



VYSOKÉ UČENÍ TECHNICKÉ V BRNĚ
BRNO UNIVERSITY OF TECHNOLOGY

FAKULTA STAVEBNÍ
FACULTY OF CIVIL ENGINEERING

ÚSTAV POZEMNÍHO STAVITELSTVÍ
INSTITUTE OF BUILDING STRUCTURES

MOTEL
MOTEL

DIPLOMOVÁ PRÁCE
MASTER'S THESIS

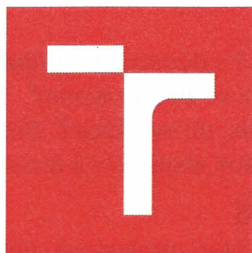
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BRNO 2017



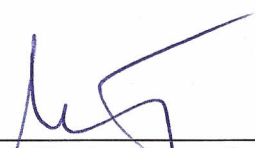
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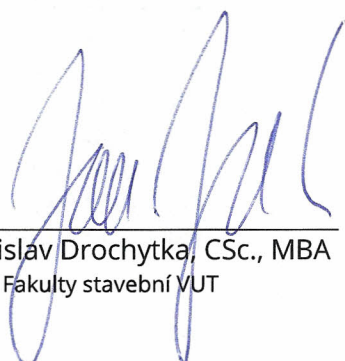
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ZADÁNÍ DIPLOMOVÉ PRÁCE

Student	Bc. et Bc. Iveta Beranová
Název	Motel
Vedoucí práce	Ing. arch. Ivana Utíkalová
Datum zadání	1. 11. 2016
Datum odevzdání	13. 1. 2017

V Brně dne 1. 11. 2016


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Děkan Fakulty stavební VUT



PODKLADY A LITERATURA

(1) Směrnice děkana č. 19/2011 s dodatkem a přílohami; (2) Katalogy a odborná literatura; (3) Stavební zákon č. 183/2006 Sb. ve znění zákona č. 350/2012 Sb.; (4) Vyhláška č. 499/2006 Sb. ve znění vyhlášky č. 62/2013 Sb.; (5) Vyhláška č. 268/2009 Sb.; (6) Vyhláška č. 398/2009 Sb.; (7) Platné normy ČSN, EN; (8) Vlastní dispoziční a architektonický návrh.

ZÁSADY PRO VYPRACOVÁNÍ

Zadání: Zpracování určené části projektové dokumentace pro provádění stavby objektu Motelu. **Cíle:** Vyřešení dispozice zadaného objektu s návrhem vhodné konstrukční soustavy a nosného systému na základě zvolených materiálů a konstrukčních prvků, včetně vyřešení osazení objektu do terénu s respektováním okolní zástavby. Dokumentace bude v souladu s vyhláškou č. 62/2013 Sb. obsahovat část A, část B, část C a část D v rozsahu části D.1.1, D.1.3 a D.1.4. Dále bude obsahovat studie obsahující předběžné návrhy objektu a jeho dispozičního řešení a přílohou část obsahující předběžné návrhy základů a rozměrů nosných prvků řešeného objektu, prostorovou vizualizaci objektu a technické listy použitých materiálů a konstrukcí. Část D.1.4 bude vypracována ve formě schématických výkresů a příslušných technických zpráv. Výkresová část bude obsahovat výkresy situace, základů, půdorysů všech podlaží, konstrukce zastřešení, svislých řezů, technických pohledů, min. 5 detailů, výkresy sestavy dílců, popř. výkresy tvaru stropní konstrukce. Součástí dokumentace budou i dokumenty podrobnosti dle D.1.1 bod c), stavebně fyzikální posouzení objektu a vybraných detailů popř. další specializované části, budou-li zadány vedoucím práce. **Výstupy:** VŠKP bude členěna v souladu se směrnicí děkana č. 19/2011 a jejím dodatkem a přílohami. Jednotlivé části dokumentace budou vloženy do složek s klopami formátu A4 opatřených popisovým polem a uvedením obsahu na vnitřní straně každé složky. Všechny části dokumentace budou zpracovány s využitím PC v textovém a grafickém CAD editoru. Výkresy budou opatřeny popisovým polem. Textová část bude obsahovat i položky h) "Úvod", i) "Vlastní text práce" jejímž obsahem budou průvodní a souhrnná technická zpráva a technická zpráva pro provádění stavby podle vyhlášky č. 499/2006 Sb. ve znění vyhlášky č. 62/2013 Sb. a j) "Závěr". VŠKP bude mít strukturu dle manuálu umístěného na www.fce.vutbr.cz/PST/Studium.

STRUKTURA DIPLOMOVÉ PRÁCE

VŠKP vypracujte a rozčleňte podle dále uvedené struktury:

1. Textová část VŠKP zpracovaná podle Směrnice rektora "Úprava, odevzdávání, zveřejňování a uchování vysokoškolských kvalifikačních prací" a Směrnice děkana "Úprava, odevzdávání, zveřejňování a uchování vysokoškolských kvalifikačních prací na FAST VUT" (povinná součást VŠKP).
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Ing. arch. Ivana Utíkalová
Vedoucí diplomové práce

Abstrakt

Diplomová práce se zabývá zpracováním projektové dokumentace pro provádění stavby. Konkrétně byly vypracovány části A, B, C, D.1.1 a D.1.3 přílohy č. 6 k vyhlášce č. 499/2006 Sb., o dokumentaci staveb, ve znění vyhlášky č. 62/2013 Sb. Dokumentace se týká motelu s restaurací navrženého pro 50 hostů. Pozemek se nachází v obci Modřice. Objekt se dělí na tři samostatné budovy. V hlavní budově je recepce, restaurace s kuchyní a kanceláře. Budova má jedno nadzemní a jedno podzemní podlaží. Ubytování je rozděleno do dvou budov, které jsou jednopodlažní. Ubytování je tvořeno samostatnými jednotkami se 4 nebo 2 pokoji spojenými společnou střechou. Všechny budovy jsou navrženy s plochou zelenou střechou. Na pozemku je řešeno i parkování pro veřejnost a návštěvníky restaurace, parkování pro ubytované hosty a soukromé parkoviště pro zaměstnance a zásobování.

