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|                       |  |
|-----------------------|--|
| Stage:                | STRUCTURAL AND CONSTRUCTION-TECHNICAL ASSESSM  |
| Project name:         | GRÖSSLING BATH   |
| Location of building: | Plot no. 219, 218  |
| Investor:             | Municipal Authority of the Capital City of the Slovak Republic Bratislavy, Department of Rental Housing, asset management and stocktaking ,<br>Primaciálne nám. 1,P. O. Box 192, 814 99 Bratislava |
| Responsible engineer: | Ing. Ľuboš Palaj   |
| Elaborated by:        | Ing. Ľ. Palaj, Ing. L. Kramarčík, Ing. J. Kvasniak   |
| Date:                 | 02/2020  |
| Contract no.:         | 20 020   |

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## 2 General data

|                        |   |
|------------------------|---|
| Project name           | GRÖSSLING BATH  |
| Place of construction: | Plot no. 219, 218   |
| Stage:                 | Structural and construction–technical assessment  |
| Client:                | Municipal Authority of the Capital City of the Slovak Republic<br>Bratislava, Department of Rental Housing, asset<br>management and stocktaking<br>Primaciálne nám. 1, P. O. Box 192, 814 99 Bratislava 1 |
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| Date:                  | 02/2020   |
| Contract no.:          | 20 010  |

### 3 Baseline documents

- [1] Archival documents-Reconstruction of the Grössling bath Bratislava, Construction company IPOS, Department of design Bratislava, 05/1969
- [2] Archival documents-Rol'nicke noviny surveying, Faculty of Civil Engineering SVŠT, 09/1986
- [3] Archival documents-Reconstruction of the object in Medená street no. 6 in Bratislava for the purposes of a bank, Ing. Arch. Peter Žalman, 05/1993
- [4] Exploration of dampening and proposal of reconstruction measures, Ing. M. Pichová, 9/1995
- [5] Archival documents-Komerční banka Bratislava, SAN – HUMA 90 spol. s.r.o., 02/1996
- [6] Assessment, Ing. Ivan Guba, 8/2018
- [7] Grössling bath, surveying and documentation of the actual state, PK Digital, s.r.o., 12/2019
- [8] Rehabilitation of concrete structures, Juraj Bičík, 1996
- [9] Construction-technical inspection, Corwum s.r.o., 02/2020
- [10] Set of standards STN EN
- [11] software Scia Engineer 2019, Allplan 2020, Geo, Fine, licence CORWUM s.r.o.

### 4 Introduction

The objective of the present document is to assess the conditions of Grössling bath objects in Bratislava. The task of the document is to address the points specified below and thus ensure the inputs into the architectural competition.

1. Description of the objects' load-bearing system
2. Select the structurally unsound structures, categorise them and determine the structural protection methods
3. Describe the composition of floors over the significant ceiling structures
4. Structural assessment of the significant load-bearing elements, especially the ceiling structures, determination of their load-bearing capacity in terms of limit conditions



## 5 Description of the load-bearing system

In terms of the floor plan the Grössling bath is rather segmented, therefore in order to increase clarity, we have divided them into individual parts. Graphical representation is shown in Annex P1 and concerns the following parts:

|         |  |
|---------|--|
| Časť A. | Bank - corner of Kúpeľná and Medená street |
| Časť B. | Wing in Medená street                      |
| Časť C. | Bath                                       |
| Časť D. | Bath facilities                            |
| Časť E. | Pool                                       |
| Časť F. | Wing at Vajanského nábrežie                |
| Časť G. | Boiler house                               |
| Časť H. | Residential part                           |
| Časť I. | Residential part                           |
| Časť J. | Facilities                                 |
| Časť K. | Roofed atrium                              |

### 5.1 Foundations of the objects

Foundation structures of individual parts were not precisely examined and the bearing capacity of the foundations was not assessed. No defects that would indicate insufficient bearing capacity of the foundation soil, or other defects of foundation structures, were discovered during the inspection of the object. Thus, it is expected that the foundation soils and foundation structures have sufficient bearing capacity. Foundations are expected to be made in the gravel layers with sufficient bearing capacity.

### 5.2 Part A

Part A has two wings and a central part which has a specific structural system. In the majority of its floor plan (80%) the part has a cellar; it has two floors and a loft. It is roofed with a saddle roof which forms a single unit covering also the parts "B" and "I". Vertical bearing system consists of perimeter longitudinal brick walls and an internal bearing wall; it is a double section, and in its southern wing it is partially a triple section. Ceilings above the 1.UF and 1.F are formed by vault ceilings with roller-steel joists. The types of joists are specified in Annex K1. It was discovered during the research that part of the ceilings is placed on the longitudinal partition with the thickness of 150 mm (southern wing), so the load-bearing function of this wall shall be considered. Ceilings

above the 2.F are wooden, joist. The position of the wooden beams is documented; it is specified in the project [5] and also in the localisation. Some ceiling joists were reinforced with cylindrical profiles; their exact specification is included in the project [5]. Drill holes were applied during the research and the accuracy of localisation was verified, thus it is probable that the reinforcement was also implemented according to the project. The structural system of the ceilings in the central part consists of rolled joists I28 into which the wooden beams are placed.

The roof structure was reconstructed; binding joists were removed, rafters were reinforced with splice pieces. The structure was completed with a top steel purlin which is supported with steel columns at the place of partitions. The central part is formed by spatial wooden frames. All the interventions into the rafter were implemented according to the project [5].

### 5.3 Part B

The part has two floors, a basement and a loft. The vertical bearing system consists of perimeter longitudinal brick walls and internal columns [B1, B2, B3], it is a double section. Horizontal structures are formed by ceiling reinforced concrete slab [B4], cross [B5] and longitudinal [B6] beam. At the contact with the beams the slabs have batters 200/50; the batters of all the beams placed near the columns are 400/100. Slabs and beams are continuous; reinforcement was detected in the drill holes. Beams show bending; the upper reinforcement was not precisely determined in the case of the slabs.

The roof structure was reconstructed; binding joists were disconnected and propped on the ceiling slab over 2. F, interventions were implemented according to the project [3].

#### Vertical structures

| Indication | Name   | Floor | Width | Height | Material | Notes                |
|------------|--------|-------|-------|--------|----------|----------------------|
| B1         | Column | 1.UF  | 400   | 400    | RC       | –                    |
| B2         | Column | 1.F   | 300   | 300    | RC       | Corners are bevelled |
| B3         | Column | 2.F   | 300   | 300    | RC       | Corners are bevelled |

#### Horizontal structures

| Indication | Name | Floor    | Height | $I_x$ | $I_y$ | Material | Notes |
|------------|------|----------|--------|-------|-------|----------|-------|
| B4         | Slab | 1.UF-2.F | 110    | 4.3   | 5.3   | RC       | –     |

| Indication | Name | Floor    | Width | Height | Span | Material | Notes                  |
|------------|------|----------|-------|--------|------|----------|------------------------|
| B5         | Beam | 1.UF-2.F | 200   | 390    | 5.3  | RC       | Batters at the support |
| B6         | Beam | 1.UF-2.F | 200   | 380    | 4.3  | RC       | Batters at the support |

## 5.4 Part C

The part has one above-ground floor and a basement; it is roofed with a flat roof with two roof lights; it is a space of the sitting pools. Ceiling slab [C1] over 1.UF is rather complicated; it includes integrated height-sectioned pools and the depth of these pools reaches into the basement. Two of them are axially symmetrical, according to the transversal axis; one is located in the middle near the longitudinal perimeter wall. Internal bearing walls [C2] of the basement support the above mentioned slab. Together with the beams [C3] they create a complex floor plan support of the bearing slab [C1]. The perimeter of the basement includes reinforced concrete walls combined with brick walls made of full fired bricks. Walls of the 1.F are bricked, rather high, supporting the roof structure. The roof is formed by a reinforced concrete slab with two roof lights made of steel girders.

### Vertical structures

| Indication | Name  | Floor | Width | Height | Material | Notes |
|------------|-------|-------|-------|--------|----------|-------|
| C2         | Walls | 1.UF  | 220   | –      | RC       | –     |

### Horizontal structures

| Indication | Name | Floor | Height | $I_x$ | $I_y$ | Material | Notes                       |
|------------|------|-------|--------|-------|-------|----------|-----------------------------|
| C1         | Slab | 1.UF  | 220    | –     | –     | RC       | At the location of the pool |
| C1         | Slab | 1.UF  | 100    | –     | –     | RC       | Outside the pool            |

| Indication | Name | Floor | Width | Height | Span | Material | Notes |
|------------|------|-------|-------|--------|------|----------|-------|
| C3         | Beam | 1.UF  | 220   | 400    | –    | RC       |       |

|    |      |      |     |     |   |    |  |
|----|------|------|-----|-----|---|----|--|
| C3 | Beam | 1.UF | 150 | 400 | – | RC |  |
|----|------|------|-----|-----|---|----|--|

## 5.5 Part D

The part has one above-ground and one underground floor; it is roofed with a flat roof with a number of roof lights. The vertical bearing system consists of walls. The basement includes perimeter and internal bearing walls made of reinforced concrete in combination with masonry. 1.F includes brick walls made of full fired bricks. The ceiling slab above the 1.UF is reinforced concrete [D1]. The roof is formed by reinforced concrete slab with multiple openings which are covered with roof lights made of steel girders.

### Horizontal structures

| Indication | Name | Floor | Height | $I_x$ | $I_y$ | Material | Notes       |
|------------|------|-------|--------|-------|-------|----------|-------------|
| D1         | Slab | 1.UF  | 160    | 2.9   | 17.3  | RC       | Over B0. 22 |

## 5.6 Part E

The subject premises include a swimming pool which is out of order. The part has one above-ground and one underground floor; it is roofed with a flat roof with three large roof lights. The vertical bearing system consists of walls and columns. The bearing perimeter brick walls are located in the basement. Under the pool slab there are reinforced concrete transversal frames consisting of two columns [E1] and beams [E2]. Moreover, these are propped against the perimeter walls of the part. Several sections were built up subsequently and only the door openings remained. The ceiling structure of the pool is built with a falling gradient and consists of two separated reinforced concrete slabs; the walls of the pool also consist of two separate walls. The first lower layer of the slab [E3] and walls [E4] is original, the upper layer of the slab [E5] and walls [E6] was implemented additionally within the redevelopment around 1968-69. The slab above 1.UF is reinforced concrete, propped on the perimeter walls of the basement and walls and frames of the pool. The walls on the 1.F are rather high, bricked and pillars are located in the thirds of the longitudinal walls. The roof structure is formed by reinforced concrete slab with trusses, with three larger openings which are covered with roof lights made of steel girders.

### Vertical structures

| Indication | Name    | Floor | Width | Height | Material | Notes |
|------------|---------|-------|-------|--------|----------|-------|
| E1         | Columns | 1.UF  | 240   | 250    | RC       | –     |
| E4         | Walls   | 1.UF  | 190   | –      | RC       | –     |
| E6         | Walls   | 1.UF  | 120   | –      | RC       | –     |

#### Horizontal structures

| Indication | Name | Floor | Height | $I_x$ | $I_y$ | Material | Notes |
|------------|------|-------|--------|-------|-------|----------|-------|
| E3         | Slab | 1.UF  | 180    | 2.5   | 8.9   | RC       | 1     |
| E5         | Slab | 1.UF  | 320    | 2.5   | 8.9   | RC       | 1     |

| Indication | Name | Floor | Width | Height | Span | Material | Notes |
|------------|------|-------|-------|--------|------|----------|-------|
| E2         | Beam | 1.UF  | 250   | 430    | 3000 | RC       |       |

#### 5.7 Part F

The wing at Vajanského nábrežie consists of one underground floor located under part of the floor plan and of seven above-ground floors. The ceiling structure of the basement is formed by various types of joist ceilings; the walls are made of full fired bricks. 1. and 2. F are formed by a frame. The vertical bearing system is formed by columns [F1], which are completed with perimeter bearing walls made of full fired bricks. Primary beams [F2] are situated in a cross direction and are placed on the columns. Secondary beams [F3] create a joist ceiling; they are placed on the primary beams or on the perimeter walls; their span varies. The joist ceiling also includes a reinforced concrete slab [F4]. The upper floors are set-off in comparison with the lower floors; they were not accessible at the time of the research. The bearing system of the ceilings is considered identical with the lower floors. The vertical system may be modified; columns may be replaced with walls.

#### Vertical structures

| Indication | Name   | Floor | Width | Height | Material | Notes |
|------------|--------|-------|-------|--------|----------|-------|
| F1         | Column | 1.F   | 500   | 750    | RC       | –     |

#### Horizontal structures

| Indication | Name | Floor | Height | $I_x$ | $I_y$ | Material | Notes |
|------------|------|-------|--------|-------|-------|----------|-------|
| F4         | Slab | 1.F   | 75     | 1.6   | prem  | RC       |       |

| Indication | Name | Floor | Width | Height | Span | Material | Notes |
|------------|------|-------|-------|--------|------|----------|-------|
| F2         | Beam | 1.F   | 450   | 240    | 6100 | RC       |       |
| F3         | Beam | 1.F   | 200   | 240    | 2300 | RC       |       |
| F3         | Beam | 1.F   | 200   | 240    | 4150 | RC       |       |
| F3         | Beam | 1.F   | 200   | 240    | 3100 | RC       |       |
| F3         | Beam | 1.F   | 200   | 240    | 5600 | RC       |       |

## 5.8 Part G

The part is single-storey, only the communication staircase reaches into the basement. Bearing walls are located only on the perimeter. The walls are made of full fired bricks. The part is covered with a saddle roof consisting of steel truss frames with rafters (Italian system) placed on top of the frames. A roof light is integrated in the level of the roof at the very top.

