CLIMATE ANALYSIS

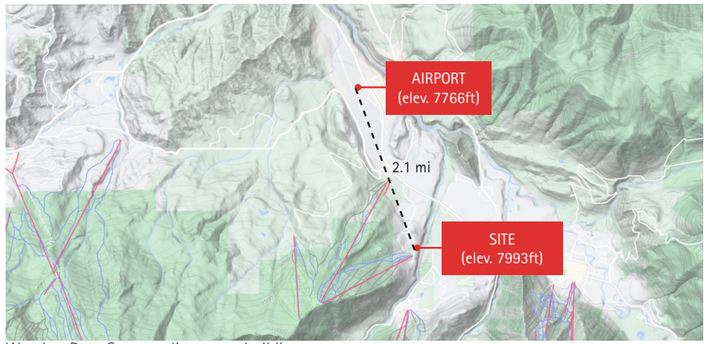
LOT 16, MAROON CREEK CLUB, ASPEN, CO 81611
39°11'32.5"N 106°51'14.3"W

Climate Type - 6B VERY COLD DRY

Comfortable and dry summers, freezing and snowy winters. High solar radiation level even with partly cloudy sky year round. Very high day-night temperature change.

Weather Data Source

Data sourced from the weather station at Aspen/Pitkin County Airport.



Weather Data Source: climate.onebuilding.org

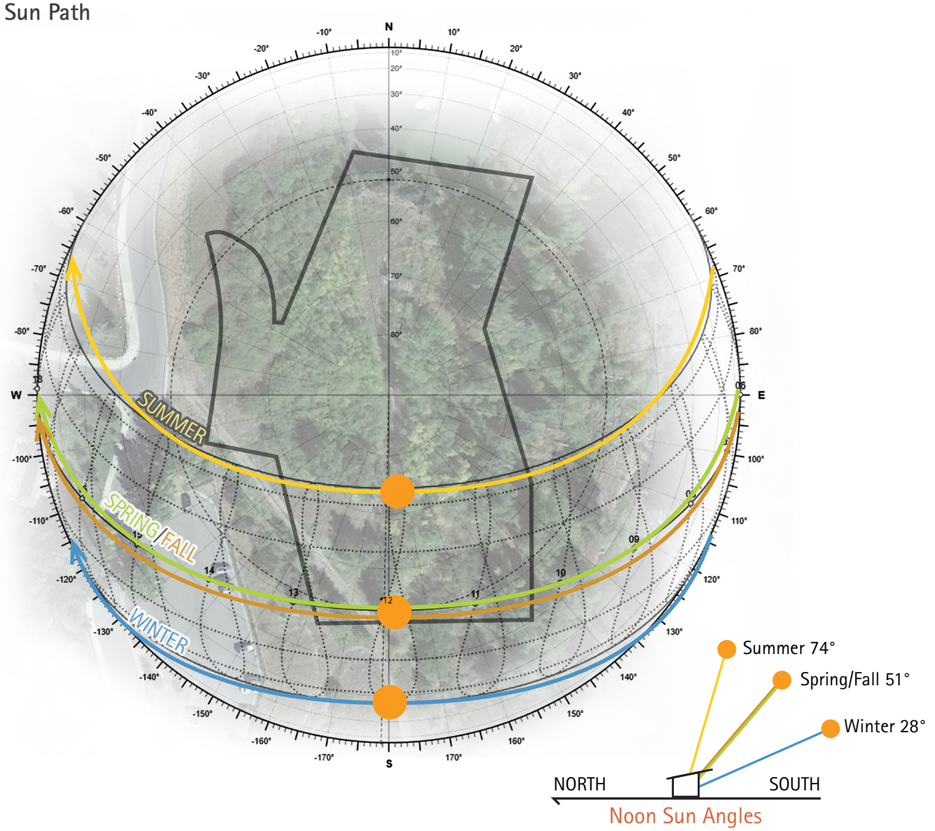
2030 Challenge

Target to meet energy consumption of 80% below the regional average for that building type.

