

WORKS TENDER - LOT 1

Construction of Courthouse in Trebinje

**TECHNICAL SPECIFICATIONS**

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## CONTENT

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### **PART I - ARCHITECTURAL AND CIVIL DESIGN**

#### **ARCHITECTURE**

- TECHNICAL DESCRIPTION
- GENERAL INFORMATION
- LOCATION
- SITE LAYOUT
- BUILDING LAYOUT
- MEASUREMENT OF AREAS
- MATERIALS
- GENERAL SPECIFICATIONS OF WORKS

#### **STRUCTURE**

- TECHNICAL DESCRIPTION

### **PART II - ELECTRICAL INSTALLATIONS**

#### **HIGH VOLTAGE**

- TECHNICAL DESCRIPTION
- CONNECTIONS
- SWITCHBOARDS AND DISTRIBUTION CABINETS
- LIGHTING
- POTENTIAL EQUALIZATION
- PROTECTION AGAINST ELECTRIC SHOCK
- PROTECTION AGAINST ATMOSPHERIC DISCHARGE (LIGHTNING PROTECTION)

#### **LOW VOLTAGE**

- GENERAL SPECIFICATIONS
- LIST OF APPLIED TECHNICAL REGULATIONS
- INSTALLATION CONDITIONS
- TELEPHONE AND COMPUTER INSTALLATION
- FIRE DETECTION SYSTEM
- ANTI – INTRUSION SYSTEM
- VIDEO SURVEILLANCE SYSTEM
- INSTALLATION OF AUDIO – VIDEO EQUIPMENT
- COURTROOM
- ROOM FOR PROTECTED WITNESSES
- AV CONTROL ROOM

### **PART III - MECHANICAL INSTALLATIONS**

- POWER STATION- TECHNICAL ROOM
- HEAT PUMP / COOLING DEVICE
- HEAT EXCHANGER - WELL WATER / WATER FOR HEAT PUMP

- FRESH WATER FROM BOREHOLE
- WATER FILTER
- CIRCULATION PUMPS
- WATER TANK (ACCUMULATION VESSEL )
- HOT WATER TANK (ACCUMULATION VESSEL) OF SOLAR PANELS
- HEATING AND COOLING BY FAN COIL UNITS
- VENTILATION AND AIR CONDITIONING
- VENTILATION OF SANITARY FACILITIES

#### **PART IV - WATER SUPPLY AND SEWERAGE SYSTEM**

- WATER SUPPLY
- SEWERAGE

## **PART I ARCHITECTURAL AND CIVIL ENGINEERING DESIGN**

### **ARCHITECTURAL DESIGN**

#### **TECHNICAL DESCRIPTION**

#### **GENERAL INFORMATION**

Judicial institutions headquartered in Trebinje - Basic Court, District Court and the District Prosecutor's Office, are located at different locations in public administration buildings of the Austro-Hungarian period. Existing buildings, because of their age, do not meet the standards and needs for functioning of these institutions. For this reason, construction of a new public administration building, designed up to the highest standards, will enable centralized and more efficient work of these judicial institutions.

#### **LOCATION**

The building site is in the urban area of Trebinje, within the settlement "Zasad polje", on the plot comprised of cp 1465, 2552/4, 1259/2, 2291/19, 2291/54, 2291/52, 2291/53, 2291/57 (new survey) CM Trebinje I.

The plot is included in the applicable regulation plan of "Zasad polje", in place of the local fire department and part of former military barracks "Luka Vukalović".

Residential and administrative buildings, with their number of floors ranging from GF to GF+4, and a small building of religious character, are situated in the immediate surroundings.

The main pedestrian access to the building is enabled from Stepa Stepanovic Street, and vehicular access from part of an existing road on the south side of the building, until construction of a new road planned by the regulation plan.

#### **SITE LAYOUT**

The position of the planned building divides the parcel into two zones: a zone for public, free movement of passers-by, and a controlled area - interior courtyard, where the parking lot for employees and access for police vehicles are planned.

The building shall have three entrances. The main entrance shall be on the south-east side of the building, from the direction of the crossroads.

Two side entrances, for employees and detained persons, are provided from the inner courtyard, on the north-west side of the building.

#### **BUILDING LAYOUT**

The judicial institutions building is a five storey building (B+GF+3).

Functionally, the building is divided into 3 parts: premises of the Basic Court, premises of the District Court and the District Prosecutor's Office. In the basement, there are archive rooms of all the three judicial institutions. On the ground floor, there are Basic and District court courtrooms, with complementary offices. The Basic Court is located on the first floor, the District Court on the second, and the District Prosecutor's Office on the third.

Vertical communication between the floors is enabled by an electric-traction passenger elevator and staircases, and horizontal communication by corridors that lead to offices in the north and south wings.

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## **CIVIL WORKS ON THE JUDICIAL INSTITUTIONS BUILDING**

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### **Foundations**

The administrative building, elaborated in the technical documentation, represents a separate and unique structural unit. In accordance with the purpose of the facility, live loads on the ceilings have been determined. The number of floors is B+GF+3 floors.

The foundation structure is formed of 60 cm thick footings, and strip footings also 60cm thick. Vertical load acting on reinforced columns and walls is transferred to footings strip footings. The function of the foundation slab in the structural system is to interconnect the footings and prevent their relative movement during seismic action. The slab on the ground 15cm thick is cast in concrete together with the footings and strip footings.

### **Basement**

The basement area shall contain the rooms for archives and preservation of evidence of the District Court, Basic Court and District Prosecutor's Office.

The archives rooms are equipped with state-of-the-art equipment and materials of high technical performance. The floors shall be covered with wear-resistant PVC flooring, and the walls shall be painted with washable paints. The archive premises shall be fire-protected by a fire detection system with smoke detectors and fire doors. Entrance and exit to and from the archives area shall be controlled.

Court police premises, two detention rooms and a toilet are planned next to the side staircase of the south-west wing and entrance from the inner yard.

Technical rooms in the basement shall accommodate the main plant of mechanical installations and shall be designed in accordance with the standards, using contemporary materials.

### **Ground Floor**

The ground floor has a public character, in terms of visitor access. The ground floor consists of the following facilities: main entrance with windshield, reception, registry, and premises of the District and Basic Court, functionally separated in the south-west and north-east wing of the building. In the central part, there is an elevator and the main staircase, for access to all the other floors of the building.

The main entrance to the building is designed in the central, south-eastern part of the building, accessed from central stairs and two ramps for disabled access. In the entrance section, there is an entrance hall (windshield) with reception and registry office, leading to the central hall where the scanner and walk-through metal detectors are located, for visitor screening. Horizontal and vertical communication of visitors and employees is enabled from the central hall.

The southwest wing is intended for the courtroom of the District Court, court council chambers, audio-video rooms, and premises for interpreters and journalists. The entrance hall contains the registry office of the District Court. In this section, there are also the court police offices and toilets, as well as a secondary staircase which is accessed from the side entrance from the inner courtyard.

In the north-east wing of the ground floor, the Basic Court courtroom, court council chambers, registry office and toilets are designed.

### **First Floor**

The first floor is intended only for premises of the Basic Court.

In the south-west part, there are offices of the President of the Basic Court, secretary and administrative assistant, accounting unit, chambers (small courtrooms) of magistrates and civil judges. There are also ICT server rooms, toilets, and the necessary auxiliary rooms.

In the central part, along the main staircase, there are offices of the Criminal Division and volunteers. A small courtroom (which also functions as a meeting room), offices of the administrator, professional associates and litigation department are designed in the north-east wing, and at the end of the hall there is a library.

### **Second Floor**

The premises of the District Court shall be located on the second floor of the building.

In the central part, opposite the vertical communication, there are offices of the President of the District Court, secretary and administrative assistant.

In the south-west wing, there are 5 judges' chambers, a typist bureau, accounting, psychologist and rooms for protected witnesses. Next to the secondary staircase, there are an ICT and server room and toilets.

In the north-east part, there are a conference room, offices of legal associates and legal apprentices, accounting unit and a library. There are also toilets for employees with a janitor's room.

### **Third Floor**

The third floor is designed to accommodate the contents of The District Prosecutor's Office.

Next to the central staircase, the offices of the Prosecutor, his deputy and technical secretary are planned.

In the south-west wing, 4 Prosecutors' offices, the offices of the Prosecutor's Secretary, the team for war crimes, psychologists and accounting unit are designed. As concerns auxiliary rooms, there are ICT and server rooms and toilets for employees.

In the north-east section of the third floor, there are a registry office, rooms for interrogation and line-up, a conference room, a multi-purpose office and a library. There are also a kitchenette, toilets for employees and a janitor's room.

## MEASUREMENT OF AREAS

The measurement of areas is performed according to the Rules for Measurement of Areas and Volumes in Buildings ("Official Gazette of RS" no. 95/13).

### TABULAR OVERVIEW OF AREAS

Rules for Measurement of Areas and Volumes in Buildings ("Official Gazette of RS" N°. 95/13)  
**pravilnik za izračunavanje površina i zapremina objekata Službeni Glasnik Republike Srpske br. 95/13**

### BASEMENT FLOOR PLAN

		Obrada poda /Floor finishing	Obim (m') /Perimeter	Površina (m²) /Area	Koeficijent K1 /Coefficient K1	Redukovan a površina (m²) /Reduced area	Koeficijent K2 /Coefficient K2	Korigovana površina (m²) /Corrected area
Br. /N°	Naziv prostorije / Name of room							
1	Stepenišni hol / Hall with staircase	granitna keramika /granite ceramics	33.88	31.01	1.00	31.01	97%	30.08
1a	Lift / Elevator		8.37	4.73	1.00	4.73	97%	4.59
2	Arhiva (Osnovni sud) / Archives (Basic Court)	pvc pod /PVC floor	62.05	154.93	1.00	15.93	97%	150.28
3	Dokazi (Osnovni sud) / Evidence (Basic Court)	pvc pod /PVC flooring	18.01	19.86	1.00	19.86	97%	19.26
4	Arhiva (Okružni sud) / Archives (District Court)	pvc pod /PVC flooring	33.17	38.54	1.00	38.54	97%	37.39
5	Dokazi (Okružni sud) / Evidence (District Court)	pvc pod /PVC flooring	18.40	19.60	1.00	19.60	97%	19.01
6	Dokazi (Okružno tužilaštvo) / Evidence (District Prosecutor's Office)	pvc pod /PVC flooring	18.40	19.60	1.00	19.60	97%	19.01
7	Arhiva(Okružno tužilaštvo) /Archives (District Prosecutor's office)	pvc pod /PVC flooring	32.80	61.72	1.00	61.72	97%	59.87
8	Sudska policija / Court police	pvc pod /PVC flooring	18.40	19.60	1.00	19.60	97%	19.01
9	Pritvorska jedinica / Detention room	pvc pod /PVC flooring	13.85	11.64	1.00	11.64	97%	11.29
10	Wc / Toilet	keramika /ceramics	6.86	2.86	1.00	2.86	97%	2.77
10 a	Predprostor / Anteroom	granitna keramika /granite ceramics	6.72	2.76	1.00	2.76	97%	2.68
11	Pritvorska jedinica / Detention room	pvc pod /PVC flooring	12.75	9.42	1.00	9.42	97%	9.13
12	Hodnik / Corridor	granitna keramika /granite ceramics	17.10	11.12	1.00	11.12	97%	10.79

