



DIVISION 28 ELECTRONIC SAFETY AND SECURITY

DESIGN CONSIDERATIONS

The Consultant shall provide a written description of how the entire system is designed to operate. This Basis of Design (BOD) narrative also shall describe how project objectives are being met. It shall be provided in a format that can be easily understood by a layperson, the end user. The narrative identifies items that specifically meet the Owners Project Requirements (OPR) and the most recent University Safety and Security Services (USSS), Facilities Management (FM) department System Master Plan(s) and articulate a rationale for any variance.

For renovations, the systems selected shall be compatible with the existing building's electronic safety and security systems. The integrity of the basic existing building system shall not be compromised. Work shall be designed and sequenced to minimize impact and interruptions in occupied buildings.

For site work, the Consultant shall indicate all existing underground work such as piping, valves, manholes, electric wiring and telephone, whether new connections are being made or not. Profiles of all piping need to be shown to facilitate coordination with the crossing of other utilities.

New buried cabling shall have location detection added per Division 26 requirements.

Provide extended service and maintenance options with every new project. Local vendors shall list and verify compliance response times for planned routine maintenance, urgent schedule repairs and emergency service as required in the OPR.

The Consultant shall incorporate any requirements from the University insurance carrier or USSS into the design and specifications.

SECURITY SYSTEMS

The American University (AU) USSS has established security standards and emergency notification standards for all University buildings. These standards encompass the technology and physical security features required to protect the AU community and buildings.

While the standards reflect best business practice and represent industry standards, they are applied based on security assessments of plans for newly constructed buildings and major renovations and take into account-planned uses of each facility and its occupants. These assessments and the application of these standards are intended to foster a uniform level of security associated with university structures, both within and exterior to the buildings.

The standards or variations of the standards, for each project are applied based on



recommendations of the USSS.

INTERIOR ACCESS CONTROL, MONITORING, AND CCTV

AU's electronic security program is comprised of three primary sub-systems; access control, intrusion detection and close circuit television systems. All systems are managed by USSS. All security design documentation and security equipment shall require prior approval by the AUPD physical security manager and be furnished by the security contractor unless otherwise noted.

All security and emergency notification system designs for new buildings and major renovations are prepared in partnership with the Planning and Project Management department. Application of these standards to existing buildings/locations on campus will be at the direction of the USSS based on a risk and threat analysis.

The AUPD unit also maintains lists of approved security hardware and will provide the information upon request. This hardware is standardized across campus and the USSS Physical Security Manager must approve variations from the list.

DETAILS

Contractor shall provide typical installation drawings prior to the commencement of any work for approval by the physical security manager. The contractor shall also provide as-built drawings after the installation is complete.

CONTACTS

Questions concerning the University's security management system guidelines should be addressed to Physical Security Manager (202) 885 2527.

ACCESS CONTROL SYSTEMS – 28 13 00

USSS is responsible for all integration and daily management of the Software CCure 9000 Management System for academic, administrative and housing facilities. This includes termination, installation, maintenance and monitoring of all equipment associated with this system. This also includes providing all card reader equipment.

The Consultant or Project Manager should consult with the USSS Physical Security Manager during the design and construction phases of any project that includes card readers.



ACCESS CONTROL HARDWARE DEVICES – 28 15 00

EXTERIOR DOOR CONTROL AND MONITORING

Provide conduit path from door area to security panel closet or equivalent for card readers, door contacts and associated equipment. This applies to all exterior doors. All security design documentation and security equipment shall require prior approval by the USSS Physical Security Manager and be furnished by the security contractor unless otherwise noted.

DOOR SECURITY

The design should provide a 3/4" conduit from the door area to a designated location in a communications closet. The Contractor is to pull the wire specified or provided by the USSS from the security panel closet to door area. In the security panel closet, the contractor is to provide and install 3/4" fire-rated plywood on wall where the Access Control panel will be mounted.

If the security panel closet is separate from the telephone entry room, provide 2" conduit connecting them. Provide 1" conduit from the security panel closet to the fire alarm control panel.