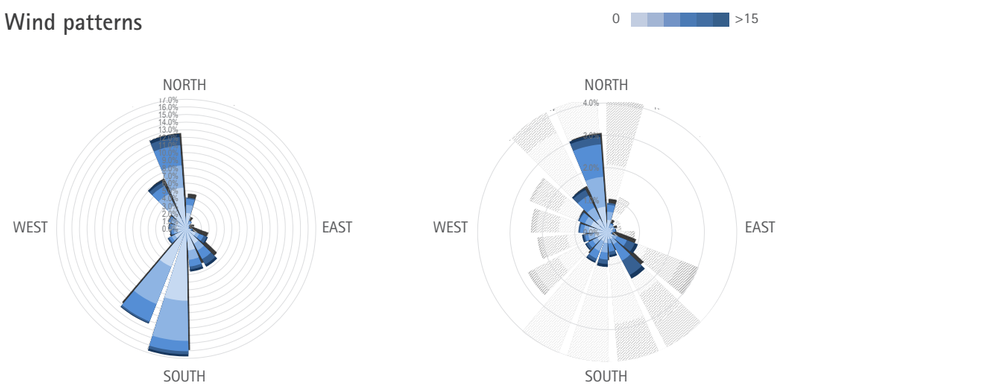
BASELINE pEUI*	GOAL	MEETS CODE
38.40	7.68	18.43
kBTU**/sf/yr	kBTU**/sf/yr	kBTU**/sf/yr
Based on Use Type: Single Family Detached	Not required, office pursuit. Savings from Baseline: 80%	Energy Code: IECC 2021*** Savings from Baseline: 52%

*pEUI stands for predicted energy use intensity, it expresses a predicted building's energy use as a function of its size and time (1 year).
**1k BTU = 0.29 kWh
*** 2021 International Energy Conservation Code

Sun Path



Wind patterns

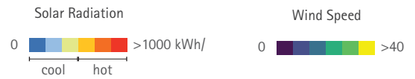


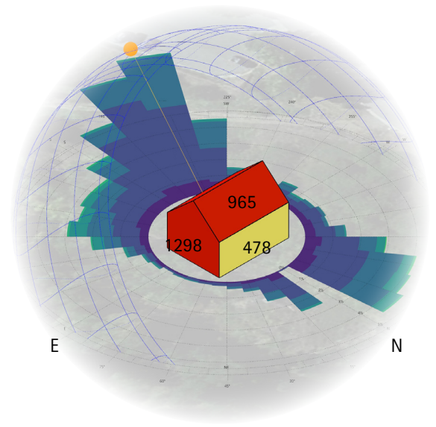
All year: Wind is blowing along the Aspen Valley from the north and south direction

60-79°F: Warm wind is usually coming from the north

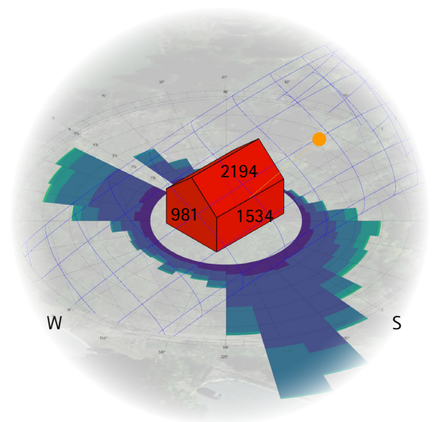
Verify wind pattern on site to account for terrain impacts.

Solar Radiation and Wind





NE Side: Low solar radiation level on the north side. Quite high level on the east side and relatively low level on the north roof slope.



SW Side: Very high solar radiation on the south side and quite high level on the west side. Very high solar radiation level on the south roof slope.

