

## Benton County IT

# Infrastructure Cabling and Wiring Standards

The following information is to inform and guide IT staff, consultants, contractors, and third-party personnel involved in any actions affecting or impacting Benton County's telecommunications and network critical physical infrastructure.

Use of this Standard, and the codes and standards referenced within this document, is intended to increase the value of Benton County's investment in infrastructure by reducing the labor expense of maintaining the system, by extending the useful economic life of the system, and by providing effective service to users.

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## 1 General guidelines

The Information Technology Department is responsible for overseeing installation, maintenance and administration of all Benton County telecommunications and network critical physical infrastructure. This responsibility includes ensuring that each building's infrastructure is built to support adequate telecommunications rooms, ductwork, cabling and wiring within the buildings, and cabling between buildings to support diverse voice, data, multi-media, surveillance, electronic control, and monitoring systems.

### 1.1 Specification of criteria, terms, acronyms and abbreviations

This document conforms to EIA Engineering Publication, EP-7B standards for language used to identify criteria. Two categories of criteria are specified - mandatory and advisory. Mandatory requirements designated by the word "shall". Advisory requirements designated by the words "should", "may" or "desirable", and used interchangeably in this Standard.

Mandatory criteria generally apply to protection, performance, administration and compatibility. They specify the absolute minimum acceptable requirements. Conformance with the additional Advisory criteria of this Standard will typically enhance the performance and usability of the cabling infrastructure.

The definitions of terms, acronyms or abbreviations used within this document derived from the ANSI/TIA/EIA-606-A: Standard for Telecommunications Infrastructure (See 2.1).

### 1.2 Major renovation and new construction

The architect/engineer for major renovation and new construction projects shall work very closely with the end user, Information Technology, and Public Works Facilities during the initial (Schematic, Preliminary) planning stage. These departments are key stakeholders in helping the end user ensure requirements are understood, that applicable codes and standards are conformed to in the design phase, and the resulting project is sustainable over the course of its planned lifecycle. Close coordination between the architect/engineer and these departments is essential to protect the investments the County has made in infrastructure and to minimize ongoing operating support costs associated with the project. Ensuring requirements are clear and standards incorporated in the design phase significantly reduces the risk of costly revisions later.

### 1.3 Minor renovation and construction

Information Technology staff shall be consulted during the planning stages of any building construction or building renovation to identify the impact of new uses/requirements on current telecommunications distribution facilities, and assess changes required to accommodate the modified use of building space.

#### 1.4 Telecommunications room planning

Spaces for interconnecting the building communication cabling and for connecting the building to the outside must be a separate room, not shared with other utility services, particularly electrical services that can potentially cause issues with interference to communication transmissions. When possible, this room will not be adjacent to the electrical distribution room.

## 2 Codes and standards

Information Technology recognizes and implements national codes and standards as a means to provide for and administer the critical infrastructure necessary for daily information technology use. Contracted personnel hired to develop designs, perform renovations, construction, or any actions that impact telecommunications and network infrastructure shall be required to adhere to the codes and standards listed in this section.

### 2.1 List of relevant codes and standards

This section intends to raise awareness of codes and standards and to provide additional guidance on their implementation at Benton County. It does not replace any code, either partially or wholly. In all cases, work performed shall meet or exceed the following installation, documentation, component and system industry specifications in order to satisfy Benton County Information Technology standard:

#### **ANSI/TIA/EIA-568-B.1**

“Commercial Building Telecommunications Cabling Standard – Part 1: General Requirements”

#### **ANSI/TIA/EIA-568-B.2**

“Commercial Building Telecommunications Cabling Standard – Part 2: Balanced Twisted-Pair Cabling Components”

#### **ANSI/TIA/EIA-568-B.3**

“Commercial Building Telecommunications Cabling Standard – Part 3: Optical Fiber Cabling and Components Standard”

#### **ANSI/TIA/EIA-569-B and addenda**

“Commercial Building Standard for Telecommunications Pathways and Spaces”

#### **ANSI/TIA/EIA-606-A and addenda**

“Administration Standard for the Telecommunications Infrastructure of Commercial Buildings”

#### **ANSI/NEMA Standards Publication No. WC 66-2001**

“Performance Standard for Category 6 and Category 7 100 Ohm Shielded and Unshielded Twisted Pair Cables”

