

**Ownership:** The University of Illinois at Urbana-Champaign owns and operates the telecommunications system that serves the Urbana campus, including all system hardware located within buildings as well as outside of buildings. Ten distribution "nodes" installed on U of I property form the demarcation points where U of I ownership ends and non - U of I telecommunication carriers' ownership begins.

**Operation and Maintenance:** The management, operation and maintenance of the U of I - owned system are the responsibility of the Campus Information Technologies and Educational Services (CITES). CITES is also responsible for the design/engineering of all voice, data, video, wireless, cellular, and satellite systems for the university.

**System Scope:** The U of I telecommunications system is designed to provide a uniform, comprehensive and flexible distribution system to meet the complete telecommunication needs of the campus. This system supports all forms of information transport and processing as required for voice (both analog and digital), data (including computer networking), video, audio, control and electronic door access systems. The system currently supports 20,000 voice connections, 80,000 active networked systems, and 150 video/multi-media sites in approximately 300 buildings; utilizing 80 miles of underground copper cable and 89 miles of underground fiber optic cable to form a high-speed, multi-service, multi-vendor communications transmission system.

**AE Requirements:** New construction and major remodeling or renovation projects will require the services of a Registered Communications Distribution Designer (RCDD) Telecommunications Engineer. At the Urbana-Champaign Campus, the Campus Information Technologies and Educational Services (CITES) will assist the commissioned Project AE in this regard by providing this service for a fee consistent with University Policy.

The Project AE (using CITES staff or Consultants) is responsible for all communications infrastructure such as conduit, cable tray, and space requirements

in the building and extension of the telecommunications outside plant facilities to the building.

Minimum qualifications for the Telecommunications Engineer are:

1. A Building Industry Consulting Service International Inc. (BICSI) Registered Communications Distribution Designer (RCDD).
2. 10 years working experience in the Telecommunications industry.
3. 3 years working experience in the planning and design of telephone Outside Plant (OSP) and building riser facilities (i.e., OSP Engineering or Building Industry Consultant Service (BICSI).
4. Ability to author detailed specifications, punch lists and other bid documents.
5. Ability to prepare detailed construction and as built drawings.
6. Ability to inspect and supervise projects.
7. Experience in a campus environment.

The CITES Telecommunications Project Manager will review and approve the qualifications of all Telecommunications Engineers to provide telecommunications services.

### **Contract Documents Drawing Submittal Requirements:**

The commissioned Project AE shall provide floor plans that show the locations of existing and new telecommunications main terminal rooms, equipment rooms and floor terminals. The floor plan drawings may be submitted in either of the following 2 formats:

1. AutoCAD compatible drawing files scaled to the true dimensions of the building. AutoCAD Release 2007 drawings are preferred; however a minimum of Release 2004 will be accepted.
2. On reproducible media scaled no smaller than 1/8" = 1' - 0".

Drawings shall also show the proposed locations for all communications outlets, and the CER or FDF destination of each outlet.

In addition, all conduits, raceways, cable trays, floor ducts, junction boxes, camera mounts, wireless access locations, pull boxes, and manholes and their supports

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shall be shown for all proposed telecommunications facilities.

All telecommunications drawings shall be separate from other disciplines, and will be identified as Telecommunications and System Drawings within the Electrical section.

Floor plan drawings shall include separate layers identifying the floor plans with distribution raceway and voice and data station outlets.

Unscaled drawings shall be provided for distribution and riser cables showing:

1. Backbone distribution cable routes.
2. Service entrance.
3. Riser distribution cable routes.
4. Distribution cable support systems.
5. Type, size, sheath, gauge and length of all cables except station cables.
6. All splice locations with cable number and count.
7. Protector location and count.
8. Terminal locations and quantities of major hardware components.

Plans or details of Main Distribution Frame (MDF), Intermediate Distribution Frame (IDF), Communications Equipment Rooms (CERs), and Floor Distribution Frames (FDFs) showing:

1. Room layout (plans and elevations) showing location of splices, backboards, protectors, protector counts, frames, racks, mounts, power supplies, ground bus, and cable counts.
2. Terminating location of distribution, station and riser cables.
3. Riser cable count and number of station jacks to be terminated.
4. Dimensions of devices, fixtures, etc.
5. Details of special supports that are required for clarification.

Provide a voice/data schematic drawing as per *Drawing 27 00 00-3, Telecommunications Typical Wiring Schematic*.

**System Description:** The system includes the following components/features:

**Outdoor Distribution:** The ten nodes are interconnected with each other and with

virtually all of the buildings on “campus proper”, as well as a number of outdoor emergency telephones, through an extensive underground conduit and manhole distribution system. The outdoor cable infrastructure consists of copper cable, single-mode and multi mode fiber optic cables.

**Voice Switching:** The Nortel DMS-100 digital switch, which provides advanced voice features for the U of I, is located in the AT&T switching center just west of the campus.

**Data Networking:** Data network switches, routers, wireless access points, and bridges are distributed throughout the campus, primarily in communications nodes and communications equipment rooms (CER's).

