The Deceptive Metric

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Kirksey
ARCHITECTURE

Kirksey
ARCHITECTURE
45 YEARS | 150 EMPLOYEES | RANKED 20TH NATIONALLY | HOUSTON, TEXAS

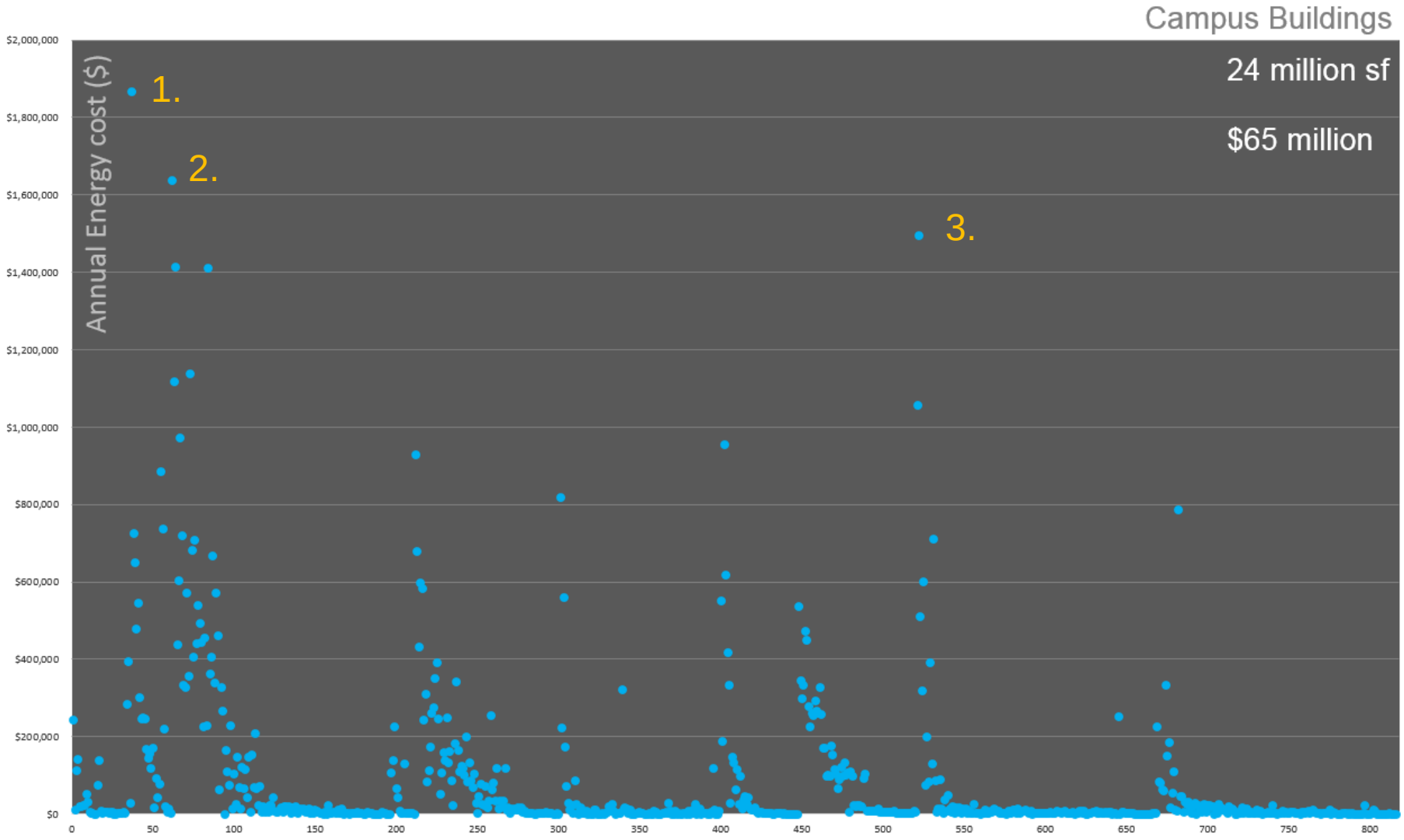
Metrics

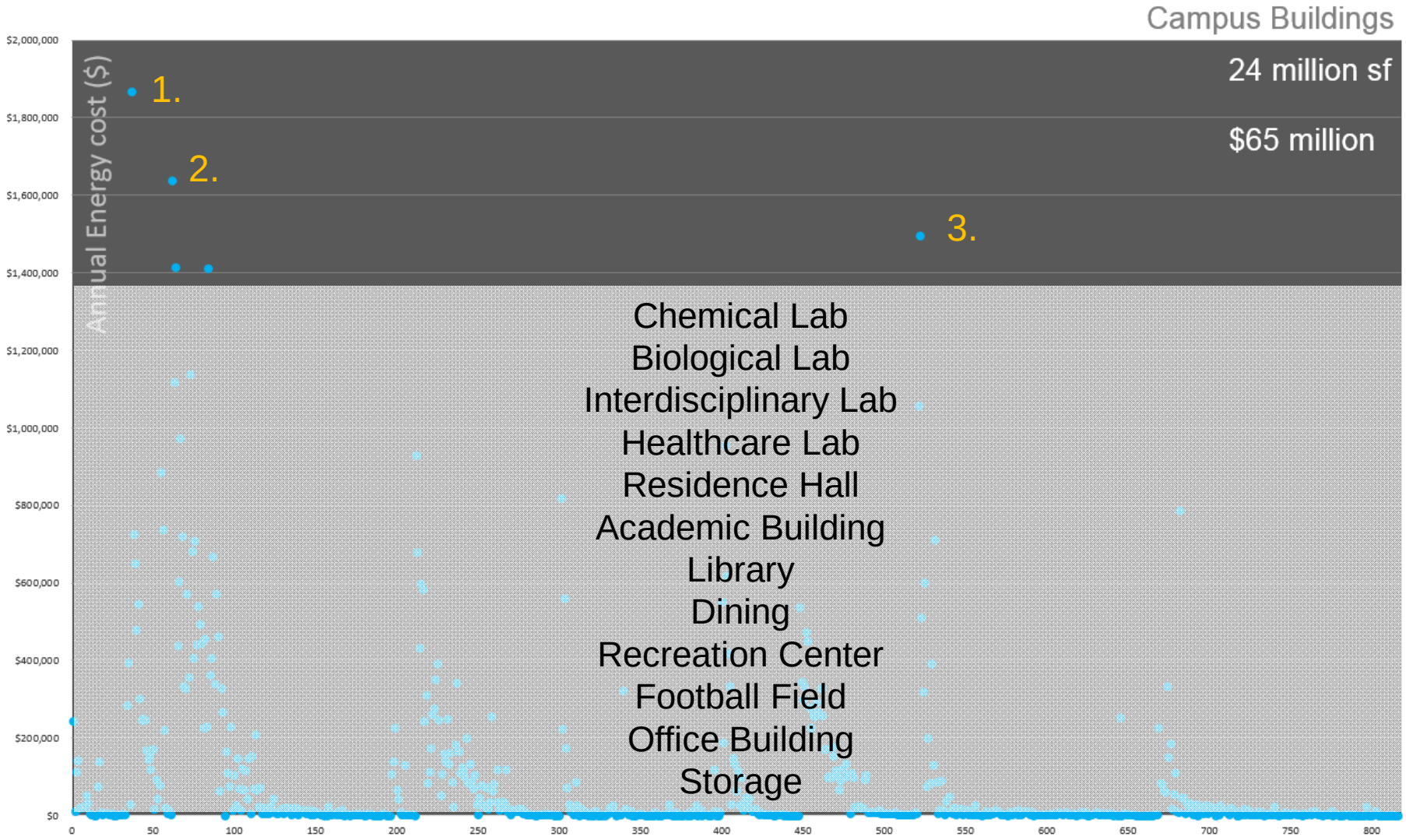
% EPEAT Computer Hardware
% Recycled paper
Land Use
%Energy Star Equipment
% of Waste (tons)
% Greenseal Cleaning Products
Fuel Purchase tons/yr
Tons of e-waste
EUI MBtu/sf
No. of Green Building Practices
No. of buildings with goals
Unoccupied EUI kBtu/sf
Capital Efficiency Investment $
% local food
Renewable Energy Oncampus
%waste reduction
Reduced Emission tons/yr
Gallons of water saved
Gal. of biodiesel
No. of Education Programs
Metric tons of CO2-Faculty & Staff

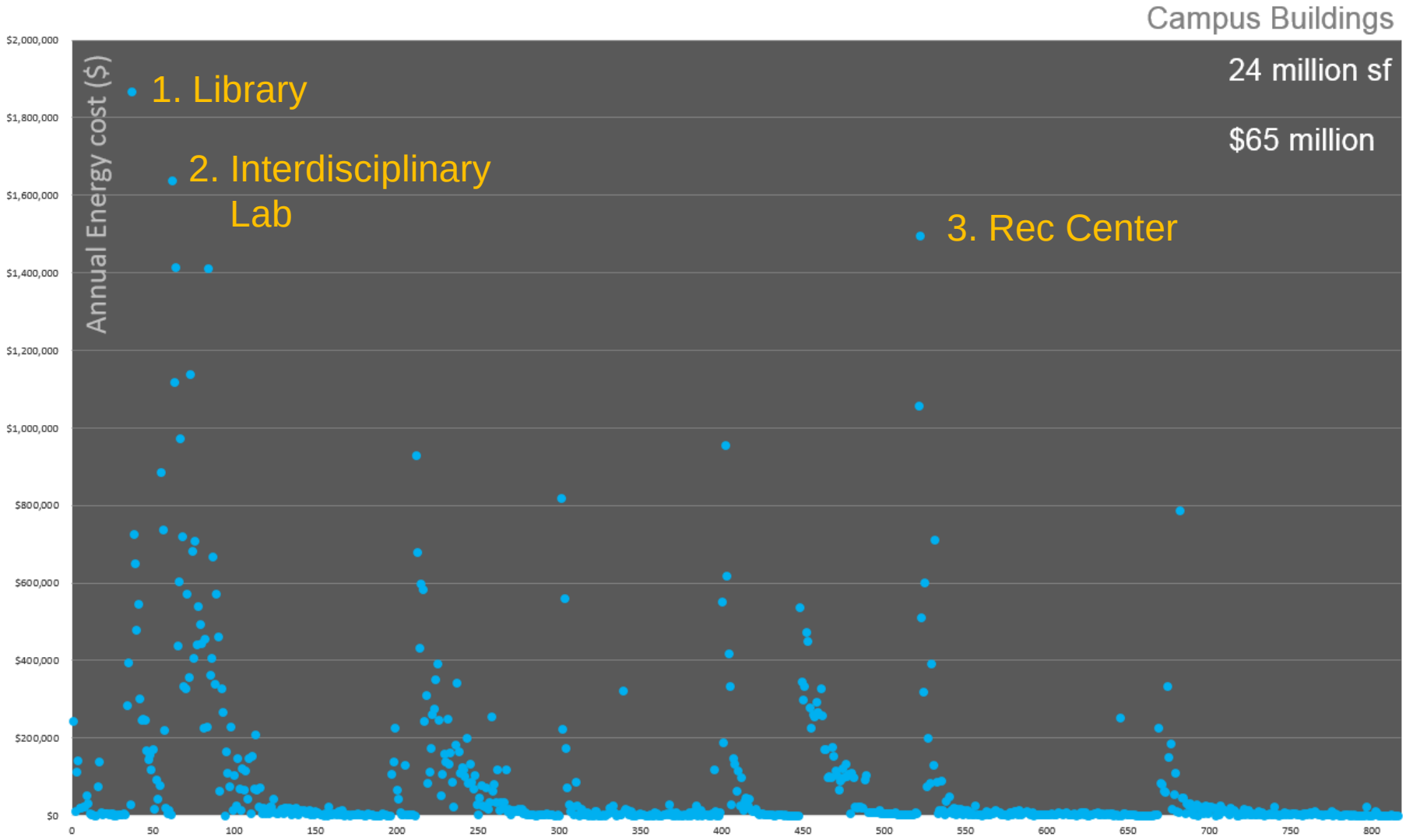
Energy

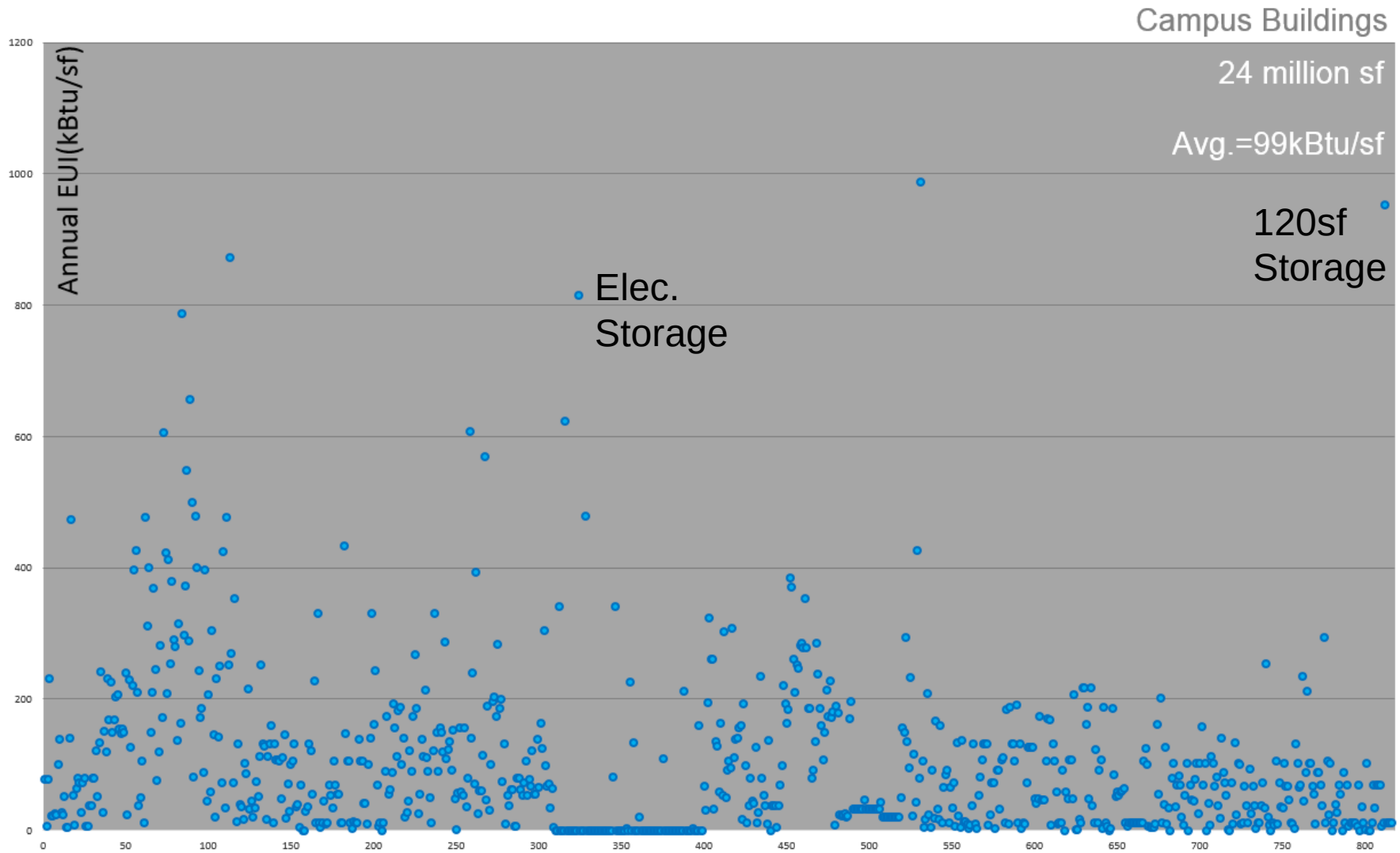
Energy

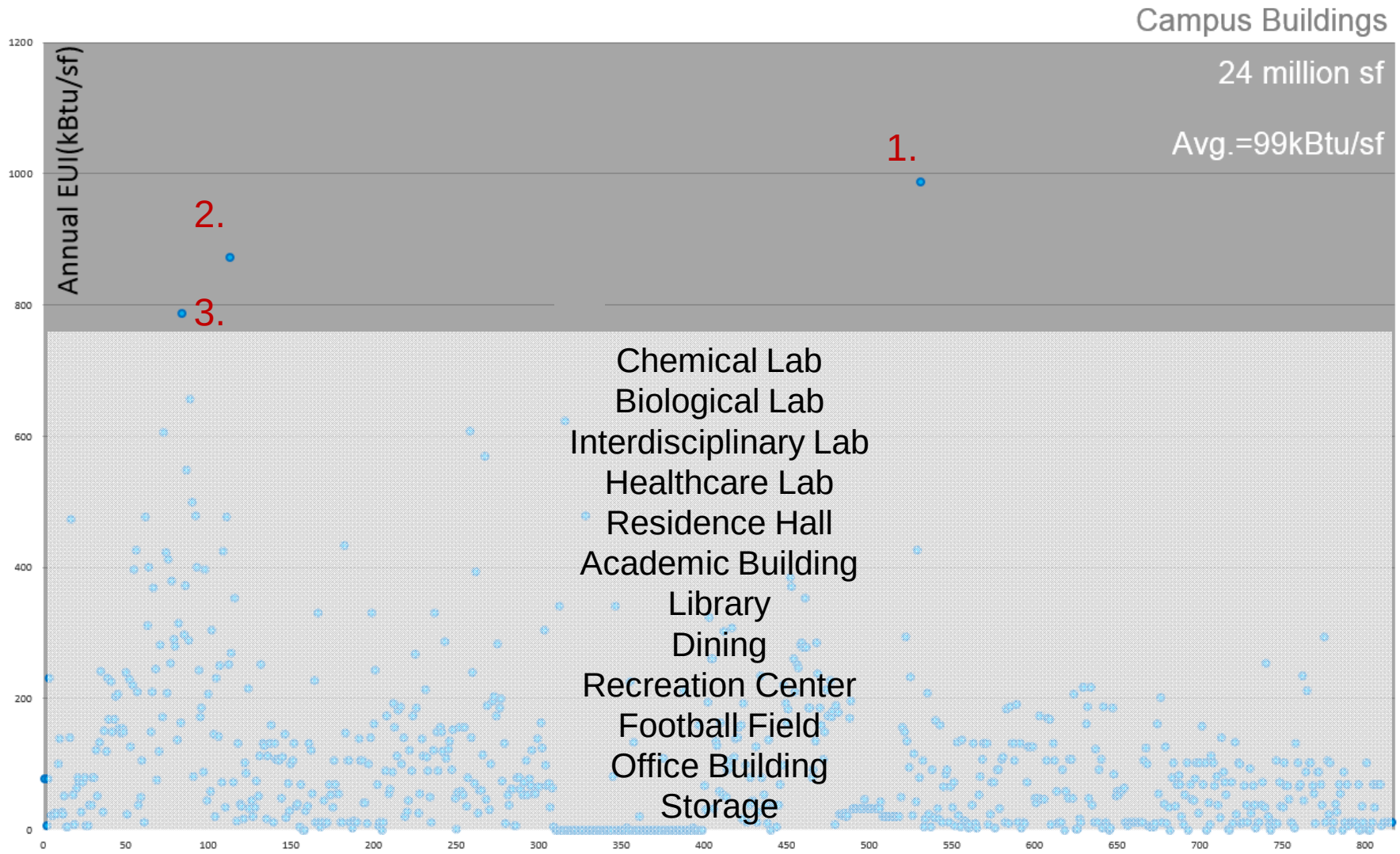
Operations

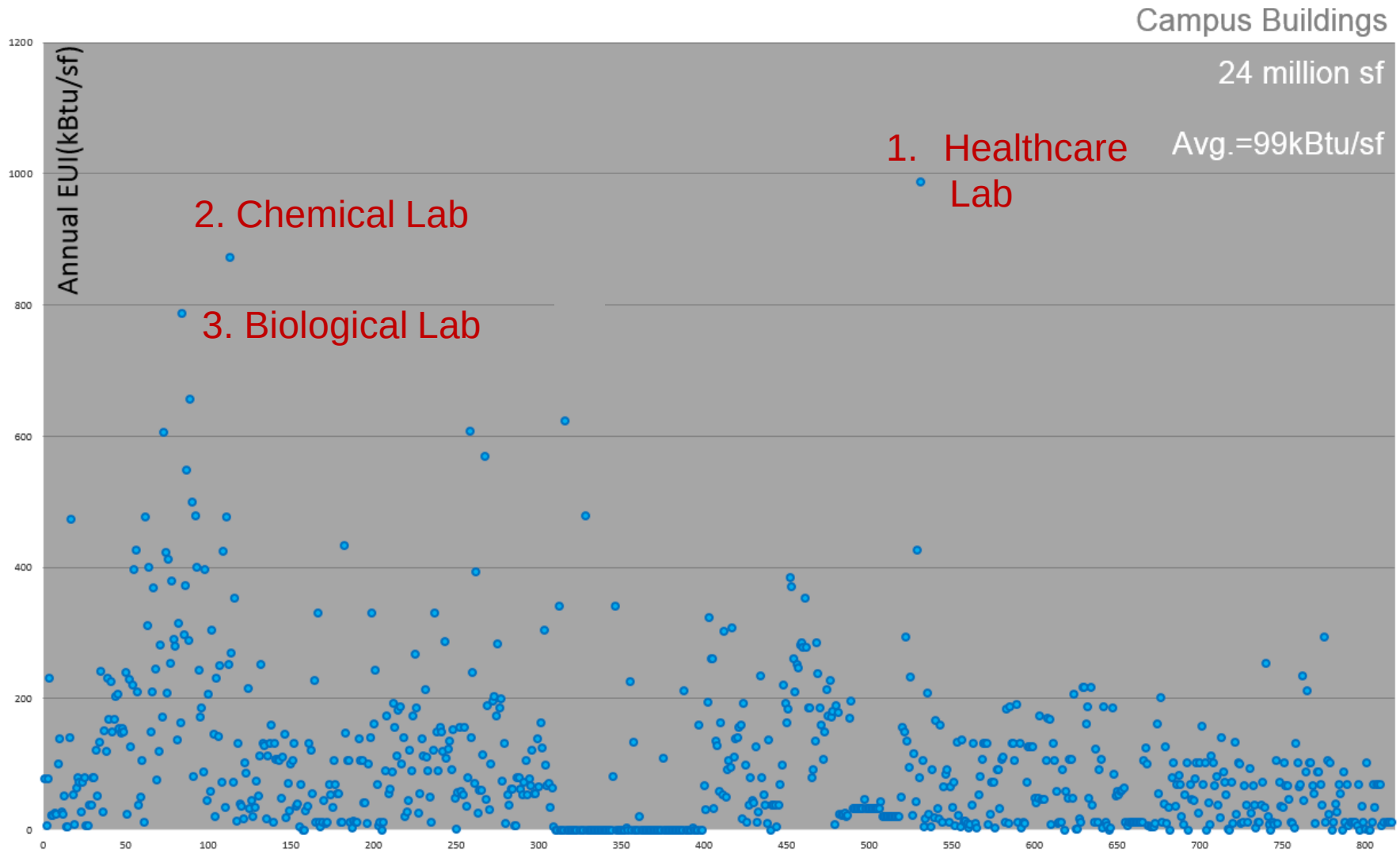

Campus Buildings
24 million sf
$65 million
Annual Energy cost ($)
1.
2.
3.
$2,000,000
$1,800,000
$1,600,000
$1,400,000
$1,200,000
$1,000,000
$800,000
$600,000
$400,000
$200,000
$0
0
50
100
150
200
250
300
350
400
450
500
550
600
650
700
750
800

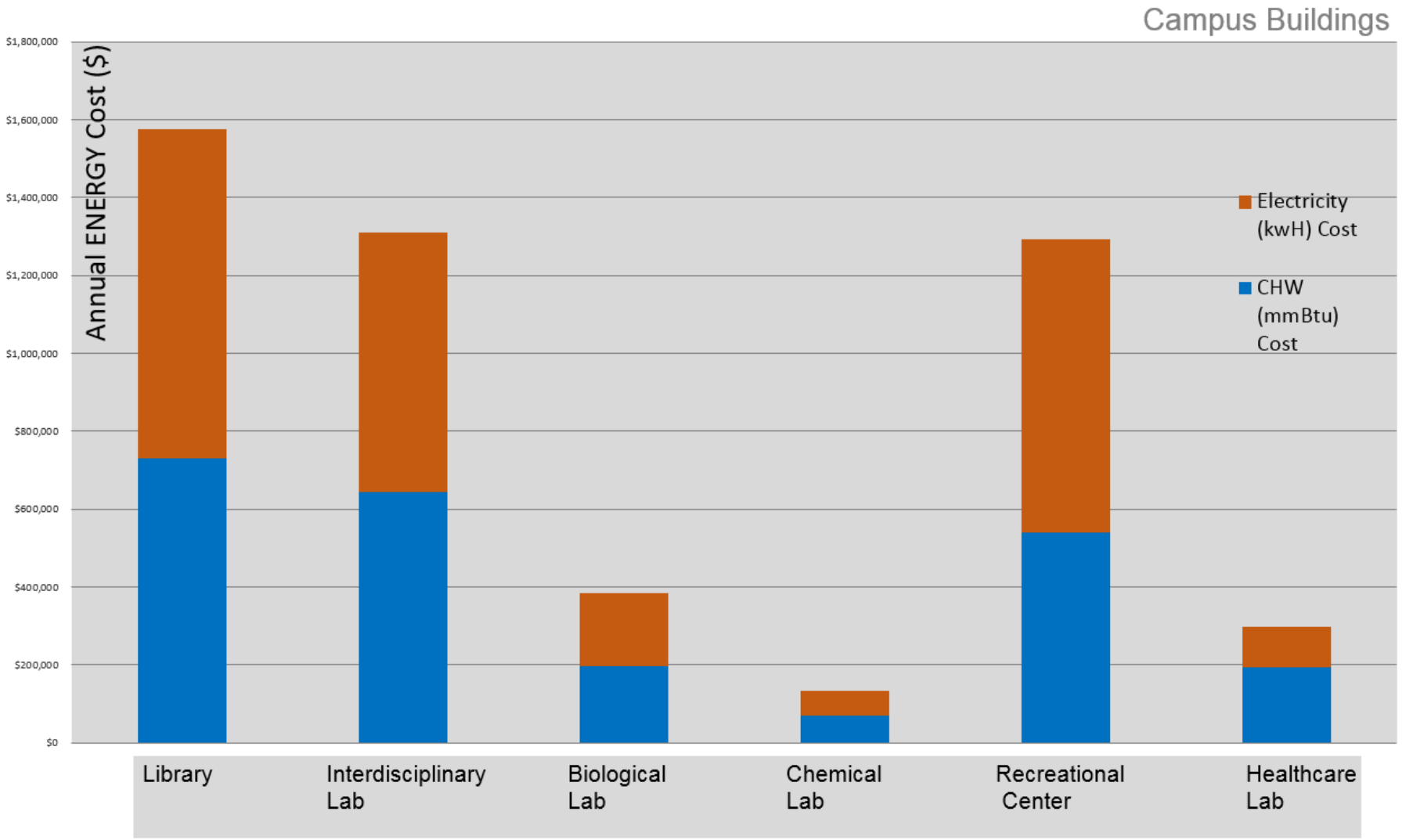

Campus Buildings
24 million sf
$65 million
Annual Energy cost ($)
$2,000,000
$1,800,000
$1,600,000
$1,400,000
$1,200,000
$1,000,000
$800,000
$600,000
$400,000
$200,000
$0
1.
2.
3.
Chemical Lab
Biological Lab
Interdisciplinary Lab
Healthcare Lab
Residence Hall
Academic Building
Library
Dining
Recreation Center
Football Field
Office Building
Storage
0
50
100
150
200
250
300
350
400
450
500
550
600
650
700
750
800


Campus Buildings
24 million sf
$65 million
Annual Energy cost ($)
1. Library
2. Interdisciplinary Lab
3. Rec Center
$2,000,000
$1,800,000
$1,600,000
$1,400,000
$1,200,000
$1,000,000
$800,000
$600,000
$400,000
$200,000
$0
0
50
100
150
200
250
300
350
400
450
500
550
600
650
700
750
800


Campus Buildings
24 million sf
Avg.=99kBtu/sf
120sf Storage
Elec. Storage
Annual EUI(kBtu/sf)
1200
1000
800
600
400
200
0
0
50
100
150
200
250
300
350
400
450
500
550
600
650
700
750
800

