

# Philadelphia, Pennsylvania

## Climate Analysis

Climate zone 4A

Location: 39.87, -75.23

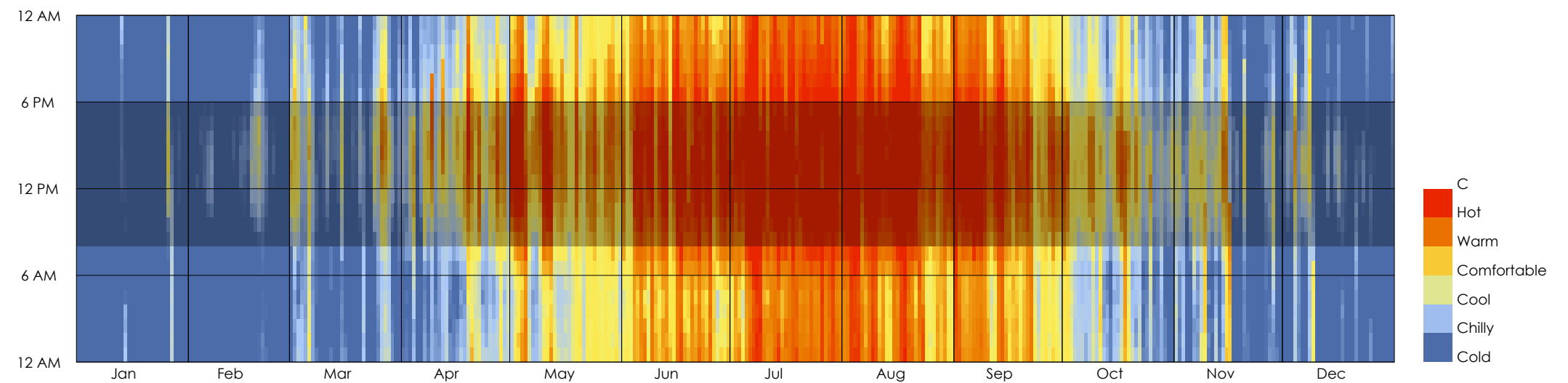
Occupied hours: 6pm - 8am

This climate analysis considers a comfort zone meeting the following parameters: dry bulb temperature between 16°C and 26°C, relative humidity between 20% and 80%, and wind speed between 2m/s and 10m/s. The number of hours that meet these conditions is 1,358, or 15.5% of the time throughout the year.

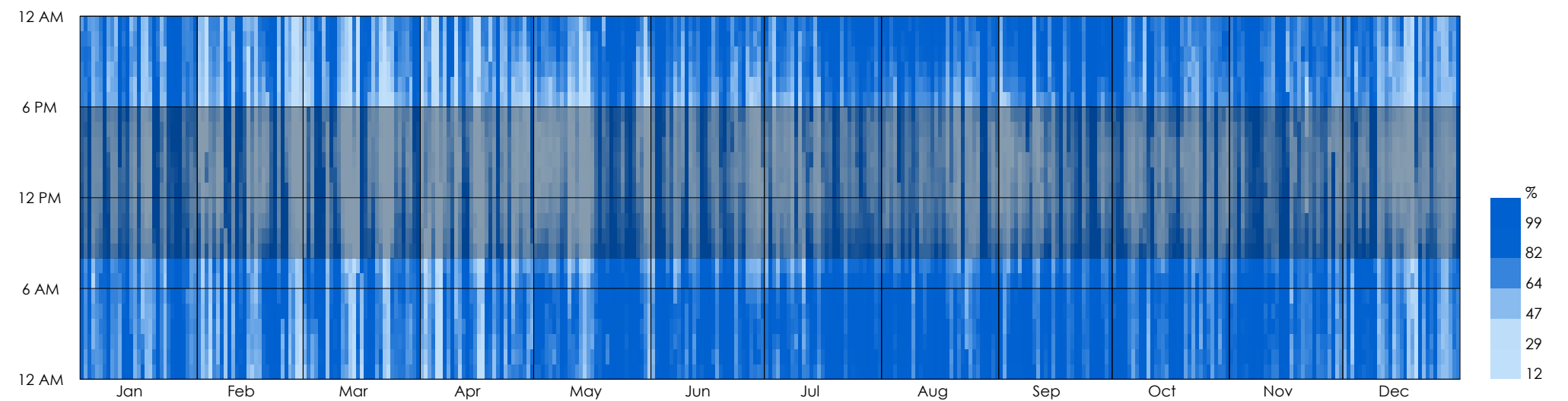
The projected climate for Philadelphia in 2050 is more extreme in temperature on both ends. Between the month of June and September, temperatures throughout the day remain warm to hot (from 25°C to 30°C+), while in October, they suddenly drop to chilly and cold (11°C to 7°C and lower) and remain there until April. There is a cooling load for 18% of the time and a heating load for 49% of the time.

