



THE URBAN BEEHIVE

affordable urban micro housing
for middle class families

Geena Pickering

THANK YOU...

To Michelle and Stephanie especially, who have always reminded me of the great things in life and to always keep pushing no matter what. You both were so important to the completion of this thesis and graduate school in general. I love you.

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ABSTRACT

Large urban areas across the United States are struggling to provide housing for middle income families in downtown areas. ⁱFamilies are being pushed out of cities for a number of factors, one of which is lack of housing that is large enough for a growing family and fully within their price range. ⁱⁱ There is a gap between low-income affordable housing prices and market rate housing prices. ⁱⁱⁱ The family dynamic of living in the suburbs is rapidly changing and new families want and need to live in the city center. ^{iv} People in the city are exposed to more cultural diversity. They have more opportunities to walk or bike. Adults and children have access to a wealth of activities nearby, while children and elderly can achieve an independence that is not as easily obtained outside the city. ^v

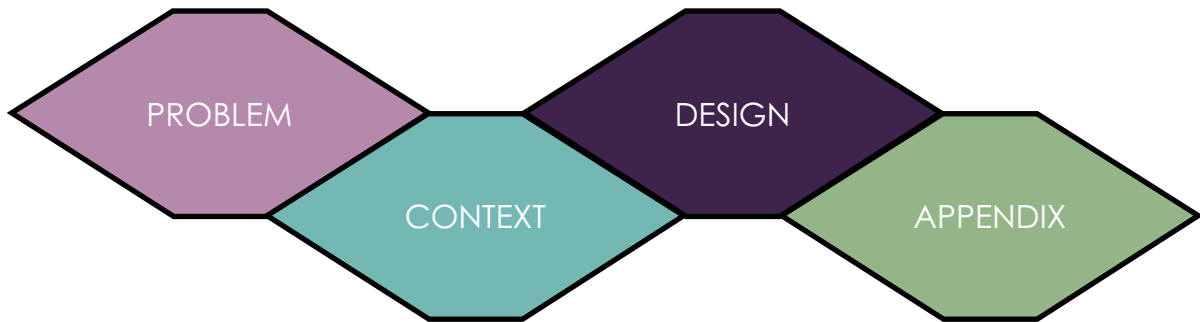
Families that would prefer to live in the city, tend to move to the suburbs when they decide to have children because they think that they need more space. ^{vi} The reality is that families don't need more space; they need better space. The best space would have the ability to adapt and change with the family as it grows and shrinks across the family life cycle. The goal of this project is to provide housing that is micro, and expandable for 5.

Since urban areas rarely have open space on the ground level, these homes will be located in the air space between buildings. This is an option not dependent on ground level real estate that could result in a cheaper option for families.

The city of San Francisco provides an opportunity to test this idea as it is one of the most expensive places for families to live in the United States. San Francisco cannot expand the downtown area due to strict height limitations and limited boundaries. A small site in San Francisco will act as a test case for how this approach might be applied to other urban contexts. Using this test case, micro housing in the city center for middle income families of 5, that can adapt and change with their needs will be provided.



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01 PROBLEM

Housing in the United States
Middle Income Family Housing
Affordable Housing Gap
The Family Life Cycle
Space Needs
Urban Living
Suburban Living

HOUSING IN THE UNITED STATES

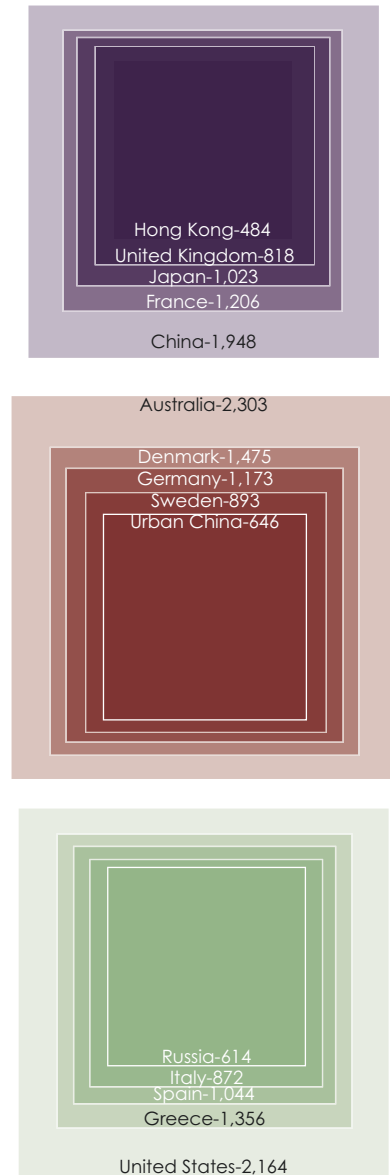
Housing in the United States has changed significantly over time. Average homes have been getting larger and larger. ¹ As of 2014 only 4% of homes being built were 1,400 square feet or less. ²

The rich are getting richer and buying these larger homes, while first-time homebuyers are unable to afford even small homes due to increasing student loans and other debt. ³

Figure 2 shows the average home size around the globe, it shows that the United States has the second largest home size in the world. These statistics were taken from 2009. As of 2015 the average home size in the United States is a staggering 2,600 square feet. ⁴

As a result of this change in housing, middle income families cannot afford the space they think they need in the city.

Figure 2: Average Home Size Around the Globe (sq.ft.)



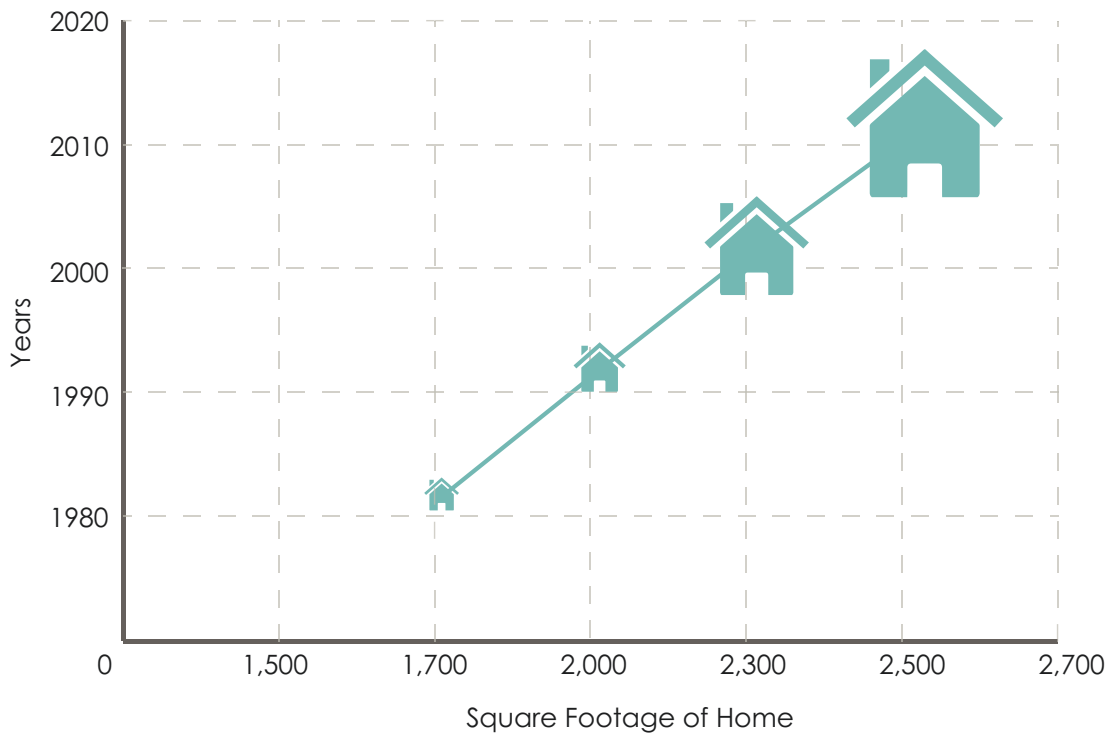


Figure 3: Average American Home Size

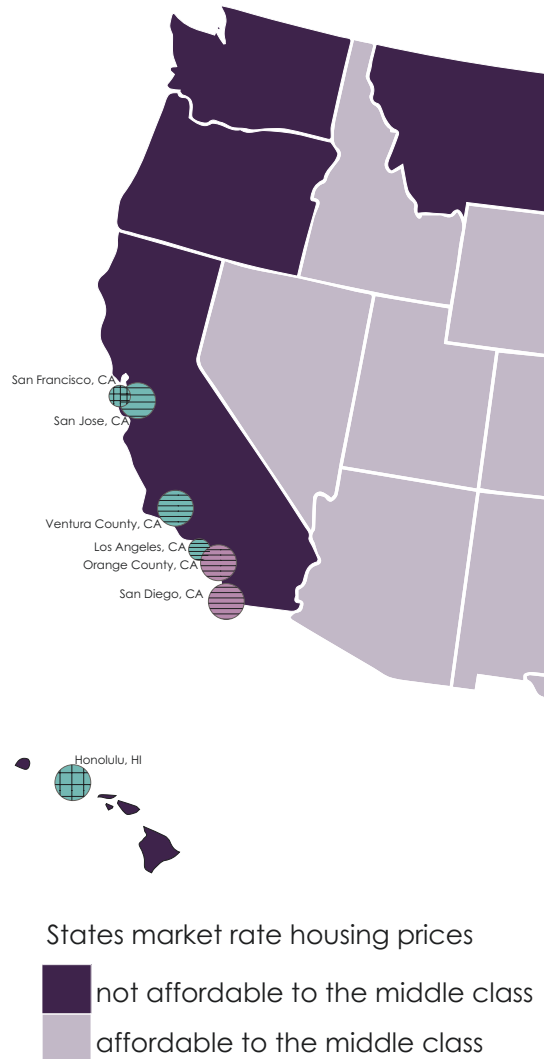
MIDDLE INCOME FAMILY HOUSING

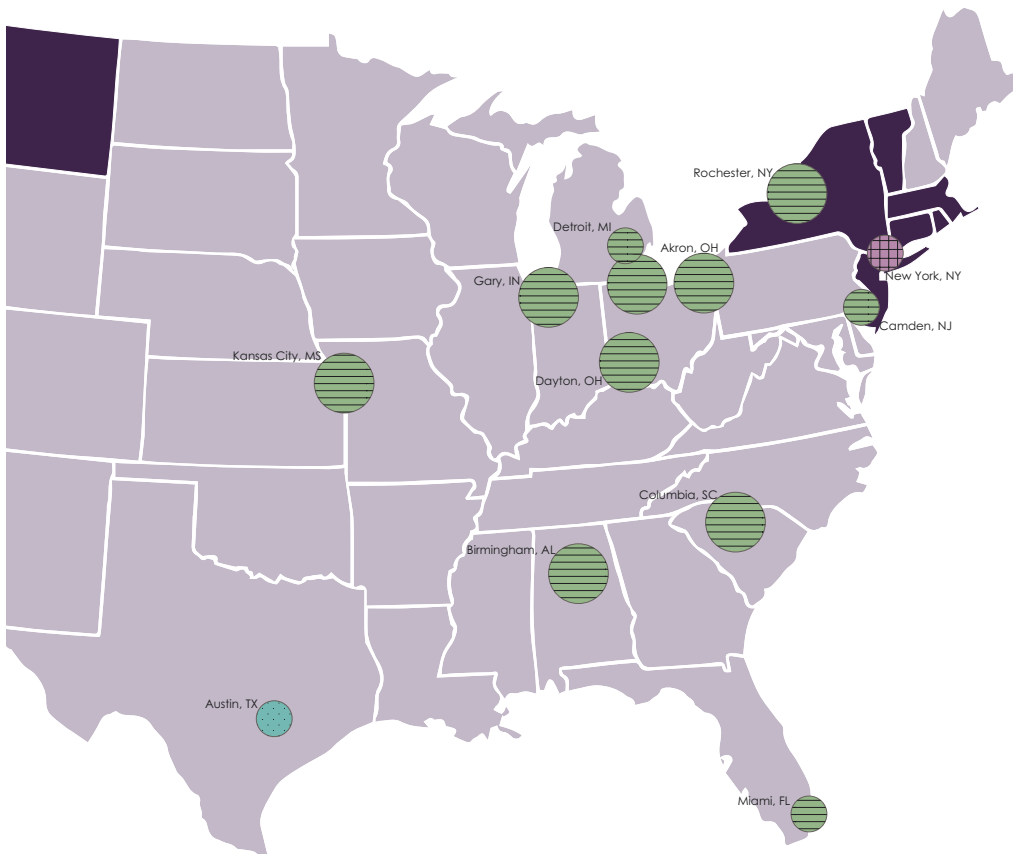
Middle income families are being forced out of the city for many reasons, one of which is high home prices and a shortage of space that they perceive they need. As families have children they decide that they need more space, and looking for more space in the city can be difficult and expensive.

The need for middle income family housing in urban areas stretches across the United States. ⁵The old notion of moving to the suburbs when having children is gone and the new generation wants to raise kids in the city center. ⁶

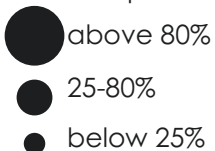
The 10 least affordable cities in the United States for middle income Americans are San Francisco, CA, Los Angeles, CA, San Diego, CA, New York, NY, Orange County, CA, San Jose, CA, Ventura County, CA, Honolulu, HI, Austin, TX, and Miami, FL. ⁷Homes in these cities are very expensive, meaning that there are not very many available to the middle class, and the homes that are available are not large enough for what middle class families want in a home.

Figure 4: U.S. Home Affordability Comparison

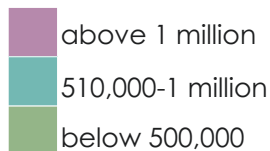




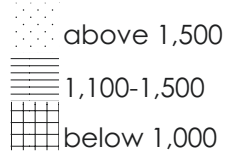
homes for sale within the middle class' price range



population of city



square footage of affordable homes



The 10 most and least affordable cities in the United States

AFFORDABLE HOUSING GAP

There is a gap between low-income affordable housing and market rate housing prices.⁸ Middle income families fall directly in this gap, their income is too high for low-income housing, and not enough for market rate prices.⁹

Looking at these numbers in San Francisco, it is apparent that average middle income families can afford a market rate studio apartment in the city, and as the number of bedrooms increases they are rapidly priced out of market rate housing. This is a major reason that families move to the suburbs when having children. They get priced out of the city and the suburbs offer a much cheaper option with more space.

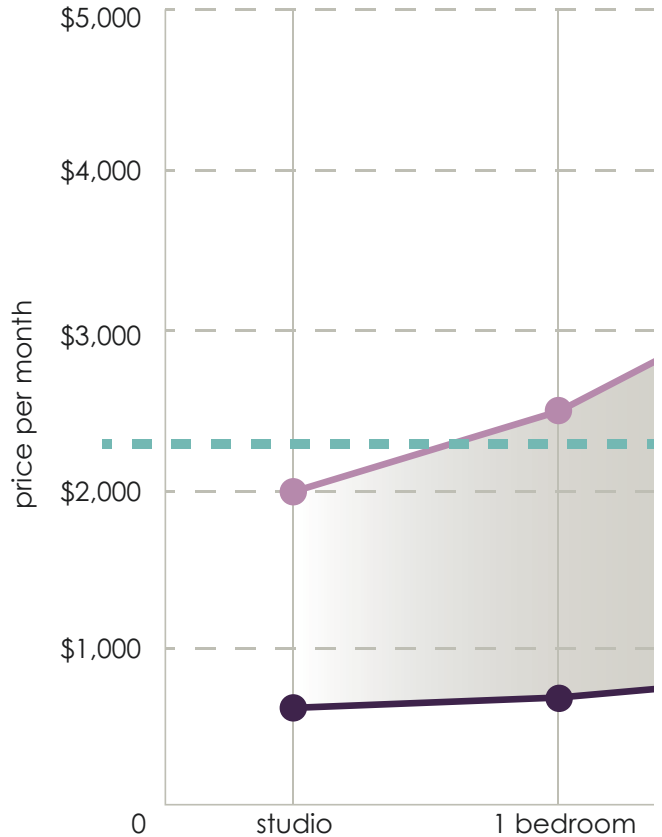
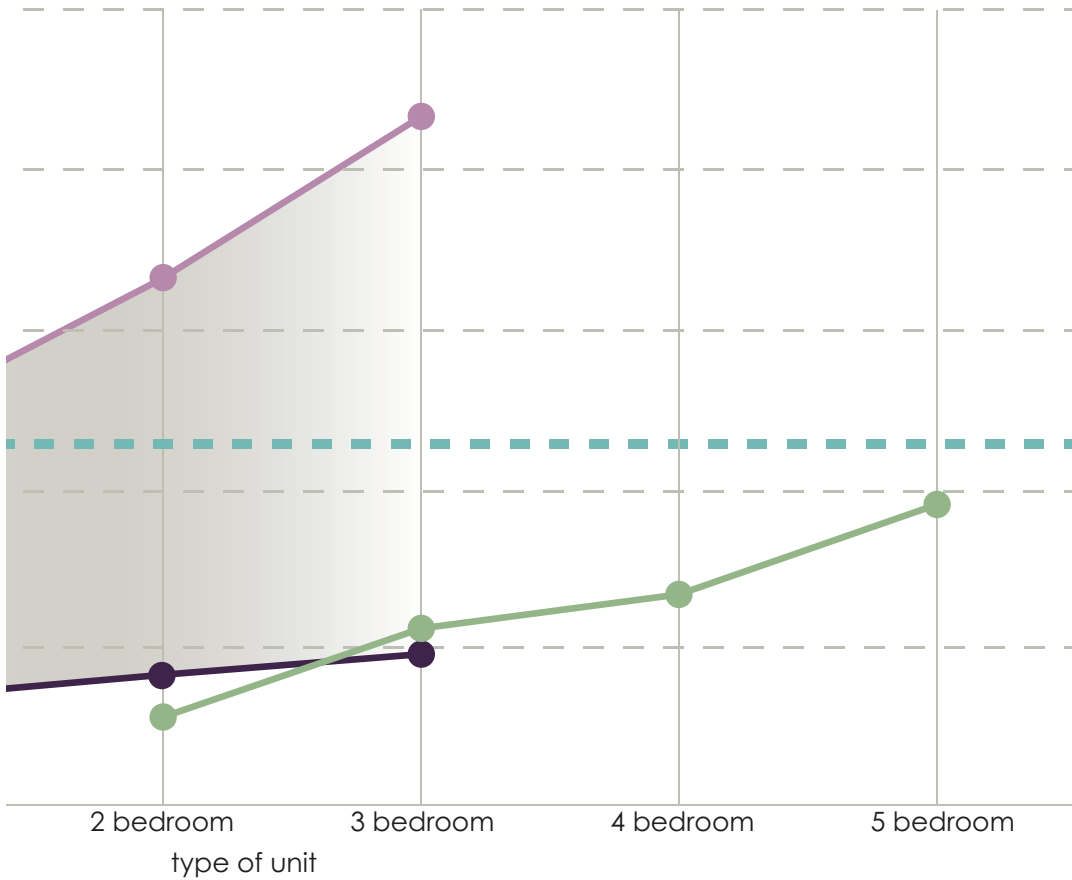


Figure 6: Income Gap Graph



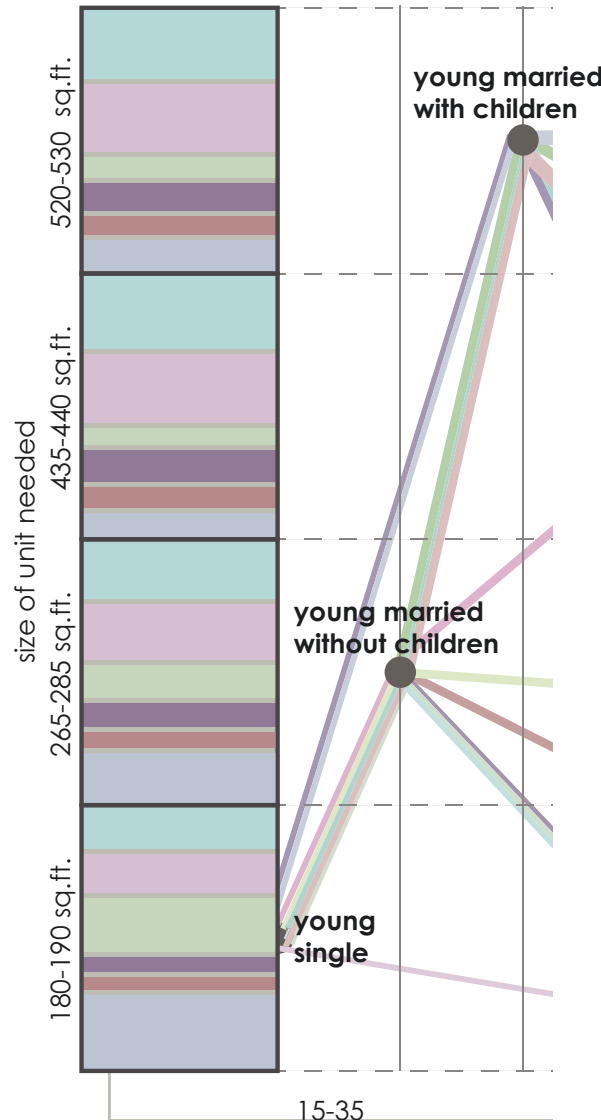
- market rate housing
- low-income housing
- affordable housing gap
- market rate suburb home mortgage payment
- - - - rent price that average middle class families can afford per month

