

Tiny Houses

Justin McNair | Nicole Simeonsson
Arc 503

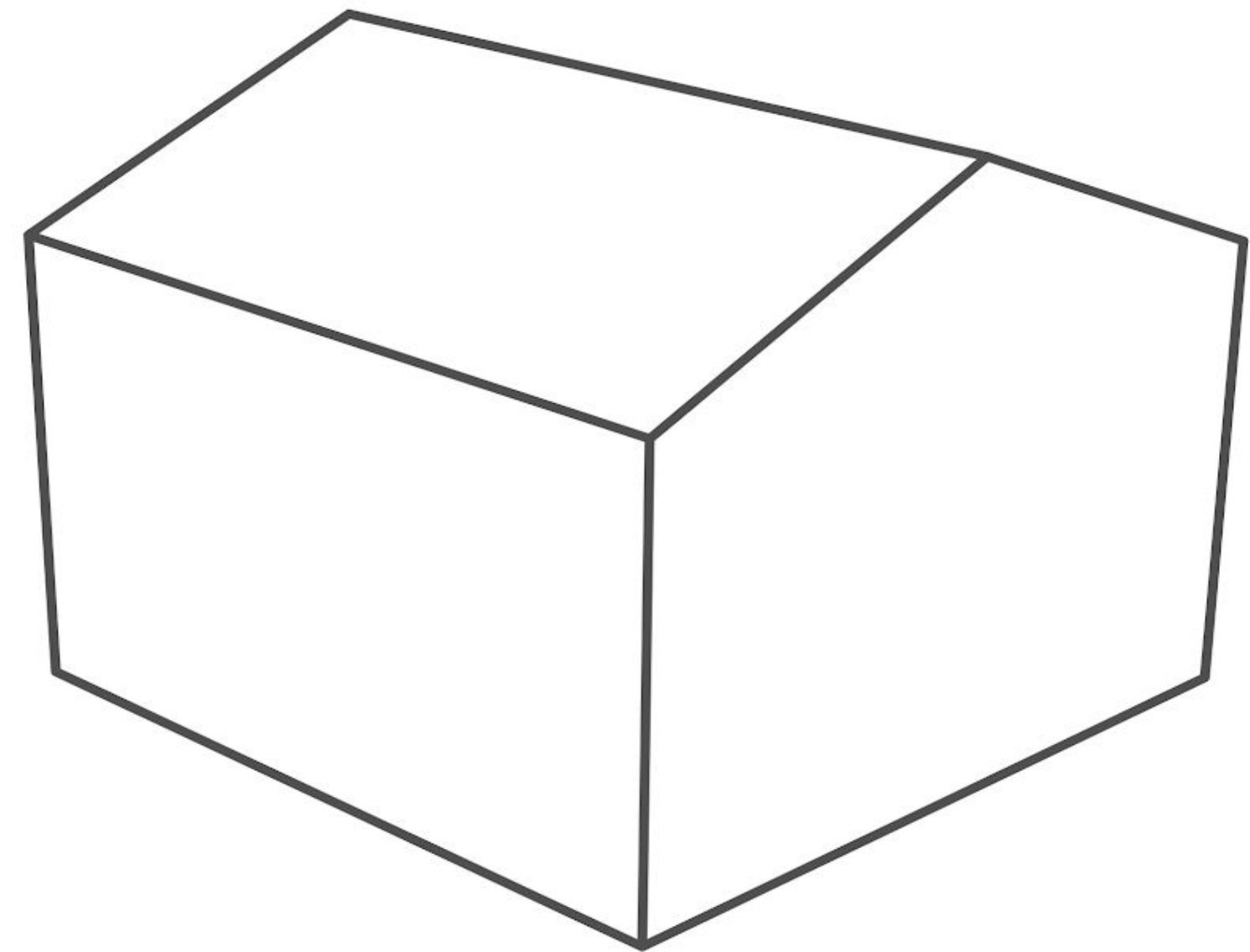
Definition

1. A full service, residential unit on a small scale, 100 - 400 square feet
2. A self sufficient, high quality, and functional full-time dwelling
3. Can be mobile/off grid or site built

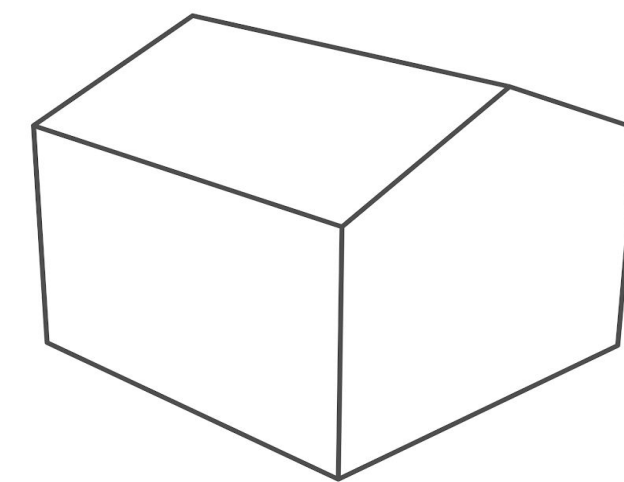
Working Definition:

A tiny house is a small footprint dwelling, mobile or site built that functions as a full time residence.

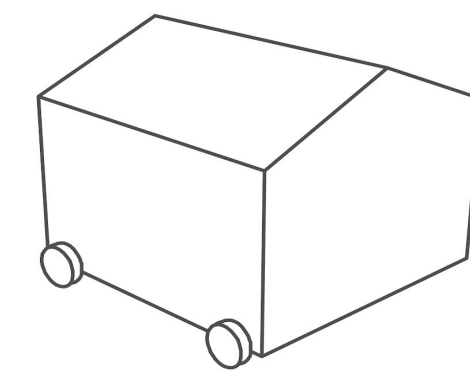
Typology



House

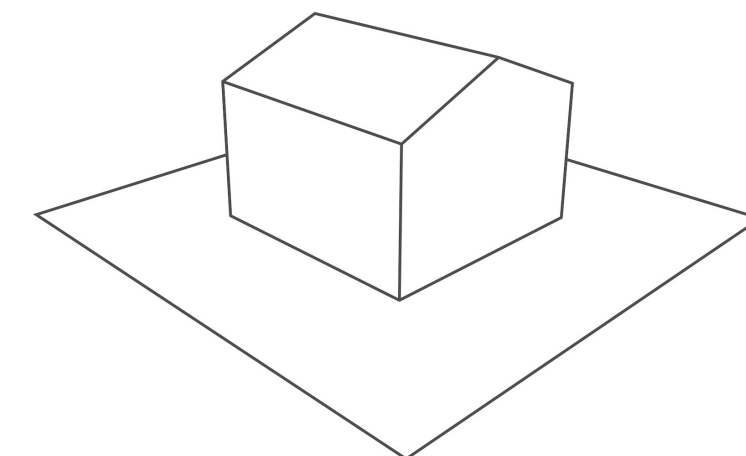


Tiny House



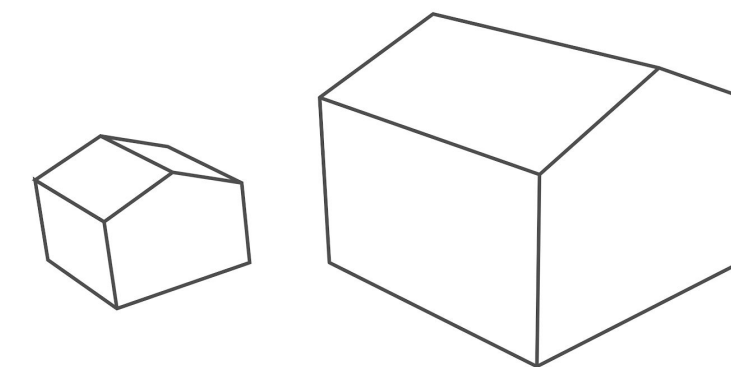
Mobile Unit (THOW)

Residential off-grid units on wheels



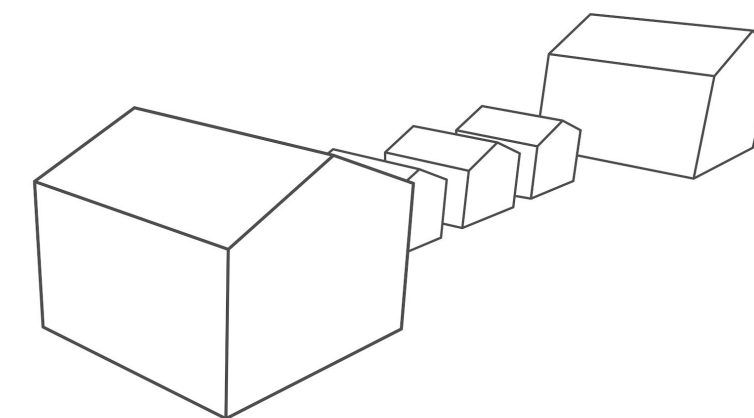
Site Built House

Residential units with permanent foundations



Accessory Dwelling Unit

Residential units as secondary properties on an existing lot



Urban Infill House

Residential units situated in existing neighborhoods

The Catalyst

House:

1. The average American house is 2600 square feet
2. The average American new house costs \$320,000
3. The average house in Wake County costs \$341,000

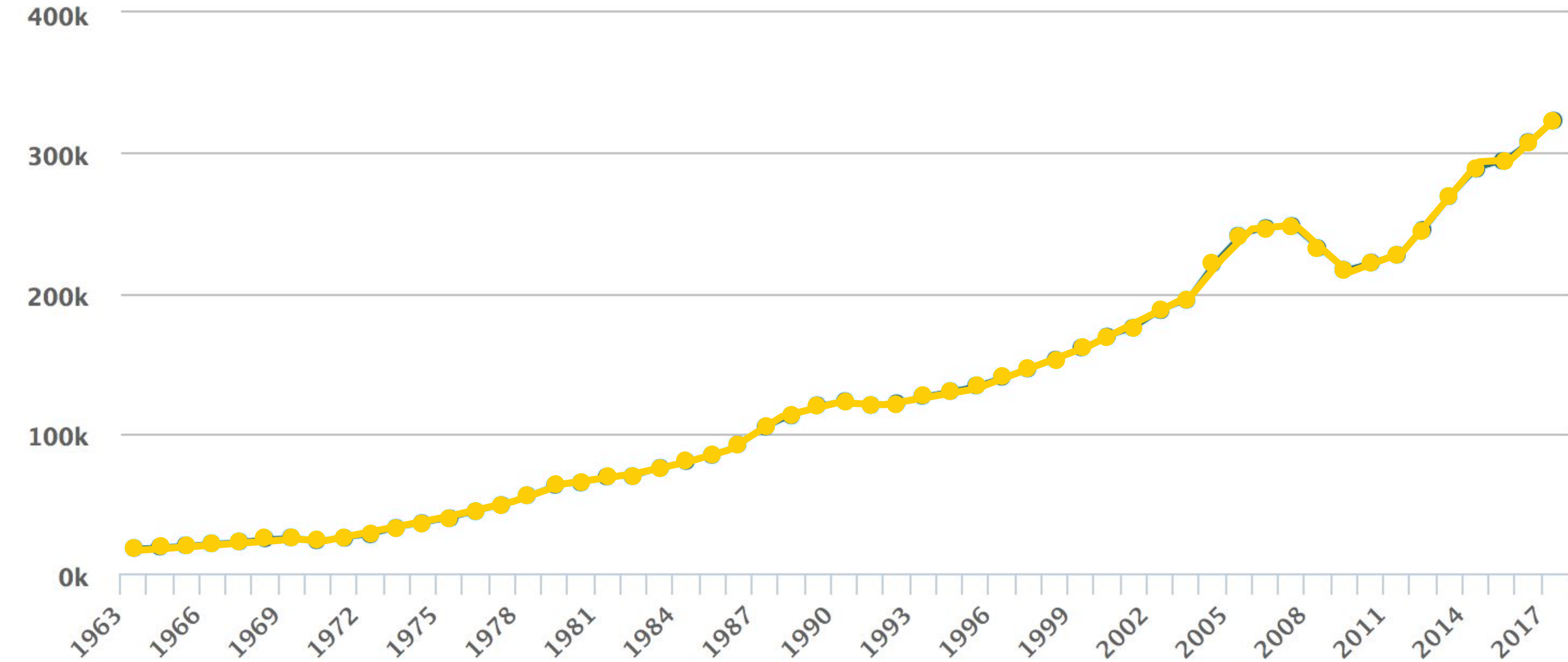
Tiny House:

1. The average American tiny house is 182 square feet (heated space)
2. The average American tiny house costs \$27,000 (DIY)

Tiny House

*Triangle Area Residential Report
*US Department of Housing and Urban Development

Median New Home Prices (total)



Influences

*Department of Housing and Urban Development

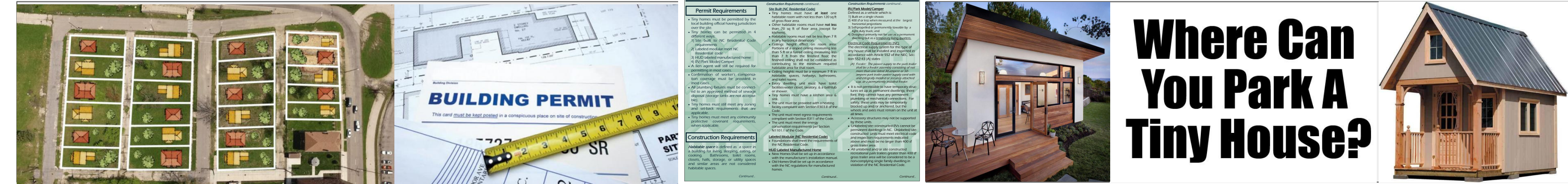
1. Social

The Tiny House movement is characterized by **living simpler, financial gain and personal freedom.**



2. Political

The Tiny House movement has been facing issues to gain tangible results due to **zoning and code laws.**



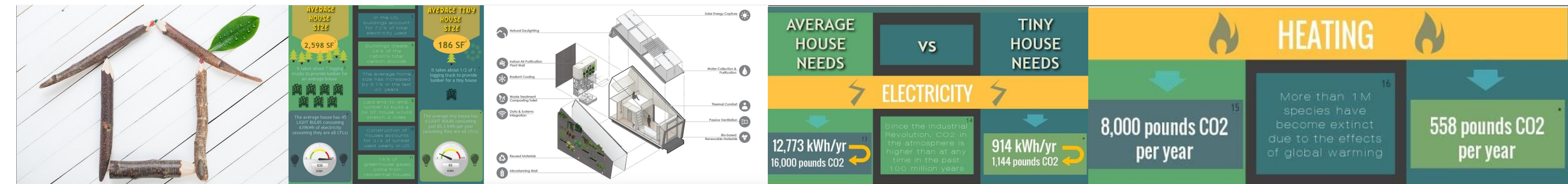
3. Economic

The Tiny House movement is trying to revolutionize **housing affordability.** Affordable housing is that which costs less than a third of the household income. The average American family spending to live at a high standard is \$130,000 annually. Equivalent to 8 low income households.



4. Environmental

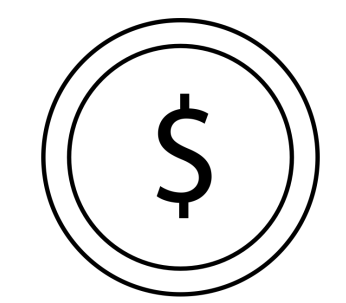
The Tiny House movement has sparked a debate of quality over quantity. This includes less consumption of energy resources.



Principles

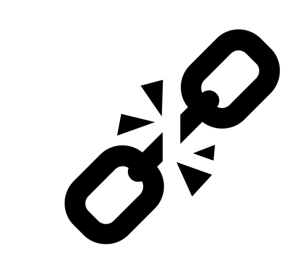
1. Affordability

On average, tiny houses cut cost of living by 60%.



2. Personal Freedom

Less stress leads to better habits and more time to pursue goals.



3. Sustainability

Less space leads to less consumption, makes you aware of possessions.



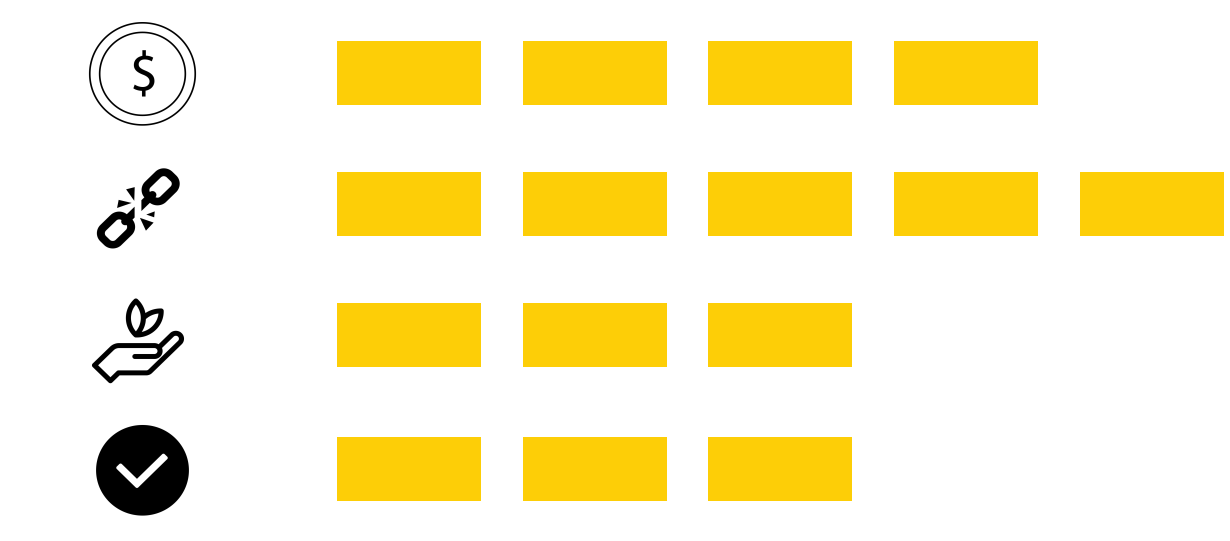
4. Space Efficiency

Small footprint allows for more creativity with spatial design.

