Outdoor Shading Design

Building Performance Simulation

Guide :
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Submitted by :
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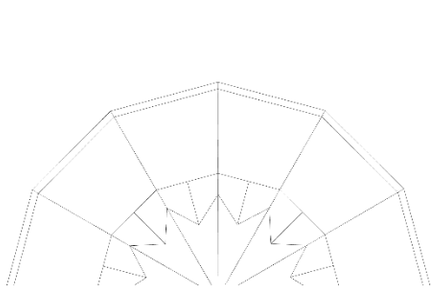
Meyerson Hall
University of Pennsylvania
Philadelphia
39°57'N 75°10'W
Weather Station : Philadelphia International Airport
Data Source : TMY3

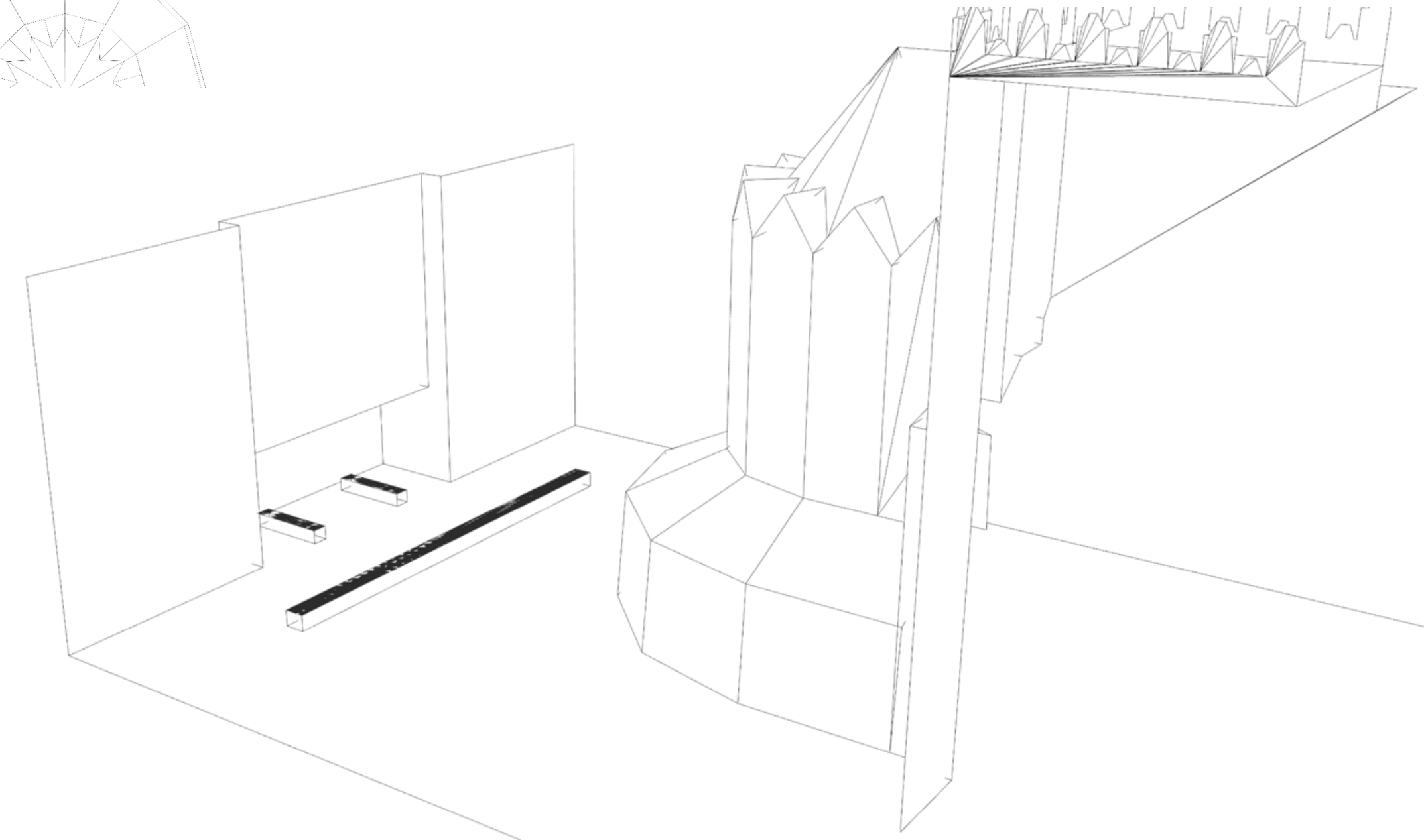
Design of Shading for Outdoor Seating

2 1

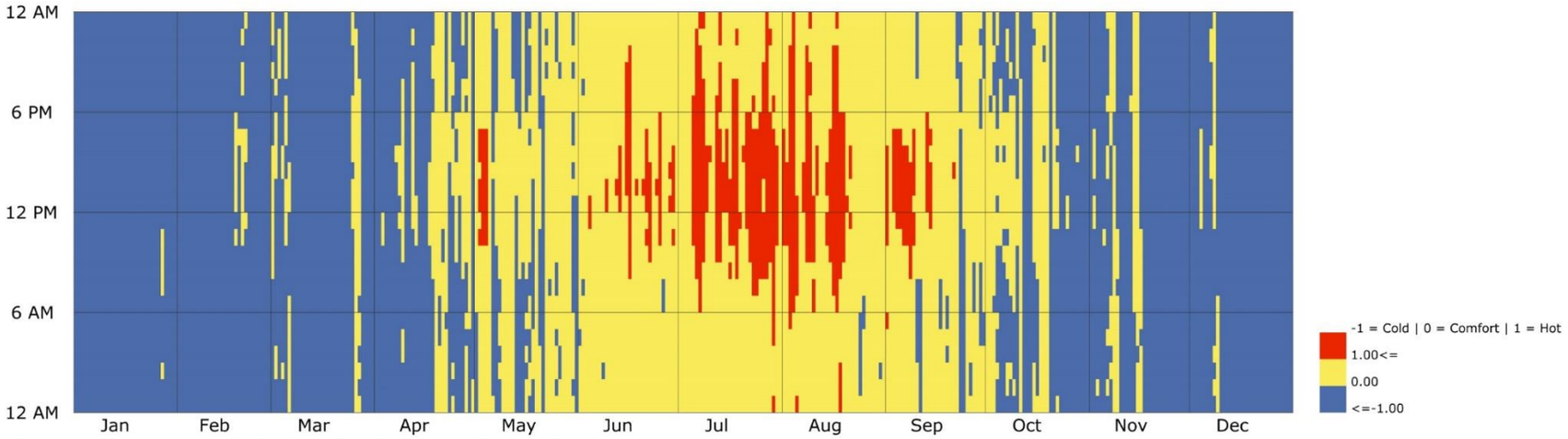
3



Plan



Thermal Stress Period



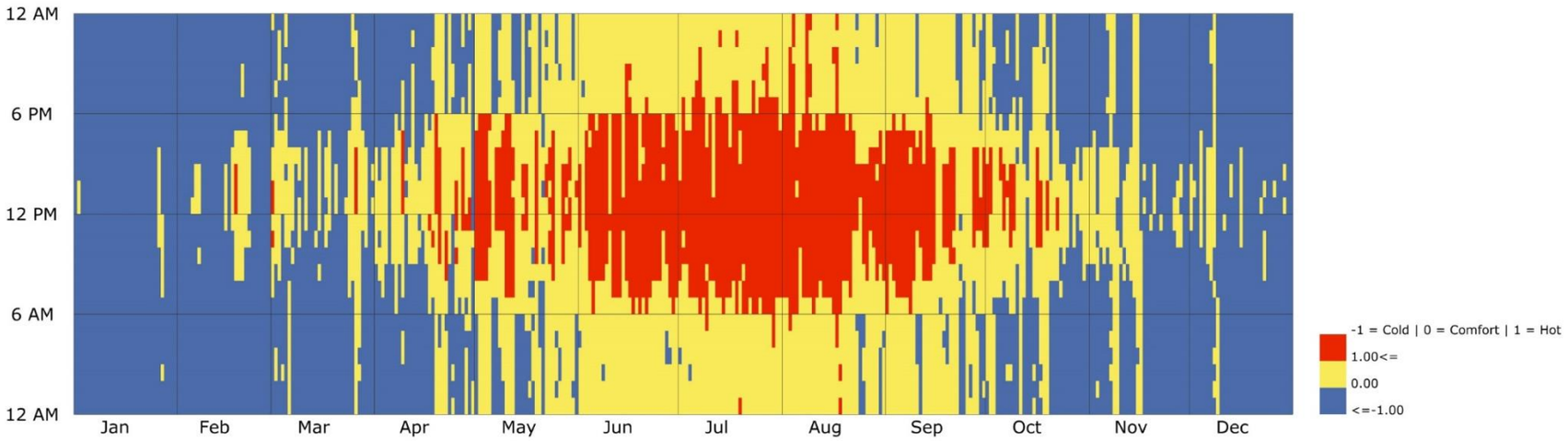
Thermal Stress (-1 = Cold | 0 = Comfort | 1 = Hot) - Hourly
Philadelphia International Ap_PA_USA
1 JAN 1:00 - 31 DEC 24:00

Condition :

Fully Shaded

Percent of Time Comfortable :