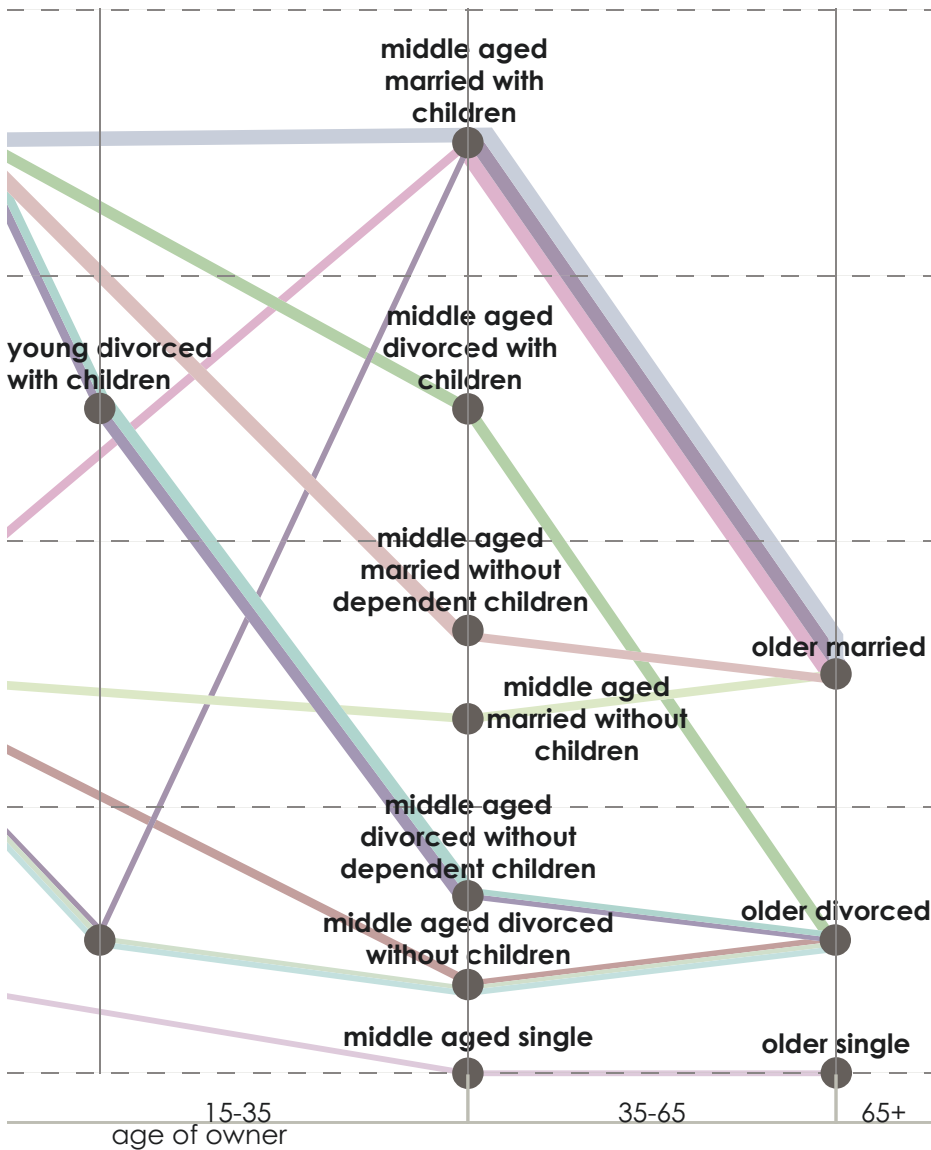
THE FAMILY LIFE CYCLE

In order to provide a space that adapts and changes with families, we need to know how families adapt and change over time. This is where the Family Life Cycle comes in, a family is defined as: related individuals sharing a household.¹⁰ Families go through the life cycle in different ways and at different times,¹¹ it is important to track these changes in order to know when and how needs change over time. There are many different versions of the Family Life Cycle that various researchers have established, but the one thing most researchers agree upon is that all families go through separate and distinct phases over time.¹² As these families and their needs change there is also a changing dwelling need.¹³ This is why most families move when they begin to have children; to gain more space.¹⁴

Figure 8 illustrates the different stages of the Family Life Cycle, along with showing the different dwelling needs at different times. Each line represents a different family, and the thickness of the line represents the number of people in the family at that time. As the lines go up, the families needs increase.

Figure 8: The Family Life Cycle





- storage
- leisure
- bathing
- sleeping
- eating
- cooking

SPACE NEEDS

The number one reason that people decide to move their family is when they start having children. ¹⁵

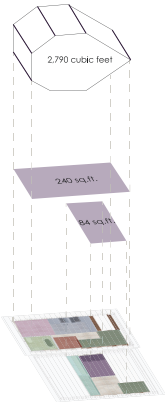
People often think that when they have children they automatically need more space, and when that number continues to grow they need even more space. This is referred to as the perceived normative housing deficit. ¹⁶ This is what happens when people see their neighbors getting more space over time, and therefore they think that they also need more space. ¹⁷

This is actually not true, the reality is that families don't need more space when they begin to have children, they need better space.

As the diagrams show, families can get the same functions that they need in a much smaller space by eliminating wasted space in the home.

Figure 10: Family Space Needs

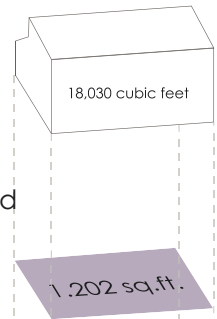
amount of space families actually need



micro home plans

- storage sleep
- leisure eat
- bathing cook
- wasted space

amount of space families think they need



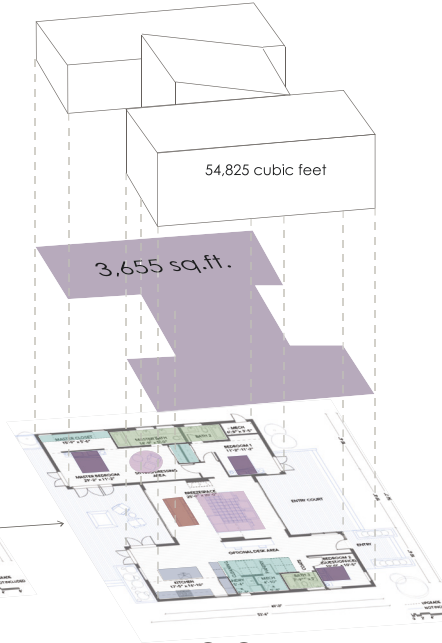
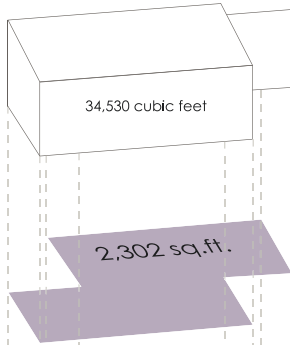
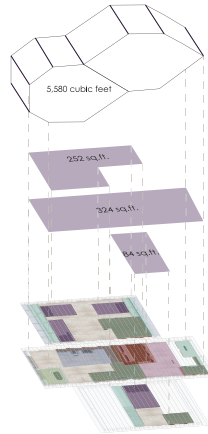
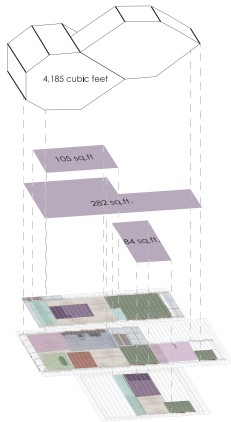
typical home plans

- storage sleep
- leisure eat
- bathing cook
- wasted space



amount of people living in the home



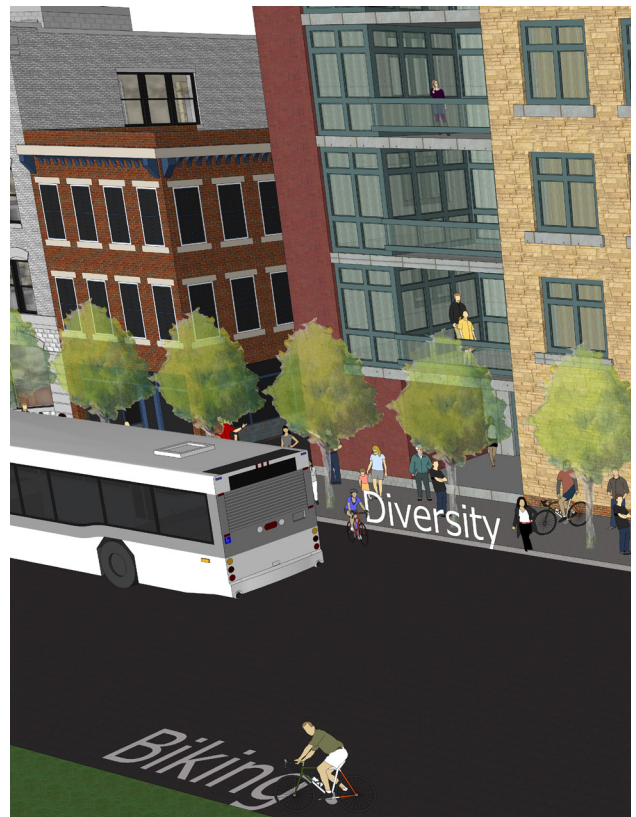


URBAN LIVING

There are benefits and drawbacks to living in an urban context. Recently people are moving more towards urban contexts. ¹⁸ Urban areas provide things like diversity of cultures, people, and activities. ¹⁹ In the city children and elderly have more independence because they do not need to rely on a car to get around. ²⁰ People can walk or bike to work or school which leads to a healthier lifestyle. Relying on walking, biking, and public transportation means there is no need to own a car, which can save a lot of money. ²¹

Urban areas can also be noisy and bright at night, as well as feeling unsafe. People will not get as much living space in the city, as well as no private yard. However, there are many public places that people can go throughout the day.

Figure 12: Urban Living





SUBURBAN LIVING

Just like urban living, suburban living has many positives as well as negatives. In the suburbs people tend to get more living space, along with a private yard. The suburbs are usually quieter and more peaceful than the city is.²²

In suburban areas people tend to be disconnected from their neighbors, and children and elderly need to rely on someone else with a car to go anywhere.²³ The private yard and large living space often require many hours of maintenance per year.²⁴ As well as the cost of owning and maintaining a personal vehicle.²⁵

Figure 14: Suburban Living





02 CONTEXT

San Francisco, California

San Francisco Costs

South Beach District

Site Typologies

Focus Site

SAN FRANCISCO, CALIFORNIA

San Francisco has some of the highest housing prices in the United States. ²⁶ It was named the worst city for renters to live in 2015, purely because of housing prices. ²⁷ In San Francisco housing prices are continuing to rise, while salaries stay stagnant, making housing harder to afford for everyone. ²⁸

San Francisco is also running out of places to build more housing downtown. ²⁹ Since the city is a peninsula they cannot expand outwards. There is also a strict height limit on the downtown area of San Francisco, ³⁰ making it difficult for additional housing to expand upwards.

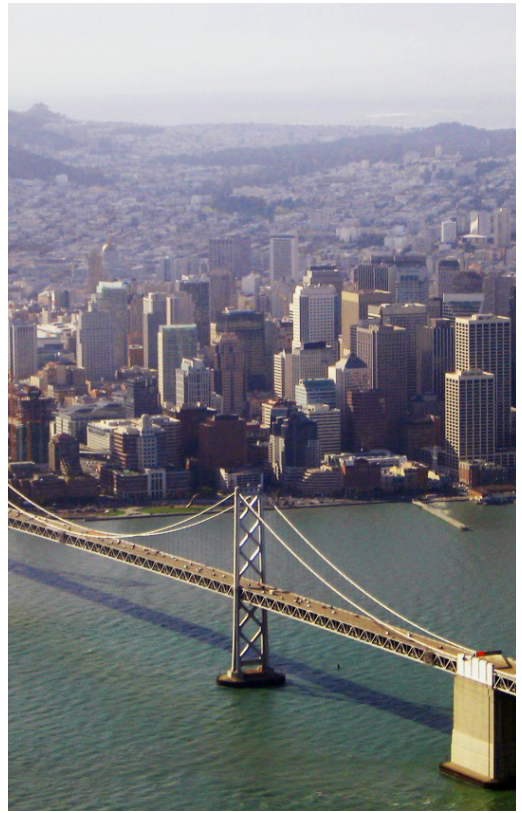
There are very few children under 18 and elders over 65 who live in the downtown area of San Francisco, ³¹ meaning that there is a lack of housing and amenities for these age groups. The city is known for its small apartments that usually only function for one or two people. There is an immediate need for affordable family housing in San Francisco. ³²



Figure 18: California Map



Figure 19.1: San Francisco Map



Figures 19.2: San Francisco Cultural Images

SAN FRANCISCO COSTS

The costs of living in San Francisco are very high. Figure 21 shows a comparison between living expenses in Grand Rapids, MI, and San Francisco, CA.

This table shows that every aspect of living in San Francisco is much more expensive than it is in Grand Rapids. While the salary number is also higher in San Francisco, it does not increase enough to justify the costs of the other aspects. The housing prices alone are over 200% higher in San Francisco than they are in Grand Rapids. Unless the wages are equally as high, which we know is not true, San Francisco clearly has an affordable housing problem.

Figure 21: Cost Comparison

	Grand Rapids	San Francisco	Percentage Difference
	\$1,033 1 bed apartment rent	\$3,322 1 bed apartment rent	+221.54
	\$7.78 milk, eggs, & bread	\$13.95 milk, eggs, & bread	+79.31
	\$13.86 1lb chicken + 1lb beef	\$16.11 1lb chicken + 1lb beef	+16.23
	\$40.00 monthly parking pass	\$73.50 monthly parking pass	+83.75
	\$2.47 1gallon of gas	\$3.54 1gallon of gas	+43.54
	\$46.00 average meal for two	\$77.50 average meal for two	+68.48
	\$6.25 fast food meal for one	\$8.00 fast food meal for one	+28.00
	\$2,934 monthly disposable salary	\$3,960 monthly disposable salary	+34.96

SOUTH BEACH DISTRICT

The South Beach district of San Francisco is located on the Eastern edge along the water. This district is directly adjacent to the financial district, where most residents work. It is in the middle of a transition from industrial uses to more residential uses, meaning that people are flocking there looking for places to live.³³

This district has all the necessary amenities for living like grocery stores, parks, pharmacies and more within walking distance. The atmosphere of South Beach is more laid back the more East you go, as you get to the Eastern shore the feeling changes from the hustle and bustle of the financial district, into a quieter neighborhood feeling, meaning this district has the right location for any type of family.



Figure 22: San Francisco Map



Figure 23: South Beach Cultural Images

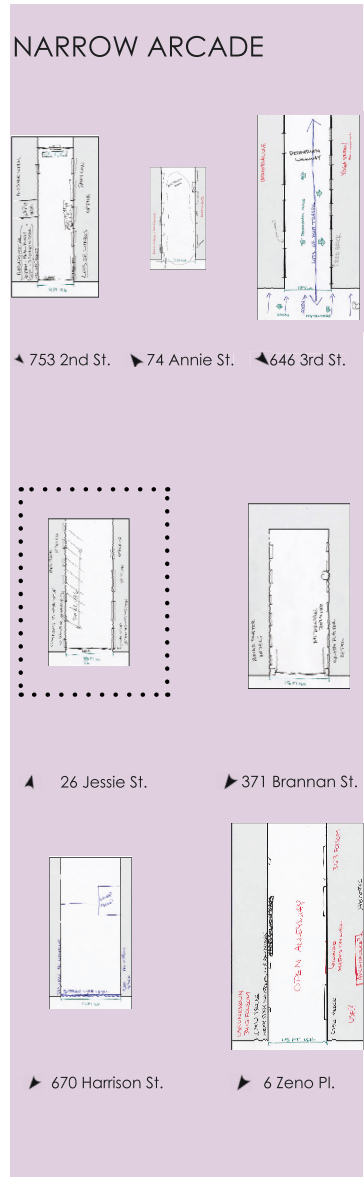
SITE TYPOLOGIES

As mentioned earlier, San Francisco has trouble expanding for multiple reasons. Since the city is so dense with no expansion space there needs to be a creative solution for locating new housing. Looking at the leftover space in the city, there are many spaces in-between. These are the spaces in between two buildings where something may be happening on the ground level, but nothing is happening in the air space above. That means that this space is open for additional housing.

There are many in-between spaces in the South Beach District of San Francisco. These spaces were located and then classified into four typologies.

1. Narrow Arcade-A site that is less than 20 feet wide, with a street, alley, or activity on the ground level that cannot be obstructed.
2. Wide Arcade-A site that is 20 feet or wider, with a street, alley, or activity on the ground level that cannot be obstructed.
3. Narrow Rooftop-A site that is less than 20 feet wide, with a building or structure on the ground level.
4. Wide Rooftop-A site that is 20 feet or wider, with a building or structure on the ground level.

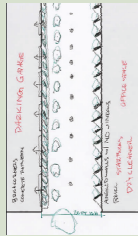
Figure 24: Site Typologies



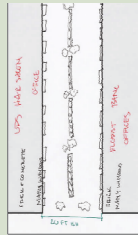
WIDE ARCADE



◀ 138 S. Park



▶ 83 Howard St.



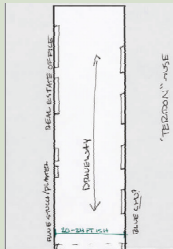
◀ 145 Howard



▶ 164 Brannan St.

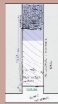


▶ 345 Main St.

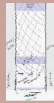


◀ 316 Brannan St.

NARROW ROOFTOP



▶ 525 Howard St. ◀ 617 2nd St. ▶ 571 Howard St.

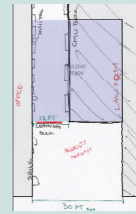


◀ 574 Folsom St.

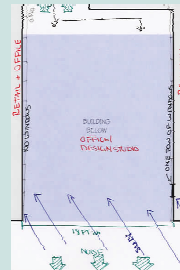


◀ 404 Bryant St.

WIDE ROOFTOP



▶ 514 Folsom St.



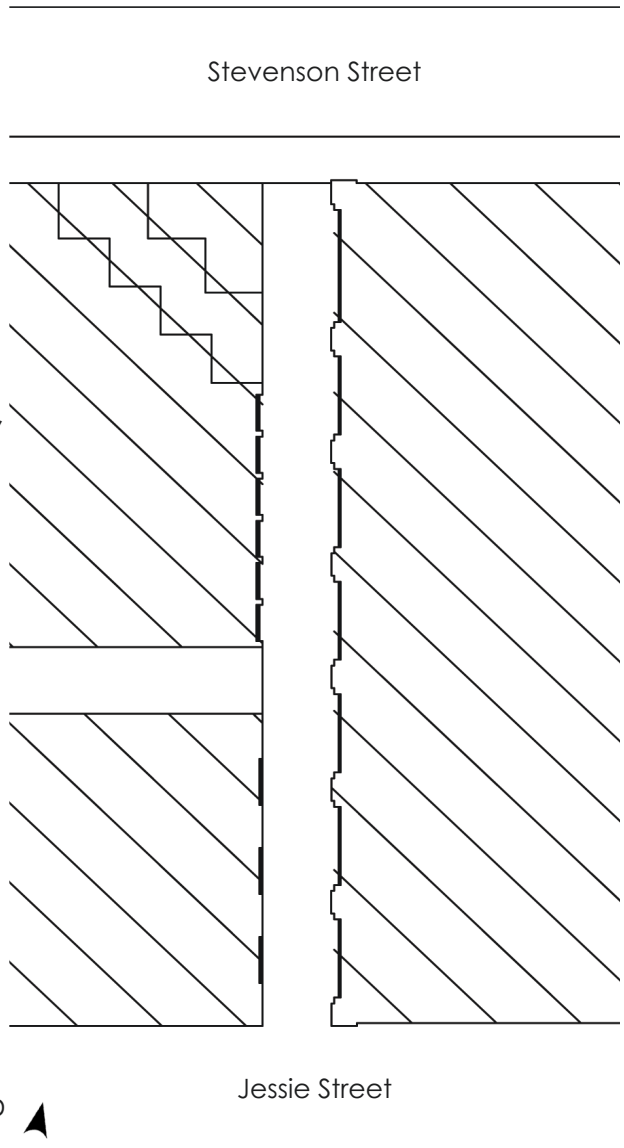
◀ 637 Howard St.

FOCUS SITE

The focus site for this project is 26 Jessie Street. It is the smallest site out of the ones identified, therefore if a design can fit into the smallest site, it should also be able to fit in the largest site.

26 Jessie Street has a heavily trafficked pedestrian walkway on the ground level, each adjacent building has many windows that need to be taken into consideration, there is a major street to the North, and an alleyway to the South. The buildings adjacent are used for residential, commercial, and retail. This site is 12 feet wide by 137 feet long, making it a challenging place for housing.

Figure 26: 26 Jessie Street Plan



26 Jessie Street



Figure 27.1: 26 Jessie Street Image

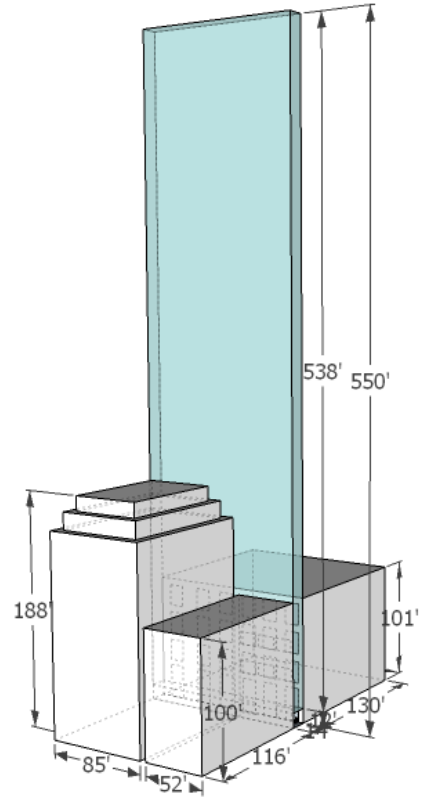


Figure 27.2: Maximum Buildable Envelope

03 DESIGN

Ergonomics

Program

City Program

Expansion and Contraction

Site Design

Unit Design

Interior Studies

Interior Design

Renderings

ERGONOMICS

When designing a small space, every dimension becomes very important. Knowing the ergonomics of a person is essential to designing a small space. This ensures that the space functions well with people in it.

