



# Department of Veterans Affairs

Philadelphia VA Medical Center  
Rekey VA Medical Center

VA Project No: 642-11-110

Project Manual – Bid Documents

August 2, 2013







**TABLE OF CONTENTS**  
**Section 00 01 10**

	<b>DIVISION 00 - SPECIAL SECTIONS</b>	<b>DATE</b>
00 01 15	List of Drawing Sheets	09-11
	<b>DIVISION 01 - GENERAL REQUIREMENTS</b>	
01 00 00	General Requirements	03-13
01 22 00	Unit Costs	NA
01 23 00	Alternates	NA
01 31 00	Project Management and Coordination	NA
01 32 16.15	Project Schedules (Small Projects - Design/Bid/Build	04-13
01 33 00	Submittal Procedure	NA
01 40 00	Quality Assurance	NA
01 42 19	Reference Standards	09-11
01 57 19	Temporary Environmental Controls	01-11
01 58 16	Temporary Interior Signage	08-11
01 60 00	Product Requirements	NA
01 70 00	Execution Requirements	NA
01 73 10	Cutting and Patching	NA
01 74 19	Construction Waste Management	05-12
01 77 00	Closeout Procedures	NA
01 78 10	Project Record Documents	NA
01 78 20	Operation and Maintenance Data	NA
01 81 11	Sustainable Design Requirements	02-13
	<b>DIVISION 07 - EXISTING CONDITIONS</b>	
07 84 00	Firestopping	04-13
	<b>DIVISION 08 - OPENINGS</b>	
08 71 00	Door Hardware	09-11
	<b>DIVISION 26 - ELECTRICAL</b>	
26 05 00	Common Work Result for Electrical	NA
26 05 19	Low-Voltage Electrical Power Conductors and Cables	12-12
26 05 26	Grounding and Bonding for Electrical Systems	12-12
26 05 29	Hangers and Supports for Electrical Systems	NA
26 05 33	Raceway and Boxes for Electrical Systems	09-10
26 05 53	Identification for Electrical Systems	NA
	<b>DIVISION 27 - COMMUNICATIONS</b>	
27 05 00	Common Work Results for Communications Systems	AEW
27 11 00	Network Communications Systems	AEW
	<b>DIVISION 28 - ELECTRONIC SAFETY AND SECURITY</b>	
28 05 00	Common Work Results for Electronic Safety and Security	AEW
28 13 00	Physical Access Control Systems	AEW
28 13 20	Patient Elopement System	AEW

**SECTION 00 01 15**  
**LIST OF DRAWING SHEETS**

The drawings listed below accompanying this specification form a part of  
the contract.

<u>Drawing No.</u>	<u>Title</u>
G-001	COVER SHEET
1-PS-001	SECURITY SYMBOLS AND ABBREVIATIONS
1-PS-002	FIBER OPTIC NETWORK CAMPUS SITE PLAN
1-PS-003	PACS CAMPUS NETWORK RISER DIAGRAMS
1-PS-004	PACS CAMPUS NETWORK RISER DIAGRAMS
1-PS-100E	BUILDING 1 BASEMENT - EAST
1-PS-100W	BUILDING 1 BASEMENT - WEST
1-PS-101E	BUILDING 1 FIRST FLOOR PLAN - EAST
1-PS-101W	BUILDING 1 FIRST FLOOR PLAN - WEST
1-PS-102E	BUILDING 1 SECOND FLOOR PLAN - EAST
1-PS-102W	BUILDING 1 SECOND FLOOR PLAN - WEST
1-PS-103E	BUILDING 1 THIRD FLOOR PLAN - EAST
1-PS-103W	BUILDING 1 THIRD FLOOR PLAN - WEST
1-PS-104E	BUILDING 1 FOURTH FLOOR PLAN - EAST
1-PS-104W	BUILDING 1 FOURTH FLOOR PLAN - WEST
1-PS-105E	BUILDING 1 FIFTH FLOOR PLAN - EAST
1-PS-105W	BUILDING 1 FIFTH FLOOR PLAN - WEST
1-PS-106E	BUILDING 1 SIXTH FLOOR PLAN - EAST
1-PS-106W	BUILDING 1 SIXTH FLOOR PLAN - WEST
1-PS-107E	BUILDING 1 SEVENTH FLOOR PLAN - EAST
1-PS-107W	BUILDING 1 SEVENTH FLOOR PLAN - WEST
1-PS-108E	BUILDING 1 EIGHTH FLOOR PLAN - EAST
1-PS-108W	BUILDING 1 EIGHTH FLOOR PLAN - WEST
1-PS-109E	BUILDING 1 NINTH FLOOR PLAN - EAST
1-PS-109W	BUILDING 1 NINTH FLOOR PLAN - WEST
1-PS-110	BUILDING 1 TENTH FLOOR PLAN
1-PS-111	BUILDING 1 ELEVENTH FLOOR PLAN
1-PS-600A	BUILDING 1 BASEMENT DOOR SCHEDULE
1-PS-600B	BUILDING 1 BASEMENT DOOR SCHEDULE
1-PS-601A	BUILDING 1 FIRST FLOOR DOOR SCHEDULE
1-PS-601B	BUILDING 1 FIRST FLOOR DOOR SCHEDULE

1-PS-601C	BUILDING 1 FIRST FLOOR DOOR SCHEDULE
1-PS-602A	BUILDING 1 SECOND FLOOR DOOR SCHEDULE
1-PS-602B	BUILDING 1 SECOND FLOOR DOOR SCHEDULE
1-PS-603A	BUILDING 1 THIRD FLOOR - DOOR SCHEDULE
1-PS-603B	BUILDING 1 THIRD FLOOR DOOR SCHEDULE"
1-PS-604A	BUILDING 1 FOURTH FLOOR DOOR SCHEDULE
1-PS-604B	BUILDING 1 FOURTH FLOOR DOOR SCHEDULE
1-PS-605A	BUILDING 1 FIFTH FLOOR DOOR SCHEDULE
1-PS-605B	BUILDING 1 FIFTH FLOOR DOOR SCHEDULE
1-PS-606A	BUILDING 1 SIXTH FLOOR DOOR SCHEDULE
1-PS-606B	BUILDING 1 SIXTH FLOOR DOOR SCHEDULE
1-PS-607A	BUILDING 1 SEVENTH FLOOR - DOOR SCHEDULE
1-PS-607B	BUILDING 1 SEVENTH FLOOR DOOR SCHEDULE
1-PS-608A	BUILDING 1 EIGHTH FLOOR DOOR SCHEDULE
1-PS-608B	BUILDING 1 EIGHTH FLOOR DOOR SCHEDULE
1-PS-609	BUILDING 1 NINTH, TENTH, ELEVENTH FLOOR DOOR
2-PS-001E	BUILDING 2 SUB-BASEMENT PLAN - EAST
2-PS-001W	BUILDING 2 SUB-BASEMENT PLAN - WEST
2-PS-002E	BUILDING 2 BASEMENT PLAN - EAST
2-PS-002W	BUILDING 2 BASEMENT PLAN - WEST
2-PS-100E	BUILDING 2 GROUND FLOOR PLAN - EAST
2-PS-100W	BUILDING 2 GROUND FLOOR PLAN - WEST
2-PS-101E	BUILDING 2 FIRST FLOOR PLAN - EAST
2-PS-101W	BUILDING 2 FIRST FLOOR PLAN - WEST
2-PS-102E	BUILDING 2 SECOND FLOOR PLAN - EAST
2-PS-102W	BUILDING 2 SECOND FLOOR PLAN - WEST
2-PS-103E	BUILDING 2 THIRD FLOOR PLAN - EAST
2-PS-103W	BUILDING 2 THIRD FLOOR PLAN - WEST
2-PS-104E	BUILDING 2 FOURTH FLOOR PLAN - EAST
2-PS-104W	BUILDING 2 FOURTH FLOOR PLAN - WEST
2-PS-105E	BUILDING 2 FIFTH FLOOR PLAN - EAST
2-PS-105W	BUILDING 2 FIFTH FLOOR PLAN - WEST
2-PS-106E	BUILDING 2 SIXTH FLOOR PLAN - EAST
2-PS-106W	BUILDING 2 SIXTH FLOOR PLAN - WEST
2-PS-107E	BUILDING 2 SEVENTH FLOOR PLAN - EAST
2-PS-107W	BUILDING 2 SEVENTH FLOOR PLAN - WEST

2-PS-108E	BUILDING 2 EIGHTH FLOOR PLAN - EAST
2-PS-108W	BUILDING 2 EIGHTH FLOOR PLAN - WEST
2-PS-600A	BUILDING 2 SUB-BASEMENT DOOR SCHEDULE
2-PS-600B	BUILDING 2 GROUND FLOOR DOOR SCHEDULE
2-PS-601A	BUILDING 2 FIRST FLOOR DOOR SCHEDULE
2-PS-601B	BUILDING 2 FIRST FLOOR DOOR SCHEDULE
2-PS-602	BUILDING 2 SECOND, FOURTH AND SIXTH FLOOR DOOR
2-PS-603A	BUILDING 2 THIRD FLOOR DOOR SCHEDULE
2-PS-603B	BUILDING 2 THIRD FLOOR DOOR SCHEDULE
2-PS-605A	BUILDING 2 FIFTH FLOOR DOOR SCHEDULE
2-PS-605B	BUILDING 2 FIFTH FLOOR DOOR SCHEDULE
2-PS-607	BUILDING 2 SEVENTH FLOOR DOOR SCHEDULE
2-PS-608A	BUILDING 2 EIGHTH FLOOR DOOR SCHEDULE
2-PS-608B	BUILDING 2 EIGHTH FLOOR DOOR SCHEDULE
3-PS-100	BUILDING 3 FLOOR PLANS
3-PS-600	BUILDING 3 DOOR SCHEDULES
5-PS-100	BUILDING 5 FLOOR PLAN
5-PS-600	BUILDING 5 DOOR SCHEDULE
6-PS-100	BUILDING 6 FLOOR PLAN
6-PS-101	BUILDING 6 DOOR SCHEUDLE
8-PS-100	BUILDING 8 FLOOR PLAN
8-PS-600	BUILDING 8 DOOR SCHEDULE
15-PS-100	BUILDING 15 FLOOR PLAN
15-PS-600	BUILDING 15 DOOR SCHEDULE
16-PS-100	BUILDING 16 FLOOR PLAN
16-PS-600	BUILDING 16 DOOR SCHEDULE
21-PS-100	BUILDING 21 BASEMENT PLAN
21-PS-101	BUILDING 21 FIRST FLOOR PLAN
21-PS-102	BUILDING 21 SECOND FLOOR PLAN
21-PS-103	BUILDING 21 THIRD FLOOR PLAN
21-PS-104	BUILDING 21 FOURTH FLOOR PLAN
21-PS-105	BUILDING 21 FIFTH FLOOR PLAN
21-PS-600	BUILDING 21 DOOR SCHEDULE - BASEMENT, FIRST, SECOND FLOORS
21-PS-601	BUILDING 21 DOOR SCHEDULE - THIRD, FOURTH, FIFTH FLOORS
28-PS-101	BUILDING 28 - LEVEL A

28-PS-102	BUILDING 28 - LEVEL B
28-PS-103	BUILDING 28 - LEVEL C
28-PS-104	BUILDING 28 - LEVEL D
28-PS-600	BUILDING 28 DOOR SCHEDULE
29-PS-101	BUILDING 29 - BRIDGE PLAN
29-PS-600	BUILDING 29 DOOR SCHEDULE
30-PS-100E	BUILDING 30 BASEMENT PLAN - EAST
30-PS-100W	BUILDING 30 BASEMENT PLAN - WEST
30-PS-101E	BUILDING 30 FIRST FLOOR PLAN - EAST
30-PS-101W	BUILDING 30 FIRST FLOOR PLAN - WEST
30-PS-102E	BUILDING 30 SECOND FLOOR PLAN - EAST
30-PS-102W	BUILDING 30 SECOND FLOOR PLAN - WEST
30-PS-600	BUILDING 30 BASEMENT DOOR SCHEDULE
30-PS-601A	BUILDING 30 FIRST FLOOR DOOR SCHEDULE
30-PS-601B	BUILDING 30 FIRST FLOOR DOOR SCHEDULE
30-PS-602A	BUILDING 30 SECOND FLOOR DOOR SCHEDULE
30-PS-602B	BUILDING 30 SECOND FLOOR DOOR SCHEDULE
31-PS-101	BUILDING 31 FIRST FLOOR AND MEZZANINE PLANS
31-PS-600	BUILDING 31 DOOR SCHEDULE
32-PS-100	BUILDING 32 PARTIAL BASEMENT PLAN
32-PS-104	BUILDING 32 FOURTH FLOOR PLAN
32-PS-600	BUILDING 32 DOOR SCHEDULE
- - - END - - -	



**SECTION 01 00 00**  
**GENERAL REQUIREMENTS**

**PART 1 - GENERAL**

**1.1 STIPULATIONS**

- A. Contractor shall completely prepare site for building operations, including demolition and removal of existing structures, and furnish labor and materials and perform work for Philadelphia VAMC, Rekey VA Medical Center as required by drawings and specifications.
- B. All employees of general contractor and subcontractors shall comply with VA security management program and obtain permission of the VA police, be identified by project and employer, and restricted from unauthorized access.
- C. Prior to commencing work, general contractor shall provide proof that a OSHA designated "competent person" (CP) (29 CFR 1926.20(b)(2)) will maintain a presence at the work site whenever the general or subcontractors are present.

**1.2 SUMMARY**

- A. This Section includes the following:
  - 1. Work covered by the Contract Documents.
  - 2. Type of the Contract.
  - 3. Work phases.
  - 4. Work under other contracts.
  - 5. Products ordered in advance.
  - 6. Owner-furnished products.
  - 7. Use of premises.
  - 8. Owner's occupancy requirements.
  - 9. Work restrictions.
  - 10. Specification formats and conventions.

**1.3 DEFINITIONS**

- A. The following definitions shall form in part and\or in whole all related specification sections.
  - 1. CIH - Certified Industrial Hygienist
  - 2. CHST - Construction Health and Safety Technicians
  - 3. CO - VA Project Contracting Officer
  - 4. COTR - VA Project Engineer Technical Representative
  - 5. CSP - Certified Safety Professional
  - 6. VA - Veterans Administration
  - 7. VAMC - Veterans Administration Medical Center
  - 8. VAPD - Veterans Administration Police Department

#### 1.4 WORK COVERED BY CONTRACT DOCUMENTS

- A. The scopes of work for this project shall include but not limited to replacing the cylinder cores at all door locations as indicated on the contract drawings and related specifications. In addition, provide the installation of a new physical access control system (PACS) and the modification of all PACS protected doors and/or components' as necessary to provide a fully operational system in conformance with all applicable life safety codes. The intent of the project scope is to provide the enhancement of the physical security measures as well as as the electronic security protections for the Veterans Administration Philadelphia VAMC in Philadelphia, PA. The project shall consist of the following system requirements and shall be provided in accordance with all related specification sections and contract drawings:
1. The Contractor shall provide all necessary costs associated with the proper installation of a new TCP/IP Physical Access Control System (PACS) and shall be responsible for providing all design, installation, materials, programming, commissioning, testing and certifications as necessary to provide a complete fully integrated and operating system in accordance with all requirements of the Contract documents. Refer to all related specification sections for additional Physical Access Control System requirements.
    - a. The PACS shall consist of but not limited to furnishing and installation all, equipment, devices, servers, client workstations, network servers, active network communications equipment, remote data gathering panels (DGP), power supplies, connections to existing emergency electrical power, printers, conduits, cabling, software, programming, integration to all door hardware ancillary systems, as necessary to provide a seamless and fully integrated physical access control management system for the Station.
      - 1) All Division 28 scopes of work shall be planned and executed as a phased construction project and shall be considered critical to all construction activities.
      - 2) The Contractor shall plan; schedule and install all scopes of work in accordance with the requirements of the project construction schedule and shall be coordinated with all the appropriate VAMC agencies prior to commencement. Refer to all related specification sections for additional information related to project scheduling and facility access.
    - b. Prior to the submission of shop drawings and the commencement of any work the Contractor shall perform a complete and comprehensive testing assessment of all existing Physical Access Control System components and related cabling currently deployed throughout the entire station.
      - 1) At the completion of this assessment the contractor shall submit documentation of all results as well as any discovery to the VA's Project Engineer and Design Professional for review and evaluation.
      - 2) It shall be noted that the results of the aforementioned security assessment shall establish the current systems performance, operational capabilities and existing wiring conditions and

shall establish the benchmark of all existing conditions for all physical access control systems on site.

- a) Note: The survey of the existing PACS shall be completed, reviewed and approved by all agencies prior to the commencement of any construction activities throughout the facility.
2. The Contractor shall prepare, schedule and coordinate all system installations, modifications and demolition without disruption of any existing security system functions or the daily operation of the facility. All systems shall be installed in such a manner that all new controls, equipment and/or devices shall be installed, programmed and tested prior to switch over and/or disconnecting of any existing electronic security systems.
- a. The contractor shall coordinate all installation activities so as not to disrupt the daily routines of the facility and shall include any costs related to a phased construction methodology including but not limited all necessary temporary equipment, devices, components or systems as well as any labor costs associated with any installation, commissioning, testing demolition of any systems required to be performed after normal business hours of the facility.
    - 1) The Contractor plan all work in accordance with requirements of the project construction schedule, all Division 01 stipulations and infection control measures. Refer to related specification sections for additional information related to project scheduling and facility access.
  - b. Prior to the disabling, switchover and/or demolition of the existing PACS and/or PES components and associated cabling, all new system components, equipment, processors, servers, devices, conduits, cabling, software and programming shall be in place, tested and fully operational.
  - c. Upon completion of the new PACS and/or PES and prior to the switchover of all existing field devices and wiring the contractor shall coordinate with the VA Project Engineer and Design Professional all proposed system conversions and/or switchover methodologies. This coordination shall include all affected systems, areas of change over, change over procedures and duration of work to be performed.
    - 1) The contractor shall coordinate all demolition activities so as not to disrupt the daily routine of the facility or negatively impact the integrality of the facility's security and life safety measures.
    - 2) Contractor shall demolish all existing electronic security systems, cabling, devices, components and/or controls not integrated with the new PACS or PES only after final acceptance by the Government, Government Representatives and the Design Professionals.
- a) The removal or demolition of all existing security system devices and/or field wiring not incorporated into the new system shall be performed in such a manner consistent with all requirements of NFPA 70.

- 3) Contractor shall submit a demolition plan for review by the VA Project Engineer, VA Police Department and the Design Professionals outlining all procedures, means, methods and precautions to be employed in the demolition of all existing electronic security systems.
3. No demolition of any existing systems shall commence until all new and/or temporary systems are installed, operational, fully tested and accepted by the VA Project Engineer, VA Police
4. The Contractor shall provide all necessary costs associated with the furnishing the cores and pinning for proper installation of new cores on all doors throughout the Campus (all buildings) as well as remote locations as indicated in the contract documents. Installation of the cores will not be the responsibility of the contractor.
  - a. The coring shall consist of but not limited to furnishing all, materials, physical core pin-out, software based key management system, software based core pin-out configuration systems, equipment, client PC terminals, all software and programming, as necessary to provide a seamless and fully integrated physical access control management system for the Station.
5. The offices of AE Works Ltd., herein known as the Design Professional, will render certain technical services during construction.
  - a. Such services shall be considered as advisory to the Government and shall not be construed as expressing or implying a contractual act of the Government without affirmations by VA's Contracting Officer or his duly authorized representative.

B. Examination Of Plans, Specification and Site Conditions:

1. All data and information furnished or referred is for the Contractor's information. Government does not guarantee that other materials will not be encountered nor that proportions, conditions or character of the existing conditions will not vary from those indicated by Contract Documents. The Government shall not be responsible for any interpretation of or conclusion drawn from the data or information by the Contractor
  - a. The bidder is to fully inform themselves as to all conditions, requirements, drawings and specifications, and Addenda before submitting bids. Failure to do so will be at the bidder's own risk.
    - 1) Any obvious errors or omissions in the plans and specifications shall not inure to the benefit of the bidder, but shall put the bidder on notice to identify and inquire from the VA's Contracting Officer and Design Professional all clarifications.
  - b. All visits to the site by perspective Bidders shall be made only by appointment with the VA's Contracting Officer.

- c. AFTER AWARD OF CONTRACT, 5 sets of specifications and drawings will be furnished. These drawings and specifications will consist of those returned by prospective bidders.
- d. Additional sets of drawings may be made by the Contractor, at Contractor's expense, from reproducible sepia prints furnished by Issuing Office. Such sepia prints shall be returned to the Issuing Office immediately after printing is completed.

#### 1.5 ALTERNATES

- A. All Contractors' shall refer to the Contract Drawings and Specifications that shall form the scope of services that constitute the project base bid contract.
- B. Summary
  - 1. Refer to specification section 01 23 00 for deduct alliterates.
- C. Definitions
  - 1. Definition below expands the definition found in "Instructions to Bidders," and assumes the normal bidding situation applies, with contractors stating alternate amounts requested on the Bid Form. It also assumes that Government will decide to accept or reject alternates before signing the Owner/Contractor Agreement and that Bidding Requirements stipulate terms under which Government will accept or reject alternates.
  - 2. The costs for each alternate shall be the net to the Contract Sum to incorporate each alternate into the Work. No other adjustments or modifications shall be made to the Contract Sum.
- D. Procedures
  - 1. Coordination: Modify or adjust affected adjacent work as necessary to completely integrate or eliminate all work of any alternate impacting the Project.
    - a. Include as part of each alternate, miscellaneous devices, accessory objects, appurtenances labor and similar items incidental to or required for the complete performance, installation and scopes of services in accordance with the requirements of all related specification sections whether or not specifically indicated as part of alternate.
  - 2. Notification: Immediately following award of the Contract, notify each party involved, in writing, of the status of each alternate. Indicate if alternates have been accepted, rejected, or deferred for later consideration. Include a complete description of negotiated modifications to alternates.
  - 3. Execute accepted alternates under the same conditions as other work of the Contract.

- E. Schedule: A Schedule of Alternates is included under Part 3 of this Section. All specification sections referenced as related documents shall apply to all requirements for all scopes of work contained herein as necessary to achieve the work described under each alternate.

#### 1.6 TYPE OF CONTRACT

- A. Project will be constructed under a single prime Security Contract.

1. All Contractors must be duly licensed, registered and certified in accordance with the requirements of all related specification sections.
  - a. The Contractor shall submit at the time of bid all documentation attesting that the prime Contractor and all subcontractors are duly licensed, registered and certified to perform the specified work and meet all criteria and qualification requirements in accordance with the Contract Documents.

#### 1.7 USE OF PREMISES

- A. General: The Contractor shall have limited use of premises for construction operations only as required to meet the scopes of work as delineated by the Contract Documents.

1. The contractor is reminded that this is and will continue to be an operating healthcare facility. It shall be the contractor's responsibility to become completely familiar with all existing conditions at the Station, and review all proposed equipment and cable terminations which shall have any impact to the daily operations of the Station.

- B. All employees of the contractor and all subcontractors shall comply with the Philadelphia VAMC security management program (both physical and administrative security procedures) and obtain all required security clearances from the Station Police Department for all personnel and staff requiring access to the Station and contiguous spaces.

1. The Contractor shall submit all required information to the VAPD for background checks of all personnel prior to the time when access is planned for the contracted work. Failure to receive the required clearances will mean denial of access to site for that individual. The Contractor will allow for this activity in their project schedule.

- a. All contractors and sub-contractors shall be required to follow all campus security procedures as required to ensure the safety of staff, patients and visitors and not compromise the daily operations of the Station. Personnel shall abide by all Government HIPAA regulations and the prohibition of carrying, transporting or possessing of any weapons, alcohol, narcotics or other contraband on Federal Facilities.

- 1) Failure to abide by any of the above referenced requirements can at the minimum cause restriction of access to the facility for the offending individual, fines and/or penalties to Prime

and/or sub-contractor. Imprisonment of the offending individual as set forth by Local, State and Federal laws.

2. Use of Site: Limit use of premises to work in areas indicated. Do not disturb portions of Project site beyond areas in which the Work is indicated.
  - a. Limits: Confine constructions operations to minimal areas as required for staging and construction operations as approved by the Owner.
3. General Contractor's employees shall not enter the project site without appropriate badge. They may also be subject to inspection of their personal effects when entering or leaving the project site.
4. For working outside the "regular hours" as defined in the contract, The General Contractor shall give 3 days' notice to the VA's Contracting Officer so that security arrangements can be provided for the employees. This notice is separate from any notices required for utility shutdown described later in this section.
5. No photography of VA premises is allowed without written permission of the VA's Contracting Officer.
6. VA reserves the right to close down or shut down the project site and order General Contractor's employees off the premises in the event of a national emergency. The General Contractor may return to the site only with the written approval of the VA's Contracting Officer.
7. The Contractor's employees, and subcontractors at any tier shall conform and abide by the following:
  - a. Obey posted campus speed limit.
  - b. Parking shall be Contractor's responsibility.
  - c. No alcohol, drugs or firearms shall be permitted on campus.
  - d. No profanity or fighting on campus.
  - e. No radios are allowed on the campus without prior written authorization by the VA's Contracting Officer.
  - f. Proper and Professional dress shall be required. Shirts shall be worn at all times. Pants shall be worn around the waist and properly fasten to prevent undergarments from display.
  - g. Hard hats, safety glasses, ear protection required by OSHA shall be utilized.
  - h. Smoking shall occur only in areas posted as designated smoking areas.
  - i. Trash generated by construction personnel shall be cleaned up daily by the Contractor and all subcontractors.
8. Occupancy: Allow for general access and occupancy of all areas not immediately affected by construction by staff and public at all times during the construction period.

9. Driveways and Entrances: Keep driveways, loading areas, and entrances serving premises clear and available to the Government, Government employees, and emergency vehicles at all times. Do not use these areas for parking or storage of materials.
  - a. Schedule deliveries to minimize use of driveways and entrances.
  - b. Schedule deliveries to minimize space and time requirements for storage of materials and equipment on-site.
- C. Use of Existing Building: Maintain existing buildings in a weather-tight condition throughout construction period. Repair damage caused by construction operations. Protect building and its occupants during construction period.
- D. Prior to commencement any work, the contractor shall provide proof that an OSHA certified "competent person" (CP) as stipulated by (29 CFR 1926.20(b),(2) shall will maintain a presence at the site whenever the contractor's or subcontractors personnel are present.
1. Training:
  - a. All employees of the contractor or subcontractors shall have completed the 10-hour and all supervisors, foremen and superintendents of the contractor or subcontractors shall have the 30-hour OSHA certified Construction Safety course and other relevant competency training, as determined by CO.
  - b. Submit training records of all such employees for approval before the start of work.

#### **1.8 OPERATIONS AND STORAGE AREAS**

- A. The Contractor shall confine all operations (including storage of materials) on Government premises to areas authorized or approved by the VA's Contracting Officer. The Contractor shall hold and save the Government, its officers and agents, free and harmless from liability of any nature occasioned by the Contractor's performance.
- B. Temporary buildings (e.g., storage sheds, shops, offices) and utilities may be erected by the Contractor only with the approval of the VA's Contracting Officer neer and shall be built with labor and materials furnished by the Contractor without expense to the Government. The temporary buildings and utilities shall remain the property of the Contractor and shall be removed by the Contractor at its expense upon completion of the work and the site restored to its original condition.
- C. The Contractor shall, under regulations prescribed by the VA's Contracting Officer, use only established roadways, or use temporary roadways constructed by the Contractor when and as authorized by the VA's Contracting Officer.



1. When materials are transported in prosecuting the work, vehicles shall not be loaded beyond the loading capacity recommended by the manufacturer of the vehicle or prescribed by any Federal, State, or local law or regulation. When it is necessary to cross curbs or sidewalks, the Contractor shall protect them from damage. The Contractor shall repair or pay for the repair of any damaged curbs, sidewalks, roads, lawns, or plantings.
- D. Working space and space available for storing materials shall be directed by the VA's Contracting Officer. No Storage of materials or set-up of working space shall be permitted without prior consent and authorization.
- E. All workmen are subject to rules of Medical Center applicable to their conduct.
- F. Execute work so as to interfere as little as possible with normal functioning of Medical Center as a whole, including operations of utility services, fire protection systems and any existing equipment, and with work being done by others.
  1. Use of equipment and tools that transmit vibrations and noises through the building structure, are not permitted in buildings that are occupied, during construction except as permitted by COR where required by limited working space.
  2. Do not store materials and equipment in other than assigned areas.
  3. Deliver materials and equipment to immediate construction working areas in quantities sufficient for not more than two work days. Provide unobstructed access to Medical Center areas required to remain occupied.
  4. Contractor shall receive deliveries of materials, equipment, tools, etc. off-station, and bring them to the job site. The VA will not accept deliveries for Contractors project.

#### **1.9 OCCUPANCY REQUIREMENTS**

- A. Full Government Occupancy: The Government's designates, staff and patients will occupy the site and existing buildings during entire construction period. Coordinate with the VA's Contracting Officer during construction operations to minimize conflicts and facilitate Government usage. Perform the Work so as not to interfere with Governments daily operations.
  1. Maintain access to all building exits existing walkways, corridors, and other adjacent occupied or used facilities. Do not close or obstruct walkways, corridors, or other occupied or used facilities without written permission from the VA's Contracting Officer and authorities having jurisdiction.
  2. Provide not less than 72 hours' notice to the VA's Contracting Officer and Design Professional of all activities that will affect the Station's daily operations.

- B. Occupancy of Completed Areas of Construction: The Government reserves the right to occupy and to place and install equipment in completed areas of building, before Substantial Completion, provided such occupancy does not interfere with completion of the Work. Such placement of equipment and partial occupancy shall not constitute acceptance of the total work.

#### **1.10 WORK RESTRICTIONS**

- A. On-Site Work Hours: Work shall be generally performed inside the existing building during normal business working hours, Monday through Friday, except otherwise indicated or as coordinated with the VA's Contracting Officer and Design Professional. Work performed outside normal business hours shall be approved by the VA's Contracting Officer in writing.
- B. Existing Utility Interruptions: Do not interrupt any utilities serving existing facilities occupied by the Veterans' Administration or others unless permitted under the following conditions and then only after arranging to provide temporary utility services according to the requirements indicated:
1. Notify the VA's Contracting Officer and Design Professional not less than two days in advance of proposed utility interruptions.
  2. Do not proceed with any utility interruptions without written permission of the VA's Contracting Officer and Design Professional.
- C. Historic Preservation
1. Where the Contractor or any of the Contractor's employees, prior to, or during the construction work, are advised and/or discover any possible archeological, historical and/or cultural resources, which will be impacted by the work, the Contractor shall immediately stop all work and notify the COTR verbally, and then with a written follow up of all conditions and/or discovery.

#### **1.11 SPECIFICATION FORMATS AND CONVENTIONS**

- A. Specification Format: The Specifications are organized into Divisions and Sections using the 34-division format and CSI/CSC's "Master-Format" numbering system.
- B. Specification Content: The Specifications use certain conventions for the style of language and the intended meaning of certain terms, words, and phrases when used in particular situations. These conventions are as follows:

1. Abbreviated Language: Language used in the Specifications and other Contract Documents is abbreviated. Words and meanings shall be interpreted as appropriate. Words implied, but not stated, shall be inferred as the sense requires. Singular words shall be interpreted as plural, and plural words shall be interpreted as singular where applicable as the context of the Contract Documents indicates.
2. Imperative mood and streamlined language are generally used in the Specifications. Requirements expressed in the imperative mood are to be performed by Contractor. Occasionally, the indicative or subjunctive mood may be used in the Section Text for clarity to describe responsibilities that must be fulfilled indirectly by Contractor or by others when so noted.
  - a. The words "shall," "shall be," or "shall comply with," depending on the context, are implied where a colon (:) is used within a sentence or phrase.

#### **1.12 INFECTION PREVENTION MEASURES**

- A. Implement the requirements of VAMC's Infection Control Risk Assessment (ICRA) team. ICRA Group may monitor dust in the vicinity of the construction work and require the Contractor to take corrective action immediately if the safe levels are exceeded.
- B. Establish and maintain a dust control program as part of the contractor's infection preventive measures in accordance with the guidelines provided by ICRA Group and as specified here.
  1. Prior to start of work, prepare a plan detailing project-specific dust protection measures, including periodic status reports, and submit to VA's Contracting Officer for review for compliance with contract requirements in accordance with Section 01 33 23, SHOP DRAWINGS, PRODUCT DATA AND SAMPLES.
    - a. All personnel involved in the construction or renovation activity shall be educated and trained in infection prevention measures established by the medical center.
- C. Medical center Infection Control personnel shall monitor for airborne disease (e.g. aspergillosis) as appropriate during construction. A baseline of conditions shall be established by the medical center prior to the start of work and periodically during the construction stage to determine impact of construction activities on indoor air quality. In addition:
  1. In areas where negative pressure differential is required the contractor shall provide a manometer capable of indicating pressure differential located at the entrance to the project site. Contractor shall take twice daily readings (morning and afternoon). Contractor shall record readings in log book to be kept adjacent to the manometer and shall submit the readings to the COTR on a weekly basis.

2. The CO and VAMC Infection Control personnel shall review pressure differential monitoring documentation to verify that pressure differentials in the construction zone and in the patient-care rooms are appropriate for their settings. The requirement for negative air pressure in the construction zone shall depend on the location and type of activity. Upon notification, the contractor shall implement corrective measures to restore proper pressure differentials as needed.
  3. In case of any problem, the medical center, along with assistance from the contractor, shall conduct an environmental assessment to find and eliminate the source.
- D. In general, following preventive measures shall be adopted during construction to keep down dust and prevent mold.
1. Dampen debris to keep down dust and provide temporary construction partitions in existing structures where directed by COTR. Blank off ducts and diffusers to prevent circulation of dust into occupied areas during construction. Contractor shall use sweeping compound when performing cleaning activities.
  2. Do not perform dust producing tasks within occupied areas without the approval of the COTR. For construction in any areas that will remain jointly occupied by the medical Center and Contractor's workers, the Contractor shall:
    - a. Provide dust proof one-hour temporary drywall construction barriers to completely separate construction from the operational areas of the hospital in order to contain dirt debris and dust.
      - 1) Barriers shall be sealed and made presentable on hospital occupied side. Install a self-closing rated door in a metal frame, commensurate with the partition, to allow worker access. Maintain negative air at all times.
      - 2) A fire retardant polystyrene, 6-mil thick or greater plastic barrier meeting local fire codes may be used where dust control is the only hazard, in areas where the construction will last less than 30 calendar days and an agreement is reached with the COTR and Medical Center.
    - b. HEPA filtration is required where the exhaust dust may reenter the breathing zone. Contractor shall verify that construction exhaust to exterior is not reintroduced to the medical center through intake vents, or building openings. Install HEPA (High Efficiency Particulate Accumulator) filter vacuum system rated at 95% capture of 0.3 microns including pollen, mold spores and dust particles.
      - 1) Insure continuous negative air pressures occurring within the work area. HEPA filters should have ASHRAE 85 or other pre-filter to extend the useful life of the HEPA. Provide both primary and secondary filtrations units. Exhaust hoses shall be heavy duty, flexible steel reinforced and exhausted so that dust is not reintroduced to the medical center.

- c. Adhesive Walk-off/Carpet Walk-off Mats, minimum 600mm x 900mm (24" x 36"), shall be used at all interior transitions from the construction area to occupied medical center area. These mats shall be changed as often as required to maintain clean work areas directly outside construction area at all times.
- d. Vacuum and wet mop all transition areas from construction to the occupied medical center at the end of each workday. Vacuum shall utilize HEPA filtration. Maintain surrounding area frequently. Remove debris as they are created. Transport these outside the construction area in containers with tightly fitting lids.
- e. The contractor shall not haul debris through patient-care areas without prior approval of the COTR and the Medical Center. When, approved, debris shall be hauled in enclosed dust proof containers or wrapped in plastic and sealed with duct tape.
  - 1) No sharp objects should be allowed to cut through the plastic. Wipe down the exterior of the containers with a damp rag to remove dust. All equipment, tools, material, etc. transported through occupied areas shall be made free from dust and moisture by vacuuming and wipe down.
- 3. Using a HEPA vacuum, clean inside the barrier and vacuum ceiling tile prior to replacement. Any ceiling access panels opened for investigation beyond sealed areas shall be sealed immediately when unattended.
- 4. There shall be no standing water during construction. This includes water in equipment drip pans and open containers within the construction areas. All accidental spills must be cleaned up and dried within 12 hours. Remove and dispose of porous materials that remain damp for more than 72 hours.
- 5. At completion, remove construction barriers and ceiling protection carefully, outside of normal work hours. Vacuum and clean all surfaces free of dust after the removal.

E. Final Cleanup:

- 1. Upon completion of project, or as work progresses, remove all construction debris from above ceiling, vertical shafts and utility chases that have been part of the construction.
- 2. Perform HEPA vacuum cleaning of all surfaces in the construction area. This includes walls, ceilings, cabinets, furniture (built-in or free standing), partitions, flooring, etc.

**1.13 CONSTRUCTION SAFETY REQUIREMENTS**

- A. The publications listed below form a part of this specification to the extent referenced. The publications are referred to within the text by the basic designation only.

- 1. AMERICAN SOCIETY OF SAFETY ENGINEERS (ASSE/SAFE)
  - a. ASSE/SAFE A10.32 (2004) Fall Protection
  - b. ASSE/SAFE A10.3 (2001; R 2005) Protection of the Public on or Adjacent to Construction Sites

- c. ASSE/SAFE Z359.1 (2007) Safety Requirements for Personal Fall Arrest Systems, Subsystems and Components
- 2. AMERICAN SOCIETY FOR TESTING AND MATERIALS (ASTM)
  - a. E84-2009 Surface Burning Characteristics of Building Materials
- 3. ASME INTERNATIONAL (ASME)
  - a. ASME B30.22 Articulating Boom Cranes
  - b. ASME B30.3 (2004) Construction Tower Cranes
  - c. ASME B30.5 (2007) Mobile and Locomotive Cranes
- 4. NATIONAL FIRE PROTECTION ASSOCIATION (NFPA)
  - a. NFPA 10 (2007; Errata 2007; AMD 1 2007) Standard for Portable Fire Extinguishers
  - b. NFPA 241 (2009) Standard for Safeguarding Construction, Alteration, and Demolition Operations
  - c. NFPA 306 (2009) Standard for Control of Gas Hazards in Vessels
  - d. NFPA 51B (2009) Standard for Fire Prevention During Welding, Cutting, and Other Hot Work
  - e. NFPA 70 (2008; AMD 1 2008) National Electrical Code - 2008 Edition
  - f. NFPA 70E (2009; Errata 2009) Standard for Electrical Safety in the Workplace
- 5. U.S. NATIONAL ARCHIVES AND RECORDS ADMINISTRATION (NARA)
  - a. CFR 20 Standards for Protection against Radiation
  - b. CFR 1910 Occupational Safety and Health Standards
  - c. CFR 1910.146 Permit-required Confined Spaces
  - d. CFR 1919 Gear Certification
  - e. CFR 1926 Safety and Health Regulations for Construction
  - f. CFR 1926.500 Fall Protection
- 6. Occupational Safety and Health Administration (OSHA):
  - a. 29 CFR 1926 Safety and Health Regulations for Construction
- 7. VHA Construction Safety Guide: web link  
  
([http://vaww.ceosh.med.va.gov/ceosh/Guidebooks/ConstructionSafety/Construction\\_Safety\\_Guidebook.htm](http://vaww.ceosh.med.va.gov/ceosh/Guidebooks/ConstructionSafety/Construction_Safety_Guidebook.htm))

B. Safety Plan

- 1. Safety plan must be submitted and approved prior to starting any and all work activities.
- 2. Safety Plan must include the following:
  - a. Preconstruction Submittals
  - b. Accident Prevention Plan (APP)
  - c. Job Hazard Analysis (JHA)
  - d. Test Reports

e. OSHA 10 and 30 Hour Cards

C. Fire Safety Plan: Establish and maintain a fire protection program in accordance with 29 CFR 1926. Prior to start of work, prepare a plan detailing project-specific fire safety measures, including periodic status reports, and submit to Resident Engineer and Facility Safety Officer for review for compliance with contract requirements in accordance with Section 01 33 23, SHOP DRAWINGS, PRODUCT DATA AND SAMPLES Prior to any worker for the contractor or subcontractors beginning work, they shall undergo a safety briefing provided by the general contractor's competent person per OSHA requirements. This briefing shall include information on the construction limits, VAMC safety guidelines, means of egress, break areas, work hours, locations of restrooms, use of VAMC equipment, etc. Documentation shall be provided to the VA's Contracting Officer that individuals have undergone contractor's safety briefing.

D. Site and Building Access: Maintain free and unobstructed access to facility emergency services and for fire, police and other emergency response forces in accordance with NFPA 241.

E. Separate temporary facilities, such as trailers, storage sheds, and dumpsters, from existing buildings and new construction by distances in accordance with NFPA 241. For small facilities with less than 6 m (20 feet) exposing overall length, separate by 3m (10 feet).

F. Reports

1. Submit reports as their incidence occurs, in accordance with the requirements of the paragraph entitled, "Reports."

- a. Accident Reports
- b. Confined Space Entry Permit
- c. Hot work permit
- d. Smoke/Fire Wall Penetration Permit
- e. Trenching Permit
- f. All License and Certificates

G. Definitions

- 1. Competent Person for Fall Protection: A person who is capable of identifying hazardous or dangerous conditions in the personal fall arrest system or any component thereof, as well as their application and use with related equipment, and has the authority to take prompt corrective measures to eliminate the hazards of falling.
- 2. High Visibility Accident: Any mishap which may generate publicity and/or high visibility.
- 3. Medical Treatment: Treatment administered by a physician or by registered professional personnel under the standing orders of a physician. Medical treatment does not include first aid treatment even through provided by a physician or registered personnel.
- 4. Recordable Injuries or Illnesses: Any work-related injury or illness that results in:
  - a. Death, regardless of the time between the injury and death, or the length of the illness;

- b. Days away from work (any time lost after day of injury/illness onset);
- c. Restricted work;
- d. Transfer to another job;
- e. Medical treatment beyond first aid;
- f. Loss of consciousness; or a significant injury or illness diagnosed by a physician or other licensed health care professional, even if it did not result in (1) through (6) above.

#### H. Regulatory Requirements

1. In addition to the detailed requirements included in the provisions of this contract, comply with the most recent addition of the VHA Construction Safety Guidebook, and federal, state, and local, laws, ordinances, criteria, rules and regulations. Submit matters of interpretation of standards to the appropriate administrative agency for resolution before starting work. Where the requirements of this specification, applicable laws, criteria, ordinances, regulations, and referenced documents vary, the most stringent requirements govern.

#### I. Site Qualifications Duties and Meetings

1. Site Safety and Health Officer (SSHO): The contractor shall provide a Safety oversight team that includes a minimum of one (1) Competent Person at each project site to function as the Safety and Health Officer (SSHO).
  - a. The SSHO shall be at the work site at all times, unless specified differently in the contract, to perform safety and occupational health management, surveillance, inspections, and safety enforcement for the Contractor, and their training, experience, and qualifications shall be as required by VHA Construction Safety Guide.
  - b. A Competent Person shall be provided for all of the hazards identified in the Contractor's Safety and Health Program in accordance with the accepted Accident Prevention Plan, and shall be on-site at all times when the work that presents the hazards associated with their professional expertise is being performed. The credentials of the Competent Persons(s) shall be approved by the VA's Contracting Officer in consultation with the Safety Office.
2. The SSHO, as a minimum, must have completed the 30-hour OSHA Construction Safety class. The SSHO is also required to have five (5) years of construction industry safety experience or three (3) years of construction safety experience if in possession of a Certified Safety Profession (CSP) or safety and health degree.
  - a. Competent Person for Confined Space Entry. Provide a competent person for confined space meeting the definition and requirements of VHA Construction Safety Guide. All confined space and enclosed space work shall comply with VA standard 1.6F.3.



J. Personnel Duties

1. Site Safety and Health Officer (SSHO)

- a. Conduct daily safety and health inspections and maintain a written log which includes area/operation inspected, date of inspection, identified hazards, recommended corrective actions, estimated and actual dates of corrections. Attach safety inspection logs to the Contractors' daily quality control report.
- b. Conduct mishap investigations and complete required reports. Maintain the OSHA Form 300 and Daily Production reports for prime and sub-contractors.
- c. Maintain applicable safety reference material on the job site.
- d. Attend the pre-construction conference, pre-work meetings including preparatory inspection meeting, and periodic in-progress meetings.
- e. Implement and enforce accepted APPS and JHAs.
- f. Maintain a safety and health deficiency tracking system that monitors outstanding deficiencies until resolution. Post a list of unresolved safety and health deficiencies on the safety bulletin board.
- g. Maintain a list of hazardous chemicals on site and their material safety data sheets.

K. Accident Prevention Plan (APP)

1. Use a qualified person to prepare the written site-specific APP. Prepare the APP in accordance with the format and requirements of the VHA Construction Safety Guide and as supplemented herein. Cover all paragraph and subparagraph elements in the VHA Construction Safety Guide.
2. Specific requirements for some of the APP elements are described below.
  - a. The APP shall be job-specific and address any unusual or unique aspects of the project or activity for which it is written.
  - b. The APP shall interface with the Contractor's overall safety and health program. Include any portions of the Contractor's overall safety and health program referenced in the APP in the applicable APP element and made site-specific.
    - 1) The Government considers the Prime Contractor to be the "controlling authority" for all work site safety and health of the subcontractors.
  - c. Contractors are responsible for informing their subcontractors of the safety provisions under the terms of the contract and the penalties for noncompliance, coordinating the work to prevent one craft from interfering with or creating hazardous working conditions for other crafts, and inspecting subcontractor operations to ensure that accident prevention responsibilities are being carried out.

