96th Communications Squadron Cyber Infrastructure Standards and Installation Specifications

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Chapter 1

INTRODUCTION

1.1. **Purpose:** The 96th Communications Squadron Cyber Infrastructure Standards and Installation Specifications provides the compliance requirements for Eglin Air Force Base Command, Control, Communications and Computer (C4) requirements. This Cyber Infrastructure typically includes telecommunications spaces, pathways, inside and outside plant cabling and interconnecting Base Area Network (BAN) equipment and Air Force Network (AFNET) components. Therefore, the design of interior and exterior telecommunications infrastructure shall be designed by a Registered Communications Distribution Designer (RCDD) using current Department of Defense, Air Force and industry standards. Moreover, the 96th Communications Squadron Cyber Infrastructure Standards and Installation Specifications provides compliance specifications to those employed or tasked with implementing existing and emerging interior and exterior BAN telecommunications Cyber infrastructure task orders, work orders, contracts, customer information technology and Simplified Acquisition of Base Engineering Requirements (SABER). Furthermore, these specifications shall be used and included as a whole when implementing, engineering, and designing communications requirements in order to meet mission operating and maintenance standards for protecting 96 TW Cyber Space domain.

1.2. **Scope:** These mandatory specification and technical requirements, parts and materials register, and referenced applicable publications contained within this document, shall be adhered to and incorporated within all project designs, contracts and SABER renovations for implementation on the Cyber Infrastructure. Deviation from this guide requires Communications Squadron (CS) approval. The telecommunications contractor(s) herein must coordinate with the 96th Communications Squadron concerning layout and configuration of the BAN. Outside Plant (OSP) is defined as network transportation (copper and fiber) outside a building (e.g., underground or buried) and Inside Plant (ISP) is defined as network transport (copper and fiber) within a building supporting the cyber infrastructure.

1.3. **Communications and Information Systems Officer:** The 96th Communications Squadron, Commander is designated by Technical Order (TO) 00-33A-1001 as the Communications and and Information Systems Officer (CSO) for the base. The 96th CS Commander is the operational and maintaining authority for Cyber Infrastructure that supports the base and tenant units and has final approval over all Cyber Infrastructure C4 processes, procedures, requirements, and installations.

> **NOTE:** The term approved is defined in this document and other standards as acceptable to the authority having jurisdiction.

Chapter 2

TECHNICAL REQUIREMENTS

The following standards and installation specification criteria provides additional installation specification requirements for 96 Test Wing, Eglin AFB. These compliance specific requirements shall be executed IAW Department of Defense, Air Force and industry standards applicable publications and documents referenced within attachment G of this document. In the case of conflicting guidance, defer to the most stringent communications applicable standard.

Contractor and subcontractor(s) are recommended to read and understand the Cyber Infrastructure Standards and Installation Specifications prior to working on or changing the BAN Cyber Infrastructure and should pose any questions to the 96 CS/SCXP, in a formal Request for Interpretation or Information (RFI), for Telecommunications design, product submittals, test results and other communications related issues that may need clarification for a complete understanding.

All coordination shall exist in writing, preferably electronic format using industry standard compatible documentation software available to all parties. i.e., Word or Outlook.

2.1. **Land Mobile Radio (LMR) Equipment**

2.1.1. **Construction and Renovation:** For new construction and renovation of existing buildings, coordinate with 96 CS/SCXP, Projects and Requirements work center regarding the installation, relocation or removal of any land mobile radio equipment and air-to-ground radio equipment. A Project Manager will provide guidance on the purchase and installation of new equipment, removal and disposition of installed equipment and removal and re-installation of equipment being moved.

2.1.2. **Planning:** For planning purposes, the Eglin LMR infrastructure is currently version 2020HS. All Eglin LMR equipment is tied to the United States Space Force's LMR zone core at Peterson AFB, CO. All changes to the LMR infrastructure will require coordination with AF Installation and Mission Support Center (AFIMSC).

2.1.3. **Subscriber Equipment:** All subscriber equipment intended to operate on the Eglin LMR infrastructure will be compatible and interoperable with the Motorola system. Subscriber equipment will have the required feature set and capabilities required to operate on the Eglin system. Subscriber programming will be completed by the 96 CS.

2.1.4. **Antenna Systems and Cabling:** All radio frequency antenna systems and cabling shall be installed, terminated, protected, and tested based on industry standards, manufacturer instructions and design technical specifications.

2.2. **Telecommunication Spaces**

2.2.1. **Floor Mount Equipment Cabinet:** All 72-inch or taller cabinet enclosures shall be 4-Post and blend seamlessly into existing or new fixed ladder rack assemblies. In order to support, internal to the cabinet, copper and fiber cable installation; all 4-Post cabinet enclosures shall be outfitted with all necessary cable management accessories IAW Attachment E. All 4-Post cabinet enclosures shall be Great Lakes model GL790ES-2442MS with two sidecars and end panels (P/N SC67942 and P/N SCP7942) cable managers or equal, however customer requirements may dictate the size. All

4-Post cabinet enclosures shall follow the rack elevation layout in Attachment D. All 4-Post cabinet enclosures shall be lockable with unique lock cylinders and corresponding keys turned over to 96 CS that are compliant and only accessible by 96 CS technicians in accordance with Attachment F. Dedicated circuits with electrical receptacles depicted in the rack elevations shall be supplied by onsite contractor and shall be placed in accordance with Attachment D. Exact electrical receptacles shall be identified in all iterations of the design drawings based on customer requirements and any future changes.

Any cabinet requiring fiber patch cables in excess of 6-foot fiber patch cords to access switches shall require horizontal cable management accessories. All Surge Arrestors shall always be 1U higher than the top mounted UPS. In narrow or crowded telecommunication rooms, equipment cabinets shall be floor-mounted adjacent to a wall but shall provide a minimum 36-inches of space both in front of and behind the cabinet and behind any installed equipment. A minimum side clearance of 24-inches shall be provided on end cabinets. Provide 100 percent spare cabinet capacity based on the amount of cabinet capacity utilized by the patch panels provided. Spare cabinets shall be provided for the mounting of Government-purchased/installed LAN equipment, if required. Only 96 CS network equipment shall reside within the confines of 96 CS lockable enclosures in accordance with Attachment F. Wall-mounted cabinets may be utilized in small buildings or smaller areas not conducive for floor mount cabinet enclosures.

2.2.2. **Wall Mount Equipment Cabinet:** All wall mount lockable enclosures shall be Chatsworth ThinLine II Model 13050-723 for low profile or Hoffman Access Plus II, Model EWMS482425 for full size, or equal based on customer requirements mounted to fire rated backboard and grounded IAW para 2.2.11. All wall-mount lockable enclosures shall follow elevation layout IAW Attachment D. Dedicated circuits with electrical receptacles depicted in the rack elevation shall be supplied by onsite contractor and shall be placed IAW rack elevation drawings in Attachment D. Exact electrical receptacles shall be identified in all iterations of the design drawings based on customer requirements and any future changes.

2.2.3. **Information Processing System (IPS) Container:** A SIPR switch not located in an approved classified storage safe, vault, approved open storage area (AKA: secure room), or in a SCIF shall be secured in an IPS container. All IPS containers shall follow elevation layout IAW Attachment D. All IPS containers shall be Hamilton Class 5 Single Door Model 23-36-19 or equal based on customer requirements. Dedicated circuits with electrical receptacles depicted in the rack elevation shall be supplied by onsite contractor and shall be placed in the nearest wall next to the IPS container. Exact electrical receptacles shall be identified in all iterations of the design drawings based on customer requirements and any future changes. End user encryption equipment shall reside outsider the IPS container IAW DISA STIG V-245788 under Traditional Security or most current applicable STIG.

2.2.4. **Network Switches:** All network switches and or network design solutions providing LAN connectivity for NIPR and SIPR shall be specified by 96 CS and funded by the occupying customer.

2.2.5. **Temporary Network Switches**: Temporary switches shall meet all aspects of this Cyber Infrastructure Standards and Installation Specification. Temporary switches shall only remain active for a period of 120 days at which a permanent solution shall be implemented and funded by the occupying customer.

2.2.6. **Voice Networking Services:** All voice networking services will be provided utilizing Voice over Internet Protocol (VoIP). All VoIP devices and equipment to provide voice service shall be specified by 96 CS and funded by the occupying customer.

2.2.7. **Intrusion Detection System (IDS) Services:** All IDS services will be coordinated through the 96 SFS prior to request for installation. SF's IDS provider will engineer a solution based on customer's requirements. Any variation to a fiber solution shall be approved through 96 CS/Authority Having Jurisdiction (AHJ). Customer may be required to purchase IDS Network Switches. Telecommunications design engineer or supporting contractor shall be responsible for incorporating an appropriately sized conduit from IDS provider security panel to the nearest supporting 96 CS communications room. Appropriate CAT-6 plenum-rated cable or fiber optic cable shall be installed inside the IDS supporting conduit to ensure the IDS controller and the supporting IDS switch are interconnected to complete the IDS path. 96 CS personnel will interconnect the cable/fiber in the 96 CS communications room to establish the remainder of the IDS path to the BDOC.

2.2.8. **Copper Patch Panels:** Modular patch panels shall consist of a metal panel that accepts all Panduit Mini-Com® Modules (or equivalent) to mix and match media types in the same panel. Patch panels shall accept all modules for UTP and ScTP applications and shall mount to standard 19" racks. A 1RU cable management panel shall be installed between all equipment and patch panels as necessary.

> **NOTE:** Users must provide and install factory-produced patch cords for work area outlet locations. Patch cables must be CAT-6 "white" to match the horizontal cabling 1-GBASE-T connections.

2.2.9. **Fiber Optic Distribution Panels:** Shall be populated for maximum density utilizing LC type connectors. Optical fiber termination shall use fusion splices with factory produced pigtails for all backbone and premise cabling with a 3-foot slack loop, strain relieve cables at panel and other termination points included with each panel in the Communications Equipment Room (CER).

2.2.10. **Distribution Pathway:** All pathways shall be installed IAW all applicable industry standards. Cable tray shall consist of a ladder type or welded wire cable tray with flat solid bottom or plenum rated tray insert in the telecommunication spaces to provide distribution between the plywood backboard, equipment racks, backbone conduits, and the pathway cable tray. When multiple distributor rooms are located on the same floor, they should be interconnected by a minimum of (2-each 4-inch) conduit or equivalent pathway. The CER distributors shall be dedicated to the telecommunications function and related communications support facilities. These CERs should not be shared with electrical installations other than those supporting telecommunications or associated equipment. Equipment not related to the support of the distributor room (e.g., piping, ductwork, pneumatic tubing) shall not be installed in, pass through, or enter the space.

Cable Installation Clearances:

1. Cables shall not rest upon any other structure not intended for the direct support of the cable(s).
2. Provide minimum clearance of 6-inches from any electromagnetic interference EMI/radio frequency interference RFI sources.
3. Provide minimum clearance of 4-feet from any motor or transformer.
4. Provide minimum clearance of 12-inches from HVAC ducts, flue, hot water, steam line or other heat-producing source.

5. Copper and Fiber cable separation of any classification shall be 3-inches or as designed.

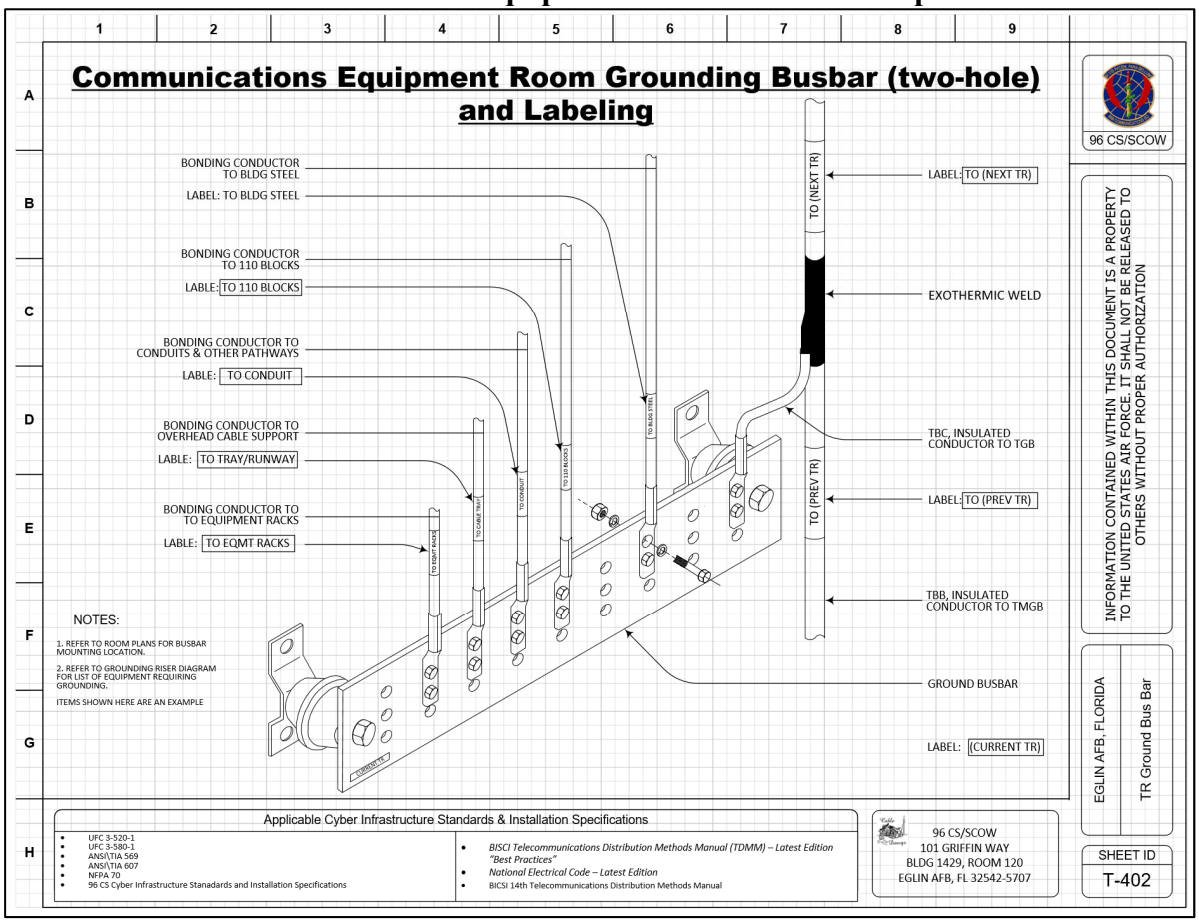
Cable jacket colors: RED - SIPR, BLUE - Wireless, WHITE - Network/VOIP, YELLOW - SCI

Commercial Communications: Commercial ISP services shall be installed and terminated in customer owned spaces only. Commercial OSP/ISP services shall not be housed or routed through any 96 CS CERs, spaces, or communication equipment locations (CEL's). The 96 CS CERs shall not contain any user system equipment or cabling such as ACS, A/V, CCTV, CATV, and similar type systems or networks. Facilities acting as distribution facilities for IDS services supporting IDS connectivity to other outlying facilities shall house the IDS network switch only in the 96 CS CERs. For larger facilities with multiple floors acting as an access or distribution facility, the IDS network switch shall be housed in the 96 CS CERs. IDS network switch(s) shall not be installed in 96 CS communication equipment racks. The IDS controller and supporting IDS panel(s) shall always be housed in end user security or IT room. The 96 CS Comm Rooms will only contain equipment relevant to AFNET maintained systems.

NOTE: Hook and loop straps shall be used to secure/bundle both fiber/copper cables within cable trays, ladders and racks throughout pathway. The hook and loop straps should be evenly spaced (4-feet on center) throughout the dressed length end-to-end. Hook and loop straps shall be used to prevent a change in the physical geometry of the cable that typically results from use of nylon tie wraps. Vinyl tape will not be accepted - Reference drawing T-305:

2.2.11. **Grounding, Bonding, and Shielding:** All grounding shall be performed IAW ANSI/TIA-607 and Rural Utility Services standards. Cyber infrastructure antenna systems, network equipment, OSP/ISP components, cabinets, racks and lockable enclosures shall be grounded to applicable standards.

Communications Equipment Room Busbar Example:



2.2.12. **Work Area Outlets:** All recessed gang boxes and surface mount deep device boxes shall be a minimum of 3.5 inches depth. All faceplates shall be four-port compatible minimum (2-active/2-blanks) feed by a 1-inch EMT stubbed-up to cable pathway above ceiling. Panduit Mini-Com® Classic series (or equivalent) single gang downward sloped faceplate that accepts four modular jacks, off white color. Contractor shall provide fiber and copper cable slack for maintenance within the horizontal cabling system configuration as follows in: CER - cable ladder - UTP/ScTP 10-feet and SM/MM 10-feet, work area outlet - UTP/ScTP 1-foot and SM/MM 3.5-Feet above ceiling. Do not put slack or service loops in communications equipment cabinets or racks. (See attachment G - Applicable Publications)

2.2.13. **Cable Specifications:** All premise wiring supporting NIPR/VoIP/POTS work area outlets shall be white in color and blue for wireless access points (Example: Category 6 UTP Plenum).

NOTE: Unless otherwise specific to support users' classification.

2.2.13.1. All cable subsystems labels shall use a permanent identifier that can be easily traced using methods in Attachment B and ANSI/TIA 606 for other system labeling requirements as described below.

2.2.14. **Existing Legacy**: CAT-3, 5 & 5e cabling shall not be reutilized, relocated, moved or re-terminated for design planning, construction, or renovation. i.e., modular and cubical furniture.

Ensure the Designer of Record (DOR) and Customers are aware of cost/detail requirements prior to Planning, Programming and Budgeting. All Legacy (CAT-3, 5 & 5e) / (OM1) cabling shall be brought to CAT-6/OM3/OM4 or current industry standards and codes during renovations, MILCONs, SABER projects or planned facility upgrades. (See attachment G - Applicable Publications)

2.2.15. **Abandoned ISP Cables:** The accessible portion of all ISP abandoned communications cables shall be removed end-to-end after cut-over and before final inspection. Where cables are identified for future use with a tag, the tag shall be of sufficient durability to withstand the environment involved.

2.2.16. **Labeling Standard:** Label all ISP/OSP telecommunications infrastructure IAW ANSI/TIA 606. Cable tags shall be polyethylene. Handwritten labeling will not be accepted. Stenciled lettering for cable and termination hardware shall be provided using thermal ink transfer process. Existing OSP cable(s) that have been spliced shall be relabeled/retagged back to the origination demarc. Label each ISP cable at both ends (patch panels/work area outlets) within 6-inches of each termination.

2.2.16.1. Use the examples in Attachment B to assist with labeling the cable subsystem on (patch panel to equipment outlet) outlets, and patch panels. From left to right the label reads, Telecomm space feeding outlet. Row letter (if there's one row then it's not needed) rack number. Patch panel elevation letter. Port number on patch panel in sequential order.
2.2.16.1.1. 96 CS prefers using a period between information to save space.
2.2.16.1.2. 96 CS prefers using elevation letter over RU's because older racks aren't marked. (Request deviation approval from 96 CS/SCOW)
2.2.16.1.3. A "/" is authorized between port numbers if all the previous information is the same in the outlet labeling window. i.e., 129.A1.B.47/48.
2.2.16.1.4. Special designator should be placed before port number for anything other than NIPR systems. i.e., DREN, CENTRIX, SIPR
2.2.16.1.5. Each cable, conduit, sleeve and pathway within the ISP shall be labeled showing TO & FROM information.
2.2.16.1.6. All labels shall meet requirements for legibility, defacement, and adhesion, specified in UL 969.
2.2.16.1.7. All outlet jacks, connectors, patch panels, and block hardware shall be labeled.
2.2.16.1.8. All labels must match design and permanent record as-built documentation.

Example:	RM # 129.	Row # A /Rack# 1.	PP# B.	Port# 44
	129.	A1.	B.	44

NOTE: All ISP/OSP requirements stated shall be used unless otherwise specified and approved during design by maintaining organization. ISP/OSP terminations shall be installed IAW all applicable local standards, industry standards and/or manufacturer specifications with the more stringent applying. (See attachment G - Applicable Publications)

2.2.17. **Voice Communications:** Work area outlets shall be installed in all telecommunication rooms, break rooms, mechanical rooms, and entryways that are secured vestibules to support phone installation for safety, courtesy, and convenience purposes. Each CER shall have one wall-outlet installed at or near the entry door for emergency and voice communications.

2.3. **OUTSIDE PLANT (OSP)**

*SEE ATTACHMENT C: FIBER DESIGN NOTES

2.3.1. **Fiber Optic Cables (FOCA):** All OSP cables installed shall be loose tube design with either water block tape or gel filled. All fiber optic cable installed shall be all dielectric with no metallic content. A minimum 24-strand single-mode fiber shall be installed to support core service for all fiber optic installations. FOCA shall be installed for long distances using a figure-8 to prevent twisting and protect the cable when pulling as one piece (home run) without splices between connections except where the distance exceeds the lengths in which cables are manufactured. Fiber cables may be installed by jetting or blown applications using special installed ducts with compressed air. Where splices are required, install splices only in 96 CS approved lockable maintenance communications holes to maximum extent possible. Avoid all unnecessary splicing to prevent excess attenuation and reflection. Follow manufacturer's instructions and pulling tensions. Ensure fibers are installed using strength members "aramid yarn" during installation. Fiber and Copper cables shall not reside together in a 4-inch conduit/duct within the infrastructure, nor shall fiber and copper cabling be installed or exist within the same innerduct or GEO-textile mesh. To maximize comm pathway availability and spacing ensure 4-inch conduit and duct systems are populated with innerduct or GEO-textile mesh before installing any cables. (Reference NECA 301-16)

2.3.2. **Fiber Optic Distribution Panels (FODP) for OSP Termination:** Shall be populated for maximum density utilizing LC type connectors. All new FODP's installed in an Information Transfer Building, Main Access Node, and Communications Equipment Rooms will be capable of housing 288-strand terminations regardless of cable size being installed. All terminations shall be fusion spliced to pre-manufactured cassettes with factory pigtails unless otherwise approved by the maintaining organization. No mechanical terminations shall be used to terminate OSP FOCA.

2.3.3. **Fiber Optic Splice Enclosures:** All fiber optic OSP underground splices shall be encased in a dome type enclosure with a 50-foot service loop for the main cable and 50-foot for each cable serviced by the splice case. Provide an additional 10-foot for racking of cables and splice case. Additionally, every other maintenance hole starting from the entrance MH shall have a 25- foot service loop installed. (Ex. TYCO 450 Fiber Optic Splice Enclosure or equivalent). Direct buried fiber splices shall NOT be allowed for any permanent or temporary communications requirements or fix actions.

2.3.4. **Copper Cables:** OSP copper core cables shall be PE-89 OSP Telephone Cable with an expanded polyethylene (Foam Skin) and external layer of solid, high-density polyethylene. Fiber and copper cabling shall not be installed within the same duct, pathway or mesh/inner ducts at any point. Copper design intra-building and cross-connects terminals from the Point-of-Presence (POP) or DMARC campus backbone for house cabling terminals shall utilize CAT 6 plenum rated UTP for connection/terminations. CAT-3, CAT-5, and CAT-5e cabling solution(s) will not be accepted.

> **NOTE:** An entrance transition point shall be required for unlisted OSP cable when the termination point is greater than (50 feet) from the point of entrance, and the cable cannot be installed in a properly rated conduit (e.g., rigid metal conduit or intermediate metal conduit) or as directed by the authority having jurisdiction. This provision does not apply to a listed indoor/outdoor fire-rated optical fiber cable. The OSP cable can be spliced to a building backbone cable to meet local codes for fire-rated cables.

2.3.5. **Copper Cable Terminations:** OSP copper cable shall be terminated on a Protected Entrance Terminal (PET) 110 type/710 splice connectors or 388 central office connectors with primary protector blocks equipped with 5-pin solid state or gas protector module accessories installed.

2.3.6. **Copper Cable Splice Enclosures:** All copper cable OSP underground splices shall be encased in an appropriate size and type enclosure and installed IAW manufacturer installation guidelines (Ex. Preformed Line Armadillo Stainless Steel Splice Enclosure or equivalent). For Copper OSP no service loop/slack shall be allowed at the terminal or within MHDS. Direct buried cables shall be spliced above ground only in a buried distribution terminal or cabinet for ease of maintenance. Note: Fiber and Copper splices shall be installed in Pre-cast concrete maintenance holes to accommodate the splice case(s) and required splicing service, copper racking and fiber service loop materials.

> **NOTE:** Some splice enclosures may require re-enterable encapsulation compound and shall be determined by the maintaining organization.

2.3.7. **Backboards:** Fire rated Backboards shall be provided on a minimum of two adjacent walls in the telecommunication spaces near cable entry ports. (Backboards) Provide void-free, interior grade A-C plywood ¾-inch thick 4-feet by 8-feet. Backboards shall be fire rated by manufacturing process. Paint applied over fire retardant backboard shall be UL 723 fire retardant paint and identified along with fire stamp clearly visible. Provide label including paint manufacturer, date painted, UL listing and name of Installer. When painted, paint label and Fire Stamp shall be clearly visible. Backboards shall be permanently fastened to the wall by means of wall anchors utilizing stainless steel hardware with a flat head bolt. Finished installation shall be flush. Drywall screws or any other screw types shall not be acceptable.

2.3.8. **Maintenance Holes** (MH)**:** The preferred term for communications underground closures or holes on Eglin AFB shall be "Maintenance Hole or Maintenance Vault", as Manhole or hand hole will not be used. All Maintenance Holes and vaults shall be pre-cast reinforced concrete, multi-directional type with cast-in single or multiple plastic terminators to accept the conduits. Thin concrete knockout sections may be provided for terminating multiple-bore conduits. New MHs shall be placed to support the locations of junction points, offsets, load points, and curvature in the duct line. The contractor shall form and install a 1-foot-wide x 8-inch-deep concrete perimeter around new maintenance holes being installed. The contractor shall ensure the appropriate MHs number is permanently stenciled by the application of paint with 3.5-inch lettering, on the inside top interior within the first 12-inches with a number designated by the 96 CS Authority Having Jurisdiction. All new ducts shall be permanently stenciled by the application of paint with 2-inch lettering on the wall above each duct back and in each building and maintenance hole indicating the connecting building/maintenance hole at the other end of the duct (for example, "To MH-200"). All MHs shall be installed IAW all applicable industry standards.

2.3.8.1. Cast-in-place (site-poured) MHs may be required when overbuilding on existing infrastructure, rebuilding, or enlarging existing MHs that are congested, oddly configured, or contain excessive cables that are improperly routed through the MH.

2.3.8.2. All MHs shall be installed on a leveled, crushed, washed, gravel base of sufficient depth, a minimum thickness of 6-inches under the entire structure and extending past foundation or all outer edges by 6-inches or more, to allow for drainage and stability. In

cantonment areas that have or will potentially have multiple cables, they shall not be spaced more than 600-feet apart using the ground plane view. In sparsely populated areas (i.e., range test area) containing only fiber cables, they may be spaced up to 800-feet apart using the ground plain view, providing spacing does not exceed the manufacture's recommended pulling tension for the cables being installed. The above distances (600-feet and 800-feet) may be modified with the approval of the 96 CS. Every effort should be made to implement Jetted or blown fiber optic cabling system designs IAW industry standards to reduce the underground cyber infrastructure and Base Civil Engineering real property footprint towards OSP pathways and maintenance hole requirements. MHs may be placed closer together to accommodate distribution designs when needed. Placed IAW ASTM C891-11 and all other applicable industry and local standards. Accessories shall be designed and provided for use IAW RUS Bulletin 1751F-643, and RUS Bulletin 1753F-151 to support the weight of the cable(s) and splice case(s).

