**Assignment 05 | Annual Outdoor Comfort For Multiple Locations**
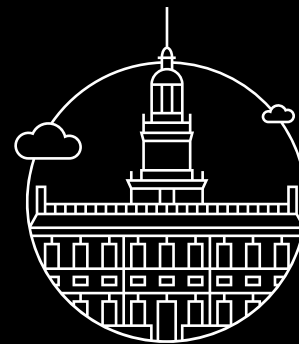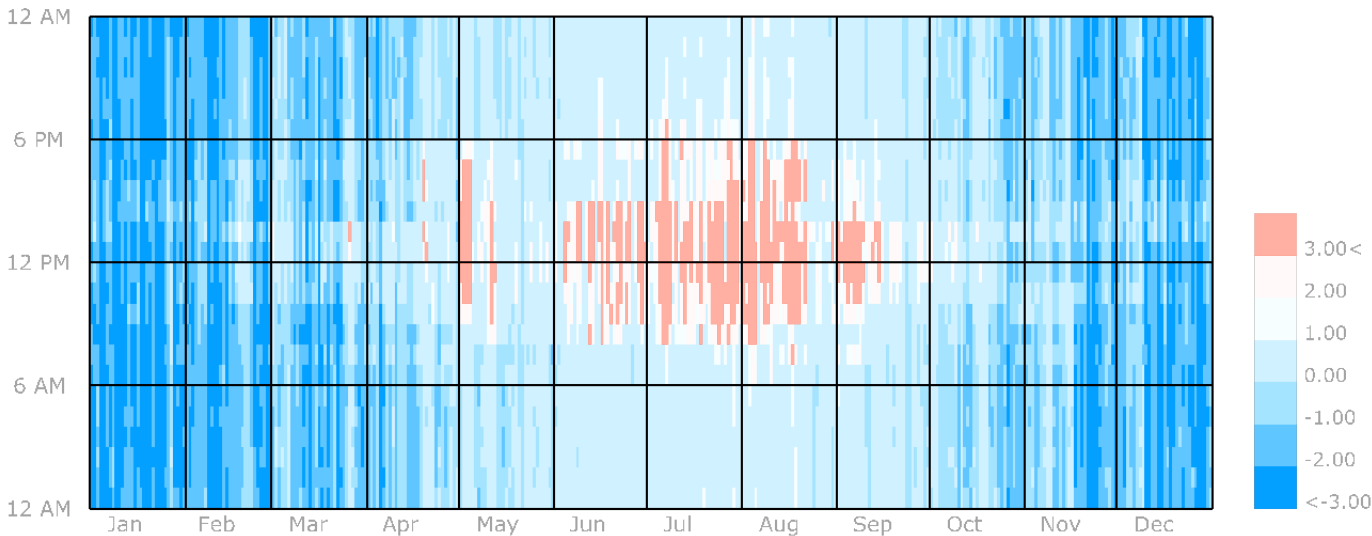
39.87° N | 75.23° W

