UNIVERSITY of HOUSTON

UNIVERSITY INFORMATION TECHNOLOGY

NETWORK INFRASTRUCTURE DESIGN STANDARDS

Prepared by UIT Network Services

Version 1.27i — March 23, 2020

TABLE OF CONTENTS

1.0 REVISION NOTES

Revision history

1.27   March 23, 2020

- Changed the document title from *Network Infrastructure Standards* to *Network Infrastructure Design Standards* to make it clearer that this document contains essential information to be incorporated early in construction projects, during the design process
- Edited entire document to improve clarity by reducing legalese, passive constructions and redundancy
- Coordinated concurrent revisions to *University of Houston Master Specification Division 27* to consolidate design guidance in this document, and parts specifications and installation instructions in the *Master Specification* (manufacturer/parts lists and installation-oriented material were moved to the *Master Specification*, with cross-references inserted in the relevant parts of this document; design-oriented material was moved from the *Master Specification* to this document)
- Changed the color of Strong (emphasized, bold) text from red to black
- Added additional contacts
- Added door locks to the items designated by the color violet on patch panels and cables
- Updated the name "Energy Research Park" to "UH Technology Bridge"
- Added a clarification about the roles of Campus Safety and UITNS in 12.0 Security Systems
- Changed the word "Wireless" to "Wi-Fi" in the heading for Wi-Fi Design and Installation Standards, moved the section to follow 5.0 Network Facilities, and renumbered that and following sections accordingly

1.26a   August 28, 2019

- For all earlier revision history, see version 1.26a of this document.

2.0 INTRODUCTION, PURPOSE AND RELATED DOCUMENTS

2.0.1 INTRODUCTION

This document contains information to guide the creation of structured wiring systems at University of Houston. University Information Technology Network Services (UITNS) updates this document periodically as functional needs and technology evolve. Each updated edition includes its effective date on the cover and in the page footers. The current version and several earlier editions are available on the UIT website at:

https://uh.edu/infotech/services/computing/networks/network-infra-standards/

The project designer is responsible for retrieving the current version of this document before beginning a design or making substantial changes to one.

In addition, the Contractor is responsible to know and follow detailed requirements for installation, including approved manufacturers and part numbers, which are available in Division 27 of the *University of Houston Master Specification* at:

https://www.uh.edu/facilities-planning-construction/vendor-resources/owners-design-criteria/master-specs/

To ensure that all current installation standards are followed, all contractors and outside Information Technology (IT) consultants must receive approval of their design documents from University IT Network Services (UITNS) before submitting them for execution. The Contractor must meet with the assigned UITNS Project Manager before beginning an installation.

Proposal submittals for capital projects and major renovations must include a turnkey solution for the installation of all network equipment.

2.0.2 PURPOSE

The purpose of this document is to ensure that designers and contractors create high quality project documents that adhere to accepted industry standards and specifications and conform to systems requirements of the University of Houston.

The *Network Infrastructure Design Standards* provide these benefits for the University:

- Support for best practices
- Provision of multi-vendor equipment and services
- Improved management of building space resources
- Reduced costs for network wiring installation, support and management
- Reduced training requirements for support personnel

- Consistency of wiring at different locations
- Improved reliability of network cabling infrastructure
- Improved trouble-shooting and fault isolation
- Improved ability to manage system moves, adds and changes

2.0.3 RELATED DOCUMENTS

The University of Houston *Master Specification Division 27 — Communications* addresses topics related to data and voice communications. *Division 27* is organized by topic:

- *27 0500*   *Communications General Provisions*
- *27 0526*   *Grounding and Bonding for Communications Systems*
- *27 0528*   *Pathways for Communications Systems*
- *27 0543*   *Underground Duct and Raceways*
- *27 0553*   *Identification for Communications Systems*
- *27 1100*   *Network Facility Fittings*
- *27 1300*   *Communications Backbone Cabling*
- *27 1500*   *Communications Horizontal Cabling*
- *27 1619*   *Patch Cords, Station Cords and Cross-contact Wire*
- *27 2000*   *Data Communications Equipment*
- *27 3000*   *Voice Communications Equipment*

The *Master Specification* is where to find information about approved products (including manufacturers and parts) and detailed installation requirements. While *Network Infrastructure Design Standards* covers details that are important in the design phase of construction, renovation and improvement projects, the *Master Specification* presents essential information for execution and installation. Designers and contractors are expected to be familiar with both, to the extent that they affect their work and decisions.

3.0 CONTACT INFORMATION

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4.0 GENERAL REQUIREMENTS

4.0.1 CODES, STANDARDS AND REGULATIONS

On network infrastructure projects at University of Houston, comply with federal, state and local codes, rules, regulations and ordinances. In addition, adhere to the *University of Houston Master Specification*, available online at:

https://www.uh.edu/facilities-planning-construction/vendor-resources/owners-design-criteria/master-specs/

If this document presents a compliance conflict, promptly bring it to the attention of the UIT Network Standards Coordinator in writing. Please include the specific provision in this document and state the rule, regulation, industry standard, code provision, manufacturer requirement or policy that is in conflict. Where these standards are more stringent than the requirements of other applicable authorities, these provisions will apply.

