Micro Living - Big Mindset

Erin Lyttle

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MICRO LIVING
BIG MINDSET
MICRO LIVING - BIG MINDSET

REQUEST FOR APPROVAL OF THESIS RESEARCH

PROJECT BOOK PRESENTED TO

PhD, FAIA WILLIAM CARPENTER

AND TO THE

FACULTY OF THE DEPARTMENT OF ARCHITECTURE

COLLEGE OF ARCHITECTURE AND CONSTRUCTION MANAGEMENT

BY

ERIN M. LYTLE

IN PARTIAL SATISFACTION OF THE REQUIREMENTS OF THE COURSE

BACHELOR OF ARCHITECTURE

KENNESAW STATE UNIVERSITY

MARIETTA, GEORGIA

MAY 1, 2020
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When does the idea of “Tiny Homes - Big Impact” come into play with the introduction that has been presented, all that has been given? It is precisely that we take a new position of how we live, starting with our personal living environments. In recent years, the idea of tiny homes has gained popularity, with people moving towards smaller living spaces in search of a more sustainable lifestyle. However, the statement “Tiny Homes - Big Impact” suggests that the impact of tiny homes goes beyond just personal living environments. It implies that by adopting tiny homes, not only do we reduce our carbon footprint, but we also contribute to a more sustainable and equitable society.

I remained upon the tiny home course early February of 2017 and got a job interview with a new tiny home company. During the time I was interviewing, I had the opportunity to attend the annual Georgia Tiny Home Festival, which was also an opportunity to see the growing styles and benefits of tiny homes. A few benefits that I can name off the top of my head about tiny homes for personal and environmental reasons include:

- Personal: Tiny homes can provide more flexibility and mobility, allowing people to live closer to work or in areas with better amenities. They can also be more affordable, providing a cost-effective housing option for a wide range of people.
- Environmental: Tiny homes can help reduce the environmental impact of housing by minimizing land use, lowering energy consumption, and reducing waste. They also promote a more sustainable lifestyle by encouraging people to live in smaller, more efficient spaces.

Tiny homes have a strong appeal in communities that are in the process of people moving from the tiny home lifestyle. The idea of tiny living is being integrated into the Atlanta and surrounding areas. There is currently a request for tiny homes in the Snellville area in DeKalb County. This community would be made up of 600-1000 tiny homes that would start at $250,000 for a 244 square foot house. While the idea of tiny living has been popular for a couple of years, one could read about these tiny homes as being located in the downtown Atlanta area.

I think I have a goal in mind that I would like to promote a low-cost housing plan for those that are interested in low income housing. I think it would be beneficial to promote this option within the Snellville area and provide some sort of housing plan for those interested in this option. This type of housing plan would allow for people to live in smaller, more efficient spaces and still have access to the same amenities as larger homes.

The key to any successful housing plan is ensuring that the needs and wants of the community are met. By designing a housing plan that is specifically tailored to the needs of the community, we can ensure that it is sustainable and can be maintained over time. This type of housing plan would also promote a more sustainable lifestyle by encouraging people to live in smaller, more efficient spaces.

How Does One Individual Impact Their Neighborhood?

What comes to mind when you think of the word “home”? I’m pretty sure that most of your thoughts include things such as decorations, furniture, food and family and friends. These items are all important, but I believe that what truly makes a home is the feeling of a warm and safe place to call your own. When you think of the word “home”, what are the different things you think? Would you think of the architecture, the training of materials, the neighborhood, coast, and all?

Affordability, Functionality, Sustainability

These factors come to my mind when I start to consider and find a place to call my home. After all, it is important to find a place that is affordable, functional, and sustainable. These three factors are crucial in determining the type of home you will choose and how it will fit into your lifestyle.

My interest in this topic is to open a conversation on how we use space and consider the housing options that are available. It is essential to explore more adaptable buildings that could meet both the environmental and practical needs of a house.

To see how we can understand the “unit” as an individual element, but also, itself, as a piece of a system that forms a community, which could exist in the urban or rural context.

The concept of the “unit” is often overlooked, yet it is a crucial component of any community. It is important to remember that the quality and comfort of a unit can change the mindset on what we view as “The American Dream”.
SCOPE OF PROJECT

OBJECTIVES

ANTICIPATED RESULTS
I intend to design and build a sustainable micro-living community that can be mass produced to address the issue of sustainability, lack of space, and financial costs that is able to exist in both the urban and rural context.

METHOD OF INQUIRY

Tiny house design and information with
Interviews with members of the Tiny House Builders Association
Program and functionality capabilities through the testing full scale models of designed micro-living spaces and traditional research methods.