# Annual Outdoor Comfort Simulation | **Location 1**
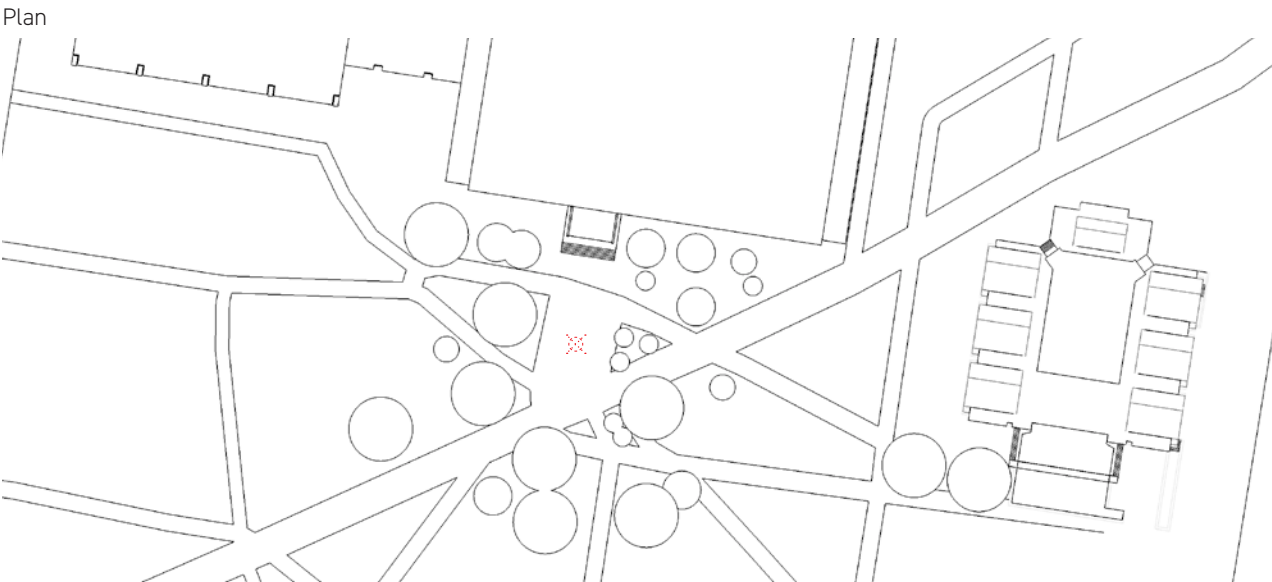
Plan



Outdoor Comfort Graph



Outdoor Comfort (-3 = Extreme Cold | -2 = Cold | -1 = Cool | 0 = Comfort | 1 = Warm | 2 = Hot | 3 = Extreme Heat) - Hourly
Philadelphia International Ap_PA_USA
1 JAN 1:00 - 31 DEC 24:00

Comfortable: 38.33%; Short period comf.: 19.86%; Heat stress: 8.46%; Cold stress: 33.34%