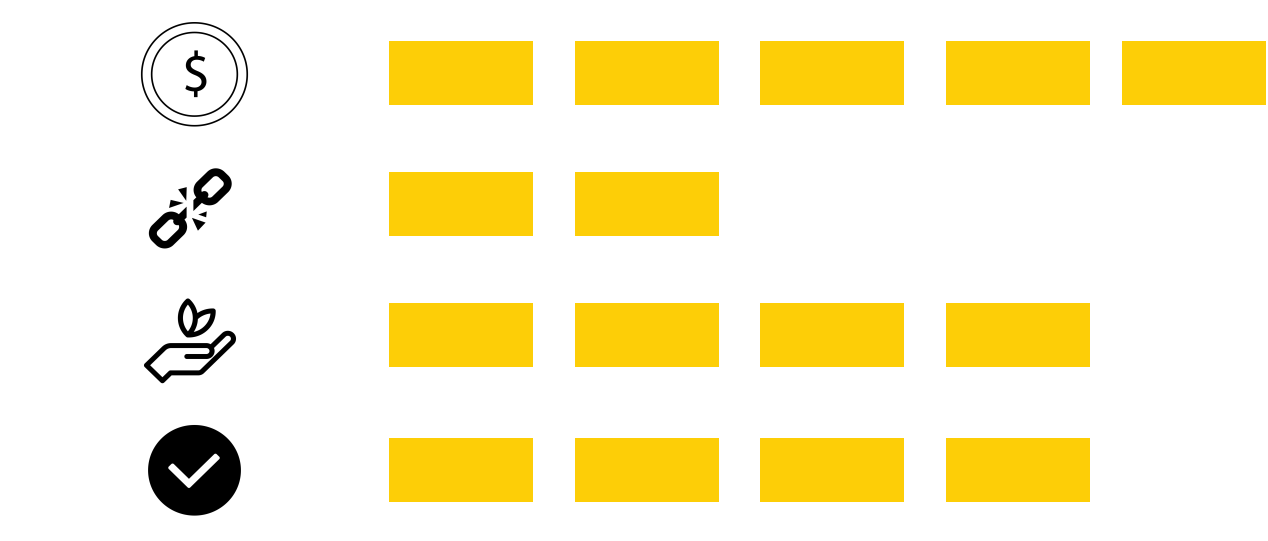


Pros/Cons

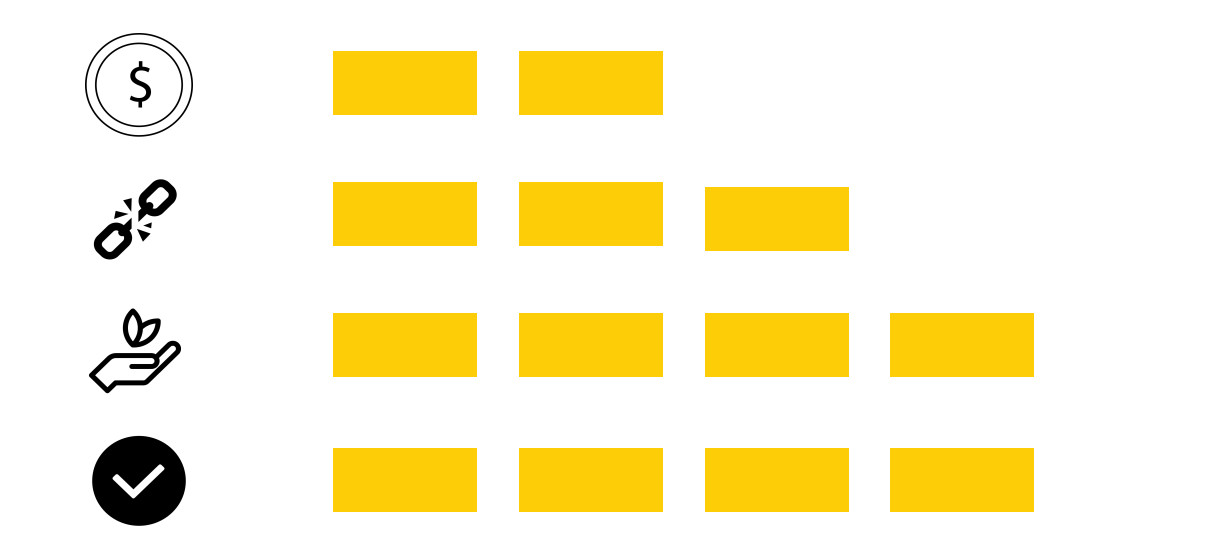
Mobile Unit (THOW)



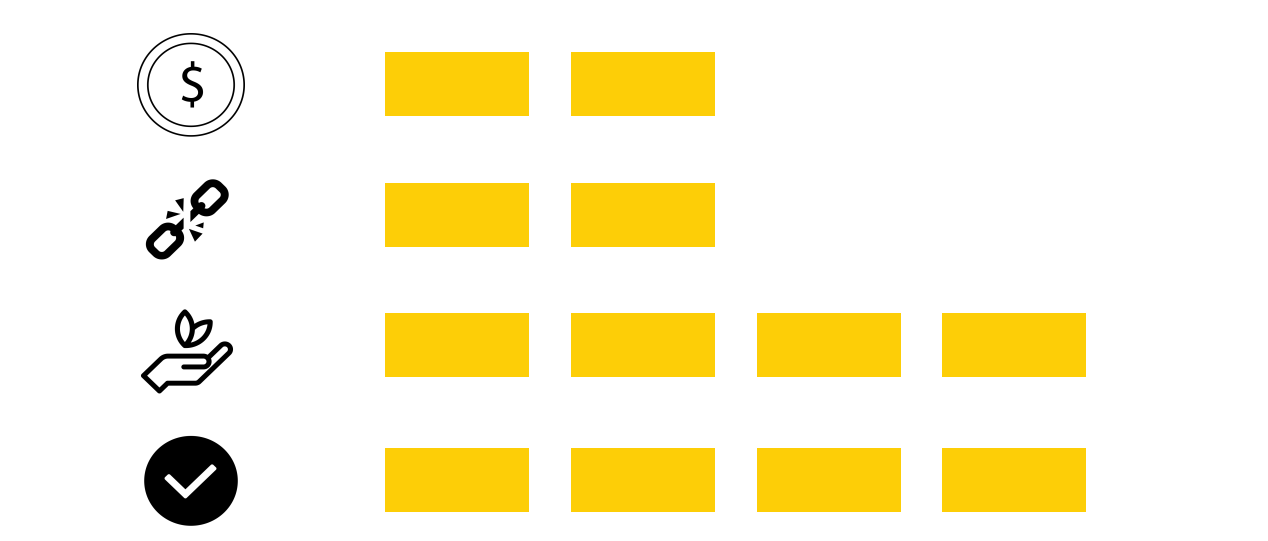
Accessory Dwelling Unit



Site Built House



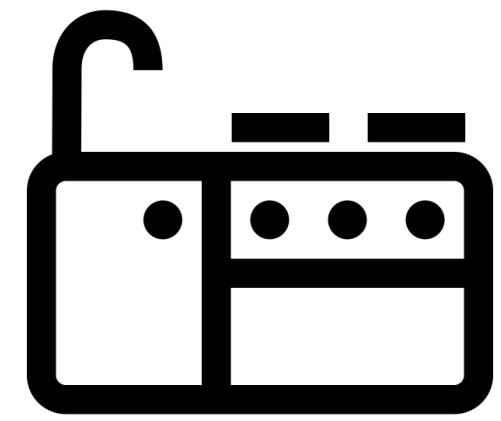
Urban Infill House



Program

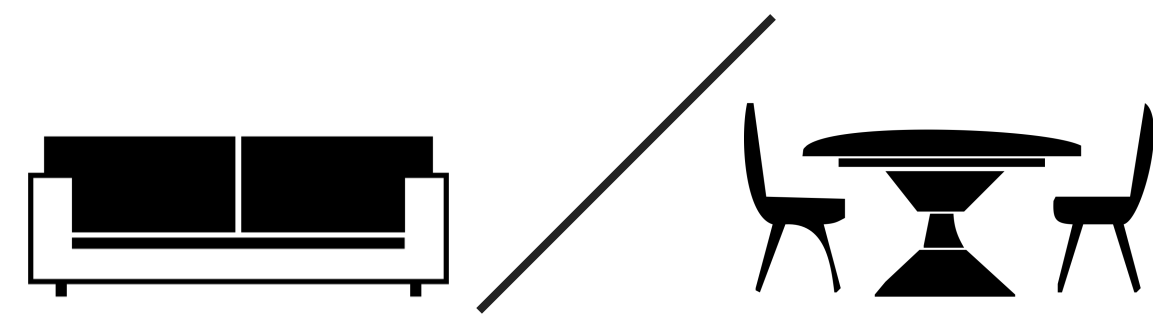
1. Galley Kitchen

Circulation doubles as living space.



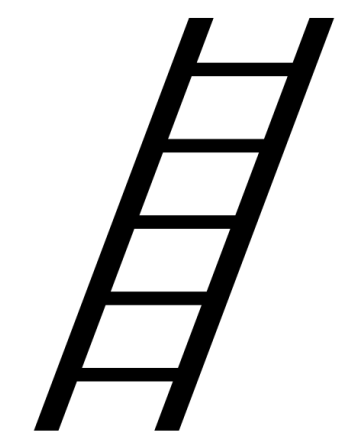
2. Living/Dining Combo

Lounge space doubles as dining space.



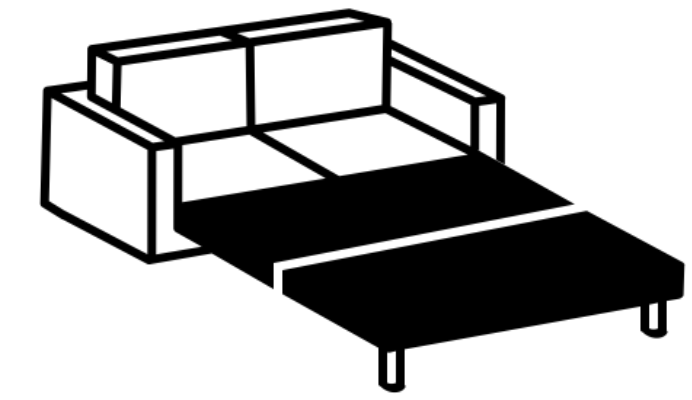
3. Loft

Sleeping space efficiently placed above living space.



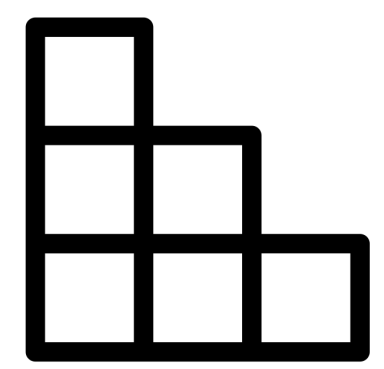
4. Retractable Spaces

Spaces can serve multiple functions. Platform walls fold out as decks, Tables fold out from walls, etc.



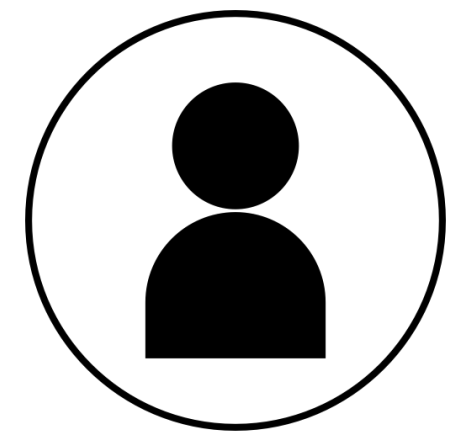
5. Built-in Storage

Storage built into interior components in non-traditional ways.



6. Single Occupancy Bathroom

Small footprint bathrooms, some without sinks.

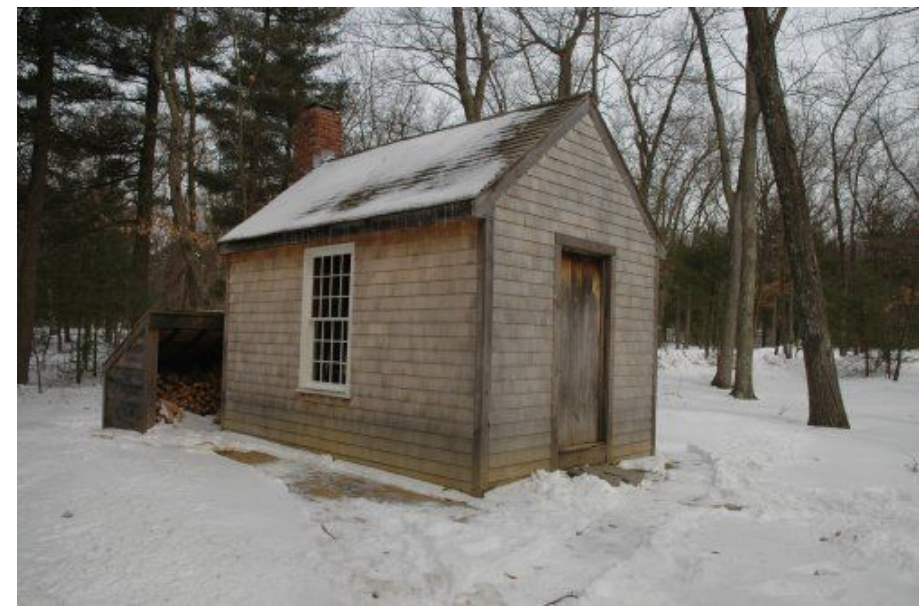


History

Evolution of the Tiny House in America



Cape Cod Cottages
1700-1750



Thoreau's Cabin
1845



Sunday Houses
1880-1920

1607

1620-1630
English Settlers' Cabins



1800
Frontier Cabins



1840-1860
Campground Cottages



1979
Autonomous House



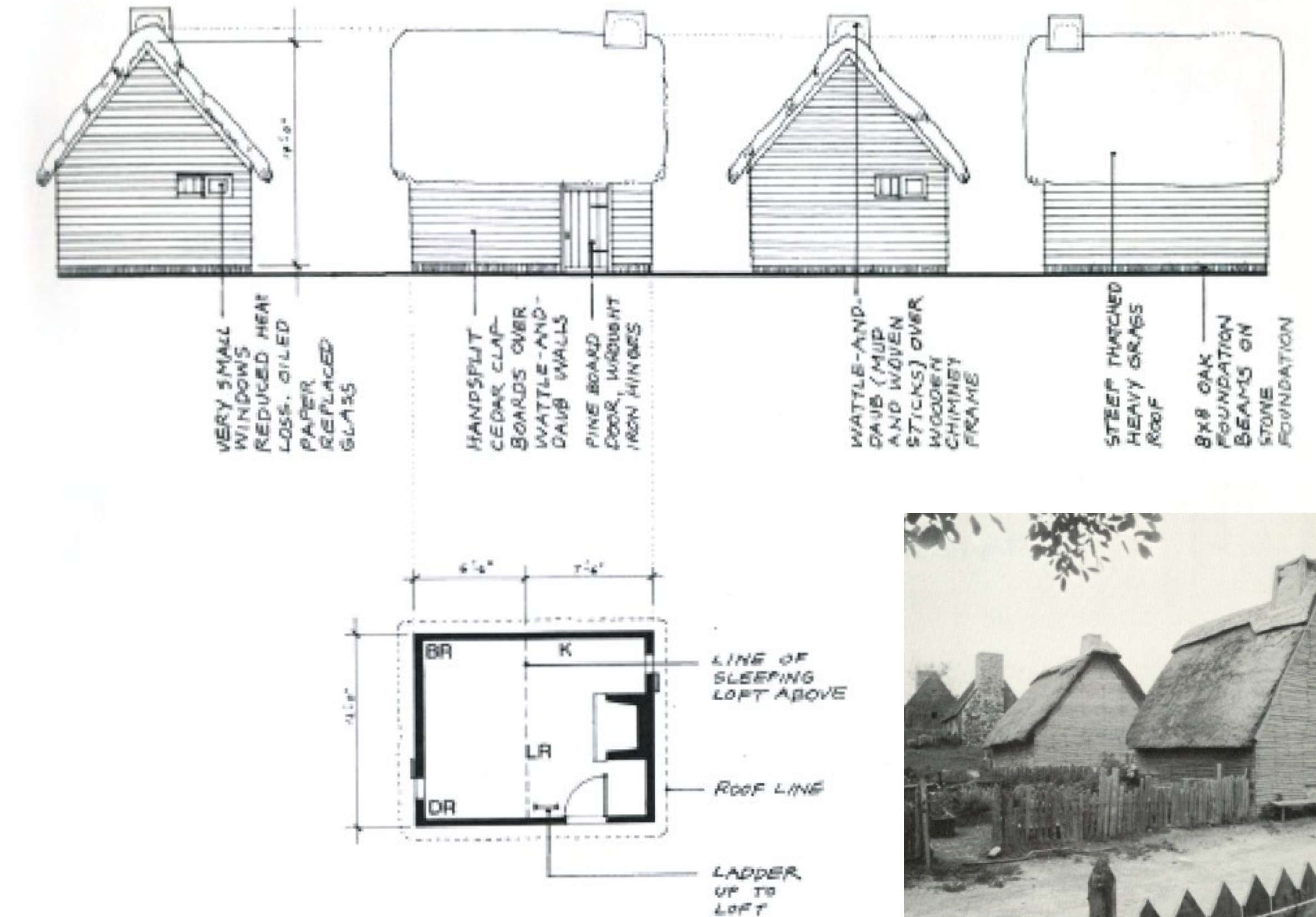
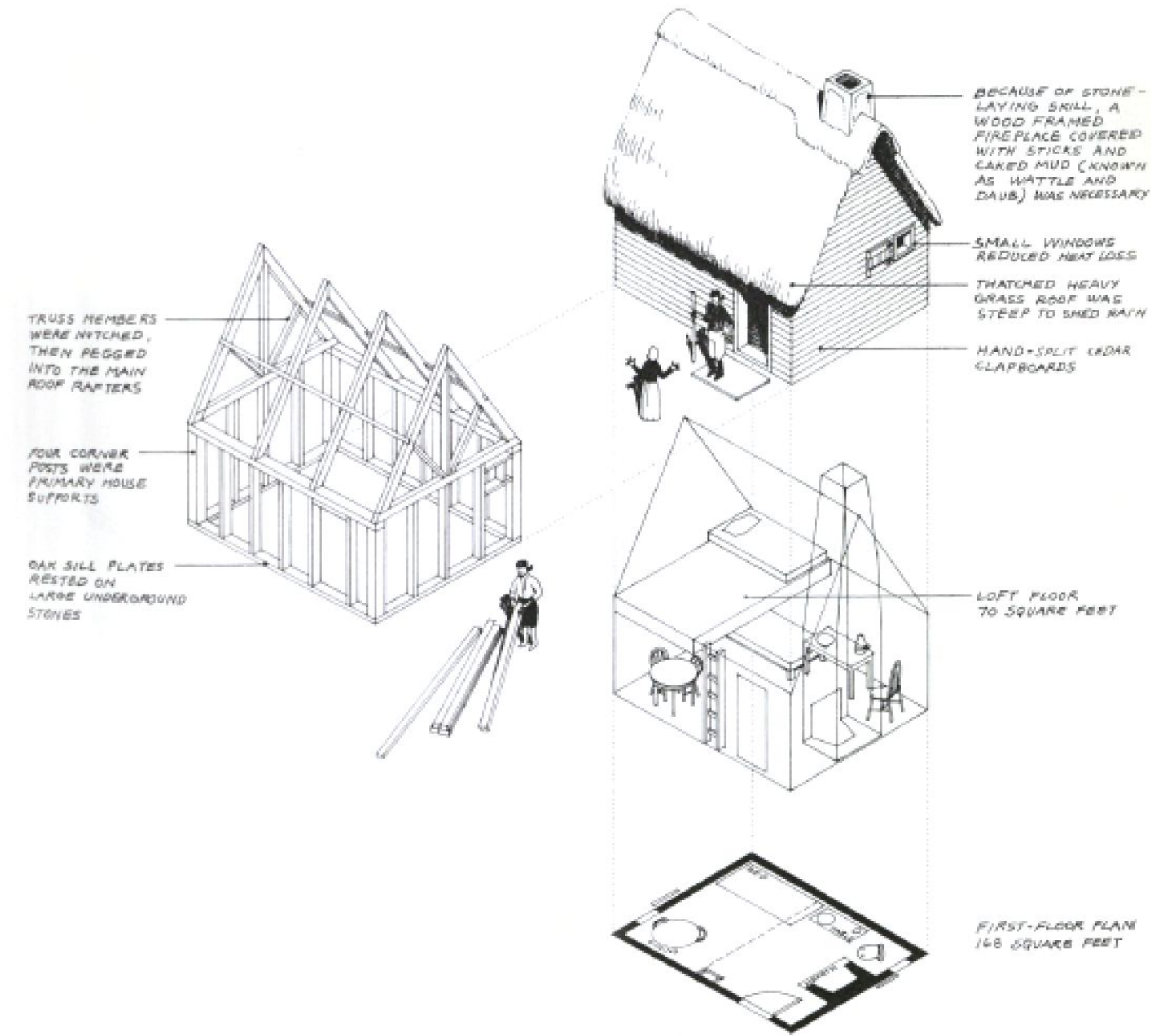
2018

English Settlers' Cabin

Area. 168 square feet

Components. Main room with large stone hearth and fireplace for cooking and heating, sleeping loft above.

