

WEST GEORGIA LIBRARY SYSTEM - NETWORK CABLING AND SWITCHES RFP APPENDIX C - SPECIFICATIONS

This document describes the requirements for furnishing and installing a telecommunications cabling infrastructure at participating public library sites of the WGRLS. A balanced twisted-pair cabling system capable of supporting 10 Gb/s Ethernet networking is described below. All cables and related support, termination, and grounding hardware shall be furnished, installed, tested, labeled, and documented by the successful vendor as detailed in this document.

Industry Standards References

The product specifications, design considerations, and installation guidelines provided in this document are in part derived from recommendations found in recognized telecommunications industry standards. The following are used as reference:

Spaces and Pathways

ISO/IEC 18010:2002 – Pathways and Spaces for Customer Premises Cabling
TIA-569-D (2015) – Commercial Building Standard for Telecommunications Pathways and Spaces
TIA-942-A (2012) – Telecommunications Infrastructure Standard for Data Centers

Cabling Systems

ISO/IEC 11801 2nd Edition 12/07/07 Information Technology – Generic cabling for Customer Premises
TIA-568-C.1 (2009) and associated Addenda – Commercial Building Telecommunications Cabling Standard, Part 1: General Requirements
TIA-568-C.2 (2009) and associated Addenda – Commercial Building Telecommunications Cabling Standard, Part 2: Balanced Twisted-Pair Cabling Components
TIA-862-B (2016) – Building Automation Systems Cabling Standard for Commercial Buildings
TIA-942-A (2012) – Telecommunications Infrastructure Standard for Data Centers
TIA-4966 (2014) - Telecommunications Infrastructure Standard for Educational Facilities
TIA- 1179 (2010) - Telecommunications Infrastructure Standard for Healthcare Facility

Cabling Administration

ISO/IEC 14763-1:1999 – Implementation and Operation of Customer Premises Cabling – Part 1: Administration
TIA-606-B (2012) – Administration Standard for Commercial Telecommunications Infrastructure

Networking

IEEE Standard 802.3an – *10GBASE-T* (10 Gb/s Ethernet operations over balanced twisted-pair cabling)

Design

BICSI Telecommunications Distribution Methods Manual (TDMM) – 13th edition (2014)

Installation

BICSI Information Transport Systems Installation Manual (ITSIM) – 6th edition (2011)

Recommended Product/Brand

The Vendor shall accept complete responsibility for the design, installation, acceptance testing, and certification of the Belden System 10GX. This recommendation is meant to

establish a required level of quality and functional capabilities, and is not intended to exclude other products of that level. Proposals are invited on equal brands; vendors must enclose descriptive literature when stating alternate brand(s) so that quality can be verified. Vendors proposing other than specified, are to clearly identify the manufacturer and the model number and must provide written, complete justification as to how the product complies with all specifications highlighted within this RFP as well as the complete list of specifications related to the requested products. Failure to do so may result in rejection of their proposal. Proposals offering equal products will be considered for an award if the WGRLS determines the alternate product meets or exceeds fully the minimum essentials specification of the RFP.

General Work

The work included in this RFP consists of all labor, equipment, products, and supplies required to design, install, test, and warranty the proposed product in compliance with project specifications. The vendor shall:

- Provide a complete balanced twisted-pair telecommunications cabling infrastructure capable of supporting 10 Gb/s networking.
- Furnish, install and terminate all cabling runs.
- Furnish and install all TOs, patch panels, and cordage.
- Furnish and install all required cable runways, cabinets and/or racks and any other material required to implement a complete system.
- Test all installed cabling runs and furnishing a summary report confirming the Pass status of each run.
- Provide all test and labeling information in both electronic and paper formats.
- Provide training and complete documentation, including product user guides, application guidelines, and as-built drawings.

Delivery/Storage

All cable to be used in the project shall be stored according to manufacturer's recommendations. In addition, all cable must be stored in a protected area. If cable is stored outside, it must be covered with opaque plastic or canvas for protection from the elements, with adequate ventilation to prevent condensation. If air temperature at the cable storage location will be below 40 °F, the cable shall be moved to a heated location (50 °F). If necessary, cable shall be stored off-site at the vendor's expense.

Cable Specifications

The balanced twisted-pair cabling system shall support 10 Gb/s networking and shall provide guaranteed performance up to 625 MHz for a 4-conductor, 100 m (328 ft) channel. At a minimum, the balanced twisted-pair cabling system will exceed the key performance parameters for Cat 6A found in TIA/EIA-568-C.2 Category 6A standard over the specified frequency ranges by the values listed below. The balanced twisted-pair cabling system shall also meet all the requirements of ISO/IEC 11801:2002 *Ed. 2 / Amendment 2*. The cables will be available in plenum (CMP), non-plenum (CMR) and low smoke zero halogen (LSOH/LSZH), and limited combustible (LC) versions. The minimum

recommended installation temperature shall be 40 °F. The cables shall include a polymer pair separator and an effective noise barrier to optimize internal near-end crosstalk (NEXT) performance and minimizes alien near-end crosstalk (ANEXT) coupling between cables.

