

# **Information Technology Design Guide**

## **Aleda E. Lutz VAMC Spaces & Cable Pathways Design Guide**



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## Changes and updates

Prior to 2019 changes where not tracked.

5.1	–	Ultra Slim Patch Cabling for closets	– Jan 2019
5.6	–	Lightning Protection for outside cabling	– Jan 2019
8	–	Equipment Requirements	– March 2019

## 1. Purpose

This guide identifies the requirements for building the telephone/data spaces and cable pathways for VHA hospital's and CBOC's. The following design criteria are, primarily, for "NEW CONSTRUCTION". The criteria, however, serves as a general guide for existing facilities as well. Each station is encouraged to utilize existing space and cable pathways to the maximum extent possible. If unclear about the design specifications, the station should request technical assistance from TCD (194D).

- IT Hub Definition: The space that houses the data and telecommunication equipment.

## 2. General Requirements

Unless otherwise directed, the General Construction Contractor shall provide and install the cable pathways and construct the telephone/data (T/D) spaces for the cable plant using these guidelines. The spaces to be provided are the Main and Intermediate Distribution Frames (MDF & IDF) where telephone & data cabling terminates and related signal processing equipment is housed and the Workstation Interface Outlet boxes where users connect for service. For new construction, the Telephone and Data MDF's shall be co-located in the Computer Room.

### 2.1. Drawings

The General Construction Contractor shall clearly show conduit runs or cable trays on separate drawings, showing the exact locations of Telephone MDF Space, Data MDF Space, Computer Room, T/D closets, pull boxes and outlet boxes.

### 2.2. Preparatory Meeting

A preparatory meeting shall be held prior to the installation. OIT approval is required prior to any equipment/cable terminations.

## 3. Applicable Codes & Standards

The following standards, as updated, are the applicable specifications to be used for the construction of the Telephone and Data MDF's spaces collocated in the Computer Rooms, the IDF's spaces located in dedicated T/D closets, and the cable pathways used to connect these spaces to each other and the user Outlet boxes located through-out the facility:

- ANSI/EIA/TIA-569-A      Commercial Building Standard for Telecommunications Pathways and Spaces
- ANSI/TIA/EIA-606      Administration Standard for the Telecommunications Infrastructure of Commercial Buildings
- ANSI/EIA/TIA-607      Commercial Building Grounding/Bonding Requirements.
- NFPA- Nation Fire Protection Association
- NEC- National Electrical Code

- BOCA- Building Owners & Contractors Association, National Building Code
- BICSI- Building Industry Consulting Services, International

These codes and standards shall be applied in addition to the requirements of equipment vendors, system and service suppliers, and state and local governments. The T/D spaces and pathways provided must comply with all requirements of the above codes and standards.

## 4. Telephone/Data Spaces

### 4.1 Data Main Distribution Frame (MDF) Space-Computer Room

The Data MDF space houses the local area network (LAN) head-end electronics used to terminate fiber optic data backbone cabling from each T/D closet, LAN servers, and interface with the VHA wide area network.

### 4.2 Telephone MDF Space

The Telephone MDF space houses the telephone Private Branch Exchange (PBX), its associated equipment, and the demarcation with the telephone company trunks. This space also terminates telephone unshielded twisted pair (UTP) backbone cabling from each T/D closet and provides the means to patch PBX ports to these backbones.

### 4.3 Sizing T/D Closets

The minimum acceptable closet dimensions are as follows. These dimensions are based on areas served up to and not exceeding 10,000 sq. ft. Door width must be a minimum of 44”.

Building Square footage	Closet Size (ft.)
10,000	10 x 10
8,000	10 x 9
5,000	10 x 8 (Min w/ Telco & data)

#### 4.3.1 Equipment Restriction

Equipment not related to the support of the Telephone MDF Space (e.g., water, drainage, steam piping, ductwork, pneumatic tubing, etc.) shall not be installed in, pass through, or enter the room.

### **4.3.2 Rack Space**

For new construction, A 19" wide by 84" tall steel data rack with 10-32 threads shall be provided and mounted to the floor and ladder rack above so that the cabling contractor may rack mount 19" patch panels to terminate data station cables. All associated hardware shall be left. A 3/4" plywood backboard should be mounted on the wall 1" off the floor to the ceiling or roof deck for data equipment installation. Plywood should be fire-rated as defined in NFPA -101, Chapter 3, Life Safety Code (NTE 25 Flame Spread). Provide Wall Mount telephone in IT Hub Closet at 60" A.F.F.