NOTE: Precast polymer concrete or combination of polymers supporting communications cyber infrastructure shall not be utilized on Eglin AFB.

2.3.8.3. New construction shall have a maintenance hole installed within 50-feet of facility telecommunication entrance, CER demarcation point. Furthermore, existing or new conduit feeding a MH or located beyond 50-feet and servicing an Information Transfer Building or Critical Edge Building shall be concrete encased. Additionally, a concrete cap is required when infrastructure backbone cables enter the facility within 40-feet of each other to truly support backbone diversity and protection.

2.3.9 **Maintenance Hole Grounding:** MH shall be grounded in accordance with RUS 1751F 802 and NEC, Article 25, the resistance for OSP grounding shall be nominally 25 ohms. All new MHs installed shall include ground rods and bonding ribbon. The surface mounted bonding ribbon may only be omitted when the following conditions apply:

2.3.9.1 MHs are designed and constructed with an integral ground system with all ironwork bonded together.

2.3.9.2 MHs are identified as containing an integral ground system with a manufacturer's label.

2.3.10. **Main Distribution Maintenance Holes:** The preferred main distribution maintenance holes system interior size is 12-feet (length) x 6-feet (width) x 7-feet. (height) and shall have a load rating of HS-20 for heavy vehicular traffic. (Deviations from this size must be pre-approved by the 96 CS)

2.3.11. **Sub-Distribution Maintenance Holes:** Other size approved for sub-distribution systems depending on location and project design are pre-cast reinforced concrete interior size 3-feet (width) x 5-feet (length) x 4-feet (height) and shall have a load rating of HS-20 for heavy vehicular traffic. (Deviations from this size must be pre-approved by the 96 CS)

Maintenance holes shall be equipped with all accessories to provide complete system:

2.3.11.1. Torsion assisted rectangular diamond plate covers

2.3.11.2. Self-latching stainless steel slam locks

2.3.11.3. 1/8" raised letters stating "COMMUNICATIONS"

2.3.11.4. A sump pan insert for drainage, and a grounding/bonding system

2.3.11.5. Corrosion resistant cable racks

2.3.11.6. Pulling irons

2.3.12. **Concrete Encasement:** In new construction, the duct system shall be concrete encased in all government areas as follows: At a minimum, the duct system shall be encased under all traffic areas; where any bend/sweep exceeds 10 degrees in any direction; in any stream/drainage area subject to washing out; and in major construction zones. Concrete encasement of the ducts for a "core path" shall be required where no alternate paths are present. Concrete encased duct, galvanized RSC, pipe casings, or HDPE duct placed by horizontal directional drilling (HDD) shall also be placed under all paved road surfaces and certain heavy traffic non-surfaced roads as documented in the design package. Concrete forms shall be utilized when encasing ducts into a maintenance hole to limit blockage of empty duct knockouts or windows in the maintenance hole. The encasement/pipe shall be extended a minimum of 6-feet beyond the roadbed for all road crossings. The installer shall use only one brand of Portland cement that conforms to American Society for Testing and Materials (ASTM) C 150. The concrete shall be a wet-type mix and shall be placed in such a manner as to ensure the concrete completely surrounds all ducts and that no air or voids are trapped in the mix. (A dry bag of ready-mix type cement that has not been mixed with water but has been dumped in the trench is not acceptable.) Prior to pouring any concrete over the duct, the installer shall obtain the signature of the on-site U.S. Government AHJ representative to signify the acceptability of the duct placement and spacing. Concrete used to encase conduits shall be a minimum compressive strength of 20,700 kPa (3,000 PSI).

NOTE: Concrete encasement of conduits should be considered for the following conditions:
a. Road or street crossings having earth covers that are equal to or less than 30-inches
b. Railroad crossings
c. Earth covers parallel to and within street, highway, or road travel areas that are less than 30-inches
d. Stream crossings, storm canals, ditches, ponds, parking lots and heavy vehicle traffic areas.
e. Bend angles of 20-degress or greater in conduit lengths equal to or greater than 550-feet

2.3.13. **Duct Placement:** New ducts shall be swept down and installed in the lowest available duct positions within the lowest available duct window in the MH. Duct placement shall not prevent placement of future ducts in the upper duct positions. Conduits shall terminate in bell ends or duct terminators at the point of entrance into the MHs and buildings. Main conduits entering poured-in-place or precast MHs shall be located in the lower portion of the end wall and centered between end walls. Conduits entering sidewalls shall be located a minimum of 4-inches from the end walls that are located farthest from the central office or serving node. Clearances of 12-inches should be maintained between main conduit formations and the roofs or floors of MHs unless the construction drawings indicate otherwise, wall recesses shall be provided at conduit entrances. Subsidiary conduits entering MHs shall be located to provide clearances of 4-inches from roofs and adjacent walls.

2.3.14. **Four Inch Duct Fill:** A minimum of one 4-inch or larger conduit/duct installed in any

given duct bank/system shall be populated with three each, 3-inch, three cell geotextile for maximum cable placement. (Other sizes/options may be used only with 96 CS pre-approval.) When installing conduits near other ducts or electrical, installers shall provide a minimum concrete separation of 3-inches or dirt separation of 12-inches. When installing conduits/ducts parallel other utilities, provide separation of 6 and 12-inches respectively. Other direct buried or underground utilities systems shall not be installed above or over-the-top any communications cables.

2.3.15. **Rerouting of Existing Ducts:** Existing ducts shall be joined to new MHs (pre- cast or cast-in-place) by rerouting the designated ducts from the demolished or abandoned MH to the new MH. Rerouting shall begin 30-feet from the old MH, to allow for standard bending radius and pulling tension. Continuity of operations on the affected cables shall be maintained during the duct rerouting actions.

2.3.16. **Pull String, Rope, and Tape:** A pull string, pull rope, or pull tape rated at not less than 600-lbs (2700-newtons (N)) tensile strength shall be installed in each new individual conduit, duct, and/or sub-duct. A minimum of 5-feet shall be provided at each end of the conduit. The string/rope/tape shall be coiled and secured to the closest maintenance hole rack or pulling eye in such a manner as to prevent it from being accidentally pulled back into the duct.

2.3.17. **Plugs:** All ducts, sub-ducts, HDPE roll pipes and innerducts, whether main or subsidiary runs, shall be plugged using universal duct plugs or removable putty sealants in all MHs, vaults and building entrances. Foam sealant is **not** acceptable in a building. Outdoor-rated ducts (sub-ducts, etc.) entering a building will be fire-stopped IAW the National Electrical Code, local codes, and per manufacturer's instructions.

2.3.18. **Duct and Acoustical Sealants**: The area between the entrance conduits and the penetrated floors and/or walls of a building or MH shall be sealed to be waterproof or shall be fire-stopped as appropriate. Use of hydraulic cement between the duct and wall is acceptable for waterproofing the duct entry point.

2.3.19. **Duct Tie-Downs**: Duct systems to be concrete-encased shall be tied down to eliminate movement of the duct system during the placement of concrete. All sections of conduit systems to be concrete-encased shall be tied down using an industry recognized method such as metal rods (four stakes) and metal strapping (for securing the duct system). The metal strapping shall be wrapped completely around the conduit structure and securely attached to the metal rods. The metal rods shall be a minimum of ¼-inch thick. Rods will be driven into the ground a minimum depth of 12-inches and the ducts shall be tied down every 10-feet or closer

2.3.20. **Conduit Spacers**: Spacers shall be installed at minimum of one spacer every 5-feet on center. The duct shall not be damaged, cracked, or crushed prior to or during installation:

2.3.20.1. Ensure the integrity of the orientation of the duct bank between MHs. Do not allow the ducts to twist or tangle between MHs.

2.3.20.2. Ducts that are classified as stub-outs shall be plugged inside the MH or building; tagged, identifying them as stub-outs; and capped on the far end to prevent soil and water from entering the duct. An orange communications locator ball shall be placed at the stub-out end location to facilitate future locating of the stub-out.

2.3.21. **Joints and Connectors:** Ducts shall be joined using manufacturer specific requirements and industry standard such as RUS/ANSI/TIA, to ensure complete end-to-end watertight system and connections. Joints shall not be damaged when pulled past the joint. Joints between dissimilar types of ducts (PVC, HDPE, galvanized steel pipe (GSP), EB, DB, etc.) shall use the appropriate connectors designed for the purpose of providing a seal between the ducts and preventing damage to cables pulled through these joints. All joint surfaces shall be prepared IAW the manufacturer's instructions, and, at a minimum, the mating surfaces shall be wiped clean before they are joined. Locating marker balls shall be placed at all HDPE splice points or duct system repairs.

2.3.22. **Bends and Sweeps:** Accomplish changes in the direction of runs exceeding a total of 10-degrees, either vertically or horizontally, by long sweeping bends having a minimum radius of 20-feet. Long sweeps may be made up of one or more curved or straight sections and/or combinations thereof. Bends made manually shall not reduce the internal diameter of the conduit. There shall be no more than the equivalent of two 90-degree bends (180-degrees total) between pull points, including offsets and kicks with a curvature radius of less than 10-feet. Back-to-back 90-degree bends shall not be utilized. NOTE: Use a large sweep bend that does not abruptly turn the corner. A sweep bends should have a much larger radius then a standard elbow, this allows for improved cable installation.

> **NOTE:** All bends, sweeps, couplers, bend radius/angles, bell ends, adapters, and connection points shall be inspected during construction and prior to burial, concrete encasement or back-filling operations by 96 CS representative to signify the acceptability of installation, placement, and spacing requirements. Follow Rural Utility Services Underground Plant Design, Underground Plant Construction, Construction of Buried Plant, and ANSI/TIA-758-B Customer-Owned Outside Plant for reference.

The following definitions apply:

2.3.22.1. **90-degree bend:** Any radius bends in a piece of pipe that changes the direction of the pipe by 90 degrees.

2.3.22.2. **Kick:** A bend in a piece of pipe, usually less than 45-degrees, made to change the direction of the pipe.

2.3.22.3. **Offset:** Two bends usually having the same degree of bend, made to avoid and obstruction blocking the run of the pipe.

2.3.22.4. **90-degree sweep:** A bend that exceeds the manufacturer's standard size 90-degree bend (e.g., 24-inches is standard for 4-inch conduit).

2.3.22.5. **Back-to-back 90-degree bend:** Any two 90-degree bends placed closer together than 10 feet in a conduit run. Utilize radius-manufactured bends to the maximum extent possible. Manufactured bends may be used on subsidiary/lateral conduits at the riser pole or building entrance. Manufactured bends shall have a minimum radius of 10-times the internal diameter of the conduit IAW Chapter 9 of the National Electrical Code and the ANSI/TIA-758 standard. Bends and sweeps shall be concrete encased to protect the duct from the pressures developed while pulling cables. Where a duct enters a building and sweeps up through a floor slab, galvanized RSC shall be used. For ducts transitioning from the lower duct window of a

maintenance hole to the nominal trench depth, the transition shall be accomplished in no less than 30-linear feet from the maintenance hole in order to reduce the radius of the bends. The duct shall be concrete encased in the transition area.

2.3.23. **Section Lengths:** Without prior U.S. Government AHJ approval, the section length of conduit shall not exceed 600-feet between pulling points in main conduit runs. The section length of duct is limited mainly by the size of the cable to be pulled into it and by the number of bends it shall contain.

2.3.24. **Minimum Duct Bank Sizing:** Duct bank sizing shall be a minimum of 4-inches for each design, build, construction and renovation application:

2.3.24.1. The minimum sizing for new duct banks is listed below. The total number of conduits required shall be determined, including existing conduits, conduits installed by this effort, and known future requirements, along with 50-percent of this total for spares.

2.3.24.2. Ducts between the cable vault and the first maintenance hole shall be based upon the size of the switch, the number of outside cable pairs served from the switch location, the FO requirements, and future growth.

2.3.24.3. A main duct run includes the maintenance holes and ducts from a DCO or node and provides the pathways for large feeder cables and/or core FOCs. New main duct runs shall consist of a minimum of 6-way, 4-inch duct banks.

2.3.24.4. A lateral duct run is defined as a minor branch run from the main duct run between maintenance holes. New lateral duct runs shall be a minimum of four-way, 4-inch duct banks.

2.3.24.5. Entrance ducts are defined as ducts from a maintenance hole or hand hole to an Edge-Building (EB). New EB entrance ducts shall be a minimum of two-way, 4-inch duct bank.

2.3.24.6. Entrance conduits in minor buildings, as listed in the design package, shall be a minimum of two-way, 4-inch ducts if the entrance cables are less than one-inch in diameter and if less than 40-percent of the duct area shall be used.

2.3.24.7. In accordance with the National Electrical Code, cables entering a building from the outside and not rated for inside plant use may not extend beyond 50-feet from the cable's point of entry into the building. The point of entry is defined as the point at which the cable penetrates the exterior wall or floor. The point of entry for metallic cables may be extended beyond the 50-foot limitation by using either rigid metal conduit (RMC) or IMC, both of which shall be grounded. Electrical metallic tubing shall not be used for extending the point of entry of metallic cables (transmission media, shields, or strength members). The point of entry for non-metallic cables may be extended using EMT or PVC. Refer to the National Electrical Code, Sections 770.50 and 800.50.

2.3.25. **Depth of Cover:** At least 36-inches of cover are required above the top of the duct bank. At least 24-inches of cover are required under roads or sidewalks (if duct is concrete-encased). For ducts installed in solid rock, the cover shall consist of at least 6-inches of concrete. If rock is encountered below grade, the minimum cover above the concrete-encased duct shall be 12-inches.

2.3.26. **Trench Width:** The installer shall engineer the trench width to the minimum width required to support the size of the duct bank being installed. When installing ducts, the trench width depends on the number of ducts, size of ducts, arrangement of ducts, and space around ducts (at least 2-inches). Additional width may be required to work in deep trenches or with large-count duct banks. Shoring of walls or sloping shall be performed as required by the OSHA and/or local requirements. The trench width for direct buried conduit shall be of sufficient width to permit tamping of dirt on the sides of the conduit formation. (See attachment H - Standard Installation Specification Drawings)

2.3.27. **Split Duct:** Pre-manufactured split ducts shall be of adequate material and approved by the AHJ. Installation shall be done IAW all manufacturer and industry standards.

2.3.28. **Existing Ducts:** Existing vacant ducts that are to be used in new cable installations, as defined in the design package, shall be cleaned and tested with a test mandrel to detect any obstructions, collapsed ducts, or duct inconsistencies. The installer may need to repair damaged ducts by installing new ducts with couplers, split ducts or cured in place pipe lining solutions

2.3.29. **Marking/Warning Tape:** The tape shall be a minimum of three inches wide and orange in color with the appropriate warning message and shall not be utilized as the sole tracing capability. Locating tape/wire shall be installed 18-inches above any communications cable or duct system. Copper wire installed in self-supporting duct shall be minimum 14-gauge and shall not be utilized as the sole tracing capability. Shall be installed IAW all applicable standards.

2.3.30. **Trace-Safe (or Equivalent):** Install 24-inches below finished grade directly over the duct banks and 12-inches below the "marking/warning tape". All new Trace-Safe (or equivalent) systems installed shall use an approved splice, termination end, connectors, etc.… where needed and an approved label installed at all wire ends. Each wire end shall be secured to the MHs walls within 6-inches of the top of the maintenance hole, accessible without having to enter the hole and not connected to grounds.

2.3.32. **Tracer Wire Installation:** Install ½-inch duct with a single 14 AWG minimum copper wire. Copper wire shall be continuous throughout the duct system and secured to the MHs walls within 6-inches of the top of the MHs, accessible without having to enter the hole and not connected to grounds. The tracer will be secured to the MHs wall and tagged with a label indicating it as a "Tracer Wire to xxx - Do Not Remove" (where xxx is the other end of the wire). Tracer Wire entering any facility shall be grounded IAW applicable standards. Any deviations from this section requires AHJ approval.

2.3.33. **Marker Poles:** Two route markers shall be installed at every maintenance hole. Additional markers are required along all communications pathways at a maximum of 500-feet, line- of-sight or less; whichever is shorter and/or at each change in route direction, on both sides of street crossings. Stenciled at the top section of each marker pole:

"*CONTACT EGLIN BASE COMMUNICATIONS PRIOR TO EXCAVATION AT 882.2581"*

2.3.34. **Duct and Conduit Mandrelling Requirements**

2.3.34.1. Mandrel inspections are a requirement under industry standards for quality control. Prime/Contractor of record shall provide reports on all mandrel tests accomplished for record to ensure compliance with industry standards noted herein.

2.3.34.2. New ducts in main and subsidiary duct runs shall be mandrelled before pulling anything into the duct system. If a design will require installing new cable in existing, empty duct, the OSP designer should consider requiring a mandrel test of the existing duct before installing the cable to verify that the duct is usable.

2.3.34.3. Prior to pouring concrete over the duct, the installer shall obtain the signature of the on-site 96 CS representative to signify the acceptability of the conduit mandrelling, placement and spacing.

2.3.34.4. Duct Cleaning: Duct shall be cleaned with an assembly that consists of a flexible mandrel (manufacturers standard product in lengths recommended for the specific size and type of duct) that is ¼-inch less than inside diameter of duct, 2 wire brushes, and a rag. The cleaning assembly shall be pulled through conduit a minimum of two times or until less than a volume of 8 cubic inches of debris is expelled from the duct. Do not install cables in ducts without an approved witness test and written approval of the 96 CS. (See attachment G - Applicable Publications)

Chapter 3

DELIVERABLES

The Contractor shall submit all applicable deliverables and test reports and as-built for review 15-duty days prior to final test and acceptance inspection to the 96 CS/SCXP, Projects and Requirements work center.

3.1. Fiber and Copper Verification Tests

3.1.1. **Factory Reel Test/Inspection:** The contractor/installer shall provide a copy of the reel tests/physical inspection reports of factory delivered cable(s) verifying good condition upon delivery.

> **NOTE:** 96 CS review/approval of reel tests/physical inspection reports of factory delivered cable(s) is not required.

3.1.2. **Pre-Installation Tests:** This testing phase is the sole responsibility of the contractor/installer and should be performed prior to the installation of any ISP/OSP cable(s) as to baseline fiber or copper quality before installation.

3.1.3. **Post-Installation Test:** The contractor/installer shall perform final configuration post-installation test and provide all tests results to 96 CS 15-days prior to final QA inspection of all installed ISP/OSP cabling.

> **NOTE:** Optical fibers or copper cable(s) found with damage or defective strands or pairs, shall be replaced (from end to end) and will not be accepted by 96 CS Authority Having Jurisdiction (AHJ).

3.1.4. **Copper Testing:** End-to-end testing for Unshielded Twisted Pair/Screened Twisted Pair (UTP/ScTP) copper shall be conducted for 100-percent of pairs and shall identify any discrepancies. All new UTP/ScTP copper installations shall be free from any and all cable faults or splicer's errors to allow for 100-percent cable usage. Cat-6 network ISP wiring will require a test report showing DB loss, head room, wire map, length, delay skew, and attenuation. The test results shall be documented, corrections implemented, and retesting conducted and documented as required. In addition, documentation shall be presented to show the length of the cable between the telecommunications room and the work area. Testing shall be per industry standards. Copper cabling shall be tested 100-percent (All Pairs) for DC loop resistance, shorts, opens, intermittent faults, and polarity between conductors, and between conductors and shield, if cable has overall shield. Test operation of shorting bars in connection blocks. Test cables after termination but prior to being cross connected (See attachment G - Applicable Publications)

> **NOTE:** Test report results shall reflect the wiring scheme that was selected during design/installation (i.e. 568A or 568B). Fiber and Copper test equipment **must be** calibrated within one year of installation use or test requirements. Test results shall be test equipment exported products from calibrated device only. No handwritten or typed out results will be accepted. All test cables shall be factory made.

3.1.6. **Fiber Testing:** All testing shall be accomplished IAW all applicable industry standards. Attenuation testing for optical fiber shall be performed and documented 1) from manufacturer, 2) upon delivery acceptance/prior to installation, 3) after cable placement/post installation and 4) after all splicing/end terminations have been completed. Any errors or above allowable loss readings will be repaired to bring the faulted fibers to within acceptable parameters. No additional splicing will be allowed in lieu of fiber end-to-end replacement due to manufacturer or installation damage. All strands are to be usable and free of errors providing 100-percent cable usage. Test Results: Certification of the cable(s) being tested is required to ensure it meets/exceeds requirements.

3.1.6.1. Perform 100-percent verification acceptance test for single-mode and multi-mode optical fibers, (all strands) end-to-end attenuation tests IAW OFSTP-14, OFSTP-7, TIA-568-C.3 and TIA-526-7.

3.1.6.2. Installer shall use Tier One Testing using an Optical Power Meter and Light Source for all Inside Plant (ISP) single-mode and multi-mode optical fibers. in a bi-directional manner. Fiber test equipment must be calibrated within one year of installation.

3.1.6.3. Installer shall use Tier Two Testing using an Optical Time Domain Reflectometer (OTDR) and Optical Power Meter and Light Source for all Outside Plant (OSP) single-mode and multi-mode optical fiber in a bi-directional manner. Fiber test equipment must be calibrated within one year of installation. All launch and test cables shall be factory made with lengths for OTDR 150-meters (SM/MM) and light source/power meter 7-feet (SM/MM).

NOTE: Optical fibers or copper cable(s) found with damage or defective strands, or pairs will not be accepted by 96 CS Authority Having Jurisdiction (AHJ) and shall be replaced (from end to end).

3.2. **As-Built Documentation:** The installer shall provide accurate As-Built documentation of the entire OSP and ISP install system to include schedule T-5 documentation (i.e., rack elevations, cable route drawings "T-Sheets"). The Telecommunications Contractor(s) of Record shall maintain "red-lined" drawings at the job site under direct control of the Site POC. The red lines shall represent changes made.

As a minimum, the following information will be on each drawing for OSP/ISP requirements:

3.2.1. Accurate, reasonable facsimile of the OSP/ISP cable pathways and maintenance hole duct/cable tray system as installed
3.2.2. Accurate, reasonable facsimile of the building floor plan
3.2.3. Room and area numbers assigned for identification purposes
3.2.4. Location and designation of all CERs
3.2.5. Telecommunication Room Layout diagram for all CERs
3.2.6. Location and designation of all work area outlets installed
3.2.7. Rack elevations
3.2.8. Location of all vertical/horizontal penetrations
3.2.9. Routes for all cables, including horizontal, tie, and backbone
3.2.10. Location of vertical/horizontal penetrations through firewalls/floors
3.2.11. Geospatial data of new outside plant distribution system with accuracy of the GNSS points no more than 6-12-inches after differential correction/post-processing
3.2.12. Drawing Reference Details (ANSI/TIA 606)

T-1 - Layout of complete building per floor showing: Building area/serving zone boundaries, backbone systems, and horizontal pathways.
T-2 - Serving zone/building area: Drop locations and cable identification.
T-4 - Typical Details: Faceplate labeling, fire stopping, symbols, installation procedures, detail racking and raceways data.
T-5 Schedule: Documentation on cables showing cut overs and cable management, patch panel layouts, faceplate assignments, cross-connects information, and terminal layout as a minimum.

3.3. **Shape Files:** The installer shall provide Global Navigation Satellite System (GNSS) collected OSP infrastructure features and communications pathways attribute, metadata, and location information shall be converted to, stored, and submitted in an Environmental Systems Research Institute (ESRI) Shape File format. The shape files must be compatible with the Cyberspace Infrastructure Planning System (CIPS) Visualization Component (CVC) web-based application. The shape files shall have a geospatial reference (.prj, .dbf, .shp, .shx and .cor) files included that specifies the parameters of the coordinate system. (See Attachment A for more information)

NOTE: Installer(s) shall coordinate with the 96 CS/SCXP office through a Request for Information (RFI) to ensure they have the latest data dictionary before accomplishing any project GIS actions. The accuracy of the GNSS points shall be no more than 6-12-inches after differential correction/post-processing.:

Coordinate system: UTM
Zone: 16 North
Datum: NAD 1983(conus)
Coordinate units: Meters
Altitude units: Meters
Altitude Reference: HAE

3.4. **Test and Acceptance Documentation (AFTO 747):** The Contractor shall submit all test reports and as-built deliverables for review 15-duty days prior to final test and acceptance inspection. The test reports shall show the tests performed to verify compliance with the specified performance criteria. Test reports shall include record of the physical parameters verified during testing. As-builts shall show all communications pathways, cabling with correct labeling as installed. The contractor shall correct any errors or performance deficiencies detected by testing. The assigned 96 CS/SCXP Project Manager will sign an AFTO Form 747 in Block 11A upon government QA acceptance of contractor's final test results. The 96 CS reserves the right to refuse final acceptance until all discrepancies have been resolved to the satisfaction of the Authority Having Jurisdiction.

3.5. **Projects, Designs, USACE, SABER Requirement Support Timelines:**

3.5.1. **Task Timelines:** Once accepted by SCX and SCO production work center(s).
3.5.1.1. Survey Inputs: 96 CS 5 full duty days (internal use only SCX 1/SCO 4)
3.5.1.2. Project/Design Reviews: 96 CS 12 full duty days (internal use only SCX 2 /SCO 10)
3.5.1.3. Comm path segment verifications: 96 CS 13 full duty days (internal use only SCX 1 / SCO 12)
3.5.1.4. Product submittals: 96 CS 6 full duty days (internal use only SCX 1/SCO 5)
3.5.1.5. Official Request for Interpretation (RFI): 96 CS 5 full duty days (internal use only SCX 1/SCO 4)
3.5.1.6. Request for Escort: 96 CS 5 full duty days (internal use only SCX 1/SCO 4)

3.5.1.7. Deliverables documentation reviews (Shape files, As-built, final test results, reviews: 96 CS 17 full duty days prior to final inspection (internal use only SCX 2/SCO 15)
3.5.1.8. Fiber and copper in-progress test result: 96 CS 9 full duty days (internal use only SCX 1 / SCO 8)
3.5.1.9. Request for in-progress checks or final inspections: 96 CS 6 full duty days (internal use only SCX 1/SCO 5)
3.5.1.10 Rough Order Magnitude (ROM): 96 CS 23 full duty days (internal use only SCX 3/SCO 20)

NOTE: It is imperative on each requirement the 96 CEG, USACE, etc. project manager(s) notifies the required 96 CS discipline in a timely manner.

Chapter 4

PARTS AND MATERIALS REGISTER

The salient physical, functional, and performance characteristics of the following telecommunication parts and materials specified shall be adhered to for all installations or like items. Replacement parts shall be standard and readily available through commercial means. Discontinued products will not be accepted unless approved by the Contracting Officer and 96 CS Authority Having Jurisdiction:

NOTE: The term approved is defined in this document as acceptable to the authority having jurisdiction.

4.1. **Data Jack:** Category 6, RJ45, 8-position, 8-wire UTP Mini-Com® universal jack module has TG-style termination. Off white (or equivalent).

4.2. **Blank Inserts:** Mini-Com® 1-port blank module, reserves space for future use, White (or equivalent).

4.3. **Surface Mount Raceway System:** Tamper resistant two-piece latching surface raceway. Supplied with pre-punched mounting holes and factory applied adhesive tape. Available in 6', 8', and 10' lengths, Off White. Compatible with surface mount outlet box. All surface mounted raceway systems shall be screwed to the wall in addition to the adhesive tape to prevent detachment from the mounted surface.

