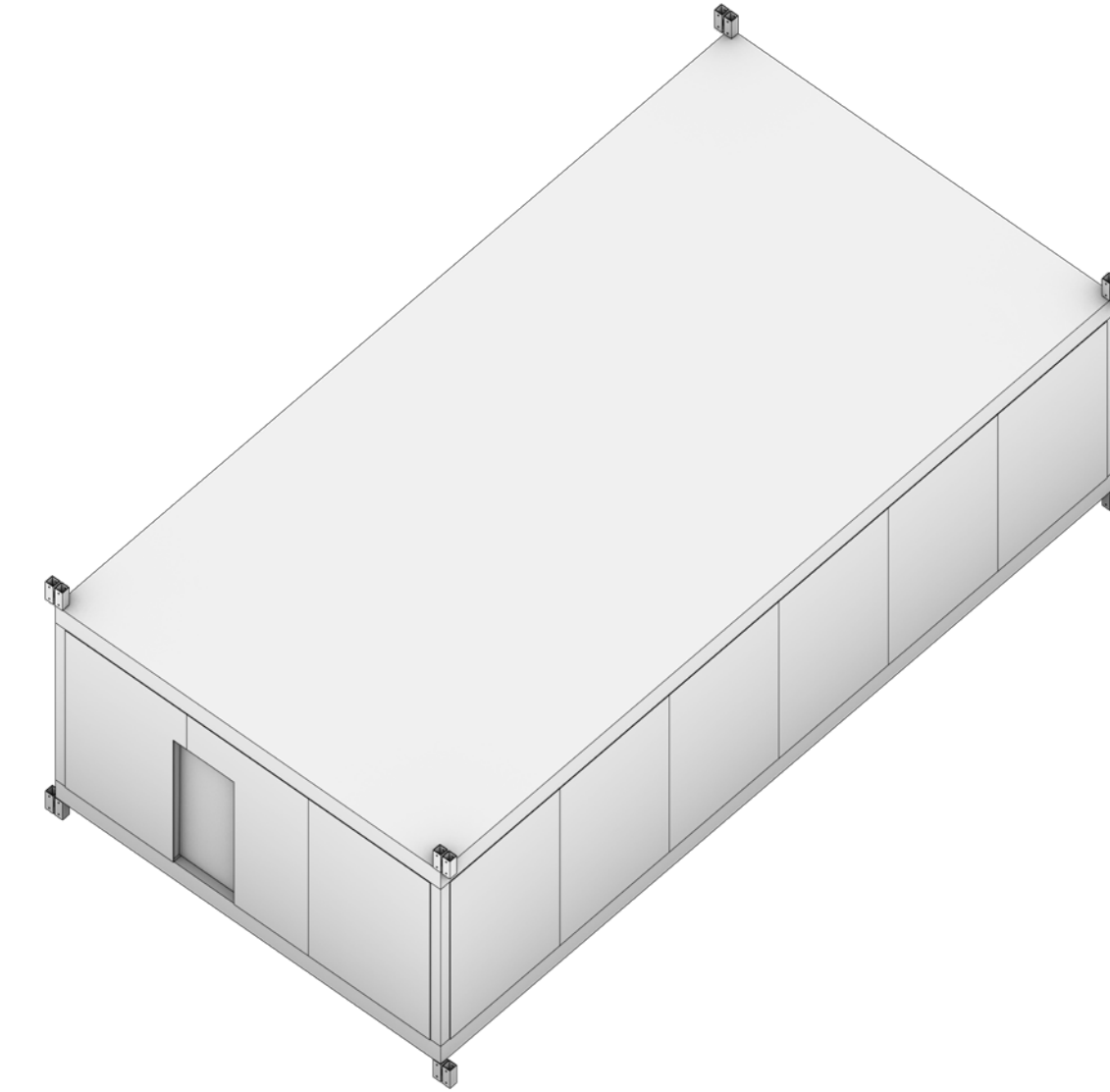
2 SELECT PANELS:
- Number
- Type



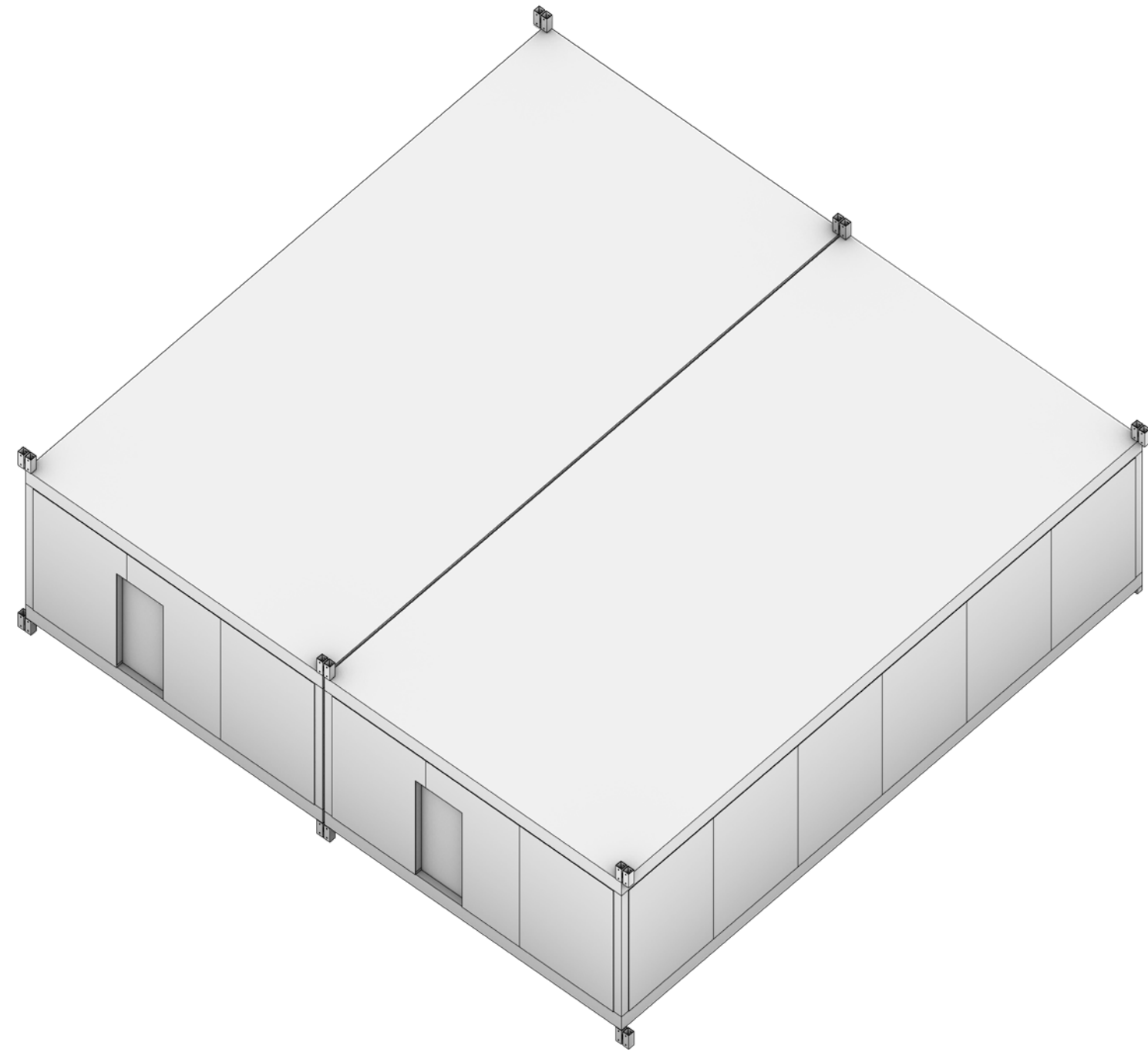
3 PANEL ASSEMBLY:
[Factory assembled]



