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Daylighting Analysis of Neuberger Hall

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Daylighting Analysis of Neuberger Hall

Heather LaRose, Rachel Sairio, & Connor Scher
in collaboration with Hacker Architects

ARCH 560 Fall 2016

Research & Data Collection

Set-Up Data Collection
Build Sefaira Models
Photograph Existing Conditions
Research Design Ideas

Visualize Data & Designs

Convert Raw Data into
Visualizations
Model Design Ideas in Sefaira

Final Proposals

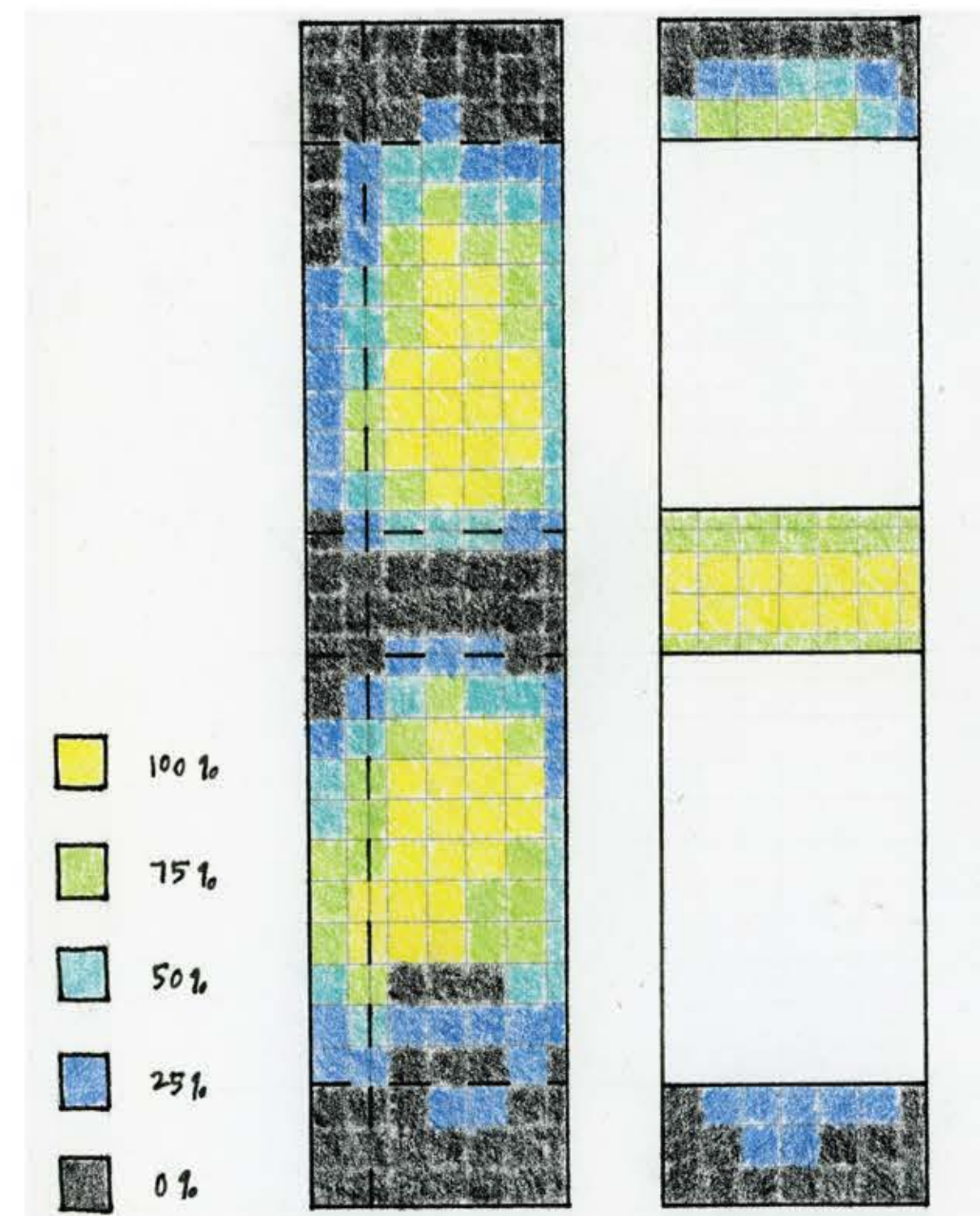
Create Design Proposals
Final Presentation



