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# Daylight Analysis Report

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Dassault  
Systems\_Office  
Building

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## Quality Control

<b>Job No</b>	1951	<b>Document Type</b>	Daylight Analysis Report
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<b>Date</b>	22 June 2020		
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<b>Authorised by</b>	Dipti	Signature (for file)	D

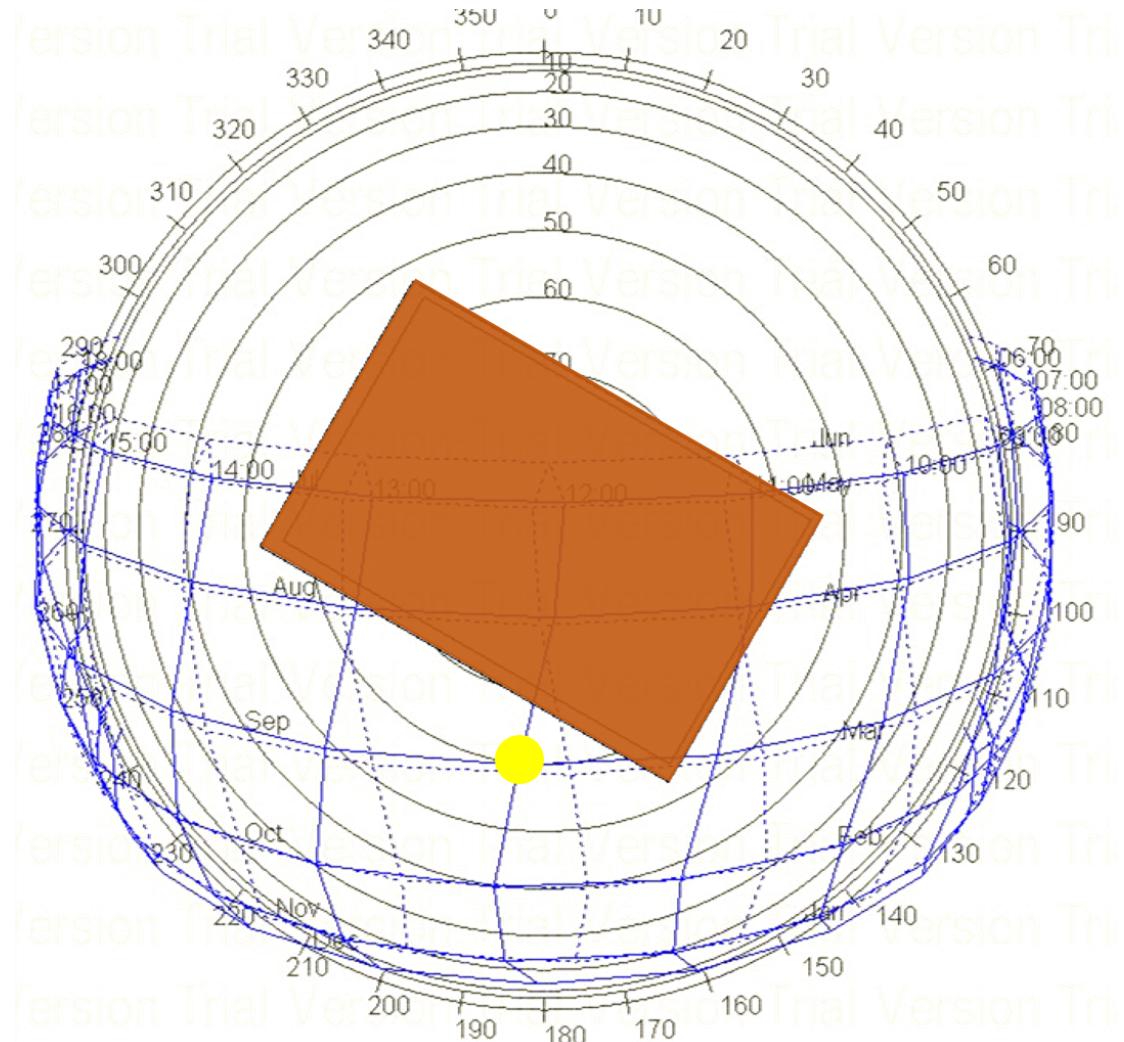
## Executive Summary

Project Description	: Office Building, Dassault Systems
Certification	: IGBC Green New Buildings, Tenant-Occupied
Building Area	: 19298 m <sup>2</sup>

### Summary of Analysis Results

A daylight model was prepared as per the current building design inputs and building is analyzed for daylight level of minimum 110 lux and maximum of 2200 lux for at least 75% of all regularly occupied spaces to enhance the comfort level of the occupants. The simulation is done on 21st September at 12 P.M.

