

Golden Lane Estate

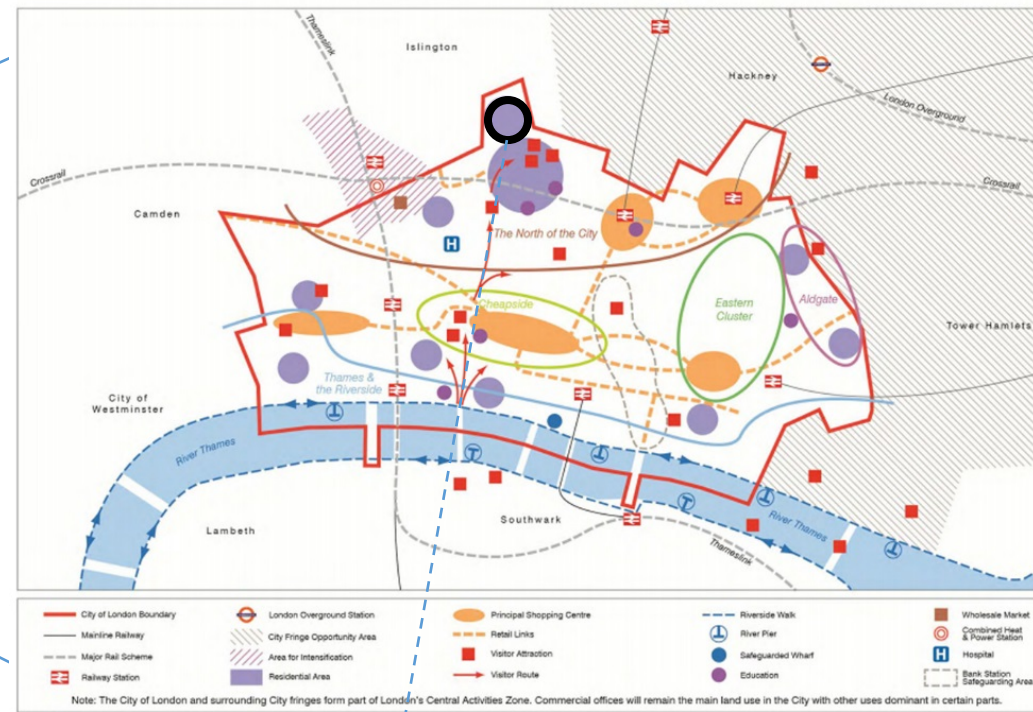
Since 1957



INTRODUCTION

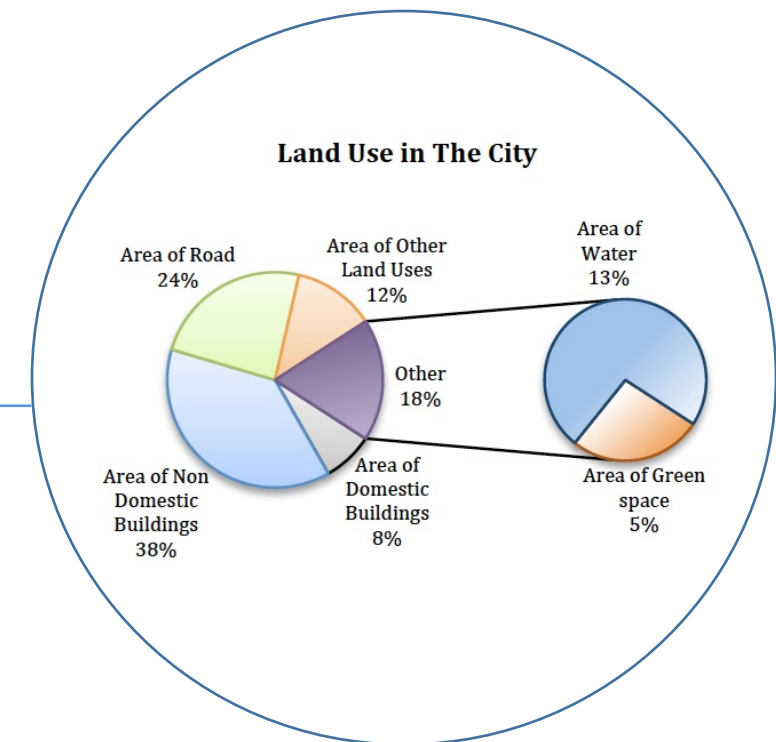


London



Source: City of London, Local plan, Jan 2015, pg. 18

City Of London



Source: http://blogs.lse.ac.uk/sustainability/2014/09/26/urban_greening/

City Of London

- The City is a major business and financial centre.
- Throughout the 19th century, the City was the world's primary business centre.
- Fixed Resident Population: 7,000 (2011)
Non Resident commuting population: 300,000



Source: Google earth

Golden Lane Estate

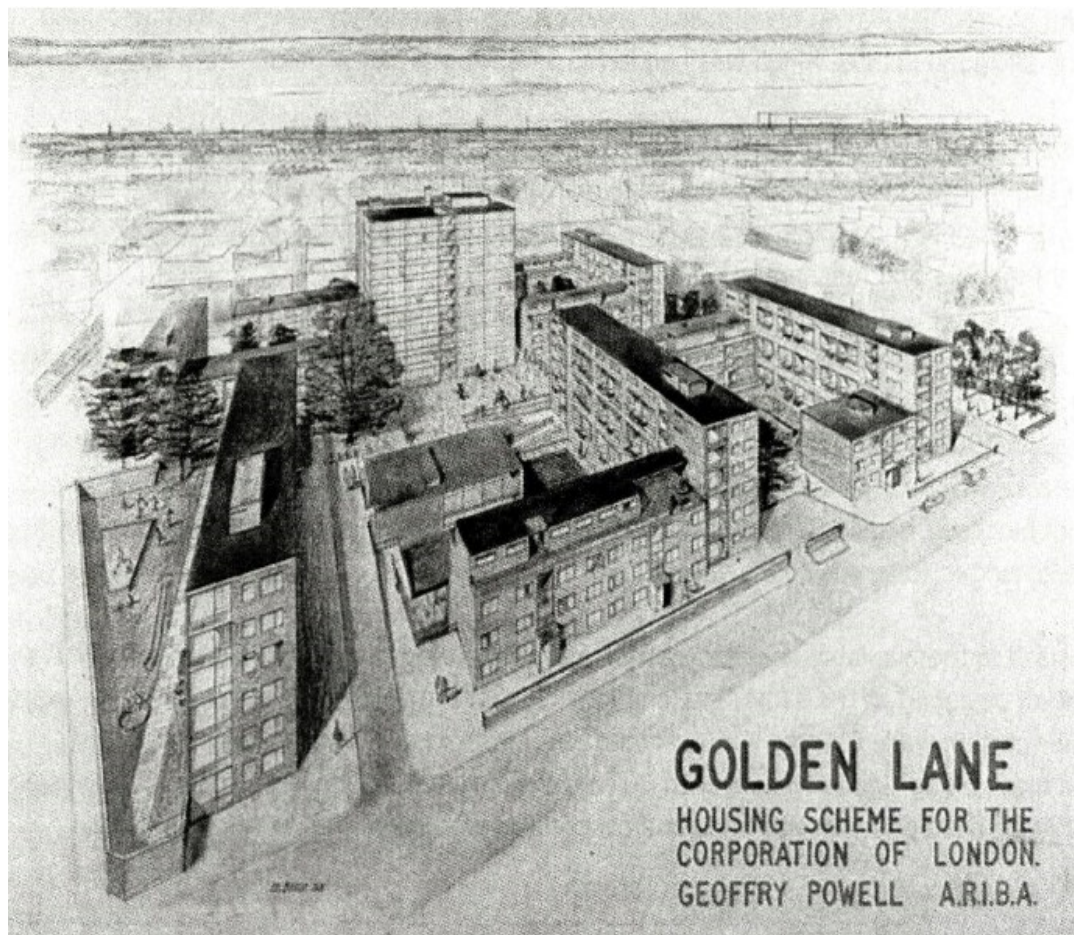
Golden Lane Estate

- The north of the City contains over 50% of the Square Mile's residential population, with the highest concentration at the Barbican and Golden Lane estates.
- Plan to lead the potential development as a 'ecodesign' district by capitalising on mixed use character, improved public transport, low car ownership levels, opportunities for improved cycle infrastructure and the combined cooling heat and power network in the area.

GOLDEN LANE ESTATE

History

- Architects: Chamberlin, Powell and Bonn
- Construction Period: 1953- 1962
- Design Philosophy of Le Corbusier
- Block of 11 storeys as the dominating feature and 12 low blocks and a community centre all arranged as an inward looking layout around a series of courts- an urban village
- Each dwelling had central heating and hot water system.
- The buildings are Grade II and II* listed.



Source: Twentieth Century Architects: Chamberlin, Powell & Bon by Elain Hardwood

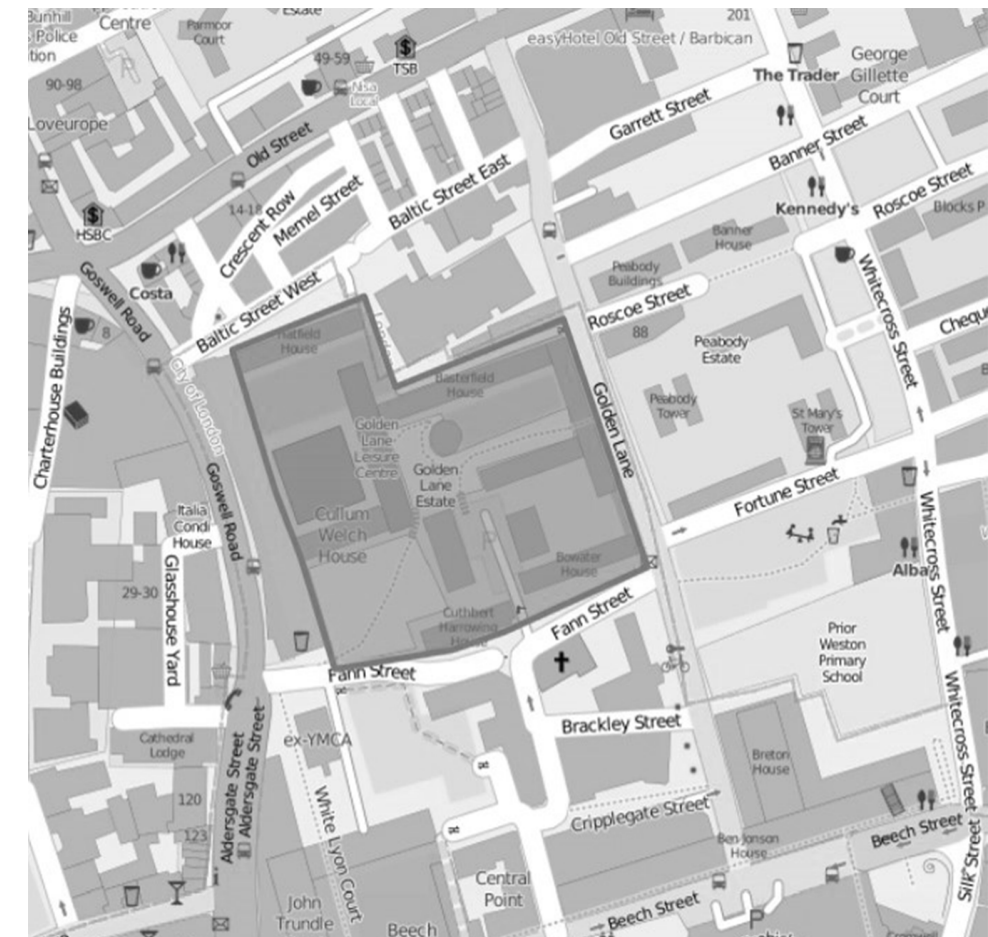


Source: Twentieth Century Architects: Chamberlin, Powell & Bon by Elain Hardwood

- In mid 19th century because of the 2nd world war , the population of the city dropped from 130,000 to just 5,000 by 1952.
- Housing estates were developed to bring back the displaced population into the centre.
- Business and commerce had become the main uses of land in the City.

The Competition

- The construction of the scheme had to be economical and the minimum amount of steel was to be specified as this was an expensive and scarce material after the war.
- It lead to the use of brick masonry built as a frame structure as well as load bearing.
- Other requirements:
 - Daylight and ventilation, especially to living rooms and bathrooms.
 - A drying room or cupboard and a balcony sufficiently large.

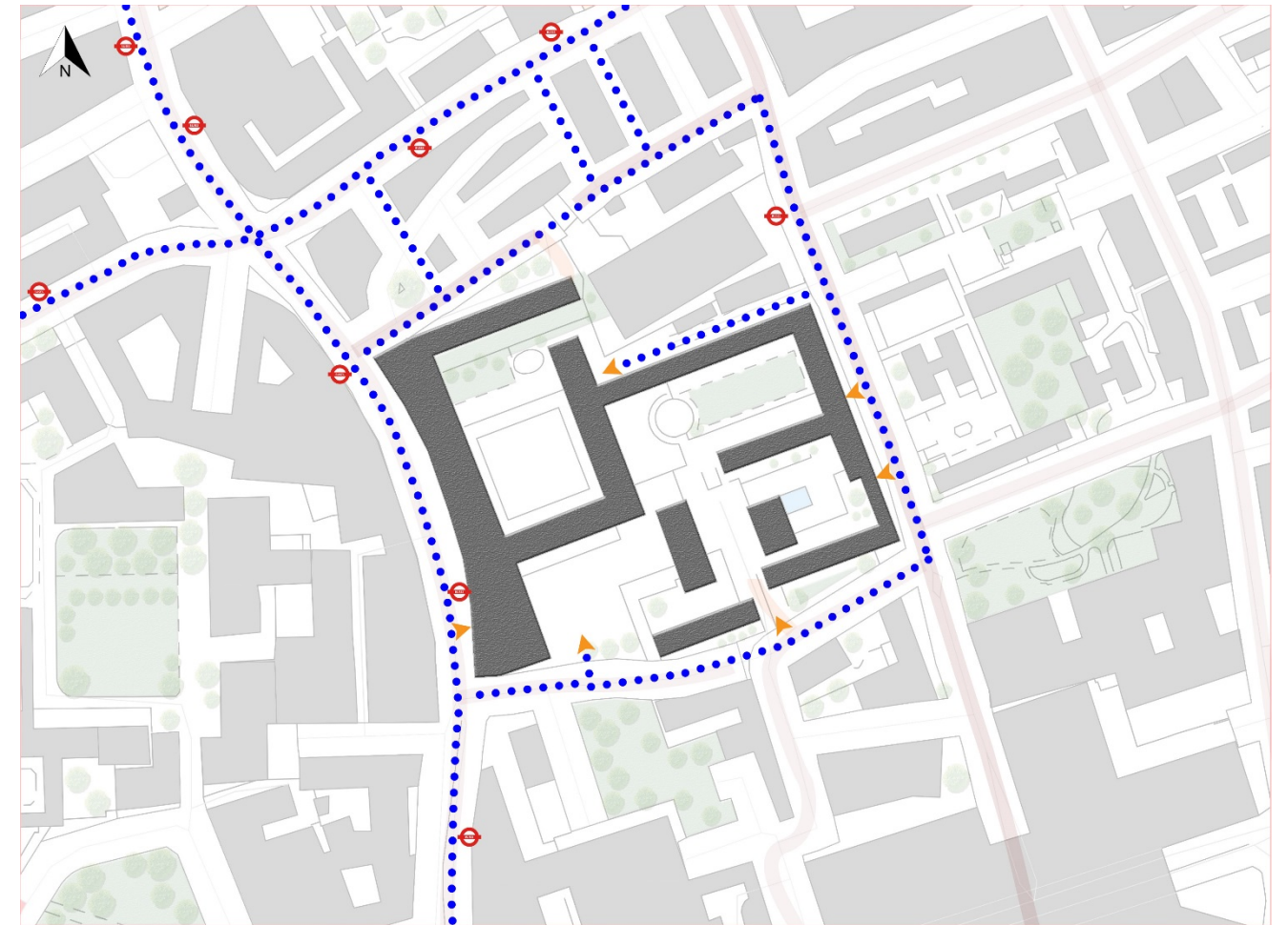


Source: http://www.wikiwand.com/en/Golden_Lane,_London

SITE CONTEXT



Traffic Route



Pedestrian Route



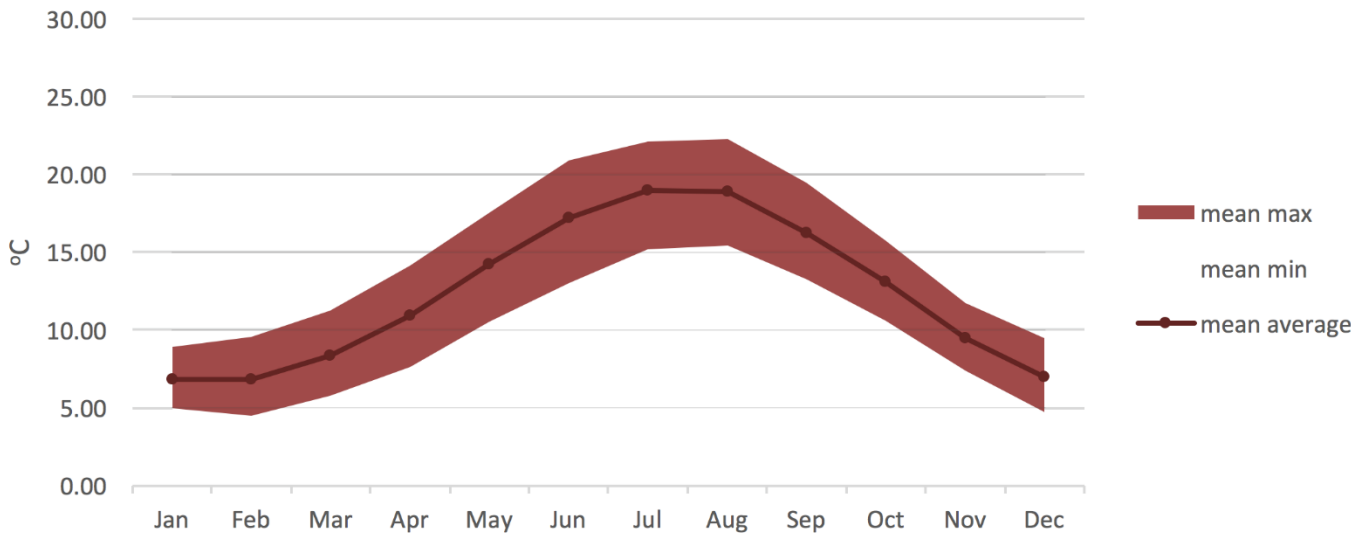
Green Areas



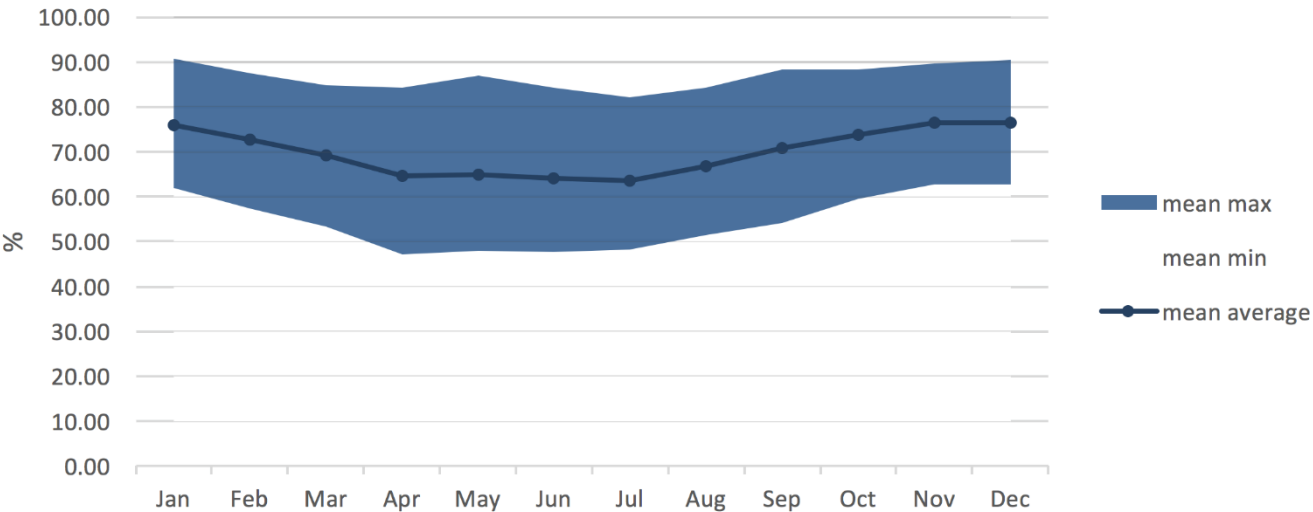
Building Heights

CLIMATE OF LONDON

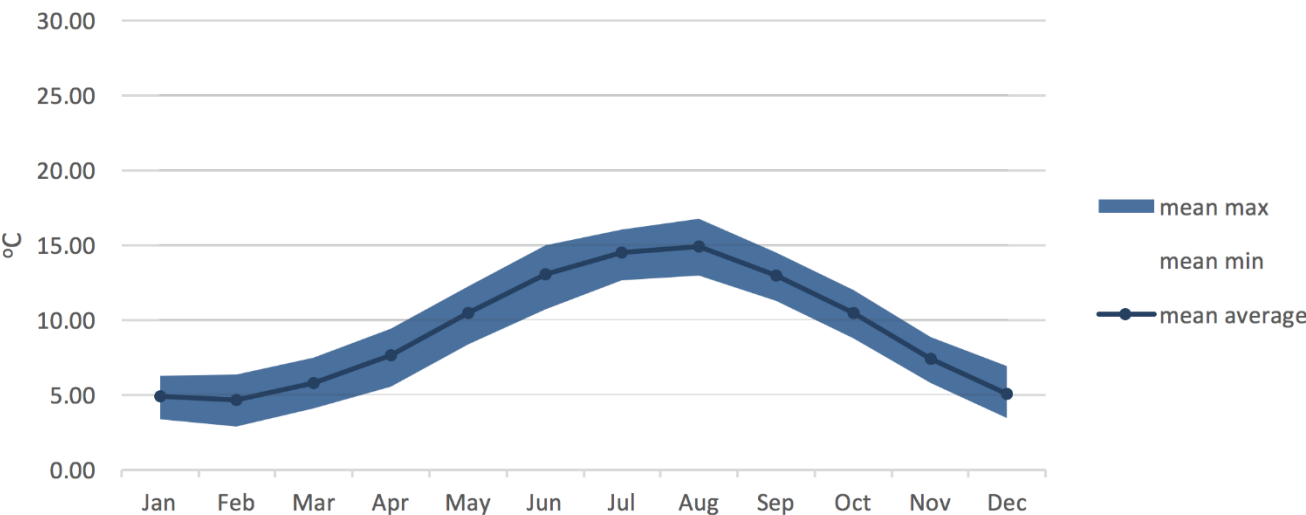
Monthly Average Dry Bulb Temperature



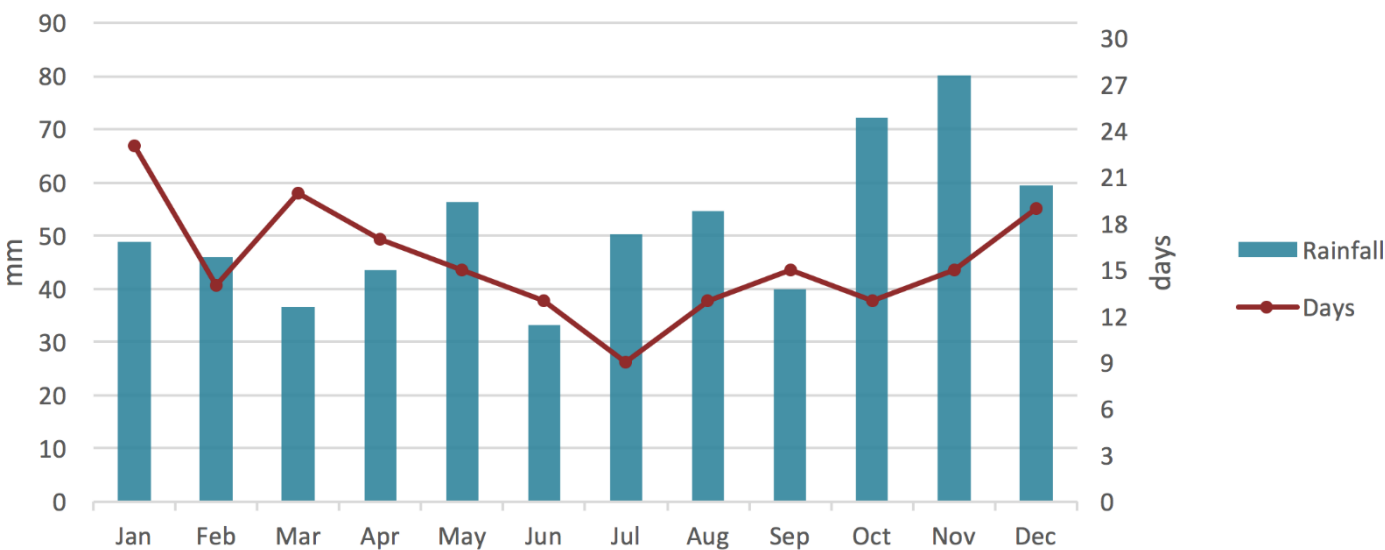
Monthly Average Relative Humidity



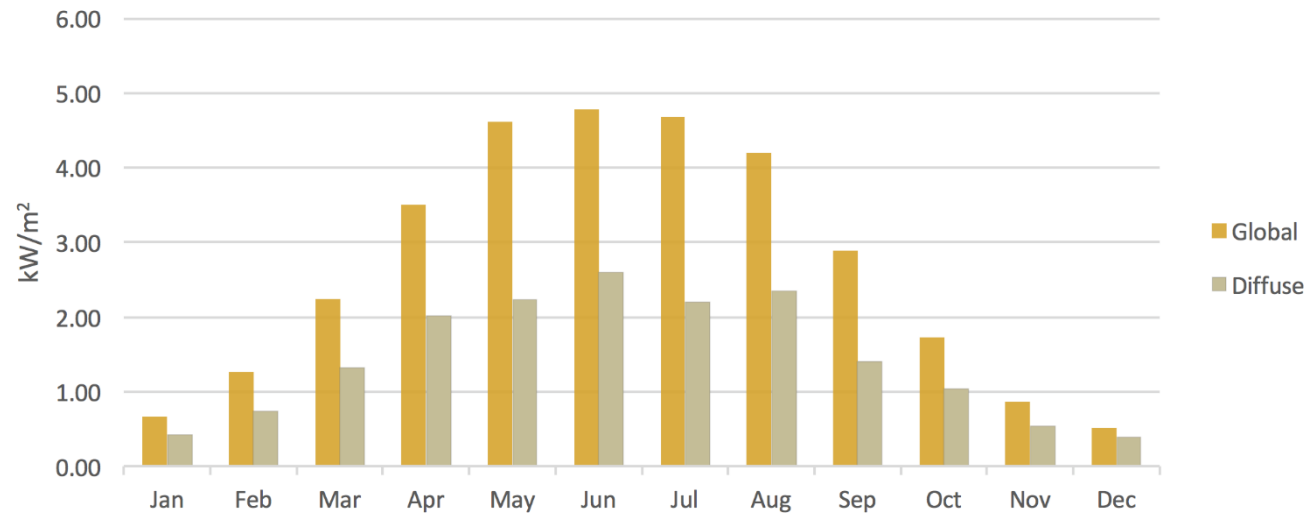
Monthly Average Wet Bulb Temperature



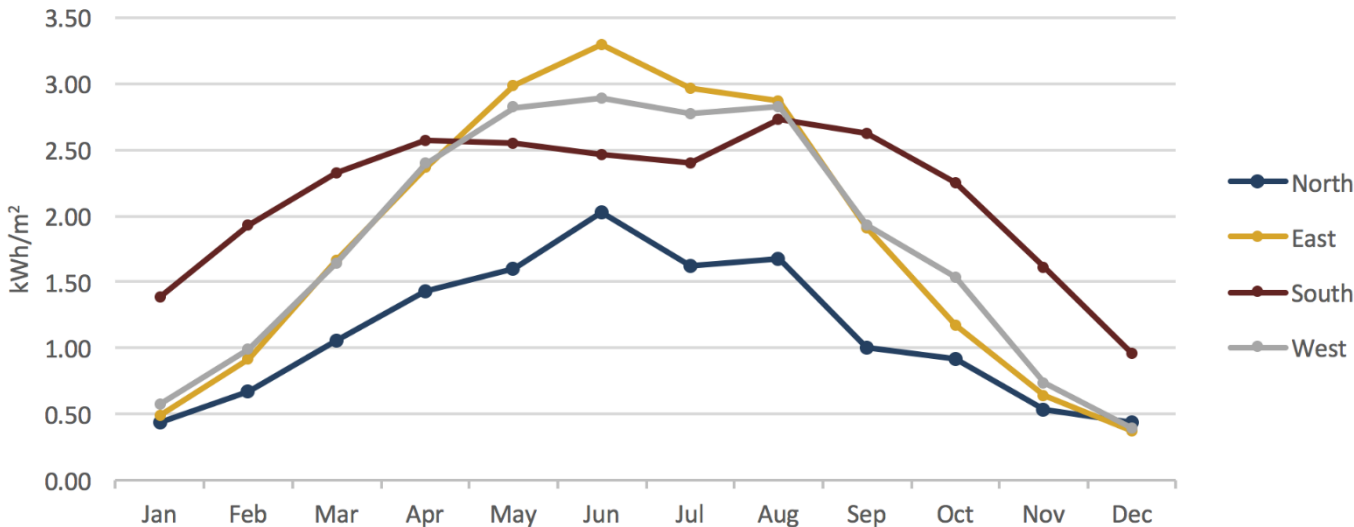
Cumulative Rainfall



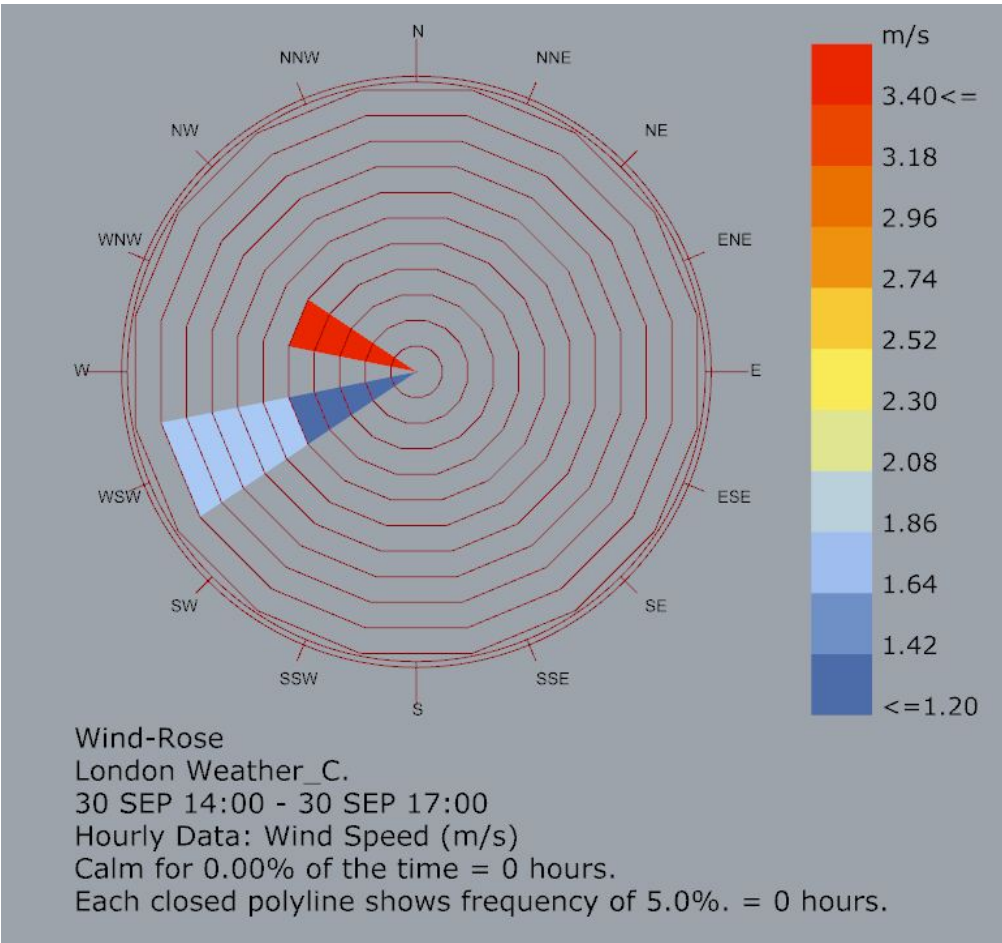
Daily Average Horizontal Radiation



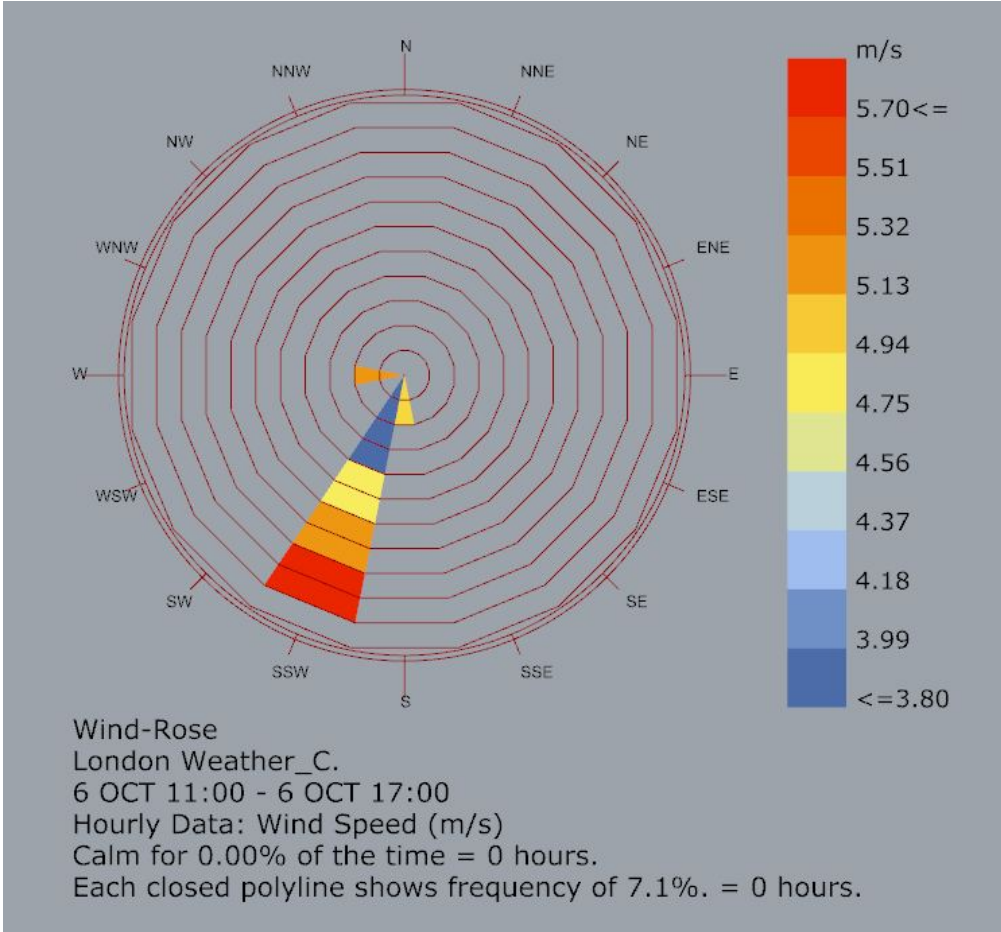
Monthly Average Global Vertical Radiation