## 5.9 Part H

The part has two above-ground and one underground floor, covered with a flat roof. The vertical bearing system is formed by brick perimeter walls. Horizontal structures are formed by concrete joist ceilings which consist of ceiling joists [H1] and reinforced concrete slab [H2]. The ceiling structure above the basement is also joist [H3, H4], however it is not identical to the above-ground floors. A structurally different part is located in the vicinity of the part "E"; it consists of a small atrium; the basement includes a massive beam which bears the load of the perimeter wall; ceiling structures of the above-ground floors are made of slabs without joists.

### Horizontal structures

| Indication | Name | Floor      | Height | $I_x$ | $I_y$ | Material | Notes |
|------------|------|------------|--------|-------|-------|----------|-------|
| H2         | Slab | 1. and 2.F | 75     | 1.96  | 5.9   | RC       |       |
| H4         | Slab | 1.UF       | 75     | 2.0   | 5.9   |          |       |

| Indication | Name | Floor | Width | Height | Span | Material | Notes |
|------------|------|-------|-------|--------|------|----------|-------|
|------------|------|-------|-------|--------|------|----------|-------|

|    |      |               |     |     |     |    |   |
|----|------|---------------|-----|-----|-----|----|---|
| H1 | Beam | 1. and<br>2.F | 200 | 300 | 5.9 | RC |   |
| H3 | Beam | 1.UF          | 200 | 300 | 5.9 | RC | 1 |

## 5.10 Part I

Part "I" is something like a continuation of part "A"; it has the same number of floors and it is covered with the same roof forming a single unit. The vertical bearing system is formed by brick perimeter walls. Horizontal structures in the basement are formed by joist ceilings which consist of ceiling joists [I1] and reinforced concrete slab [I2]. The above-ground floors were not accessible during the research; the type of ceiling structures is unknown. The roof structure is described in part "A".

## Horizontal structures

| Indication | Name | Floor | Width | Height | Span | Material | Notes |
|------------|------|-------|-------|--------|------|----------|-------|
| I1         | Beam | 1. UF | 150   | 350    | 5.9  | RC       |       |

| Indication | Name | Floor | Height | $I_x$ | $I_y$ | Material | Notes |
|------------|------|-------|--------|-------|-------|----------|-------|
| I2         | Slab | 1.UF  | –      | 1.86  | 5.9   | RC       |       |

### 5.11 Part J

The part includes one underground and one above-ground floor. The vertical structures of the basement are formed by perimeter walls; the walls of the above-ground floor are made of full fired bricks. The ceiling structure above the basement is made from reinforced concrete; ceiling is ribbed with vault-like shape. The roof is flat with two roof lights. Partial vaulting is visible from the interior – something like a cavetto vault which is bricked (discovered by a drill hole), but we do not exclude that the edges of roof lights are made of steel or concrete, or a combination of these materials – drill holes were not applied in this space.

### 5.12 Part K

The part is partially a cellar and has one above-ground floor. The vertical structures of the basement are formed by perimeter walls. The structural system of the above-ground floor is formed by brick perimeter walls completed with composite steel-concrete columns (concreted I18 with spirally wound wire as stirrups. Dimensions of the column 140/230 mm). The ceiling structure above the basement is made from reinforced concrete; the ceiling is ribbed with a vault-like shape. The roof is flat, made from steel trusses; secondary trusses consist of wooden beams.

## 6 Evaluation of load-bearing structures

In this paragraph we deal more or less only with the structures which are structurally unsound and need to be repaired within five years, thus their reconstruction shall be dealt with within the upcoming renovation of the bath. The remaining structures are in relatively good technical condition, showing signs of usual wear – proportionate to their age.





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GRÖSSLING BATH

Plot no. 219, 218

Structural and construction-technical assessment

It is suggested to completely remove some of the structures, since their rehabilitation would be extremely demanding, even impossible, in any case uneconomical. The structures are classified according to individual parts.

## 6.1 Part B

Inspection of the roof trussing discovered biotically damaged rafters at the place of the roof lights and chimneys [BX1], roofing is damaged, it is leaking at the given places. In addition to the rafters which are completely rotted out (and their deformation is also visible at the filler block), the eaves plate may also be damaged. This structurally unsound condition was discovered only in one place, but more or less damaged wooden elements are expected around the chimneys along the entire roof (this applies also to the part A). The exact condition will be discovered after the roof trussing is stripped down.



Fig.: 1 Leaking in the loft



Fig.: 2 Critical detail – between the roof light and chimney

| Indication | Stage "A" | Stage "B" | Stage "C" | Notes |
|------------|-----------|-----------|-----------|-------|
| AX1        | 4         | –         | S5        |       |

Places of active leaks shall be repaired as soon as possible, even only temporarily. During the reconstruction, when the roof trussing is stripped down it is necessary to identify all damages and damaged rafters must be replaced with new ones, or a prosthesis must be applied, according to the extent of damage.

## 6.2 Parts C

The ceiling slab above the basement has significantly corroded lower reinforcement, the cover layer is flaking and the mechanical bond of reinforcement and concrete is significantly disrupted [CX1]. It is caused by past damp operation and probably non-functioning water-proofing, or the concrete was unsuitable for such an environment and the reinforcement cover layer was thin. The damage affects almost the entire area.



Fig.: 3 Damaged cover layer and corroded reinforcement





Fig.: 4 Damaged cover layer and detail of the corroded reinforcement



Fig.: 5 View of the ceiling rib – damaged lower reinforcement, cracked cover layer



Fig.: 6 View of the ceiling rib – damaged lower reinforcement, cracked cover layer

| Indication | Stage "A" | Stage "B" | Stage "C" | Notes |
|------------|-----------|-----------|-----------|-------|
| CX1        | 4         | –         | S3        |       |

In this case the best solution would be to completely remove the ceiling slab and to create a new ceiling structure – a copy of the original one.





Fig.: 7 Damaged cover layer and detail of the corroded reinforcement

### 6.3 Parts D

The ceiling slab above the basement in rooms B0.23 and B0.24 has a significantly corroded lower reinforcement, the cover layer is flaking and the mechanical bond of reinforcement and concrete is significantly disrupted [DX1].



Fig.: Damaged cover layer





Fig.: Damaged cover layer

| Indication | Stage "A" | Stage "B" | Stage "C" | Notes |
|------------|-----------|-----------|-----------|-------|
| DX1        | 4         | –         | S3        |       |

The ceiling slab shall be removed and a new ceiling structure shall be created.

#### 6.4 Parts E

Reinforced concrete structures have insufficient cover from the basement and the reinforcement is corroded [EX1]; the mechanical bond of reinforcement and concrete is not globally disrupted, only locally. Reconstruction works were carried out in the past; the structure of the pool was covered with additional concrete which should ensure water-tightness and overall load-bearing capacity of the structures. However, the height of the additional concrete is not proportionate and the reinforced concrete slab does not ensure sufficient water-tightness.



Fig.: 8 Damaged cover layer – it can be re-profiled



Fig.: 9 Damaged cover layer – it can be re-profiled

| Indication | Stage "A" | Stage "B" | Stage "C" | Notes |
|------------|-----------|-----------|-----------|-------|
| EX1        | 3         | –         | S2        |       |

We propose to remove the additional concrete layers of the pool and create a new, thinner slab on which the water-proofing layer shall be applied (it must be resolved with



the pool operator). If the water column in the pool significantly drops, the additional concrete may be preserved and an intermediate reinforced concrete ceiling shall be created. Insufficient cover layer of the reinforcement shall be restored with the use of suitable reconstruction mortars. The original reinforced concrete structures shall only be used as permanent formwork. The structures of walls and beams can be reinforced by underpinning, as was partially implemented in the past.

## 6.5 Part G

The roof of the boiler house is significantly damaged; many asbestos plates are missing [GX1]. Long-term leaking caused the damage of the Italian-system rafters by rot, secondarily by wood-destroying insects [GX2]; at present, many of the rafters are broken or their sections are significantly weakened. This situation is extremely structurally unsound and it is dangerous to move in these areas.



Fig.: 10 Damaged roof



Fig.: 11 Damaged roof

| Indication | Stage "A" | Stage "B" | Stage "C" | Notes |
|------------|-----------|-----------|-----------|-------|
| GX1        | 5         | –         | S5        |       |
| GX2        | 5         | –         | S5        |       |

It is proposed to completely remove and replace all wooden elements of the roof with new ones (formwork + Italian-style rafters). The original structure without damages caused by rot can withstand and safely transfer loads based on the factor of present fitness if the new load will not significantly differ from the original one (the new composition of the roof deck must be formed accordingly).

## 6.6 Part K

The roof above the part "K" is significantly damaged; the roof deck is not functional and is leaking in many places [KX1]. Long-term leaking has caused the damage of secondary wooden beams, mainly by rot [KX2].



Fig.: 12 Damaged roof

| Indication | Stage "A" | Stage "B" | Stage "C" | Notes |
|------------|-----------|-----------|-----------|-------|
| KX1        | 4         | –         | S5        |       |
| KX2        | 4         | –         | S5        |       |

The roof structure shall be fully supported by wood supports; the roof deck shall be temporarily repaired with the use of asphalt patches. This repair is only temporary until the bath is completely reconstructed. Should this structure be preserved in the future, it is suggested to leave the composite steel-concrete columns which are in good condition, as well as the main steel girders.





Fig.: 13 Large room in part K – ceiling in a state of serious disrepair

## 7 Composition of floors

The composition of the floors was examined with the use of drill holes and core holes. Determination points were selected and the drill holes and core holes were implemented subsequently. Core holes were primarily used for the exact determination of the thickness of reinforced concrete ceilings, and secondarily for the determination of the composition and thickness of the floor layers. At the places of the drill holes the floor layers were removed and their composition and thickness was determined. The drill hole points are marked in Annex P3. All the drill holes and core holes were documented by photos which are included in Annex P3.

Conclusions resulting from the drill holes and core holes were subsequently applied on the ceilings of similar types, and these conclusions were graphically represented in the floor plans, which are included in Annex P2.

## 8 Load-bearing capacity of ceilings

The selected ceiling structures were calculated and evaluated in compliance with the standards STN EN. The calculation always took into consideration the weight of the ceiling structure and layers of the existing floors; useful load was always considered as

the highest possible. The calculation procedure is as follows: firstly, the maximum load-bearing capacity of the ceiling was calculated, next the maximum load the ceiling is able to withstand was determined, and then the load of floors and own weight was subtracted. The resulting maximum characteristic useful load is graphically represented in Annex P8.

Individual parts include a rather large number of ceiling types therefore, to ensure clarity, the ceilings were classified into the following groups, i.e. reinforced concrete ceilings, wooden, and vault ceilings with steel girders. Every ceiling type was assessed using the above mentioned methodology, however the procedure used for individual ceiling types differed and it is described in the following sections.

## 8.1 Reinforced concrete ceilings

Selected reinforced concrete ceilings were examined with the use of core holes; their location is graphically represented in Annex P3; the thickness of the reinforced concrete slabs is specified in Annex P2 as well as in the chapter "Description of the load-bearing system". Tests from the individual boreholes were carried out in the accredited laboratory of the University of Žilina; the test results are documented in Annex P6. The remaining concrete structures were examined by durometer – Proceq DIGI SCHMIDT 2000; the drill holes locations are graphically represented in Annex P4. In the case of concrete, the confidence coefficient of the material was modified since the strength of material was strictly determined; instead of the coefficient  $\gamma_M = 1.5$ , the coefficient  $\gamma_M = 1.0$  is used in the calculations.

Laboratory tests and durometer tests were classified into areas. An area includes one ceiling, or one phase of construction. The strength of concrete was subsequently evaluated for the entire area. The evaluation of laboratory tests is included in Annex P6. In the vicinity of the boreholes, a reference strength was always determined by a durometer. Its value was then compared with the strength determined in the laboratory, and the resulting coefficient was used for the evaluation of the remaining measurements with the use of the durometer. The resulting strength determined by durometer is specified in Annex P4. A coefficient of 0.8 was used for structures where no core holes were implemented.

The position of reinforcement was examined at the selected places; the locations of the drill holes are graphically represented in Annex P5. The diameter, span and position of reinforcement are also shown in Annex P5. The strength of concreting reinforcement was determined based on the literature [8] and the value of 180Mpa was considered.

Load-bearing capacity calculation was carried out in the programme FINE-BETON. Beams, joists and slabs were considered as simple beams; in part B as continuous beams. The results were subsequently arranged into tables and the above-mentioned methodology was applied. Part B was assessed as continuous slab in the Scia program, where the reinforcement detected in drill holes was entered. The results are documented in Annex P7.

## 8.2 Wooden ceilings

Wooden ceilings are located in part "A" above the 2.F. The subject ceilings were precisely surveyed, assessed and reinforced in the project of loft reconstruction [5]. During their use, as well as during the technical inspection [9], the ceiling structures did not show any defects; no excessive bends or cracks were detected, therefore, this project shall take over the load-bearing capacity of the ceilings from the project of reconstruction; the subject ceilings are designed for the value of  $2.0\text{kN/m}^2$ .