Budovy jsou založeny na základových pasech z prostého betonu. Svislé nosné konstrukce jsou navrženy z vápenopískových tvárnic. Horizontální nosné konstrukce jsou navrženy z filigránových desek. Příčky jsou navrženy z pórobetonových tvárnic. Fasáda je zateplena deskami EPS. Sklon ploché střechy je vytvořen z EPS desek zkosených ve sklonu 3 %. Na střeše bude osazena vegetace (rozchodníky). Součástí práce je statický výpočet železobetonové desky jednoho schodišťového ramene.

Abstract

The diploma thesis deals with the processing of project documentation. Specifically, the parts A, B, C, D.1.1 and D.1.3 of Annex 6 to Regulation No. 499/2006 Coll., On construction documentation, as amended by Decree No. 62/2013 Coll. The documentation refers to a motel with restaurant designed for 50 guests. The plot is located in Troubsko. The motel is divided into three separate buildings. In the main building is reception, restaurant with kitchen and offices. The building has ground floor and underground floor. The accommodation is divided into two one-storey buildings. The buildings are formed by separate units with 4 or 2 rooms which are connected by one roof. All buildings are designed with flat green roof. There is parking lot for public and restaurant guests, for accommodated guests and private parking for employees and supply is solved on the plot.

The buildings are based on plain concrete foundation strips. Vertical load-bearing structures are designed from sand-lime. Horizontal load-bearing structures are designed from precast filigree slabs. Partitions are designed from autoclaved aerated concrete blocks. The facade is thermally insulated by EPS boards. The 3% slope of the roof is achieved by using tapered EPS boards. Vegetation (stone crops) will be planted on the roof. part of this thesis is static calculation and design of staircase slab from reinforced concrete.

Klíčová slova

projektová dokumentace, motel, motelový pokoj, restaurace, parkování, plochá střecha, zelená střecha, podzemní podlaží, vápenopískové zdivo, sádkartonový podhled

Keywords

project documentation, motel, restaurant, parking lot, flat roof, green roof, underground floor, sand-lime blocks, suspended ceiling

Bibliografická citace VŠKP

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Prohlášení:

Prohlašuji, že jsem diplomovou práci zpracovala samostatně a že jsem uvedla všechny použité informační zdroje.

V Brně dne 10.1.2017

.....
Bc. et Bc. Iveta Beranová

Prohlášení o shodě listinné a elektronické formy VŠKP

Prohlašuji, že elektronická forma odevzdané typ práce je shodná s odevzdanou listinnou formou.

V Brně dne 10. 1. 2017

Beranová

Bc. et Bc. Iveta Beranová

Poděkování:

Na tomto místě bych ráda poděkovala Ing. arch. Ivaně Utíkalové za její ochotu a moudré rady při vedení mé bakalářské práce. Dále patří velké díky mé rodině a přátelům za podporu při psaní této práce.

V Brně dne 10. 1. 2017


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Bc. et Bc. Iveta Beranová

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3. B Summary Technical Report
4. D.1.1.a Technical Report
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Introduction

The main aim of this thesis is to design project documentation for motel with restaurant, in particular, parts A, B, C, D.1.1 a D.1.3 of Annex 6 to Regulation No. 499/2006 Coll., On construction documentation, as amended by Decree No. 62/2013 Coll. The motel capacity should be 50 guests and restaurant capacity should be 80 guests. The design must follow applicable regulations and standards so that the building meets the required standard of living and working. The building is located in Modřice. As part of the work are executed drawings with a list of elements and compositions. Special attachment is devoted to building physics assessment of the building. Fire safety solutions are also made as a separate attachment. The work also contains documents, studies and data sheets of the proposed materials and products. Part of the thesis is also static calculation and design of staircase slab from reinforced concrete.



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A Accompanying report

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A.1 Identification information

A.1.1 Building information

Name of the Building: Motel
Address: Splavinská 1139, Modřice 664 42
Cadastral region: Modřice
Parcel number: 1952/9, 1952/10, 1952/21, 1952/22

A.1.2 Investor information

Owner and investor: A.X.A. s.r.o
Address: Holandská 4, Brno 639 00

A.1.3 Designer information

Designer: Bc. et Bc. Iveta Beranová
Supervisor: Ing. arch. Ivana Utíkalová

A.2 List of input information

Basic information about decision or arrangement on which base is the building permitted. Notation of building office/name of authorized inspector, date of process and number of negotiation decision.

Basis for preparation of documentation:

- feasibility study and architectural design,
- information form investor,
- solution of the locality,
- surveying of the parcel,
- surveying of utilities pipelines
- standards and regulations.

A.3 Site information

a) extend of building site

The plot is located in partially build-up area close to road E65 in Modřice municipality.

