*(stamped for approval of the Botevgrad Municipality)*

*(signed and stamped of the chief architect)*

**PROJECT: HETEROTOPIAS, BOTEVGRAD – LESKOVATC**

Interreg – IPA for cross border cooperation

Bulgaria – Serbia 2014 – 2020

**SITE: EXPOSURE AND SOCIALIZATION OF A CLOCK TOWER BOTEVGRAD**

In quarter 49 of the central part of the city

Botevgrad, Municipality of Botevgrad, Sofia – District

**PART**: Electricity *(signed and stamped of the mayor)*

**PHASE**: Detailed design

**CONTRACTING AUTHORITY**: Municipality of Botevgrad

Manager: *(signed and stamped)*

arch. Mariela Andreevska

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| Architecture | Architecture | Construction | Electricity | Electricity |
| Signature | Signature | Signature | Signature | signature |
| Arch. Milena Kamenova | Arch. M. Andreevska | Eng. V. Martulkov | Eng. V. Krasteva | Eng. Ch. Iochkolovska |

Object code: B\_25 – 20180415- 3E; edition № 0

**CONTENT**

**PROJECT: HETEROTOPIAS, BOTEVGRAD – LESKOVATC**

Interreg – IPA for cross border cooperation

Bulgaria – Serbia 2014 – 2020

**SITE: REALIZATION OF AN OPEN-AIR MUSEUM IN BOTEVGRAD**

In quarter 49 of the central part of the city

Botevgrad, Municipality of Botevgrad, Sofia – District

**PART**: Electricity

**PHASE**: Detailed design

**CONTRACTING AUTHORITY**: Municipality of Botevgrad

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TEXT PART:

1. Documents, certifying the eligibility of the designer

2. Copy of insurance policy

3. Explanatory note

4. Bill of quantities

Graphical part:

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| --- | --- | --- |
| 1. | Situation | Sheet 1/5 |
| 2. | Indoor electrical installations | Sheet 2/5 |
| 3. | Facade lighting | Sheet 3/5 |
| 4. | Electrical diagram of the main switchboard - square | Sheet 4/5 |
| 5. | Electrical diagram of the main switchboard – clock tower | Sheet 5/5 |

COMPILED: *(signed)*

Eng. V. Krasteva

April 2018, Botevgrad  *(signed and stamped)*

Eng. Ch. Iochkolovska

Object code: B\_25 – 20180415- 3E; edition № 0

*(stamped for approval of the Botevgrad Municipality)*

*(signed and stamped of the chief architect)*

**EXPLANATORY NOTE**

**SITE: EXPOSURE AND SOCIALIZATION OF A CLOCK TOWER**

In quarter 49 of the central part of the city

Botevgrad, Municipality of Botevgrad, Sofia – District

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The present project technical documentation has been prepared by qualified persons in ANDREW\_05 EOOD but assigned by the MUNICIPALITY OF BOTEVGRAD, in compliance with the current regulations in the country.

BOTEVGRAD MUNICIPALITY is the holder of the real property right over the Clock Tower in Botevgrad, Botevgrad Municipality, Sofia District.

In the sense of the Law on Obligations and Contracts and the respective contractual relations between the parties, the person MUNICIPALITY OF BOTEVGRAD is called the CONTRACTING AUTHORITY OF according Law on Obligations and Contracts, and the legal entity “ANDREW 05” EOOD is called the CONTRACTOR.

In the sense of the Spatial Development Act, in its capacity of owner of the property, provided for construction and installation works, the MUNICIPALITY OF BOTEVGRAD is called the CONTRACTING AUTHORITY of the Spatial Development Act, and the legal entity ANDREW 05 EOOD - DESIGNER.

The investment intention of the Contracting authority is to expose and socialize the clock tower in accordance with its real rights, legitimized by the attached ownership documents.

In order to realize the investment intention of the Contracting authority, the Contractor-designer prepares construction design documentation, representing an investment project in the sense of the Spatial Development Act.

The present technical documentation is part Electricity and is an integral part from the complete construction documentation of the site.

The current project part is developed in accordance with the architectural solution.

The clock tower is an architectural and construction monument of culture of national importance from 24.10.2006. and is one of the hundred national tourist sites in Bulgaria. This project is a methodical continuation of the works carried out in the period 2010-2014. on "Restoration, conservation and restoration of the clock tower in Botevgrad" and its commissioning. The clock tower is located in the central part of Botevgrad.

The aim of the project is to give a basic idea of the various electrical systems and installations, to serve as a guide and request for the reconstruction of the site.

**ELECTRICAL PART**

In the clock tower there is a main switchboard, powered by TP "BKP" for the tower itself, for the external lighting of the square and the green areas around, as well as a board for the city fountain. These panels are to be dismantled; it is planned to take them out of the tower in one main switchboard mounted behind the tower / west /.

