



Massachusetts ADU Design Challenge | Project Cover Sheet

1. Design Team

Lead Applicant: Ralph Brill

Additional Applicants: Peter van Geldern

Design Firm Name (If Applicable): PURE HEMP MA

Contact Info: brill.group@verizon.net

2. Design Information

EntryID (randomly assigned by HLC for tracking purposes): 3557

Design Name: MA ADU

ADU Gross Floor Area (square footage): 900

Unit Layout: Studio

ADU Height (feet): 25

Window/Wall Ratio: 15%

Foundation Type: Block Frost Wall

3. Project Narrative

The Western Gateway ADU is a scalable, high-performance, hempcrete panel home designed to make small housing attainable, healthy, and climate-resilient across Massachusetts. Ranging from 500 to 900 square feet, the design operates as a modular platform that can adapt to diverse household needs, lot conditions, and budget thresholds while maintaining architectural integrity and performance consistency. At its core, the project integrates three principles: regenerative materials, bioclimatic design, and replicable construction systems. The ADU combines a prefabricated hempcrete panel envelope with a light-filled Sunspace or “Third Space” that functions as a climate buffer, food-growing zone, and seasonal living extension. This integrated system transforms a compact footprint into a spatially expansive, energy-efficient dwelling. The architectural form respects Massachusetts vernacular traditions through refined massing, proportion, and material expression, ensuring compatibility ac

Please note that the information contained in this file was submitted to the Executive Office of Housing and Livable Communities (HLC) by ADU Design Challenge participants and has not been independently verified by HLC or the Commonwealth of Massachusetts. Please direct questions to the designers.

SUNSPACE-ADU

ADU + DETACHED AUXILLARY DWELLING UNIT

ADU @ 500SF @ \$350/SF (175k) + SUNSPACE @ 400SF @ \$150/SF (\$60k) AFFORDABLE 900SF ADU (\$235k TOTAL)

HEALTHY HOME

This ADU is designed as a living environment that actively supports human health. Built with non-toxic, plant-based materials and abundant natural daylight, it prioritizes clean indoor air, thermal comfort, and a deep connection to natural cycles. The result is a home that reduces chemical exposure, regulates humidity naturally, and fosters physical and mental well-being.

CARBON & NET ZERO

Our ADU is designed to be both low-embodied-carbon and net-zero operational. By utilizing bio-based structural materials that sequester carbon, combined with high-performance insulation and rooftop solar integration, the home dramatically reduces lifecycle emissions. It produces as much energy as it consumes annually, positioning it as a scalable climate-positive housing solution for Massachusetts.

BIO-PHILIC DESIGN

This design integrates nature not as decoration, but as architecture. The SUNSPACE envelope, visible planting systems, natural materials, and daylight-rich interior create a continuous dialogue between indoors and outdoors. Biophilic principles enhance occupant resilience, productivity, and emotional well-being while transforming the ADU into a regenerative micro-ecosystem.

CIRCULAR CONSTRUCTION

The ADU is conceived as part of a circular building economy, from seed to roof. Components are designed for durability, disassembly, and future reuse. Plant-based materials store carbon during their life cycle and can safely return to the soil at end-of-life. This approach reduces construction waste, minimizes extraction, and supports regional regenerative supply chains.

NATURAL HIGH PERFORMANCE

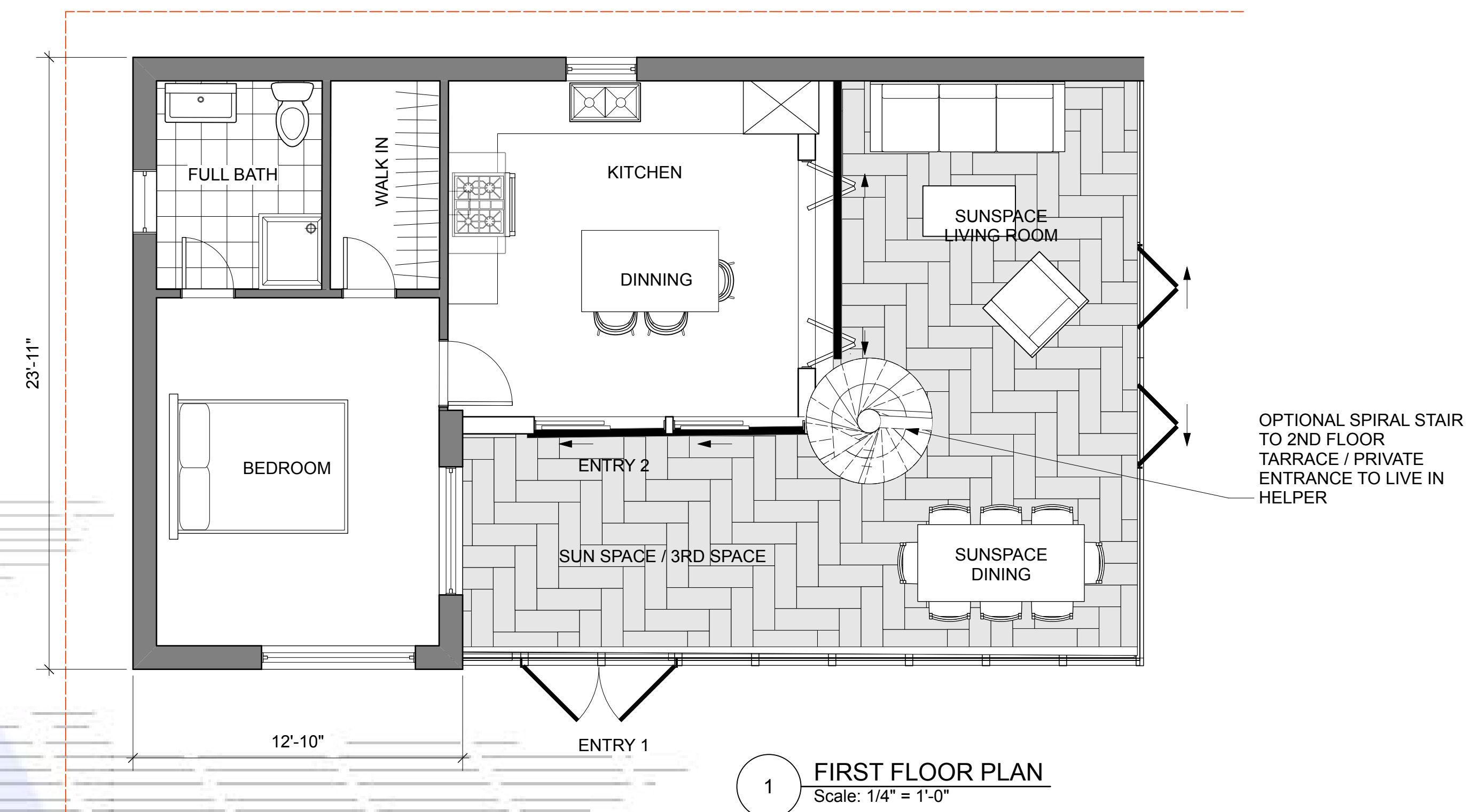
High performance does not require petrochemical systems. Through super-insulated natural wall assemblies, passive solar orientation, thermal mass, and airtight detailing, this ADU achieves exceptional energy efficiency while maintaining vapor permeability and indoor comfort. It proves that natural materials can meet — and exceed — modern performance standards.