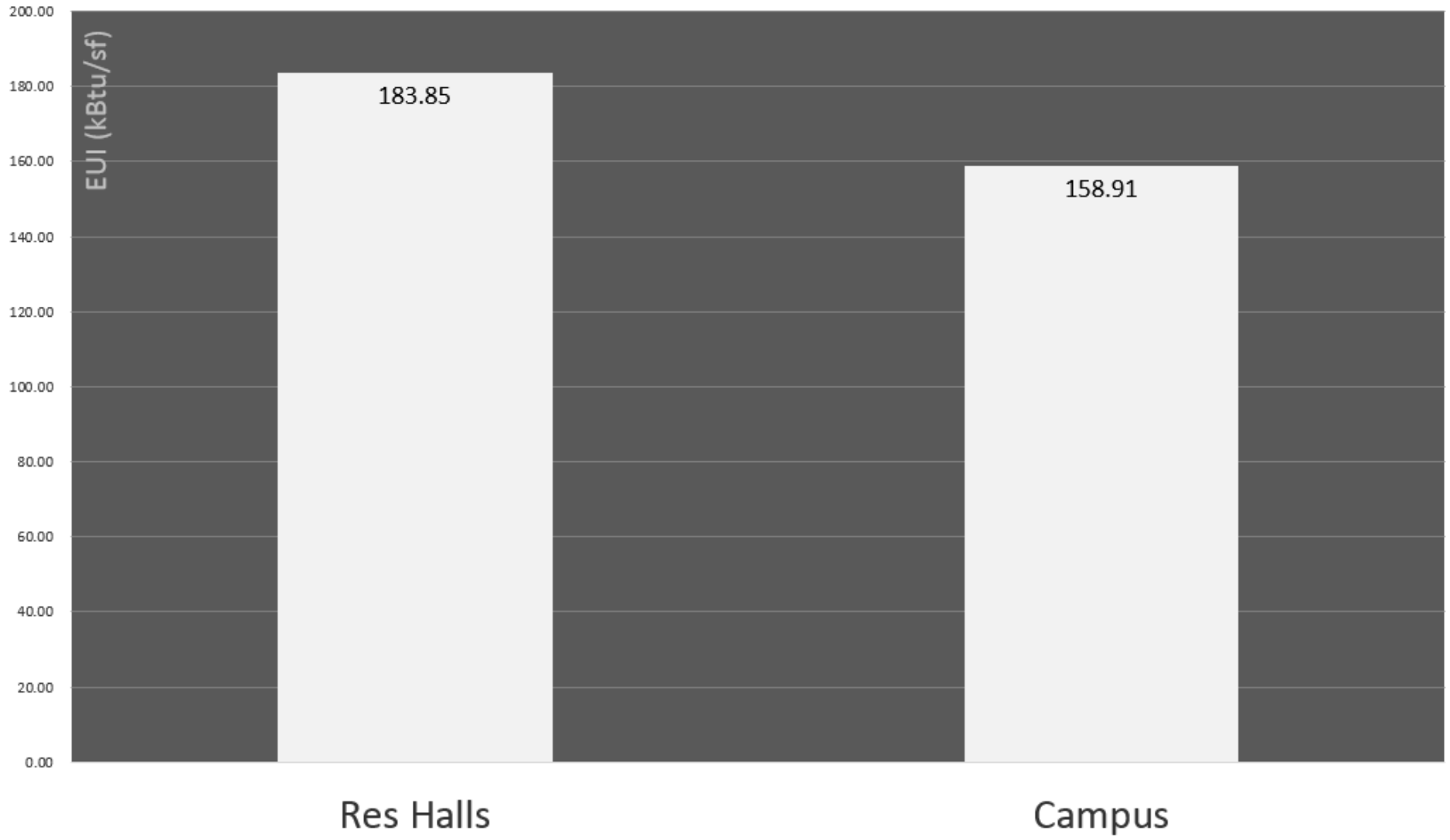

Campus Buildings
24 million sf
Avg.=99kBtu/sf
Annual EUI(kBtu/sf)
1200
1000
800
600
400
200
0
0
50
100
150
200
250
300
350
400
450
500
550
600
650
700
750
800
1.
2.
3.
Chemical Lab
Biological Lab
Interdisciplinary Lab
Healthcare Lab
Residence Hall
Academic Building
Library
Dining
Recreation Center
Football Field
Office Building
Storage

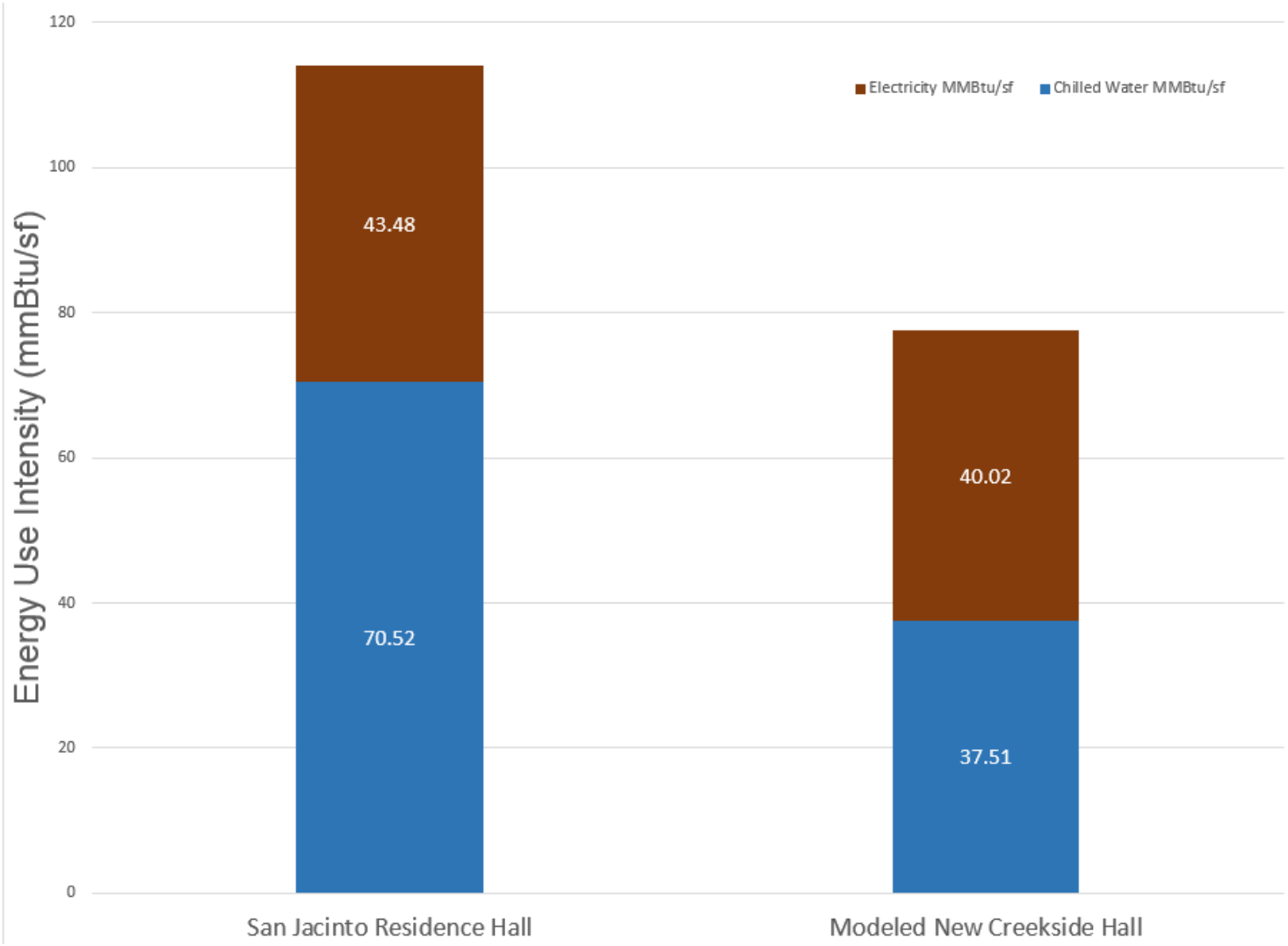

Campus Buildings
24 million sf
Avg.=99kBtu/sf
Annual EUI(kBtu/sf)
1200
1000
800
600
400
200
0
0
50
100
150
200
250
300
350
400
450
500
550
600
650
700
750
800
1. Healthcare Lab
2. Chemical Lab
3. Biological Lab

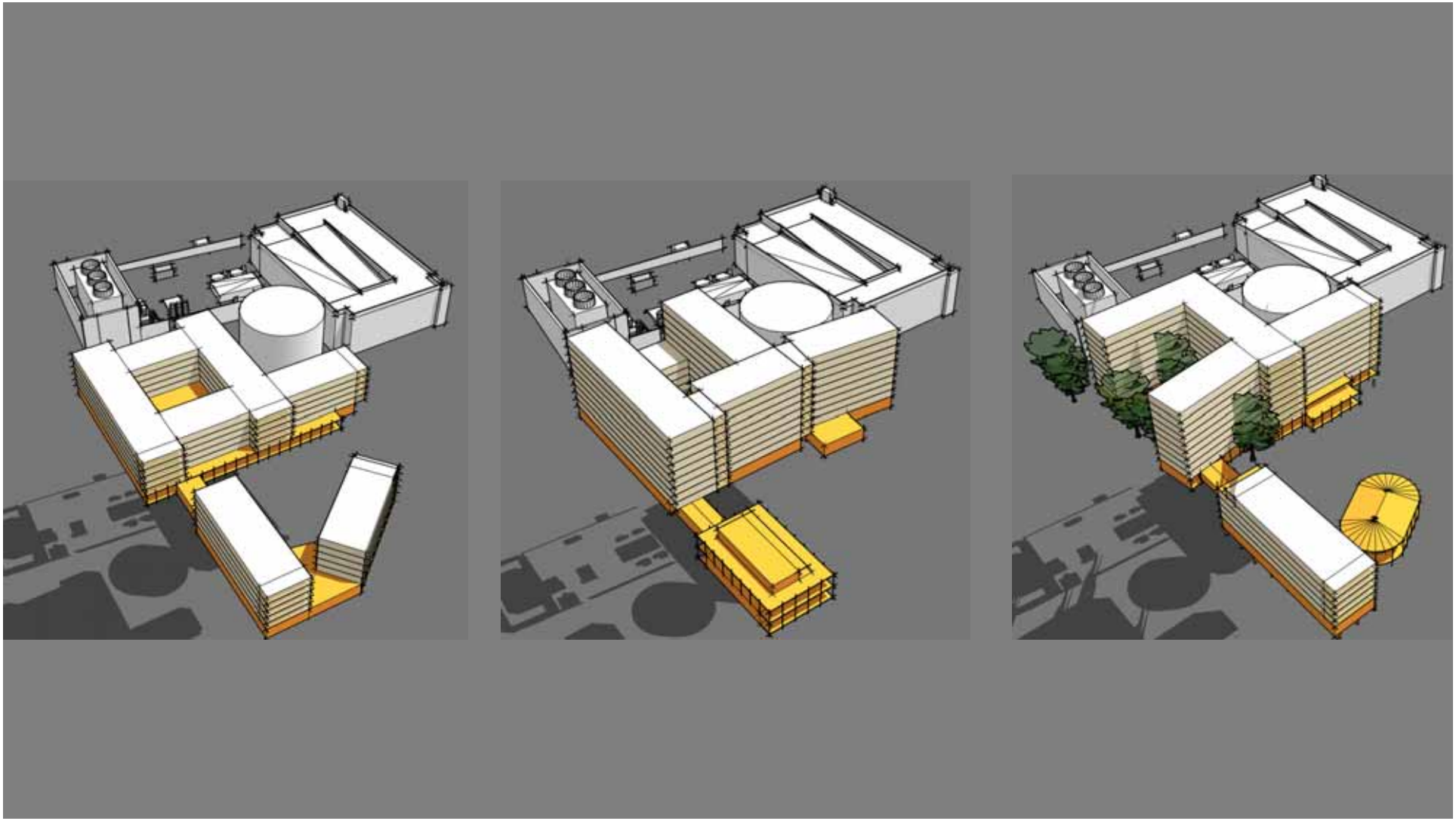

Campus Buildings
Annual ENERGY Cost ($)
$1,800,000
$1,600,000
$1,400,000
$1,200,000
$1,000,000
$800,000
$600,000
$400,000
$200,000
$0
Electricity (kwH) Cost
CHW (mmBtu) Cost
Library
Interdisciplinary Lab
Biological Lab
Chemical Lab
Recreational Center
Healthcare Lab

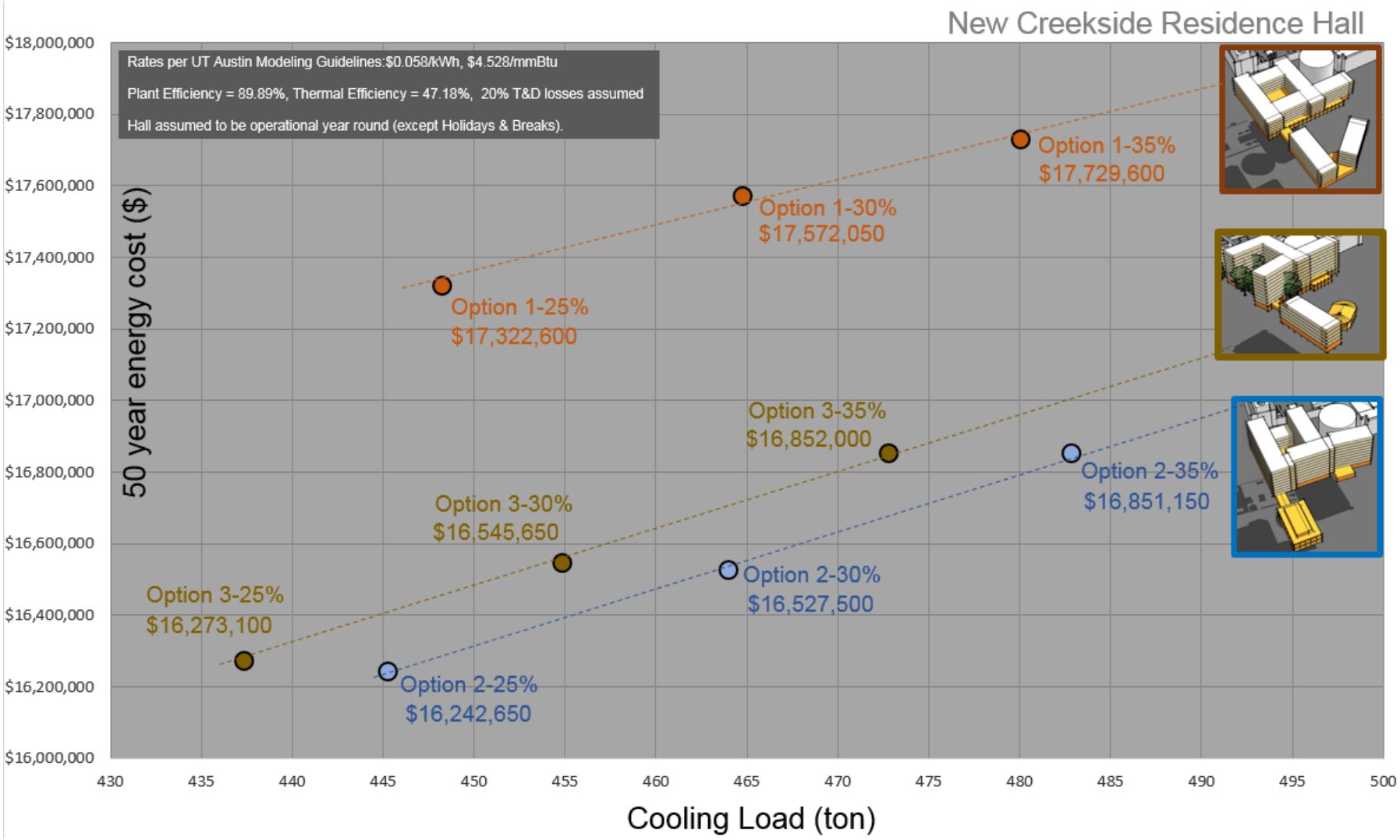
Energy

new buildings


EUI (kBtu/sf)
200.00
180.00
160.00
140.00
120.00
100.00
80.00
60.00
40.00
20.00
0.00
183.85
158.91
Res Halls
Campus

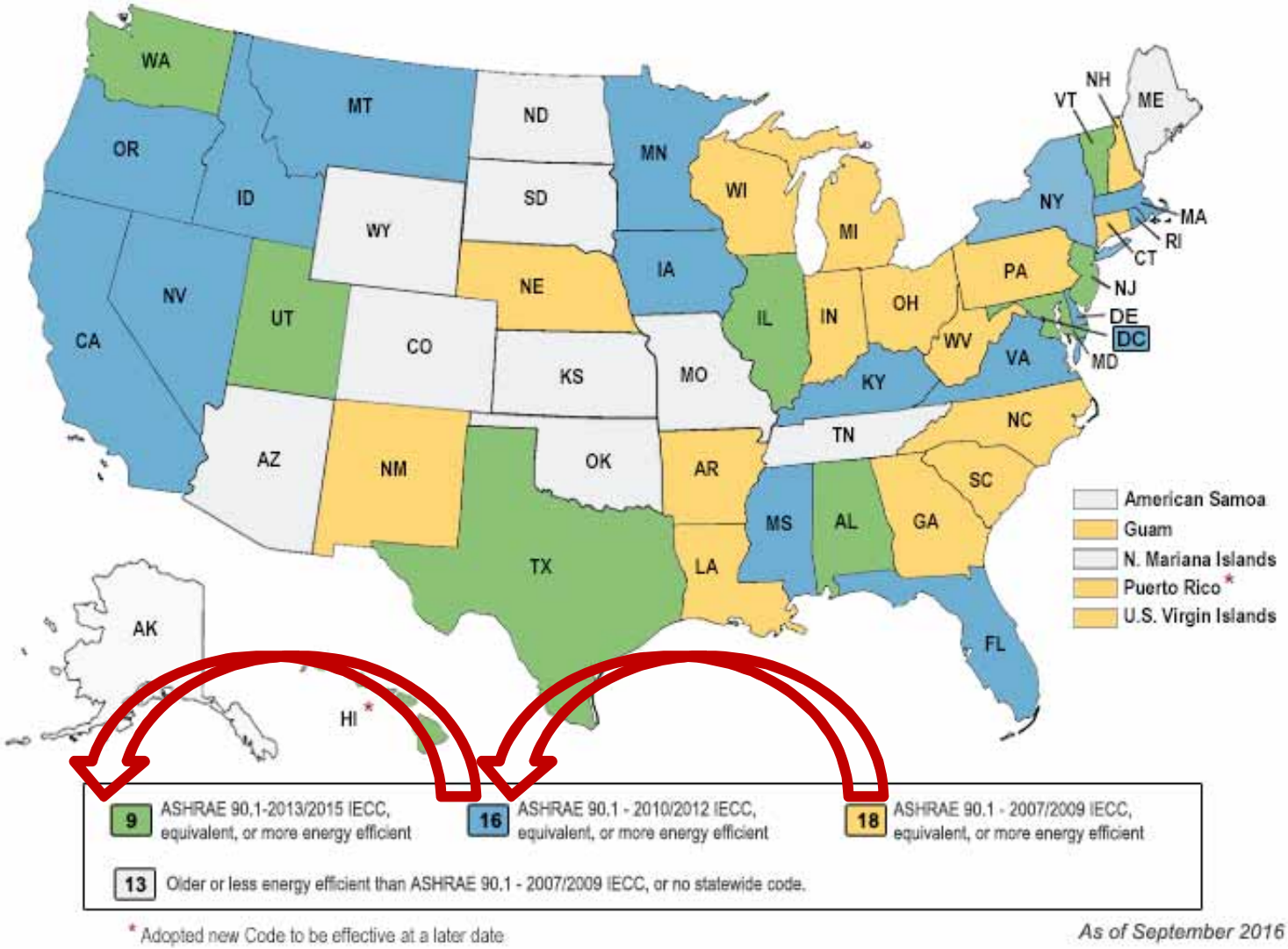

120
100
80
60
40
20
0
Energy Use Intensity (mmBtu/sf)
Electricity MMBtu/sf
Chilled Water MMBtu/sf
43.48
70.52
40.02
37.51
San Jacinto Residence Hall
Modeled New Creekside Hall




New Creekside Residence Hall
Rates per UT Austin Modeling Guidelines:$0.058/kWh, $4.528/mmBtu
Plant Efficiency = 89.89%, Thermal Efficiency = 47.18%, 20% T&D losses assumed
Hall assumed to be operational year round (except Holidays & Breaks).
50 year energy cost ($)
Cooling Load (ton)
$18,000,000
$17,800,000
$17,600,000
$17,400,000
$17,200,000
$17,000,000
$16,800,000
$16,600,000
$16,400,000
$16,200,000
$16,000,000
430
435
440
445
450
455
460
465
470
475
480
485
490
495
500
Option 1-35%
$17,729,600
Option 1-30%
$17,572,050
Option 1-25%
$17,322,600
Option 3-35%
$16,852,000
Option 2-35%
$16,851,150
Option 3-30%
$16,545,650
Option 2-30%
$16,527,500
Option 3-25%
$16,273,100
Option 2-25%
$16,242,650

Energy

renovations



* Adopted new Code to be effective at a later date

As of September 2016

University of Houston	Texas State University	Stephen F. Austin

COMBINED:

Orientation, WWAR, Wall and Roof Insulation, Efficient Glazing, and Lighting Improvements

University of Houston	Texas State University	Stephen F. Austin
20.9% improvement	**20.5%** improvement	**20.9%** improvement

University of Houston	Texas State University	Stephen F. Austin
COMBINED IMPROVEMENTS		
20.9% improvement	**20.5%** improvement	**20.9%** improvement
$92,341 yearly savings	**$39,187** yearly savings	**$25,315** yearly savings
$1,359,370 25-year savings	**$439,999** 25-year savings	**$641,415** 25-year savings
3-year payback	**7**-year payback	**0**-year payback

University of Houston	Texas State University	Stephen F. Austin
560 sf floor area / bed	312 sf floor area / bed	316 sf floor area / per bed
80 sf wall area / bed	45 sf wall area / bed	26 sf wall area / bed
Roof is 23% of envelope area	Roof is 28% of envelope area	**Roof is 37% of envelope area**
24 MBtu / bed	18 MBtu / bed	16 MBtu / bed