The projected relative humidity in 2050 is quite high during the summer and fall months (from June to November) during the occupied hours. During the winter the relative humidity swings from dry to wet periodically. Most wind speeds in Philadelphia range moderately from 4 to 6 m/s. They come primarily from northwest and southwest directions. Most of these winds range in 20°C-26°C with humidity between 50%-80%.

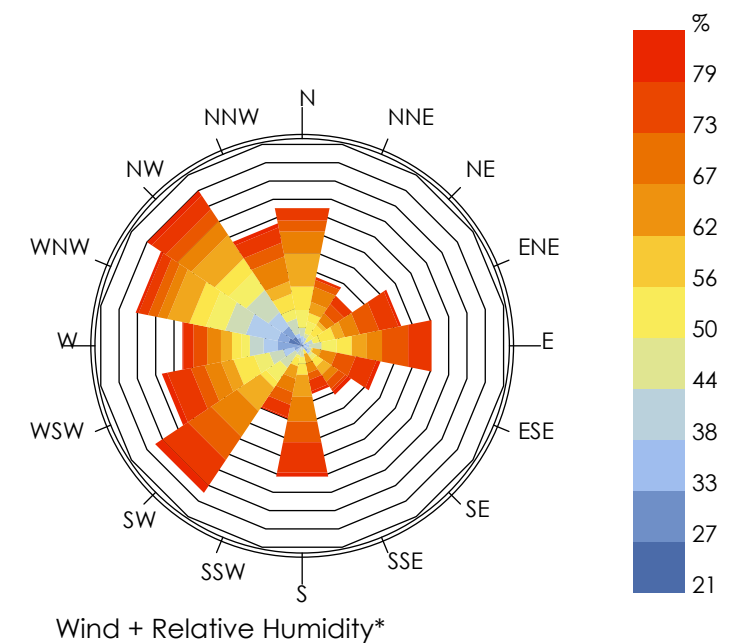
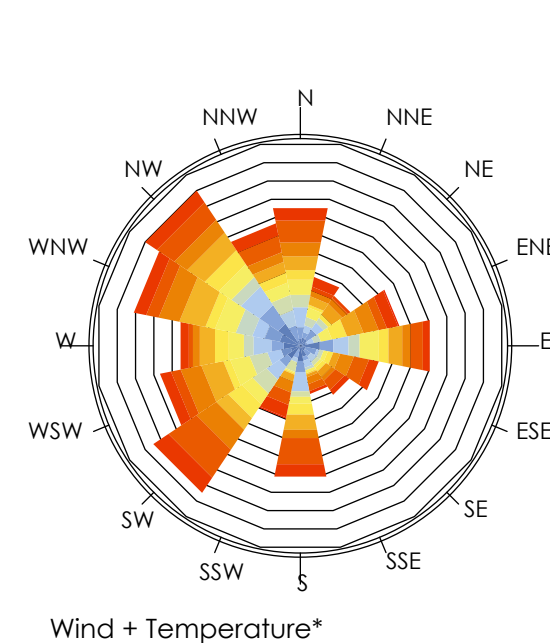
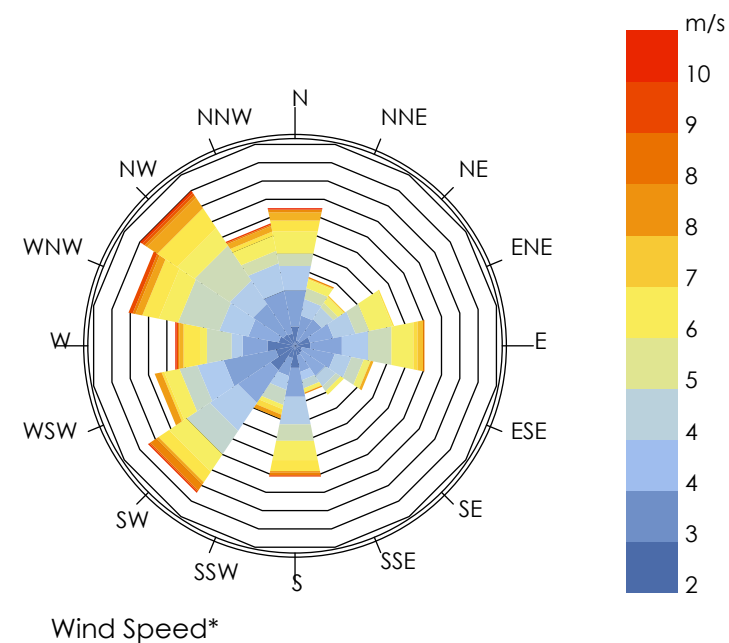
\*Conditional Selection Applied:  
16 < Dry Bulb Temperature < 26  
and 20 < Relative Humidity < 80  
and 2 < Wind Speed < 10