EXPANDABLE

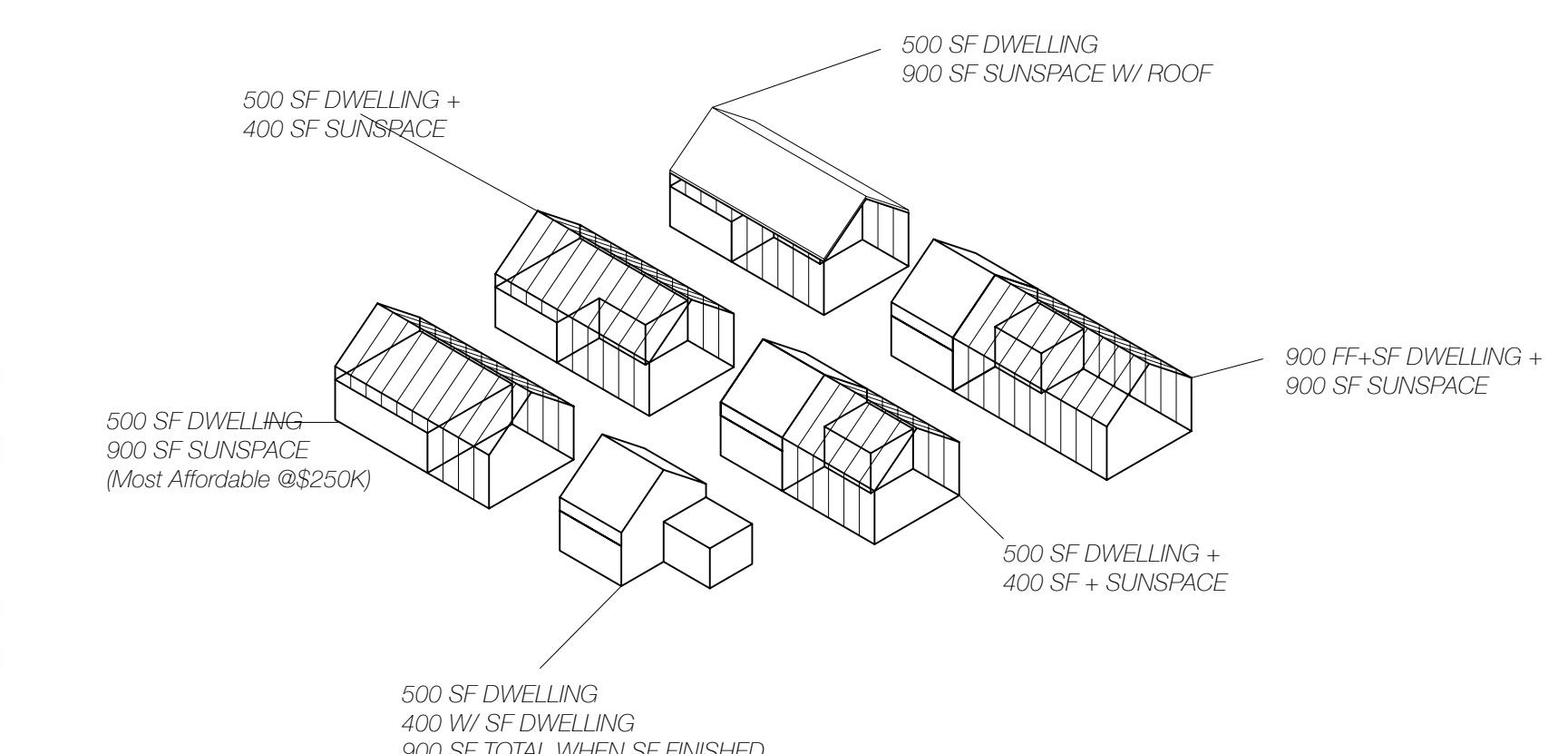
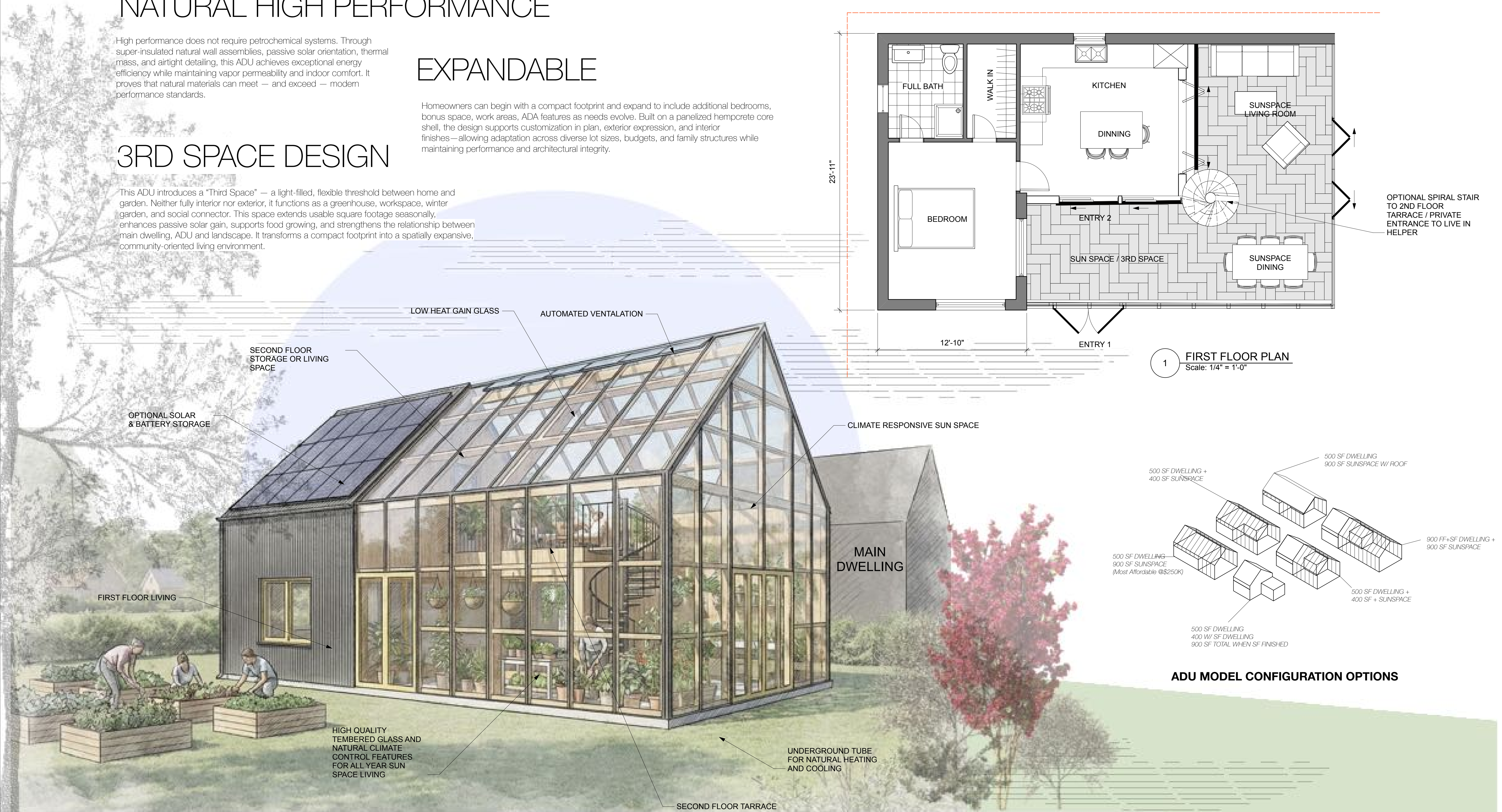
Homeowners can begin with a compact footprint and expand to include additional bedrooms, bonus space, work areas, ADA features as needs evolve. Built on a panelized hempcrete core shell, the design supports customization in plan, exterior expression, and interior finishes — allowing adaptation across diverse lot sizes, budgets, and family structures while maintaining performance and architectural integrity.

3RD SPACE DESIGN

This ADU introduces a "Third Space" — a light-filled, flexible threshold between home and garden. Neither fully interior nor exterior, it functions as a greenhouse, workspace, winter garden, and social connector. This space extends usable square footage seasonally, enhances passive solar gain, supports food growing, and strengthens the relationship between main dwelling, ADU and landscape. It transforms a compact footprint into a spatially expansive, community-oriented living environment.



1 FIRST FLOOR PLAN
Scale: 1/4" = 1'-0"



ADU MODEL CONFIGURATION OPTIONS

Project Title
SUNSPACE ADU

500 - 900 sqft

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| DESIGN PROFESSIONAL | | |
| Consultant | | |
| REV. | DATE | DESCRIPTION |
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| NO. | DATE | ISSUE NOTE |
| Project Manager | | Drawn By |
| Date | JUNE 2025 | Reviewed By |
| Project ID | WHIT 6/17 | |
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| DESIGN TITLE | | |
| Sheet No. | | |
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SUNSPACE-ADU

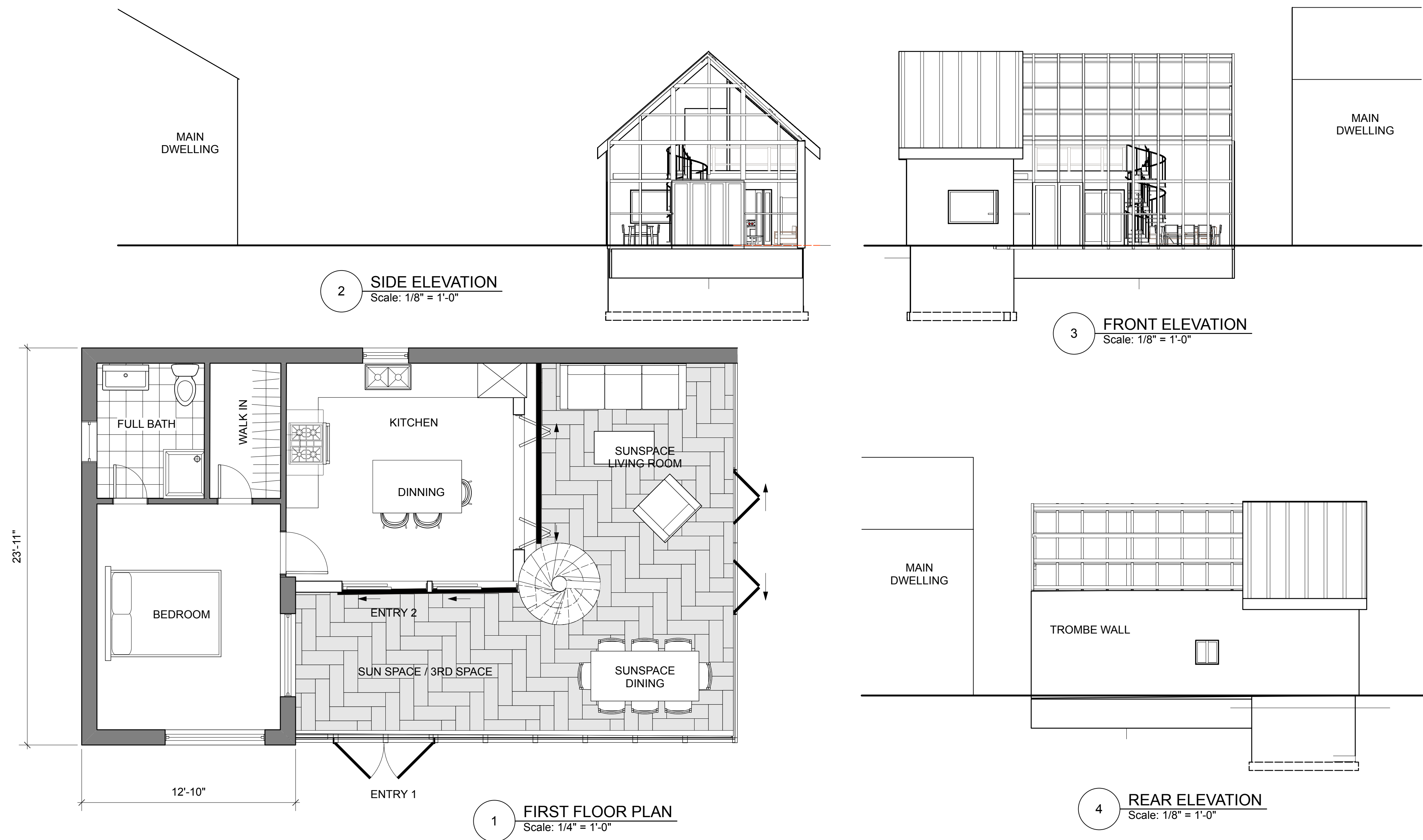
PROJECT NARRATIVE

The MA ADU is a scalable, high-performance, hempcrete panel home designed to make small housing attainable, healthy, and climate-resilient across Massachusetts. Ranging from 500 to 900 square feet, the design operates as a modular platform that can adapt to diverse household needs, lot conditions, and budget thresholds while maintaining architectural integrity and performance consistency.

At its core, the project integrates three principles: regenerative materials, bioclimatic design, net zero solar with battery backup and replicable construction systems. The ADU combines a prefabricated hempcrete panel envelope with a light-filled sunspace acts as a "Third Space" for that also functions as a climate buffer, food-growing zone, and seasonal living extension. This integrated system transforms a compact footprint into a spatially expansive, energy-efficient dwelling.

The architectural form respects Massachusetts vernacular traditions through refined massing, proportion, and material expression, ensuring compatibility across urban, suburban, and rural contexts. At the same time, the interior planning prioritizes flexibility and long-term adaptability, allowing homeowners to evolve the space from studio to one-bedroom, caregiver suite, multigenerational unit, or remote work environment.

This project directly addresses the ADU Design Challenge goals by providing a ready-to-build, high-quality design that reduces complexity, shortens timelines, and improves performance. It demonstrates that small homes can be beautiful, accessible, sustainable, and economically viable — without compromise.