Building site area is 36847.7 m². Neighboring plots are owned by private companies. Investor owns the plot.

b) protection of the building site

The building is not located in floodplains nor nature reserve or protected conservation area. It is not necessary to follow any special regulations about protection.

c) building site outflow

The building plot is flatland with very low slope down towards East side of the plot. Rain water is gathered from roof by inlets and drain away to sewage system. All buildings have green roofs. Most of the plot is cover with grass. Parking lot is paved with grass concrete pavers to help water soaking in the plot.

d) spatial planing documentation

Spatial planning decision was issued.

e) spatial planing decision

The building is designed in agreement with spatial planing of Modřice municipality and spatial decision issued by building office Šlapanice.

f) conditions for usage of the site

Common condition for usage of the site will be fulfilled. The building is located on the plot in a such way that it fulfills requirement for distances from other plots and buildings.

g) condition from state authority

Legitimate demands of the authorities have been incorporated into the documentation.

h) list of exceptions and relief

No exceptions or reliefs concern this site.

i) list of related and conditioning investments

No related or conditioning investments concerns this building.

j) list of plots and buildings affected by the implementation of construction

The construction will affect only concerned plots with parcel numbers: 1952/9, 1952/10, 1952/21, 1952/22. Plots with parcel numbers 1952/37, 1952/32, which are public road, will be used as access road.

A.4 Building information

a) type of building

New building.

b) purpose of the building

Purpose of the building is temporary housing (motel) and restaurant.

c) permanent or temporary

Permanent building.

d) protection of the building site

The building is not located in floodplains nor nature reserve or protected conservation area. It is not necessary to follow any special regulations about protection.

e) technical requirements

Project documentation has been prepared in accordance with the conditions set in the amendment Act No. 183/2006 Coll., On Spatial Planning and Building Code (Building Act) and implementing regulations pursuant to this Act.

Decree:

- decree no. 499/2006 Coll., on construction documentation,
- decree no. 500/2006 Coll., on planing analytical materials, planning documentation and way of planning activities evidence,
- decree no. 501/2006 Coll., on general requirements for land use,
- decree no. 503/2006 Coll., on the details of territorial management,
- decree no. 268/2009 Coll., on technical requirements for buildings.

f) condition from state authorities

Legitimate demands of the authorities have been incorporated into the documentation.

g) list of exceptions and relief

No exceptions or reliefs concern this building.

h) design capacity

Build-up area:	1869.89 m ²
Paved surface:	15705.23 m ²
Grass area:	19272.58 m ²
Usable area:	1563.91 m ²

Design capacity:	27 rooms for 50 guests restaurant for 80 guests
Employees:	15

i) basic review of the building

Energy efficiency rating:	C
---------------------------	---

Detailed calculation of energy demands, gas and electricity consumption, rain water management and waste management is not solved in this diploma thesis.

j) time schedule

Orientation milestones:

Start of construction:	4/2017
Finish of earthworks:	5/2017
Finish of connections:	6/2017
Finish of load-bearing structure:	8/2017
Complete finishing:	10/2017
Hand over the building:	11/2017

k) cost

The orientation cost of the building is set on 80 mil CZK without WAT

A.5 Breakdown of construction on buildings and technological equipment

B1 – Main building – restaurant, reception, shop

A1 – Accommodation 1

B2 – storage, utility room, room for disabled

B3 – 4 single rooms

B4 – 4 double rooms

B5 – 2 double rooms

A2 – Accommodation 2

B6 – 2 double rooms

B7 – 4 double rooms

B8 – 4 double rooms

B9 – 4 double rooms

B10 – 2 double rooms

TE1 – Sewage connection

TE2 – Treated water connection

TE3 – Gas pipeline connection



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B Summary Technical Report

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B.1 Site description

a) building site description

The plot is located in partially build-up area close to road E65 in Modřice municipality. Building site area is 36847.7 m². The plot has roughly rectangular shape. The plot was used for agriculture so the building will be build on so called “green field”. The building plot is flatland with very low slope down towards East side of the plot.

b) research and analysis

In this area prevail clay with moderate plasticity F5-MI, load capacity $R_{dt}=235$ kPa. thickness of the layer might be more than 10 m. The radon risk is mild in this area. Underground water level is expected below this layer of clay.

The plot is not situated in archaeologically interesting area therefore no archaeological research was done. There are no building on the plot therefore no historical research was done.

c) protection and safety areas

The land does not go through any protective and safety zones. The construction will not interfere with any protective and safety zones.

d) flood-up area

The site I not located in floodplains. Also no mining areas or protected mineral deposits are located on the plot. The land does not lie in the undermined area or in its vicinity.

e) influence on surrounding

The building will not have any negative influence on its surrounding – buildings or plots. The building will not affect drainage conditions in the area. Most of the rain water will soak in the ground.

f) remediation, demolition, clearance

There are no buildings therefore no remediation nor demolition are necessary. There are no trees on the building site, clearance is unnecessary.

g) agricultural land resources

There are no requirements for confiscation or occupation of land from agricultural land source.

h) technical land conditions

Building will be connected to access road in street Splavinská in the southeast corner of the building site. The existing road will be elongated to connect with newbuild roads of the building.

The Building will be connected to the utilities networks – gas, water, electricity, and sewage. These networks are located on near the west boarder of the building site.

i) subject and time binding

The building do not require any subject and time binding limiting construction.