Daylight simulation shows that **77%** of regularly occupied areas are achieving daylight between 110 lux and 2200 lux as per IGBC New Building requirement. Hence, the building is eligible to gain 1 credit point under daylighting.

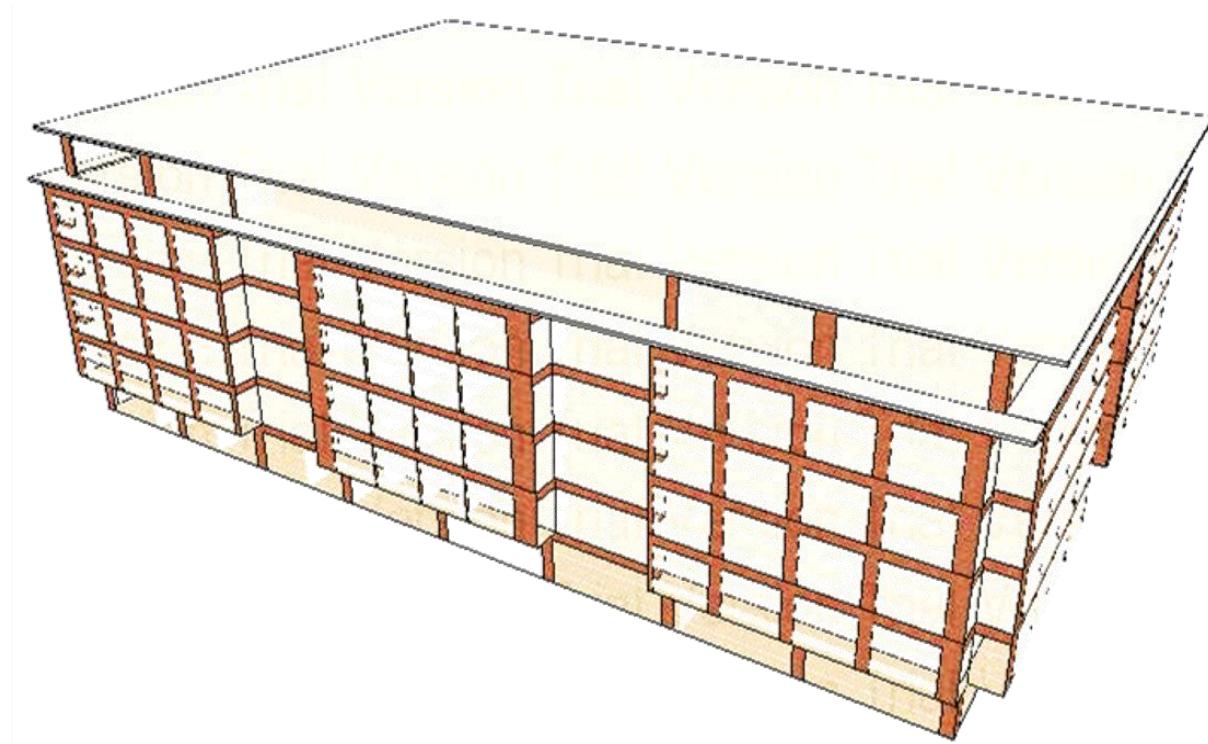


## Introduction

This report has been prepared by Environmental Design Solutions Pvt. Ltd. It provides preliminary daylight analysis for the proposed Office Building of Dassault Systems Project, Pune, India. Daylight model inputs are based on information provided by building design teams.

A preliminary model includes design elements identified during design development stages. The purpose of modelling is to understand the distribution of daylight level of minimum 110 and maximum 2200 lux for atleast 75% of the total floor area of all regularly occupied spaces.

**OFFICE BUILDING**



**Figure 1: 3D View of Simulation Model**

## Analysis Methodology

The daylighting analysis is done using Design Builder which connects the geometry to Radiance Synthetic Imaging System Software (commonly referred to as RADIANCE). The Radiance Synthetic Imaging System is a highly accurate ray-tracing software program for the analysis and visualization of daylighting in design. RADIANCE has a lighting simulation engine that calculates light levels and renders images based on a detailed description of the 3-dimensional surface geometry, materials, and light sources in a building.

## Model Description

A detailed 3-D model of the building is created in Design Builder, and analyzed using RADIANCE software for the daylight performance. A daylight factor methodology with cloudy sky condition is used for the simulation. The external shading devices (wherever present) are modeled as per the drawings.

