Sustained BY Nature

Compelled BY Nature

Committed BY Nature

Nature

Enhanced BY Nat

Nature

Restored BY Nature

Visionary BY

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INTERNATIONAL CONFERENCE AND EXPO

Human × Nature

Resolved BY Nature

EXCERPT:

Daylight Design as a Service Model (Kris Callori, Verdacity)

How robust LEED v4 simulation tools are successfully applied to design projects through case studies

d BY Nature

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Driven BY Nature

Strengthened BY Nature

How to use LEED v4 EQ7 successfully to both get more points and better daylight design outcomes

- Daniel Glaser | *LightStanza*
- Derek Felschow | *Point Energy Innovations*
- Kris Callori | *Verdacity*
- Patrick Sheehan | *Gensler*

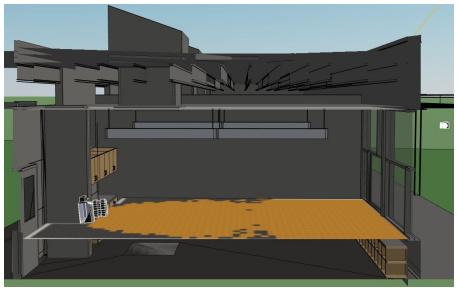
To achieve maximum credit, LEED v4 EQ7 uses a new scoring system reliant on complex metrics and calculation tables. These new metrics are highly processed and its total score difficult is difficult to deconstruct Hence, very few design teams even consider going through this option. This talk will not only demystify this process, but illustrate how design teams can productively use these scorecards to both advance their daylight design as well as obtain EQ7 credits. The first speaker will provide insight on how they progressed using the LEED EQ7 scorecards and how they were able to score better as they gained more experience and integrate into their long established daylight practices. To better understand and critique the process, the second speaker will engage you with instructions on how to calculate a small portion of the LEED scorecard. You will share your results with neighboring groups who together will form a larger report card. In doing these exercises you will get a practical understanding of the borders of the credit, where there is flexibility, and what additional calculations may be necessary outside LEED. The 3rd and 4th speakers will also provide both background as well as detailed case studies.

Human × Nature

Today, you will learn...

1. **Different options for calculating the Daylight Credit in LEED v4 BD+C:**
    - Option 1 (Simulation: Spatial Daylight Autonomy)
    - Option 2 (Simulation: Illuminance Calculations)
2. **How to calculate the following requirements for LEED v4 BD+C Daylight:**
    - Spatial Daylight Autonomy (sDA)
    - Annual Sunlight Exposure (ASE)
3. **How robust LEED v4 simulation tools are successfully applied to design projects through case studies**
    - Menlo Park Office Building
    - Albuquerque, New Mexico
    - San Francisco Airport

Course Outline



1. Introduction and LEED v4 EQ7 Metrics Explanation

2. Case Study: Menlo Park Office Building

3. Activity: Calculating LEED v4 Daylight Requirements on Your Own

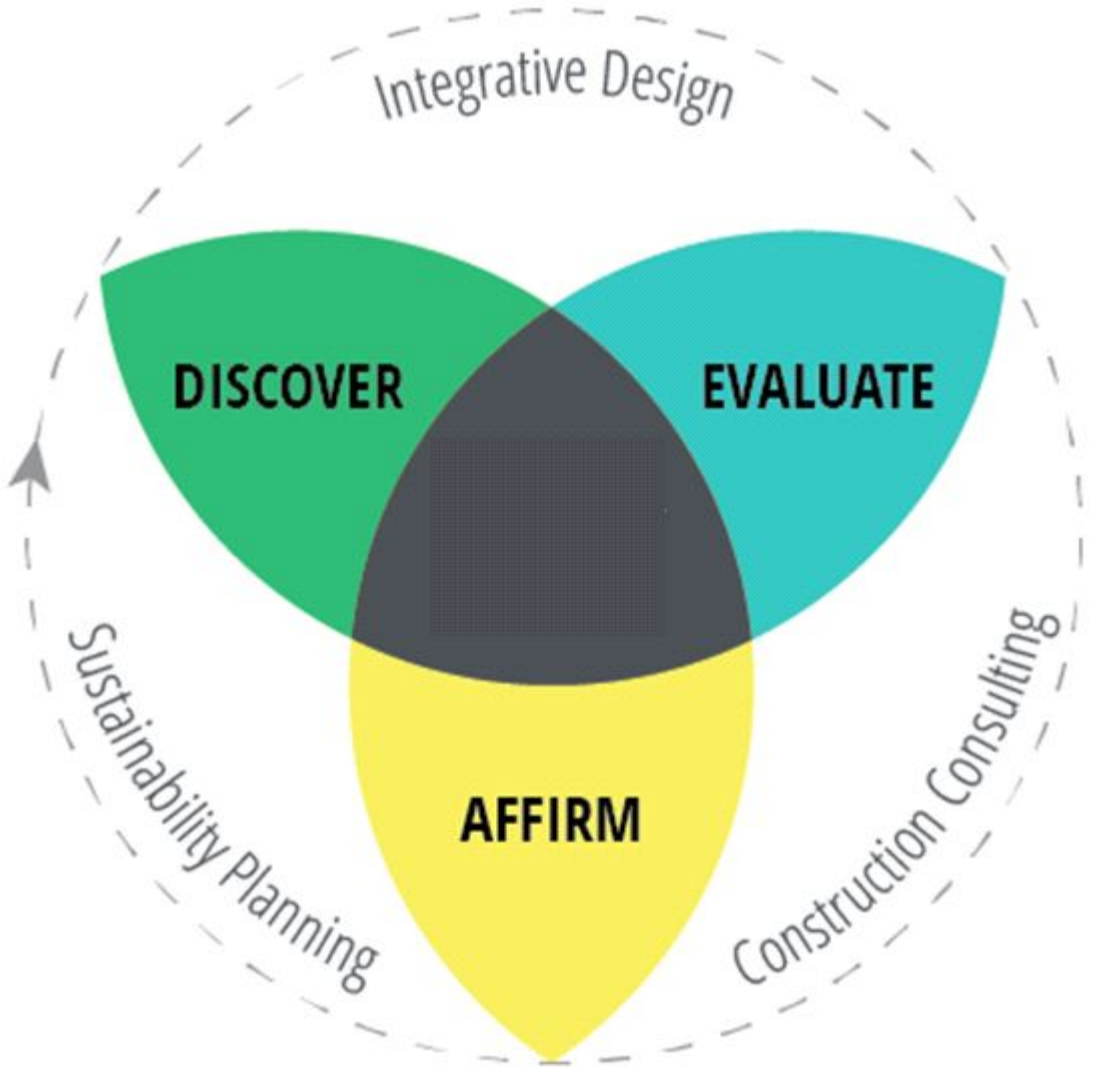
EXCERPT:
Daylight Design as a Service Model (Kris Callori, Verdacity)
How robust LEED v4 simulation tools are successfully applied to design projects through case studies