**ANSI-J-STD-607-A and addenda**

“Commercial Building Grounding and Bonding Requirements for Telecommunications”

**ANSI/TIA/EIA-526-7**

“Measurement of Optical Power Loss of Installed Single-Mode Fiber Cable Plant”

**ANSI/TIA/EIA-526-14A**

“Optical Power Loss Measurements of Installed Multimode Fiber Cable Plant”

**BICSI TDMM**

“Telecommunications Distribution Methods Manual, 11th Edition”

**CENELEC EN 50173:2000 and amendments**

“Information Technology – Generic Cabling Systems”

**IEC/TR3 61000-5-2 – Ed. 1.0 and amendments**

“Electromagnetic compatibility (EMC) – Part 5: Installation and mitigation guidelines – Section 2: Earthing and cabling”

**ISO/IEC 11801:2002 Ed 2.0 and amendments**

“Information technology – Generic cabling for customer premises”

**NFPA70 National Electric Code – Article 645 and Article 800 2.2.15. NFPA 70E**

“Standard for Electrical Safety in the Workplace, 2004 Edition” 2.2.16. NFPA 75

“Standard for the Protection of Information Technology Equipment, 2003 Ed.”

**NFPA 76**

“Standard for the Fire Protection of Telecommunications Facilities, 2005 Edition”

2.2 Professional workmanship

The list of codes and standards (2.1) have specific applications to the planning, design, development and maintenance of Benton County’s infrastructure. It is not all-inclusive. Personnel acting in any professional capacity have a responsibility to comply with and perform their work in accordance with all applicable national, state and local codes governing their profession.

2.3 Standards precedence and conflict resolution

The latest edition of these referenced standards shall be the controlling document. In the case of proposed standards, the latest available draft shall be the controlling document. Where the standards appear to conflict with one another, the one with the most stringent requirements shall be applicable.

## 2.4 Applying the standards

There is latitude within the standards to expand or vary implementation by applying criteria that are more stringent and/or to specify organizational guidance on how these standards shall be applied and administered. The remaining sections of this document provide information on how these standards shall be followed at Benton County.

## 3 Specific guidance

### 3.1 General planning guidance for work areas

This section contains infrastructure guidelines for the work areas typically found at Benton County facilities. These are the minimum initial planning requirements to design and build the appropriate infrastructure to support the foreseeable use of the intended facility. For each type of work area listed in this section, the end user shall consult with Information Technology to help determine the specific configuration necessary to meet work area requirements.

The recommended location for outlets is as follows:

- Mid-point on walls without windows or doors
- Mid-point of the wall-area on walls with doors and windows

### **Offices, rooms, cubicles**

In offices, rooms and cubicles, four communication outlets (one on each wall), each with a minimum of two data ports are required. Rooms may be designed to be subdivided, by adding or removing walls, and often are in future renovations in order to maximize space. Design specifications and communication outlet locations may be increased to accommodate and/or anticipate this use.

### **Conference rooms**

Four communication outlets (one on each wall), each with a minimum of two data ports are required. Rooms larger than 500 square feet should have a communication outlet, with a minimum of two data ports, every 10 feet of wall. Conference Rooms will have a minimum of one communication outlet designated for Wireless Access Points on the ceiling within 25 feet of the center of the room and this outlet may be outside of the room. Conference Room Audio/Visual cabling shall be provided to support user-specified equipment and shall be installed and routed in a way that is not visible whenever possible. Cabling for connecting to Audio/Visual equipment shall be provided as communication outlets in areas of the room chosen to be the most convenient for use of the equipment and displays.

**High Density Rooms (Patient care, clinical, exam, technical professional office space)**

Install four communication outlets (one on each wall) each with a minimum of four data ports for the support of high-density technology spaces. In addition to the types above, High Density Rooms can be identified by using higher numbers of network-connected devices (printers, copiers, phones, computers, appliances) than others.

**Storage areas**

One communication outlet, with a minimum of one data port is required.

**Facilities – HVAC, electrical, mechanical rooms**

One communication outlet, with a minimum of two data ports is required. A minimum of one communication outlet designated for a Wireless Access Point within 25 feet of the room.

**3.2 Cable and wire infrastructure and equipment**

This section addresses intra-building cables between network and telecommunication spaces, station (or premise) wiring from these spaces to the user's wall outlets, their wiring paths and related equipment.