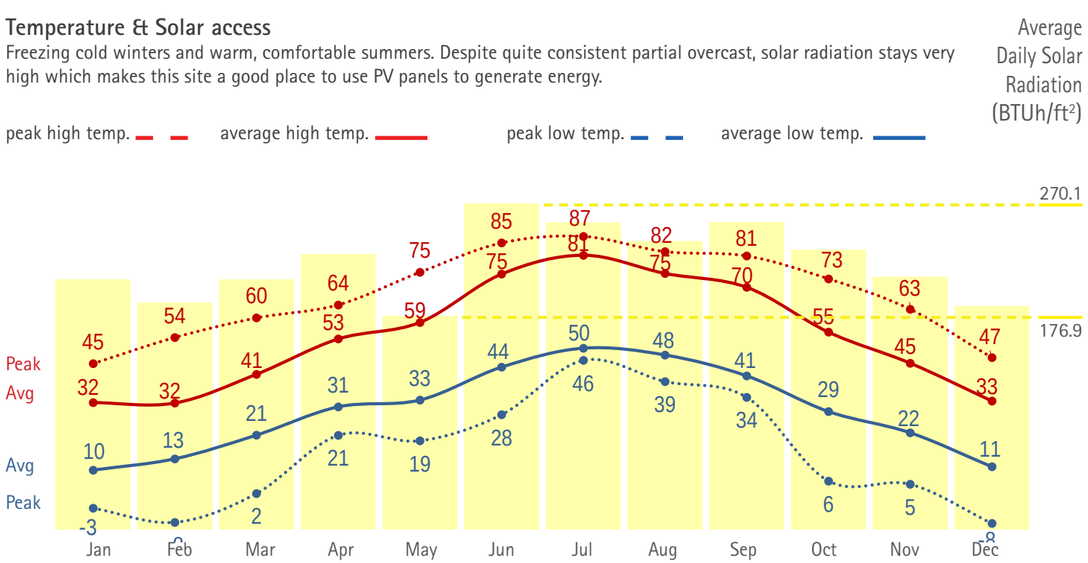
Site context not included in the simulation

CLIMATE ANALYSIS

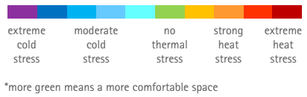
Temperature & Solar access

Freezing cold winters and warm, comfortable summers. Despite quite consistent partial overcast, solar radiation stays very high which makes this site a good place to use PV panels to generate energy.

Average Daily Solar Radiation (BTUh/ft²)



Universal Thermal Climate Index (UTCI)

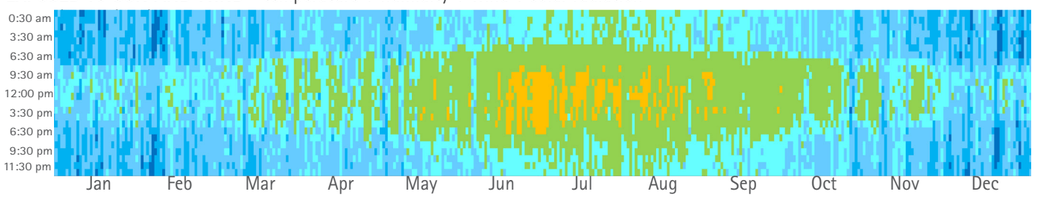


*more green means a more comfortable space

UTCI, or Universal Thermal Climate Index, measures the heat stress on the human body induced by a set of climatic conditions – including air temperature, humidity, wind, and radiation.

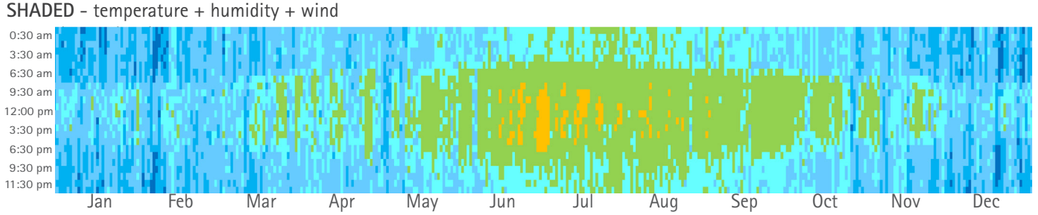
Wind protection significantly helps with improving thermal comfort in winter time. Shading will help to decrease negative impact of solar radiation during summer.