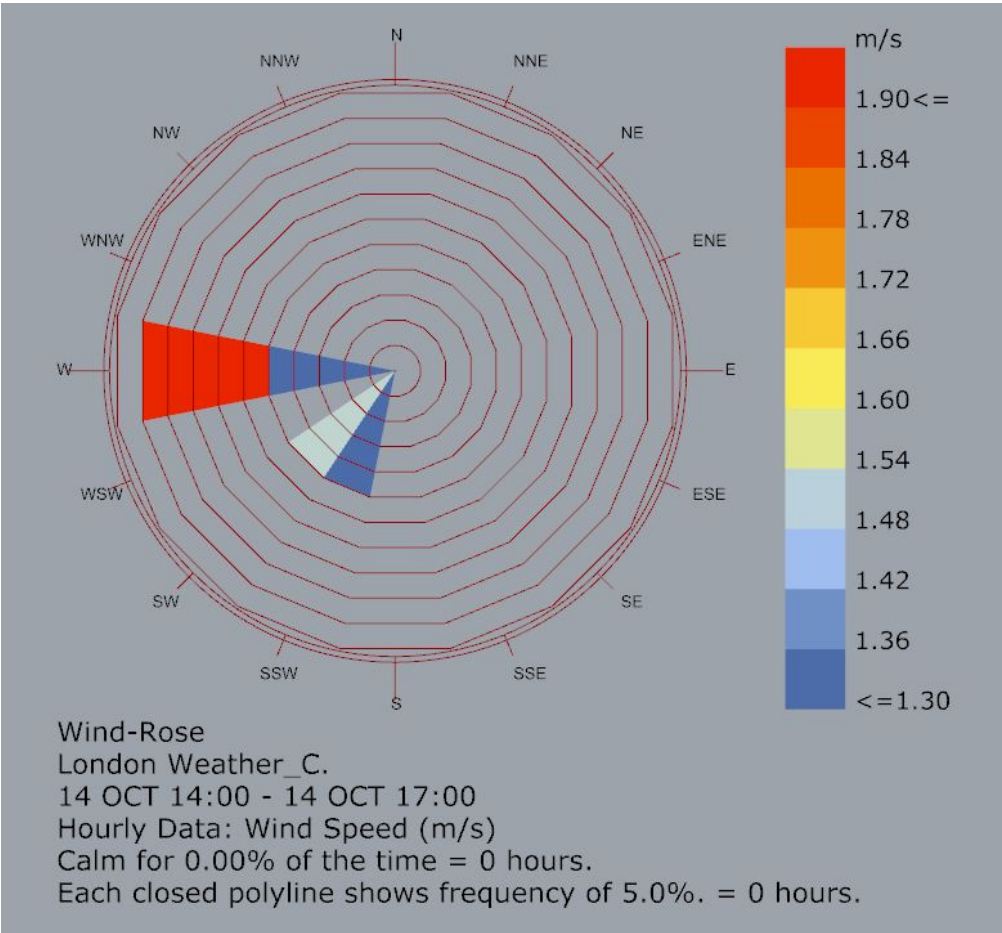
WIND PATTERN ANALYSIS



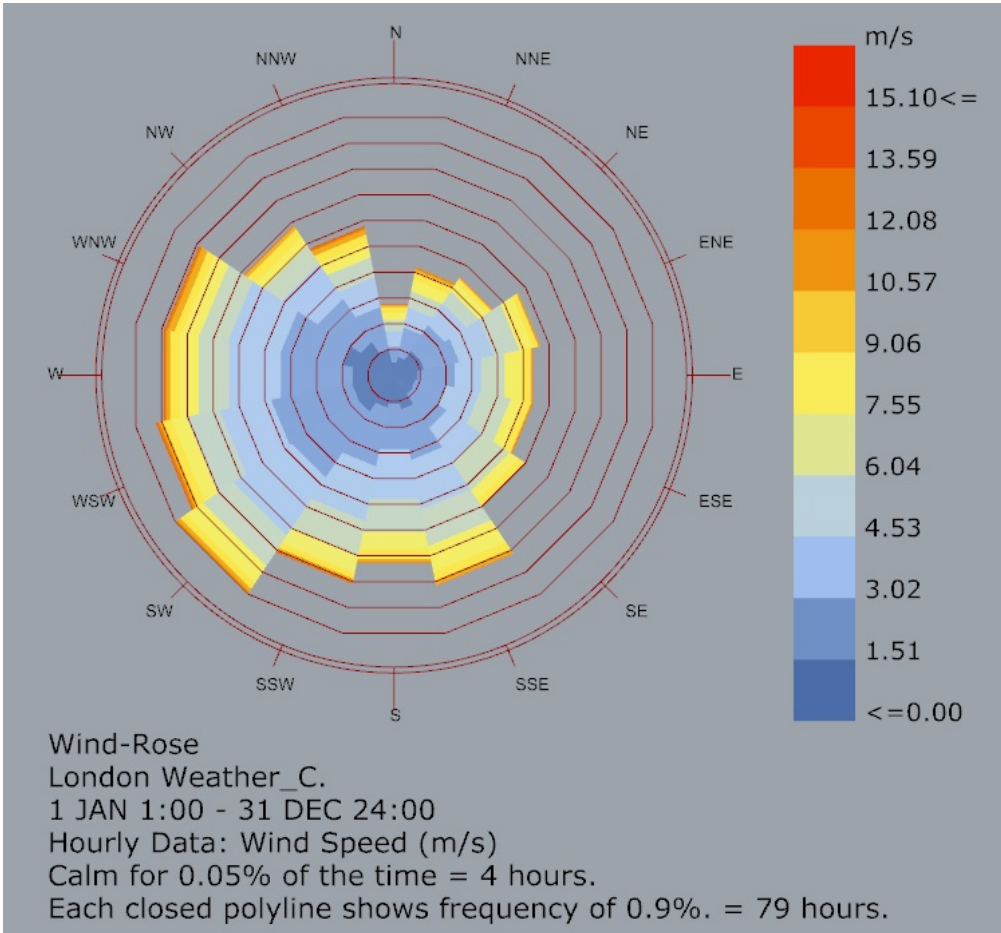
30 SEPTEMBER



6 OCTOBER

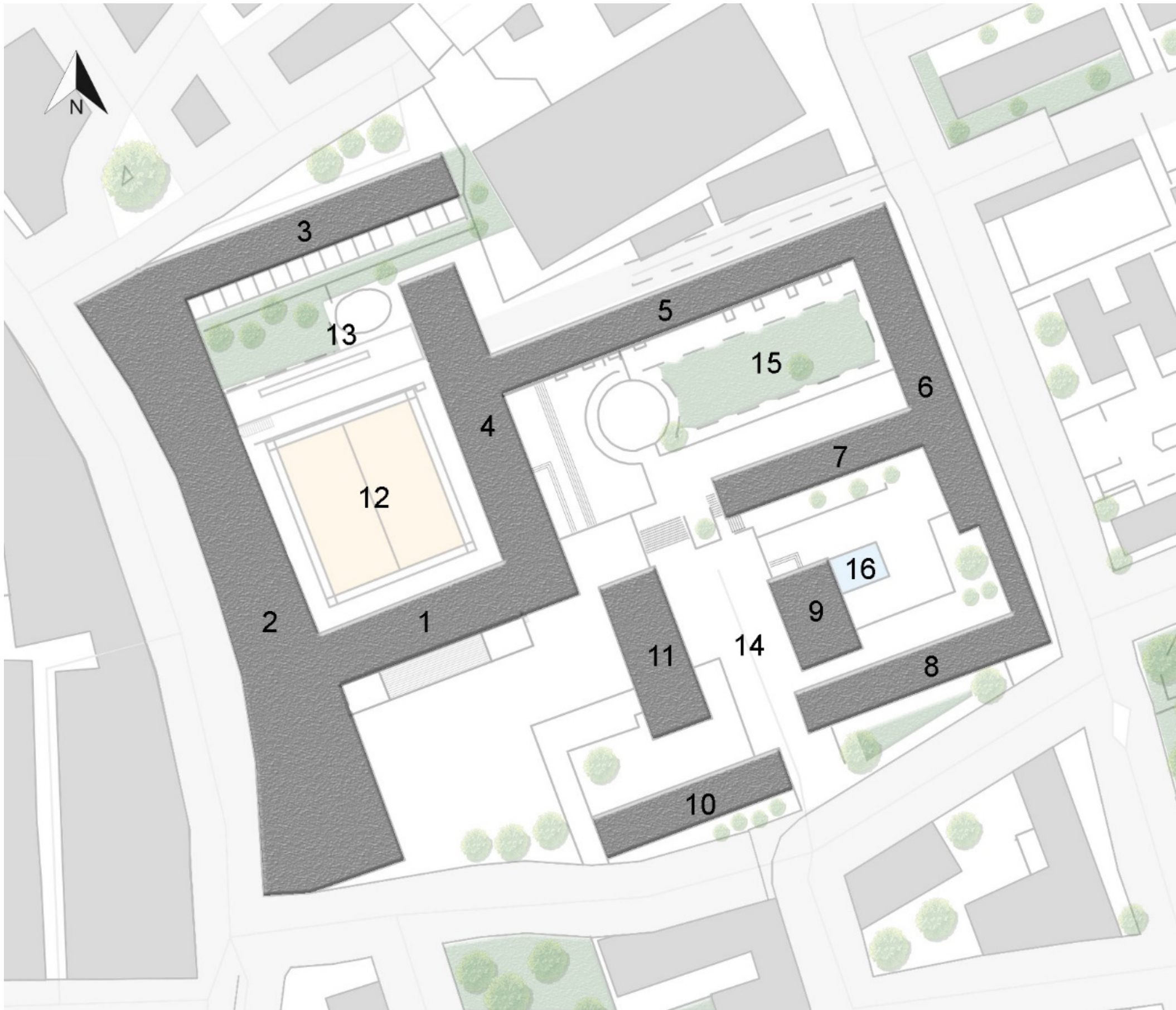


14 OCTOBER



ENTIRE YEAR

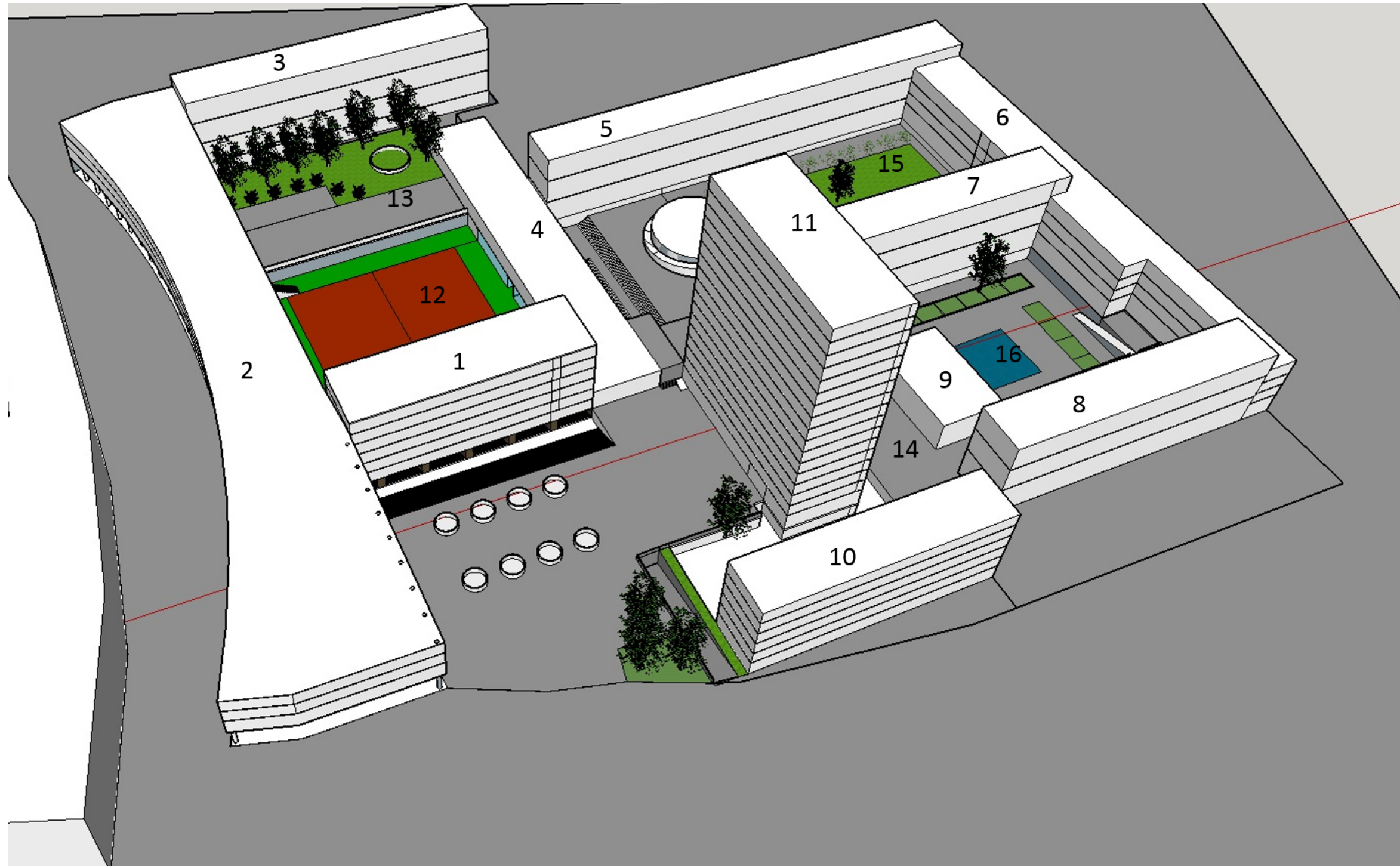
SITE PLAN



LEGENDS:

1. CULLUM WELCH HOUSE
2. CRESCENT HOUSE
3. HOTFIELD HOUSE
4. SWIMMING POOL/ BATH
5. BASTERFIELD HOUSE
6. STANLEY COHEN HOUSE
7. BAYER HOUSE
8. BOWATER HOUSE
9. COMMUNITY BUILDING
10. CUTHBERT HARROWING
11. GREAT ARTHUR HOUSE
12. TENNIS COURT
13. PLAY AREA
14. OPEN PARKING
15. GARDEN
16. POND

AERIAL VIEW



LEGEND

1. CULLUM WELCH HOUSE
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SITE CHARACTERISTICS

Total Area 28,000 sq. mtr
 Total Residential building: 9
 No. of Dwellings: 580
 Total Population : Around 1500
 Maisonettes building : 5
 Flat system buildings : 4

MATERIALS:



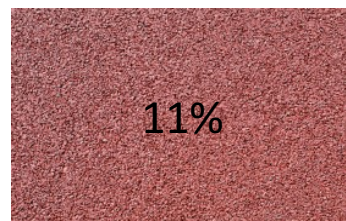
71%

Concrete:19,880
Sq. Mtr



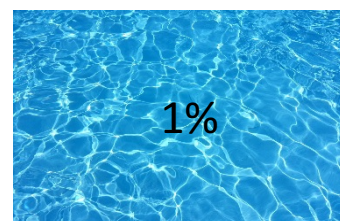
17%

Grass: 4,760
Sq. Mtr



11%

Asphalt: 3,080
Sq. Mtr



1%

Water: 208
Sq. Mtr

Material used and the properties

sl No.	Material	Emmittance	Absorption
1	Brick	0.85 - 0.95	0.65 - 0.8
2	Glass	0.92 - 0.94	0.11
3	Aluminium spandrel panels	0.4 - 0.6	0.3 - 0.5
4	Black paint on rough wall	0.9-0.98	0.85-0.98

SITE PHOTOS



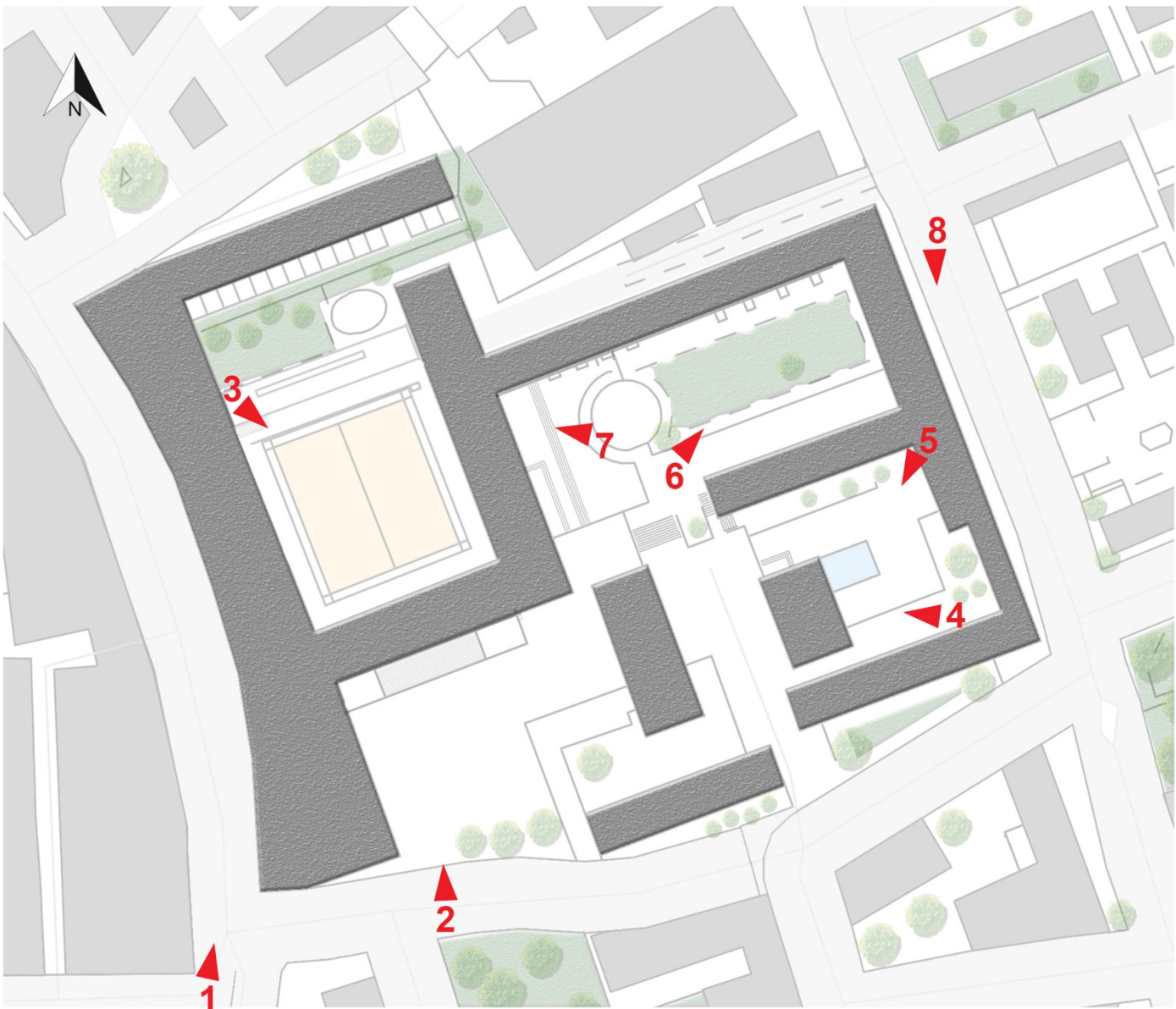
1



2



3



8



7



4



5



6

TOOLS USED FOR MEASUREMENTS



Lux Meter



Anemometer



Decibel Meter



Infrared Thermometer



Data Logger



Data Logger

WEATHER DATA





METEONORM DATA

	Sep	Oct		Sep	Oct		Sep	Oct		Sep	Oct
1	14.6	11.9	1	79	80	1	3.8	3.2	1	0	0
2	14.1	11.6	2	82	81	2	3.7	3.2	2	0	0
3	13.9	11.3	3	83	81	3	3.4	3.3	3	0	0
4	13.6	11.1	4	84	83	4	3.3	3.2	4	0	0
5	13.4	11.0	5	85	84	5	3.4	3.4	5	0	0
6	13.5	10.8	6	85	84	6	3.4	3.7	6	0	0
7	14.1	10.9	7	82	84	7	3.2	3.7	7	5	0
8	15.0	11.7	8	77	81	8	3.0	3.9	8	10	6
9	15.9	12.7	9	72	75	9	3.1	3.6	9	14	11
10	16.9	13.5	10	66	71	10	2.7	3.7	10	18	15
11	17.8	14.2	11	63	66	11	2.9	3.8	11	21	18
12	18.4	14.8	12	60	65	12	3.0	3.9	12	21	20
13	18.8	15.2	13	59	64	13	2.7	3.9	13	21	19
14	19.2	15.6	14	58	63	14	3.0	3.9	14	22	18
15	19.3	15.6	15	57	63	15	3.5	4.0	15	18	13
16	19.2	15.4	16	58	64	16	3.3	3.7	16	14	8
17	18.7	14.8	17	59	66	17	3.3	3.8	17	10	3
18	18.0	14.2	18	63	68	18	3.3	3.8	18	4	0
19	17.4	13.8	19	66	70	19	3.4	3.8	19	0	0
20	16.8	13.5	20	68	72	20	3.7	3.6	20	0	0
21	16.3	13.2	21	71	73	21	3.7	3.4	21	0	0
22	15.8	12.8	22	72	76	22	3.7	3.3	22	0	0
23	15.2	12.5	23	74	77	23	3.4	3.3	23	0	0
24	14.7	12.2	24	76	79	24	3.5	3.3	24	0	0
	Sep	Oct		Sep	Oct		Sep	Oct		Sep	Oct
Daily Average Dry Bulb Temperature (°C)			Daily Average Relative Humidity (%)			Daily Average Air Velocity (m/s)			Daily Average Diffuse Illuminance (klux)		

WEATHER STATION DATA

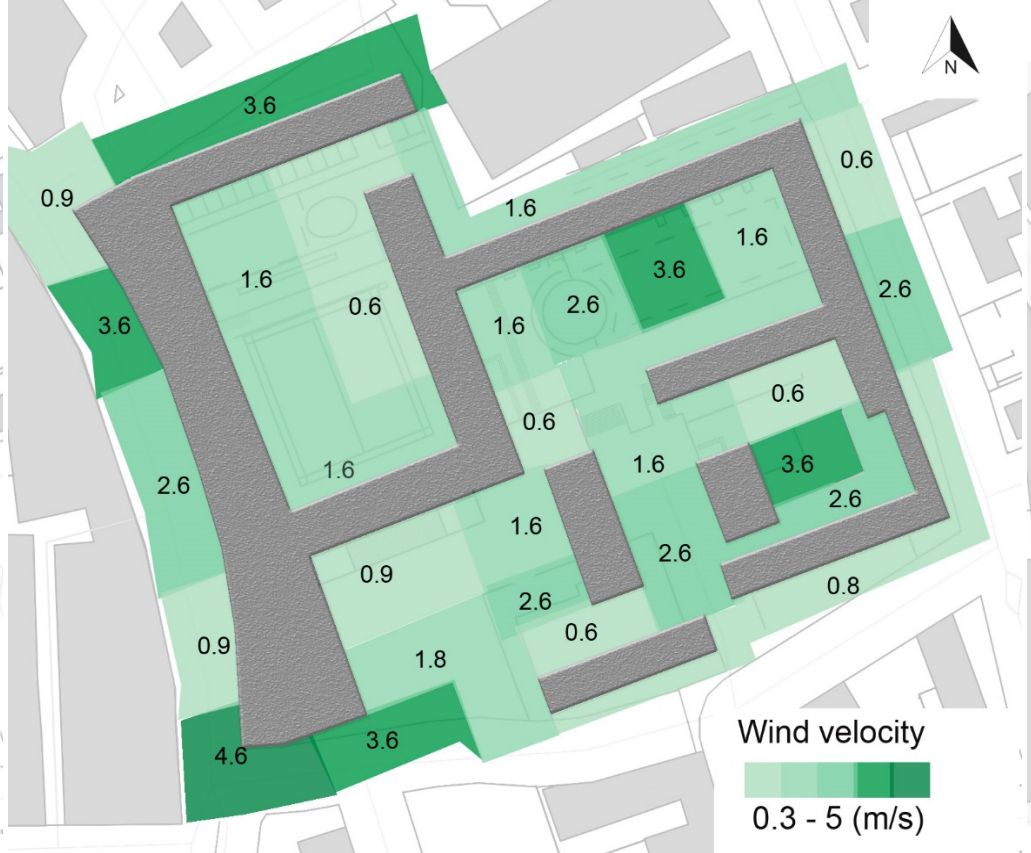
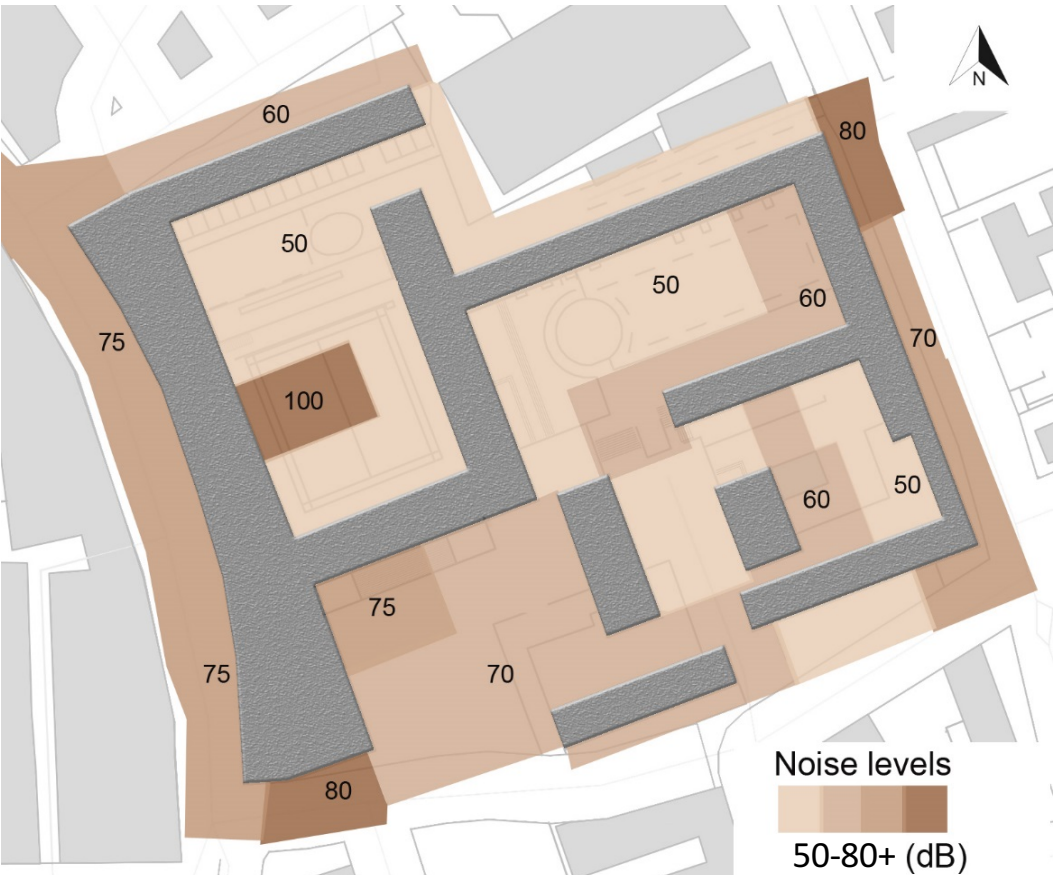
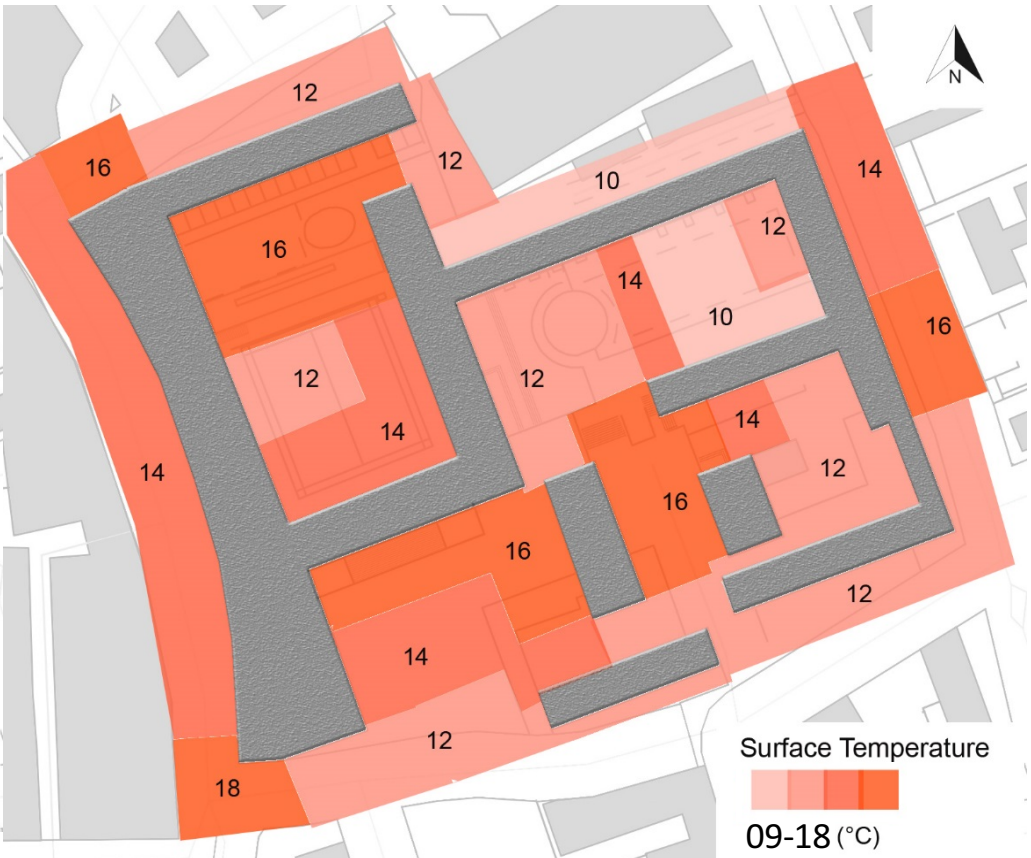
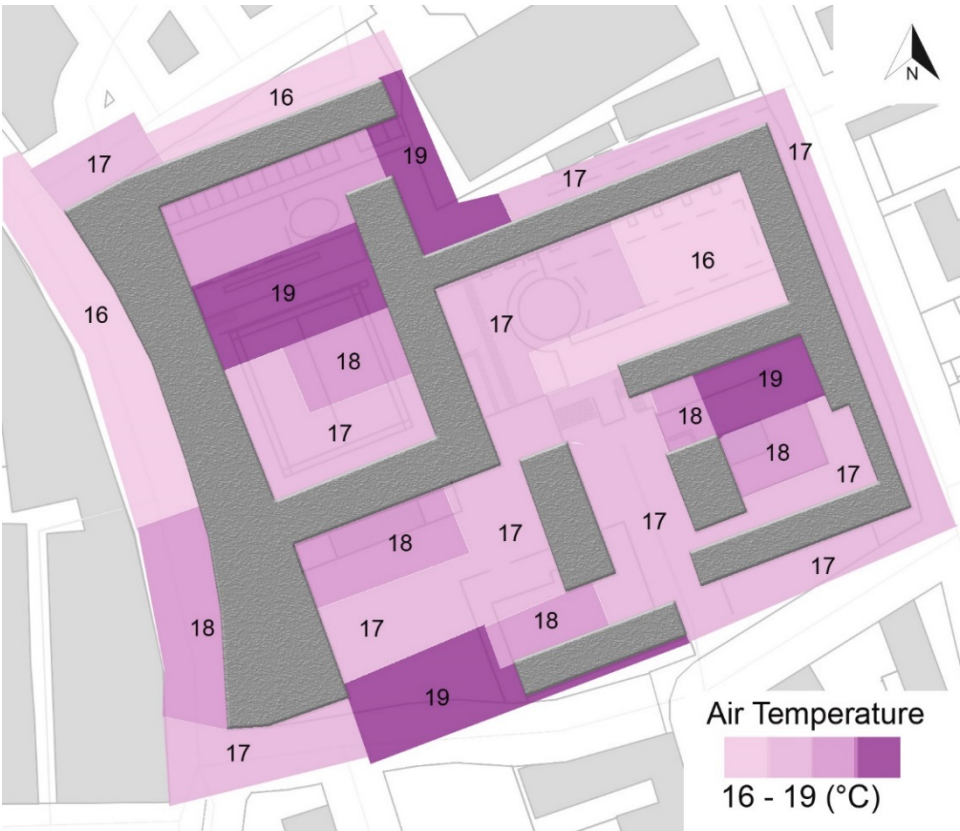
	30 th Sept.	5 th Oct.	6 th Oct.	14 th Oct.
Temperature (Avg)	14.1	13.4	11.4	11.3
RH (Avg)	77.39	62.7	62.7	75.8
Air velocity (Avg)	3.63	6.16	4.51	3.28

AVERAGE ON SITE WEATHER DATA

	 30 th of Sept.	 5 th Oct.	 6 th Oct.	 14 th Oct.
Air Temp. (°C)	21.5	18.4	14.27	15.84
R. Humudity (%)	47.7	45.22	43.83	57.72
Air Velocity (m/s)	1.09	3.60	2.1	0.84
Av D. Illuminance (klux)	28.71	24.26	23.6	11.97