## Assumptions:

1. Following rad parameters have been assumed to run the simulation:
  - Number of ambient bounces: 4
  - Number of ambient divisions: 500
  - Number of ambient super samples: 100
  - Ambient resolution: 500
2. Since the floor plans changes for every floor, simulation for every floor is run.
3. The analysis grid for simulation is constructed at 0.5m from the floor with a grid size of 0.3m
4. The following assumptions for surface reflectance are made for the model.
  - All walls and columns: 60%
  - Ceiling: 80%
  - Floor: 20%
  - Shading: 60%
  - Glazing:
    - a. Podium Floor - 80 Visible Light Transmission
    - b. First & Second Floor – 50 Visible Light Transmission
    - c. Third, Fourth & Fifth Floor – 39 Visible Light Transmission
5. The areas that have been excluded from compliance and so for this simulation are support areas. This includes all staircase lobbies, lift lobbies, storage areas, corridors, washrooms, and other unoccupied spaces.

## Results

Floor Name	Total Regularly Occupied Area (SQ. M.)	Total Regularly Occupied area with Day Light (SQ. M.)	DAYLIT %
Podium Floor	965	669.5	69
1 <sup>st</sup> Floor	2051	1563	76
2 <sup>nd</sup> Floor	2051	1548	75
3 <sup>rd</sup> Floor	2041	1525	75
4 <sup>th</sup> Floor	2096	1630	78
5 <sup>th</sup> Floor	1546	1178.5	76
<b>TOTAL</b>	<b>10750</b>	<b>8114</b>	<b>75</b>

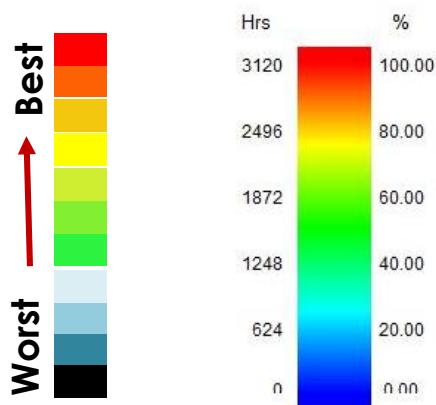
## Day Lighting Evaluation Methodology:

Metrics used for evaluating Day Light

- Useful Day light illuminance (UDI)

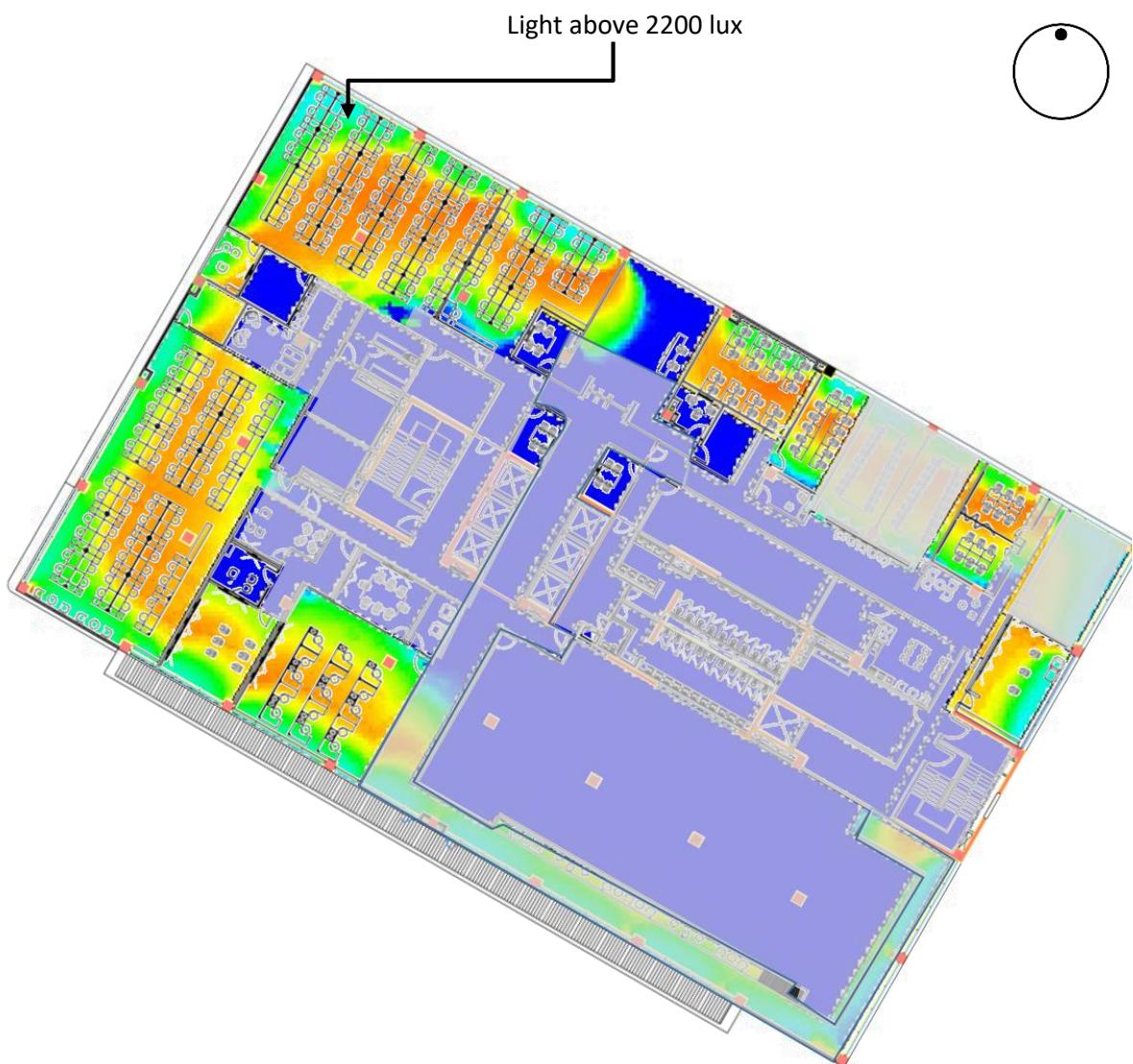
*Useful Day Light Illuminance (UDI): 110 to 2200 lux*

