

Hill Air Force Base
Installation Facilities Standards (IFS)

G014 AFB IFS Electrical

Comply with Air Force Corporate Standards for Overview:

<http://afcfs.wbdg.org/index.html>

Summary of Sections in this Supplementary Document:

- G14.0. General Requirements
- G14.1. General Design Criteria
- G14.2. Hill AFB Exterior Distribution
- G14.3. Hill AFB Interior Distribution
- G14.4. Exterior Lighting
- G14.5. Interior Lighting
- G14.6. Permitted Lighting Technology
- G14.7. Additional Lighting Guidelines
- G14.8. TEMPEST
- G14.9. Special Protection for Rotating Electrical Equipment:
- G14.10. Lightning, Static & Surge Protection
- G14.11. Generators
- G14.12. ACS Systems
- G14.13. Intrusion Detection Systems (IDS)
- G14.14. Cybersecurity Compliance of Facility Related to Control Systems

G14.0 General Requirements

14.0.1 Note: This Supplementary Document is provided as part of the Hill AFB IFS and will become fully part of the IFS. If there are any discrepancies between this Supplementary Document and the requirements of the IFS, the IFS will govern.

14.0.2 This Supplementary Document supersedes the Hill Air Force Base Architectural Compatibility Guide dated 01 February 2019.

G14.1 General Design Criteria

14.1.1 Applicable Design Criteria: All installations must comply with the following criteria as applicable including but not limited to UFC 3-501-01, *Electrical Engineering* which provides minimum requirements for design analyses and calculations, UFC 3-550-01 *Exterior Electrical Power Distribution* which provides minimum requirements for underground distribution system design (AF ETL 11-10:

Electrical Manhole Design Considerations clarifies these requirements and provides additional recommendations), NFPA 70 *National Electric Code* (NEC), NFPA 70E *Standard for Electrical Safety in the Work Place*, the *Lineman's and Cableman's Handbook*, AFMAN 32-1065 *Grounding and Electrical Systems*, City Light & Power (CLP) *Electric Service Connection Standards Manual*. Note that CLP specifications take precedence over UFC requirements. UFC 3-550-01 Section 1-6 states, "This UFC does not apply to ... Military installations that have privatized their electrical distribution system."

Electrical distribution segments/appurtenances which will become ownership of the system owner, CLP, will comply with their service connection manual, available from CLP. (See URL <https://clp.exavault.com/share/view/m6nc-eyf62h1y> using access code: CLPscp101!).

14.1.2 Coordination Requirements: Prior to the installation or modification of any existing exterior electrical service the privatized electrical system owner, City Light & Power (CLP), and the 75th CES Exterior Electrical shop must be consulted to review the overall primary and secondary voltage scope, design and equipment locations. CLP will also be the authority having jurisdiction (AHJ) on all exterior/outdoor electrical installations which are within the privatized electrical system.

14.1.3 Service Connection to Privatized Electrical System: The contractor will engage the services of the System Owner, CLP, to perform construction activities on any primary exterior electrical distribution system assets owned by CLP. It is recommended that the prime contractor contract with CLP to construct new primary distribution elements such as transformers, switches, electrical lines, etc. that will ultimately be owned by CLP. Contractors may construct new assets for the primary distribution system themselves, but they will be required to pay for compliance inspections and other fees as documented by CLP. To obtain a quote from CLP the contractor may request a Service Connection Application/Quote Request form at rrh@CLPinc.com, tjc@CLPinc.com, nrc@CLPinc.com and/or cmb@CLPinc.com.

14.1.4 Protection of facilities: When required by the City Light & Power and 75th Exterior Electrical section, bollards will be installed by the contractor to protect temporary and permanent exterior electrical services.

14.1.5 Temporary Power: All temporary power will be run at the expense of the contractor that is performing the work. CLP will be notified by the project manager and a connection location will be determined. CLP may require bollards to protect temporary facilities as stated in 14.1.4.