4. Case Studies: Albuquerque, New Mexico

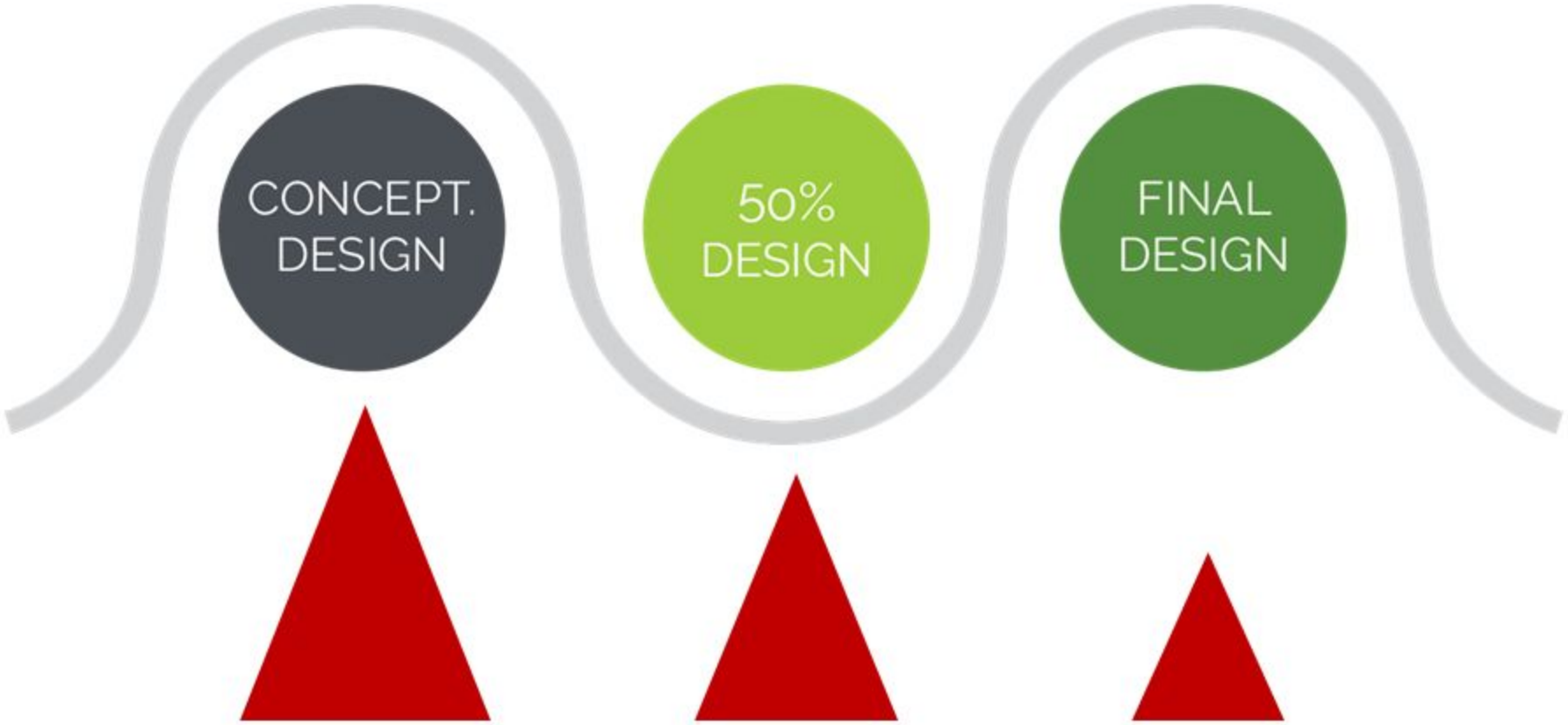
5. Case Study: San Francisco Airport

Daylight Design as a Service Model

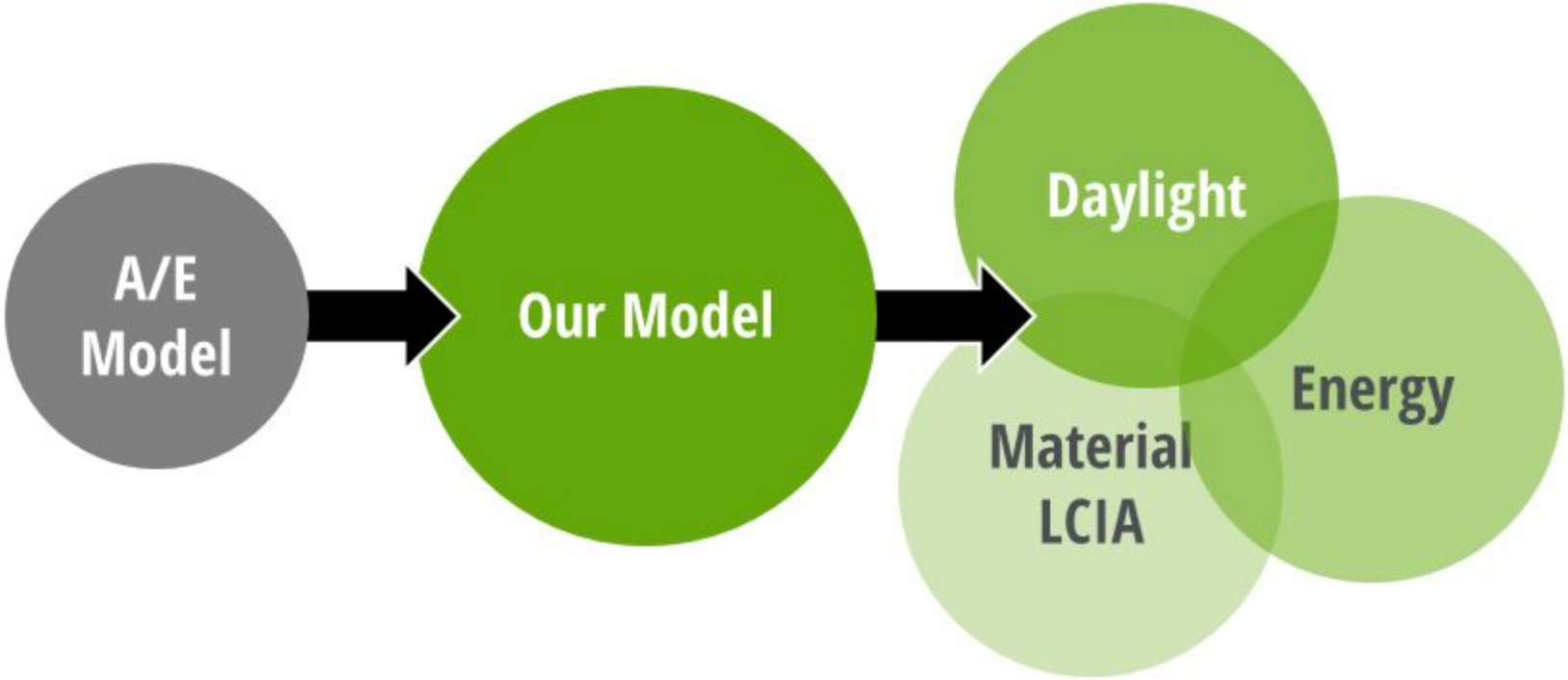
Presented by: Kris Callori | Verdacity


Integrative Design
DISCOVER
EVALUATE
AFFIRM
Sustainability Planning
Construction Consulting

Daylight Design Process



Methodology



Conceptual Design

CONCEPT DESIGN | 50% DESIGN | FINAL DESIGN

Primary Goal: Assure enough daylight is available — sDA

Secondary Goal: Determine general glare conditions — ASE

Process:

1. Evaluate context
2. Determine general daylight availability
3. Determine general glare conditions
4. Establish preliminary recommendations

50% Design

CONCEPT DESIGN | 50% DESIGN | FINAL DESIGN

Primary Goal: Refine glare control strategies
Secondary Goal: Assure daylight availability

ASE
sDA

Process:

1. Identify design updates and incorporate new information into our model
2. Conduct iterations for glare control strategies and refine recommendations
3. Verify daylight availability

