

## TECHNICAL DESCRIPTION

**Facility:** Ballistic Laboratory Reception Office  
Adaptation of the existing space of the MUP corridor

**Location:** 107 Bulevar despota Stefana st., 3rd floor, Belgrade

For the needs of the Ballistic Laboratory of the Ministry of the Interior, it is necessary to build a reception office at the entrance to the space used by the laboratory. The room would be used to hand over materials delivered to the center.

In order to build a reception office that should meet all the prescribed requirements, it is necessary to report, within the existing corridor of the MUP facility, works that will ensure that this space functions in accordance with the project task.

### Definitions of terms used

**Contractor** - The company performing the works, selected in a tender announced by UNDP

**Supervisory Authority** - Person / Company selected in a UNDP tender to monitor the execution of works and the Contractor's contract

**Financier** - UNDP

**Investor** - Owner of the facility located at Bul. despot Stephen 107

**User** - Ballistic Laboratory NFC, MUP

**Provider** - service provider to the user (ptt, internet, electricity ..)

### General requirements

The contractor is obliged to study the project before the start of works and to check the compliance of the project with the situation on the ground together with the supervisory body before opening the construction site and to propose changes / adjustments if necessary.

After visiting the construction site, the Contractor is obliged to prepare a dynamic plan of works with a description of activities, their duration, required human resources and define places for temporary disposal / disposal of materials as well as a detailed project for the contracted works. For the workers who will work on the project, it is necessary to submit data in order to obtain permits for their entry into the MUP building.

All workers must be experienced and trained for the work for which they are hired, equipped with the correct tools, equipment and personal protective equipment. All planned works must be reported with a professional workforce, quality, efficiently and cleanly with the application of appropriate safety measures at work.

All construction waste and dismantled material must be removed from the building on the same day it was created.

Prior to the commencement of any works, the Contractor is obliged to submit workshop drawings and material samples for approval to the Supervisor / User. Without the prior consent of the Supervisor, the execution of works and installation of equipment cannot be started. The equipment and materials that are installed must meet the relevant technical conditions and standards in terms of quality. Improper equipment and materials must not be installed.

When performing works, care must be taken not to damage existing or already performed installations more than necessary.

Drilling of openings and grooving of reinforced concrete construction may be performed only with the written consent of the Supervision for construction works.

All damage caused to the User due to insufficient expertise or carelessness in the work, the contractor is obliged to compensate and remove at his own expense.

The contractor is obliged to keep a construction book and a construction log. A certified construction book is a condition for payment for work performed.

For all additional and unforeseen works, as well as for all changes in relation to the bid, the Contractor is obliged to indicate to the Supervisor and obtain his consent before the start of the works in question. If during the construction there is a need to deviate from the project, both in terms of technical solution and in terms of selection of materials and equipment, the contractor must obtain the written consent of the supervisory authority in the construction log.

Prior to issuing the written consent, the supervisory body will request the prior consent of the User.

Upon completion of the works, the contractor is obliged to examine the performed works, to prepare appropriate measurement protocols, documentation of the performed condition and instructions for use, as well as to participate in the handover of works to the User.

The warranty period is two years for works and one year for functionality, from the day of handover of works. Within this period, the contractor is obliged to eliminate all defects and defects, which arise as a result of unsound work or poor quality of used materials and equipment, at his own expense.

If, during the warranty period, defects occur due to improper handling, the contractor is also obliged to eliminate them at the request of the User - but not at his own expense.

The unit price for unforeseen / additional works (for which there is no price in the offer) is formed on the basis of comparison with the prices of similar works from the offer or on the basis of the offer and analysis of prices done according to construction norms. Supervision approves unforeseen and additional works, as well as their unit prices with the prior consent of the Financier.

Reserve funds in the offer are spent with the written consent of the Supervisor (surpluses, additional and unforeseen works).

**NOTE:** Proposed equipment in the bid must correspond to the equipment describer in these specifications and BoQ or to the similar one with the same or better technical characteristics

## **A / Architectural and construction works**

### **Dismantling and demolition works**

Before starting the construction works, it is necessary to dismantle the existing fixed partition with a door. The door and part of the partition, which will be reused, should be protected, stored and saved for later use, all in accordance with the design. Dispose the other parts of the partition in a place determined by the User or take it to a landfill.