**Access to cross-connect rooms**

Access to cross-connect rooms is acceptable by either extending the cable tray, providing J-hook style hanging supports or by providing conduit.

**Backbone cabling requirements**

The main building wiring closet will have single mode fiber originating from and distributed to each of the other wiring closets on each floor in the building. Fiber cabling from the first floor main wiring closet to and between each of the building floors shall be six strands (6) single-mode optical fiber. Fiber optic cable shall have at least 30 feet of additional cable (slack) on each end upon entering the cross-connect room.

**Cable facilities planning**

Telecommunications rooms and cabling facilities (conduit, cable trays, raceways, equipment cabinets/racks, etc.) are required for connecting work areas with the building communications equipment and cross-connect rooms. Previously, cross-connects were called main distribution frames (MDFs) and/or intermediate distribution frames (IDFs). This document will use the term cross-connect to represent either the main or intermediate cross-connect.

**Conduit specifications**

Conduits to communication outlets are to be a minimum of one inch. A dedicated conduit will serve each outlet box. Pull boxes, if needed, must be accessible. Do not place pull boxes above fixed ceilings, HVAC ducts or piping. No conduit run, without a pull box, is to be longer than 100 feet and have no more than two 90-degree bends.

**Drop ceilings**

A cable wire tray may be placed above drop ceilings with the 1-inch communication outlet conduits stubbed to the cable tray from individual room outlets. This tray will provide a path back to the cross-connect. The tray will have a maximum of 8-inch spacing between cable supports and can be basket style, either with 4-inch sides. Width of the tray to be determined by the quantity of cables in the tray, and projected growth. Cable trays and conduits must be properly grounded. All NEC codes for grounding of cable trays shall be adhered to. Communication outlets designated for Wireless Access Points can be mounted inside drop ceilings, but the Access Point Hardware is to be mounted on the interior surface of the room - wall or ceiling.

**Electrical requirements**

Although the electrical load is usually minimal (most devices draw less than 1 amp), devices connected to communications outlets can sometimes use power provided by telecommunications equipment called PoE (Power over Ethernet). These typically draw 12-15 watts each. Other devices require separate electrical service: computers, copiers, printers, monitors, etc. Each communication outlet should be located in proximity to a duplex electric outlet to accommodate the need to plug in the electronic equipment using the communication outlet.

**Equipment cabinet requirements**

Enclosed cabinets shall have a rack mount width of 19 inches, with a height dependent on space and mounting constraints. Enclosed cabinets shall have provisions for a roof mounted cable fan and multiple options for cable entry. Enclosed cabinets must be at least 32 inches deep to accommodate a rack mounted uninterruptible power supply (UPS). Information Technology shall work with end users and planners to identify equipment cabinet requirements.

**Existing intra-building wiring**

There are currently six different types of known network infrastructure cabling that exists within Benton County Facilities. These are:

- Shielded and Unshielded Twisted Pair (UTP) Ethernet cabling for data
- Shielded and UTP cabling for voice/telephone
- Multi-Mode Fiber
- Single-Mode Fiber
- Various Multi-Media cabling (HDMI, Serial, DVI, Component)
- Legacy shielded 25-pair cabling for voice/telephone

**Fiber optic rack mount**

Fiber optic hardware shall be FC series and fiber optic cabinets shall provide safe reliable patch cord management. Provide splicing and patching features. Provide high-density splice trays capability. Fiber management tray slides forward and backward.



**Fiber optic backbone cable**

Fiber optic cable for backbone connections, long distance runs and between cross connect rooms shall be Indoor/Outdoor Optical Fiber Conductive Plenum (OFCP) Cable with interlocking armor and OM3 10 Gigabit Laser Optimized for 50/125  $\mu$ m Optical Fibers or Riser/Plenum Tight Buffer Optical Fiber Conductive Cable.