Final Design

CONCEPT DESIGN | 50% DESIGN | FINAL DESIGN

Primary Goal: Final alignment and verification ASE sDA

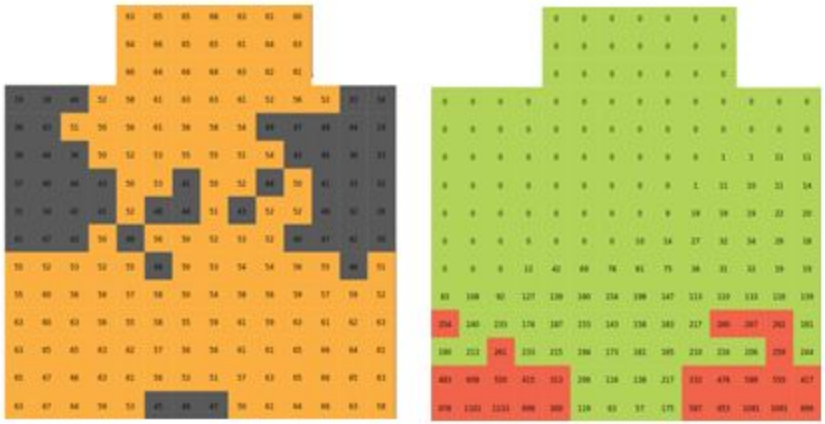
Process:

1. Incorporate final design parameters, including finish selections
2. Verify proper space type allocations
3. Run final analysis to determine that ASE and sDA values are within the proper range
4. Execute the LEED report verifying the total number of points

Daylight Optimizations

Glazing + Horizontal Shading

AS DESIGNED

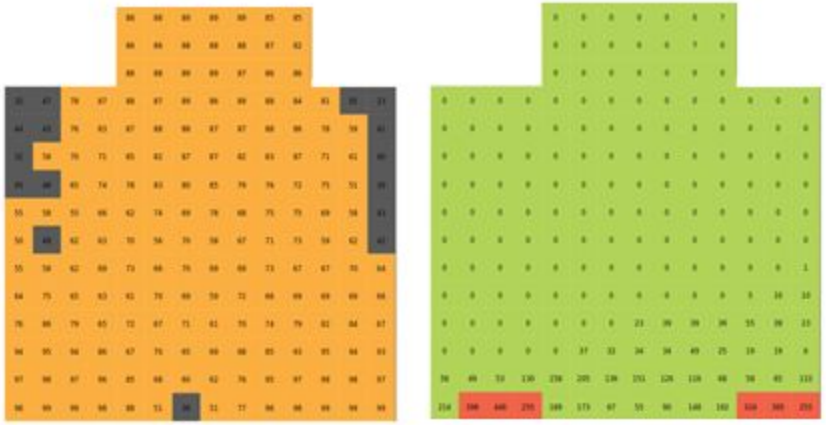


sDA: 72.80% **ASE: 13.33%**

EXT. SHADE: 2'-6" Horiz. Louvered @ 7'-0"

GLAZING:	**Vision**	**70% VLT**
	Daylight	**20% Translucent**
	Clerestory	**20% Translucent**

OPTIMIZED



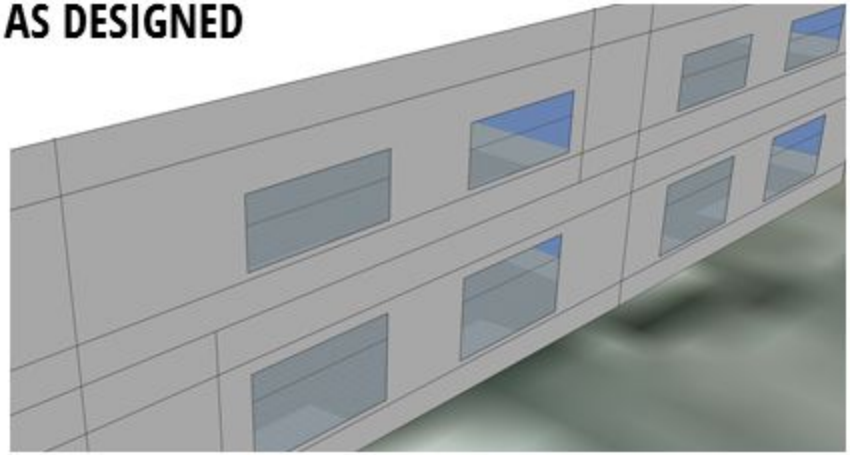
sDA: 90.93% **ASE: 3.20%**

EXT. SHADE: 3'-0" Horiz. Louvered @ 7'-0"

GLAZING:	**Vision**	**64% VLT**
	Daylight	**20% Translucent**
	Clerestory	**70% VLT**

Translucent Panel + Horizontal Shading

AS DESIGNED

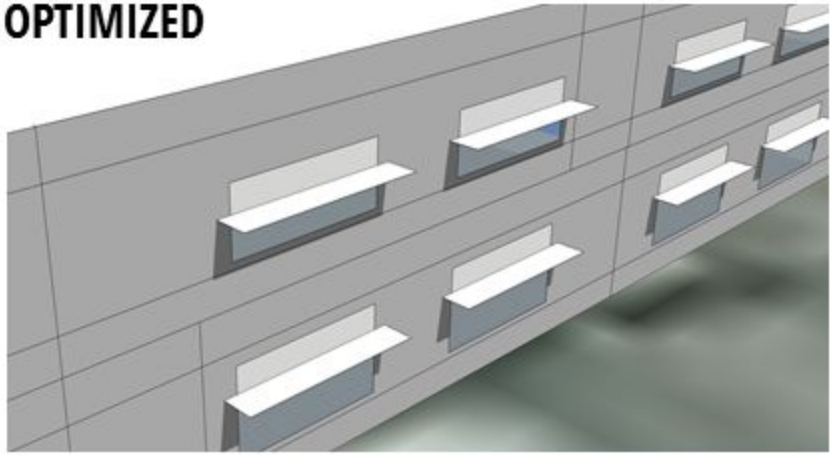


ASE: 16.05%

EXT. SHADE: None

GLAZING: Vision 70% VLT

OPTIMIZED



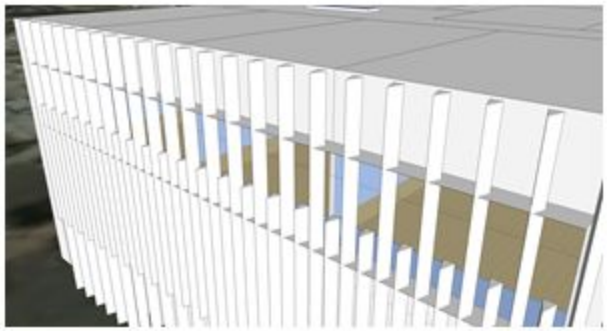
ASE: 6.50%

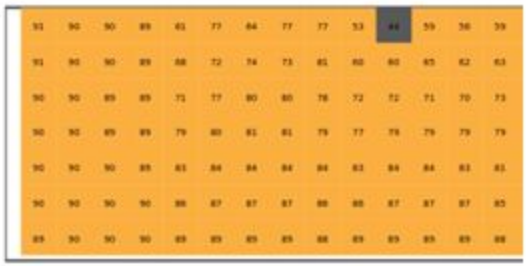
EXT. SHADE: 2'6" Horiz. Shade @ 6'-0"