In the security panel closet, provide one dedicated 120-volt duplex receptacle for required power. This power is to be on the emergency generator for the building if a generator is present. Refer all questions or concerns to the USSS Physical Security Manager.

The light fixture in the security panel closet is to be on the emergency generator if a generator is present. Refer all questions or concerns to the AU Master Electrician. All buildings requiring electronic security locking hardware must be Fail Secure in functionality unless otherwise noted. The physical security manager must approve all work prior to installation.

VIDEO SURVEILLANCE CLOSED CIRCUIT CAMERA SYSTEM – 28 20 00

USSS is responsible for the integration and daily management of the Genetec Security Desk/Omicast video management system. This includes termination, installation, maintenance and monitoring of all equipment associated with this system.

The Consultant or Project Manager should consult with the university's physical security manager during the design and construction phases of any project that includes a requirement for video monitoring equipment.



INTRUSION DETECTION – 28 31 00

The Project Manager should consult with the USSS Physical Security Manager during the design and construction phases of any project to determine the intrusion detection requirements for the project.

FIRE ALARM SYSTEMS – 28 46 21.1x

The Fire Alarm system is maintained by Facilities Management Energy & Engineering Department. It is a campus wide system monitored 24/7 by AUPD.

Refer to separate section 28 46 21.1x for university fire alarm system requirements. Address questions or concerns to the AU Master Electrician.

REFRIGERANT MONITORING – 28 44 00

See product requirements at the end of this division.

See also monitoring, graphic and alarm notification and integration requirements to the Building Automation Systems in Division 25.

MASS NOTIFICATION SYSTEMS – 28 47 00

The Emergency Notification Systems are comprised of two sub systems: A system that permits USSS to make public announcements of emergencies affecting the university, and a system that allows individuals to contact USSS to report an emergency.

Each mass notification must be tested and/or undergo integrated commissioning at the 100% device level.

EQUIPMENT NUMBERING SCHEME

- First Identifier** – Identifier for the building that the equipment is associated with. This will be consistent with the established computerized maintenance management (AiM) building identifier codes existing in the AiM system.
- Second Identifier** – Floor location of the equipment if the building is multi-level, having more than a basement and a first floor.
- Third Identifier** – Type of equipment that is being identified. Abbreviated equipment type code consistent with existing AiM established codes.
- Fourth identifier** – This will indicate the incremental number of the item according to the location. The incrementing should begin with the lowest physical level of the building.



Examples of Asset Codes for AiM:

If there are 3 VAV units on the first floor and 3 on the third floor and 2 Fan coil units on the first floor and 5 on the third floor in Anderson Hall the AiM asset numbering codes will be:

AH-01-VAV001 VAV BOX
AH-01-VAV002 VAV BOX
AH-01-VAV003 VAV BOX
AH-03-VAV004 VAV BOX

AH-03-VAV005 VAV BOX
AH-03-VAV006 VAV BOX

AH-01-FCU001 FAN COIL UNIT
AH-01-FCU002 FAN COIL UNIT
AH-03-FCU003 FAN COIL UNIT

AH-03-FCU004 FAN COIL UNIT
AH-03-FCU005 FAN COIL UNIT
AH-03-FCU006 FAN COIL UNIT
AH-03-FCU007 FAN COIL UNIT

Refer to the document Schematic Equipment and Building Codes for existing identifiers. Consult with the Facilities Management Planned Maintenance Manager prior to assigning equipment identifiers the contract documents. List AiM number on building documents including equipment schedule. Equipment shall be labeled consistently across all disciplines.

Resolution of equipment not associated with buildings.

There are some items identified as equipment that are not associated with any building. These are equipment items for the Grounds Maintenance Operation (mowers, tillers, clippers, etc.). Other items are unique to the housekeeping operation (vacuums). Equipment that is affixed to the facility or requires special connections shall be identified in the project documents by the corresponding AiM equipment asset identification.