Construction. Post and beam, wooden stud walls coated with mud for insulation, steep pitched & thatched roof



Tiny Tiny Houses: or How To Get Away From It All by Lester Walker

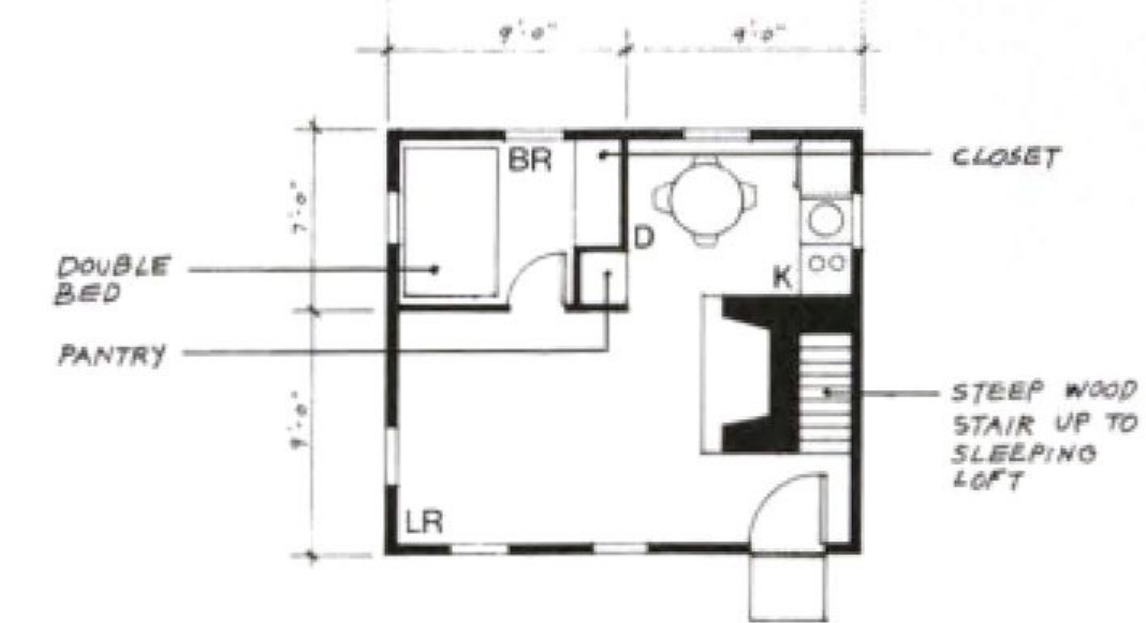
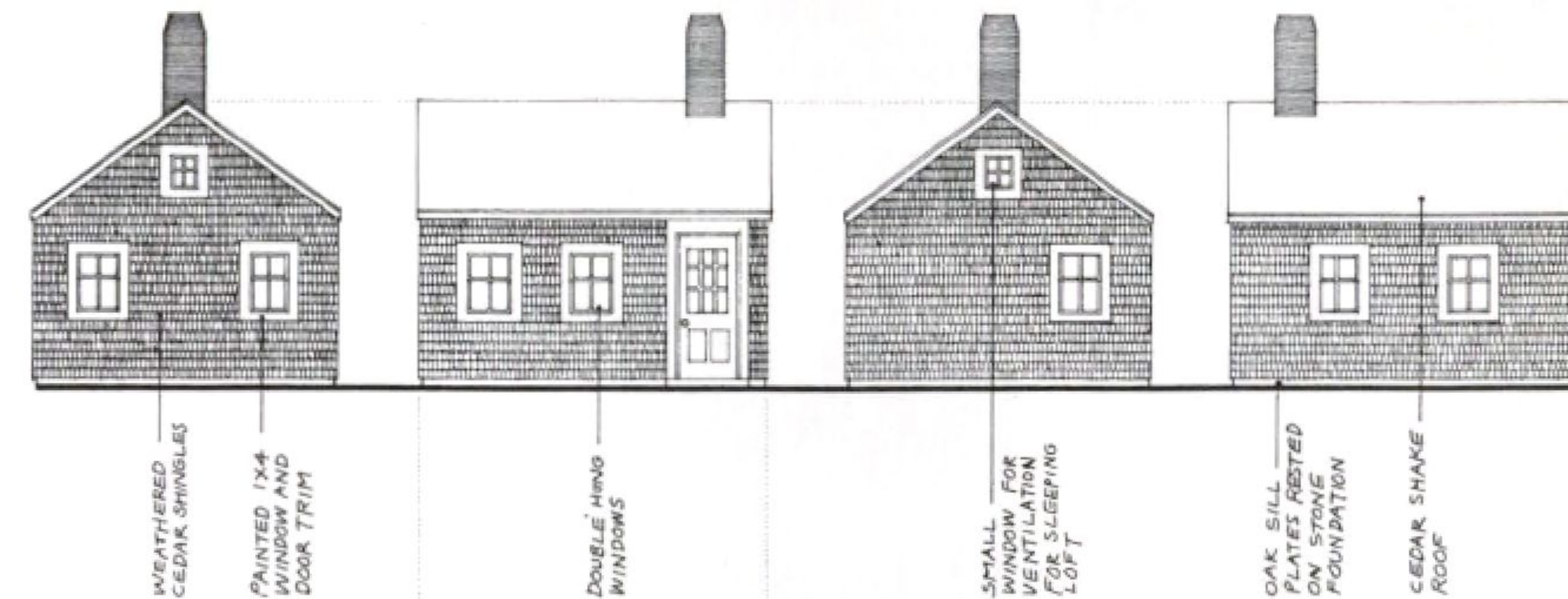
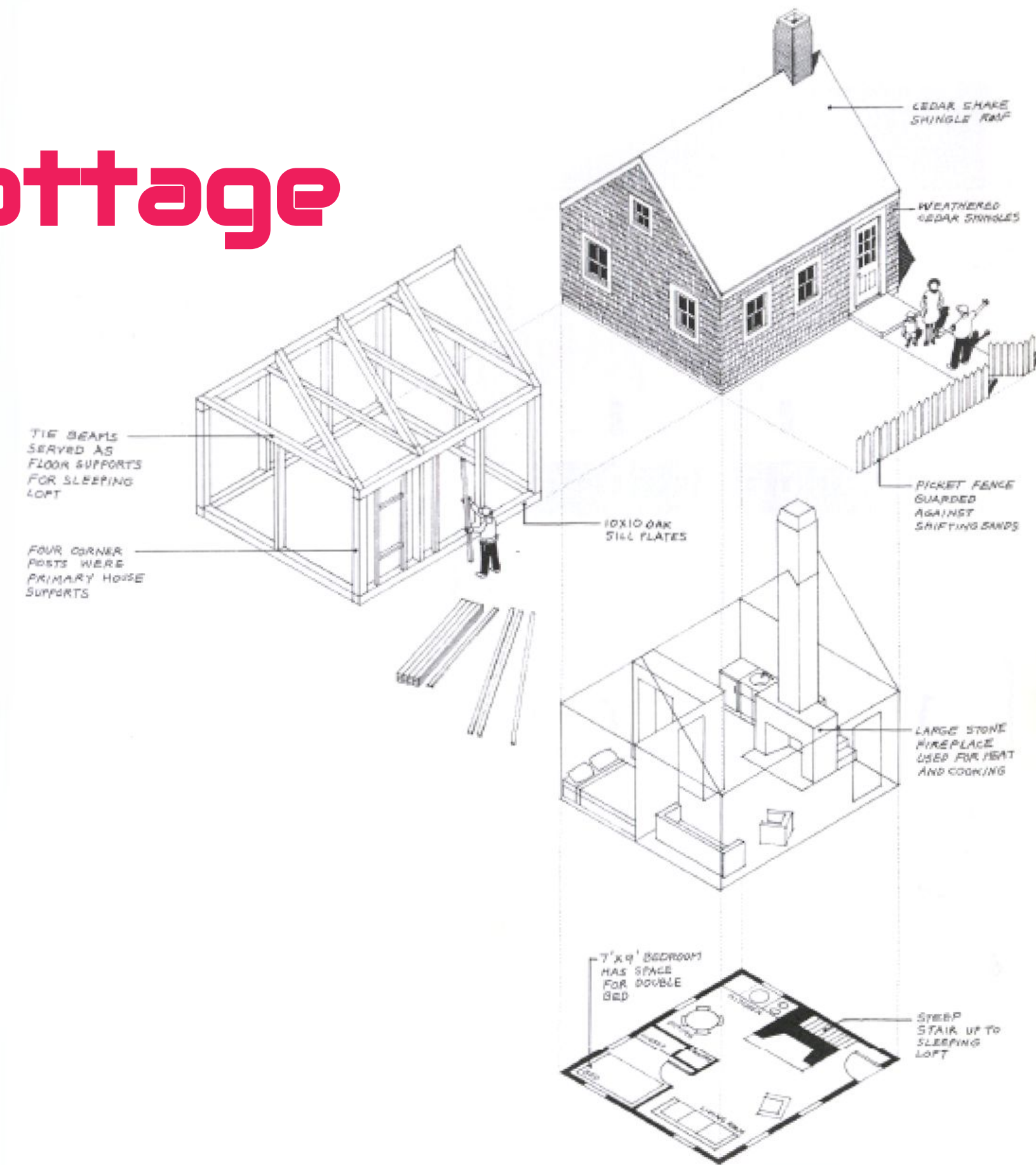
1620-1630

Cape Cod Honeymoon Cottage

Area. 288 square feet.

Components. The cape cod honeymoon cottage has a living room with large fireplace, kitchen/dining & pantry, and separate bedroom. Up the stairs is a sleeping loft.

Construction. Post and beam, wood framed, wood shingles on wall and roof.



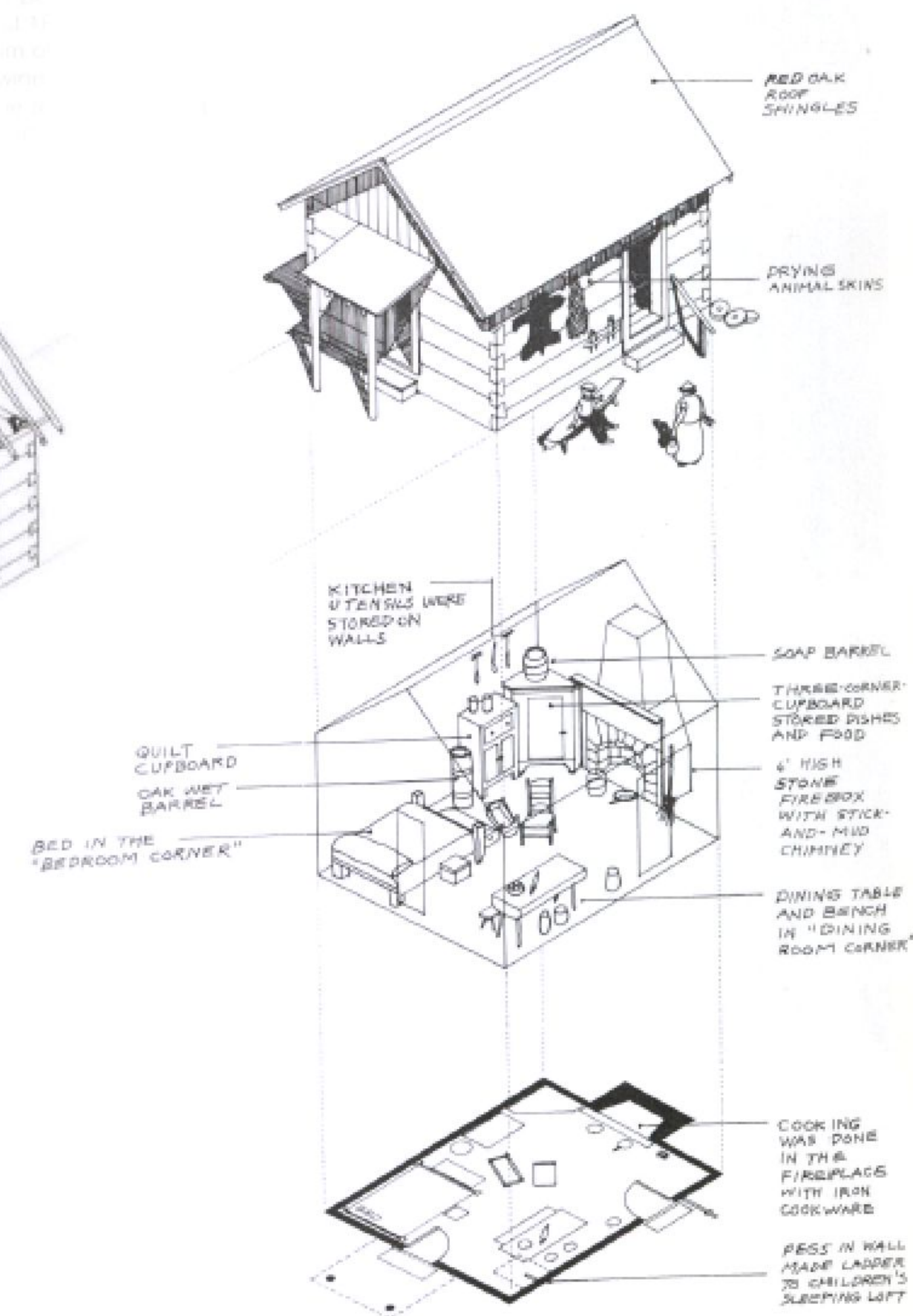
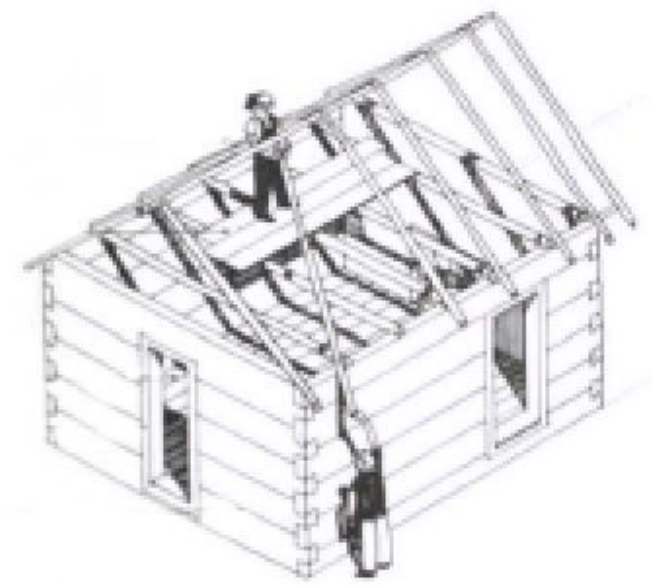
1700-1750

Frontier Cabin

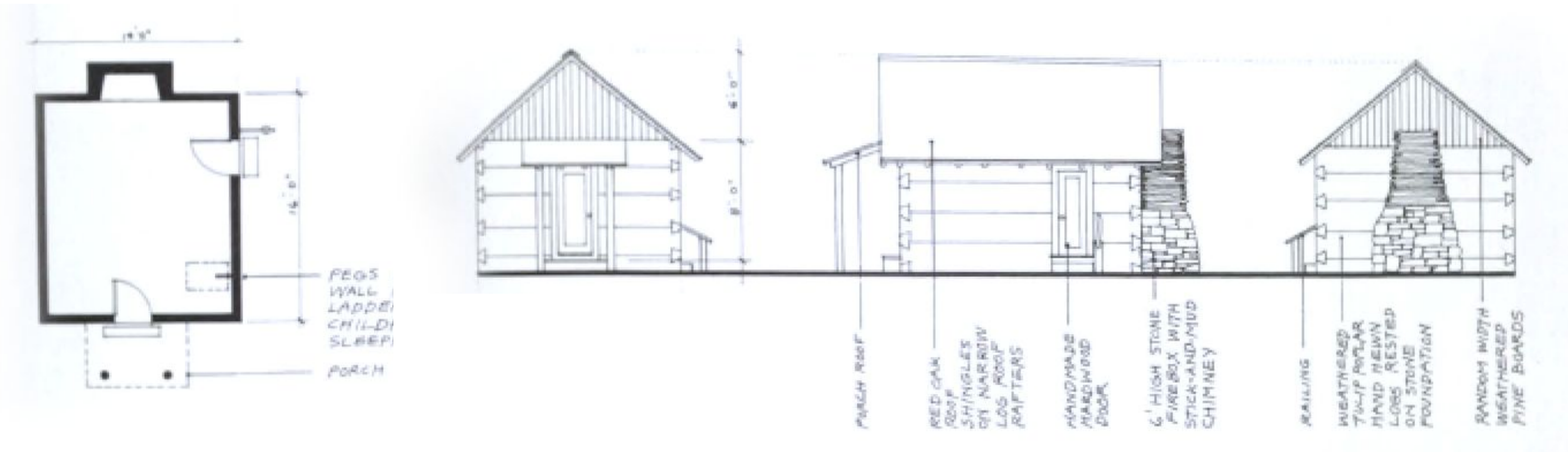
Area. 224 square feet.

Components. Main room divided into four corners: entry, kitchen bedroom and the collective living space. Sleeping loft above. Large fireplace.

Construction. Hand cut logs notched together, wood roof shingles.



Tiny Tiny Houses: or How To Get Away From It All by Lester Walker



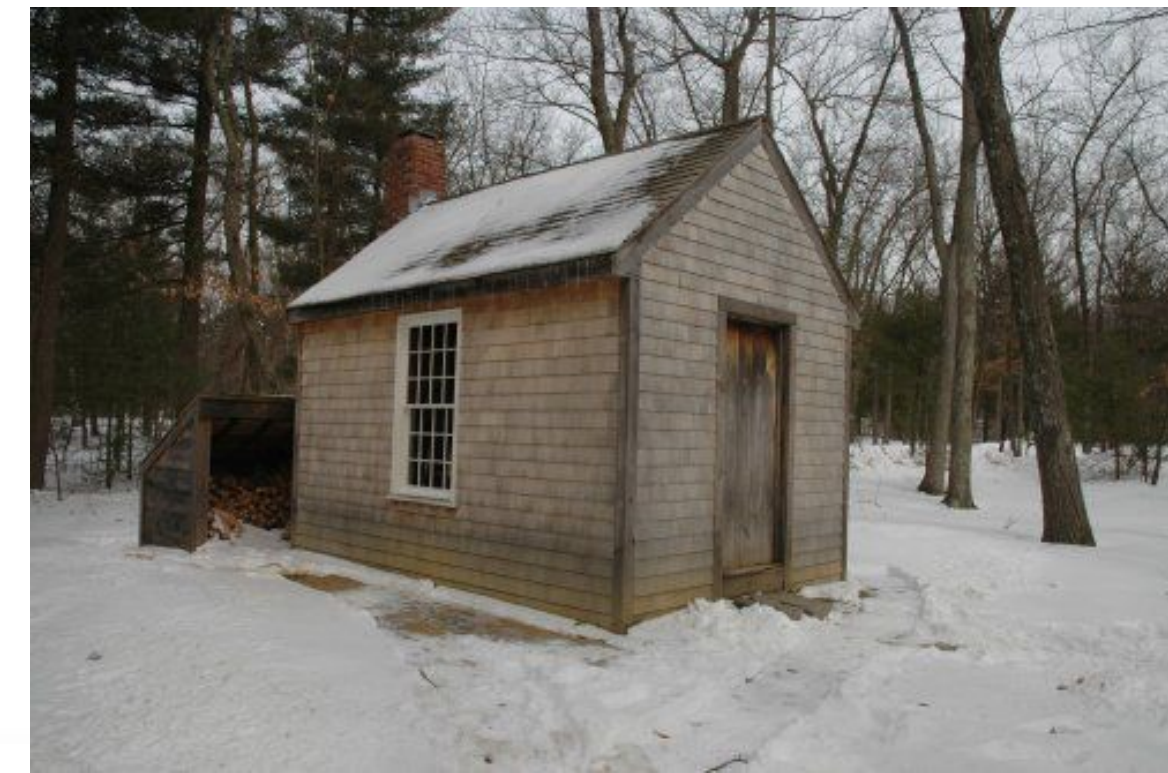
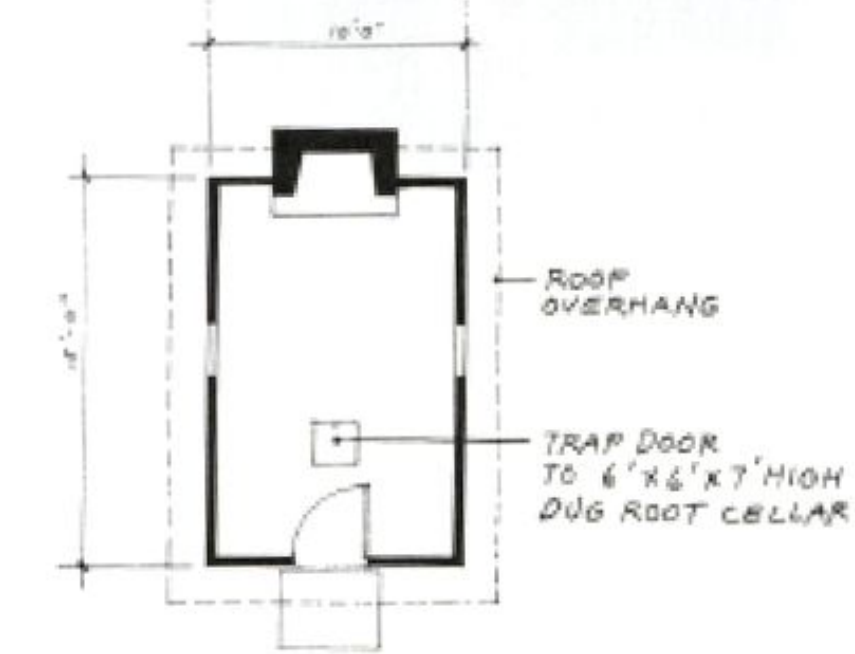
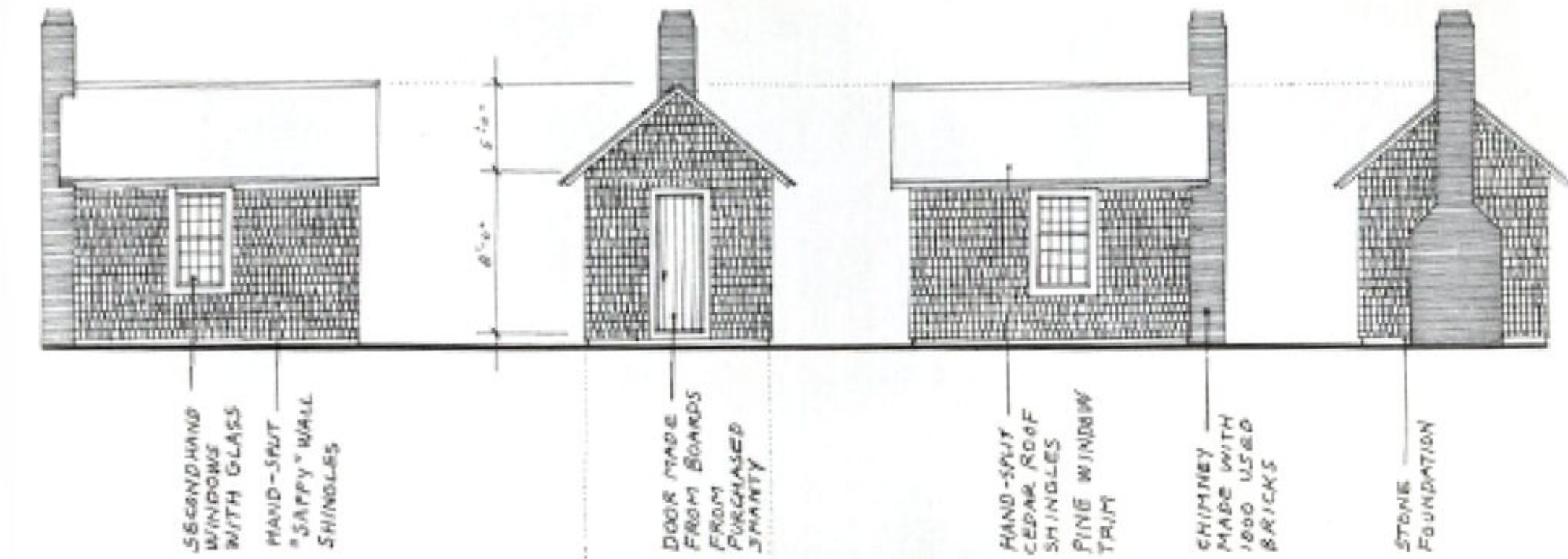
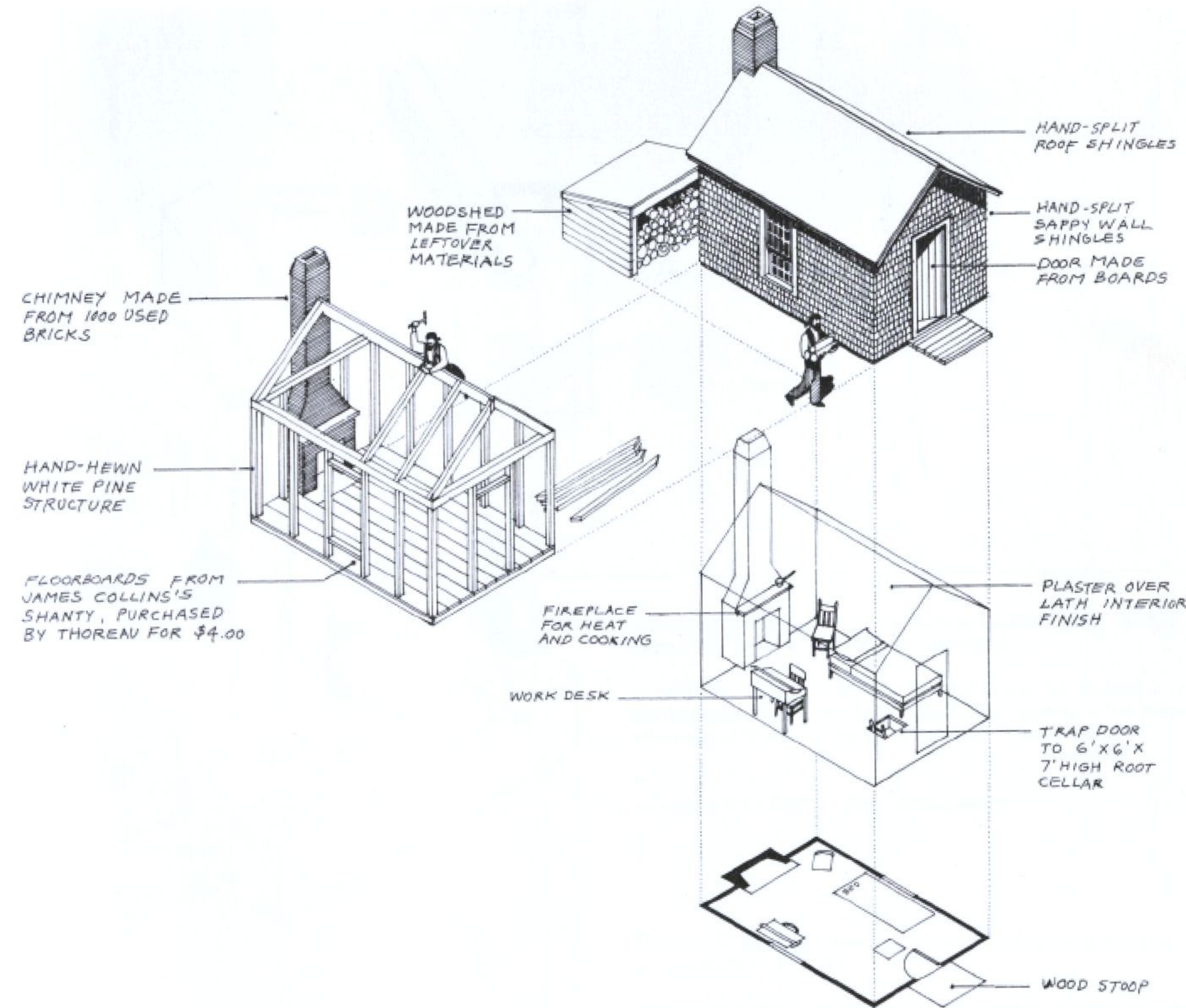
1800