Creating a digital tool of a person that can be manipulated into any position is very helpful to designing spaces around a person. This lets the designer see what can work and what may not work for the residents living in the space.

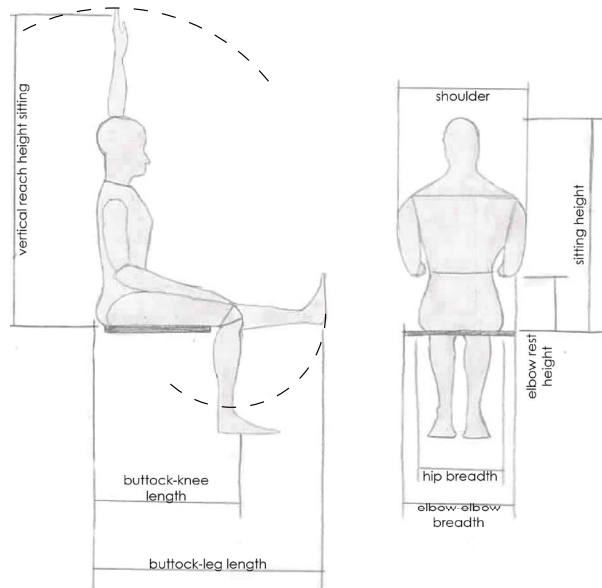


Figure 30.1: Ergonomic Person

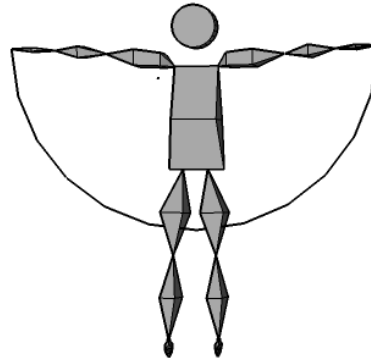
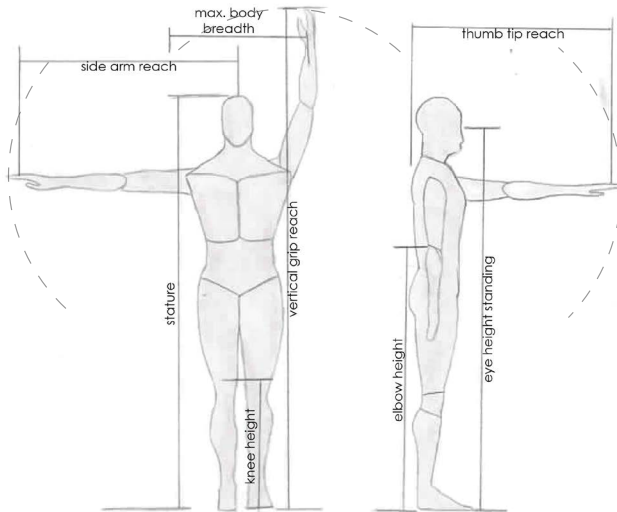
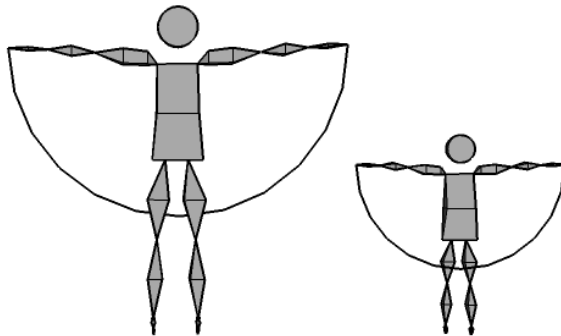


Figure 30.2: Digital Person Tool



	women	m
-vertical reach height sitting	50"	54"
-buttock-knee length	21.3"- 25.2"	22.4"- 26.3"
-buttock-leg length	39.84"	42.60"
-shoulder	19"	20"
-sitting height	31.3"- 35.8"	33.6"- 38.3"
-elbow rest height	11"	11"
-hip breadth	18.1"	16.9"
-elbow-elbow breadth	18.44"	21.50"
-side arm reach	32.91"	35.88"
-max. body breadth	18.44"	21.50"
-stature	60.2"- 68.4"	64.8"-73.5"
-knee height	18.06"	19.88"
-vertical grip reach	74.9"- 86.8"	81.2"- 93.7"
-elbow height	42.9"	46.4"
-thumb tip reach	30.7"	33.4"
-eye height standing	56.9"- 65.0"	61.4"- 69.8"



PROGRAM

The program of a micro home is not much different than the program of a typical home. The program of a typical home usually includes rooms such as kitchen, dining room, living room, bathrooms, and bedrooms. In a micro home there is very little space and therefore instead of rooms the space is divided into different functions. These functions are cooking, eating, leisure, bathing, and sleeping.

The square footage needed for each of these functions per person has been calculated, in order to know how much the home needs to expand in the different stages. This is a minimum square footage, therefore more space than just these dimensions will be provided.

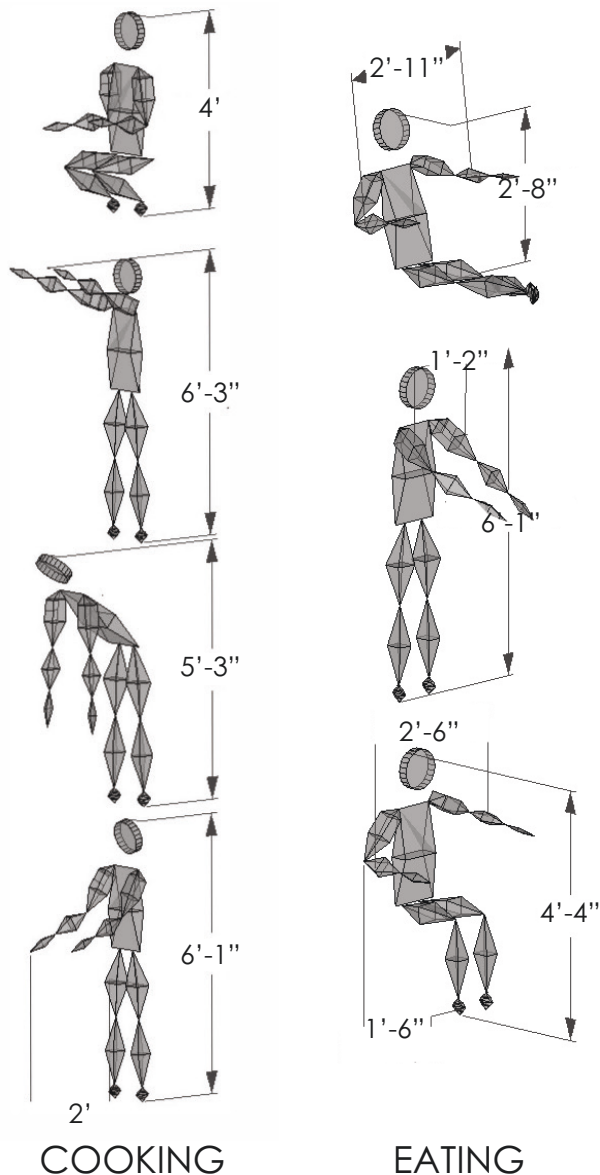
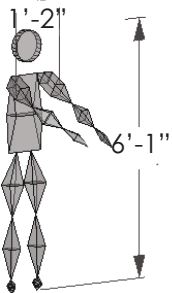
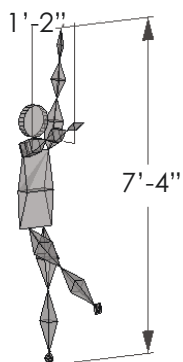
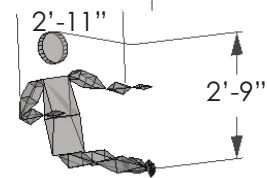
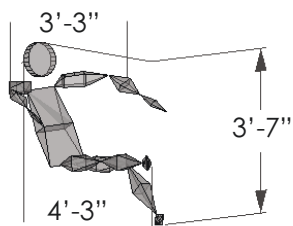


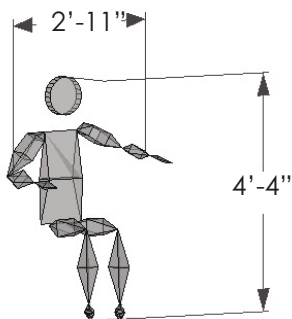
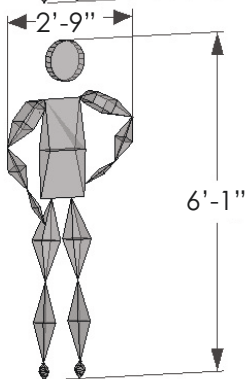
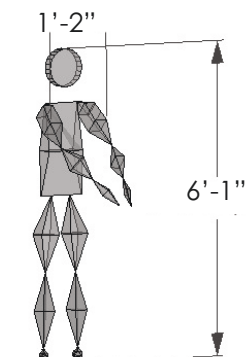
Figure 32: Amount of Space Needed for Different Activities

COOKING

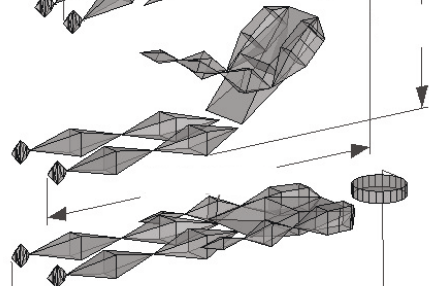
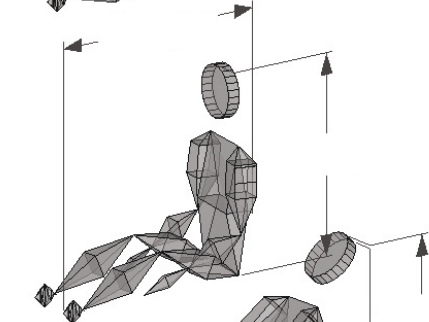
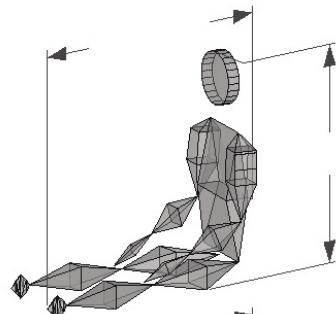
EATING



LEISURE



BATHING



SLEEPING

CITY PROGRAM

In San Francisco many people use the city as their living room and restaurants as their kitchen and dining room. This context is ideal for a micro home because the space that the home lacks, the city makes up for with its many close amenities.

San Francisco has many places where anyone is welcome to go, there are public open spaces throughout the city, as well as privately owned public spaces. These are privately owned spaces that anyone is welcome to use, the spaces range from outdoor parks to indoor seating areas to urban gardens, and they are free to use with no purchase required at anytime of the day. These spaces across the city can provide residents with a different living room every day. San Francisco has an abundance of restaurants that range in price for anyone's budget so that the city could act as their kitchen and dining room.

Figure 34: Privately Owned Public Space Images



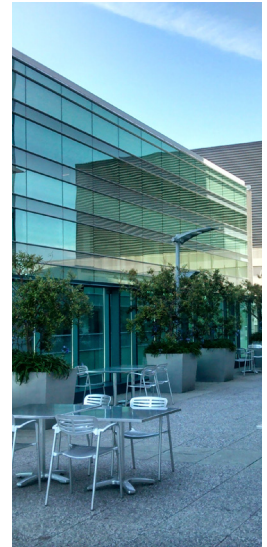
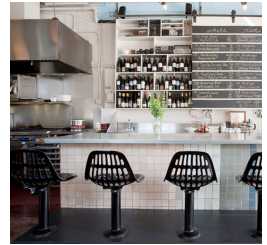


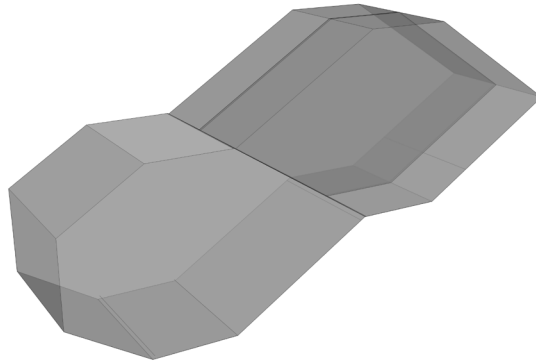
Figure 35: San Francisco Local Amenities Map

EXPANSION & CONTRACTION

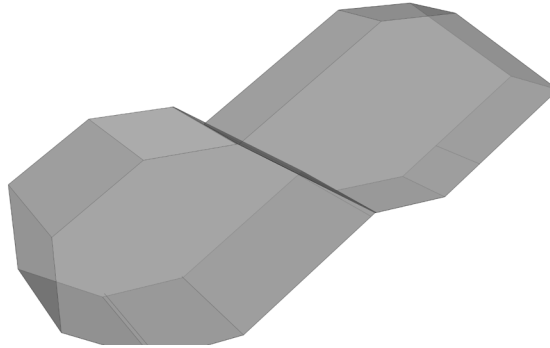
According to the Family Life Cycle, combined with square footages per person, there are four basic sizes of living that families need.

The average family would start with a young single person, they would start with the base unit of one hexagon. When they get married, their spouse would join them in the base unit. The base unit can serve one person or a married couple. When this couple decides to have children they can expand by one half of a hexagon, this provides more leisure, sleeping, and storage space. This would be large enough for one couple with one child. If the couple decides to keep having children they can then add on the other half of a hexagon, this provides more leisure, dining, sleeping and storage space. At this point the family consists of one couple and three children, living in two hexagons. This is the max amount of living space that the family can have. If more storage space is required the family can add on another half or whole hexagon, but are limited to three hexagons total. When the family decides they need less space, the hexagons can be removed at any time.

Fully Expanded
Unit



Half Expanded
Unit



Base Unit

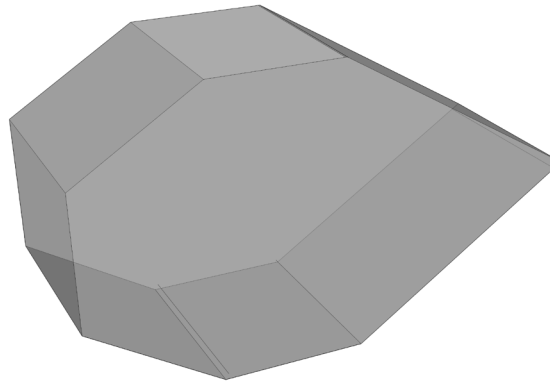


Figure 37: Unit Expansion Diagram

EXPANSION & CONTRACTION

The expansion and contraction in this design is not only on a large time scale. There are some extra features that are made possible by the skin of the units. The skin of the units is made up of a grid system that can be filled with metal or glass panels, depending on where the family feels windows or light is necessary. This panel system makes it possible for certain walls or portions of walls to be on hinges. This means that the walls can move and transform the space.

For example, on the base unit, if more storage is required, the basement wall can fold down and another wall will fold up out of that to expand the space. On the fully expanded unit, the upstairs sleeping floors wall can open and allow access to the roof of the base unit, creating a patio. These changes can be made on an hourly basis, allowing flexibility to the owners.

Of course these changes heavily depend on the residents neighbors, there has to be a negotiation between owners.

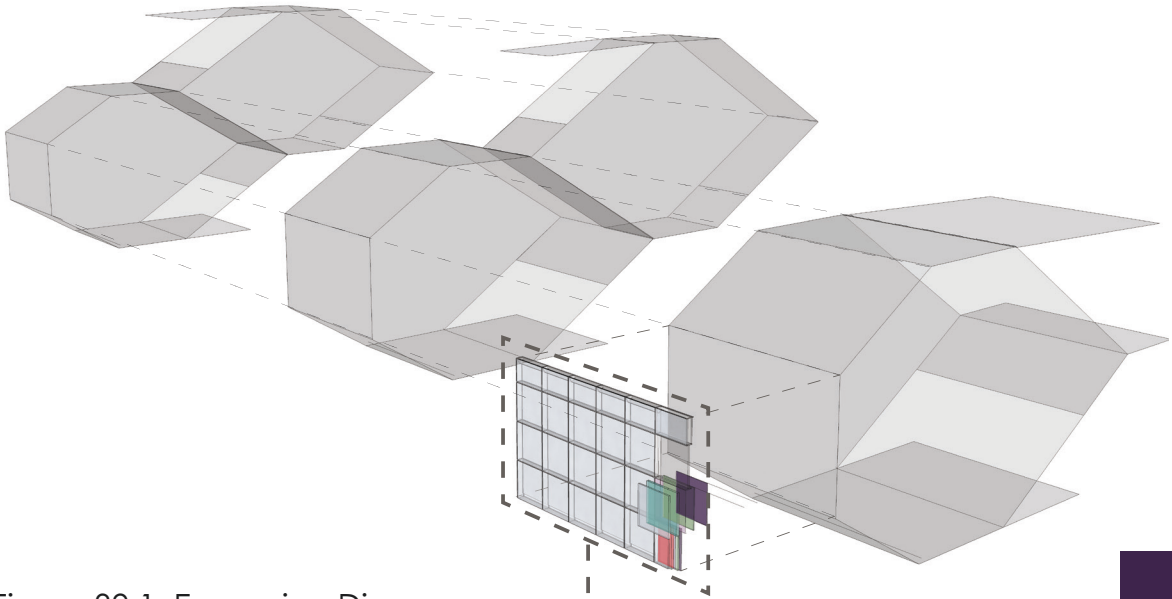


Figure 39.1: Expansion Diagram

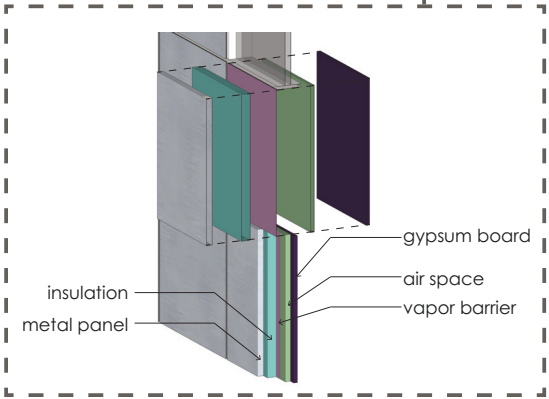


Figure 39.2: Unit Wall Section



SITE DESIGN

In order to have one site design that can be replicated into many other sites there needs to be some sort of system in place that can be replicated. In this instance that is the frame. A large hexagonal frame with plug and play pieces inserted into it. This frame can be replicated and manipulated according to almost any site dimension.

Within the frame, units and circulation are placed. The central circulation core is ever changing as units come in and out. This circulation is meant for the public also, as a place for them to stop or slow down that is not on the pedestrian walkway below. This central space can include things like outdoor movie theaters, sitting stairs, urban gardens and more. It depends on the community that lives there.

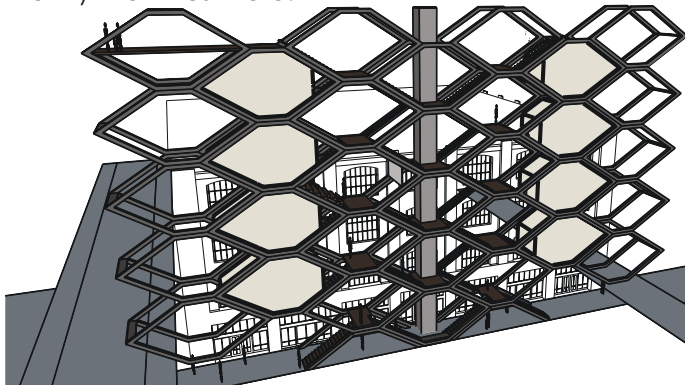


Figure 40:
Site Phase 1

Figure 41.1:
Site Phase 2

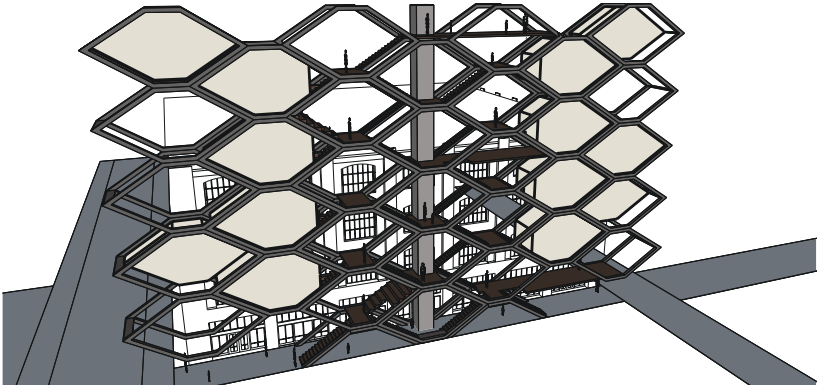


Figure 41.2:
Site Phase 3

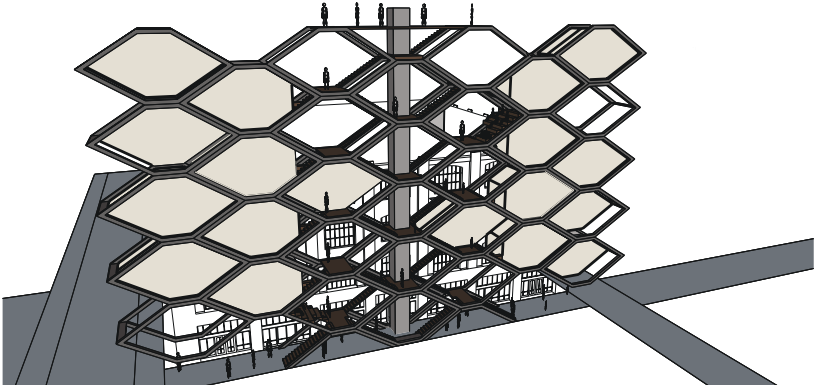
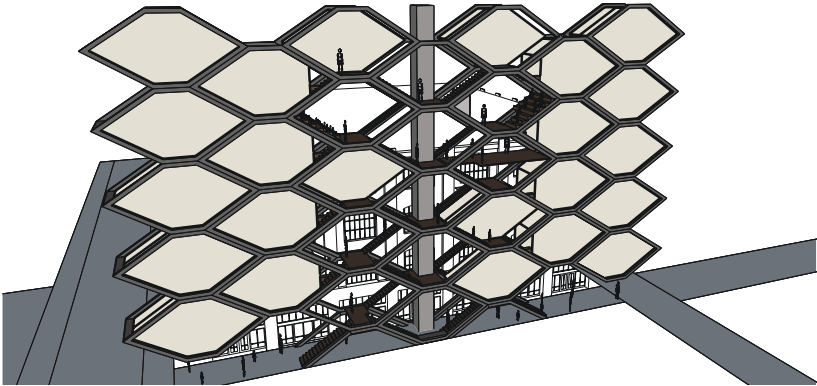


Figure 41.3:
Site Phase 4



SITE DESIGN

The site begins with 8 base units already in place for residents. The central circulation begins as a blank canvas of stairs.