- d. The APP shall be signed by the person and firm (senior person) preparing the APP, the Contractor, the on-site superintendent, the designated site safety and health officer, the Contractor Quality control Manager, and any designated CSP and/or CIH.
3. Submit the APP to the VA's Contracting Officer 15 calendar days prior to the date of the preconstruction conference for acceptance. Work cannot proceed without an accepted APP. Once accepted by the VA's Contracting Officer, the APP and attachments will be enforced as part of the contract. Disregarding the provisions of this contract or the accepted APP will be cause for stopping of work, at the discretion of the VA's Contracting Officer, until the matter has been rectified.
  - a. Once work begins, changes to the accepted APP shall be made with the knowledge and concurrence of the VA's Contracting Officer, project superintendent, SSSH and/or quality control manager.
    - 1) Should any severe hazard exposure, i.e. imminent danger, become evident, stop work in the area, secure the area, and develop a plan to remove the exposure and control the hazard. Notify the VA's Contracting Officer within 24 hours of discovery.
    - 2) Eliminate/remove the hazard. In the interim, take all necessary action to restore and maintain safe working conditions in order to safeguard onsite personnel, visitors, the public (as defined by ASSE/SAFE A10.34) and the environment.
4. Copies of the accepted plan will be maintained at the VA's Contracting Officer's office and at the job site. Continuously reviewed and amended the APP, as necessary, throughout the life of the contract. Incorporate unusual or high-hazard activities not identified in the original APP as they are discovered.
5. VHA Construction Safety Guide Contents: In addition to the requirements outlined in the VHA Construction Safety Guide, the following is required:
  - a. Names and qualifications (resumes including education, training, experience and certifications) of all site safety and health personnel designated to perform work on this project to include the designated site safety and health officer and other competent and qualified personnel to be used such as CSP, CIH, or, CHSTs. Specify the duties of each position.
6. Qualifications of competent and of qualified persons. As a minimum, designate and submit qualifications of competent persons for each of the following major areas: excavation; scaffolding; fall protection; hazardous energy; confined space; health hazard recognition, evaluation and control of chemical, physical and biological agents; personal protective equipment and clothing to include selection, use and maintenance.
7. Confined Space Entry Plan. Develop a confined and/or enclosed space entry plan in accordance with VHA Construction Safety Guide, applicable OSHA standards, 29 CFR 1910, 29 CFR 1915, and 29 CFR 1926, OSHA Directive 2.100, and any other federal, state and local regulatory requirements identified in this contract.

- a. Identify the qualified person's name and qualifications, training, and experience. Delineate the qualified person's authority to direct work stoppage in the event of hazardous conditions.
  - 1) Include procedures for rescue by contractor personnel and the coordination with emergency responders.
  - 2) If there is no confined space work, include a statement that no confined space work exists and none will be created.

L. Job hazard Analysis (JHA)

1. The Job Hazard Analysis (JHA) format shall be performed in accordance with OSHA 3071 (R2002) <http://www.osha.gov/> and the requirements of chapters 2 through 17 of the VHA Construction Safety Guide. Submit the JHA for review at least 15 calendar days prior to the start of each phase.
  - a. Format subsequent JHAs as amendments to the APP. The analysis should be used during daily inspections to ensure the implementation and effectiveness of the activity's safety and health controls. The JHA list will be reviewed periodically (at least monthly) at the Contractor supervisory safety meeting and updated as necessary when procedures, scheduling, or hazards change.
2. Develop the activity hazard analyses using the project schedule as the basis for the activities performed. Any activities listed on the project schedule may require a JHA. The JHAs will be developed by the contractor, supplier or subcontractor and provided to the prime contractor for submittal to the VA's Contracting Officer. A JHA shall be prepared for all activities comprising:
  - a. Jobs with the highest injury or illness rates;
  - b. Jobs with potential to cause severe or disabling injuries or illness, even if no previous history of accidents;
  - c. Jobs in which one simple human error could lend to severe accident or injury;
  - d. Jobs that are new to operators or have undergone changes in procedures and processes;
  - e. All jobs applicable from VHA Construction Safety Guide for which MAJOR OSHA VIOLATIONS as noted in the Guide text.

M. Construction and/or Other Work

1. Comply with VHA Construction Safety Guide, NFPA 241, the APP, the AHA, Federal and/or State OSHA regulations, and other related submittals and activity fire and safety regulations. The most stringent standard prevails.
2. Hazardous Material Use
  - a. Each hazardous material must receive approval from the Contracting Office or their designated representative prior to being brought onto the job site or prior to any other use in connection with this contract.
  - b. Allow a minimum of 10 working days for processing of the request for use of a hazardous material.

3. Hazardous Material Exclusions

- a. Notwithstanding any other hazardous material used in this contract, radioactive materials or instruments capable of producing ionizing/non-ionizing radiation as well as materials which contain asbestos, mercury or polychlorinated biphenyls, di-isocyanates, lead-based paint are prohibited.

N. Scaffolding

1. Provide employees with a safe means of access to the work area on the scaffold. Climbing of any scaffold braces or supports not specifically designed for access is prohibited. Access scaffold platforms greater than 20 feet maximum in height by use of a scaffold stair system. Do not use vertical ladders commonly provided by scaffold system manufacturers for accessing scaffold platforms greater than 20 feet maximum in height.
  - a. The use of an adequate gate is required.
  - b. Ensure that employees are qualified to perform scaffold erection and dismantling.
  - c. Do not use scaffold without the capability of supporting at least four times the maximum intended load or without appropriate fall protection as delineated in the accepted fall protection and prevention plan.
  - d. Stationary scaffolds must be attached to structural building components to safeguard against tipping forward or backward.
    - 1) Give special care to ensure scaffold systems are not overloaded.
    - 2) Side brackets used to extend scaffold platforms on self-supported scaffold systems for the storage of material are prohibited.
    - 3) The first tie-in shall be at the height equal to 4 times the width of the smallest dimension of the scaffold base.
    - 4) Place work platforms on mud sills.
    - 5) Scaffold or work platform erectors shall have fall protection during the erection and dismantling of scaffolding or work platforms that are more than six feet.
    - 6) Delineate fall protection requirements when working above six feet or above dangerous operations in the Fall Protection and Prevention (FP&P) Plan and Job Hazard Analysis (JHA) for the phase

O. Excavation

1. Contractor shall perform soil classification by a competent person in accordance with 29 CFR 1926.
2. Utility Locations
  - a. Prior to digging, the appropriate digging permit must be obtained.

- b. All underground utilities in the work area must be positively identified by a private utility locating service in addition to any station locating service and coordinated with the station utility department.
- c. Any markings made during the utility investigation must be maintained throughout the contract.

3. Utility Location Verification

- a. The Contractor must physically verify underground utility locations by hand digging using wood or fiberglass handled tools when any adjacent construction work is expected to come within three feet of the underground system.
- b. Digging within 2 feet of a known utility must not be performed by means of mechanical equipment; hand digging shall be used.
- c. If construction is parallel to an existing utility expose the utility by hand digging every 100 feet if parallel within 5 feet of the excavation.

4. Shoring Systems

- a. Trench and shoring systems must be identified in the accepted safety plan and JHA.
- b. Manufacture tabulated data and specifications or registered engineer tabulated data for shoring or benching systems shall be readily available on-site for review.
- c. Job-made shoring or shielding must have the registered professional engineer stamp, specifications, and tabulated data.

5. Trenching Machinery

- a. Operate trenching machines with digging chain drives only when the spotters/laborers are in plain view of the operator.
- b. Provide operator and spotters/laborers training on the hazards of the digging chain drives with emphasis on the distance that needs to be maintained when the digging chain is operating.
- c. Keep documentation of the training on file at the project site.

P. Work in Confined Spaces

- 1. Comply with the requirements of the VHA Construction Safety Guide, OSHA 29 CFR 1910.146 and OSHA 29 CFR 1926.21(b)(6).
  - a. Any potential for a hazard in the confined space requires a permit system to be used. NOTE: The Contractor shall submit documentation, before starting work, that Contractor employees entering confined spaces have received confined space training or re-training within the last 12 months.
- 2. Entry Procedures.
  - a. Obtain confined space entry permit from the VA Fire Department.

**1.14 RESTORATION**

- A. Remove, cut, alter, replace, patch and repair existing work as necessary to install new work. Except as otherwise shown or specified, do not cut, alter or remove any structural work, and do not disturb any ducts, plumbing, steam, gas, or electric work without approval of the VA's Contracting Officer. Existing work to be altered or extended and that is found to be defective in any way, shall be reported to the VA's Contracting Officer and Design Professional before it is disturbed. Materials and workmanship used in restoring work shall conform in type and quality to that of original existing construction, except as otherwise shown or specified.
- B. Upon completion of contract, deliver work complete and undamaged. Existing work (walls, ceilings, partitions, floors, mechanical and electrical work, lawns, paving, roads, walks, etc.) disturbed or removed as a result of performing required new work, shall be patched, repaired, reinstalled, or replaced with new work, and refinished and left in as good condition as existed before commencing work.
- C. At Contractor's own expense, Contractor shall immediately restore to service and repair any damage caused by Contractor's workmen to existing piping and conduits, wires, cables, etc., of utility services or of fire protection systems and communications systems (including telephone) which are indicated on drawings and which are not scheduled for discontinuance or abandonment.

#### **1.15 AS-BUILT DRAWINGS**

- A. The contractor shall maintain two full size sets of as-built drawings which will be kept current during construction of the project, to include all contract changes, modifications and clarifications.
- B. All variations shall be shown in the same general detail as used in the contract drawings. To insure compliance, as-built drawings shall be made available for the VA's Contracting Officer and Design Professional review, as often as requested.
- C. Contractor shall deliver two approved completed sets of as-built drawings to the COR within 15 calendar days after each completed phase and after the acceptance of the project by the COR.
- D. Paragraphs A, B, & C shall also apply to all shop drawings.
- E. Refer to related specification sections for additional as-built requirements

#### **1.16 TEMPORARY USE OF EXISTING ELEVATORS**

- A. Use of existing elevator for handling building materials and Contractor's personnel will be permitted subject to following provisions:
  - 1. Contractor makes all arrangements with the VA's Contracting Officer for use of elevator. The VA's Contracting Officer will ascertain that elevator is in proper condition. Contractor may use elevator for daily use between the hours of 9 - 10 am, and 2 - 3 pm, and for special nonrecurring time intervals when permission is granted. Personnel for

operating elevators will not be provided by the Department of Veterans Affairs.

2. Contractor covers and provides maximum protection of following elevator components:
  - a. Entrance jambs, heads soffits and threshold plates.
  - b. Entrance columns, canopy, return panels and inside surfaces of car enclosure walls.
  - c. Finish flooring.

#### **1.17 TESTS**

- A. Pre-test all electrical equipment and systems and make corrections required for proper operation of such systems before requesting final tests. Final test will not be conducted unless pre-tested.
- B. Conduct final tests as required in all related specification sections in presence of an authorized representative of the VA's Contracting Officer and Design Professional. Contractor shall furnish all labor, materials, equipment, instruments, and forms, to conduct and record such tests.
  1. All systems shall be programmed, calibrated and commissioned. A system is defined as the entire complex which must be integrated to operate and perform together in a seamless manner during normal operation to produce results for which the systems are designed to provide the specified performance.
  2. All related components shall be fully integrated and functioning when any system component is tested. All system tests shall be completed within a reasonably short period of time during which operating and environmental conditions remain reasonably constant.
  3. Individual test result of any component, where required, will only be accepted when submitted with the test results of related components of the entire system.

#### **1.18 INSTRUCTIONS\TRAINING**

- A. Contractor shall furnish Maintenance and Operating manuals and verbal instructions as required by all related specification sections and as herein specified.
  1. Manuals: Maintenance and operating manuals (three copies each) for each separate piece of equipment shall be delivered to the VA's Contracting Officer coincidental with the delivery of the equipment to the job site.

2. Manuals shall be complete, detailed guides for the maintenance and operation of equipment. They shall include complete information necessary for starting, adjusting, maintaining in continuous operation for long periods of time and dismantling and reassembling of the complete units and sub-assembly components.
3. Manuals shall include an index covering all component parts clearly cross-referenced to diagrams and illustrations. Illustrations shall include "exploded" views showing and identifying each separate item.
  - a. Emphasis shall be placed on the use of special tools and instruments. The function of each piece of equipment, component, accessory and control shall be clearly and thoroughly explained.
  - b. All necessary precautions for the operation of the equipment and the reason for each precaution shall be clearly set forth. Manuals must reference the exact model, style and size of the piece of equipment and system being furnished. Manuals referencing equipment similar to but of a different model, style, and size than that furnished will not be accepted.
4. Instructions: Contractor shall provide qualified, factory-trained manufacturers' representatives to give detailed instruction and training to assigned Department of Veterans Affairs personnel in the operation and complete maintenance for each piece of equipment and system.
  - a. All such training will be at the job site. These requirements are more specifically detailed in the various technical sections. Instructions for different items of equipment that are component parts of a complete system shall be given in an integrated, progressive manner.
  - b. All instructors for every piece of component equipment in a system shall be available until instructions for all items included in the system have been completed. This is to assure proper instruction in the operation of inter-related systems.
  - c. All instruction periods shall be at such times as scheduled by the VA's Contracting Officer and shall be considered concluded only when the VA's Contracting Officer and Design Professional is satisfied in regard to complete and thorough coverage.
  - d. The Department of Veterans Affairs reserves the right to request the removal of, and substitution for, any instructor who, in the opinion of the VA's Contracting Officer, does not demonstrate sufficient qualifications in accordance with requirements for instructors above.
  - e. Refer to all relate specification sections for additional training requirements.

#### **1.19 GOVERNMENT-FURNISHED PROPERTY**

- A. The Government shall deliver to the Contractor, all Government furnished property and/or equipment as shown on the drawings.
  1. Equipment furnished by Government to be installed by Contractor will be furnished to Contractor at the Station.



2. Contractor shall be prepared to receive this equipment from Government and store or place such equipment not less than 90 days before Completion Date of each phase of the project.
- B. Notify the VA's Contracting Officer in writing, 60 days in advance, of date on which Contractor will be prepared to receive equipment furnished by Government. Arrangements will then be made by the Government for delivery of equipment.
1. Immediately upon delivery of equipment, Contractor shall arrange for a joint inspection thereof with a representative of the Government. At such time the Contractor shall acknowledge receipt of equipment described, make notations, and immediately furnish the Government representative with a written statement as to its condition or shortages.
  2. Contractor thereafter is responsible for such equipment until such time as acceptance of contract work is made by the Government.
- C. Equipment furnished by the Government will be delivered in a partially assembled (knock down) condition in accordance with existing standard commercial practices, complete with all fittings, fastenings, and appliances necessary for connections to respective services installed under contract. All fittings and appliances (i.e., couplings, ells, tees, nipples, piping, conduits, cables, and the like) necessary to make the connection between the Government furnished equipment item and the utility stub-up shall be furnished and installed by the contractor at no additional cost to the Government.
1. Completely assemble and install the Government furnished equipment in place ready for proper operation in accordance with specifications and drawings.
  2. Furnish supervision of installation of equipment at construction site by qualified factory trained technicians regularly employed by the equipment manufacturer.
- D. Temporary Heating and Electrical (If Required) Install, use and maintain installations in accordance with 29 CFR 1926, NFPA 241 and NFPA 70.
- E. Means of Egress: Do not block exiting for occupied buildings, including paths from exits to roads. Minimize disruptions and coordinate with the VA's Contracting Officer and Facility Safety Officer
- F. Egress Routes for Construction Workers: Maintain free and unobstructed egress. Inspect daily. Report findings and corrective actions weekly to the VA's Contracting Officer and Facility Safety Officer
- G. Fire Extinguishers: Provide and maintain extinguishers in construction areas and temporary storage areas in accordance with 29 CFR 1926, NFPA 241 and NFPA 10.
- H. Flammable and Combustible Liquids: Store, dispense and use liquids in accordance with 29 CFR 1926, NFPA 241 and NFPA 30.

- I. Existing Fire Protection: Do not impair automatic sprinklers, smoke and heat detection, and fire alarm systems, except for portions immediately under construction, and temporarily for connections. Provide fire watch for impairments more than 4 hours in a 24-hour period. Request interruptions in accordance with Article, OPERATIONS AND STORAGE AREAS, and coordinate with the VA's Contracting Officer and Facility Safety Officer All existing or temporary fire protection systems (fire alarms, sprinklers) located in construction areas shall be tested as coordinated with the medical center. Parameters for the testing and results of any tests performed shall be recorded by the medical center and copies provided to the VA's Contracting Officer.
- J. Smoke Detectors: Prevent accidental operation. Remove temporary covers at end of work operations each day. Coordinate with the VA's Contracting Officer and Facility Safety Officer
- K. Hot Work: Perform and safeguard hot work operations in accordance with NFPA 241 and NFPA 51B. Coordinate with the VA's Contracting Officer. Obtain permits from facility Safety Officer at least \_24 hours in advance. Designate contractor's responsible project-site fire prevention program manager to permit hot work.
- L. Fire Hazard Prevention and Safety Inspections: Inspect entire construction areas weekly. Coordinate with, and report findings and corrective actions weekly to the VA's Contracting Officer and Facility Safety Officer
- M. The Contractor shall, under regulations prescribed by the VA's Contracting Officer, use only established roadways, When materials are transported in prosecuting the work, vehicles shall not be loaded beyond the loading capacity recommended by the manufacturer of the vehicle or prescribed by any Federal, State, or local law or regulation. When it is necessary to cross curbs or sidewalks, the Contractor shall protect them from damage. The Contractor shall repair or pay for the repair of any damaged curbs, sidewalks, or roads.
- N. Execute work so as to interfere as little as possible with normal functioning of Medical Center as a whole, including operations of utility services, fire protection systems and any existing equipment, and with work being done by others. Use of equipment and tools that transmit vibrations and noises through the building structure, are not permitted in buildings that are occupied, during construction, jointly by patients or medical personnel, and Contractor's personnel, except as permitted by the VA's Contracting Officer where required by limited working space.
  - 1. Do not store materials and equipment in other than assigned areas.
  - 2. Schedule delivery of materials and equipment to immediate construction working areas within buildings in use by Department of Veterans Affairs in quantities sufficient for not more than two work days. Provide unobstructed access to Medical Center areas required to remain in operation.
  - 3. Where access by Medical Center personnel to vacated portions of buildings is not required, storage of Contractor's materials and equipment will be permitted subject to fire and safety requirements.

- O. Utilities Services: Where necessary to cut existing pipes, electrical wires, conduits, cables, etc., of utility services, or of fire protection systems or communications systems (except telephone), they shall be cut and capped at suitable places where shown; or, in absence of such indication, where directed by the VA's Contracting Officer. All such actions shall be coordinated with the Utility Company involved:
1. Whenever it is required that a connection fee be paid to a public utility provider for new permanent service to the construction project, for such items as water, sewer, electricity, gas or steam, payment of such fee shall be the responsibility of the Government and not the Contractor.

## 1.20 Phasing

- A. To insure such executions, Contractor shall furnish the VA's Contracting Officer with a schedule of approximate phasing and dates on which the Contractor intends to accomplish work in each specific area of site, building or portion thereof. In addition, Contractor shall notify the VA's Contracting Officer two weeks in advance of the proposed date of starting work in each specific area of site, building or portion thereof. Arrange such phasing and dates to insure accomplishment of this work in successive phases mutually agreeable to the VA's Contracting Officer and Contractor, as follows:
1. All buildings will be occupied during performance of work.
  2. Utilities Services: Maintain existing utility services for Medical Center at all times. Provide temporary facilities, labor, materials, equipment, connections, and utilities to assure uninterrupted services. Where necessary to cut existing water, steam, gases, sewer or air pipes, or conduits, wires, cables, etc. of utility services or of fire protection systems and communications systems (including telephone), they shall be cut and capped at suitable places where shown; or, in absence of such indication, where directed by the VA's Contracting Officer.
  3. No utility service such as water, gas, steam, sewers or electricity, or fire protection systems and communications systems may be interrupted without prior approval of the VA's Contracting Officer. Electrical work shall be accomplished with all affected circuits or equipment de-energized. When an electrical outage cannot be accomplished, work on any energized circuits or equipment shall not commence without the Medical Center Director's prior knowledge and written approval.
    - a. Refer to specification Sections 26 05 00, COMMON WORK RESULTS FOR ELECTRICAL INSTALLATIONS, 27 05 00 COMMON WORK RESULTS FOR COMMUNICATIONS INSTALLATIONS and 28 05 00, COMMON WORK RESULTS FOR ELECTRONIC SAFETY AND SECURITY INSTALLATIONS for additional requirements.
  4. Contractor shall submit a request to interrupt any such services to the VA's Contracting Officer, in writing, 48 hours in advance of proposed interruption. Request shall state reason, date, exact time of, and approximate duration of such interruption.
  5. Contractor will be advised (in writing) of approval of request, or of which other date and/or time such interruption will cause least inconvenience to operations of Medical Center. Interruption time approved

- by Medical Center shall occur at other than Contractor's normal working hours.
6. Major interruptions of any system must be requested, in writing, at least 15 calendar days prior to the desired time and shall be performed as directed by the VA's Contracting Officer.
  7. In case of a contract construction emergency, service will be interrupted on approval of the VA's Contracting Officer. Such approval will be confirmed in writing as soon as practical.
  8. Whenever it is required that a connection fee be paid to a public utility provider for new permanent service to the construction project, for such items as water, sewer, electricity, gas or steam, payment of such fee shall be the responsibility of the Government and not the Contractor.
  9. Abandoned Lines: All service lines such as wires, cables, conduits, ducts, pipes and the like, and their hangers or supports, which are to be abandoned but are not required to be entirely removed, shall be sealed, capped or plugged. The lines shall not be capped in finished areas, but shall be removed and sealed, capped or plugged in ceilings, within furred spaces, in unfinished areas, or within walls or partitions; so that they are completely behind the finished surfaces.
  10. To minimize interference of construction activities with flow of Medical Center traffic, comply with the following:
  11. Keep roads, walks and entrances to grounds, to parking and to occupied areas of buildings clear of construction materials, debris and standing construction equipment and vehicles.
  12. Coordinate the work for this contract with other construction operations as directed by the VA's Contracting Officer. This includes the scheduling of traffic and the use of roadways, as specified in Article, USE OF ROADWAYS.

#### 1.21 ALTERATIONS

- A. Survey: Before any work is started, the Contractor shall make a thorough survey with the VA's Contracting Officer of buildings in which alterations occur and areas which are anticipated routes of access, and furnish a report, signed by both, to the VA's Contracting Officer. This report shall list by rooms and spaces.
  1. Existing condition and types of resilient flooring, doors, windows, walls and other surfaces not required to be altered throughout affected areas of buildings.
  2. Existence and conditions of items such as electrical fixtures, equipment, etc., required by drawings to be either reused or relocated, or both.
  3. Shall note any discrepancies between drawings and existing conditions at site.
  4. Shall designate areas for working space, materials storage and routes of access to areas within buildings where alterations occur and which have been agreed upon by Contractor and the VA's Contracting Officer.

- B. Any items required by drawings to be either reused or relocated or both, found during this survey to be nonexistent, or in opinion of the VA's Contracting Officer, to be in such condition that their use is impossible or impractical, shall be furnished and/or replaced by Contractor with new items in accordance with specifications which will be furnished by Government. Provided the contract work is changed by reason of this subparagraph B, the contract will be modified accordingly, under provisions of clause entitled "DIFFERING SITE CONDITIONS" (FAR 52.236-2) and "CHANGES" (FAR 52.243-4 and VAAR 852.236-88).
- C. Re-Survey: Thirty days before expected partial or final inspection date, the Contractor and the VA's Contracting Officer together shall make a thorough re-survey of the areas of buildings involved. They shall furnish a report on conditions then existing, of resilient flooring, doors, windows, walls and other surfaces as compared with conditions of same as noted in first condition survey report:
1. Re-survey report shall also list any damage caused by Contractor to such flooring and other surfaces, despite protection measures; and, will form basis for determining extent of repair work required of Contractor to restore damage caused by Contractor's workmen in executing work of this contract.
- D. Protection: Provide the following protective measures:
1. Wherever existing roof surfaces are disturbed they shall be protected against water infiltration. In case of leaks, they shall be repaired immediately upon discovery.
  2. Temporary protection against damage for portions of existing structures and grounds where work is to be done, materials handled and equipment moved and/or relocated.
  3. Protection of interior of existing structures at all times, from damage, dust and weather inclemency. Wherever work is performed, floor surfaces that are to remain in place shall be adequately protected prior to starting work, and this protection shall be maintained intact until all work in the area is completed.

## **1.22 TEMPORARY TOILETS**

- A. Contractor may have for use of Contractor's workmen, such toilet accommodations as may be assigned to Contractor by Medical Center. Contractor shall keep such places clean and be responsible for any damage done thereto by Contractor's workmen. Failure to maintain satisfactory condition in toilets will deprive Contractor of the privilege to use such toilets.

## **1.23 AVAILABILITY AND USE OF UTILITY SERVICES**

- A. The Government shall make all reasonably required amounts of utilities available to the Contractor from existing outlets and supplies, as specified in the contract.

- B. Heat: Furnish temporary heat necessary to prevent injury to work and materials through dampness and cold. Use of open salamanders or any temporary heating devices which may be fire hazards or may smoke and damage finished work, will not be permitted. Maintain minimum temperatures as specified for various materials:

#### **1.24 RELOCATED EQUIPMENT and/or ITEMS**

- A. Contractor shall disconnect, dismantle as necessary, remove and reinstall in new location, all existing equipment and items indicated on the drawings.
- B. Perform relocation of such equipment or items at such times and in such a manner as directed by the VA's Contracting Officer.
- C. Suitably cap existing service lines, such as steam, condensate return, water, drain, gas, air, vacuum and/or electrical, whenever such lines are disconnected from equipment to be relocated. Remove abandoned lines in finished areas and cap as specified herein before under paragraph "Abandoned Lines".
- D. Provide all mechanical and electrical service connections, fittings, fastenings and any other materials necessary for assembly and installation of relocated equipment; and leave such equipment in proper operating condition.
- E. All service lines such as noted above for relocated equipment shall be in place at point of relocation ready for use before any existing equipment is disconnected. Make relocated existing equipment ready for operation or use immediately after reinstallation.

#### **PART 2 - PRODUCTS (Not Used)**

#### **PART 3 - EXECUTION**

##### **3.1 SCHEDULE OF ALTERNATES**

- A. Refer to specification section 01 23 00 for all deduct alternates from the base bid of the project.

- - - END - - -

**SECTION 01 22 00**  
**UNIT PRICES**

**PART 1 - GENERAL**

**1.1 STIPULATIONS**

A. Project drawings and general provisions of the Contract, including but not limited to all; General and Supplementary Conditions, Division 01 and all related specification sections shall apply to this section.

B. Related Specification Sections:

1. Division 28 - Physical Access Control System (PACS)

**1.2 SUMMARY**

A. This Section includes administrative and procedural requirements for unit prices.

**1.3 DEFINITIONS**

A. Unit price is an amount proposed by bidders, stated on the Bid Form, as a price per unit of measurement for materials or services added to or deducted from the Contract Sum by appropriate modification, if estimated quantities of Work required by the Contract Documents are increased or decreased.

**1.4 PROCEDURES**

A. Unit prices shall include all necessary material, labor, sub-contractor costs, software licenses, programming, testing plus cost for delivery, installation, insurance, applicable taxes, overhead, and profit.

B. Measurement and Payment: Refer to related Specification Sections for work and performance requirements in the establishment of all unit prices.

C. The Government reserves the right to reject Contractor's measurement of work-in-place that involves use of established unit prices and to have this work measured, at Government's expense, by an independent estimator.

D. List of Unit Prices: A list of unit prices is included in Part 3. Specification Sections referenced in the schedule contain requirements for materials described under each unit price.

E. The unit prices shall be any work items that will be either ADDED to, or DELETED from quantities as required by the Contract Documents.

F. Government reserves the right to take following actions regarding unit prices:

1. Accept any or all unit prices that the Government considers fair and reasonable.
2. Negotiate the amount acceptable to both the Government and Contractor.
3. Reject any or all unit prices that Government considers excessive and unreasonable.

**PART 2 - PRODUCTS (Not Used)**

**PART 3 - EXECUTION**

**3.1 LIST OF UNIT PRICES**

A. Unit Price No. 1:

1. Description: Provide add/deduct unit price for the furnishing and installation of multi-conductor cabling installed in dedicated 1 inch, 1-1/2 inch or four inch conduit as required to support all control and locking devices at the door location installed and tested in accordance with all requirements of the related specification sections.
2. Unit of Measurement: Cost Per 100 Feet.

B. Unit Price No. 2:

1. Description: Provide add/deduct unit price for the furnishing and installation of multi-conductor cabling installed in dedicated flexible 1/2" EMT conduit as required to support all control and locking devices at the door location installed and tested in accordance with all requirements of the related specification sections.
2. Unit of Measurement: Cost Per 100 Feet.

C. Unit Price No. 3:

1. Description: Provide add/deduct unit price for the furnishing and installation of multi-conductor plenum rated cabling installed in free air supported by "J" as required to support all control and locking devices at the door location installed and tested in accordance with all requirements of the related specification sections.
2. Unit of Measurement: Cost Per 100 Feet.



D. Unit Price No. 4:

1. Description: Provide add/deduct unit price for the furnishing and installation of 12/12 fiber optic cabling installed in dedicated conduit and terminated at both ends installed and tested in accordance with all requirements of the related specification sections.
2. Unit of Measurement: Cost Per 100 Feet.

E. Unit Price No. 5:

1. Description: Provide add/deduct unit price for the furnishing and installation of plenum rated Category 6 cabling installed in free air supported by "J" and terminated at both ends installed and tested in accordance with all requirements of the related specification sections.
2. Unit of Measurement: Cost Per 100 Feet.

F. Unit Price No. 6:

1. Description: Provide add/deduct unit price for the furnishing and installation of "Remote Field Processor Panels (DGP)" installed programmed and tested in accordance with all requirements of the related specification sections.
2. Unit of Measurement: Each.

G. Unit Price No. 7:

1. Description: Provide add/deduct unit price for the furnishing and installation of "Layer II Switch, UTP Patch Panel and Communications Enclosure" installed programmed and tested in accordance with all requirements of the related specification sections.
2. Unit of Measurement: Each.

H. Unit Price No. 8:

1. Description: Provide add/deduct unit price for the furnishing and installation of "Contactless PIV Reader" installed programmed and tested in accordance with all requirements of the related specification sections.
2. Unit of Measurement: Each.

I. Unit Price No. 9:

1. Description: Provide add/deduct unit price for the furnishing and installation of "Contactless PIV Reader w/PIN" installed programmed and tested in accordance with all requirements of the related specification sections.
2. Unit of Measurement: Each.

J. Unit Price No. 10:

1. Description: Provide add/deduct unit price for the furnishing and installation of "Auxiliary Door Power Supply " installed programmed and tested in accordance with all requirements of the related specification sections.
2. Unit of Measurement: Each.

K. Unit Price No. 11:

1. Description: Provide add/deduct unit price for the furnishing and installation of "PIR Request to Exit Device" installed programmed and tested in accordance with all requirements of the related specification sections.
2. Unit of Measurement: Each.

L. Unit Price No. 12:

1. Description: Provide add/deduct unit price for the furnishing and installation of "Emergency Exit Device (Pushbutton)" installed programmed and tested in accordance with all requirements of the related specification sections.
2. Unit of Measurement: Each.

M. Unit Price No. 13:

1. Description: Provide add/deduct unit price for the furnishing and installation of "Magnetic Locking Mechanism" installed programmed and tested in accordance with all requirements of the related specification sections.
2. Unit of Measurement: Each.

N. Unit Price No. 14:

1. Description: Provide add/deduct unit price for the furnishing and installation of "Door Position Switch (DPS)" installed programmed and tested in accordance with all requirements of the related specification sections.
2. Unit of Measurement: Each.

- - - END - - -

**SECTION 01 23 00**  
**ALTERNATES**

**PART 1 - GENERAL**

**1.1 STIPULATIONS**

- A. Project drawings and general provisions of the Contract, including but not limited to all; General and Supplementary Conditions, Division 01 and all related specification sections shall apply to this section.
- B. Related Sections:
  - 1. Division 28 - Physical Access Control System (PACS)

**1.2 SUMMARY**

- A. This Section includes administrative and procedural requirements for alternates.

**1.3 DEFINITIONS**

- A. Definition below expands the definition found in "Instructions to Bidders," and assumes the normal bidding situation applies, with contractors stating alternate amounts requested on the Bid Form. It also assumes that Government will decide to accept or reject alternates before signing the Owner/Contractor Agreement and that Bidding Requirements stipulate terms under which Government will accept or reject alternates.
- B. Alternate: An amount proposed by bidders and stated on the Bid Form for certain work defined in the Bidding Requirements that may be added or deducted to the Base Bid amount if the Government decides to accept a corresponding change either in the amount of construction to be completed or in the products, materials, equipment, systems, or installation methods described in the Contract Documents.
  - 1. The cost for each alternate is the net addition or deduction as stipulated to the Contract Sum to incorporate any alternates into the Work. No other adjustments or modifications shall be made to the Contract Sum.

**1.4 PROCEDURES**

- A. Coordination: Modify or adjust affected adjacent work as necessary to completely integrate all work of any alternate into Project.
  - 1. Include as part of each alternate, miscellaneous devices, accessory objects, appurtenances labor and similar items incidental to or required for the complete performance, installation and scopes of services in accordance with the requirements of all related specification sections whether or not specifically indicated as part of alternate.

- B. Notification: Immediately following award of the Contract, notify each party involved, in writing, of the status of each alternate. Indicate if alternates have been accepted, rejected, or deferred for later consideration. Include a complete description of negotiated modifications to alternates.
- C. Execute accepted alternates under the same conditions as other work of the Contract.
- D. Schedule: A Schedule of Alternates is included at the end of this Section. Specification Sections referenced in the related document paragraph herein contain all requirements for scopes of work necessary to achieve the work described under each alternate.

## **PART 2 - PRODUCTS (Not Used)**

## **PART 3 - EXECUTION**

### **3.1 SCHEDULE OF DEDUCT ALTERNATES**

- A. Deduct Alternate No. 1: In lieu of installing all Physical Access Control System (PACS) cabling from processors to door locations in dedicated conduits as specified, provide a deduct cost for the installation of all cabling in 1" Flexible Conduit (Greenfield). All flexible conduits shall be properly secured to the building structure in accordance with all requirements of the NEC and related specification sections.
- B. Deduct Alternate No. 2: In lieu of installing all Physical Access Control System (PACS) cabling from processors to door locations in dedicated conduits as specified, provide a deduct cost for the installation of all cabling as free air cable runs. All free air cabling shall be plenum rated, bundled and properly secured to the building structure by use of "J" hooks. All cabling shall be installed in accordance with all requirements of the NEC and related specification sections.

- - - END - - -

**SECTION 01 31 00**  
**PROJECT MANAGEMENT AND COORDINATION**

**PART 1 - GENERAL**

**1.1 STIPULATIONS**

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions as well as all Division 1, Division 26 and Division 28 Specification Sections, apply to this Section.

**1.2 SUMMARY**

- A. This Section includes administrative provisions for coordinating construction operations on Project including, but not limited to, the following:
  - 1. Shop Drawing Submissions.
  - 2. Administrative and supervisory personnel.
  - 3. Project meetings.
- B. The contractor shall participate in all project management and coordination activities. It shall be the responsibility of this Contractor to assigned specific personnel, subcontractors or manufacturers' representatives to key project objectives in accordance with their expertise, licenses and\or certifications to meet all project objectives and goals.

**1.3 COORDINATION**

- A. Coordination: The contractor and all subcontractors shall coordinate all construction operations with the VA's Project Engineer, as well as other contractors to ensure efficient and orderly installation of all scopes of Work. The contractor shall coordinate its operations with all operations of the Station, and those that are dependent on the proper installation, connection, and operation all scopes of work.
  - 1. Schedule construction operations in the sequence required to obtain the best results where installation of one part of the work is dependent on the installation of other components, before or after installation of the dependent scopes of work.
    - a. Coordinate all installation activities so as not to disrupt the daily routines of the Station, include any costs related to a phased construction methodology, including but not limited all necessary temporary equipment, devices, components or systems as well as any labor costs associated with any installation, commissioning, testing of any systems as required to be performed after normal business hours of the Station to minimize any disruptions.

2. Coordinate the installation of system components with all Station and Government entities as well as other contractors to ensure maximum accessibility for required operation, maintenance, service, and repair.
  3. Make adequate provisions to accommodate any items, equipment or components scheduled for installation at a later date.
  4. Coordinate the integration of all Government provided equipment, utilities and/or network connections
  5. Where availability of space is limited, coordinate installation of all system components to ensure maximum performance and accessibility for required maintenance, service, and repair of all components, including mechanical and electrical.
- B. Prepare all documentation for the distribution to the VA's Project Engineer, Design Professional, all Government agencies and other Contractors, outlining special procedures required for the proper coordination of all work. Include such items as required notices, reports, and list of attendees at any required coordination meetings.
- C. Administrative Procedures: Coordinate scheduling and timing of required administrative procedures with other construction activities and activities of the Station or other contractors to avoid conflicts and to ensure orderly progress of all Work. Such administrative activities shall include, but are not limited to, the following:
1. Preparation of Construction Schedule.
  2. Preparation of the Schedule of Values.
  3. Delivery and processing of submittals.
  4. Pre-installation conferences.
  5. Progress meetings.
  6. Startup commissioning and adjustment of systems.
  7. Project closeout activities.

#### **1.4 SUBMITTALS**

- A. Provide all submissions in accordance with the requirements of related specification sections. Prepare required coordination to necessitate maximum utilization of space for the efficient installation and different components or the coordination of products equipment and connectivity provided by the Government or other Contractors.
- 1.
  2. Content: Project-specific information, drawn accurately to scale. Do not base any Coordination Drawings on the reproductions of the Contract Documents or standard printed data. Include the following information, as applicable:
    - a. Indicate functional and spatial relationships of components of architectural, structural, civil, mechanical, and electrical systems.
    - b. Indicate required installation sequences.
    - c. Indicate dimensions shown on the Contract Drawings and make specific note of dimensions that appear to be in conflict with submitted equipment and minimum clearance requirements. Provide alternate sketches to the VA's Project Engineer and

Design Professional for resolution of such conflicts. Minor dimension changes and difficult installations will not be considered changes to the Contract.

- B. Key Personnel Names: Within 15 days of starting construction operations, submit a list of key personnel assignments, including superintendent and other personnel in attendance at Project site. Identify individuals and their duties and responsibilities; list office addresses and telephone numbers, including office cell phone telephone numbers. Provide names, addresses, and telephone numbers of individuals assigned as standbys in the absence of individuals assigned to Project.
1. Post copies of list in Project meeting room, in temporary field office, and by each temporary telephone. Keep list current at all times.

#### **1.5 ADMINISTRATIVE AND SUPERVISORY PERSONNEL**

- A. General: In addition to Project superintendent, provide other administrative and supervisory personnel as required for proper performance of all Scopes of Work.
1. Include special personnel required for coordination of operations with other contractors.

#### **1.6 PROJECT MEETINGS**

- A. General: Schedule and conduct project progress meeting meetings and conferences at Project site, unless otherwise indicated.
1. Attendees: Inform all participants and others involved, and individuals whose presence is required, of date and time of each meeting. Notify the VA's Project Engineer and Design Professional in writing of all scheduled meeting dates and times.
  2. Agenda: Prepare the meeting agenda. Distribute the agenda to all invited attendees.
  3. Minutes: Record significant discussions and agreements achieved. Distribute the meeting minutes to everyone concerned, including VA's Project Engineer and Design Professional, within three days of the meeting.
- B. Project Kick-off Conference: Schedule a project kick-off conference before starting project mobilization, at a time convenient to the VA's Project Engineer, Design Professional and Station Representatives, but no later than 15 days after execution of the Agreement. Hold the conference at Project site. Conduct the meeting to review project approach and key personnel responsibilities.

1. Attendees: Authorized representatives of the VA's Project Engineer, Design Professional, Station Representatives, the Contractor superintendents, all subcontractors, suppliers, and other impacted Contractors shall attend this conference. All participants at the conference shall be familiar with Project and authorized to conclude matters relating to the Work.
  2. Agenda: Discuss items of significance that could affect progress, including the following:
    - a. Tentative construction schedule.
    - b. Phasing.
    - c. Critical work sequencing and long-lead items.
    - d. Designation of key personnel and their duties.
    - e. Procedures for processing field decisions and Change Orders.
    - f. Procedures for requests for interpretations (RFIs).
    - g. Procedures for testing and inspecting.
    - h. Procedures for processing Applications for Payment.
    - i. Distribution of the Contract Documents.
    - j. Submittal procedures.
    - k. Preparation of Record Documents.
    - l. Use of the premises.
    - m. Station Security requirements, contractor personnel security clearances and security site access restrictions
    - n. Government occupancy requirements.
    - o. Construction waste management and recycling.
    - p. Parking availability.
    - q. Office, work, and storage areas.
    - r. Equipment deliveries and priorities.
    - s. First aid.
    - t. Work hours and construction phasing.
  3. Minutes: Contractor shall record and distribute meeting minutes.
- C. Pre-installation Conferences: Conduct a pre-installation conference at Project site before each construction activity that requires coordination with other construction trades or Government agencies or as specified by all related specification sections.
1. Attendees: Installer and representatives of manufacturers and fabricators involved in or affected by the installation and its coordination or integration with other materials and installations that have preceded or will follow, shall attend the meeting. Inform the VA's Project Engineer and Design Professional in writing of all scheduled meeting dates.
  2. Agenda: Review progress of other construction activities and preparations for the particular activity under consideration, including requirements for the following:
    - a. The Contract Documents.
    - b. Requests for interpretations (RFIs).
    - c. Change Orders.
    - d. Purchases.
    - e. Deliveries.
    - f. Submittals.
    - g. Possible conflicts.
    - h. Security access limitations to restricted spaces.



- i. Temporary utility, roadway or parking lot closures
    - j. Compatibility problems.
    - k. Time schedules.
    - l. Weather limitations.
    - m. Manufacturer's written recommendations.
    - n. Warranty requirements.
    - o. Compatibility of materials.
    - p. Regulations of authorities having jurisdiction.
    - q. Testing and inspecting requirements.
    - r. Installation procedures.
    - s. Coordination with other work.
    - t. Required performance results.
    - u. Protection of adjacent work.
    - v. Protection of construction and personnel.
  3. Record significant conference discussions, agreements, and disagreements, including required corrective measures and actions.
  4. Reporting: Distribute minutes of the meeting to each party present and to parties who should have been present.
  5. Do not proceed with installation if the conference cannot be successfully concluded. Initiate whatever actions are necessary to resolve impediments to performance of the Work and reconvene the conference at earliest feasible date.
- D. Progress Meetings: Conduct progress meetings at intervals as determined by the VA's Project Engineer and Design Professional. Coordinate dates of meetings with preparation of payment requests. Project progress meetings shall at the minimum be scheduled biweekly until the final acceptance of all scopes of work.
1. Attendees: In addition to representatives of the VA's Contracting Office and Design Professional, Government Agencies, each contractor, subcontractor, supplier, and other entity concerned with current progress or involved in planning, coordination, or performance of future activities shall be represented at these meetings. All participants at the conference shall be familiar with Project and authorized to conclude matters relating to the Work.
  2. Agenda: Review and correct or approve minutes of previous progress meeting. Review other items of significance that could affect progress. Include topics for discussion as appropriate to status of Project.
    - a. Contractor's Construction Schedule: Review progress since the last meeting. Determine whether each activity is on time, ahead of schedule, or behind schedule, in relation to Contractor's Construction Schedule. Determine how behind schedule work will be expedited; secure commitments from parties involved to do so. Discuss whether schedule revisions are required to ensure that current and subsequent activities will be completed within the Contract Time.

- 1) Review schedule for next period.
- b. Review present and future needs of each entity present, including but not limited to the following:
  - 1) Integration requirements of work provided by others.
  - 2) Sequence of operations.
  - 3) Status of submittals.
  - 4) Deliveries.
  - 5) Off-site fabrication.
  - 6) Site access and utilization.
  - 7) Integration requirements of work provided by others.
  - 8) Work hours and construction phasing.
  - 9) Known hazards and risks.
  - 10) Temporary utility, roadway or parking lot closures
  - 11) Quality and work standards.
  - 12) Status of correction of deficient items.
  - 13) Field observations.
  - 14) Requests for interpretations (RFIs).
  - 15) Status of proposal requests.
  - 16) Pending changes.
  - 17) Status of Change Orders.
  - 18) Pending claims and disputes.
  - 19) Documentation of information for payment requests.
3. Reporting: Distribute minutes of the meeting to each party present and to parties who should have been present.
  - a. Schedule Updating: Revise Contractor's Construction Schedule after each progress meeting where revisions to the schedule have been made or recognized. Issue revised schedule concurrently with the report of each meeting.
- E. Coordination Meetings: The Contractor shall conduct Project coordination meetings at biweekly intervals. Project coordination meetings are in addition to specific meetings held for other purposes, such as progress meetings and pre-installation conferences and are the responsibility of the Contractor to ensure no impediments to the project schedule is impacted. The Contractor shall keep all minutes of such meetings and shall make available the VA's Project Engineer and Design Professional upon request.
  1. Attendees: Each contractor, subcontractor, supplier, and other entity concerned with current progress or involved in planning, coordination, or performance of future activities shall be represented at these meetings. All participants at the conference shall be familiar with Project and authorized to conclude matters relating to the Work.
    - a. Notify the VA's Project Engineer, Design Professional or Government agencies in advance of any scheduled meeting dates which require their attendance.

2. Agenda: Review and correct or approve minutes of the previous coordination meeting. Review other items of significance that could affect progress. Include topics for discussion as appropriate to status of Project.
  - a. Combine all construction and equipment delivery schedules: Review progress since the last coordination meeting. Determine whether each milestone of the project is on time, ahead of schedule, or behind schedule, in relation to the overall project Construction Schedule. Determine how all behind schedule work will be expedited; secure commitments from parties involved to do so. Discuss whether schedule revisions are required to ensure that current and subsequent activities will be completed within the Contract Time.
  - b. Schedule Updating: Revise Construction Schedule after each coordination meeting where revisions to the schedule have been made or recognized. Issue revised schedule concurrently with report of each meeting.
  - c. Review present and future needs of each scope of work, including the following:
    - 1) The integration schedule of any Government provided equipment or utilities.
    - 2) Sequence of operations.
    - 3) Material deliveries.
    - 4) Off-site fabrication.
    - 5) Access to restricted areas.
    - 6) Temporary controls.
    - 7) Specialized equipment
    - 8) Temporary utility, roadway or parking lot closures
    - 9) Work hours or Phased Construction activities.
    - 10) Any identified hazards and risks.
    - 11) Quality and work standards.
    - 12) Change Orders.
3. Reporting: Record meeting results and distribute copies to everyone in attendance and to others affected by decisions or actions resulting from each meeting.