500 SF FIRST FLOOR LIVING / ADA / AGE IN PLACE ADU WITH OPTIONAL UNCONDITIONED STORAGE ATTIC
OPTIONAL 400 SF SECOND FLOOR LIVING FOR LIVE IN HELPER WITH PRIVATE ENTRANCE, ATTIC OR MASTER SUITE
(SUNSPACE OPTIONAL)



500 SF FIRST FLOOR STUDIO MURPHY BED/LIVING ROOM - FULL KITCHEN / FULL BATH /
400 SF SUNSPACE

Project Title
SUNSPACE ADU

500 - 900 sqft

DESIGN PROFESSIONAL

Consultant

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DESIGN TITLE

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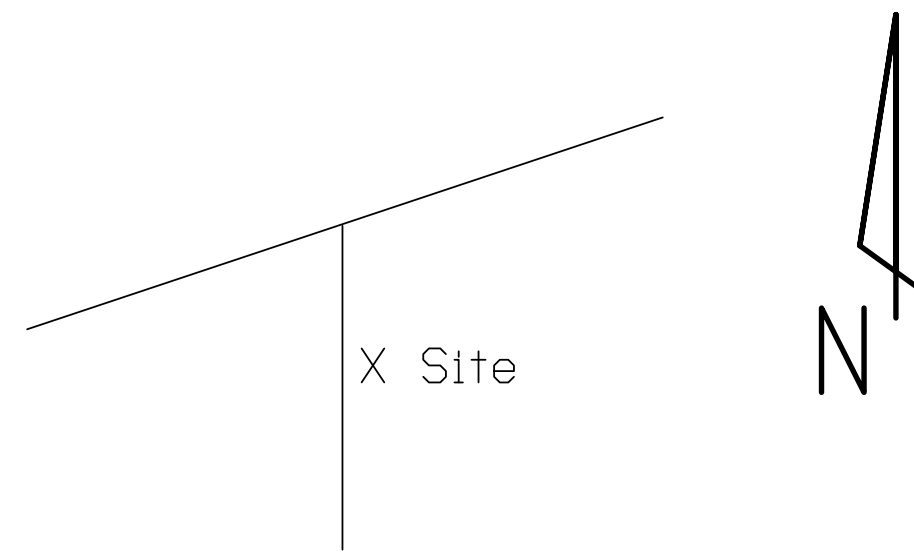
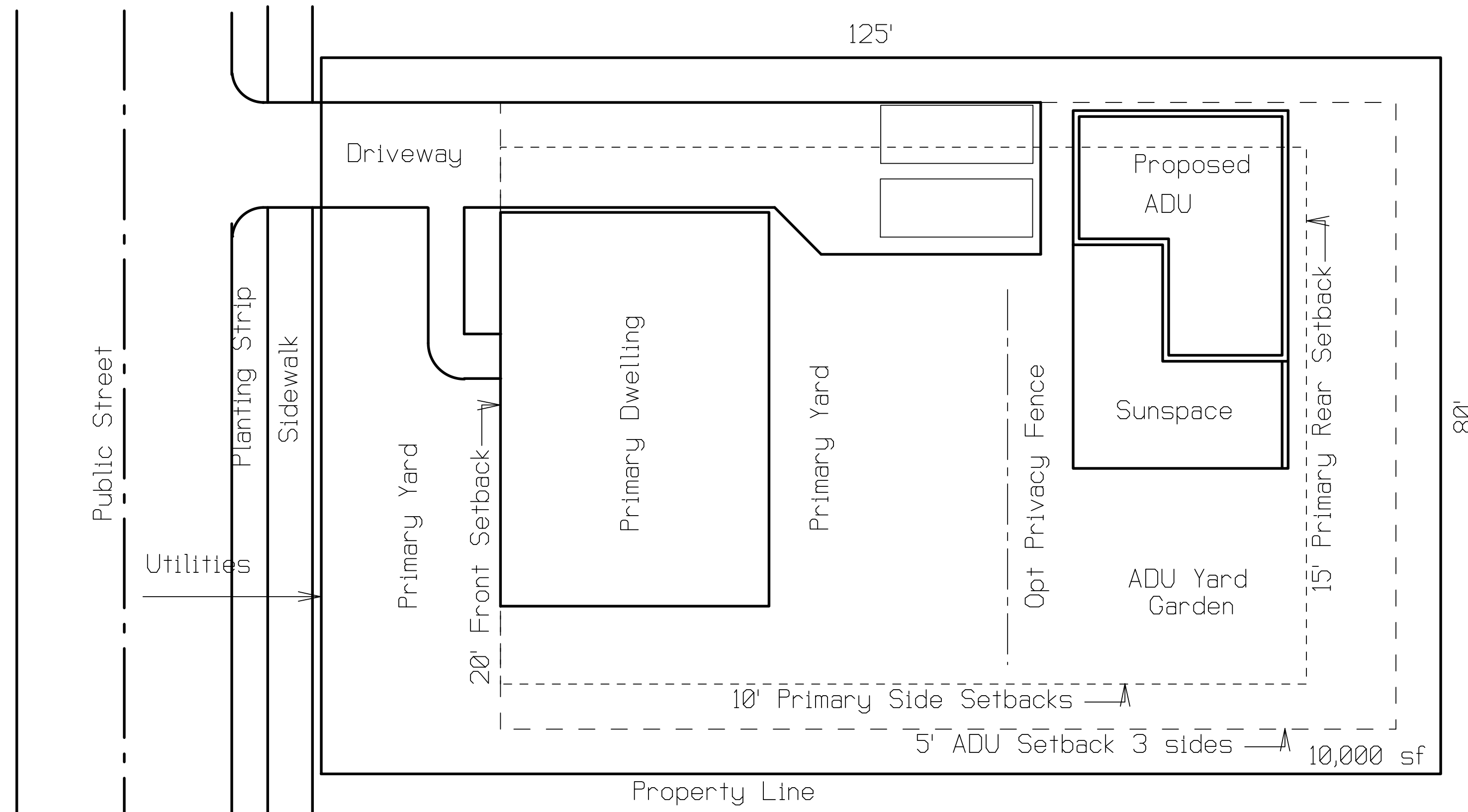
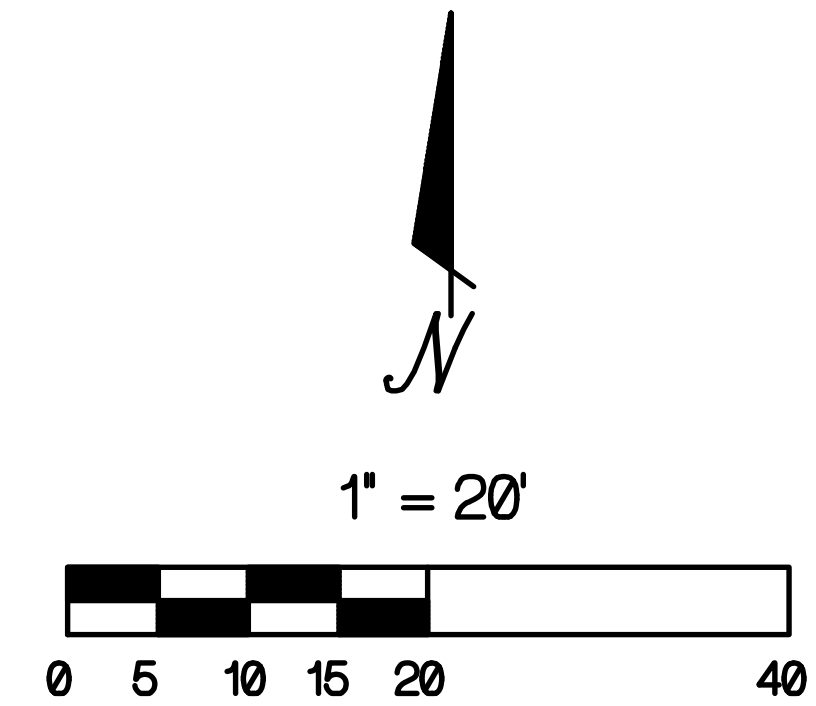
SUNSPACE-ADU

Mass ADU – Lot __ – Site Plan

OWNER:
 APPLICANT:
 ADDRESS:
 LEGAL DESCRIPTION:

Parcel #:
 situate in the County of _____, Commonwealth of Massachusetts
 ~0.23 Acres - 10,000 sf
 Public Water/Septic

NOTES:
 _____ sf Total Impervious area (house, driveway, sidewalk)
 Main Roof Area: _____ sf hs _____ sf ADU - lot area: 10,000 sf
 There are no NGPA concerns
 There are existing structures, drainage areas
 No logging required on the property
 Roof drains to splash blocks or Storm system
 Refer to Civil Eng.