Thoreau's Cabin

Area. 150 square feet.

Components. Main room with with fireplace, root cellar below and storage attic above.

Construction. Stone foundation, White pine structure, brick chimney, wood shingles on walls and roof, plaster finish on the interior



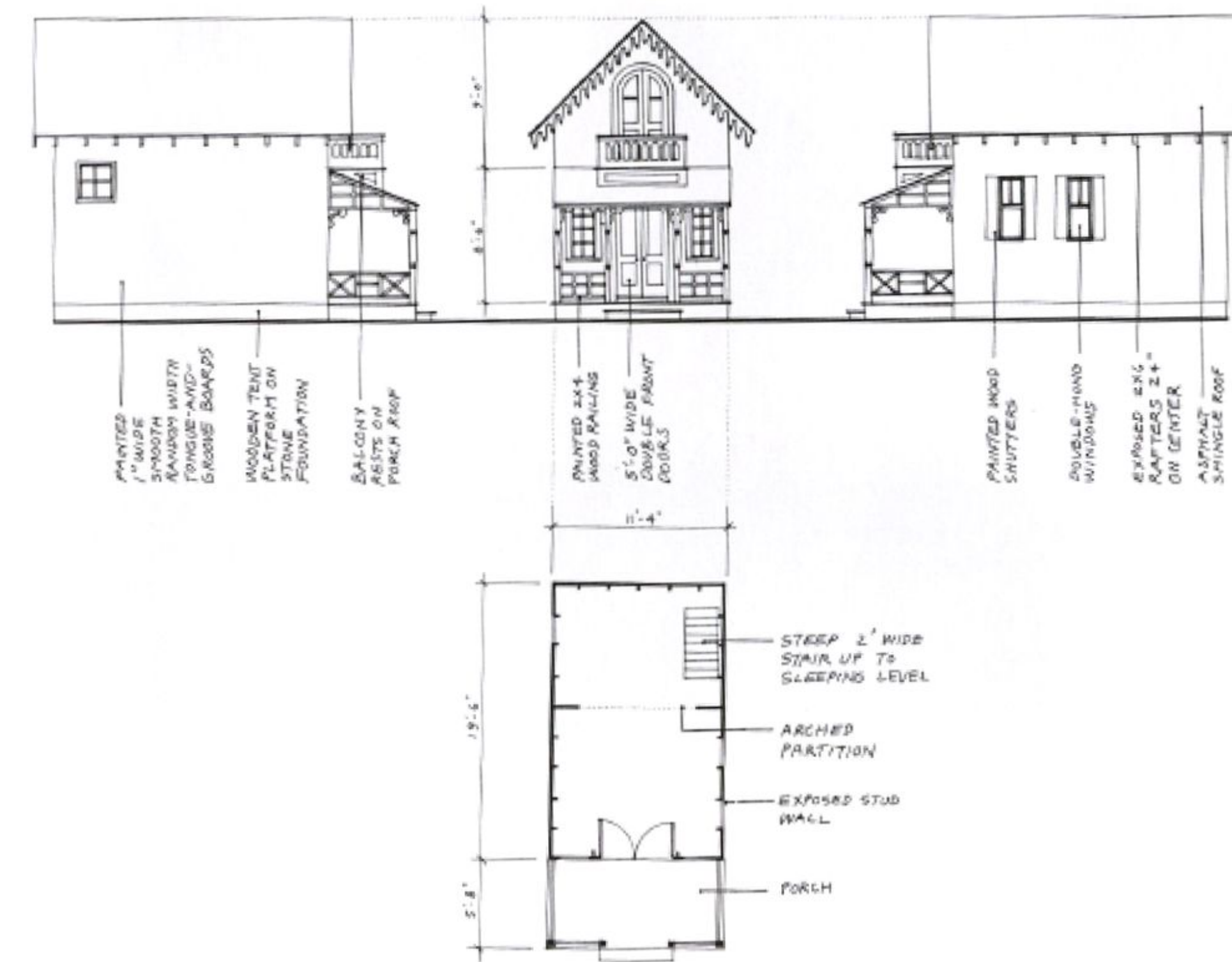
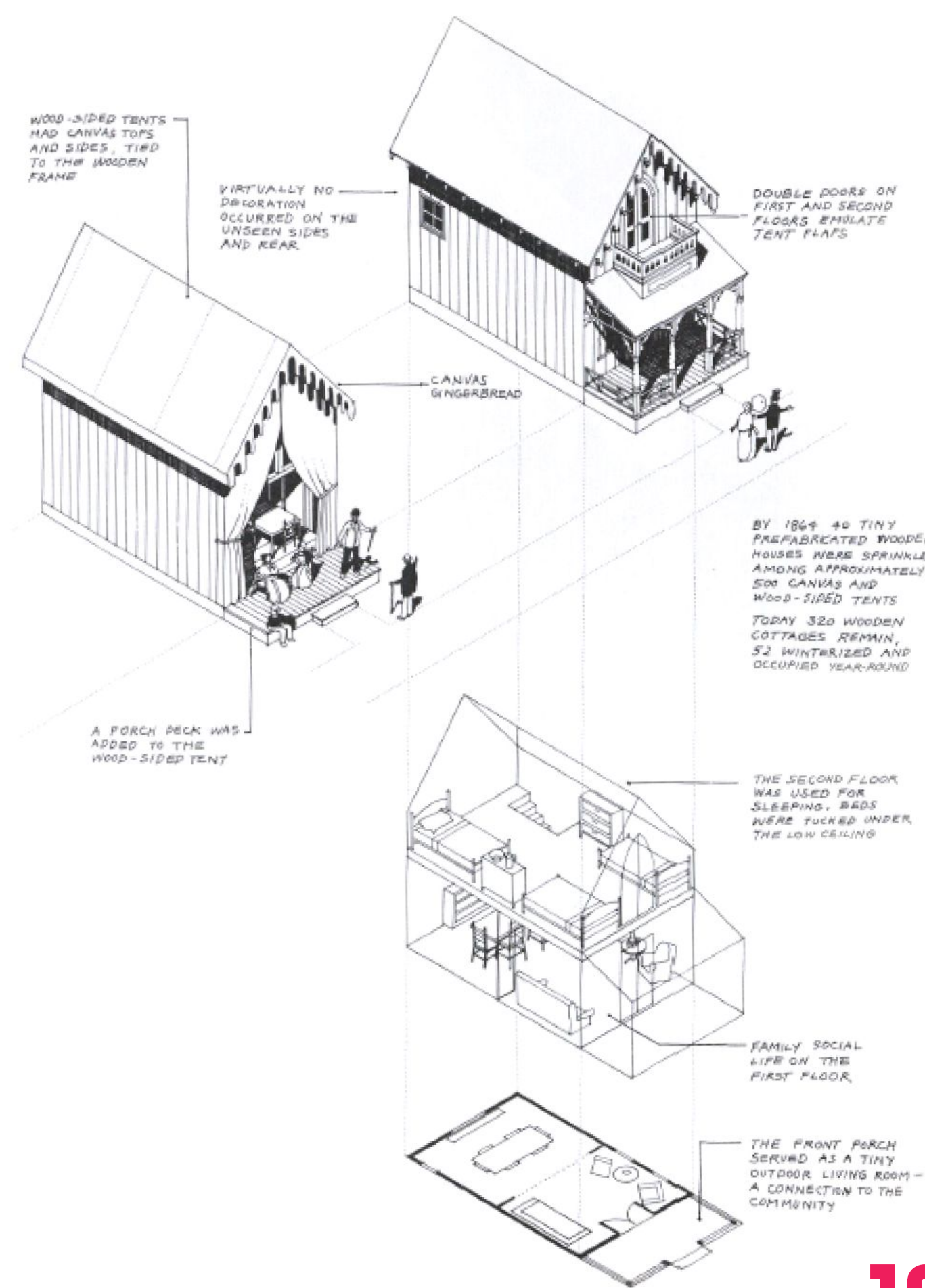
1845

Campground Cottage

Area. 221 square feet

Components. The first floor was for socializing, and the beds were tucked under the low ceilings upstairs. The front porch served as an outdoor living room and connection to the community.

Construction. Wooden Tent platform on stone foundation, tongue and groove boards as exterior, asphalt shingles.



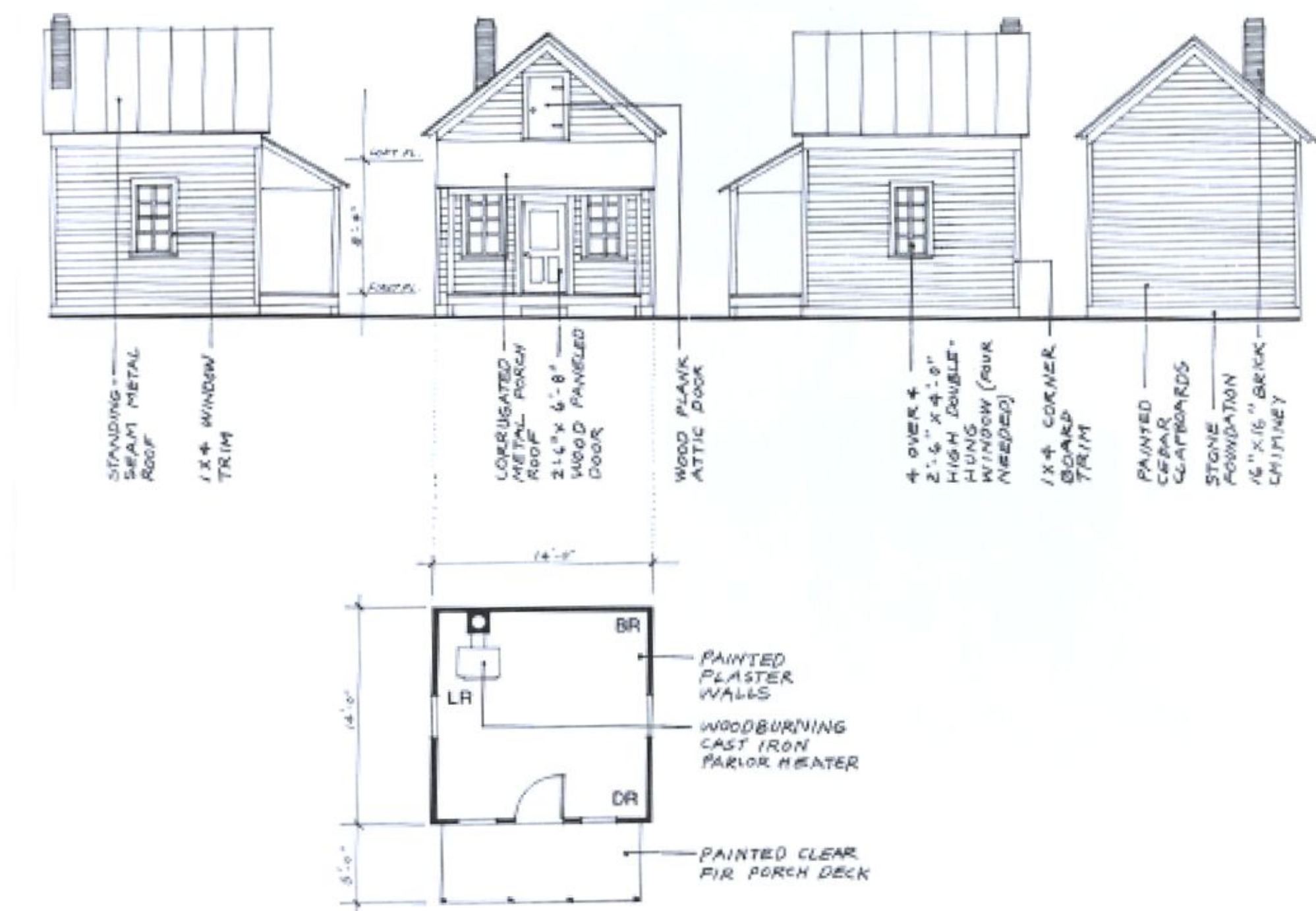
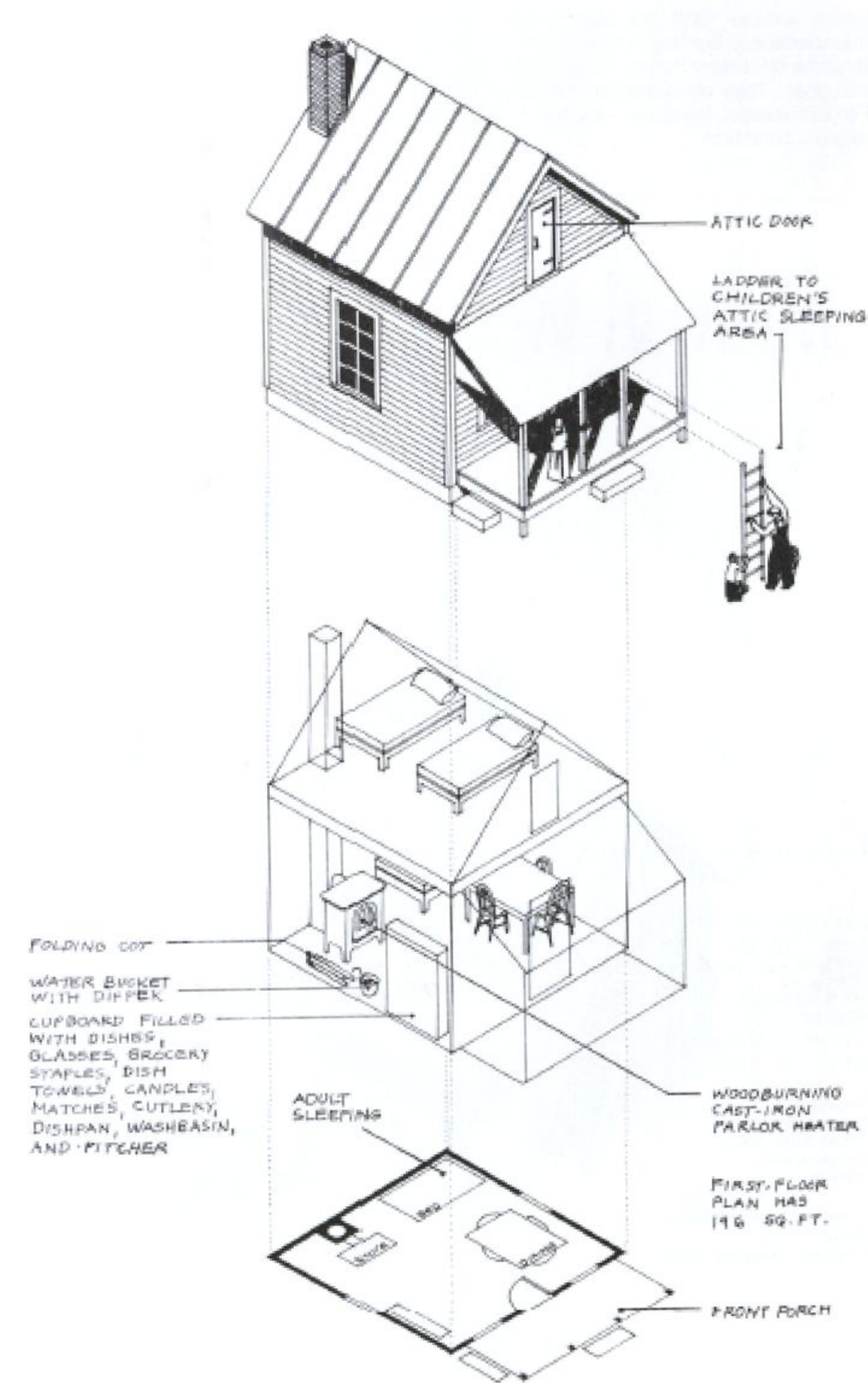
1840-1860

Sunday House

Area. 196 square feet

Components. The houses contained the bare minimum needed for living, with common area on main level and a sleeping attic upstairs.