**PART 2 - PRODUCTS (Not Used)**

**PART 3 - EXECUTION (Not Used)**

- - - END - - -

VA Project No. 642-12-110  
AE Works Project No. 12030

Philadelphia VAMC  
Rekey VA Medical Center  
Bid Documents

**SECTION 01 32 16.15**  
**PROJECT SCHEDULES**  
**(SMALL PROJECTS - DESIGN/BID/BUILD)**

**PART 1- GENERAL**

**1.1 DESCRIPTION:**

- A. The Contractor shall develop a Critical Path Method (CPM) plan and schedule demonstrating fulfillment of the contract requirements (Project Schedule), and shall keep the Project Schedule up-to-date in accordance with the requirements of this section and shall utilize the plan for scheduling, coordinating and monitoring work under this contract (including all activities of subcontractors, equipment vendors and suppliers). Conventional Critical Path Method (CPM) technique shall be utilized to satisfy both time and cost applications.

**1.2 CONTRACTOR'S REPRESENTATIVE:**

- A. The Contractor shall designate an authorized representative responsible for the Project Schedule including preparation, review and progress reporting with and to the Contracting Officer's Representative (Project Engineer).
- B. The Contractor's representative shall have direct project control and complete authority to act on behalf of the Contractor in fulfilling the requirements of this specification section.
- C. The Contractor's representative shall have the option of developing the project schedule within their organization or to engage the services of an outside consultant. If an outside scheduling consultant is utilized, Section 1.3 of this specification will apply.

### **1.3 CONTRACTOR'S CONSULTANT:**

- A. The Contractor shall submit a qualification proposal to the Project Engineer, within 10 days of bid acceptance. The qualification proposal shall include:
1. The name and address of the proposed consultant.
  2. Information to show that the proposed consultant has the qualifications to meet the requirements specified in the preceding paragraph.
  3. A representative sample of prior construction projects, which the proposed consultant has performed complete project scheduling services. These representative samples shall be of similar size and scope.
- B. The Contracting Officer has the right to approve or disapprove the proposed consultant, and will notify the Contractor of the VA decision within seven calendar days from receipt of the qualification proposal. In case of disapproval, the Contractor shall resubmit another consultant within 10 calendar days for renewed consideration. The Contractor shall have their scheduling consultant approved prior to submitting any schedule for approval.

### **1.4 COMPUTER PRODUCED SCHEDULES**

- A. The contractor shall provide monthly, to the Department of Veterans Affairs (VA), all computer-produced time/cost schedules and reports generated from monthly project updates. This monthly computer service will include: three copies of up to five different reports (inclusive of all pages) available within the user defined reports of the scheduling software approved by the Contracting Officer; a hard copy listing of all project schedule changes, and associated data, made at the update and an electronic file of this data; and the resulting monthly updated schedule in PDM format. These must be submitted with and substantively support the contractor's monthly payment request and the signed look ahead report. The Project Engineer shall identify the five different report formats that the contractor shall provide.

- B. The contractor shall be responsible for the correctness and timeliness of the computer-produced reports. The Contractor shall also be responsible for the accurate and timely submittal of the updated project schedule and all CPM data necessary to produce the computer reports and payment request that is specified.
- C. The VA will report errors in computer-produced reports to the Contractor's representative within ten calendar days from receipt of reports. The Contractor shall reprocess the computer-produced reports and associated diskette(s), when requested by the Contracting Officer's representative, to correct errors which affect the payment and schedule for the project.

#### **1.5 THE COMPLETE PROJECT SCHEDULE SUBMITTAL**

- A. Within 45 calendar days after receipt of Notice to Proceed, the Contractor shall submit for the Contracting Officer's review; three blue line copies of the interim schedule on sheets of paper 765 x 1070 mm (30 x 42 inches) and an electronic file in the previously approved CPM schedule program. The submittal shall also include three copies of a computer-produced activity/event ID schedule showing project duration; phase completion dates; and other data, including event cost. Each activity/event on the computer-produced schedule shall contain as a minimum, but not limited to, activity/event ID, activity/event description, duration, budget amount, early start date, early finish date, late start date, late finish date and total float. Work activity/event relationships shall be restricted to finish-to-start or start-to-start without lead or lag constraints. Activity/event date constraints, not required by the contract, will not be accepted unless submitted to and approved by the Contracting Officer. The contractor shall make a separate written detailed request to the Contracting Officer identifying these date constraints and secure the Contracting Officer's written approval before incorporating them into the network diagram. The Contracting Officer's separate approval of the Project Schedule shall not excuse the contractor of this requirement. Logic events (non-work) will be permitted where necessary to reflect proper logic among work events, but must have zero duration. The complete

working schedule shall reflect the Contractor's approach to scheduling the complete project. **The final Project Schedule in its original form shall contain no contract changes or delays which may have been incurred during the final network diagram development period and shall reflect the entire contract duration as defined in the bid documents.** These changes/delays shall be entered at the first update after the final Project Schedule has been approved. The Contractor should provide their requests for time and supporting time extension analysis for contract time as a result of contract changes/delays, after this update, and in accordance with Article, ADJUSTMENT OF CONTRACT COMPLETION.

- B. Within 30 calendar days after receipt of the complete project interim Project Schedule and the complete final Project Schedule, the Contracting Officer or his representative, will do one or both of the following:
1. Notify the Contractor concerning his actions, opinions, and objections.
  2. A meeting with the Contractor at or near the job site for joint review, correction or adjustment of the proposed plan will be scheduled if required. Within 14 calendar days after the joint review, the Contractor shall revise and shall submit three blue line copies of the revised Project Schedule, three copies of the revised computer-produced activity/event ID schedule and a revised electronic file as specified by the Contracting Officer. The revised submission will be reviewed by the Contracting Officer and, if found to be as previously agreed upon, will be approved.
- C. The approved baseline schedule and the computer-produced schedule(s) generated there from shall constitute the approved baseline schedule until subsequently revised in accordance with the requirements of this section.
- D. The Complete Project Schedule shall contain approximately \_36work activities/events.



#### **1.6 WORK ACTIVITY/EVENT COST DATA**

- A. The Contractor shall cost load all work activities/events except procurement activities. The cumulative amount of all cost loaded work activities/events (including alternates) shall equal the total contract price. Prorate overhead, profit and general conditions on all work activities/events for the entire project length. The contractor shall generate from this information cash flow curves indicating graphically the total percentage of work activity/event dollar value scheduled to be in place on early finish, late finish. These cash flow curves will be used by the Contracting Officer to assist him in determining approval or disapproval of the cost loading. Negative work activity/event cost data will not be acceptable, except on VA issued contract changes.
- B. The Contractor shall cost load work activities/events for guarantee period services, test, balance and adjust various systems in accordance with the provisions in Article, FAR 52.232 - 5 (PAYMENT UNDER FIXED-PRICE CONSTRUCTION CONTRACTS) and VAAR 852.236 - 83 (PAYMENT UNDER FIXED-PRICE CONSTRUCTION CONTRACTS).
- C. In accordance with FAR 52.236 - 1 (PERFORMANCE OF WORK BY THE CONTRACTOR) and VAAR 852.236 - 72 (PERFORMANCE OF WORK BY THE CONTRACTOR), the Contractor shall submit, simultaneously with the cost per work activity/event of the construction schedule required by this Section, a responsibility code for all activities/events of the project for which the Contractor's forces will perform the work.
- D. The Contractor shall cost load work activities/events for all BID ITEMS including ASBESTOS ABATEMENT. The sum of each BID ITEM work shall equal the value of the bid item in the Contractors' bid.

#### **1.7 PROJECT SCHEDULE REQUIREMENTS**

- A. Show on the project schedule the sequence of work activities/events required for complete performance of all items of work. The Contractor Shall:

1. Show activities/events as:
  - a. Contractor's time required for submittal of shop drawings, templates, fabrication, delivery and similar pre-construction work.
  - b. Contracting Officer's and Architect-Engineer's review and approval of shop drawings, equipment schedules, samples, template, or similar items.
  - c. Interruption of VA Facilities utilities, delivery of Government furnished equipment, and rough-in drawings, project phasing and any other specification requirements.
  - d. Test, balance and adjust various systems and pieces of equipment, maintenance and operation manuals, instructions and preventive maintenance tasks.
  - e. VA inspection and acceptance activity/event with a minimum duration of five work days at the end of each phase and immediately preceding any VA move activity/event required by the contract phasing for that phase.
2. Show not only the activities/events for actual construction work for each trade category of the project, but also trade relationships to indicate the movement of trades from one area, floor, or building, to another area, floor, or building, for at least five trades who are performing major work under this contract.
3. Break up the work into activities/events of a duration no longer than 20 work days each or one reporting period, except as to non-construction activities/events (i.e., procurement of materials, delivery of equipment, concrete and asphalt curing) and any other activities/events for which the Project Engineer may approve the showing of a longer duration. The duration for VA approval of any required submittal, shop drawing, or other submittals will not be less than 20 work days.
4. Describe work activities/events clearly, so the work is readily identifiable for assessment of completion. Activities/events labeled "start," "continue," or "completion," are not specific and will not be allowed. Lead and lag time activities will not be acceptable.
5. The schedule shall be generally numbered in such a way to reflect either discipline, phase or location of the work.

B. The Contractor shall submit the following supporting data in addition to the project schedule:

1. The appropriate project calendar including working days and holidays.
2. The planned number of shifts per day.
3. The number of hours per shift.

Failure of the Contractor to include this data shall delay the review of the submittal until the Contracting Officer is in receipt of the missing data.

C. To the extent that the Project Schedule or any revised Project Schedule shows anything not jointly agreed upon, it shall not be deemed to have been approved by the Project Engineer. Failure to include any element of work required for the performance of this contract shall not excuse the Contractor from completing all work required within any applicable completion date of each phase regardless of the Project Engineer's approval of the Project Schedule.

D. Compact Disk Requirements and CPM Activity/Event Record Specifications: Submit to the VA an electronic file(s) containing one file of the data required to produce a schedule, reflecting all the activities/events of the complete project schedule being submitted.

#### **1.8 PAYMENT TO THE CONTRACTOR:**

A. Monthly, the contractor shall submit the AIA application and certificate for payment documents G702 & G703 reflecting updated schedule activities and cost data in accordance with the provisions of the following Article, PAYMENT AND PROGRESS REPORTING, as the basis upon which progress payments will be made pursuant to Article, FAR 52.232 - 5 (PAYMENT UNDER FIXED-PRICE CONSTRUCTION CONTRACTS) and VAAR 852.236 - 83 (PAYMENT UNDER FIXED-PRICE CONSTRUCTION CONTRACTS). The Contractor shall be entitled to a monthly progress payment upon approval of estimates as determined from the currently approved updated project schedule. Monthly payment requests shall include: a listing of all agreed upon project schedule changes and associated data; and an electronic file (s) of the resulting monthly updated schedule.

- B. Approval of the Contractor's monthly Application for Payment shall be contingent, among other factors, on the submittal of a satisfactory monthly update of the project schedule.

#### **1.9 PAYMENT AND PROGRESS REPORTING**

- A. Monthly schedule update meetings will be held on dates mutually agreed to by the Project Engineer and the Contractor. Contractor and their CPM consultant (if applicable) shall attend all monthly schedule update meetings. The Contractor shall accurately update the Project Schedule and all other data required and provide this information to the Project Engineer three work days in advance of the schedule update meeting. Job progress will be reviewed to verify:

1. Actual start and/or finish dates for updated/completed activities/events.
2. Remaining duration for each activity/event started, or scheduled to start, but not completed.
3. Logic, time and cost data for change orders, and supplemental agreements that are to be incorporated into the Project Schedule.
4. Changes in activity/event sequence and/or duration which have been made, pursuant to the provisions of following Article, ADJUSTMENT OF CONTRACT COMPLETION.
5. Completion percentage for all completed and partially completed activities/events.
6. Logic and duration revisions required by this section of the specifications.
7. Activity/event duration and percent complete shall be updated independently.

- B. After completion of the joint review, the contractor shall generate an updated computer-produced calendar-dated schedule and supply the Contracting Officer's representative with reports in accordance with the Article, COMPUTER PRODUCED SCHEDULES, specified.

- C. After completing the monthly schedule update, the contractor's representative or scheduling consultant shall rerun all current period contract change(s) against the prior approved monthly project schedule.

The analysis shall only include original workday durations and schedule logic agreed upon by the contractor and Project Engineer for the contract change(s). When there is a disagreement on logic and/or durations, the Contractor shall use the schedule logic and/or durations provided and approved by the Project Engineer. After each rerun update, the resulting electronic project schedule data file shall be appropriately identified and submitted to the VA in accordance to the requirements listed in articles 1.4 and 1.7. This electronic submission is separate from the regular monthly project schedule update requirements and shall be submitted to the Project Engineer within fourteen (14) calendar days of completing the regular schedule update. Before inserting the contract changes durations, care must be taken to ensure that only the original durations will be used for the analysis, not the reported durations after progress. In addition, once the final network diagram is approved, the contractor must recreate all manual progress payment updates on this approved network diagram and associated reruns for contract changes in each of these update periods as outlined above for regular update periods. This will require detailed record keeping for each of the manual progress payment updates.

- D. Following approval of the CPM schedule, the VA, the General Contractor, its approved CPM Consultant, RE office representatives, and all subcontractors needed, as determined by the SRE, shall meet to discuss the monthly updated schedule. The main emphasis shall be to address work activities to avoid slippage of project schedule and to identify any necessary actions required to maintain project schedule during the reporting period. The Government representatives and the Contractor should conclude the meeting with a clear understanding of those work and administrative actions necessary to maintain project schedule status during the reporting period. This schedule coordination meeting will occur after each monthly project schedule update meeting utilizing the resulting schedule reports from that schedule update. If the project is behind schedule, discussions should include ways to prevent further slippage as well as ways to improve the project schedule status, when appropriate.

#### **1.10 RESPONSIBILITY FOR COMPLETION**

- A. If it becomes apparent from the current revised monthly progress schedule that phasing or contract completion dates will not be met, the Contractor shall execute some or all of the following remedial actions:
1. Increase construction manpower in such quantities and crafts as necessary to eliminate the backlog of work.
  2. Increase the number of working hours per shift, shifts per working day, working days per week, the amount of construction equipment, or any combination of the foregoing to eliminate the backlog of work.
  3. Reschedule the work in conformance with the specification requirements.
- B. Prior to proceeding with any of the above actions, the Contractor shall notify and obtain approval from the Project Engineer for the proposed schedule changes. If such actions are approved, the representative schedule revisions shall be incorporated by the Contractor into the Project Schedule before the next update, at no additional cost to the Government.

#### **1.11 CHANGES TO THE SCHEDULE**

- A. Within 30 calendar days after VA acceptance and approval of any updated project schedule, the Contractor shall submit a revised electronic file (s) and a list of any activity/event changes including predecessors and successors for any of the following reasons:
1. Delay in completion of any activity/event or group of activities/events, which may be involved with contract changes, strikes, unusual weather, and other delays will not relieve the Contractor from the requirements specified unless the conditions are shown on the CPM as the direct cause for delaying the project beyond the acceptable limits.
  2. Delays in submittals, or deliveries, or work stoppage are encountered which make rescheduling of the work necessary.
  3. The schedule does not represent the actual prosecution and progress of the project.

4. When there is, or has been, a substantial revision to the activity/event costs regardless of the cause for these revisions.

- B. CPM revisions made under this paragraph which affect the previously approved computer-produced schedules for Government furnished equipment, vacating of areas by the VA Facility, contract phase(s) and sub phase(s), utilities furnished by the Government to the Contractor, or any other previously contracted item, shall be furnished in writing to the Contracting Officer for approval.
- C. Contracting Officer's approval for the revised project schedule and all relevant data is contingent upon compliance with all other paragraphs of this section and any other previous agreements by the Contracting Officer or the VA representative.
- E. The cost of revisions to the project schedule resulting from contract changes will be included in the proposal for changes in work as specified in FAR 52.243 - 4 (Changes) and VAAR 852.236 - 88 (Changes - Supplemental), and will be based on the complexity of the revision or contract change, man hours expended in analyzing the change, and the total cost of the change.
- F. The cost of revisions to the Project Schedule not resulting from contract changes is the responsibility of the Contractor.

#### **1.12 ADJUSTMENT OF CONTRACT COMPLETION**

- A. The contract completion time will be adjusted only for causes specified in this contract. Request for an extension of the contract completion date by the Contractor shall be supported with a justification, CPM data and supporting evidence as the Project Engineer may deem necessary for determination as to whether or not the Contractor is entitled to an extension of time under the provisions of the contract. Submission of proof based on revised activity/event logic, durations (in work days) and costs is obligatory to any approvals. The schedule must clearly display that the Contractor has used, in full, all the float time available for the work involved in this request. The Contracting

Officer's determination as to the total number of days of contract extension will be based upon the current computer-produced calendar-dated schedule for the time period in question and all other relevant information.

- B. Actual delays in activities/events which, according to the computer-produced calendar-dated schedule, do not affect the extended and predicted contract completion dates shown by the critical path in the network, will not be the basis for a change to the contract completion date. The Contracting Officer will within a reasonable time after receipt of such justification and supporting evidence, review the facts and advise the Contractor in writing of the Contracting Officer's decision.
- C. The Contractor shall submit each request for a change in the contract completion date to the Contracting Officer in accordance with the provisions specified under FAR 52.243 - 4 (Changes) and VAAR 852.236 - 88 (Changes - Supplemental). The Contractor shall include, as a part of each change order proposal, a sketch showing all CPM logic revisions, duration (in work days) changes, and cost changes, for work in question and its relationship to other activities on the approved network diagram.
- D. All delays due to non-work activities/events such as RFI's, WEATHER, STRIKES, and similar non-work activities/events shall be analyzed on a month by month basis.

**PART 2 - PRODUCTS (Not Used)**

**PART 3 - EXECUTION (Not Used)**

- - - E N D - - -



**SECTION 01 33 00**  
**SUBMITTAL PROCEDURES**

**PART 1 - GENERAL**

**1.1 STIPULATIONS**

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Division 1 Specification Sections, apply to this Section.
- B. Related Sections include the following:
  - 1. Division 1 Section "Closeout Procedures" for submitting warranties.
  - 2. Division 1 Section "Project Record Documents" for submitting Record Drawings, Record Specifications, and Record Product Data.
  - 3. Division 1 Section "Operation and Maintenance Data" for submitting operation and maintenance manuals.
  - 4. Divisions 26 and Division 28 Sections for specific requirements for submittals in those Sections.

**1.2 SUMMARY**

- A. This Section includes administrative and procedural requirements for submitting Shop Drawings, Product Data, Samples, and other submittals.

**1.3 DEFINITIONS**

- A. Action Submittals: Written and graphic information that requires the design professional's responsive action.
- B. Informational Submittals: Written information that does not require the design professional's responsive action. Submittals may be rejected for not complying with requirements.

**1.4 SUBMITTAL PROCEDURES**

- A. General: Provide one complete set of submittals. All submittals shall be prepared and submitted in hardcopy only. No electronic format (PDF) submissions shall be accepted. The Contractor shall submit all criteria as stipulated as herein specified and in accordance with all related specification sections.

1. Electronic copies of CAD Drawings of the Contract Drawings may be provided by the Design Professional for Contractor's use in preparing submittals upon execution of the required release forms and written approval of the VA's Contracting Officer and Design Professional. Consult the office of the VA's Contracting Officer and Design Professional for all costs and other information pertaining to the process and release of CAD files.

B. Contractor's Responsibilities

1. The Contractor shall be responsible for the accuracy and completeness of the information contained in each submittal and shall assure that the material, equipment, or method of work to be performed shall be as described in the submittal. The Contractor shall verify in writing that all features of all products conform to the requirements of the specifications and drawings.
  - a. All submittal documents shall be clearly edited to indicate only those items, models, or series of material or equipment that are being submitted for review. All extraneous materials shall be crossed out or otherwise obliterated.
  - b. The Contractor shall insure that there are no conflicts with other scopes of work and shall notify the Design Professional in each case where the submittal may affect the work of another contractor or Government Agency. The Contractor shall insure coordination of submittals among all related trades, sub-contractors and other scopes of work.

C. Deviations from the Contract Documents:

1. If the Contractor proposes to provide material, equipment, or method of work which deviates from the Contract Documents, the Contractor shall give the Design Professional specific written notice of such deviations or variations that the submittal may have from the requirements of the Contract Documents, such notice to be in a written communication separate from the submittal:
  - a. In addition, any deviations the Contractor shall highlight, encircle, or otherwise specifically annotate all approved deviations from the Contract Documents on submittals.

D. Coordination: Coordinate preparation and processing of submittals with performance of construction activities.

1. Coordinate each submittal with fabrication, purchasing, testing, delivery, other submittals, and related activities that require sequential activity.
2. Coordinate transmittal of different types of submittals for related parts of the Work so processing will not be delayed because of need to review submittals concurrently for coordination.

- a. The design professional's reserves the right to withhold action on a submittal requiring coordination with other submittals until related submittals are received.
  - b. Submittals, which do not have all the information required to be submitted, including deviations, are not acceptable and will be returned without review.
  - c. The Design Professional's review of Contractor's submittals will be limited to examination of an initial submittal review and one (1) resubmittal review. The Government is entitled to obtain reimbursement from the Contractor for amounts paid to the Design Professional for the evaluation of all additional resubmittals beyond the allowed one (1) re-submission.
    - 1) The submission of an incomplete submittal shall count as a submittal (either initial or a resubmitted as the case may be).
- E. Processing Time: Allow enough time for submittal review, including time for resubmittals, as follows. Time for review shall commence on the design professional's receipt of submittal. No extension of the Contract Time will be authorized because of failure to transmit submittals enough in advance of the Work to permit processing, including resubmittals.
1. Initial Review: Allow seven (7) days for initial review of each submittal. Allow additional time if coordination with subsequent submittals is required. The Design Professional will advise Contractor when a submittal being processed must be delayed for coordination.
  2. Intermediate Review: If intermediate submittal is necessary, process it in same manner as initial submittal.
  3. Resubmittal Review: Allow five (5) days for review of each resubmittal.
  4. No equipment or work shall proceed without approval of all submittals by the design professional. No extension of the Contract Time will be authorized because of failure to transmit submittals in accordance with all Contract requirements and in enough in advance of the Work to permit processing.
- F. Identification: Provide all submission in accordance with all requirements of the Contract documents. The submitting Contractor shall place a permanent label or title block on each submittal for identification.
1. Indicate name of firm or entity that prepared each submittal on label or title block.
  2. Provide a space approximately 6 by 8 inches on label or beside title block to record Contractor's review and approval markings and action taken by Engineer.
  3. Include the following information on label for processing and recording action taken:

- a. Project name.
- b. Date.
- c. Name and address of Engineer.
- d. Name and address of Contractor.
- e. Name and address of subcontractor.
- f. Name and address of supplier.
- g. Name of manufacturer.
- h. Submittal number or other unique identifier, including revision identifier.

- 1) Submittal number shall use Specification Section number followed by a decimal point and then a sequential number (e.g., 28\_23\_00.01). Resubmittals shall include an alphabetic suffix after another decimal point (e.g., 28\_23\_00.01.A).

- i. Number and title of appropriate Specification Section.
- j. Drawing number and detail references, as appropriate.
- k. Location(s) where product is to be installed, as appropriate.
- l. Other necessary identification.

- G. Additional Copies: Unless additional copies are required for final submittal, and unless the Design Professional observes noncompliance with provisions in the Contract Documents, initial submittal may serve as final submittal.

1. Submit one copy of submittal to concurrent reviewer in addition to specified number of copies to the design professional.

- H. Transmittal: Package each submittal individually and appropriately for transmittal and handling. Transmit each submittal using a transmittal form. The Design Professional will return submittals, without review, received from sources other than Contractor.

1. Transmittal Form: Provide locations on form for the following information:

- a. Project name.
- b. Date.
- c. Destination (To:).
- d. Source (From:).
- e. Names of subcontractor, manufacturer, and supplier.
- f. Category and type of submittal.
- g. Submittal purpose and description.
- h. Specification Section number and title.
- i. Drawing number and detail references, as appropriate.
- j. Transmittal number, numbered consecutively.
- k. Submittal and transmittal distribution record.
- l. Remarks.
- m. Signature of transmitter.

2. On an attached separate sheet, prepared on Contractor's letterhead, record relevant information, requests for data, revisions other than those requested by the Design Professional on previous submittals, and deviations from requirements in the Contract Documents, including minor variations and limitations. Include same label information as related submittal.
- I. Resubmittals: Make resubmittals in same form and number of copies as initial submittal.
1. Note date and content of previous submittal.
  2. Note date and content of revision in label or title block and clearly indicate extent of revision.
- J. Distribution: Furnish copies of final submittals to manufacturers, subcontractors, suppliers, fabricators, installers, authorities having jurisdiction, and others as necessary for performance of construction activities. Show distribution on transmittal forms.
- K. Use for Construction: Use only final submittals with mark-ups indicating action taken by Project Engineer in connection with construction.

## **PART 2 - PRODUCTS**

### **2.1 ACTION - SUBMITTALS**

- A. General: Prepare and submit Action Submittals required by individual Specification Sections.
- B. Product Data: Collect information into a single submittal for each element of construction and type of product or equipment.
1. If information must be specially prepared for submittal because standard printed data are not suitable for use, submit as Shop Drawings, not as Product Data.
  2. Mark each copy of each submittal to show which products and options are applicable.
  3. Include the following information, as applicable:
    - a. Manufacturer's written recommendations.
    - b. Manufacturer's product specifications.
    - c. Manufacturer's installation instructions.
    - d. Standard color charts.
    - e. Manufacturer's catalog cuts.
    - f. Wiring diagrams showing factory-installed wiring.
    - g. Printed performance curves.
    - h. Operational range diagrams.
    - i. Mill reports.

- j. Standard product operation and maintenance manuals.
    - k. Compliance with specified referenced standards.
    - l. Testing by recognized testing agency.
    - m. Application of testing agency labels and seals.
    - n. Notation of coordination requirements.
  - 4. Submit Product Data before or concurrent with Samples.
- C. Shop Drawings: Prepare Project-specific information, drawn accurately to scale. Do not base Shop Drawings on reproductions of the Contract Documents or standard printed data.
- 1. Preparation: Fully illustrate requirements in the Contract Documents. Include the following information, as applicable:
    - a. Dimensions.
    - b. Identification of products.
    - c. Fabrication and installation drawings.
    - d. Roughing-in and setting diagrams.
    - e. Wiring diagrams showing field-installed wiring, including power, signal, and control wiring.
    - f. Shop-work manufacturing instructions.
    - g. Templates and patterns.
    - h. Schedules.
    - i. Design calculations.
    - j. Compliance with specified standards.
    - k. Notation of coordination requirements.
    - l. Notation of dimensions established by field measurement.
    - m. Relationship to adjoining construction clearly indicated.
    - n. Seal and signature of professional engineer if specified.
    - o. Wiring Diagrams: Differentiate between manufacturer-installed and field-installed wiring.
  - 2. Sheet Size: Except for templates, patterns, and similar full-size drawings, submit Shop Drawings on sheets at least 8-1/2 by 11 inches but no larger than 30 by 40 inches.
  - 3. Number of Copies: Submit copies of each submittal, as follows:
    - a. Initial Submittal: Submit one complete electronic copy of drawings
- D. Product Schedule or List: As required in individual Specification Sections, prepare a written summary indicating types of products required for the Work and their intended location. Include the following information in tabular form:
- 1. Type of product. Include unique identifier for each product.
  - 2. Number and name of room or space.
  - 3. Location within room or space.
- E. Subcontract List: Prepare a written summary identifying individuals or firms proposed for each portion of the Work, including those who are to furnish products or equipment fabricated to a special design. Include the following information in tabular form:

1. Name, address, and telephone number of entity performing subcontract or supplying products.
2. Number and title of related Specification Section(s) covered by subcontract.
3. Drawing number and detail references, as appropriate, covered by subcontract.

## **2.2 INFORMATIONAL - SUBMITTALS**

- A. General: Prepare and submit Informational Submittals required by other Specification Sections.
  1. Number of Copies: Submit complete set of electronic (PDF) copy of each submittal, unless otherwise indicated. Design Professional will not return copies.
  2. Certificates and Certifications: Provide a notarized statement that includes signature of entity responsible for preparing certification. Certificates and certifications shall be signed by an officer or other individual authorized to sign documents on behalf of that entity.
  3. Test and Inspection Reports: Comply with requirements specified in Division 1 Section "Quality Assurance".
- B. Qualification Data: Prepare written information that demonstrates capabilities and experience of firm or person. Include lists of completed projects with project names and addresses, names and addresses of Engineers and owners, and other information specified.
- C. Installer Certificates: Prepare written statements on manufacturer's letterhead certifying that Installer complies with requirements in the Contract Documents and, where required, is authorized by manufacturer for this specific Project.
- D. Manufacturer Certificates: Prepare written statements on manufacturer's letterhead certifying that manufacturer complies with requirements in the Contract Documents. Include evidence of manufacturing experience where required.
- E. Product Certificates: Prepare written statements on manufacturer's letterhead certifying that product complies with requirements in the Contract Documents.
- F. Product Test Reports: Prepare written reports indicating current product produced by manufacturer complies with requirements in the Contract Documents. Base reports on evaluation of tests performed by manufacturer and witnessed by a qualified testing agency, or on comprehensive tests performed by a qualified testing agency.
- G. Research/Evaluation Reports: Prepare written evidence, from a model code organization acceptable to authorities having jurisdiction, that product complies with building code in effect for Project. Include the following information:

1. Name of evaluation organization.
  2. Date of evaluation.
  3. Time period when report is in effect.
  4. Product and manufacturers' names.
  5. Description of product.
  6. Test procedures and results.
  7. Limitations of use.
- H. Schedule of Tests and Inspections: Comply with requirements specified in Division 1 Section "Quality Requirements."
- I. Field Test Reports: Prepare reports written by a qualified testing agency, on testing agency's standard form, indicating and interpreting results of field tests performed either during installation of product or after product is installed in its final location, for compliance with requirements in the Contract Documents.
- J. Maintenance Data: Prepare written and graphic instructions and procedures for operation and normal maintenance of products and equipment. Comply with requirements specified in Division 1 Section "Operation and Maintenance Data."
- K. Design Data: Prepare written and graphic information, including, but not limited to, performance and design criteria, list of applicable codes and regulations, and calculations. Include list of assumptions and other performance and design criteria and a summary of loads. Include load diagrams if applicable. Provide name and version of software, if any, used for calculations. Include page numbers.
- L. Programming Data: Prepare written and graphic information, including, but not limited to, all programming criteria, list all functional descriptions component identifiers logic diagrams input/output functions and all operational features, functions, user rights and responses Include list of assumptions and other performance and design criteria and a summary of loads. Include load diagrams if applicable. Provide name and version of software, if any, used for calculations. Include page numbers.
- M. Manufacturer's Instructions: Prepare written or published information that documents manufacturer's recommendations, guidelines, and procedures for installing or operating a product or equipment. Include name of product and name, address, and telephone number of manufacturer. Include the following, as applicable:
1. Preparation of substrates.
  2. Required substrate tolerances.
  3. Sequence of installation or erection.
  4. Required installation tolerances.
  5. Required adjustments.
  6. Recommendations for cleaning and protection.
- N. Manufacturer's Field Reports: Prepare written information documenting factory-authorized service representative's tests and inspections. Include the following, as applicable:



1. Name, address, and telephone number of factory-authorized service representative making report.
  2. Statement on condition of substrates and their acceptability for installation of product.
  3. Statement that products at Project site comply with requirements.
  4. Summary of installation procedures being followed, whether they comply with requirements and, if not, what corrective action was taken.
  5. Results of operational and other tests and a statement of whether observed performance complies with requirements.
  6. Statement whether conditions, products, and installation will affect warranty.
  7. Other required items indicated in individual Specification Sections.
- O. Insurance Certificates and Bonds: Prepare written information indicating current status of insurance or bonding coverage. Include name of entity covered by insurance or bond, limits of coverage, amounts of deductibles, if any, and term of the coverage in accordance all requirements of related specification sections..
- P. Material Safety Data Sheets (MSDSs): Submit information directly to the VA's Contracting Officer; do not submit to design professional.

### **2.3 DELEGATED DESIGN**

- A. Performance and Design Criteria: Where professional design services or certifications by a Design Professional are specifically required of Contractor by the Contract Documents, provide products and systems complying with specific performance and design criteria indicated.
1. If criteria indicated are not sufficient to perform services or certification required, submit a written request for additional information to Project Engineer.
- B. Delegated-Design Submittal: In addition to Shop Drawings, Product Data, and other required submittals, submit three copies of a statement, signed and sealed by the responsible design professional, for each product and system specifically assigned to Contractor to be designed or certified by a design professional.
1. Indicate that products and systems comply with performance and design criteria in the Contract Documents. Include list of codes, loads, and other factors used in performing these services.

### **PART 3 - EXECUTION**

#### **3.1 CONTRACTOR'S REVIEW**

- A. Review each submittal and check for coordination with other Work of the Contract and for compliance with the Contract Documents. Note corrections and field dimensions. Mark with approval stamp before submitting to Project Engineer.
- B. Approval Stamp: Stamp each submittal with a uniform, approval stamp. Include Project name and location, submittal number, Specification Section title and number, name of reviewer, date of Contractor's approval, and statement certifying that submittal has been reviewed, checked, and approved for compliance with the Contract Documents.

#### **3.2 DESIGN PROFESSIONALS' ACTION**

- A. General: The Design Professional will not review submittals that do not bear Contractor's approval stamp and will return them without action.
- B. Action Submittals: The Design Professional will review each submittal, make marks to indicate corrections or modifications required, and return it. Engineer will stamp each submittal with an action stamp and will mark stamp appropriately to indicate action taken, as follows:
  - 1. Final Unrestricted Release: When the Design Professional marks a submittal "Approved," the Work covered by the submittal may proceed provided it complies with requirements of the Contract Documents. Final payment depends on that compliance.
  - 2. Final-But-Restricted Release: When the Design Professional marks a submittal "Approved as Noted," the Work covered by the submittal may proceed provided it complies with notations or corrections on the submittal and requirements of the Contract Documents. Final payment depends on that compliance.
  - 3. Restricted Release, Returned for Resubmittal: When the Design Professional marks a submittal "Approved as Noted, Revise and Resubmit," the Work covered by the submittal may proceed provided it complies with notations or corrections on the submittal and requirements of the Contract Documents. Final payment depends on that compliance. Revise or prepare a new submittal according to the notations; resubmit without delay. Repeat if necessary to obtain different action mark.
  - 4. Returned for Resubmittal: When the Design Professional marks a submittal "Not Approved, Revise and Resubmit," do not proceed with Work covered by the submittal, including purchasing, fabrication, delivery, or other activity. Revise or prepare a new submittal according to the notations; resubmit without delay. Repeat if necessary to obtain different action mark.

5. Do not use, or allow others to use, submittals marked "Not Approved, Revise and Resubmit" at the Project Site or elsewhere where Work is in progress.
- C. Informational Submittals: The Design Professional will review each submittal and will not return it, or will return it if it does not comply with requirements. The Design Professional will forward each submittal to appropriate party.
- D. Partial submittals are not acceptable, will be considered nonresponsive, and will be returned without review.
- E. Submittals not required by the Contract Documents may not be reviewed and may be discarded.

- - - END - - -

VA Project No. 642-12-110  
AE Works Project No. 12030

Philadelphia VAMC  
Rekey VA Medical Center  
Bid Documents

**SECTION 01 40 00**  
**QUALITY ASSURANCE**

**PART 1 - GENERAL**

**1.1 STIPULATIONS**

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Division 1 Specification Sections, apply to this Section.
- B. Related Sections include the following:
  - 1. Divisions 26 and Division 28 Sections for specific requirements for Quality Assurance in those Sections.

**1.2 SUMMARY**

- A. This Section includes administrative and procedural requirements for quality assurance and quality control.
- B. Where testing and inspecting services are required to verify compliance with requirements specified or indicated. These services do not relieve Contractor of responsibility for compliance with the Contract Document requirements.
  - 1. Specific quality-assurance and control requirements for individual construction activities are specified in the Sections that specify those activities. Requirements in those Sections may also cover production of standard products.

**1.3 DEFINITIONS**

- A. Quality-Assurance Services: Activities, actions, and procedures performed before and during execution of the Work to guard against defects and deficiencies and substantiate that proposed construction will comply with requirements.
- B. Quality-Control Services: Tests, inspections, procedures, and related actions during and after execution of the Work to evaluate that actual products incorporated into the Work and completed construction comply with requirements. Services do not include contract enforcement activities performed by Design Professional.
- C. Factory Mockups: Full-size, physical assemblies that are constructed at testing facility to verify performance characteristics.
- D. Preconstruction Testing: Tests and inspections that are performed specifically for the Project before products and materials are incorporated into the Work to verify performance or compliance with specified criteria.

- E. Product Testing: Tests and inspections that are performed by an NRTL, an NVLAP, or a testing agency qualified to conduct product testing and acceptable to authorities having jurisdiction, to establish product performance and compliance with industry standards.
- F. Source Quality-Control Testing: Tests and inspections that are performed at the source, i.e., plant, mill, factory, or shop.
- G. Field Quality-Control Testing: Tests and inspections that are performed on-site for installation of the Work and for completed Work.
- H. Testing Agency: An entity engaged to perform specific tests, inspections, or both. Testing laboratory shall mean the same as testing agency.
- I. Installer/Applicator/Erector: Contractor or another entity engaged by Contractor as an employee, Subcontractor, or Sub-subcontractor, to perform a particular construction operation, including installation, erection, application, and similar operations.
  - 1. Using a term such as "carpentry" does not imply that certain construction activities must be performed by accredited or unionized individuals of a corresponding generic name, such as "carpenter" It also does not imply that requirements specified apply exclusively to trades people of the corresponding generic name.
- J. Experienced: When used with an entity, "experienced" means having successfully completed a minimum of five previous projects similar in size and scope to this Project; unless more stringent requirements are indicated in specific specification section; being familiar with special requirements indicated; and having complied with requirements of authorities having jurisdiction.

#### **1.4 CONFLICTING REQUIREMENTS**

- A. Minimum Quantity or Quality Levels: The quantity or quality level shown and/or specified shall be the minimum provided or performed. The actual installation shall comply exactly with the minimum quantity or quality specified, or it may exceed the minimum within reasonable limits. To comply with these requirements, indicated numeric values are minimum or maximum, as appropriate, for the context of requirements. Refer uncertainties to the Design Professional for a decision before proceeding.
  - 1. If compliance with two or more standards is specified and the standards establish different or conflicting requirements for minimum quantities or quality levels, comply with the most stringent requirement. Refer uncertainties and requirements that are different, and apparently not equal, to Design Professional for a decision before proceeding.
    - a. Where ambiguity exists between the project specifications and the contract drawings, the superior in system performance

and/or cost shall prevail and shall be delivered by the Contractor at no additional expense to the project.

#### 1.5 SUBMITTALS

- A. Qualification Data: For testing agencies specified in "Quality Assurance" Article to demonstrate their capabilities and experience. Include proof of qualifications in the form of a recent report on the inspection of the testing agency by a recognized authority.
- B. Schedule of Tests and Inspections: Prepare in tabular form and include the following:
  - 1. Specification Section number and title.
  - 2. Description of test and inspection.
  - 3. Identification of applicable standards.
  - 4. Identification of test and inspection methods.
  - 5. Number of tests and inspections required.
  - 6. Time schedule or time span for tests and inspections.
  - 7. Entity responsible for performing tests and inspections.
  - 8. Requirements for obtaining samples.
  - 9. Unique characteristics of each quality-control service.
- C. Reports: Prepare and submit certified written reports that include the following:
  - 1. Date of issue.
  - 2. Project title and number.
  - 3. Name, address, and telephone number of testing agency.
  - 4. Dates and locations of samples and tests or inspections.
  - 5. Names of individuals making tests and inspections.
  - 6. Description of the Work and test and inspection method.
  - 7. Identification of product and Specification Section.
  - 8. Complete test or inspection data.
  - 9. Test and inspection results and an interpretation of test results.
  - 10. Record of temperature and weather conditions at time of sample taking and testing and inspecting.
  - 11. Comments or professional opinion on whether tested or inspected Work complies with the Contract Document requirements.
  - 12. Name and signature of laboratory inspector.
  - 13. Recommendations on retesting and re-inspecting.
- D. Permits, Licenses, and Certificates: For Government's records, submit copies of permits, licenses, certifications, inspection reports, releases, jurisdictional settlements, notices, receipts for fee payments, judgments, correspondence, records, and similar documents, established for compliance with standards and regulations bearing on performance of the Work.
  - 1. Refer to related specification sections for additional permits, Licensing, and Certificate requirements.

## 1.6 QUALITY ASSURANCE

- A. General: Qualifications paragraphs in this Article establish the minimum qualification levels required; individual Specification Sections specify additional requirements.
- B. Installer Qualifications: A firm or individual experienced in installing, erecting, or assembling work similar in material, design, and extent to that indicated for this Project, whose work has resulted in construction with a record of successful in-service performance.
- C. Manufacturer Qualifications: A firm experienced in manufacturing products or systems similar to those indicated for this Project and with a record of successful in-service performance, as well as sufficient production capacity to produce required units.
- D. Fabricator Qualifications: A firm experienced in producing products similar to those indicated for this Project and with a record of successful in-service performance, as well as sufficient production capacity to produce required units.
- E. Professional Engineer Qualifications: A professional engineer who is legally qualified to practice in jurisdiction where Project is located and who is experienced in providing engineering services of the kind indicated. Engineering services are defined as those performed for installations of the system, assembly, or products that are similar to those indicated for this Project in material, design, and extent.
- F. Specialists: Certain sections of the Specifications require that specific construction activities shall be performed by entities who are recognized experts in those operations. Specialists shall satisfy qualification requirements indicated and shall be engaged for the activities indicated.
  - 1. Requirement for specialists shall not supersede building codes and regulations governing the work. Refer to related specification section for required specialist certification requirements.
- G. Testing Agency Qualifications: An NRTL, an NVLAP, or an independent agency with the experience and capability to conduct testing and inspecting indicated, as documented according to ASTM E 548; and with additional qualifications specified in individual Sections; and where required by authorities having jurisdiction, that is acceptable to authorities.
  - 1. NRTL: A nationally recognized testing laboratory according to 29 CFR 1910.7.
  - 2. NVLAP: A testing agency accredited according to NIST's National Voluntary Laboratory Accreditation Program.
- H. Factory-Authorized Service Representative Qualifications: An authorized representative of manufacturer who is trained and approved by manufacturer to inspect installation of manufacturer's products



that are similar in material, design, and extent to those indicated for this Project.

#### **1.7 QUALITY CONTROL**

- A. Government Responsibilities: Where quality-control services are indicated as Government's responsibility, the VA's Contracting Officer will engage a qualified testing agency to perform these services.
  - 1. Government will furnish Contractor with names, addresses, and telephone numbers of testing agencies engaged and a description of types of testing and inspecting they are engaged to perform.
  - 2. Costs for retesting and re-inspecting construction that replaces or is necessitated by work that failed to comply with the Contract Documents will be charged to Contractor.
- B. Tests and inspections not explicitly assigned to the Government are Contractor's responsibility. Unless otherwise indicated, provide quality-control services specified and those required by authorities having jurisdiction. Perform quality-control services required of Contractor by authorities having jurisdiction, whether specified or not.
- C. Manufacturer's Field Services: Where indicated, engage a factory-authorized service representative to inspect field-assembled components and equipment installation, including service connections. Report results in writing as specified in Division 1 Section "Submittal Procedures."
- D. Retesting/Re-inspecting: Regardless of whether original tests or inspections were Contractor's responsibility, provide quality-control services, including retesting and re-inspecting, for construction that replaced Work that failed to comply with the Contract Documents.
- E. Coordination: Coordinate sequence of activities to accommodate required quality-assurance and -control services with a minimum of delay and to avoid necessity of removing and replacing construction to accommodate testing and inspecting.
  - 1. Schedule times for tests, inspections, obtaining samples, and similar activities.

### **PART 2 - PRODUCTS (Not Used)**

### **PART 3 - EXECUTION**

#### **3.1 TESTING AND COMMISSIONING**

- A. Provide all testing, and commissioning as specified by related specification sections.

- B. Prepare a record of tests and inspections. Include the following:
1. Date test or inspection was conducted.
  2. Description of the Work tested or inspected.
  3. Date test or inspection results were transmitted to Engineer.
  4. Identification of testing agency or special inspector conducting test or inspection.
- C. Maintain log at Project site. Post changes and modifications as they occur. Provide access to test and inspection log for Engineer's reference during normal working hours.

### **3.2 REPAIR AND PROTECTION**

- A. General: On completion of testing, inspecting, sample taking, and similar services, repair damaged construction and restore substrates and finishes.
1. Provide materials and comply with installation requirements specified in other Specification Sections. Restore patched areas and extend restoration into adjoining areas with durable seams that are as invisible as possible.
- B. Protect construction exposed by or for quality-control service activities specified in other Specification Sections.
- C. Repair and protection are Contractor's responsibility, regardless of the assignment of responsibility for quality-control services.

- - -END - - -

**SECTION 01 42 19  
REFERENCE STANDARDS**

**PART 1 - GENERAL**

**1.1 DESCRIPTION**

This section specifies the availability and source of references and standards specified in the project manual under paragraphs APPLICABLE PUBLICATIONS and/or shown on the drawings.

**1.2 AVAILABILITY OF SPECIFICATIONS LISTED IN THE GSA INDEX OF FEDERAL SPECIFICATIONS, STANDARDS AND COMMERCIAL ITEM DESCRIPTIONS FPMR PART 101-29 (FAR 52.211-1) (AUG 1998)**

- A. The GSA Index of Federal Specifications, Standards and Commercial Item Descriptions, FPMR Part 101-29 and copies of specifications, standards, and commercial item descriptions cited in the solicitation may be obtained for a fee by submitting a request to - GSA Federal Supply Service, Specifications Section, Suite 8100, 470 East L'Enfant Plaza, SW, Washington, DC 20407, Telephone (202) 619-8925, Facsimile (202) 619-8978.
- B. If the General Services Administration, Department of Agriculture, or Department of Veterans Affairs issued this solicitation, a single copy of specifications, standards, and commercial item descriptions cited in this solicitation may be obtained free of charge by submitting a request to the addressee in paragraph (a) of this provision. Additional copies will be issued for a fee.

**1.3 AVAILABILITY FOR EXAMINATION OF SPECIFICATIONS NOT LISTED IN THE GSA INDEX OF FEDERAL SPECIFICATIONS, STANDARDS AND COMMERCIAL ITEM DESCRIPTIONS (FAR 52.211-4) (JUN 1988)**

The specifications and standards cited in this solicitation can be examined at the following location:

DEPARTMENT OF VETERANS AFFAIRS  
Office of Construction & Facilities Management  
Facilities Quality Service (00CFM1A)  
811 Vermont Avenue, NW - Room 462  
Washington, DC 20420  
Telephone Numbers: (202) 461-8217 or (202) 461-8292  
Between 9:00 AM - 3:00 PM

**1.4 AVAILABILITY OF SPECIFICATIONS NOT LISTED IN THE GSA INDEX OF FEDERAL SPECIFICATIONS, STANDARDS AND COMMERCIAL ITEM DESCRIPTIONS (FAR 52.211-3) (JUN 1988)**

The specifications cited in this solicitation may be obtained from the associations or organizations listed below.

