

Sonora School District

Local Area Network Infrastructure Upgrade Project

Attachment A - Bid Specifications

Note to Bidders: While the District has formulated Specifications for each project component, the District encourages interested parties to include in their proposals recommendations or solutions, based on industry best practices, that may enhance, improve, or supplement these Specifications.

Project Component 3: Local Area Network Fiber and Cable Upgrade

It is the District's preference that this work is to be performed while school is not in session. However, if substantial discounts are afforded the District to allow work during school hours then the District may consider the waiver of this provision.

All materials should come with a 25 year performance and application warranty.

Installer must be fiber certified.

Bidder must have experience in Category 6 cable termination and Testing. Testing procedures must be completed with a Microtest Penta Scanner or equivalent and a detailed record for each Cat 6 cable provided, in hard copy.

MDF and IDF equipment must support 10GB connections to Fiber backbone and 1GB connections to all classrooms, offices and Wireless Access points.

Installation Overview

The successful bidder shall furnish all racks, mounting brackets, RF cables, network electronics, etc., enumerated in this Specification and that may be identified in the Mandatory Pre-Bid Conference. In addition:

- The bidder is required to provide cable test results for each data and fiber optic cable. As-built drawings are required, which identify the telecommunication space locations, workstation outlet locations and cabling pathways. All documentation must be provided in hard and electronic copy.
- Cables shall be installed and terminated per IEEE and FCC standards for their intended use. All cables shall be plenum rated. All cables shall be installed in conduits, D-Rings or cable trays.
- Bidder shall ring out and identify, with sturdy ty-wraps clearly marking every cable in the system (both ends) all markings shall include purpose destination and origination of the wire or cable.

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- Cable lengths at every outlet will have a minimum of four feet (4 ') of slack and fifteen (15') at the head-end if applicable.
- Bidder shall use standard cable practices in the installation process and follow Telecommunication industry standards including the ANSI/EIA/TIA 568 (Telecommunication Cabling Standard), ANSI/EIA/TIA 569 (Pathways and Spaces) and the ANSI/EIA/TIA942 (Standard for Data Centers) as well as federal, state and local codes.

Racks

At each IDF location, there will be a free standing mounted aluminum rack. The bidder should utilize existing mounts where possible for IDFs. At the Mandatory Pre-Bid Conference locations are to be identified where new racks will be required. The bidder will be required to provide and install new freestanding aluminum racking where required.

Mount Wireless Access Points

The District will provide drawings to the awarded bidder specifying where District provided Wireless Access Points (WAPs) are to be mounted. WAPs will be mounted by winning vendor in locations specified.

Cable Specifications

Bidder shall furnish and install all wiring and associated electronics indicated in this RFP or by virtue of the Mandatory Pre-Bid Conference. The data system shall consist of a 10GB Fiber backbone with 1GB Category 6 UTP Ethernet LAN system. All wiring and terminations shall be in conformance with IEEE requirements of the specific LAN.

Ethernet cabling shall be installed as indicated on the drawings and design submitted by the bidder as part of their bid. Bidder shall provide unshielded twisted pair Category 6 data cabling, RJ-45 Category 6 data outlets, device plates, data punch down racks, and all terminations at the punch down blocks.

Bidder shall provide circuit number designation tags on the conductors in each outlet box and at each punch down block and each distribution rack. Further, the bidder shall provide cable tags on each cable as they enter the room where they get punched down and the room where the outlets are located. Cable tags shall identify cable punch down room and cable outlet room.

Fiber Cable Backbone

A 12 strand indoor/outdoor plenum rated multi-mode fiber optic cable must be installed between each IDF and the MDF. Optical fibers will be tightly buffered 50 micron, multi-

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mode fiber. Fiber must meet specification for FDDI operation at 10GB. Fiber optic cable must be installed in a PVC innerduct. A pull string must be left in the innerduct.

All twelve strands are to be terminated with connectors at both ends. LC connectors preferred.

Category 6

A four pair UTP plenum rated 24 gauge Category 6 cable will be required for each data location. Three data drops will be required into each classroom and\or office location. Color selection must be consistent throughout the installation.

General Guidelines for Cable Installation

- 1) Neatly dress all voice and data cables.
- 2) Meet or exceed installation requirements dictated by applicable federal, state and local codes.
- 3) Maintain all minimum bend radius requirements
- 4) Cable shall be protected from contact with sharp metal edges.
- 5) Replace crushed, kinked, or stretched cable or cable with damaged sheath or insulation.
- 6) Avoid routing cable near source of interference, power lines, motors, radio interference, fluorescent lights, heavy machinery, HVAC, etc.

The following routing guidelines shall be adhered to:

Interference Source	Distance from Cable
Power Lines <2KVA	5 inches
Power Lines < 2-5 KVA	12 Inches
Power Lines <5KVA	36 inches
Fluorescent Lights	5 inches
Motors\Generators	40 Inches

Testing

- Each cable pair shall be tested to include terminations at each end.
- Each cable pair shall be tested for abnormal electrical noise and interference.
- Each cable pair must be tested for infinite resistance between each conductor and an established earth ground
- Each cable pair shall be tested for proper end-to-end polarity.

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Fiber Optic Backbone Testing

- Test each optical fiber from both ends using an optical time domain reflectometer. Testing will be conducted at both 850 and 1300MM wavelengths/ The ODTR test will determine the following:
- The overall length of each segment
- Proper termination
- Continuity in the fiber
- Total segment attenuation
- Irregularities in the Fiber

Category 6 Testing

All Category 6 Cable testing shall be conducted from both ends of the link using a PentaScanner or equivalent in accordance with the following:

- Cable performance shall meet the standards outline in EIA/TIA 568-A
- Each cable run shall be tested to include all outlets throughout to the closest patch panels
- Each station cable shall be tested for abnormal electrical noise and/or interference
- Each pair must be tested for infinite resistance between the conductors in the pair
- Each pair must be tested for signal attenuation and crosstalk.

Testing Documentation

Cabling bidder shall deliver testing documentation to District upon completion and include the hard copy test results produced by the testing instruments

Labeling Requirements

- All cables shall be visibly labeled with the room number of where the outlet is located. Since most rooms will have more than one outlet then label the cable with the room number plus a letter (IE D4-A, D4-B, D4-C, etc.)
- Each cable shall be labeled with a wraparound permanent tag. Additionally the designation stops, and patch panels shall be labeled with a permanent typed or silk screened method, with the same number/letter designation
- Handwritten labels on the outlet face plates, cables, patch panels, etc., are not acceptable.

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- Bidder shall provide cable tags on each cable as they enter the room where they get punched down and the room where the outlets are located. Cable tags shall identify cable punch down room and cable outlet rooms.

Acceptance Period

The awarded bidder shall provide written certification to the District of final completion of this Project Component in accordance with these Specifications. District shall have thirty (30) days to determine that the work is complete and in conformance with the Specifications. The awarded bidder shall provide all necessary and or appropriate follow-up work and service during this period.

Warranty

All installed materials, equipment and products shall carry a manufacturer, vendor and bidder warranty for all parts and labor of at least 25 years. Any additional warranty option (for no charge or for a fee) should be noted in the bid proposal.

All materials, equipment and products furnished shall be new and of the latest model, and free from defects in material and workmanship. The bidder is required to replace defective or faulty equipment, materials, software or products provided promptly with a minimum loss of operating time, and without charge to the District. This includes labor and services related to replacement and installation. The warranty period shall commence after all systems have been placed in working operation and accepted by the District.

Project Documentation

Bidder will provide complete as-built diagrams to the district upon completion.