

PROJECT: Sports and Culture Centre in Obrenovac

SITE: Obrenovac, Cadastral plot 509, CM Rvati

INVESTOR: City of Belgrade, Belgrade

**ESTIMATED BILL OF QUANTITIES FOR CIVIL AND SPECIALISTS' WORKS**  
SPORTS AND CULTURE CENTRE IN OBRENOVAC

**PHASE I - THEATRE HALLS WITH SUPPORT FACILITIES**



$((6,0 +6,0 +231,63 +9,33 +39,35 +54,18 +53,97 +25,72)*4,06)*0,2$

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**1.5.** Demolition of brick walls, masonry in mortar, thickness 20cm.

Walls shall be demolished together with ring beams, door lintels and all wall claddings. Usable material shall be cleaned from plaster and stacked on a construction site landfill designated by the Investor.

Collect, remove, load debris to a truck and transport it to the city landfill, up to 15km away.

Calculation per m3

m3 20.66

$((10,0+2,9+2,90+2,85+2,85+4,0+0,6+1,0 +1,70)*3,7)*0,20$

to be deducted

$((0,8*2,05)*0,20)*2$

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**1.6.** Dismantling of suspended ceiling made of matchboarding, along with the substructure. Separate usable material, load it into a truck and transport to a landfill designated by the Investor to 15 km away. Collect, remove, load debris to a truck and transport it to the city landfill.

Calculation per m2

m2 343.39

231,63+111,76

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**1.7.** Removal of wall tiles with mortar.

Ceramic wall tiles on the first floor of the building shall be removed.

Remove tiles with mortar and clean the joints up to 1.5cm deep, while brick surface shall be cleaned with steel brushes. Collect, remove, load debris to a truck and transport it to the city landfill.

Calculation per m2

m2 140.28

$(7,36+7,55+4,94+4,96+13,78)*4,0$

to be deducted

$((0,8*2,20)*8)$

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**1.8.** Removal of floor tiles, on the first floor of the building, placed in cement mortar.

Tiles and base shall be removed down to concrete structure. Remove, load debris to a truck and transport it to the city landfill.

Calculation per m2

m2 18.02

3,41+3,56+1,45+1,47+8,13

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**1.9.** Forming openings in the floor, for platform landing for the disabled.

Size of openings are 90x160cm and 85x90cm, depth 15cm.

Marble floor shall be precisely cut with Widia blade, to the size provided in the design documentation.

Subsequently, floor and layers shall be removed, to a depth of 15cm.

The bottom of this formed pit shall be levelled with cement mortar.  
 Collect, remove, load debris to a truck and transport it to the city landfill.  
 Unit price includes labour, supply of necessary material and all transport.

Calculation per m3 m2 0.33  
 $((0,9*1,60)*0,15) + ((0,85*0,9)*0,15)$

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**1.10.** Demolition of asphalt pathways, with all the layers, to form the screed for ramps for the disabled, near the entrance.

Remove all the layers in the thickness of approximately 20cm, remove and load debris on a truck and transport it to the city landfill.

Calculation per m2 m2 20.67

ramp 1

$6,30*((1,80+1,55)/2)$

ramp 2

$9,2*1,10$

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**1.11.** Hand digging of soil III category, bulk excavation, for the screed of ramp, including soil removal.

Perform and level the excavation according to the design and provided elevations. The sides shall be properly cut, while the bottom shall be leveled with an accuracy of  $\pm 2$ cm.

The excavated soil shall be loaded on a truck and transported to the city landfill.

Calculation per m3. m3 2.78

ramp 1

$((6,25*0,58)/2)*((1,80+1,55)/2)$

ramp 2

$(2,40*0,10)*1,10$

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**1.12.** Supply, transport, spreading in layers, compaction and thorough gravel planning.

Gravel shall be placed in a layer provided in the design documentation and structural analysis, and then compacted.

Unit price includes the supply of necessary material, all transport and construction.

Calculation per m3 m3 1.68

ramp 1

$((6,25*0,58)/2)*((1,80+1,55)/2)*0,10$

ramp 2

$((2,40*0,10)*1,10)*0,10 + ((6,80*0,90)*(0,44/2))$

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## 2. MASONRY

**2.1.** Plastering of interior walls with compo mortar in two layers, in the area where the plaster is stripped.

Before plastering, the surface shall be cleaned and sprayed with cement slurry. The first layer, ground, shall be performed with compo mortar, up to 2 cm thick, made of sifted gravel and lime. Apply plaster over the base and cut it for better application of the second layer.

The second layer shall be performed with fine and clean sand, without impurities, silt and organic matter. Float with wetting and smoothening with small floats.

The plastered surface must be flat, without breaks and waves, and the edges must be sharp and straight.

The joint with plaster that is not stripped must be flush and invisible.

Wet plaster to prevent rapid drying.

Unit price includes the necessary material, all transport, construction, and assembly and disassembly of light mobile scaffold.

Calculation per m2 m2 350.00

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- 2.2.** Patching of plastered surfaces, grooves, quoins, etc. to the width of 30cm, by compo mortar in two layers. Before plastering, wall surfaces shall be wetted and sprayed with cement slurry, apply the first layer, ground, mortar, made with sifted gravel in thickness of about 2cm.

Apply the second layer on dry first layer, made with fine sand, and then thoroughly float it including wetting.

Surfaces must be flat, without breaks and waves, and edges must be sharp. The joints with the existing surfaces must be flush.

Unit price includes the necessary material, all transport, construction, and assembly and disassembly of light mobile scaffold.

Calculation per meter m 180.60

$((2,2+2,2)+1,0)*5) +(((2,2+2,2)+0,8)*24) +(((3,1+3,1)+1,0)*4)$

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- 2.3.** Plastering of walls, base for gluing tiles, with compo mortar.

Before plastering, wall surfaces must be cleaned and sprayed with cement slurry. Apply a layer of plaster made with sifted gravel, 0-4mm, and level it. The plastered surfaces must be flat and roughened.

Calculation per m2 m2 140.28

$(7,36+7,55+4,94+4,96+13,78)*4,0$

to be deducted

$((0,8*2,20)*8)$

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- 2.4.** Cladding of the separating wall between the sports hall and cultural center with MULTIPOR panels.

Panels of thermal insulation of aerated concrete type Multipor or corresponding thickness of 10cm (density of panel P=100-115kg/m<sup>3</sup>) shall be glued to the base (adhesive density 770kg/m<sup>3</sup>) and leveled.

Install plastic anchors, 1 piece per panel, as well as metal and PVC sections to protect edges and corners.

Over the placed panels, uniformly apply adhesive layer of 2-3 mm and sink the mesh with flap, over the entire surface.

After drying, apply adhesive in a layer 2-3mm thick for leveling the entire surface, and use smoothing trowel. Wall surface must be flat, without waves or humps and edges must be sharp.

Unit price includes the supply of necessary material, all transport, construction and assembling and dismantling the necessary scaffolding. The height of the wall to be clad is 16,5 m'.

Calculation per m2 of finished clad. m2 1,132.40  
 $(52,03*16,50) + ((8,30*16,5)*2)$



**3. CONCRETE AND REINFORCING WORKS**

**3.1.** Repair, curing of damage to cement screed  
 Repair should be made with polymeric materials.  
 Surfaces for reparation should be prepared, remove loose material, in all follow the manufacturer's instructions.  
 Mixture should be applied in layers, by hand or by machine, to the required thickness of approximately 2mm according to materials manufacturer.  
 Unit price contains the supply of necessary material, construction, all transport, as well as any additional material.

Calculation per m2 m2 1,140.71  
 $15,83+3,88+15,83+264,03+43,37+454,61+43,37+23,59+109,49+62,96+26,28+77,47$

**3.2.** Construction of inclined ramp slab made of reinforced concrete MB25. Slab thickness d=20cm  
 Inclined slab shall be concreted over a prepared base layer of gravel, and reinforced with mesh reinforcement according to details from structural analysis.  
 Upper concrete surface shall be floated and then treated with spiked tool to obtain non-slip roughened surface.  
 Concrete shall be poured and cured in line with regulations.  
 Unit price contains the supply of necessary material, construction, all transport, installation and dismantling of necessary wooden formwork. The unit price excludes supply, processing and installation of reinforcement.

Calculation per m2 m2 4.75  
 ramp 1  
 $((((1,80+1,55)/2)*6,25)*0,2) + (((0,48/2)*6,25)*0,20)$   
 ramp 2  
 $((9,35*1,10)*0,2) + (((0,44/2)*6,80)*0,20)$

**3.3.** Supply and installation of mesh reinforcement Q-355.

Reinforcement shall be cleaned, cut and installed in accordance with the design and structural analysis. Prior to concreting, reinforcement must be reviewed and approved in writing by the Supervision.

Calculation per kg kg 352.05



**4. JOINERY**

**4.1.** Fabrication and installation of doors, in ready-made openings.  
 Door frame made of first class and dry oak, MDF door wing, according to joinery diagrams and details. Skylight is glazed with a single glass 6mm thick.  
 Between the wing and frame place sealing profile of neoprene rubber.  
 The doors are provide with adequate hardware, concealed cylinder lock and three keys, three mortise hinges per wing, chosen by the Designer.  
 Rubber bumper shall be placed on the floor. Transitional strip on the floor, made of stainless steel.  
 Unit price contains the supply of necessary material, shop fabrication, all transport, on-site installation with all flashings inside and out, and the final product painted in colour and shade by Designer's choice.

Calculation per piece

item IV	single door 100x220	pcs.	2
item VIII	single door 80x210	pcs.	3
item IX	single door with skylight 80x300	pcs.	3
item X	single door 70x210	pcs.	22

**4.2.** Fabrication and installation of panel partition, (folding sliding doors) in ready-made openings.  
 Frame is made of first class and dry oak, wing is coated with MDF, according to joinery diagrams and details.

Between the wing and frame place sealing profile of neoprene rubber.

The doors are provide with adequate hardware, concealed cylinder lock and three keys, three mortise hinges per wing, chosen by the Designer, and guide rails.

Unit price contains the supply of necessary material, shop fabrication, all transport, on-site installation with all flashings inside and out, and the final product painted in colour and shade by Designer's choice.

Calculation per m2

item XIV	dim. 989/233 pieces 1	m2	23.05
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**4.3.** Supply of materials, production and installation of wooden floor in the area intended for the orchestra.  
 The structure shall be made of straight dry, aged timber, softwood, II-class.

Supporting structure made of wooden beams, dim.12/12cm and beams 10/10cm, according to the scheme and details from the design documentation. Planks 5cm thick shall be nailed to the placed and fixed substructure, as the final floor, adjacent.

Planks are sanded on three sides and are of the same width.

All timber shall be impregnated with protective coating against insects, algae, fungi, decay.

Unit price contains the supply of necessary material, construction, on-site installation, protective coating and all transport.

Calculation per m2 of horizontal projection m2 38.18  
 $3,44*((11,75+10,45)/2)$

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**4.4.** Supply of materials, fabrication and installation of the damaged and worn-out wooden elements of wood balustrade.

Dilapidated wooden parts, lining of the sides and handrails shall be dismantled. Modelled after the existing parts, fabricate new ones, of high quality, dry, straight timber of first class.

Unit price contains the supply of necessary material, shop fabrication, all transport and on-site installation.

Calculation per m2, measured side elevation m2 49.70

item-S1 9,45\*1,10

item-S2 7,57\*1,10

item-S3 8,67\*1,10

item-S4 4,19\*1,10

item-S4` 2,78\*1,10

item-S5 3,75\*1,10

item-S6 8,77\*1,10

**4.5.** Lining of walls of the small theatre hall with acoustic panels, on the part where the floods damaged the existing lining.

B absorption class of panels, an open area 24%, according to standard EN ISO 354, panel thickness 45mm, distance from wall min 30mm.

Lining throughout the entire height of the wall, on the part of the hall where wall lining existed.

Corresponding metal substructure shall be placed over supporting wall of the hall, and then acoustic panels are hung.

Substructure and wall shall be performed according to design documentation, details, instructions of the Designer and panel manufacturer.

Lining is final factory-painted, colour and shade chosen by the Designer.

Wall panels in openings (doors, windows) shall have finish as envisaged by the design.

Unit price contains the supply of necessary material, all transport, as well as fabrication-assembly and disassembly of light movable scaffolding.

Calculation per m2 m2 136.81  
 $(17,50+4,05+17,30)*4,06$

to be deducted

$$((1,84*2,56)*2) + (1,85*2,20) + (1,84*4,04)$$

- 4.6.** Lining of ceiling of small theatre hall with acoustic panels.  
B absorption class of panels, an open area 24%, according to standard EN ISO 354, panel thickness 45mm, distance from wall min 30mm.  
Corresponding metal substructure shall be placed by hangers on support floor structure of the hall, and then acoustic panels are hung.  
Ceiling lining shall be performed according to design documentation, details, instructions of the Designer and panel manufacturer.  
Lining is final factory-painted, colour and shade chosen by the Designer.  
Panels in openings (lights, etc.), abutting next to walls and wall lining shall have finish as envisaged by the design.  
Unit price contains the supply of necessary material, all transport, as well as fabrication-assembly and disassembly of light movable scaffolding.  
Calculation per m2  
12,70\*8,80

m2 111.76

- 4.7.** Lining of walls of the large theatre hall with acoustic panels, on the part where the floods damaged the existing lining.  
B absorption class of panels, an open area 24%, according to standard EN ISO 354, panel thickness 45mm, distance from wall min 30mm.  
Lining is done at height of approximately 190cm, on the part of the hall where wall lining existed.  
Corresponding metal substructure shall be placed over supporting wall of the hall, and then acoustic panels are hung.  
Substructure and wall shall be performed according to design documentation, details, instructions of the Designer and panel manufacturer.  
Lining is final factory-painted, colour and shade chosen by the Designer.  
Wall panels in openings (doors, windows) shall have finish as envisaged by the design.  
Unit price contains the supply of necessary material, all transport, as well as fabrication-assembly and disassembly of light movable scaffolding.  
Calculation per m2  
53\*1,9

m2 100.70



## 5. METAL WORK

- 5.1.** Fabrication and installation of fire doors (doors with a report on fire testing issued by IMS)

Doors made of steel sections, sheet metal. The door wing is a grid of box sections 50x30x1mm, partition sheet plate is 1.5mm thick, placed at both sides, while door frame is of box sections 80x40x1,5mm.

Fire infill 30mm thick, lining, fire panels placed on both sides, metal sheet 1.5mm thick placed on both sides, fire resistant MDF panels 8mm thick placed on both sides, the color chosen by the Designer.

Sealing, double row of sealing rubber on frame and wing, double row of expansion strips on door frame and wing.

Hardware, hinges, safety locks, panic fittings.

Unit price contains the supply of necessary material, shop fabrication, all transport, on-site installation with all flashings inside and out, and the final product painted in colour and shade by Designer's choice.

item XV	dim 200/314 F90	pcs.	2
item XVII	dim 100/220 F60	pcs.	4
item XVIII	dim 105/220 F60	pcs.	2
item XIX	dim 196/220 F90	pcs.	8
item XX	dim 113/220 F60	pcs.	2
item XXI	dim 219/220 F90	pcs.	2
item XXII	dim 240/220 F90	pcs.	2
item XXVII	dim 80/220 F60	pcs.	2

**5.2.** Fabrication and installation of fire window, fire-retardant F90 minutes.

Window shall be made of steel sections, sheet metal. glazed with fire safety glass.

Before painting, metal shall be cleaned of corrosion and dust, apply impregnation and primer, and then apply putty and grind it. Apply the first layer of fireproof paint for metal, putty and then grind it, and then final paint for the second time. Doors shall be performed in line with the details and the Designer's instructions and provide attest documentation.

Unit price contains the supply of necessary material, shop fabrication, all transport, on-site installation with all flashings inside and out, and the final product painted in colour and shade by Designer's choice.

Calculation per piece

item 58	dim 165/60 cm F60	pcs.	1.00
item 59	dim 145/60 cm F60	pcs.	1.00
item 60	dim 40/60 cm F60	pcs.	2.00

**5.3.** Fabrication and installation of ramp handrail made of steel sections.

Handrail shall be made and installed as per details, drawings, regulations for this type of work and the Designer's instruction. Joints and welds shall be perfectly performed, cleaned and sanded.

Before installation, the structure shall be cleaned of corrosion and dirt, ground and dedusted. Apply impregnation, primer and then install it. After installation, fix the primer, apply putty and grind and paint it twice, in colour and shade chosen by the Designer.

Unit price contains the supply of necessary material, shop fabrication, all transport, on-site installation, and the final product painted, provision of attest documentation for structure and welds.

Calculation per m2

m2 15.01

item-S7 6,85\*0,9

item-S8 9,83\*0,90

**5.4** Supply of materials, fabrication and installation of a metal staircase, descend to the orchestra pit. Staircase is made of steel girders, sheet plates, flat steel bars, base plates, anchors, etc., according to the design.

Joints and welds shall be perfectly made, cleaned and ground. Before installation, clean the elements from corrosion and dust, apply impregnation and primer, and after installation fix the paint.

After installation, fix primer, apply putty and grind it and paint twice.

Unit price contains the supply of necessary material, all transport and fabrication, on-site installation, final paint, and obtaining attest documentation for structure and welds.

item-S-9 Calculation per kg.

kg 55.00

**5.5.** Supply, fabrication and installation of structure, platforms, air conditioners carriers. Air conditioner carrier is made of steel girders (I sections, I 160) sheet plates, angles, flat steel bars, base plates, anchors, etc., according to the design, the details of the structural analysis and the designer's instructions.

Joints and welds shall be perfectly made, cleaned and ground. Before installation, clean the elements from corrosion and dust, apply impregnation and primer, and after installation fix the paint.

After installation, fix primer, apply putty and grind it and paint twice in colour and shade chosen by the Designer.

Unit price contains the supply of necessary material, all transport and fabrication, on-site installation, final paint, and obtaining attest documentation for structure and welds.

Calculation per kg.

kg 520.00

**5.6.** Supply, fabrication and installation of assembly-disassembly structure, the cover for orchestra pit. Floor carrier above the orchestra pit is made of steel girders (box sections 80x80x3mm), sheet plates, angles, flat steel bars, base plates, anchors, etc., according to the design, the details of the structural analysis and the designer's instructions.