Video Documentations:

Studying the human movement throughout spaces and performing different activities in certain programs
Seeing where actions and movement overlaps in order to help better shape the functions within a micro-living environment

RESEARCH QUESTIONS

- What defines a house or single living unit?
- What functions are vital to having a cohesive living environment?
- What are current issues regarding tiny house living?
- How do we change the stigma of the tiny house from negative to positive?
- How does the tiny house fit into the urban and rural context currently?
- How do we diversify the urban and rural environment vernacular by integrating tiny houses?
- How do we consciously design a more sustainable house turned home, that will fully meet our daily needs and offer adaptability over a lifetime?
- What are the differences between a typical house, tiny house, and recreational vehicles?
- What is the relationship between a unit of living and the community in which it exists in?
- What defines a community?
- What defines a tiny house community?
- In what ways does a tiny house community differ from existing multi-family residences?
- How do we alter the mindset of what we understand as “The American Dream”?
- What distinguishes the programmatic thresholds in typical residential architecture?
- How can studying the human movement help to form certain spatial programs?
- How will each unit be assembled?
The artifact for this thesis study is made to represent the amount of money that homeowners put into their houses and that money and material objects have become their obsession. The focus on ideas that “the bigger, the better” has become a detriment to our environment. Tiny houses are a way to be more conscious about our impact on the earth. The blocks protruding from the house correlate to Sustainable Design Goals that have been put into effect in most countries and the ones highlighted relate to tiny house sustainability.
HISTORY OF TINY HOUSES

QUESTIONS...

- What are current issues regarding tiny house living?
- How do we change the stigma of the tiny house from negative to positive?
- How does the tiny house fit into the urban and rural context currently?

HOW’D IT ALL BEGIN...

The term “Tiny House Movement” is just a re-branding of a historically previous type of house size and lifestyle that existed as a part of a normal way of life. People would buy only what they could afford and build with what they had in the vicinity around them. However, this way of living began to change after the World Wars where we saw a shift in sentiments. Thinking they started viewing smaller housing in a light negative to the concept of “The American Dream”. This negative viewpoint saw small dwellings and other unconventional dwellings such as mobile or “modular” housing and recreational vehicles (RVs) as a detriment to the urban environment and who would reside there. And due to the notion, that quantity or size of a person’s possessions equal to their income which then led society to believe that a smaller house equal to a person being poor. This mindset however has taken a shift over the last few decades and this chapter will explore the history of the “tiny house” and the tiny house movement throughout American society.

1945 - Henry David Thoreau’s famous book, Walden, espouses living in a 40 x 80 ft House in Concord, Massachusetts. He quit his job for ecstacy and wrote about his experiences at Walden Pond. In an influential quote, “A man is rich in proportion to the number of things which he can afford to let go.”

1973 - the book Shelter by Lloyd Kahn and Bill Kohler captures the essence of the tiny house movement in building construction manuals over time and a guide on how to build small buildings and craft. The idea remained in the development of tiny houses because it brought back the concept of simplicity and building a house that is small enough and affordable.

1987 - Accessory Dwelling units become legalised on personal properties in Portland, Oregon, opening the door for tiny houses to start making a name by making the ACQ requirements.

2004 - legislation between Jay Heale and Ginger Johnson changes Oregon law to allow the construction of accessory dwelling units. It became legal to build small structures on residential or commercial properties in Oregon. The law was also passed in other states.

2006 - The global financial crisis effect the housing market causing many homeowners to think on downsizing their homes and many people began to understand downsizing and tiny houses as a real estate trend.

2010 - Regulations for tiny houses remained to be added to the new publication of the International Residential Code (IRC) by the International Code Council (ICC) which is a set of building codes for the construction of buildings. The tiny house official building rules being able to ensure code compliance. Tiny Houses became more appealing to tiny houses by including different codes from the IRC which includes safety, fire, and more.
Affordability

Everyone wants the perfect house one that has the look and function that works for their everyday routines while considering how much they must risk financially. With the development of the tiny house over the last few years here in the United States many innovative tiny structures have been designed to meet the issue of meeting all three points of affordability, functionality, and sustainability.

Affordability

The thing we all look at first when buying or making anything is how much it costs. In the research unveiling the costs of tiny houses it's been debated if the cost of such a small space is worth it. Most of my upcoming generation struggle with the concept of owning their own house not renting or leasing, but owning their house seems like a very out-of-reach goal compared to the generations before us. With higher fees of student debt, car notes, paying for their current living arrangement, many young folks must be considered before the idea of having personal living property is a reality and it is usually put off to the side until their early or mid-thirties. Tiny houses have been a means in which people can downsize and become thoughtful in how they live their lives, but they can also be a great opportunity for someone to begin their home-owning journey.