> For a list of agencies, standards and codes specifically included by reference, see *Master Specification 27 0500 Communications General Provisions*.

4.0.2 CERTIFICATIONS, WARRANTY AND PROJECT EXECUTION

Details related to the following topics formerly included in this document are covered in *Master Specification 27 0500 Communications General Provisions:*

- Contractor Certification
- Warranty
- Delivery, Storage and Handling
- Sequence and Scheduling
- Use of the Site
- Continuity of Services

5.0 NETWORK FACILITIES

5.0.1 TERMINOLOGY: ACRONYMS, ABBREVIATIONS AND DEFINITIONS

> For a full list of relevant acronyms, abbreviations and agencies, see *Master Specification 27 0500 Communications General Provisions*.

Building Distribution Frame (BDF, also known as BICSI Entrance Facility) is the area where the demarcation between the inter-building and intra-building cabling systems is affected. This securable room is to be dedicated to this purpose, with no other building services sharing the space.

Horizontal Cross-Connect (HC) is a cross-connect allowing horizontal cabling to be interconnected to backbone cabling.

Intermediate Distribution Frame (IDF) provides for demarcation between the per-floor horizontal customer service cabling and the building's data, voice and video backbone cabling. This room contains the electronic equipment that transitions between the building backbone and the end user's telecommunications equipment. This securable room is to be dedicated to this purpose, with no other building services sharing the space.

IDFs are allocated to each floor of a building and house the communications equipment and related wiring that serves that specific floor. Several IDFs may be located on a single floor in order to maintain the cable length limitations specified within particular standards.

Lateral Fiber (LF) is the term used to describe a fiber optic cable of a smaller fiber count (12 – 48 is typical) that originates from a BDF and terminates into the Metro Fiber for its network connectivity.

Main Cross-Connect (MC) is the cross-connect normally located in the BDF for cross-connection and interconnection of entrance cables, first-level backbone cables, and equipment cables.

Main Distribution Frame (MDF, also known as BICSI Entrance Room) is the main telecommunications service entrance into the campus. It may or may not be where the BDF is located.

Metro Fiber (MF) is the term used to describe high fiber count cables (144, 288, etc.) that traverse the campus, have midpoint splice cases, and act as the fiber backbone of the campus.

Network Facility (NFs, also known as Telecommunications Rooms [TRs] or BICSI Equipment Rooms [ERs]) are environmentally controlled spaces and secured rooms housing telecommunication and network equipment such as data, voice and video components and their associated connectivity infrastructure. The types of Network Facilities are Main Distribution Frame, Building Distribution Frame, Intermediate Distribution Frame and Telecommunication Enclosure.

Telecommunication Enclosure (TE) is a secured case, cabinet or housing for telecommunications equipment, cable terminations and cross-connect cabling.

5.0.2 REQUIREMENTS

5.0.2.1 GENERAL

Refer to *Master Specification 1100 Network Facility Fittings* for information related to authorized products and installation requirements.

- The guidelines published by **ANSI/TIA/EIA** and **BICSI** (as modified, expanded or limited by this document or the *Master Specification*) govern both design and construction of NFs.

- Submit all variances to UITNS for approval.
- Position NFs to comply with TIA/EIA distance limitations.
- Stack NFs one above the other whenever possible.
- Clearly describe the building service entrance for communications and specify in Drawing details how the building connects to the campus network.
- Route cable paths so that the total cable length between the telecommunications outlet and its termination in the NFs is not greater than 90 meters.
- Do not route plumbing, HVAC or electrical conduit through or above the NF, except for sprinkler systems that directly serve the NF (no pass-through sprinkler trunks or temporary services are allowed).
- Use sprinkler heads that are rated for high temperature.
- Cage the sprinkler heads.
- **Do not place electrical or any other utility panels in a NF.**

Doors and Locks for NFs

- Use a windowless, solid core door measuring at least 36" wide by 80" tall.
- Mount doors to open outward.
- Core the locks with a campus standard system to accept the NF standard keying of 3ILxxx as provided by the University of Houston Lock Shop.
- Equip all doors with an online card reader system.
- After installation, obtain keys for NFs from UITNS as needed.

Security

- Secure NFs to be protected from environmental concerns, hazards and theft.
- Configure NFs so that UIT staff has full-path access throughout.

Floors

- Design floors to bear loads of at least 50 pounds per square foot.
- Use vinyl composition tile or sealed concrete floor material.
- Do not use carpet.

Conduits and Sleeves

The size and placement of conduits and sleeves need to facilitate frequent additions, moves and changes to the telecommunication systems.

- Once the number and size of conduits are determined, add two additional, empty conduits for growth.
- For the communications service entrance pathway, design for a minimum of four 4-inch conduits from the Building Entrance Point to the MDF.
- Use 4-inch conduits entering the building, with some type of sub-space partitioning.