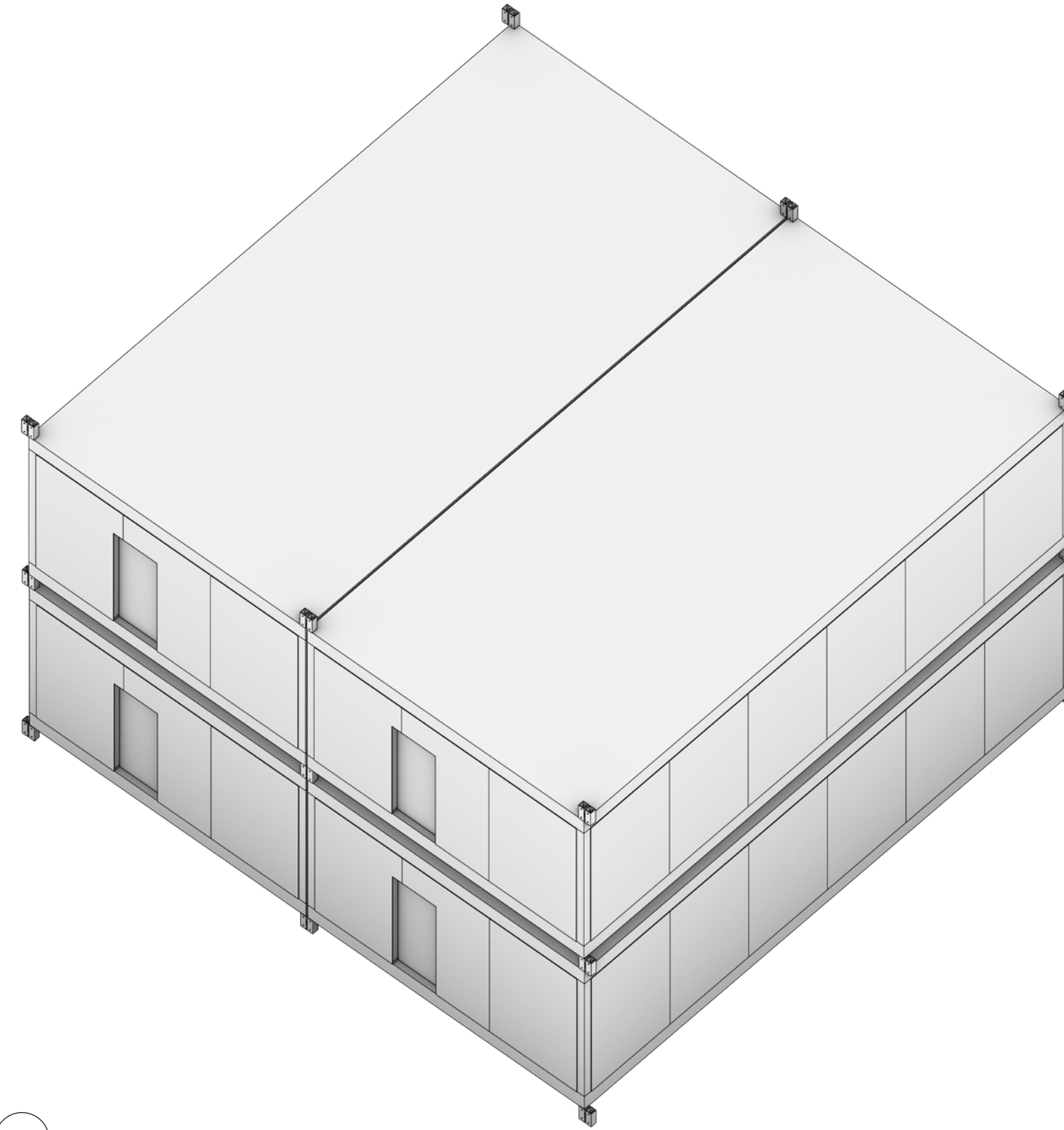
4 TRANSPORTATION:
Truck dimensions
[8'-6" x 72' x 13'-6"]



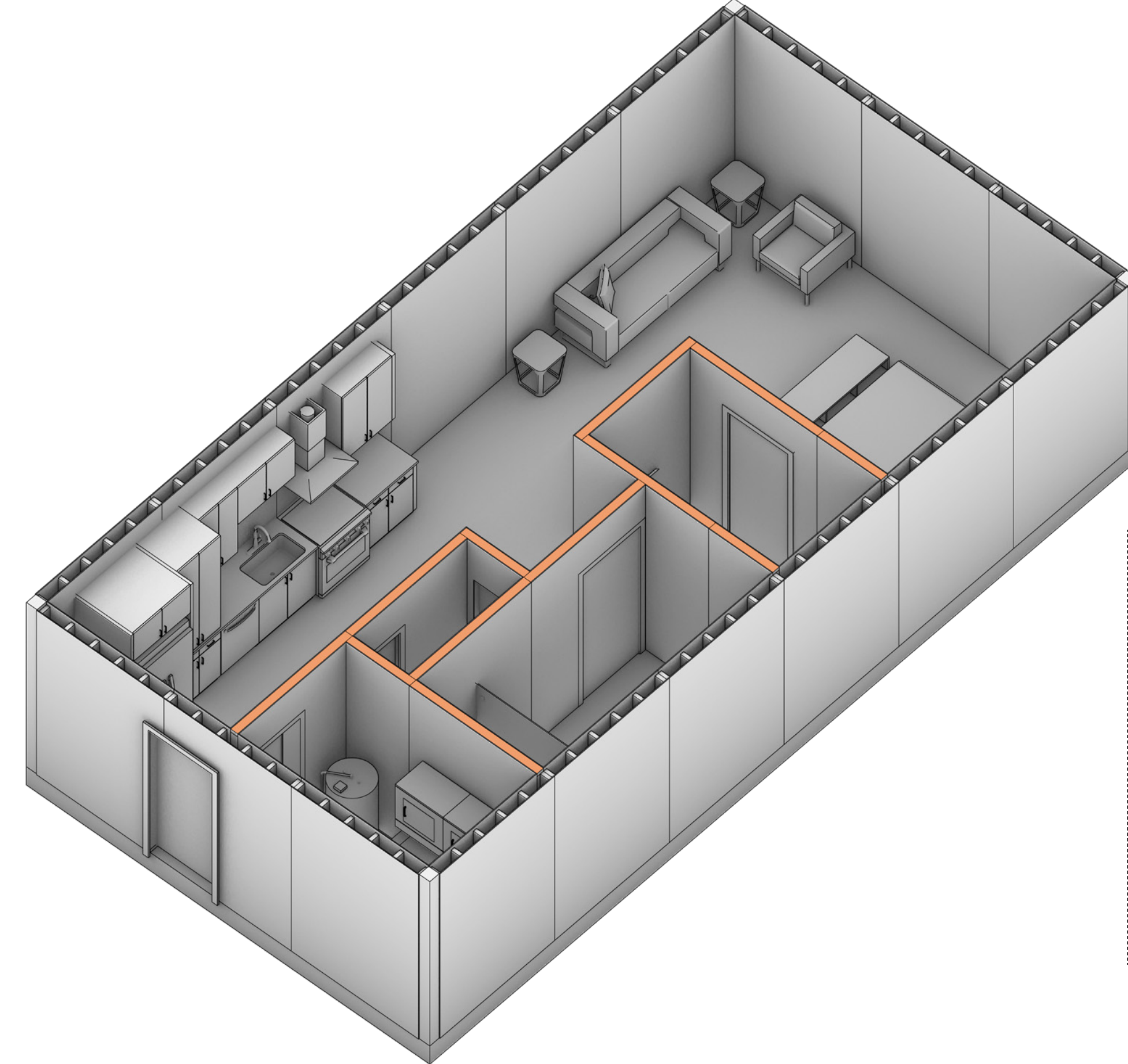
5 UNIT ASSEMBLY:
[Once panels are shipped to the site, unit gets assembled on site]