Site Location Map

SITE PLAN
 1"-20" - Sheet # 1 of 1
 dpw - 3/16/2026
 ADU-sp.fcd

SP

Project Title
SUNSPACE ADU

500 - 900 sqft

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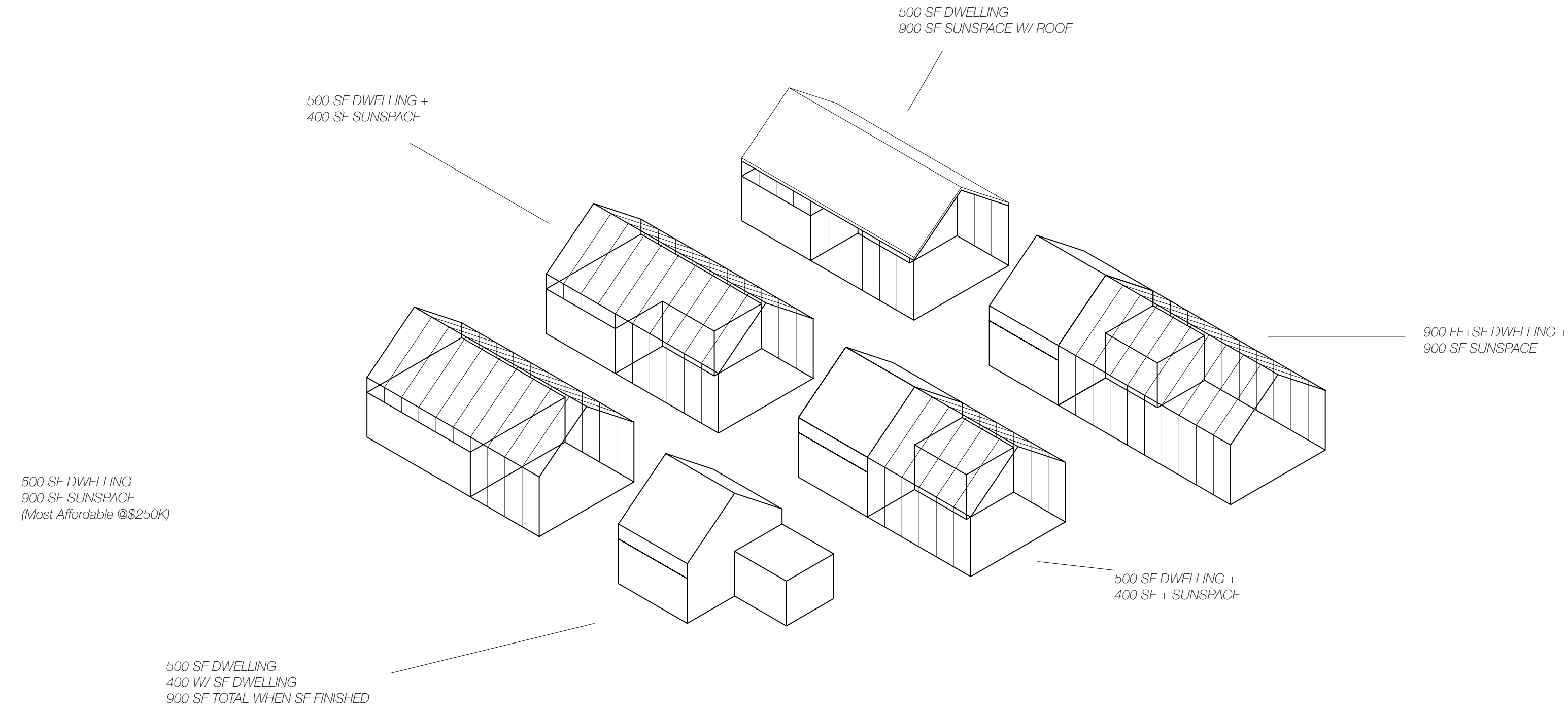
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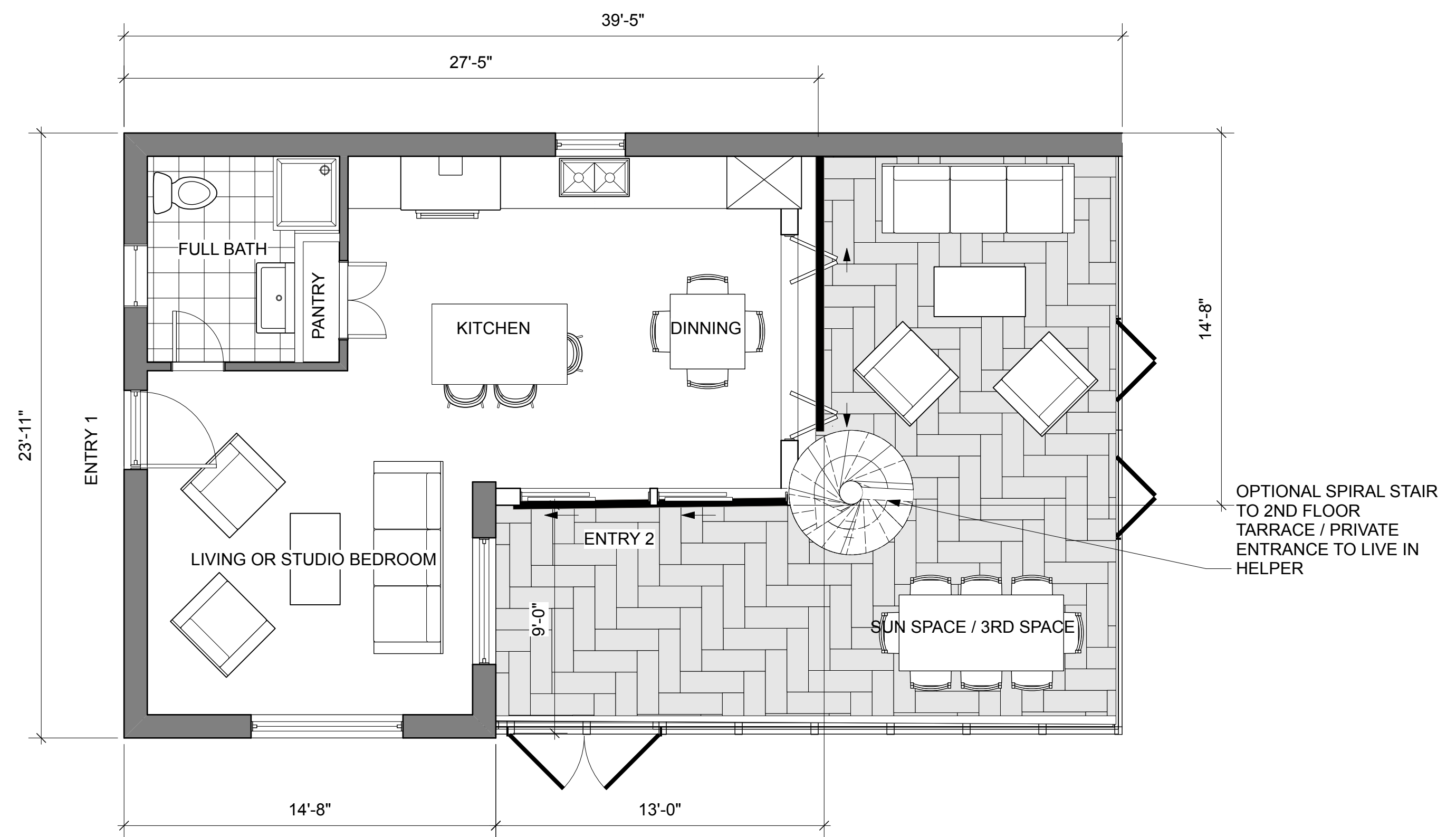
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C

MA ADU



ADU MODEL CONFIGURATIONS



1 FIRST FLOOR PLAN
Scale: 1/4" = 1'-0"

Project Title
MASS ADU

500 - 900 sqft

DESIGN PROFESSIONAL
UNFOLD CREATIVE
655 N. GEORGES HILL RD.
SOUTHURY CT 06488
peter.vangeldern@gmail.com

Consultant

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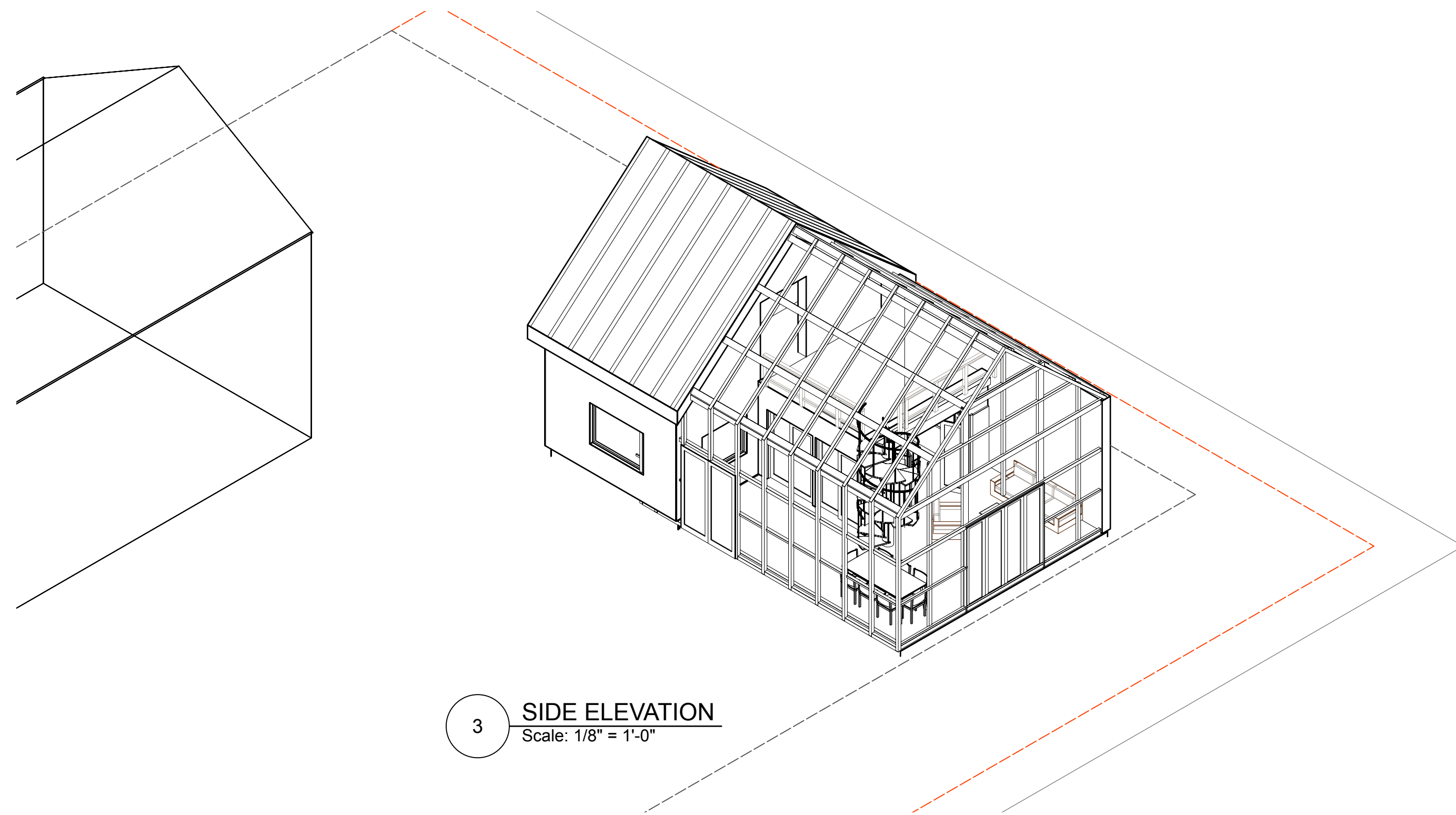
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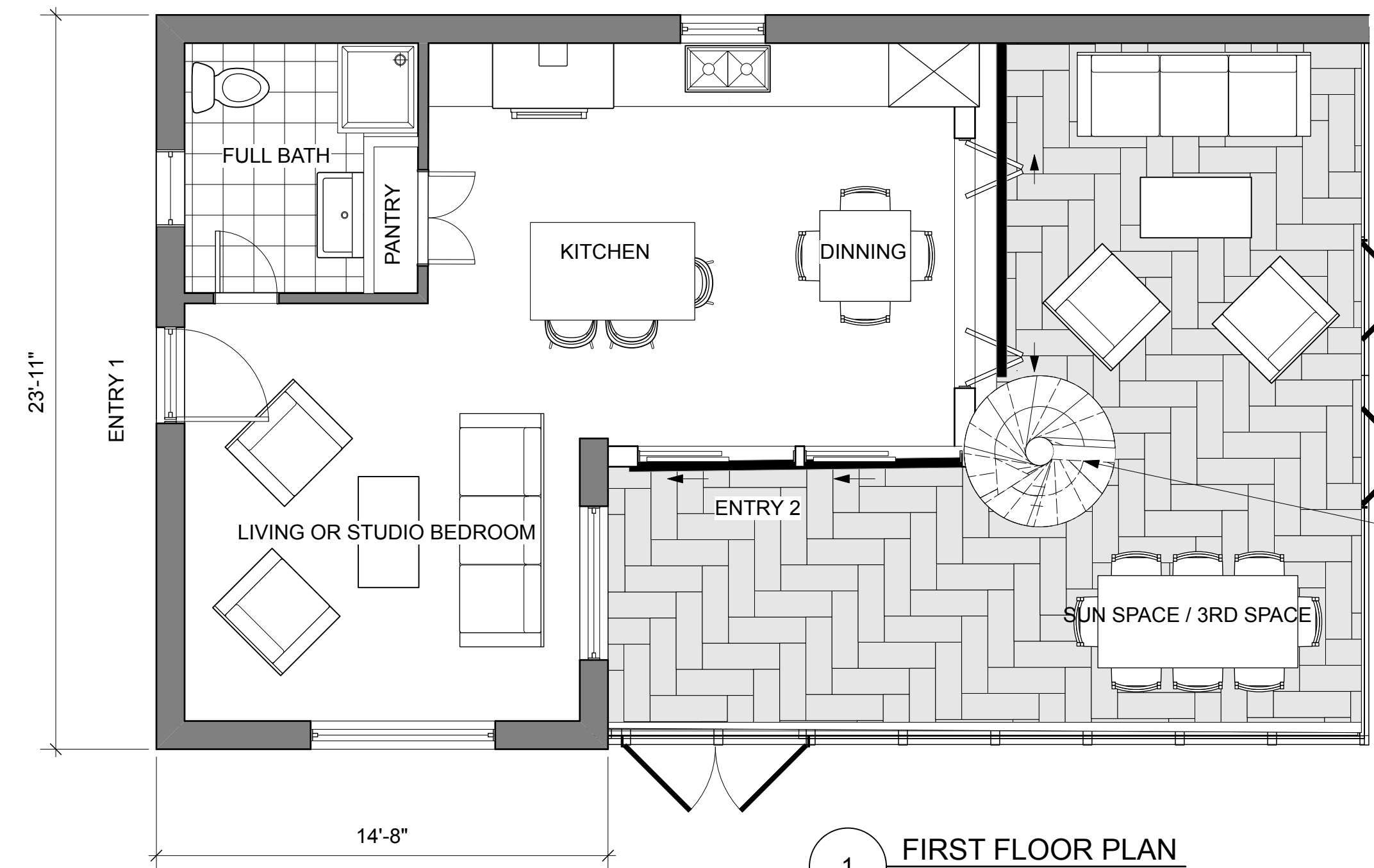
PLANS