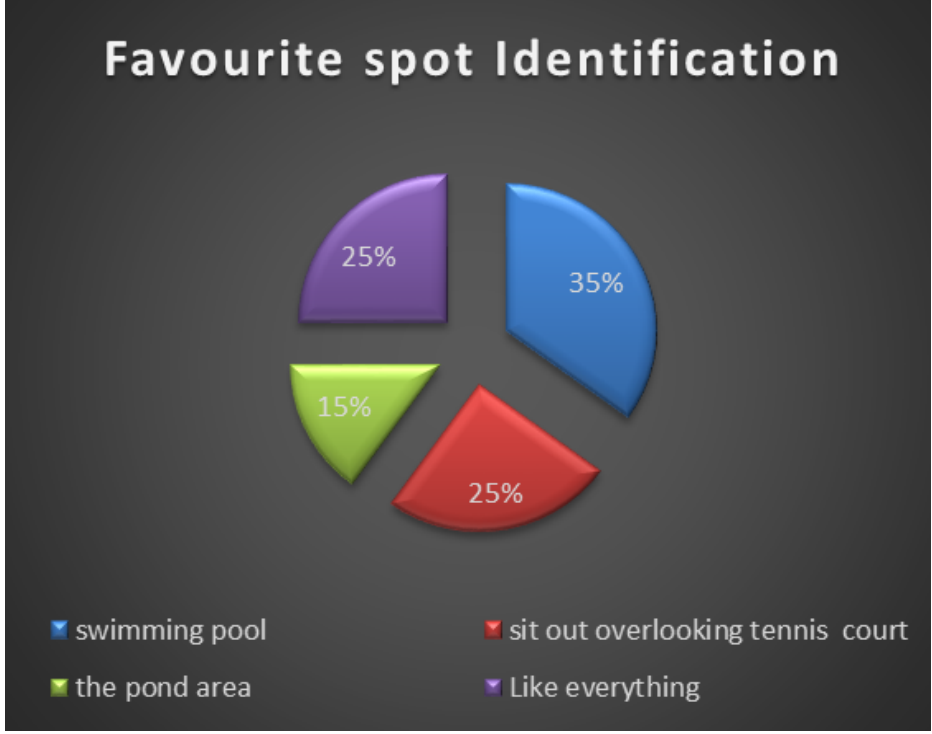
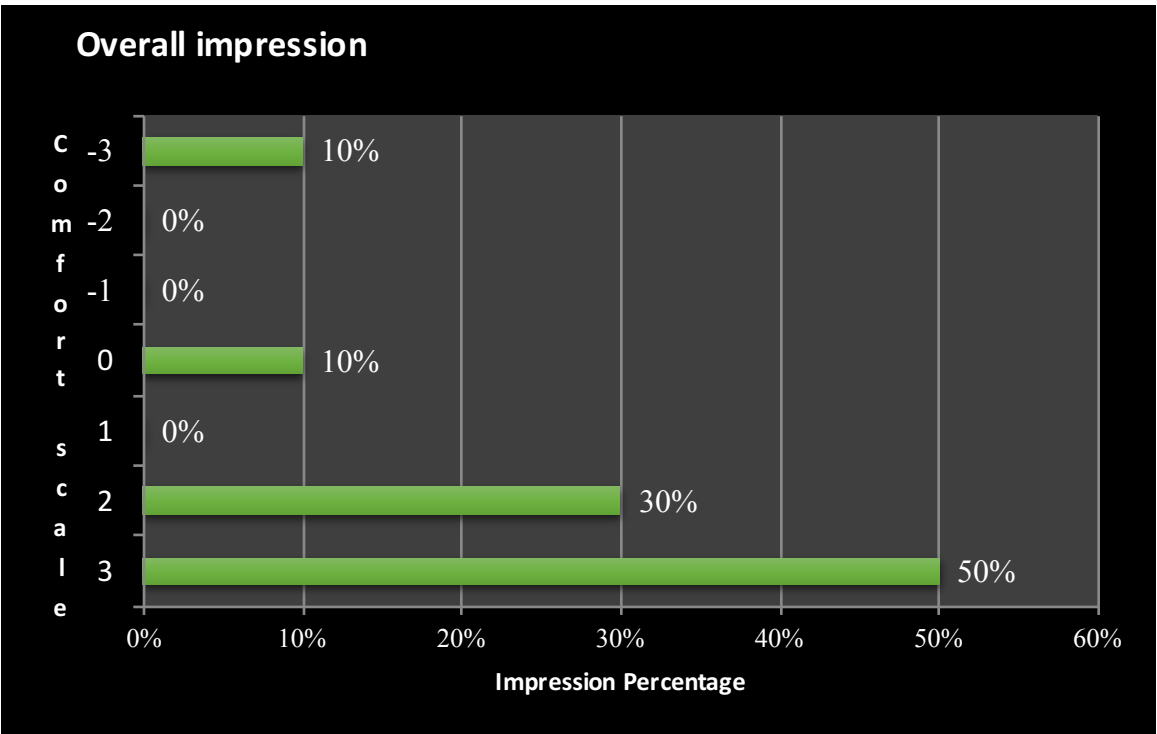
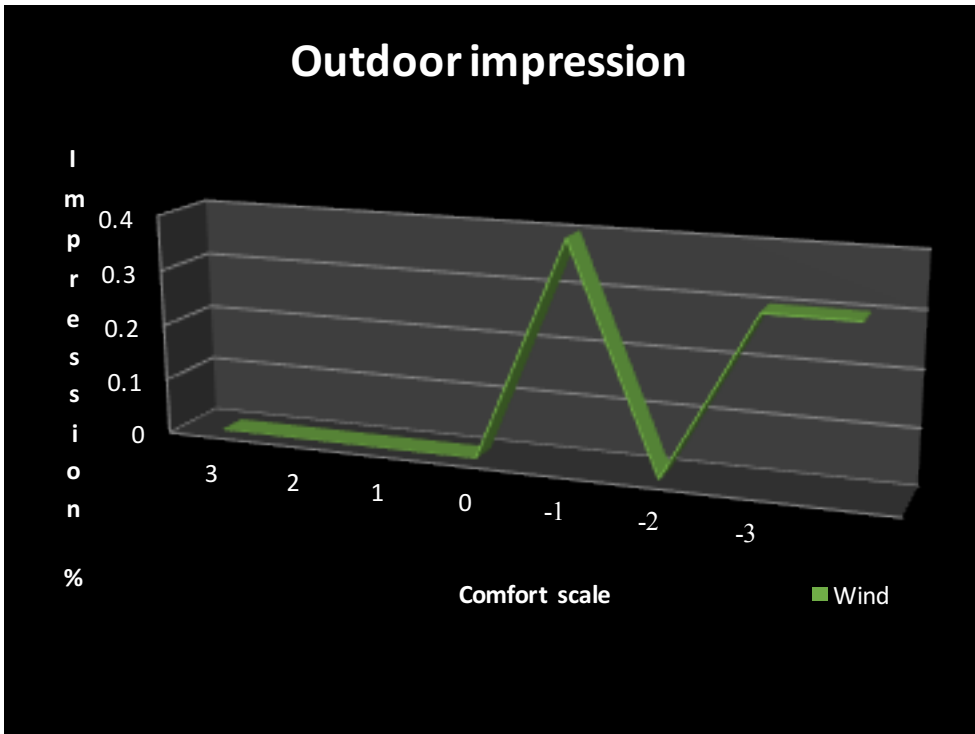
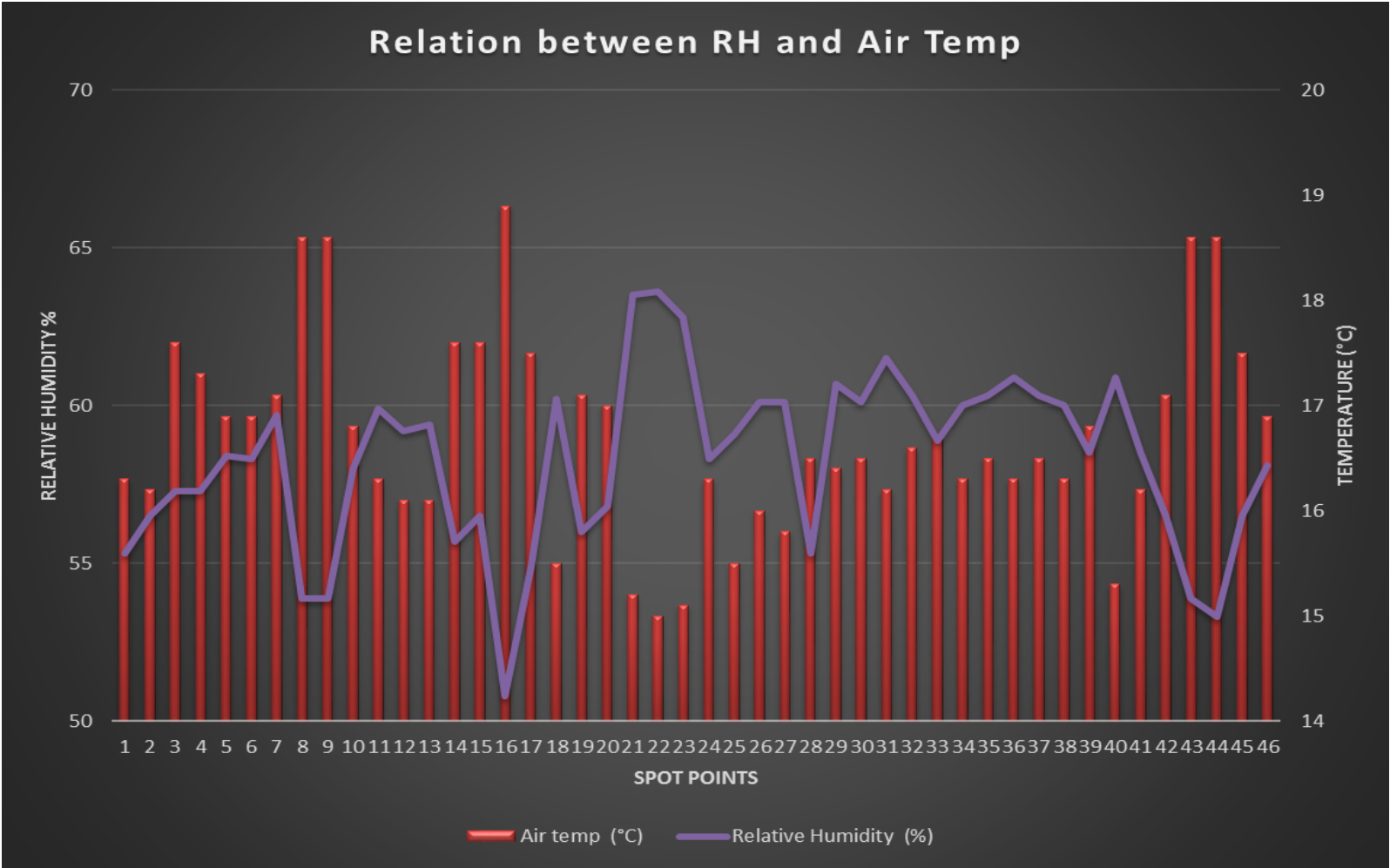
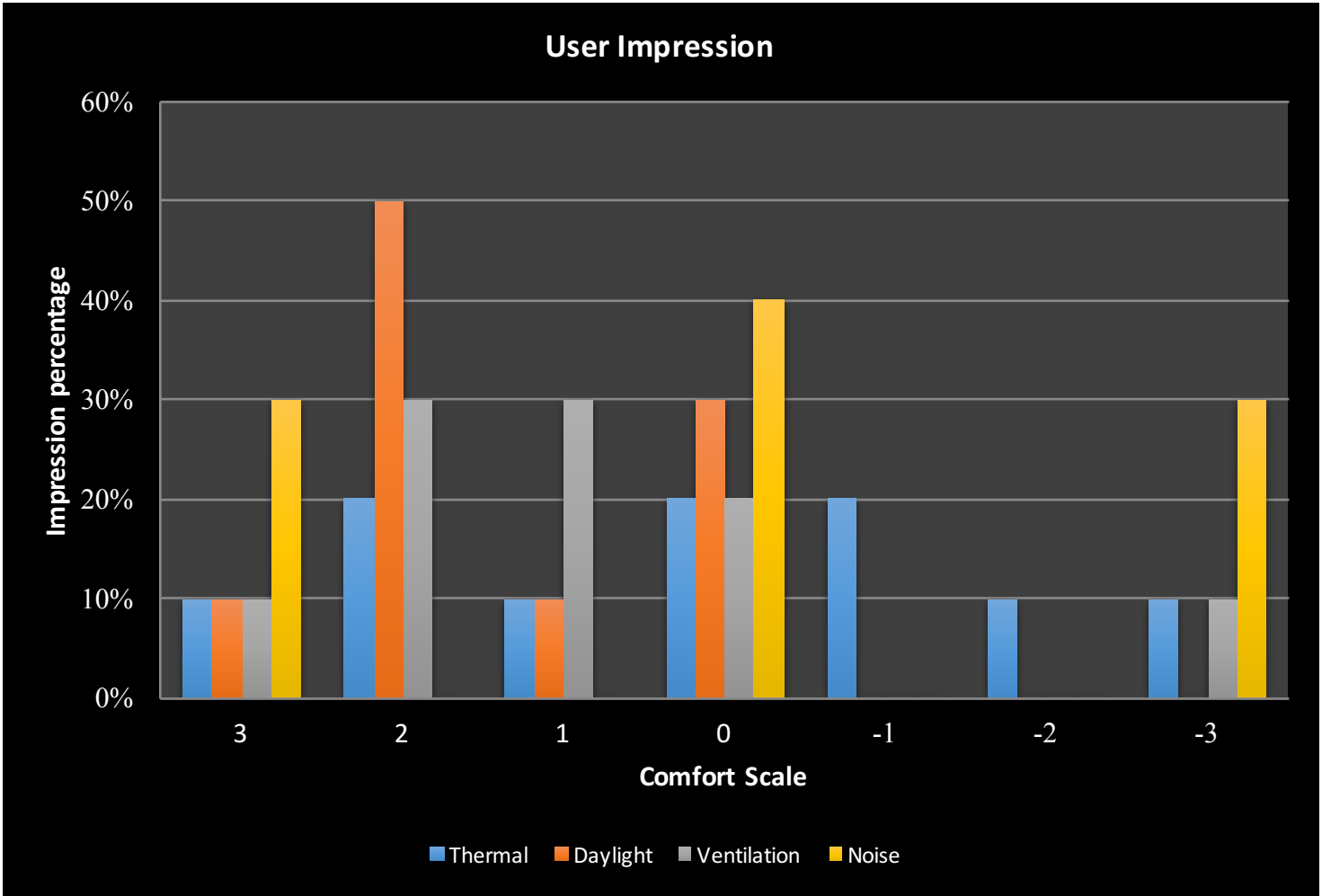
ON-SITE MEASUREMENTS

(20.10.16 11:30-13:00)
(T:13°C, RH:72%, W:N 3.33 m/s)

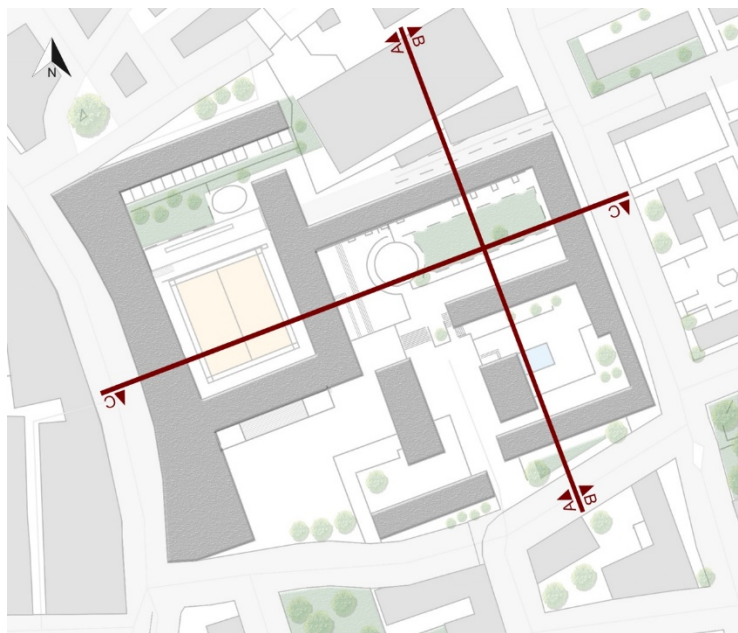
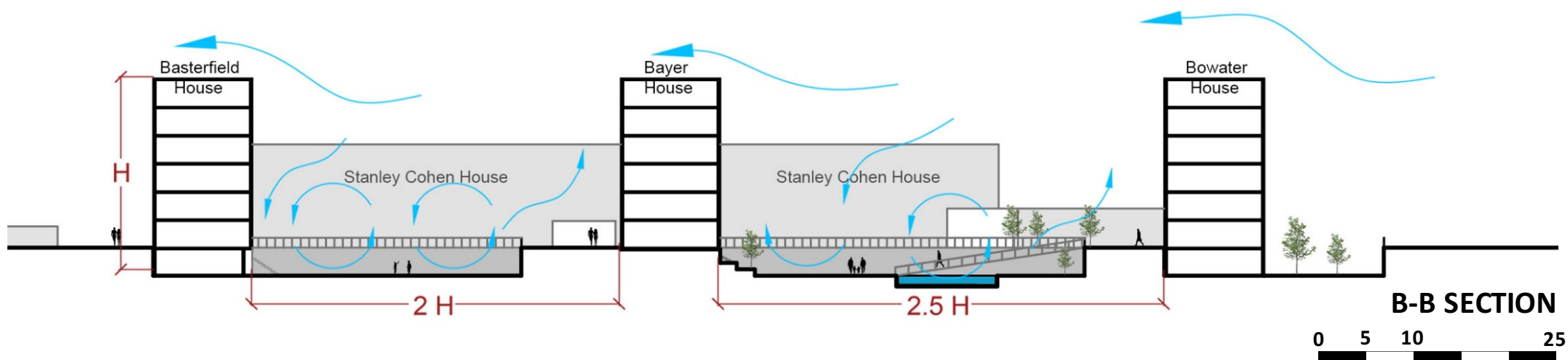
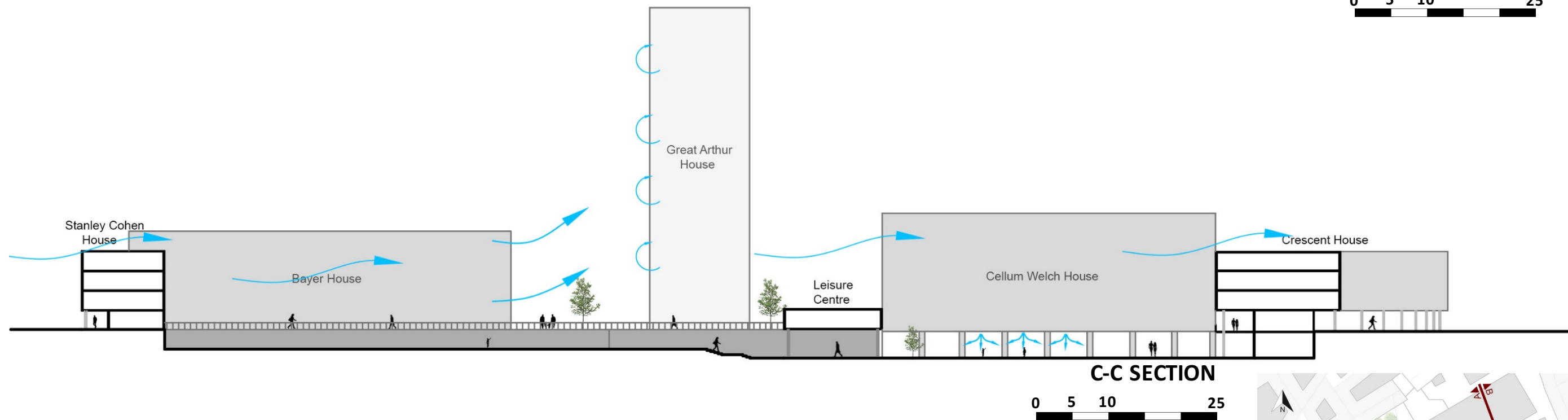
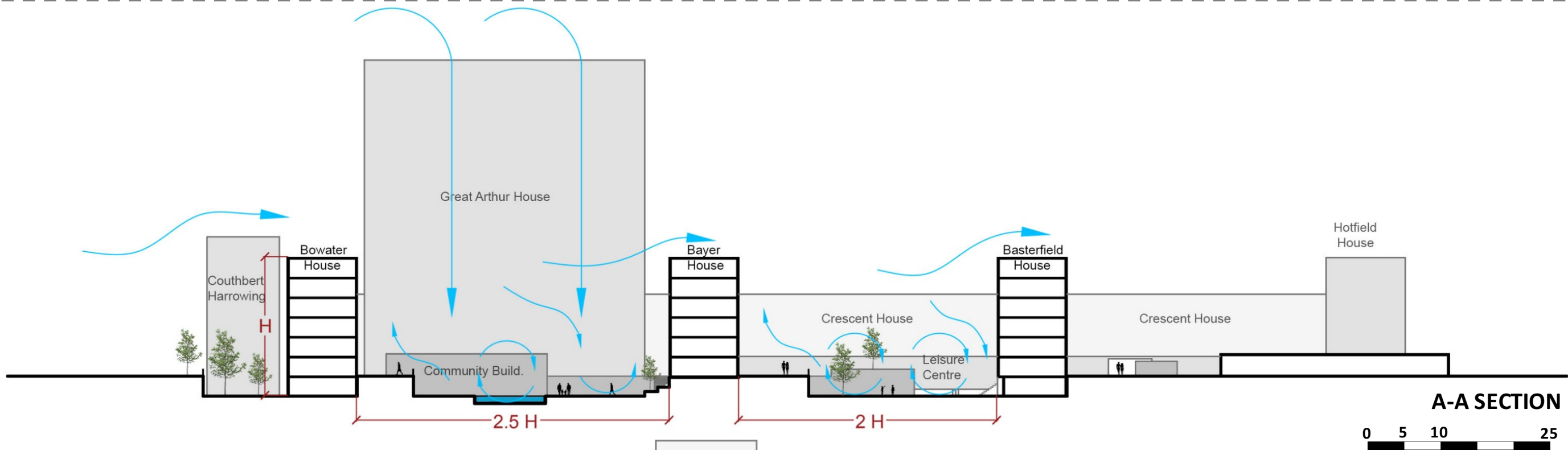


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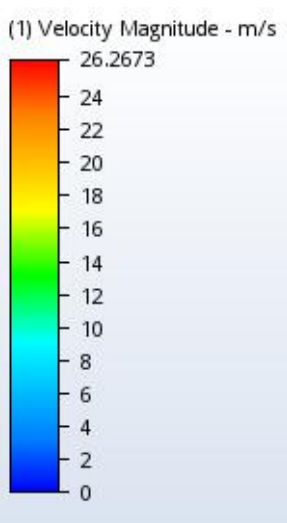
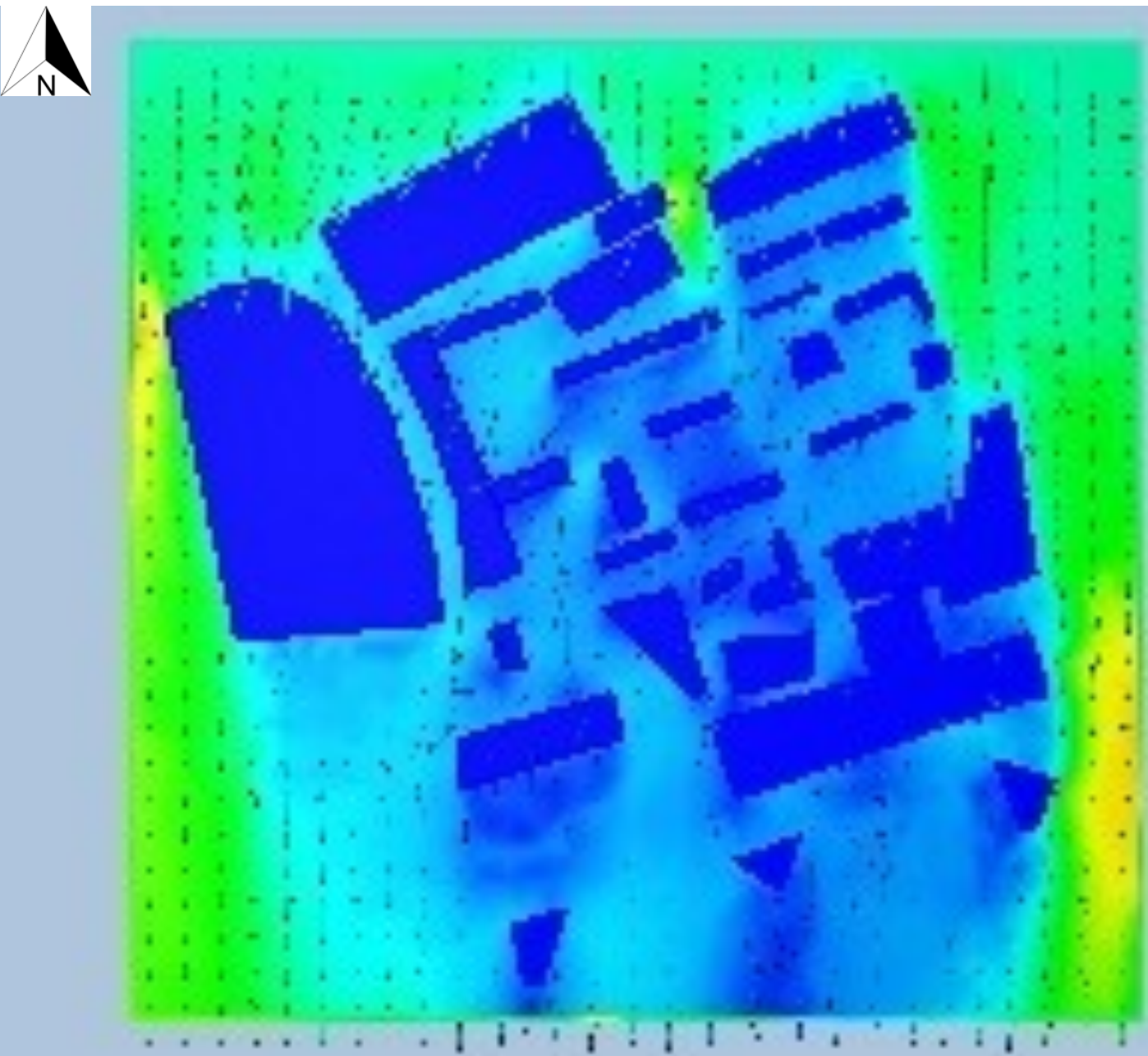
USER EXPERIENCE DATA



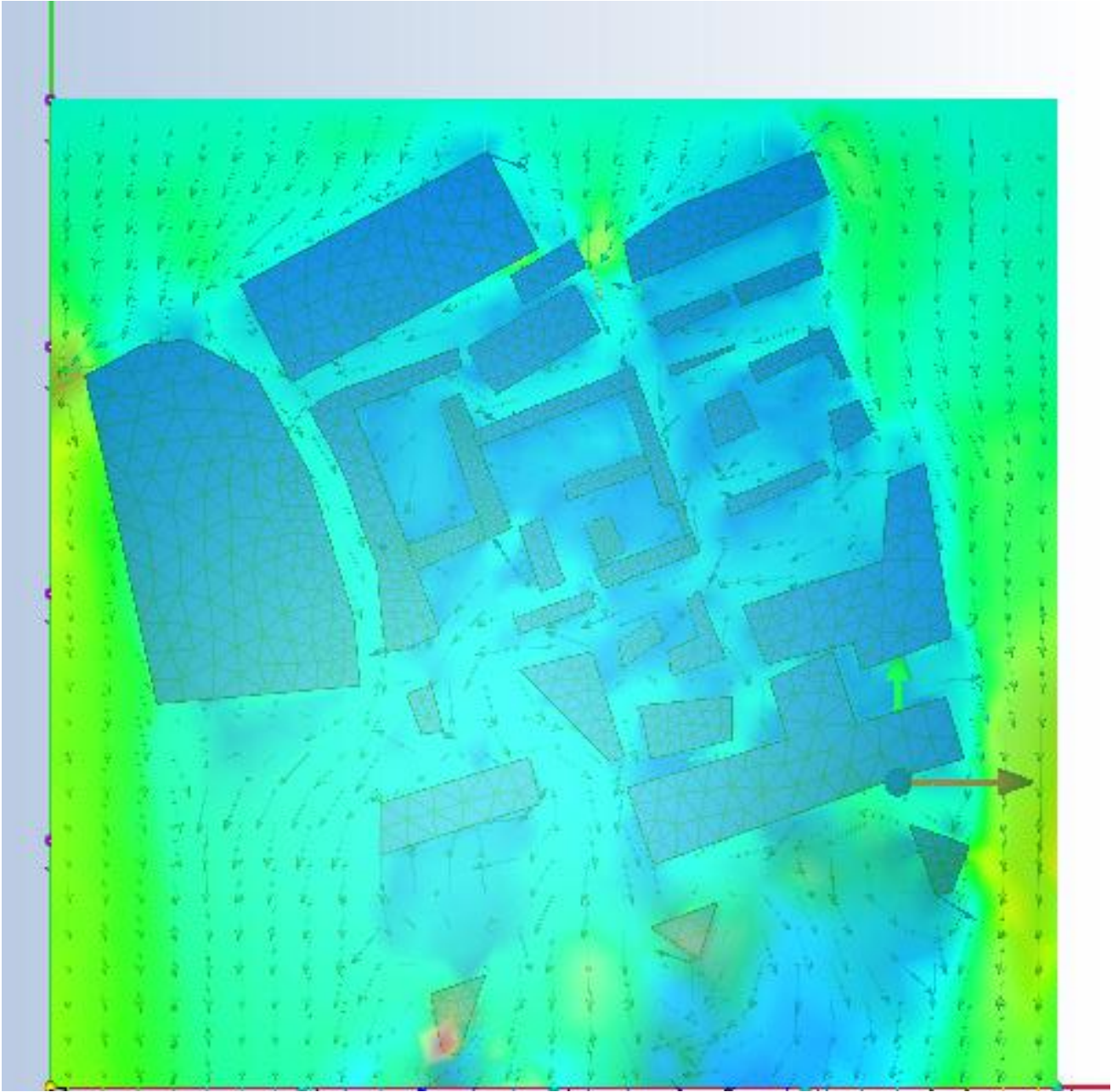
WIND PATTERN ANALYSIS



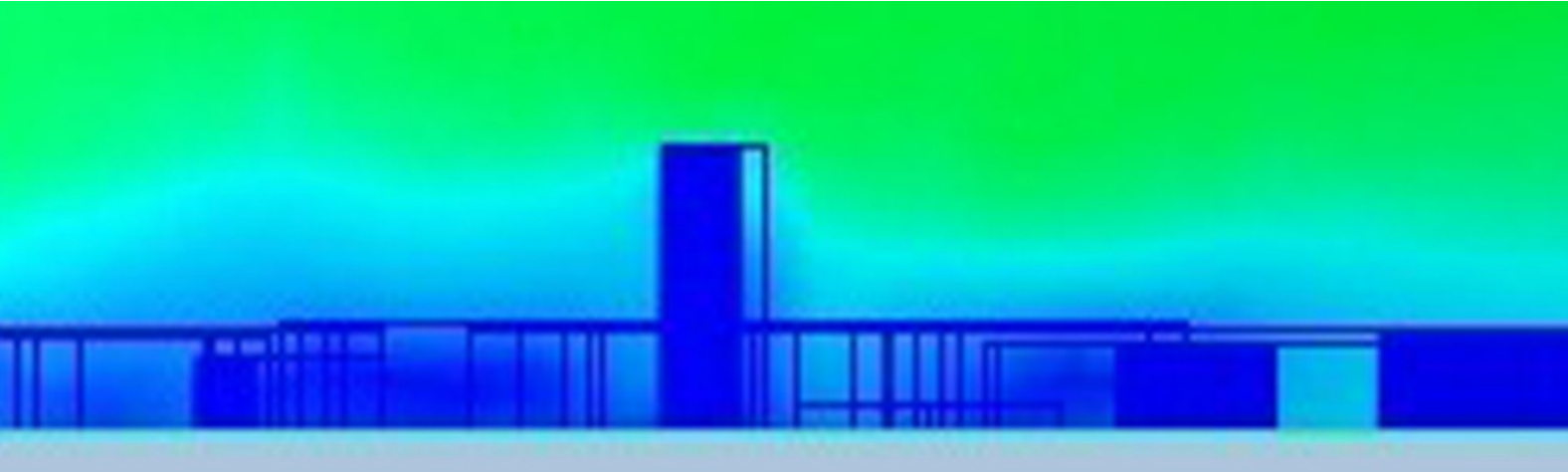
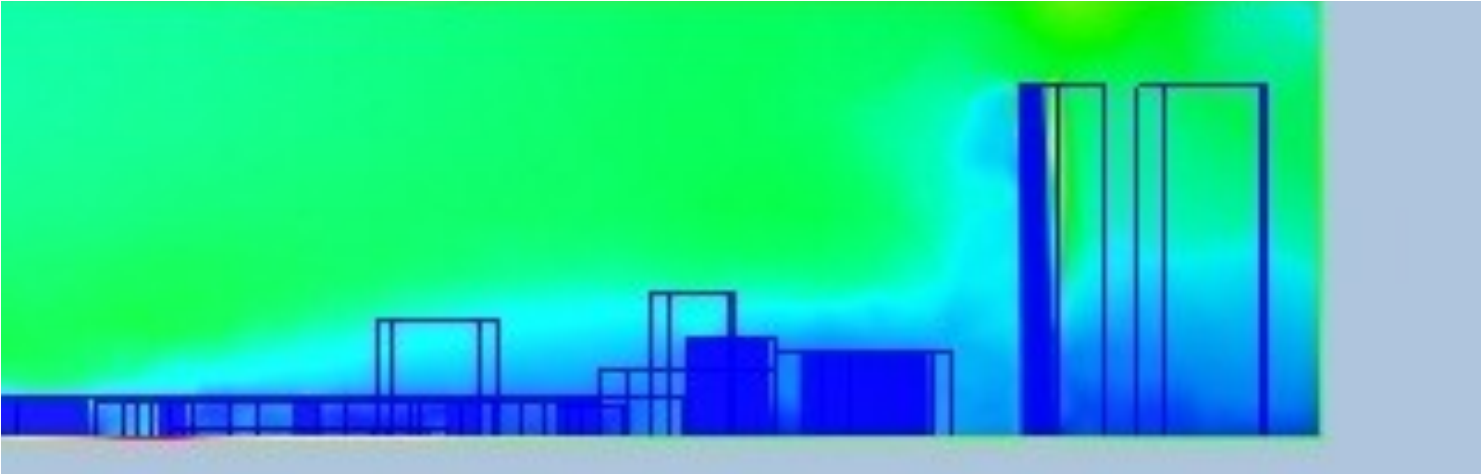
CFD ANALYSIS FOR WIND



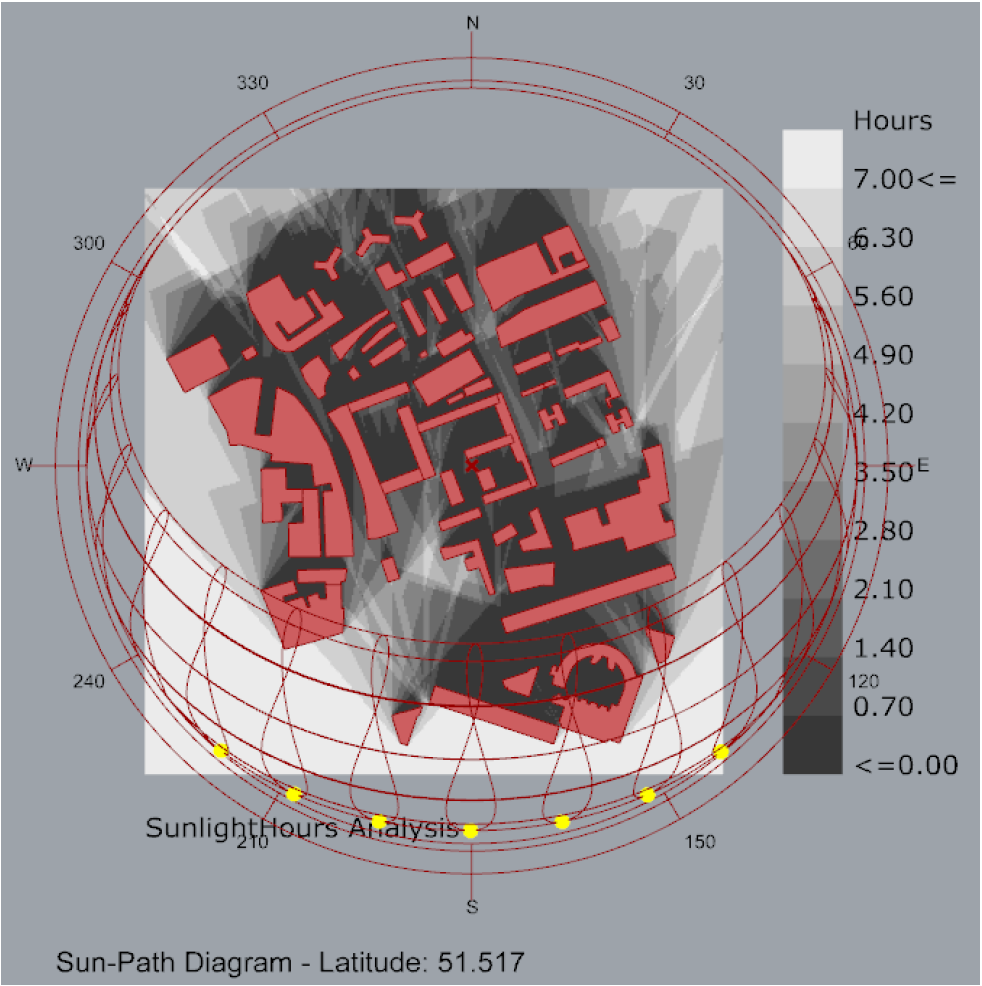
At 15 mtr. from ground



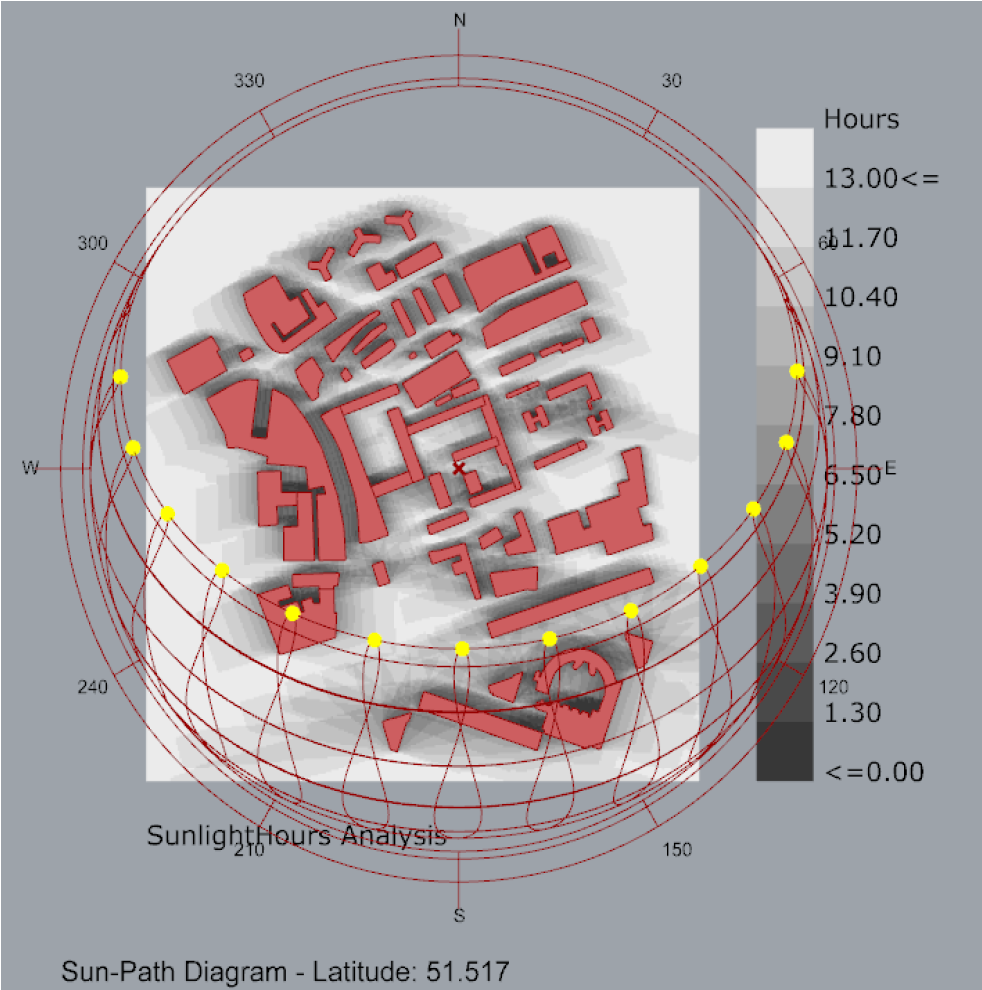
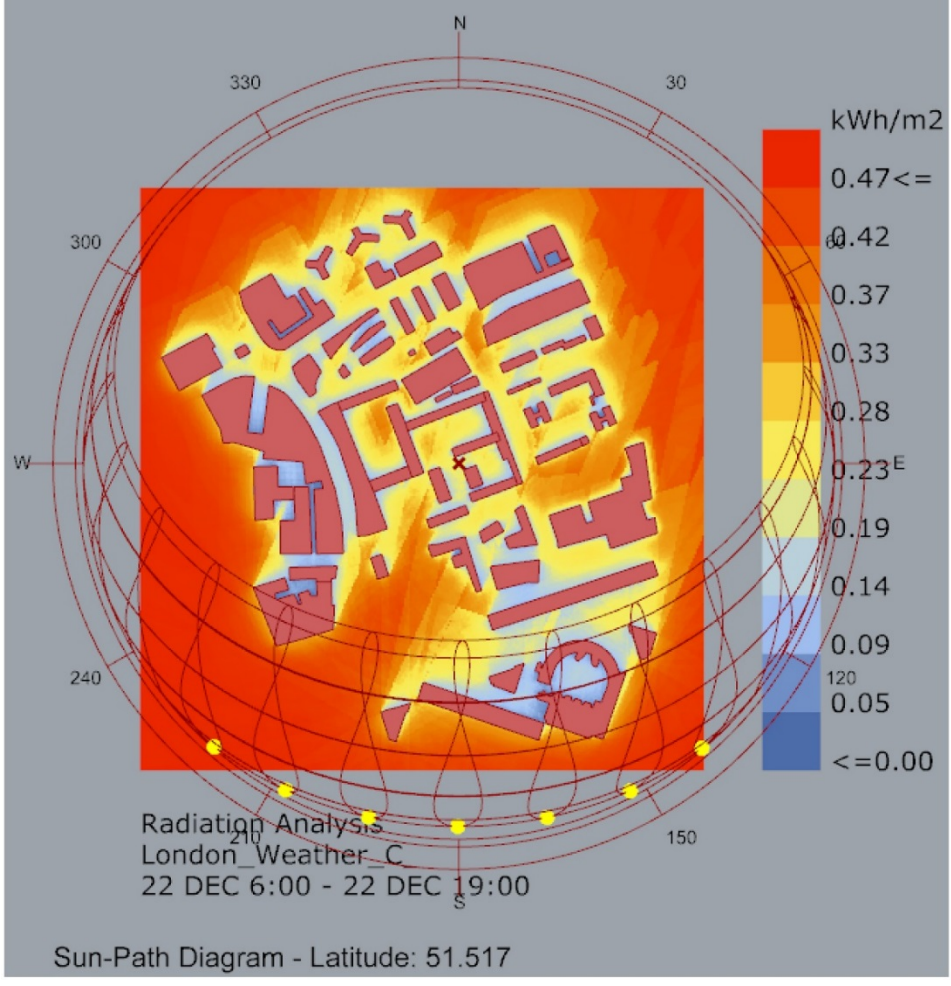
At 5 mtr. from ground