6 UNIT ASSEMBLY:
[Once units are assembled they are layed out next to each other with connectors]



7 UNIT ASSEMBLY:
[Once units are assembeled side by side, vertical unit assembly starts until achieving the total unit count for the building]



UNIT - A1

Vertical Panel Type : V4C	Horizontal Panel Type : H1A
Quantity : 12	Quantity : 2
Vertical Panel Type : V2B	Vertical Panel Type : H2B
Quantity : 4	Quantity : 4
Vertical Panel Type : V3C	Total Number of Panels : V & H
Quantity : 14	V : 30 H : 6

6.2 COMPARISON

Traditional Construction Method	AA Construction Methods
Construction Time on Site	
8 months	2 months
Cost per sqft.	
\$300	\$13
Cost per Unit (Avg. 648sf)	
\$194,400	\$8,532
Cost per Floor (25 units - 648sf)	
\$4,860,00	\$276,696
Overall Cost (5 Floors)	
\$24,300,000	\$2,075,220

Traditional Construction Method	AA Construction Methods
PROS	
Reliable	Reduced const. cost
It embraces various building shapes	Reduced on site labor
It is easily used for two way structural systems	Reduced schedule
Connection are homogeneous with rest of the frame	Reduced weather disruptions
	Quality control
CONS	
Not configurable	Increased moving pieces
Not cost effective from a renter's standpoint	Structural challenge
The quality control is difficult	Number of connections



A high-speed photograph of water splashing, with several droplets suspended in the air. The background is a blurred city skyline with various buildings. The overall color palette is light and monochromatic, with shades of grey and white.

07 CHAPTER
APPENDIX

7.1 BOARDS

ADAPTIVE ASSEMBLIES

[A SCALABLE SOLUTION TO ATLANTA'S HOUSING CRISIS]

01 CONCEPT

The future of multi-family development: an Adaptive Assembly Approach.

THESIS STATEMENT

The intent of this thesis is to redefine the architectural approach to modular housing. This involves "open" modular housing components from the constraints of transport, and deliver new adaptive assemblies which could benefit the economic, environmental and urban fabric in which the product exists. What if rather than a historic strategy for assembling dwellings, that instead the current one were to be further broken down into the essential components of architecture. If the construction method was treated as a kit of parts.

- #### RESEARCH QUESTIONS
- ▶ Define how or where can the current model for modular construction be improved and where is it failing?
 - ▶ How can a revitalized model of modular construction contribute to the solution of the housing crisis in Atlanta?
 - ▶ How can the current model of modular construction be challenged in terms of affordability, scale and accessibility?
 - ▶ What factors have contributed to the stagnation of development of construction methods?
 - ▶ What design strategies, technologies could be implemented to respond to the stagnant methods of construction?

SUPPORTING DATA

2%

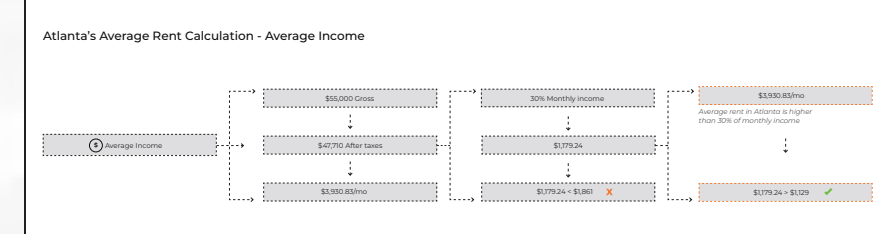
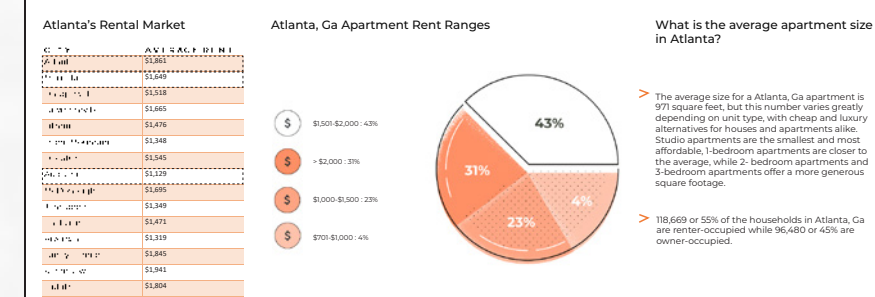
The city of Atlanta's population peaked in 1970 at 406,973. As the region grew dramatically over the next 50 years, the city's population shrank to 394,207 by 2000. And over the next 20 years the population grew a mere 0.85 percent. That shrinking pattern has now changed.

12%

The census indicates that in 2006 Atlanta's population was 472,252, a 2 percent increase in a 10 year span from 2003 to 2006. The magnitude in growth has not been seen in Atlanta in the last 50 years. There is no reason to believe this trend will not continue and accelerate. Between July 2016 and July 2017, the city of Atlanta permitted more than 16 billion in construction more than any other 12 months in the city's history.