DIVISION 28 ELECTRONIC SAFETY AND SECURITY PRODUCTS

Subject to compliance with project requirements, basis-of-design manufacturer(s) (and model number if applicable) shall be:

- Fire Alarm System
1. Siemens XLS



Card Access System

1. CCure

Refrigerant Monitor

1. Sherlock with infrared refrigerant sensors

Subject to compliance with project requirements, acceptable manufacture(s) include, but are not limited to the following:

All products in this Division require integration into existing systems. No exceptions. New product use only with Departmental approval.

END OF SECTION



SECTION 28 46 21.1x FIRE ALARM SYSTEMS

This document is provided as a reference for the design professionals working for American University (AU). This document should not be used directly as written project specifications. This document does not define products for maintenance replacement purposes, but rather should be used for renovation and new construction projects.

The American University Facilities Management Life Safety Manager/Master Electrician has established standards for fire alarm systems to protect the AU community and buildings. While the standards reflect best business practice and represent industry standards, they are applied based on assessments of plans for newly constructed buildings and major renovations and take into account planned uses of each facility and its occupants. These assessments and the application of these standards are intended to foster a uniform level of protection and notification associated with university structures, both within and exterior to the buildings. The standards, or variations of the standards, are applied based on recommendations to Facilities Management developed through the Life Safety Master Plan and in consultation with University Safety and Security (USSS) and the university insurance provider.

The USSS Physical Security Unit also maintain lists of approved security hardware and will provide the information upon request. This hardware is standardized across campus and the physical security manager must approve variations from the list.

All security and emergency notification system designs for new buildings and major renovations are prepared in partnership with the Planning and Project Management department. Application of these standards to existing buildings/locations on campus as of May 2016 will be at the joint direction of Facilities Management and University Safety and Security Services based on objectives in the current departmental Master Plans and a detailed risk and threat analysis. The Designer shall consult with Facilities Management and Safety/Security requirements for commissioning in accordance with NFPA 3 Standard Commissioning of Fire Protection and Life Safety Systems and NFPA 4 Standard for Integrated Fire Protection and Life Safety System Testing.

American University fire alarm systems campus-wide are Siemens only, hard wired. Refer to MANUFACTURERS later in this document.

PART 1 – GENERAL

RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this Section.
- B. Provisions of Division 26 Electrical including labeling, wiring practices, fire stop, and general provisions, apply to this Section.



SUMMARY

- A. The system shall include all wiring, raceways, terminal cabinets, pull boxes, outlet and mounting boxes, initiating devices, alarm indicating devices, annunciators, printers, control equipment, and all other accessories and miscellaneous items required for a complete operating system even though each item is not specifically mentioned or described.
- B. Related Standards: The following standards contain requirements that relate to this Section: "Fire Protection" for water-flow, pressure, or tamper switches connected to fire alarm system.

DEFINITIONS

- A. Alarm-Initiating Device: A manual station, smoke detector, heat detector, flame detector, or sprinkler water-flow switch.
- B. Alarm Signal: Signifies a state of emergency requiring immediate action. Pertains to signals such as the operation of a manual station and the operation of a sprinkler system flow switch.
- C. Class A Wiring: Circuits arranged and electrically supervised so a single break or single ground fault condition will be indicated by a trouble signal at the fire alarm control panel (FACP) and the circuit will continue to be capable of operation for its intended service in the faulted condition no matter where the break or ground fault condition occurs.
- D. Class B Wiring: Circuits electrically supervised such that a single break or a single ground fault condition will be indicated by a trouble signal at the FACP no matter where the break or ground fault condition occurs.
- E. Hard-Wired System: Alarm, supervisory, and initiating devices directly connected, through individual dedicated conductors, to a central control panel without the use of multiplexing circuits or devices.
- F. Multiplex System: One using a signaling method characterized by simultaneous or sequential transmission, or both, and the reception of multiple signals in a communication channel, including means for positively identifying each signal.
- G. Supervisory Signal: Indicates abnormal status or need for action regarding fire suppression or other protective system.
- H. Trouble Signal: Indicates that a fault, such as an open circuit or ground, has occurred in the system.
- I. Zone: A building area, which has all initiating devices located within it programmed to initiate an alarm and to give a common visual location indication on the system annunciator.