4.4. **Riser CAT-6:** CAT-6 (600MHz), 4-Pair, U/UTP-Unshielded, Riser-CMR, Premise Horizontal Cable, 23 AWG Solid Bare Copper Conductors, Polyolefin Insulation, X Spline, Ripcord, PVC Jacket.

4.5. **Plenum CAT-6:** Copper Cable, Giga SPEED XL 2071E, 23 AWG, 4 Pair, Unshielded, UTP, Solid Bare Copper Conductor, FEP/PVC, CMP, (WHITE) jacket. Plenum CAT-6: Copper Cable, Giga SPEED XL 2071, 23 AWG, 4 Pair, Shielded, ScTP, Solid Bare Copper Conductor, FEP/PVC, CMP, (RED).

4.6. **Intra-Building Distribution Cables:** Used after 15m (50ft) of “exposed” outside plant copper cable enters building. “Fold back” splicing method preferred.

4.7. **25-pair – 3600-pair:** CMR rated. Pair count varies. Use applicable count determined by the pair count from the outside plant cable.

4.8. **Splice Enclosure:** An intra-building splice closure is a strong, lightweight, fire-retardant covering that protects non-pressurized splices. The closure shields the splice against humidity and moisture and may even resist temporary immersion in water. When you install the closure, properly support it, ground it and test it for air leaks according to manufacturer's recommendations. Affix labels to all cables entering the splice, indicating cable number and pair counts. Clearly designate the "In" and "Out" for the spliced cables.

4.9. **Building Station Terminal Blocks (110-Type):** Terminates intra-building cables and horizontal cables. Must clearly label intra-building cable using stencils above 110 type (IDC) block with applicable information during pre-installation survey.

4.10. **Building Entrance Terminal Blocks (110-Type):** 16 AWG steel building entrance terminals feature an industry standard 110 - style connector for both the input and output terminals. Also included are multiple external and internal ground lugs. UL approved standard on all terminals and standard 5-pin protection modules.

4.11. **Cat-6 Connector Block 24/48 Port (Patch Panel):** Constructed for maximum strength and durability. Rack-mount modular panels shall include an integrated cable management requirement for cable routing and strain relieve cables at patch panel and other termination points. Provide a complete modular system from patch panel to work area outlet.

4.12. **Strain Relief Requirements:** All Strain relief bars shall consist of a metal bar that mounts to the rear of a standard EIA 19-inch rack to support a minimum of 24 cables exiting from the back of a patch panel with a 2-inch to 5-inch inward mounted offset. Cables shall be secured with integrated adjustable clips, hook and loop strips or cable ties. Optional quick release brackets shall provide an easy way to remove the strain relief bar without the use of tools.

NOTE: Vinyl tape will not be accepted

4.13. **Fiber Optic Cabling for Inside Structure Installation:** Inside plant single-mode fiber will have a (YELLOW) Polyvinyl Difluoride jacket and multi-mode will have a (ORANGE) Polyvinyl Difluoride jacket for quick identification unless otherwise noted for specified network. Cable medium and strand count shall be determined by 96 CS Authority Having Jurisdiction and customer requirement(s).

4.14. **Fiber Optic Connectors:** All new installations requiring the installation of a fiber optic distribution panel will use the connector style below:

4.15. **Fiber Optic Connector — LC, SM:** Splice Cassette, 24 fiber strands, LC, UPC, Duplex, Single-Mode (OS2), Single-Fiber (250 µm).

4.16. **Fiber Optic Connector — LC, MM:** Splice Cassette, 24 fiber strands, LC, PC, Duplex, 62.5 µm (OM1), 50 µm (OM 3 and 4).

4.17. **Fiber Optic Patch Panel:** All fiber optic housing units shall be compatible to support fiber splice cassettes mentioned in 4.8.

4.18. **Fiber Optic Core Cables:** Non-Armored MicroCore® Fiber (or equivalent) is to be used for new installations. Due to damages caused by lightning, all fiber optic cables will contain zero conductive materials.

4.19. **MicroCore® Fiber Single-Mode Cable (or equivalent):** Minimum strand count to be installed unless otherwise approved by 96 CS.

4.20. **Maintenance-Holes:** Shall be equipped with all accessories to provide a complete system as or like Oldcastle Precast concreted MH design and meet applicable ASTM standards specification.

4.20.1. Main distribution MH system interior size is 12-feet (length) x 6-feet (width) x 7-feet (height) and shall have a load rating of HS-20 for heavy vehicular traffic.

4.20.2. Sub-distribution MH systems depending on location and project design are pre-cast reinforced concrete interior size 3-feet (width) x 5-feet (length) x 4-feet (height) and shall have a load rating of HS-20 for heavy vehicular traffic.

4.21. **Underground Plant Conduit HDPE:** UL Listed HDPE is a flexible, non-metallic raceway used to protect underground cables. It has superior crush resistance, low coefficient of friction, and high tensile strength. Size, length and type will be determined during design. Smooth wall, approved/listed for directional boring, minimum Schedule 80 HDPE SLR 11.5, ASTM F2160, NEMA TC 7.

4.22. **Underground Plant Conduit Schedule 40/80:** Non-metallic conduits shall be encased in concrete of minimum 3,000 lb/in2 (20,700kPa) compressive strength where vehicular traffic (i.e. automotive, railway) is above the pathway or where a bend or sweep is placed.

Chapter 5

EMERGENCY REPAIR PROCEDURES

5.1**. ISP/OSP Telecommunication Infrastructure Copper/Fiber Repair Guidelines:** Contractor shall notify Eglin's 96 CS Communications Focal Point (CFP) at 850-882-2666 or immediately upon discovery of any damaged Eglin communications cyber infrastructure. Extent of repairs required will be assessed and determined by 96 CS/CC or designated Authority Having Jurisdiction (AHJ).

> **NOTE**: All temporary and/or permanent repairs shall be made at no additional cost to the government. Repairs shall be IAW all applicable industry and local standards.

5.2. **Temporary Repair Actions:** Temporary repairs shall be initiated within 12-hours of reported/identified damage and must restore all circuits (pairs, strands, etc...) to full mission capability within 24-hours unless otherwise approved by AHJ. Contractor shall provide 24 hour/7 day a week on-call maintenance service for temporary repairs until all permanent repairs have been completed and accepted by the AHJ.

5.3. **Permanent Repair Actions:** All fiber optic and copper communications cyber infrastructure shall be restored to its original state or better prior to damage for all permanent repairs. All damaged communications cyber infrastructure shall be replaced, at a minimum, to the closest, pre-existing, splice/terminal locations regardless of distance and/or cost incurred. New or additional splices shall not be allowed for permanent repairs without written approval from the designated AHJ.

5.3.1. Contractors shall provide a Statement of Work (SOW), test plan and product submittals for all proposed permanent repair solutions within 5 business days from date of reported damage to 96 CS/CFP and AHJ for written approval prior to beginning any permanent repairs.

Chapter 6

TELECOMMUNICATIONS CONTRACTOR(S) QUALIFICATIONS

6.1. Telecommunications Contractor(s) Qualifications Requirements

6.1.1. Work under communications requirements shall be performed by and the equipment shall be provided by the approved telecommunications contractor and key personnel. Qualifications shall be provided for: The Telecommunications System Contractor, the telecommunications system installer, and the supervisor (if different from the installer). A minimum of 30 days prior to installation, submit documentation of the experience of the Telecommunications Contractor and of the key personnel.

6.1.2. Telecommunications Contractor shall be a firm which is regularly and professionally engaged in the business of the applications, installation, and testing of the specified telecommunications fiber optic and copper OSP/ISP systems and equipment. The Telecommunications Contractor shall demonstrate experience in providing successful telecommunications systems within the past 3 years of similar scope and size. Submit documentation for a minimum of three and a maximum of five successful telecommunication system installations for the Telecommunications Contractor.

6.1.3. Provide key personnel who are regularly and professionally engaged in the business of the application, installation and testing of the specified telecommunications fiber optic and copper OSP/ISP systems and equipment. There may be one key person or more key persons proposed for this solicitation depending upon how many of the key roles each has successfully provided. Each of the key personnel shall demonstrate experience in providing successful telecommunications systems within the past 3 years.

6.1.4. Supervisors and installers assigned to the installation of this system or any of its components shall be Building Industry Consulting Services International (BICSI) Registered Cabling Installers, Technician Level. Submit documentation of current BICSI certification for each of the key personnel. In lieu of BICSI certification, supervisors and installers assigned to the installation of this system or any of its components shall have a minimum of 3-years experience in the installation of the specified copper and fiber optic cable and components. They shall have factory or factory approved certification from each equipment manufacturer indicating that they are qualified to install and test the provided products. Submit documentation for a minimum of three and a maximum of five successful telecommunication system installations for each of the key personnel. Documentation for each key person shall include at least two successful system installations provided that are equivalent in system size and in construction complexity to the telecommunications system proposed for this solicitation. Include specific experience in installing and testing telecommunications systems and provide the names and locations of at least two project installations successfully completed using optical fiber and copper telecommunications

6.1.5. Indicate that all key persons are currently employed by the Telecommunications Contractor or have a commitment to the Telecommunications Contractor to work on this Project. All key persons shall be employed by the Telecommunications Contractor at the date of issuance of this solicitation, or if not, have a commitment to the Telecommunications Contractor to work on this Project by the date that the bid was due to the Contracting Officer.

NOTE: Only the key personnel approved by the Contracting Officer in the successful proposal shall do work on this solicitation's telecommunications system. Key personnel shall function in the same roles in this Contract, as they functioned in the offered successful experience. Any substitutions for the Telecommunications Contractor's key personnel requires approval from the Contracting Officer.

NOTE: The term approved is defined in this document and other standards as acceptable to the authority having jurisdiction.

Chapter 7

CRITICAL EDGE BUILDING

7.1. **Classification and Criteria**

7.1.1. Specific criteria shall be met in order for a facility to be classified as a critical edge building (CEB) on Eglin AFB. Discussions to classify a facility as a CEB will take place during the design kickoff, charrette, or SATAF meetings. If the organization wishes to seek the CEB classification, customer shall complete the Critical Edge Building Classification and Criteria template coordinated by 96 CS/SCOI. Responses to the specified criteria will dictate an approved/disapproved CEB classification. In accordance with current Air Force Base Area Network Specifications (AFBAN) policy, a facility shall be classified as a CEB prior to implementing redundant links to two different Information Transfer Buildings (ITBs) or Core Nodes. If the mission set changes throughout the lifecycle of the facility, customers shall reassess their responses to the criteria to ensure the justification for being a CEB is still warranted. Additionally, if a facility meets compliance to be classified as a CEB, the alternate fiber path shall be physically diverse. If all means necessary have been exhausted to ensure physically diverse fiber paths have been implemented, but physical diversity is still unachievable, logically diverse cable paths are an exception, but are not guaranteed. Physically diverse fiber paths shall be classified as the following: Fiber Point of Entry to the facility for alternate route should be different from primary point of entry, but same point of entry is also authorized up to 50-feet maximum. Then both FOCA's are required to be in separate ducts using different communication pathways in different geographical directions. See current AFBAN for additional pathway information.

7.1.2. Once approval for the classification and criteria document has been completed, the 96 CS network engineers will conduct extensive network assessments to determine the most viable core node infrastructure capable of supporting the customer’s new CEB requirement. Following network assessment completion for each core node where logical path and ITB has been determined, the physical path and duct assessment will be conducted by the 96 CS Cyber Infrastructure personnel.

Chapter 8

COMMUNICATIONS EQUIPMENT LOCATION (CEL)

8.1. Eglin AFB CEL Requirements

8.1.1. CEL's must be locked and secured IAW DoD 5200.08-R, paragraph C6.2.4.

8.1.2. CEL's must be clean and in good order IAW AFMAN 91-203, paragraph 30.1.

8.1.3. CEL's cannot be used as a storage room and must only contain 96 CS information technology equipment IAW UFC 3-580-01, paragraph 2-4.2.1.

8.2. 96 CS managed CEL's house installation network equipment and shall be protected IAW Defense Information Systems Agency (DISA) Traditional Security Guidance.

8.3. Access to CEL's or cohabiting space within a CEL shall only be provided as a last resort.

8.3.1. Cohabiting space within a CEL should only be requested if there is absolutely no other suitable space within the facility to house non-core networking equipment. Valid justification is required and must be accompanied by documentation preventing units from installing non-core equipment elsewhere within the facility.

8.3.2. If a CEL shall be deemed a cohabiting space, specific criteria must be met to retrofit an existing CEL:

- If existing keying mechanism is standard Z5 key lock, then entire door handle and lock mechanism shall be replaced to support cipher lock and Z5 lock keying mechanisms. Cohabiting unit shall use cipher lock for entry and 96 CS will use standard Z5 lock keying mechanism.
- A survey shall be conducted by 796 CES in coordination with 96 CS to assess electrical loads and heating/ventilation air conditioning (HVAC) requirements for proposed unit equipment.
- The requesting unit shall submit a request to 796 CES when current or existing electrical loads and or HVAC loads will be exceeded or limitations to existing provisions will not support user's requirement.
- The requesting unit shall fund for any expansions to electrical, HVAC, door handle retrofits, etc. to satisfy unit's requirement.

8.4. Units requesting space for equipment installation in a CEL shall adhere to all DoD policies and regulations, to include but not limited to:

Air Force Base Area Network Functional Specifications (AFBAN)
DISA Security Technical Implementation Guides (STIGs)
Unified Facilities Criteria (UFC) 3-580-01, Telecommunications Interior Infrastructure Planning and Design
DoD 5200.08.R, Physical Security Program
AFMAN 91-203, Air Force Occupational Safety, Fire, and Health Standards

T.O. 00-33A-1001, General Cyberspace Support Activities Management Procedures and Practice Requirements
AFI 33-200, Air Force Cybersecurity Program Management

8.5. All 96 CS core network equipment shall reside in its own separate lockable enclosure. All non-core network equipment shall reside in a separate enclosure from 96 CS network equipment.

8.5.1. Core network equipment includes: all NIPRNet, SIPRNet, VoIP, and SONET-Transport equipment managed by the 96 CS.

8.5.2. A lockable enclosure is defined as either a lockable equipment rack or lockable wall mount cabinet that is controlled and accessed by 96 CS authorized personnel only. 96 CS lockable enclosures are outlined in Attachment D.

8.6. All network connections must be secured within a locked communications closet or secured within a CEL if room is accessed by non-network personnel.

8.7. Outside Plant cabling infrastructure shall only reside in designated 96 CS lockable enclosures.

8.8. 96 CS managed patch panels and premise wiring shall not be cross utilized with other unit services.

8.9. The final approver for 96 CS CEL usage or cohabiting space within a CEL is the 96 CS/CC.

8.9.1. CEL access requests shall use the 96 CS Communications Focal Point (CFP) Remedy process.

8.9.2. 96 CS personnel shall change the cipher lock code when personnel on the access roster change or when CEL access privileges have been revoked.

8.10. 96 CS shall provide a tech solution in collaboration with 796 CES for all CEL usage requests. CEL usage is not guaranteed and is subject to 96 CS/CC approval.

8.11. CEL building manager shall submit names of personnel requiring CEL access to their unit's security manager for vetting. Unescorted access shall only be granted to personnel with a minimally favorable adjudicated National Agency Check (NAC), appropriate security clearance, and a need-to-know IAW the DISA Traditional Security STIG. Vetted access lists names shall be approved and signed by the submitting unit's commander or appointed representative.

8.11.1. Approved access list personnel shall be provided cipher lock codes for CEL access, but codes may not be shared with other unit members.

8.11.2. When unit member access for cohabiting space is no longer required or personnel no longer require access to the shared space, units shall remove names from the access list and submit updates to the 96 CS.

8.11.3. Units shall audit their access lists every six months IAW the DISA Traditional Security STIG. The unit security managers, facility managers, and work center SMEs shall revalidate each unit's access list.

8.11.4. CEL Inspection

8.11.4.1. 96 CS Policy and Evaluation (96 CS/SCQ) are the lead inspectors for 96 CS managed CELs.

8.11.4.2. Inspection results shall be sent to the associated units for further actions.

8.11.4.3. Any unit in breach of the CEL guidance shall be considered for removal from the 96 CS CEL

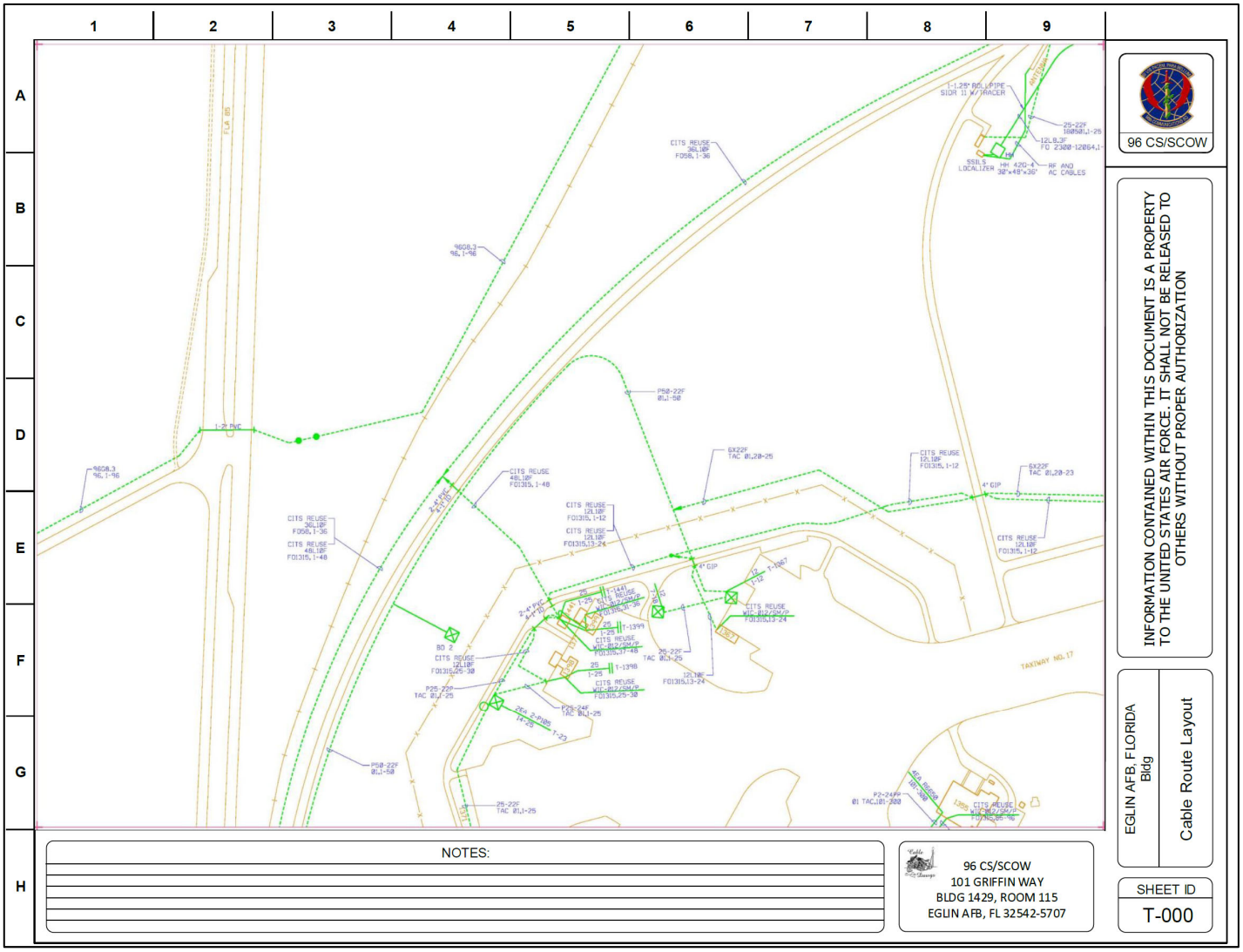
8.12. Any new building projects or facility renovations shall adhere to this guidance and be incorporated into the standard architecture.

Attachment A

DRAWING SPECIFICATIONS

A.1. Cable Route: The outside plant communications cable shall be depicted as installed, showing street/road locations and names, building 'footprints' accurately oriented as actually located. Maintenance Holes shall be depicted accurately oriented as located in reference to buildings and streets/roads. Extraneous information of other utility disciplines shall NOT be accepted on the as-built drawings. The information on the as-built drawings shall pertain to COMM specific.

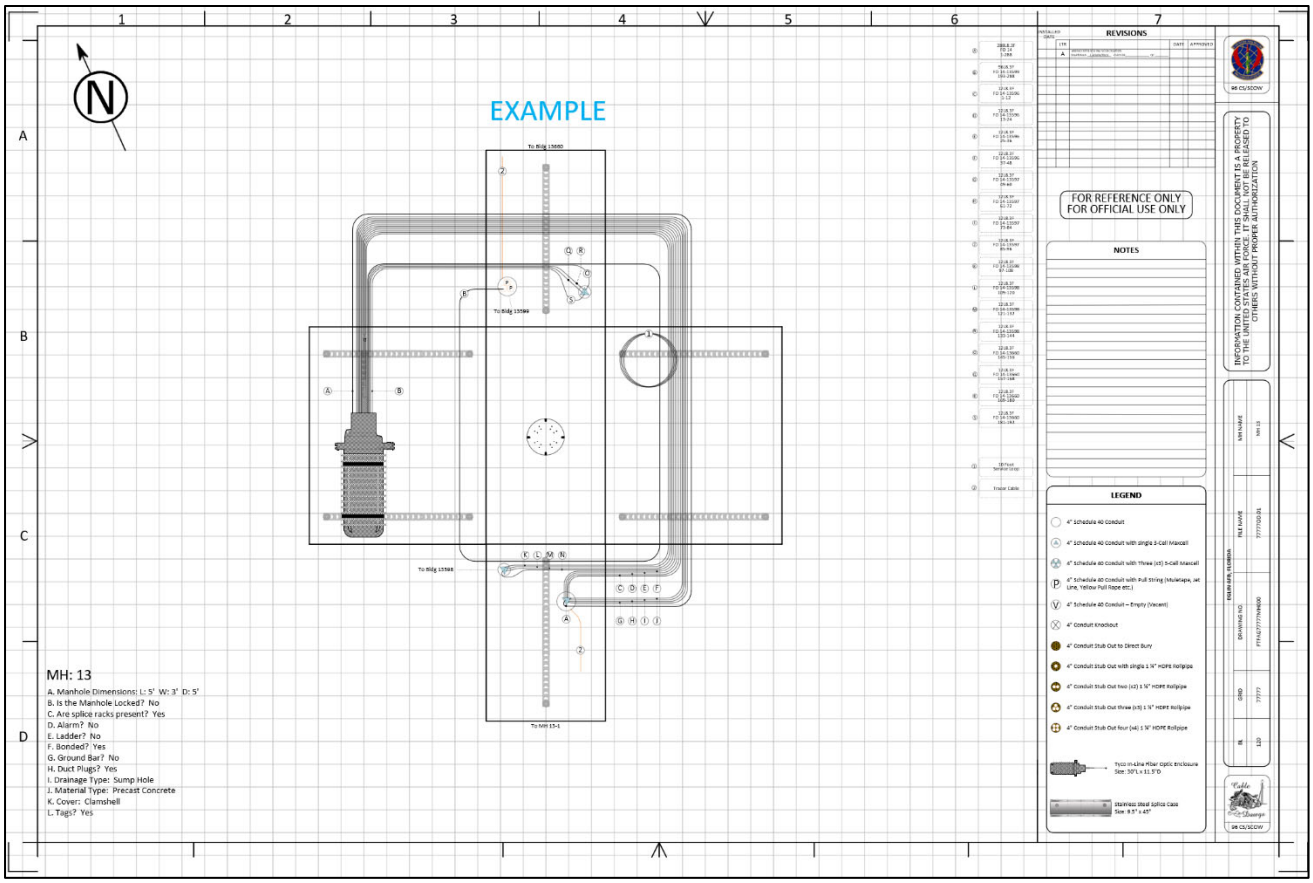
A.2.



Sample Cable Route Drawing

A.3. Butterfly: Drawing of the interior of individual Maintenance Holes that were installed, passed through, or modified in any way. Reference drawing below.

A.4. The Installer shall augment the GNSS survey by using conventional land surveying equipment and electronic cable locating (underground utility toning) equipment to meet requirements. The Installer shall ensure collected/provided data is compatible with the CVC. The accuracy of the GNSS points shall be no more than 6-12-inches after differential correction/post-processing.



Example: Maintenance Hole Butterfly with GIS Metadata

A.5. Geographic Information Systems (GIS) data: Provide technical/field services necessary to locate and perform Geographic Information System (GIS) data collection of Outside Plant (OSP) cable infrastructure and communications pathways for government entry into the Cyberspace Infrastructure Planning System (CIPS) Visualization Component (CVC). Additionally, the Contractor shall enter into all communication "containers" to include communication Maintenance Vaults, Maintenance-Holes (MH), and Pedestals in order to record/document detailed container information by means of field drawings. Outside plant features/containers include vaults, maintenance-holes, pedestals, underground cables, direct buried splices, terminals, etc. The communications pathways include duct routes, aerial and direct-buried cable, trench routes, communication pathway entry points on building exterior walls that lead to interior building entry terminals, etc. The Installer shall augment the GPS survey by using conventional land surveying equipment and electronic cable locating (underground utility toning) equipment to meet requirements. The Installer shall ensure collected/provided data is compatible with the CVC. The accuracy of the GPS points shall be no more than 6-12-inches after differential correction/post-processing.

NOTE: Contractor/Installer(s) shall coordinate with the AHJ through a Request for Information (RFI) to ensure they have the latest data dictionary before accomplishing any project GIS actions.

Shapefile filename extensions:
.prj. = projection description, using a well-known text representation of coordinate reference systems
.dbf = attribute format; columnar attributes for each shape, in dBase IV format
.shp = shape format; the feature geometry itself
.shx = shape index format; a positional index of the feature geometry to allow seeking forwards and backwards quickly
.cor = COR files generated by GPS Pathfinder Office after post processing the positions captured by GPS devices

A.6. GPS_MAINTENANCE HOLE

A.6.1. Definition: An enclosed structure MHs. A butterfly layout is used that shows the floor and walls flattened out so that duct openings can be drawn on the walls. This must be represented as one polygon (one row in the table). The point is used to show the center of the MHs cover.

A.6.2. Geometry type: Site (Point).

A.6.3. Attributes:

Column Name	SDSFIE Common Name	Description	Data Type	Use	Domain Table
MH_NAME	Identifier Name	The standard identifier name (e.g., MH-19)	Char (60)	Required	
MATERIAL		Used to describe the material composition of the maintenance hole	Menu	Required	PreCast Concrete Fiberglass Quazite Unknown Other
SIZE	Dimension of the structure	The width, length, and height (or depth) of the structure measured from the inside	Char (30)	Required	

Column Name	SDSFIE Common Name	Description	Data Type	Use	Domain Table
LID		Shape of the structure lid	Menu	Required	Round Clamshell Rectangle Other
DRAINAGE_TYPE			Menu	Required	Sump Hole Seepage Pit Other None
SPLICE_RACK		Support braces on the side of the structure	Menu	Required	Yes No
LOCK_PRESENT		Is the structure able to be locked	Menu	Required	Yes No
SPLICE_PRESENT		Type of splice case is in the structure	Menu	Required	Copper Fiber Optics Both None
BONDED			Menu		Yes No
GROUND BAR			Menu		Yes No
ARE DUCTS PLUGGED			Menu		All Some None

A.7. COMM_PATH_SEGMENT

A.7.1. Definition: Link that represents an enclosure path of comm, items outside of a building, maintenance hole, General Container, or other enclosed structure. For duct banks, comm-path segment can represent the virtual path, duct bank, duct, and innerducts. For ducts, comm-path segment can represent the virtual path, duct, and innerducts. For direct-buried cables at road-crossings, comm- path segment can represent the virtual path, road-crossing duct, and direct-buried cables. It can also represent the path of aerial cable, cable-bridges, and cable-troughs.