G14.2 Hill AFB Exterior Distribution

14.2.1 Primary Voltage: The Primary voltage at Hill AFB is 12,470 volts. This infrastructure is almost entirely within the Privatized Electrical System (See Section 14.1) with a few exceptions.

14.2.2 Transformers: All new transformers will be 3-phase pad mounted. Primary voltage is 12470 volts delta. Primary case will be grounded by a ground conductor back to the source switch. Transformers will have loop feed with elbow arrestors, dead front, bushing wells with inserts installed, 4 hole spades, 3-phase gang operated on/off loadbreak switch, bayonet fusing, top level oil temperature gages, liquid level & pressure vacuum gages, drain valve with sampler, copper windings and two each 2-1/2% taps above and below normal. This will assure that the user voltage can be regulated within proper limits. Lightning arrestors will be installed on all unused high voltage well bushings. No Parking stands or Y splitters will be installed unless deemed necessary by 75th CES Exterior Electrical section or CLP.

14.2.3 High Voltage Conductors: High voltage primary conductors may be copper or aluminum, unless specified in construction project documents.

14.2.4 Buried High Voltage Cable: All buried high voltage cable (over 600 volts) will be placed in conduit with a minimum of 3-inches of concrete encasing around the conduit. Depth of burial will be 36 inches below grade. All high voltage conductor installations will be 36 inches deep minimum to the top of the conduit, and they will be encased in concrete to include airfield runway lighting circuits. A 6-inch wide, red plastic marker tape with the words "Danger-Buried High Voltage Cable" will be placed directly over the high voltage line at a depth of 12 inches below finished grade or 6 inches below the top of sub grade whichever is deeper. Any change of

direction that is more than 5 degrees will require the installation of a manhole. Maximum spacing between manholes or equipment must not exceed 500 feet.

14.2.5 Buried Conductors Below Traffic: All conduit containing conductors **of any voltage** including communication circuits that run under streets or parking lots will be concrete encased 3 inches thick on all sides.

14.2.6 Only Rigid Galvanized Steel (RGS) 90 degree elbows and Rigid Galvanized Steel (RGS) conduit or fiberglass sweeps for high voltage will be used when making the transition from underground to overhead high voltage power lines. Always use a minimum of two layers of PVC pipe wrap tape to protect the entire elbow against corrosion. Before wrapping with tape, coat the pipe or other metal surfaces with Pipe Primer to enhance adhesion. Wrap the last layer in a more relaxed manner to prevent this layer from flagging. Only one high voltage riser in rigid galvanized steel per utility pole will be installed.

14.2.7 Support Structures: All power poles, steel support structures and their foundations will be rated for a 100 mph wind load. The minimum dimensions for cross arms will be 8-ft long by 3 1/4-inches wide by 4 1/2-inches deep.

14.2.8 All new high voltage cable will be 15 KV, 133 percent insulation.

14.2.9 Watt-hour meters will be installed on all Base facilities requiring new service and modifications to existing facility power requirements. Approved AMRS compatible watt hour meters will be provided and be connected to the AMRS system. Meters must meet the requirements of UFGS 26 27 13.10 30, Electric Meters and ASHRAE Standard 90.1. All new meter installations or modifications to existing electrical services must include the following additional requirements:

14.2.9.1. Provide new AMRS complaint electrical KWH demand meter, Schneider 5563 with Modbus communications protocol and option INP200 or other approved equivalent equipment. Refer to Section 6.5.9 for AMRS Meter Specifications, for additional information and requirements with respect to electric watt-hour meters.

14.2.9.2. The meter installation will include, but is not limited to, network connections, installation of safety disconnect switches and Current Transformers (CT's) in the electrical/mechanical room in each building. All new meter installations, including relocated existing meters, three phase voltage will be supplied from a breaker, disconnect or fused source which must be finger safe, labeled at the electrical meter and electrical panel. All meter safety disconnect switches will be marked as follows "Meter Disconnect NOT Service Equipment" per the NEC. In addition, instructions to safely engage the safety disconnect switches and finger safe shorting blocks for CT conductors will be included inside each meter assembly.