Joints and welds shall be perfectly made, cleaned and ground. Before installation, clean the elements from corrosion and dust, apply impregnation and primer, and after installation fix the paint.

After installation, fix primer, apply putty and grind it and paint twice in colour and shade chosen by the Designer, with paint for metal.

Unit price contains the supply of necessary material, all transport, shop fabrication, on-site installation, final paint, and obtaining attest documentation for structure and welds.

Calculation per kg kg 168.00

**6. TILING WORKS**

**6.1. Pointing of existing wall tiles, placed adjacent.**

Clean the existing joints, wash and point them with white cement or grouts, and then clean them.

Unit price contains the supply of necessary material, all transport and construction.

Calculation per m2 m2 1,035.20

$(8,36+9,58+4,79+4,79+7,24+8,52+6,06+4,79+4,72+20,94+17,46+5,34+5,19+5,06+4,96+4,84+4,79+22,71+17,46+5,36+4,84+4,79+18,29+4,75+4,66+4,15+8,65+5,12+5,06+4,98)*4,0$

to be deducted

$((0,8*2,20)*33)$

**6.2. Pointing of existing floor tiles, placed adjacent.**

Clean the existing joints, wash and point them with white cement or grouts, and then clean them.

Unit price contains the supply of necessary material, all transport and construction.

Calculation per m2 m2 165.04

$3,83+5,39+1,36+1,36+3,04+4,04+2,22+1,34+1,29+24,80+12,89+1,65+1,53+1,47+1,42+1,37+1,35+30,85+13,83+1,65+1,53+1,47+1,43+1,37+1,36+10,91+1,34+1,28+1,05+4,22+1,49+1,47+1,42$

**6.3. Replacement of damaged wall tiles.**

Replace damaged wall tiles with the same type modeled after the existing ones. Carefully remove damaged tiles with mortar, avoid damage to adjacent tiles, install new tiles and place grout in joints.

Based on the estimate on the spot, it is necessary to replace approximately 10% of wall tiles.

Unit price contains the supply of necessary material, all transport and construction.

Calculation per m2 m2 110.74

$((8,36+9,58+4,79+4,79+7,24+8,52+6,06+4,79+4,72+20,94+17,46+5,34+5,19+5,06+4,96+4,84+4,79+22,71+17,46+5,36+4,84+4,79+18,29+4,75+4,66+4,15+8,65+5,12+5,06+4,98)*4,0)*0,1$

**6.4. Replacement of damaged floor tiles.**

Replace damaged floor tiles with the same ones modeled after the existing ones.  
 Carefully remove damaged tiles with mortar, avoid damage to adjacent tiles, install new tiles and place grout in joints.  
 Based on the estimate on the spot, it is necessary to replace approximately 15% of floor tiles.  
 Unit price contains the supply of necessary material, all transport and construction.

Calculation per m2 m2 24.76  
 ground floor  
 $(3,83+5,39+1,36+1,36+3,04+4,04+2,22+1,34$   
 $+1,29+24,80+12,89+1,65+1,53+1,47+1,42+1,37$   
 $+1,35+30,85+13,83+1,65+1,53+1,47+1,43+1,37$   
 $+1,36+10,91+1,34+1,28+1,05+4,22+1,49+1,47$   
 $+1,42)*0,15$

**6.5.** Placement of wall ceramic tiles on the adhesive, on the first floor, in the rooms where tiles are removed.  
 I class tiles, domestic production, glue them in butt joint. If necessary, additionally grind the tile edges manually. Tiled surfaces must be flat and vertical. Placed tiles shall be pointed and cleaned with sawdust.

Unit price contains the supply of necessary material, all transport and construction, as well as assembly and disassembly of light movable scaffolding.

Calculation per m2 m2 140.28  
 $(7,36+7,55+4,94+4,96+13,78)*4,0$   
 to be deducted  
 $((0,8*2,20)*8)$

**6.6.** Placement of floor ceramic tiles on cement mortar, on the first floor, where tiles are removed.  
 I class tiles, placed in cement mortar, in bonding chosen by the Designer. The base shall be previously sprayed with cement slurry. If necessary, additionally grind the tile edges manually. Tiles shall be placed flat and grouted with cement slurry. Placed tiles shall be pointed and cleaned with sawdust.

Unit price contains the supply of necessary material, all transport and construction.

Calculation per m2 m2 18.02  
 $(3,41+3,56+1,45+1,47+8,13)$

**6.5.** Placement of the plinth of marble plates, height 10cm.  
 Marble plates shall be placed on the tile adhesive. The base must be flat and prepared. Placed tiles shall be pointed and plinth cleaned.

Unit price contains the supply of necessary material, all transport and construction.

Calculation per meter. m 286.30  
 $17+14+14,70+46+97+97,60$



## 7. DRY WORKS

- 7.1.** Construction of partition walls, thickness of 125mm, made of moist-proof plasterboards.  
Single metal substructure covered on both sides with double moisture-proof plasterboards.  
Any opening and places where equipment should be built in shall have necessary reinforcements and carriers of built-in components.  
Placed rock wool must have thermal and mechanical properties prescribed by civil engineering physics study.

Type protective corner shall be installed at any protruding angles. Plate joints are filled, bandaged with tape and point with joint grout.  
Joints are filled with gypsum filler by using bandage tape.

During installation of partition walls, joints with floor and ceiling as well as finish of doorjamb and window jambs shall be performed according to details and specification of the manufacturer and with the consent of the designer.

Strictly follow details from the design documents and take measures on the spot.

Unit price contains the supply of necessary material, all transport, construction, supply and installation of built-in components for the assembly of doors and sanitary appliances, fabrication, assembly and disassembly of light movable scaffolding.

Calculation per m2

The calculation is provided without openings deduction.      m2      134.73  
(4,13+1,42+1,68+4,17+3,61+1,43+1,38+1,43  
+3,61+1,45+1,25+1,20+2,70+3,40)\*4,10

- 7.2.** Construction of suspended ceiling on a steel substructure and cladding with plasterboards, thickness 12.5 mm.  
Double substructure is made of bearing and prefabricated galvanized sections CD 60x27 mm fixed by hangers to the supporting ceiling and covered with plasterboards, according to design and manufacturer's instructions. The joints shall be finished with putty and bandage tapes as per the designer's instructions.  
Unit price contains the supply of necessary material, all transport, fabrication, assembly and disassembly of light movable scaffolding.

Calculation per m2

m2      231.63

- 7.3.** Lining of ventilation pipes with fire GPK panels, fire resistance F=60min.  
Construct self-standing metal substructure, around pipes, rock wool shall be placed as insulation, thickness of 70mm, and double coated with plasterboards thickness 2x12.5mm. The total thickness of the lining is approximately 75 mm.

Metal substructure is made of galvanized CW 50 sections, as per design and the manufacturer's instructions. Rock mineral wool thickness 70 mm is placed, and then two layers of plasterboards are installed and fixed. The joints shall be finished with putty and bandage tape.

The lining shall be trowelled with putty, surfaces finished and finally painted in the colour and shade chosen by the designer, with semi-dispersive paint, two coats.

Unit price contains the supply of necessary material, all transport, construction, fabrication, assembly and disassembly of light movable scaffolding.

Calculation per m2

m2 35.64

$((1,10+1,10)*2)*4,10) + (((1,10+1,10)*2)*4,0)$

**7.4.** Construction of acoustic insulation of the ceiling of the stage, the large hall, across the existing wooden structure.

The existing wooden ceiling of the stage is made from wooden supporting beams, dimensions 14x20cm, covered with boards 5cm thick, placed on the top side, adjacent. Prior to work commencement, carefully inspect the base, and replace worn or damaged parts with new ones.

After on-the-spot inspection, and based on visual inspection, it is estimated that on approximately 1% of the area, boards 5cm (approx 5m2) should be replaced.

Isolation shall be performed from the upper side of the existing structure.

Surface shall be previously cleaned of dirt, dedusted, and then hard pressed panels shall be placed, mounted on one side with black glass fleece (acoustic panels of hard pressed rock wool, EN 13162).

Plates shall be coated on both sides with PE foil. The foil shall be placed with overlaps of 10cm, joints will be glued on both sides by tape. The total thickness of insulation is 125mm.

Unit price includes the supply of necessary material, all transport and construction.

Calculation per m2

m2 455.20



**8. FLOORING WORKS**

**8.1.** Supply, delivery and installation of stage floor, in the theatre hall, according to standards and details from the design.

Stage floor is beech parquet thickness d=22mm.

Parquet must be factory varnished on both sides.

The substructure consists of a system of scantlings with special shock-absorbing foam. Parquet is mechanically fixed to scantlings.

Parquet must have EN 14904 and EN 13501-01 standards, which will be documented with the offer.

The item should include assembly-disassembly part of the stage floor, cover for orchestra pit. This item includes only flooring works for the stage floor above orchestra pit, while the substructure for orchestra pit is included by a special metal work item.

Unit price includes the supply of necessary material, all transport and construction.

Calculation per m2 m2 438.46  
 $(455,20+61,76) - (5,0*5,0)*3,14$

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**8.2.** Supply, delivery and installation of stage floor, on a rotating platform of theatre hall, according to all the standards and the details of the design.

Stage floor is beech parquet thickness d=22mm.

Parquet must be factory varnished on both sides.

Parquet is fixed directly to existing wooden base mechanically.

Parquet must have EN 14904 and EN 13501-01 standards, which will be documented with the offer.

The item should include cleaning of metal structure of platform against corrosion and dirt by mechanical and chemical means, replacement of worn out or damaged parts and final painting for metal.

Wooden parts, sub-structure, should be impregnated with protective coating against insects, algae, fungi, rotting.

Unit price includes the supply of necessary material, all transport and construction.

Calculation per m2 m2 78.50  
 $(5,0*5,0)*3,14$

---

**8.3.** Fabrication and assembly of edge beech strip around the stage.

Wooden edge strip shall be performed around the stage, with openings for floor ventilation. The strip is a two-part so that one part is fixed in the parquet and the second part is screwed into the wall. The two parts are independent from one another, and are separated by metal spacers.

Unit price contains the supply of necessary material, all transport, as well as fabrication and assembly and disassembly of light movable scaffolding.

Calculation per meter. m 122.93  
 $90,07+32,86$

---

**8.4.** Curing and protection of marble floors.

Prior to work commencement, carefully inspect the surfaces, and visibly mark the damaged parts.

Damage, cracks, should be repaired with putty made of cement and marble flour.

Once the putty is hardened, floor shall be smoothed with grindstones of various fineness, until a smooth and flat surface of equal gloss is obtained.

Repeat the entire process, if holes or grooves appear.

Once the finest grinding is completed, floor shall be washed twice with water with the addition of detergent and then dried.

After drying, the surfaces shall be coated with transparent coating IZOLIT and two coats of silicone water-repellent transparent coating.

The tiles, which are damaged to such an extent that they cannot be repaired as described above, shall be replaced with tiles of the same size and colour.

Unit price contains the supply of necessary material, all transport, as well as fabrication and assembly and disassembly of light movable scaffolding.

Calculation per m2 m2 664.47  
 $16,43+7,85+7,85+231,63+28,49+15,39+15,39+36,87$   
 $+17,70+84,10+7,34+54,18+53,97+18,97+18,20+9,32$   
 $+17,72+23,07$

**8.5.** Supply and installation of textile floor, resistant to fire, abrasion, as the final layer of the floor, in the theatre hall.

Textile covering combines durability and resistance of PVC floors with quality, warmth and comfort of carpet.

Flooring shall be glued to the prepared and dry base with appropriate adhesive. The type, quality and colour of the textile floor are chosen by the designer.

Oak profiled plinth 12x2.2 cm shall be placed next to walls, while abutting shall be bevelled.

Plinth is attached with brass screws with countersunk heads at a distance of 80 cm and then varnished.

Note: in the orchestra pit, textile covering is glued to the walls, up to the full height of the room.

Unit price includes the supply of necessary material, construction and transport.

Calculation per m2 m2 1,279.17

hall of ground floor

$((14,80+19,0)/2)*11,0 + (((11,8+9,70)*1,90)$   
 $+ (16,75+14,10+21,80) + (33,8*0,12) + (((0,46*6)*2,20)*2)$   
 orchestra

$38,15 + (15,80*1,90) + (13,25*3,20)$

balcony

$(14,85*((28,0+22,53)/2) + (5,70*2) + (2,7*2) + (4,30*2)$   
 $+ (((0,46*1,35)*4)*2) + (((0,46*3)*1,35)*2)$   
 $+ (((2,35*0,46)*7)*2) + (((0,6*22)*1,0)*2)$   
 $+ (((0,6*10)*1,0)*2) + (((0,6*12)*0,6)*2)$



**9. PAINTING WORKS**

**9.1.** Scraping of old paint from all walls and ceiling of the ground floor and first floor.

The surfaces of walls and ceilings, which are painted, shall be scraped, washed, ground, dedusted, cleaned and impregnated.

During the works, avoid damaging that parts of the walls and ceilings that are covered with wood cladding. They should be protected with PVC foil.

Unit price contains the supply of necessary material, all transport, as well as fabrication and assembly and disassembly of light movable scaffolding.

Calculation per m2

m2 5,600.86

---

Ground floor, walls

$(176,53 \times 4,0) + (108,80 \times 4,0) + ((19,41 + 22,60) \times 4,0) + ((16,25 + 9,20 + 24,28 + 20,86 + 12,27) \times 4) + ((8,28 + 24,50) \times 16,5^2) + ((23,14 \times 16,5) \times 2) + ((31,80 \times 3,7)$   
to be deducted

$(5,80 \times 3,5) + ((1,0 \times 2,20) \times 21) + ((1,4 \times 2,5) \times 5) + (11,43 \times 3,6) + (1,20 \times 4) \times 9 + (6,0 \times 3,5)$

ceilings

$33,0 + 28,49 + 15,84 + 3,88 + 15,83 + 17,70 + 3,46 + 1,67 + 7,34 + 5,18 + 53,97 + 24,8 + 12,89 + 1,65 + 1,53 + 1,47 + 1,42 + 1,37 + 1,35 + 2,75 + 30,85 + 13,83 + 1,65 + 1,53 + 1,47 + 1,43 + 1,37 + 1,35 + 18,97 + 43,37 + 455,20 + 43,37 + 25,72 + 10,91 + 1,34 + 1,28 + 18,20 + 37,2 + 61,76 + 24,48 + 5,50 + 17,72 + 23,07 + 61$

first floor

walls

$(180,9 \times 4,0) + (27,50 \times 2,90)$

to be deducted

$((1,0 \times 2,2) \times 10) + ((2,30 \times 2,20) \times 4) + (12,0 \times 3,6)$

ceilings

$99,16 + 111,28 + 71,61 + 48,27$

---

**9.2.** Troweling and painting of old walls and ceilings with dispersive, antibacterial washable paint.

The old plastered walls shall be dedusted and trowelled with emulsion filler.

After they are prepared, the surfaces shall be ground, cleaned and neutralized. Inspect and point slightly damaged parts and cracks. Impregnate and apply dispersion putty twice.

All surfaces shall be ground, impregnated, while minor damages shall be pointed. Paint them and then correct with tinted dispersion putty, and paint with dispersion paint in two layers. The colour and shade are chosen by the designer.

Unit price contains the supply of necessary material, all transport, as well as fabrication and assembly and disassembly of light movable scaffolding.

Calculation per m2

m2 5,600.86

---

Sports hall

$(176,53 \times 4,0) + (108,80 \times 4,0) + ((19,41 + 22,60) \times 4,0) + ((16,25 + 9,20 + 24,28 + 20,86 + 12,27) \times 4) + ((8,28 + 24,50) \times 16,5^2) + ((23,14 \times 16,5) \times 2) + ((31,80 \times 3,7)$   
to be deducted

$(5,80 \times 3,5) + ((1,0 \times 2,20) \times 21) + ((1,4 \times 2,5) \times 5) + (11,43 \times 3,6) + (1,20 \times 4) \times 9 + (6,0 \times 3,5)$

ceilings

33,0+28,49+15,84+3,88+15,83+17,70+3,46+1,67+7,34+  
 5,18+53,97+24,8+12,89+1,65+1,53+1,47+1,42+1,37+1,3  
 5+2,75+30,85+13,83+1,65+1,53+1,47+1,43+1,37+1,35+  
 18,97+43,37+455,20+43,37+25,72+10,91+1,34+1,28+18  
 ,20+37,2+61,76+24,48+5,50+17,72+23,07+61

first floor

walls

$(180,9 \times 4,0) + (27,50 \times 2,90)$

to be deducted

$((1,0 \times 2,2) \times 10) + ((2,30 \times 2,20) \times 4) + (12,0 \times 3,6)$

ceilings

99,16+111,28+71,61+48,27

plasterboard walls are deducted from the total area

$269,45 - (((0,7 \times 2,10) \times 2) + ((0,8 \times 2,10) \times 8))$

- 9.3.** Troweling and painting of new plasterboard walls and ceilings, including necessary previous activities, with dispersion, antibacterial washable paint. Heads of screws or nails shall be red lead coated, surfaces shall be coated with boiled linseed oil and joints pointed with dispersion putty. After they are prepared, the surfaces shall be ground, cleaned and neutralized. Inspect and point slightly damaged parts and cracks. Impregnate and apply dispersion putty twice. All surfaces shall be ground, impregnated, while minor damages shall be pointed. Paint them and then correct with tinted dispersion putty, and paint with dispersion paint in two layers. The colour and shade are chosen by the designer. Unit price contains the supply of necessary material, all transport, as well as fabrication and assembly and disassembly of light movable scaffolding. Calculation per m2

m2 484.70

- 9.4.** Cleaning and painting of railing of gallery, stairs, and auditorium. Before painting, clean metal from corrosion with chemical and physical means, and then the surfaces shall be ground and cleaned. Railing shall be impregnated and primed, and then painted twice with paint for metal. Wooden part of railing shall be stained with Sadolin or similar agent chosen by the designer. Prior to painting, all surfaces shall be sandpapered, until obtaining smooth surface. Paint it twice, respecting the drying period of 24 hours, and then apply the finest sandpaper and paint it for the third time. Unit price contains the supply of necessary material, all transport, and construction. Calculation per m2

m2 112.31

$((11,0 \times 1,1) \times 2) + ((4,5 \times 1,1) \times 7) + ((30,0 \times 1,1) + (18,6 \times 1,10))$



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**10. FINISHING WORKS**

**10.1.** Cleaning and washing of the site after the completion of  
Carry out thorough cleaning of the entire site, dedusting  
of walls, cleaning and thorough washing of all interior  
rooms.

