Annex 5.1 – Technical specifications

Content

Facility:	**Facility of central activities - Administrative facility of the MoI**
Technical Documentation:	**Main Design**
Investor:	**Ministry of Interior**
Location**:**	**Urban plot 3b-33k in the scope of DUP "Zagorič 3-4 zone 2" changes and additions, at lots no. 182/1,182/2,182/3 and 182/4, K.O. Podgorica II, in Podgorica, Montenegro.**

A Architectural Design

A 1. Conditions from the spatial planning and urban documentation

Based on Urbanist-technical conditions No. 08-352/18-553 dated October 15, 2018 issued by the Secretariat for Spatial Planning and Sustainable Development of the Capital City Podgorica, and the Design specification signed by Beneficiary, and the Agreement on the preparation of the technical documentation, the Conceptual Design for the construction Facility of central activities - Administrative facility of the Ministry of Interior of Montenegro, on urban plot 3b-33k, in the area DUP "Zagoric 3-4, zone 2", Capital City Podgorica. Consent no. UP I 30-332/22-166 dated September 20, 2022, was obtained on Conceptual Design, everything under legal regulations and the competence of the Office of the Chief City Architect of the Capital City of Podgorica.

A 2. General information about the facility and location

The location of the planned facility is on urban plot No. 3b-33k, in the area of DUP "Zagorič 3-4, zone 2" in Podgorica. The space that makes up the urban plot are lots no. 182/1 and 182/2, according to the cadastre of the CM of Podgorica II.

Based on the field data of the site, made by Geo-sistem d.o.o., the total gross area of the existing buildings on the plot is 5,559.75 m², and the total gross area of all floors is 8,500.16 m². The planned facility is located on the site, and the existing facility No. 2 - Warehouse, which is planned for demolition, floor level - ground floor has an area of 508.48 m². After demolition of the existing facility, the gross area of the existing buildings on the site is 5,051.59 m², and the total gross area of all floors is 7,991.68 m².

Vehicle access to the site is provided through the existing entrance to the complex from the southern side of the plot, which is connected to the public road.

A 3. Purpose

Based on the Urbanistic Technical Conditions and the Terms of Reference, the urban plot No. 3b-33k will be used for the construction of the Facility of central activities - Administrative facility of the Ministry of Interior of Montenegro.

A 4. Concept of the facility

The facility is designed as a freestanding building with a height level of Ground Floor + 2 floors, and Ground Floor + 3 floors in some parts. The facility in the complex is planned as an independent facility for the performance of certain activities for the needs of the Ministry of Interior of Montenegro.

A 5. Architecture Design

The building has a basic rectangular shape, with dimensions of width 18 m and length 24 m. The roof is flat. The materialization of the façade of the facility is in white RAL 9106 demit facade and ventilated facade made of compact board in wood decorative panel.

The locksmith is in black RAL 9011, with rollers in the wood decorative panel, equivalent to the colour of the wood decorative panel on a compact board.

A 6. Capacities and Area Analysis

The surface areas and the area's purpose are shown in the tables.

The table shows the requested and achieved parameters:

	REQUESTED PARAMETERS	ACHIEVED PARAMETERS
	UP 174b	UP 174b
AREA OF THE URBAN PLOT	25163,72 m²	25163,72 m²
OCCUPANCY INDEX	0.5	0,22
AREA UNDER THE FACILITIES	12581,50 m²	5481,01 m²
INDEX OF CONSTRUCTION	2,75	0.37
GROSS AREA OBJEKTA	69198,25 m²	9414,82 m²
FLOOR LEVEL	P+4+Ps	P+3

- The Net area of the projected facility is 1260.58 m², and the Gross area is 1423.14 m².
- The total net area of the ground floor is 390.05 m², and the gross area is 429.42 m².
- The total net area of the first floor is 384.24 m², and the gross area is 440.44 m².
- The total net area of the second floor is 383.24 m², and the gross area is 440.44 m².
- The total net area of the third floor is 103.04 m², and the gross area is 112.84 m².
- The total surface area of the free landscaped area is approximately 2600 m².

On the **ground floor**, a large operating room of the Coordination Centre - NCC is designed, which has an amphitheatre shape with cascaded workplaces - operator stations in 3 rows with height gaps that should provide a direct view of the video wall with monitors. At the very top of the amphitheatre hall, a multimedia meeting room is planned with a fully glazed wall facing the Operating Room. A technical room with rack cabinets and a server room are planned behind the video wall with monitors. Auxiliary offices are designed to the side of the Operations Hall, which are entered from a longitudinal corridor. On the opposite side of the auxiliary offices are the working offices of the Coordination Centre. The relevant official premises of the Coordination Centre have a small kitchen and separate male/female toilets.

On the ground floor, the main entrance to the building with access control is designed, along with a smaller entrance hall with a registration desk near which there are vertical communications on the side - a staircase and an elevator through which vertical communication is achieved on the floors of the building. It is necessary to plan a separate official entrance from the entrance hall to the official rooms of the Coordination Centre, with a system of repeated/additional access control.

An administrative block is organized on the **first floor**, in which the following official accommodation rooms are designed: Mobile units of the SGP, Regional Border Police Centre - RCGP Centre, as well as common administrative premises at the facility level. From the entrance hall (using the elevator or the stairs from the ground floor), you first enter the block of common rooms, consisting of a large meeting room, a room for the staff, a kitchen, and separate women's and men's toilets.

From the corridor of the block of common rooms, there are two separate official entrances, one for the needs of the SGP Mobile Unit and the other for the needs of the RCGP Centre. For the needs of the Mobile Unit, rooms are planned for the needs of the head of the unit, heads of groups, administrative offices, and rooms for storing archives, equipment, and weapons. The number of official rooms was defined by the beneficiary according to their operational needs and the available space on the relevant floor of the building.

For the needs of the RCGP Centre, it is necessary to plan the optimal number of rooms for the needs of the head of the centre, the Regional Coordination Centre - RCC Centre, administrative offices, and rooms for archive accommodation. The number of official rooms was defined by the beneficiary according to their operational needs and the available space on the relevant floor of the building.

An office is planned for the needs of service dog handlers.

On the **second floor** is designed administrative block with official spaces for the accommodation of:

An office for the Assistant Director of the Directorate of the Border Police with its own restroom and direct access to the secretary's office. Within the office, a room for the analyst has also been planned. The number and layout of official spaces have been defined by the beneficiary in accordance with their operational needs and available space on the related floor of the building.

For the needs of the Department of Border Police, an optimal number of offices for the Head of Department, administrative offices, storage rooms for equipment, and archives have been planned. The number and layout of official spaces have been defined by the beneficiary in accordance with their operational needs and available space on the related floor of the building.

The Department of Operations and Risk Analysis requires additional space for its office, and a plan has been made to allocate an optimal number of rooms for the head of the department, administrative offices, storage space for equipment, and archives. The number and layout of the official rooms were determined by the beneficiary in accordance with their operational needs and available space on the related floor.