GLAZING: Vision 70% VLT
Clerestory 20% Translucent

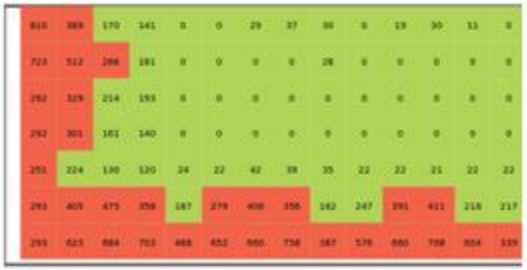
Light Shelves + Vertical Fins

AS DESIGNED: Exterior Fins



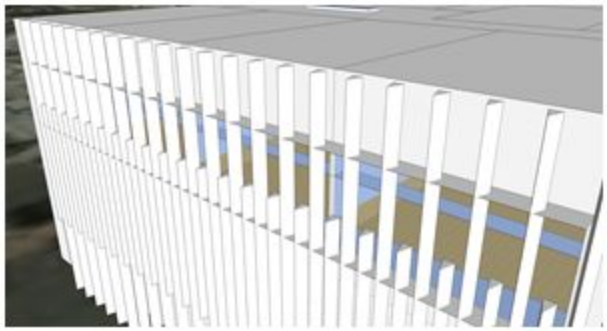


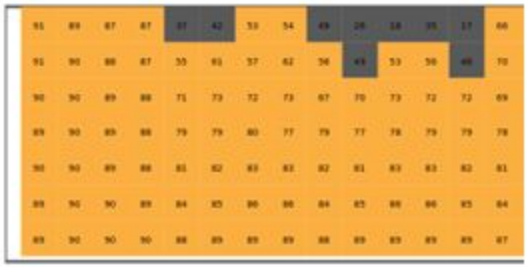
sDA: 99.21%



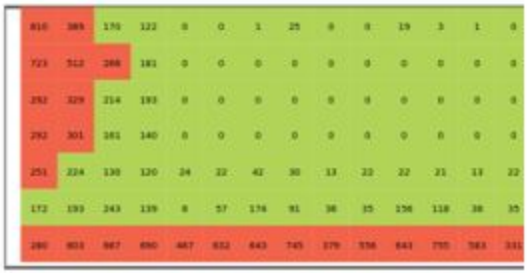
ASE: 30.95%

OPTIMIZED: 30" Light Shelf + High Reflectance Ceiling



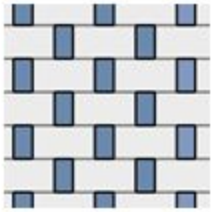


sDA: 92.86%

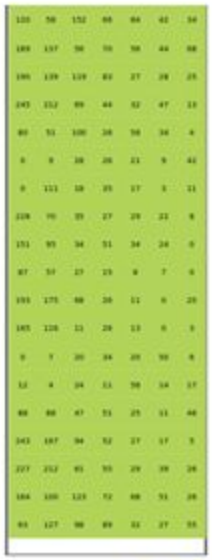


ASE: 22.22%

Perforated Screens

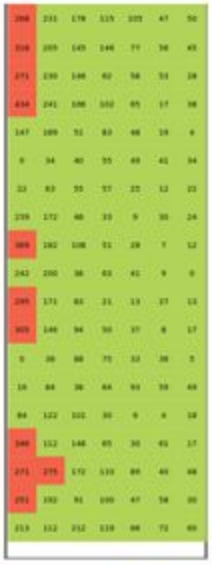


25%
SCREEN

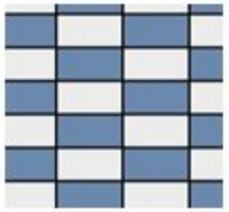


sDA: 55.64% ASE: 0.00%

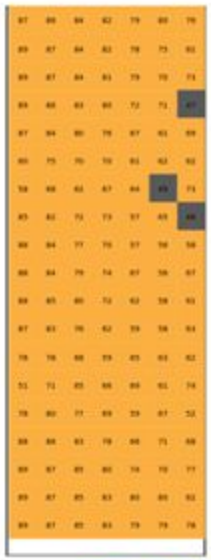
35%
SCREEN

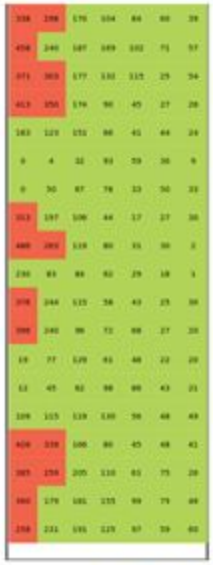


sDA: 82.71% ASE: 8.27%



50%
SCREEN

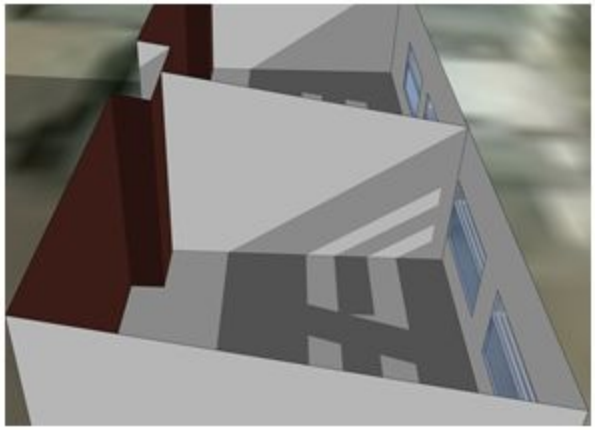


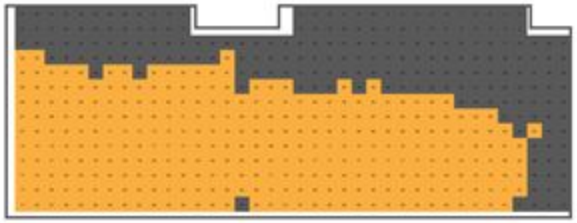


sDA: 97.74% ASE: 15.13%

Paint Color Study

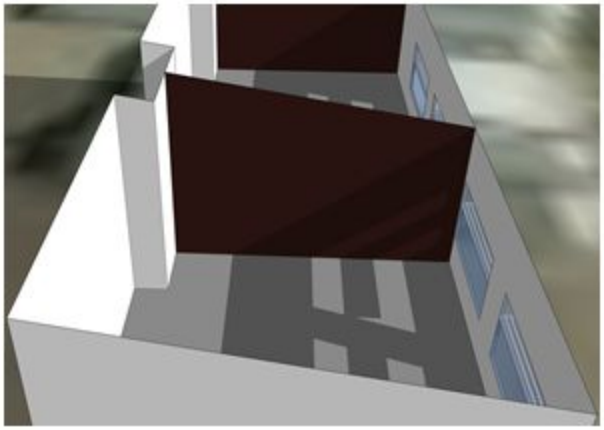
"REAR" WALL

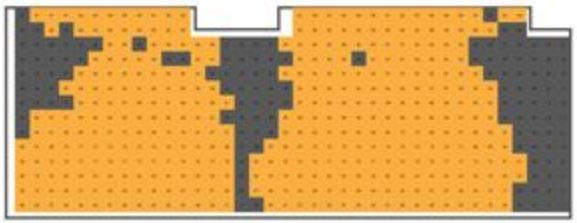




sDA: 59.96%

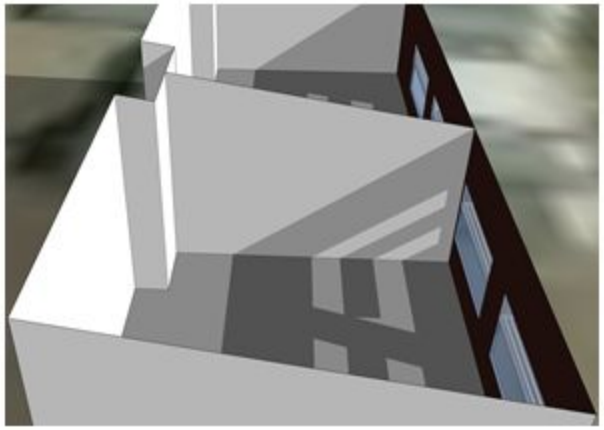
"SIDE" WALL

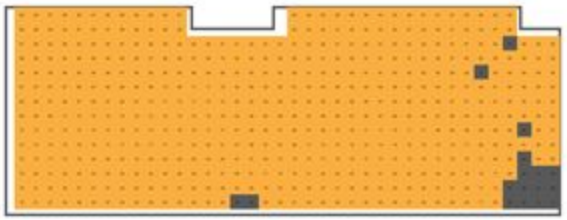




sDA: 74.80%

"FRONT" WALL





sDA: 96.68%

COMMON SPECIFICATIONS:

FIELD WALLS LRV:	83	FLOOR REFLECTANCE:	50%	GLAZING:	70% VLT
ACCENT WALLS LRV:	13	CEILING REFLECTANCE:	80%	sDA SHADE:	5% Transmittance

Case Studies

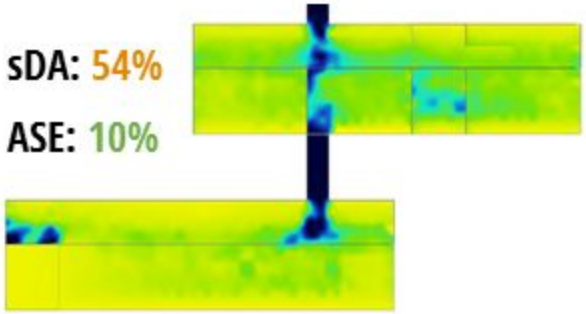
Albuquerque Bernalillo County Water Utility Authority

GREENBUILD INTERNATIONAL CONFERENCE AND EXPO

Human × Nature

ABC Water Utility Authority

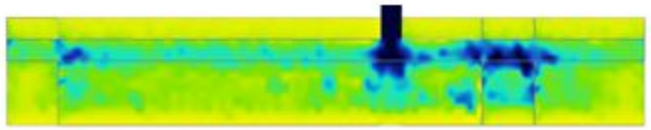
CONCEPT DESIGN | 50% DESIGN | FINAL DESIGN



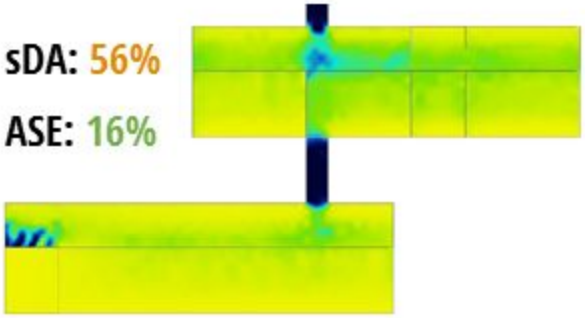
sDA: 54%

ASE: 10%

15% WINDOW/WALL RATIO



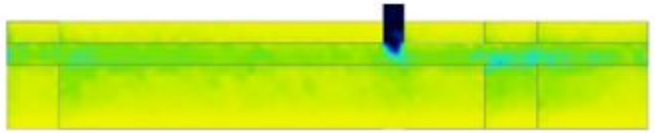
sDA: 43% ASE: 6%



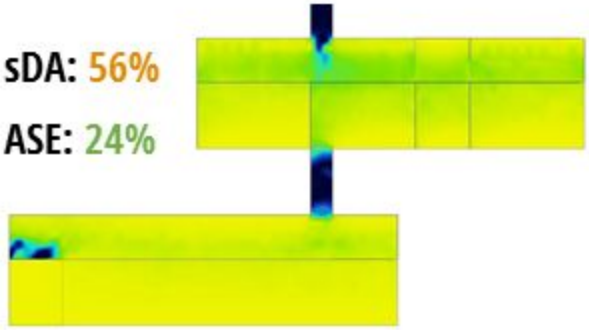
sDA: 56%

ASE: 16%

35% WINDOW/WALL RATIO



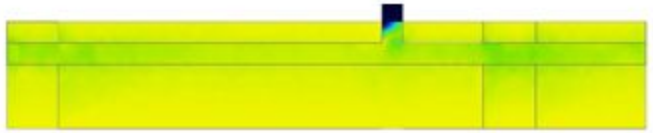
sDA: 48% ASE: 12%



sDA: 56%

ASE: 24%

50% WINDOW/WALL RATIO



sDA: 49% ASE: 19%

ABC Water Utility Authority

CONCEPT DESIGN | 50% DESIGN | FINAL DESIGN

Baseline

Regularly Occupied Space Average
sDA: 66.77%

Optimized

sDA

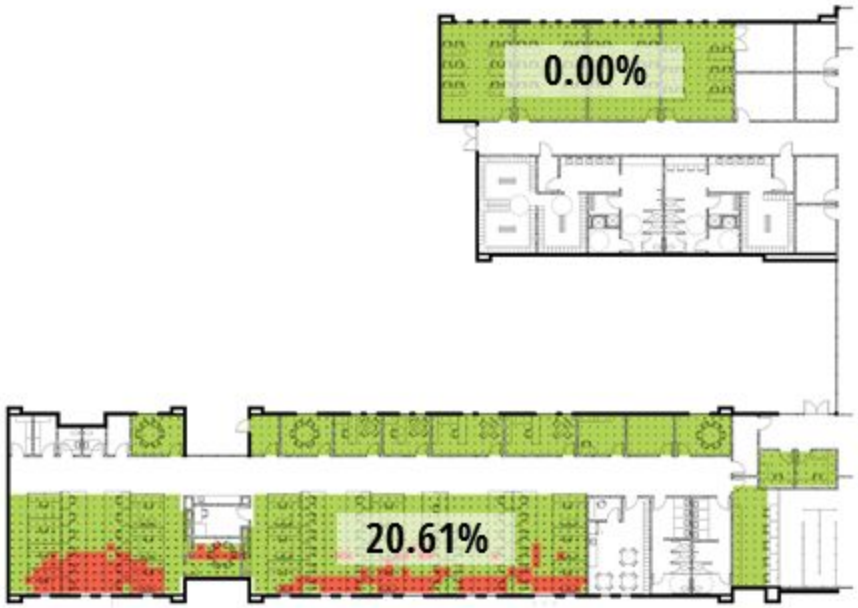
Regularly Occupied Space Average
sDA: 79.48%

