

High-performance skylights flood the interior spaces with daylight and passive solar gain while maintaining privacy.



# ENGLEWOOD DUPLEX

Denver, CO

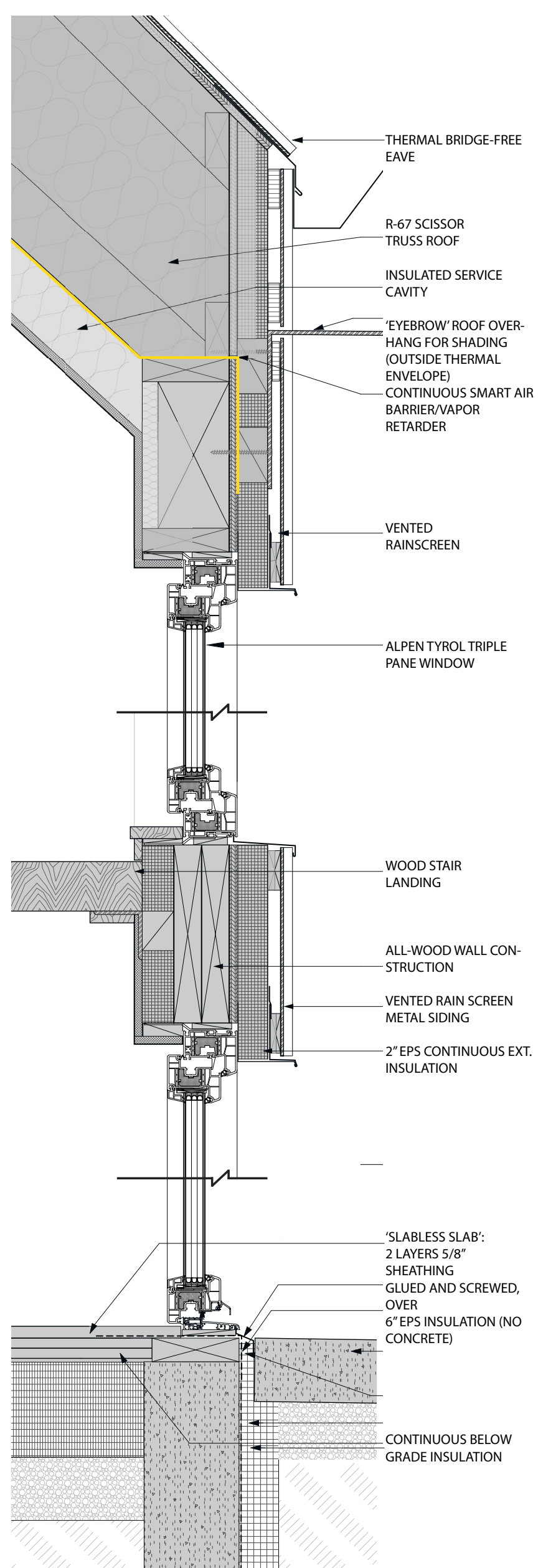
Colorado's first Passivehouse certified duplex employs carbon-sequestering construction materials, ultra-quiet heat pump mechanical systems and triple-pane, thermally broken windows.

## 1st Passive House Certified Duplex in CO

Located in Englewood, Colorado, the Englewood Passive House Duplex exemplifies the benefits of a multi-unit construction within a shared Passive House envelope- as a duplex, the adjoining wall and simple, rectangular massing significantly reduce the amount of wall and roof area per unit of interior floor area, in turn reducing energy losses.

The 2-unit, three story building is situated on a difficult site adjacent to a busy arterial road - with 6 lanes on a hill, traffic noises and air pollution or severe impacts on the property. The Passivehouse approach allowed the project team to mitigate these acoustic and visual challenges and create a quiet, comfortable, healthy indoor environment, while also dramatically reducing energy use. The exclusively electric homes achieve both comfort and energy efficiency through an air-tight building envelope, super insulation, and continuously ventilated indoor air. Triple-pane, thermally broken windows and doors, continuous exterior insulation and mineral wool batt stud insulation make the home interior peacefully quiet. Both units command sweeping views of the Rocky Mountains to the west from the upper stories. Large balconies are a dramatic extension to spacious party rooms on the third floor. Both units are east-west oriented - the south unit captures southern solar gain through a three-story window wall at the stairwell, which also drives natural light deep into the core of all three floors. This approach allows the east and west windows, away from the highway, to be smaller but operable, while the south glazing facing the highway is fixed for maximum acoustic and air quality protection. The north unit features a large skylight over the stairwell, which provides much of the home's solar heat gain as well as natural light.

The bold design, with rich wood and metal siding emphasized by large window openings, was the result of a careful and pragmatic approach to optimize the home for passive solar while shielding occupants from the busy highway; prioritizing simplicity in order to optimize energy performance. Minimizing embodied carbon was also a priority: the main floor is constructed from two layers of OSB subfloor, cross laminated, glued and screwed, directly over the vapor barrier and 6" of EPS foam, on the gravel substrate: no concrete was used in the floors of either unit. There is also no steel in either home: floors and roof are all open-web trusses, while the walls are 2x6 wood studs and larger structural beams are glulam and microlam.



This stair at the heart of the home features a 3-story bank of triple-pane windows that optimize solar gain and bring daylight deep into the space while keeping out noise from the adjacent highway.

**CLIMATE ZONE: 5B**

ANNUAL HEATING DEMAND: 12 kWh/m<sup>2</sup>/yr [3.8 kBtu/sf/yr]

TOTAL ENERGY DEMAND: 54 kWh/m<sup>2</sup>/yr [17.1 kBtu/sf/yr]

SOLAR-READY AVAILABLE: 28,000 kWh/yr