For the needs of the Department of Foreigners and Suppression of Illegal Migration, an optimal number of rooms has been allocated for the head of the department, administrative offices, storage space for equipment, and archives. The number and layout of the official rooms were determined by the beneficiary in accordance with their operational needs and available space on the related floor.

For the needs of the Department of Logistics and Support, an optimal number of rooms has been allocated for the head of the department, administrative offices, storage space for equipment, and archives. The number and layout of the official rooms were determined by the beneficiary in accordance with their operational needs and available space on the related floor.

As part of shared facilities, a mini kitchen and central toilets (male and female) have been planned for the required number of employees.

On the **third floor** is designed continuation of communicational block (stairs and elevator) that leads toward to the exit on the roof terrace which presents, at the same time, airfield for unmanned aerial vehicle. As integral part of the third floor the hangar for unmanned aerial vehicle is designed. The rest of the floor is designed as walkable flat roof.

44 parking spaces are designed. Traffic and parking itself are designed in relation to the organization of the rest of the complex. Within the yard area, 2 covered boxes for washing and vacuuming the official vehicles of the Border Police are planned in a suitable place.

A 7. Materialization / Wall Works

Facade walls and interior walls between special segments and on structural elements such as columns, beams, and girders are planned to be made of 19x19x20cm Giter blocks, while interior walls inside the apartments are planned to be made of 12x19x25cm Giter blocks. The finishing of the walls is planned to be plastering, with the addition of trowelling. In bathrooms and kitchens, ceramic tiles and decorative tiles are planned to be used.

A 8. Floors

The floors in corridors, bathrooms, and kitchens are to be made of non-slip and best-quality ceramic tiles. In bathrooms, the floors need to be set at a slope of 0.5-1% towards the drain. In the NCC hall, it is planned to raise the floor with a space for setting installations, with a final floor covering made of panels. A floor with an antistatic finish is planned in the service and weapons rooms. The floors in offices and other rooms are high-quality parquet.

A 9. Ceilings

In the facility, all ceilings are planned to be suspended. This includes mineral ceiling boards of 60x60 cm and suspended ceilings made of gypsum cardboard sheets.

The Main Design is executed in accordance with all technical norms, in compliance with the Law, the Regulation, and with issued urban planning-technical conditions.

B Structural Design – Construction

B 1. General information

This Main Design covers the construction of an administrative building on urban plot number 3b-33, within the scope of the DUP "Zagorič 3-4 zone 2", on lots no. 182/1 and 182/2, , 182/3 and 182/4 K.O Podgorica II.

The facility is rectangular in the base, with a level height of GF+3. The height of the first three floors is 3.70m and the height of the last floor is 4.70m. The building has a basic module of width 18.2m, length 24.2m, with a roof slab measuring 6.2x18.2m.

The roof of the facility is designed as a flat roof. The roof level T-300 is designed as a protruding roof, while the roof level T-400 is designed as a non-protruding roof.

The calculation parameters for the foundation were determined based on the Elaboration of a detailed geotechnical examination of the terrain, which was conducted for the construction of this facility. It was determined that the broader area of the location is made up of clayey silt, partially bound in conglomerate, which corresponds to soil type B. This means that the soil has good strength, higher than σ_{soil}=300 kN/m².

B 2. Description of Structure

The choice of the structural system and the use of basic construction materials were selected following the design requirements, the function of the facility, local conditions, the architectural design, and the preliminary results of the calculation of the structure of the facility. The facility is designed as an independent structural system.

The construction of the facility consists of reinforced - concrete columns of different dimensions, reinforced - concrete wall panels, and beams formed in two vertical directions.

The floors are designed as full slabs with a thickness of 20 cm. The roofing slabs are also 20 cm thick. These slabs, due to the configuration of the walls and the span of the roof, structurally transfer load mostly as slabs in two directions.

The staircase is reinforced concrete with a thickness of d=15 cm, which rests on slabs, beams, and intermediate beams.

The beams in the structure are of different dimensions of cross sections. All beams in the construction are designed so that there is no failure of the concrete, which is highly advantageous in seismic areas and corresponds to the assumed ductility of the cross sections based on which the seismic loads were determined.

The reinforced concrete slabs are designed with a thickness of d=20 cm and d=30 cm.

The reinforced concrete columns are designed of different dimensions.

The facade and interior walls are filled with horizontal and vertical reinforced concrete joints. In this way, the filling is dilated from the basic construction, and its ductility is increased, which is very important so that there is no falling and collapse of the filling due to seismic effects. Vertical reinforced concrete joints are placed at the ends of the walls, at the junctions with other walls, and around larger openings.

Based on the geological structure of the terrain, the facility will be founded on "T" foundation strips of reinforced concrete C25/30, and a rectangular cross-section in the place where due to the functionality of the building it was not possible to use the T cross-section, as shown in graphic documentation.

Based on the geomechanical report, it can be concluded that the facility will be founded in soil type B according to EC8, which is characterized as a deposit of very fine sand, gravel, or very hard clay, with a minimum thickness of several tens of meters, with an increase in mechanical properties with depth.

Notes for execution of earthworks:

- When performing deeper excavations, consider the stability of the excavation walls and reinforce them if the depth exceeds 2 meters.
- It is necessary to make a tampon of granular materials, which should not be less than 20 cm in thickness and should be compacted following the norms and technical specifications for this type of work (Ms>40 MPa). Test the compaction and make an appropriate report on the test.
- Based on the preliminary analysis of the soil condition and the analysis of the soil layers, it was determined that the total consolidation will be within the permitted limits (s=2.2 cm).

- During the execution of earthworks, take the necessary measures to protect the excavation and the foundation following construction regulations and the Law on Protection at Work. Perform excavation during dry weather to prevent the water from the surface from causing settling of the excavation.
- To ensure the safety of people and facilities, the Contractor is obliged to comply with the provisions of the Technical Norms for Foundations of Buildings, which apply to foundation works.
- Given the geotechnical conditions for foundation work, the Investor is recommended to appoint a geotechnical expert supervision to oversee the excavation phase to ensure:
  - ✓ Geotechnical supervision,
  - ✓ Quality of the installed material,
  - ✓ Control of the compacted material.

B 3. Applied materials

- Concrete:
  - ✓ For slabs, beams, and columns: C25/30
  - ✓ For walls: C25/30
  - ✓ For foundations: C25/30
- Reinforcement:
  - ✓ Foundations: B500B
  - ✓ Walls: MA 500/560
    B500B
  - ✓ Floor slab: MA 500/560
  - ✓ Reinforced concrete columns: B500B
  - ✓ Stair plates: B500B

- Retaining walls and fill: according to the architectural design.

B 4. Applied standards

- Eurocode 0: Basis of structural design.
- Eurocode 1: Actions on structures.
- Eurocode 2: Design of concrete structures.
- Eurocode 7: Geotechnical design.
- Eurocode 8: Design of structures for earthquake resistance.

