APPROVALS

University of Houston

Date: June 5, 22

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UNIVERSITY of HOUSTON SYSTEM

IT FACILITIES: BASELINE STANDARDS

Version 1.06 — July 15, 2022

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GENERAL INFORMATION

1 REVISION HISTORY

1.06 July 15, 2022
- Removed the parenthetic student worker restriction from "Only university employees (but not student workers)…" in section 3.4.4.3.

1.05 June 30, 2022
- Added creative team credit to section 2.1.
- Made a minor change to provision 3.4.4.3.
- Added definitions for Building Distributor Room and Campus Distributor Room and corrected a minor error in the definition of Critical IT Facility.

1.04 June 23, 2022
- Inserted technical drawings for BD and FD rooms.
- Retitled and revised section 3.4 to make clear the IT Facilities Access Requirements are not a formal UH System policy (SAM). Removed the headings in the first two parts (previously numbered 3.4.1 and 3.4.2).
- Made minor changes to several access requirements provisions in section 3.4.

1.03 June 17, 2022
- Incorporated feedback from UH System senior IT managers.
- Added the UH System Information Facilities Access Policy
- Corrected various omissions and relocated parallel provisions for consistency between different IT Facility types.
- Added the facility elevation drawings.

1.02 May 18, 2022
- Incorporated feedback from UH System CIO.
- Edited for language, grammar, spelling, and style.

1.01 May 11, 2022
- This is the inaugural edition of *University of Houston System IT Facilities: Baseline Standards*.

2 INTRODUCTION, PURPOSE AND RELATED DOCUMENTS

2.1 INTRODUCTION

This document sets forth the baseline standards for Information Technology Facilities (IT Facilities) throughout the UH System.

Establishing uniform standards for IT Facilities across the four universities of the UH System was complex and required considerable creativity, collaboration and compromise. To accomplish it, 44 subject-matter experts from the universities and industry partner 4b Technology Group met dozens of times over 24 weeks, creating and refining multiple drafts of numerous preliminary documents. The result is this document, assessment checklists for every IT Facility type, and a repository of standard resolutions for common gaps where the requirements are not met.

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Each university in the UH System will maintain an up-to-date inventory of all IT Facilities assigned to the central IT department, with key information that includes room type (space use) code, room ownership and access details, and a record of gaps against the Baseline Standards as they are identified, tracked and remedied. The inventory data will be accessible to a system-level dashboard, using a common data dictionary across all universities. There are two broad categories of IT Facilities: Production IT Facilities (the subject of this document) and Administrative IT Facilities.

There are 11 types of Production IT Facilities within three broad categories. Any of these can be designated a "Critical IT Facility" by the IT organization if it delivers services to the entire campus or a majority of the campus, or serves a mission-critical function.

- Network Facilities
    - Floor Distributor Room (FD, formerly known as IDF at UH System)
    - Technology Closet
    - Technology Enclosure
    - Building Distributor (BD, formerly known as BDF at UH System) [houses electronics that serve as aggregators for connections to FDs]
    - Campus Distributor (CD, formerly known as MDF at UH System) [houses equipment that delivers technology services to multiple buildings or the entire campus]
- Computing Facilities
    - Data Center
    - Server Room
        - Critical
        - Non-critical
- Audiovisual (AV) Facilities
    - Storage
    - Work
    - Equipment

A task force composed of representatives from the four universities in the University of Houston System 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 earlier editions are available on the University of Houston UIT website at:

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

2.2 PURPOSE

This document serves two purposes:

- State the baseline standards requirements for all IT Facilities in the University of Houston System.
- Establish criteria for a systemwide, self-administered audit of existing Information Technology Facilities that will identify deficiencies, propose solutions and lead to remediation of issues that present risks to personal safety or operational continuity.

2.3 Related Documents

2.3.1 University of Houston (UH)

- University Information Technology Network Services (UITNS) *Network Infrastructure Design Standards* has additional requirements. 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 University of Houston *Master Specification Division 27 — Communications* addresses topics related to data and voice communications. Note that this document applies systemwide to construction projects valued at $300K or more. *Division 27* is organized by topic:

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

- 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 this document and *Network Infrastructure Design Standards* cover 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 all three, to the extent that they affect their work and decisions.

2.3.2 University of Houston Clear Lake (UHCL)

- [No additional documents]
- The University of Houston *Master Specification Division 27 — Communications* (see 2.3.1 above) provide guidance in cases where the university has no other recommendations or documented master specifications. Note that this document formally applies to construction projects valued at $300K or more for all UHS universities.

2.3.3 University of Houston Downtown (UHD)

- [No additional documents]
- The University of Houston *Master Specification Division 27 — Communications* (see 2.3.1 above) provide guidance in cases where the university has no other recommendations or documented master specifications. Note that this document formally applies to construction projects valued at $300K or more for all UHS universities.

2.3.4 University of Houston Victoria (UHV)

- [No additional documents]
- The University of Houston *Master Specification Division 27 — Communications* (see 2.3.1 above) provide guidance in cases where the university has no other recommendations or documented master specifications. Note that the *Master Specification* formally applies for all UHS universities to construction projects valued at $300K or more.

3 General Requirements

3.1 Evaluation Process and Scheduling

3.1.1 Visually evaluate each Information Technology Facility for compliance with baseline room standards and document results.

3.1.2 Develop resolution plan to address issues of non-compliance based on risk to physical or information safety and operationally continuity.

3.1.3 Execute plans to bring rooms into compliance.

3.1.4 Coordinate, annually, with university access control administrators to ensure Information Technology Facility access is current and compliant with IT access requirements (see section 3.4, UH System Information Facilities Access).

3.1.5 Conduct a meeting at least annually between the central IT department and the Facilities department to discuss development plans, practices, and correction of deficiencies in IT Facilities.

3.1.6 Using previous documentation as a baseline, visually re-evaluate and document each Information Technology Facility as follows:

3.1.6.1 Facilities with known compliance issues — once a year

3.1.6.2 New or Compliant Facilities — once every two years

3.2 Signage and Labeling

3.2.1 No IT Facility can be visibly labeled in a way that reveals that it contains technology equipment. IT Facilities should be labelled solely with a room number or other unique identifier, and optionally, “For service to this facility, call XXX-YYY-ZZZZ”.

3.3 Codes, Standards and Regulations

3.3.1 Nation Fire Protection Agency Code (NFPA), Chapters 72, 80, 101 and IFC 1221
3.3.2 National Electric Code (NEC), Latest Issue
3.3.3 National Electrical Manufacturers Association (NEMA)
3.3.4 ADA Standards for Accessible Design 28 CFR Part 36
3.3.5 American Society for Testing Materials (ASTM)*
3.3.6 ANSI/TIA-568.1-D - Commercial Building Telecommunications Infrastructure Standard
3.3.7 ANSI/TIA-568.2-D - Balanced Twisted-Pair Telecommunications Cabling and Components Standard
3.3.8 ANSI/TIA-568.3-D - Optical Fiber Cabling and Components Standard
3.3.9 ANSI/TIA-568.4-D - Broadband Coaxial Cabling and Components Standard
3.3.10 ANSI/TIA-569-E - Telecommunications Pathways and Spaces
3.3.11 ANSI/TIA-606-C - Administration Standard for Telecommunications Infrastructure
3.3.12 ANSI/TIA-607-D - Generic Telecommunications Bonding and Grounding (Earthing) for Customer Premises
3.3.13 ANSI/TIA-526-7-A - Testing of Installed Single-Mode Fiber Cable Plant
3.3.14 ANSI/TIA-526-14-C - Testing of Installed Multimode Fiber Cable Plant
3.3.15 ANSI/TIA -758-B - Customer-Owned Outside Plant Telecommunications Infrastructure Standard
3.3.16 BICSI TDMM, Cabling Installation, LAN Design, and Customer-Owned Outside Plant Manuals-Latest Editions
3.3.17 ANSI/BICSI 002-2019, Data Center Design and Implementation Best Practices
3.3.18 International Standards Organization/International Electrotechnical Commission (ISO/IEC) IS 11801, 2000
3.3.19 Others as applicable (e.g., NEMA, UL, IEEE)

3.4 UH System Information Facilities Access Requirements

To maintain security, integrity and continuity of information management and network operation, access to IT Facilities must be limited and controlled. Employees who work in and maintain these facilities will be granted the appropriate access level as determined by their supervisor. Personnel who are not part of a university's central IT department may be granted access to IT Facilities as needed to fulfill the mission of the university and the UH System and achieve their business objectives. These requirements standardize the management of access to UH System IT Facilities.

The universities of the UH System are responsible for ensuring that all information resources are secure (i.e., that hardware, software, data and services are protected against damage, theft or corruption by individuals or events, internal or external to the university).

The central IT department team members of each university are responsible to prevent the possibility of misuse, abuse or incidents related to information resource security.

Every person in each university community is responsible for becoming familiar and comply with guidelines, policies and procedures relating to the acceptable use of university information resources. Use of university information resources constitutes implicit agreement to comply.

3.4.1 Procedures

Procedures to satisfy these requirements vary among the universities. Each university's central IT department maintains and administers such procedures, which may include:

3.4.1.1 Ownership/occupancy Classifications (Space Use)

This documents the space use codes used to designate IT Facilities in the university's space management system.

3.4.1.2 Procedure for Equipment Colocation inside IT Facility

This governs the housing of non-IT department equipment inside an IT Facility.

3.4.1.3 IT Facility Access Procedure

This governs requesting, administering and terminating individual access to IT Facilities.

3.4.1.4 Agreement for Appropriate Use of IT Facilities

This documents the agreed responsibilities of a user granted access to an IT Facility.

3.4.2 Ownership of IT Facilities

3.4.2.1 The central IT department should be the owner-of-record for every IT Facility except those where IT shares space granted by another facility owner.

3.4.2.2 For shared spaces not owned by the central IT department (e.g., mechanical rooms owned by the Facilities department where the central IT department has been granted use of part of the space:

3.4.2.2.1 A written Shared Use Agreement between the space owner and the central IT department must be in place as needed.

3.4.2.2.2 IT equipment must be secured from other users of the space to assure integrity and security.

3.4.3 Colocation of Non-IT Equipment inside IT Facilities

3.4.3.1 Equipment owned by non-IT departments may qualify for colocation within an IT Facility. To do so, all of the following requirements must be satisfied:

3.4.3.1.1 Requesting department has no alternative location.

3.4.3.1.2 Equipment does not require hands-on manipulation or an operator to be physically present to perform its function.

3.4.3.1.3 The IT Facility does not have security considerations that would limit or prohibit access by the requesting department.

3.4.3.2 Installation and removal of non-IT department equipment must be supervised by central IT staff.

3.4.3.3 The requesting department is responsible for costs to transport, install, connect, maintain, repair, replace and remove colocated equipment unless otherwise specified in a formal Service Level Agreement with the central IT department.

3.4.3.4 The presence of departmental equipment within an IT Facility does not automatically grant departmental access to the facility. Contact the central IT department for the procedure to request access.

3.4.3.5 Demarcation Point

3.4.3.5.1 A dedicated network connection (demarcation point) is required for departmental equipment installed inside an IT Facility. Connecting departmental equipment to IT infrastructure is permitted only through the demarcation point.

3.4.3.5.2 Installation of the demarcation point will be at the expense of the requesting department.

3.4.4 Access to IT Facilities by Non-IT Personnel

3.4.4.1 Access granted may be revoked if the grantee changes departments or employers.

3.4.4.2 Access privileges will be denied to or revoked for a person who poses a security risk or who violates access procedures or these requirements.

3.4.4.3 Only university employees may be granted access to IT Facilities through their personal access control credential (e.g., employee badge or card). All other individuals must acquire access by checking out a card or key as mandated under the central IT department's procedures.

3.4.4.4 Non-IT personnel may not grant access to others or escort others into the facility. Sharing a card or key with another person is not permitted.

3.4.4.5 Justifications for non-IT access

To qualify for access to an IT Facility, a non-IT person must meet at least one of the following criteria:

3.4.4.5.1 Their department or company has equipment inside the facility.

3.4.4.5.2 The individual requires access to conduct inspection, audit, facilities maintenance or other official functions.

3.4.4.5.3 The individual is an authorized visitor escorted by a central IT employee authorized to use the facility and remains in the company of the employee at all times while inside the facility.

3.4.4.6 In the event a card, key or other access control item is lost, or access to the facility is compromised in any other way, the user must report the situation to the central IT department immediately and follow the university's procedures.

3.4.4.7 Costs

3.4.4.7.1 The cost to establish access, if any, may be charged to the requesting department or company.

3.4.4.7.2 The requesting department or company is responsible for the cost to remedy a lost card, key or other access control item.

3.4.4.8 Daily Key/card Return

3.4.4.8.1 At the end of a workday, ALL Access Cards and Keys shall be returned to the designated location. If keys or cards are not returned in a timely manner, the individual will be subject to the following actions.

Incident Count or Infraction	Action
1 – 2	Verbal warning
3	Verbal reminder, email to PMs
4 – 5	Verbal reminder, email to PMs, person loses privilege for 2 weeks
6 or more	Verbal reminder, email to PMs, person loses privilege for 4 weeks
If keys out for 24 hours or more	Verbal reminder, email to PMs, person loses privilege for 4 weeks

3.4.5 Access Levels

3.4.5.1 **Visitor – Escorted Access.** Non-IT employees, vendors, family members, students and any other visitors who have not been granted access to the IT Facility must be escorted by a person with **General Access** while in these areas. These visitors must sign in and out at the location designated by the central IT department.