41.28%



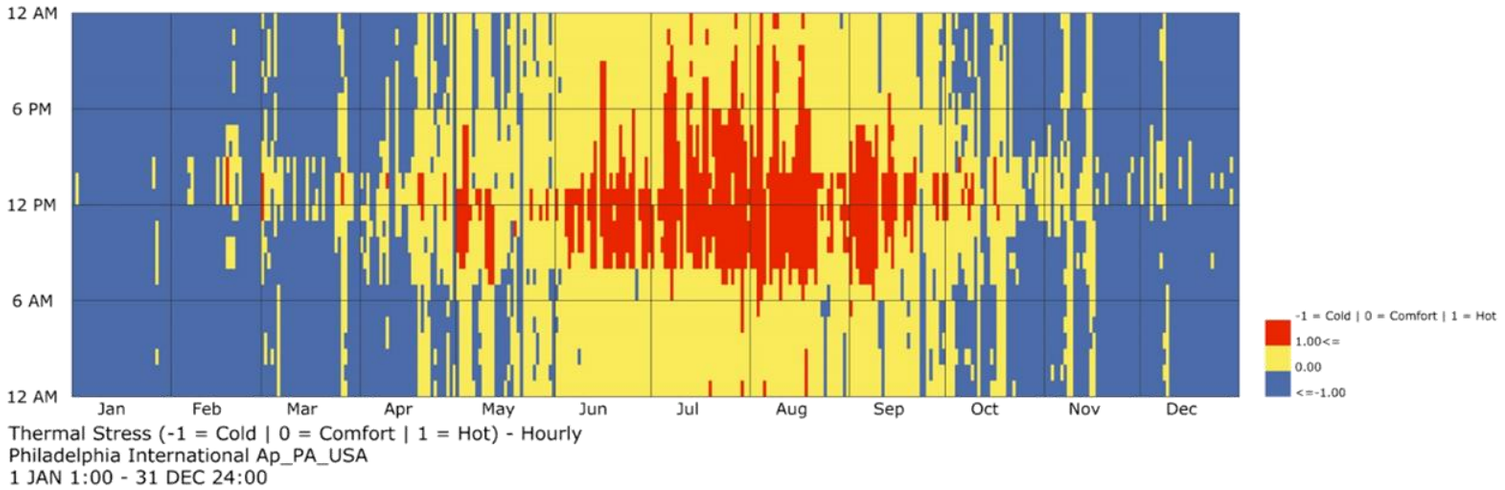
Thermal Stress (-1 = Cold | 0 = Comfort | 1 = Hot) - Hourly
Philadelphia International Ap_PA_USA
1 JAN 1:00 - 31 DEC 24:00

Condition :

Exposed to Solar Radiation

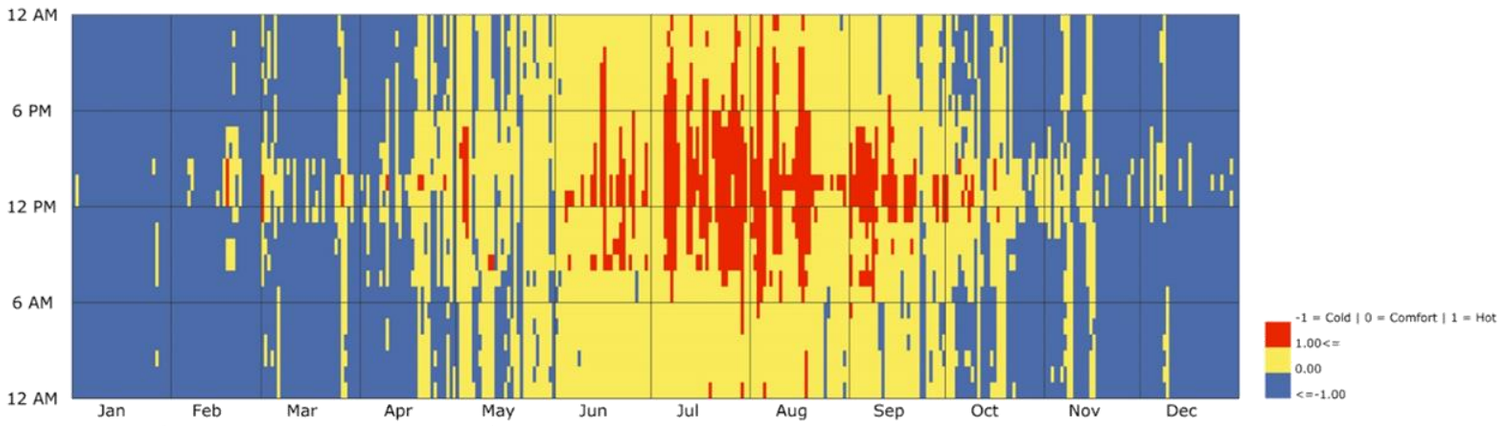
Percent of Time Comfortable :

37.34%



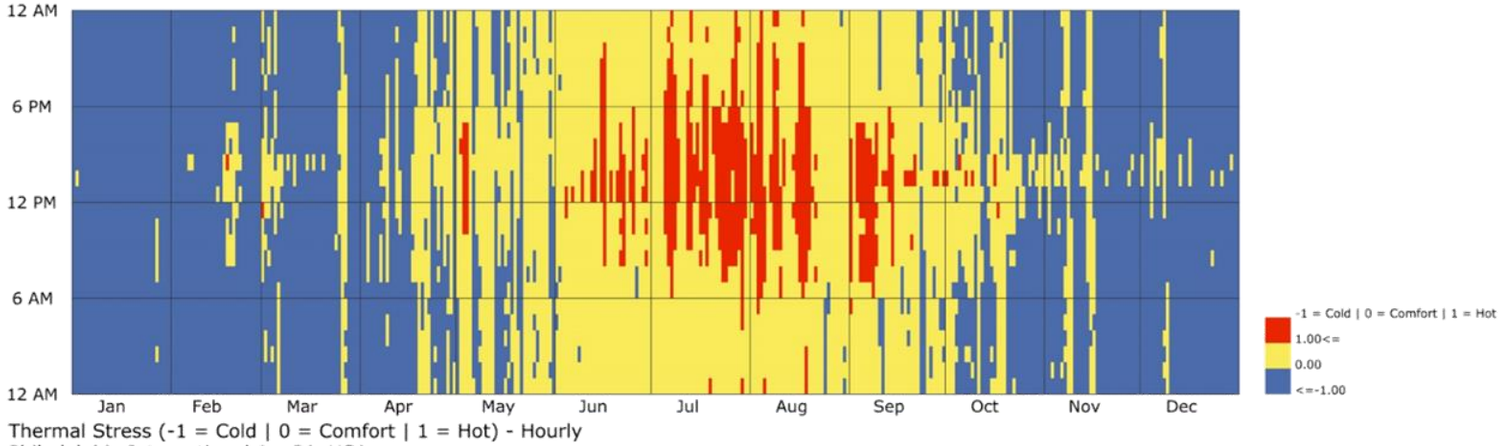
Thermal Stress (-1 = Cold | 0 = Comfort | 1 = Hot) - Hourly
Philadelphia International Ap_PA_USA
1 JAN 1:00 - 31 DEC 24:00

