

AN EARTH-SHELTERED FORM FIT FOR WEATHER EXTREMES

Methow Valley common house relies on Passive House principles, superinsulation, advanced air sealing, cross-laminated timber panels and a green roof to meet sustainability goals.



BY MATT HUTCHINS
CAST
ARCHITECTURE

The Methow Valley, in the foothills of the North Cascade Mountain Range, is known for its access to nature, cold winters with abundant snowfall, and hot summers. The agricultural history in the valley is rich, and many small farms thrive today.

Sited amongst agricultural fields near the historic McKinney Mountain, the Berm House — part of a complex under development in the valley — is built into a meadow slope. It will informally serve as a common house for the larger, 19-house mixed income community.

Cold climates call for particular design elements to facilitate passive solar heating and cooling, and the cyclical changing of seasons.

Planning for these strategies involved a detailed analysis of the site which sits between the Methow River on the east and McKinney Mountain to the west.

The north side required protection from winter winds, while the southern exposure needed to be designed for solar heat gain in winter and to limit solar exposure in summer, while maximizing territorial views. At the east, the winter sun tucks itself behind McKinney Mountain right around noontime, and the west side would provide Highway 20 access. Considering these factors, as well as the site's orientation, it became clear the general form and massing of the architecture would be a key consideration throughout the design process.

The home's low profile opens to the valley panorama of mountains and agricultural fields while remaining virtually invisible from the McKinney Ridge residential area to the north. The south-facing building orientation optimizes passive heating, and the large overhang protects from snowfall and intense summer sun.

With the earth-sheltered strategy, other elements of the design became important and dependent on this approach. A simple and compact shape with a sunken terrace to the south was integrated into the design to act as a windbreak and private patio for the bedrooms. On the east and west facades, 'wing walls' complete the berm, provide privacy, and focus the views down the valley. Toward the north, a formal entrance is located between two berming mounds acting as a focal point yet integrates with the design scheme.

The home is post and beam structure with a Cross-Laminated



A simple and compact shape with a sunken terrace to the south acts as a windbreak and private patio for the bedrooms.

PHOTOS BY BENJAMIN DRUMMOND

Timber (CLT) roof, prefabricated in northeastern Washington. The design incorporates Passive House principles including superinsulation, advanced air sealing, and mechanical ventilation. Thermal bridges are minimized by wrapping the house in continuous external insulation, including under the foundation, isolating the home from outdoor temperature swings and the brisk winter wind.

The bermed roof, with 12-inches of soil, adds thermal mass and protection from weather exposure and fire. The roof will feature a path through the native landscaping. The Methow Valley's original one-room schoolhouse will be placed on the roof and oriented toward a peak that holds personal significance to the owner and be open as a space for reflection.

Guided by the client's community-oriented vision, a significant design request emerged: the ability to host guests, allowing privacy and independence for everyone. A great room was designed for friends and neighbors to gather regularly. Off the great room, a five-foot wide hall leads to three guest suites and the primary suite. The uncomplicated and efficient floor plan shows a clear division between the private and public spaces.

Varying sunlight exposures, seasonal warmth, and views are maximized along the entire south-facing wall of the heavily occupied great room and suites. The south facade



The Berm House design incorporates Passive House principles including superinsulation, advanced air sealing, and mechanical ventilation.

is outfitted with floor-to-ceiling energy-efficient windows that intend to allow the winter sun in fully, yet be efficient enough to protect the interior environment from indirect summer heat. The mechanical and storage areas are located where sunlight is not required and there is a desire for dark, cool, and dry spaces. Back-of-house includes a large pantry, with access to a crawl space for storage, and a laundry room.

Unique openings and strip lighting accentuate the wood beams. The CLT ceiling, wood panels, deep gray slate floors and black horizontal fixtures unify the space. Dark hickory on the floor in the hall and suites add continuity. A cof-

fee table and the kitchen bar were crafted from a fir tree felled off the property. Landscape boulders were sourced from a quarry on the property as well. The homeowners' quarry informed the rocky landscaping theme.

Matt Hutchins serves on the Seattle Planning Commission, is a strategic councilor for AIA Washington, is on AIA Seattle's Board of Directors, and is co-chair of the public policy board. He is a co-founder of CAST architecture.

BERM HOUSE'S THREE PRIMARY DESIGN GOALS

1 Passive solar heating and cooling
The site location and natural building orientation posed opportunities and challenges explored through diagrams and massing studies. The goal of these studies was to explore passive heating and cooling design strategies.

2 Efficient construction
An efficient construction process and high-quality materials were crucial aspects of the design process. After explorations, CAST proposed a combination of concrete and mass timber, particularly cross-laminated timber (CLT) and glued-laminated timber (glulams) to carry the loads of the design efficiently, and function as an exposed finished surface.

3 Systems efficiency
Several key components came into play designing for a residence in a cold climate, including exterior thermal insulation, crawlspace and slab waterproofing, vapor barrier inside exterior walls, energy-efficient fenestration, and HVAC systems with energy recovery ventilation.

TEAM

Owner:
Lee Whittaker
Methow Housing Trust

Architect:
CAST architecture

Contractor:
Methow Valley Builders

CLT:
Vaagen Timbers

Concrete subcontractor:
JR's Five Star Concrete

Geotechnical engineering:
GeoEngineers