A.7.2. Geometry type: Polyline

A.7.3. Attributes:

Column Name	SDSFIE Common Name	Description	Data Type	Use	Domain Table
FROM		Origination	Char (60)	Required	
TO		Destination	Char (60)	Required	
CABLE_ID		A field that describes the originating and end structure this segment is representing	Char (60)	Required	
INSTALL_TYPE		Type of path	Menu	Required	Duct Duct Bank Direct Buried
NUMBER_OF_DUCTS		Condition, Install Type = Duct Bank	Numeric Min=1 Max=20 Default=1		
DUCT_SIZE		Dimension of the duct measured in inches	Numeric Min=1 Max=12 Default=4	Required	
MATERIAL		Composition of the Duct		Required	Schedule 40 PVC Schedule 80 PVC HDPE
DEPTH		The minimum depth of this part of the path from grade, in inches	Numeric	Required	
COMMENTS					

A.8. PEDESTAL

A.8.1. Definition: An above ground container used as a splice point, testing point, ortermination.

A.8.2. Geometry type: Site (Point).

A.8.3. Attributes:

Column Name	Description	Data Type	Use	Domain Table
TERMINAL_ID	A unique container identifier	Char (60)	Required	
SIZE	Dimensions of the container	Menu	Required	BD1 = 2”x2” BD2 = 4”x4” BD3 = 6”x6” BD4 = 8”x8” BD5 = 10”x10” BD7 = Cabinet – 23”x12” BD8 = Cabinet – 32”x18”
GROUNDED/BONDED		Menu	Required	Yes No
BONDING_SECURED		Menu	Required	Yes No Some
TERMINAL		Menu	Required	Yes No
MATERIAL		Menu	Required	Metal Fiberglass
CABLE TAGS PRESENT		Menu	Required	Yes No Some
COMMENTS		Char (230)		

A.9. MARKER POLE

A.9.1. Definition: An above ground marker used to identify MH or Cable Route.

A.9.2. Geometry type: Site (Point).

A.9.3. Attributes:

Column Name	Description	Data Type	Use	Domain Table
LOCATION		Char (60)	Required	
TYPE	What the marker is used for	Menu	Required	MH/HH Marker Cable Route

A.10. MARKER BALL

A.10.1. Definition: A below ground marker used to identify entrances, road crossings, routes, stub out locations.

A.10.2. Geometry type: Site (Point).

A.10.3. Attributes:

Column Name	Description	Data Type	Use	Domain Table
TYPE	What the marker is used for	Char (60)	Required	Ball Disk
MARKER PURPOSE		Menu	Required	Splice Bldg Entrance Road Crossing Cable/Duct Route MH Stub out
MANUFACTURER		Char (60)	Required	

A.11. SPLICE

A.11.1. Definition: A below ground splice used to connect cables or tracing wire.

A.11.2. Geometry type: Site (Point).

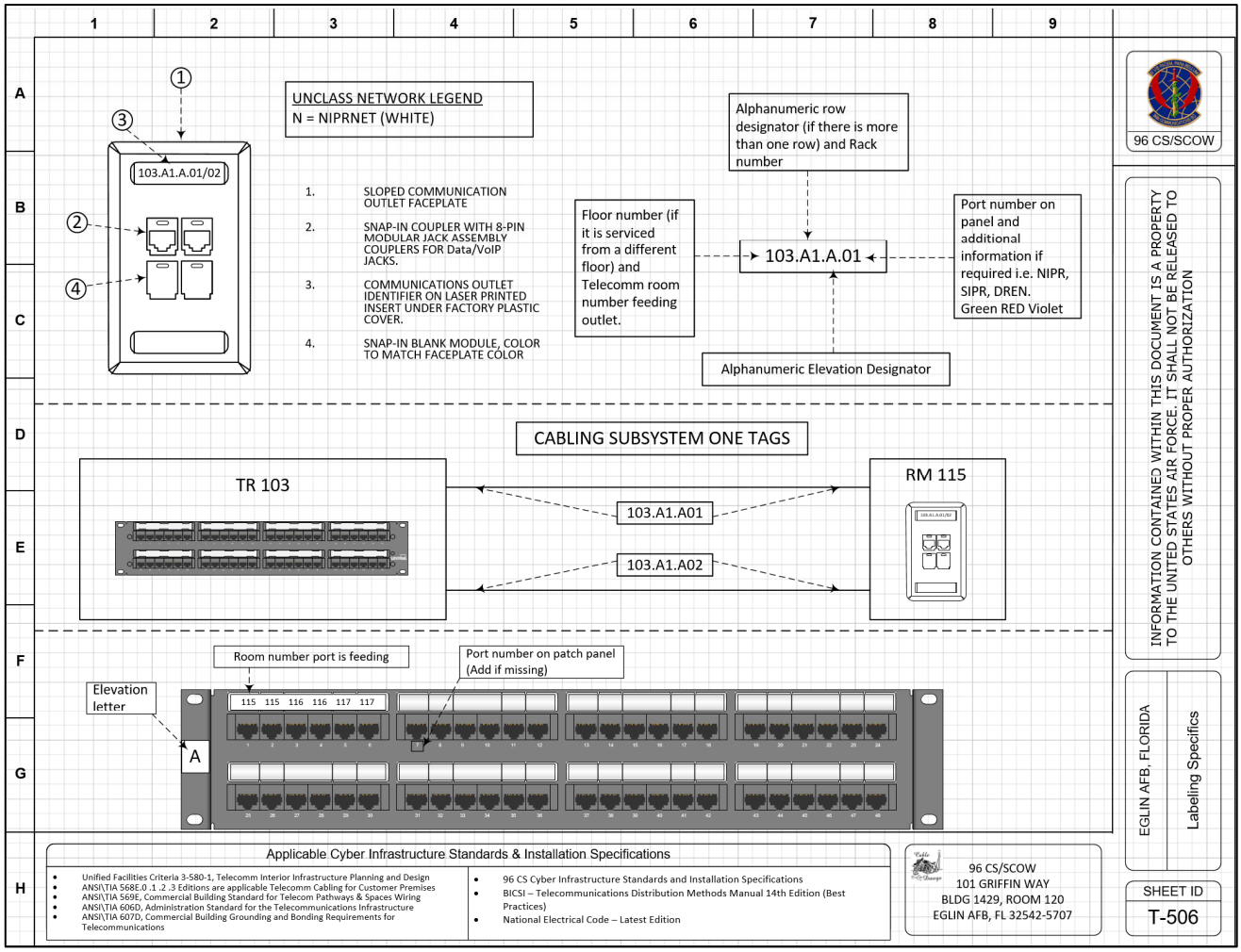
A.11.3. Attributes:

Column Name	Description	Data Type	Use	Domain Table
LOCACTION	Where the splice is	Char (200)	Required	
TYPE	What type of splice	Menu	Required	Auto-Wire Trace Safe Copper Fiber Optic

Attachment B

LABELING SPECIFICATIONS

B.1. LABELING SPECIFICATIONS



Attachment C

FIBER DESIGN REQUIREMENTS

C.1. FIBER DESIGN NOTES

Eglin AFB Core Fiber Optic Baseline

References: (a) AF Base Area Network Functional Specification (AFBAN), dated February 2021

C.1.1. Per the AF Base Area Network Functional Specification (AFBAN), dated February 2021, section 4.1.3.

- New ITB construction shall contain a minimum of 72 single-mode (OS1 and OS2) fiber strand cables, one each Home Run to separate existing (or new) ITBs. Higher strand counts may be used based on known and future requirements.
- Existing ITB-to-ITB cable with less than 18 available strands is a candidate for additional fiber cables between the ITBs.
- Additional fiber cables installed between existing ITBs shall contain a minimum of 48 single-mode (OS1 and OS2) fiber strands. Higher strand counts may be used based on known and future requirements.
- New EB construction shall contain a minimum of 12 single-mode fiber strands dedicated between that EB and its ITB. Higher strand counts may be used based on known and future requirements.
- Existing EB-to-ITB cables with 4 or less available strands is a candidate for additional fiber between the EB and the ITB.
- Additional fiber cables installed between existing EBs and ITBs shall contain a minimum of 12 single-mode (OS1 or OS2) fiber strands. Higher strand counts may be used based on known and future requirements.
- With any cable installation, 10% of the total fiber strands (rounded to the nearest pair of fibers) should be unused to provide emergency routing should the need arise.

Home Run cable design is the recommended method of fiber distribution when adequate OSP pathway is available. In order to conserve preinstalled available pathways, fiber optic trunk design should be considered if ITB to EB fiber routes must traverse existing available pathway routes that are near capacity.

NOTE: The above standards cover minimum OSP fiber optic requirements needed to provide minimal connectivity and required spare fiber for maintenance purposes only.

C.1.2. The organizational requirements supporting advanced warfighter missions and the demand for increased fiber optic capabilities to support “gray” or “other” networks, Intrusion Detection Systems (IDS), high resolution video graphics imaging and global environmental management control systems has increased. To ensure these requirements and all core services are satisfied and IAW the AFENT architecture specifications and Assured Services LAN (ASLAN), Eglin’s minimum fiber requirements have been determined to be the following:

a) Information Transfer Building to Edge Building = 24 Single Mode fiber optic strands

b) Edge Building main telecommunication room to other downstream communication equipment locations within the same building = 24 Single Mode fiber optic strands

c) Fiber Optic strands 1-18 shall be recorded in the circuit actions installation reporting system as reserved for 96 CS management/use to support and maintain base core services only.

d) Fiber optic strands 19-24 will be available to satisfy design requirements like Intrusion Detection System (IDS) "Alarms" and/or other temporary mission support requirements. All additional fiber optic strand requirements for customer specific use that will deplete or diminish the core service reservations shall be in addition to the baseline 24 strands to include additional maintenance spare fiber optic strands. Final fiber optic cable sizing shall be determined by 96 CS during network design and project requirement reviews.

C.1.3. Cable replacement will be the first design consideration for installation requirements of new cable to existing EBs or through legacy underground plant infrastructure with limited duct availability.

C.1.4. All network designs will be IAW the most current AFBAN, applicable Unified Facilities Criteria, applicable industry standards, and local specifications. (See attachment G - Applicable Publications)

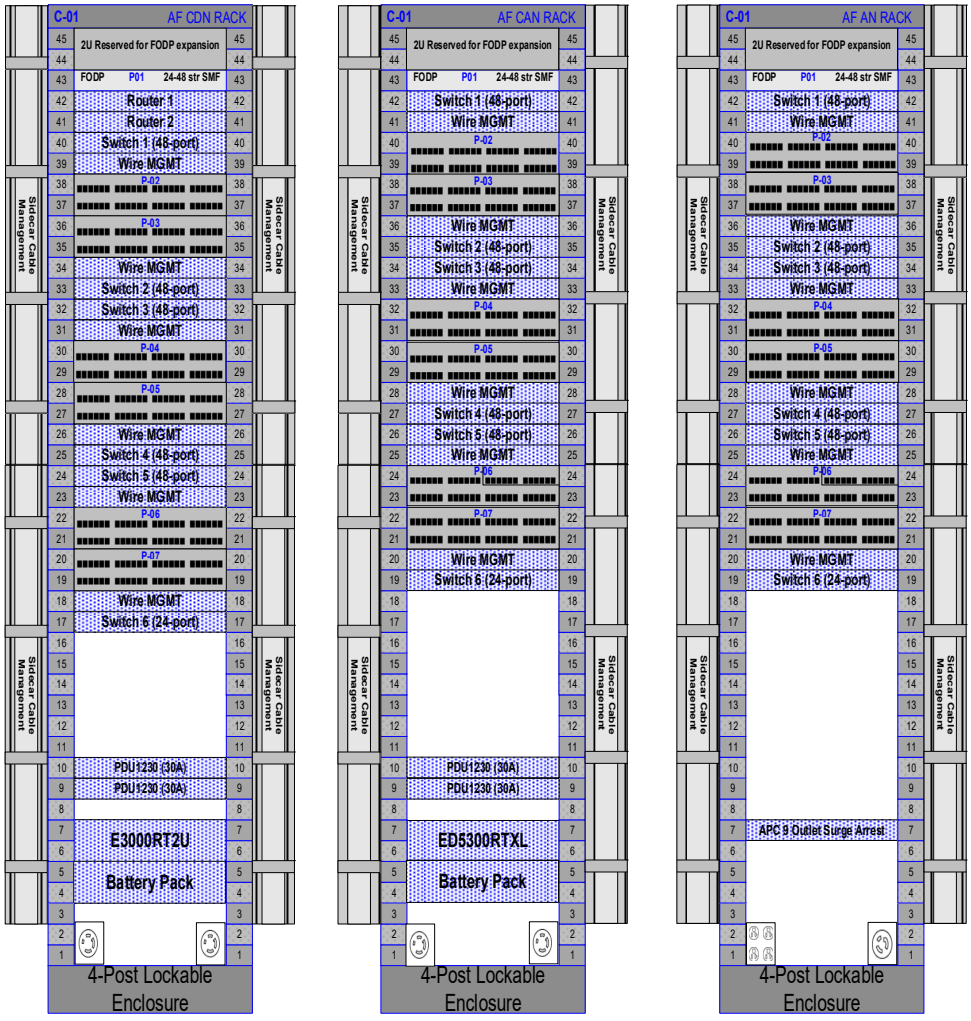
Attachment D

RACK ELEVATION STANDARDS FOR NIPR/SIPR/DATA/VOIP

D.1. FLOOR-MOUNT LOCKABLE NETWORK ENCLOSURE

Standard AF Data/VoIP Rack Elevation for all NIPR TRs

Current as of: 27 Jul 22



AF CDN RACK AF CAN RACK AF AN RACK

Notes:

1. All 72" TR racks shall be 4-post lockable enclosures with vertical sidecar cable management to support wiring on either side.

2. All 72" TR racks shall follow this elevation layout to comply with Eglin rack elevation standards.

3. All 4-post lockable enclosures shall be specified by 96CS to ensure proper rack specifications based on customer provided requirements. Racks shall be lockable enclosures with part number GL790ES-2442MS or equivalent.

4. Dedicated circuits with power receptacles indicated below and depicted in the rack elevation shall be supplied by onsite contractor. Exact power receptacle shall be identified in the 100% design drawings based on the requirements.

5. A dedicated junction box shall be placed no greater than 2-feet from the 96CS lockable enclosure and appropriate electrical wiring shall be homerun from supporting electrical panel to junction box. A pigtail splice with compatible size wiring shall be run from the 96CS electrical outlet(s) to the junction box and interconnected with dedicated homerun wiring using appropriate wire nuts.

6. No other circuits shall reside in this junction box to ensure survivability of the 96CS dedicated circuits are not interrupted or impacted.

7. Each rack shall require 1-foot patch cables routed from each patch panel to its corresponding network switch. All network equipment to provide LAN connectivity is specified by 96CS and funded by the contractor or the occupying customer.
5A: Example RU40 patches to P-02 and RU33 patches to P-03, etc…

8. PDU's shall always be 1U higher than the top mounted UPS.

120V / 20A dedicated circuit w/Quad receptacle mounted at base of rack w/receptacles facing towards rear of rack

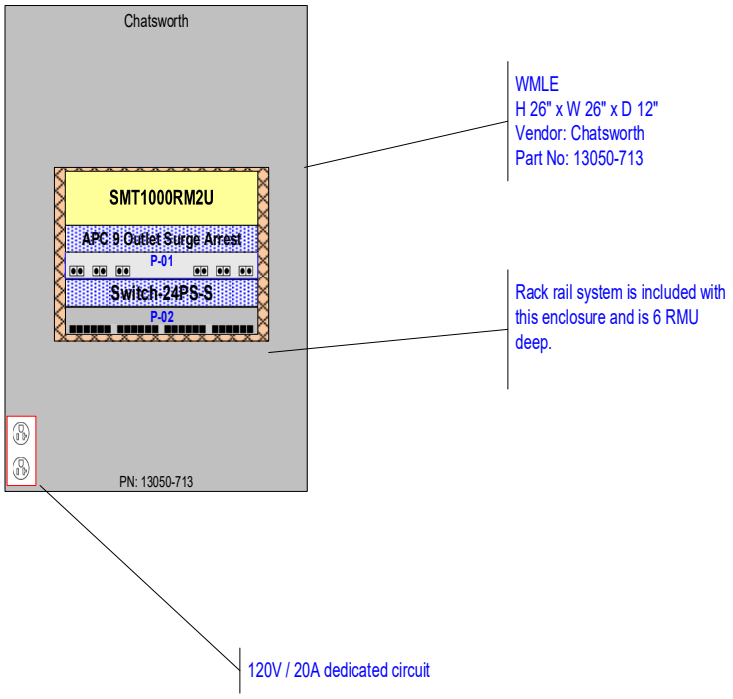
120V / 30A dedicated circuit w/NEMA L5-30R w/ Duplex receptacle mounted at base of rack w/receptacle facing towards rear of rack

208V / 30A dedicated circuit w/NEMA L14-30R receptacle mounted at base of rack w/receptacle facing towards rear of rack

D.2. WALL-MOUNT LOCKABLE NETWORK ENCLOSURE (VERTICAL EQUIPMENT MOUNT)

Standard AF Data Wall-Mount Lockable Enclosure (WMLE)
Rack Elevation for all 96 TRs using a Chatsworth WMLE

Current as of: 27 Jul 22



Notes:

1. WMLE will be mounted on backer board in TR. All AF network equipment will be mounted vertically in the WLME.

2. A 120V / 20A dedicated electrical circuit will be mounted inside the wall mount enclosure as depicted in the diagram to the left.

3. A dedicated junction box shall be placed no greater than 2-feet from the 96CS lockable enclosure and appropriate electrical wiring shall be homerun from supporting electrical panel to junction box. A pigtail splice with compatible size wiring shall be run from the 96CS electrical outlet(s) to the junction box and interconnected with dedicated homerun wiring using appropriate wire nuts.

4. No other circuits shall reside in this junction box to ensure survivability of the 96CS dedicated circuits are not interrupted or impacted.

5. Rack elevation shown here is top-view depiction with UPS closest to backer board.

6. Fiber optic PP and TP PP will also be terminated in this enclosure.

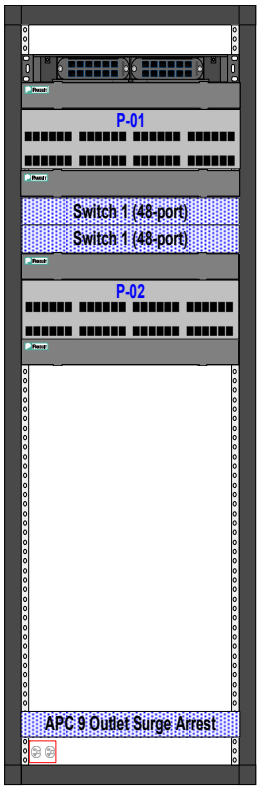
7. Each rack shall require 1-foot patch cables routed from patch panel to the corresponding network switch. All network equipment to provide LAN connectivity is specified by 96CS and funded by the contractor or the occupying customer.

120V / 20A dedicated circuit w/ duplex receptacle mounted inside enclosure.

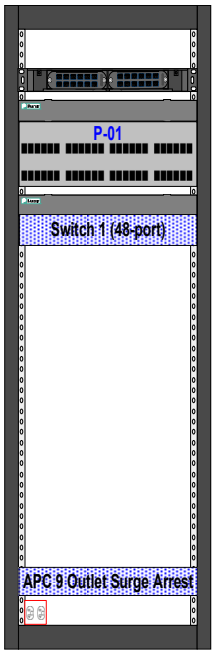
D.3. WALL-MOUNT LOCKABLE NETWORK ENCLOSURE (HORIZONTAL EQUIPMENT MOUNT)

Current as of: 27 Jul 22

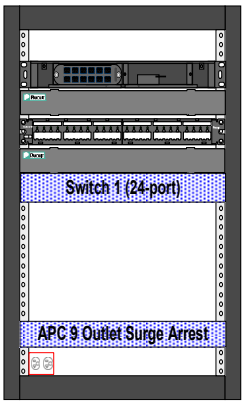
Standard AF Data Wall-Mount Lockable Enclosure (WMLE) Elevations for all 96CS TRs using Hoffman WMLE's



EWMS482425
48.03 x 23.62 x 25.09 1220 x 600 x 637 26
EWMR48T or EWMR48S



EWMS362425
36.02 x 23.62 x 25.09 915 x 600 x 637 19
EWMR36T or EWMR36S



EWMS242425
23.62 x 23.62 x 25.09
EWMR24T or EWMR24S

Notes:

1. WMLE shall be mounted on backer board in TR. All AF network equipment shall be mounted vertically in WMLE.

2. A 120V / 20A dedicated circuit shall be mounted inside WMLE toward the bottom facing the front. Preferably on either side inside the WMLE.

3. Rack elevation shown here is front-view depiction. If UPS is required, it will be placed at the bottom of the WMLE above the electrical receptacle , but 1U below the surge arrestor.

4. A dedicated junction box shall be placed no greater than 2-feet from the 96CS lockable enclosure and appropriate electrical wiring shall be homerun from supporting electrical panel to junction box. A pigtail splice with compatible size wiring shall be run from the 96CS electrical outlet(s) to the junction box and interconnected with dedicated homerun wiring using appropriate wire nuts.

5. No other circuits shall reside in this junction box to ensure survivability of the 96CS dedicated circuits are not interrupted or impacted.

6. Each rack shall require 1-foot patch cables routed from each patch panel to its corresponding network switch. All network equipment to provide LAN connectivity is specified by 96CS and funded by the contractor or the occupying customer.

7. All 96CS fiber optic PPs and TP PPs shall also be terminated inside the WMLE.

8. All WMLE's shall be double-hinged with a solid metal front door.

9. All keys to WMLE's shall be turned over to the 96CS upon installation.

10. All WMLE's shall be sized to support 20% growth.

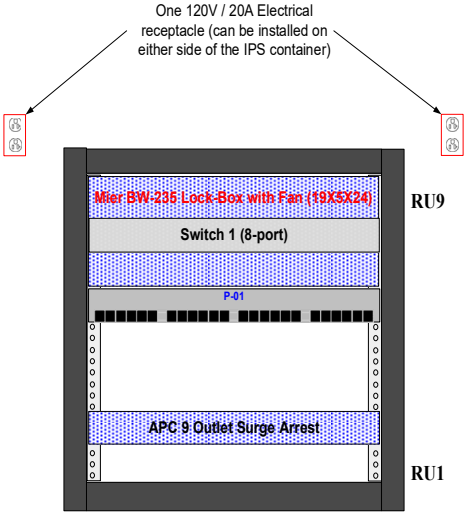
11. All WMLE's shall be grounded IAW UFC 3-580-01.

120V / 20A dedicated circuit w/duplex receptacle mounted inside enclosure.

D.4. IPS CONTAINER

Standard AF Data IPS Container
Rack Elevation for 96CS IPS Container

Current as of: 27 Jul 22



Hamilton Class 5 Single Door Model 23-36-19

Notes:

1. IPS container shall be installed in End-User-Area and not in 96CS TR.

2. All AFNET related 96CS network equipment shall be mounted IAW the diagram to the left.

3. 96CS Network switch shall be housed in IPS container inside Mier Box BW-B235 and placed at RU 7-9.

4. A 120V / 20A dedicated circuit shall be mounted outside located at the top left or right of the IPS container, but no further than 1-foot away.

5. Rack elevation shown here is front-view depiction.

6. All network equipment to provide LAN connectivity is specified by 96CS and funded by the occupying customer.

7. All IPS containers shall be Class 5 with single door.

8. All IPS containers shall meet proper clearances from the wall in order to circulate room air through the cabinet for electronic equipment cooling.

9. All IPS containers shall be grounded IAW UFC 3-580-01.

120V / 20A dedicated circuit w/duplex receptacle mounted inside enclosure.

Attachment E

CABLE MANAGEMENT ACCESSORIES

E.1. Cable Management.

BGS-79 – Brush grommet to cover rear vertical cable pass through
ESC-K12 – Cable management rail kit for front or rear rails; includes 12 sections of "fingers" (each section 7 RMU); rails will need to be recessed 4.5"
GL790ES-2242MS - Great Lakes 79" x 24" x 42" D Complete Rack Mount Enclosure, Black
SC67942 - Great Lakes External Cable Manager/Sidecar
SCP7942 Great Lakes Side Car End Panel
VCT-79 – Vertical cable trough
VCT-79C – Cover for VCT-79
VCB-7936 – Vertical cable bar kit (includes 1 vertical cable bar, 2 horizontal bars and 6-inch straps); use with optional ¼ turn "D" rings
CM-26 – Kit of 10, ¼ turn "D" rings, 3.5"x 5"

E.2. Other Accessories.

HDW-105-50 **–** Package of 50 M6 cage nuts with screws (12mm screw length)

Attachment F

SECURITY TECHNICAL IMPLEMENTATION GUIDE

F.1. PHYSICAL SECURITY

Based on the AFI 31-101 section 2.7.1.3 all locations where active communications equipment is used are designed as Protection Level 4 (PL) and have to be secured as such.

Every data switch in the network shall reside in a physically locked CEL closet, data center, or a lockable enclosure. Controlled areas are legally defined areas containing PL4 resources. Only authorized personnel, designated by a unit commander, have access to controlled areas.

The designation "controlled area" carries the same legal and moral restrictions as a physical barrier. Unless physical barriers are specifically required, the actual effectiveness of a controlled area may depend entirely on the security awareness of the people working in it. Installation commanders must designate areas containing the resources identified below.

APPLICABLE AFI REFERENCES

AFI 31-101, Section 2.7.1.3. - Mission essential communications facilities and computer centers, RAPCONs to include off installation navigational aids and related resources, control towers, power plants, and environmental control systems critical to operational capability.

The protection implemented shall be sufficient to protect the network from unauthorized personnel. The keys to the locked cabinets and dedicated communications rooms shall be controlled and only provided to authorized individuals appointed by 96 CS leadership.

APPLICABLE STIG REFERENCES

CAT III: NET0140 - The IAO/NSO will ensure the connection between the CSU/DSU and the local exchange carriers (LEC) data service jack (i.e., demarc) is in a secured environment.
CAT II: NET0210 - The IAO/NSO will ensure that all network devices (i.e., IDS, routers, RAS, NAS, firewalls, etc.) are located in a secure room with limited access.
CAT II: NET1730 - The IAO/NSO will ensure that the management workstation (NMS) is located in a secure environment.
CAT II: NET1832 - The ISSM will ensure the VPN tunnel demarcation is located in facilities authorized to process classified US government information, classified at the Secret Level (for SIPRNet).
CAT II: NET-VLAN-001 - The IAO/NSO will ensure that all switches and associated cross-connects hardware are kept in a secured IDF or an enclosed cabinet that is kept locked.