13	Stepenište / Staircase	granitna keramika /granite ceramics	18.40	19.60	1.00	19.60	97%	19.01
14	Tehničar / Technician	pvc pod /PVC flooring	18.65	21.36	1.00	21.36	97%	20.72
15	Tehnička soba / Technical room	pvc pod /PVC flooring	18.25	20.55	1.00	20.55	97%	19.94
16	Hodnik / Corridor	granitna keramika /granite ceramics	24.30	16.88	1.00	16.88	97%	16.37
<b>UKUPNA NETO KORISNA POVRŠINA SUTERENA /TOTAL NET USABLE AREA OF BASEMENT</b>				<b>485.78</b>		<b>485.78</b>		<b>471.20</b>
<b>UKUPNA BRUTO POVRŠINA SUTERENA /TOTAL GROSS AREA OF BASEMENT</b>								<b>545.73</b>

GROUND FLOOR PLAN								
		Obrada poda /Floor finishing	Obim (m <sup>3</sup> ) /Perimeter	Površina (m <sup>2</sup> ) /Area	Koeficijent K1 /Coefficient K1	Redukovana površina (m <sup>2</sup> ) /Reduced area	Koeficijent K2 /Coefficient K2	Korigovana površina (m <sup>2</sup> ) /Corrected area
<b>Br. /N°</b>	<b>Naziv prostorije /Name of room</b>							
	<b>Zajedničke prostorije / Common areas</b>							
1	Ulaz / Entrance	granitna keramika /granite ceramics	13.92	11.59	1.00	11.59	97%	11.24
2	Hol (sa stepeništima) / Hall (with staircases)	granitna keramika /granite ceramics	119.00	121.62	1.00	121.62	97%	117.97
3	Recepcija / Reception	parket /parquet	9.67	5.63	1.00	5.63	97%	5.46
4	Sudska policija / Court police	parket /parquet	9.67	5.63	1.00	5.63	97%	5.46
	<b>Okružni sud / District Court</b>							
5	Pisarnica / Court Registry	parket /parquet	24.04	31.19	1.00	31.19	97%	30.25
6	Sudska policija / Court police	parket /parquet	17.25	14.47	1.00	14.47	97%	14.04
7	Prevodilac/novinari / Interpreter/Journalists	parket /parquet	11.19	7.80	1.00	7.80	97%	7.56
8	AV- prostorija / Audio-Video room	parket /parquet	9.61	5.65	1.00	5.65	97%	5.48
9	Sudnica / Courtroom	parket /parquet	37.07	74.21	1.00	74.21	97%	71.98
10	Vijeće / Court council chambers	parket /parquet	11.71	8.27	1.00	8.27	97%	8.02
11	Sudska policija / Court police	parket /parquet	13.67	11.68	1.00	11.68	97%	11.32



12	Sudska policija / Court police	parket /parquet	13.41	11.24	1.00	11.24	97%	10.90
13 a	Wc (l) / Toilet for disabled access	keramika /ceramics	9.77	5.18	1.00	5.18	97%	5.03
13 b	Wc (ž) / Toilet (w)	keramika /ceramics	6.87	2.90	1.00	2.90	97%	2.81
13 b'		keramika /ceramics	5.60	1.89	1.00	1.89	97%	1.83
13c	Wc (m) / Toilet (m)	keramika /ceramics	7.01	2.99	1.00	2.99	97%	2.90
13c ,		keramika /ceramics	5.34	1.76	1.00	1.76	97%	1.71
14	Advokat / Attorney-at-law	parket /parquet	11.57	8.14	1.00	8.14	97%	7.90
15	Sudska policija / Court police	parket /parquet	11.57	8.14	1.00	8.14	97%	7.90
	<b>Osnovni sud /Basic Court</b>							
16 a	Wc (m) / Toilet (m)	keramika /ceramics	4.62	1.26	1.00	1.26	97%	1.22
16 a'		keramika /ceramics	4.75	1.25	1.00	1.25	97%	1.22
16 b	Wc (ž) / Toilet (w)	keramika /ceramics	4.63	1.27	1.00	1.27	97%	1.23
16 b'		keramika /ceramics	4.76	1.32	1.00	1.32	97%	1.28
17	Pisarnica / Court Registry	parket /parquet	35.97	47.94	1.00	47.94	97%	46.50
18	Šef pisarnice / Head of Registry Office	parket /parquet	12.07	8.89	1.00	8.89	97%	8.62
19	Vijeće / Court council chambers	parket /parquet	11.17	7.33	1.00	7.33	97%	7.11
20	Sudnica / Courtroom	parket /parquet	32.80	61.72	1.00	61.72	97%	59.87
21	Prijemna kancelarija / Mail reception office	parket /parquet	13.29	9.78	1.00	9.78	97%	9.49

<b>UKUPNA NETO KORISNA POVRŠINA PRIZEMLJA /TOTAL NET USABLE AREA OF GROUND FLOOR</b>		<b>480.73</b>		<b>480.73</b>		<b>466.31</b>
<b>UKUPNA BRUTO POVRŠINA PRIZEMLJA /TOTAL GROSS AREA OF GROUND FLOOR</b>						<b>546.07</b>

FIRST FLOOR PLAN - Basic Court								
		Obrada poda /Floor finishing	Obim (m') /Perimeter	Površina (m²) /Area	Koeficijent K1 /Coefficient K1	Redukovan a površina (m²) /Reduced area	Koeficijent K2 /Coefficient K2	Korigovana površina (m²) /Corrected area
Br. /N°	Naziv prostorije /Name of room							

1	Stepenišni hol / Hall with staircase	granitna keramika /granite ceramics	40.18	48.98	1.00	48.98	97%	47.51
2	Hodnik / Corridor	granitna keramika /granite ceramics	47.47	40.79	1.00	40.79	97%	39.56
3	Prekršajni sudija (+daktilograf) / Magistrate (+typist)	parket /parquet	18.66	20.36	1.00	20.36	97%	19.75
4	Prekršajni sudija (+daktilograf) / Magistrate (+typist)	parket /parquet	18.66	20.36	1.00	20.36	97%	19.75
5a	Predprostor / Anteroom	keramika /ceramics	6.63	2.75	1.00	2.75	97%	2.66
5b	Wc (ž) / Toilet (w)	keramika /ceramics	6.15	2.35	1.00	2.35	97%	2.27
5b'		keramika /ceramics	5.75	1.95	1.00	1.95	97%	1.89
5c	Wc (m) / Toilet (m)	keramika /ceramics	7.93	3.75	1.00	3.75	97%	3.64
5c'		keramika /ceramics	5.51	1.81	1.00	1.81	97%	1.75
5d	Ostava za čistačice / Janitor's room	keramika /ceramics	7.11	3.05	1.00	3.05	97%	2.96
6	Stepenište / Staircase	granitna keramika /granite ceramics	18.70	19.84	1.00	19.84	97%	19.24
7	Predsjednik / President of the Court	parket /parquet	22.01	28.18	1.00	28.18	97%	27.34
8	Tehnički sekretar / Administrative assistant	parket /parquet	16.23	15.33	1.00	15.33	97%	14.87
9	Sekretar / Secretary	parket /parquet	16.03	15.63	1.00	15.63	97%	15.16
10	Računovodstvo / Accounting unit	parket /parquet	13.62	11.29	1.00	11.29	97%	10.95
11	IKT prostorija / ICT room	pvc pod /PVC flooring	12.02	8.12	1.00	8.12	97%	7.88
12	Server prostorija / Server room	pvc pod /PVC flooring	12.03	8.15	1.00	8.15	97%	7.91
13	Građansko odjeljenje/sudnica / Civil Department/Courtroom	parket /parquet	20.81	26.93	1.00	26.93	97%	26.13
14	Građansko odjeljenje/sudnica / Civil Department/Courtroom	parket /parquet	22.27	31.01	1.00	31.01	97%	30.08
15	Krivično odjeljenje / Criminal Department	parket /parquet	17.90	18.35	1.00	18.35	97%	17.79
16	Volonteri / Volunteers	parket /parquet	15.99	15.14	1.00	15.14	97%	14.68
17	Krivično odjeljenje / Criminal Department	parket /parquet	17.90	18.35	1.00	18.35	97%	17.79
18	Stručni saradnik / Legal Associate	parket /parquet	17.81	18.61	1.00	18.61	97%	18.05
19	Izvršitelj-prekršajno odjeljenje / Bailiff - Offence Department	parket /parquet	15.33	11.73	1.00	11.73	97%	11.38
20	Izvršitelj-građansko odjeljenje / Bailiff - Civil Department	parket /parquet	16.75	15.67	1.00	15.67	97%	15.20

21	Biblioteka / Library	parket /parquet	14.92	10.59	1.00	10.59	97%	10.27
22	Sudnica/sala za sastanke / Courtroom/Conference room	parket /parquet	21.26	27.96	1.00	27.96	97%	27.12
23 a	Predprostor / Anteroom	keramika /ceramics	6.43	2.58	1.00	2.58	97%	2.51
23 b	Wc (ž) / Toilet (w)	keramika /ceramics	6.03	2.26	1.00	2.26	97%	2.19
23 b'		keramika /ceramics	5.63	1.88	1.00	1.88	97%	1.82
23c	Wc (m) / Toilet (m)	keramika /ceramics	8.07	3.91	1.00	3.91	97%	3.79
23c '		keramika /ceramics	5.63	1.88	1.00	1.88	97%	1.82
24	Ostava za čistačice / Janitor's room	keramika /ceramics	7.47	3.47	1.00	3.47	97%	3.37
25	Parnično odjeljenje / Litigation Department	parket /parquet	18.66	20.30	1.00	20.30	97%	19.69
26	Hodnik / Corridor	granitna keramika /granite ceramics	28.34	21.34	1.00	21.34	97%	20.70