200 square feet... What makes tiny house ownership so affordable and appealing? The square footage for a tiny house compared to a typical standard-size house are a lot higher but one thing that I would consider is what you get out of the higher square per foot price with a smaller house that provides something that you can live in. The ability to customize a house to meet one’s specific needs would be a rather expensive in your typical house but it is more feasible and easy to accomplish in a tiny house making tiny house a higher quality living environment, “more bang for your buck”, as the expression goes.

Besides the ability to have a well-designed custom house, tiny houses offer lower building costs, lower mortgages or loan fees, and lower monthly utility expenses, the following break down each area and an overall cost savings will be tallied up to conclude the total saving that is achievable.
Building Costs:

Tiny House

$5,000

Trailer

Wood Stove + Pot* $4,000

Windows + Skylights $4,000

Structural Lumber, Sheathing, Etc. $3,000

Portable Solar System* $3,000 Goal Solar Generator, Cabins & 2 x 90W Panels

$2,000

$2,250

$2,250

Inulation $2,000 Rigid Foam

Flash Efficient Ticket $2,000

Water Heater $1,250

Refrigerator $500

Water Tanks $900 Grey water and Fresh water tanks 200 Gallons each

Roofing $500

Build Plans $800

Plumbing $200

Stove + Oven $700

Kitchen Sink + Faucet $400

Mattress $450

Shower $450 tub, low flow fixtures, and shower bar

Light Fixtures $400

Doors $400

Flooring $300 Hardwood

Propane*$650 Tanks, regulators and piping

Country pots $300

Additional Cost + Fees $200

Typical House TOTAL COST: $49,950

Monthly Billing Costs + Expenses:

Tiny House (Average U.S. 2018-2019)

House Insurance $75

Electric $80

Gas $1

Cell + WiFi $60

Water $40

Trash Collection $10

Landscaping Maintenance $0

**Tiny House MONTHLY EXPENSES: $277**

Typical House (Average GA 2018-2019)

House Insurance $95

Electric $140

Gas $20

Cell + WiFi $105

Water $60

Trash Collection $10

Landscaping Maintenance $0

Typical House MONTHLY EXPENSES: $530

Mortgage + Loan Fees:

Tiny House (Average GA 2018-2019)

House Value $30,000

Down Payment $15,000

Monthly Mortgage $450

**Tiny House ANNUAL MORTGAGE: $4,400**

Typical House (Average GA 2018-2019)

House Value $260,000

Down Payment $150,000

Monthly Mortgage $1,500

**Typical House ANNUAL MORTGAGE: $18,000**

Functionality + Sustainability

Functionality

Integrative Design

Ingenuity: the functions of multiple programs into a single space. Living Mimetically can help to spark this use of integrative design. We start to look at what can fold into what, and what is necessary for a space to work for what the inhabitant needs. This may vary from person to person but there is room to marginalized certain age groups together for different uses of spaces.

Sustainability

By generating power off the grid tiny houses can collect their energy from renewable resources such as sun, rainwater and the wind. Building materials and smaller appliances can also be included into the sustainable factor of a house. Smaller appliances use less energy which also ties into the affordability factor and not only helps to preserve our over-deteriorating, environment, but also saves in expenses for the owner as well. When looking into building materials such as lumber, quite a bit can be reconfirmed or re-purposed from lumber yards and hardware supply stores at a discounted price or unconventional materials are more readily available for smaller houses at a lower cost than it would be to integrate into a typical sized house.
CASE STUDIES

QUESTIONS...

- What is the relationship between a unit of living and the community in which it exists?
- How do we diversify the urban and rural environment-—will emulating tiny houses?
- How does the tiny house fit into the urban and rural context currently?
- What defines a tiny house community?

EXPLORING TINY HOUSES - WHAT THEY OFFER...

STAND - ALONE

Project: Modhouse 3 X 20
Location:Victoria, Australia
Architect/Designer: Mark and Melissa Plant
Year Built: Size: 150 sq. ft.