Cleaning and washing of windows and doors after  
completion of works.

Windows and doors shall be carefully cleaned, all  
surfaces washed with water with the addition of  
appropriate chemical agents.

Calculation per m<sup>2</sup> measured net area from the data.

m2 1,470.00

1140+330

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**SUMMARY**

1. PRELIMINARY WORKS - DEMOLITION
  2. MASONRY
  3. CONCRETE AND REINFORCING WORKS
  4. JOINERY
  5. METAL WORK
  6. TILING WORKS
  7. DRY WORKS
  8. FLOORING WORKS
  9. PAINTING WORKS
  10. FINISHING WORKS
-

## ESTIMATED BILL OF QUANTITIES FOR WATER SUPPLY AND SEWAGE INSTALLATIONS

## JOINT PREVIOUS WORKS WITHIN PHASE I - (THEATRE HALLS WITH SUPPORT FACILITIES)

**A. EXTERNAL INSTALLATIONS**

No.	DESCRIPTION	UoM	Quantity	Total RSD
I	<b>SURVEYING</b>			
1	Staking and setting out of piping route. Prior to commencement of civil works, perform staking and setting out of water supply pipe routes, including issuance of the protocol, as well as as-built surveying, data entering in KAT-KOM. Regular control during the works is carried out by the contractor and the supervision.			
	Calculation per meter of piping. Sanitary water supply network	m	330.00	
<b>TOTAL I:</b>				
II	<b>EARTHWORKS</b>			
1	Mechanical cutting of base. Cutting in strips 1m wide. The item includes all sides of the field that is cut. Calculation per meter.			
	asphalt	m1	420	
	concrete (slab on the ground)	m1	60	
2	Manual removal of the base of concrete			
	concrete slab dim.30x30x5cm	m2	20	
	concrete-grass dim 60x40x10cm	m2	20	
	sett paving 10x10x10cm	m2	5	
	concrete drain channels 40x40x12.5cm	m1	10	
3	Manual trench digging Trench digging, rectangular shape, width 0.8 m, maximum depth 1.50 m, disposal of excavated material on one side at a minimum distance of 1.0 m from the edge of the trench. Calculation per m3 of excavated material in virgin condition, for all necessary labour and materials. The unit price includes possible pumping of groundwater, necessary shoring of trenches deeper than 1.0m, trench protection and construction of temporary pedestrian crossings.			
	Sanitary water supply network	m3	316.00	
4	Sand backfilling Unit price includes the supply, delivery, transport along the trench, pouring into trench, planning and compaction of sand in layers beneath and around the pipe, layer thickness 30cm. Material to be used is sand type "Dunavac".  Calculation per m3 of installed sand in compacted condition, for all necessary labour and materials.			
	Sanitary water supply network	m3	53.00	
5	Trench backfilling with excavated soil Trench backfilling with excavated soil including compaction in layers of 30 cm, until obtaining natural compaction. Calculation per m3 of backfilled trench in compacted state, for all labour and material.			
	Sanitary water supply network	m3	263.00	
6	Transport of excess soil from excavation. Unit price includes the transport of the excavated material to the city landfill.			

	m3	53.00
<b>7 Pavement sub-base</b>		
Supply of materials, transport and construction of pavement sub-base of internal road and parking area. Structure is made of granulated gravel 0/ 63.50mm in a layer of 25cm. Calculation per m3.		
	m3	50.00
<b>8 Pavement sub-base</b>		
Supply of materials, transport and construction of pavement sub-base of internal road and parking area. Structure is made of crushed stone 0/ 31.50mm in a layer of 25cm. Calculation per m3.		
	m3	50.00
<b>9 Concrete plateau sub-base</b>		
Supply of materials, transport and gravel placement in layer of 10cm, as a base for concrete plateau. Calculation per m2.		
	m2	40.00

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TOTAL II:

### III INSTALLATION WORKS

<b>1</b>	Supply of materials, loading, transport to the site, unloading, transport along the trench and installation of fittings and pipes, with the necessary seals and connection material.		
	<b>Pipes</b>		
	Water pipes made of polyethylene, PE-100, NP10 bar, Ø90 mm (ND 80 mm)	m'	
	Water pipes made of polyethylene, PE-100, NP10 bar, Ø73 mm (ND 65 mm)	m'	120.00

Water pipes made of polyethylene, PE-100, NP10bar, Ø50 mm (ND 40 mm)	m'	20.00
Water pipes made of polyethylene, PE-100, NP10bar, Ø40 mm (ND 32 mm)	m'	240.00

**Supply, transport and installation of a cabinet for housing over-ground hydrant equipmen.**

Cabinet consists of 2 Trevira hoses Ø52, 15m long, nozzles, key, and other necessary equipment for outdoor hydrants.

Calculation per piece of completely built-in closet.	pcs	7.00
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TOTAL III:

IV CONCRETE WORKS

1 Construction and installation of manifold water meter manhole.

Supply, transport of materials for construction of manifold concrete water meter manhole (in accordance with details) dim. 2x2,5x1,2 m. The works include the planning of the trench bottom and construction of screed, pouring of concrete, installation of cast iron steps, supply and installation of a sewage cover, diameter 600 mm.

Calculation per executed manhole including all labour and material.	pcs.	1.00
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2 Road patching

Construction of pavement structure, asphalt-concrete wearing layer, d= 8cm. Wearing layer of asphalt-concrete is in accordance with technical norms and standards for this type of works. The unit price includes production of asphalt, transport, installation by finisher, and rolling by group of rollers. Before installation,

m2 200.00

3 Patching of concrete slab

Supply of materials, transport and patching of concrete slab of the plateau in front of the building, concrete MB 20, inclination 1% from the facility towards green area. Slab thickness 10cm. Calculation per m2.

m2 40.00

4 Placement of concrete products

Supply of materials, transport and installation of concrete products in the layer of sand. Shape and colour of concrete elements in accordance with the dismantled elements. The joints between the concrete elements are filled with sand. Unit price includes sand. Calculation per m2.

concrete plates dim.30x30x5cm	m2	20.00
concrete-grass dim 60x40x10cm	m2	20.00
sett paving 10x10x10cm	m2	5.00

5 Installation of concrete drain channels

Supply of materials, transport and installation of concrete drain channels, dimensions 40x40x12 cm, colour as the existing drain channels. They shall be placed in a layer of cement mortar, scale 1: 2. Joints shall be grouted and drain channels cleaned, according to the Designer's instructions. Calculation per meter.

m1 10

TOTAL IV:

## V OTHER WORKS

<b>1</b>	Testing of pipeline on trial pressure Unit price includes the labour and materials needed to perform individual and group trials of mounted pipeline, according to current regulations. Calculation per meter of pipeline route where the works were carried out. Sanitary water supply network	m'	380.00
<b>2</b>	Flushing, disinfection of pipeline and bacteriological examination of water Unit price includes the labour and materials required to obtain certificate of compliance for water quality sampled from the newly built pipeline, according to current regulations. Calculation per meter of pipeline route where the works were carried out. Sanitary water supply network	m'	380.00
<b>3</b>	Flushing of the rainwater and foul sewage network before and after the intervention. Flushing should be done gradually, manhole by manhole. rainwater goods foul sewage	m' m'	120 60
<b>4</b>	Separation of sanitary from hydrant networks Unit price includes cutting of pipes at the manifold manhole, at the separation between sanitary and hydrant reticulation. Calculation per piece.	pcs.	5.00
<b>5</b>	Introduction of sanitary water to the building Unit price includes the introduction of sanitary water to the building. Calculation per piece.	pcs.	5.00
<b>6</b>	Supply and installation of fittings in the manifold water meter manhole. Supply of materials, loading, transport to the site of fittings, at the point of separation of sanitary from hydrant reticulation water. Cast Tee 125/65 mm Cast Q 65 mm Flat valve flanged Ø65 mm Flange adaptor Ø80 mm	pcs. pcs. pcs. pcs.	1.00 1.00 1.00 1.00

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TOTAL V:

### TOTAL A.

- I SURVEYING
- II EARTHWORKS
- III INSTALLATION WORKS
- IV CONCRETE WORKS
- V OTHER WORKS

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**TOTAL A :**

## B. INTERNAL INSTALLATIONS

### I DISMANTLING AND DEMOLITION

#### Introduction of sanitary water to the building

- 1 Mechanical cutting of concrete slab on the ground. Cutting in the field 1.2x1.2m. The item includes all sides of the field that is cut. Calculation per meter.

m1 24

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#### TOTAL I:

### II EARTHWORKS

- 1 Shaft digging, rectangular shape, width 1.0 m, maximum depth 1.80 m, disposal of excavated material on one side at a minimum distance of 1.0 m from the edge of the trench.

Calculation per m3 of excavated material in virgin condition, for all necessary labour and materials. The unit price includes possible pumping of groundwater, necessary shoring of trenches deeper than 1.0m, trench protection.

m3 10

- 2 **Sand backfilling**

Unit price includes the supply, delivery, transport along the trench, pouring into trench, planning and compaction of sand in layers beneath and around the pipe, layer thickness 30cm. Material to be used is sand type "Dunavac".

Calculation per m3 of installed sand in compacted condition, for all necessary labour and materials.

m3 2

- 3 **Trench backfilling with excavated soil**

Trench backfilling with excavated soil including compaction in layers of 30 cm, until obtaining natural compaction.

Calculation per m3 of backfilled trench in compacted state, for all labour and material.

m3 8

- 4 **Transport of excess soil from excavation.**

Unit price includes the transport of the excavated material to the city landfill.

Calculation per m3 of transported material in compacted state, including labour and material.

m3 2.00

- 5 **Sub-base of concrete floor slab**

Supply of materials, transport and backfilling of gravel in a layer of 10cm as a base for construction of concrete floor slab. Calculation per m2.

m2 40.00

---

#### UKUPNO II:

### III WATER SUPPLY INSTALLATIONS

1. The works on separation of sanitary from hydrant network. Unit price includes closing of valves, discharge of reticulation, cutting of cast iron pipes at points of connection with the sanitary reticulation. Unit price includes installation of temporary closures on sanitary reticulation pipes that will be kept. Calculation per separation point, i.e. per piece.

separation of hydrant and sanitary reticulation pcs. 5.00

2. Supply and installation of polypropylene (plastic) water supply pipes with all the necessary fittings for pipe network. Unit price includes hanging the pipes on wall and structure, chiselling and punching of walls in floor structure, as well as the required excavation including backfilling.

NOTE: pipe diameter in the drawings represents the inner diameter of pipe.

Calculation per meter of finished pipeline.

Ø25,DN 20 mm	m	65.00
Ø40,DN 32 mm	m	5.00
Ø50,DN 40 mm	m	6.00

3. Supply and installation of thermal insulation for pipes made of material class A1, A2 or at least B1, which is hardly flammable in accordance with SRPS U.J1.050 or EN 13501-1.

Calculation per meter.

Ø 25mm	m	65.00
Ø 40mm	m	5.00
Ø 50mm	m	6.00

4. Connection of the existing sanitary reticulation to a new one, below the first floor slab. The existing verticals and branches of the existing sanitary reticulation are connected to the new lower distribution of repaired sanitary reticulation, in toilets that are not subject to the intervention. Proper fittings shall be installed at connection points.

Calculation per connection point, i.e. piece. pcs. 20.00

TOTAL III:

#### IV OTHER WORKS

1. Testing of the newly-designed pipeline on pressure. Defective pipes and joints shall be replaced.

Calculation per meter m' 76.00

2. Disinfection and bacteriological testing of the newly-designed pipeline.

Calculation per meter m' 76.00

TOTAL IV:

#### V BETONSKI RADOVI

- 1 Supply of materials, transport and construction of base for waterproofing, made of lean concrete MB20 d=10cm. Calculation per m2.

m2 8.00

- 2 Supply of materials, transport and construction of concrete slab on the ground d=12cm, MB25 concrete. Calculation per m2.

m2 8.00

**UKUPNO V:**

#### VI INSULATION WORKS

Supply of materials, transport and construction of horizontal waterproofing on parts of the slab on the ground (after patching) to protect it against moisture and seepage water. It is performed in the layers of bleeding concrete, as follows:

- Cold applied bitulite coating "A"
- Hot applied bitumen coating 85/25
- kondor 3 (APP Plastomer Modified-Bitumen Waterproof Membrane)
- kondor 3 (APP Plastomer Modified-Bitumen Waterproof Membrane) with defined overlappings welded to the previous layer. Special attention is paid to the connection between new and existing waterproofing layer. Insulation shall be raised along the walls to the height of 30cm.

m2 16.00

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**UKUPNO VI:**

**TOTAL B.**

- I DISMANTLING AND DEMOLITION
- II GROUND WORKS
- III WATER SUPPLY INSTALLATIONS
- IV OTHER WORKS

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- V CONCRETE WORKS
- VI INSULATION WORKS

---

**TOTAL B :**

<b>C. INTERNAL INSTALLATIONS - SUBSTATION AND AIR-HANDLING UNITS</b>
--

I DISMANTLING AND DEMOLITION

- |   |   |     |      |
|---|---|-----|------|
| 1 | Mechanical cutting of base. Cutting in strips 1.0m wide. The item includes all sides of the field that is cut. Calculation per meter.   | m1  | 28.5 |
| 2 | Mechanical drilling ribbed ceiling of the first floor, dimension Ø125mm. Inspect the location of drilling together with the Investor's representative. Calculation per piece. | kom | 2    |

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UKUPNO

II EARTHWORKS

- |   |   |    |      |
|---|---|----|------|
| 1 | Trench digging, rectangular shape, width 1.0 m, maximum depth 1.80 m, disposal of excavated material on one side at a minimum distance of 1.0 m from the edge of the trench.<br>Calculation per m3 of excavated material in virgin condition, for all necessary labour and materials. The unit price includes possible pumping of groundwater, necessary shoring of trenches deeper than 1.0m, trench protection. | m3 | 37.5 |
| 2 | <b>Sand backfilling</b><br>Unit price includes the supply, delivery, transport along the trench, pouring into trench, planning and compaction of sand in layers beneath and around the pipe. Material to be used is sand type "Dunavac".<br>Calculation per m3 of installed sand in compacted condition, for all necessary labour and materials.  | m3 | 7.5  |
| 3 | <b>Trench backfilling with excavated soil</b><br>Trench backfilling with excavated soil including compaction in layers of 30 cm, until obtaining natural compaction.<br>Calculation per m3 of backfilled trench in compacted state, for all labour and material.<br>Sanitary water supply network   | m3 | 25   |
| 4 | <b>Transport of excess soil from excavation.</b><br>Unit price includes the transport of the excavated material to the city landfill.<br>TOTAL I:   | m3 | 17.5 |

- |   |  |    |     |
|---|--|----|-----|
| 5 | <b>Sub-base of concrete floor slab</b><br>Supply of materials, transport and backfilling of gravel in a layer of 10cm as a base for construction of concrete floor slab. Calculation per m2. | m3 | 2.5 |
|---|--|----|-----|

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UKUPNO II

III WATER SUPPLY INSTALLATIONS

- |    |  |   |       |
|----|--|---|-------|
| 1. | Supply and installation of polypropylene (plastic) water supply pipes with all the necessary fittings for pipe network. Unit price includes hanging the pipes on wall and structure, chiselling and punching of walls in floor structure, as well as the required excavation including backfilling.<br>Calculation per meter of finished pipeline.<br>Ø20,DN 15 mm | m | 10.00 |
|----|--|---|-------|

2. Supply and installation of thermal insulation for pipes made of POLYURETHANE or other appropriate foam insulator.  
Calculation per meter.  
Ø 20mm m 10.00

---

TOTAL III:

**IV SEWAGE INSTALLATIONS**

1. Supply and installation of PVC sewage pipes with all the necessary fittings. Pipes are mounted by hanging, chiselling and punching walls in floor structure or by digging into the walls or floors in a strictly designed decline of 2%. Unit price includes sealing material for pipe.  
Calculation per meter of finished pipeline.
- |                |   |      |
|----------------|---|------|
| Ø 75 mm - PVC  | m | 5.00 |
| Ø 125 mm - PVC | m | 5.00 |
| Ø 160 mm - PVC | m | 5.00 |
2. Connection of new sewer pipes with the existing ones. Unit price includes cutting of cast iron pipes of storm sewer and installation of inclined branch at the junction with the new sewage.  
Calculation per connection point, i.e. per piece.
- |             |     |      |
|-------------|-----|------|
| KR Ø125/150 | pcs | 2.00 |
| L45°/125    | pcs | 2.00 |
| Rv Ø125/150 | pcs | 1.00 |
| KR Ø150/150 | pcs | 1.00 |
| L45°/150    | pcs | 1.00 |
3. Supply and installation of cast iron floor drains with chrome grille. Drains are height adjustable with built-in water stop - trap  
Calculation for completely mounted drain.
- |          |      |      |
|----------|------|------|
| Ø 150 mm | pcs. | 1.00 |
| Ø 125 mm | pcs. | 2.00 |

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TOTAL IV:

**V SANITARY DEVICES**

1. Supply and installation of faucet bowl. Unit price includes the enamel faucet bowl, pouring tap and drain valves.  
Calculation for completely mounted faucet bowl. pcs. 1.00
2. Supply and installation of gate valves with internal thread, as follows:  
- gate valves with capstan:
- |         |     |      |
|---------|-----|------|
| Ø 15 mm | pcs | 1.00 |
|---------|-----|------|

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TOTAL V:

**VI BETONSKI RADOVI**

1. Supply of materials, transport and construction of base for waterproofing, made of lean concrete MB20 d=10cm. Calculation per m2.
- |  |    |       |
|--|----|-------|
|  | m2 | 25.00 |
|--|----|-------|
2. Supply of materials, transport and construction of concrete slab on the ground d=12cm, MB25 concrete. Calculation per m2.
- |  |    |       |
|--|----|-------|
|  | m2 | 25.00 |
|--|----|-------|

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**UKUPNO VI:**

**VII INSULATION WORKS**

- 1 Supply of materials, transport and construction of horizontal waterproofing on parts of the slab on the ground (after patching) to protect it against moisture and seepage water. It is performed in the layers of bleeding concrete, as follows:
  - Cold applied bitulite coating "A"
  - Hot applied bitumen coating 85/25
  - kondor 3 (APP Plastomer Modified-Bitumen Waterproof Membrane)
  - kondor 3 (APP Plastomer Modified-Bitumen Waterproof Membrane) with defined overlappings welded to the previous layer. Special attention is paid to the connection between new and existing waterproofing layer. Insulation shall be raised along the walls to the height of 30cm.