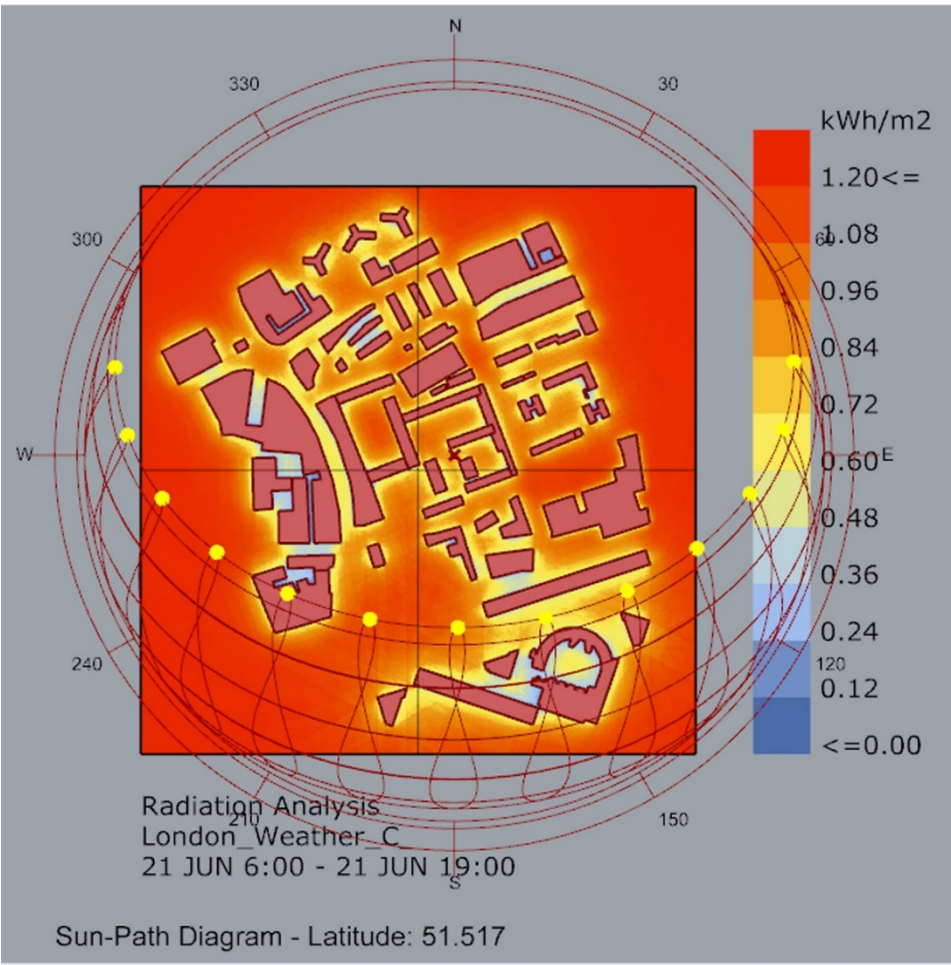
SUN SHADE – RADIATION ANALYSIS



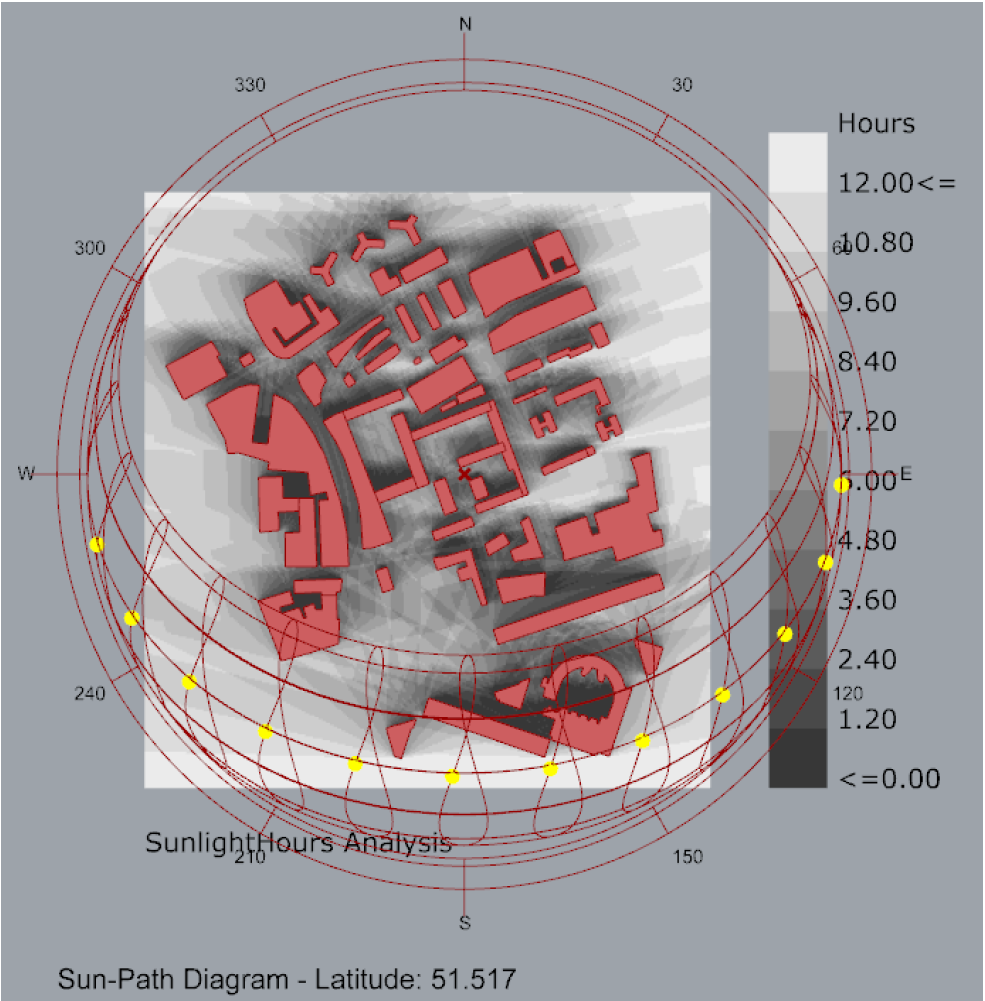
22 DECEMBER (SHORTEST DAY)



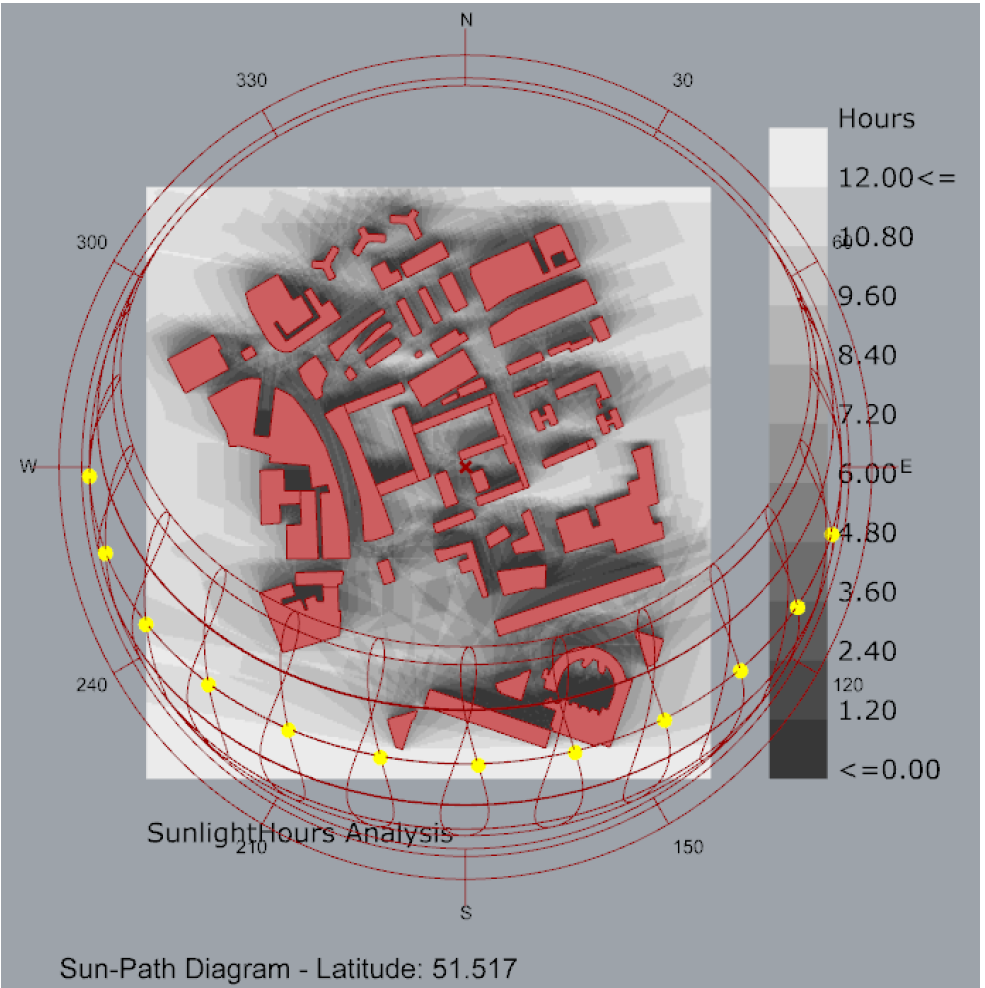
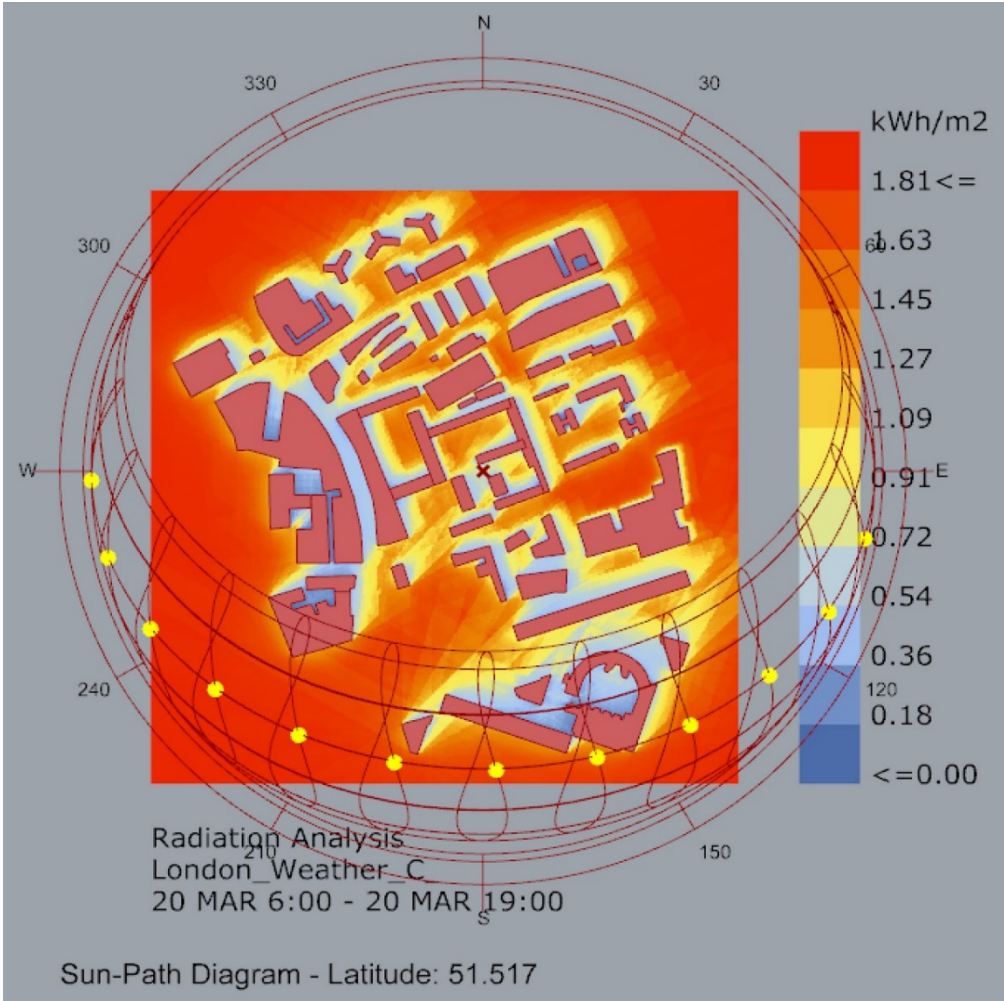
21 JUNE (LONGEST DAY)



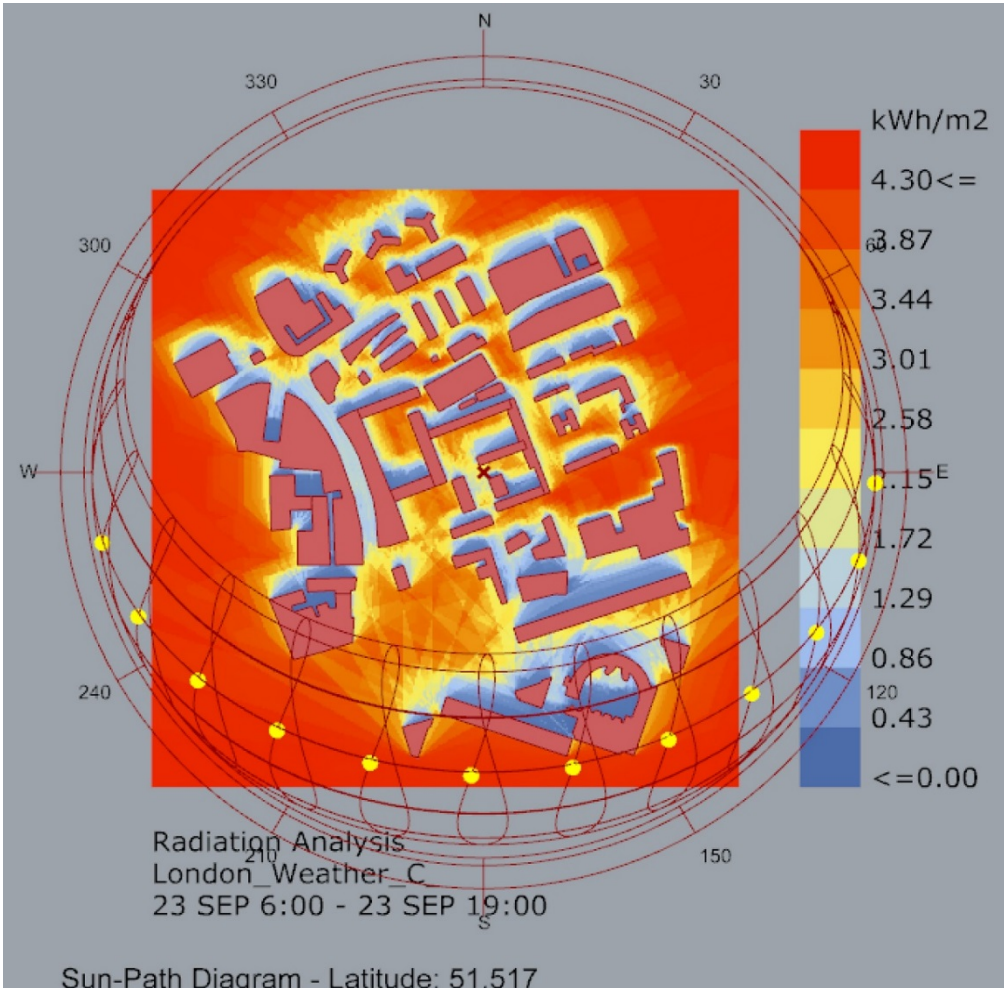
SUN SHADE – RADIATION ANALYSIS



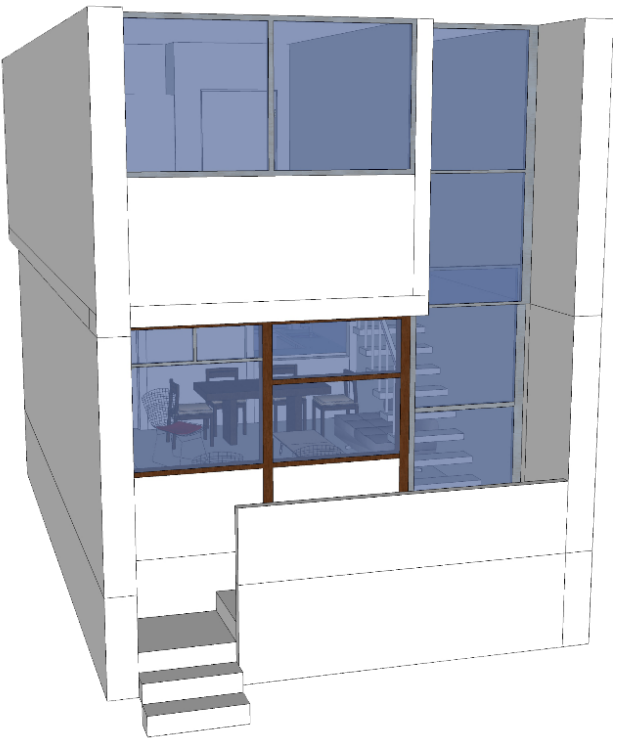
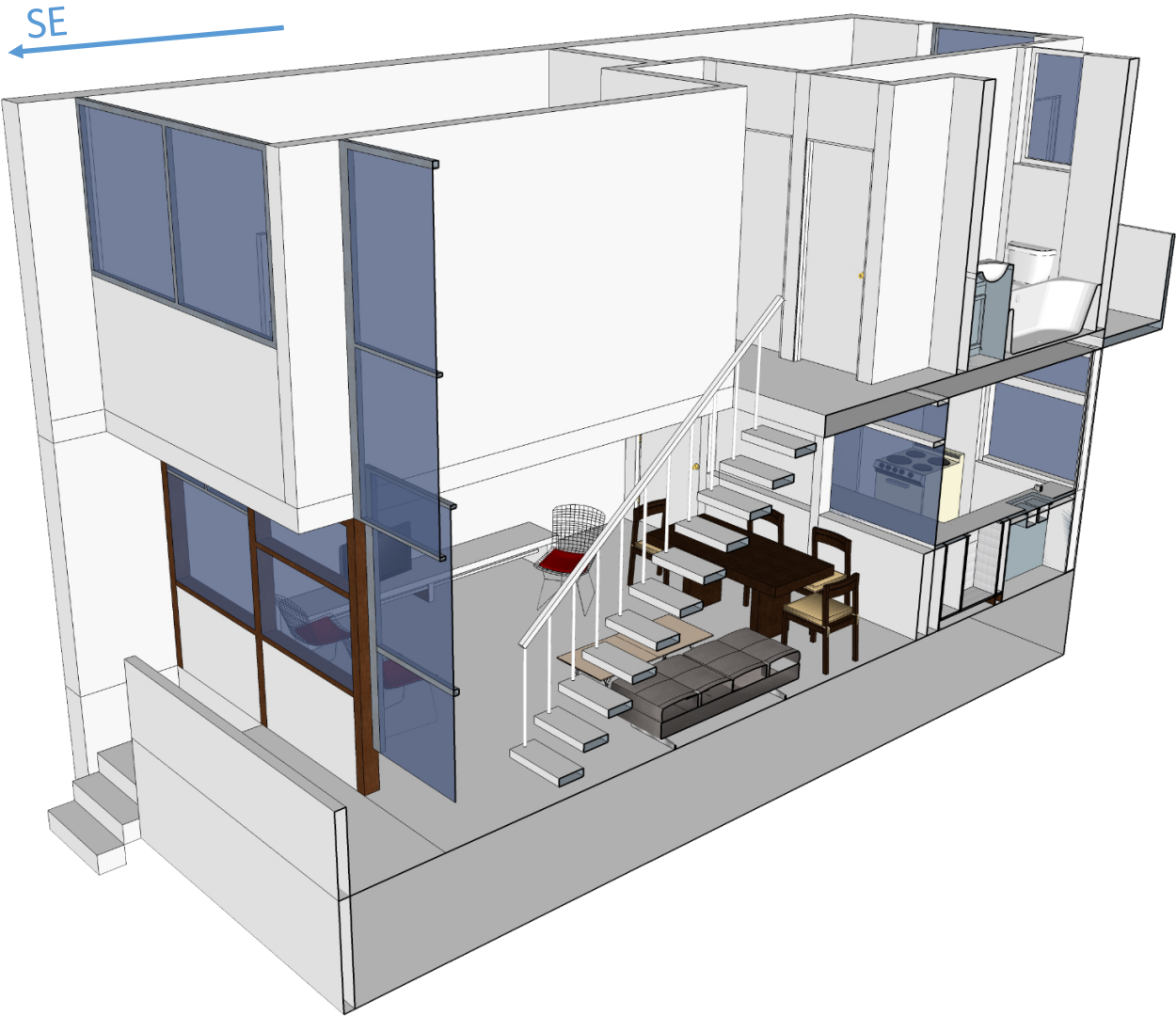
20 MARCH (EQUINOX)



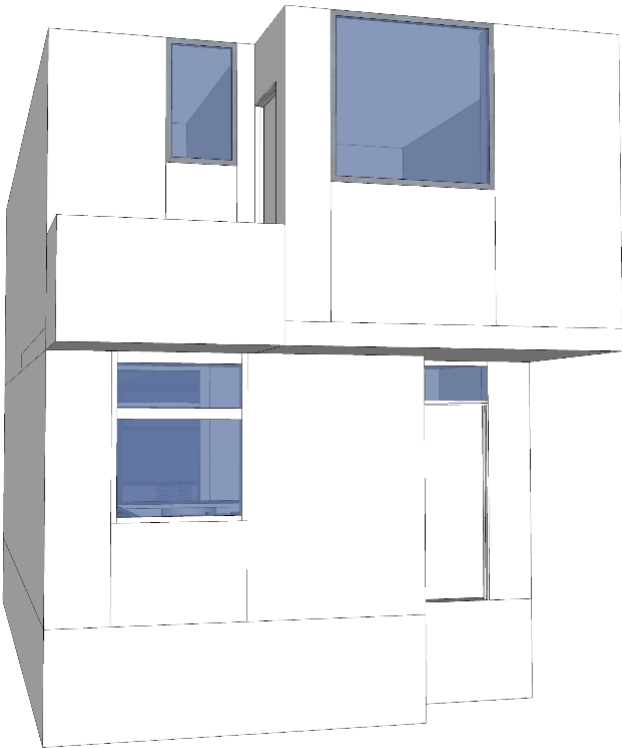
23 SEPTEMBER (EQUINOX)



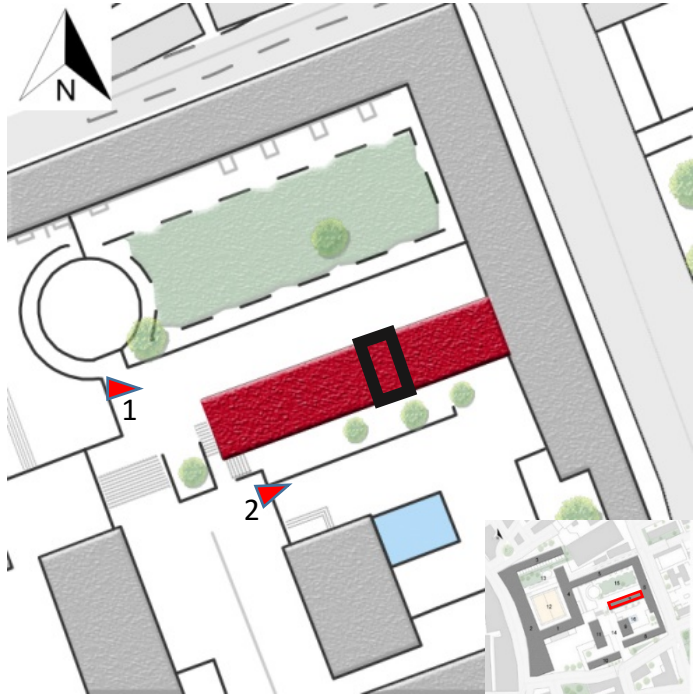
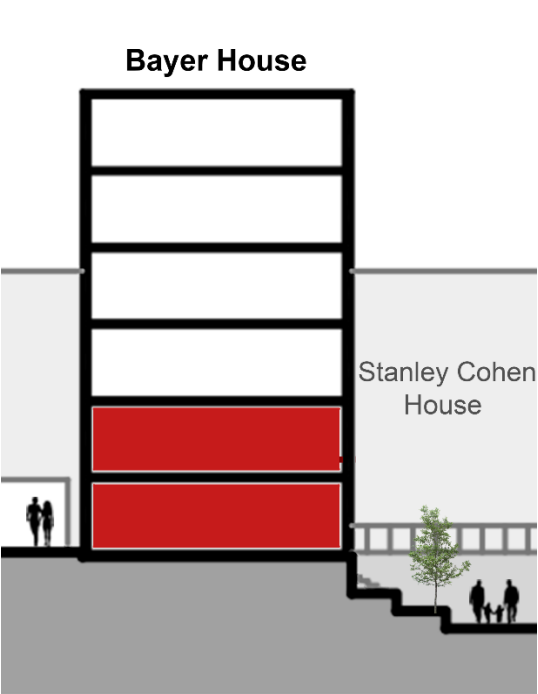
BAYER HOUSR FLAT NO. 4



