



APOLLO

Scott Brown | Andrew Levy



350 MISSION

FUNCTION



30 story mixed-use high-rise

4 story lobby

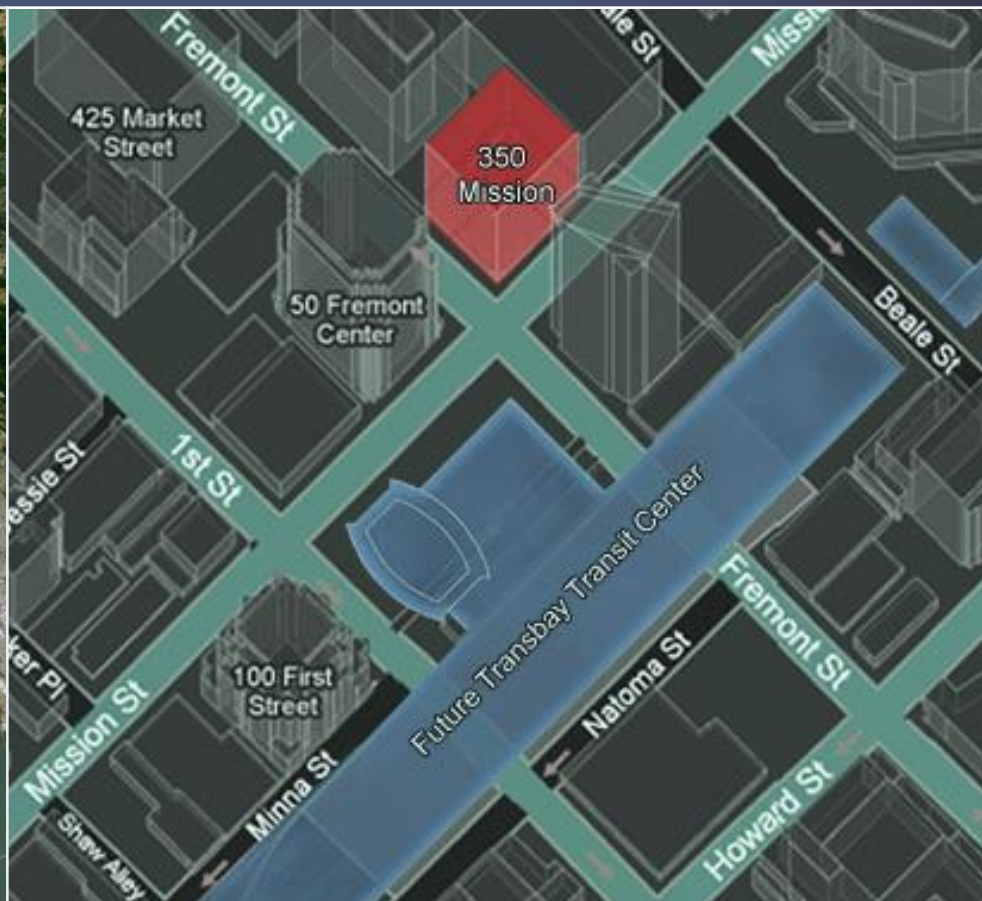
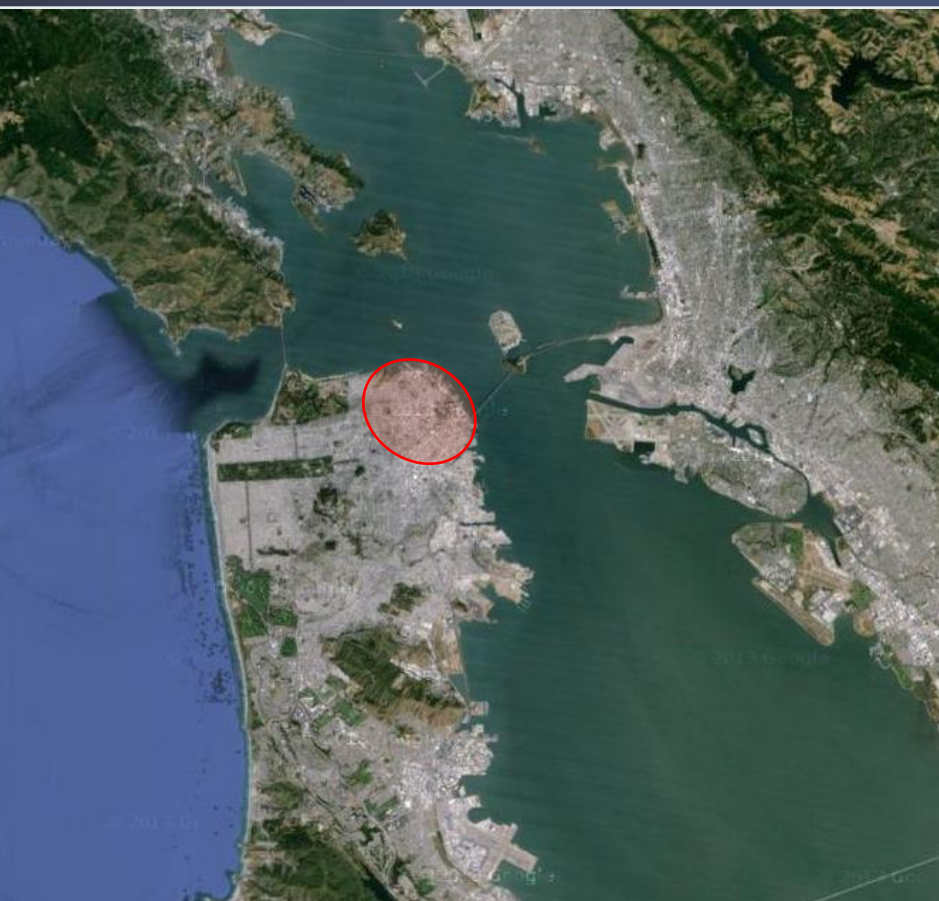
restaurant

retail

25 office floors

LOCATION

San Francisco Business District



DESIGN GOAL

Create an iconic building that sets a precedent for sustainable architecture in San Francisco

Net Zero Design

- Producing Energy

- Reducing Energy use

Structural Integrity

- Continuous operation after a design level earthquake

- Half of code allowed drift

High Quality for Occupants

- Lighting Design

- Lighting Controls

DESIGN GOAL

Create an iconic building that sets a precedent for sustainable architecture in San Francisco

Net Zero Design

Producing Energy

Reducing Energy use

Structural Integrity

Continuous operation after a design level earthquake

Half of code allowed drift

High Quality for Occupants

Lighting Design

Lighting Controls

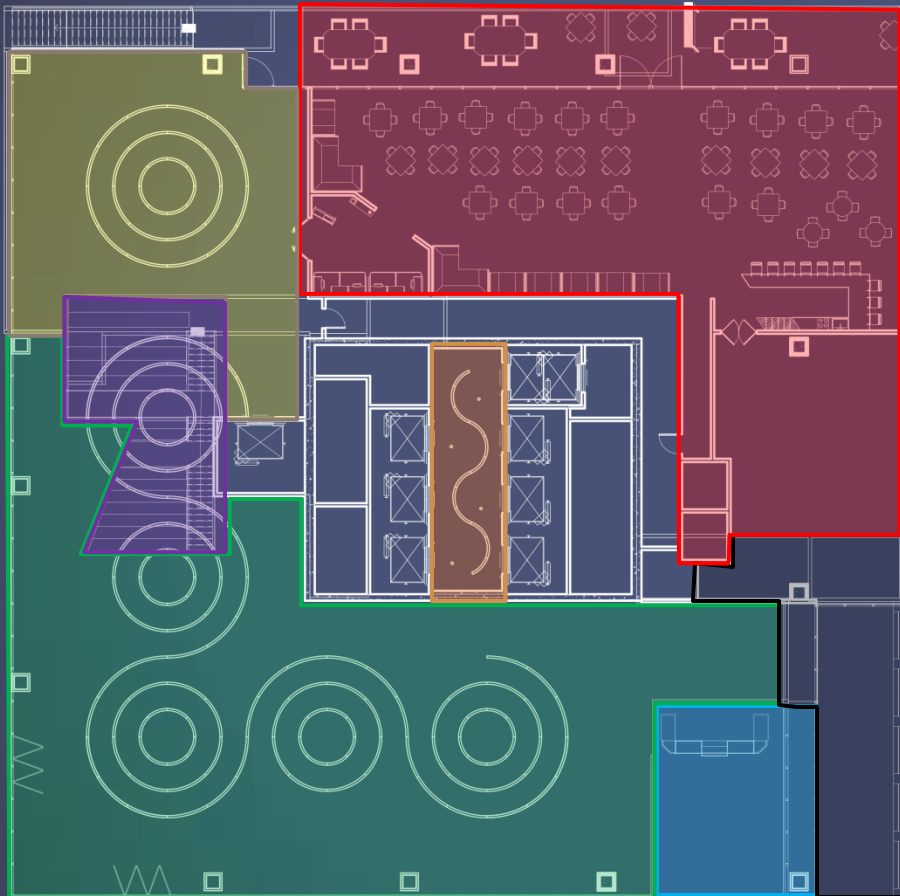
LIGHTING DESIGN

Concept: Use geometry to lead people through areas of transition and to create places of congregation