14.2.9.3. AMRS meter will be located within its own rated enclosure inside main electrical room. If this is not feasible, the enclosure may be mounted near the electrical service equipment or nearby but not on the outside of the building. In the event communications equipment and/or a metering device has to be located in an exterior location, the meter enclosure must be a lockable NEMA 4 enclosure. All new install interior meters are required to be enclosed in a lockable NEMA 3 enclosure unless otherwise noted. All new and relocated meter assemblies be located approximately 5 feet above the ground (4 feet minimum -- 6 feet maximum). Clearances about the transformer as required by City Light & Power (CLP) will be observed.

14.2.9.4. Provide CT's which are high accuracy type and rated for type of installation on insulated or uninsulated locations. CT's will be located within the main electrical gear unless otherwise approved by the Base Exterior Electrical Shop. Provide manufacturer recommended brackets or inserts to support and center CT device positioning. Coordinate installation of CT's with Base Exterior Electrical Shop.

14.2.9.5. Meter enclosures will include CT shunt block capability and fuse block for phase voltage references and meter line voltage rated per manufacturer OR rated meter enclosure with meter line voltage fusible protection rated per manufacturer and self-contained meter test switch

that provides full electrical isolation and shunt capability. Provide terminal block or for multi ratio CT's use a shorting terminal block. Extend leads from the CT to the terminal block; if necessary, add additional length of cable to the opposite side off the terminal block in order to provide a solid mechanical connection point. Wire nuts and crimp splices are not permitted as they can become loose due to improper torque on the crimp or nut installation during operation. 14.2.9.6. CT reference wiring to meter location will either be continuous or fusible protection and shunt capability will be installed locally and easily accessible without exposing personnel to additional electrical hazards.

14.2.9.7. Meter voltage reference and meter power wiring will conform to standard NEC color code. Meter CT wiring will be black or white to match CT terminal location with matching voltage phase identification stripes or color coding tape (per NEC color code) for reference at all access locations.

14.2.9.8. In accordance with IEEE Standards, no more than two each solderless connectors are permitted to be terminated under lugs on CT's, test switches, meter sockets etc.

14.2.9.9. New communications installation/connection will be from meter to RJ45 jack (blue CAT6), which is located within 6 feet of meter, to existing or new patch panel adjacent to the base network switch. Cables labels will be permanent, wrap-around and self-laminating with text generated by a mechanical device. Labels will be applied at both ends of the cable, visible during normal maintenance of the infrastructure, resistant to environmental conditions (such as moisture, heat or ultraviolet light) and have a design life equal to or greater than that of the labeled Component. Contractor will provide to the Government a 6 ft. patch cord for Base Communications to make the final connection from the patch panel to the AF switch. The CAT6 cable will be installed in 1" rigid conduit.

14.2.9.10. Provide approved surge protection as required for all communication and pulse cabling extending from the exterior to the interior of a facility. This includes gas meter communication cables from the exterior to the interior of the building. Surge suppression devices will be installed w/in 3 feet of the building entrance inside the facility unless otherwise noted. Devices will be easily accessible and labeled to aide in location during future troubleshooting efforts. Surge protection devices will be Power over Ethernet (PoE) compatible and housed within an enclosure that allows space for a proper cable bend radius.

14.2.9.10.1 Preferred technical approach to network communication cabling in excess of 328 feet is: Fiber optic cable and fiber media converters with dedicated power outlets. Fiber media converter will be installed in the communications room within 6 feet of the network switch and within 6 feet of the electric meter enclosure.

14.2.9.11. The following deliverables will be provided by submittal to the Government upon final inspection of the installation. Final acceptance will include Government approval of a complete submittal.