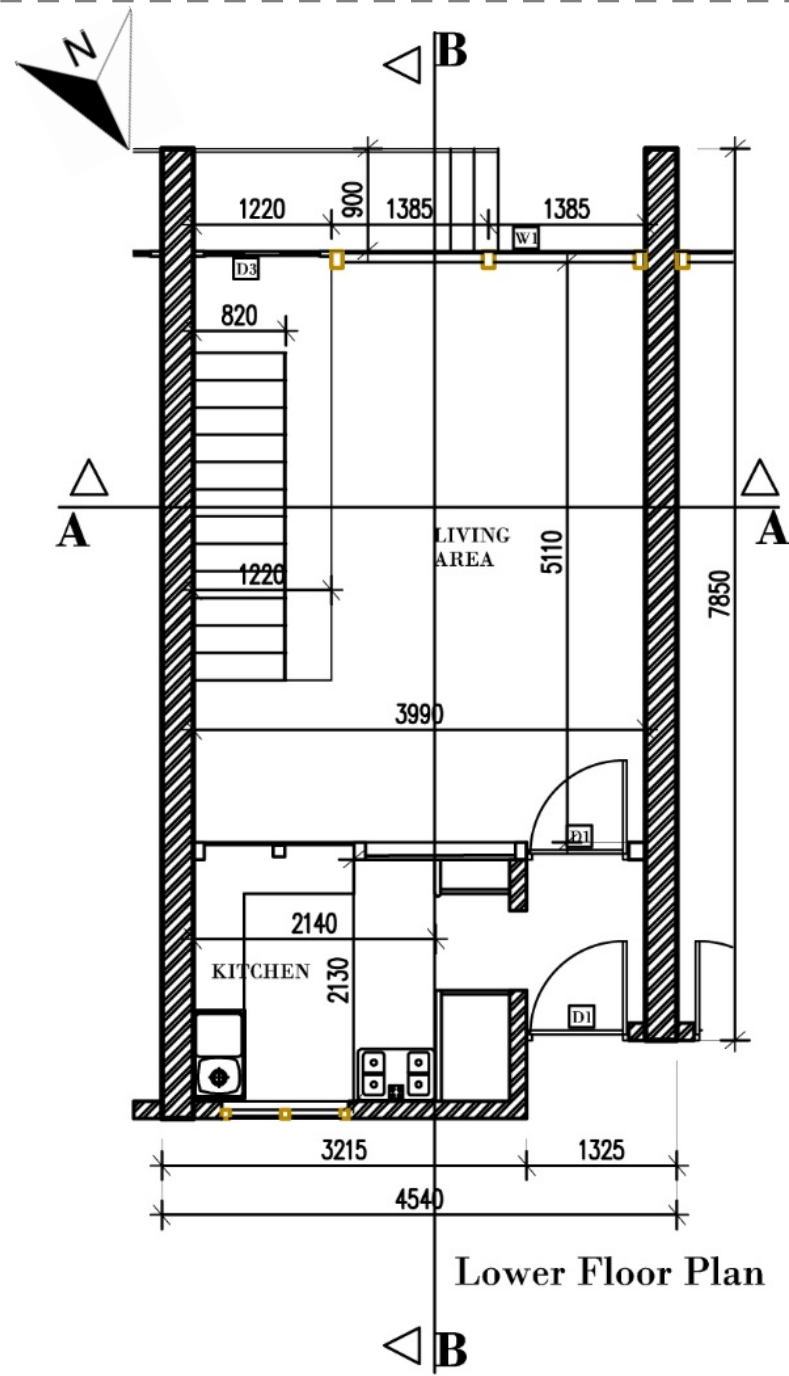
South East View



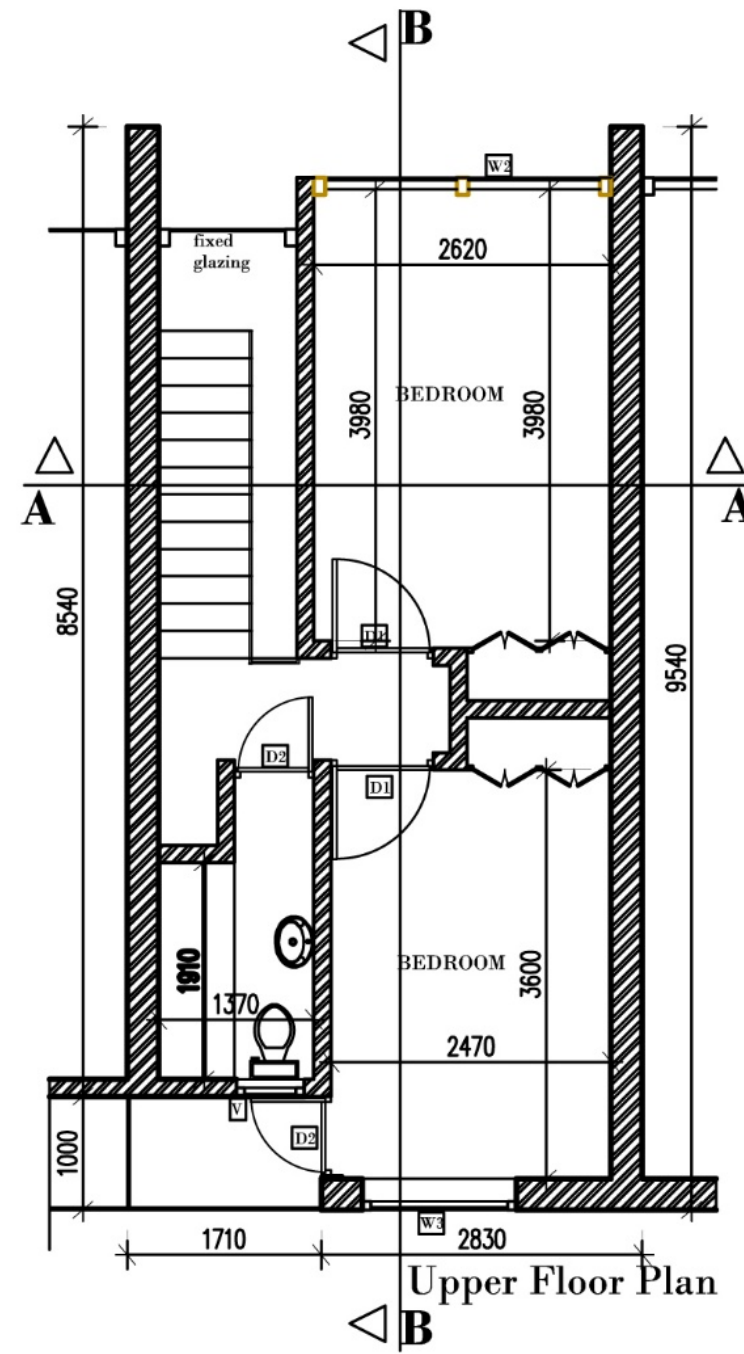
North West View



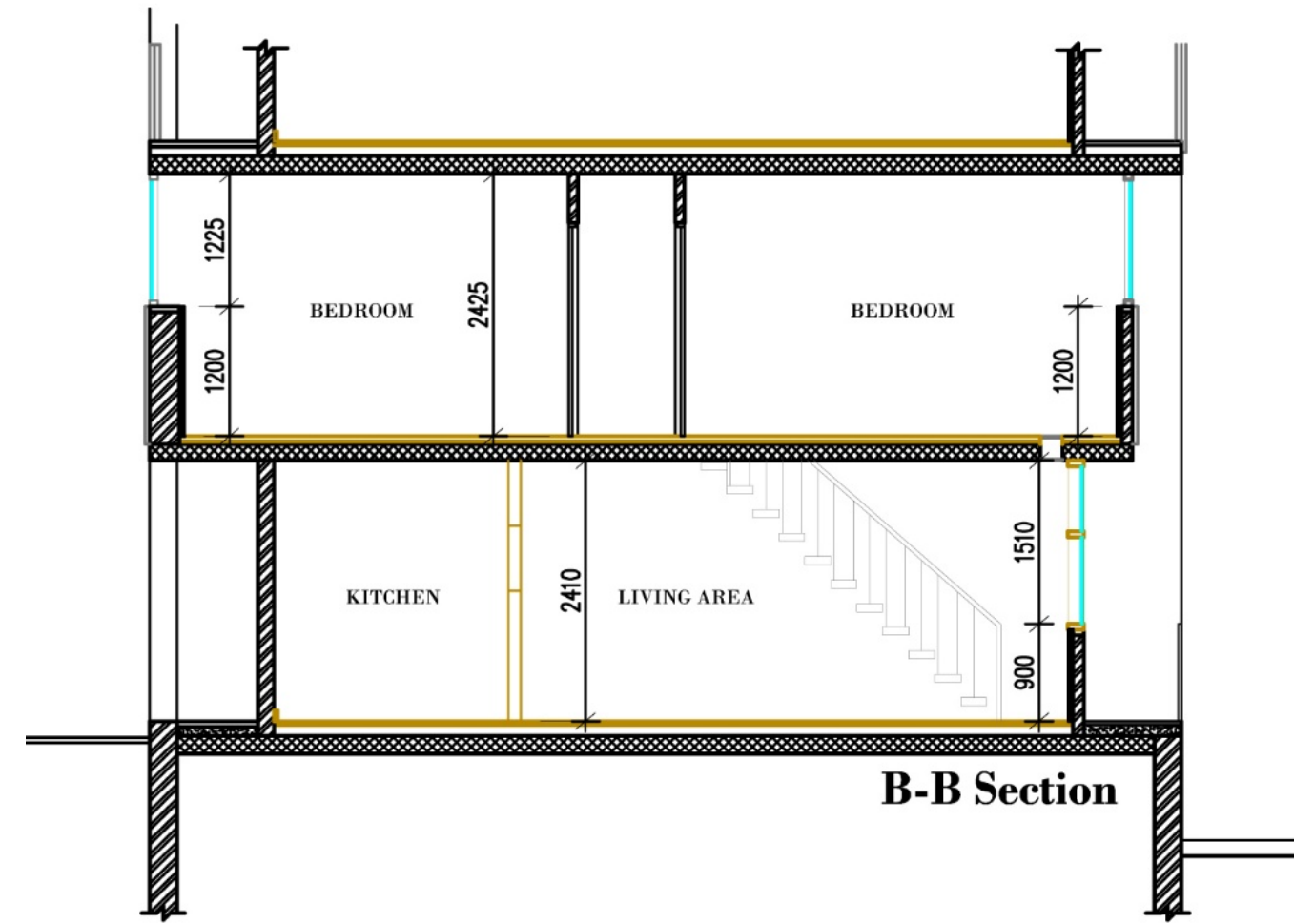
BAYER HOUSE FLAT NO. 4



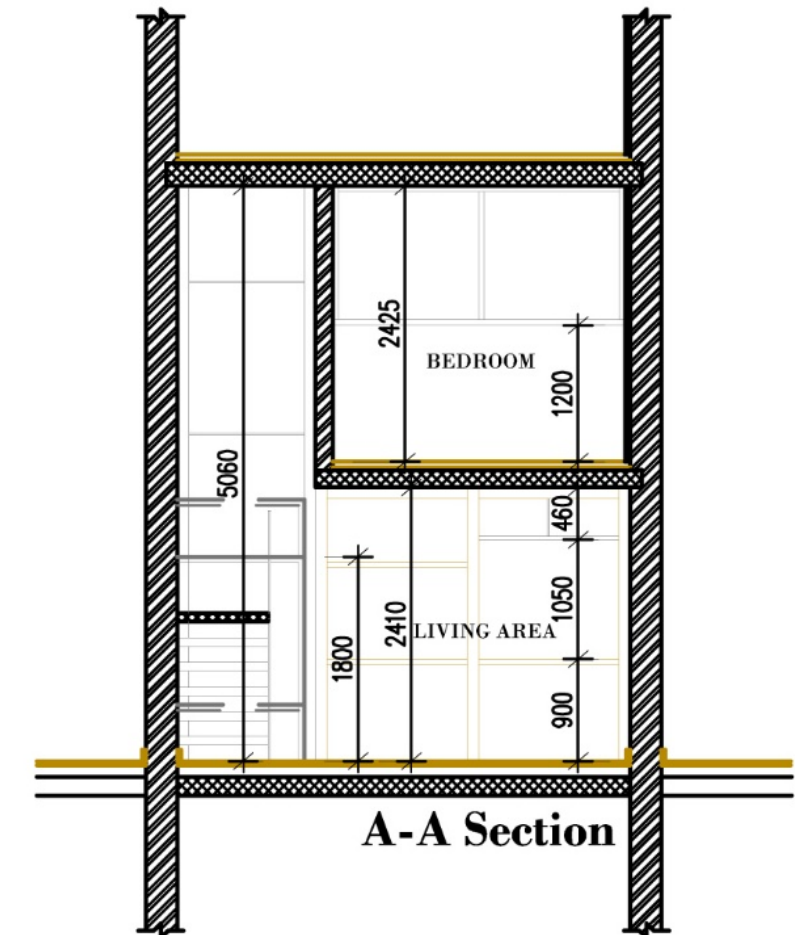
Lower Floor Plan



Upper Floor Plan



B-B Section



A-A Section

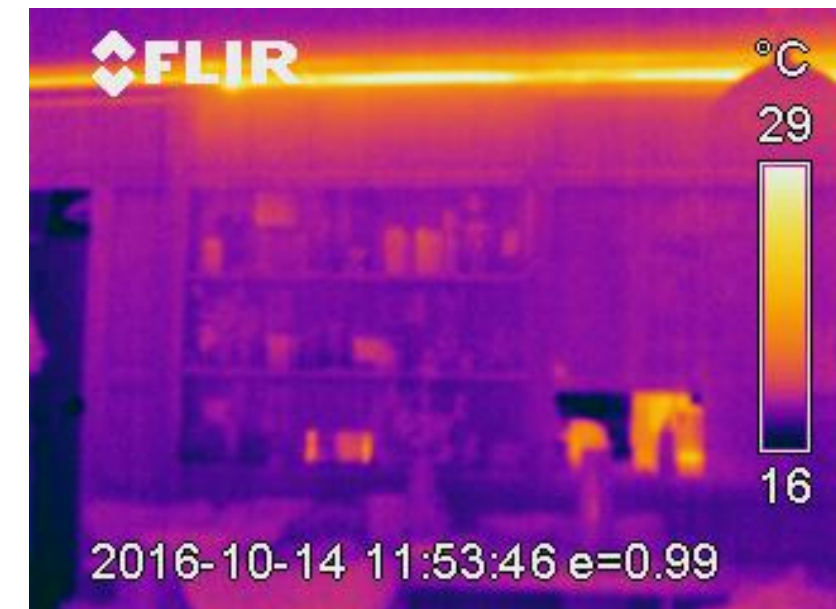
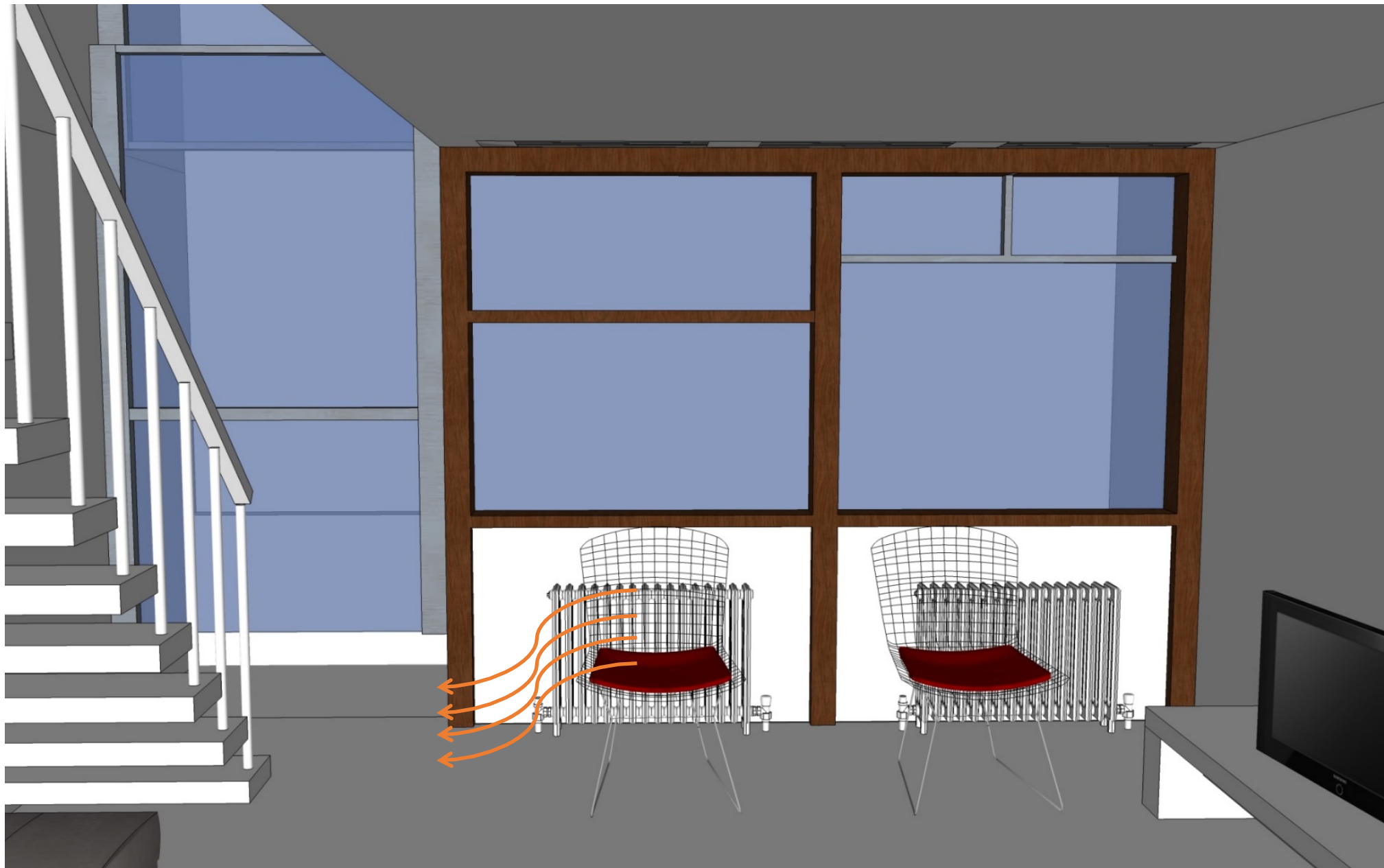
Planning characteristics

1. Large glass opening on south east side
2. Brick wall on North side and between units
3. Service spaces on North side
4. Almost in original state
5. Single glazed windows

BAYER HOUSE

Observation

1. Placement of the radiators near the sliding door.
2. The sliding door usage as the primary ventilation strategy.
3. Concentrating of radiator only along one side.
4. Continuous use of radiator
5. Problem with high electric bills and over heated water in taps.
6. Single glazed windows.



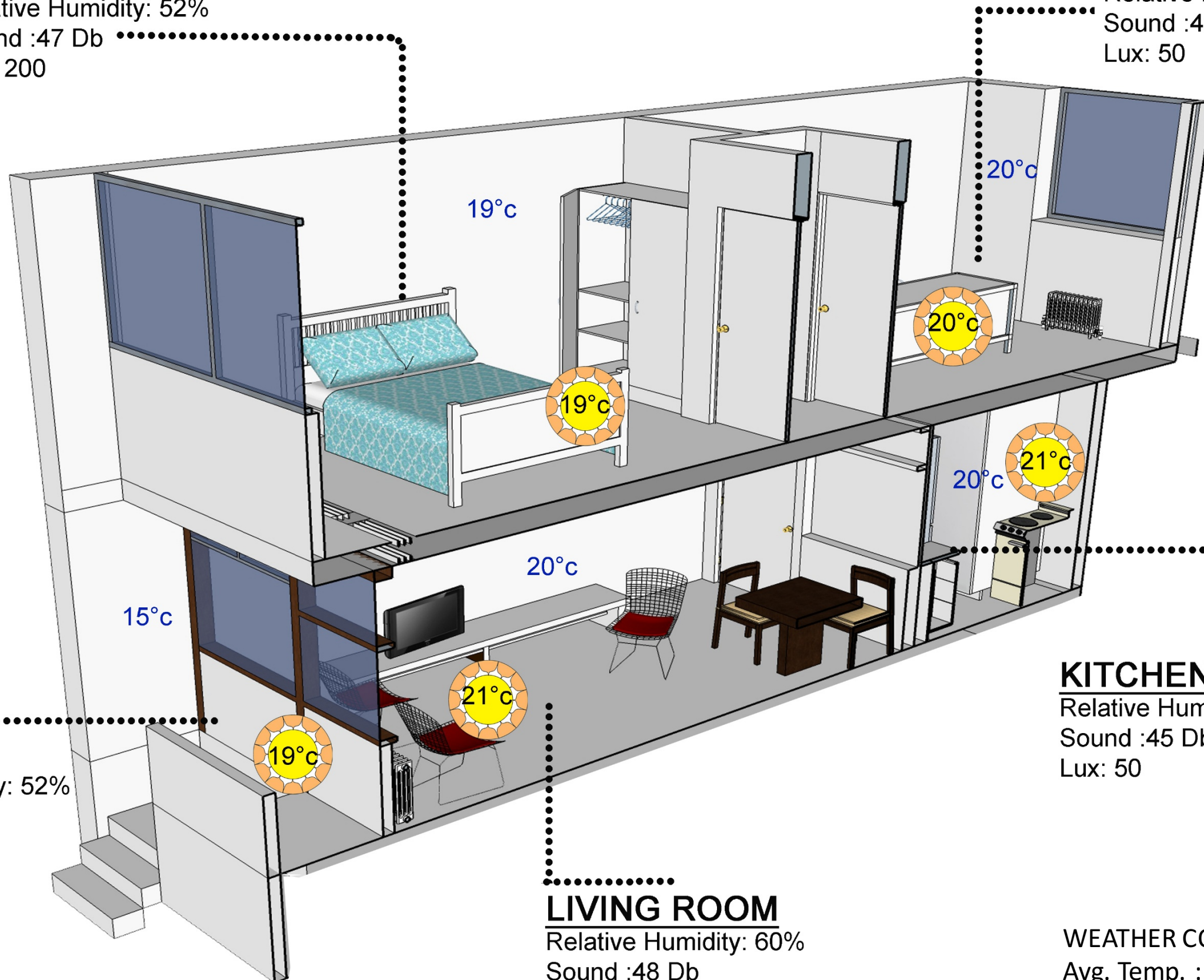
BAYER HOUSE MEASUREMENTS

BEDROOM

Relative Humidity: 52%
Sound :47 Db
Lux: 200

STUDYROOM

Relative Humidity: 48%
Sound :40 Db
Lux: 50



BALCONY

Relative Humidity: 52%
Sound :47 Db
Lux: 13 k

KITCHEN

Relative Humidity: 58%
Sound :45 Db
Lux: 50

LIVING ROOM

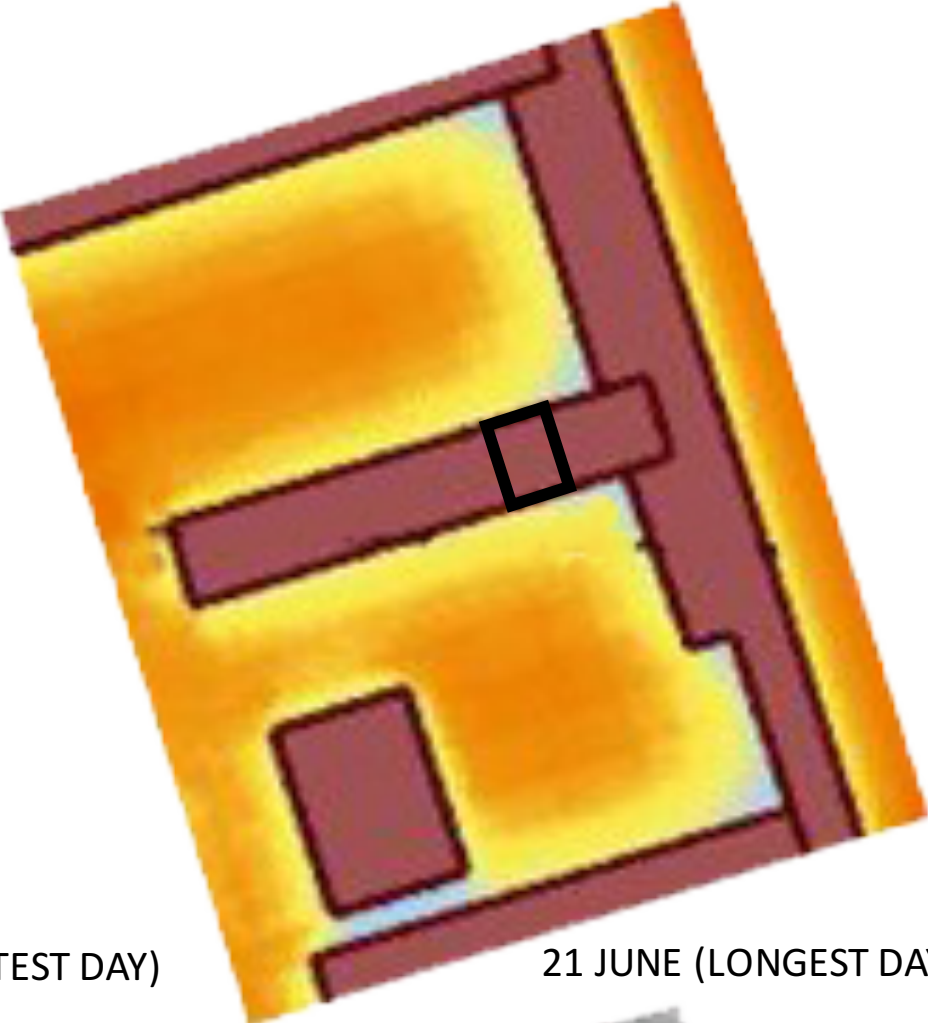
Relative Humidity: 60%
Sound :48 Db
Lux: 100

WEATHER CONDITIONS (10 am-12 noon)
Avg. Temp. : 12° C
Avg. Humidity : 70%

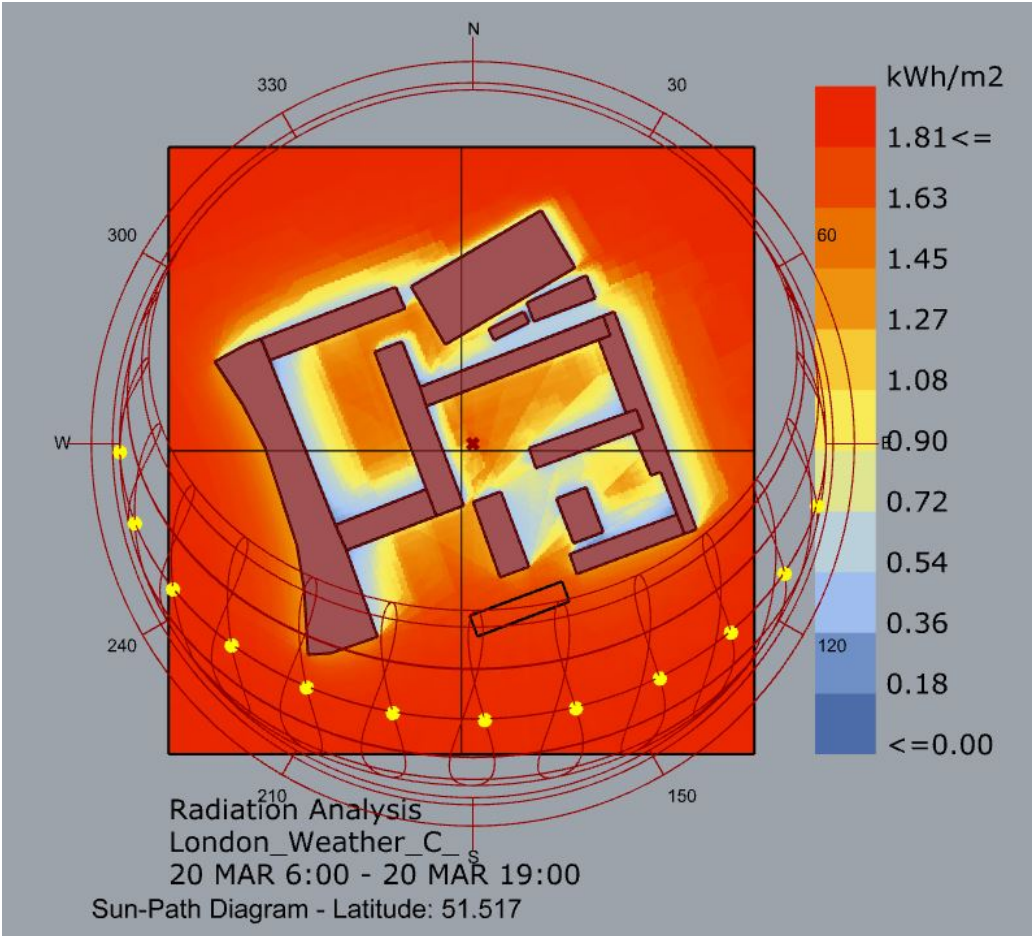
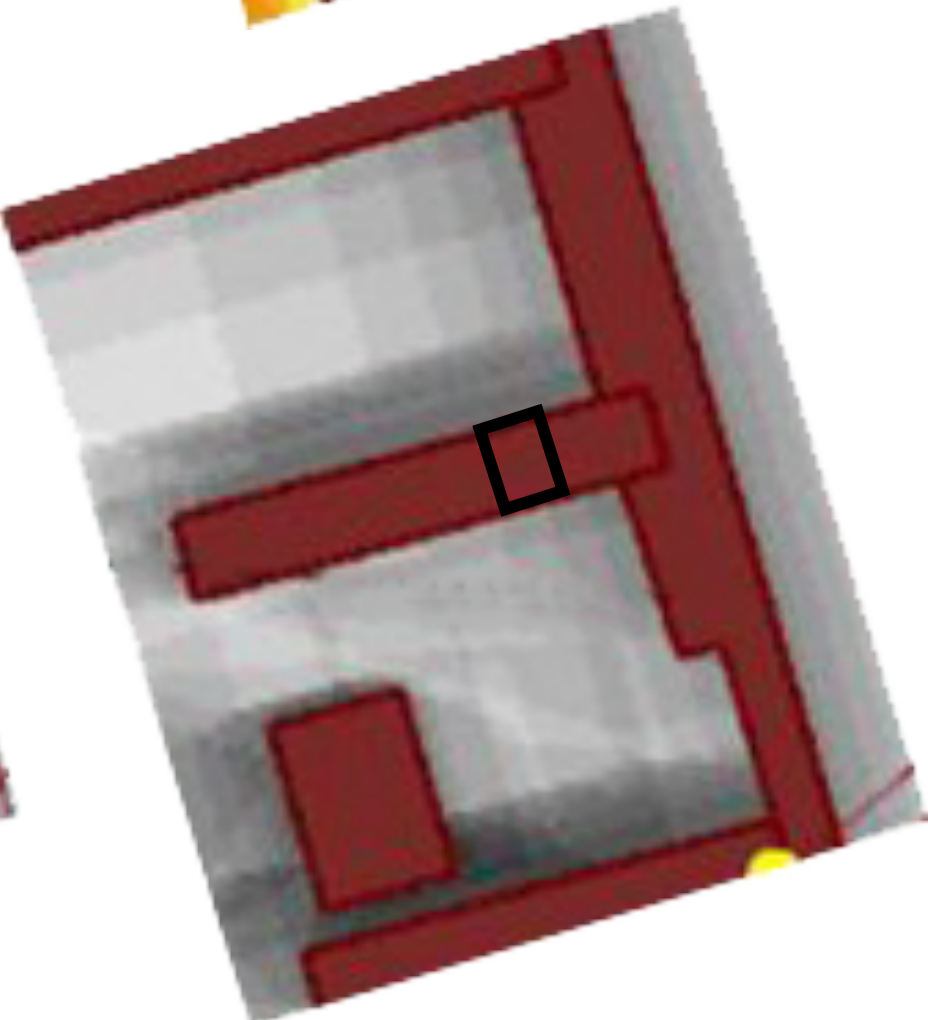
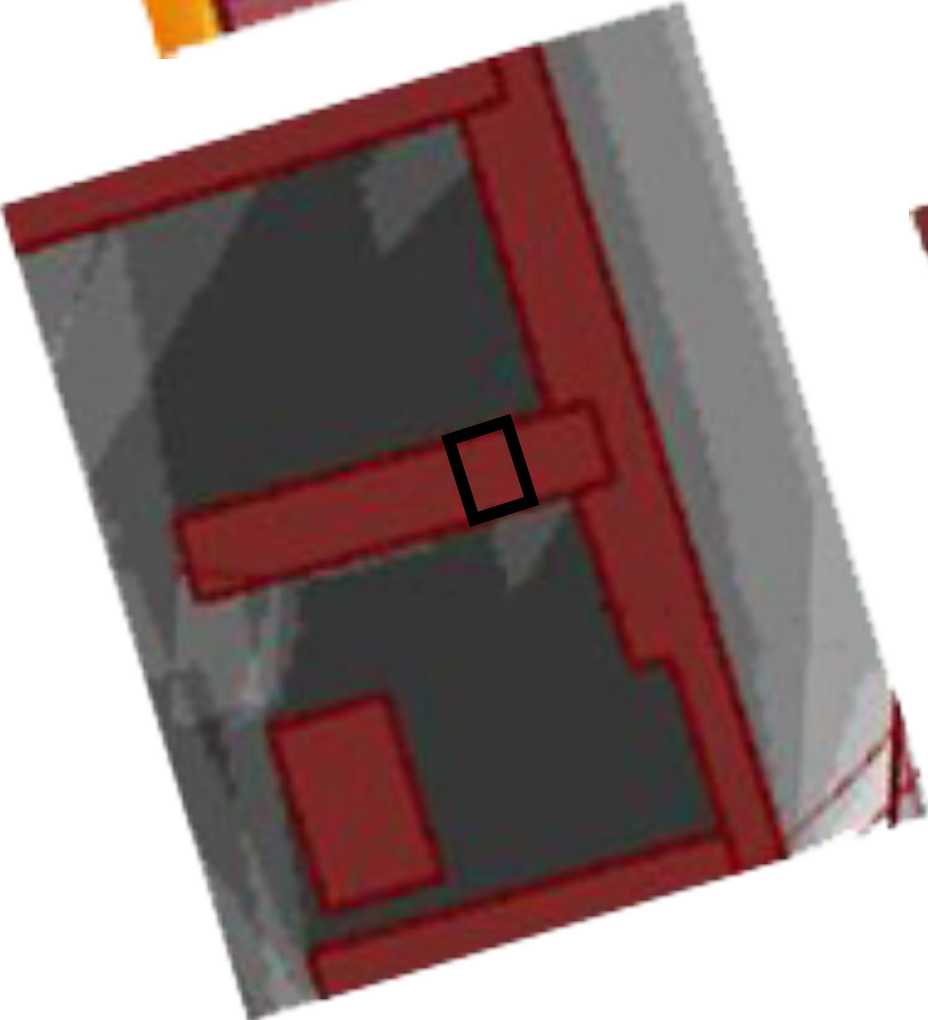
SOLAR RADIATION AND SHADOW ANALYSIS



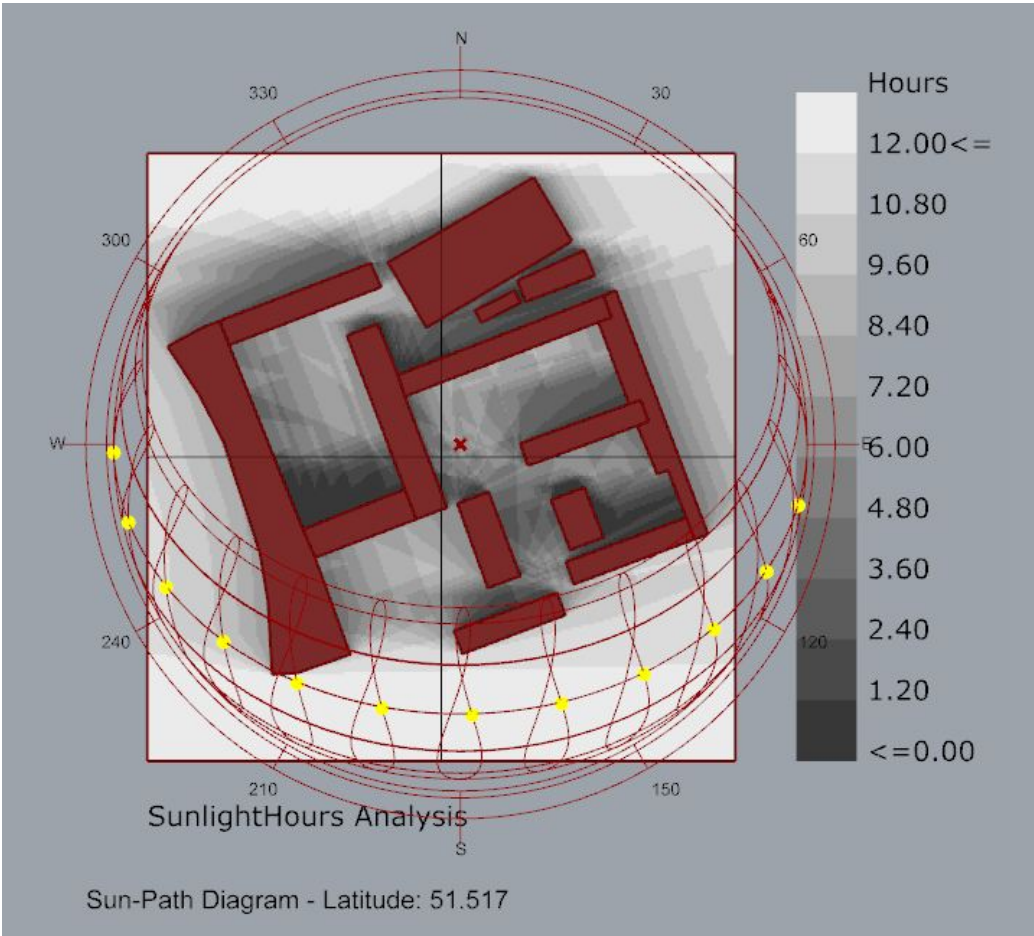
22 DECEMBER (SHORTEST DAY)



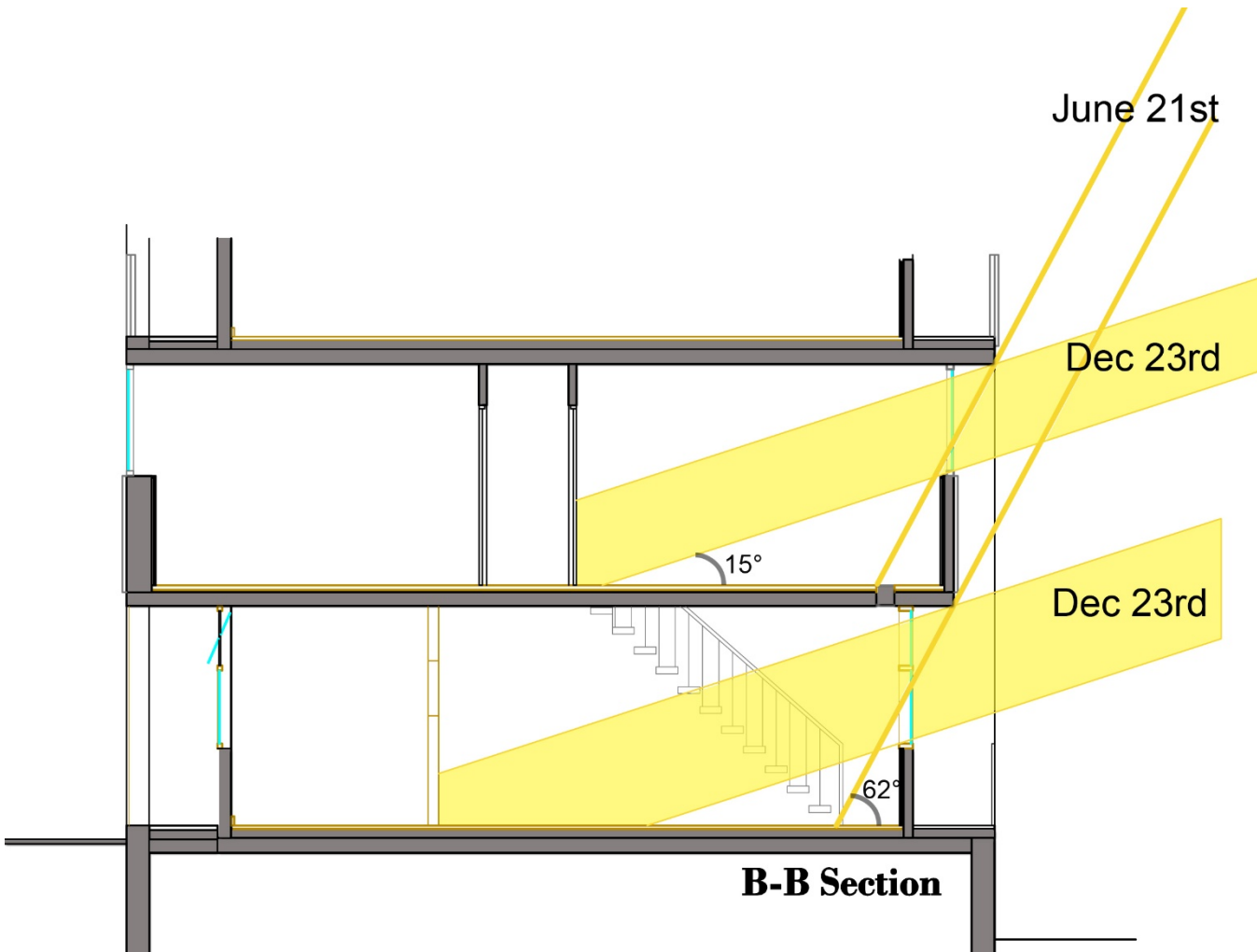
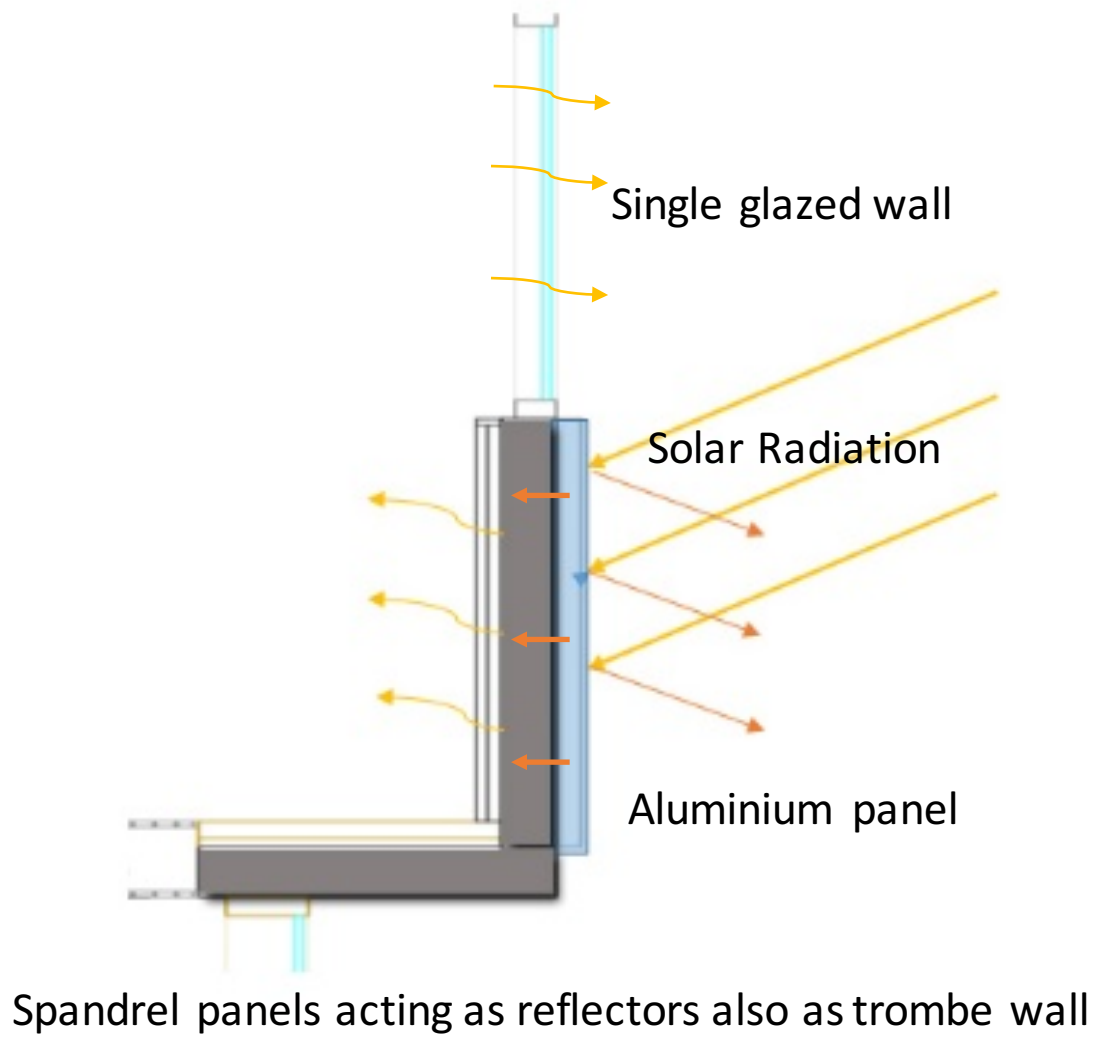
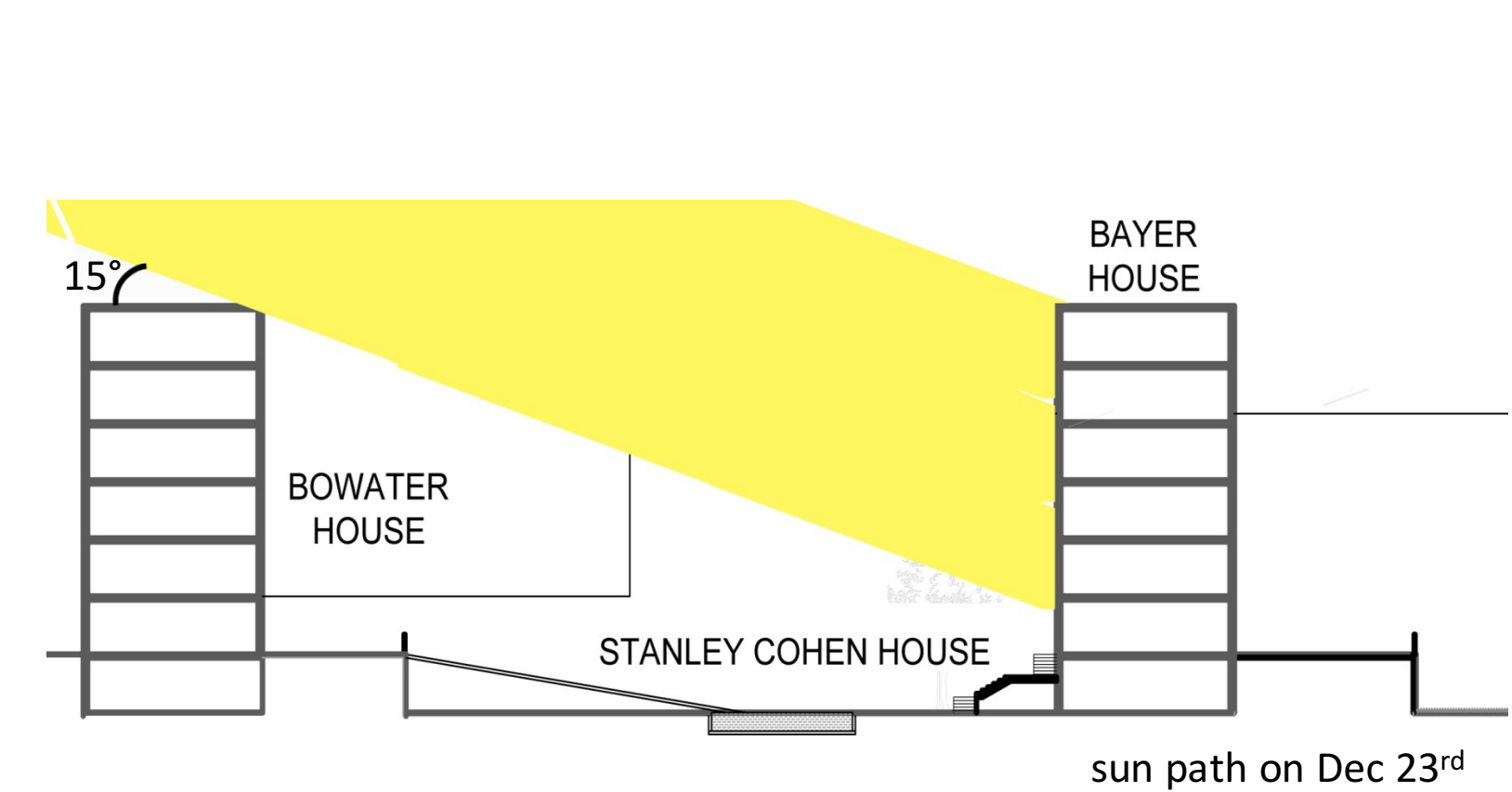
21 JUNE (LONGEST DAY)



