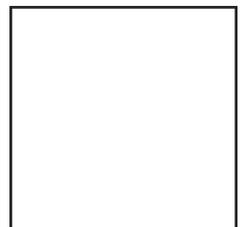


**NEW  
TOWN HALL  
FOR  
PRAGUE 7  
DISTRICT**

**OPEN  
HEART  
SURGERY**





# ANNOTATION

“Your diagnostic, doctor?”

“A skeleton able to receive a new life! Powerful and energy efficient organs! A heart where exchanges are possible! A new and vibrant skin that will complete your daily!”

“The new town hall for Prague 7 District will be an open public building, efficient and well-functioning, and employees will benefit from a worthy setting for their daily work?”

“Yes for sure!”



# AUTHOR'S DESCRIPTION OF THE DESIGN

The very square shape of the building inspired us from the beginning.

We wanted to reveal the structure of the building and highlight its geometry.

We re-question the feasibility study to find circulation more fluent and in agreement with the plan.

This led us to hollow the heart of the building in order to find there a skylight. This open heart, we wanted to make it the centerpiece of the project and of course the vertical circulation found their place in it.

Energy efficiency must be one of the highlights of this proposal for a new town hall. So we choose to show the technique rather than hide it. The central well is the point where employees, citizens of the city and building technology meet.

The metaphor of the human body appears to us as obvious. The program of the new city hall takes place in this existing «body» and reanimates it!

Boxes, as suspended, complete the peripheral offices program, and functions that need less natural light find their place here (archives, toilets, waiting area, games area). The offset between those boxes and the enclosed staircase meandering creates voids: air and light circulation.

On the front facade, we wanted to multiply the square shape that emerges from the overall shape of the building.

So we are working on the orientations and exposures with a square window module, which stands out more or less and comes from frames.

- On the North facade, we have a smooth outer façade, the frame is inside and comes to create a light reflector
- On the east and west, double windows help create a “buffer” space whose use changes according to climatic variations: thermal “buffer”, air treatment by decontamination through integrated plants in this in-between .
- On the south, window frames draw balconies also receiving plants on summer which foliage makes a filter effect.

The façade skin is alive and plays with climate. The new city hall is an intelligent building that has better taken advantage of its form.



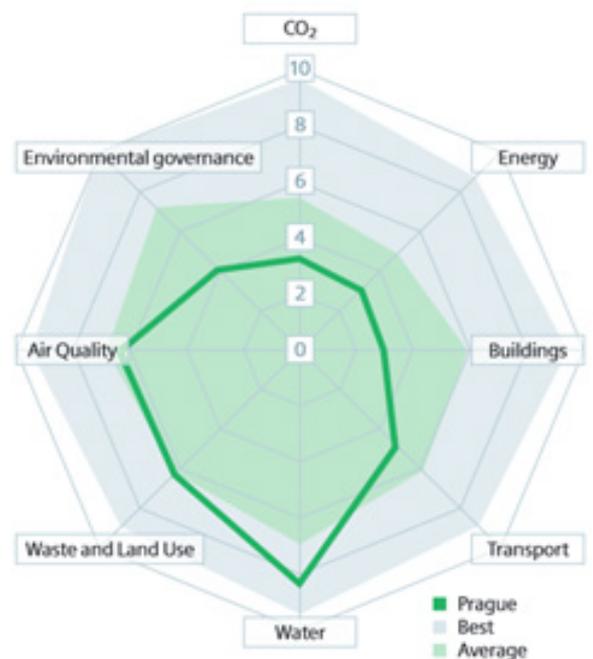
# ENERGY CONCEPT OF THE BUILDING

The refurbishment of the new town hall of Prague 7 is a refurbishment which has to be exemplary from an environmental point of view and mostly on its energetic aspects. The international goal in the limitation of the elevation of the temperature at 2°C is transposed in the architectural and technical program of the contest. In this note, we present which elements we used to develop the entire environmental subject with the aim of creating a renovated building as consistent and performant as possible for the city of Prague.