Each Fiber shall be graded-index optical fiber wave-guide with nominal 50/125.  $\mu$ m-core/cladding diameter. Comply with the latest revision of ANSI/ TIA-492AAAC. Attenuation shall be measured in accordance with ANSI /TIA-455-78-B. Information transmission capacity shall be measured in accordance with ANSI/ TIA-455-204 or 455-220. Measurements shall be performed at 23°C  $\pm$  5°C. Maximum attenuation dB/km @ 850/1300 nm: 3.0/1.0. OFL Bandwidth: 1500 MHz/km @ 850nm for overfilled launch. OFL Bandwidth 500 MHz/km @ 1300nm. Bandwidth 2000 MHz/km characterized using FOTP-220. Optical fiber shall be laser optimized and guaranteed for 10 Gigabit Ethernet distances of 300m/300m for 850nm and 1300nm, respectively. Optical fiber shall be laser optimized and guarantee Gigabit Ethernet distances of 1000m/600m for 850nm and 1300nm respectively.

Physical Characteristics shall:

Be suitable for use in both outdoor and indoor applications without the use of a transition at the building entrance. Be suitable for use in risers, plenums and horizontal applications. Have a dry water blocking system for cable core and buffer tubes. Be available with a fiber strand count range from 6 to 432. Have a 3.0 mm sub-unit diameter. Have and be marked with an UL-OFNP and OFN FT6 Flame Rating. Comply with the requirements of ICEA S-83-596 & ANSI/ICEA S-87-640. Strength members shall be dielectric and may be either fiberglass or aramid yarn.

Interlocking armor shall be helically wound of a continuous formed aluminum tape. The nominal number of convolutions shall be 48 per foot in order to ensure maximum flexibility and strength. Suitable for underground or aboveground conduits. Have a ripcord for overall jacket. Be suitable for operation between -40°C to +75°C. Be UV resistant. Be of an all-dielectric design.

**Fiber termination – connector specification**

The type of termination used for all fiber optic cabling shall be SC or LC type connections and conform to requirements of the specified fiber manufacturer. Application of which type of connector shall be determined by consulting with Information Technology staff and providing details of its intended use.

**Fiber Optic Connectors**

Each LC and SC Fiber Connector shall be a pre-polished fiber connector with a fiber stub. Be available in single mode and multimode versions. Have a domed zirconia ferrule. Be a PC polish type connector. Accept a nominal fiber diameter of 125 micrometers. Have a typical insertion loss of 0.1 dB for multimode and 0.2 dB for single mode. Capable of

reusable termination. Have an insertion loss change of less than 0.2 dB after 500 reconnects. Be stable over an operating range of -40°C to +75°C.

### **Firestop**

A firestop system is comprised of the item or items penetrating the fire rated structure, the opening in the structure and the materials and assembly of the materials used to seal the penetrated structure. Firestop systems comprise an effective block for fire, smoke, heat, vapor and pressurized water stream.

All penetrations through fire-rated building structures (walls and floors) shall be sealed with an appropriate firestop system. This requirement applies to through penetrations (complete penetration) and membrane penetrations (through one side of a hollow fire rated structure). Any penetrating item i.e., riser slots and sleeves, cables, conduit, cable tray, and raceways, etc. shall be properly firestopped.

Firestop systems shall be UL Classified to ASTM E814 (UL 1479) and shall be approved by a qualified Building Inspector. Proposed systems including the UL Drawings shall be including in the submittals prior to installing the firestop systems.

Firestop device systems must have ratings up to 4 hours for fire rated walls and up to 3 hours for fire rated floors. Firestop putty must be remain soft and moldable for the duration of the installation. Only re-enterable materials shall be used. Firestop caulking shall not be used around the structured cabling assemblies.

### **Horizontal cabling**

Also known as station or premise wiring. TIA/EIA Category 6a plenum rated cabling shall be used for all new or replacement horizontal wiring in Benton County facilities. Sufficient wiring closets must be located on each floor so that horizontal wiring to each office/floor location shall remain within wiring distance limits specified in industry standards.

### **Outlet cable path requirement**

All communication outlets will have conduit, wire mold, or other suitable path provided to the nearest cross-connect or to a cable tray that provides a path back to the nearest cross-connect room. Cables shall be secured at every corner. If cable ties are used, they must be trimmed off cleanly at the locking hole and trimmings, broken, removed or unused ties must disposed of appropriately. Cables shall be run in a uniform fashion and shall not be woven among other utilities. Each wiring run must be labeled individually.