- Use 4-inch conduits between building NFs.
- Position the outer diameter of conduits within 4 inches of room walls.
- Generally, use 1-inch conduits to service user spaces. An exception is made for outlets for wall phones, payphones, etc. where only one cable is needed. This conduit may be ¾-inch.
- Avoid the use of flexible conduit. If it is the only solution, obtain approval from the UIT PM and increase its size by one trade size.
- Stub conduits that interconnect NFs between floors 2 inches into the rooms.
- Stub the 1-inch conduits that serve end users' information outlets to above the ceiling, and from there to the nearest corridor/hallway horizontal telecommunications pathway leading to the IDFs.
- Minimum radius for conduit bends is:

  1. Internal diameter of less than 2 inches — bending radius is 6 times the internal diameter.
  2. Internal diameter of 2 inches or more — bending radius is 10 times the internal diameter.

- Fire seal all conduits.

Building Riser — The building backbone riser system connects IDFs to each other and to the BDF.

> Refer to *Master Specification 1300 Communications Backbone Cabling* for product and installation details.

- Separate (do not mix) the cabling systems that provide data, video and voice needs.

Ceilings

- Do not use suspended ceilings in NFs.
- When cable projects require the installation of new cable trays or overhead conduits and sleeves in NFs with existing, suspended ceilings, include the removal of such ceilings as part of the project.

Cable Trays

- Place basket tray of 12-inch width on three walls at a height of 7 feet, with minimum clearance of 4 inches from ceiling.
- Above the telecommunication racks, install basket tray spanning the width of the room.
- Use radius drop-outs where cable exits a tray to a lower elevation.

Lighting

- Place light fixtures a minimum of 8.5 feet above finished floor (AFF).
- Supply illumination of at least 500 lumens, measured at 3 feet AFF.

- Use timer- or motion-type light switches, placed immediately inside the door.
- Use LED bright white lighting.
- Do not use fluorescent lighting.
- Provide 30% emergency light fixtures, if available.

Cable Entrance

- Route riser or distribution cables to enter/exit the NF via four-inch conduits, sleeved cores or cable tray.
- To allow for future growth, include two additional conduits, sleeved cores or cable trays (beyond the number required at the time of the project) at each cable entrance and along the entire path between the BDF and each IDF.

Backbone Cabling

- At a minimum, run a 12-strand, single-mode fiber of size 9/125 micron between the BDF and each IDF. Obtain approval of the final strand count from UITNS before submitting the design.

5.0.2.2 ROOM SIZING

Room size varies according to the total building area served.

Note: Special purpose rooms, such as laboratories, computer rooms and certain instructional spaces, may have higher than average density of communications outlets. The size of the NF serving these rooms will increase accordingly, as determined by UITNS.

ALL NFs

- Place the ceiling at a height of at least 9' 6".
- Do not route water pipes within an NF's interior space, horizontally on the floor directly above the room, or within the floor slab, except for sprinkler systems that directly serve the NF (no pass-through sprinkler trunks or temporary services are allowed).

MDF/BDF

- Minimum *finished* interior size, based on the size of the building:

  - <10,000 sq. ft. — 10 ft. X 12 ft.
  - <20,000 sq. ft. — 10 ft. X 15 ft.
  - <30,000 sq. ft. — 15 ft. X 15 ft.
  - <40,000 sq. ft. — 17 ft. X 17 ft.
  - <50,000 sq. ft. — 19 ft. X 19 ft.

IDF

- Minimum *finished* interior size for IDFs in all buildings is 10 ft. x 9 ft.

5.0.2.3 ENVIRONMENTAL CONTROL

- Design and duct in HVAC to maintain a room temperature of 68 to 70 degrees Fahrenheit with 30 to 55 percent humidity when the full complement of equipment is in the room.
- Provide a thermostat control inside every NF.

5.0.2.4 ELECTRICAL

- Position all convenience electrical outlets in NFs on a side wall so power cables can be run along the telecommunication racks, minimizing the possibility of tripping hazards.
- Provide at least one duplex convenience outlet for general purpose use at 6-foot intervals around perimeter walls immediately to the left and right of the door.
- Place the outlets at industry standard height.
- **Provide backup power to all outlets via the building-wide UPS, if there is one, or by emergency generator if there is not.**
- Provide at least one 240-volt, 30-amp, dedicated circuit with a NEMA L6-30R receptacle installed at a height of 7 feet AFF.
- Attached to the outside of the basket tray at a height of 7 feet, facing the rear of the equipment racks, provide at least four 120-volt, 20-amp NEMA 5-20R dedicated outlets, with each pair on a dedicated circuit with emergency generator backup.
- **Obtain UITNS approval of the layout, number, type and location of outlets before submitting the final design.**
- **Include a rack mounted UPS of appropriate size in every NF. UITNS will determine appropriate UPS devices. These units serve a separate purpose from and are not part of the emergency power operation.**

5.0.2.5 TERMINATION HARDWARE

- **Obtain UITNS approval of the layout for the placement of racks, rack hardware and wall fields within the IDFs before submitting the final design.**

Equipment Racks

- Allow space for new outside plant copper and fiber optic cable and terminating hardware mounted in contractor provided 19-inch racks in the MDF.
- Use heavy duty, aluminum, 7-foot floor-mount racks with cable management channels on both sides and mounting rails for 19-inch equipment.
- Allocate space between racks for installation of vertical cable managers.
- Properly anchor all racks.
- Place racks side by side as shown in Figure 1 and Figure 2.