Attachment G

APPLICABLE PUBLICATIONS

Publications current time of contract or design build award or latest editions of the following publications shall apply and be utilized as applicable for engineering, installations, progress checks, quality controls, and final acceptance quality assurance inspections.

- AF Base Area Network Functional Specification (AFBAN) For Official Use ONLY
- AFI 31-101, The Air Force Resource Protection Program for Official Use ONLY
- AFI 31-501, Personnel Security Program Management
- AFI 33-111, Telephone Systems Management
- AFI-91-203, Consolidated Occupational Safety Instruction and Station Protector Installations
- Air Force Systems Security Instruction 7700, Emission Security
- Air Force Systems Security Instruction 7702, Emission Security Countermeasures Reviews
- Air Force Systems Security Instruction 7703, Communications Security: Protected Distribution Systems (PDS)
- ANSI C2-1997, National Electric Safety Code (NESC)
- ANSI/NEMA WC 66, Performance Standard for Category 6 and Category 7 100 Ohm Shielded and Unshielded Twisted Pairs
- ANSI/TIA-526-7, OFSTP-7 Measurement of Optical Power Loss of Installed Single-Mode Fiber Cable Plant
- ANSI/TIA-568-E.0, Generic Telecommunications Cabling for Customer Premises
- ANSI/TIA-568-E.1, Commercial Building Telecommunications Cabling Standard
- ANSI/TIA-568-E.2, Balanced Twisted-Pair Telecommunications Cabling and Components Standards
- ANSI/TIA-568-E.3, Optical Fiber Cabling Components Standard
- ANSI/TIA-568-E, Commercial Building Telecommunications Cabling Standard
- ANSI/TIA-569-D, Commercial Building Standard for Telecom Pathways & Spaces Wiring
- ANSI/TIA-570-A, Residential Telecommunications Cabling Standard
- ANSI/TIA-598, Optical Fiber Cable Color Coding
- ANSI/TIA-604-10, FOCIS 10 Fiber Optic Connector Intermateability Standard - Type LC
- ANSI/TIA-606-D, Administration Standard for the Telecommunications Infrastructure
- ANSI/TIA-607-D, Commercial Building Grounding and Bonding Requirements for Telecommunications
- ANSI/TIA-758, Customer-Owned Outside Plant Telecommunications Cabling Standard

- ANSI/TIA-1152, Requirements for Field Test
- ANSI/TIA 942 B DATA CENTER INFRASTRUCTURE
- ANSI/BICSI 002-2019 Data Center Design and Implementation (Best Practices)
- ASTM C 478, Standard Specification for Precast Reinforced Concrete Maintenance Hole Sections
- ASTM D 709, Laminated Thermosetting Materials
- ASTM C 789, Standard Specification for Precast Reinforced Concrete Box Sections for Culverts, Storm Drains, and Sewers
- ASTM C 850, Standard Specification for Precast Reinforced Concrete Box Sections for Culverts, Storm Drains, and Sewers with Less Than 2 Ft of Cover Subjected to Highway Loadings
- ASTM C 857, Standard Practice for Minimum Structural Design Loading for Underground Precast Utility Structures
- ASTM C 858, Standard Specification for Underground Precast Concrete Utility Structures
- ASTM C 890, Standard Practice for Minimum Structural Design Loading for Monolithic or Sectional Precast Concrete Water and Wastewater Structures
- ASTM C 891, Standard Practice for Installation of Underground Precast Concrete Utility Structures
- ASTM C 891.11, Standard Practice for Installation of Underground Precast Concrete Utility Structures
- ASTM C 913, Standard Specification for Precast Concrete Water and Wastewater Structures
- ASTM C 1037, Standard Practice for Inspection of Underground Precast Concrete Utility Structures
- BICSI - Telecommunications Distribution Methods Manual 14th Edition (Best Practices)
- BICSI - Outside Plant Design Reference Manual 6th Edition (Best Practices)
- BICSI's ICT Terminology Handbook Version 2.0
- CFR Title 47, Parts 68, Telecommunications, Federal Communications Commission Connection of terminal equipment to the telephone network
- DODI 5000.2, Part 6, System Safety, Health Hazards, and Environmental Impact
- ECA EIA/ECA 310, Cabinets, Racks, Panels, and Associated Equipment
- EPA CFR 40, Parts 1500-1508, Protection of Environment, Council on Environment Quality
- EPA CFR 40, Parts 260, 261, 262, 263, 264, 265, Hazardous Waste Generation and Transportation
- EPS-98-38EITS-001, Equipment Performance Specification for Maintenance and Operations Services for Base Telecommunications System
- FCC Part 68, Connection of Terminal Equipment to the Telephone Network (47 CFR 68)
- ICEA S-83-596, Indoor Optical Fiber Cables
- IEEE 100, The Authoritative Dictionary of IEEE Standards Terms

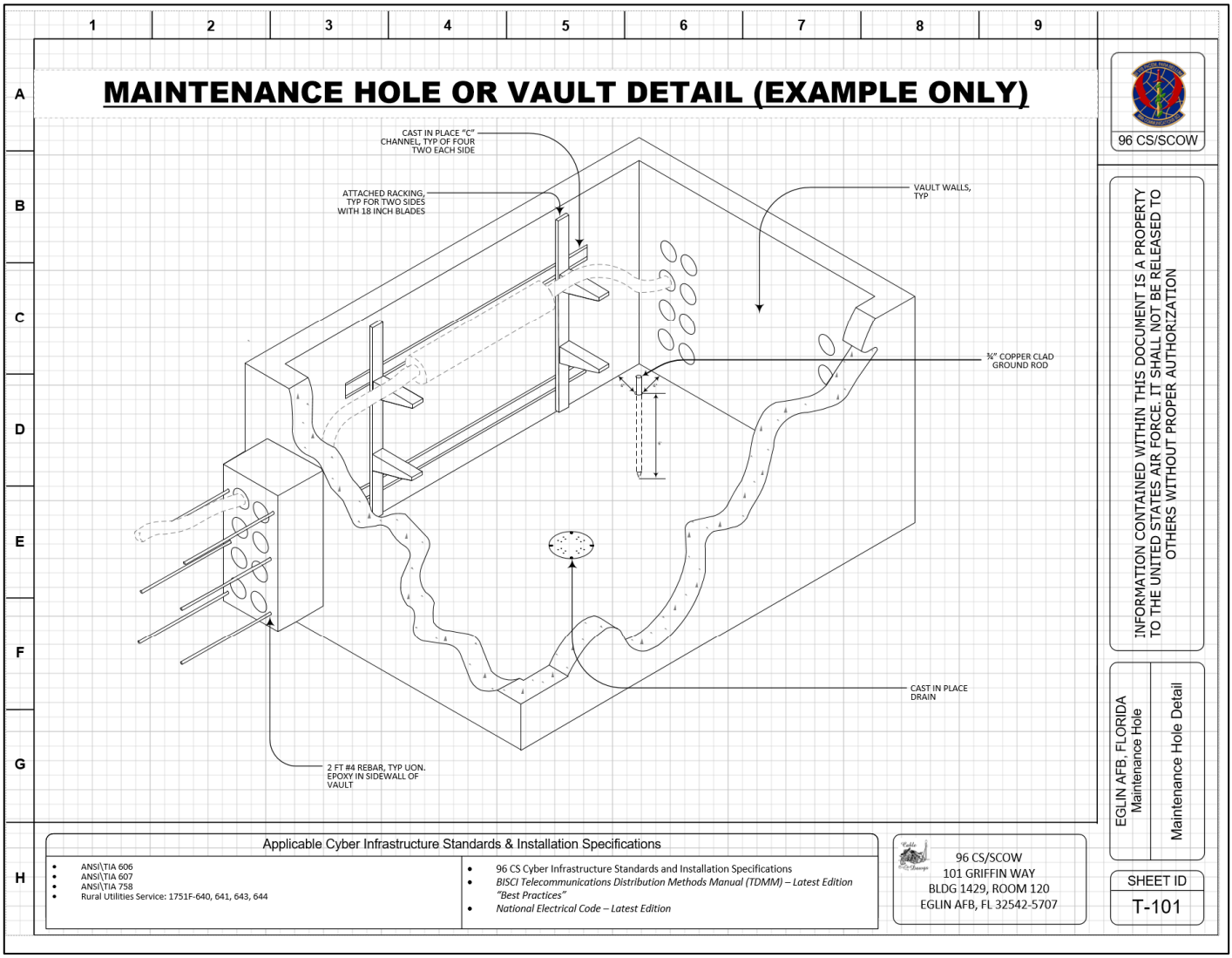
- MIL-STD-188-124B, Grounding, Bonding, and Shielding for Common/ Long Haul/ Tactical Systems Including Ground Based Communications-Electronics Facilities and Equipment

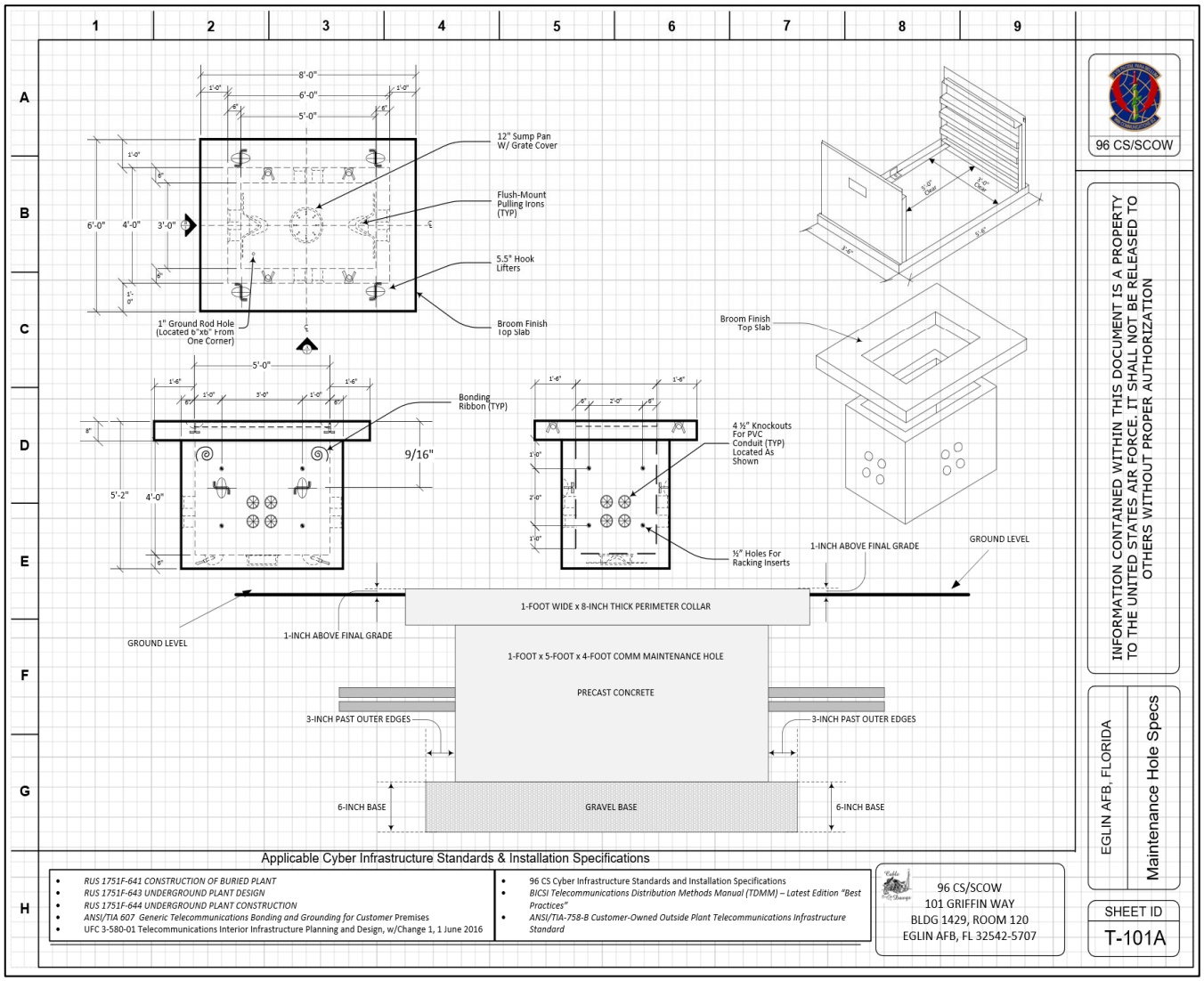
- MIL-STD-882-D, System Safety Program
- NECA/FOA 301-2016 Standard for Installing and Testing Fiber Optics
- NECA/BICSI 568, Standard for Installing Building Telecommunications Cabling
- NECA/NEMA 605-201X Standard for Installing Underground Nonmetallic Utility Duct
- NEMA Standards Publication TC-7
- NEMA Standards Publication TC-2
- NFPA 70, National Electrical Code
- NFPA 70-2002, National Electrical Code (NEC)
- OSHA CFR 29, Asbestos
- OSHA CFR 29, Excavation
- OSHA CFR 29, Hazardous Waste Operation and Emergency Response
- OSHA CFR 29, Occupational Safety and Health Standards
- OSHA CFR 29, Part 1910.1200, Hazard Communications
- OSHA CFR 29, Part 1910.147, The Control of Hazardous energy (Lockout/Tagout)
- OSHA CFR 29, Permit-required Confined Spaces
- OSHA CFR 29, Telecommunications
- REA Standard PC-5A, Bulletin 345-52, REA Standard for Service Entrance
- REA TE & CM Section 451.2, Shield Continuity
- REA TE & CM Section 644, Design and Construction of Underground Cable (Physical Plant)
- REA TE & CM Section 823, Electrical Protection by Use of Gas Tube Arresters
- REA TE & CM, Section 643, Underground Conduit and Maintenance hole Design and Construction
- REA TE & CM, Section 810, Electrical Protection of Electronic Analog Section Digital Central Office Equipment
- REA TE & CM, Section 825, Situations Requiring Special Protection
- RUS Bulletin 1751F-630, Design of Aerial Plant
- RUS Bulletin 1751F-640, Design of Buried Plant-Physical Considerations
- RUS Bulletin 1751F-641, Construction of Buried Plant
- RUS Bulletin 1751F-642, Construction Route Planning of Buried Plant
- Rural Utilities Service (RUS) 1751F-643 Underground Plant Design
- Rural Utilities Service (RUS) 1751F-644 Underground Plant Construction
- RUS Bulletin 1751F-805, Electrical Protection at Customer Locations
- RUS Bulletin 1753F-401 (PC-2), Standard for Splicing Copper and Fiber Optic Cables
- RUS Form 515a, Specifications and Drawings for Construction of a Direct Buried Plant
- RUS Form 515c, Specifications and Drawings for Conduit and Maintenance hole Construction
- RUS Form 515d, Specifications and Drawings for Underground Cable Installation
- RUS Form 515f, Specifications and Drawings for Construction of Pole Lines, Aerial Cables and Wires
- RUS Form 515g, Specifications and Drawings for Service Entrance and Station Protector Installation
- Unified Facilities Criteria (UFC) 3-520-1 Interior Electrical Systems
- Unified Facilities Criteria (UFC) 3-580-1, Telecommunications Interior

Infrastructure Planning and Design
- Unified Facilities Criteria (UFC) 4-010-05 - Sensitive Compartmented Information Facilities Planning, Design, and Construction
- Unified Facilities Criteria (UFC) 4-010-06 Cybersecurity of Facility
- Unified Facilities Criteria (UFC) Facilities Criteria (UFC) 4-510-01 Design: Military Medical Facilities
- Unified Facilities Criteria (UFC) 4-711-01 Family Housing
- UL 1286, Office Furnishings
- UL 1863, Communication Circuit Accessories
- UL 444, Communications Cables
- UL 467, Grounding and Bonding Equipment
- UL 50, Enclosures for Electrical
- UL 514C, Nonmetallic Outlet Boxes, Flush-Device Boxes, and Covers
- UL 723, Test for Surface Burning Characteristics of Building Materials
- UL 969, Standard for Marking and Labeling Systems

Attachment H

STANDARD INSTALLATION DRAWINGS




12" Sump Pan W/ Grate Cover
Flush-Mount Pulling Irons (TYP)
5.5" Hook Lifters
Broom Finish Top Slab
1" Ground Rod Hole (Located 6"±6" from One Corner)
Bonding Ribbon (TYP)
9/16"
4 ½" Knockouts For PVC Conduit (TYP) Located As Shown
½" Holes For Racking Inserts
1-INCH ABOVE FINAL GRADE
GROUND LEVEL
1-FOOT WIDE x 8-INCH THICK PERIMETER COLLAR
1-FOOT x 5-FOOT x 4-FOOT COMM MAINTENANCE HOLE
PRECAST CONCRETE
3-INCH PAST OUTER EDGES
6-INCH BASE
GRAVEL BASE
96 CS/SCOW
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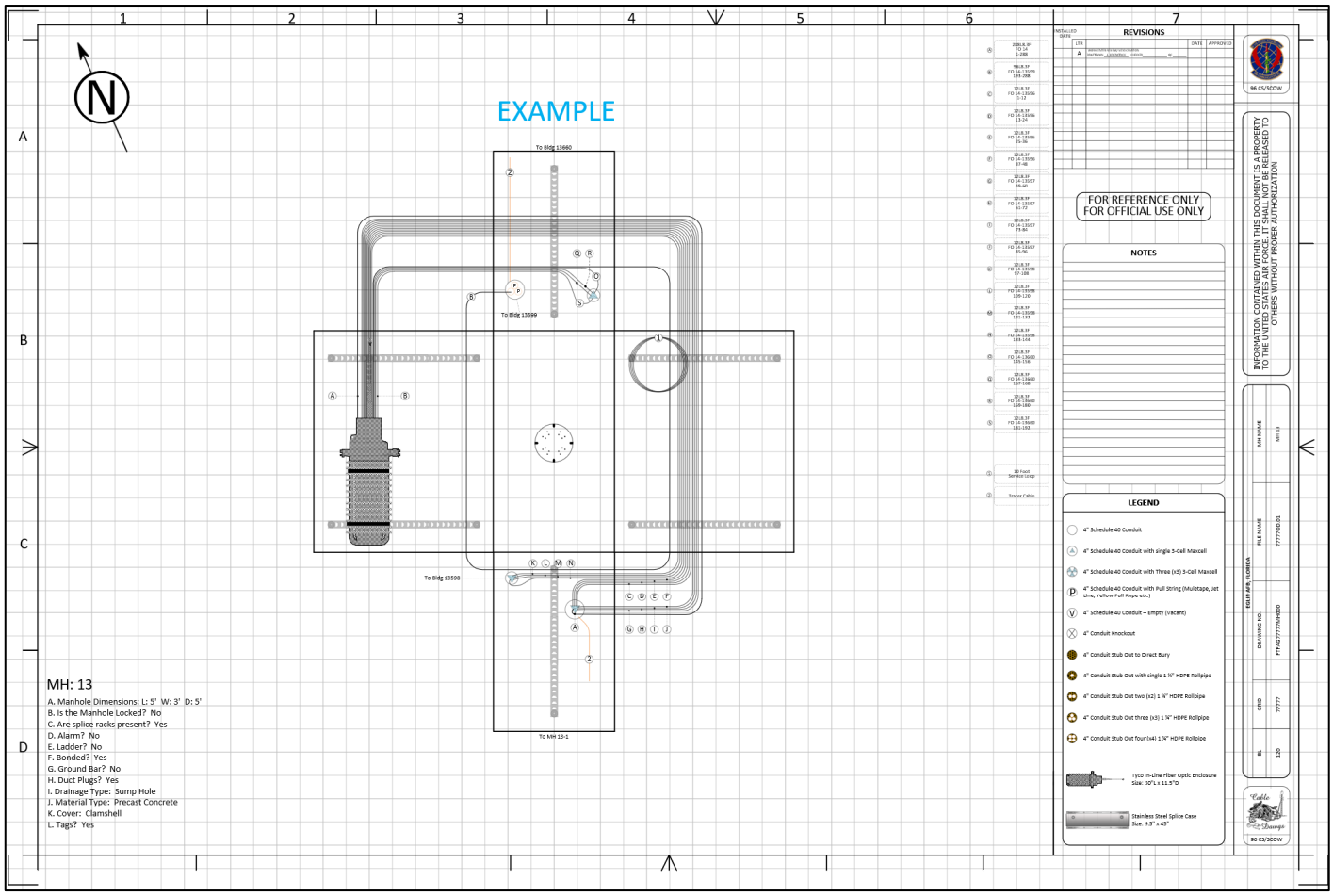
Maintenance Hole Specs
Applicable Cyber Infrastructure Standards & Installation Specifications
RUS 1751F-641 CONSTRUCTION OF BURIED PLANT
RUS 1751F-643 UNDERGROUND PLANT DESIGN
RUS 1751F-644 UNDERGROUND PLANT CONSTRUCTION
ANSI/TIA 607 Generic Telecommunications Bonding and Grounding for Customer Premises
UFC 3-580-01 Telecommunications Interior Infrastructure Planning and Design, w/Change 1, 1 June 2016
96 CS Cyber Infrastructure Standards and Installation Specifications
BICSI Telecommunications Distribution Methods Manual (TDMM) – Latest Edition "Best Practices"
ANSI/TIA-758-B Customer-Owned Outside Plant Telecommunications Infrastructure Standard
96 CS/SCOW
101 GRIFFIN WAY
BLDG 1429, ROOM 120
EGLIN AFB, FL 32542-5707
SHEET ID
T-101A


EXAMPLE
REVISIONS
FOR REFERENCE ONLY
FOR OFFICIAL USE ONLY
NOTES
LEGEND
MH: 13
A. Manhole Dimensions: L: 5' W: 3' D: 5'
B. Is the Manhole Locked? No
C. Are splice racks present? Yes
D. Alarm? No
E. Ladder? No
F. Bonded? Yes
G. Ground Bar? No
H. Duct Plugs? Yes
I. Drainage Type: Sump Hole
J. Material Type: Precast Concrete
K. Cover: Clamshell
L. Tags? Yes
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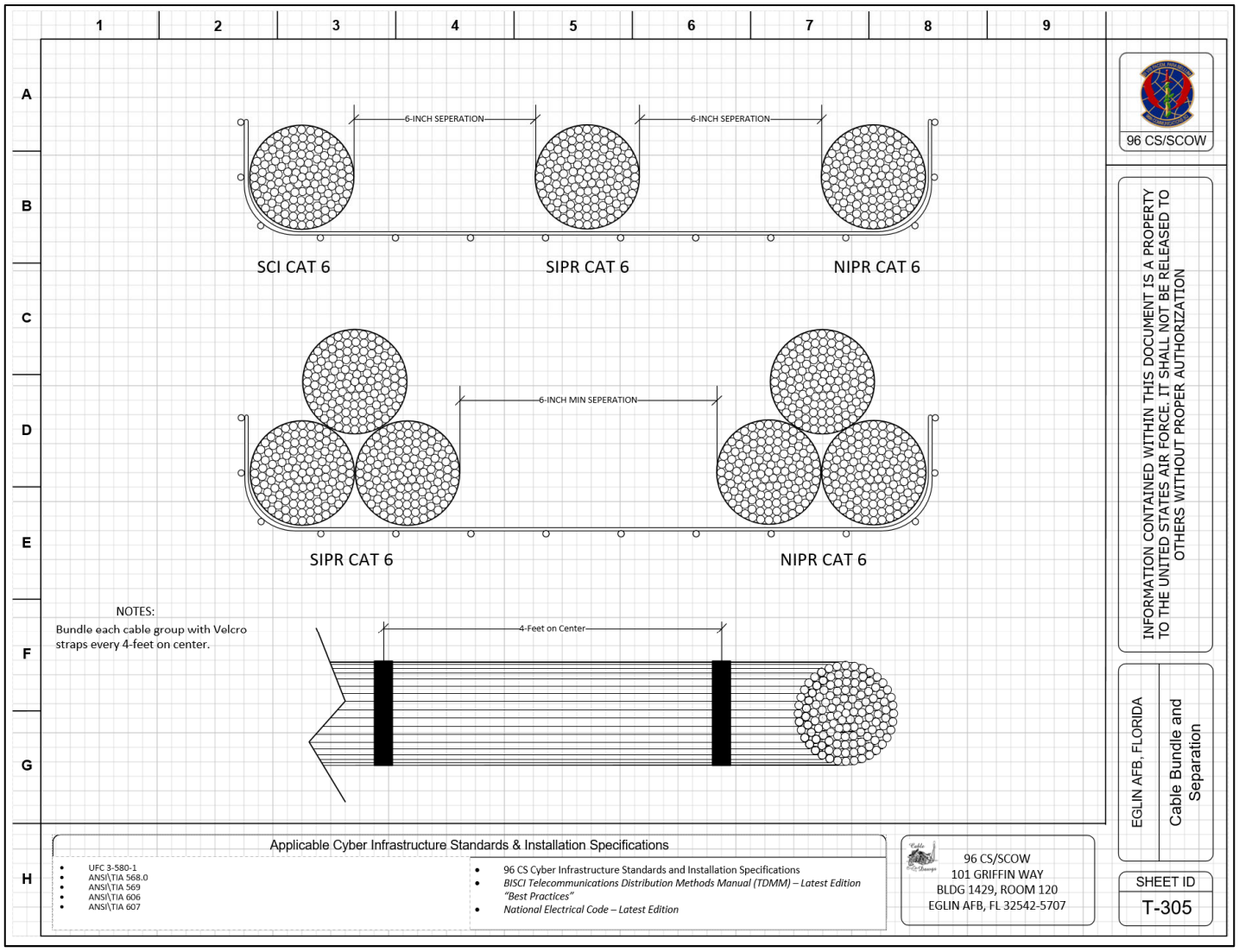
6-INCH SEPERATION
6-INCH SEPERATION
SCI CAT 6
SIPR CAT 6
NIPR CAT 6
6-INCH MIN SEPERATION
SIPR CAT 6
NIPR CAT 6
NOTES:
Bundle each cable group with Velcro straps every 4-feet on center.
4-Feet on Center
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Cable Bundle and Separation
Applicable Cyber Infrastructure Standards & Installation Specifications
UFC 3-580-1
ANSI\TIA 568.0
ANSI\TIA 569
ANSI\TIA 606
ANSI\TIA 607
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"Best Practices"
National Electrical Code – Latest Edition
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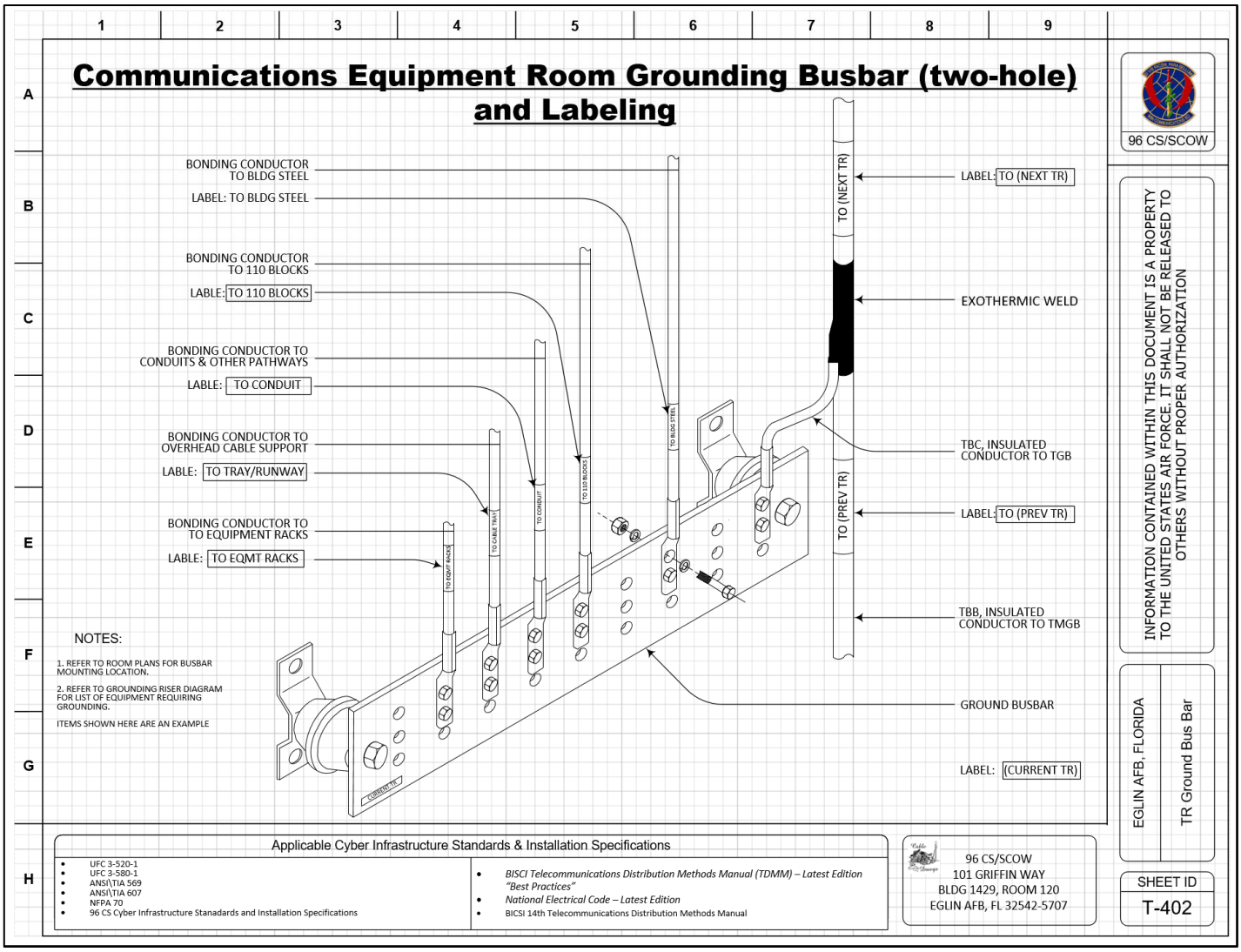
SHEET ID
T-305