**Modular patch panels**

The Modular Patch Panels shall:

Meet category 6 component compliance and be verified by a third-party nationally recognized independent testing laboratory. Use low emission IDC contacts. Use dual reactance technology to enhance the signal-to-noise ratio. Require standard termination practices using a 110 impact tool or be a unloaded panel using High Density (HDJ) jacks. Use a single piece IDC housing designed to accept larger category 6 conductors. Support both T568B and T568A wiring. Include easy to follow wiring labels. Include label fields. Allow for the use of icons. Include full length metal rear cable management. Be available in standard or high density. Be backward compatible to category 3, 5 and 5e. Be center tuned to category 6 test specifications.

**Paths for cabling between cross-connect rooms**

A path between cross-connects in separate communications rooms is required. Cable tray, conduit(s), or sleeved holes that provide this path are acceptable. The volume of cable and predicted expansion determines the size and quantity of the trays, conduit(s), or sleeved holes that make up the path.

**Pull strings**

The electrical contractor will provide a pull string in all empty conduits and conduits with room for expansion.

**Racks**

All racks and wire management shall provide vertical cable management. Provide support for the patch cords at the front of the rack and wire management. Provide support and protection for the horizontal cables inside the legs of the rack. Waterfall cable management shall be provided at the top of the rack for patch cords and for horizontal cables entering the rack channels for protection and to maintain proper bend radius and cable support. Wire management shall also be mounted above each patch panel and/or piece of equipment on the rack. The rack shall include mounting brackets for cable tray-ladder rack to mount to the top of the rack. Velcro cable ties shall be provided inside the rack channels to support the horizontal cable.

Free-standing racks shall:

Provide the necessary strain relief, bend radius and cable routing for proper installation of high performance cross connect products, meeting all specifications of the most current revision of ANSI/TIA-568. Have top cable trough with waterfall and built in patch/horizontal cable distribution separator. Have EIA hole pattern on front and rear. Be available with a 10.5" or 16.25" channel depth and four post server racks. Be available with hook and loop straps for securing bulk cables inside the vertical U-channels. Assemble as 19" (483 mm) or 23" (584 mm) with no additional hardware. Be

available with three styles of vertical patch cord management: inter-bay with latches, cable management rings, or fingerduct with covers. Provide floor and ceiling access for cable management and distribution. Provide pre-drilled base for floor attachment of rack. Be available in standard colors of black and white. Use speed nuts for easy installation. Rack units imprinted or stamped top to bottom/ bottom. Be manufactured by an ISO 9001 registered company.

### **Removal of wiring**

Information Technology shall be consulted before removal of telephone, communications wire and equipment, i.e., when office walls partitions are relocated. All wiring must be removed all the way back to the cross-connect source. If a run is planned to be re-used, it must have sufficient length to be re-terminated properly at the communication outlet without splicing. The wire can be temporarily coiled up out of the way of construction until it is ready to be re-used. Re-used runs must be verified to have proper labeling.

### **Splicing and routing**

Splicing station wire is not permitted. Wire must be continuous from the cross- connect to the outlet (jack). Cables shall not be tie-wrapped to or routed along electrical, water or gas conduit. For renovation projects when it is necessary to have exposed interior wiring runs, the wire shall be enclosed using wire molding or conduit. Cable shall not be installed below ceiling in an exposed fashion, i.e., all surface mounted cable should be placed in conduit.

### **Voice/Telephone cabling and termination**

Cabling distribution to each office, conference room and space shall be TIA/EIA Category 6a plenum rated wiring from the cross connect. At the outlet end, enough additional cable (slack) must be left to reach the farthest corner of the wall, plus 5 feet. Depending on the facility, the wiring may be terminated with type 110 blocks, type 66 blocks or Category 6 panel in the cross-connect room. At the cross-connect end, at least 5 feet of additional cable (slack) must be provided past the center point of the appropriate telephone or data rack.

### **Work area outlets**

Work area cables shall each be terminated at their designated work area location in the connector types described in the subsections below. Modular telecommunication jacks to be used in all work area outlets. These connector assemblies shall snap into a faceplate.

The Telecommunications Outlet Assembly shall:

Accommodate a minimum of two (2) modular jacks. Additional accommodations for specific locations as noted in the plans for optical fiber and/or additional copper cables as necessary. Blank filler plate shall be installed when extra ports are not used. Dust caps/stuffer caps shall be provided on all modular jacks. Multiple jacks identified in close

proximity on the drawings but not separated by a physical barrier may be combined in a single assembly.