LOBBY

Freemont Street



Mission Street

Street Level

Lower Lobby

Retail

Back of House

Elevator Lobby

Staircase

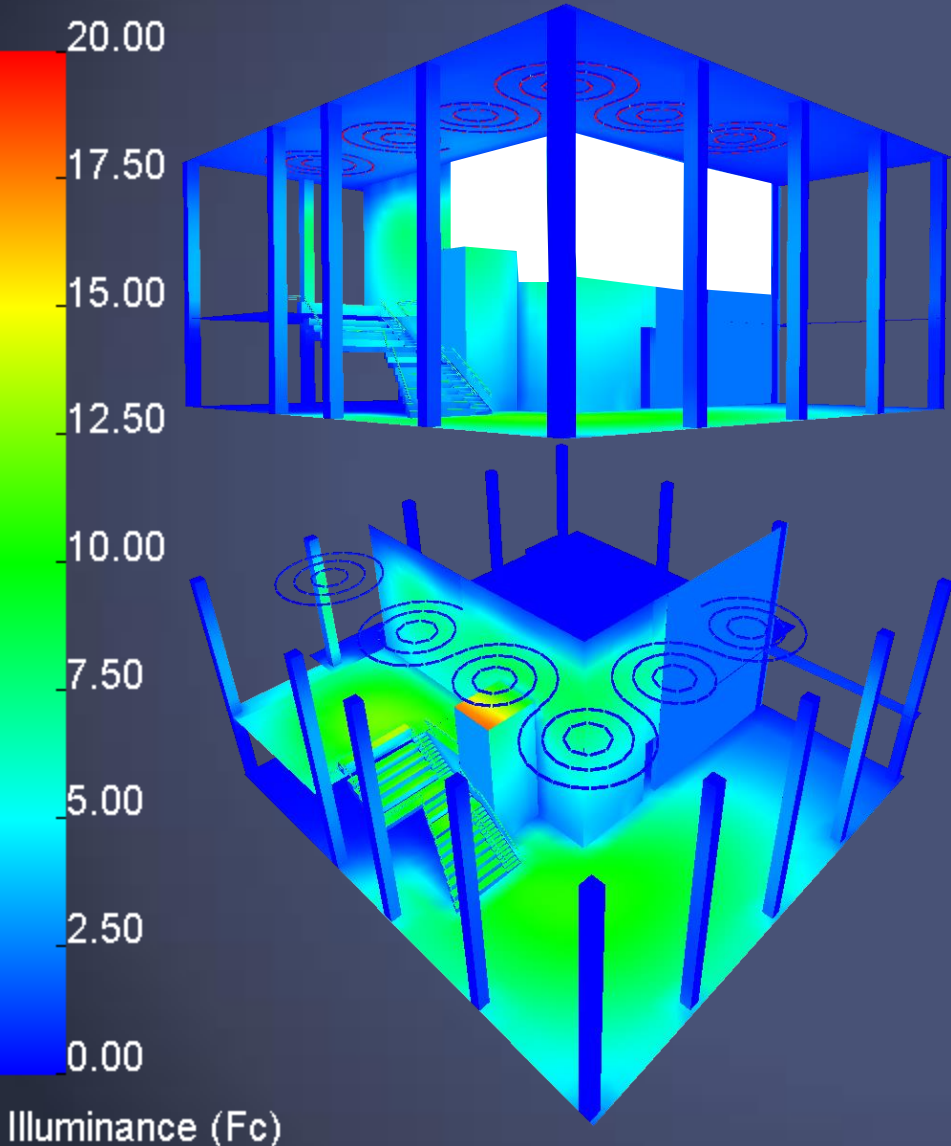
Second Level

Upper Lobby

Restaurant

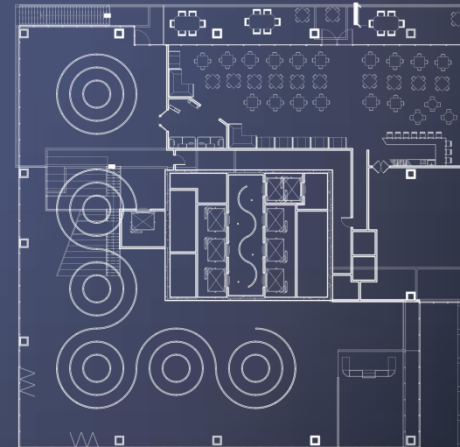
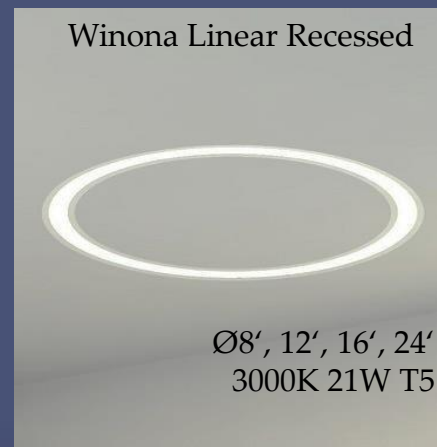
Elevator Lobby

