VA Maryland Health Care System (VAMHCS)

OFFICE of INFORMATION and TECHNOLOGY (OI&T)

Communication Closet and Cabling Minimum Specifications

Introduction:

This document establishes the standards of Office of Information and Technology (Ol&T) for the installation of communications facilities in VA Maryland Health Care System (VAMHCS) while the standards are meant to apply. Particularly to new construction and major renovation projects, they should also be followed when wiring or rewiring existing buildings whenever it is practical. OI&T will act as a communications consultant and review the plans for all VAMHCS construction and renovation projects. Reference material used in preparing this document includes standards that are published in several pre-existing documents, all containing related information from which a complete building wiring system is defined. This VAMHCS Ol&T Communication Closet and Cabling Minimum Specifications document take precedence over all others and shall be the defining document used going forward.

COMMUNICATIONS CLOSET SPECIFICATIONS

1. **General**
   Ol&T Communications closets house the wiring and electronic equipment that are used to connect user workstations to the VAMHCS communications Network. These closets are designed for and intended for the intra-building distribution of centrally managed telephone and data communications and in no instance shall they be used to support other building utilities or other non-OI&T system(s) or functions. OI&T Communications closets must be located so they can be accessed by their own Ol&T keyed door from the hallway. Ol&T Communication Closets may be placed adjacent to but not combined with electrical closets.

2. **Dimensions**

Sufficient space shall be provided at a minimum of 10' X 10' (no less than 100 sq. ft.), shall be provided on the floors where the Government occupies space for the purposes of terminating telecommunication services into the building. In areas where greater than 100 outlet locations are anticipated the closet shall be sized on a case-by-case basis. Ceilings shall be 9 ft. minimum in height; no false ceilings will be allowed. The Ol&T communications closet must provide

prevention of "Up & Over Access" for security purposes. Therefore, drywall must go from the floor to the top of the structural ceiling. The door shall be a minimum of 36" wide and 80" high, open outward, and be fitted with fitted with an Automatic door-closer and deadlocking latch bolt with a minimum throw of 1/2 inch. Entrance must have a minimum unobstructed area of 48 inches directly in front of the closet door. Lock keying should meet OI&T specifications as appropriate. A magnetic card system may be requested in some cases in order to meet a particular requirement.

3. Interior Furnishings

All Communication closets shall be lined with (3/4") "fire retardant" plywood (8') high on all walls with the bottom beginning two inches above the electrical outlets, (which should be 18" off floor). If Fire Retardant plywood is not available then regular 3/4" plywood must be painted on all six sides with fire-retardant paint. It should be limited combustible as defined in NFPA 101, Chapter 3, Life Safety Code (NTE 25 Flame Spread). Floors, walls, and ceilings shall be treated to minimize dust. Paint or other surface finishes shall be of a texture and color such that room lighting is enhanced.

4. Lighting

Lighting shall be a minimum of 50-foot candles measured 3 feet above the finished floor, mounted 8.5 ft. above the finished floor. No wall-mounted lighting will be allowed.

5. AC Power

Three (3) dedicated 20-amp, double-duplex, 120 volt circuit’s electrical outlets shall be provided. (1) of the (3) electrical outlets to be installed in a data rack of the VA's choosing. Quad service outlets shall be placed at four (4) ft. intervals along the length of the four walls and 18 inches above the finished floor. Service panel location and breaker positions shall be clearly marked. Access shall be available to the main building-grounding electrode. Power for communications wiring closets should always be supplied from building emergency power systems whenever emergency power is available in a building. Some wiring closets in some buildings will need additional electrical power depending on special needs. These extra needs will be specified by OI&T during the review process.

6. Environment

The OI&T Communication rooms shall be provided with heating and cooling equipment capable of maintaining the internal space between 60 degrees F and 72 degrees F, with humidity control. The relative humidity shall not exceed 50 percent relative humidity non-condensing. Heating and cooling requirements

shall include back up AC power capabilities the HVAC equipment shall be stand alone in design and accommodate a twenty four hour, seven-day week, 365 days per year operation, and remote alarming (loss of power, cooling and heating) functions. Wiring closet cooling cannot be controlled by energy management systems that cut off cooling when the building is not occupied. Minimum cooling requirement is 20,000 BT/H. A positive pressure shall be maintained with an air exchange sufficient to dissipate the heat generated by electronic/electrical equipment. Dissipated power will typically be less than 6,000 watts. When additional power is specified per Section 5 above, a corresponding increase in cooling capacity is required.

7. Closet Penetrations

The Ol&T Communication closets require additional vertical risers from the Computer Room to each closet to support a separate backbone cable distribution system for data requirements. Conduit and path sizing shall be a minimum according to Telephone Backbone Guidelines herein. For further guidance on conduit requirements, consult with TCD-1940. Floor penetrations for vertically stacked closets shall be a minimum of two 4" penetrations per closet. Each penetration will include a bushed sleeve extending 1" above the finished floor. It is recommended that all penetrations be in clusters at a location in the closet stack specified by Ol&T. Penetrations for horizontal conduit or cable tray runs which use ceiling pathways should be near the 8 ft. level. Additional penetrations may be needed depending on the density of network devices needed in a particular area. Fire Retardant procedures must be followed. See item 11 this section. Installation of the cable in conduit, raceway and cable tray(s) will not exceed the standard of 60% fill ratio.