<b>UKUPNA NETO KORISNA POVRŠINA 1. SPRATA /TOTAL NET AREA FIRST FLOOR PLAN</b>		<b>504.62</b>		<b>504.62</b>		<b>489.48</b>
<b>UKUPNA BRUTO POVRŠINA 1. SPRATA /TOTAL GROSS AREA FIRST FLOOR PLAN</b>						<b>574.49</b>

SECOND FLOOR PLAN - District Court								
		Obrada poda /Floor finishing	Obim (m <sup>1</sup> ) /Perimeter	Površina (m <sup>2</sup> ) /Area	Koeficijent K1 /Coefficient K1	Redukovan a površina (m <sup>2</sup> ) /Reduced area	Koeficijent K2 /Coefficient K2	Korigovana površina (m <sup>2</sup> ) /Corrected area
Br. /N°	Naziv prostorije /Name of room							
1	Stepenišni hol / Hall with staircase	granitna keramika /granite ceramics	40.18	48,94	1,00	48,94	97%	47.47
2	Hodnik / Corridor	granitna keramika /granite ceramics	46.12	38,44	1,00	38,44	97%	37.28
3	Psiholog / Psychologist	parket /parquet	18.66	20,36	1,00	20,36	97%	19.75
4	Zaštićeni svjedok / Protected Witness	parket /parquet	18.66	20,36	1,00	20,36	97%	19.75
4a		keramika /ceramics	7.11	3,05	1,00	3,05	97%	2.96
5a	Predprostor / Hall	keramika /ceramics	6.63	2,75	1,00	2,75	97%	2.66
5b	Wc (ž) / Toilet (w)	keramika /ceramics	6.15	2,35	1,00	2,35	97%	2.27
5b'		keramika /ceramics	5.75	1,95	1,00	1,95	97%	1.89

5c	Wc (m) / Toilet (m)	keramika /ceramics	7.93	3,75	1,00	3,75	97%	3.64
5c'		keramika /ceramics	6.51	1,81	1,00	1,81	97%	1.75
6	Stepenište / Staircase	granitna keramika /granite ceramics	18.70	19,84	1,00	19,84	97%	19.24
7	Sudija / Judge's chambers	parket /parquet	16.42	16,46	1,00	16,46	97%	15.97
8	Sudija / Judge's chambers	parket /parquet	20.48	22,45	1,00	22,45	97%	21.78
9	Sudija / Judge's chamber	parket /parquet	20.13	22,50	1,00	22,50	97%	21.82
10	Računovodstvo / Accountant office	parket /parquet	13.62	11,29	1,00	11,29	97%	10.95
11	IKT prostorija / ICT room	pvc pod /PVC flooring	12.02	8,12	1,00	8,12	97%	7.88
12	Server prostorija / Server room	pvc pod /PVC flooring	12.03	8,15	1,00	8,15	97%	7.91
13	Sudija / Judge's chambers	parket /parquet	17.94	18,97	1,00	18,97	97%	18.40
14	Sudija / Judge's chambers	parket /parquet	18.07	19,33	1,00	19,33	97%	18.75
15	Daktilo biro / Typist's office	parket /parquet	17.94	18,97	1,00	18,97	97%	18.40
16	Tehnički sekretar / Administrative assistant	parket /parquet	17.90	18,35	1,00	18,35	97%	17.79
17	Sekretar / Secretary	parket /parquet	16.01	15,14	1,00	15,14	97%	14.69
18	Predsjednik okružnog suda /President of the District Court	parket /parquet	17.90	18,35	1,00	18,35	97%	17.80
19	Sala za sastanke / Conference room	parket /parquet	17.94	18,97	1,00	18,97	97%	18.40
20	Stručni saradnik / Legal Associate	parket /parquet	18.07	19,33	1,00	19,33	97%	18.75
21	Biblioteka / Library	parket /parquet	17.94	18,97	1,00	18,97	97%	18.40
22	Pripravnik / Legal apprentice	parket /parquet	11.20	7,53	1,00	7.53	97%	7.31
23	Višenamjenska kancelarija / Multi-purpose office	parket /parquet	16.53	16,66	1,00	16.66	97%	16.16
24 a	Predprostor / Anteroom	keramika /ceramics	6.43	2,58	1,00	2.58	97%	2.51
24 b	Wc (ž) / Toilet (w)	keramika /ceramics	6.03	2,26	1,00	2.26	97%	2.19
24 b'		keramika /ceramics	5.63	1,88	1,00	1.88	97%	1.82
24c	Wc (m) / Toilet (m)	keramika /ceramics	8.07	3,91	1,00	3.91	97%	3.79
24c ,		keramika /ceramics	5.63	1,88	1,00	1.88	97%	1.82
25	Ostava / Storage	keramika /ceramics	7.21	3,21	1,00	3.21	97%	3.12
26	Računovodstvo / Accountant office	parket /parquet	18.66	20,36	1,00	20.36	97%	19.75

27	Hodnik / Corridor	granitna keramika /granite ceramics	33.68	24,35	1,00	24.35	97%	23.62
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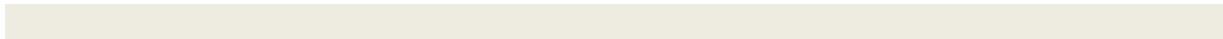
<b>UKUPNA NETO KORISNA POVRŠINA 2. SPRATA /TOTAL NET USABLE AREA OF THE SECOND FLOOR</b>		<b>503.54</b>		<b>503,. 4</b>		<b>488.43</b>
<b>UKUPNA BRUTO POVRŠINA 2. SPRATA /TOTAL GROSS AREA OF THE SECOND FLOOR</b>						<b>574.49</b>

THIRD FLOOR PLAN - District Prosecutor's Office								
		Obrada poda /Floor finishing	Obim (m <sup>1</sup> ) /Perimeter	Površina (m <sup>2</sup> ) /Area	Koeficijent K1 /Coefficient K1	Redukovan a površina (m <sup>2</sup> ) /Reduced area	Koeficijent K2 /Coefficient K2	Korigovana površina (m <sup>2</sup> ) /Corrected area
Br. /N°	Naziv prostorije /Name of room							
1	Stepenišni hol / Hall with staircase	granitna keramika /granite ceramic	40.18	48.94	1.00	48.94	97%	47.47
2	Hodnik / Corridor	granitna keramika /granite ceramic	46.12	38.44	1.00	38.44	97%	37.28
3	Sekretar tužilaštva / Secretary of Prosecution	parket /parquet	18.53	19.98	1.00	19.98	97%	19.38
4	Daktilografi / Typists	parket /parquet	18.79	20.74	1.00	20.74	97%	20.12
5a	Predprostor / Hall	keramika /ceramic	6.63	2.75	1.00	2.75	97%	2.66
5b	Wc (ž) / Toilet (w)	keramika /ceramic	6.15	2.35	1.00	2.35	97%	2.27
5b'		keramika /ceramic	5.75	1.95	1.00	1.95	97%	1.89
5c	Wc (m) / Toilet (m)	keramika /ceramic	7.93	3.75	1.00	3.75	97%	3.64
5c'		keramika /ceramic	5.51	1.81	1.00	1.81	97%	1.75
5d	Ostava za čistačice / Janitor's room	keramika /ceramic	7.11	3.05	1.00	3.05	97%	2.96
6	Stepenište / Staircase	granitna keramika /granite ceramic	18.70	19.84	1.00	19.84	97%	19.24
7	Psiholog / Psychologist	parket /parquet	16.42	16.46	1.00	16.46	97%	15.97
8	Tim za ratne zločine / War Crimes Team	parket /parquet	20.48	22.45	1.00	22.45	97%	21.78

9	Okružni tužilac / District Prosecutor	parket /parquet	20.13	22.50	1.00	22.50	97%	21.82
10	Računovodstvo / Accountant office	parket /parquet	13.62	11.29	1.00	11.29	97%	10.95
11	IKT prostorija / ICT room	pvc pod /pvc floor	12.02	8.12	1.00	8.12	97%	7.88
12	Server prostorija / Server room	pvc pod /pvc floor	12.03	8.15	1.00	8.15	97%	7.91
13	Tužilac- organizovani kriminal / Prosecutor - Organized Crime	parket /parquet	17.94	18.97	1.00	18.97	97%	18.40
14	Tužilac- opšti kriminal / Prosecutor - General Crime	parket /parquet	18.07	19.33	1.00	19.33	97%	18.75
15	Tužilac- opšti kriminal / Prosecutor - General Crime	parket /parquet	17.94	18.97	1.00	18.97	97%	18.40
16	Zamjenik glavnog tužioca / Deputy Chief Prosecutor	parket /parquet	17.90	18.35	1.00	18.35	97%	17.80
17	Tehnički sekretar / Technical Secretary	parket /parquet	16.01	15.14	1.00	15.14	97%	14.69
18	Glavni tužilac / Chief Prosecutor	parket /parquet	17.90	18.35	1.00	18.35	97%	17.79
19	Sala za sastanke / Conference room	parket /parquet	17.94	18.97	1.00	18.97	97%	18.40
20	Biblioteka / Library	parket /parquet	15.20	11.37	1.00	11.37	97%	11.03
21	Sala za saslušanje / Interrogation room	parket /parquet	16.75	15.67	1.00	15.67	97%	15.20
22	Sala za prepoznavanje / Line-up room	parket /parquet	14.92	10.59	1.00	10.59	97%	10.27
23	Čajna kuhinja / Kitchenette	keramika /ceramic	11.20	7.53	1.00	7.53	97%	7.31
24	Višenamjenska kancelarija / Multi-purpose office	keramika /ceramic	17.40	18.10	1.00	18.10	97%	17.56
25	Ostava za čistačice / Janitor's room	keramika /ceramic	7.98	3.92	1.00	3.92	97%	3.80
26 a	Predprostor / Anteroom	keramika /ceramic	6.94	3.00	1.00	3.00	97%	2.91
26 b	Wc (ž) / Toilet (w)	keramika /ceramic	5.59	1.91	1.00	1.91	97%	1.85
26 b'		keramika /ceramic	5.56	1.82	1.00	1.82	97%	1.77
26c	Wc (m) / Toilet (m)	keramika /ceramic	6.18	2.26	1.00	2.26	97%	2.19
26c '		keramika /ceramic	5.31	1.74	1.00	1.74	97%	1.69
27	Pisarnica+ upisničar / Registry + Clerk	parket /parquet	18.66	20.36	1.00	20.36	97%	19.75
28	Hodnik / Corridor	granitna keramika /granite ceramic	33.57	24.18	1.00	24.18	97%	23.45