3.4.5.1.1 Requirements

3.4.5.1.1.1 Present identification, preferably an employee badge or driver's license.

3.4.5.1.1.2 Adhere to the Agreement for Appropriate Use of IT Facilities.

3.4.5.1.1.3 Keep the visitor ID badge visible while onsite.

3.4.5.2 **Visitor – Expanded Access.** Non-IT employees, vendors, family members, students and any other visitors who meet the requirements below.

3.4.5.2.1 Requirements

3.4.5.2.1.1 Meet all requirements for **Visitor – Escorted Access** above.

3.4.5.2.1.2 Be assigned legitimate work in the IT Facility.

3.4.5.2.1.3 Be subject to random checks while onsite to verify access is authorized.

3.4.5.2.2 Permissions

3.4.5.2.2.1 May be left to work independently in the assigned workspace.

3.4.5.2.2.2 Must be escorted to the work location by a person with **General Access** and knowledge of the work being performed.

3.4.5.2.2.3 May not access sub-floor or plenum spaces except under the direction of a person with **General Access**.

3.4.5.3 **General Access.** Central IT employees, vendors, students and any other visitors who meet the requirements below.

3.4.5.3.1 Requirements

3.4.5.3.1.1 Must be (A) a central IT department employee with legitimate work in the facility, (B) an approved vendor with assigned work in the facility, or (C) building maintenance staff assigned to work in the facility.

3.4.5.3.1.2 Understands raised-floor safety and operations concerns, if applicable to the facility.

3.4.5.3.2 Permissions are as allowed or limited by applicable central IT department procedures and authorized by the individual's central IT department supervisor or sponsor.

4 Terminology: Acronyms, Abbreviations and Definitions

AHJ — Authority Having Jurisdiction

BD — Building Distributor (formerly Building Distribution Frame, or BDF) is the distributor facility in which the building backbone cable(s) terminate(s) and at which connections to the campus backbone cable(s) may be made. This room may also serve as an FD for its floor.

BICSI — Building Industry Consulting Services International Inc.

Building Distributor Room — A room that serves as a BD.

Campus Distributor Room — A room that serves as a CD.

CD — Campus Distributor (formerly Main Distribution Frame, or MDF) is the distributor facility from which the campus backbone cabling starts.

Colocation — Portion of a data center dedicated to the housing of third-party servers or other equipment. Requires security separation from the University operations area of data center.

CP — Consolidation Point is a connection point in the horizontal cabling subsystem between a Floor Distributor and a terminal equipment outlet.

Critical IT Facility — A facility that delivers services to the entire campus or a majority of the campus, or serves a mission-critical function.

Data Center — Any mission critical server room consisting of more than 6 racks. A data center is considered a mission critical facility and therefore will typically be provided with redundant utilities such as HVAC, electrical, and security.

Distributor — A functional element enabling the termination and connection of cabling subsystems to other cabling subsystems or transmission equipment, defined in *ISO/IEC 11801-1:2017(en): Information technology — Generic cabling for customer premises.*

ERRCS — Emergency Responder Radio Communications System. Also known as Distributed Antenna System (DAS) or Bi-Directional Amplifier system (BDA).

FD — Floor Distributor (formerly Intermediate Distribution Frame, or IDF) is the distributor facility that provides the per-floor horizontal customer service cabling for the end user's telecommunications equipment and connects to the building's data, voice, and video backbone cabling in the BD.

Floor Distributor Room — A room that serves as an FD.

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

IFC — International Fire Code

IT — Information Technology; when used as a reference to an organizational unit, refers to the central IT Department at the applicable University.

Lateral Fiber (LF) — A fiber optic cable of a smaller fiber count (12 – 48 is typical) that originates from a BD and terminates into the Metro Fiber for its network connectivity.

Legacy Facility — A facility that has been released to the university for active use by its intended occupants and is not the subject of a current construction or renovation project.

Level 1 Data (Confidential Information) — Managed according to the requirements of SAM 07.A.08, Level 1 data is information, as defined by SAM 01.D.06 – Protection of Confidential Information, that includes, but is not limited to, social security numbers, educational records as defined by the Family Educational Rights and Privacy Act ("FERPA"), health care information as defined by the Health Insurance Portability and Accountability Act ("HIPAA") and other applicable law, and customer information as defined by the Gramm-Leach-Bliley Act ("GLB Act").

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

MEP — Mechanical, Electrical and Plumbing

Metro Fiber (MF) — High fiber count cables (144, 288, etc.) that traverse the campus, have midpoint splice cases, and act as the fiber backbone of the campus.

NEC — National Electrical Code

Network Facility (NF) —A secured facility that houses telecommunication and network equipment such as data, voice and video components and their associated connectivity infrastructure. The types of Network Facilities are Campus Distributor (CD), Building Distributor (BD), Floor Distributor (FD), Technology Enclosure (TE) and Technology Closet.

NFPA — National Fire Protection Agency

PDU — Power Distribution Unit

Technology Closet — A legacy Network Facility that uses the room's doorway as working clearance. Use of these facilities should be limited to small renovations or parking facilities, and requires the written approval of IT. This is a type of CP.

Technology Enclosure (TE) — A type of CP that is a secured case, cabinet or housing for technology equipment, cable terminations, and cross-connect cabling. This is a type of CP.

Wallfield — A dedicated wall space used for mounting equipment or routing cabling.

UITNS or UIT- University of Houston IT Network Services, or University of Houston IT

UH — University of Houston

UHD — University of Houston-Downtown

UHCL — University of Houston-Clear Lake

UHV — University of Houston-Victoria

UHS — University of Houston System (the entity that comprises the four universities: UH, UHD, UHCL and UHV)

UPS — Uninterruptable Power Supply

VCT — Vinyl Composition Tile

NETWORK FACILITIES

5 FD ROOM REQUIREMENTS

5.1 ROOM LOCATION, SIZING, AND WORKING CLEARANCES

5.1.1 Room Location: FD Rooms are stacked vertically from floor to floor with horizontal cable access at no fewer than two separate locations on separate walls.

5.1.2 FD Room walls do not contain any type of liquid piping (water, sewer, roof drain, etc.).

5.1.3 If the FD Room is adjacent to a restroom or janitors' closets, there is a concrete curb at least 3 inches tall separating the rooms.

5.1.4 The sizing of the FD depends upon the building size and technology density. During design, take into consideration the amount of communication infrastructure required for the room being served, and propose the adequate room size to the architect and IT for approval.

5.1.5 At a minimum, FD Rooms must be sized to accommodate 3 two-post racks with ten-inch vertical managers between racks and at the ends.

5.1.6 To provide for a safe working environment, 3 feet (36 inches) of working clearance is required on the front, rear, and sides of rack assemblies and wallfields in the FD room.

5.1.7 Room size allows at least 2 feet (24 inches) of space for rack-mounted equipment and 6 inches for wallfields.

5.1.8 FD room has a minimum 1-hour fire rating construction and is positively pressurized. Buildings with 4 or more stories require 2-hour rating.

Exception — If any Emergency Responder Radio Communications system equipment is housed within the FD room, then per NFPA 72, 1221 and the IFC, the room must have a 2-hour rated construction.

5.1.9 Doors are of solid wood or hollow metal construction and swing outward.

5.1.10 Legacy Facility Minimums:

5.1.10.1 Any liquid piping passing above equipment is equipped with a drip tray.

5.1.10.2 Working clearances allow for the safe installation of new cabling and maintenance of existing equipment.

5.1.10.3 Existing rooms have positive air pressure to help prevent dust intrusion and premature equipment failure.

5.1.10.4 Existing in-swinging doors do not affect equipment clearances.

5.1.10.5 Louvered doors are not used, as they do not maintain positive pressure.

5.2 Room Finishes

5.2.1 FD walls go to deck for security and air flow purposes.

5.2.2 All wallfields within the FD room have ¾-inch fire rated plywood (FRP) vertically starting 6 inches above the floor. Plywood is painted on both sides with a minimum of 2 coats of light-colored paint, leaving the fire-rating stamp exposed.

5.2.3 FD room has no ceilings, unless serving a floor-to-floor height exceeding 18 feet.

5.2.4 Room contains no windows, exterior or interior.

5.2.5 Flooring is either non-static VCT or sealed concrete. Carpet flooring, or any static-generating type flooring, is not acceptable.

5.2.6 Linear LED lights on chains at the front and rear of the racks are present and provide 50 foot-candles of light in working areas.

5.2.7 Room has an ANSI/TIA Standard Secondary Bus Bar (12 inches x 4 inches x 0.25 inches) bonded with a two-hole lug connection to the Telecommunications Bonding Backbone.

5.2.8 Room is clearly labeled per Facilities Standards and includes a door jamb bar code for inventory purposes.

5.2.9 Legacy Facility Minimums:

5.2.9.1 Room is clearly labeled and includes a door jamb bar code for inventory purposes.

5.2.9.2 Walls to deck.

5.2.9.3 No windows.

5.2.9.4 Lights are operable and provide safe lighting levels.

5.2.9.5 Compliant grounding.

5.3 Physical Security Requirements

5.3.1 Walls go to deck.

5.3.2 A card reader and door hardware with IT Master core are installed on the exterior of the FD room for controlled entry.

5.3.3 IT-managed camera is installed in the interior of the FD room facing the entrance.

5.3.4 Legacy Facility Minimums:

5.3.4.1 Walls to deck.

5.3.4.2 Readers with IT Master Keyed Doors on dedicated FDs.

5.3.4.3 Camera coverage of entry door and rack equipment on Shared Facilities.

5.4 Mechanical and Electrical Requirements

5.4.1 In general, if the electrical design for the building incorporates generator power backup, then all IT-specific electrical and HVAC provisions must be generator-backed.

5.4.2 Convenience outlets installed every 6 feet as specified by the NEC article 210. Convenience outlets in FD rooms are required to be 120VAC, 20A and on emergency / generator power.

5.4.3 Sufficient outlets are present to prevent the need for power strips or extension cords.

5.4.4 Power cords that have the potential to be disconnected accidentally have locking connections.

5.4.5 All reserved wallfields have a dedicated 120VAC, 20A circuit. Outlets are coordinated around wallfield requirements.

5.4.6 Outlets are positioned above the rear of the racks, with locking connections for essential equipment.

5.4.7 HVAC units are dedicated units located to keep chilled water and maintenance access outside of the FD. HVAC employs a ducted design that provides cold air to the front side of the racks and return from the rear.

5.4.8 It is preferred to have the HVAC serving the FD room on generator power. An acceptable alternative is emergency power.

5.4.9 Acceptable design measures for HVAC are between 60 degrees F and 75 degrees F, and between 30 percent and 50 percent relative humidity. Designs outside of these parameters are not acceptable.

5.4.10 Room has a dedicated controllable thermostat with digital temperature readout.

5.4.11 Room lighting is on emergency power.

5.4.12 Legacy Facility Minimums:

5.4.12.1 Equipment on emergency or generator power, if available.

5.4.12.2 Room temperature 60 to 85 degrees F and 75 degrees F, and between 30 percent and 50 percent relative humidity.

5.4.12.3 Power outlets and cords are safe and not a tripping hazard.

5.5 Active Equipment

5.5.1 Uninterruptable power supplies (UPS) type and sizing vary from university to university but are connected to an over-rack power receptacle with a locking connection.

5.5.2 Network-based monitoring of room temperature, humidity, and UPS status is required.

5.5.3 Power distribution units (PDU) are configured in two-post racks horizontally.

5.5.4 Legacy Facility Minimums:

5.5.4.1 Existing UPS are sized properly and tested.
5.5.4.2 Switches are labeled, free of dust, and have spare ports for future expansion.

5.6 Utility Requirements

5.6.1 All Fire and Life Safety requirements for FD rooms comply with code requirements set forth by the NFPA, IFC, and the local AHJ. The standard for FDs is to have a dry pipe, pre-action fire suppression with high-temp heads installed with cages.
5.6.2 If the room rating requires fire stopping, then ez-path or sealed sleeves are the preferred fire stopping measures.
5.6.3 The following non-serving utilities are not permitted to pass through or reside in FD rooms:

5.6.3.1 Potable water, chilled water, sanitary, grey water, ductwork, roof drains, transformers, lighting control panels, building automation panels, fire alarm panels, electrical panels, main or branch circuits.

5.6.4 The following non-serving utilities require written approval from IT to place equipment in and have shared access to the FD room:

5.6.4.1 Access Control
5.6.4.2 Cellular Distributed Antenna Systems
5.6.4.3 Audiovisual
5.6.4.4 Emergency Radio Repeater Systems

5.6.5 Legacy Facility Minimums:

5.6.5.1 All room penetrations are properly sealed or fire-stopped.
5.6.5.2 Any liquid piping passing above equipment is equipped with a drip tray.
5.6.5.3 Fire sprinkler heads have cages.
5.6.5.4 Rooms without sprinklers have inspected CO_2 or clean agent fire extinguishers.

5.7 Racks and Cabinets

5.7.1 FD racks are 2-post racks that are 19 inches wide, 7 feet tall, and 3 inches in depth.
5.7.2 Ten (10) inches of space is allowed between and at the ends of racks/cabinets for vertical wire management.

5.7.3 Horizontal wire management requirement varies from university to university, but is required at the top and middle of each two-post rack.

5.7.4 All new rack layouts are sized for a minimum 50 percent additional spare capacity at the Design Development stage.

5.7.5 Legacy Facility Minimums:

5.7.5.1 Cables are properly supported with vertical and horizontal management.

5.7.5.2 Rooms have space for future additions.

5.8 Wiring and Cabling

5.8.1 All wiring and cabling is installed in basket or ladder trays.

5.8.2 All cable trays, baskets, and ladders are properly grounded per the NEC article 250 and ANSI/TIA 607-D using two-hole lugs.