- UDI is the annual occurrence of illuminance distribution across the working plane that is within a range of 100 to 2000 lux considered “useful” by occupants
- High UDI % suggest that the entire floor area of the space under evaluation has Adequate day light throughout the year.

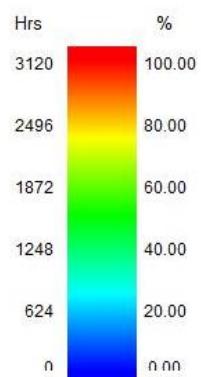


# Daylight Analysis Report

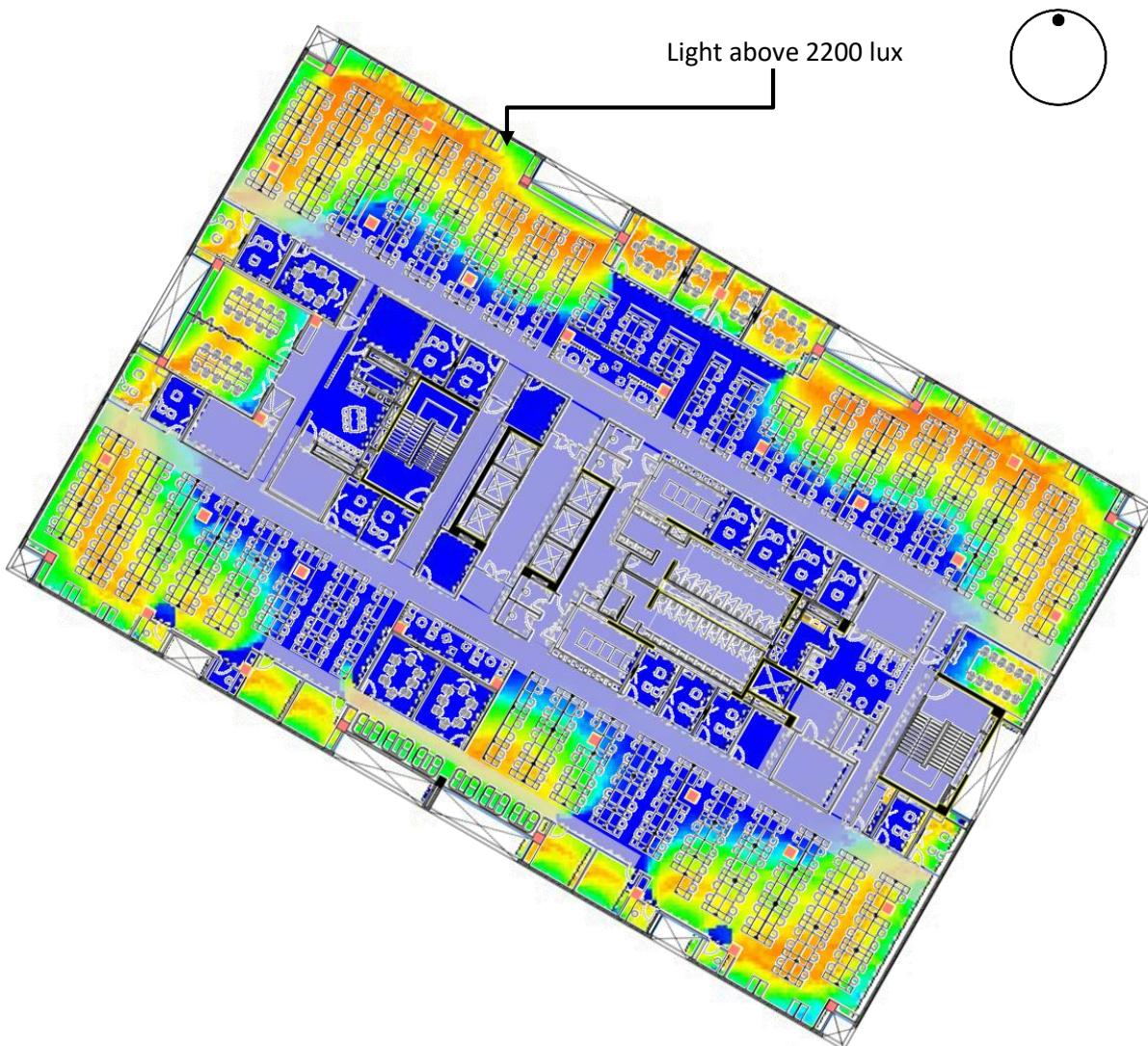
**Table 1:Floor Plan Images with daylighting levels**