LOBBY

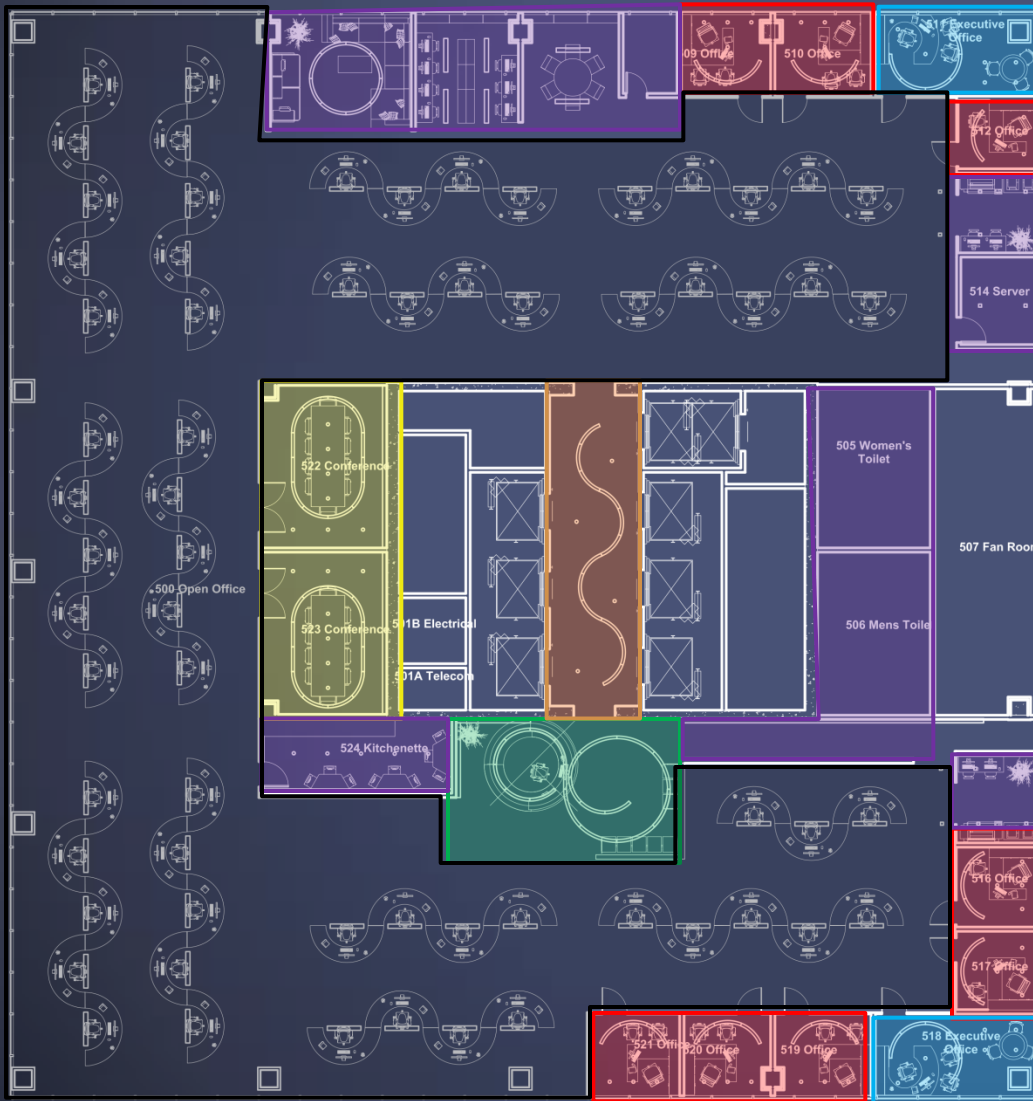


	Horizontal Illuminance	Avg:Min Ratio	LPD
Target	10FC	2.5	.8W/sf
Design	8FC	2.25	0.64W/sf
Staircase Target	15FC	2.5	-
Staircase Design	11FC	2.29	-

LED Video Display Walls



TYPICAL OFFICE



Elevator Lobby

Reception

Executive Offices

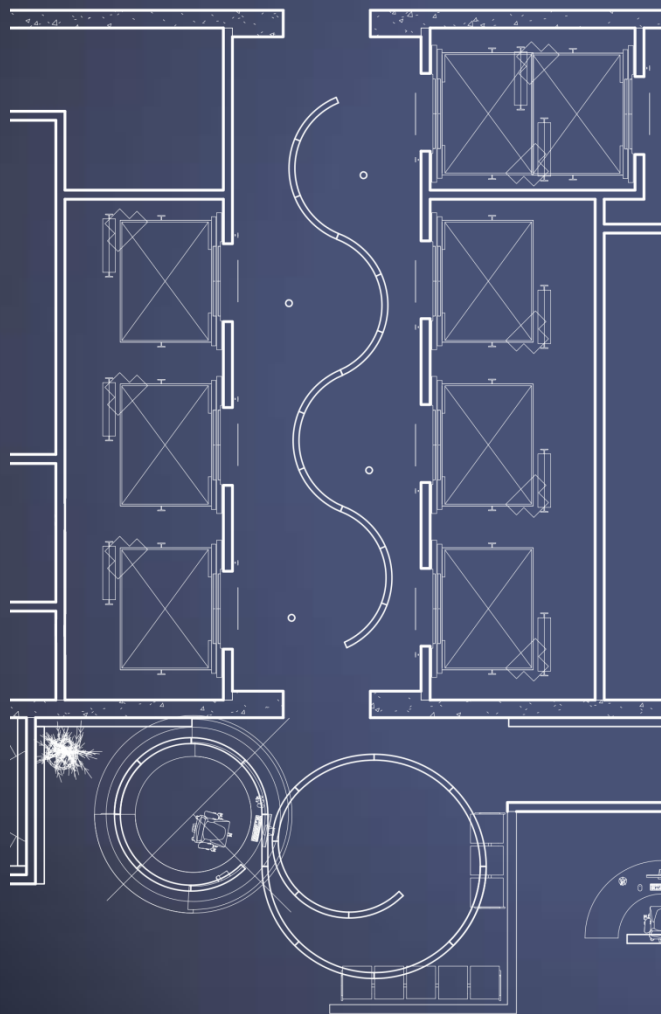
Partner Offices

Open Offices

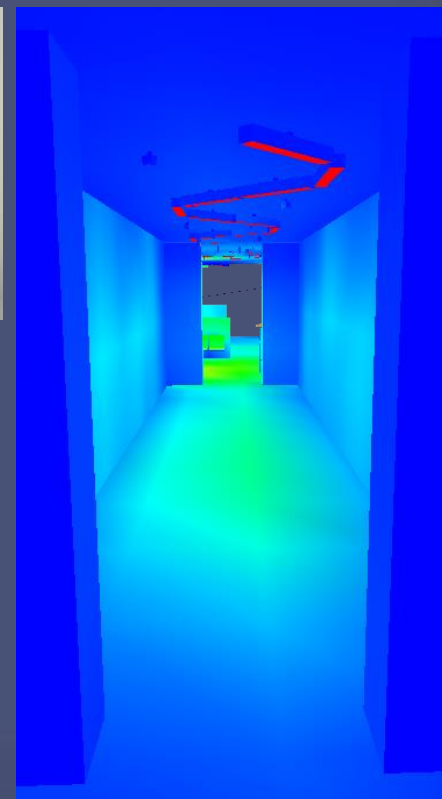
Conference Rooms

Ancillary Spaces

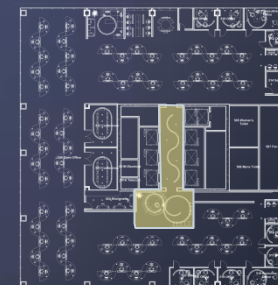
TYPICAL OFFICE Elevator Lobby



	Horizontal Illuminance	LPD
Target	15FC	0.67W/sf
Design	20FC	0.72W/sf

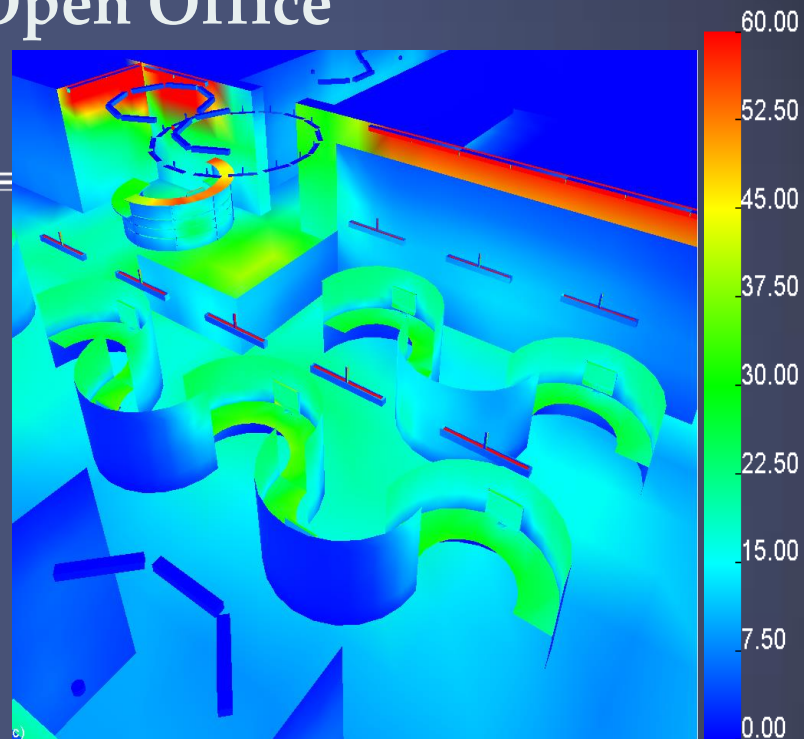
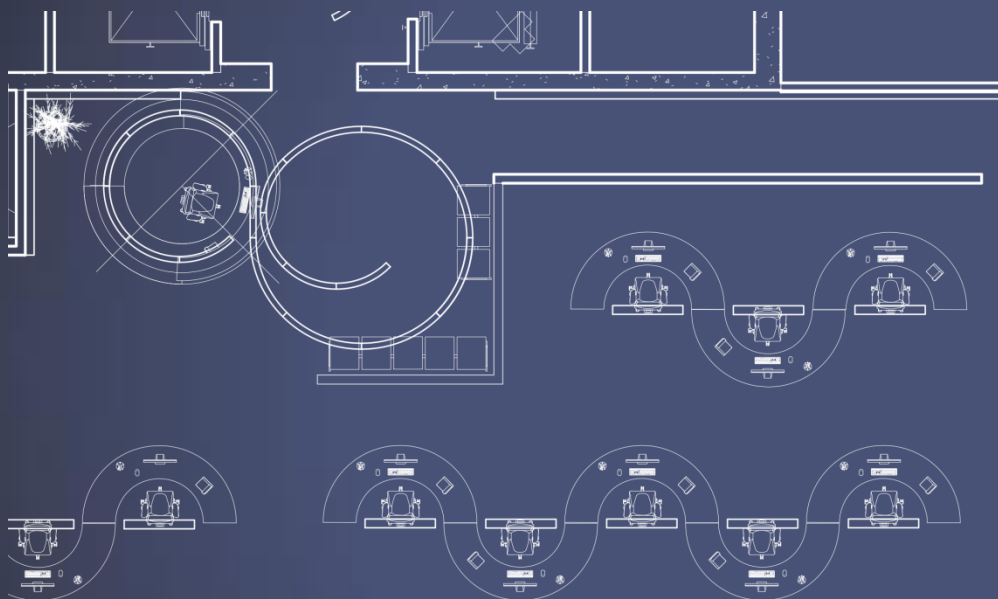