5.8.3 All cable labeling follows IT standards.

5.8.4 All horizontal and vertical sleeves use either ez-path or sealed sleeves. Four (4) additional 4-inch sleeves were added to the minimum design requirements of the project for future expansions. For any sleeves that penetrate fire rate walls, refer to section 5.6 for compliance.

5.8.5 Horizontal cabling meets or exceeds ANSI/TIA Category 6 Standard.

5.8.6 All patching is neat, tidy, and consistent with horizontal cable category and brand. Patch cord colors comply with IT standard.

5.8.7 Colors for all connectivity (modular jacks) are based on use per IT standard.

5.8.8 All horizontal cabling is neatly dressed with Velcro ties in bundles of 48 cables or fewer.

5.8.9 Legacy Facility Minimums:

5.8.9.1 Cables are properly supported in basket or ladder trays.

5.8.9.2 All metals are properly bonded to bus bar with two-hole lugs.

5.8.9.3 All penetrations are properly sealed or fire-stopped and have room for expansion.

5.8.9.4 All cables are labeled.

5.8.9.5 All cables and patch cords are neatly installed.

5.8.9.6 Abandoned wiring and cabling is removed per NEC 800.25.

5.9 Miscellaneous Requirements

5.9.1 FD room is kept clean and free of trash and debris, and is not used to store equipment or miscellaneous items for the building.

5.9.2 Any existing asbestos identified by a design professional or contractor for a renovation or interior improvement project is reported to IT for proper handling.

5.10 Sample Diagrams of a Standard FD Room

FIGURE 1

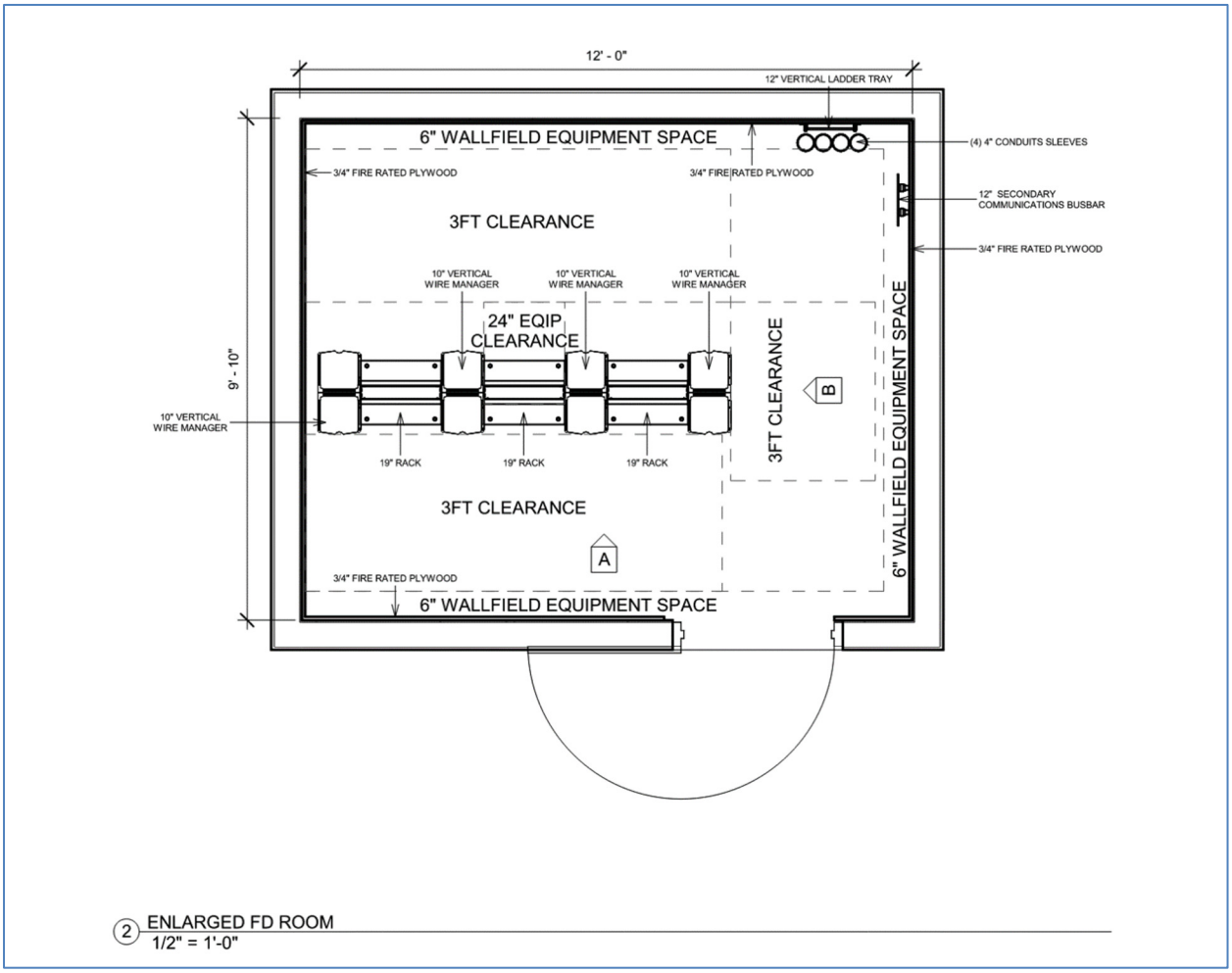

Illustration credit: 4b Technology Group, LLC (https://www.4btechnology.com/)

FIGURE 2

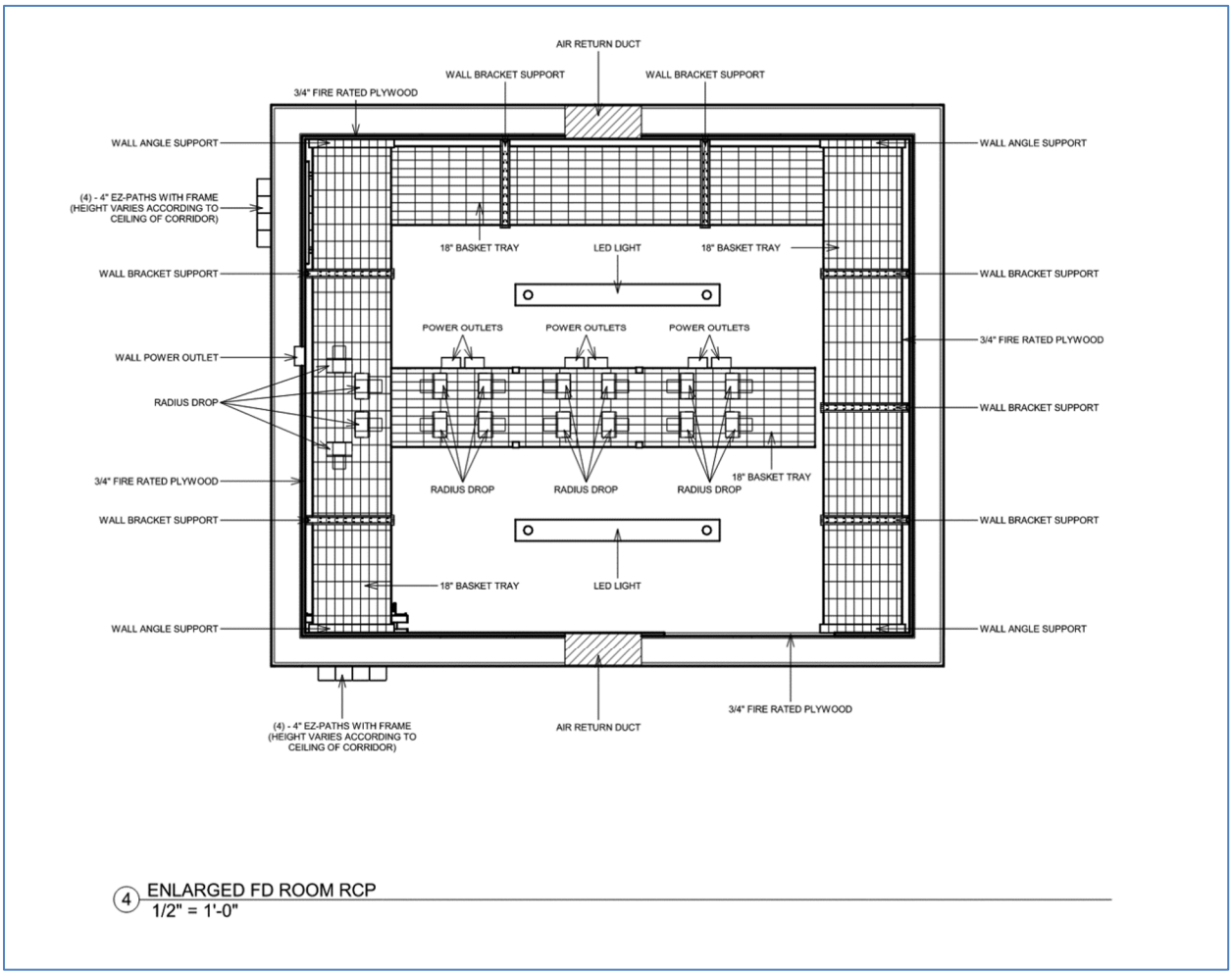

Illustration credit: 4b Technology Group, LLC (https://www.4btechnology.com/)

FIGURE 3

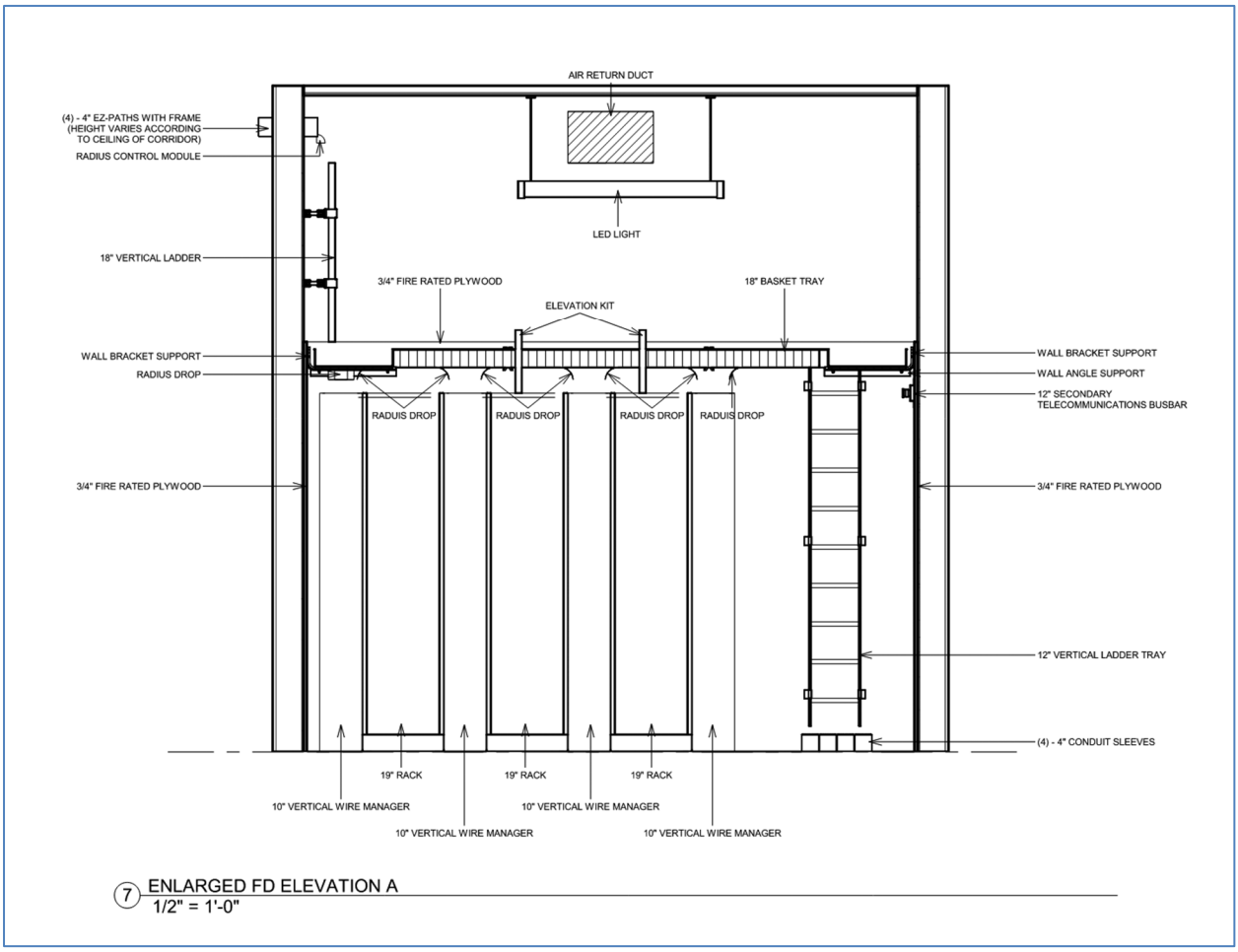

Illustration credit: 4b Technology Group, LLC (https://www.4btechnology.com/)