Patch Panels

- Use Category 6E and Category 6A jacks.

- Use colored jacks to represent each connection's purpose as follows:

    - **Red**   General purpose, office and lab connection — other than Category 6A
    - **Blue**   General purpose, office and lab connection — Category 6A
    - **Yellow** Wireless Access Point connection
    - **Violet**   Security camera, security device, lighting controller, door lock or Code Blue
      phone
    - **Green**   EMECS system connection
    - **White**   AV

Rack Mounted Hardware

- For BDFs, reserve a minimum of eight Units (8U) at the top of each rack for fiber enclosures.
- For IDFs, reserve a minimum of six Units (6U) at the top of each rack for fiber enclosures.

Wall Mounted Hardware — NFs

- For legacy installations only, fasten 25-pair or 50-pair 110 system kits to the plywood
  backboard and D-rings or jumper troughs used for wire management.
- For new installations, avoid wall mounted hardware. If it is necessary, obtain advance
  approval from UITNS.

Cable Support Systems (Wire Managers)

- Mount 10-inch-wide, vertical wire managers to both sides of each rack, running the entire
  height of the rack.
- Below the spaces left for the fiber enclosure on each rack, mount horizontal wire managers
  running from one side of the rack to the opposite side to contain patch cabling.

5.0.2.6 SAMPLE IDF LAYOUT

FIGURE 1
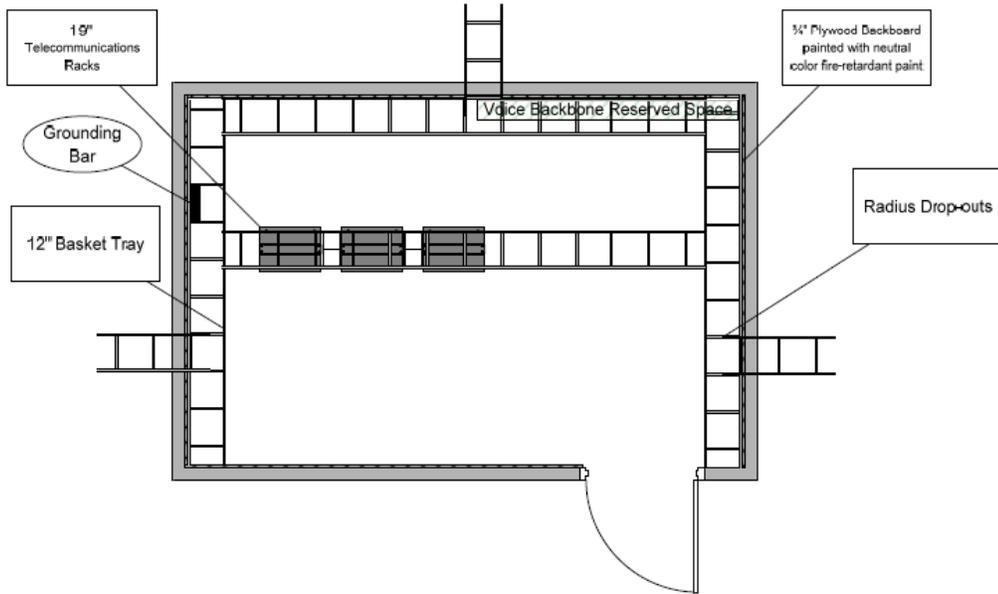
5.0.2.7 SAMPLE RACK ELEVATION

FIGURE 2
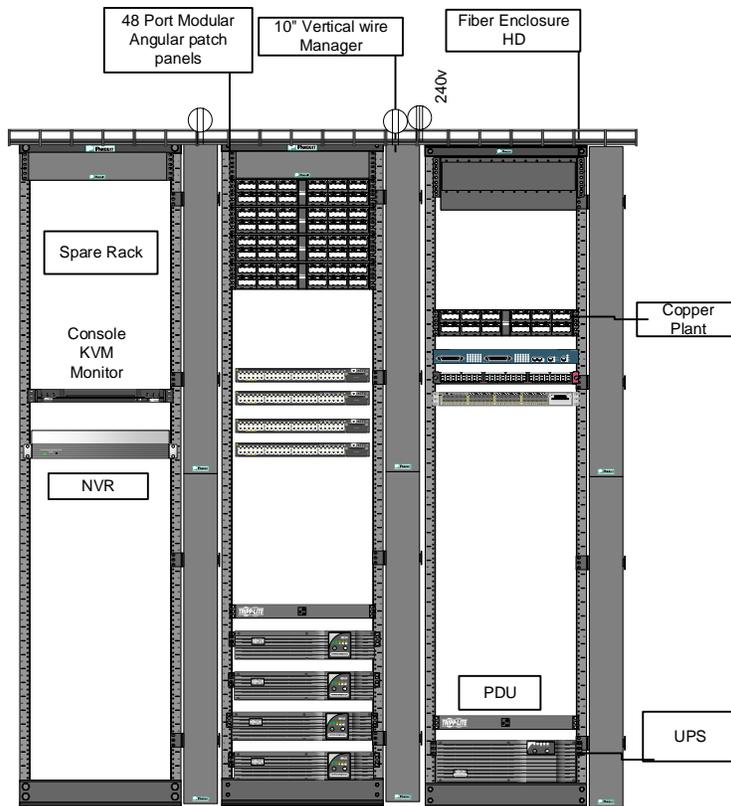
5.0.2.8 ADDITIONAL REQUIREMENTS