Illuminance (Fc)



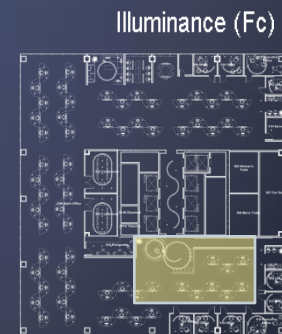
TYPICAL OFFICE

Reception and Open Office



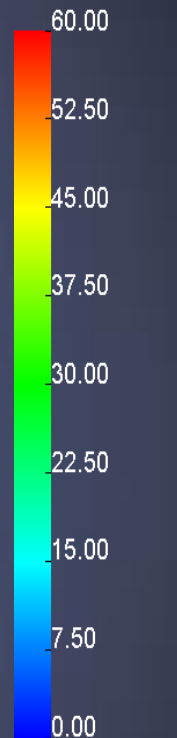
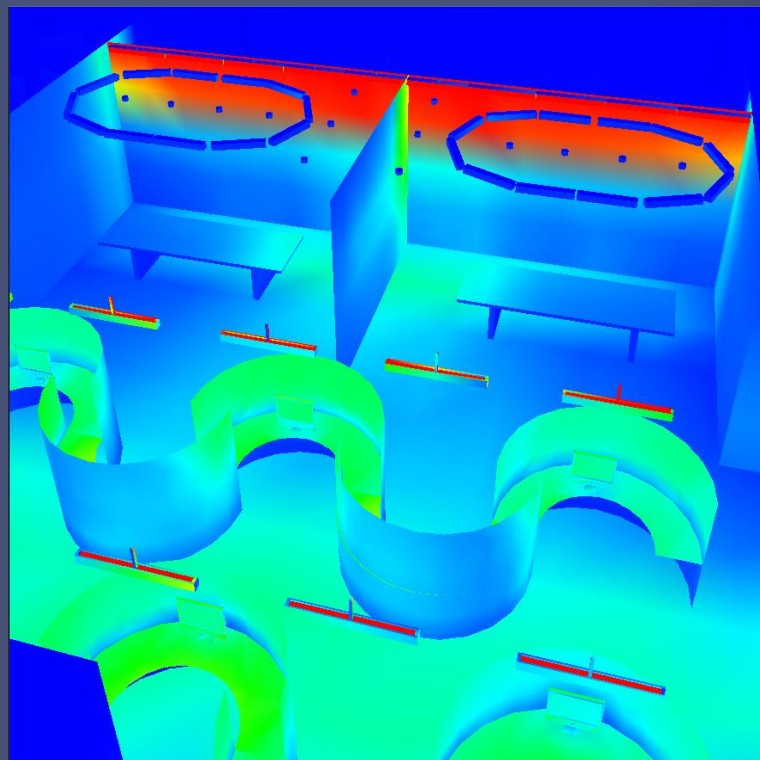
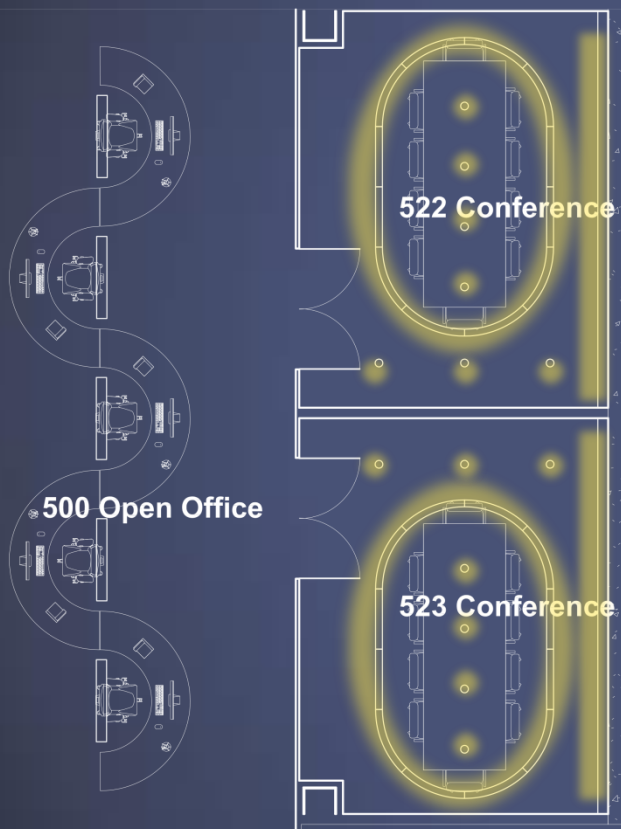
	Horizontal Illuminance	LPD
Target	10-20FC	0.67W/sf
Design	17FC	0.51W/sf
Reception Desk Target	30-50FC	-
Reception Desk Design	45-55FC	-
Office Desk Target	30-50FC	-
Office Desk Design*	30FC	-

*Additional Task Lighting at each desk for desired light levels



TYPICAL OFFICE

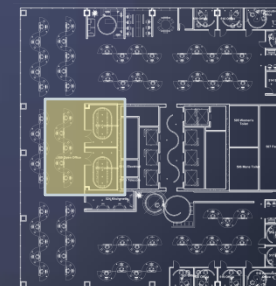
Conference Rooms and Open Office



Illuminance (Fc)

	Horizontal Illuminance on Table	LPD
Target	10FC, 30-50FC*	0.9W/sf
Design	5FC, 23-45FC	1.1W/sf

*Depending on the activity



TYPICAL OFFICE

Typical Executive Office and Partner Office



	Horizontal Illuminance	LPD
Target	10-20FC	.83W/SF
Design	12FC	.81W/SF
Desk Target	30-50FC	-
Desk Design	34FC	-

Winona Linear Recessed



Ø8
3000K 21W T5

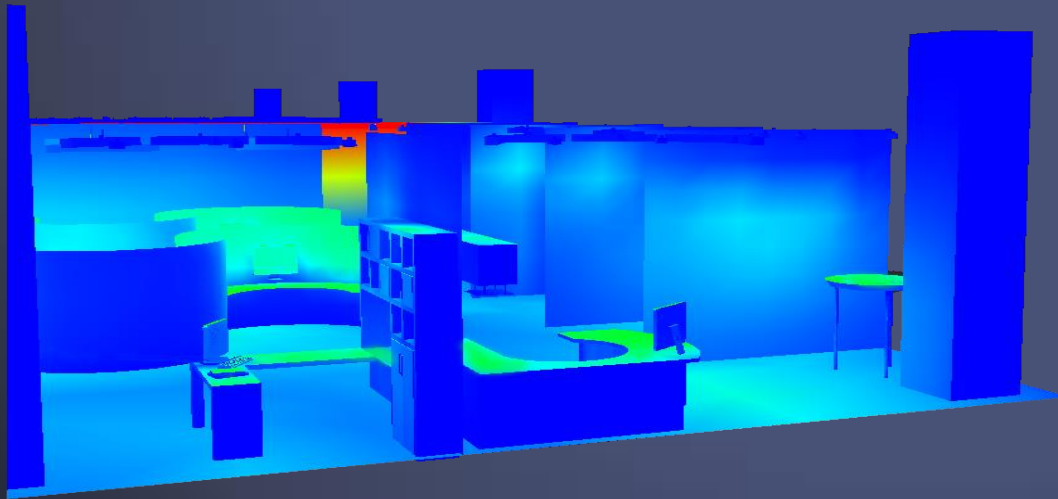
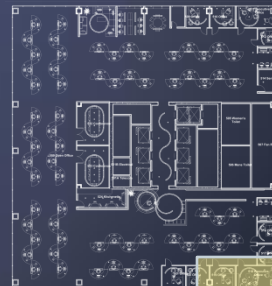
Lightolier Round