B.2 Overall building description

B.2.1 Building purpose

Build-up area:	1869.89 m ²
Paved surface:	15705.23 m ²
Grass area:	19272.58 m ²
Usable area:	1563.91 m ²
Design capacity:	27 rooms for 50 guests restaurant for 80 guests
Employees:	15

B.2.2 Architectonic and urban solution

a) urbanism

The building is located in outskirts area of the city next to important highway connection of the city center. this area is reserved mainly for shopping malls and motorests. The motel with restaurant fits in this area. With its simple design it does not disturb the landscape. And from the highway there will be nice view of the green roofs which can be used to bring some interesting colors in the area.

b) architecture

The motel is divided into three separate buildings – main building with restaurant and reception and two buildings of accommodation. The main building has clean easy shape with contrast of straight lines and curves. Facades oriented to the south and west have big windows to let in enough light. Accommodation buildings constitute of

separate units with 4 or 2 rooms connected by common roof which cover also parking plots. On the sides of the buildings the roof slope to the ground level. the roof is designed to be green roof so these building look like small hills and melt in the landscape. All building are not higher than ground floor. Cold hues of blue and turquoise are chosen for the facades. Dark ebony staining for the windows and doors will contrast with white parapet of flat roof of accommodation buildings.

B.2.3 Operation order

There will be no manufacturing in the building. The restaurant and kitchen will be open from 7:00 to 22:00.

B.2.4 Disability building usage

The public part of the main building is designed to enable access and free movement for people with disability. The pavements are designed with slopes there are no thresholds in the building. The rooms and width of door are designed to comply strict requirements. The private part of the building – offices, kitchen are not designed for access of people with disabilities. One accommodation unit is designed to comply with requirements for disabled.

B.2.5 Building usage safety

The building is designed so there is no unnecessary danger while using the building. To prevent fall from high places, railing are placed or greenery prevents the access to the edge. Nonskid paving is designed for the pavements. During the usage of the building relevant legislation will be followed.

B.2.6 Basic characteristics

a) building solution

The motel is divided into three separate buildings. All buildings have only ground level. The main building has also underground floor. The building have flat green roof. There are restaurant, kitchen, reception, offices and shop in the main building. Other two buildings are devoted to the accommodation. These two buildings consists of separate units with 4 or 2 rooms. Parking plot are located between neighboring units. These units are connected by common flat roof. Each room has vestibule, bedroom with small common area and bathroom.

b) structural and material solution

Main load-bearing element are wall build from sand-lime blocks. Peripheral walls

are build from sand-lime block thickness 150 mm and 150 mm EPS thermal insulation. Inner load-bearing walls are build from sand-lime blocks 300 mm thick. Partitions are made from autoclaved aerated concrete, thickness 125 mm. For horizontal load-bearing structures are used precast concrete filigree slabs. timber beams 120x240 mm are used for ceilings above parking lot in accommodation buildings. From the slabs is hanged suspending ceiling from gypsum plaster boards with CD profiles system. Roof is insulated with tapered EPS boards. The waterproofing layer is from PVC foil. The roof is designed as green roof with planted stone crops. Triple glazed wooden windows will be installed. Foundation are designed as concrete strip foundations. Staircase is cast in-situ reinforced concrete slabs with reinforced concrete slab landing.

c) Mechanical resistance and stability

All structural elements are made of traditional materials, sizes and technologies. Load capacity of construction materials is guaranteed by the system manufacturer.

B.2.7 Technical and technological equipment

The building will be connected to the the water conduit, sewage system, gas pipeline and LV cable. All connection (except sewage system) will end in technical room in the main building. In the main building will be gas boiler that will heat water for both heating and hot domestic water. Boiler will be connected to the chimney with feed of air from the outside.

B.2.8 Fire protection

See separate attachment PD – D.1.3 Fire safety.

B.2.9 Energy management

a) thermally technical assessment criteria

See separate attachment PD – Building physic.

b) energy performance of the building

Classification class of heat transfer through the building envelope: B.

c) assessment of the use of alternative energy sources

There are no alternative energy sources designed for the building.

B.2.10 Hygiene requirements

In the accommodation buildings the ventilation is provided naturally through

windows. Bathrooms will be ventilated by vent through the roof. In the main building ventilation system will be implemented, mainly for the kitchen and restaurant. Also some WC without access to the facade will be ventilated by vent through the roof. The building will be heated by radiator. Domestic water is supplied from water conduit. Daylighting is ensured by windows. Lighting will be described in electrical installation report and must fulfill standard requirements. Sewage waters will be drained into the sewerage system. Waste will be collected in containers and regularly removed. In the building there will be no substantial source of noise and vibrations. The building is designed so that noise would not endanger health.

B.2.11 Protection against negative influence

a) protection against radon

Protection against radon is provided by waterproofing bitumen felts in two layers placed on foundation slab and peripheral walls of underground floor.

b) protection against stray currents

Protection against stray currents is provided by electrical installations solution.

c) protection from technical seismicity

The building is not affected by technical seismicity.

d) protection against noise

Protection against noise is provided by peripheral wall from substantive construction materials (sand-lime blocks).

e) flood control

The building is not located in floodplains.

B.3 Technical infrastructure connections

Gas

The building will be supplied with gas from gas pipeline led by the west boarder of the plot. New gas connection from HDPE will be connected to the gas pipeline. Main gas shut-off valve is located near the plot borders in masonry pillar.

Domestic water

The building will be supplied with water from water conduit led by the west boarder of the plot. New water connection from HDPE will be connected to the water conduit. At the end of the connection will be water valve accessible from water

measuring shaft.

Sewage system

The building will be connected to the sewage system by new sewage connection from earthenware, which will end in control shaft on the plot border.

