



Date  
28/11/2019

# SALTSJÖ JÄRLA





## 1 Project Info

**Description & Objectives:** Identify daylight potential at an early design stage of a housing building block located in Saltsjö Järila, Stockholm. Evaluation according to building regulation code, BBR.

**Prepared by:** Danai Vogiatzi

**Reviewed by:** Danai Vogiatzi

**Expected outcomes:** Simulated DF values for all apartments at the lower floors which are identified as the critical ones.

## 2 Method

### 2.1 Performance indicators

The performance indicator was DFpoint according to BBR (SS 914201,  $DF_p \geq 1\%$ ). Due to the incomplete apartment layout the single DFpoint could not be defined. To overcome this a grid of points spaced  $0.20\text{ m} \times 0.20\text{ m}$  across the apartment area relevant to BBR point was sampled, as shown in Figure 1. When the final apartment layout is decided, the BBRpoint will be located inside this area.

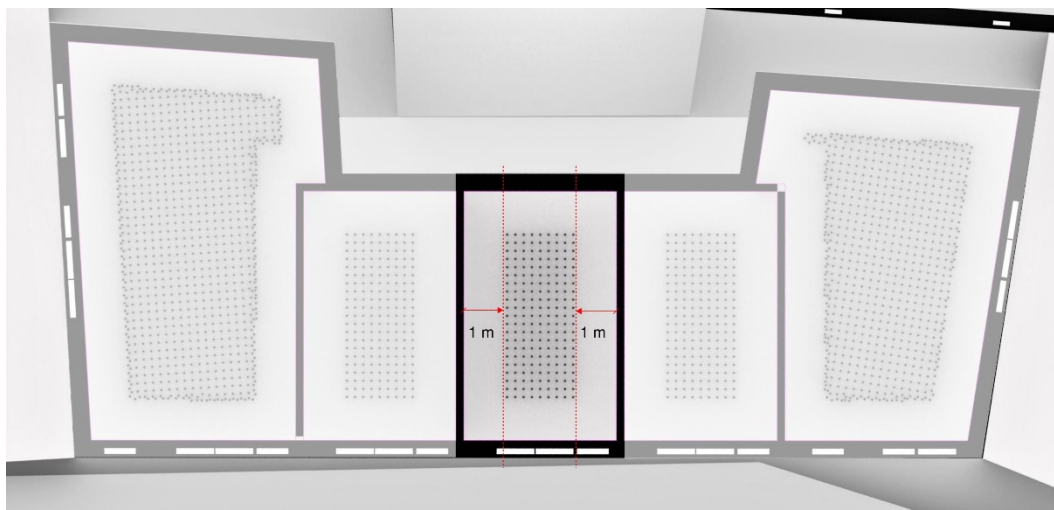


Figure 1. Illustration of the grid points (offset of 1 m from the side walls in order to include the BBR point).

The same method was used at floor plan 12 of the west building, where the model did not have walls/partitions between apartments. However, in the *Tvärsektion C-C* ("Saltsjö Järila Skiss 2019.10.04" document) the floor use is defined as housing.

The simulated floors are marked with red color in Figure 2.



Figure 2. The simulated floors (in red).

## 2.2 Model inputs

### Software:

Simulation engine: Radiance

Interface: Honeybee

### Radiance parameters:

Table 1. The key Radiance simulation parameters used for this study.

Radiance Parameters	
ab	6
ad	2048
as	1024
aa	0.1
ar	528
lr	8
lw	0.00001
st	0.15

### Optical properties:

Table 2. The optical properties of the model geometry.

Reflectance Values	
Internal walls	0.6
Internal floor	0.3
Internal ceiling	0.8
External walls and surroundings	0.3
External floor & ground	0.2
External ceiling	0.7
Frames	0.7
Doors	0.4
Transmittance (Tvis)	
Windows	0.7



## 3 Results

### **Delivered files:**

One (1) Rhino file named:

- Saltsjö Järla2.3dm

Four (4) Grasshopper files with internalized data (points, DFvalues and meshes) for each floor that was assessed, named:

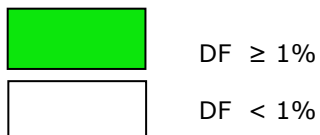
- Saltsjö Järla\_Plan\_10.gh
- Saltsjö Järla\_Plan\_11.gh
- Saltsjö Järla\_Plan\_12.gh
- Saltsjö Järla\_Plan\_13.gh