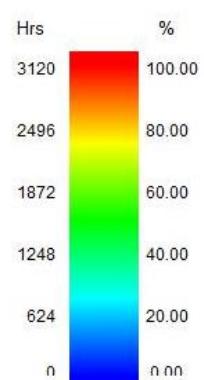
**Figure 2: Podium Floor**



Non regularly occupied areas



**Figure 3: 1st Floor**



Non regularly occupied areas

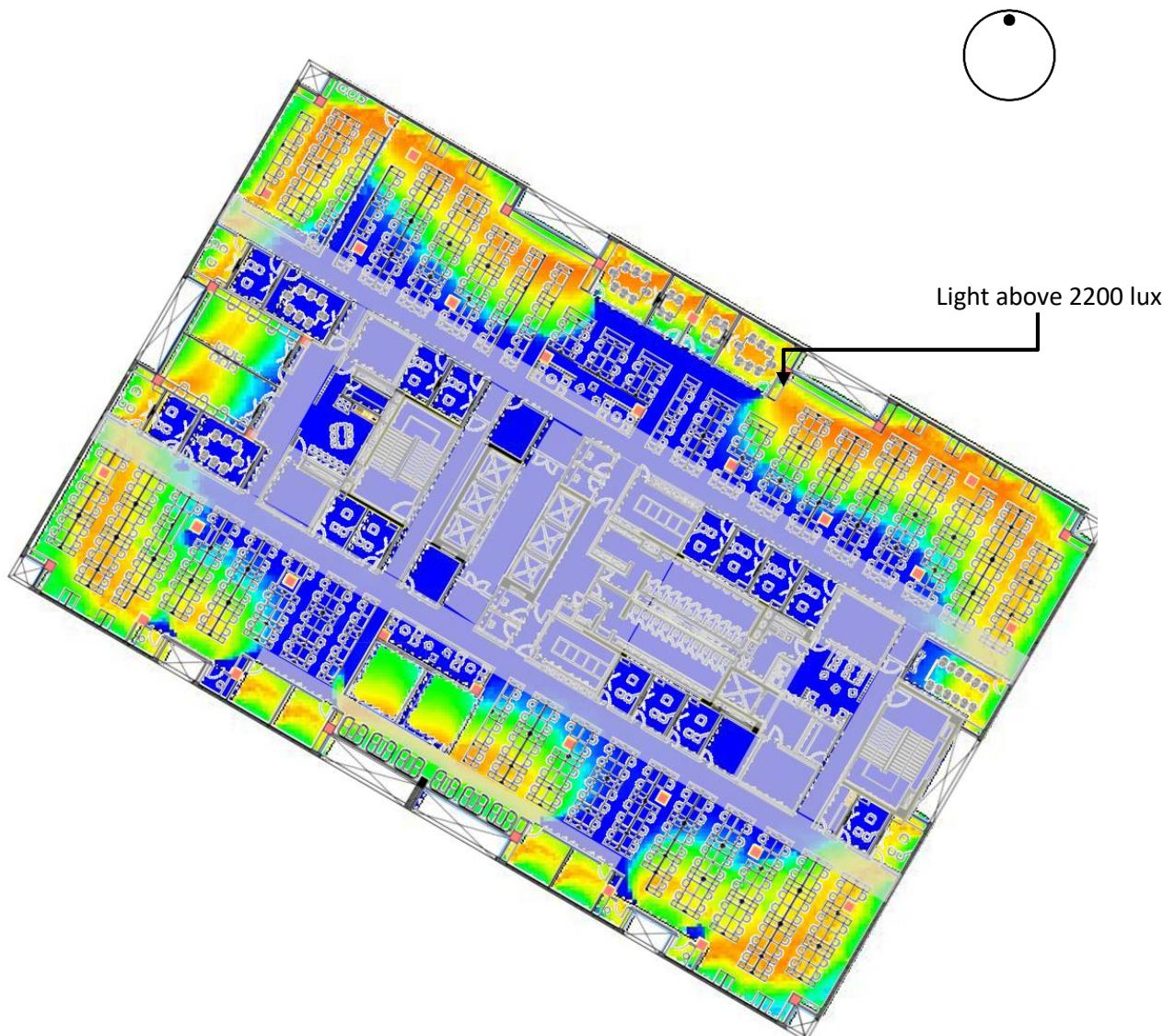
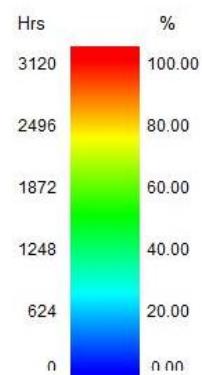