Bench 1
Condition :
With Context
Percent of Time Comfortable :
40.39%



Thermal Stress (-1 = Cold | 0 = Comfort | 1 = Hot) - Hourly
Philadelphia International Ap_PA_USA
1 JAN 1:00 - 31 DEC 24:00

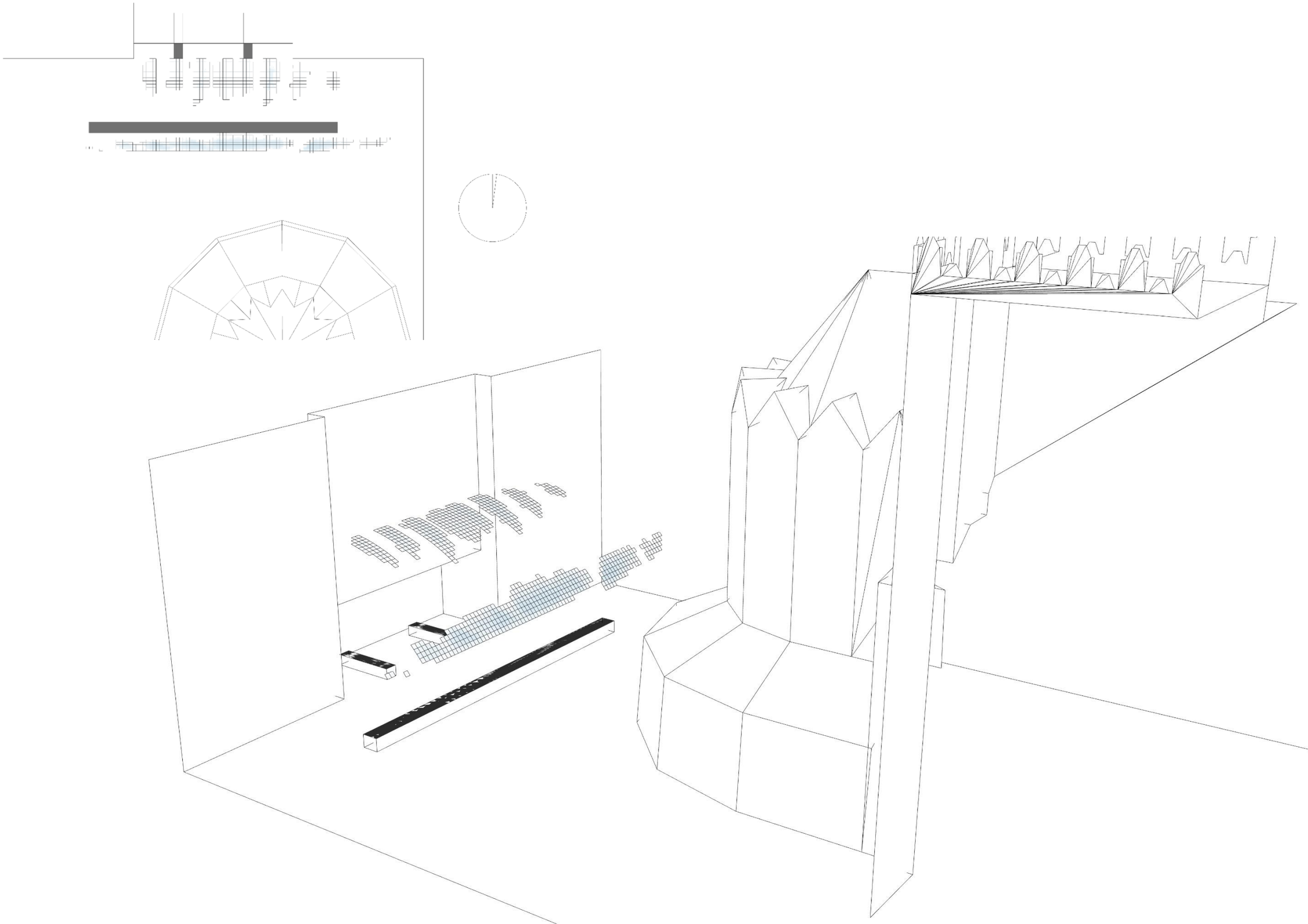
Bench 2
Condition :
With Context
Percent of Time Comfortable :
40.57%