+2.5 million

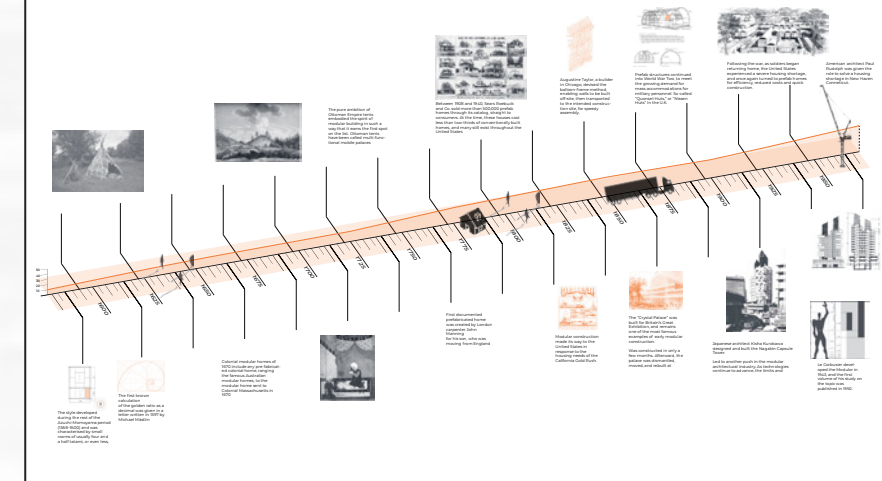
Atlanta is experiencing levels of growth that numbers that long have been reserved in the last century. It is projected that within the next ten years the city will grow by 2.5 million people to a population of 7 million.



TARGET MARKET & TARGET USER

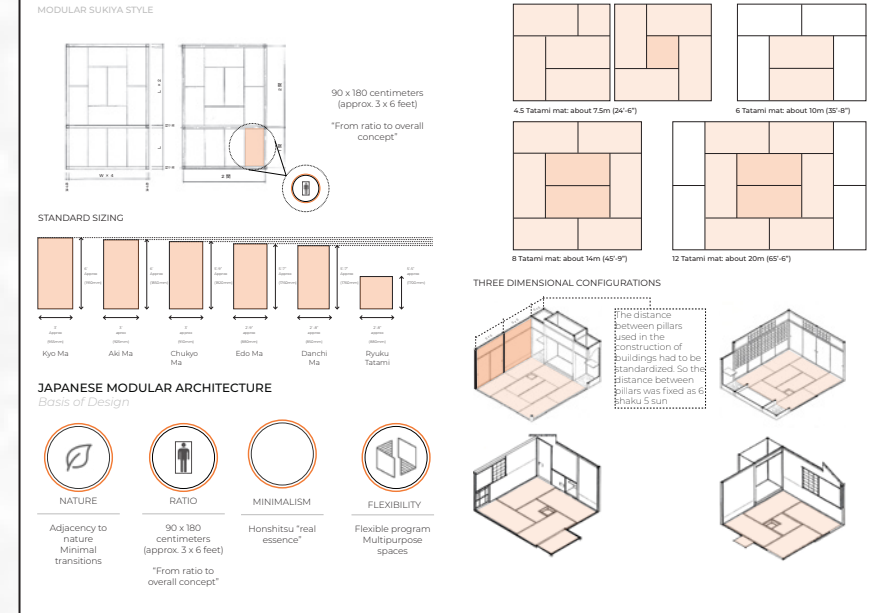


MODULARITY TIMELINE



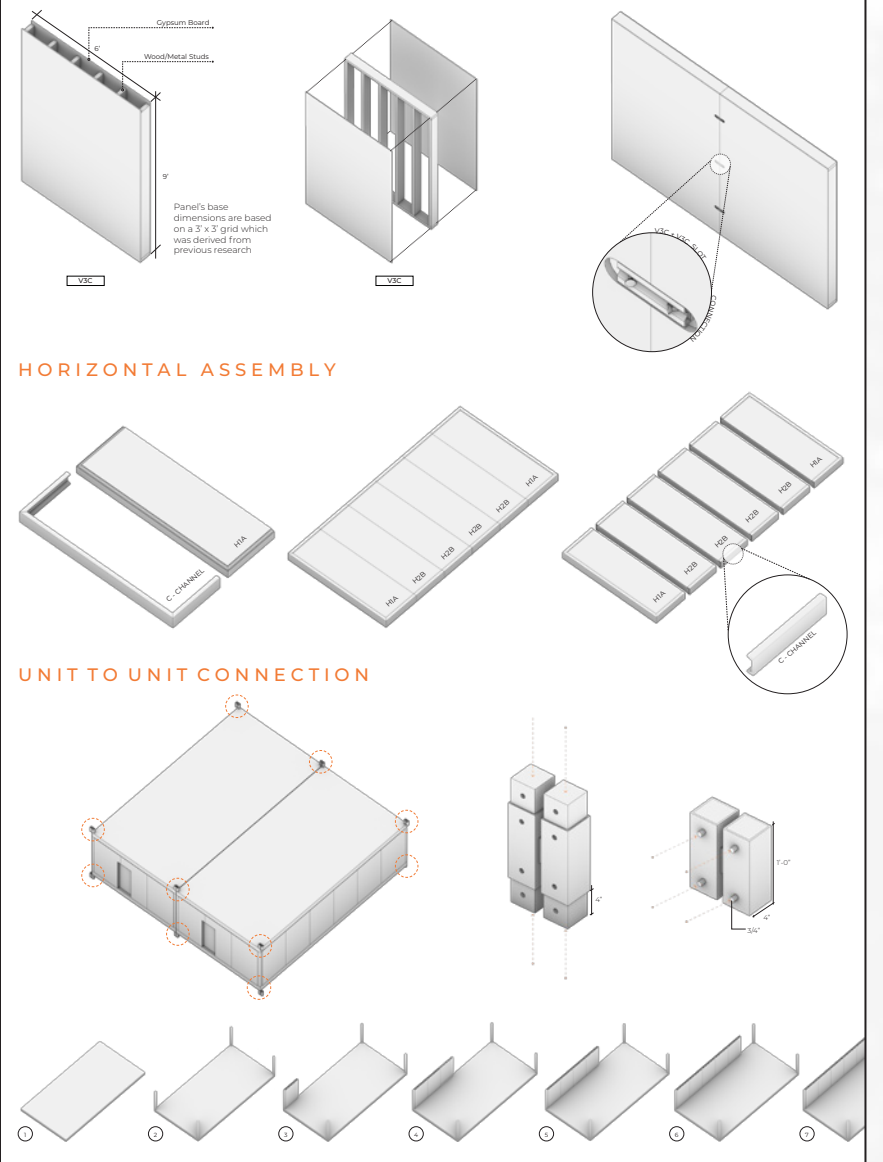
02 RESEARCH

The Atlanta region is projected to grow by 2.5 million people in the coming years. For Atlanta to be a more mobile, affordable and livable city, it should be built to support an unprecedented amount of growth.



03 SYSTEM

The goal is to take advantage of a component-based system and explore a scalable solution to modular housing. My proposal aims specifically to design a kit of parts that are made to be easily transported and assembled.



