

NOT FOR CONSTRUCTION



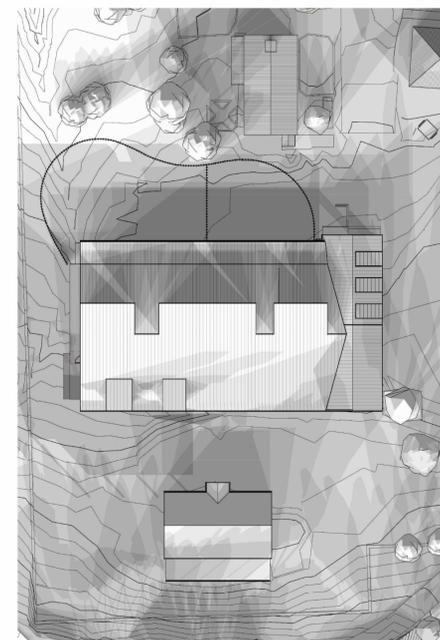
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WINTER SOLSTICE

SHADE DURATION (HRS)

LITTLE RED SCHOOL HOUSE – 50% DD ENERGY ANALYSIS

July 11, 2024

Little Red School House is an approximately 5,400 SF 1-story childcare center located in Snowmass Village, Colorado (ASHRAE Climate Zone 7). The project will comply with 2015 IECC via section C407 – Total Building performance, which requires showing 15% annual energy cost savings above the 2015 IECC Standard reference design.

RECOMMENDATIONS

TABLE 1: HIGH PERFORMANCE BUNDLE

Strategy	Annual Energy Cost	Annual Energy Cost Savings (15% required for 2015 IECC Compliance)	Site EUI (kBTLU/SF)
B 2015 IECC Standard Reference Design	\$8,582	-	55
P 50% DD Proposed	\$6,075	29.2%	40

50% DD PROPOSED DESIGN

The following energy model inputs are based on the 50% DD drawings dated 07/01/2024.

Operating Schedule: The building is assumed to be open year-round M-F from 8AM – 6PM, with reduced occupancy from 6PM – 9 PM (staff).

Envelope

- Roof: Metal deck with 12.25" GPS SIPs, R-55 (U-0.018)
- Exterior Walls: Wood framing with 6.5" GPS SIPs, R-28 (U-0.032)
- Ground contact walls: CIP mass wall with R-10 XPS (C-0.092)
- Slab on grade foundation: R-10 XPS for 3' below grade (F-0.51)
- Fixed Windows/Storefront: Insulated fiberglass frame with double film, triple chamber insulated glass and 4 low-E surfaces. Higher performance spacers and high-performance inert gas fill. (Alpen Zenith, ZR-10 fixed low profile) (Assembly: U-0.11, SHGC-0.19, VT-0.44)
 - Window-to-wall ratio: 32%
 - North: 67%
 - East: 9%
 - South: 7%
 - West: 8%
- Opaque Doors: U-0.37
- Infiltration (building tightness, air sealing): 0.4 CFM / SF envelope surface area (2021 IECC compliant building envelope performance)

Lighting and Interior Loads

- Interior lighting power: Target a 30% reduction in lighting power density (W/SF) below 2015 IECC prescriptive allowances using the space-by-space method (assumed)

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- 0.87 W/SF in classrooms
- 0.51 W/SF in breakroom
- 0.48 W/SF in corridors
- 0.77 W/SF in office
- 0.44 W/SF in storage
- 0.68 W/SF in restroom
- 0.63 W/SF in lobby
- 0.66 W/SF in mechanical/electrical
- Occupancy sensors in classrooms, storage, restrooms, offices, laundry/custodial
- 1,000 W exterior lighting power (assumed)

HVAC & DHW

- ERV provides ventilation to entire building (100% OA) with flat plate heat exchanger energy recovery.
 - Energy recovery ventilation: 60% effectiveness (assumed)
 - 1,800 CFM
- Horizontal air handling units with split heat pumps provides heating and cooling
 - Ventilation air ducted to each AHU from ERV
 - 17 SEER2 cooling
 - 8.1 HSPF2 heating
 - Minimum heat pump compressor operating temperature of 25 deg F (assumed)
 - EC motors
- Mechanical rooms and vestibules: Electric unit heaters
- Domestic Hot Water: Electric resistance water heater (119 gal) | water fixtures: 1.5 gpm kitchen sink, 0.5 gpm lavs

Utility Rates – Holy Cross Energy, General Services – Small, \$18/month, \$0.095/kWh