AA	Aluminum Association Inc. <a href="http://www.aluminum.org">http://www.aluminum.org</a>
AABC	Associated Air Balance Council <a href="http://www.aabchg.com">http://www.aabchg.com</a>
AAMA	American Architectural Manufacturer's Association <a href="http://www.aamanet.org">http://www.aamanet.org</a>
AAN	American Nursery and Landscape Association <a href="http://www.anla.org">http://www.anla.org</a>
AASHTO	American Association of State Highway and Transportation Officials <a href="http://www.aashto.org">http://www.aashto.org</a>
AATCC	American Association of Textile Chemists and Colorists <a href="http://www.aatcc.org">http://www.aatcc.org</a>
ACGIH	American Conference of Governmental Industrial Hygienists <a href="http://www.acgih.org">http://www.acgih.org</a>
ACI	American Concrete Institute <a href="http://www.aci-int.net">http://www.aci-int.net</a>
ACPA	American Concrete Pipe Association <a href="http://www.concrete-pipe.org">http://www.concrete-pipe.org</a>
ACPPA	American Concrete Pressure Pipe Association <a href="http://www.acppa.org">http://www.acppa.org</a>
ADC	Air Diffusion Council <a href="http://flexibleduct.org">http://flexibleduct.org</a>
AGA	American Gas Association <a href="http://www.aga.org">http://www.aga.org</a>
AGC	Associated General Contractors of America <a href="http://www.agc.org">http://www.agc.org</a>

AGMA	American Gear Manufacturers Association, Inc. <a href="http://www.agma.org">http://www.agma.org</a>
AHAM	Association of Home Appliance Manufacturers <a href="http://www.aham.org">http://www.aham.org</a>
AISC	American Institute of Steel Construction <a href="http://www.aisc.org">http://www.aisc.org</a>
AISI	American Iron and Steel Institute <a href="http://www.steel.org">http://www.steel.org</a>
AITC	American Institute of Timber Construction <a href="http://www.aitc-glulam.org">http://www.aitc-glulam.org</a>
AMCA	Air Movement and Control Association, Inc. <a href="http://www.amca.org">http://www.amca.org</a>
ANLA	American Nursery & Landscape Association <a href="http://www.anla.org">http://www.anla.org</a>
ANSI	American National Standards Institute, Inc. <a href="http://www.ansi.org">http://www.ansi.org</a>
APA	The Engineered Wood Association <a href="http://www.apawood.org">http://www.apawood.org</a>
ARI	Air-Conditioning and Refrigeration Institute <a href="http://www.ari.org">http://www.ari.org</a>
ASAE	American Society of Agricultural Engineers <a href="http://www.asae.org">http://www.asae.org</a>
ASCE	American Society of Civil Engineers <a href="http://www.asce.org">http://www.asce.org</a>
ASHRAE	American Society of Heating, Refrigerating, and Air-Conditioning Engineers <a href="http://www.ashrae.org">http://www.ashrae.org</a>
ASME	American Society of Mechanical Engineers <a href="http://www.asme.org">http://www.asme.org</a>

ASSE	American Society of Sanitary Engineering <a href="http://www.asse-plumbing.org">http://www.asse-plumbing.org</a>
ASTM	American Society for Testing and Materials <a href="http://www.astm.org">http://www.astm.org</a>
AWI	Architectural Woodwork Institute <a href="http://www.awinet.org">http://www.awinet.org</a>
AWS	American Welding Society <a href="http://www.aws.org">http://www.aws.org</a>
AWWA	American Water Works Association <a href="http://www.awwa.org">http://www.awwa.org</a>
BHMA	Builders Hardware Manufacturers Association <a href="http://www.buildershardware.com">http://www.buildershardware.com</a>
BIA	Brick Institute of America <a href="http://www.bia.org">http://www.bia.org</a>
CAGI	Compressed Air and Gas Institute <a href="http://www.cagi.org">http://www.cagi.org</a>
CGA	Compressed Gas Association, Inc. <a href="http://www.cganet.com">http://www.cganet.com</a>
CI	The Chlorine Institute, Inc. <a href="http://www.chlorineinstitute.org">http://www.chlorineinstitute.org</a>
CISCA	Ceilings and Interior Systems Construction Association <a href="http://www.cisca.org">http://www.cisca.org</a>
CISPI	Cast Iron Soil Pipe Institute <a href="http://www.cispi.org">http://www.cispi.org</a>
CLFMI	Chain Link Fence Manufacturers Institute <a href="http://www.chainlinkinfo.org">http://www.chainlinkinfo.org</a>
CPMB	Concrete Plant Manufacturers Bureau <a href="http://www.cpmc.org">http://www.cpmc.org</a>
CRA	California Redwood Association <a href="http://www.calredwood.org">http://www.calredwood.org</a>

CRSI	Concrete Reinforcing Steel Institute <a href="http://www.crsi.org">http://www.crsi.org</a>
CTI	Cooling Technology Institute <a href="http://www.cti.org">http://www.cti.org</a>
DHI	Door and Hardware Institute <a href="http://www.dhi.org">http://www.dhi.org</a>
EGSA	Electrical Generating Systems Association <a href="http://www.egsa.org">http://www.egsa.org</a>
EEI	Edison Electric Institute <a href="http://www.eei.org">http://www.eei.org</a>
EPA	Environmental Protection Agency <a href="http://www.epa.gov">http://www.epa.gov</a>
ETL	ETL Testing Laboratories, Inc. <a href="http://www.etl.com">http://www.etl.com</a>
FAA	Federal Aviation Administration <a href="http://www.faa.gov">http://www.faa.gov</a>
FCC	Federal Communications Commission <a href="http://www.fcc.gov">http://www.fcc.gov</a>
FPS	The Forest Products Society <a href="http://www.forestprod.org">http://www.forestprod.org</a>
GANA	Glass Association of North America <a href="http://www.cssinfo.com/info/gana.html/">http://www.cssinfo.com/info/gana.html/</a>
FM	Factory Mutual Insurance <a href="http://www.fmglobal.com">http://www.fmglobal.com</a>
GA	Gypsum Association <a href="http://www.gypsum.org">http://www.gypsum.org</a>
GSA	General Services Administration <a href="http://www.gsa.gov">http://www.gsa.gov</a>
HI	Hydraulic Institute <a href="http://www.pumps.org">http://www.pumps.org</a>

HPVA	Hardwood Plywood & Veneer Association <a href="http://www.hpva.org">http://www.hpva.org</a>
ICBO	International Conference of Building Officials <a href="http://www.icbo.org">http://www.icbo.org</a>
ICEA	Insulated Cable Engineers Association Inc. <a href="http://www.icea.net">http://www.icea.net</a>
\ICAC	Institute of Clean Air Companies <a href="http://www.icac.com">http://www.icac.com</a>
IEEE	Institute of Electrical and Electronics Engineers <a href="http://www.ieee.org/">http://www.ieee.org/</a>
IMSA	International Municipal Signal Association <a href="http://www.imsasafety.org">http://www.imsasafety.org</a>
IPCEA	Insulated Power Cable Engineers Association
NBMA	Metal Buildings Manufacturers Association <a href="http://www.mbma.com">http://www.mbma.com</a>
MSS	Manufacturers Standardization Society of the Valve and Fittings Industry Inc. <a href="http://www.mss-hq.com">http://www.mss-hq.com</a>
NAAMM	National Association of Architectural Metal Manufacturers <a href="http://www.naamm.org">http://www.naamm.org</a>
NAPHCC	Plumbing-Heating-Cooling Contractors Association <a href="http://www.phccweb.org.org">http://www.phccweb.org.org</a>
NBS	National Bureau of Standards See - NIST
NBBPVI	National Board of Boiler and Pressure Vessel Inspectors <a href="http://www.nationboard.org">http://www.nationboard.org</a>
NEC	National Electric Code See - NFPA National Fire Protection Association
NEMA	National Electrical Manufacturers Association <a href="http://www.nema.org">http://www.nema.org</a>



NFPA      National Fire Protection Association  
<http://www.nfpa.org>

NHLA      National Hardwood Lumber Association  
<http://www.natlhardwood.org>

NIH        National Institute of Health  
<http://www.nih.gov>

NIST      National Institute of Standards and Technology  
<http://www.nist.gov>

NLMA      Northeastern Lumber Manufacturers Association, Inc.  
<http://www.nelma.org>

NPA        National Particleboard Association  
18928 Premiere Court  
Gaithersburg, MD 20879  
(301) 670-0604

NSF        National Sanitation Foundation  
<http://www.nsf.org>

NWWDA    Window and Door Manufacturers Association  
<http://www.nwwda.org>

OSHA      Occupational Safety and Health Administration  
Department of Labor  
<http://www.osha.gov>

PCA        Portland Cement Association  
<http://www.portcement.org>

PCI        Precast Prestressed Concrete Institute  
<http://www.pci.org>

PPI        The Plastic Pipe Institute  
<http://www.plasticpipe.org>

PEI        Porcelain Enamel Institute, Inc.  
<http://www.porcelainenamel.com>

PTI        Post-Tensioning Institute  
<http://www.post-tensioning.org>

RFCI	The Resilient Floor Covering Institute <a href="http://www.rfci.com">http://www.rfci.com</a>
RIS	Redwood Inspection Service See - CRA
RMA	Rubber Manufacturers Association, Inc. <a href="http://www.rma.org">http://www.rma.org</a>
SCMA	Southern Cypress Manufacturers Association <a href="http://www.cypressinfo.org">http://www.cypressinfo.org</a>
SDI	Steel Door Institute <a href="http://www.steeldoor.org">http://www.steeldoor.org</a>
IGMA	Insulating Glass Manufacturers Alliance <a href="http://www.igmaonline.org">http://www.igmaonline.org</a>
SJI	Steel Joist Institute <a href="http://www.steeljoist.org">http://www.steeljoist.org</a>
SMACNA	Sheet Metal and Air-Conditioning Contractors National Association, Inc. <a href="http://www.smacna.org">http://www.smacna.org</a>
SSPC	The Society for Protective Coatings <a href="http://www.sspc.org">http://www.sspc.org</a>
STI	Steel Tank Institute <a href="http://www.steeltank.com">http://www.steeltank.com</a>
SWI	Steel Window Institute <a href="http://www.steelwindows.com">http://www.steelwindows.com</a>
TCA	Tile Council of America, Inc. <a href="http://www.tileusa.com">http://www.tileusa.com</a>
TEMA	Tubular Exchange Manufacturers Association <a href="http://www.tema.org">http://www.tema.org</a>
TPI	Truss Plate Institute, Inc. 583 D'Onofrio Drive; Suite 200 Madison, WI 53719 (608) 833-5900

UBC        The Uniform Building Code  
            See ICBO

UL         Underwriters' Laboratories Incorporated  
            <http://www.ul.com>

ULC        Underwriters' Laboratories of Canada  
            <http://www.ulc.ca>

WCLIB      West Coast Lumber Inspection Bureau  
            6980 SW Varns Road, P.O. Box 23145  
            Portland, OR 97223  
            (503) 639-0651

WRCLA      Western Red Cedar Lumber Association  
            P.O. Box 120786  
            New Brighton, MN 55112  
            (612) 633-4334

WWPA      Western Wood Products Association  
            <http://www.wwpa.org>

**PART 2 - PRODUCTS (Not Used)**

**PART 3 - EXECUTION (Not Used)**

- - - E N D - - -

VA Project No. 642-12-110  
AE Works Project No. 12030

Philadelphia VAMC  
Rekey VA Medical Center  
Bid Documents

**SECTION 01 57 19**  
**TEMPORARY ENVIRONMENTAL CONTROLS**

**PART 1 - GENERAL**

**1.1 DESCRIPTION**

- A. This section specifies the control of environmental pollution and damage that the Contractor must consider for air, water, and land resources. It includes management of visual aesthetics, noise, solid waste, radiant energy, and radioactive materials, as well as other pollutants and resources encountered or generated by the Contractor. The Contractor is obligated to consider specified control measures with the costs included within the various contract items of work.
- B. Environmental pollution and damage is defined as the presence of chemical, physical, or biological elements or agents which:
1. Adversely affect human health or welfare,
  2. Unfavorably alter ecological balances of importance to human life,
  3. Effect other species of importance to humankind, or;
  4. Degrade the utility of the environment for aesthetic, cultural, and historical purposes.
- C. Definitions of Pollutants:
1. Chemical Waste: Petroleum products, bituminous materials, salts, acids, alkalis, herbicides, pesticides, organic chemicals, and inorganic wastes.
  2. Debris: Combustible and noncombustible wastes, such as leaves, tree trimmings, ashes, and waste materials resulting from construction or maintenance and repair work.
  3. Sediment: Soil and other debris that has been eroded and transported by runoff water.
  4. Solid Waste: Rubbish, debris, garbage, and other discarded solid materials resulting from industrial, commercial, and agricultural operations and from community activities.
  5. Surface Discharge: The term "Surface Discharge" implies that the water is discharged with possible sheeting action and subsequent soil erosion may occur. Waters that are surface discharged may terminate in drainage ditches, storm sewers, creeks, and/or "water

of the United States" and would require a permit to discharge water from the governing agency.

6. Rubbish: Combustible and noncombustible wastes such as paper, boxes, glass and crockery, metal and lumber scrap, tin cans, and bones.
7. Sanitary Wastes:
  - a. Sewage: Domestic sanitary sewage and human and animal waste.
  - b. Garbage: Refuse and scraps resulting from preparation, cooking, dispensing, and consumption of food.

#### **1.2 QUALITY CONTROL**

- A. Establish and maintain quality control for the environmental protection of all items set forth herein.
- B. Record on daily reports any problems in complying with laws, regulations, and ordinances. Note any corrective action taken.

#### **1.3 REFERENCES**

- A. The publications listed below form a part of this specification to the extent referenced. The publications are referred to in the text by basic designation only.
- B. U.S. National Archives and Records Administration (NARA):  
33 CFR 328.....Definitions

#### **1.4 SUBMITTALS**

- A. In accordance with Section, 01 33 23, SHOP DRAWINGS, PRODUCT DATA, AND SAMPLES, furnish the following:
  1. Environmental Protection Plan: After the contract is awarded and prior to the commencement of the work, the Contractor shall meet with the Project Engineer to discuss the proposed Environmental Protection Plan and to develop mutual understanding relative to details of environmental protection. Not more than 20 days after the meeting, the Contractor shall prepare and submit to the Project Engineer for approval, a written and/or graphic Environmental Protection Plan including, but not limited to, the following:

- a. Name(s) of person(s) within the Contractor's organization who is (are) responsible for ensuring adherence to the Environmental Protection Plan.
  - b. Name(s) and qualifications of person(s) responsible for manifesting hazardous waste to be removed from the site.
  - c. Name(s) and qualifications of person(s) responsible for training the Contractor's environmental protection personnel.
  - d. Description of the Contractor's environmental protection personnel training program.
  - e. A list of Federal, State, and local laws, regulations, and permits concerning environmental protection, pollution control, noise control and abatement that are applicable to the Contractor's proposed operations and the requirements imposed by those laws, regulations, and permits.
  - g. Procedures to provide the environmental protection that comply with the applicable laws and regulations. Describe the procedures to correct pollution of the environment due to accident, natural causes, or failure to follow the procedures as described in the Environmental Protection Plan.
  - h. Permits, licenses, and the location of the solid waste disposal area.
  - j. Environmental Monitoring Plans for the job site noise.
- B. Approval of the Contractor's Environmental Protection Plan will not relieve the Contractor of responsibility for adequate and continued control of pollutants and other environmental protection measures.

#### **1.5 PROTECTION OF ENVIRONMENTAL RESOURCES**

- A. Handle and dispose of solid wastes in such a manner that will prevent contamination of the environment. Place solid wastes (excluding clearing debris) in containers that are emptied on a regular schedule. Transport all solid waste off Government property and dispose of waste in compliance with Federal, State, and local requirements.
- B. Store chemical waste away from the work areas in corrosion resistant containers and dispose of waste in accordance with Federal, State, and local regulations.

C. Handle discarded materials other than those included in the solid waste category as directed by the Project Engineer.

D. Reduction of Noise: Minimize noise using every action possible. Perform noise-producing work in less sensitive hours of the day or week as directed by the Project Engineer. Maintain noise-produced work at or below the decibel levels and within the time periods specified.

1. Perform construction activities involving repetitive, high-level impact noise only between 8:00 a.m. and 6:00p.m unless otherwise permitted by local ordinance or the Project Engineer. Repetitive impact noise on the property shall not exceed the following dB limitations:

Time Duration of Impact Noise	Sound Level in dB
More than 12 minutes in any hour	70
Less than 30 seconds of any hour	85
Less than three minutes of any hour	80
Less than 12 minutes of any hour	75

2. Provide sound-deadening devices on equipment and take noise abatement measures that are necessary to comply with the requirements of this contract, consisting of, but not limited to, the following:

- a. Maintain maximum permissible construction equipment noise levels at 15 m (50 feet) (dBA):

EARTHMOVING		MATERIALS HANDLING	
FRONT LOADERS	75	CONCRETE MIXERS	75
BACKHOES	75	CONCRETE PUMPS	75
DOZERS	75	CRANES	75
TRACTORS	75	DERRICKS IMPACT	75
SCAPERS	80	PILE DRIVERS	95
GRADERS	75	JACK HAMMERS	75
TRUCKS	75	ROCK DRILLS	80
PAVERS, STATIONARY	80	PNEUMATIC TOOLS	80
PUMPS	75	BLASTING	//--//
GENERATORS	75	SAWS	75



COMPRESSORS

75

VIBRATORS

75

- b. Use shields or other physical barriers to restrict noise transmission.
  - c. Provide soundproof housings or enclosures for noise-producing machinery.
  - d. Use efficient silencers on equipment air intakes.
  - e. Use efficient intake and exhaust mufflers on internal combustion engines that are maintained so equipment performs below noise levels specified.
  - f. Line hoppers and storage bins with sound deadening material.
  - g. Conduct truck loading, unloading, and hauling operations so that noise is kept to a minimum.
3. Measure sound level for noise exposure due to the construction at least once every five successive working days while work is being performed above 55 dB(A) noise level. Measure noise exposure at the property line or 15 m (50 feet) from the noise source, whichever is greater. Measure the sound levels on the A weighing network of a General Purpose sound level meter at slow response. To minimize the effect of reflective sound waves at buildings, take measurements at 900 to 1800 mm (three to six feet) in front of any building face. Submit the recorded information to the Project Engineer noting any problems and the alternatives for mitigating actions.
- E. Restoration of Damaged Property: If any direct or indirect damage is done to public or private property resulting from any act, omission, neglect, or misconduct, the Contractor shall restore the damaged property to a condition equal to that existing before the damage at no additional cost to the Government. Repair, rebuild, or restore property as directed or make good such damage in an acceptable manner.
- F. Final Clean-up: On completion of project and after removal of all debris, rubbish, and temporary construction, Contractor shall leave the construction area in a clean condition satisfactory to the Project Engineer. Cleaning shall include off the station disposal of all items and materials not required to be salvaged, as well as all debris and rubbish resulting from demolition and new work operations.

VA Project No. 642-12-110  
AE Works Project No. 12030

Philadelphia VAMC  
Rekey VA Medical Center  
Bid Documents

**PART 2 - PRODUCTS (Not Used)**

**PART 3 - EXECUTION (Not Used)**

- - - E N D - - -

**SECTION 01 58 16**  
**TEMPORARY INTERIOR SIGNAGE**

**PART 1 GENERAL**

**1.1 DESCRIPTION**

- A. This section specifies temporary interior signs.

**PART 2 PRODUCTS**

**2.1 TEMPORARY SIGNS**

- A. Fabricate from 50 Kg (110 pound) mat finish white paper.
- B. Cut to 100 mm (4-inch) wide by 300 mm (12 inch) long size tag.
- C. Punch 3 mm (1/8-inch) diameter hole centered on 100 mm (4-inch) dimension of tag. Edge of Hole spaced approximately 13 mm (1/2-inch) from one end on tag.
- D. Reinforce hole on both sides with gummed cloth washer or other suitable material capable of preventing tie pulling through paper edge.
- E. Ties: Steel wire 0.3 mm (0.0120-inch) thick, attach to tag with twist tie, leaving 150 mm (6-inch) long free ends.

**PART 3 EXECUTION**

**3.1 INSTALLATION**

- A. Install temporary signs attached to room door frame or room door knob, lever, or pull for doors on corridor openings.
- B. Mark on signs with felt tip marker having approximately 3 mm (1/8-inch) wide stroke for clearly legible numbers or letters.
- C. Identify room with numbers as designated on floor plans.

**3.2 LOCATION**

- A. Install on doors that have room, corridor, and space numbers shown.
- B. Doors that do not require signs are as follows:

1. Corridor barrier doors (cross-corridor) in corridor with same number.
2. Folding doors or partitions.
3. Toilet or bathroom doors within and between rooms.
4. Communicating doors in partitions between rooms with corridor entrance doors.
5. Closet doors within rooms.

C. Replace missing, damaged, or illegible signs.

- - - E N D - - -

**SECTION 01 60 00**  
**PRODUCT REQUIREMENTS**

**PART 1 - GENERAL**

**1.1 STIPULATIONS**

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Division 1 Specification Sections, apply to this Section.
- B. Related Sections include the following:
  - 1. Division 1 Section "Closeout Procedures" for submitting warranties for Contract closeout
  - 2. Divisions 26 and Division 28 Sections for specific requirements for products, warranties and installations specified by these Sections.

**1.2 SUMMARY**

- A. This Section includes administrative and procedural requirements for selection of products for use in Project; product delivery, storage, and handling; manufacturers' standard warranties on products; special warranties; product substitutions; and comparable products.

**1.3 DEFINITIONS**

- A. Products: Items purchased for incorporating into the Work, whether purchased for Project or taken from previously purchased stock. The term "product" includes the terms "material," "equipment," "system," and terms of similar intent.
  - 1. Named Products: Items identified by manufacturer's product name, including but not limited to make or model number or other designation shown or listed in manufacturer's published product literature, which is current as of date of the Contract Documents.
  - 2. New Products: Items that have not previously been incorporated into another project or facility, except that products consisting of recycled-content materials are allowed, unless explicitly stated otherwise. Products salvaged or recycled from other projects are not considered new products.
  - 3. Comparable Product: Product that is demonstrated and approved through submittal process, or where indicated as a product substitution, to have the indicated qualities related to type, function, dimension, in-service performance, physical properties, appearance, and other characteristics that are deemed equal or exceed those of specified product.
  - 4. Approved Manufacturer: Where a specific manufacturer's which are named to form the project's "basis of performance or design,"

including make or model number or other designation, to establish the significant qualities related to type, function, dimension, in-service performance, physical properties, appearance, and other characteristics for purposes of evaluating comparable products of other named manufacturers.

- B. Substitutions: Changes in manufacturer, product, material, equipment, and methods of construction from those that differ or not addressed by Contract Documents and are proposed by the Contractor to be considered as equal.

#### 1.4 SUBSTITUTION SUBMISSIONS

- A. Substitution Requests: Where related specification sections permit the substitution of approved manufacturer\product submit three copies of each request for consideration. Identify manufacturer product, fabrication or installation method to be substituted. Include Specification Section number and title and Drawing numbers and titles.

1. Within 15 days prior to bid opening submit all requests for product substitutions. The request shall include a written documentation in compliance with all requirements of related specification section for substitutions include the following, as applicable:

- a. Statement indicating why specified material or product cannot be provided.
- b. Coordination information, including a list of changes or modifications needed to other parts of the Work and to construction performed by Government and separate contractors, which will be necessary to accommodate proposed substitution.
- c. Detailed comparison of significant qualities of proposed substitution with those of the Work specified. Significant qualities may include attributes such as performance, weight, size, durability, visual effect, and specific features and requirements indicated.
- d. Product Data, including drawings and descriptions of products and fabrication and installation procedures.
- e. Samples, where applicable or requested.
- f. List of similar installations for completed projects with project names and addresses and names and addresses of Engineers and owners.
- g. Research/evaluation reports evidencing compliance with building code in effect for Project, from a model code organization acceptable to authorities having jurisdiction, performance criteria as stipulated by referenced specification sections.
- h. Detailed comparison of Contractor's Construction Schedule using proposed substitution with products specified for the Work, including effect on the overall Contract Time. If specified product or method of construction cannot be provided within the Contract Time, include letter from manufacturer, on manufacturer's letterhead, stating lack of availability or delays in delivery.

- i. Cost information, including a proposal of change, if any, in the Contract Sum.
  - j. Contractor's certification that proposed substitution complies with requirements in the Contract Documents and is appropriate for applications indicated.
  - k. Contractor's waiver of rights to additional payment or time that may subsequently become necessary because of failure of proposed substitution to produce indicated results.
2. Professional's Action: If necessary, the Design Professional will request additional information or documentation for evaluation within 7 days of receipt of a request for substitution. The Design Professional will notify Contractor of acceptance or rejection of proposed substitution within 5 days of receipt of request, or 7 days of receipt of additional information or documentation, whichever is later.
  - a. Form of Acceptance: By Addendum.

#### **1.5 QUALITY ASSURANCE**

- A. Compatibility of Options: If Contractor is given option of selecting between two or more products for use on Project, product selected shall be compatible with products previously selected, even if previously selected products were also options.
  1. Each contractor is responsible for providing products and construction methods compatible with products and construction methods of other contractors.
  2. If a dispute arises between contractors over concurrently selectable but incompatible products, the Design Professional will determine which products shall be used.

#### **1.6 PRODUCT DELIVERY, STORAGE, AND HANDLING**

- A. Deliver, store, and handle products using means and methods that will prevent damage, deterioration, and loss, including theft. Comply with all manufacturer's written instructions and requirements of related specification sections.
- B. Delivery and Handling:
  1. Schedule delivery to minimize long-term storage at Project site and to prevent overcrowding of construction spaces.
  2. Coordinate delivery with installation time to ensure minimum holding time for items that are flammable, hazardous, easily damaged, or sensitive to deterioration, theft, and other losses.
  3. Deliver products to Project site in an undamaged condition in manufacturer's original sealed container or other packaging system, complete with labels and instructions for handling, storing, unpacking, protecting, and installing.
  4. Inspect products on delivery to ensure compliance with the Contract Documents and to ensure that products are undamaged and properly protected.

C. Storage:

1. Store products to allow for inspection and measurement of quantity or counting of units.
2. Store materials in a manner that will not endanger Project structure.
3. Store products that are subject to damage by the elements, under cover in a weather-tight enclosure above ground, with ventilation adequate to prevent condensation.
4. Comply with product manufacturer's written instructions for temperature, humidity, ventilation, and weather-protection requirements for storage.
5. Protect stored products from damage and liquids from freezing.

**1.7 PRODUCT WARRANTIES**

- A. Warranties specified in other Sections shall be in addition to, and run concurrent with, other warranties required by the Contract Documents and/or as herein specified Manufacturer's disclaimers and limitations on product warranties do not relieve Contractor of obligations under requirements of the Contract Documents.
1. Manufacturer's Warranty: Preprinted written warranty published by individual manufacturer for a particular product and specifically endorsed by manufacturer to the Government.
  2. Special Warranty: Written warranty required by or incorporated into the Contract Documents, either to extend time limit provided by manufacturer's warranty or to provide more rights for the Government.
- B. Special Warranties: Prepare a written document that contains appropriate terms and identification, ready for execution. Submit a draft for approval before final execution.
1. Manufacturer's Standard Form: Modified to include Project-specific information and properly executed.
  2. Specified Form: When specified forms are included with the Specifications, prepare a written document using appropriate form properly executed.
  3. Refer to Divisions 2 through 16 Sections for specific content requirements and particular requirements for submitting special warranties.
- C. Submittal Time: Comply with requirements in Division 1 Section "Closeout Procedures."



- D. The warranty period on all systems, equipment, devices, material and installations shall begin at date of final acceptance by the VA's Contracting Officer and Design Professional in part or in whole and shall run continuous for a period of not less than two (2) years. The Contractor shall make all provisions as required and document the extension of all manufacturers' warranties from time of final acceptance to the expiration of the specified warranty period.

## **PART 2 - PRODUCTS**

### **2.1 PRODUCT SELECTION PROCEDURES**

- A. General Product Requirements: Provide products that comply with all requirements of the Contract Documents and related specification sections, which shall be undamaged and, unless otherwise indicated, that are new at time of installation.
1. Provide products complete with accessories, trim, finish, fasteners, appurtenances and other items needed for a complete fully operational installation as indicated for use and effect by the Contract Documents.
  2. Standard Products: If available, and unless custom products or nonstandard options are specified, provide standard products of types that have been produced and used successfully in similar situations on other projects.
  3. The VA's Contracting Officer and Design Professional reserve the right to limit selection to products with warranties not in conflict with requirements of the Contract Documents.
  4. Where products are accompanied by the term "as selected," Design Professional will make selection.
  5. Descriptive, performance, and reference standard requirements in the Specifications establish "salient characteristics" of products.
  6. Or Equal: Where products are specified by name and accompanied by the term "or equal" or "or approved equal" or "or approved," comply with provisions in Part 2 "Comparable Products" Article to obtain approval for use of an unnamed product.
- B. Product Selection Procedures:
1. Products\Manufacturers/Source: Where Specifications name specific manufacturers, products or sources, provide a product by the named manufacturer or source that complies with the specified project requirements.
    - a. Substitutions or approved equal may be considered unless otherwise specified and all substitution requests are submitted prior to receipt of Bids in accordance with all requirements of related specification sections.

## **2.2 PRODUCT SUBSTITUTIONS**

- A. Timing: The Design Professional will consider requests for substitution if received within 15 days prior to receipt of Bids and the manufacturers or products being substituted are not specified as "No Substitutions". Requests received after that time may be considered or rejected at discretion of the Design Professional.
- B. Conditions: The Design Professional will consider the review of the Contractor's request for substitution when the following conditions are satisfied. If the following conditions are not satisfied, The Design Professional will return requests without action, except to record noncompliance with these requirements:
1. Requested substitution offers the Government a substantial advantage in cost, time, energy conservation, or other considerations, after deducting additional responsibilities the Government must assume. The Governments' additional responsibilities may include compensation to the Design Professional for redesign and evaluation services, increased cost of other construction by the Government, and similar considerations.
  2. Requested substitution does not require extensive revisions to the Contract Documents.
  3. Requested substitution is consistent with the Contract Documents and will produce indicated results.
  4. Substitution request is fully documented and properly submitted with fully executed "Substitution Request Documentation" as specified in the context of this document.
  5. Requested substitution will not adversely affect Contractor's Construction Schedule.
  6. Requested substitution is compatible with other portions of the Work.
  7. Requested substitution has been coordinated with other portions of the Work.
  8. Requested substitution provides specified warranty.
  9. If requested substitution involves more than one contractor, requested substitution has been coordinated with other portions of the Work, is uniform and consistent, is compatible with other products, and is acceptable to all contractors involved.

## **2.3 COMPARABLE PRODUCTS**

- A. Conditions: The Design Professional will consider Contractor's request for comparable or equal products were the products are specified "approved equal" are acceptable and the following conditions are satisfied. If the following conditions are not satisfied, the Design Professional will return submittals without action, except to record noncompliance with these requirements:
1. Evidence that the proposed product does not require extensive revisions to the Contract Documents that it is consistent with the Contract Documents and will produce the indicated results, and that it is compatible with other portions of the Work.

2. Detailed comparison of significant qualities of proposed product with those named in the Specifications. Significant qualities include attributes such as performance, weight, size, durability, visual effect, and specific features and requirements indicated.
3. Evidence that proposed product provides specified warranty.
4. List of similar installations for completed projects with project names and addresses and names and addresses of Engineers and owners, if requested.
5. Samples, if requested.

**PART 3 - EXECUTION (Not Used)**

- - -END - - -

**SUBSTITUTION REQUEST FORM**

---

---

Date: \_\_\_\_\_

Agency: \_\_\_\_\_

Project: \_\_\_\_\_

Contractor: \_\_\_\_\_

Subcontractor: \_\_\_\_\_

Design Professional: A|E Works.

Requested Substitution:

Replacing:

---

---

Contractor and Subcontractor request that the VA Contracting Officer and Design Professional authorize the Requested Substitution described above. Contractor and Subcontractor, jointly and severally, make the following promises and representations about the Requested Substitution:

1. The Requested Substitution complies in all respects with all applicable building laws, codes and regulations.
2. Contractor and Subcontractor have carefully evaluated the Authorized Substitution and have determined that it complies in all respects with all requirements of the plans, specifications and contract documents for the Project except as specifically noted herein or in any attached exhibit.

3. Contractor and Subcontractor clearly understand that any authorizations to make the Requested Substitution will be based entirely on the promises and representations of Contractor and Subcontractor and will not permit, authorize or approve any deviation from the plans, specifications or contract documents except as specifically set forth herein or in any exhibit.
4. Contractor and Subcontractor are completely and solely responsible for compliance of the Requested Substitution with all requirements of the plans, specifications and contract documents except as specifically set forth herein or in any attached exhibit.
5. Contractor and Subcontractor expressly warrant that the Requested Substitution is merchantable and suitable for its intended purpose.
6. The Requested Substitution varies from the requirements of the plans, specifications and contract documents only in the following respects:
7. Errors, omissions or oversights by the VA Contracting Officer or Design Professional in review of this request shall not be the basis for any claim or defense by Contractor or Subcontractor.

\_\_\_\_\_  
Contractor

\_\_\_\_\_  
Subcontractor

Owner and Design Professional hereby authorize the Requested Substitution to be made.

Dated: \_\_\_\_\_  
(Agency)

Dated: \_\_\_\_\_  
(Design Professional)

VA Project No. 642-12-110  
AE Works Project No. 12030

Philadelphia VAMC  
Rekey VA Medical Center  
Bid Documents

**SECTION 01 70 00**  
**EXECUTION REQUIREMENTS**

**PART 1 - GENERAL**

**1.1 STIPULATIONS**

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Division 1 Specification Sections, apply to this Section.
- B. Related Sections include the following:
  - 1. Division 1 Section "Cutting and Patching" for procedural requirements for cutting and patching necessary for the installation or performance of other components of the Work.
  - 2. Division 7 Section "Penetrations Fire-Stopping" for procedural requirements for specific execution requirements.
  - 3. Divisions 26 and Division 28 Sections for specific execution requirements.

**1.2 SUMMARY**

- A. This Section includes general procedural requirements governing execution of the Work including, but not limited to, the following:
  - 1. Construction layout.
  - 2. General installation of products.
  - 3. Coordination of all Government provided equipment or utilities.
  - 4. Progress cleaning.
  - 5. Starting and adjusting.
  - 6. Protection of installed construction.
  - 7. Correction of the Work.

**1.3 SUBMITTALS**

- A. Landfill Receipts: Submit copy of receipts issued by a landfill facility, licensed to accept hazardous materials, for hazardous waste disposal.

**PART 2 - PRODUCTS (Not Used)**

## **PART 3 - EXECUTION**

### **3.1 EXAMINATION**

- A. Existing Conditions: The existence and location of site improvements, utilities, and other construction indicated as existing are not guaranteed. Before beginning work, investigate and verify the existence and location of mechanical and electrical systems and other construction affecting the Work.
  - 1. Before construction, verify the location and points of connection of utility services.
- B. Existing Utilities: The existence and location of underground and other utilities and construction indicated as existing are not guaranteed. Before beginning site-work, investigate and verify the existence and location of underground utilities and other construction affecting the Work.
  - 1. Before construction, verify the location and invert elevation at points of connection of sanitary sewer, storm sewer, and water-service piping; and underground electrical services.
  - 2. Furnish location data for work related to Project that must be performed by public utilities serving Project site.
- C. Acceptance of Conditions: Examine substrates, areas, spaces, and conditions, with Installer or Applicator present, for compliance with requirements for installation tolerances and other conditions affecting performance. Record observations.
  - 1. Written Report: Where a written report listing conditions detrimental to performance of the Work is required by other Sections, include the following:
    - a. Description of the Work.
    - b. List of detrimental conditions, including substrates.
    - c. List of unacceptable installation tolerances.
    - d. Recommended corrections.
  - 2. Verify compatibility with and suitability of substrates, including compatibility with existing finishes or primers.
  - 3. Examine roughing-in for electrical systems to verify actual locations of connections before equipment and fixture installation.
  - 4. Examine walls, floors, and roofs for suitable conditions where products and systems are to be installed.
  - 5. Proceed with installation only after unsatisfactory conditions have been corrected. Proceeding with the Work indicates acceptance of surfaces and conditions.



### **3.2 PREPARATION**

- A. Field Measurements: Take field measurements as required to fit the Work properly. Recheck measurements before installing each product. Where portions of the Work are indicated to fit to other construction, verify dimensions of other construction by field measurements before fabrication. Coordinate fabrication schedule with construction progress to avoid delaying the Work.
- B. Space Requirements: Verify space requirements and dimensions of items shown diagrammatically on Drawings.
- C. Review of Contract Documents and Field Conditions: Immediately on discovery of the need for clarification of the Contract Documents, submit a request for information to Project Engineer. Include a detailed description of problem encountered, together with recommendations for changing the Contract Documents submit in writing a, "Request for Information." Contractor shall follow requirement of General and Supplementary Conditions governing Requests for Information.

### **3.3 CONSTRUCTION LAYOUT**

- A. Verification: Before proceeding to lay out the Work, verify layout information shown on Drawings. If discrepancies are discovered, notify Project Engineer promptly.
- B. Site Improvements: Locate and lay out site improvements, including pavements, grading, fill and topsoil placement, utility slopes, and invert elevations.

### **3.4 INSTALLATION**

- A. General: Locate the Work and components of the Work accurately, in correct alignment and elevation, as indicated.
  - 1. Make vertical work plumb and make horizontal work level.
  - 2. Where space is limited, install components to maximize space available for maintenance and ease of removal for replacement.
  - 3. Conceal pipes, ducts, and wiring in finished areas, unless otherwise indicated.
  - 4. Maintain minimum headroom clearance of 8 feet in spaces without a suspended ceiling.
- B. Comply with manufacturer's written instructions and recommendations for installing products in applications indicated.
- C. Install products at the time and under conditions that will ensure the best possible results. Maintain conditions required for product performance until Substantial Completion.

- D. Conduct construction operations so no part of the Work is subjected to damaging operations or loading in excess of that expected during normal conditions of occupancy.
- E. Tools and Equipment: Do not use tools or equipment that produce harmful noise levels.
- F. Templates: Obtain and distribute to the parties involved templates for work specified to be factory prepared and field installed. Check Shop Drawings of other work to confirm that adequate provisions are made for locating and installing products to comply with indicated requirements.
- G. Anchors and Fasteners: Provide anchors and fasteners as required to anchor each component securely in place, accurately located and aligned with other portions of the Work.
  - 1. Mounting Heights: Where mounting heights are not indicated, mount components at heights directed by Project Engineer.
  - 2. Allow for building movement, including thermal expansion and contraction.
  - 3. Coordinate installation of anchorages. Furnish setting drawings, templates, and directions for installing anchorages, including sleeves, concrete inserts, anchor bolts, and items with integral anchors, that are to be embedded in concrete or masonry. Deliver such items to Project site in time for installation.
- H. Hazardous Materials: Use products, cleaners, and installation materials that are not considered hazardous.

### **3.5 GOVERNMENT - PROVIDED EQUIPMENT OR UTILITIES**

- A. Site Access: Provide access to Project site for Governments' construction forces.
- B. Coordination: Coordinate construction and operations of the Work with work performed by Governments' construction forces.
  - 1. Construction Schedule: Inform the VA's Contracting Officer and Design Professional of Contractor's preferred construction schedule for the Governments' portion of the Work. Adjust construction schedule based on a mutually agreeable timetable. Notify VA's Contracting Officer and Design Professional if changes to schedule are required due to differences in actual construction progress.
  - 2. Pre-installation Conferences: Include Governments' construction forces at pre-installation conferences covering portions of the Work that are to receive the Governments' work. Attend pre-installation conferences conducted by the Governments' construction forces if any portions of Work depend on the Governments' construction projects.

### 3.6 PROGRESS CLEANING

- A. General: Clean Project site and work areas daily, including common areas. Coordinate progress cleaning for joint-use areas where more than one installer has worked. Enforce requirements strictly. Dispose of materials lawfully.
  - 1. Comply with requirements in NFPA 241 for removal of combustible waste materials and debris.
  - 2. Do not hold materials more than 7 days during normal weather or 3 days if the temperature is expected to rise above 80 deg F.
  - 3. Containerize hazardous and unsanitary waste materials separately from other waste. Mark containers appropriately and dispose of legally, according to regulations.
- B. Site: Maintain Project site free of waste materials and debris.
- C. Work Areas: Clean areas where work is in progress to the level of cleanliness necessary for proper execution of the Work.
  - 1. Remove liquid spills promptly.
  - 2. Where dust would impair proper execution of the Work, broom-clean or vacuum the entire work area, as appropriate.
- D. Installed Work: Keep installed work clean. Clean installed surfaces according to written instructions of manufacturer or fabricator of product installed, using only cleaning materials specifically recommended. If specific cleaning materials are not recommended, use cleaning materials that are not hazardous to health or property and that will not damage exposed surfaces.
- E. Concealed Spaces: Remove debris from concealed spaces before enclosing the space.
- F. Exposed Surfaces in Finished Areas: Clean exposed surfaces and protect as necessary to ensure freedom from damage and deterioration at time of Substantial Completion.
- G. Waste Disposal: Burying or burning waste materials on-site will not be permitted. Washing waste materials down sewers or into waterways will not be permitted.
- H. During handling and installation, clean and protect construction in progress and adjoining materials already in place. Apply protective covering where required to ensure protection from damage or deterioration at Substantial Completion.
- I. Clean and provide maintenance on completed construction as frequently as necessary through the remainder of the construction period. Adjust and lubricate operable components to ensure operability without damaging effects.
- J. Limiting Exposures: Supervise construction operations to assure that no part of the construction completed or in progress, is subject to

harmful, dangerous, damaging, or otherwise deleterious exposure during the construction period.

### **3.7 START-UP AND ADJUSTING**

- A. Start equipment and operating components to confirm proper operation. Remove malfunctioning units, replace with new units, and retest.
- B. Adjust operating components for proper operation without binding. Adjust equipment for proper operation.
- C. Test each piece of equipment to verify proper operation. Test and adjust controls and safeties. Replace damaged and malfunctioning controls and equipment.
- D. Manufacturer's Field Service: If a factory-authorized service representative is required to inspect field-assembled components and equipment installation, comply with qualification requirements in Division 1 Section "Quality Requirements."

### **3.8 PROTECTION OF INSTALLED CONSTRUCTION**

- A. Provide final protection and maintain conditions that ensure installed Work is without damage or deterioration at time of Substantial Completion.
- B. Comply with manufacturer's written instructions for temperature and relative humidity.

### **3.9 CORRECTION OF THE WORK**

- A. Repair or remove and replace defective construction. Restore damaged substrates and finishes. Comply with requirements in Division 1 Section "Cutting and Patching."
  - 1. Repairing includes replacing defective parts, refinishing damaged surfaces, touching up with matching materials, and properly adjusting operating equipment.
- B. Restore permanent facilities used during construction to their specified condition.
- C. Remove and replace damaged surfaces that are exposed to view if surfaces cannot be repaired without visible evidence of repair.
- D. Repair components that do not operate properly. Remove and replace operating components that cannot be repaired.
- E. Remove and replace chipped, scratched, and broken glass or reflective surfaces.

- - - END - - -

**SECTION 01 73 10  
CUTTING AND PATCHING**

**PART 1 - GENERAL**

**1.1 STIPULATIONS**

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Division 1 Specification Sections, apply to this Section.
- B. Related Sections include the following:
  - 1. Division 7 Section "Through-Penetration Fire-stop Systems" for patching fire-rated construction.
  - 2. Divisions 26 and Division 28 Sections for specific requirements.

**1.2 SUMMARY**

- A. This Section includes procedural requirements for cutting and patching.

**1.3 DEFINITIONS**

- A. Cutting: Removal of in-place construction necessary to permit installation or performance of other Work.
- B. Patching: Fitting and repair work required to restore surfaces to original conditions after installation of other Work.

**1.4 SUBMITTALS**

- A. Cutting and Patching Proposal: Submit a proposal describing procedures at least 10 days before the time cutting and patching will be performed, requesting approval to proceed. Include the following information:
  - 1. Extent: Describe cutting and patching, show how they will be performed, and indicate why they cannot be avoided.
  - 2. Changes to In-Place Construction: Describe anticipated results. Include changes to structural elements and operating components as well as changes in building's appearance and other significant visual elements.
  - 3. Products: List products to be used and firms or entities that will perform the Work.
  - 4. Dates: Indicate when cutting and patching will be performed.
  - 5. Utility Services and Mechanical/Electrical Systems: List services/systems that cutting and patching procedures will disturb or affect. List services/systems that will be relocated

and those that will be temporarily out of service. Indicate how long services/systems will be disrupted.

6. Structural Elements: Where cutting and patching involve adding reinforcement to structural elements, submit details and engineering calculations showing integration of reinforcement with original structure.
7. Design Professional Approval: Obtain approval of cutting and patching proposal before cutting and patching. Approval does not waive right to later require removal and replacement of unsatisfactory work.

#### 1.5 QUALITY ASSURANCE

- A. Structural Elements: Do not cut and patch structural elements in a manner that could change their load-carrying capacity or load-deflection ratio.
- B. Operational Elements: Do not cut and patch operating elements and related components in a manner that results in reducing their capacity to perform as intended or that result in increased maintenance or decreased operational life or safety. Operating elements include the following:
  1. Primary operational systems and equipment.
  2. Air or smoke barriers.
  3. Fire-suppression systems.
  4. Mechanical systems piping and ducts.
  5. Control systems.
  6. Communication systems.
  7. Conveying systems.
  8. Electrical wiring systems.
  9. Operating systems of special construction in Division 13 Sections.
- C. Miscellaneous Elements: Do not cut and patch miscellaneous elements or related components in a manner that could change their load-carrying capacity that results in reducing their capacity to perform as intended, or that result in increased maintenance or decreased operational life or safety. Miscellaneous elements include the following:
  1. Water, moisture, or vapor barriers.
  2. Membranes and flashings.
  3. Exterior curtain-wall construction.
  4. Equipment supports.
  5. Piping, ductwork, vessels, and equipment.
  6. Noise- and vibration-control elements and systems.
- D. Visual Requirements: Do not cut and patch construction in a manner that results in visual evidence of cutting and patching. Do not cut and patch construction exposed on the exterior or in occupied spaces in a manner that would, in Project Engineer's opinion, reduce the building's aesthetic qualities. Remove and replace construction that has been cut and patched in a visually unsatisfactory manner.