This house is made of three 10-ft.-long by 4-ft. wide standard shipping containers. The exterior has been modified with larger windows and an angular roof to give the house a more spa-like look and the containers themselves are staged in a row on an arranged outdoor area with little rooms in the space between the larger forms. Each container is connected to the next by corridors that house additional storage and utility spaces such as laundry rooms and workrooms. The design allows for all spaces of the house to be used to its maximum potential without giving the feeling of being isolated and closed. The overrun plan on the ground floor is focused on the needs of the residents children. The upstairs level plays into its sustainable design and grows in positive translucency and optimal lighting conditions within the spaces inside. Not only was the positioning of all the house taken into consideration when looking at ways to live into sustainability but the house is completely off the grid power is collected through solar panels, converted, and stored in power banks and rain water is recycled for washing and toilet appliances.

Project: Hartwell Cabin
Location: Martin, GA - US
Architect/Designer: William Carpenter - Lightroom Studio
Year Built: Size: 200 sq. ft.

The Hartwell Cabin is a tiny house that offers a living environment that connects with the surrounding from the inside out. This living space is used as a gateway from the hustle and bustle of everyday life and allows the resident to live at one with nature. It's located in rural environment and constructed from local recycled timber. One thing that the architect of this house wanted to do was introduce tray housing at a low cost to places that have never seen them or seem to have that experience. The house used the very efficient building process not only in the cost but also in the sustainable aspect to pull into the beginning of what Lightroom Studio has in store for the Atlanta area.
Project: Kids Under Cover Project
Location: Australia
Architect/Designer: Grimshaw Designs
Year Built: 2018
Size: 277 sq ft

This tiny house project was designed with comfort and safety in mind for an underprivileged youth and young adults in Australia in order to give them a foundation of stability by having a place to call home. This building is made for materials that are easy to get with hands from a hardware store so it can be duplicated in more than one place. High quality of an affordable price-point were the main intent of this project so that the owner could still afford to live in the city without having a substantial amount of money. This house has double height ceilings, small floor where the living area is divided into two, and a compact kitchen with storage. The house also has two bedrooms, living room, and a bathroom. The appliances and furniture placement can be customized to suit different owners needs and preferences.

Project: Homes for the Homeless
Location: London, England - UK
Architect/Designer: James Furzer
Year Built: 2015
Size: N/A

These pods were created in a means to help with the issue of homelessness in the city which has one of the highest rates of homelessness in London. They were designed with a transportation system in mind so that they could easily be able to be attached to building facades. They are designed so that they do not obstruct the pedestrian path and are accessible through drop down ladders which one might see used on glass elevators in other cities like the US. Like New York and can also be connected to one another to form a micro-community between the residences. Comfort, environmental impact, functionality and adequate lighting were factors taken into consideration in the pod design as it tends more like a room versus the traditional shared space shelters.

Project: Community First Village
Location: Austin, Texas - US
Architect/Designer: Alain Graham
Year Built: 2015
Size: 87 Acres site

Real estate design institute has master-planned a twenty-seven acre facility by the name of Community First Village. It is home to over one housing options. There are 136 units, 136 tiny houses, and about 20 commercial tent houses. They have done a great job of using micro-living as means to solve the issue with homelessness. This plan is self-sufficient and offers occupants as well as housing for its community members and is well organized and integrates the outside public into the facility. It’s something that could be a strong model when looking into seeing how to arrange and define what a community needs to work efficiently and sustainably.

Project: Oquari Living Space
Location: Kobe - Japan
Architect/Designer: Splytys Co
Year Built: 2018
Size: 10,032 sq ft (per unit)

Shared housing has been the true in many countries and one place where it has really taken off is in Japan. Shared housing offers the aspect of both privacy and public large living spaces. The layouts are that of which one would find in a hotel. Each shared house typically has its own amenities that can be found in a hotel. The shared house also has a shared kitchen, living room, and an entertainment spaces, where it offers to each resident has their own kitchen, dining and living spaces, but also a shared kitchen/dining and living space with the other residents so that the sense of knowing your neighbor and community is more living above.
TINY HOUSES + ZONING

QUESTIONS...

- What are current issues regarding tiny house living?
- How does the tiny house fit into the urban and rural context (currently)?
- What defines a community?
- In what ways does a tiny house community differ from existing multi-family residences?
- How do we alter the mindset of what we understand as “The American Dream”?

TINY HOUSES... IN MY NEIGHBORHOOD?

Developers and city planners want to not only know how their property is divided and zoned but also want to make sure that they can yield the maximum amount of profit by having the most amount of square footage on the least amount of lot space. The more lots that they can fit within a neighborhood the more they can make a buck from, so a tiny house not only poses a “threat” to the urban environment, but it also poses the threat to inadvertently lower property value. “How exactly could you come to that conclusion?” one might ask. Let’s look at it from the developer’s perspective. If a tiny house is price at roughly $40k which is about a fifth of the price a traditional residential house which would be about $320k, and we could place either one of these residences on one lot to sell, we would definitely earn more for the property with a higher priced house on that lot. It would be highly unlikely for me to place the tiny house there unless there was property increases or other factor than just the tiny house on the lot.