**Wireless Networking:** Wireless connections are distributed throughout the campus, both in buildings and at exterior locations and are connected to be Communications Equipment Rooms (CER's) via network cabling.

**Main Distribution Frames:** The U of I telecommunications system is connected to the AT&T Central Office through ten separate “main distribution frames” (MDF's), referred to as “nodes”, as mentioned above.

**Intermediate Distribution Frames:** Each MDF is connected to an “intermediate distribution frame” (IDF), also called a “main terminal room”, in each of the buildings it serves.

**Floor Distribution Frames:** Each IDF is connected to one or more “floor distribution frames” (FDF's), also called “terminal closets”, on each floor of the building it serves to primarily handle voice communications.

**Communications Equipment Rooms:** Each IDF is also connected to one or more “communications equipment rooms” (CER's) in each building to primarily handle data communications.

**Outlets:** Each FDF is connected (primarily) to the voice jacks on the floor, or portion of thereof, that it serves. Each CER is

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connected (primarily) to the data jacks in the building, or portion thereof, that it serves.

**Typical Circuits:** A typical complete voice circuit consists of a voice jack wired to the FDF; the FDF wired to the IDF; the IDF wired to the MDF; and the MDF wired back to the central office. A typical complete data circuit consists of a data jack wired back to the CER.

**Building System Requirements:** Each building shall incorporate the following features/devices to support the telecommunications system that serves it:

**Main Terminal Room:** A 7 x 4 ½ ft. (minimum) room shall be provided at the telecommunications service entrance, on a lower level of each building, to serve as the “intermediate distribution frame” (IDF) or “main terminal room”. The exact IDF room size required to serve a specific building shall be determined/confirmed by CITES.

**Floor Distribution Closet:** Multiple 8 x 5 ½ ft. (minimum) rooms shall be provided to serve as “floor distribution frames” (FDF’s) or “terminal closets”. As stated above, FDF’s primarily support voice communications. These rooms shall be “stacked” vertically to create a riser up through a building (with a FDF on each floor). Multiple FDF risers shall be provided as required to support the number of voice jacks that are expected to be installed within a building. The exact number and location of FDF’s to serve a specific building shall be determined/confirmed by CITES.

**Communications Equipment Rooms:** One or more rooms shall be provided to serve as “communications equipment rooms” (CER’s). The minimum dimension of this room is 10 x 8 feet. As stated above, CER’s primarily support data communications. CER’s shall be provided in number and location as required to limit the cable length to 100 meters from a CER to the most remote data jack. The exact number and location of CER’s to serve a specific building shall be determined/confirmed by CITES.

**Outlets:** Outlets shall be installed as indicated by the *Program Statement* and U

of I representatives for a given project. The density of telephones and computer equipment used within U of I buildings is quite high. Also, the usage of spaces changes often. Therefore a generous number/distribution of outlets shall be provided. A minimum of one combination voice/data outlet shall be provided in each room that may someday be occupied (e.g. storage rooms). Where applicable, the location of outlets shall be coordinated with the layout of modular furniture/partitions with integral raceway. This has been a repeated problem area in the past. Outlets shall be provided for emergency and service telephones (see paragraphs individually addressing each of these items below). This requires coordination and is easily overlooked. An Ethernet data jack shall be provided for the building automation control unit(s) that serves each building. An Ethernet data jack shall also be provided in each elevator machine room. Both of these are also often overlooked. Generally, outlets shall be flush-mounted in walls. Flush-mounted floor outlets are not allowed. However, recessed floor boxes with hinged/removable covers that contain power and/or voice/data receptacles may be installed to serve equipment that is located remotely from the nearest wall.

**Raceway:** Cable raceway shall be provided as required to interconnect all system components within a building. The exact type and routing of raceway within a building shall be determined/confirmed by CITES.

**Emergency Telephones:** An emergency telephone shall be installed within each elevator cab and at each area of refuge within stairwells. One outdoor kiosk with an emergency telephone shall also be installed at each new or remodeled campus building. All emergency telephones shall be placed so as to be noticeable to pedestrians in the area and not hidden from view.

**Service Telephones:** Each new or remodeled building shall incorporate at least one campus service telephone. When only one such phone is provided, it shall be installed in the combination key / service phone cabinet that serves the building or adjacent to the building key cabinet if a combination cabinet is not available /

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provided. An additional phone shall be considered for installation in each major equipment room.

**Outdoor System Requirements:** Buried concrete-encased conduits shall be provided as protective raceway for outdoor cabling between nodes and/or buildings. A manhole/vault shall be provided at each junction point in the system. Conduit number/configuration/routing and manhole size/configuration/location shall be determined/confirmed by CITES.

**Brand Name Products:** Long-term management to maintain the integrity of the campus distribution system through consistent standards requires the designation and use of certain brand name products (see *Section 27 00 00 – Communications*).

**Additional Information / Requirements:** See *Technical Section 27 00 00 – Communications* and *Drawings #27 00 00 - 1 through 37* for detailed information/requirements related to all of the above topics. Contact CITES, Networking/Communications Engineering Section for clarifications or additional information.)