ASSEMBLY LIBRARY

UNIT-A1: Gross: 444.00 SF, Net: 464.00 SF, Framing cost: \$8,532, Avg. cost per sqft: \$13

UNIT-A2: Gross: 864.00 SF, Net: 884.00 SF, Framing cost: \$12,332, Avg. cost per sqft: \$13

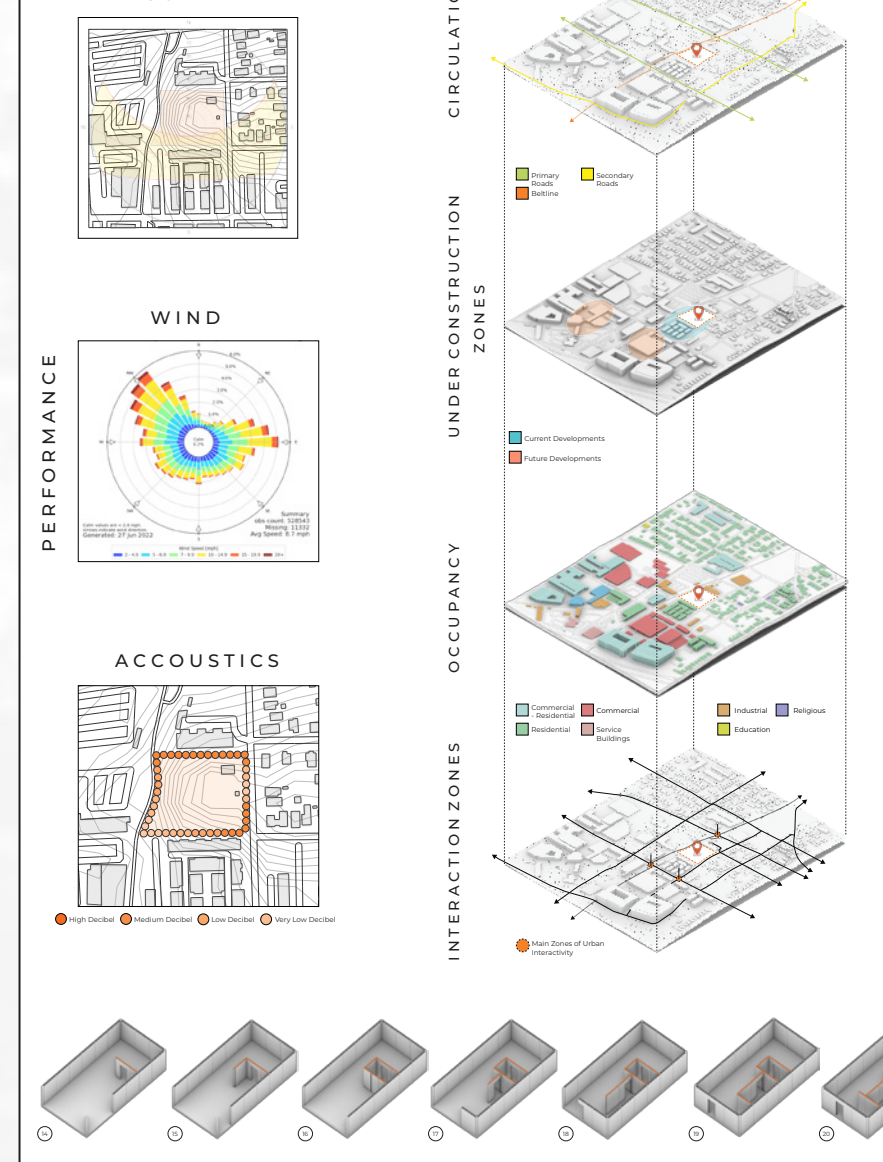
UNIT-B1: Gross: 1080.00 SF, Net: 72.00 SF, Framing cost: \$18,848, Avg. cost per sqft: \$13