## 8.3 Vault ceilings

Vault ceilings are located in part "A" and consist of barrel vaults made of full fired vault and steel rolled joists made of engineering steel. The strength of the joists was considered at 180MPa, the type of joists was strictly examined. The joists were considered as simple. Since the static scheme is clearly defined and the floor layers were examined, the confidence coefficient for permanent load was reduced from 1.35 to 1.1. The calculation was carried out according to the above specified methodology; types of joists, as well as the calculation results, are presented in Annex P7. It is necessary to note that these are rolled profiles from the beginning of the 20th century (or the end of the 19th and beginning of the 20th century) and their dimensions differ from the currently manufactured rolled I profiles. In general, the joists used have wider and thicker covering strips. The calculations were carried out with the use of Viennese structural tables from 1905. The dimensions specified in these tables precisely correspond with the determined dimensions of the steel profiles used in this construction.

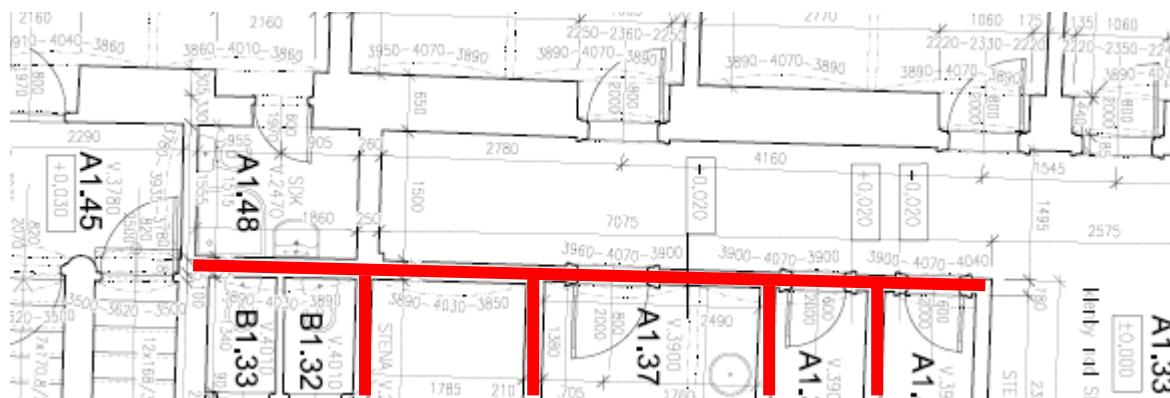
## 9 Conclusions

### 9.1 Part A

The floor above vault ceilings is relatively heavy, which limits the load-bearing capacity of the ceilings. Particularly negative effects have the added layers of cement screeds which were probably applied in the past without significant consideration of the load-bearing capacity of the ceilings. The load-bearing capacity of ceilings cannot be generalised; each ceiling has individual values which significantly differ. It depends on the joist used, span and floor layers. There are ceilings that have problems with the load-bearing capacity when loaded with their own weight. In such cases it is necessary to consider the removal of some floor layers in the future or to replace them with lighter ones. It is also necessary to specify the load and the future use of these premises and adapt them to the load-bearing capacities of individual ceilings, which are specified in P8.

The most problematic ceiling is the one above the rooms A1.37- A1.42 and A1.33. Only the steel profiles I16 – I20 (it is a combination of multiple profiles used in a single ceiling) which, with the span of 5.8 m, do not have sufficient load-bearing capacity even for the load of their own weight and permanent load, are used. Naturally, they are supported by the longitudinal wall with the thickness of 150 mm, with a thicker bearing wall located under it in the basement, and therefore we have to consider it as bearing. Similarly, we think that the function of bearing walls is partially taken over also by the transverse walls with the thickness of 150 mm, which are perpendicular to the wall – they again respect the transverse walls in the basement and almost in the entire length support the steel girders. Therefore, it is necessary to carefully consider the removal of these walls – in case it is necessary, their effect must be adequately replaced.

It is not recommended to reinforce the steel profiles by welding of steel profiles or strips to the lower covering strip, since this is the steel from the turn of 19th and 20th century (it cannot be precisely determined if it is mild steel or wrought steel), which may not be weldable or the safety of the welded joint cannot be ensured.



The wooden ceilings are in good condition; it is possible to consider the useful characteristic load of 2.0 kN/m<sup>2</sup>.

The roof frame structure is in good condition; however, locally there may be biotic damage caused by leaking of the roof deck, especially around the roof lights and chimneys. It is important that the reconstruction of the roof frame was implemented precisely according to the project from 1995-96.

## 9.2 Part B

Skeleton structure is implemented precisely; load-bearing capacity is greatly limited by rather heavy floors. In the reconstruction proposal, it is recommended to use as light a floor composition as possible; in case the load-bearing capacity is increased, the ceilings may be reinforced.

## 9.3 Part C

Ceilings above 1. UF are significantly damaged; their reconstruction is not possible, therefore we recommend their removal.

## 9.4 Part D

Part of the ceilings above 1. UF are significantly damaged; their reconstruction is not possible, therefore we recommend their removal. A rather heavy floor, which significantly limits the load-bearing capacity of the ceilings, is located above the rest of the ceilings.

## 9.5 Part E

The structure of the pool is locally quite significantly damaged by corrosion of the reinforcement, the cover layer is unsatisfactory. The subject structures were reconstructed in the past. A large area of the load-bearing skeleton of the pool was



reinforced with additionally built walls. The bottom and walls of the pool were re-concreted (additional concrete layer). It is recommended to reinforce the remaining part of the skeleton by additional walls; the bottom and walls of the pool can be used as a permanent formwork; the upper reconstruction layer of concrete may be removed.

## 9.6 Part F

Ceiling slabs are rather thin; they are able to transfer a relatively small load. Reinforcement of beams is atypical: four bars are located in the middle of the beam and only one bar at its edge. Some beams are affected by cracks and they also include short tassels of unknown importance. The ceiling can be reinforced.

## 9.7 Part G

The roof of the boiler house is in a state of serious disrepair; the Italian-style rafters are significantly damaged by rot. It is proposed to repair the roof within one year. The structure of the steel girder shall be preserved and the wooden elements must be completely replaced.

## 9.8 Part H

Ceiling slabs are rather thin; they are able to transfer a relatively small load. In relation to the thickness of the slabs, the floor layers are heavy. The concrete is of low quality; the application of additional reinforcement is relatively difficult. It is recommended to remove them.

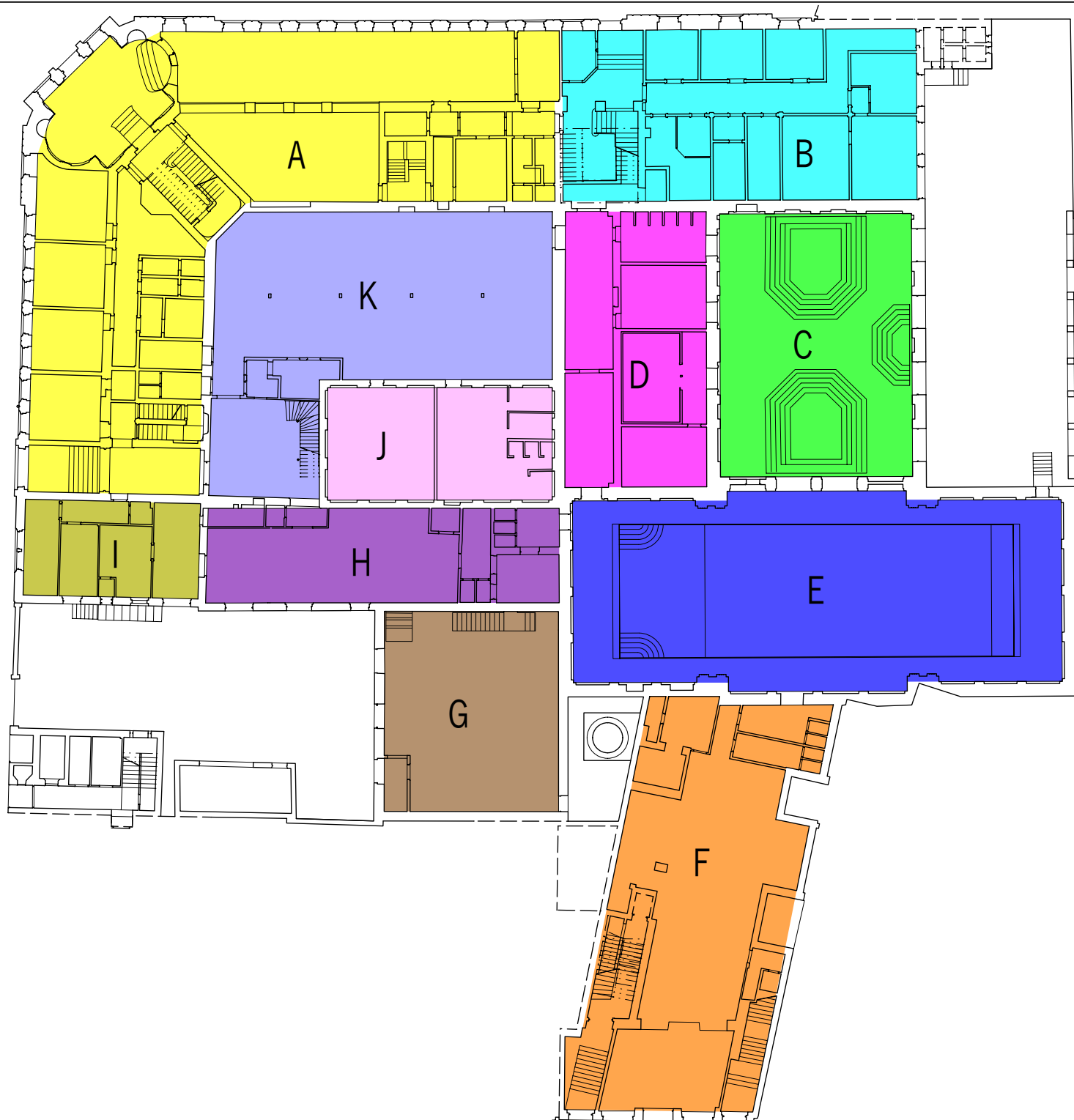
## 9.9 Part J

The ceiling above the basement is from reinforced concrete, with a rather low load-bearing capacity and heavy floor.

## 9.10 Part K

The ceiling structure is significantly damaged; It is necessary to replace all the damaged parts of the roof or to build a new roof structure.

In Bratislava, February 2020



#### ČLENENIE OBJEKTU

| ČASŤ | GRAFICKÁ ZNAČKA |
|------|-----------------|
| A    | Yellow          |
| B    | Cyan            |
| C    | Green           |
| D    | Magenta         |
| E    | Blue            |
| F    | Orange          |
| G    | Brown           |
| H    | Purple          |
| I    | Olive Green     |
| J    | Pink            |
| K    | Light Blue      |

## PRÍLOHA Č. 1

ČLENENIE OBJEKTU



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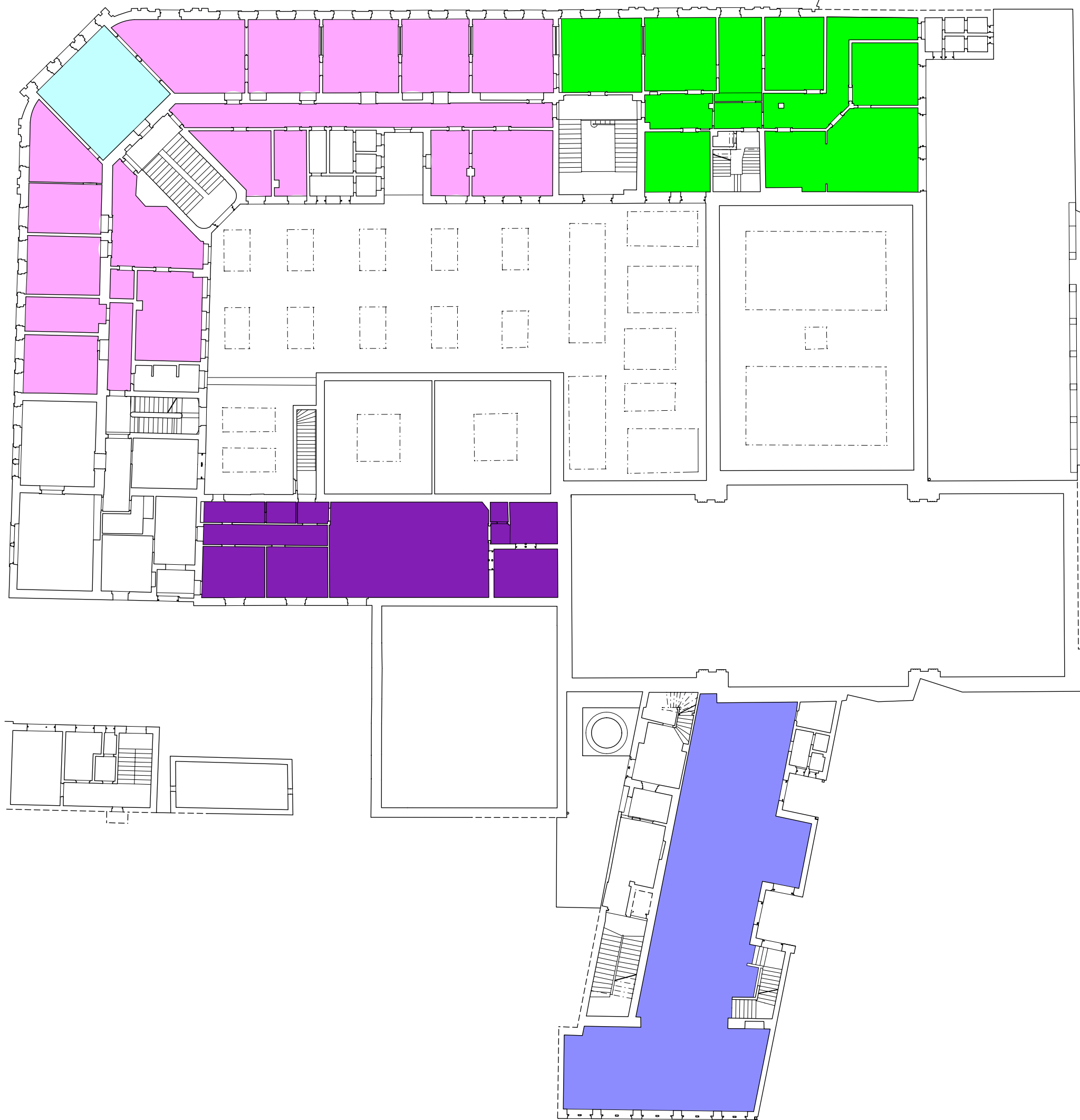