Disassemble the existing cabinets and all other furniture and dispose them on a place determined by the User. Carefully remove part of the existing ceramic tiles and terrazzo floor in the area intended for the future room. Ceramic tiles are not removed from the rest of the hallway.

Take all generated rubbish and waste to the landfill. Removal of rubble to the landfill and cleaning of the premises before the continuation of works is included in the price of demolition / dismantling.

### **Locksmith works**

The existing space will be partitioned with aluminium glazed partitions approximately 3.5 m high in accordance with the design attached in annex. Aluminium profiles are dimensioned in accordance with the requirements and instructions of the manufacturer. Aluminium profiles are plasticized, colour similar to the colour of the dismantled partition.

On the side aluminium partitions, in the upper part (50 cm from the ceiling), aluminium blinds are installed to provide air flow in the room.

If necessary, for construction reasons, reinforce the Aluminium (Al) structure and connect the existing partition with the door and the newly designed structure with steel profiles. Protect steel parts and paint them with metal paint.

The parapet part, 85 cm high, will be filled with plasterboard. Beams for high and low voltage installations will be placed within the parapet

The middle part will be glazed with laminated safety glass  $d = 10\text{mm}$ .

In the parapet part, in the part of the corridor before the existing fixed partition, make an opening for the installation of the transfer counter, which provides no direct contact during reception of materials. Work on the opening should be harmonized with the technical requirements for the installation and assembly of the transfer desk.

The entrance door to the space is aluminium, glazed as well as a partition, equipped with a hardware, a self-closing mechanism and a lock for card opening.

Provide a structural part for mounting and connecting the dismantled door and panel with the new Al construction.

Dismantled part of the existing partition (fixed part with the door) has to be cleaned and prepared and the elements necessary for installation and connection with the newly installed Al partition will be provided.

After the installation of all partitions, install the edging on the joint between the wall and the ceiling, as well as on the connection of the parapet part of the partition with the plaster wall.

Communication with the visitors is by intercom, and accordingly in the glass partitions should be provided openings for the installation of the necessary intercom equipment.

### **Plastering works**

The parapet wall, 85 cm / 125 cm high, is placed between the AI partitions, as part of the partition. The wall is made as a sandwich of plasterboard fillings (2x d = 12cm) fire resistance F60. Gypsum boards are placed on a standard galvanized substructure in accordance with the manufacturer's instructions.

The wall is painted in a colour according to User's choice. Beams for high and low voltage installations will be placed through the parapet wall.

The existing de-levelling on the ceiling approx. 30 cm high is treated with gypsum boards, fire resistance F60.

### **Ceramic works**

The floor of the newly designed premise is made of ceramic tiles similar in size and colour to the existing ones, acid-resistant, placed by gluing on the subbase levelled and prepared after the existing tiles and terrazzo floor were removed and grouting with a suitable grouting material that is also acid-resistant.

Along the floor and the existing wall ceramic plinth h=15 cm of the same material as the tiles will be installed.

### **Painting works**

The existing ceiling and walls are painted with semi-dispersion paint.

The gypsum board parapet wall is painted with a semi-dispersion paint.

All surfaces to be prepared before painting, cleaned, smooth in two layers, and the joints of gypsum boards to be bandaged.

### **Other works**

The cabinet for storage of evidence and equipment, dimensions 350x350x45cm, consists of parts as defined in the graphic documentation. The cabinet is made of stainless steel profiles and stainless steel sheets (Inox AISI430 (č4174)) d = 0.8mm with drawers and drawer opening mechanism, partitions with door closing mechanism and 6 doors that go all over the cabinet and on which are locks for card opening door.

The cabinet should be made in everything according to the schemes from the project and the regulations that regulate this area. Prior to production, workshop drawings, details and descriptions have to be submitted to the Supervisor/Beneficiary for approval. The construction of the cabinet must be strong, to ensure that there is no bending and / or twisting of the material.