EXPOSED TO SUN AND WIND - temperature + humidity + wind + solar radiation



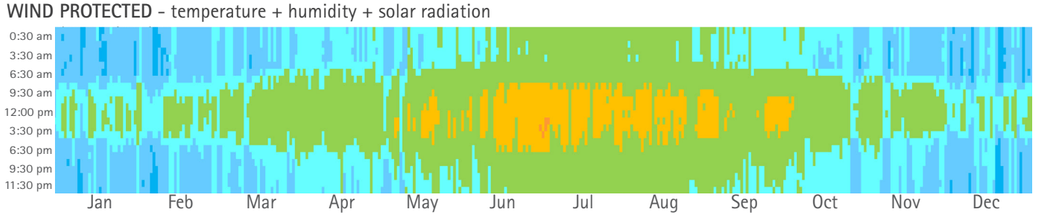
27% No Thermal Stress

SHADED - temperature + humidity + wind



25% No Thermal Stress

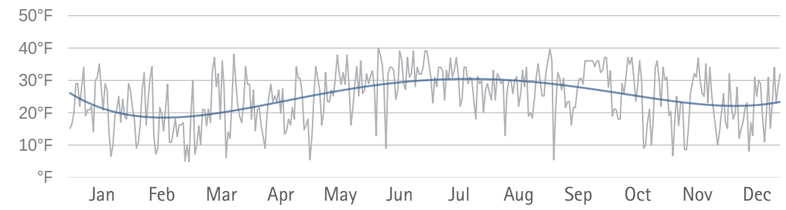
WIND PROTECTED - temperature + humidity + solar radiation



41% No Thermal Stress

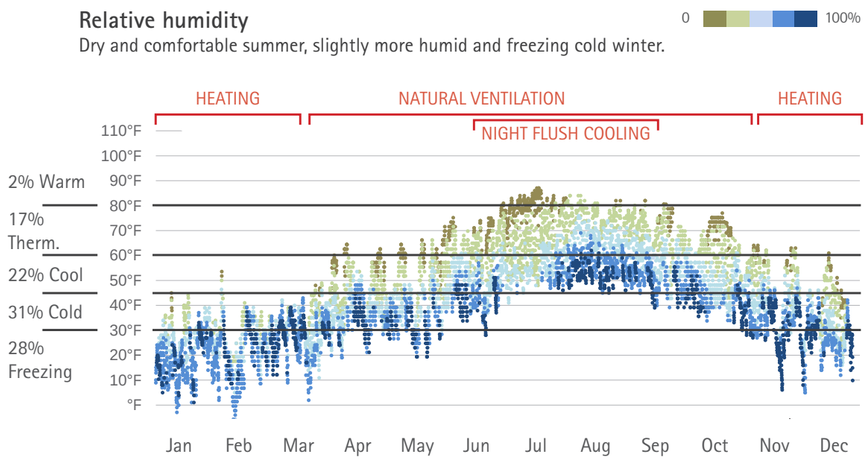
Day-night temperature swing

Very high diurnal swing all year round mostly due to low air humidity.