Electricity

The building will be supplied with electricity from low voltage system led by the west boarder of the plot.

B.4 Infrastructure

a) description of the traffic solution

As motel and restaurant the building needs to accommodate traffic and parking for reasonable amount of cars, buses and trucks. There are three main areas of parking: public parking for the restaurant, public parking for accommodation and private parking for employees and supply. With appropriate number of parking spaces for disabled.

b) connection to existing infrastructure

The building will be connected to the exit from highway E65. This exit continues as road at street Splavinská. This road will continue and turn to the motel parking from east side of the plot. The plot will be exited from west side of the plot connecting to the existing road.

c) parking

There will be public parking lot with 36 parking spaces for cars + 2 for disabled, perpendicular parking. And 11 spaces for buses and trucks, angle parking. For each guest rooms is designed one covered parking space next to the room, perpendicular parking. Privet parking will accommodate 10 cars, perpendicular parking

d) walking and cycling paths

No walking nor cycling paths are designed for this building.

B.5 Vegetation solution and landscape

a) landscape

The only excavations needed for the building is partial basement under the main building and foundation. Excavated soil will be used on the plot.

b) vegetation elements

Since the plot is opened without any trees or other vegetation, trees and bushes will be planted to shield the accommodation buildings. Also close to the public parking lot trees will be planted to provide shadow for rest. Flat roofs of the building will be used as green roofs, stone crops will be planted.

c) biotechnical equipment

No biological measures are required.

B.6 Environmental impact

a) impact to environment

The building will not have negative impact on environment. During the operation the building will not emit any air pollutant and the noise limit will not be exceeded. Sewage waters will be drain into sewage system. Rain water will be soaked in on the plot and excessive rain water will be drained to the sewage system. Waste will be accumulated in containers and regularly removed.

b) impact to landscape

On the land grow no protected trees or plants nor live there any rare and protected animals. No bio corridors run through the plot. Overall, the site does not play any vital role in the ecological character of the surrounding landscape. The building will not disturb the ecological balance.

c) impact to Natura 2000

The land is not listed as protected area of Natura 2000 nor is any protected area in its vicinity so it could be affected by the building.

d) impact to EIA

Inquiry proceedings of the EIA for this type of the building is not required.

e) safety zones

There are not proposed any protection or safety zones.

B.7 Protection of population

The building is not designed to protect population. Residents in case of threat will use the local population protection system. The building can be used only as a temporary shelter in peaceful conditions, eg. in case of release of hazardous gas.

B.8 Principles of organization of construction

a) construction energy supply

Supply point of water and electricity will be provided by the newly build connections for the building. For the purpose of hygiene and sanitary mobile toilets will be installed on the building site.

b) draining of the building site

Ground water does not reach the level of foundation structures and therefore not counting the device for pumping out the water. Alternatively, formation of large amounts of precipitation and groundwater existed the foundation base, this will have to be incurred solve these problems by using a submersible pump water from the footing bottom drain. Most of the water will be soaked in on the plot. The rest will be (after necessary treatment) lead to the sewage system.

c) connection to the existing infrastructure

The building site will be connected to the access road in street Splaviská in the southeast corner of the plot. The building site will be exited by road in the southwest corner of the site.

d) influence on surrounding buildings

Construction will no affect surrounding buildings. Only the public road will be used as access road. During the construction, impacts on site surroundings in terms of noise, vibrations, dust , etc. will be minimized.

e) environmental protection

Construction will no affect surrounding buildings. The construction site will fenced around its perimeter to a high of 1.80 m to ensure safe operation and prevent access of unauthorized persons. Nothing will be stored outside the building site. Measures will be taken against pollution of the surroundings eg. by blowing away of light waste or raising dust. There are no buildings therefore no remediation nor demolition are necessary. There are no trees on the building site, clearance is unnecessary.

f) Maximum occupation of the site

Permanent occupation of the site is defined by the boundary of the plot. It is unnecessary to permanently occupy neighboring plots. The need for temporary occupation of the site arises only during building of connection to the technical infrastructure. Temporary occupation of land will be the smallest possible extent and only for as long as necessary. These will be agreed upon in advanced with owner.

g) the maximum amount of and types of produced waste and emissions during construction, liquidation

During construction following wastes are produced. They were distinguished in accordance with the categorization of a catalog of waste in accordance with Decree no. 381/2001 Coll. Waste Catalogue as amended by Decree no. 503/2004 Coll. During the construction no products containing asbestos fibers, lead, tar and hazardous chemicals will be used.

Table 1: List of waste

#	Name and type	Category	Amount [t]
15 01 01	Paper packaging	O	0.7
15 01 03	Wooden packaging	O	0.1
15 01 02	Plastic packaging	O	0.4
17 01 01	Concrete	O	1,00
17 02 01	Wood	O	0.5
17 02 03	Plastic	O	0.5
17 04 02	Aluminium	O	0.3
17 04 05	Steel and iron	O	0.5
17 04 08	Cabels	O	0.5
17 06 04	Other insulation materials	O	0.5
16 02 05	Other discarded equipment	O	0.5
17 08 02	Gypsum based materials	O	0.2
200301	Municipal solid waste	O	1,00

Already on the site wastes are sorted and stored in containers to be taken to authorized recycling facilities authorized to waste disposal. Evidence of the transfer of waste to these establishments must contractor, respectively investor, keep for possible inspection.

h) balance of earthworks

The soil left after digging will be spent on land during land leveling. In the western part of the site is a temporary repository of topsoil and excavated soil. It is not necessary to import or export any soil on the plot.