Construction. stone foundation, wood framed, standing metal seam gabled roof



1880-1920



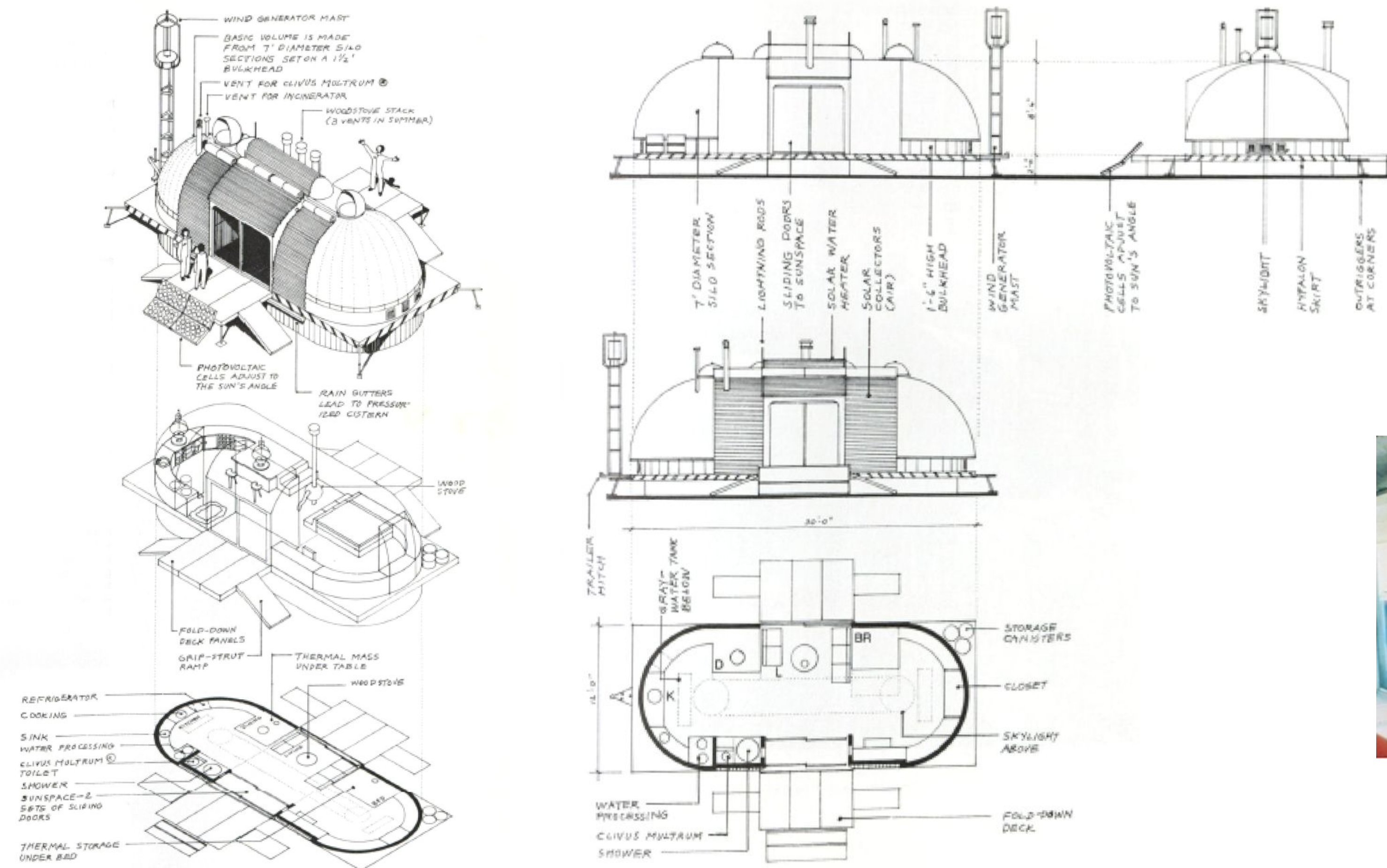
Tiny Tiny Houses: or How To Get Away From It All by Lester Walker

Autonomous House

Area. 324 square feet

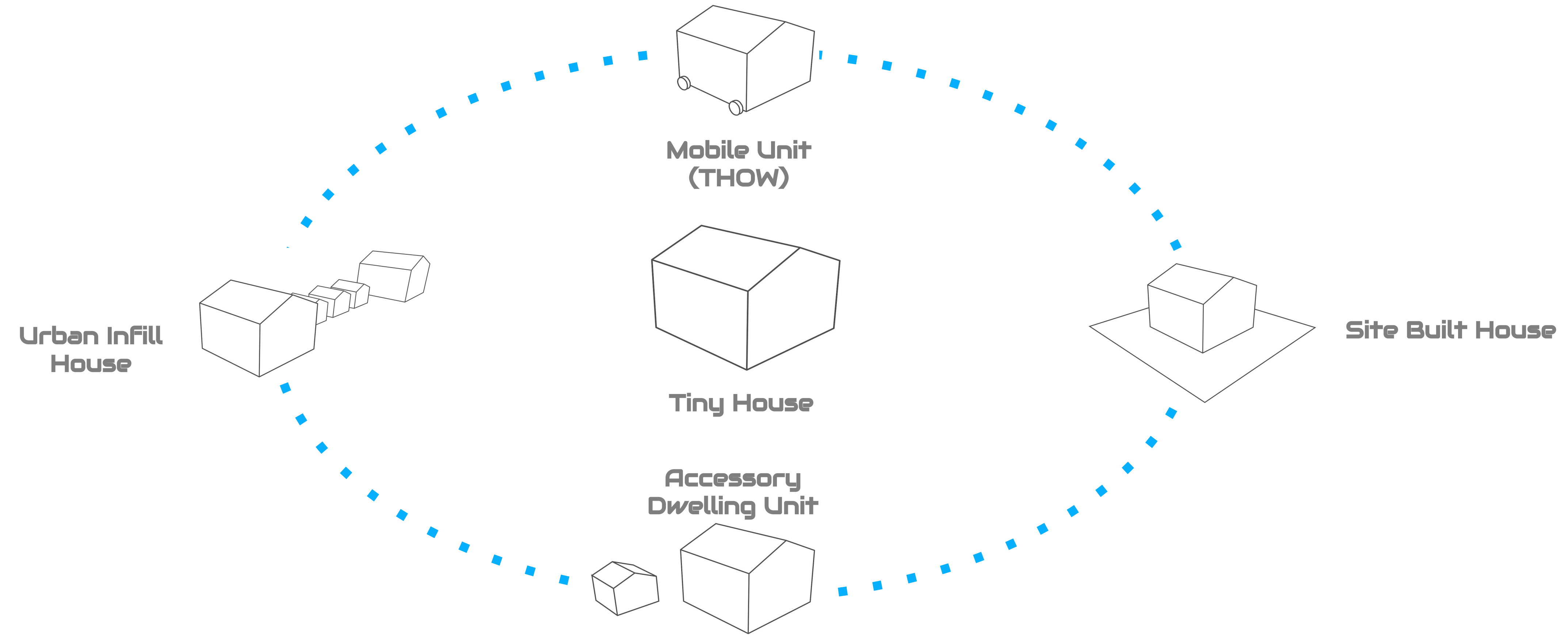
Components. Self supportive, free from utility connections, mobile.

Construction. 7' diameter metal silo sections create the capsule.



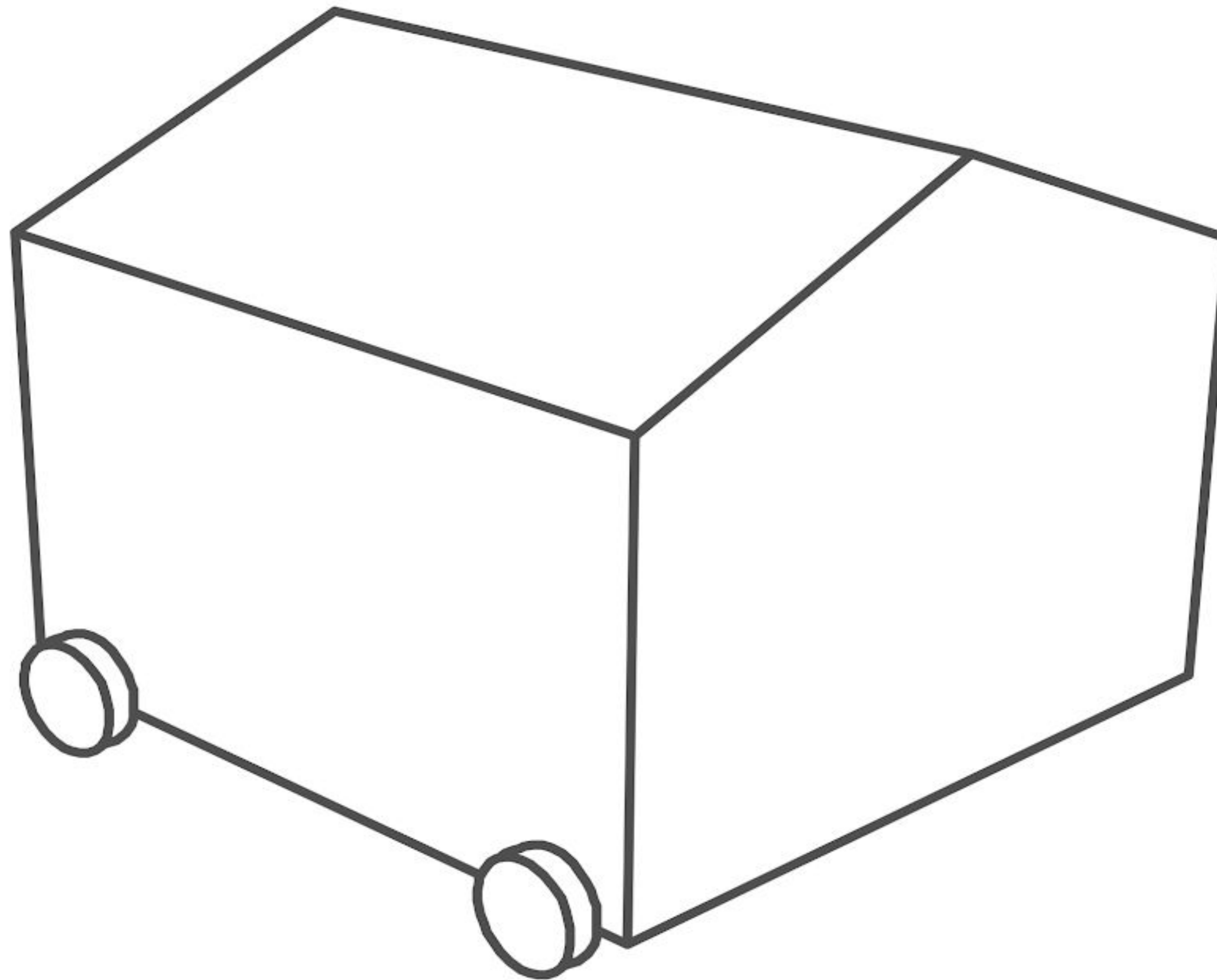
1979

Precedents



2018

Mobile Unit (THOW)

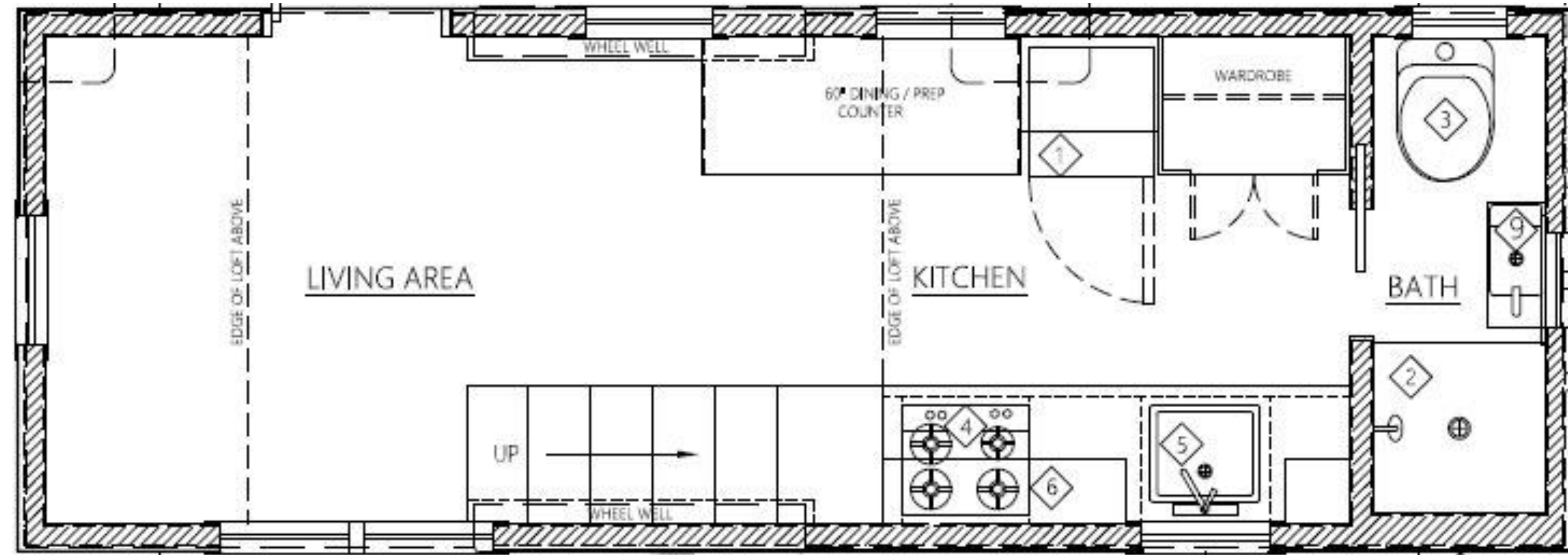


- RV Registered
- Pre Manufactured or Catalog Ordered
- Efficiently Built
- Easily Assembled
- Galley Style Design
- Affordable

Case Study : Hikari Box

Portland Alternative Dwellings (PAD) | Derin Williams

- 184 square feet
- Manufactured in preconceived 'styles'
- Ease of Construction, DIY
- Prefabricated materials and instructions
- Flexibility in design cost



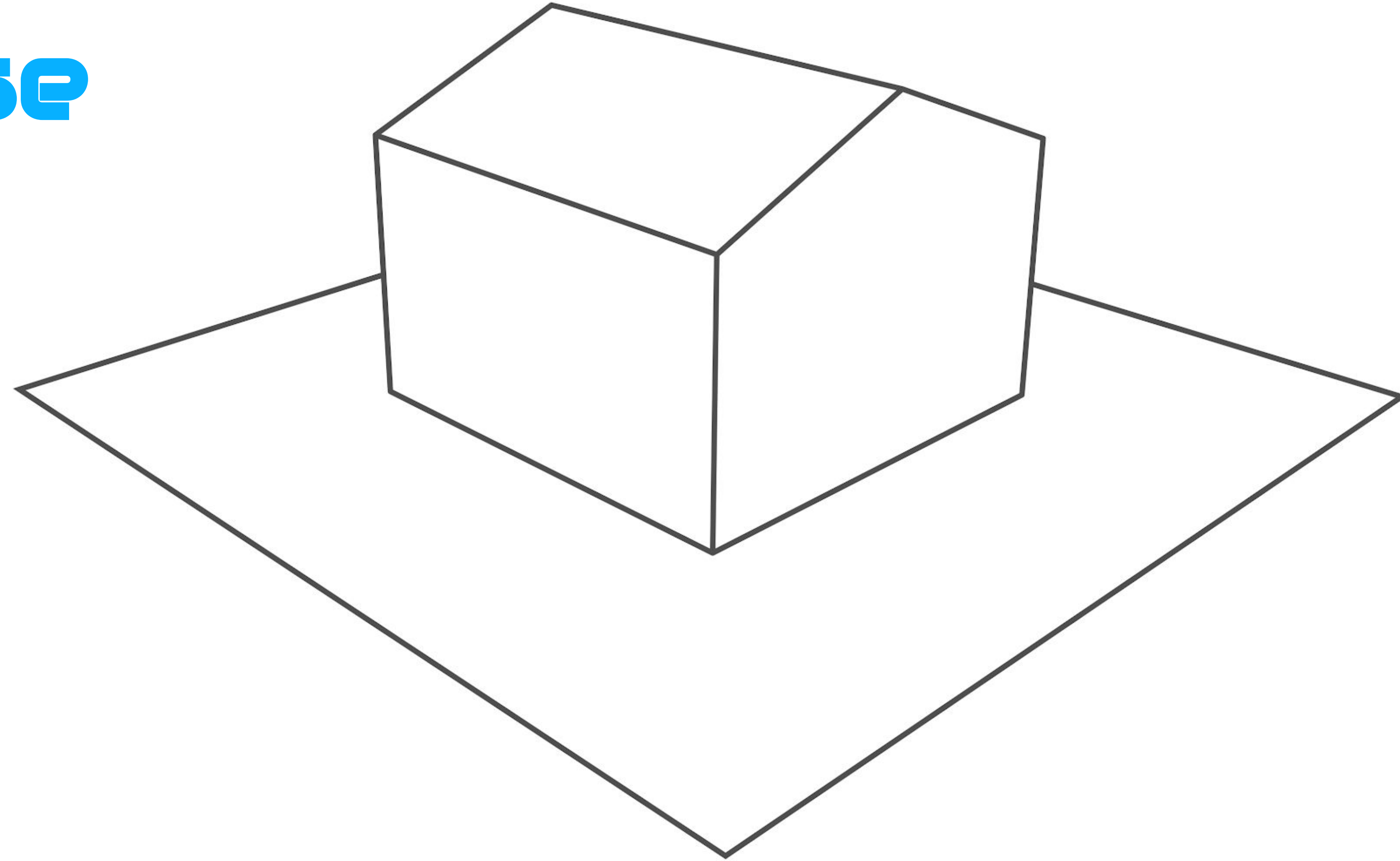
Case Study : Civic Works

Baltimore, MD | Davin Hong | 2015

- 200 square feet
- \$60,000
- 1 of 5 design models
- Built over 8 months in collaboration with YouthBuild - Baltimore city youth.
- Features sustainable options:
 - tankless water heater
 - 'pedal' generator
 - a cool roof
 - solar powered ventilator