B 5. Final notes

1. Entrust the execution work to a professional contractor with the constant presence of professional supervision.
2. Use quality and certified materials.
3. After excavating the foundation pit, it is necessary to have the presence of an engineer in geotechnics. Check if the assumed parameters of soil are correct and if they differ, inform the project manager.
4. There are no allowed changes in the structural design without the approval of the main designer.

C Structural Design – Hydrotechnics

C 1. General part

The design of hydrotechnics installations is carried out following architectural solutions, terms of reference, urban planning, and technical requirements for this type of work, all with possession of permits for connection to the water and sewage network, as shown in the graphic documentation.

In this design, technical solutions for the internal and external installations of water and sewage systems are solved and presented.

Atmospheric drainage is described within the documentation of external installations and transport around the facility.

Extracts from water supply and sewerage facilities are made in the most rational way, which includes both a functional and the shortest route to the appropriate connections.

The connection points are defined by the Technical Conditions of the water supply system, and they correspond to the design solution.

It is mandatory to use valid standards, laws and regulations, safety measures, as well as environmental protection.

C 2. Water supply

The design of the water supply installation includes the network of sanitary, fire protection, and sprinkler water systems.

The distribution of the water installation is made up of the street connection, courtyard network, and household network, as shown in the layout of the facility.

Following the Terms of References, all requirements have been met, and as such, all applicable standards, laws and regulations, measures for protection, and protection of the environment are applied.

For the sprinkler network, special water output is provided, which according to regulations is Ø100 and is separated from the common pipe network in a water meter room, where a water meter Ø100 is installed that must contain all fittings and accessories prescribed in the Conditions of J.P. “Vodovod”, Podgorica.

To protect against fires, fireproof internal hydrants, are installed in the stairs area, which is a rational and, above all, functional solution.

Considering the recommendation and explanation of the need for a joint hydrant and sanitary network by the Regulations of J.P. “Vodovod”, Podgorica, it has been done this way. In the water meter room, water is separated into common hydrant and sanitary water, as shown in the graphics.

The water supply network supplies all sanitary devices in the basement, ground floor, and third floor.

Connection to the water system is planned with the pipe PEVG Ø250, which is connected to the city water supply network, as shown in the situation.

Water consumption is measured separately for sprinklers through water meters DN110 and DN75 for hydrant and sanitary water, as well as for irrigation water, as shown in the attached diagrams.

Before the water meter, an isolating valve, a sediment collector, an MDK piece, a levelling strainer, and an MDC piece are installed. In front of the water meter, a backflow preventer, a levelling strainer, a ventilation pipe, a levelling strainer, and a backflow preventer are installed. The backflow preventer is installed behind the water meter due to the presence of the hydrant network.

The water meter shaft is located near the internal road, easily accessible for reading, as shown in the situation.

Based on the requirements, it is written that the working pressure in the street network is around 3.00 bar.

Using hydraulic calculations for the overall hydrant and sanitary water network, a required working pressure of 4.80 bar was determined, and a corresponding device was selected to increase the pressure. In this case, the selected device has the following characteristics: type GSR.1504-2RI(37-17m), flow rate 2,2-7,6 l/s, URS2104, power 1.5 kW, current 3.4 A, nominal diameter 65 mm. The device is located under the staircase.

The internal water network is made up of pipes with diameters of PPr Ø65 and Ø50 mm, as well as smaller diameters of Ø15 mm, Ø20 mm, and Ø25 mm, as shown in the attached isometric drawing. Pipes for cold water must be protected with a filc track, and pipes for hot water with thermo-isolation characteristics, and corrugated structures.

The fire hydrant system is designed using steel pipe couplings Ø65 and Ø50mm, protected against mechanical impact, vibration, and corrosion. The horizontal distribution system is installed below the floor slab and under the beams, while the vertical pipes are installed in the corresponding holes and sleeves in the walls.

The supply of hot water for sanitary purposes will be carried out separately, through electric heaters with a capacity of V=120l, V=80l, V=50l, and V=10l.

The investor can optionally choose other types of pipes, as well as for the sanitary equipment and batteries, and for which they must have the appropriate certificates.

After completing the water supply network, before installing the sanitary equipment, perform a water supply network test in the prescribed manner, with a recorded logbook.

C 3. Sewerage System for Wastewater

The internal sewage system for wastewater is designed based on the layout of sanitary appliances and the most rational solution, as well as the connection to the appropriate inspection outlet, as shown in the graphics.

For the acceptance and discharge of wastewater from sanitary outlets, predetermined verticals VØ50, VØ110, and VØ125 are provided, which pass through a horizontal Ø110 for vertical VØ50, and Ø160 for other verticals and further to the corresponding inspection window.

Considering the symmetry of the facility, it was necessary to guide the horizontal pipes below the floor slab of the first floor, as shown in the plans and vertical sections of the wastewater drainage. Water supply nodes are located on the facade of the building, on the first and second floors, which has led to the given solution. The designer has found the simplest and most rational way to convey wastewater from the roof to the ground floor, while not impairing the function or the space of the ground floor.

The ventilation shafts for the sewage system are in the designed openings.

On all verticals, predetermined verticals Ø125, Ø110, and Ø50 are provided, at a height of 50 cm above the finished floor, as shown in the vertical sections of the sewage drainage.

The collection of wastewaters is performed with corresponding pipes and sectional segments in the designed openings, under and above the finished floor, following the location of the sanitary facilities and technical possibilities of guiding the pipes.

The designed sewage pipes are made of plastic (PVC), with a diameter of Ø160, Ø125, Ø110, Ø75, and PVC Ø50, with mandatory welding with a rubber gasket.

Two verticals are executed up to the roof of the facility and end with a ventilation head (cap) Ø150, while the others are collected below the second floor ceiling and are discharged to the facade as a decorative rosette.

The horizontal sewer distribution in the building is provided with a minimum drop of 2.0%, as well as the horizontal distribution on the ground floor.

The transition of verticals from the first floor to the horizontals under the ceilings of the first floor is designed with a drop of 1.5%.

The verticals connected to the respective chambers are collected in a common chamber RO. I, from where they are discharged to the street sewer, as shown in the graphic plans.

It is mandatory to examine the sewer network for water tightness, both for the outlets and for the horizontal and verticals, as well as for the vertical. For the horizontal water, it is necessary to examine a pressure of 0.5 bar.

C 4. Atmospheric Drainage:

The roof drainage system collects water from the roof surface through vertical drainage pipes with a diameter of Ø75 mm. These pipes cross the inspection chamber into the horizontal drainage pipe that leads to RO. RO is connected to a

closed pipe collector with a diameter of Ø75 mm, according to the specified design. The same pipes are connected to RO 5572, which are given in the requirements for water supply.

As for the drainage from the parking lot, closed canals with a pipe diameter of DN 315 have been designed, along the curb, with an appropriate number of downspouts. Before the inflow into the SL 2365 drain, which is given in the conditions of the water supply system, the atmospheric water from the parking lot is purified through a grease and oil separator.