Figure 4: 2nd Floor



Non regularly occupied areas

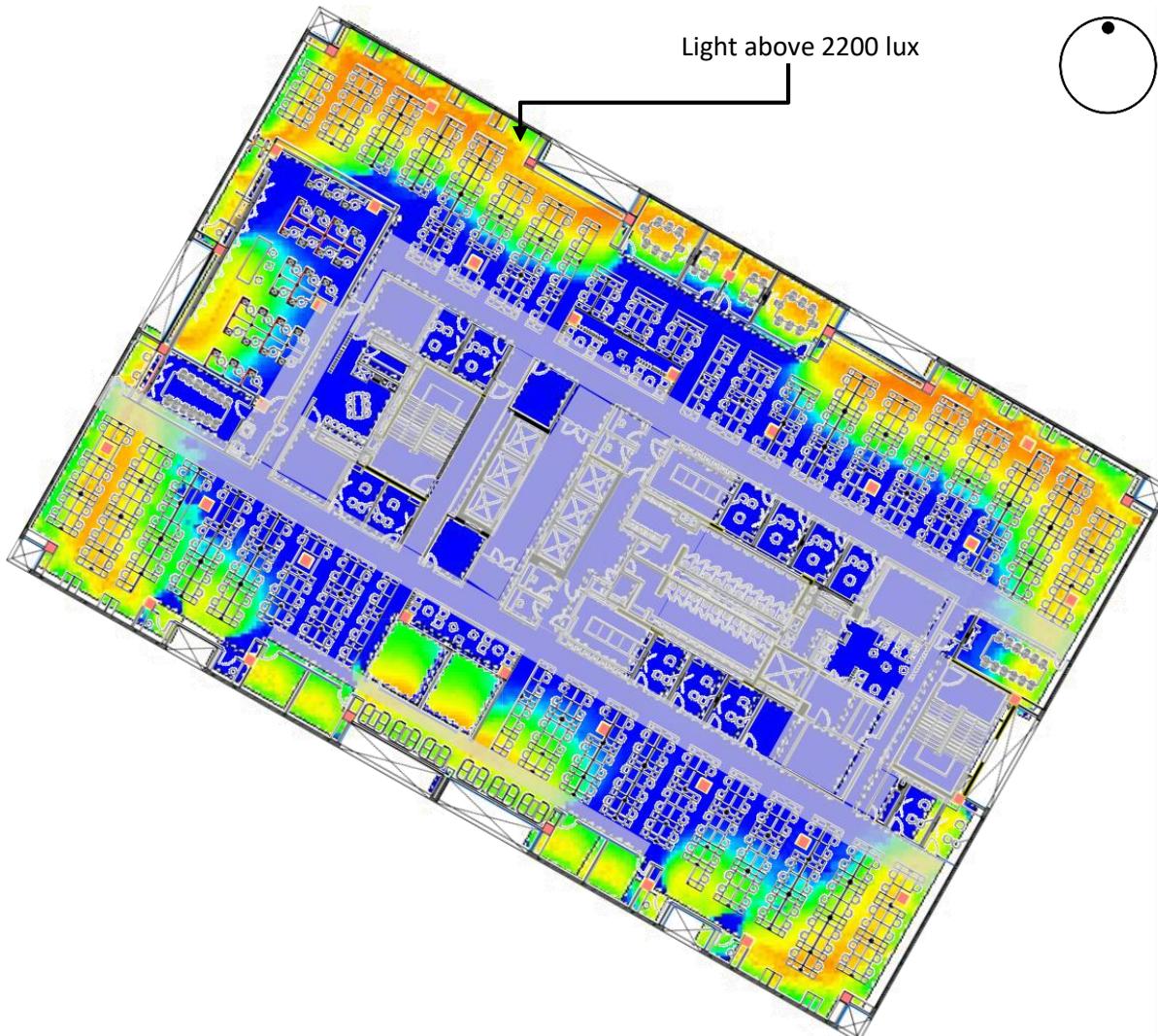
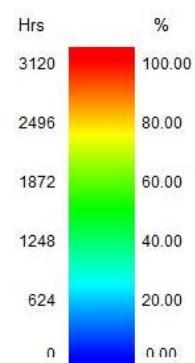


