

# A) Bicycle point in Bezdan

## 3.1.1. TECHNICAL DESCRIPTION OF THE ARCHITECTURAL WORK

Based on the request of the investors of the City of Sombor, Sombor, Trg Cara Uroša 1, recording on the ground, as well as the applicable regulations and norms for the design and construction of this type of object, a preliminary design for a rest area for cyclists - public toilet with a canopy, floors P + 0 , on cadastral parcel no. 3135/1 K.O. Bezdan. The purpose of the property is a public restroom. The facility is located along cadastral parcel 3136 K.O. Bezdan, along the Channel.

Regulation Line RL is located on the east side of lot boundary No. 3136 K.O. Bezdan. Planned construction, is envisaged at 1.00 m from the regulation line of RL plot 3136 K.O. Bezdan. The building is rectangular in size and has a maximum dimensions of 5.50m x 3.00m, set on a plateau max. dimension 6.50x4.20m. It is away from the adjacent cadastral parcel No.3279 / 4, about 7.40m.

The building is made of steel construction, mounted on a reinforced concrete slab. The walls are made of insulated panel panels. The roof structure is a steel girder and the cover is a thermo-insulated panel.

The floors of the building are made of ceramic tiles. The toilets are made of stainless steel.

Two toilets with showers are planned. The toilet has two cabins, each with a toilet, sink and shower.

The facility provides for the installation of water and sewerage installations. Connect the water supply system to the existing water supply system. Connect sewage installations to a watertight septic tank. The pipeline of the water supply connection on the basis of the required capacities will be constructed from PPR - fluidterm water pipes, diameter DN 20mm. The connection point is an existing connection, using appropriate fittings. Internal sewage is provided by PVC sewage pipes according to hydraulic calculation. The sewer vertical in the toilet shall be Ø 110 mm in diameter.

The facility is intended to be connected to an existing el. installation. The electrical installation project involves the installation of lighting, sockets and thermal consumers.

The contractor is obliged to perform the work with a certified workforce, and to provide certificates and certificates for the installed equipment and materials.

### INSTALLATIONS IN THE FACILITY

Plumbing and sewerage installations, as well as electricity installations are foreseen from the facility's installations.

### 3.1.2. TECHNICAL DESCRIPTION OF HYDRAULIC INSTALLATIONS

Based on Location Conditions, under number 353-27 / 2017-V, dated 28.02.2017. and Technical information from the Public Utility Company "Vodovod" Bezdan, under No. 7/2017, dated 28.02.2017. No. 3135/1 KO Bezdan, on which the construction of the object is planned, there is a plumbing installation of the settlement water supply system, but on the other side of the asphalt surface, it is necessary to drill under the road. There is no possibility of constructing a connection to the street sewage at this location, because it does not exist in a populated place.

The planned construction consists of a ground floor with two toilets and one canopy. The need for hot water has toilets with shower, toilet and sink.

The supply of hot water will be done by a local water heater, which will be located in one of the cabins.

#### INTERNAL WATER INSTALLATION

All sanitary appliances will be supplied with water from the connection, which can be carried out to the existing shaft near the object concerned, which serves to flush the settlement water supply network, and through the designed water meter in the water shaft of the projected connection near the projected object.

The home water supply network is provided by PPR water pipes - fluidterm of suitable diameter. The plumbing verticals in the building are made visible along plasterboard partition walls. The verticals are positioned so that all the sanitary fittings in the cabins are easily connected to the supply pipeline.

Horizontal branches of hot and cold water are placed prominently on the wall. Under each sanitary appliance there is a leak valve, which can be disconnected from the water supply if necessary. Each plumbing vertical ends with a leak valve with a drain tap. From the vertical, the horizontal distribution of the pipeline is done in the ground floor. The horizontal water distribution line connects to the existing water meter in the water well on the plot of the local community building.

There is one type of water consumer in the facility. According to the terms of the Public Utility Company "Vodovod", the Abyssal Water Meter will be located in the designed water manhole, which will be located in the yard of the building at 1.0m from the control line towards the street. The dimension of the water mains pipeline is determined by hydraulic calculation through "BRIX" tables, resulting in a connection pressure of about 3 bar, which can be considered as the prevailing pressure in the street water supply (according to 2.5 - 3.5 bar conditions). The meter is mounted on a concrete base in the manhole floor in the water shaft.