3000K 8.7W LED

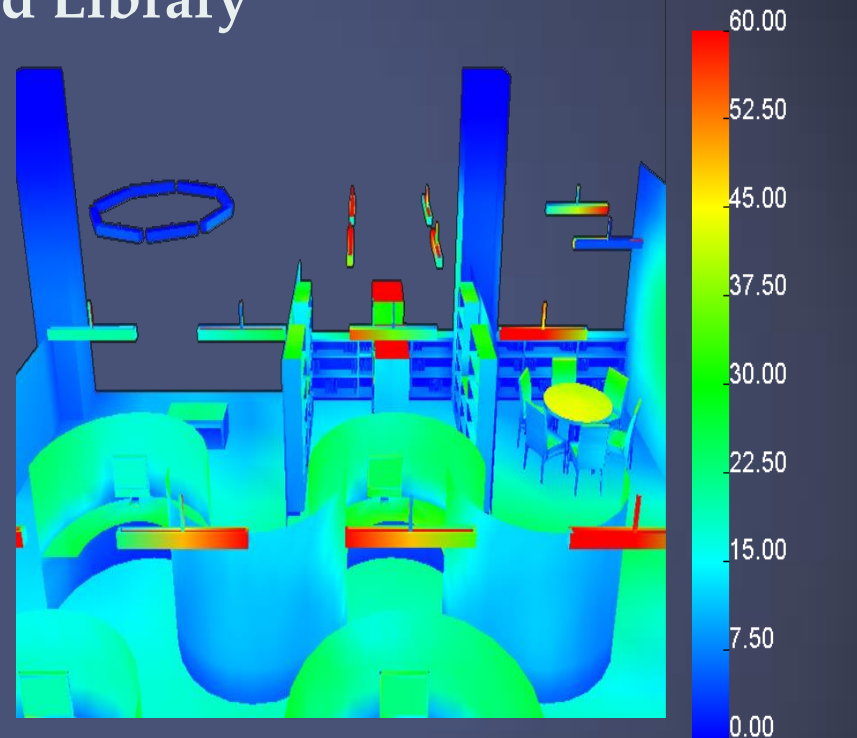
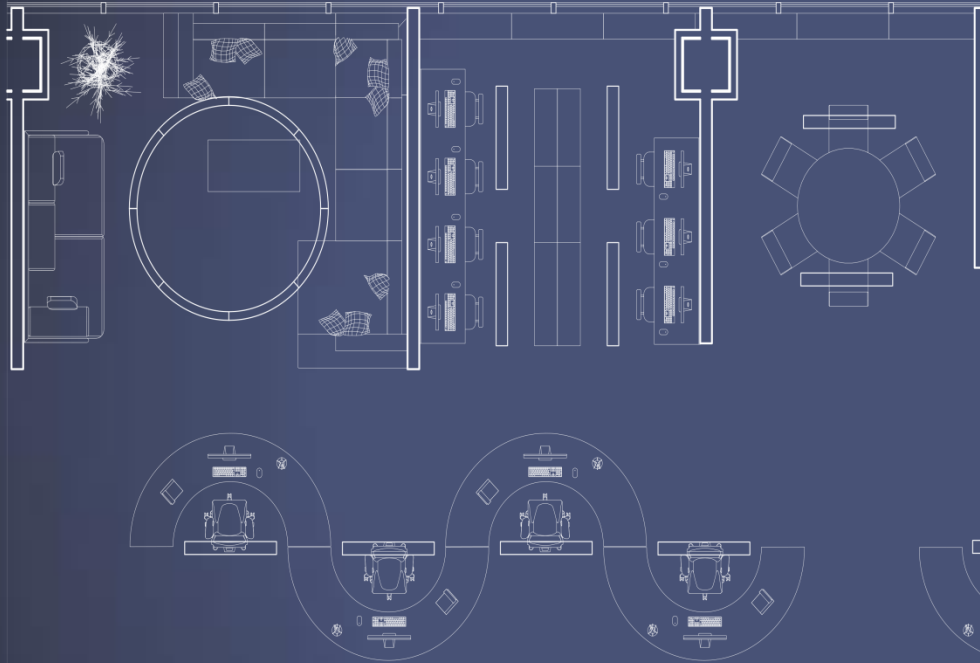


Illuminance (Fc)

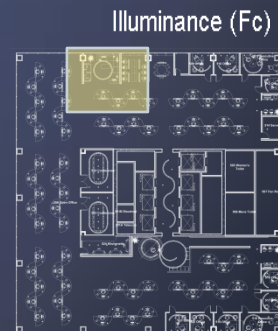


TYPICAL OFFICE

Break Room and Library

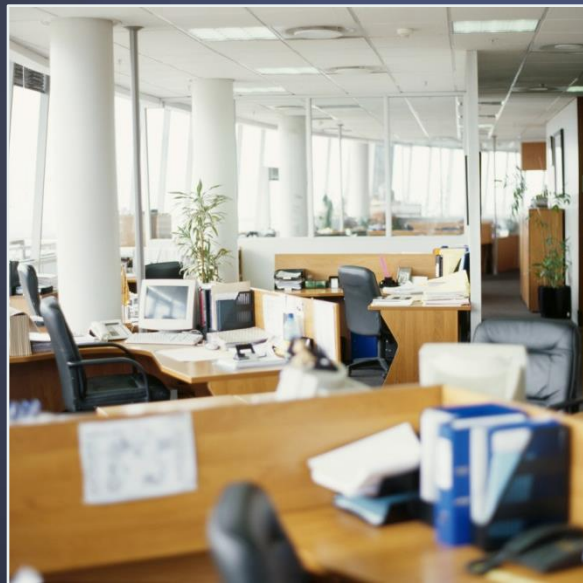


	Horizontal Illuminance	Vertical Illuminance	LPD
Target	10-20	-	.9W/sf
Design	14FC	-	1.01W/sf
Desk Target	30-50FC	-	-
Desk Design	44FC	-	-
Bookshelf Target	-	30FC	-
Bookshelf Design	-	21FC	-