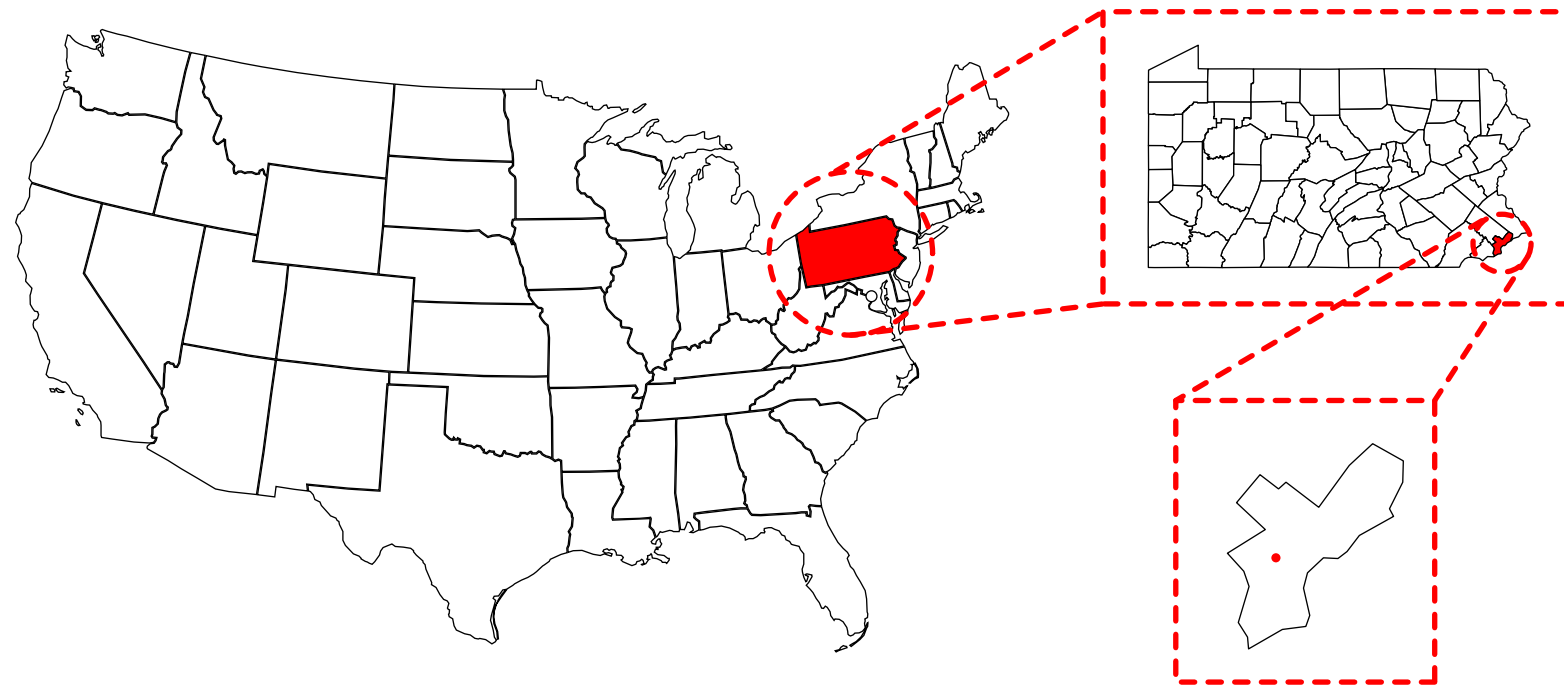


Dry Bulb Temperature (C) - Annual

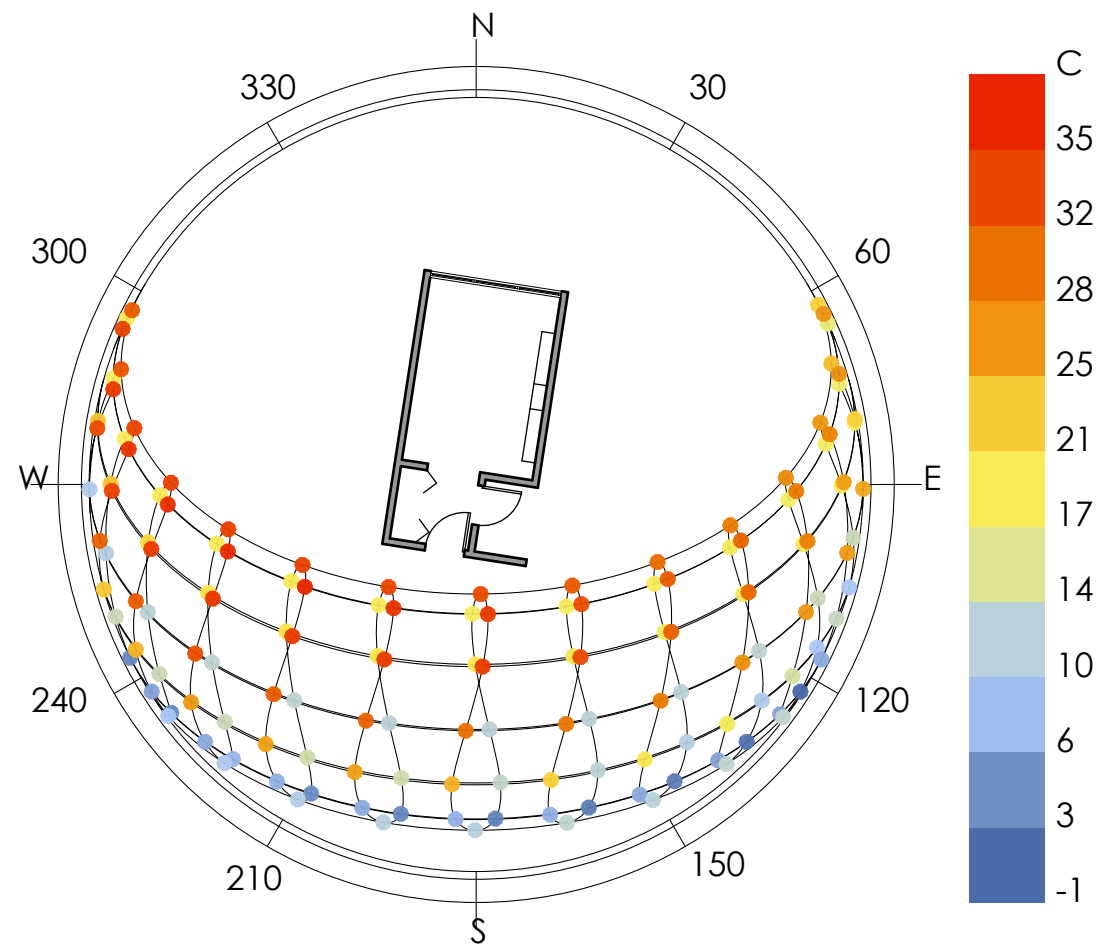