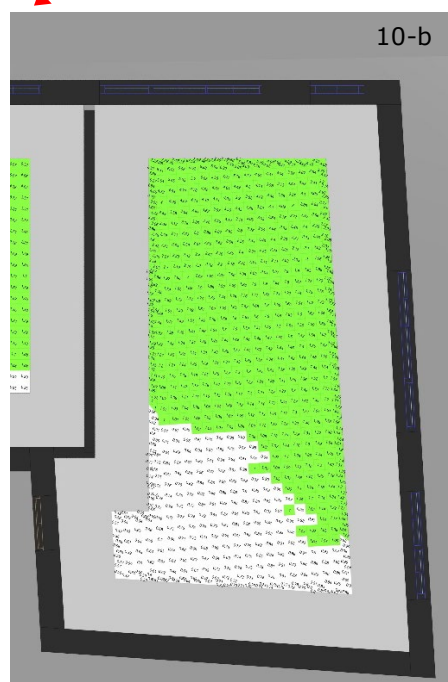
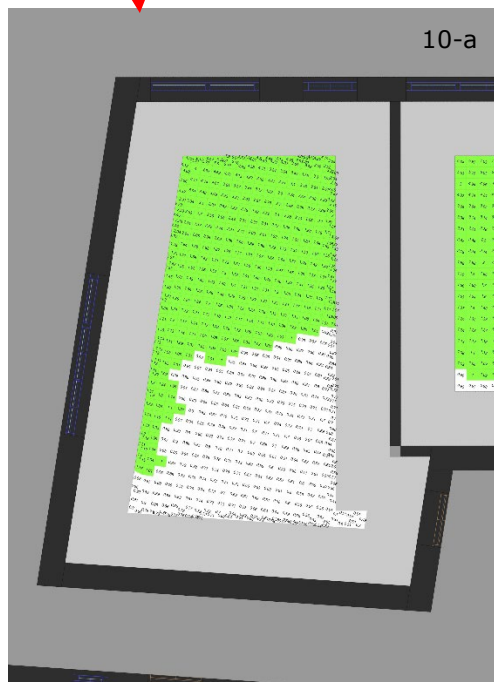
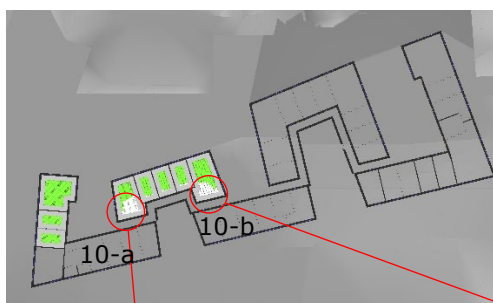
### Comments:

The following pictures illustrate the simulation results per floor.

Green colour indicates the area that has DF at least 1%. White colour indicates the points that the measured DF was lower than 1 %.



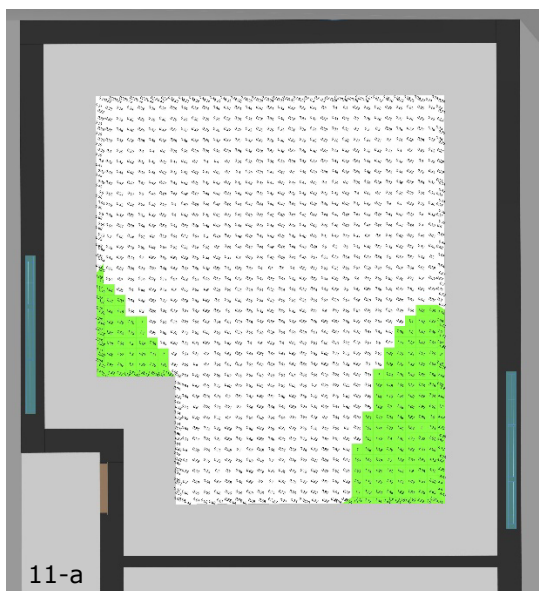
### Plan 10



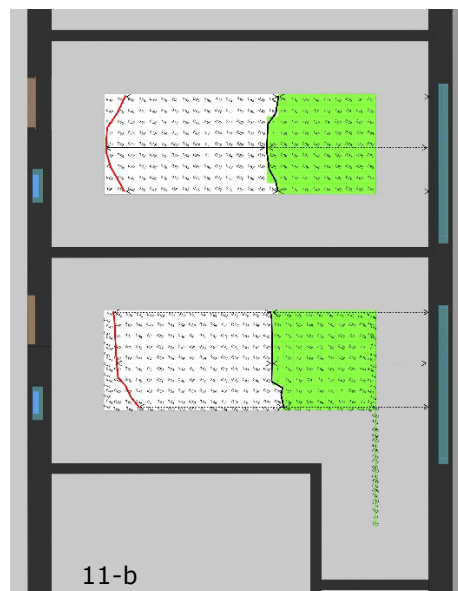
10-a & 10-b: DFpoint reached the BBR requirement in the middle of the (whole) depth of both apartments. It is though recommended not to place frequently occupied areas toward south.