- a. Screen Shot capture showing device configured with required security settings
- b. Meter configuration sheet
- c. Screenshot capture of meter ping results
- d. Screen shot capture of device status, phasor diagram, and polling information using meter software
- e. Screenshot capture of Modbus registers for all 3 phases, phase to phase voltage, amperage, and kilowatt hours using a generic Modbus tester
- f. Photographs of all installed devices, safety disconnects, and associated wiring
- g. Provide manufacturers calibration certificates for all contractor installed equipment
- h. Provide meter MAC address

14.2.9.12 Provide a meter label that is 1in x 3in, weather resistant, and is permanently attached above the meter face using approved materials and methods. The label will be engraved with the naming convention provided by the Government.

14.2.10 Exterior equipment will not be placed-near the drip lines of roof overhangs or rain gutters.

14.3 Hill AFB Interior Distribution

Do not use aluminum conductors or bus bars inside any facility at Hill AFB. Only copper conductors and bus bars should be used. All dry type transformers must have copper windings.

14.3.1 All new building wiring systems will be designed using 277/480 volts unless uneconomical to accomplish and will be in rigid conduit or central open raceways.

14.3.2 Lighting will be installed using 277 volts if available.

14.3.3 Do not use any polystyrene lenses in light fixtures.

14.3.4 Comply with federal energy requirements when designing lighting systems. See section 5 Mandatory Energy and Water Conservation Requirements above.

14.3.5 In buildings that will have a considerable amount of computer equipment installed, or will have systems furniture:

1. a. For installations with a higher density of computer equipment installed, run oversized neutral conductors from the transformer to service equipment, and from service equipment through the distribution panels to the branch circuit panels (double sized neutral conductors are recommended).
2. b. For systems furniture from the branch circuit panel boards, run eight conductor circuits (three hot conductors, three neutral conductors one ground conductor, and one isolated ground conductor) to all receptacle outlets, including those receptacle outlets in pre-wired systems furniture. Provide oversized neutrals to match the harness configuration and balance loads between circuits and phases. A single circuit must not serve more than 4 cubicles under any circumstances. Refer to Section 4.2.6 for additional information and requirements regarding systems furniture.
3. c. Run all other circuits as per the National Electric Code requirements.

14.3.6 All installed floor mounted electrical gear placed will be provided with a minimum 4-inch thick concrete housekeeping pad. The pad will extend 4 in horizontally beyond the front and sides of the gear (and back if not located against a wall). The pad will be seismically anchored to the floor and provided with high strength concrete with a 1-inch 45-degree chamfer along the top edges. Provide steel reinforcement for housekeeping pads which contain heavy equipment such as larger switchgear and transformers in a line up.

14.3.7 Branch Circuit Conductors and Feeders. All branch circuit and feeder conductors below 100-amperes must be copper only. All larger branch circuit and feeder conductors may be copper or aluminum alloy as stipulated in Section 14.3.7.1.

14.4 Exterior Lighting

14.4.1 Light Poles: All light poles and foundations will be rated for a 100 mph wind load.

14.4.2 Comply with federal energy requirements when designing lighting systems. See Section 6, Mandatory Energy and Water Conservation Requirements above. Use white LED lights for exterior lighting when economically viable.

14.4.3 Photoelectric Controls: Use photoelectric controls on exterior lighting where possible to save energy. Where practical fixtures will be grouped together using contactors, which are controlled by a single photocell.