For receiving water from the parking lot into the collectors, drain and inspection shafts with one-piece drain bars with frame and bar connections were designed. The bars are 60 x 60 cm. Drainage shafts are placed at a distance that ensures high-quality and quick acceptance of stormwater. It is planned that the channels will be made of PEVG R pipes of the indicated diameter.

C 5. Separator

The selected separator complies with standard MEST EN 858-1/2.

C 6. Sanitary facilities

Sanitary facilities are of first-class and high quality and are located in the spaces indicated in the graphic plans.

The colour, shape, and type of sanitary facilities will be determined by the investor and designer.

After installation of the sanitary facilities, an inspection will be carried out following the prescribed installation and the functioning of the same, as well as the battery and other accessories.

Sanitary facilities must have the appropriate certificates and be installed following the manufacturer's instructions and applicable regulations and standards.

For all equipment, materials, fittings, and supplies, it is mandatory to apply the relevant standards, standards, and regulations.

D Electrical Design- High voltage

D 1. Introduction remarks

The subjects of this part of the Main Design are:

- Electrical installation for general consumption;
- Electrical installation for lighting;
- Electrical installation for grounding;
- Electrical installation for the lightning rod;
- Electrical installation for equalization of potential.

D 2. Main power (connecting) cable

The facility is provided with a power supply solution from the existing substation. Two power cables of type XP00-A 4x1x240 mm² are proposed for the GRO_M network and the GRO_A generator. The power cable is not part of this technical documentation and will be determined through the design of a cable network, after precise calculation. Based on the data provided by the Technical Service of the Ministry of Interior, it is assumed that the connection will be made from the existing substation, where there already is an active measurement of electrical energy for the existing facility. Within the GRO network, there is a field of the network on the plans marked as GRO_M, the generator on the plans marked as GRO_A, and UPS on the plans marked as GRO_UPS. ATS is also provided within the generator. From the generator to GRO_A, a power cable of type PP00 4x1x120 mm² is proposed, and from UPS to GRO_UPS, a power cable of type N2XH 4x35 mm² is proposed.

D 3. Distribution Cabinet and Feeders

The main distribution boards (GRO) are located on the ground floor of the facility, in the server room. The GRO provides power distribution to other distribution boards. The main distribution boards have a field of the network, the generator, and the UPS. Each floor has its distribution board, from which local power distribution is carried out to the consumers.

The network of the generators is intended for power supply to external and internal lighting, electrical equipment in the office, the elevator, sprinklers, and backup climate control in the server room. The UPS generators are intended for power supply to electrical equipment in the office and low-voltage equipment. The generator is located outside the facility, while the UPS is located in the server room.

It is necessary to cut wall chases for vertical power distribution of electrical cables.

Distribution boards are overalls, IP 54 protection, and in accordance with the electrical installations in the project. The distribution board is installed and equipped following one-pole standards and material measurements.

D 4. Electrical installation for general consumption

For general consumption, considering the heating and cooling method, the required number of single-phase and three-phase connections, and outgoing conductors, is determined based on the intended use of the facility.

It should be noted that the number of single-phase and three-phase connections, as well as outgoing conductors, is determined based on the plan of furniture and equipment. In the event of a change in the number of equipment, the relevant outgoing conductors must be adjusted to the same amount of equipment.

As per the requirements, 3 distribution boxes, 3 UPS distribution boxes, and 3 electrical vehicle charging points will be installed at each workplace. The request from the Investor also requires that a reserve system for air conditioning be provided for the server room. The reserve systems for air conditioning will be installed on the roof of the building, with one aggregate and one UPS outlet.

If otherwise not specified, the connections will be mounted at a height of 0.3 meters from the floor, except for the connection in the kitchen and bathroom, which will be mounted at a height of 0.7, 1.2, and 1.5 meters, depending on the intended use of the connected place. The installation material is modular. In the sanitary outlets, the predetermined connections in "OG" format are provided as indicated in the plans for the installation. This and other connections in the kitchen and toilets are protected with a protective device for the differential current of 30 milliamperes. The locations

and heights of these connections are given with the number of the electrical circuits on the plans in the attachment. Protection against indirect voltage is provided by a system for protecting TN-C/S.

D 5. Electrical lighting installation

In all rooms of the facility, appropriate lighting is provided, with LED light sources, adapted to the use and mounting conditions. The lighting is controlled according to the room's purpose (through switches, and sensors). The external lighting is controlled through a contactor and a built-in timer. The entire lighting is capable of backup power through an aggregate.

The switches are mounted at a height of 1.2 meters from the floor. All metal parts of the lamps are to be earthed. The installations of internal and external lighting are to be performed through conduits of types N2HX-J 3x1,5 mm² and PP00 4x6 mm², respectively.

When selecting the light equipment, the goal was to meet all technical and economical requirements.

D 6. Installation of necessary lighting

Considering the purpose of the facility, it is planned to provide and install necessary lighting in all corridors. The proposed lighting will ensure necessary lighting for 3 hours in case of power failure. The proposed lighting includes anti-panic lights and exit lights. The installation will be carried out using conduits of type N2XH-J 3x1,5 mm² placed in conduits with a diameter of 13 mm.

D 7. Installation of equalization of potential

In accordance with the Technical Rules for the Execution of Electrical Installations, a system for equalizing potential is required. For this purpose, a GSIP container will be installed in the GRO, where the equalization of potential will take place. It is planned to connect the main storage container for equalizing potential to the sub-storage container with a P/F 1x50mm² conductor. P/F cables 1x16 mm², 1x10 mm², and 1x6 mm² connect the thermal installations, metal masses in the facility, external unit supports, weak current nets, and similar.

D 8. Installation of lightning rods and grounding

According to JUS 1024-1 t.2.3.2, the grounding of the installation is to be done through a common grounding point for all installations in the facility, following EN IEC 62305.

The common grounding point is to be established by a FeZn 25x4mm bar, placed in the foundation of the facility. The bar is to be embedded in the concrete layer at least 10 cm thick, by using special brackets or by laying the bar on top of the reinforcement of the foundation. The bar is to be fixed at a distance of 1-2 meters from each other. A 15700 m² area is considered as the acceptable coverage area. After considering various factors given in the budget, the Hermi risk manager has determined the grounding level as IV, meaning that the level of protection is adequate.

During the installation of the track, the following connections must be made:

- connection with the tape laid next to the power cable;
- connection with neighboring buildings;
- connection to the main ground bus.

The elements for grounding and their installation and connection methods are defined by standards and technical regulations. The resistance to soil penetration of the grounding element is proportional to the specific soil resistance (ρ) and the coefficient that depends on the type of grounding element, its dimensions, and the depth of burial.

NOTE: The foundation grounding is installed during the construction of the facility. The track in the ground is laid in a tight corner, and "anchors" are created as close as possible to the ground to improve contact with the earth.

As the main grounding point for the facility, a single-phase (JS) bakery transformer is planned to be connected to a main switch in the main distribution cabinet, to which the following will be connected:

- connection to the foundation grounding with a FeZn 25x4 mm cable;
- main water pipe;
- main sewer pipe;
- low-voltage distribution cabinet;

- metal parts of thermomechanical pipes;
- elevator room and all other metal masses.

