CZECH TECHNICAL UNIVERSITY IN PRAGUE

FACULTY OF CIVIL ENGINEERING

DEPARTMENT OF BUILDING STRUCTURES

TECHNICAL REPORT – BUILDING SERVICES PART

RESIDENTIAL BUILDING

Created by

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Name of project	Residential building in Prague
Investor:	CTU
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Content

1. General information

Residential building outside of Prague is designed. The building is located on the corner of Bovarikova and Novakova Streets. Investor is CTU. The residential building is design economically and utilizing modern ways of design and construction. The project emphasize in good quality. The project utilized orthogonal architecture to blend in with the surrounding of nice and efficient buildings. Czech and euro codes were used during design.

2. Basic information

The residential building has 1 underground floor and 4 upper ground floors. The Length is 28.58 m. Width is 19.6 m. Height above the ground is 16.48 m. Height under the ground is 3m. Total height is 19.48 m. The underground floor is equipped with a technical room and ten parking spaces. 13 more parking spaces are located outside the building. Drive in to the building is from Bovarikova street. Drive in is than separated into a way to outside parking spaces and to the way to the underground floor. Entrance to the underground floor is via ramp with slope of 14%. There are area of closets assigned to the apartments in the first floor. There are 6 apartment units in the ground floor, 1 of 3+kk disposition, 4 of 1+kk disposition, 1 of 4+kk disposition. There are 8 apartment units in the other floors (2^{nd} level to 5^{th} level), 1 of 3+kk disposition, 6 of 1+kk disposition, 1 of 4+kk disposition. The building consists of 38 apartment units in total.

2.1. Software

- AutoCAD 2015
- MS Office
- SCIA Engineer 2015
- Teplo

2.2. Codes

Water:

CSN 736660

CSN 736005

Gas:

TPG 70401

CSN 736660

Drainage:

CSN 756114

CSN 756760

3. Structural system

The structural system of underground floor is a one-way slab with girders in one direction. Girders are supported by reinforced concrete columns. Column dimension is 300x550mm.Underground perimeter reinforced concrete wall is 300 mm thick. Floor structure is created by a one way slab by thickness of 180 mm. Communication areas around stairs well and elevator is created by reinforced concrete wall of thickness 300 mm. There are light shafts located in the underground walls. The shafts are thermally separated with use of isobeams.

Structural system of the upper floors is one way reinforced concrete slab sitting on load bearing masonry walls. Perimeter load bearing masonry wall is 440 mm thick, inner load bearing masonry wall is 300 mm thick. Load bearing walls around communication area are from reinforced concrete and are 300 mm thick. Elevator shaft walls is created by reinforced concrete walls of thickness of 200 mm and are separated from the load bearing structure of the building due to acoustic reasons.

4. Water supply

4.1. Water source

Water source is the public water supply.

4.2. Water supply connection

Water is supplied to the north side of the limit of the land. Supply pipes are from steel DN50. Main water meter assembly is located in the shaft outside the object. Shaft is located 2 m from the façade of the object. It is circular shaft with diameter 1200 mm.

4.3. Inner piping

Cold water piping is from plastic pipelines PPR. Pipelines are going to be put under the ceiling of underground floor. Connection to the each apartments are going to be directed throuch installation shafts. Drainage fitting valve is located before every vertical piping. Piping in the apartments is done in the walls. There is a water meter and valve in located in every apartment. Cold water piping is connected to the boiler in the technical room in the underground. Hot water will be heated in the boiler in the technical room located in the underground. Heated water will be directed next to the cold water under the ceiling in the underground floor and through vertical shafts to each apartment. There will be as well water meter and valve. Not used hot water will go back in the circulated piping to the hot water reservoir. Circulated piping will be always between piping of hot and cold water. Water will be pumped by pump located directly before hot water reservoir.

4.4. Hot water preparation

Hot water preparation will be solved as central system for the whole building located in the technical room in the ground floor. Technical room will be equipped with the gas boiler and hot water reservoir.

4.5. Materials

Inner piping will be from plastic PPP. Water supply connection, part of the piping from water supply connection to main water meter assembly and fire water piping will be from steel piping. All the water piping will be thermally insulated.

5. Gas supply

5.1. Gas supply

Gas piping is connected to the low pressure gas piping under the street Bovarikova in the distance of 15m. The connection is done through `T` element. Connection is from steel material. The connection piping is in the sand bedding. From the main closing gas valve the piping in in the angle of 0.5% to the connection. Main gas closing valve is located at the facade. Horizontal piping is from steel. Piping is directed under the ceiling in the underground floor. Piping must be gas tighed and must have yellow color. Gas is used only for boilers to heat hot water.

5.2. Horizontal piping

Horizontal piping is from steel. Its angle is 0.2% directed to the vertical piping. Piping is directed mainly under the ceiling. The piping is yeallow.

6. Drainage

6.1. Main drainage connection

Building is connected to the drainage network, it has separated rain water drainage from common drainage. Drainage is located -2.45 m under the pavement. Drainage piping is from concrete and is DN200

6.2. Drainage elements

Connection

It connects main drainage network with inner drainage. It is located in the revision shaft. Connecting piping is bedded in the sand gravel rigol, 1.4 m below ground in the angle of 21%.

Revision shaft

Revision shaft is located inside the object. Cleaning element is placed in this shaft. The distance between cleaning shafts in the object is 17,5 m. Other revision shafts are located outside the building due to the limit of 20 m per revision shaft.

Inner drainage

Inner drainage drains all water from all fittings an ends outside the building into main drainage network.

Underground drainage

Piping is equipped with security box in the place of going through foundation. Piping is directed under the floor of underground floor and has angle 2%. It is DN100 and DN125.

Vertical drainage

Every apartment has its vertical drainage located in the installation shaft. Cleaning elements are located in every floor, 1m above floor level. Connection from vertical to horizontal drainage is done by two 45° elements. All the vertical drainage has ventilation piping exiting to the roof.

Rain drainage

Building has a flat roof of area 360 m2. Rain water is drained by two inner piping by PVC DN 100. It is directed underground next to drainage and goes to the rain drainage network.

7. Heating

7.1. Heating source

There is a gas boiler with hot water reservoir located in the technical room on the underground level. Boiler has estimated power 25kW.

7.2. Technical room

Technical room is located in the underground level. It is equipped with boiler, hot water reservoir, expansion vessel, watermeter assembly, chimney, main watermeters.

7.3. Piping

All the piping needed for heating the object is from copper. There are several vertical piping. All the water piping for hot water is from PPR.

7.4. Heating devices

In all the apartments this type of heating devices is installed.

8. List of drawings

1. Drainage - Plan View of the underground floor
2. Drainage - Plan View of the ground floor
3. Drainage - Plan View of the general floor
4. Water - Plan View of the underground floor
5. Water - Plan View of the ground floor
6. Water - Plan View of the general floor
7. Ventilation - Plan View of the underground floor
8. Ventilation - Plan View of the ground floor
9. Ventilation - Plan View of the general floor