Figure 5: 3rd Floor



Non regularly occupied areas

## Daylight Analysis Report

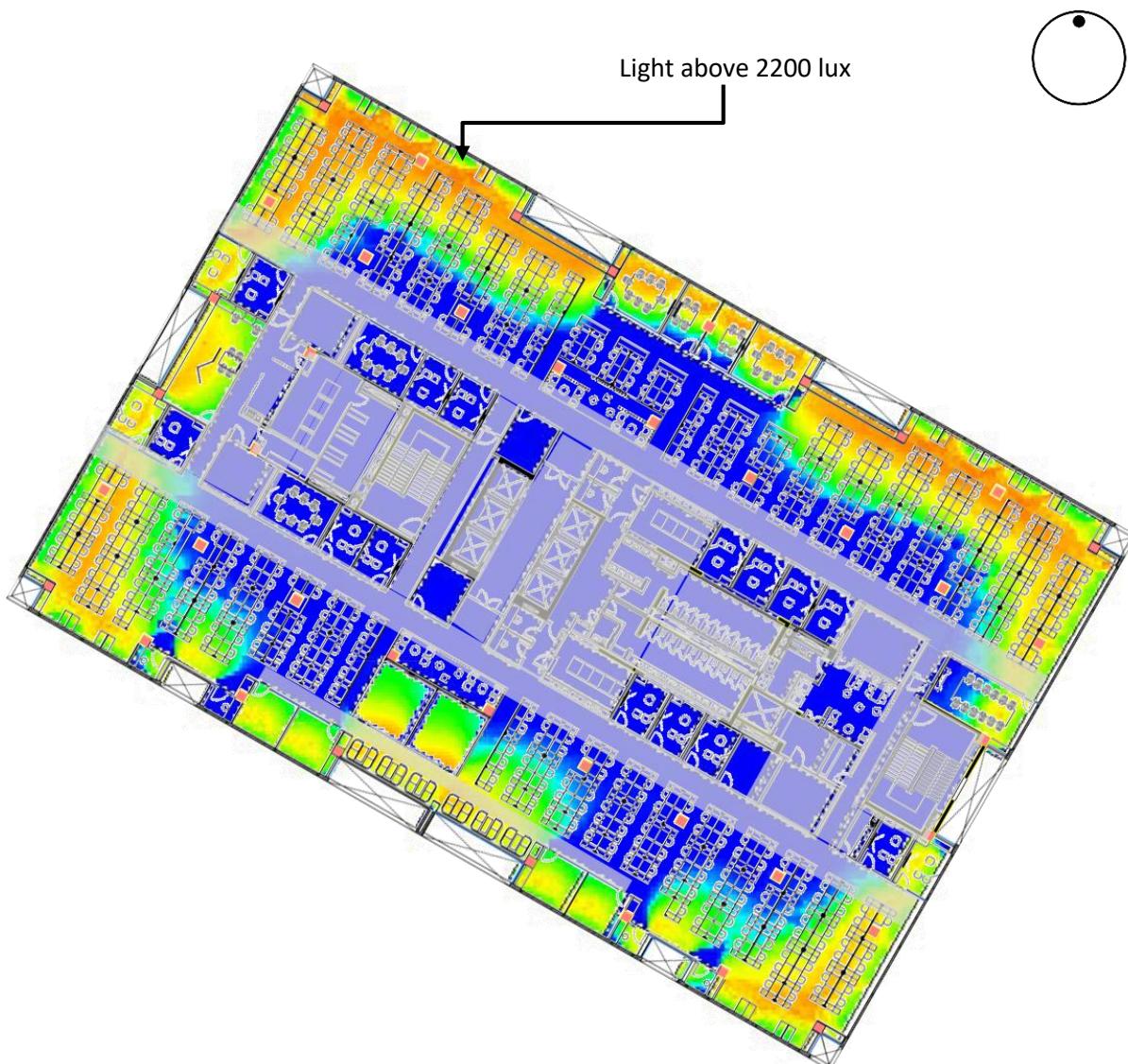
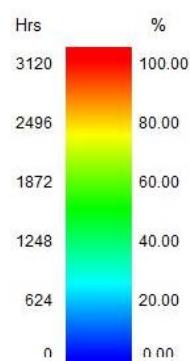