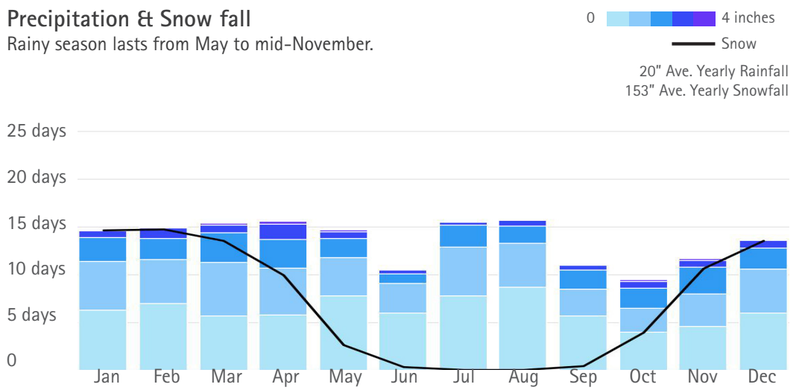
Relative humidity

Dry and comfortable summer, slightly more humid and freezing cold winter.



Precipitation & Snow fall

Rainy season lasts from May to mid-November.



source: meteoblue.com for Aspen, CO

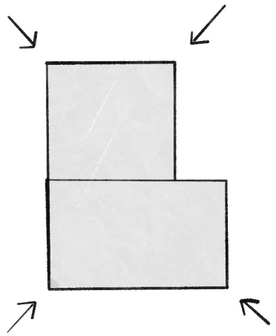
CLIMATE ANALYSIS

6B - VERY COLD, DRY

KEY STRATEGY: MAXIMIZE THE WARMING EFFECT OF SOLAR RADIATION, REDUCE THE IMPACT OF COLD WIND

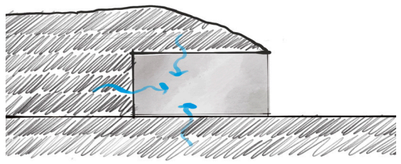
FORM

Huddle/Consolidate



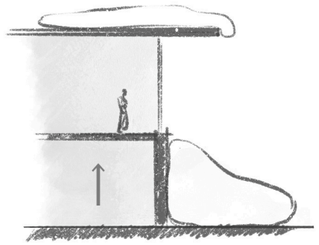
- Minimize building's envelope area to decrease heat load

Earth Coupling



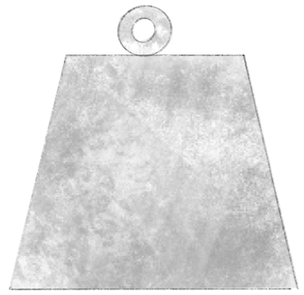
- Use earth for extra cooling during the day, and extra heating during the night

Elevate Living Space



- Protect the living areas with large openings from snow

Heavy Mass / Solid



- Use materials like concrete, adobe or PCM to keep the temperature in the building more uniform

PASSIVE STRATEGIES

Shading/Orientation

12036 | Dragonfly

By designing shading devices according to the sun's seasonal path, both summer shading and winter solar gain can be achieved in climates with seasonal variations.

Tight Envelope

13046 | City Cabin

Tightly sealed envelopes keep temperatures more uniform by reducing winter night time heat losses and providing faster heat buildup in the morning.

Thermal Mass + Passive Solar

09042 | Sawmill Canyon

High mass walls and flooring can store winter solar gain and summer time 'coolth'. Face thermal mass towards South for maximum passive solar gain.

Night Flush Cooling

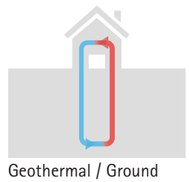
09042 | Sawmill Canyon

Use cool breeze to ventilate house. Draw cool night air across high-mass elements to store nighttime 'coolth'. A space will then remain cool during the daytime without the use of off-site energy sources.

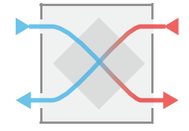
ACTIVE STRATEGIES

Photovoltaic Panels

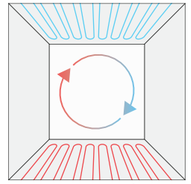
Snowmelt System Reduction



Geothermal / Ground Source Heat Pump



Energy Recovery Ventilation



Radiant Heating / Cooling

OK