## SITE ANALYSIS

The climate in Prague is semi-continental with rough winters and relatively hot summers. The Czech Republic is a country using essentially gas, coal and nuclear resources for heating and generating electricity, according to the International Energy Agency. Renewable energy is growing rapidly.

The city wants to grow on eco-friendly transports and outside air quality. According to the European Green City Index, the city performs best in the categories of water and of waste and land use. Viewing this index, she has also to perform in energy and CO<sub>2</sub> emissions which are really in accordance with the requirement of this contest.



*European Green City index of Prague*

## ENERGY MANAGEMENT

### FACADES

The building is initially very compact. The facade is designed to bring a lot of light in offices. Largely glazed on south, east and west facades, the glazing rate is reduced to the north.

The windows are all triple glazing ( $U_g = 0.9 \text{ W} / \text{m}^2\text{K}$ ) and openable. The double skin on south, east and west orientations allows the insertion of plants that will play the role of both sun protection and new air refreshing through evapotranspiration. The double-skin is openable for natural ventilation in summer and winter.

### HEATING EMISSION

To combine comfort and efficiency, it is planned to install a radiant ceiling, diffusing low temperature heat radiation. The human body is more accustomed to radiation than to a sensation of hot air. Working with a radiant ceiling allows greater transmission areas and in addition a low water temperature regime. There is no maintenance required, as it is a static heating.

### HEATING PRODUCTION

Although the current installation is recent, 2013, the quality of energy production is a real issue to reduce energy consumption and greenhouse gas emissions.

It is chosen to keep the current heat production system: a connection to the heating network to ensure the basic heating requirements. Two systems will be added:

1. A heat pump using grey water and rainwater
2. A heat recovery on servers

The heatpump using grey and rainwater consists of a buffer tank in which is recovered all grey and rainwater. A heat pump draws the calories in this buffer tank to heat the low temperature water loop.

A system of energy recovery on servers allows us to recover the heat generated by computer servers to heat the building.

### AIR TREATMENT

Indoor air quality is a contemporary topic. A lack of ventilation creates more easily an unhealthy atmosphere than outside air. As winter is generally quite rude, it is necessary to ensure a preheating of fresh air by an decentralized air handling unit on the facade.

