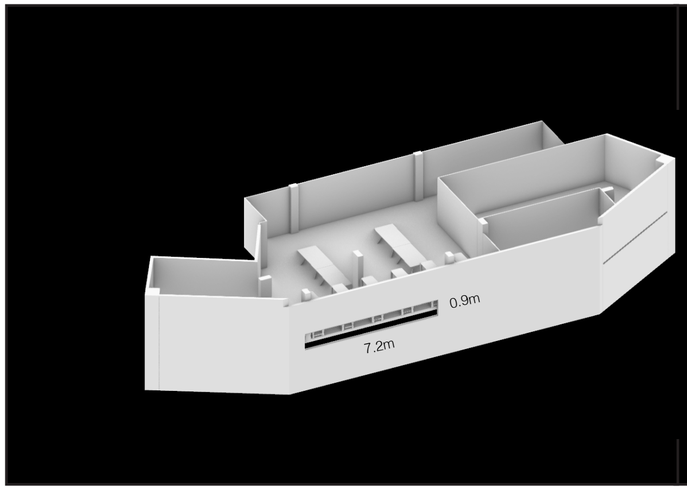
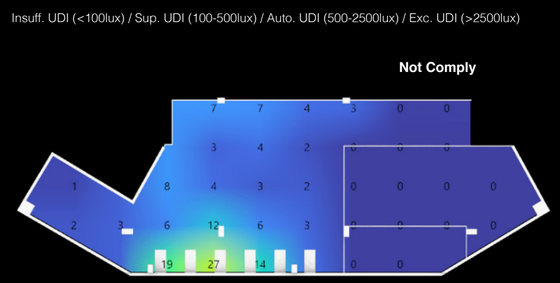
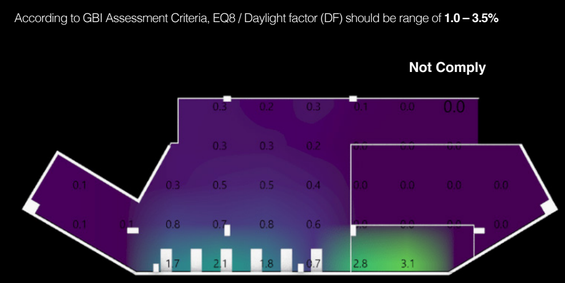
Task 2: Daylighting Optimization

Ori : The entire studio is very gloomy due to lack of opening. Artificial ligthing needs to be opened all the time





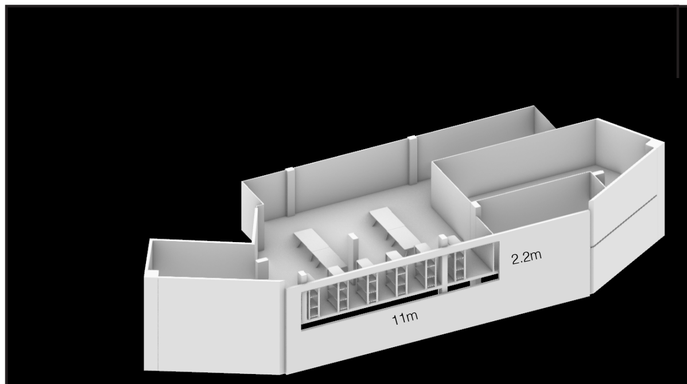
Mean LUX: 4.3 lux

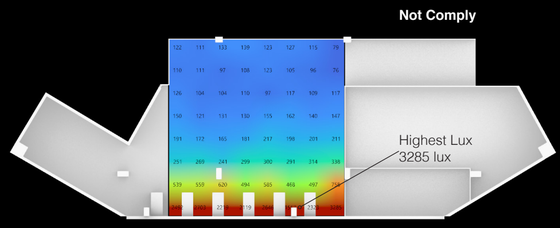


Mean DF: 0.48%

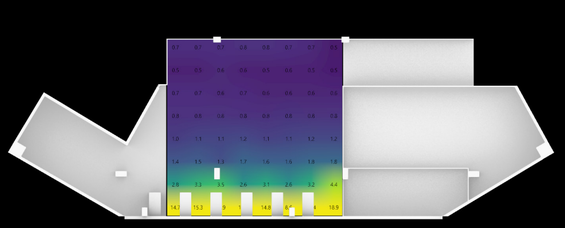
12 PM

Progress: Maximize the opening to introduce the daylight. However, deeper space receive limited daylight. Futhermore, the cabinet still block huge amount of daylight