There’s nothing that can be done to change zoning regulations throughout the many state of the U.S. but something can be designed in order to comply with the restrictions that do exist so that tiny house owners can have the freedom from moving place to place more easily. What role does zoning have regarding the tiny house movement? Tiny houses can help to diesel gentrification in urban city centers by not being so invasive and work to restore the close knit neighborhoods that currently existing in the lower ends of the city. Rather than creating the unwanted neighborhoods that exist this can be a means to enrich the community aspect and revive the identity of these areas.
SOLELY AIMS TO INCREASE THE MARKET

Investors from outside of the neighborhood come in and disrupt the existing community.

Due to quickly rising cost and development, existing community members are forced out.

Money is taken away from the community economy and put into larger corporations.

The neighborhood is built to the better interest of the investors and developers.

AIMS TO INCREASE THE QUALITY OF LIVING OF ALL

Community develops vacant lots and rehabilitates existing establishments to increase the overall value of the neighborhood.

Reductions in costs are made through policies and planning.

New community members reinvest into the existing neighborhood.

Community is inclusive and built to suit the interest of previous and new members.
SELECTION OF SITE

QUESTIONS...

- What defines a community?
- How does the tiny house fit into the urban and rural context currently?
- How do we diversify the urban and rural environment vernacular by integrating tiny houses?
- How do we change the stigma of the tiny house from negative to positive?

DIVERSIFYING THE URBAN VERNACULAR...

Urban - 397 Irwin St NE, Atlanta GA, 30312

The site is located near the heart of Atlanta. Georgia. It is positioned in between the Sweet Auburn and Inman Park districts of the city.
The site is currently an abandoned lot west adjacent to the Banneker Baptist Church in the Historic MLK neighborhood and is zoned as General Residential.

The neighborhood is surrounded with activities and amenities within a walkable one-block radius and is also connected to the Freedom Park Trail that leads into the Atlanta Beltline Trail. The Atlanta Beltline is a pedestrian hub filled with commercial, mixed-use, and office spaces making this site location a great point near work and play hot-spots.
SITe HISTORY
+ DEMOGRAPHICS

TOTAL POPULATION 21,731

MEN 48.72%
WOMEN 51.28%

MARRIED 65%
SINGLE 35%

W很多事情

NEIGHBORHOOD HISTORY

SITE HISTORY
+ DEMOGRAPHICS

TOTAL POPULATION 21,731

MEN 48.72%
WOMEN 51.28%

MARRIED 65%
SINGLE 35%

W的事情

TRANSPORTATION

AVERAGE INCOME $48k annually

What Makes A Place?

A Great All-Encompassing Era of 1970 took over more than 30 blocks of the neighborhood. In 1987, D.C. Mayor Marion Barry ordered the entire neighborhood, causing the future of the neighborhood to be permanently stunted and it's income and tax base which was one of the highest in the city started to decline.

In 2002, Mayor Anthony Williams declared the neighborhood a "community of concern," which in the city's eyes meant it was no longer cared for and that the city would not actively engage with it.

The condition of the neighborhood continued to decline as the city's attention to the neighborhood was minimal, allowing the neighborhood to fall further into disrepair.

Due to the division of the neighborhood and the lack of resources, the neighborhood has struggled to improve. The community has worked hard to improve the neighborhood by establishing community centers, improving public spaces, and engaging with the residents to build a sense of community.
In the surrounding area there are many points of interest to help activate and engage the residents of this neighborhood within the Sweet Auburn District.

There is room to add to the community development and creating a new residential hub with a tiny house community could bring the opportunity for spaces for communal activities and events.

QUESTIONS...

- How is a tiny house affordable?
- How are they made to be functional for different types of people?
- How can renewable resources such as solar, water and wind be used to make living environments more efficient and sustainable?
- What are the differences between a typical house, tiny house, and recreational vehicle?

MINIMALISTIC LIFESTYLE...
CLIMATE

MONTHLY AVERAGE

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ANNUAL AVERAGE

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[Images of climate maps and graphs]
WHAT CAN TINY HOUSES DO FOR SWEET AUBURN?

- Tiny houses can offer another style for affordable "ADU" type of dwelling space for residents of this neighborhood.
- Tiny houses will add variation to the existing housing typeology within the community.
- Increase the economic diversity within the community.
- Create a closer knit community not only through proximity of dwelling units but also through outdoor living spaces as well.