*Partial Floorplans Shown

ABC Water Utility Authority

CONCEPT DESIGN | 50% DESIGN | FINAL DESIGN

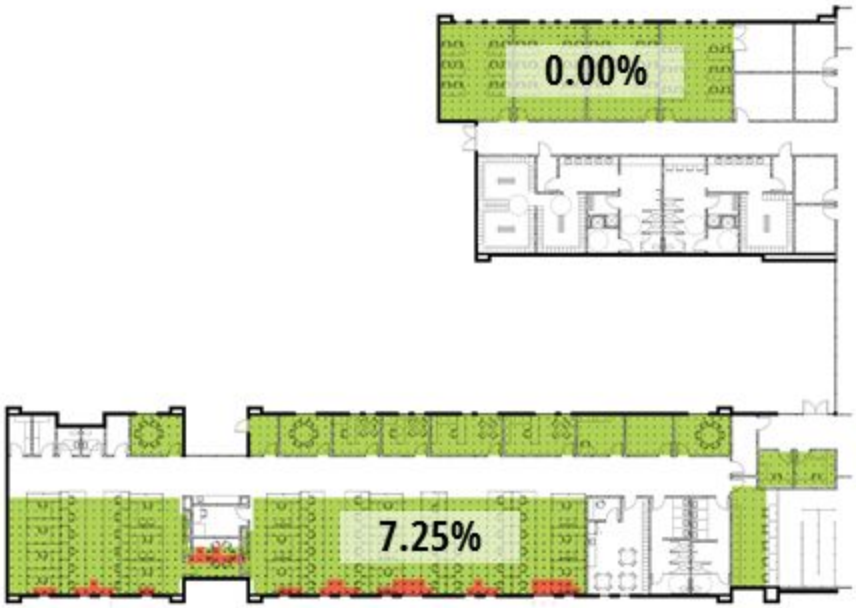
Baseline



Regularly Occupied Space Average
ASE: 12.29%

Optimized

ASE



Regularly Occupied Space Average
ASE: 4.15%

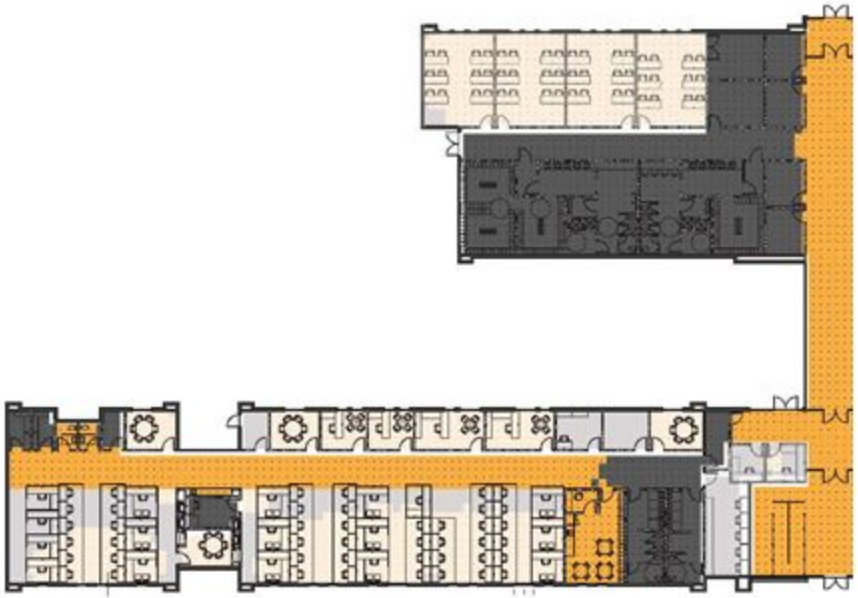
*Partial Floorplans Shown

ABC Water Utility Authority

CONCEPT DESIGN | 50% DESIGN | FINAL DESIGN

Pilot Credit

sDA



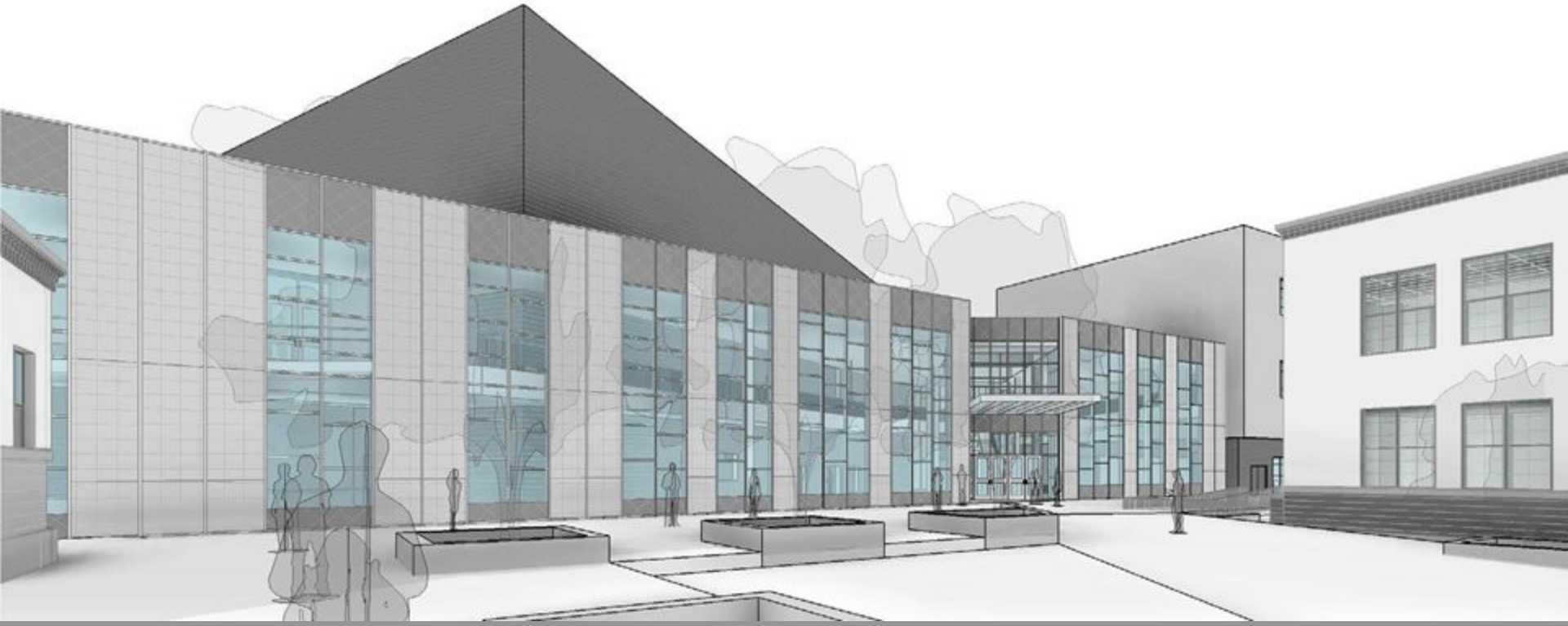
Occupiable Non-Regularly Occupied Space Average **sDA: 57.37%**

