# WHITE BOX CONCEPT

annotation

A concept in software engineering.
You can see all but you cannot corrupt anything.

A city hall must be a **WHITE BOX CONCEPT**
All is visible and testable.
The great advantage is that using this concept , white box, you can create an error free environment.
The system can be predictable.
Total transparency
Esthetically
Functional
Total

Let's do a **WHITE BOX CITY HALL**

# WHITE BOX CONCEPT

**author's description of the design**

A concept in software engineering.
You can see all but you cannot corrupt anything.

White-box testing (also known as clear box testing, glass box testing, transparent box testing, and structural testing) is a method of testing software.

To use this concept you must know **all** the box structure and relations of its configuration. All is visible and testable.
The great advantage is that using this concept , white box, you can create an error free environment. The system can be predictable.

We suggest to implement this concept for a city hall because:

- For the relations people-authorities the predictability and the transparency are very important.
- the architectural design is based on a synergism relation between a opaque white box and a crystal box. The mix of opaque and transparent is determined by the sun orientation, the the cardinal points and the shadows induced by the near by buildings.

The building is a passive house. The facades solutions are based on metal claddings, mineral insulation and metal secondary structures. We used a water retenant of rain water and a gray water circuits.

The south and west facades, are double skin facades with a controlled air circulation.

The building is heated by the steam heat connection of the Prague grid in winter. The cooling system and the intermediate heat system are integrate for spring, winter and autumn.

We focused on solid and robust high-quality materials and solutions. All materials used must be low-maintenance CE-labeled materials.

As a minimum, the new building facilities will comply with Low Energy Class 2015 requirements and insofar as possible also with Energy Class Building 2020 requirements.

We used a vertical garden in the patio, cafeteria space with rain water irrigation..

Let's do a “**WHITE HOUSE” CITY HALL**

## Energy concept of the building

The principle in our project is fundamental to use good materials in indicated places.
The priority is to use synergistic materials and architecture.
The clue is intelligent use of materials.

Orientation pattern:
North and East we used efficient windows and ventilated facade with mineral wool. The windows at least one will be able to open. In office space is important to use diffuse natural light.
In south and east the facade is made by to layers. Like double skin. The gap between will work in summer like a ventilation and in winter like a "glass house". In spring and autumn the two possibilities will be used by a building management system.

We used bigger windows at ground floor, first floor and partially at the second floor determinate by light and the shelter climate produced by the neighborhood buildings.
Windows energy class A

A building management system will control the quality, temperature of the air.
For heating we used district heating.
The cooling system and the intermediate heat system are integrate for spring, winter and autumn.
The mechanical ventilation is constant 1,80 l/s per m2 gross floor area. The heat recovery efficiency is 0,70 and the minimum inlet temperature is 18 C.
The specific power for air transportation, SEL is 1,80 kJ/m3.
The air exchange rate in relation to airing at summer time is 1,80 l/s per m2 gross floor area in average. In relation to the improved ventilation the air exchange rate in average is up till 2,40 l/s per m2 gross floor area and includes also airing at night.
Installed power in office areas is 6 W/m2. There is daylight dimming control and present sensors in 2 zones from the facade and one zone in the middle.

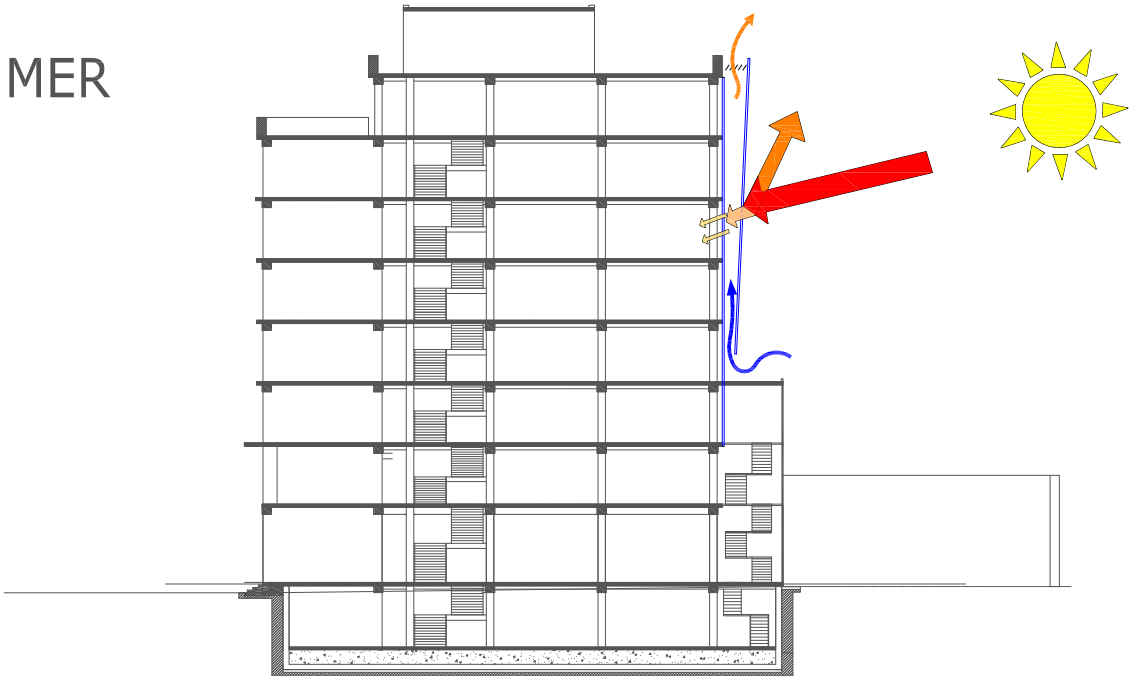
Building envelope:

- flat roof 180 mm insulation 0,196 W/m2 K
- heavy wall 190 mm insulation 0,203 W/m2 K
- light wall 190 mm insulation 0,213 W/m2 K
- basement slap 100 mm insulation 0,313 W/m2 K

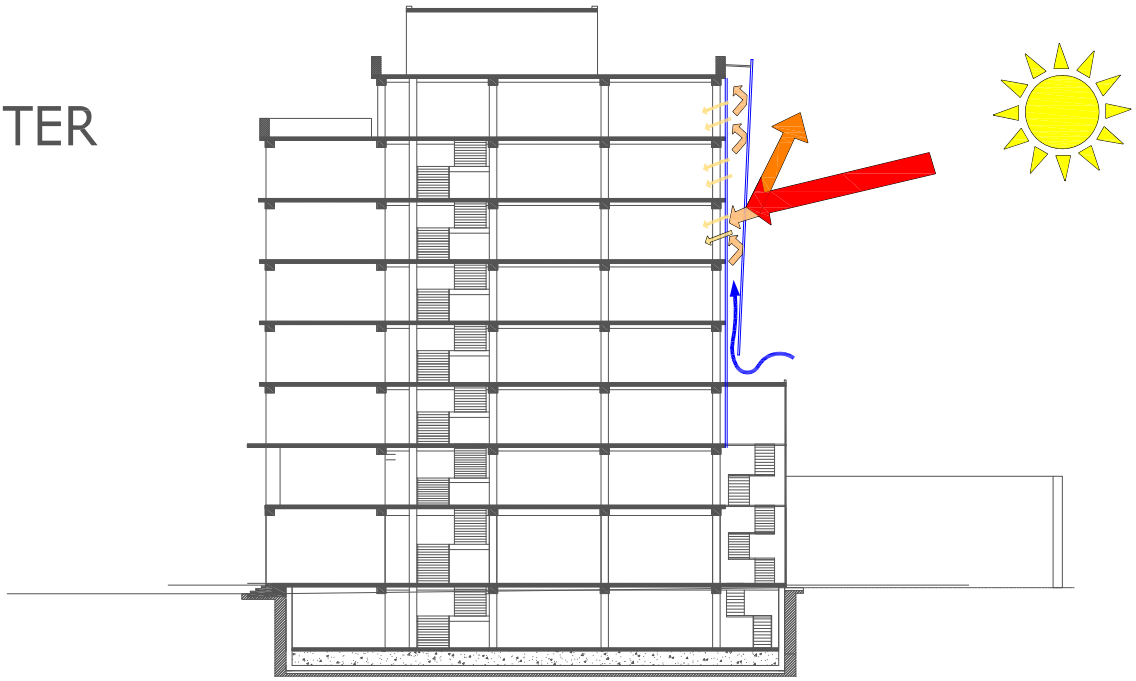
The rain water will be retained partially and used for irrigate the vertical garden in the patio, cafeteria space.

Is it possible to use heat solar panels to heat water for toilets supplementary in summer.