The tower envisages dismantling of all cables and electrical equipment, followed by installation of new ones in accordance with the provisions of the current design.

A new board for the tower is planned - only for the electrical consumers in the tower, mounted in a suitable place on the stone wall under the first staircase.

The required power for the clock tower is 9kW.

The power supply of the board for the tower will be done with cable SVT 5x10mm2 from the newly provided outside the tower main switchboard.

The above-mentioned main switchboard will supply, in addition to the board for the tower, the electrical elements for the city fountain, and the existing outdoor lighting on the square and green areas.

The measurement of the consumed electric energy is done with the existing electricity meter and clock installed in the new main switchboard.

The electrical power cable for the switchboard MAIN DISTRIBUTION BOARD is existing, is pulled from the tower through the existing hole in the masonry and connected to the new MAIN DISTRIBUTION BOARD. The cables for the city fountain are also pulled from the tower and connected in the MAIN DISTRIBUTION BOARD, and then laid in a new trench around the tower next to the city fountain, where couplings are made to the existing cables. The cables for the outdoor square lighting are also pulled from the tower and connected in the new MAIN DISTRIBUTION PANEL. In front of the switchboard MAIN DISTRIBUTION BOARD, in the newly built covered niche, a single electrical shaft is built for the correct distribution of the cables. The ground panel is a set of three earthing switches. The transient resistance of the earthing switch must not exceed 10 ohms.

For the clock tower, the project provides a new solution for interior lighting with LED lighting fixtures and facade lighting of the tower cornices with LED spotlights, giving a light character at night to the external silhouette of the tower.

The planned interior lighting for the elevations of +0.00 and +14.65 m, on which the clock mechanism is located - provides directional lighting to photos and texts with historical information about the tower. For lighting of the stairs it is planned to descend from different elevations of lighting fixtures at different heights. The control of the interior lighting is carried out with switches on site - ordinary, serial and deviator. The control of the external searchlights and the lighting fixture at the top of the tower is carried out with a clock in the Tkula panel.

Shuko type contacts are provided at elevations of +0.00 and +14.65 m for general use. Defective current protection is provided for the contact outputs. This protection provides a high level of service safety and increases the level of fire safety. At the elevation with the clock mechanism there is a contact for a sound system.

The installation for lighting and sockets is performed openly with cables drawn in corrugated pipes with black steel strip. The cable for lighting is SVT Zh1,5mm2, and for the contacts SVT Zh2,5mm2. The pipes are attached to the tower with PKOM brackets or other fixing brackets.

The sizing of the power cables is done according to the load, taking into account the probability of simultaneous operation of the different consumers according to the existing Design Standards. The cable cross-sections are checked for permissible voltage loss.

All power cables have three and five wires, and the third and fifth wires are for grounding. The Tkula switchboard is earthed with the fifth wire of the power cable from the MAIN DISTRIBUTION PANEL board.

Everything is connected to the grounding installation - electrical switchboards, electrical consumers, metal pipes, etc. The transient resistance of the earthing conductors must not exceed 10 ohms.

At an elevation of + 14.65 m there is an RJ45 socket, powered by an HDMF or FTP cat.6 cable, providing the possibility to turn on a projector.

Around the tower in the pavement there are existing floodlights which are preserved together with their power supply. Only four floodlights in front of the tower entrance are dismantled due to a defective condition of their plasterboard cladding, installed in new places along the fountain with new insulation boxes, and their power supply is maintained by existing cables.

It is planned to dismantle the existing lightning conductor rope with a control connector for lightning protection and a new installation on the west wall of the tower.

**OCCUPATIONAL SAFETY AND HEALTH AND FIRE SAFETY**

When performing the electrical installation, all requirements for labor protection and safe work are observed.

The main distribution board (MAIN DISTRIBUTION BOARD) is grounded with a set of three grounding circuits, Tkula switchboard is grounded by means of a fifth ground wire. The transient resistance at the ground point should not exceed 10 ohms. All electrical consumers must be securely grounded and grounded. The safety equipment and power cables are calculated by short-circuit current and checked by current load.

GENERAL PART

The lighting is made by LED luminaires. The degree of protection of all luminaires is IP23, and the external floodlights is IP65. The control of the lighting fixtures is done with switches mounted in appropriate places, and of the floodlights with a clock.

The installation is made of SVT wire laid openly on walls and beams in a tower in corrugated pipes with black steel strip.

When performing the electrical installation, all the requirements for labor protection and safe work and the requirements under Ordinance No. 1h-1971 of 05.06.2010 are observed.