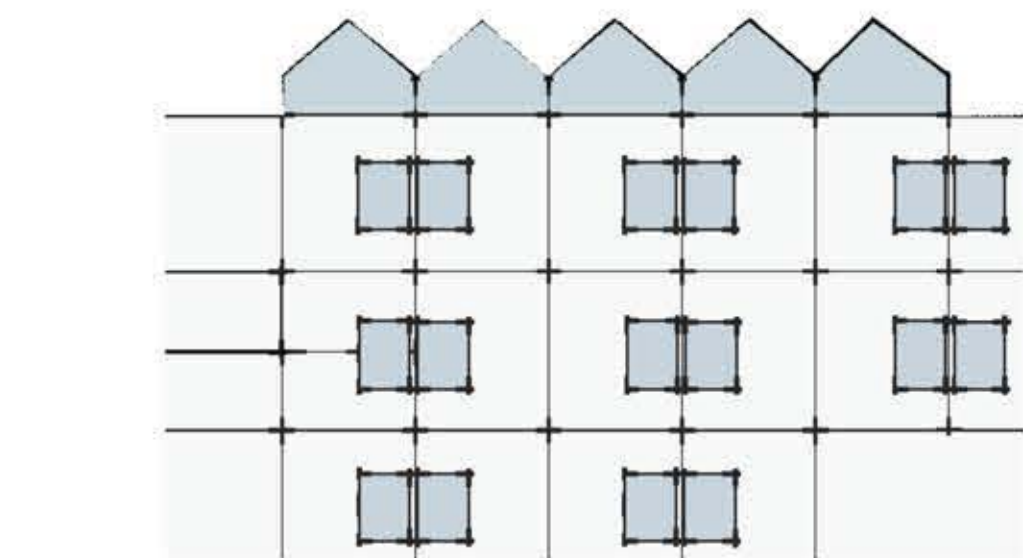
HACKER

With the renovation of Neuberger Hall, one of the most highly used academic buildings on the PSU campus, it is crucial to balance the need for maximizing daylighting potential with the long term costs. With various design elements being considered it is necessary to understand the existing daylighting conditions to better enable us to provide effective and efficient design recommendations. Daylighting design plays a critical role in the quality of the learning and working spaces provided at Neuberger, as well as the effect on student comfort and productivity.

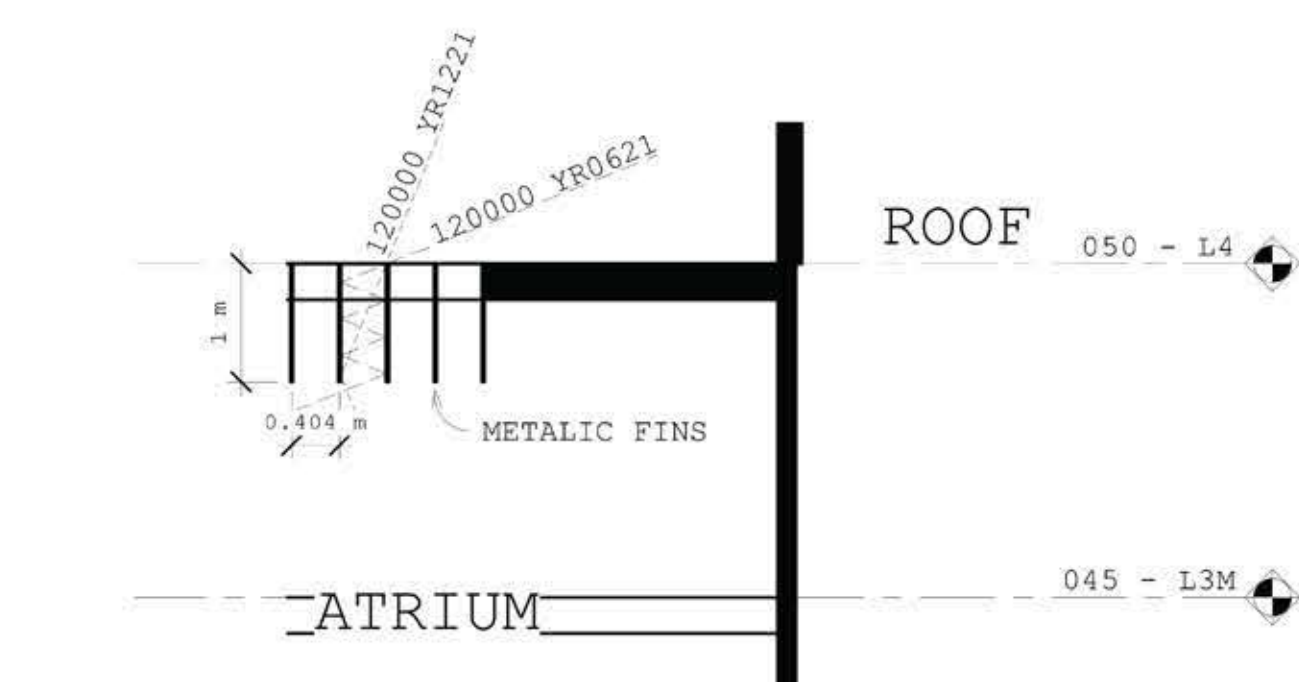
East Atrium:



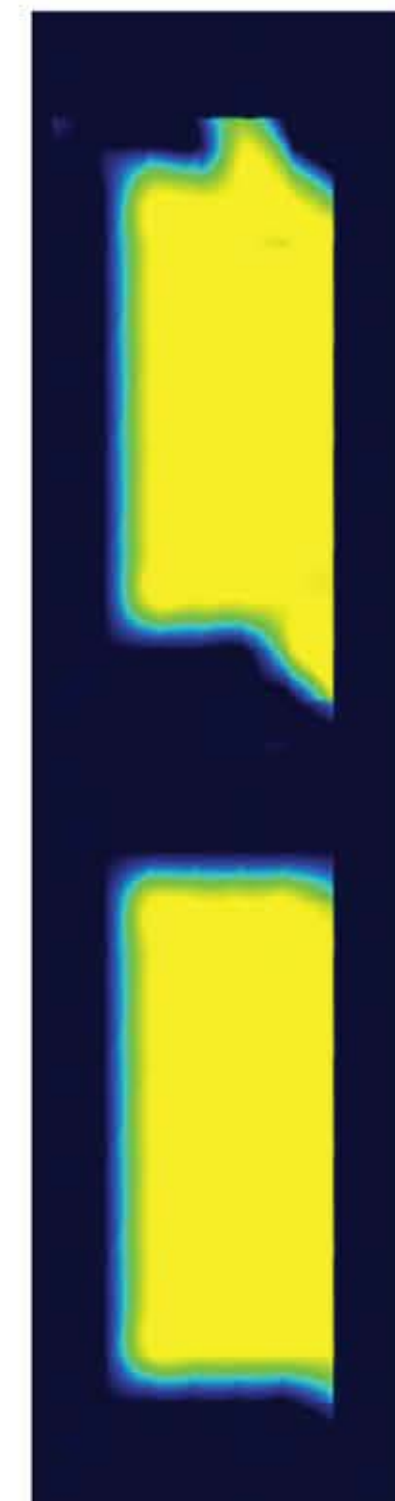
Collected Data Visualization



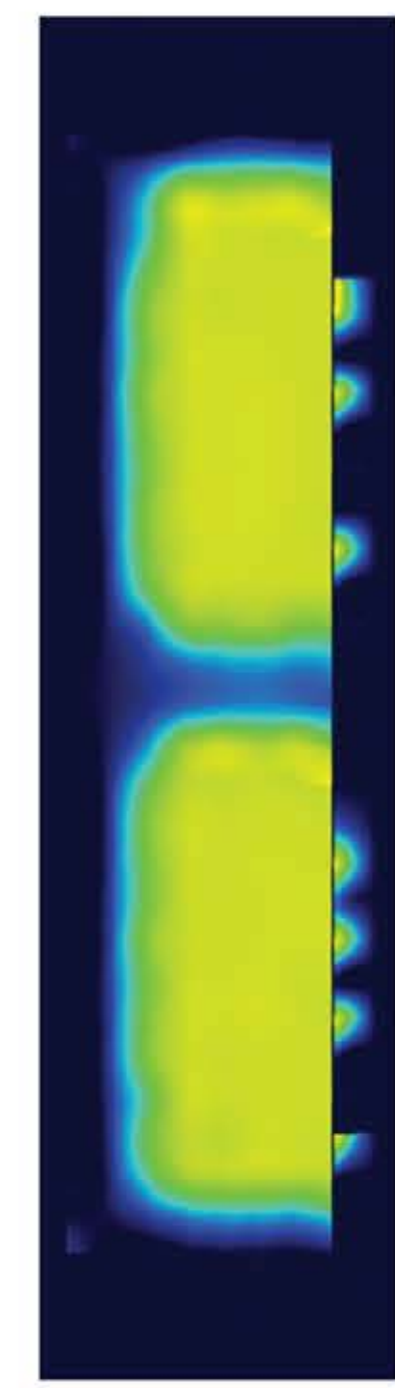
Existing Design



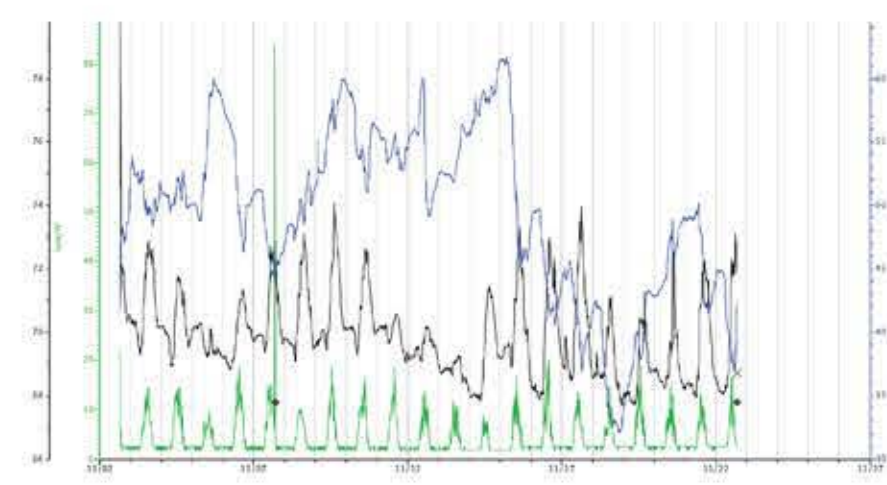