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m2            35.00

**UKUPNO VII:**

**VIII OSTALI RADOVI**

1. Testing of the newly designed water pipeline on pressure.

Calculation per m' m1            10.00

2. Disinfection and bacteriological testing of newly designed water pipeline

Calculation per m' m'            10.00

- 3 Testing of the new sewerage system for water tightness

Calculation per m' m'            28.50

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**UKUPNO VIII:**

**TOTAL C.**

I DISMANTLING AND DEMOLITION WORKS

II GROUND WORKS

III WATER SUPPLY INSTALLATIONS

IV SEWAGE INSTALLATIONS

V SANITARY DEVICES

VI CONCRETE WORKS

VII INSULATION WORKS

VIII OTHER WORKS

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**TOTAL C :**

**D. INTERNAL INSTALLATIONS - HYDRANT NETWORK****I HYDRANT NETWORK**

1. Dismantling of hydrant network. The item within Previous preparatory works in the Internal sanitary reticulation, Part III, Item 1 includes closing of valves, discharge of reticulation, cutting of cast iron pipes on points of connection with the sanitary reticulation. This item includes cutting of cast iron pipes of hydrant reticulation in branching points towards hydrant cabinets. Unit price covers placement of temporary closures on pipes, which will be kept. Calculation per branching point, i.e. per piece.  
separation of hydrant reticulation at branching pcs. 10  
points towards hydrant cabinets
2. Careful dismantle of wall fire hydrants. Dismantle the hydrants, clean and hand over them to the investor through kept records.  
Calculation per piece. pcs. 24.00
3. Supply and installation of galvanized water supply pipes with all the necessary fittings for the pipeline. Unit price includes hanging of pipes on wall and structure, as well as all necessary materials for sealing of pipe joints and anti-corrosion protection of pipeline.  
Calculation per meter of finished pipeline.  
Ø 50 mm m 105.00  
Ø 80 mm m 140.00
4. Supply and installation of thermal insulation for pipes made of material class A1, A2 or at least B1, which is hardly flammable in accordance with SRPS U.J1.050 or EN 13501-1.  
Calculation per meter.  
Ø 50 mm m 200.00  
Ø 80 mm m 220.00
5. Supply, transport and installation of a complete wall-mounted fire hydrant. The hydrant is composed of tin box, standard dimensions 50x50 cm, with a lock. The cabinet keeps the reel with Trevira hose, diameter 50 mm, with the appropriate nozzle attached to the hose end. The other end of the hose is attached to the hydrant - union valve. Inlet plumb line is located next to hydrant box. Slant union valve with capstan Ø50 mm is installed at the end of the pipe and is included in the price. Unit price includes supply and installation of the plugs for the screws and hanging of hydrant.  
Calculation per piece of complete hydrant, installed and tested. pcs. 26.00

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TOTAL I:

**TOTAL D.**

**I HYDRANT NETWORK**

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**TOTAL D :**

- A. ESTERNAL INSTALLATIONS
  - B. INTERNAL INSTALLATIONS
  - C. INTERNAL INSTALLATIONS - SUBSTATION  
AND AIR-HANDLING UNITS
  - D. INTERNAL INSTALLATIONS - HYDRANT
- 

**SUMMARY - PREVIOUS PRELIMINARY  
WORKS:**

ESTIMATED BILL OF QUANTITIES: WATER SUPPLY  
AND SEWAGE INSTALLATIONS

PHASE I - THEATRE HALLS WITH SUPPORT FACILITIES

No.	DESCRIPTION	UoM	Quantity	Total RSD
<b>I PREVIOUS WORKS</b>				
1.	Careful dismantle of basin fixtures. Dismantle the basin fixtures, clean and hand them over to the investor through kept records. Calculation per piece.	pcs.	8.00	
2.	Careful dismantle of WC pan fixtures. Dismantle the WC pan fixtures, clean and hand them over to the investor through kept records. Calculation per piece.	pcs.	6.00	
3.	Careful dismantle of sink fixtures. Dismantle the sink fixtures, clean and hand them over to the investor through kept records. Calculation per piece.	pcs.	1.00	
4.	Careful dismantle of urinal fixtures. Dismantle the urinal fixtures, clean and hand them over to the investor through kept records. Calculation per piece.	pcs.	3.00	
5.	Careful dismantle of drain fixtures. Dismantle the drains, clean and hand them over to the investor through kept records. Calculation per piece.	pcs.	6.00	
6.	Sealing of sewage pipes. Seal the sewage pipes in the floor leading from the disassembled devices. Lump sum calculation.	LS	1	
7.	Dismantling of water supply network. Dismantle the water supply pipes in the walls so they can be replaced with new ones. Dismantled pipes shall be cleaned and handed over to the investor through kept records.  Lump sum calculation.	LS	1	
8.	Mechanical cutting of slab on the ground d=12cm. Cutting in strips 1m wide. The item includes all sides of the field that is cut. Calculation per meter.	m	17.9	

**TOTAL I:**

II EARTHWORKS

1	Trench digging, rectangular shape, width 1.0 m, maximum depth 1.80 m, disposal of excavated material on one side at a minimum distance of 1.0 m from the edge of the trench. Calculation per m3 of excavated material in virgin condition, for all necessary labour and materials. The unit price includes possible pumping of groundwater, necessary shoring of trenches deeper than 1.0m, trench protection.	m3	26.85
2	Unit price includes the supply, delivery, transport along the trench, pouring into trench, planning and compaction of sand in layers beneath and around the pipe, thickness of layer is 30cm. Material to be used is sand type "Dunavac". Calculation per m3 of installed sand in compacted condition, for all necessary labour and materials.	m3	5.37
3	Trench backfilling with excavated soil Trench backfilling with excavated soil including compaction in layers of 30 cm, until obtaining natural compaction. Calculation per m3 of backfilled trench in compacted state, for all labour and material. Sanitary water supply network	m3	21.48
4	Transport of excess soil from excavation. Unit price includes the transport of the excavated material to the city landfill.	m3	5.37
5	Sub-base of concrete floor slab Supply of materials, transport and backfilling of gravel in a layer of 10cm as a base for construction of concrete floor slab. Calculation per m2.	m2	17.9

**UKUPNO II:**

**III WATER SUPPLY INSTALLATIONS**

1.	Supply and installation of polypropylene (plastic) water supply pipes with all the necessary fittings for pipe network. Unit price includes hanging the pipes on wall and structure, chiselling and punching of walls in floor structure, as well as the required excavation including backfilling. Calculation per meter of finished pipeline.		
	Ø20, DN 15 mm	m	15.00
	Ø25, DN 20 mm	m	10.00
	Ø32, DN 25 mm	m	10.00
	Ø40, DN 32 mm	m	5.00
2.	Testing of pipeline on pressure. Defective pipes and joints shall be replaced Lump sum calculation	m1	40.00

3. Disinfection and bacteriological testing of pipeline. Lump sum calculation	m1	40.00
4. Supply and installation of thermal insulation for pipes made of POLYURETHANE or other appropriate foam insulator. Calculation per meter. Ø 20-32mm	m	20.00
Ø 40-50mm	m	5.00
5 Supply and installation of electrical low-mounted hot water heater under pressure. Calculation for completely mounted hot water heater. V = 10 lit.	pcs.	3.00
V = 30 lit.	pcs.	1.00
6. Connection of the existing sanitary network to a new one, below the first floor slab. The existing verticals and branches of the existing sanitary network are connected to the new lower distribution of repaired sanitary network, in toilets that are not subject to the intervention. Proper fittings shall be installed at connection points. Calculation per connection point, i.e. piece.	pcs	1.00

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**TOTAL III:**

**IV SEWAGE INSTALLATIONS**

1. Supply and installation of PVC sewer pipes with appropriate fittings. The pipes are mounted by hanging, chiselling and punching walls of floor structure or by digging into the walls or floors in a strictly designed decline of 2%. Unit price includes sealing material for pipe joints. Calculation per meter of complete pipeline. Ø 50 mm - PVC	m	5.00
Ø 75 mm - PVC	m	15.00
Ø 110 mm - PVC	m	10.00
2. Supply and installation of floor drains with waterless trap, plastic housing and a chrome grille, horizontal drains with a flange for toilets. Calculation for completely mounted drain. Ø 75 mm	pcs.	14.00
3. Watertightness testing of sewage pipes. Calculation per meter.	m'	20.00

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**TOTAL IV:**

**V SANITARY DEVICES**

- 1 Nabavka i montaža električnih niskomontažnih bojlera pod pritiskom.  
Obračun za komplet montiran bojler.

V = 10 lit.	pcs.	1.00
- concealed gate valve Ø 15 mm	pcs.	1.00

2. Supply, transport and installation of complete wash basin, I class, white faience. Basin size 50/40 cm, it should be furnished with a standing single lever mixer for cold and hot water, with a short outlet, nickel-plated drain trap Ø32 mm with a rosette, plug and chain. Design and installation of fixing strips or plastic plugs in the wall for fixing the basin, and is included in the unit price.

Calculation per piece including labour and material.	pcs.	8.00
- concealed gate valve Ø 15 mm	pcs.	8.00

3. Supply, transport and installation of a complete WC pan made of faience, I class. EK valve Ø15 mm with nickel-plated cap shall be placed on water inlet to toilet cistern. Plastic seat is mounted on the toilet pan. Low-mounted toilet cistern shall be installed, fountain type, with plastic flush pipe and other accessories. Unit price includes all connecting and sealing materials.

Calculation per completely mounted and tested device.	pcs.	6.00
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4. Supply and installation of faience urinal, which consists of: urinal bowl, set with a trap, valves for flushing with angle valve, PE drain elbow Ø50mm, connection sets for flushing, flat valve DN15.

Obračun za komplet montiran pisoar.	pcs.	3.00
- angle valve for urinal: Ø 15 mm	pcs.	3.00

5. Supply, transport and installation of SLOP SINK made of white faience, domestic production, complete with grid, cistern, flush pipe and necessary connecting sealing material. Slop sink shall be equipped with a pillar single tap for cold and hot water

Calculation per piece including labour and materials.	pcs.	1.00
- concealed gate valve Ø 15 mm	pcs.	1.00

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**TOTAL V:**

**VI SANITARY WARE**

1. Supporting accessories in bathrooms and toilets, as chosen by the designer, with all the necessary material for fixing:

* paper holder	pcs.	6.00
* liquid soap dispenser	pcs.	8.00
* toilet brush	pcs.	6.00
* mirror dimension 80x100cm, next to wash basin	pcs.	8.00

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**TOTAL VI:**

**VII CONCRETE WORKS**

1 Supply of materials, transport and construction of base for waterproofing, made of lean concrete MB20 d=10cm. Calculation per m2.	m2	17.90
2 Supply of materials, transport and construction of concrete slab on the ground d=12cm, MB25 concrete. Calculation per m2.	m2	17.90
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TOTAL VI:		

**VIII INSULATION WORKS**

1 Supply of materials, transport and construction of horizontal waterproofing on parts of the slab on the ground (after patching) to protect it against moisture and seepage water. It is performed in the layers of bleeding concrete, as follows: - Cold applied bitulite coating "A" - Hot applied bitumen coating 85/25 - kondor 3 (APP Plastomer Modified-Bitumen Waterproof Membrane) - kondor 3 (APP Plastomer Modified-Bitumen Waterproof Membrane) with defined overlappings welded to the previous layer. Special attention is paid to the connection between new and existing waterproofing layer. Insulation shall be raised along the walls to the height of 30cm. Calculation per m2, complete item.	m2	25.06
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TOTAL VII:		

**IX OTHER WORKS**

1. Flushing of sewer network before and after the intervention. Calculation per meter.	m'	20.00
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TOTAL IX:		

**S U M M A R Y**

- I PREVIOUS WORKS
- II GROUND WORK
- III WATER SUPPLY INSTALLATIONS
- IV SEWAGE INSTALLATIONS
- V SANITARY DEVICES
- VI SANITARY WARE
- VII CONCRETE WORKS
- VIII INSULATION WORKS
- IX OTHER WORKS

**TOTAL :**

ESTIMATED BILL OF QUANTITIES: ELECTRICAL INSTALLATIONS				
PHASE I - THEATRE HALLS WITH SUPPORT FACILITIES				
Item	DESCRIPTION	UoM	Quantity	Total
<b>1</b>	<b>Dismantling</b>			
	Dismantling of the existing electrical equipment including the necessary works and hand over to the Investor			
1.1	- distribution cabinets RO (1 piece) and related equipment	set	1	
1.2	- relating feeding lines of cabinet, sockets, lighting	set	1	
1.3	- existing lighting, 27 pcs. 4x18W, 29 pcs. of top reflectors	set	1	
1.4	- existing outlets and HVAC consumers	set	1	
<b>2</b>	<b>Equipment in Power Substation</b>			
2.1	Delivery and installation of NV fuses at the theatre hall outlets for consumers:			
	- 200A, Ik=10kA, za RO-PS, outlet no.1, 3pcs.	set	1	
	- 200A, Ik=10kA, za RO-KL1 - outlet no. 6, 3pcs.	set	1	
	- 80A, Ik=10kA, za RO-3 - outlet no. 3, 3pcs.	set	1	
	- 80A, Ik=10kA, za RO-4 - outlet no. 4, 3pcs.	set	1	
2.2	Delivery and installation of diesel electric generator DEA, similar to type J165K, manufacturer SDMO France, with a generator of power 160kVA/132kW in stand-by mode, in housing type M226, John Deere engine, SDMO alternator, APM303 control panel, equipped for automatic start, and automatic changeover cabinet similar to type TSI, in = 250A, complete with the necessary supporting cables and works to connect DEA and ATS with other equipment; Unit price includes instruction in the Serbian language; Supervision over the commissioning of performed installations; issuing guarantee; user training, and logistical support for the duration of the works; guarantee of 24 months, according to the terms of the manufacturer.	set	1	
<b>3</b>	<b>Distribution cabinets</b>			
	Delivery of new distribution cabinets similar to type Evrotehna, Kraljevo, for installation in/on the wall, complete with equipment similar to type Schrack, by single-line diagrams, works and commissioning			
3.1	Supply, delivery and wall-mounting of distribution cabinet RO-PS/M, made from pickled sheet metal, with a door and lock, dimensions 800x950x200mm, IP 54, with the following accessories: - main switch 0-1, three-pole 200 A, 500V pieces 1; - circuit breakers 10 A, type "B", pieces 2; - circuit breakers 16 A, type "B", pieces 4; - circuit breaker 25 A, type "B", pieces 2; - fuses NV00160/125 A, pieces 3	pcs..	1	
3.2	Supply, delivery and wall-mounting of distribution cabinet RO-PS/D, made from pickled sheet metal, with a door and lock, dimensions 800x950x200mm, IP 54, with the following accessories: - main switch 0-1, three-pole 63 A, 500V pieces 1; - circuit breakers 10 A, type "B", pieces 22; - switch 0-1, single-pole 10 A, 240 V, pieces 5;	pcs..	1	
3.3	RO-SR (stage lighting cabinet, which is delivered with the stage lighting)	pcs..	1	
3.4	Supply, delivery and wall-mounting of distribution cabinet RO-KL2 which consists of a network and generator part, made from pickled sheet metal, with a door and lock, dimensions 800x950x200+ 800x400x200, IP 54 with the following accessories: - switch 0-1, three-pole 160 A, 500V, with magnetic thermal protection, with shut down coil 240 V, 50 Hz, with two working and two break contacts, with a range of settings 120-160 A , pieces 1; - - switch 0-1, three-pole 63 A, 500V, with magnetic thermal protection, with shut down coil 240 V, 50 Hz, with two working and two break contacts, with a range of settings 40-63 A , pieces 1; - knife-type fuses NV00 160/ 80 A, pieces 3; - knife-type fuses NV00 160/ 125 A, pieces 3; - knife-type fuses NV00 160/ 40 A, pieces 6 - knife-type fuses NV00 160/ 35 A, pieces 3; - other fine material for wiring. - green signal lamps, network indication, pieces 6;	pcs..	1	
3.5	Delivery and mounting of distribution cabinet RO-PPK2 fire dampers, of necessary dimensions, including installation of equipment under single-pole diagram: - single-pole cam switch 1-0, 10A, 500V, piece 1 - single-pole LV circuit breakers of nominal current 6A, pieces 1 - single-pole LV circuit breakers of nominal current 4A, pieces 1 - transformer station 230V AC / 24V AC, 100VA, pieces 1 - auxiliary relay 24V AC, 3xNO/NC, pieces 15 - push button 1xNO/NC, pieces 2 - LED lamps for indication of damper position - open, φ 22mm, 230V, green, pieces 6 - LED lamps for indication of damper position - closed, φ 22mm, 230V, yellow, pieces 6 - LED lamps for indication of fire, φ 22mm, 230V, red, pieces 1 - other supplies (clips, rails, wiring wire, marks, etc.)	pcs..	1	