Sheet No.

A-3

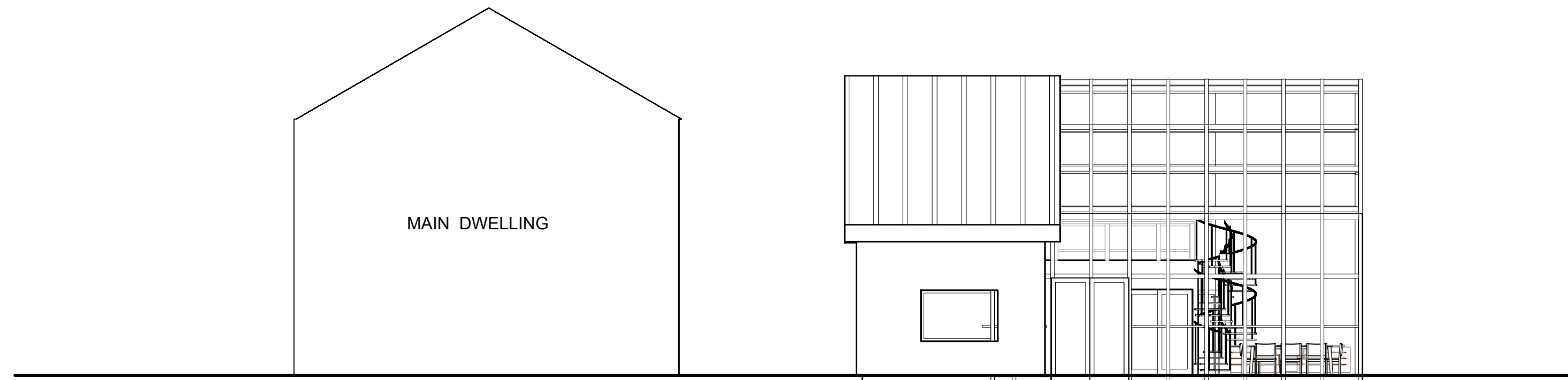


3 **SIDE ELEVATION**
Scale: 1/8" = 1'-0"

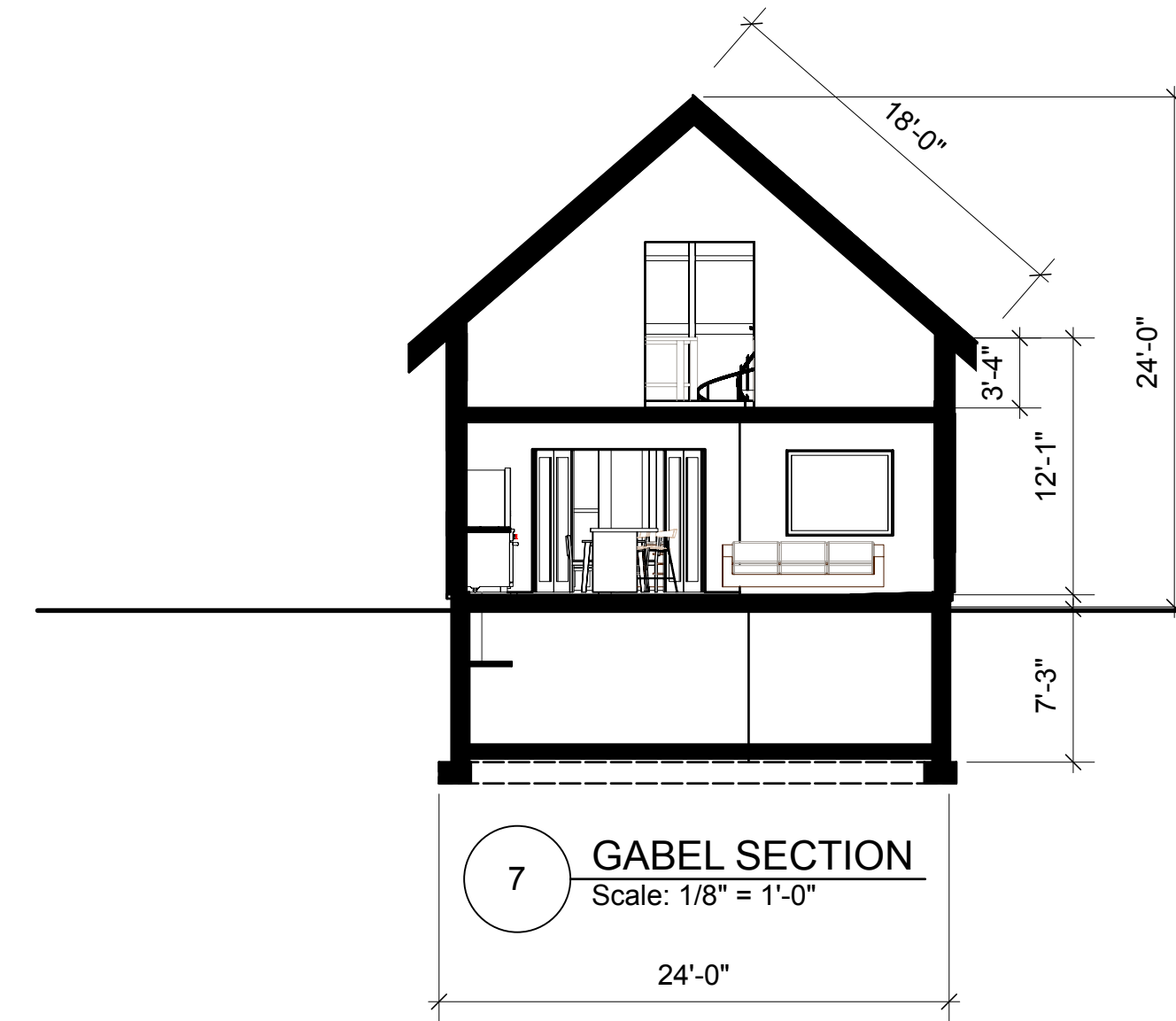


1 **FIRST FLOOR PLAN**
Scale: 1/4" = 1'-0"