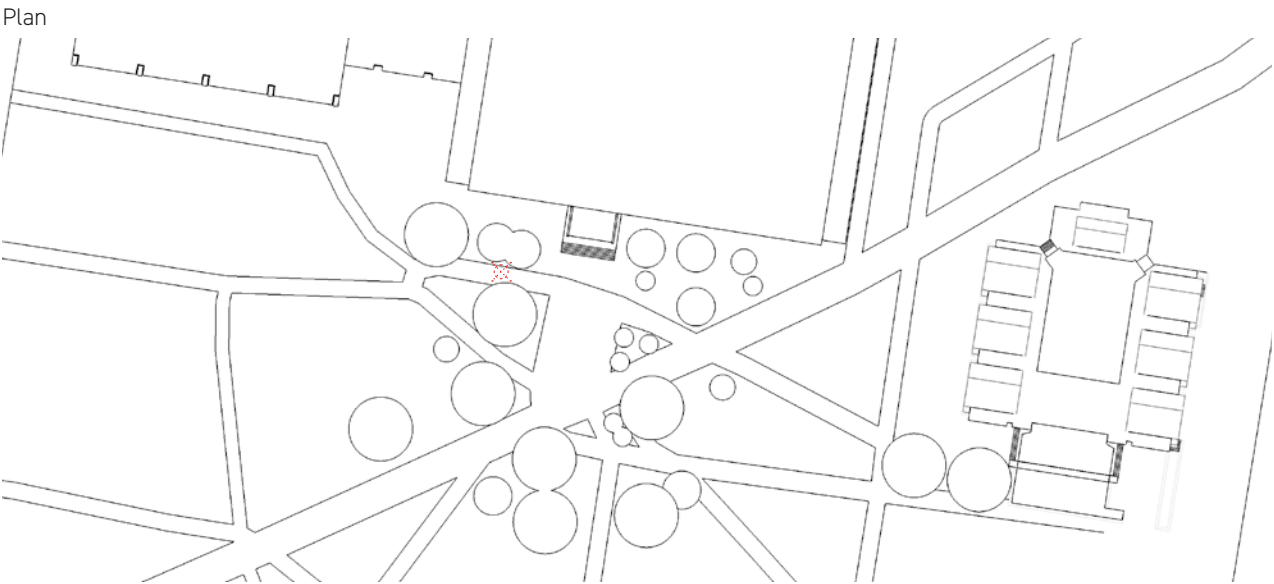Annual Outdoor Comfort Simulation | **Location 2**
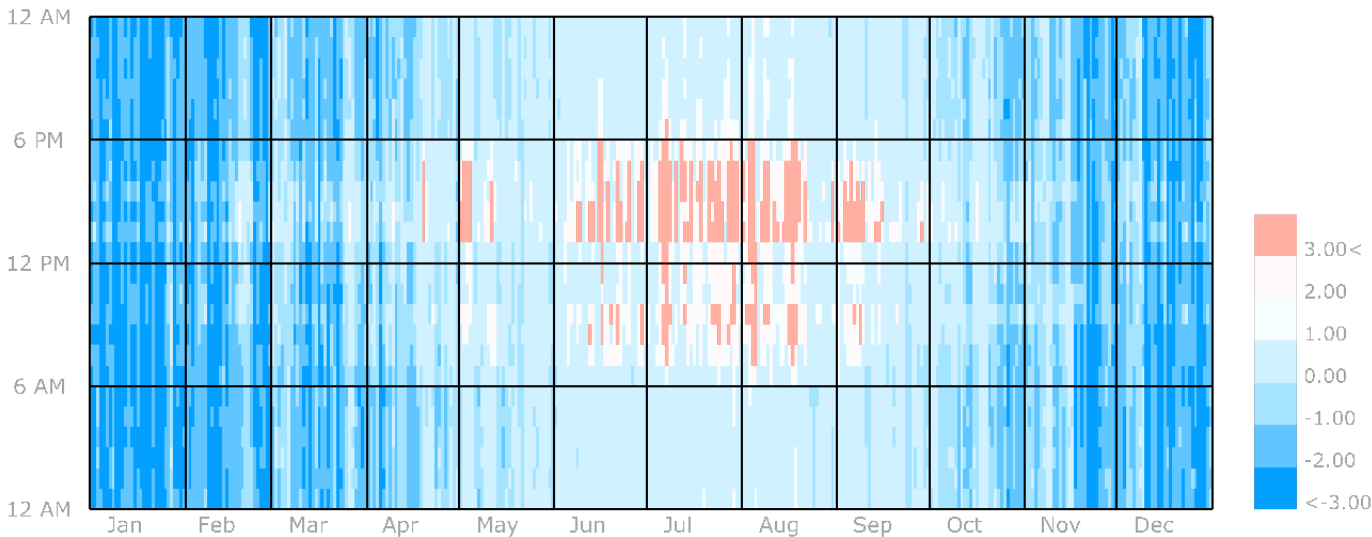
Plan



Outdoor Comfort Graph



Outdoor Comfort (-3 = Extreme Cold | -2 = Cold | -1 = Cool | 0 = Comfort | 1 = Warm | 2 = Hot | 3 = Extreme Heat) - Hourly
Philadelphia International Ap_PA_USA
1 JAN 1:00 - 31 DEC 24:00
Comfortable: 39.0%; Short period comf.: 20.31%; Heat stress: 7.25%; Cold stress: 33.45%