<b>UKUPNA NETO KORISNA POVRŠINA 3. SPRATA /TOTAL NET USABLE AREA OF THE THIRD FLOOR</b>		<b>503.07</b>		<b>503.07</b>		<b>487.98</b>
<b>UKUPNA BRUTO POVRŠINA 3. SPRATA /TOTAL GROSS AREA OF THE THIRD</b>						<b>574.49</b>

<b>FLOOR</b>				
<b>UKUPNA NETO KORISNA POVRŠINA OBJEKTA/ TOTAL NET USABLE AREA OF THE BUILDING</b>		<b>2,477.7 4</b>		<b>2,403.40</b>
<b>UKUPNA BRUTO POVRŠINA OBJEKTA /TOTAL GROSS AREA OF THE BUILDING</b>				<b>2,815.27</b>



## **MATERIALS**

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### **Facade and Metal Works**

In accordance with the function of the building and contemporary architectural design, the facade is designed to provide the required level of thermal protection while meeting all aesthetic criteria. The facade cladding solution consists of:

- Thermally insulated façade, on the dominant surface of the façade walls. Insulating lining is made of hard-pressed rockwool, anchored to the walls, overlaid with a reinforced layer of façade adhesive, and then with stucco finishing.
- Stone cladding, which is made of regular polished panels, mounted onto the previously prepared structure fixed to the wall by special anchors. The thermal coating is also hard-pressed rockwool, anchored to the wall. Lining spacing by means of substructure enables a layer for façade ventilation.
- Structural glass facade, with glass panels resting on their own bearing structure.

All metal works are made of multi-chamber aluminium profiles with thermal bridges. Glazing is performed with UV-resistant argon-filled thermal glass.

### **FINISHING OF INTERIOR WALLS, FLOORS AND CEILINGS**

#### **Exterior Walls**

All basement walls are made of reinforced concrete plastered with lime mortar, smoothed and painted with oil paint.

Exterior walls of above-ground floors, are form in a smaller portion out of structural reinforced concrete canvases 25cm thick, and in a larger portion of brick blocks with vertical cavities 25cm thick. Interior walls are plastered with lime mortar, and then smoothed and painted with acrylic paints.

#### **Interior Walls**

Partly made of brick blocks d = 25cm, plastered on both sides, smoothed and painted with acrylic paint. Part of the walls is made by dry process. These 125mm thick partition walls are made by placing appropriate double gypsum boards on a metal substructure. Soundproofing is achieved with mineral wool d = 75mm. After bandaging, these walls shall be smoothed and painted with acrylic paints.

#### **Ceilings**

In all rooms and toilets, there are 60x60 suspended ceiling grids, mounted on a special metal substructure. The ceiling structure is fixed by regulating metal suspenders to the reinforced concrete ceiling. The ceiling is filled with standard gypsum boards.

Ceilings in all toilets are of aluminium sealed "Dampa" type.

On entrance canopies, a ceiling of waterproof cement-based panels shall be built. Panels shall be mounted on galvanized structure.

#### **Floors**

The floors in offices and courtrooms are covered with parquet flooring with angular masks, and those in halls, corridors, kitchen and sanitary facilities are covered with granite and ceramic tiles. For floors in archives rooms, PVC flooring is planned, made of non-combustible, self-extinguishing materials with a high level of abrasion resistance.



### **Internal Joinery**

Internal joinery is wooden, lacquered with matte paint.

On door frames of all courtrooms, illuminated signs "trial in progress" shall be installed.

The doors of the technical room and archives rooms meet the fire standards and the standards for controlled access.

Electronic lock with encoding system for opening, and soundproof door leaf (padded on the inside) are planned for the doors of the court President's room and meeting room.

### **Roof**

The roof is flat and non-walkable. The roof covering is formed of thermal insulation and waterproofing layers. The final layer is gravel.

### **Installations**

Installations of water supply system, sewerage, electrical system, TT, lightning protection system and central heating system are planned in the building.

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## **GENERAL SPECIFICATIONS OF WORKS**

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### **TECHNICAL SPECIFICATIONS**

- All works shall be carried out according to technical documentation and the quality assurance and control program, with a commitment to acceptance of general specifications for each group of works.
- The contractor of works is obligated to check the conditions provided by competent services and public companies in the process of issuing of the construction permit, and to carry out the works in compliance with them.
- The contractor of works shall execute all works in compliance with the bill of quantities and project documents, engaging experienced associates qualified for particular kinds of works.
- Before undertaking the works, the contractor is obligated to inspect the building site and define the access and transport to the site, to secure the site from unauthorized access, to determine the method of scaffolding setup, etc., and to provide electricity and water service outlets.
- The contractor is obligated to keep the construction log and, before the works start, to inform the competent town inspection committee, and then the Investor as well.
- The contractor is obligated to eliminate any damages inflicted during the works execution, and keep the site clean and to take all waste to the planned municipal landfill on daily basis.
- The contractor is obligated to procure all material necessary for the execution of the planned works within the deadline. In case some material is not available at the market, the contractor is obligated to consult the design engineer before purchasing a substitute material which, in terms of price and quality, represents a suitable replacement for execution of planned works.

- In case of any doubts about the method of works execution, quantities or prices, the design engineer and the supervisory body shall be notified in due time. The contractor shall clarify any uncertainties with the design engineer before the beginning of works.
- Before the beginning of works, the quality of construction material should be inspected by the design engineer or supervisory engineer, and the works shall be executed in compliance with technical documentation for construction materials.
- Before the beginning of works, it is obligatory to perform regular control tests at the site. Any changes in details or used material shall be agreed between the contractor and the design engineer or supervising engineer.
- It is prohibited to execute the works using the construction materials (either basic or auxiliary) not foreseen in technical documentation, unless the changes are previously agreed between the contractor and the design engineer or supervising engineer.
- If the contractor performs the works improperly, or uses inadequate construction material, he shall, at his own cost, execute such works using materials of adequate quality and in the stipulated manner, having previously removed the improperly executed items of works.
- If prior to execution of works the contractor finds that the conditions for works execution have changed, he is obligated to warn the supervising engineer on that matter, to solve it in agreement and to establish a new method of works execution and enter it in the construction log.
- During the works execution, the contractor shall protect all parts of the structure – civil works, and any previously executed civil works, and prevent damages, all in compliance with the Rulebook on Protection at Work. Costs of protection at work are included in the contract price of civil works.
- If previously performed works (for which the contractor or his co-worker are responsible) should get damaged, the contractor is obligated to reconstitute them at his own cost. The repair should be performed within framework of agreed deadline for completion or as agreed.
- All incorporated construction material shall meet the conditions and details from technical documentation, applicable standards and norms for construction, that is, technical specifications for construction and finishing works and, if it is specifically required by the design, other regulations, too. The contractor is obligated to prove the quality of incorporated materials and the qualifications of workers by adequate certificates and licenses, issued by competent institutions.
- At the end of the works, and during the works, if necessary for the harmonization with other contractors, the contractor is obligated to clear the site and previously executed items of works from all waste generated during his works or works of his sub-contractor, at his own cost, including the removal of remaining construction debris, devices and machinery for construction.
- The contractor is obligated to remove all protective and auxiliary structures within the deadline provided for the works execution, at his own cost.

### **SCHEDULE OF WORKS**

- The contractor is, in compliance with his offer, obligated to enclose the schedule of works, and if the investor should ask for a shortening of the proposed deadline, he should define the structure of the increased engagement of capacities which would enable completion in such a shorter deadline. The supervisory body performs constant control of engagement of contractor's planned capacities.
- When planning the schedule of works, the contractor should take into account the provision of conditions of work in unfavourable weather or at low or high temperatures.
- The contractor is obligated to ensure unobstructed execution of works, according to the deadline determined by the contract, and to provide timely for transport of materials, tools, machines, expert workforce during the works, that is, until the building reaches its full functionality.
- When submitting the offer, the contractor shall deliver the operative plan, site organization scheme, the list of necessary machines tools and the list of workers and responsible persons who will be present at the site.

### **CERTIFICATES AND WARRANTY PERIOD**

- Applicable standards and norms shall apply to all used materials, technical data and terms specified in technical and contract documentation.
- Electricity, water supply, sewerage and other installations should be tested at the end of the works, performing pressure test and heating system testing, and all certificates shall be obtained according to regulations and contents of project documents, applicable laws and rulebooks, and all installations shall functionally correct and ready for commissioning.
- Diagrams of installations, operation manuals and warranty certificates for all built-in devices shall be handed over to the investor. All test and certificates are the contractor's responsibility.
- The contractor is obligated to guarantee for all the works performed, used materials and equipment. The warranty period is determined in the contract on works execution. If the built-in equipment is covered by a longer warranty period than the building and executed civil works, the investor shall obtain the warranty coverage directly from the manufacturer, based on the list of warranties submitted by the contractor.

### **PROTECTION AT WORK**

- The contractor is obligated to conform to regulations on protection at work.
- The elements of protection at work are included in the price of civil works and shall be implemented at contractor's cost.
- During the works execution, all required measures of protection at work and fire protection must be applied.

- If the supervising engineer identifies any irregularities or complete non-compliance of the contractor with these regulations, he may suspend the works until the works are organised in compliance with regulations on protection at work.

#### **SITE ORGANIZATION AND CONNECTION TO INSTALLATIONS**

- Site organisation scheme with the plan of movements and energy connection, shall be submitted by the contractor to the investor for review and approval. The contractor is obligated to ensure, at his own cost, the site access, electricity service outlet and water service outlet, for site requirements, by means of a contract signed with competent public utility companies.
- General specifications of works constitute an integral part of the contract on works execution.

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## **STRUCTURE**

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### **CONTENT**

Project documentation for the structural engineering phase was prepared in parallel with the architectural design, with which it is harmonized in terms of sizes of the building and all elements contained therein. After demolition of existing structure, it is necessary to investigate the soil in order to determine the actual parameters of load bearing capacity, to carry out monitoring and testing of soil condition during earthworks. If the parameters of the soil bearing capacity cannot meet the conditions for founding, it is necessary to carry out further deepening of excavation and soil replacement. For the designed shape of the foundation structure, maximum stress at the foundation joint should not exceed the value of 180 kN / m<sup>2</sup>.

