OVERVIEW

Networking and Telecommunications Infrastructure Budgets
Libraries & Information Technology Services (LITS) infrastructure budgets are required for all Emory owned properties or leased space. LITS infrastructure budgets are prepared in accordance with the LITS Building Design Standards, which are a collection of requirements that architects and engineering consultants must adhere to when addressing communication needs for new and renovated buildings as well as leased space. The standards provide a baseline for the design of pathways and spaces. Designing and budgeting with these standards in mind effectively allows Emory University to maximize the benefits of a common, facility based infrastructure, establish meaningful budgets, allocate space and more effectively plan how technology is integrated into a new construction project or existing facility. The Building Design Standards may be modified based on the size and scope of the project but must be approved by the LITS PM assigned to the project.

Once a request for budget is submitted to the PMO a project manager is assigned and a feasibility budget is prepared. During this early stage of a project, specific site plans may not be available to accurately determine the true requirements of the occupants. To that end, the PM designs the space and cabling requirements based on the information provided.

Budgets may include but are not limited to the following:
- Required network service entrance – typical for remote sites (AT&T/Charter)
- Building entrance cable – copper/fiber
- Riser connectivity between floors – copper/fiber/coax
- Build-out of communications closets
- Estimated low voltage cabling for work stations
  - 2 Cat6 drops per work station - typical
- Network electronics – sized for occupants
- Estimated Phone budget – new vs. relocations
- Emory CATV
- Wireless Access Points – Coverage based on feasibility drawings
- Distributed Antenna System (DAS) for Cellular/Radio/Messaging
- LITS labor – Engineer/Coordinator/Project Manager/Move-in
- Contingency – returned to project if not used

Once a budget has been submitted, the PM for the project will revise the estimate as more detailed information becomes available. It is important to understand the costs associated with a feasibility budget compared to a detailed estimate based off of occupant requirements so a meeting with the customer and LITS PM is strongly encouraged to review the budgetary numbers and provide details into the design and estimate criteria. If for any reason there are questions about the estimate, please work through the LITS PM for escalation or resolution to any areas of concern. It is our goal to provide an accurate and detailed budget so that the user can make an informed decision.

Please note: Exclusion of IT Infrastructure components (e.g., DAS, wireless) from any budget must be approved in writing by the Enterprise CIO and Senior Provost for Library Services and the Vice President for Campus Services.

Services
- Private Emory-owned networks carry Data, Computer Services and Wi-Fi Services. The design of cable distribution should be coordinated and campus tie-in determined on a case-by-case basis through the LITS Project Manager.
• **Voice Service** is carried privately by Emory University, LITS. The design of cable distribution should be coordinated and campus tie-in determined on a case-by-case basis through the LITS Project Manager.

• **Video Service** is carried privately by Emory University, LITS. The design of cable distribution should be coordinated and campus tie-in determined on a case-by-case basis through the LITS Project Manager.

• **Paging and Two-way radio** is carried privately by Emory University, LITS. The design of cable distribution should be coordinated and campus tie-in determined on a case-by-case basis through the LITS Project Manager.

• **Audio Visual** – The design/installation of audiovisual technologies in support of conference rooms or digital displays, are not included in the LITS scope of work. Please coordinate this effort with occupants.

**Drawings**

Drawings must be provided in the form of electronic files during all phases of construction. Drawings and design documents should be delivered to the assigned LITS Project Manager.

**SECTION 27 00 00 COMMUNICATIONS**

**General**

The information in this section should be used as a guideline for the design of communication spaces. It is both owned and maintained by the Emory University, LITS Division with updates occurring on an annual basis. It should be used by the Architect for the programming of communications spaces as described within.

The major organizational sections are:

- **27 05 26**  Grounding and Bonding for Communications Systems
- **27 05 28**  Pathways for Communications Systems
- **27 05 28 29**  Hangers and Supports for Communications Systems
- **27 05 28 31**  Riser Pathways
- **27 05 28 33**  Conduits and Backboxes for Communications Systems
- **27 05 28 36**  Cable Trays for Communications Systems
- **27 05 28 39**  Surface Raceways for Communications Systems
- **27 05 43**  Underground Ducts and Raceways for Communications Systems
- **27 10 00**  Structured Cabling
- **27 11 00**  Communications Equipment Room Fittings
- **27 21 33**  Data Communications Wireless Access Points
- **27 26 26**  Data Communications Integration Services
- **27 32 23**  Elevator Phones
- **27 32 26 01**  Emergency Blue Light
- **27 32 26 03**  Gate Controls
- **27 32 26 05**  Fire Alarm Panels
- **27 53 19**  Internal Cellular, Paging, Distributed Antenna System
- **Appendix A**  Communications Room Footprint
- **Appendix B**  Communications Horizontal Requirements
- **Appendix C**  Communications Vertical Requirements
- **Appendix D**  Elevator Control Room Wiring Diagram
- **Appendix E**  Emergency Blue Light Wiring Diagram
  - Tower with Alarm Wiring
  - Parking Deck Wiring
- **Appendix F**  Building Entrance Phone Wiring
- **Appendix G**  Distributed Antenna System Break-out Room

For any information that is not covered in the following guidelines, refer to the appropriate industry standard as listed below.