## Plan 11



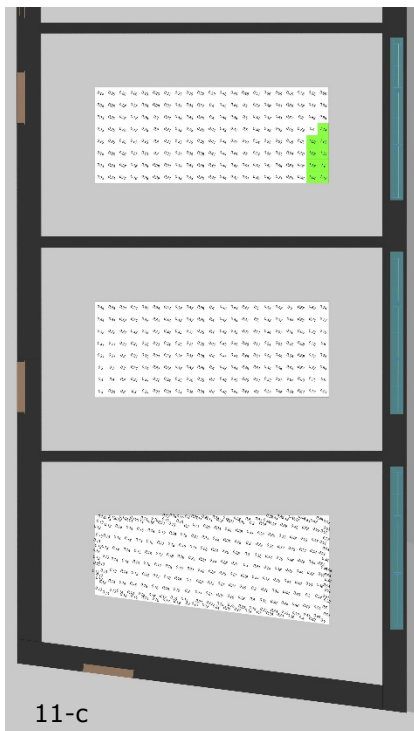
11-a



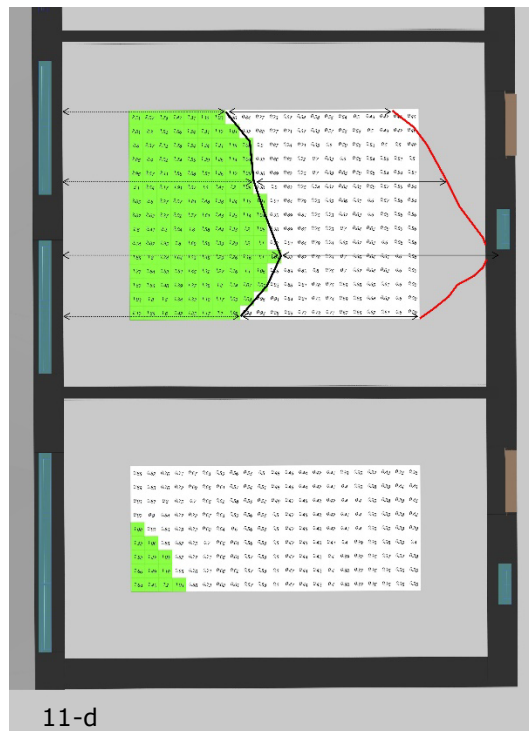
11-b

11-a: Not adequate daylight provision. A north opening is recommended in order to comply with the standard.

11-b: The area that has  $DF \geq 1\%$  is shown with green. The red line shows the maximum depth that the room would comply with the BBR (which equals twice the distance of the former line). If hallway and bathroom are placed close to the entrance it will comply with the standard.



11-c



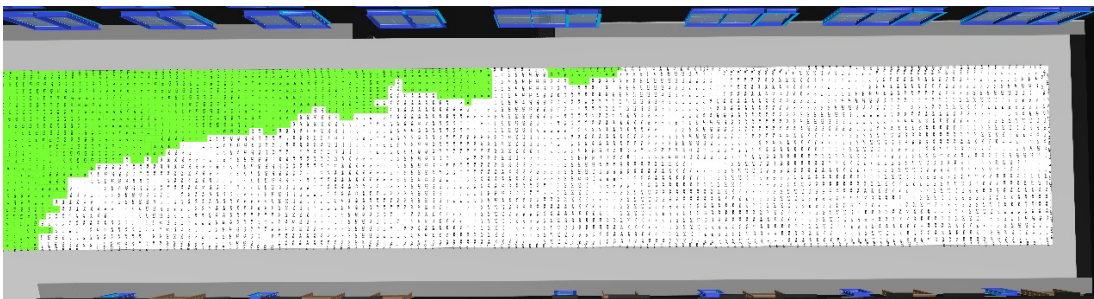
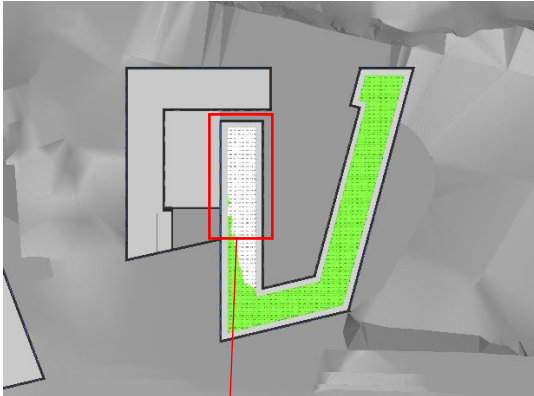
11-d

11-c: All three spaces are considered problematic for daylight provision due to high obstruction. The rooms would not comply with the BBR. A wider atrium might improve the daylight performance.