i) environmental protection

During construction only devices and equipment in proper condition must be used so as to prevent oil leakage into the soil, respectively. into groundwater. All waste generated on site will be stored in containers and taken away for disposal. During construction must be eliminated pollution of air such as burnable waste burning or excessive dustiness. Contractors and persons engaged in the realization of the

construction will use mobile toilets. Vehicles will be cleaned before exiting from the construction site on the public road.

j) safety and health on the building site

During the execution of the works must be strictly adhered to Government Decree no. 591/2006 Coll. A specific minimum requirements for occupational safety and health on construction sites and government decree no. 362/2005 Coll. The detailed requirements for occupational safety and health at workplaces with danger of falling from a height or depth. Responsibility for security lies with the investor, contractors and construction supervision. Investor will provide plan for occupational safety and health on the construction site by Act no. 309/2006 Coll. Section 15, para. 2 according to the type and size of the building, if there are performed on-site work and activity that exposes an individual to increased danger to life or health. To do this here in accordance with Annex no. 5 of the Government Decree no. 591/2006 does not, because there is no fall from a height greater than 10 m. In terms of scope it is a small building so would be unnecessary to hire a coordinator for safety. Given the extent of the proposed work it can be assumed that on-site personnel will be employe by more than one supplier, so it is recommended to hire a coordinator for safety.

k) disabled access for affected buildings

Construction will not affect any other buildings, it is not necessary to make adjustments to their disability use.

l) principles for infrastructure measures

When supply site public transport and pedestrians will be respected. Temporary simple road signs indicating the entrance and exit from the site will be fitted at the entrance and exit to the site. Other traffic engineering measures are no anticipated.

m) specific conditions for carrying out the construction

The building is not limited to any special conditions, only at the entering and exiting of the site it is necessary to pay increased attention to surrounding traffic.

n) time schedule

Orientation milestones:

Start of construction:	4/2017
Finish of earthworks:	5/2017
Finish of connections:	6/2017

Finish of load-bearing structure:	8/2017
Complete finishing:	10/2017
Hand over the building:	11/2017



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INSTITUTE OF BUILDING STRUCTURES

MOTEL
MOTEL

D.1.1.a Technical Report

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MASTER'S THESIS

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BRNO 2017

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D.1.1.a.1 Purpose of the building, capacity

The purpose of the building is temporary housing. The building is motel with restaurant. Main building contains restaurant, kitchen, offices, reception and shop. The other two buildings are devoted to accommodation. There is combination of single and double rooms and suite for disabled. Each room has its own covered parking space, vestibule, bedroom and bathroom. All buildings have only ground floor. The main building has also underground floor with technical room. The buildings have flat green roof.

Build-up area:	1869.89 m ²
Paved surface:	15705.23 m ²
Grass area:	19272.58 m ²
Usable area:	1563.91 m ²
Design capacity:	27 rooms for 50 guests restaurant for 80 guests
Employees:	15

D.1.1.a.2 Architectonic solution, disabled use

The building is located in outskirts area of the city next to important highway connection of the city center. This area is reserved mainly for shopping malls and motorests. The motel with restaurant fits in this area. With its simple design it does not disturb the landscape. And from the highway there will be nice view of the green roofs which can be used to bring some interesting colors in the area.

The motel is divided into three separate buildings – main building with restaurant and reception and two buildings of accommodation. The main building has clean easy shape with contrast of straight lines and curves. Facades oriented to the south and west have big windows to let in enough light. Accommodation buildings constitute of separate units with 4 or 2 rooms connected by common roof which cover also parking plots. On the sides of the buildings the roof slope to the ground level. The roof is designed to be green roof so these buildings look like small hills and melt in the landscape. All buildings are not higher than ground floor. Cold hues of blue and turquoise are chosen for the facades. Dark ebony staining for the windows and doors will contrast with white parapet of flat roof of accommodation buildings.

The public part of the main building is designed to enable access and free movement for

people with disability. The pavements are designed with slopes there are no thresholds in the building. The rooms and width of door are designed to comply strict requirements. The private part of the building – offices, kitchen are not designed for access of people with disabilities. One accommodation unit is designed to comply with requirements for disabled.

D.1.1.a.3 Operation order, technology of manufacture

There will be no manufacturing in the building. The restaurant and kitchen will be open from 7:00 to 22:00.

D.1.1.a.4 Design and engineering solutions and technical characteristics

The motel is divided into three separate buildings. All buildings have only ground level. The main building has also underground floor. The building have flat green roof. There are restaurant, kitchen, reception, offices and shop in the main building. Other two buildings are devoted to the accommodation. These two buildings consists of separate units with 4 or 2 rooms. Parking plot are located between neighboring units. These units are connected by common flat roof. Each room has vestibule, bedroom with small common area and bathroom.

Main load-bearing element are wall build from sand-lime blocks. Peripheral walls are build from sand-lime block thickness 150 mm and 150 mm EPS thermal insulation. Inner load-bearing walls are build from sand-lime blocks 300 mm thick. Partitions are made from autoclaved aerated concrete, thickness 125 mm. For horizontal load-bearing structures are used precast concrete filigree slabs. timber beams 120x240 mm are used for ceilings above parking lot in accommodation buildings. From the slabs is hanged suspending ceiling from gypsum plaster boards with CD profiles system. Roof is insulated with tapered EPS boards. The waterproofing layer is from PVC foil. The roof is designed as green roof with planted stone crops. Triple glazed wooden windows will be installed. Foundation are designed as concrete strip foundations. Staircase is cast in-situ reinforced concrete slabs with reinforced concrete slab landing.