**Standards, Codes, & References**

- **Building Industry Consulting Service International (BICSI)**
  - Telecommunications Distribution Methods Manual (TDMM)
  - Network Design Reference Manual
  - Customer-Owned Outside Plant Design Manual
  - Wireless Design Reference Manual (BICSI)
- Electronic Security (BICSI)
- American National Standards Institute, Inc. (ANSI)
  - National Electrical Safety Code
- Federal Communications Commission (FCC) Publications
  - FCC Rules and Regulations – Part 15
  - FCC Rules and Regulations – Part 68
- Occupational Safety and Health Act of 1970 (OSHA)
  - Public Law 91-596
- Insulated Cable Engineers Association (ICEA) Standard
  - ICEA S – 80 – 59
- National Fire Protection Association (NFPA)
  - 101
- National Electrical Code (2005)
- Institute of Electrical and Electronics Engineers, Inc. (IEEE)
- National Electrical Safety Code
  - 800 Series Standards
- Electronics Industries Association (EIA/TIA 568B, 569, 606, 607)
- International Telecommunications Union (ITU), formally CCITT
  - I Series Standards
- The Joint Commission

END OF SECTION 27 00 00

SECTION 27 05 26 GROUNDING & BONDING FOR COMMUNICATIONS SYSTEMS

A ground bus (CPI 13622-010 copper ground bar or equivalent and TIA/EIA 607 compliant) must be installed on the back wall of each Communications Room. All wire used for communications ground applications must be no smaller than AWG #3/0. Two paths to ground must be created and bonded to the ground bus bar in each communications room for the purpose of creating a redundant communications ground system. One ground path leads to the building main electrical ground and should bond within two (2) to three (3) Feet of the ground connection for the main electrical panel. The second ground path leads to building metal frame in proximity to the Communications Room. Communications ground systems must be Meggar tested to 10 ohms or less. Ground bus bars must be mounted 18 inches above the finished floor and, along with the associated grounding riser, must be placed or routed in a manner that does not obstruct backboard space.

END OF SECTION 27 05 26

SECTION 27 05 28 PATHWAYS FOR COMMUNICATIONS SYSTEMS

SECTION 27 05 28.29 HANGERS & SUPPORTS FOR COMMUNICATIONS SYSTEMS

Cable hooks (J-hooks) are a suitable alternative to cable tray only when the planned capacity of the pathway system is 50 cables or less. Use and design of J-hook pathways must be coordinated with and approved by the LITS Project Manager. Unless otherwise noted by the LITS PM for a particular project, J-hook routing and installation is part of the building infrastructure and is within the scope of the general contractor. The routing and design must be coordinated with the LITS Project Manager. J-hook pathways are to be installed in accordance with industry standards (not to exceed 48-60 inches between supports). Pathways are not to be routed across adjacent office spaces.

END OF SECTION 27 05 28.29

SECTION 27 05 28.31 RISER PATHWAYS

A minimum of five (4) four-inch sleeves with bushings must be installed between stacked communications rooms. Sleeves must extend four (4) inches above and below the floor, and must be no farther than four (4) inches from the wall. Cores only are not permitted.

With regard to non-stacked rooms, conduit turns must be installed with sweeping radii having no more than two (2) 90-degree bends. The inside radius of the conduit bends must never be less than ten (10) times the internal diameter of the conduit.
All riser sleeves and conduits must have bushings, must be installed with measure tape (200 pounds or equivalent) and must be fire stopped. In addition, all sleeves must be sealed or waterproofed around their perimeter to avoid any leakage to the floor below in the event of a water leak.

Space within the riser conduits specified in this document is intended for LITS only. Any planned use of the riser must be coordinated and approved by the LITS Project Manager.

**END OF SECTION 27 05 28.31**

**SECTION 27 05 28.33 CONDUITS & BACKBOXES FOR COMM. SYSTEMS**

**Workstation Conduit**

Space within the workstation conduits specified in this document is intended for LITS only.

Where accessible lay-in type ceiling is used, a one-inch conduit with bushings must connect from the outlet box and run to the cable support system in the adjacent corridor.