11-d: The area that has  $DF \geq 1\%$  is shown with green. The red line shows the maximum depth that the room would comply with the BBR. The apartment placed in south does not have adequate daylight provision due to high obstruction.



## Plan 12

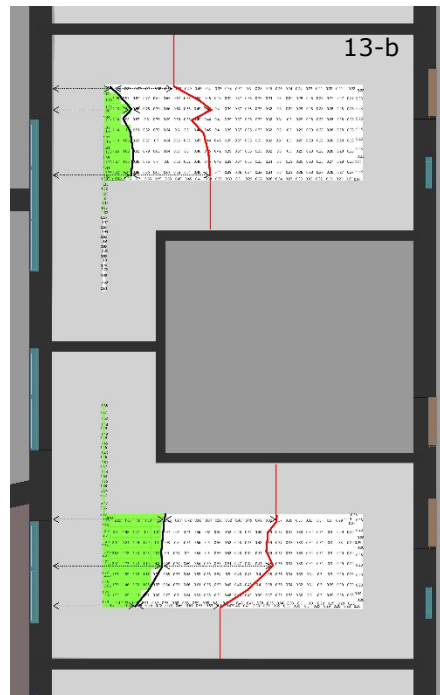
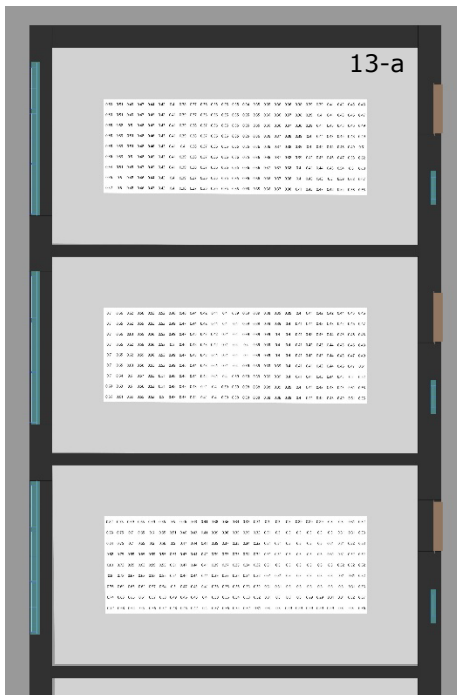
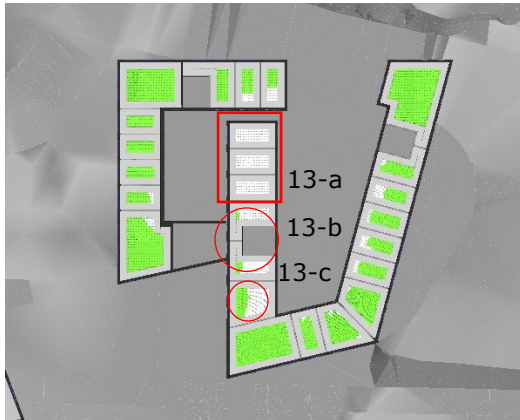


Problematic in west part due to high obstruction. The rooms would not comply with the BBR. The east and north parts have deep daylight penetration. A wider atrium and/or a lower "wing" of the surrounding building might improve the daylight performance.





## Plan 13

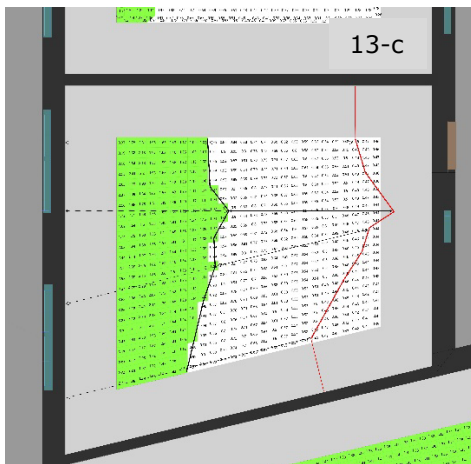


13-a: Problematic in west part due to high obstruction. The rooms would not comply with the BBR. A wider atrium and/or a lower "wing" of the surrounding building might improve the daylight performance.

13-b: The area that has  $DF \geq 1\%$  is shown with green. The red line shows the maximum depth that the room would comply with the BBR.

First apartment: difficult to comply with the BBR.