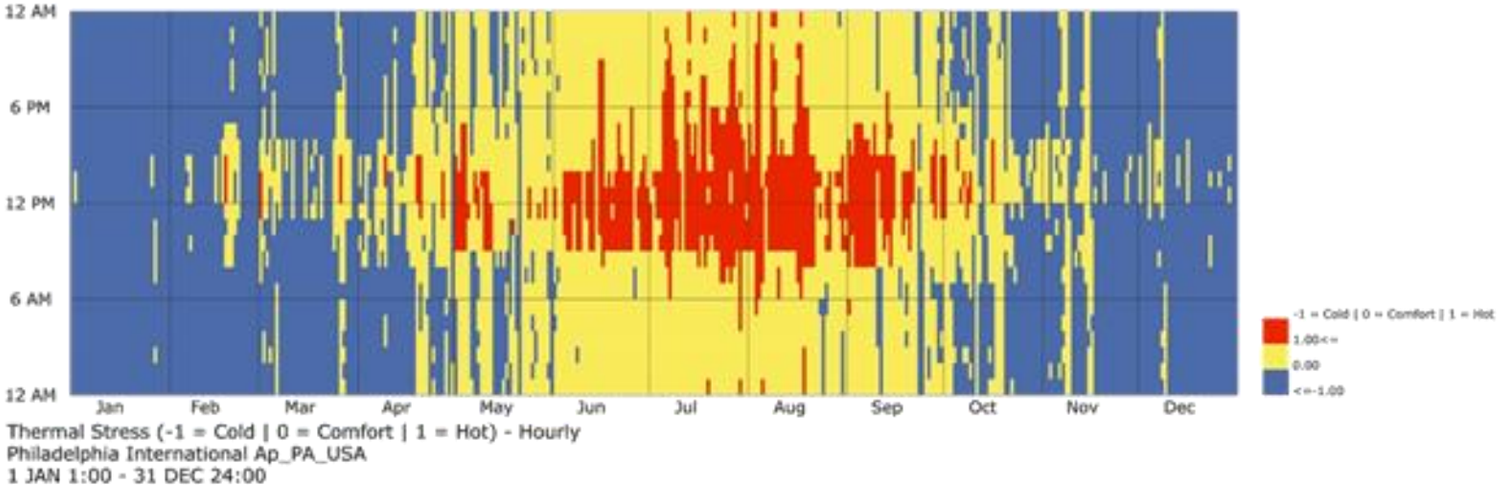


Thermal Stress (-1 = Cold | 0 = Comfort | 1 = Hot) - Hourly
Philadelphia International Ap_PA_USA
1 JAN 1:00 - 31 DEC 24:00