14.4.4 Exterior Lighting Color Temperature Requirements. Provide lighting with CCT of 4000K for the following:

- General building mounted exterior lighting
- Area lighting including walkways and parking lighting
- Airfield area lighting for aprons, hangars and shelters

14.5 Interior Lighting

14.5.1 Lighting power levels must comply with ANSI/ASHRAE/IESNA Standard 90.1

14.5.2 Interior Lighting Calculations: Computer-generated photometric plans for each space are required to verify proposed luminaires and locations meet the required performance criteria of the design using a light loss factor (LLF) of 0.7. Photometric plan submittals must include:

- Horizontal illuminance measurements at workplane or other designated height above
- finished floor.
- Minimum and maximum illuminance levels.
- Average maintained illuminance level.
- Average to minimum and maximum to minimum ratios for horizontal illuminance
- Lighting power density (Watts per square foot or per square meter)

14.5.3 Use a color rendering index (CRI) of no less than 80 for interior applications.

14.5.4 Use a correlated color temperature (CCT) of no greater than 4100K as stated on the manufacturer's cut sheet for all interior spaces.

14.5.5 Do not mix source CCTs within a single building with the purpose of minimizing maintenance staff from having to keep track of specific CCTs.

14.5.6 Daylighting Controls- Control the electric lighting in response to daylight.

- Continuously dim electric light in task oriented areas such as offices, conference rooms, classrooms, or turning it off in non-task areas such as circulation and lounge areas.
- Control primary and secondary daylight zones separately. Refer to Daylighting Best Practices in APPENDIX C of UFC 3-530 for additional information.

14.5.7 Exit signs will be the photo-luminescent type.

14.6 Permitted Lighting Technology:

14.6.1 Solid State Lighting (SSL):

- LED luminaires must be dimmable or capable of multi-level control according to the
- control strategy.
- LED light source replacements (screw base) are only permitted for the replacement of
- incandescent or compact fluorescent light sources.
- IES LM-79, LM-80, and TM-21 testing reports must be supplied from manufacturer and include all relevant information.
- Consistent with industry standard, all LED luminaires require a 10-year warranty.

- Ballasts, Drivers, Generators and Power Supplies
 - Total current harmonic distortion (THD) less than or equal to 20%.
 - Power factor (PF) greater than or equal to 0.9
 - For current and future dimming requirements (i.e. smart grid, curfew, adaptive),
 - use dimmable or bi-level drivers compatible with standard dimming control
 - circuit of 0-10V. Other dimming protocols must comply with Network
 - Certification requirements.

Note: For LED applications, provide built in failure detection in the luminaire or include labor costs to measure light levels (baseline and 70% output - before the end of the warranty) in the LCCA.

14.6.2 Compact Fluorescent Light (CFL):

- Do not use CFL sources less than 13 watts.
- Do not use u-bent fluorescent light sources.
- Do not use in cold temperature environments (colder than 50 degrees Fahrenheit), except where alternatives such as SSL are unavailable
- Ballasts, Drivers, Generators and Power Supplies
 - Provide dimmable ballasts.
 - Provide programmed start ballasts for compact fluorescent light sources that include end of life protection

14.6.3 Linear Fluorescents:

- Do not use LED linear fluorescent light source replacements.
- Do not use T12 light sources.
- Do not use in cold temperature environments (colder than 50 degrees Fahrenheit), except where alternatives such as SSL are unavailable.
- Ballasts, Drivers, Generators and Power Supplies
 - Provide dimmable or bi-level ballasts in spaces
 - Use programmed start ballasts with end of life protection.
 - NEMA premium electronic ballasts must be specified where applicable.
 - Do not use instant start ballasts.

14.6.4 Induction (Electrodeless Fluorescent)

- All induction light sources must be dimmable.

14.6.5 Metal Halide

- No restrictions.

14.6.6 Mercury Vapor

- Do not use mercury vapor light sources.

14.6.7 High and Low Pressure Sodium

- Do not use for interior applications.

14.6.8 Incandescent and Tungsten Halogen

- Do not use incandescent or tungsten halogen light sources, except where alternatives such as SSL are unavailable.

14.6.9 High Intensity Discharge

- Power factor (PF) greater than or equal to 0.9.

- Provide electronic ballasts for all available wattages.