In the second apartment: if hallway and bathroom are placed close to the entrance it will comply with the standard.



13-c: The area that has  $DF \geq 1\%$  is shown with green. The red line shows the maximum depth that the room would comply with the BBR. If hallway and bathroom are placed close to the entrance it will comply with the standard.



## 4 Contact

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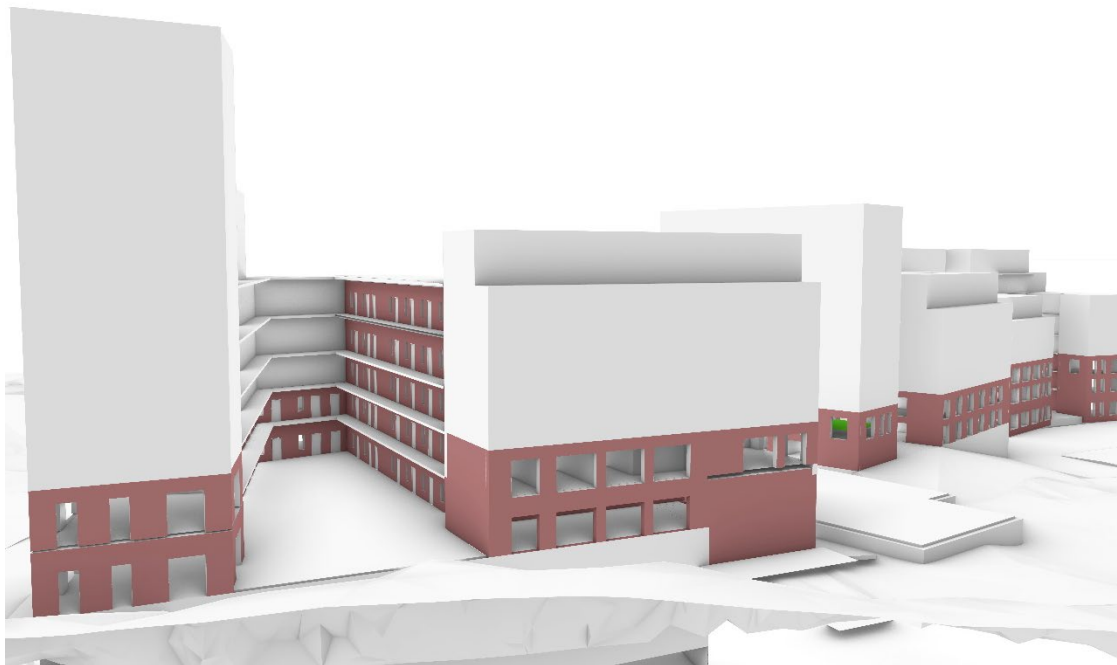
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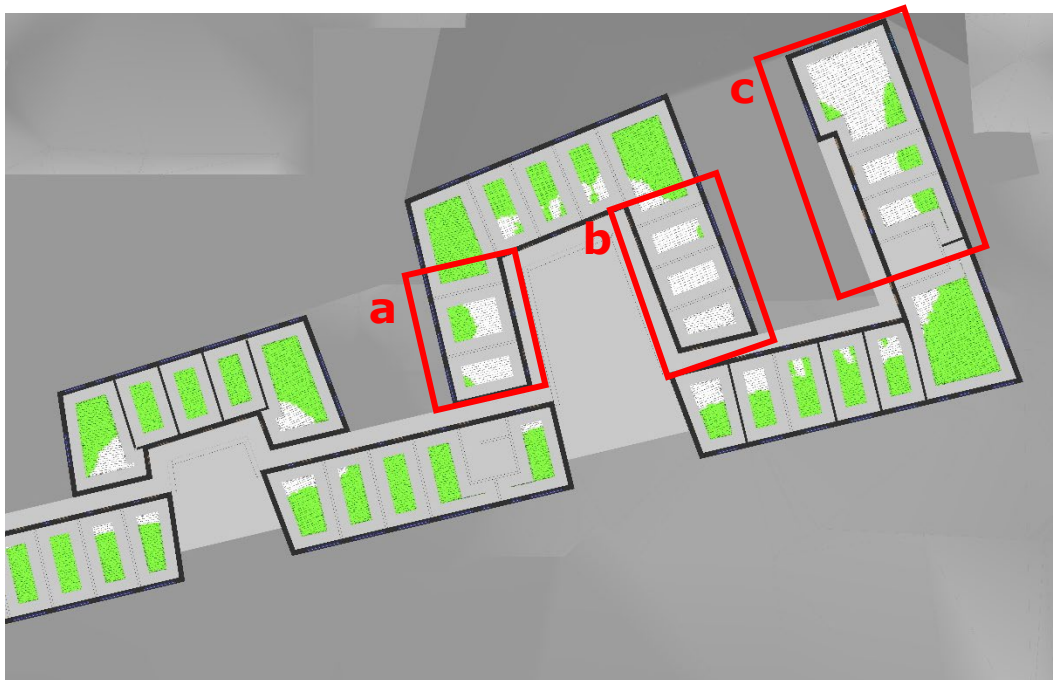
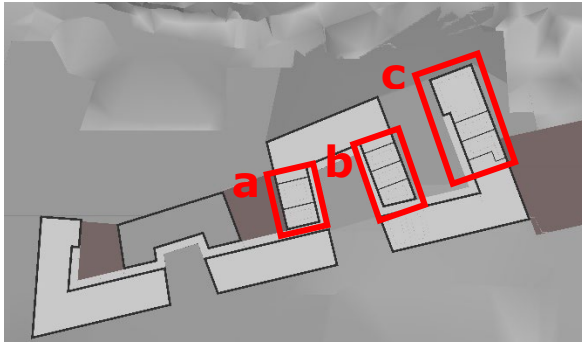
# SALTSJÖ JÄRLA

