the NEW house  team 2
Net-zero Energy Workforce
affordable access housing
for northwestern North Carolina

filter house
Integrated Team

Project Support
Andrew WINDHAM, PhD  Faculty Advisor
Reza FOROUGHI, PhD  Faculty Advisor
Jason MILLER, MArch  Faculty Advisor
Zach HOFFMAN  Consulting Architect Partner, in situ studio
Paul DRACE  Building Industry Specialist, SmartLam

Architectural Technology and Design
Jori DURHAM  Lead Architectural Designer
Sara TAYLOR  Architectural Designer

Construction Management
Matthew COOK  Assistant Estimator
Kyle GROGAN  Cost Analyzer
John MEDFORD  Assistant Estimator
Denton CLARK  Lead Construction Manager
Kacie BECK  Construction Management Assistant

Sustainable Building Systems
Emily MALINOWSKI  Lead Building Systems Specialist
the NEW House
the NEW house: FILTER house

Project Data
Client
the WILLIAMS family
Location
Burnsville, NC, USA
Climate zone
5a
Lot info
Glendale
082009251369000
Building size
1933 csf
Program
3 bed / 2 bath
HERS score
0 w PV / 50 wo PV
Utility costs
$66.73 per month
Construction
$108 per sf

Technical Specifications
Assembly
Cross Laminated
Timber (CLT)
R-Values
13 F / 24 W / 27 R
HVAC ID
MZ-HM18NA [1.56
req tons]
PV
DOE PV Ready /

Project Highlights
The filter house uses compact public space that extends to outdoor living space to maximize the usable space for the Williams family. These exterior

Meet the Williams
A family of four relocating from South Carolina to Burnsville, NC, to become part of the local community workforce. A combined annual income of $60,000 makes it difficult for them to access affordable housing options in Yancey County.
Affordability

Constraints & Goals
Constraints & Goals

Affordability

Community
Affordability
Community
Constructability
Affordability
Community
Constructability
Net Zero Energy
Design Concept
This NEW house acts as a filter for the Williams family.
Stack
Stack

Stretch
Stack
Stretch
Subtract
Stack
Stretch
Subtract
Slope
01 Open Covered Garage
02 Kitchen/Dining/Living
03 Mudroom/Utility
04 Main Bathroom
05 Main Bedroom
06 West Deck
07 Stairwell
07  Stairwell
08  South Porch
09  Den
10  Bedroom
11  Bedroom
12  Bathroom
13  Mechanical
14  Unconditioned Storage

Lower Level
Structure
Structure
Control Layers
Continuous Insulation
Structure
Control Layers
Continuous Insulation
Air Gap/Drainage
Structure
Control Layers
Continuous Insulation
Air Gap/Drainage
Cladding
3 Market Analysis

- **Market Analysis**
  - **Maintenance Cost**: $2,000
  - **Life Expectancy**: 50+ years
  - **Operating Cost**: $3,595
  - **Total Cost**: $207,450
Total Cost of Construction: $207,404.29

2.75% of labor costs saved through Habitat for Humanity’s “sweat equity”
4 Durability and Resilience

Thermal layer
Moisture layer
5 Embodied Environmental Impact
7
Occupant Experience
8
Comfort and Environmental Quality
HERS Index

0 HERS Rating: With PV Offset
52 HERS Rating: Without PV

HERS: Baseline Home

LOADS

HEATING 17 kBTU/hr

COOLING 11 kBTU/hr
the NEW House