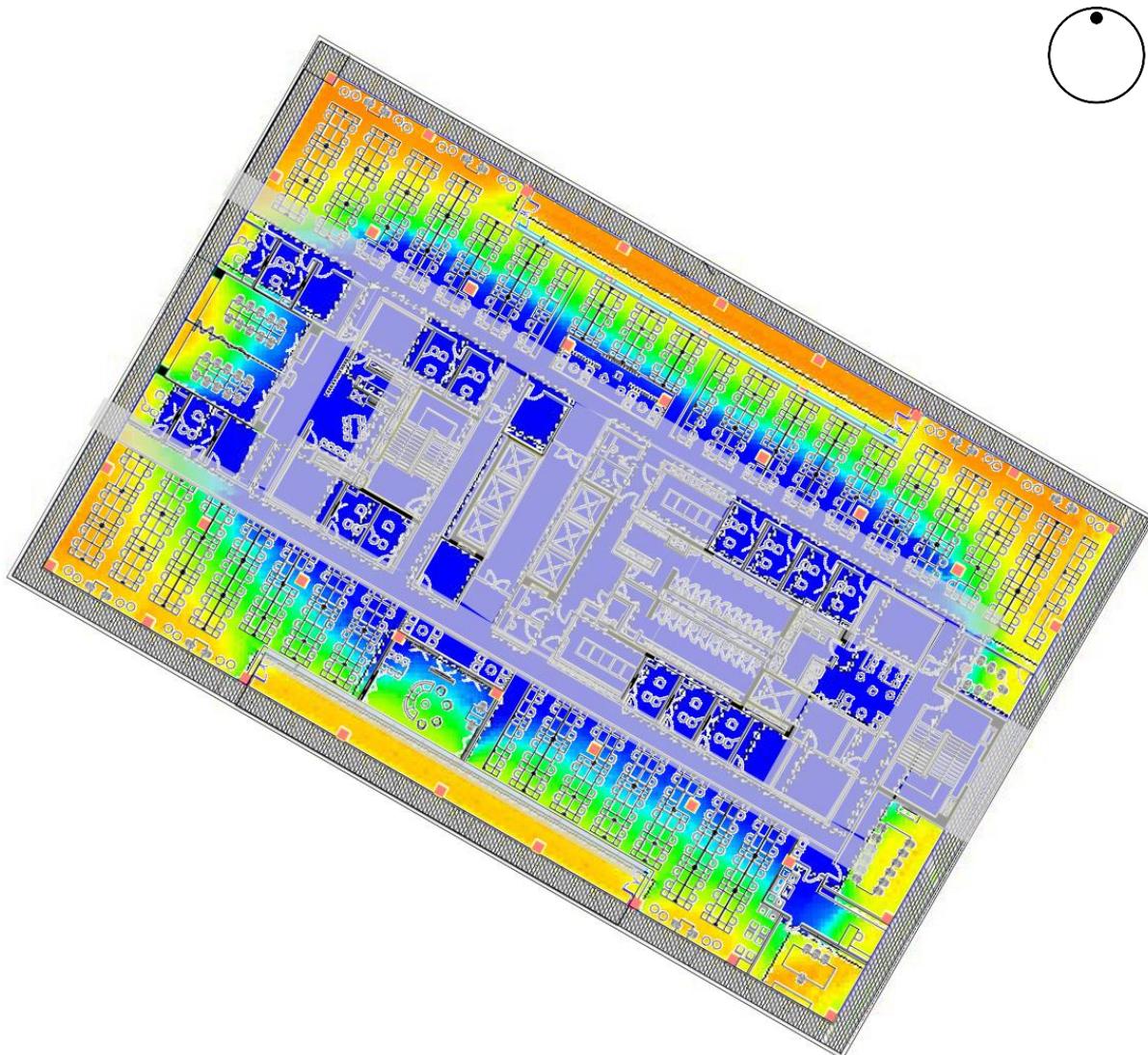


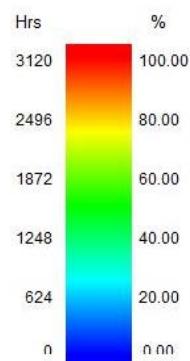
Figure 6: 4th Floor



Non regularly occupied areas



**Figure 7: 5th Floor**



Non regularly occupied areas