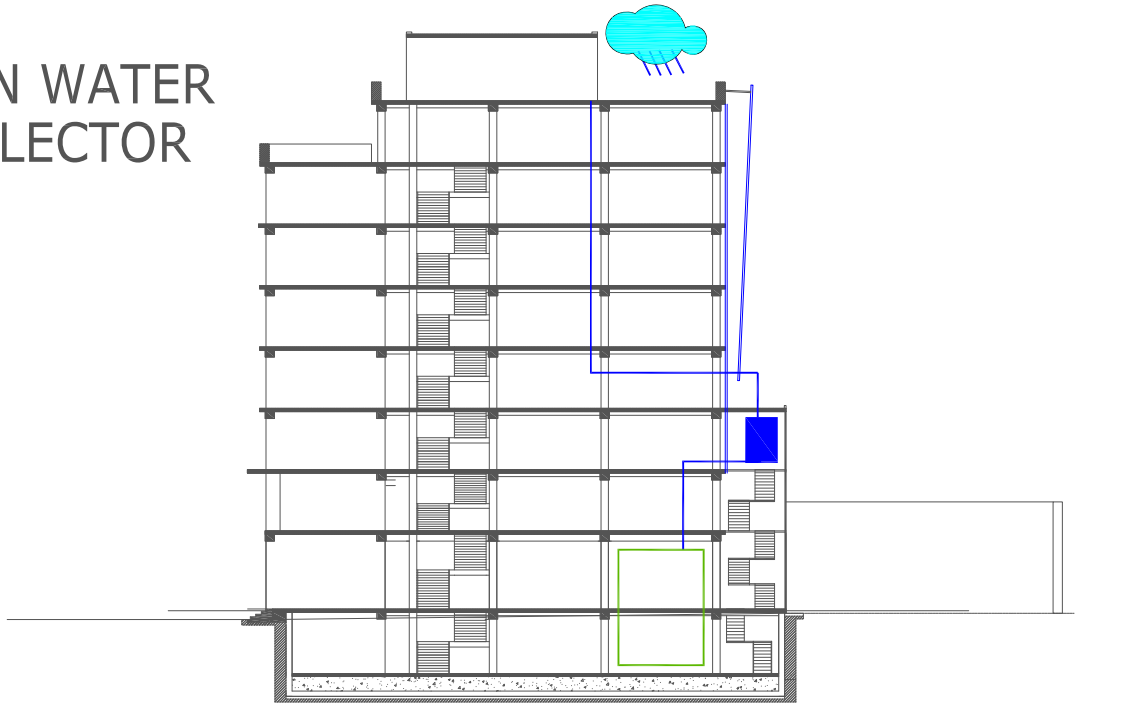
SUMMER

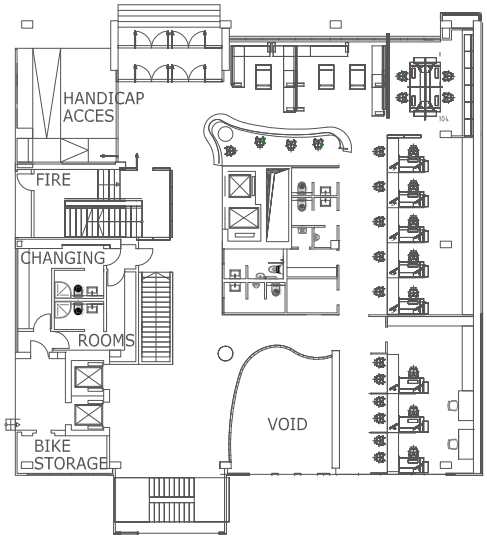


WINTER

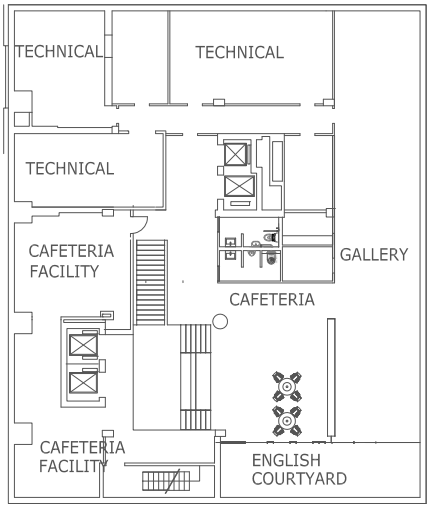


RAIN WATER
COLLECTOR

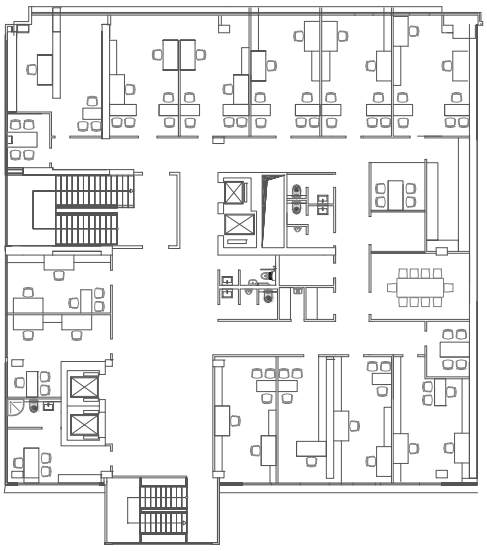




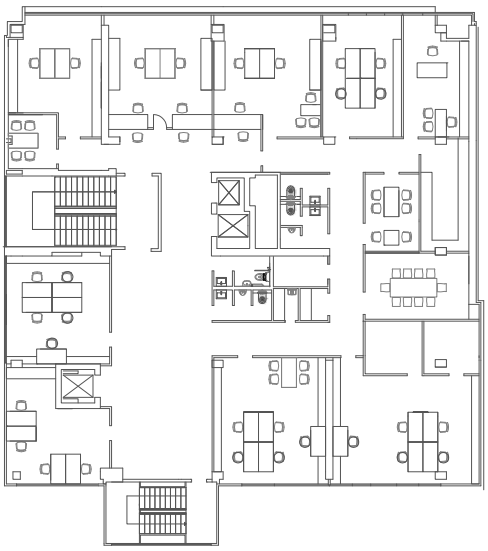

GROUND FLOOR



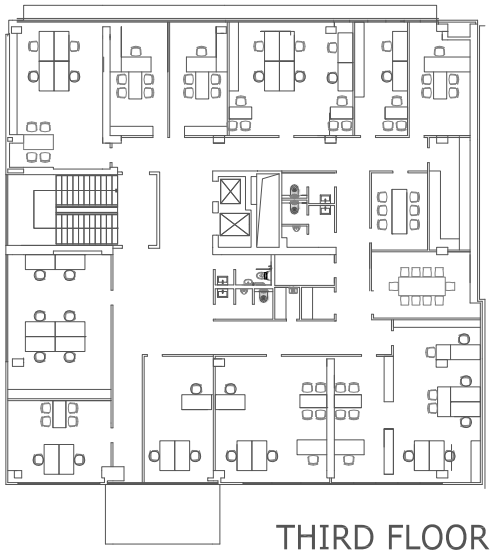

FIRST UNDERGROUND FLOOR



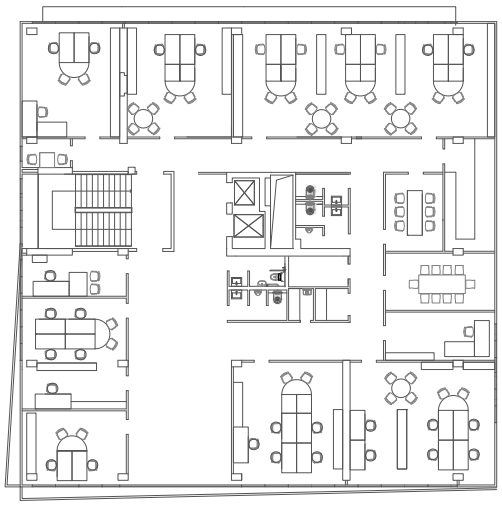
FIRST FLOOR



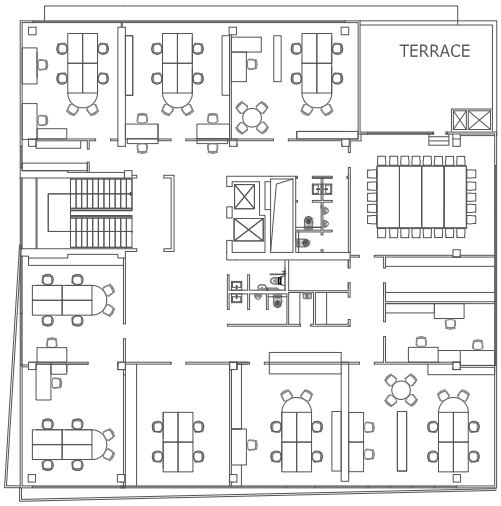
SECOND FLOOR



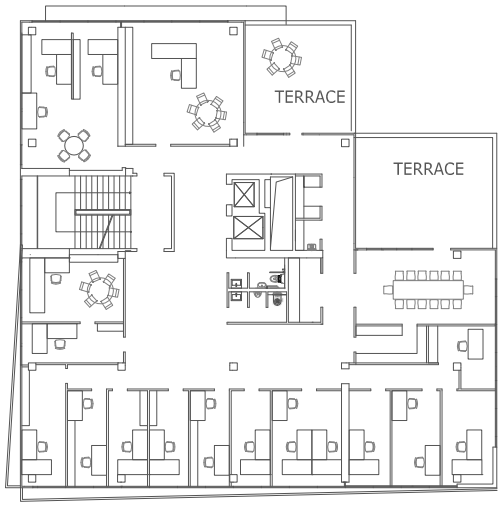
THIRD FLOOR



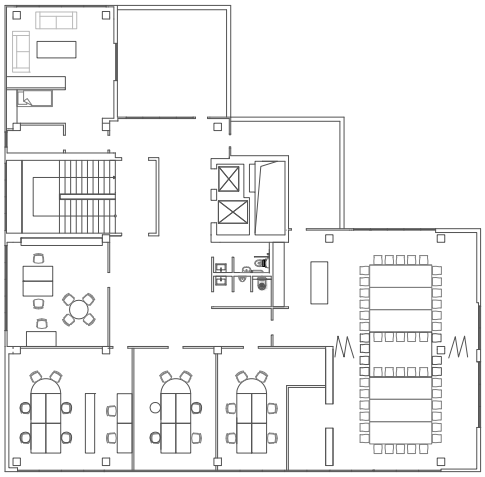
FOURTH FLOOR



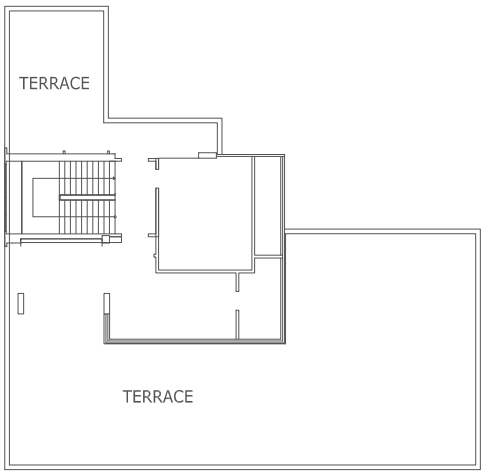

FIFTH FLOOR




SIXTH FLOOR



SEVENTH FLOOR




EIGHT FLOOR

document No. 08

**Building parameters**

| | unit | number of units |
|---|---|---|
| Land area | m2 | 1,282 |
| Built-up area | m2 | 626 |
| Built-up space | m3 | 19,200 |
| Carpet area | m2 | 5,566 |