Relative Humidity (%) - Annual

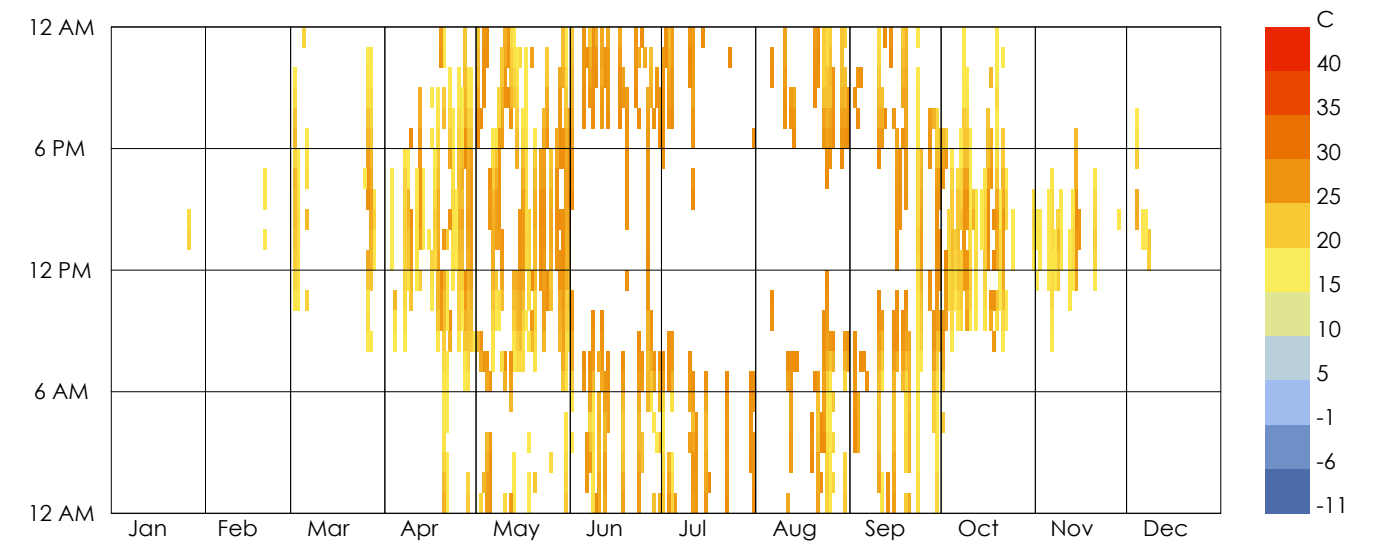




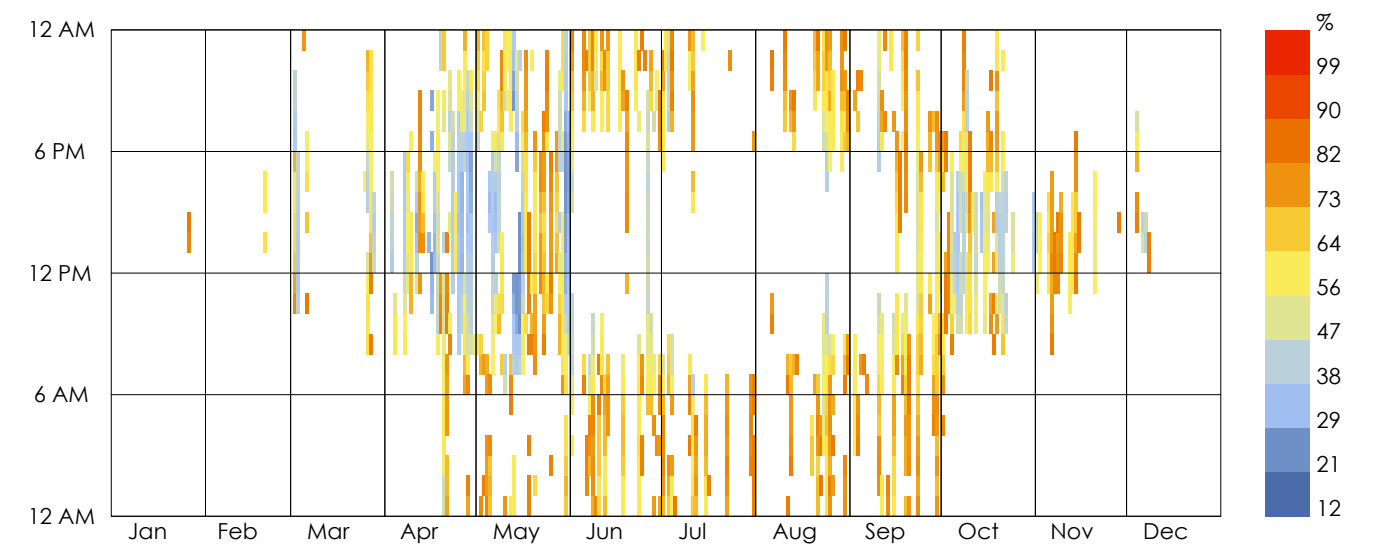