The water supply network in the designed facility of the resort for cyclists with toilet and canopy is provided as one unit and with one connection to the existing street water supply.

The load calculation of the water supply network by consumers has been done.

#### NUMBER OF SANITARY APPLIANCES

No..	Devices	pcs.	Unit of load	TOTAL unit of load
1	WC	2.00	0.25	0.50
2	washbasin	2.00	0.50	1.00
3	shower tub	2.00	1.00	2.00
			TOTAL unit of load.	3.50

Water consumption at the cycling resort requires a DN20mm water pipe.

For load: 3.50 unit of load.  $\rightarrow q = 0.468 \text{ l / s}$ .

The connection point to the existing line in the water well is made with appropriate fittings.

#### EXTERNAL INSTALLATION OF WATERWAY WITH STREET WATER

To supply water for the planned construction, the existing water well will be used to flush the street water pipe located near the building on the opposite side of the pavement, and pavement paving must be done. The connection is in the water well. The water supply pipeline is made of PPR - fluidterm water pipes, DN 20mm in diameter. The pipes run into a trench approximately 1.20-1.30m deep in sand. The connection point is in the designed water well, using the appropriate fittings. Rinsing and disinfection must be carried out before commissioning the pipeline

#### INTERNAL SEWER INSTALLATION

Internal sewage is provided by PVC sewage pipes according to hydraulic calculation. The sewer vertical in the bathroom of the building will be  $\phi 110$  mm in diameter, and will be placed in a slotted wall.

Horizontal branches from the vertical to the individual sanitary units on the ground floor run at the ground floor. The slope of the pipeline is 1.5% vertically. Each sewer line runs through the roof outside the building as a ventilation line and ends with a ventilation cap.

In all places in sewer pipelines where verticals cross into the horizontal part (cascades inside the building as well as cascades on the façade wall) - a fitting piece must be installed to allow intervention in possible congestion of the pipeline.

#### EXTERNAL SEWER INSTALLATION

For drainage of used water, a sewerage network is designed, which through the projected audit shafts is led outside the facility through the main drainage system with the possibility of pouring into the designed watertight septic tank on its own plot, at 5.0m from the designed facilities. The newly designed sewer is made of PVC sewer pipes with a diameter of 160 mm and drops 1.5% according to the budget. The inspection manholes are located on a common parcel of this facility and have a cast iron lid for medium-heavy traffic.

#### MAIN HOUSEHOLD ARRANGEMENT FOR DESIGNED BUSINESS AND RESIDENTIAL BUILDING

TYPE OF SANITARY ACCESSORIES	N	K	N * K	P	qn	Q (l / s)	
Washbasin	2.00	0.50	1.00	19.80	0.17	0.07	
Bathtub		2.00	2.00	4.00	19.80	0.67	0.27
WC	2.00	6.00	12.00	19.80	2.00	0.79	
					TOTAL: 1.12		

Considering that the flow from the device in the project construction of the facility is 1.12l / s, it is concluded that the existing adopted tube per KUTER fi 160 mm for filling 0.70 D and a drop of 1.5% misses  $q = 38.40 \text{ l / s}$  with a flow rate  $v = 1.41 \text{ m / s}$ . For sanitary facilities in the facility, a drainage was made through the designed watertight septic tank, and through the audit shafts, which is located directly next to the designed facility, and in all according to the conditions obtained from PUC "Vodovod" Beždan.

## **APPENDIX MEASURES OF PROTECTION**

Special Contribution on Possible Hazards and Measures for Hazard Elimination Measures Regarding Water Supply and Sewer Installations for the Construction of Cycling Resorts, Floors P + 0

- water supply is solved by connection to the existing connection to the city water supply network
- Wastewater is piped into a designed watertight septic tank
- atmospheric water is fed into the absorbent well, the green areas and the city's atmospheric sewage system.