GRAFICKÉ ZNAČENIE PODLÁH

| PODLAHA | GRAFICKÁ ZNAČKA |
|---------|-----------------|
| P1      |                 |
| P2      |                 |
| P3      |                 |
| P4      |                 |
| P5      |                 |
| P6      |                 |
| P7      |                 |
| P8      |                 |
| P9      |                 |
| P10     |                 |
| P11     |                 |
| P12     |                 |
| P13     |                 |
| P14     |                 |
| P15     |                 |
| P16     |                 |
| P17     |                 |
| P18     |                 |
| P19     |                 |
| P20     |                 |
| P21     |                 |
| P22     |                 |
| P23     |                 |
| P24     |                 |

PRÍLOHA Č. 2

SKLADBY PODLÁH 1.NP

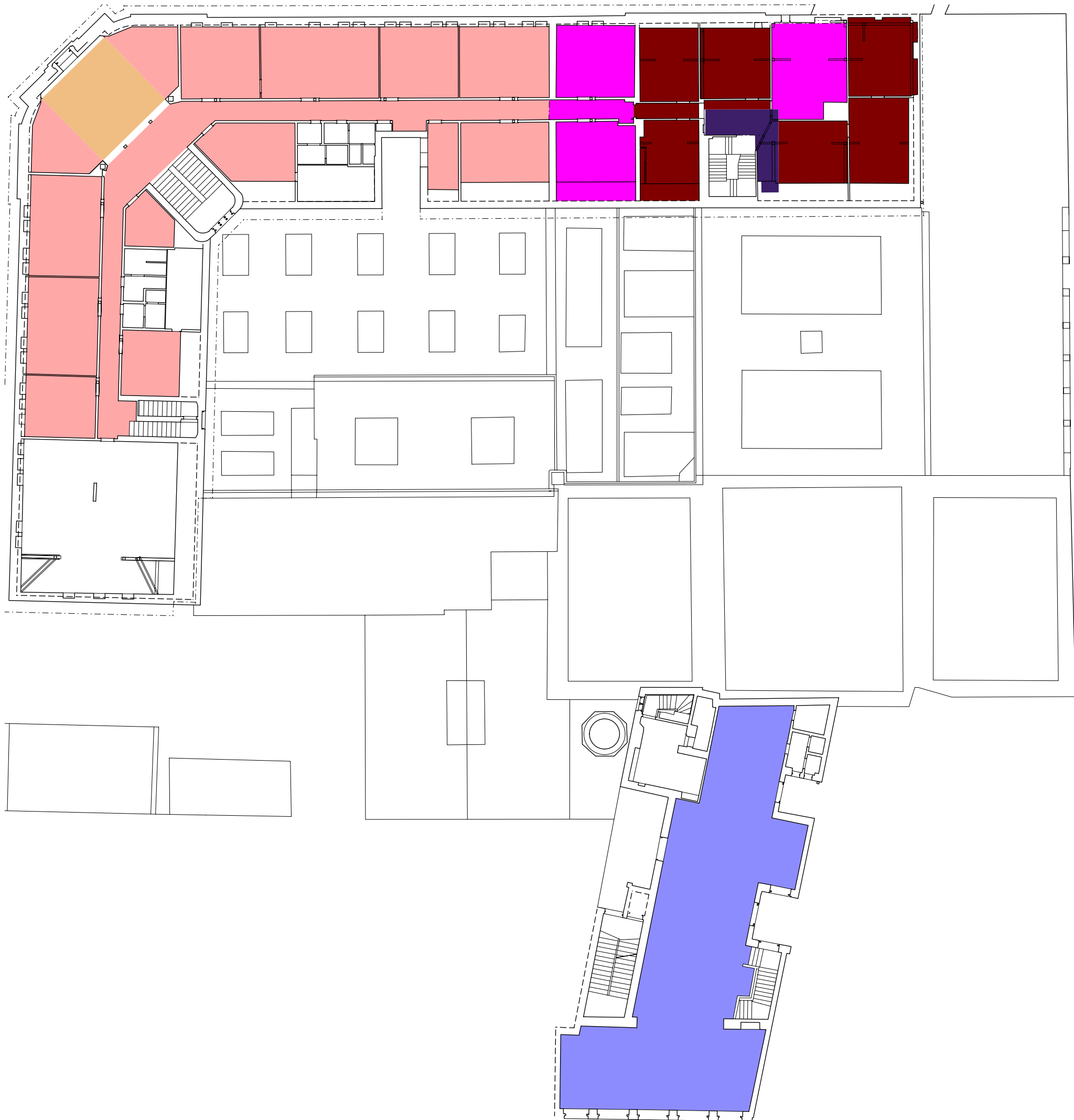


GRAFICKÉ ZNAČENIE PODLÁH

| PODLAHA | GRAFICKÁ ZNAČKA |
|---------|-----------------|
| P1      |                 |
| P2      |                 |
| P3      |                 |
| P4      |                 |
| P5      |                 |
| P6      |                 |
| P7      |                 |
| P8      |                 |
| P9      |                 |
| P10     |                 |
| P11     |                 |
| P12     |                 |
| P13     |                 |
| P14     |                 |
| P15     |                 |
| P16     |                 |
| P17     |                 |
| P18     |                 |
| P19     |                 |
| P20     |                 |
| P21     |                 |
| P22     |                 |
| P23     |                 |
| P24     |                 |

PRÍLOHA Č. 2

SKLADBY PODLÁH 2.NP



GRAFICKÉ ZNAČENIE PODLÁH

| PODLAHA | GRAFICKÁ ZNAČKA |
|---------|-----------------|
| P1      |                 |
| P2      |                 |
| P3      |                 |
| P4      |                 |
| P5      |                 |
| P6      |                 |
| P7      |                 |
| P8      |                 |
| P9      |                 |
| P10     |                 |
| P11     |                 |
| P12     |                 |
| P13     |                 |
| P14     |                 |
| P15     |                 |
| P16     |                 |
| P17     |                 |
| P18     |                 |
| P19     |                 |
| P20     |                 |
| P21     |                 |
| P22     |                 |
| P23     |                 |
| P24     |                 |

PRÍLOHA Č. 2

SKLADBY PODLÁH 3.NP



**LEGENDA**

t - hrúbka vrstvy / thickness of a layer

ρ - objemová hmotnosť / bulk density

g<sub>k</sub> - charakteristické zaťaženie /characteristic load

g<sub>d</sub> - návrhové zaťaženie / design load

V<sub>G</sub> - parciálny súčiniteľ stálych zaťažení / partial factor of permanent loads

| Podlaha P1/<br>Flooring P1   | t   | ρ                  | g <sub>k</sub>     | V <sub>G</sub> | g <sub>d</sub>     |
|------------------------------|-----|--------------------|--------------------|----------------|--------------------|
|                              | mm  | kN.m <sup>-3</sup> | kN.m <sup>-2</sup> |                | kN.m <sup>-2</sup> |
| Laminát / Laminate           | 7   | 8                  | 0,06               | 1,1            | 0,06               |
| Betón. poter/concrete screed | 80  | 24                 | 1,92               | 1,1            | 2,11               |
| Zásyp /grit                  | 110 | 18                 | 1,98               | 1,1            | 2,18               |
| ŽB doska /RC slab            | 105 | 25                 | 2,63               | 1,1            | 2,89               |
| Omietka / plaster            | 5   | 18                 | 0,09               | 1,1            | 0,10               |
| Spolu / Sum                  |     |                    | 6,67               |                | 7,34               |

| Podlaha P2/<br>Flooring P2    | t   | ρ                  | g <sub>k</sub>     | V <sub>G</sub> | g <sub>d</sub>     |
|-------------------------------|-----|--------------------|--------------------|----------------|--------------------|
|                               | mm  | kN.m <sup>-3</sup> | kN.m <sup>-2</sup> |                | kN.m <sup>-2</sup> |
| Laminát / Laminate            | 7   | 8                  | 0,06               | 1,1            | 0,06               |
| Drevený záklop /wooden boards | 25  | 6                  | 0,15               | 1,1            | 0,17               |
| Drevený záklop /wooden boards | 25  | 6                  | 0,15               | 1,1            | 0,17               |
| Pieskový násyp /sand grit     | 135 | 18                 | 2,43               | 1,1            | 2,67               |
| ŽB doska /RC slab             | 105 | 25                 | 2,63               | 1,1            | 2,89               |
| Omietka / plaster             | 5   | 18                 | 0,09               | 1,1            | 0,10               |
| Spolu / Sum                   |     |                    | 5,50               |                | 6,05               |

| Podlaha P3/<br>Flooring P3         | t   | ρ                  | g <sub>k</sub>     | V <sub>G</sub> | g <sub>d</sub>     |
|------------------------------------|-----|--------------------|--------------------|----------------|--------------------|
|                                    | mm  | kN.m <sup>-3</sup> | kN.m <sup>-2</sup> |                | kN.m <sup>-2</sup> |
| Laminát/koberec<br>laminate/carpet | 7   | 8                  | 0,06               | 1,1            | 0,06               |
| Betón. poter/concrete screed       | 100 | 24                 | 2,40               | 1,1            | 2,64               |
| Separčná fólia/separating foil     | -   | -                  | -                  | -              | -                  |
| Minerálna vlna /mineral wool       | 20  | 1                  | 0,02               | 1,1            | 0,02               |
| Štrkový násyp /gravel grit         | 60  | 18                 | 1,08               | 1,1            | 1,19               |
| ŽB doska /RC slab                  | 105 | 25                 | 2,63               | 1,1            | 2,89               |
| Omietka / plaster                  | 5   | 18                 | 0,09               | 1,1            | 0,10               |
| Spolu / Sum                        |     |                    | 6,27               |                | 6,90               |

| Podlaha P4/<br>Flooring P4                            | t   | ρ                  | g <sub>k</sub>     | V <sub>G</sub> | g <sub>d</sub>     |
|---|-----|--------------------|--------------------|----------------|--------------------|
|   | mm  | kN.m <sup>-3</sup> | kN.m <sup>-2</sup> |                | kN.m <sup>-2</sup> |
| Keramická dlažba / laminát<br>Ceramic tiles /laminate | 10  | 25                 | 0,25               | 1,1            | 0,28               |
| Betón. poter/concrete screed                          | 40  | 24                 | 0,96               | 1,1            | 1,06               |
| Betón. poter/concrete screed                          | 125 | 24                 | 3,00               | 1,1            | 3,30               |
| ŽB doska /RC slab                                     | 105 | 25                 | 2,63               | 1,1            | 2,89               |
| Omietka / plaster                                     | 10  | 18                 | 0,18               | 1,1            | 0,20               |
| Spolu / Sum   |     |                    | 7,02               |                | 7,72               |

| Podlaha P5/<br>Flooring P5   | t   | $\rho$             | $g_k$              | $V_G$ | $g_d$              |
|------------------------------|-----|--------------------|--------------------|-------|--------------------|
|                              | mm  | $\text{kN.m}^{-3}$ | $\text{kN.m}^{-2}$ |       | $\text{kN.m}^{-2}$ |
| Linoleum                     | 3   | 12                 | 0,04               | 1,1   | 0,04               |
| Betón. poter/concrete screed | 115 | 24                 | 2,76               | 1,1   | 3,04               |
| Škvára/štrk                  | 100 | 16                 | 1,60               | 1,1   | 1,76               |
| ŽB doska /RC slab            | 75  | 25                 | 1,88               | 1,1   | 2,06               |
| Spolu / Sum                  |     |                    | 6,27               |       | 6,90               |

| Podlaha P6/<br>Flooring P6       | t   | $\rho$             | $g_k$              | $V_G$ | $g_d$              |
|----------------------------------|-----|--------------------|--------------------|-------|--------------------|
|                                  | mm  | $\text{kN.m}^{-3}$ | $\text{kN.m}^{-2}$ |       | $\text{kN.m}^{-2}$ |
| Keramická dlažba / ceramic tiles | 10  | 25                 | 0,25               | 1,1   | 0,28               |
| Betón. poter/concrete screed     | 60  | 24                 | 1,44               | 1,1   | 1,58               |
| Betón. poter/concrete screed     | 40  | 24                 | 0,96               | 1,1   | 1,06               |
| ŽB doska /RC slab                | 160 | 25                 | 4,00               | 1,1   | 4,40               |
| Spolu / Sum                      |     |                    | 6,65               |       | 7,32               |