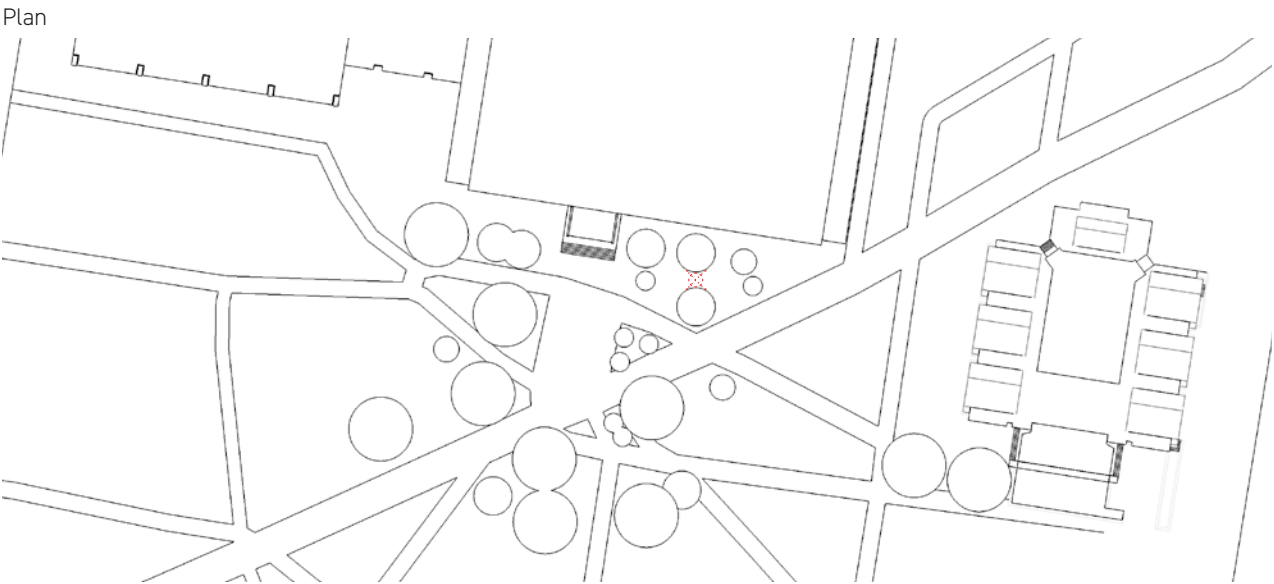# Annual Outdoor Comfort Simulation | **Location 3**
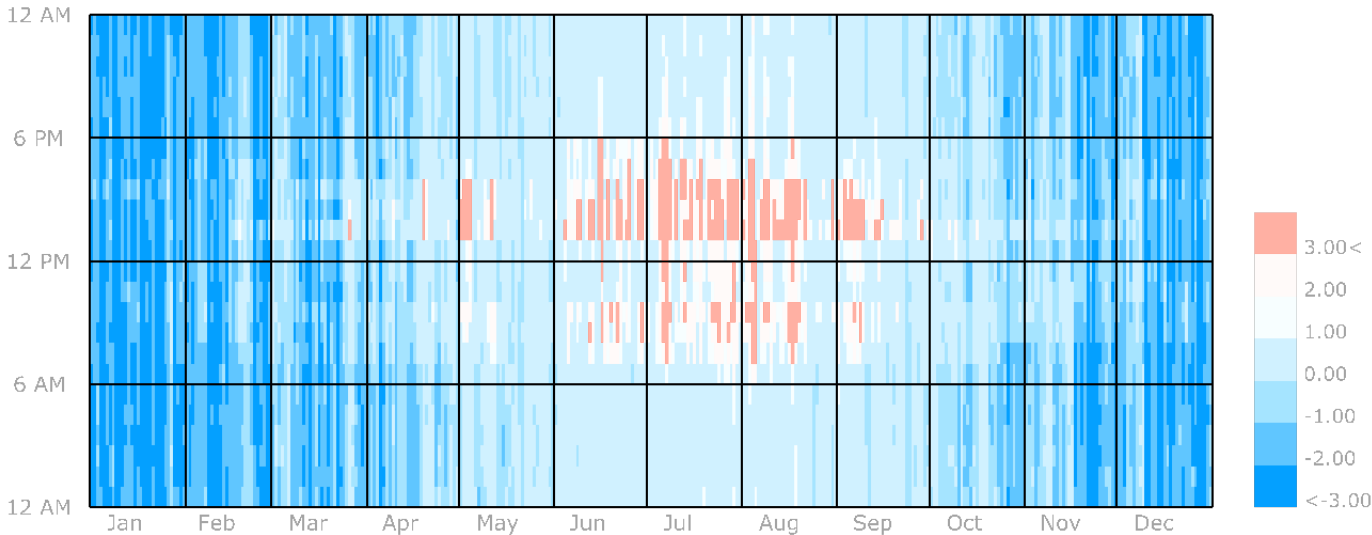
Plan