The preparation table measuring 100x150x85 cm is made of stainless steel profiles and sheets. The work surface is made of stainless acid-resistant steel 1 mm thick. The drawers are made of the same material and are equipped with an opening and closing mechanism.

The transfer desk has internal dimensions of 90x40x85cm. The construction is made of stainless steel profiles coated with 0.8 mm thick stainless steel sheet, acid-resistant, with sliding doors with interlocking alternative opening system (control open / closed) without the possibility of opening both elements at the same time. Opening / closing of the transfer desk door is only possible from the inside. Cover the outer part with refined plywood in the colour according to Beneficiary's choice. Cover the upper part of the counter with the same material. The counter should be made according to the attached drawing.

Workbench dimensions 150x30 / 4 is made of refined plywood d = 2x2cm glued together and edged with ABS tapes. It is leaned on a work table at one end and on the other side attaching to the AI partition, in accordance with the attached drawings.

Office desk, dimensions 100x60x75cm is made of refined plywood with a fixed part for drawers. The back is made of refined plywood d = 1cm. The table also comes with two upholstered chairs with armrests, hydraulic height and backrest adjustment, with mesh backrest and on wheels.

Archive cabinet will be placed partly in the corridor and behind the entrance door to the Ballistic centre. The cabinet has three parts dimensions 278x320x55cm, 80x320x55 and 165x320x55cm. Cabinet is made of refined plywood panels, closed from the back side, with perforated sides to enable adjusting the height of the shelves (shelves are max 45 cm distanced). Shelves are placed on metal holders. Cabinet doors are refined plywood panels veneered in the colour like existing cabinets. All is edged with ABS tapes. Closing of the cabinets is with hinges that are cut in the door and handles according to the Beneficiary's choice. Locks to be built in the doors and three keys to be obtained.

## **B/ High Voltage Installations**

The project envisages the installation of general lighting and electrical sockets in the room.

The choice of lighting methods and types of lamps intended for general lighting installations is made on the basis of the purpose and characteristics of the room and the requirements to be met in terms of lighting intensity.

General lighting in the room will be performed with recessed downlight beam lamps of wide beam optics made in LED technology (total 6 lamps).

The outer diameter of the lamp is 162mm, and the cutting diameter is 150mm, the depth of the lamp is 100mm. The lamp housing is painted white in aluminium, while the reflector of the lamp and the optical block are made of polycarbonate. The degree of mechanical protection is IP20, and the impact resistance is IK02, while the current class is I. The lamps are delivered with LED modules with light colour 4000K, electronic ballasts and colour reproduction index Ra80. Efficiency min 116lm / W, total flux of the system is 1100lm. The total power of the system is 11W. The temperature range of the lamps is from -20 to +40 degrees Celsius. The lamp must comply with European directives applicable to products, to have the CE mark. The luminaire manufacturer

should operate in accordance with the ISO 9001: 2008 quality management system, the ISO 14001: 2004 environmental management system and the OHSAS 18001: 2007 health and safety management system (Philips CoreLine Downlight DN140B LED10S / 840 PSU WR PI6 or similar)

The circuits are connected locally, with switches placed at the entrance door to the room at a height of  $h = 1.5$  m from the floor (one switch for 3 lamps).

In addition to the installation of lighting in the room, the installation of general purpose Schuco sockets is also planned. There are 4 general purpose sockets (8 in total) at each workplace. In addition to these sockets, a socket for room cleaning appliances is also planned, which will be located next to the front door at a height of 30 cm.

General lighting and switches are connected with cable N2XH-J 3x2,5mm<sup>2</sup> which will be located in PVC fi32 flexible hoses to the existing distribution cabinet located in the common hallway upstairs and in which an automatic fuse (switch) should be provided; 1P single pole from 6A to 10A

## **C/ Low current**

### **Structured cabling system**

In order to provide the infrastructure for data and voice transmission in the room, the installation of a structured cabling system in accordance with the standards ISO / IEC 11801, TIA / EIA 568B, CENELEC 50173-1 is planned. The system designed in this way is guaranteed to provide full performance of the computer network (Local Area Network-LAN), telecommunication systems, data transmission systems, video signals and other systems that work according to already known protocols.