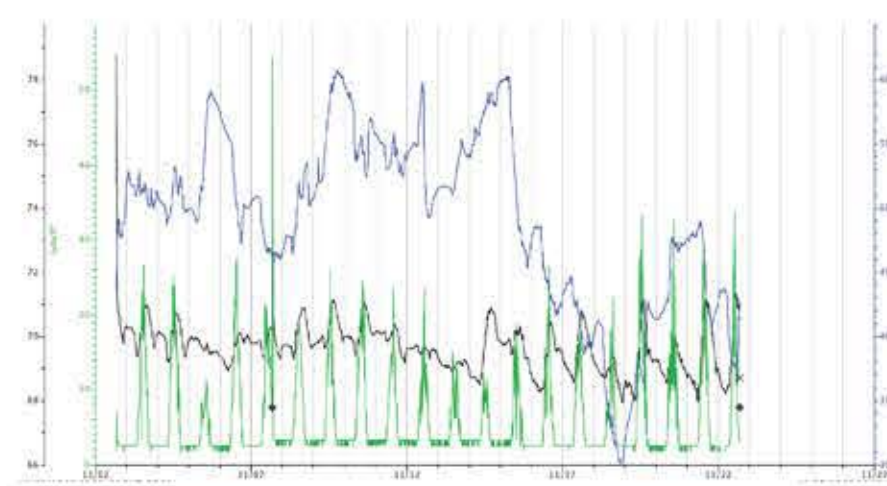
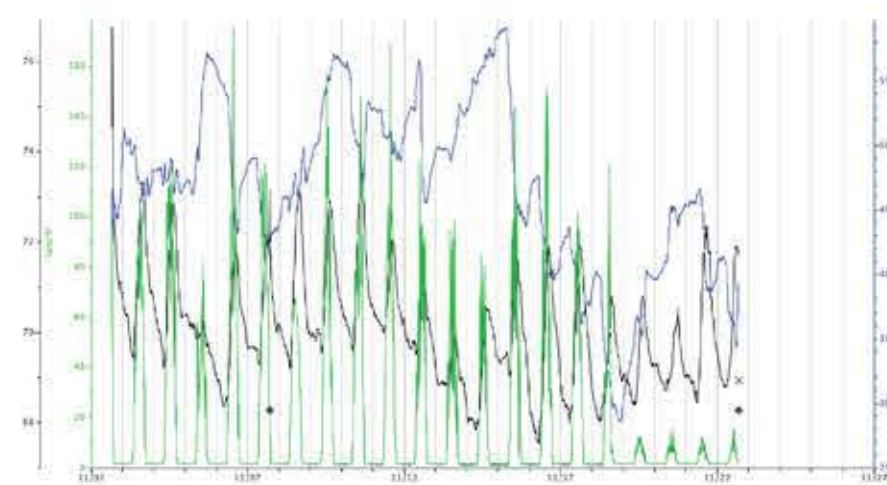
New Lighting Design



Sefaira (Existing)



Sefaira (New Lighting)



