CZECH TECHNICAL UNIVERSITY IN PRAGUE
FACULTY OF CIVIL ENGINEERING

D.1.1 ARCHITECTURAL AND BUILDING DESIGN

12/2022

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1. Identification data

1.1. Building data

Name of the building:

Community centre – Vodňany

Place of the building:

Zeyerovy sady 963, 389 01 Vodňany, Czech Republic

plots st.1678, 132, st.358, st.1021, 3132, 1762, 689, 3123, 1855/9, st.784/1, 130/3, 130/4, 130/1, 1929

cadastral community Vodňany [784281]

Subject of project documentation:

The subject of the project documentation is the new building of the community centre including the connection to the technical infrastructure.

1.1.1. Data about the developer

ARCHCON atelier, s. r. o.

Národní obrany 826/31

160 00 Praha 6 – Bubeneč

IČ: 28586204

1.1.2. Data about the designer

Bc. Tadeáš Petřík

Dlouhá 971, 330 23 Nýřany

2. General description of the building

The subject of the project documentation is a design of a community centre in a Czech town called Vodňany. It is a building with two floors above ground and one underground floor. The building is square in shape, with

The building is located on plots with parcel number st.1678, 132, st.358, st.1021, 3132, 1762, 689, 3123, 1855/9, st.784/1, 130/3, 130/4, 130/1, 1929. Cadastral community Vodňany [784281].

The building will be connected to the utilities, which are led under the adjacent roads in Zeyerovy Sady and Elektrárenská streets. The construction will not affect any surrounding existing buildings.

3. Urban, architectural and layout design of the building

The subject of the project documentation is a design of a community centre in a Czech town called Vodňany. The building is square in shape, with area of 46,1 x 45,9 m. It has two floors above ground and one underground floor. The height of the building is 9,5 m above ±0,000 or 9,8 m above ground (modified terrain). Structural floor height is 3,9 m for the underground floor, 4,4 m for the first floor and 4,3 m for the second floor.

The main part of the building is a large black box theatre right in the middle of the layout. Around it, on the first floor, there are public areas such as a foyer, cloakroom, café, playroom, clubrooms, staff facilities and sanitary facilities. On the second floor there is another foyer, an adult‘s library and children's library, an exhibition space, a cinema room, storage space, technical facilities for the black room theatre, and again staff and sanitary facilities. On the underground floor we can find a rehearsal room, an air-conditioner mechanical room, a boiler room and storerooms. Near the building there is a playground, few parking spaces, and a park that extends on the rest of the property.

4. Barrier-free use of the building

The building is accessible to persons with reduced mobility via a ramp leading to the main entrance. There is also an elevator leading through all floors of the building by the main staircase near the main entrance.

5. Technical design of the building

The load-bearing system varies in different parts of the building. In the underground floor, the load-bearing system is designed as monolithic reinforced concrete walls supplemented by reinforced concrete beams and one-way floor slabs. On the above-ground floors, another load-bearing system is used for the black box theatre, where again monolithic reinforced concrete walls are used, now in combination with wooden truss beams. In the rest of the building, the load-bearing system is designed as a combination of wooden wall panels and wooden columns, supplemented by wooden beams and wooden one-way floor slabs.

The foundation structures are designed as a combination of strips and footings made of plain concrete, between which a base plain concrete slab will be made.

The staircases on the underground floor are designed as prefabricated reinforced concrete, half landing or two-quarter landing. The staircases on the above-ground floors are designed as wooden staircases, placed on wooden staircase beams, again half landing or two-quarter landing.

The building has sufficient spatial rigidity due to the large number of load-bearing walls perpendicular to each other in combination with woodem beams and rigid floor slabs.

5.1. Material solution of the building

Load-bearing structures in the underground floor are made as reinforced concrete monolithic, in the black box theatre as reinforced concrete monolithic in combination with wooden elements, and in the rest of the building the load-bearing structures are made of wood. The foundations are made of plain concrete.

<u>Reinforced concrete structures</u>

- concrete C30/37 XC1 (CZ) – Cl 0,2 – D_{max} 16 – S3
- concrete C30/37 XC2 (CZ) – Cl 0,2 – D_{max} 16 – S3
- steel B 500 B

<u>Foundations</u>

- concrete C25/30 XC2 (CZ) – Cl 0,2 – D_{max} 16 – S3

<u>Truss beams</u>

- wood KVH/DUO C24 (S4S)

Wooden structures

- wood KVH C24
- wood CLT C24
- wood SWP + BSH GL32h
- wood BSH GL30

Partitions

- Knauf W111, thickness 100 mm
- Knauf W112, thickness 100 mm
- YTONG Klasik 100, thickness 100 mm

5.2. Earthworks

The soils located under the building and in its surroundings have the mining class I and II according to the standard ČSN 73 6133. The excavations will be marked out by an authorised surveyor who will mark out the reference points of the object. The object will then be marked out using benches, which will be placed in such a way that they cannot be damaged during the earthworks.

First, topsoil 0,1 m thick will be stored on the site and used for final landscaping. Part of the soil excavated during the excavation works will be taken off-site and part will be stored on-site for use in the landscaping.

The groundwater level is below the level of the foundation joint. Drainage of the construction pit will be accomplished by using drainage channels to sumps with sump pumps, and the water will be directed to the adjacent storm sewer.

5.3. Foundations

All vertical load-bearing structures in the underground floor will be placed on plain concrete foundation strips 0,4 m wide and 0,6 m high, their foundation joint will be at a depth of 4,7 m below ±0.000. In the first storey, the load-bearing walls will be placed on plain concrete strips with a width of 0,4 m and a height of 1 m, and load-bearing columns on footings with dimensions of 0,6x0,6 m and a height of 1 m, the foundation joint of these foundations will be at a depth of 1,2 m below ±0.000. This height is determined primarily to maintain a safe frost depth. A base plain concrete slab with thickness of 150 mm will be made between all the foundations.

5.4. Waterproofing of the substructure, anti-radon measures

The waterproofing of the substructure will be realized with a pair of modified asphalt strips Glastek 40 Special Mineral with a thickness of 4 mm. The asphalt strips will be placed on the foundation structure and the base concrete. The asphalt strips shall not be disturbed anywhere. The joints of the asphalt strips will be made by melting, a back joint will be made at the exterior basement walls and the strips will be pulled up the basement walls to a height of at least 300 mm above the level of the modified terrain, the basement walls will be coated with a penetrating asphalt emulsion before laying the asphalt strips. The used modified asphalt strips also serve as protection against radon, which is only at a low level in this area.

5.5. Vertical load-bearing structures

Monolithic reinforced concrete walls of uniform thickness of 200 mm will be made in the underground floor. In the above-ground floors, the load-bearing walls will be constructed in two ways. In the black box theatre, the walls will again be monolithic reinforced concrete walls of 200 mm thickness, in the rest of the building the walls will be made of NOVATOP SOLID wooden panels of uniform thickness 124 mm, supplemented by load-bearing wooden columns with dimensions 200x200 mm.

5.6. Horizontal load-bearing structures

In the underground floor, the floor slabs are made as one-way, monolithic, from reinforced concrete, designed in a uniform thickness of 250 mm. On this floor there are also monolithic reinforced concrete beams with a width of 200 mm and a height of 500 mm.

There will be openings in the reinforced concrete floor slabs, from which the reinforcement will be summarised outside the opening to the edges of the slab, the edges of the slab at the openings will be further edged with reinforcement.

On the above-ground floors, the floor slabs are designed as one-way wooden slabs NOVATOP ELEMENT, supplemented by wooden beams with a width of 180 mm and a height of 300 mm.

5.7. Vertical communication elements

In the underground floor the staircases will be made as prefabricated, from reinforced concrete, in the above-ground floors straicases will be made out of wood, supported by the staircase wooden beams. All staircase connections to load bearing structures will need to be made in such a way to eliminate the distribution of the impact sound as much as possible. An elevator from VOTO s.r.o. will be used. It is a traction lift without machine room, type III.

5.8. Partitions

There are 3 types of partitions designed in the building. Ytong partitions, 100 mm thick, are designed in the underground floor. In the rest of the building, PBD partitions of Knauf system are designed, namely W111 with a thickness of 100 mm and W112 with a thickness of 100 mm.

For a more detailed description of the individual compositions of each partition, including their minimum airborne sound insulation R'w, see annexes D.1.1-13 to D.1.1-17.

5.9. Floors

Several types of floors are designed in the building. All floors on the ground are thermally insulated and have a total thickness of 200 mm, waterproofing in form of asplhalt strips is also implemented underneath. Rest of the floors in the building is 100 mm thick. The floors in the sanitary facilities have a waterproofing layer. The floors also vary in the top layers, depending on the use of the individual rooms, and include epoxy, carpet, laminate and ceramic tiles. For their individual locations, see drawings D.1.1-2 to D.1.1-4.

5.10. Dropped ceilings

In the whole building, except for the underground floor, there is a PBD dropped ceiling made of the Knauf system. The 15 mm thick Knauf Silentboard boards are anchored to the CD 27/60 load-bearing steel profiles, which are further anchored to the floor slabs using the Nonius anchoring system and steel dowels. The total ceiling height is 500 mm. The dropped ceiling is mainly used to increase the acoustic quality and also the aesthetic quality of the rooms by covering the HVAC ducts.

5.11. Thermal insulation

The basement walls will be insulated with XPS Isover Styrodur 3000 CS, 200 mm thick. In all areas of the building the insulation will be pulled 300 mm above the landscaped ground to form a plinth.

This thermal insulation will be followed by STEICO Therm 200 mm thick fibreboard on the external walls on the upper floors.

A layer of PIR Puren FAL thermal insulation, 140 mm thick, will be installed in the floors on the ground.

In the floors between the first floor and the underground floor, 140 mm thick Isover EPS 200 thermal insulation will be installed, but primarily to level the height with the floors on the ground on the first floor.

The flat roof above the black box theatre will be insulated with a 270 mm thick layer of Isover EPS 150 thermal insulation.

The flat roof in the rest of the building will include a 200 mm thick layer of XPS Isover Styrodur 3000 CS thermal insulation and a 50-250 mm thick wedge of Isover EPS 150 thermal insulation.

5.12. Exterior surface design

The basement walls will be plastered with Baumit Marmolit 10 mm thick plaster, dark grey colour, in the place of the plinth. The perimeter walls of the above-ground floors will be finished with either wooden slats (placed horizontally), or a CETRIS LASUR 007 boards, dark grey colour.

5.13. Interior surface design

The interior surfaces of the walls and partitions in the underground floor will be plastered with Cemix 136 thin-layer plaster, 5 mm thick. The walls and partitions in the above-ground floors will be finished with Knauf White PBD boards. Floor slabs in the underground floor will also be plastered with Cemix 136 thin-layer plaster 5 mm thick, floor slabs in the above-ground floors will be covered with dropped ceiling by system Knauf with PBD boards named Knauf Silentboard. All walls will be painted in the colours according to the investor's requirements.

5.14. Windows and doors

The window openings are filled with DAFE PROGRESS ALU EF+ windows with aluminium window frames, triple glazing and integrated blinds. The windows will be finished in a dark grey colour matching the same shade as the plinth plaster and CETRIS LASUR 007 boards.

Several of the entrance doors to the building on the first floor, including one interior door between the vestibule and the fyoer behind the main entrance, are designed as glazed in a plastic frame, also with triple glazing and also in a dark grey colour matching the shade of the plinth plaster and the CETRIS LASUR 007 boards. The other entrance door is designed with a solid door panels in frame jambs.

In the interior of the basement floor, the door panels will be solid, in steel jambs. In the interior of the upper floors, the doors will be made with a wooden solid door panels, either in wooden jambs or in frame jambs.

5.15. Installation shafts and partitions

Several installation shafts are designed in the building, their number varies on each floor due to the partial basement of the building. The shafts are designed in different dimensions, these dimensions and the overall layout of the shafts is shown in the structural system drawings and the load-bearing strctures layout drawings, see annexes D.1.2-1 to D.1.2-7.

The walls of the installation shafts are made up of 100 mm thick Knauf W111 PBD partitions. In the bathrooms and toilets, the installation PBD partitions are also designed as Knauf W111 100 mm thick, with a 100 mm air gap behind them for all pipework.

5.16. Roof construction

The building is designed with two types of roofs. Above the black box theatre there is a flat, inaccessible (except for maintenance) green roof. It is waterproofed with Fatrafol 810/V PVC-P foil, which is designed so that it can be exposed to direct sunlight and weather conditions. The thermal insulation of this roof consists of Isover EPS 150 with a thickness of 270 mm. The vapour barrier consists of a combination of a top asphalt strip BITAGIT 40 AL+V60 Mineral Radon, t. 4 mm, and a bottom asphalt strip Glastek 30 Sticker Plus KVK, t. 3 mm, the wedge is made of Isover Woodsil mineral wool.

The second type of roof is also a flat inaccessible (except for maintenance) green roof. XPS Isover Styrodur 3000 CS with a thickness of 200 mm is used as thermal insulation, and again PVC-P foil Fatrafol 810/V as waterproofing. The slope is made of Isover EPS 150 thermal insulation 50-250 mm thick.

For a more detailed description of the roof compositions with a complete listing of the individual layers and their thicknesses, including their heat transfer coefficient, see annexes D.1.1-13 to D.1.1-17.

5.17. Tinsmith roof elements

All the tinsmith roof elements in the roof structures are designed from plastic-coated sheet metal. The cladding of the roof parapets is formed of a Viplanyl weather rail, TDW 400 mm and 0,6 mm thick, and outer corner plastic-coated sheet metal element, TDW 130 mm and 0,6 mm thick.

The roof parapets are designed with a slope of 5%.

5.18. Locksmith elements

The stair railings in the interior will be dark grey steel, 1100 mm high.

The railings in the foyer on the second floor will also be dark grey steel, with glass filling and height 1100 mm.

The railing on the ramp for people with reduced mobility will be made of stainless steel, dark grey, 800 mm high. This railing will be installed on a plinth 100 mm high. The top edge of the railing will therefore be 900 mm from the top layer of the ramp. The railing will be fitted with two handrails, one at a height of 900 mm from the top layer of the ramp and the other at a height of 750 mm from the top layer of the ramp.

5.19. Ventilation

All rooms of the building will be equipped with ventilation units with heat recovery. All HVAC ductwork will be routed under ceilings covered with Knauf PBD dropped ceiling. The ventilation of the building will be addressed in greater detail in subdivision D.1.4.

5.20. Thermal technical solution

All structures of the building are designed in accordance with the requirements of ČSN 73 0540-2 Thermal protection of buildings, and meet the required values of the heat transfer coefficient for passive houses prescribed by this standard.

For the values of the heat transfer coefficient of the individual compositions of the structures, see annexes D.1.1-13 to D.1.1-17.

5.21. Impact of the building and its use on the environment and solutions to negative impacts

The construction will not have any negative impacts on the environment. Waste generated during the construction will be sorted and subsequently disposed of by a waste sorting facility. All materials used will comply with all standards and regulations, all materials will also be environmentally friendly. During construction, care will be taken to limit excessive noise and dust, and all regulations will be complied with. The nature of the construction and its operation does not require the establishment of any special protection or safety zones that would encroach on neighbouring properties.

5.22. Traffic solutions

The construction of the building will not affect the traffic solution around the site. Access to the building is situated on its northern side from the existing road. Several sidewalks will lead to this road. Only 6 parking spaces are designed near the building, two of which is for handicapped persons. The majority of the parking spaces designated for this building are not designed as part of this project and are located in the nearby already constructed parking lot.

5.23. Work safety and health protection

All measures and legal regulations to ensure occupational safety and health protection on the construction site must be strictly observed by all construction workers throughout the construction activity and in the phase of its preparatory work (Act No. 183/2006 Coll., Government Regulation No. 591/2006 Coll., on more detailed minimum requirements for occupational safety and health protection on construction sites, Government Regulation No. 494/2001 Coll. and No. 495/2001 Coll.).

6. Software used

- AutoCAD 2018 (student version)
- AutoCAD 2023 (student version)
- Microsoft Office 365 (student version)

7. List of references

- ARCHCON Architectural study KD Vodňany [online]
  ARCHCON atelier s.r.o., [cit. 2023-01-08], [https://www.archcon.cz/projekt/kd-vodnany/]

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- Google Maps [online], Google LLC, [cit. 2023-01-08], [https://www.google.com/maps/]

8. List of used standards, laws and decrees

- ČSN 01 3420 Výkresy pozemních staveb – Kreslení výkresů stavební část
- ČSN EN 1990 Eurokód: Zásady navrhování konstrukcí
- ČSN 73 5305 Administrativní budovy a prostory
- ČSN 73 5245 Kulturní objekty s hledištěm. Podmínky viditelnosti
- ČSN 73 1901 Navrhování střech – Základní ustanovení
- ČSN 73 4130 Schodiště a šikmé rampy – Základní požadavky

- ČSN 73 0532 Akustika – Ochrana proti hluku v budovách a posuzování akustických vlastností stavebních konstrukcí a výrobků – Požadavky
- ČSN 73 0525 Akustika – Projektování v oboru prostorové akustiky – Všeobecné zásady
- ČSN 73 0527 Akustika – Projektování v oboru prostorové akustiky – Prostory pro kulturní účely – Prostory ve školách – Prostory pro veřejné účely

- ČSN 01 3495 Výkresy ve Stavebnictví – Výkresy požární bezpečnosti staveb
- ČSN 73 0802 ed. 2 Požární bezpečnost staveb – Nevýrobní objekty
- ČSN 73 0831 ed. 2 Požární bezpečnost staveb – Shromažďovací prostory
- ČSN 73 0818 Požární bezpečnost staveb – Obsazení objektů osobami
- ČSN 73 0821 ed. 2 Požární bezpečnost staveb – Požární odolnost stavebních konstrukcí
- ČSN 73 0810 Požární bezpečnost staveb – Společná ustanovení
- ČSN 73 0833 Požární bezpečnost staveb – Budovy pro bydlení a ubytování

- ČSN 73 0540-1 Tepelná ochrana budov – Část 1: Terminologie
- ČSN 73 0540-2 Tepelná ochrana budov – Část 2: Změna 10/2011 Tepelná ochrana budov – požadavky
- ČSN 73 0540-3 Tepelná ochrana budov – Část 3: Návrhové hodnoty veličin
- ČSN 73 2901 Provádění vnějších tepelně izolačních kompozitních systémů (ETICS)
- ČSN 73 2902 Vnější tepelně izolační kompozitní systémy (ETICS) - Navrhování a použití mechanického upevnění pro spojení s podkladem

- Zákon č. 183/2006 Sb., o územním plánování a stavebním řádu (stavební zákon)
- Zákon č. 201/2012 Sb., o ochraně ovzduší
- Zákon č. 262/2006 Sb., zákoník práce
- Zákon č. 263/2016 Sb., atomový zákon
- Zákon č. 541/2020 Sb., zákon o odpadech
- Zákon č. 100 / 2001 Sb., o posuzování vlivů na životní prostředí a o změně některých souvisejících zákonů (zákon o posuzování vlivů na životní prostředí)
- Zákon č. 185/2001 Sb., o odpadech a o změně některých dalších zákonů
- Zákon č. 258/2000 Sb., o ochraně veřejného zdraví a o změně některých souvisejících zákonů
- Zákon č. 309/2006 Sb., o zajištění dalších podmínek bezpečnosti a ochrany zdraví při práci

- Nařízení vlády č. 163/2002 Sb., ověření o shodě výrobku
- Nařízení vlády č. 101/2005 Sb., o podrobnějších požadavcích na pracoviště a pracovní prostředí
- Nařízení vlády č. 272/2011 Sb., o ochraně zdraví před nepříznivými účinky hluku a vibrací
- Nařízení vlády č. 361/2007 Sb., kterým se stanoví podmínky ochrany zdraví při práci
- Nařízení vlády č. 591/2006 Sb., o bližších minimálních požadavcích na bezpečnost a ochranu zdraví při práci na staveništích
- Nařízení vlády č. 494/2001 Sb., kterým se stanoví způsob evidence, hlášení a zasílání záznamu o úrazu, vzor záznamu o úrazu a okruh orgánů a institucí, kterým se ohlašuje pracovní úraz a zasílá záznam o úrazu
- Nařízení vlády č. 495/2001 Sb., kterým se stanoví rozsah a bližší podmínky poskytování osobních ochranných pracovních prostředků, mycích, čisticích a dezinfekčních prostředků

- Vyhláška č. 268/2009 Sb., o technických požadavcích na stavby
- Vyhláška č. 499/2001 Sb., o dokumentaci staveb
- Vyhláška č. 78/2013 Sb., o energetické náročnosti budov
- Vyhláška č. 398/2009 Sb., o obecných technických požadavcích zabezpečujících bezbariérové užívání staveb
- Vyhláška č. 23/2008 Sb., o technických podmínkách požární ochrany staveb
- Vyhláška č. 422/2016 Sb., o radiační ochraně a zabezpečení radionuklidového zdroje
- Vyhláška č. 120/2011 Sb., kterou se mění vyhláška Ministerstva zemědělství č. 428/2001 Sb., kterou se provádí zákon č. 274/2001 Sb., o vodovodech a kanalizacích pro veřejnou potřebu a o změně některých zákonů (zákon o vodovodech a kanalizacích), ve znění pozdějších předpisů

In Barcelona 12/2022

Author: Bc. Tadeáš Petřík

BASIC DATA

Basic description of the zone:

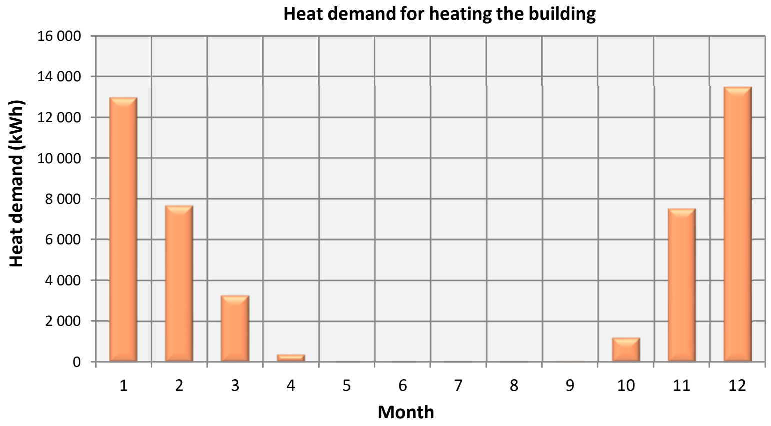
Number of persons	n_{os}	156	os	
Presence of persons (percentage of time)	p	70%		
Required indoor temperature	θ_i	20	°C	
Volume of zone to be heated	V	18 387,8	m^3	← from external dimensions
Area of the envelope of the heated zone	A	5 949,1	m^2	
Floor area of heated zone	A_f	3141,0	m^2	← from total internal dimensions
Volume factor of building form	A/V	0,32	-	

HEAT DEMAND

according to ČSN EN ISO 13790

Heat demand for heating the building Q_h (kWh):

month	period t days	hours	outdoor temperature	indoor temperature	thermal loss	total usable heat gains	heat demand
	d	hod	θ_e (°C)	θ_i (°C)	Q_L (kWh)	Q_g (kWh)	Q_h (kWh)
1	31	744	-1,0	20,0	25 025	12 057	12 969
2	28	672	1,0	20,0	20 672	13 004	7 668
3	31	744	4,0	20,0	19 589	16 319	3 270
4	30	720	9,0	20,0	13 560	13 176	384
5	31	744	14,6	20,0	7 718	7 710	8
6	30	720	17,0	20,0	4 787	4 786	0
7	31	744	18,2	20,0	3 505	3 505	0
8	31	744	18,8	20,0	2 755	2 755	0
9	30	720	13,8	20,0	8 008	7 964	44
10	31	744	9,4	20,0	13 185	11 981	1 204
11	30	720	4,0	20,0	18 636	11 098	7 538
12	31	744	-0,5	20,0	24 361	10 867	13 494
				TOTAL PER YEAR	161 800	115 220	46 580



Specific heat demand of the building:

Specific heat demand of the building in relation to the heated area	E_A	14,8	kWh/(m^2·a)
Specific heat demand of the building in relation to the heated volume	E_V	2,5	kWh/(m^3·a)

HEAT TRANSFER THROUGH THE BUILDING ENVELOPE

according to ČSN 730540-2

Calculated value	U_{em}	0,23	W/(m^2·K)

HEAT LOSS - SINGLE ZONE CALCULATION - WITHOUT INTERMITTENT HEATING

according to ČSN EN ISO 13790

Total heat loss Q_L (kWh):

month	period t		outdoor	indoor	heat loss through penetration							heat loss	heat loss	heat loss
	days	hours	temperature	temperature	walls	roofs	windows	doors	thermal ties and bridges	unheated	**TOTAL**	**by ventilation**	**through soil**	Q_L
	d	hod	θ_e (°C)	θ_i (°C)	kWh	kWh	kWh	kWh	kWh	kWh	**kWh**	**kWh**	**kWh**	**kWh**
1	31	744	-1,0	20,0	3026	3545	10060	189	1859	0	**18 679**	**4 647**	**1 700**	**25 025**
2	28	672	1,0	20,0	2473	2897	8221	154	1519	0	**15 265**	**3 797**	**1 610**	**20 672**
3	31	744	4,0	20,0	2305	2701	7665	144	1416	0	**14 232**	**3 540**	**1 817**	**19 589**
4	30	720	9,0	20,0	1534	1797	5099	96	942	0	**9 469**	**2 355**	**1 736**	**13 560**
5	31	744	14,6	20,0	778	912	2587	49	478	0	**4 803**	**1 195**	**1 720**	**7 718**
6	30	720	17,0	20,0	418	490	1391	26	257	0	**2 582**	**642**	**1 562**	**4 787**
7	31	744	18,2	20,0	259	304	862	16	159	0	**1 601**	**398**	**1 505**	**3 505**
8	31	744	18,8	20,0	173	203	575	11	106	0	**1 067**	**266**	**1 423**	**2 755**
9	30	720	13,8	20,0	865	1013	2874	54	531	0	**5 337**	**1 328**	**1 343**	**8 008**
10	31	744	9,4	20,0	1527	1790	5078	95	938	0	**9 428**	**2 345**	**1 411**	**13 185**
11	30	720	4,0	20,0	2231	2614	7417	139	1371	0	**13 773**	**3 426**	**1 437**	**18 636**
12	31	744	-0,5	20,0	2954	3461	9820	184	1815	0	**18 234**	**4 536**	**1 591**	**24 361**
				CELKEM	18 543	21 727	61 649	1 158	11 392	0	**114 470**	**28 476**	**18 854**	**161 800**
					11,5%	13,4%	38,1%	0,7%	7,0%	0,0%	70,7%	17,6%	11,7%	100,0%

Recapitulation of specific heat losses:

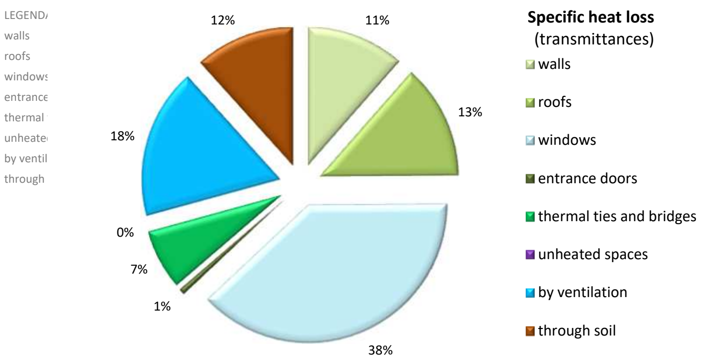
Thermal transmittance - walls	$L_{D,1}$	193,7	W/K
Thermal transmittance - roofs	$L_{D,2}$	226,9	W/K
Thermal transmittance - windows	$L_{D,3}$	643,9	W/K
Thermal transmittance - entrance doors	$L_{D,4}$	12,1	W/K
Thermal transmittance - thermal ties and bridges	$L_{D,5}$	119,0	W/K
Thermal transmittance - unheated spaces	$L_{D,6}$	0,0	W/K
Specific heat loss through penetration	H_T	**1195,5**	**W/K**
Specific heat loss through ventilation	H_V	**297,4**	**W/K**
Steady-state thermal transmittance through soil	L_s	**197,1**	**W/K**
Specific heat loss (without loss through soil)	H'	**1492,9**	**W/K**

Surcharge for thermal ties and bridges: 0,02 W/(m^2·K)

Specific heat loss (with loss through soil L_s)	H	1690,0	W/K

↑ to calculate the time constant of the building

Heat loss (required power delivered by the heat source)	Q	60 840	W



HEAT GAINS - INDOOR AND SOLAR

according to ČSN EN ISO 13790

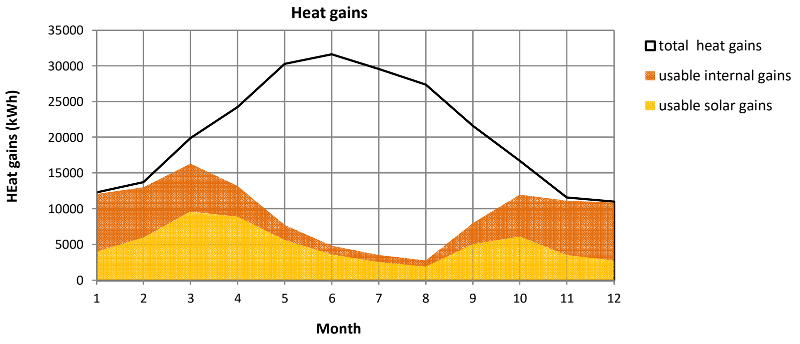
Internal heat gains:

Specific internal heat gains		100	W/os
Internal heat gains	Q_i	11020	W

Recapitulation of the total collection area of windows A_s:

Orientation	collection area $A_{s,j}$ (m^2)
S	34,3
J	21,2
V	161,2
Z	17,4
H	0,0
SV	0,0
SZ	0,0
JV	0,0
JZ	0,0
TOTAL	234,17

← fill according to the table for windows



Net solar gains, internal heat gains and heat gain recovery rate:

month	period t days	hours	N	S	E	W	H	NE	NW	SE	SW	TOTAL	internal heat gains	total heat gains	gain nad loss ratio	**degree of use**
	d	hod	net solar gains for each orientation $Q_{s,j}$ (kWh)										Q_i (kWh)	Q_g (kWh)	γ (-)	**η (-)**
1	31	744	240	1060	2419	349	0	0	0	0	0	4067	8199	12266	0,49	**0,98**
2	28	672	446	1187	4192	488	0	0	0	0	0	6313	7405	13719	0,66	**0,95**
3	31	744	789	1738	8223	924	0	0	0	0	0	11674	8199	19873	1,01	**0,82**
4	30	720	1098	2014	11932	1256	0	0	0	0	0	16299	7934	24233	1,79	**0,54**
5	31	744	1612	2056	16769	1622	0	0	0	0	0	22059	8199	30258	3,92	**0,25**
6	30	720	1784	1844	18542	1535	0	0	0	0	0	23705	7934	31639	6,61	**0,15**
7	31	744	1612	1971	16124	1622	0	0	0	0	0	21329	8199	29528	8,43	**0,12**
8	31	744	1303	2120	14189	1535	0	0	0	0	0	19147	8199	27346	9,92	**0,10**
9	30	720	823	2014	9674	1116	0	0	0	0	0	13627	7934	21562	2,69	**0,37**
10	31	744	583	1590	5482	837	0	0	0	0	0	8492	8199	16691	1,27	**0,72**
11	30	720	309	763	2257	314	0	0	0	0	0	3643	7934	11577	0,62	**0,96**
12	31	744	206	615	1774	209	0	0	0	0	0	2803	8199	11002	0,45	**0,99**
												153158,4		**249 694**		

Usable solar and internal heat gains:

month	period t days	hours	N	S	E	W	H	NE	NW	SE	SW	TOTAL	usable int. heat gains	total usable heat gains
	d	hod	usable solar gains for each orientation $Q_{s,j}$ (kWh)										**Q_i (kWh)**	**Q_g (kWh)**
1	31	744	236	1042	2377	343	0	0	0	0	0	**3 998**	**8 059**	**12 057**
2	28	672	423	1125	3974	463	0	0	0	0	0	**5 984**	**7 019**	**13 004**
3	31	744	648	1427	6752	759	0	0	0	0	0	**9 587**	**6 733**	**16 319**
4	30	720	597	1095	6487	683	0	0	0	0	0	**8 862**	**4 314**	**13 176**
5	31	744	411	524	4273	413	0	0	0	0	0	**5 621**	**2 089**	**7 710**
6	30	720	270	279	2805	232	0	0	0	0	0	**3 586**	**1 200**	**4 786**
7	31	744	191	234	1914	192	0	0	0	0	0	**2 532**	**973**	**3 505**
8	31	744	131	214	1430	155	0	0	0	0	0	**1 929**	**826**	**2 755**
9	30	720	304	744	3573	412	0	0	0	0	0	**5 033**	**2 930**	**7 964**
10	31	744	419	1141	3935	601	0	0	0	0	0	**6 096**	**5 885**	**11 981**
11	30	720	296	731	2164	301	0	0	0	0	0	**3 492**	**7 606**	**11 098**
12	31	744	203	607	1752	207	0	0	0	0	0	**2 769**	**8 098**	**10 867**
											TOTAL	**59 487**	**55 733**	**115 220**

Auxiliary characteristics for calculating the degree of heat gain recovery:

Numerical parameter	a_0	1	-	← value for permanently heated buildings and monthly calculation
Time constant	τ_0	15	h	← value for permanently heated buildings and monthly calculation
Numerical parameter	a	4,8	-	

SPECIFIC HEAT LOSS THROUGH PENETRATION - OPAQUE CONSTRUCTION

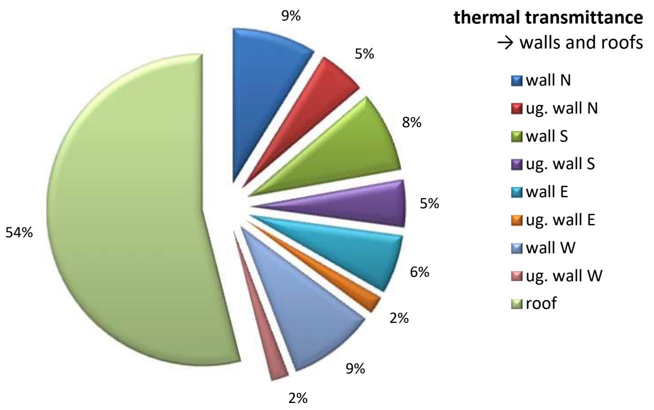
according to ČSN EN ISO 13789 - direct heat transfer to the external environment (→ flat opaque constructions, except doors)

Exterior walls between the heated space and the outside environment:

walls	orientation	width *b* m	height *h* m	total area A_T m²	area of windows and doors A_G m²	 %	net wall area *A* m²	heat transfer coefficient *U* W/(m².K)	thermal transmittance $L_{D,1,i}$ W/K
wall N	N	46,38	8,65	401,14	119,61	29,8	281,5	0,132	37,16
ug. wall N	N	32,95	3,90	128,51	0,00	0,0	128,5	0,162	20,82
wall S	S	46,38	8,65	401,14	133,34	33,2	267,8	0,132	35,35
ug. wall S	S	32,95	3,90	128,51	0,00	0,0	128,5	0,162	20,82
wall E	E	46,38	8,65	401,14	205,61	51,3	195,5	0,132	25,81
ug. wall E	E	12,50	3,90	48,75	0,00	0,0	48,8	0,162	7,90
wall W	W	46,38	8,65	401,14	113,92	28,4	287,2	0,132	37,91
ug. wall W	W	12,50	3,90	48,75	0,00	0,0	48,8	0,162	7,90
				1959,09	572,47		**1386,6**		**193,7**
								TOTAL	

Roofs between the heated space and the outdoor environment:

roofs		width *b* m	height *h* m	total area A_T m²	area of windows and doors A_G m²	 %	net roof area *A* m²	heat transfer coefficient *U* W/(m².K)	thermal transmittance $L_{D,2,i}$ W/K
roof		-	-	1995,0	150,12	7,5	1844,9	0,123	226,92
				1995,0			**1844,88**		**226,9**
								TOTAL	



SPECIFIC HEAT LOSS THROUGH PENETRATION - WINDOWS AND DOORS

according to ČSN EN ISO 10077-1 and ČSN EN ISO 13790

Windows between the heated space and the outside environment:

Windows	heat transfer coefficient			floor	orientation	energy transmittance	width	height	area	number	total area	area of glazing	correction coefficients					collection area	lining length	sill length	thermal transmittance
	U_g	U_f	U_w			g_{normal}	b	h	A_w		A_w	A_g	F_F	F_C	F_o	F_f	F_h	A_s	o_1	o_2	$L_{D,3,j}$
	W/(m²·K)	W/(m²·K)	W/(m²·K)			-	m	m	m²	ks	m²	m²	-	-	-	-	-	m²	m	m	W/K
window1	0,80	1,10	0,86	1+2	S	0,60	8,86	5,65	50,06	1	50,1	45,05	0,90	1,00	1,00	1,00	0,90	24,33	20,16	8,86	43,16
window2	0,80	1,10	0,95	1	S	0,60	1,20	2,80	3,36	1	3,4	3,02	0,90	0,35	1,00	1,00	0,90	0,57	6,80	1,20	3,21
window3	0,80	1,10	0,94	1&2	S	0,60	3,75	2,30	8,63	2	17,3	15,53	0,90	0,35	1,00	1,00	0,90	2,93	8,35	3,75	16,21
window4	0,80	1,10	0,94	1&2	S	0,60	3,45	2,30	7,94	2	15,9	14,28	0,90	0,35	1,00	1,00	0,90	2,70	8,05	3,45	14,99
window5	0,80	1,10	0,88	2	S	0,60	8,43	2,30	19,39	1	19,4	17,45	0,90	0,35	1,00	1,00	0,90	3,30	13,03	8,43	17,10
window6	0,80	1,10	0,97	2	S	0,60	1,20	2,30	2,76	1	2,8	2,48	0,90	0,35	1,00	1,00	0,90	0,47	5,80	1,20	2,67
window7	0,80	1,10	0,95	1	J	0,60	1,30	2,80	3,64	1	3,6	3,28	0,90	0,35	0,80	1,00	0,90	0,50	6,90	1,30	3,46
window8	0,80	1,10	0,99	1	J	0,60	3,75	2,80	10,50	5	52,5	47,25	0,90	0,35	0,80	1,00	0,90	7,14	9,35	3,75	51,82
window9	0,80	1,10	0,91	1	J	0,60	2,60	2,80	7,28	1	7,3	6,55	0,90	0,35	0,80	1,00	0,90	0,99	8,20	2,60	6,66
window10	0,80	1,10	0,90	1+2	J	0,60	1,50	8,05	12,08	1	12,1	10,87	0,90	1,00	0,80	1,00	0,90	4,69	17,60	1,50	10,81
window11	0,80	1,10	0,92	2	J	0,60	2,50	2,30	5,75	1	5,8	5,18	0,90	0,35	0,80	1,00	0,90	0,78	7,10	2,50	5,32
window12	0,80	1,10	0,96	2	J	0,60	1,30	2,30	2,99	1	3,0	2,69	0,90	0,35	0,80	1,00	0,90	0,41	5,90	1,30	2,88
window13	0,80	1,10	1,00	2	J	0,60	3,75	2,30	8,63	5	43,1	38,81	0,90	0,35	0,80	1,00	0,90	5,87	8,35	3,75	43,27
window14	0,80	1,10	0,92	2	J	0,60	2,60	2,30	5,98	1	6,0	5,38	0,90	0,35	0,80	1,00	0,90	0,81	7,20	2,60	5,52
window15	0,80	1,10	0,92	1	V	0,60	2,20	2,80	6,16	1	6,2	5,54	0,90	0,35	1,00	1,00	0,90	1,05	7,80	2,20	5,68
window16	0,80	1,10	1,00	1	V	0,60	1,30	2,80	3,64	2	7,3	6,55	0,90	0,35	1,00	1,00	0,90	1,24	6,90	1,30	7,27
window17	0,80	1,10	0,85	1+2	V	0,60	20,25	8,40	170,10	1	170,1	153,09	0,90	1,00	1,00	1,00	0,90	82,67	37,05	20,25	144,15
window18	0,80	1,10	0,91	2	V	0,60	3,45	2,30	7,94	1	7,9	7,14	0,90	0,35	1,00	1,00	0,90	1,35	8,05	3,45	7,23
window19	0,80	1,10	0,91	2	V	0,60	3,75	2,30	8,63	1	8,6	7,76	0,90	0,35	1,00	1,00	0,90	1,47	8,35	3,75	7,83
window20	0,80	1,10	0,96	2	V	0,60	1,30	2,30	2,99	1	3,0	2,69	0,90	0,35	1,00	1,00	0,90	0,51	5,90	1,30	2,88
window21	0,80	1,10	0,85	stř	V	0,60	20,15	7,45	150,12	1	150,1	135,11	0,90	1,00	1,00	1,00	0,90	72,96	35,05	20,15	127,39
window22	0,80	1,10	1,05	1&2	Z	0,60	3,75	2,30	8,63	8	69,0	62,10	0,90	0,35	0,90	1,00	0,90	10,56	8,35	3,75	72,40
window23	0,80	1,10	0,96	1	Z	0,60	1,25	2,30	2,88	1	2,9	2,59	0,90	0,35	0,90	1,00	0,90	0,44	5,85	1,25	2,77
window24	0,80	1,10	0,94	1&2	Z	0,60	3,45	2,30	7,94	2	15,9	14,28	0,90	0,35	0,90	1,00	0,90	2,43	8,05	3,45	14,99
window25	0,80	1,10	0,96	1	Z	0,60	1,05	2,80	2,94	1	2,9	2,65	0,90	0,35	0,90	1,00	0,90	0,45	6,65	1,05	2,83
window26	0,80	1,10	0,91	2	Z	0,60	3,15	2,30	7,25	1	7,2	6,52	0,90	0,35	0,90	1,00	0,90	1,11	7,75	3,15	6,63
window27	0,80	1,10	0,90	2	Z	0,60	4,40	2,30	10,12	1	10,1	9,11	0,90	0,35	0,90	1,00	0,90	1,55	9,00	4,40	9,12
window28	0,80	1,10	0,96	2	Z	0,60	1,30	2,30	2,99	1	3,0	2,69	0,90	0,35	0,90	1,00	0,90	0,46	5,90	1,30	2,88
window29	0,80	1,10	0,96	2	Z	0,60	1,25	2,30	2,88	1	2,9	2,59	0,90	0,35	0,90	1,00	0,90	0,44	5,85	1,25	2,77
										48	709,2						TOTAL	234,2	299,3	118,2	643,9

Uprům 0,91 W/m2K

Recap. of windows by orientation *j* :