Communications Equipment Room Grounding Busbar (two-hole) and Labeling
BONDING CONDUCTOR TO BLDG STEEL
LABEL: TO BLDG STEEL
BONDING CONDUCTOR TO 110 BLOCKS
LABLE: TO 110 BLOCKS
BONDING CONDUCTOR TO CONDUITS & OTHER PATHWAYS
LABLE: TO CONDUIT
BONDING CONDUCTOR TO OVERHEAD CABLE SUPPORT
LABLE: TO TRAY/RUNWAY
BONDING CONDUCTOR TO TO EQUIPMENT RACKS
LABLE: TO EQMT RACKS
TO (NEXT TR)
LABEL: TO (NEXT TR)
EXOTHERMIC WELD
TBC, INSULATED CONDUCTOR TO TGB
TO (PREV TR)
LABEL: TO (PREV TR)
TBB, INSULATED CONDUCTOR TO TMGB
GROUND BUSBAR
LABEL: (CURRENT TR)
NOTES:
1. REFER TO ROOM PLANS FOR BUSBAR MOUNTING LOCATION.
2. REFER TO GROUNDING RISER DIAGRAM FOR LIST OF EQUIPMENT REQUIRING GROUNDING.
ITEMS SHOWN HERE ARE AN EXAMPLE
Applicable Cyber Infrastructure Standards & Installation Specifications
UFC 3-520-1
UFC 3-580-1
ANSI\TIA 569
ANSI\TIA 607
NFPA 70
96 CS Cyber Infrastructure Stanadards and Installation Specifications
BISCI Telecommunications Distribution Methods Manual (TDMM) – Latest Edition "Best Practices"
National Electrical Code – Latest Edition
BICSI 14th Telecommunications Distribution Methods Manual
96 CS/SCOW
101 GRIFFIN WAY
BLDG 1429, ROOM 120
EGLIN AFB, FL 32542-5707
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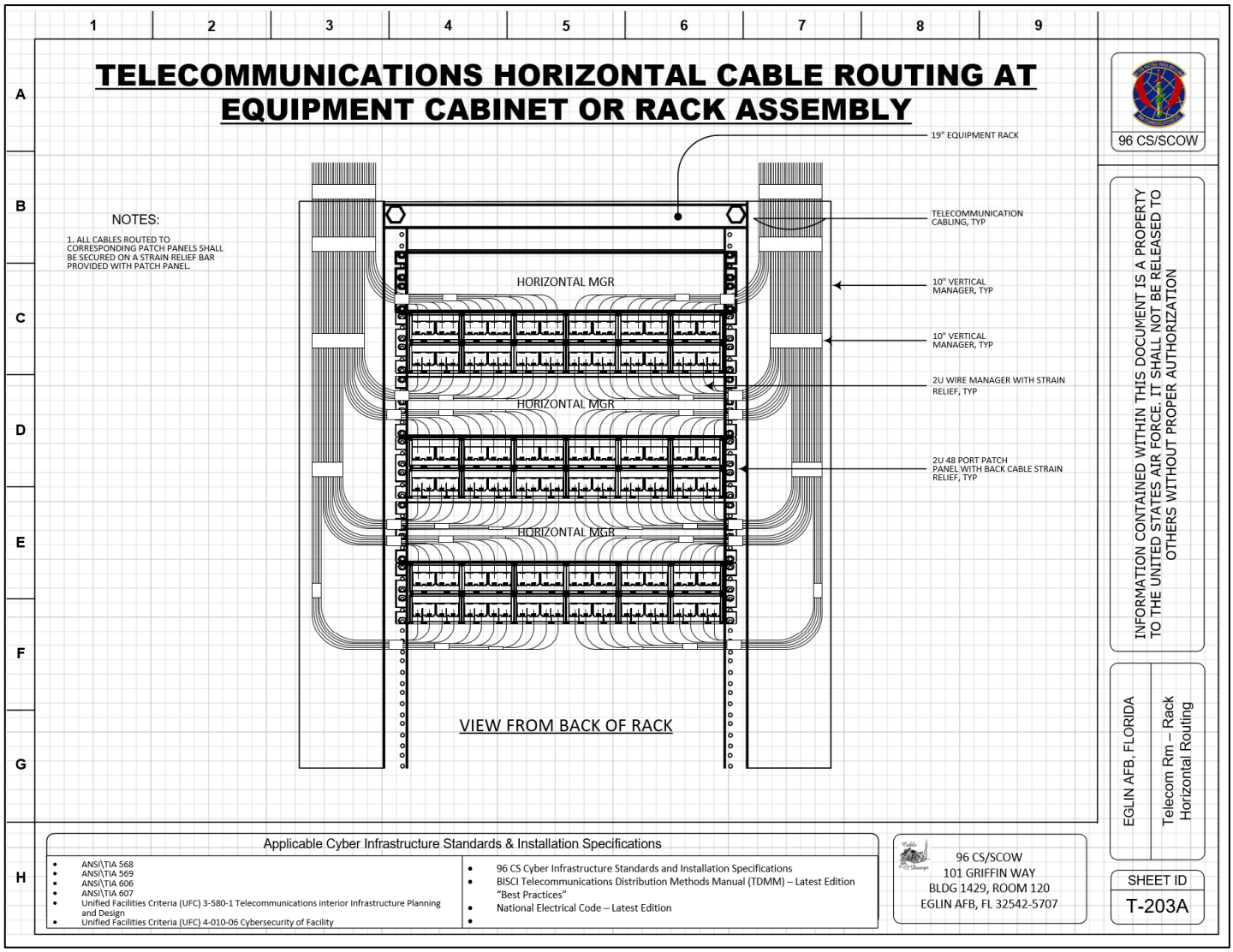
EGLIN AFB, FLORIDA
TR Ground Bus Bar
SHEET ID
T-402


TELECOMMUNICATIONS HORIZONTAL CABLE ROUTING AT EQUIPMENT CABINET OR RACK ASSEMBLY
19" EQUIPMENT RACK
TELECOMMUNICATION CABLING, TYP
10" VERTICAL MANAGER, TYP
10" VERTICAL MANAGER, TYP
2U WIRE MANAGER WITH STRAIN RELIEF, TYP
2U 48 PORT PATCH PANEL WITH BACK CABLE STRAIN RELIEF, TYP
HORIZONTAL MGR
HORIZONTAL MGR
HORIZONTAL MGR
VIEW FROM BACK OF RACK
NOTES:
1. ALL CABLES ROUTED TO CORRESPONDING PATCH PANELS SHALL BE SECURED ON A STRAIN RELIEF BAR PROVIDED WITH PATCH PANEL.
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Telecom Rm – Rack Horizontal Routing
Applicable Cyber Infrastructure Standards & Installation Specifications
ANSI\TIA 568
ANSI\TIA 569
ANSI\TIA 606
ANSI\TIA 607
Unified Facilities Criteria (UFC) 3-580-1 Telecommunications interior Infrastructure Planning and Design
Unified Facilities Criteria (UFC) 4-010-06 Cybersecurity of Facility
96 CS Cyber Infrastructure Standards and Installation Specifications
BISCI Telecommunications Distribution Methods Manual (TDMM) – Latest Edition "Best Practices"
National Electrical Code – Latest Edition
96 CS/SCOW
101 GRIFFIN WAY
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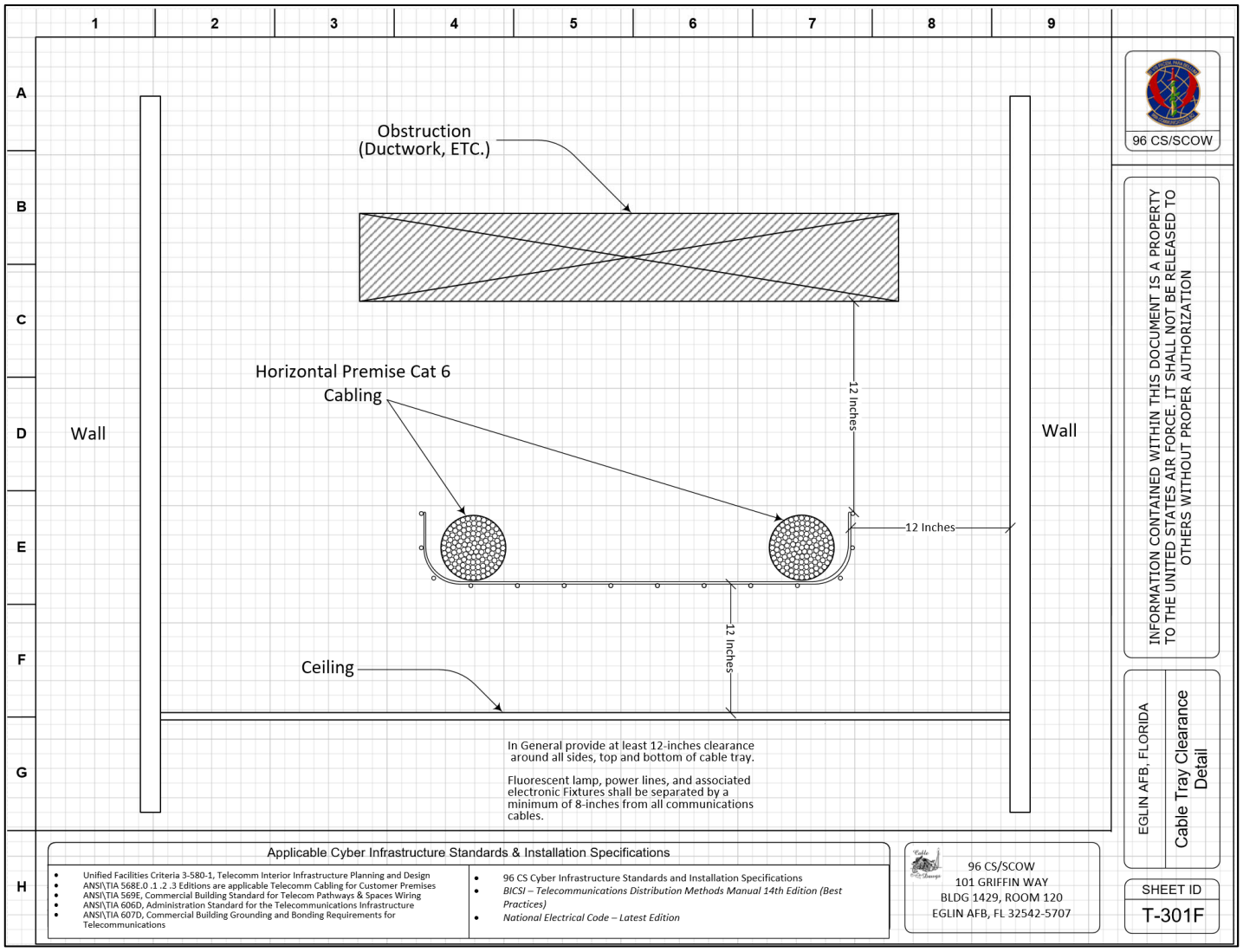
SHEET ID
T-203A


Obstruction
(Ductwork, ETC.)
Horizontal Premise Cat 6
Cabling
Wall
Wall
12 Inches
12 Inches
12 Inches
Ceiling
In General provide at least 12-inches clearance around all sides, top and bottom of cable tray.
Fluorescent lamp, power lines, and associated electronic Fixtures shall be separated by a minimum of 8-inches from all communications cables.
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Cable Tray Clearance Detail
Applicable Cyber Infrastructure Standards & Installation Specifications
Unified Facilities Criteria 3-580-1, Telecomm Interior Infrastructure Planning and Design
ANSI\TIA 568E.0 .1 .2 .3 Editions are applicable Telecomm Cabling for Customer Premises
ANSI\TIA 569E, Commercial Building Standard for Telecom Pathways & Spaces Wiring
ANSI\TIA 606D, Administration Standard for the Telecommunications Infrastructure
ANSI\TIA 607D, Commercial Building Grounding and Bonding Requirements for Telecommunications
96 CS Cyber Infrastructure Standards and Installation Specifications
BICSI – Telecommunications Distribution Methods Manual 14th Edition (Best Practices)
National Electrical Code – Latest Edition
96 CS/SCOW
101 GRIFFIN WAY
BLDG 1429, ROOM 120
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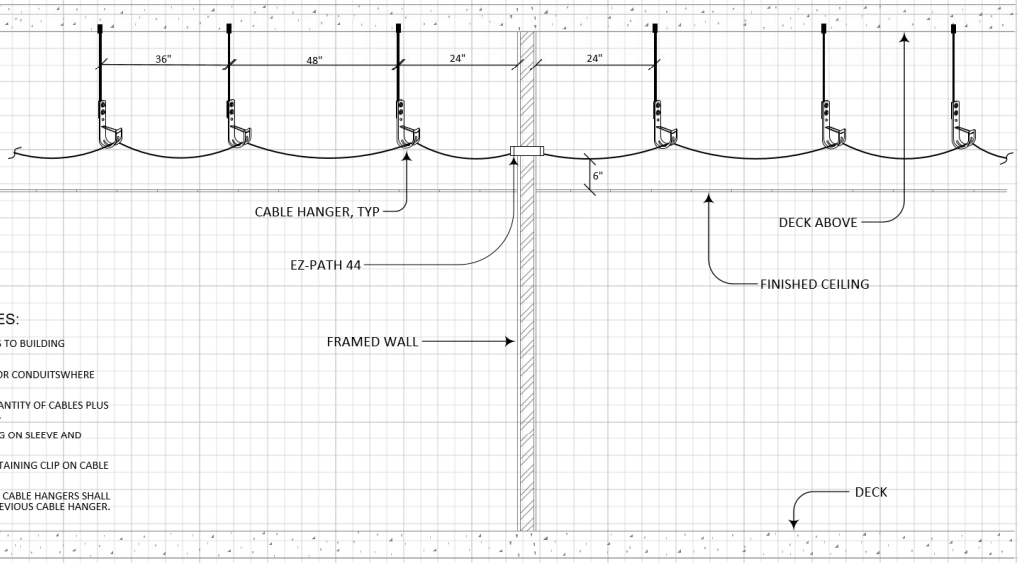
SHEET ID
T-301F

TELECOMMUNICATIONS CABLE ROUTING DETAIL USING J-HOOKS SUPPORT THROUGH FULL HEIGHT PARTITIONS



NOTES:

1. DO NOT TIE CABLES TO BUILDING STRUCTURES.
2. PROVIDE SLEEVES OR CONDUITSWHERE REQUIRED.
3. SIZE BASED ON QUANTITY OF CABLES PLUS 40% SPARE CAPACITY.
4. PROOVIDE BUSHING ON SLEEVE AND COONDUIT ENDS.
5. PROVIDE CABLE RETAINING CLIP ON CABLE HANGERS.
6. SPACING BETWEEN CABLE HANGERS SHALL NOT BE EQUAL TO PREVIOUS CABLE HANGER.

96 CS/SCOW

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Cable Routing – Full Height Wall

Applicable Cyber Infrastructure Standards & Installation Specifications

- Unified Facilities Criteria 3-580-1, Telecomm Interior Infrastructure Planning and Design
- ANSI\TIA 568E.0 .1 .2 .3 Editions are applicable Telecomm Cabling for Customer Premises
- ANSI\TIA 569E, Commercial Building Standard for Telecom Pathways & Spaces Wiring
- ANSI\TIA 606D, Administration Standard for the Telecommunications Infrastructure
- ANSI\TIA 607D, Commercial Building Grounding and Bonding Requirements for Telecommunications
- 96 CS Cyber Infrastructure Standards and Installation Specifications
- BICSI – Telecommunications Distribution Methods Manual 14th Edition (Best Practices)
- National Electrical Code – Latest Edition

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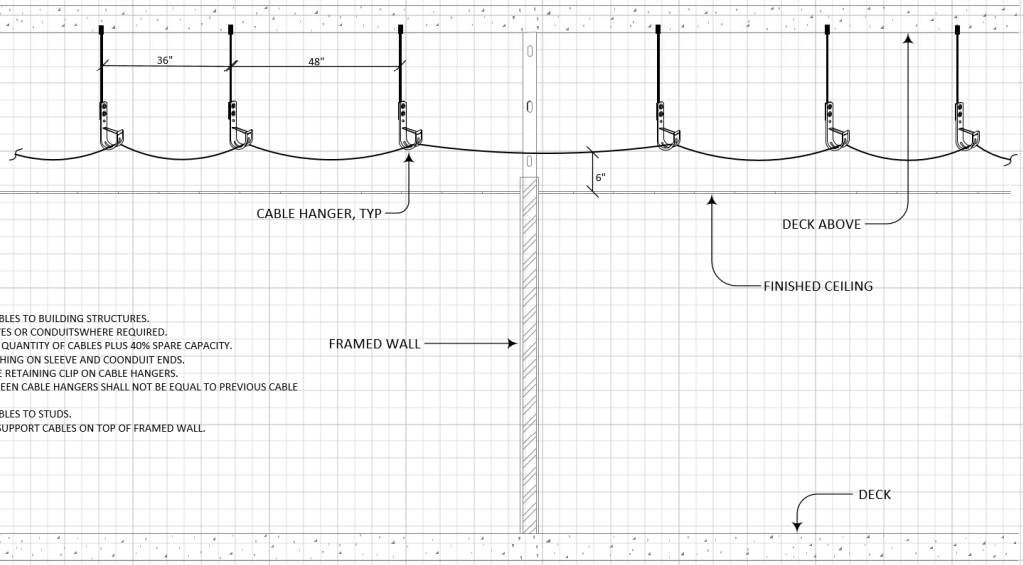
101 GRIFFIN WAY
BLDG 1429, ROOM 120
EGLIN AFB, FL 32542-5707

SHEET ID
T-302

TELECOMMUNICATIONS CABLE ROUTING DETAIL USING J-HOOKS SUPPORT FOR LOW PROFILE PARTITIONS



NOTES:

1. DO NOT TIE CABLES TO BUILDING STRUCTURES.
2. PROVIDE SLEEVES OR CONDUITSWHERE REQUIRED.
3. SIZE BASED ON QUANTITY OF CABLES PLUS 40% SPARE CAPACITY.
4. PROOVIDE BUSHING ON SLEEVE AND COONDUIT ENDS.
5. PROVIDE CABLE RETAINING CLIP ON CABLE HANGERS.
6. SPACING BETWEEN CABLE HANGERS SHALL NOT BE EQUAL TO PREVIOUS CABLE HANGER.
7. DO NOT TIE CABLES TO STUDS.
8. DO NOT REST/SUPPORT CABLES ON TOP OF FRAMED WALL.

96 CS/SCOW

EGLIN AFB, FLORIDA

Cable Routing – Partition Wall

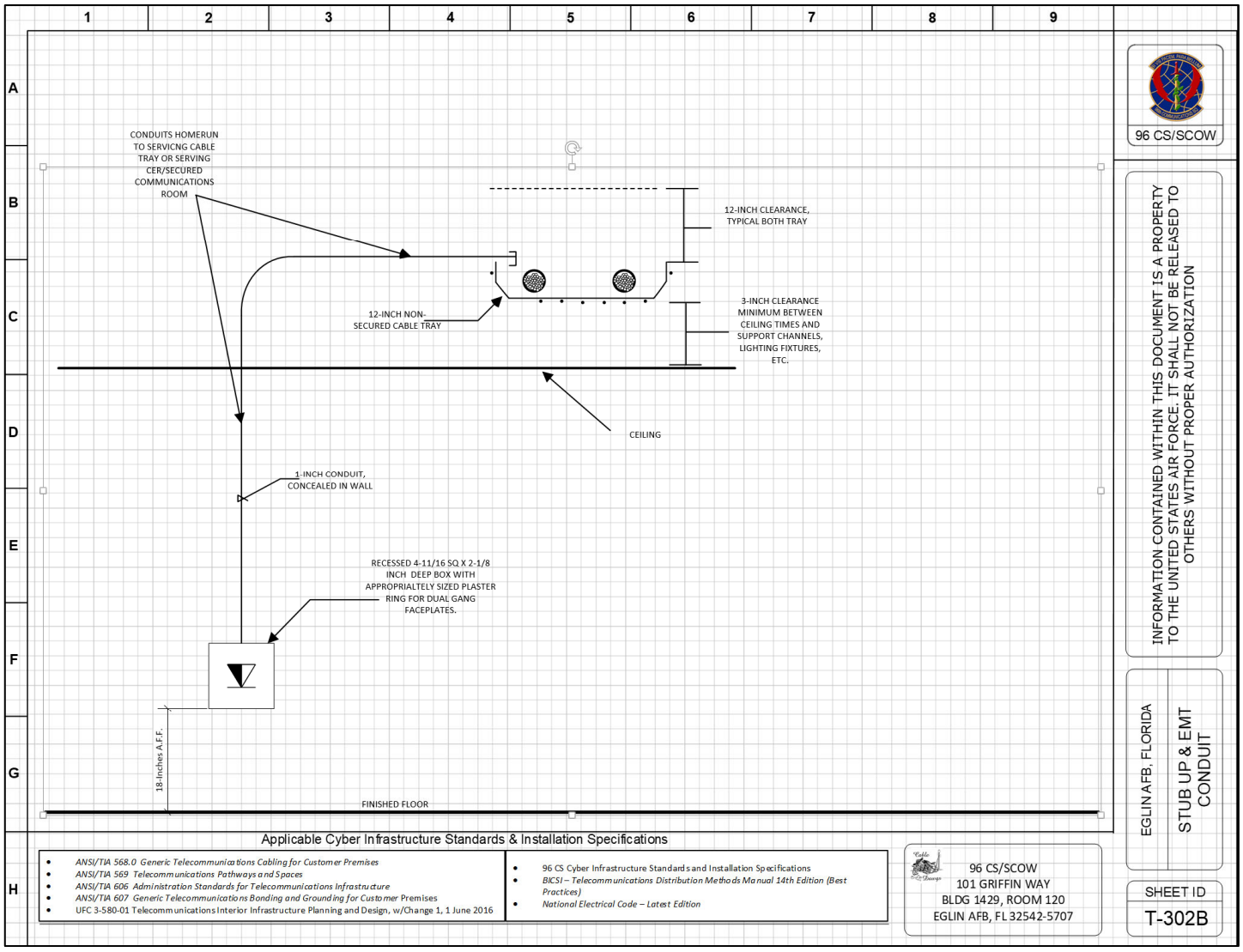
SHEET ID

T-302A

Applicable Cyber Infrastructure Standards & Installation Specifications

- Unified Facilities Criteria 3-580-1, Telecomm Interior Infrastructure Planning and Design
- ANSI\TIA 568E.0 .1 .2 .3 Editions are applicable Telecomm Cabling for Customer Premises
- ANSI\TIA 569E, Commercial Building Standard for Telecom Pathways & Spaces Wiring
- ANSI\TIA 606D, Administration Standard for the Telecommunications Infrastructure
- ANSI\TIA 607D, Commercial Building Grounding and Bonding Requirements for Telecommunications
- 96 CS Cyber Infrastructure Standards and Installation Specifications
- BICSI – Telecommunications Distribution Methods Manual 14th Edition (Best Practices)
- National Electrical Code – Latest Edition