### **4.3.3 Power & Lighting**

#### **4.3.3.1 120/208/240 VAC Service Receptacles**

Install a minimum of one 120 VAC duplex TVSS receptacle on each wall surface and every 8 feet minimum to be used for service and test equipment. Each 20A circuit shall power no more than 2 duplex receptacles (Minimum of 2 separate circuits in each closet). Install Two (2) 208/240V receptacles' (L6-30) on a transfer module with one on emergency power and one on normal power. Provide at least ONE duplex receptacle on normal power.

#### **4.3.3.2 Grounding**

Provide access to the telecommunications grounding system as specified by ANSI/TIA/EIA-607, connected by #6 AWG CONTINUOUS GREEN copper wire to the building grounding electrode. A Grounding buss bar is to be located in closet between the data wall and the telephone wall and fed with a green insulated wire back to the building ground. With a two (2) inch penetration conduit to the other future stacked closets. The COPPER ground bus is to be a minimum 3x12x1/4" and must be three (3) inches from the wall mounted on isolators. Provide #6 AWG Green bonding jumper on all metal components located in the IT spaces. The ground wire and conduit it is installed in shall be label every 10" as TMGB or appropriate terminology.

#### **4.3.3.3 Overhead Lighting**

Provide sufficient overhead lighting, located to avoid undesirable shadows. Provide Ceiling mounted occupancy sensors. Lighting fixtures shall be connected to the emergency power system, if emergency power is present and shall not be attached to the above power panel. All lighting shall be LED.

## **4.3.4 Environmental Conditions**

### **4.3.4.1 Temperature & Humidity**

Telephone MDF Space shall be equipped with circulation and heating/cooling equipment capable of maintaining the space between 64 and 75 degrees Fahrenheit, with humidity control. The Optimal relative humidity should not exceed 55% or no less than 30%. Heating and cooling requirements shall also include the heat dissipation of the back-up batteries and associated rectifiers. All communication closets must have year round air conditioning.

### **4.3.4.2 HVAC Duty Cycle**

The HVAC equipment shall be stand-alone in design and accommodate a twenty-four hour, seven days a week, year-around operation.

## **4.3.5 Ceilings & Finishes**

Closets shall not have a suspended ceiling. The ceiling must be of 2 sheets of 5/8 inch thick drywall, or steel mesh reinforced. The ceiling will be a minimum of nine (9) feet from the floor. Floors, walls, and ceiling should be treated to eliminate dust. Finishes shall be of light color to enhance room lighting.

Where ceiling height is restricted and the cable tray must enter the IT HUB room above the secure ceiling the contractor is to provide a secure access into the ceiling adjacent to the cable tray. Provide 3) 4 inch sleeves directly above each rack. Seal around cables with HILTI fire putty.

## **5. Cable Plant**

### **5.1 Cable Distribution System, Copper (Twisted Pair)**

The contractor shall provide a new Category 6 or 6A cable distribution system conforming to Building Industry Consulting Service International (BICSI) Standards, TIA/EIA 568-B.2-1 & 569 and ICEA Publications S-80-576-1988 (Ref. B1.6) as to size, color code, and insulation. All cable distribution installation shall be fully coordinated with the VA's Contracting Officers Technical Representative (COR) prior to start of installation. Patch cabling for closets should be ultra slim cat 6 snag-less cabling.

## 5.2 Cable Pathways

The contractor is responsible for complete knowledge of the space and cable pathways (equipment rooms, telephone closets, conduits, wire ways, etc.) of the locations listed above in paragraph 1. The Contractor shall design new pathway (cable tray, J-Hooks, etc.) if required to complete work and if provided install the cable distribution system using the pathways (conduit, etc.) provided in the area of the VAMC. Install 1" EMT conduit from data boxes to the cable tray. Connect to cable tray using a 1 inch conduit clip. Cables shall be supported with J hooks (small amount of cable) every four (4) feet whenever there is an absence of a cable tray and conduit is not feasible. All cables installed in pathways and spaces will conform to the ANSI/TIA/EIA-569-A standard. Contractor is to adhere to the VA fire stop requirements, but noting that removable putty is preferred over caulking or foam.

The VA, upon written request, will authorize the contractor to provide a quote to increase number or size of pathways only in the event the total pathways provided to any given area are inadequate.