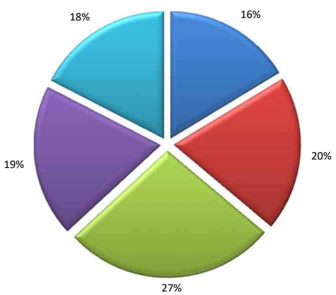
orientation	total area	collection area	thermal transmittance
	$A_{w,j}$	$A_{s,j}$	$L_{D,4,j}$
	m²	m²	W/K
windows N	108,7	34,3	97,3
windows S	133,3	21,2	129,7
windows E	203,1	88,3	175,0
roof w. E	150,1	73,0	127,4
windows W	113,9	17,4	114,4
CELKEM	709,2	234,2	643,9

The door between the heated space and the outside environment:

doors	orientation	width	height	area	number	total area	lining length	sill length	heat transfer coefficiet	thermal transmittance
		b	h	A_D		A_D	o_1	o_2	U	$L_{D,4,j}$
		m	m	m²	ks	m²	m	m	W/(m²·K)	W/K
door1	doors N	3,90	2,80	10,92	1	10,92	9,50	3,90	0,90	9,83
door2	doors S	0,00	0,00	0,00	0	0,00	0,00	0,00	0,90	0,00
door3	doors E	0,90	2,80	2,52	1	2,52	6,50	0,90	0,90	2,27
door4	roof d. E	0,00	0,00	0,00	0	0,00	0,00	0,00	0,90	0,00
door5	doors W	0,00	0,00	0,00	0	0,00	0,00	0,00	0,90	0,00
					TOTAL	13,44	16,00	4,80		12,1

Total area of windows and doors according to orientation *j* :

orientation	total area	total thermal transmittance
	A_j	$L_{D,4,j}$
	m²	W/K
windows + doors N	119,6	107,15
windows + doors S	133,3	129,73
windows + doors E	205,6	177,30
roof w. + d. E	150,1	127,39
windows + doors W	113,9	114,39
TOTAL	722,6	656,0



thermal transmittance
→ individual windows and doors

- windows + doors N
- windows + doors S
- windows + doors E
- roof w. + d. E
- windows + doors W

SPECIFIC HEAT LOSS THROUGH PENETRATION - UNHEATED SPACES

according to ČSN EN ISO 13789

Specific heat loss from unheated space to outdoor environment H_{ue} (W/K):

element	orientation	total area A_T m²	net area A m²	heat transfer coefficient U W/(m².K)	**thermal transmittance** L_{Due} **W/K**	
xxx					**0,0**	
xxx					**0,0**	
xxx					**0,0**	
xxx					**0,0**	
xxx					**0,0**	
xxx					**0,0**	
xxx					**0,0**	
xxx					**0,0**	
xxx					**0,0**	
xxx					**0,0**	
xxx					**0,0**	
				TOTAL	**0,0**	**W/K**

Specific heat loss from heated space to unheated H_{iu} (W/K):

element	total area A_T m²	net area A m²	heat transfer coefficient U W/(m².K)	**thermal transmittance** L_{Diu} **W/K**	
xxx				**0,0**	
xxx				**0,0**	
xxx				**0,0**	
xxx				**0,0**	
xxx				**0,0**	
xxx				**0,0**	
xxx				**0,0**	
xxx				**0,0**	
xxx				**0,0**	
xxx				**0,0**	
xxx				**0,0**	
			TOTAL	**0,0**	**W/K**

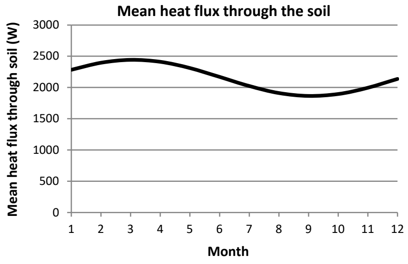
Temp. reduction factor between heated and unheated space	***b***	**1,00**	**-**
Specific heat loss through the unheated space	H_U	**0,0**	**W/K**

HEAT FLOW THROUGH THE SOIL - FLOOR ON THE GROUND

according to ČSN EN ISO 13370 - in detail according to annexes B and C

Mean heat flux through the soil Φ_G (W) in month m:

month	monthly average indoor temp. $T_{i,m}$ (°C)	monthly average outdoor temp. $T_{e,m}$ (°C)	mean heat flux through the soil Φ_G (W)
1	20,0	-0,9	**2284**
2	20,0	0,5	**2396**
3	20,0	4,1	**2442**
4	20,0	9,1	**2411**
5	20,0	14,0	**2312**
6	20,0	17,7	**2170**
7	20,0	19,0	**2023**
8	20,0	17,7	**1912**
9	20,0	14,0	**1866**
10	20,0	9,1	**1896**
11	20,0	4,1	**1996**
12	20,0	0,5	**2138**
		9,1	



Annual average indoor temperature	$T_{i,mean}$	20,00	°C
Annual average outdoor temperature	$T_{e,mean}$	9,07	°C
Amplitude of variation of monthly average indoor temperatures	$T_{i,amp}$	0,00	K
Amplitude of variation of monthly average outdoor temperatures	$T_{e,amp}$	9,95	K
Serial number of the month when the lowest outside temp. is reached	τ	1	-

Basic value of floor heat transfer coefficient U_0 (W/(m^2.K)):

(for both cases: well insulated floor where $d_t \geq B'$ / uninsulated or slightly insulated floor where $d_t < B'$)

Floor area	A	1995,0	m^2
Exposed floor perimeter	P	185,7	m
Characteristic floor dimension	B'	21,5	m
Exterior wall thickness	w	0,5	m
Thermal conductivity of the soil	λ	2,0	W/(m·K)
Resistance to heat transfer at inner side of the floor	$R_{si,f}$	0,17	m^2·K/W
Heat transfer resistance at the floor/soil interface	$R_{se,g}$	0,00	m^2·K/W
Resistance to heat transfer at the ground surface	R_{se}	0,04	m^2·K/W
Thermal resistance of the floor composition	R_f	5,0	m^2·K/W
Equivalent floor thickness	d_t	10,94	m
Fulfilment of the condition $d_t \geq B'$		NE	
Basic value of the floor heat transfer coefficient	U_0	**0,100**	**W/(m^2·K)**

Thermal-technical properties of soil:

category	description	thermal conductivity λ (W/(m·K))	Volumetric heat capacity $(\rho \cdot c)$ (J/(m^3·K))
1	Hlíny a jíly	1,5	3,00E+06
2	Písky a štěrky	2,0	2,00E+06
3	Stejnorodá skála	3,5	2,00E+06

Heat transfer coefficient of the floor composition

U_f 0,193 W/(m^2.K)

Steady-state thermal transmittance L_s (W/K):

(floor on the ground with vertical edge insulation)

Thickness of vertical edge insulation	d_n	0,1	m
Thermal conductivity of vertical edge insulation	λ_n	0,041	W/(m·K)
Thermal resistance of the vertical edge insulation	R_n	2,44	m^2·K/W
Additional effective thickness when placing edge insulation	d'	2,39	m
Depth of vertical edge insulation below ground	D	1	m
Add. lin. heat transfer coeff. at the location of the vertical edge insulation	$\Delta\Psi$	-0,0179	W/(m·K)
Steady state thermal transmittance through the soil	L_s	**197,1**	**W/K**

→ temperature reduction factor (according to ČSN 730540-4:2005 - annex H.2.2)

b 0,51 -

Periodic thermal transmittance:

(floor on ground with vertical edge insulation)

Volumetric heat capacity of soil	$(\rho \cdot c)$	2,50E+06	J/(m^3·K)
Periodic penetration depth	δ	2,83	m
Time advance of the heat flux cycle compared to the internal temp. cycle	α	0,218	months
Time delay of heat flux cycle compared to external temperature cycle	β	2,104	months
Internal periodic thermal transmittance	L_{pi}	**320,7**	**W/K**
External periodic thermal transmittance	L_{pe}	**29,0**	**W/K**

SPECIFIC HEAT LOSS THROUGH VENTILATION - MECHANICAL VENTILATION WITH HEAT RECOVERY

according to ČSN EN ISO 13790

Input parameters:

Indoor air volume	V_a	18387,8	m^3
Measured volume flow of fresh air supply		35	$m^3/(os{\cdot}h)$
Multiplicity of air exchange	n	0,21	1/h
Volume flow rate at Δp = 50 Pa	n_{50}	0,60	1/h
Wind exposure coefficient	e	0,01	-
Wind exposure coefficient	f	20	-

Wind exposure coefficients *e* and *f*:

coefficient *e* for shading class:	more than one exposed facade	one exposed facade
no shading	0,10	0,03
moderate shading	0,07	0,02
significant shading	0,04	0,01
coefficient *f*	15	20

Volumetric air flow:

Volumetric flow of supply air	V_f	3822,0	m^3/h
Heat recovery efficiency	η	80%	
Reduced volumetric flow rate of supply air	V	764,4	m^3/h
Additional volumetric flow rate	V_x	110,3	m^3/h
Total volumetric flow rate	V	874,7	m^3/h

Specific heat loss through ventilation:

Specific heat capacity of air per unit volume	$\rho_a c_a$	0,34	$Wh/(m^3{\cdot}K)$
Specific heat loss through ventilation	H_V	**297,41**	**W/K**

CLIMATE DATA - MONTHLY

Location description:

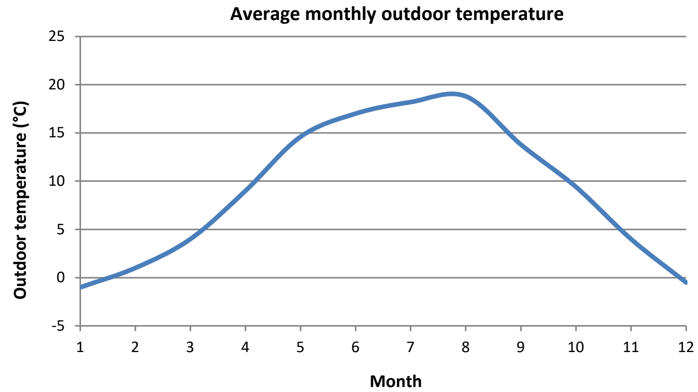
Location: Praha
GPS: 50° s.š. / 14° v.d.
Altitude: 220 m.n.m.

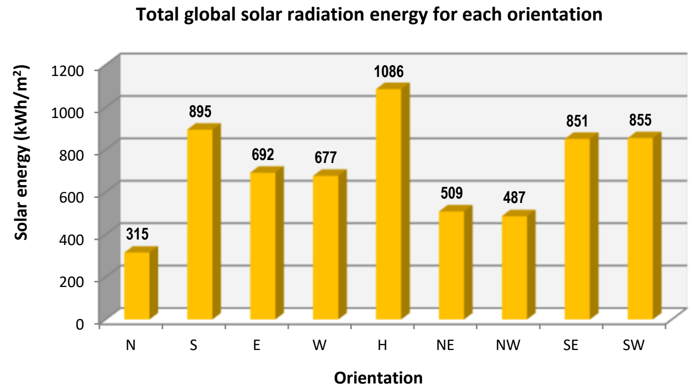
Solar energy in MJ/m^2:

month	number of days	outdoor temperature θ_e (°C)	Total global solar radiation energy for each orientation $I_{s,j}$ (MJ/m^2) N	S	E	W	H	NE	NW	SE	SW
1	31	-2,4	47	104	58	58	76	47	47	86	86
2	28	-0,9	72	162	97	97	133	76	76	137	137
3	31	3,0	115	234	162	162	259	122	122	209	209
4	30	7,7	158	292	238	238	410	184	184	277	277
5	31	12,7	209	313	299	299	536	245	245	320	320
6	30	15,9	216	284	292	292	526	248	248	299	299
7	31	17,5	212	292	288	288	518	245	245	302	302
8	31	17,0	184	320	277	277	490	216	216	313	313
9	30	13,3	126	256	187	187	313	140	140	234	234
10	31	8,3	86	220	126	126	205	90	90	184	184
11	30	2,9	47	112	61	61	90	47	47	94	94
12	31	-0,6	32	72	40	40	54	32	32	61	61

Solar energy in kWh/m^2:

month	number of days	outdoor temperature θ_e (°C)	Total global solar radiation energy for each orientation $I_{s,j}$ (kWh/m^2) N	S	E	W	H	NE	NW	SE	SW
1	31	-1,0	7	50	15	20	23	12	12	37	44
2	28	1,0	13	56	26	28	40	20	20	47	51
3	31	4,0	23	82	51	53	79	36	37	73	76
4	30	9,0	32	95	74	72	118	51	49	92	86
5	31	14,6	47	97	104	93	161	79	73	109	98
6	30	17,0	52	87	115	88	166	91	73	108	88
7	31	18,2	47	93	100	93	162	78	75	103	97
8	31	18,8	38	100	88	88	143	64	63	101	100
9	30	13,8	24	95	60	64	96	38	40	82	86
10	31	9,4	17	75	34	48	57	21	25	51	71
11	30	4,0	9	36	14	18	24	10	11	25	32
12	31	-0,5	6	29	11	12	17	9	9	23	26
	365	**9,1**	**315**	**895**	**692**	**677**	**1086**	**509**	**487**	**851**	**855**





TIME CONSTANT OF THE BUILDING

according to ČSN EN ISO 13790

Constant for capacity calculation by building class	K	110 000	J/K
Floor area of heated zone	A_f	3141	m^2
Effective internal heat capacity of the building	C_m	95975	Wh/K
Time constant of the building	**τ**	**57**	**hod**

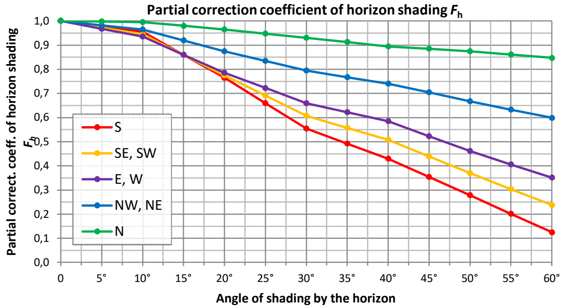
class	K J/K
very light	80 000
light	110 000
medium	165 000
heavy	260 000
very heavy	370 000

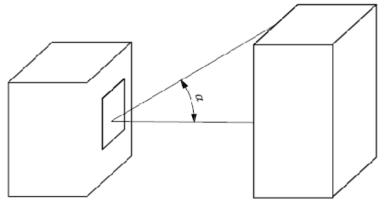
PARTIAL CORRECTION COEFFICIENTS OF SHADING

according to ČSN EN ISO 13790 - annex H

Partial correction coefficient of horizon shading F_h:

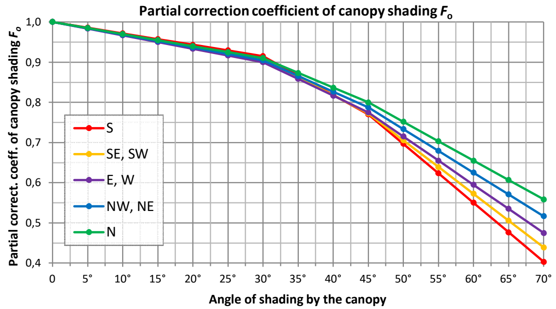
angle of shading by the horizon	Standard values: 45° north latitude S	E, W	N	Standard values: 55° north latitude S	E, W	N	Interpolated values: 50° north latitude S	SE, SW	E, W	NW, NE	N
0	1,00	1,00	1,00	1,00	1,00	1,00	1,00	1,00	1,00	1,00	1,00
5°							0,98	0,97	0,97	0,98	1,00
10°	0,97	0,95	1,00	0,94	0,92	0,99	0,96	0,95	0,94	0,97	1,00
15°							0,86	0,86	0,86	0,92	0,98
20°	0,85	0,82	0,98	0,68	0,75	0,95	0,77	0,78	0,79	0,88	0,97
25°							0,66	0,69	0,72	0,84	0,95
30°	0,62	0,70	0,94	0,49	0,62	0,92	0,56	0,61	0,66	0,80	0,93
35°							0,49	0,56	0,62	0,77	0,91
40°	0,46	0,61	0,90	0,40	0,56	0,89	0,43	0,51	0,59	0,74	0,90
45°							0,35	0,44	0,52	0,70	0,88
50°							0,28	0,37	0,46	0,67	0,87
55°							0,20	0,30	0,41	0,63	0,86
60°							0,13	0,24	0,35	0,60	0,85

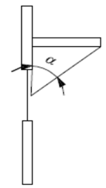




Partial correction coefficient of canopy shading F_o:

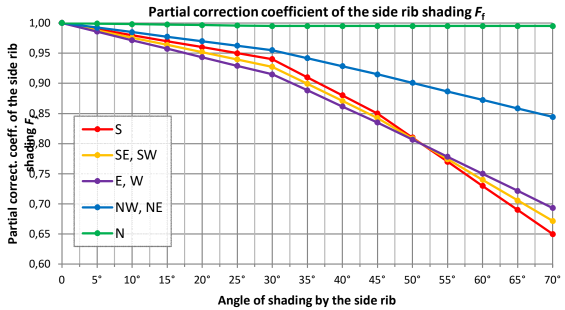
angle of shading by the canopy	Standard values: 45° north latitude S	E, W	N	Standard values: 55° north latitude S	E, W	N	Interpolated values: 50° north latitude S	SE, SW	E, W	NW, NE	N
0	1,00	1,00	1,00	1,00	1,00	1,00	1,00	1,00	1,00	1,00	1,00
5°							0,99	0,98	0,98	0,98	0,99
10°							0,97	0,97	0,97	0,97	0,97
15°							0,96	0,95	0,95	0,95	0,96
20°							0,94	0,94	0,93	0,94	0,94
25°							0,93	0,92	0,92	0,92	0,93
30°	0,90	0,89	0,91	0,93	0,91	0,91	0,92	0,91	0,90	0,91	0,91
35°							0,87	0,86	0,86	0,87	0,87
40°							0,82	0,82	0,82	0,83	0,84
45°	0,74	0,76	0,80	0,80	0,79	0,80	0,77	0,77	0,78	0,79	0,80
50°							0,70	0,71	0,72	0,73	0,75
55°							0,62	0,64	0,66	0,68	0,70
60°	0,5	0,58	0,66	0,60	0,61	0,65	0,55	0,57	0,60	0,63	0,66
65°							0,48	0,51	0,54	0,57	0,61
70°							0,40	0,44	0,48	0,52	0,56

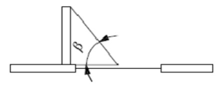




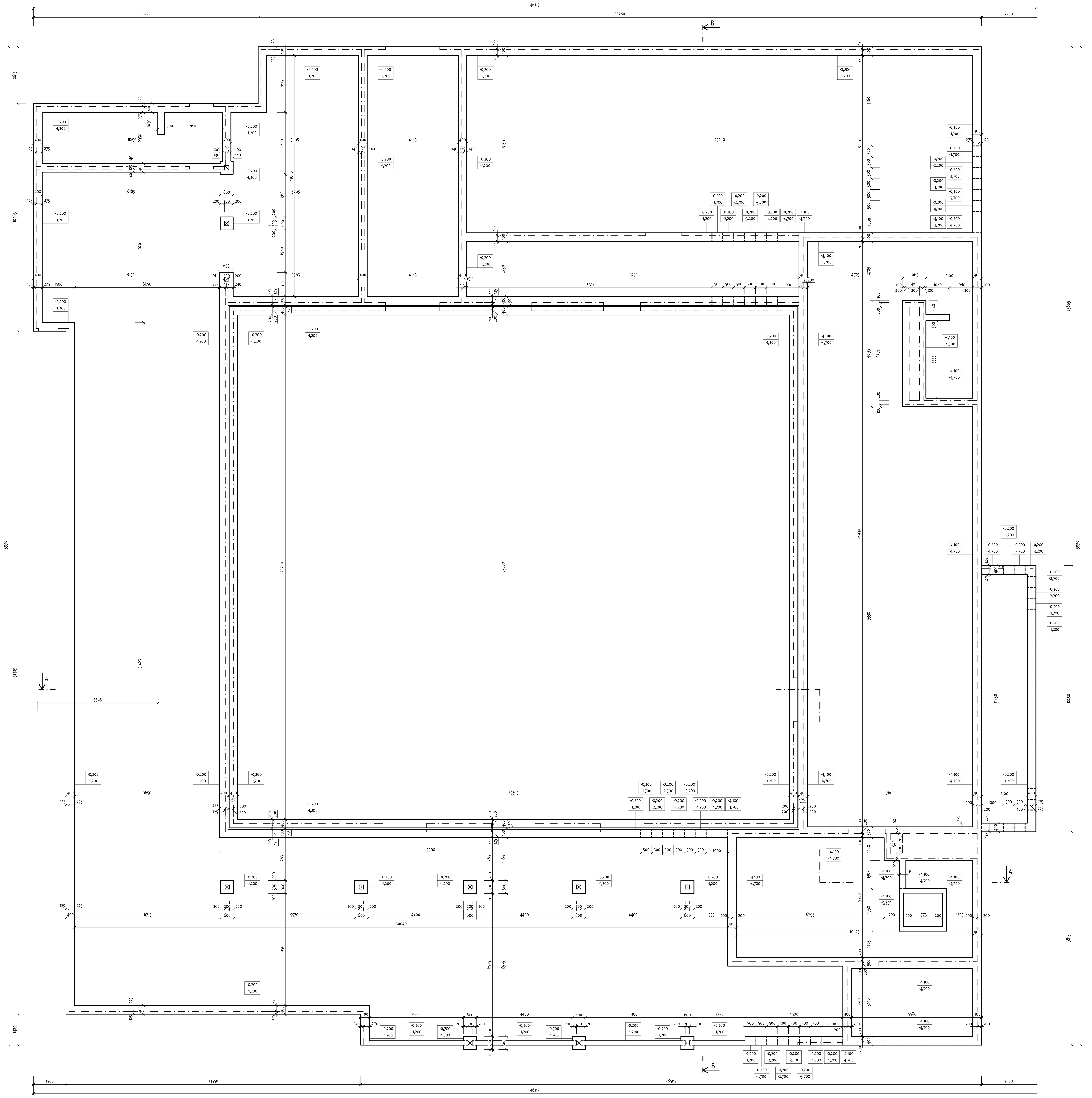
Partial correction coefficient of the side rib shading F_f:

angle of shading by the side rib	Standard values: 45° north latitude S	E, W	N	Standard values: 55° north latitude S	E, W	N	Interpolated values: 50° north latitude S	SE, SW	E, W	NW, NE	N
0	1,00	1,00	1,00	1,00	1,00	1,00	1,00	1,00	1,00	1,00	1,00
5°							0,99	0,99	0,99	0,99	1,00
10°							0,98	0,98	0,97	0,99	1,00
15°							0,97	0,96	0,96	0,98	1,00
20°							0,96	0,95	0,94	0,97	1,00
25°							0,95	0,94	0,93	0,96	1,00
30°	0,94	0,92	1,00	0,94	0,91	0,99	0,94	0,93	0,92	0,96	1,00
35°							0,91	0,90	0,89	0,94	1,00
40°							0,88	0,87	0,86	0,93	1,00
45°	0,84	0,84	1,00	0,86	0,83	0,99	0,85	0,84	0,84	0,92	1,00
50°							0,81	0,81	0,81	0,90	1,00
55°							0,77	0,77	0,78	0,89	1,00
60°	0,72	0,75	1	0,74	0,75	0,99	0,73	0,74	0,75	0,87	1,00
65°							0,69	0,71	0,72	0,86	1,00
70°							0,65	0,67	0,69	0,84	1,00