20 MARCH (EQUINOX)

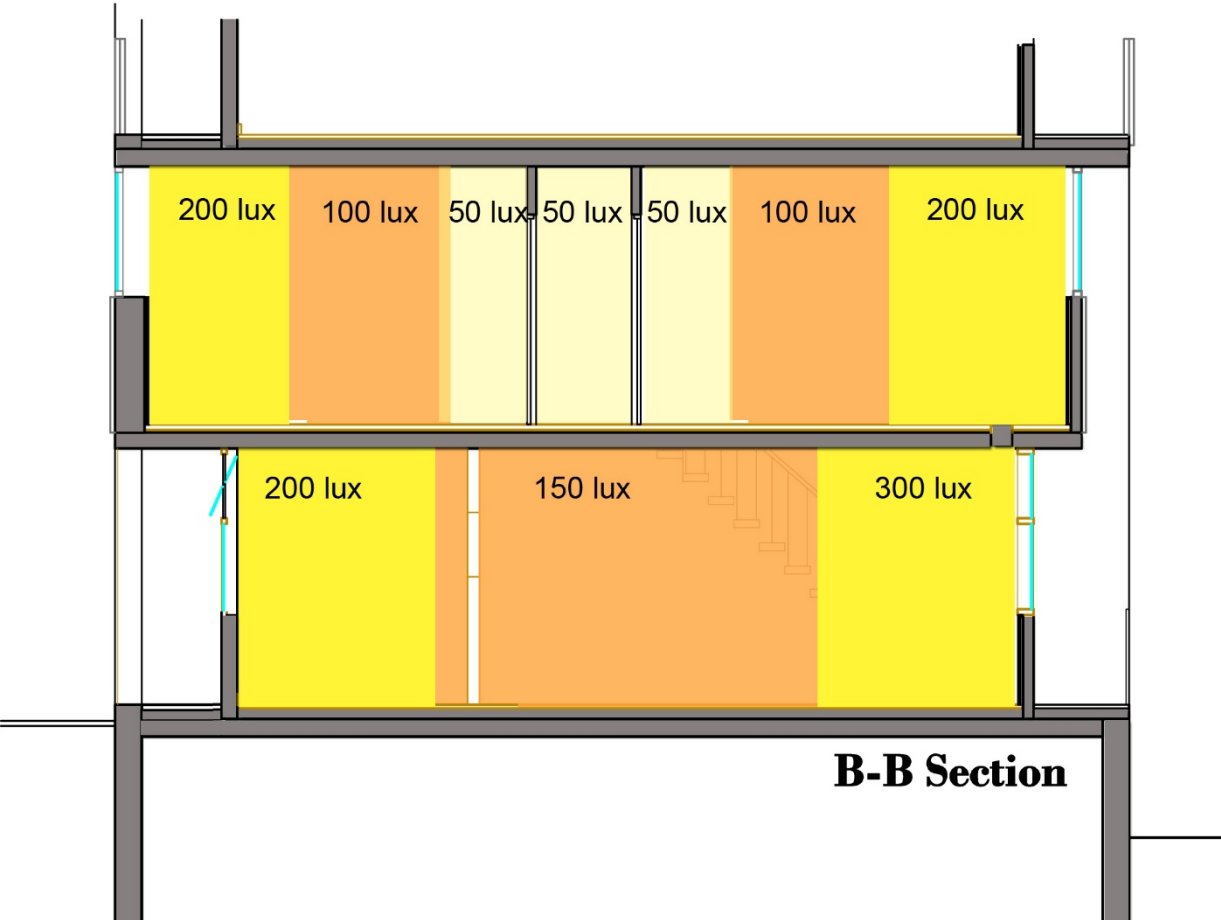


BAYER HOUSE- DAYLIGHTING AND SOLAR GAIN

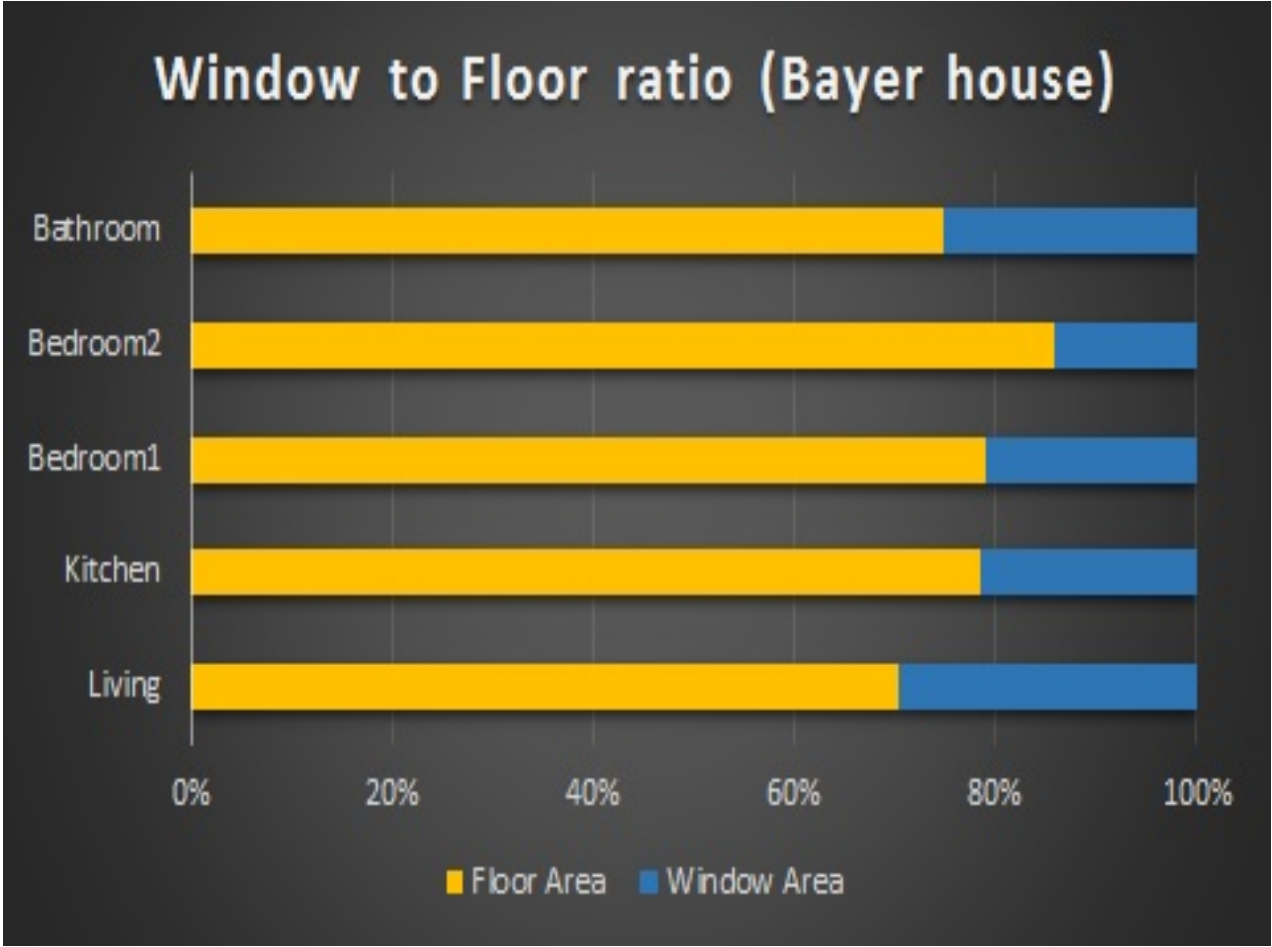
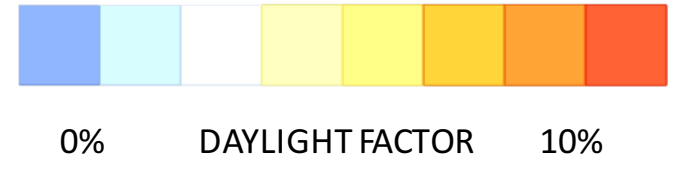
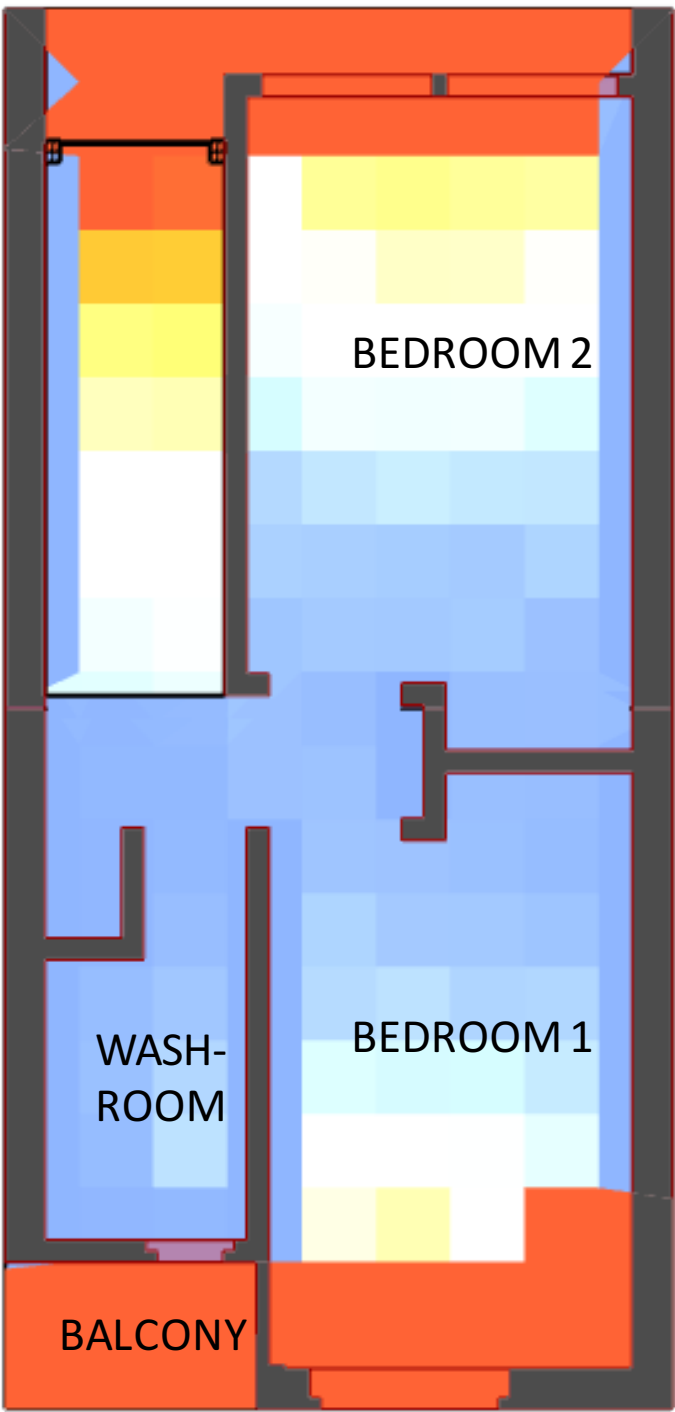
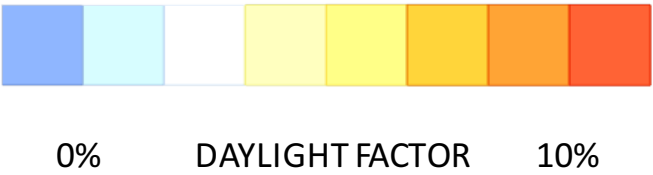
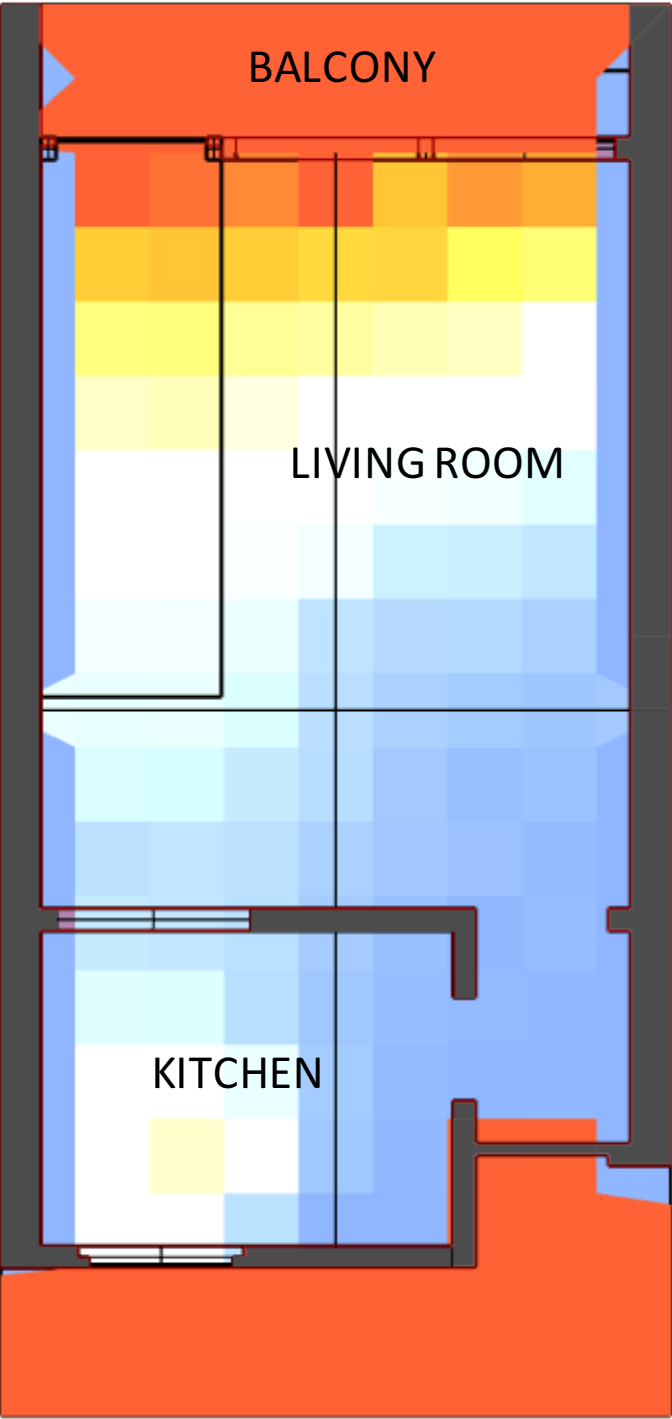


Minimal sun infiltration in summer to full sun infiltration in winter

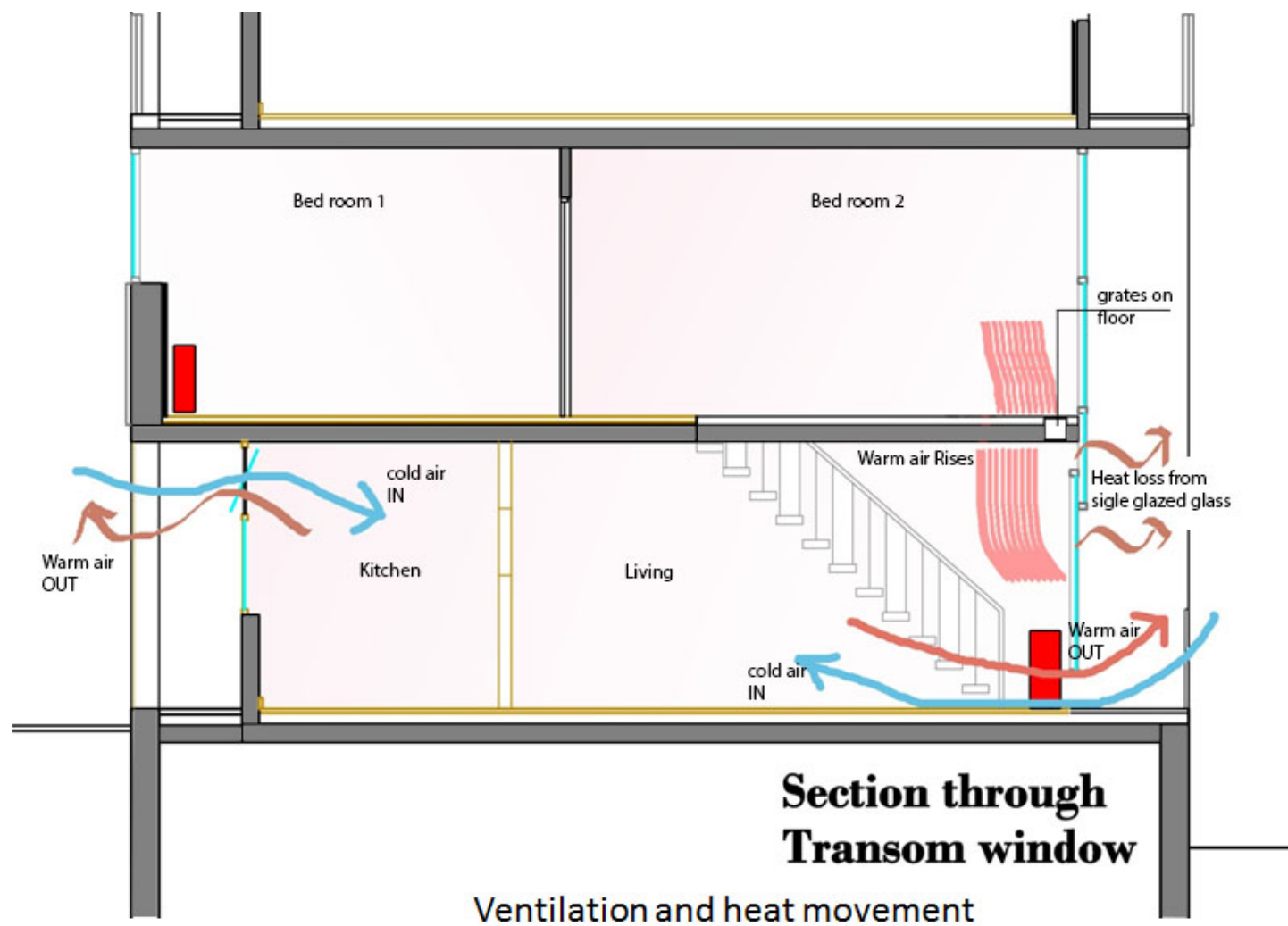
Overhang projection factor of 0.29



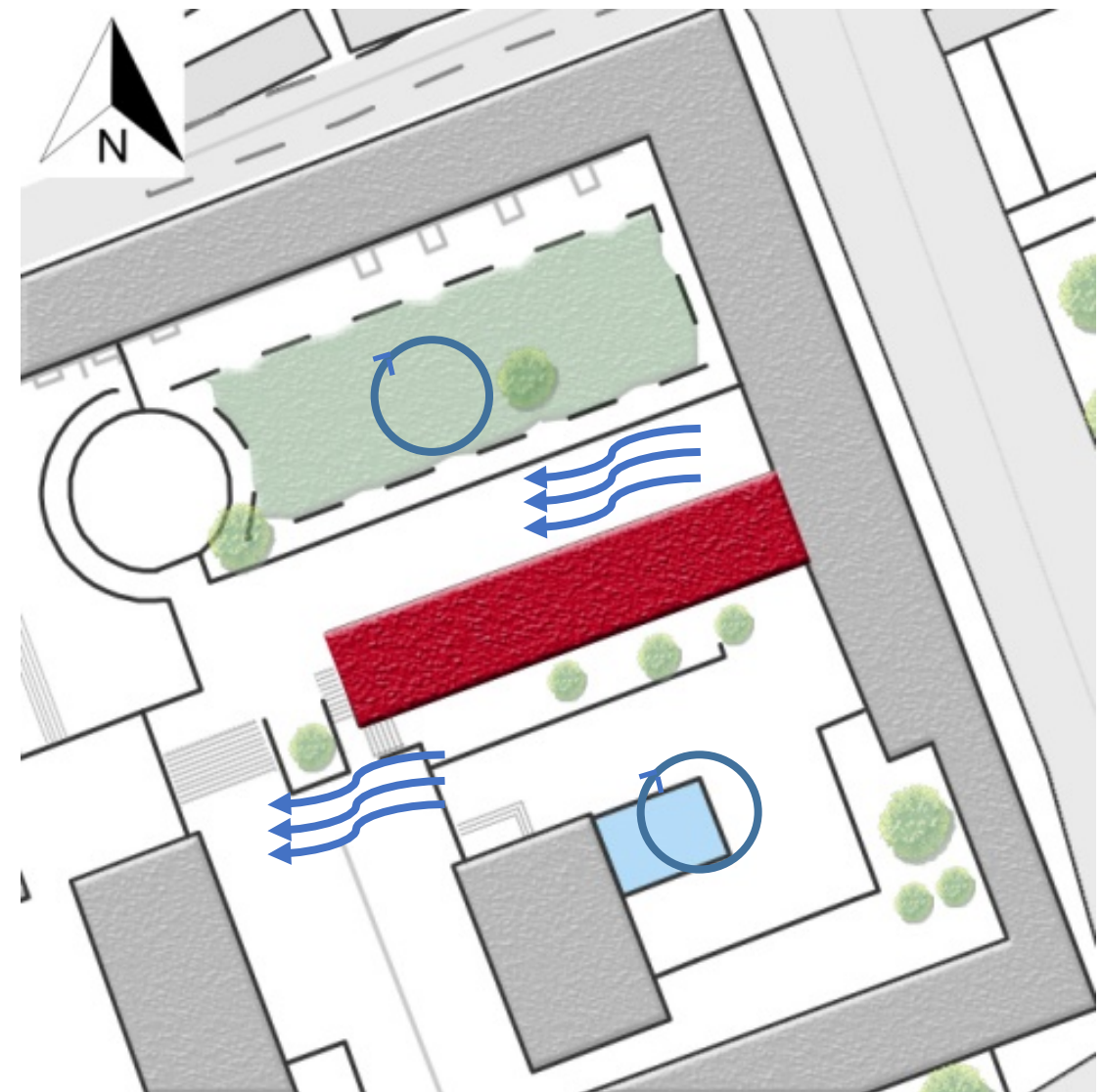
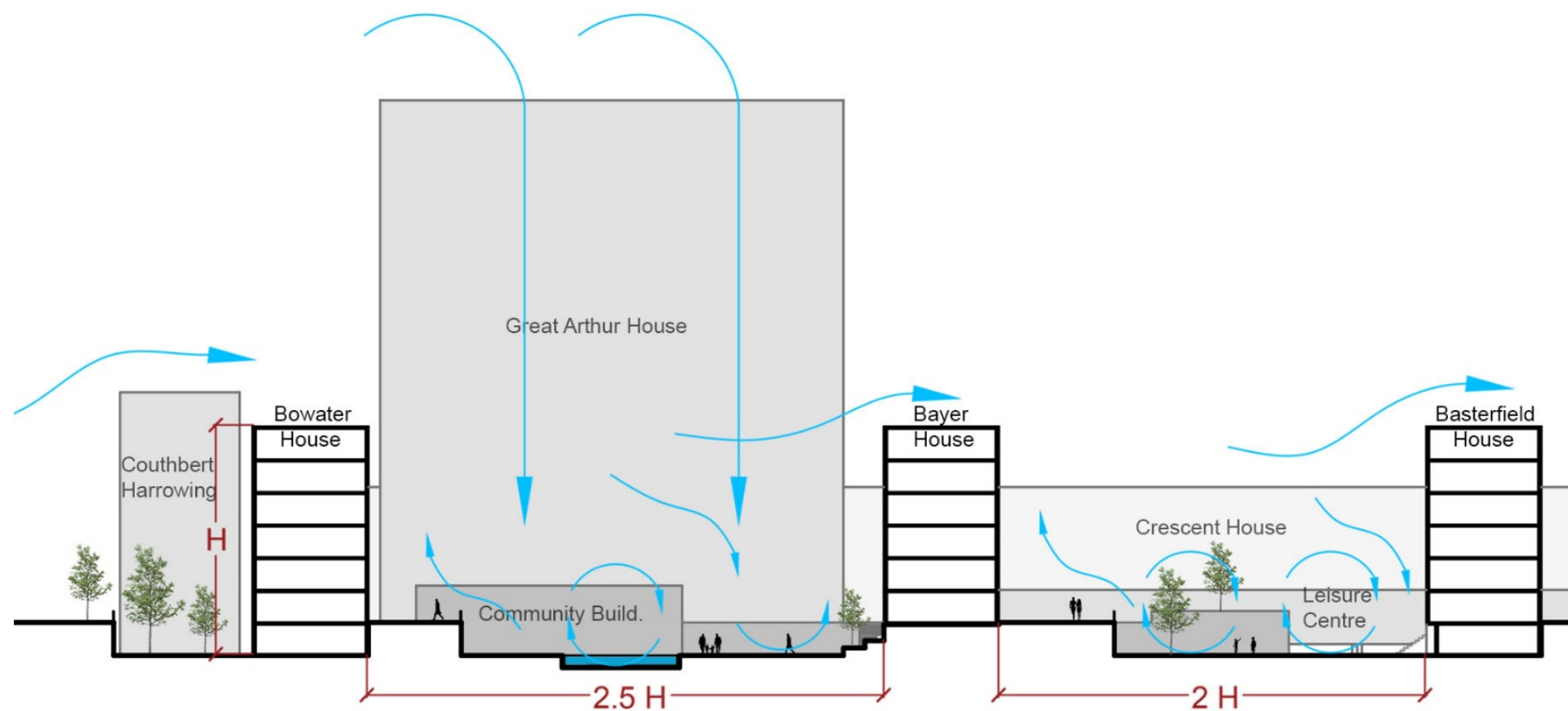
BAYER HOUSE-DAYLIGHT ANALYSIS



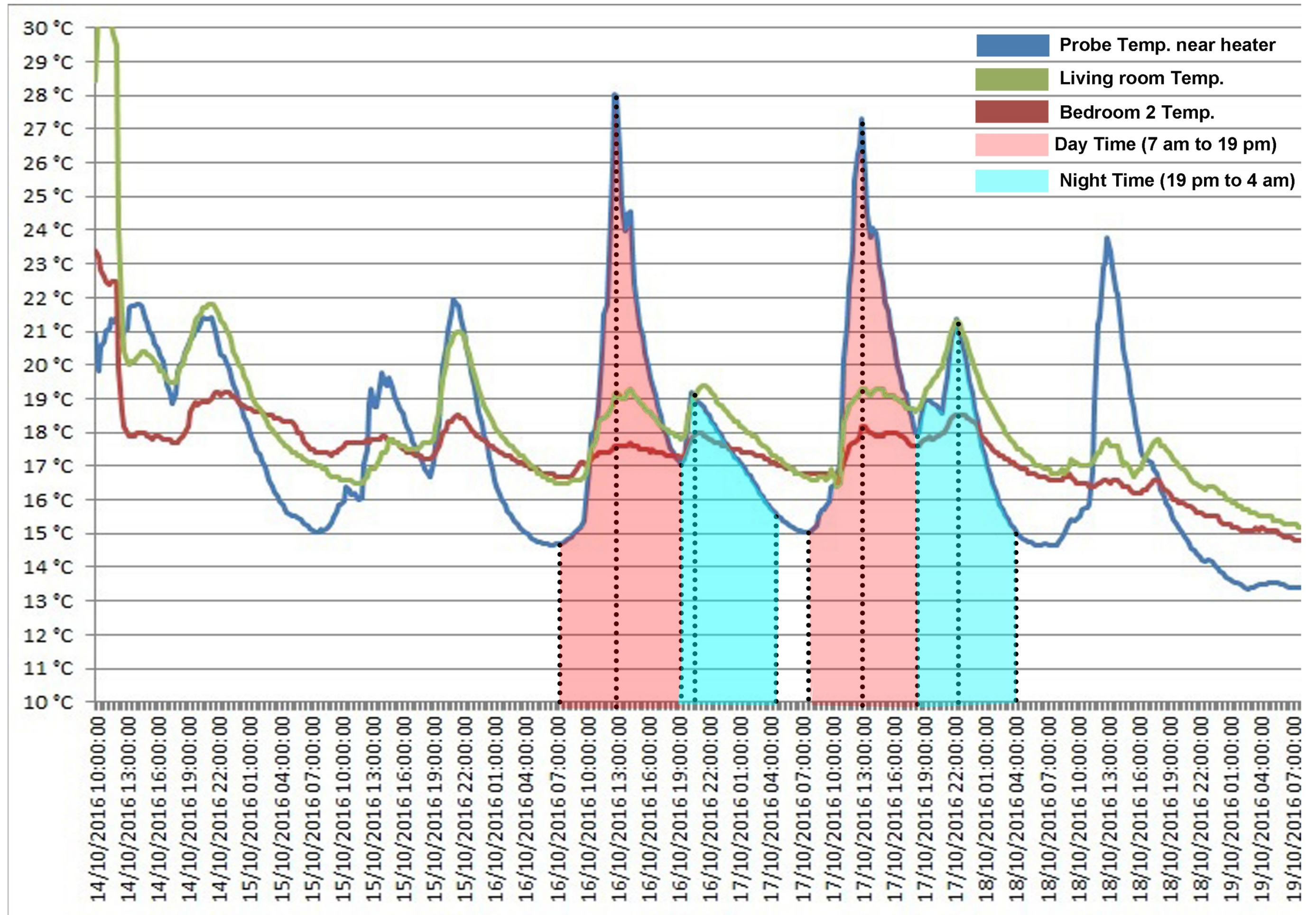
BAYER HOUSE-VENTILATION AND WIND ANALYSIS



Grating on Floor

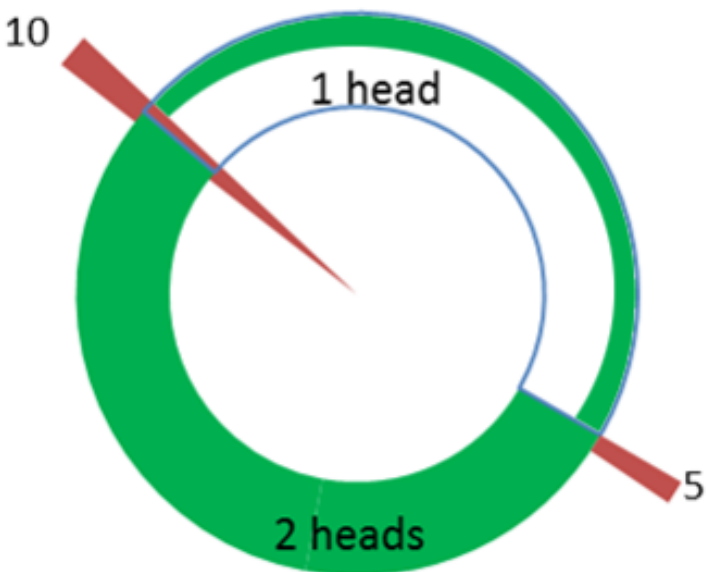


BAYER HOUSE-INFERENCE

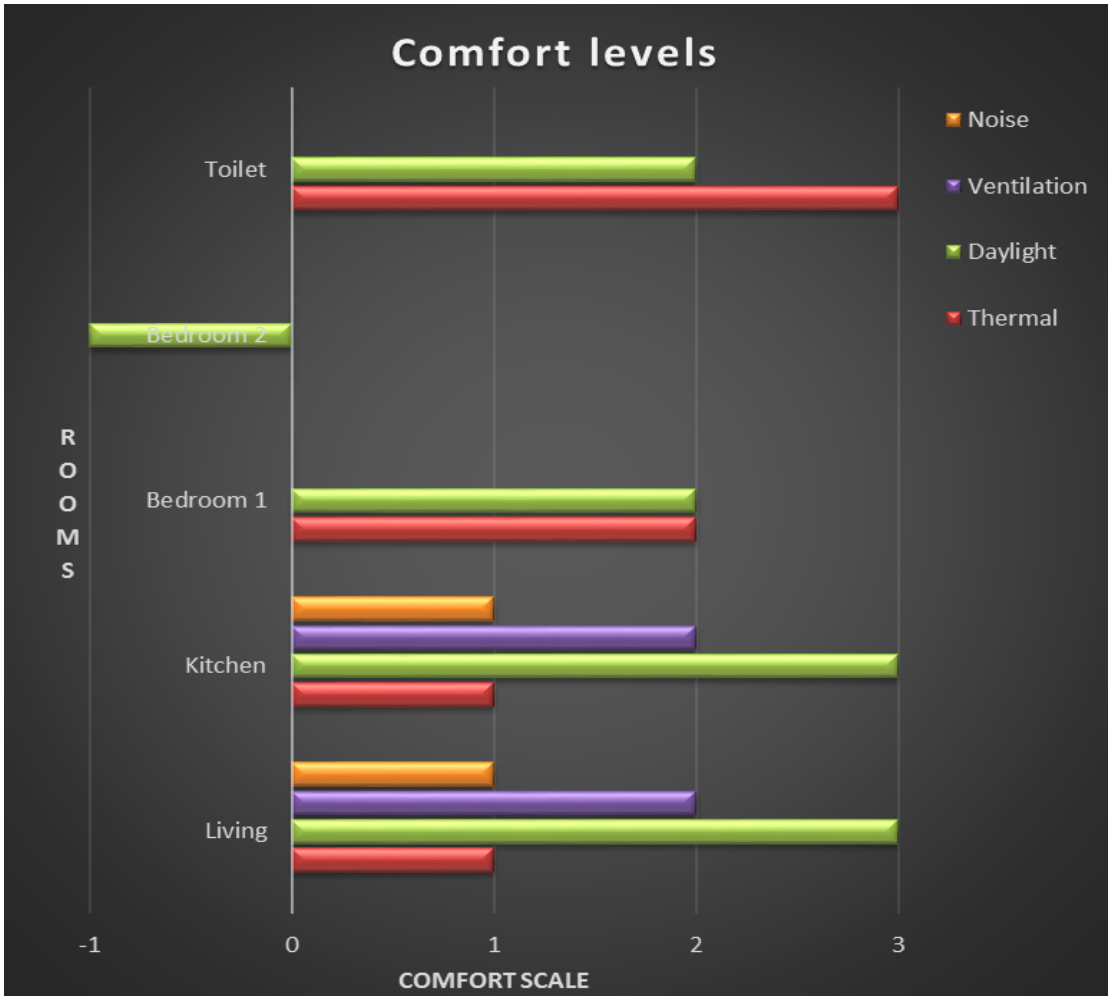


BAYER HOUSE COMFORT ANALYSIS

Occupancy hours (week days)