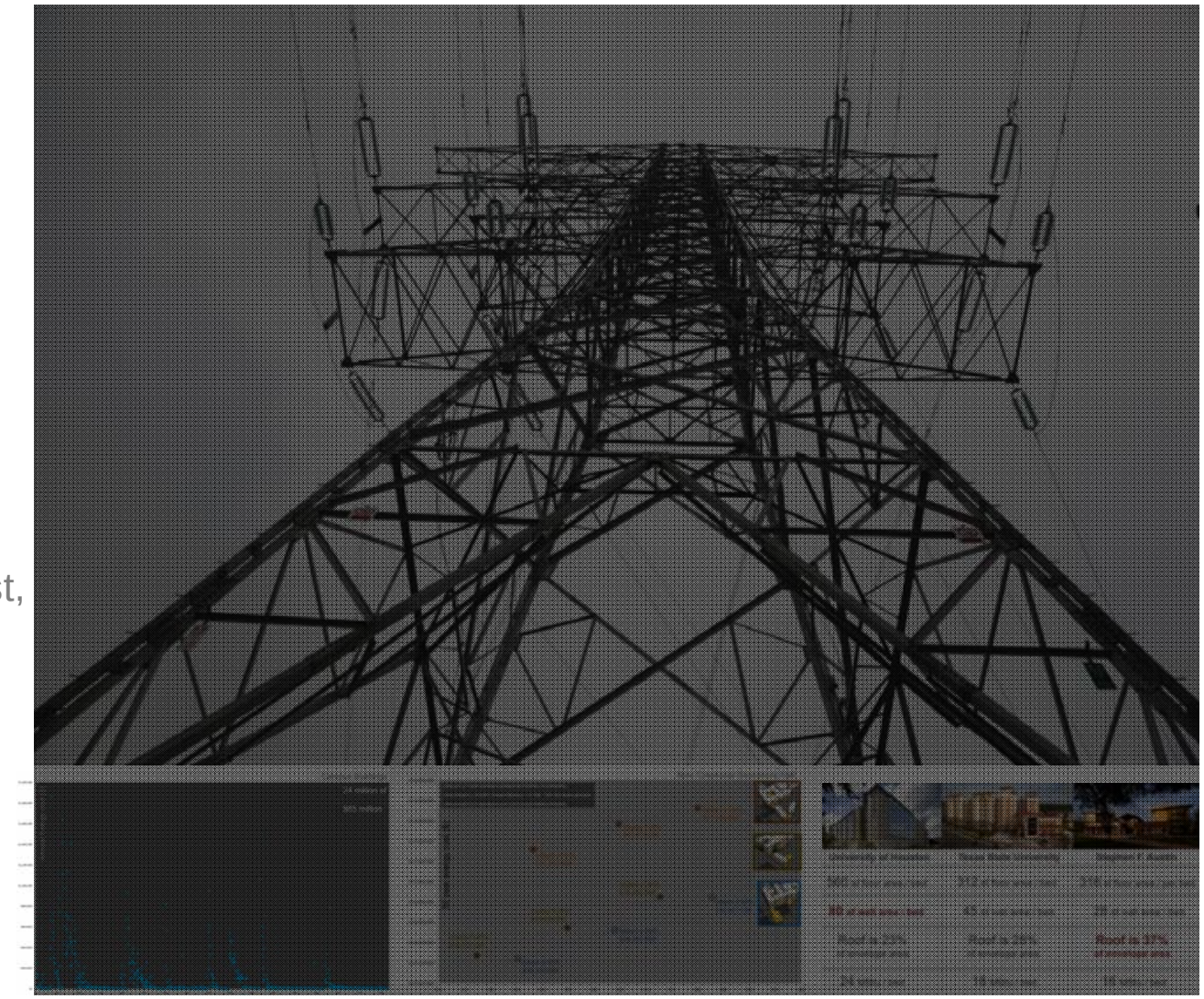
Energy

Energy

Operations:
$/sf, $Chilled Water & EUI

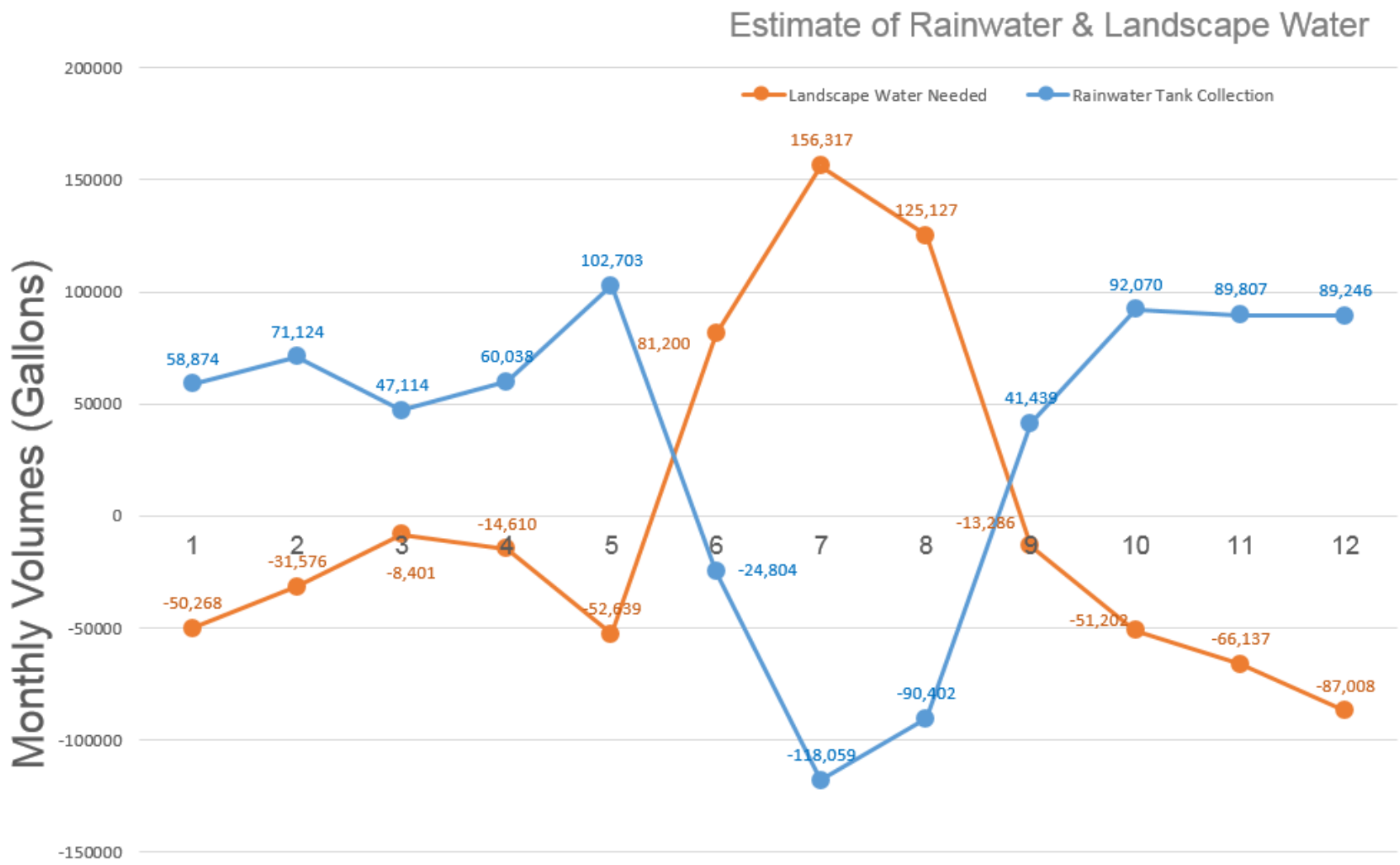
New Buildings: 50 year cost, Loads

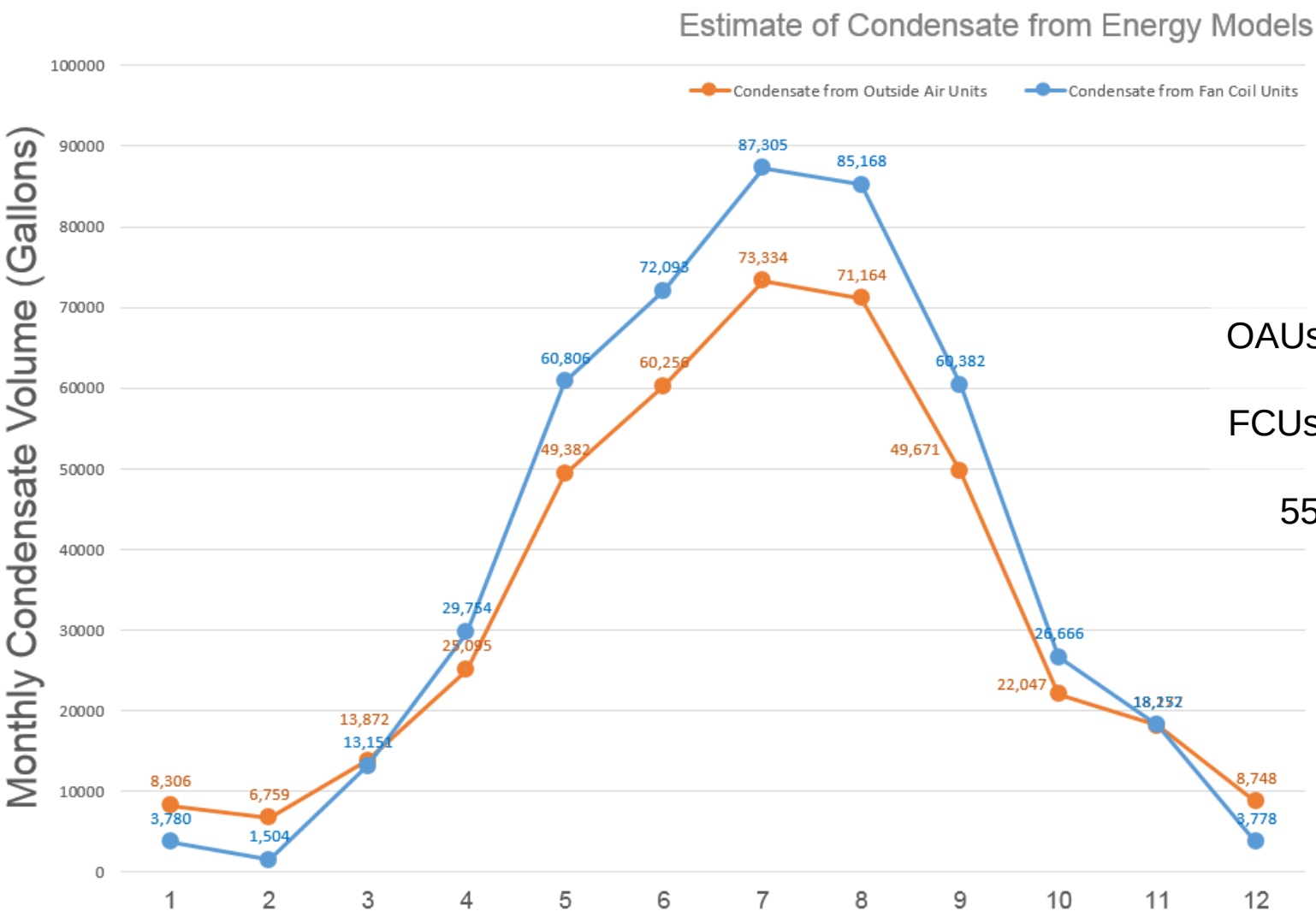
Renovation: ROI



Rainwater

Texas Campus

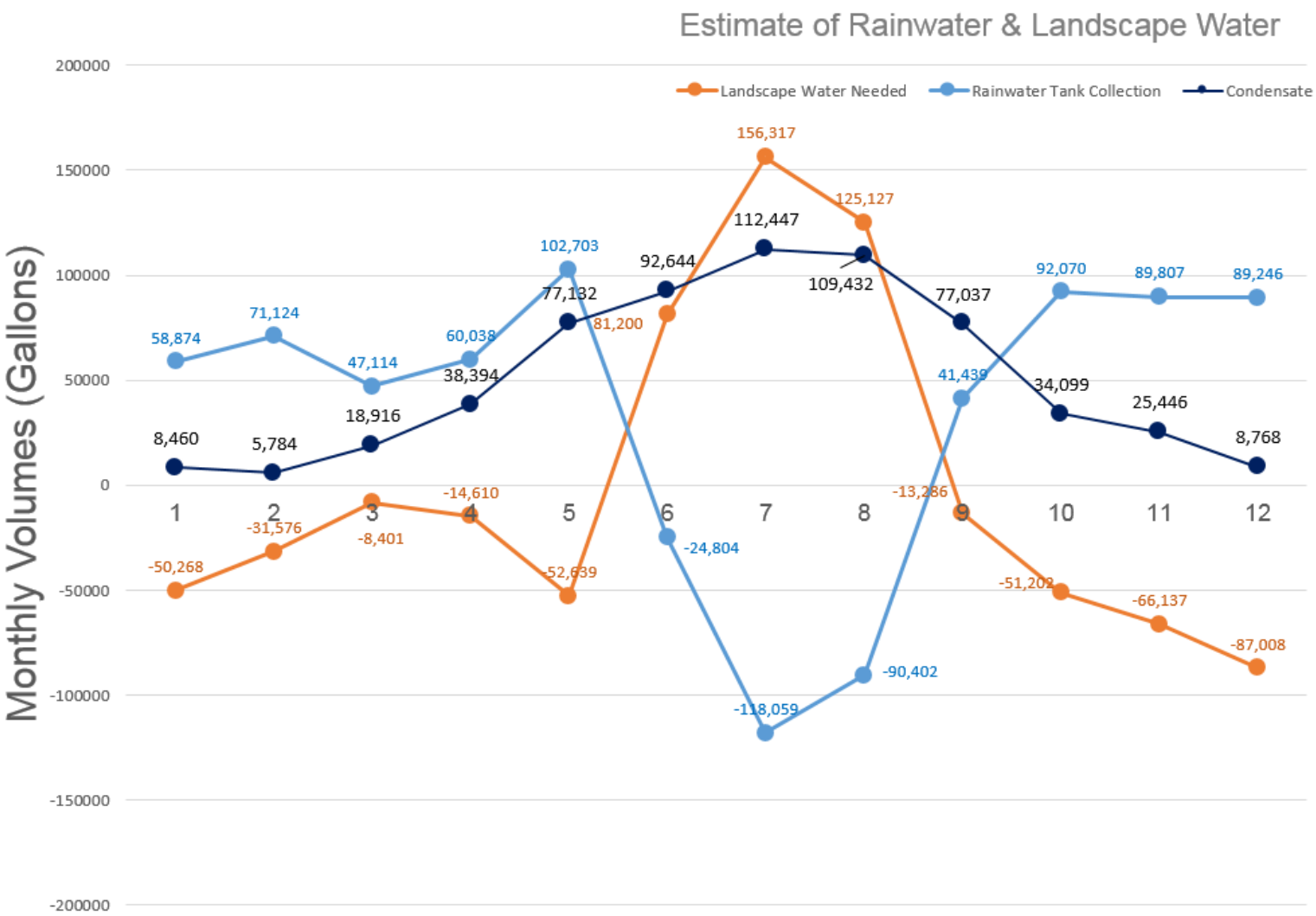

Estimate of Rainwater & Landscape Water
Landscape Water Needed
Rainwater Tank Collection
Monthly Volumes (Gallons)
200000
150000
100000
50000
0
-50000
-100000
-150000
1
2
3
4
5
6
7
8
9
10
11
12
58,874
71,124
47,114
60,038
102,703
-24,804
-118,059
-90,402
41,439
92,070
89,807
89,246
-50,268
-31,576
-8,401
-14,610
-52,639
81,200
156,317
125,127
-13,286
-51,202
-66,137
-87,008

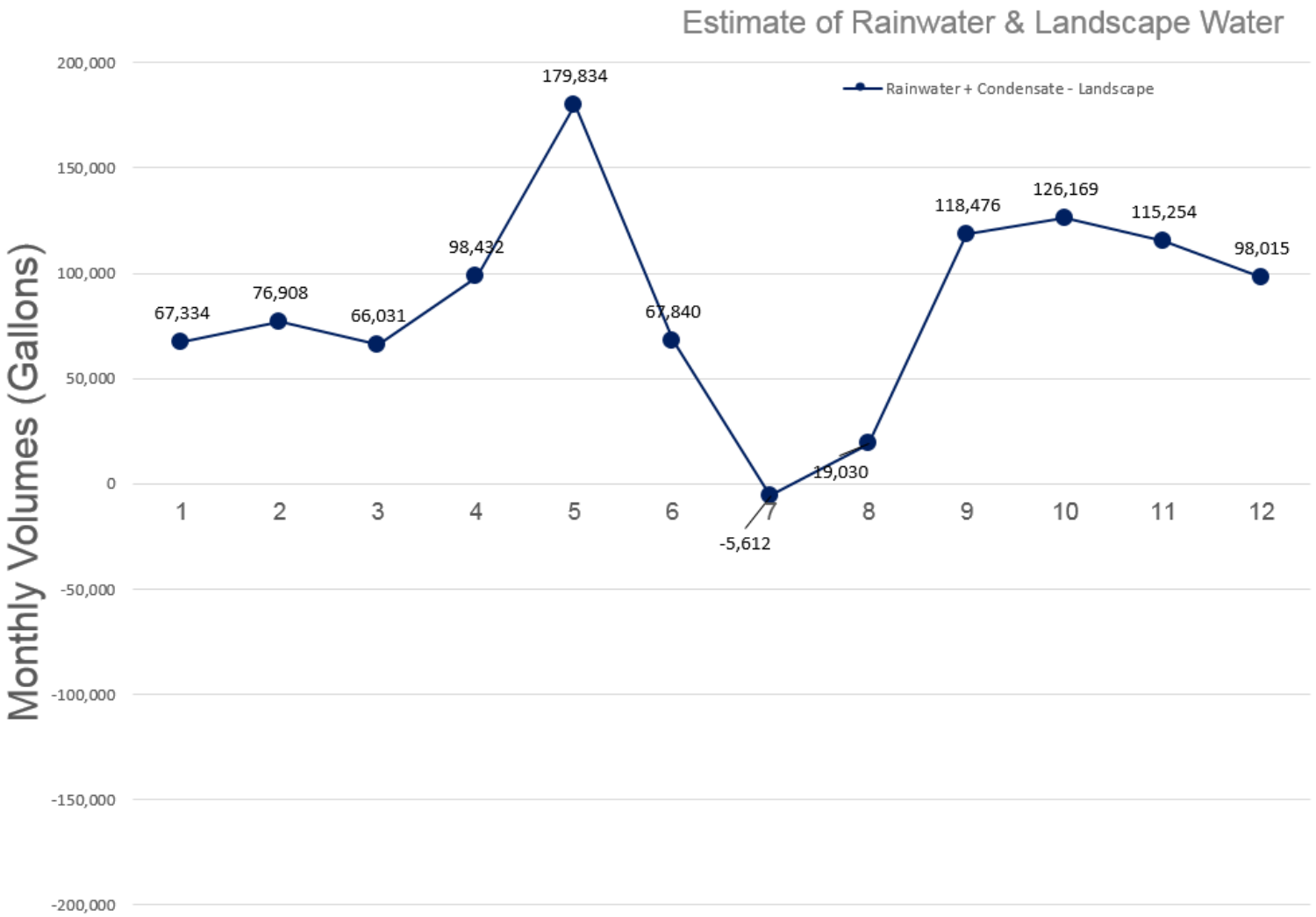


OAUs 406,812 gallons

FCUs 462,638 gallons

556,576 gallons


Estimate of Rainwater & Landscape Water
Landscape Water Needed
Rainwater Tank Collection
Condensate
Monthly Volumes (Gallons)
200000
150000
100000
50000
0
-50000
-100000
-150000
-200000
1
2
3
4
5
6
7
8
9
10
11
12
58,874
71,124
47,114
60,038
102,703
-24,804
-118,059
-90,402
41,439
92,070
89,807
89,246
-50,268
-31,576
-8,401
-14,610
-52,639
81,200
156,317
125,127
-13,286
-51,202
-66,137
-87,008
8,460
5,784
18,916
38,394
77,132
92,644
112,447
109,432
77,037
34,099
25,446
8,768

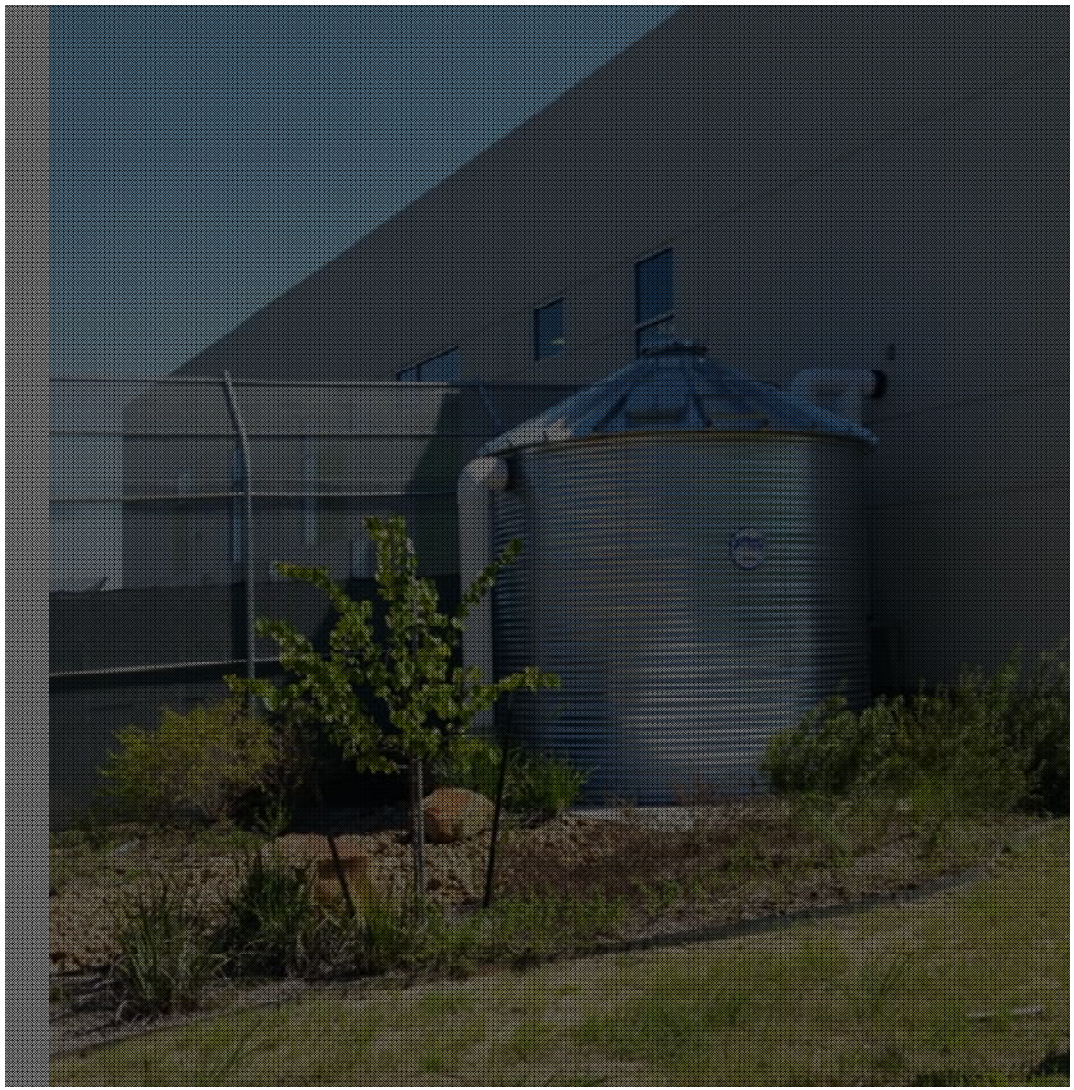

Estimate of Rainwater & Landscape Water
Monthly Volumes (Gallons)
Rainwater + Condensate - Landscape
200,000
150,000
100,000
50,000
0
-50,000
-100,000
-150,000
-200,000
1
2
3
4
5
6
7
8
9
10
11
12
67,334
76,908
66,031
98,432
179,834
67,840
-5,612
19,030
118,476
126,169
115,254
98,015

Rainwater

Meter Landscape gallons

Meter Condensate gallons

Measure Collection Efficiencies

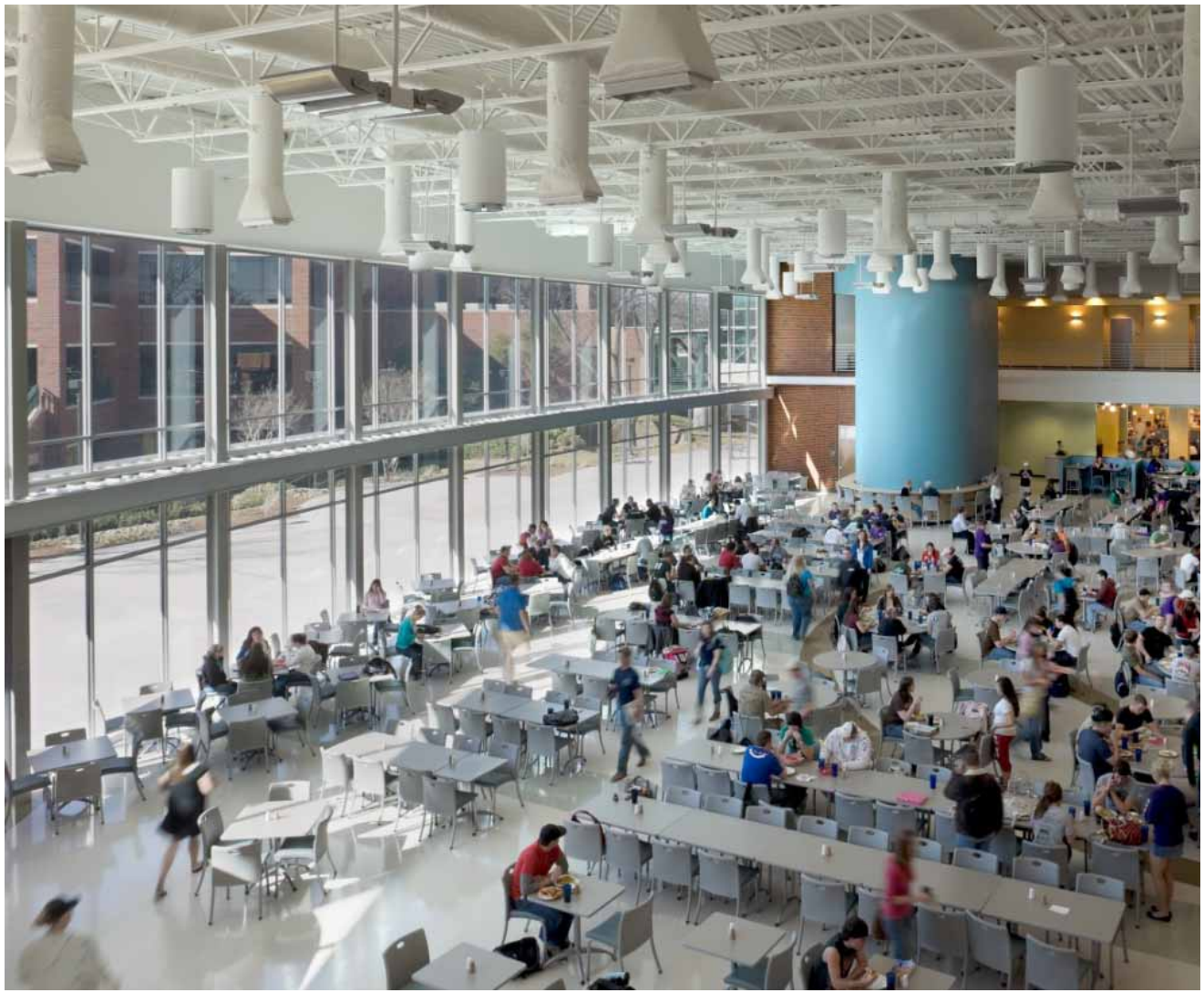


Space

McDonald's
Subway
Pizza Hut
Memorial Stadium
Dollar General
ATM
Commerce Chevrolet Buick
Department of Music - Texas A&M
Student Health Services
College of Business and Entrepreneurship
Journalism Building
Commerce Inn
Maples Place Apartments
One Stop Shop
Lot 35
Lot 18
Texas A&M University-Commerce
Jerry D. Morris Recreation Center
Lot 14
Northeast Texas Children's Mseum
Commerce Church of Christ

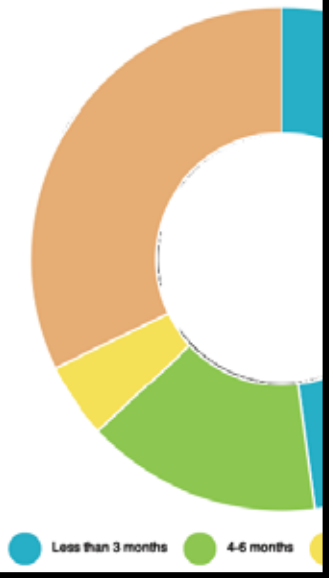
Space

Indoor Utilization



How long have you worked or lived in this building?

n 3 months	4-6 months	7-12 months
79 .88%)	25 (15.15%)	8 (4.85%)

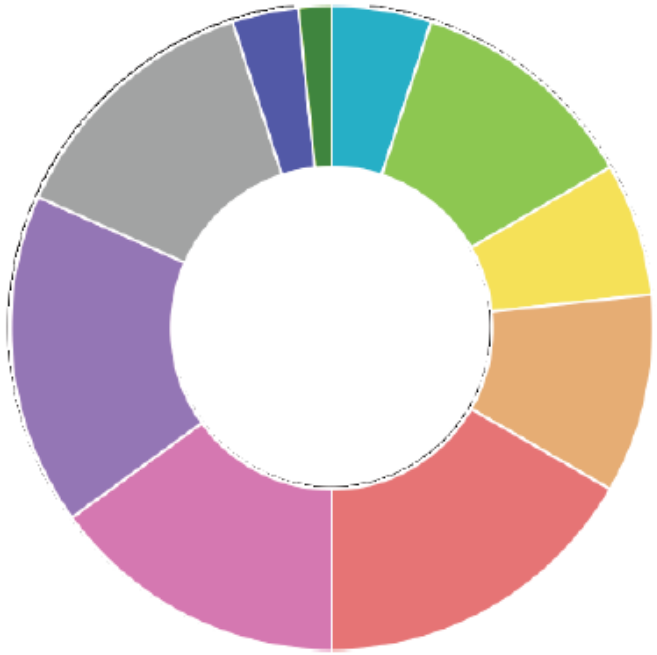


How long have you been working at your present workspace, or living in your current room? (if applicable)

	Less than 3 months	4-6 months
All Data	83 (52.53%)	26 (16.46%)

Please indicate the area of the building where you work or live:

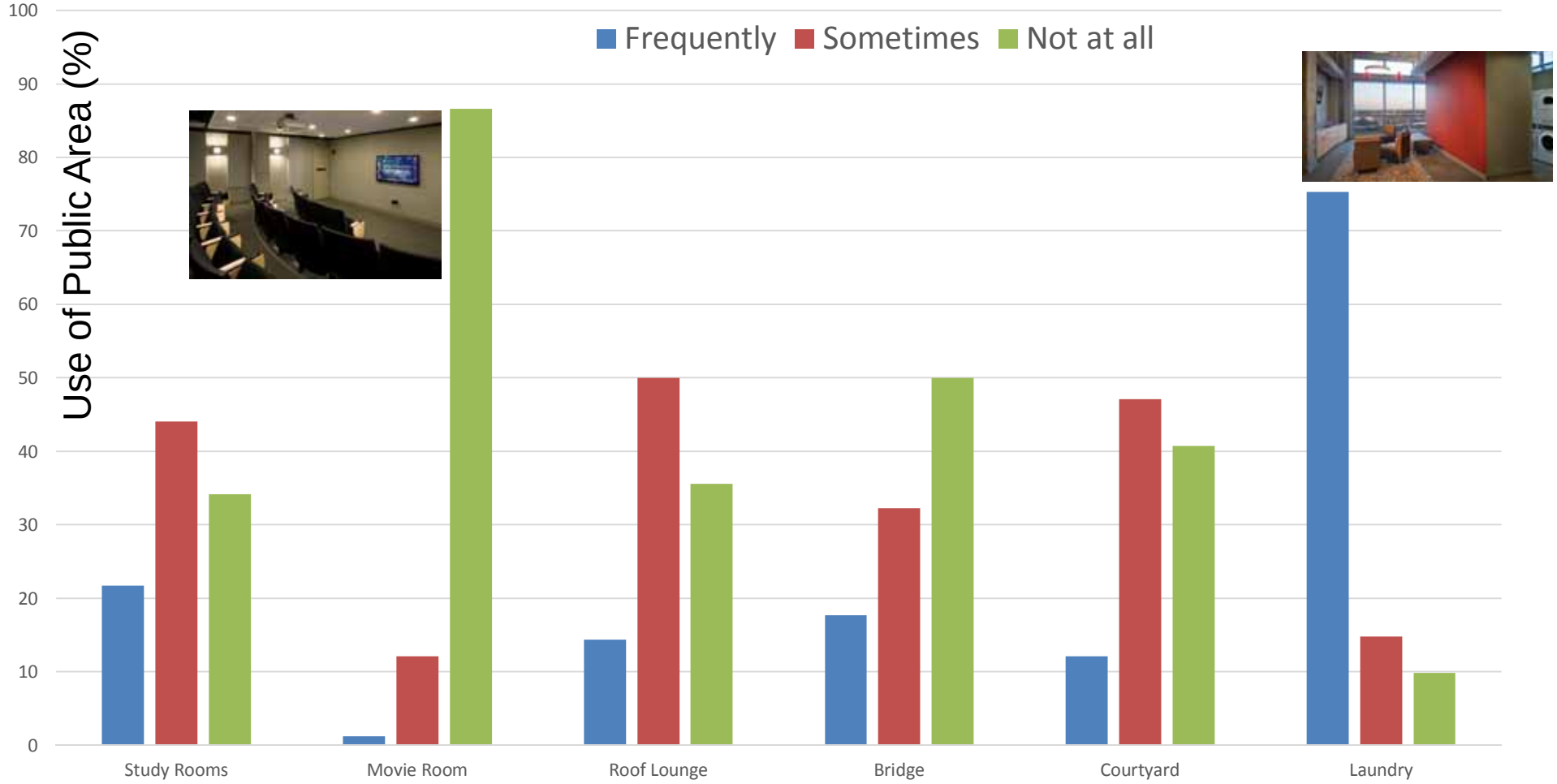
	1st Floor	2nd Floor	3rd Floor	4th Floor	5th Floor	6th Floor	7th Floor	8th Floor	9th Floor	10th Floor	Standa
All Data	3 (5%)	7 (11.67%)	4 (6.67%)	6 (10%)	10 (16.67%)	9 (15%)	10 (16.67%)	8 (13.33%)	2 (3.33%)	1 (1.67%)	