Foundations

All buildings have strip foundations from plain concrete C20/25. Foundations are placed below every load-bearing wall, staircase and chimney. Foundations under the ground floor are at level -1.020 mm (peripheral wall) and -0.620 (inner load-bearing wall).

These strips lower to the level of -3.720 mm under the underground floor by steps 500x500 mm. Strips are cast in prepared furrow in the ground. Under the two columns in main building pad footing from plain concrete is designed. In order to ensure the foundations are deep enough and to solve thermal bridge, under the foundation slab will be to layers of hollow concrete blocks (width 150 mm, height 200 mm) filled with concrete C 25/30. These will be thermally insulated by XPS boards from one side. The foundation slab is cast all over from concrete C 25/30 reinforced by steel mesh \varnothing 6 mm.

Peripheral load-bearing walls

Load-bearing walls are designed from sand-lime blocks 150x248x248 mm with masonry mortar for thin joints. Walls are thermally insulated with EPS boards thickness 150 mm using ETICS system to fulfill standard requirements for U-value. Peripheral walls of underground floor are penetrated by bitumen paint and waterproofed by 2 layers of bitumen felts. Then they are insulated by XPS boards thickness 140 mm.

Interior load-bearing structure

Load-bearing walls and columns are designed from sand-lime blocks 300x248x248 mm with masonry mortar for thin joints. Other type of load-bearing walls are walls from sand-lime blocks 150x248x248 mm bearing landing of the staircase and ceiling slabs in several places.

Partitions

Partitions are designed from autoclaved aerated concrete blocks 125x249x599 mm with masonry mortar for thin joints. They are anchored to other structures by metal strips embedded in the mortar.

Lintels

For from sand-lime blocks will be used lintels from sand-lime U blocks in thickness of the wall, height 249 and length depends on the opening. These block will be filled with concrete C25/30 and steel rods B500B according to structural design. For walls from AAC will be used.

Load-bearing horizontal structure

For load-bearing structure above the main building accommodation units are designed precast concrete filigree slabs with reinforcement B490 6,67 \varnothing R8/bm, 6,67 \varnothing R10/bm, distribution reinforcement \varnothing R8/350 mm finished with concrete C25/30. Recommended

bearing length at least 120 mm.

Overhangs in accommodation buildings are designed as cast in-situ concrete slab thickness 150 mm C25/30, B410B connected to the structure by concrete to concrete thermal break with 80 mm of EPS insulation.

Parking lot for accommodation is covered with slabs made from timber beams, impregnated spruce, 120x240 mm. Top cover is made from OSB/3 thickness 22 mm. The bottom cover is made from fire resistant gypsum fiber boards, thickness 15 mm. Beams are connected to the structure by concrete to wood thermal break with 80 mm of EPS insulation.

Staircase

Staircase in the main building from underground floor to the ground floor is designed as cast in-situ reinforced concrete slabs. The staircase has two flight and landing. For detailed calculation of the reinforcement see attachment Staircase – Structural report.

Chimney

The chimney is designed as three component system with ceramic flue, AAC casing , inner thermal insulation and feed of air from the outside. This system consists of blocks 400x400x249 mm with specific functions.

Duct shafts

All duct shafts will be build from gypsum plaster boards 12,5 mm and aluminum CD profile structural system. In bathrooms must be used water resistant gypsum plaster boards.

Plasters

Inner walls will be covered with one layer lightweight interior plaster, thickness 6 mm. Peripheral walls use system ETICS therefore there is to be used reinforcing adhesive mortar with reinforcing fiberglass mesh, penetration and silicate-silicone plaster. Overall thickness is 5 mm. For surfaces covered by boards only silicate-silicone plaster will be used, thickness 2 mm.

Roof

All roofs are designed to be flat green roofs. The vapor barrier is made from bitumen felts, thermal insulation using tapered EPS board to create slope 3%. There is used PVC foil as main waterproofing. PVC foil must be separated from EPS by geotextile. Water

will be accumulated in dimpled plastic sheet. Vegetation to be used are stone crops planted in 80 mm of extensive soil.

Parapets of the main building and above accommodation units are made from 3 layers of AAC blocks, thickness 125 mm. Parapets above parking lots for accommodation are build from truss beams covered by OSB. These parapets will be screwed in the load-bearing timber beam.

Floors

All floors are designed as heavy floating floors. Distribution anhydrite screed will be separated from wall by strip from mineral wool insulation, thickness 15 mm. Wear layer is usually ceramic tiles but in offices and bedrooms it is carpet. In bathrooms waterproofing membrane in the composition of the floor. The floors are thermally insulated with EPS boards.

Windows and floors

Windows are designed from wooden EURO frames with triple glazing and ebony staining. Windows are anchored to the wall by stainless steel plate. The window is place in the thermal insulation in order to eliminate the thermal bridge. Doors are also wooden with ebony staining and steel door frame. Sliding entrance doors open with photocell.

Paved areas

All pavements around the building will be paved from concrete pavers and ended with concrete curbs. Pavements are in slope 2 % from the building. Public and private parking lots are paved with concrete grass pavers. The road and parking lots for accommodation have wear layer from asphalt concrete.

Plinth

Up to 300 mm above the pavement will continue thermal insulation and water proofing from foundations in order to protect the plinth. Thermal insulation is XPS boards thickness 140 mm and waterproofing is two layers of bitumen felts. The transition from plinth to wall should be undetectable.