- Cable tray shall be installed per manufacturer's instructions.
- Protect cables at their egress from the wire-ways by mechanically securing them with fittings to the wire-ways.
- Cable Tray shall be electroplated Zinc Galvanized Finish.
- All cable trays will be sized to accommodate all wiring plus 20% additional space included in the 50 percent fill requirement.
- Provide a GREEN #6 AWG ground wire alongside the tray with ground wire supports and attach it to each tray section and on both sides of a cut in the tray with UL listed split bolts.
- Cable Tray shall be installed with trapeze hangers; minimum 3/8 diameter supports rods, minimum 8" plastic cable protectors on rods.
- Cable Tray shall be 4" x 12" provided with 4" tray divider to separate special systems, i.e. CCTV, Nurse Call, Public Address, ETC.
- All bends shall be provided with cable rollers.
- Drop out connectors shall be provided over the Equipment racks and other locations where conduit is not used.
- Install wire mesh cable tray as indicated; in accordance with recognized industry practices (NEMA VE-2 2000), to ensure that the cable tray equipment complies with requirements of NEC, and applicable portions of NFPA 70B and NECA's "Standards of Installation" pertaining to general electrical installation practices.
- Coordinate wire mesh cable tray with other electrical work as necessary to properly interface installation of wire mesh cable tray runway with other work.
- Provide sufficient space encompassing wire mesh cable tray to permit access for installing and maintaining cables.



### 5.3 Color Code

All new Station Data / Voice cable sheaths will be according to the table below and shall conform to the requirements of ICEA Publications S-80-576-1988 (Ref. B1.6) as to size, color code, and insulation. The Contractor shall also supply appropriate lengths of patch cables for each new home run to match colors below.

Purple- Security (PACS)

Yellow- Engineering/Medical

Orange- Private Network (VGIA)

Green- Wireless AP

Blue- Data/Phone/ and Others

#### Analog Voice Patch Cables

White- RJ45 – 110 cables

#### Fiber Patch Cables

Yellow- Single Mode

Orange- Multimode OM1

Aqua- Multimode OM3

### 5.4 Testing

All material, installed by the contractor, shall be new and thoroughly tested. Any station cables testing with bad pairs will be reinstalled. The contractor is to provide submittals on testing equipment and methods for approval. Provide test results on excel spreadsheet or other form approved by VA.

- Category 6A Ethernet- All testing in accordance with TIA/EIA 568-B.2-1
- Fiber (OM1/OM3)- All testing in accordance with TIA 492AAAC

### 5.5 Cable Sheaths

The Contractor shall ground all metallic cable sheaths, etc. (e.g. risers, underground, station wiring).

### 5.6 Outside Cable

All outside cable shall be shielded, 24AWG solid conductors, solid PIC insulation, and filled core (flex gel) (waterproof) REA LISTED PE 39 or PE 89 Code. The outside cable plant cable shall be

grounded with 6 gauge green ground cable. Access to the manholes will be coordinated with the VAMC (Quality Management-Safety).

This will allow time to air and test the manhole environment to ensure a safe entry. Any network or telecom copper/metallic cabling that passes between buildings, either underground or aerial, must be connected to lighting surge protection. A surge protector should be placed on both ends of the cable, in the T/D closets of each building.

## **5.7 Conduit to Phone Company Facilities**

The contractor shall provide minimum 4" conduit into hub closet from the Telephone company facilities where not present. The contractor shall work with Saginaw OI&T, Facilities Management Service, and Local Telephone company officials for placement of conduit.

# **6. Telecommunications Outlet Connectors and Work Area Cable Terminations**

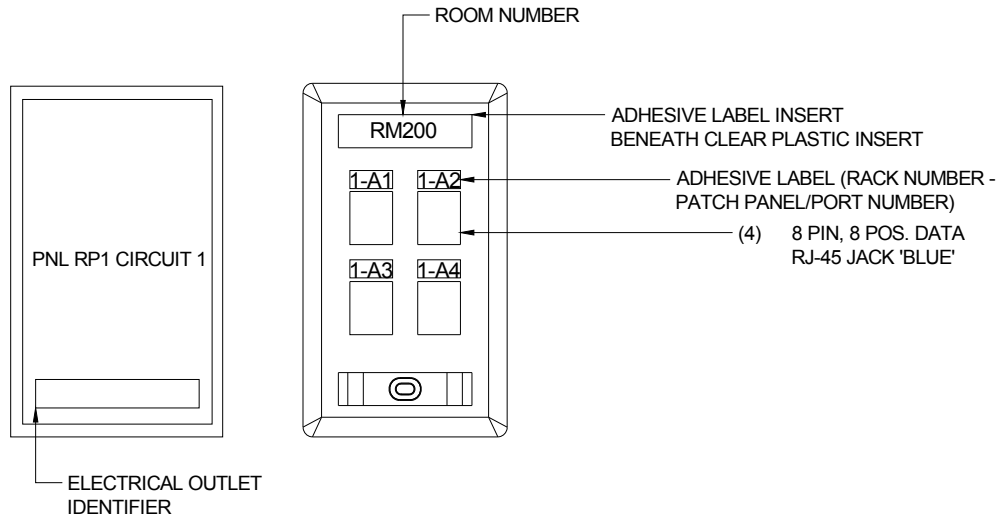
## **6.1 Station Terminations**

All new voice and data telecommunications outlets (Jacks) shall be Category 6A compliant eight position RJ-45 non-keyed (EIA/TIA 568B). Four unshielded twisted pair 24 AWG Work Area (WA) cable shall be terminated from each jack (in accordance with EIA/TIA standards 568 "T568B" and 606) to the telecommunication room (IDF) and shall be of a type designed to support Category 6A data communications (not less than 100 MHz / 100 Mbps).