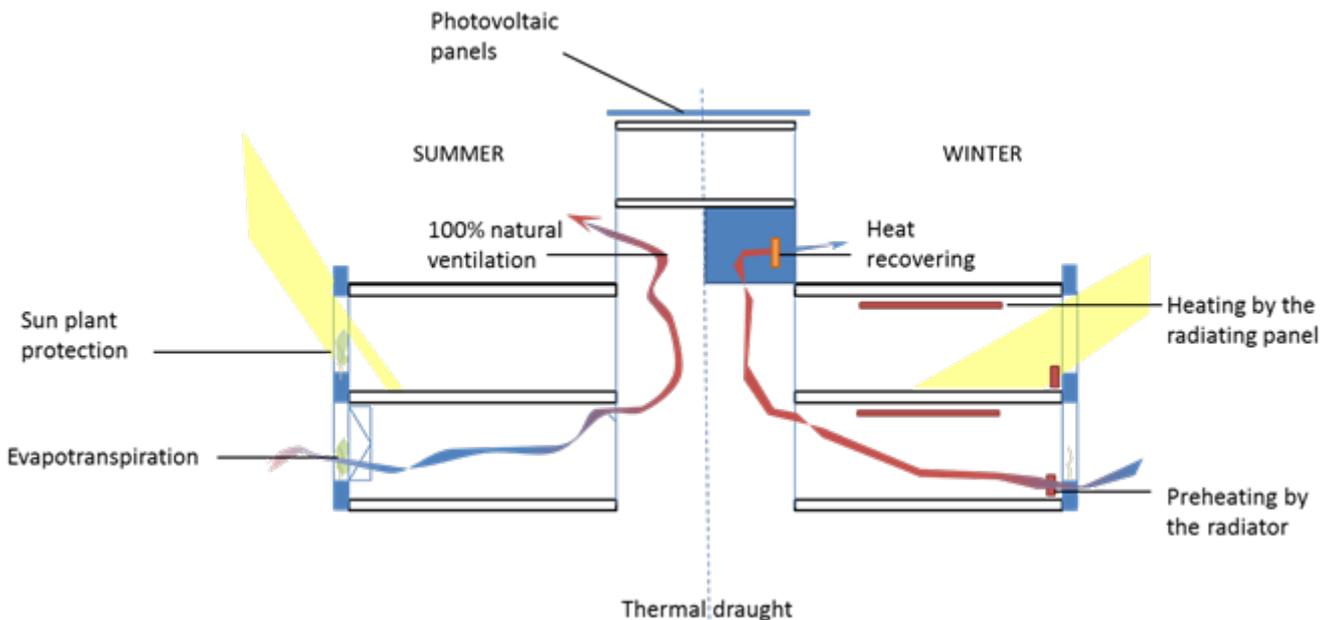
### ELECTRICITY PRODUCTION

According to the International Energy Agency, electricity generation is produced mainly by coal power (60%) followed by nuclear energy (30%). The carbon is actually quite high with 9.62 tons of CO<sub>2</sub> per capita.

In order to limit global warming, green electricity will be produced through photovoltaic panels installed on the highest flat roof, in addition of energy efficiency systems developed on the project.

## PASSIVE SUMMER COMFORT

First, to have an optimal summer comfort, it was decided to limit solar gain. Seasonal plants located in the double-skin allow sunscreen which varies according to the year. The double-skin opens and allows natural ventilation of all office spaces. The natural thermal draught is made in the central circulation



*Bio-climatic Scheme*

## WATER MANAGEMENT

Prague is ahead of most of the other European cities on water management according to the European Green City Index.

First, this strength is assimilated into the renovation of the 7th district's town hall, limiting the consumption of drinking water: dual-flow flushing on all the toilets; limited water taps rates and limited supply pressure to 3 bars. Second, a rain water reuse will be installed: water from the roof terrace on the top floor will be collected and reused to supply sanitary facilities and green spaces watering via a vessel of 5 m<sup>3</sup>.

For the management of rainfall events, retention is achieved with vegetated or storing roof depending on the location. This limits the water leakage rate in the drainage systems of the city.

## BIODIVERSITY

One of the project strength is to bring back nature into the city, to recreate an area of biodiversity on the project.

To do so, the whole of east, south and west facades as well as the majority of roofs are vegetated. Planned species are native species, cold-resistant and non-allergenic. On the facades, species types are non-persistent shrubs while species will be persistent on the roofs.

## **HEALTH**

The health issue in buildings is essential. The selection of materials used will allow us to limit the emission of glue and VOC. Furthermore, to ventilate the building, the ventilation units are designed to supply fresh air rates of 36 m<sup>3</sup> / h per person.

### **Waste management**

An area of 15 m<sup>2</sup> is provided for waste management. This surface allows sufficient storage space for differentiated bins, to facilitate waste sorting.

## **ACCESS BIKES**

Although the city has a low rate of cycle track (0.67 km / km<sup>2</sup> for a European average at 1.15 km / km<sup>2</sup>), cycling development is a major issue for the city. Moreover, the building is located in a residential area, relatively flat, suitable for travels by bicycle. It is therefore planned a protected outdoor cycle storage space of 25 m<sup>2</sup> and one inside in the basement..