| Podlaha P7/<br>Flooring P7       | t   | $\rho$             | $g_k$              | $V_G$ | $g_d$              |
|----------------------------------|-----|--------------------|--------------------|-------|--------------------|
|                                  | mm  | $\text{kN.m}^{-3}$ | $\text{kN.m}^{-2}$ |       | $\text{kN.m}^{-2}$ |
| Keramická dlažba / ceramic tiles | 10  | 25                 | 0,25               | 1,1   | 0,28               |
| Betón. poter/concrete screed     | 30  | 24                 | 0,72               | 1,1   | 0,79               |
| Betón. poter/concrete screed     | 50  | 24                 | 1,20               | 1,1   | 1,32               |
| ŽB doska /RC slab                | 100 | 25                 | 2,50               | 1,1   | 2,75               |
| Spolu / Sum                      |     |                    | 4,67               |       | 5,14               |

| Podlaha P8/<br>Flooring P8       | t   | $\rho$             | $g_k$              | $V_G$ | $g_d$              |
|----------------------------------|-----|--------------------|--------------------|-------|--------------------|
|                                  | mm  | $\text{kN.m}^{-3}$ | $\text{kN.m}^{-2}$ |       | $\text{kN.m}^{-2}$ |
| Keramická dlažba / ceramic tiles | 10  | 25                 | 0,25               | 1,1   | 0,28               |
| Betón. poter/concrete screed     | 60  | 24                 | 1,44               | 1,1   | 1,58               |
| ŽB doska /RC slab                | 220 | 25                 | 5,50               | 1,1   | 6,05               |
| Spolu / Sum                      |     |                    | 7,19               |       | 7,91               |

| Podlaha P9/<br>Flooring P9   | t  | $\rho$             | $g_k$              | $V_G$ | $g_d$              |
|------------------------------|----|--------------------|--------------------|-------|--------------------|
|                              | mm | $\text{kN.m}^{-3}$ | $\text{kN.m}^{-2}$ |       | $\text{kN.m}^{-2}$ |
| Linoleum                     | 3  | 12                 | 0,04               | 1,1   | 0,04               |
| Betón. poter/concrete screed | 30 | 24                 | 0,72               | 1,1   | 0,79               |
| ŽB doska /RC slab            | 75 | 25                 | 1,88               | 1,1   | 2,06               |
| Spolu / Sum                  |    |                    | 2,63               |       | 2,89               |



## PRÍLOHA Č. 2/ATTACHMENT No.2

CORWUM s.r.o. Projektovanie a diagnostika SKLADBY PODLÁH/FLOOR LAYERS

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| Podlaha P10/<br>Flooring P10      | t   | $\rho$             | $g_k$              | $V_G$ | $g_d$              |
|-----------------------------------|-----|--------------------|--------------------|-------|--------------------|
|                                   | mm  | $\text{kN.m}^{-3}$ | $\text{kN.m}^{-2}$ |       | $\text{kN.m}^{-2}$ |
| Keramická dlažba / ceramic tiles  | 5   | 25                 | 0,13               | 1,1   | 0,14               |
| Betón. poter/concrete screed      | 30  | 24                 | 0,72               | 1,1   | 0,79               |
| Betón. poter/concrete screed      | 75  | 23                 | 1,73               | 1,1   | 1,90               |
| ŽB doska /RC slab                 | 320 | 25                 | 8,00               | 1,1   | 8,80               |
| Betón. poter/concrete screed      | 30  | 24                 | 0,72               | 1,1   | 0,79               |
| Asfaltový pás /asphalt            | 15  | 1                  | 0,02               | 1,1   | 0,02               |
| Cementová stierka /cement plaster | 5   | 23                 | 0,12               | 1,1   | 0,13               |
| ŽB doska /RC slab                 | 180 | 25                 | 4,50               | 1,1   | 4,95               |
| Spolu / Sum                       |     |                    | 15,92              |       | 17,51              |

| Podlaha P11/<br>Flooring P11 | t   | $\rho$             | $g_k$              | $V_G$ | $g_d$              |
|------------------------------|-----|--------------------|--------------------|-------|--------------------|
|                              | mm  | $\text{kN.m}^{-3}$ | $\text{kN.m}^{-2}$ |       | $\text{kN.m}^{-2}$ |
| Linoleum                     | 3   | 12                 | 0,04               | 1,1   | 0,04               |
| Betón. poter/concrete screed | 45  | 24                 | 1,08               | 1,1   | 1,19               |
| Štrkový násyp /gravel grit   | 100 | 18                 | 1,80               | 1,1   | 1,98               |
| ŽB doska /RC slab            | 75  | 25                 | 1,88               | 1,1   | 2,06               |
| Spolu / Sum                  |     |                    | 4,79               |       | 5,27               |

| Podlaha P12/<br>Flooring P12             | t   | $\rho$             | $g_k$              | $V_G$ | $g_d$              |
|--|-----|--------------------|--------------------|-------|--------------------|
|  | mm  | $\text{kN.m}^{-3}$ | $\text{kN.m}^{-2}$ |       | $\text{kN.m}^{-2}$ |
| Laminát na koberci<br>Laminate on carpet | 7   | 8                  | 0,06               | 1,1   | 0,06               |
| Nivelizačný poter /leveling screed       | 10  | 23                 | 0,23               | 1,1   | 0,25               |
| Betón. poter/concrete screed             | 55  | 24                 | 1,32               | 1,1   | 1,45               |
| Sypký zásyp 100-250mm /grit              | 130 | 18                 | 2,34               | 1,1   | 2,57               |
| Klenbičkový strop/ bricks                | 150 | 18                 | 2,70               | 1,1   | 2,97               |
| Spolu / Sum                              |     |                    | 6,65               |       | 7,31               |

| Podlaha P13/<br>Flooring P13       | t   | $\rho$             | $g_k$              | $V_G$ | $g_d$              |
|------------------------------------|-----|--------------------|--------------------|-------|--------------------|
|                                    | mm  | $\text{kN.m}^{-3}$ | $\text{kN.m}^{-2}$ |       | $\text{kN.m}^{-2}$ |
| Keramická dlažba / ceramic tiles   | 10  | 25                 | 0,25               | 1,1   | 0,28               |
| Nivelizačný poter /leveling screed | 10  | 23                 | 0,23               | 1,1   | 0,25               |
| Betón. poter/concrete screed       | 55  | 24                 | 1,32               | 1,1   | 1,45               |
| Sypký zásyp 100-250mm /grit        | 130 | 18                 | 2,34               | 1,1   | 2,57               |
| Klenbičkový strop/ bricks          | 150 | 18                 | 2,70               | 1,1   | 2,97               |
| Spolu / Sum                        |     |                    | 6,84               |       | 7,52               |



| Podlaha P14/<br>Flooring P14    | t   | $\rho$             | $g_k$              | $V_G$ | $g_d$              |
|---------------------------------|-----|--------------------|--------------------|-------|--------------------|
|                                 | mm  | $\text{kN.m}^{-3}$ | $\text{kN.m}^{-2}$ |       | $\text{kN.m}^{-2}$ |
| Linoleum                        | 3   | 12                 | 0,04               | 1,1   | 0,04               |
| Betón. poter/concrete screed    | 30  | 24                 | 0,72               | 1,1   | 0,79               |
| Separačná fólia/separating foil | 10  | 1                  | 0,01               | 1,1   | 0,01               |
| Betón. poter/concrete screed    | 80  | 24                 | 1,92               | 1,1   | 2,11               |
| Lepenka /asphalt paper          | 2   | 1                  | 0,00               | 1,1   | 0,00               |
| ŽB doska /RC slab               | 100 | 25                 | 2,50               | 1,1   | 2,75               |
| Spolu / Sum                     |     |                    | 5,19               |       | 5,71               |

| Podlaha P15/<br>Flooring P15             | t   | $\rho$             | $g_k$              | $V_G$ | $g_d$              |
|--|-----|--------------------|--------------------|-------|--------------------|
|  | mm  | $\text{kN.m}^{-3}$ | $\text{kN.m}^{-2}$ |       | $\text{kN.m}^{-2}$ |
| Laminát na koberci<br>Laminate on carpet | 6   | 8                  | 0,05               | 1,1   | 0,05               |
| Drevené parkety /wooden floor            | 20  | 6                  | 0,12               | 1,1   | 0,13               |
| Drevený záklop /wooden boards            | 15  | 6                  | 0,09               | 1,1   | 0,10               |
| Sypký zásyp 135-315mm/ grit              | 190 | 18                 | 3,42               | 1,1   | 3,76               |
| Klenbičkový strop / bricks               | 150 | 18                 | 2,70               | 1,1   |                    |
| Omietka / plaster                        | 10  | 18                 | 0,18               | 1,1   | 0,20               |
| Spolu / Sum                              |     |                    | 6,56               |       | 7,21               |

| Podlaha P16/<br>Flooring P16             | t   | $\rho$             | $g_k$              | $V_G$ | $g_d$              |
|--|-----|--------------------|--------------------|-------|--------------------|
|  | mm  | $\text{kN.m}^{-3}$ | $\text{kN.m}^{-2}$ |       | $\text{kN.m}^{-2}$ |
| Laminát na koberci<br>Laminate on carpet | 8   | 8                  | 0,06               | 1,1   | 0,07               |
| Sádrovláknitá doska /gypsum board        | 40  | 12                 | 0,48               | 1,1   | 0,53               |
| Betón. poter/concrete screed             | 60  | 24                 | 1,44               | 1,1   | 1,58               |
| Drevený záklop / wooden boards           | 25  | 6                  | 0,15               | 1,1   | 0,17               |
| Trámový strop /wooden beams              | 260 | -                  | -                  | -     | -                  |
| Drevený záklop / wooden boards           | 25  | 6                  | 0,15               | 1,1   | 0,17               |
| Omietka s rákosom / plaster              | 20  | 16                 | 0,32               | 1,1   | 0,35               |
| Spolu                                    |     |                    | 2,60               |       | 2,86               |

| Podlaha P17/<br>Flooring P17     | t   | $\rho$             | $g_k$              | $V_G$ | $g_d$              |
|----------------------------------|-----|--------------------|--------------------|-------|--------------------|
|                                  | mm  | $\text{kN.m}^{-3}$ | $\text{kN.m}^{-2}$ |       | $\text{kN.m}^{-2}$ |
| Keramická dlažba / ceramic tiles | 10  | 25                 | 0,25               | 1,1   | 0,28               |
| Betón. poter/concrete screed     | 100 | 24                 | 2,40               | 1,1   | 2,64               |
| ŽB doska /RC slab                | 80  | 25                 | 2,00               | 1,1   | 2,20               |
| Spolu / Sum                      |     |                    | 4,65               |       | 5,12               |



## PRÍLOHA Č. 2/ATTACHMENT No.2

CORWUM s.r.o. Projektovanie a diagnostika SKLADBY PODLÁH/FLOOR LAYERS

corwum@corwum.sk

| Podlaha P18/<br>Flooring P18       | t  | $\rho$             | $g_k$              | $V_G$ | $g_d$              |
|------------------------------------|----|--------------------|--------------------|-------|--------------------|
|                                    | mm | $\text{kN.m}^{-3}$ | $\text{kN.m}^{-2}$ |       | $\text{kN.m}^{-2}$ |
| Linoleum                           | 3  | 12                 | 0,04               | 1,1   | 0,04               |
| Betón. poter/concrete screed       | 30 | 24                 | 0,72               | 1,1   | 0,79               |
| Separáčna vrstva / separating foil | 10 | 1                  | 0,01               | 1,1   | 0,01               |
| Betónový poter/concrete screed     | 80 | 24                 | 1,92               | 1,1   | 2,11               |
| Piesok/ sand                       | -  | -                  | -                  | -     | -                  |
| Spolu / Sum                        |    |                    | 2,69               |       | 2,95               |

| Podlaha P19/<br>Flooring P19                          | t   | $\rho$             | $g_k$              | $V_G$ | $g_d$              |
|---|-----|--------------------|--------------------|-------|--------------------|
|   | mm  | $\text{kN.m}^{-3}$ | $\text{kN.m}^{-2}$ |       | $\text{kN.m}^{-2}$ |
| Keramická dlažba / laminát<br>Ceramic tiles /laminare | 10  | 25                 | 0,25               | 1,1   | 0,28               |
| Betónový poter + základy /concrete                    | 400 | 24                 | 9,60               | 1,1   | 10,56              |
| Zemina / clay   | -   | -                  | -                  | -     | -                  |
| Spolu / Sum   |     |                    | 9,85               |       | 10,84              |

| Podlaha P20/<br>Flooring P20             | t   | $\rho$             | $g_k$              | $V_G$ | $g_d$              |
|--|-----|--------------------|--------------------|-------|--------------------|
|  | mm  | $\text{kN.m}^{-3}$ | $\text{kN.m}^{-2}$ |       | $\text{kN.m}^{-2}$ |
| Laminát na koberci<br>Laminare on carpet | 20  | 8                  | 0,16               | 1,1   | 0,18               |
| Podkladný betón /concrete                | 145 | 25                 | 3,63               | 1,1   | 3,99               |
| Zemina / clay                            | -   | -                  | -                  | -     | -                  |
| Spolu / Sum                              |     |                    | 3,79               |       | 4,16               |