The structured cabling system is designed so that in terms of performance it enables the realization of Gigabit Ethernet defined by the IEEE Std 802.3ae-2002 standard according to the star topology, where RJ-45 sockets are connected to communication devices-switches so that the malfunction of one connection line or device does not affect functionality of the rest of the system.

The structured cabling system (SKS system) is designed to transmit any data or speech in the band up to 500 MHz (ISO / IEC 11801 - current category 6A standard).

The SKS system includes all passive components necessary for the realization of the LAN network within the room. Horizontal cabling for telephone and computer network will be performed with halogen-free UTP cables of category 6A (4x2x0.5mm 100  $\Omega$ ) which will be located in PVC fi32 flexible hoses.

The socket layout is designed so that each workstation has two RJ-45 category 6A sockets for the computer network and one RJ-45 category 6A socket for the telephone network (6 in total). All sockets of the computer network are connected via the patch panel to the existing switch in the rack cabinet in the hallway (6 ports required), and all sockets of the telephone network are connected via the patch panel for the digital telephone PBX exchange. The maximum allowed distance from the RJ-45 socket to the patch panel is 90m. Analog, ISDN or IP connections will be used to connect the PBX to the external telephone network, depending on the type of telephone exchange that exists in the facility.

The connection to the external telephone network will be made in accordance with the conditions obtained from the provider.

## **CCTV - Video surveillance system**

The video surveillance system in this room functions as a security system. Two IP anti-vandal dome cameras 3MP with varifocal lenses are planned.

IP Dome cameras, TD / N, Full HDTV resolution: 1920x1080; 1080p @ 60fps; Video compression: H.264 / H.264 + IntelliZip / H.265 / MJPEG; Image sensor: 1 / 2.8 "CMOS; True WDR; SD, SDHC card; Mechanical ICR; Minimum brightness: 0.03 lux @ F1.2 color, 0.001 lux B / W; Motion detection; Three parallel video streams; Audio input; Audio output; Alarm input; Alarm output.

One IP camera will monitor the main entrance to the NFC Ballistic Laboratory, MUP, and the other IP camera will monitor the receiving office. Both IP cameras will be connected with a halogen-free UTP cat 6A cable to the corresponding PoE switch located in the rack cabinet. Both IP cameras are connected via a patch panel to the existing PoE switch in the rack cabinet in the hallway (2 ports should be provided on it). The existing NVR (network video recorder) will be used to control the cameras, where the recordings on the hard disk will be stored to the extent required by the User.

All cameras will be placed at optimal heights and at optimal angles, and with an adequate focal length.

The cables are UTP cat6A 4x2x0.5 type with halogen-free insulation that supports 10Gigabit Ethernet and complies with ISO 61156-5, ANSI / TIA / EIA standards. The cables will be laid in and around the room in PVC fi32 flexible hoses.

## **Intercom system**

An audio intercom system is used for audio communication between the reception office and the main entrance to the Ballistic Laboratory of the Ministry of the Interior, as well as remote unlocking of the entrance door.

The planned intercom system consists of a central device for controlling the operation of the intercom system (with relay for interconnection), an audio call panel with one button, two intercom devices with a desk stand for opening the front door, an existing electrical receiver and associated cable installation.

The central device for controlling the operation of the intercom system is located in the cabinet inside the reception office and is connected by cable N2XH-J FE180 / E90 3x1,5mm<sup>2</sup> which will be located in PVC fi32 flexible hoses to the existing distribution cabinet located in the common hallway upstairs and in which an automatic fuse (switch) should be provided; single pole 1P; from 6A to 16A C curve.

Front-door station is located next to the main entrance to the MUP Ballistic Laboratory. It is mounted at a height of 1.5 m from ground level to the axis of the board. There is an existing electrical receiver on the main entrance door.

Intercoms with a desk stand are mounted on desks in the reception office.

All system components are connected with J-H (St) H 2x2x0.8mm cable.

Inside and around the room, the cables will be laid in PVC fi32 flexible hoses.

## **Access control system**

The access control system controls and records the entry of employees through the entrance door to the reception office.