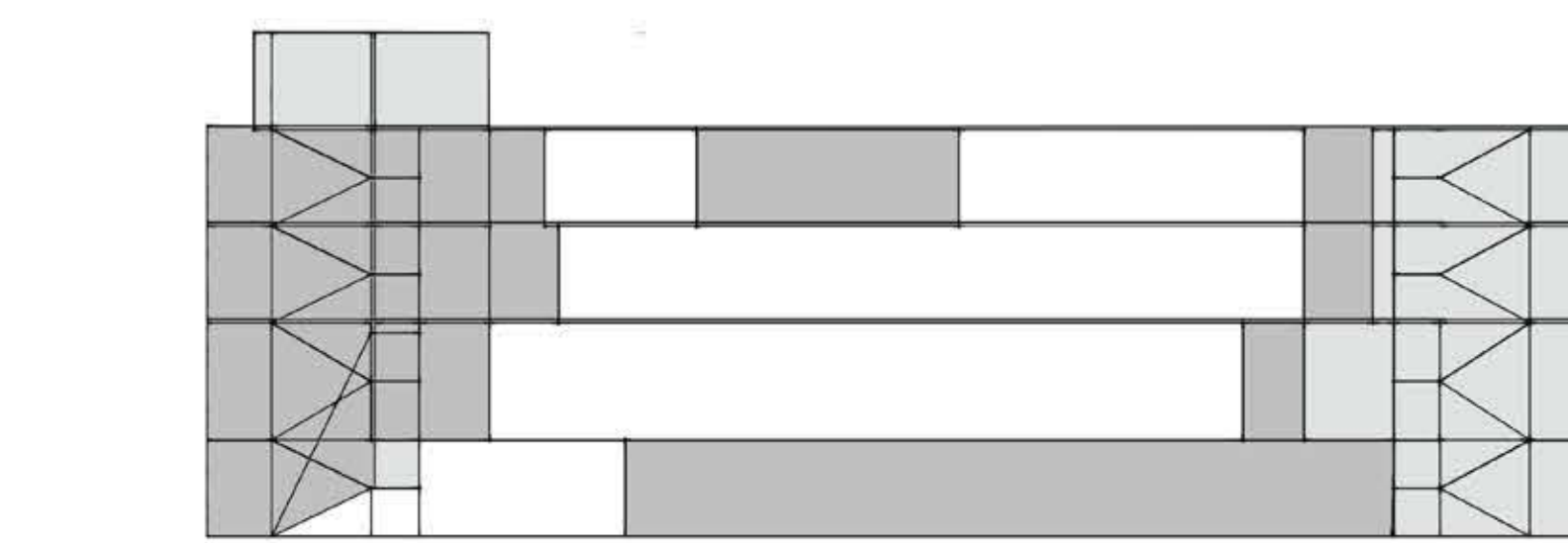
Collected Data



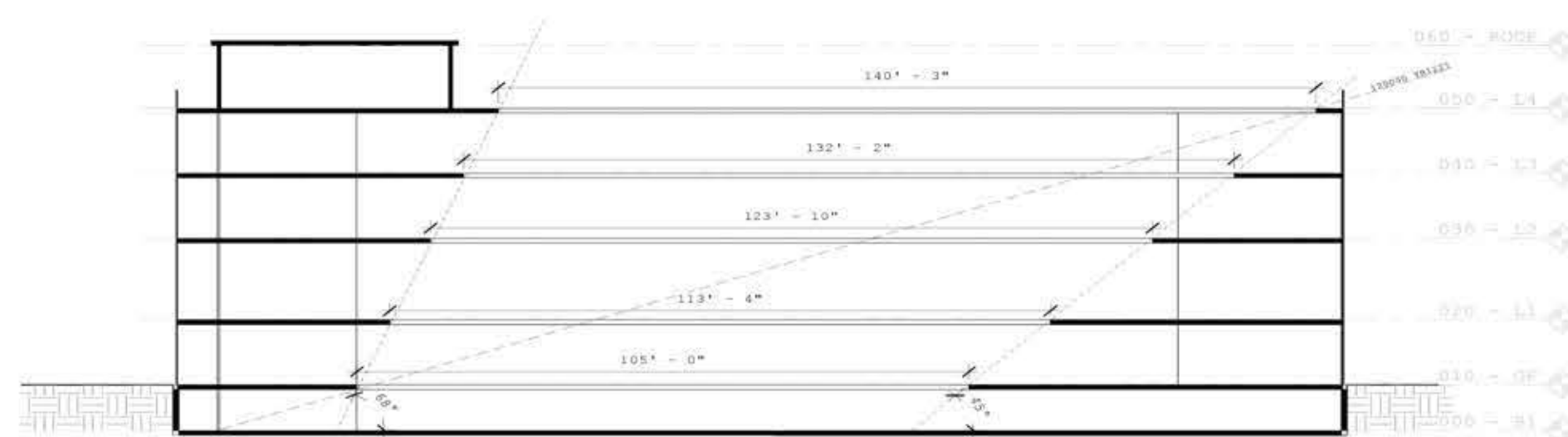
Existing Atrium



West Atrium:



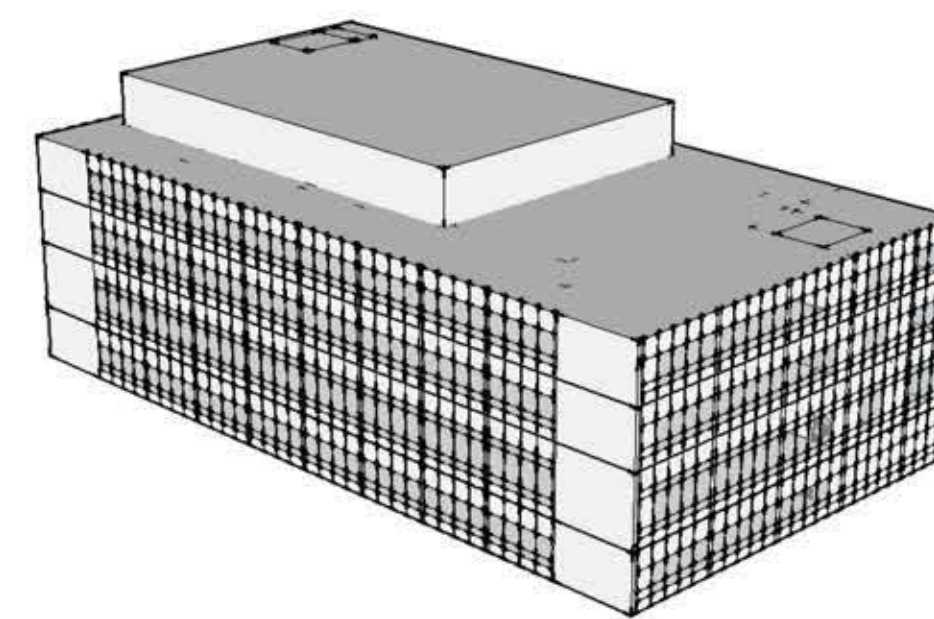
Existing West Section



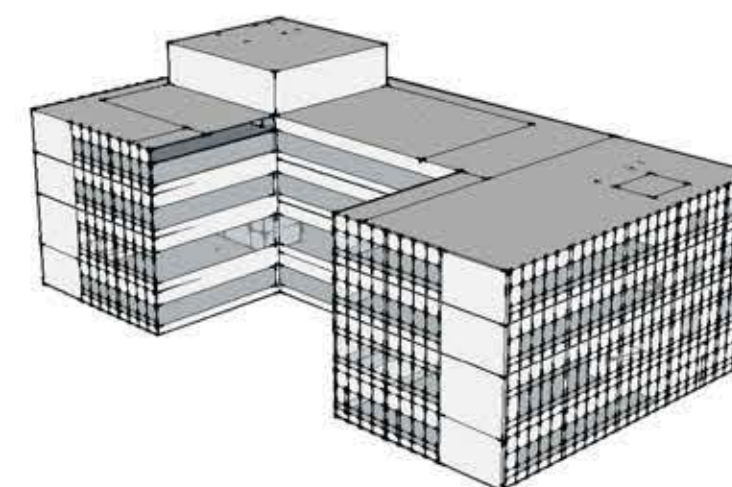
New West Atrium

The atrium cut maximizes floor area and takes full advantage of the sun angles throughout the year. The 68 degree cut corresponds to the Summer Solstice noon sun while the 45 degree cut matches the Equinoxes to balance Summer and Winter insolation. The steps allow the noon sun to reach the basement throughout the year. The atrium is in the middle of the floorplate to ensure the areas of the floor get similar insolation. The minimum width needs to be between 21'6" - 27'0" to allow the adjacent spaces in the top story to receive full daylight for more than half of the year during working hours.

West Courtyard:

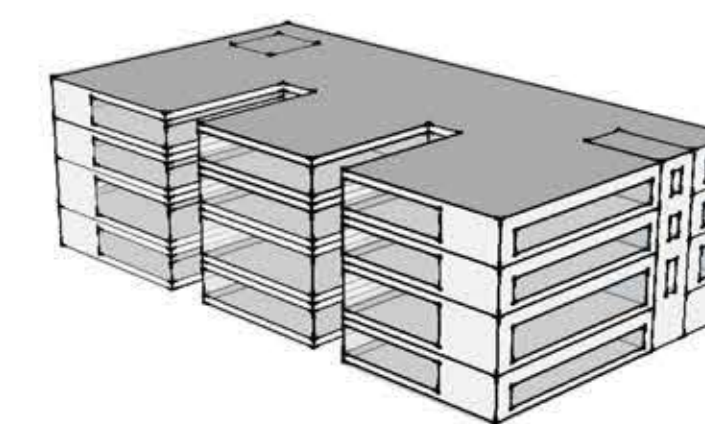


Existing West Facade

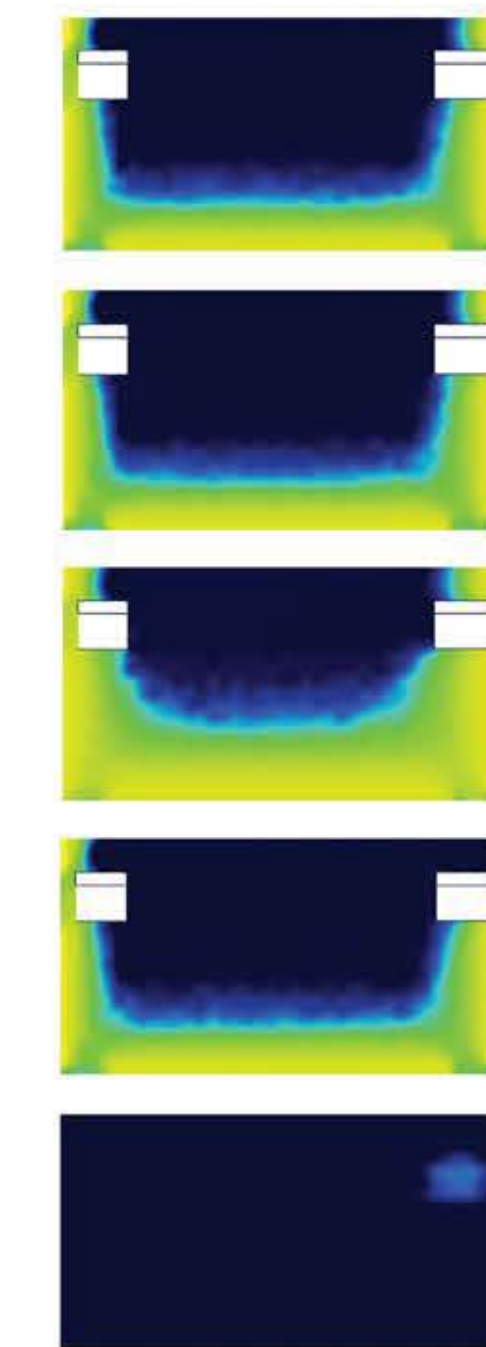


Design One

New West Courtyard

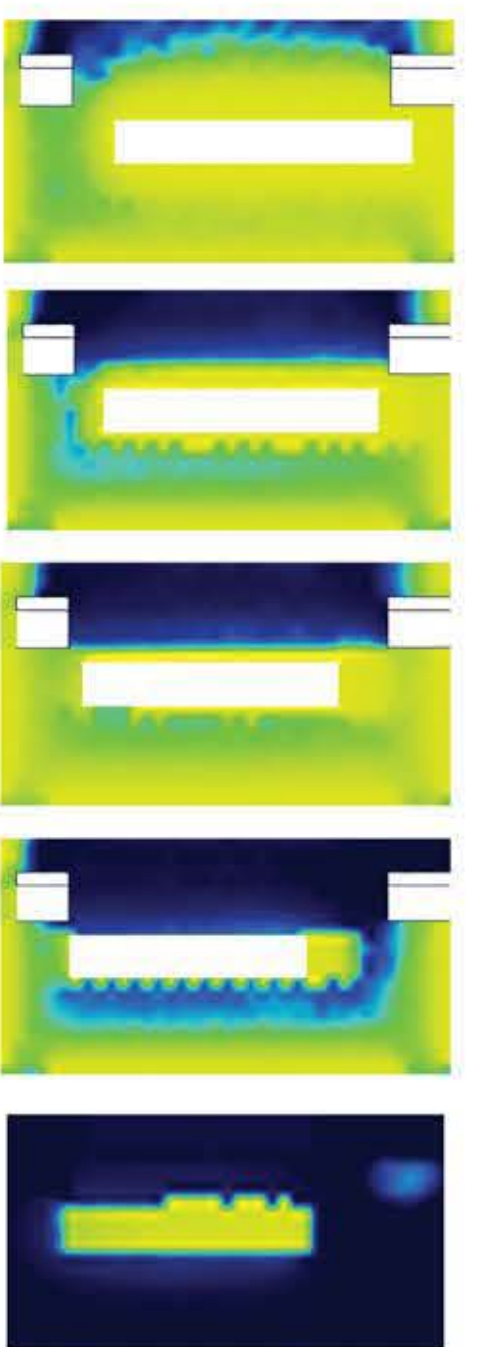


Design Two

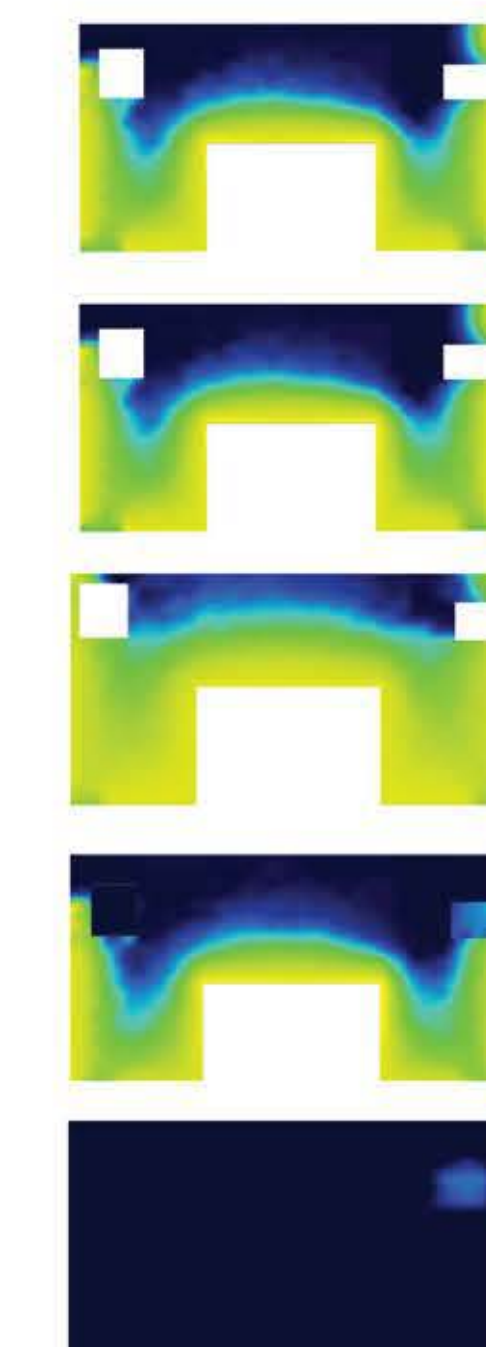


Sefaira (Existing Section)

L4
L3
L2
L1
B1

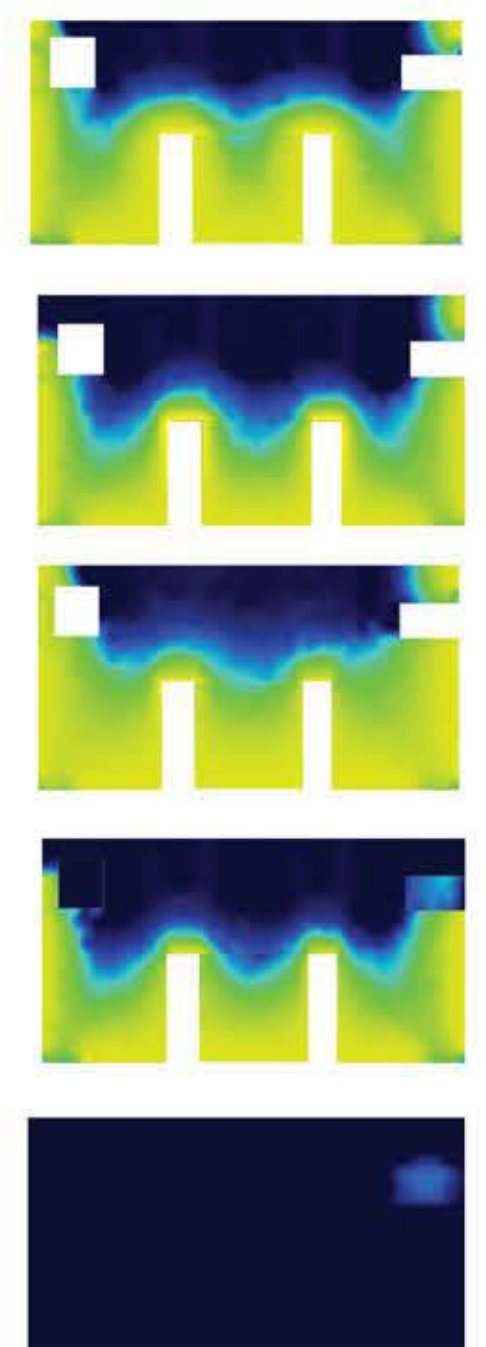


Sefaira (New Atrium)



Sefaira (Design One)

L4
L3
L2
L1
B1



Sefaira (Design Two)

The west courtyard is designed to maximize the daylight while still retaining adequate floor area. Hacker was interested in making a large cut in the west facade in an effort to bring more daylight into the building, but we quickly realized how drastically it reduced the useable floor area. We designed a second option that still brought light into the space, but also allowed us to keep the maximum amount of useable floor space.