## Appendix 1. Technical Requirements

1. The SCS topology is a “hierarchical star” with the least possible number of intermediate connections between workstations and active network components of the local area network.
2. The SCS should be built and tested in accordance with the current version of the international standard ISO/IEC 11801 as a solution compliant with the requirements of Class D.
3. The SCS should be built in a manner that does not contravene the current building codes and regulations, as well as safety requirements in force in Ukraine.
4. At the stage of preparations leading up to the expansion of the SCS, the Contractor should prepare and coordinate with the Beneficiary a Preliminary Design containing the following information: preliminary structural diagram of the SCS, layout of trunk routes, floor plans of premises with cable wiring and switching centres, and switching cabinet schematics. The location of additional workstations, additional data sockets, and sockets for connecting wireless access points should be determined at the stage of preparations leading up to the expansion of the SCS based on the floor plan and the design of the existing SCS supplied by the Beneficiary.
5. The expansion of the SCS should use permanently installed materials and equipment (cables, modules, patch panels, etc.) manufactured by Legrand to ensure maximum integration with the SCS already in place at the facility. Additional workplaces, data sockets and, sockets for connecting wireless access points should be arranged in such a way as not to affect the warranty period of the existing SCS.
6. Cables should be laid in existing cable ducts (trays, raceways). Units of data sockets (except for sockets for connecting wireless access points) and power outlets should be built-in and mounted in a cable duct (raceway).
7. All data sockets and patch panel ports should be labelled to ensure unambiguous identification of components and convenient system management in a format consistent with the existing SCS.
8. Installation of additional workplaces:
	* Each additional workplace should be equipped with two RJ-45 FTP cat.5e data sockets for connecting network devices and three 2P+E power outlets.
	* The design power rating of one additional workstation is 500 W.
	* An additional workstation for the printer should be provided with one RJ-45 FTP cat.5e data socket for connecting network devices and one 2P+E power outlet.
	* Users should be divided into power groups (by room). Each power group should be equipped with a separate differential circuit breaker, which should be connected to the existing floor distribution panel. It is also possible to connect consumers to existing groups based on the results of permissible load calculations.
	* Data sockets of users as part of additional workstations should be distributed in accordance with the existing infrastructure: the first port of each workplace (socket “A”) in the first (“A”) switching cabinet of the switching centre; the second port of each workstation (socket “B”) in the second (“B”) switching cabinet of the switching centre.
9. Installation of additional data sockets:
	* Each additional data socket requires providing one RJ-45 FTP cat.5e data socket for connecting network devices.
	* Additional data sockets should be installed in accordance with the existing infrastructure in the first (“A”) switching cabinet of the switching centre.
10. Providing sockets for connection of wireless access points:
	* Each socket for connecting wireless access points is equipped with 1 RJ-45 FTP cat.5e data socket for connecting external network devices and is located in the space above the drop ceiling.
	* Sockets for connecting wireless access points should be installed in accordance with the existing infrastructure on a separate patch panel in the first (“A”) switching cabinet of the switching centre.
11. The power supply cable should be laid from the switchboard in the switching room on the 3rd floor (with the replacement of the incomer circuit breaker) to the main switchboard room (in the basement).
12. Total estimated quantity:
	* Additional worksplaces – 2.
	* Additional printer workplaces – 1.
	* Additional data sockets – 58.
	* Sockets for connecting wireless access points – 1.
13. Installation of switching cabinets:
	* When installing cables in a patch panel, the cable outlets should be located so as not to block the free space in the panel and not to interfere with the installation of active network equipment. Excess cables should not be placed in the cabinet installation space.
	* Provide the SCS switching cabinets with one cable organizer (1U with five plastic rings, through holes, black) per 24 ports of the SCS.
	* The shields of all cables within the switching cabinet should be combined and connected to the technical telecommunications grounding circuit;
	* Provide the switching cabinet with shielded patch cords of the minimum required length (depending on the type and setup of the switching cabinet) at the rate of one patch cord for each patch panel port.
14. Requirements for cable routes:
	* The total length of the duct for copper cables (horizontal subsystem together with patch cords) should not exceed 100 (one hundred) meters, while the length of the duct from the socket port to the patch panel port should not exceed 90 (ninety) meters, and the total length of the patch cords should not exceed 10 (ten) meters.
	* Interfloor transitions should be made through existing cable ducts.
	* SCS cables and power supply cables should be separated, i.e. laid in separate metal trays, separate corrugated pipes, and in the raceway - separated by means of a partition.
	* When laying cables, they should not extend beyond the tray/riser. All cables laid in metal trays/risers should be fixed and laid as flat as possible to ensure optimal use of space inside the tray/riser and aesthetic appearance.
15. Testing and certification:
	* Testing of the SCS for compliance with the requirements of ISO 11801 should be carried out with a cable analyser.
	* The Contractor should draw up SCS documentation, test reports, etc.
	* The Contractor should submit the test results to the Beneficiary in electronic form.
16. Documentation:
	* Structural diagram of the SCS;
	* Layout of trunk routes;
	* Floor plans of premises with cable distribution. The plans should indicate the IP with the labelling of SCS ports, power outlets, cable wiring and switching centres;
	* Switching cabinet layout schematic;
	* Patch panel port labelling scheme;
	* Basic single-line circuit diagrams;
	* Calculations of electrical loads;
	* Cable log;
	* Specifications of materials and equipment;
	* Test reports in accordance with standards.
	* The Contractor should draw up the as-built documentation in the form of a technical data sheet of the SCS of the facility. The as-built and maintenance documentation should be executed in accordance with the norms and standards in force in Ukraine.
17. Preliminary (indicative) quantitative and qualitative characteristics of SCS components, consumables and services:

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| --- | --- | --- | --- | --- | --- |
| **No.** | **Product number** | **Description** | **Manufacturer** | **Unit of measurement** | **Quantity** |
| 1 | L32752 | Cable 4 Pairs Cat.5e Ftp Lszh | Legrand | m | 3,460 |
| 2 | L632860 | Patch Cord RJ45 Cat.5e FTP 1 m, brown | Legrand | pcs | 70 |
| 3 | L632862 | Patch Cord RJ45 Cat.5e FTP 3 m, brown | Legrand | pcs | 40 |
| 4 | L632863 | Patch Cord RJ45 Cat.5e FTP 5 m, brown | Legrand | pcs | 35 |
| 5 | L33751 | Complete patch panel – 19” – 1U – category 5e – FTP – 24 x RJ 45 | Legrand | pcs | 2 |
| 6 | L33791 | Patch panel, empty, for insertion of cassettes – 19” – 1U | Legrand | pcs | 3 |
| 7 | L33755 | Empty cassette for a patch panel | Legrand | pcs | 4 |
| 8 | L33754 | High-density connectors – category 5e – FTP – 6 x RJ 45 | Legrand | pack | 4 |
| 9 | L33757 | Blanking cassette | Legrand | pcs | 6 |
| 10 | L33759 | Cable ring (x2) | Legrand | pcs | 5 |
| 11 | L76552 | Mosaic Legrand, data socket RJ45 FTP cat5e 1 module, white | Legrand | pcs | 64 |
| 12 | L76555 | Mosaic RJ45 FTP cat5e 2mod, white | Legrand | pcs | 2 |
| 13 | L277802L | Frame, 2 modules, white | Legrand | pcs | 1 |
| 14 | L80281 | Msc cover plate, white 2mod, H40mm | Legrand | pcs | 1 |
| 15 | L80251 | Mosaic 1-seat support | Legrand | pcs | 1 |
| 16 | UA-CMS-CM-05 | Cable organizer 1U with 5 plastic rings, black | CMS | pcs | 6 |
| 17 | SM6.1 | M6 mounting kit (screw, washer, nut) | CMS | pcs | 40 |
| 18 | REB-CL | Clip for the ground bus, 5 mm | IQT | pcs | 3 |
| 19 | L603857 | DLP-S fastener for Mosaic (Legrand) | Legrand | pcs | 28 |
| 20 | L638020 | DLP-S cable channel with cover 45 mm 85x50 mm  | Legrand | m | 44 |
| 21 | L638008 | DLP-S partition H50 mm | Legrand | m | 30 |
| 22 | L638025 | DLP-S blanking cap 85x50mm | Legrand | pcs | 5 |
| 23 | L638028 | DLP-S outer corner 85x50mm | Legrand | pcs | 2 |
| 24 | L638027 | DLP-S inner corner 85x50mm | Legrand | pcs | 3 |
| 25 | L638029 | DLP-S flat corner 85x50mm | Legrand | pcs | 5 |
| 26 | VVGng-nd 3x2.5 | Power cable VVGng-LS 3\*2.5 (ozh)-0.66 | Odeskabel | m | 50 |
| 27 | VVGng-nd 5х6 | Power cable VVGng-LS 5\*6 (ozh)-0.66 | Odeskabel | m | 50 |
| 28 | PV-3 6 | Power cable PV-3 6 | Odeskabel | m | 5 |
| 29 | AD966J | Differential circuit breaker 1+N, 16A, 30mA, C, 6 KA, A, 2m | Hager | pcs | 1 |
| 30 | L77210 | Mosaic Socket 2P+E n.st.v/clamp | Legrand | pcs | 7 |
| 31 |   | VGP pipe 25 mm diam. | Ukraine | m | 12 |
| 32 |   | Dowel with impact screw 6/40 polypropylene shoulder | Soldi | pcs | 300 |
| 33 | INCT-HC-2-WH | Cable tie platform with screw hole, 22x15 mm (100 pcs.), white | CMS | pack | 1 |
| 34 | INCT20040 | Cable tie 200x4.0 mm, 100 pcs. | CMS | pack | 3 |
| 35 |   | Set of consumables for fastening and installation |   | pcs | 1 |

1. Network equipment:

To ensure maximum integration into the existing network infrastructure the network equipment manufactured by Cisco should be delivered:

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **No.** | **Description** | **Manufacturer** | **Unit of measurement** | **Quantity** |
| 1 | C9200L-48P-4G-E Catalyst 9200L 48-port PoE+, 4 x 1G, Network Essentials | Cisco | pcs | 2 |

The equipment delivery timeframe is no more than 90 days from the signing date of the contract. Equipment should be delivered to the central office of the NABU.