FIGURE 4

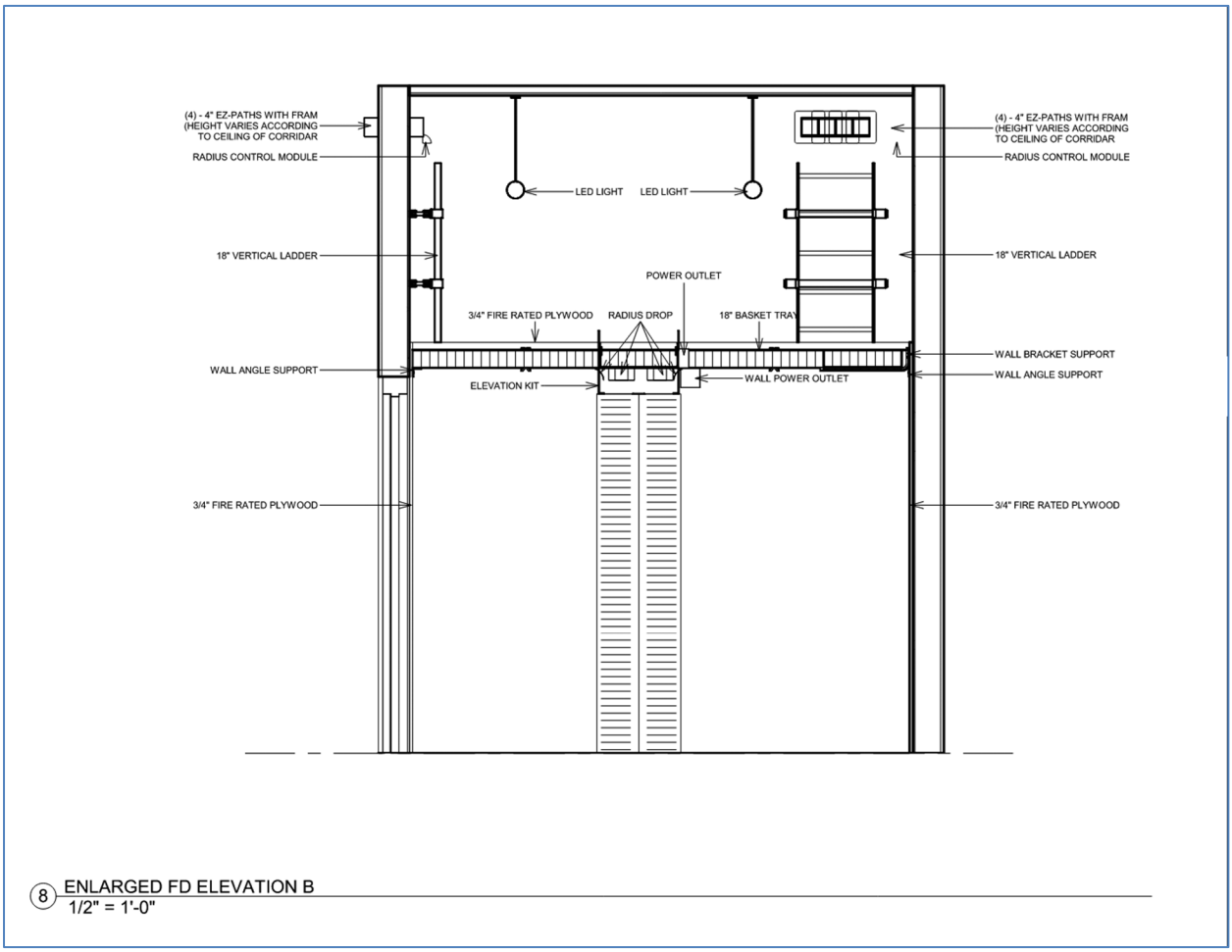

Illustration credit: 4b Technology Group, LLC (https://www.4btechnology.com/)

6 BD Room Requirements

6.1 Room Location, Sizing, and Working Clearances

6.1.1 Room Location: BD room is placed on level 1 unless the building is adjacent to areas prone to flooding (500-year flood plain). If also serving as an FD, the BD room is stacked vertically below other FDs in the Building.

6.1.2 BD is supplied with diverse backbone pathway and horizontal cable access at no fewer than two separate locations on separate walls.

6.1.3 BD Rooms walls do not contain any type of liquid piping (water, sewer, roof drain, etc.).

6.1.4 If the BD Room is adjacent to a restroom or janitors' closets, there is a concrete curb at least 3 inches tall separating the rooms.

6.1.5 The sizing of the BD depends upon the building size and technology density. During design, take into consideration the amount of communication infrastructure required for the room being served, and propose the adequate room size to the architect and IT for approval.

6.1.6 At a minimum BD Rooms must be sized to accommodate one server cabinet and 3 two-post racks with ten-inch vertical managers between racks.

6.1.7 To provide for a safe working environment, 3 feet (36 inches) of working clearance is required on the front, rear, and sides of rack assemblies and wallfields and 4 feet (48 inches) in the front of Server Cabinets.

6.1.8 Room size allows at least 2 feet (24 inches) of space for rack-mounted equipment and 6 inches for wallfields.

6.1.9 BD room has a minimum 1-hour fire rating construction and be positively pressurized. Buildings with 4 or more stories require 2-hour rating.

Exception — If any Emergency Responder Radio Communications system equipment is housed within the room, then per NFPA 72, 1221 and the IFC, the room must have a 2-hour rated construction.

6.1.10 Doors are of solid wood or hollow metal construction and swing outward.

6.1.11 Legacy Facility Minimums:

6.1.11.1 Any liquid piping passing above equipment is equipped with a drip tray.

6.1.11.2 Working clearances allow for the safe installation of new cabling and maintenance of existing equipment.

6.1.11.3 Existing rooms have positive air pressure to help prevent dust intrusion and premature equipment failure.

6.1.11.4 Existing in-swinging doors do not affect equipment clearances.

6.1.11.5 Louvered doors are not used, as they do not maintain positive pressure.

6.2 Room Finishes

6.2.1 All BD walls go to deck.

6.2.2 All wallfields within the BD room have ¾-inch fire rated plywood (FRP) vertically starting 6 inches above the floor. Plywood is painted on both sides with a minimum of 2 coats of light-colored paint, leaving the fire-rating stamp exposed.

6.2.3 BD room has no ceilings, unless serving a floor-to-floor height exceeding 20 feet.

6.2.4 Room contains no windows, exterior or interior.

6.2.5 Flooring is either non-static VCT or sealed concrete. Carpet flooring, or any static-generating type flooring, is not acceptable.

6.2.6 Linear LED lights on chains at the front and rear of the racks are present and provide 50 foot-candles of light in working areas.

6.2.7 Room has an ANSI/TIA Standard Primary Bus Bar (20 inches x 4 inches x 0.25 inches) bonded with a two-hole lug connection to the Telecommunications Bonding Backbone and to the building's main ground connection.

6.2.8 Room is clearly labeled per Facilities Standards and includes a door jamb bar code for inventory purposes.

6.2.9 Legacy Facility Minimums:

6.2.9.1 Room is clearly labeled and includes a door jamb bar code for inventory purposes.

6.2.9.2 Walls to deck.

6.2.9.3 No windows.

6.2.9.4 Lights are operable and provide safe lighting levels.

6.2.9.5 Compliant grounding.

6.3 Physical Security Requirements

6.3.1 Walls go to deck.

6.3.2 A card reader and door hardware with IT Master core are installed on the exterior of the BD room for controlled entry.

6.3.3 IT-managed camera is installed in the interior of the BD room facing the entrance.

6.3.4 Legacy Facility Minimums:

6.3.4.1 Walls to deck.

6.3.4.2 Readers with IT Master Keyed Doors on dedicated BDs.

6.3.4.3 Camera coverage of entry door and rack equipment on Shared Facilities.

6.4 Mechanical and Electrical Requirements

6.4.1 In general, if the electrical design for the building incorporates generator power backup, then all IT-specific electrical and HVAC provisions must be generator-backed.

6.4.2 Convenience outlets installed every 6 feet as specified by the NEC article 210. Convenience outlets in BD rooms are required to be 120VAC, 20A and on emergency / generator power.

6.4.3 Sufficient outlets are present to prevent the need for power strips or extension cords.

6.4.4 Power cords that have the potential to be disconnected accidentally have locking connections.

6.4.5 All reserved wallfields have a dedicated 120VAC, 20A circuit. Outlets are coordinated around wallfield requirements.

6.4.6 Rack/Cabinet power requirements vary from university to university. Outlets are positioned above the rear of the racks/cabinets, with locking connections for essential equipment.

6.4.7 HVAC units are dedicated units located to keep chilled water and maintenance access outside of the BD. HVAC employs a ducted design that provides cold air to the front side of the racks and return from the rear.

6.4.8 It is preferred to have the HVAC serving the BD room on generator power. An acceptable alternative is emergency power.

6.4.9 Acceptable design measures for HVAC are between 60 degrees F and 75 degrees F, and between 30 percent and 50 percent relative humidity. Designs outside of these parameters are not acceptable.

6.4.10 Room has a dedicated controllable thermostat with digital temperature readout.

6.4.11 Room lighting is on emergency power.

6.4.12 Legacy Facility Minimums:

6.4.12.1 Equipment on emergency or generator power, if available.

6.4.12.2 Room temperature 60 to 85 degrees F and 75 degrees F, and between 30 percent and 50 percent relative humidity.

6.4.12.3 Power outlets and cords are safe and not a tripping hazard.

6.5 Active Equipment

6.5.1 Uninterruptable power supplies (UPS) type and sizing vary from university to university but are connected to an over-rack power receptacle with a locking connection.

6.5.2 Network-based monitoring of room temperature, humidity, and UPS status is required.

6.5.3 Power distribution units (PDU) are configured horizontally in racks and vertically in cabinets.

6.5.4 All network equipment is labeled according to IT standard.

6.5.5 Legacy Facility Minimums:

6.5.5.1 Existing UPS are sized properly and tested.

6.5.5.2 Switches are labeled, free of dust, and have spare ports for future expansion.

6.6 Utility Requirements

6.6.1 All Fire and Life Safety requirements for BD rooms comply with code requirements set forth by the NFPA, IFC, and the local AHJ. The standard for BDs is to have dry pipe, pre-action fire suppression with high-temp heads installed with cages.

6.6.2 If the room rating requires fire stopping, then ez-path or sealed sleeves are the preferred fire stopping measures.

6.6.3 The following non-serving utilities are not permitted to pass through BD rooms:

6.6.3.1 Potable water, chilled water, sanitary, grey water, ductwork, roof drains, transformers, fire alarm, electrical panels, main or branch circuits.

6.6.4 The following non-serving utilities require written approval from IT to place equipment in and have shared access to the BD room:

6.6.4.1 Access Control
6.6.4.2 Cellular Distributed Antenna Systems
6.6.4.3 Audiovisual
6.6.4.4 Emergency Radio Repeater Systems

6.6.5 Legacy Facility Minimums:

6.6.5.1 All room penetrations are properly sealed or fire stopped.
6.6.5.2 Any liquid piping passing above equipment is equipped with a drip tray.
6.6.5.3 Fire sprinkler heads have cages.
6.6.5.4 Rooms without sprinklers have inspected CO_2 or clean agent fire extinguishers.

6.7 Racks and Cabinets

6.7.1 BD racks are 2-post racks that are 19 inches wide, 7 feet tall, and 3 inches in depth.

6.7.2 Ten (10) inches of space is allowed between and at the ends of racks/cabinets for vertical wire management.

6.7.3 Server cabinets are 750 mm wide, 2150 mm tall, and 1200 mm deep.

6.7.4 Horizontal wire management requirement varies from university to university, but is required at the top and middle of each two-post rack.

6.7.5 All new rack layouts are sized for a minimum 50 percent additional spare capacity at the Design Development stage.

6.7.6 Legacy Facility Minimums:

6.7.6.1 Cables are properly supported with vertical and horizontal management.
6.7.6.2 Rooms have space for future additions.

6.8 Wiring and Cabling

6.8.1 Install all wiring and cabling in basket or ladder trays.

6.8.2 All cable trays, baskets, and ladders are properly grounded per the NEC article 250 and ANSI/TIA 607-D.

6.8.3 All cable labeling follows IT standards.

6.8.4 All horizontal and vertical sleeves use either ez-path or sealed sleeves. Two (2) additional 4-inch sleeves were added to the minimum design requirements of the project for future expansions. For any sleeves that penetrate fire rate walls, refer to section 6.6 for compliance.

6.8.5 Horizontal cabling meets or exceeds ANSI/TIA Category 6 Standard.

6.8.6 All patching is neat, tidy, and consistent with horizontal cable category and brand. Patch cord colors comply with IT standard.

6.8.7 Colors for all connectivity (modular jacks) are based on use per IT standard.

6.8.8 All horizontal cabling is neatly dressed with Velcro ties in bundles of 48 cables or fewer.

6.8.9 Fiber Optic cabling requirements vary depending on project need. Single-mode fiber is the baseline standard for backbone connectivity, with other fiber types permitted as needed.

6.8.10 Legacy Facility Minimums:

6.8.10.1 Cables are properly supported in basket or ladder trays.

6.8.10.2 All metals are properly bonded to bus bar with two-hole lugs.

6.8.10.3 All penetrations are properly sealed or fire-stopped and have room for expansion.

6.8.10.4 All cables are labeled.

6.8.10.5 All cables and patch cords are neatly installed.

6.8.10.6 Abandoned wiring and cabling is removed per NEC 800.25.

6.9 Miscellaneous Requirements

6.9.1 BD requires diverse outside plant pathway connectivity to the campus backbone infrastructure and surrounding site. A minimum of two sets of two 4-inch conduits leaving the building slab separated by 65 feet and terminating in site interface maintenance hole is required.

6.9.2 BD room is kept clean and free of trash and debris, and is not used to store equipment or miscellaneous items for the building.

6.9.3 Any existing asbestos identified by a design professional or contractor for a renovation or interior improvement project is reported to IT for proper handling.