| Podlaha P21/<br>Flooring P21             | t   | $\rho$             | $g_k$              | $V_G$ | $g_d$              |
|--|-----|--------------------|--------------------|-------|--------------------|
|  | mm  | $\text{kN.m}^{-3}$ | $\text{kN.m}^{-2}$ |       | $\text{kN.m}^{-2}$ |
| Laminát na koberci<br>Laminare on carpet | 10  | 8                  | 0,08               | 1,1   | 0,09               |
| Drevené parkety / wooden floor           | 22  | 6                  | 0,13               | 1,1   | 0,15               |
| Drevený záklop/ wooden boards            | 25  | 6                  | 0,15               | 1,1   | 0,17               |
| Sypký zásyp /dust grit                   | 180 | 18                 | 3,24               | 1,1   | 3,56               |
| Drevený záklop/ wooden boards            | 25  | 6                  | 0,15               | 1,1   | 0,17               |
| Trámový strop /wooden beams              | 180 | -                  | -                  | -     | -                  |
| Drevený záklop/ wooden boards            | 25  | 6                  | 0,15               | 1,1   | 0,17               |
| Omietka/ Plaster                         | 20  | 18                 | 0,36               | 1,1   | 0,40               |
| Spolu / Sum                              |     |                    | 4,26               |       | 4,69               |



| Podlaha P22/<br>Flooring P22             | t  | $\rho$             | $g_k$              | $V_G$ | $g_d$              |
|--|----|--------------------|--------------------|-------|--------------------|
|  | mm | $\text{kN.m}^{-3}$ | $\text{kN.m}^{-2}$ |       | $\text{kN.m}^{-2}$ |
| Laminát na koberci<br>Laminate on carpet | 10 | 8                  | 0,08               | 1,1   | 0,09               |
| Sádrovláknitá doska/gypsum boards        | 50 | 12                 | 0,60               | 1,1   | 0,66               |
| Polystyrén/polystyrene                   | 10 | 0,5                | 0,01               | 1,1   | 0,01               |
| Sypký zásyp/ dust grit                   | 40 | 18                 | 0,72               | 1,1   | 0,79               |
| Betón. poter/concrete screed             | 60 | 24                 | 1,44               | 1,1   | 1,58               |
| Drevený záklop/ wooden boards            | 25 | 6                  | 0,15               | 1,1   | 0,17               |
| Trámový strop/ wooden beams              | -  | -                  | -                  | -     | -                  |
| Drevený záklop/ wooden boards            | 25 | 6                  | 0,15               | 1,1   | 0,17               |
| Omietka s rásokom/ plaster               | 20 | 16                 | 0,32               | 1,1   | 0,35               |
| Spolu / Sum                              |    |                    | 3,47               |       | 3,81               |

| Podlaha P23/<br>Flooring P23            | t   | $\rho$             | $g_k$              | $V_G$ | $g_d$              |
|---|-----|--------------------|--------------------|-------|--------------------|
|   | mm  | $\text{kN.m}^{-3}$ | $\text{kN.m}^{-2}$ |       | $\text{kN.m}^{-2}$ |
| Linoleum (koberec/carpet)               | 3   | 12                 | 0,04               | 1,1   | 0,04               |
| 2xSádrovláknitá doska<br>2xgypsum board | 40  | 12                 | 0,48               | 1,1   | 0,53               |
| Betón. poter/concrete screed            | 60  | 24                 | 1,44               | 1,1   | 1,58               |
| ŽB doska /RC slab                       | 115 | 25                 | 2,88               | 1,1   | 3,16               |
| Omietka/ plaster                        | 5   | 18                 | 0,09               | 1,1   | 0,10               |
| Spolu / Sum                             |     |                    | 4,92               |       | 5,41               |

| Podlaha P24/<br>Flooring P24 | t   | $\rho$             | $g_k$              | $V_G$ | $g_d$              |
|------------------------------|-----|--------------------|--------------------|-------|--------------------|
|                              | mm  | $\text{kN.m}^{-3}$ | $\text{kN.m}^{-2}$ |       | $\text{kN.m}^{-2}$ |
| ŽB doska /RC slab            | 140 | 25                 | 3,50               | 1,1   | 3,85               |
| ŽB doska /RC slab            | 105 | 25                 | 2,63               | 1,1   | 2,89               |
| Omietka /plaster             | 5   | 18                 | 0,09               | 1,1   | 0,10               |
| Spolu / Sum                  |     |                    | 6,22               |       | 6,84               |

# LEGENDA

t - hrúbka vrstvy / thickness of a layer

$\rho$  - objemová hmotnosť / bulk density

$g_k$  - charakteristické zaťaženie /characteristic load

$g_d$  - návrhové zaťaženie / design load

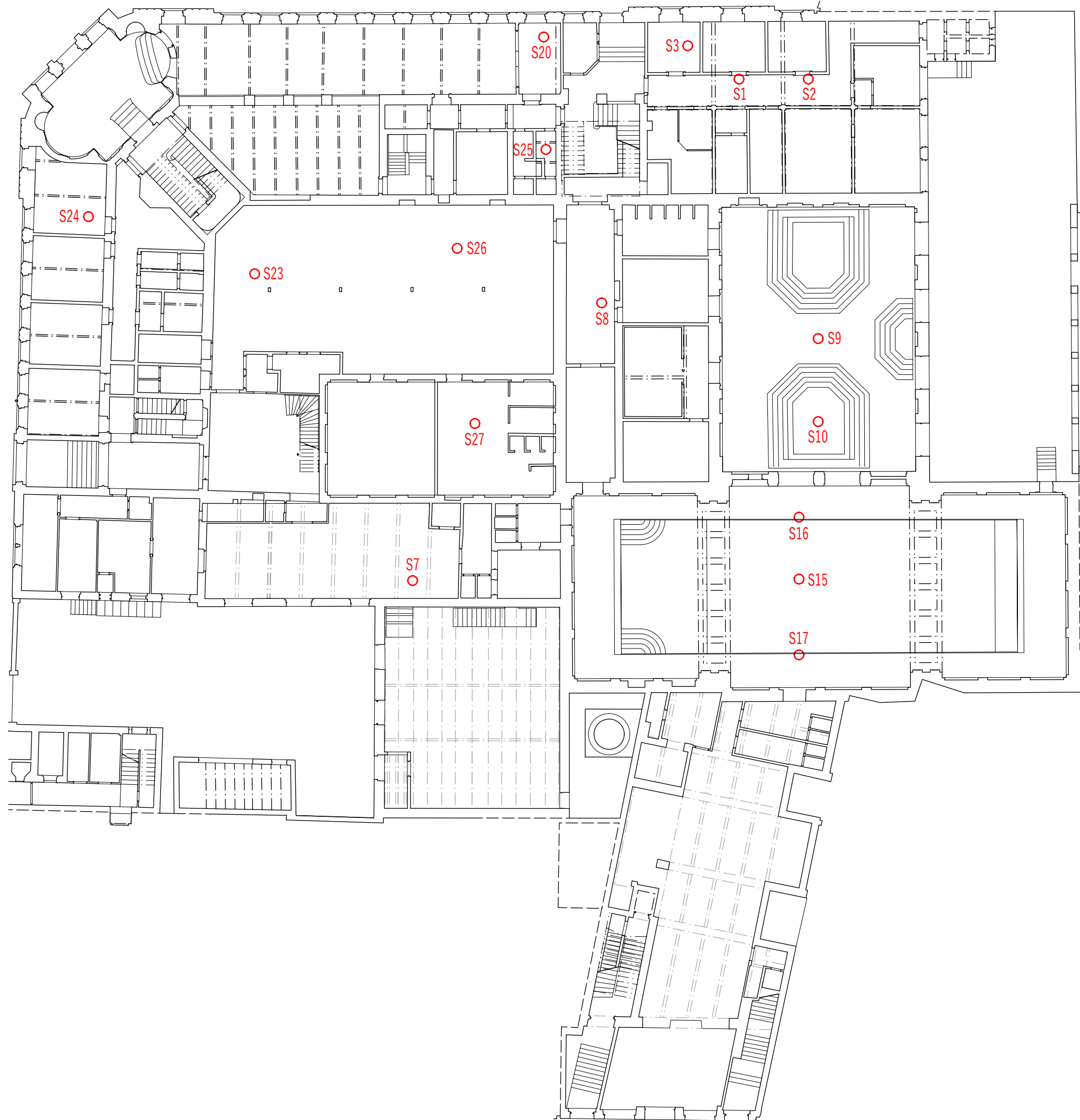
$V_G$  - parciálny súčiniteľ stálych zaťažení / partial factor of permanent loads