These 8 units gradually transform as families expand their unit in almost any direction. Expansion required negotiation with neighbors to figure out who gets which space, what if two people want the same space? Well they will have to resolve that between the two. This reenforces the community aspect of living in the city which occasionally gets forgotten. The neighbors collaborate together on what should be in the central circulation space, and who gets which expansion space or spaces.

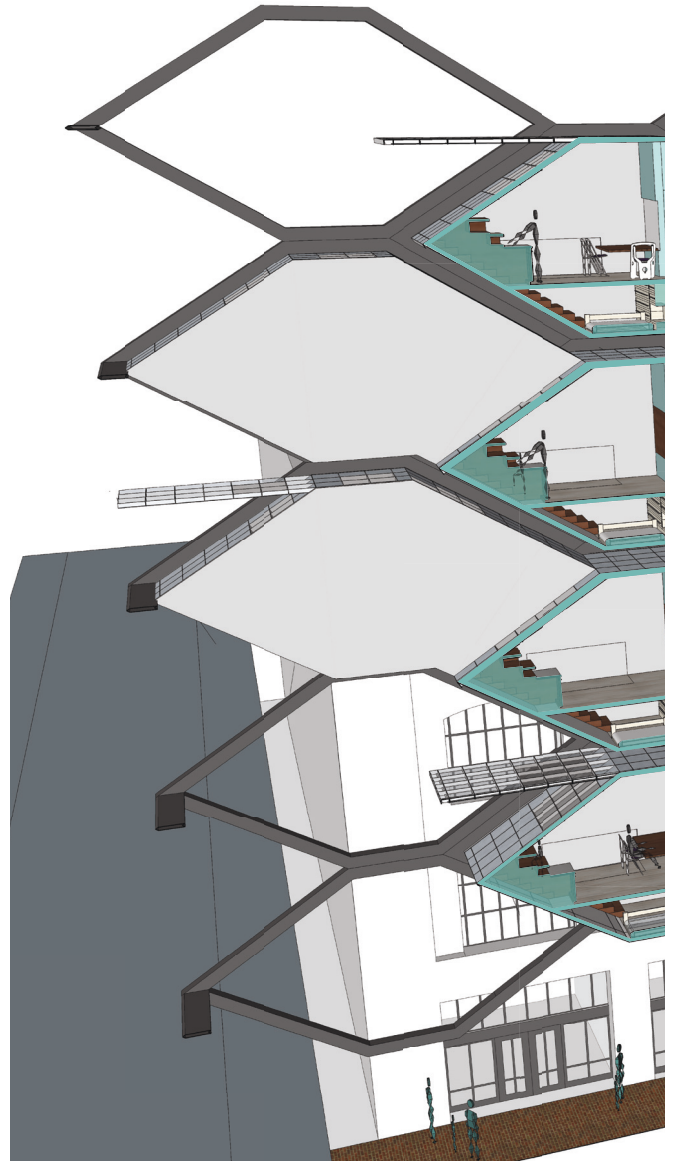
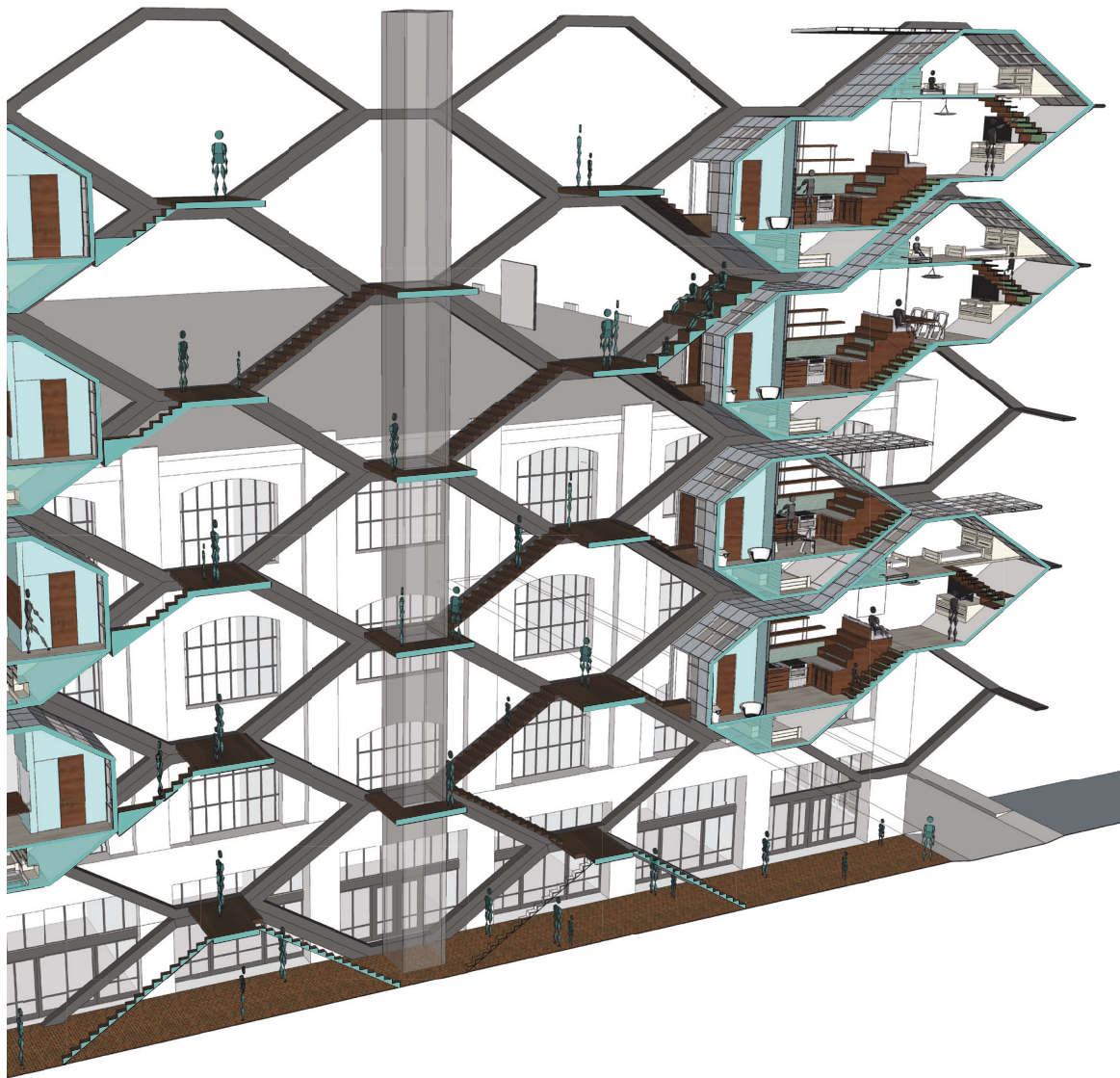


Figure 42: Site Section



UNIT DESIGN

The unit is designed with as much flexibility as the site is. There are walls that fold down into tables, walls that fold down to cover the stairs and create a floor. There is storage within each stair. The kitchen is suited for enough cooking and storage space for a family of 5. The spaces are flexible. There is a dining table for 3 incase the whole family isn't there, or for 5 when everyone is around.

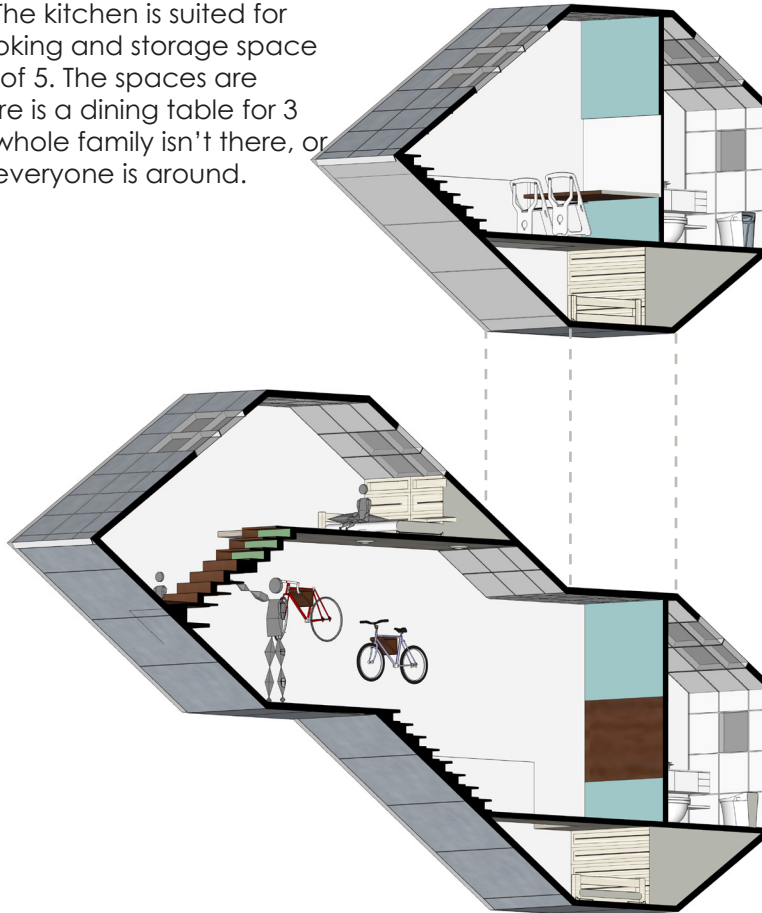
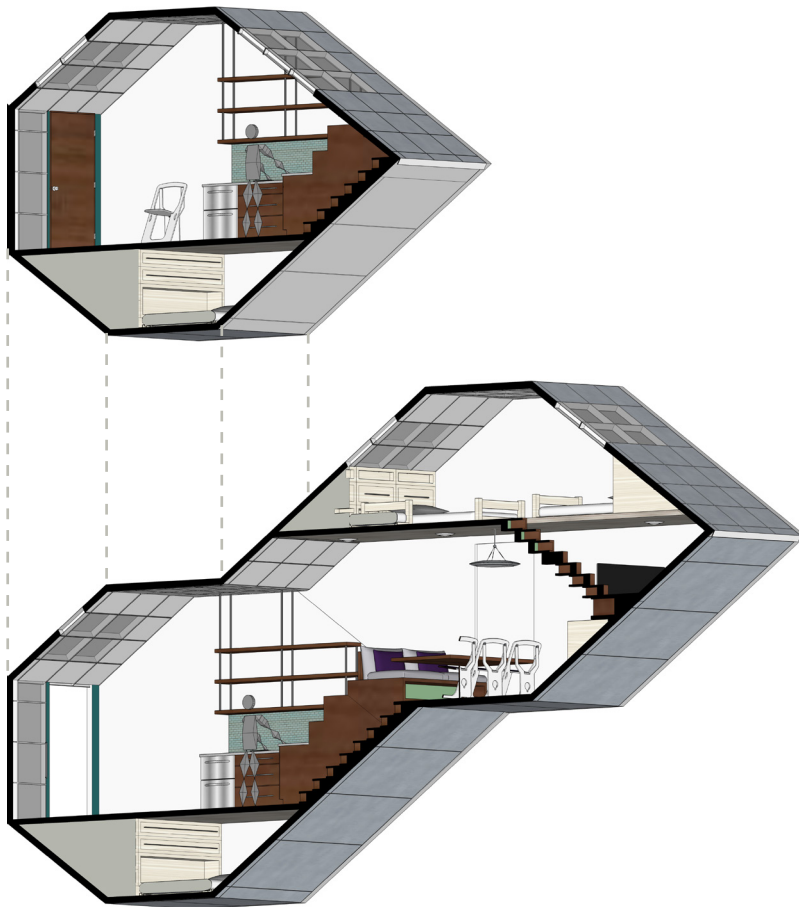


Figure 44: Unit Design



UNIT DESIGN

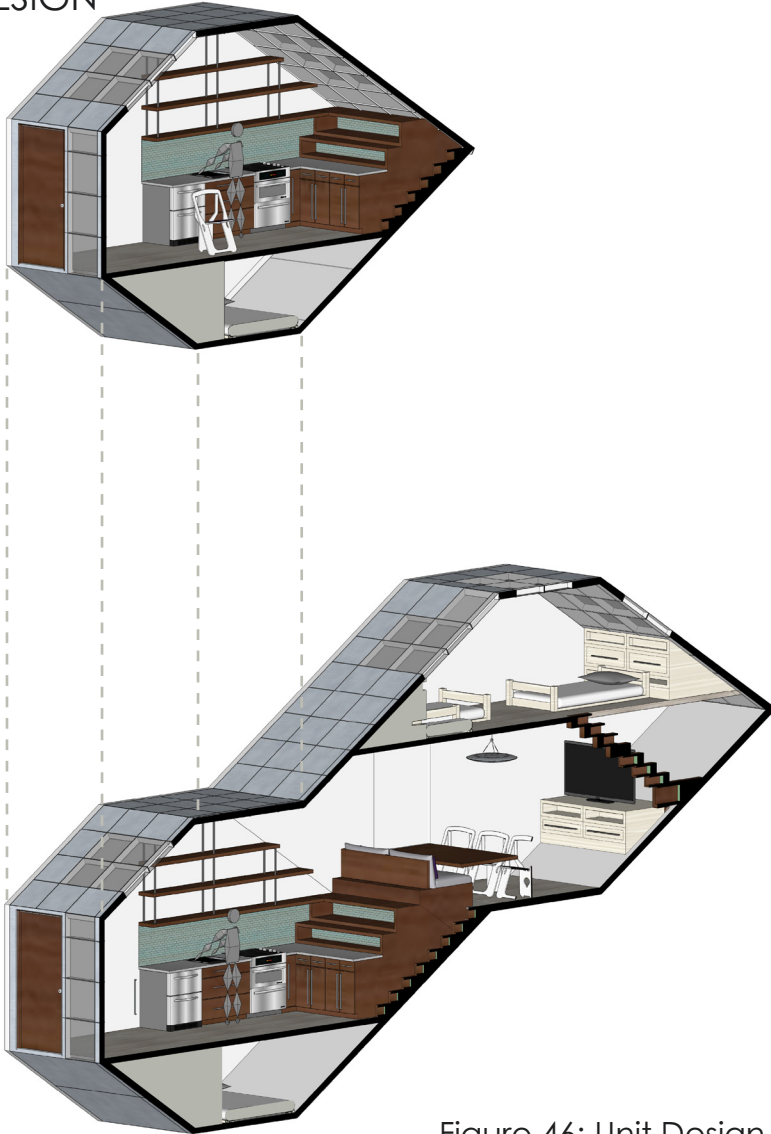
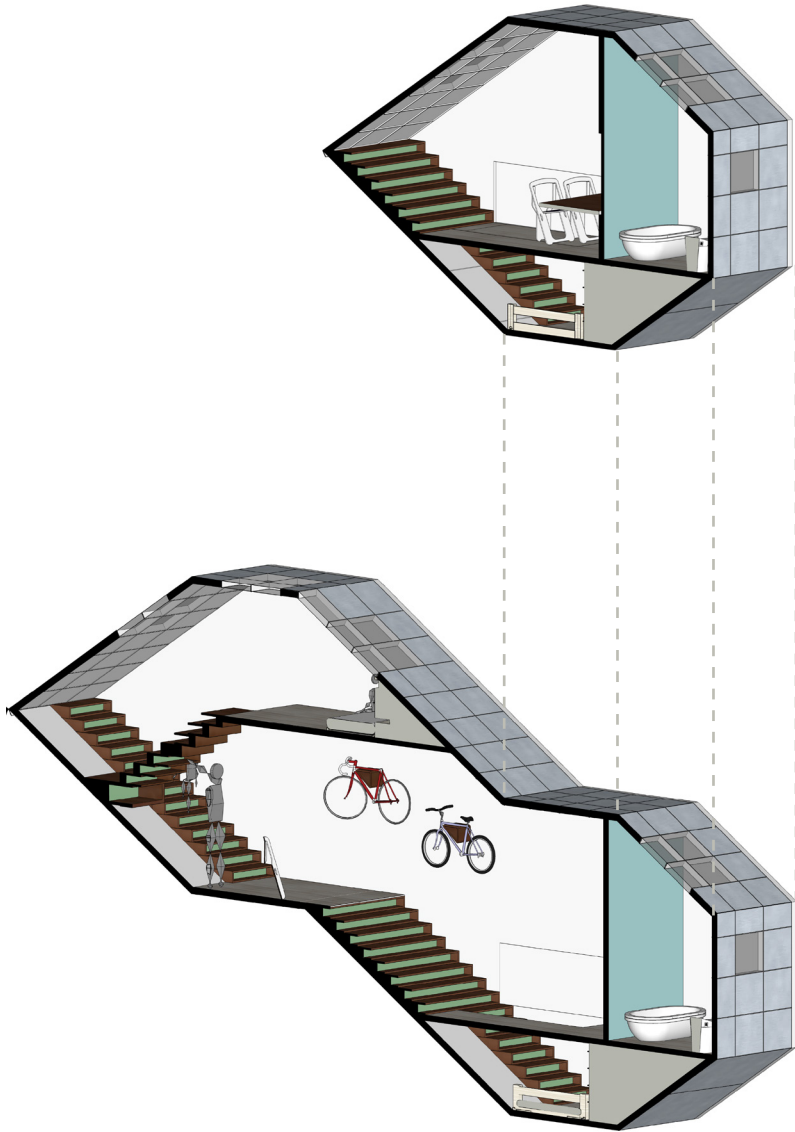


Figure 46: Unit Design



INTERIOR STUDIES

When designing a small space it is important to distil things down to the essentials. These collages representing kitchens and bathrooms from around the world demonstrate what the essentials of these two spaces really are.

For kitchens it seems to be a heat source, water supply, and a work surface. While for bathrooms the only requirement in some places was a hole in the ground. Looking at these gives a better idea of what is needed in small kitchens and bathrooms.



Figure 48: Kitchens From Around the World



Figure 49: Bathrooms From Around the World

INTERIOR STUDIES

When it comes to interior space, most people think of a room that is a box. These sketches show the exploration of differently shaped rooms and how it effects the people that live in these spaces. They also explore the effects of bright colors in spaces and how that changes the overall feeling of the space. These studies led to a different and innovative design.

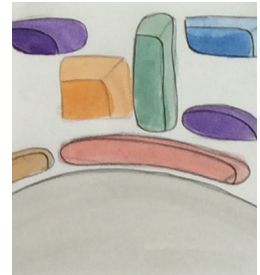
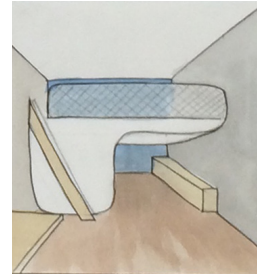
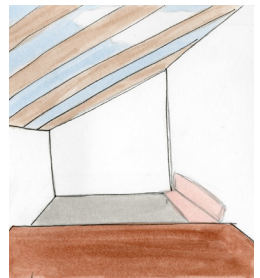
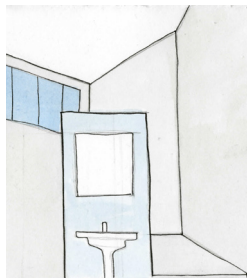
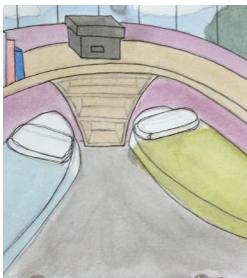
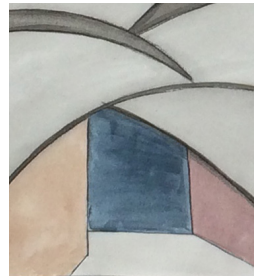
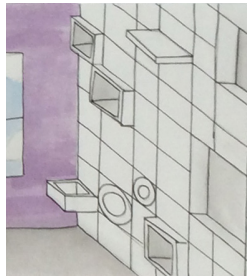
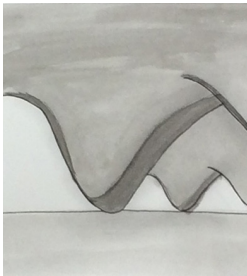
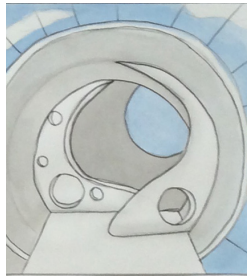
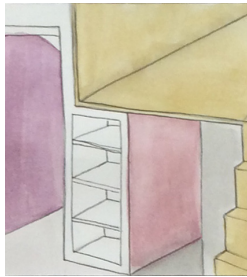
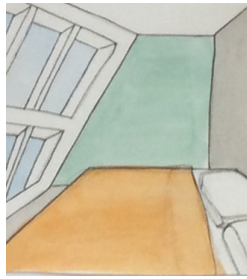
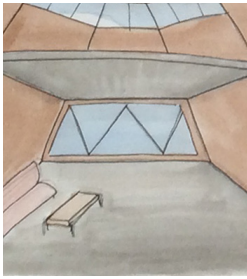


Figure 50: Drawn and Water Colored Space Vignettes



INTERIOR DESIGN

The interior of this micro home is full of flexible features. There are tables that fold up into walls, and walls that fold down to cover the stairs and create a floor. There are chairs that fold away flat, and storage integrated everywhere possible.