SYSTEM DESCRIPTION

- A. General: This specification intends to describe an integrated fire detection and voice evacuation system to be intelligent device addressable, analog detecting, low-voltage and modular with multiplex communication techniques in full compliance with all applicable codes and standards. The features described in this



specification are a requirement for this project and shall be furnished by the successful contractor.

- B. Signal Transmission: Multiplex signal transmission dedicated to fire alarm service only.
- C. Audible Alarm Indication: By sounding of voice evacuation via speakers.
- D. System connections for alarm-initiation and alarm-indicating circuits: Class B wiring.
- E. Functional Description: The following are required system functions and operating features:
 - i. Priority of Signals: Accomplish automatic response functions by the first zone initiated. Alarm functions resulting from initiation by the first zone are not altered by subsequent alarms. The highest priority is an alarm signal. Supervisory and trouble signals have second- and third-level priority. Signals of a higher-level priority take precedence over signals of lower priority even though the lower-priority condition occurred first. Annunciate all alarm signals regardless of priority or order received.
 - ii. Non-interfering: Zone, power, wire, and supervise the system so a signal on one zone does not prevent the receipt of signals from any other zone. All zones are manually re-settable from the FACP after the initiating device or devices are restored to normal. Systems that require the use of batteries or battery backup for the programming function are not acceptable.
 - iii. The system shall monitor all alarm initiating and supervisory devices, initiate audible and visual alarm, supervisory and trouble signals, initiate automatic elevator recall, de-energize magnetic door holders, initiate shutdown of air handling units whether in automatic or hand operation, close respective fire/smoke dampers, operate smoke control systems, operate smoke relief hatches, provide alpha/numeric display of alarm, supervisory and trouble conditions at the fire alarm control panel, provide a hard copy record of system events, provide LED annunciation at all remote annunciators, and transmit required signals to a remote central station.
 - iv. Silencing at FACP: Switches provide capability for acknowledgment of alarm, supervisory, trouble, and other specified signals at the FACP; and capability to silence the local audible signal and light a light-emitting diode (LED). Subsequent zone alarms because the audible signal to sound again until silenced in turn by switch operation. Restoration to normal of alarm, supervisory, and trouble conditions extinguish the associated LED and cause the audible signal to sound again until the restoration is acknowledged by switch operation.
 - v. Loss of primary power at the FACP sounds trouble signal at the FACP and indicates at the FACP when the system is operating on an alternate power supply.
 - vi. Annunciation: Manual and automatic operation of alarm-and-supervisory-initiating devices is annunciated both on the FACP and on the annunciator, indicating the location and type device.



- vii. FACP Alphanumeric Display: Displays plain-language description of alarms, trouble signals, supervisory signals, monitoring actions, system and component status, and system commands.
 - viii. Remote Detector Sensitivity Adjustment: Manipulation of controls at the FACP causes the selection of specific addressable smoke detectors for adjustment, display of their status and sensitivity settings, and control of changes in those settings. The same controls can be used to program repetitive, scheduled, automated changes in sensitivity of specific detectors. The system printer records sensitivity adjustments and sensitivity adjustment schedule changes.
- F. Recording of Events: Record all alarm, supervisory, and trouble events by means of the NCC-WAN printer. Printouts are by zone, device, and function. When the FACP receives a signal, the alarm, supervisory, and trouble conditions are printed. The printout includes the type of signal (alarm, supervisory, or trouble) the zone identification, date, and the time of the occurrence. The printout differentiates alarm signals from all other printed indications. When the system is reset, this event is also printed, including the same information concerning device, location, date, and time. A command initiates the printout of a list of existing alarm, supervisory, and trouble conditions in the system.
- i. Permissible Signal Time Elapse: The maximum permissible elapsed time between the actuation of any fire alarm or fire-detection system alarm-initiating device and its indication at the FACP is ten seconds.
 - ii. Circuit Supervision: Indicate circuit faults by means of both a zone and a trouble signal at the FACP. Provide a distinctive indicating audible tone and (LED) indicating light. The maximum elapsed time between the occurrence of the trouble condition and its indication at the FACP is 200 seconds.