## **6.2 Configuration**

There shall be a minimum of two drops per room, each drop consisting of FOUR Cat 6 cables at each faceplate unless the site at which the work is being performed has different requirements. Each faceplate shall be capable of handling a minimum four (4) connectors. The voice connectors in the faceplate should be available in the color white for the distinction of different voice services provided at the faceplate. A modular furniture insert shall be available that uses the same connector being used in faceplates. A surface mount box using same connectors is required.

## Faceplate Part # Hubbell AFP14W



### TYPICAL FULL DROP 4 DATA

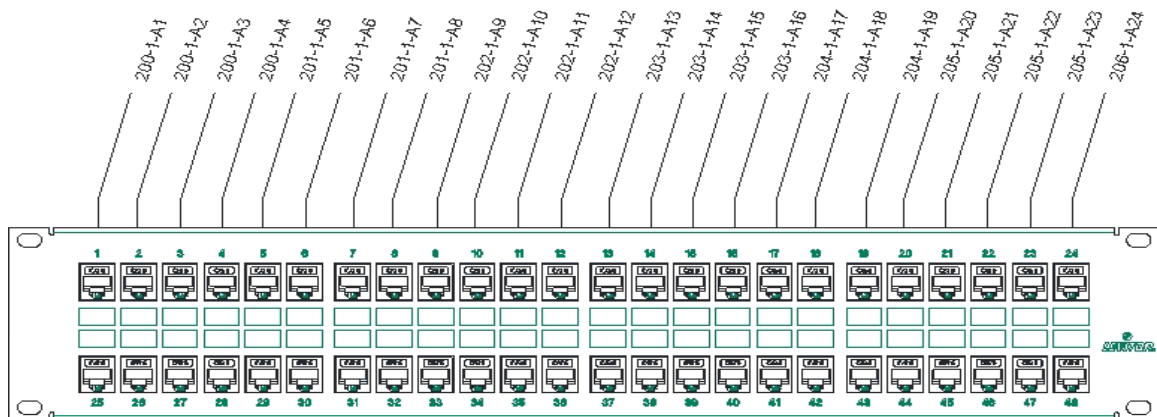
1. CONTRACTOR TO PROVIDE 2  $\frac{1}{8}$  DEEP 4 SQUARE BOX PER OUTLET AND INSTALL ADJACENT TO THE ELECTRICAL RECEPTACLE