Load cases were adopted according to current regulations.

Dead load consists of the dead weight of the structure (columns, supporting walls, beams, ceiling) and the weight of non-bearing elements (walls of filling, floors, roof coverings), JUS.U.C7.123 / 1988 – Basics of civil structure design engineering.

All loads are defined according to current standards.

Seismic effects were calculated by the method of equivalent static loads under applicable JUS standards for buildings in seismic zone VIII.

Static-dynamic analysis and dimensioning were carried out in the software package Tower 6.0.

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## **PART II ELECTRICAL INSTALLATIONS**

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### **HIGH VOLTAGE**

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The design of electrical installations in the building includes the power supply and its distribution on the floors. The design was prepared in accordance with the architectural and civil engineering design, Terms of Reference and applicable regulations and standards for respective types of installations and devices.

## CONNECTION

External LV cable connection is executed with the cable XP00 4x185 mm<sup>2</sup> + 120 mm<sup>2</sup> laid from the measurement-distribution cabinet to the main distribution cabinet (MDC). From the measurement-distribution cabinet to the main distribution cabinet, it is necessary to lay a power supply and signal cable to the building. The cables are laid and connected according to the conditions of the competent electricity distribution company. Cable entry into the building to MDC is enabled with a PVC duct Ø 110 mm, laid in an earthen trench.

The low voltage (LV) distribution system is TN-C-S, and protection against indirect contact will be achieved by automatic disconnection of power supply. Protection against indirect contact in case of a failure is provided by TN-C-S system.

Protection will be carried out in such a way that in each circuit and in each power supply line, a protective conductor marked green-yellow shall be laid in addition to the phase and neutral conductors. The protective earth (PE) conductor is thus one of the wires in the multi-core cable, and it has the same cross section as the phase conductor. The protective conductor is connected to the protective contacts of protected devices and sockets on one side, and PE bus on the other side.

## SWITCHBOARDS AND DISTRIBUTION CABINETS

### Main Distribution Cabinet

MDC is made of twice pickled steel, with protection degree IP 54, with a lockable door. MDC contains the main switches of the network, a generator set, UPS-0, UPS 1 UPS 2 UPS 3, bypass switches, circuit breakers with overcurrent protection for all distribution cabinets, and cable distribution blocks. It is necessary to leave some space in the cabinet for installation of internal meters for measuring of electricity consumption for: general consumers, Basic Court, District Court and District Attorney's Office. Dimensions of the free-standing cabinet are 3x (200x80x30 cm). All distribution cabinets planned in the project are powered from this cabinet.

MDC is provided with solenoid switches for rapid disconnection from the grid of generator sets, UPSs, bus bars, disconnectors, bypass cam switches (1-0-2), fuses, surge arresters, etc.

### Local Distribution Cabinets

They are located in places as shown in the graphic attachment. Distribution cabinets are made of twice pickled sheet, with protection degree IP 44. In all distribution cabinets, there are bus bars from the grid, generator sets, UPSs. Distribution cabinets are mounted with half their depth in the wall, and the other half is treated with gypsum board.

In the panel underneath the cabinet, there are openings for cable inlet/outlet to the sockets on the floor below, and the cables run through metal ducts and then through the opening in the panel to the aforementioned socket on the floor where the corresponding cabinet is located. Cables from metal ducts are fastened by cable supports "OBO grip 15", and they should be fixed by dowel screws to the mezzanine slab.

The aforementioned cabinets are located in places as shown in the graphic attachment. Apart from MDC, there is an ATS cabinet (automatic transfer switch) which is used for automatic switching from the grid mode to the generator mode, and vice versa.

The design provides that all major electricity consumers shall be powered from the grid, while the portable generator supplies electricity to approximately 50% lighting and sockets, in accordance with the Terms of Reference.

In addition to the grid power supply, a backup power generator is provided, 220 kVA - 178 kW. In case of interrupted power supply from the grid, the generator receives a signal from ATS to start operating. The generator is required to have its own electronic ACP (Automatic Control Panel) for starting, monitoring and control of the diesel generator.

When the power supply from grid is interrupted, some conditions have to be met, i.e. it takes some time (app. 40s) for the generator to be started and stabilized. ATS is responsible, in case of power failure, or failure of only one phase, to send a signal to the generator to start, and switch the consumers over to the generator mode. When power supply from the grid recovers, ATS sends a signal to turn off the generator and switch back to the grid mode.

To avoid interruption of power supply to the most important and top priority consumers, such as:

- Computers in offices;
- Servers;
- RACK's;
- Telecommunication network and PBX;
- Fire alarm;
- Anti-intrusion system;
- Video surveillance,

power supply to such installations is ensured by the backup UPS 0, UPS 1 UPS 2 UPS -3. UPSs are powered by the generator and they are located in the technical room in the basement. According to the design, the Basic Court, District Court, District Prosecution and general consumers shall have a separate UPS each.

In normal operation regime, UPSs forward the voltage from the grid, and in case of a grid power failure, UPSs deliver forward the voltage from the generator. By switching over from the grid to the generator, UPSs ensure power supply to priority consumers.

In all hallways, there are manual call points connected through the fire alarm control panels to the main switches for the network, generator and UPSs, so that they switch off the switches simultaneously (simultaneous power supply interruption from the grid, generator and UPSs).

## **LIGHTING**

When designing the electrical lighting, the architectural solution was taken into consideration, as well as the technical requirements for this type of installations. In the hallways, staircases and toilets, there are designed LED lamps 14-21 W, while in the offices T5 raster lamps 4x14W are installed.

## **POTENTIAL EQUALIZATION**

In order to avoid differences in voltage between individual metal parts, these should be interconnected. It is necessary to carry out the main and local potential equalization.

We distinguish between parts that are not part of electrical devices, and parts which are integrated in the device structure.

## **PROTECTION AGAINST ELECTRIC SHOCK**

In order to protect people against electric shock, the TN-C-S system with foundation earthing is adopted, together with potential equalization measures in the building, as an additional measure of protection. The foundation earth electrode has to be installed in the prescribed manner (the strip is to be connected "on edge" to the reinforcement of the building - in case of welded joints, these should be protected with a bitumen layer, and passage through insulating joints of the building should be performed according to relevant drawings enclosed to the design).

## **PROTECTION AGAINST ATMOSPHERIC DISCHARGE (LIGHTNING PROTECTION)**

To protect the building against atmospheric discharges, a classic lightning rod shall be installed, in the form of a Faraday cage. The air termination system is comprised of a galvanized FeZn strip 20x3 mm, mounted on the roof of the building on appropriate roof supports of concrete marker blocks.

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## **LOW VOLTAGE**

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Low voltage electrical installations include: telephone and computer installations, fire detection system, anti-intrusion system, video surveillance system, access control system and installations of audio/video equipment (courtroom, AV room, protected witness room).

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### **GENERAL SPECIFICATIONS**

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#### ***LIST OF APPLIED TECHNICAL REGULATIONS***

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Law on Spatial Planning - RS (No.40/13)

Law on Standardization – B&H (No.19/2001)

Technical norms for low voltage electrical installations

Law on Safety at Work – RS (No. 01/08 & 13/10)

Law on Fire Protection - RS (No. 71/12);

Regulation - technical norms for the protection of LV networks and associated substations

SRPS industry standards " N ' ' - Electricity: the main group of LV - electronics and

telecommunications, the main group N. R - component parts for electronics and telecommunications

Technical recommendations and instructions:

## **TECHNICAL SPECIFICATIONS**

These specifications are an integral part of the design. The Investor and the Contractor shall conform to these specifications.

Accordingly, during execution of the designed installation, it is necessary to adhere to the following: Before the beginning of works, the Contractor shall thoroughly examine the project documentation. All objections, if any, should be timely delivered to the Investor and the Supervisor.

The Investor is obliged to provide professional supervision of works throughout the construction period.

The Contractor is required, prior to the commencement of works, to visit the site. If the Contractor finds that certain changes are needed, he shall inform the Supervisor and obtain the necessary approval for such changes.

In case that any deviations or minor changes in the design are needed during construction, the Contractor shall obtain the Supervisor's consent for each such modification. The supervisory body shall, if necessary, notify the design engineer of the proposed modifications and seek his approval. All installation materials and equipment shall conform to standards and be of premium quality. The use of any material which fails to meet these requirements is prohibited.

When performing these works, care shall be taken to minimize damage to already completed installations. Proper coordination of various phases of works is required.

Parallel conductors shall conform to JUS N.B4.702.

Any intersection of high and low voltage cables should be avoided. If such intersections are impossible to avoid, they should be carried out at right angles, at a distances of at least 10 cm, or using 3mm thick insulating inserts.

At any change of direction, the conductor bending diameter shall not be less than 10 D.

Cables and ducts shall be laid only in a straight line (horizontal and vertical).

During the construction works, the Contractor shall keep a proper construction log, containing all information required therein. All requests and communications, sent both by the Supervisor and the Contractor, shall be recorded in the construction log.

The Contractor shall issue a 2-year warranty for the accuracy of performed works. The warranty starts on the date of technical acceptance of the building. Any accidents or malfunctions which might occur during this period, due to the use of low-quality materials or poor workmanship, shall be eliminated by the Contractor free of charge.

After completion of the works, the Contractor shall perform the necessary installation tests and obtain the appropriate certificates.

## **TELEPHONE AND COMPUTER INSTALLATIONS**

Structured cabling is planned to allow maximum functionality in accordance with the technology of work of judicial Institutions (Basic Court, District Court and District Prosecutor's Office).

Structured cabling is based on a unified IT infrastructure. It should be implemented in accordance with current technical recommendations, internationally recognized standards and norms.

Main Distribution Frame (MDF) shall be located in the server room on the 1st floor. A 100cm deep server cabinet (KO-S11) and concentrator cabinets for corresponding wing of the building (KO-S12) shall be installed in this room.

Active network equipment (routers, switches L2 and L3, firewall devices, AAA controllers, etc.), which is not the subject to procurement under this design, shall be concentrated in a redundant configuration in the KO-S12 cabinet.

**Core** devices shall be connected in a way which allows for logical network segmentation (VLANs, etc.).



Passive and active equipment shall be adapted to current and future requirements of the Investor.

Passive equipment (patch panels, outlets and cables) will be of Category 6 as a minimum.