- E. Cutting and Patching Conference: Before proceeding, meet at Project site with parties involved in cutting and patching, including mechanical and electrical trades. Review areas of potential interference and conflict. Coordinate procedures and resolve potential conflicts before proceeding.

#### **1.6 WARRANTY**

- A. Existing Warranties: Remove, replace, patch, and repair materials and surfaces cut or damaged during cutting and patching operations, by methods and with materials so as not to void existing warranties.

### **PART 2 - PRODUCTS**

#### **2.1 MATERIALS**

- A. General: Comply with requirements specified in other Sections.
- B. In-Place Materials: Use materials identical to in-place materials. For exposed surfaces, use materials that visually match in-place adjacent surfaces to the fullest extent possible.
  - 1. If identical materials are unavailable or cannot be used, use materials that, when installed, will match the visual and functional performance of in-place materials.

### **PART 3 - EXECUTION**

#### **3.1 EXAMINATION**

- A. Examine surfaces to be cut and patched and conditions under which cutting and patching are to be performed.
  - 1. Compatibility: Before patching, verify compatibility with and suitability of substrates, including compatibility with in-place finishes or primers.
  - 2. Proceed with installation only after unsafe or unsatisfactory conditions have been corrected.

#### **3.2 PREPARATION**

- A. Temporary Support: Provide temporary support of Work to be cut.
- B. Protection: Protect in-place construction during cutting and patching to prevent damage. Provide protection from adverse weather conditions for portions of Project that might be exposed during cutting and patching operations.

- C. Adjoining Areas: Avoid interference with use of adjoining areas or interruption of free passage to adjoining areas.
- D. Existing Utility Services and Mechanical/Electrical Systems: Where existing services/systems are required to be removed, relocated, or abandoned, bypass such services/systems before cutting to minimize interruption to occupied areas.

### 3.3 PERFORMANCE

- A. General: Employ skilled workers to perform cutting and patching. Proceed with cutting and patching at the earliest feasible time, and complete without delay.
  - 1. Cut in-place construction to provide for installation of other components or performance of other construction, and subsequently patch as required to restore surfaces to their original condition.
- B. Cutting: Cut in-place construction by sawing, drilling, breaking, chipping, grinding, and similar operations, including excavation, using methods least likely to damage elements retained or adjoining construction. If possible, review proposed procedures with original Installer; comply with original Installer's written recommendations.
  - 1. In general, use hand or small power tools designed for sawing and grinding, not hammering and chopping. Cut holes and slots as small as possible, neatly to size required, and with minimum disturbance of adjacent surfaces. Temporarily cover openings when not in use.
  - 2. Finished Surfaces: Cut or drill from the exposed or finished side into concealed surfaces.
  - 3. Concrete and Masonry: Cut using a cutting machine, such as an abrasive saw or a diamond-core drill.
  - 4. Excavating and Backfilling: Comply with requirements in applicable Division 2 Sections where required by cutting and patching operations.
  - 5. Mechanical and Electrical Services: Cut off pipe or conduit in walls or partitions to be removed. Cap, valve, or plug and seal remaining portion of pipe or conduit to prevent entrance of moisture or other foreign matter after cutting.
  - 6. Proceed with patching after construction operations requiring cutting are complete.
- C. Patching: Patch construction by filling, repairing, refinishing, closing up, and similar operations following performance of other Work. Patch with durable seams that are as invisible as possible. Provide materials and comply with installation requirements specified in other Sections.
  - 1. Inspection: Where feasible, test and inspect patched areas after completion to demonstrate integrity of installation. Exposed Finishes: Restore exposed finishes of patched areas and extend



finish restoration into retained adjoining construction in a manner that will eliminate evidence of patching and refinishing.

- a. Clean piping, conduit, and similar features before applying paint or other finishing materials.
  - b. Restore damaged pipe covering to its original condition.
  - c. Restore all surfaces to previous conditions prior to the start of construction.
2. Floors and Walls: Where walls or partitions that are removed extend one finished area into another, patch and repair floor and wall surfaces in the new space. Provide an even surface of uniform finish, color, texture, and appearance. Remove in-place floor and wall coverings and replace with new materials, if necessary, to achieve uniform color and appearance.
- a. Where patching occurs in a painted surface, apply primer and intermediate paint coats over the patch and apply final paint coat over entire unbroken surface containing the patch. Provide additional coats until patch blends with adjacent surfaces. Restore all surfaces to previous condition prior to the start of construction.
3. Ceilings: Patch, repair, or rehang in-place ceilings as necessary to provide an even-plane surface of uniform appearance. Restore all ceilings to previous conditions prior to the start of construction.
4. Exterior Building Enclosure: Patch components in a manner that restores enclosure to a weather-engineered tight condition.
- D. Cleaning: Clean areas and spaces where cutting and patching are performed. Completely remove paint, mortar, oils, putty, and similar materials.

- - - END - - -

VA Project No. 642-12-110  
AE Works Project No. 12030

Philadelphia VAMC  
Rekey VA Medical Center  
Bid Documents

**SECTION 01 74 19**  
**CONSTRUCTION WASTE MANAGEMENT**

**PART 1 - GENERAL**

**1.1 DESCRIPTION**

- A. This section specifies the requirements for the management of non-hazardous building construction and demolition waste.
- B. Waste disposal in landfills shall be minimized to the greatest extent possible. Of the inevitable waste that is generated, as much of the waste material as economically feasible shall be salvaged, recycled or reused.
- C. Contractor shall use all reasonable means to divert construction and demolition waste from landfills and incinerators, and facilitate their salvage and recycle not limited to the following:
  - 1. Waste Management Plan development and implementation.
  - 2. Techniques to minimize waste generation.
  - 3. Sorting and separating of waste materials.
  - 4. Salvage of existing materials and items for reuse or resale.
  - 5. Recycling of materials that cannot be reused or sold.
- D. At a minimum the following waste categories shall be diverted from landfills:
  - 1. Soil.
  - 2. Inerts (eg, concrete, masonry and asphalt).
  - 3. Clean dimensional wood and palette wood.
  - 4. Green waste (biodegradable landscaping materials).
  - 5. Engineered wood products (plywood, particle board and I-joists, etc).
  - 6. Metal products (eg, steel, wire, beverage containers, copper, etc).
  - 7. Cardboard, paper and packaging.
  - 8. Bitumen roofing materials.
  - 9. Plastics (eg, ABS, PVC).
  - 10. Carpet and/or pad.
  - 11. Gypsum board.
  - 12. Insulation.
  - 13. Paint.

14. Fluorescent lamps.

## **1.2 RELATED WORK**

- A. Section 02 41 00, DEMOLITION.
- B. Section 01 00 00, GENERAL REQUIREMENTS.
- C. Lead Paint: Section 02 83 33.13, LEAD BASED PAINT REMOVAL AND DISPOSAL.

## **1.3 QUALITY ASSURANCE**

- A. Contractor shall practice efficient waste management when sizing, cutting and installing building products. Processes shall be employed to ensure the generation of as little waste as possible. Construction /Demolition waste includes products of the following:
  - 1. Excess or unusable construction materials.
  - 2. Packaging used for construction products.
  - 3. Poor planning and/or layout.
  - 4. Construction error.
  - 5. Over ordering.
  - 6. Weather damage.
  - 7. Contamination.
  - 8. Mishandling.
  - 9. Breakage.
- B. Establish and maintain the management of non-hazardous building construction and demolition waste set forth herein. Conduct a site assessment to estimate the types of materials that will be generated by demolition and construction.
- C. Contractor shall develop and implement procedures to recycle construction and demolition waste to a minimum of 50 percent.
- D. Contractor shall be responsible for implementation of any special. Programs involving rebates or similar incentives related to recycling. Any revenues or savings obtained from salvage or recycling shall accrue to the contractor.
- E. Contractor shall provide all demolition, removal and legal disposal of materials. Contractor shall ensure that facilities used for recycling,

reuse and disposal shall be permitted for the intended use to the extent required by local, state, federal regulations. The Whole Building Design Guide website <http://www.cwm.wbdg.org> provides a Construction Waste Management Database that contains information on companies that haul, collect, and process recyclable debris from construction projects.

- F. Contractor shall assign a specific area to facilitate separation of materials for reuse, salvage, recycling, and return. Such areas are to be kept neat and clean and clearly marked in order to avoid contamination or mixing of materials.
- G. Contractor shall provide on-site instructions and supervision of separation, handling, salvaging, recycling, reuse and return methods to be used by all parties during waste generating stages.
- H. Record on daily reports any problems in complying with laws, regulations and ordinances with corrective action taken.

#### **1.4 TERMINOLOGY**

- A. Class III Landfill: A landfill that accepts non-hazardous resources such as household, commercial and industrial waste resulting from construction, remodeling, repair and demolition operations.
- B. Clean: Untreated and unpainted; uncontaminated with adhesives, oils, solvents, mastics and like products.
- C. Construction and Demolition Waste: Includes all non-hazardous resources resulting from construction, remodeling, alterations, repair and demolition operations.
- D. Dismantle: The process of parting out a building in such a way as to preserve the usefulness of its materials and components.
- E. Disposal: Acceptance of solid wastes at a legally operating facility for the purpose of land filling (includes Class III landfills and inert fills).

- F. Inert Backfill Site: A location, other than inert fill or other disposal facility, to which inert materials are taken for the purpose of filling an excavation, shoring or other soil engineering operation.
- G. Inert Fill: A facility that can legally accept inert waste, such as asphalt and concrete exclusively for the purpose of disposal.
- H. Inert Solids/Inert Waste: Non-liquid solid resources including, but not limited to, soil and concrete that does not contain hazardous waste or soluble pollutants at concentrations in excess of water-quality objectives established by a regional water board, and does not contain significant quantities of decomposable solid resources.
- I. Mixed Debris: Loads that include commingled recyclable and non-recyclable materials generated at the construction site.
- J. Mixed Debris Recycling Facility: A solid resource processing facility that accepts loads of mixed construction and demolition debris for the purpose of recovering re-usable and recyclable materials and disposing non-recyclable materials.
- K. Permitted Waste Hauler: A company that holds a valid permit to collect and transport solid wastes from individuals or businesses for the purpose of recycling or disposal.
- L. Recycling: The process of sorting, cleansing, treating, and reconstituting materials for the purpose of using the altered form in the manufacture of a new product. Recycling does not include burning, incinerating or thermally destroying solid waste.
1. On-site Recycling - Materials that are sorted and processed on site for use in an altered state in the work, i.e. concrete crushed for use as a sub-base in paving.
  2. Off-site Recycling - Materials hauled to a location and used in an altered form in the manufacture of new products.
- M. Recycling Facility: An operation that can legally accept materials for the purpose of processing the materials into an altered form for the

manufacture of new products. Depending on the types of materials accepted and operating procedures, a recycling facility may or may not be required to have a solid waste facilities permit or be regulated by the local enforcement agency.

N. Reuse: Materials that are recovered for use in the same form, on-site or off-site.

O. Return: To give back reusable items or unused products to vendors for credit.

P. Salvage: To remove waste materials from the site for resale or re-use by a third party.

Q. Source-Separated Materials: Materials that are sorted by type at the site for the purpose of reuse and recycling.

R. Solid Waste: Materials that have been designated as non-recyclable and are discarded for the purposes of disposal.

S. Transfer Station: A facility that can legally accept solid waste for the purpose of temporarily storing the materials for re-loading onto other trucks and transporting them to a landfill for disposal, or recovering some materials for re-use or recycling.

## **1.5 SUBMITTALS**

A. In accordance with Section 01 33 23, SHOP DRAWINGS, PRODUCT DATA, and SAMPLES, furnish the following:

B. Prepare and submit to the Project Engineer a written demolition debris management plan. The plan shall include, but not be limited to, the following information:

1. Procedures to be used for debris management.
2. Techniques to be used to minimize waste generation.
3. Analysis of the estimated job site waste to be generated:

- a. List of each material and quantity to be salvaged, reused, and recycled.
  - b. List of each material and quantity proposed to be taken to a landfill.
- 4. Detailed description of the Means/Methods to be used for material handling.
  - a. On site: Material separation, storage, protection where applicable.
  - b. Off site: Transportation means and destination. Include list of materials.
    - 1) Description of materials to be site-separated and self-hauled to designated facilities.
    - 2) Description of mixed materials to be collected by designated waste haulers and removed from the site.
  - c. The names and locations of mixed debris reuse and recycling facilities or sites.
  - d. The names and locations of trash disposal landfill facilities or sites.
  - e. Documentation that the facilities or sites are approved to receive the materials.
- C. Designated Manager responsible for instructing personnel, supervising, documenting and administer over meetings relevant to the Waste Management Plan.
- D. Monthly summary of construction and demolition debris diversion and disposal, quantifying all materials generated at the work site and disposed of or diverted from disposal through recycling.

#### **1.6 APPLICABLE PUBLICATIONS**

- A Publications listed below form a part of this specification to the extent referenced. Publications are referenced by the basic designation only. In the event that criteria requirements conflict, the most stringent requirements shall be met.
- B. U.S. Green Building Council (USGBC):  
LEED Green Building Rating System for New Construction



## **1.7 RECORDS**

- A. Maintain records to document the quantity of waste generated; the quantity of waste diverted through sale, reuse, or recycling; and the quantity of waste disposed by landfill or incineration. Records shall be kept in accordance with the LEED Reference Guide and LEED Template.

## **PART 2 - PRODUCTS**

### **2.1 MATERIALS**

- A. List of each material and quantity to be salvaged, recycled, reused.
- B. List of each material and quantity proposed to be taken to a landfill.
- C. Material tracking data: Receiving parties, dates removed, transportation costs, weight tickets, tipping fees, manifests, invoices, net total costs or savings.

## **PART 3 - EXECUTION**

### **3.1 COLLECTION**

- A. Provide all necessary containers, bins and storage areas to facilitate effective waste management.
- B. Clearly identify containers, bins and storage areas so that recyclable materials are separated from trash and can be transported to respective recycling facility for processing.
- C. Hazardous wastes shall be separated, stored, disposed of according to local, state, federal regulations.

### **3.2 DISPOSAL**

- A. Contractor shall be responsible for transporting and disposing of materials that cannot be delivered to a source-separated or mixed materials recycling facility to a transfer station or disposal facility that can accept the materials in accordance with state and federal regulations.

- B. Construction or demolition materials with no practical reuse or that cannot be salvaged or recycled shall be disposed of at a landfill or incinerator.

### 3.3 REPORT

- A. With each application for progress payment, submit a summary of construction and demolition debris diversion and disposal including beginning and ending dates of period covered.
- B. Quantify all materials diverted from landfill disposal through salvage or recycling during the period with the receiving parties, dates removed, transportation costs, weight tickets, manifests, invoices. Include the net total costs or savings for each salvaged or recycled material.
- C. Quantify all materials disposed of during the period with the receiving parties, dates removed, transportation costs, weight tickets, tipping fees, manifests, invoices. Include the net total costs for each disposal.

- - - E N D - - -

**SECTION 01 77 00  
CLOSEOUT PROCEDURES**

**PART 1 - GENERAL**

**1.1 STIPULATIONS**

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Division 1 Specification Sections, apply to this Section.
- B. Related Sections include the following:
  - 1. Division 1 Section "Project Record Documents" for submitting Record Drawings, Record Specifications, and Record Product Data.
  - 2. Division 1 Section "Operation and Maintenance Data" for operation and maintenance manual requirements.
  - 3. Division 1 Section "Demonstration and Training" for requirements for instructing Government personnel.
  - 4. Divisions 26 and Division 28 Sections for specific requirements

**1.2 SUMMARY**

- A. This Section includes administrative and procedural requirements for contract closeout, including, but not limited to, the following:
  - 1. Inspection procedures.
  - 2. Warranties.
  - 3. Final cleaning.

**1.3 SUBSTANTIAL COMPLETION**

- A. Preliminary Procedures: Before requesting inspection for determining date of Substantial Completion, complete the following. List items below that are incomplete in request.
  - 1. Prepare a list of items to be completed and corrected (punch list), the value of items on the list, and reasons why the Work is not complete.
  - 2. Advise the VA's Contracting Officer and Design Professional of pending insurance changeover requirements.
  - 3. Submit specific warranties, workmanship bonds, maintenance service agreements, final certifications, and similar documents.
  - 4. Obtain and submit releases permitting the Government unrestricted use of the Work and access to services and utilities. Include occupancy permits, operating certificates, and similar releases.
  - 5. Prepare and submit Project Record Documents, operation and maintenance manuals, damage or settlement surveys, and similar final record information.

6. Deliver tools, spare parts, extra materials, and similar items to location designated by the VA's Contracting Officer. Label with manufacturer's name and model number where applicable.
  7. Complete startup testing of systems.
  8. Submit test/adjust/balance records.
  9. Submit changeover information related to Government's use, operation, and maintenance of systems.
  10. Complete final cleaning requirements, including touchup painting.
  11. Touch up and otherwise repair and restore marred exposed finishes to eliminate visual defects.
- B. Inspection: Submit a written request for inspection for Substantial Completion. On receipt of request, Project Engineer will either proceed with inspection or notify Contractor of unfulfilled requirements. Project Engineer will prepare the Certificate of Substantial Completion after inspection or will notify Contractor of items, either on Contractor's list or additional items identified by Project Engineer, that must be completed or corrected before certificate will be issued.
1. Re-inspection: Request re-inspection when the Work identified in previous inspections as incomplete is completed or corrected.
  2. Results of completed inspection will form the basis of requirements for Final Completion.

#### **1.4 FINAL ACCEPTANCE**

- A. Preliminary Procedures: Before requesting final inspection for determining date of Final Completion, complete the following:
1. Submit requests for final payment in accordance with all requirements of the General and Supplementary Conditions of the Contract.
  2. Submit certified copy of Design Professionals Substantial Completion inspection list of items to be completed or corrected (punch list), endorsed and dated by Project Engineer. The certified copy of the list shall state that each item has been completed or otherwise resolved for acceptance.
  3. Submit evidence of final, continuing insurance coverage complying with insurance requirements.
  4. Instruct the Governments' personnel in operation, adjustment, and maintenance of products, equipment, and systems. Submit demonstration and training videotapes.
- B. Inspection: Submit a written request for final inspection for acceptance. On receipt of request, the VA's Contracting Officer and Design Professional will either proceed with inspection or notify Contractor of unfulfilled requirements. The Design Professional will authorize VA's Contracting Officer to make final Payment after inspection or will notify Contractor of construction that must be completed or corrected before authorization will be issued.
1. Re-inspection: Request re-inspection when the Work identified in previous inspections as incomplete is completed or corrected.

#### **1.5 LIST OF INCOMPLETE ITEMS (PUNCH LIST)**

- A. Preparation: Submit three copies of list. Include name and identification of each space and area affected by construction operations for incomplete items and items needing correction including, if necessary, areas disturbed by Contractor that are outside the limits of construction.
1. Organize list of spaces in sequential order, starting with exterior areas first and proceeding from lowest floor to highest floor.
  2. Organize items applying to each space by major element, including categories for ceiling, individual walls, floors, equipment, and building systems.
  3. Include the following information at the top of each page:
    - a. Project name.
    - b. Date.
    - c. Name of Design Professional.
    - d. Name of Contractor.
    - e. Page number.

#### **1.6 WARRANTIES**

- A. Submittal Time: Submit written warranties on request of Design Professional for designated portions of the Work where commencement of warranties other than date of Substantial Completion is indicated.
- B. Organize warranty documents into an orderly sequence based on the table of contents of the Project Manual.
1. Bind warranties and bonds in heavy-duty, 3-ring, vinyl-covered, loose-leaf binders, thickness as necessary to accommodate contents, and sized to receive 8-1/2-by-11-inch paper.
  2. Provide heavy paper dividers with plastic-covered tabs for each separate warranty. Mark tab to identify the product or installation. Provide a typed description of the product or installation, including the name of the product and the name, address, and telephone number of Installer.
  3. Identify each binder on the front and spine with the typed or printed title "WARRANTIES," Project name, and name of Contractor.
- C. Provide additional copies of each warranty to include in operation and maintenance manuals.

## **PART 2 - PRODUCTS**

### **2.1 MATERIALS**

- A. Cleaning Agents: Use cleaning materials and agents recommended by manufacturer or fabricator of the surface to be cleaned. Do not use cleaning agents that are potentially hazardous to health or property or that might damage finished surfaces.

## **PART 3 - EXECUTION**

### **3.1 FINAL CLEANING**

- A. General: Provide final cleaning. Conduct cleaning and waste-removal operations to comply with local laws and ordinances and Federal and local environmental and anti-pollution regulations.
  - 1. Complete the following cleaning operations before requesting inspection for certification of Substantial Completion for entire Project or for a portion of Project:
    - a. Clean Project site, and grounds, in areas disturbed by construction activities, of rubbish, waste material, litter, and other foreign substances.
    - b. Sweep paved areas broom clean. Remove petrochemical spills, stains, and other foreign deposits.
    - c. Remove tools, construction equipment, machinery, and surplus material from Project site.
    - d. Sweep concrete floors broom clean in unoccupied spaces.
    - e. Touch up and otherwise repair and restore marred, exposed finishes and surfaces. Replace finishes and surfaces that cannot be satisfactorily repaired or restored or that already show evidence of repair or restoration.
      - 1) Do not paint over "UL" and similar labels, including mechanical and electrical nameplates.
    - f. Wipe surfaces of electrical equipment,. Remove excess lubrication, paint and mortar droppings, and other foreign substances.
    - g. Leave Project clean and ready for occupancy.
- B. Comply with safety standards for cleaning. Do not burn waste materials. Do not bury debris or excess materials on Governments' property. Do not discharge volatile, harmful, or dangerous materials into drainage systems. Remove waste materials from Project site and dispose of lawfully.

- - - END - - -

**SECTION 01 78 10**  
**PROJECT RECORD DOCUMENTS**

**PART 1 - GENERAL**

**1.1 STIPULATIONS**

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Division 1 Specification Sections, apply to this Section.
- B. Related Sections include the following:
  - 1. Division 1 Section "Closeout Procedures" for general closeout procedures.
  - 2. Division 1 Section "Operation and Maintenance Data" for specific requirements
  - 3. Divisions 26 and Division 28 Sections for specific requirements

**1.2 SUMMARY**

- A. This Section includes administrative and procedural requirements for Project Record Documents, including the following:
  - 1. Record Drawings.
  - 2. Record Specifications.
  - 3. Record Product Data.
- B. Related Sections include the following:

**1.3 SUBMITTALS**

- A. Record Drawings: Comply with the following:
  - 1. Number of Copies: Submit one complete set of marked-up Record Prints.
- B. Record Specifications: Submit one copy of Project's Specifications, including addenda and contract modifications.
- C. Record Product Data: Submit one copy of each Product Data submittal.
  - 1. Where Record Product Data is required as part of operation and maintenance manuals, submit marked-up Product Data as an insert in manual instead of submittal as Record Product Data.

## **PART 2 - PRODUCTS**

### **2.1 RECORD DRAWINGS**

- A. Record Prints: Maintain one complete set of the Contract Drawings and Shop Drawings.
  - 1. Preparation: Mark Record Prints to show the actual installation where installation varies from that shown originally. Require individual or entity who obtained record data, whether individual or entity is Installer, subcontractor, or similar entity, to prepare the marked-up Record Drawings.
    - a. Give particular attention to information on concealed elements that would be difficult to identify or measure and record later.
    - b. Accurately record information in an understandable drawing technique.
    - c. Record data as soon as possible after obtaining it. Record and check the markup before enclosing concealed installations.
    - d. Revisions to electrical circuitry.
    - e. Actual equipment locations.
    - f. Locations of concealed internal utilities.
    - g. Changes made by Change Order or Construction Change Directive.
    - h. Changes made following Design Professional written orders.
    - i. Details not on the original Contract Drawings.
    - j. Field records for variable and concealed conditions.
    - k. Record information on the Work that is shown only schematically.
  - 2. Mark the Shop Drawings, showing actual physical conditions, completely and accurately.
  - 3. Mark important additional information that was either shown schematically or omitted from original Drawings.
  - 4. Note Construction Change Directive numbers, alternate numbers, Change Order numbers, and similar identification, where applicable.
- B. Format: Identify and date each Record Drawing; include the designation "PROJECT RECORD DRAWING" in a prominent location.
  - 1. Record Prints: Organize Record Prints and newly prepared Record Drawings into manageable sets. Bind each set with durable paper cover sheets. Include identification on cover sheets.
  - 2. Identification: As follows:
    - a. Project name.
    - b. Date.
    - c. Designation "PROJECT RECORD DRAWINGS."
    - d. Name of Engineer.
    - e. Name of Contractor.



## **2.2 RECORD SPECIFICATIONS**

- A. Preparation: Mark Specifications to indicate the actual product installation where installation varies from that indicated in Specifications, addenda, and contract modifications.
1. Give particular attention to information on concealed products and installations that cannot be readily identified and recorded later.
  2. Mark copy with the proprietary name and model number of products, materials, and equipment furnished, including substitutions and product options selected.
  3. Record the name of manufacturer, supplier, Installer, and other information necessary to provide a record of selections made.
  4. For each principal product, indicate whether Record Product Data has been submitted in operation and maintenance manuals instead of submitted as Record Product Data.
  5. Note related Change Orders, Record Product Data, and Record Drawings where applicable.

## **2.3 RECORD PRODUCT DATA**

- A. Preparation: Mark Product Data to indicate the actual product installation where installation varies substantially from that indicated in Product Data submittal.
1. Give particular attention to information on concealed products and installations that cannot be readily identified and recorded later.
  2. Include significant changes in the product delivered to Project site and changes in manufacturer's written instructions for installation.
  3. Note related Change Orders, Record Specifications, and Record Drawings where applicable.

## **2.4 MISCELLANEOUS RECORD DOCUMENTS**

- A. Assemble miscellaneous records, programs and software as required by other Specification Sections for miscellaneous record keeping and submittal in connection with actual performance of the Work. Bind or file miscellaneous records and identify each, ready for continued use and reference.

### **PART 3 - EXECUTION**

#### **3.1 RECORDING AND MAINTENANCE**

- A. Recording: Maintain one copy of each submittal during the construction period for Project Record Document purposes. Post changes and modifications to Project Record Documents as they occur; do not wait until the end of Project.
- B. Maintenance of Record Documents: Store Record Documents in the field office apart from the Contract Documents used for construction. Do not use Project Record Documents for construction purposes. Maintain Record Documents in good order and in a clean, dry, legible condition, protected from deterioration and loss. Provide access to the Project Record Documents for the VA's Contracting Officer and Design Professional reference during normal working hours.

- - - END - - -

**SECTION 01 78 20**  
**OPERATION AND MAINTENANCE DATA**

**PART 1 - GENERAL**

**1.1 STIPULATIONS**

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Division 1 Specification Sections, apply to this Section.
- B. Related Sections include the following:
  - 1. Division 1 Section "Submittal Procedures" for submitting copies of submittals for operation and maintenance manuals.
  - 2. Division 1 Section "Closeout Procedures" for submitting operation and maintenance manuals.
  - 3. Division 1 Section "Project Record Documents" for preparing Record Drawings for operation and maintenance manuals.
  - 4. Divisions 26 and Division 28 Sections for specific requirements for operation and maintenance manuals in those sections.

**1.2 SUMMARY**

- A. This Section includes administrative and procedural requirements for preparing operation and maintenance manuals, including the following:
  - 1. Operation and maintenance documentation directory.
  - 2. Operation manuals for systems, subsystems, and equipment.
  - 3. Maintenance manuals for the care and maintenance of products, materials, and finishes and systems and equipment.

**1.3 DEFINITIONS**

- A. System: An organized collection of parts, equipment, or subsystems united by regular interaction.
- B. Subsystem: A portion of a system with characteristics similar to a system.

**1.4 SUBMITTALS**

- A. Initial Submittal: Submit 2 draft copies of each manual at least 15 days before requesting final inspection for Substantial Completion. Include a complete operation and maintenance directory. Design Professional will return one copy of draft and mark whether general scope and content of manual are acceptable.

1. Correct or modify each manual to comply with Design Professional's comments. Submit 3 final copies of each corrected manuals within 15 days after final acceptance by the VA's Contracting Officer and Design Professional.

## **1.5 COORDINATION**

- A. Where operation and maintenance documentation includes information on installations by more than one factory-authorized service representative, assemble and coordinate information furnished by representatives and prepare manuals.

## **PART 2 - PRODUCTS**

### **2.1 OPERATION AND MAINTENANCE DOCUMENTATION DIRECTORY**

- A. Organization: Include a section in the directory for each of the following:
  1. List of documents.
  2. List of systems.
  3. List of equipment.
  4. Table of contents.
- B. List of Systems and Subsystems: List systems alphabetically. Include references to operation and maintenance manuals that contain information about each system.
- C. List of Equipment: List equipment for each system, organized alphabetically by system. For pieces of equipment not part of system, list alphabetically in separate list.
- D. Tables of Contents: Include a table of contents for each emergency, operation, and maintenance manual.
- E. Identification: In the documentation directory and in each operation and maintenance manual, identify each system, subsystem, and piece of equipment with same designation used in the Contract Documents. If no designation exists, assign a designation according to ASHRAE Guideline 4, "Preparation of Operating and Maintenance Documentation for Building Systems."

### **2.2 MANUALS, GENERAL**

- A. Organization: Unless otherwise indicated, organize each manual into a separate section for each system and subsystem, and a separate section for each piece of equipment not part of a system. Each manual shall contain the following materials, in the order listed:

1. Title page.
  2. Table of contents.
  3. Manual contents.
- B. Title Page: Enclose title page in transparent plastic sleeve. Include the following information:
1. Subject matter included in manual.
  2. Name and address of Project.
  3. Name and address of Government Agency.
  4. Date of submittal.
  5. Name, address, and telephone number of Contractor.
  6. Name and address of Design Professional.
  7. Cross-reference to related systems in other operation and maintenance manuals.
- C. Table of Contents: List each product included in manual, identified by product name, indexed to the content of the volume, and cross-referenced to Specification Section number in Project Manual.
1. If operation or maintenance documentation requires more than one volume to accommodate data, include comprehensive table of contents for all volumes in each volume of the set.
- D. Manual Contents: Organize into sets of manageable size. Arrange contents alphabetically by system, subsystem, and equipment. If possible, assemble instructions for subsystems, equipment, and components of one system into a single binder.
1. Binders: Heavy-duty, 3-ring, vinyl-covered, loose-leaf binders, in thickness necessary to accommodate contents, sized to hold 8-1/2-by-11-inch paper; with clear plastic sleeve on spine to hold label describing contents and with pockets inside covers to hold folded oversize sheets.
    - a. If two or more binders are necessary to accommodate data of a system, organize data in each binder into groupings by subsystem and related components. Cross-reference other binders if necessary to provide essential information for proper operation or maintenance of equipment or system.
    - b. Identify each binder on front and spine, with printed title "OPERATION AND MAINTENANCE MANUAL," Project title or name, and subject matter of contents. Indicate volume number for multiple-volume sets.
  2. Dividers: Heavy-paper dividers with plastic-covered tabs for each section. Mark each tab to indicate contents. Include typed list of products and major components of equipment included in the section on each divider, cross-referenced to Specification Section number and title of Project Manual.
  3. Protective Plastic Sleeves: Transparent plastic sleeves designed to enclose programming and software diskettes for computerized electronic equipment.

4. Supplementary Text: Prepared on 8-1/2-by-11-inch white bond paper.
5. Drawings: Attach reinforced, punched binder tabs on drawings and bind with text.
  - a. If oversize drawings are necessary, fold drawings to same size as text pages and use as foldouts.
  - b. If drawings are too large to be used as foldouts, fold and place drawings in labeled envelopes and bind envelopes in rear of manual. At appropriate locations in manual, insert typewritten pages indicating drawing titles, descriptions of contents, and drawing locations.

## **2.3 OPERATION MANUALS**

- A. Content: In addition to requirements in this Section, include operation data required in individual Specification Sections and the following information:
  1. System, subsystem, and equipment descriptions.
  2. Performance and design criteria if Contractor is delegated design responsibility.
  3. Operating standards.
  4. Operating procedures.
  5. Operating logs.
  6. Wiring diagrams.
  7. Control diagrams.
  8. Piped system diagrams.
  9. Precautions against improper use.
  10. License requirements including inspection and renewal dates.
- B. Descriptions: Include the following:
  1. Product name and model number.
  2. Manufacturer's name.
  3. Equipment identification with serial number of each component.
  4. Equipment function.
  5. Operating characteristics.
  6. Limiting conditions.
  7. Performance curves.
  8. Engineering data and tests.
  9. Complete nomenclature and number of replacement parts.
- C. Operating Procedures: Include the following, as applicable:
  1. Startup and restoral procedures.
  2. Equipment or system break-in procedures.
  3. Routine and normal operating instructions.
  4. Regulation and control procedures.
  5. Instructions on stopping.
  6. Normal shutdown instructions.
  7. Seasonal and weekend operating instructions.
  8. Required sequences for electronic systems.
  9. Special operating instructions and procedures.

- D. Systems and Equipment Controls: Describe the sequence of operation, and diagram controls as installed.

#### **2.4 PRODUCT MAINTENANCE MANUAL**

- A. Content: Organize manual into a separate section for each product, material, and finish. Include source information, product information, maintenance procedures, repair materials and sources, and warranties and bonds, as described below.
- B. Source Information: List each product included in manual, identified by product name and arranged to match manual's table of contents. For each product, list name, address, and telephone number of Installer or supplier and maintenance service agent, and cross-reference Specification Section number and title in Project Manual.
- C. Product Information: Include the following, as applicable:
1. Product name and model number.
  2. Manufacturer's name.
  3. Reordering information for specially manufactured products.
- D. Maintenance Procedures: Include manufacturer's written recommendations and the following:
1. Inspection procedures.
  2. Types of cleaning agents to be used and methods of cleaning.
  3. List of cleaning agents and methods of cleaning detrimental to product.
  4. Schedule for routine testing and maintenance.
  5. Repair instructions.
- E. Repair Materials and Sources: Include lists of materials and local sources of materials and related services.
- F. Warranties and Bonds: Include copies of all warranties and bonds and lists of circumstances and conditions that would affect validity of warranties or bonds.
1. Include procedures to follow and required notifications for warranty claims.

#### **2.5 SYSTEMS AND EQUIPMENT MAINTENANCE MANUAL**

- A. Content: For each system, subsystem, and piece of equipment not part of a system, include source information, manufacturers' maintenance documentation, maintenance procedures, maintenance and service schedules, spare parts list and source information, maintenance service contracts, and warranty and bond information, as described below.
- B. Source Information: List each system, subsystem, and piece of equipment included in manual, identified by product name and arranged

to match manual's table of contents. For each product, list name, address, and telephone number of Installer or supplier and maintenance service agent, and cross-reference Specification Section number and title in Project Manual.

- C. Manufacturers' Maintenance Documentation: Manufacturers' maintenance documentation including the following information for each component part or piece of equipment:
1. Standard printed maintenance instructions and bulletins.
  2. Drawings, diagrams, and instructions required for maintenance, including disassembly and component removal, replacement, and assembly.
  3. Identification and nomenclature of parts and components.
  4. List of items recommended to be stocked as spare parts.
- D. Maintenance Procedures: Include the following information and items that detail essential maintenance procedures:
1. Test and inspection instructions.
  2. Troubleshooting guide.
  3. Precautions against improper maintenance.
  4. Disassembly; component removal, repair, and replacement; and reassembly instructions.
  5. Aligning, adjusting, and checking instructions.
  6. Demonstration and training videotape, if available.
- E. Maintenance and Service Schedules: Include service and lubrication requirements, list of required lubricants for equipment, and separate schedules for preventive and routine maintenance and service with standard time allotment.
1. Scheduled Maintenance and Service: Tabulate actions for daily, weekly, monthly, quarterly, semiannual, and annual frequencies.
  2. Maintenance and Service Record: Include manufacturers' forms for recording maintenance.
- F. Spare Parts List and Source Information: Include lists of replacement and repair parts, with parts identified and cross-referenced to manufacturers' maintenance documentation and local sources of maintenance materials and related services.
- G. Maintenance Service Contracts: Include copies of maintenance agreements with name and telephone number of service agent.
- H. Warranties and Bonds: Include copies of warranties and bonds and lists of circumstances and conditions that would affect validity of warranties or bonds.
1. Include procedures to follow and required notifications for warranty claims.



### **PART 3 - EXECUTION**

#### **3.1 MANUAL PREPARATION**

- A. Operation and Maintenance Documentation Directory: Prepare a separate manual that provides an organized reference to emergency, operation, and maintenance manuals.
- B. Product Maintenance Manual: Assemble a complete set of maintenance data indicating care and maintenance of each product, material, and finish incorporated into the Work.
- C. Operation and Maintenance Manuals: Assemble a complete set of operation and maintenance data indicating operation and maintenance of each system, subsystem, and piece of equipment not part of a system.
  - 1. Engage a factory-authorized service representative to assemble and prepare information for each system, subsystem, and piece of equipment not part of a system.
  - 2. Prepare a separate manual for each system and subsystem, in the form of an instructional manual for use by Government's operating personnel.
- D. Manufacturers' Data: Where manuals contain manufacturers' standard printed data, include only sheets pertinent to product or component installed. Mark each sheet to identify each product or component incorporated into the Work. If data include more than one item in a tabular format, identify each item using appropriate references from the Contract Documents. Identify data applicable to the Work and delete references to information not applicable.
  - 1. Prepare supplementary text if manufacturers' standard printed data are not available and where the information is necessary for proper operation and maintenance of equipment or systems.
- E. Drawings: Prepare drawings supplementing manufacturers' printed data to illustrate the relationship of component parts of equipment and systems and to illustrate control sequence and flow diagrams. Coordinate these drawings with information contained in Record Drawings to ensure correct illustration of completed installation.
  - 1. Do not use original Project Record Documents as part of operation and maintenance manuals.
  - 2. Comply with requirements of newly prepared Record Drawings in Division 1 Section "Project Record Documents."
- F. Comply with Division 1 Section "Closeout Procedures" for schedule for submitting operation and maintenance documentation.

- - - END - - -

VA Project No. 642-12-110  
AE Works Project No. 12030

Philadelphia VAMC  
Rekey VA Medical Center  
Bid Documents

**SECTION 01 81 11**  
**SUSTAINABLE DESIGN REQUIREMENTS**

**PART 1 - GENERAL**

**1.1 SUMMARY**

- A. This Section describes general requirements and procedures to comply with the Guiding Principles for Leadership in High Performance and Sustainable Buildings Memorandum of Understanding incorporated in the Executive Orders 13423 and 13514; Energy Policy Act of 2005 (EPA 2005) and the Energy Independence and Security Act of 2007 (EISA 2007).

**1.2 OBJECTIVES**

- A. To maximize resource efficiency and reduce the environmental impacts of construction and operation, the Contractor during the construction phase of this project shall implement the following procedures:
1. Select products that minimize consumption of energy, water and non-renewable resources, while minimizing the amounts of pollution resulting from the production and employment of building technologies. It is the intent of this project to conform with EPA's Five Guiding Principles on environmentally preferable purchasing. The five principles are:
    - a. Include environmental considerations as part of the normal purchasing process.
    - b. Emphasize pollution prevention early in the purchasing process.
    - c. Examine multiple environmental attributes throughout a product's or service's life cycle.
    - d. Compare relevant environmental impacts when selecting products and services.
    - e. Collect and base purchasing decisions on accurate and meaningful information about environmental performance.
  2. Control sources for potential Indoor Air Quality (IAQ) pollutants by controlled selection of materials and processes used in project construction in order to attain superior IAQ.
  3. Products and processes that achieve the above objectives to the extent currently possible and practical have been selected and included in these Construction Documents. The Contractor is

responsible to maintain and support these objectives in developing means and methods for performing the work of this Contract and in proposing product substitutions and/or changes to specified processes.

4. Use building practices that insure construction debris and particulates do not contaminate or enter duct work prior to system startup and turn over.

### **1.3 RELATED DOCUMENTS**

- A. Section 01 74 19 CONSTRUCTION WASTE MANAGEMENT
- B. Section 01 81 09 TESTING FOR INDOOR AIR QUALITY (not written yet)
- C. Section 01 91 00 GENERAL COMMISSIONING REQUIREMENTS

### **1.4 DEFINITIONS**

- A. Agrifiber Products: Composite panel products derived from agricultural fiber
- B. Biobased Product: As defined in the 2002 Farm Bill, a product determined by the Secretary to be a commercial or industrial product (other than food or feed) that is composed, in whole or in significant part, of biological products or renewable domestic agricultural materials (including plant, animal, and marine materials) or forestry materials
- C. Biobased Content: The weight of the biobased material divided by the total weight of the product and expressed as a percentage by weight.
- D. Certificates of Chain-of-Custody: Certificates signed by manufacturers certifying that wood used to make products has been tracked through its extraction and fabrication to ensure that it was obtained from forests certified by a specified certification program.
- E. Composite Wood: A product consisting of wood fiber or other plant particles bonded together by a resin or binder.

- F. Construction and Demolition Waste: Includes solid wastes, such as building materials, packaging, rubbish, debris, and rubble resulting from construction, remodeling, repair and demolition operations. A construction waste management plan is to be provided by the Contractor as defined in Section 01 74 19.
- G. Third Party Certification: Certification of levels of environmental achievement by nationally recognized sustainability rating system.
- H. Light Pollution: Light that extends beyond its source such that the additional light is wasted in an unwanted area or in an area where it inhibits view of the night sky.
- I. Recycled Content Materials: Products that contain pre-consumer or post-consumer materials as all or part of their feedstock.
- II.
- J. Post-Consumer Recycled Content: The percentage by weight of constituent materials that have been recovered or otherwise diverted from the solid-waste stream after consumer use.
- K. Pre-Consumer Recycled Content: Materials that have been recovered or otherwise diverted from the solid-waste stream during the manufacturing process. Pre-consumer content must be material that would not have otherwise entered the waste stream as per Section 5 of the FTC Act, Part 260 "Guidelines for the Use of Environmental Marketing Claims": [www.ftc.gov/bcp/grnrule/guides980427](http://www.ftc.gov/bcp/grnrule/guides980427).
- L. Regional Materials: Materials that are extracted, harvested, recovered, and manufactured within a radius of 250 miles (400 km) from the Project site.
- M. Salvaged or Reused Materials: Materials extracted from existing buildings in order to be reused in other buildings without being manufactured.

- N. Sealant: Any material that fills and seals gaps between other materials
- O. Type 1 Finishes: Materials and finishes which have a potential for short-term levels of off gassing from chemicals inherent in their manufacturing process, or which are applied in a form requiring vehicles or carriers for spreading which release a high level of particulate matter in the process of installation and/or curing.
- P. Type 2 Finishes: "Fuzzy" materials and finishes which are woven, fibrous, or porous in nature and tend to adsorb chemicals offgas.
- Q. Volatile Organic Compounds (VOCs): Any compound of carbon, excluding carbon monoxide, carbon dioxide, carbonic acid, metallic carbides or carbonates, and ammonium carbonate, which participates in atmospheric photochemical reactions. Compounds that have negligible photochemical reactivity, listed in EPA 40 CFR 51.100(s), are also excluded from this regulatory definition.

#### **1.5 SUBMITTALS**

- A. Sustainable Design Submittals:
  - 1. Appliances and Equipment: Provide copies of manufacturer's product data for all Energy Star eligible equipment and appliances, including office equipment, computers and printers, electronics, and commercial food service equipment (excluding HVAC and lighting components), verifying compliance with EPA's Energy Star program.
  - 2. Measurement and Verification Systems: Provide cut sheets and manufacturer's product data for all controls systems, highlighting electrical metering and trending capability components.
  - 3. Salvaged or Reused Materials: Provide documentation that lists each salvaged or reused material, the source or vendor of the material, the purchase price, and the replacement cost if greater than the purchase price.
  - 4. Recycled Content: Submittals for all materials with recycled content (excluding MEP systems equipment and components) must include the following documentation: Manufacturer's product data, product literature, or a letter from the manufacturer verifying the

- percentage of post-consumer and pre-consumer recycled content (by weight) of each material or product
- a. An electronic spreadsheet that tabulates the Project's total materials cost and combined recycled content value (defined as the sum of the post-consumer recycled content value plus one-half of the pre-consumer recycled content value) expressed as a percentage of total materials cost. This spreadsheet shall be submitted every third month with the Contractor's Certificate and Application for Payment. It should indicate, on an ongoing basis, line items for each material, including cost, pre-consumer recycled content, post-consumer recycled content, and combined recycled content value.
5. Regional Materials: Submittals for all products or materials expected to contribute to the regional calculation (excluding MEP systems equipment and components) must include the following documentation:
- a. Cost of each material or product, excluding cost of labor and equipment for installation
  - b. Location of product manufacture and distance from point of manufacture to the Project Site
  - c. Location of point of extraction, harvest, or recovery for each raw material in each product and distance from the point of extraction, harvest, or recovery to the Project Site
  - d. Manufacturer's product data, product literature, or a letter from the manufacturer verifying the location and distance from the Project Site to the point of manufacture for each regional material
  - e. Manufacturer's product data, product literature, or a letter from the manufacturer verifying the location and distance from the Project Site to the point of extraction, harvest, or recovery for each regional material or product, including, at a minimum, gravel and fill, planting materials, concrete, masonry, and GWB
  - f. An electronic spreadsheet that tabulates the Project's total materials cost and regional materials value, expressed as a percentage of total materials cost. This spreadsheet shall be submitted every third month with the Contractor's Certificate and

Application for Payment. It should indicate on an ongoing basis, line items for each material, including cost, location of manufacture, distance from manufacturing plant to the Project Site, location of raw material extraction, and distance from extraction point to the Project Site.