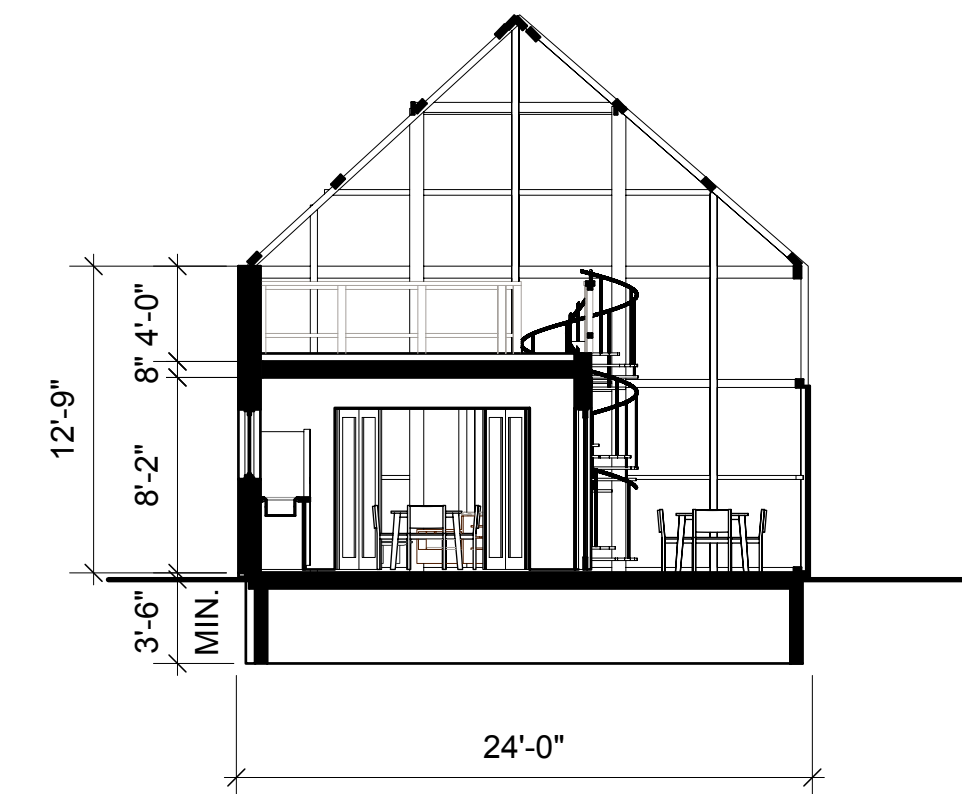
OPTIONAL SPIRAL STAIR
TO 2ND FLOOR
TARRACE / PRIVATE
ENTRANCE TO LIVE IN
HELPER



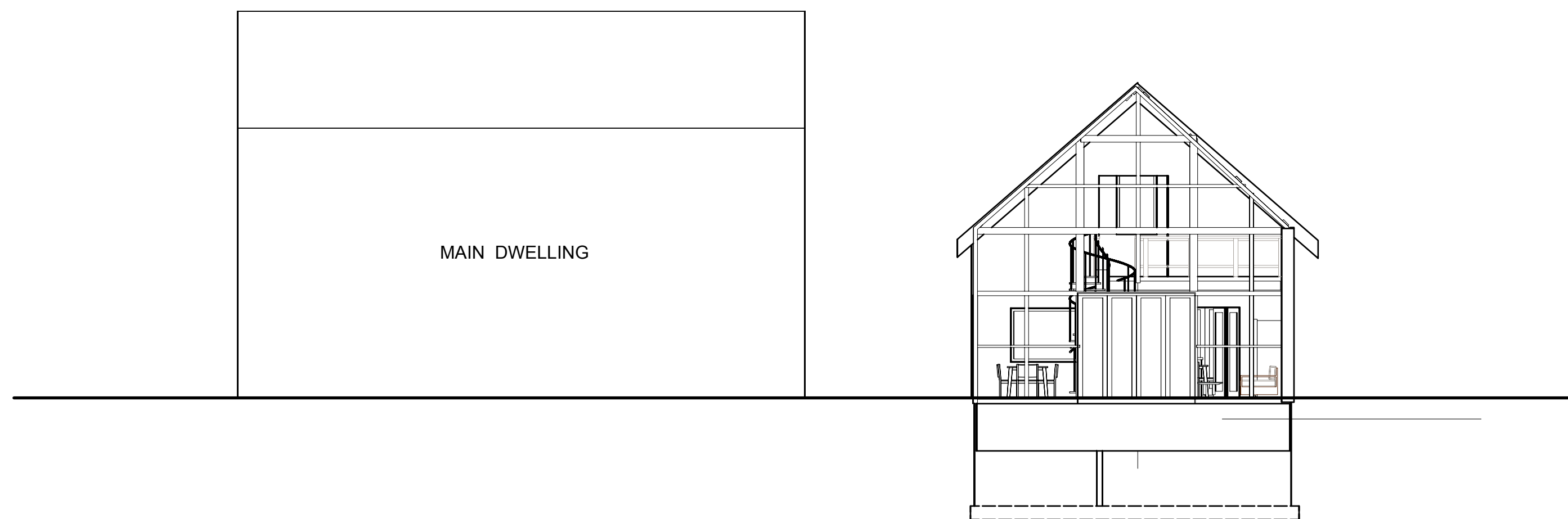
2 **SIDE ELEVATION**
Scale: 1/8" = 1'-0"



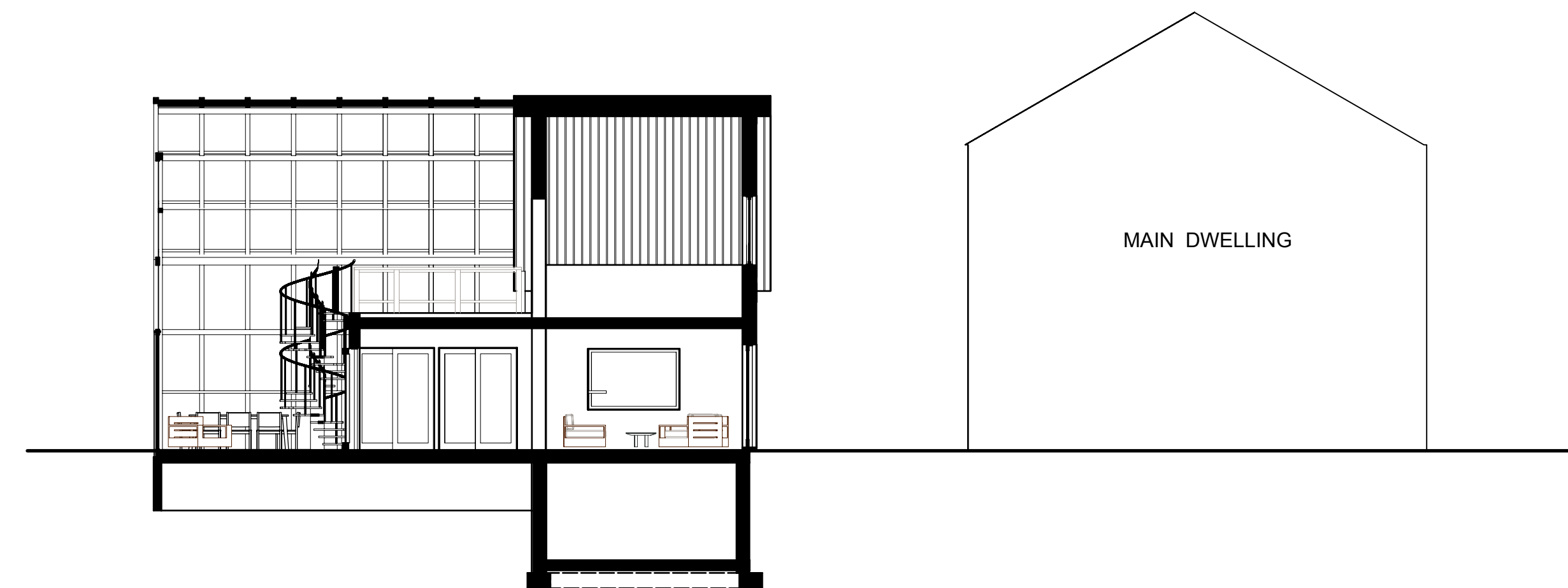
7 **GABEL SECTION**
Scale: 1/8" = 1'-0"



6 **SHORT SECTION SUN SPACE**
Scale: 1/8" = 1'-0"



4 **REAR ELEVATION**
Scale: 1/8" = 1'-0"



5 **LONG SECTION**
Scale: 1/8" = 1'-0"

Project Title
MASS ADU

500 - 900 sqft

DESIGN PROFESSIONAL
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655 N. GEORGES HILL RD.
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peter.vangeldern@gmail.com

Consultant

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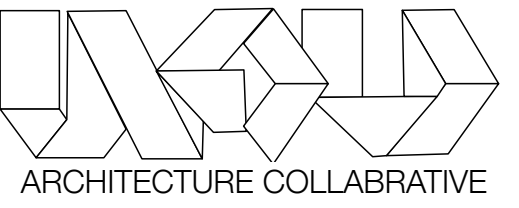
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| Sheet Title | PLANS AND ELEVATIONS |
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|-----------|-----|
| Sheet No. | A-2 |
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MA ADU



UNFOLDHOMES.COM
 DESIGN LEADERSHIP
 Peter van Geldern
 (203) 278-6243
 peter.vangeldern@gmail.com



FRONT



SUNSPACE SECTION

Project Title
MASS ADU

500 - 900 sqft

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Date **JUNE 2025** Reviewed By _____

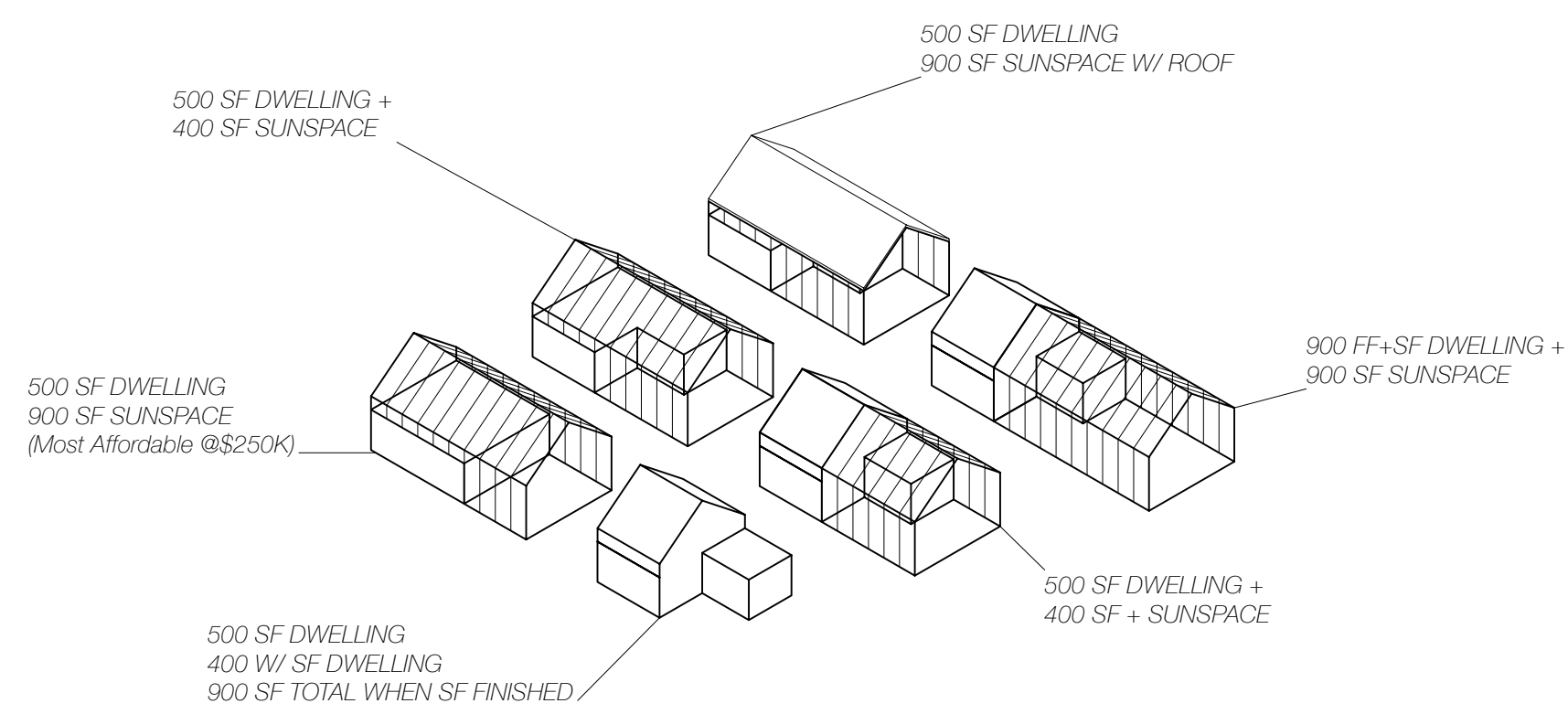
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Sheet Title