6.10 Sample Diagrams of a Standard BD Room

FIGURE 5

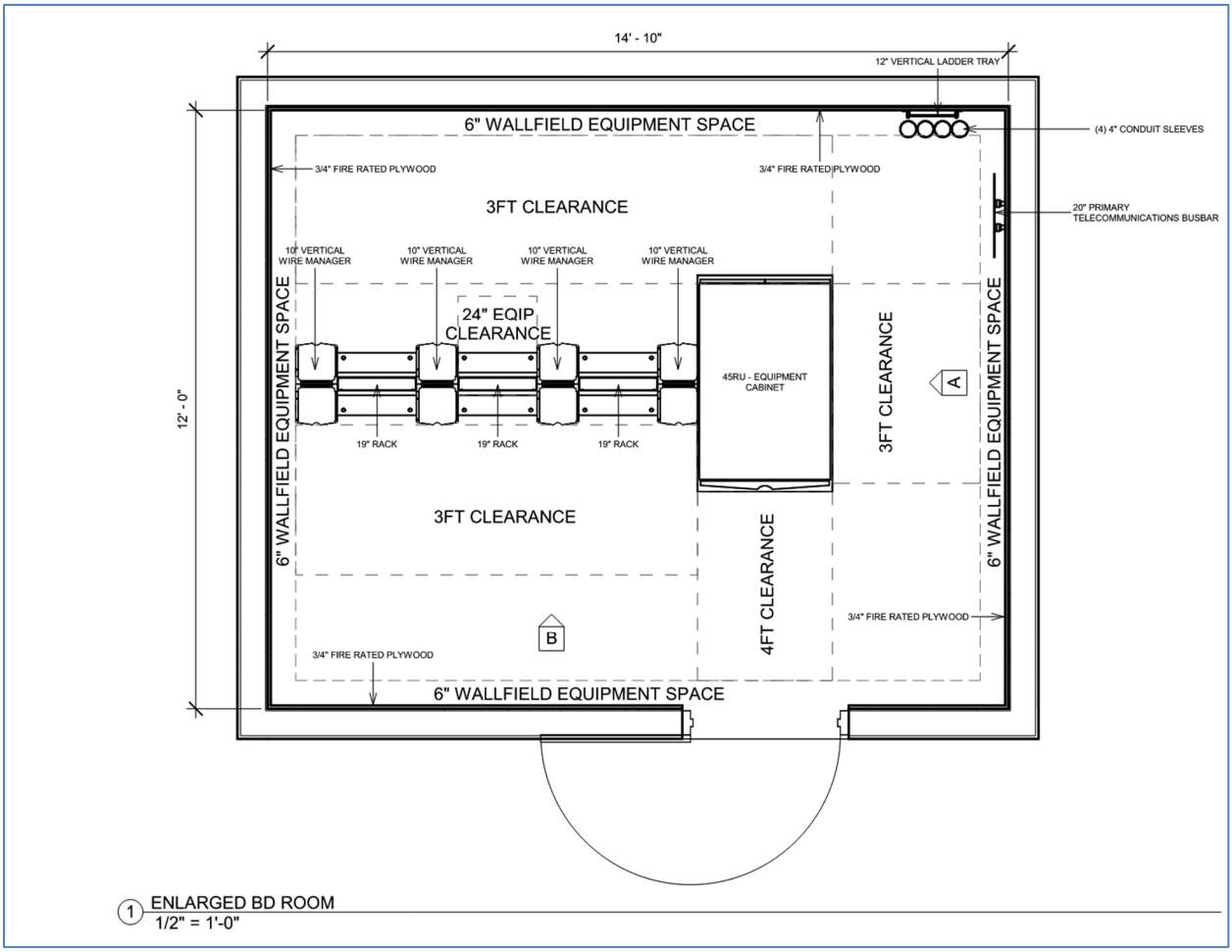

Illustration credit: 4b Technology Group, LLC (https://www.4btechnology.com/)

FIGURE 6

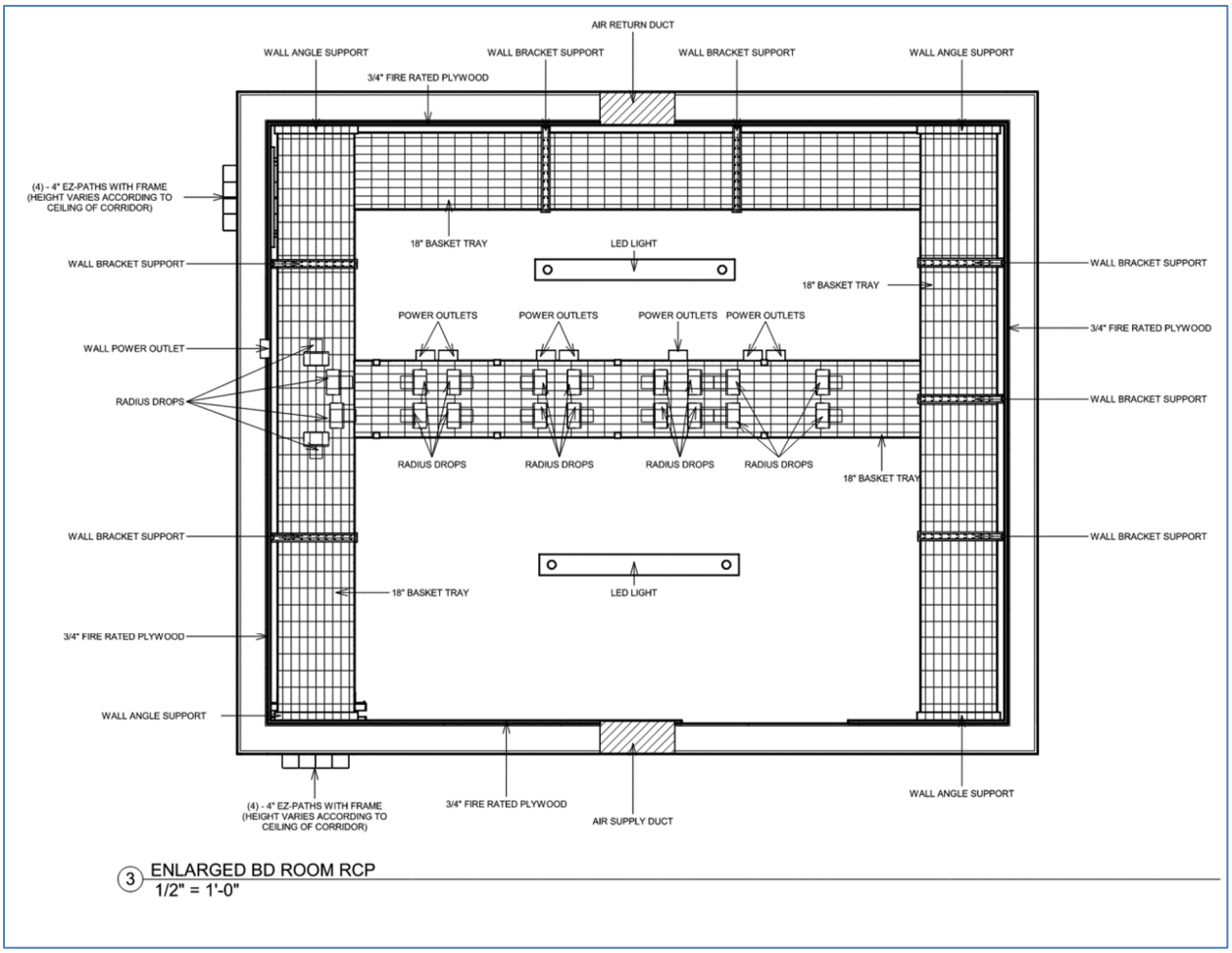

Illustration credit: 4b Technology Group, LLC (https://www.4btechnology.com/)

FIGURE 7

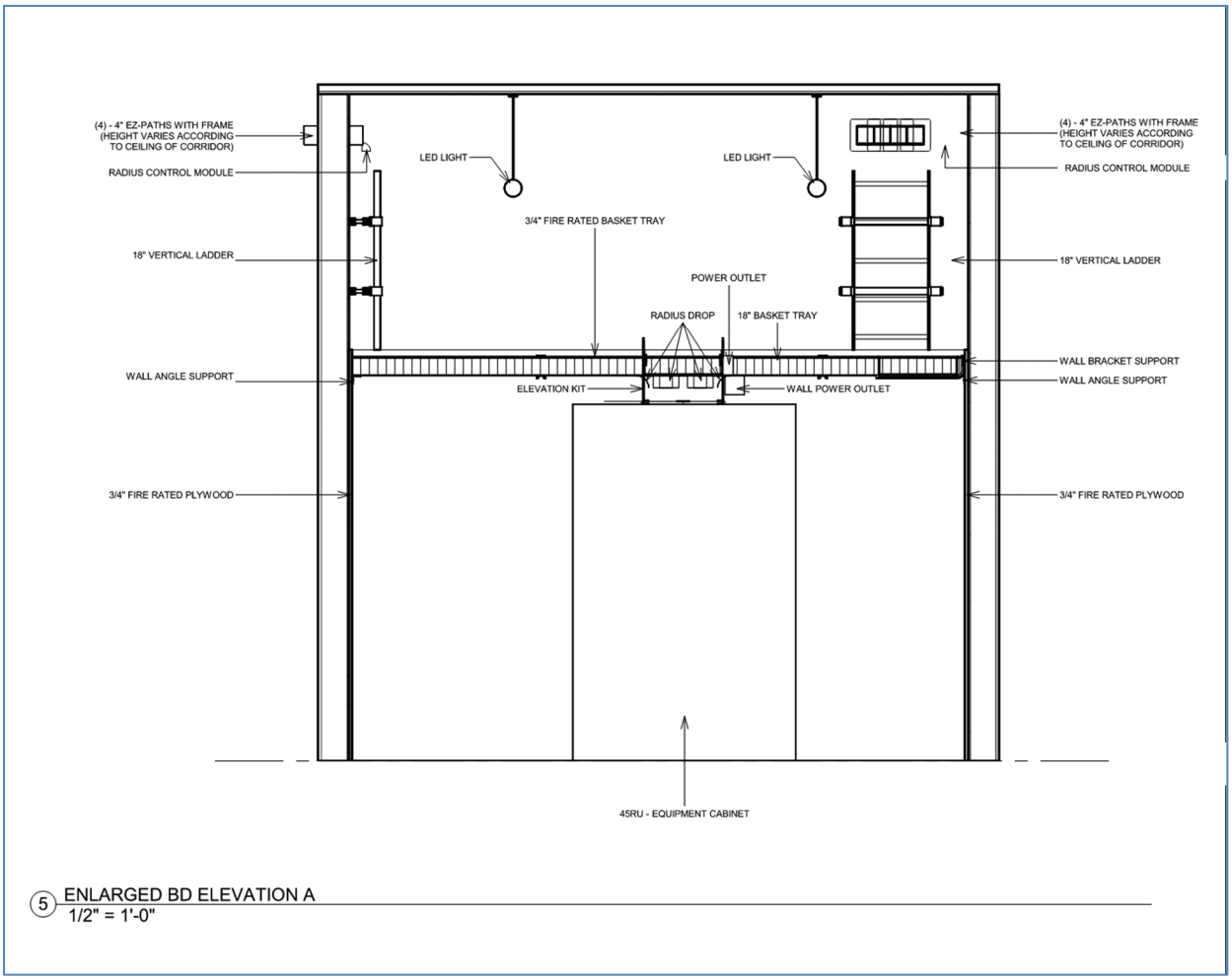

Illustration credit: 4b Technology Group, LLC (https://www.4btechnology.com/)

FIGURE 8

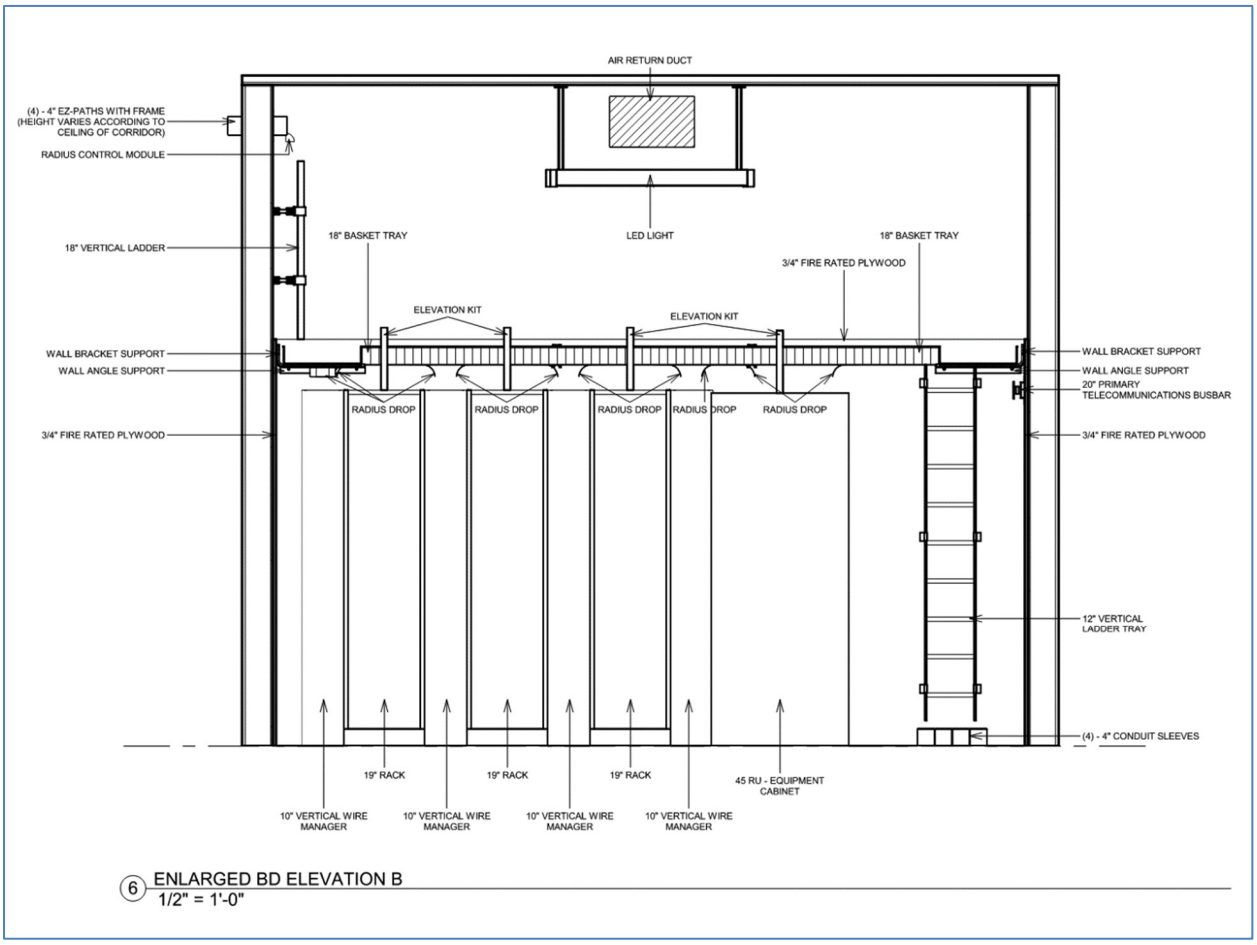

Illustration credit: 4b Technology Group, LLC (https://www.4btechnology.com/)