### **POSSIBLE HAZARDS:**

1. Environmental pollution by wastewater
2. Leakage of plumbing installations in the building due to inadequate sealing of the joints on the network and water pollution in the pipes
3. Not placing audit pieces in places where congestion can occur
4. No prediction of disinfection and bacteriological analysis of water
5. Flooding the room when repairing an installation or equipment
6. Pouring of visible water pipes
7. Network dirt
8. Sewer congestion
9. Creating puddles on the floor of wet rooms from spilled water
10. Collection and disposal of organic gases in sewage
11. Sewage shedding and leveling breakage
12. Lack of sewage at joints
13. Fire occurrence

### **MEASURES FOR THE FOLLOWING OF THE FOLLOWING HAZARDS AND DAMAGES:**

1. Waste water from the facility is discharged through sewage pipes, inspection shaft in the direction of the street sewer network. The verticals for the ventilation of the sewer network were designed.
2. It is envisaged that the pipe network shall be tested for watertightness before use, as well as the possibility of closing individual branches of the water supply network.
3. When designing it is necessary to install audit shafts in the necessary places.
4. Before commissioning, it is necessary to disinfect the tubing net as well as bacteriological analysis of water, which should be recorded.
5. A leakage valve shall be provided in front of each spillway to shut off the spillway
6. Water pipes are visibly attached to the walls or snakes by the ceiling of the shells
7. Before giving the network to the used ones, the network is disinfected according to the instructions of the sanitary inspector

8. The sewage system is dimensioned with optimum profiles and lows, so that no specific congestion occurs in the concrete drains.
9. A drainage basin is provided in rooms where water may spill or frequently need to be washed
10. All drains are connected to the sewer via a water-tight siphon
11. Sewage is packed in a layer of sand and well packed with excavated soil
12. The project envisages PVC pipes connecting to the sleeve with a sealing rubber band
13. Dry fire extinguishers were installed in the premises for fire fighting

**MEASURES THE INVESTOR NEEDS TO IMPLEMENT:**

Regular maintenance of the network as sewage treatment in sewage shafts.

### **3.1.3. TECHNICAL DESCRIPTION OF ELECTRICAL INSTALLATIONS**

#### **ELECTRIC POWER SUPPLY**

Power is supplied from the new OMM measuring cabinet located on the GR Mixed Water Pillar on Kanalska Obala Street. OMM is of the type POMM-1. The electricity consumption is measured by a new single-phase meter.

OMM production is subject to electricity distribution.

A new polyester switchboard RT with a FID 25 / 0.03A safety switch and automatic fuses will be installed in the new restroom facility.

The PP00-Y 3x2.5mm<sup>2</sup> power cable will be laid underground through a PVC pipe from OMM to RT.

#### **ELECTRICAL INSTALLATION**

Electrical installation includes the installation of lighting, sockets and electric heaters. The cables are laid on the wall under the plaster. Lighting is performed by LEDs and switched on by motion sensors. Both toilets will be fitted with electric heaters that are switched on via a thermostat and should prevent freezing at low temperatures.

Lighting installation and socket are 1.5mm<sup>2</sup> in cross section, thermal consumers sockets are 2.5mm<sup>2</sup> in diameter.

Conductors are laid exclusively horizontally or vertically. Horizontal conductors are laid in the upper zone up to 30cm below the ceiling and the lower zone up to 50cm above the floor.

The lamps, like the sockets, are marked with the number of the corresponding circuit.

#### **INDIRECT TOUCH PROTECTION**

The distribution system of the LV network is TT. In the installation, a protective conductor is installed as the 5th and 3rd cores of cables. ZUDS switches are provided as additional protection against indirect contact in apartments with a sensitivity of 0.03mA, which in case of earth fault disconnects the installation from the mains voltage.

All conductors contain a protective conductor that is yellow-green in color. All metal masses / EXPOSED CONDUCTORS / which are not normally energized / electric cooker, boiler and others / must be connected to the protective conductor.

#### **ELECTRICAL INSTALLATION EXAMINATION AND TESTING**

Inspection and testing of the completed electrical installation shall be carried out in accordance with the following regulations:

- " Law on Safety and Health at Work " - Official Gazette of the RS No 113/2017 "
- " Rulebook on the Procedure for Inspection and Testing of Personal Protective Equipment Installation, Means and Equipment "
- Official Gazette of RS no. 7/99,
- " Ordinance on technical standards for low voltage electrical installations " Fig. SFRY Gazette No.28 / 95,

Testing includes:

- Measurement of earth resistance,

- Checking the functionality of the protection against indirect touch,
  - Measurement of conductor insulation resistance,
  - Check continuity of protective conductors and conductors for equalization of potentials.
- Inspection and testing can only be carried out by an authorized company