Bench 3
Condition :
With Context
Percent of Time Comfortable :
38.03%

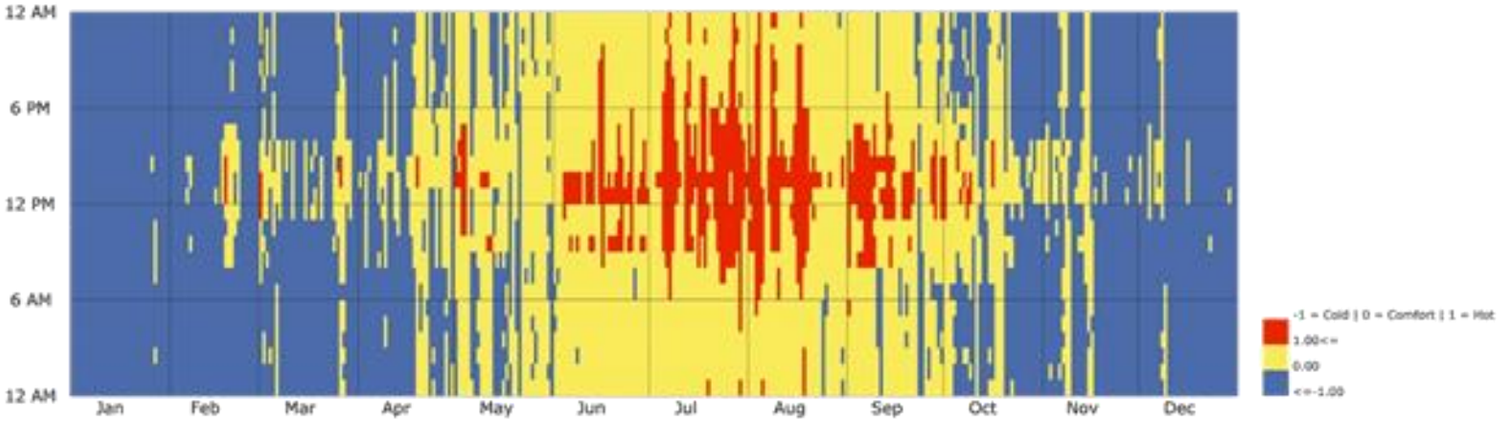
Optimized Shading Zone





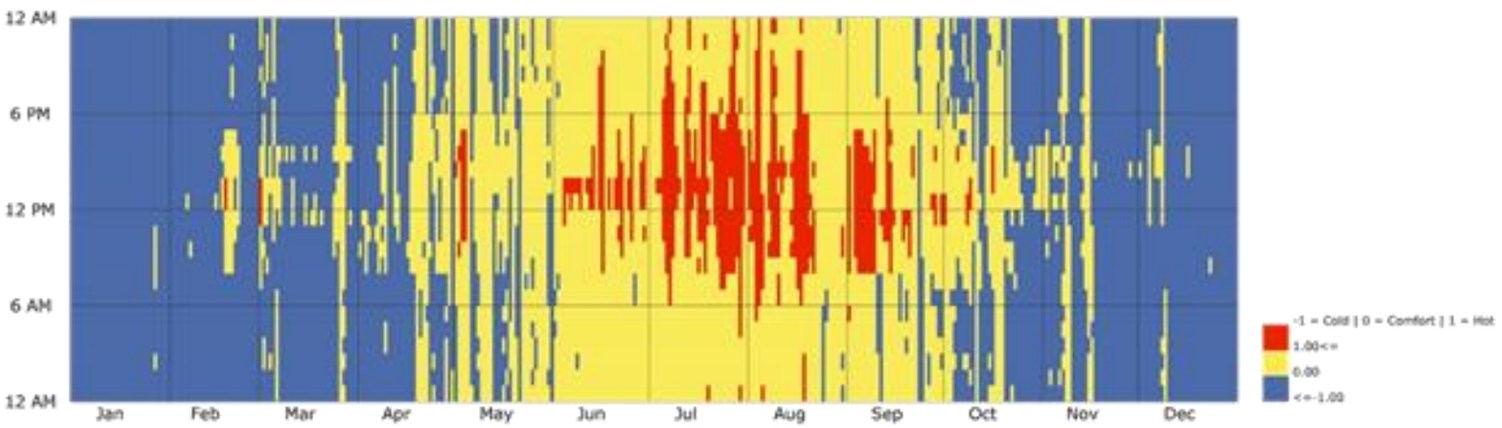
Thermal Stress (-1 = Cold | 0 = Comfort | 1 = Hot) - Hourly
Philadelphia International Ap_PA_USA
1 JAN 1:00 - 31 DEC 24:00

Bench 1
Condition :
With Context & Optimized Shading
Percent of Time Comfortable :
42.23%



Thermal Stress (-1 = Cold | 0 = Comfort | 1 = Hot) - Hourly
Philadelphia International Ap_PA_USA
1 JAN 1:00 - 31 DEC 24:00

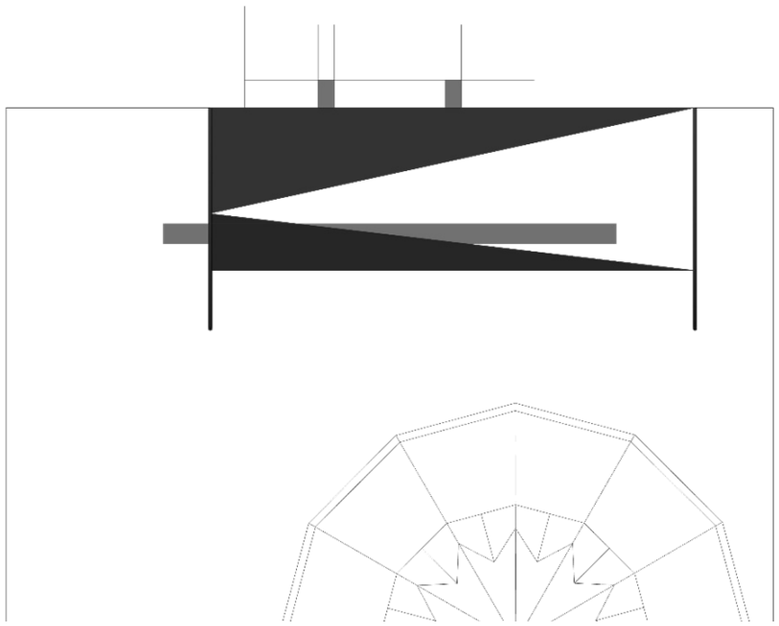
Bench 2
Condition :
With Context & Optimized Shading
Percent of Time Comfortable :
41.89%