Location



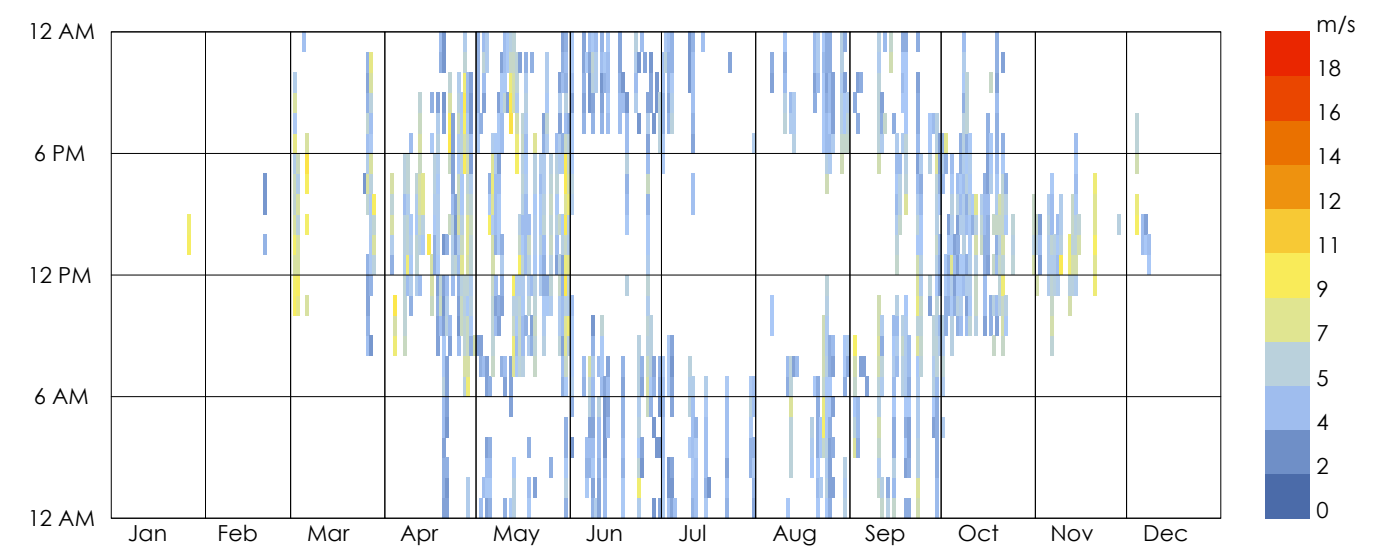
Sun-Path Diagram + Temperature