## Supplementary report

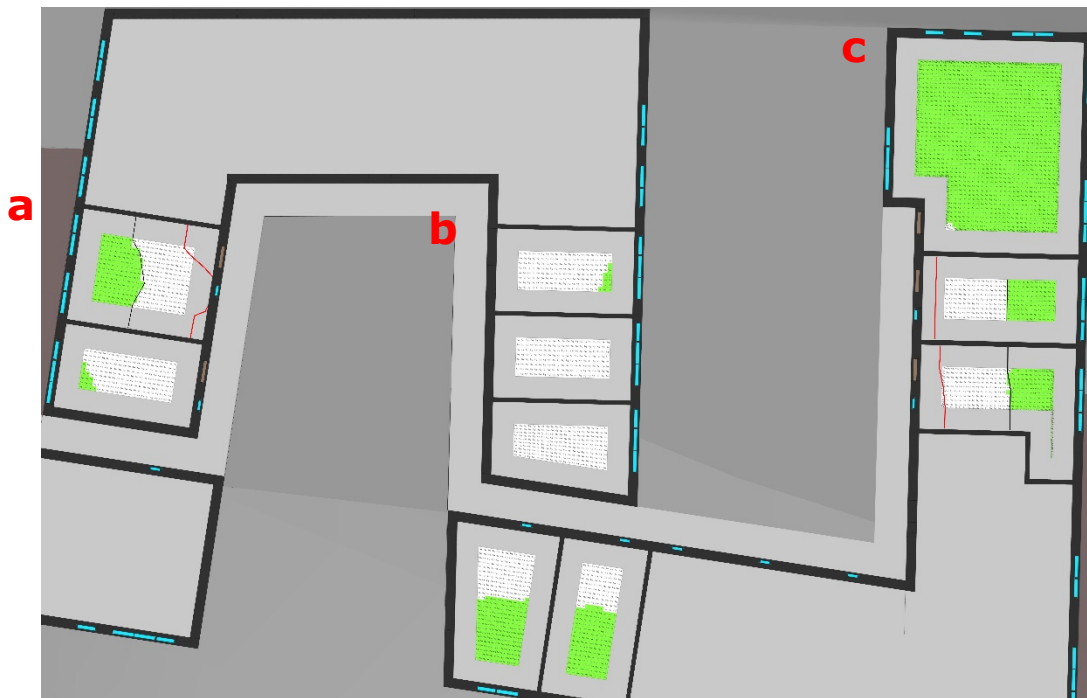




**Västra Kvarteret :**



Plan 11 (previous delivery)