D.1.1.a.5 Building usage safety

The building is designed so there is no unnecessary danger while using the building. To prevent fall from high places, railing are placed or greenery prevents the access to the edge. Nonskid paving is designed for the pavements. During the usage of the building

relevant legislation will be followed to ensure safety in the work place.

D.1.1.a.6 Building physics

See separate attachment PD – Building physic.

Protection against radon is provided by waterproofing bitumen felts in two layers placed on foundation slab and peripheral walls of underground floor. Protection against stray currents is provided by electrical installations solution.

D.1.1.a.7 Fire safety

See separate attachment PD – D.1.3 Fire safety.

D.1.1.a.8 Required quality of proposed materials and workmanship

All materials used must have the required properties that are listed in the project documentation. The materials must be handled strictly in accordance with the conditions laid down by the manufacturer, and installation or implementation structures must be in accordance with instructions, and recommendations specific product or system. Observance of labor procedures and guidelines set by the manufacturer, provides the required quality of execution.

D.1.1.a.9 Innovative technological processes

In the PD there are proposed no unusual technological procedures. There are no specific requirements for implementation and quality of the proposed structures.

D.1.1.a.10 Requirements for preparation of the documentation provided by the contractor

No such a documentation is requested.

D.1.1.a.11 Inspections and control measurements

All structures will be properly controlled before covering, especially good laying thermal insulation (filling all the nooks and crannies). No special controls or measurements beyond the requirements of technical regulations and standards is necessary.

D.1.1.a.12 List of used standards

CSN 734301 Residential buildings

CSN 734130 Stairs and inclined ramps - Basic requirements

CSN 731901 Roof Design - Basic provisions

CSN 743305 Guard rails

CSN P 730600 Waterproofing of buildings - Basic provisions

CSN 734201 Chimneys and flues - Design, implementation and connection of fuel consumers

CSN 744505 Floors - Common provisions

CSN 736058 Individual, row and collective garages

CSN 730540-1 Thermal protection of buildings - Part 1: Terminology

CSN 730540-2 Thermal protection of buildings - Part 2: Requirements

CSN 730540-3 Thermal protection of buildings - Part 3: Design values of variables

CSN 730540-4 Thermal protection of buildings - Part 4: calculation methods

CSN 730532 Acoustics - Protection against noise in buildings and related acoustic properties of construction products - Requirements

CSN 730802 Fire safety of buildings - non-production buildings

CSN 730810 Fire safety of buildings - Common provisions

CSN 730818 Fire safety of buildings - persons

CSN 730824 Fire safety engineering - calorific value combustible materials

CSN 730873 Fire safety of buildings - fire water supply

CSN 730833 Fire safety of buildings - residential buildings and accommodation

Conclusion

In this thesis project documentation for motel with restaurant was designed, in particular, parts A, B, C, D.1.1 a D.1.3 of Annex 6 to Regulation No. 499/2006 Coll., On construction documentation, as amended by Decree No. 62/2013 Coll. The building is design in a way to fulfill urbanistic and architectural requirements of the locality. The motel is divided in three separate buildings – main building with reception and restaurant and two buildings for accommodation. The buildings are formed by separate units with 4 or 2 rooms which are connected by one roof. All buildings are designed with flat green roof. There is parking lot for public and restaurant guests, for accommodated guests and private parking for employees and supply is solved on the plot. The buildings are based on plain concrete foundation strips. Vertical load-bearing structures are designed from sand-lime. Horizontal load-bearing structures are designed from precast filigree slabs. Partitions are designed from autoclaved aerated concrete blocks. The facade is thermally insulated by EPS boards. The 3% slope of the roof is achieved by using tapered EPS boards. Vegetation (stone crops) will be planted on the roof so the building fits in the land more naturally.

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List of used symbols

EPS	Expanded polystyrene
XPS	Extruded polystyrene
ČSN	Czech national standard
DN	Pipe diameter
PU	Polyurethane
PD	Project documentation
AAC	Autoclaved aerated concrete
HDPE	High density polyethylene
OSB	Oriented strand board
s_d [m]	Diffusion equivalent thickness
λ [$\text{Wm}^{-1}\text{K}^{-1}$]	Thermal conductivity
ϕ [m]	Diameter
U [$\text{Wm}^{-2}\text{K}^{-1}$]	Thermal transmittance
U_f [$\text{Wm}^{-2}\text{K}^{-1}$]	Thermal transmittance – frame
U_g [$\text{Wm}^{-2}\text{K}^{-1}$]	Thermal transmittance – glazing
U_w [$\text{Wm}^{-2}\text{K}^{-1}$]	Thermal transmittance – window
b [m]	Breadth
h [m]	Height
l [m]	Length
A [m^2]	Area
Ψ_g [$\text{Wm}^{-1}\text{K}^{-1}$]	Thermal bridge coefficient – spacer
Ψ_f [$\text{Wm}^{-1}\text{K}^{-1}$]	Thermal bridge coefficient – frame
R [m^2KW^{-1}]	Thermal resistance
R_{si} [m^2KW^{-1}]	Surface thermal resistance – interior
R_{se} [m^2KW^{-1}]	Surface thermal resistance - exterior

List of attachments

Attachment 1 – C Site plans

Attachment 2 – D.1.1.b drawings

Attachment 3 – Compositions end elements

Attachment 4 – Fire safety

Attachment 5 – Building physics

Attachment 6 – Preparatory work and study design

Attachment 7 – Staircase – Structural report