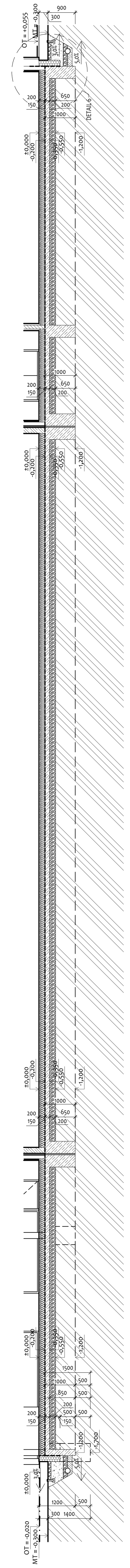




FOUNDATIONS



SECTION B - B'



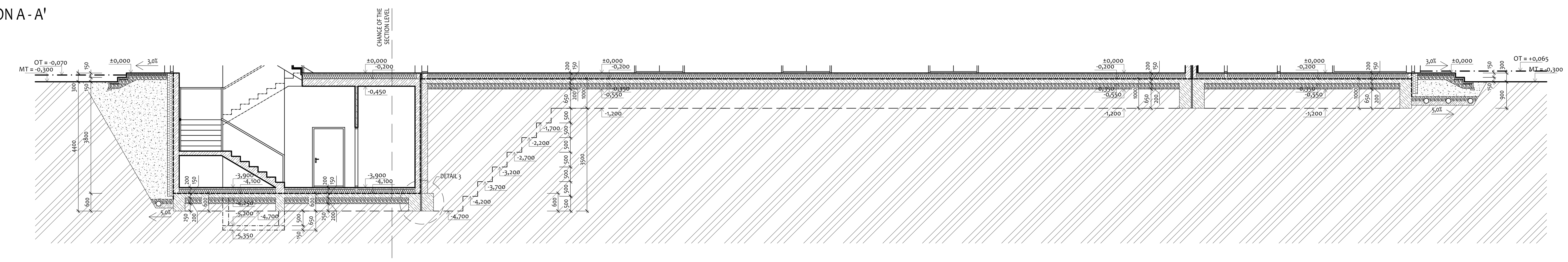
LEGEND OF THE MATERIALS:

- REINFORCED CONCRETE C30/37
- PLAIN CONCRETE C25/30
- AERATED CONCRETE BLOCKS YTONG KLASIK 100
- WOOD CLT C24
- KNAUF PARTITIONS (for specification, see D.1.1-13 - D.1.1-17)
- THERMAL INSULATION (for specification, see D.1.1-13 - D.1.1-17)
- THERMAL INSULATION (for specification, see D.1.1-13 - D.1.1-17)
- THERMAL INSULATION (for specification, see D.1.1-13 - D.1.1-17)
- COMPACTED GRAVEL SUB-BASE
- COMPACTED BACKFILLING / ROOF SUBSTRATE
- ORIGINAL SOIL

NOTES:

- min. covering layer of reinforcement c = 25 mm
- The black box theatre space will be separated from the rest of the building to break the acoustic bridges. This applies to the walls, roof, floor and foundations, an air gap of at least 50 mm will be left between the walls of the black box theatre and the rest of the building.
- Detail 6 (and 4, 5) will be drawn in the form of a detailed section.
- for a detailed description of the individual structure compositions, see D.1.1-13 - D.1.1-17
- the project documentation can be used only as DSP and in case of any questions it is necessary to contact the responsible designer

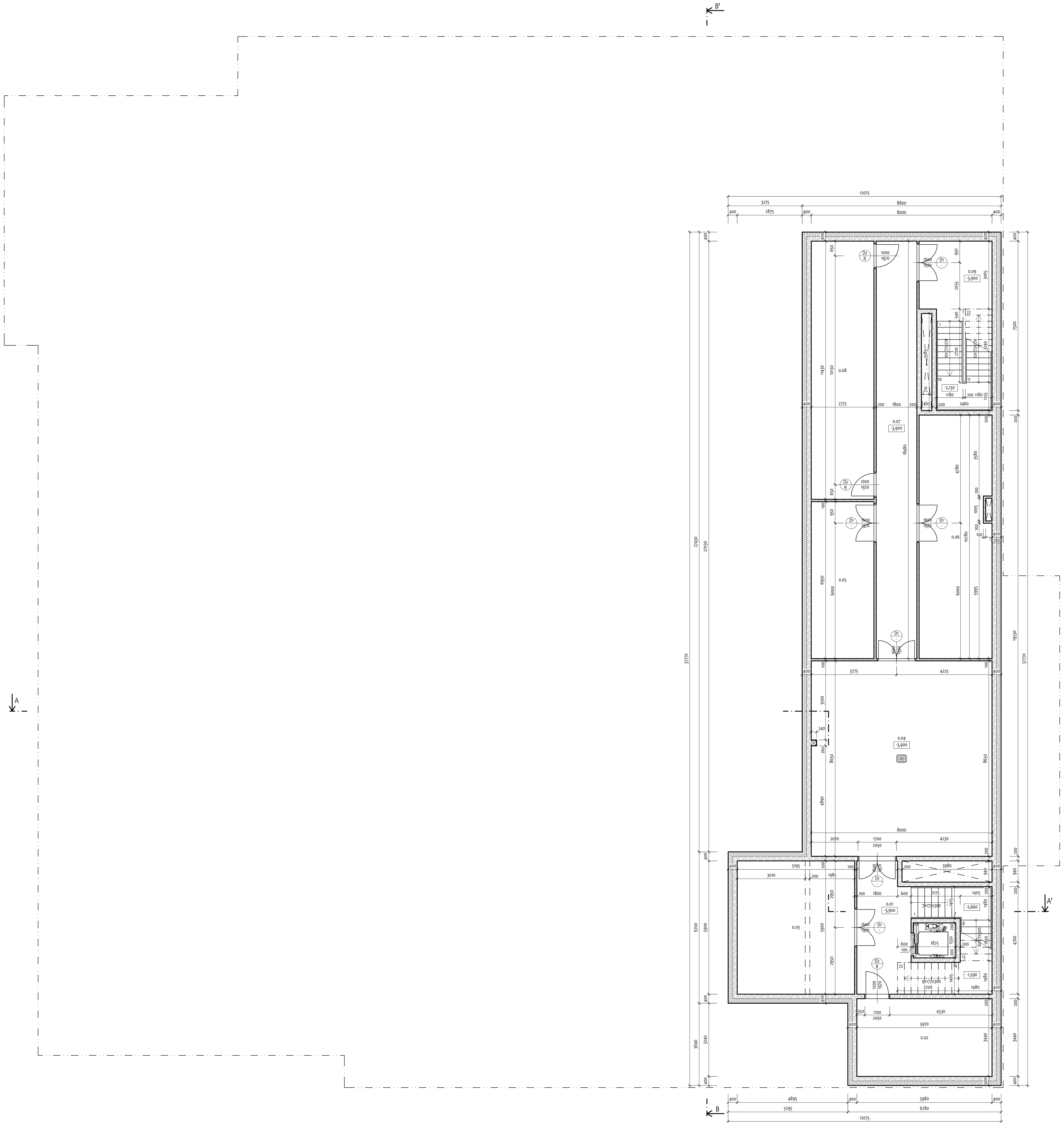
SECTION A - A'



±0,000 = 401,5 m.s.l. (B.p.v.)

AUTHOR	Bc. Tadeáš Petřík	CTU Prague Faculty of Civil Engineering	
SUPERVISOR	Ing. Kamil Staněk, Ph.D.		
CONSULTANT	Professor Climent Molins Borrell		
TYPE OF THESIS	Master's Thesis		
YEAR	2022/2023	FORMAT	16 x A4
LOCATION	Czech Republic - Vodňany	DATE	12/2022
BUILDING'S NAME	Community Centre - Vodňany	LEVEL OF PD	DSP
SUBDIVISION	D.1.1 ARCHITECTURAL AND BUILDING DESIGN	SCALE	NO.
CONTENT	FOUNDATIONS	1:75	D.1.1-1

UNDERGROUND FLOOR No.1



Community centre - Vodňany - UG FL No.1			
NO.	ROOM	AREA [m²]	FLOOR COVERING
0.01	CORRIDOR	30,5	EPOXY
0.02	STORAGE	20,6	EPOXY
0.03	REHEARSAL ROOM	30,7	CARPET
0.04	UTILITY ROOM	69,2	EPOXY
0.05	STORAGE	19,3	EPOXY
0.06	WORKSHOP	34,3	EPOXY
0.07	CORRIDOR	33,3	EPOXY
0.08	STORAGE	31,7	EPOXY
0.09	CORRIDOR	20,7	EPOXY
	TOTAL	290,3	

LEGEND OF THE MATERIALS:

- REINFORCED CONCRETE C30/37
- AERATED CONCRETE BLOCKS YTONG KLASIK 100
- THERMAL INSULATION (for specification, see D.1.1-13 - D.1.1-17)

NOTES:

- The black box theatre space will be separated from the rest of the building to break the acoustic bridges. This applies to the walls, roof, floor and foundations, an air gap of at least 50 mm will be left between the walls of the black box theatre and the rest of the building.
- An elevator from VOTO s.r.o. will be used. It is a traction lift without machine room, type III.
- All shafts for piping and ductwork will be equipped with inspection doors at the location of the shut-off valves.
- for a detailed description of the individual structure compositions, see D.1.1-13 - D.1.1-17
- the project documentation can be used only as DSP and in case of any questions it is necessary to contact the responsible designer

±0,000 = 401,5 m.s.l. (B.p.v.)

AUTHOR	Bc. Tadeáš Petřík	CTU Prague Faculty of Civil Engineering	
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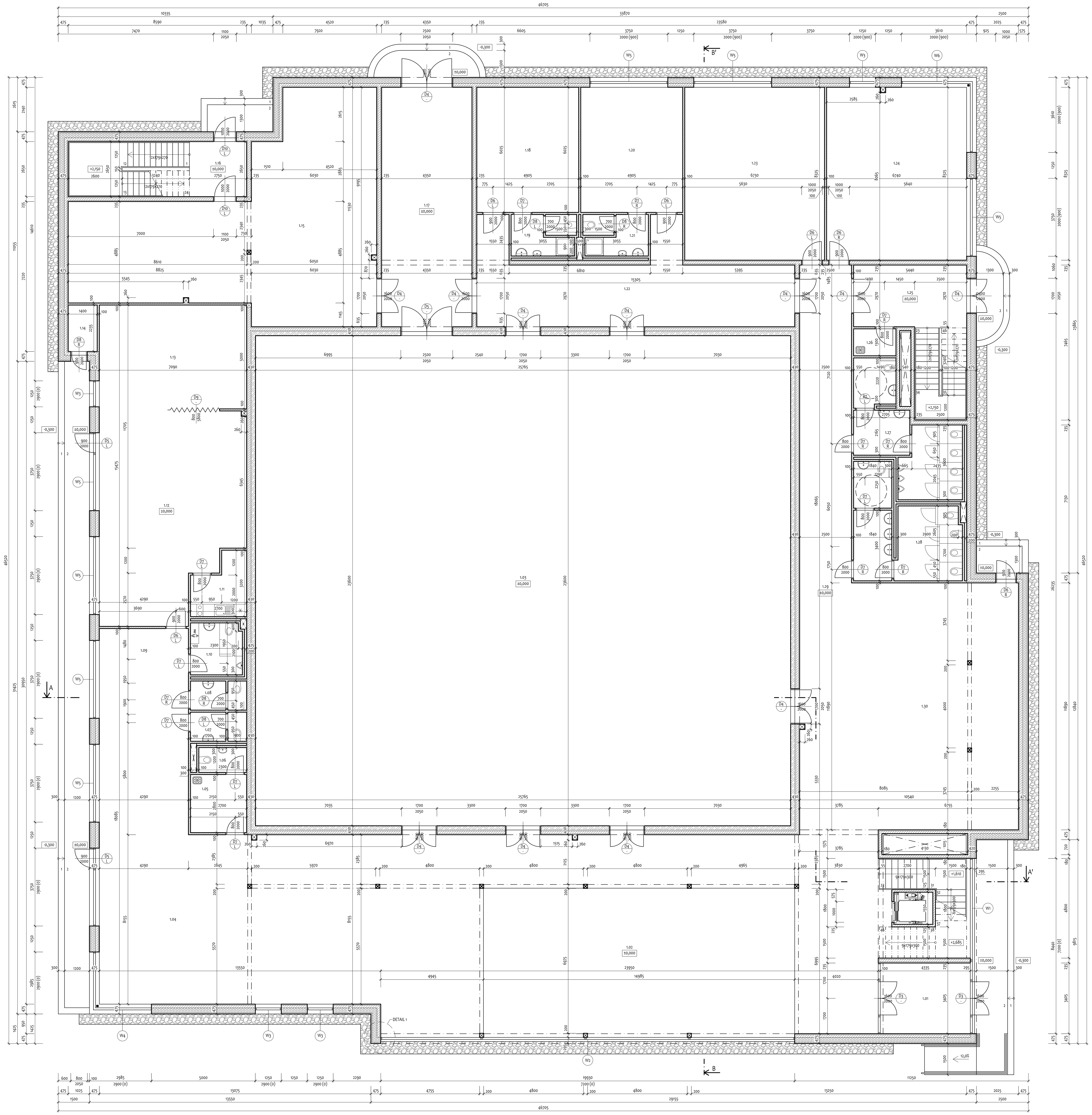
TYPE OF THESIS	Master's Thesis		
YEAR	2022/2023	FORMAT	16 x A4
LOCATION	Czech Republic - Vodňany	DATE	12/2022
BUILDING'S NAME	Community Centre - Vodňany	LEVEL OF PD	DSP
SUBDIVISION	D.1.1 ARCHITECTURAL AND BUILDING DESIGN	SCALE	NO.
CONTENT	FLOOR PLAN - UG FL No.1	1:75	D.1.1-2

FLOOR No.1



Community centre - Vodňany - FL No.1			
NO.	ROOM	AREA [m²]	FLOOR COVERING
1.01	VESTIBULE	14,8	CERAMIC TILES
1.02	FOYER + STAIRCASE	256,3	CERAMIC TILES
1.03	BLACK BOX THEATRE	608,1	CARPET
1.04	CAFÉ	143,5	CERAMIC TILES
1.05	STORAGE + CLEANING ROOM	7,6	CERAMIC TILES
1.06	WC EMPLOYEES	2,8	CERAMIC TILES
1.07	WC WOMEN	3,7	CERAMIC TILES
1.08	WC MEN	3,7	CERAMIC TILES
1.09	CLOAKROOM	9,6	CERAMIC TILES
1.10	WC CHILDREN	6,2	CERAMIC TILES
1.11	KITCHEN	6,8	CERAMIC TILES
1.12	PLAYROOM	65,1	LAMINATE
1.13	BEDROOM	35,7	LAMINATE
1.14	TOY STORAGE	3,1	CERAMIC TILES
1.15	STORAGE	108,7	CERAMIC TILES
1.16	CORRIDOR	22,8	CERAMIC TILES
1.17	VESTIBULE	50,7	CERAMIC TILES
1.18	DRESSING ROOM MEN	29,6	LAMINATE
1.19	WC MEN	6,0	CERAMIC TILES
1.20	DRESSING ROOM WOMEN	29,6	LAMINATE
1.21	WC WOMEN	6,0	CERAMIC TILES
1.22	CORRIDOR	53,8	CERAMIC TILES
1.23	CLUBROOM	56,0	LAMINATE
1.24	CLUBROOM	56,1	LAMINATE
1.25	CORRIDOR	27,4	CERAMIC TILES
1.26	CLEANING ROOM	2,7	CERAMIC TILES
1.27	WC MEN	20,9	CERAMIC TILES
1.28	WC WOMEN	21,8	CERAMIC TILES
1.29	CORRIDOR	68,4	CERAMIC TILES
1.30	CLOAKROOM	95,6	CERAMIC TILES
	TOTAL	1823,1	

LEGEND OF THE MATERIALS:

- REINFORCED CONCRETE C30/37
- WOOD CLT C24
- KNAUF PARTITIONS (for specification, see D.1.1-13 - D.1.1-17)
- THERMAL INSULATION (for specification, see D.1.1-13 - D.1.1-17)

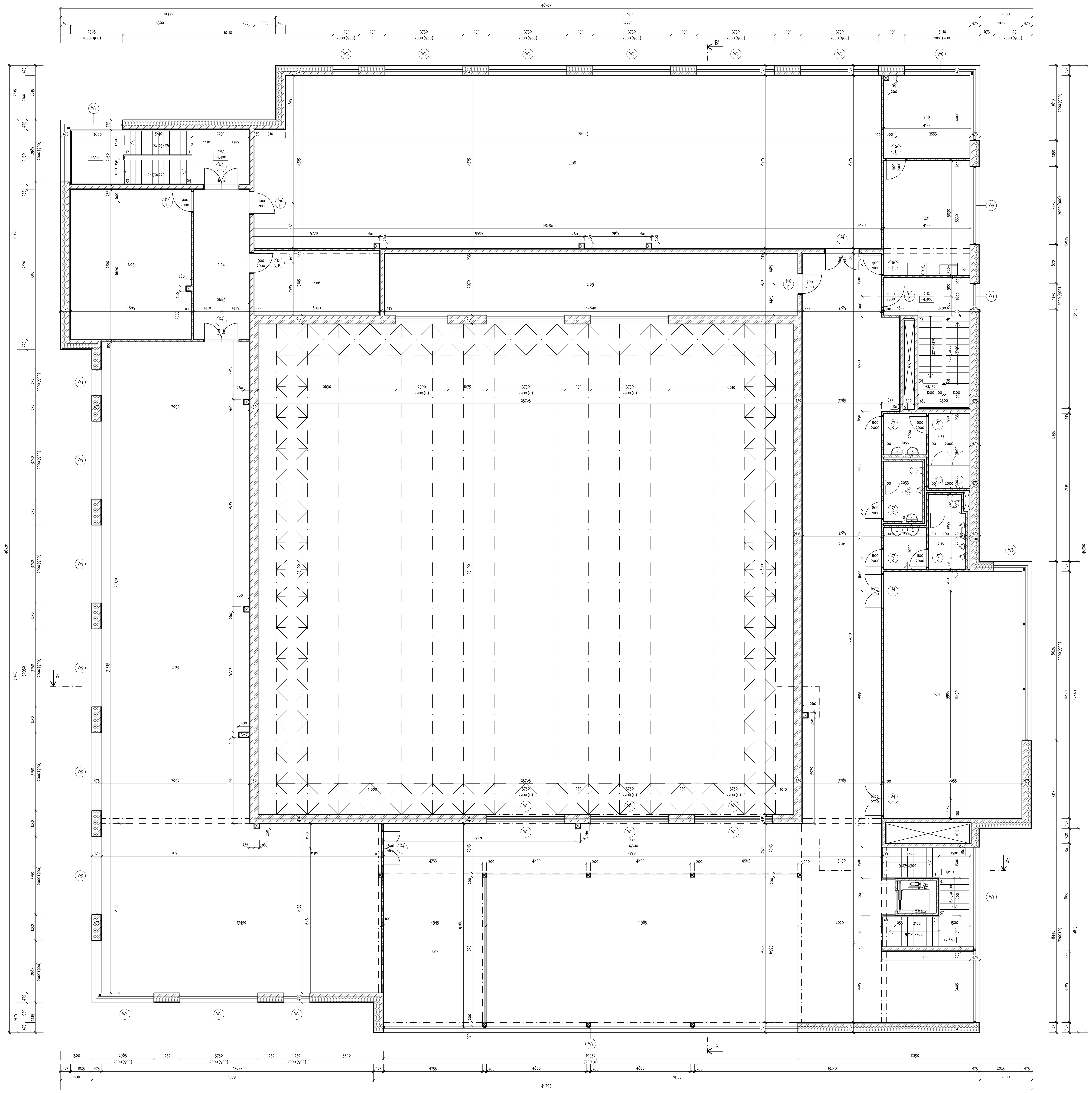
NOTES:

- The black box theatre space will be separated from the rest of the building to break the acoustic bridges. This applies to the walls, roof, floor and foundations, an air gap of at least 50 mm will be left between the walls of the black box theatre and the rest of the building.
- An elevator from VOTO s.r.o. will be used. It is a traction lift without machine room, type III.
- The pipe routing space in the sanitary facilities and kitchens has a thickness of 100 mm and is sheathed on one or both sides with Knauf partitions of 100 mm each (see D.1.1-13 - D.1.1-17).
- All shafts for piping and ductwork will be equipped with inspection doors at the location of the shut-off valves.
- for a detailed description of the individual structure compositions, see D.1.1-13 - D.1.1-17
- the project documentation can be used only as DSP and in case of any questions it is necessary to contact the responsible designer

±0,000 = 401,5 m.s.l. (B.p.v.)