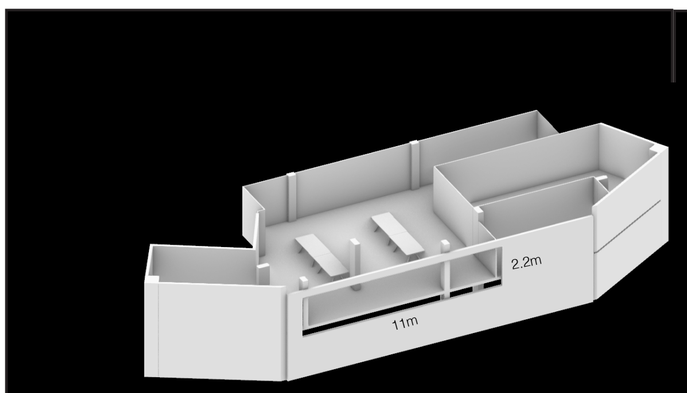


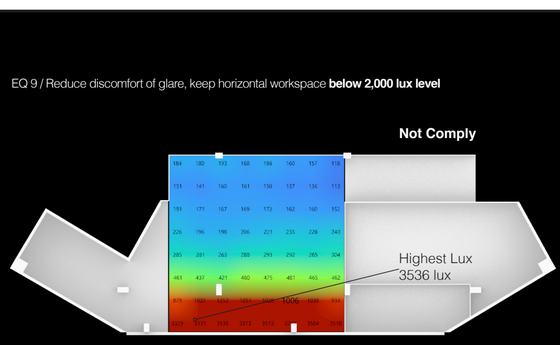
Mean LUX: 492 lux



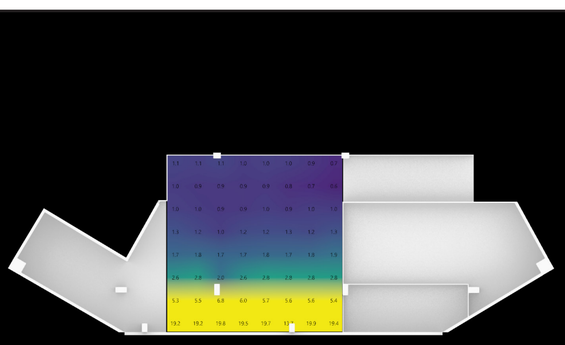
12 PM

Baseline : Relocate the cabinets to maximize the indoor daylight condition. For the over exposed part will be integrated with shading devices





Mean LUX: 721 lux

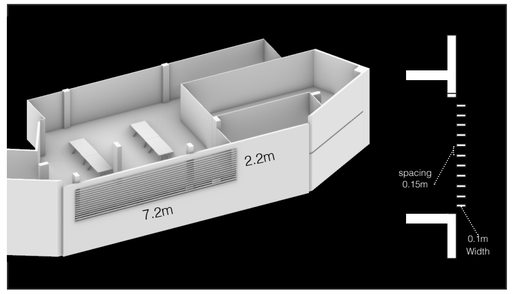


12 PM

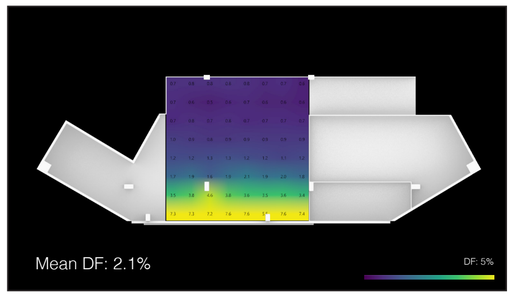
Option 1 : Louver

12PM / Medium Daylight Factor (DF) & Illuminance (LUX), Medium Glare / Average in bringing daylight & create shading into the space

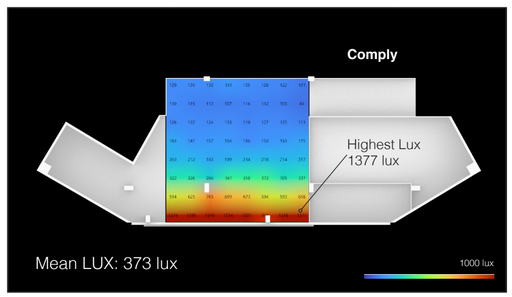
Design Variation 1

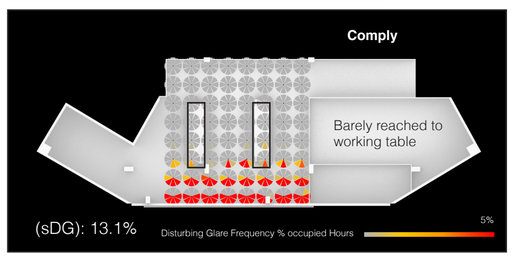


According to GBI Assessment Criteria, EQ8 / Daylight factor (DF) should be range of **1.0 – 3.5%**



EQ 9 / Reduce discomfort of glare, keep horizontal workspace below **2,000 lux** level

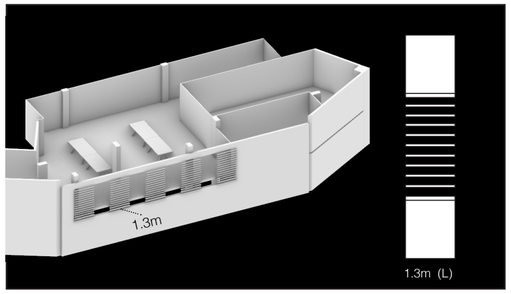


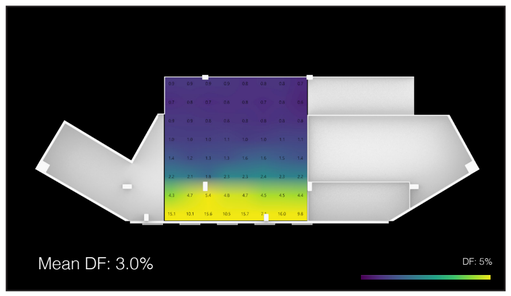


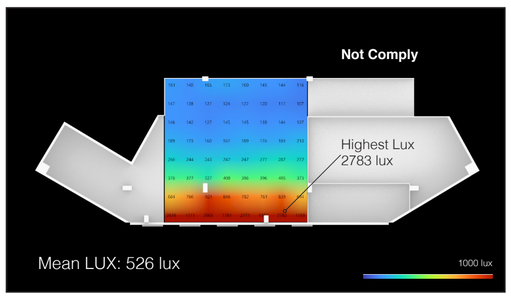
89% Imperceptible 2% Perceptible 3% Disturbing 5% Intolerable