7 CD Room Requirements

7.1 Room Location, Sizing, and Working Clearances

7.1.1 Room location and working sizing: Same as BD; refer to section 6.1, with the addition of a separately secured space for service provider entrance terminations (see 7.1.3).

7.1.2 Larger, diverse backbone pathways are provided for the CD, as it will serve as the main backbone termination point for multiple buildings. A minimum of two sets of four 4-inch conduit duct banks is required.

7.1.3 Service provider points of entry or demarcation terminations are separate from those for CD facilities, with cable pathway connecting them.

7.1.4 Service provider duct bank connections are separate from campus infrastructure, with two dedicated 4-inch conduits per service provider.

7.1.5 CD room sizing will vary substantially based on campus facility needs. Coordinate with IT for requirements.

7.1.6 All rooms must have a minimum 1-hour fire rating construction and be positively pressurized.

Exception — If any Emergency Responder Radio Communications system equipment is housed within the CD room, then per NFPA 72, 1221 and the IFC, the room must have a 2-hour rated construction.

7.1.7 Doors are of solid wood or hollow metal construction and swing outward.

7.1.8 Rooms are clearly identified and labeled per Facilities Standards and include door jamb bar code for inventory purposes.

7.1.9 Legacy Facility Minimums:

7.1.9.1 Any liquid piping passing above equipment is equipped with a drip tray.

7.1.9.2 Working clearances allow for the safe installation of new cabling and maintenance of existing equipment.

7.1.9.3 Existing rooms have positive air pressure to help prevent dust intrusion and premature equipment failure.

7.1.9.4 Existing in-swinging doors do not affect equipment clearances.

7.1.9.5 Louvered doors are not used, as they do not maintain positive pressure.

7.2 Room Finishes

7.2.1 CD Finishes: Same as BD, refer to section 6.1.10.

7.2.2 Service provider area has a dedicated bus bar.

7.3 Physical Security Requirements

7.3.1 Same as BD, refer to section 6.3.

7.3.2 Service provider area is secured separately from campus areas.

7.4 Mechanical and Electrical Requirements

7.4.1 CD rooms are essential for the operation of multiple campus buildings. Generator-backed electrical power and HVAC systems are required.

7.4.2 Other MEP requirements are similar to BD Rooms. Refer to section 6.3.3.

7.5 Active Equipment

7.5.1 Uninterruptable power supplies (UPS) type and sizing vary from university to university but are connected to an over-rack power receptacle with a locking connection.

7.5.2 Power distribution units (PDU) are configured horizontally in racks and vertically in cabinets.

7.5.3 Legacy Facility Minimums:

7.5.3.1 Existing UPS are sized properly and tested.

7.5.3.2 Switches and other equipment are labeled, free of dust, and have spare ports for future expansion.

7.6 Utility Requirements

7.6.1 Same as BD, refer to section 6.6.

7.7 Racks and Cabinets

7.7.1 Same as BD, refer to section 6.7.

7.8 Wiring and Cabling

7.8.1 Same as BD, refer to section 6.8.

7.9 Miscellaneous Requirements

7.9.1 CD requires diverse outside plant pathway connectivity to the campus backbone infrastructure and surrounding site. A minimum of two sets of four 4-inch conduits leaving the building slab separated by 65 feet and terminating in site interface maintenance hole is required.

7.9.2 Any existing asbestos identified by a design professional or contractor for a renovation or interior improvement project is reported to IT for proper handling.

8 Technology Closet Requirements

The use of Technology Closets on new construction projects requires written approval from IT.

In legacy facilities, Technology Closets are used in small, non-critical, low-density areas. If approved for use in new construction, Technology Closets should be designed adhering to FD requirements with the following exceptions:

8.1 Room Location, Sizing, and Working Clearances

8.1.1 Technology Closets often use door openings as part of the working clearance areas.

8.1.2 Rear access is provided by wall-mounted, hinged, or rotating racks and cabinets for mounting of terminations and equipment.

8.1.3 Legacy Requirements:

8.1.3.1 Clearances must allow for safe installation of new cabling and maintenance or replacement of existing equipment.

8.2 Room Finishes

8.2.1 Same as FD with allowances for different room and equipment configuration. Refer to section 5.2.

8.2.2 Legacy Requirements:

8.2.2.1 TCs that house fewer than 48 connections and do NOT support mission critical operations or building security networks may use ventilated doors to support cooling, provided that acceptable temperature ranges can be maintained.

8.3 Physical Security Requirements

8.3.1 Same as FD. Refer to section 5.3.

8.4 Mechanical and Electrical Requirements

8.4.1 Same as FD with allowances for different room and equipment configuration. Refer to section 5.4.

8.4.2 Legacy Requirements:

8.4.2.1 Technology Closets that house fewer than 144 connections and do NOT support mission critical operations or building security networks may use ducted building power for cooling, provided that acceptable temperature ranges can be maintained.

8.5 Active Equipment

8.5.1 Same as FD, Refer to section 5.5.

8.6 Utility Requirements

8.6.1 Same as FD, refer to section 5.6.

8.7 Racks and Cabinets

8.7.1 Must allow for front and rear access to terminations and equipment.

8.8 Wiring and Cabling

8.8.1 Same as FD, refer to section 5.8.

8.9 Miscellaneous Requirements

8.9.1 Same as FD, refer to section 5.9.

COMPUTING FACILITIES

9 NON-CRITICAL SERVER ROOM REQUIREMENTS

Room type does not process or store Level 1 data as described in SAM 07.A.08 of the UH System policies.

9.1 ROOM LOCATION, SIZING, AND WORKING CLEARANCES

9.1.1 Room Location: Server rooms are generally located above the ground-level floor or away from exterior walls.

9.1.2 Room has diverse backbone pathway and horizontal cable access at no fewer than two separate locations on separate walls.

9.1.3 Sever room walls do not contain any type of liquid piping (water, sewer, roof drain, etc.).

9.1.4 If a server room is adjacent to a restroom or janitors' closet there is a concrete curb at least 3 inches tall separating the rooms.

9.1.5 The sizing of the server room depends upon use and technology density. During design, take into consideration the amount of communication infrastructure required for the room being served, and propose the adequate room size to the architect and IT for approval.

9.1.6 To provide for a safe working environment, 4 feet (48 inches) of working clearance is required on the front, and 3 feet (36 inches) on the rear and sides of server cabinets. No exceptions.

9.1.7 Room size allows for a minimum of 6 inches for wallfields. No exceptions.

9.1.8 Server room has a 1-hour fire rating construction and is positively pressurized.

9.1.9 Doors are of solid wood or hollow metal construction and swing outward.

9.1.10 Legacy Facility Minimums:

9.1.10.1 Any liquid piping passing above equipment is equipped with a drip tray.

9.1.10.2 Working clearances allow for the safe installation of new cabling and maintenance of existing equipment.

9.1.10.3 Existing rooms have positive air pressure to help prevent dust intrusion and premature equipment failure.

9.1.10.4 Existing in-swinging doors do not affect equipment clearances.

9.1.10.5 Louvered doors are not used, as they do not maintain positive pressure.

9.2 Room Finishes

9.2.1 All server room walls go to deck.
9.2.2 Ceiling type will be dependent on server cooling technology.
9.2.3 Room contains no exterior windows.
9.2.4 Flooring is non-static VCT, sealed concrete, or raised flooring. Carpet flooring, or any static-generating type flooring, is not acceptable.
9.2.5 Linear LED lights on chains at the front and rear of the racks are present and provide 50 foot-candles of light in working areas.
9.2.6 Room has an ANSI/TIA Standard Secondary Bus Bar (12 inches x 4 inches x 0.25 inches) bonded with a two-hole lug connection to the Telecommunications Bonding Backbone and to the building's main ground connection.
9.2.7 Room is clearly labeled per Facilities Standards and includes a door jamb bar code for inventory purposes.
9.2.8 Legacy Facility Minimums:

9.2.8.1 Walls to deck.
9.2.8.2 No exterior windows.
9.2.8.3 Lights are operable and provide safe lighting levels.
9.2.8.4 Compliant grounding.

9.3 Physical Security Requirements

9.3.1 Walls go to deck.
9.3.2 A card reader and door hardware with IT Master core are installed on the exterior of the server room for controlled entry.
9.3.3 IT-managed camera is installed in the interior of IT-managed server rooms facing the entrance.
9.3.4 Legacy Security Minimums:

9.3.4.1 Walls to deck.
9.3.4.2 Access control and door hardware with IT Master core required.
9.3.4.3 Camera coverage of entrance.

9.4 Mechanical and Electrical Requirements

9.4.1 In general, if the electrical design for the building incorporates generator power backup, then IT requires generator power for all IT electrical and HVAC provisions listed below.
9.4.2 Convenience outlets installed every 6 feet as specified by the NEC article 210. Convenience outlets in BD rooms are required to be 120VAC, 20A and on emergency / generator power.

9.4.3 Sufficient outlets are present to prevent the need for power strips or extension cords.

9.4.4 Power cords that have the potential to be disconnected accidentally have locking connections.

9.4.5 All reserved wallfields have a dedicated 120VAC, 20A circuit. Outlets are coordinated around wallfield requirements.

9.4.6 Rack/cabinet power requirements vary from university to university. Outlets are positioned above the rear of the racks/cabinets with 2 circuits per rack: one circuit on house power and one on the UPS.

9.4.7 HVAC units are dedicated units designed to provide cold air to the front side of the racks and return from the rear.

9.4.8 It is preferred to have the HVAC serving the server room on generator power. An acceptable alternative is emergency power.

9.4.9 Acceptable design measures for HVAC are between 60 degrees F and 75 degrees F, and between 30 percent and 50 percent relative humidity. Designs outside of these parameters are not acceptable.

9.4.10 Room lighting is on emergency power.

9.4.11 Legacy Facility Minimums:

9.4.11.1 Equipment on emergency or generator power, if available.

9.4.11.2 Room temperature 60 to 85 degrees F and 75 degrees F, and between 30 percent and 50 percent relative humidity.

9.4.11.3 Power outlets and cords are safe and not a tripping hazard.

9.5 Active Equipment

9.5.1 Uninterruptable power supplies (UPS) type and sizing vary from university to university but are connected to an over-rack power receptacle with a locking connection.

9.5.2 Power distribution units (PDU) are configured horizontally in racks and vertically in cabinets.

9.5.3 Legacy Facility Minimums:

9.5.3.1 Existing UPS are sized properly and tested.

9.5.3.2 Equipment is free of dust with spare capacity for future expansion.

9.6 Utility Requirements

9.6.1 All Fire and Life Safety requirements for server rooms comply with code requirements set forth by the NFPA, IFC, and the local AHJ. The standard for BDs

is to have dry pipe, pre-action fire suppression with high-temp heads installed with cages.

9.6.2 If the room rating requires fire stopping, then ez-path or sealed sleeves are the preferred fire stopping measures.

9.6.3 The following non-serving utilities are not permitted to pass through server rooms:

9.6.3.1 Potable water, chilled water, sanitary, grey water, ductwork, roof drains, transformers, fire alarm, electrical panels, main or branch circuits.

9.6.4 The following non-serving utilities are permitted to house equipment, install panel enclosures, or have shared access into the room provided they have received approval in writing from IT and have coordinated with IT prior to design and installation:

9.6.4.1 Access Control, DAS, Audiovisual, Lighting Controls, Building Automation Systems

9.6.4.2 Video Surveillance / Access Control Servers and other Building System appliances.

9.6.5 Legacy Facility Minimums:

9.6.5.1 All room penetrations are properly sealed or fire stopped.

9.6.5.2 Any liquid piping passing above equipment is equipped with a drip tray.

9.6.5.3 Fire sprinkler heads have cages.

9.6.5.4 Rooms without sprinklers have inspected CO_2 or clean agent fire extinguishers.

9.7 Racks and Cabinets

9.7.1 Server cabinets are 600 to 750 mm wide, 2150 mm tall, and 1200 mm deep.

9.7.2 Horizontal wire management requirement varies from university to university.

9.7.3 All new rack layouts are sized for a minimum 50 percent additional spare capacity at the Design Development stage. No exceptions.