8. Closet Linkage

When multiple closets exist on a single floor, these closets must be interconnected via horizontal cable pathways. If drop ceilings are used, the closets should be interconnected using cable ladder/tray that is 12 inches wide and 4 inches deep. In locations without drop ceilings a minimum of two four (4) inch conduits should be provided to implement the closet interconnection. A conduit system must include pull boxes at 100 foot intervals and after every pair of 90-degree bends. Conduits entering the closet through a 90-degree bend, whether from floor or ceiling, shall do so with a bend radius of 18 inches for 2' Inner Diameter (ID) or less. Conduits with greater than a 2" ID shall have a radius ten times conduit ID. Pull cords shall be provided in all conduits.

9. Closet-to-Wall Outlet Distance

The closet-to-wall outlet distance shall be a maximum of 290 cable-feet and for CAT6A maximum 328 cable-feet (100 meters). Multiple closets shall be provided where necessary to meet this requirement. Remember to include the vertical components of a cable path when calculating distances. The 290 foot limit is

cable length and not simply floor path length.

10. **Number of Closets Per Building**
General rule of thumb is that one Ol&T Communications closet shall be provided per 10,000 square ft. of administrative office floor space. For every *additional* 10,000 sq. ft. of administrative floor space served, there shall be an additional 10 linear ft. of wall space provided or an additional 01& T Communication closet. The choice will be determined by Ol&T Communications manager and the Building Committee to best serve the needs of people destined to occupy the space.

10. Fire Code

Any wall penetrations must be sleeved and the appropriate fire rated protection used. Fire Retardant putty or caulk is required on both sides of the sleeve. Local fire code must be met as well as the main hospital.

11. Room Layout

All new voice and data cable shall be terminated in the OI&T Communication closet on appropriate Contractor provided Category 6 compliant 48 port patch panels (EIA/TIA 568B) with wire management to be provided for both vertical and horizontal management of cables and patch cords. Vertical wire management shall be provided on both sides of the equipment rack. Horizontal wire management shall be provided between each patch panel. All work to be done in accordance with the existing facility cable plant design. Each patch panel will have its own unique NT number, starting with the next highest unused number. One (1) 7' Category 6 patch cable shall be provided by the Contractor for each cable installed. Also to be installed in the Ol&T Communications closet shall be standard 19" relay rack(s) floor mounted type. All associated cable trays, ladder racks; vertical and horizontal wire and cable management are to be supplied. Relay racks with vertical and horizontal wire and cable management are to be supplied and installed. The racks are to be mounted using the appropriate Red Head© type expanding bolts and connected with ladder rack above the equipment racks around the entire Ol&T Communications closet to the wall for transversal of the wiring from the ceiling to the center-mounted rack(s).

HORIZONTAL WIRING PATHWAYS

1. **General**

The term "horizontal wiring" refers to a number of cable types that run from a communications closet on a particular floor of a building to workstations on that floor. Where there are multiple closets on a floor, it can also include wiring-hub interconnection cables. These interconnection cables are typically some combination of copper and fiber optic cables. Careful design work on the horizontal cable pathways to minimize total cable length will help to lower wiring

costs and in some cases might decrease the total number of wiring closets needed to serve a building.

2. **Recognized Cables**

The following cable types are recognized as intra-building horizontal wiring.
• Category 6 twisted-pair cables
• FDDI-grade 62.5 micron multi-mode.

3. **Color Codes**

All voice and data cabling must conform to the existing VAMHCS's color code:
• Blue Data 1, Yellow Data 2, White Voice, All CAT6. All Jacks and Face plates are System Max CAT6.

4. **Ceiling Cable Pathways**

Ceilings used as distribution pathways for horizontal cabling shall meet the following conditions:
a. If a fixed ceiling has to be used as a cable route, properly sized conduit must be installed as a pass through.

b. **Conduit Capacity:**
• 4 inch conduit = 60 Category 6 cables
• 3 inch conduit = 40 Category 6 cables
• 2 inch conduit = 20 Category 6 cables
• 1 inch conduit = 6 Category 6 cables

c. Ceilings of lay-in tiles which allow easy access to a suitable space above are recommended. Suitable space is defined as that which supports the installation and ready use of a 12" open-frame cable ladder/tray. These cable ladders/trays should be installed in all hallways. Solid bottom cable trays are not to be used.
d. Height of the cable ladder/raceway above the finished floor shall be no more than 11 ', where ever possible.
e. Metal cable ladders/raceways shall be bonded to the building ground per applicable code.
f. Plenum ceilings add to the cost of wiring a building since special type of cable must be used to meet fire codes.

5. **Raceway-to-Workstation Outlet Cable Path**

All locations for telephone and data jacks in the office space will need a 3/4" stub up conduit with a 2.5"(deep) box, or power pole depending on modular furniture arrangement. All existing abandoned phone/data cable must be removed. A 1"

conduit shall be provided from the cable raceway area above the ceiling to a quad wall box, or quad boxes if specifically requested, for each workstation location. The quad box should be fitted with a mud ring to size it down to use a standard mud ring faceplate. The conduit should be installed from the outlet box to the cable ladder/tray in main corridor. When no cable ladder/tray exists, a simple stub termination of the in-wall outlet conduit extending several inches into the ceiling space is preferred. A cable ladder/tray should be installed for all addition and renovation projects. Enclosed raceways should not be installed as this restricts access. Pull ropes shall be installed in all conduits as part of the conduit installation work. Daisy-chained systems that originate in the wiring closet and serve multiple outlets via a single conduit are not allowed.

6. **Faceplate Jack Specifications**

All faceplates are will to have (2) CAT 6 Data and (1) Voice. Arrangement on the faceplate shall be a single Voice jack in the upper left corner, a blank in the upper right corner, and 2 RJ-45 CAT 6 jacks on the bottom. Labeling of the workstation outlet jack shall include telecom closet number patch panel (NT) number and port number of the patch panel and shall be done with 3/8" Ptouch labels.