AUTHOR	Bc. Tadeáš Petřík	CTU Prague Faculty of Civil Engineering	
SUPERVISOR	Ing. Kamil Staněk, Ph.D.		
CONSULTANT	Professor Climent Molins Borrell		
TYPE OF THESIS	Master's Thesis		
YEAR	2022/2023	FORMAT	16 x A4
LOCATION	Czech Republic - Vodňany	DATE	12/2022
BUILDING'S NAME	Community Centre - Vodňany	LEVEL OF PD	DSP
SUBDIVISION	D.1.1 ARCHITECTURAL AND BUILDING DESIGN	SCALE	NO.
CONTENT	FLOOR PLAN - FL No.1	1:75	D.1.1-3

FLOOR No.2



Community centre - Vodňany - FL No.2			
NO.	ROOM	AREA [m²]	FLOOR COVERING
2.01	FOYER	106,2	CERAMIC TILES
2.02	EXHIBITION SPACE	35,5	CERAMIC TILES
2.03	LIBRARY	273,9	CARPET
2.04	CORRIDOR	19,4	CERAMIC TILES
2.05	DEPOSITORY	41,9	CERAMIC TILES
2.06	DEPOSITORY	18,7	CERAMIC TILES
2.07	CORRIDOR	7,3	CERAMIC TILES
2.08	CHILDREN'S LIBRARY	247,3	CARPET
2.09	TECHNICAL FACILITIES	59,9	CERAMIC TILES
2.10	OFFICE	16,6	LAMINATE
2.11	OFFICE + KITCHEN	23,0	LAMINATE
2.12	CORRIDOR	7,6	CERAMIC TILES
2.13	WC WOMEN	11,4	CERAMIC TILES
2.14	WC EMPLOYEES	5,4	CERAMIC TILES
2.15	WC MEN	10,5	CERAMIC TILES
2.16	CORRIDOR	107,7	CERAMIC TILES
2.17	LECTURE ROOM	79,1	CARPET
	TOTAL	1071,4	

1.03	BLACK BOX THEATRE	608,1	CARPET

LEGEND OF THE MATERIALS:

- REINFORCED CONCRETE C30/37
- WOOD CLT C24
- KNAUF PARTITIONS (for specification, see D.1.1-13 - D.1.1-17)
- THERMAL INSULATION (for specification, see D.1.1-13 - D.1.1-17)

NOTES:

- The black box theatre space will be separated from the rest of the building to break the acoustic bridges. This applies to the walls, roof, floor and foundations, an air gap of at least 50 mm will be left between the walls of the black box theatre and the rest of the building.
- An elevator from VOTO s.r.o. will be used. It is a traction lift without machine room, type III.
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- All shafts for piping and ductwork will be equipped with inspection doors at the location of the shut-off valves.
- for a detailed description of the individual structure compositions, see D.1.1-13 - D.1.1-17
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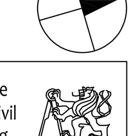

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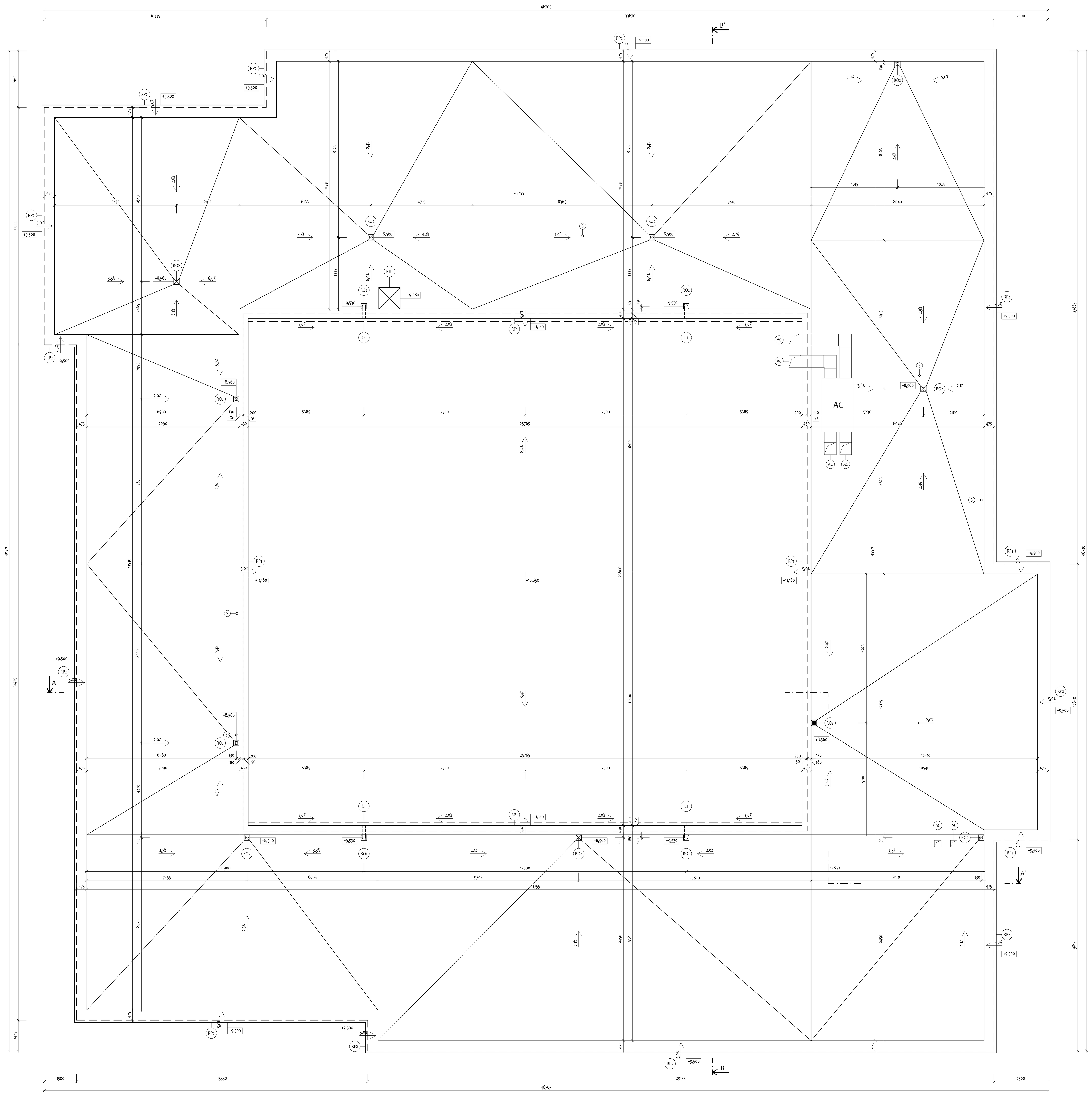
LOCATION	Czech Republic - Vodňany	DATE	12/2022
BUILDING'S NAME	Community Centre - Vodňany	LEVEL OF PD	DSP
SUBDIVISION	D.1.1 ARCHITECTURAL AND BUILDING DESIGN	SCALE	NO.
CONTENT	FLOOR PLAN - FL No.2	1:75	D.1.1-4

ROOF



LEGEND OF THE ELEMENTS:

- RO1 — ROOF OUTLET (BLACK BOX THEATRE) connected to the linear shallow gutter through the roof parapet
- RO2 — ROOF OUTLET (REST OF THE BUILDING)
- RH1 — ROOF HATCH
- RP1 — INNER ROOF PARAPET
- RP2 — OUTER ROOF PARAPET
- L1 — LINEAR SHALLOW GUTTER
- S — SEVERAGE VENTING MIN. 500 mm ABOVE THE ROOF
- AC — HVAC RISER PIPE OUTLET MIN. 500 mm ABOVE THE ROOF
- AC — AIR CONDITIONING UNIT

NOTES:

- The black box theatre space will be separated from the rest of the building to break the acoustic bridges. This applies to the walls, roof, floor and foundations, an air gap of at least 50 mm will be left between the walls of the black box theatre and the rest of the building.
- for a detailed description of the individual structure compositions, see D.1.1-13 - D.1.1-17
- the project documentation can be used only as DSP and in case of any questions it is necessary to contact the responsible designer

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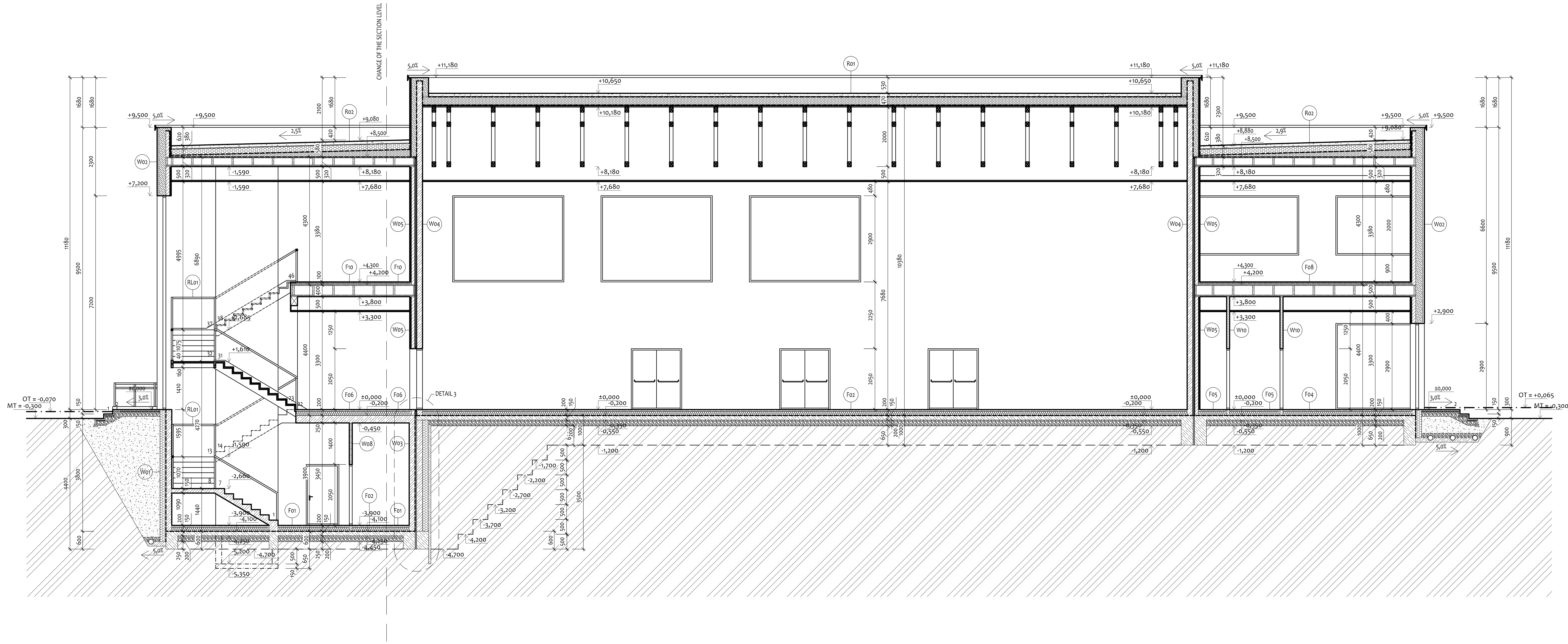
LOCATION	Czech Republic - Vodňany	DATE	12/2022
BUILDING'S NAME	Community Centre - Vodňany	LEVEL OF PD	DSP
SUBDIVISION	D.1.1 ARCHITECTURAL AND BUILDING DESIGN	SCALE	NO.
CONTENT	FLOOR PLAN - ROOF	1:75	D.1.1-5

CROSS-SECTION A - A'



LEGEND OF THE MATERIALS:

- REINFORCED CONCRETE
- PLAIN CONCRETE
- AERATED CONCRETE BLOCKS YTONG KLASIK 100
- WOOD (for specification, see D.1.1-13 - D.1.1-17)
- WOOD (for specification, see D.1.1-13 - D.1.1-17)
- KNAUF PARTITIONS (for specification, see D.1.1-13 - D.1.1-17)
- THERMAL INSULATION (for specification, see D.1.1-13 - D.1.1-17)
- THERMAL INSULATION (for specification, see D.1.1-13 - D.1.1-17)
- THERMAL INSULATION (for specification, see D.1.1-13 - D.1.1-17)
- COMPACTED GRAVEL SUB-BASE
- COMPACTED BACKFILLING / ROOF SUBSTRATE
- ORIGINAL SOIL

LEGEND OF THE ELEMENTS:

- F01 Floor of the heated space adjacent to the ground (epoxy)
- F02 Floor of the heated space adjacent to the ground (carpet)
- F04 Floor of the heated space adjacent to the ground (ceramic tiles)
- F05 Floor of the heated space adjacent to the ground (ceramic tiles, waterproof)
- F06 Floor without temperature difference or up to 10 °C max. (ceramic tiles), (above underground floor)
- F08 Floor without temperature difference or up to 10 °C max. (carpet)
- F10 Floor without temperature difference or up to 10 °C max. (ceramic tiles)
- W01 Exterior load-bearing wall of the heated space adjacent to the ground (underground floor)
- W02 Exterior load-bearing wall of the heated space (rest of the building)
- W03 Interior load-bearing wall without temp. diff. or up to 10 °C max. (underground floor)
- W04 Interior load-bearing wall without temp. diff. or up to 10 °C max. (black box theatre - inner side)
- W05 Interior load-bearing wall without temp. diff. or up to 10 °C max. (black box theatre - outer side)
- W08 Partition wall without temp. diff. or up to 10 °C max. (underground floor)
- W10 Partition wall without temp. diff. or up to 10 °C max. (rest of the building)
- RL01 STAIRCASE RAILING, height 1100 mm

NOTES:

- The black box theatre space will be separated from the rest of the building to break the acoustic bridges. This applies to the walls, roof, floor and foundations, an air gap of at least 50 mm will be left between the walls of the black box theatre and the rest of the building.
- for a detailed description of the individual structure compositions, see D.1.1-13 - D.1.1-17
- the project documentation can be used only as DSP and in case of any questions it is necessary to contact the responsible designer

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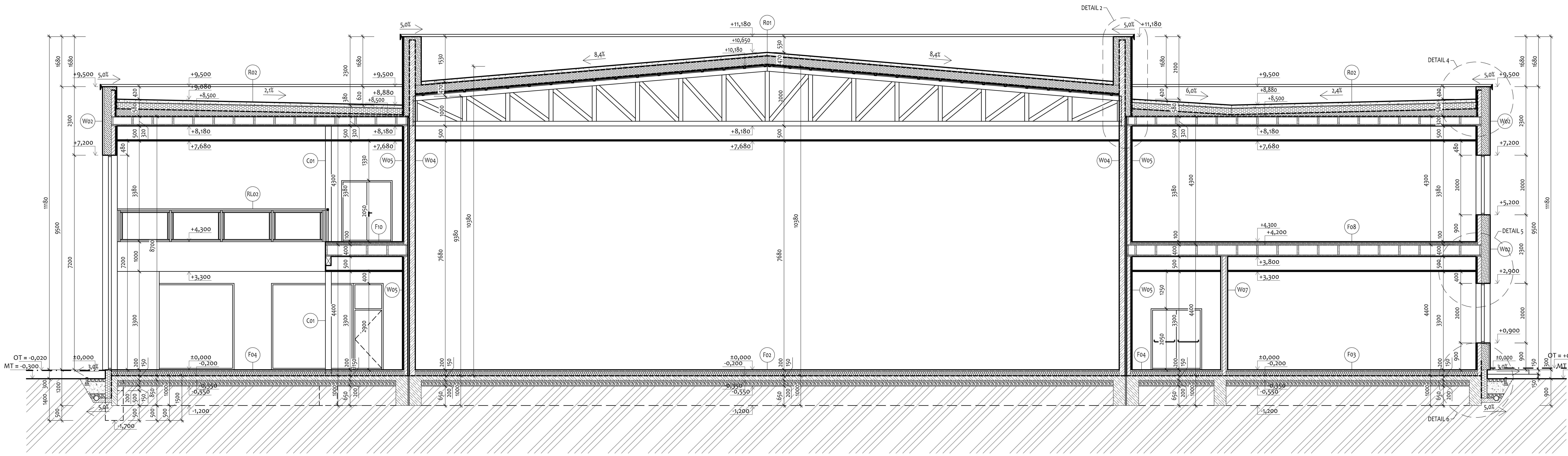
TYPE OF THESIS	Master's Thesis		
YEAR	2022/2023	FORMAT	8 x A4
LOCATION	Czech Republic - Vodňany	DATE	12/2022
BUILDING'S NAME	Community Centre - Vodňany	LEVEL OF PD	DSP
SUBDIVISION	D.1.1 ARCHITECTURAL AND BUILDING DESIGN	SCALE	NO.
CONTENT	CROSS-SECTION A - A'	1:75	D.1.1-6

CROSS-SECTION B - B'



LEGEND OF THE MATERIALS:

- REINFORCED CONCRETE
- PLAIN CONCRETE
- AERATED CONCRETE BLOCKS YTONG KLASIK 100
- WOOD (for specification, see D.1.1-13 - D.1.1-17)
- WOOD (for specification, see D.1.1-13 - D.1.1-17)
- KNAUF PARTITIONS (for specification, see D.1.1-13 - D.1.1-17)
- THERMAL INSULATION (for specification, see D.1.1-13 - D.1.1-17)
- THERMAL INSULATION (for specification, see D.1.1-13 - D.1.1-17)
- THERMAL INSULATION (for specification, see D.1.1-13 - D.1.1-17)
- COMPACTED GRAVEL SUB-BASE
- COMPACTED BACKFILLING / ROOF SUBSTRATE
- ORIGINAL SOIL

LEGEND OF THE ELEMENTS:

- F03 Floor of the heated space adjacent to the ground (laminate)
- F04 Floor of the heated space adjacent to the ground (ceramic tiles)
- F08 Floor without temperature difference or up to 10 °C max. (carpet)
- F10 Floor without temperature difference or up to 10 °C max. (ceramic tiles)
- W02 Exterior load-bearing wall of the heated space (rest of the building)
- W04 Interior load-bearing wall without temp. diff. or up to 10 °C max. (black box theatre - inner side)
- W05 Interior load-bearing wall without temp. diff. or up to 10 °C max. (black box theatre - outer side)
- W07 Interior load-bearing wall without temp. diff. or up to 10 °C max. (rest of the building)
- RL01 RAILING, height 1100 mm
- C01 WOODEN LOAD-BEARING COLUMN, 200x200 mm

NOTES:

- The black box theatre space will be separated from the rest of the building to break the acoustic bridges. This applies to the walls, roof, floor and foundations, an air gap of at least 50 mm will be left between the walls of the black box theatre and the rest of the building.
- Details 4 - 6 will be drawn in the form of a detailed section.
- for a detailed description of the individual structure compositions, see D.1.1-13 - D.1.1-17
- the project documentation can be used only as DSP and in case of any questions it is necessary to contact the responsible designer