ASE

Occupiable Non- Regularly Occupied Space Average **ASE: 5.89%**

*Partial Floorplans Shown

Highland High School

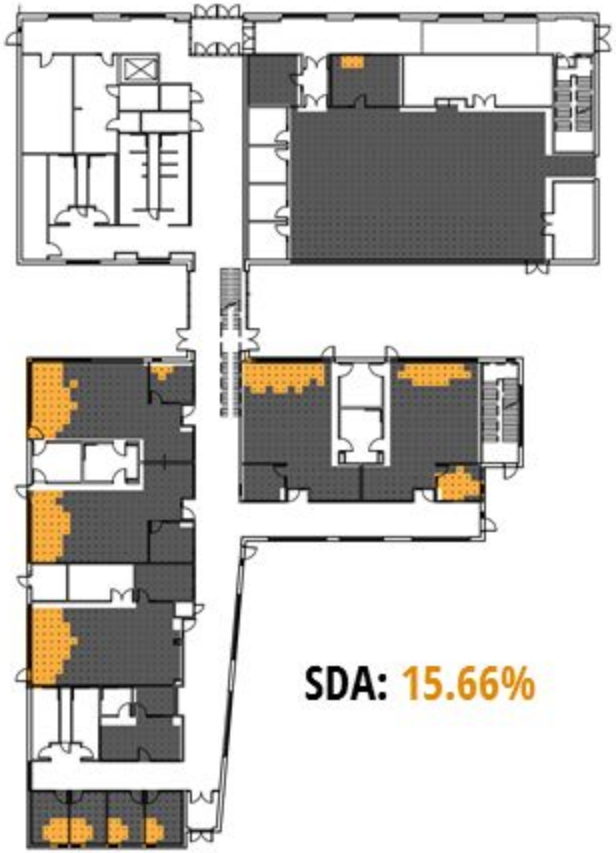


Highland High School

CONCEPT DESIGN | 50% DESIGN | FINAL DESIGN

First Floor Baseline

CHALLENGE:
Limited daylight availability on first floor



SDA: 15.66%

ASE: 4.21%

*Partial Floorplans Shown

Highland High School

CONCEPT DESIGN | 50% DESIGN | FINAL DESIGN

Second Floor Baseline

CHALLENGE:
Exterior glazed corridors with interior rooms

SDA: 63.01%

ASE: 2.22%

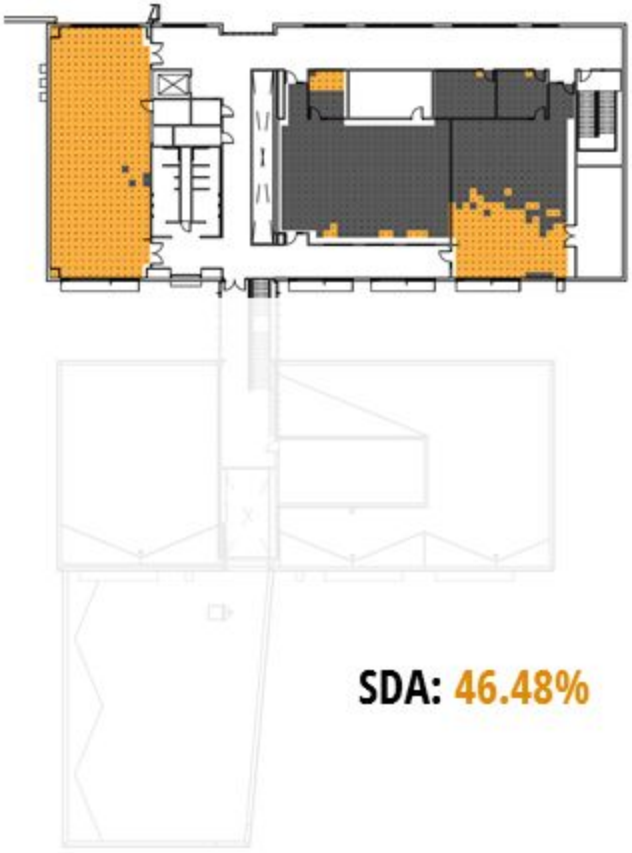
*Partial Floorplans Shown

Highland High School

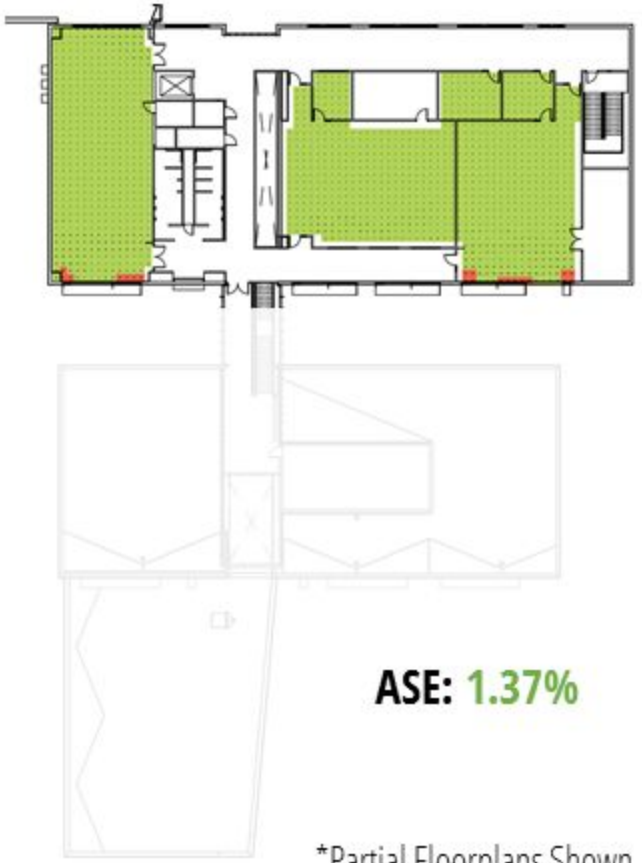
CONCEPT DESIGN | 50% DESIGN | FINAL DESIGN

Third Floor Baseline

CHALLENGE:
Exterior glazed corridors with interior rooms



SDA: 46.48%



ASE: 1.37%

*Partial Floorplans Shown

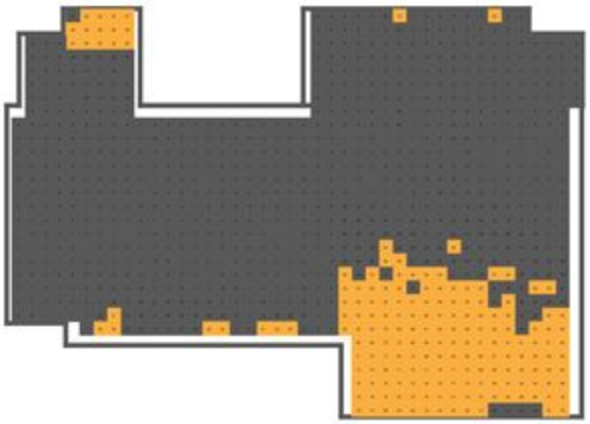
Highland High School

CONCEPT DESIGN | 50% DESIGN | FINAL DESIGN

Floor Reflectivity Analysis

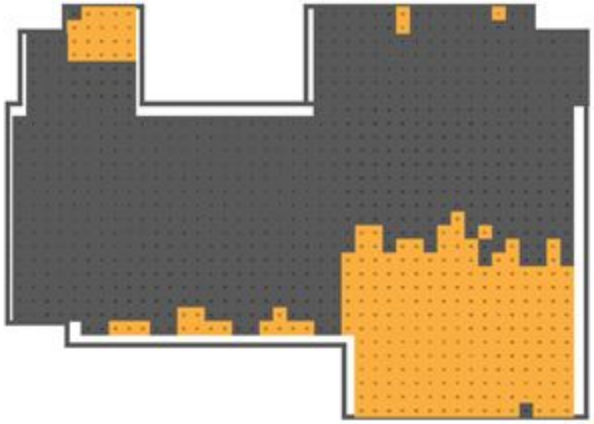
sDA

CARPET TILE
Floor Reflectance: 25%



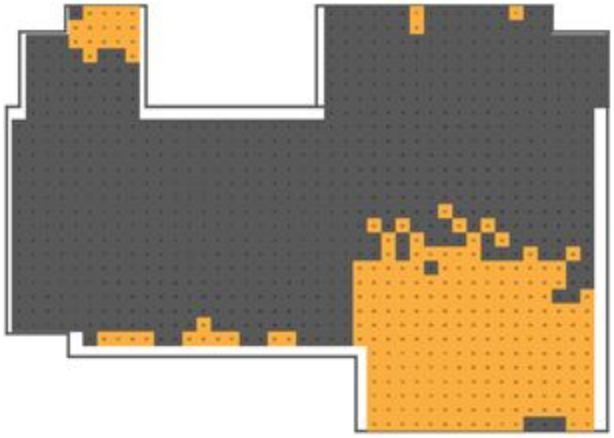
sDA: 19.14%

POLISHED CONCRETE
Floor Reflectance: 40%



sDA: 24.58%

LIGHT CERAMIC TILE
Floor Reflectance: 60%



sDA: 24.90%

*Partial Floorplans Shown

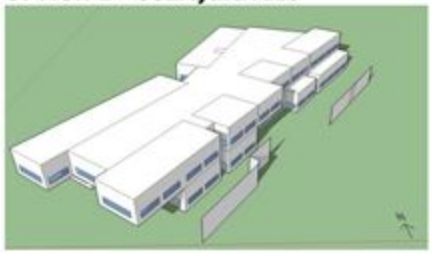
Sierra Vista Elementary School

Sierra Vista Elementary

CONCEPT DESIGN | 50% DESIGN | FINAL DESIGN

Daylight

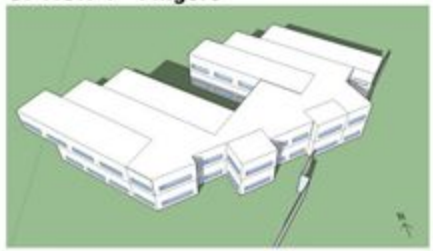
OPTION 2 - Courtyard Axis



Floor Area	=	**38,900 ft²**
Glazing Area	=	5,300 ft²
Glazing/SF Floor Area	=	0.135
Area Underlit	=	39%
Area Overlit	=	18%

Classroom Area	=	**20,201 ft²**
Area Underlit	=	8%
Area Overlit	=	43%

OPTION 4 - Fingers



Floor Area	=	**40,300 ft²**
Glazing Area	=	7,200 ft²
Glazing/SF Floor Area	=	0.178
Area Underlit	=	29%
Area Overlit	=	23%