The access control system allows authorized persons access to protected areas with event registration. The system is designed to work in parallel with the audio intercom.

A special part of the access control system is the control and records of door opening (6 in total) on the cabinet for storage of received material. This part of the system is integrated with the system that controls and records the entry of employees through the front door to the reception office.

The planned integrated system consists of: an existing computer on which all the necessary software for an integrated access control system is installed, a controller with a card reader that has the possibility of encryption (with relay for connecting electric locks), electric locks, wireless locks with card reader for cabinet doors (6 in total), wireless IP communication hub (capacity of 16 wireless locks with card reader), reading cards and associated cable installations.

The computer is connected with halogen-free UTP cables of category 6A (4x2x0.5mm 100 Ω) to the existing switch in the rack cabinet in the hallway via a patch panel (1 port should be provided on it).

The controller with the card reader is placed in front of the entrance to the reception office at a height of 1.5 m from the ground level to the axis of the reader. J-H (St) H 2x2x0.8mm cable is connected to the electric lock located on the entrance door to the reception office. The controller with the card reader will be connected to the existing PoE switch in the rack cabinet in the hallway with halogen-free UTP cables of category 6A (4x2x0.5mm 100 Ω) which will be located in PVC fi32 flexible hoses.

Wireless locks with a card reader will be placed on all doors of the cabinet for storing the received material. They communicate with a wireless IP communication hub at 1.4GHz, through which they are connected to an integrated access control system.

The 1.4GHz wireless IP communication hub allows encrypted radio communication with wireless locks with a card reader. The hub will be connected to the existing PoE switch in the rack cabinet in the hallway with halogen-free UTP cables of category 6A (4x2x0.5mm 100 Ω) which will be located in PVC fi32 flexible hoses (1 port in the rack cabinet should be provided).

Contactless access control cards will be of the DESFIRE 13.56 MHz type with the possibility of encryption.

## **Counter system**

The counter system enables voice communication between the person in the reception office and the person at the main entrance to the Ballistic Laboratory.

There are two independent counter systems (one counter system for each workplace).

The planned counter system consists of: central unit with power supply for the counter system, integrated microphone and speaker amplifier, integrated induction loop amplifier and integrated hands-free controller, control panel with integrated speaker and microphone, built-in speaker, built-in microphone, inductive loops and associated cable installations.

The central unit is placed next to the workplace and controls the counter system at that workplace and is connected by cable N2XH-J FE180 / E90 3x1,5mm<sup>2</sup> located in PVC fi32 flexible hoses to the existing distribution cabinet located in the common hallway upstairs and in which an automatic fuse (switch) should be

provided; single pole 1P; from 6A to 16A C curve. All other elements of the counter system are connected to the central unit.

The control panel with integrated speaker and microphone is located on the desk in the reception office and is connected with a halogen-free UTP cable category 6A (4x2x0.5mm 100 Ω) which will be located in PVC fi32 flexible hoses (2 ports on it should be provided) to the central unit counter system. The control panel with integrated speaker and microphone is used for voice communication from the workplace in the reception office with people at the entrance to the Ballistic Laboratory of the Ministry of the Interior.

The built-in speaker is placed on the side of the corridor at a height of 1.5 m and is connected with a LiHCH 2x0.75 mm<sup>2</sup> cable that will be located in the PVC fi32 flexible hoses to the central unit of the counter system. The built-in speaker is located at a height of approximately 160 cm at the main entrance to the Ballistic Laboratory of the Ministry of the Interior.

The built-in microphone is placed on the side of the corridor at a height of 1.3 m and is connected by J-H (St) H 2x2x0.8 mm cable which will be located in PVC fi32 flexible hoses to the central unit of the counter system. The built-in microphone is located at the height of the person's mouth at the main entrance to the Ballistic Laboratory of the Ministry of the Interior.

The inductive loop is placed on the side of the corridor at a height of 1.5 m and is connected with a LiHCH 2x0.75 mm<sup>2</sup> cable that will be located in PVC fi32 flexible hoses to the central unit of the counter system. The inductive loop is located at a height of approximately 160 cm at the main entrance to the Ballistic Laboratory of the Ministry of the Interior. The inductive loop for the hearing impaired transmits voice to the hearing aid via EM waves.