- In the NFs, terminate the riser cable on the patch panel in accordance with the drawing in Figure 3.
- Use D-rings or jumper troughs for wire management.
- Use black jacks for voice connections.

FIGURE 3
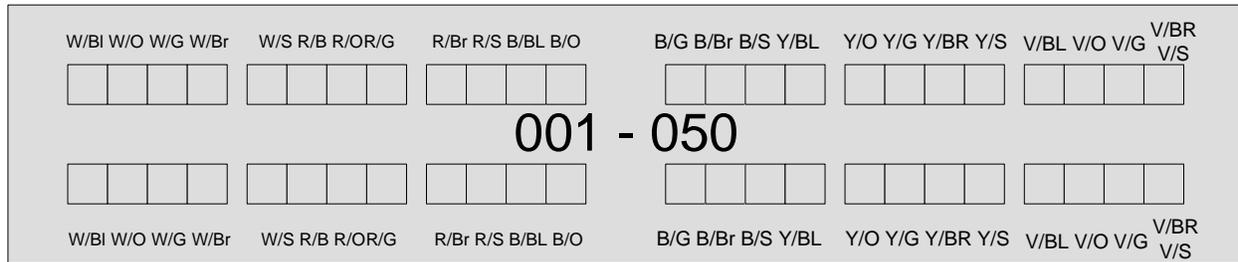
6.0 WI-FI DESIGN AND INSTALLATION STANDARDS

6.0.1 GENERAL

The standards in this section are for indoor design only. Outdoor specifications are not included. Consult with UITNS before designing for outdoor spaces.

The approved vendor for Wireless Access Points (WAP) is Aruba. Consult the assigned UITNS Project Manager for the approved WAP model, specifications and capability at the time of product selection.

6.0.2 WI-FI DESIGN

Our design criteria for coverage is a signal-to-noise ratio (SNR) of 20 dBm minimum and a signal no less than minus 63 dBm at 5 GHz measured at the extents of the target coverage areas. Design for capacity in high density areas such as classrooms, auditoriums, meeting rooms, study areas, multipurpose areas and housing facilities.

Standards for designing for capacity:

- Place one (1) WAP per 50 seats in open concept rooms (classrooms, auditoriums).
- Place WAPs so as to evenly divide the target coverage area.
- Each WAP requires two (2) Category 6E cables.
- Every elevator car requires one (1) WAP. Add two (2) fiber optic cables to the elevator umbilical for the WAP.

- Provide proposed planning electronic maps that include WAP locations and dB levels to obtain UITNS approval before installation (see 6.0.2.1 Example of WAP Location Map.
- Use Aruba standards and design software (such as Ekahau) for planning (see 6.0.2.2 Example of a WAP dB Level (Heat) Map).