14.7 Additional Lighting Guidelines

14.7.1 A new design must ensure reduced energy consumption, reduced maintenance, and improved lighting quality at the lowest life cycle cost. A lighting redesign is required when a renovation involves changing lighting technologies such as fluorescent to LED and when renovation involves changing lighting with more efficient lighting within the same technology.

14.7.2 Lighting control requirements must meet ASHRAE 90.1, ASHRAE 189.1 and UFC 3- 530-01. Refer to UFC 1-200-02 for publication year of ASHRAE. Refer to CHAPTER 3 (Interior Applications) of UFC 3-530-01 for control requirements. Provide commissioning per ASHRAE requirements. Refer to IES DG-29 for commission guidance for specific applications.

14.7.3 Select light sources, power supplies, and controls that are rated and warranted for long useful lives to increase the amount of time between maintenance cycles. Minimize light source types on an individual project. Locate luminaires in locations to improve access for regular servicing such as light source replacement.

14.7.4 Reference UFC 3-530-01 for further instruction on control strategies, project specific design guides, and design specific performance requirements.

14.8 TEMPEST

All Electromagnetic Interference related problems should be referred to the Base Electromagnetic Emissions Security Officer, Lori Prendergast, 75 CS/SCBS, 777-0362.

14.9 Special Protection for Rotating Electrical Equipment

Three-phase electrical motors will have phase failure and ground fault-protection when such protection costs are equal to or less than one-fourth the cost of the motor. This protection will be in addition to all protective devices required by the National Electric Code. Where there are a number of smaller three phase motors within a particular building, the building will be protected at the service entrance with phase failure protection.

14.10 Lightning, Static & Surge Protection

14.10.1 Provide a complete lightning protection system as required by NFPA 70, NFPA 780, Mil-HDBK-419, AFMAN 91-201 *Explosive Safety Standards*, DOD 6055.9, *Ammunition and Explosives Safety Standards*, AFMAN 32-1065 *Grounding and Electrical Systems*, **UFC 3-575-01 Lightning and Static Electricity Protection systems**, LPI-175, and UL 96A. The system must be installed by a certified lightning protection installer who is listed with the National Recognized Testing Laboratory (NRTL) and is actively engaged in the installation of UL Master Labeled lightning protection systems or who is certified by the Lightning Protection Institute (LPI) as a master Installer/designer and be so listed by the Lightning Protection Institute and by Underwriters Laboratories, Inc. For the complete scope of the installation of a lightning protection system the installer must provide a UL certification stating compliance with AFMAN 32-1065 *Grounding and Electrical Systems*, and if applicable a UL Master Label. All antennae installations will be bonded to the lightning protection system. A complete drawing showing connections and initial test results will be forwarded to the 75th CES Exterior Electrical section. All lightning protection system installations and modifications will be

of copper materials. The exception will be the use of connections with dissimilar metals, and then aluminum may be used. All lightning protection systems will have surge protection at all points where electrical or electronic system conductors enter or exit a facility.

14.11 Generators

14.11.1 Per AFCEC/CO's Memorandum Generator Standardization, Single Manufacturer Selection dated 19 May 2023, Onan (now Cummins) must be the sole manufacturer source used for the installation of all generators at Hill AFB until 19 May 2028. Please contact 75 CEG/CENM for a copy of these documents upon request.

14.11.2. If any fuel tanks and/or generators are to be installed or operated as part of this project, prior approval and modifications to the Hill AFB Environmental Permits will be made during design, and prior to installation, fueling, testing or operation of the tanks and generators by the 75 Civil Engineer Group Environmental Flight authorities. In addition, any new generators must be approved by the Air Force Civil Engineer Center during design and prior to installation.