Site Built House

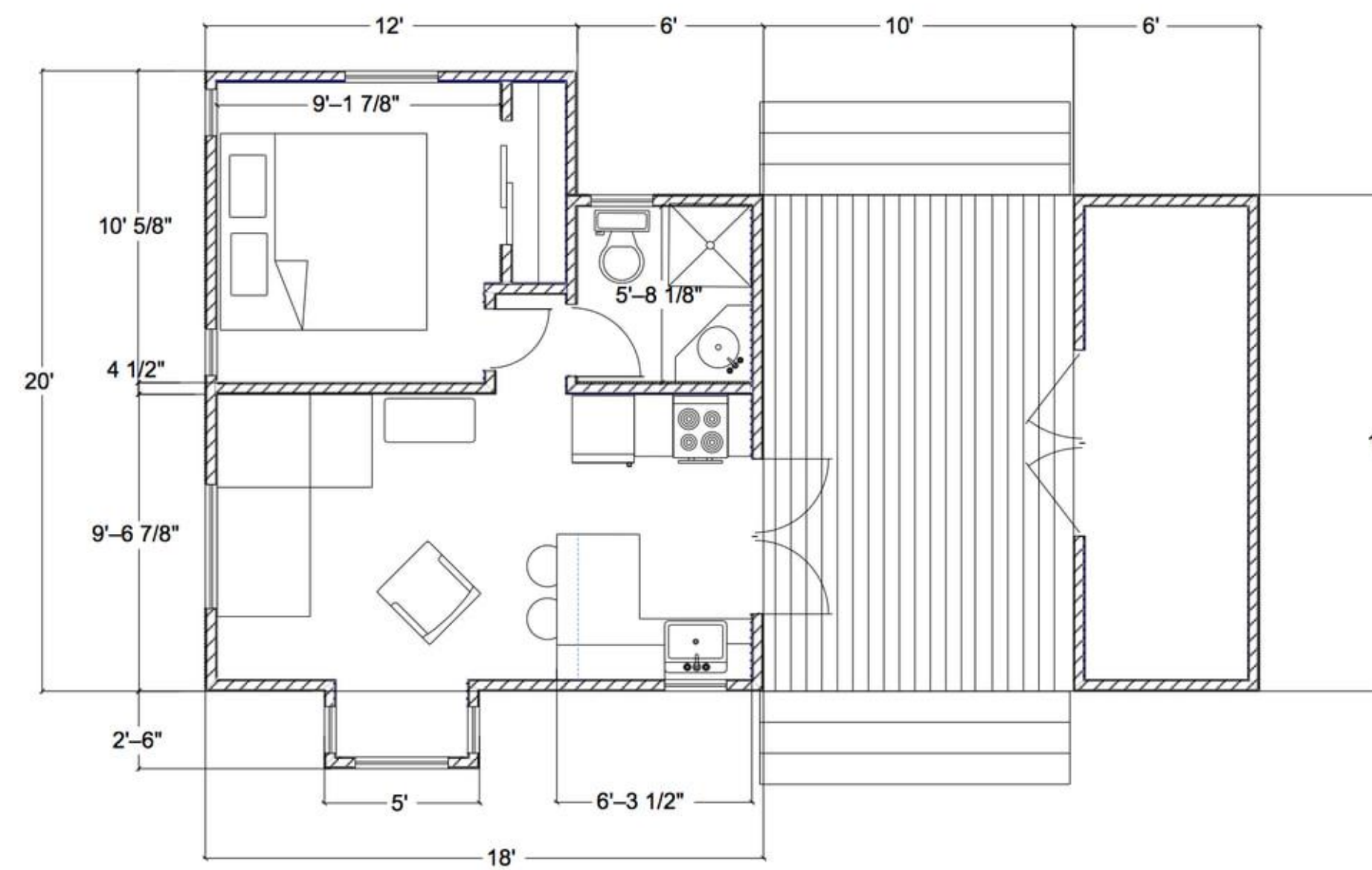
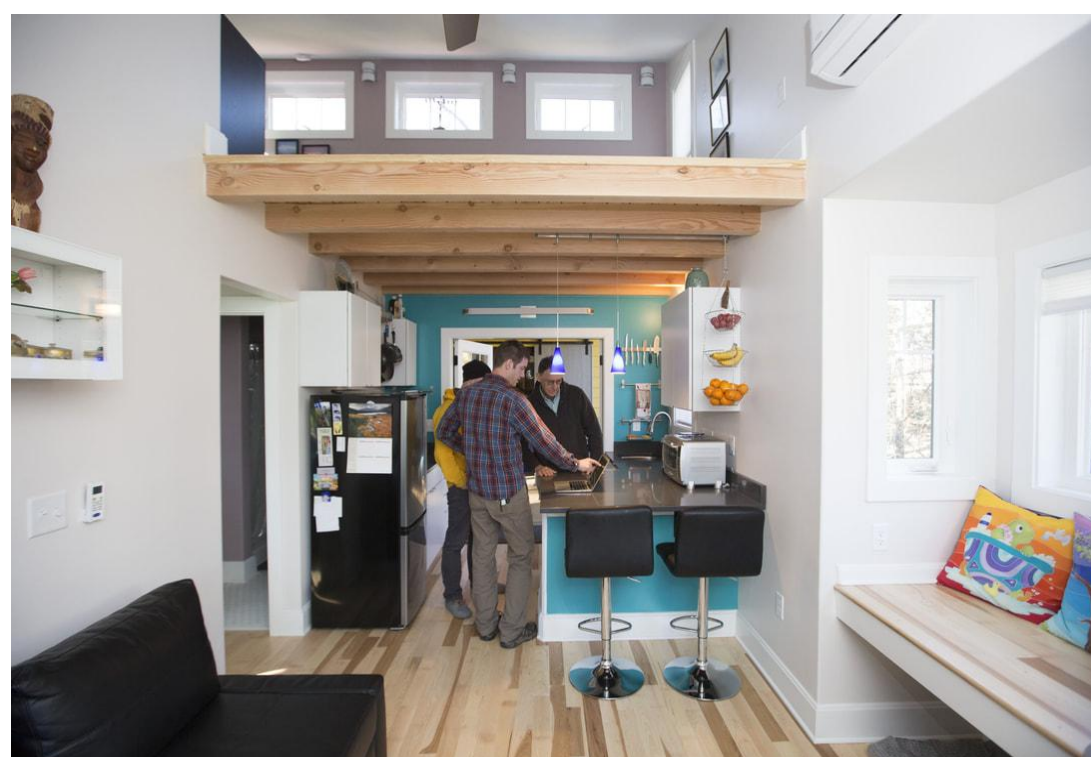
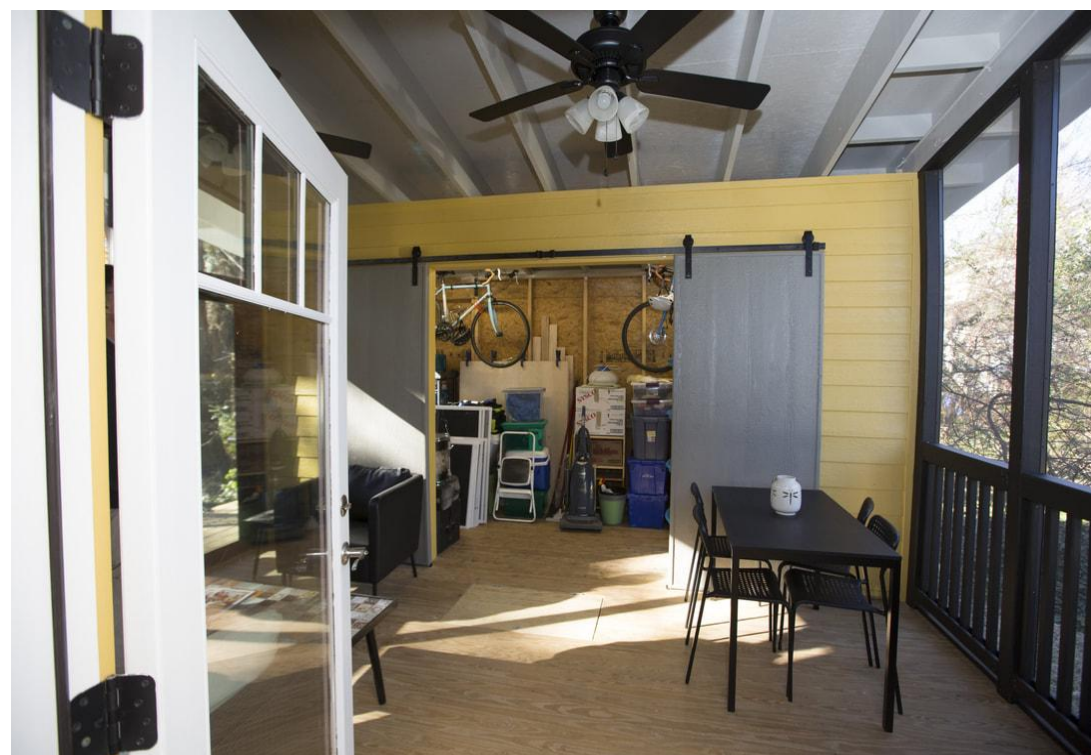


- Contextual
- High Level of Design
- Resembles a “House”
- Outdoor/Indoor
- All Encompassing
- Most Expensive

Case Study : Murdoch 400

Asheville, NC | Wishbone Tiny Homes | 2014

- 350 heated square feet, 750 w/ porch and storage
- \$200/sf, = \$150,000
- 1 bed/bath
- Includes permitting for appliance and utilities
- Features sustainable options:
 - tankless water heater
 - 'pedal' generator
 - a cool roof
 - solar powered ventilator



First Floor Plan
 Neylan 88 Murdoch
 1/23/15
 Wishbone Tiny Homes



Case Study: Salt Box

Tellico Lake, TN | Jeffrey Dungan | 2017

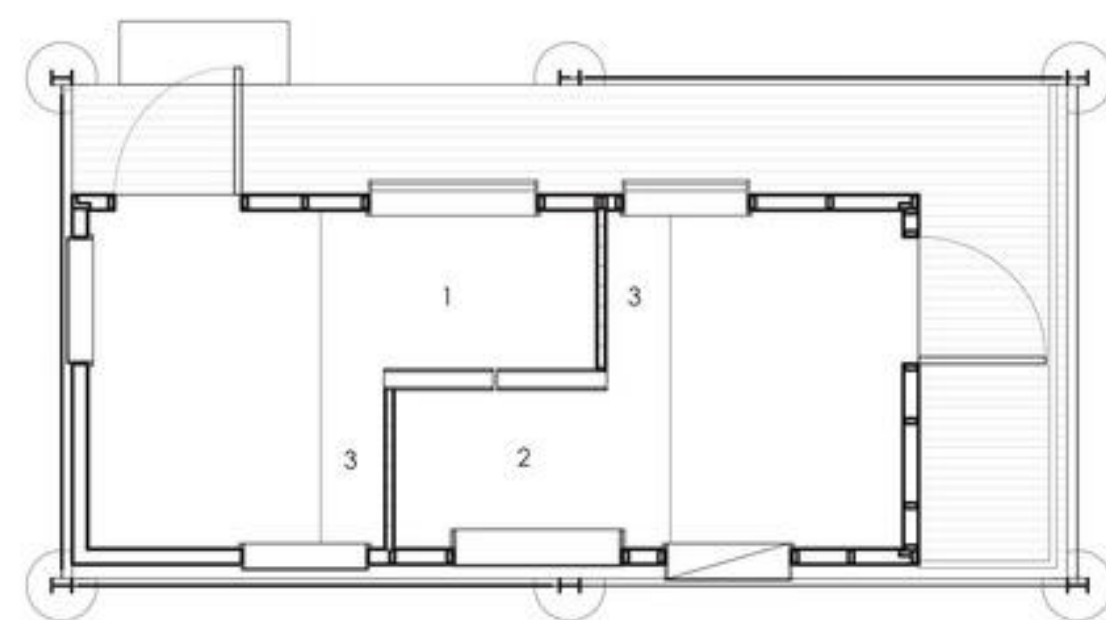
- Site Built
- 400 square feet
- \$100,000-\$130,000 Luxury Unit
- Designed to evoke the home, with moments of natural light and privacy.
- Units range from \$30k-150k



Case Study: Micro Cabins - Outward Bound

Denver, CO | University of Colorado | 2015

- Site Built, sits lightly on the landscape
- 3 week on site construction
- 250 square feet
- \$100,000-\$130,000 Units
- Concept: Box and Frame, box rest within frame, which acts as hanging storage
- Porches create communal social spaces
- Design inspired by campground cabins
- Purpose: Micro Dormitories for Colorado Outbound School

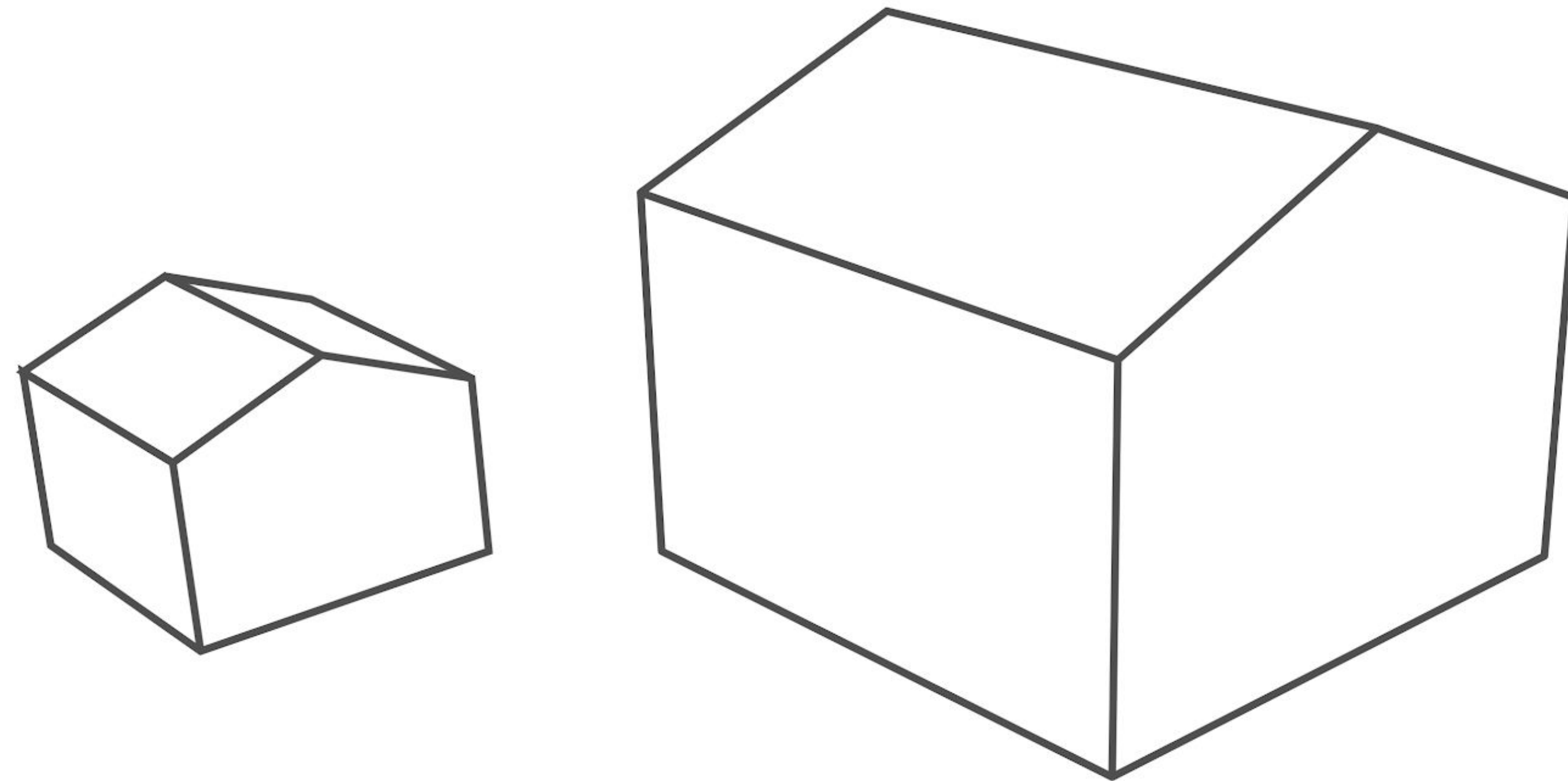


CABIN 10
FLOOR PLAN

1	BED 1 (TWIN)
2	BED 2 (TWIN)
3	DESK/STORAGE



Accessory Dwelling Unit

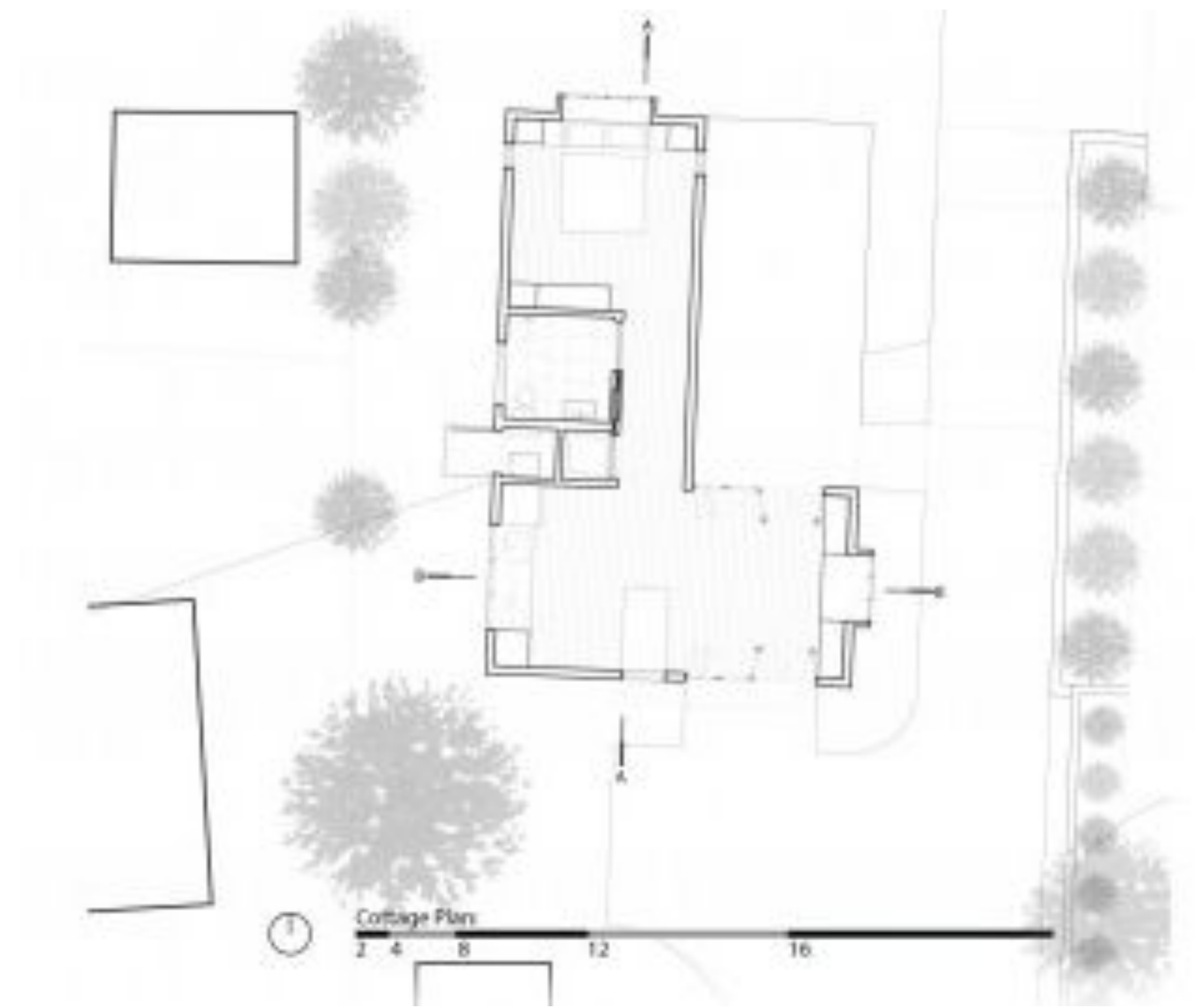
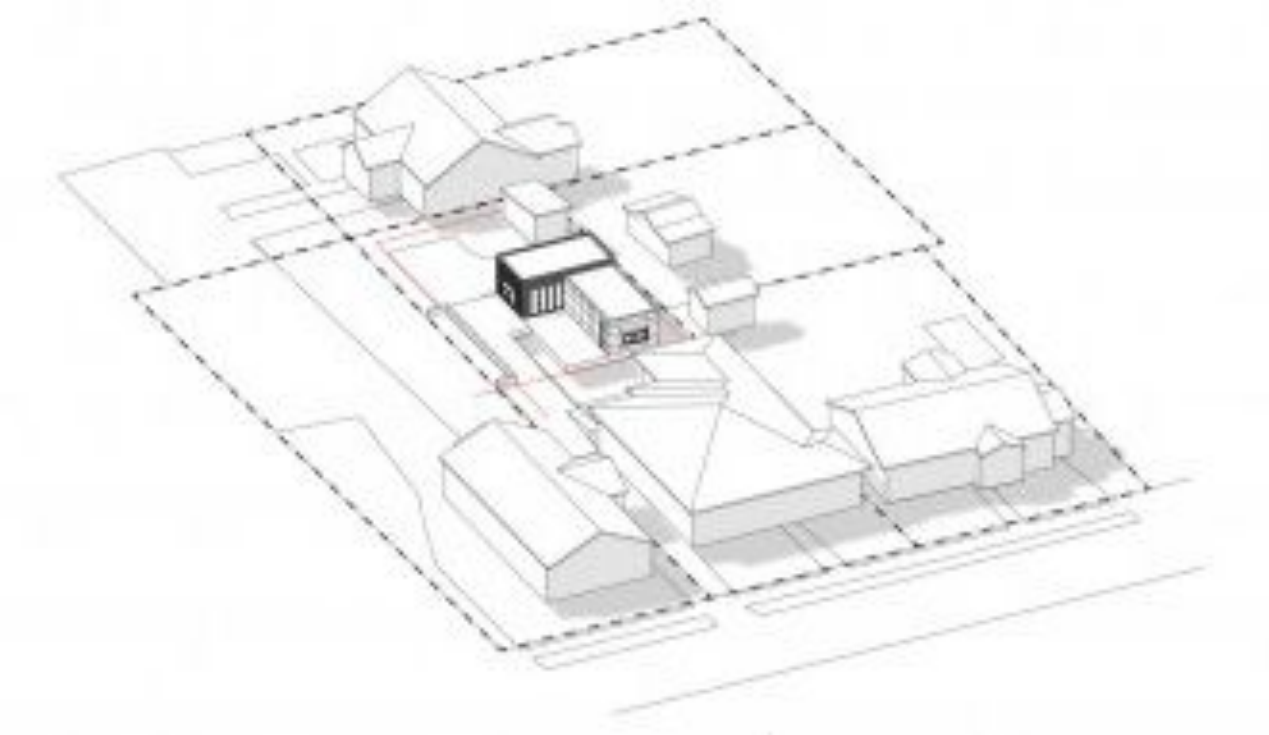


- Alleviate Density
- Pre Manufactured or Catalog Ordered
- Efficiently Built
- Easily Assembled
- “One Room” Design
- Most Affordable

Case Study: Mordecai Neighborhood

Backyard Cottage Project | Glasscock Street, Raleigh, NC | 2014 | Michael Wengenroth

- Also known as Backyard Cottages or “Granny” flats
- 450 square feet
- ADU can be used flexibly as a residence for relatives or as rental income
- This unit is flexible in spatial layout
 - Built-ins fold out from walls to accommodate functions
 - Material envelope distinguishes interior functions
- 75% of those surveyed in the neighborhood are in favor of ADU’s in Raleigh
 - Addresses Suburban Sprawl
 - Care of Aging Families
 - Affordable units for rent
 - Flexibility of Use