SYSTEM OPERATION:

- A. Activation of any system fire, security, supervisory, trouble, or status-initiating device shall cause the following actions and indications in the Fire Command Center at University Safety and Security Services in the NCC Network Command Center. The USSS command center is located on East Campus, lower level of the Don Meyers Technology and Innovation Building.
- B. Fire Alarm Condition:
 - i. Sound an audible alarm and display a custom screen/message defining the building in alarm and the specific alarm point initiating the alarm.
 - ii. Log to the system history archives all activity pertaining to the alarm condition.
 - iii. A simultaneous message shall be delivered via all alarm speakers including those installed in stairways and elevators informing occupants of the imminent shutdown of elevator circuits and the expected high traffic load in the stairwells.



- iv. An automatic announcement or tone evacuation signal shall be capable of interruption by the operation of the system microphone to give voice evacuation instructions overriding the pre-programmed sequences.
 - v. Status lights next to speaker selection switches on the control panel shall indicate speaker circuit selection.
 - vi. Audible signals shall be silenced from the fire alarm control panel by an alarm silence switch. Visual signals shall be programmed to flash until the system reset or alarm silencing, as required by the local District of Columbia Fire Marshal or designated authority having jurisdiction (AHJ).
 - vii. A signal dedicated to the sprinkler system water flow alarm shall not be silenced while the sprinkler system is flowing at a rate of flow equal to a single head.
 - viii. Activation of any smoke detector in a single elevator lobby or an elevator equipment room shall cause the recall of that bank of elevators to the 1st floor and the lockout of controls. In the event of recall initiation by a detector in the first floor lobby, the recall shall be to the alternate floor as determined by the AHJ. Furthermore, any single device activation in a Residence Hall will trigger this same "lobby" recall response.
 - ix. Where indicated in the drawings heat detectors in elevator shaft and machine rooms shall activate an elevator power shunt trip breaker. The heat detectors shall be rated at a temperature below the ratings of the sprinkler heads in respective locations to insure that the power shall be shut off before activation of sprinkler system.
 - x. Remote LCD annunciators shall display the alarm condition via unique messages as required by the system owner. LED type annunciator displays, conventional and graphic style shall indicate alarm zoning as specified.
 - xi. System operated duct detectors as per local requirements shall accomplish HVAC shut down.
 - xii. Door closure devices shall operate by floor or by local requirements.
 - xiii. Activation of Stairwell pressurization, Smoke purge, and damper control shall be as required and operated as per local requirements.
 - xiv. Print alarm conditions on NCC-WAN printer located at the USSS office at East Campus.
- C. Supervisory Condition:
- i. Display the origin of the supervisory condition.
 - ii. Activate supervisory audible and dedicated visual signal.
 - iii. Audible signals shall be silenced from the control panel by the supervisory acknowledge switch.
 - iv. Record within the system the initiating device and time of occurrence of the event.
 - v. Print supervisory condition to system printer.
 - vi. Remote LCD annunciators shall display the supervisory condition via unique messages as required by the system owner. LED type annunciator displays, conventional and graphic style shall indicate alarm zoning as specified.



D. Trouble Conditions

- i. Display the origin of the trouble condition.
- ii. Activate trouble audible and visual signals at the control panel and as indicated on the drawings.
- iii. Audible signal shall be silenced from the fire alarm control panel by a trouble acknowledge switch.
- iv. Trouble reports for primary system power failure to the master control shall be automatically delayed for a period equal to 25% of the system standby battery capacity to eliminate spurious reports because of power fluctuations.
- v. Record within system history, the occurrence of the event, the time of occurrence and the device initiating the event.
- vi. Print trouble condition to system printer.
- vii. Remote LCD annunciators shall display the trouble condition via unique messages as required by the system owner. LED type annunciator displays, conventional and graphic style shall indicate alarm zoning as specified.