In areas where the ceiling is inaccessible, the one-inch conduit with bushings must connect from the outlet box, run above the ceiling and continue to a point where it can be accessed for pulling cable. Pull String must be provided. A maximum of two (2) bends are allowed, and no breakout points are allowed. Inaccessible ceiling must be avoided where high concentrations of voice/data cabling are present or anticipated in the future. In situations such as an office with inaccessible ceilings, consideration should be given to include empty conduit and wall boxes on opposing ceilings in order to facilitate future moves, adds or changes. This will need to be coordinated with the LITS Project Manager.

Although not preferred, the one inch conduit with bushings may *home run* from the outlet all the way back to the local communications room. A maximum of two (2) bends are allowed and no breakout points are allowed. Pull String must be provided.

Drop conduits longer than 25 feet, including home runs, must be labeled with room numbers where the conduit terminates, and must be installed with Pull String.

Flexible conduit is not allowed.

Firewall penetrations in corridors should be sized according to cable quantities and *fire stop requirements*.

**Workstation Outlet Boxes**

Space within the outlet boxes specified in this document is intended for LITS only.

Communications outlet boxes must be four inches by four inches by 2½ inches electrical boxes with a single gang plaster ring. The outlet boxes must be mounted at least 18 inches on center above the finished floor.

Outlets above counters must be 12 inches on center above the counter if the counter does not have a back splash, and six inches on center above the back splash if the counter does have one. A minimum of eight inches on center of clearance must be maintained around the outlet.

Jacks for wall mount phones must have single gang plaster rings and must meet ADA regulations for handicap access. ADA requirements are 48" AFF with no more than 4 inches protrusion from the wall, phone inclusive.

Any communications floor outlet applications must be coordinated and approved by Emory University, LITS.

Additional outlet boxes are required for video applications.

The selection of modular furniture solutions must be coordinated with Emory University, LITS. The design including conduit sizing and wall box specifications must be coordinated with the LITS Project Manager in the case of *ganged* modular furniture.

Furniture placement must be taken into consideration when laying out communications jacks and wiring schemes.
Access to communications outlets must not be obstructed by furniture installations. If it appears that restricted access is unavoidable, special plans must be made in advance to either relocate the jacks on the wall or possibly install jacks directly in the furniture. (This is usually the case in modular furniture installations. Designers must consult with LITS PM when making a selection during schematic design phase.)

Electrical power for connecting occupant computer and video devices must be made available wherever communications outlets containing data or video cables are planned.

One duplex electrical outlet must be installed in close proximity of each CATV outlet.

END OF SECTION 27 05 28.33

SECTION 27 05 28.36 CABLE TRAYS FOR COMMUNICATIONS SYSTEMS
Space within the horizontal pathway system specified in this document is intended for LITS only.

Cable tray is required in any building requiring LITS. Design of cable tray systems must be coordinated with appropriate LITS PM. The use of wire “basket tray” is acceptable and may realize a cost savings from both price and ease of installation. The cable tray must be single tiered and must be installed to allow 12 inches of open space above and to one side of the tray. The volume of cable being installed at construction, as well as future growth projections, will determine actual type and dimensions of cable tray.

Cable trays are to be installed in all corridors and hallways and should not be installed above individual offices, conference rooms or restrooms.

A minimum of two (2) four-inch conduits must be used in place of a cable tray when installation involves passing over inaccessible ceilings and entrances into communications rooms. Additional conduits may be required as cable volume dictates. Determination of conduit requirements must be coordinated with appropriate LITS PM.

Appendix B: Typical Communications Horizontal Requirements

END OF SECTION 27 05 28.36

SECTION 27 05 28.39 SURFACE RACEWAY
The design of raceway, communications poles, modular furniture & floor-mounted devices will be coordinated with LITS Project Manager.

END OF SECTION 27 05 28.39

SECTION 27 05 43 UNDERGROUND DUCTS & RACEWAYS FOR COMM. SYSTEMS
An entrance conduit bank must be constructed from the building entrance communications room to an appropriate location, as determined by LITS, for the purpose of connection to existing LITS infrastructure.

Trenches for underground conduits should be excavated to required depths. Bottoms of trenches should be tamped hard and graded as required. If rock is encountered, trench should be excavated to a depth of six inches below bottom of pipe. Before laying pipe, the space between bottom of pipe and rock surface should be filled with gravel and thoroughly tamped. After testing, inspection and approval by Project Engineer and local inspecting authorities, trenches should be backfilled with clean dirt as follows:

• Backfill should be installed in layers six inches deep, and should be adequately tamped and wetted or flushed before the next layer of earth is laid in place. Backfill should be compacted to 95% density and this process continued until trenches are filled. No roots, rocks, or foreign materials of any kind are to be used in back-filling trenches. Contractor should furnish all additional material required, and should remove excess materials and debris from site.