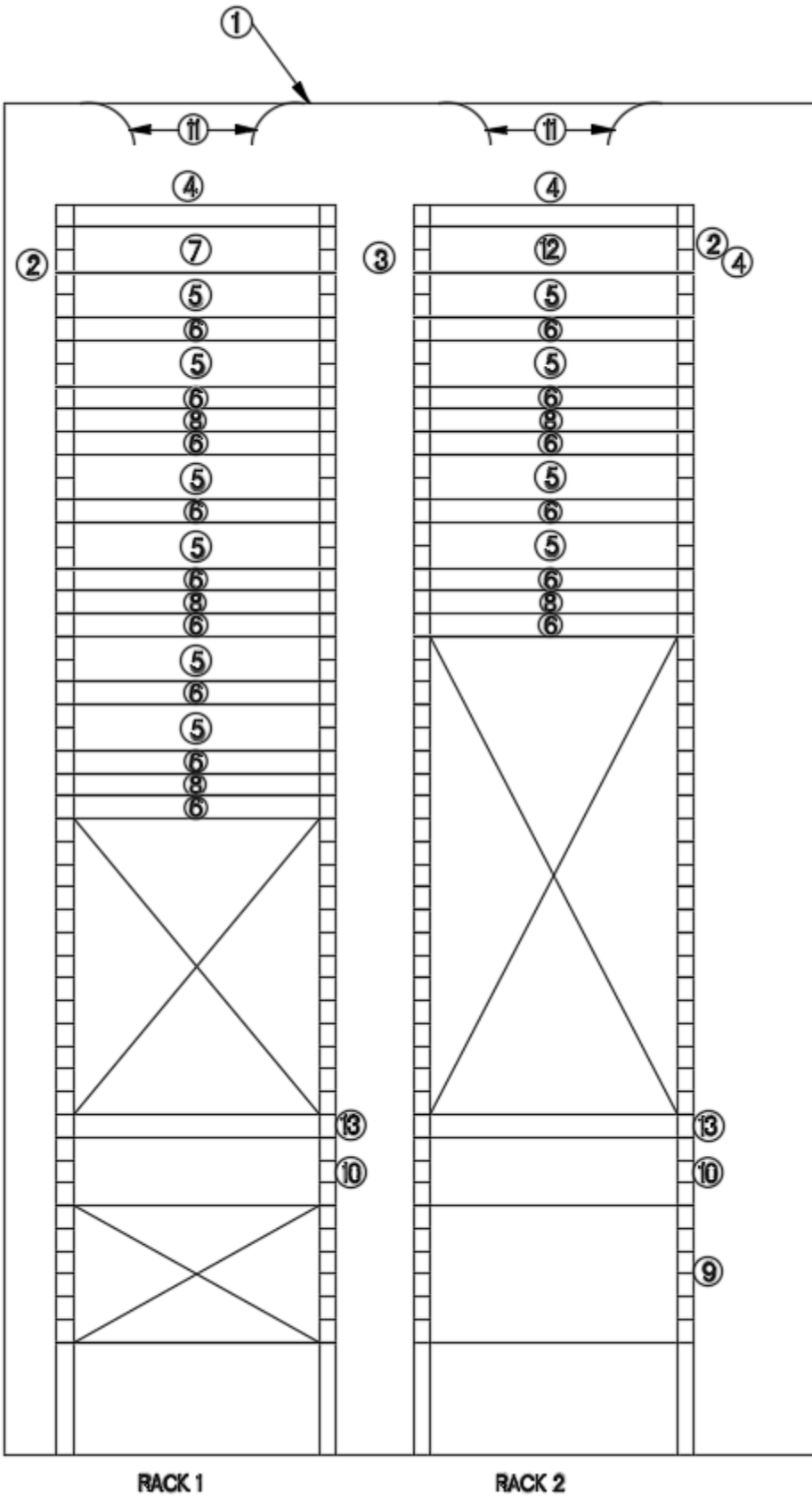
### ELECTRICAL DATA COMBINATION COVER PLATE DETAIL

## 6.3 Voice & Data Termination

At the telecommunication room (MDF), Voice and Data cables shall be terminated on Category 6A compliant RJ-45, 48 port modular patch panels. Labeling of the patch panels shall be in compliance with EIA/TIA 606. Each patch panel is to be designated with a letter; the first patch panel will be A, the next B, the next C, etc.

Include 11x17 laminated sheets for each patch panel as shown below.





**GENERAL NOTE:**

1. PROVIDE BONDING JUMPERS TO GROUND TERMINAL ON ALL EQUIPMENT IN RACK.
2. SINGLE RACK APPLICATIONS REQUIRE 110 BLOCK AND FIBER SHELF ALL IN ONE RACK.
3. TWO RACK APPLICATIONS REQUIRE 110 BLOCK IN RACK 1 AND FIBER SHELF IN RACK. IN APPLICATIONS WITH MORE THAN TWO RACKS PLEASE CONSULT WITH OI&T.

**DRAWING NOTES:**

- ① 18" WIDE LADDER RACK MOUNTED TO WALLS WITH APPROPRIATE HARDWARE. PROVIDE WATER FALLS INTO CABINETS AND BONDING JUMPERS TO ALL SECTIONS.
- ② 4" WIDE VERTICAL CABLE MANAGER
- ③ 6" WIDE VERTICAL CABLE MANAGER
- ④ 19" x 7' TALL (45RU) 2 POST EQUIPMENT RACK
- ⑤ 48 PORT PATCH PANEL TYPICAL – CAT6
- ⑥ 1U HORIZONTAL CABLE MANAGER 4" DEEP
- ⑦ RACK MOUNTED 100 PAIR – 110 BLOCK WITH JUMPER TROUGH – FOR VOICE FEED CABLE
- ⑧ 1U SPACE FOR CUSTOMER SUPPLIED EQUIPMENT
- ⑨ UPS 6U
- ⑩ AUTOMATIC TRANSFER SWITCH
- ⑪ CABLE TRAY WATERFALL
- ⑫ 1U/2U FIBER TERMINATION SHELF
- ⑬ 19" RACK MOUNTED COPPER GROUND BAR

## **6.4 Cable Management**

Cable Management shall be provided by the contractor for field distribution/patch cord management, use one U horizontal organizers 4" deep located at the bottom of each patch panel. Four inch vertical organizers shall be supplied on each vertical rail (front and back) of a data rack.