## **TECHNICAL CONDITIONS**

1. These technical requirements are an integral part of the project and as such oblige the investor and contractors when constructing the facility.
2. Electrical installation must be performed according to text and graphics part of this project and applicable regulations.
3. All changes and deviations from the design, both in terms of technical solution and in the selection of materials, must be approved by the designer.
4. All material to be installed must meet the standards and be of first-class quality.
5. All professional work must only be carried out by the technician when designing, testing and commissioning.
6. All works and procedures not described in detail in the project shall be performed in accordance with the relevant technical rules and apply the correct technical solutions and appropriate regulations.
7. Energy power cables must be uninterrupted (not adjusted) and tested.
8. Water lines shall be cut only after the actual length is determined on the spot according to the definitive disposition of the equipment and the connection point.
9. Cables and installation wires laid in wall installation pipes or cables laid directly in mortar must be run vertically and (or) horizontally so that they are parallel to the edges of the room.
10. Laying of cables through a wall or a floor is done through pipes which are pre-installed.
11. When laying cables, care must be taken not to damage them. Where the cables change direction, slight bends must be made whose radius must not be less than fifteen times the diameter of the cable.
12. Cables laid directly under the mortar and into the wall must be covered with a 4 mm thick mortar throughout the length.
13. When parallel lines are laid, the distance between the two lines must be at least 10 mm.
14. Wires run horizontally 30 cm from the ceiling and at least 200 cm above the floor.
15. Insulated wires and cables must not continue in installation pipes and ducts.
16. Connection and continuation of lines is only permitted in junction boxes with appropriate couplings.
17. Electrical power installations must be separated from low-voltage installations by all their parts. Horizontal laying of lines must be 10 cm from the ceiling, with a distance of 20 cm from the power lines. should be made at right angles with a distance of 10 mm, otherwise install an insulating cartridge 3 mm thick.
18. They will place the switches 1.5 m from the floor next to the door on the side where they open.
19. Place the sockets at a height of 0.4-0.8 m from the floor (not 1 m from the floor).
20. In each circuit, the neutral conductor must be different in color from the phase conductors.
21. The protective conductor should be yellow-green in color.
22. The yellow-green conductor must not be used for any purpose other than protection.
23. Installation of junction boxes shall be carried out at a minimum distance of 6 cm or in accordance with special circumstances.
24. Through one installation junction box, wires from different circuits cannot be installed.
25. Switches and fuses shall only be installed in phase conductors.
26. It is forbidden to break the zero and protective conductors

## **B) Bicycle point in Sombor**

### **3.1.4. TECHNICAL DESCRIPTION OF THE ARCHITECTURAL WORK**

Based on the request of the investors of the City of Sombor, Sombor, Trg Cara Urosa 1, shooting on the ground, as well as the applicable regulations and norms for the design and construction of this type of facility, a preliminary design for a rest area for cyclists - public toilet with a canopy, floors P + 0 , on cadastral parcel no. 3279/1 K.O. Sombor-1. The purpose of the property is a public restroom. The facility is located next to the premises of the Local Community "Gornja Varos", at XII Vojvodina Strike Brigade No.57.

Regulation Line RL is located on the south side of lot boundary No. 10145 K.O. Sombor-1. The planned construction is planned at 2.70m from the RL control line. The building is rectangular in size and has a maximum dimensions of 5.50m x 3.00m, set on a plateau max. dimension 6.50x4.20m. It is away from the adjacent cadastral parcel No.3279 / 4, about 7.40m.

The building is made of steel construction, mounted on a reinforced concrete slab. The walls are made of insulated panel panels. The roof structure is a steel girder and the cover is a thermo-insulated panel. The floors of the building are made of ceramic tiles. The toilets are made of stainless steel.

Two toilets with showers are planned. The toilet has two cabins, each with a toilet, sink and shower. The facility is intended to be connected to an existing el. installation. The electrical installation project involves the installation of lighting, sockets and thermal consumers.

The contractor is obliged to perform the work with a certified workforce, and to provide certificates and certificates for the installed equipment and materials.



### 3.1.5. TECHNICAL DESCRIPTION OF HYDRAULIC INSTALLATIONS

#### INSTALLATIONS IN THE FACILITY

Plumbing and sewerage installations, as well as electricity installations are foreseen from the facility's installations.