Interconnection of strips should be done with cross pieces of strips EN IEC 62305. The complete grounding assembly is provided following the valid Technical Regulations.

E Electrical Design – Low voltage

E1. Introduction

For the technical operation of the administrative facility of MoI on urban plot number 3b-33, within the scope of the DUP "Zagorič 3-4 zone 2", on lots no. 182/1 and 182/2, 182/3 and 182/4 K.O Podgorica II, the following low current installations were planned:

- **a)** Connecting to electronic communication infrastructure;
- **b)** Installation of SKS and audio-video presentation systems;
- **c)** Installation of video surveillance;
- **d)** Installation of access control;
- **e)** Installation of sound;
- **f)** Installation of fire alarm;
- **g)** Installation of an inergen fire control system.

During the design of this project, all relevant laws, regulations, standards, and recommendations have been observed.

E2. Connecting to electronic communication infrastructure

The connection of the facility to the access telecommunication infrastructure and the common KDS system should be carried out on the planned MASTER REK cabinets. The project envisages the creation of a cable network with PE pipes with a capacity of 2 x Ø 60 mm from the position of the MASTER REK cabinet to the planned TK shaft 1, all according to the conditions issued by the authorized institutions. Also, it is planned to lay 2x Ø 60 mm from the position of the MASTER REK cabinet towards the existing building. On that route, the installation of TK shaft 2 is planned, and the position is visible from the drawing.

Description of the cable box

The new cable shaft is 150x110x100cm with a cast iron cover. A planned TK shaft consists of a lower plate (bottom), sides (walls), upper plate (ceiling), and cover neck. The bottom plate is poured from concrete 15 cm thick, and in soils with weak load-bearing capacity 20 cm. The shaft sides (walls) can be made in several ways, made of concrete blocks, reinforced concrete, and made in combination. For experiential reasons, the Designer suggests making the walls of the planned shaft out of reinforced concrete. After the completion of the upper plate, the creation of the entrance to the shaft and the installation of the cover are started. The upper surface of the top plate is plastered with a cement mortar made of cement and sand in a ratio of 1:2 with a thickness of 2 cm so that the ceiling does not leak. The entrance should be built from concrete blocks or bricks with a wall thickness of 25 cm so that the inner sides of the entrance are level with the entrance opening in the slab (60x60 cm). The height of the entrance should be adjusted so that the installed iron frame with the cover is higher than the level of the surrounding terrain by 1 cm in the sidewalk, or 2 cm in the ground.

E3. Installation of SKS and audio-video presentation system

A structured cabling system is the foundation for the upgrading of an information system of a facility that should be in line with current, widely accepted standards that define this field. This means that, first of all, it is necessary to meet the need for a reliable, scalable, and modular network that will serve as a transmission medium for different types of communication. The basic advantage of structured cabling is the use of a single cabling system for all installations that transmit information in each frequency range. This includes voice, images, control signals, and very high-speed data transmission. In addition to its great flexibility, structured cabling provides a high level of reliability, makes it easy to manage the network, and allows for easy expansion of the installation. Because of this, it is also completely independent of the type of active devices used for telephony and computer networks.

As such, the realized computer/telephony network must be of the type Ethernet according to the standard IEEE 802.3, and the installation of cabling must follow the standards ANSI/EIA/TIA-568-B.2, 569, 570, 606, 607, and TSB-67.

To ensure adequate fire protection for evacuated individuals in case of a fire, all installed cables must comply with the requirements of fire protection category Dca-s2-d2-a1. Optical cables will terminate on the appropriate panel. All RJ45 computer/telephone outlets will be located at the appropriate height. The mentioned outlets will be provided by well-

known international manufacturers such as Legrand, Ave, Krone, and Panduit and will be tested to meet all criteria of category 6.

The REK cabinets will be connected on the second floor using a shared grounding system with a 1x16 mm^2 conductor.

F Mechanical installations - Sprinkler

F 1. Description of the installation

Sprinkler installation is one of the most effective installations for fire suppression. It is an automatic, stable fire sprinkler installation that sprays a stream of water to extinguish fires, which is activated in the prepared state and has closed nozzles that open at a predetermined high temperature and thereby start the automatic activation of the installation. The pipes that bring water to the nozzles are under constant water pressure. The fire is extinguished by a certain number of nozzles, depending on the spread of the fire.

In addition to extinguishing, when the sprinkler installation is activated, it simultaneously reports a fire by giving an alarm signal, because each sprinkler nozzle is also a thermomaximal fire detector.

F 2. Type of installation

A sprinkler installation with water has been selected as there is no possibility of freezing water in the pipes of the facility. The space for equipment storage is also protected from low temperatures.

Water in sprinkler pipes is constantly under pressure and flows to the location of the fire as soon as the sprinkler installation is activated.

F 3. The basic elements of the sprinkler installation

The sprinkler installation consists of the following elements:

- sprinkler pump;
- wet sprinkler alarm vent;
- pipe network;
- sprinkler nozzles;
- supply pipes;
- other supporting equipment.

F 4. Sprinkler ventilation station

In this room, there is a sprinkler vent with other supporting equipment and a pump for maintaining pressure in the sprinkler system, SiFire-FIRST-32/200-172-5,5EJ. This room is protected from low temperatures, and it represents a special fire-resistant sector able to withstand fire for 120 minutes.

The water reservoir needed for extinguishing is located outside the facility, under the ground. In addition, there is a sprinkler station also under the ground. The sprinkler station must be properly hydro isolated.

Signals from oval-shaped zones

Microcircuit breakers on these oval-shaped zones should give, within the system control and management or the system for alarming, a signal if the vent is not in the correct position.

Signal indicating a lack of water supply

The absence of the sprinkler vent cap indicates that the sprinkler vent cap has been raised, which can be a sign of a possible fire because the sprinkler vent cap may be slightly open due to the obstruction of the sprinkler vent cap. Due to this possibility, this signal is sent to the system for monitoring and management. This signal should trigger an internal alarm in the system for monitoring and management. Actions that must be taken must be appropriate for the state of the fire but without the functions of the fire protection center (e.g., closing the fire protection valves).

Signals of flow indicators

The flow indicator is a device that, because of the movement of water through a pipe (in one direction), establishes contact that is transmitted to the fire protection center. This signal is treated as a safe fire. The executive functions of the fire protection center must be adequate to the state of the fire.

The flow indicator is located on the horizontal section of the pipe, and the inlet pipe of the sprinkler station.

Fire truck connection

A fire truck connection is a connection that is located on the facade of the facility and is yet another measure of security, which allows the fire truck to be connected to the sprinkler system and thereby extinguish a fire. This additional measure of security is provided in case there is no water in the city's water supply.

Alarm wet sprinkler station

The alarm wet sprinkler station contains a non-return valve that is in a closed position due to equal pressures upward and downward from the valve. This balance of pressures is achieved through a balance valve, which equalizes these pressures. In the event of a fire, the sprinkler head opens. The pressure above the valve (downward) decreases, allowing the valve to open and release the required amount of water to the sprinkler heads.