## **CONCLUSION**

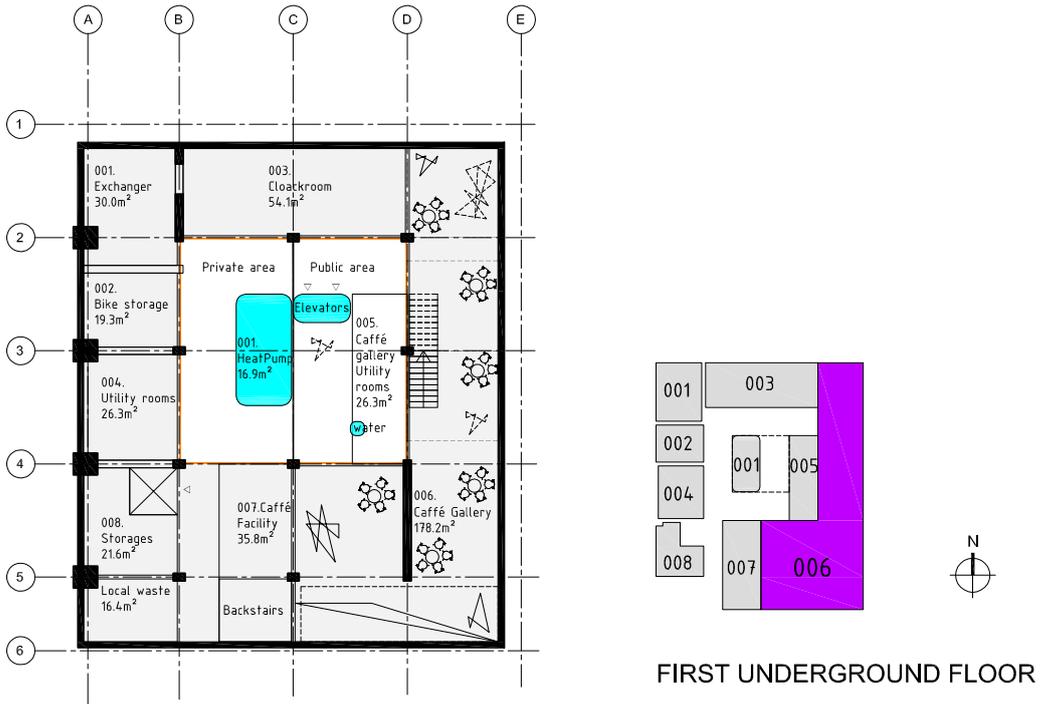
It's an innovating refurbishment that we propose with natural protection and refreshing. Due to a recovering of all heating sources (data servers, grey and rainwater flow and exhaust air) and an insulating from the outside we anticipate a consumption of heating less than 30kWh/m<sup>2</sup>.year. We produce also some electricity on the last roof to complete bioclimatic refurbishment.

# ALL FLOORS PLANS SCALE 1:400

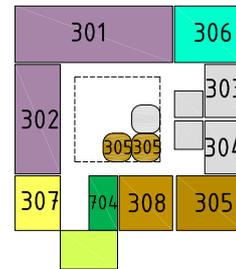
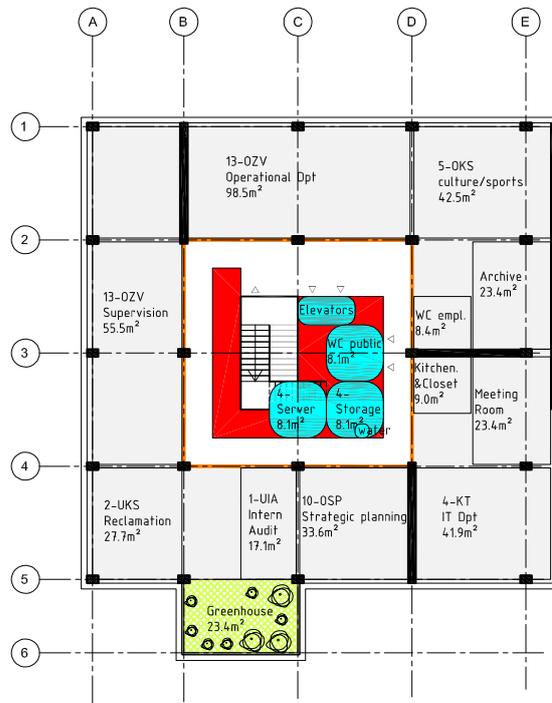
U Průhonu - ulice / street