## 7. Physical Security Requirements

### 7.1 Windows

When below 12m (40 ft.) from ground level, or the roof of a lower abutment, or less than 7.5 m (25 ft.) from windows of an adjoining building, or accessible by a building ledge leading to windows of other floor rooms, security mesh, screening for windows is required. Security measures that exceed these requirements may be authorized in writing by OS&LE. Required specifications for stainless steel security mesh screening are:

- (1) All #304 stainless steel woven mesh 0.7 mm (.028 in.) wire diameter, with tensile strength of 15 kg/mm (800 pounds per linear inch).
- (2) Mesh 12x12 per 25 mm (1 in.) with main and sub frames of 2.7 mm (12 gauges) carbon steel with baked enamel finish and internal key locking slide bolts.

### 7.2 Walls

Exterior walls of brick and masonry construction are acceptable. Exterior walls which are composed of wood frame and siding require an interior backing of steel security screen mesh or sheet partition. Pharmacy and Agent Cashiers perimeter walls shall be full height, floor to underside of slab above. Interior walls containing dispensing windows shall be a minimum of 100 mm (4 in.) solid concrete masonry units to ceiling height with either masonry or gypsum wallboard to underside of slab above. Bulk control substance storage vaults require perimeter walls of brick or masonry construction full height. Exception: For CMOPs that are located in a leased warehouse setting without brick or Masonry construction, walls may be of drywall construction built slab to slab (no up and over access). Passive infrared motion sensors will be placed every 50 feet and doors protected with access control systems.

### 7.3 Doors & Door Locks

The locking requirements (including access controlled egress doors) outlined in National Fire Protection Association (NFPA) Life Safety Code standard, latest edition, 101-7.2.1.5 and 7.2.1.6 must be followed.

- (1) Door Construction: Doors are of 45 mm (1-3/4 in.) solid core hardwood or hollow steel construction. Dutch or half doors are unacceptable. Removable hinge pins on door exteriors must be retained with set pins or spot welded, preventing their removal. This applies only if the hinge pins are on the outside of the doors and door frames. Hinge pins will be on the outside if the door opens outward.
- (2) Mechanical locking systems. Where mechanical lock systems are used, installed lock sets must allow for single motion egress. The installation of high security exit devices meeting NFPA Life Safety Code standards is appropriate.

- (a) Glass doors or doors with glass panes must have one lock set that is key operated from the interior of the protected area.

**Note:** Fire code prohibits locks from being locked from the inside that require a key to exit. The intent is that there must be two locks, one of which must be key operated. The other lock can be key, combination or electronic. (NFPA 101, 7.2.1.5.2) locks, if provided, shall not require the use of a key, a tool or special knowledge or effort for the operations from the egress side.

- (b) Steel doors will not be set into wooden frames.
  - (c) Doors set in steel frames must be fitted with a mortise lock with a deadlock feature. IAW ANSI/BHMA A156.13 American National Standards for Mortise Locks.
  - (d) The day lock on the main door must be automatically locking, with a minimum 19 mm (3/4 in.) dead bolt and inside thumb latch. Access to electronic locking systems, combinations or keys to day locks will be restricted to service employees and electronic access and/or combinations changed immediately on the termination or reassignment of an employee. See paragraph 8 of this appendix for a detailed description of key control systems.
- (3) Electronic/Magnetic locking systems. Where installed, electronic locking systems will include an automatic "request to exit" sensor and a "push to exit" manual lock release switch. Refer to the NFPA Life Safety Code for details.

## 7.4 Other Room Access Means

Interstitial overhead areas which enable entry into a secure room from an unsecured room must be barricaded by the installation of a suitable partition in the interstitial space which prevents "up and over" access. Openings in construction above ceilings or below raised access floors shall be protected as below requirement. All vents, ducts, and similar openings in excess of 96 square inches (620 cm<sup>2</sup>) that enter or pass through space shall be protected with either bars or grills. If one dimension of the duct measures less than six inches (150 mm) or duct is less than 96 square inches (620 cm<sup>2</sup>), bars are not required; however, all ducts must be treated to provide sufficient sound attenuation. If bars are used, they must be 1/2 inch (12.7 mm) diameter steel welded vertically and horizontally six (6) inches (150 mm) on center; if grills are used, they must be of 9-gauge expanded steel.

## 7.5 Motion Intrusion Detectors

An intrusion detection alarm is a system which detects entry into the room. It broadcasts a local alarm of sufficient volume to cause an illegal entrant to abandon a burglary attempt. Intrusion detector equipment which operates on the principle of narrow beam interception, door contacts, microwave, or photoelectric eyes is unacceptable as the primary means of detection. Intrusion detectors must have the following essential features.