6. Interior Adhesives and Sealants: Submittals for all field-applied adhesives and sealants, which have a potential impact on indoor air, must include manufacturer's MSDSs or other Product Data highlighting VOC content.
    - a. Provide manufacturers' documentation verifying all adhesives used to apply laminates, whether shop-applied or field-applied, contain no urea-formaldehyde.
  7. Interior Paints and Coatings: Submittals for all field-applied paints and coatings, which have a potential impact on indoor air, must include manufacturer's MSDSs or other Product Data highlighting VOC content
  8. Exterior Paints and Coatings: Submittals for all field-applied paints and coatings, which have a potential impact on ambient air quality, must include manufacturer's MSDSs or other manufacturer's Product Data highlighting VOC content.
  9. Mercury in Lighting: Provide manufacturer's cut sheets or product data for all fluorescent or HID lamps highlighting mercury content.
  10. Lighting Controls: Provide manufacturer's cut sheets and shop drawing documentation highlighting all lighting controls systems components.
- B. Project Materials Cost Data: Provide a spreadsheet in an electronic file indicating the total cost for the Project and the total cost of building materials used for the Project, as follows:
1. Not more than 60 days after the Preconstruction Meeting, the General Contractor shall provide to the Owner and Architect a preliminary schedule of materials costs for all materials used for the Project organized by specification section. Exclude labor costs and all mechanical, electrical, and plumbing (MEP) systems materials and labor costs. Include the following:



- a. Identify each reused or salvaged material, its cost, and its replacement value.
  - b. Identify each recycled-content material, its post-consumer and pre-consumer recycled content as a percentage the product's weight, its cost, its combined recycled content value (defined as the sum of the post-consumer recycled content value plus one-half of the pre-consumer recycled content value), and the total combined recycled content value for all materials as a percentage of total materials costs.
  - c. Identify each regional material, its cost, its manufacturing location, the distance of this location from the Project site, the source location for each raw material component of the material, the distance of these extraction locations from the Project site, and the total value of regional materials as a percentage of total materials costs.
  - d. Identify each biobased material, its source, its cost, and the total value of biobased materials as a percentage of total materials costs. Also provide the total value of rapidly renewable materials (materials made from plants that are harvested in less than a 10-year cycle) as a percentage of total materials costs.
  - e. Identify each wood-based material, its cost, the total wood-based materials cost, each FSC Certified wood material, its cost, and the total value of Certified wood as a percentage of total wood-based materials costs.
2. Provide final versions of the above spreadsheets to the Owner and Architect not more than 14 days after Substantial Completion.

C. Construction Waste Management: See Section 01 74 19 "Construction Waste Management" for submittal requirements.

#### **1.6 QUALITY ASSURANCE**

- A. Preconstruction Meeting: After award of Contract and prior to the commencement of the Work, schedule and conduct meeting with Owner, Architect, and all Subcontractors to discuss the Construction Waste Management Plan, the required Construction Indoor Air Quality (IAQ)

Management Plan, and all other Sustainable Design Requirements. The purpose of this meeting is to develop a mutual understanding of the Project's Sustainable Design Requirements and coordination of the Contractor's management of these requirements with the Contracting Officer and the Construction Quality Manager.

- B. Construction Job Conferences: The status of compliance with the Sustainable Design Requirements of these specifications will be an agenda item at all regular job meetings conducted during the course of work at the site.

## **PART 2 - PRODUCTS**

### **2.1 PRODUCT ENVIRONMENTAL REQUIREMENTS**

A. Exterior Lighting Fixtures:

1. All exterior luminaires must emit 0% of the total initial designed fixture lumens at an angle above 90° from nadir and/or meet the requirements of the Dark Sky certification program.
2. Exterior lighting cannot exceed 80% of the lighting power densities defined by ASHRAE/IESNA Standard 90.1-2004, Exterior Lighting Section, without amendments.
3. No lighting of building facades or landscape features is permitted.

- B. Appliances and Equipment: All materials and equipment being installed that falls under the Energy Star or FEMP programs must be Energy Star or FEMP-rated. Eligible equipment includes refrigerators, motors, laundry equipment, office equipment and more. Refer to each program's website for a complete list.

- C. Salvaged or Reused materials: There shall be no substitutions for specified salvaged and reused materials and products.

1. Salvaged materials: Use of salvaged materials reduces impacts of disposal and manufacturing of replacements.

D. Recycled Content of Materials:

1. Provide building materials with recycled content such that post-consumer recycled content value plus half the pre-consumer recycled content value constitutes a minimum of 30% of the cost of materials

used for the Project, exclusive of all MEP equipment, labor, and delivery costs. The Contractor shall make all attempts to maximize the procurement of materials with recycled content.

- a. e post-consumer recycled content value of a material shall be determined by dividing the weight of post-consumer recycled content by the total weight of the material and multiplying by the cost of the material.
- b. Do not include mechanical and electrical components in the calculations.
- c. Do not include labor and delivery costs in the calculations.
- d. Recycled content of materials shall be defined according to the Federal Trade Commission's "Guide for the Use of Environmental Marketing Claims," 16 CFR 260.7 (e).
- e. Utilize all on-site existing paving materials that are scheduled for demolition as granulated fill, and include the cost of this material had it been purchased in the calculations for recycled content value.
- f. The materials in the following list must contain the minimum recycled content indicated:

Category	Minimum Recycled Content
Compost/mulch	100% post-consumer
Asphaltic Concrete Paving	25% post-consumer
Cast-in-Place Concrete	6% pre-consumer
CMU: Gray Block	20% pre-consumer
Steel Reinforcing Bars	90% combined
Structural Steel Shapes	90% combined
Steel Joists	75% combined
Steel Deck	75% combined
Steel Fabrications	60% combined
Steel Studs	30% combined
Steel Roofing	30% post-consumer

VA Project No. 642-12-110  
AE Works Project No. 12030

Philadelphia VAMC  
Rekey VA Medical Center  
Bid Documents

Aluminum Fabrications	35% combined
Rigid Insulation	20% pre-consumer
Batt insulation	30% combined

E. Biobased Content:

1. For products designated by the USDA's BioPreferred program, provide products that meet or exceed USDA recommendations for biobased content, so long as products meet all other performance requirements in VA master specifications. For more information regarding the product categories covered by the BioPreferred program, visit <http://www.biopreferred.gov>

**PART 3 - EXECUTION (Not Used)**

- - - E N D - - -

VA Project No. 642-12-110  
AE Works Project No. 12030

Philadelphia VAMC  
Rekey VA Medical Center  
Bid Documents

**07 84 00**  
**FIRE-STOPPING**

**PART 1 - GENERAL**

**1.1 STIPULATIONS**

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Division 1 Specification Sections, apply to this Section.
- B. Related Sections include the following:
  - 1. Division 1 Section "Submittal Procedures" for submitting copies of submittals for penetration fire-stopping requirements.
  - 2. Division 1 Section "Closeout Procedures" for general closeout procedures.
  - 3. Divisions 26 and Division 28 Sections for specific requirements for penetration fire-stopping in those Sections.

**1.2 SUMMARY**

- A. This Section includes through-penetration fire-stop systems for penetrations through the following fire-resistance-rated assemblies, including both empty openings and openings containing penetrating items:
  - 1. Floors.
  - 2. Roofs.
  - 3. Walls and partitions.
  - 4. Smoke barriers.
  - 5. Construction enclosing compartmentalized areas.

**1.3 PERFORMANCE REQUIREMENTS**

- A. General: For the following constructions, provide through-penetration fire-stop systems that are produced and installed to resist spread of fire according to requirements indicated, resist passage of smoke and other gases, and maintain original fire-resistance rating of assembly penetrated.
  - 1. All interior partitions and exterior back-up walls
  - 2. Fire and smoke rated walls.
  - 3. Fire-resistance-rated floor assemblies.
- B. F-Rated Systems: Provide through-penetration fire-stop systems with F-ratings indicated, as determined per ASTM E 814, but not less than that equaling or exceeding fire-resistance rating of constructions penetrated.

- C. T-Rated Systems: For the following conditions, provide through-penetration fire-stop systems with T-ratings indicated, as well as F-ratings, as determined per ASTM E 814, where systems protect penetrating items exposed to potential contact with adjacent materials in occupied floor areas:
1. Penetrations located outside wall cavities.
  2. Penetrations located outside fire-resistive shaft enclosures.
  3. Penetrations located in construction containing fire-protection-rated openings.
  4. Penetrating items larger than 4-inch diameter nominal pipe or 16 sq. in. in overall cross-sectional area.
- D. For through-penetration fire-stop systems exposed to view, traffic, moisture, and physical damage, provide products that after curing does not deteriorate when exposed to these conditions both during and after construction.
1. For piping penetrations for plumbing and wet-pipe sprinkler systems, provide moisture-resistant through-penetration fire-stop systems.
  2. For floor penetrations with annular spaces exceeding 4 inches in width and exposed to possible loading and traffic, provide fire-stop systems capable of supporting floor loads involved either by installing floor plates or by other means.
  3. For penetrations involving insulated piping, provide through-penetration fire-stop systems not requiring removal of insulation.
- E. For through-penetration fire-stop systems exposed to view, provide products with flame-spread ratings of less than 25 and smoke-developed ratings of less than 450, as determined per ASTM E 84.

#### 1.4 SUBMITTALS

- A. Product Data: For each type of through-penetration fire-stop system products.
- B. Shop Drawings: For each through-penetration fire-stop system, show each kind of construction condition penetrated, relationships to adjoining construction, and kind of penetrating item. Include fire-stop design designation of testing and inspecting agency acceptable to authorities having jurisdiction that evidences compliance with requirements for each condition indicated.
1. Submit documentation, including illustrations, from a qualified testing and inspecting agency that is applicable to each through-penetration fire-stop system configuration for construction and penetrating items.
  2. Contractor shall submit illustrations to suit each typical through-penetration fire-stop condition, submit product data and samples to illustrate each condition.



3. Project's local Fire Marshall shall approve submission prior to it being sent to Design Professional
- C. Qualification Data: For Installer. Include lists of completed projects with project names and addresses, names and addresses of Architect's and Owner's, and other information specified.
- D. Product Certificates: Signed by manufacturers of through-penetration fire-stop system products certifying that products furnished comply with requirements.
- E. Product Test Reports: From a qualified testing agency indicating through-penetration fire-stop system complies with requirements, based on comprehensive testing of current products.

#### 1.5 QUALITY ASSURANCE

- A. Installer Qualifications: An experienced installer who is qualified by having the necessary experience, staff, and training to install manufacturer's products per specified requirements. A manufacturer's willingness to sell its through-penetration fire-stop system products to Contractor or to an installer engaged by Contractor does not in itself confer qualification on buyer.
- B. Source Limitations: Obtain through-penetration fire-stop systems, for each kind of penetration and construction condition indicated, from a single manufacturer.
- C. Fire-Test-Response Characteristics: Provide through-penetration fire-stop systems that comply with the following requirements and those specified in "Performance Requirements" Article:
  1. Fire-stopping tests are performed by a qualified testing and inspecting agency. A qualified testing and inspecting agency is UL, or another agency performing testing and follow-up inspection services for fire-stop systems acceptable to authorities having jurisdiction.
  2. Through-penetration fire-stop systems are identical to those tested per ASTM E 814. Provide rated systems complying with the following requirements:
    - a. Through-penetration fire-stop system products bear classification marking of qualified testing and inspecting agency.
    - b. Through-penetration fire-stop systems correspond to those indicated by reference to through-penetration fire-stop system designations listed by the following:
      - 1) UL in its "Fire Resistance Directory."

## **1.6 DELIVERY, STORAGE, AND HANDLING**

- A. Deliver through-penetration fire-stop system products to Project site in original, unopened containers or packages with intact and legible manufacturers' labels identifying product and manufacturer; date of manufacture; lot number; shelf life, if applicable; qualified testing and inspecting agency's classification marking applicable to Project; curing time; and mixing instructions for multicomponent materials.
- B. Store and handle materials for through-penetration fire-stop systems to prevent their deterioration or damage due to moisture, temperature changes, contaminants, or other causes.

## **1.7 PROJECT CONDITIONS**

- A. Environmental Limitations: Do not install through-penetration fire-stop systems when ambient or substrate temperatures are outside limits permitted by through-penetration fire-stop system manufacturers or when substrates are wet due to rain, frost, condensation, or other causes.
- B. Ventilate through-penetration fire-stop systems per manufacturer's written instructions by natural means or, where this is inadequate, forced-air circulation.

## **1.8 COORDINATION**

- A. Coordinate construction of openings and penetrating items to ensure that through-penetration fire-stop systems are installed according to specified requirements.
- B. Coordinate sizing of sleeves, openings, core-drilled holes, or cut openings to accommodate through-penetration fire-stop systems.
- C. Notify the VA's Contracting Officer and Design Professional at least seven days in advance of through-penetration fire-stop system installations; confirm dates and times on days preceding each series of installations.
- D. Do not cover up through-penetration fire-stop system installations that will become concealed behind other construction until inspection agency and Architect have reviewed each installation.

## **PART 2 - PRODUCTS**

### **2.1 PRODUCTS AND MANUFACTURERS**

- A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

1. A/D Fire Protection Systems Inc.
2. DAP Inc.
3. Fire-stop Systems Inc.
4. Hilti Construction Chemicals, Inc.
5. Nelson Fire-stop Products.
6. RectorSeal Corporation (The).
7. 3M Fire Protection Products.
8. Tremco.
9. United States Gypsum Company.
10. W.R. Grace

## **2.2 FIRE-STOPPING, GENERAL**

- A. Compatibility: Provide through-penetration fire-stop systems that are compatible with one another, with the substrates forming openings, and with the items, if any, penetrating through-penetration fire-stop systems, under conditions of service and application, as demonstrated by through-penetration fire-stop system manufacturer based on testing and field experience.
- B. Accessories: Provide components for each through-penetration fire-stop system that are needed to install fill materials and to comply with "Performance Requirements" Article. Use only components specified by through-penetration fire-stop system manufacturer and approved by the qualified testing and inspecting agency for fire-stop systems indicated. Accessories include, but are not limited to, the following items:
  1. Permanent forming/damming/backing materials, including the following:
    - a. Slag-/rock-wool-fiber insulation.
    - b. Sealants used in combination with other forming, damming, backing materials to prevent leakage of fill materials in liquid state.
    - c. Fire-rated form board.
    - d. Fillers for sealants.
    - e. Temporary forming materials.
    - f. Substrate primers.
    - g. Collars.
    - h. Steel sleeves.

## **2.3 FILL MATERIALS**

- A. General: Provide through-penetration fire-stop systems containing the types of fill materials indicated in the Through-Penetration Fire-stop System Schedule at the end of Part 3 by reference to the types of materials described in this Article. Fill materials are those referred to in directories of the referenced testing and inspecting agencies as fill, void, or cavity materials

- B. Cast-in-Place Fire-stop Devices: Factory-assembled devices for use in cast-in-place concrete floors and consisting of an outer metallic sleeve lined with an intumescent strip, a radial extended flange attached to one end of the sleeve for fastening to concrete formwork, and a neoprene gasket.
- C. Latex Sealants: Single-component latex formulations that after cure do not re-emulsify during exposure to moisture.
- D. Fire-stop Devices: Factory-assembled collars formed from galvanized steel and lined with intumescent material sized to fit specific diameter of penetrant.
- E. Intumescent Composite Sheets: Rigid panels consisting of aluminum-foil-faced elastomeric sheet bonded to galvanized steel sheet.
- F. Intumescent Putties: Non-hardening dielectric, water-resistant putties containing no solvents, inorganic fibers, or silicone compounds.
- G. Intumescent Wrap Strips: Single-component intumescent elastomeric sheets with aluminum foil on one side.
- H. Mortars: Prepackaged, dry mixes consisting of a blend of inorganic binders, hydraulic cement, fillers, and lightweight aggregate formulated for mixing with water at Project site to form a non-shrinking, homogeneous mortar.
- I. Pillows/Bags: Reusable, heat-expanding pillows/bags consisting of glass-fiber cloth cases filled with a combination of mineral-fiber, water-insoluble expansion agents and fire-retardant additives.
- J. Silicone Foams: Multicomponent, silicone-based liquid elastomers that, when mixed, expand and cure in place to produce a flexible, non-shrinking foam.
- K. Silicone Sealants: Moisture-curing, single-component, silicone-based, neutral-curing elastomeric sealants of grade indicated below:
  - 1. Grade: Pourable (self-leveling) formulation for openings in floors and other horizontal surfaces and non-sag formulation for openings in vertical and other surfaces requiring a non-slumping, gunnable sealant, unless indicated fire-stop system limits use to non-sag grade for both opening conditions.
- L. Intumescent Acrylic Sealant: Fire-stop sealant that expands when exposed to heat. Protects penetrations containing combustible and non-combustible penetrants.
- M. Foam "Sponge-Like" Blocks: Re-penetrable intumescent blocks that may be friction fit, deformed, or cut to fit in through penetration openings.
- N. Polyurethane Foam: Two-part, expanding, intumescent polyurethane foam. Foam shall be dispensed from a coaxial tube through a mixing nozzle

such that the two components are mixed thoroughly and in the proper proportions

## **2.4 MIXING**

- A. For those products requiring mixing before application, comply with through-penetration fire-stop system manufacturer's written instructions for accurate proportioning of materials, water (if required), type of mixing equipment, selection of mixer speeds, mixing containers, mixing time, and other items or procedures needed to produce products of uniform quality with optimum performance characteristics for application indicated.

## **PART 3 - EXECUTION**

### **3.1 EXAMINATION**

- A. Examine substrates and conditions, with Installer present, for compliance with requirements for opening configurations, penetrating items, substrates, and other conditions affecting performance.
- B. Proceed with installation only after unsatisfactory conditions have been corrected.

### **3.2 PREPARATION**

- A. Surface Cleaning: Clean out openings immediately before installing through-penetration fire-stop systems to comply with written recommendations of fire-stop system manufacturer and the following requirements:
  - 1. Remove from surfaces of opening substrates and from penetrating items foreign materials that could interfere with adhesion of through-penetration fire-stop systems.
  - 2. Clean opening substrates and penetrating items to produce clean, sound surfaces capable of developing optimum bond with through-penetration fire-stop systems. Remove loose particles remaining from cleaning operation.
  - 3. Remove laitance and form-release agents from concrete.
  - 4. Remove oil from steel decking.
- B. Priming: Prime substrates where recommended in writing by through-penetration fire-stop system manufacturer using that manufacturer's recommended products and methods. Confine primers to areas of bond; do not allow spillage and migration onto exposed surfaces.
- C. Masking Tape: Use masking tape to prevent through-penetration fire-stop systems from contacting adjoining surfaces that will remain exposed on completion of Work and that would otherwise be permanently

stained or damaged by such contact or by cleaning methods used to remove smears from fire-stop system materials. Remove tape as soon as possible without disturbing firestop system's seal with substrates.

### **3.3 THROUGH-PENETRATION FIRE-STOP SYSTEM INSTALLATION**

- A. General: Install through-penetration fire-stop systems to comply with "Performance Requirements" Article and fire-stop system manufacturer's written installation instructions and published drawings for products and applications indicated.
- B. Install forming/damming/backing materials and other accessories of types required to support fill materials during their application and in the position needed to produce cross-sectional shapes and depths required to achieve fire ratings indicated.
  - 1. After installing fill materials, remove combustible forming materials and other accessories not indicated as permanent components of fire-stop systems.
- C. Install fill materials for fire-stop systems by proven techniques to produce the following results:
  - 1. Fill voids and cavities formed by openings, forming materials, accessories, and penetrating items as required to achieve fire-resistance ratings indicated.
  - 2. Apply materials so they contact and adhere to substrates formed by openings and penetrating items.
  - 3. For fill materials that will remain exposed after completing Work, finish to produce smooth, uniform surfaces that are flush with adjoining finishes.

### **3.4 IDENTIFICATION**

- A. Identify through-penetration fire-stop systems with preprinted metal or plastic labels. Attach labels permanently to surfaces adjacent to and within 6 inches of edge of the fire-stop system so that labels will be visible to anyone seeking to remove penetrating items or fire-stop system or according to requirements of authority have jurisdiction.
- B. Include the following information on the labels:
  - 1. The words "Warning - Through-Penetration Fire-stop System - Do Not Disturb. Notify Building Management of Any Damage."
  - 2. Contractor's name, address, and phone number.
  - 3. Through-penetration fire-stop system designation of applicable testing and inspecting agency.
  - 4. Date of installation.
  - 5. Through-penetration fire-stop system manufacturer's name.
  - 6. Installer's name.

### **3.5 FIELD QUALITY CONTROL**

- A. Inspection: By Local Fire Marshall, VA's Contracting Officer and Design Professional to review all through-penetration fire-stop systems.
- B. Proceed with enclosing through-penetration fire-stop systems with other construction only after review.
- C. Where deficiencies are found, repair or replace through-penetration fire-stop systems so they comply with requirements.

### **3.6 CLEANING AND PROTECTION**

- A. Clean off excess fill materials adjacent to openings as Work progresses by methods and with cleaning materials that are approved in writing by through-penetration fire-stop system manufacturers and that do not damage materials in which openings occur.
- B. Provide final protection and maintain conditions during and after installation that ensure through-penetration fire-stop systems are without damage or deterioration at time of Substantial Completion. If, despite such protection, damage or deterioration occurs, cut out and remove damaged or deteriorated through-penetration fire-stop systems immediately and install new materials to produce through-penetration fire-stop systems complying with specified requirements.

### **3.7 THROUGH-PENETRATION FIRE-STOP SYSTEM SCHEDULE**

- A. Where UL-classified systems are indicated, they refer to the alpha-alpha-numeric designations listed in UL's "Fire Resistance Directory" under Category XHEZ.
- B. Fire-stop Systems For Wall Tops: Comply with the following:
  - 1. UL-Classified Systems: Provide USG Therma-fiber mineral wool or Hilti's No. CP 777 "Speed Plugs" or No. CP767 "Fire-stop Joint Strips" packed tightly in decking voids from both sides. Continuously seal mineral wool to all walls and to decking above using 3M Fire-dam Spray, Hilti Speed Spray or USG Fire-code "A" spray acrylic sealant.
- C. Fire-stop Systems for Metallic Pipes, Conduit, or Tubing: Comply with the following:
  - 1.
  - 2. Available UL-Classified Systems that seal penetrating item at both wall faces.
  - 3. Type of Fill Materials: One or more of the following:
    - a. Latex sealant.
    - b. Silicone sealant.
    - c. Intumescent putty.

- d. Mortar around pipe sleeve with fire-stopping in the annular space.
- D. Fire-stop Systems for Nonmetallic Pipe, Conduit, or Tubing: Comply with the following:
- 1. Available UL-Classified Systems that seal wall or floor openings left by melted piping.
  - 2. Type of Fill Materials: One or more of the following:
    - a. Latex sealant.
    - b. Silicone sealant.
    - c. Intumescent putty.
    - d. Intumescent wrap strips.
    - e. Fire-stop device.
    - f. Fire-stop Systems for Electrical Cables: Comply with the following:
      - 1) Available UL-Classified Systems that are packed tightly around single cable or bundle of cables inside wall opening and extending to both wall faces.
      - 2) Type of Fill Materials: One or more of the following:
        - a) Latex sealant.
        - b) Silicone sealant.
        - c) Intumescent putty.
        - d) Silicone foam.
- E. Fire-stop Systems for Cable Trays: Comply with the following:
- 1. Available UL-Classified Systems that are packed tightly around cable-tray-supported single cable or bundle of cables inside wall opening and extending to both wall faces.
  - 2. Type of Fill Materials: One or more of the following:
    - a. Latex sealant.
    - b. Intumescent putty.
    - c. Silicone foam.
    - d. Pillows/bags.
- F. Fire-stop Systems for Insulated Pipes: Comply with the following:  
Comply with the following:
- 1. Available UL-Classified Systems that seal penetrating pipe (substitute foam glass insulation as necessary) at both wall faces.
  - 2. Type of Fill Materials: One or more of the following:
    - a. Latex sealant.
    - b. Silicone sealant.
    - c. Intumescent putty.
    - d. Mortar around pipe sleeve with fire-stopping in the annular space.

- - - END - - -



**SECTION 087100**  
**DOOR HARDWARE**

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this Section.

1.2 SUMMARY

- A. This Section includes commercial door hardware for the following:
  - 1. Swinging doors.
  - 2. Sliding doors.
  - 3. Other doors to the extent indicated.
- B. Door hardware includes, but is not necessarily limited to, the following:
  - 1. Mechanical door hardware.
  - 2. Cylinders specified for doors in other sections.
- C. Related Sections:
- D. Codes and References: Comply with the version year adopted by the Authority Having Jurisdiction.
  - 1. ANSI A117.1 - Accessible and Usable Buildings and Facilities.
  - 2. ICC/IBC - International Building Code.
  - 3. NFPA 80 - Fire Doors and Windows.
  - 4. NFPA 101 - Life Safety Code.
  - 5. NFPA 105 - Installation of Smoke Door Assemblies.
  - 6. State Building Codes, Local Amendments.
- E. Standards: All hardware specified herein shall comply with the following industry standards:
  - 1. ANSI/BHMA Certified Product Standards - A156 Series
  - 2. UL10C - Positive Pressure Fire Tests of Door Assemblies

1.3 SUBMITTALS

- A. Product Data: Manufacturer's product data sheets including installation details, material descriptions, dimensions of individual components and profiles, operational descriptions and finishes.

- B. Door Hardware Schedule: Prepared by or under the supervision of supplier, detailing fabrication and assembly of door hardware, as well as procedures and diagrams. Coordinate the final Door Hardware Schedule with doors, frames, and related work to ensure proper size, thickness, hand, function, and finish of door hardware.
1. Format: Comply with scheduling sequence and vertical format in DHI's "Sequence and Format for the Hardware Schedule."
  2. Organization: Organize the Door Hardware Schedule into door hardware sets indicating complete designations of every item required for each door or opening. Organize door hardware sets in same order as in the Door Hardware Sets at the end of Part 3. Submittals that do not follow the same format and order as the Door Hardware Sets will be rejected and subject to resubmission.
  3. Content: Include the following information:
    - a. Type, style, function, size, label, hand, and finish of each door hardware item.
    - b. Manufacturer of each item.
    - c. Fastenings and other pertinent information.
    - d. Location of door hardware set, cross-referenced to Drawings, both on floor plans and in door and frame schedule.
    - e. Explanation of abbreviations, symbols, and codes contained in schedule.
    - f. Mounting locations for door hardware.
    - g. Door and frame sizes and materials.
  4. Submittal Sequence: Submit the final Door Hardware Schedule at earliest possible date, particularly where approval of the Door Hardware Schedule must precede fabrication of other work that is critical in the Project construction schedule. Include Product Data, Samples, Shop Drawings of other work affected by door hardware, and other information essential to the coordinated review of the Door Hardware Schedule.
- C. Keying Schedule: Prepared under the supervision of the Owner, separate schedule detailing final keying instructions for locksets and cylinders in writing. Include keying system explanation, door numbers, key set symbols, hardware set numbers and special instructions. Owner to approve submitted keying schedule prior to the ordering of permanent cylinders.
- D. Operating and Maintenance Manuals: Provide manufacturers operating and maintenance manuals for each item comprising the complete door hardware installation in quantity as required in Division 01, Closeout Submittals. The manual to include the name, address, and contact information of the manufacturers providing the hardware and their nearest service representatives. The final copies delivered after completion of the installation test to include "as built" modifications made during installation, checkout, and acceptance.

- E. Warranties and Maintenance: Special warranties and maintenance agreements specified in this Section.

#### 1.4 QUALITY ASSURANCE

- A. Manufacturers Qualifications: Engage qualified manufacturers with a minimum 5 years of documented experience in producing hardware and equipment similar to that indicated for this Project and that have a proven record of successful in-service performance.
- B. Installer Qualifications: Installers, trained by the primary product manufacturers, with a minimum 3 years documented experience installing both standard and electrified builders hardware similar in material, design, and extent to that indicated for this Project and whose work has resulted in construction with a record of successful in-service performance.
- C. Door Hardware Supplier Qualifications: Experienced commercial door hardware distributors with a minimum 5 years documented experience supplying both mechanical and electromechanical hardware installations comparable in material, design, and extent to that indicated for this Project. Supplier recognized as a factory direct distributor in good standing by the manufacturers of the primary materials with a warehousing facility in Project's vicinity. Supplier to have on staff a certified Architectural Hardware Consultant (AHC) available during the course of the Work to consult with Contractor, Architect, and Owner concerning both standard and electromechanical door hardware and keying.
  - 1. Scheduling Responsibility: Preparation of door hardware and keying schedules.
  - 2. Scope of project to include, but not limited to, 14 buildings on the main campus and 8 off campus satellite buildings.
- D. Source Limitations: Obtain each type and variety of Door Hardware specified in this Section from a single source, qualified supplier unless otherwise indicated.
  - 1. Electrified modifications or enhancements made to a source manufacturer's product line by a secondary or third party source will not be accepted.
  - 2. Provide electromechanical door hardware from the same manufacturer as mechanical door hardware, unless otherwise indicated.
- E. Regulatory Requirements: Comply with NFPA 70, NFPA 80, NFPA 101 and ANSI A117.1 requirements and guidelines as directed in the model building code including, but not limited to, the following:
  - 1. NFPA 70 "National Electrical Code", including electrical components, devices, and accessories listed and labeled as

defined in Article 100 by a testing agency acceptable to authorities having jurisdiction, and marked for intended use.

2. Where indicated to comply with accessibility requirements, comply with Americans with Disabilities Act (ADA), "Accessibility Guidelines for Buildings and Facilities (ADAAG)," ANSI A117.1 as follows:
  - a. Handles, Pulls, Latches, Locks, and other Operating Devices: Shape that is easy to grasp with one hand and does not require tight grasping, tight pinching, or twisting of the wrist.
  - b. Door Closers: Comply with the following maximum opening-force requirements indicated:
    - 1) Interior Hinged Doors: 5 lbf applied perpendicular to door.
    - 2) Fire Doors: Minimum opening force allowable by authorities having jurisdiction.
  - c. Thresholds: Not more than 1/2 inch high. Bevel raised thresholds with a slope of not more than 1:2.
3. NFPA 101: Comply with the following for means of egress doors:
  - a. Latches, Locks, and Exit Devices: Not more than 15 lbf to release the latch. Locks shall not require the use of a key, tool, or special knowledge for operation.
  - b. Thresholds: Not more than 1/2 inch high.
4. Fire-Rated Door Assemblies: Provide door hardware for assemblies complying with NFPA 80 that are listed and labeled by a testing and inspecting agency acceptable to authorities having jurisdiction, for fire ratings indicated, based on testing according to NFPA 252 (neutral pressure at 40" above sill) or UL-10C.
  - a. Test Pressure: Positive pressure labeling.
- F. Each unit to bear third party permanent label demonstrating compliance with the referenced standards.
- G. Keying Conference: Conduct conference to comply with requirements in Division 01 Section "Project Meetings." Keying conference to incorporate the following criteria into the final keying schedule document:
  1. Function of building, purpose of each area and degree of security required.
  2. Plans for existing and future key system expansion.
  3. Requirements for key control storage and software.
  4. Installation of permanent keys, cylinder cores and software.

5. Address and requirements for delivery of keys.

- H. Pre-Submittal Conference: Conduct coordination conference in compliance with requirements in Division 01 Section "Project Meetings" with attendance by representatives of Supplier(s), Installer(s), and Contractor(s) to review proper methods and the procedures for receiving, handling, and installing door hardware.
1. Prior to installation of door hardware, arrange for manufacturers' representatives to hold a project specific training meeting to instruct the installing contractors' personnel on the proper installation and adjustment of their respective products. Product training to be attended by installers of door hardware (including electromechanical hardware) for aluminum, hollow metal and wood doors. Training will include the use of installation manuals, hardware schedules, templates and physical product samples as required.
  2. Inspect and discuss electrical roughing-in, power supply connections, and other preparatory work performed by other trades.
  3. Review sequence of operation narratives for each unique access controlled opening.
  4. Review and finalize construction schedule and verify availability of materials.
  5. Review the required inspecting, testing, commissioning, and demonstration procedures
- I. At completion of installation, provide written documentation that components were applied to manufacturer's instructions and recommendations and according to approved schedule.

1.5 DELIVERY, STORAGE, AND HANDLING

- A. Inventory door hardware on receipt and provide secure lock-up and shelving for door hardware delivered to Project site. Do not store electronic access control hardware, software or accessories at Project site without prior authorization.
- B. Tag each item or package separately with identification related to the final Door Hardware Schedule, and include basic installation instructions with each item or package.
- C. Deliver, as applicable, permanent keys, cylinders, cores, access control credentials, software and related accessories directly to Owner via registered mail or overnight package service. Instructions for delivery to the Owner shall be established at the "Keying Conference".

1.6 COORDINATION

- A. Templates: Obtain and distribute to the parties involved templates for doors, frames, and other work specified to be factory prepared for installing standard and electrified hardware. Check Shop Drawings of other work to confirm that adequate provisions are made for locating and installing hardware to comply with indicated requirements.
- B. Door Hardware and Electrical Connections: Coordinate the layout and installation of scheduled electrified door hardware and related access control equipment with required connections to source power junction boxes, low voltage power supplies, detection and monitoring hardware, and fire and detection alarm systems.
- C. Door and Frame Preparation: Related Division 08 Sections (Steel, Aluminum and Wood) doors and corresponding frames are to be prepared, reinforced and pre-wired (if applicable) to receive the installation of the specified electrified, monitoring, signaling and access control system hardware without additional in-field modifications.

1.7 WARRANTY

- A. General Warranty: Reference Division 01, General Requirements. Special warranties specified in this Article shall not deprive Owner of other rights Owner may have under other provisions of the Contract Documents and shall be in addition to, and run concurrent with, other warranties made by Contractor under requirements of the Contract Documents.
- B. Warranty Period: Written warranty, executed by manufacturer(s), agreeing to repair or replace components of standard and electrified door hardware that fails in materials or workmanship within specified warranty period after final acceptance by the Owner. Failures include, but are not limited to, the following:
  - 1. Structural failures including excessive deflection, cracking, or breakage.
  - 2. Faulty operation of the hardware.
  - 3. Deterioration of metals, metal finishes, and other materials beyond normal weathering.
  - 4. Electrical component defects and failures within the systems operation.
- C. Standard Warranty Period: One year from date of Substantial Completion, unless otherwise indicated.
- D. Special Warranty Periods: As provided with the specified Basis of Design.

1.8 MAINTENANCE SERVICE

- A. Maintenance Tools and Instructions: Furnish a complete set of specialized tools and maintenance instructions as needed for Owner's continued adjustment, maintenance, and removal and replacement of door hardware.
- B. Continuing Service: Beginning at Substantial Completion, and running concurrent with the specified warranty period, provide continuous (6) months full maintenance including repair and replacement of worn or defective components, lubrication, cleaning, and adjusting as required for proper door opening operation. Provide parts and supplies as used in the manufacture and installation of original products.

PART 2 - PRODUCTS

2.1 SCHEDULED DOOR HARDWARE

- A. General: Provide door hardware for each door to comply with requirements in Door Hardware Sets and each referenced section that products are to be supplied under.
  - 1. Designations: Requirements for quantity, item, size, finish or color, grade, function, and other distinctive qualities of each type of door hardware are indicated in the Door Hardware Sets at the end of Part 3. Products are identified by using door hardware designations, as follows:
    - a. Named Manufacturer's Products: Product designation and manufacturer are listed for each door hardware type required for the purpose of establishing requirements. Manufacturers' names are abbreviated in the Door Hardware Schedule.
- B. Substitutions: Requests for substitution and product approval for inclusive mechanical and electromechanical door hardware in compliance with the specifications must be submitted in writing and in accordance with the procedures and time frames outlined in Division 01, Substitution Procedures. Approval of requests is at the discretion of the architect, owner, and their designated consultants.

2.2 CYLINDERS AND KEYING

- A. General: Cylinder manufacturer to have minimum (10) years experience designing secured master key systems and have on record a published security keying system policy.
- B. Source Limitations: Obtain each type of keyed cylinder and keys from the same source manufacturer as locksets and exit devices, unless otherwise indicated.

- C. Cylinders: Original manufacturer cylinders complying with the following:
1. Mortise Type: Threaded cylinders with rings and straight- or clover-type cam.
  2. Rim Type: Cylinders with back plate, flat-type vertical or horizontal tailpiece, and raised trim ring.
  3. Bored-Lock Type: Cylinders with tailpieces to suit locks.
  4. Mortise and rim cylinder collars to be solid and recessed to allow the cylinder face to be flush and be free spinning with matching finishes.
  5. Keyway: Manufacturer's Standard.
- D. Permanent Cores: Manufacturer's standard; finish face to match lockset; complying with the following:
1. Interchangeable Cores: Core insert, removable by use of a special key; usable with other manufacturers' cylinders.
- E. Patented Cylinders and/or Cores: ANSI/BHMA A156.5, Grade 1, certified patented cylinders employing a utility patented and restricted keyway requiring the use of a patented key. Cylinders and cores are to be protected from unauthorized manufacture and distribution by manufacturer's United States patents. Patent protected until 2027 or beyond. Cylinders are to be factory keyed with owner having the ability for on-site original key cutting.
1. Basis of Design: Stanley Best Cormax X Series or equivalent (see paragraph 2.1.B for requests for substitution).
- F. Keying System: Each type of lock and cylinders to be factory keyed. Conduct specified "Keying Conference" to define and document keying system instructions and requirements. Furnish factory cut, nickel-silver large bow, thicker body permanently inscribed with a visual key control number as directed by Owner. Include stamping as shown below.
1. Basis of Design: Stanley Best 1AX1... with Key stamping KS717 and KS714 and VKC or equivalent (see paragraph 2.1.B for requests for substitution).
- G. Key Quantity: Provide the following minimum number of keys:
1. Top Master Key: One (1)
  2. Change Keys per Cylinder: Two (2)
  3. Master Keys (per Master Key Group): Two (2)
  4. Grand Master Keys (per Grand Master Key Group): Two (2)
  5. Construction Keys (where required): Ten (10)
  6. Construction Control Keys (where required): Two (2)
  7. Permanent Control Keys (where required): Two (2)
  8. Additional Cut Keys (where required) Five Hundred(500)



- H. Key Registration List: Provide keying transcript list to Owner's representative in the proper format for importing into key control software.
- I. Key Control System: Provide a key control system including envelopes, labels, and tags with self-locking key clips, receipt forms, 3-way visible card index, temporary markers, permanent markers, and standard metal cabinet.

1. Basis of Design: Telkee Systems President T3670C or equivalent.

- J. Key Control Software: Provide one network version of key management software package that includes one year of technical support and upgrades to software at no charge. Provide factory key system formatted for importing into software.

1. Basis of Design: Stanley Best Keystone 600N5(KS600N 1 1)networkable, installed on server and licensed for up to 5 users with codes file import to software KS600MP 1 and Webex training KS600TRN or equivalent(see paragraph 2.1.B for requests for substitution).

- K. Security Asset Manager: Provide a SAM intelligent key security locker for 40 keys.

Basis of Design: Key Systems SAM 96 with GFMS software or equivalent (see paragraph 2.1.B for requests for substitution).

- L. Service Equipment: Provide the following equipment for on site pinning of cores and cutting and stamping keys:

1. Basis of Design: Stanley Best or equivalent (see paragraph 2.1.B for requests for substitution).
- a. Key Combinator AD433 A2
  - b. Combining Kit CD431 A2
  - c. Core Stamping Plate CD504C
  - d. Core Capping Press CD517
  - e. Letter Die Stamps DD501 3/32"
  - f. Number Die Stamps DD503 3/32"
  - g. Key Stamping Plate DD514
  - h. 6 boxes(144 per box) key blanks 1AX1... 1 1 KS717 KS714
  - i. Additional combined and/or uncombined cores as directed by owner:  
10% of total number of locks on the project

## 2.1 FABRICATION

- A. Fasteners: Provide door hardware manufactured to comply with published templates generally prepared for machine, wood, and sheet metal screws. Provide screws according to manufacturers recognized installation standards for application intended.

## 2.2 FINISHES

- A. Standard: Designations used in the Hardware Sets and elsewhere indicate hardware finishes complying with ANSI/BHMA A156.18, including coordination with traditional U.S. finishes indicated by certain manufacturers for their products.
- B. Provide quality of finish, including thickness of plating or coating (if any), composition, hardness, and other qualities complying with manufacturer's standards, but in no case less than specified by referenced standards for the applicable units of hardware.
- C. Protect mechanical finishes on exposed surfaces from damage by applying a strippable, temporary protective covering before shipping.

## PART 3 - EXECUTION

### 3.1 EXAMINATION

- A. Examine scheduled openings, with Installer present, for compliance with requirements for installation tolerances, labeled fire door assembly construction, wall and floor construction, and other conditions affecting performance.
- B. Notify architect of any discrepancies or conflicts between the door schedule, door types, drawings and scheduled hardware. Proceed only after such discrepancies or conflicts have been resolved in writing.

### 3.2 PREPARATION

- A. Hollow Metal Doors and Frames: Comply with ANSI/DHI A115 series.
- B. Wood Doors: Comply with ANSI/DHI A115-W series.

### 3.3 INSTALLATION

- A. Install each item of mechanical and electromechanical hardware and access control equipment to comply with manufacturer's written instructions and according to specifications.
  - 1. Installers are to be trained and certified by the manufacturer on the proper installation and adjustment of fire, life safety, and security products including: hanging devices; locking devices; closing devices; and seals.
  - 2. Installation of permanent keyed cores to be performed by "owner".
- B. Mounting Heights: Mount door hardware units at heights indicated in following applicable publications, unless specifically indicated or required to comply with governing regulations:

1. Standard Steel Doors and Frames: DHI's "Recommended Locations for Architectural Hardware for Standard Steel Doors and Frames."
  2. Wood Doors: DHI WDHS.3, "Recommended Locations for Architectural Hardware for Wood Flush Doors."
  3. Where indicated to comply with accessibility requirements, comply with ANSI A117.1 "Accessibility Guidelines for Buildings and Facilities."
  4. Provide blocking in drywall partitions where wall stops or other wall mounted hardware is located.
- C. Retrofitting: Install door hardware to comply with manufacturer's published templates and written instructions. Where cutting and fitting are required to install door hardware onto or into surfaces that are later to be painted or finished in another way, coordinate removal, storage, and reinstallation of surface protective trim units with finishing work specified in Division 9 Sections. Do not install surface-mounted items until finishes have been completed on substrates involved.
- D. Thresholds: Set thresholds for exterior and acoustical doors in full bed of sealant complying with requirements specified in Division 7 Section "Joint Sealants."
- E. Storage: Provide a secure lock up for hardware delivered to the project but not yet installed. Control the handling and installation of hardware items so that the completion of the work will not be delayed by hardware losses before and after installation.
- 3.4 FIELD QUALITY CONTROL
- A. Field Inspection: Supplier will perform a final inspection of installed door hardware and state in report whether work complies with or deviates from requirements, including whether door hardware is properly installed, operating and adjusted.
- 3.5 ADJUSTING
- A. Initial Adjustment: Adjust and check each operating item of door hardware and each door to ensure proper operation or function of every unit. Replace units that cannot be adjusted to operate as intended. Adjust door control devices to compensate for final operation of heating and ventilating equipment and to comply with referenced accessibility requirements.
- 3.6 CLEANING AND PROTECTION
- A. Protect all hardware stored on construction site in a covered and dry place. Protect exposed hardware installed on doors during the construction phase. Install any and all hardware at the latest possible time frame.

- B. Clean adjacent surfaces soiled by door hardware installation.
- C. Clean operating items as necessary to restore proper finish. and provide final protection and maintain conditions that ensure door hardware is without damage or deterioration at time of owner occupancy.

3.7 DEMONSTRATION

- A. Instruct Owner's maintenance personnel to adjust, operate, and maintain mechanical and electromechanical door hardware.

3.8 DOOR HARDWARE SCHEDULE

- A. The hardware sets represent the design intent and direction of the owner and architect. They are a guideline only and should not be considered a detailed hardware schedule. Discrepancies, conflicting hardware and missing items should be brought to the attention of the architect with corrections made prior to the bidding process. Omitted items not included in a hardware set should be scheduled with the appropriate additional hardware required for proper application and functionality.
- B. Refer to Section 080671, Door Hardware Schedule, for hardware sets.
- C. Manufacturer's Abbreviations:
  - 1. Stanley Best Access Systems BE

**Hardware Schedule**

**Set: 1.0**

Doors: typical

1 Removable Core	1CX7...1 2	626	BE
------------------	------------	-----	----

Notes: Balance of existing hardware to remain.  
Inspect existing hardware to confirm actual type of cylinder required

- - - END - - -

**SECTION 26 05 00**  
**COMMON WORK RESULTS FOR ELECTRICAL**

**PART 1 - GENERAL**

**1.1 STIPULATIONS**

- A. Project drawings and general provisions of the Contract, including but not limited to all; General and Supplementary Conditions, Division 01 Specification Sections and all related specification sections apply to this Section.
- B. Related Specification Sections:
  - 1. Division 07 - Penetrations Fire Stopping.
  - 2. Division 26 - Low Voltage Electrical Power Conductors and Cables.
  - 3. Division 26 - Grounding and Bonding for Electrical Systems
  - 4. Division 26 - Hangers and Supports for Electrical Systems
  - 5. Division 26 - Raceways and Boxes for Electrical Systems
  - 6. Division 26 - Identification for Electrical Systems
  - 7. Division 27 - Common Work Results for Communications Systems
  - 8. Division 27 - Network Communications
  - 9. Division 28 - Common Work Results for Safety and Security Systems
  - 10. Division 28 - Physical Access Control System (PACS)

**1.2 SUMMARY**

- A. Section Includes:
  - 1. Electrical equipment coordination and installation.
  - 2. Sleeves for raceways and cables.
  - 3. Sleeve seals.
  - 4. Grout.
  - 5. Common electrical installation requirements.

**1.3 DEFINITIONS**

- A. EPDM: Ethylene-propylene diene terpolymer rubber.
- B. NBR: Acrylonitrile-butadiene rubber.

**1.4 SUBMITTALS**

- A. Product Data: For sleeve seals.

**1.5 COORDINATION**

- A. Coordinate arrangement, mounting, and support of electrical equipment:

1. To allow maximum possible headroom unless specific mounting heights that reduce headroom are indicated.
  2. To provide for ease of disconnecting the equipment with minimum interference to other installations.
  3. To allow right of way for piping and conduit installed at required slope.
  4. So connecting raceways, cables, wireways, cable trays, and busways will be clear of obstructions and of the working and access space of other equipment.
- B. Coordinate installation of required supporting devices and set sleeves in cast-in-place concrete, masonry walls, and other structural components as they are constructed.

## **PART 2 - PRODUCTS**

### **2.1 SLEEVES FOR RACEWAYS AND CABLES**

- A. Steel Pipe Sleeves: ASTM A 53/A 53M, Type E, Grade B, Schedule 40, galvanized steel, plain ends.
- B. Cast-Iron Pipe Sleeves: Cast or fabricated "wall pipe," equivalent to ductile-iron pressure pipe, with plain ends and integral water-stop, unless otherwise indicated.
- C. Sleeves for Rectangular Openings: Galvanized sheet steel.
1. Minimum Metal Thickness:
    - a. For sleeve cross-section rectangle perimeter less than 50 inches and no side more than 16 inches, thickness shall be 0.052 inch.
    - b. For sleeve cross-section rectangle perimeter equal to, or more than, 50 inches and 1 or more sides equal to, or more than, 16 inches, thickness shall be 0.138 inch.