The site is a third category in terms of power supply,

functional fire hazard class - Ф2.2-acc. Article 8, paragraph 1, Table 1 and according to Art. Article 137 of the Spatial Development Act,

The power supply system is 380 / 220V, 50Hz,

the safety equipment and power cables are calculated by short-circuit current and checked by current load,

system TN-S according to art. 155 of NUEU EL

The electrical switchboards are designed according to the requirements of section III, chapter 38 of NUEU EL.

The measures taken in the project for earthing and protection against electric shocks correspond to Chapter Seven of NUEU EL.

All electrical equipment provided for in the project shall be delivered with a certificate or permanent marking of the hull, guaranteeing the class of reaction to fire or explosion.

The project includes cables and wires with flame-retardant insulation and copper cores.

The electrical equipment is selected for each room according to its fire hazard group and depending on the respective class and functional fire hazard of the tower, observing the requirements of Chapter 12 of Ordinance 1h-1971 / 05.06.2010.

The electrical installations comply with Article 262. The project provides automatic devices for protection against overload and short circuit.

ASSESSMENT OF POSSIBLE HAZARDS

In the mode of operation of the site, electric shock is possible when touching exposed live parts or burns due to the formation of arcs in case of insulation breakdown or short circuits.

MEASURES TO PREVENT POSSIBLE HAZARDS

The following measures will be taken to ensure occupational safety and hygiene, as well as fire safety during the operation of the site:

The premises have dimensions that allow proper installation, placement of all installations and equipment.

The lighting of the premises is in accordance with the norms for minimum lighting. The manner of execution of the electrical installations will comply with all regulations and standards.

The switchboards are lockable for outdoor installation. The connection of the input and output wires from the board is done by means of cable lugs, and for the small sections - with an ear and the screw connection.

When working on the electrical installation, disconnect the corresponding circuit from the panel. When using an escalator, take other additional safety measures.

When performing the electrical installation works, the requirements of the prescriptions in Ordinance № 1h-1971, PPSTN and all regulations in force for this type of work in force shall be observed.

Electrical work to be performed by professionals with the appropriate qualification and license for this type of work.

Work on cable lines and electrical installations with voltage up to 1000 V must be performed by at least two persons, one of whom must have at least a third qualification group.

Before starting work, check each cable line for voltage on both sides, ground it and place signs “Do not switch on! People are working! ”

When performing installation and commissioning works on cable lines and electrical installations to comply with the requirements for operation of cable lines and underground electrical equipment of the "Regulations on occupational safety in the operation of electrical equipment" - sections 1, 11, III and IV and Ordinance №3 / 2004 on the structure of electrical installations and power lines.

All persons involved in the installation work (at work is equipment with voltage up to 1000V) must have passed the TB exam and have the necessary qualification

Before starting work, to conduct on-site instruction, to obtain the necessary protective equipment, respectively checked for the given voltage, to turn off the voltage, to check the grounding and to put in a visible place signs “Do not turn on, work people! ”

Use tools with insulated handles.

The work must be performed by two people.

The equipment should be positioned so that it is convenient to adjust it.

The connecting wires must be fastened firmly, not tangled and as short as possible.

**Take all necessary measures against incorrect supply of voltage to the place where you work!**

When working with electrical equipment, the installer should read the instructions for working with her.

Measurements should be made with special devices. Measurement with current measuring pliers for cables, to be performed only with dielectric pliers and dielectric boots. During the measurements, the handles of the pliers must be wiped to keep them dry and clean.

Protective equipment that must be used to protect personnel from electric shock are: insulating pliers, dielectric gloves, dielectric carpets, TB safety signs (such as "Don't turn on! People are working!").

When carrying out the installation works on the site, strictly observe all rules and requirements of the "Regulations on occupational safety in the operation of electrical installations and equipment", as well as all regulations and normative documents valid at the time of construction.

After the completion of the electrical installation works to perform measurements of the impedance of the circuit "phase-zero" for all electrical consumers (power contacts and lighting fixtures) from a licensed electrical laboratory. The results should be formed in a protocol, which should be one of the prerequisites in operation.

The CONTRACTOR-DESIGNER expresses readiness for timely and adequate actions in case of gaps, inaccuracies and deviations from the norms in the process of conformity assessment and approval by the competent authorities of the investment project.

COMPILED: *(signed)*

Eng. V. Krasteva

April 2018, Botevgrad  *(signed and stamped)*

*(stamped and signed of competency of Milcho Milenkov)* Eng. Ch. Iochkolovska

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| signature | Signature | Signature | Signature | signature |
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*(Copy of Certificate for full design with reg. № 01826 of eng. Violetka Atanasova Krasteva in Bulgarian)*

*(stamped and signed of competency of Violetka Krasteva)*

*(Copy of insurance policy № 002233/20.11.2017 for Professional liability for Geodesy, Cartography and Cadaster on eng. Violetka Atanasova Krasteva in Bulgarian )*