Based on Location Conditions, under number 353-26 / 2017-V, dated 27.02.2017. and Technical information from: Public utility company "Vodokanal" Sombor, under number 04-18op / 008-2017, dated 23.02.2017. parcel number 3279/1 KOSombor-1, which are designed as a whole to the existing water connection of the owner of the Municipality of Gornja Varos Sombor.

The planned construction consists of a ground floor with two toilets and one canopy. The need for hot water has toilets with shower, toilet and sink.

The supply of hot water will be done by a local water heater, which will be located in one of the cabins.

#### INTERNAL WATER INSTALLATION

All sanitary appliances are supplied with water from the existing water supply system through the existing water supply connection in the facility of Gornja Varoš Sombor MZ, to the city water supply network in the existing water supply shaft.

The home water supply network is provided by PPR water pipes - fluidterm of suitable diameter. The plumbing verticals in the building are made visible along plasterboard partition walls. The verticals are positioned so that all the sanitary fittings in the cabins are easily connected to the supply pipeline.

Horizontal branches of hot and cold water are placed prominently on the wall. Under each sanitary appliance there is a leak valve which can be disconnected from the water supply if necessary. Each plumbing vertical ends with a leak valve with a drain tap. From the vertical, the horizontal distribution of the water pipeline is done in the ground floor. The horizontal distribution line is connected to the existing water meter in the water well on the plot of the local community building.

There is one type of water consumer in the facility. According to the terms of the Public Utility Company "Vodokanal", Sombor water meter exists and is located in the existing water manhole, which is located in the yard of the building at 1.0m from the control line towards the street XII of Vojvodjanska strike brigade. The dimension of the water mains pipeline is determined by hydraulic calculation through "BRIX" tables, resulting in a connection pressure of about 3 bar, which can be considered as the prevailing pressure in the street water supply (according to 2.5 - 3.5 bar conditions). The meter is mounted on a concrete base in the manhole floor in the water shaft.

The water supply network in the designed facility of the resort for cyclists with toilet and canopy is provided as one unit and with one connection to the existing street water supply.

The load calculation of the water supply network by consumers has been done.

#### NUMBER OF SANITARY APPLIANCES

No..	Devices	pcs.	Unit of load	TOTAL unit of load
1	WC	2.00	0.25	0.50
2	washbasin	2.00	0.50	1.00
3	shower tub	2.00	1.00	2.00
			TOTAL unit of load.	3.50

Water consumption at the cycling resort requires a DN20mm water pipe.

For load: 3.50 unit of load.  $\rightarrow q = 0.468 \text{ l / s}$ .

The connection point to the existing line in the water well is made with appropriate fittings.

#### EXTERNAL INSTALLATION OF WATERWAY WITH STREET WATER

To supply water for the planned construction, the existing water well will be used to flush the street water pipe located near the building on the opposite side of the pavement, and pavement paving must be done. The connection is in the water well. The water supply pipeline is made of PPR - fluidterm water pipes, DN 20mm in diameter. The pipes run into a trench approximately 1.20-1.30m deep in sand. The connection point is in the designed water well, using the appropriate fittings. Rinsing and disinfection must be carried out before commissioning the pipeline

#### INTERNAL SEWER INSTALLATION

Internal sewage is provided by PVC sewage pipes according to hydraulic calculation. The sewer vertical in the bathroom of the building will be  $\phi 110$  mm in diameter, and will be placed in a slotted wall.

Horizontal branches from the vertical to the individual sanitary units on the ground floor run at the ground floor. The slope of the pipeline is 1.5% vertically. Each sewer line runs through the roof outside the building as a ventilation line and ends with a ventilation cap.

In all places in sewer pipelines where verticals cross into the horizontal part (cascades inside the building as well as cascades on the façade wall) - a fitting piece must be installed to allow intervention in possible congestion of the pipeline.

#### EXTERNAL SEWER INSTALLATION

For drainage of used water, a sewerage network is designed, which through the projected audit shafts is led outside the facility through the main drainage system with the possibility of pouring into the designed watertight septic tank on its own plot, at 5.0m from the designed facilities. The newly designed sewer is made of PVC sewer pipes with a diameter of 160 mm and drops 1.5% according to the budget. The inspection manholes are located on a common parcel of this facility and have a cast iron lid for medium-heavy traffic.