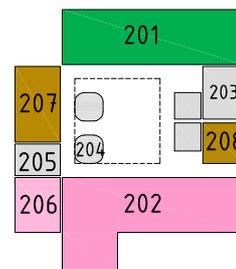
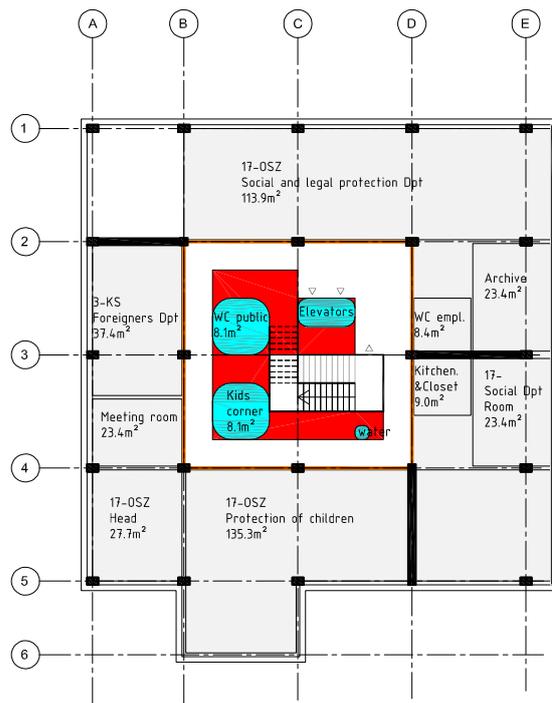
GROUND FLOOR



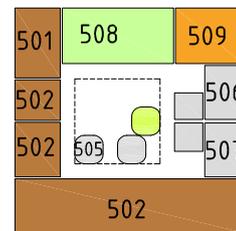
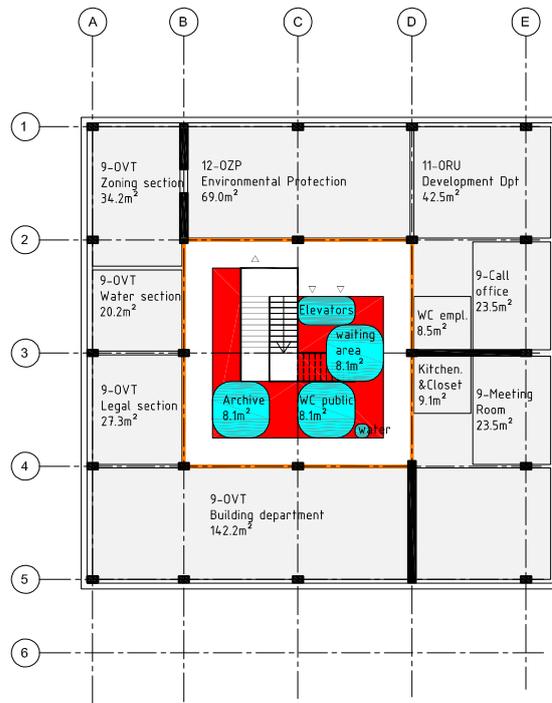
FIRST UNDERGROUND FLOOR



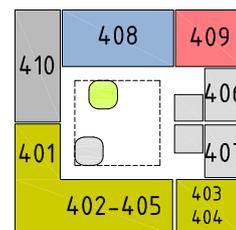
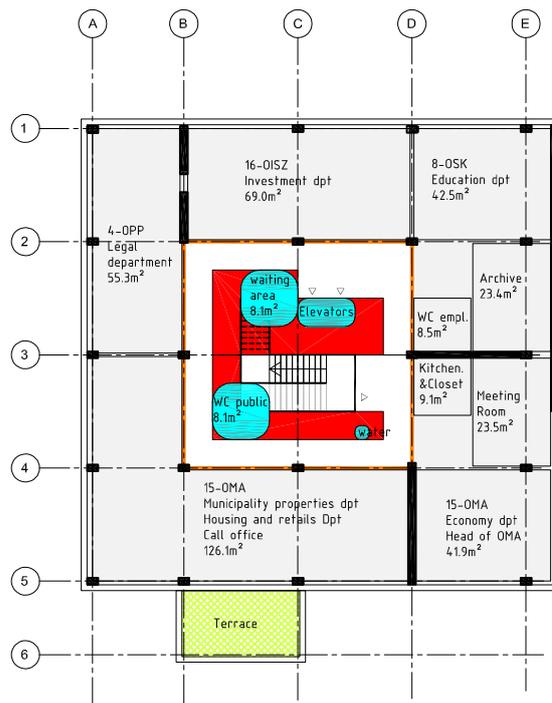
SECOND FLOOR