1. Frequently

2. Sometimes

3. Not at all

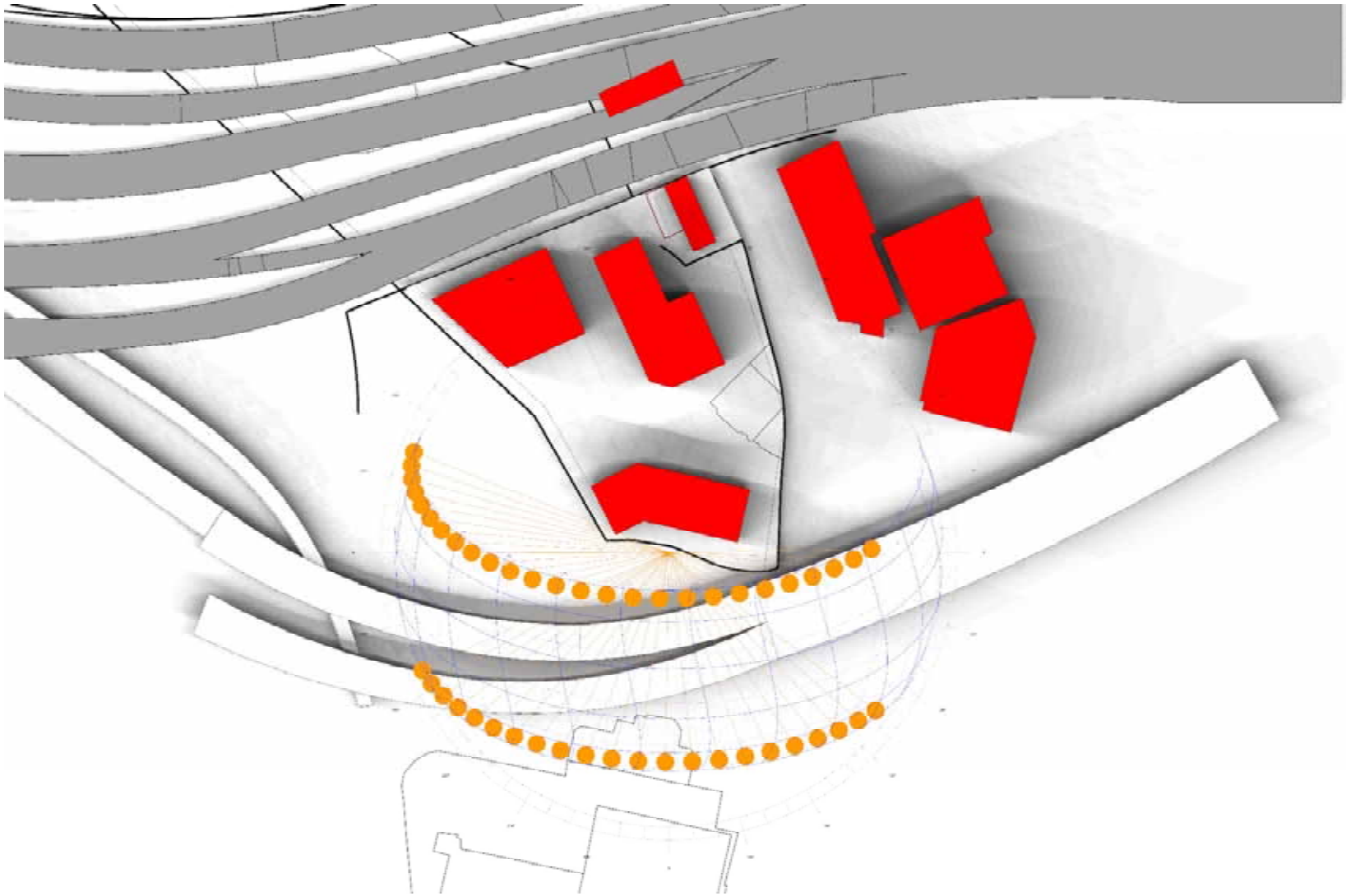

Use of Public Area (%)
100
90
80
70
60
50
40
30
20
10
0
Frequently
Sometimes
Not at all
Study Rooms
Movie Room
Roof Lounge
Bridge
Courtyard
Laundry

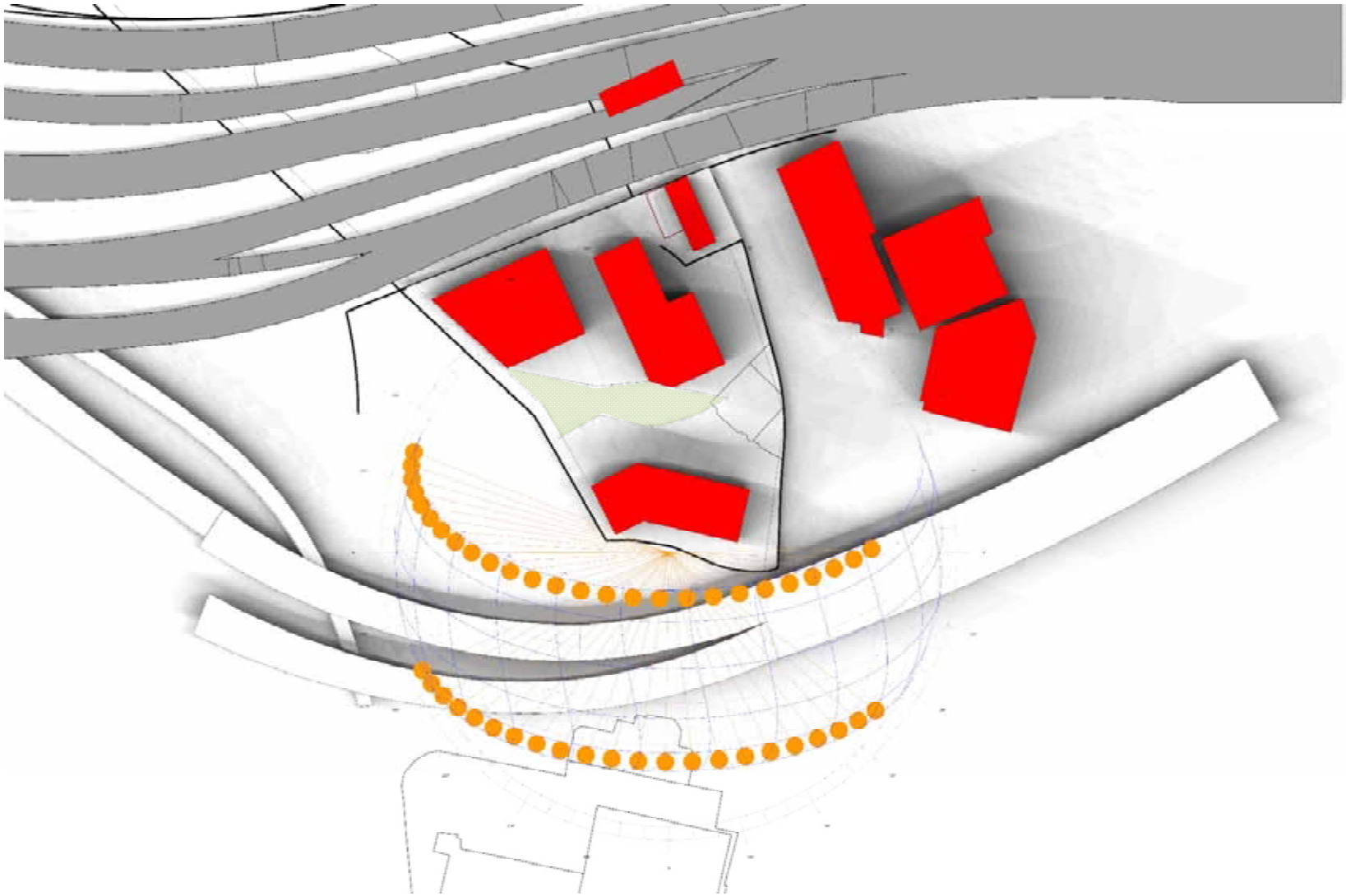
Living Spaces	Unit Quantity	sf/Unit	Net/SF	Beds	Baths	Kitchens
Micro Units	**150**	300	45,000	150	150	150
1 Bedroom	**40**	430	17,200	40	40	40
2 Bedroom 1 Bath	**0**	660	0	0	0	0
2 Bedroom 2 Bath	**78**	700	54,600	156	156	78
Staff Apratments	**2**	725	1,450	4	4	2
4 Bedroom 2 Bath	**50**	1,115	55,750	200	100	50
4 Bedroom 4 Bath	**50**	1,235	61,750	200	200	50
	370		**235,750**	**750**	**650**	**370**

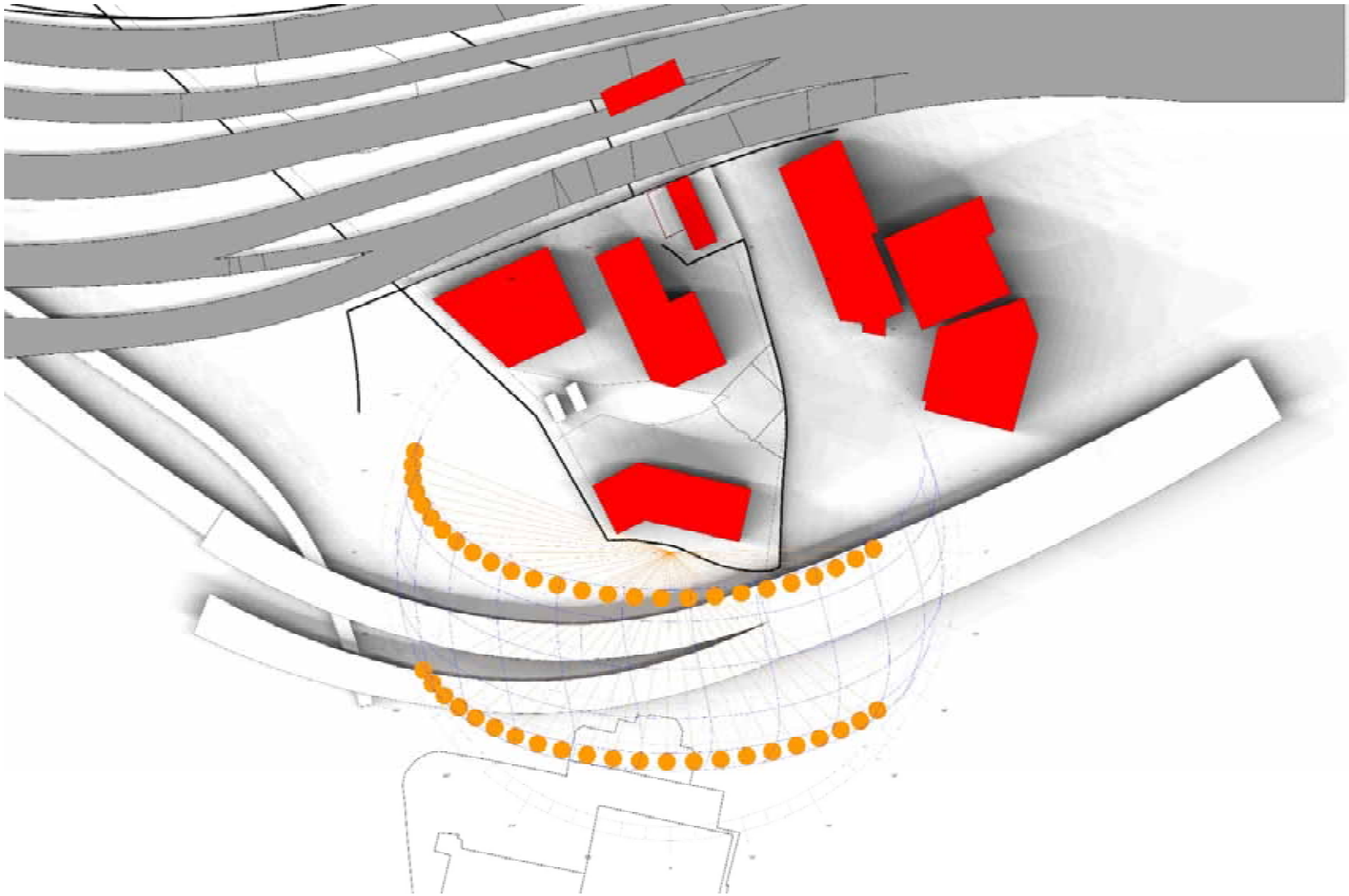
Community Spaces	Quantity	sf/Unit	Net/SF	Comments
Grocery Store	1	6,000	6,000	Centrally located
Coffee Shop/Pub	1	3,000	3,000	Combined or separate. Could be co-located with grocery for staff sharing
Community Space	1	3,500	3,500	Lobby, restrooms, meeting rooms open work space
Student Kitchen	1	200	200	With community space
Vending Area	1	100	100	With community space
Storage	1	200	200	With community space for chairs and other equipment
Lounge/Study	20	180	3,600	Spaces for 4-5 students and some for 8-10 students - open study areas
Operations	**Quantity**	**sf/Unit**	**Net/SF**	**Comments**
Maintenance Office	1	120	120	Facilities Supervisor
Work Room/Copy	1	120	120	With staff area
Mail Room	1	600	600	Central to all activities associated with the community space
Front Desk	1	380	380	Central to all activities associated with the community space
Leasing Office	1	120	120	Adjacent to front desk with view of lobby
Staff Offices	2	120	240	Adjacent to front desk and leasing office
Staff Break Room/Locker Room	1	700	700	Kitchen, lockers, showers, restrooms
Building Service - Laundry	1	100	100	One washer and one dryer
Building Service - Storage	1	250	250	Supplies and Equipment
Maintenance Storage	1	250	250	Bulk storage for supplies
Building Service - Storage	1	400	400	Furniture and Mattresses
Maintenance Shop	1	150	150	Open work area adjacent to maintenance storage
Laundry	6	400	2,400	Conveniently located throughout complex adjacent to study or lounge space
Janitors Rooms	6	60	360	1 on the first floor of each building
Trash Rooms	16	60	960	1 per floor in each building - located near elevators.
Bike Storage	4	1,040	4,160	Provide indoor bike parking for 50% of occupants in each building

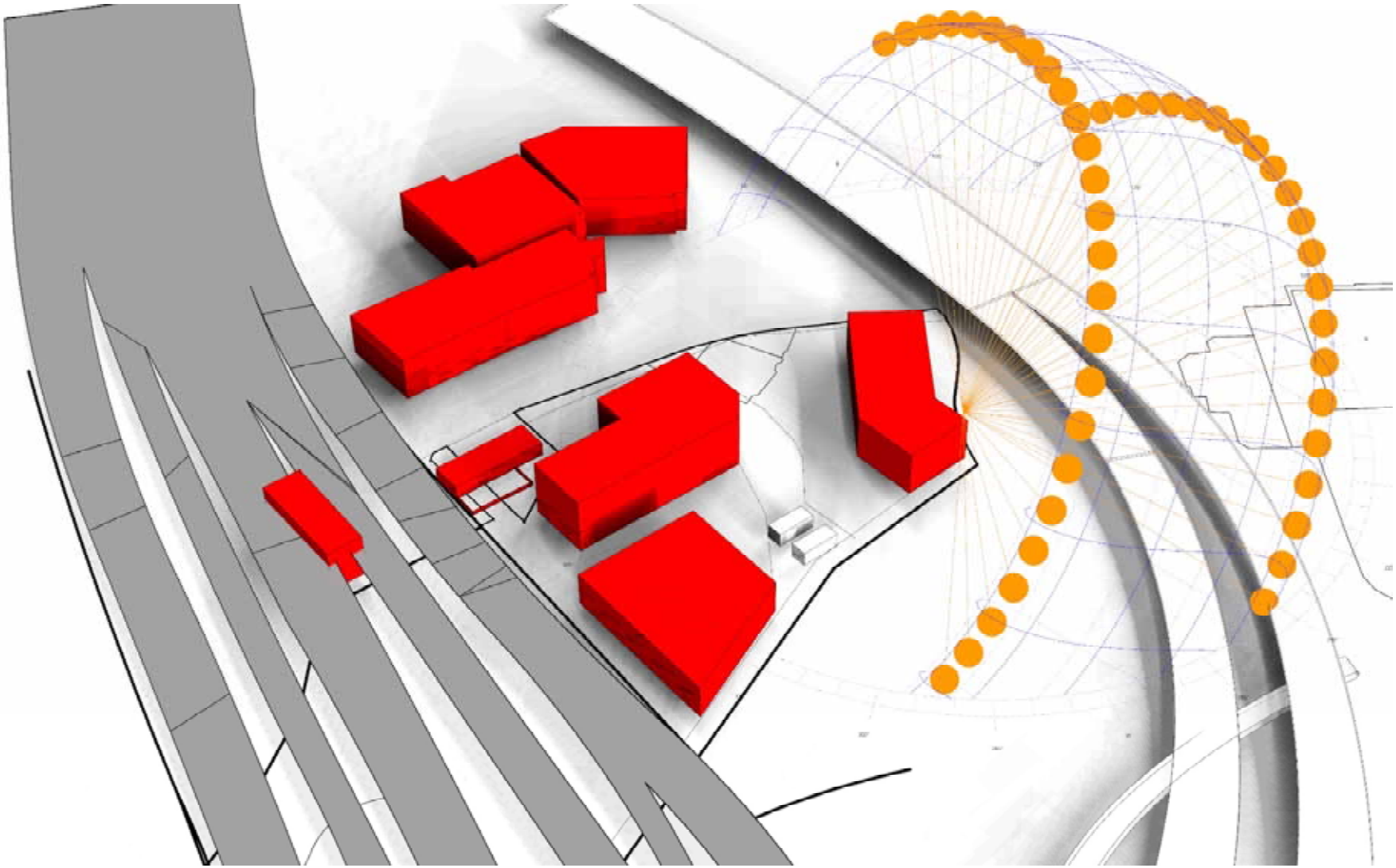
Space

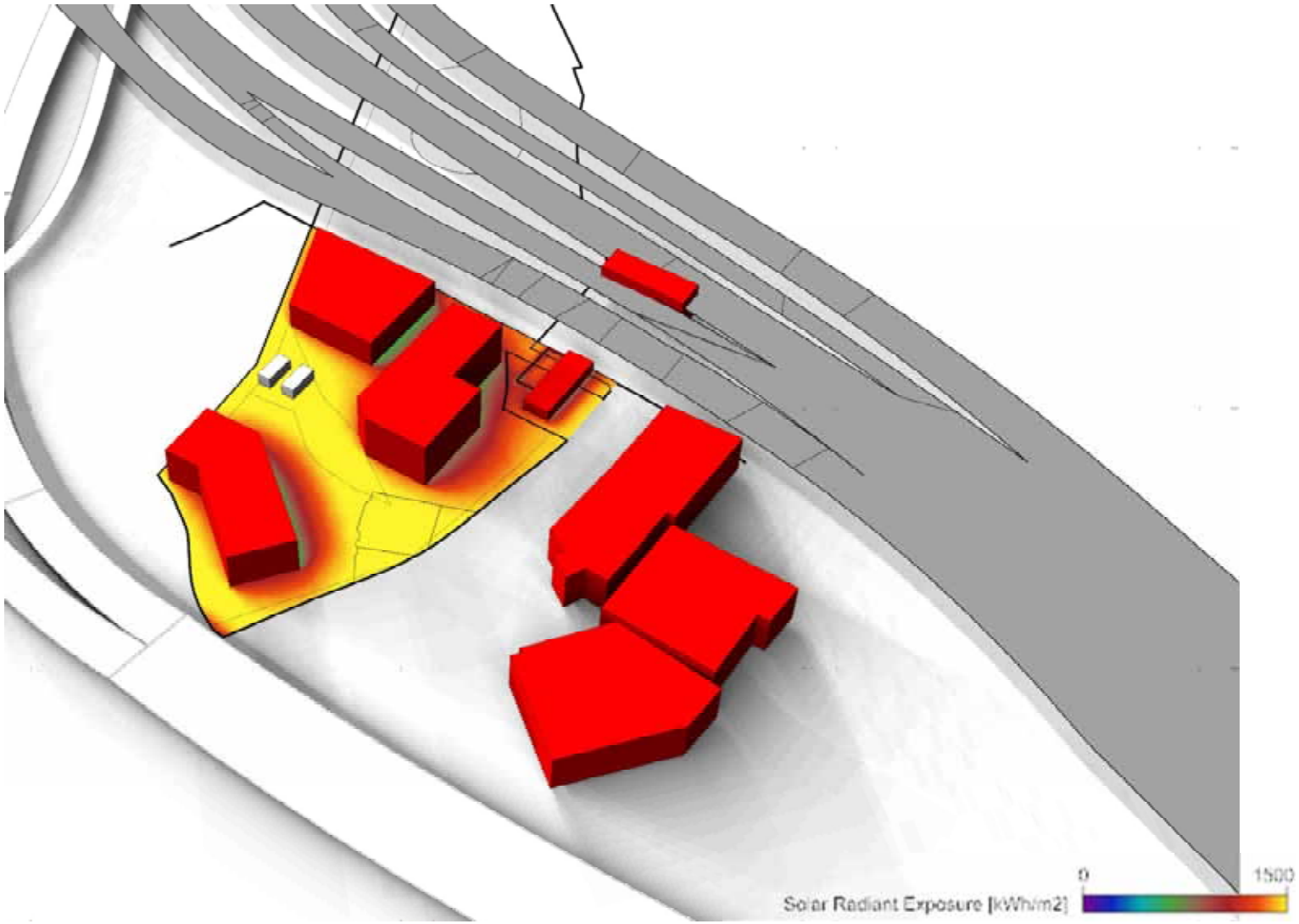
Outdoor Utilization





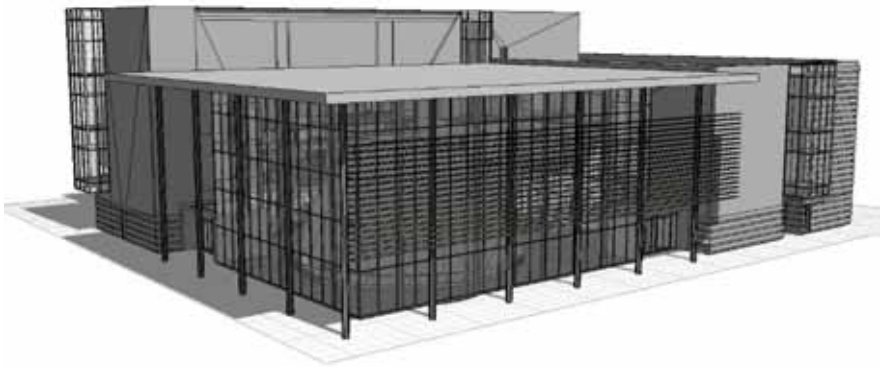


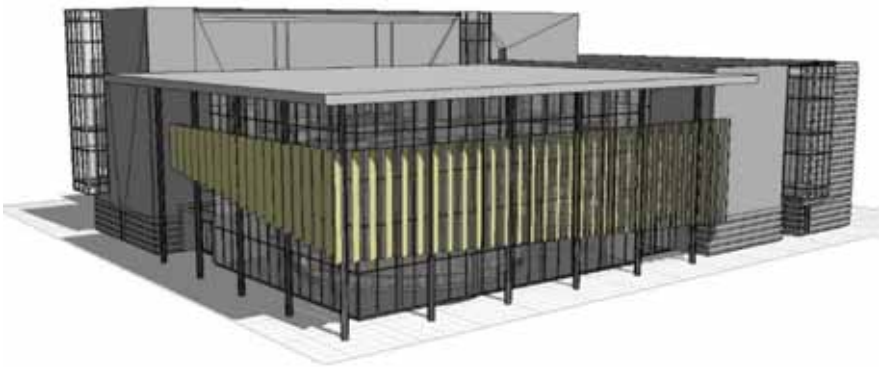


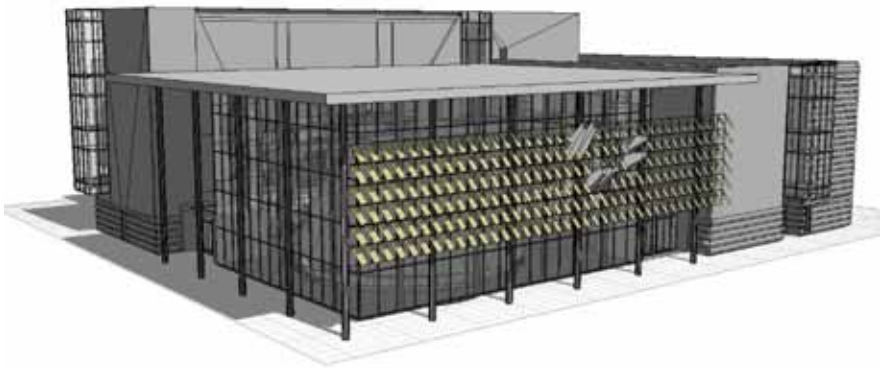

0
1500
Solar Radiant Exposure [kWh/m2]