A minimum of three (3) four-inch conduits (schedule 40) should run between the service manhole outside of the building and the entrance to the communications room. Outdoor conduit banks must be encased in concrete. The top of the conduit bank must be buried at least 24 inches below grade surface. Reduction in the quantity of entrance conduits must be approved by LITS PM.
Buried/encased conduit should be placed at a depth of no less than thirty inches below surface, except for locations where underground obstructions such as steam tunnels or gas lines prevent the practical installation at this depth, and shall be installed with a sensing tape.

Conduit runs should be placed as straight as possible with no more than two (2) 90 degree bends, using a minimum 40 inch radius (48 inch radius preferred). All new conduits and existing conduits used by the contractor should be roped and free from sharp edges or burs. All conduits should have a #10 gauge THHN or #10 steel galvanized pull wire.

Conduits must be clean, obstruction free, debris free, dry, and capped at both ends with a waterproof cap. Building entrance conduits that are used (populated with cable/fiber) should be waterproof-sealed to prevent water entrance into the building.

Building entrance conduits entering through the floor should be turned up six inches above the slab at the Plywood backboard. Conduits should be located as close to the wall as possible to allow for maximum utilization of the floor space.

Conduit turns must be installed with sweeping radiuses having no more than two (2) 90 degree bends without some form of breakout point (e.g. manhole or breakout box). The inside radius of the conduit bends must never be less than ten (10) times the internal diameter of the conduit.

Conduit runs must not exceed 500 feet without a breakout point.

**NEC ARTICLE 800.2 DEFINITIONS**

**Point of Entrance:** Within a building, the point at which the wire or cable emerges from an external wall, from a concrete floor slab, or from a rigid metal conduit or an intermediate metal conduit grounded to an electrode in accordance with NEC 800.100(8).

**NEC ARTICLE 800.50**

Outside plant cables are typically unlisted because of the sheath material and filling compounds used within the cables. In the United States the NEC allows the use of exposed OSP cable for the first 15m/50ft at the building entrance. Per BICSI TDM: “**further away than 15m/50ft** but still relatively close, the most cost effective solution is to enclose the cable in a rigid or intermediate metal conduit for the conductive cables, grounded in accordance with the NEC and local building codes.”

All conduits with bushings must be installed with measure tape, and must be non-corrosive with a pulling strength of 200 pounds or equivalent. They must be obstruction-free and capped off at both ends.

The conduit design must take into account the proper slope to prevent water accumulation entering the building.

Space within the entrance conduits specified in this document is for LITS only.

**END OF SECTION 27 05 43**

**SECTION 27 10 00 STRUCTURED CABLING**

Horizontal cable selection, placement and termination shall be the sole responsibility of LITS.

**ABANDONED CABLING MUST BE REMOVED**, and shall be considered a part of the project’s budget. In the case of a renovation project, it is at the discretion of the LITS Project Manager to determine if existing cabling meets standards, or if replacement cabling will be required. Both removal and replacement are considered part of the project expense and should be budgeted as part of the project.

**NEC 800.2 DEFINITIONS**

**Abandoned Communications Cable:** Installed communications cable that is not terminated at both ends at a connector or other equipment, and is not identified for future use with a tag.

**END OF SECTION 27 10 00**
SECTION 27 11.00 COMMUNICATIONS EQUIPMENT ROOM FITTINGS

The construction project must include communications room requirements such as backboards, sleeves, conduits, and grounding components necessary for the managed routing and grounding of communications cabling within the communications rooms. Cable tray design and installation will be the responsibility of LITS Project Manager.

The construction project will provide all space, power, lighting, and HVAC requirements necessary for the delivery of LITS.

Communications rooms must be placed on all floors. The doors must open out (unless prohibited by code) in order to enable maximum use of space. The room entrances must be placed on an adjacent hallway to allow easy access to rooms during system outages and future equipment installations, and to ensure that after-hours access is available (24 hours a day, 7 days a week).

Each room must be placed at a location, which minimizes the length of the vertical and horizontal distribution system and is as close as possible to the geographic center of the building, keeping average cable runs to 150 feet with a maximum of 295 feet.

Satellite rooms are required where horizontal cable runs exceed 295 feet or where circumstances such as high-density communications applications (more than three drops per 100 square feet) are required.

The minimum height of the ceiling in Communications Equipment Rooms should be no less than 102 inches. False ceilings are not permitted within the Entrance Facility Room and Communications Equipment Room. Obstructions such as lighting fixtures, air ducts, and cable trays should be no less than 90 inches from the floor throughout the rooms.