6.0.2.1 EXAMPLE OF WAP LOCATION MAP
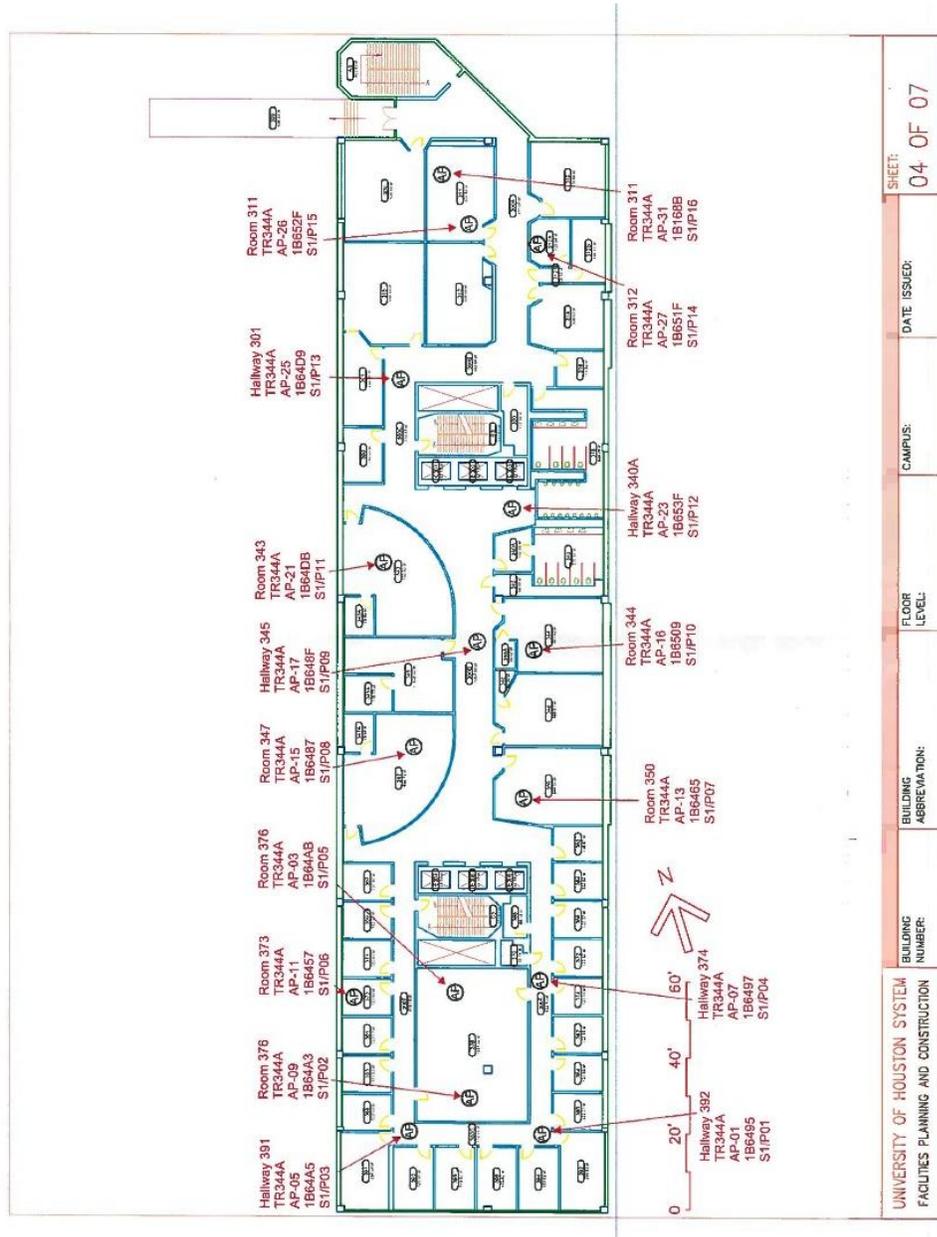
6.0.2.2 EXAMPLE OF A WAP DB LEVEL (HEAT) MAP

6.0.3 WI-FI INSTALLATION

6.0.3.1 INSTALLATION OF WIRELESS ACCESS POINTS (WAPs)

> Refer to *Master Specification 27 1500 Communications Horizontal Cabling, Part 3* for installation requirements related to WAPs.

6.0.3.2 CABLING INSTALLATIONS IN THE IDF ROOMS

> See *Part 3* of *Master Specification 27 1619 Patch Cords, Station Cords and Cross-connect Cables* and *Master Specification 27 1500 Communications Horizontal Cabling* for cabling and connector standards in IDF rooms.

7.0 OPTICAL FIBER

> For information regarding telecommunications fiber product and installation requirements, refer to:
>
> - *Master Specification 27 1100 Network Facility Fittings*
> - *Master Specification 27 1300 Communications Backbone Cabling*
> - *Master Specification 27 1500 Communications Horizontal Cabling*
> - *Master Specification 27 1619 Patch Cords, Station Cords and Cross-Connect Cables*

7.0.1 GENERAL

- For all new network services to be connected to or disconnected from the UH campus telephone network, local area network, wide area network, video network and fiber optic network, the design, configuration and cross-connect work will be performed by UIT or by personnel UIT designates.
- For new installations and renovations, only single-mode fiber cabling must be used. The sole exception is that multi-mode OSP cable will be provided for the fire alarm system on the main campus as needed. The fire alarm systems at UH Technology Bridge and other remote locations use single-mode fiber, and are not included in this exception.

7.0.2 MINIMUM FIBER QUALITIES

- Use fiber of matched-clad design with a doped silica core surrounded by a concentric silica cladding.

7.0.3 MINIMUM REQUIREMENTS FOR OSP FIBER OPTIC CABLE

- User fiber cable with these characteristics:

  - Loose buffer tube configuration
  - Gel-free
  - Does not adhere to the inside of the buffer tube
  - New, unused, and of current design and manufacture, with all fibers useable
  - Color-coded according to current standard
  - In buffer tubes that contain multiple fibers, colors must:

    - Remain stable during temperature changes
    - Not fade or smear onto each other or into adjacent layers

- Not cause fibers to stick together

- Outer jacket characteristics:

  - Fungus resistant
  - UV inhibited
  - Water resistant
  - Equipped with a non-wicking rip cord for easy removal
  - Free of holes, splits and blisters
  - Contains no metal elements
  - Has consistent thickness
  - Marked with "(Manufacturer's Name) Optical Cable", sequential foot or meter markings, and year of manufacture, with markings approximately 2.5mm high

7.0.4 OPTICAL FIBER CABLE INSTALLATION

- **Aerial installation of fiber optic cable is prohibited unless written approval has been received from UITNS management.**
- Inside each 4-inch diameter conduit, provide a minimum of one 3-cell flexible fabric inner-duct.