Occupancy hours on weekdays



Bar chart showing the comfort levels in different Rooms for different parameters

CBE Thermal Comfort Tool

Select method: Adaptive method

Air temperature: 18 °C

Mean radiant temperature: 21 °C

Outdoor running mean temperature: 15 °C

Air speed: 0.01 m/s

Local air speed control required

Globe temp Specify pressure Set defaults SI IP Local discomfort ? Help

ASHRAE-55 EN-15251 Compare Ranges Upload

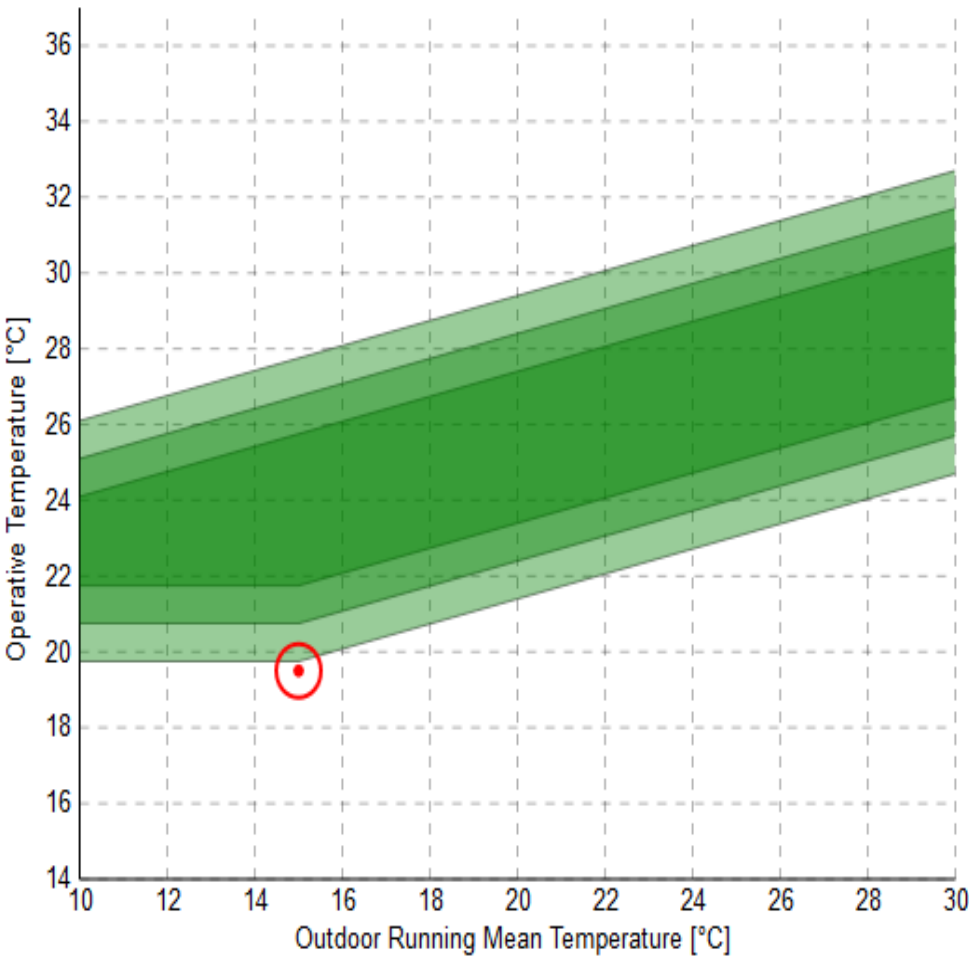
✗ Does not comply with EN-15251

Class III acceptability limits
↳ Status Too cool
Operative temperature: 19.8 to 27.8°C

Class II acceptability limits
↳ Status Too cool
Operative temperature: 20.8 to 26.8°C

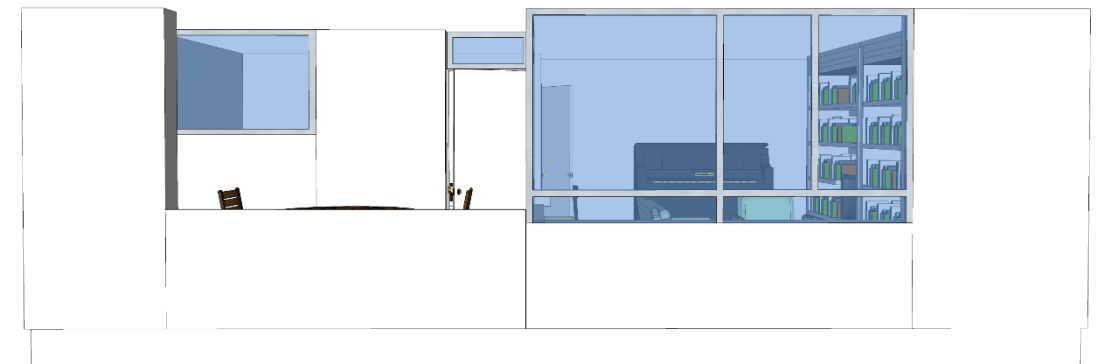
Class I acceptability limits
↳ Status Too cool
Operative temperature: 21.8 to 25.8°C

Adaptive chart

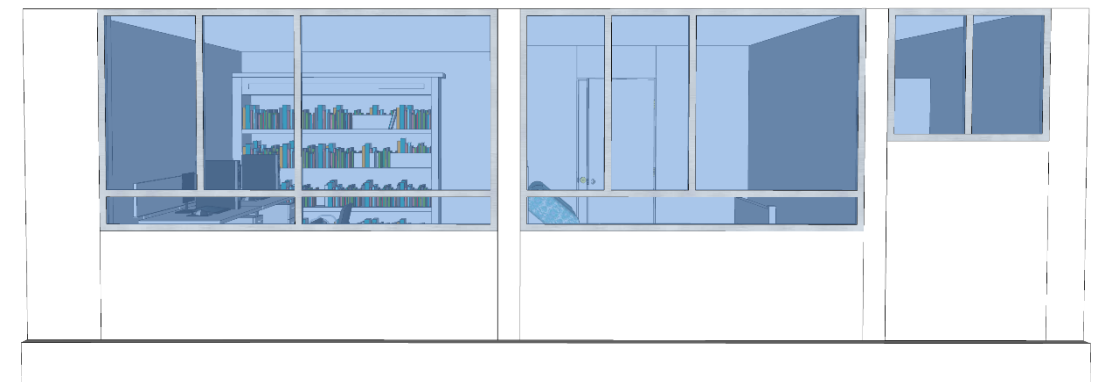


Computation of Comfort index using adaptive method

STANLEY COHEN HOUSE FLAT NO.10



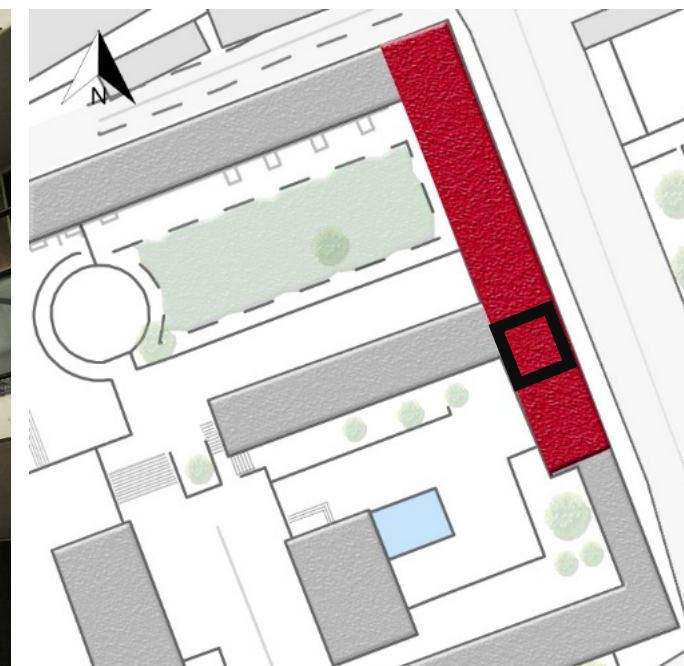
South West View



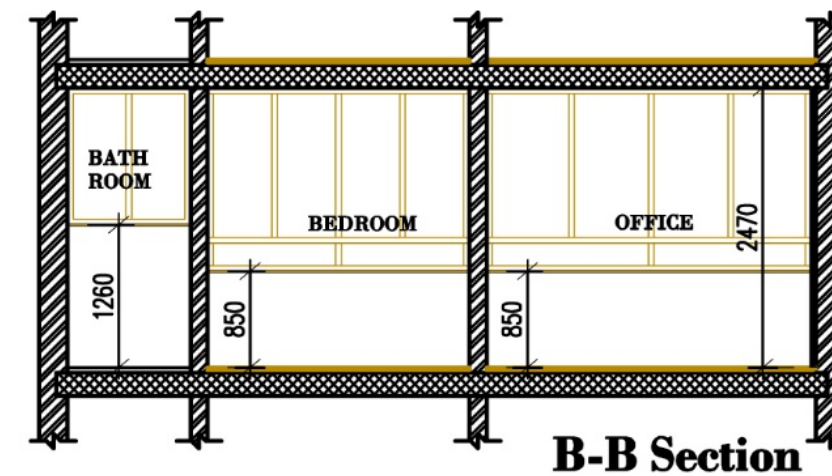
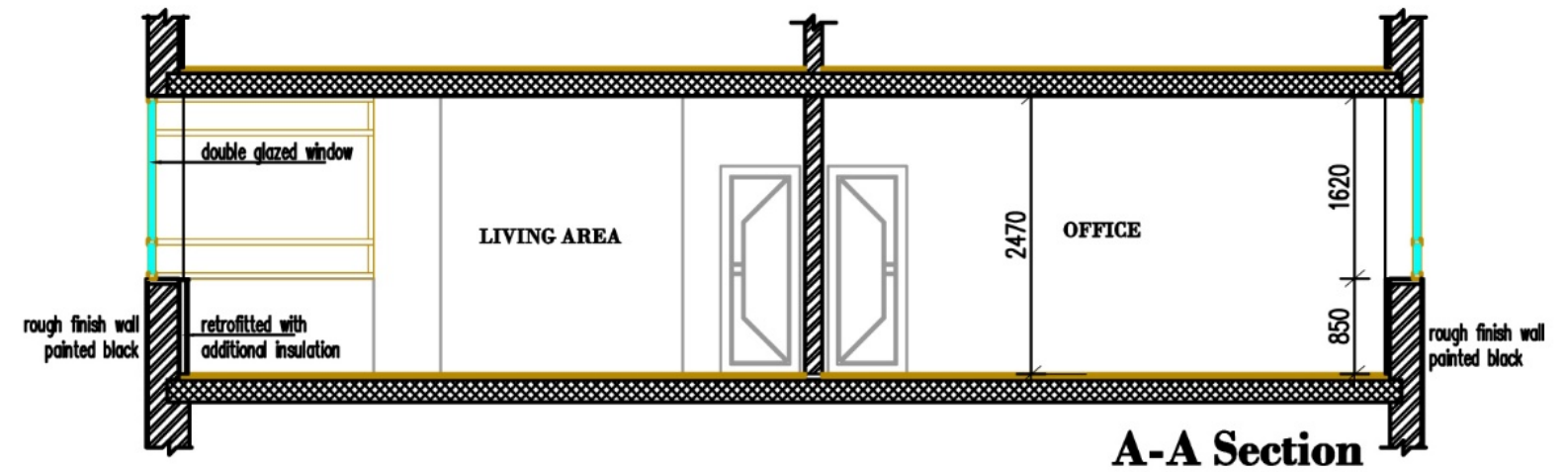
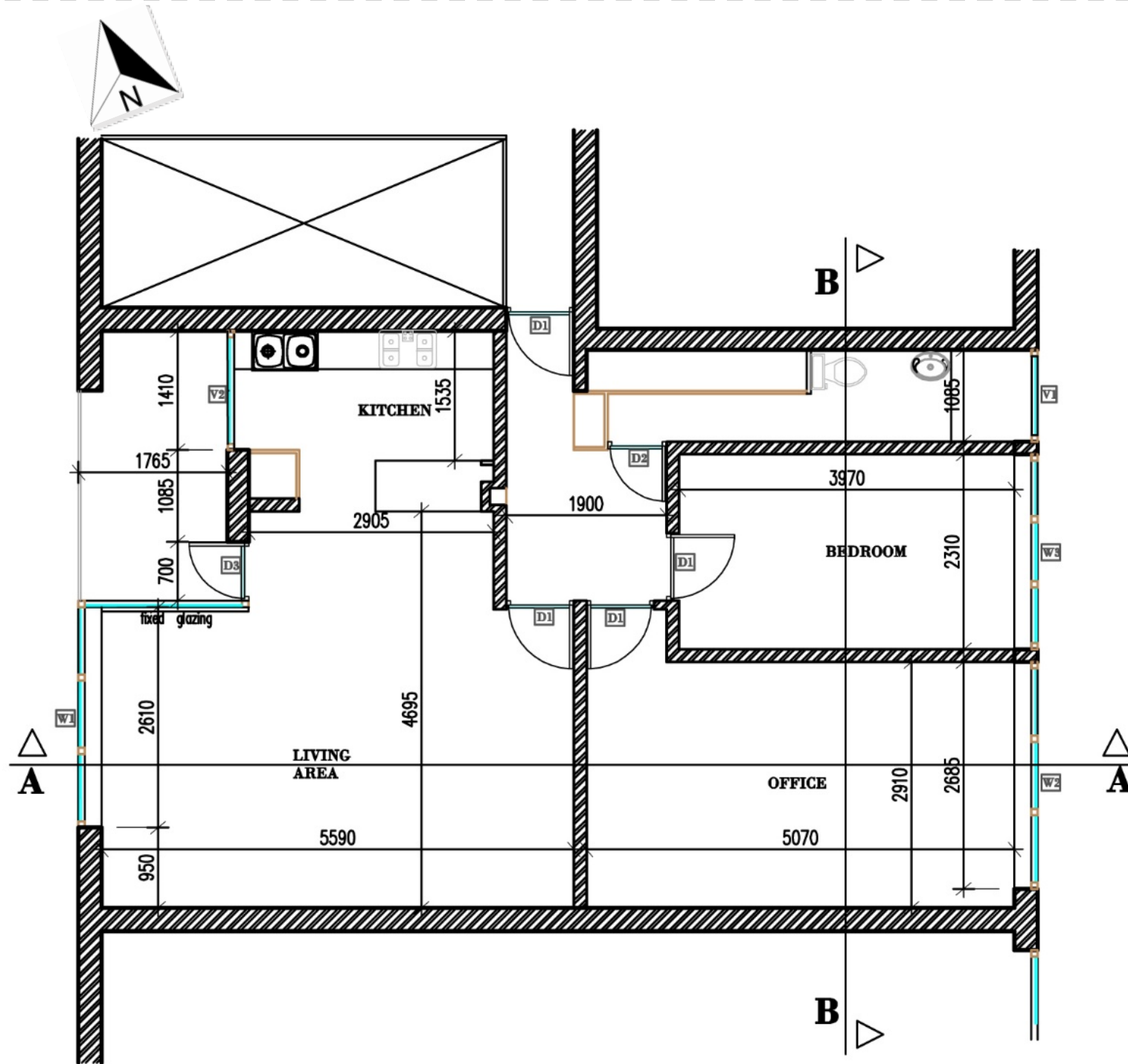
North East View

Stanley Cohen House

Bowater House



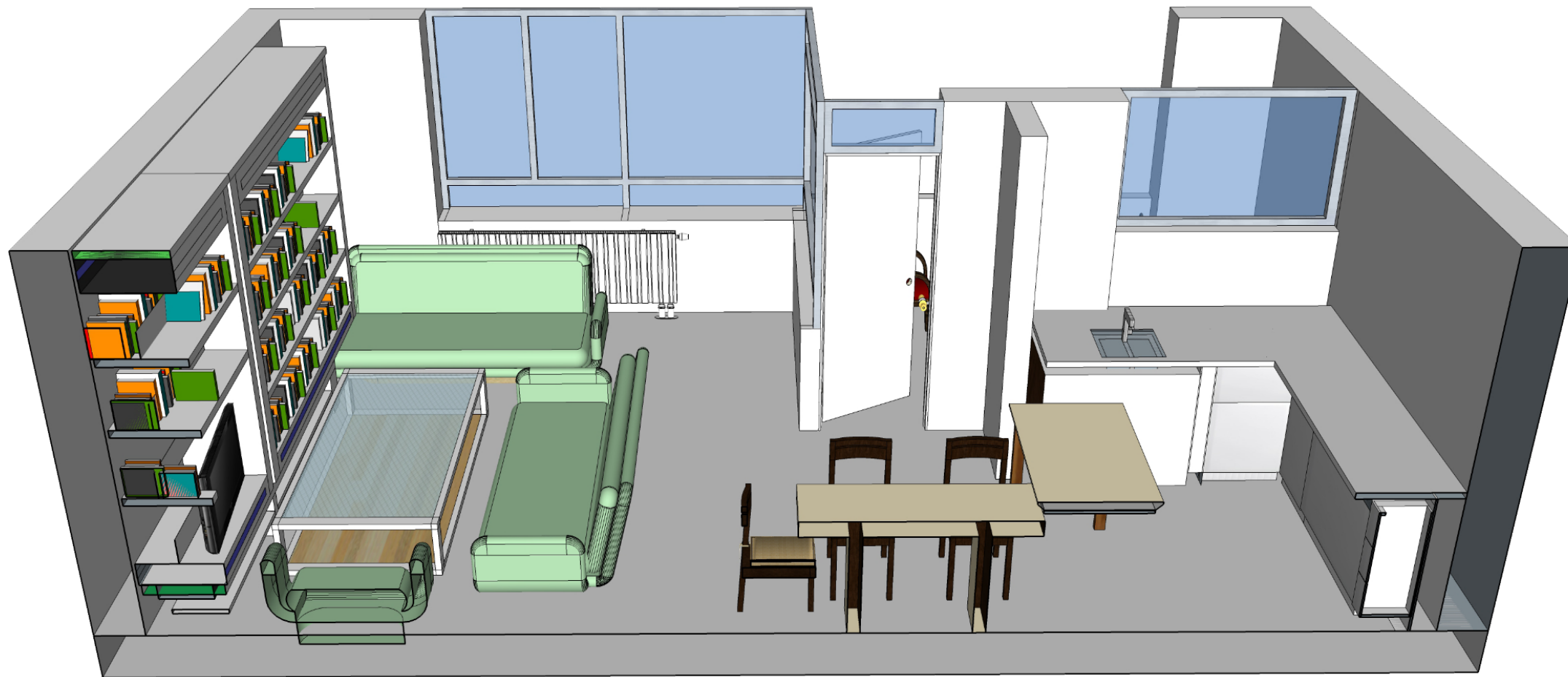
STANLEY COHEN HOUSE FLAT NO.10



Planning characteristics

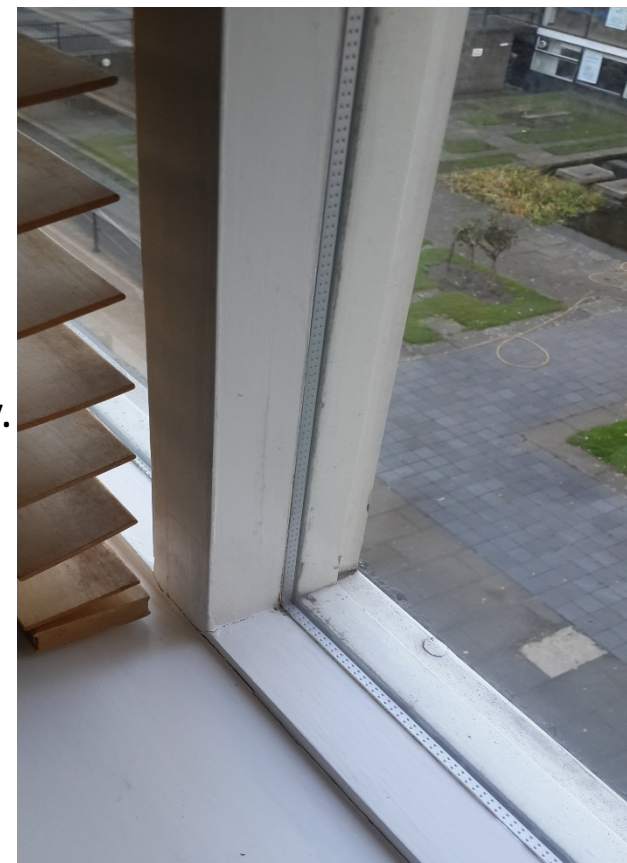
1. North east –south west orientation
2. Black painted external walls
3. Bedrooms along external street
4. Renovated flat with double glazing and wall insulation

STANLEY COHEN HOUSE

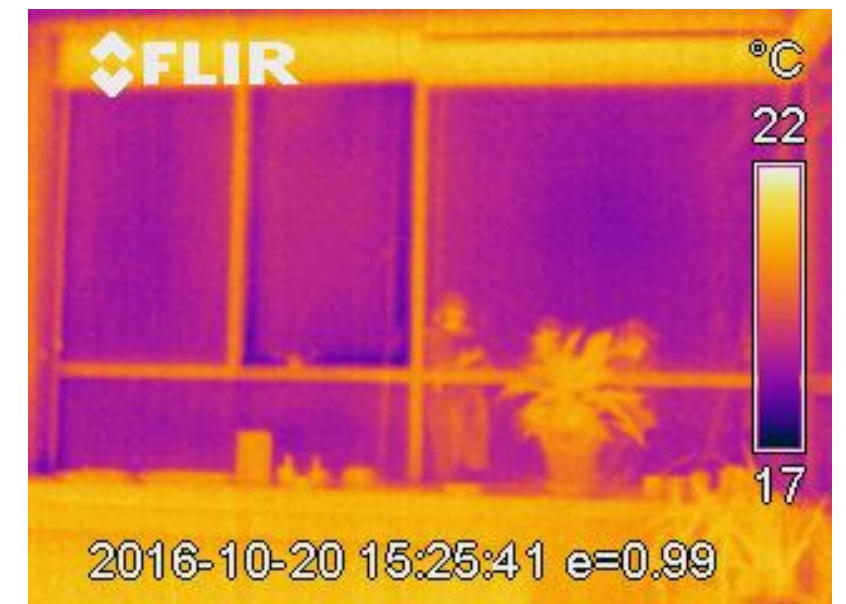
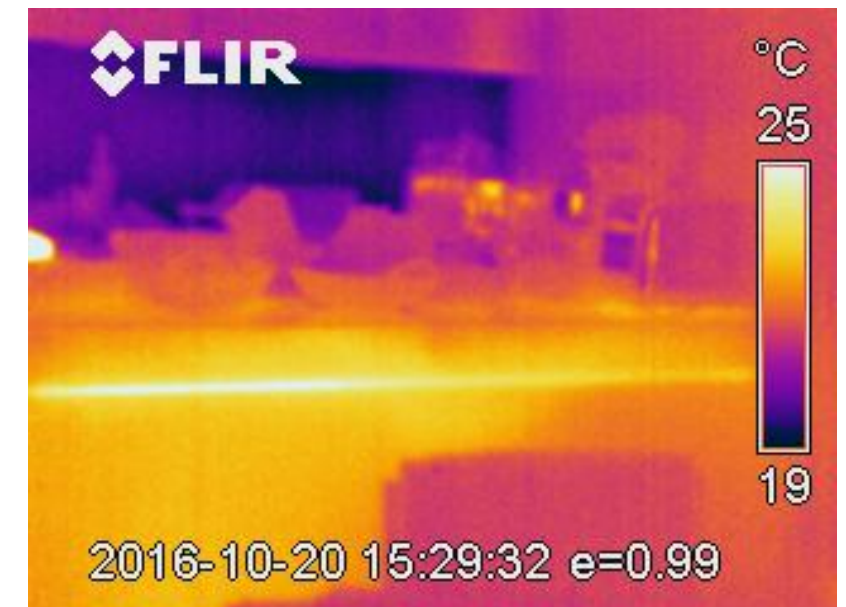


Observation

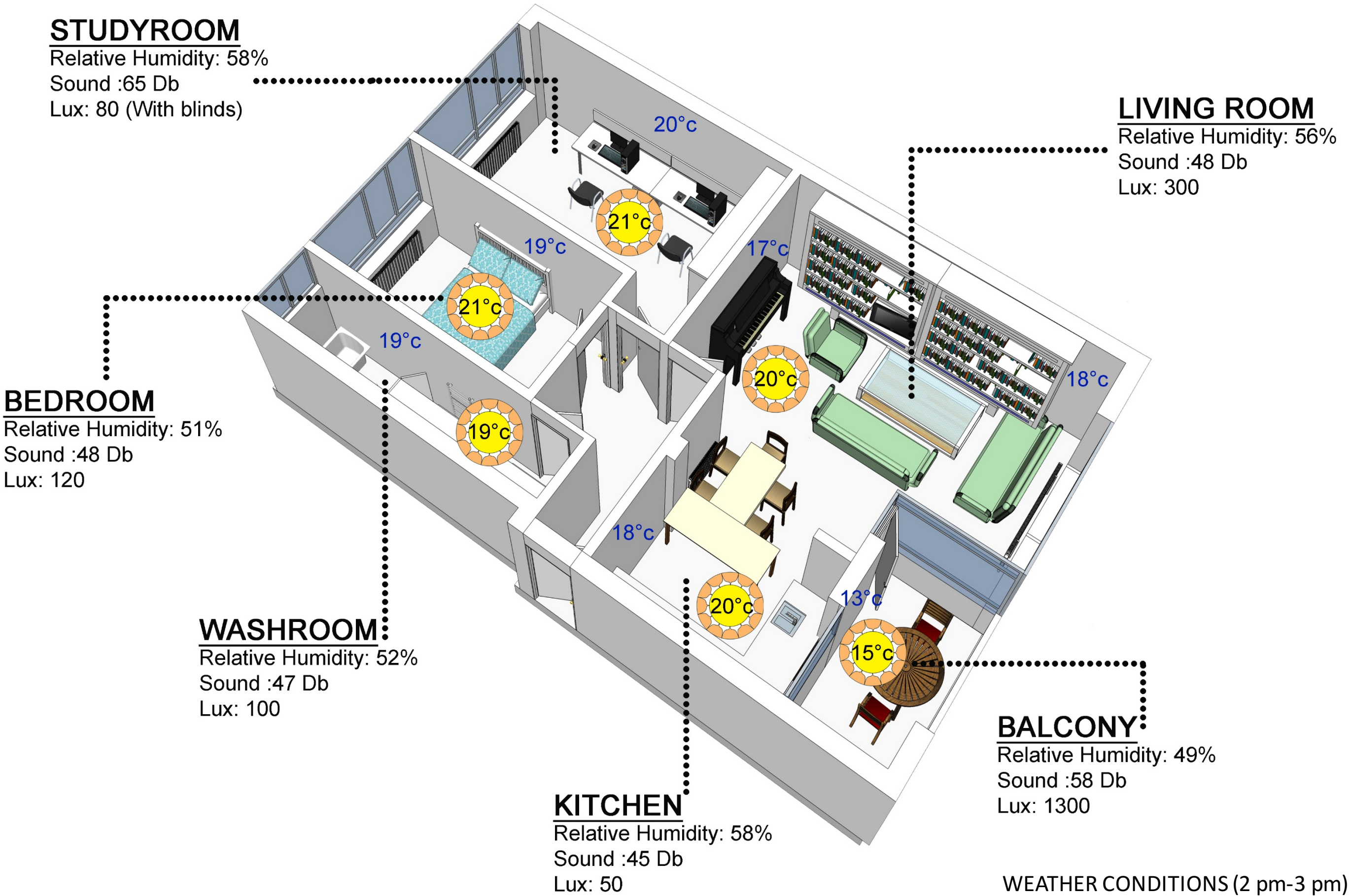
1. The exterior doors had seepage issues.
2. Kitchen and toilet fitted with mechanical extract
3. The radiators are rarely operated unless very cold
4. The living room is used primarily in the evening and morning hours only.
5. Sound issues on the side overlooking the road
6. Double glazed windows in the living area