Dry Bulb Temperature (C) - Comfort zone



Relative Humidity (%) - Comfort zone



Wind Speed (m/s) - Comfort zone

# Dream Room

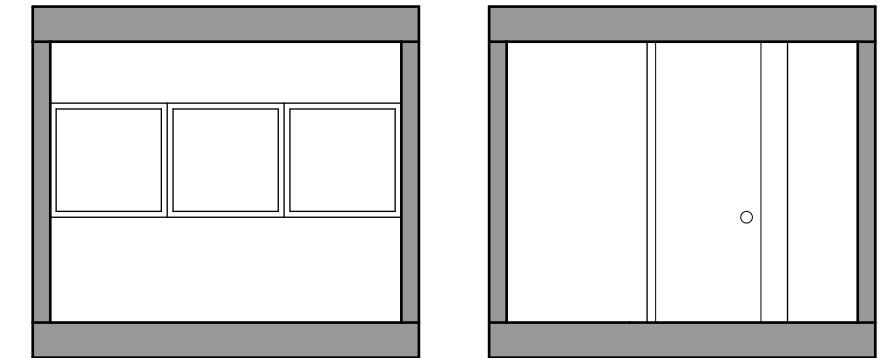
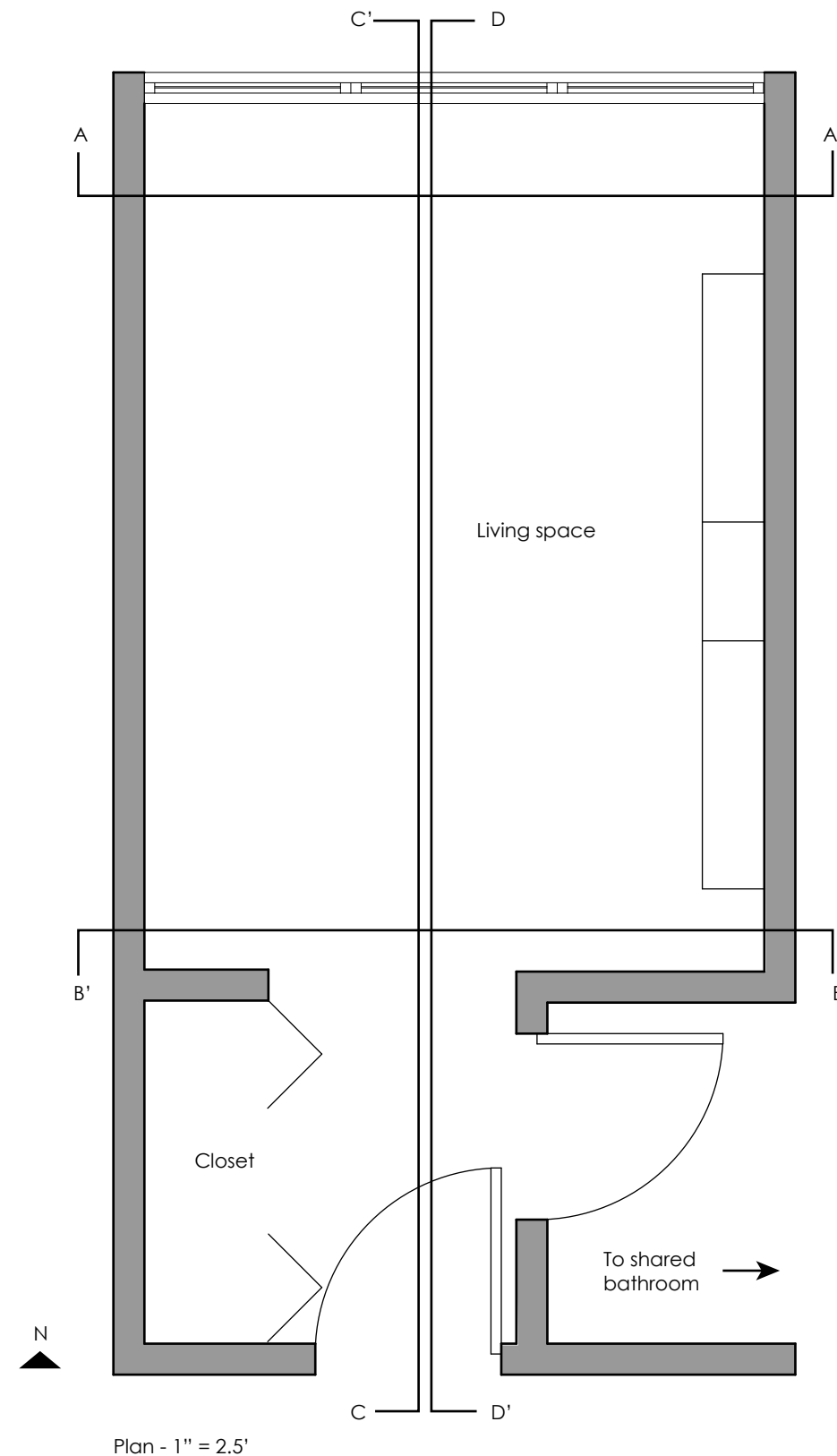
3600 Chestnut St, Rm 1406