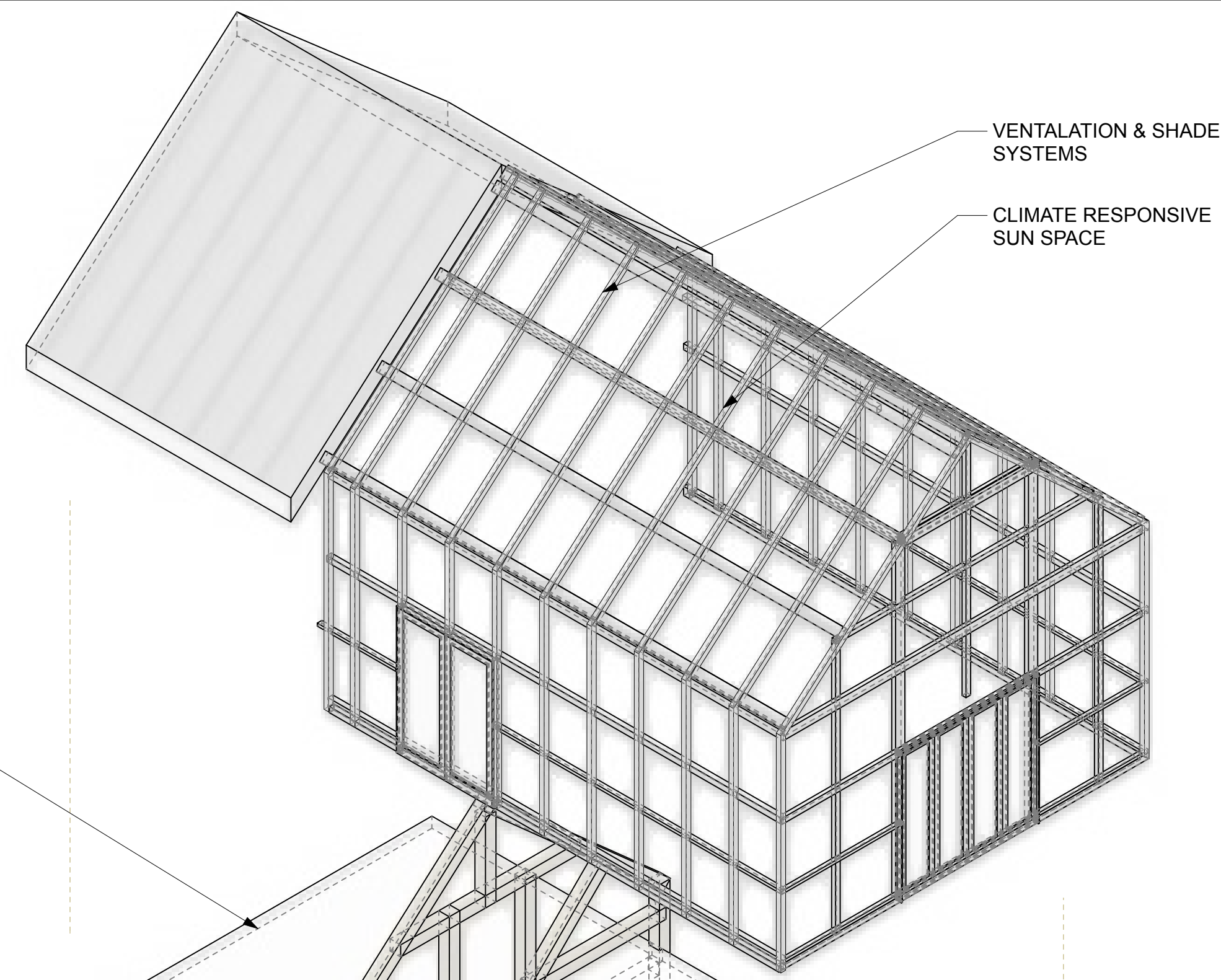
**FRONT ELEVATION
 AND REAR SECTION**

Sheet No.