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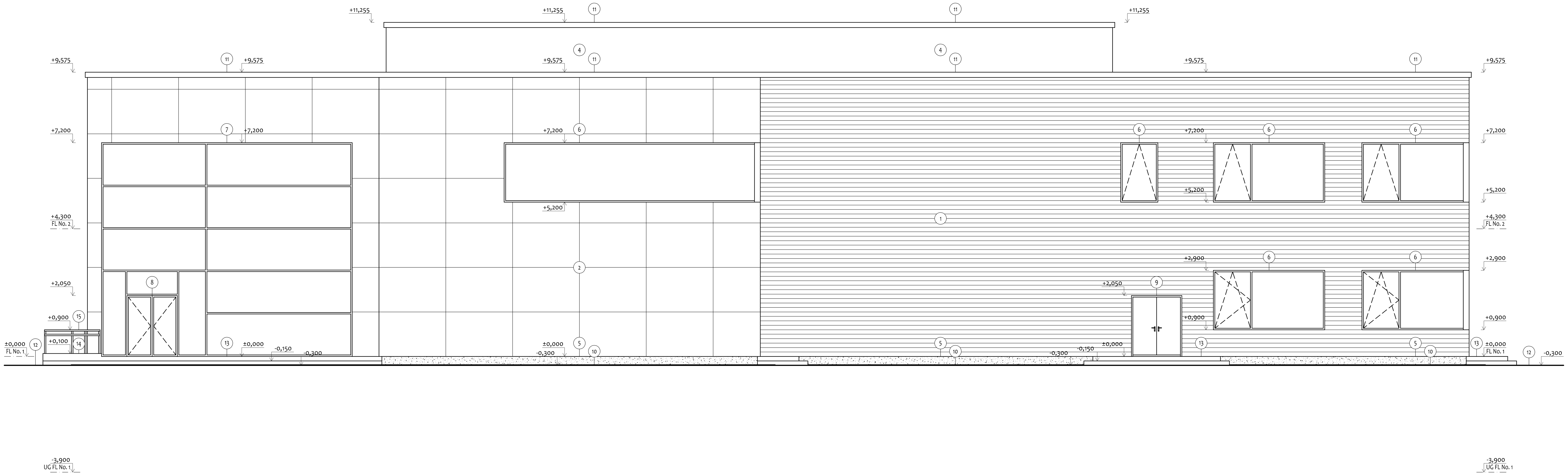
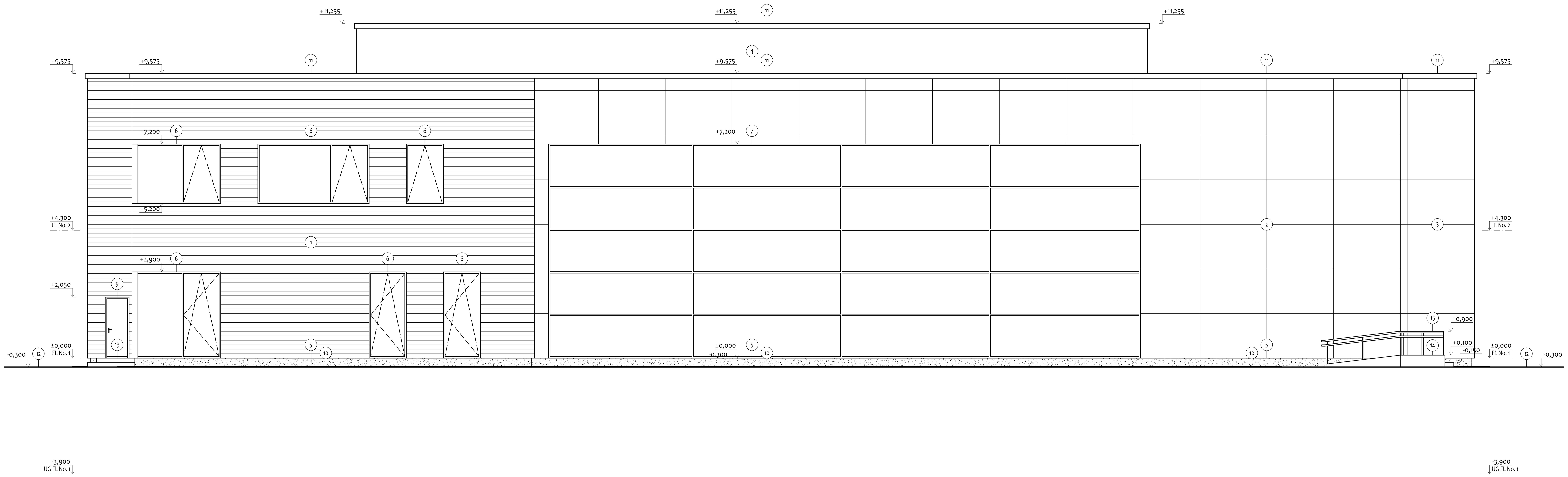
CONSULTANT	Professor Climent Molins Borrell		
TYPE OF THESIS	Master's Thesis		
YEAR	2022/2023	FORMAT	8 x A4
LOCATION	Czech Republic - Vodňany	DATE	12/2022
BUILDING'S NAME	Community Centre - Vodňany	LEVEL OF PD	DSP
SUBDIVISION	D.1.1 ARCHITECTURAL AND BUILDING DESIGN	SCALE	NO.
CONTENT	CROSS-SECTION B - B'	1:75	D.1.1-7

NORTHERN ELEVATION



EASTERN ELEVATION



LEGEND OF THE ELEMENTS:

1. WOODEN SLATS, PLACED HORIZONTALLY, NATURAL COLOUR
2. CETRIS LASUR 007, DARK GREY COLOUR
3. CETRIS LASUR 007, WHITE COLOUR
4. PVC-P FOIL FATRAFOL 810/V, WHITE COLOUR
5. PLINTH PLASTER BAUMIT MARMOLIT, DARK GREY COLOUR
6. FRAME DAFE PROGRESS OF THE WINDOW ALU EF+, DARK GREY COLOUR
7. ALUMINIUM PROFILE OF THE SCHÜCO AOC 50 TI.SI SYSTEM, DARK GREY COLOUR
8. FRAME DAFE PROGRESS OF THE GLASS DOORS, DARK GREY COLOUR
9. FRAME JAMBS OF THE DOOR WITH SOLID DOOR PANEL, DARK GREY COLOUR
10. DRIP PATH, AGGREGATE FRACTION 8/16 mm
11. WEATHER RAIL VIPLANYL MADE OF PLASTIC-COATED SHEET METAL, DARK GREY COLOUR
12. INTERLOCKING PAVING, GREY COLOUR
13. WOODEN EXTERIOR TILES, NATURAL COLOUR
14. RAMP FOR THE PERSONS WITH DISABILITIES
15. STAINLESS STEEL RAILING, DARK GREY COLOUR

NOTES:

- for a detailed description of the individual structure compositions, see D.1.1-13 - D.1.1-17
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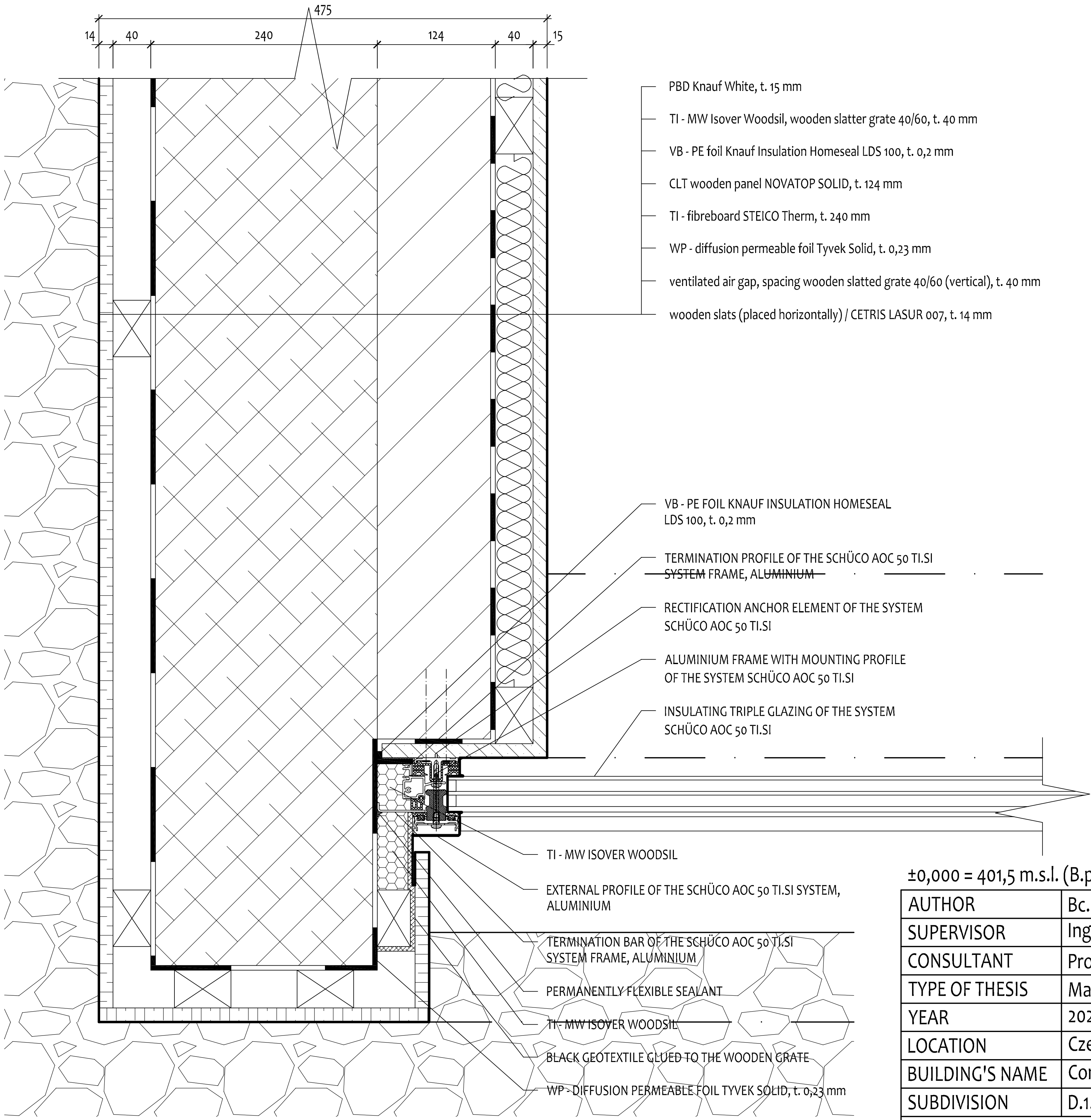
TYPE OF THESIS	Master's Thesis		
YEAR	2022/2023	FORMAT	8 x A4
LOCATION	Czech Republic - Vodňany	DATE	12/2022
BUILDING'S NAME	Community Centre - Vodňany	LEVEL OF PD	DSP
SUBDIVISION	D.1.1 ARCHITECTURAL AND BUILDING DESIGN	SCALE	NO.
CONTENT	NORTHERN ELEVATION, EASTERN ELEVATION	1:75	D.1.1-8

DETAIL 1 - GLASS CURTAIN WALL CONNECTION (FLOOR PLAN VIEW)



LEGEND OF THE MATERIALS:

- WOOD (for specification, see D.1.1-13 - D.1.1-17)
- KNAUF PARTITIONS (for specification, see D.1.1-13 - D.1.1-17)
- THERMAL INSULATION (for specification, see D.1.1-13 - D.1.1-17)
- THERMAL INSULATION (for specification, see D.1.1-13 - D.1.1-17)
- DRIP PATH, AGGREGATE FRACTION 8/16 mm

NOTES:

- for a detailed description of the individual structure compositions, see D.1.1-13 - D.1.1-17
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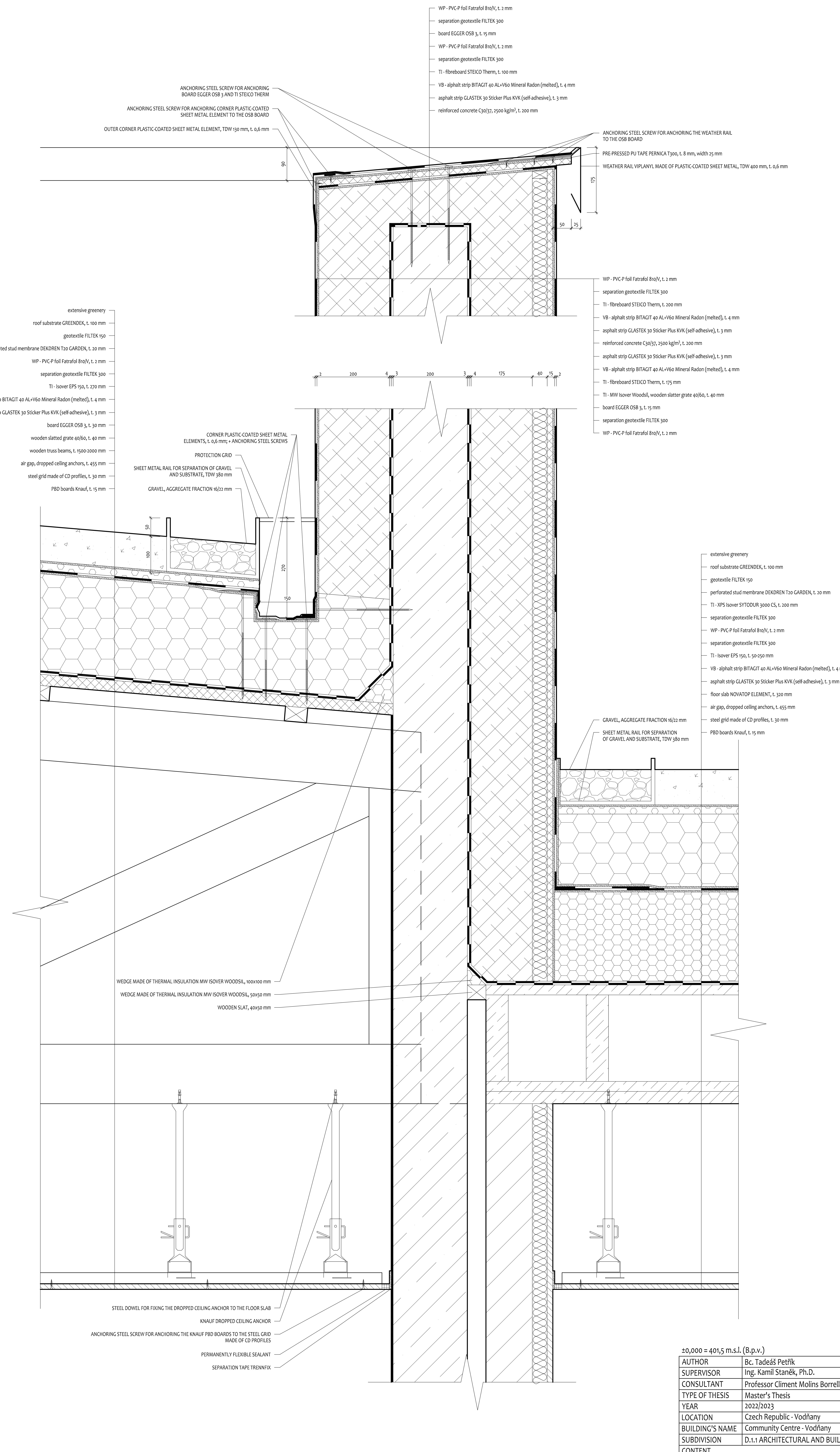
SUPERVISOR	Ing. Kamil Staněk, Ph.D.		
CONSULTANT	Professor Climent Molins Borrell		
TYPE OF THESIS	Master's Thesis		
YEAR	2022/2023	FORMAT	2 x A4
LOCATION	Czech Republic - Vodňany	DATE	12/2022
BUILDING'S NAME	Community Centre - Vodňany	LEVEL OF PD	DSP
SUBDIVISION	D.1.1 ARCHITECTURAL AND BUILDING DESIGN	SCALE	NO.
CONTENT	DETAIL 1 - GLASS CURTAIN WALL CONNECTION	1:5	D.1.1-9

DETAIL 2 - ROOF PARAPET WITH LINEAR SHALLOW GUTTER



LEGEND OF THE MATERIALS:

- REINFORCED CONCRETE
- WOOD (for specification, see D.1.1-13 - D.1.1-17)
- WOOD (for specification, see D.1.1-13 - D.1.1-17)
- KNAUF PARTITIONS (for specification, see D.1.1-13 - D.1.1-17)
- THERMAL INSULATION (for specification, see D.1.1-13 - D.1.1-17)
- THERMAL INSULATION (for specification, see D.1.1-13 - D.1.1-17)
- THERMAL INSULATION (for specification, see D.1.1-13 - D.1.1-17)
- GRAVEL, AGGREGATE FRACTION 16/22 mm
- ROOF SUBSTRATE

NOTES:

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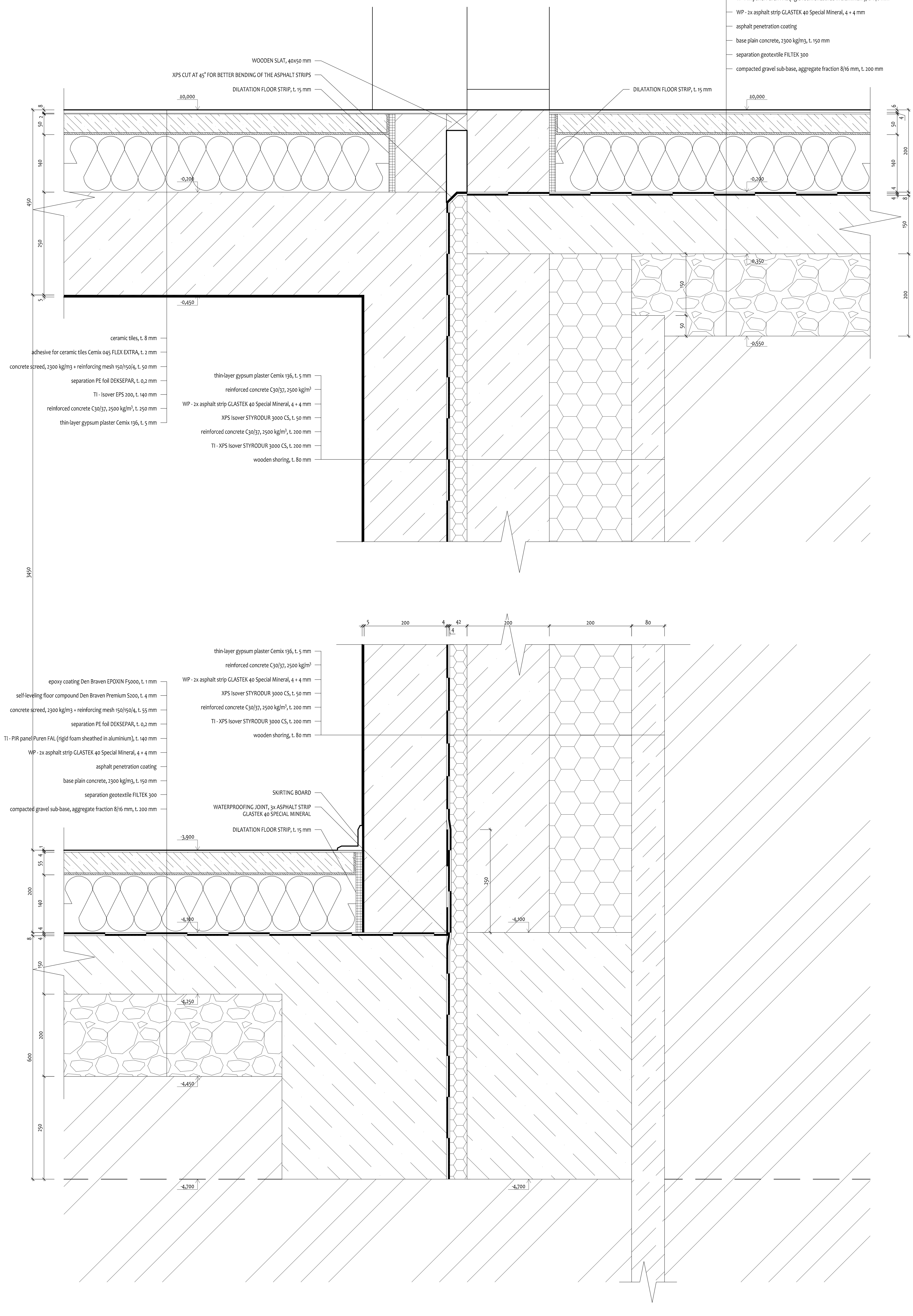
YEAR	2022/2023	FORMAT	8 x A4
LOCATION	Czech Republic - Vodňany	DATE	12/2022
BUILDING'S NAME	Community Centre - Vodňany	LEVEL OF PD	DSP
SUBDIVISION	D.1.1 ARCHITECTURAL AND BUILDING DESIGN	SCALE	NO.
CONTENT	DETAIL 2 - ROOF P. WITH LINEAR SHALLOW GUTTER	1:5	D.1.1-10

DETAIL 3 - SEPARATION OF THE TWO FOUNDATIONS



LEGEND OF THE MATERIALS:

- REINFORCED CONCRETE
- PLAIN CONCRETE
- AERATED CONCRETE BLOCKS YTONG KLASIK 100
- WOOD (for specification, see D.1.1-13 - D.1.1-17)
- WOOD (for specification, see D.1.1-13 - D.1.1-17)
- KNAUF PARTITIONS (for specification, see D.1.1-13 - D.1.1-17)
- THERMAL INSULATION (for specification, see D.1.1-13 - D.1.1-17)
- THERMAL INSULATION (for specification, see D.1.1-13 - D.1.1-17)
- THERMAL INSULATION (for specification, see D.1.1-13 - D.1.1-17)
- COMPACTED GRAVEL SUB-BASE, AGGREGATE FRACTION 8/16 mm
- COMPACTED BACKFILLING
- ORIGINAL SOIL

NOTES:

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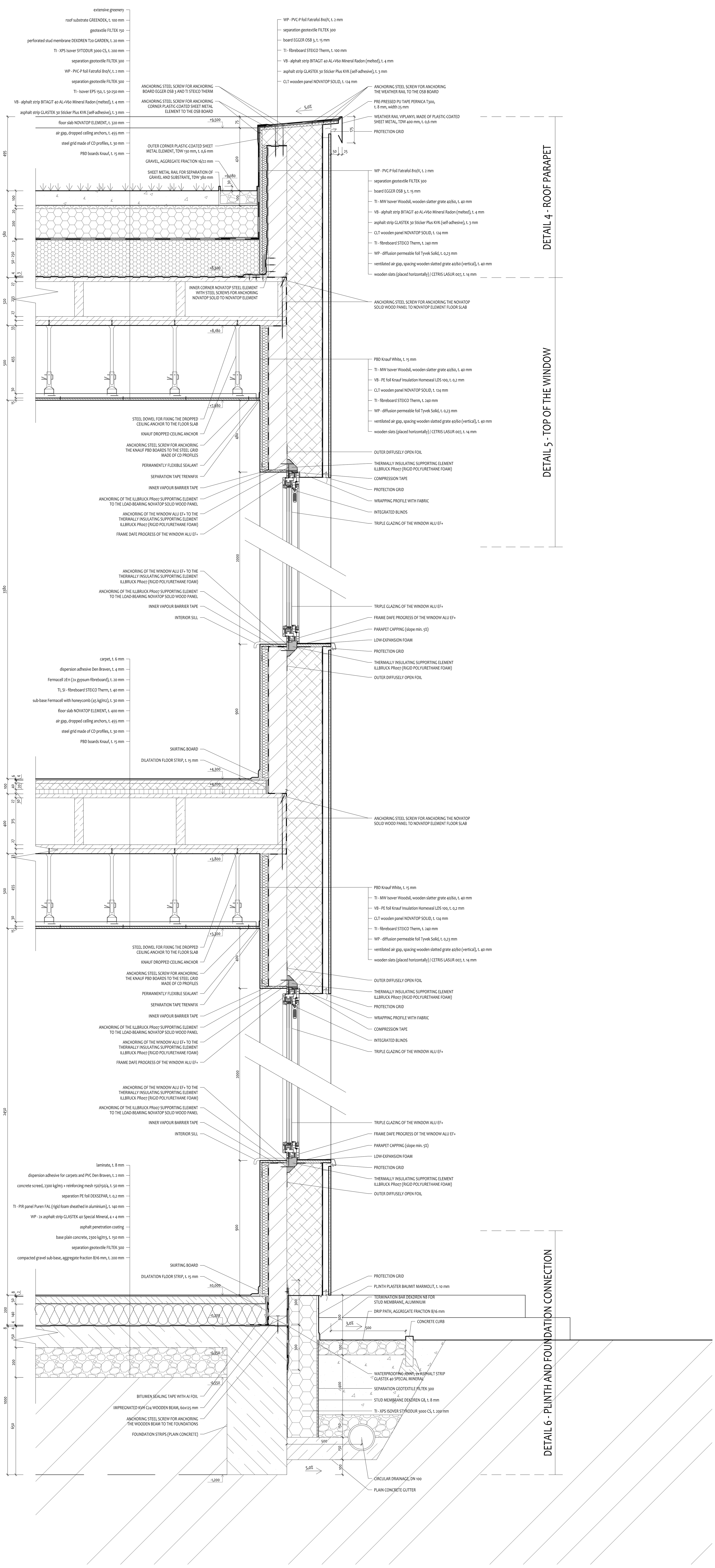
LOCATION	Czech Republic - Vodňany	DATE	12/2022
BUILDING'S NAME	Community Centre - Vodňany	LEVEL OF PD	DSP
SUBDIVISION	D.1.1 ARCHITECTURAL AND BUILDING DESIGN	SCALE	NO.
CONTENT	DETAIL 3 - SEPARATION OF THE TWO FOUNDATIONS	1:5	D.1.1-11

DETAILED SECTION



LEGEND OF THE MATERIALS:

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- PLAIN CONCRETE
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- WOOD (for specification, see D.1.1-13 - D.1.1-17)
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- THERMAL INSULATION (for specification, see D.1.1-13 - D.1.1-17)
- THERMAL INSULATION (for specification, see D.1.1-13 - D.1.1-17)
- THERMAL INSULATION (for specification, see D.1.1-13 - D.1.1-17)
- COMPACTED GRAVEL SUB-BASE / GRAVEL
- COMPACTED BACKFILLING / ROOF SUBSTRATE
- ORIGINAL SOIL

NOTES:

- for a detailed description of the individual structure compositions, see D.1.1-13 - D.1.1-17
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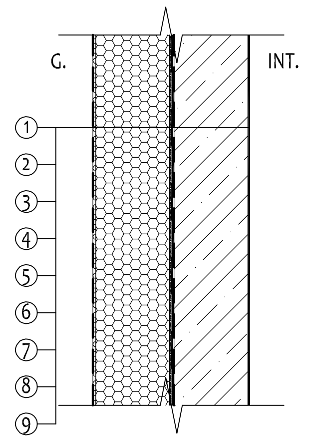
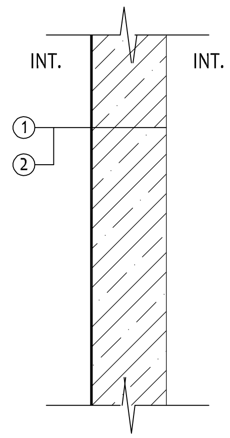
LOCATION	Czech Republic - Vodňany	DATE	12/2022
BUILDING'S NAME	Community Centre - Vodňany	LEVEL OF PD	DSP
SUBDIVISION	D.1.1 ARCHITECTURAL AND BUILDING DESIGN	SCALE	NO.
CONTENT	DETAILED SECTION (DETAILS 4, 5, 6)	1:10	D.1.1-12



W01 - Exterior load-bearing wall of the heated space adjacent to the ground (underground floor)				
NO.	FUNCTION	DESCRIPTION INT - GROUND	THICKNESS [mm]	U [W/(m²K)]
1	aesthetic	thin-layer gypsum plaster Cemix 136	5	0,162
2	load-bearing	reinforced concrete C30/37, 2500 kg/m³	200	
3	penetration, protect.	asphalt penetration coating	-	
4	waterproofing	asphalt strip GLASTEK 40 Special Mineral	4	
5	waterproofing	asphalt strip GLASTEK 40 Special Mineral	4	
6	binding	frost-resistant and trowel compound Cemix BASIC	4	
7	thermal insulation	XPS Isover STYRODUR 3000 CS	200	
8	protective	stud membrane DEKDREN G8	8	-
9	separation, protective	separation geotextile FILTEK 300	-	-
Σ			425	0,162

Requirement for heat transfer coefficient $U_{pas,20}$ = 0,220 W/(m²K) => FULFILLED

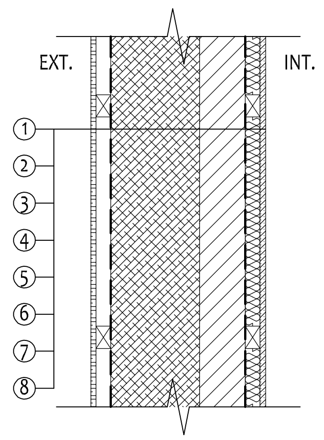


W04 - Interior load-bearing wall without temp. diff. or up to 10 °C max. (black box theatre - inner side)				
NO.	FUNCTION	DESCRIPTION INT - INT	THICKNESS [mm]	R_w [db]
1	load-bearing	reinforced concrete C30/37, 2500 kg/m³	200	59 (-1; -5)
2	aesthetic	thin-layer gypsum plaster Cemix 136	5	-
Σ			205	59

Requirement for minimum airborne sound insulation R'_w ≥ 52 (57) dB => FULFILLED (see notes)

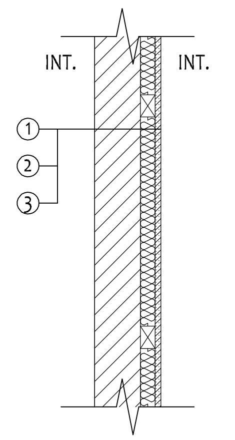
Notes: The wall will be equipped with acoustic elements (it would have to be solved within the acoustic design of the theatre space).

The main sound insulation between the black box theatre and the rest of the building is created by the air gap (min. 50 mm) between walls W04 and W05, not the walls themselves.



W02 - Exterior load-bearing wall of the heated space (rest of the building)				
NO.	FUNCTION	DESCRIPTION INT - EXT	THICKNESS [mm]	U [W/(m²K)]
1	aesthetic, SI, fireproof	PBD Knauf White	15	0,132
2	thermal insulation	MW Isover Woodsil, wooden slatted grate 40/60	40	
3	vapour barrier	PE foil Knauf Insulation Homeseal LDS 100	0,2	
4	load-bearing	CLT wooden panel NOVATOP SOLID	124	
5	TI, (load-bearing)	fibreboard STEICO Therm	240	
6	protect., waterproof.	diffusion permeable foil Tyvek Solid	0,23	
7	air gap, (load-bearing)	ventilated air gap, spacing wooden slatted grate 40/60 (vertical)	40	-
8	aesthetic, facade	wooden slats (placed horizontally) / CETRIS LASUR 007	14	-
Σ			473	0,132

Requirement for heat transfer coefficient $U_{pas,20}$ = 0,180 W/(m²K) => FULFILLED

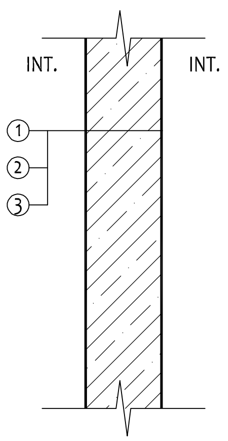


W05 - Interior load-bearing wall without temp. diff. or up to 10 °C max. (black box theatre - outer side)				
NO.	FUNCTION	DESCRIPTION INT - INT	THICKNESS [mm]	R_w [db]
1	aesthetic, SI, fireproof	PBD Knauf Silentboard	15	approx. 30
2	sound insulation	MW Knauf Insulation Akustik Board, wooden slatted grate 40/60	40	
3	load-bearing	CLT wooden panel NOVATOP SOLID	124	
Σ			179	30

Requirement for minimum airborne sound insulation R'_w ≥ 52 (57) dB => FULFILLED (see notes)

Notes: If better fire resistance is required (e.g. in unprotected escape routes NÚC), PBD Knauf Silentboard can be replaced by Knauf RED Piano or Knauf Fireboard. (A new value of R_w would have to be determined).

The main sound insulation between the black box theatre and the rest of the building is created by the air gap (min. 50 mm) between walls W04 and W05, not the walls themselves.



W03 - Interior load-bearing wall without temp. diff. or up to 10 °C max. (underground floor)				
NO.	FUNCTION	DESCRIPTION INT - INT	THICKNESS [mm]	R_w [db]
1	aesthetic	thin-layer gypsum plaster Cemix 136	5	-
2	load-bearing	reinforced concrete C30/37, 2500 kg/m³	200	59 (-1; -5)
3	aesthetic	thin-layer gypsum plaster Cemix 136	5	-
Σ			210	59

Requirement for minimum airborne sound insulation R'_w ≥ 52 (57) dB => FULFILLED

Notes: For calculations of the heat transfer coefficient values of individual structures, see annex THERMAL AND MOISTURE ASSESSMENT OF STRUCTURES

For the fire resistance of individual structures, see D.1.3-4 - D.1.3-7

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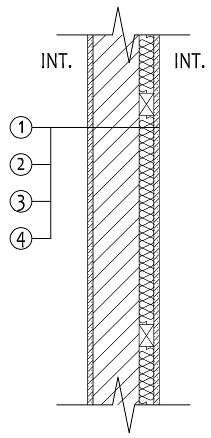
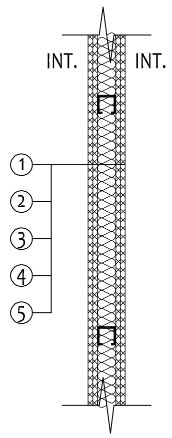
YEAR	2022/2023	FORMAT	2 x A4
LOCATION	Czech Republic - Vodňany	DATE	11/2022
BUILDING'S NAME	Community Centre - Vodňany	LEVEL OF PD	DSP
SUBDIVISION	D.1.1 ARCHITECTURAL-CONSTRUCTION DESIGN	SCALE	NO.
CONTENT	LIST OF STRUCTURE COMPOSITIONS	1:20	D.1.1-13



W06 - Interior load-bearing wall without temp. diff. or up to 10 °C max. (installation shafts)				
NO.	FUNCTION	DESCRIPTION INT - INT	THICKNESS [mm]	R_w [db]
1	aesthetic, SI, fireproof	PBD Knauf Silentboard	15	approx. 45
2	sound insulation	MW Knauf Insulation Akustik Board, wooden slatted grate 40/60	40	
3	load-bearing	CLT wooden panel NOVATOP SOLID	124	
4	SI, fireproof	PBD Knauf Silentboard	15	
Σ			194	45

Requirement for minimum airborne sound insulation R'_w ≥ - dB => FULFILLED

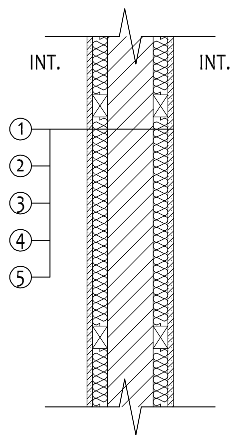
Notes: If better fire resistance is required (e.g. in unprotected escape routes NÚC), PBD Knauf Silentboard can be replaced by Knauf RED Piano or Knauf Fireboard. (A new value of R_w would have to be determined).



W09 - Partition wall without temp. diff. or up to 10 °C max. (acoustically demanding rooms)				
NO.	FUNCTION	DESCRIPTION INT - INT	THICKNESS [mm]	R_w [db]
1	aesthetic, SI	PBD Knauf Silentboard	12,5	67
2	aesthetic, SI	PBD Knauf Silentboard	12,5	
3	load-bearing, SI	steel profile CW50 + MW Knauf Insulation Akustik Board	50	
4	aesthetic, SI	PBD Knauf Silentboard	12,5	
5	aesthetic, SI	PBD Knauf Silentboard	12,5	
Σ			100	67

Requirement for minimum airborne sound insulation R'_w ≥ 52 (57) dB => FULFILLED

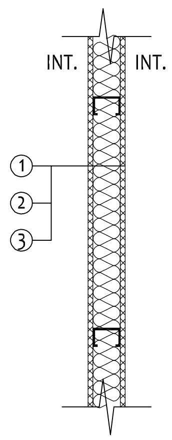
Notes: If better fire resistance is required (e.g. in unprotected escape routes NÚC), the first upper board PBD Knauf Silentboard can be replaced by Knauf RED Piano or Knauf Fireboard. (A new value of R_w would have to be determined).



W07 - Interior load-bearing wall without temp. diff. or up to 10 °C max. (rest of the building)				
NO.	FUNCTION	DESCRIPTION INT - INT	THICKNESS [mm]	R_w [db]
1	aesthetic, SI, fireproof	PBD Knauf Silentboard	15	approx. 60
2	sound insulation	MW Knauf Insulation Akustik Board, wooden slatted grate 40/60	40	
3	load-bearing	CLT wooden panel NOVATOP SOLID	124	
4	sound insulation	MW Knauf Insulation Akustik Board, wooden slatted grate 40/60	40	
5	aesthetic, SI, fireproof	PBD Knauf Silentboard	15	
Σ			234	60

Requirement for minimum airborne sound insulation R'_w ≥ 52 (57) dB => FULFILLED

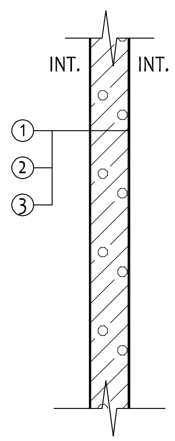
Notes: If better fire resistance is required (e.g. in unprotected escape routes NÚC), PBD Knauf Silentboard can be replaced by Knauf RED Piano or Knauf Fireboard. (A new value of R_w would have to be determined).



W10 - Partition wall without temp. diff. or up to 10 °C max. (rest of the building)				
NO.	FUNCTION	DESCRIPTION INT - INT	THICKNESS [mm]	R_w [db]
1	aesthetic, SI	PBD Knauf Silentboard	12,5	59
2	load-bearing, SI	steel profile CW75 + MW Knauf Insulation Akustik Board	75	
3	aesthetic, SI	PBD Knauf Silentboard	12,5	
Σ			100	59

Requirement for minimum airborne sound insulation R'_w ≥ 52 (57) dB => FULFILLED

Notes: If better fire resistance is required (e.g. in unprotected escape routes NÚC), PBD Knauf Silentboard can be replaced by Knauf RED Piano or Knauf Fireboard. (A new value of R_w would have to be determined).



W08 - Partition wall without temp. diff. or up to 10 °C max. (underground floor)				
NO.	FUNCTION	DESCRIPTION INT - INT	THICKNESS [mm]	R_w [db]
1	aesthetic	thin-layer gypsum plaster Cemix 136	5	-
2	load-bearing	aerated concrete blocks YTONG Klasik 100	100	37
3	aesthetic	thin-layer gypsum plaster Cemix 136	5	-
Σ			110	37

Requirement for minimum airborne sound insulation R'_w ≥ - dB => FULFILLED

Notes: For calculations of the heat transfer coefficient values of individual structures, see annex THERMAL AND MOISTURE ASSESSMENT OF STRUCTURES

For the fire resistance of individual structures, see D.1.3-4 - D.1.3-7

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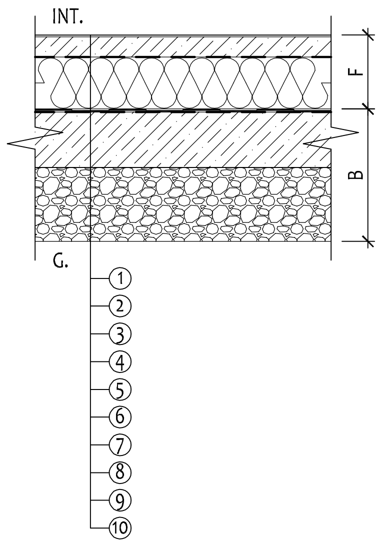
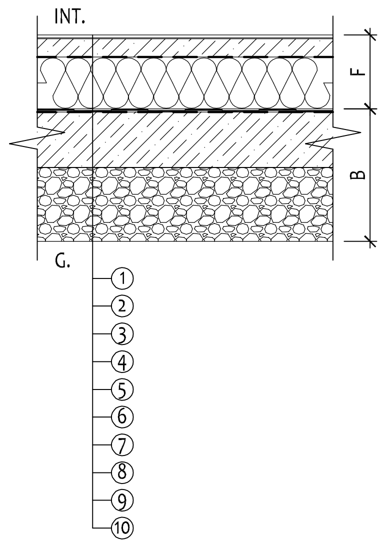
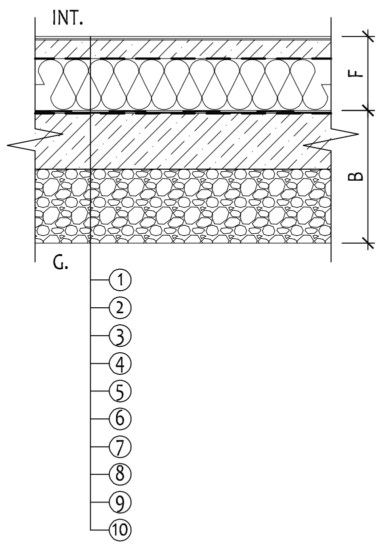
BUILDING'S NAME	Community Centre - Vodňany	LEVEL OF PD	DSP
SUBDIVISION	D.1.1 ARCHITECTURAL-CONSTRUCTION DESIGN	SCALE	NO.
CONTENT	LIST OF STRUCTURE COMPOSITIONS	1:20	D.1.1-14



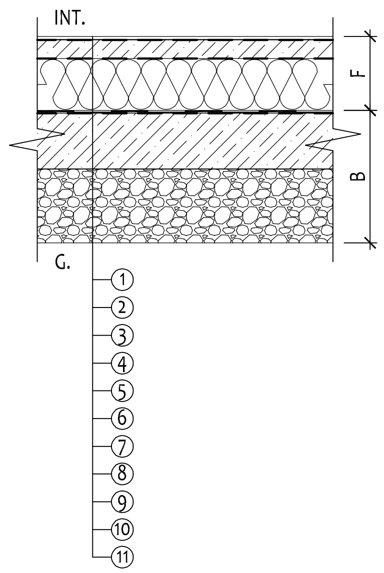
F01 - Floor of the heated space adjacent to the ground (epoxy)					
NO.	FUNCTION	DESCRIPTION INT - GROUND	PT.	THICKNESS [mm]	U [W/(m²K)]
1	aesth., non-slip, prot.	epoxy coating Den Braven EPOXIN F5000		1	-
2	leveling, protective	self-leveling floor compound Den Braven Premium S200		4	-
3	leveling	concrete screed, 2300 kg/m3 + reinforcing mesh 150/150/4	F	55	
4	separation, protective	separation PE foil DEKSEPAR		0,2	
5	thermal insulation	PIR panel Puren FAL (rigid foam sheathed in aluminium)		140	0,193
6	waterproofing	2x asphalt strip GLASTEK 40 Special Mineral		4 + 4	
7	penetration, protect.	asphalt penetration coating		-	
8	base	base plain concrete, 2300 kg/m³	B	150	
9	separation, protective	separation geotextile FILTEK 300		-	-
10	leveling	compacted gravel sub-base, aggregate fraction 8/16 mm		200	-
Σ			F	200	0,193
Requirement for heat transfer coefficient $U_{pas,20}$ = 0,220 W/(m²K)		=> FULFILLED	FB	558	



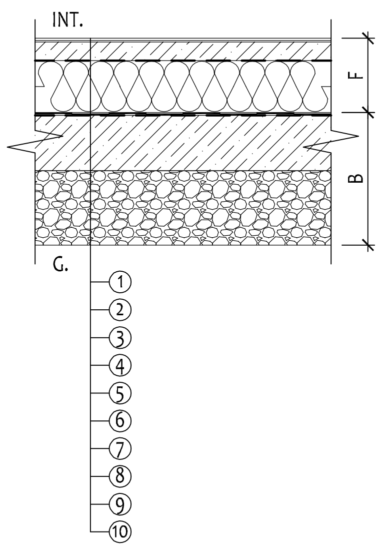
F04 - Floor of the heated space adjacent to the ground (ceramic tiles)					
NO.	FUNCTION	DESCRIPTION INT - GROUND	PT.	THICKNESS [mm]	U [W/(m²K)]
1	aesthetic	ceramic tiles		8	-
2	adhesive	adhesive for ceramic tiles Cemix 045 FLEX EXTRA		2	-
3	leveling	concrete screed, 2300 kg/m3 + reinforcing mesh 150/150/4	F	50	
4	separation, protective	separation PE foil DEKSEPAR		0,2	
5	thermal insulation	PIR panel Puren FAL (rigid foam sheathed in aluminium)		140	0,193
6	waterproofing	2x asphalt strip GLASTEK 40 Special Mineral		4 + 4	
7	penetration, protect.	asphalt penetration coating		-	
8	base	base plain concrete, 2300 kg/m³	B	150	
9	separation, protective	separation geotextile FILTEK 300		-	-
10	leveling	compacted gravel sub-base, aggregate fraction 8/16 mm		200	-
Σ			F	200	0,193
Requirement for heat transfer coefficient $U_{pas,20}$ = 0,220 W/(m²K)		=> FULFILLED	FB	558	