The Entrance Facility Room will be located close to where the voice, data and video cables actually enter the building; it must connect to both the entrance cable pathway and the building backbone pathway. The ideal location would be within 50 feet of the building cable entrance point (this may be 50 feet from the point where the cable exits the continuous entrance conduit) and situated either on the ground floor or in the basement. This location should provide accessibility for the delivery of large equipment.

The Communications Equipment Room should be vertically aligned with the building’s vertical riser system. The room should be located in the center of the space that it serves, in order to minimize wiring distances from the room to the communications faceplate. The room must be connected to the building backbone pathway. The location should allow accessibility for the delivery of large equipment. These rooms should be used for communications equipment only; it is to be separate from spaces used for such things as building electrical services, fire alarm, building mechanical services, janitorial services and general storage. If security equipment will be placed in the room, LITS Project Manager must approve placement and installation.

Access to Communication Equipment Rooms must be direct and not be through any other room.

Communications rooms must be sized according to floor space as follows:
Up to 10,000 square feet; 10 feet by 11 feet.
Up to 8,000 square feet; 10 feet by 9 feet.
Up to 5,000 square feet; 10 feet by 7 feet.

Plans for any floor exceeding 10,000 square feet will require additional space in the form of either an increased room size or the placement of a satellite room on the floor. Any requested changes in closet design or sizing will be coordinated with and approved by the LITS Project Manager.
Satellite communications rooms must be no smaller than 6 feet by 8 feet and must meet the same specifications as standard communications rooms. A minimum of two (2) four-inch conduits must be installed between a satellite room and the main communications room for the same floor.
Communications room door size must be a minimum of three feet wide and six feet eight inches tall. (These measurements do not include the doorsill or center post.)

Room shape should be as square as possible, with continuous walls to maximize the use of space.

Appendix A: Communication Room Footprint
The communications room environment must have a temperature range of 64 to 75 degrees Fahrenheit. Typical BTUs for the space are approximately 17,000. The temperature must be measured at five feet above the finished
floor, and must not vary by more than or less than five degrees Fahrenheit. Relative humidity must remain between 20% and 60%. The humidity change must not vary by more than or less than ten percent. Adequate lighting is required and must be a minimum of 50 foot-candles measured three feet above the finished floor. Floor loading must be at a range of 50 to 200 pounds per square foot.

Under normal building operating conditions communications equipment rooms require the HVAC system to function properly at all times (24 hours per day, 365 days per year) which cannot be overridden by the building automation system. If the building’s HVAC system cannot ensure continuous operation (including weekends and holidays), provide a stand-alone HVAC unit with independent controls for the Equipment Room. Condensation from a stand-alone HVAC unit must be addressed, i.e. drip pan, drain line, etc., so as not to compromise equipment operation. If emergency power and HVAC sources are available in the building, connect the Equipment Room to them.

The HVAC system that serves the Equipment Room should be tuned to maintain a positive air pressure differential with respect to surrounding areas. Equipment to control humidity and air quality will be provided as warranted.

There must be a minimum of two (2) four-inch conduit sleeves or LITS approved fireproofed access product installed from the ceiling area of the communications room to the corridor pathway system in an adjacent hallway. Additional sleeves may be necessary as cable quantities dictate.

All walls must be lined with ¾ inch plywood, beginning at 24 inches above finished floor and extending upward to the cable tray, unless otherwise directed by the LITS Project Manager. The plywood must be fire-treated and painted with two (2) coats of gray fire-resistant paint.

One duplex, surge-protected electrical outlet must be installed on each wall of the communication room. Each outlet must be on a separate 120V/20A dedicated circuit and must be connected to emergency power. Communications room AC circuits should be on generator power, when available. In the case of life critical situations, both generator back up with UPS backup and conditioning will be required. In some cases other critical technology based devices may also require a building UPS back-up solution.

Plan for one 120V/20A quad outlet to be extended into the rack system by the electrical contractor (under the GC) utilizing seal-tight conduit or another pre-approved method. Coordinate the location of power in racks with LITS PM.

The room (including the ceiling) must be painted and the floor must be tiled to help reduce atmospheric dust. Paint and tile colors are restricted to either white or light gray.

All communications room doors must be installed with a lock that is keyed for use with the LITS key and the electronic security access system installed for the building prior to occupancy. All communications rooms on campus, including Oxford and locations in the immediate vicinity, will be keyed with the PPX-7 key. In the situation of off campus satellite facilities, the door will be secured with a push button door lock that allows for changeable lock codes. The approved choices from the Emory Security shop are the PRO5196 or the PRO5596 depending on the door type. Further information on these locksets can be found at: http://www.locknetics.com/pdf/Manually%20Programmable%20Locks.pdf

During construction, it is the responsibility of the GC to ensure that the seal around the door as well as other openings to the room are properly sealed to eliminate dust from being drawn into any LITS equipment placed within the rooms for the CO. Any damage to the equipment including replacement if required will be at the expense of the GC.