Item	DESCRIPTION	UoM	Quantity		Total
3.6	Supply, delivery and wall-mounting of distribution cabinet RO-3, made from pickled sheet metal, with a door and lock, dimensions 550x800x200, IP 54, with the following accessories: - main switch 0-1, 500V, three-pole 80 A, pieces 1; - circuit breakers 10 A, type "B", pieces 16; - circuit breakers 16 A, type "B", pieces 20; - fuses NV100/63A, pieces 6; - FID 25/0,5A, pieces 10	pcs..	1		
3.7	Supply, delivery and wall-mounting of distribution cabinet RO-3.1, made from pickled sheet metal, with a door and lock, dimensions 400x600x200, IP 54, with the following accessories: - main switch 0-1, 500V, three-pole 63 A, pieces 1; - circuit breakers 10 A, type "B", pieces 9; - circuit breakers 16 A, type "B", pieces 10; - FID 25/0,5A, pieces 7	pcs..	1		
3.8	Supply, delivery and wall-mounting of distribution cabinet RO-3.2, made from pickled sheet metal, with a door and lock, dimensions 550x800x200, IP 54, with the following accessories: - main switch 0-1, 500V, three-pole 63 A, pieces 1; - circuit breakers 10 A, type "B", pieces 14; - circuit breakers 16 A, type "B", pieces 28; - circuit breakers 25 A, type "B", pieces 5;	pcs..	1		
3.9	Supply, delivery and wall-mounting of distribution cabinet RO-4, made from pickled sheet metal, with a door and lock, dimensions 550x800x200, IP 54, with the following accessories: - main switch 0-1, 500V, three-pole 80 A, pieces 1; - knife-type fuses NV00 160/63 A, pieces 9; - knife-type fuses NV00 160/R, pieces 6;	pcs..	1		
3.7	Supply, delivery and wall-mounting of distribution cabinet RO-SH, made from pickled sheet metal, with a door and lock, dimensions 800x950x200, IP 54 with the following accessories: - main switch 0-1, three-pole, 200 A, 500V, pieces 1; - cam switch 0-1, 10 A, 250 V, pieces 44; out of which 10pcs-training 24pcs lower rank competition, 8pcs high rank competition. 2pcs back-up - circuit breakers 10 A, type "B", pieces 49; - circuit breakers 16 A, type "B", pieces 6; - circuit breakers 16 A, type "C", pieces 3; - circuit breakers 25 A, type "C", pieces 9; - fuses NVOO 100/63 A, pieces 6.	pcs..	1		
3.8	Supply, delivery and wall-mounting of distribution cabinet RO-TP, made from pickled sheet metal, with a door and lock, dimensions 800x950x200, IP 54 with the following accessories: -- switch 0-1, three-pole 25 A, 500V, pieces 1; - circuit breakers 2 A, type "B", pieces 3; - circuit breakers 10 A, type "B", pieces 13; - circuit breakers 16 A, type "B", pieces 5; - cam switch 10 A, 1-0-2, pieces 7; - contactors CN-10 A,, 250V, 50Hz, pieces 7; - bimetal 2-3 A, pieces 2; - bimetal 1-1,5 A, pieces 3; - bimetal 3-4 A, pieces 1; - bimetal 0,2-0,5 A, pieces 1; - green signal lamp, 5 W, for indicating the presence of network and pumps operation, pieces 10; - red signal lamp for indicating pump failure, pieces 7; - three-phase, siluminum socket, IP 65, on cabinet's side wall, pieces 1; - single-phase siluminum socket, IP 65, on cabinet's side wall, pieces 1; - clips, buses and other fine material for wiring.	pcs..	1		
3.9	Supply, delivery and wall-mounting of switchboard RT-CNS with the following accessories: - main switch 0-1, 25A, three-pole, pieces 1; - circuit breaker 10 A, type "C", pieces 1; - circuit breakers 16 A, type "C", pieces 5.	pcs..	1		
<b>4</b>	<b>Power lines</b>				
	Delivery of power lines for supplying distribution cabinets, including their laying in the prepared and existing route, connecting and commissioning				
4.1	-W1 power line, N2XH 4x95mm <sup>2</sup> + N2XH-Y 1x50mm <sup>2</sup> from LV distribution TS - RO-PS	m	80		
4.1.1	-W1.1 power line, N2XH 4x50mm <sup>2</sup> + N2XH 1x35mm <sup>2</sup> from RO-PS - RO-SR	m	10		
4.2	-W6 power line N2XH 4x95mm <sup>2</sup> + N2XH-Y 1x50mm <sup>2</sup> from LV distribution TS - RO-KL2	m	60		
4.2.1	-W6.1 power line N2XH 5x25mm <sup>2</sup> from RO-KL2 to RO-KK2	m	10		
4.2.2	-W6.2 power line N2XH 4x50mm <sup>2</sup> + N2XH 1x35mm <sup>2</sup> from RO-KL2 to RO-ČIL2	m	20		
4.2.3	-W6.3 power line N2XH 5x6mm <sup>2</sup> from RO-KL2 to RO-REK2	m	10		
4.2.4	-W8.6 power line N2XH 5x16mm <sup>2</sup> from RO-SH to RO-PS/D	m	75		

Item	DESCRIPTION	UoM	Quantity		Total
4.2.5	-W3 power line N2XH-Y 5x25mm2 from LV distribution TS - RO-3	m	100		
4.2.6	-W3.1 power line N2XH 5x10mm2 from RO-3 to RO-3.1	m	10		
4.2.7	-W3.2 power line N2XH 5x10mm2 from RO-3 to RO-3.2	m	50		
4.2.8	-W8 power line N2XH 4x95mm2 from LV distribution TS - ATS (ground floor)	m	10		
4.2.9	-W8.1 power line PPOO 4x95mm2 from ATS do DEA (outside facility)	m	35		
4.2.1	-W8.2 power line N2XH 4x95mm2 from ATS do RO-SH	m	5		
4.2.1	-W8.4 power line N2XH 5x6mm2 from RO-SH do RO-TP	m	50		
4.2.1	-W8.5 power line N2XH 5x6mm2 from RO-SH do RT-CNS	m	60		
4.2.1	-W8.7 power line N2XH 5x6mm2 from RO-SH do RO-KL-2	m	60		
4.4	Supply, delivery and laying of lines for supplying lamps and fire dampers. The line is type N2XH 3x1,5mm2	m	2200		
4.5	Supply, delivery and laying of line N2XH 3x2,5mm2, for supplying single-phase sockets I RO-PPK2	m	900		
4.6	Supply, delivery and laying of lines for supplying fire dampers. The line is type N2XH 4x1,5mm2	m	100		
4.7	Supply, delivery and laying of fireproof line NHXHX Fe180/E90 3x1,5mm2 for supplying panic lighting.	m	150		
4.8	Supply, delivery and laying of control cable JH(St)H 2x2x0,8mm for connection between air-handling unit and control centre,	m	170		
<b>5</b>	<b>Lamps</b>				
	Delivery of lamps, complete with works on the installation, connection and commissioning				
5.1	Recessed luminaire, circular, with matte glass, equivalent to type Lara W DO 226 EPP, IP 20, G24q3, with electronic control gear accessories and compact fluorescent light source 26W/840. Lamp ring is white. Buck-Berng.	pcs.	36		
5.2	Recessed luminaire, circular, movable in two planes, equivalent to type Dora 1x70W, grio Gx8.5, 230V, IP20, complete with electronic transformer BTE 70W and metal halogen light source of 70W, 3000K, Buck. Lamp ring is finestructured grey.	pcs.	16		
5.3	Surface mounted luminaire with opal polycarbonate diffuser equivalent to type Prima M DO 1x49W, T5, IP20, Buck. Complete with electronic control gear accessories, suspension accessory and fluorescent light source 49W/840, Buck. Body of the luminaire is made of extruded aluminum profile in gray.	pcs.	14		
5.4	Hanging luminaire with a combination of direct and indirect illumination, equivalent to type DUAL DO/S 2x80W, T5, complete with electronic control gear accessories and fluorescent light source 80W/840, Buck. Optical accessories for indirect/direct lighting component is opal polycarbonate diffuser. Body of the luminaire is made of extruded aluminum profiles. Delivered complete with suspension accessory.	pcs.	42		
5.5	Surface mounted circular luminaire diameter Ø300mm made of impact-resistant (IK08) UV stabilized polycarbonate, halogen free, equivalent to type 1544 Globo (Buck-Disano) 1x100W, E27, IP65, 230V. Luminaire is supplied complete with mounting accessories and light source maximum 100W	pcs.	18		
5.6	Surface mounted luminaire equivalent to type Titan 236W PC, IP65. The luminaire is made of polycarbonate, with electronic control gear accessories, reflector made of white plastic sheet, plastic buckles and fluorescent light source 36W/840, Buck-Berng	pcs.	4		
5.7	Surface mounted luminaire security lighting with local power supply in non-maintained, made of V2 self-extinguishing polycarbonate with a transparent, polycarbonate diffuser, equivalent to type AESTETICA LED 8SE3-40 (Beghelli), 230V, IP40, operating autonomy 3h, electronic control gear accessories, with battery, inverter, LED light source and an appropriate label on adhesive foil, code: 16225	pcs.	36		
5.8	Surface mounted projector lamp with its own carrier, rotationally symmetric light beam, housing made of die-cast aluminum, reflector made of polished aluminum purity 99.85%, diffuser of tempered glass thickness 5mm, equivalent to type 1156 FORUM XL INDOOR (Disano), 1 x HQI-TS 1000W, K12s-36, 230V, IP65, IK08, weight 13kg; - magnetic control gear accessories, ACC, 1176 (Disano), 1000W, 230 V, IP 65 - bulb HQI-TS 1000W/D/S (Osram), 6100 K, Ra>90, K12s-36, 230 V.	pcs.	5		
5.9	Recessed luminaire, circular, equivalent to type Dora DLE 28W, IP20, complete with electronic transformer, LED light source of 28W, 3000K, Buck. Lamp ring is finestructured white.	pcs.	43		
5.10	Surface mounted luminaire made of white painted steel plate thickness 0.6mm, with opal diffuser of PMMA that is UV stabilized, structure and thickness of the diffuser provide a uniform and high light distribution and aluminum frame diffuser, equivalent to type ORIEN 228 DO (Buck) 2xT16 28W/840, G5, IP40, 230V. The luminaire is supplied with electronic equipment class A2, installation accessories and light sources of 28W/840.	pcs.	6		
5.11	Surface-mounted, wall or ceiling luminaire with housing made of extruded aluminum and transparent polycarbonate diffuser, equivalent to type 418 RIGO (Buck-Disano), 1xT16 14W/840, G5, P43, 230V. The luminaire is supplied with electronic equipment class A2, installation accessories and light sources of 14W/840, without switch and convenience outlet	pcs.	12		
5.12	Supply, delivery and installation of an ordinary switch 250V, 16A, white, similar to type Aling.	pcs.	15		
5.13	Supply, delivery and installation of two-gang switch 250V, 16A, white, similar to type Aling.	pcs.	4		

Item	DESCRIPTION	UoM	Quantity		Total
5.14	Supply, delivery and installation of one-gang switch 250V, 16A, white, similar to type Aling.	pcs.	4		
5.15	STAGE LIGHTING IS NOT SUBJECT OF THIS BILL OF QUANTITIES				
<b>6</b>	<b>Sockets and HVAC consumers</b>				
	Delivery of sockets, complete with the works on the installation, connection and commissioning				
6.1	Supply, delivery and installation of single phase socket 250V, 16A with protective contact, white, similar to the type Aling.	pcs.	15		
<b>7</b>	<b>Air-handling units</b>				
	Delivery of air-handling unit installations, chillers and recuperators, complete with electrical cabinets, other electrical equipment and necessary works on the installation. Connection and commissioning is carried out by the supplier of equipment				
	INCLUDED BY UNIT PRICE FOR MECHANICAL INSTALLATIONS except equipotential metal masses				
	Delivery of material and making of additional equipotential by tape FeZn 2ox3mm, mounted on supports for wall at a height of 0.3m from the floor. Galvanic bonding of metal masses to the tape is performed by conductor P-F/Y 1x6mm <sup>2</sup> . Unit price includes construction of fixing clips for pipes, drilling of tape, setting corresponding plates, screws with nuts and star washers and connection development for housing RO-KL2; Delivery and laying of conductors P/Y 1x16mm <sup>2</sup> of existing equipotential bus to the ring for additional equipotential.	set	1		
<b>8</b>	<b>Heat substation</b>				
	Delivery of electrical cabinets of automation, other electrical equipment and necessary works on the installation. Connection and commissioning is carried out by supplier of equipment				
	INCLUDED IN UNIT PRICE OF MECHANICAL INSTALLATIONS except equipotential of metal masses				
	Delivery of material and additional equipotential by tape FeZn 2ox3mm, mounted on support on wall at a height of 0.3m from the floor. Galvanic bonding of metal masses to the tape shall be performed by conductor P-F/Y 1x6mm <sup>2</sup> . Unit price includes construction of fixing clips for pipes, drilling of tape, setting of the corresponding plates, screws with nuts and star washers and construction a connection to the housing RO-TP; Delivery and laying of conductors P/Y 1x16mm <sup>2</sup> from the existing equipotential bus to the ring for additional equipotential.	set	1		
<b>9.</b>	<b>Central control system CNS</b>				
9.1	Delivery of the equipment in the room for a central control - a computer with communication modules, monitor, printer, and UPS-APC 1.000VA	set	1		
9.2	Delivery and installation of communication module in PLC controllers of air handling units, heat pumps and heat substation	set	1		
9.3	Delivery, installation and placement of communication cables type HY(St)Y 2x2x0,8mm between PC for surveillance and PLC controller in air handling units, heat pumps and heat substation. The cables are partially laid by the existing route, and partly in cable conduits on the ceiling and walls, complete with the necessary materials, works and connection.	m	250		
9.4	Delivery and installation of the system and application software, complete with commissioning	set	1		
9.5	Delivery of technical documentation and instructions for work and 3 days for users training	set	1		
<b>10.</b>	<b>Construction of cable routes</b>				
	Delivery of necessary materials and equipment for making cable routes, complete with works on the installation.				
10.1	Installation of PNK 200mm cabinet through corridors. Complete with brackets, joints, T branches and bends.	m	90		
10.2	Installation of PNK 300mm cabinet through corridors. Complete with brackets, joints, T branches and bends.	m	80		
10.3	Installation of fireproof PNK 100/60mm, similar to type OBO Bettermann	m	130		
10.4	Delivery of material and making of grounding PNK cabinet with conductor P/Y 1x6mm <sup>2</sup> fed from the nearest PE bus.	set	1		
10.5	Breaking concrete pavement to provide a route for laying a power line from the DEA to ATS, including re-concreting after laying of cable and removal of debris.	m <sup>2</sup>	5		
10.6	Trench excavation in soil, III category, dimensions 0,8x0,4m for laying of power cable from DEA to ATS. Including construction of sand bedding, backfilling after laying of cable, soil compaction and removal of excess soil. The unit price includes warning tape and two labels for the cable on the regulated field.	m	15		
<b>11</b>	<b>Other</b>				
11.1	Required testing and commissioning with the issuance of certificates of compliance				
	Testing the continuity of protective conductor and equipotential				

Item	DESCRIPTION	UoM	Quantity		Total
	Measurement of insulation resistance of cables, electrical equipment and devices, individual and entire installations performed.				
	Testing of protection by electrical separation of electrical installation				
	Testing of additional equipotential - testing of functionality of individual devices and equipment.				
	Measuring transitional resistance and grounding				
	After measuring, the Contractor shall make a protocol and provide the investor with all the necessary certificates along with certification of the obtained values.	set	1		
11.2	Sealing of penetration of power lines in the transition from one to another fire zone by fireproof compound.	pcs.	3		
11.3	Development of As-built design	set	1		
11.4	Development of equipotential of metal masses in the toilets by conductor P/Y 1x6mm <sup>2</sup> . Including box for equipotential PS-49, as well as cable P/Y 1x6mm <sup>2</sup> fed from the nearest PE bus.	pcs.	6		
<b>TOTAL:</b>					

## ESTIMATED BILL OF QUANTITIES: TELECOMMUNICATION AND SIGNAL INSTALLATIONS

## PHASE I - THEATRE HALLS WITH SUPPORT FACILITIES

ITEM	DESCRIPTION	UoM	QUANTITY	TOTAL (RSD)
<b>1</b>	<b>COMMUNICATION AND DATA SHARING SYSTEM</b>			
	<b>Passive equipment</b>			
1.1	Standing cabinet 19" 42U 800x800, BD - perforated front door, removable rear and sides - splice box with cassettes for 24 splices, pigtails, patch panel with 12 SC duplex adapters MULTIMODE - 1 piece - patch panel 50 x RJ-45 cat 3 - 2 pcs. - patch panel 24 x RJ-45 cat 6a - 4 pcs. - Shunting ring - 7 pcs. - fan unit - power strip - delivery, installation, connection	pcs.	1	
1.2	Socket with two modules RJ-45 category 6 with built-in box and mask - delivery, connection, installation	pcs.	6	
1.3	Copper twisted pair cable, FTP LSHF-FR, category 6a, 4x2x0,5 mm. - delivery, laying	m	500	
1.4	Patch cord FTP category 6a - delivery, connection	pcs.	14	
1.5	Electrical cable JH(St)H 60x2x0.8 mm. - delivery, laying	m	30	
1.6	Attestation of links 6A category with the development of measurement protocol	pcs.	14	
	<b>Active equipment</b>			
1.7	Layer 2 / Layer 3 switch, 48 x 10/100/1000BASE-T PoE similar to type Cisco Catalyst WS-C3650-48FS-S - delivery, installation, connection	pcs.	1	
1.8	Access point for wireless network access - delivery, installation, connection	pcs.	2	
1.9	Uninterruptable power supply similar to type APC SMX3000RMHV2U; 2700 W / 3000 VA, input 230V / output 230V , Interface ports: SmartSlot, USB, Extended runtime model, height in rack 2U - delivery, installation, connection	pcs.	1	
1.10	Testing and commissioning	lump	1	
<b>TOTAL 1</b>				
<b>2</b>	<b>INSTALLATION MATERIAL</b>			
2.1	Halogen-free cable ducts with lid/ dimensions 16x25mm including forming of penetration through walls made of concrete, gypsum or brick - delivery and installation	m	55	