The goal for this interior was to have the family feel like they are in a typical home, it should have all the comforts and functions without all of the wasted space.

The finishes of this interior were kept light to make the space feel larger, and neutral to let the family decorate themselves and feel like they own this space.

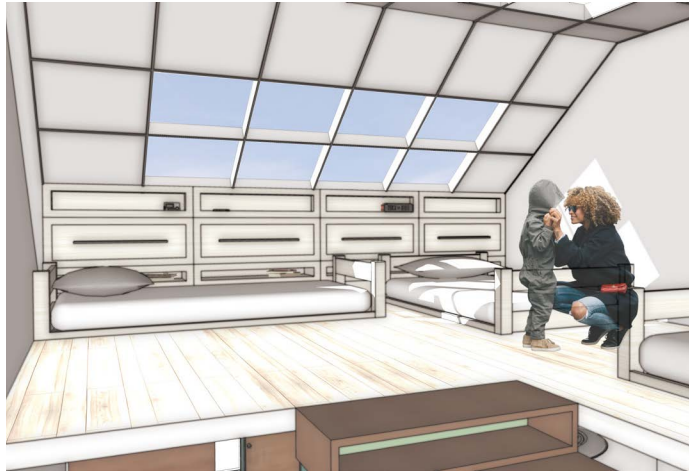


Figure 52: Interior Rendering Collection



BASE UNIT RENDERING

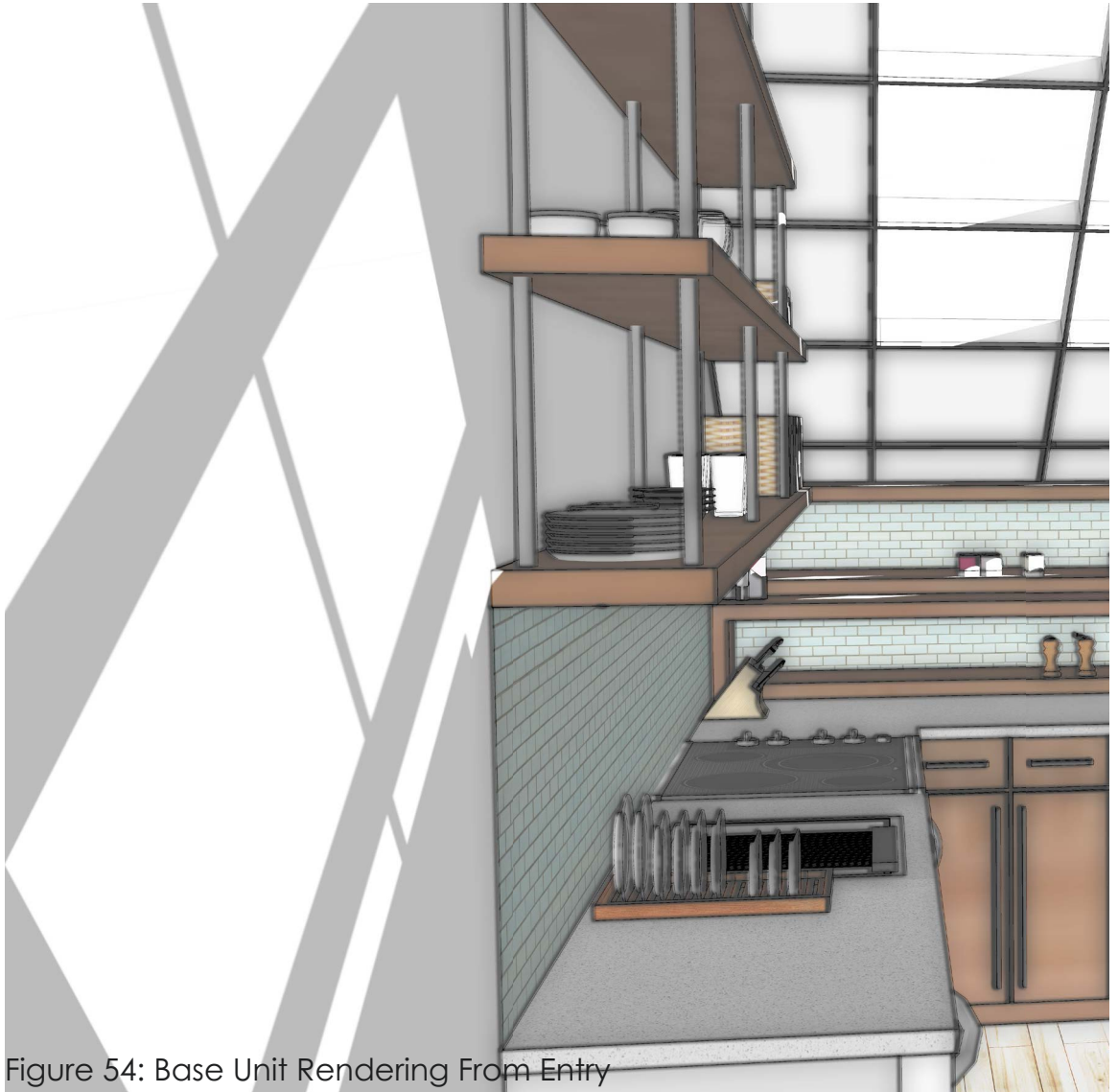
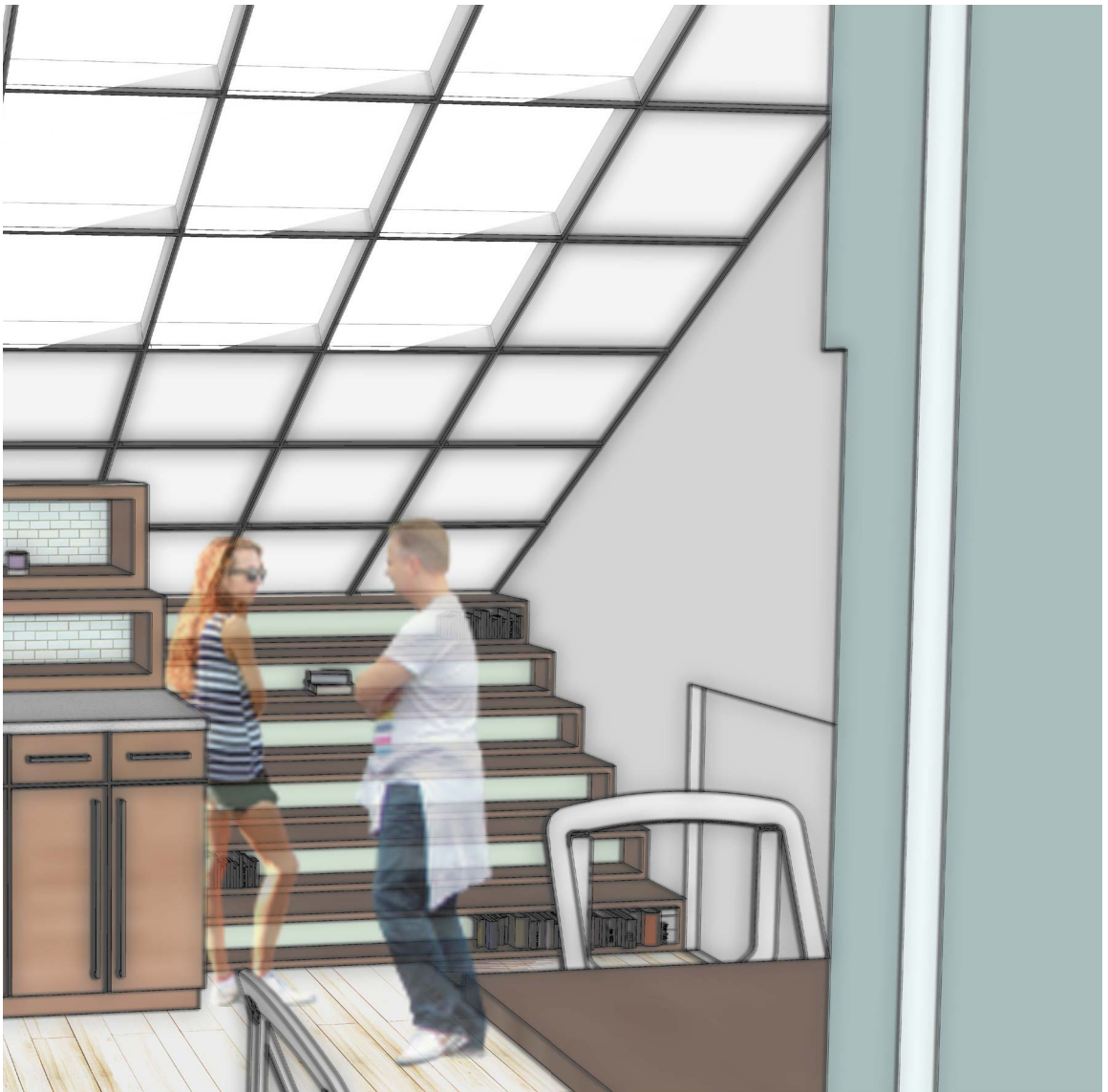


Figure 54: Base Unit Rendering From Entry



EXPANDED UNIT RENDERING

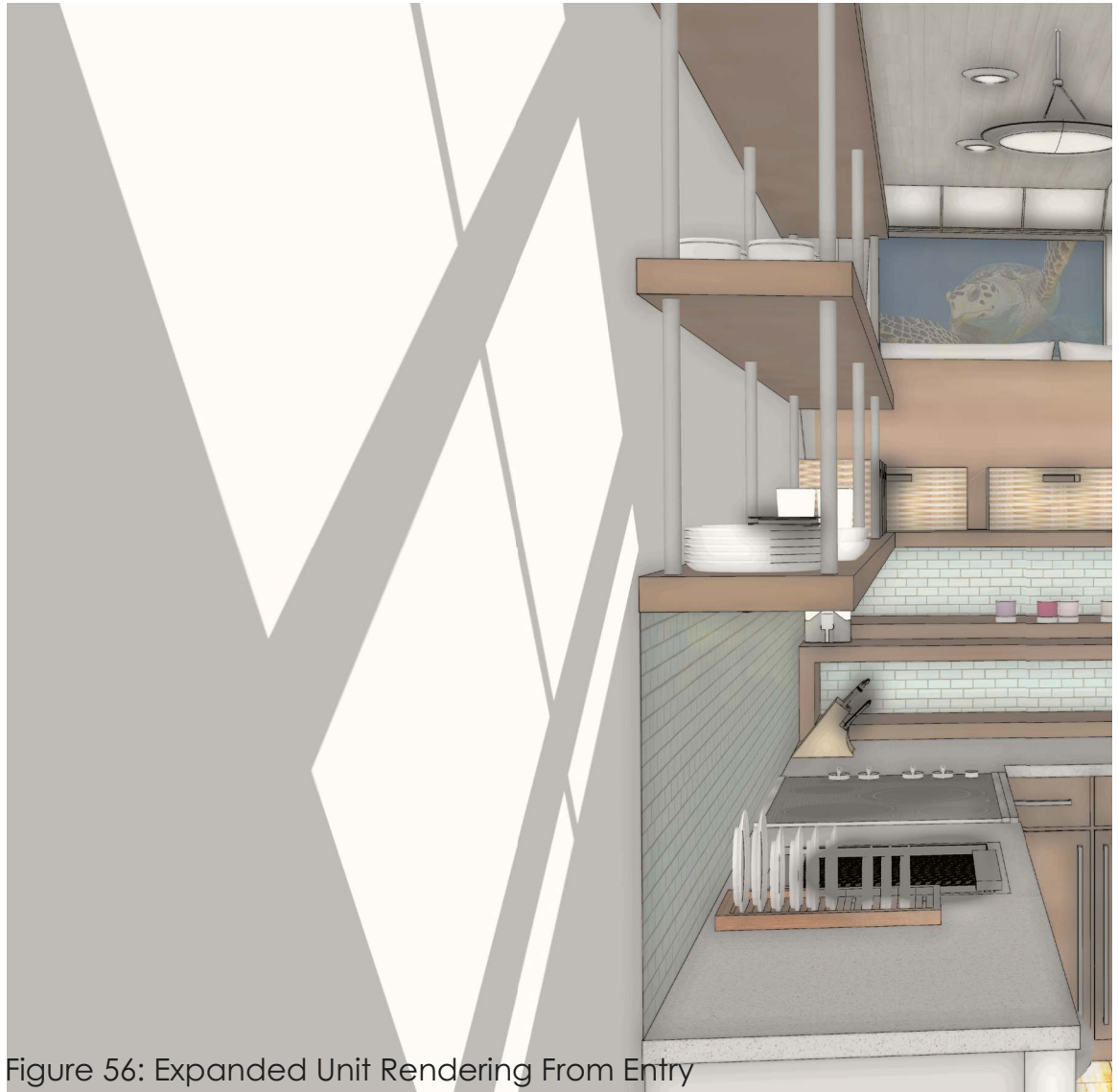
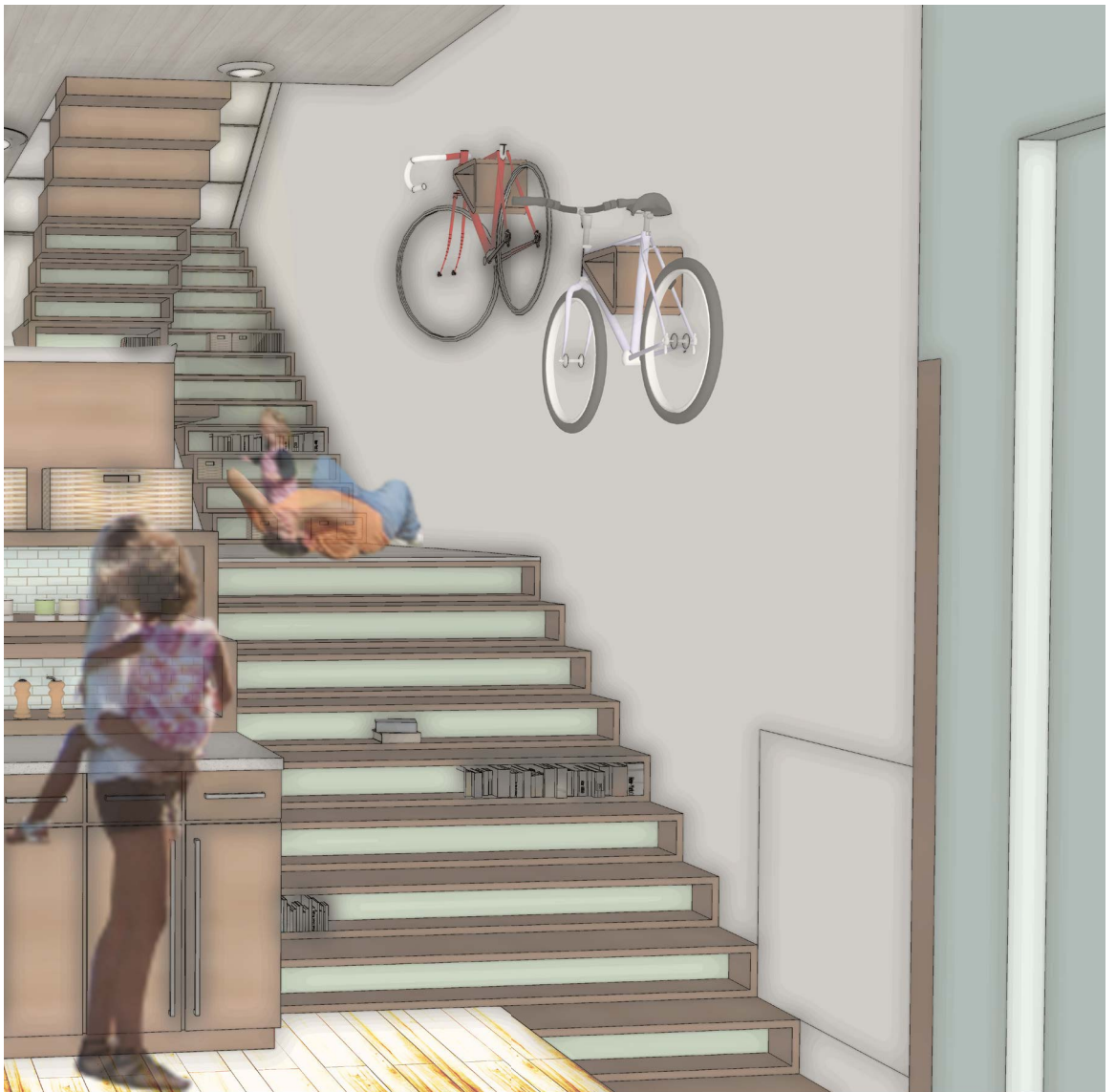


Figure 56: Expanded Unit Rendering From Entry



EXPANDED UNIT INTERIOR



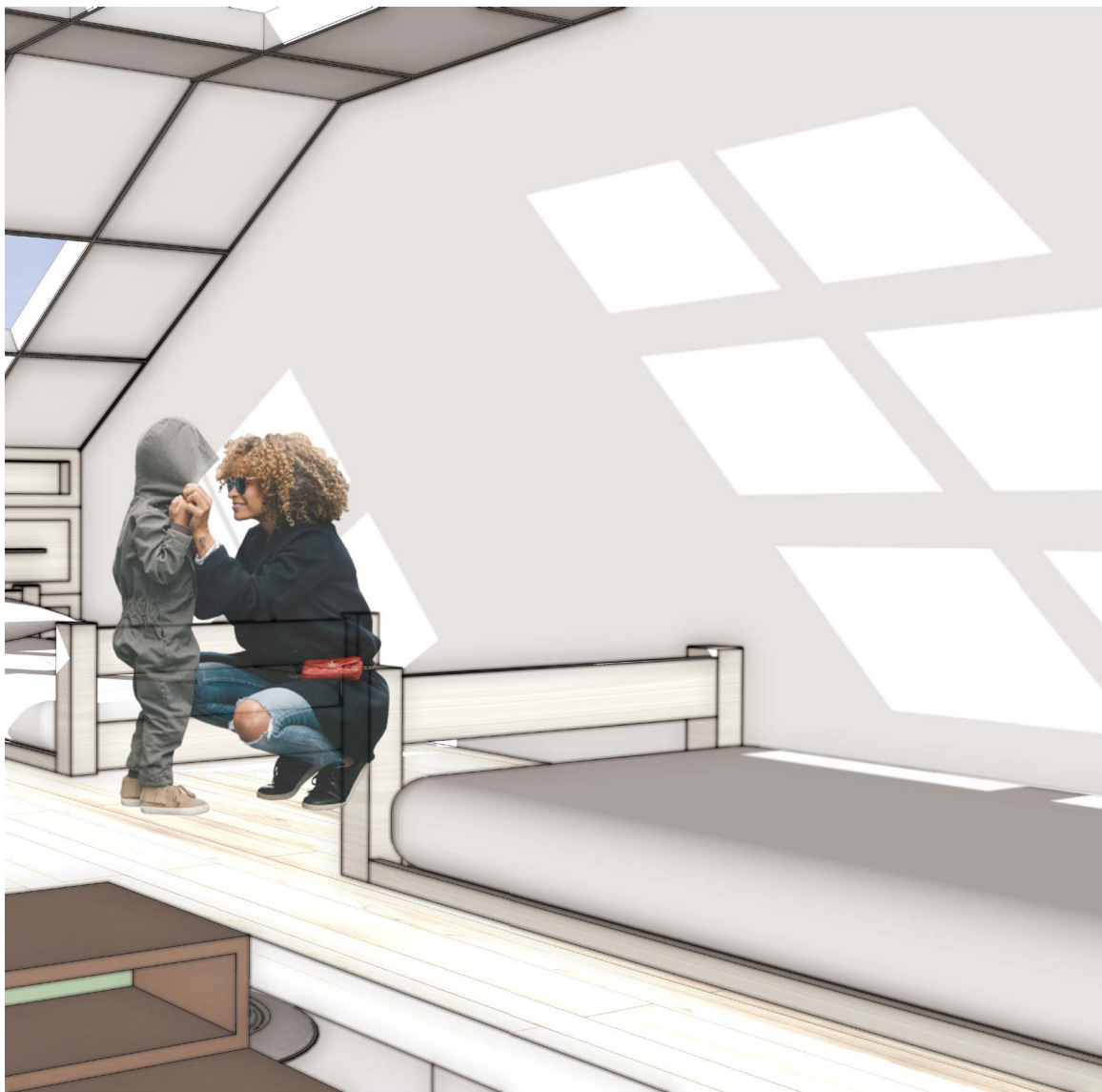
Figure 58: Expanded Unit Rendering From Stairs