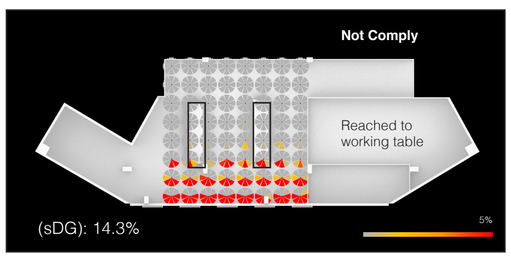
Design Variation 2

Reduce 50% length





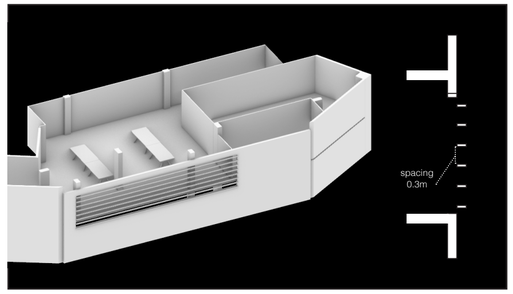


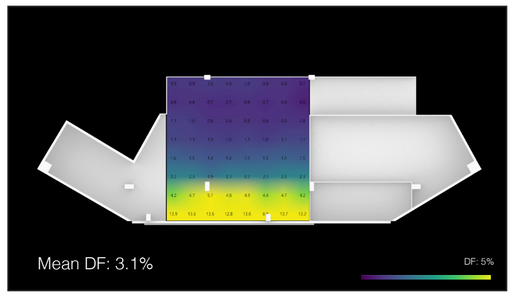


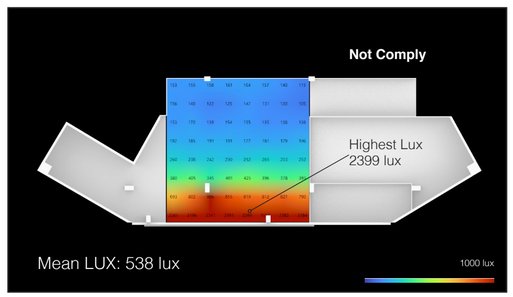
88% Imperceptible 2% Perceptible 3% Disturbing 7% Intolerable

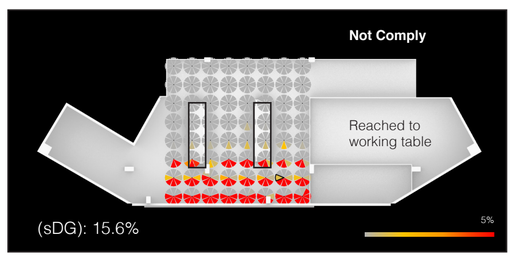
Design Variation 3

Reduce 50% gaps between





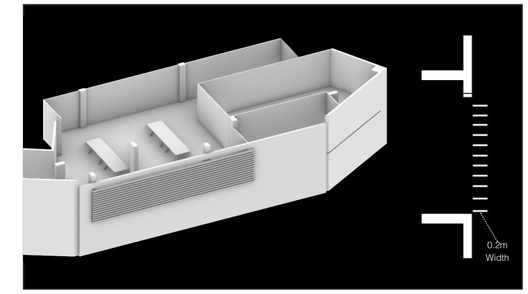


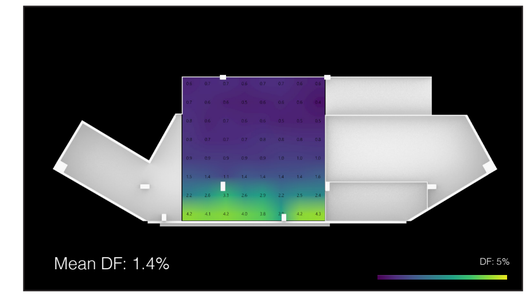


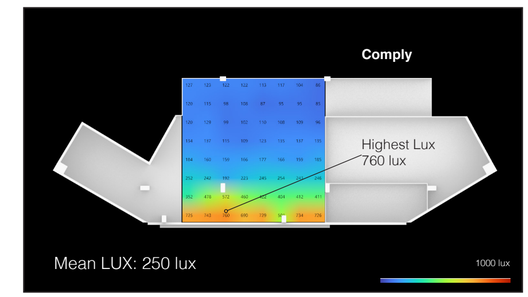
87% Imperceptible 2% Perceptible 3% Disturbing 7% Intolerable

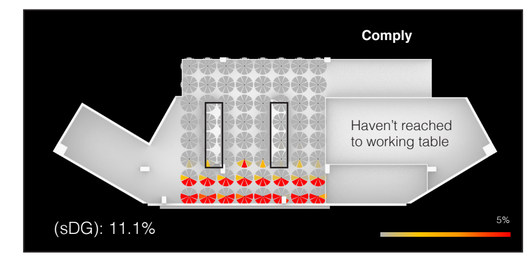
Design Variation 4

Increase 50% width



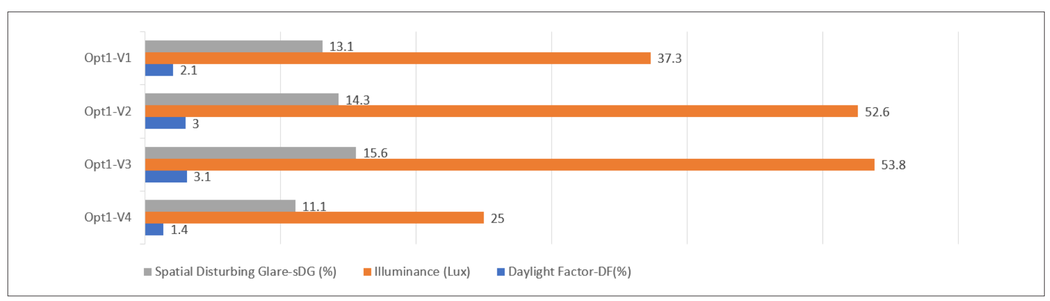


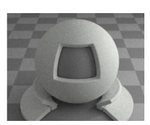




92% Imperceptible 2% Perceptible 2% Disturbing 3% Intolerable

Imperceptible glare Perceptible glare Disturbing glare Intolerable glare





Type	Glossy
Reflectance	54.14%
Specular	0.56%
Diffuse	53.59%
R	0.527
G	0.541
B	0.515
Roughness	0.200

Material - Curved Exterior Louvers

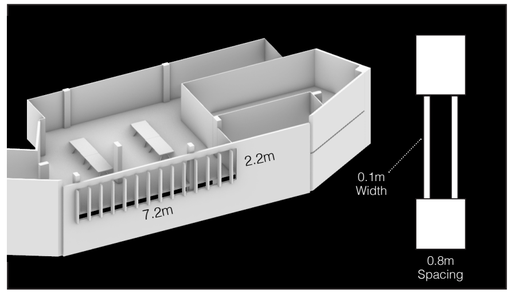
Variable 1 has the best control in general, especially higher (DF) & (Lux) comes with acceptable glare condition to the working place. For the Variable 2 & 3 brought too much (Lux) & (sDG) that closed to the window, the working place may get glare. Variable 4 also has better control in general, however, it brought lesser amount of (DF) & (Lux).