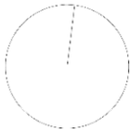


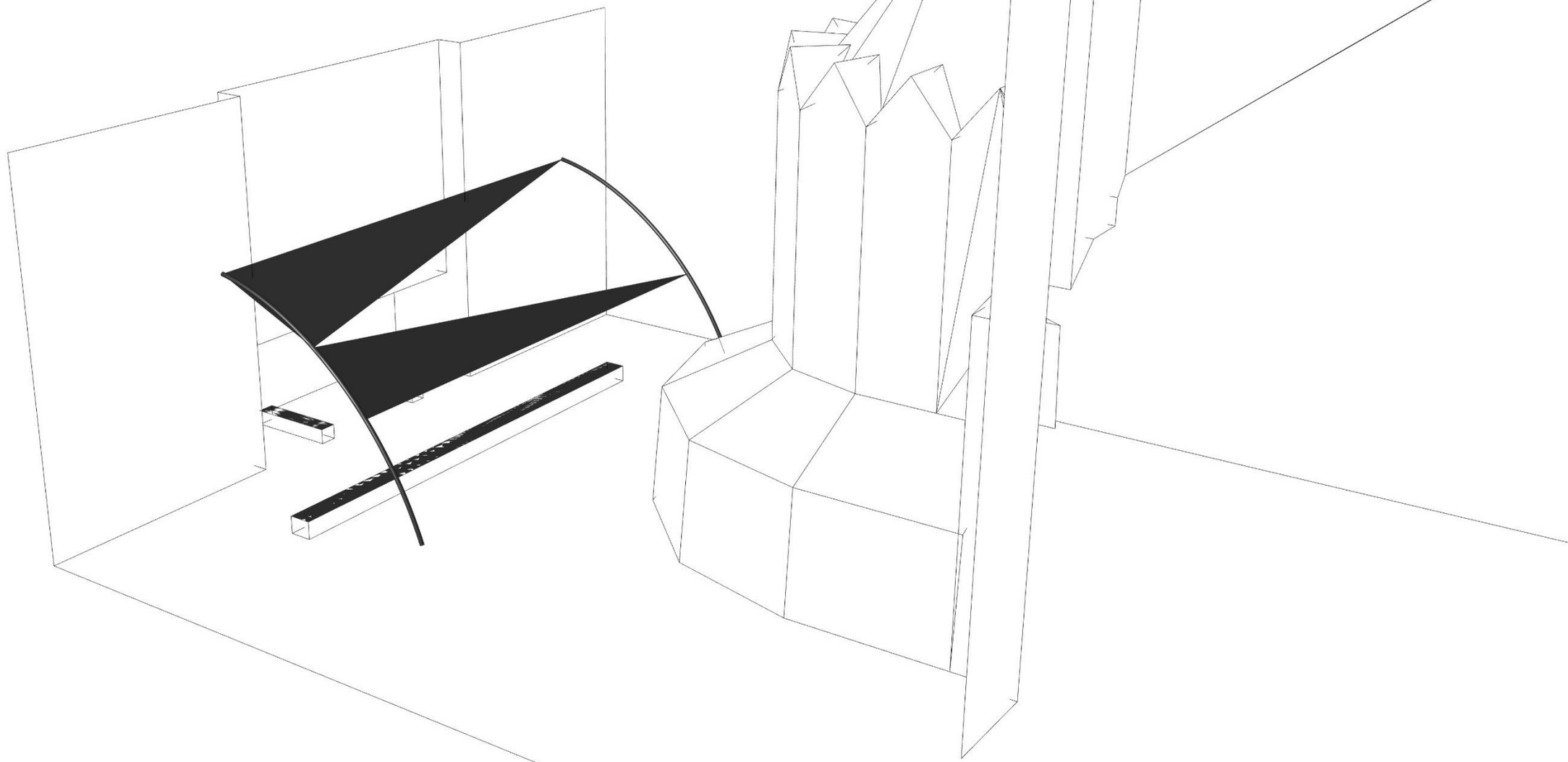
Thermal Stress (-1 = Cold | 0 = Comfort | 1 = Hot) - Hourly
Philadelphia International Ap_PA_USA
1 JAN 1:00 - 31 DEC 24:00

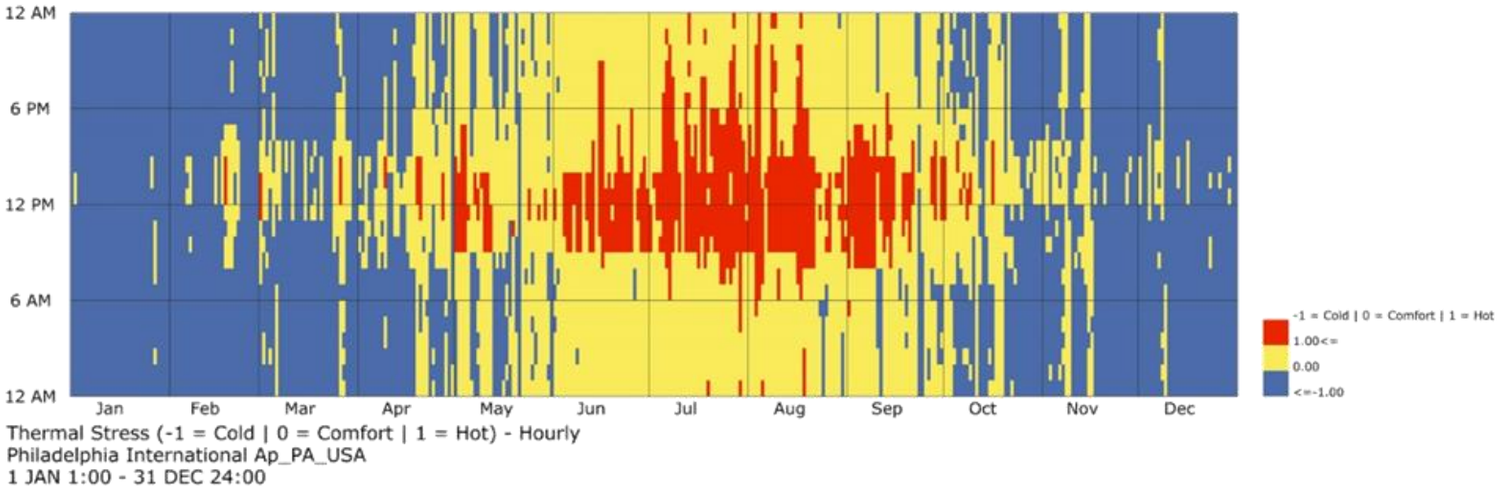
Bench 3
Condition :
With Context & Optimized Shading
Percent of Time Comfortable :
40.42%