Due to the limited space requested for communications rooms, all space allocations are for Emory University, LITS’ requirements only. Spaces where water vapor exposure, steam pipes, drains, clean out, chemical exposure, air handling units, EMI or RFI situations or transformers, alarm panels and associated cabling, or electrical panels are present, or spaces where any non-LITS supported systems are present, are not permitted.

END OF SECTION 27 11 00
SECTION 27 21 33 DATA COMMUNICATIONS WIRELESS ACCESS POINTS
LITS provides and supports the managed, encrypted, authenticated, and secure wireless service for Emory. Design and installation of WI-FI within projects is the sole responsibility of the LITS Wireless Engineer and is an integral part of all projects. The inclusion of the wireless access point design into the communications layer of the prints should be coordinated with the LITS Wireless Engineer. In addition, the building design itself should take into account wireless when it comes to design features which may interfere with wireless signal such as but not limited to large mirrors, building materials and types of tinted glass. Examples of material conflicts are: metal lathe in stucco, perforated and non-perforated metal wall coverings, firebrick, rebar and glazed tiles. Any questions regarding potential signal conflicts should be coordinated with the LITS Wireless Engineer. Inclusion for complete wireless coverage in living spaces such as dorms will be coordinated with the LITS Wireless Engineer. Wireless Access Points within living spaces are acceptable by LITS Standards.

END OF SECTION 27 21 33

SECTION 27 26 26 DATA COMMUNICATIONS INTEGRATION SERVICES
HVAC control panels for monitoring along with IP configuration requests must be coordinated with LITS Project Manager. A one inch conduit will be required from the nearest accessible ceiling into the control panel for cable routing.

Cabling for the above services is required.

END OF SECTION 27 26 26

SECTION 27 32 23 ELEVATOR PHONES
Elevator phones are critical to obtaining the certificate of occupancy (CO), and it is imperative that this installation be closely coordinated with the LITS PM. The elevator phone is part of the elevator car, and is not provided by LITS. However, the elevator phone should not be connected without LITS personnel present. In a typical installation, the phone cable should enter the elevator control panel through a one-inch conduit. A one-inch conduit should be extended from elevator control panel to the nearest accessible ceiling. There can be no exposed communication cable within the elevator control room.

Appendix D: Elevator Control Room diagram

END OF SECTION 27 32 23

SECTION 27 32 26.01 EMERGENCY BLUE LIGHT
Emergency Blue Light phones should be included into projects. A one-inch conduit should be placed from the location of the pole to the nearest LITS communication room.

Cabling for the above services is required.

Appendix E: Emergency Blue Light diagram

END OF SECTION 27 32 26.01

SECTION 27 32 26.03 GATE CONTROLS
Parking gate control circuit connectivity must be coordinated with LITS. The Port controller equipment itself should be mounted in a location other than the LITS communication closets. There must be one (1) one inch conduit from the Gate Island into the LITS closet closest to the physical location of the ITR Gate Control Dialer equipment. Additionally, there must be coordination with the ITR team to determine their needs.

Cabling for the above services is required.

END OF SECTION 27 32 26.03

SECTION 27 32 26.05 FIRE ALARM PANELS
Fire alarm systems are critical to obtaining the certificate of occupancy (CO) and it is imperative that this installation be closely coordinated with LITS Project Manager. The fire alarm panel will not reside in the LITS communication room and is not provided by LITS; however, the circuit by which it reports is provided by LITS. The fire alarm panel should not be connected to the communication circuit without LITS personnel present. A one inch conduit will be required from the nearest accessible ceiling into the fire alarm control panel.
Cabling for the above services is required.

END OF SECTION 27 32 26.05

SECTION 27 53 19 INTERNAL CELLULAR, PAGING & DISTRIBUTED ANTENNA SYSTEM

Distributed Antenna System – Cellular Coverage
Distributed Antenna System for Cellular coverage is required for all Emory Owned properties and/or leased space.

New Building Construction
- The LITS Project Manager will coordinate the design of infrastructure to support the DAS system and ensure that the requirements are incorporated into the project plans.
- Based on the size and layout of the building, additional closet space beyond the LITS equipment room may be required at various points on the floor for distribution. Each of these break-out rooms will require a 3’ X 3’ ¾” fire rated plywood with (2) coats of fire rated paint and a dedicated 20Amp circuit located on the back board. [Appendix G: Distributed Antenna System Break-out Room]
- Additional conduit, sleeves, or alternative pathways may be needed for the DAS installation. The LITS PM will work with the GC and/or Campus Services PM to identify those instances to co-develop a solution that best supports the facility.
- If the site location for the new building is not located on an Emory Campus with a DAS head-end established (1) 4” conduit would be required for roof access. (May be shared with other LITS DAS services)

Renovation of existing floor or Building
- The LITS Project Manager will determine the feasibility of DAS design and the impact on the project budget based on the following criteria:
  - DAS is already present in the building in which case the design will need to be re-worked based on the new floor plan.
  - DAS is not present in the building in which case the feasibility of placing DAS into the space will be reviewed with executive leadership for approval.