Take away the negative stigma towards tiny house communities such as RV parks or mobile house parks, by having a planned block with slab foundation units.
Understanding of Program • Space

- We design for certain implied vision/visual recognition of division and hierarchy within a given amount of area and volume
- Spatial interpretation is based on how the individual prioritizes their use of program and time spent within that space, performing movements based on how they interpret the program

Scale
- How our body relates to the space and objects that surround us
- Scale and proportion both work together in unity to create higher functionality and more usable space
- What we design for specific emphasis has a great influence on how one visualizes and experiences the space
- What falls into the individuals line or cone of vision and how it affects the atmosphere in that particular area and volume

Light + Color + Texture
- Light is essentially time’s play or manipulation of space; its temporal and goes through phases that in turn transform our view of the space that it passes through
- How light bends and alters the view of the individual
- Light, when focused, can give certain objects in space the sense of priority and hierarchy in relation to another object of similar qualities within the space
- Symbolism of color and how it changes the atmosphere of space, what the implied meaning of that color is how it influences the mood, perception, and behavior of the individual within that space
- Material types will vary in how they absorb, reflect, and reflect light and it will affect the perception and understanding of a volume of space (whether it perceived as larger or smaller). Both elements of light and materiality are key to the design of space

Movement
- Different viewpoints gives a better or more diverse understanding of a space
- Once the space is understood from all angles the individual can strategically pass through it in order to achieve a specific outcome or use (program) out that space
SPACE

movement

SCALE

LIGHT
PROGRAM + TARGET CLIENTELE

HUMAN COMFORT

DESIGNING FOR

3 Main Demographics of the Sweet Auburn District

Single - 1 adult
Focus on Entertainment + Lounge
- Extended Living Space
- Separation of Private and Public Spaces

Senior - 1 to 2 adults
Focus on Accessibility + Rest
- Lower Counter and Shelving Height
- Ramped Entry
- Wider Bathroom and Circulation

Family - 2 adults + 1 child
Focus on Openness + Storage
- Central Circulation
- Upper and Lower Beds
- Longitudinal Storage for Open Floor Space

or

fLEXiBILiTY

SPACE SAVING

accessibility

EASE OF USE

FUNCTIONALITY
WHAT DO THEY NEED FOR COMFORT?

FOOD CONSUMPTION

- calories per day: women: 1,440 cal, men: 1,920 cal
- calories per week: women: 10,080 cal, men: 13,440 cal
- calories per month: women: 30,240 cal, men: 40,320 cal
- calories per year: women: 362,880 cal, men: 483,840 cal

WATER CONSUMPTION

- gallons per day: 12/5 per person
- gallons per week: 94/5 per person
- gallons annually: 49/4 per person

SLEEP AMOUNT & SPACE

- hours needed daily: 11 – 14 hours
- 14 – 17 hours: Toddler (2 – 5 yrs)
- 15 – 17 hours: Child (6 – 10 yrs)
- 16 – 18 hours: Teen (14 – 17 yrs)
- 19 – 21 hours: Adult (18 yrs+)

LIGHTING REQUIRED

- Suggested exposure to natural light to maintain a health amount of vitamin D is 30 minutes a day.
- Other than obtaining natural light daily the average human’s lighting preference will vary based on personal things.

The amount of power used, however, does have track-able standard measurements.

- Average US residential electricity usage:
  - per day: 32.65 kilowatts
  - per week: 228.58 kilowatts
  - per month: 946.33 kilowatts
  - annually: 11,072.09 kilowatts

WASTE PRODUCTION

- 1 person per day:
  - 4 lbs of non-recyclable garbage

- 1 person per lifetime:
  - creates 84 tons of non-recyclable garbage

TOTAL SYSTEMS REQUIREMENTS NEEDED FOR SINGLE OCCUPANCY

- 94.4 gallons of water weekly
- 238.64 kilowatts of power weekly

TOTAL SYSTEMS REQUIREMENTS NEEDED FOR FAMILY 4 OCCUPANCY

- 198.80 gallons of water weekly
- 486.56 kilowatts of power weekly

TOTAL SYSTEMS REQUIREMENTS NEEDED FOR FAMILY 6 OCCUPANCY

- 298.20 gallons of water weekly
- 734.84 kilowatts of power weekly

3,000 calories = 1 pound
- women: 108,400 cal / 3,000 cal = 36 lbs
- men: 147,300 cal / 3,000 cal = 49 lbs

Average Weight in U.S.:
- women: 150-230 lbs
- men: 180-230 lbs

All of this means we each eat around one and half of our entire body weight each year!
SPATIAL ORGANIZATION

TYPICAL VS TINY
ROOM ORGANIZATION

Looking at the three clientele based on the demographics of the area, major key points were determined as focuses for each demographic. Standard room sizes were measured from existing residential studies and arranged into the following configurations that are the basis for the final unit layouts.