ITEM	DESCRIPTION	UoM	QUANTITY	TOTAL (RSD)
2.2	Halogen-free cable ducts with lid/ dimensions 25x40mm including forming of penetration through walls made of concrete, gypsum or brick - delivery and installation	m	10	
2.3	Halogen free cable ducts with lid/ dimensions 40x60mm including forming of penetration through walls made of concrete, gypsum or brick - delivery and installation	m	20	
2.4	Halogen-free cable ducts with lid/ dimensions 75x150mm including forming of penetration through walls made of concrete, gypsum or brick - delivery and installation	m	40	
2.5	Sealing of penetrations for telecommunication and signal cables between different fire zones with fire-resistant compound - delivery of materials and penetration sealing	lump	1	
2.6	Small installation material	lump	1	
<b>TOTAL 2</b>				
<b>3 FINISHING WORKS</b>				
3.1	Development of as-built design of telecommunication and signal installations	lump	1	
<b>TOTAL 3</b>				
<b>SUMMARY</b>				
<b>1 COMMUNICATION AND DATA SHARING SYSTEM</b>				
<b>2 INSTALLATION MATERIAL</b>				
<b>3 FINISHING WORKS</b>				
<b>TOTAL (RSD)</b>				

## ESTIMATED BILL OF QUANTITIES FOR STAGE EQUIPMENT

## PHASE I - THEATRE HALLS WITH SUPPORT FACILITIES

## 1. STAGE LIGHTING FOR LARGE THEATRE HALL

No.	GOODS - SUPPLY AND INSTALLATION:	UoM	QUANTITY	TOTAL excl. VAT
<b>1.0.</b>	<b>Spotlights</b>			
1.1.	Spotlight 1000W, theatre set Zoom Profile, with adjustable light angle from 15-25°, with 4 carving blades for modeling of the light beam, mechanical iris, lamp caps and lamp GE HPL 750W, spotlight carrier, hook, protective cable, filter carrier and silicon cable 2m long with Shuko plug.	piece	14	
1.2.	Spotlight 1000W, theatre set Zoom Profile, with adjustable light angle from 25-50°, with 4 carving blades for modeling of the light beam, mechanical iris, lamp caps and lamp GE HPL 750W, spotlight carrier, hook, protective cable, filter carrier and silicon cable 2m long with Shuko plug.	piece	4	
1.3.	Spotlight with PC spot 2000W, theatre set, lens diameter 150mm, adjustable light angle 9-50°, lamp cap GY16 and light 2000W, spotlight carrier, hook, protective cable, filter carrier, four-way flaps and silicon cable 2m long with Shuko plug.	piece	8	
1.4.	Spotlight with PC spot 1000W, theatre set, lens diameter 150mm, adjustable light angle from 4-63°, lamp cap and lamp GX 9.5 T19, spotlight carrier, hook, protective cable, filter carrier, four-way flaps and silicon cable 2m long with Shuko plug.	piece	18	
1.5.	Spotlight with diffusing (Fresnel) lens 1000W, theatre set, lens diameter 150mm, adjustable light angle from 7-53°, lamp cap and lamp GX 9.5 T19, spotlight carrier, hook, protective cable, filter carrier, flap and silicon cable 2m long with Shuko plug.	piece	16	
1.6.	Spotlight focusing LED PAR 64, 6 in 1 LED diodes RGBWA+UV PAR, aluminium 12 x 10W, with light angle of 25°, DMX led or independent working mode, possibility to choose 4, 6, 12, 15 DMX channels depending on the purpose, black with spotlight carrier, filter carrier, hook, protective cable and cable 2m long with Shuko plug.	piece	18	
1.7.	Spotlight LED RGBW Flood 18 x 8W black, with light angle of 12°, 4 in 1 LED diode, DMX led or independent working mode, possibility to choose 4, 6, 12, 15 DMX channels depending on the purpose, with spotlight carrier, hook, protective cable, four-way flaps and silicon cable 2m long with Shuko plug.	piece	12	
<b>2.0.</b>	<b>Work lighting</b>			
2.1.	Wall-mounted metal halogen spotlight - maximum power up to 200W, for installation on the ceiling above the stage, the degree of protection IP 44	piece	12	
<b>3.0.</b>	<b>Technological lighting</b>			
3.1.	Wall-mounted lamp, power 150W, silumin housing, the optical system of blue glass, degree of protection IP 54.	piece	10	
<b>4.0.</b>	<b>Effects</b>			
4.1.	Smoke machine 1300W, with minimum constant smoke output of 35mil/min. DMX 512 channels, control via DMX, 0-10 V analogue, timer or manually, 5L tank capacity and power supply 230V/ 50 Hz.	piece	2	
4.2.	Liquid for smoke machine, package of 10 liters.	piece	2	

4.3.	Stroboscope with maximum power 5000W, the frequency of oscillation 0-20Hz, with adjustable light 0-100%, with the carrier, hook, protective cable, silicone cable 2m long, with Shuko plug and power supply 230V / 50 Hz.	piece	2		
<b>5.0. Stage lighting control and power supply</b>					
5.1	Dimming unit including installation and connection to the internal 10 bit digital control system. 12 channels at 10A, with 32A three-phase power supply, XLR 5-pin DMX512 input, Harting output connector. Housing 19" for rack mounting.	piece	5		
5.2.	DMX splitter with two parallel inputs and 8 outputs with galvanic isolation for each output channel, with an indication of the DMX signal, 8 three-pole XLR.	piece	2		
<b>6.0. Stage lighting control equipment</b>					
6.1.	Laptop with 15.6 inches screen, minimum configuration: Intel® Core™ i5 processor 1.8 GHz speed, 4GB RAM, 500GB hard drive, 1GB of graphics memory, Windows 8.1 64-bit operating system, with supporting software for stage lighting control.	piece	1		
6.2.	USB light mixer (PC Wing), for connection to a computer and software for stage lighting control. It supports up to 32768 DMX channels, 12 controls/ chasers, 71 switches for direct access, the main master with black out, 8 editing points, 2000 memory, 5000 snapshot, 2 direct DMX outputs, audio input, dimmable work lamp on flexible medium, including installation and training.	piece	1		
<b>7.0. Additional equipment for stage lighting</b>					
7.1.	Metal rack cabinet 19", 32U dimensions 1560x600x600mm, with internal wiring.	piece	1		
7.2.	Wall mounting rack cabinet 19", 12U dimensions 640x600x300mm, with internal wiring.	piece	1		
7.3.	Wall mounting rack cabinet 19", 9U dimensions 506x600x300mm, with internal wiring.	piece	1		
7.4.	Telescopic stand with "T" bar for mounting the spotlight height of up to 3 m, load 40 kg.	piece	6		
7.5.	Floor stand for mounting of spotlight on the floor level.	piece	8		
7.6.	Power connection box with 8 Shuko sockets with harting connector.	piece	9		
7.7.	Power connection box with 6 Shuko sockets with harting connector.	piece	2		
7.8.	LEE filters in colour and in rolls, dimensions 122 x 53 cm.	piece	40		
<b>8.0. Spare lamps</b>					
8.1.	Spare lamps GE HPL 750 240V/750W.	piece	14		
8.2.	Spare lamps GY 16 240V/2000W.	piece	8		
8.2.	Spare lamps GX 9,5 240V/1000W T19.	piece	34		
8.3.	Spare lamps R7s 119,6mm 240V/500W K1.	piece	10		
<b>9.0. Cables and connectors for stage lighting installation</b>					
9.1.	HARTING 16 pole female cable for dimers.	piece	21		
9.2.	HARTING 16 pole male surface-mounted for dimers.	piece	21		
9.3.	Power cable multicore LMC-H 14 x 2.5 mm <sup>2</sup> , halogen-free, package of 100 m.	piece	2		
9.4.	Power cable multicore LMC-H 18 x 1.5 mm <sup>2</sup> , halogen-free, package of 100 m.	piece	3		

9.5.	Power cable N2XH 3 x 1.5 mm <sup>2</sup> , halogen-free, package of 100 m.	piece	2		
9.6.	Power cable N2XH 3 x 2.5 mm <sup>2</sup> , halogen-free, package of 100 m.	piece	2		
9.7.	Shuko plug cable rubber-coated.	piece	90		
9.8.	Shuko socket cable rubber-coated.	piece	90		

9.9.	Network F/STP Cat. 6 cable, 4x2xAWG26/7 FTP-C200 FRNC, halogen-free, package of 305m.	piece	2		
9.10.	DMX cable M-FCY FRNC 2 x 0.22 mm <sup>2</sup> , halogen-free, package of 100 m.	piece	8		
9.11.	XLR three-pole male cable connector.	piece	60		
9.12.	XLR three-pole female cable connector.	piece	60		
9.13.	XLR five-pole male cable connector.	piece	60		
9.14.	XLR five-pole female cable connector.	piece	60		
9.15.	Installation and small supplies.	piece	1		
9.16.	Programming, commissioning of systems and user training.	piece	1		
<b>2. STAGE LIGHTING FOR SMALL THEATRE HALL</b>					
No.	GOODS - SUPPLY AND INSTALLATION:	UoM	QUANTITY		TOTAL excl. VAT
<b>1.0. Spotlights</b>					
1.1.	Spotlight with diffusing (Fresnel) lens 1000W, theatre set, lens diameter 150mm, adjustable light angle from 7-53°, lamp cap and lamp GX 9.5 T19, spotlight carrier, hook, protective cable, filter carrier, flap and silicon cable 2m long with Shuko plug.	piece	6		
1.2.	Spotlight focusing LED PAR 64, 6 in 1 LED diode RGBWA+UV PAR, aluminium 12 x 10W, with light angle of 25°, DMX led or independent working mode, possibility to choose 4, 6, 12, 15 DMX channels depending on the purpose, black with spotlight carrier, filter carrier, hook, protective cable and cable 2m long with Shuko plug.	piece	8		
1.3.	Spotlight LED RGBW Flood 18 x 8W black, with light angle of 12°, 4 in 1 LED diode, DMX led or independent working mode, possibility to choose 4, 6, 12, 15 DMX channels depending on the purpose, with spotlight carrier, hook, protective cable, four-way flaps and silicon cable 2m long with Shuko plug.	piece	6		
<b>2.0. Work lighting</b>					
2.1.	Ceiling-mounted metal halogen spotlight - maximum power up to 200W, for installation on the ceiling above the stage, the degree of protection IP 44	piece	2		
<b>3.0. Lighting control and power supply</b>					
3.1.	Dimming unit including installation and connection to the internal 10 bit digital control system. 12 channels at 10A, with 32A three-phase power supply, XLR 5-pin DMX512 input, Harting output connector. Housing 19" for rack mounting.	piece	1		
3.2.	DMX splitter with two parallel inputs and 8 outputs with galvanic isolation for each output channel, with an indication of the DMX signal, 8 three-pole XLR.	piece	1		
<b>4.0. Control equipment</b>					
4.1.	DMX lighting desk with 24 channels containing 24 potentiometers for light dimming with programmable 48 scenes or chases (999 steps), MIDI input/output, audio input, DMX inverter, dimensions 267x483x76mm, weighing 5kg.	piece	1		
<b>5.0. Additional equipment for stage lighting</b>					
5.1.	Wall-mounted rack cabinet 19", 9U dimensions 505x600x600mm, with internal wiring.	piece	1		
5.2.	Telescopic stand with "T" bar for mounting the spotlight height of up to 3 m, load 40 kg.	piece	2		

5.3.	Floor stand for mounting of spotlight on the floor level.	piece	2		
5.4.	Power connection box with 8 Shuko sockets with harting con	piece	4		
<b>6.0.</b>	<b>Spare lamps</b>				
6.1.	Spare lamps GX 9,5 240V/1000W T19.	piece	6		
<b>7.0.</b>	<b>Cables and connectors for stage lighting installation</b>				
7.1.	HARTING 16 pole female cable for dimers.	piece	2		
7.2.	HARTING 16 pole male surface-mounted for dimers.	piece	2		
7.3.	Power cable multicore LMC-H 14 x 2.5 mm <sup>2</sup> , halogen-free, package of 100 m.	piece	1		
7.4.	Power cable N2XH 3 x 1.5 mm <sup>2</sup> , halogen-free, package of 100 m.	piece	1		
7.5.	Shuko plug cable rubber-coated.	piece	18		
7.6.	Shuko socket cable rubber-coated.	piece	18		
7.7.	DMX cable M-FCY FRNC 2 x 0.22 mm <sup>2</sup> , halogen-free, package of 100 m.	piece	1		
7.8.	XLR five-pole male cable connector.	piece	24		
7.9.	XLR five-pole female cable connector.	piece	24		
7.10.	Installation and small supplies.	piece	1		
7.11.	Programming, commissioning of systems and user training.	piece	1		

<b>3. EQUIPMENT COMPLEMENTING THE AUDIO SYSTEM IN LARGE THEATRE HALL</b>				
No.	GOODS - SUPPLY AND INSTALLATION:	UoM	QUANTITY	TOTAL excl. VAT
<b>1.0.</b>	<b>Audio system</b>			
1.1.	Speaker covering the balcony, three-band /bi-amp passive wooden sound box with a frequency range of 60Hz - 18kHz $\pm$ 3dB with 2 x 8"/2" LF speaker, 2 x 8"/2" MF speaker and 4 x 1" HF driver /horn of power LF + MF: 800W AES, 3200W peak, HF: 150W AES, 600W peak, sensitivity LF+MF: 102dB, HF: 106dB, max SPL 137dB peak, impedance 6 $\Omega$ , dispersion 100-120 $^\circ$ x 30 $^\circ$ , dimension 628x506x369mm, weight 47kg.	piece	2	
1.2.	Wall-mounted carrier of speaker - black metal bracket, with support point for the speaker at 420mm from the wall, load capacity 50kg.	piece	2	
1.3.	Mobile speaker - monitor dual-band passive wooden sound box with a range of 65Hz - 20kHz $\pm$ 3dB with a 12" LF loudspeaker and 1" HF driver / horn, power 300W AES, 1200W peak, sensitivity 96dB, max 125dB peak, impedance 8 $\Omega$ , dispersion 90 $^\circ$ x 40 $^\circ$ , dimension 351x500x317mm, weight 17kg.	piece	4	
1.4.	Aluminium black stand for speaker, two-piece, height up to 2 m, load capacity up to 35 kg.	piece	4	
<b>2.0.</b>	<b>Audio control</b>			
2.1.	Digital audio mixing console with 24 mic inputs, 12 analogue XLR outputs, two AES I/O (mono), Ethernet and MIDI connection, DVI output for additional monitor, 2 x 24 segment of master/ solo meter, 2 x multi-touch screen, 21 x regulator touch-sensitive, 46 busses 16x stereo (32), stereo Master (2), solo busses (2 stereo, 4 total), dimension 763x586x295mm, weight 19kg.	piece	1	
2.2.	Digital Audio Processor with 4 inputs and 8 outputs, for processing analogue and AES/EBU signals. Adjustable input and output signal levels, delays, limiting, transition frequency, graphic and 8x parametric equalizer, RS 232 connection and corresponding software for lap top control, store and lock and preset, dimension 44x482x305mm, weight 3.5kg.	piece	1	
2.3.	Speaker amplifier with "switched mode" power supply, four-channel, power 4x2200W/4 $\Omega$ , frequency range 20Hz - 25kHz $\pm$ 0.5dB with distortion <0.1%, sensitivity of 23-44dB, noise -110dB. Housing 19", 2U, dimension 483x377x88mm, weight 16kg.	piece	2	
2.4.	Monitor speaker in audio control, ultra-compact dual-band passive wooden sound box with a range of 80Hz - 20kHz $\pm$ 3dB with 6.5"/1.5" LF loudspeaker and 1" HF driver/horn, power 150W AES, 600W peak, sensitivity 91dB, max 119dB peak, impedance 8 $\Omega$ , dispersion 110 $^\circ$ x 80 $^\circ$ , dimension 210x325x210 mm, weight of 5kg.	piece	2	
2.5.	Wall-mounting rack cabinet 19", 9U, dimension 505x600x600mm, with internal wiring.	piece	1	
<b>3.0.</b>	<b>Sound sources and accessories</b>			
3.1.	UFH diversity set wireless microphone set consisting of receiver with 8 frequencies, balanced XLR output, handheld microphone with a dynamic head and 1x1.5V AA power supply. Addition for installation in 19". Plus dynamic head-worn microphone with pocket transmitter and 2x1.5V AA power supply.	piece	8	
3.2.	Portable rack cabinet 19", 8U dimension 501x600x600mm for the installation of wireless receivers with a metal drawer 3U for storing wireless microphones.	piece	1	

3.3.	Microphone for signal transmission from the hall to control room monitors, shotgun condenser microphone with 48V power supply, frequency range 70Hz - 20kHz, sensitivity of 2.6 mV/Pa, impedance of 600Ω.	piece	2		
<b>4.0.</b>	<b>Cables and connectors for audio system installation</b>				
4.1.	Audio cable multicore 28 pairs, MF-FY FRNC 28x2x0.22 mm <sup>2</sup> , halogen-free, package of 100 m.	piece	1		
4.2.	Audio cable sub-multicore 8 pairs with stage box, MF-FY FRNC 8x2x0.22 mm <sup>2</sup> , length 15 m.	piece	3		
4.3.	Microphone cable NF-M-RF FRNC 2x0.22 mm <sup>2</sup> , halogen-free, package of 100 m.	piece	2		
4.4.	XLR connector three-pole male, cable.	piece	40		
4.5.	XLR connector three-pole female, cable.	piece	40		
4.6.	Speaker cable LS-FRNC 2 x 2.5 mm <sup>2</sup> , halogen-free, package of 100 m.	piece	2		
4.7.	Speaker cable LS-FRNC 2 x 4 mm <sup>2</sup> , halogen-free, package of 100 m.	piece	5		
4.8.	SPEAKON connector four-pole, cable.	piece	20		
4.9.	Network F/STP Cat. 6 cable, 4x2xAWG26/7 FTP-C200 FRNC, halogen-free, package of 305m.	piece	2		
4.10.	Power cable N2XH 3 x 2.5 mm <sup>2</sup> , halogen-free, package of 100 m.	piece	1		
4.11.	Shuko plug, cable, rubber-coated.	piece	30		
4.12.	Shuko socket, cable, rubber-coated.	piece	30		
4.13.	Installation and small supplies.	piece	1		
4.14.	Programming, commissioning of systems and user training.	piece	1		
<b>4. EQUIPMENT FOR STAGE MECHANICS TECHNOLOGICAL SYSTEM IN LARGE AND SMALL THEATRE HALLS</b>					
No.	GOODS - SUPPLY AND INSTALLATION:	UoM	QUANTITY		TOTAL excl. VAT
<b>1.0.</b>	<b>Stage</b>				
1.1.	Repair of electrical-motorized mechanism of circular stage: manufacturer: ENERGOINVEST Type: EMHD40-6/24-T year 1981 Vooltage: 380V Rotetion per minute: 940/200 Power: 4,8/1,2kW With backup motor: Manufacturer: ELEKTROKOVINA Type: T 80 A 4 Voltage: 380V/220V Rotation per minute: 1400 obrtaja u minuti Power: 0,55kW	piece	1		
1.2.	Repair of the wooden base of circular stage	m2	79		
<b>2.0.</b>	<b>Support elements within the small theater hall stage</b>				
2.1.	Fixed structure (grill) for ceiling-mounting above the stage, made of 12 steel sections φ 48 mm, length 12.7 m, at axial distance of 1m, anchored to a concrete ceiling slab. Steel sections φ 48 mm, length 12 m, black, are transversely hung by rotary joints, load capacity of 300Kg/pcs. Grill is used for hanging spotlights, curtains and motorized hoists on stage.	piece	1		
<b>3.0.</b>	<b>Curtains</b>				