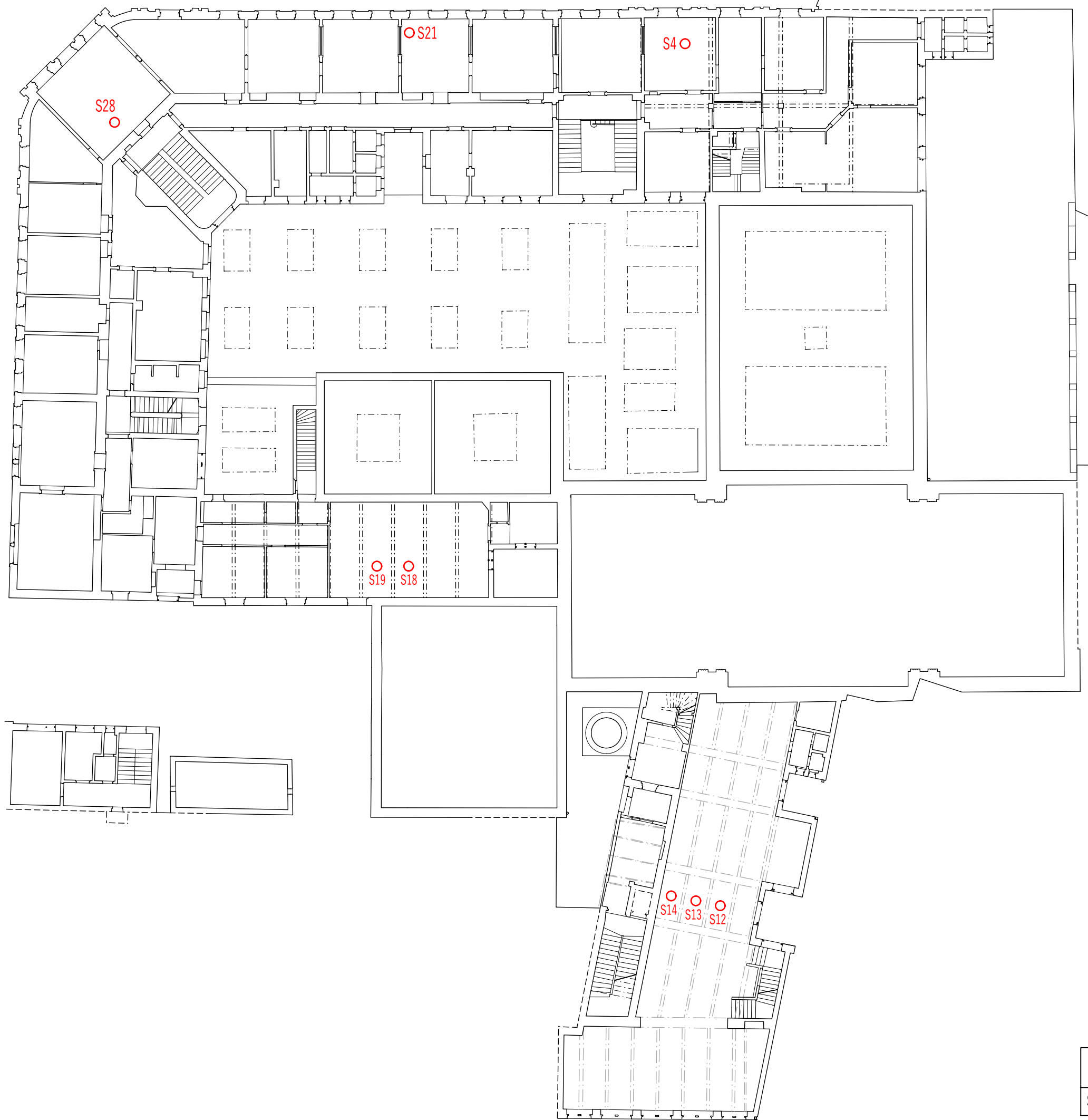


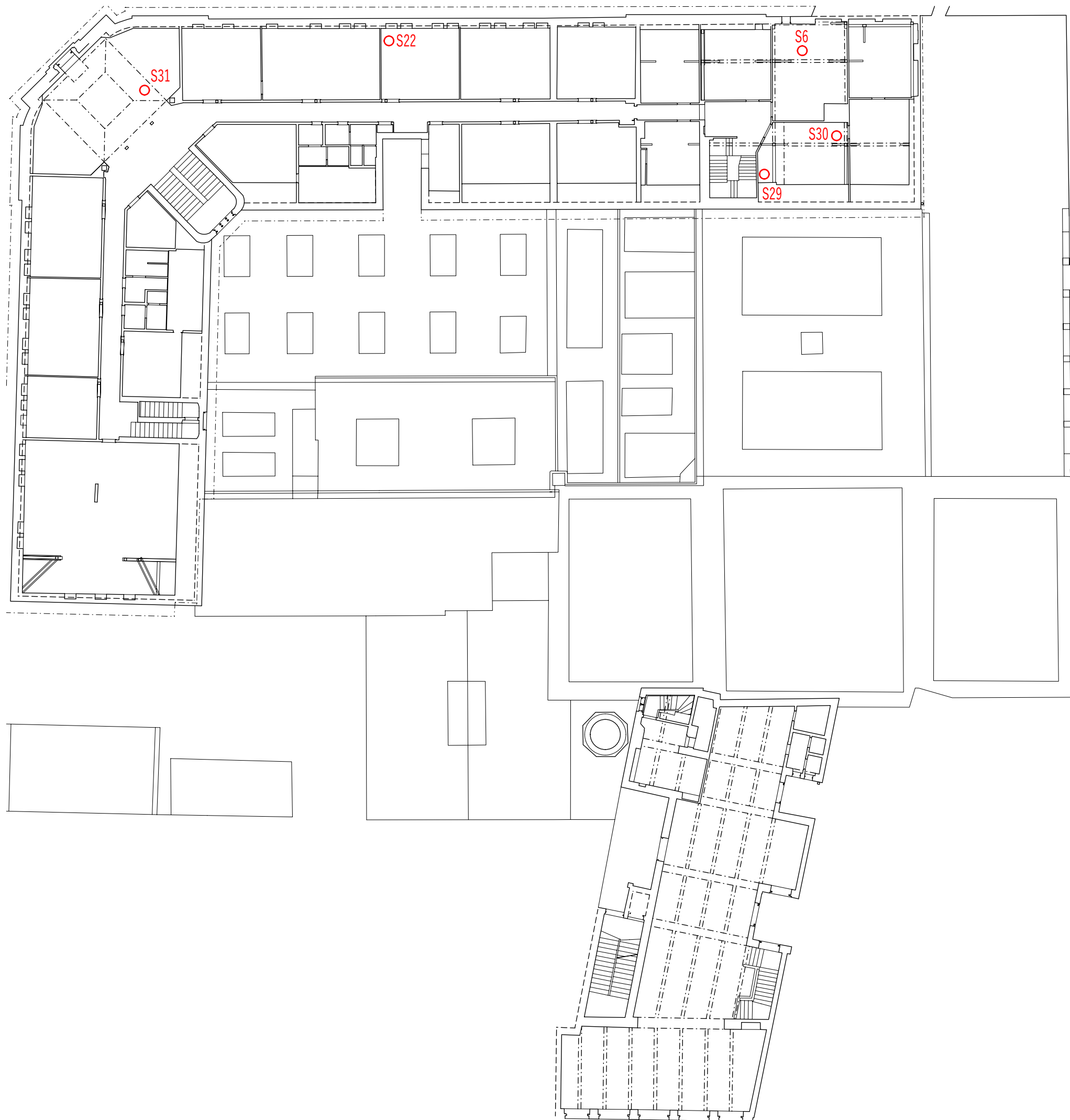
| Stena ST1 / Wall ST1               | t   | $\rho$             | $g_k$              | $\gamma_G$ | $g_d$              |
|------------------------------------|-----|--------------------|--------------------|------------|--------------------|
|                                    | mm  | $\text{kN.m}^{-3}$ | $\text{kN.m}^{-2}$ |            | $\text{kN.m}^{-2}$ |
| Keramická dlažba / ceramic tiles   | 5   | 25                 | 0,13               | 1,1        | 0,14               |
| Betónový poter / concrete screed   | 35  | 24                 | 0,84               | 1,1        | 0,92               |
| ŽB stena /RC wall                  | 120 | 25                 | 3,00               | 1,1        | 3,30               |
| Asfaltový pás / asphalt            | 15  | 1                  | 0,02               | 1,1        | 0,02               |
| Cementová stierka / cement plaster | 5   | 23                 | 0,12               | 1,1        | 0,13               |
| ŽB stena / RC wall                 | 190 | 25                 | 4,75               | 1,1        | 5,23               |
| Spolu                              |     |                    | 8,85               |            | 9,73               |

| Stena ST2 / Wall ST2               | t   | $\rho$             | $g_k$              | $\gamma_G$ | $g_d$              |
|------------------------------------|-----|--------------------|--------------------|------------|--------------------|
|                                    | mm  | $\text{kN.m}^{-3}$ | $\text{kN.m}^{-2}$ |            | $\text{kN.m}^{-2}$ |
| Keramická dlažba / ceramic tiles   | 5   | 25                 | 0,13               | 1,1        | 0,14               |
| Betónový poter / concrete screed   | 35  | 24                 | 0,84               | 1,1        | 0,92               |
| ŽB stena /RC wall                  | 140 | 25                 | 3,50               | 1,1        | 3,85               |
| Asfaltový pás / asphalt            | 15  | 1                  | 0,02               | 1,1        | 0,02               |
| Cementová stierka / cement plaster | 5   | 23                 | 0,12               | 1,1        | 0,13               |
| ŽB stena / RC wall                 | 190 | 25                 | 4,75               | 1,1        | 5,23               |
| Spolu                              |     |                    | 9,35               |            | 10,28              |

| Strecha / Roof                                 | t   | $\rho$             | $g_k$              | $\gamma_G$ | $g_d$              |
|--|-----|--------------------|--------------------|------------|--------------------|
|  | mm  | $\text{kN.m}^{-3}$ | $\text{kN.m}^{-2}$ |            | $\text{kN.m}^{-2}$ |
| Betónová krytina Bramac<br>Concrete roof tiles | -   | -                  | 0,45               | 1,35       | 0,61               |
| Latovanie                                      | -   | -                  | 0,10               | 1,35       | 0,14               |
| Tepelná izolácia / insulation                  | 200 | 0,3                | 0,06               | 1,35       | 0,08               |
| Sadrokartón /gypsum board                      | -   | -                  | 0,15               | 1,35       | 0,20               |
| Spolu / sum                                    |     |                    | 0,76               |            | 1,03               |







PRÍLOHA Č. 3

SONDY 3.NP





Obr.: 1 Sonda - S1



Obr.: 2 Sonda - S2



Obr.: 3 Sonda – S3



Obr.: 4 Sonda – S4





Obr.: 5 Sonda - S6



Obr.: 6 Sonda - S5



Obr.: 7 Sonda - S8



Obr.: 8 Sonda - S9





Obr.: 9 Sonda - S10



Obr.: 10 Sondy - S12, S13, S14



Obr.: 11 Sonda - S15





Obr.: 12 Sonda - S16



Obr.: 13 Sonda - S17



Obr.: 14 Sonda - S18



Obr.: 15 Sonda - S19





Obr.: 16 Sonda - S20



Obr.: 17 Sonda S21





Obr.: 18 Sonda - S22



Obr.: 19 Sonda - S23



Obr.: 20 Sonda - S28



| Sonda S1, S2                     | t   |
|----------------------------------|-----|
|                                  | mm  |
| Laminát / Laminat                | 7   |
| Betónový poter / concrete screed | 80  |
| Štrkový násyp / gravel grit      | 110 |
| ŽB doska / RC slab               | 105 |
| Omietka / Plaster                | 5   |
| Spolu / Sum                      | 307 |

| Sonda S3                       | t   |
|--------------------------------|-----|
|                                | mm  |
| Laminát / Laminat              | 7   |
| Drevený záklop / wooden boards | 25  |
| Drevený záklop / wooden boards | 25  |
| Pieskový násyp / sand grit     | 135 |
| ŽB doska / RC slab             | 105 |
| Omietka / Plaster              | 5   |
| Spolu / Sum                    | 302 |

| Sonda S4                          | t   |
|-----------------------------------|-----|
|                                   | mm  |
| Laminát / Laminat                 | 7   |
| Betónový poter / concrete screed  | 100 |
| Separáčna fólia / separating foil | -   |
| Minerálna vlna / mineral wool     | 20  |
| Štrkový násyp / gravel grit       | 60  |
| ŽB doska / RC slab                | 105 |
| Omietka / plaster                 | 5   |
| Spolu / Sum                       | 297 |

| Sonda S6                         | t   |
|----------------------------------|-----|
|                                  | mm  |
| Keramická dlažba / Ceramic tiles | 10  |
| Betónový poter / concrete screed | 40  |
| Betónový poter / concrete screed | 125 |
| ŽB doska / RC slab               | 105 |
| Omietka / Plaster                | 10  |
| Spolu / Sum                      | 290 |

| Sonda S7                         | t   |
|----------------------------------|-----|
|                                  | mm  |
| Linoleum                         | 3   |
| Betónový poter / Concrete screed | 115 |
| Škvára/štrk - gravel/cinder      | 100 |
| ŽB doska / RC slab               | 75  |
| Spolu / Sum                      | 293 |

| Sonda S8                         | t   |
|----------------------------------|-----|
|                                  | mm  |
| Keramická dlažba / ceramic tiles | 10  |
| Betónový poter / concrete screed | 60  |
| Betónový poter / concrete screed | 40  |
| ŽB doska / RC slab               | 160 |
| Spolu / Sum                      | 270 |

| Sonda S9                         | t   |
|----------------------------------|-----|
|                                  | mm  |
| Keramická dlažba / ceramic tiles | 10  |
| Betónový poter / concrete screed | 30  |
| Betónový poter / concrete screed | 50  |
| ŽB doska / RC slab               | 100 |
| Spolu / Sum                      | 190 |

| Sonda S10                        | t   |
|----------------------------------|-----|
|                                  | mm  |
| Keramická dlažba / ceramic tiles | 10  |
| Betónový poter / concrete screed | 60  |
| ŽB doska / RC slab               | 220 |
| Spolu / Sum                      | 290 |

| Sonda S12, S13, S14              | t   |
|----------------------------------|-----|
|                                  | mm  |
| Linoleum                         | 3   |
| Betónový poter / concrete screed | 30  |
| ŽB doska / RC slab               | 75  |
| Spolu / Sum                      | 108 |

| Sonda S15                        | t   |
|----------------------------------|-----|
|                                  | mm  |
| Keramická dlažba / ceramic tiles | 5   |
| Betónový poter / concrete screed | 30  |
| Betónový poter / concrete screed | 75  |
| ŽB doska / RC slab               | 320 |
| Betónový poter / concrete screed | 30  |
| Asfaltový pás / asphalt          | 15  |
| Cementová stierka/cement plaster | 5   |
| ŽB doska / RC slab               | 180 |
| Spolu / Sum                      | 660 |

| Sonda S16                        | t   |
|----------------------------------|-----|
|                                  | mm  |
| Keramická dlažba / ceramic tiles | 5   |
| Betónový poter / concrete screed | 35  |
| ŽB stena / RC wall               | 120 |
| Asfaltový pás / asphalt          | 15  |
| Cementová stierka/cement plaster | 5   |
| ŽB stena / RC wall               | 190 |
| Spolu / Sum                      | 370 |

| Sonda S17                        | t   |
|----------------------------------|-----|
|                                  | mm  |
| Keramická dlažba / Ceramic tiles | 5   |
| Betónový poter / concrete screed | 35  |
| ŽB stena / RC wall               | 140 |
| Asfaltový pás / asphalt paper    | 15  |
| Cementová stierka/cement plaster | 10  |
| ŽB stena / RC wall               | 190 |
| Spolu / Sum                      | 395 |

| Sonda S18, S19                   | t   |
|----------------------------------|-----|
|                                  | mm  |
| Linoleum                         | 3   |
| Betónový poter / concrete screed | 45  |
| Štrkový násyp / gravel grit      | 100 |
| ŽB doska / RC slab               | 75  |
| Spolu / Sum                      | 223 |

| Sonda S20                           | Hrúbka |
|-------------------------------------|--------|
|                                     | mm     |
| Laminát / Laminate                  | 7      |
| Koberec / carpet                    | 3      |
| Nivelizačný poter / leveling screed | 10     |
| Betónový poter / concrete screed    | 55     |
| Sypký zásyp 100-250mm / grit        | 130    |
| Klenbičkový strop / bricks          | 150    |
| Spolu / Sum                         | 355    |

| Sonda S21                      | t   |
|--------------------------------|-----|
|                                | mm  |
| Laminát / laminate             | 6   |
| Koberec / carpet               | 4   |
| Drevené parkety / wooden floor | 20  |
| Drevený záklop / wooden boards | 15  |
| Sypký zásyp 135-315mm / grit   | 170 |
| Klenbičkový strop / bricks     | 150 |
| Omietka / plaster              | 10  |
| Spolu / Sum                    | 375 |

| Sonda S22           | t   |
|---------------------|-----|
|                     | mm  |
| Laminátová podlaha  | 8   |
| Koberec             | 5   |
| Sádrovláknité dosky | 40  |
| Betónový poter      | 60  |
| Drevený záklop      | 25  |
| Trámový strop       | 260 |
| Drevený záklop      | 25  |
| Omietka + rákos     | 20  |
| Spolu / Sum         | 443 |

| Sonda S23        | t   |
|------------------|-----|
|                  | mm  |
| Linoleum         | 3   |
| Betónový poter   | 30  |
| Separačná vrstva | 10  |
| Betónový poter   | 80  |
| Lepenka          | 2   |
| ŽB doska         | 100 |
| Spolu / Sum      | 225 |

| Sonda S24          | t   |
|--------------------|-----|
|                    | mm  |
| Laminátová podlaha | 10  |
| Koberec            | 10  |
| Podkladný betón    | 145 |
| Zemina             | -   |
| Spolu / Sum        | 165 |

| Sonda S25         | t   |
|-------------------|-----|
|                   | mm  |
| Dlažba            | 10  |
| Betónový poter    |     |
| a základová doska | 400 |
| Zemina            | -   |
| Spolu / Sum       | 410 |

| Sonda S26        | t   |
|------------------|-----|
|                  | mm  |
| Linoleum         | 3   |
| Betónový poter   | 30  |
| Separačná vrstva | 10  |
| Betónový poter   | 80  |
| Piesok min 500mm | -   |
| Spolu / Sum      | 123 |



| Sonda S27                        | t   |
|----------------------------------|-----|
|                                  | mm  |
| Dlažba / ceramic tiles           | 10  |
| Betónový poter / concrete screed | 100 |
| ŽB doska / RC slab               | 80  |
| Spolu / Sum                      | 190 |

| Sonda S28                      | t   |
|--------------------------------|-----|
|                                | mm  |
| Laminát / Laminat              | 7   |
| Koberec / carpet               | 3   |
| Drevené parkety / wooden floor | 22  |
| Drevený záklop / wooden boards | 25  |
| Sypký zásyp / grit             | 180 |
| Drevený záklop / wooden boards | 25  |
| Trámový strop / Wooden beams   | 180 |
| Drevený záklop / wooden boards | 25  |
| Omietka / plaster              | 20  |
| Spolu / Sum                    | 487 |