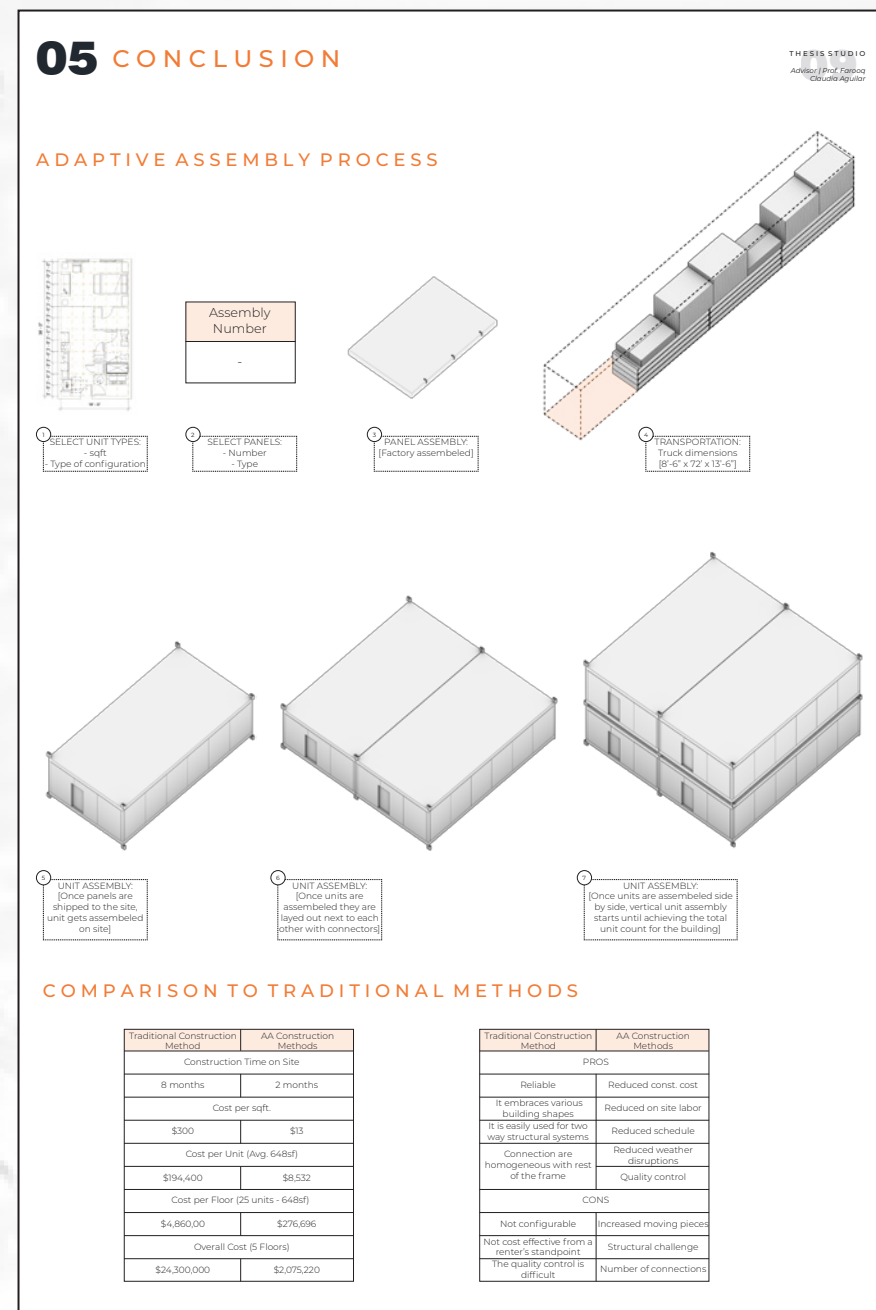
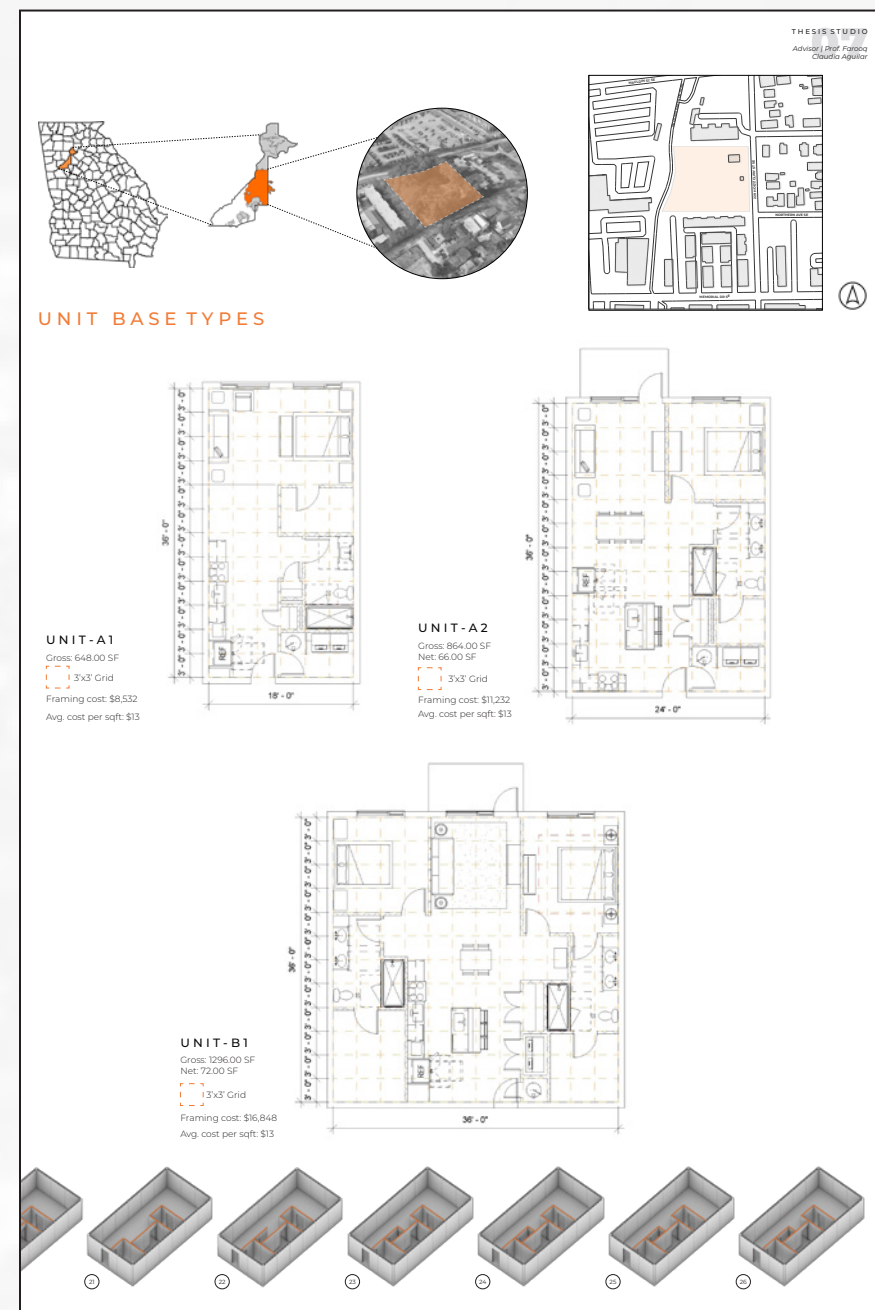
Apartment Number	L	W	D	Cost Per Panel
V0A	8'	2'	4.50'	\$5142
V0B	8'	2'	4.50'	\$5117
V0C	8'	2'	4.50'	\$5050
V0D	8'	2'	4.50'	\$5042
V0E	8'	2'	4.50'	\$4975
V0F	8'	2'	4.50'	\$4975
V0G	8'	2'	4.50'	\$4975
V0H	8'	2'	4.50'	\$4975
V0I	8'	2'	4.50'	\$4975
V0J	8'	2'	4.50'	\$4975
V0K	8'	2'	4.50'	\$4975
V0L	8'	2'	4.50'	\$4975
V0M	8'	2'	4.50'	\$4975
V0N	8'	2'	4.50'	\$4975
V0O	8'	2'	4.50'	\$4975
V0P	8'	2'	4.50'	\$4975
V0Q	8'	2'	4.50'	\$4975
V0R	8'	2'	4.50'	\$4975
V0S	8'	2'	4.50'	\$4975
V0T	8'	2'	4.50'	\$4975
V0U	8'	2'	4.50'	\$4975
V0V	8'	2'	4.50'	\$4975
V0W	8'	2'	4.50'	\$4975
V0X	8'	2'	4.50'	\$4975
V0Y	8'	2'	4.50'	\$4975
V0Z	8'	2'	4.50'	\$4975

Apartment Number	L	W	D	Cost Per Panel
V10A	8'	2'	4.50'	\$5142
V10B	8'	2'	4.50'	\$5117
V10C	8'	2'	4.50'	\$5050
V10D	8'	2'	4.50'	\$5042
V10E	8'	2'	4.50'	\$4975
V10F	8'	2'	4.50'	\$4975
V10G	8'	2'	4.50'	\$4975
V10H	8'	2'	4.50'	\$4975
V10I	8'	2'	4.50'	\$4975
V10J	8'	2'	4.50'	\$4975
V10K	8'	2'	4.50'	\$4975
V10L	8'	2'	4.50'	\$4975
V10M	8'	2'	4.50'	\$4975
V10N	8'	2'	4.50'	\$4975
V10O	8'	2'	4.50'	\$4975
V10P	8'	2'	4.50'	\$4975
V10Q	8'	2'	4.50'	\$4975
V10R	8'	2'	4.50'	\$4975
V10S	8'	2'	4.50'	\$4975
V10T	8'	2'	4.50'	\$4975
V10U	8'	2'	4.50'	\$4975
V10V	8'	2'	4.50'	\$4975
V10W	8'	2'	4.50'	\$4975
V10X	8'	2'	4.50'	\$4975
V10Y	8'	2'	4.50'	\$4975
V10Z	8'	2'	4.50'	\$4975