Design Variable 1 is the best performance in overall for Option 1

Option 2 : Vertical & Horizontal Devices

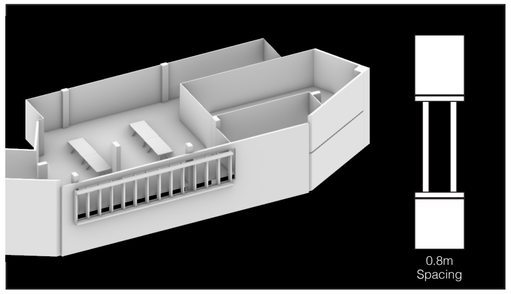
12PM / Low Daylight Factor (DF) & Illuminance (LUX), Low Glare / Suitable to create more shading into the space

Design Variation 1



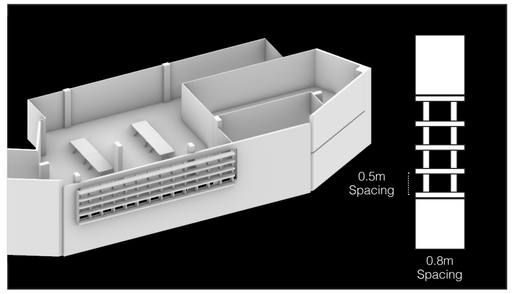
Design Variation 2

Add top & bottom



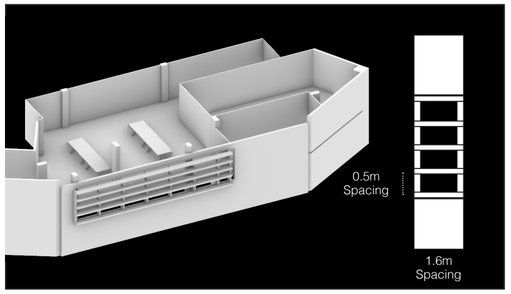
Design Variation 3

Add Horizontal Fin

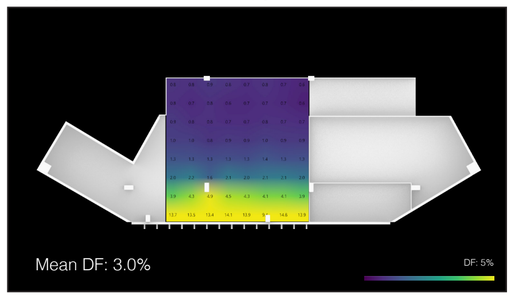


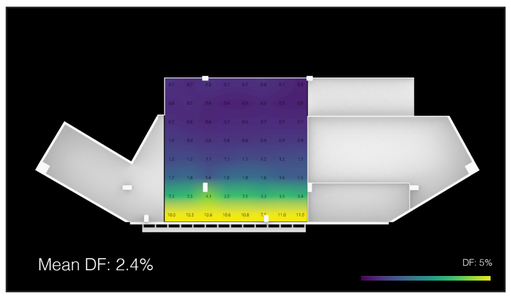
Design Variation 4

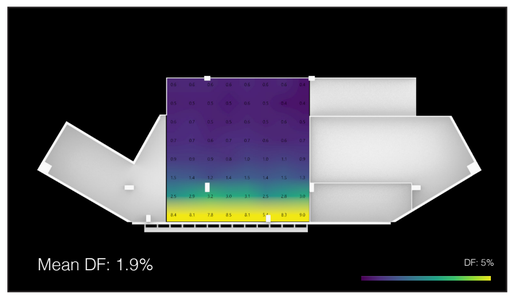
Reduce Vertical Fin 50%

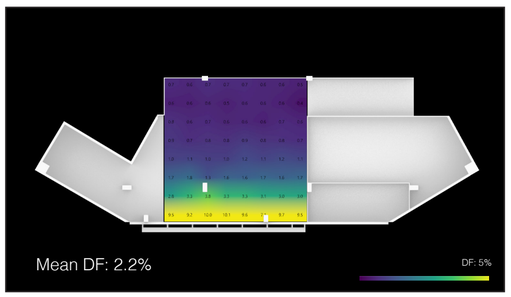


According to GBI Assessment Criteria, EQ8 / Daylight factor (DF) should be range of **1.0 – 3.5%**