Fiber optic cables MM 50/125µm OM2 and UTP Category 6 cables will be used for backbone cabling.

UTP Category 6 cables will be placed in wall-mounted trunking with partitions (at approx. 20cm

height from the floor), in the floor (courtrooms, meeting rooms) and perforated trays

(corridor). After defining the active network equipment, uplink connection can be implemented with

Category 6 UTP cable, instead of the fiber optic cable, if the price of optical (SFP) transceiver is

unacceptably high.

Telephone/computer ports shall be placed in a junction box for wall-mounted trunking (diameter =

60 mm), or floor box with a lid of aluminium alloy at every workplace and generally in any place

defined by the Investor.

Intermediate distribution frame (IDF) concentration points, planned on all floors, will be connected

to the MDF by 4xUTP cat.6 cable and/or 4 fiber optic cables (MM 50 /125µm).

Flexible ducts (diameter = 16 mm) from communications cabinets to low voltage cable channels

should be used.

Communication cabinets will be powered through separate fuses directly from the cabinet of grid

power supply. All active network equipment must be on UPS.

Telephone exchange will be located in the server room on the 1st floor.

From the main phone splitter to the telephone exchange - the cable JY (St) Y nx2x0.6 shall be laid in

hard PVC ducts through cable conduits. Telephone exchange is supplied with telephone

communication facility (VoIP gateway / modules, etc.). Instead of traditional telephone cables, IP

phones use the structure of the computer network.

IP telephony provides a number of benefits:

- The ability to use VoIP and standard telephony using the same equipment.  
There is a unique telephone (network) platform for existing fixed-line and VoIP lines.
- Easy setup, configuration and maintenance.
- The system is scalable.
- It is possible to connect several related institutions into a single network.
- There is an internal database of all calls.
- Advanced options are available, such as group formation, LCR (Least Cost Routing),  
Voicemail, systems for voice call forwarding and the like.
- A large number of extensions and advanced sound quality.
- 

If the Investor plans to use the existing telephone exchange, convergence towards IP telephony can

be implemented gradually, using special devices - VoIP Gateways. These devices convert real-time

voice and fax calls between IP and public switched telephone networks. VoIP Gateway performs

compression / decompression of voice, packetization, call routing, and control signalling.

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## **FIRE PROTECTION SYSTEM**

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Since this is a building of great social and national significance, an adequate fire protection system is designed.

The design provides for the supply and installation of a fire detection control unit, automatic fire

detectors and manual call points, alarm devices and other components of the fire detection system.

The addressable fire detection system consists of:

- the control unit of the fire detection system with keypad for control and management,
- automatic fire detectors and manual call points,
- alarm siren and
- cable installation.

Fire detection control unit will be placed in the court police room, manned 24-hours a day. It must

have its own ACCU battery. Automatic fire detectors will be mounted in all rooms exposed to the fire

risk. All working and technological areas with high-value equipment and all high-occupancy communication areas will be covered by automatic fire detectors. Manual call points will be installed in corridors according to the attached layout.

Addressable fire detection system is accomplished by serial connectivity of the components within the fire loop. As each detector has an address, it can be easily monitored and the location of fire incidence identified.

The installation for fire detectors is implemented with cables type JB-Y(St) Y 2x2x0.8 mm<sup>2</sup>. The cables are laid on perforated cable trays, PVC ducts underneath the plaster surface and in suspended ceiling.

One pair is used for power supply to the detector and the other to close the loop.

Cables for fire protection shall be set at a proper distance from power cables.

Employees shall be warned of a fire event in the building by audible alarm sirens.

Monitoring/management shall be performed from the control panel/keypad at the receptionist's.

Reporting and management is possible on the same line, as well as arbitrary grouping of addresses. Selection of different priorities is available on the control line. Testing of transmission system is fully automated.

The addressable fire alarm control panel receives and processes all alarm signals according to the specified algorithm. A short time delay (approximately 60 seconds) is *attendance supervision*. This is a way to check the worker on duty and his response to the alarm. If the worker on duty fails to respond within 60 seconds, general alarm is automatically triggered.

*Reconnaissance supervision* starts when the worker turns off the acoustic alarm. This delay is set to 5-7 minutes, depending on the distance of the danger zone from the room where the fire detection control panel is located. During this time, the worker on duty has to verify the presence of fire and, if possible, reset the control panel. If during the specified time the control panel is not reset, the alarm is automatically transformed into general alarm. Activation of a manual call point also automatically sounds general alarm. The worker on duty acts according to prescribed procedures in case of fire: calls the fire brigade, assists in extinguishing, evacuation, etc.

The fire detection control unit should be modular. It comes with modules for two loops (up to 254), and a module for control of two siren lines. It is a redundant CAN (Controller Area Network) Ethernet network.

The fire detection system maintenance log shall contain the following information: dates of all checks, identified deficiencies, manner of defects elimination, false alarms and probable causes of such false alarms, etc.

Periodic inspection of the system should include:

- checking whether all automatic detectors and call points respond properly,
- checking whether all the functions of the control unit are in place,
- checking whether all the other devices of the fire detection system function properly.

System users are obliged to ensure the execution of regular periodic checks and enable unhindered work of the personnel who carries out the checks.

## **ANTI – INTRUSION SYSTEM**

This system includes motion control in all access and communication areas in the building. Intrusion detection central unit is located in the court police room on the ground floor. IC addressable motion detectors are used for monitoring of all entrances to the building and access to the corridors on each floor of the building.

Microprocessor central unit for intrusion detection is modular, with 8 supervised inputs, two programmable inverter outputs, two relay outputs, USB and Ethernet ports.

A keypad with a high-resolution LCD "touch screen" display 5.7" (320x240 pixels) will be installed for system management and control. The keypad shall be located in the office of the court police.

Alarm sirens will be arranged according to the planned layout. The intrusion detection central unit is equipped with telephone communicators which enable burglary reporting to the city police station and security personnel. The installation of intrusion detectors is implemented with cables type 6 AF 22 + 2x0.75 mm with insulation that can withstand temperatures up to 80 degrees, laid in suspended ceiling, and down the wall in plastic ducts. One pair is used to power the detector, and the other to close the loop.

## **VIDEO SURVEILLANCE SYSTEM**

The video surveillance system of the building includes installation of a central server in redundant configuration, installation of high-quality cameras for indoor and outdoor installation, DIVAR IP recorder and high-resolution colour monitor for control.

The design envisages a video surveillance system of the building with a total of 55 cameras, arranged as presented on drawings, out of which 43 indoor cameras and 12 cameras for outdoor installation. The cameras are powered by cable type FTP Category 6. Before laying, the cable supplier needs to be consulted.

## **INSTALLATION OF AUDIO – VIDEO EQUIPMENT**

This system will be implemented in all segments according to Investor's requirements. Audio/video and witness protection system is intended to improve the technical capacity of judicial institutions in Trebinje to process all cases.

The system must have the following functionalities:

- Transmission of audio and video from the room for protected witnesses to the courtroom and vice versa;
- Scrambling of voice and image of witnesses for the purpose of identity protection;
- Transcription of court hearing records ;
- Distribution and presentation of audio/video files within the courtroom;
- Electronic storage of audio/video files;
- Presentation of evidence in the courtroom and room for protected witnesses (witness room).

Court hearings will be audio/video recorded to different media, as well as on the central server, for the purpose of storage and subsequent playback. Saving must support application of user access rights to protect unauthorized access to audio/video files.

Entire court hearing including testimonies and evidence must be presented on monitors and via loudspeakers in the courtroom as well as in the media room, if any.

Transcription software will be used by typists to keep records during or after a court hearing.

The system is composed of equipment and installations at three main locations:

- Courtroom

- Witness room
- Audio/video control room (AV room)

## **COURTROOM**

The courtroom must be equipped with pan-tilt high-resolution cameras. Those cameras will be operated by an audio/video operator (hereafter called AV operator) from the AV room. LCD screens shall be installed on the desks of both parties (prosecution and defence).

The monitors will display:

- Picture and video from court hearings
- Video records representing evidence in court proceedings
- Evidence presented on document camera (ELMO presenter)
- Picture and video of the protected witness while testifying from the witness room

Afore mentioned video and picture shall be projected on a big LCD screen. Respective audio shall be reproduced on passive speakers mounted on courtroom walls.

The courtroom shall be equipped with audio conference system which will be used as the basis for audio recording of the overall court hearing. Due to the courtroom size and large number of parties expected to take part in court proceedings, the audio conference system must include a unit (stand) with installed microphones (at least 30 cm long), two audio outputs for headphones, on/off microphone button, as well as a red indicator (when the microphone is on) at each position as indicated on the audio system diagrams.

A separate and independent headphone system must also be installed in order to comply with the witness protection measures as prescribed by law and standards for witness protection.

Each party in the court hearing must be equipped with a microphone and LCD screen in order to be able to take part in court proceedings. Passive speakers, mounted on the walls, will be used for sound coverage of the court room or audio playback of the hearing or evidence (sound reproduction).

The judiciary must be able to view a clear (unprotected) picture and video on their LCD screens (generated by the camera covering the witness), hear a clear (unprotected) audio on their headphones (generated by the witness microphone) during testimony of the protected witnesses given from the witness room or via video link from a remote location. Other parties and public present in or around the courtroom must see a scrambled (protected) picture or video and hear a scrambled (protected) audio during testimony of the protected witnesses given from the witness room or via video link from a remote location.

All technical equipment needed for audio recording on the typist's computer, distribution of video signal to LCD screens in the courtroom and to the typist's computer, must be installed in a mini rack, 19" wide and 10U tall. The rack must be placed under the typist's desk.

## **ROOM FOR PROTECTED WITNESSES**

In the room for protected witnesses, the following equipment must be installed:

- LCD screen
- Headphones
- Desktop microphone
- Wall-mounted fixed camera

The witness must be able to see on the LCD screen the same picture and video as the parties in court proceedings. Audio signal from the microphone of the protected witness must be imported to the audio processor (equipped with voice scrambling/protection) in the AV room. Video signal from the

camera which covers the protected witness must be imported to the video mixer (equipped with picture scrambling/protection) placed in the AV room.

The witness shall be able to listen to court hearings via headphones.

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#### **AV CONTROL ROOM**

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A 19" rack shall be installed in the AV room. Audio and video equipment shall be arranged within that rack. Camera installation cables from the courtroom shall lead to DVR which records each camera separately. Its loop output brings all cameras into the video mixer placed on the desk of the AV operator. The operator operates the cameras via PTZ camera management console. Control of these operations shall be provided via preview LCD screen placed on the desk of the AV operator. The second LCD screen shall be provided for the AV operator in order to preview the final video recording of the HDD recorder.