7.0.5 OUTSIDE PLANT (INFRASTRUCTURE CABLES)

- Use single-mode fiber.
- For a UIT-designated Core location, the minimum number of fiber strands is 48.
- To calculate the minimum number of fiber strands for the redundant path, add one to the total number of NFs (IDF and BDF), then multiply by two:

$$2 \times [(\#IDFs + \#BDFs) + 1]$$

- Obtain UIT approval of final strand counts before design is complete.
- Place sump pumps in manholes where flooding may be a problem.

8.0 INSIDE PLANT

8.0.1 HAZARDOUS MATERIALS

> Refer to the *Master Specification 02 4119* for information regarding removal of hazardous materials.

8.0.2 GENERAL

- Obtain UIT approval of all wiring designs.

See *Master Specification 27 1619 Patch Cords, Station Cords and Cross-connect Cables* and *Master Specification 27 1500 Communications Horizontal Cabling* for cabling and connector standards in IDF rooms.

8.0.3 BACKBONE CABLING

Refer to *Master Specification 27 1300 Backbone Cabling* for product and installation information, and to *Master Specification 27 0533 Identification for Communications Systems* for labeling requirements for backbone cabling.

- Obtain UIT approval of all optical fiber and copper backbone cable designs, materials and sizes before installation.

8.0.4 FIBER OPTIC RISER CABLES

- User fiber optic cable of tight-buffer tube construction.
- The minimum number of fiber strands required is 12.
- Obtain UIT approval of final strand counts before design is complete.
- Color-code each buffer tube following BICSI standards, with no color repeated within a cable.
- Color-code each fiber following BICSI standards, with no color repeated within a buffer tube.
- Provide a service loop of ten meters (33 feet) of extra cable, coiled and fastened to the IDF plywood backboard.

8.0.5 HORIZONTAL CABLING

Refer to *Master Specification 27 1500 Communications Horizontal Cabling* for product and installation information, and to *Master Specification 27 0533 Identification for Communications Systems* for labeling requirements for horizontal cabling.

8.0.6 PATCH CABLES

For product and installation details, including patch cable color assignments, see *Master Specification 27 1619 Patch Cords, Station Cords and Cross-connect Cables*, and refer to *Master Specification 27 0533 Identification for Communications Systems* for labeling requirements for horizontal cabling.

8.0.7 TELECOMMUNICATION OUTLETS

- Configure each telecommunication outlet with a single, gang-mounting faceplate with four openings, to contain one or more the following devices:

  - Telecommunications Jack
  - Security Alarm/Intrusion Alarm/Door Lock Jack
  - EMECS Systems Jack

- Blank Insert (in unused openings)

> For product and installation details, including outlet jack color assignments, see *Master Specification 27 1500 Communications Horizontal Cabling*.

8.0.7.1 PLACEMENT OF TELECOMMUNICATION OUTLETS

- Place telecommunication outlets at industry standards heights (12 inches from center) unless otherwise noted.
- Locate each telecommunication outlet providing data services within 3m (10 feet) of its intended usage area.
- If a telecommunication outlet provides *voice services only,* intended for wall phone use, place it to conform with requirements of the Americans with Disability Act (ADA).

8.0.7.2 TELECOMMUNICATION OUTLET RECOMMENDED LOCATION AND QUANTITIES

- For most locations, provide one telecommunication outlet consisting of one data jack. Add outlets where a customer needs analysis indicates more are necessary. Such spaces include:

  - Faculty/Administrative Offices
  - Clerical/Staff Offices
  - Secretary/Administrative Assistant Offices
  - Conference Rooms
  - Dormitories
  - Lecture Halls
  - Classrooms
  - General Purpose Classrooms

- For Labs, provide one telecommunication outlet consisting of one data jack for each designated lab station.

9.0 DOCUMENTATION AND SUBMITTALS

> Specific requirements for Action Submittals and Informational Submittals are found in each section of *Master Specification Division 27*.
>
> General requirements for Submittals, Substitution Procedures, Quality Assurance and Control, Substitution Procedures and related topics are found in *Master Specification Division 01*.

Where submittals require UIT or UITNS approval, do not perform work related to the submittal until UIT or UITNS approval has been received.

10.0 LIGHTNING PROTECTION, GROUNDING AND BONDING

> Refer to *Master Specification 27 0526 Grounding and Bonding for Communications Systems* for details related to products and installation requirements.