### **2.2 SLEEVE SEALS**

- A. Description: Modular sealing device, designed for field assembly, to fill annular space between sleeve and raceway or cable.
1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
    - a. Advance Products & Systems, Inc.
    - b. Calpico, Inc.
    - c. Metraflex Co.
    - d. Pipeline Seal and Insulator, Inc.
  2. Sealing Elements: EPDM interlocking links shaped to fit surface of cable or conduit. Include type and number required for material and size of raceway or cable.

3. Pressure Plates: Plastic. Include two for each sealing element.
4. Connecting Bolts and Nuts: Carbon steel with corrosion-resistant coating of length required to secure pressure plates to sealing elements. Include one for each sealing element.

### **PART 3 - EXECUTION**

#### **3.1 COMMON REQUIREMENTS FOR ELECTRICAL INSTALLATION**

- A. Comply with NECA 1.
- B. Measure indicated mounting heights to bottom of unit for suspended items and to center of unit for wall-mounting items.
- C. Headroom Maintenance: If mounting heights or other location criteria are not indicated, arrange and install components and equipment to provide maximum possible headroom consistent with these requirements.
- D. Equipment: Install to facilitate service, maintenance, and repair or replacement of components of both electrical equipment and other nearby installations. Connect in such a way as to facilitate future disconnecting with minimum interference with other items in the vicinity.
- E. Right of Way: Give to piping systems installed at a required slope.

#### **3.2 SLEEVE INSTALLATION FOR ELECTRICAL PENETRATIONS**

- A. Electrical penetrations occur when raceways, cables, wireways, cable trays, or busways penetrate concrete slabs, concrete or masonry walls, or fire-rated floor and wall assemblies.
- B. Concrete Slabs and Walls: Install sleeves for penetrations unless core-drilled holes or formed openings are used. Install sleeves during erection of slabs and walls.
- C. Use pipe sleeves unless penetration arrangement requires rectangular sleeved opening.
- D. Fire-Rated Assemblies: Install sleeves for penetrations of fire-rated floor and wall assemblies unless openings compatible with fire-stop system used are fabricated during construction of floor or wall.
- E. Cut sleeves to length for mounting flush with both surfaces of walls.
- F. Extend sleeves installed in floors 2 inches above finished floor level.
- G. Size pipe sleeves to provide 1/4-inch annular clear space between sleeve and raceway or cable, unless indicated otherwise.

- H. Seal space outside of sleeves with grout for penetrations of concrete and masonry
  - 1. Promptly pack grout solidly between sleeve and wall so no voids remain. Tool exposed surfaces smooth; protect grout while curing.
- I. Interior Penetrations of Non-Fire-Rated Walls and Floors: Seal annular space between sleeve and raceway or cable, using joint sealant appropriate for size, depth, and location of joint.
- J. Fire-Rated-Assembly Penetrations: Maintain indicated fire rating of walls, partitions, ceilings, and floors at raceway and cable penetrations. Install sleeves and seal raceway and cable penetration sleeves with fire-stop materials.

### **3.3 SLEEVE-SEAL INSTALLATION**

- A. Use type and number of sealing elements recommended by manufacturer for raceway or cable material and size. Position raceway or cable in center of sleeve. Assemble mechanical sleeve seals and install in annular space between raceway or cable and sleeve. Tighten bolts against pressure plates that cause sealing elements to expand and make watertight seal.

### **3.4 FIRE-STOPPING**

- A. Apply fire-stopping to penetrations of fire-rated floor and wall assemblies for electrical installations to restore original fire-resistance rating of assembly.

- - - END - - -



**SECTION 26 05 19**  
**LOW-VOLTAGE ELECTRICAL POWER CONDUCTORS AND CABLES**

**PART 1 - GENERAL**

**1.1 STIPULATIONS**

- A. Project drawings and general provisions of the Contract, including but not limited to all; General and Supplementary Conditions, Division 01 Specification Sections and all related specification sections apply to this Section.
- B. Related Specification Sections:
  - 1. Division 26 - Common Work Results for Electrical.
  - 2. Division 26 - Grounding and Bonding for Electrical Systems
  - 3. Division 26 - Hangers and Supports for Electrical Systems
  - 4. Division 26 - Raceways and Boxes for Electrical Systems
  - 5. Division 26 - Identification for Electrical Systems
  - 6. Division 27 - Common Work Results for Communications Systems
  - 7. Division 27 - Network Communications
  - 8. Division 28 - Common Work Results for Safety and Security Systems
  - 9. Division 28 - Physical Access Control System (PACS)

**1.2 SUMMARY**

- A. This Section includes the following:
  - 1. Building wires and cables rated 600 V and less.
  - 2. Connectors, splices, and terminations rated 600 V and less.
  - 3. Sleeves and sleeve seals for cables.

**1.3 DEFINITIONS**

- A. EPDM: Ethylene-propylene-diene terpolymer rubber.
- B. NBR: Acrylonitrile-butadiene rubber.

**1.4 SUBMITTALS**

- A. Product Data: For each type of product indicated.
- B. Qualification Data: For testing agency.
- C. Field quality-control test reports.

## **1.5 QUALITY ASSURANCE**

- A. Testing Agency Qualifications: An independent agency, with the experience and capability to conduct the testing indicated, that is a member company of the International Electrical Testing Association or is a nationally recognized testing laboratory (NRTL) as defined by OSHA in 29 CFR 1910.7, and that is acceptable to authorities having jurisdiction.
  - 1. Testing Agency's Field Supervisor: Person currently certified by the InterNational Electrical Testing Association or the National Institute for Certification in Engineering Technologies to supervise on-site testing specified in Part 3.
- B. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, Article 100, by a testing agency acceptable to authorities having jurisdiction, and marked for intended use.
- C. Comply with NFPA 70.

## **1.6 COORDINATION**

- A. Set sleeves in cast-in-place concrete, masonry walls, and other structural components as they are constructed.

## **PART 2 - PRODUCTS**

### **2.1 CONDUCTORS AND CABLES**

- A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
  - 1. Alcan Products Corporation; Alcan Cable Division.
  - 2. American Insulated Wire Corp.; a Leviton Company.
  - 3. General Cable Corporation.
  - 4. Senator Wire & Cable Company.
  - 5. Southwire Company.
- B. Copper Conductors: Comply with NEMA WC 70.
- C. Conductor Insulation: Comply with NEMA WC 70 for Types THHN-THWN and USE.

### **2.2 CONNECTORS AND SPLICES**

- A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
  - 1. AFC Cable Systems, Inc.
  - 2. Hubbell Power Systems, Inc.
  - 3. O-Z/Gedney; EGS Electrical Group LLC.

4. 3M; Electrical Products Division.
5. Tyco Electronics Corp.

- B. Description: Factory-fabricated connectors and splices of size, ampacity rating, material, type, and class for application and service indicated.

### **2.3 SLEEVES FOR CABLES**

- A. Steel Pipe Sleeves: ASTM A 53/A 53M, Type E, Grade B, Schedule 40, galvanized steel, plain ends.
- B. Cast-Iron Pipe Sleeves: Cast or fabricated "wall pipe," equivalent to ductile-iron pressure pipe, with plain ends and integral waterstop, unless otherwise indicated.
- C. Sleeves for Rectangular Openings: Galvanized sheet steel with minimum 0.052- or 0.138-inch thickness as indicated and of length to suit application.
- D. Coordinate sleeve selection and application with selection and application of fire-stopping

### **2.4 SLEEVE SEALS**

- A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
1. Advance Products & Systems, Inc.
  2. Calpico, Inc.
  3. Metraflex Co.
  4. Pipeline Seal and Insulator, Inc.
- B. Description: Modular sealing device, designed for field assembly, to fill annular space between sleeve and cable.
1. Sealing Elements: EPDM interlocking links shaped to fit surface of cable or conduit. Include type and number required for material and size of raceway or cable.
  2. Pressure Plates: Plastic. Include two for each sealing element.
  3. Connecting Bolts and Nuts: Carbon steel with corrosion-resistant coating of length required to secure pressure plates to sealing elements. Include one for each sealing element.

## **PART 3 - EXECUTION**

### **3.1 CONDUCTOR MATERIAL APPLICATIONS**

- A. Feeders: Copper. Solid for No. 10 AWG and smaller; stranded for No. 8 AWG and larger.

- B. Branch Circuits: Copper. Solid for No. 10 AWG and smaller; stranded for No. 8 AWG and larger.

### **3.2 CONDUCTOR INSULATION AND MULTI-CONDUCTOR CABLE APPLICATIONS AND WIRING METHODS**

- A. Service Entrance: Type THHN-THWN, single conductors in raceway.
- B. Exposed Feeders: Type THHN-THWN, single conductors in raceway.
- C. Feeders Concealed in Ceilings, Walls, Partitions, and Crawlspace: Type THHN-THWN, single conductors in raceway.
- D. Feeders Concealed in Concrete, below Slabs-on-Grade, and Underground: Type THHN-THWN, single conductors in raceway.
- E. Feeders Installed below Raised Flooring: Type THHN-THWN, single conductors in raceway.
- F. Exposed Branch Circuits, Including in Crawlspace: Type THHN-THWN, single conductors in raceway.
- G. Branch Circuits Concealed in Ceilings, Walls, and Partitions: Type THHN-THWN, single conductors in raceway.
- H. Branch Circuits Concealed in Concrete, below Slabs-on-Grade, and Underground: Type THHN-THWN, single conductors in raceway.
- I. Branch Circuits Installed below Raised Flooring: Type THHN-THWN, single conductors in raceway.
- J. Cord Drops and Portable Appliance Connections: Type SO, hard service cord with stainless-steel, wire-mesh, strain relief device at terminations to suit application.
- K. Class 1 Control Circuits: Type THHN-THWN, in raceway.
- L. Class 2 Control Circuits: Type THHN-THWN, in raceway.

### **3.3 INSTALLATION OF CONDUCTORS AND CABLES**

- A. Conceal cables in finished walls, ceilings, and floors, unless otherwise indicated.
- B. Use manufacturer-approved pulling compound or lubricant where necessary; compound used must not deteriorate conductor or insulation. Do not exceed manufacturer's recommended maximum pulling tensions and sidewall pressure values.
- C. Use pulling means and methods; including fish tape, cable, rope, and basket-weave wire/cable grips that will not damage cables or raceway.

- D. Install exposed cables parallel and perpendicular to surfaces of exposed structural members, and follow surface contours where possible.
- E. Support cables according to Division 26 Section "Hangers and Supports for Electrical Systems."
- F. Identify and color-code conductors and cables according to Division 26 Section "Identification for Electrical Systems."

### **3.4 CONNECTIONS**

- A. Tighten electrical connectors and terminals according to manufacturer's published torque-tightening values. If manufacturer's torque values are not indicated, use those specified in UL 486A and UL 486B.
- B. Make splices and taps that are compatible with conductor material and that possess equivalent or better mechanical strength and insulation ratings than un-spliced conductors.
  - 1. Use oxide inhibitor in each splice and tap conductor for aluminum conductors.
- C. Wiring at Outlets: Install conductor at each outlet, with at least 6 inches of slack.

### **3.5 SLEEVE INSTALLATION FOR ELECTRICAL PENETRATIONS**

- A. Coordinate sleeve selection and application with selection and application of fire-stopping.
- B. Concrete Slabs and Walls: Install sleeves for penetrations unless core-drilled holes or formed openings are used. Install sleeves during erection of slabs and walls.
- C. Use pipe sleeves unless penetration arrangement requires rectangular sleeved opening.

- D. Rectangular Sleeve Minimum Metal Thickness:
1. For sleeve rectangle perimeter less than 50 inches and no side greater than 16 inches, thickness shall be 0.052 inch.
  2. For sleeve rectangle perimeter equal to, or greater than, 50 inches and 1 or more sides equal to, or greater than, 16 inches, thickness shall be 0.138 inch.
- E. Fire-Rated Assemblies: Install sleeves for penetrations of fire-rated floor and wall assemblies unless openings compatible with fire-stop system used are fabricated during construction of floor or wall.
- F. Cut sleeves to length for mounting flush with both wall surfaces.
- G. Extend sleeves installed in floors 2 inches above finished floor level.
- H. Size pipe sleeves to provide 1/4-inch annular clear space between sleeve and cable unless sleeve seal is to be installed.
- I. Seal space outside of sleeves with grout for penetrations of concrete and masonry.
- J. Interior Penetrations of Non-Fire-Rated Walls and Floors: Seal annular space between sleeve and cable, using joint sealant appropriate for size, depth, and location of joint according to UL and NFPA standards.
- K. Fire-Rated-Assembly Penetrations: Maintain indicated fire rating of walls, partitions, ceilings, and floors at cable penetrations. Install sleeves and seal with fire-stop materials according to UL and NFPA standards.
- L. Roof-Penetration Sleeves: Seal penetration of individual cables with flexible boot-type flashing units applied in coordination with roofing work.
- M. Aboveground Exterior-Wall Penetrations: Seal penetrations using sleeves and mechanical sleeve seals. Size sleeves to allow for 1-inch annular clear space between pipe and sleeve for installing mechanical sleeve seals.
- N. Underground Exterior-Wall Penetrations: Install cast-iron "wall pipes" for sleeves. Size sleeves to allow for 1-inch annular clear space between cable and sleeve for installing mechanical sleeve seals.

### **3.6 SLEEVE-SEAL INSTALLATION**

- A. Install to seal underground exterior-wall penetrations.
- B. Use type and number of sealing elements recommended by manufacturer for cable material and size. Position cable in center of sleeve. Assemble mechanical sleeve seals and install in annular space between cable and sleeve. Tighten bolts against pressure plates that cause sealing elements to expand and make watertight seal.

### **3.7 FIRE-STOPPING**

- A. Apply fire-stopping to electrical penetrations of fire-rated floor and wall assemblies to restore original fire-resistance rating of assembly according to UL and NFPA standards.

### **3.8 FIELD QUALITY CONTROL**

- A. Testing Agency: Engage a qualified testing agency to perform tests and inspections and prepare test reports.
- B. Perform tests and inspections and prepare test reports.
- C. Tests and Inspections:
  - 1. After installing conductors and cables and before electrical circuitry has been energized, test service entrance and feeder conductors, and conductors feeding the following critical equipment and services for compliance with requirements.
  - 2. Perform each visual and mechanical inspection and electrical test stated in NETA Acceptance Testing Specification. Certify compliance with test parameters.
  - 3. Infrared Scanning: After Substantial Completion, but not more than 60 days after Final Acceptance, perform an infrared scan of each splice in cables and conductors No. 3 AWG and larger. Remove box and equipment covers so splices are accessible to portable scanner.
    - a. Follow-up Infrared Scanning: Perform an additional follow-up infrared scan of each splice 11 months after date of Substantial Completion.
    - b. Instrument: Use an infrared scanning device designed to measure temperature or to detect significant deviations from normal values. Provide calibration record for device.
    - c. Record of Infrared Scanning: Prepare a certified report that identifies splices checked and that describes scanning results. Include notation of deficiencies detected, remedial action taken, and observations after remedial action.
- D. Test Reports: Prepare a written report to record the following:

1. Test procedures used.
  2. Test results that comply with requirements.
  3. Test results that do not comply with requirements and corrective action taken to achieve compliance with requirements.
- E. Remove and replace malfunctioning units and retest as specified above.

- - - END - - -



**SECTION 26 05 26**  
**GROUNDING AND BONDING FOR ELECTRICAL SYSTEMS**

**PART 1 - GENERAL**

**1.1 STIPULATIONS**

- A. Project drawings and general provisions of the Contract, including but not limited to all; General and Supplementary Conditions, Division 01 Specification Sections and all related specification sections apply to this Section.
- B. Related Specification Sections:
  - 1. Division 26 - Common Work Results for Electrical.
  - 2. Division 26 - Low Voltage Electrical Power Conductors and Cables.
  - 3. Division 26 - Hangers and Supports for Electrical Systems
  - 4. Division 26 - Raceways and Boxes for Electrical Systems
  - 5. Division 26 - Identification for Electrical Systems
  - 6. Division 27 - Common Work Results for Communications Systems
  - 7. Division 27 - Network Communications
  - 8. Division 28 - Common Work Results for Safety and Security Systems
  - 9. Division 28 - Physical Access Control System (PACS)

**1.2 SUMMARY**

- A. This Section includes methods and materials for grounding systems and equipment, plus the following special applications:
  - 1. Underground distribution grounding.
  - 2. Common ground bonding with lightning protection system.

**1.3 SUBMITTALS**

- A. Product Data: For each type of product indicated.
- B. Other Informational Submittals: Plans showing dimensioned as-built locations of grounding features specified in Part 3 "Field Quality Control" Article, including the following:
  - 1. Test wells.
  - 2. Ground rods.
  - 3. Ground rings.
  - 4. Grounding arrangements and connections for separately derived systems.
  - 5. Grounding for sensitive electronic equipment.
- C. Qualification Data: For testing agency and testing agency's field supervisor.

- D. Field quality-control test reports.
- E. Operation and Maintenance Data: For grounding to include the following in emergency, operation, and maintenance manuals:
  - 1. Instructions for periodic testing and inspection of grounding features at test wells based on NETA MTS.
    - a. Tests shall be to determine if ground resistance or impedance values remain within specified maximums, and instructions shall recommend corrective action if they do not.
    - b. Include recommended testing intervals.

#### **1.4 QUALITY ASSURANCE**

- A. Testing Agency Qualifications: An independent agency, with the experience and capability to conduct the testing indicated, that is a member company of the International Electrical Testing Association or is a nationally recognized testing laboratory (NRTL) as defined by OSHA in 29 CFR 1910.7, and that is acceptable to authorities having jurisdiction.
  - 1. Testing Agency's Field Supervisor: Person currently certified by the International Electrical Testing Association to supervise on-site testing specified in Part 3.
- B. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, Article 100, by a testing agency acceptable to authorities having jurisdiction, and marked for intended use.
- C. Comply with UL 467 for grounding and bonding materials and equipment.

### **PART 2 - PRODUCTS**

#### **2.1 CONDUCTORS**

- A. Insulated Conductors: Copper wire or cable insulated for 600 V unless otherwise required by applicable Code or authorities having jurisdiction.
- B. Bare Copper Conductors:
  - 1. Solid Conductors: ASTM B 3.
  - 2. Stranded Conductors: ASTM B 8.
  - 3. Tinned Conductors: ASTM B 33.
  - 4. Bonding Cable: 28 kcmil, 14 strands of No. 17 AWG conductor, 1/4 inch in diameter.
  - 5. Bonding Conductor: No. 4 or No. 6 AWG, stranded conductor.
  - 6. Bonding Jumper: Copper tape, braided conductors, terminated with copper ferrules; 1-5/8 inches wide and 1/16 inch thick.
  - 7. Tinned Bonding Jumper: Tinned-copper tape, braided conductors, terminated with copper ferrules; 1-5/8 inches wide and 1/16 inch thick.

- C. Grounding Bus: Rectangular bars of annealed copper, 1/4 by 2 inches in cross section, unless otherwise indicated; with insulators.

## **2.2 CONNECTORS**

- A. Listed and labeled by a nationally recognized testing laboratory acceptable to authorities having jurisdiction for applications in which used, and for specific types, sizes, and combinations of conductors and other items connected.
- B. Bolted Connectors for Conductors and Pipes: Copper or copper alloy, bolted pressure-type, with at least two bolts.
  - 1. Pipe Connectors: Clamp type, sized for pipe.
- C. Welded Connectors: Exothermic-welding kits of types recommended by kit manufacturer for materials being joined and installation conditions.

## **2.3 GROUNDING ELECTRODES**

- A. Ground Rods: Copper-clad steel; 3/4 inch by 10 feet in diameter.

# **PART 3 - EXECUTION**

## **3.1 APPLICATIONS**

- A. Conductors: Install solid conductor for No. 8 AWG and smaller, and stranded conductors for No. 6 AWG and larger, unless otherwise indicated.
- B. Isolated Grounding Conductors: Green-colored insulation with continuous yellow stripe. On feeders with isolated ground, identify grounding conductor where visible to normal inspection, with alternating bands of green and yellow tape, with at least three bands of green and two bands of yellow.
- C. Grounding Bus: Install in electrical and telephone equipment rooms, in rooms housing service equipment, and elsewhere as indicated.
  - 1. Install bus on insulated spacers 1 inch, minimum, from wall 6 inches above finished floor, unless otherwise indicated.
  - 2. Where indicated on both sides of doorways, route bus up to top of door frame, across top of doorway, down to specified height above floor, and connect to horizontal bus.
- D. Conductor Terminations and Connections:
  - 1. Pipe and Equipment Grounding Conductor Terminations: Bolted connectors.
  - 2. Underground Connections: Welded connectors, except at test wells and as otherwise indicated.
  - 3. Connections to Ground Rods at Test Wells: Bolted connectors.

4. Connections to Structural Steel: Welded connectors.

### 3.2 EQUIPMENT GROUNDING

- A. Install insulated equipment grounding conductors with all feeders and branch circuits.
- B. Install insulated equipment grounding conductors with the following items, in addition to those required by NFPA 70:
1. Feeders and branch circuits.
  2. Lighting circuits.
  3. Receptacle circuits.
  4. Single-phase motor and appliance branch circuits.
  5. Three-phase motor and appliance branch circuits.
  6. Flexible raceway runs.
  7. Armored and metal-clad cable runs.
  8. Busway Supply Circuits: Install insulated equipment grounding conductor from grounding bus in the switchgear, switchboard, or distribution panel to equipment grounding bar terminal on busway.
  9. Computer and Rack-Mounted Electronic Equipment Circuits: Install insulated equipment grounding conductor in branch-circuit runs from equipment-area power panels and power-distribution units.
- C. Isolated Grounding Receptacle Circuits: Install an insulated equipment grounding conductor connected to the receptacle grounding terminal. Isolate conductor from raceway and from panelboard grounding terminals. Terminate at equipment grounding conductor terminal of the applicable derived system or service, unless otherwise indicated.
- D. Isolated Equipment Enclosure Circuits: For designated equipment supplied by a branch circuit or feeder, isolate equipment enclosure from supply circuit raceway with a nonmetallic raceway fitting listed for the purpose. Install fitting where raceway enters enclosure, and install a separate insulated equipment grounding conductor. Isolate conductor from raceway and from panelboard grounding terminals. Terminate at equipment grounding conductor terminal of the applicable derived system or service, unless otherwise indicated.
- E. Signal and Communication Equipment: For telephone, alarm, voice and data, and other communication equipment, provide No. 4 AWG minimum insulated grounding conductor in raceway from grounding electrode system to each service location, terminal cabinet, wiring closet, and central equipment location.
1. Service and Central Equipment Locations and Wiring Closets: Terminate grounding conductor on a 1/4-by-2-by-12-inch grounding bus.
  2. Terminal Cabinets: Terminate grounding conductor on cabinet grounding terminal.

### **3.3 INSTALLATION**

- A. Grounding Conductors: Route along shortest and straightest paths possible, unless otherwise indicated or required by Code. Avoid obstructing access or placing conductors where they may be subjected to strain, impact, or damage.
- B. Bonding Straps and Jumpers: Install in locations accessible for inspection and maintenance, except where routed through short lengths of conduit.
  - 1. Bonding to Structure: Bond straps directly to basic structure, taking care not to penetrate any adjacent parts.
  - 2. Bonding to Equipment Mounted on Vibration Isolation Hangers and Supports: Install so vibration is not transmitted to rigidly mounted equipment.
  - 3. Use exothermic-welded connectors for outdoor locations, but if a disconnect-type connection is required, use a bolted clamp.

### **3.4 FIELD QUALITY CONTROL**

- A. Perform the following tests and inspections and prepare test reports:
  - 1. After installing grounding system but before permanent electrical circuits have been energized, test for compliance with requirements.
  - 2. Test completed grounding system at each location where a maximum ground-resistance level is specified, at service disconnect enclosure grounding terminal, at ground test wells, and at individual ground rods. Make tests at ground rods before any conductors are connected.
    - a. Measure ground resistance not less than two full days after last trace of precipitation and without soil being moistened by any means other than natural drainage or seepage and without chemical treatment or other artificial means of reducing natural ground resistance.
    - b. Perform tests by fall-of-potential method according to IEEE 81.
- B. Report measured ground resistances that exceed the following values:
  - 1. Power and Lighting Equipment or System with Capacity 500 kVA and Less: 10 ohms.
  - 2. Power and Lighting Equipment or System with Capacity 500 to 1000 kVA: 5 ohms.
  - 3. Power and Lighting Equipment or System with Capacity More Than 1000 kVA: 3 ohms.
  - 4. Power Distribution Units or Panelboards Serving Electronic Equipment: 1 ohm(s).
  - 5. Substations and Pad-Mounted Equipment: 5 ohms.

- C. Excessive Ground Resistance: If resistance to ground exceeds specified values, notify Architect promptly and include recommendations to reduce ground resistance.

- - - END - - -

**SECTION 26 05 29**  
**HANGERS AND SUPPORTS FOR ELECTRICAL SYSTEMS**

**PART 1 - GENERAL**

**1.1 STIPULATIONS**

- A. Project drawings and general provisions of the Contract, including but not limited to all; General and Supplementary Conditions, Division 01 Specification Sections and all related specification sections apply to this Section.
- B. Related Specification Sections:
  - 1. Division 26 - Common Work Results for Electrical.
  - 2. Division 26 - Low Voltage Electrical Power Conductors and Cables.
  - 3. Division 26 - Grounding and Bonding for Electrical Systems
  - 4. Division 26 - Raceways and Boxes for Electrical Systems
  - 5. Division 26 - Identification for Electrical Systems
  - 6. Division 27 - Common Work Results for Communications Systems
  - 7. Division 27 - Network Communications
  - 8. Division 28 - Common Work Results for Safety and Security Systems
  - 9. Division 28 - Physical Access Control System (PACS)

**1.2 SUMMARY**

- A. This Section includes the following:
  - 1. Hangers and supports for electrical equipment and systems.
  - 2. Construction requirements for concrete bases.

**1.3 DEFINITIONS**

- A. EMT: Electrical metallic tubing.
- B. IMC: Intermediate metal conduit.
- C. RMC: Rigid metal conduit.

**1.4 PERFORMANCE REQUIREMENTS**

- A. Delegated Design: Design supports for multiple raceways, including comprehensive engineering analysis by a qualified professional engineer, using performance requirements and design criteria indicated.
- B. Design supports for multiple raceways capable of supporting combined weight of supported systems and its contents.

- C. Design equipment supports capable of supporting combined operating weight of supported equipment and connected systems and components.
- D. Rated Strength: Adequate in tension, shear, and pullout force to resist maximum loads calculated or imposed for this Project, with a minimum structural safety factor of five.

#### **1.5 SUBMITTALS**

- A. Product Data: For the following:
  - 1. Steel slotted support systems.
  - 2. Nonmetallic slotted support systems.
- B. Welding certificates.

#### **1.6 QUALITY ASSURANCE**

- A. Welding: Qualify procedures and personnel according to AWS D1.1/D1.1M, "Structural Welding Code - Steel."
- B. Comply with NFPA 70.

#### **1.7 COORDINATION**

- A. Coordinate with VA's Contracting Officer and all other trades where applicable.

### **PART 2 - PRODUCTS**

#### **2.1 SUPPORT, ANCHORAGE, AND ATTACHMENT COMPONENTS**

- A. Steel Slotted Support Systems: Comply with MFMA-4, factory-fabricated components for field assembly.
  - 1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
    - a. Allied Tube & Conduit.
    - b. Cooper B-Line, Inc.; a division of Cooper Industries.
    - c. ERICO International Corporation.
    - d. GS Metals Corp.
    - e. Thomas & Betts Corporation.
    - f. Unistrut; Tyco International, Ltd.
    - g. Wesanco, Inc.
  - 2. Metallic Coatings: Hot-dip galvanized after fabrication and applied according to MFMA-4.



3. Nonmetallic Coatings: Manufacturer's standard PVC, polyurethane, or polyester coating applied according to MFMA-4.
  4. Painted Coatings: Manufacturer's standard painted coating applied according to MFMA-4.
  5. Channel Dimensions: Selected for applicable load criteria.
- B. Nonmetallic Slotted Support Systems: Structural-grade, factory-formed, glass-fiber-resin channels and angles with 9/16-inch- diameter holes at a maximum of 8 inches o.c., in at least 1 surface.
1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
    - a. Allied Tube & Conduit.
    - b. Cooper B-Line, Inc.; a division of Cooper Industries.
    - c. Fabco Plastics Wholesale Limited.
    - d. Seasafe, Inc.
  2. Fittings and Accessories: Products of channel and angle manufacturer and designed for use with those items.
  3. Fitting and Accessory Materials: Same as channels and angles, except metal items may be stainless steel.
  4. Rated Strength: Selected to suit applicable load criteria.
- C. Raceway and Cable Supports: As described in NECA 1 and NECA 101.
- D. Conduit and Cable Support Devices: Steel hangers, clamps, and associated fittings, designed for types and sizes of raceway or cable to be supported.
- E. Support for Conductors in Vertical Conduit: Factory-fabricated assembly consisting of threaded body and insulating wedging plug or plugs for non-armored electrical conductors or cables in riser conduits. Plugs shall have number, size, and shape of conductor gripping pieces as required to suit individual conductors or cables supported. Body shall be malleable iron.
- F. Structural Steel for Fabricated Supports and Restraints: ASTM A 36/A 36M, steel plates, shapes, and bars; black and galvanized.
- G. Mounting, Anchoring, and Attachment Components: Items for fastening electrical items or their supports to building surfaces include the following:
1. Powder-Actuated Fasteners: Threaded-steel stud, for use in hardened portland cement concrete, steel, or wood, with tension, shear, and pullout capacities appropriate for supported loads and building materials where used.
    - a. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
      - 1) Hilti Inc.

- 2) ITW Ramset/Red Head; a division of Illinois Tool Works, Inc.
  - 3) MKT Fastening, LLC.
  - 4) Simpson Strong-Tie Co., Inc.; Masterset Fastening Systems Unit.
2. Mechanical-Expansion Anchors: Insert-wedge-type, zinc-coated steel, for use in hardened portland cement concrete with tension, shear, and pullout capacities appropriate for supported loads and building materials in which used.
  - a. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
    - 1) Cooper B-Line, Inc.; a division of Cooper Industries.
    - 2) Empire Tool and Manufacturing Co., Inc.
    - 3) Hilti Inc.
    - 4) ITW Ramset/Red Head; a division of Illinois Tool Works, Inc.
    - 5) MKT Fastening, LLC.
3. Concrete Inserts: Steel or malleable-iron, slotted support system units similar to MSS Type 18; complying with MFMA-4 or MSS SP-58.
4. Clamps for Attachment to Steel Structural Elements: MSS SP-58, type suitable for attached structural element.
5. Through Bolts: Structural type, hex head, and high strength. Comply with ASTM A 325.
6. Toggle Bolts: All-steel springhead type.
7. Hanger Rods: Threaded steel.

## **2.2 FABRICATED METAL EQUIPMENT SUPPORT ASSEMBLIES**

- A. Description: Welded or bolted, structural-steel shapes, shop or field fabricated to fit dimensions of supported equipment.

## **PART 3 - EXECUTION**

### **3.1 APPLICATION**

- A. Comply with NECA 1 and NECA 101 for application of hangers and supports for electrical equipment and systems except if requirements in this Section are stricter.
- B. Maximum Support Spacing and Minimum Hanger Rod Size for Raceway: Space supports for EMT, IMC, and RMC as scheduled in NECA 1, where its Table 1 lists maximum spacings less than stated in NFPA 70. Minimum rod size shall be 1/4 inch in diameter.
- C. Multiple Raceways or Cables: Install trapeze-type supports fabricated with steel slotted support system, sized so capacity can be increased

by at least 25 percent in future without exceeding specified design load limits.

1. Secure raceways and cables to these supports with two-bolt conduit clamps.
- D. Spring-steel clamps designed for supporting single conduits without bolts may be used for 1-1/2-inch and smaller raceways serving branch circuits and communication systems above suspended ceilings and for fastening raceways to trapeze supports.

### **3.2 SUPPORT INSTALLATION**

- A. Comply with NECA 1 and NECA 101 for installation requirements except as specified in this Article.
- B. Raceway Support Methods: In addition to methods described in NECA 1, EMT, IMC, and RMC may be supported by openings through structure members, as permitted in NFPA 70.
- C. Strength of Support Assemblies: Where not indicated, select sizes of components so strength will be adequate to carry present and future static loads within specified loading limits. Minimum static design load used for strength determination shall be weight of supported components plus 200 lb.
- D. Mounting and Anchorage of Surface-Mounted Equipment and Components: Anchor and fasten electrical items and their supports to building structural elements by the following methods unless otherwise indicated by code:
  1. To Wood: Fasten with lag screws or through bolts.
  2. To New Concrete: Bolt to concrete inserts.
  3. To Masonry: Approved toggle-type bolts on hollow masonry units and expansion anchor fasteners on solid masonry units.
  4. To Existing Concrete: Expansion anchor fasteners.
  5. Instead of expansion anchors, powder-actuated driven threaded studs provided with lock washers and nuts may be used in existing standard-weight concrete 4 inches thick or greater. Do not use for anchorage to lightweight-aggregate concrete or for slabs less than 4 inches thick.
  6. To Steel: Beam clamps (MSS Type 19, 21, 23, 25, or 27) complying with MSS SP-69.
  7. To Light Steel: Sheet metal screws.
  8. Items Mounted on Hollow Walls and Nonstructural Building Surfaces: Mount cabinets, panelboards, disconnect switches, control enclosures, pull and junction boxes, transformers, and other devices on slotted-channel racks attached to substrate by means that meet seismic-restraint strength and anchorage requirements.
- E. Drill holes for expansion anchors in concrete at locations and to depths that avoid reinforcing bars.

**3.3      INSTALLATION OF FABRICATED METAL SUPPORTS**

- A.    Cut, fit, and place miscellaneous metal supports accurately in location, alignment, and elevation to support and anchor electrical materials and equipment.
- B.    Field Welding:    Comply with AWS D1.1/D1.1M.

**3.4      PAINTING**

- A.    Touchup:    Clean field welds and abraded areas of shop paint.    Paint exposed areas immediately after erecting hangers and supports.    Use same materials as used for shop painting.    Comply with SSPC-PA 1 requirements for touching up field-painted surfaces.
  - 1.    Apply paint by brush or spray to provide minimum dry film thickness of 2.0 mils.
- B.    Touchup:    Provide all touchup painting of for all field welds, bolted connections, and abraded areas of shop paint on miscellaneous metal.
- C.    Galvanized Surfaces:    Clean welds, bolted connections, and abraded areas and apply galvanizing-repair paint to comply with ASTM A 780.

- - - END - - -

**SECTION 26 05 33**  
**RACEWAY AND BOXES FOR ELECTRICAL SYSTEMS**

**PART 1 - GENERAL**

**1.1 STIPULATIONS**

- A. Project drawings and general provisions of the Contract, including but not limited to all; General and Supplementary Conditions, Division 01 Specification Sections and all related specification sections apply to this Section.
- B. Related Specification Sections:
  - 1. Division 07 - Penetrations Fire Stopping.
  - 2. Division 26 - Common Work Results for Electrical.
  - 3. Division 26 - Low Voltage Electrical Power Conductors and Cables.
  - 4. Division 26 - Grounding and Bonding for Electrical Systems
  - 5. Division 26 - Hangers and Supports for Electrical Systems
  - 6. Division 26 - Identification for Electrical Systems
  - 7. Division 27 - Common Work Results for Communications Systems
  - 8. Division 27 - Network Communications
  - 9. Division 28 - Common Work Results for Safety and Security Systems
  - 10. Division 28 - Physical Access Control System (PACS)

**1.2 SUMMARY**

- A. This Section includes raceways, fittings, boxes, enclosures, and cabinets for electrical wiring.
- B. Related Sections include the following:
  - 1. Division 26 Section "Underground Ducts and Raceways for Electrical Systems" for exterior ductbanks, manholes, and underground utility construction.

**1.3 DEFINITIONS**

- A. The following definitions shall form in part and/or in whole a part of this specification. Refer to related specification sections for additional definitions.
  - 1. EMT: Electrical metallic tubing.
  - 2. ENT: Electrical nonmetallic tubing.
  - 3. EPDM: Ethylene-propylene-diene terpolymer rubber.
  - 4. FMC: Flexible metal conduit.
  - 5. IMC: Intermediate metal conduit.
  - 6. LFMC: Liquid-tight flexible metal conduit.
  - 7. LFNC: Liquid-tight flexible nonmetallic conduit.
  - 8. NBR: Acrylonitrile-butadiene rubber.
  - 9. RNC: Rigid nonmetallic conduit.

#### 1.4 SUBMITTALS

- A. Product Data: For surface raceways, wire-ways and fittings, floor boxes, hinged-cover enclosures, and cabinets.
- B. Shop Drawings: For the following raceway components. Include plans, elevations, sections, details, and attachments to other work.
  - 1. Custom enclosures and cabinets.
  - 2. For handholes and boxes for underground wiring, including the following:
    - a. Duct entry provisions, including locations and duct sizes.
    - b. Frame and cover design.
    - c. Grounding details.
    - d. Dimensioned locations of cable rack inserts, and pulling-in and lifting irons.
    - e. Joint details.
- C. Coordination Drawings: Conduit routing plans, drawn to scale, on which the following items are shown and coordinated with each other, based on input from installers of the items involved:
  - 1. Structural members in the paths of conduit groups with common supports.
  - 2. HVAC and plumbing items and architectural features in the paths of conduit groups with common supports.
- D. Manufacturer Seismic Qualification Certification: Submit certification that enclosures and cabinets and their mounting provisions, including those for internal components, will withstand seismic forces defined in Division 26 Section "Vibration and Seismic Controls for Electrical Systems." Include the following:
  - 1. Basis for Certification: Indicate whether withstand certification is based on actual test of assembled components or on calculation.
    - a. The term "withstand" means "the cabinet or enclosure will remain in place without separation of any parts when subjected to the seismic forces specified and the unit will retain its enclosure characteristics, including its interior accessibility, after the seismic event."
  - 2. Dimensioned Outline Drawings of Equipment Unit: Identify center of gravity and locate and describe mounting and anchorage provisions.
  - 3. Detailed description of equipment anchorage devices on which the certification is based and their installation requirements.
- E. Qualification Data: For professional engineer and testing agency.
- F. Source quality-control test reports.

## **1.5 QUALITY ASSURANCE**

- A. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, Article 100, by a testing agency acceptable to authorities having jurisdiction, and marked for intended use.
- B. Comply with NFPA 70.

## **PART 2 - PRODUCT**

### **2.1 METAL CONDUIT AND TUBING**

- A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
  - 1. AFC Cable Systems, Inc.
  - 2. Alfalex Inc.
  - 3. Allied Tube & Conduit; a Tyco International Ltd. Co.
  - 4. Anamet Electrical, Inc.; Anaconda Metal Hose.
  - 5. Electri-Flex Co.
  - 6. Manhattan/CDT/Cole-Flex.
  - 7. Maverick Tube Corporation.
  - 8. O-Z Gedney; a unit of General Signal.
  - 9. Wheatland Tube Company.
- B. Rigid Steel Conduit: ANSI C80.1.
- C. Aluminum Rigid Conduit: ANSI C80.5.
- D. IMC: ANSI C80.6.
- E. PVC-Coated Steel Conduit: PVC-coated rigid steel conduit.
  - 1. Comply with NEMA RN 1.
  - 2. Coating Thickness: 0.040 inch, minimum.
- F. EMT: ANSI C80.3.
- G. FMC: Zinc-coated steel.
- H. LFMC: Flexible steel conduit with PVC jacket.
- I. Fittings for Conduit (Including all Types and Flexible and Liquidtight), EMT, and Cable: NEMA FB 1; listed for type and size raceway with which used, and for application and environment in which installed.
  - 1. Conduit Fittings for Hazardous (Classified) Locations: Comply with UL 886.
  - 2. Fittings for EMT: Steel, compression type.
  - 3. Coating for Fittings for PVC-Coated Conduit: Minimum thickness, 0.040 inch, with overlapping sleeves protecting threaded joints.

- J. Joint Compound for Rigid Steel Conduit or IMC: Listed for use in cable connector assemblies, and compounded for use to lubricate and protect threaded raceway joints from corrosion and enhance their conductivity.

## **2.2 NONMETALLIC CONDUIT AND TUBING**

- A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
1. AFC Cable Systems, Inc.
  2. Anamet Electrical, Inc.; Anaconda Metal Hose.
  3. Arnco Corporation.
  4. CANTEX Inc.
  5. CertainTeed Corp.; Pipe & Plastics Group.
  6. Condux International, Inc.
  7. ElecSYS, Inc.
  8. Electri-Flex Co.
  9. Lamson & Sessions; Carlon Electrical Products.
  10. Manhattan/CDT/Cole-Flex.
  11. RACO; a Hubbell Company.
  12. Thomas & Betts Corporation.
- B. ENT: NEMA TC 13.
- C. RNC: NEMA TC 2, Type EPC-40-PVC, unless otherwise indicated.
- D. LFNC: UL 1660.
- E. Fittings for ENT and RNC: NEMA TC 3; match to conduit or tubing type and material.
- F. Fittings for LFNC: UL 514B.

## **2.3 METAL WIRE-WAYS**

- A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
1. Cooper B-Line, Inc.
  2. Hoffman.
  3. Square D; Schneider Electric.
- B. Description: Sheet metal sized and shaped as indicated, NEMA 250, Type 1, unless otherwise indicated.
- C. Fittings and Accessories: Include couplings, offsets, elbows, expansion joints, adapters, hold-down straps, end caps, and other fittings to match and mate with wireways as required for complete system.
- D. Wireway Covers: Hinged type.



- E. Finish: Manufacturer's standard enamel finish.

## **2.4 NONMETALLIC WIRE-WAYS**

- A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
1. Hoffman.
  2. Lamson & Sessions; Carlon Electrical Products.
- B. Description: Fiberglass polyester, extruded and fabricated to size and shape indicated, with no holes or knockouts. Cover is gasketed with oil-resistant gasket material and fastened with captive screws treated for corrosion resistance. Connections are flanged, with stainless-steel screws and oil-resistant gaskets.
- C. Description: PVC plastic, extruded and fabricated to size and shape indicated, with snap-on cover and mechanically coupled connections with plastic fasteners.
- D. Fittings and Accessories: Include couplings, offsets, elbows, expansion joints, adapters, hold-down straps, end caps, and other fittings to match and mate with wireways as required for complete system.

## **2.5 SURFACE RACEWAYS**

- A. Surface Metal Raceways: Galvanized steel with snap-on covers. Manufacturer's standard enamel finish in color selected by Architect.
1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
    - a. Thomas & Betts Corporation.
    - b. Walker Systems, Inc.; Wiremold Company (The).
    - c. Wiremold Company (The); Electrical Sales Division.
- B. Surface Nonmetallic Raceways: Two-piece construction, manufactured of rigid PVC with texture and color selected by Architect from manufacturer's standard colors.
1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
    - a. Butler Manufacturing Company; Walker Division.
    - b. Enduro Systems, Inc.; Composite Products Division.
    - c. Hubbell Incorporated; Wiring Device-Kellems Division.
    - d. Lamson & Sessions; Carlon Electrical Products.
    - e. Panduit Corp.
    - f. Walker Systems, Inc.; Wiremold Company (The).
    - g. Wiremold Company (The); Electrical Sales Division.

## **2.6 BOXES, ENCLOSURES, AND CABINETS**

- A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
1. Cooper Crouse-Hinds; Div. of Cooper Industries, Inc.
  2. EGS/Appleton Electric.
  3. Erickson Electrical Equipment Company.
  4. Hoffman.
  5. Hubbell Incorporated; Killark Electric Manufacturing Co. Division.
  6. O-Z/Gedney; a unit of General Signal.
  7. RACO; a Hubbell Company.
  8. Robroy Industries, Inc.; Enclosure Division.
  9. Scott Fetzer Co.; Adalet Division.
  10. Spring City Electrical Manufacturing Company.
  11. Thomas & Betts Corporation.
  12. Walker Systems, Inc.; Wiremold Company (The).
  13. Woodhead, Daniel Company; Woodhead Industries, Inc. Subsidiary.
- B. Sheet Metal Outlet and Device Boxes: NEMA OS 1.
- C. Cast-Metal Outlet and Device Boxes: NEMA FB 1, ferrous alloy, Type FD, with gasketed cover.
- D. Nonmetallic Outlet and Device Boxes: NEMA OS 2.
- E. Metal Floor Boxes: Cast metal, fully adjustable, rectangular.
- F. Nonmetallic Floor Boxes: Nonadjustable, round.
- G. Small Sheet Metal Pull and Junction Boxes: NEMA OS 1.
- H. Cast-Metal Access, Pull, and Junction Boxes: NEMA FB 1, cast aluminum with gasketed cover.
- I. Hinged-Cover Enclosures: NEMA 250, Type 1, with continuous-hinge cover with flush latch, unless otherwise indicated.
1. Metal Enclosures: Steel, finished inside and out with manufacturer's standard enamel.
  2. Nonmetallic Enclosures: Plastic, finished inside with radio-frequency-resistant paint.
- J. Cabinets:
1. NEMA 250, Type 1, galvanized-steel box with removable interior panel and removable front, finished inside and out with manufacturer's standard enamel.
  2. Hinged door in front cover with flush latch and concealed hinge.
  3. Key latch to match panelboards.
  4. Metal barriers to separate wiring of different systems and voltage.
  5. Accessory feet where required for freestanding equipment.

## **2.7 SLEEVES FOR RACEWAYS**

- A. Steel Pipe Sleeves: ASTM A 53/A 53M, Type E, Grade B, Schedule 40, galvanized steel, plain ends.
- B. Cast-Iron Pipe Sleeves: Cast or fabricated "wall pipe," equivalent to ductile-iron pressure pipe, with plain ends and integral water-stop, unless otherwise indicated.
- C. Sleeves for Rectangular Openings: Galvanized sheet steel with minimum 0.052- or 0.138-inch thickness as indicated and of length to suit application.

## **2.8 SLEEVE SEALS**

- A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
  - 1. Advance Products & Systems, Inc.
  - 2. Calpico, Inc.
  - 3. Metraflex Co.
  - 4. Pipeline Seal and Insulator, Inc.
- B. Description: Modular sealing device, designed for field assembly, to fill annular space between sleeve and cable.
  - 1. Sealing Elements: EPDM interlocking links shaped to fit surface of cable or conduit. Include type and number required for material and size of raceway or cable.
  - 2. Pressure Plates: Plastic. Include two for each sealing element.
  - 3. Connecting Bolts and Nuts: Carbon steel with corrosion-resistant coating of length required to secure pressure plates to sealing elements. Include one for each sealing element.