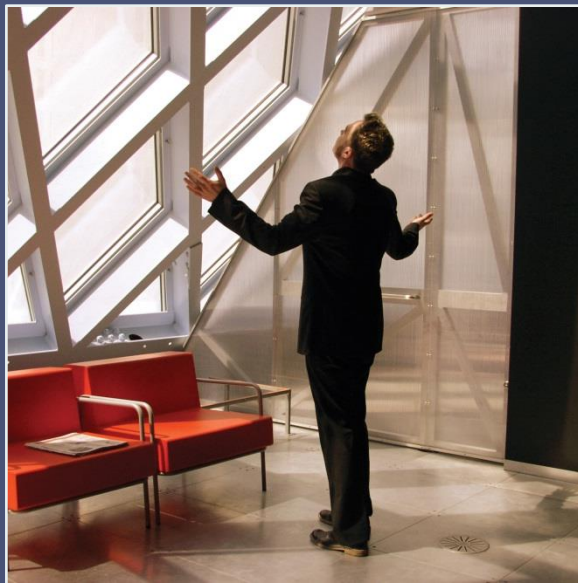


AUTOMATED CONTROLS

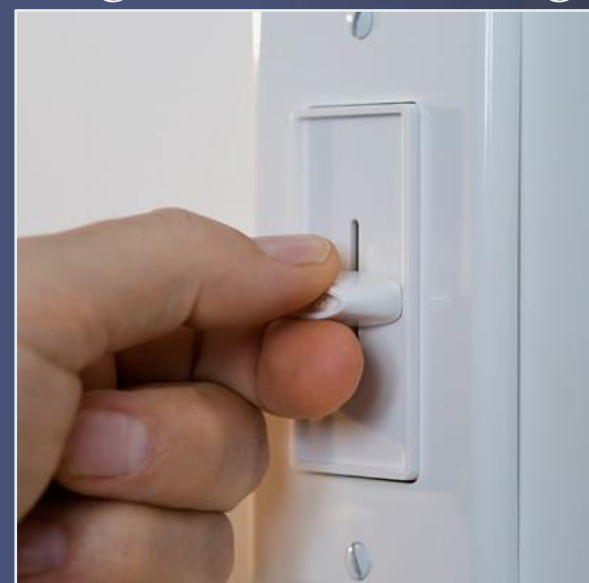
Occupancy Sensing



Daylight Harvesting

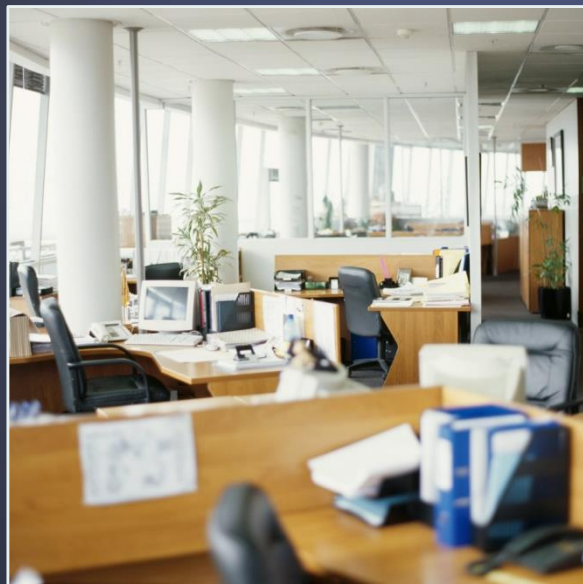


Light Level Tuning



AUTOMATED CONTROLS

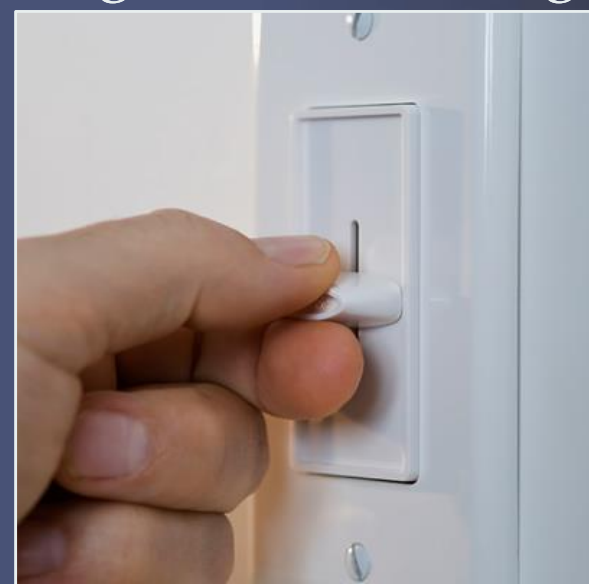
Occupancy Sensing



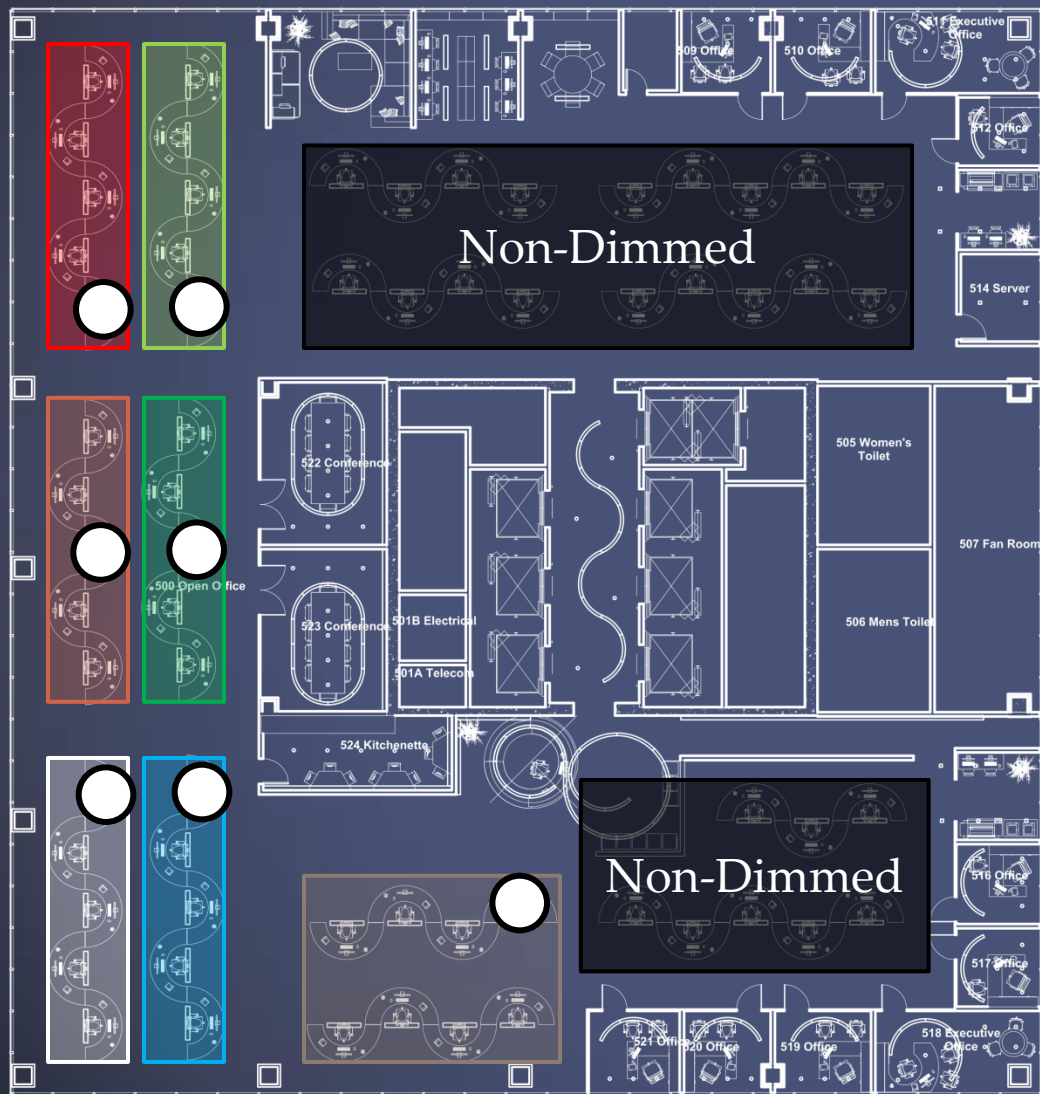
Daylight Harvesting



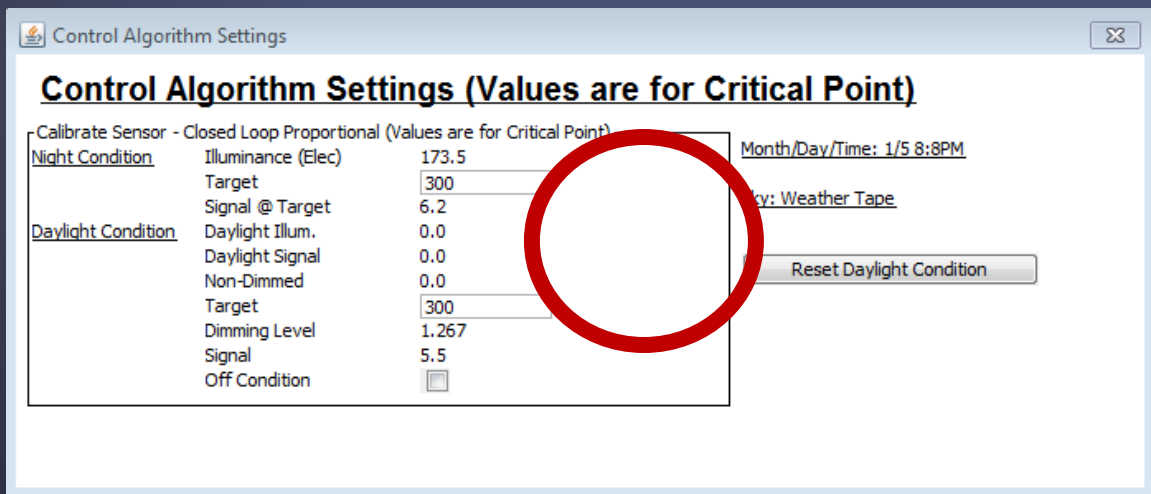
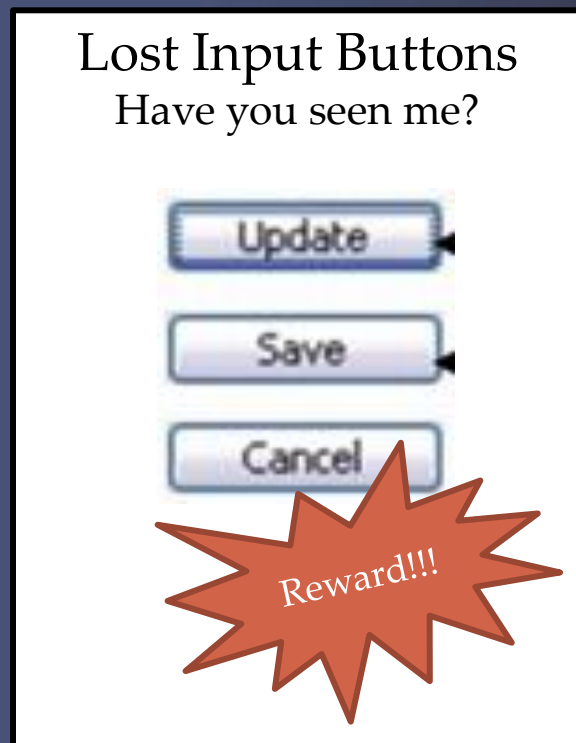
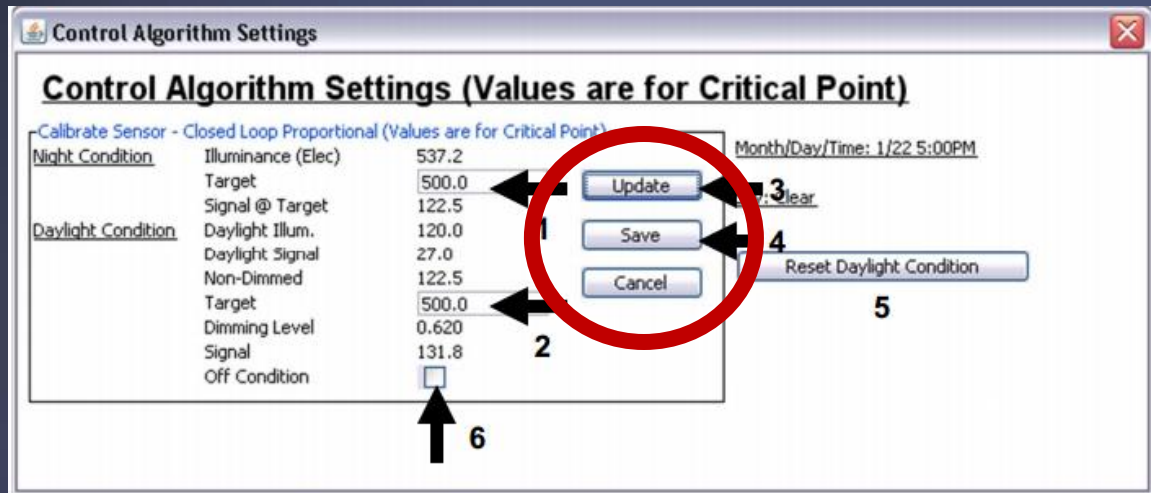
Light Level Tuning



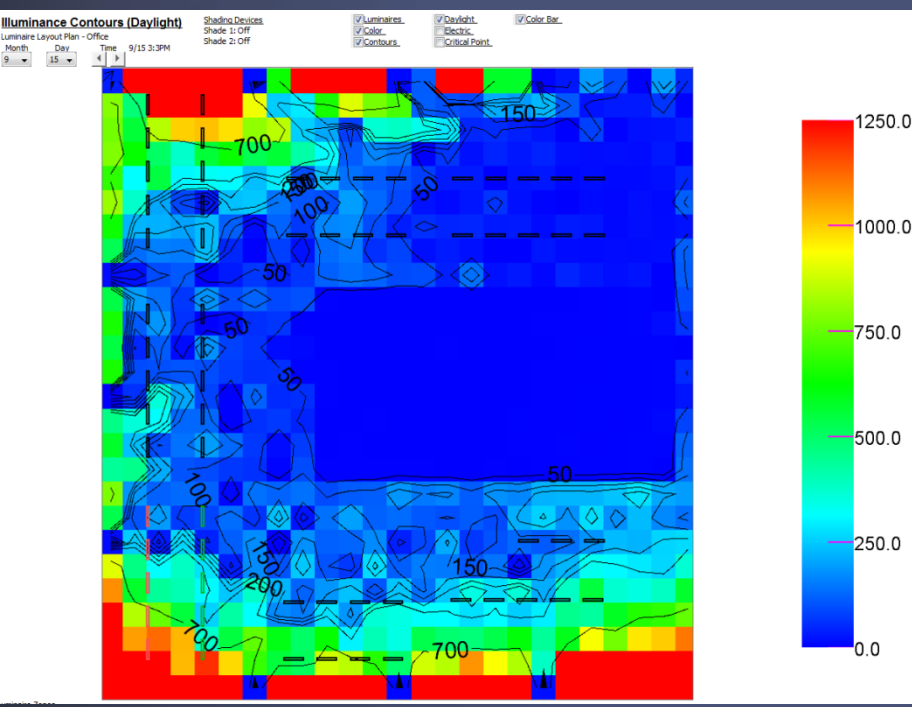
TYPICAL OFFICE



DAYSIM



CALIBRATION



Zone 1				
Illuminance				
	Dec	March	June	Sept
9:00 AM	350	600	300	150
12:00 PM	500	700	700	700
3:00 PM	50	150	700	150
Dimming Level				
	Dec	March	June	Sept
9:00 AM	0.00	0.00	0.00	0.50
12:00 PM	0.00	0.00	0.00	0.00
3:00 PM	0.83	0.50	0.00	0.50
Average Dimming Level = 0.19				

Zone 2				
Illuminance				
	Dec	March	June	Sept
9:00 AM	350	200	250	200
12:00 PM	450	600	250	350
3:00 PM	100	200	350	200
Dimming Level				
	Dec	March	June	Sept
9:00 AM	0.00	0.33	0.17	0.33
12:00 PM	0.00	0.00	0.17	0.00
3:00 PM	0.67	0.33	0.00	0.33
Average Dimming Level = 0.19				

Zone 3				
Illuminance				
	Dec	March	June	Sept
9:00 AM	350	600	450	100
12:00 PM	500	700	700	700
3:00 PM	50	150	250	100
Dimming Level				
	Dec	March	June	Sept
9:00 AM	0.00	0.00	0.00	0.00
12:00 PM	0.00	0.00	0.00	0.00
3:00 PM	0.83	0.50	0.17	0.67
Average Dimming Level = 0.18				