Outdoor Comfort Graph



Outdoor Comfort (-3 = Extreme Cold | -2 = Cold | -1 = Cool | 0 = Comfort | 1 = Warm | 2 = Hot | 3 = Extreme Heat) - Hourly
Philadelphia International Ap_PA_USA
1 JAN 1:00 - 31 DEC 24:00
Comfortable: 39.5%; Short period comf.: 20.63%; Heat stress: 6.67%; Cold stress: 33.21%

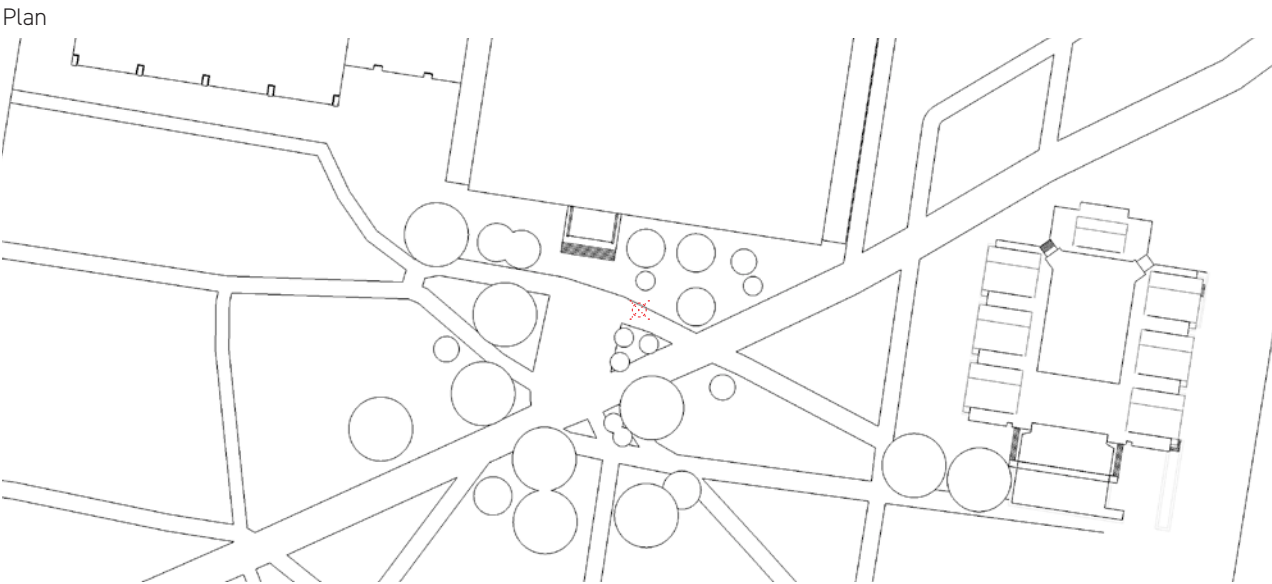# Annual Outdoor Comfort Simulation | **Location 4**

Plan



Outdoor Comfort Graph



Outdoor Comfort (-3 = Extreme Cold | -2 = Cold | -1 = Cool | 0 = Comfort | 1 = Warm | 2 = Hot | 3 = Extreme Heat) - Hourly
Philadelphia International Ap_PA_USA
1 JAN 1:00 - 31 DEC 24:00
Comfortable: 39.04%; Short period comf.: 20.09%; Heat stress: 7.5%; Cold stress: 33.37%