Hydraulic alarm bell

During the raising of the sprinkler head valve, the hydraulic alarm bell is released upon obstruction of the water flow, giving an alarm. The entire installation, including all its elements, is shown in a technical scheme.

F 5. Network of supply and distribution pipes

The network of supply and distribution pipes has the basic function of connecting sprinkler heads to the water source, providing the necessary parameters - water quantity and pressure. It is made of black, smooth-walled pipes.

Cross-connections are made by joining pipes with reducers, and spigots are used for DN50 and smaller pipes. The ends of the main supply pipes are provided with tees for the discharge of air. The distribution pipes are laid at an angle towards the discharge points so that they can be emptied. The starting points of the main supply pipes are provided with shut-off valves for maintenance.

The uniformity of coverage of the protected area is influenced by the formation of the pipe network. The practical conditions and possibilities have determined the layout of the pipe network and its dimensions, depending on the construction and purpose of the facility. The maximum allowable pressure in the pipes is not to exceed the maximum of 10 bar.

F 6. Sprinkler nozzles

Sprinkler nozzles are an important component of sprinkler installation, as they activate the system. They open at a certain temperature and through their design allow for even distribution of water, spreading it evenly over the area that has been affected by a fire.

Sprinkler nozzles consist of the following parts:

- the body of the nozzle;
- a valve that is held in place by an ampoule filled with an expanding liquid (the valve opens when the temperature around the nozzle reaches 68°C);
- a deflector at the top of the body of the nozzle.

Sprinkler nozzles are installed with a deflector facing downwards (for a higher nozzle) in retracted ceilings, mounted on flexible pipes.

The minimum allowable pressure on sprinkler nozzles is Pmin = 0,50 bar.

F 7. Method of installation

The entire installation is filled with water under pressure. Each sprinkler at the end of its outlet has an ampoule that closes the opening. When the temperature reaches 68°C, the ampoule on the sprinkler bursts due to the expansion of the expanding liquid that is contained in it. In this way, the water outlet is opened.

Water hits the deflector and spreads in a circular pattern, covering the area being protected. If the first activated sprinkler nozzle does not manage to extinguish the fire and it spreads, the next sprinkler nozzles close to the fire are activated.

After the activation of the sprinkler nozzles, the pressure in the upper chamber of the sprinkler valve rises, and the valve flap is lifted. Water from the municipal water supply flows into the sprinkler nozzles. Through the pipe, the water enters the seat of the sprinkler valve.

The alarm valve is located on the wall of the sprinkler cabinet, at a height of about 2 meters from the floor. During the flow of water in the pipes, the flow indicator gives an impulse that is transmitted to the fire alarm center, which then gives an alarm signal that the installation is operating correctly.

F 8. Rapid supply of water to the sprinkler installation.

The proper and safe operation of the sprinkler installation depends on a reliable water supply, and enough with the required pressure during the time of extinguishing. Water supply must be reliable and not be affected by low temperatures. As an unlimited source of water, the reservoir is used, which is replenished by the water supply network. From the side of the water supply network, it is necessary to ensure a minimum pressure of 3.16 bar.

Since the provided water conditions do not provide sufficient pressure in the network, a pump is used for maintaining pressure, and a reservoir of water necessary for fire extinguishing in the event of a fire lasting 1 hour. The type of pump is SiFire-Easy-40/200-205-11/11EEJ or equivalent. The operating point of the pump is: flow Q=491,21l/min at a pressure of 32,45m

The reservoir has a volume of 36m³. The reservoir is replenished from the water supply through a valve with a plug. As an additional supply, there is a connection for a firefighting vehicle at the most convenient location near the facility, as shown in the Graphic Documentation.

G Mechanical installations - Thermotechnics

G 1. Technical description and explanation

Main Design of the heating installations of the Facility of Central Activities - Administrative Building of the Ministry of Interior, performed according to the project documentation, which is in line with the final architectural-construction solution, in accordance with the Law on Spatial Planning and Construction of Buildings (Official Gazette of Montenegro, No. 64/17 and 44/18); JUS, DIN and ASHRAE standards, and applicable regulations and recommendations for this type of installation.

In accordance with the project parameters for the Podgorica area: winter -6°C; summer +37°C, and relative humidity 28%, thermal losses, and gains have been calculated for the entire facility following the standard and using software INTEGRA, which is based on the standard EN 12831 for losses and thermal gains following the standard ASHRAE 1997.

G 2. Heating and cooling of the facility

Multi-system (VRV system)

For the heating and cooling of the facility, a thermal pump of the type freon/air (VRV system) has been installed next to the facility, in the most suitable location for the placement of the energy block equipment.

All floors are covered with VRV thermal pumps, and in the server room, two single split systems (one operational and one standby) of the type: AR18TXFCAWKNEU+ AR18TXFCAWKXEU. The heat exchangers and indoor units are manufactured by SAMSUNG or similar manufacturers. The external units are of the type AM100AXVAGH/EU, and the indoor units are of the type AM028AN4PKH/EU and AM015NNNDEH/EU.

This concept was chosen due to its optimal balance of predicted heating and cooling capacity for the entire facility. The VRF system (Variable Refrigerant Volume system) with freon R 410-A as the working fluid, which is not harmful to the ozone layer, has been selected as the heating and cooling system. This is the most advanced system in the field of air conditioning. The compressor is controlled by an inverter that, depending on the heat load of the facility, selects the most favourable speed of the compressor. Therefore, the cooling fluid is supplied to the indoor units with a variable volume flow, while the indoor units have an electronic expansion valve with an opening range of 0-120%. The external (compressor-condenser) unit has many degrees of capacity regulation, so it is possible that only one internal unit works in the system, and the external unit will achieve as much power as it needs through the inverter. This means that the completely installed electrical power for the outdoor unit is not engaged fully, but only as much power as needed to achieve the required thermal power on the indoor unit. This makes this system extremely energy efficient in terms of electricity consumption for its operation, i.e. exploitation costs.

External units are connected to internal units with bakelite tubes, according to the standard EN112735-1 and bakelite Y branches. Bakelite tubes are isolated with self-healing insulation from synthetic rubber with a thickness of 6-13 mm. The bakelite tubes are first installed from external units to the entrance of the building, then placed in protective PVC tubes with a diameter of Ø 110 mm, and then introduced into the building, where the tube network branches to individual internal units on each floor.

Internal units are connected to external units with two-wire communication cables (shielded), type LiY CY 2 x 1.50 mm². Each internal unit is addressed and, together with the external unit, forms a unique control system.

A detailed description is provided in the graphic documentation.

The heating and cooling of rooms are provided by cassette ceiling heating and cooling units. For all internal units of the system, it is intended to use MWR-WG00JN - Wireless controllers.

The system is designed and projected to regulate the temperature of the building during the summer season, while in the winter season, it also works very efficiently for heating rooms.