The contractor shall be responsible for determining the optimum compliant configuration based on the products proposed. The same orientation and positioning of jacks and connectors shall be utilized throughout the installation. Prior to the installation, the contractor shall submit the proposed configuration for each outlet assembly for review by Information Technology staff. The modular jack shall incorporate a printed label strip on the dust cap module for identification purposes. Printed labels shall be permanent and compliant with ANSI/TIA-606-B. Hand printed labels shall not be accepted.

The faceplates shall be:

High Density style, as appropriate to fit the modular jack used, UL listed and CSA certified. Constructed of high impact, ABS plastic UL 94V-0 construction (except where noted otherwise). Matched in color used for other utilities in the building or match the color of the raceway if installed in surface raceway. Easy to access for moves, adds, and changes by front removal of jack modules. Recessed designation windows to facilitate labeling and identification. Equipped with a clear plastic cover to protect labels in the designation window. Equipped with mounting screws located under recessed designation windows. ANSI/TIA-606-B work area labeling standard.

Compliant with the above requirements along with the following when incorporating optical fiber:

Be a low profile assembly. Incorporate a mechanism for storage of cable and fiber slack needed for termination. Position the fiber optic couplings to face downward or at a downward angle to prevent contamination. Faceplates must also incorporate a shroud that protects the optical couplings from impact damage.

Voice / Data Jacks:

Voice/Data jacks shall be 8-position, 8-conductor (8P8C) modular jacks and shall be category 6 performance as defined by the references in this document including ANSI/TIA-568-C.2. All pair combinations must be considered, with the worst-case measurement being the basis for compliance.

Modular jack performance shall be third-party verified by a nationally recognized independent testing laboratory. The modular jack shall use dual reactance modular contact array. The modular jack shall have low emission IDC contacts. The modular jack shall use standard termination practice using 110 impact tool or if using the High Density Solution, the jack shall have a lacing cap. The modular jack shall be backwards

compatible to category 3, 5, and 5e. The modular jack shall be center tuned to category 6 test specifications.

## 4 Documentation

### 4.1 Installation, testing, and maintenance records

All initial installation and modifications to cable paths, backbone cabling, cross-connects, horizontal wiring, termination and testing is to be documented in accordance with ANSI/TIA/EIA 606A standards. Information Technology shall be furnished documentation and as-built drawings in electronic and printed form for large projects and installations. Information Technology shall maintain this documentation for modifications and small projects.

#### As-built drawings

Drawings are to include cable routes and outlet locations. Outlet locations shall be identified by their sequential number as defined elsewhere in this document. Numbering, icons, and drawing conventions used shall be consistent throughout all documentation provided. Information Technology staff will provide floor plans when available in paper and/or electronic formats on which as-built construction information can be added. Contractors shall annotate the base drawings and return a hard copy and electronic form.

### 4.2 Cable plant records

All cable and station wiring that is to be connected to, or disconnected from, the Benton County network infrastructure must be reported to Information Technology for approval. This information must be submitted and tracked so that accurate infrastructure records can be maintained.

### 4.3 Labeling requirements

All the information to label wall plates, horizontal cabling, patch panels and cross-connects shall be included in Information Technology cable management records. The naming and labeling conventions in this section identify specific methods of implementing ANSI/EIA/TIA-606-A Standard. The 606-A identifiers are shown in italics. Each character in the identifier represents a key piece of information. The 606-A Standard allows administrative flexibility to accommodate variations in naming conventions format (Sections A2 and A5), such as alpha designations for floors. Brackets identify expansions to the ANSI/EIA/TIA-606-A Standard.

- *f* = [alpha] numeric character(s) designating the floor
- *s* = alpha [numeric] character(s) uniquely identifying the telecommunications space
- *a* = one or two alpha characters uniquely identifying the patch panel/cross-connect
- *n* = two to four numeric characters designating the port
- *r* = one to four numeric characters designating the room number

### Identification and naming

Jack locations are identified upon entering each room through its main entrance and sequentially numbering them, 1, 2, n, from left to right (clockwise), and vertically from top to bottom, around the room. Each jack position on every wall plate is sequentially lettered A, B, , left to right, then top to bottom. Room identifiers frrr can be 3 or 4- character unique alphanumeric designators (i.e., 103, 206T, B09) within the building (first character matching floor identifier, i.e. 1st floor, 2nd floor, Basement, respective to these examples).