# Annual Outdoor Comfort Simulation | **Location 5**
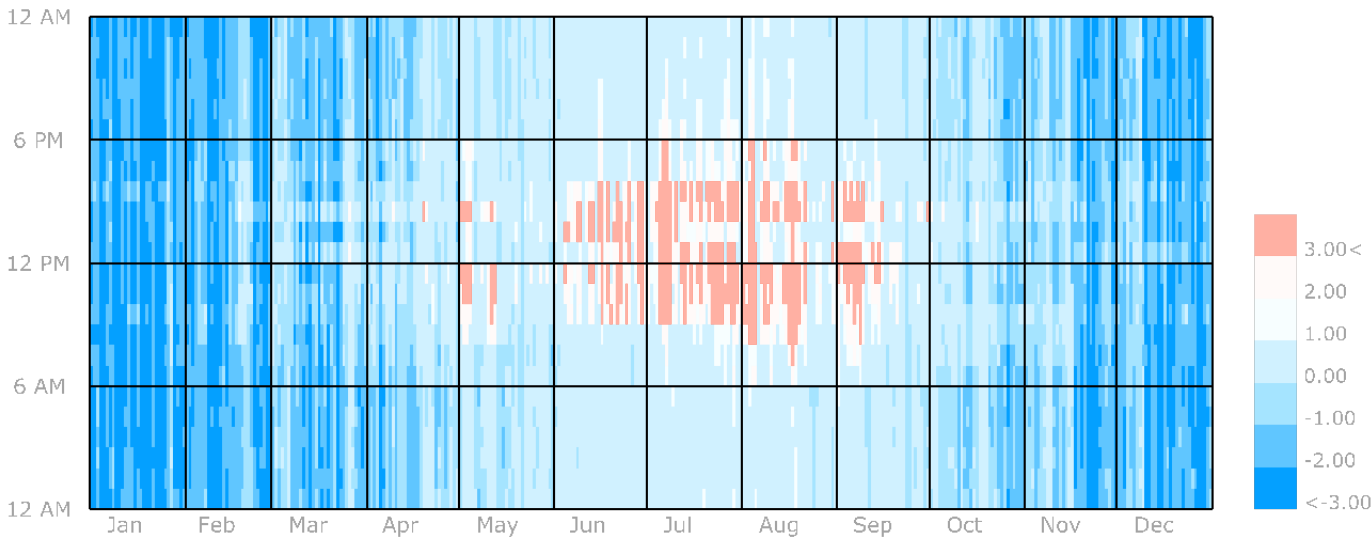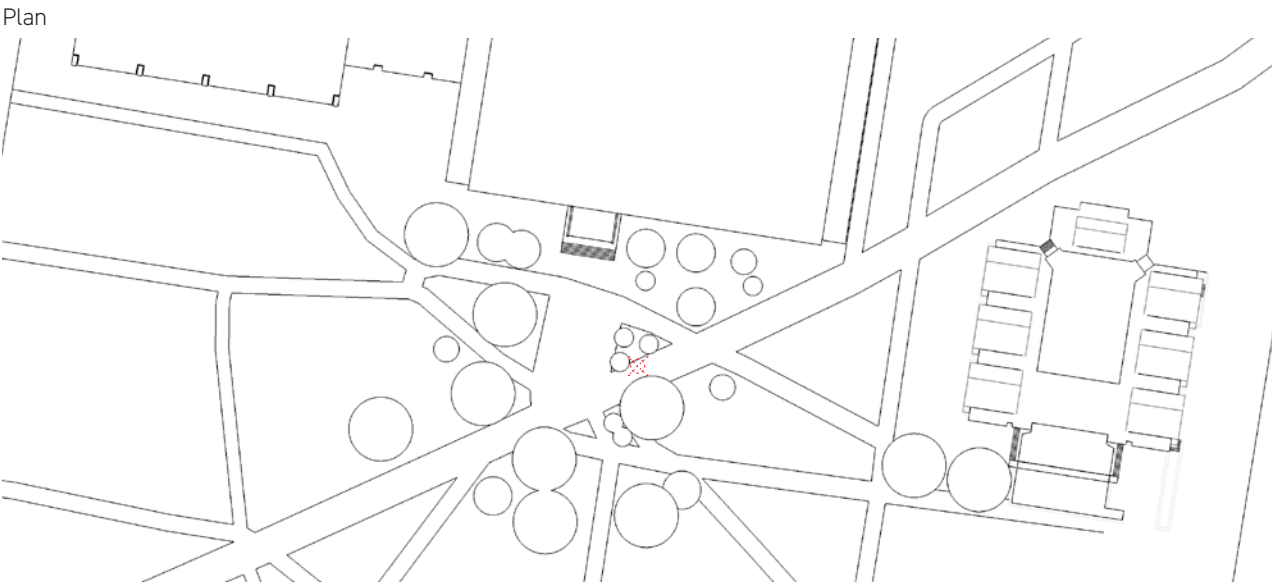
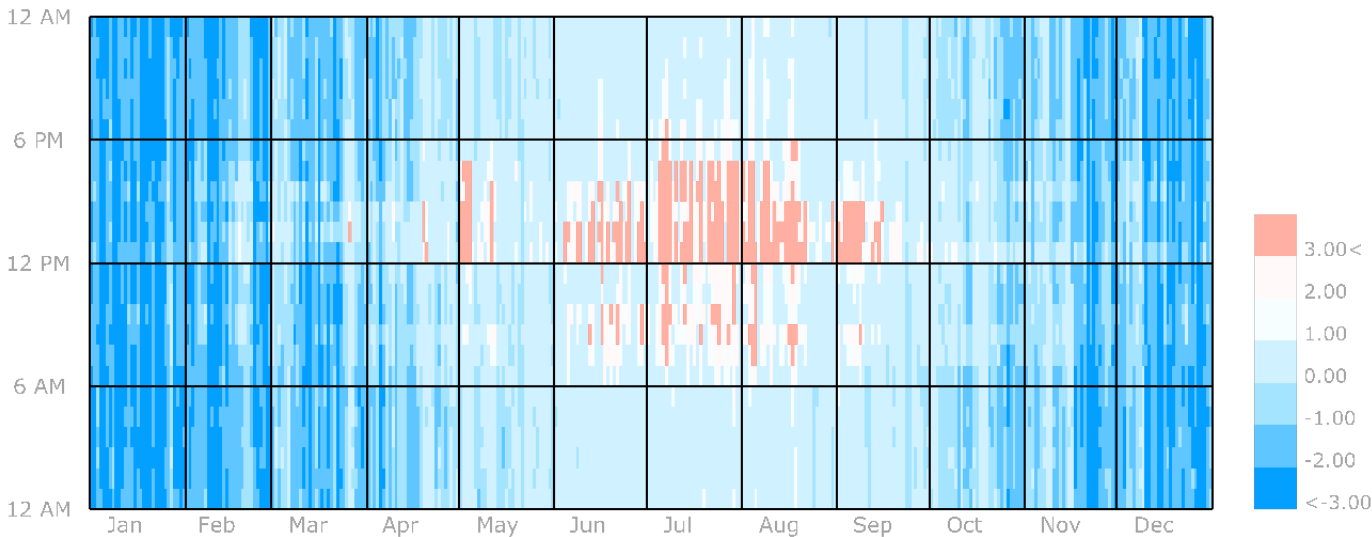Plan