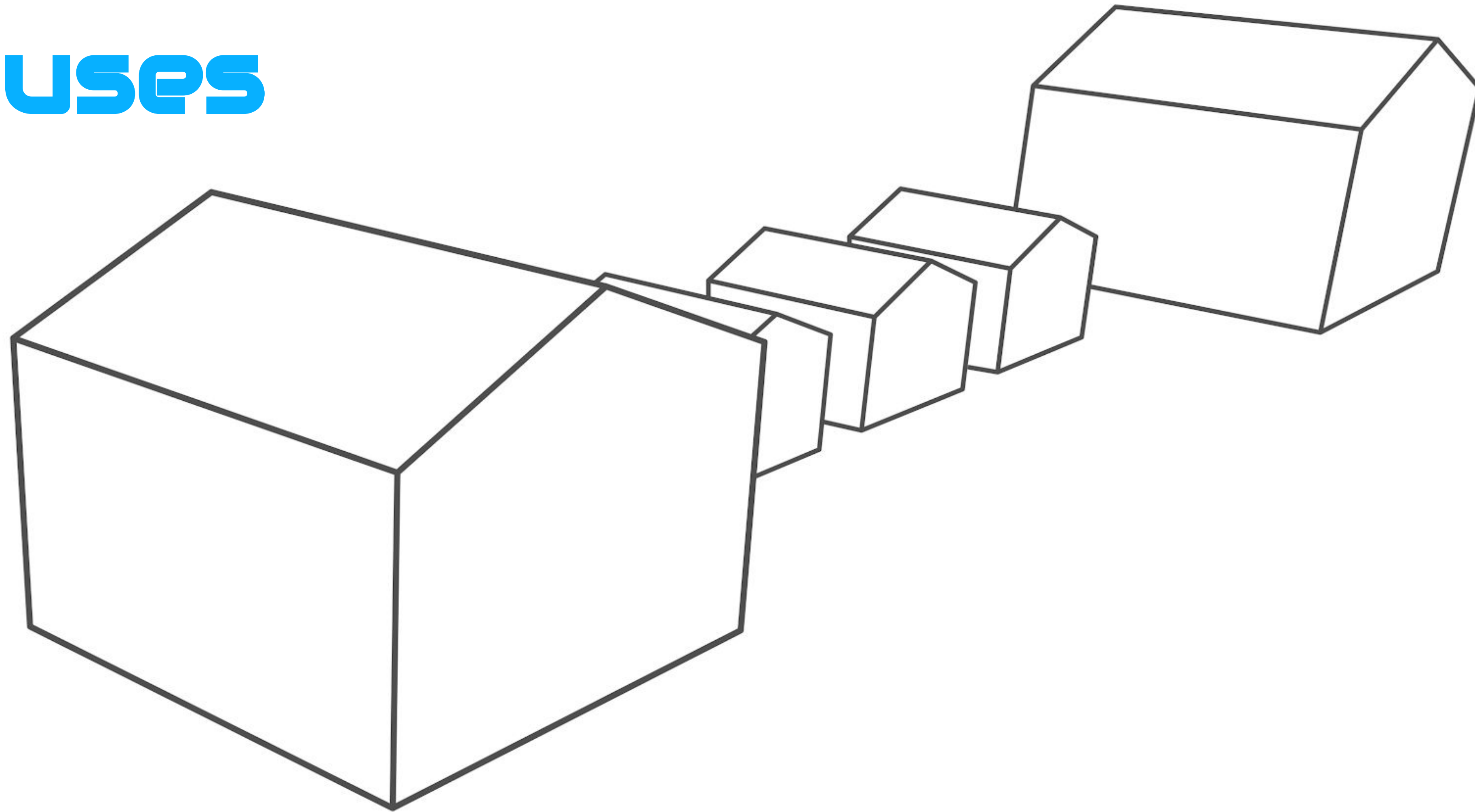
Case Study: Yard Pod

Palo Alto, CA | YardPods | 2014

- Also known as Backyard Cottages or “Granny” flats
- 92 square feet
- Freestanding residential units of one room
- Ease of Construction, DIY
- Prefabricated materials and instructions
- Built throughout the San Francisco bay area for aging adults



Urban Infill Houses

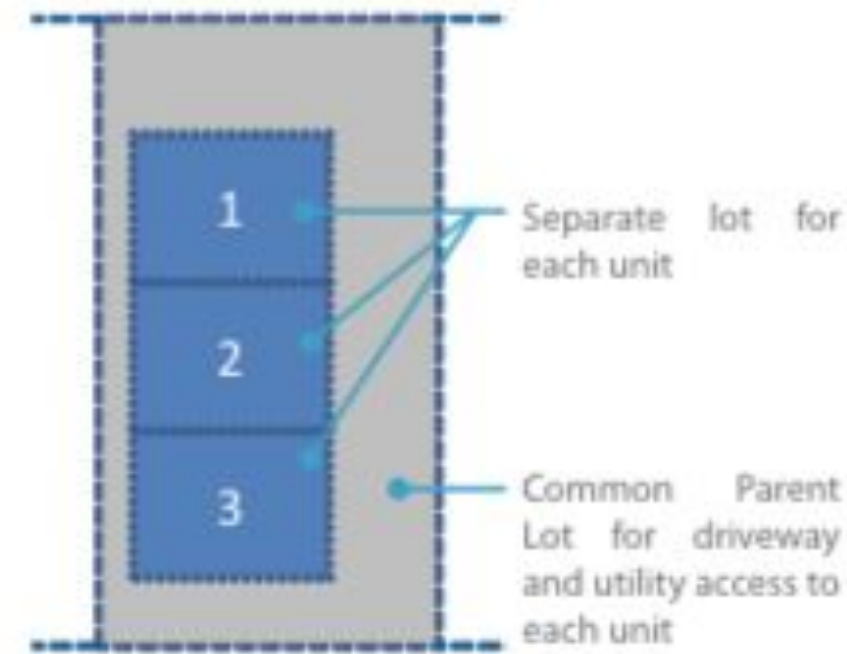


- Improve Neighborhoods
- Re-envision Suburbs
- Policy Intensive
- Communal Focus
- Alleviate Density
- More Expensive

Urban Infill Studies

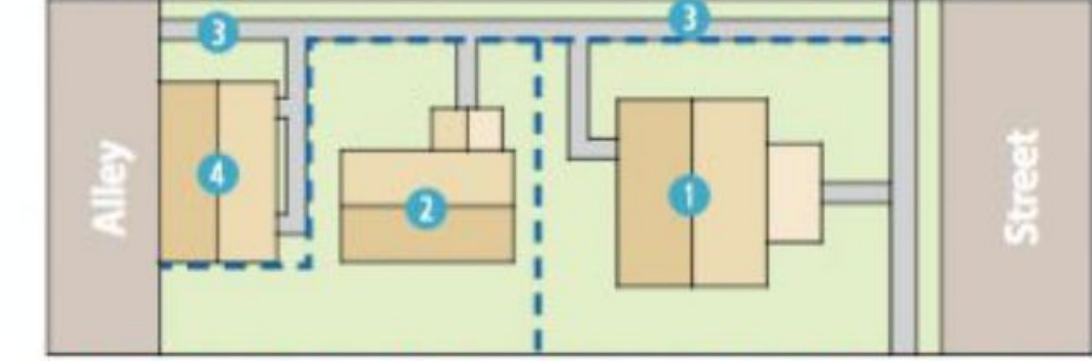
Spokane, WA | Nathan Gwinn | 2018

- 37,000 vacant lots in Spokane, a lot of opportunity for urban infill within the city limits.
- Units can be built on lot sizes at 0.2 acres.
- The city council has been effectively easing restrictions on ADU's and urban infill/pocket neighborhoods.
- General consensus in Spokane is there is a need for flexible housing and a variety of typologies.
- The purpose is to build multiple units on a traditional house lot within existing neighborhoods to address suburb density.
- Example of a local government addressing housing reform for suburban sprawl.

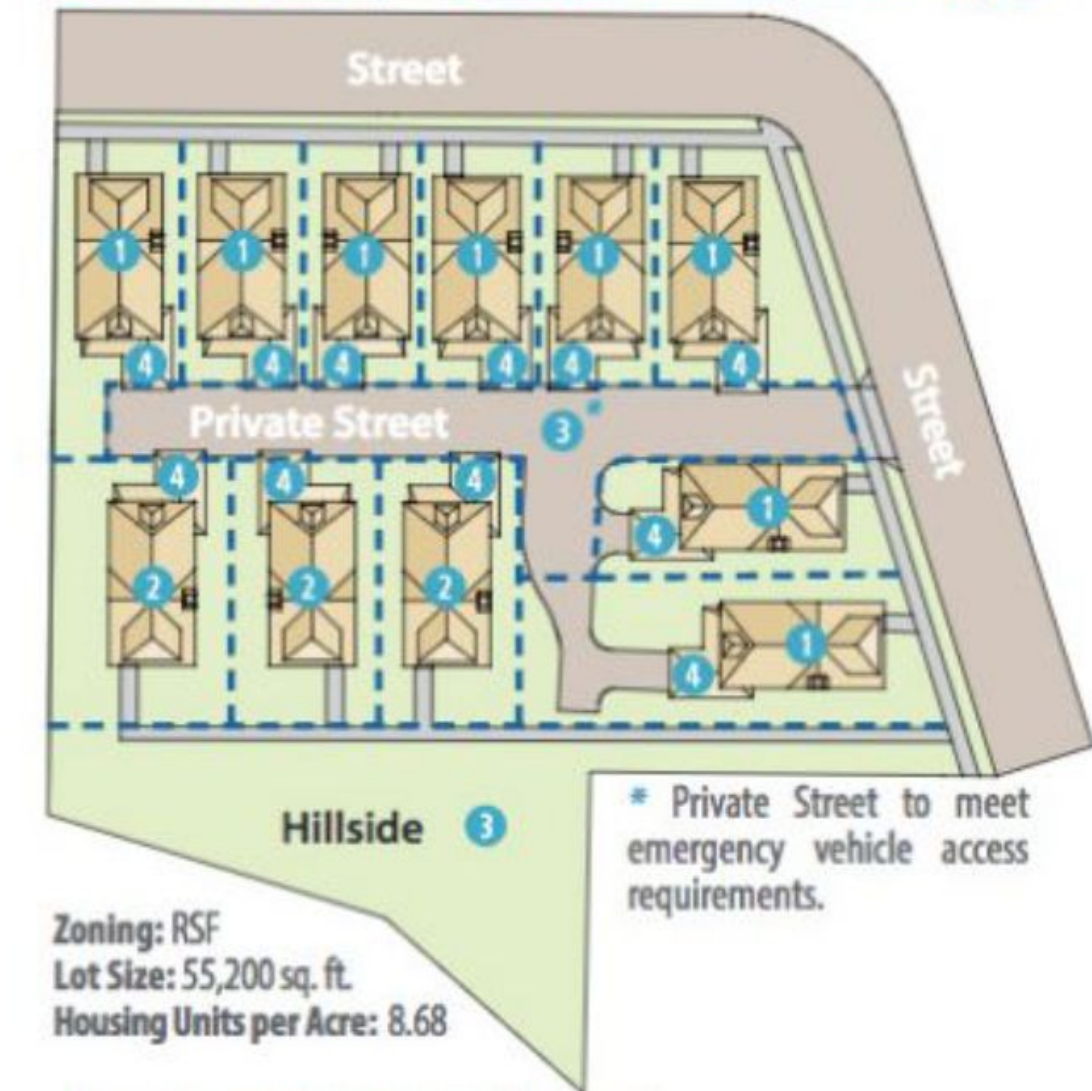


Unit Lot Subdivision allows for the creation of lots for types of attached housing and specified cottage housing projects, while applying only those site development standards applicable to the parent site as a whole, rather than to individual unit lots.

Zoning: RSF | Lot Size: 9,000 sq. ft. (60 ft. x 150 ft.) | Housing Units per Acre: 9.68

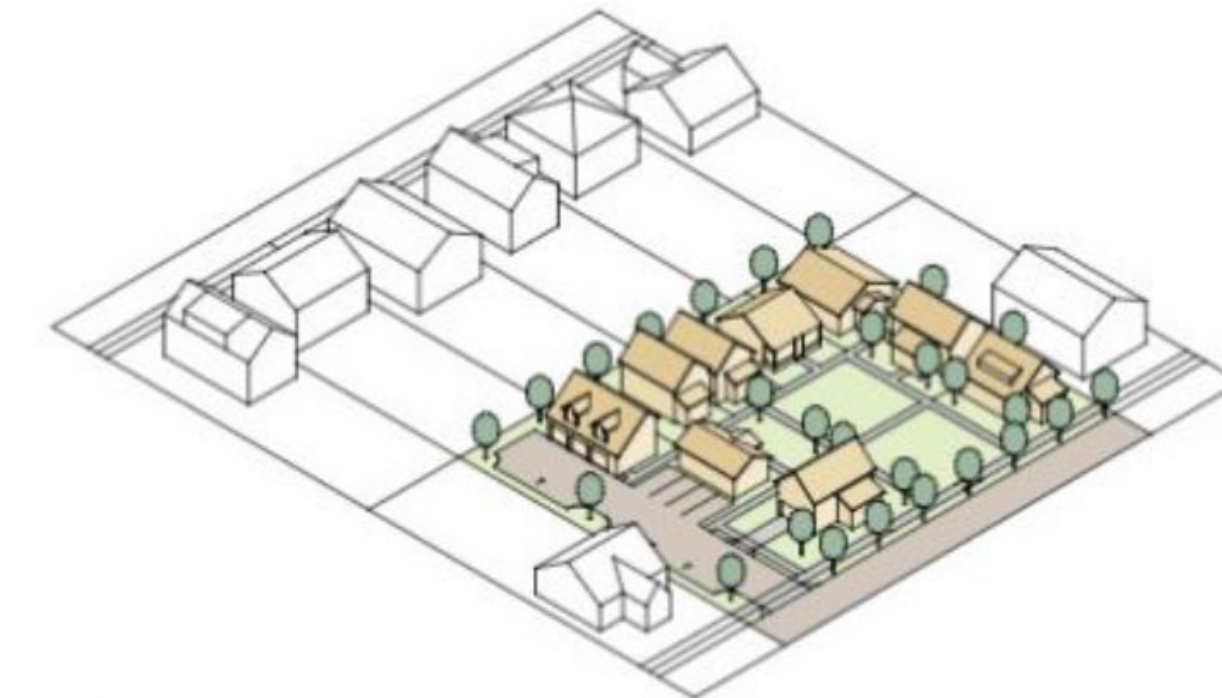


▲ PRD in RSF Zone | Mid-Block Lot with Alley | Tandem Layout



▲ PRD in RSF Zone | Large Lot Layout

Note: This document is only a summary of the major proposed changes.



Tiny House

*<https://nextcity.org/daily/entry/spokane-hopes-tiny-homes-and-cottages-will-spur-infill-density>
<https://static.spokanecity.org/documents/projects/infill-housing-strategies-infill-development/infill-development-open-house-strategies-boards.pdf>
<https://my.spokanecity.org/business/residential/development-options/>

Case Study: Boneyard Studios

Washington D.C. | Brian Levy | 2015

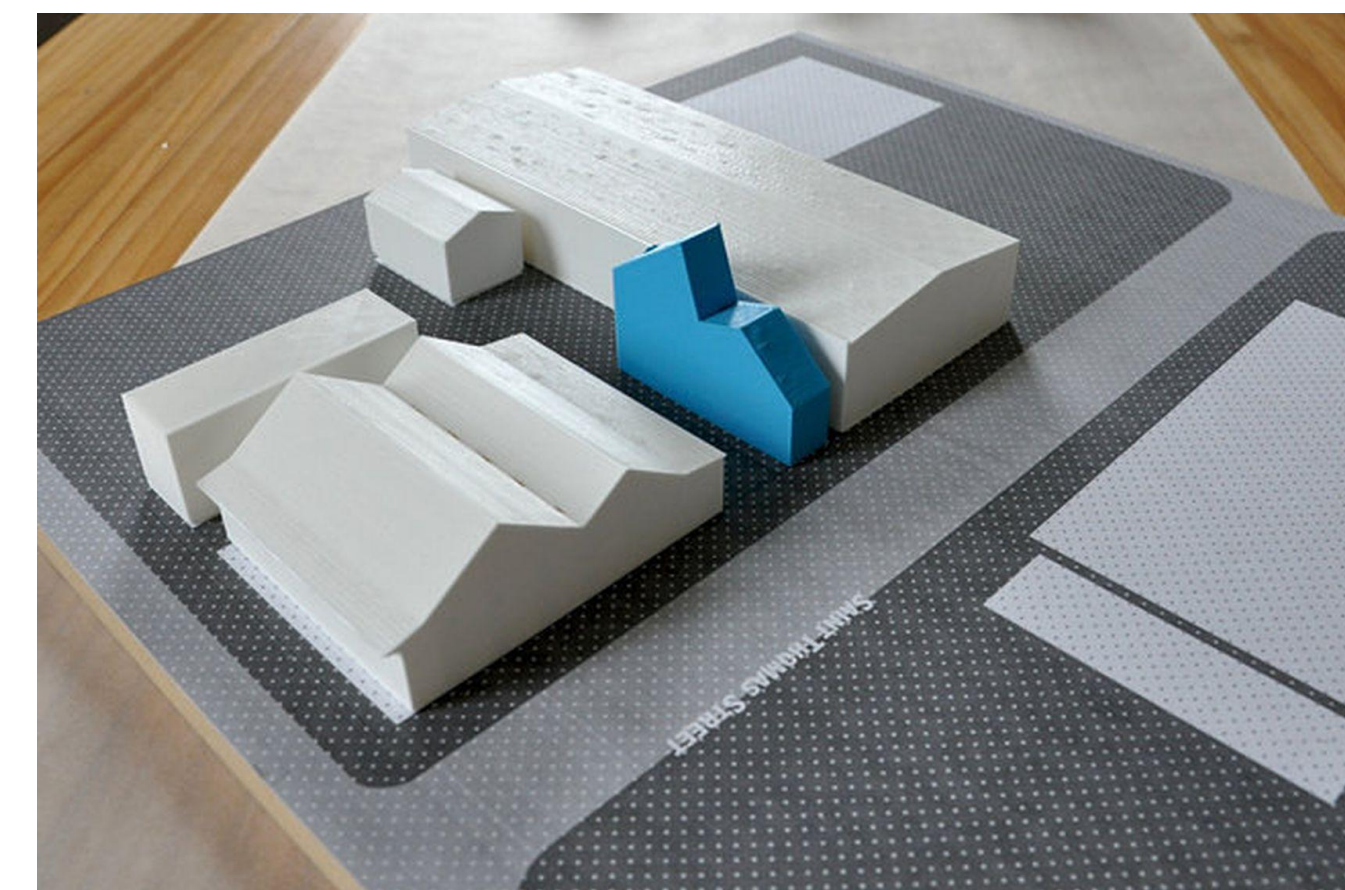
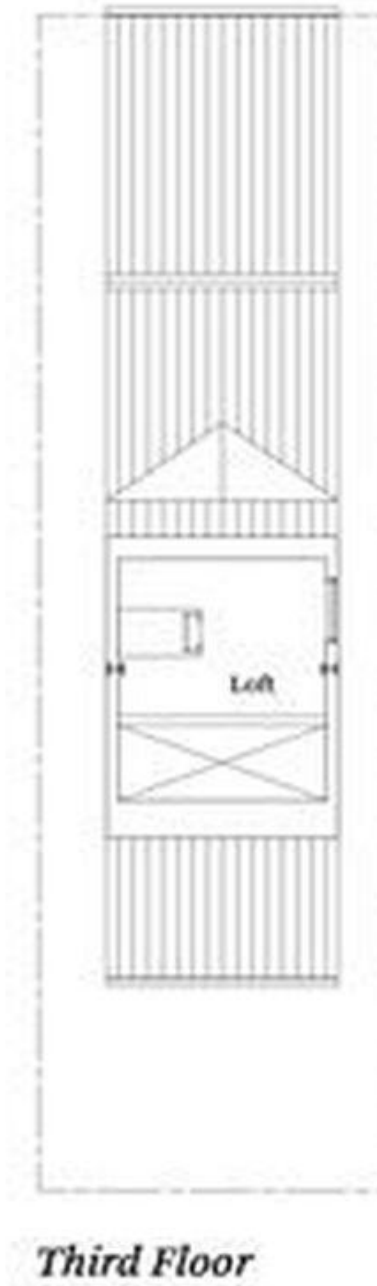
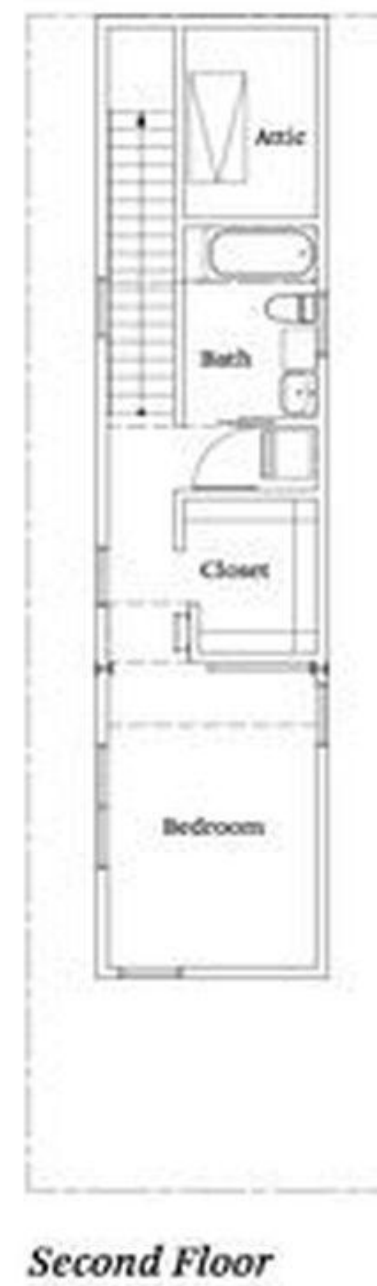
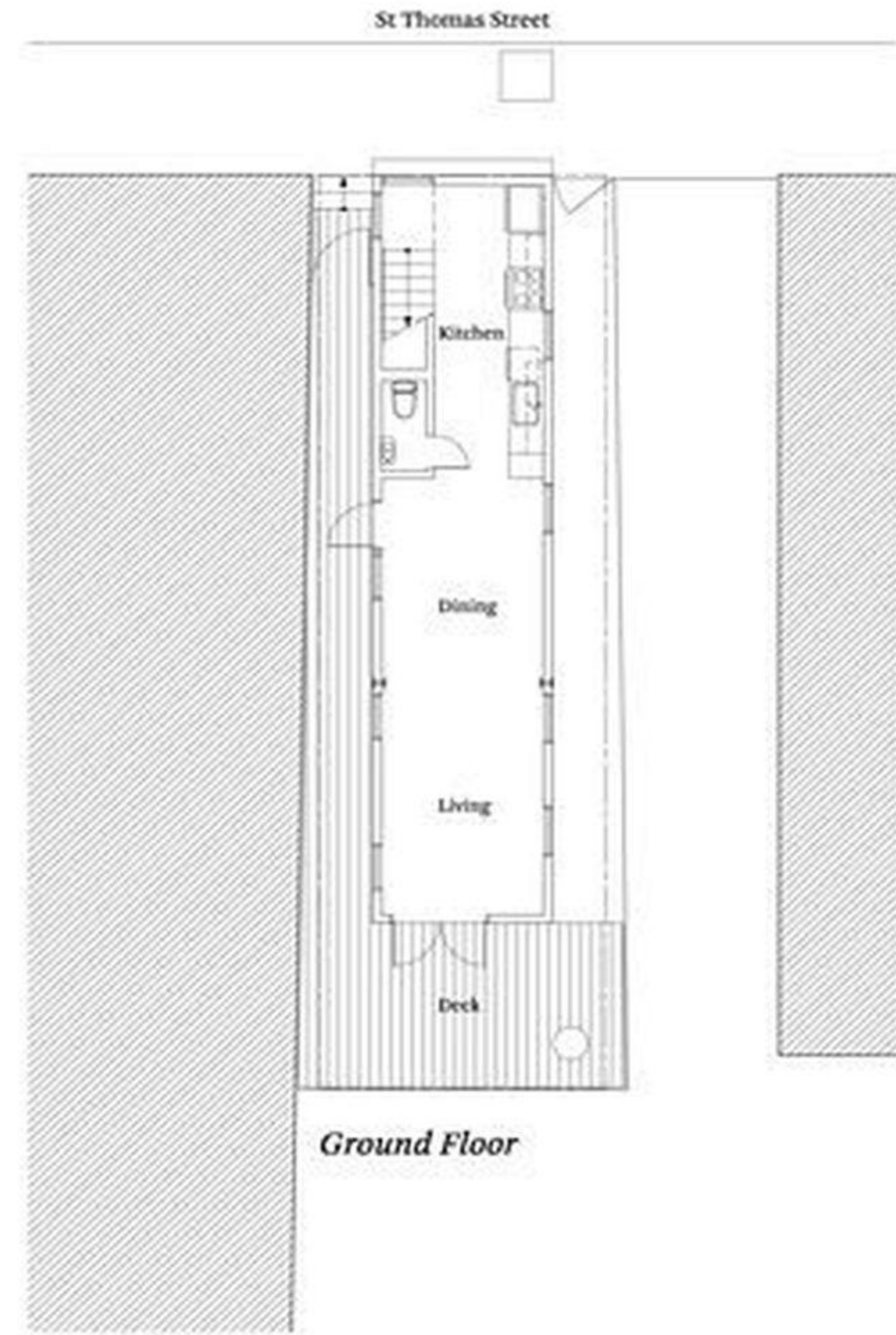
- Shared lot community
- Communal organic garden
- Shared 120 gallon cistern
- Repurposed shipping containers
- 200 square feet or below
- Purpose was to create low impact homes and affordable housing
- Example of a grassroots, community driven urban infill project