- (1) An internal, automatic charging DC standby power supply and a primary AC power operations.
- (2) A remote, key operated activation/deactivation switch installed outside the room and adjacent to the room entrance door frame and/or a central alarm ON-OFF control in the Police office or other monitoring location. For personal safety reasons, alarm switches and panels will be located outside of the protected space.
- (3) An automatic reset capability following intrusion detection.
- (4) A local alarm level of 80 dB (min) to 90 dB (max) within the configuration of the protected area.
- (5) An integral capability for the attachment of wiring for remote alarm and intrusion indicator equipment (visual or audio).
- (6) A low nuisance alarm rate as defined in VA Master Specifications, Division 28 - Electronic Safety and Security "28 16 11 INTRUSION DETECTION SYSTEM."
- (7) Installation Notes
  - (a) A locally sounding alarm should not be installed in a room which is close to an ICU, cardiac care, or other special treatment areas where a loud alarm would have an injurious effect on patients.
  - (b) In addition to the locally sounding alarm, remote visual and/or audio annunciators must be at a location within the facility which ensures 24 hour monitoring. These annunciators will have the capability of identifying individually protected zones.
  - (c) In protected rooms of outpatient clinics not on facility grounds, intrusion detector alarms will be routed to a commercial security alarm monitoring firm, a local police department, or a security office charged with building security. The remote alarms will be in addition to locally broadcast alarms in the protected areas.
  - (d) Intrusion detection equipment shall integrate with CCTV and physical access control systems and shall be programmed in the Saginaw Campus PAC system. Provide an IP CCTV camera in a location outside of the secure area to identify the entrant.

## **7.6 Fire Detection/Suppression**

If the building has a fire alarm and/or fire suppression, both shall be installed in the IT closet.



## 7.7 Electronic Physical Access Control Systems (PACS)

For monitoring and controlling access to areas identified as requiring high or medium levels of assurance. ) PACS systems are not used for recording employee time and attendance.

- (1) For pharmacies and similar Services, PACS will be used to protect the perimeter of operations areas.
  - (a) Access Safeguard. To prevent learning codes through keypad observations or use of stolen or found access cards.
  - (b) Time Sensitive. The ability to program access by user, by shift and day.
  - (c) Area Sensitive. The ability to program access by door and area for each individual user.
  - (d) Fail-Safe. The ability to maintain access security if the system goes down (i.e. bypass key).
  - (e) Access Record/Audit Trail. The ability to provide for periodic or on demand print-out of names and time/dates of individual accessing. Records of access or audit trails will not be used for employee time and attendance purposes.
  - (f) User Coverage. The number of individual access codes that the system will accommodate.
  - (g) Personal Identifier Number (PIN) Codes. Access control systems protecting PACS high security areas, such as controlled substance storage, primary computer and communications rooms, research or clinical laboratories that store, use or develop bio-hazardous materials, require a PIN number as a secondary personal authentication to be used in addition to card readers. "Scramble Pad" type PIN readers are recommended when PIN systems are installed. See the table below for specific VA identified required locations.
  - (h) Biometric Systems. Biometric security systems are those that use a personal measurement, such as fingerprints, hand geometry, facial geometry or iris scans, as authentication. Biometric devices can be used in lieu of PIN systems in PACS high protected spaces, but only as a secondary form of authentication. Biometric measurements may also be used in addition to a PIN in high security applications.

- (i) Compliance with Federal Standards. New installations or retrofitted access control systems will be compliant with technology described in Federal Information Processing Standard (FIPS) Publication 201, Personal Identity Verification of Federal Employees and Contractors, and the document “PACS Implementation Guidance, Version 2.2 (July 30, 2004), published by the Physical Access Interagency Interoperability Working Group of the GSA Government Smart Card Interagency Advisory Board. This requires that such systems will meet the ISO/IEC 14443 a/b, Parts 1-4 standard for contactless (proximity) card systems, or the ISO/IEC 7816 Standard for contact-type cards. Facilities may continue to use existing PACS that operate on older technology (Magnetic Stripe, 2nd Generation bar code, etc.) as an interim measure until replacement systems are acquired and installed as part of normal equipment lifecycles. Further information on VA Smart Card operated PACS requirements can be found in the most recent edition of the document: “Physical Access Control Recommendations for the Department of Veterans Affairs.” Guidance and assistance with the standards can be obtained from the OS&LE.
- (j) PACS Assurance Level Designations: PACS provide a level of assurance regarding the identity of persons entering a protected space. The levels of assurance required are determined as a result of vulnerability or risk assessments and physical security surveys. In addition, the following chart indicates minimum requirements for specified VA protected activities.