**Investment costs**

| | unit | number of units | unit price* | price Nr of units x unit price |
|---|---|---|---|---|
| Outdoor spaces | | 656 | 542 Kc | 355,556 Kc |
| | | | | |
| Reconstruction of the building, including all installations and built-in equipment | m2 | *5,586.00* | | |
| Carpet area without corridors and technical equipment rooms - Pu | m2 | 3,955 | 10,569 Kc | 41,800,813 Kc |
| Corridors area - Pk | m2 | 1,221 | 9,485 Kc | 11,581,301 Kc |
| Area for technical equipment - Ptv | m2 | 410 | 2,168 Kc | 888,889 Kc |
| Surface of facades in total | m2 | *3,045.00* | | |
| Lightweight external facade | m2 | 2,670 | 7,317 Kc | 19,536,585 Kc |
| Heavy external facade | m2 | 300 | 2,981 Kc | 894,309 Kc |
| Other…… | m2 | 75 | 2,981 Kc | 223,577 Kc |
| Area of the roof and terraces | m2 | *626.00* | | |
| Roof | m2 | 110 | 5,149 Kc | 566,396 Kc |
| Walkable roof | m2 | 426 | 8,672 Kc | 3,694,309 Kc |
| Green roof | m2 | 90 | 4,878 Kc | 439,024 Kc |
| Technology | | | | |
| airconidtioning | set | estimate costs | 23,035,230 Kc | 23,035,230 Kc |
| smart building system (Measurement and control, smart instalation etc) | set | estimate costs | 7,588,076 Kc | 7,588,076 Kc |
| elevators | set | estimate costs | 3,794,038 Kc | 3,794,038 Kc |
| other technologies | set | estimate costs | 4,607,046 Kc | 4,607,046 Kc |
| | | | | |
| Embedded Interior | set | estimate costs | 3,252,033 Kc | 3,252,033 Kc |
| Furniture and settings | set | estimate costs | 4,878,049 Kc | 4,878,049 Kc |
| Reserve | 10.00% | | 12,713,523 Kc | 12,713,523 Kc |
| | | **Investment** | | **139,848,753 Kc** |

*Indicate the price list of works on the basis of which the price is determined, or describe a method for determining the unit price