#### **D/ Fire alarm system**

The fire alarm system provides automatic and manual alarm after a fire occurs. The system ensures the occurrence of fires in the room by means of alarm sirens with a flash. The fire alarm control panel will be located on the wall next to the front door of the room.

The fire alarm system will form the following units:

- conventional battery fire control panel
- conventional hand-held detector
- conventional optical-thermal detectors
- conventional alarm siren with flash
- cable distribution J-H (St) H 2x2x0.8mm
- cable distribution J-H (St) H 2x2x0.8mm J-H (St) H FE180 / E90
- cable distribution N2XH-J 3x1,5mm<sup>2</sup> FE180 / E90

Manual fire alarms and a siren with a flash are provided at the exit of the reception office. Optical fire detectors are provided in the room at two positions.

All fire detectors, automatic and manual, and sirens with flash are conventional.

#### **Fire alarm control panel**

The fire alarm panel is basic unit for building a centralized, modular system. It provides power and permanently monitors the complete detector line, the condition of the detectors, their operation as a pre-alarm and alarm condition and the correctness of the cable connection. The control panel is supplied with voltage 220V, 50 Hz from the distribution cabinet from a special circuit. In the event of a power failure, it

has a backup power source (built-in rechargeable batteries that provide system autonomy for a minimum of 30 hours in quiet mode and 72 hours in alarm mode).

## Fire detectors

### Automatic fire detectors

Considering the purpose of the room, possible causes of fire outbreaks, the speed of fire development and the conditions prevailing in the room, the use of two optical-thermal detectors is planned for automatic detection of fire occurrence. Both detectors are connected to one zone each and are connected directly to the fire alarm control panel. All detectors are characterized by digital sensor signal processing and fuzzy logic for analysis. The self-monitoring, which exists in these detectors, ensures long-term economy and reliability.

### Manual fire detectors

A manual fire alarm will be installed next to the entrance to the room. The manual detector serves for manual remote signaling of the fire alarm signal to the central device of the fire alarm system, without check time and thus has a role in fire protection for direct alarm. Detector is placed at a height of 1.5 m from the top layer of the floor.

### Alarm sirens with flash

Notification of personnel about the occurrence of fire will be done by means of light and sound alarm signals emitted through a conventional alarm siren with a flash placed in the hallway in front of the room.

The alarm siren with flash is powered from the PP control panel.

The siren has 3 tone settings with different tones, which are selected via DIP switches: 800Hz continuous, 800Hz intermittent and 800Hz / 1000Hz alternative. When a slow intermittent tone or a slow alternating tone is required, the tab should be broken to select a low frequency change tone.

Installation of fire detector in the room will be realized by halogen free cables JH (St) H 2x2x0,8mm (connection of automatic detectors and manual detectors with the fire alarm control panel) and JH (St) H FE180 / E90 2x2x0,8mm connecting alarm sounder with a fire alarm control panel and connecting the electric lock to the fire alarm control panel) which will be located in PVC fi32 flexible hoses. The main place of concentration of the fire alarm installation will be fire alarm control panel itself. Fire detectors are connected to their zone line. The fire alarm control panel is connected with a cable N2XH-J FE180 / E90 3x1,5mm<sup>2</sup> which will be located in PVC fi32 flexible hoses to the existing distribution cabinet located in the common hallway upstairs and in which an automatic fuse (switch) should be provided; single pole 1P; from 6A to 16A C curve.

The distance of the detector from the walls and stored goods must not be less than 0.5 m, except in corridors, passages or similar parts of the building whose width is less than 1 m. If there are beams or openings for air flow under the ceiling at a distance of less than 0.15 m then the lateral distance of the detector must be at least 0.5 m.

Installation cables at the points of passage from one to another fire sector should be protected by a surface slow-burning mass, 1 meter on each side.

## Telecommunication equipment and installations

Install all devices according to the disposition drawings from this project. Make any changes based on the written consent of the Supervisor. Before starting the works, the Contractor is obliged to mark the places of installation of devices, distribution cabinets, distribution boxes and lines.