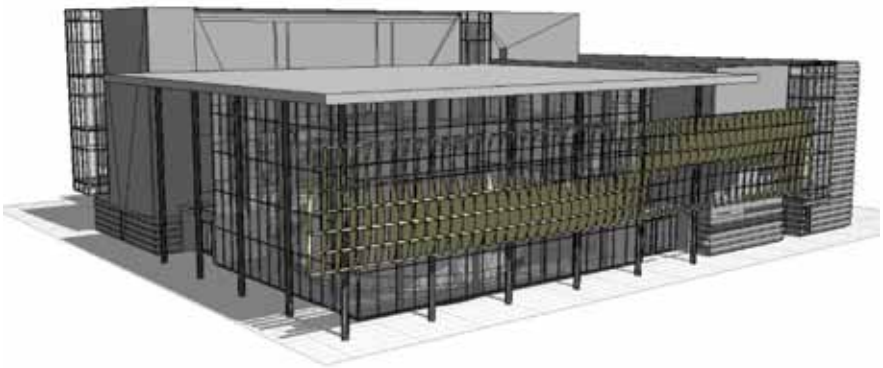
Space

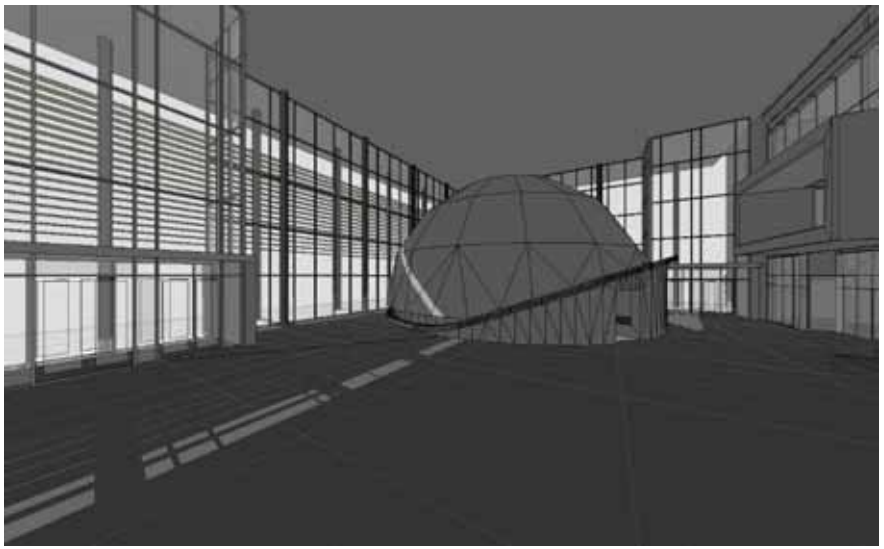
Indoor Comfort

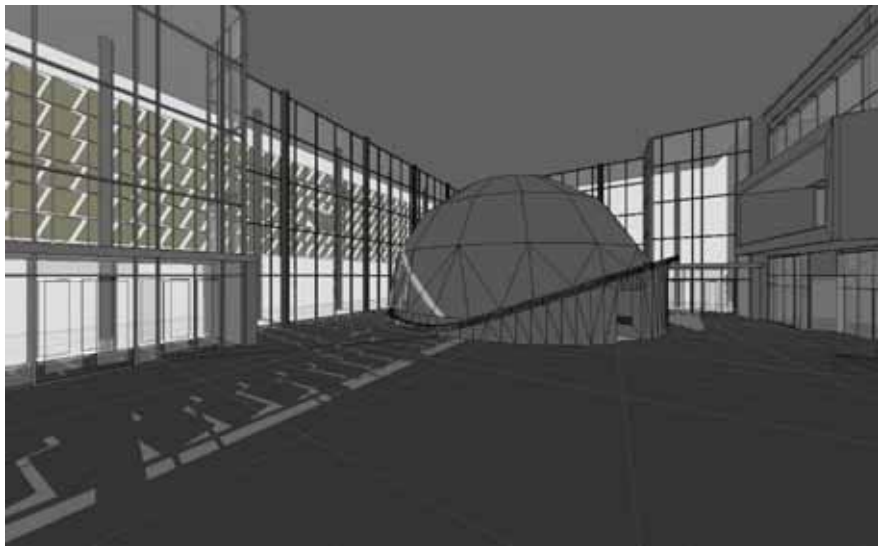


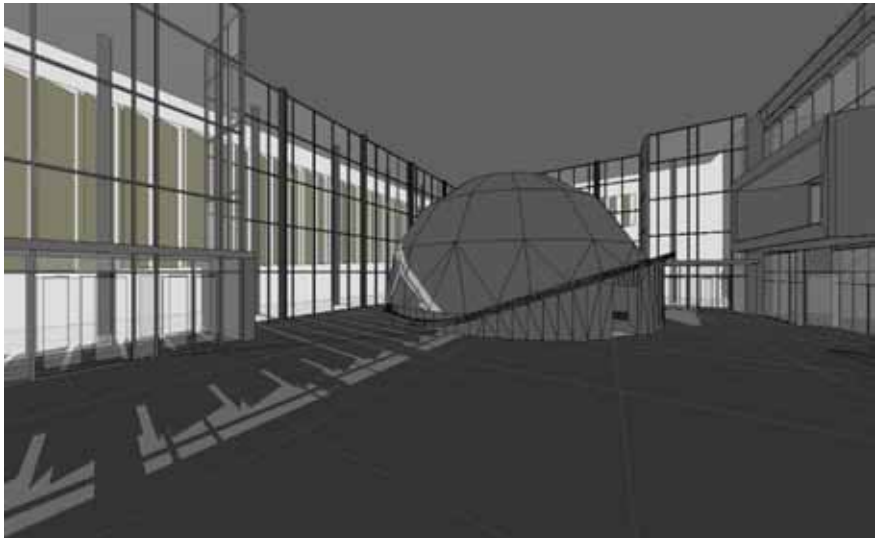


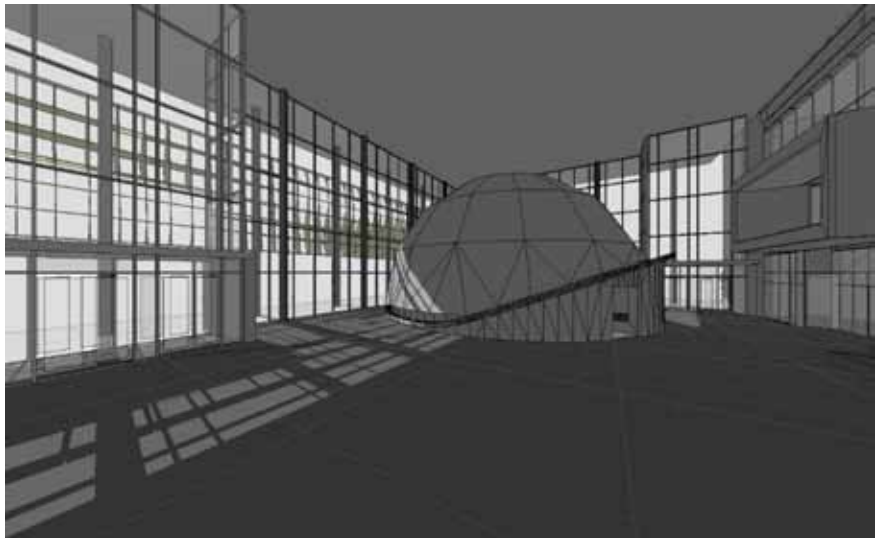


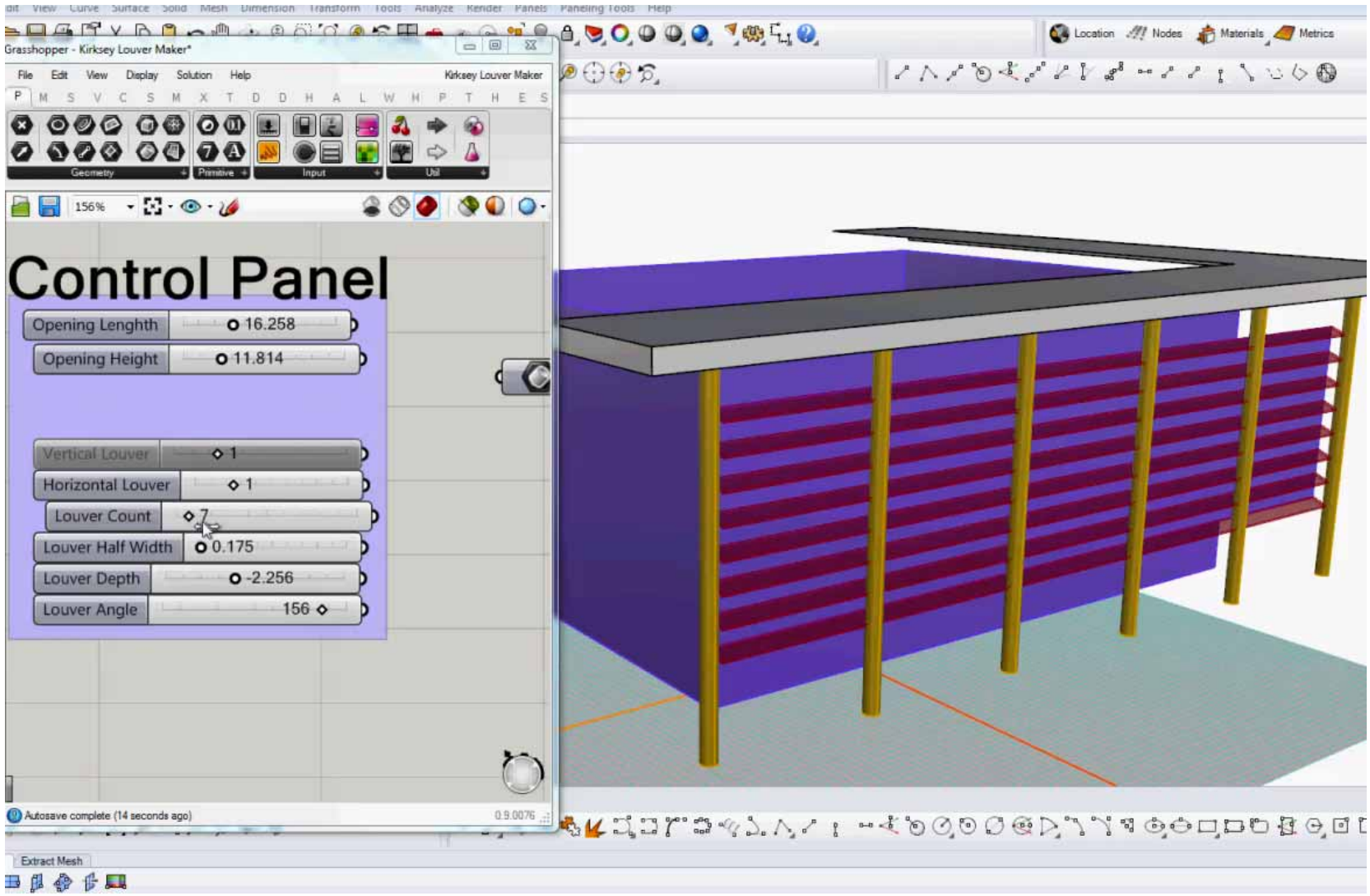











Grasshopper - Kirksey Louver Maker*
File Edit View Display Solution Help
Kirksey Louver Maker
Geometry
Primitive
Input
Util
156%
Control Panel
Opening Lenghth 16.258
Opening Height 11.814
Vertical Louver 1
Horizontal Louver 1
Louver Count 7
Louver Half Width 0.175
Louver Depth -2.256
Louver Angle 156
Autosave complete (14 seconds ago)
0.9.0076
Location
Nodes
Materials
Metrics
Extract Mesh

West Façade Louver Study :

Louvers Number

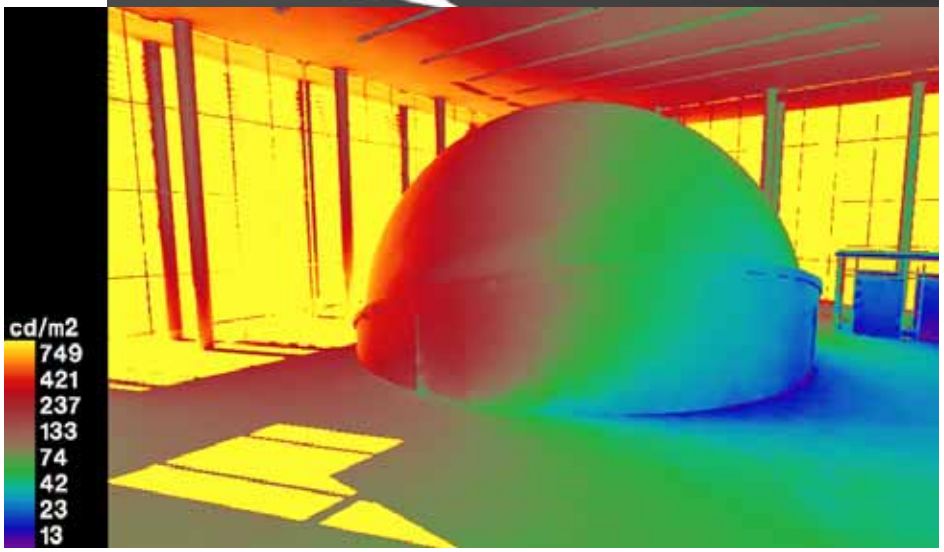
16 Vs 24

16:00

March 21th

Louver Angle: 45

No : 24



West Façade Louver Study :

Louvers Angle

0 Vs 30 Vs 45 Vs 60

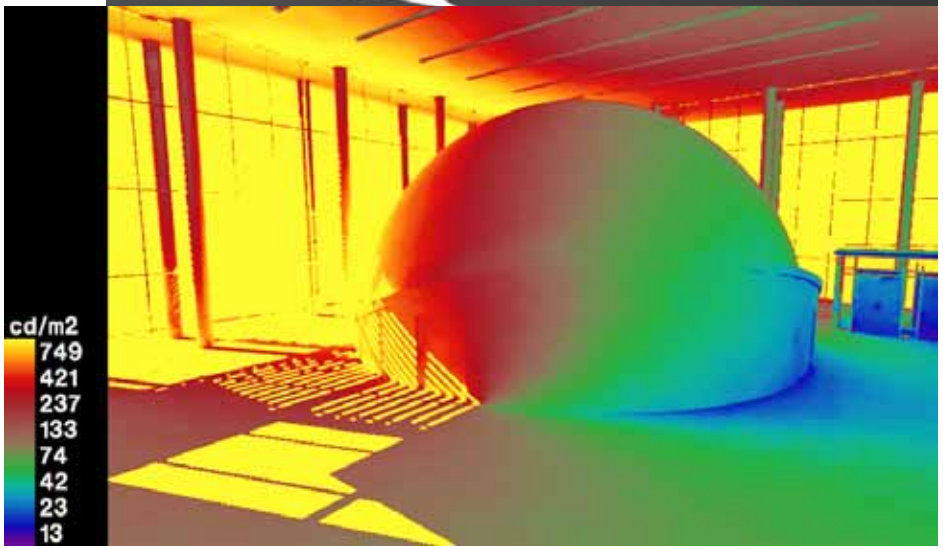
Obviously higher angle would provide more shade but it will obstruct the sight. This study tires to find the optimum angle in order to have a fare sight and view toward outside and also to provide enough shading.

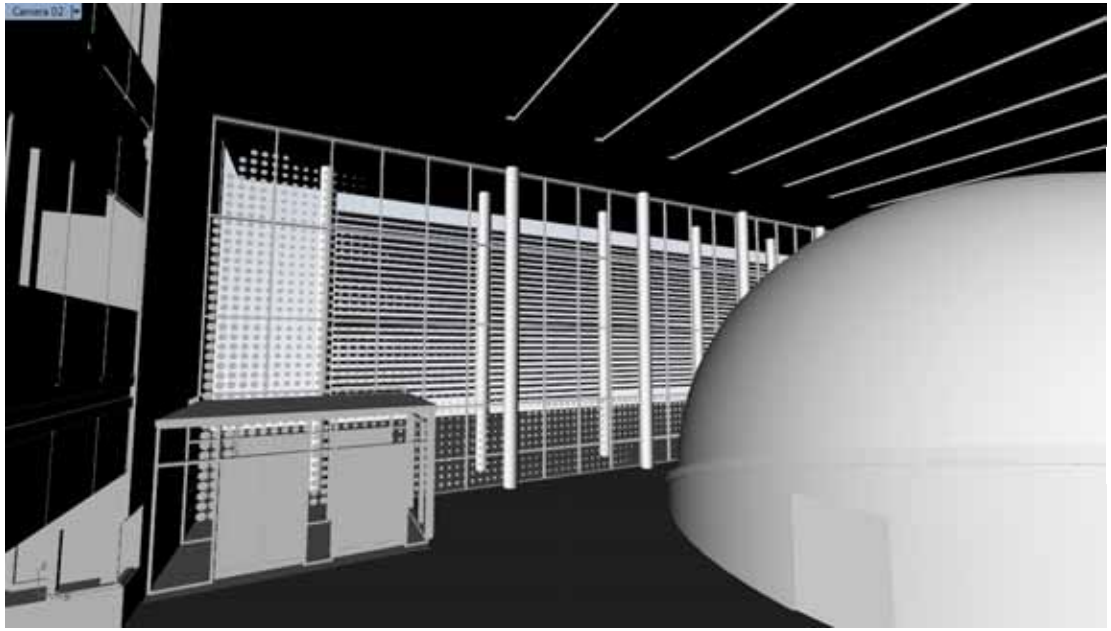
16:00

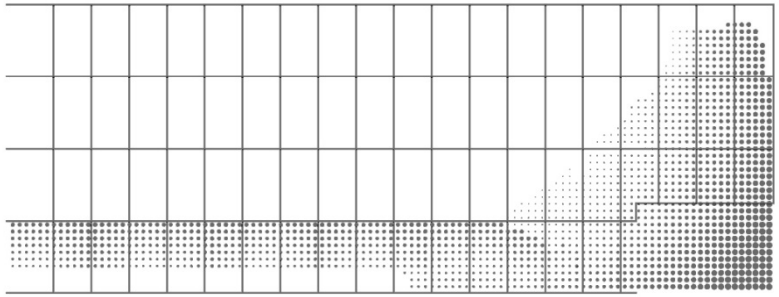
March 21th

Louver Angle: 0

No : 24

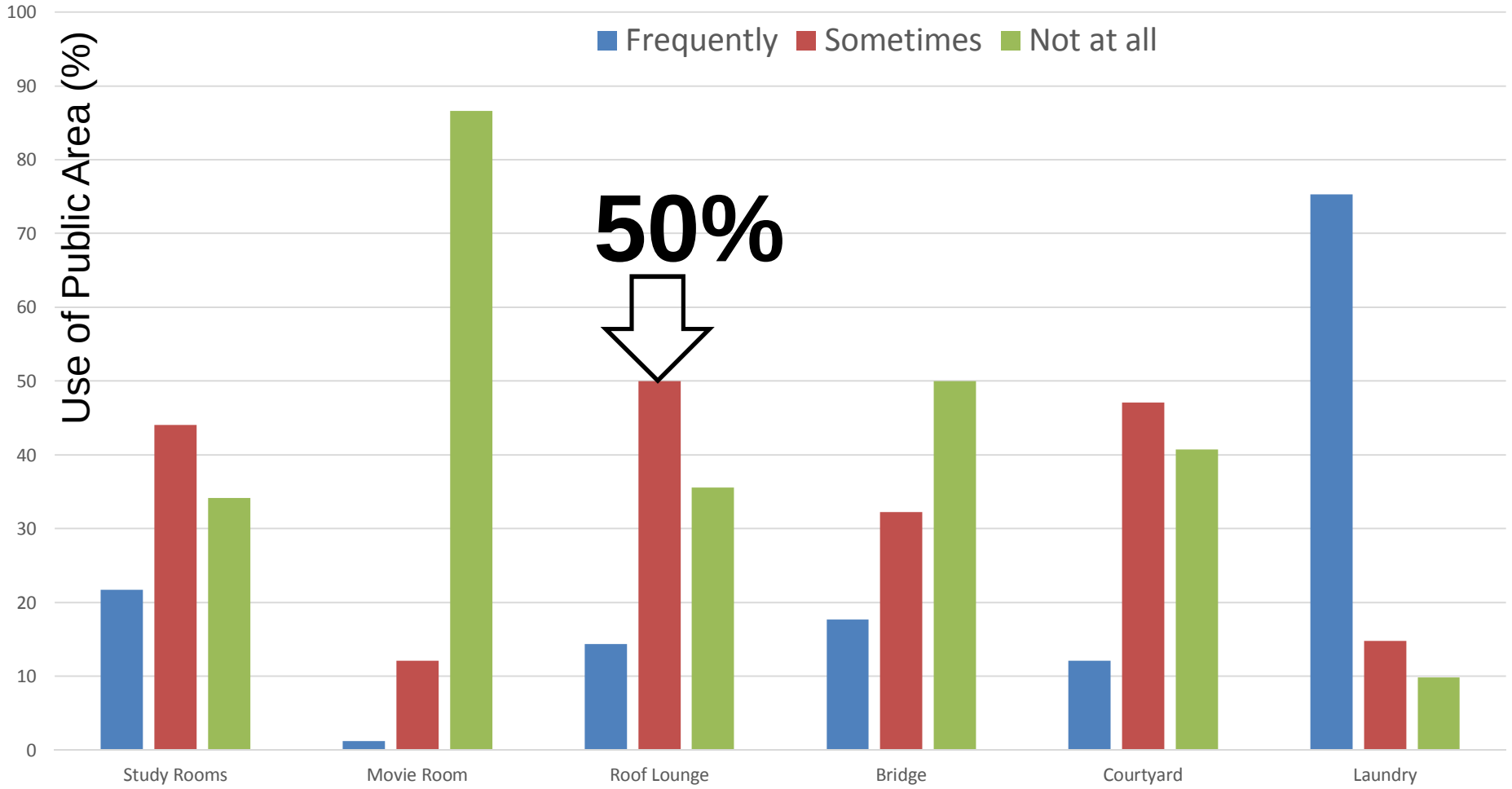


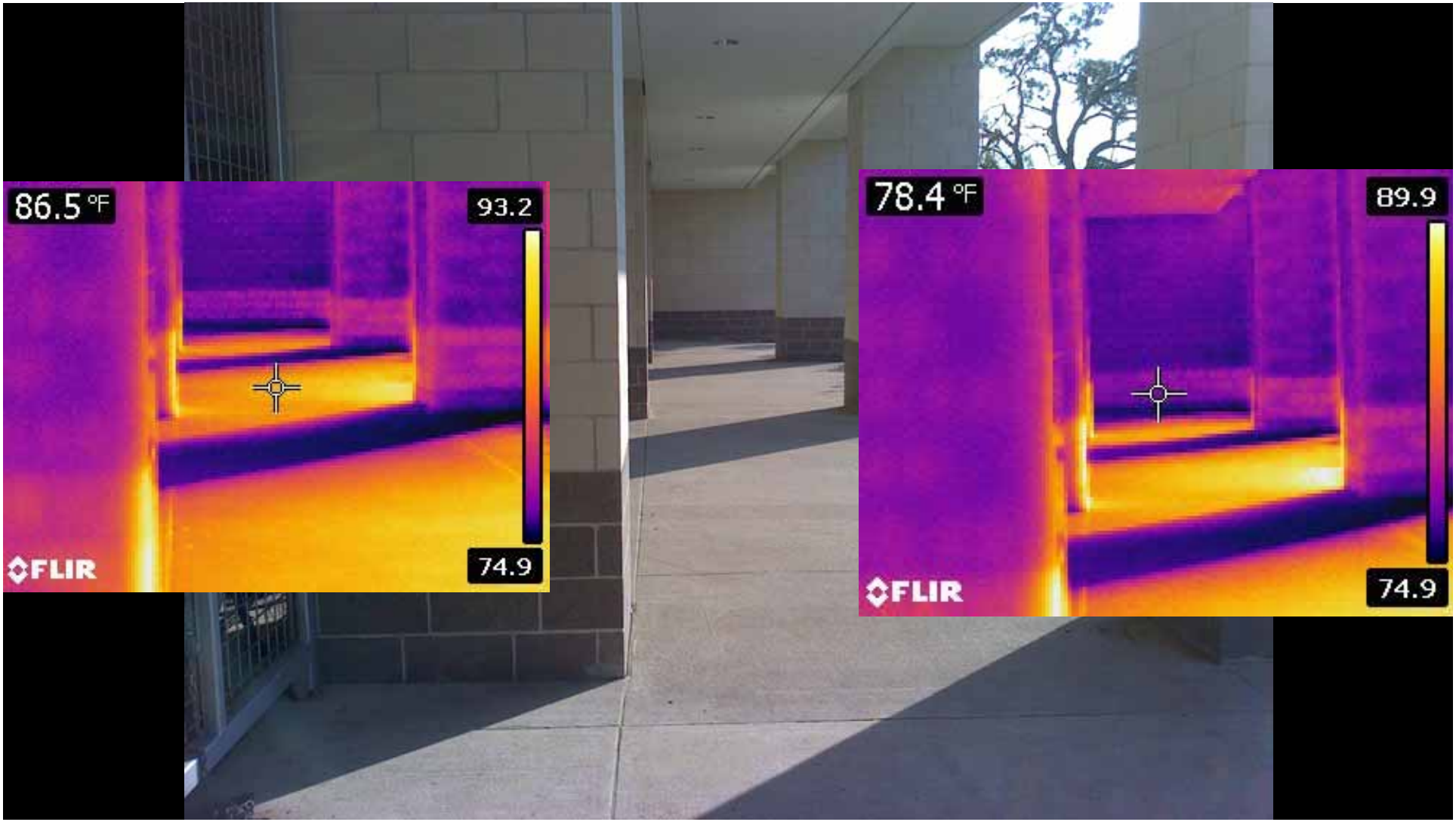

Camera 02

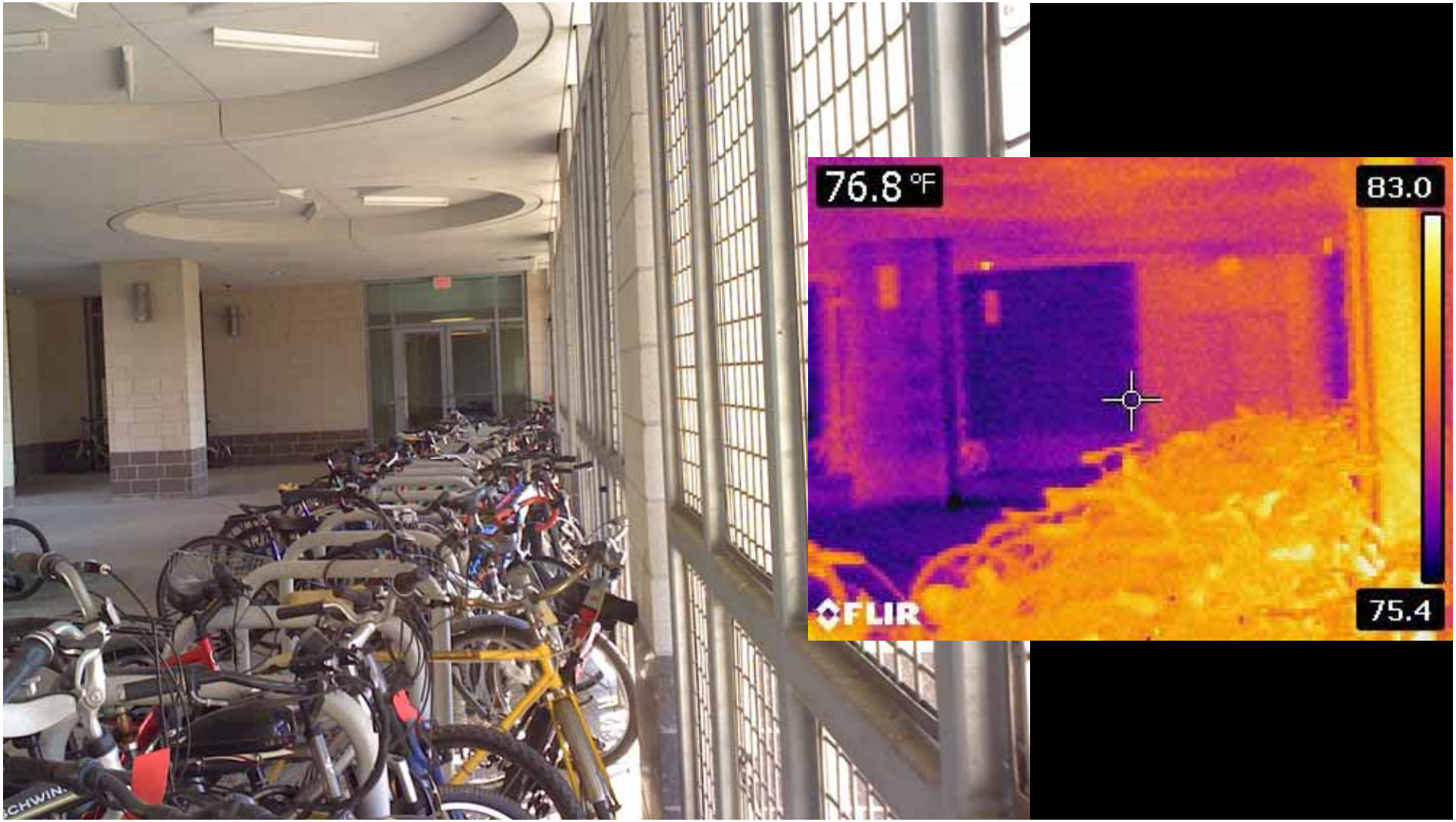


Space

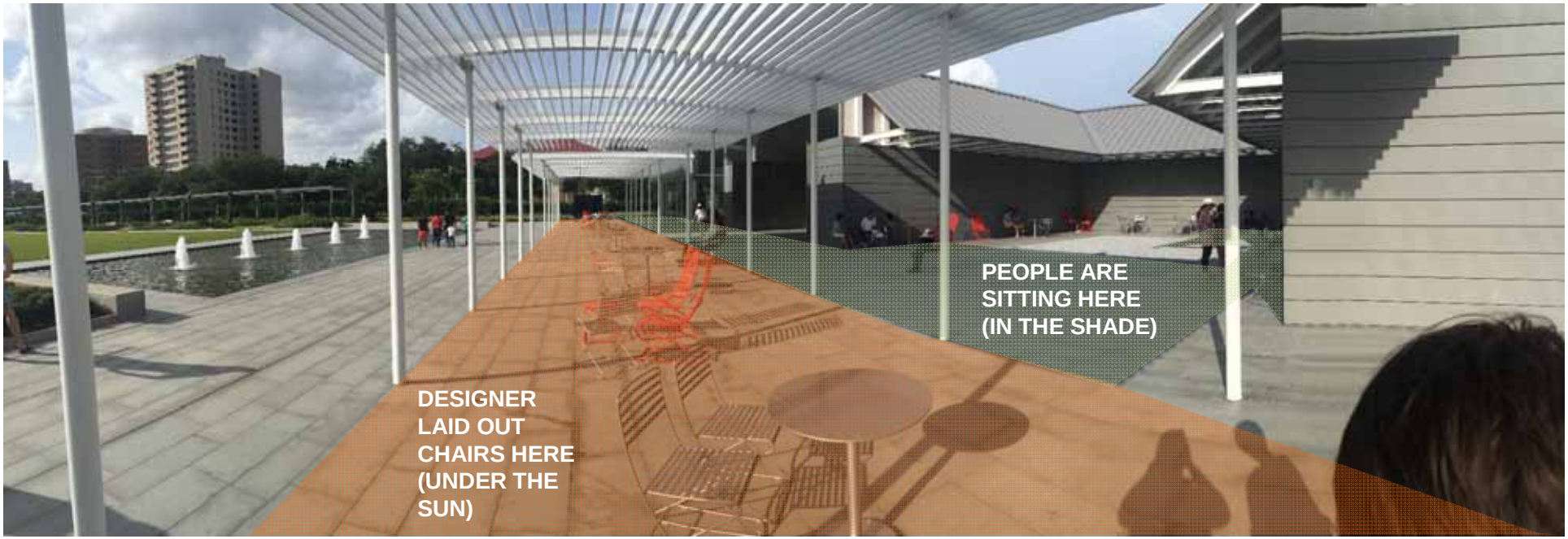
Outdoor Comfort


Use of Public Area (%)
Frequently
Sometimes
Not at all
100
90
80
70
60
50
40
30
20
10
0
50%
Study Rooms
Movie Room
Roof Lounge
Bridge
Courtyard
Laundry

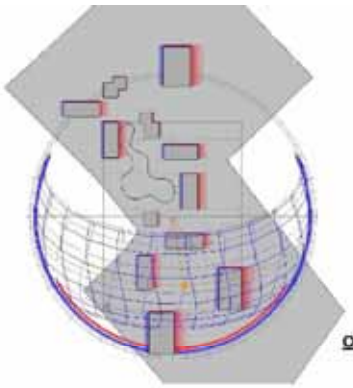

86.5 °F
93.2
74.9
FLIR
78.4 °F
89.9
74.9
FLIR


76.8 °F
83.0
75.4
FLIR

TAKEN ON JULY 4TH 2015



TAKEN ON JULY 4TH 2015



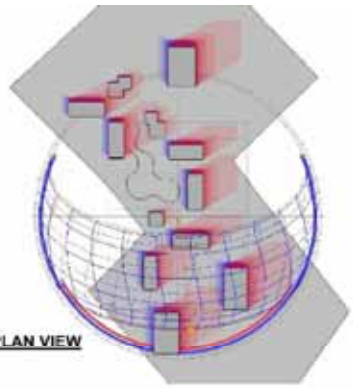
ORIGINAL - PLAN VIEW

MORNING SHADOWS

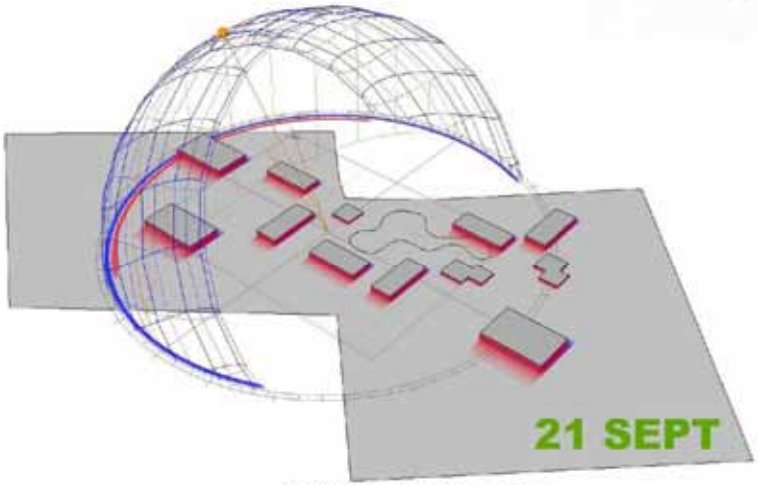
AFTERNOON SHADOWS

NOTE:

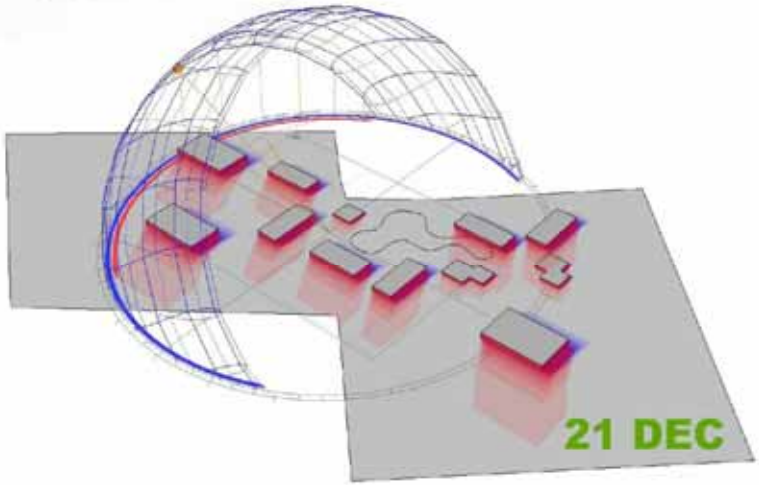
THIS MASSING IS BASED ON THIS PREVIOUS SKETCH



ORIGINAL - PLAN VIEW



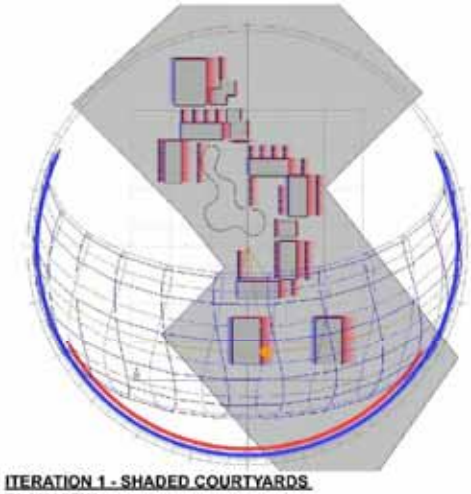
ORIGINAL - PERSPECTIVE VIEW



ORIGINAL - PERSPECTIVE VIEW

Kirksey EcoServices

SITE SOLAR INCIDENCE - ORIGINAL



ITERATION 1 - SHADED COURTYARDS
PLAN VIEW

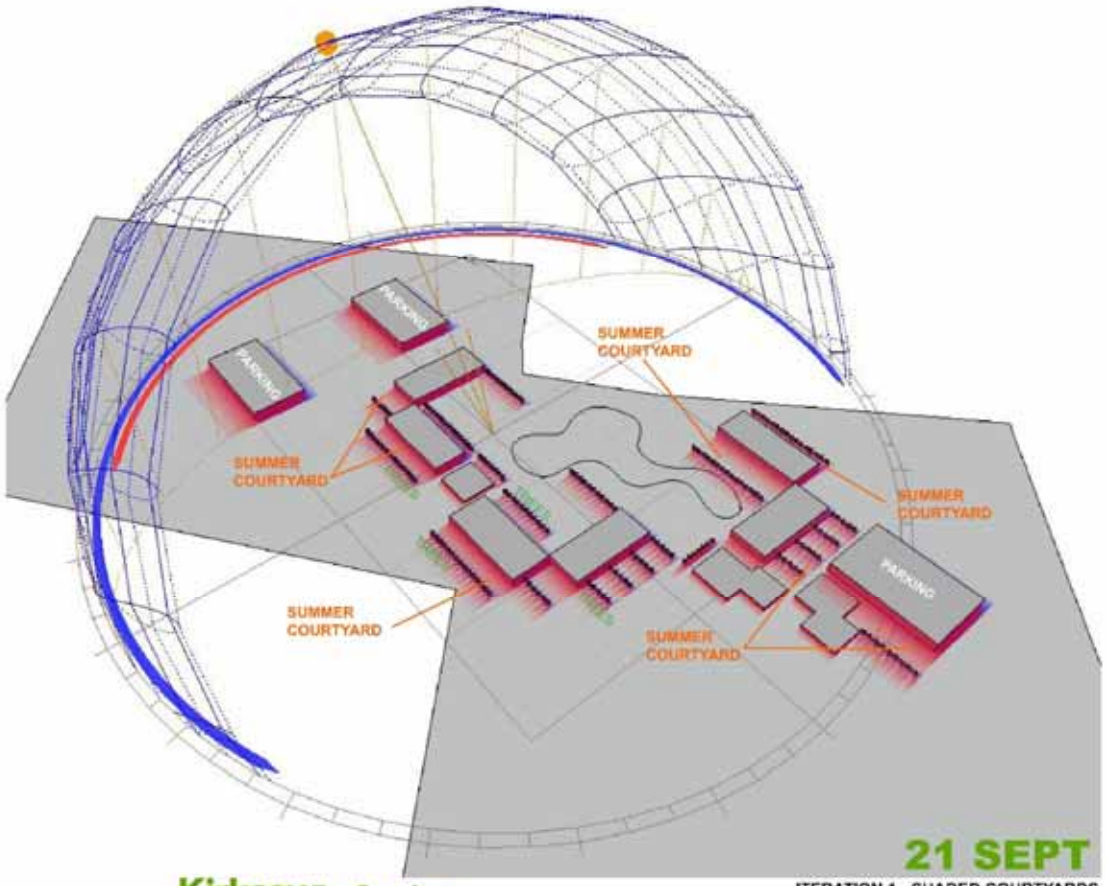
MORNING SHADOWS

AFTERNOON SHADOWS

NOTE:

DECIDUOUS TREES WILL PROVIDE SHADE IN THE SUMMER AND MID-SEASON TIMES.

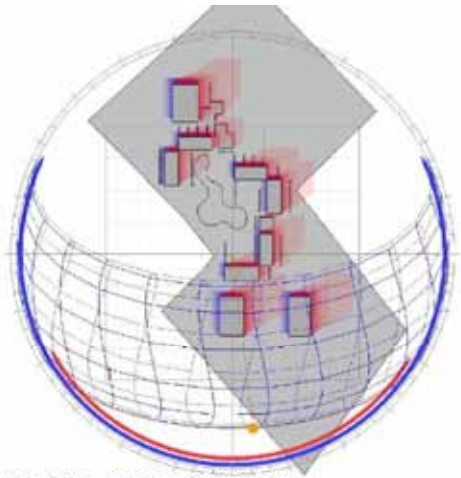
APPROXIMATE HEIGHT OF THE TREES USED: 40 FT



ITERATION 1 - SHADED COURTYARDS
PERSPECTIVE VIEW

Kirksey EcoServices

SITE SOLAR INCIDENCE - SUMMER/MID-SEASON



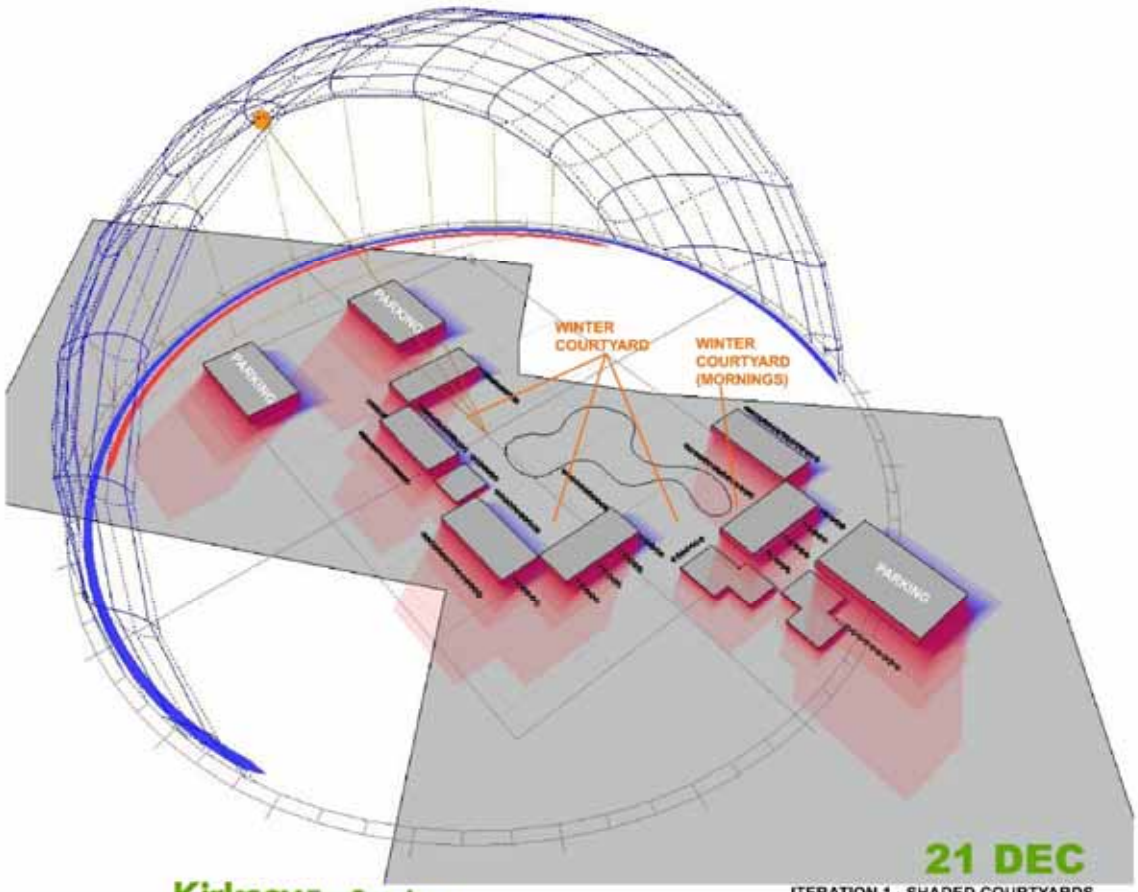
ITERATION 1 - SHADED COURTYARDS
PLAN VIEW

MORNING SHADOWS

AFTERNOON SHADOWS

NOTE:

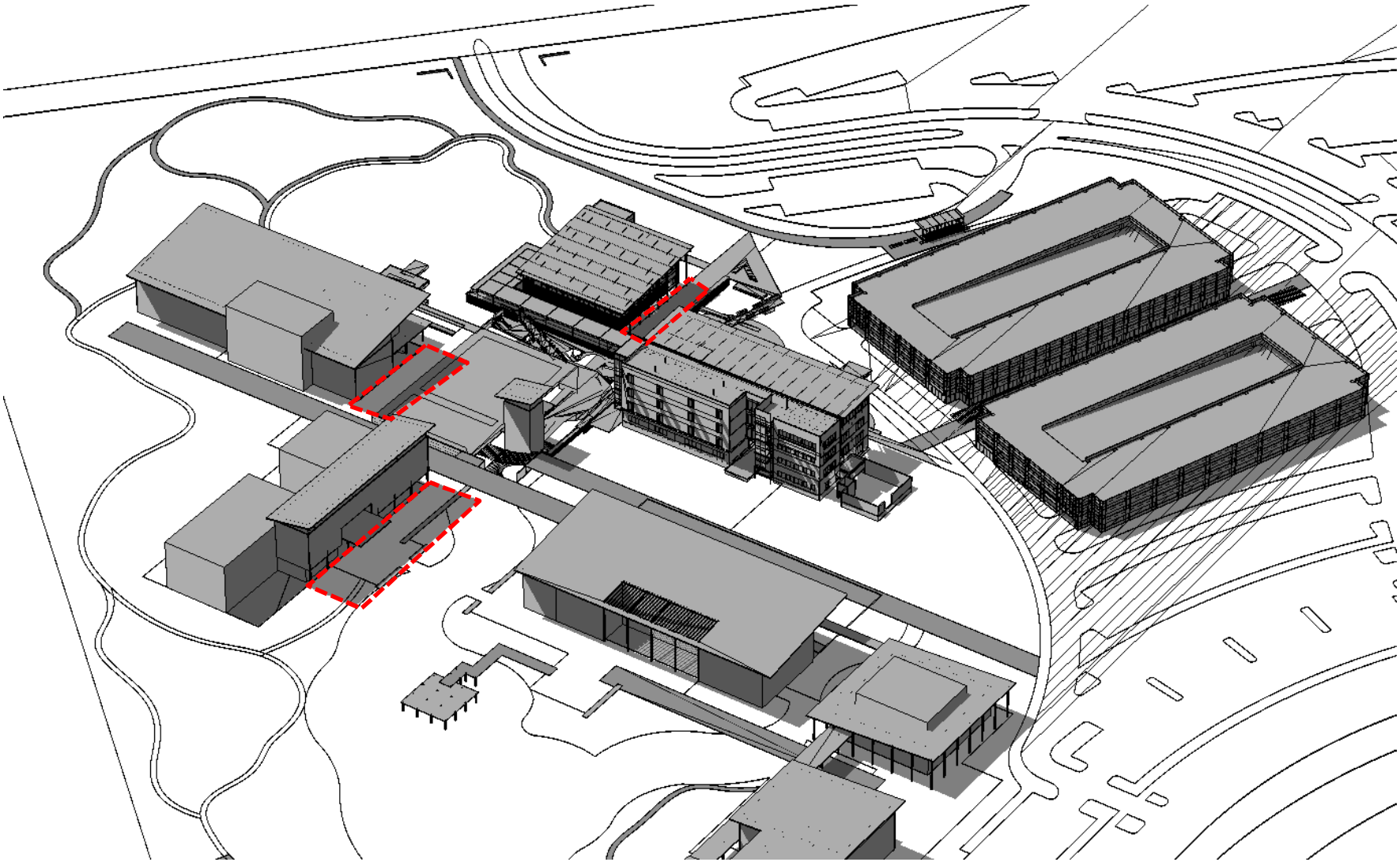
DECIDUOUS TREES WILL DIE OFF IN THE WINTER TIME, PROVIDING SOLAR ACCESS TO THE WINTER COURTYARDS

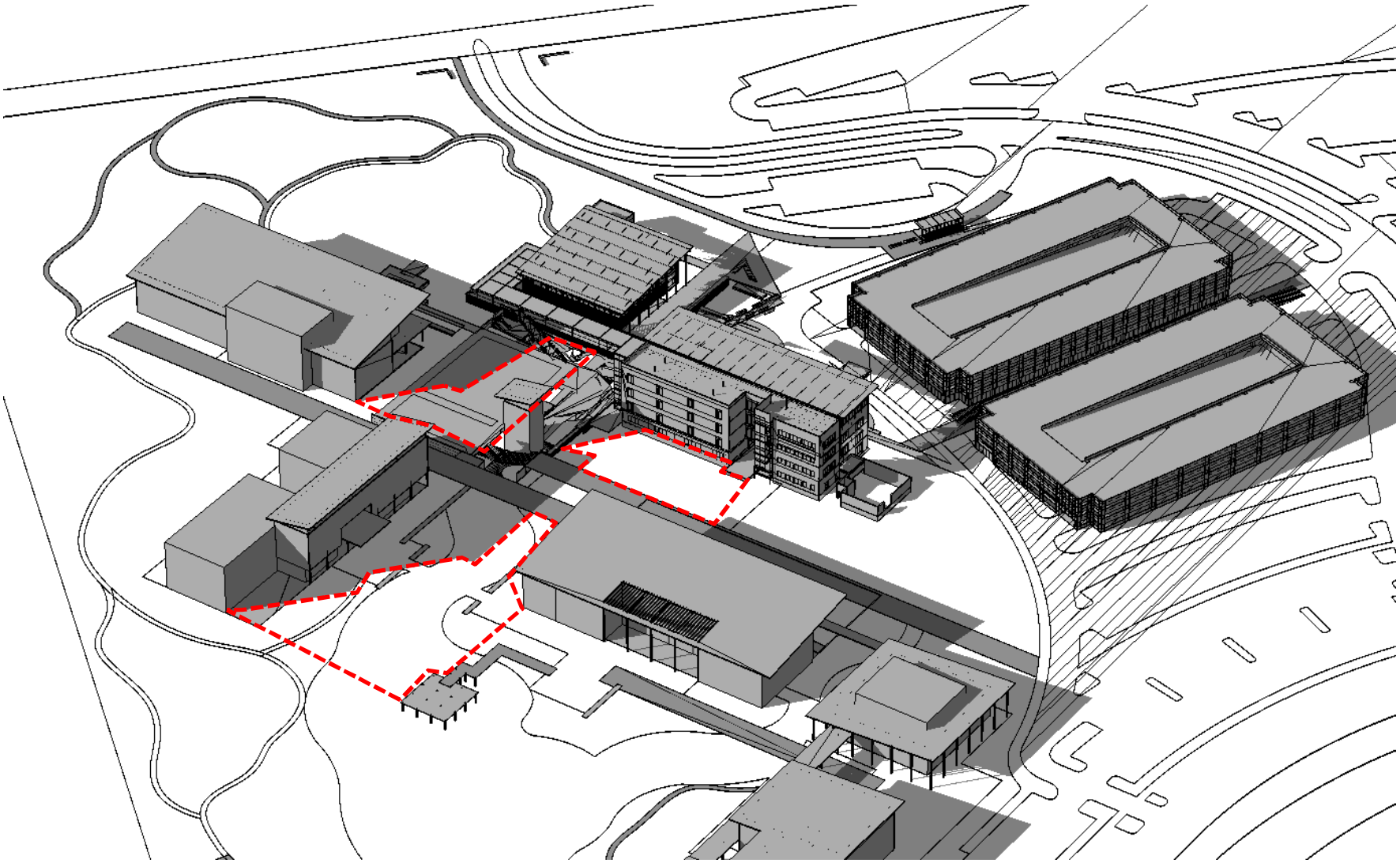


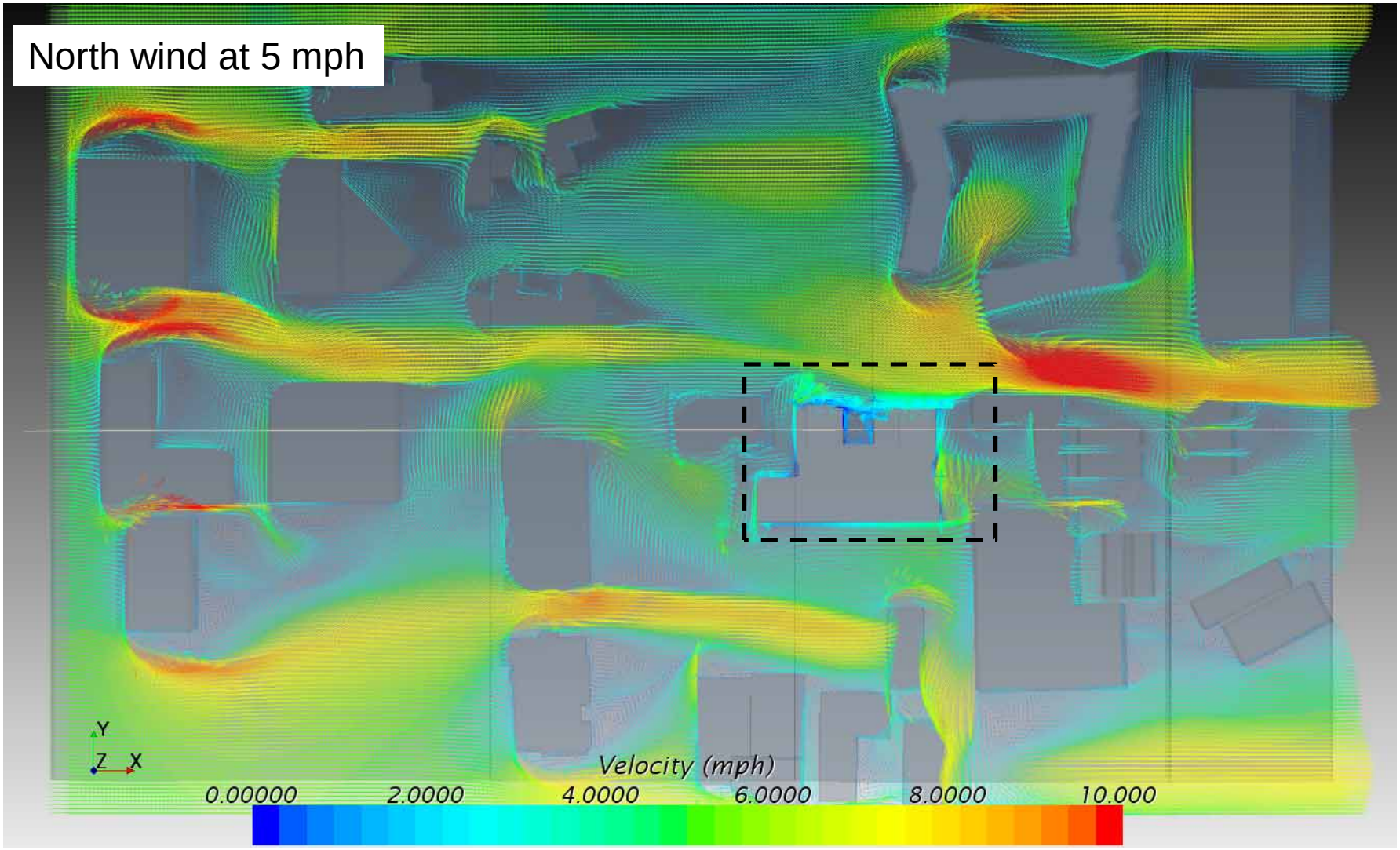
Kirksey EcoServices

SITE SOLAR INCIDENCE - WINTER

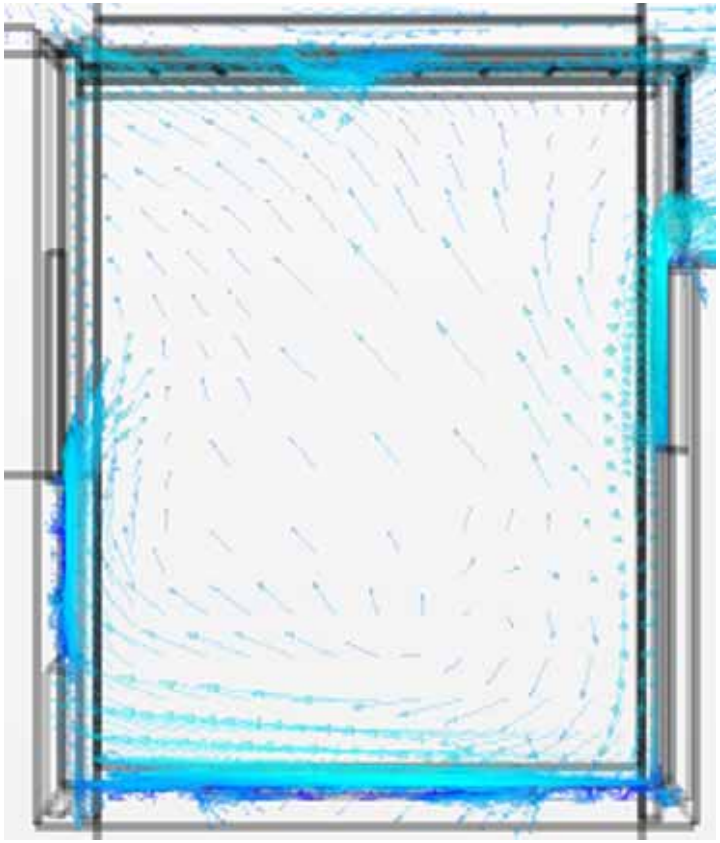
ITERATION 1 - SHADED COURTYARDS
PERSPECTIVE VIEW

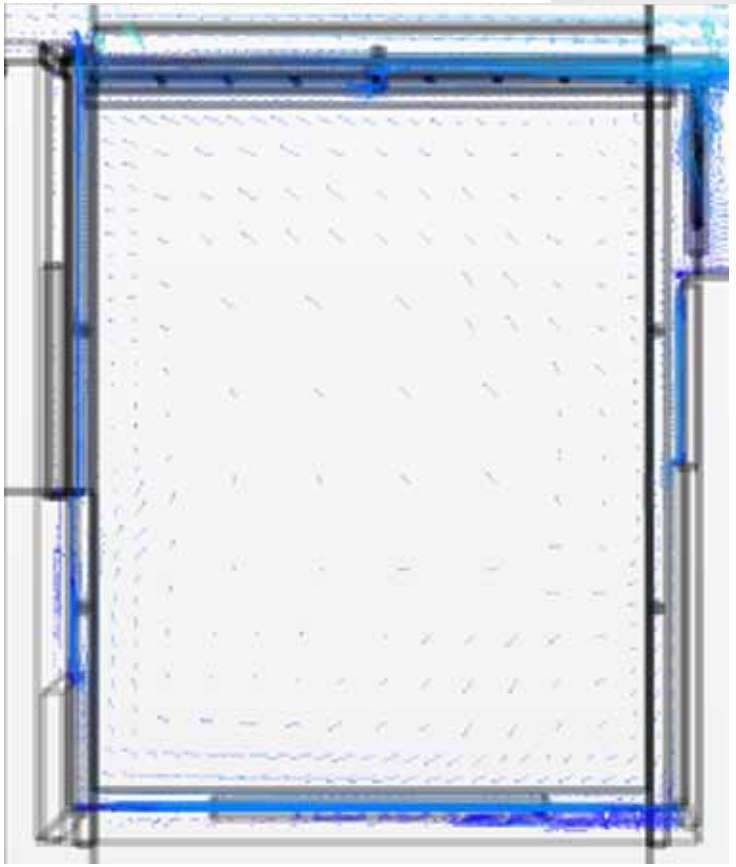





North wind at 5 mph
Y
Z X
Velocity (mph)
0.00000
2.0000
4.0000
6.0000
8.0000
10.000

Velocity (mph)
0.00000
2.0000
4.0000
6.0000
8.0000
10.000





Space

Academics (AC)

Engagement (EN)

Operations (OP)

Planning & Administration (PA)

Innovation & Leadership (IN)

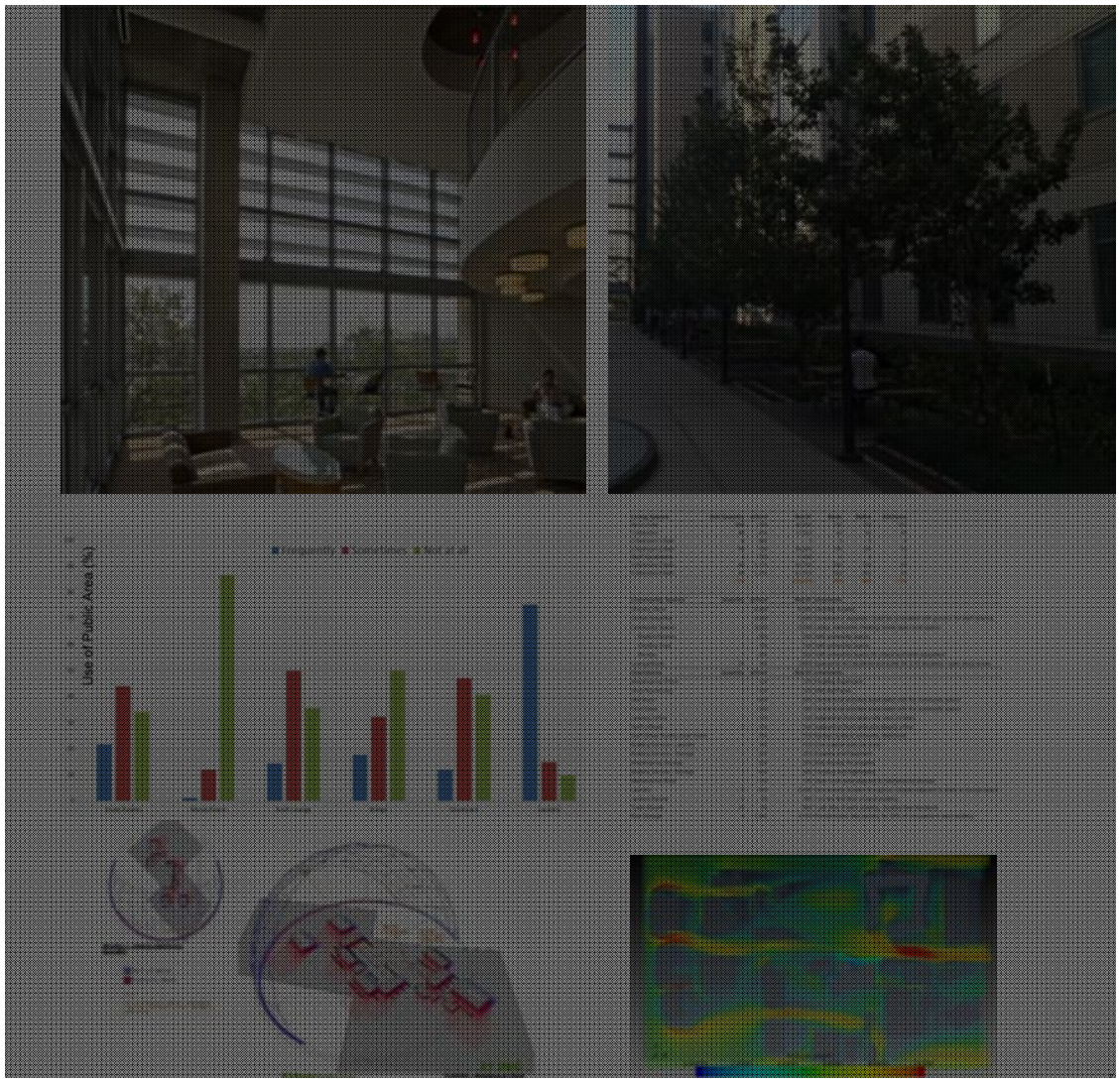
Space

Indoor Utilization – obsolete ‘sf’