Shading Device Design









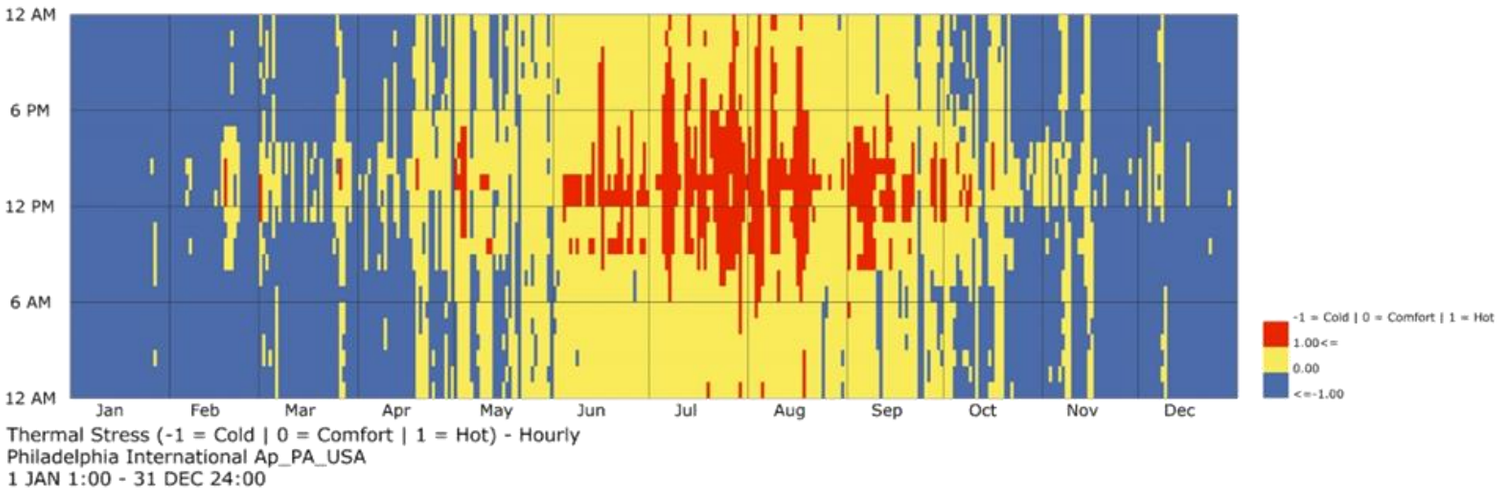
Bench 1

Condition :

With Context & Shading Device

Percent of Time Comfortable :

42.05%



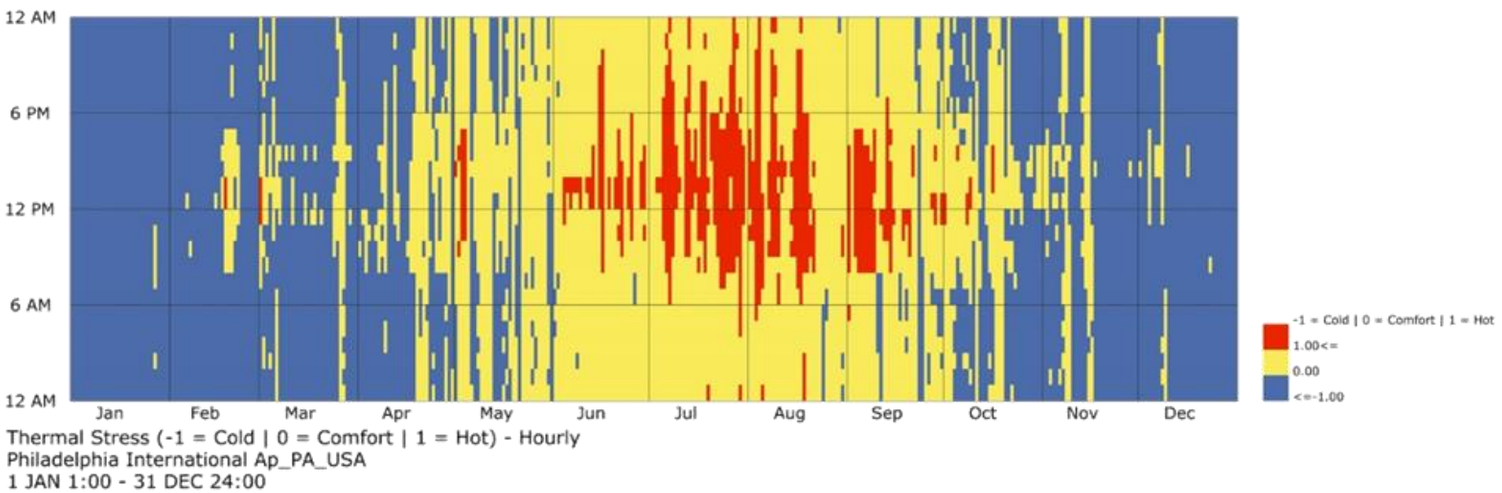
Bench 2

Condition :

With Context & Shading Device

Percent of Time Comfortable :

41.93%



Bench 3

Condition :

With Context & Shading Device

Percent of Time Comfortable :

41.37%