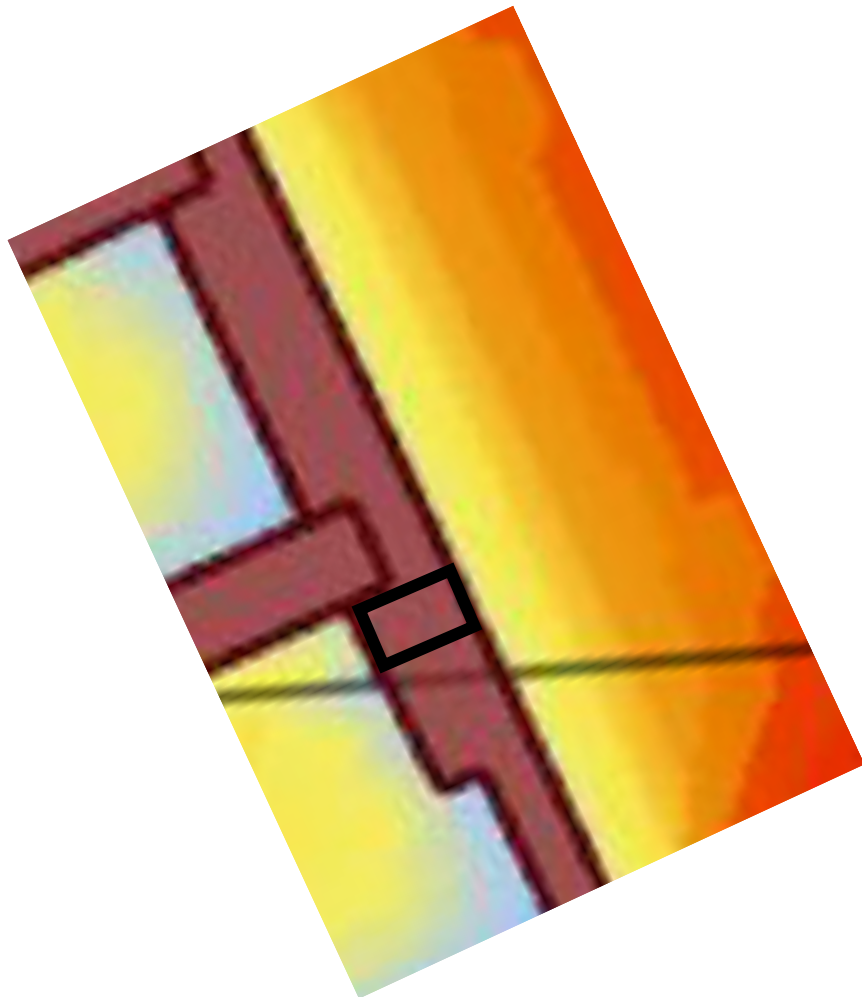
Double Glazing Window



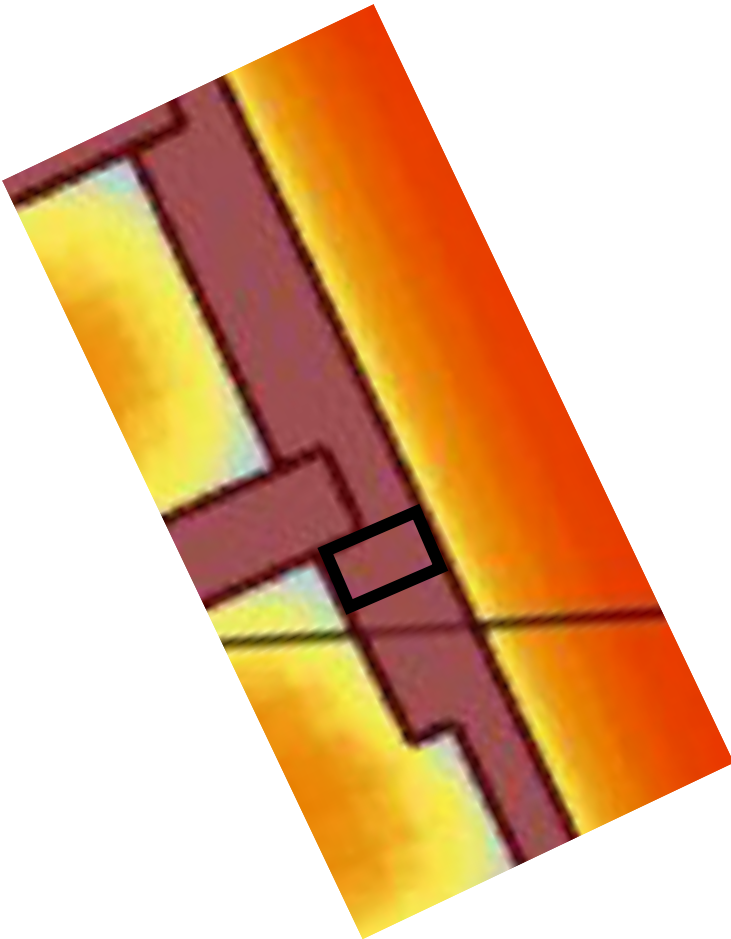
STANLEY COHEN HOUSE-SPOT MEASUREMENTS



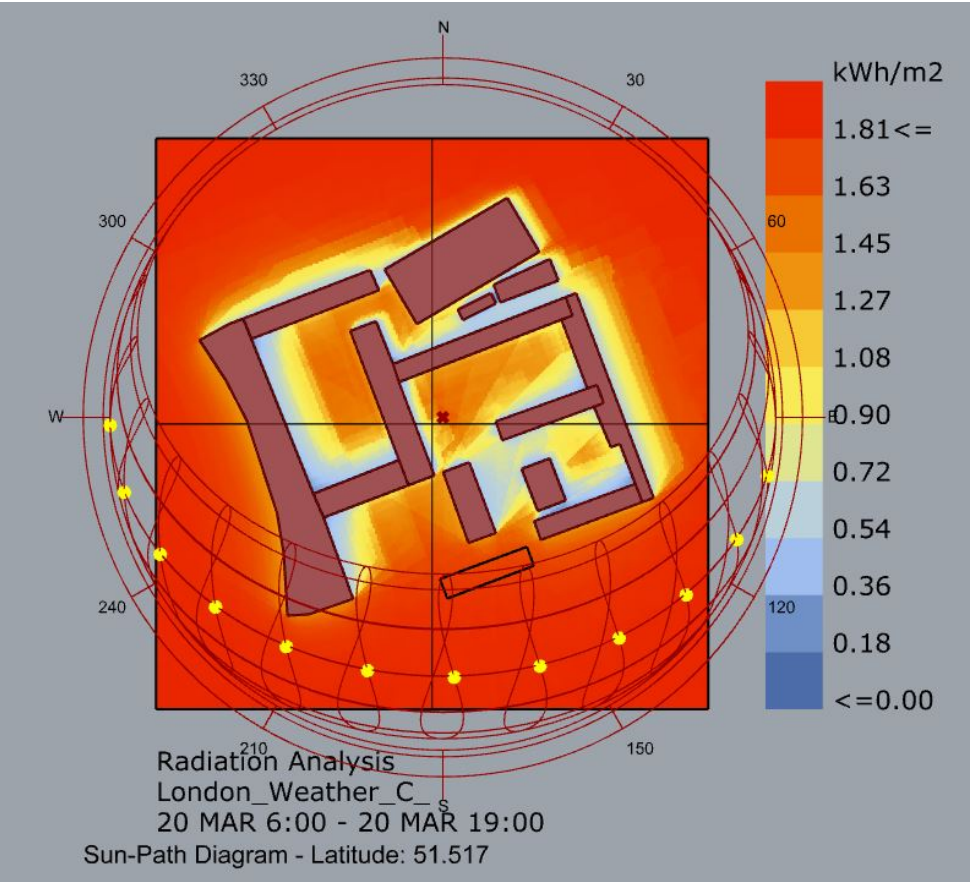
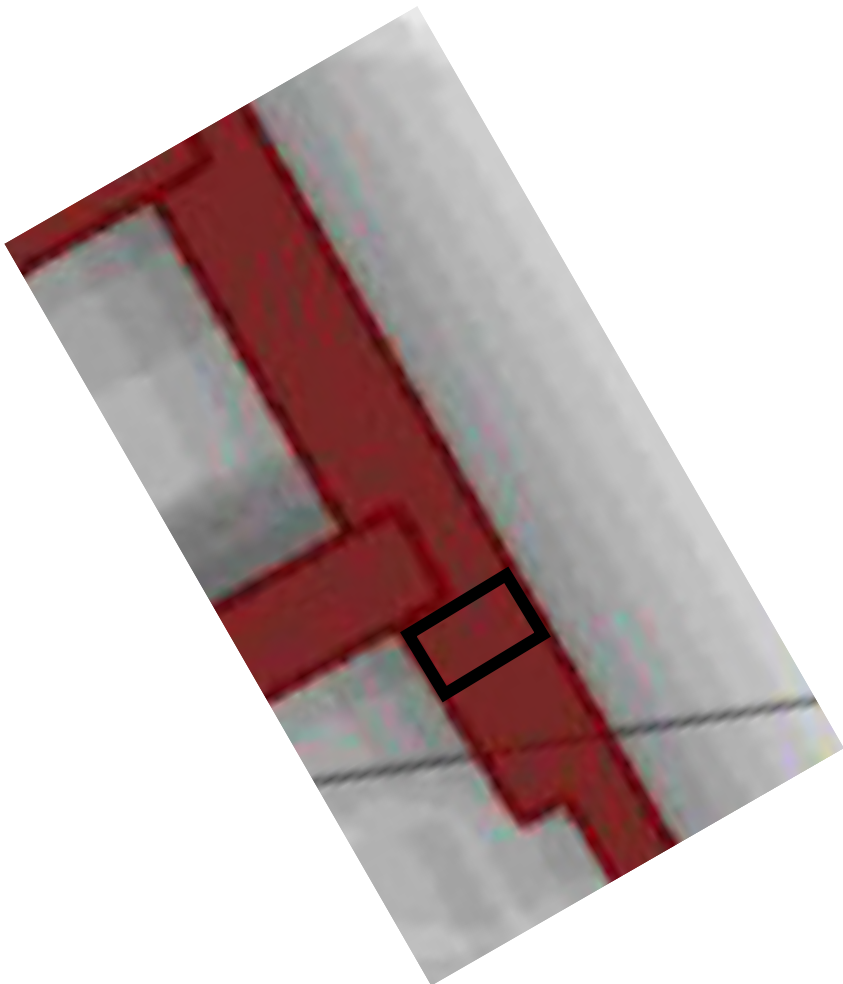
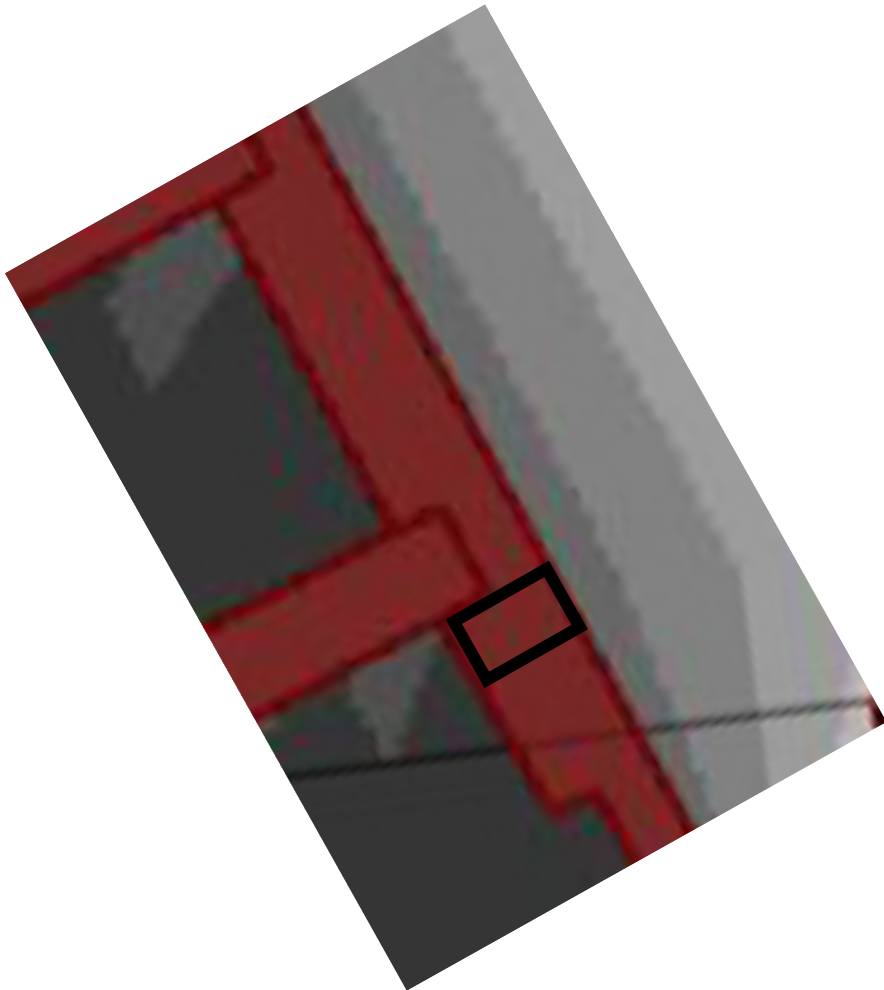
SOLAR RADIATION AND SHADOW ANALYSIS



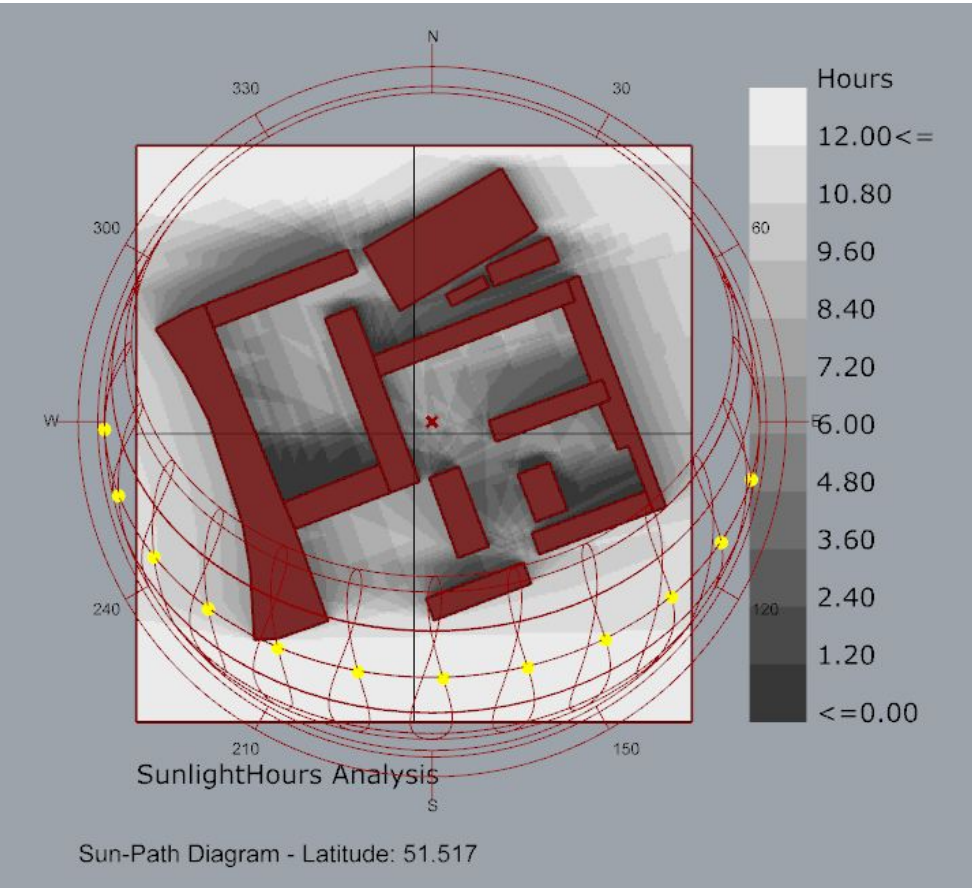
22 DECEMBER (SHORTEST DAY)



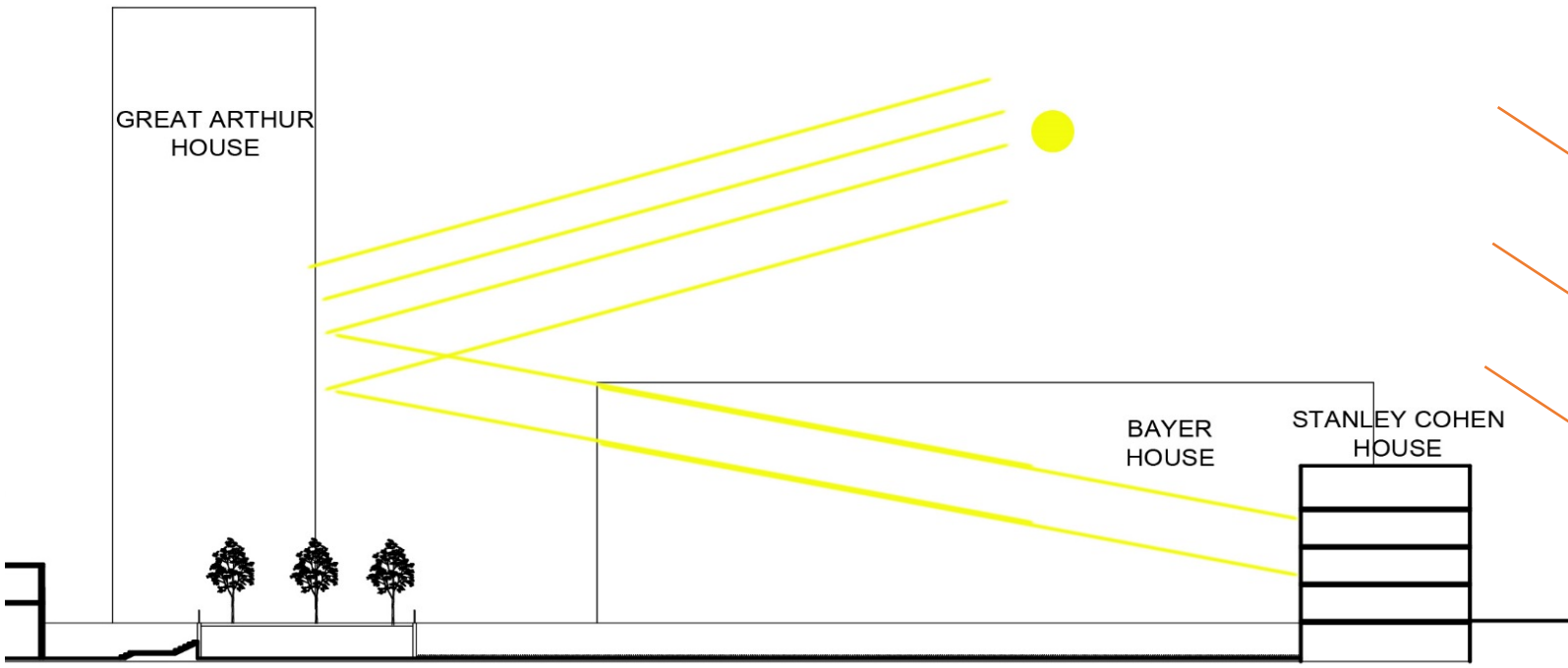
21 JUNE (LONGEST DAY)



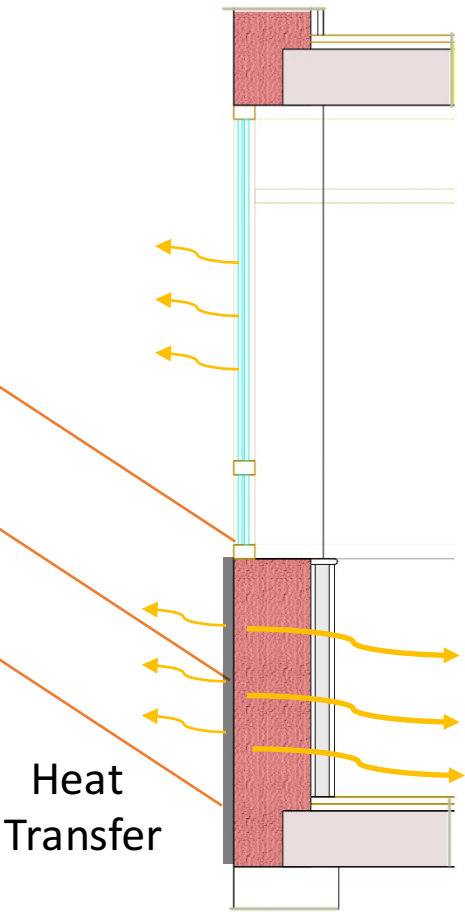
20 MARCH (EQUINOX)



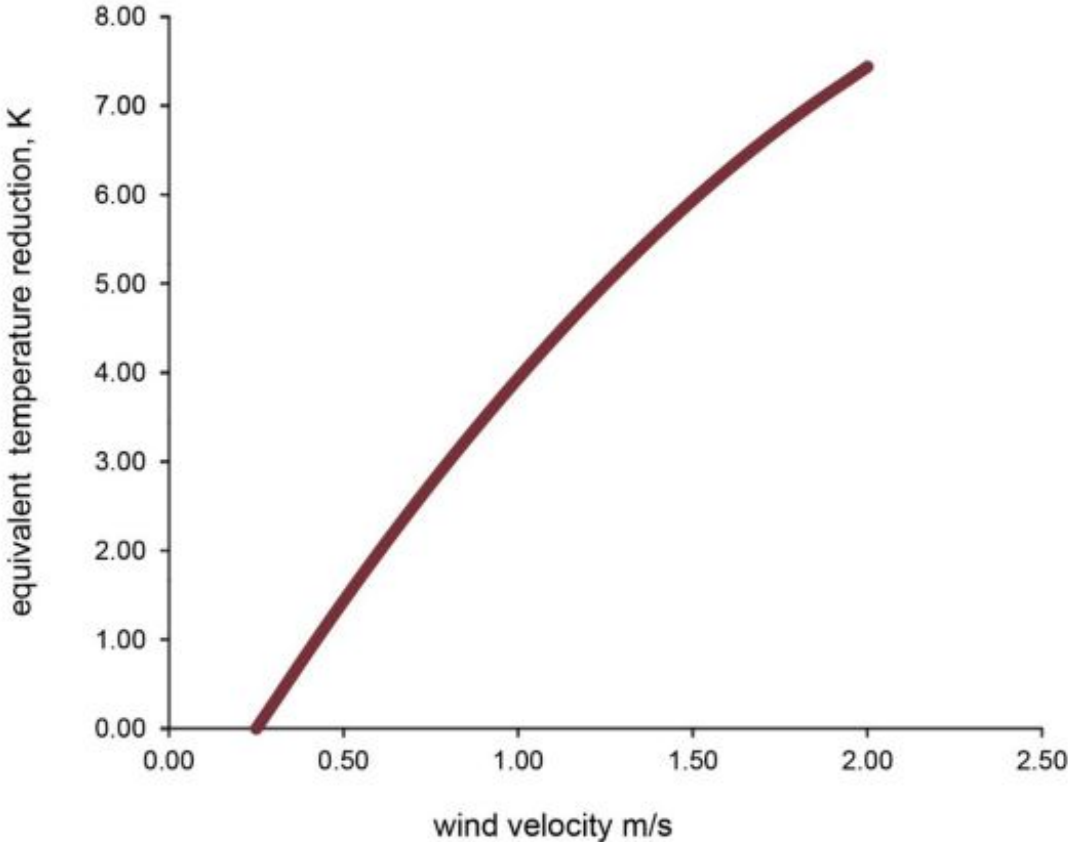
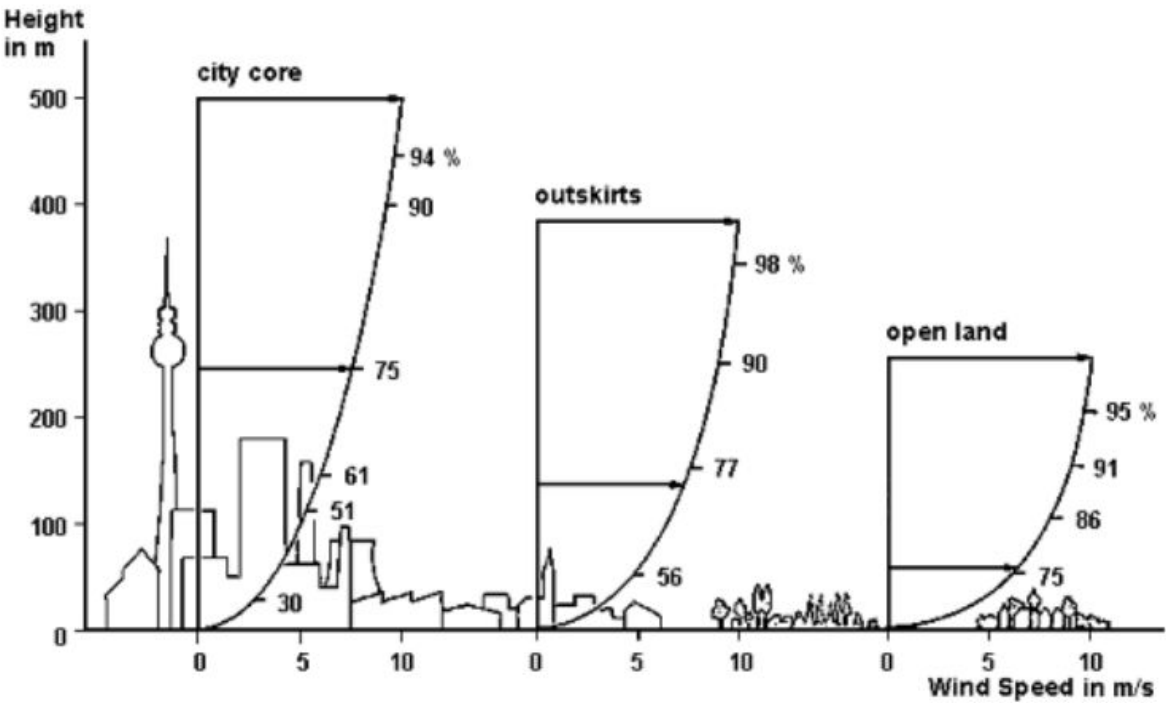
STANLEY COHEN HOUSE-SOLAR GAIN AND WIND ANALYSIS



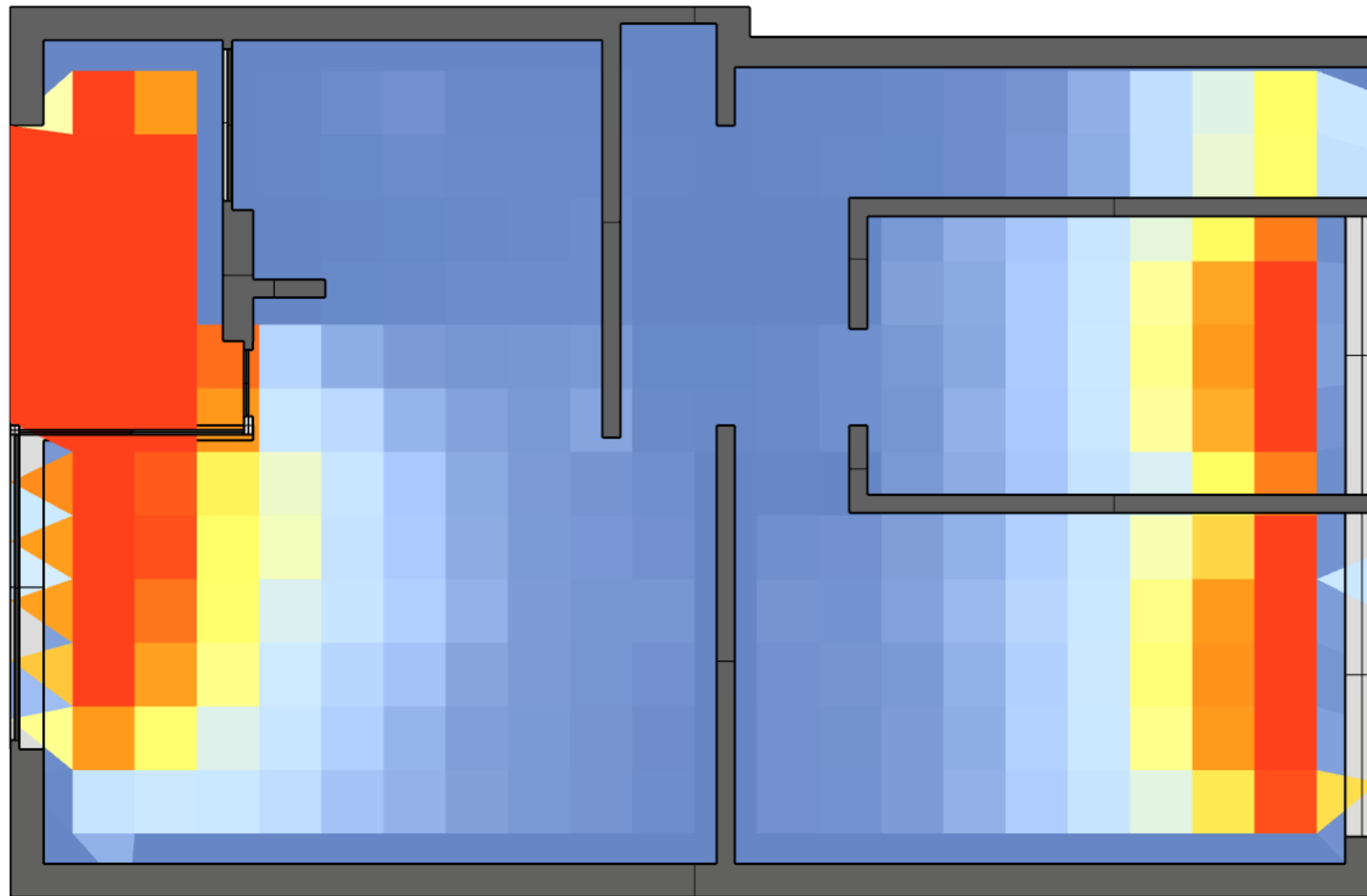
Indirect Solar Radiation



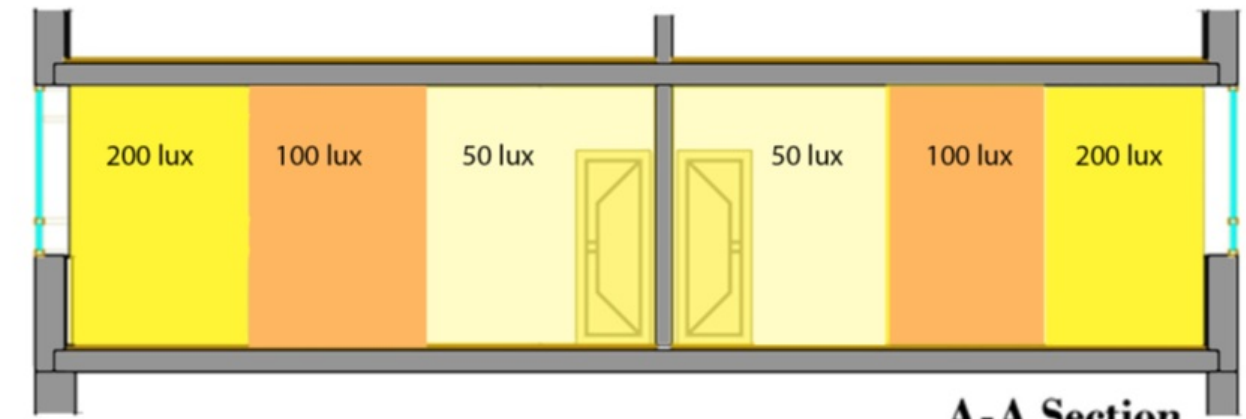
CROSS SECTIONAL WALL



STANLEY COHEN HOUSE- DAYLIGHT ANALYSIS



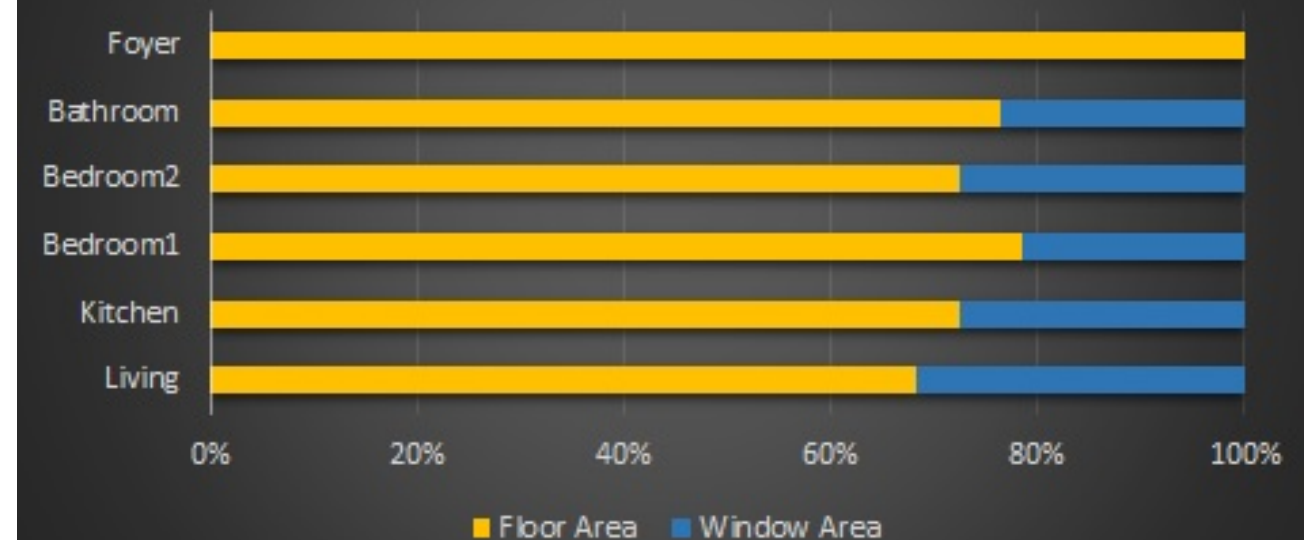
0% DAYLIGHT FACTOR 10%



Daylighting

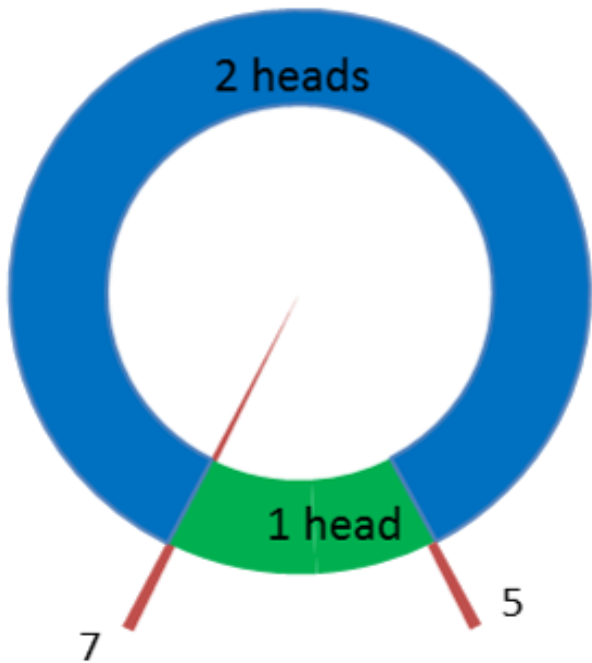
A-A Section

Window to floor area ratio (Stanley Cohen house)

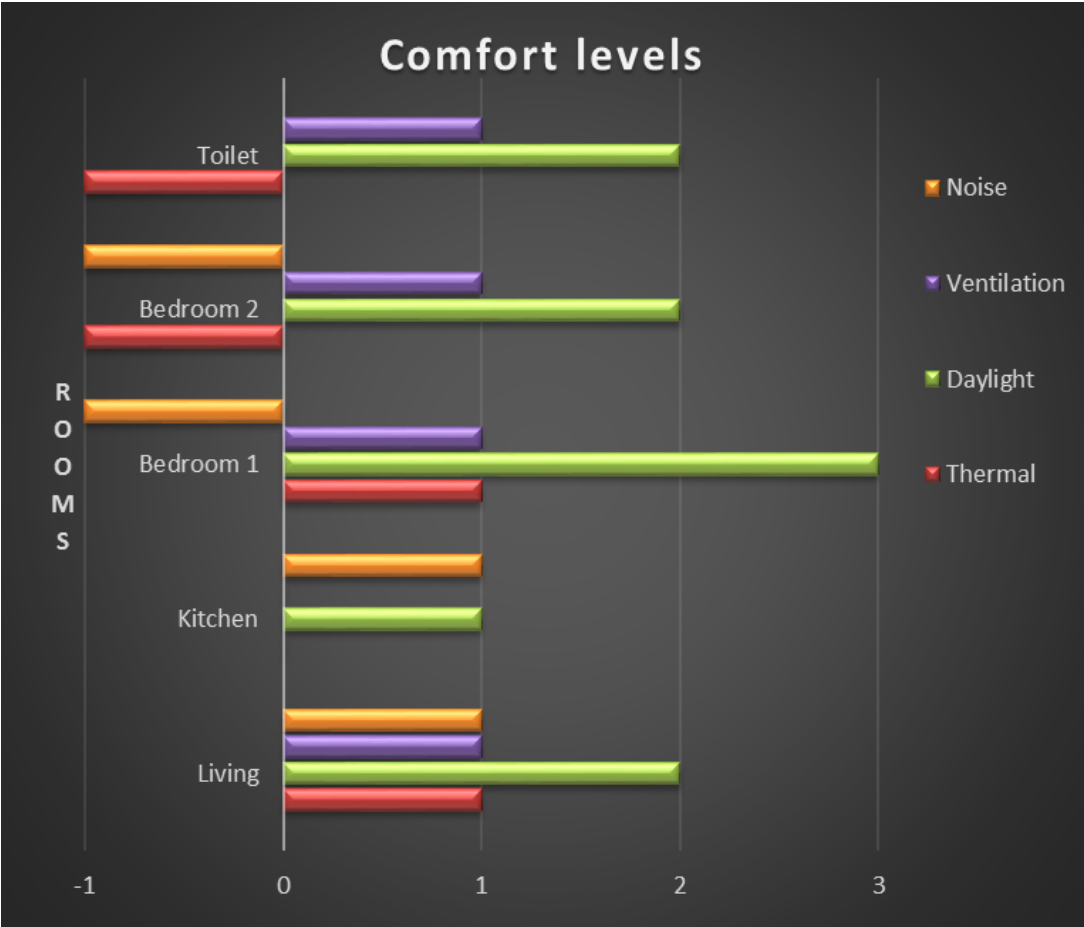


STANLEY COHEN HOUSE-COMFORT ANALYSIS

Occupancy hours (week days)



Occupancy hours on weekdays



Bar chart showing the comfort levels in different Rooms for different parameters

CBE Thermal Comfort Tool

Select method: Adaptive method

Air temperature: 21 °C

Mean radiant temperature: 19 °C

Outdoor running mean temperature: 15 °C

Air speed: 0.01 m/s

Local air speed control required

Globe temp Specify pressure Set defaults SI IP Local discomfort ? Help

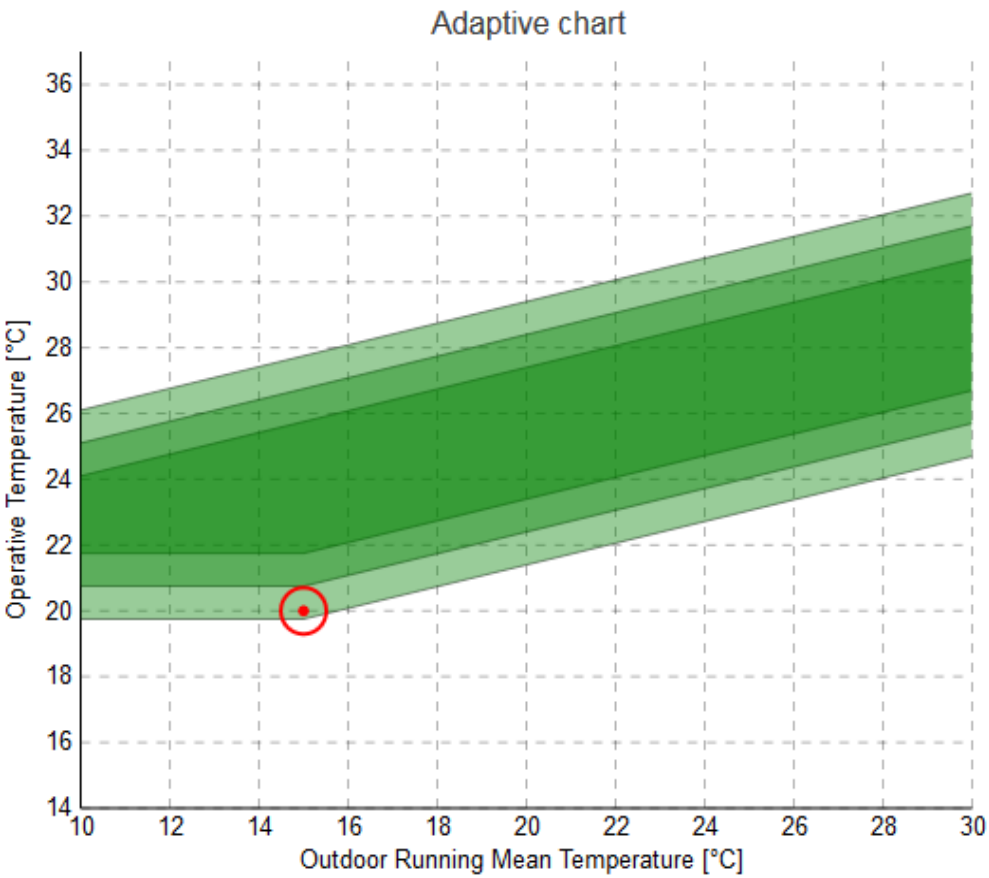
ASHRAE-55 EN-15251 Compare Ranges Upload

✓ Complies with EN-15251

Class III acceptability limits
↳ Status
Operative temperature: 19.8 to 27.8°C
Comfortable

Class II acceptability limits
↳ Status
Operative temperature: 20.8 to 26.8°C
Too cool

Class I acceptability limits
↳ Status
Operative temperature: 21.8 to 25.8°C
Too cool



Computation of Comfort index using adaptive method

Q AND A

THANK YOU !