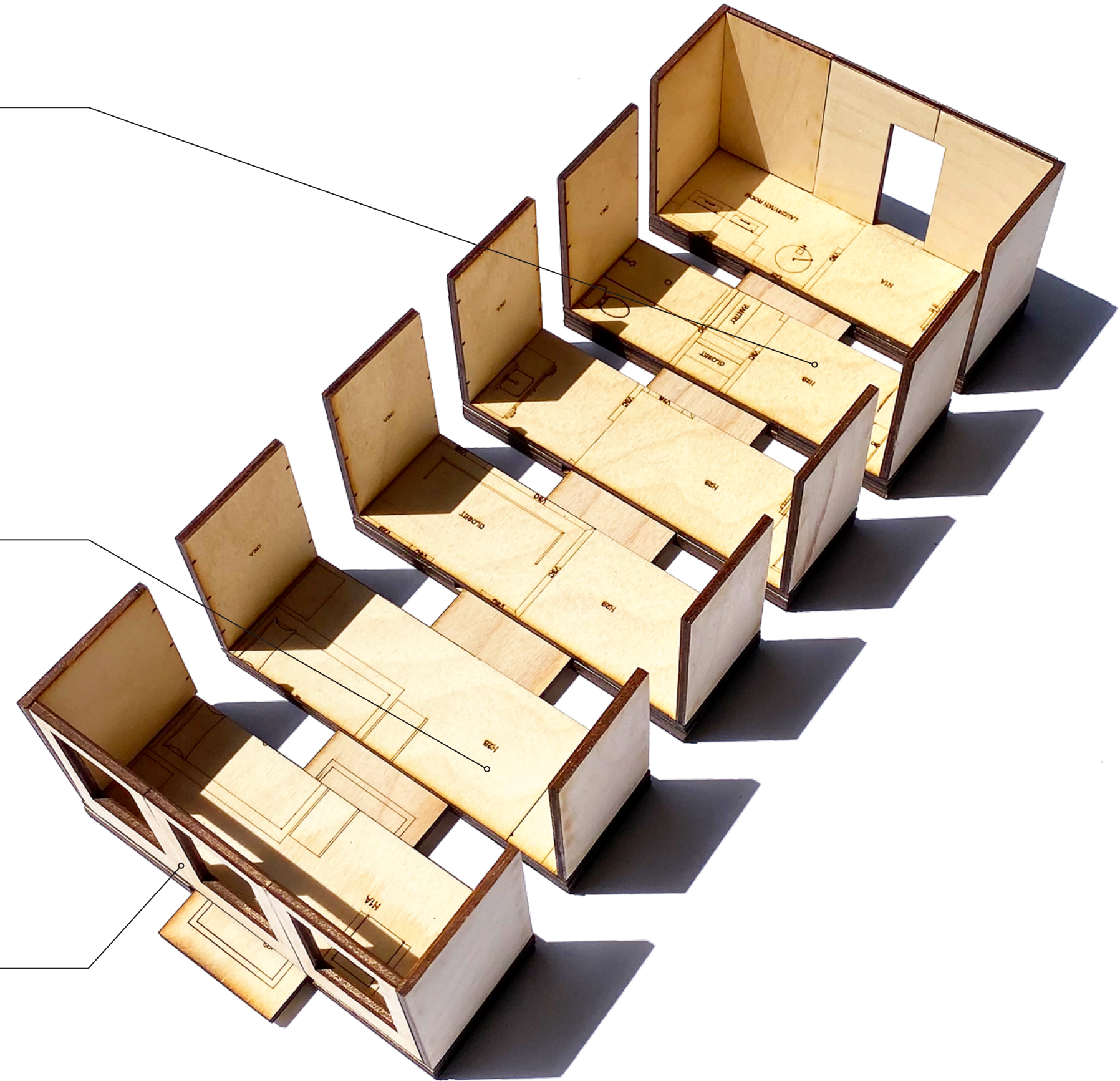
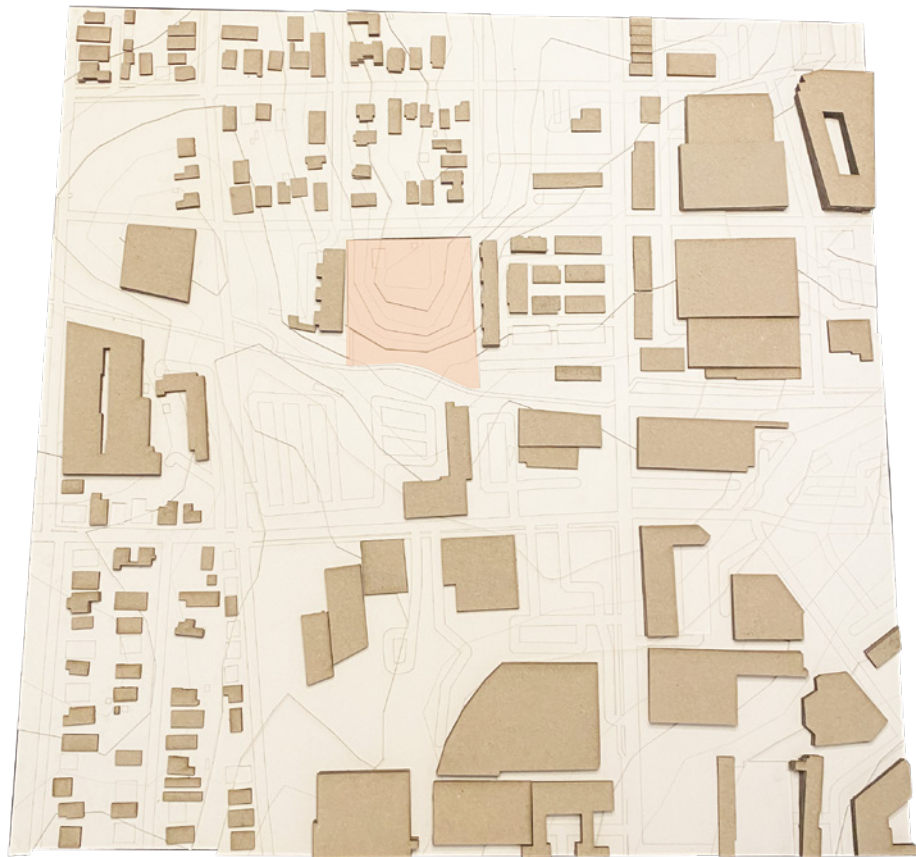
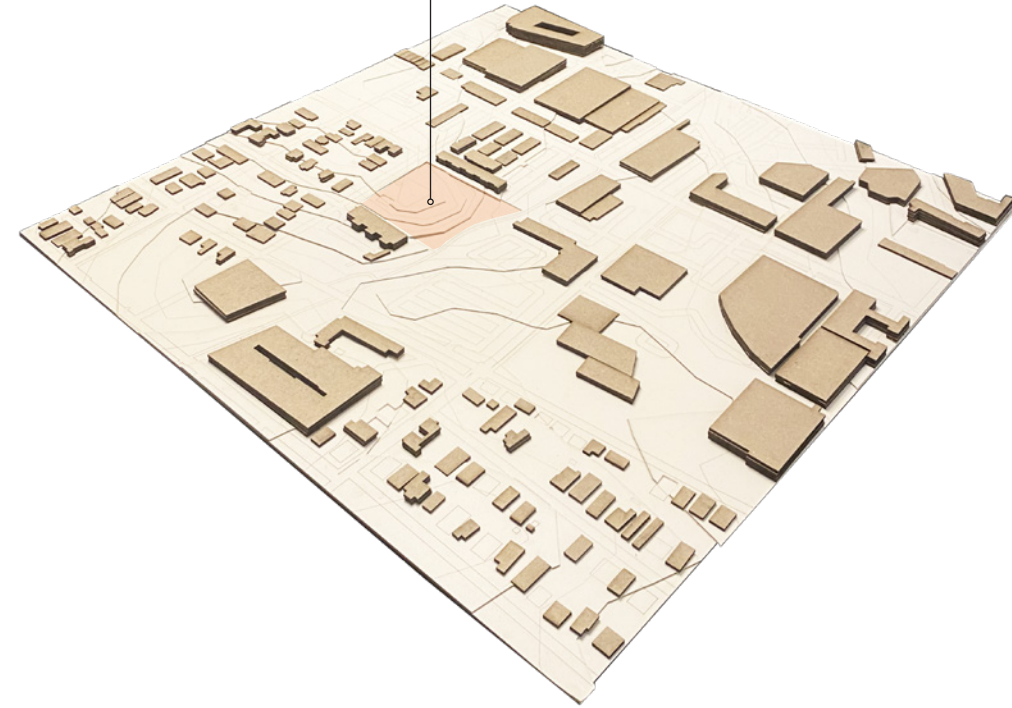
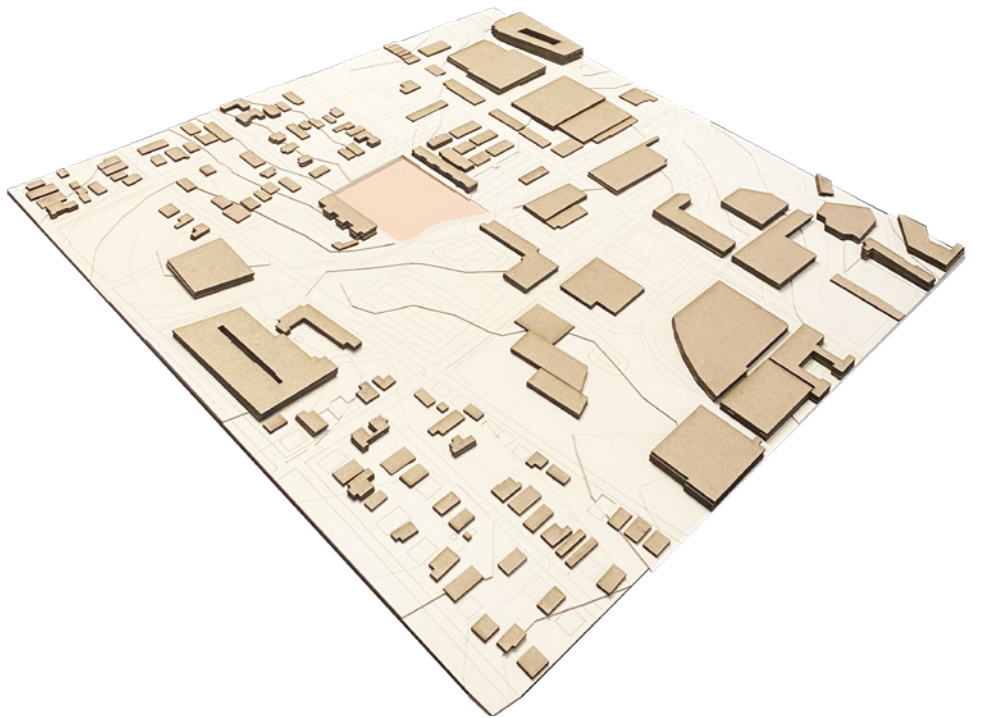
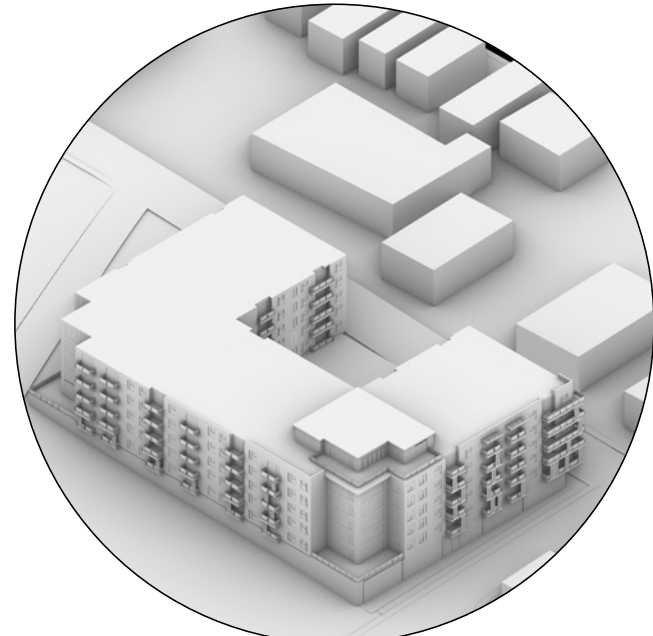
04 APPLICATION