#### MAIN HOUSEHOLD ARRANGEMENT FOR DESIGNED BUSINESS AND RESIDENTIAL BUILDING

TYPE OF SANITARY ACCESSORIES	N	K	N * K	P	qn	Q (l / s)	
Washbasin	2.00	0.50	1.00	19.80	0.17	0.07	
Bathtub		2.00	2.00	4.00	19.80	0.67	0.27
WC	2.00	6.00	12.00	19.80	2.00	0.79	
					TOTAL: 1.12		

Considering that the flow from the device in the project construction of the facility is  $1.12 \text{ l / s}$ , it is concluded that the existing adopted tube per KUTER  $\phi 160$  mm for filling 0.70 D and a drop of 1.5% misses  $q = 38.40 \text{ l / s}$  with a flow rate  $v = 1.41 \text{ m / s}$ . For sanitary facilities in the facility, a drainage was made through the designed watertight septic tank, and through the audit shafts, which is located directly next to the designed facility, and in all according to the conditions obtained from PUC "Vodovod" Beždan.

#### APPENDIX MEASURES OF PROTECTION

Special Contribution on Possible Hazards and Measures for Hazard Elimination Measures Regarding Water Supply and Sewer Installations for the Construction of Cycling Resorts, Floors P + 0

- water supply is solved by connection to the existing connection to the city water supply network
- Wastewater is piped into a designed watertight septic tank
- atmospheric water is fed into the absorbent well, the green areas and the city's atmospheric sewage system.

#### **POSSIBLE HAZARDS:**

1. Environmental pollution by wastewater
2. Leakage of plumbing installations in the building due to inadequate sealing of the joints on the network and water pollution in the pipes
3. Not placing audit pieces in places where congestion can occur
4. No prediction of disinfection and bacteriological analysis of water
5. Flooding the room when repairing an installation or equipment
6. Pouring of visible water pipes
7. Network dirt
8. Sewer congestion
9. Creating puddles on the floor of wet rooms from spilled water
10. Collection and disposal of organic gases in sewage
11. Sewage shedding and leveling breakage
12. Lack of sewage at joints
13. Fire occurrence

#### **MEASURES FOR THE FOLLOWING OF THE FOLLOWING HAZARDS AND DAMAGES:**

1. Waste water from the facility is discharged through sewage pipes, inspection shaft in the direction of the street sewer network. The verticals for the ventilation of the sewer network were designed.
2. It is envisaged that the pipe network shall be tested for watertightness before use, as well as the possibility of closing individual branches of the water supply network.
3. When designing it is necessary to install audit shafts in the necessary places.
4. Before commissioning, it is necessary to disinfect the tubing net as well as bacteriological analysis of water, which should be recorded.
5. A leakage valve shall be provided in front of each spillway to shut off the spillway
6. Water pipes are visibly attached to the walls or snakes by the ceiling of the shells
7. Before giving the network to the used ones, the network is disinfected according to the instructions of the sanitary inspector
8. The sewage system is dimensioned with optimum profiles and lows, so that no specific congestion occurs in the concrete drains.
9. A drainage basin is provided in rooms where water may spill or frequently need to be washed
10. All drains are connected to the sewer via a water-tight siphon
11. Sewage is packed in a layer of sand and well packed with excavated soil
12. The project envisages PVC pipes connecting to the sleeve with a sealing rubber band
13. Dry fire extinguishers were installed in the premises for fire fighting

#### **MEASURES THE INVESTOR NEEDS TO IMPLEMENT:**

Regular maintenance of the network as sewage treatment in sewage shafts.

### **3.1.6. TECHNICAL DESCRIPTION OF ELECTRICAL INSTALLATIONS ELECTRIC POWER SUPPLY**

Power is supplied from the new OMM measuring cabinet located on the GR Mixed Water Pillar on Kanalska Obala Street. OMM is of the type POMM-1. The electricity consumption is measured by a new single-phase meter.

OMM production is subject to electricity distribution.

A new polyester switchboard RT with a FID 25 / 0.03A safety switch and automatic fuses will be installed in the new restroom facility.

The PP00-Y 3x2.5mm<sup>2</sup> power cable will be laid underground through a PVC pipe from OMM to RT.

#### **ELECTRICAL INSTALLATION**

Electrical installation includes the installation of lighting, sockets and electric heaters. The cables are laid on the wall under the plaster. Lighting is performed by LEDs and switched on by motion sensors. Both toilets will be fitted with electric heaters that are switched on via a thermostat and should prevent freezing at low temperatures.