Leased Space
- The LITS Project Manager will determine the feasibility of DAS design and the impact on the project budget based on the following criteria:
  - Existing cell tower coverage
  - What Staff will occupy the space & how many
  - Size of the location
  - Type of lease & duration

Rooftop antenna by Cellular Provider
- If the location of the building requires a rooftop antenna, the cell provider will determine the approval of cellular service based on the design of service for the given area.

Please note: Exclusion of IT infrastructure components (e.g., DAS, wireless) from any budget must be approved in writing by the Enterprise CIO and Senior Provost for Library Services and the Vice President for Campus Services.

Distributed Antenna System – Radio Coverage
Distributed Antenna System for Radio coverage is required for all Emory Owned properties and/or leased space.

New Building Construction
- The LITS Project Manager will coordinate the design of infrastructure to support the DAS system and ensure that the requirements are incorporated into the project plans.
- Additional conduit, sleeves, or alternative pathways may be needed for the DAS installation. The LITS PM will work with the GC and/or Campus Services PM to identify those instances to co-develop a solution that best supports the facility.
- (1) 4” conduit will be required from the LITS Equipment Room on the top floor to the roof for antenna placement. (May be shared with other LITS DAS services)
Renovation of existing floor or Building
• The LITS Project Manager will determine the feasibility of DAS design and the impact on the project budget based on the following criteria:
  o DAS is already present in the building in which case the design will need to be re-worked based on the new floor plan.
  o DAS is not present in the building in which case the feasibility of placing DAS into the space will be reviewed with executive leadership for approval.

Leased Space
• The LITS Project Manager will determine the feasibility of DAS design and the impact on the project budget based on the following criteria:
  o Existing cell tower coverage
  o What Staff will occupy the space & how many
  o Size of the location
  o Type of lease & duration

Rooftop antenna by Radio Provider
• If the location of the building requires a rooftop antenna, the provider will determine the approval of service based on the design of service for the given area.

Distributed Antenna System – Messaging
Distributed Antenna System for Messaging coverage is required for all Emory Owned properties and/or leased space.

New Building Construction
• The LITS Project Manager will coordinate the design of infrastructure to support the DAS system and ensure that the requirements are incorporated into the project plans.
• Additional conduit, sleeves, or alternative pathways may be needed for the DAS installation. The LITS PM will work with the GC and/or Campus Services PM to identify those instances to co-develop a solution that best supports the facility.
• (1) 4” conduit will be required from the LITS Equipment Room on the top floor to the roof for antenna placement. (May be shared with other LITS DAS services)

Renovation of existing floor or Building
• The LITS Project Manager will determine the feasibility of DAS design and the impact on the project budget based on the following criteria:
  o DAS is already present in the building in which case the design will need to be re-worked based on the new floor plan.
  o DAS is not present in the building in which case the feasibility of placing DAS into the space will be reviewed with executive leadership for approval.

Leased Space
• The LITS Project Manager will determine the feasibility of DAS design and the impact on the project budget based on the following criteria:
  o Existing coverage from provider
  o What Staff will occupy the space & how many
  o Size of the location
  o Type of lease & duration

Rooftop antenna by Messaging Provider
• If the location of the building requires a rooftop antenna, the provider will determine the approval of service based on the design of service for the given area.
APPENDIX A: COMMUNICATION ROOM FOOTPRINT

(4) 4” Conduits/Sleeves between stacked closets.

Openings must be sealed to prevent water penetration to the floor below.

Allow for a Dedicated Quad 20 Amp Outlet located in Racks
Coordinate with Emory PM

4’ Fire rated Plywood on all walls with (2) coats of fire rated paint.

(2) 4” Sleeves or Equivalent Capacity
APPENDIX B: TYPICAL COMMUNICATIONS HORIZONTAL REQUIREMENTS

Communications Closet

(2) 4" conduit sleeves penetrating room wall adjacent to corridor. Depending on service density, additional sleeves may be required.

Station conduit with sweeping elbow to accessible ceiling. If no accessible ceiling is present, conduit should be homogenous to Comm Closet. Two turns maximum without breakout points.