Case Study: Starter Home

New Orleans, LA | Jonathan Tate | 2015

- Homes on tiny, overlooked city lots
- Site specific, high density units
- Low cost - Extremely expensive units, \$100k-\$300k
- Re-imagining tract design on narrow, city lots
- Using unorthodox sites as inspiration
- Zig Zag form is inspired by Creole cottages
- Example of a local architect addressing inner city abandoned lots.

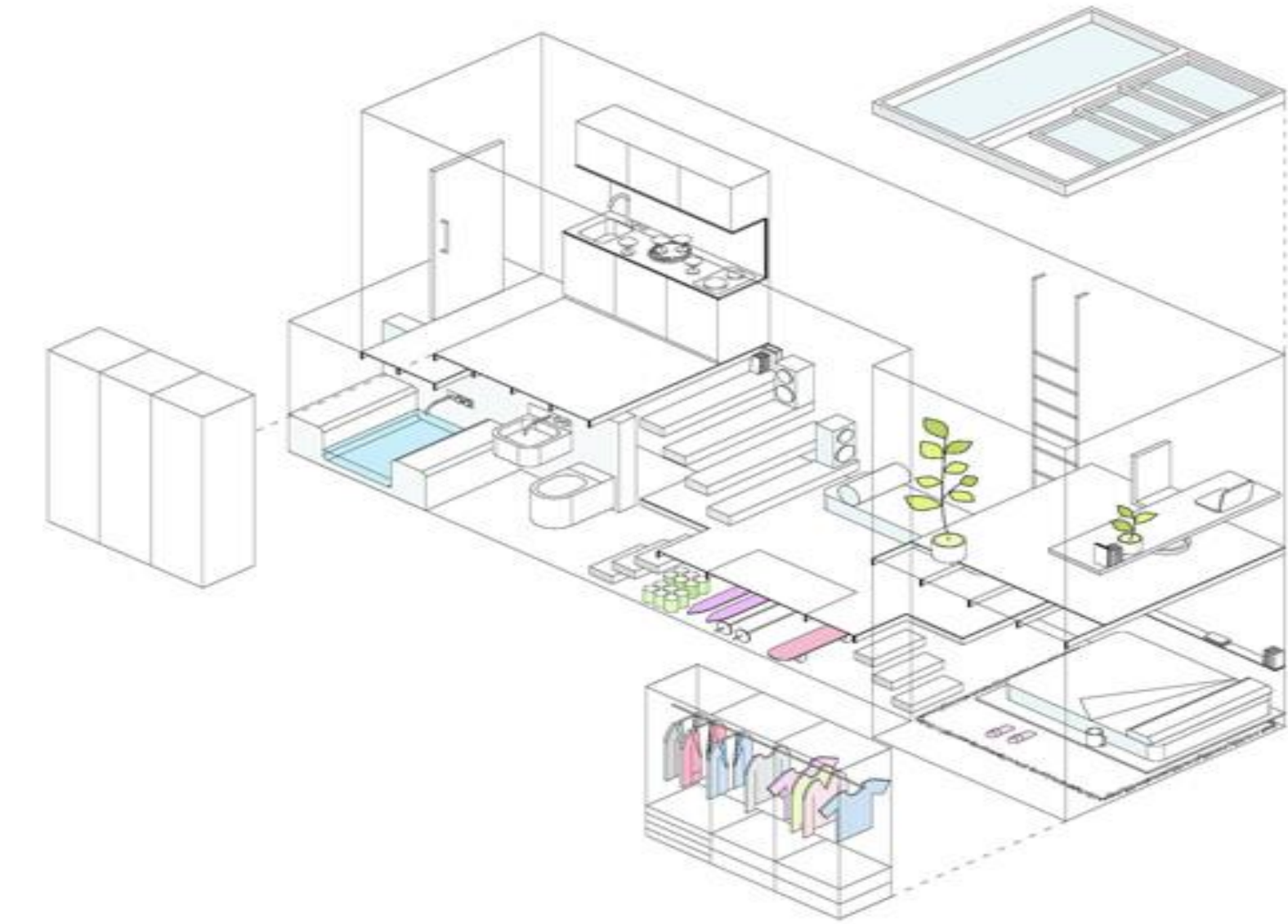


Building Code Implications

A dwelling is considered by building codes to be used as a non-transient occupancy for the purposes of living, which includes sleeping and cooking (Applying building codes to tiny homes, National Fire Protection Association 4). IRC Section R306.1 states that every dwelling unit must have a toilet, lavatory, and a tub or shower.

(Tiny homes constructed on a trailer with a permanent chassis are referred to as THOW, tiny homes on wheels. These tiny homes fall under the category of recreational vehicle, and therefore do not fall under the mandate of building codes. (Applying building codes to tiny homes, National Fire Protection Association)

A group of tiny home advocates have both submitted and gained approval for the new Appendix Q Tiny Houses for the 2018 International Residential Code (IRC). This appendix would be for tiny houses on foundations, NOT on wheels.



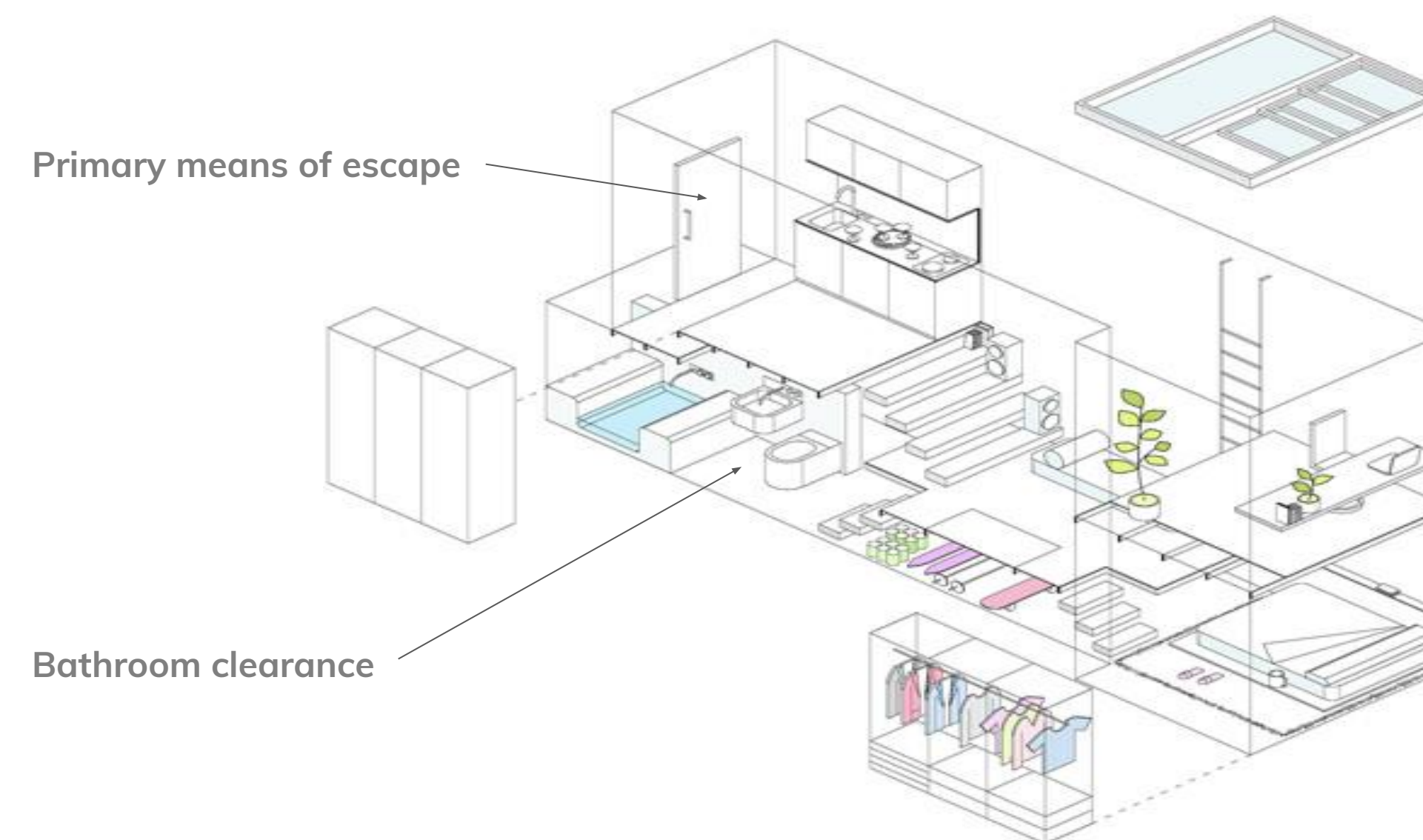
Building Code Implications

In most cases, the sleeping room in a tiny home is the main room of the house, and the main door serves as the **primary means of escape**. Where a separate sleeping room is created, a secondary means of escape is required.

NFPA 5000 Section 22.2.2.2 does not require the primary door to be a side-hinged door. However, IRC Section R311.2 requires the primary means of escape to be a side-hinged door (8)

The primary means of escape is required to be at least 32 inches wide by NFPA 5000 Section 22.2.2.1.2 and IRC Section R311.2 (Applying building codes to tiny homes, National Fire Protection Association 9)

Bathrooms are not habitable rooms, but there are established dimensional requirements that may affect a tiny home. Codes generally require a clearance of 15 inches from the center of a toilet to any obstruction. They also require 24 inches in front of a toilet. Also, shower basins are required to be a minimum of 30 inches by 30 inches. See IRC Section P2708.



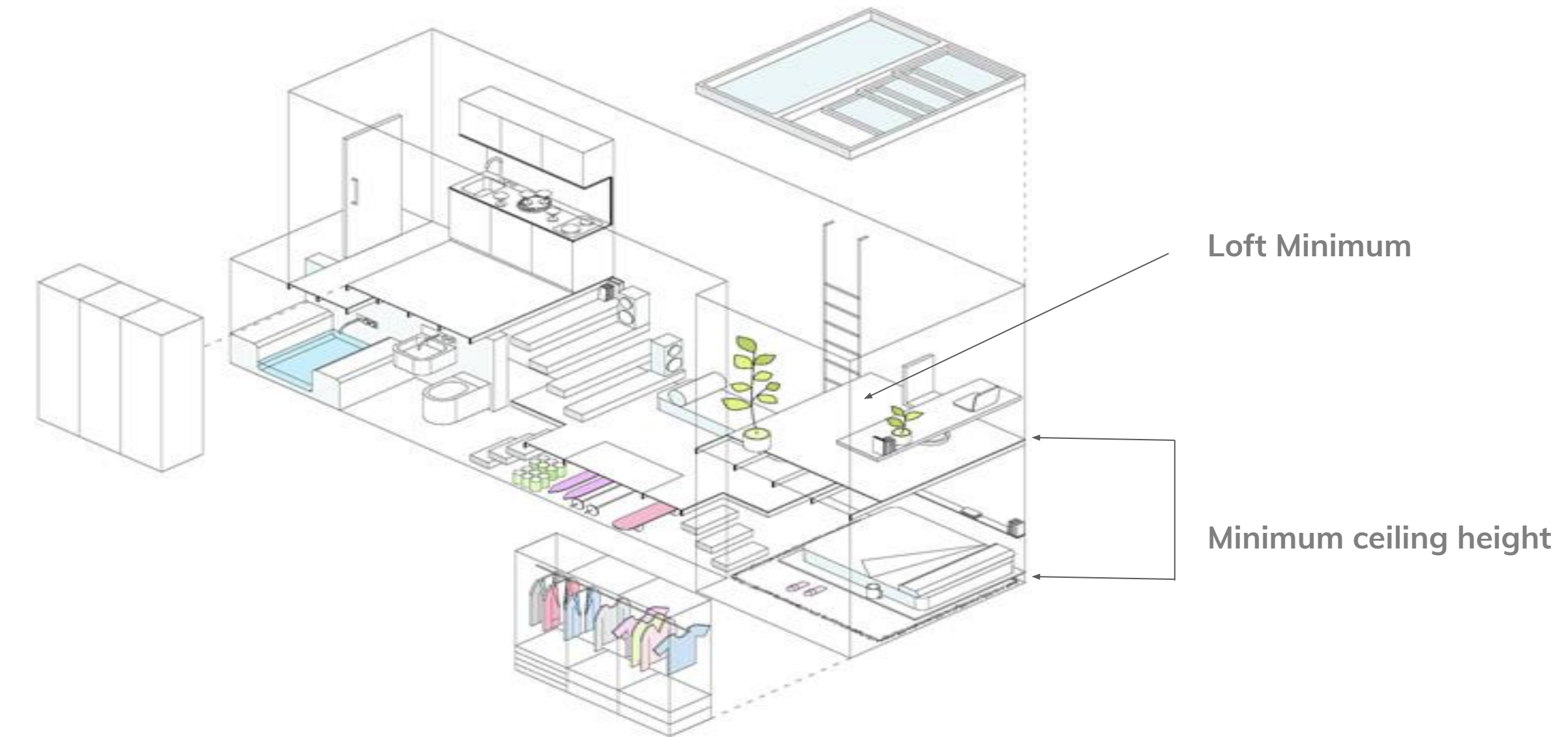
Building Code Implications

AV104.1.1 **Loft Minimum area.** Lofts shall have a floor area of not less than 35 square feet (3.25 m²)

AV104.1.2 **Loft Minimum dimensions.** Lofts shall be not less than 5 feet (1524 mm) in any horizontal dimension.

AV104.3 **Loft guards.** Loft guards shall be located along the open side(s) of lofts located more than 30 inches (762 mm) above the main floor. Loft guards shall be not less than 36 inches (914 mm) in height or one-half the clear height to the ceiling, whichever is less.

AV103.1 **Minimum ceiling height.** Habitable space and hallways in tiny houses shall have a ceiling height not less than 6 feet 8 inches (2032 mm). Bathrooms, toilet rooms, and kitchens shall have a ceiling height not less than 6 feet 4 inches (1930 mm).
Exception: Ceiling heights in lofts are permitted to be less than 6 foot 8 inches (2032 mm).



Building Code Implications

AV.104.2.1.3 Stair Treads and Risers. Risers for stairs accessing a loft shall be a minimum of 7 inches (178 mm) and a maximum of 12 inches (305 mm). Tread depth and riser height shall be calculated with the following formulas:

Tread depth = 20 inches (508 mm) minus $\frac{4}{3}$ riser height OR

Riser height = 15 inches (381 mm) minus $\frac{3}{4}$ tread depth

Exception: Landing platforms shall measure two treads deep and two risers tall.

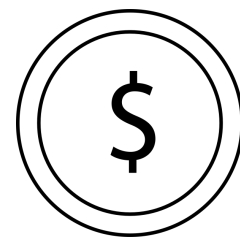
AV104.2.2.1 Ladder Size and capacity. Ladders accessing lofts shall have 12 inches (305 mm) minimum rung width and 10 inches (254 mm) to 14 inch (356 mm) spacing between rungs. Ladders shall be capable of supporting a 200 pound (75 kg) load on any rung. Rung spacing shall be uniform within $\frac{3}{8}$ -inch (9.5 mm).



Conclusion

Principles

1. Affordability On average, tiny houses cut cost of living by 60%.



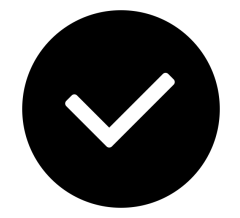
2. Personal Freedom Less stress leads to better habits and more time to pursue goals.



3. Sustainability Less space leads to less consumption, makes you aware of possessions.



4. Space Efficiency Small footprint allows for more creativity with spatial design.



History

Evolution of the Tiny House in America

1607

1620-1630

English Settlers' Cabins



Cape Cod Cottages
1700-1750



Thoreau's Cabin
1845



Sunday Houses
1880-1920

1800

Frontier Cabins



1840-1860

Campground Cottages



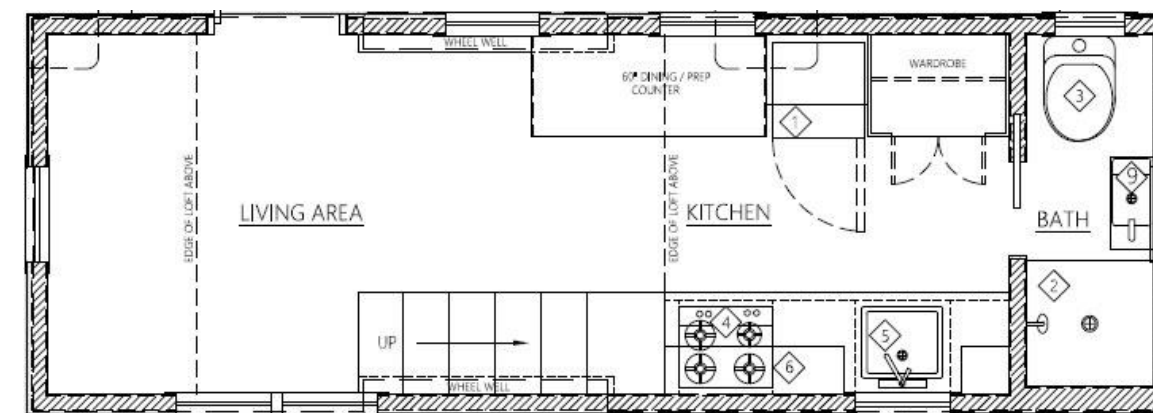
1979

Autonomous House



2018

Precedents



Hikari Box - PAD



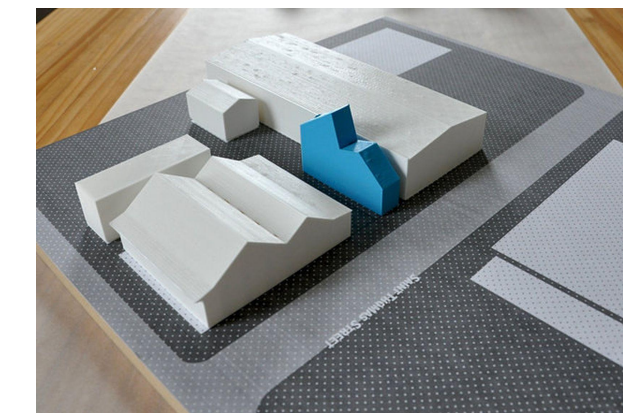
Murdoch - Wishbone



Micro Cabin



ADU - YardPod



Starter Home - Jonatan Tate