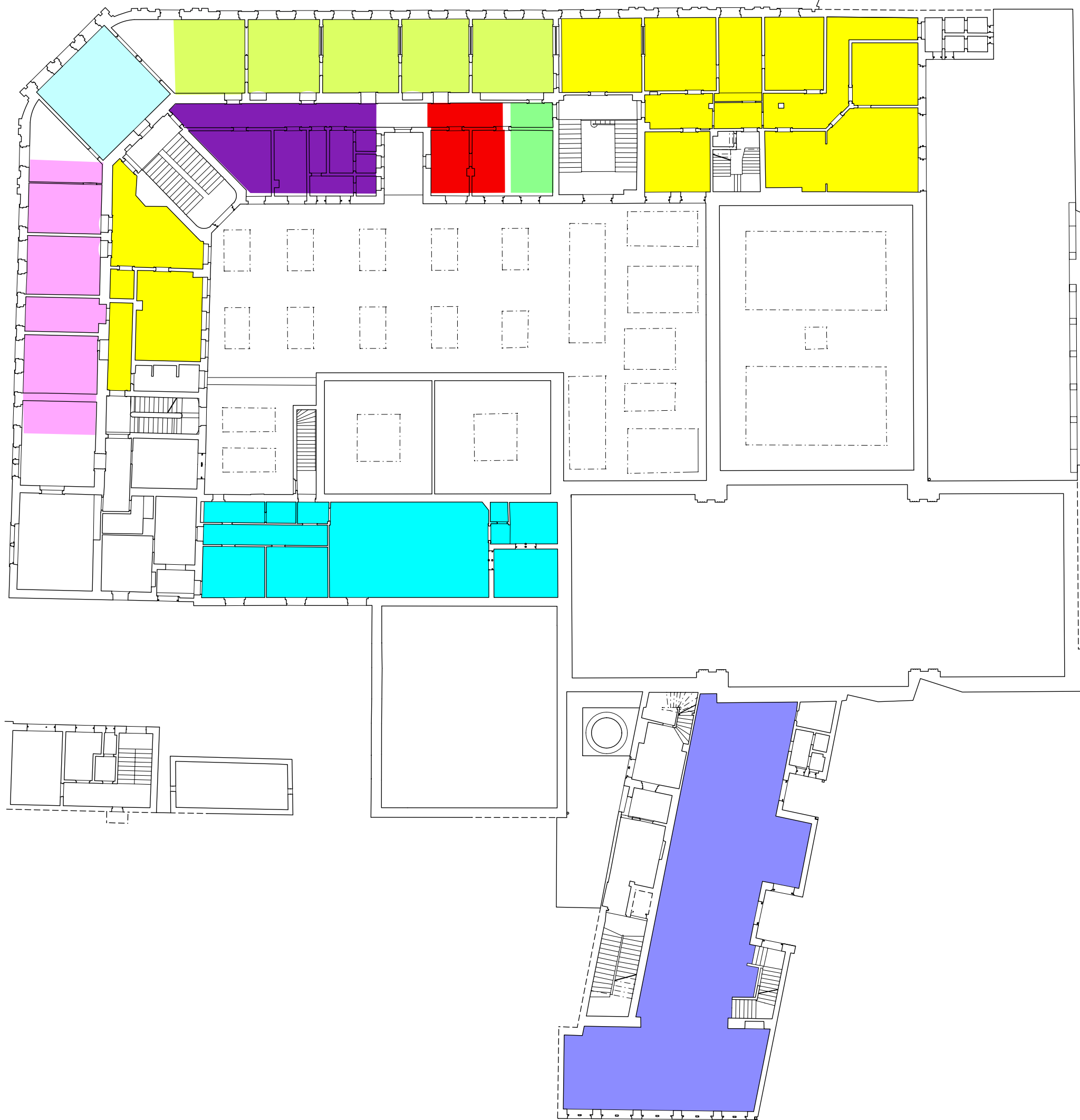
| Sonda S29                        | t   |
|----------------------------------|-----|
|                                  | mm  |
| Betónový poter / concrete screed | 140 |
| ŽB doska / RC slab               | 105 |
| Omietka / plaster                | 5   |
| Spolu / Sum                      | 250 |

| Sonda S30                                 | t   |
|---|-----|
|   | mm  |
| 2x Sádroláknité dosky<br>2x Gypsum boards | 40  |
| Betónový poter / concrete screed          | 60  |
| ŽB doska / RC wall                        | 115 |
| Omietka / Plaster                         | 5   |
| Spolu / Sum                               | 220 |

| Sonda S31                        | t   |
|----------------------------------|-----|
|                                  | mm  |
| Laminát / Laminat                | 7   |
| Koberec / carpet                 | 3   |
| Sádroláknité dosky / gyps. Board | 50  |
| Polystyrén / polystyrene         | 10  |
| Sypký zásyp / grit               | 40  |
| Betónový poter / concrete screed | 60  |
| Drevený záklop / wooden boards   | 25  |
| Trámový strop / wooden beams     | -   |
| Drevený záklop / wooden boards   | -   |
| Omietka / plaster                | -   |
| Spolu / Sum                      | 195 |

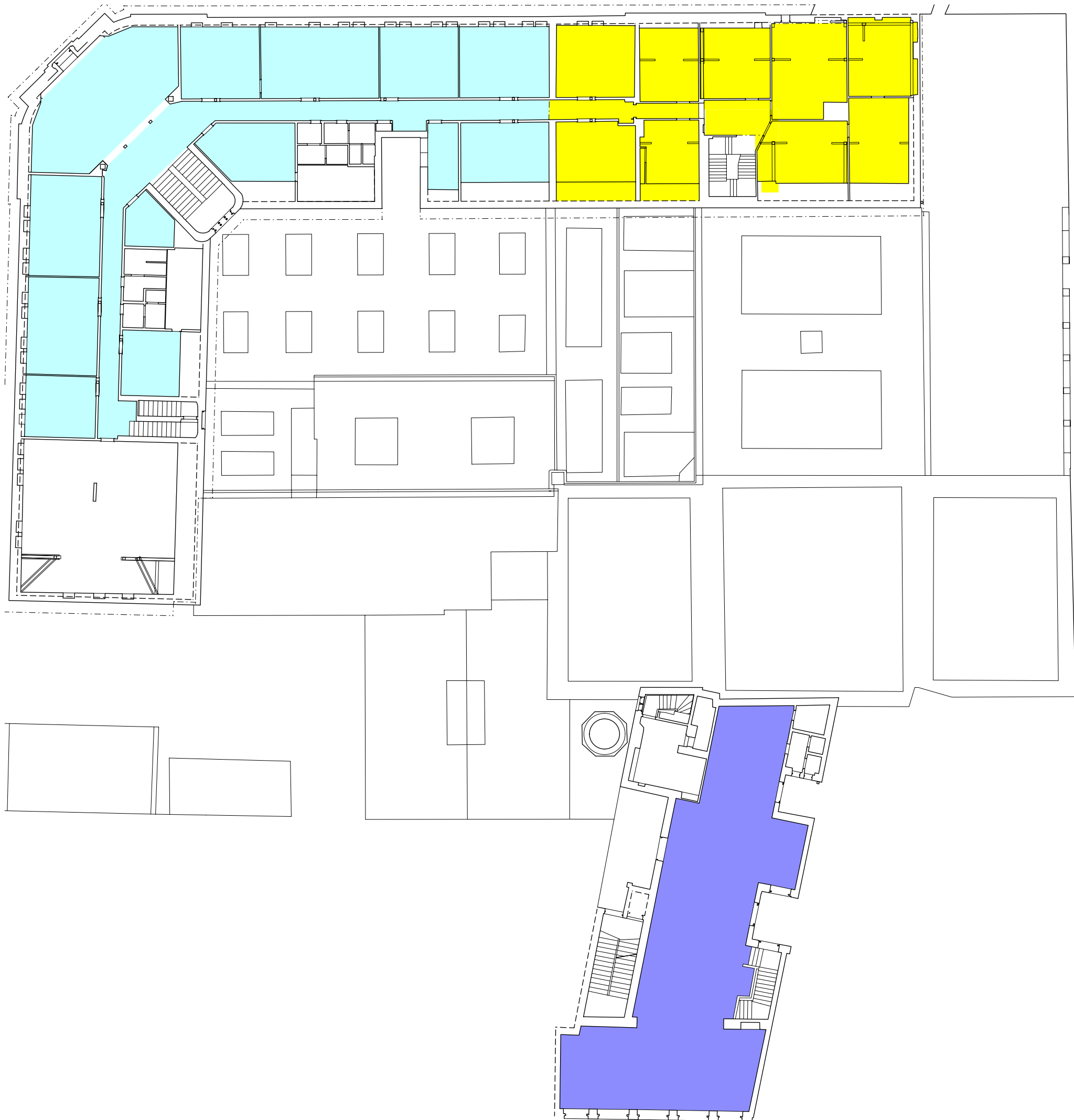


| GRAFICKÉ ZNAČENIE PODLÁH   |         |                 |
|----------------------------|---------|-----------------|
| ÚŽITKOVÉ ZATAŽENIE [kN/m²] | PODLAHA | GRAFICKÁ ZNAČKA |
| 0,00                       | P1      | Yellow          |
| 0,00                       | P2      |                 |
| 0,00                       | P3      |                 |
| 0,00                       | P4      |                 |
| 0,00                       | P5      |                 |
| 0,00                       | P6      |                 |
| 0,00                       | P23     |                 |
| 0,00                       | P24     |                 |
| 0,00                       | P15     |                 |
| 0,99                       | P9      | Orange          |
| 0,55                       | P11     | Blue            |
| 2,22                       | P12     | Green           |
| 0,73                       | P13     | Magenta         |
| 3,47                       | P13     | Dark Blue       |
| 9,30                       | P13     | Orange-Red      |
| 8,61                       | P15     | Light Green     |
| 9,67                       | P15     | Purple          |
| 3,47                       | P15     | Red             |
| 26,72                      | P15     | Light Green     |
| 9,89                       | P15     | Pink            |
| 2,00                       | P16     | Cyan            |
| 2,00                       | P21     |                 |
| 2,00                       | P22     |                 |



GRAFICKÉ ZNAČENIE PODLÁH

| ÚŽITKOVÉ<br>ZAŤAŽENIE<br>[kN/m <sup>2</sup> ] | PODLAHA | GRAFICKÁ<br>ZNAČKA |
|---|---------|--------------------|
| 0,00  | P1      | Yellow             |
| 0,00  | P2      |                    |
| 0,00  | P3      |                    |
| 0,00  | P4      |                    |
| 0,00  | P5      |                    |
| 0,00  | P6      |                    |
| 0,00  | P23     |                    |
| 0,00  | P24     |                    |
| 0,00  | P15     |                    |
| 0,99  | P9      | Light Blue         |
| 0,55  | P11     | Dark Blue          |
| 2,22  | P12     | Light Green        |
| 0,73  | P13     | Light Purple       |
| 3,47  | P13     | Dark Blue          |
| 9,30  | P13     | Orange             |
| 8,61  | P15     | Light Green        |
| 9,67  | P15     | Dark Purple        |
| 3,47  | P15     | Red                |
| 26,72   | P15     | Light Green        |
| 9,89  | P15     | Light Purple       |
| 2,00  | P16     | Light Blue         |
| 2,00  | P21     |                    |
| 2,00  | P22     |                    |



GRAFICKÉ ZNAČENIE PODLÁH

| ÚŽITKOVÉ<br>ZAŤAŽENIE<br>[kN/m <sup>2</sup> ] | PODLAHA | GRAFICKÁ<br>ZNAČKA |
|---|---------|--------------------|
| 0,00  | P1      |                    |
| 0,00  | P2      |                    |
| 0,00  | P3      |                    |
| 0,00  | P4      |                    |
| 0,00  | P5      |                    |
| 0,00  | P6      |                    |
| 0,00  | P23     |                    |
| 0,00  | P24     |                    |
| 0,00  | P15     |                    |
| 0,99  | P9      |                    |
| 0,55  | P11     |                    |
| 2,22  | P12     |                    |
| 0,73  | P13     |                    |
| 3,47  | P13     |                    |
| 9,30  | P13     |                    |
| 8,61  | P15     |                    |
| 9,67  | P15     |                    |
| 3,47  | P15     |                    |
| 26,72   | P15     |                    |
| 9,89  | P15     |                    |
| 2,00  | P16     |                    |
| 2,00  | P21     |                    |
| 2,00  | P22     |                    |

PRÍLOHA Č. 8

MAXIMÁLNE ÚŽITKOVÉ ZAŤAŽENIE PODLÁH 3.NP