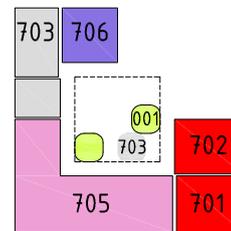
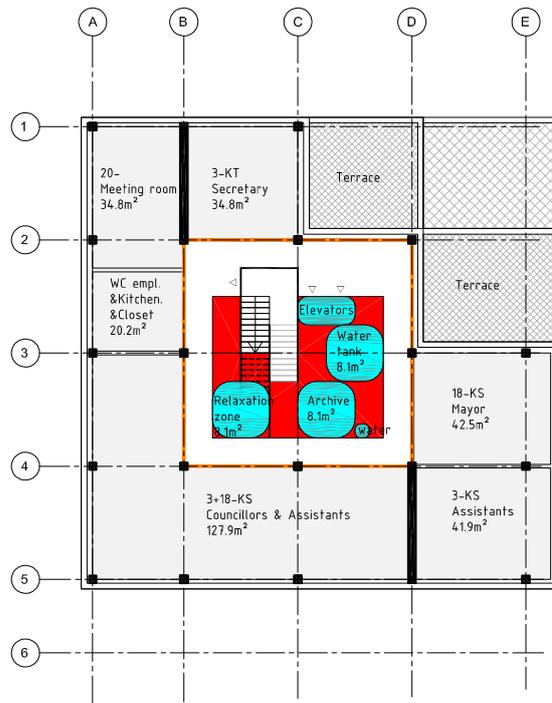
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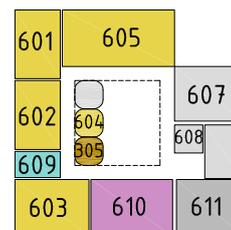
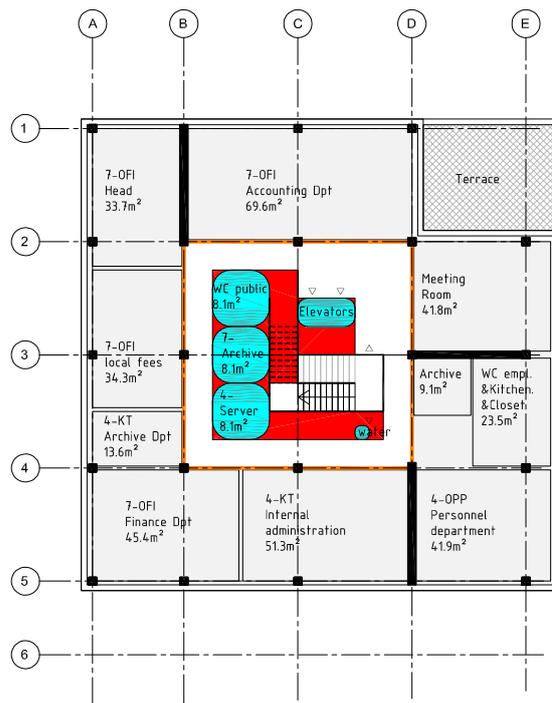
FOURTH FLOOR