3.1.	Motorized curtain of the portal - two-piece black cotton curtain for covering the portal, 8.5 m wide, 4.5 m high. It consists of two overlapping rails, two electric motors and controls that are on the stage. Dimensions of curtain are: 10m wide and 5m long, min. 300g/m2, light proof with lead strip on the bottom hem with 75% of folds. Curtain fabric must meet fire protection requirements, i.e. class B1, hardly flammable materials group, defined by norm DIN 4102-1 and tested by norm EN ISO 9239-1.	piece	1		
3.2.	Volant curtain for the soffit stage - black, cotton, 12.65m wide and 0.5 m high, lightproof. It is mounted on the hoist above the portal. The fabric must meet fire protection requirements, i.e. class B1, hardly flammable materials group, defined by norm DIN 4102-1 and tested by norm EN ISO 9239-1.svetlo	piece	1		
3.3.	Curtains (streets) - repair of existing ones by trimming and hemming	piece	6		
3.4.	Installation and small supplies.	piece	1		
3.5.	Testing, commissioning of systems and user training.	piece	1		

<b>5. DIGITAL SYSTEM FOR CINEMA PROJECTION - THEATRE HALL</b>				
<b>1.0.</b>	<b>VIDEO SYSTEM</b>			
1.1.	Cinema 3D projector, resolution 2048x1080 2K pixels, brightness of 12000 lumens, contrast > 2000:1, 0.98" 2K 3-chip DMD DLP technology with server and storage, dimensions 665x687x395mm, weight 44kg.	piece	1	
1.2.	3D projection system with 500 black glasses	piece	1	
<b>6. LARGE THEATRE HALL SEATING</b>				
<b>1.0.</b>	<b>SEATING</b>			
1.1.	Chair of the following characteristics <ul style="list-style-type: none"> <li>• Fireproof seat fabric (colour at the Investor's choice) black with white point</li> <li>• self-lifting mechanism</li> <li>• backrests and seats anatomically shaped by polyurethane foam</li> <li>• metal internal structure</li> <li>• two lateral legs</li> <li>• chair's width from 54 to 56 cm</li> <li>• seating number sewn on the backrest central part</li> <li>• armrests made of polyurethane with a cup holder (optional)</li> <li>• polypropylene backrest shell</li> <li>• row numbers on the side of the chair</li> </ul>	piece	300	
1.2.	Repair of existing balcony chairs with respect to the materialization, as like new chairs of the stalls.	piece	250	
<b>TOTAL 1-6:</b>				

ESTIMATED BILL OF QUANTITIES FOR MECHANICAL INSTALLATIONS

JOINT PREVIOUS WORKS WITHIN PHASE I - (THEATRE HALLS WITH SUPPORT FACILITIES)

**A. HEATING SUBSTATION**

1. Supply and installation of circulation pumps produced by "GRUNDFOSS", Germany or equivalent with electronic regulation

MAGNA3 25-60 pcs. 1  
1x230-240 V  
G=1.14m<sup>3</sup>/h, H=4.03 - circle 5

MAGNA3 50-80F pcs. 3  
1x230-240 V  
G=6.81m<sup>3</sup>/h, H=4.9 - circle 2  
G=5.92m<sup>3</sup>/h, H=5.54 - circle 4  
G=10.62m<sup>3</sup>/h, H=4.13 - circle 7

MAGNA3 65-100F pcs. 2  
1x230-240 V  
G=13.22m<sup>3</sup>/h, H=6.24 - circle 1  
G=11.56m<sup>3</sup>/h, H=5.83 - circle 3

MAGNA3 65-120F pcs. 1  
1x230-240 V  
G=16.99m<sup>3</sup>/h, H=7.77 - circle 6

2. Supply and installation of ball valve with threaded connection

NO 15 pcs. 10  
NO 32 pcs. 3  
NO 65 pcs. 9  
NO 80 pcs. 9

3. Supply and installation of butterfly valve with flange connection

NO 125 pcs. 3  
NO 150 pcs. 3

4. Supply and installation of dirt trap complete with flange connection, NP6

NO 125 pcs. 1  
NO 150 pcs. 1

5. Supply and installation of bimetallic thermometers of measuring range 0-120°C.

pcs. 14

6. Supply and installation of manometer with manometer valve

measuring range 0-6 bar pcs. 7

7. Supply and installation of shut off landing balancing valves with measuring valves

threaded connection

NO 32 set 1

flange connection

NO 65 set 3

NO 80 set 3

8. Supply and installation of black sockets

NO 15 pcs. 20

9. Supply and installation of black pipes for connecting cables in substation

NO15 m' 18

NO125 m' 18

NO150 m' 36

10. Binding, welding and other auxiliary supplies, pipe bends, oxygen, acetylene, hangers etc., 50% from previous item  
All carriers and hangers to be used should be non-combustible, i.e. metal, minimum combustibility class A2 d1,s0

0.50

11. Cleaning with a steel brush and double red lead coating of entire piping.

m<sup>2</sup> 40

<p><b>12.</b> Supply and erection of prefabricated insulation 19 mm thick, minimum combustibility class B-s1,d0</p>	m <sup>2</sup>	50
<p><b>13.</b> Supply and installation of plate heat exchangers Danfoss or equivalent</p> <p>TRM050ML-1-83 capacity 650 kW prim/sec. (115-75)/(70-90)</p>	pcs.	1
<p>XGF100-034ML-1-50 capacity 900 kW prim/sec. (115-75)/(70-90)</p>	pcs.	1
<p><b>14.</b> Supply and installation of membrane expansion vessel REFLEX or equivalent</p>		
N 500/6	pcs.	1
N 800/6	pcs.	1
<p><b>15.</b> Supply and installation of safety valve</p>		
NO25/50	pcs.	1
NO40/50	pcs.	1
<p><b>16.</b> Fabrication and installation of brackets and carriers made of profiled steel.</p>	kg	100
<p><b>17.</b> Fabrication and installation of pipe widenings for collector, splitters and air exhaust vessels.</p>		
NO 50x150	pcs.	2
NO 150x300	pcs.	4
NO 200x800	pcs.	2
NO 250x2000	pcs.	2

- 18.** Supply and installation of equipment for automatic control of heating substation, connected and commissioned.

Any hereby mentioned equipment may be replaced with equivalents.

BA Systems, BAS920  
electronic controller, 8AI, 4DI, 4DO, 4AO

pcs. 1

BA Systems, BAS920 DIOM  
Additional module, 8DI, 8DO, Mbus

pcs. 1

BA Systems, BAS920 AO  
Additional module, 8AO

pcs. 1

BA Systems, BAS920 DI  
Additional module, 8DI

pcs. 1

Weintek, MT8071iE  
Colour touch-sensitive display

pcs. 1

Danfoss, VRG3 25  
Three-way control valve, K5

pcs. 1

Danfoss, AME435  
Motorized drive, K5

pcs. 1

Danfoss, VRG3 50  
Three-way control valve, K2, K4, K7

pcs. 3

Danfoss, AME435  
Motorized drive, K2, K4, K7

pcs. 3

Danfoss, VF3 65  
Three-way control valve, K1, K3, K6

	pcs.	3
Danfoss, AME435 Motorized drive, K1, K3, K6		
	pcs.	3
Danfoss, ESMU 100 Immersion temp. sensor		
	pcs.	7
Danfoss, Pocket Pocket for temp. sensor		
	pcs.	7
Danfoss, ESMT Outside temperature sensor		
	pcs.	1
OTHER		
cables and cable runs, DC, including material	pcs.	1
installation of electrical cabinets setting cable runs and laying cables		
	pcs.	1
installation of peripheral equipment, connection of equipment, connection of electrical cabinets		
	pcs.	1
development of application software for the controller and display		
	pcs.	1
commissioning		
	pcs.	1
preparation of documentation and user training		
	pcs.	1

19. Dismantling of heat substation, such as collector and splitter with existing pumps for radiator heating and air handling units, heat exchangers, compressors with station for cold water to the primary substation.

After dismantling, the elements shall be transported to landfill as the Investor requested

set 1

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**TOTAL A:**

***B. OTHER WORKS***

1. Forming openings through walls and floor structure, including the installation of ribbed PVC pipe framing on distribution piping, at penetration points and making the passage beneath doors

set 10

2. Preparatory and finishing works, with installation handover.

lupm sum 1

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**TOTAL B:**

***SUMMARY - SUBSTATION***

- A. HEATING SUBSTATION
- B. OTHER WORKS

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**TOTAL:**

ESTIMATED BILL OF QUANTITIES FOR MECHANICAL INSTALLATIONS

PHASE I - THEATRE HALLS WITH SUPPORT FACILITIES

**I.A. HEATING UNITS AND ACCESSORIES**

1. Dismantling of the existing heating units within administration, large and small theatre halls complete with radiator valves, lockshield valves, air exhaust valves and reductions. After being dismantled, radiators shall be taken to landfill within the facility, for further finishing and rehabilitation

pcs. 143
2. Dismantling of the existing double radiator pipe connections, including removal to the landfill within the facility.

pcs. 143
3. Dismantling of the existing bracket and radiator carriers found to be, after heating units dismantling unstable or inadequate, to 50% of total number of heating units

pcs. 220
4. Flushing of interior of dismantled radiator sections with cold water under pressure, (Karcher or equivalent) until traces of mud and dirt stop exiting from radiator

pcs. 143
5. Supply and installation of radiator reduction  
NO32/NO15

pcs. 572
6. Supply and installation of seal for cast iron radiators  
NO32

pcs. 572
7. Hydraulic testing of all flushed radiator sections with cold water under pressure of 5 bar for 5 minutes

pcs. 143
8. After hydraulic testing, paint shall be removed from all heating units, by sandblasting to metal gloss.

After sandblasting, radiator sections shall be painted with anti-corrosive coating in two layers.

m<sup>2</sup> 954

9. Supply and installation of radiator angle valves with thermostatic head in anti-vandal execution, lockable, in chosen position.

NO 15 pcs. 143

10. Supply and installation of radiator angle lockshield valves

NO 15 pcs. 143

11. Supply and installation of radiator manual air exhaust valves

NO 15 pcs. 143

12. Supply and installation of radiator filling and emptying valves

NO 15 pcs. 143

13. Supply and installation of cast iron radiator brackets

pcs. 220

14. Painting and varnishing of radiator units with hot resistant varnish in two layers, colour shade at the Investor's choice.

m<sup>2</sup> 954

15. Fabrication and installation of double connection for radiators

pcs. 143

16. Dismantling and installation of radiators for painting purposes.

pcs. 143

17. Disassembly, repacking (under new concept) and re-installation of radiators

pcs. 4

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**TOTAL I.A:**

**I.B. PIPEWORK AND ACCESSORIES**

1. Supply and installation of black steel pipes for hot water

NO15	m'	306
NO20	m'	144
NO25	m'	96
NO32	m'	144
NO40	m'	24
NO50	m'	120
NO65	m'	42
NO80	m'	12

.....

2. Binding, welding and other auxiliary supplies, pipe bends, oxygen, acetylene, hangers etc., 50% of previous item.  
All carriers and hangers to be used should be non-combustible, i.e. metal, minimum combustibility class A2 d1,s0

0.5

3. Insulation of the parts of pipeline that pass through the floor or beneath the door, with prefabricated Insulation, minimum combustibility class B-s1,d0, all packed in tar paper

NO20	m'	13
NO25	m'	15
NO32	m'	38
NO40	m'	11
NO50	m'	10

4. Cutting parts of the existing cables, which pass through floor channels including channel opening and pipe extraction.

set 1

5. Fabrication and installation of pipe widening for air exhaust vessels

NO 150x300 pcs. 2

6. Supply and installation of ball vessels with threaded connection

NO 15 pcs. 2

7. Cleaning with a steel brush and double

red lead coating of entire piping.

m<sup>2</sup> 110

8. Painting of visible pipe network by hot resistant varnish in two layers

m<sup>2</sup> 95

9. Cold test of installation  
water pressure of 7 bar.  
for two hours

branch K1 set 1

branch K2 set 1

branch K5 set 1

10. Hot testing of installations  
including regulation of piping and  
heating units MANDATORY

branch K1 set 1

branch K2 set 1

branch K5 set 1

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**TOTAL I.B.:**

### **I.C. AIR-CONDITIONING**

1. Dismantling the existing air handling unit KGD 25 capacity 25000 m<sup>3</sup>/ h of air, including hot and cold water piping, accompanying pipe fittings and equipment in the space where air handling unit is installed. It is also necessary to dismantle the parts of air channels to allow removal of air-handling unit. Dismantled elements of air handling units and accessories shall be taken to the landfill within the facility.

set 1

2. Supply and installation of air-handling units produced by "WOLF" or equivalent, with glycol heat recovery and factory corresponding elements of glycol run around (circulation pump, expansion vessel, safety valve, air exhaust valve and shut-off and regulating fittings), and command box, for internal installation. Side of operation is at right Characteristics according to the enclosed wording of

Bill of Quantities. Cabling from electrical cabinets to air handling unit. Filling glycol heat exchanger run around with 23% mixture of glycol-water.  
All assembled, filled and tested

**KG TOP 320**

according to DIN EN 13053 02/2012

Intake air volume 25000 m<sup>3</sup>/h

Exhaust air volume 25000 m<sup>3</sup>/h

external pressure drop

insertion / extraction 350/350 Pa

set 1

3. Fabrication and installation galvanized steel channels, rectangular sections, complete with MEC sections

thickness 0,8 mm kg 860

4. Supply and installation of carriers, hangers, sealing self-adhesive tapes and small accessories for air ducts 30% of the duct weight

All carriers and hangers to be used should be non-combustible, i.e. metal, minimum combustibility class A2 d1,s0

30%

5. Supply and installation of prefabricated insulation with vapour barrier thickness 19 mm for insulating rectangular channels for distribution of air, complete with connecting tape minimum combustibility class B-s1,d0

m<sup>2</sup> 52

6. On the spot check and rehabilitation of existing aluminum grille for air supply with flow regulator

dim. 1025x425 mm pcs. 16

7. On the spot check and rehabilitation of existing fixed blinds for intake of external and exhaust of old air

dim 1500x700 pcs. 2

8. On the spot check and rehabilitation of existing floor grids in the hall under the seat

dim. 1525x375 mm pcs. 12

9.	On the spot check and rehabilitation of existing fire flaps		
	dim 1100x1100	pcs.	2
10.	Thorough cleaning of the floor, exhaust channel in the sports hall, by hand and cleaning robots for sheet metal ducts. After cleaning, channel cleanliness shall be inspected by taking control samples.		
		m´	50
11.	Supply and installation of thermostatic switches for air-handling unit fans, all connected and commissioned. Thermostatic switch in the supply of fresh air should be set at 55°C, and in the return flow of exhaust air at 52°C		
		pcs	2
12	Supply and installation of equipment for air handling unit auto control, fully connected and commissioned. <b><i>Any mentioned equipment may be replaced with equivalent one.</i></b>		
	BA System, BAS 920 electronic controller 8AI, 4DI, 4DO, 4AO	pcs.	1
	BA System, BAS 920 DIOM additional module 8DI, 8DO Mbus com.	pcs.	1
	Weintek, MT8071iE colour, touch-sensitive display	pcs.	1
	Siemens, QAM 2110.040 duct temp. sensor Pt100	pcs.	4
	Siemens, QAF81.6 frost thermostat	pcs.	1
	Siemens, QBM81-3		

diff. pressostat	pcs.	1
Danfoss, AMD 510 AS damper actuator on / off	pcs.	2
Danfoss, AMD 520 damper actuator control	pcs.	1
Danfoss, VRG3 50 three-way control valve, glycol	pcs.	1
Danfoss, AME 435 motorized drive	pcs.	2
Danfoss, VF3 65 three-way control valve, heater	pcs.	1
Danfoss, ESMT outside temperature sensor	pcs.	1
WORKS		
fabrication of electrical cabinets	pcs.	1
installation of electrical cabinets setting cable runs and laying cables	pcs.	1
mounting peripheral equipment, connection of equipment, connection of electrical cabinets	pcs.	1
development of application software for the controller and display	pcs.	1
commissioning	pcs.	1
preparation of documentation and user training	pcs.	1

**13** Supply and installation of heat pump air-water,

produced by "WESPER", or equivalent, type AQAH 125, with the characteristics from design documentation and the remote ON / OFF command. The unit has buffer 300 liters, water duty, circulation pump and all the necessary electronics for operation. Heat pump works with 100% water and system emptied in winter.