UPSTAIRS RENDERING-EXPANDED UNIT



Figure 60: Expanded Unit Upstairs Rendering From Stairs



OVERALL RENDERING

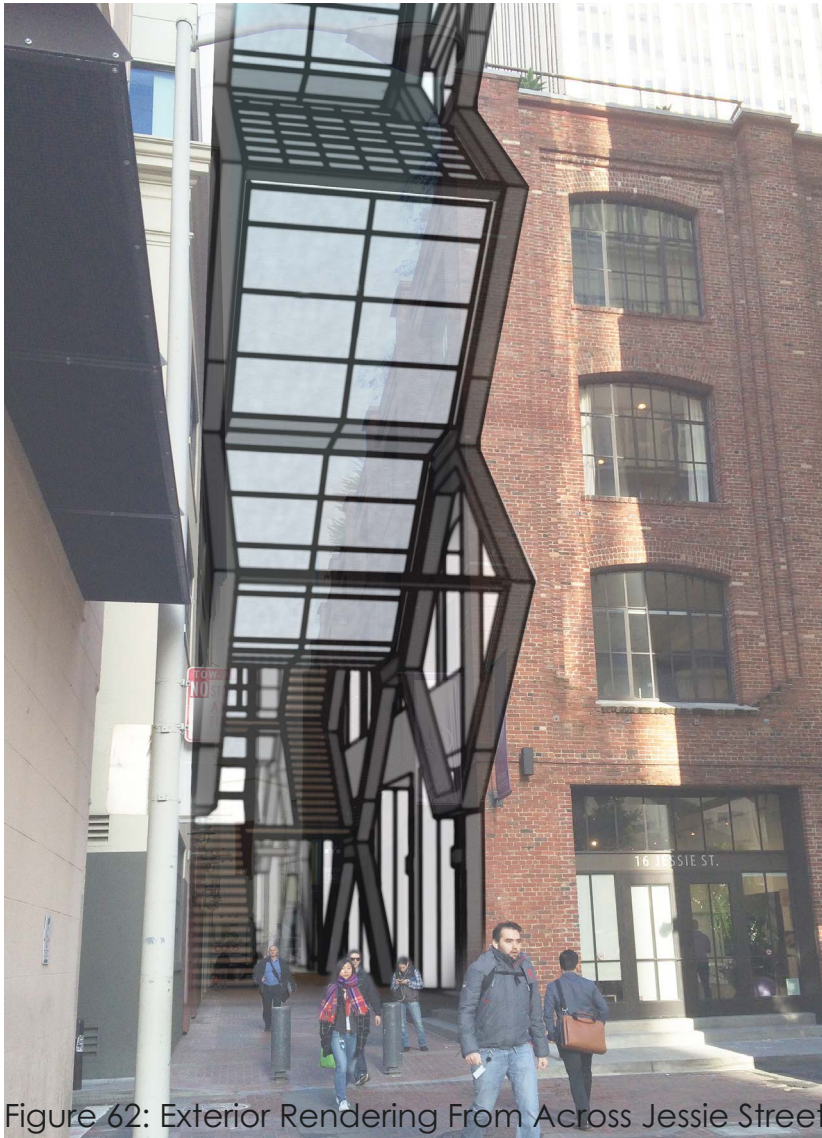


Figure 62: Exterior Rendering From Across Jessie Street

VIEW FROM JESSIE STREET

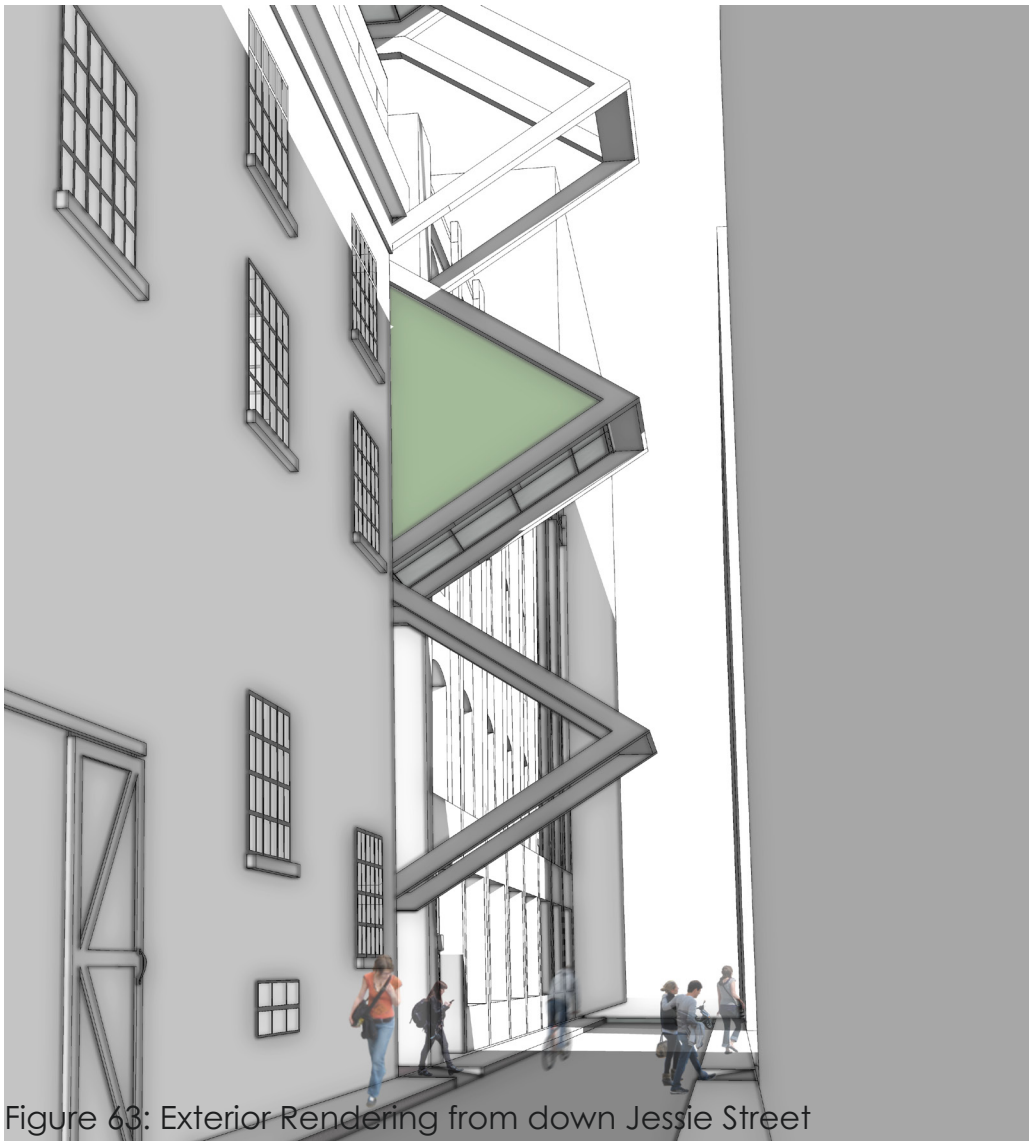


Figure 63: Exterior Rendering from down Jessie Street

VIEW FROM ADJACENT BUILDING

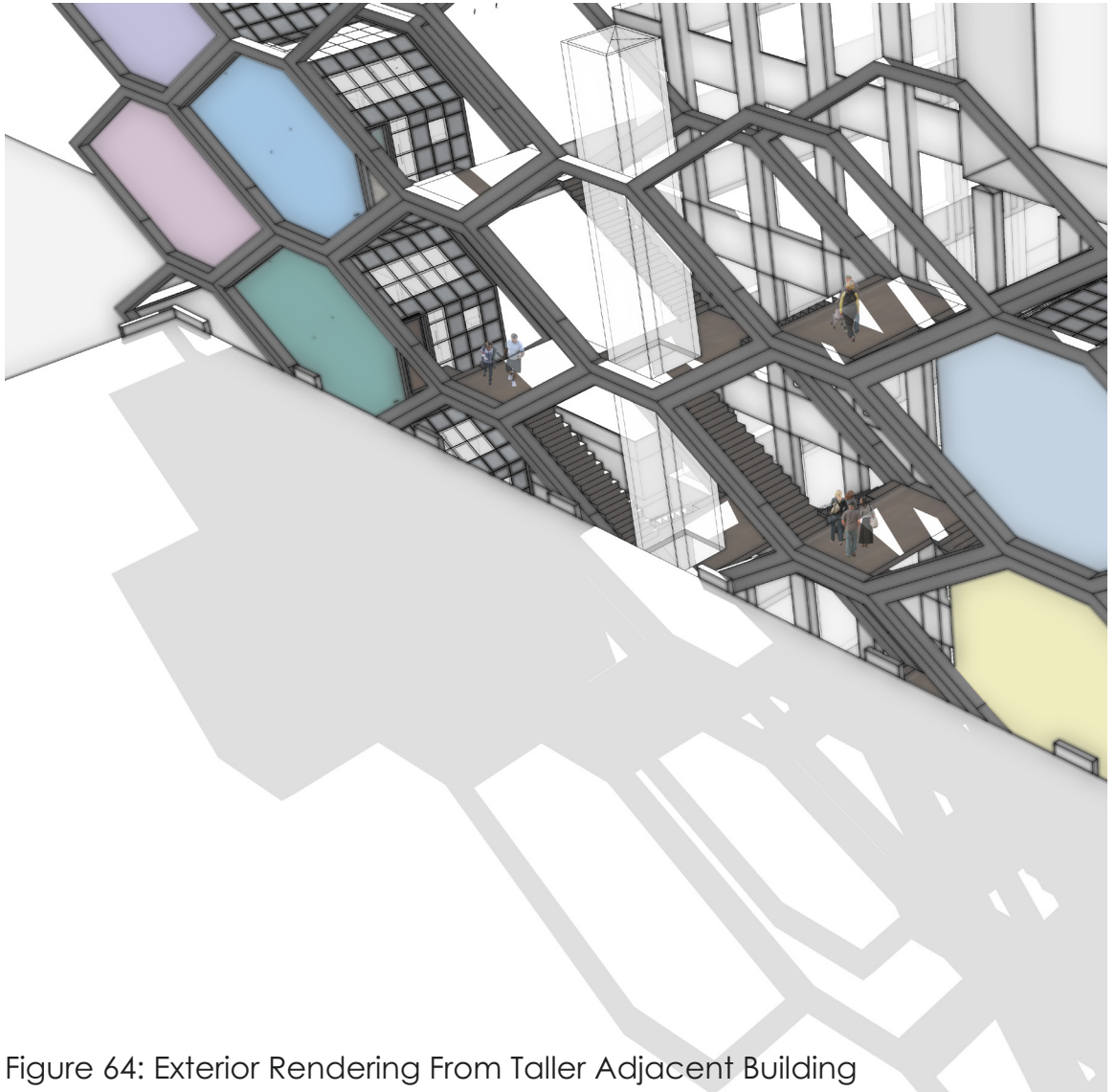
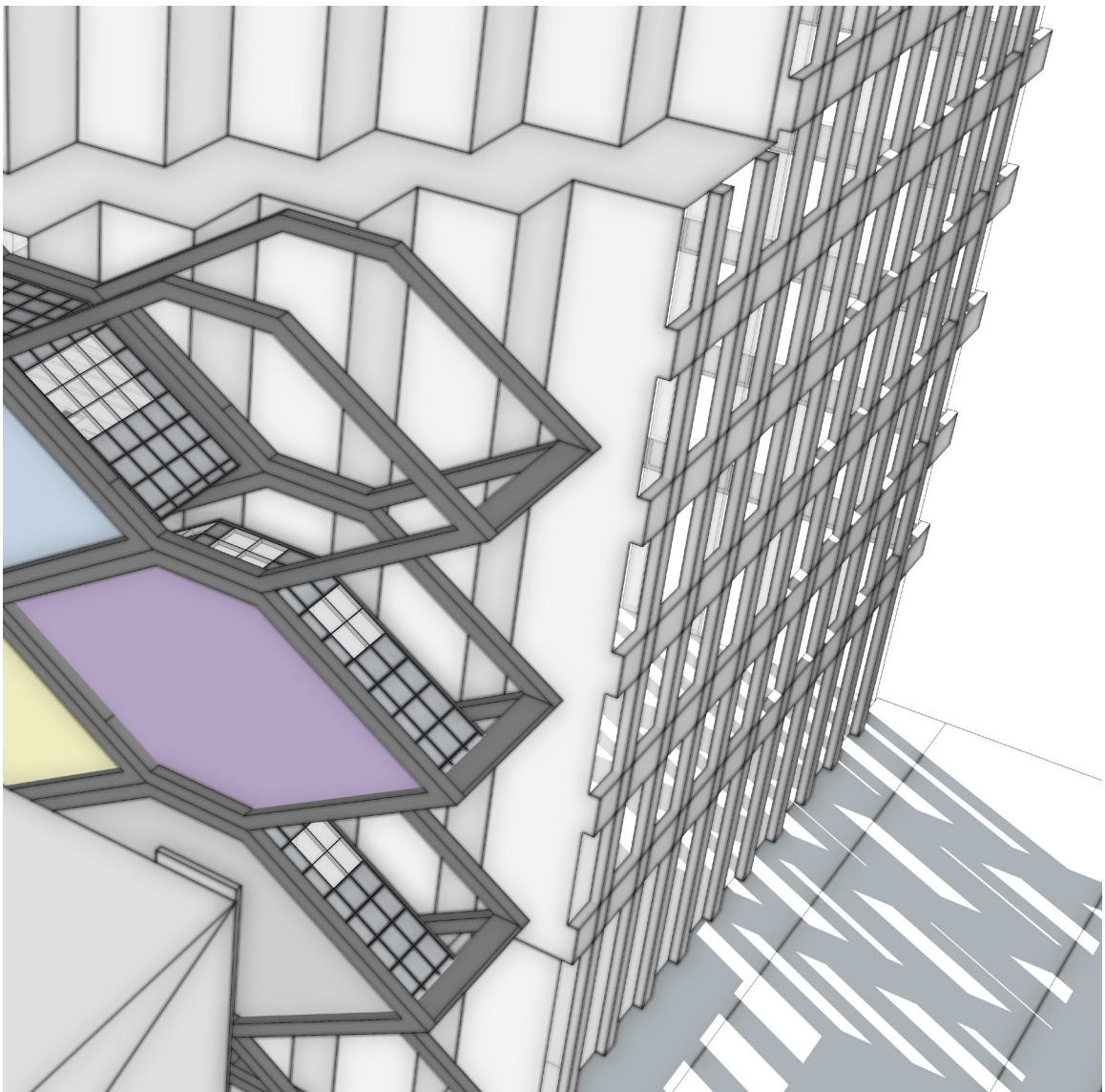


Figure 64: Exterior Rendering From Taller Adjacent Building



PEDESTRIAN WALKWAY

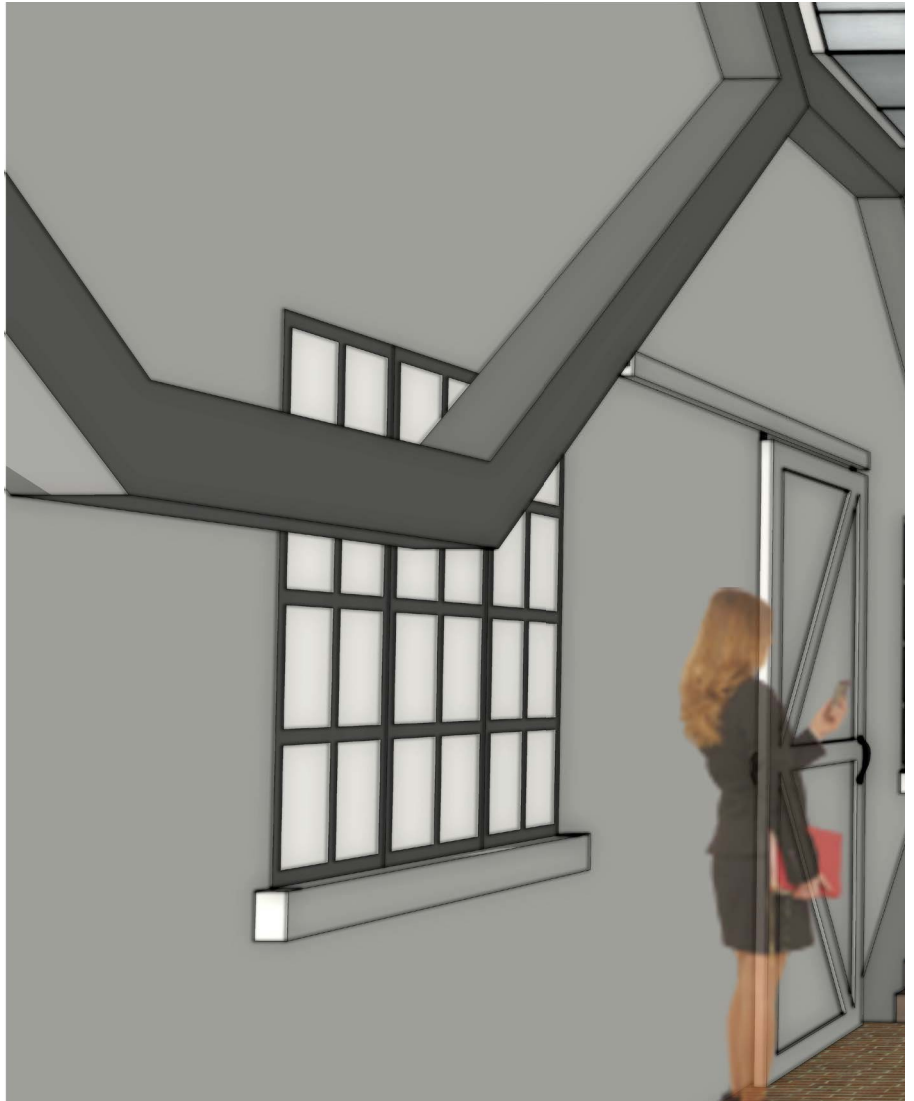


Figure 66: Pedestrian Walkway Rendering From Jessie Street Entrance



04 APPENDIX

How the Family Life Cycle Affects Migration Decisions
Precedent Studies
Thesis Exhibition and Presentation
End Notes
List of Figures
Sources

HOW THE FAMILY LIFE CYCLE AFFECTS MIGRATION DECISIONS

Introduction

Families move multiple times over the course of the family life cycle.³⁴ These moves can be caused by many factors such as location, economic aspirations, extended family orientation, the current stage of the family life cycle and more.³⁵ However there has been debate as to what the most important factor in a family's decision to move is. The family life cycle is a way of categorizing the different stages that a family can go through in their lifetime; it is based off of the parents ages, and children's age also.³⁶ There are a number of articles and journals that have different perspectives on this question; however there are few studies that directly answer the question: Is the family life cycle the most important factor in when and why family's decide to migrate?

The Family Life Cycle

In order to determine if the family life cycle, or FLC, is the most important factor, the definition needs to be discussed. The most widely accepted versions of the family life cycle come from Duvall (1971) and Wells and Gubar (1966).³⁷ Since then, Murphy and Staples have come up with a modernized version of the family life cycle in 1979.³⁸

Figure 71 shows the different methods of categorization between the three definitions of the family life cycle. Duvall (1971) is based on marital status, age of parents, and age of oldest child.³⁹ Wells and Gubar (1966) is based on marital status, age of parents, and age of youngest child.⁴⁰ Murphy and Staples (1979) is based on marital status, age of parents, children, and children's ages.⁴¹ Murphy and Staples (1979) is an updated version which includes more options such as divorced and widowed.⁴² While all of these tables vary and have different stages and different amounts of stages, Murphy and Staples have pointed out that "agreement exists on one central idea-each family progresses through a number of distinct phases from point of formation to death of both spouses".⁴³

Housing Preferences and the Family Life Cycle

The family life cycle has been tied to housing preference throughout this literature. For example, Rossi states that "housing requirements are strongly tied to its family life cycle stage; and much residential mobility, especially short distance, can be explained in terms of individual efforts to satisfy housing needs brought about by

Figure 71: Family Life Cycle

Duvall (1971)

1. Married couples (without children)
2. Childbearing families (oldest child under 30 months)
3. Families with preschool children (oldest 2.5-6)
4. Families with school children (oldest 6-13)
5. Families with teenagers (oldest 13-20)
6. Families as launching centers (first child gone to last child's leaving)
7. Middle aged parents (empty nest to retirement)

Wells and Gubar (1966)

1. Bachelor stage (young single people not living at home)
2. Newly married couples (no children)
3. Full nest I (youngest child under 6)
4. Full nest II (youngest child 6 or over)
5. Full nest III (older married couples with dependent children)
6. Empty nest I (no children living at home, head in labor force)
7. Empty nest II (head retired)

Murphy and Staples (1979)

1. Young single
2. Young married without children
3. Other young
 - a. Young divorced without children
 - b. Young married with children
 - Infant
 - Young
 - Adolescent
 - c. Young divorced with children
 - Infant
 - Young
 - Adolescent
4. Middle aged
 - a. Middle aged married without children
 - b. Middle aged divorced without children
 - c. Middle aged married with children
 - Young
 - Adolescent
 - d. Middle aged divorced with children
 - Young
 - Adolescent
 - e. Middle aged married without dependent children
 - f. Middle aged divorced without dependent children
5. Older
 - a. Older married
 - b. Older unmarried
 - Divorced
 - Widowed

life-cycle changes.”⁴⁴ As a family goes through the FLC, their needs are going to change, housing needs, privacy needs, space needs, and more. These needs are perceived to be normative needs. As McAuley and Nutty explain, “While the family may view itself as having a housing “need” such “needs” are likely to be the result of cultural standards rather than minimal requirements for health and safety.”⁴⁵ Meaning that families don’t necessarily need more space, they think they need more space, but what they really need is better, more efficient space. This ties into my overall argument about family housing. The answer isn’t always more space, it is better space.

We know that families want more space, but when do they want it? How do families needs vary across the different stages? According to Rossi and others (Chevan, 1971; Leslie and Richardson, 1961; Pickvance, 1973) Families cite space deficits as the most important residential concern brought on by the family life cycle. While families are expanding they believe that they need more room, therefore during the childbearing years is when the family wants more space. Families are more likely to move in order to gain more space than they are if they feel they have too much space. This has to do with the age of the parents, the further along in the family life cycle that they are, the less likely they are to move.⁴⁶ According to McAuley and Nutty “some attributes of residence of more concern to those in a particular stage, while concerns for other attributes span several related stages.”⁴⁷ This means that the way families decide to move changes over time, during the family life cycle. The FLC not only effects when and why couples decide to move, it also is a factor in if they decide to move at all.