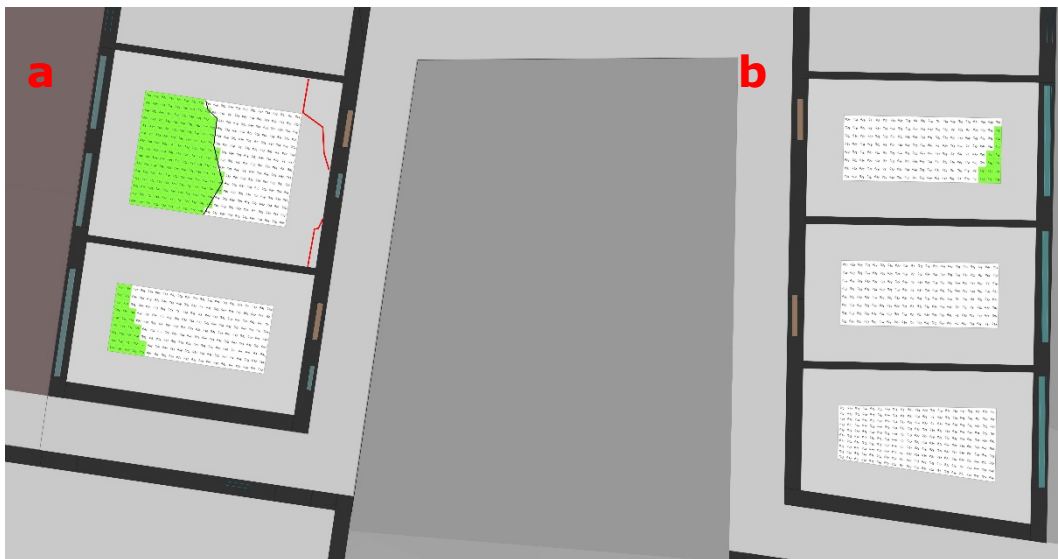


Plan 12.

a: The northern (upper) apartment will comply with the daylight requirement if occasionally used spaces are placed towards the entrance. The southern apartment does not have adequate daylight provision.

b: All three apartments do not meet the daylight requirements due to the building block shelf-shading.

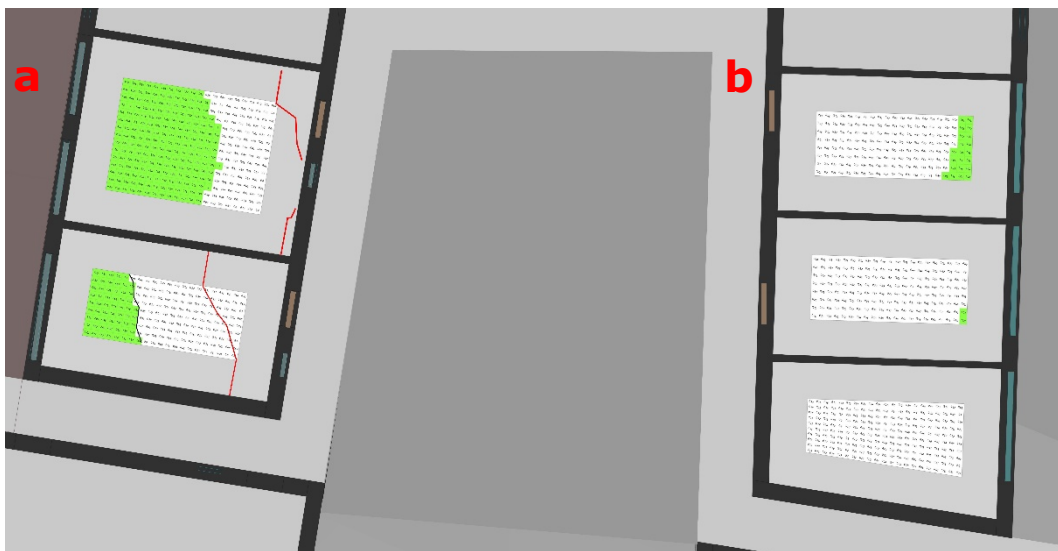
c: The two apartments towards south can fulfil the daylight requirement if they consist of one open space/room that people are present other than occasionally.



Plan 13

a: The northern (upper) apartment will comply with the daylight requirement if occasionally used spaces are placed towards the entrance. The southern apartment does not have adequate daylight provision.

b: All three apartments do not meet the daylight requirements due to the building block shelf-shading.



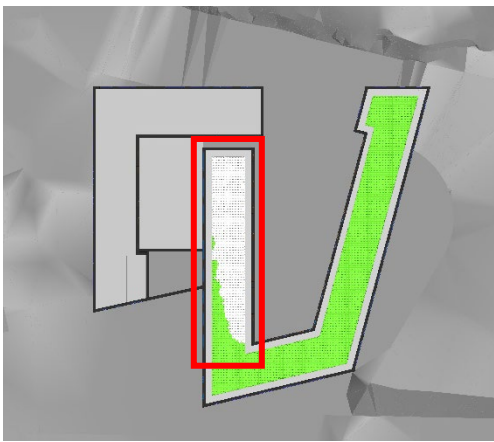
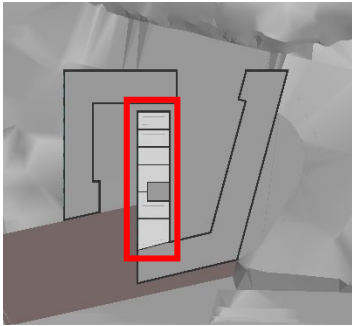
Plan 14

a: The northern (upper) apartment will comply with the daylight requirement if occasionally used spaces are placed towards the entrance. The southern apartment can fulfil the daylight requirement if it consists of one open space/room that people are present other than occasionally.

b: All three apartments do not meet the daylight requirements due to the building block shelf-shading.