9.7.4 Legacy Facility Minimums:

9.7.4.1 Cables are properly supported with vertical and horizontal management.

9.7.4.2 Rooms have space for future additions.

9.8 Wiring and Cabling

9.8.1 Comply with campus standards.

9.9 Miscellaneous Requirements

9.9.1 Non-critical server rooms are often departmentally managed. Room configurations may differ from department to department.

10 Critical Server Room Requirements

10.1 Room Location, Sizing, and Working Clearances

10.1.1 Room Location: Sever rooms are generally located above the ground-level floor or away from exterior walls.

10.1.2 Room has diverse backbone pathway and horizontal cable access at no fewer than two separate locations on separate walls.

10.1.3 Sever rooms walls do not contain any type of liquid piping (water, sewer, roof drain, etc.).

10.1.4 Server room is not located adjacent to or below a restroom, janitors' closet, drinking fountain, or other water bearing room or feature.

10.1.5 The sizing of the server room depends upon use and technology density. During design, take into consideration the amount of communication infrastructure required for the room being served, and propose the adequate room size to the architect and IT for approval.

10.1.6 To provide for a safe working environment, 4 feet (48 inches) of working clearance is required on the front and 3 feet (36 inches) on the rear and sides of server cabinets. No exceptions.

10.1.7 Room size allows for a minimum of 6 inches for wallfields. No exceptions.

10.1.8 Server room has a 1-hour fire rating construction and is positively pressurized.

10.1.9 Doors are of solid wood or hollow metal construction and swing outward. Interior fire-rated glass doors are permitted where viewing functionality is required.

10.1.10 Legacy Facility Minimums:

10.1.10.1 Any liquid piping passing above equipment is equipped with a drip tray.

10.1.10.2 Working clearances allow for the safe installation of new cabling and maintenance of existing equipment.

10.1.10.3 Existing rooms must have positive air pressure to help prevent dust intrusion and premature equipment failure.

10.1.10.4 Existing in-swinging doors do not affect equipment clearances.

10.1.10.5 Louvered doors are not used, as they do not maintain positive pressure.

10.2 Room Finishes

10.2.1 All server room walls go to deck.
10.2.2 Ceiling type will be dependent on server cooling technology.
10.2.3 Room contains no exterior windows.
10.2.4 Flooring is non-static VCT, sealed concrete, or raised flooring. Carpet flooring, or any static-generating type flooring, is not acceptable.
10.2.5 Linear LED lights on chains at the front and rear of the racks are present and provide 50 foot-candles of light in working areas. Lights to be on emergency / generator power.
10.2.6 Room has an ANSI/TIA Standard Secondary Bus Bar (12 inches x 4 inches x 0.25 inches) bonded with a two-hole lug connection to the Telecommunications Bonding Backbone and to the building's main ground connection.
10.2.7 Room is clearly labeled per Facilities Standards and includes a door jamb bar code for inventory purposes.
10.2.8 Legacy Facility Minimums:

10.2.8.1 Walls to deck.
10.2.8.2 No exterior windows.
10.2.8.3 Lights are operable and provide safe lighting levels.
10.2.8.4 Compliant grounding.

10.3 Physical Security Requirements

10.3.1 Walls go to deck.
10.3.2 A card reader and door hardware with IT Master core are installed on the exterior of the server room for controlled entry.
10.3.3 Visitor sign-in record keeping is provided in rooms subject to audit.
10.3.4 IT-managed camera is installed in the interior of IT-managed server rooms facing the entrance.
10.3.5 Cabinets are lockable or access controlled with different cores on the front and rear doors.
10.3.6 Legacy Security Minimums:

10.3.6.1 Walls to deck.
10.3.6.2 Access control and visitor logs required.
10.3.6.3 Camera coverage of entrance.
10.3.6.4 Locks on cabinets.

10.4 Mechanical and Electrical Requirements

10.4.1 Critical server rooms have redundant generator and UPS support such that equipment can by serviced while maintaining uninterrupted operations.

10.4.2 Convenience outlets installed every 6 feet as specified by the NEC article 210. Convenience outlets in BD rooms are required to be 120VAC, 20A and on emergency / generator power.

10.4.3 Sufficient outlets are present to prevent the need for power strips or extension cords.

10.4.4 Power cords that have the potential to be disconnected accidentally have locking connections.

10.4.5 All reserved wallfields have a dedicated 120VAC, 20A circuit. Outlets are coordinated around wallfield requirements.

10.4.6 Rack/cabinet power requirements vary from university to university. Outlets are positioned above the rear of the racks/cabinets with 2 circuits per rack, both circuits on UPS/generator power.

10.4.7 HVAC units are dedicated units designed to provide cold air to the front side of the racks and return from the rear.

10.4.8 HVAC serving the critical server room is on generator power.

10.4.9 Acceptable design measures for HVAC are between 60 degrees F and 75 degrees F, and between 30 percent and 50 percent relative humidity. Designs outside of these parameters are not acceptable.

10.4.10 Room lighting is on emergency power.

10.4.11 Legacy Facility Minimums:

10.4.11.1 Equipment on emergency or generator power, if available.

10.4.11.2 Room temperature 60 to 75 degrees F, and between 30 percent and 50 percent relative humidity.

10.4.11.3 Power outlets and cords are safe and not a tripping hazard.

10.5 Active Equipment

10.5.1 Uninterruptable power supplies (UPS) type and sizing vary from university to university but are connected to an over-rack power receptacle with a locking connection.

10.5.2 Power distribution units (PDU) are configured horizontally in racks and vertically in cabinets.

10.5.3 Legacy Facility Minimums:

10.5.3.1 Existing UPS are sized properly and tested.

10.5.3.2 Equipment is free of dust with spare capacity for future expansion.

10.6 Utility Requirements

10.6.1 All Fire and Life Safety requirements for server rooms comply with code requirements set forth by the NFPA, IFC, and the local AHJ. The standard for BDs is to have dry pipe, pre-action fire suppression with high-temp heads installed with cages.

10.6.2 The preferred fire stopping measures are ez-path and sealed sleeves for a 1-hour rated room.

10.6.3 The following non-serving utilities are not permitted to pass through server rooms:

10.6.3.1 Potable water, chilled water, sanitary, grey water, ductwork, roof drains, transformers, fire alarm, electrical panels, main or branch circuits.

10.6.4 The following non-serving utilities are permitted to house equipment, install panel enclosures, or have shared access into the room provided they have received approval in writing from IT and have coordinated with IT prior to design and installation:

10.6.4.1 Access Control, DAS, Audiovisual, Lighting Controls, Building Automation Systems

10.6.4.2 Video Surveillance / Access Control Servers and other Building System appliances.

10.6.5 Legacy Facility Minimums:

10.6.5.1 All room penetrations are properly sealed or fire stopped.

10.6.5.2 Any liquid piping passing above equipment is equipped with a drip tray.

10.6.5.3 Wet fire sprinkler heads have cages.

10.6.5.4 Rooms without sprinklers have inspected fire extinguishers.

10.6.5.5 Clean agent system inspections are up to date.

10.7 Racks and Cabinets

10.7.1 Server cabinets are 600 to 750 mm wide, 2150 mm tall, and 1200 mm deep.

10.7.2 Horizontal wire management requirement varies from university to university.

10.7.3 All new rack layouts are sized for a minimum 50 percent additional spare capacity at the Design Development stage. No exceptions.

10.7.4 Legacy Facility Minimums:

10.7.4.1 Cables are properly supported with vertical and horizontal management.
10.7.4.2 Rooms have space for future additions.

10.8 Wiring and Cabling

10.8.1 Comply with campus standards.

10.9 Miscellaneous Requirements

10.9.1 None

11 Data Center Requirements

11.1 Room Location, Sizing, and Working Clearances

11.1.1 Data centers have separate, adjacent support spaces to facilitate safe, reliable, and efficient operation. These spaces include:

11.1.1.1 Loading Dock or Freight Elevator
11.1.1.2 Command Center and Support Offices
11.1.1.3 Equipment Staging and Storage
11.1.1.4 Critical Media Storage
11.1.1.5 Electrical Room
11.1.1.6 UPS and Battery Room
11.1.1.7 Fire Suppression Room (optional)
11.1.1.8 Emergency Operations Center, Sleeping Quarters and Showers (optional)

11.1.2 Room Location: data centers are generally located above the ground-level floor and /or away from exterior walls.
11.1.3 Data center has diverse backbone pathways and horizontal cable access at no fewer than two separate locations on separate walls.
11.1.4 With the exception of Sleeping Quarter Showers, data centers and support space walls do not contain any type of liquid piping (water, sewer, roof drain, etc.).
11.1.5 Data center is not located adjacent to or below a restroom, janitors' closet, drinking fountain, or other water bearing room or feature.
11.1.6 The sizing of the data center depends upon use and technology density. During design, take into consideration the amount of communication infrastructure required for the room being served, and propose the adequate room size to the architect and IT for approval.

11.1.7 To provide for a safe working environment, 4 feet (48 inches) of working clearance is required on the front, and 3 feet (36 inches) on the rear and sides of server cabinets. No exceptions.

11.1.8 Room size allows for a minimum of 6 inches for wallfields. No exceptions.

11.1.9 Data center and associated support spaces, except critical media storage, has a 1-hour rated fire construction and is positively pressurized. Critical media storage has a 2-hour fire rated construction.

11.1.10 Doors for data center entrances are of solid wood or hollow metal construction and swing outward. Interior fire-rated glass doors are permitted where viewing functionality is required.

11.1.11 Legacy Facility Minimums:

11.1.11.1 Any liquid piping passing above equipment is equipped with a drip tray.

11.1.11.2 Working clearances allow for the safe installation of new cabling and maintenance of existing equipment.

11.1.11.3 Equipment unboxing and setup happens outside of the data center.

11.1.11.4 Data center command and support offices are separate from the data center. Long-term exposure to data center noise levels and temperatures is not recommended.

11.1.11.5 Existing rooms have positive air pressure to help prevent dust intrusion and premature equipment failure.

11.1.11.6 Existing in-swinging doors do not affect equipment clearances.

11.2 Room Finishes

11.2.1 All data center room walls go to deck.

11.2.2 Ceiling type will be dependent on cooling technology.

11.2.3 Room contains no exterior windows.

11.2.4 Flooring is non-static VCT, sealed concrete, or raised flooring. Carpet flooring, or any static-generating type flooring, is not acceptable.

11.2.5 Linear LED lights on chains at the front and rear of the racks are present and provide 50 foot-candles of light in working areas.

11.2.6 Data center grounding and bonding, being complex, complies with *ANSI/BICSI 002-2019, Data Center Design and Implementation Best Practices.*

11.2.7 Room has a door jamb label for asset management purposes.

11.2.8 Legacy Facility Minimums:

11.2.8.1 Walls to deck.

11.2.8.2 No exterior windows.

11.2.8.3 Lights are operable and provide safe lighting levels.

11.2.8.4 Compliant grounding.
11.2.8.5 Room has a door jamb label for asset management purposes.

11.3 Physical Security Requirements

11.3.1 Walls go to deck.
11.3.2 A card reader and door hardware with IT Master core are installed on the exterior of the data center for controlled entry.
11.3.3 Visitor sign-in record keeping is provided in rooms subject to audit.
11.3.4 IT-managed camera is installed in the interior of IT-managed server rooms facing the entrance.
11.3.5 Cabinets are lockable or access controlled with different cores on the front and rear doors
11.3.6 Data centers that offer colocation services for departmental equipment provide caged colocation space separate from campus operational space.
11.3.7 Legacy Security Minimums:

11.3.7.1 Walls to deck.
11.3.7.2 Access control and visitor logs required.
11.3.7.3 Camera coverage of entrance.
11.3.7.4 Locks on cabinets.

11.4 Mechanical and Electrical Requirements

11.4.1 Data center has redundant generator and UPS support such that equipment can by serviced while maintaining uninterrupted operations. Diverse power source feeds are also recommended where available.
11.4.2 Convenience outlets installed every 6 feet as specified by the NEC article 210. Convenience outlets in BD rooms are required to be 120VAC, 20A and on emergency / generator power.
11.4.3 Sufficient outlets are present to prevent the need for power strips or extension cords.
11.4.4 Power cords that have the potential to be disconnected accidentally have locking connections.
11.4.5 All reserved wallfields have a dedicated 120VAC, 20A circuit. Outlets are coordinated around wallfield requirements.
11.4.6 Rack/Cabinet power requirements vary from university to university. Outlets are positioned above the rear of the racks/cabinets with 2 circuits per rack, both circuits on UPS/generator power.
11.4.7 The data center has dedicated, redundant HVAC units designed to provide cold air to the front side of the racks and return from the rear. Temperature monitoring devices are provided in both hot and cold aisles.

11.4.8 HVAC serving the data center is on generator power.

11.4.9 Acceptable design measures for HVAC are between 60 degrees F and 75 degrees F, and between 30 percent and 50 percent relative humidity. Designs outside of these parameters are not acceptable.

11.4.10 Room lighting is on emergency power.

11.4.11 Legacy Facility Minimums:

11.4.11.1 Data center equipment is on n+1 UPS and generator power. UPS and generator testing and maintenance is performed as required.

11.4.11.2 Room temperature can be maintained at 60 degrees F to 75 degrees F, and between 30 percent and 50 percent relative humidity in the event of an HVAC unit malfunction.