## Application of climate analysis on Dream Room

The room in question is oriented to the North. There are three windows on the north elevation of the room. These windows are single-paned. Based on this configuration, this room does not have much direct sunlight or glare issues throughout most of the year, but will face heat loss problems in the winter when the north side will be the coldest. However, there are some days between April and August when the sun will come into view of the window to the northwest due to its low angle in the afternoon. According to the wind roses above, the room will receive some gentle wind from the north at fairly comfortable temperatures between 20°C and 26°C and 50% to 80% humidity.

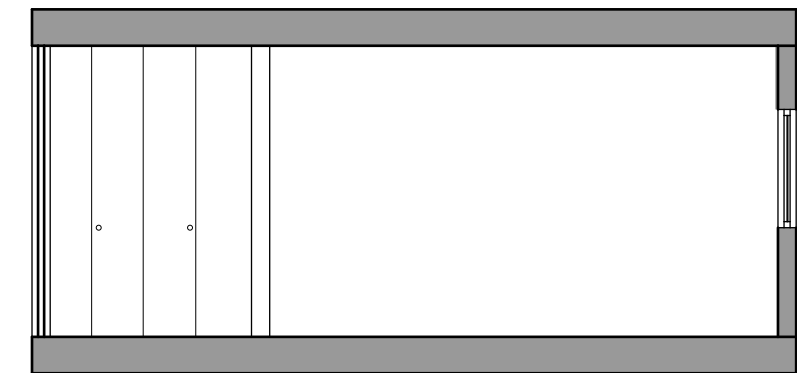
The three passive design strategies recommended to the design team are:

1. Install operable windows to allow natural ventilation during the summer morning and evenings.
2. Install a vertical shading device to the west side of the window to block out the low angle sun from the northwest during summer afternoons.
3. Convert single-pane windows into double-pane windows to minimize heat loss during the winter.

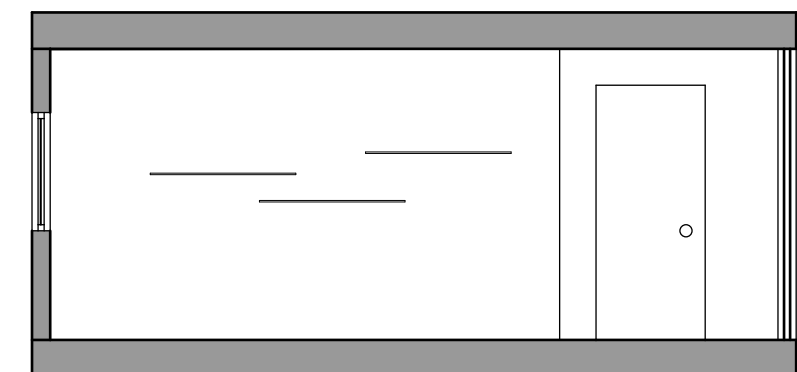


A-A'

B-B'



C-C'



D-D'

Section-Elevations - 1" = 5'