Cooling capacity 121,9 kW  
 Heating capacity 119,1 kW  
 Cooling fluid R410A  
 Power: 400 (VAC); 50 (Hz).  
 El. power: 46.35 kW  
 Dimensions: 2180x1160x2286mm

Operational weight: 1020 kg  
 Fully connected and commissioned

		set	1
<b>14</b>	Supply and installation of elastic connections to connect the heat pump with flange		
	NO 65	set	2
<b>15</b>	Supply and installation of ball valves with threaded connection		
	NO 15	pcs.	2
	NO 20	pcs.	4
	NO 65	pcs.	7
<b>16</b>	Supply and installation of dirt trap complete with flange connection, NP6		
	NO 65	pcs.	1
<b>17</b>	Supply and installation of membrane expansion vessel REFLEX or equivalent		
	NG 50	pcs.	1
<b>18</b>	Supply and installation of safety valve		
	NO15/25		
	opening pressure	6bar	
	closing pressure	5.4bar	
		pcs.	1
<b>19</b>	Supply and installation of manometer with manometer valve		

	measuring range 0-10 bar	pcs.	1
<b>20</b>	Fabrication and installation of pipe widenings for air exhaust vessels		
	NO 50x100	pcs.	1
<b>21</b>	Supply and installation of black pipes for connecting cables from cooling aggregate to air handling unit		
	NO15	m'	6
	NO65	m'	30
<b>22</b>	Binding, welding and other auxiliary supplies, pipe bends, oxygen, acetylene, hangers etc., 50% from previous item All carriers and hangers to be used should be non-combustible, i.e. metal, minimum combustibility class A2 d1,s0		0.50
<b>23</b>	Cleaning with a steel brush and double red lead coating of entire piping.		
		m <sup>2</sup>	8
<b>24</b>	Supply and installation of prefabricated insulation PLAMAFLEX or equivalent 19 mm thick with vapour barrier. minimum combustibility class B-s1,d0		
		m <sup>2</sup>	16
<b>25</b>	0.5cm mineral wool insulation of piping, coated in Al-sheet metal, pipe shall be first insulated with ARMAFLEX or equivalent, thickness 20mm with vapour barrier, and then coated with mineral wool 5cm thick. minimum combustibility class B-s1,d0		
	NO65	m'	10
<b>26</b>	Commissioning of installations including necessary control measurement and system control - central air-conditioning		
		set	1

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**TOTAL I.C:**

#### I.D. SMALL HALL AIR-CONDITIONING

1. Supply and installation of recovery air-handling units manufactured by "FROST" or equivalent with integrated heat pump and control module. Characteristics according to the text of Bill of Quantities. Fully installed and tested.

ULYSSE HP3000 (CONFIGURATION E)  
 air flow  
 Fan pressure  
 Cooling cap. TP  
 Cooling cap. TOTAL  
 Heating cap. TP  
 Heating cap. TOTAL  
 Number of fans  
 Fan el.power  
 Fan rotation speed  
 Input power  
 Input current  
 Voltage

set 1

2. Fabrication and installation galvanized steel channels, rectangular sections, complete with MEC sections

thickness 0,8 mm kg 900

3. Supply and installation of carriers, hangers, sealing self-adhesive tapes and small accessories for air ducts 20% of the duct weight  
All carriers and hangers to be used should be non-combustible, i.e. metal, minimum combustibility class A2 d1,s0

kg 180

4. Supply and installation of prefabricated insulation for air-conditioning with vapour barrier thickness 19 mm

m<sup>2</sup> 95

5. Supply and installation of aluminum grille for air extraction with flow regulator

manufactured by "KLIMA OPREMA"  
Belgrade or equivalent.

type OAV 1- L 325x1025 pcs. 4

6. Supply and installation of vortex diffuser for air supply, with junction box PK 1 and regulation damper manufactured by "KLIMA OPREMA" Belgrade or equivalent.

type DVS 600 pcs. 8

7. Supply and installation of fixed blinds for air intake and exhaust manufactured by "KLIMA OPREMA" Belgrade or equivalent

type FŽ 785x600 mm pcs. 2

8. Supply and installation of elastic insulated air ducts

Ø 200 mm m' 16

9. Forming and finishing of holes for passage of air ducts

450x450 mm pcs. 2

500x450 mm pcs. 2

800x650 mm pcs. 2

10. Supply and installation of fire flaps with electric starter

450x400 pcs. 2

400x400 pcs. 2

11. Supply and installation of trap according to manufacturer's details

pcs. 1

12. Supply and installation of PVC pipes for condensate drain

ø32 m' 12

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13. Material for fastening, connecting, and sealing of PE pipes, elbows, branches and

similar 40% of previous item

0.40

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**TOTAL I.D:**

***I.E. OTHER WORKS***

1. Forming openings through walls and floor structure, including the installation of ribbed PVC pipe framing on distribution piping, at penetration points and making the passage beneath doors  

set                      30
  
2. Supply of sealants and sealing of pipelines and channels that pass through the fire wall by sealant of fire resistance 120min.  

set                      1
  
3. Preparatory and finishing works, with installation handover.  

Lump sum              1

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**TOTAL I.E.:**

**SUMMARY - PHASE I**

- I.A. HEATING UNITS AND ACCESSORIES
- I.B. PIPEWORK AND ACCESSORIES
- I.C. AIR-CONDITIONING
- I.D. SMALL HALL AIR-CONDITIONING
- I.E. OTHER WORKS

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**TOTAL:**

## ESTIMATED BILL OF QUANTITIES FOR VERTICAL LIFTING PLATFORMS

### PHASE I - THEATRE HALLS WITH SUPPORT FACILITIES

#### 1. DELIVERY OF PLATFORM ACCORDING TO FOLLOWING TECHNICAL CHARACTERISTICS

<i>Equipment type:</i>	VERTICAL LIFTING PLATFORM (SRPS EN 81-41)
<i>Pieces</i>	1
<i>Drive:</i>	Hydraulic / indirect rucksack-manner, 2:1
<i>Load capacity:</i>	Q=300 kg (4 persons) or 1 person in wheelchair + 1 guide
<i>Number of stations</i>	2 - 0 (elevation 0.00), 1 (elevation +0.96)
<i>Number of accesses:</i>	2 (1 + 1 under 180 <sup>0</sup> )
<i>Ride speed:</i>	v= 0,15 m/s
<i>Lifting height</i>	H= 960 mm
<i>Control:</i>	Single, through commands on the command panel from the platform and outside through call box controls
<i>Commands:</i>	<p><i>On platform control panel:</i> Key to activate commands, Button for drive controls, Button for command - STOP, Button for command - Alarm</p> <p><i>Outside, on call boxes:</i> Key to activate commands, Button for commands to call the platform</p> <p><i>Additional:</i> Automatic emergency driving - in case of mains failure, Fire mode, Compulsive manual ride by an authorized person;</p>
<i>Signalization:</i>	<p><i>On platform control panel:</i> Light confirmation of commands, Light signalling the platform readiness for drive, Sound and light signals for platform overload</p> <p><i>Outside, on call boxes:</i> Light confirmation of commands, Light signalling the platform readiness for drive,</p>
<i>Drive equipment:</i>	<p>Hydraulic generator unit with screw pump, valve group and cylinder</p> <p>Drive features: Q=12.5 l/min, V=30 l, P=1.5 kW, I<sub>n</sub> =6.5 A, I<sub>p</sub>=19 A</p> <p>Piston: Ø60 x 5 x 600 mm, Cylinder: Ø101.6 x 3.6 mm, Oil pipe - rubber hose 3/4", Block valve at the junction between flexible hose and cylinder.</p>
<i>Electrical connection, installations and equipment:</i>	<p>Operating voltage 220V, 50Hz on the main switch with fuses 10A</p> <ul style="list-style-type: none"><li>- Power cable according to the electrical design (permitted voltage drop 5%)</li><li>- Power-command switchboard 1 pc - set</li><li>- Car operating panel – control panel 1 pc. - set</li><li>- Call boxes 2 pcs. - set</li><li>- Electrical installations 1 set</li><li>- Landing lighting with the switch in the control cabinet</li><li>- Electrical safety devices: closure of access doors, lock of the access door, support ropes in terms of loosening and / or rupture, capture device, limit switches, protective platform curbs, platform leveling, the stop button on the control panel, stop button in the landing pit, controls of safety beam position, closure of control desk housing, correct position of the protective screen, platform overload, maximum pressure, valve breakage - block valve, timing control for operation of the electric motor, hydraulic oil temperature control.</li><li>- Electrical installations and dry space devices.</li><li>- Connecting metal mass in the landing pit and connection to the equipotential system;</li></ul>

	<ul style="list-style-type: none"> <li>- Connecting metal mass in the landing pit and connecting to the lightning protection installation;</li> </ul>
	Other: limit switches, station switches, electrical safety contact, trailing cable, plastic ducts for laying electrical conductors
<i>Supporting ropes:</i>	pieces 2, $\varnothing 9$ ( $\sigma_m=1770\text{N/mm}^2$ ) - complete with accompanying equipment.
<i>Pulley:</i>	D=230mm – complete with the carrier and accompanying slides.
<i>Guides:</i>	T – 82 x 68 x 9 - L=2x2.4 m, complete with brackets (N=4+4) <ul style="list-style-type: none"> <li>- maximum distance of brackets 1000 mm.</li> </ul>
<i>Safety gear:</i>	immediate effect
<i>Bumper:</i>	Solid - wooden pads thickness 30mm ( $v \leq 0,3\text{m/s}$ ) under the vertical carriers of platform frame.
<i>Landing doors:</i>	Semi-automatic, single and revolving <i>Size:</i> - station 0: 900 x H2000 mm <ul style="list-style-type: none"> <li>- station 1: 900 x H1300 mm</li> </ul> <p>Panoramic door. Glazed part with multilayered laminar glass 8 mm (4+4+0.76). Wing frame and door portal are made of stainless steel in the design at the investor's choice. Electro mechanized door locks. Safety devices in accordance with regulations. The lighting in front of the access door minimum 100 Lx:</p>
<i>Car - platform:</i>	Metal, standard, without doors, platform floor size: 1100 x 1400 mm Sidewise (on the side of the piston) - panel B800 / H1100 with the command panel; safety curbs on the platform floor perimeter; Maximum horizontal distance from the platform edges to the landing walls 20mm; Floor - PVC; Lighting - directly (min.50lx), incorporated within the control desk; Equipment: handrail, emergency light, alarm; Interior finish of platform part, lamination in the pattern at the Investor's choice;
<i>Landing:</i>	Steel substructure of box sections and reinforced-concrete part on the landing site for lifting height and wall to the support piston in width of 900 mm. Remaining part of the wall to the piston and the front and rear wall around the access door portal are finally coated with stainless steel sheet. The second side wall of the structure (outer dimensions 1560/H2260 mm) composite laminar glass 10 mm (5+5+0.76). Landing pit made of reinforced concrete and waterproof.  Moving and support parts in the landing on the side of the platform control panel enclosed with protective screen made of sheet metal - powder-coated in designs at the investor's choice. <i>Landing dimensions:</i> <ul style="list-style-type: none"> <li>- base: 1550 x 1440 mm</li> <li>- pit depth: 150 mm</li> <li>- landing height above station 1: 1300 mm</li> <li>- total landing height: 2410 mm</li> <li>- height from the station 1 floor to ceiling: min. 2400 mm</li> </ul> <i>Other:</i> Loadings at the landing bottom in accordance with the main design, STOP switch and safety beam control light at the level of the landing pit bottom

*Machine room:* Metal cabinet with lockable door, dimensions 600x400xH1800 mm, set on the ground floor to the landing. The cabinet houses the drive unit and power supply control panel, which holds the main switch of the plant. The lower part of the cabinet in caisson execution with the possibility of accepting the entire volume of oil from the generator. Perforations for cabinet equipment ventilation are at the lower and upper cabinet door area. The area around the cabinet is dry and ventilated, with temperature ranging from +5 to +40°C. Lighting in cabinet area minimum 200lx. Fire extinguisher is in the immediate vicinity of the cabinet.

*inscriptions, notices, signs:* Fully in compliance with the regulations

<i>No.</i>	<i>Equipment</i>	<i>Pieces</i>	<i>Comprises</i>	<i>Dinars</i>
1.	Vertical lifting platform according to technical specifications referred to in Item 1.	1	all in accordance with applicable regulations and standards: - production and delivery of equipment - transport - installation - development of as-build documentation  - preparation of manuals for operation and maintenance - certification by the Notified Body - commissioning	
<b>TOTAL:</b>				

*NOTE: Bearing in mind that certain items within the design are based on specific manufacturers, the Bidder is free to choose manufacturers for these items under the following conditions:*

*to fully comply with the basic design characteristics (load capacity, speed, dimensions of the platform floor, the command - control, etc.);*

*without jeopardizing the overall balance of power and loads;*

*to perform, in technical terms, all necessary changes and adjustments to ensure full functionality and which will be proved by final attestation of equipment;*

ESTIMATED BILL OF QUANTITIES FOR INCLINED LIFTING PLATFORMS

PHASE I - THEATRE HALLS WITH SUPPORT FACILITIES

1. DELIVERY OF PLATFORM ACCORDING TO FOLLOWING TECHNICAL CHARACTERISTICS

<i>Equipment type:</i>	INCLINED LIFTING FOLDING PLATFORM (SRPS EN 81-40)
<i>Pieces</i>	1
<i>Drive:</i>	Electrical - electrical mechanized with friction transmission
<i>Load capacity:</i>	Q= 250 kg
<i>Ride speed:</i>	v= 0.1 m/s
<i>Number of stations</i>	2 (lower "0", level 0.00 / upper "1", level +4.16)
<i>Parking station:</i>	Lower station (level 0.00)
<i>Lifting height</i>	H= 4160 mm
<i>Path of travel:</i>	Straight-line, continuous, variable elevation
<i>Length of travel path:</i>	L= 10046 mm (4493 + 1208 + 4345 mm)
<i>Inclination of path:</i>	28° / 0° / 28°
<i>Commands:</i>	microprocessor
<i>Control:</i>	Control: Fixed - using stable incorporated commands on equipment  Remote - using transmission - remote controls (joystick <i>Button controls on the control panel of the mobile unit:</i> <ul style="list-style-type: none"><li>- Command for platform travel - way up</li><li>- Command for platform travel - way down</li><li>- STOP switch</li><li>- connection for mobile-remote controls</li></ul> <i>Button controls on access stations:</i> <ul style="list-style-type: none"><li>- key lock</li><li>- Command for platform travel - way up</li><li>- Command for platform travel - way down</li><li>- command to open podium</li><li>- command to close podium</li></ul> <i>Button commands on mobile box for remote control:</i> <ul style="list-style-type: none"><li>- platform travel bar – down/ up</li></ul> STOP switch
<i>Signalization:</i>	<i>Light indication</i> <ul style="list-style-type: none"><li>- functional platform – green lamp</li><li>- platform is out of order – red lamp</li><li>- light confirmation of accepting the activated command</li></ul>
<i>Power supply:</i>	Own, with two batteries 24V
<i>Drive electrical motor:</i>	N= 0.65 kW, with electric motor with electromagnetic disc brake
<i>Battery charging:</i>	Automated, through an AC adapter and contact (220V) on the parking station
<i>Electrical safety devices:</i>	/ Key lock / remote control / STOP switch/ speed limiter / limit switches / platform - podium opened/closed / floor folding ramp / folding protective handrail / drive protection in terms of finding obstacles (shock - shear - crushing / safety lock in terms of sequence of certain commands / platform overload, power outage, electric motor heat protection / closed closet door - mobile units housing /

- Platform:** Metal, with mobile unit for driving and podium for receiving users - fully in accordance with the Technical description of the design
- Dimensions of usable platform floor: 700 x 800 mm
- Manipulation transport platform width:
- Closed platform: B= 404 mm
  - Open platform: B= 1000 mm
- Platform accessories:
- Folding protective handrail
  - Floor folding ramp
- Guides:** Steel O-section D50x6 mm, L=10556 mm - 2 pieces
- Guide carriers:** Slab anchored to the wall  $\delta=8\text{mm}$  with welded bracket-like steel girders
- sections L 80x50x6 mm, l=650 mm, 15 pieces, maximum distance 863 mm*
- Stairs:** Reinforced concrete - inside the facility
- Building measurements of steps:
- Stairs height: 4160 mm
  - Diagonal range of steps: 4080 / 0 / 4080 mm
  - Stairs width: 1521 / 1221 mm (from the wall to the rail)

No.	Equipment	Pieces	Comprises	Dinars
1.	Inclined lifting platform according to technical specifications referred to in Item 1.	1	all in accordance with applicable regulations and standards: <ul style="list-style-type: none"> <li>- production and delivery of equipment</li> <li>- transport</li> <li>- installation</li> <li>- development of as-build documentation</li> <li>- preparation of manuals for operation and maintenance</li> <li>- certification by the Notified Body</li> <li>- commissioning</li> </ul>	
<b>TOTAL:</b>				

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INSTALLATION OF AUTOMATIC FIRE ALARM - ADDITIONAL WORKS ON EXISTING SYSTEM

Item	DESCRIPTION	UoM	Quantity	Total
1.	Delivery, installation on the room ceilings and connection to the existing system of	pcs.	63	
2.	Delivery, installation and connection to the existing system of addressable fire	pcs.	2	
3.	Delivery, installation and connection to the existing system of reflective beam detectors	pcs.	4	
4.	Delivery, installation and connection of the module to connect to the loop of reflective	pcs.	4	
5.	Delivery and installation on room ceiling and connection to its parallel indicator detector	pcs.	13.00	
6.	Delivery and connection in appropriate housing of reserve supply (for beam detectors)	pcs.	1.00	
7.	Delivery and laying of cable partially in quick tube in walls of the rooms, and partly in	m	40	
8.	Delivery and laying of cable partially in quick tube in walls of the rooms, and partly in the existing LV cable trays JH(St)H 2x2x0,8 of connection cable in a loop of manual and automatic fire detectors.	m	750	
9.	Delivery and laying of hard halogen-free quick pipes Ø 16 mm on the walls and ceilings	m	500	
10.	Functional testing of installation, commissioning of central units, marking of detectors and parallel indicators, operator's training and creation of control books.	Lump sum	1	
<b>TOTAL 1-10:</b>				

## TOTAL SUMMARY - SHARED INSTALLATION AND THEATRE\_ PHASE I

N <sup>0</sup>	Description of works			
1	Civil and specialist1s works			
2	Shared installation_water supply and sewage installation			
3	Water supply and sewage_phase I			
4	Electrical installation_phase I			
5	Telecommunicatione and signal installation_phase I			
6	Stage equipment			
7	Shared installation_heating substation			
8	Mechanical installation_phase I			
9	Vertical lifting platform			
10	Inclined lifting platform			
11	Automatic fire alarm			
<b>UKUPNO (RSD):</b>				