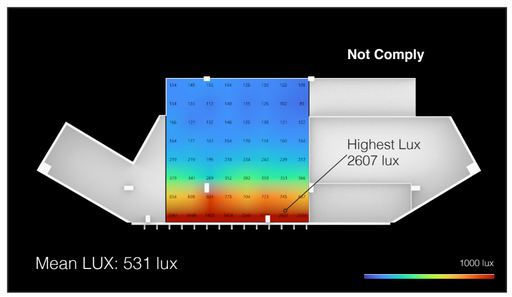


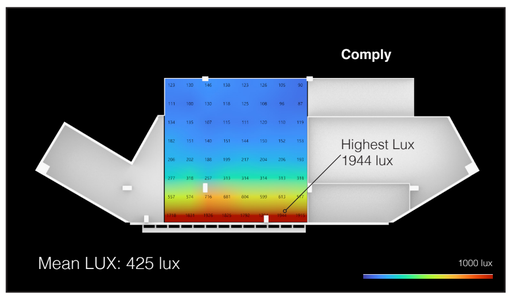


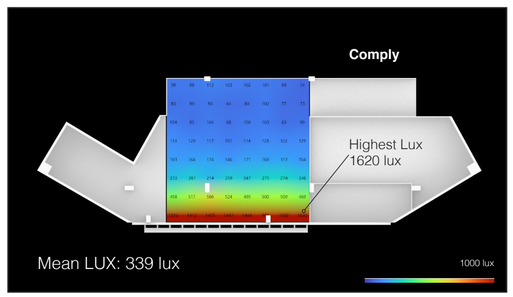


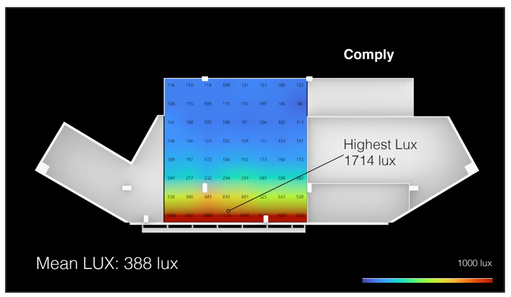


EQ 9 / Reduce discomfort of glare, keep horizontal workspace below **2,000 lux** level

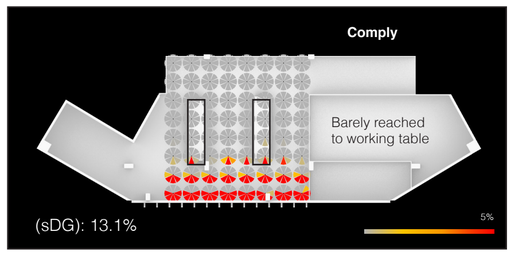




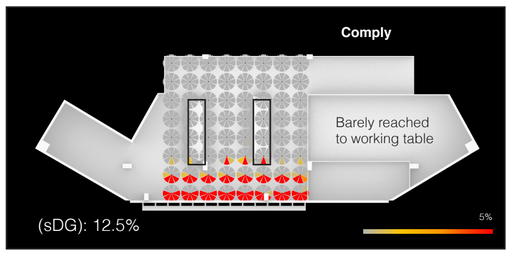




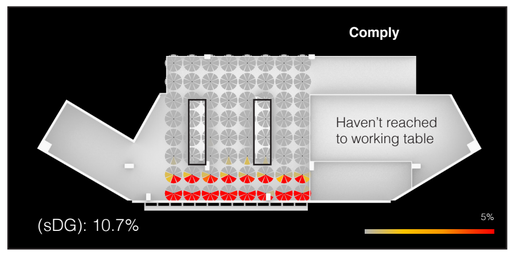
Imperceptible glare | Perceptible glare | Disturbing glare | Intolerable glare



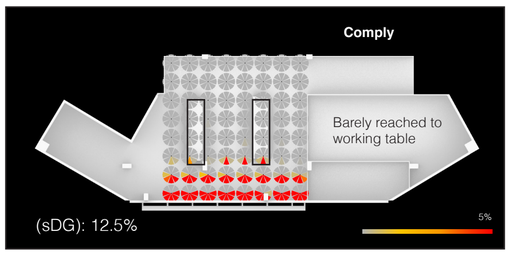
89% Imperceptible 2% Perceptible 3% Disturbing 6% Intolerable



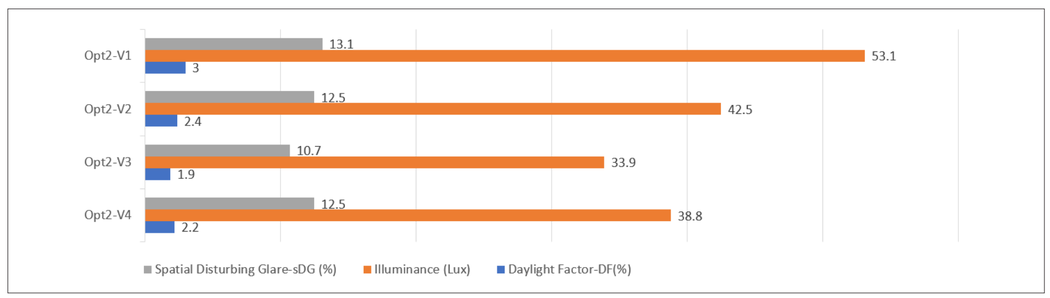
90% Imperceptible 2% Perceptible 3% Disturbing 5% Intolerable

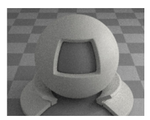


93% Imperceptible 2% Perceptible 2% Disturbing 3% Intolerable



91% Imperceptible 2% Perceptible 3% Disturbing 4% Intolerable





Type	Glossy
Reflectance	47.21%
Specular	2.07%
Diffuse	45.15%
R	0.456
G	0.452
B	0.428
Roughness	0.100

Material - Aluminium White Cladding

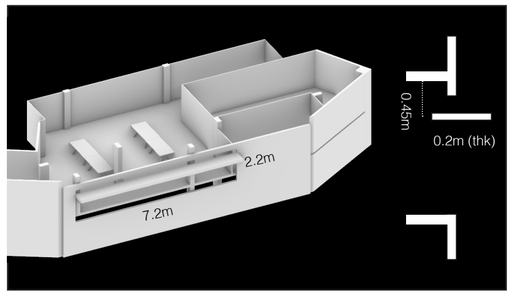
Variable 1 brought too much (DF) & (sDG) that closed to the window, the working place may get too much glare. Variable 2 has the best control in general, especially higher (DF) & (Lux) comes with acceptable glare condition to the working place. Meanwhile, Variable 3 & 4 values are lower (DF) & (Lux).