96 CS/SCOW
101 GRIFFIN WAY
BLDG 1429, ROOM 120
EGLIN AFB, FL 32542-5707


CONDUITS HOMERUN TO SERVICNG CABLE TRAY OR SERVING CER/SECURED COMMUNICATIONS ROOM
12-INCH CLEARANCE, TYPICAL BOTH TRAY
12-INCH NON-SECURED CABLE TRAY
3-INCH CLEARANCE MINIMUM BETWEEN CEILING TIMES AND SUPPORT CHANNELS, LIGHTING FIXTURES, ETC.
CEILING
1-INCH CONDUIT, CONCEALED IN WALL
RECESSED 4-11/16 SQ X 2-1/8 INCH DEEP BOX WITH APPROPRIALTELY SIZED PLASTER RING FOR DUAL GANG FACEPLATES.
18-Inches A.F.F.
FINISHED FLOOR
Applicable Cyber Infrastructure Standards & Installation Specifications
ANSI/TIA 568.0 Generic Telecommunications Cabling for Customer Premises
ANSI/TIA 569 Telecommunications Pathways and Spaces
ANSI/TIA 606 Administration Standards for Telecommunications Infrastructure
ANSI/TIA 607 Generic Telecommunications Bonding and Grounding for Customer Premises
UFC 3-580-01 Telecommunications Interior Infrastructure Planning and Design, w/Change 1, 1 June 2016
96 CS Cyber Infrastructure Standards and Installation Specifications
BICSI – Telecommunications Distribution Methods Manual 14th Edition (Best Practices)
National Electrical Code – Latest Edition
96 CS/SCOW
101 GRIFFIN WAY
BLDG 1429, ROOM 120
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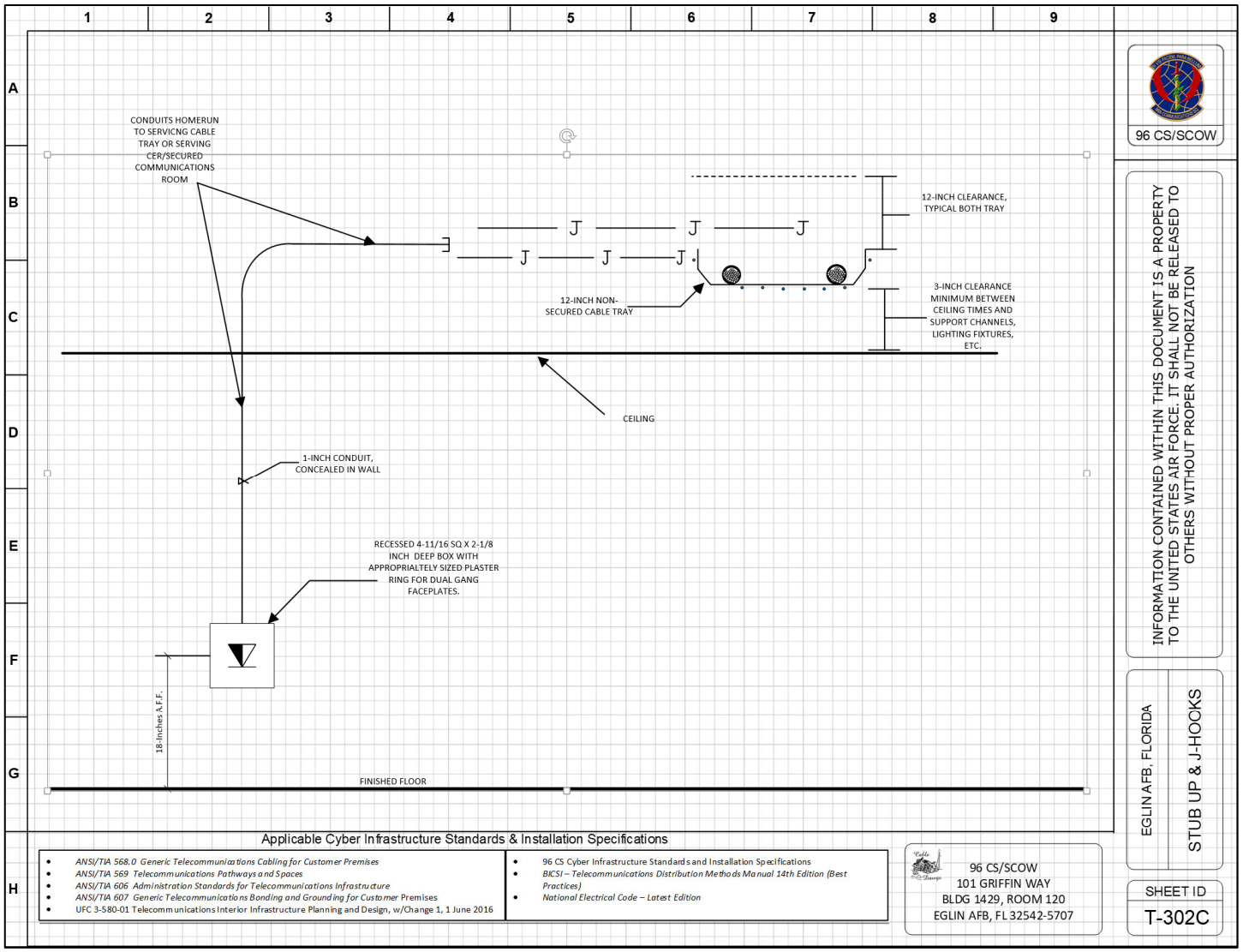
EGLIN AFB, FLORIDA
STUB UP & EMT CONDUIT
SHEET ID
T-302B


CONDUITS HOMERUN TO SERVICNG CABLE TRAY OR SERVING CER/SECURED COMMUNICATIONS ROOM
12-INCH CLEARANCE, TYPICAL BOTH TRAY
12-INCH NON-SECURED CABLE TRAY
3-INCH CLEARANCE MINIMUM BETWEEN CEILING TIMES AND SUPPORT CHANNELS, LIGHTING FIXTURES, ETC.
CEILING
1-INCH CONDUIT, CONCEALED IN WALL
RECESSED 4-11/16 SQ X 2-1/8 INCH DEEP BOX WITH APPROPRIALTELY SIZED PLASTER RING FOR DUAL GANG FACEPLATES.
18 Inches A.F.F.
FINISHED FLOOR
96 CS/SCOW
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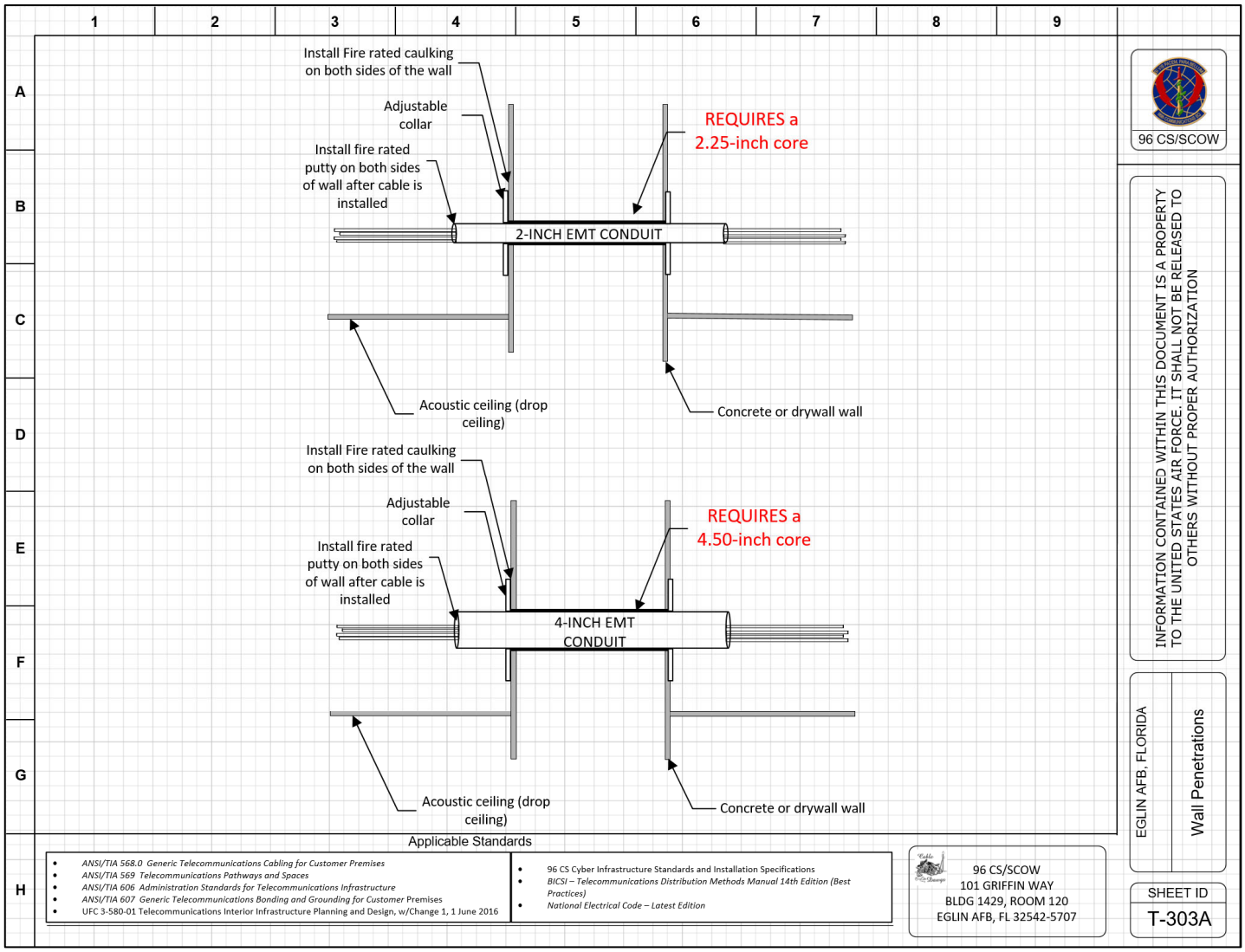
STUB UP & J-HOOKS
Applicable Cyber Infrastructure Standards & Installation Specifications
ANSI/TIA 568.0 Generic Telecommunications Cabling for Customer Premises
ANSI/TIA 569 Telecommunications Pathways and Spaces
ANSI/TIA 606 Administration Standards for Telecommunications Infrastructure
ANSI/TIA 607 Generic Telecommunications Bonding and Grounding for Customer Premises
UFC 3-580-01 Telecommunications Interior Infrastructure Planning and Design, w/Change 1, 1 June 2016
96 CS Cyber Infrastructure Standards and Installation Specifications
BICSI – Telecommunications Distribution Methods Manual 14th Edition (Best Practices)
National Electrical Code – Latest Edition
96 CS/SCOW
101 GRIFFIN WAY
BLDG 1429, ROOM 120
EGLIN AFB, FL 32542-5707
SHEET ID
T-302C


Install Fire rated caulking on both sides of the wall
Adjustable collar
Install fire rated putty on both sides of wall after cable is installed
REQUIRES a 2.25-inch core
2-INCH EMT CONDUIT
Acoustic ceiling (drop ceiling)
Concrete or drywall wall
Install Fire rated caulking on both sides of the wall
Adjustable collar
Install fire rated putty on both sides of wall after cable is installed
REQUIRES a 4.50-inch core
4-INCH EMT CONDUIT
Acoustic ceiling (drop ceiling)
Concrete or drywall wall
Applicable Standards
ANSI/TIA 568.0 Generic Telecommunications Cabling for Customer Premises
ANSI/TIA 569 Telecommunications Pathways and Spaces
ANSI/TIA 606 Administration Standards for Telecommunications Infrastructure
ANSI/TIA 607 Generic Telecommunications Bonding and Grounding for Customer Premises
UFC 3-580-01 Telecommunications Interior Infrastructure Planning and Design, w/Change 1, 1 June 2016
96 CS Cyber Infrastructure Standards and Installation Specifications
BICSI – Telecommunications Distribution Methods Manual 14th Edition (Best Practices)
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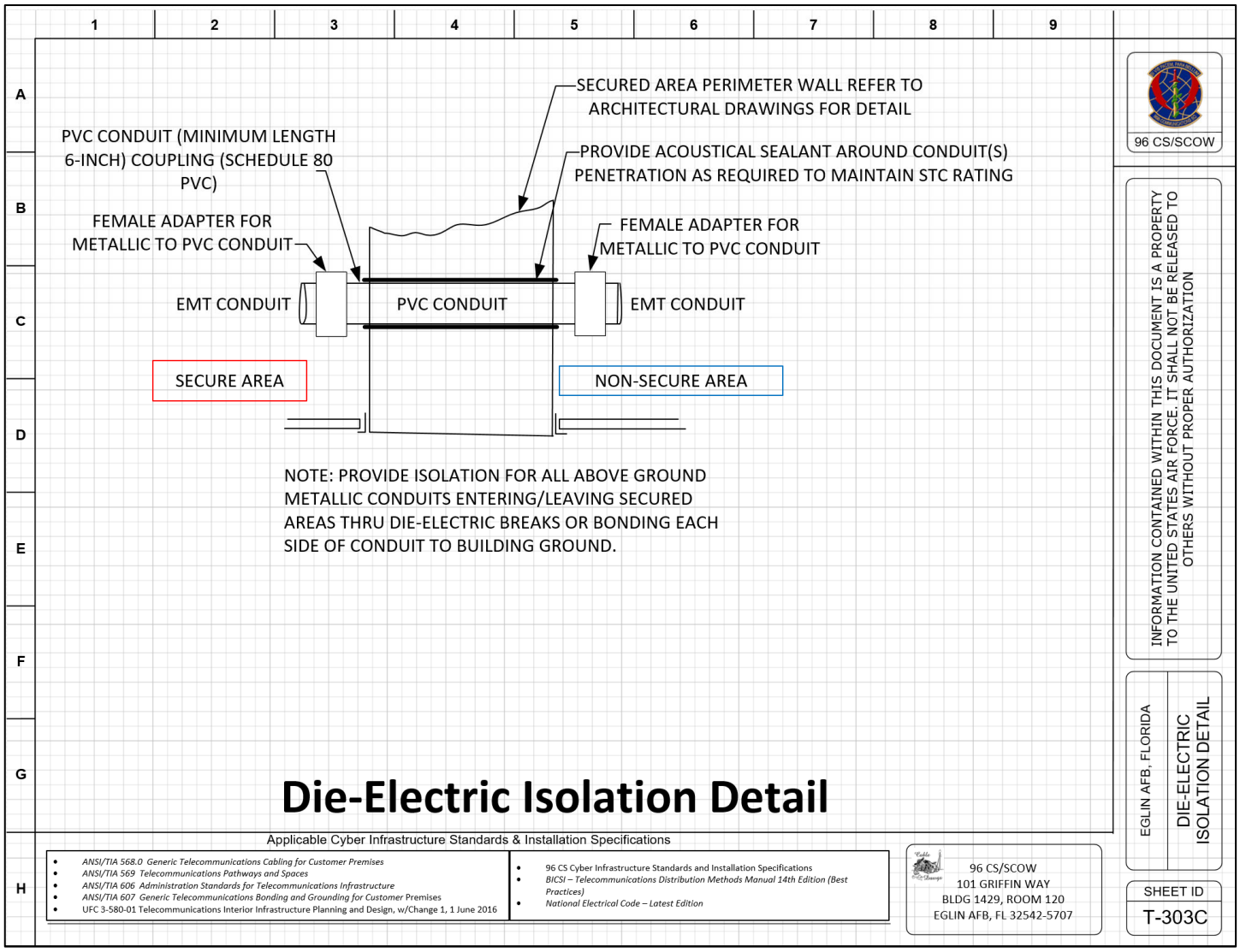
Wall Penetrations
SHEET ID
T-303A


SECURED AREA PERIMETER WALL REFER TO ARCHITECTURAL DRAWINGS FOR DETAIL
PVC CONDUIT (MINIMUM LENGTH 6-INCH) COUPLING (SCHEDULE 80 PVC)
PROVIDE ACOUSTICAL SEALANT AROUND CONDUIT(S) PENETRATION AS REQUIRED TO MAINTAIN STC RATING
FEMALE ADAPTER FOR METALLIC TO PVC CONDUIT
FEMALE ADAPTER FOR METALLIC TO PVC CONDUIT
EMT CONDUIT
PVC CONDUIT
EMT CONDUIT
SECURE AREA
NON-SECURE AREA
NOTE: PROVIDE ISOLATION FOR ALL ABOVE GROUND METALLIC CONDUITS ENTERING/LEAVING SECURED AREAS THRU DIE-ELECTRIC BREAKS OR BONDING EACH SIDE OF CONDUIT TO BUILDING GROUND.
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DIE-ELECTRIC ISOLATION DETAIL
Die-Electric Isolation Detail
Applicable Cyber Infrastructure Standards & Installation Specifications
ANSI/TIA 568.0 Generic Telecommunications Cabling for Customer Premises
ANSI/TIA 569 Telecommunications Pathways and Spaces
ANSI/TIA 606 Administration Standards for Telecommunications Infrastructure
ANSI/TIA 607 Generic Telecommunications Bonding and Grounding for Customer Premises
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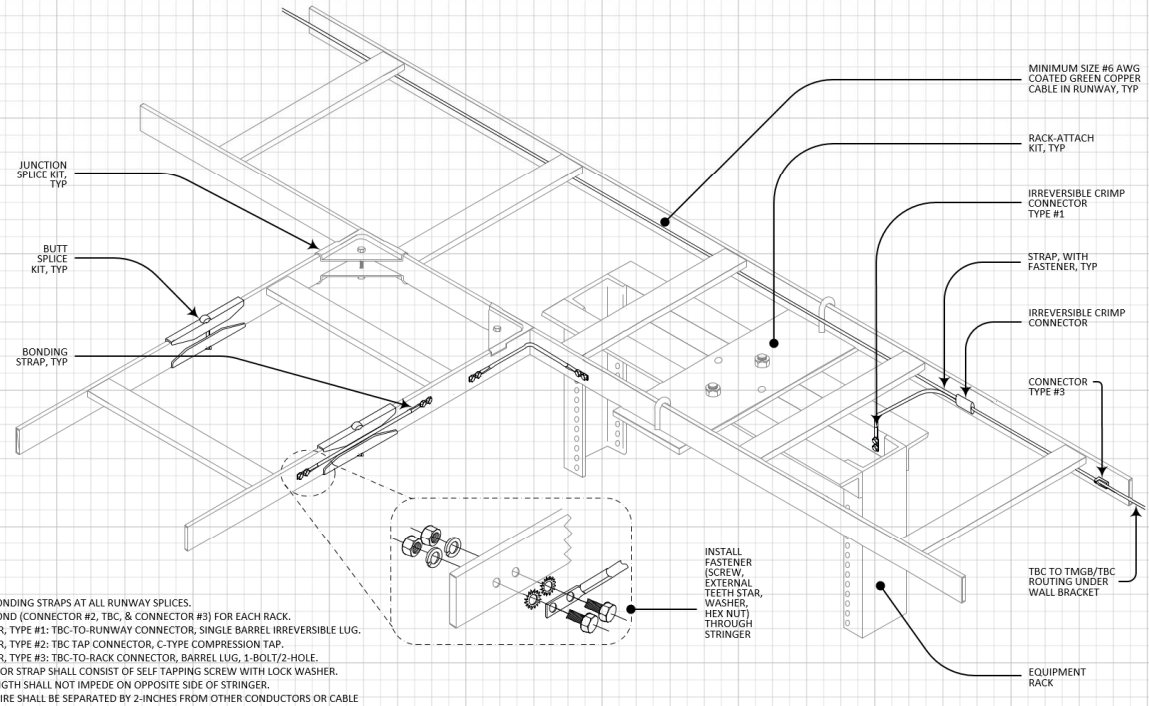
TELECOMMUNICATIONS CABLE RUNWAY BONDING



NOTES:
1. PROVIDE BONDING STRAPS AT ALL RUNWAY SPLICES.
2. PROVIDE BOND (CONNECTOR #2, TBC, & CONNECTOR #3) FOR EACH RACK.
3. CONNECTOR, TYPE #1: TBC-TO-RUNWAY CONNECTOR, SINGLE BARREL IRREVERSIBLE LUG.
4. CONNECTOR, TYPE #2: TBC TAP CONNECTOR, C-TYPE COMPRESSION TAP.
5. CONNECTOR, TYPE #3: TBC-TO-RACK CONNECTOR, BARREL LUG, 1-BOLT/2-HOLE.
6. FASTENER FOR STRAP SHALL CONSIST OF SELF TAPPING SCREW WITH LOCK WASHER. FASTENER LENGTH SHALL NOT IMPEDE ON OPPOSITE SIDE OF STRINGER.
7. GROUND WIRE SHALL BE SEPARATED BY 2-INCHES FROM OTHER CONDUCTORS OR CABLE GROUPS OR INSTALLED UNDER OR OFF THE SIDE OF THE CABLE TRAY.
8. TAG OR LABEL ALL GROUND CONNECTIONS IW ANSI/TIA 606 AND ANSI/TIA 607

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Cable Runway Section Bonding

Applicable Cyber Infrastructure Standards & Installation Specifications

- Unified Facilities Criteria 3-580-1, Telecomm Interior Infrastructure Planning and Design
- Unified Facilities Criteria 3-520-1, Interior Electrical Systems
- ANSI\TIA 569E, Commercial Building Standard for Telecom Pathways & Spaces Wiring
- ANSI\TIA 606D, Administration Standard for the Telecommunications Infrastructure
- ANSI\TIA 607D, Commercial Building Grounding and Bonding Requirements for Telecommunications
- 96 CS Cyber Infrastructure Standards and Installation Specifications
- BICSI – Telecommunications Distribution Methods Manual 14th Edition (Best Practices)
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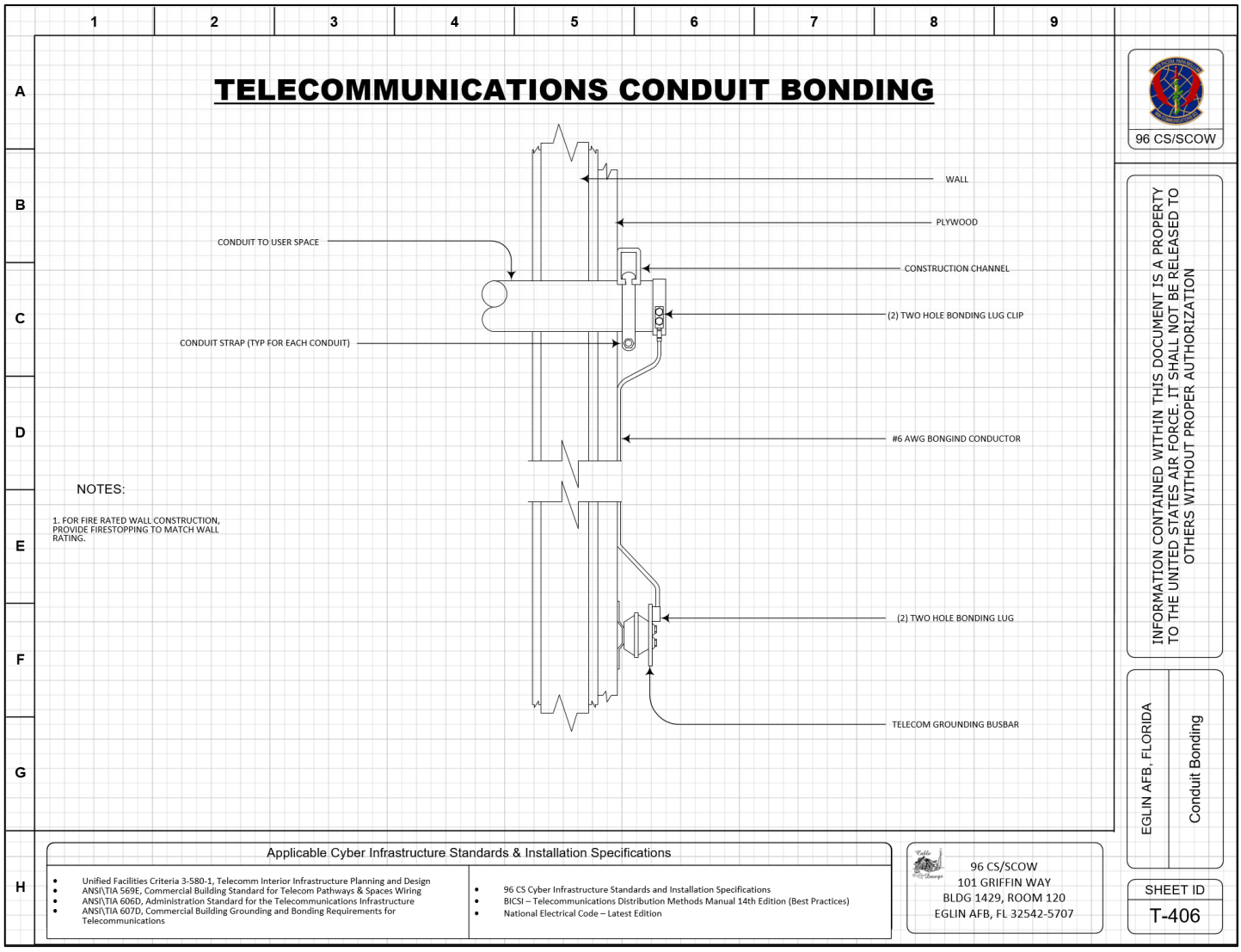
SHEET ID
T-405


TELECOMMUNICATIONS CONDUIT BONDING
WALL
PLYWOOD
CONDUIT TO USER SPACE
CONSTRUCTION CHANNEL
(2) TWO HOLE BONDING LUG CLIP
CONDUIT STRAP (TYP FOR EACH CONDUIT)
#6 AWG BONGIND CONDUCTOR
NOTES:
1. FOR FIRE RATED WALL CONSTRUCTION, PROVIDE FIRESTOPPING TO MATCH WALL RATING.
(2) TWO HOLE BONDING LUG
TELECOM GROUNDING BUSBAR
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Conduit Bonding
Applicable Cyber Infrastructure Standards & Installation Specifications
Unified Facilities Criteria 3-580-1, Telecomm Interior Infrastructure Planning and Design
ANSI\TIA 569E, Commercial Building Standard for Telecom Pathways & Spaces Wiring
ANSI\TIA 606D, Administration Standard for the Telecommunications Infrastructure
ANSI\TIA 607D, Commercial Building Grounding and Bonding Requirements for Telecommunications
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BICSI – Telecommunications Distribution Methods Manual 14th Edition (Best Practices)
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101 GRIFFIN WAY
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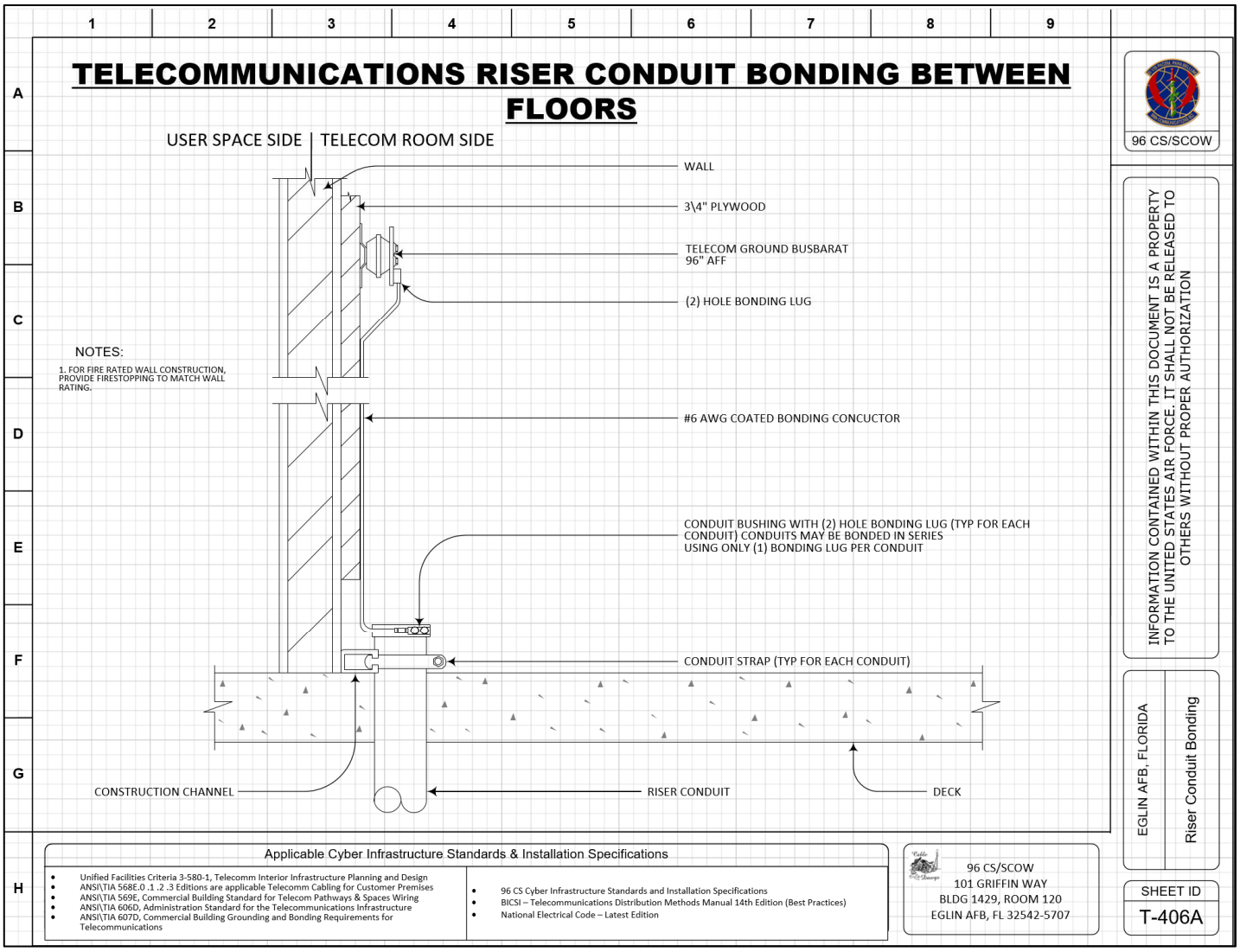
SHEET ID
T-406