Outdoor Comfort Graph



Outdoor Comfort (-3 = Extreme Cold | -2 = Cold | -1 = Cool | 0 = Comfort | 1 = Warm | 2 = Hot | 3 = Extreme Heat) - Hourly
Philadelphia International Ap_PA_USA
1 JAN 1:00 - 31 DEC 24:00
Comfortable: 39.18%; Short period comf.: 20.35%; Heat stress: 6.99%; Cold stress: 33.48%

Data Analysis

*What was your thinking process to find the best location?*
_My initial goal was to find a location that was most central and accessible in the square. But I quickly realized that the surrounding trees provided little shade in this area, so I began looking at locations that benefited directly from the shade the trees provided, as a passive design strategy.

*What is the difference between the best and the worst location?*
_The best location (#3) was comfortable 39.5% of the year, while the worst location (#1) was comfortable 38.33% of the year. Why heat stress saw the biggest overall change (8.4% > 6.67%), it is interesting to note that both heat stress and cold stress was affected by the change in location.

*What are the effective parameters that makes the best location perform better than other spots?*
_The parameter that has the biggest effect on performance seems to be heat stress due to solar radiation. As such, we see the locations with the most shade perform the best.

*What are the main limitations of the current simulation method for your study?*
_This method of study is limited to the EPW file that is based on climate data recorded at the Philadelphia Airport. Since this is a study on a hyper-specfic location in front of the Van Pelt library, it would be more accurate to perform measurements for outdoor comfort on site and compare that to the annual data contained in the EPW file. A successful design would try and reconcile the two data sets.