Design Variable 2 is the best performance in overall for Option 2

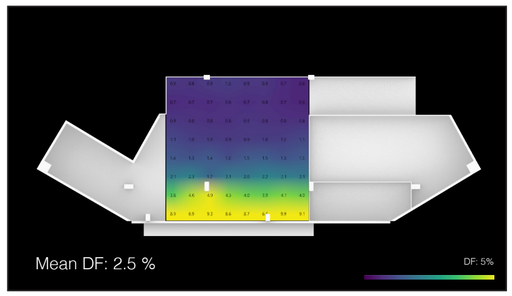
Option 3 : Light Shelf

12PM / High Daylight Factor (DF) & Illuminance (LUX), High Glare / Bring more daylight into deeper space

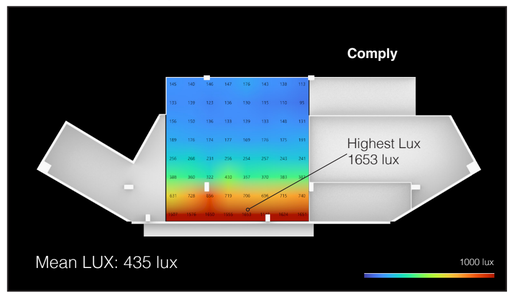
Design Variation 1

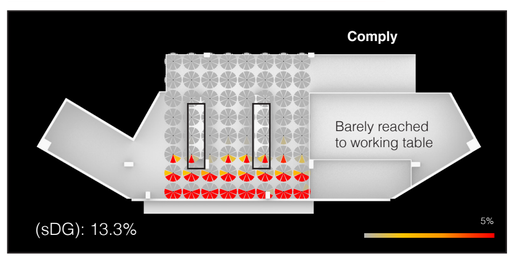


According to GBI Assessment Criteria, EQ8 / Daylight factor (DF) should be range of **1.0 – 3.5%**



EQ 9 / Reduce discomfort of glare, keep horizontal workspace below **2,000 lux** level

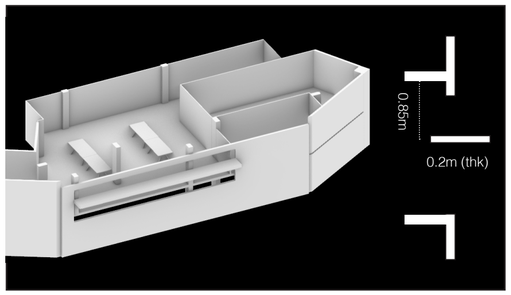


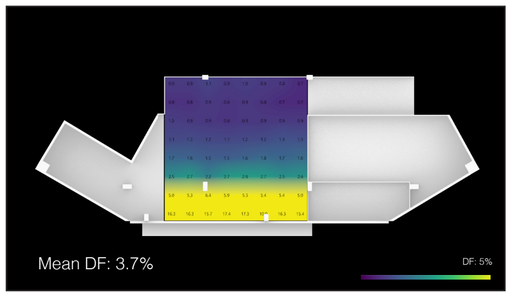


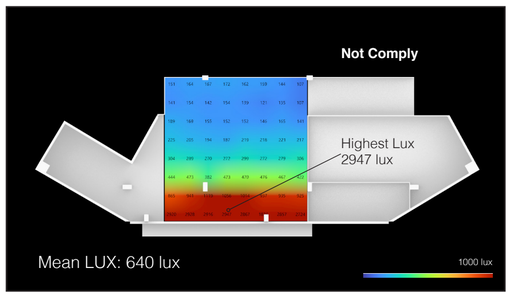
89% Imperceptible 2% Perceptible 4% Disturbing 6% Intolerable

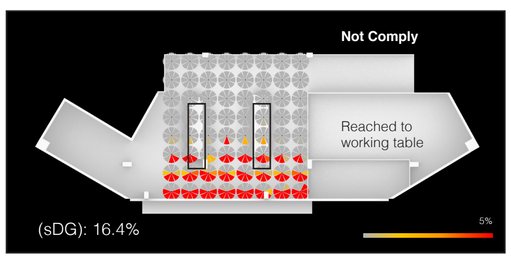
Design Variation 2

Move to Middle





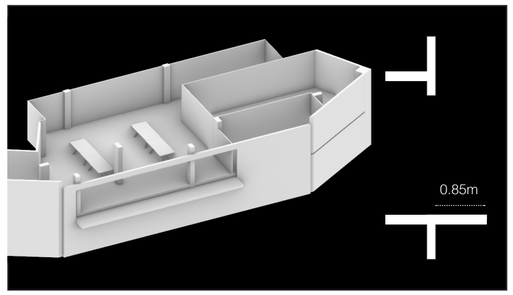


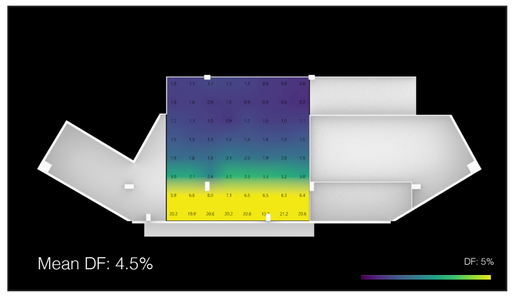


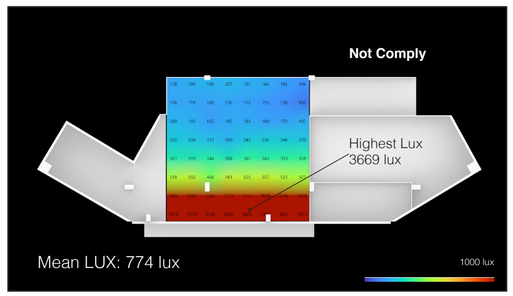
85% Imperceptible 3% Perceptible 3% Disturbing 9% Intolerable