TELECOMMUNICATIONS RISER CONDUIT BONDING BETWEEN FLOORS
USER SPACE SIDE
TELECOM ROOM SIDE
WALL
3\4" PLYWOOD
TELECOM GROUND BUSBARAT 96" AFF
(2) HOLE BONDING LUG
NOTES:
1. FOR FIRE RATED WALL CONSTRUCTION, PROVIDE FIRESTOPPING TO MATCH WALL RATING.
#6 AWG COATED BONDING CONCUCTOR
CONDUIT BUSHING WITH (2) HOLE BONDING LUG (TYP FOR EACH CONDUIT) CONDUITS MAY BE BONDED IN SERIES USING ONLY (1) BONDING LUG PER CONDUIT
CONDUIT STRAP (TYP FOR EACH CONDUIT)
CONSTRUCTION CHANNEL
RISER CONDUIT
DECK
96 CS/SCOW
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EGLIN AFB, FLORIDA
Riser Conduit Bonding
Applicable Cyber Infrastructure Standards & Installation Specifications
Unified Facilities Criteria 3-580-1, Telecomm Interior Infrastructure Planning and Design
ANSI\TIA 568E.0 .1 .2 .3 Editions are applicable Telecomm Cabling for Customer Premises
ANSI\TIA 569E, Commercial Building Standard for Telecom Pathways & Spaces Wiring
ANSI\TIA 606D, Administration Standard for the Telecommunications Infrastructure
ANSI\TIA 607D, Commercial Building Grounding and Bonding Requirements for Telecommunications
96 CS Cyber Infrastructure Standards and Installation Specifications
BICSI – Telecommunications Distribution Methods Manual 14th Edition (Best Practices)
National Electrical Code – Latest Edition
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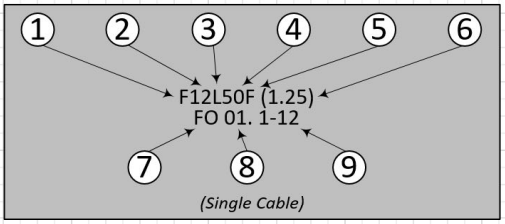
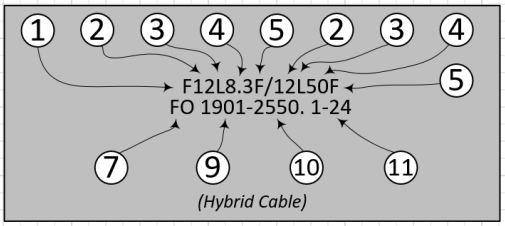
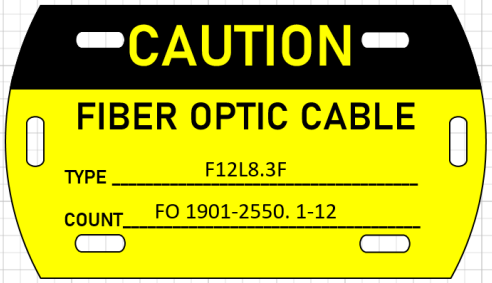
SHEET ID
T-406A

FIBER CABLE TAG INFORMATION







Fiber Optic Cable

1	-	P = Plenum (Else Leave Blank) R = Riser Rated (Else Leave Blank) F = Indoor/Outdoor
2	-	12 = 12 Strand Fiber Cable (Range is 1-288)
3	-	L = Loose Tube Buffer T = Tight Tube Buffer
4	-	Core Size in Microns Multimode = 50 and 62.5 (UNKNOWN = MM) Singlemode = 8.3, 9.2 or 10 (UNKNOWN = SM) (Cladding is assumed to be 125um, If different include after core size, separated with slash "/")
5	-	F = Filled Core (leave blank for Air Core)
6	-	(1.25) = Cable installed in 1.25" I.D. innerduct 1 = Cable installed in 1" I.D. innerduct Blank = No innerduct
7	-	FO – Fiber Optic Cable
8	-	##### - Cable Number (Range is 01 – 99999)
9	-	#### - Source Building Number
10	-	#### - Destination Building Number
11	-	1 – 12 = Conductor Count

CABLE NUMBERS WILL EITHER USE A SEQUENTIAL NUMBERING PATTERN OR SOURCE AND DESTINATION BUILDING NUMBERS

IF THE BUILDING NUMBER METHOD IS USED, THE SOURCE BUILDING WILL BE THE ITN AND DESTINATION WILL BE THE EBN (BACKBONE CABLES MAY USE EITHER ITN AS THE SOURCE BUILDING)

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Fiber Cable Tag Information

Applicable Cyber Infrastructure Standards & Installation Specifications

- Unified Facilities Criteria 3-580-1, Telecomm Interior Infrastructure Planning and Design
- ANSI\TIA 606D, Administration Standard for the Telecommunications Infrastructure
- 96 CS Cyber Infrastructure Standards and Installation Specifications
- BICSI – Telecommunications Distribution Methods Manual 14th Edition (Best Practices)
- National Electrical Code – Latest Edition

- Cables shall be label/tagged at ducts, Conduits, service loops and transition entrance and exit points throughout the cable pathway to clearly identify ISP/OSP circuits.

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101 GRIFFIN WAY
BLDG 1429, ROOM 120
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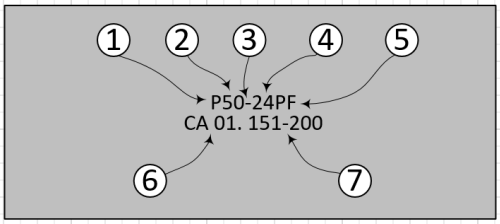
SHEET ID
T-501B

COPPER CABLE TAG INFORMATION



Central Office Copper Cable

1	-	Cable Outer Protection P = Plastic Sheath Cable PP = Double Layer Plastic Sheath Core Blank = Lead Sheath Cable A = ABAM Cable WA = Wire Armored Cable JP = Jute Protected Cable TA = Tape Armored Cable DTA = Double Tape Armored Cable
2	-	(Size) Number of Cable Pairs in Sheath (For Greater than 100 pairs Exclued "00"s when labeling cables)
3	-	"X" = 24 Pair (or less) Cables "-" = 25 pair (or greater) cables
4	-	Wire Gauge Size (19, 22, 24, or 26)
5	-	Conductor Protection PF = Plastic Insulated Filled Core Cable FF = Foam Insulated Filled Core Cable P = Plastic Insulated Air Core Cable
6	-	Cable Number (Two Numeric Digits) "CA" Optional
7	-	Inclusive Cable Count(s) (If pairs are Dead/Dead Ended/Abandoned they are on a separate line below and denoted with a plus sign "+" followed by an Alpha Character (Sequential if Multiples) a comma "," and the Inclusive pair count)

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Copper Cable Tag Information

Applicable Cyber Infrastructure Standards & Installation Specifications

- Unified Facilities Criteria 3-580-1, Telecomm Interior Infrastructure Planning and Design
- ANSI\TIA 606D, Administration Standard for the Telecommunications Infrastructure
- 96 CS Cyber Infrastructure Standards and Installation Specifications
- BICSI – Telecommunications Distribution Methods Manual 14th Edition (Best Practices)
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- Cables shall be label/tagged at ducts, conduits, service loops and transition entrance and exit points throughout the cable pathway to clearly identify ISP/OSP circuits.

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101 GRIFFIN WAY
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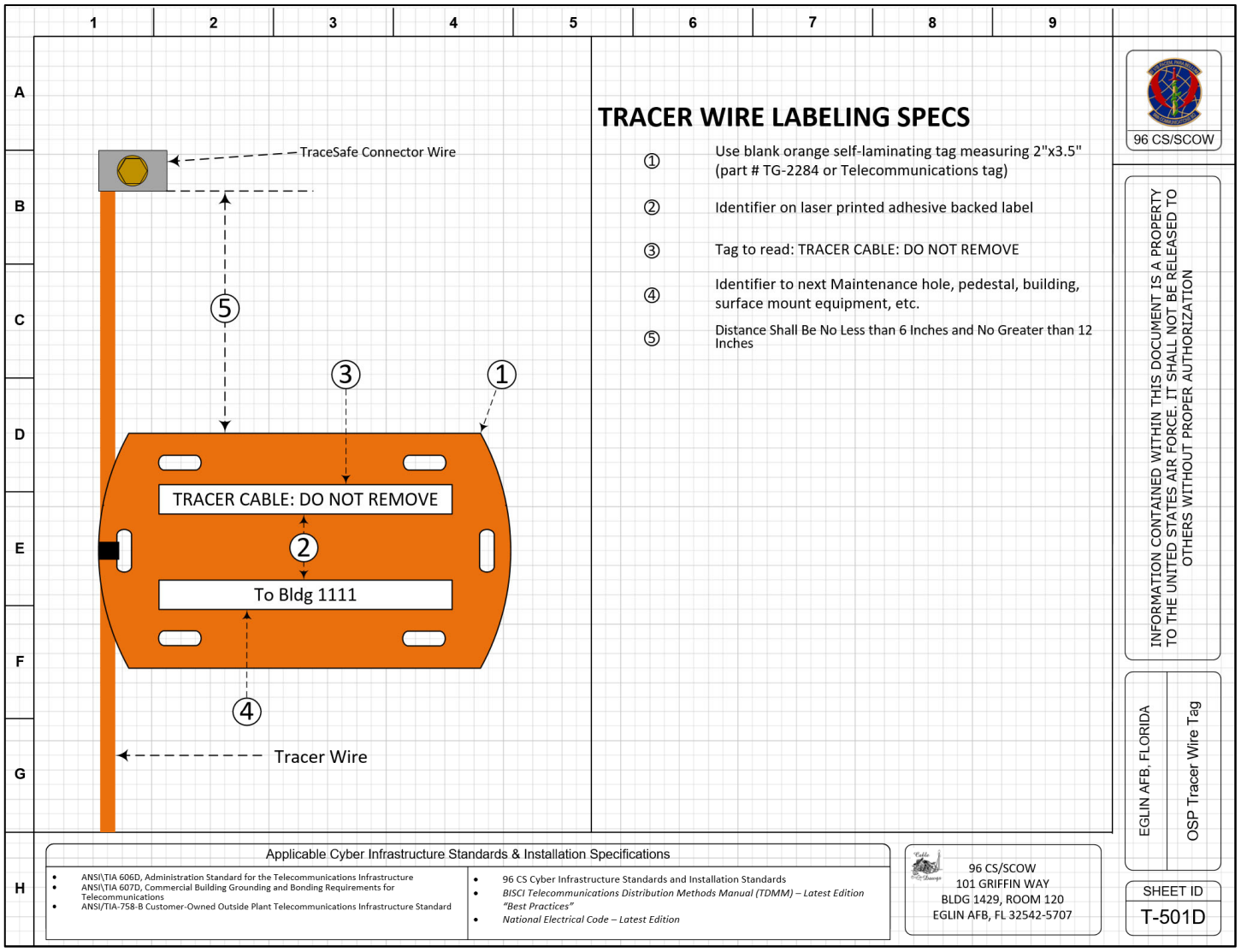
T-501C


TRACER WIRE LABELING SPECS
① Use blank orange self-laminating tag measuring 2"x3.5" (part # TG-2284 or Telecommunications tag)
② Identifier on laser printed adhesive backed label
③ Tag to read: TRACER CABLE: DO NOT REMOVE
④ Identifier to next Maintenance hole, pedestal, building, surface mount equipment, etc.
⑤ Distance Shall Be No Less than 6 Inches and No Greater than 12 Inches
TraceSafe Connector Wire
TRACER CABLE: DO NOT REMOVE
To Bldg 1111
Tracer Wire
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OSP Tracer Wire Tag
Applicable Cyber Infrastructure Standards & Installation Specifications
ANSI\TIA 606D, Administration Standard for the Telecommunications Infrastructure
ANSI\TIA 607D, Commercial Building Grounding and Bonding Requirements for Telecommunications
ANSI/TIA-758-B Customer-Owned Outside Plant Telecommunications Infrastructure Standard
96 CS Cyber Infrastructure Standards and Installation Standards
BISCI Telecommunications Distribution Methods Manual (TDMM) – Latest Edition "Best Practices"
National Electrical Code – Latest Edition
96 CS/SCOW
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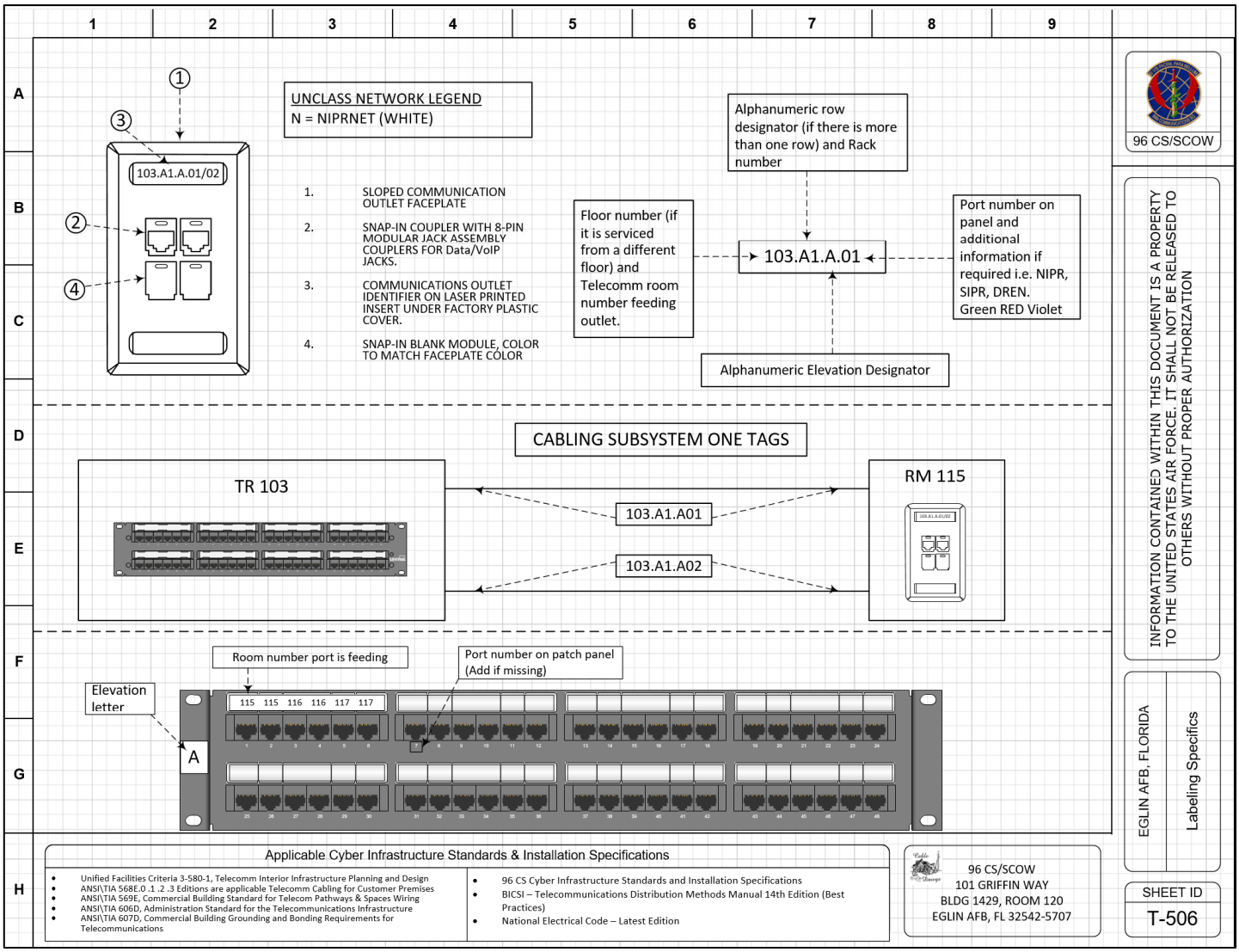
SHEET ID
T-501D


UNCLASS NETWORK LEGEND
N = NIPRNET (WHITE)
103.A1.A.01/02
1. SLOPED COMMUNICATION OUTLET FACEPLATE
2. SNAP-IN COUPLER WITH 8-PIN MODULAR JACK ASSEMBLY COUPLERS FOR Data/VoIP JACKS.
3. COMMUNICATIONS OUTLET IDENTIFIER ON LASER PRINTED INSERT UNDER FACTORY PLASTIC COVER.
4. SNAP-IN BLANK MODULE, COLOR TO MATCH FACEPLATE COLOR
Alphanumeric row designator (if there is more than one row) and Rack number
Floor number (if it is serviced from a different floor) and Telecomm room number feeding outlet.
103.A1.A.01
Port number on panel and additional information if required i.e. NIPR, SIPR, DREN. Green RED Violet
Alphanumeric Elevation Designator
CABLING SUBSYSTEM ONE TAGS
TR 103
RM 115
103.A1.A01
103.A1.A02
Room number port is feeding
Port number on patch panel (Add if missing)
Elevation letter
A
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Labeling Specifics
Applicable Cyber Infrastructure Standards & Installation Specifications
Unified Facilities Criteria 3-580-1, Telecomm Interior Infrastructure Planning and Design
ANSI\TIA 568E.0 .1 .2 .3 Editions are applicable Telecomm Cabling for Customer Premises
ANSI\TIA 569E, Commercial Building Standard for Telecom Pathways & Spaces Wiring
ANSI\TIA 606D, Administration Standard for the Telecommunications Infrastructure
ANSI\TIA 607D, Commercial Building Grounding and Bonding Requirements for Telecommunications
96 CS Cyber Infrastructure Standards and Installation Specifications
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96 CS/SCOW
101 GRIFFIN WAY
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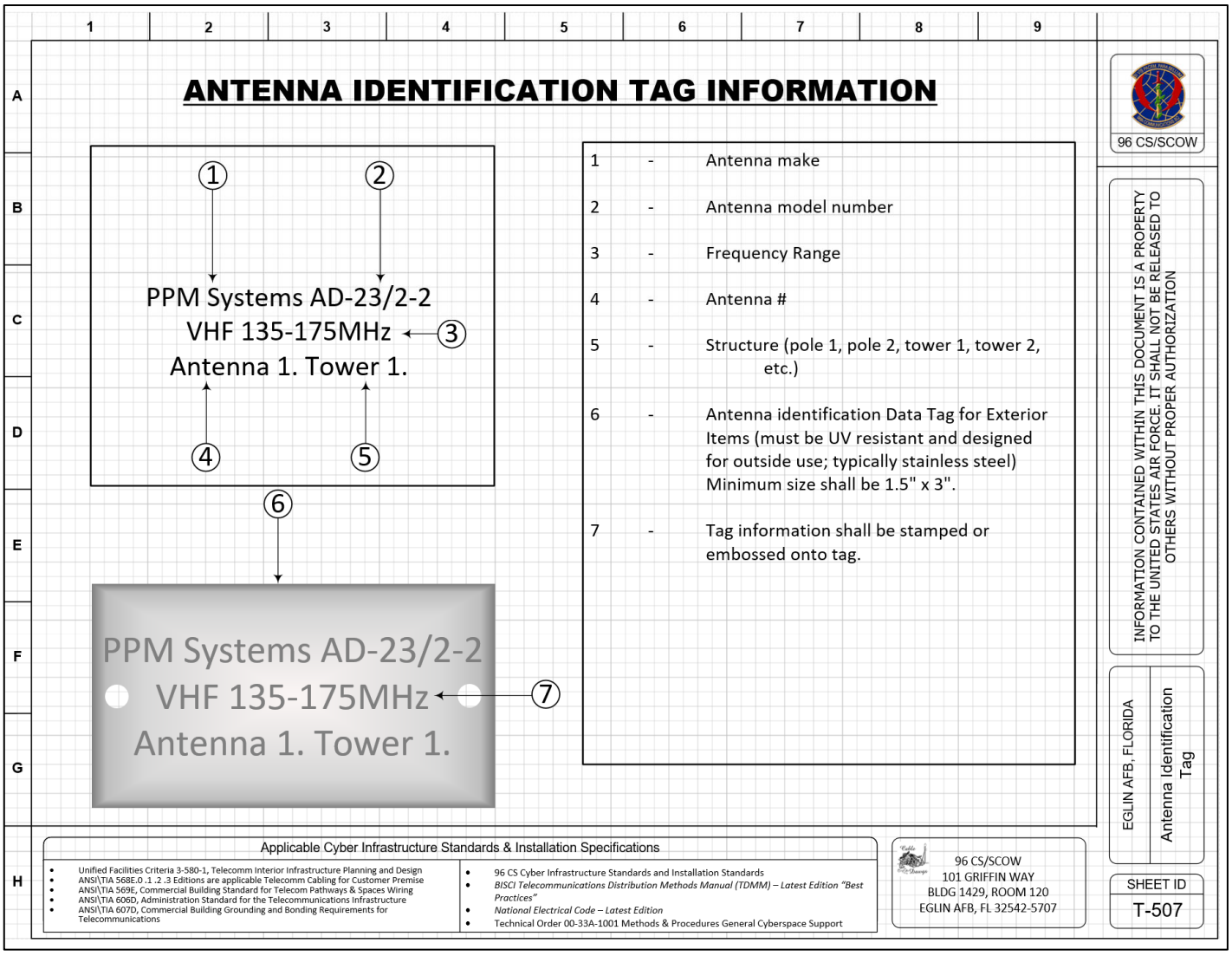
EGLIN AFB, FL 32542-5707
SHEET ID
T-506


ANTENNA IDENTIFICATION TAG INFORMATION
PPM Systems AD-23/2-2
VHF 135-175MHz
Antenna 1. Tower 1.
1 - Antenna make
2 - Antenna model number
3 - Frequency Range
4 - Antenna #
5 - Structure (pole 1, pole 2, tower 1, tower 2, etc.)
6 - Antenna identification Data Tag for Exterior Items (must be UV resistant and designed for outside use; typically stainless steel) Minimum size shall be 1.5" x 3".
7 - Tag information shall be stamped or embossed onto tag.
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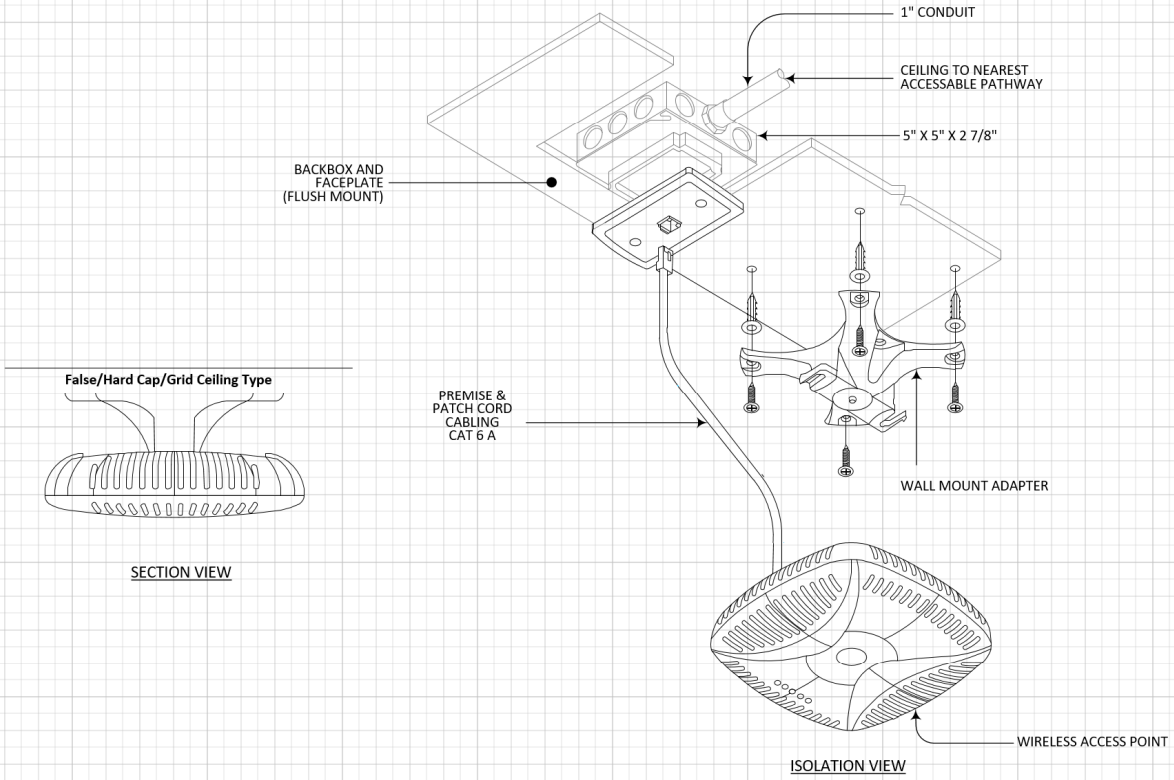
Antenna Identification Tag
SHEET ID
T-507
Applicable Cyber Infrastructure Standards & Installation Specifications
Unified Facilities Criteria 3-580-1, Telecomm Interior Infrastructure Planning and Design
ANSI\TIA 568E.0 .1 .2 .3 Editions are applicable Telecomm Cabling for Customer Premise
ANSI\TIA 569E, Commercial Building Standard for Telecom Pathways & Spaces Wiring
ANSI\TIA 606D, Administration Standard for the Telecommunications Infrastructure
ANSI\TIA 607D, Commercial Building Grounding and Bonding Requirements for Telecommunications
96 CS Cyber Infrastructure Standards and Installation Standards
BISCI Telecommunications Distribution Methods Manual (TDMM) – Latest Edition "Best Practices"
National Electrical Code – Latest Edition
Technical Order 00-33A-1001 Methods & Procedures General Cyberspace Support
96 CS/SCOW
101 GRIFFIN WAY
BLDG 1429, ROOM 120
EGLIN AFB, FL 32542-5707

WIRELESS ACCESS POINT MOUNTED IN CEILING



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Wireless Access Point

Applicable Cyber Infrastructure Standards & Installation Specifications

- Unified Facilities Criteria 3-580-1, Telecomm Interior Infrastructure Planning and Design
- ANSI\TIA 568E.0 .1 .2 .3 Editions are applicable Telecomm Cabling for Customer Premises
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- ANSI\TIA 607D, Commercial Building Grounding and Bonding Requirements for Telecommunications
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SHEET ID
T-603