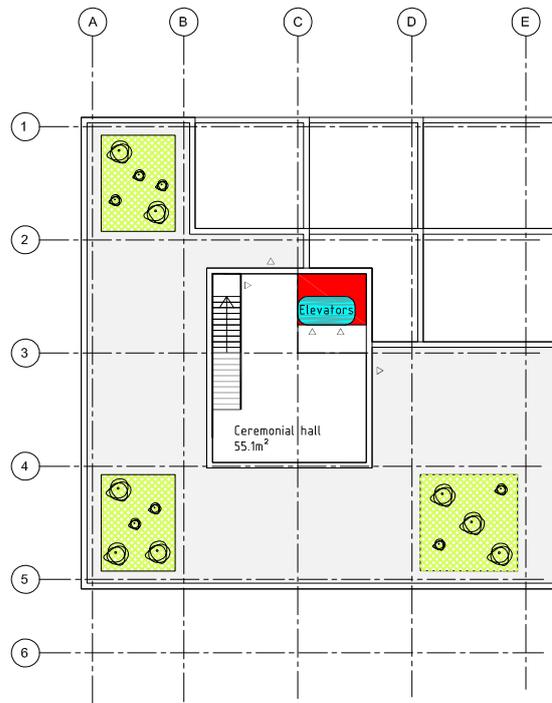
THIRD FLOOR



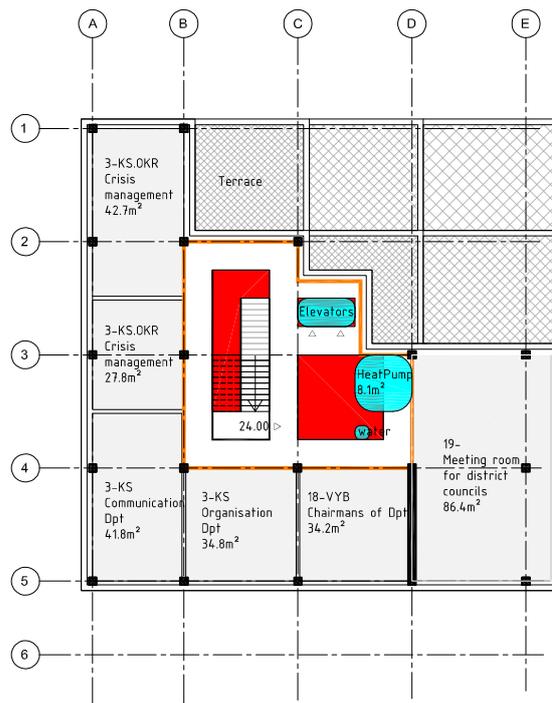
SIXTH FLOOR



FIFTH FLOOR



EIGHT FLOOR



SEVENTH FLOOR



# CALCULATION OF INVESTMENTS COSTS

**CCEA**

**P R A H A 7**

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				
Reconstruction of the building, including all installations and built-in equipment	m2	5 000,00		
Carpet area without corridors and technical equipment rooms - Pu	m2	3 500	10 800 Kč	37 800 000 Kč
Corridors area - Pk	m2	1 000	10 800 Kč	10 800 000 Kč
Area for technical equipment - Ptv	m2	500	8 100 Kč	4 050 000 Kč
Surface of facades in total	m2	3 000,00		
Lightweight external facade	m2	1 500	12 150 Kč	18 225 000 Kč
Heavy external facade	m2	1 500	9 450 Kč	14 175 000 Kč
Other.....	m2	0	0 Kč	0 Kč
Area of the roof and terraces	m2	600,00		
Roof	m2	220	4 050 Kč	891 000 Kč
Walkable roof	m2	300	6 750 Kč	2 025 000 Kč
Green roof	m2	80	5 400 Kč	432 000 Kč
Technology				
airconditioning	set	estimate costs		9 450 000 Kč
smart building system (Measurement and control, smart instalation etc)	set	estimate costs		2 700 000 Kč
elevators	set	estimate costs		2 970 000 Kč
other technologies	set	estimate costs		20 250 000 Kč
Embedded Interior	set	estimate costs		13 500 000 Kč
Furniture and settings	set	estimate costs		5 400 000 Kč
Reserve	4,50%			6 750 000 Kč

**Investment costs in total 149 418 000 Kč**

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

The methodology used for the estimation is performing quantity take-offs and using price ratios checked from similar operations applied to the different areas of the project.