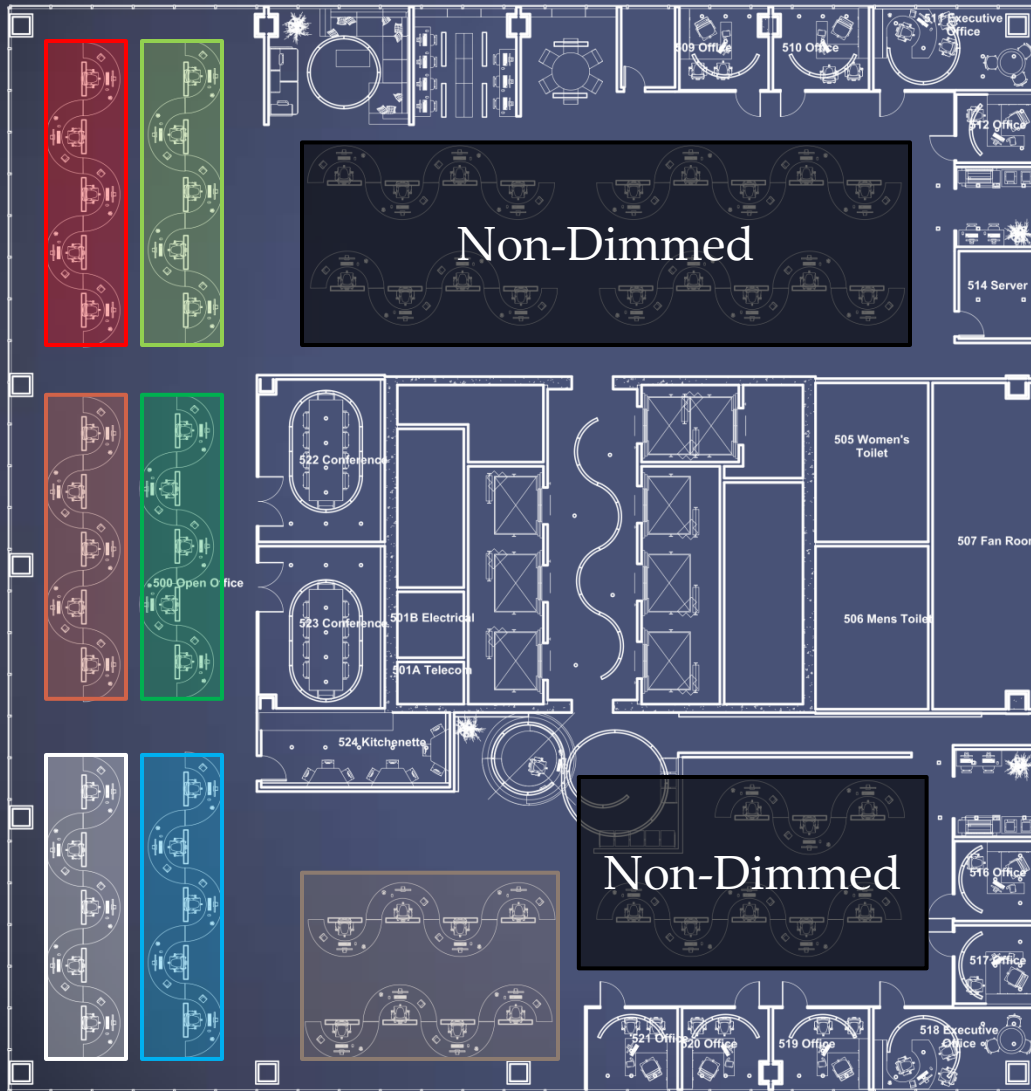
Zone 4				
Illuminance				
	Dec	March	June	Sept
9:00 AM	225	200	350	50
12:00 PM	750	700	300	700
3:00 PM	100	150	200	75
Dimming Level				
	Dec	March	June	Sept
9:00 AM	0.25	0.33	0.00	0.83
12:00 PM	0.00	0.00	0.00	0.00
3:00 PM	0.67	0.50	0.33	0.75
Average Dimming Level = 0.31				

Zone 5				
Illuminance				
	Dec	March	June	Sept
9:00 AM	350	500	300	200
12:00 PM	750	700	700	700
3:00 PM	200	250	300	150
Dimming Level				
	Dec	March	June	Sept
9:00 AM	0.00	0.00	0.00	0.33
12:00 PM	0.00	0.00	0.00	0.00
3:00 PM	0.33	0.17	0.00	0.50
Average Dimming Level = 0.11				

Zone 6				
Illuminance				
	Dec	March	June	Sept
9:00 AM	300	300	300	200
12:00 PM	800	700	700	700
3:00 PM	100	150	275	150
Dimming Level				
	Dec	March	June	Sept
9:00 AM	0.00	0.00	0.00	0.33
12:00 PM	0.00	0.00	0.00	0.00
3:00 PM	0.67	0.50	0.08	0.50
Average Dimming Level = 0.17				

Zone 7				
Illuminance				
	Dec	March	June	Sept
9:00 AM	100	300	700	150
12:00 PM	200	500	300	350
3:00 PM	50	400	200	200
Dimming Level				
	Dec	March	June	Sept
9:00 AM	0.67	0.00	0.00	0.50
12:00 PM	0.33	0.00	0.00	0.00
3:00 PM	0.83	0.00	0.33	0.33
Average Dimming Level = 0.25				

RESULTS



Zone 1: 19%

Zone 2: 19%

Zone 3: 18%

Zone 4: 31%

Zone 5: 11%

Zone 6: 17%

Zone 7: 25%

Average:
24%

RESULTS

Based on this model, we predict to save roughly

- 98,000 kWhr every year

- \$25,500 every year

with daylight harvesting alone.

ENERGY SAVING

LPDs (calculated)

- 0.67 W/ft²
- less than 75% of baseline
- 97,200 kWhr/yr energy savings

Daylight Harvesting (DAYSIM estimated)

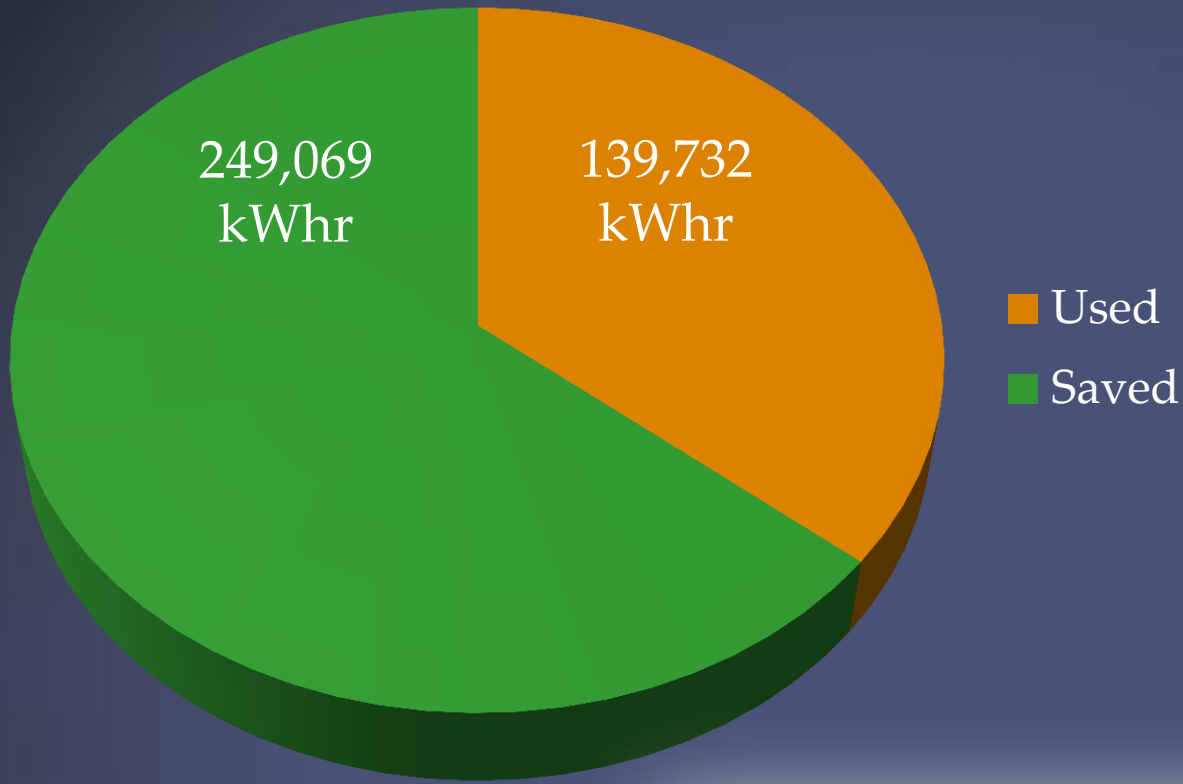
- 98,300 kWh/yr energy savings

Light Level Tuning (estimated)

- 24,700 kWh/yr energy savings

Occupancy Sensing (estimated)

- 29,00 kWh/yr energy savings





350 MISSION

An iconic building that sets a precedent for sustainable architecture in San Francisco