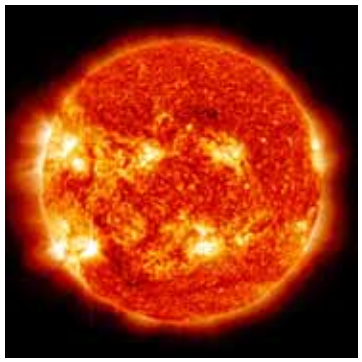
Indoor comfort – unused ‘sf’

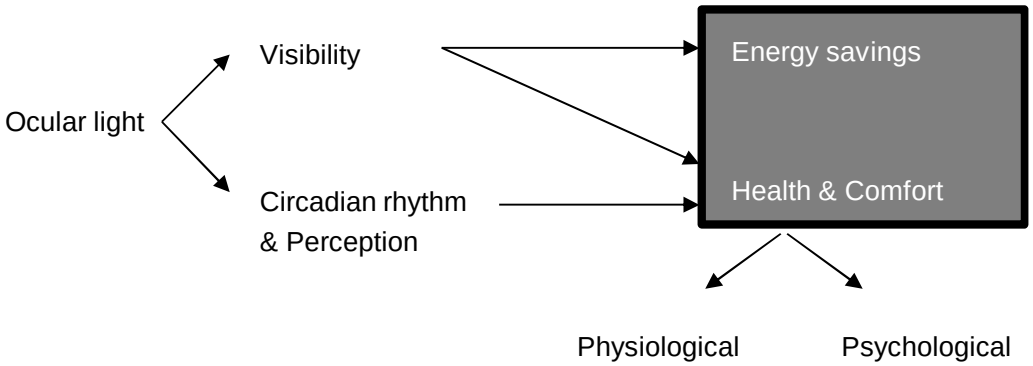
Outdoor Utilization – underutilized ‘sf’

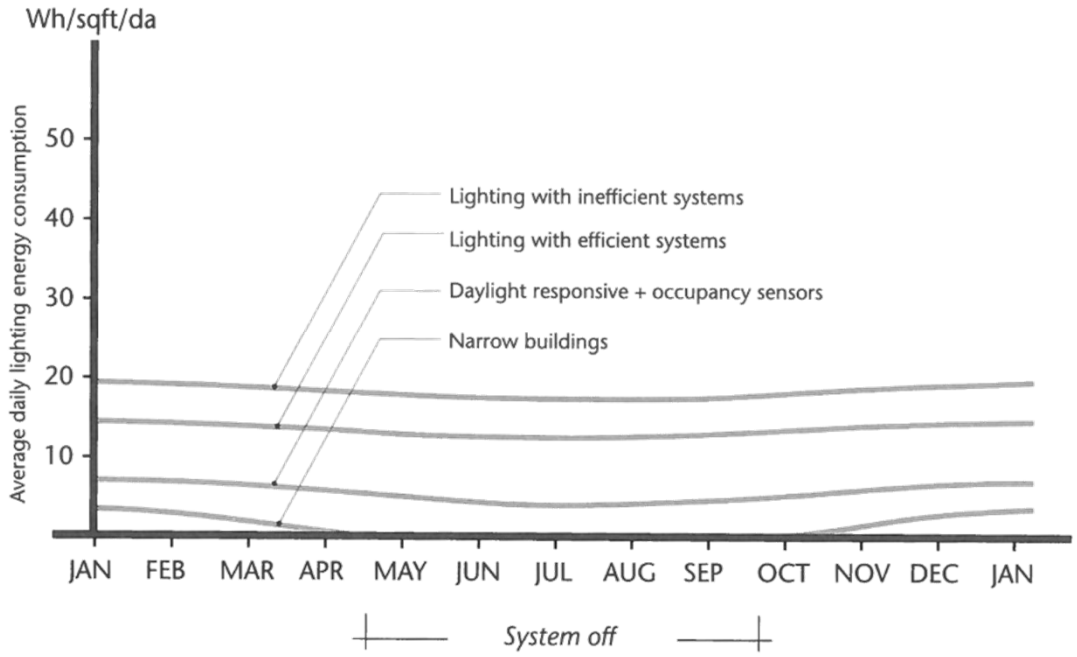
Outdoor comfort – unused ‘sf’



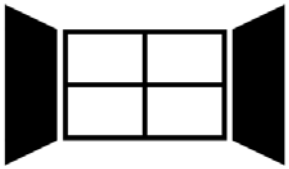
Daylighting



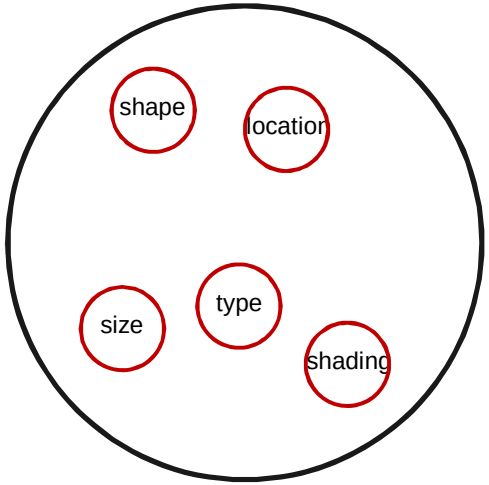

Ocular light
Visibility
Circadian rhythm
& Perception
Energy savings
Health & Comfort
Physiological
Psychological

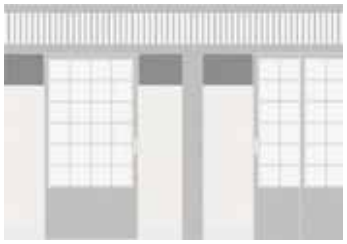


Source: Loftness, V

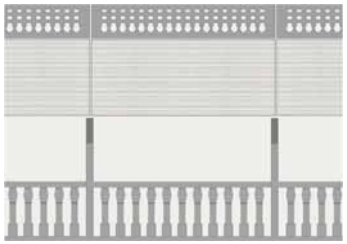


Source of daylight





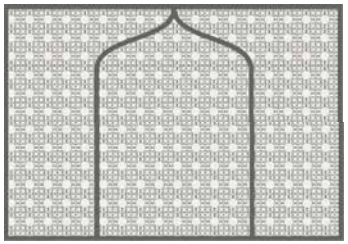
Osaka, Japan



Port Au Prince, Haiti

London, UK

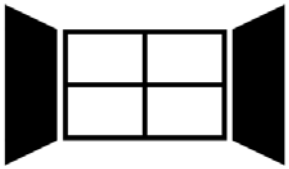
Stockholm, Sweden



Abu Dhabi, UAE

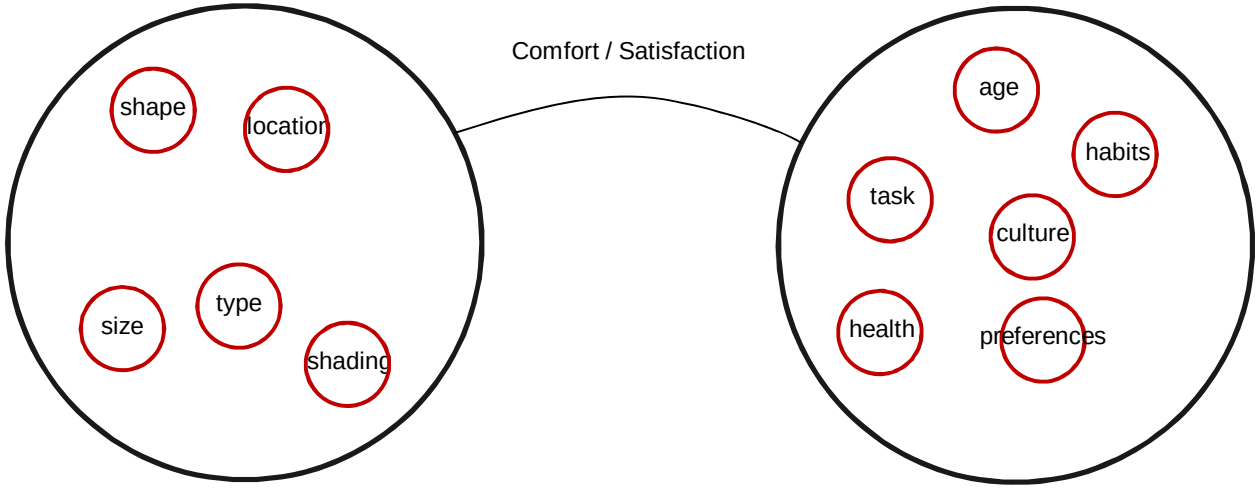
Rome, Italy

Thomas Schielke, Light Matters
http://www.archdaily.com/617266/light-matters-learning-from-vernacular-windows



Source of daylight

Receptor



daylight

METRICS

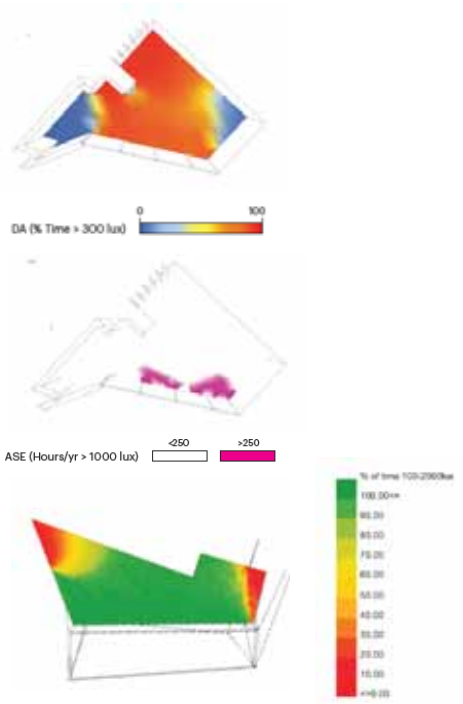
Table 24.2 | Educational Facilities Illuminance Recommendations continued from previous page

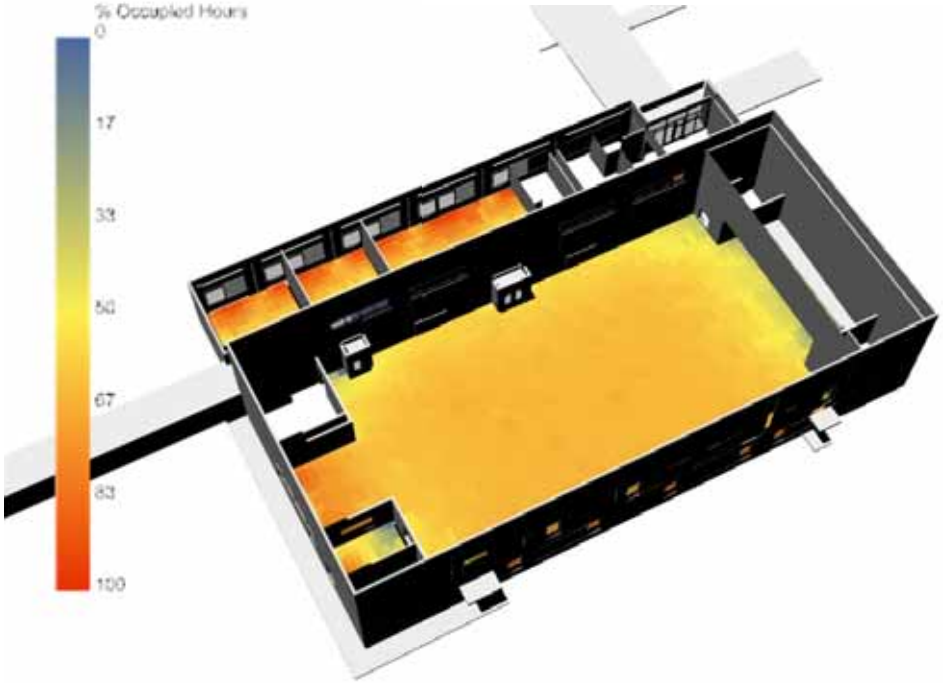
Applications and Tasks[a]	Notes	Recommended Maintained Illuminance Targets (lux)[b, c, d]									
		Horizontal (E_h) Targets					Vertical (E_v) Targets				
		Visual Ages of Observers (years) where at least half are					Visual Ages of Observers (years) where at least half are				
		<25	25-65	>65			<25	25-65	>65		
		Category				Gauge	Category				Gauge
CLASSROOMS	(Graphic Arts continued)										
• Permanent/Temporary	Awards, student art, plaques										
Dimensional	E_h and E_v @artworks										
Dark finish	<50% reflectance	Avg = 5 times E_h of surrounding space					Avg = 5 times E_h of surrounding space				
Light finish	≥50% reflectance	Avg = 3 times E_h of surrounding space					Avg = 3 times E_h of surrounding space				
Flat											
Horizontal	E_h and E_v @artworks										
Dark finish	<50% reflectance	Avg = 5 times E_h of surrounding space									
Light finish	≥50% reflectance	Avg = 3 times E_h of surrounding space									
Vertical	E_h and E_v @artworks										
Dark finish	<50% reflectance						Avg = 5 times E_h of surrounding space				
Light finish	≥50% reflectance						Avg = 3 times E_h of surrounding space				
• Drafting and Design	On drafting board or table										
• Blueline blueprint	Also see READING AND WRITING/Xerograph	R	250	500	1000	Avg	M	50	100	200	Avg
• CAD (exclusively)	See READING AND WRITING/VDT Screen and Keyboard										
• CAD/paper mixed	See READING AND WRITING, establish tasks and normalize to illuminance of most important task or most common task; use controls to provide illuminance variability if tasks so demand.										
• Light table	On light table	M	50	100	200	Avg	I	15	30	60	Avg
• Photographs (inspection)											
• Color and B+W prints	E_h @2' 6"; E_v @4' AFF	R	250	500	1000	Avg	M	50	100	200	Avg
• Negative lightbox	Architectural lighting illuminances on front of backlit light box	K	25	50	100	Max	K	25	50	100	Max
• Kiln Room	E_h @2' 6"; E_v @4' AFF	R	250	500	1000	Avg	P	150	300	600	Avg
• Music Room	E_h and E_v @4' AFF	P	150	300	600	Avg	O	100	200	400	Avg
• General Classrooms											
• Learning/teaching	Interactive experience										
• AV (dedicated AV viewing)	E_h @2' 6"; E_v @4' AFF	K	25	50	100	Avg	I	15	30	60	Avg
• Chalkboard							Q	200	400	800	Avg
• Dedicated VDT screens	CSA/ISO Type I and II negative polarity screens.[f] E_h @2' 6"; E_v @4' AFF	N	75	150	300	Avg	K	25	50	100	Avg
• Hardcopy and writing	Variety of paper tasks.[g] E_h @2' 6"; E_v @4' AFF	Q	200	400	800	Avg	N	75	150	300	Avg
• Task board							N	75	150	300	Avg
• White board							P	150	300	600	Avg
• Home Economics	At all food prep and detailed work areas	500	500	500	Min		O	100	200	400	Avg
• Lecture Halls	See AUDITORIA/Lecture Hall										
• Science Lab											
• Bench	E_h @3'; E_v @4' 6" AFF	R	250	500	1000	Avg	P	150	300	600	Avg
• Demonstration Area	E_h @3' AFF; E_v @4' 6" AFF	T	500	1000	2000	Avg	R	250	500	1000	Avg
• Seminar Rooms	See 22	LIGHTING FOR COMMON APPLICATIONS/CONFERENCING/Meeting									

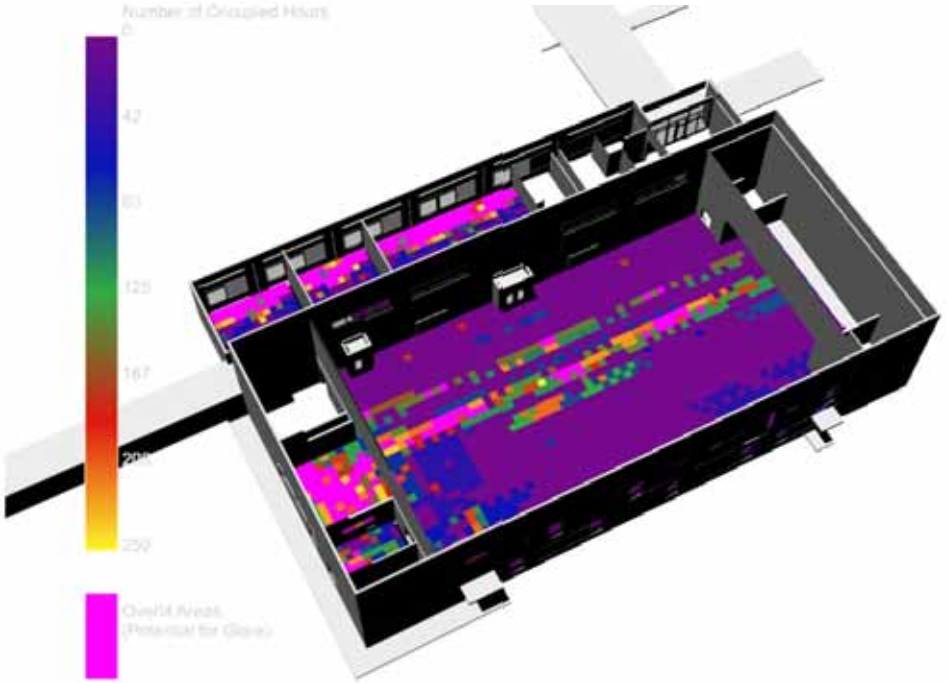
Table 24.2 | Educational Facilities Illuminance Recommendations continued next page

Daylight Simulations and LEED

- ***Point in time*** — Illuminance (lux) at a time and date.
- ***sDA**: Spatial Daylight Autonomy* — The percentage of floor area that receives at least **300 lux** for at least *50% of the annual occupied hours.*
- ***ASE**: Annual Sunlight Exposure* — The percentage of floor area that receives at least **1000 lux** for at least *250 occupied hours per year.*
- ***UDI**: Useful Daylight Illuminance* — This metric provides full credit only to values **between 100 lux and 2,000 lux** suggesting that horizontal illumination values outside of this range are not useful. The graphical percent values represent the percentage of the floor area that that meets the UDI criteria at least *50% of the time*.



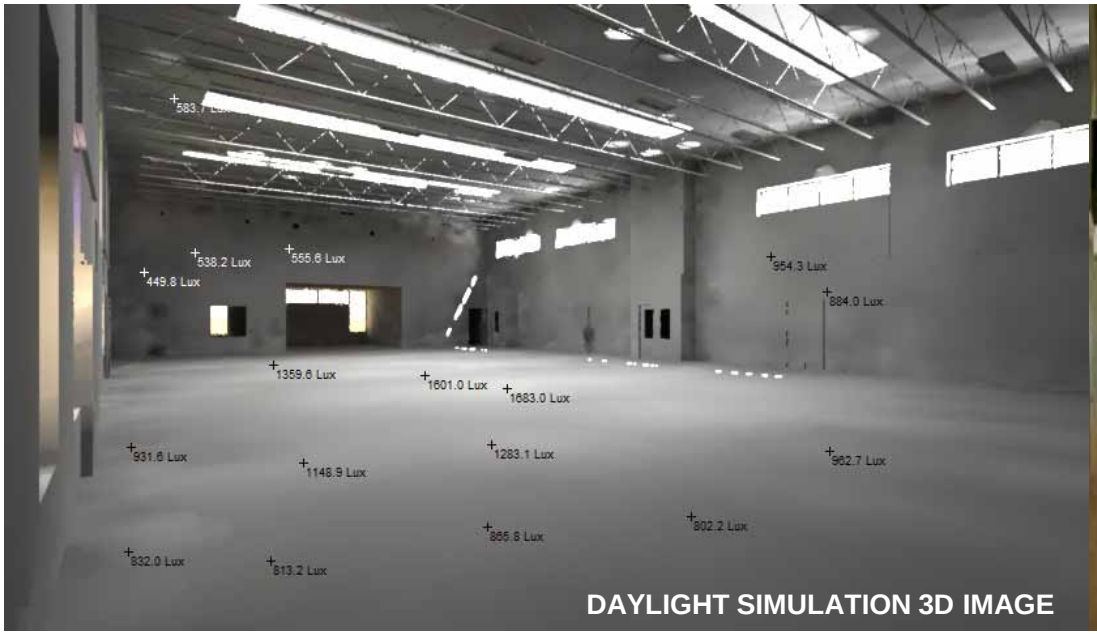




DIVA-for-Rhino Simulation
Daylight Autonomy (300 lux, IES-LM-83 sDA control schema)
LEEDv4 BD+C: New Construction, Daylight Credit Analysis
83.6% of the space has a sDA 300lx value for more than 50% of occupied hours.
9.3% of the space has an ASE greater than 250 hours.
This space qualifies for 3 LEED points.

daylight

QUANTITY

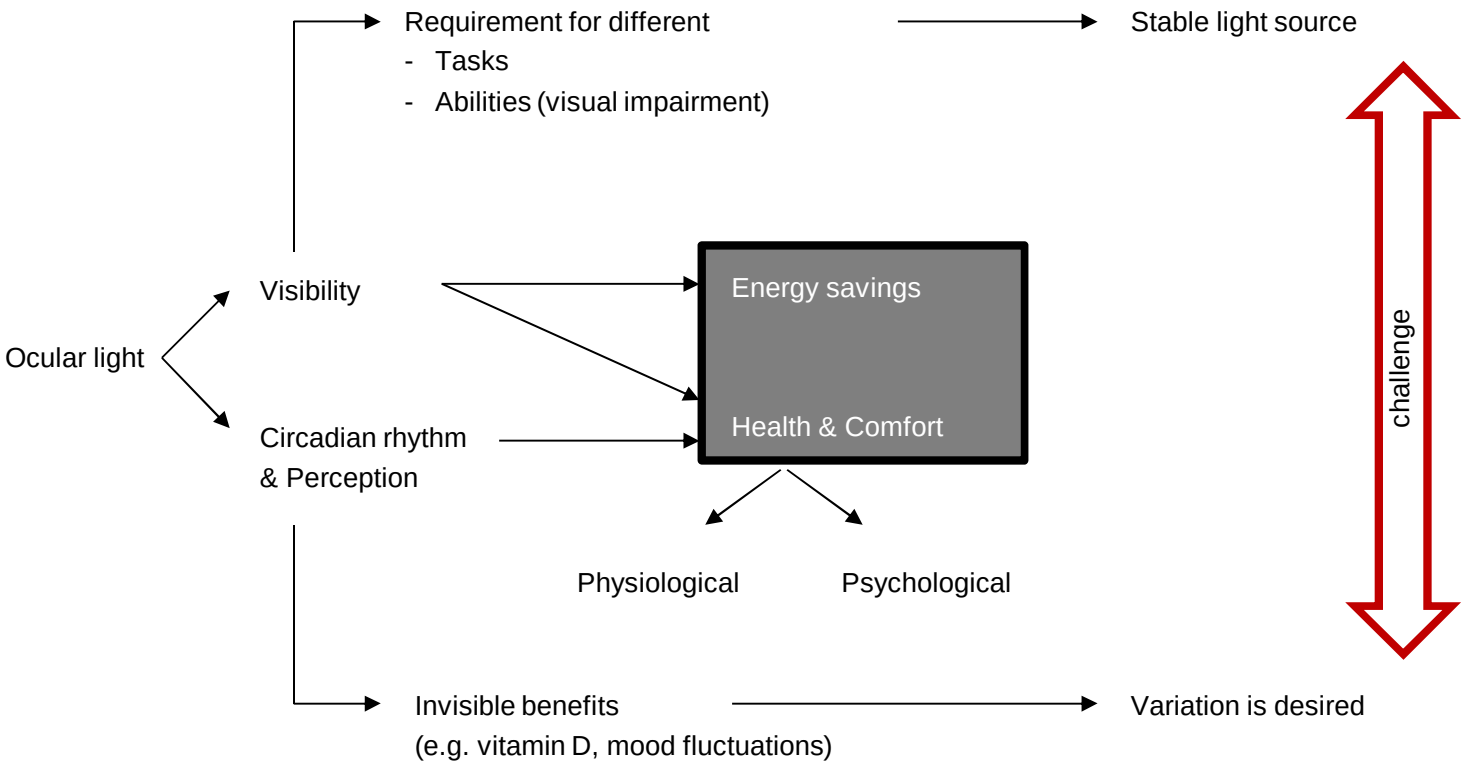


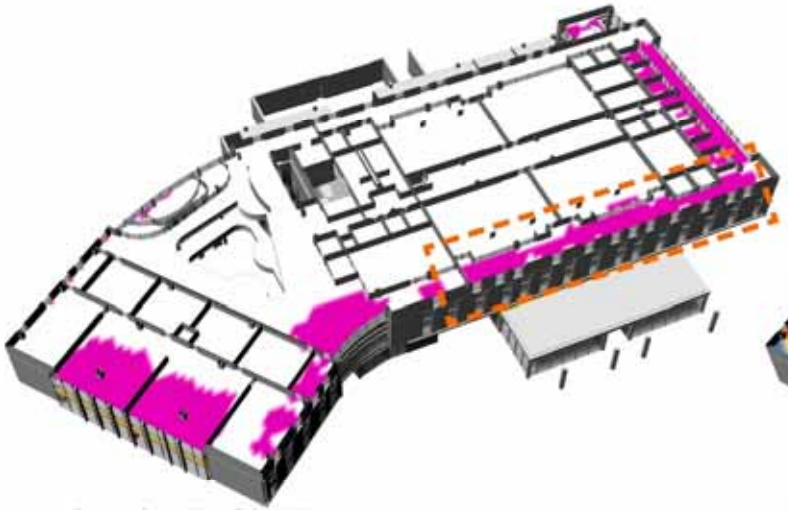
DAYLIGHT SIMULATION 3D IMAGE

ACTUAL SPACE

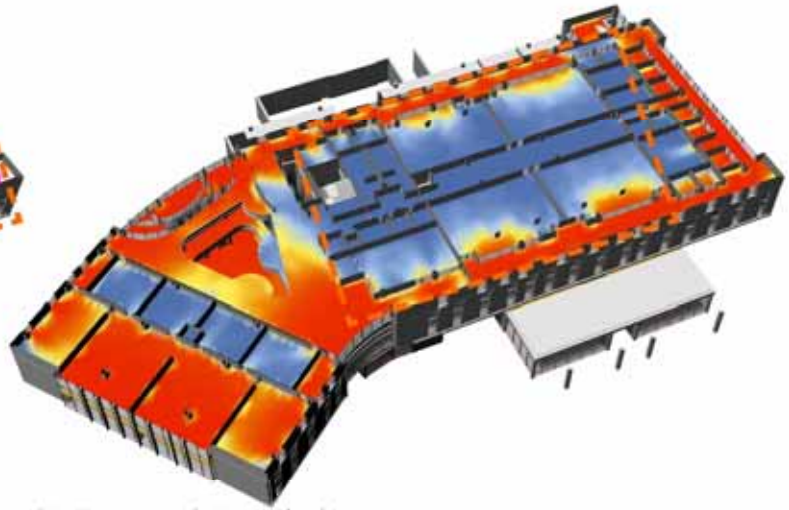
daylight

QUALITY


Requirement for different
- Tasks
- Abilities (visual impairment)
Stable light source
Ocular light
Visibility
Energy savings
Health & Comfort
Circadian rhythm
& Perception
Physiological
Psychological
challenge
Invisible benefits
(e.g. vitamin D, mood fluctuations)
Variation is desired



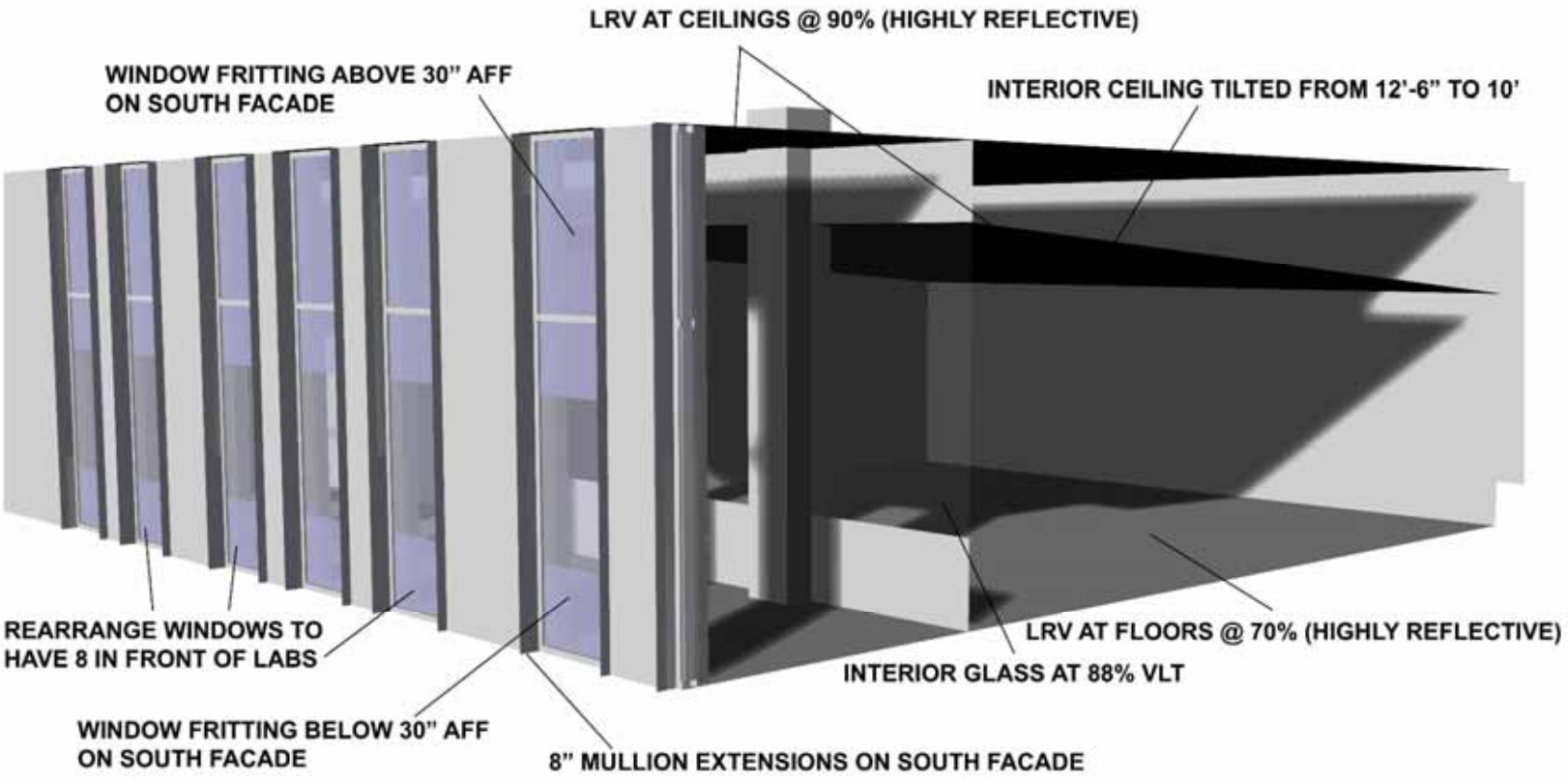
ANNUAL SUNLIGHT EXPOSURE
(INDICATING POTENTIAL FOR GLARE)