Audio signal from the central digital unit of the audio conference system shall be imported to the audio mixer equipped with 12 inputs and +48V phantom voltage. Audio mixer outputs shall be sent to the audio distribution which transmits the audio signal to the headphones of the parties in the courtroom and to the amplifier for audio speakers mounted on court room walls.

Two active loudspeakers shall be mounted in the AV room. One of them is used for control of the audio signal reproduced in the courtroom, and the other controls the final audio recording.

A video mixer with mosaic effect, used for protection of the witness picture, shall be installed in the rack. The camera signal from the witness room shall be carried to it. That signal in its clear, unprotected form shall be carried to the video switch 3in / 1out for further distribution to the LCD screens of the judiciary.

Video signal processed by the mosaic effect of the video mixer shall be sent to the video mixer placed at the AV operator's desk. Video mix from that mixer shall be sent to the video distribution amplifier 1in/20 out for further distribution to other LCD screens in the courtroom and in the space/room for the audience.

In order to scramble/protect the voice of the witness, it is necessary to carry the signal from the microphone of the protected witness to the audio processor. It will process the signal and forward it to the audio mixer placed on the desk of the AV operator. Therefrom, the signal is sent to the audio distribution amplifier for further distribution to the headphones of the parties and speakers located in the courtroom and in the room for audience.

Audio/video material is recorded by a HDD/DVD recorder, using multi-channel audio software.

Saving is performed on both DVD media and central AV archive server. Additional backup of AV material is provided using LTO (Linear Tape-Open) gen 5 tapes performed by the respective drive installed within AV archiving server. The Linear Tape File System (LTFS) presents files on tape to a user just like a disk or another removable storage medium, such as USB drive. The LTO partitioning feature (available from LTO-5 on) creates a separate partition on the front of the tape providing an index of content stored on the primary tape partition. With LTFS, users are able to search, retrieve, and store files simply through any operating system, without the need for a backup application. Computer equipment will be procured and installed in the scope and according to the characteristics defined by the Investor.

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## **PART III MECHANICAL INSTALLATIONS**

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### **POWER STATION - TECHNICAL ROOM**

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Power station of the building, where the heating and cooling energy is prepared, is located in the basement. It contains the main parts of those systems, such as:

- Heat pump / cooling device
- well-water/water for heat pump heat exchanger
- borehole water tank
- water filter
- circulation pumps
- water storage tank
- solar heating set
- tank for hot water of solar heating
- expansion vessels

The main source of heating and cooling energy is the groundwater, which is conveyed into the building from the source borehole, and returned to the sinkhole after the temperature exchange. The water temperature is 14 ° C, and the temperature of the return water should not drop by more than 5 ° C.

Calculations result in the following actual max. well water consumption: winter regime:  $V_w = 6.5 \text{ l / sec}$  (23.35 m<sup>3</sup> / h) and summer regime:  $V_w = 6.5 \text{ l / sec}$  (23.35 m<sup>3</sup> / h)

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### **HEAT PUMP / COOLING DEVICE**

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Heat pump / cooling device is supplied with borehole water in winter regime, through a tank with capacity of  $V = 1500 \text{ m}^3$ , located in the basement. Water from the tank is pumped via a plate heat exchanger. After the temperature exchange, the water is conveyed to the second borehole, which serves as a sinkhole.

On the hot side of the heat pump, the required heating power is 105 kW, according to energy needs, as shown below. On the cold side, the cooling power of 110kW is required.

Therefore, the required power of the heat exchanger on the well-water side is  $Q_{hmin} = 125 \text{ kW}$ , and the temperature regime is 14/9 ° C on the primary and 12/7 ° C on the secondary side. This is the so-called "cold side" of the heat pump.

Selected heat pump / cooling device is a product such as YORK, with two plate heat exchangers - evaporators - and a plate heat exchanger - capacitor.

The heat pump has been selected 15% larger due to the three-position selection of power.

Two compressors are incorporated in the cooling circuit, with two expansion valves, one for each evaporator.

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### **HEAT EXCHANGER - WELL WATER / WATER FOR THE HEAT PUMP**

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The power of the heat exchanger is 125 kW and the temperature regime is 14/9 ° C on the primary side and 12/7° C on the secondary side. This is the so-called "cold side" of the heat pump. The heat exchanger is of plate type, with demountable plates.

#### **BOREHOLE WATER TANK**

The water tank capacity is  $V = 1500 \text{ m}^3$ , it should be thermally insulated and filled with water from the source borehole, using a pump in the borehole. The tank, including sensors in it, is elaborated in the design, and water supply from the borehole and the associated pump are considered in the water supply design. It is equal in the water supply design and water discharge to borehole 2, which is used as a sinkhole and drainage of overflowed water from the tank.

The tank is designed of plastic (polyethylene - HDPE) of standard make, with connections.

The capacity  $V = 2 \text{ m}^3$  was selected mindful of the refill time, which is:

In winter regime:

for max. water consumption, the heat pump requires a water flow from the borehole (105 kW on the cold side of the heat pump at  $\Delta t = 5 \text{ ° C}$   $23.35 \text{ m}^3 / \text{h} = 6.5 \text{ l} / \text{sec}$  is required), which means that tank emptying takes 14.5 minutes.

#### **WATER FILTER**

Behind the borehole-water tank from, there are two water filters (F1, F2), each with capacity of about  $25 \text{ m}^3 / \text{h}$  (max possible flow  $50 \text{ m}^3 / \text{h}$ ), with pore size of 0.1 mm. The filter shall avail with automatic self-cleaning function with return water, which is discharged into the sewerage. Self-cleaning is performed automatically per hour (once in 7 days) and per increase in pressure drop through the filter. Pressure drop, which propels the self-cleaning, is adjustable between 0.1 and 1.0 bar, with factory setting at 0.5 bar.

#### **CIRCULATION PUMPS**

Individual circulation pumps with frequency regulation are provided. The selection was made aiming to choose the most possible pumps of the same type and dimensions.

The pumps selected in the design are those manufactured by Wilo or similar, one circulation pump per each floor, except that the basement and ground floor share one network, i.e. pump.

#### **WATER TANK (ACCUMULATION VESSEL)**

Water tank with capacity of  $V = 1.0 \text{ m}^3$  for water in the system serves as the storage of hot water in winter (45/40 ° C), and cold water in summer (7/12 ° C), as a hydraulic crossover and a common point, to which the energy from the heat pump is brought. The vessel is made of pressed steel, thermally insulated, with flanged connections according to the diagram, dimensions 4 x DN65, and threaded connections 1x and 4x DN25 for thermometers and temperature sensors (G1 / 2 internal)

### **HOT WATER TANK (ACCUMULATION VESSEL) FROM SOLAR PANELS**

For solar panels located on the roof of the building store hot water in an accu vessel with capacity of  $V = 300$  l. The vessel is made of pressed steel, thermally-insulated, with connections for solar heating, dimensions  $\varnothing 28$ , and threaded connections for thermometers and temperature sensors (G1 / 2 internal), as well as connections for hydraulic network.

### **HEATING AND COOLING BY FAN COIL UNITS**

On Investor's request, all rooms, except for those which are heated by radiators (sanitary facilities), shall be heated and cooled by fan coil units.

The uniform recommended room air temperature in summer is adopted at  $26^{\circ}\text{C}$ , and in winter at  $20^{\circ}\text{C}$ .

Selection of fan coil units was made as follows:

For all highly important and frequented areas: courtrooms, registry offices, etc., checks were made during the selection based both on calculated heat loss in winter regime and heat gains in summer regime.

For other rooms (offices), the selection was made on the basis of calculated heat loss in winter regime. Based on their experience with the quantitative ratio between heat losses and gains in any room, it may be argued with high accuracy that even in summer season these rooms shall have a comfortable temperature for living and work.

In rooms where people do not stay for long: archives, smaller libraries, court council, line-up room, kitchenette – the heat/loss gain is not calculated.

The design provides for a two-pipe system, with switching over depending on the operation regime - winter or summer.

The transition from black pipes to the fan coil units is planned with copper pipes and flexi connections.

Switching is done manually on valves in the technical room, by opening and putting into operation a part of the installation towards the heat pump, in this case water-to-water, which is located in the dedicated room. Details and instructions for utilization of this heat source, or cooling unit, are presented in graphic documentation on the drawing: "Equipment Wiring Diagram in the Technical Room."

Fan coil units are of ducted type in all rooms where they are to be mounted.

Temperature is controlled by a thermostat mounted on the fan coil unit itself, and each unit has a three-position control.

Fan coil units shall have at least three speeds, i.e. three volumetric air flows.

On coil connections to distribution piping, there are radiator valves with dual regulation. On the return line, there are radiator shutoff caps, making it possible to remove the device without emptying the pipeline. Connections for appliances, fittings, brackets, clips, clamps, visible distribution pipes and risers shall be cleaned from surface corrosion and impurities of all kinds, and then protected with protective paint.

On completion of protection and acceptance by the supervisory body, the piping shall be coated with sponge insulation. The thickness of the pipe insulation varies, depending on the pipe diameter, ranging from 8mm for pipes of smaller diameters, up to 15 mm for pipes of the largest diameters. Insulation thicknesses for different pipe diameters is specified in the Priced Bill of Quantities. Both pipes shall be insulated.

The piping for collection of condensate is not insulated, and it is possible to use steel galvanized pipes or plastic-based pipes. Piping for condensate collection runs by the shortest route to sanitary



facilities or another similar space suitable for safe condensate outflow. When installing the piping for condensate, the minimum inclination should be 3mm per meter of pipe, according to the outflow point.

The fan coil system has a separate branch for each floor, with corresponding circulation pump.

The design provides for branching of the joint branch to horizontal pipe networks.

All fan coil units are supplied via their own horizontal piping for a given floor, traced in the suspended ceiling of the floor below, except for the piping of basement fan coil units, where the pipes are laid in the suspended ceiling of the basement itself. At departures of horizontal piping networks, slanted control valves are mounted on return lines for the purpose of hydraulic balance, and ball stop valves are mounted on distribution lines.

Fan coil units shall be disguised on Investor's request.

Each coil is wearing an air release valve, of metal structure.