14.11.3. As outlined in Section 3.3 of Hill Air Force Base Instruction 32-7002, *Air Quality Compliance*, **Construction Contractors must notify the Civil Engineering Installation Management and Environmental Assets Branch (75 CEG/CEIEA) with an approved New Source Sheet (NSS) for equipment modifications including the relocation of equipment, shutdowns (excluding daily equipment shutdown); changes in the types of materials used; addition of new equipment prior to purchase, installation and/or construction of equipment, including associated controls; changes in the operating conditions of existing equipment; or other activities that could affect air emissions or existing permit conditions. To obtain a NSS, the organization Environmental Representative or Unit Environmental Coordinator should be contacted.**

14.11.4. 75 CEG/CEIEA will review the information on the NSS provided by Construction Contractors, as well as additional types of information including verbal or written coordination. 75 CEG/CEIEA will assess data completeness and determine whether a permitting action is required. Permitting actions include 7-day Flexibility Notice or Notice of Intent (NOI). The Construction Contractor will be notified according of any required permitting actions. If a permitting action is required, the Construction Contractor will provide the necessary information to 75CEG/CEIEA, who will prepare and submit the necessary application to Utah Division of Air Quality.

14.11.5. In accordance with the Title V Operating Permit, new generators less than or equal to 1,700 kW, can be permitted by a 7-day Flexibility Notice. These units are required to meet Best Available Control Technology (BACT) and comply with both New Source Performance Standards and National Emission Standards for Hazardous Air Pollutants.

14.11.6. For emergency engines greater than 1700 kW, additional criteria may need to be met to satisfy BACT, and a full NOI application must be prepared and submitted to UDAQ. This permitting process takes an estimated six to nine months to complete.

14.12 ACS Systems

14.12.1 The authorized ACS systems for Hill AFB are Honeywell/Vindicator components utilizing the V3 controller (AES firmware revision 4.3.2). Note: A V6 controller may be authorized in the future when they become available from the manufacturer. The workstation will be either a Security System Terminal (SST) or a Security Archive Workstation (SAW) based on customer requirements.

14.12.2 The installing contractor will provide and install all material identified by the 75th CES Electrical/Alarm Shop, to construct a new, complete, operational access control system. The

contractor will be factory certified by Honeywell/Vindicator. Certification(s) and material submittals will be provided before construction begins.

14.12.3 The contractor will provide all new equipment, including panels, enclosures, boxes, wiring, conduit, devices and all installation, programming, and testing. All conductors will be installed in conduit ($\frac{3}{4}$ " EMT minimum) and will be properly identified by a continuous blue coating. Each door will have a separate home run.

14.12.4 System wiring will be consistent with manufacturer instructions and sized per National Electrical Codes. Minimum conductor size will be 18 AWG. Wiring types used are OAS 18/2, 18/4, and 18/6. All devices will be installed on an individual circuit from a fuse block.

14.12.5 All doors will be equipped with electronic strikes that fail-secure in a "locked" position upon extended power failures that exceed the battery backup capability. Magnetic locks will not be allowed. Door frames must be manufactured of steel and prefabricated with appropriate "Mud Box" along with proper cutout or backing for the approved electric strike. No onsite modifications are allowed.

14.12.6 Doors with removable center mullions will have a factory sealed quick disconnect for the electric strike wiring on the secure side of the door. The preferred method is with an SAE power socket (18 AWG minimum) or similar.

14.12.7 All doors getting ADA openers and ACS will be integrated together for proper operation.

14.12.8 Custom enclosures will be installed no higher than 6' to the top and will be a minimum dimension of 24"X36"X6". A 6"x6"x24" gutter may be installed above the enclosure.

14.12.9 Custom enclosures will have a lockable disconnecting means along with surge protection on all separate power circuits at or within a reasonable distance of the equipment that it services. The preferred Surge Protection is a Ditek DTK-120HW. Dedicated circuits are required and will not be shared with other general-purpose equipment. All power supplies will have a minimum of 12VDC 18Ah battery backup capacity.

14.12.10 The preferred door strikes will be the Hanchett Entry Systems (HES) 9600-630 for crash bar style doors and the Adams Rite 7440-628 for handset style doors. All door strikes and associated equipment will be 12VDC only.