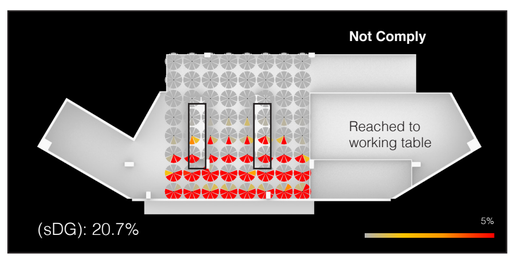
Design Variation 3

Move to Floor





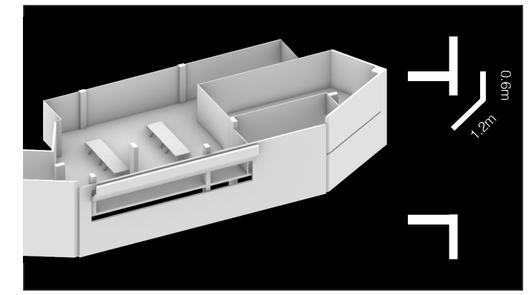


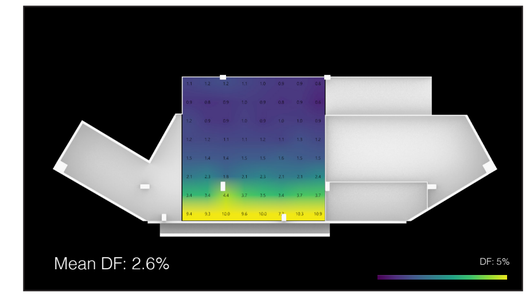


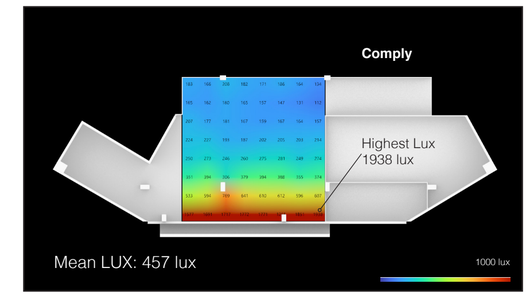
83% Imperceptible 3% Perceptible 3% Disturbing 10% Intolerable

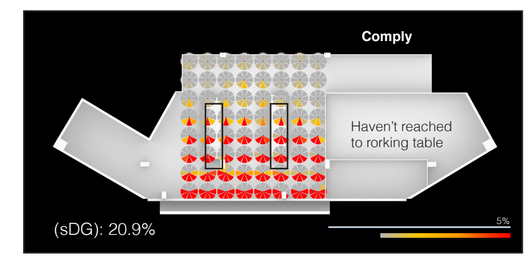
Design Variation 4

Light Tunnel

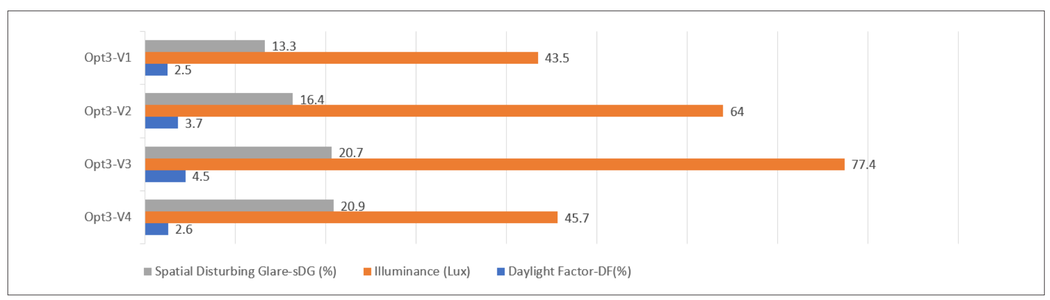


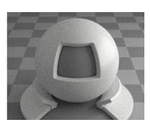






89% Imperceptible 3% Perceptible 3% Disturbing 5% Intolerable





Type	Glossy
Reflectance	64.79%
Specular	5.33%
Diffuse	59.46%
R	0.593
G	0.596
B	0.582
Roughness	0.100

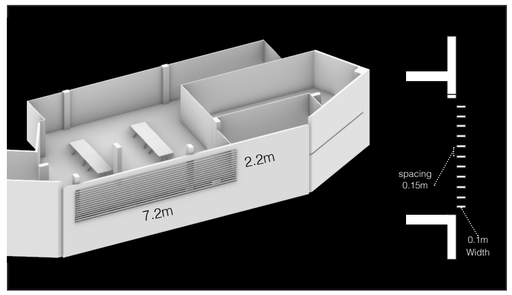
Material - Aluminium Metal Cladding

Variable 1 has the best control in general, especially (sDG). For the Variable 2 & 3 brought too much (DF), (Lux) & (sDG) that closed to the window, the working place may get glare. Variable 4 also has better control in general, however, it brought too much glare into the working place.

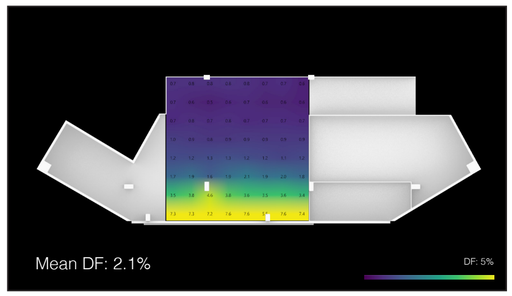
Design Variable 1 is the best performance in overall for Option 3

Option 1 : Louver

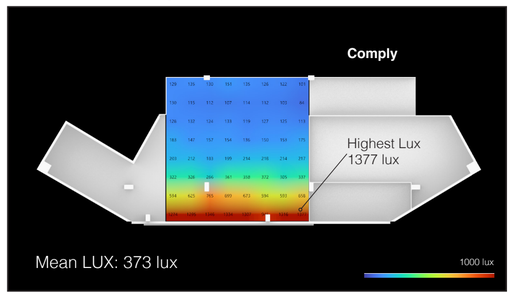
Design Variation 1



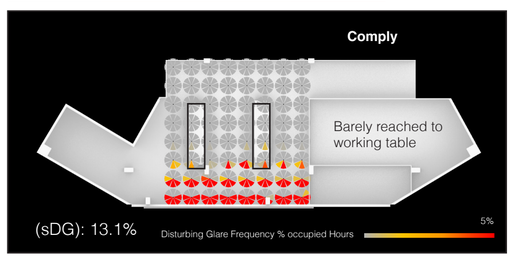
According to GBI Assessment Criteria, EQ8 / Daylight factor (DF) should be range of **1.0 – 3.5%**