- **Single - 1 adult**
  - Focus on Entertainment + Lounge
  - Extended Living Space
  - Separation of Private and Public Spaces

- **Family - 2 adults + 1 child**
  - Focus on Openness + Storage
  - Central Circulation
  - Upper and Lower Beds
  - Longitudinal Storage for Open Floor Space

- **Senior - 1 to 2 adults**
  - Focus on Accessibility + Reach
  - Lower Counter and Showering Horizontal
  - Ramped Entry
  - Wide Bathroom and Circulation

MANEUVERING IN SPACE

Studying particular spaces in residential rooms in the previously specified programs. The following highlight the amount of space needed to maneuver through various actions in one space.

- **SITTING**
  - Workspace
  - Dining

- **STANDING**
  - Cooking
  - Washing

- **LYING DOWN**
  - Sleeping
  - Lounging

- **BATHING**
  - Showering
  - Water Closet Use

- **CLIMBING**
  - Ladder
  - Stair
Volume program blocks arranged to desired layout and stacked to appropriate orientation

Volume program blocks aligned to desired layout and arranged to appropriate orientation

Volume program blocks interlocked according to entry hierarchy, height, and appropriate orientation
**QUESTIONS...**
- How do we consciously design a more sustainable house turned home, that will fully meet our daily needs and offer adaptability over a lifetime?
- What distinguishes the programmatic thresholds in typical residential architecture?
- How will each unit be assembled?

**DIFFERENT PEOPLE DIFFERENT PROGRAMS...**

**UNIT ORGANIZATION**

The units are organized in a tessellated manner that is derived from the layout of small city squares.

The close knit feeling that is brought from seeing familiar faces is something that I felt was important.

Each person within this community can also find places to of solitude as well in small niche garden spaces that are more enclosed unlike the more open “squares” within the neighborhood.

**COMMUNITY HALL**

The community hall offers 2000 sq ft of open space for the tiny house community members.

Open hall that is flexible to suit the need of the gathering and also a community garden in the rear of the building that is open to the entire neighborhood.

The Gardens located near the Martin Luther King Museum and neighborhood park can be a place of education and help to improve the over all health and promotes communal engagement.
Single adult UNIT

24' x 10.5'

Shelving units rotate on pivot and collapse against one another also at a height that could serve as additional seating when entertaining guests.

Main level beds can fold up to the wall in a Murphy bed standard for more usable floor space during the day.

One large loft area for guests, additional storage, or workspace.

Space-saving bathroom layout that allows for a toilet/shower combination.

Usable
200
SQ-FT
elderly UNIT
24’ x 10.5’

USABLE
220
SQ-FT

- Main level beds can fold up to the wall to save floor space for more usable floor space during the day.
- One small loft area for guest or possible full time healthcare assistant
- Bedroom and living rooms have been designed with room for a full 6’ diameter for occupants that may use a wheel chair

Bedroom 1
Storage
35 SF

Bathroom
37 SF

Kitchen + Living
Area
106 SF

1 - 2 adults

Asphalt shingles roof
Solar cell glazing
- 1/2" 3D printed cladding exterior cladding
- Ventilated air space
- Air and vapor protective membrane
- 1/2" gypsum sheathing panel
- Standard foam insulation
- 1" crossGRADE insulation
- 1/2" interior drywall panel

Retractable door
Aluminum porch railing
Laminated wood flooring
Self healing concrete slab foundation

Detailed section - main patio entry
Scale: 1” = 1/2”
family UNIT
24’ x 10.5’

USABLE
240
SQ-FT

Working units rotate on pivot and collapse against one another
Main level beds can fold up to the wall in a Murphy bed standard for more usable floor space during the day
Two upper loft areas for children and set as an upper storage space between the beds
Larger living, kitchen, and storage areas in comparison to that the single adult unit to adapt to more occupants
# SYSTEMS + COSTS