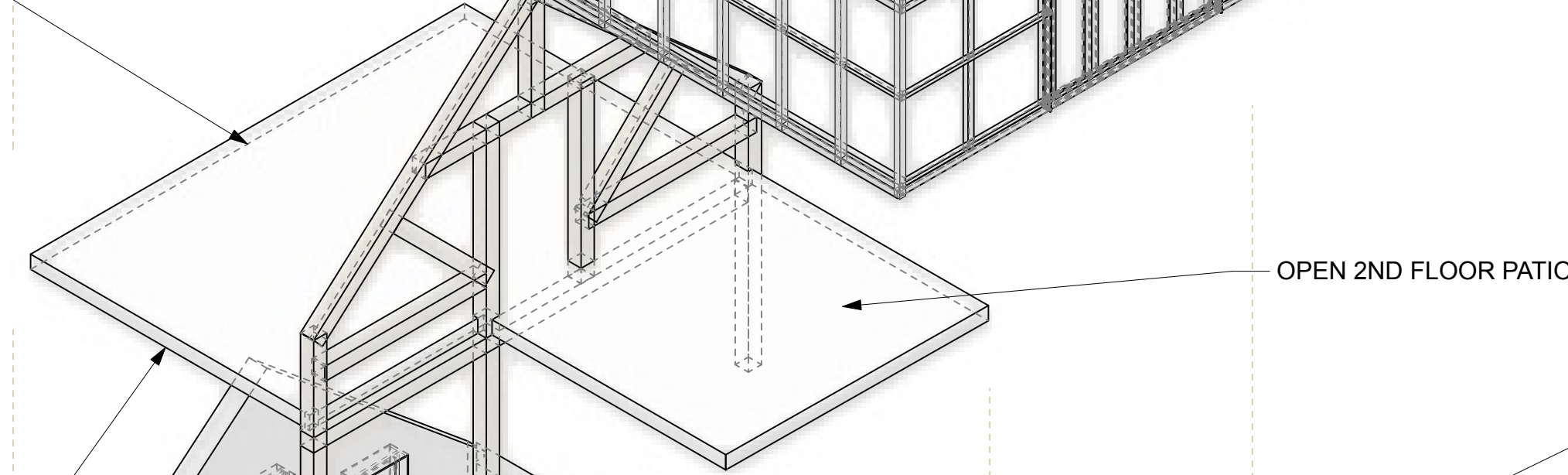
A-4



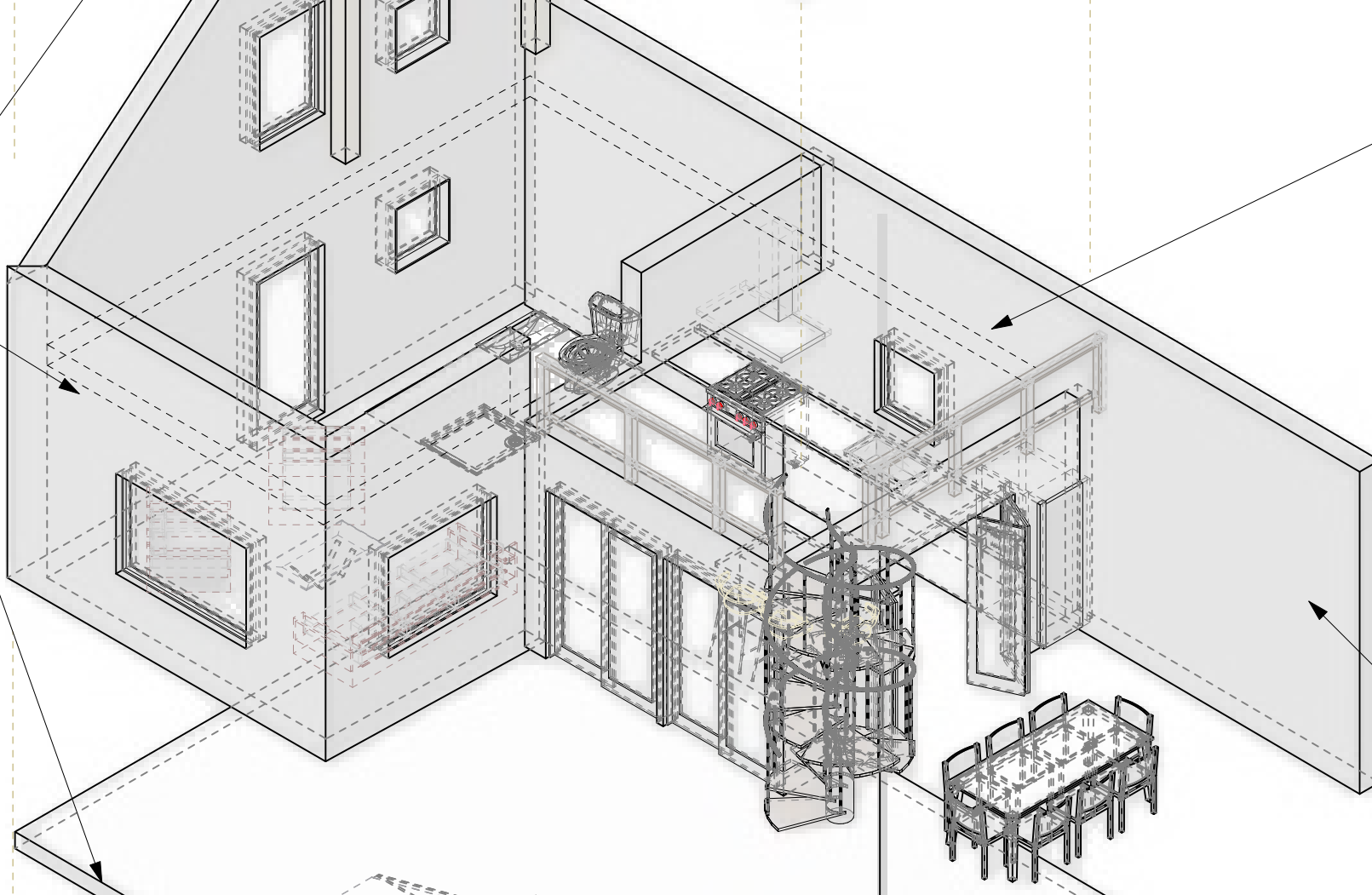
ADU MODEL CONFIGURATIONS



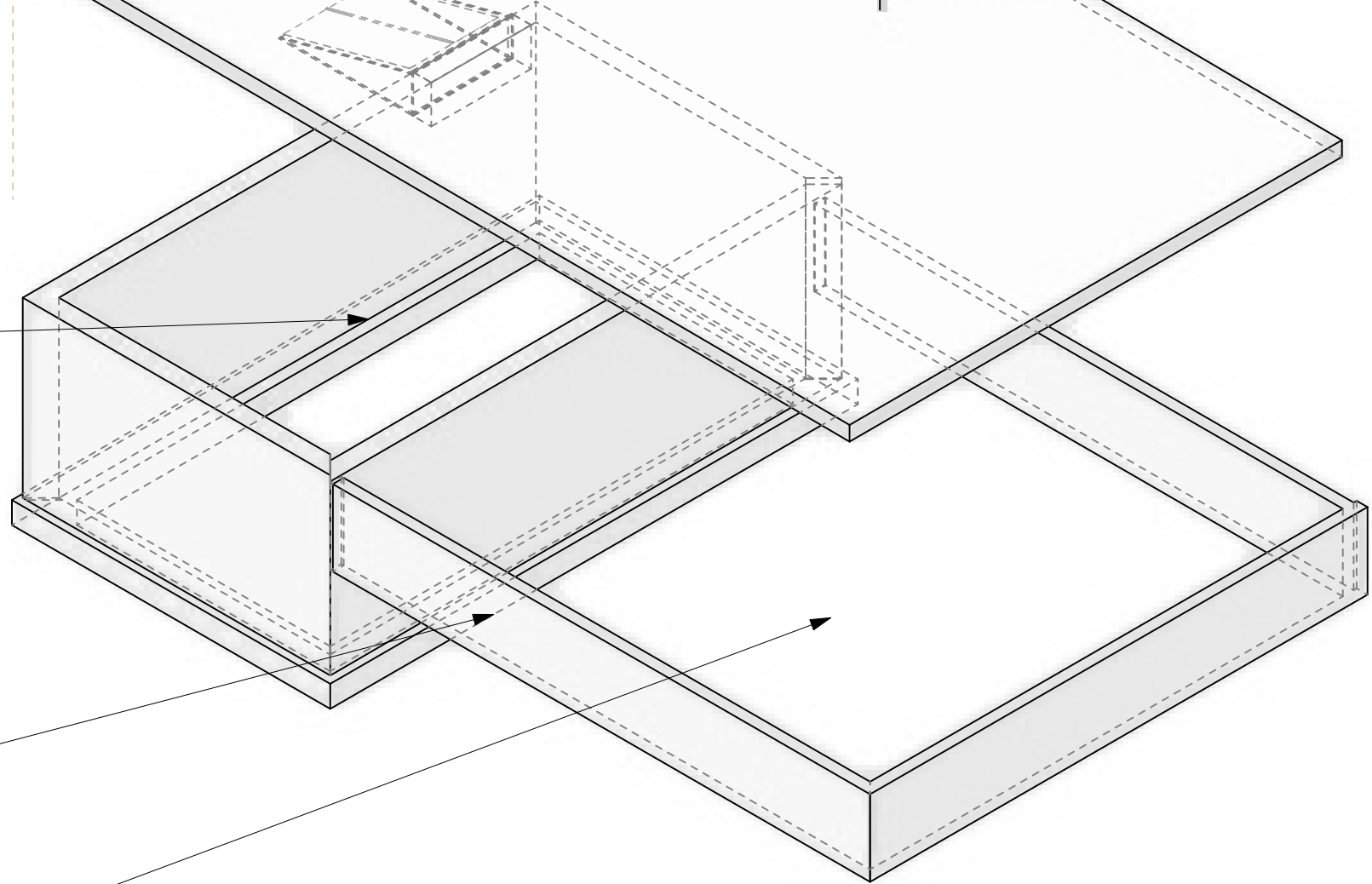
UNFINISHED ATTIC OR 2ND FLOOR DWELLING



HEMPCRETE PANELS

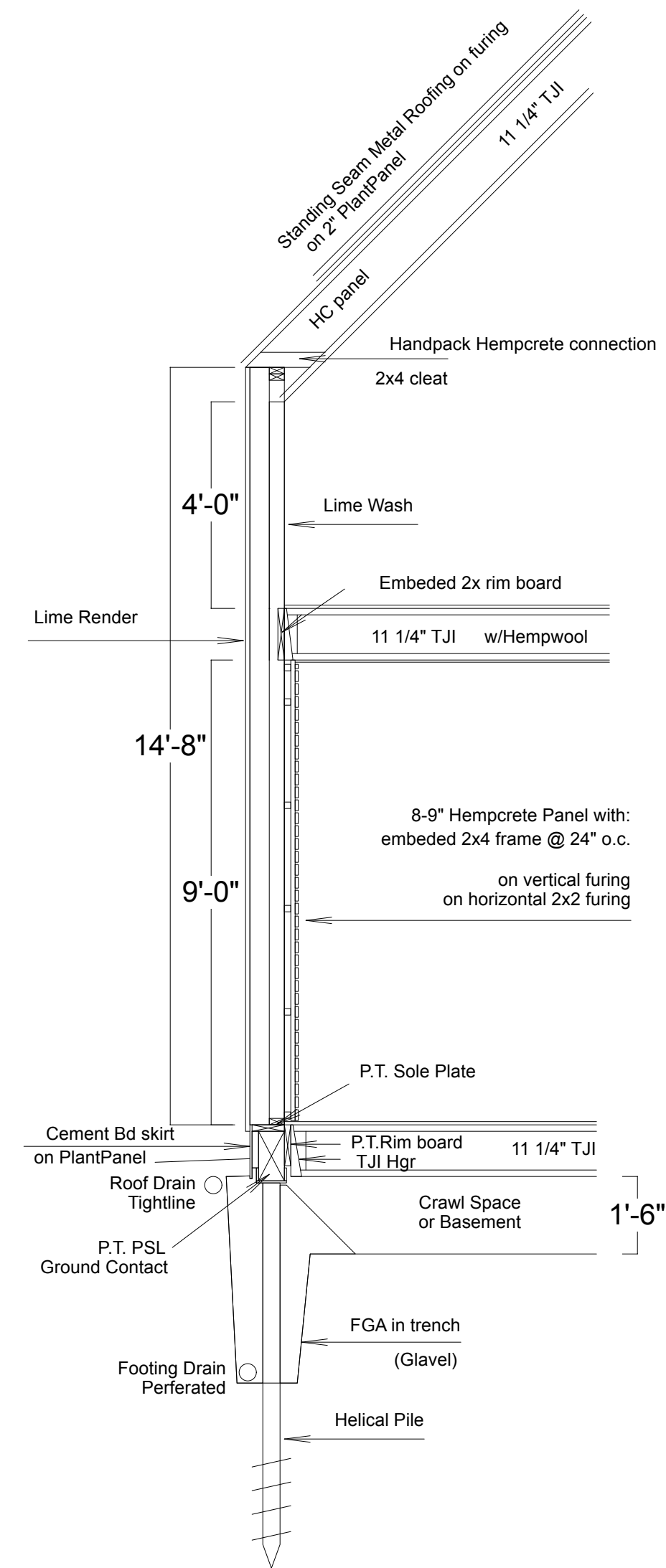


MECHANICAL ROOM



INSULATED GLAVEL CRAWL

42" FOOTINGS OR HELICAL PILE WITH PSL BEAMS FOR NO CONCRETE FOOTING.



2 STORY SECTION 4 @ KITCHEN (CRAWL OPTION)

2 WALL SECTION Scale: 3/8" = 1'-0"

8 ADU EXPLODED AXON Scale: 3/16" = 1'-0"

What is It?
Biocomposite insulation made from woody hemp hurds and a lime-based binder.

Versatile Applications
Ideal for wall insulation, roofing, and flooring to dampen sound and heat.

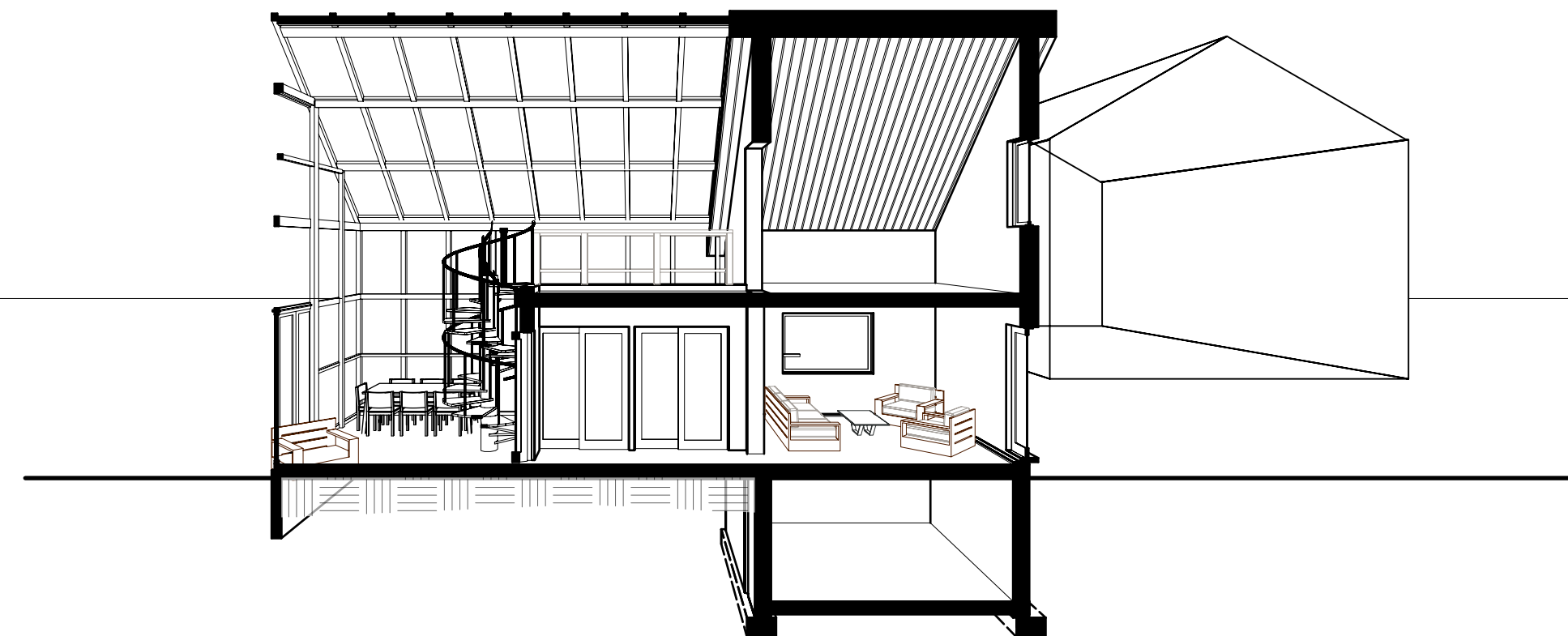
Structural Limits
Non-structural material requiring a wood frame for load-bearing support.

Cost Efficiency
Slashes energy bills by up to 50 percent through superior thermal retention.

Carbon Negative
Locks away 1.6 tons of CO₂ for every ton of hemp harvested.

Safety First
Resists direct flames for over two hours and naturally prevents mold growth.

Moisture Regulation
Permeable walls regulate humidity and improve indoor air quality naturally.



5 LONG SECTION Scale: 1/8" = 1'-0"

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Sheet Title

STORY BOARD

Sheet No.

A-1