Communications Outlet
With 1" Conduit

Inaccessible Ceiling

Cable Tray

(2) 4" Conduits providing access across Inaccessible Ceiling

Cable Tray located within corridor 12" of access above and to one side of tray

Extend station conduit to main corridor. If conduits are not extended to the hallway it is the responsibility of the GC to provide a 1" sleeve on the wall adjacent to the cable pathway for each space.
APPENDIX C: TYPICAL COMMUNICATIONS VERTICAL REQUIREMENTS

Communication closets should be stacked and located in the center of the Bldg.

(1) 4" conduit for Distributed Antenna System from UTS Equipment Room to Roof Access.

Bldg Steel

Communications near Gnd bus attached to main building Gnd and to Metal frame of Bldg.

(4) 4" conduit/sleeves must connect communications rooms.

Main Electrical Panel for Bldg

Communications Gnd connection to the Bldg main electrical Gnd must be within 2-3 of the Gnd connection for the main electrical panel.

Emory Comm. Manhole

(3) 4" conduits must connect from the building communications entrance room to a specified Emory communications manhole. Maximum of 2" sweeping bends allowed without a breakout point.

Main Electrical Gnd for Bldg (Metal frame, Copper water pipe, Driven rod, etc.)
APPENDIX D: ELEVATOR CONTROL ROOM WIRING

Provide a 1” conduit from Control Panel to nearest accessible ceiling for UTS Cat6 cable. There can be no exposed communication cable within the elevator control room.

1” conduit to control panel

Elevator motor control wiring panel

Elevator wire raceway

Side wall, elevator motor room

Elevator phone RJ11 disconnect point

Floor, elevator motor room
APPENDIX E: EMERGENCY BLUE LIGHT WIRING DIAGRAM
TOWER WITH ALARM EMERGENCY BLUE LIGHT WIRING

The Blue Light assembly as shown to the left must be installed to conform with accessibility guidelines as follows:

- Poles must be installed with or adjacent to an accessible ground surface measuring a minimum of 30” x 48”, with an approach whose slope and cross slope must not exceed 2%.

- Each location must be along an accessible route, to include appropriate 36” minimum width and 360 degree turning radius to accommodate the average wheelchair.

Per ADA: “Highest operable part of device mounted no higher than 48” AFF”.

Talk A Phone
ETP-MT/R OP4 “tower”
w/ camera arm & ETP 400 phone

Anixter p/n to meet Emory standards (color & graphics) is: “EMORY - TOWER - LOGO”

Note: NOT to scale
PARKING DECK EMERGENCY BLUE LIGHT WIRING

APPENDIX E: (Continued)

Sign, from UTS warehouse stock

Light: Edwards p/n 48SLED8-B5 120vac or equivalent, provided/installed by general contractors electrician.

Comm. wiring exits wall behind phone back box.

Standard versions: A or B
A Galtronics 293 AL-003 or
B Talk A Phone ETP-400 w/ ETP-SM

Per ADA: “Highest operable part of device mounted no higher than 48” AFF”

Enhanced version:
Galtronics 293WM w/297.003 phone or
Talk A Phone ETP-WM/E w/ ETP-400 phone

NOTE: Telephone sets, back boxes and police signs from UTS warehouse stock. Enhanced version wall mount unit w/ light, supplier & installer to be determined on a case by case basis.

Parking Deck Emergency Phone
APPENDIX F: BUILDING ENTRANCE PHONE WIRING

SURFACE MOUNT

RAMTEL 925D surface mount enclosure, w/door, neutral gray

Comm. wiring exits wall behind phone back box, both surface & recessed units.

Use RAMTEL RR734 phone

Per ADA: “Highest operable part of device mounted no higher than 48” AFF”.

NOTE: Telephone sets & enclosures from UTS warehouse stock

FLUSH MOUNT

RAMTEL 906 flush mount enclosure, w/flush mount bezel

Use RAMTEL RR734 phone

NOTE: Overall size w/Bezel: 9.219”W x 12.875”H x 3.125”D,

1. Cut opening to fit phone box 7 5/8 x 11 5/8

2. For wood mounting use (4) 3/16” x 5/8” long lag screws w/washers.

3. For Concrete/Brick/Masonry, use plastic flanged inserts for 3/16” screws w/washers.

Building Entrance Phones
APPENDIX G: Distributed Antenna System Break-out Room

The location of the Distributed Antenna System Break-out Room may be a shared space.

Back board must not be placed over a sink or blocked by storage.

UTS must have access to the room for service at all times.

Coordinate door key with UTS PM.

Height of the back board should not exceed 7' to allow for mounting of equipment.

3' x 3' ¾" Fire rated Plywood on one walls with (2) coats of fire rated paint.

Dedicated Duplex 20 Amp