Lighting installation and socket are 1.5mm<sup>2</sup> in cross section, thermal consumers sockets are 2.5mm<sup>2</sup> in diameter.

Conductors are laid exclusively horizontally or vertically. Horizontal conductors are laid in the upper zone up to 30cm below the ceiling and the lower zone up to 50cm above the floor.

The lamps, like the sockets, are marked with the number of the corresponding circuit.

#### **INDIRECT TOUCH PROTECTION**

The distribution system of the LV network is TT. In the installation, a protective conductor is installed as the 5th and 3rd cores of cables. ZUDS switches are provided as additional protection against indirect contact in apartments with a sensitivity of 0.03mA, which in case of earth fault disconnects the installation from the mains voltage.

All conductors contain a protective conductor that is yellow-green in color. All metal masses / EXPOSED CONDUCTORS / which are not normally energized / electric cooker, boiler and others / must be connected to the protective conductor.

#### **ELECTRICAL INSTALLATION EXAMINATION AND TESTING**

Inspection and testing of the completed electrical installation shall be carried out in accordance with the following regulations:

- " Law on Safety and Health at Work " - Official Gazette of the RS No 113/2017 "
- " Rulebook on the Procedure for Inspection and Testing of Personal Protective Equipment Installation, Means and Equipment "
- Official Gazette of RS no. 7/99,
- " Ordinance on technical standards for low voltage electrical installations " Fig. SFRY Gazette No.28 / 95,

Testing includes:

- Measurement of earth resistance,
- Checking the functionality of the protection against indirect touch,
- Measurement of conductor insulation resistance,

-Check continuity of protective conductors and conductors for equalization of potentials.  
Inspection and testing can only be carried out by an authorized company

## **TECHNICAL CONDITIONS**

1. These technical requirements are an integral part of the project and as such oblige the investor and contractors when constructing the facility.
2. Electrical installation must be performed according to text and graphics part of this project and applicable regulations.
3. All changes and deviations from the design, both in terms of technical solution and in the selection of materials, must be approved by the designer.
4. All material to be installed must meet the standards and be of first-class quality.
5. All professional work must only be carried out by the technician when designing, testing and commissioning.
6. All works and procedures not described in detail in the project shall be performed in accordance with the relevant technical rules and apply the correct technical solutions and appropriate regulations.
7. Energy power cables must be uninterrupted (not adjusted) and tested.
8. Water lines shall be cut only after the actual length is determined on the spot according to the definitive disposition of the equipment and the connection point.
9. Cables and installation wires laid in wall installation pipes or cables laid directly in mortar I below mortar shall be run vertically and (or) horizontally so that they are parallel to the edges of the room.
10. Laying of cables through a wall or a floor is done through pipes which are pre-installed.
11. When laying cables, care must be taken not to damage them. Where the cables change direction, slight bends must be made whose radius must not be less than fifteen times the diameter of the cable.
12. Cables laid directly under the mortar and into the wall must be covered with a 4 mm thick mortar throughout the length.
13. When parallel lines are laid, the distance between the two lines must be at least 10 mm.
14. Waters run horizontally 30 cm from the ceiling and at least 200 cm above the floor.
15. Insulated wires and cables must not continue in installation pipes and ducts.
16. Connection and continuation of lines is only permitted in junction boxes with appropriate couplings.
17. Electrical power installations must be separated from low-voltage installations by all their parts. Horizontal laying of lines must be 10 cm from the ceiling, with a distance of 20 cm from the power lines. should be made at right angles with a distance of 10 mm, otherwise install an insulating cartridge 3 mm thick.
18. They will place the switches 1.5 m from the floor next to the door on the side where they open.
19. Place the sockets at a height of 0.4-0.8 m from the floor (not 1 m from the floor).
20. In each circuit, the neutral conductor must be different in color from the phase conductors.
21. The protective conductor should be yellow-green in color.
22. The yellow-green conductor must not be used for any purpose other than protection.
23. Installation of junction boxes shall be carried out at a minimum distance of 6 cm or in accordance with special circumstances.
24. Through one installation junction box, wires from different circuits cannot be installed.
25. Switches and fuses shall only be installed in phase conductors.
26. It is forbidden to break the zero and protective conductors