<table>
<thead>
<tr>
<th>Component</th>
<th>Cost</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>WATER</strong></td>
<td></td>
</tr>
<tr>
<td>WATER COLLECTION TANK (per capita)</td>
<td>$5</td>
</tr>
<tr>
<td>GUTTER SYSTEM + INSTALLATION</td>
<td>$21</td>
</tr>
<tr>
<td>TANK HOUSE WATER HEATER (1200 L)</td>
<td>$55</td>
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<tr>
<td>PLUMBING INSTALLATION (per m)</td>
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<tr>
<td>PIPES FOR PLUMBING (400 m)</td>
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<td><strong>SOLAR KIT WITH PANELS</strong></td>
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<tr>
<td>ELECTRICIAN WIRING</td>
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<tr>
<td>LED LIGHT FIXTURES</td>
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<tr>
<td>ENERGY EFFICIENT LIGHT SWITCHES</td>
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<tr>
<td><strong>CARROTS</strong></td>
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<tr>
<td>SINKS</td>
<td>$150</td>
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<tr>
<td>APARTMENT SIZED FRIDGE</td>
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<tr>
<td>COOK TOP STOVE</td>
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<tr>
<td>WATER EFFICIENT TOILET</td>
<td>$250</td>
</tr>
<tr>
<td>LIVING SHOWER</td>
<td>$350</td>
</tr>
</tbody>
</table>
FRAME WORK + FOUNDATION

MATERIALITY + STRUCTURES

SELF-HEALING CONCRETE FOUNDATION

This type of concrete is low in small particles of clay that break down, heal, and prevent the spread of cracks in reinforcement, so it is used in the structural designs of concrete.

3D PRINTED CARBON FIBER STRUCTURAL FRAME

With the new and innovative technology, this structural frame is made from reinforced concrete and carbon fiber, a combination that can withstand the strength of forces and the changing weather, making it highly resistant to extreme weather conditions.
MATERIALITY + STRUCTURES

PHOTO-VOLTAIC LINED GLAZING
This glazing was selected to allow the building to draw on the solar power generated by the panels mounted on the roof to augment the building's energy needs. The glazing has an insulated glass core and faces made from solar panel-glass to encourage the harvesting of solar energy and extend the self-sufficient capacity of the building.

HYDRO-CERAMIC INSULATION
This ceramic insulation is one of the most popular items for the energy saving of buildings. It is made using a foam metal mixture and is able to absorb and conduct heat in its normal function and could help to minimize the amount of total heat loss from the building. The insulation is made using a solar-powered roasting system.

MATERIALITY + STRUCTURES

BAMBOO-FIBER FABRIC
Woven from the bamboo's natural fibers, this fabric cloth is a great material for textile products. Also, bamboo's ability to grow quickly makes it suitable for large-scale production. It is a natural product that can be sustainable. In furniture, the use of bamboo will incorporate natural aesthetics and contribute to creating a warm and natural feel to the interior, giving a sense of eco-friendliness to the furniture.

LAMINATED TIMBER
This material is made by cross pressing layers of plywood together. This process increases the rigidity and structural strength of the laminate, ensuring that the laminate would not bend or deflect under pressure. Unlike other laminated furniture, the pressure that is used to consolidate the layers is at a lower temperature, which allows the wood to stay in its original state, retaining its natural characteristics and enhancing the visual appeal.

FURNITURE + TEXTILES

A"
In future planning for urban areas this could be a start to see in what ways to add a tiny house community to an existing neighborhood.

Points to explore further:
- Does this serve as a plan of action that can work in more than one site area and if that is not, is it required to meet a different neighborhood’s demographics?
- What tiny house microvillages are successful and are they functional in a dense residential area?
- Taking a deeper look into construction drawings for the planned units and how they would change to meet building codes?
- How does the entry and porch area to each unit based on the location it is placed in?

Conclusion of this thesis study:

This has been an interesting thesis task into tiny living and the history and planning of programs in such a small space. The idea of microvillages brings up many questions about how space is utilized especially when considering density and surrounding context. Hopefully this gives way to look at vacant lots and abandoned urban areas in a different manner rather than making larger scaled developments in those spaces.

Acknowledgments - Thanks:

I would like to thank my advisor Dr. William Carpenter for his insight with this thesis study.
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To my brothers of the Alpha Rho Chi - Polyidus Chapter and to my fellow members of the National Organization of Minority Architect Students, you are amazing and support me in ways I cannot express.

COMMUNITY HALL
PHOTO + WORKSPACE
FIGURE 8 - PLACE

FIGURE 9 - CLIMATE

FIGURE 10 - IMPACT

FIGURE 11 - SPACE

FIGURE 12 - PROGRAM

FIGURE 13 - WATER

FIGURE 14 - POWER

FIGURE 15 - APPLIANCES