The details of attaching the device to the floor, wall or appropriate brackets are defined by the equipment supplier's documentation.

After fixing, leveling and wiring the cabinet for storing the device, install equipment that is specially packed for transport in accordance with the documentation of the equipment manufacturer.

Route all cables and conductors as provided in this project:

- per wall or ceiling in suitable cable racks,
- per wall on plastic spacers, and / or
- in the wall or on the wall in plastic installation pipes.

All pipes and junction boxes used on parts of installations that are made in pipes, must be made of insulating material. The inner diameter of the pipe must correspond to the cross section and the number of conductors, which are drawn into them in accordance with the applicable regulations and standards. Pipes on walls and ceilings must be laid under plaster.

When laying pipes on the walls, special care must be taken not to damage the walls more than necessary. The pipes must be laid so that there is no place between the two junction boxes where condensed water could collect.

In the case of horizontal lines, the pipes between the two junction boxes must form a slight arc with the apex upwards with the ends falling towards the junction boxes.

Continuation of the conductors and branching of the lines must be done exclusively in junction boxes of sufficient dimensions, so that all connections can be accommodated. The smallest inside diameter of junction boxes in which the conductor connections are made must not be less than 70 mm. Connections must be soldered and insulated. It is forbidden to continue the conductor by pulling it into the pipe.

TK and EE lines are laid in parallel at a distance of not less than 20 cm. In the case of horizontal ranges, EE lines are laid 30 cm from the ceiling, 10 cm above them for signaling and other installations, and 10 cm above these telephone lines.

As a rule, junction boxes on these lines are placed obliquely to each other, at an angle of 45 °. When laying hard pipes in parallel, the distance between them must be at least 5 cm.

Crossing of TK lines with EE lines should be avoided. At the intersections, which should be reported at right angles, the distance between the two lines must be 10 mm, and where this is not possible, an insulating insert 3 mm thick should be placed.

Insertion of conductors in the pipe is done after patching the walls, and installation of sockets, junction boxes, devices and switches after painting the walls.

Care must be taken not to damage the cables when laying cables. In places where the cables change direction, make slight curves, the radius of which must not be less than 15 cable diameters.

All metal parts of telecommunication devices, distribution cabinets, distributors and cable racks must be grounded with a copper personal conductor.

Leave sufficient lengths on the terminals for connecting the devices so that the devices can be placed in the given dispositions.

After the installation of the cables, be sure to mark the cables with metal rings and check the understanding of the cores.

Also check that the insulation resistance meets the following conditions:

- Insulation resistance a / b must not be below the minimum value of 10 Mohm,
- The insulation resistance a / z must not be below the minimum value of 10 Mohm.

**The equipment is put into operation exclusively in the presence of the works manager and the supervisor.**

After inspecting the installed equipment and making connections, apply the supply voltage and switch on the device. The program of final calibration and testing of devices, equipment and installations is made by the works manager and submitted to the Supervision for approval.

## **E / Ballistic expertise container**

For the needs of the Ballistic Laboratory, a container with the equipment that needs to be placed in the position determined by the User, was procured.

Before placing the container, it is necessary to prepare the location – clean and prepare the area cca 7.0 m x 3.0m for concreting of the slab that will be used for placing the container.

Concrete slab d = 15cm with concrete cornice 20x10cm along the entire perimeter is made of concrete brand MB30 and reinforced with Q335 mesh in both zones. Concrete surface is prepared and painted with concrete paint.

A drain with a drain grate is installed in the slab, which is connected to the sewer pipe in order to drain water from the space under the container.

Container installation and connecting is not the responsibility of the contractor.

For container protection, it is necessary to place waterproof tarpaulin on the metal construction that will be placed as described on the drawing attached in annex. The construction is placed partly over existing fence and the rest is new construction placed orthogonally to the existing fence. A waterproof tarpaulin with a print, approximately 13m x 3m in size, is placed over the construction. The construction has to be designed, delivered and placed according to supplier's instructions. The logo of the User, the project and the Financier is printed on the tarpaulin.

6. August 2020.

Prepared by engineer Gordana Bajic, external expert engaged by UNDP.

