

Forest Haus

Boulder, CO

Single Family Building

New Build

PHI Database ID#: pending

Certification Goal:



Status: Pending - In Construction

Size: 3402 FT² TFA with One Unit

Description: Designed by Greg D. Fisher, Architect, Forest Haus will be the first PHI certified Passive House in the City of Boulder. The project is a 5 bedroom 4 bath home with a unique blend of refined architecture, technology, and high performance systems.

DOE Climate Zone: 5a

Team:

Owner:

Matt Brill & Eric Moore

Architect/Designer:

Greg D. Fisher, Architect
<https://www.gregdfisherarchitect.com>

PH Consultant:

Enrico Bonilauri, Emu Passive
<https://www.emupassive.com>

MEP Design:

Hans Joachim,
<https://www.brightsense.com>

Structural Engineer:

Wendy Dworak, TD Structural Engineering
<http://www.tdstructural.com>

Builder:

Bauen Build
<https://www.bauenbuild.com>

Certifier:

Marco Filippi, Energy Plus Project

Interior Design:

Kat Kurtz, K Squared Design
<https://www.k-squaredesign.com>



Forest Haus will be the first PHI certified Passive House in the City of Boulder. The Passive House approach was integral to the entire design and construction process with a goal to prove that Passive House design and a quality architectural expression could be wedded with one enhancing the other.



The home addresses the needs of a growing family within the tight constraints of the City of Boulder's zoning requirements, which include Floor Area Ratio (FAR) limitations, bulk plane limitations, and solar access restrictions along with setbacks. The zoning constraints along with attempting to weave around existing trees, required the forms to be a bit more complex than the typical Passive House expression, which strives for simple forms in order to make Passive House more attainable. This led to early and frequent modeling to ensure the team was on the path to success.

Thermal Envelope

Ground:

Subslab = 8" foam underslabe
Basement Walls = 2" exterior insulation, 10" interior Rockwool Batt insulation

Walls:

Double stud wall assembly with 9.5" dense pack fiberglass and 3.5" Rockwool Batt insulation; interior air barrier with Proclima Intello, exterior WRB with Adhero

Roof:

20" cellulose

Windows & Doors:

Smartwin Solar from Advantage Architectural
Woodwork PHA rated

Shading Strategies:

Mid roof to minimize solar intensity in summer but allow sunlight in winter

Mechanical Systems:

Ventilation:

Zehnder ERV Q600

Heating:

Mitsubishi ducted air source heat pump with four air handlers

Cooling/Dehumidification:

Mitsubishi ducted air source heat pump with four air handlers

Domestic Hot Water:

Rheem hybrid heat pump water heater

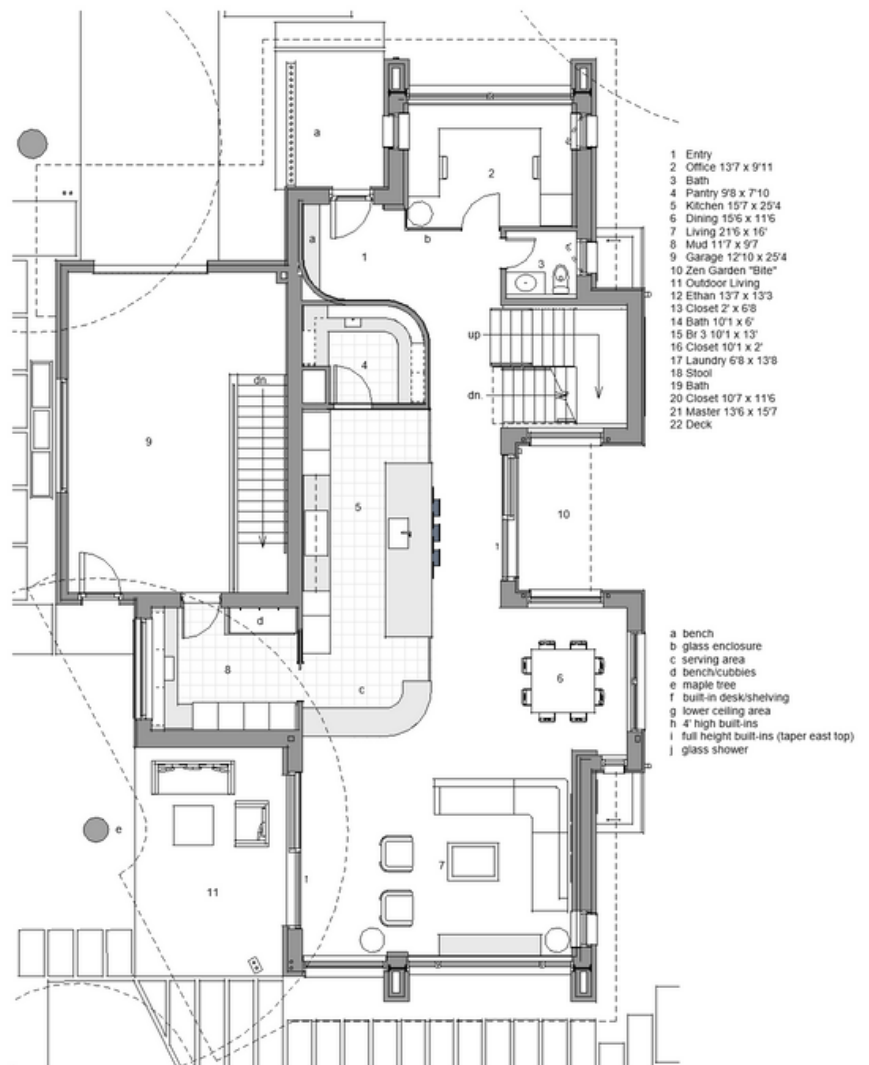
Onsite Renewable Energy:

10kw solar array on roof

PHPP Values

Climate: cool-temperate	Cooling & Dehumidification Demand: 14 kwh/m2a
Airtightness: 0.35 ACH50	Cooling Load: 9 w/m2
Annual Heating Demand: 15.4 kwh/m2a	PE Demand: 97 kwh/m2a
Heating Load: 16 w/m2	PER Demand: 49 kwh/m2a

The challenge was made more interesting by the owner's fascination with an interior courtyard solution ("donut hole like" form) in order to create a private outdoor space that the primary living spaces could be fully open to. This approach was ruled out early due to site and Passive House constraints, but it led to a nice compromise of taking a "bite" out of the east side of the house adjacent to the primary living spaces. This created a private "Zen Garden" space by tucking the space into the "bite" and then R-Design landscape architects added strategic screening landscape elements to complete the sense of enclosure.



The interior finishes and details, designed by Kat Kurtz of K Square Design, are both practical and creative. The materiality is warm throughout, where wood and brick are used to express textural variation against smoother surfaces. The project team collaborated with R Design Landscape Architects to create a series of interconnected spaces that effortlessly flow from inside to outside, where the landscaped elements unite and enhance the architecture.