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## **VENTILATION AND AIR CONDITIONING**

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The design envisages the following separate systems:

- Ventilation of courtrooms, registry office, hallways on the ground floor
- Ventilation of corridors on the 1<sup>st</sup>, 2<sup>nd</sup> and 3<sup>rd</sup> floor
- Ventilation of sanitary facilities
- Offices are ventilated naturally
- Ventilation of archives room and hall in the basement

The first two systems are conceptually designed with injection of certain amount of fresh air into the rooms based on the fresh air requirement per person, and based on the number of persons in the room, provided that there is a possibility of natural airing in rooms which can accommodate a large number of people. The systems operate with 100% fresh air. This enables avoiding of oversized ducts which would be needed if the system operated with certain share of recirculation air, because the building does not avail with sufficient space for their routing.

The system is designed to inject 10% more fresh air at all times, thus creating a slight overpressure in the rooms.

Excess air in a room is re-streamed through gaps in the building structure and to other rooms which are not aired.

Each of the systems consists of separate chambers for fresh air preparation and waste air release through heat recovery unit which serves the function of waste air energy utilization.

The temperature of injected air varies in summer and winter regime, and the basic function is to mitigate the temperature difference between the outdoor and indoor air.

Channelled outdoor unit for fresh air preparation and injection for the 1<sup>st</sup>, 2<sup>nd</sup> and 3<sup>rd</sup> floor has sound absorbers, to reduce the noise transfer to those rooms from the ventilation section as much as possible.

All channelling units are connected to the piping by a three-way valve which is supposed to activate the channel sensor set to the desired temperature.

Channelling unit in the archives 01 / S operates with air recirculation. Channel sensor is placed in the channel after the HRV, so that it detects the temperature of injected air below 15 ° C.

Fan systems without the channelling unit for fresh air preparation include the rooms covered by fan coil units, so that HRVs use up to 60% energy spent for heating/cooling of these rooms.

Fresh air is taken from the part of external wall facing the yard through rain-proof louvres, while the waste air is released back to the yard, through rain-proof louvres.

The temperature of injected air is automatically controlled, by microprocessor control units, three-way electromotor valves and channel sensors.

Airing systems have a separate ductwork of galvanized steel sheet, with a thickness of 0.5 to 1 mm, for air intake and exhaust.

Intake ducts are insulated with 20mm thick sponge insulation.

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#### **VENTILATION OF SANITARY FACILITIES**

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Designed ventilation of blocked sanitary facilities conforms to technical norms and standards, and includes fans with non-return valves. Sanitary facilities shall be aired at time intervals via el. timer.

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## **PART IV WATER SUPPLY AND SEWAGE SYSTEM**

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### **WATER SUPPLY**

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The building is supplied with drinking water from the municipal water supply system, through the water meter manhole. The water meter manhole is envisaged on the west side of the building, protected by a cast iron lid, in conformity with the conditions of the waterworks company. Hydrant and sanitary distribution pipes have to be separated in the main manhole. A water meter has to be installed in the water meter manhole, for reading of cumulative consumption of the sanitary and hydrant water.

Cold water plumbing shall be made of high density polypropylene water supply pipes, the same as hot water, and hot water recirculation pipes. Internal hydrant network is made of galvanized steel pipes. All main piping (cold, hot, hydrant and technical) runs on the ceiling, while some secondary parts run through the floors or walls of the structure. The reason for this is easier installation and subsequent adjustments of plumbing, if required.

Pipes are dimensioned on the basis of unit loads for each tapping spot, provided that the flow rates in pipes do not exceed the rates specified for the adopted pipe section. Hot water is centrally prepared for the whole building.

All pipes under the ceiling and in the floor, as well as risers in installation blocks, must be thermally insulated. Plumbing for water distribution shall be insulated against condensate forming, depending on the medium where it runs. Pipes in the walls and floors are insulated with suitable prefabricated insulation (based on polyurethane such as "plamaflex", "armaflex", etc.)

Fire protection of the building is solved with hydrants, 10 pieces in total, according to the Regulations on Technical Standards for Fire Hydrant Network ("Official Gazette of RS", No. 39/13). The arrangement of hydrants (hydrant cabinets) is shown in corresponding graphic attachments and designed to protect each part of the building. Each hydrant cabinet (wall-mounted) contains a hydrant valve, a fire hose with a nominal diameter of 52 mm, length of 15 m, and a 12mm nozzle. Hydrant network must be protected against frost and mechanical damage.

Hydrant network, with all equipment and fittings, must be checked at least once a year. The control includes measuring of water pressure at simultaneous operation of two hydrants. The pressure is measured at full water jet on both hydrants, after 2 minutes, and the date and time of pressure measurement shall be specified in the report. Hoses in hydrant cabinets are checked at least once a year, and must be tested at water pressure of 7 bar. All pipes for hydrant network have to be insulated according to the place of installation, by twice wrapped felt tapes in case of pipes in the wall, by twice wrapped corrosion protection tape and bitulit coating in case of pipes in the ground, and by prefabricated polyurethane insulation of appropriate diameter in case of pipes exposed to freezing.

After distribution and fixing, the plumbing system has to be tested for water tightness as instructed by the manufacturer of specified pipes. After completed pressure test, the system has to be flushed with water or a mixture of air and water, and disinfected. Bacteriological and chemical analyses of water should be carried out by an authorized institution and attached to the technical documentation on occasion of technical acceptance of the building.

Laying of water supply network shall conform to the following guidelines:

- The pipes shall be laid in a straight line, horizontally and vertically, using fittings. The pipes shall be laid in accessible places, ascending to the outflow.
- Pipes shall be fixed to the structure by clamps, adding rubber or felt in between the pipes and clamps. Clamp shall be set apart at 2.0 m intervals.
- Openings in the walls and beams where the pipes pass must be of larger cross sections than the pipe. It is necessary to install transition pipes and fill the gaps with permanently elastic putty.
- Vertical and horizontal pipes must be at sufficient distance from the walls at all times, and insulated with adequate thermal insulation of good quality.
- Risers have to be laid in provided grooves, installation spaces or visible on the walls, in accessible places for the requirements of installation, inspection and repair. When managing multiple parallel pipes, they must be sufficiently set apart to allow for thermal insulation.
- Vertical lines which pass through floor joists shall run through a prefabricated steel plate with welded-on transition pipes. Gaps shall be filled with permanently elastic putty.
- Safety-valves are installed only on the network that is fed through the pumping unit, on the vertical pipe next to pressure vessels or next to the building. Alongside safety valves, gate valves shall be installed as well.
- In cases where the pressure exceeds 6.0 bar, it is necessary to install a pressure reducing valve.
- Sanitary facilities (toilet, kitchen), shall be fitted with appropriate valves.
- Pressure tests on the water supply network shall be carried out before placing the thermal insulation and protective covers. The test pressure and duration are prescribed by the regulations of the municipal waterworks company. The test pressure should be by 50 to 100% higher than the maximum operating pressure. The test lasts for 2 hours. Test results shall be recorded in a protocol signed by the supervisory body.

NOTE: Service connection from the municipal water supply system to water meter manhole and installation of fittings and valves in the manhole shall be performed by the competent municipal service organization. The value of these works shall be defined by the said institution in the final approval which is to be obtained after submission of the application.

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## **SEWERAGE**

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Internal installation of sewerage for this object is solved with a separate sewerage system. The sanitary sewerage collects and conveys domestic and sanitary wastewater, and the storm water drainage system, which shall be subject to the landscaping design, collects the storm water from the roof.

All vertical and horizontal sewer pipes are sized depending on the anticipated load. The total number of vertical pipes is 9.

Vertical sewer pipes 1, 2, 3, 4 and 5 collect wastewater from the first, second and third floor, and in the suspended ceiling of the ground floor they transit to a collector vertical pipe KV1,2 KV3,4,5.

Vertical pipes 6 and 7 collect part of wastewater from the ground floor, while the vertical collector pipes KV3, 4 and 5 collect the other part of the ground floor wastewater, as shown in the graphic part. Vertical sewer pipe 8 collects wastewater from the basement, while the vertical pipe 9 accepts wastewater from the kitchen located on the third floor.

Vertical pipes (KV1, 2; KV3, 4, 5; KV6; KV7 and KV9) transit to the main horizontal distribution under the basement slab so that they are 60 centimetres above the ground level, while the vertical pipe KV8 transits into the main horizontal distribution below the zero slab of the basement. The main horizontal distribution that conveys the wastewater from the building is adopted, in relation to the sum of the outflow unit, as Ø160 at 2% gradient.

Connection of sanitary fixtures to the floor is provided partly in the floor and partly in the suspended ceiling of the floor below, depending on the position of the device and floor structure. A minor part shall run in the wall.

Sewerage pipes shall be made of PVC pipes Ø50 to Ø160. In places where the sewerage changes the direction in the distribution network within the building, access eyes shall be provided for interventions in case of clogging. Access eyes shall be provided on all vertical pipes, even two access eyes on higher levels. Foul water and sink vertical pipes shall end outside the roof, in ventilation caps. Before pipe walling up, the plaster around the vertical pipes when passing through the walls shall be tested to watertightness.

Sewerage pipeline must be made of durable and strong material that is corrosion resistant or corrosion protected on the inside and outside.

Because of the possibility of water plug loss in drain traps, thereby creating the opportunity for penetration of odour, gases and insects to the rooms in the building, special attention must be paid to water suction and evaporation from the drain trap. Proper positioning of branches from sanitary appliances to vertical pipes and installation of ventilation ducts should prevent self-suction of the trap plug.

Each foul water vertical pipe must have a ventilation duct. Ventilation from vertical pipes is performed on the roof. The superelevation above the roof is 1.0 m. If the ventilation runs on a walk-on roof - terrace, the superelevation is minimum 1.5m. Ventilation ending shall be such as to enable proper functioning and protection against damage. It is forbidden to merge the sewerage ventilation with chimneys or other ventilation ducts.

On vertical pipes (sanitary service outlets), one-way manifolds should be fitted at an angle of 45 °. Exceptionally, a two-way manifold may be fitted at 45°.

Vertical foul water pipes and rainwater downpipes may be placed visibly down the wall, in an envisaged groove, and may be subsequently walled-up and disguised. In all cases, the vertical pipes must be spaced 1-2 cm from the wall and secured to the building structure by clamps. Between the clamp and the pipe, it is necessary to put a rubber or felt pad. When passing through the ceiling structure, pipes must not be firmly built in. At the bottom of the vertical pipe, i.e. before transition to a horizontal line, it is necessary to install an access eye.