11.4.11.3 UPS batteries have been tested and exceed minimum required operation by 25%.

11.4.11.4 Power outlets and cords are safe and not a tripping hazard.

11.4.11.5 UPS batteries that contain potentially harmful chemicals or can emit fumes are contained in a ventilated room that is separated from the data center.

11.5 Active Equipment

11.5.1 Uninterruptable power supplies (UPS) type and sizing vary from university to university but are connected to an over-rack power receptacle with a locking connection.

11.5.2 Power distribution units (PDU) are configured horizontally in racks and vertically in cabinets.

11.5.3 All switches and servers are generally installed at the end or in the center for each server cabinet row.

11.5.4 Legacy Facility Minimums:

11.5.4.1 Existing UPS are sized properly and tested.

11.5.4.2 Equipment is free of dust with spare capacity for future expansion.

11.6 Utility Requirements

11.6.1 All Fire and Life safety requirements for data centers comply with code requirements set forth by the NFPA, IFC, and the local AHJ. The standard for data centers is an AHJ-approved clean agent system.

11.6.2 The preferred fire stopping measures are ez-path and sealed sleeves for a 1-hour rated room construction.

11.6.3 The following non-serving utilities are not permitted to pass through data centers:

11.6.3.1 Potable water, chilled water, sanitary, grey water, ductwork, roof drains, transformers, fire alarm, electrical panels, main or branch circuits.

11.6.4 The following non-serving utilities are permitted to house equipment, install panel enclosures, or have shared access into the data center provided they have received approval in writing from IT and have coordinated with IT prior to design and installation:

11.6.4.1 Access Control, DAS, Audiovisual, Lighting Controls, Building Automation Systems
11.6.4.2 Video Surveillance / Access Control Servers and other Building System appliances.

11.6.5 Legacy Facility Minimums:

11.6.5.1 All room penetrations are properly sealed or fire stopped.
11.6.5.2 Any liquid piping passing above equipment is equipped with a drip tray.
11.6.5.3 Rooms without sprinklers have inspected fire extinguishers.
11.6.5.4 Clean agent system inspections are up to date.

11.7 Racks and Cabinets

11.7.1 Server cabinets are 600 to 750 mm wide, 2150 mm tall, and 1200 mm deep.
11.7.2 Horizontal wire management requirement varies from university to university.
11.7.3 All new rack layouts are sized for a minimum 50 percent additional spare capacity at the Design Development stage. No exceptions.
11.7.4 Ladder tray is provided above server rows for horizontal copper and backbone cable routing.
11.7.5 Fiber runner is provided above server rows for fiber optic patch cord routing.
11.7.6 Legacy Facility Minimums:

11.7.6.1 Cables are properly supported with vertical and horizontal management.
11.7.6.2 Rooms have space for future additions.

11.8 Wiring and Cabling

11.8.1 Comply with campus standards.

11.8.2 Legacy Facility Minimums:

11.8.2.1 Abandoned power and data cabling are removed per NEC.
11.8.2.2 Existing cabling is properly routed and labeled.

11.9 Miscellaneous Requirements

11.9.1 Keep a detailed inventory record of server cabinet equipment readily available for review.

AUDIOVISUAL FACILITIES

12 AV STORAGE ROOM REQUIREMENTS

Dedicated rooms that provide storage for AV Equipment, cables, carts, and accessories. Active AV equipment and furniture is NOT stored in these facilities.

12.1 ROOM LOCATION, SIZING, AND WORKING CLEARANCES

12.1.1 AV storage rooms are required in all technology rich buildings, and their sizes vary by building AV facility density.

12.1.2 AV storage rooms have double doors accessible from hallways, as not to disturb meetings and classes in progress.

12.1.3 Legacy requirements:

12.1.3.1 Clearances allow for the safe transportation and storage of elements without having to move furniture.

12.2 ROOM FINISHES

12.2.1 Standard building finishes are acceptable.

12.2.2 Room is clearly labeled per Facilities Standards and includes a door jamb bar code for inventory purposes.

12.3 PHYSICAL SECURITY REQUIREMENTS

12.3.1 Room is secured. Access control is present for new buildings and highly recommended for legacy facilities.

12.4 MECHANICAL AND ELECTRICAL REQUIREMENTS

12.4.1 Standard building HVAC and power are acceptable.

12.5 ACTIVE EQUIPMENT

12.5.1 N/A

12.6 UTILITY REQUIREMENTS

12.6.1 Drip trays are recommended for water piping passing over electronic storage area.

12.7 Racks and Cabinets

12.7.1 N/A

12.8 Wiring and Cabling

12.8.1 Room has wireless data coverage.

12.9 Miscellaneous Requirements

12.9.1 Room is kept neat, organized, and safe for working.

13 AV Work Room Requirements

Dedicated rooms for staff hoteling, unboxing, maintenance, setup, and testing of active equipment.

13.1 Room Location, Sizing, and Working Clearances

13.1.1 AV work rooms are highly recommended in all technology rich buildings, should be located in close proximity to AV storage rooms, and their sizes vary by building AV facility density,

13.1.2 AV work room doors have a minimum width of 42 inches and are accessible from hallways, as not to disturb meetings and classes in progress.

13.1.3 Legacy requirements:

13.1.3.1 Clearances allow for the safe transportation and storage of elements without having to move furniture.

13.2 Room Finishes

13.2.1 Standard building finishes are acceptable with the addition of:

13.2.1.1 One 6-foot-long workbench with above-counter lighting, power, and wired data.

13.2.2 Room is clearly labeled per Facilities Standards and includes a door jamb bar code for inventory purposes.

13.3 Physical Security Requirements

13.3.1 Room is secured. Access control and door hardware with IT Master core is present for new buildings and highly recommended for legacy spaces.

13.4 Mechanical and Electrical Requirements

13.4.1 Standard building HVAC and is acceptable.

13.4.2 Power is provided above workbench for task lighting and equipment setup and testing.

13.5 Active Equipment

13.5.1 Equipment provided depends on use case. A wall-mounted network switch located above the workbench may be appropriate for equipment programming and testing.

13.6 Utility Requirements

13.6.1 Drip trays are recommended for water piping passing over work bench.

13.7 Racks and Cabinets

13.7.1 Not Required

13.8 Wiring and Cabling

13.8.1 Connections for wired data are provided at workbench and hoteling locations.

13.8.2 Room has wireless data coverage.

13.9 Miscellaneous Requirements

13.9.1 Room is kept neat, organized, and safe for working.

14 AV Equipment Room Requirements

Dedicated rooms that house active equipment supporting nearby AV presentation facilities, and may provide workspace for equipment operators or staff hoteling.

14.1 Room Location, Sizing, and Working Clearances

14.1.1 Room Location: Adjacent to rooms being served by the AV equipment.

14.1.2 Water mains are not routed over or through AV room walls.

14.1.3 The sizing of the AV room depends upon the room use. During design, take into consideration the amount of communication infrastructure required for the room being served, and propose the adequate room size to the architect and IT for approval.

14.1.4 At a minimum, AV equipment room is sized to accommodate 2 AV cabinets.

14.1.5 To provide for a safe working environment, 3 feet (36 inches) of working clearance is required on the front, rear, and sides of AV rack assemblies. No exceptions.

14.1.6 AV equipment room has a 1-hour fire rating construction and is positively pressurized.

14.1.7 Doors are of solid wood or hollow metal construction and swing outward.

14.1.8 Legacy Facility Minimums:

14.1.8.1 Any liquid piping passing above equipment is equipped with a drip tray.

14.1.8.2 Working clearances allow for the safe installation of new cabling and maintenance of existing equipment.

14.1.8.3 Existing rooms have positive air pressure to help prevent dust intrusion and premature equipment failure.

14.1.8.4 Existing in-swinging doors do not affect equipment clearances.

14.1.8.5 Louvered doors are not used, as they do not maintain positive pressure.

14.2 Room Finishes

14.2.1 All walls should go to deck for security and air flow purposes.

14.2.2 Room has no ceilings, unless serving a floor-to-floor height exceeding 18 feet.

14.2.3 Room contains no exterior windows.

14.2.4 Flooring is either non-static VCT or sealed concrete. Carpet flooring, or any static-generating type flooring, is not acceptable.

14.2.5 Linear LED lights on chains at the front and rear of the racks are present and provide 50 foot-candles of light in working areas.

14.2.6 Room is clearly labeled per Facilities Standards and includes a door jamb bar code for inventory purposes.

14.2.7 Legacy Facility Minimums:

14.2.7.1 Walls to deck.

14.2.7.2 No windows.

14.2.7.3 Lights are operable and provide safe lighting levels.

14.2.7.4 Room is clearly labeled per Facilities Standards and includes a door jamb bar code for inventory purposes.

14.3 Physical Security Requirements

14.3.1 All walls go to deck.

14.3.2 A card reader and door hardware with IT Master core are installed on the exterior of the FD room for controlled entry.

14.3.3 IT-managed camera is installed per campus standard.

14.3.4 Legacy Facility Minimums:

14.3.4.1 Walls to deck.

14.3.4.2 Readers required on dedicated AV Equipment Rooms.

14.4 Mechanical and Electrical Requirements

14.4.1 Generator power is only required if mission critical services are supported from the room. If they are, then IT requires generator power for all IT electrical and HVAC provisions listed below.

14.4.2 Convenience outlets installed every 6 feet as specified by the NEC article 210.

14.4.3 Sufficient outlets are present to prevent the need for power strips or extension cords.

14.4.4 Power cords that have the potential to be disconnected accidentally have locking connections.

14.4.5 Rack power requirements vary based on application.

14.4.6 Racks servicing large event spaces with a centralized AV control room feeding satellite AV equipment rooms have phased, dedicated-ground power.

14.4.7 HVAC units are dedicated units located to keep chilled water and maintenance access outside of the facility.

14.4.8 It is preferred to have the HVAC serving the facility on emergency power.

14.4.9 Acceptable design measures for HVAC are between 60 degrees F and 75 degrees F, and between 30 percent and 50 percent relative humidity. Designs outside of these parameters are not acceptable.

14.4.10 Room has a dedicated, controllable thermostat with digital temperature readout.

14.4.11 Room lighting is on emergency power.

14.4.12 Legacy Facility Minimums:

14.4.12.1 Room temperature 60 to 75 degrees F, and between 30 percent and 50 percent relative humidity.

14.4.12.2 Power outlets and cords are safe and not a tripping hazard.

14.4.12.3 Lights are operable and provide safe lighting levels.

14.5 Active Equipment

14.5.1 Procurement of network equipment, UPS and PDUs supporting AV equipment varies from university to university.

14.6 Utility Requirements

14.6.1 All Fire and Life safety requirements for AV equipment rooms comply with code requirements set forth by the NFPA, IFC, and the local AHJ. The standard for AV

Equipment rooms is building standard using caged, high-temp heads, with fire main in an adjacent room.

14.6.2 The preferred fire stopping measures are ez-path and sealed sleeves for a 1-hour rated room construction.

14.6.3 The following non-serving utilities are not permitted to pass through AV rooms:

14.6.3.1 Potable water, chilled water, sanitary, grey water, roof drains, fire mains, high voltage power mains.

14.6.4 The following non-serving utilities are permitted to house equipment, install panel enclosures, or have shared access into the AV room provided they have received approval in writing from IT and have coordinated with IT prior to design and installation:

14.6.4.1 Lighting controls specific to the rooms supported by the AV equipment room.

14.6.5 Legacy Facility Minimums:

14.6.5.1 All room penetrations are properly sealed or fire-stopped.

14.6.5.2 Any liquid piping passing above equipment is equipped with a drip tray.

14.6.5.3 Fire sprinkler heads have cages.

14.6.5.4 Rooms without sprinklers have inspected fire extinguishers.

14.7 Racks and Cabinets

14.7.1 AV racks are 24 inches wide, 7 feet tall, and 32 to 40 inches in depth.

14.7.2 All new rack layouts are sized for a minimum 50 percent additional spare capacity at the Design Development stage. No exceptions.

14.7.3 Legacy Facility Minimums:

14.7.3.1 Cables are properly supported with vertical and horizontal management.

14.7.3.2 Rooms have space for future additions.

14.8 Wiring and Cabling

14.8.1 All wiring and cabling is installed in basket or ladder trays.

14.8.2 All cable trays, baskets, and ladders are properly grounded per the NEC article 250 and ANSI/TIA 607-D

14.8.3 All cable labeling follows IT standards.

14.8.4 All horizontal and vertical sleeves use either ez-path or sealed sleeves. Two (2) additional 4-inch sleeves were added to the minimum design requirements of the project for future expansions. For any sleeves that penetrate fire rate walls, refer to section 14.6 for compliance.

14.8.5 Horizontal cabling complies with IT Standards.

14.8.6 All horizontal cabling is neatly dressed with Velcro ties in bundles separated by type.

14.8.7 Legacy Facility Minimums:

14.8.7.1 Cables are properly supported in basket or ladder trays.

14.8.7.2 All penetrations are properly sealed or fire-stopped and have room for expansion.

14.8.7.3 All cables are labeled.

14.8.7.4 All cables and patch cords are neatly installed.

14.8.7.5 Abandoned wiring and cabling is removed per NEC 800.25.

14.9 Miscellaneous Requirements

14.9.1 AV equipment room is kept clean and free of trash and debris, and is not used to store equipment items or any other miscellaneous items for the building.

14.9.2 Abandoned cable or loose wiring is immediately removed, as this is a building code violation.

14.9.3 Any existing asbestos identified by a design professional or contractor for a renovation or interior improvement project is reported to IT for proper handling.