F02 - Floor of the heated space adjacent to the ground (carpet)					
NO.	FUNCTION	DESCRIPTION INT - GROUND	PT.	THICKNESS [mm]	U [W/(m²K)]
1	aesthetic	carpet		6	-
2	adhesive	dispersion adhesive for carpets and PVC Den Braven		4	-
3	leveling	concrete screed, 2300 kg/m3 + reinforcing mesh 150/150/4	F	50	
4	separation, protective	separation PE foil DEKSEPAR		0,2	
5	thermal insulation	PIR panel Puren FAL (rigid foam sheathed in aluminium)		140	0,193
6	waterproofing	2x asphalt strip GLASTEK 40 Special Mineral		4 + 4	
7	penetration, protect.	asphalt penetration coating		-	
8	base	base plain concrete, 2300 kg/m³	B	150	
9	separation, protective	separation geotextile FILTEK 300		-	-
10	leveling	compacted gravel sub-base, aggregate fraction 8/16 mm		200	-
Σ			F	200	0,193
Requirement for heat transfer coefficient $U_{pas,20}$ = 0,220 W/(m²K)		=> FULFILLED	FB	558	



F05 - Floor of the heated space adjacent to the ground (ceramic tiles, waterproof)					
NO.	FUNCTION	DESCRIPTION INT - GROUND	PT.	THICKNESS [mm]	U [W/(m²K)]
1	aesthetic	ceramic tiles		8	-
2	adhesive	adhesive for ceramic tiles Cemix 045 FLEX EXTRA		2	-
3	waterproofing	one-component waterproofing KOUPELNA Den Braven	F	0,4	-
4	leveling	concrete screed, 2300 kg/m3 + reinforcing mesh 150/150/4		50	
5	separation, protective	separation PE foil DEKSEPAR		0,2	
6	thermal insulation	PIR panel Puren FAL (rigid foam sheathed in aluminium)		140	0,193
7	waterproofing	2x asphalt strip GLASTEK 40 Special Mineral		4 + 4	
8	penetration, protect.	asphalt penetration coating		-	
9	base	base plain concrete, 2300 kg/m³	B	150	
10	separation, protective	separation geotextile FILTEK 300		-	-
11	leveling	compacted gravel sub-base, aggregate fraction 8/16 mm		200	-
Σ			F	200	0,193
Requirement for heat transfer coefficient $U_{pas,20}$ = 0,220 W/(m²K)		=> FULFILLED	FB	558	



F03 - Floor of the heated space adjacent to the ground (laminate)					
NO.	FUNCTION	DESCRIPTION INT - GROUND	PT.	THICKNESS [mm]	U [W/(m²K)]
1	aesthetic	laminate		8	-
2	adhesive	dispersion adhesive for carpets and PVC Den Braven		2	-
3	leveling	concrete screed, 2300 kg/m3 + reinforcing mesh 150/150/4	F	50	
4	separation, protective	separation PE foil DEKSEPAR		0,2	
5	thermal insulation	PIR panel Puren FAL (rigid foam sheathed in aluminium)		140	0,193
6	waterproofing	2x asphalt strip GLASTEK 40 Special Mineral		4 + 4	
7	penetration, protect.	asphalt penetration coating		-	
8	base	base plain concrete, 2300 kg/m³	B	150	
9	separation, protective	separation geotextile FILTEK 300		-	-
10	leveling	compacted gravel sub-base, aggregate fraction 8/16 mm		200	-
Σ			F	200	0,193
Requirement for heat transfer coefficient $U_{pas,20}$ = 0,220 W/(m²K)		=> FULFILLED	FB	558	

Notes: For calculations of the heat transfer coefficient values of individual structures, see annex THERMAL AND MOISTURE ASSESSMENT OF STRUCTURES

For the fire resistance of individual structures, see D.1.3-4 - D.1.3-7

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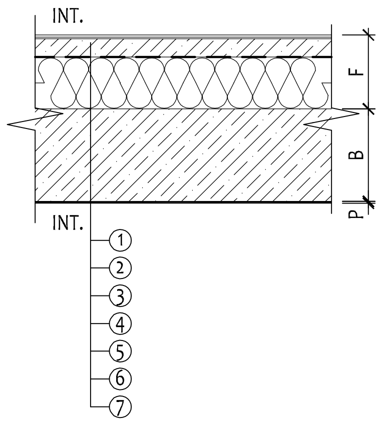
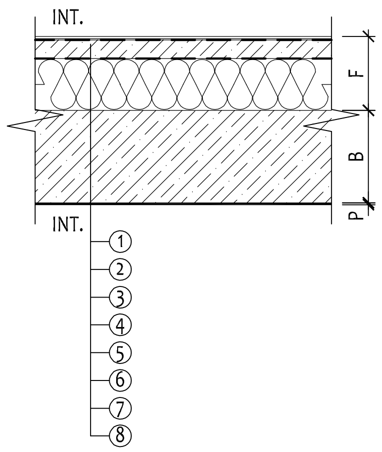
BUILDING'S NAME	Community Centre - Vodňany	LEVEL OF PD	DSP
SUBDIVISION	D.1.1 ARCHITECTURAL-CONSTRUCTION DESIGN	SCALE	NO.
CONTENT	LIST OF STRUCTURE COMPOSITIONS	1:20	D.1.1-15

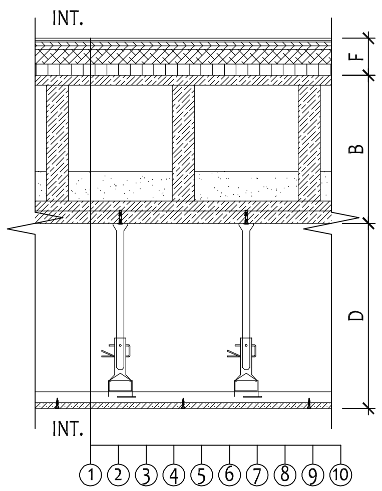


F06 - Floor without temperature difference or up to 10 °C max. (ceramic tiles) (above underground floor)						
NO.	FUNCTION	DESCRIPTION INT - GROUND	PT.	THICKNESS [mm]	R_w [dB]	$L_{n,w}$ [dB]
1	aesthetic	ceramic tiles	F	8	-	-
2	adhesive	adhesive for ceramic tiles Cemix 045 FLEX EXTRA		2	-	-
3	leveling	concr. screed, 2300 kg/m3 + reinf. mesh 150/150/4		50	-	-
4	separation, protective	separation PE foil DEKSEPAR		0,2	-	-
5	thermal insulation	Isover EPS 200		140	-	-
6	load-bearing	reinforced concrete C30/37, 2500 kg/m³	B	250	63 (-1; -5)	-
7	aesthetic	thin-layer gypsum plaster Cemix 136	P	5	-	-
Σ			F	200	63 (-1; -5)	-
Requirement for min. airborne sound insulation R'w ≥ - dB		=> FULFILLED	FB	450		
Requirement for maximum impact sound $L'_{n,w}$ ≤ - (58) dB		=> FULFILLED	FBP	455		

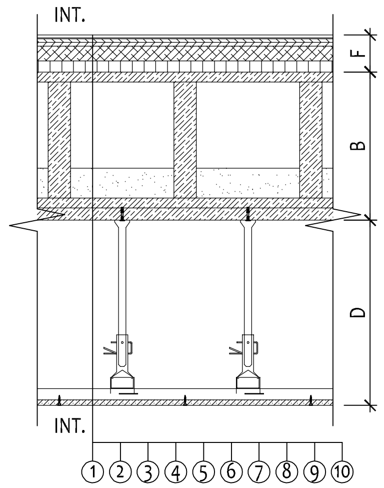
Notes: The sound insulation (max. impact sound) of the ceiling above the rehearsal room will be designed individually within the acoustic elements inside the room. (see notes)



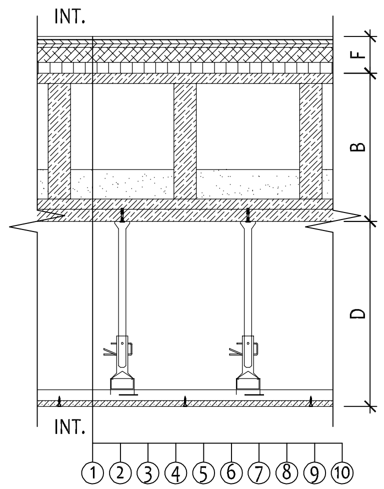
F07 - Floor without temperature difference or up to 10 °C max. (ceramic tiles, waterproof) (above underground floor)						
NO.	FUNCTION	DESCRIPTION INT - GROUND	PT.	THICKNESS [mm]	R_w [dB]	$L_{n,w}$ [dB]
1	aesthetic	ceramic tiles	F	8	-	-
2	adhesive	adhesive for ceramic tiles Cemix 045 FLEX EXTRA		2	-	-
3	waterproofing	one-component waterpr. KOUPELNA Den Braven		0,4	-	-
4	leveling	concr. screed, 2300 kg/m3 + reinf. mesh 150/150/4		50	-	-
5	separation, protective	separation PE foil DEKSEPAR		0,2	-	-
6	thermal insulation	Isover EPS 200		140	-	-
7	load-bearing	reinforced concrete C30/37, 2500 kg/m³	B	250	63 (-1; -5)	-
8	aesthetic	thin-layer gypsum plaster Cemix 136	P	5	-	-
Σ			F	200	63 (-1; -5)	-
Requirement for min. airborne sound insulation R'w ≥ - dB		=> FULFILLED	FB	450		
Requirement for maximum impact sound $L'_{n,w}$ ≤ - dB		=> FULFILLED	FBP	455		



F08 - Floor without temperature difference or up to 10 °C max. (carpet)						
NO.	FUNCTION	DESCRIPTION INT - INT	PT.	THICKNESS [mm]	R_w [dB]	$L_{n,w}$ [dB]
1	aesthetic + adhesive	carpet + dispersion adhesive Den Braven	F	6 + 4	-	-
2	underlay	Fermacell 2E11 (2x gypsum fibreboard)		20	62	54
3	TI, SI	fibreboard STEICO Therm		40		
4	leveling	sub-base Fermacell with honeycomb (45 kg/m²)		30		
5	load-bearing, sound insulation	three-layer spruce board	B	27		
6		wooden grate, limestone grit fill (40 kg/m²)		313		
7		three-layer spruce board		27		
8		three-layer spruce board		33		
9	air gap, (load-bearing)	air gap, dropped ceiling anchors	D	455 (max)	-	-
10	(load-bearing) + aesth.	steel grid made of CD profiles + PBD boards Knauf		30 + 15	-	-
Σ			F	100	62	54
Requirement for min. airborne sound insulation R'w ≥ 52 (57) dB		=> FULFILLED	FB	500		
Requirement for maximum impact sound $L'_{n,w}$ ≤ 58 (55) dB		=> FULFILLED	FBD	1000		



F09 - Floor without temperature difference or up to 10 °C max. (laminate)						
NO.	FUNCTION	DESCRIPTION INT - INT	PT.	THICKNESS [mm]	R_w [dB]	$L_{n,w}$ [dB]
1	aesthetic + adhesive	laminate + dispersion adhesive Den Braven	F	8 + 2	-	-
2	underlay	Fermacell 2E11 (2x gypsum fibreboard)		20	62	54
3	TI, SI	fibreboard STEICO Therm		40		
4	leveling	sub-base Fermacell with honeycomb (45 kg/m²)		30		
5	load-bearing, sound insulation	three-layer spruce board	B	27		
6		wooden grate, limestone grit fill (40 kg/m²)		313		
7		three-layer spruce board		27		
8		three-layer spruce board		33		
9	air gap, (load-bearing)	air gap, dropped ceiling anchors	D	455 (max)	-	-
10	(load-bearing) + aesth.	steel grid made of CD profiles + PBD boards Knauf		30 + 15	-	-
Σ			F	100	62	54
Requirement for min. airborne sound insulation R'w ≥ 52 (57) dB		=> FULFILLED	FB	500		
Requirement for maximum impact sound $L'_{n,w}$ ≤ 58 (55) dB		=> FULFILLED	FBD	1000		



F10 - Floor without temperature difference or up to 10 °C max. (ceramic tiles)						
NO.	FUNCTION	DESCRIPTION INT - INT	PT.	THICKNESS [mm]	R_w [dB]	$L_{n,w}$ [dB]
1	aesthetic + adhesive	ceramic tiles + adhesive Cemix 045 FLEX EXTRA	F	8 + 2	-	-
2	underlay	Fermacell 2E11 (2x gypsum fibreboard)		20	62	54
3	TI, SI	fibreboard STEICO Therm		40		
4	leveling	sub-base Fermacell with honeycomb (45 kg/m²)		30		
5	load-bearing, sound insulation	three-layer spruce board	B	27		
6		wooden grate, limestone grit fill (40 kg/m²)		313		
7		three-layer spruce board		27		
8		three-layer spruce board		33		
9	air gap, (load-bearing)	air gap, dropped ceiling anchors	D	455 (max)	-	-
10	(load-bearing) + aesth.	steel grid made of CD profiles + PBD boards Knauf		30 + 15	-	-
Σ			F	100	62	54
Requirement for min. airborne sound insulation R'w ≥ 52 (57) dB		=> FULFILLED	FB	500		
Requirement for maximum impact sound $L'_{n,w}$ ≤ 58 (55) dB		=> FULFILLED	FBD	1000		

Notes: For calculations of the heat transfer coefficient values of individual structures, see annex THERMAL AND MOISTURE ASSESSMENT OF STRUCTURES

For the fire resistance of individual structures, see D.1.3-4 - D.1.3-7

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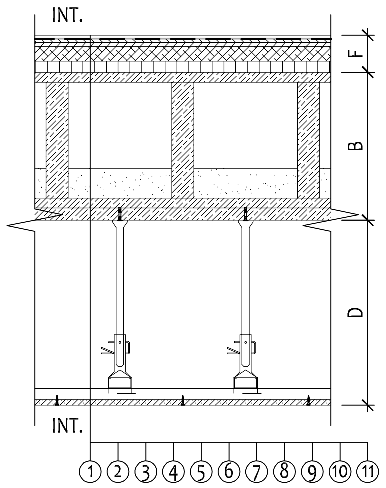
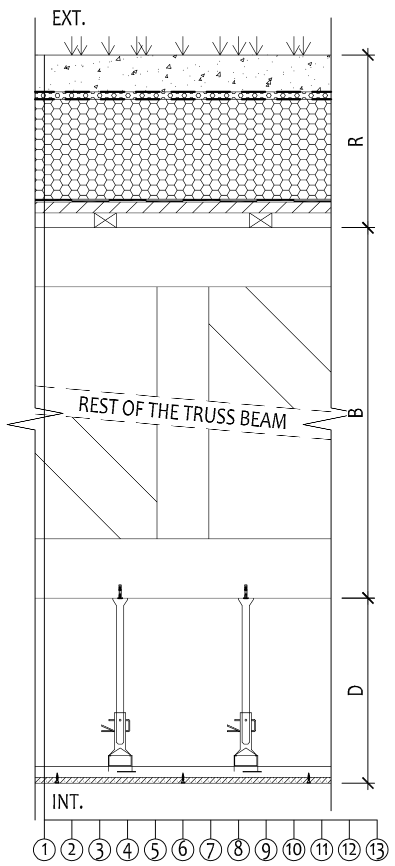
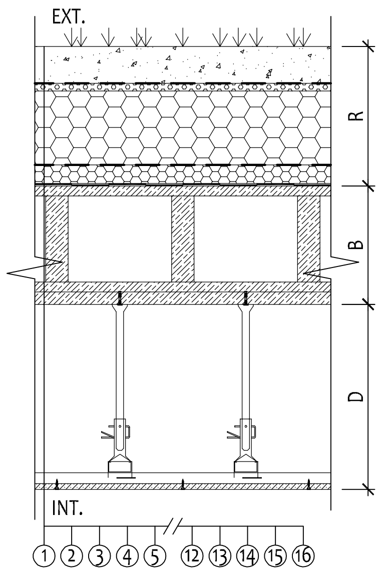
BUILDING'S NAME	Community Centre - Vodňany	LEVEL OF PD	DSP
SUBDIVISION	D.1.1 ARCHITECTURAL-CONSTRUCTION DESIGN	SCALE	NO.
CONTENT	LIST OF STRUCTURE COMPOSITIONS	1:20	D.1.1-16



F11 - Floor without temperature difference or up to 10 °C max. (ceramic tiles, waterproof)						
NO.	FUNCTION	DESCRIPTION INT - INT	PT.	THICKNESS [mm]	R_w [dB]	$L'_{n,w}$ [dB]
1	aesthetic + adhesive	carpet + dispersion adhesive Den Braven	F	6 + 4	-	-
2	waterproofing	one-component waterpr. KOUPELNA Den Braven		0,4	-	-
3	underlay	Fermacell 2E11 (2x gypsum fibreboard)		20	62	54
4	TI, SI	fibreboard STEICO Therm		40		
5	leveling	sub-base Fermacell with honeycomb (45 kg/m²)		30		
6	load-bearing, sound insulation	three-layer spruce board	B	27		
7		wooden grate, limestone grit fill (40 kg/m²)		313		
8		three-layer spruce board		27		
9		three-layer spruce board		33		
10	air gap, (load-bearing)	air gap, dropped ceiling anchors	D	455 (max)	-	-
11	(load-bearing) + aesth.	steel grid made of CD profiles + PBD boards Knauf		30 + 15	-	-
Σ			F	100	62	54
Requirement for min. airborne sound insulation $R'_w \geq 52$ (57) dB => FULFILLED			FB	500		
Requirement for maximum impact sound $L'_{n,w} \leq 58$ (55) dB => FULFILLED			FBD	1000		



R01 - Roof of the heated space (black box theatre)					
NO.	FUNCTION	DESCRIPTION EXT - INT	PT.	THICKNESS [mm]	U [W/(m²K)]
1	aesthetic + substrate	extensive greenery, roof substrate GREENDEK	R	100	-
2	filtration	geotextile FILTEK 150		-	-
3	drainage, hydroacc.	perforated stud membrane DEKDREN T20 GARDEN		20	-
4	waterproofing	PVC-P foil Fatrafol 810/V		2	0,123
5	separation, protective	separation geotextile FILTEK 300		-	
6	thermal insulation	Isover EPS 150		270	
7	vapour barrier	asphalt strip BITAGIT 40 AL+V60 Mineral Radon (melted)		4	
8	underlay	asphalt strip GLASTEK 30 Sticker Plus KVK (self-adhesive)		3	
9	underlay	board EGGER OSB 3		30	
10	load-bearing	wooden slatted grate 40/60		40	
11	load-bearing, sloping	wooden truss beams	B	1500 - 2000	-
12	air gap, (load-bearing)	air gap, dropped ceiling anchors	D	455 (max)	-
13	(load-bearing) + aesth.	steel grid made of CD profiles + PBD boards Knauf		30 + 15	-
Σ			R	469	0,123
Requirement for heat transfer coefficient $U_{pas,20} = 0{,}150$ W/(m²K) => FULFILLED			RB	1969 - 2469	
			RBD	2469 - 2969	



R02 - Roof of the heated space (rest of the building)					
NO.	FUNCTION	DESCRIPTION EXT - INT	PT.	THICKNESS [mm]	U [W/(m²K)]
1	aesthetic + substrate	extensive greenery, roof substrate GREENDEK	R	100	-
2	filtration	geotextile FILTEK 150		-	-
3	drainage, hydroacc.	perforated stud membrane DEKDREN T20 GARDEN		20	-
4	thermal insulation	XPS Isover STYRODUR 3000 CS		200	0,123 (0,072)
5	separation, protective	separation geotextile FILTEK 300		-	
6	waterproofing	PVC-P foil Fatrafol 810/V		2	
7	separation, protective	separation geotextile FILTEK 300		-	
8	sloping, TI	Isover EPS 150		50 - 250	
9	vapour barrier	asphalt strip BITAGIT 40 AL+V60 Mineral Radon (melted)		4	
10	underlay	asphalt strip GLASTEK 30 Sticker Plus KVK (self-adhesive)		3	
11	load-bearing, thermail insulation, (vapour barrier)	three-layer spruce board	B	27	
12		wooden grate		233	
13		three-layer spruce board		27	
14		three-layer spruce board		33	
15	air gap, (load-bearing)	air gap, dropped ceiling anchors	D	455 (max)	-
16	(load-bearing) + aesth.	steel grid made of CD profiles + PBD boards Knauf		30 + 15	-
Σ			R	379 - 579	0,123 (0,081)
Requirement for heat transfer coefficient $U_{pas,20} = 0{,}150$ W/(m²K) => FULFILLED			RB	699 - 899	
			RBD	1199 - 1399	

Notes: For calculations of the heat transfer coefficient values of individual structures, see annex THERMAL AND MOISTURE ASSESSMENT OF STRUCTURES

For the fire resistance of individual structures, see D.1.3-4 - D.1.3-7

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CONTENT	LIST OF STRUCTURE COMPOSITIONS	1:20	D.1.1-17