G 3. Drainage of condensate

The condensate from the internal units is discharged to the roof drains or, as agreed upon with the supervisory body, to the most convenient location. The condensate drain network is shown in the graphic documentation, and the horizontal plumbing network for condensate drainage is in the most convenient location. The pipes for condensate drainage are VP25 (OD 32, ID 25) and VP20 (OD 25, ID 20).

G 4. Ventilation of the building

Ventilation of the meeting room is planned with an air recuperator. For the distribution elements, aluminium grilles have been selected. The grilles for inserting air have horizontal-vertical louvers and a flow regulator. The protective grilles for air intake and exhaust ducts on the outer wall are designed in line with the graphic documentation.

The required amount of air for ventilation with the specified number of exchanges per hour is given in the budget documentation, and the air recuperator for both meeting rooms was selected based on it.

Recuperators are installed below the ceiling in line with the architectural design. The position, shape, dimensions, and length of the ducts with the amount of flow in each section are given in the budget section and the graphic documentation.

G 5. Ventilation of the toilets

Toilet ventilation is planned with TTMAX 250, TT MAX200, and ENPROWIND 100-type channel ventilators. Air is exhausted through AOV 100 air outlet and flows through circular spiral pipes to protective screens FPR-A 300x300 FPR-A; 250x250 and FPR-B Φ250 on the facade of the building.

The position, shape, dimensions, and flow rate in each section are provided in the budget section and the graphic documentation.

By selecting the appropriate heating, ventilation, and cooling methods, as well as choosing high-efficiency equipment, significant energy savings are achieved. This contributes to a significant reduction in energy consumption.

All items not described in the technical description are shown in the budget and graphic documentation and the specifications and installation instructions for equipment and installation.

H Mechanical installations - Inergen

Static automatic installation for fire extinguishing with Inert Gas NOVEC 1230 is designed for fire extinguishing in the Administrative building of the Ministry of Interior of Montenegro.

Batteries with the appropriate equipment will be placed in the rooms according to the agreement with the investors and representatives of each phase of the project.

Since there are ten rooms that need to be protected with inergen, we will have ten installations for automatic fire extinguishing:

Ground Floor

- room no. 20 – Reck room
- room no. 18 – Archives

First Floor

- room no. 04 – Archives
- room no. 26 – Archives
- room no. 18 – Reck room

Second Floor

- room no. 26 – Archives
- room no. 25 – Archives
- room no. 28 – Archives
- room no. 27 – Archives
- room no. 29 – Reck room

The calculation of all systems was done by system simulations.

Modern fire protection has set a requirement that the inergen will be the gas of the future, that it serves for the protection of material goods, the protection of human lives, and that it doesn't pollute the environment. The new gas that meets the fire protection quality test and fulfils all three criteria is Inert gas NOVEC 1230.

H 1. System description

The VSN 1230 fire extinguishing system with Novec™1230 fire extinguishing agent offers optimal fire protection and is particularly suitable for electrical and electronic risks. The system consists of one or more extinguishing cylinders, which are connected by piping to extinguishing nozzles. The design of the system is adapted to fire hazards and spatial conditions. Immediately after the fire detection system automatically recognizes a developing fire, the fire extinguishing system is activated. After a short warning time, the fire extinguishing cylinders are released - and the calculated concentration of the fire extinguishing agent is achieved in the protected room after 10 seconds. Novec™1230 residue-free extinguishing agent has high extinguishing efficiency and environmental compatibility (Global Warming Potential GWP = 1, Ozone Depletion Potential ODP = 0).

Additional advantages are its high personal safety and small storage volume.

Novec™ 1230 extinguishing agent does not have sufficient vapor pressure to ensure complete and effective flooding of the protected space. To achieve the desired system pressure, the extinguishing agent is therefore pressurized with nitrogen to the intended system pressure of 25, 42, or 50 bar.

Novec™ 1230 extinguishing agent used in VSN 1230 fire extinguishing systems is a liquid that looks like water but does not damage computers or books.

Novec™ 1230 is a chemically defined fluorinated ketone. Since the extinguishing agent does not conduct electricity, it does not cause short circuits in electronic devices. For example, a computer monitor works perfectly when it is in this liquid.

Novec™ 1230 is non-corrosive and leaves no residue - even the paper dries again in a short time without damage. For this reason, it is optimally suitable for use in areas with electrical and electronic equipment (EDP centers, computer rooms, telecommunications, and server rooms, switching and distribution rooms, and similar applications).

H 2. High personal safety Novec™ 1230

While the extinguishing effect of inert gases is based on the reduction of oxygen, Novec™ 1230 absorbs the heat of the flame and thus stops the combustion reaction. Due to the commonly used working concentration of Novec™ 1230, the oxygen concentration in the flooded room is still approx. 19% by volume. Furthermore, the working concentration of 5.8 % by volume is also far below the NOAEL value of 10%, from which according to research no damage to persons from Novec™ 1230 can be recognized. Therefore, Novec™ 1230 is a safe gas, especially for use in inhabited premises.

H 3. Environmental impact Novec™ 1230

Unlike halon, which was often used in earlier times, it decomposes in the atmosphere within five days, when exposed to natural UV radiation.

Novec™ 1230 is an ecologically compatible alternative to the chemical extinguishing agents used so far. It has the lowest global warming potential, and the shortest lifetime in the atmosphere, and does not affect the ozone layer at all.

After numerous research and according to current knowledge, Novec™ 1230 is not subject to sanctions regarding climate regulations.

The manufacturer 3M™ supports this with a purchase guarantee for the announced systems if there is a ban due to climate regulations.

Control of the filling of bottles with inert gas is carried out through contact pressure gauges located on each bottle.

Inert gas cylinders, as well as associated valves, fittings, and other structural elements, must be placed in a ventilated area that is not exposed to any fire hazard, physically separated from the protected premises, but easily accessible, even in the event of a fire. The wall used to fasten the modular bottle must be reinforced concrete or brick.

This project defines the area of the openings for the placement of the overpressure relief valves in the space that is protected from fire in the system simulation for each system.

The dampers are fire resistant for 120 min. mechanical (self-elevating) adjusted to the permissible overpressure after releasing the gas from the bottle and amounts to a maximum of 100 Pa and are usually installed in a wall that gravitates towards, for example, a corridor, vestibule, facade.

The ventilation of the room where the batteries of bottles with sector valves are located was processed through the air conditioning and ventilation project.

Immediately before opening the valve to release the gas, the fire control panel turns off the ventilation of the area being extinguished to prevent the gas from escaping through the ventilation ducts.

A siren has been installed in the extinguishing sector to alert the staff.

By pressing the switch-off lock button, within 30 seconds, it is possible to temporarily delay the automatic switch-off operation.

For all systems, mains voltage is the main power supply, while backup power systems are batteries with the necessary equipment for assembly and connection. Accumulator batteries are 12 V with a capacity of 7.0 Ah.

I Main landscape design

Building the green area

To build a functional green area, it is necessary to carry out all work positions in accordance with the project, technical description, preliminary measurements, valid technical regulations and standards, as well as the instructions of the supervisory authority and the designer. During work it is mandatory to hire appropriate professional and qualified workforce.