14.13 Intrusion Detection Systems (IDS)

14.13.1 If an Intrusion Detection System (IDS) is necessary it must include sufficient levels of protection as per AFI 31-101, AFI 31-401, AFI 31-601, DEPARTMENT OF DEFENSE MANUAL 5205.07V3/AIR FORCE MANUAL 16-703V3 or TECHNICAL SPECIFICATIONS FOR CONSTRUCTION AND MANAGEMENT OF SENSITIVE COMPARTMENTED INFORMATION FACILITIES VERSION 1.3 for the respective asset. See section 2.5 General Security in this document for further guidance. For a list of approved devices see Air Force Life Cycle Management Center memorandum dated 8 Nov 2021.

14.13.2 Prior to system design the following offices must be consulted for their requirements: 75 ABW/IP; and 75 SFS/S5. All IDS system requirements MUST have a letter of authorization on file.

14.13.3 The alarm system must be compatible with the existing base alarm system. The authorized IDS system for Hill AFB is a Honeywell/Vindicator V5 w/TDEA. All connections must be completed by a Honeywell/Vindicator certified installer prior to the final survey. After verification by 75 SFS/S5E that the system is ready, a 72-hour acceptance test must be accomplished with 75 SFS/S5E. A final survey of the building will be accomplished at this time prior to normal operation starting.

14.13.4 Hill AFB utilizes standards for all IDS components and equipment listed on the CMD and this list is made available by the 75 SFS/S5E.

14.13.5 In the event that Intrusion Detection (IDS) and Card Access are required in the same facility both systems will be completely independent of one another; they must not share wiring, conduits, junction boxes, power supplies or enclosures.

14.13.6 The installing contractor will provide material submittals listed on the AFTO 747 before construction begins. The AFTO 747 is made available by the 75 SFS/S5E.

14.13.7 Prior to system programming, contractor must provide 75 SFS/S5E a set of AutoCAD drawings, maps, and data sheets.

14.13.8 Terminal/Junction Boxes, Permanent junction boxes, field distribution boxes, cable terminal boxes, and cabinets/CCDE consoles must have tamper protection. Exception: Boxes must not have any knockouts, and tamper screws must be used in place of tamper device.

14.13.9 Pull boxes used during installation to prevent a break or termination in the wire and do not present the opportunity to spoof, bypass, or otherwise defeat the system do not require tamper protection.

14.13.10 Vindicator panel enclosure must be equipped with 2 tamper devices. Once on the top and bottom of the enclosure. Alarm Panel enclosure must be labeled with a black label with white lettering.

14.13.11 Batteries must maintain satisfactory operation of sensors and annunciation of equipment for a minimum of 8 hours.

14.14 Cybersecurity Compliance of Facility Related Control Systems

14.14.1 Where an order to [plan, design, construct, sustain, restore, and or modernize] of a Facility Related Control System (FRCS) is tasked, full compliance with the latest version of UFC 4-010-06, Cybersecurity of Facility Related Control Systems, as published on the Whole Building Design Guide website (www.wbdg.org), [is] required and will be adhered to.

14.14.2 Where an order to [implement, install, replace, expand, program components of, interconnect to, and or repair or add to] an [existing] Facility Related Control System (FRCS) is tasked, full compliance with the latest version of UFGS 25-05-11, Cybersecurity for Facility Related Control Systems, as published on the Whole Building Design Guide website (www.wbdg.org), [is] required and must be adhered to.

14.14.3 Where the context of either of 14.14.1, 14.14.2, or both, are applicable and either or both are ordered, compliance with Department of the Air Force Guidance Memorandum (DAFGM), Civil Engineer Control Systems Cybersecurity (DAFGM 2023-32-01), as published on the Whole Building Design Guide website (www.wbdg.org) [is] required and must be adhered to.

End of Section