The following diagrams analyze the chosen site located at 239 Holbrook St SE, Atlanta, GA. The site is within the historic district of Cabbage Town.





7.2 MODELS





7.3 CITATIONS

Image's

[pg.23]

Golden Ratio. Photograph. The Golden Ratio Is Even More Astonishing than Dan Brown and Pepsi Thought. Jordan Ellenberg, June 5, 2021. <https://slate.com/technology/2021/06/golden-ratio-phi-irrational-number-ellenberg-shape.html>.

[pg.24]

Golden Ratio. Photograph. The Golden Ratio Is Even More Astonishing than Dan Brown and Pepsi Thought. Jordan Ellenberg, June 5, 2021. <https://slate.com/technology/2021/06/golden-ratio-phi-irrational-number-ellenberg-shape.html>.

[pg. 31]

Floor plan image 1. Cover. Accessed 2023. <https://buildcover.com/process>.

Floor plan image 2. ibid.

Floor plan image 3. ibid.

Floor plan image 4. ibid.

Floor plan image 5. ibid.

[pg. 32]

Floor plan image 6. ibid.

Floor plan image 7. ibid.

Floor plan image 8. ibid.

Floor plan image 9. ibid.

[pg.40]

Georgia map image 1. Fulton County Georgia Municipalities Map East Point Highlighted.svg. Accessed 2023. https://en.m.wikipedia.org/wiki/File:Fulton_County_Georgia_Municipalities_Map_East_Point_Highlighted.svg.

Fulton map image 1. ibid.

[pg.26]

Tatami floor plan image 1. Kyoma Tatami. Accessed 2023. <http://www.omotesenke.jp/english/list4/list4-1/list4-1-4/>.

[pg.29]

Tatami three dimensional floor plan image 1. ibid.

Tatami three dimensional floor plan image 2. ibid.

Tatami three dimensional floor plan image 3. ibid.

Tatami three dimensional floor plan image 4. ibid.

[pg. 25]

Photograph. My Micro NY Is Manhattan's First and Tallest Modular Apartment Building. Living Spaces, November 10, 2017. <https://www.livinspaces.net/projects/architecture/a-high-rise-face-me-i-face-you-my-micro-ny-is-manhattans-first-and-tallest-modular-apartment-building/>.

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"The Millennial Generation-Birth Years, Characteristics, and History - Familysearch." FamilySearch, November 18, 2021. <https://www.familysearch.org/en/blog/millennial-generation>.

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Nguyen, Tommy Minh. "Tommy Minh Nguyen." Archi Hacks, August 27, 2021. <https://archihacks.com/architecture-style-series-japanese-residential/>. Team, Content.

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