How Families Decide to Migrate

While there is no doubt that the family life cycle and housing preferences are related, there is some doubt on whether the FLC is the most important factor when deciding to move. There are many other factors to be taken into account such as economical aspirations, extended family orientation, location, climate, amenities, and more. In order to know which is the most important factor, we need to know how families make decisions. According to Kammeyer (1971) the influences of economy and family in the decision making process can be separated into three different categories: 1. The societal level, 2. The personal-structural level, and 3. The

personal-psychological level.⁴⁸

The Societal Level of Decision Making

The societal level focuses on the effects of the changing economic conditions as they influence moving volume and direction. It also focuses on the health and security of the family and migration effects.⁴⁹

The Personal-Structural Level of Decision Making

Influences in this stage could be things like the stage of a person's career or the current family life cycle stage. This stage focuses on the ramifications of migration as they pertain to individuals in the household.⁵⁰

The Personal-Psychological Level of Decision Making

These could include economic aspirations or extended family orientations. Researchers know very little about how this stage translates into the family life cycle. This level seems to be about personal aspirations. For example, someone with low economic aspirations would be willing to migrate to accept a better opportunity, whereas a person with high economic aspirations would be willing to migrate to see out a better opportunity for themselves. Therefore on a personal-psychological level, the person with high economic aspirations has a higher propensity to migrate than the one with low economic aspirations.⁵¹

In order to fully answer this question, researchers need to know more about how the family life cycle affects someone at the personal-psychological level. Another gap in this research is what influence, if any, children have on the decision to migrate. Are children's preferences on migration taken into account?

Aspects of Migration

When thinking about migrating, families consider many factors such as economical aspirations, extended family orientation, location, climate, and amenities.⁵²

Economic aspirations refer to the feeling a husband or wife has about their current economic status. They can have low aspirations, meaning they are fine where they

are. They could have high aspirations, meaning they want to move up.⁵³ Extended family orientation refers to the emotional bonds the husband or wife has with their extended family. A high bond will likely live close to relatives while a low bond might be willing to move farther away.⁵⁴ The location of the home is very important, this can refer to a geographic location, a relative distance from amenities or extended family. Climate is more important to certain people, usually depending on their age.⁵⁵

When looking at these factors the research states that for Husbands the family life cycle stage is the most important factor in the decision to migrate.⁵⁶ While for wives the highest factor is propensity to migrate is her economic aspirations.⁵⁷ Although the wives highest factor was her economic aspirations, it was proven that a significant influence is the family life cycle stage.⁵⁸ This research is interesting because the common thought is that the wife is more dedicated to the family than the husband is, and these results disprove that.

Steele provides research that proves that children are the number one factor that causes families to move. He states "Our analysis showed that the birth of a child raised significantly the propensity of moving to a new house; further, the likelihood of moving to a new single-family house increased with the number of children in the family."⁵⁹ While this research claims that childbearing is the number one cause, one can argue that childbearing and the family life cycle stage are actually the same factor. Since life cycle stages are most commonly defined by children and children's ages, these two studies could be saying the same thing; that the family life cycle is the number one reason that families decide to migrate.

Conclusions

The family life cycle has a large effect on how families make decisions. It is not certain that it is the most important factor on migration choice although the research does suggest that it plays a large role in that decision. One cause of the family life cycle is having children, and children come with the need for more space, therefore the parents decide to move in order to obtain more space. Therefore the as the family goes through the life cycle they feel that they need more space, and the easiest way to obtain that is to move houses.

This thesis aims to prove that families do not need more space as their family grows. The space they think they need comes from the perceived normative housing deficit. The space the family thinks they need is the space they really need. Instead of more space this thesis will provide better space as a family traverses through the Family Life Cycle.

PRECEDENT STUDY-SHORTHAND HOUSE ⁶⁰

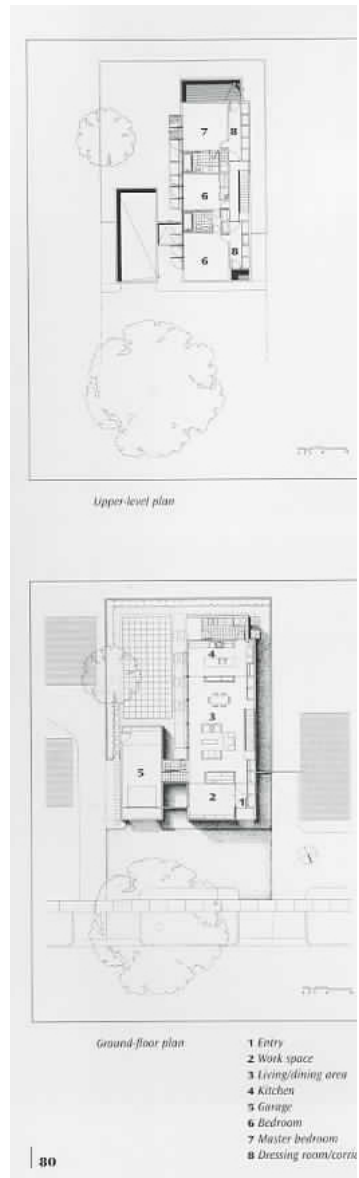
Architecturally Significant House
-Shorthand House
-Houston, Texas

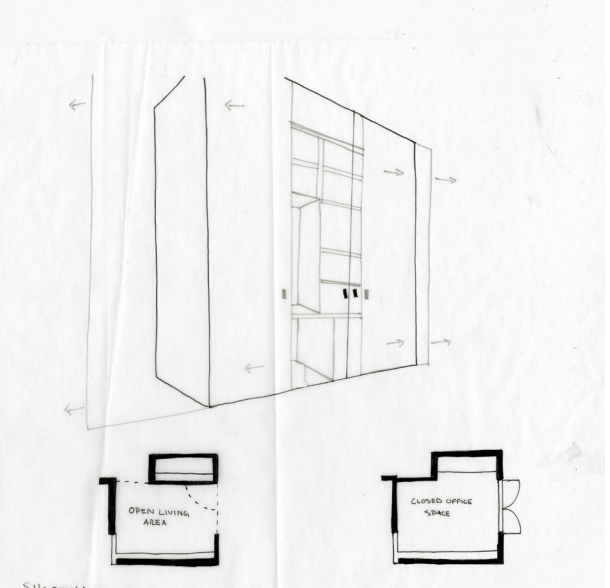
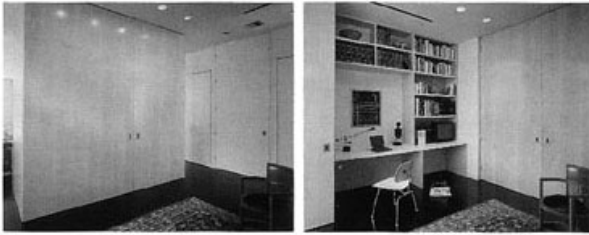
Architect: Francois De Menil
Square Footage: 3,480 sq ft ⁶¹

Client:
Single woman with grown children

Features:
-Walls do not define rooms, instead furniture does
-a table defines the dining room
-a hearth defines a family room
-Includes many moving partitions to change the use of space
-An open sitting area can become a closed work space
-A hallway can transition into a closet
-Since the user has to interact with the house to make it transform, she engages in understanding the experience of architecture

Figure 76: Shorthand House Images





PRECEDENT STUDY- SCHRETTNER APARTMENT ⁶¹

Micro Home
-Schretter Apartment
-Vienna, Austria

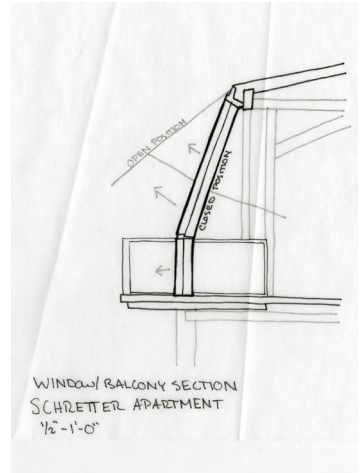
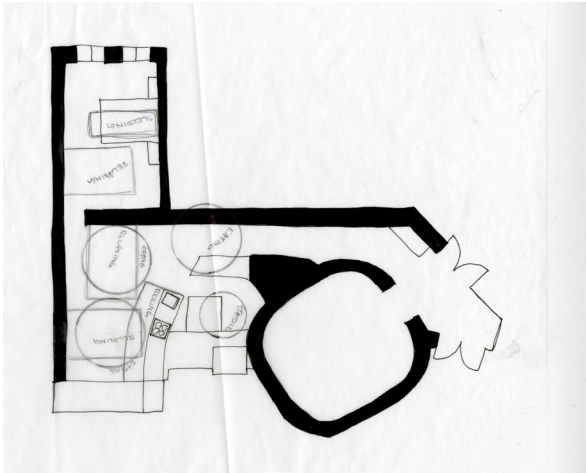
Architect: Eichinger, Oder, Knechtl
Square Footage: 540 sq ft

Client:
Unknown

Features:
-created from an old rooftop laundry space in a residential block
-A window that transforms into a balcony
-no rooms besides a bedroom
-the entire apartment can be configured different ways through sliding and hinging elements of the design



Figure 78: Schretter Apartment Images



PRECEDENT STUDY- FENNELL RESIDENCE ⁶²

Houseboat

-Fennell Residence

-Portland, Oregon

Architect: Robert Oshatz

Square Footage: 2,364 sq ft

Client:

The Fennell Family

-Professional couple

-Wanted a summer home on the river

Features:

-Glulam beams were used to form the arches for durability, sustainability, lightness and aesthetics

-Since the house has to float the materials needed to be light

-the glass provides natural light and natural ventilation

-construction required minimal amounts of energy, and did not disrupt the riverbed, which is a national natural landmark

-Incorporates storage in the stairway

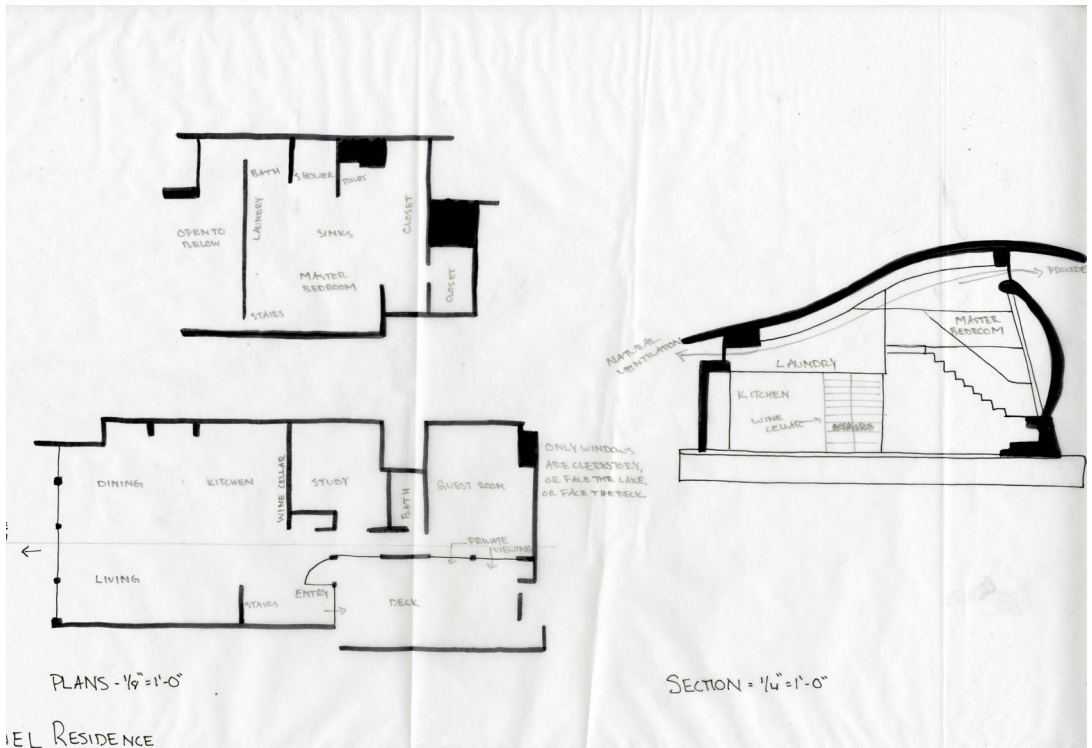
-lofted bedroom and bathroom on the second level

-neighbors are only 10 feet away on either side, so this house had to incorporate privacy

-the only windows face the water, meaning that neighbors are not a concern

Figure 80: Fennell Residence Images





PRECEDENT STUDY-SEARS COLUMBINE HOUSE 63

Average American Home
-Sears Columbine House

Architect: Sears
Square Footage: Around 1,500 sq ft

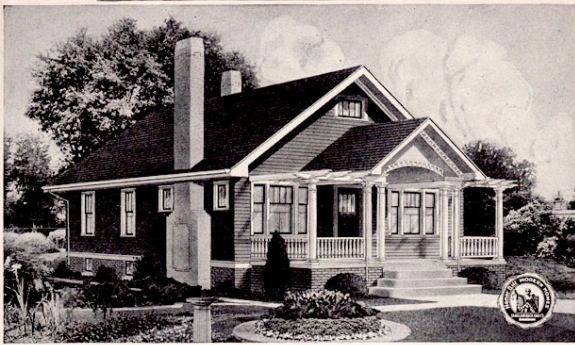
Client:
Any American with \$2,259

Features:

- This home was mass manufactured and ready to sell to any American willing to buy it
- This particular model includes:
 - 3 bedrooms on the main floor
 - kitchen
 - dining room
 - Living room
 - 1 bathroom
 - 2 optional bedrooms on the second level
- This home was the idea model for a family with room for growth
- It could be built with on the first level, then expanded upon when needed
- Owners could also choose to build a basement on the model

Figure 82: Columbine House Images

SIX ROOMS AND BATH



See Description of "Honor Bldg." Houses on Page 7. This house can be built with the rooms reversed. See page 8.

Honor Bldg.

The Columbine
No. 8013 "Always Built and Fitted."
\$2,259.00

At the price quoted we will furnish all the material to build this six-room bungalow, consisting of mill work, mastic case, kitchen cupboards, lumber, lath, roofing, porch ceiling, siding, flooring, finishing lumber, plaster, building paper, cement, trough, down spout, sash weights, hardware and painting material. We guarantee enough material to build this house. Price does not include cement, brick or plaster.

THIS house is so well arranged that it will make an ideal home. A place for everything makes for perfect order and the arrangement insures the comfort and contentment of the entire family.

Main Floor. All rooms except the dining room open at the end of which is the bathroom. There are three good bedrooms, each with a closet; an extra closet in the hall and another in the attic and a kitchen that is the last word in step saving. Living and dining rooms are in front. Great freedom is permitted in the placing of furniture and there is plenty of light and air. The view from the living and dining room is equally good, as both are in the front of the house. Throwing the two rooms together by means of the French doors makes each lighter and more airy and seemingly larger than it shut off. Besides the Craftsman door, there are nine windows in these two rooms, two of which are casement sash at the sides of the fireplace. In the bathroom dresser can stand where one sits in good. There are big shelves in all closets. The kitchen is reached directly from hall, dining room, basement or outdoors. The grade entrance is a great help in keeping the kitchen clean and warm. On the landing in space for the refrigerator will be found a light because the door is almost level with the floor. This landing might have been an extra step to the basement.

Paint for three coats outside, your choice of color. Varnish and wood filler for two coats of interior finish. Stratford Design hardware, see page 177.

Our "Honor Bldg." "Quality Guarantee" will work, shown on pages 124 and 125. Interior doors are six-course panel, with trim and flooring to match, all yellow pine, in beautiful gray and color. Windows are made of clear California white pine, with good quality glass set in with best grade of putty.

Basement color match house 1-foot bath.

Built on a concrete and brick foundation; No. 1 yellow pine framing lumber, siled with surface level that expresses siding. Seaman's Bay guaranteed Fire-Child Shingle Roll Roofing for the roof. Height of rooms 9 feet from floor to ceiling.

Options

Furnished with 2 rooms in attic, with single door, \$28.00 extra. See floor plan.

Sheet Metal and Plaster finish to take the place of wood lath, \$44.00 extra; with attic, \$18.00. See page 125.

Dark wood finish and floors in living and dining rooms, instead of yellow pine, \$140.00 extra.

Marble flooring for kitchen and bathroom, instead of yellow pine, no extra charge.

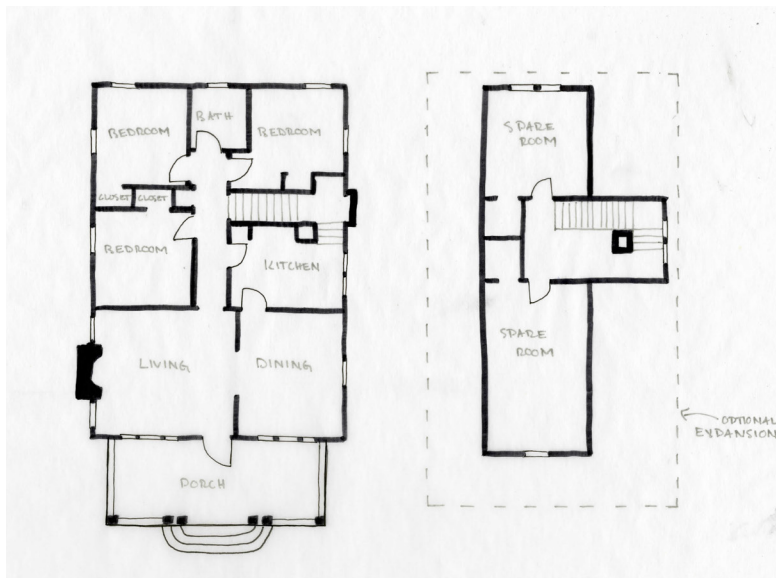
Storm Doors and Windows, \$28.00 extra.

Steeple Doors and Windows, galvanized wire, \$44.00 extra.

If Brick Mantel is not wanted, deduct \$60.00.

For price of plan and specifications, see page 125. For price of plan and specifications, see page 125. For price of plan and specifications, see page 125.

Our Guarantee Protects You—Order Your House From This Book.
Price Includes Plans and Specifications.



SIX ROOMS AND BATH



PRECEDENT STUDY- CAPSULE HOTEL ⁶⁴

Small Space

-Capsule Hotel

-Japan

Architect: Various across Japan

Square Footage:

each capsule- 6.5ft. x 3.3ft. x 4ft

Features:

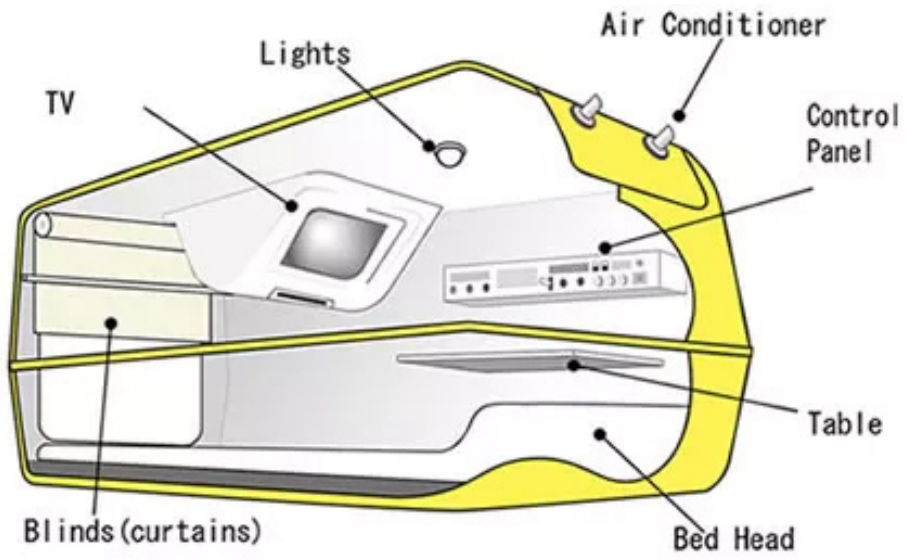
-Many individual capsules for people

-common locker rooms, showers and common areas such as lounges

-cost is approx. \$65 a night

Figure 84: Capsule Hotel Images





PRECEDENT STUDY-UNITE D HABITATION ⁶⁵

Public Space Study
-Unite d' Habitation
-Marseille, France

Architect: Le Corbusier
Square Footage:

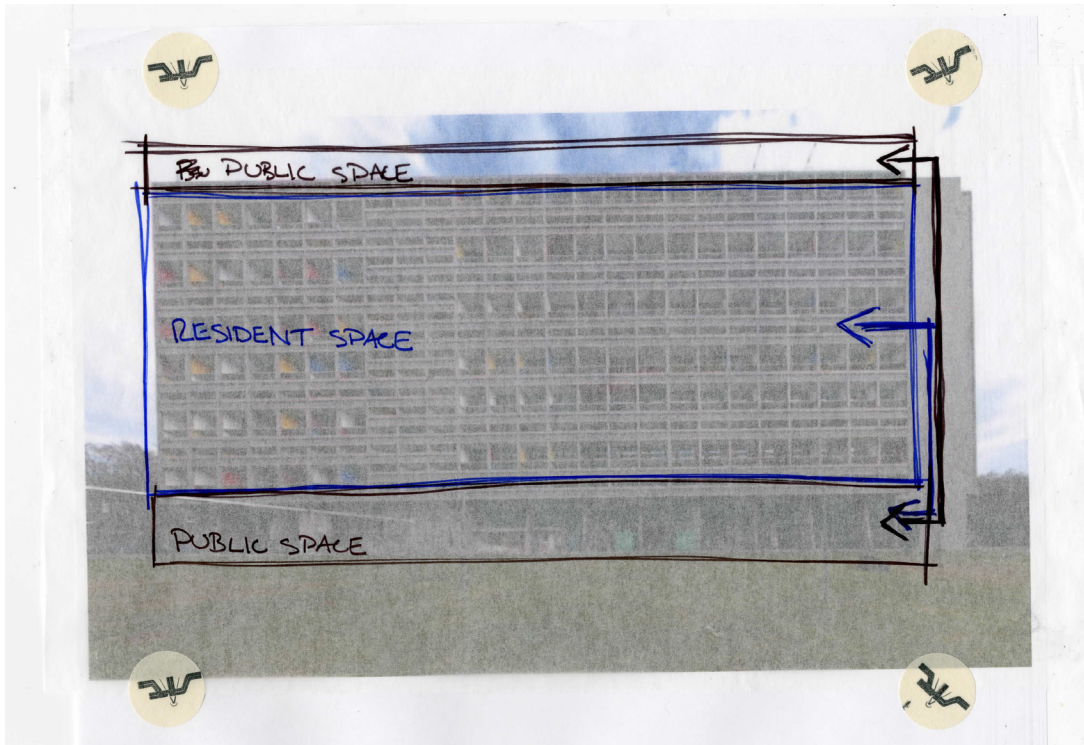
Client: The people of Marseille,
France

Features:

- multi-family residential housing project
- to house 1,600 residents
- communal spaces placed on roof rather than inside building
- a "city within a city"
- gathering spaces also placed on the lower level

Figure 86: Unite d' Habitation Images





PRECEDENT STUDY- SPACE STATION MODULE ⁶⁶

Small Space Study

-International Space Station
Habitation Module

Architect: Michael Kalil

Client: NASA

Features:

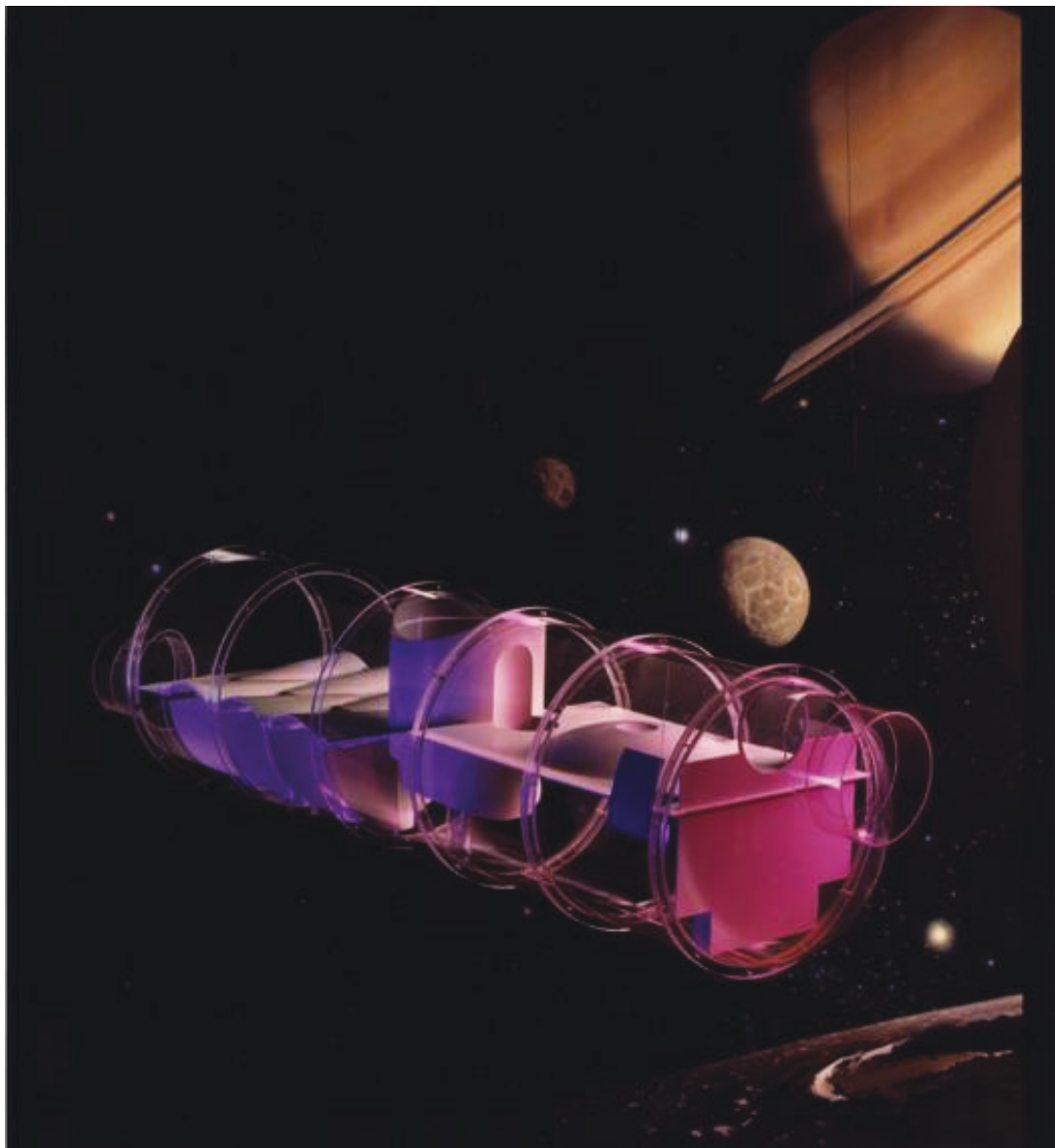
-In space there is no up or down, no
floor or roof

-13 feet in diameter

-living quarters for 6 people

Figure 88: Space Station Module Images





THESIS EXHIBITION AND PRESENTATION



Figure 90: Thesis Exhibition



Figure 91.1: Thesis Exhibition



Figure 91.2: Physical Model

THESIS EXHIBITION AND PRESENTATION



Figure 92: Thesis Presentation



END NOTES

- I. Thompson, Derek. "Why It's So Hard for Millennials to Find a Place to Live and Work." *The Atlantic* (November 19, 2014).
 - II. Kirkham, Chris. "California's high housing costs drive out poor, middle-income workers." *Los Angeles Times*, January 1, 2015.
 - III. Boffetta, Elena. "Hunting in Hunter's Point South: Affordable Housing in Long Island City." *NY City Lens*.
 - IV. Frizzle, Sam. "The New American Dream Is Living in a City, Not Owning a House in the Suburbs." *Time Magazine*, April 25, 2014
 - V. Smith, AJ. "5 Reasons to Live in a Big City." *Credit.com*.
 - VI. McAuley, William J., and Cheri L. Nutty. "Preferences and Moving Behavior: A Family Life-Cycle Analysis." *Journal of Marriage and Family* 44.2 (1982): 301-09. Jstor. Web. 18 Jan. 2016.
-
1. Perry, Mark J. "Today's new homes are 1,000 square feet larger than in 1973, and the living space per person has doubled over last 40 years." *American Enterprise Institute*. June 5, 2014.
 2. Christie, Les. "Americas Homes are Bigger than Ever." *CNN Money*, June 5, 2014.
 3. Ibid.
 4. Ibid.
 5. Pew Research Center. "The American Middle Class Is Losing Ground."
 6. Frizzle, Sam. "The New American Dream Is Living in a City, Not Owning a House in the Suburbs." *Time Magazine*, April 25, 2014
 7. Thompson, Derek. "Why It's So Hard for Millennials to Find a Place to Live and Work." *The Atlantic* (November 19, 2014).
 8. Boffetta, Elena. "Hunting in Hunter's Point South: Affordable Housing in Long Island City." *NY City Lens*.
 9. Ibid.
 10. Merriam-Webster. "Simple Definition of Family."
 11. Murphy, Patrick E., and Willaim A. Staples. "A Modernized Family Life Cycle." *Journal of Consumer Research* 6.1 (1979): 12-22. Web. 18 Jan. 2016.
 12. Nock, Steven L. "The Family Life Cycle: Empirical or Conceptual Tool?" *Journal of Marriage and Family* 41.1 (1979): 15-26. Jstor. Web. 18 Jan. 2016.
 13. Chevan, Albert. "Family Growth, Household Density, and Moving." *Demography* 8.4 (1971): 451-58. Jstor. Web. 31 Jan. 2016.

14. Ibid.
15. Ibid.
16. McAuley, William J., and Cheri L. Nutty. "Preferences and Moving Behavior: A Family Life-Cycle Analysis." *Journal of Marriage and Family* 44.2 (1982): 301-09. Jstor. Web. 18 Jan. 2016.
17. Ibid.
18. Smith, AJ. "5 Reasons to Live in a Big City." Credit.com.
19. Ibid.
20. Brukman, Jessie. "10 Reasons why Cities are Way Better than Suburbs." Thrillist.
21. Stepp, Erin. "Annual Cost to Own and Operate a Vehicle Falls to \$8,698, Finds AAA." AAA News Room.
22. Harris, Alexander. "The Advantages of Living in the Suburbs." SFGate.
23. Ibid.
24. The Wiseman Agency. "Living in a Suburb: Pros and Cons."
25. Ibid.
26. VanderMey, Anne. "Here's How Nuts Bay Area Housing Prices Have Become." *Fortune*, March 7, 2016
27. Carlyle, Erin. "San Francisco Tops Forbes' 2015 List Of Worst Cities For Renters." *Forbes Business* (April 16, 2015).
28. Priceonomics. "The San Francisco Rent Explosion Part III."
29. Yglesias, Matthew. "San Francisco Is Great—They Should Make More of It." MoneyBox.
30. Ibid.
31. Census. "San Francisco County, California."
32. Thornberg, Christopher. "California's affordable housing crisis spreads to the middle class." *The San Francisco Chronicle*, January 15, 2016.
33. Airb&b. "South Beach, San Francisco."
34. Murphy, Patrick E., and Willaim A. Staples. "A Modernized Family Life Cycle." *Journal of Consumer Research* 6.1 (1979): 12-22. Web. 18 Jan. 2016.
35. Miller, Sheila J. "Family Life Cycle, Extended Family Orientations, and Economic Aspirations as Factors in the Propensity to Migrate." *The Sociological Quarterly* 17.3 (1976): 323-35. Jstor. Web. 18 Jan. 2016.
36. Murphy, Patrick E., and Willaim A. Staples. "A Modernized Family Life Cycle." *Journal of Consumer Research* 6.1 (1979): 12-22. Web. 18 Jan. 2016.

END NOTES CONT.

37. Ibid.

38. Ibid.

39. Ibid.

40. Ibid.

41. Ibid.

42. Ibid. 16.

43. Ibid. 18.

44. McAuley, William J., and Cheri L. Nutty. "Preferences and Moving Behavior: A Family Life-Cycle Analysis." *Journal of Marriage and Family* 44.2 (1982): 301. Jstor. Web. 18 Jan. 2016.

44. Ibid.

45. Ibid. 302.

46. Ibid. 308.

47. Ibid. 308

48. Miller, Sheila J. "Family Life Cycle, Extended Family Orientations, and Economic Aspirations as Factors in the Propensity to Migrate." *The Sociological Quarterly* 17.3 (1976): 333. Jstor. Web. 18 Jan. 2016.

49. Ibid.

50. Ibid.

51. Ibid.

52. Ibid.

53. Ibid. 324.

54. Ibid. 325.

55. McAuley, William J., and Cheri L. Nutty. "Preferences and Moving Behavior: A Family Life-Cycle Analysis." *Journal of Marriage and Family* 44.2 (1982): 302. Jstor. Web. 18 Jan. 2016.

56. Miller, Sheila J. "Family Life Cycle, Extended Family Orientations, and Economic Aspirations as Factors in the Propensity to Migrate." *The Sociological Quarterly* 17.3 (1976): 331. Jstor. Web. 18 Jan. 2016.

57. Ibid. 332.

58. Ibid. 332.

59. Kulu, Hill, and Fiona Steele. "Interrelationships Between Childbearing and Housing Transitions in the Family Life Course." (2013): 1710. Springer. Web. 29 Jan. 2016.

60. FdM Arch. "Residential Shorthand House."
61. Pople, Nicolas. Small Houses. N.p.: Laurence King Publishing, 2003.
62. Robert Harvey Oshatz Architect. "Fennell Residence."
63. Sears Modern Homes. "The Columbine: The Flower of Sears Homes."
64. Borgobello, Bridget. "How to use a Japanese Capsule Hotel." gizmag, September 13, 2011
65. Kroll, Andrew. "AD Classics: Unite d' Habitation / Le Corbusier." Arch Daily, November 5, 2010.
66. MOMA. "International Space Station Habitation Module, NASA, project."

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Information Source: Christie, Les. "Americas Homes are Bigger than Ever." CNN Money, June 5, 2014.

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Information Source: Thompson, Derek. "Why It's So Hard for Millennials to Find a Place to Live and Work." The Atlantic (November 19, 2014).

Figure 6: Income Gap Graph

Information Source: Boffetta, Elena. "Hunting in Hunter's Point South: Affordable Housing in Long Island City." NY City Lens

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Information Source: Murphy, Patrick E., and Willaim A. Staples. "A Modernized Family Life Cycle." Journal of Consumer Research 6.1 (1979): 12-22. Web. 18 Jan. 2016.

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Image Sources: Graff, Amy. "THE MOMMY FILES 103 things all S.F. kids should do in the city before they grow up." SF Gate, April 27, 2009.

Wikipedia.com. "Bay Bridge congestion tolls."
Wikipedia.com. "The Painted Ladies."

Figure 21: Cost Comparison

Information Source: NUMBEO. "Cost of Living Comparison Between Grand Rapids, MI and San Francisco, CA." http://www.numbeo.com/cost-of-living/compare_cities.jsp?country1=United+States&city1=Grand+Rapids%2C+MI&country2=United+States&city2=San+Francisco%2C+CA

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Information Source: AllSteel. "Ergonomics and Design A Reference Guide."
energy.gov. "WORKSPACE, STORAGE, AND WORKSHOP DESIGN."

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Landon, Shanti. "What kitchens around the world look like." Life Made Full.

Figure 49: Bathrooms From Around the World

Image Sources: Oge, Lucie. "25 Weird Toilets of the World." Hostel Bookers.

Popular Mechanics. "The Worlds 18 Strangest Bathrooms."

Murano, Grace. "10 Cool Bathrooms From Around the World." ODDEE.

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Image Sources: FdM Arch. "Residential Shorthand House."

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Image Sources: Pople, Nicolas. *Small Houses*. N.p.: Laurence King Publishing, 2003.

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Image Sources: Robert Harvey Oshatz Architect. "Fennell Residence."

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Image Sources: Sears Modern Homes. "The Columbine: The Flower of Sears Homes."

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Image Sources: Borgobello, Bridget. "How to use a Japanese Capsule Hotel." gizmag, September 13, 2011

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Image Sources: MOMA. "International Space Station Habitation Module, NASA, project."

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Image Source: Kendall College of Art and Design. "2016 Thesis Show."
<https://kcad.smugmug.com/Photobase/MArch/2016-Thesis-Show/n-4PQKJk/>.

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Image Source: Kendall College of Art and Design. "2016 Thesis Show."
<https://kcad.smugmug.com/Photobase/MArch/2016-Thesis-Show/n-4PQKJk/>.

Figure 91.2: Physical Model

Image Source: Kendall College of Art and Design. "2016 Thesis Show."
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Image Source: Kendall College of Art and Design. "2016 Thesis Show."
<https://kcad.smugmug.com/Photobase/MArch/2016-Thesis-Show/n-4PQKJk/>.

SOURCES

"In Japan, Living Large In Really Tiny Houses." NPR, August 3, 2010.

Airb&b. "South Beach, San Francisco."

Aydilek, Asiye. "Habit formation and housing over the life cycle." Elsevier : 858-66.

Web. 25 Jan. 2016.

Beasley, Elizabeth, and Steve Harper. "Micro Space Living: Pros and Cons."

Apartment Guide.

Boffetta, Elena. "Hunting in Hunter's Point South: Affordable Housing in Long Island

City." NY City Lens.

Brukman, Jessie. "10 Reasons why Cities are Way Better than Suburbs." Thrillist.

Carlyle, Erin. "San Francisco Tops Forbes' 2015 List Of Worst Cities For Renters."

Forbes Business (April 16, 2015).

Carlyle, Erin. "San Francisco Tops Forbes' 2015 List Of Worst Cities For Renters." Forbes

Business (April 16, 2015).

Census. "San Francisco County, California."

Chevan, Albert. "Family Growth, Household Density, and Moving." Demography 8.4

(1971): 451-58. Jstor. Web. 31 Jan. 2016.

Christie, Les. "Americas Homes are Bigger than Ever." CNN Money, June 5, 2014.

Cohen, Michelle. "City Kids: Why Parents Pick City Living Over the Suburbs." 6SQFT

(September 23, 2014).

Corso, Annalisa, and Margherita Lanz. "Felt obligation and the family life cycle: A

study on intergenerational relationships." International Journal of Psychology

48, no. 6 (2013): 1196-200.

Dodson, Brian. "Micro-dwellings: Part of the solution or just more problems?" gizmog,

October 1, 2012.

- Durning, Alan. "SEATTLE GOES BACKWARD ON MICRO-HOUSING." Sightline Institute.
- Erickson, Martin. "Re-visioning the family life cycle theory and paradigm in marriage and family therapy." *The American Journal of Family Therapy* (October 1998): 341.
- Frey, Thomas. "Why the Tiny Home Movement May Not be So Tiny." *Futurist Speaker*.
- Frizzle, Sam. "The New American Dream Is Living in a City, Not Owning a House in the Suburbs." *Time Magazine*, April 25, 2014
- Glick, Paul C. "The Family Life Cycle and Social Change." *Family Relations* 38, no. 2 (April 1989): 123-29.
- Glick, Paul. "The Family Life Cycle and Social Change." *Family Relations* 38.2 (1989): 123-29. Jstor. Web. 29 Jan. 2016.
- Grozdanic, Lidija. "Hong Kong's Shocking 40-Square-Foot Apartments Photographed by Chinese Human Rights Group." *Inhabitat* (February 28, 2014).
- Harris, Alexander. "The Advantages of Living in the Suburbs." *SFGate*.
- Kulu, Hill, and Fiona Steele. "Interrelationships Between Childbearing and Housing Transitions in the Family Life Course." (2013): 1688-713. Springer. Web. 29 Jan. 2016.
- Light, John, and Neha Mehta. "Are Tiny Houses a Viable Affordable Housing Solution?" *Moyers & Company* (October 6, 2014).
- McAuley, William J., and Cheri L. Nutty. "Preferences and Moving Behavior: A Family Life-Cycle Analysis." *Journal of Marriage and Family* 44.2 (1982): 301-

SOURCES CONT.

09. Jstor. Web. 18 Jan. 2016.

McAuley, William J., and Cheri L. Nutty. "Residential Satisfaction, Community Integration, and Risk across the Family Life Cycle." *Journal of Marriage and Family* 47.1 (1985): 125-30. Jstor. Web. 31 Jan. 2016.

McLeod, P B., and J R. Ellis. "Alternative Approaches to the Family Life Cycle in the Analysis of Housing Consumption." *Journal of Marriage and Family* 45.3 (1983): 699-708. Jstor. Web. 31 Jan. 2016.

McLeod, P.B., and J.R. Ellis. "Alternative Approaches to the Family Life Cycle in the Analysis of Housing Consumption." *Journal of Marriage and Family* 45, no. 3 (August 1983): 699-708.

Meinhold, Bridgette. "PREFAB FRIDAY: Parasitic Homes Take Root On Empty Walls." *Inhabitat* (September 25, 2009).

Miller, Sheila J. "Family Life Cycle, Extended Family Orientations, and Economic Aspirations as Factors in the Propensity to Migrate." *The Sociological Quarterly* 17.3 (1976): 323-35. Jstor. Web. 18 Jan. 2016.

Mitchell, Ryan, and Amy Henion. <http://thetinylife.com>.

Murphy, Patrick E., and Willaim A. Staples. "A Modernized Family Life Cycle." *Journal of Consumer Research* 6.1 (1979): 12-22. Web. 18 Jan. 2016.

Nock, Steven L. "The Family Life Cycle: Empirical or Conceptual Tool?" *Journal of Marriage and Family* 41.1 (1979): 15-26. Jstor. Web. 18 Jan. 2016.

Perry, Mark J. "Today's new homes are 1,000 square feet larger than in 1973, and the living space per person has doubled over last 40 years." *American Enterprise Institute*. June 5, 2014.

Pew Research Center. "The American Middle Class Is Losing Ground."

Pino, Alex. <http://tinyhousetalk.com>.

Plesant, Liz. "Tiny House Living: How Two Families Made It Work—Teenagers, Sleepovers, Alone Time, and All." yes!, December 24, 2014.

Priceonomics. "The San Francisco Rent Explosion Part III."

Riley, Neil J. "S.F. supervisors back micro-apartments." SF Gate, November 20, 2012.

Rollins, Boyd, and Harold Feldman. "Marital Satisfaction over the Family Life Cycle." *Journal of Marriage and Family* 32, no. 1 (February 1970): 20-28.

Rossi, Annalisa, and Margherita Lanz. "Felt Obligation and the family life cycle: A study on intergenerational relationships." *International Journal of Psychology* 48.6 (2013): 1196-200. Web. 29 Jan. 2016.

Russell, Kyle. "This One Intersection Explains Why Housing Is So Expensive In San Francisco." *Business Insider*, April 8, 2014.

Smith, AJ. "5 Reasons to Live in a Big City." *Credit.com*.

Smith, Ruth, Donna Downer, Mildred Lynch, and Mary Winter. "Privacy and Interaction within the Family as Related to Dwelling Space." *Journal of Marriage and Family* 31, no. 3 (August 1969): 559-66.

Spaner, Graham B., William Sauer, and Robert Lerzelere. "An Empirical Evaluation of the Family Life Cycle." *Journal of Marriage and Family* 41.1 (1979): 27-38. Jstor. Web. 29 Jan. 2016.

The Wiseman Agency. "Living in a Suburb: Pros and Cons."

Thompson, Derek. "Why It's So Hard for Millennials to Find a Place to Live and Work." *The Atlantic* (November 19, 2014).

SOURCES CONT.

Thornberg, Christopher. "California's affordable housing crisis spreads to the middle class." *The San Francisco Chronicle*, January 15, 2016.

VanderMey, Anne. "Here's How Nuts Bay Area Housing Prices Have Become." *Fortune*, March 7, 2016

Weingus, Leigh. "This 86-Square-Foot Paris Apartment Is Totally Livable." *Huffington Post*, November 4, 2014.

Wilson, Lindsay. "How big is a house? Average house size by country." *Shrink That Footprint*.

Yglesias, Matthew. "San Francisco Is Great—They Should Make More of It." *MoneyBox*.