### Wall plate labeling

Each room's Data, Telephone, and Audio/Visual wall plates are to be labeled to show the horizontal link identifier (fs-an). This consists of the originating telecommunications space (TS), designated by (fs) and patch panel port (an) where the link originates. Information Technology also requires the work area identifier, wall plate, and jack identifier be labeled where the horizontal link is terminated. These are mandatory data elements to be included in infrastructure records. See ANSI/EIA/TIA-606-A Section 5.2.1 for a list of horizontal link records requirements.

### Port labeling

The Benton County data port labeling convention is fsss-ann JP-frrr, where fsss represents the originating cross-connect room identifier, ann represents the originating patch panel and port number, JP represents the room's data Jack and Port location, and frrr is the destination floor/room identifier. For instance, the label "202-F04-1A-206T" would identify cross-connect room 202, patch panel F, port 04, and connecting jack location/position 1A in room 206T. Note that room identifiers typically use the first character(s) position to specify floor(s).

- J = one to two numeric characters designating jack location within the work space
- P = one alpha character to represent the jack position within the wall plate
- frrr = one to four alphanumeric characters to uniquely identify the work space

## 5 Outside plant

### 5.1 Vaults and duct system requirements

All new building construction planning must include a cable path into existing vaults or manholes, or new vault/duct systems included as part of the new construction. The size of the cable path to be based on the requirements of the facility. This path shall be used exclusively for data, voice, low voltage control/alarms, and video cables.

### 5.2 Outside plant plan review

Information Technology is the control entity for telecommunication facilities and will review drawings and specifications on construction and renovation projects for compliance with Benton County telecommunications/network infrastructure standards and user specifications.

### 5.3 Funding for cable plant modifications

Any project that requires moving or rerouting of telecommunication cables will be paid for with project or department sponsor funding. Not by the Information Technology Department.

## 6 Quality Assurance standards

### 6.1 Infrastructure cable testing and standards

#### 6.1.1 Testing documentation

All infrastructure testing results shall be documented. Paper and electronic copies of all testing documentation is to be provided to Information Technology at the conclusion of testing.

#### 6.1.2 Testing standards

Testing shall be performed in accordance with the following standards:

#### **ASTM D 4566-98**

“Standard Test Methods for Electrical Performance Properties of Insulation and Jackets for Telecommunications Wire and Cable”

#### **ANSI/TIA/EIA-568-B.2**

“Commercial Building Telecommunications Cabling Standard – Part 2: Balanced Twisted-Pair Cabling Components — Addendum 1 – Transmission Performance Specifications for 4-Pair 100 ohm Category 6 Cabling”

### 6.2 Equipment Standardization

Selection of specific equipment, installation methods and maintenance requirements have an impact on Information Technology staff’s ability to manage and grow the technical infrastructure. Many solutions meet the standards-based compliance requirements mentioned previously in this document, but may not integrate well with Benton County’s infrastructure. During its requirements review, Information Technology will base its specific recommendations and approval of proposed projects on compatibility with the existing and planned infrastructure, legal requirements, mandatory use of state contracts, warranty and certification requirements, maintenance and overhead costs and other factors affecting the total cost of ownership.

### 6.3 Warranty and certification



All wiring shall be warranted a minimum of 15 years and certified to EIA/TIA 568 and NFPA standards for Category 6 data/telephone and plenum cabling.

#### 6.4 Cleanup

Contractors shall clean up all debris related communications cabling installation on a regular basis throughout a project and at project/work completion before Benton County's acceptance of the work. Contractors shall protect all new and existing equipment from damage during work. Damaged equipment because of not being properly protected shall be replaced at the Contractor's expense.

### 7 Wireless infrastructure support

#### 7.1 Wireless Access Point (WAP) installation

Wireless access point installation locations shall be documented on plans. Each wireless access point shall have Category 6 wiring pulled back to the floor's cross-connect room. Communication outlets designated for Wireless Access Points may be mounted inside drop ceilings but shall follow all termination and labeling standards. Access Point Hardware shall be mounted on the interior surface of the room - wall or ceiling.

#### 7.2 Appropriate use of wireless networks

As a general rule, Wireless networks shall be installed only as extensions or additions to hard-wired networks, not as a replacement for cabled communication networks.