SUBMITTALS

- A. No substitutions of equipment or materials shall be allowed.
- B. Submittals must be signed by NICET Level IV Senior Engineering Technologist employed by Siemens Industry, Inc., 6435 Virginia Manor Road, Beltsville, MD 20705.
- C. Provide six (6) sets of complete submittals which shall include drawings of all annunciator panel graphics, schematic wiring drawings of the control panel showing internal and external control panel wiring and all devices. Sequence of operation, annunciator wiring and faceplate drawings, specification sheets for all equipment, all devices, and battery calculations shall be provided. Drawings of the control panel and graphic annunciator panel(s) shall be done on 30" x 42" sheet size. Partial submittals will not be accepted.
- D. Submittals shall be provided in accordance with the project submittal schedule as outlined in the Division 1 General Requirements of the contract or the contract project manual.
- E. If re-submittals are required, they shall be provided within two (2) weeks after the date of notification. If re-submittals are not received by the Engineer in two (2) weeks, the supplier will be considered non-responsive and subsequent submittals from the supplier will not be reviewed. The Contractor shall then provide submittals from another equipment supplier within two (2) weeks as directed by the Owner at no change in contract price.
- F. The cost of reviewing any submittals after two (2) submittals have been disapproved shall be paid by the Contractor to the Engineer. The Contractor shall then deliver a purchase order to the Engineer before any submittals will be reviewed.

RECORD DOCUMENTS

- A. The As-Built drawings shall include one (1) complete set of 30" x 42" contract base sheet drawings with any and all changes included and noted. The approved contract panel drawings and graphic annunciator panel drawings shall also be



- provided in PDF format. The Conduit Plan shall show the device address for all intelligent/analog initiating devices. The electrician in charge of the system installation shall keep the As-built drawings up to date continuously. These drawings shall be reviewed on a weekly basis for accuracy and completeness.
- B. The Operation and Maintenance Manual shall include a complete set of equipment, component and device specification and data sheets as well as a reduced size paper copy (11" x 17") of the complete set of system drawings described in the specification section A copy of the NFPA 72 Test Report/Certificate, the printer record of all test activity including the sensitivity readings for all intelligent/analog smoke detectors, the required system and component warrantee papers, and the name and address of the installer shall be included. The manual shall be bound in a black three-ring loose-leaf binder with dividers and a table of contents. Four (4) duplicate sets are required or as otherwise required in the contract documents.
 - C. Six (6) sets of keys to all locks shall be provided at occupancy with each set of keys properly and legibly marked and tagged. Loose keys will not be accepted. Transmit to Facilities Management Material Supply Manager and Life Safety Manager jointly for acceptance at occupancy.
 - D. All documents and items described above shall be submitted for approval and turnover prior to the final testing and system certification with the exception of the NFPA 72 Test Report/Certificate that shall be delivered by hand to the Owner within two (2) days of the actual test and acceptance.

QUALITY ASSURANCE

- A. Qualifications of the Installer: an electrical contractor experienced in the installation of fire alarm systems shall install the system. A minimum of five years verifiable installation of fire alarm systems is required for both the firm and the site supervisor.
- B. The name of the electrician who will be responsible for the fire alarm system installation shall be submitted for the Owner's approval before any work is started on the system. The qualifications and experience of the proposed individual shall also be included. The Owner-approved fire alarm installation electrician shall remain on this project until the fire alarm system is accepted by the Owner.
- C. The services of a technician who has been trained and certified by the manufacturer of the equipment being supplied shall be provided to supervise the installation, adjustments, tests and final connections and certification of the system.
- D. The system control panel, annunciators, devices specified, and their installation and operation shall conform to the most stringent applicable requirements of the following publications and this specification unless otherwise noted:
 - i. NFPA 70 The National Electric Code
 - ii. NFPA 72 The National Fire Alarm Code
 - iii. NFPA 90A
 - iv. BOCA
- E. The control panel, annunciators, all initiating and indicating devices and all other devices connected to the system shall be UL Listed as provided and shall bear UL



and Construction Standards (archived) for applicable specification requirements.
The equipment shall be Siemens type MXLV.

END OF SECTION