Patch Panels

The patch panel offering shall be available in 24-port 1U, 48-port 1U, 48-port 2U, and 72-port 2U in flat and angled configurations to address various density and cable management needs. The patch panel offering shall include a front accessible panel with 1-port modularity to facilitate installation in tight spaces. The rear cable management for the patch panels shall be integrated in the design of the panel and require no additional accessories to dress terminated cables. Cables shall be dressed and terminated in accordance with standards-based recommendations, the manufacturer's recommendations/installation guides, and industry best practices. The twisted pairs shall be guided, positioned and secured at the connector termination point using a termination device that locks the pairs in place to prevent untwisting of pairs into the cable when terminating the conductors. Each cable shall be clearly labeled on the cable jacket behind the patch panel at a location that can be viewed without removing the bundle support element(s). Labels obscured from view shall not be acceptable.

Installation

All products shall be installed in accordance with standards-based recommendations, the manufacturer's recommendations/installation guides, and industry best practices. Cable raceways shall not be filled greater than the TIA-569-D recommended maximum fill for the particular raceway type, of initially no more than 25%. Cables shall be installed in continuous lengths from origin to destination. Where cables are installed in an air return plenum, any non-plenum cable shall be installed in metallic conduit. Where support for horizontal cable is required, the vendor shall install appropriate carriers to support the cabling. If a J-hook or trapeze system is used to support cable bundles, all horizontal cables shall be supported at every 1.2 m to 1.5 m (48 in to 60 in) intervals. It is recommended that the support surface is rounded without any sharp edges and at least 2 inches wide. Do not exceed the manufacturer's recommended quantity of cables for the cable support system. At no point shall cable(s) rest on acoustic ceiling grids or panels. Horizontal cables shall be bundled in groups of no more than 48 cables. Cable bundle quantities in excess of 48 cables may cause deformation of the bottom cables within the bundles, which will degrade the performance of those cables. Cable shall be installed above fire-sprinkler systems and shall not be attached to such systems or any associated ancillary equipment or hardware. The cabling system and its associated pathways shall be installed so that they do not obscure any valves, fire alarm conduit(s), boxes, or other control devices.

Each horizontal cable shall be terminated at its designated work area in a modular connector assembly using modular jack designed to snap into a faceplate. The same orientation and positioning of modular connector assemblies on faceplates shall be used

throughout the project. All telecommunications room and work area outlets shall accommodate printed label strips for outlet identification purposes. Printed labels shall be permanent and shall comply with TIA/EIA-606-B. Hand-written labels shall not be accepted. All faceplate designs shall be compatible with UTP, F/UTP and multimedia modules.

Connectors shall incorporate crosstalk compensation circuitry at their plug interfaces, using flexible printed circuit board (PCB) technology in order to meet the TIA 568-C.2 mated connection requirements extended in frequency up to 625 MHz. Work area telecommunication outlets shall be installed in accordance with standards-based recommendations, the manufacturer's recommendations/installation guides, and industry best practices. Cables shall be dressed and terminated in accordance with standards-based recommendations, the manufacturer's recommendations or installation guides, and industry best practices. Slack cable shall be coiled in flush or surface-mount outlets if adequate space is provided to house the cable coil without exceeding the manufacturer's bend radius limitations. In hollow-wall installations where box eliminators are used, cable slack can be stored in the wall. No more than 300 mm (12 in) of slack shall be stored in an outlet, modular furniture raceway, or insulated wall. Excess slack may be loosely coiled and stored in the ceiling above each work area.

Testing

All terminated cabling runs shall be 100% tested for defects in installation and to verify cabling system performance under installed conditions according to the requirements found in the TIA/EIA-568-C series of standards. All pairs in each installed cable shall be verified prior to system acceptance. Any defect in the cabling system installation, including (but not limited to) cables, connectors, patch panels, and cordage shall be repaired or replaced in order to ensure 100% usability of all installed runs.

All balanced twisted-pair cable links shall be tested for basic continuity and length, as indicated below. Additional testing shall be performed to verify compliance with Category 6A performance for accepted product specifications; the WGRSL recommends 100% testing of permanent links for Insertion Loss, Return Loss, NEXT, PSNEXT and PSACRF. These tests are performed at the same time as the continuity test using an automated tester, such as the Fluke DTX1800.

In addition, a random sampling of short length and long length installed links shall be tested for PSANEXT and PSAACRF. The links selected for testing shall follow the selection criteria specified in ANSI/TIA-568-C.2 standards; the WGRSL recommends a minimum of five links per site.

Note existing, maximum existing cabling runs for WGRSL sites (295 feet maximum for recommended product) do not exceed maximum lengths recommended. Testing installed length using a Time Domain Reflectometer or other device is not required.

Warranty

The proposed solution shall be designed, installed, and tested by a vendor who maintains certifications, partnerships or the required manufacturer's program standards. The vendor shall maintain organizational and installation guidelines to ensure the performance of the WGRS installation and component warranties. The recommended product maintains a 25 year warranty for all passive components used in the installation. The vendor's selected manufacturer shall provide assurance that all present and future commercially available applications engineered for the performance level of the installed cabling system in accordance with published standards will work for the lifetime of the certified application.

Should the certified product(s) fail to support the networking technologies designed to operate over it—at the time of cutover, during subsequent use, or after upgrading active network devices (e.g., migrating to 10 Gigabit Ethernet switches from Gigabit Ethernet switches)—the vendor and manufacturer shall take prompt corrective action.

WGRS member libraries accept that the benefits offered by the warranty are revoked if non-approved products are introduced to the installed application. To regain the benefits of the warranty in such cases, a manufacturer-approved Contractor must apply and validate all corrective modifications deemed necessary by the manufacturer.