- Provide building entrance protection for copper cabling, and bond and ground equipment.
- Coordinate final design and specifications for the Grounding and Bonding system with the Electrical Engineer of Record.

11.0 FIRESTOPPING

Consult the assigned UITNS Project Manager for guidance before beginning a project that involves network cable penetrations.

> Refer to *Master Specification 07 8413 Penetration Firestopping* and *Master Specification 27 0500 Communications General Provisions* for additional information.

12.0 SECURITY SYSTEMS

Network cabling infrastructure for security systems is covered in other parts of this document and in the related sections of the *Master Specification.* UITNS is responsible for providing network connectivity for security systems; UIT Campus Safety is responsible for planning and design of security systems, including selection of manufacturers and products, project management and transition to operation.

> Consult *Master Specification 27 0553 Identification for Communications Systems* for physical and on-screen labeling and identification requirements related to electronic security systems equipment and network connections.
>
> Consult *Master Specification 27 1500 Communications Horizontal Cabling* for parts and installation information related to network connectivity.
>
> Consult *Master Specification Division 28 Electronic Safety and Security* for additional information regarding manufacturers, products and installation requirements, and *MAPP 06.06.01 Security Technology Systems* for UH policy requirements.

12.0.1 CAMERA CONTRACTOR CERTIFICATION

Document the certification status of contractor personnel:

- For all on-site personnel, use people certified for installation, programming and troubleshooting.
- Include the appropriate certifications in all responses to RFOs, RFPs and standard contract project solicitations.

- Provide certification documentation for all on-site personnel to UITNS for approval before work begins.

12.0.2 CAMERAS

> Refer to *Master Specification Division 28* for information related to security cameras.

12.0.2.1 CAMERA INSTALLATION REQUIREMENTS

12.0.2.1.1 IP CAMERA POWER SOURCE PREFERENCES
- PoE(+) switch ports
- AC adaptors

12.0.2.1.2 CAMERA AND IDF CABLE LABELING
- Refer to *Master Specification 27 0553 Identification for Communications Systems* for detailed labeling requirements for cameras and their associated patch panel connections.

12.0.2.2 NETWORK VIDEO RECORDER (NVR) REQUIREMENTS
- Place all Network Video Recorders (NVRs) inside BDFs or other location approved by UITNS
- Connect all NVR servers to an access switch
- Connect all NVR servers to a gigabit port
- Supply a monitor, keyboard and mouse for each NVR stack being installed. If more than two are in the same BDF, use a KVM Rack Console unit.

12.0.2.2.1 CAMERA-NVR CONFIGURATION REQUIREMENTS
- Submit all camera-NVR system designs to UITNS for approval, in addition to following any approval requirements defined by UHDPS and UIT Campus Safety.
- Provide maps to UITNS with camera location, general lens direction, and the last octet of the IP address of each camera clearly marked.
- Label all cameras as described in *Master Specification 27 0553 Identification for Communications Systems.*
- Provide an Excel spreadsheet to UITNS of the camera number, its IP address, the switch IP address, the panel port number, and switch port number.

12.0.2.2.2 BACK-UP POWER SUPPLY
In addition to the building generator/UPS, supply rack-mountable UPS's to support NVR installations.

12.0.3 EMERGENCY PHONES

> Refer to *Master Specification Division 28* for information related to emergency (Code Blue) telephones.

12.0.4 SECURITY ALARMS

Refer to *Master Specification Division 28* for information related to security alarms.

12.0.4.1 INSTALLATION TESTING REQUIREMENTS

- Test all zones and associated devices with UHDPS as part of a system's signoff
- Forward all IP configurations, device serial numbers, and deployment documentation copies to the Manager of Public Safety Systems and the UITNS Project Manager. Installation forms are available through the UH Department of Public Safety.

12.0.4.2 LABELING REQUIREMENTS

- Include the building name, building number and room number on all zone labels.
- Distinguished the panic alarm type as either Hold-up (for Point of Sale locations) or Panic (for all other locations)

13.0 AUDIOVISUAL (AV)

AV standards are published separately as *University of Houston Audiovisual (AV) Standards*, which is also available for download at the UIT website. For more information, please contact the Academic Technology Support Center Manager — Academic/Classroom Technology.

13.0.1 DIGITAL SIGNAGE

The University of Houston's official digital signage solution is Four Winds. Standards documentation is being updated. Until that is available, contact your assigned UITNS Project Manager for details, clarification or questions.

13.0.2 MICROSOFT SKYPE FOR BUSINESS VIDEO CONFERENCING ROOMS

MS Skype for Business is the official University of Houston conferencing service and platform. For a sample design of a Skype for Business conference room please visit: http://www.uh.edu/infotech/services/skype/conference-room/index.php

13.0.3 TELEVISION SERVICES

The University uses Philo to deliver television services over the IP data network.

14.0 TELEPHONE SERVICES

Telephone services are provided as Voice over IP. The vendor is MS Skype for Business. The phone shares a data jack with a computer.

For a detailed list of features and capabilities please visit: www.uh.edu/skype.