Preparatory works

Preparatory works include cleaning the terrain from all admixtures of organic and inorganic mass: rubble, weeds and other undesirable substances.

As part of the preparatory work, mark the positions of all planned types of trees, bushes, and feathers. The contractor should transfer the project to the field by using coloured stakes or other markings from the planting plan to transfer them to the field of the planting site.

Before filling the fertile soil, clear the terrain and mechanically remove the top layer of 30 cm of soil and take it to the landfill, then level the terrain.

Earthworks

Fill the fertile humus soil in a layer of 30 cm on the free areas intended for greening. The earth that is being filled and which represents a medium for the active growth and development of plant roots must have good structural, textural properties and an appropriate humus content. Backfilling is planned in layers of 10 cm with settlement of the individual layer before filling the next one. When spreading, make a rough levelling of the terrain.

Planting

Use standard container-type seedlings, well-nourished in the nursery, phytosanitary neat, with a symmetrical and properly formed habitus.

Trees should be planted in planting pits with a circular section and a cylindrical shape, which are at least 30% larger than the sod of the seedling. Remove rubble and other harmful ingredients from the pit. Around the sod, pour a mixture of fertile humus soil, peat fertilizer and sand in a ratio of 6:3:1. The soil around the sod is added carefully, removing "air pockets". Avoid excessive soil compaction. After planting the seedlings, water them well and anchor them.

Tree anchoring should be done using underground anchors using the anchoring trees method.

Shrubs, ferns and ground covers should also be planted in pits with a circular section, the dimensions of which are min. 30% larger than sod seedlings.

The amount of water for watering varies depending on the period when planting is carried out, but it can be considered that for trees after planting it is necessary to use 40-50 liters per tree, while for hedge seedlings it is recommended 15-20 liters per m2 of planting. When watering, also pay attention to the settlement of the sod, so that it does not bend.

Tree anchoring system

Tree anchoring is provided by underground anchoring with the "Greenleaf Arborguy" system. This system ensures safe fixing of the sod of tree seedlings and is provided in different dimensions in relation to the size of the seedling or the size of the sod. Planned equipment for sodding an individual tree: 3 x S41 anchors, 4m of galvanized wire, 1x tensioner on both sides, 3x Plati-net. The advantages of this system are easy installation and a completely underground system, which does not damage the aesthetic appearance of the designed green area.

Divider mouldings

To separate grass areas and areas under decorative pebbles, dividing strips made of hard plastic are used. Border guards are imperceptible because they are covered with earth. Deco uni stops or equivalent product are planned.

Curbs are placed on the base and are connected to each other with grooves that are specially cutted into them. Planned curbs can be cut to arbitrary lengths with common tools.

Mulching

On the areas marked in the project, it is planned to install decorative white sand, granulation 16-32 mm, in a layer of 5 cm, as an inorganic mulch and decorative element.

A geotextile is placed under the mulch, the main purpose of which is to prevent the growth of weed plants.

The layer of mulch protects the soil from excessive drying, does not allow the development of weed plants, and the soil maintains a loose structure.

Formation of lawns

When creating a lawn, milling, rough and fine planning should be done before sowing. Sow the grass mixture in calm weather (no wind), manually in two cross directions. Cover the seeds easily with a rake, then roll with a light wooden roller and moisten with a fine stream of water. Use 40 g of seed mixture per 1m2. The grass varieties most suitable for warm and dry climate conditions (Mediterranean; Mediterranean & Fun) are suggested.

Green maintenance

Care and maintenance measures for tree rows include:

- pruning bushes in order to maintain the desired height, shape and rejuvenation
- fertilizing planting material with mineral fertilizer 3 times a year (in March, end of April and end of May)
- weeding
- addition of substrate and mulch in case of erosion
- regular watering of seedlings and lawns
- regular mowing and raking of the lawn
- health status monitoring and application of protective measures in case of disease and insect attacks.

Investment maintenance of buildings during construction until technical acceptance amounts to 20% of the amount for greening. The nature of the work is such that maintenance of the planted material should be started at the very beginning of the work, and the specified percentage is used to provide funds for maintenance until the acceptance of the work.

The contractor's obligation is, that if defects appear within the warranty period due to unprofessionally performed works or low-quality planted plant material, to remove them at his own expense.

The rule is that the length of the guarantee period for greening works is determined for a duration of 1 year (one vegetation period), counting from the date of acceptance of the works, because in this period all possible defects are manifested.

J Demolition of existing buildings

The existing facility in the area of the "Zagorič". The exact year of construction is not known but based on the used materials, it can be assumed that the construction period was somewhere between the 1970s and 1980s. The building served as an office building in the private sector and is currently owned by Montenegro, at the disposal of the Government of Montenegro. Management of the building is under the Ministry of Internal Affairs, according to the property list.

This part of the building was built from materials that were current in that period, with brick walls and foundations of reinforced concrete.

The building has a rectangular base with dimensions of 48.30 x 10.60 m. The building is a single-floor unit, and it's covered with a gable roof on a wooden structure. The roof covering is made of salonit boards.

The building is functionally divided into several units. Partition walls are also made of brick.

There is a concrete access area on the entrance side of the building, while there is no sidewalk on the other three sides.

The building is currently in a state of disrepair, the roof covering is damaged, the facade cladding is cracked, and the windows have broken glass. The entrance door is covered with a trapezoidal sheet.

The works include activities for the removal of the building on the first floor. parc. no. 181/1 KO Podgorica II.

Removal of the object will be carried out manually and mechanically. The manual part refers to removing furniture from the building, disassembling locksmithing, carpentry, electrical installations and equipment, plumbing installations, and equipment.

Following activities are planned:

- removing furniture from the object;
- disconnect the facility from the water supply network;
- perform the disconnection of the facility from the electrical network and the reconstruction of the existing connection from the electrical distribution system by CEDIS experts;
- removal of salonit panels from the roof;
- demolition of the wooden roof structure;
- mechanical removal of construction walls;
- mechanical loading with an excavator and removal of destroyed material to a previously defined location;
- final cleaning of the plot with removal of selected materials, construction rubble and other materials to the landfill.

Mechanical removal of the facility will be performed by the contractor with construction machinery, namely a crawler excavator with a boom equipped with various attachments (hammer, scissors...) depending on the operation it is performing, in addition to the excavator, a loader, tipper truck, grinders and other accompanying small tools will be in operation.

Before starting the works on the removal of the object, it is necessary to ensure the following conditions:

- The investor is obliged to hand over the empty building, without tenants and their movable property, to the contractor, which is confirmed in minutes before the start of the works;

- The investor is obliged to hand over to the contractor the facility for removal that is disconnected from the utility networks, which is confirmed in the minutes before the start of the works. Overhead and underground lines in the immediate area of the works must be visibly marked, safely protected or relocated. The investor, if necessary, and at the request of the contractor, must ensure the presence of a responsible person from the utility company who will direct the contractor to the possible presence of installations.