SPATIAL DAYLIGHT AUTONOMY
(INDICATING ANNUAL DAYLIGHT AVAILABILITY)

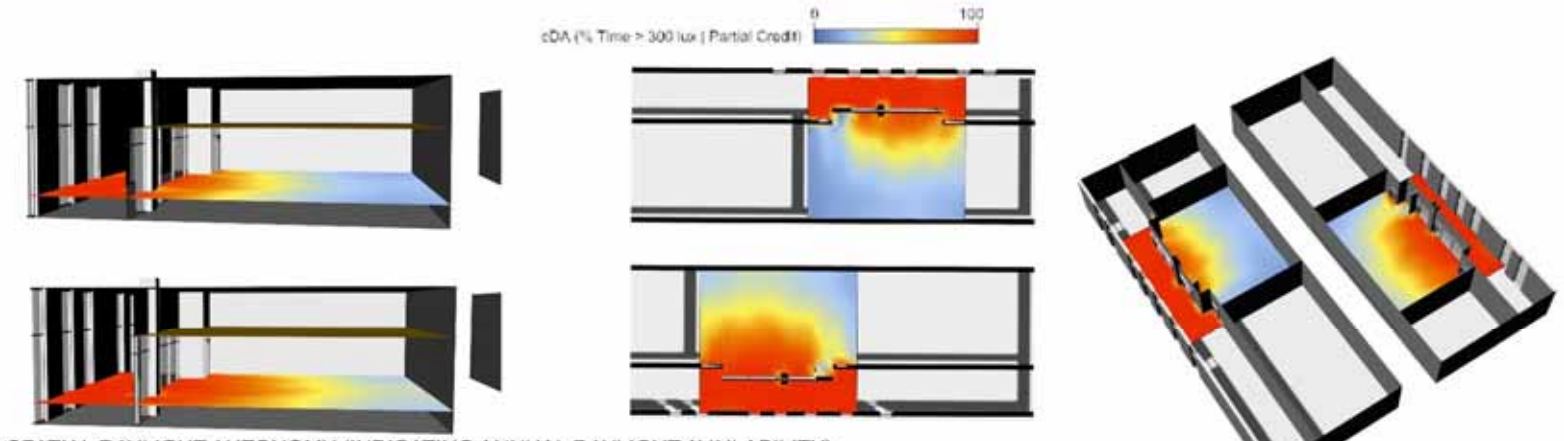
BASELINE

Kirksey
ECOSERVICES

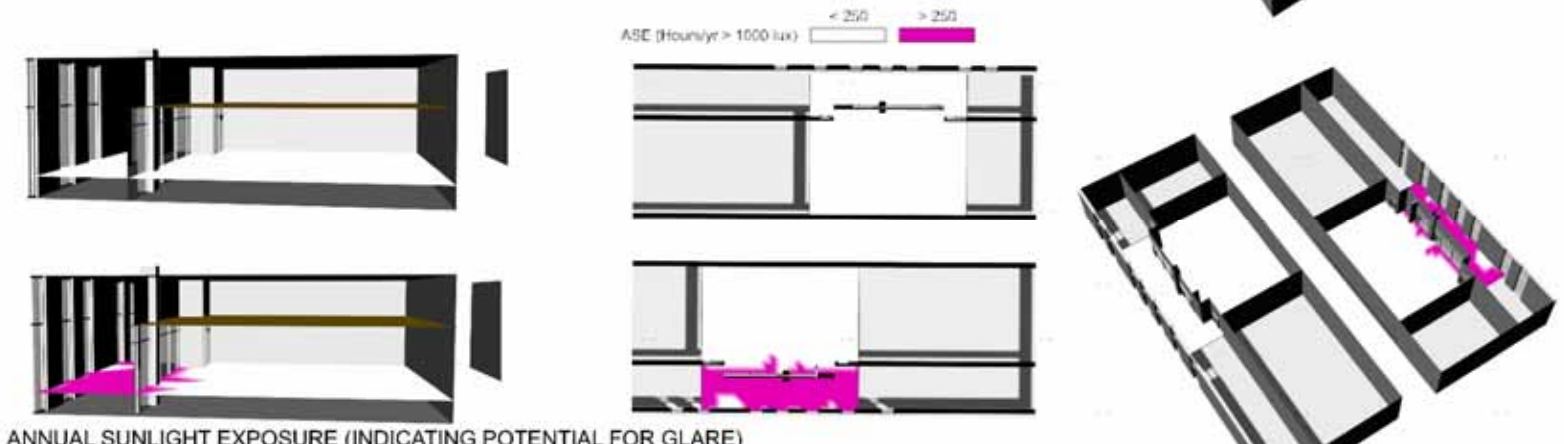


ITERATION 1

Kirksey ECOSERVICES



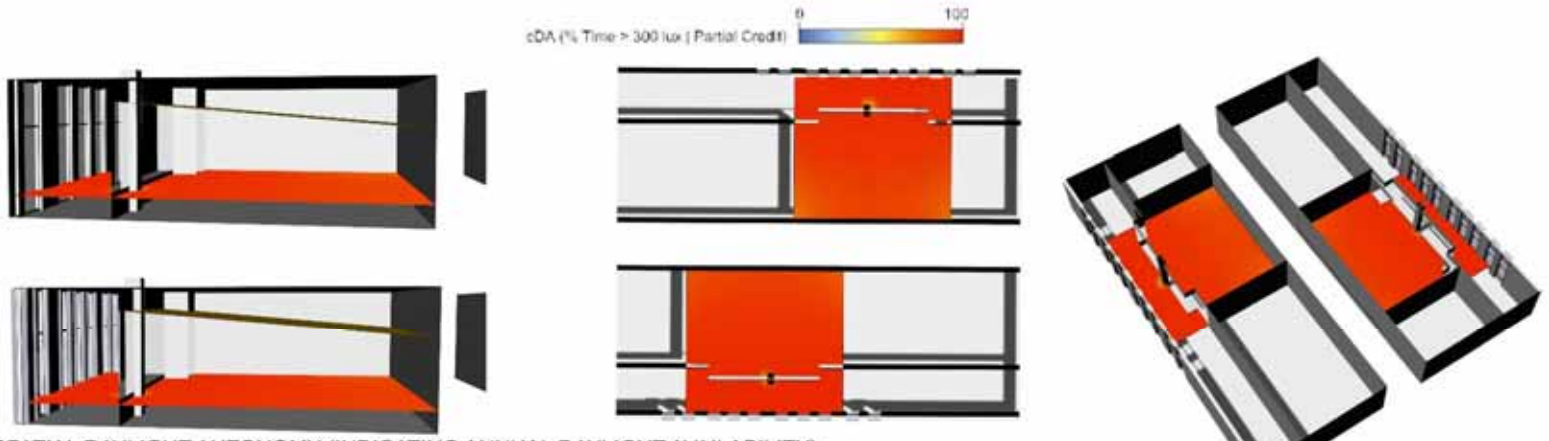
SPATIAL DAYLIGHT AUTONOMY (INDICATING ANNUAL DAYLIGHT AVAILABILITY)



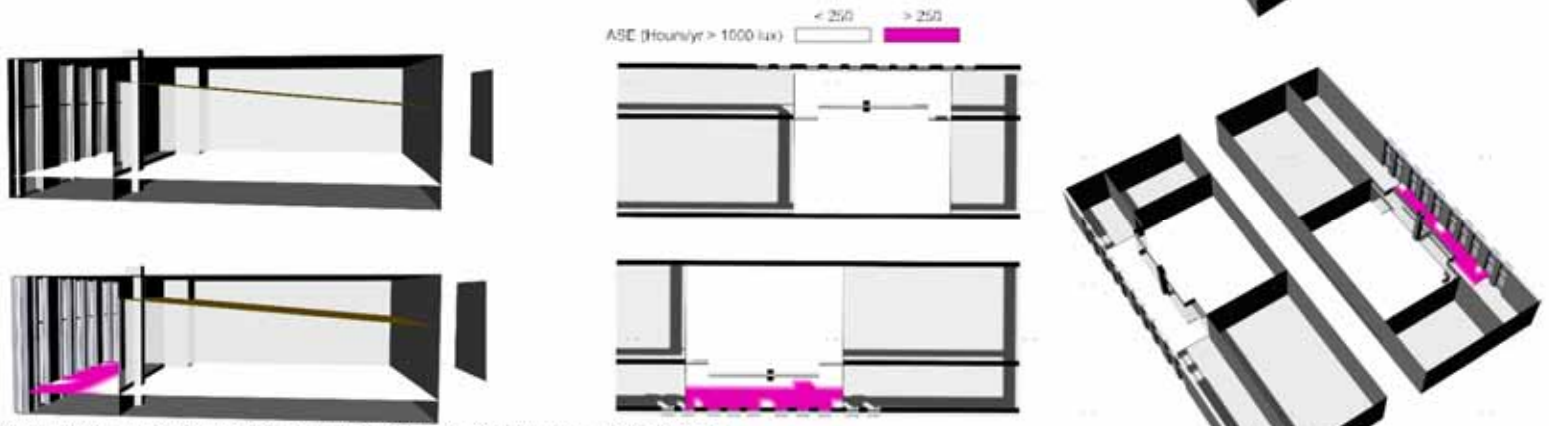
ANNUAL SUNLIGHT EXPOSURE (INDICATING POTENTIAL FOR GLARE)

BASELINE

Kirksey
ECOSERVICES



SPATIAL DAYLIGHT AUTONOMY (INDICATING ANNUAL DAYLIGHT AVAILABILITY)



ANNUAL SUNLIGHT EXPOSURE (INDICATING POTENTIAL FOR GLARE)

ITERATION 1

Kirksey
ECOSERVICES

Daylighting

Academics (AC)

Engagement (EN)

Operations (OP)

Planning & Administration (PA)

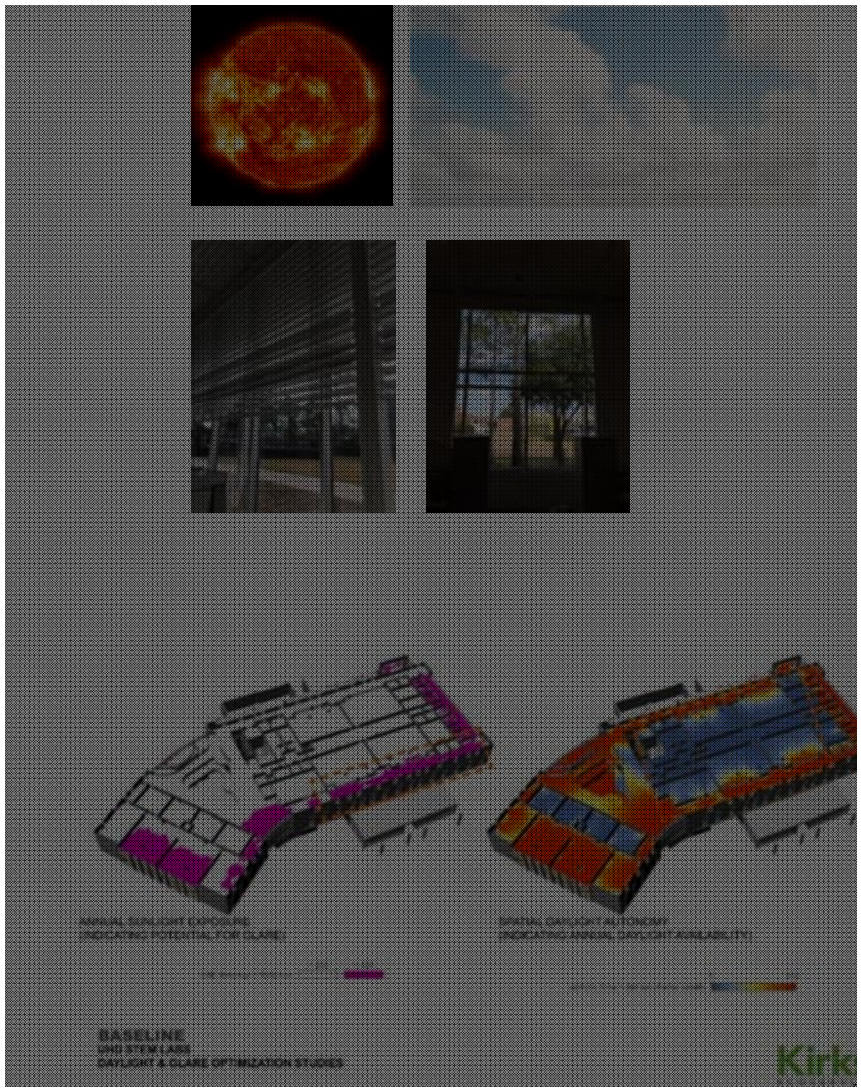
Innovation & Leadership (IN)

Daylighting

Comfort Illuminance (fc.)

Spatial Daylight Autonomy

Annual Solar Exposure



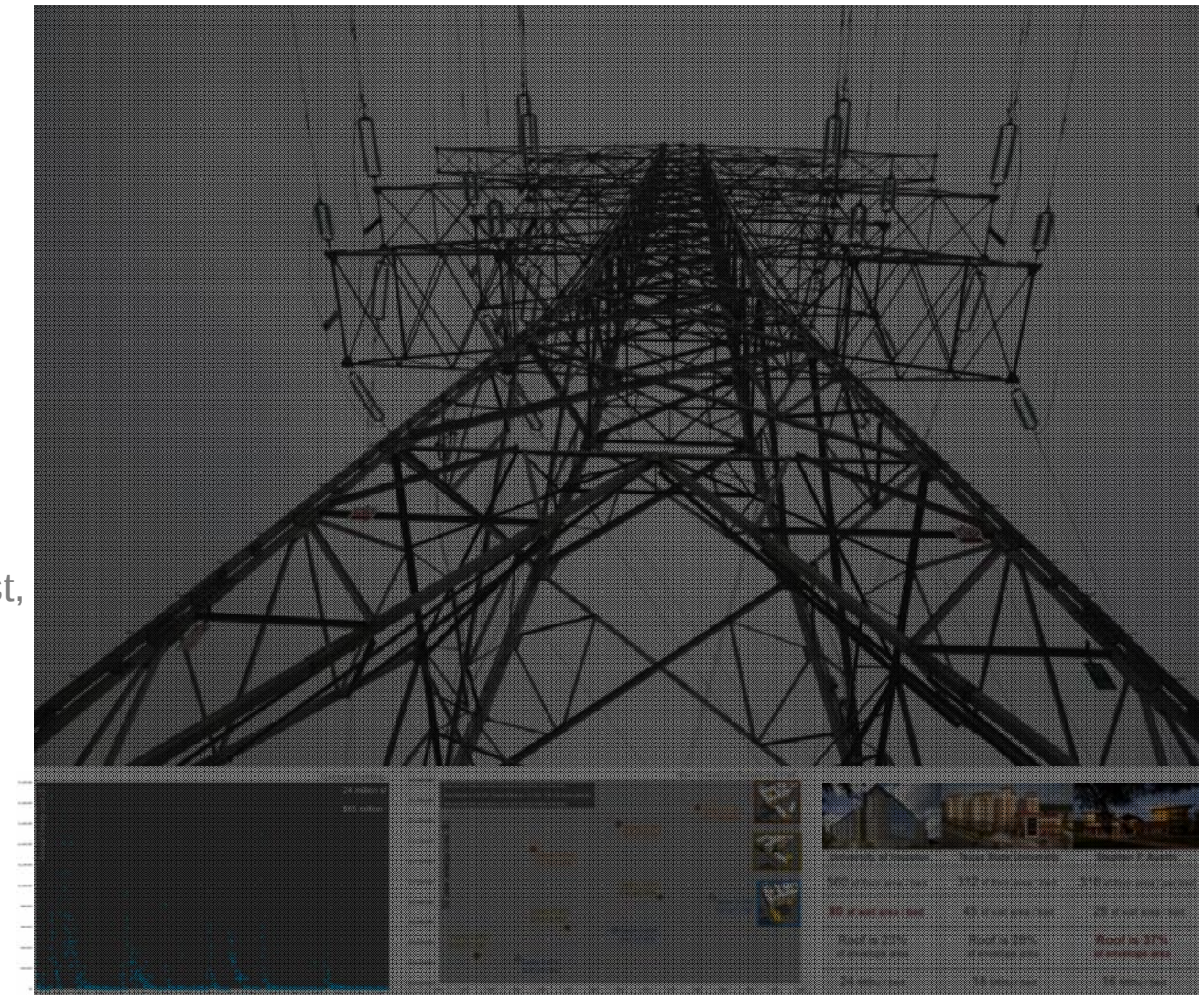
in summary…

Energy

Operations:
$/sf, $Chilled Water & EUI

New Buildings: 50 year cost, Loads

Renovation: ROI

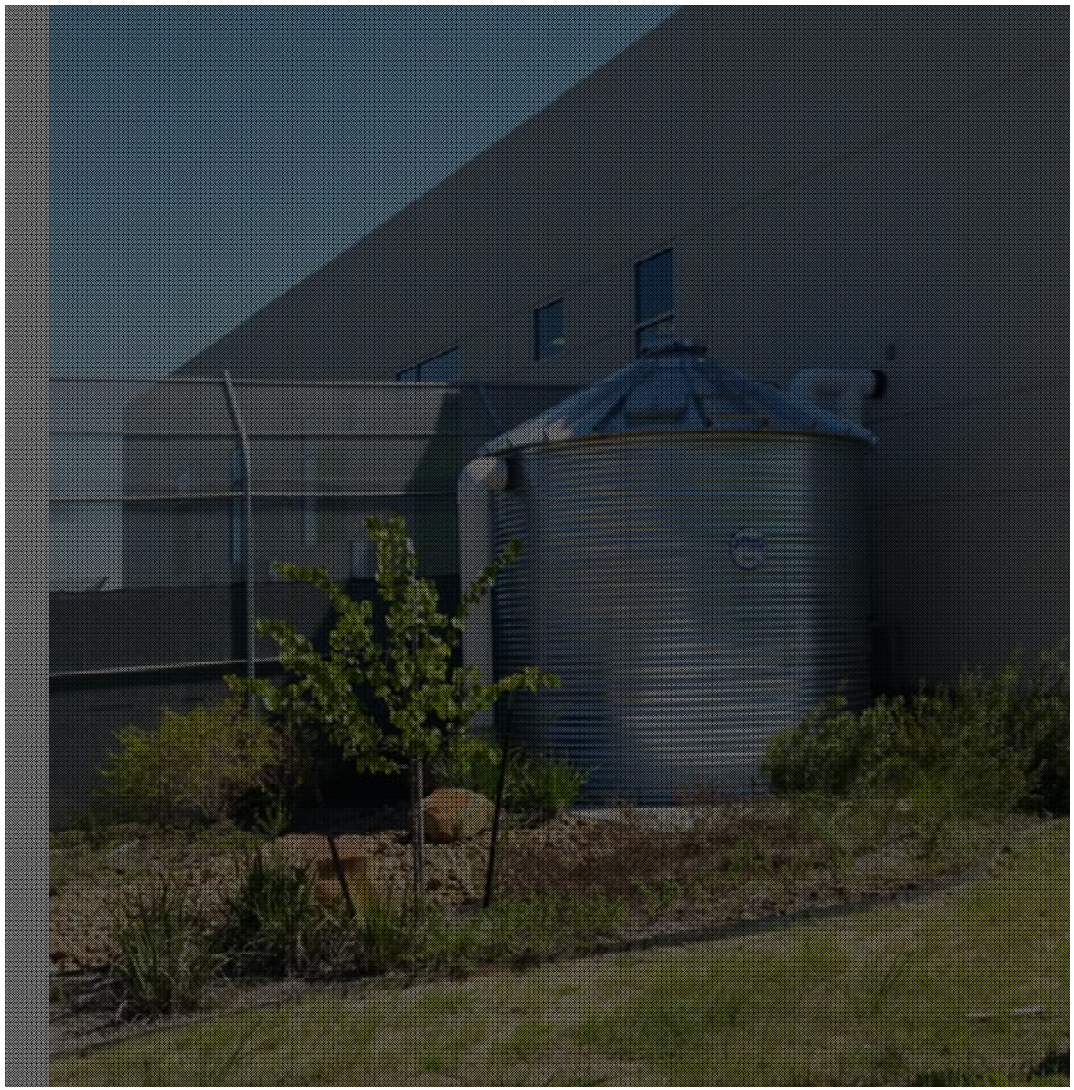


Rainwater

Meter Landscape gallons

Meter Condensate gallons

Measure Collection Efficiencies



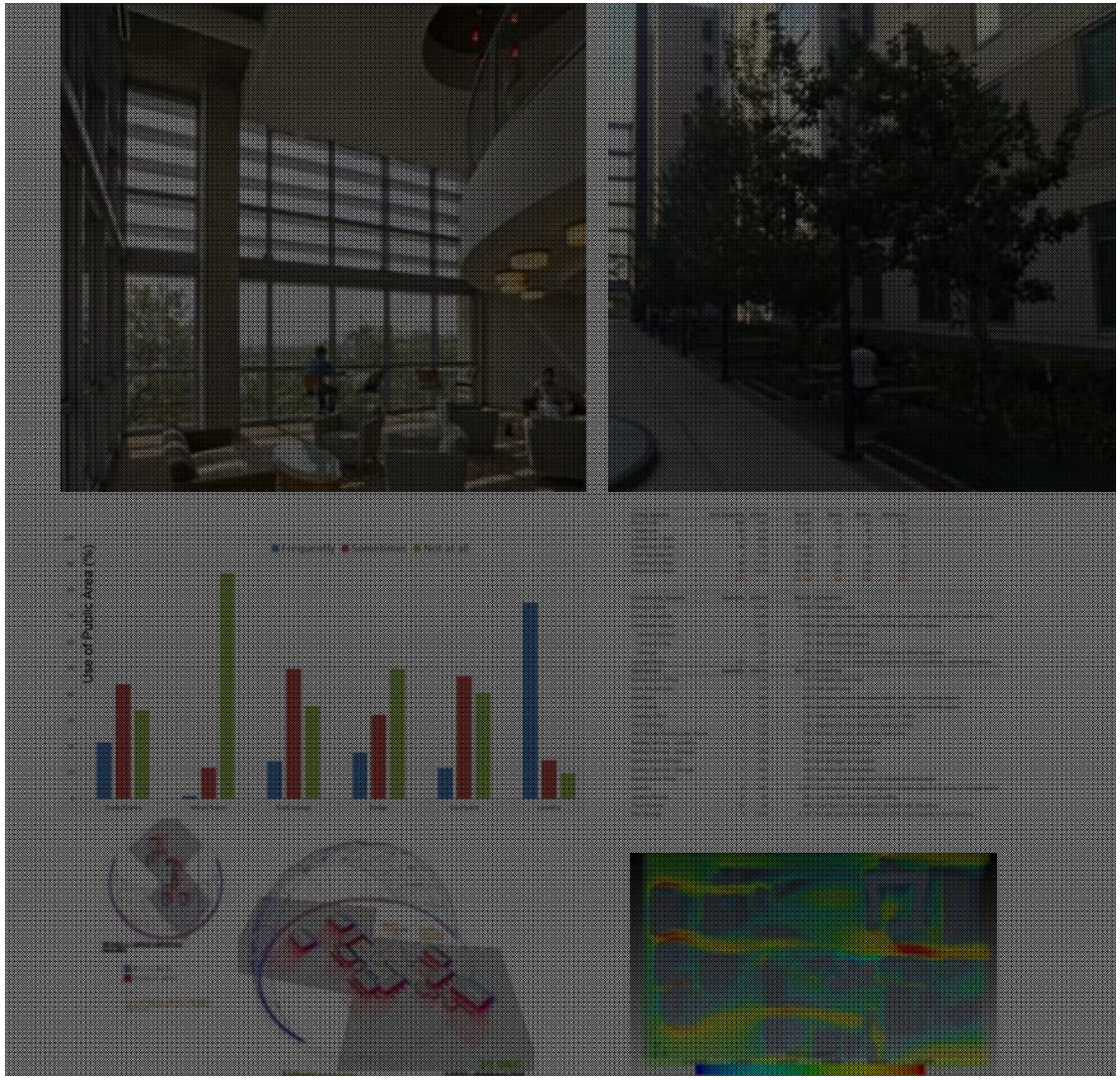
Space

Indoor Utilization – obsolete ‘sf’

Indoor comfort – unused ‘sf’

Outdoor Utilization – underutilized ‘sf’

Outdoor comfort – unused ‘sf’

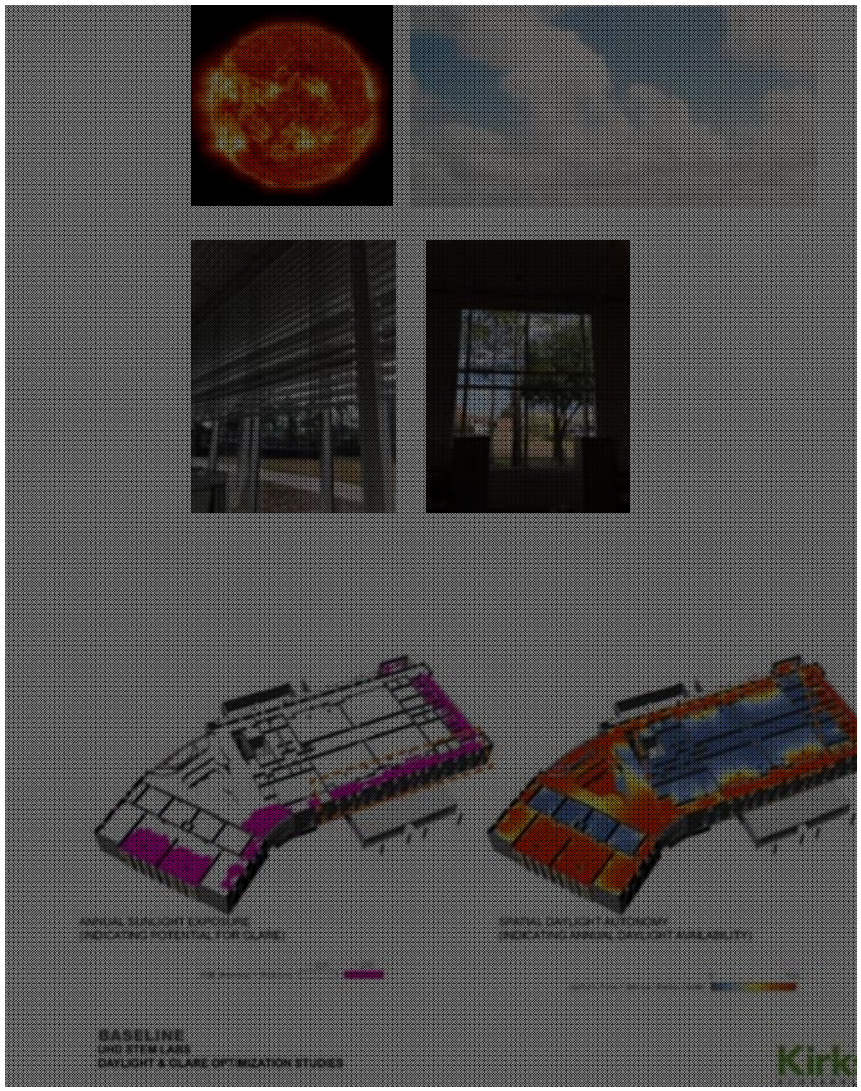


Daylighting

Comfort Illuminance (fc.)

Spatial Daylight Autonomy

Annual Solar Exposure



The Deceptive Metric

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Alfonso E.Hernandez, AIA, LEED AP BD&C, alfonsoh@Kirksey.com

Kirksey ARCHITECTURE

Thank You!