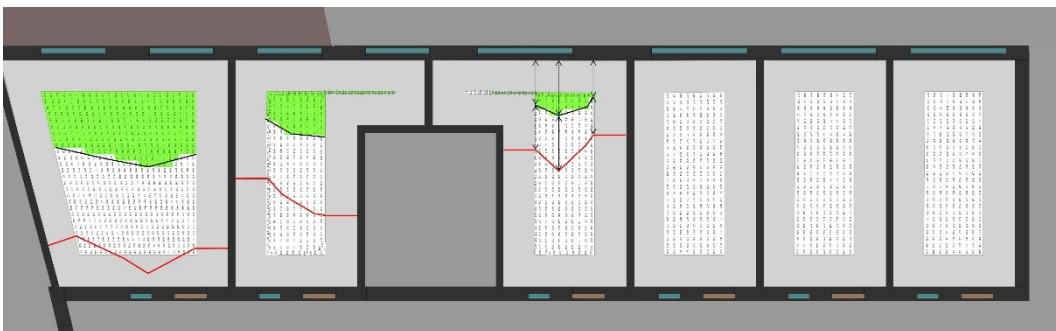
## Östra Kvarteret :



Plan 12 (previous delivery)

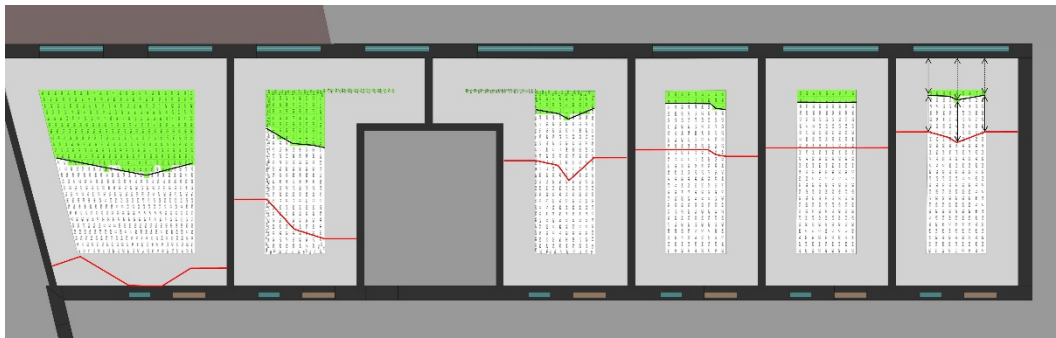


Plan 13 (previous delivery)

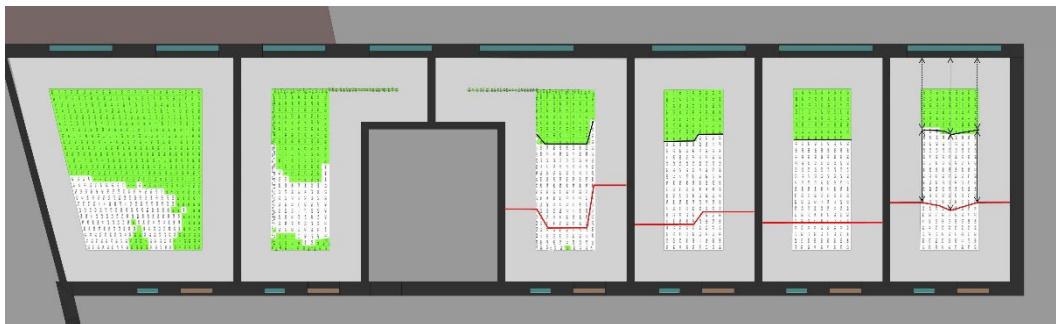


Plan 14. Only the two leftmost (towards south) apartments can fulfil the daylight requirement. For the rest it is not possible due to the building block shelf-shading.





Plan 15. Only the two leftmost (towards south) apartments can fulfil the daylight requirement. For the rest it is not possible due to the building block shelf-shading.



Plan 16. All apartments fulfil the requirement. The three apartments in the right (towards north) should have an open space/room that people are present other than occasionally.

### General

The inner parts of the synthesis/building block that are surrounded by higher floor apartments are problematic for daylight provision. The reason is the close distance with the other parts of higher building. The only way to provide daylight to these apartments is to decrease the obstruction angle.