For purposes of this policy, levels of assurance are defined as:

**High** - Entry requires a valid access card used in conjunction with a secondary form of authentication. Either a Personal Identification Number (PIN) known only to the card holder, or a biometric measurement, or both, is used as the secondary authenticator.

**Medium** – Entry requires the use of a valid access card.

**Low** – Entry requires the visual authentication of a valid access card or facility identification card. The card may be inspected by a police officer or other designated staff upon entry into the protected space, or may just require that it is worn at all times in a visible manner, see VA Directive 0730, paragraph 2.n. Facilities may choose to use a more stringent protection level for any of these locations. In addition, facilities may choose to protect other activities with PACS. Further information on PACS Assurance level designations is found in VA Handbook 0720, Part E, Paragraph 1.g. (5).

## 8. Equipment Requirements

Provide and Install equipment listed below comparable to:

Vertical wire management	Panduit	PR2VD06	2 Per Rack
Freestanding Metal Rack	Middle Atlantic	RL10-45	2
1U Wire Management Horizontal	Panduit	CMPHHF1	10
48 Port Patch Panel CAT-6	Panduit	NK6PPG48Y	6
Strain Relief - REAR ORGANIZER	Panduit	SRB19BLY	6
3 Ft Blue CAT-6 – Ultra Slim		<b>Patch Cords should equal the number of Drops Pulled x2</b>	
5 Ft Blue CAT-6 – Ultra Slim			
7 Ft Blue CAT-6			
3 Ft Green CAT 6 – Ultra Slim			
5 Ft Green CAT 6 - Ultra Slim			
7 Ft Green CAT-6			
3 FT Yellow CAT 6 – Ultra Slim			
5 Ft Yellow CAT-6 – Ultra Slim			
7 Ft Yellow CAT-6			
3 FT Purple CAT-6 - Ultra Slim			
5 Ft Purple CAT-6 - Ultra Slim			
7 Ft Purple CAT-6			
CAT-6 Jacks	Panduit	NK688MBUQ	As needed
Faceplates (EA)	Panduit	CBEIWY	As Needed
2 PORT KEY STONE Blanks	Panduit	NKHS2IW-X CHB2IW-X	As Needed
Rack Mount 110 block	Panduit	P110B1005R2Y	1 per closet VA
Patch cord 110 type-RJ-45, 1 pair, 1 m (3.28ft)		PC-110-RJ45-1P-CX-1M-GY	10 Per Closet
Patch cord 110 type-RJ-45, 1 pair, 2 m (6.56ft)		PC-110-RJ45-1P-CX-2M-GY	10 Per Closet
Patch cord 110 type-RJ-45, 1 pair, 3 m (9.84ft)		PC-110-RJ45-1P-CX-3M-GY	10 Per Closet
Patch cord 110 type-RJ-45, 2 pairs, Ethernet, 2 m		PC-110-RJ45-2P-CX-2M-GY	10 Per Closet
Patch cord 110 type-RJ-45, 2 pairs, Ethernet, 3 m		PC-110-RJ45-2P-CX-3M-GY	10 Per Closet
48 Port CDP, POE capable switch	Cisco	WS-C3850-48F-L	2 Per Closet
Stack Cable Cisco	Cisco	STACK-T1-1M	2 Per Closet
Stack Cable Cisco	Cisco	STACK-T1-3M	2 Per Closet

## 9. Final Acceptance

The Contractor shall conduct a Final Acceptance Test. This test shall be conducted 5 days following notification by the contractor of completion of any addition or new cable distribution system called for in this document. In addition to compliance with the technical characteristics and quantities of equipment specified in this document, a provision is added that all punch list items noted during the initial inspection, when the contractor notifies the VA of completion of the installation, must be resolved before the conclusion of the Final Acceptance Test. Upon completion of the punch-list item(s), the Contractor will be deemed to be in compliance with this statement of work and provide As-Built CAD drawings.

At the conclusion of the Acceptance Test, the VA and the Contractor shall jointly agree to the results of the test, and reschedule testing on deficiencies and shortages, if any. When the test shows the system performs in accordance with the VA statement of work, and all punch-list items have been completed, the cable distribution system will be considered to have achieved compliance with the requirements of the statement of work. If any retesting is needed to reach agreement on the results of the tests or to establish compliance with this statement of work, such retesting will be done at the Contractor's expense.

The contractor shall be certified by the manufacturer for the installation. The contractor shall also provide a letter of certification from the Manufacturer. Coordinate with Saginaw OI&T and the Service Provider for locations and requirements for installation of circuits. It is the responsibility of the contractor to provide a turnkey installation. All installation charges for the connection are borne to the contractor.