Classroom Area	=	**21,307 ft²**
Area Underlit	=	9%
Area Overlit	=	32%

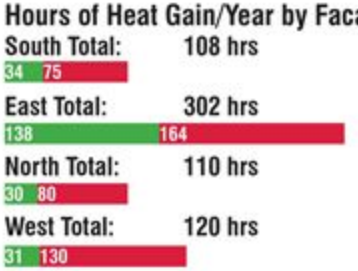
Energy

OPTION 2 - Courtyard Axis

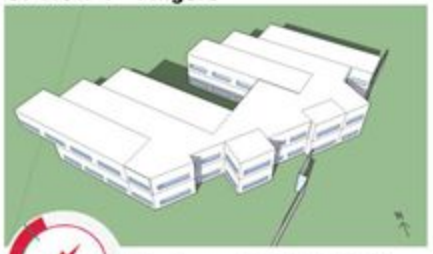
Heating = 310,000 kBTU/yr
Cooling = 180,000 kBTU/yr

Hours of Heat Gain/Year by Facade:

South Total:	108 hrs
East Total:	302 hrs
North Total:	110 hrs
West Total:	120 hrs



OPTION 4 - Fingers



Heating = 380,000 kBTU/yr
Cooling = 190,000 kBTU/yr

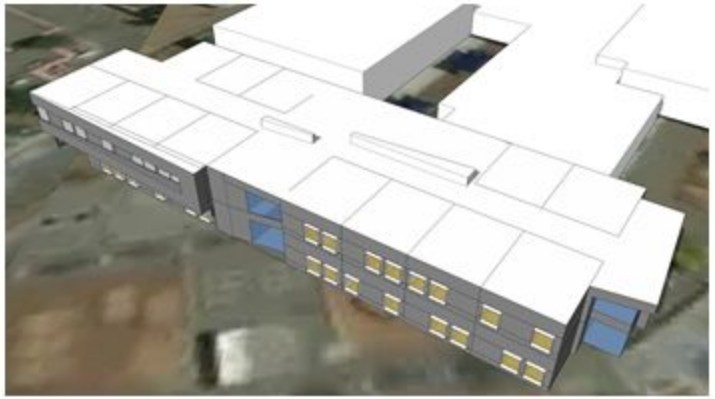
Hours of Heat Gain/Year by Facade:

South Total:	401 hrs
East Total:	73 hrs
North Total:	215 hrs
West Total:	202 hrs

Sierra Vista Elementary

CONCEPT DESIGN | 50% DESIGN | FINAL DESIGN

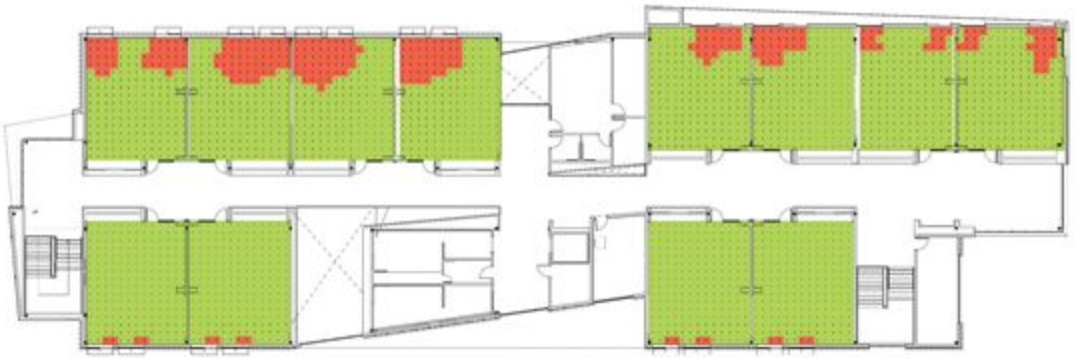
50% Design



sDA: 75.60%

CHALLENGE:
Low daylight availability
High glare

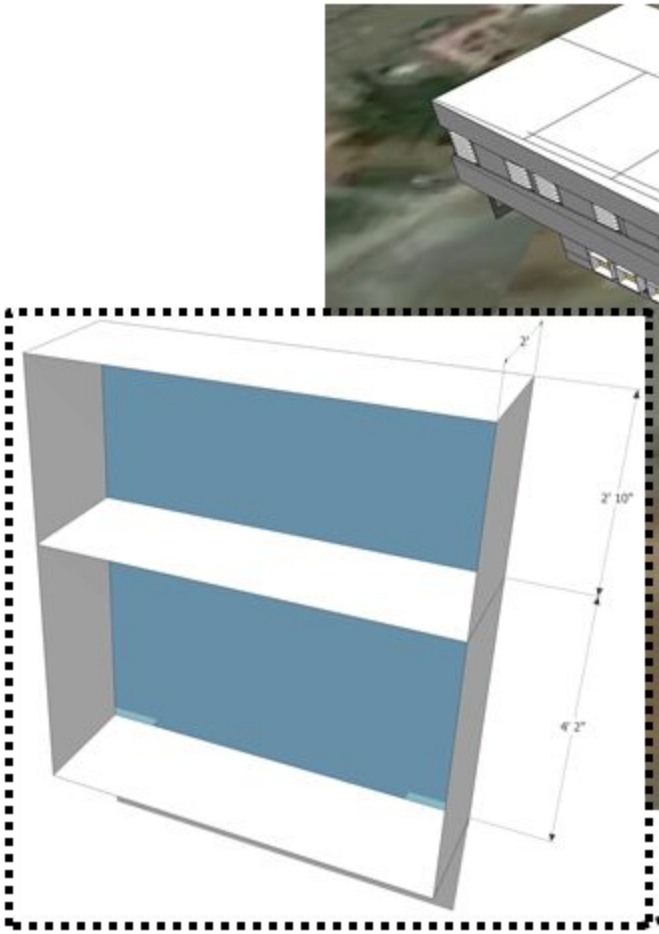
LEED Points: 0



ASE: 11.45%

Sierra Vista Elementary

CONCEPT DESIGN | 50% DESIGN | FINAL DESIGN

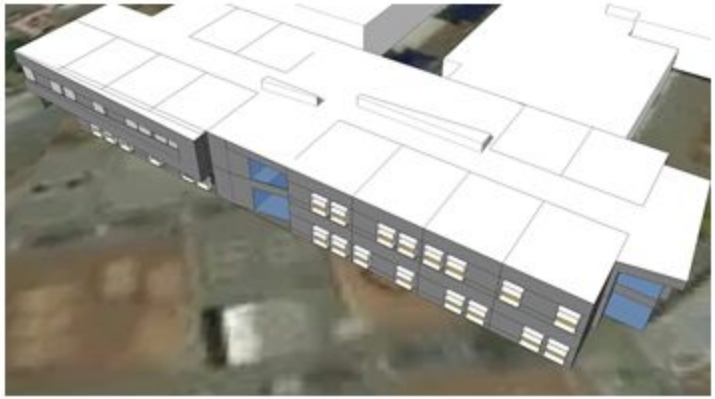


STRATEGIES IMPLEMENTED:
Exterior shade increased to depth of 2'-0"
Added horizontal shade 4'-2" above sill

Sierra Vista Elementary

CONCEPT DESIGN | 50% DESIGN | FINAL DESIGN

Final Design



sDA: 89.90%

ASE: 9.48%

LEED Points: 3

Summary

Strategies for Success

1. Be proactive in communicating best practices to clients early, followed by refinement based upon trusted data gathered during design iterations
2. Account for all factors that influence design and present alternative options to maintain good daylight
3. Implement big moves early, followed by progressively smaller ones that cumulatively result in a cohesive, effective daylighting strategy

CONCLUSION

& AUDIENCE QUESTIONS

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