EQ 9 / Reduce discomfort of glare, keep horizontal workspace below **2,000 lux** level



Imperceptible glare | Perceptible glare | Disturbing glare | Intolerable glare

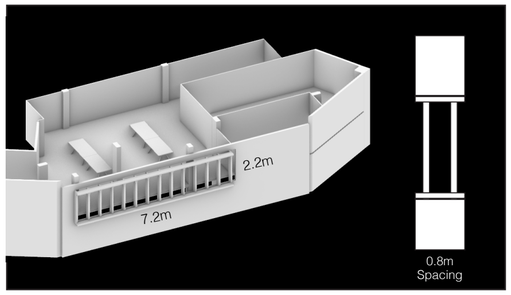


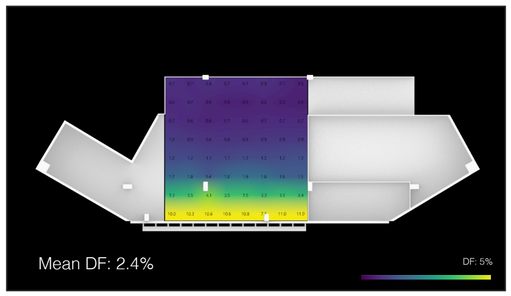
89% Imperceptible | 2% Perceptible | 3% Disturbing | 5% Intolerable

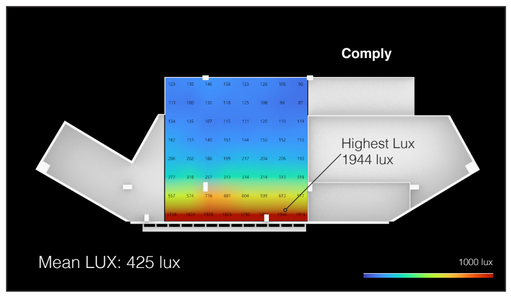
Option 2 : Vert. & Hor. Devices

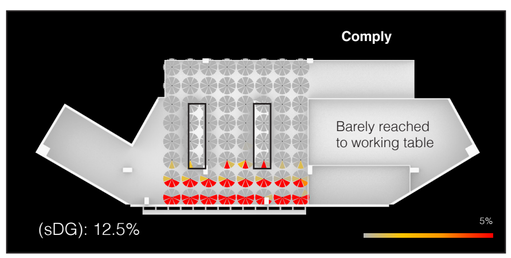
Design Variation 2

Add top & bottom





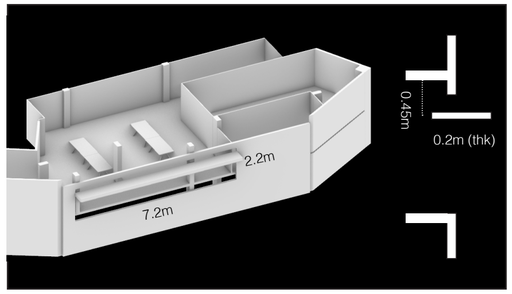




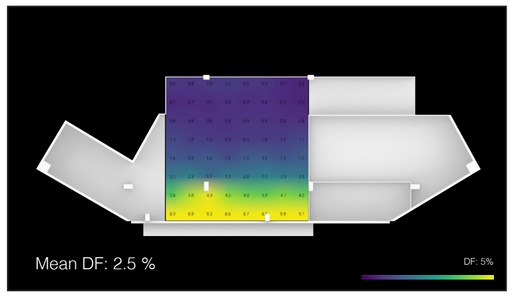
90% Imperceptible | 2% Perceptible | 3% Disturbing | 5% Intolerable

Option 3 : Light Shelf

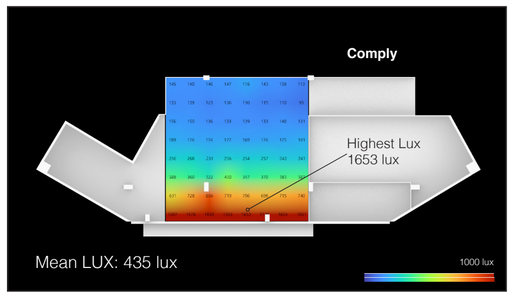
Design Variation 1



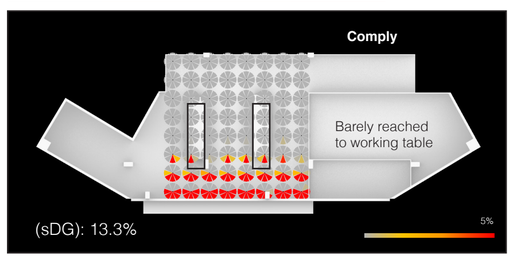
According to GBI Assessment Criteria, EQ8 / Daylight factor (DF) should be range of **1.0 – 3.5%**



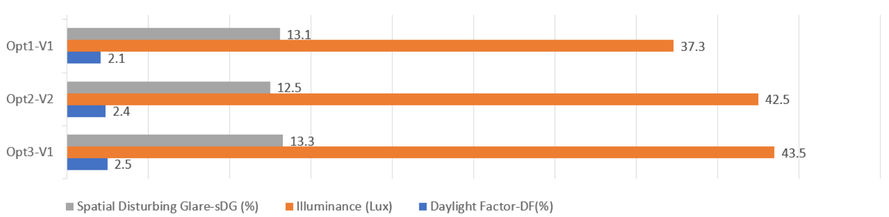
EQ 9 / Reduce discomfort of glare, keep horizontal workspace below **2,000 lux** level



Imperceptible glare | Perceptible glare | Disturbing glare | Intolerable glare



89% Imperceptible | 2% Perceptible | 4% Disturbing | 6% Intolerable



Comparison Result

Option 3 Variable 1 (Light Shelf) brought the most (DF) & (Lux) in comparison to the other two shading devices (Louver) & (Vertical & Horizontal Devices). Hence,

Option 3 - Design Variable 1 (Light Shelf) has the best performance