## **PART 3 - EXECUTION**

### **3.1 RACEWAY APPLICATION**

- A. Comply with the following indoor applications, unless otherwise indicated:
  - 1. Exposed, Not Subject to Physical Damage: EMT.
  - 2. Exposed, Not Subject to Severe Physical Damage: EMT.
  - 3. Exposed and Subject to Severe Physical Damage: Rigid steel conduit. Includes raceways in the following locations:
    - a. Loading dock.
    - b. Corridors used for traffic of mechanized carts, forklifts, and pallet-handling units.
    - c. Mechanical rooms.
  - 4. Concealed in Ceilings and Interior Walls and Partitions: EMT.

5. Connection to Vibrating Equipment (Including Transformers and Hydraulic, Pneumatic, Electric Solenoid, or Motor-Driven Equipment): FMC, except use LFMC in damp or wet locations.
  6. Damp or Wet Locations: Rigid steel conduit.
  7. Raceways for Optical Fiber or Communications Cable in Spaces Used for Environmental Air: Plenum-type, optical fiber/communications cable raceway.
  8. Raceways for Optical Fiber or Communications Cable Risers in Vertical Shafts: Riser-type, optical fiber/communications cable raceway.
  9. Raceways for Concealed General Purpose Distribution of Optical Fiber or Communications Cable: General-use, optical fiber/communications cable raceway.
  10. Boxes and Enclosures: NEMA 250, Type 1, except use NEMA 250, Type 4, stainless steel in damp or wet locations.
- B. Minimum Raceway Size: 3/4-inch trade size.
- C. Raceway Fittings: Compatible with raceways and suitable for use and location.
1. Rigid and Intermediate Steel Conduit: Use threaded rigid steel conduit fittings, unless otherwise indicated.
  2. PVC Externally Coated, Rigid Steel Conduits: Use only fittings listed for use with that material. Patch and seal all joints, nicks, and scrapes in PVC coating after installing conduits and fittings. Use sealant recommended by fitting manufacturer.
- D. Install nonferrous conduit or tubing for circuits operating above 60 Hz. Where aluminum raceways are installed for such circuits and pass through concrete, install in nonmetallic sleeve.
- E. Do not install aluminum conduits in contact with concrete.

### **3.2 INSTALLATION**

- A. Comply with NECA 1 for installation requirements applicable to products specified in Part 2 except where requirements on Drawings or in this Article are stricter.
- B. Keep raceways at least 6 inches away from parallel runs of flues and steam or hot-water pipes. Install horizontal raceway runs above water and steam piping.
- C. Complete raceway installation before starting conductor installation.
- D. Support raceways as specified in Division 26 Section "Hangers and Supports for Electrical Systems."
- E. Arrange stub-ups so curved portions of bends are not visible above the finished slab.

- F. Install no more than the equivalent of three 90-degree bends in any conduit run except for communications conduits, for which fewer bends are allowed.
- G. Conceal conduit and EMT within finished walls, ceilings, and floors, unless otherwise indicated.
- H. Threaded Conduit Joints, Exposed to Wet, Damp, Corrosive, or Outdoor Conditions: Apply listed compound to threads of raceway and fittings before making up joints. Follow compound manufacturer's written instructions.
- I. Raceway Terminations at Locations Subject to Moisture or Vibration: Use insulating bushings to protect conductors, including conductors smaller than No. 4 AWG.
- J. Install pull wires in empty raceways. Use polypropylene or monofilament plastic line with not less than 200-lb tensile strength. Leave at least 12 inches of slack at each end of pull wire.
- K. Raceways for Optical Fiber and Communications Cable: Install raceways, metallic and nonmetallic, rigid and flexible, as follows:
  - 1. 3/4-Inch Trade Size and Smaller: Install raceways in maximum lengths of 50 feet.
  - 2. 1-Inch Trade Size and Larger: Install raceways in maximum lengths of 75 feet.
  - 3. Install with a maximum of two 90-degree bends or equivalent for each length of raceway unless Drawings show stricter requirements. Separate lengths with pull or junction boxes or terminations at distribution frames or cabinets where necessary to comply with these requirements.
- L. Install raceway sealing fittings at suitable, approved, and accessible locations and fill them with listed sealing compound. For concealed raceways, install each fitting in a flush steel box with a blank cover plate having a finish similar to that of adjacent plates or surfaces. Install raceway sealing fittings at the following points:
  - 1. Where conduits pass from warm to cold locations, such as boundaries of refrigerated spaces.
  - 2. Where otherwise required by NFPA 70.
- M. Expansion-Joint Fittings for RNC: Install in each run of aboveground conduit that is located where environmental temperature change may exceed 30 deg F, and that has straight-run length that exceeds 25 feet.
  - 1. Install expansion-joint fittings for each of the following locations, and provide type and quantity of fittings that accommodate temperature change listed for location:
    - a. Indoor Spaces: Connected with the Outdoors without Physical Separation: 125 deg F temperature change.
    - b. Attics: 135 deg F temperature change.

2. Install fitting(s) that provide expansion and contraction for at least 0.00041 inch per foot of length of straight run per deg F of temperature change.
  3. Install each expansion-joint fitting with position, mounting, and piston setting selected according to manufacturer's written instructions for conditions at specific location at the time of installation.
- N. Flexible Conduit Connections: Use maximum of 72 inches of flexible conduit for recessed and semi-recessed lighting fixtures, equipment subject to vibration, noise transmission, or movement; and for transformers and motors.
1. Use LFMC in damp or wet locations subject to severe physical damage.
  2. Use LFMC or LFNC in damp or wet locations not subject to severe physical damage.
- O. Recessed Boxes in Masonry Walls: Saw-cut opening for box in center of cell of masonry block, and install box flush with surface of wall.
- P. Set metal floor boxes level and flush with finished floor surface.
- Q. Set nonmetallic floor boxes level. Trim after installation to fit flush with finished floor surface.

### **3.3 SLEEVE INSTALLATION FOR ELECTRICAL PENETRATIONS**

- A. Coordinate sleeve selection and application with selection and application of fire-stopping.
- B. Concrete Slabs and Walls: Install sleeves for penetrations unless core-drilled holes or formed openings are used. Install sleeves during erection of slabs and walls.
- C. Use pipe sleeves unless penetration arrangement requires rectangular sleeved opening.
- D. Rectangular Sleeve Minimum Metal Thickness:
1. For sleeve cross-section rectangle perimeter less than 50 inches and no side greater than 16 inches, thickness shall be 0.052 inch.
  2. For sleeve cross-section rectangle perimeter equal to, or greater than, 50 inches and 1 or more sides equal to, or greater than, 16 inches, thickness shall be 0.138 inch.
- E. Fire-Rated Assemblies: Install sleeves for penetrations of fire-rated floor and wall assemblies unless openings compatible with firestop system used are fabricated during construction of floor or wall.
- F. Cut sleeves to length for mounting flush with both surfaces of walls.

- G. Extend sleeves installed in floors 2 inches above finished floor level.
- H. Size pipe sleeves to provide 1/4-inch annular clear space between sleeve and raceway unless sleeve seal is to be installed or unless seismic criteria require different clearance.
- I. Seal space outside of sleeves with grout for penetrations of concrete and masonry and with approved joint compound for gypsum board assemblies.
- J. Interior Penetrations of Non-Fire-Rated Walls and Floors: Seal annular space between sleeve and raceway, using joint sealant appropriate for size, depth, and location of joint.
- K. Fire-Rated-Assembly Penetrations: Maintain indicated fire rating of walls, partitions, ceilings, and floors at raceway penetrations. Install sleeves and seal with firestop materials. Comply with all UL and NFPA standards.

#### **3.4 SLEEVE-SEAL INSTALLATION**

- A. Install to seal underground, exterior wall penetrations.
- B. Use type and number of sealing elements recommended by manufacturer for raceway material and size. Position raceway in center of sleeve. Assemble mechanical sleeve seals and install in annular space between raceway and sleeve. Tighten bolts against pressure plates that cause sealing elements to expand and make watertight seal.

#### **3.5 FIRE-STOPPING**

- A. Apply fire-stopping to electrical penetrations of fire-rated floor and wall assemblies to restore original fire-resistance rating of assembly. Fire-stopping materials and installation requirements shall be in compliance with all UL and NFPA standards.

#### **3.6 PROTECTION**

- A. Provide final protection and maintain conditions that ensure coatings, finishes, and cabinets are without damage or deterioration at time of Substantial Completion.
  - 1. Repair damage to galvanized finishes with zinc-rich paint recommended by manufacturer.
  - 2. Repair damage to PVC or paint finishes with matching touchup coating recommended by manufacturer.

VA Project No. 642-12-110  
AE Works Project No. 12030

Philadelphia VAMC  
Rekey VA Medical Center  
Bid Documents

- - - END - - -



**SECTION 26 05 53**  
**IDENTIFICATION FOR ELECTRICAL SYSTEMS**

**PART 1 - GENERAL**

**1.1 STIPULATIONS**

- A. Project drawings and general provisions of the Contract, including but not limited to all; General and Supplementary Conditions, Division 01 Specification Sections and all related specification sections apply to this Section.
- B. Related Specification Sections:
  - 1. Division 26 - Common Work Results for Electrical
  - 2. Division 26 - Low Voltage Electrical Power Conductors and Cables
  - 3. Division 26 - Grounding and Bonding for Electrical Systems
  - 4. Division 26 - Hangers and Supports for Electrical Systems
  - 5. Division 26 - Raceways and Boxes for Electrical Systems
  - 6. Division 27 - Common Work Results for Communications Systems
  - 7. Division 27 - Network Communications
  - 8. Division 28 - Common Work Results for Safety and Security Systems
  - 9. Division 28 - Physical Access Control System (PACS)

**1.2 SUMMARY**

- A. Section Includes:
  - 1. Identification for raceways.
  - 2. Identification of power and control cables.
  - 3. Identification for conductors.
  - 4. Underground-line warning tape.
  - 5. Warning labels and signs.
  - 6. Instruction signs.
  - 7. Equipment identification labels.
  - 8. Miscellaneous identification products.

**1.3 SUBMITTALS**

- A. Paragraphs in this article are defined in Division 01 Section "Submittal Procedures" as "Action Submittals."
- B. Product Data: For each electrical identification product indicated.
- C. Samples: For each type of label and sign to illustrate size, colors, lettering style, mounting provisions, and graphic features of identification products.
- D. Identification Schedule: An index of nomenclature of electrical equipment and system components used in identification signs and labels.

#### **1.4 QUALITY ASSURANCE**

- A. Comply with ANSI A13.1.
- B. Comply with NFPA 70.
- C. Comply with 29 CFR 1910.144 and 29 CFR 1910.145.
- D. Comply with ANSI Z535.4 for safety signs and labels.
- E. Adhesive-attached labeling materials, including label stocks, laminating adhesives, and inks used by label printers, shall comply with UL 969.

#### **1.5 COORDINATION**

- A. Coordinate identification names, abbreviations, colors, and other features with requirements in other Sections requiring identification applications, Drawings, Shop Drawings, manufacturer's wiring diagrams, and the Operation and Maintenance Manual; and with those required by codes, standards, and 29 CFR 1910.145. Use consistent designations throughout Project.
- B. Coordinate installation of identifying devices with completion of covering and painting of surfaces where devices are to be applied.
- C. Coordinate installation of identifying devices with location of access panels and doors.
- D. Install identifying devices before installing acoustical ceilings and similar concealment.

### **PART 2 - PRODUCTS**

#### **2.1 POWER RACEWAY IDENTIFICATION MATERIALS**

- A. Comply with ANSI A13.1 for minimum size of letters for legend and for minimum length of color field for each raceway size.
- B. Colors for Raceways Carrying Circuits at 600 V or Less:
  - 1. Black letters on an orange field.
  - 2. Legend: Indicate voltage.
- C. Colors for Raceways Carrying Circuits at More Than 600 V:
  - 1. Black letters on an orange field.
  - 2. Legend: "DANGER CONCEALED HIGH VOLTAGE WIRING" with 3-inch- high letters on 20-inch centers.
- D. Self-Adhesive Vinyl Labels for Raceways Carrying Circuits at 600 V or Less: Preprinted, flexible label laminated with a clear, weather- and

chemical-resistant coating and matching wraparound adhesive tape for securing ends of legend label.

- E. Snap-Around Labels for Raceways Carrying Circuits at 600 V or Less: Slit, pretensioned, flexible, preprinted, color-coded acrylic sleeve, with diameter sized to suit diameter of raceway or cable it identifies and to stay in place by gripping action.
- F. Snap-Around, Color-Coding Bands for Raceways Carrying Circuits at 600 V or Less: Slit, pretensioned, flexible, solid-colored acrylic sleeve, 2 inches long, with diameter sized to suit diameter of raceway or cable it identifies and to stay in place by gripping action.
- G. Tape and Stencil for Raceways Carrying Circuits More Than 600 V: 4-inch- wide black stripes on 10-inch centers diagonally over orange background that extends full length of raceway or duct and is 12 inches wide. Stop stripes at legends.
- H. Metal Tags: Brass or aluminum, 2 by 2 by 0.05 inch, with stamped legend, punched for use with self-locking cable tie fastener.
- I. Write-On Tags: Polyester tag, 0.010 inch thick, with corrosion-resistant grommet and cable tie for attachment to conductor or cable.
  - 1. Marker for Tags: Permanent, waterproof, black ink marker recommended by tag manufacturer.
  - 2. Marker for Tags: Machine-printed, permanent, waterproof, black ink marker recommended by printer manufacturer.

## **2.2 POWER AND CONTROL CABLE IDENTIFICATION MATERIALS**

- A. Comply with ANSI A13.1 for minimum size of letters for legend and for minimum length of color field for each raceway and cable size.
- B. Self-Adhesive Vinyl Labels: Preprinted, flexible label laminated with a clear, weather- and chemical-resistant coating and matching wraparound adhesive tape for securing ends of legend label.
- C. Metal Tags: Brass or aluminum, 2 by 2 by 0.05 inch, with stamped legend, punched for use with self-locking cable tie fastener.
- D. Write-On Tags: Polyester tag, 0.010 inch thick, with corrosion-resistant grommet and cable tie for attachment to conductor or cable.
  - 1. Marker for Tags: Permanent, waterproof, black ink marker recommended by tag manufacturer.
- E. Snap-Around Labels: Slit, pretensioned, flexible, preprinted, color-coded acrylic sleeve, with diameter sized to suit diameter of raceway or cable it identifies and to stay in place by gripping action.
- F. Snap-Around, Color-Coding Bands: Slit, pretensioned, flexible, solid-colored acrylic sleeve, 2 inches long, with diameter sized to suit

diameter of raceway or cable it identifies and to stay in place by gripping action.

### **2.3 CONDUCTOR IDENTIFICATION MATERIALS**

- A. Color-Coding Conductor Tape: Colored, self-adhesive vinyl tape not less than 3 mils thick by 1 to 2 inches wide.
- B. Self-Adhesive Vinyl Labels: Preprinted, flexible label laminated with a clear, weather- and chemical-resistant coating and matching wraparound adhesive tape for securing ends of legend label.
- C. Snap-Around Labels: Slit, pretensioned, flexible, preprinted, color-coded acrylic sleeve, with diameter sized to suit diameter of raceway or cable it identifies and to stay in place by gripping action.
- D. Snap-Around, Color-Coding Bands: Slit, pretensioned, flexible, solid-colored acrylic sleeve, 2 inches long, with diameter sized to suit diameter of raceway or cable it identifies and to stay in place by gripping action.
- E. Marker Tapes: Vinyl or vinyl-cloth, self-adhesive wraparound type, with circuit identification legend machine printed by thermal transfer or equivalent process.
- F. Write-On Tags: Polyester tag, 0.010 inch thick, with corrosion-resistant grommet and cable tie for attachment to conductor or cable.
  - 1. Marker for Tags: Permanent, waterproof, black ink marker recommended by tag manufacturer.
  - 2. Marker for Tags: Machine-printed, permanent, waterproof, black ink marker recommended by printer manufacturer.

### **2.4 FLOOR MARKING TAPE**

- A. 2-inch- wide, 5-mil pressure-sensitive vinyl tape, with black and white stripes and clear vinyl overlay.

### **2.5 WARNING LABELS AND SIGNS**

- A. Comply with NFPA 70 and 29 CFR 1910.145.
- B. Self-Adhesive Warning Labels: Factory-printed, multicolor, pressure-sensitive adhesive labels, configured for display on front cover, door, or other access to equipment unless otherwise indicated.
- C. Baked-Enamel Warning Signs:
  - 1. Preprinted aluminum signs, punched or drilled for fasteners, with colors, legend, and size required for application.
  - 2. 1/4-inch grommets in corners for mounting.

3. Nominal size, 7 by 10 inches.

D. Metal-Backed, Butyrate Warning Signs:

1. Weather-resistant, nonfading, preprinted, cellulose-acetate butyrate signs with 0.0396-inch galvanized-steel backing; and with colors, legend, and size required for application.
2. 1/4-inch grommets in corners for mounting.
3. Nominal size, 10 by 14 inches.

E. Warning label and sign shall include, but are not limited to, the following legends:

1. Multiple Power Source Warning: "DANGER - ELECTRICAL SHOCK HAZARD - EQUIPMENT HAS MULTIPLE POWER SOURCES."
2. Workspace Clearance Warning: "WARNING - OSHA REGULATION - AREA IN FRONT OF ELECTRICAL EQUIPMENT MUST BE KEPT CLEAR FOR 36 INCHES."

## **2.6 INSTRUCTION SIGNS**

- A. Engraved, laminated acrylic or melamine plastic, minimum 1/16 inch thick for signs up to 20 sq. inches and 1/8 inch thick for larger sizes.
1. Engraved legend with black letters on white face.
  2. Punched or drilled for mechanical fasteners.
  3. Framed with mitered acrylic molding and arranged for attachment at applicable equipment.
- B. Adhesive Film Label: Machine printed, in black, by thermal transfer or equivalent process. Minimum letter height shall be 3/8 inch.
- C. Adhesive Film Label with Clear Protective Overlay: Machine printed, in black, by thermal transfer or equivalent process. Minimum letter height shall be 3/8 inch. Overlay shall provide a weatherproof and UV-resistant seal for label.

## **2.7 EQUIPMENT IDENTIFICATION LABELS**

- A. Adhesive Film Label: Machine printed, in black, by thermal transfer or equivalent process. Minimum letter height shall be 3/8 inch.
- B. Adhesive Film Label with Clear Protective Overlay: Machine printed, in black, by thermal transfer or equivalent process. Minimum letter height shall be 3/8 inch. Overlay shall provide a weatherproof and UV-resistant seal for label.
- C. Self-Adhesive, Engraved, Laminated Acrylic or Melamine Label: Adhesive backed, with white letters on a dark-gray background. Minimum letter height shall be 3/8 inch.

- D. Engraved, Laminated Acrylic or Melamine Label: Punched or drilled for screw mounting. White letters on a dark-gray background. Minimum letter height shall be 3/8 inch.
- E. Stenciled Legend: In nonfading, waterproof, black ink or paint. Minimum letter height shall be 1 inch.

## **2.8 CABLE TIES**

- A. General-Purpose Cable Ties: Fungus inert, self-extinguishing, one piece, self-locking, Type 6/6 nylon.
  - 1. Minimum Width: 3/16 inch.
  - 2. Tensile Strength at 73 deg F, According to ASTM D 638: 12,000 psi.
  - 3. Temperature Range: Minus 40 to plus 185 deg F.
  - 4. Color: Black except where used for color-coding.
- B. UV-Stabilized Cable Ties: Fungus inert, designed for continuous exposure to exterior sunlight, self-extinguishing, one piece, self-locking. Type 6/6 nylon
  - 1. Minimum Width: 3/16 inch.
  - 2. Tensile Strength at 73 deg F, According to ASTM D 638: 12,000 psi.
  - 3. Temperature Range: Minus 40 to plus 185 deg F.
  - 4. Color: Black.
- C. Plenum-Rated Cable Ties: Self-extinguishing, UV stabilized, one piece, self-locking.
  - 1. Minimum Width: 3/16 inch.
  - 2. Tensile Strength at 73 deg F, According to ASTM D 638: 7000 psi.
  - 3. UL 94 Flame Rating: 94V-0.
  - 4. Temperature Range: Minus 50 to plus 284 deg F.
  - 5. Color: Black.
- D. Note: Only Velcro Plenum-Rated Cable Ties shall be used on Category 6 cabling. Nylon type ties shall not be permitted.

## **2.9 MISCELLANEOUS IDENTIFICATION PRODUCTS**

- A. Fasteners for Labels and Signs: Self-tapping, stainless-steel screws or stainless-steel machine screws with nuts and flat and lock washers.

### **PART 3 - EXECUTION**

#### **3.1 INSTALLATION**

- A. Verify identity of each item before installing identification products.
- B. Location: Install identification materials and devices at locations for most convenient viewing without interference with operation and maintenance of equipment.
- C. Apply identification devices to surfaces that require finish after completing finish work.
- D. Self-Adhesive Identification Products: Clean surfaces before application, using materials and methods recommended by manufacturer of identification device.
- E. Attach signs and plastic labels that are not self-adhesive type with mechanical fasteners appropriate to the location and substrate.
- F. System Identification Color-Coding Bands for Raceways and Cables: Each color-coding band shall completely encircle cable or conduit. Place adjacent bands of two-color markings in contact, side by side. Locate bands at changes in direction, at penetrations of walls and floors, at 50-foot maximum intervals in straight runs, and at 25-foot maximum intervals in congested areas.
- G. Aluminum Wraparound Marker Labels and Metal Tags: Secure tight to surface of conductor or cable at a location with high visibility and accessibility.
- H. Cable Ties: For attaching tags. Use general-purpose type, except as listed below:
  - 1. Outdoors: UV-stabilized nylon.
  - 2. In Spaces Handling Environmental Air: Plenum rated.

#### **3.2 IDENTIFICATION SCHEDULE**

- A. Concealed Raceways, Duct Banks, More Than 600 V, within Buildings: Tape and stencil 4-inch- wide black stripes on 10-inch centers over orange background that extends full length of raceway or duct and is 12 inches wide. Stencil legend "DANGER CONCEALED HIGH VOLTAGE WIRING" with 3-inch- high black letters on 20-inch centers. Stop stripes at legends. Apply to the following finished surfaces:
  - 1. Floor surface directly above conduits running beneath and within 12 inches of a floor that is in contact with earth or is framed above unexcavated space.
  - 2. Wall surfaces directly external to raceways concealed within wall.

3. Accessible surfaces of concrete envelope around raceways in vertical shafts, exposed in the building, or concealed above suspended ceilings.
- B. Accessible Raceways, Armored and Metal-Clad Cables, More Than 600 V: Self-adhesive vinyl labels. Install labels at 10-foot maximum intervals.
- C. Accessible Raceways and Metal-Clad Cables, 600 V or Less, for Service, Feeder, and Branch Circuits More Than 30 A, and 120 V to ground: Identify with self-adhesive vinyl label. Install labels at 10-foot maximum intervals.
- D. Accessible Raceways and Cables within Buildings: Identify the covers of each junction and pull box of the following systems with self-adhesive vinyl labels with the wiring system legend and system voltage. System legends shall be as follows:
  1. Emergency Power.
  2. Power.
  3. UPS.
- E. Power-Circuit Conductor Identification, 600 V or Less: For conductors in vaults, pull and junction boxes, manholes, and handholes, use color-coding conductor tape to identify the phase.
  1. Color-Coding for Phase and Voltage Level Identification, 600 V or Less: Use colors listed below for ungrounded service feeder and branch-circuit conductors.
    - a. Color shall be factory applied or field applied for sizes larger than No. 8 AWG, if authorities having jurisdiction permit.
    - b. Colors for 208/120-V Circuits:
      - 1) Phase A: Black.
      - 2) Phase B: Red.
      - 3) Phase C: Blue.
    - c. Colors for 480/277-V Circuits:
      - 1) Phase A: Brown.
      - 2) Phase B: Orange.
      - 3) Phase C: Yellow.
    - d. Field-Applied, Color-Coding Conductor Tape: Apply in half-lapped turns for a minimum distance of 6 inches from terminal points and in boxes where splices or taps are made. Apply last two turns of tape with no tension to prevent possible unwinding. Locate bands to avoid obscuring factory cable markings.
- F. Install instructional sign including the color-code for grounded and ungrounded conductors using adhesive-film-type labels.



- G. Conductors to Be Extended in the Future: Attach write-on tags to conductors and list source.
- H. Auxiliary Electrical Systems Conductor Identification: Identify field-installed alarm, control, and signal connections.
  - 1. Identify conductors, cables, and terminals in enclosures and at junctions, terminals, and pull points. Identify by system and circuit designation.
  - 2. Use system of marker tape designations that is uniform and consistent with system used by manufacturer for factory-installed connections.
  - 3. Coordinate identification with Project Drawings, manufacturer's wiring diagrams, and the Operation and Maintenance Manual.
- I. Workspace Indication: Install floor marking tape to show working clearances in the direction of access to live parts. Workspace shall be as required by NFPA 70 and 29 CFR 1926.403 unless otherwise indicated. Do not install at flush-mounted panelboards and similar equipment in finished spaces.
- J. Warning Labels for Indoor Cabinets, Boxes, and Enclosures for Power and Lighting: Self-adhesive warning labels.
  - 1. Comply with 29 CFR 1910.145.
  - 2. Identify system voltage with black letters on an orange background.
  - 3. Apply to exterior of door, cover, or other access.
  - 4. For equipment with multiple power or control sources, apply to door or cover of equipment including, but not limited to, the following:
    - a. Power transfer switches.
    - b. Controls with external control power connections.
- K. Operating Instruction Signs: Install instruction signs to facilitate proper operation and maintenance of electrical systems and items to which they connect. Install instruction signs with approved legend where instructions are needed for system or equipment operation.
- L. Emergency Operating Instruction Signs: Install instruction signs with white legend on a red background with minimum 3/8-inch- high letters for emergency instructions at equipment used for power transfer.
- M. Equipment Identification Labels: On each unit of equipment, install unique designation label that is consistent with wiring diagrams, schedules, and the Operation and Maintenance Manual. Apply labels to disconnect switches and protection equipment, central or master units, control panels, control stations, terminal cabinets, and racks of each system. Systems include power, lighting, control, communication, signal, monitoring, and alarm systems unless equipment is provided with its own identification.

1. Labeling Instructions:

- a. Indoor Equipment: Self-adhesive, engraved, laminated acrylic or melamine label. Unless otherwise indicated, provide a single line of text with 1/2-inch- high letters on 1-1/2-inch- high label; where two lines of text are required, use labels 2 inches high.
- b. Outdoor Equipment: Engraved, laminated acrylic or melamine label.
- c. Elevated Components: Increase sizes of labels and letters to those appropriate for viewing from the floor.
- d. Unless provided with self-adhesive means of attachment, fasten labels with appropriate mechanical fasteners that do not change the NEMA or NRTL rating of the enclosure.

2. Equipment to Be Labeled:

- a. Panelboards: Typewritten directory of circuits in the location provided by panelboard manufacturer. Panelboard identification shall be self-adhesive, engraved, laminated acrylic or melamine label.
- b. Enclosures and electrical cabinets.
- c. Access doors and panels for concealed electrical items.
- d. Emergency system boxes and enclosures.
- e. Enclosed switches.
- f. Enclosed circuit breakers.
- g. All video surveillance, physical access control and intrusion detection system cabling, equipment, components and equipment cabinets.

- - - END - - -

**SECTION 27 05 00  
COMMON WORK RESULTS FOR COMMUNICATIONS SYSTEMS**

**PART 1 - GENERAL**

**1.1 STIPULATIONS**

- A. Project drawings and general provisions of the Contract, including but not limited to all; General and Supplementary Conditions, Division 01 Specification Sections and stipulated Specification Sections shall apply to this and all related Division 27 specification sections.
- B. Related Specification Sections:
1. Division 26 - Common Work Results for Electrical.
  2. Division 26 - Low Voltage Electrical Power Conductors and Cables.
  3. Division 26 - Grounding and Bonding for Electrical Systems
  4. Division 26 - Hangers and Supports for Electrical Systems
  5. Division 26 - Raceways and Boxes for Electrical Systems
  6. Division 26 - Identification for Electrical Systems
  7. Division 27 - Network Communications
  8. Division 28 - Common Work Results for Electronic Safety and Security
  9. Division 28 - Physical Access Control System (PACS)
  10. Division 28 - Patient Elopement System (PES)
- C. Reference Symbols:
1. All device symbols are defined by the appropriate symbol schedule on the symbols and abbreviations sheet in the security system drawing package. Not all device symbols as indicated may be required for the project.
  2. Because of the scale of the drawings, symbols are shown on drawings as close as possible to the mounting location. Contractor shall coordinate exact locations with all drawings and affected trades prior to submittal of shop drawings.
    - a. The Contractor shall coordinate exact locations with all security drawings and site plan drawings as well as all affected trades prior to submittal of any shop drawings.
- D. Abbreviations:
1. AP: Wireless Access Point.
  2. A/V: Audio Visual Systems - For purposes of this specification section A/V systems shall include all Media Management, Video Broadcasting, Intercommunications (Paging/Public Address, Clock, Auxiliary Sound), Nurse Call\Code Blue, Video Intercom, Master Antenna (MATV) and Distance Learning Systems

- 3. AVI      Audio Visual Systems Integrator: Shall be a qualified contractor experienced in the installation and certification of A/V systems. The AVI contractor shall be responsible for the design, testing and certification of all audio/visual systems including but not limited to Intercommunications, Nurse Call\Code Blue, TV Distribution, Audio/Visual, Master Antenna and Bi-Directional Antenna systems as well as all structured cabling systems supporting these technologies.
- 4. BACnet:    TCP/IP broadcast management methods as outlined in ISO 16484-5.
- 5. BAS:      Building Automation System
- 6. BICSI:    Building Industry Consultant Services International - International organization whose primary objective is to enhance the reputation and skills of companies and individuals employed in the telecommunications and security industries by ensuring that current and developing standards are maintained.
- 7. CATV:    Community Antenna Television System - Cable TV Network
- 8. CCD:      Charge-coupled device.
- 9. CCTV:   Closed Circuit Television Surveillance System.
- 10. CMOS:    Complementary metal-oxide-semiconductor
- 11. CP:      Consolidation Point - Local Interconnection Point between horizontal cables from the building IDF/MDF rooms and horizontal cables for the furniture drops.
- 12. CPU:     Central Processing Unit
- 13. DP:      Demarcation Point - The point of interface between the Communications Networks, MATV, any Auxiliary Systems, and the associated Service Providers or Public Utilities. Also known as Entrance Facility. Shall also serve as the primary termination point for all incoming OSP cabling as well as the primary main grounding bus-bar for all communications systems. Refer to project documents for exact location and termination requirements.
- 14. DVR     Digital Video Recorder.
- 15. DGP     Data Gathering Panel- component of the Physical Access Control System (PACS) which provides the portal at the door location to communicate, store and process information received from readers, reader modules, input modules, output modules with the Security Management System CPU and software.
- 16. DTS:    Digital Termination Service: A microwave-based, line-of-sight communications provided directly to the end user.
- 17. EMI:     Electromagnetic interference.
- 18. EMT:     Electric Metallic Tubing.
- 19. ESS      Electronic Security Systems - Including but not limited to; intrusion detection, physical access control, CCTV video surveillance, electronic perimeter detection, duress alarm, programmable logic controllers (PLC), supervisory control and data acquisition (SCADA), integrated security management platforms and electronic screening systems.

20. ESSI: Electronic Security Systems Integrator - Shall be a qualified contractor experienced in the design, programming, installation, testing and certification of all Intrusion Alarm, Access Control, CCTV Surveillance and Security Management Systems. The ESSI shall have a registered RCDD professional review and seal the designs, installations and certifications of all structured cabling networks related to the installation of any IP based electronic security system.
21. EVAC: UL Listed Emergency Voice Evacuation System. Not to be confused with the building; Public Address/Intercom, Intercommunications and/or Mass Notification systems.
22. FASS: Fire Alarm and Signaling System
23. FASI: Fire Alarm System Integrator - Shall be engaged in the full time business of providing the installation of life safety systems and shall employ on staff a minimum of one NICET Level III certified contractor experienced in the installation, programming, testing and certification of Rescue Assistance, Protected Premises and Central Station Signaling Fire Alarm Systems as defined by NFPA 72.
24. GAP: Graphic Annunciator Panel - A custom fabricated fixed display panel providing operational control and visual display of all alarm and system functions related to the operation of the FAS and/or ESSM as described in related specification sections.
25. GFI: Ground fault interrupter.
26. GUI: Graphic User Interface - A specialized program employing graphical display maps of a facility and/or site which, also provides a manual user interface for all system functions and operations by utilizing control and annunciation ICON's from dedicated human machine interface terminals.
27. HMI: Human Machine Interface - A Computer-operated, video control terminal complying with FCC Part 15 CFR Title 47, Subparts A and B, and shall utilize multiple dynamic GUI based displays for annunciation and control LCD flat panel computer monitor or display screen as defined by related specification sections.
28. ICS: Intercommunications system - Shall include but not limited to all intercoms, public address, clock, program, and auxiliary sound or emergency communications systems as defined by related specification sections.
29. IDF: Intermediate Distribution Frame - The room/space that shall serve as the local termination point for all horizontal and backbone cabling. Also shall be known as Equipment Room (ER), Horizontal Cross-Connect (HC) or Floor Distribution (FD).
30. IDS: Intrusion Detection System.
31. I/O: Input/Out - Commonly associated with dry/contact relay based digital integration.

32. ITS: Information Transport Systems - For purposes of this specification section ITS shall include all data and telecommunications communications systems including but not limited to all Data, Telephone, Intercommunications (Paging/Public Address), TV Distribution Systems (MATV) and Audio Visual Systems (A/V) and IP based CCTV Surveillance Systems.
33. ITSI: Information Technology System Integrator - Shall be a qualified contractor experienced in the installation and certification of all data, telecommunications and A/V systems. The ITSI shall be responsible for the design, testing and certification of Data, Telephone communications systems and all structured cabling systems supporting these technologies.
34. LAN: Local Area Network
35. LCD: Liquid-crystal display.
36. LED: Light Emitting Diode.
37. LV: Low Voltage: As defined in NFPA 70 for circuits and equipment operating at less than 50 V or for remote-control and signaling power-limited circuits.
38. MATV: Master Antenna System - Shall include all TV and media management distribution cabling, termination jacks, head-end components, control, equipment racks, amplifiers, projection equipment and video monitoring devices as defined by the project drawings and related specification sections.
39. MDF: The Main Distribution Frame - The room/space that shall serve as the primary termination point for all backbone cabling to each IDF locations and horizontal connection point for local communication drops. May also serve as a local IDF location as well as the cross-connection and interconnection of all entrance cables from the DP for all PSTN and WAN connections. Also shall be known as Main Cross Connect (MC), Telecommunications Room (TR) and/or Campus Distributor (CD)
40. M-JPEG: Motion - Joint Photographic Experts Group.
41. MPEG: Moving picture experts group.
42. MNS: Mass Notification System
43. NEC: National Electric Code
44. NEMA: National Electrical Manufacturers Association
45. NFPA: National Fire Protection Association
46. NTSC: National Television System Committee.
47. NRTL: Nationally Recognized Testing Laboratory.
48. NVR: Network Video Recorder
49. NVS: Network Video Server
50. OTDR: Optical Time Domain Reflectometer
51. OSP: Outside Plant - All cabling associated with building services supporting the incoming service connections to Service Providers, Public Utilities and Wide Area Networks.
52. PA: Public Address or Building Intercommunications System.
53. PACS: Physical Access Control System.
54. POTS: Plain Old Telephone Service - Analog Telephone Circuit used for the connection of FAX machines, BAS and FAS communications devices and shall be wired upstream of the facility's telephone switch.

- 55. PSTN: Public Switched Telephone Network - Connection to local telephone utility providing local telephony communications service.
- 56. RCDD BICSI accredited Reregistered Communications Distribution Designer
- 57. RFI: Radio-frequency interference.
- 58. RIGID: Rigid conduit is galvanized steel tubing, with a tubing wall that is thick enough to allow it to be threaded.
- 59. RS-232: A TIA/EIA standard for asynchronous serial data communications protocol between terminal devices. This standard defines a 25-pin connector and certain signal characteristics for interfacing computer equipment.
- 60. RS-485: A TIA/EIA standard for multipoint communications protocol.
- 61. SCADA: Supervisory Control and Data Acquisition - A system used in to monitor and control plant status of facilities scattered over wide geographic areas.
- 62. SMS: Security Management System - A system incorporating security alarms, door controls, emergency intercoms/paging, duress alarms and surveillance systems all integrated through a single operating platform, providing centralized command and control capability for the various systems via dedicated human machine interface terminals.
- 63. TCP/IP: The standard communications protocol that implement protocol stack on which the Internet and data communications networks operate
- 64. TGB: Telecommunications Grounding Busbar - Located in each IDF
- 65. TMGB Main Grounding Busbar - Located at the building DP/MDF
- 66. TP: Transition Point - A location in the horizontal cabling where flat under-carpet cable transitions to a horizontal cabling consolidation point (CP).
- 67. TVSS: Transient voltage surge suppressor
- 68. VLAN: Virtual LAN - A technique made possible by switching technologies that permits the logical grouping of any number of network devices into one or more sub- networks.
- 69. UPS: Uninterruptible Power Supply
- 70. UTP: Unshielded Twisted Pair
- 71. VMS: Video Management Software
- 72. VoIP: Voice Over IP telephone Network
- 73. WAN: Wide Area Network
- 74. WLAN: Wireless Local Area Network

E. Definitions:

1. Contract Documents: The documents consisting of the Form of Agreement between Owner and Contractor, Conditions of the Contract, (General, Supplementary, and other Conditions), Drawings, Specifications and all Addenda issued prior to the execution of the Contract.
2. Contract Drawings: The drawings that form a part of the Contract Documents that provides the graphical representation of the project requirements intended design and/or performance criteria to be delivered by the Contractor.

3. Reference Drawings: A drawing and/or set of drawings produced by a proprietary supplier, manufacturer, subcontractor, or fabricator included in the Contract Documents for informational purposes, providing specific information related to the installation of related appurtenances, components, devices, hardware, products and/or systems. Reference Drawings shall also include any Contract Drawings from prior bid packages that may have pertinent information or require coordination of trades related to this contract.
4. Shop Drawings: A drawing and/or set of drawings produced by the contractor, supplier, manufacturer, subcontractor, or fabricator as a detailed representation of the proper installation of the related, appurtenance, component, device, hardware, product and/or system to be delivered in conformance to the requirements of the Contract Documents.

## 1.2 SUMMARY

- A. This Section contains the overall requirements associated with all Division 27 Specification Sections, and includes the project design intent for all security network communication cabling and equipment related to the installation of a new Physical Access Control System (PACS) and Patient Elopement System as specified by Division 28 specification sections.
  - B. In addition, this section shall address all requirements for submittals, quality assurance, product handling, record documents, project conditions, installation, system performance, demonstrations, testing and certifications for all scopes of work related to network communication cabling for this project scope of work. Refer to related Division 26, 27 and 28 specification sections and all contract drawings for additional information.
1. The intent of this project is to award as a single prime contract the successful Contractor shall act as the prime contractor for the project and who herein shall be known as the "Contractor".
    - a. The ITSI shall be a sub-contractor to the prime contractor and shall have overall responsibility for all designs, equipment and all technical support related to all Division 27 and Division 28 scopes of work and shall ensure full coordination of all work as required to provide the following fully operational communications network in accordance with all related specification sections and contract drawings.
      - 1) The Division 27 integrator shall be responsible for providing all equipment, devices, system components, final cable terminations, programming, commissioning and testing of all security network communications cabling and equipment in accordance with all related Division 27 and Division 28 specification sections.
      - 2) All sub-contractors shall meet the minimum technical capabilities, certifications and licensing requirements as defined by the "Quality Assurance" chapter.



- C. It shall be the responsibility of the Contractor to furnish and install all necessary cabling, conduits/raceways, cable terminations, controls, systems, active communications switching equipment, materials, devices, components, electrical power, equipment racks/cabinets and software as well as all appurtenances, programming, commissioning and testing necessary to deliver a complete and fully operational security communications network as indicated by the contract documents.
1. The installation, performance, features, functions, software and programming criteria as specified herein as well as all related Division 27 specification sections have been designed to offer the maximum system efficiency, ease of operation, occupant safety and the protection of equipment as recommended by the Veterans Administration (VA) and Design Professional.
    - b. Any deviations from the specified criteria shall be documented, reviewed and agreed to in writing by VA's Project Engineer and Design Professional prior to submission of bids. Refer to Division 1, and all related Division 27 specification sections for any substitutions and/or project deviation requests.
      - 1) The required information shall include but not limited to: reason for deviation, all differences in performance, operation and function from the herein specified requirements, all benefits and added features to the Government as a result of the deviations and any additional incurred costs to the Government for maintenance and long term ownership.
      - 2) Failure to provide the VA's Project Engineer and Design Professional with the required information shall result in any shop drawing submissions being returned for non-conformance with the contract requirements.
    - c. The contractor and all sub-contractors for this work shall have read all of the General Conditions, Special Requirements, General Requirements and all related specification sections and in the execution of all work shall be bound by all of the conditions and requirements therein.
    - d. Prior to the submission of the Bid any discrepancies or inconsistencies noted within these specifications and/or the project drawings shall be brought to the immediate attention of the VA's Project Engineer and Design Professional.
  2. All device symbols are defined by the appropriate symbol schedules as indicated by the symbol and abbreviation drawing sheets for each discipline. The Contractor shall coordinate exact locations with all architectural, mechanical, electrical, reflected ceiling, furniture drawings and door hardware specifications as well as all affected trades prior to submittal of bids.

3. All symbols are shown on the contract drawings as close as possible to their intended location. Contractor shall coordinate the installation of all equipment, devices, controls, components, cabling conduits/raceways and integration of other systems with all affected trades and specified system integrators. The contractor shall document all coordination requirements at the time of shop drawing submission.
  - a. Drawings for this work are diagrammatic and intended to convey the extent, general arrangement and locations of the work. Because of the scale of the drawings, certain basic items such as access panels, conduits, cabinet sizes, penetration sleeves, pull boxes, back-boxes and junction boxes may or may not be shown on the contract drawings. Include all items where required by code and related specification sections for proper installation of all work.
  - b. Where ambiguity exists between the project specifications and the contract drawings, the superior in system performance regardless of cost shall prevail and shall be delivered by the Contractor at no additional expense to the project.
4. Project specifications and drawings may not deal individually with every part, control, device, component, or appurtenance which may be required to produce the equipment performance for the specified system and/or as required for compliance with all specified systems integration.
  - a. Include such items and components, as required, for complete operational systems as defined by the project documents, whether or not specifically indicated. The contractor shall be responsible for providing conduits/raceways, cable terminations, controls, systems, equipment, materials, devices, components, electrical power, equipment racks/cabinets, software, programming, commissioning, testing and all appurtenances as well as the integration of any ancillary systems or Government provided equipment/components/systems.
  - b. Coordinate with other applicable trades in submittal of shop drawings and the installation of all systems. All shop drawings shall detail space conditions in order to accommodate other concerned trades, all equipment locations are subject to final review by the VA's Project Engineer and Design Professional.

D. Use Of Premises

1. General: The Contractor shall have limited use of premises for construction operations only as required to meet the scopes of work as delineated by the Contract Documents.
  - a. The contractor is reminded that this is and will continue to be an operating healthcare facility. It shall be the contractor's responsibility to become completely familiar with all existing conditions at the Station, and review all proposed equipment and cable installation requirements which shall have any impact to the daily operations of the Station.

- 1) All Division 27 scopes of work shall be planned and executed as a phased construction project and shall be considered critical to all construction activities.
  - 2) The Contractor shall plan; schedule and install all scopes of work in accordance with the requirements of the project construction schedule and shall be coordinated with all the appropriate VAMC agencies prior to commencement. Refer to all related specification sections for additional information related to project scheduling and facility access.
2. The Contractor shall design, prepare, schedule and coordinate all scopes of work without disruption of any existing security system functions or the daily operation of the facility. All communications cabling and equipment shall be installed in such a manner that all new controls, equipment and/or devices shall be installed, programmed and tested prior to switch over and/or disconnecting of any existing electronic security systems.
- a. The contractor shall coordinate all installation activities so as not to disrupt the daily routines of the facility and shall include any costs related to a phased construction methodology including but not limited all necessary temporary equipment, devices, components or systems as well as any labor costs associated with any installation, commissioning, testing demolition of any systems required to be performed after normal business hours of the facility.
  - 1) Contractor shall plan, schedule and install all communications cabling and equipment in accordance with all requirements of the project construction schedule. Refer to related specification sections for additional information related to project scheduling and facility access.
  - b. Prior to the disabling, switchover and/or demolition of the existing PACS components and associated cabling, all new system components, equipment, processors, servers, devices, conduits, cabling, software and programming shall be in place, tested and fully operational.
  - c. Upon completion of the new PACS and prior to the switchover of all existing field devices and wiring the contractor shall coordinate with the VA Project Engineer and Design Professional all proposed system conversions and/or switchover methodologies. This coordination shall include all affected systems, areas of change over, change over procedures and duration of work to be performed.
  - 1) The contractor shall coordinate all installation and demolition activities so as not to disrupt the daily routine of the facility or negatively impact the integrality of the facility's security and life safety measures.

- 2) Contractor shall demolish all existing electronic security systems, cabling, devices, components and/or controls not integrated with the new electronic security management system at the completion of each project phase and only after final acceptance by the Government, Government' Representatives and the Design Professionals. The removal or demolition of all existing security system devices and/or field wiring not incorporated into the new systems shall be performed in such a manner consistent with all requirements of NFPA 70.
  - 3) Contractor shall submit a demolition plan for review by the VA Contracting Officer, VA Police Department and the Design Professionals outlining all procedures, means, methods and precautions to be employed in the demolition of all existing electronic security systems.
    - a) No demolition of any existing security systems shall commence until all new and/or temporary systems are installed, operational, fully tested and accepted by the VA Contracting Officer, VA Police Department and the Design Professionals.
3. All employees of the contractor and all subcontractors shall comply with the Philadelphia VMAC security management program and obtain all required security clearances from the VA Police Department for all personnel and staff requiring access to the Station and contiguous spaces.
- a. The Contractor shall submit all required information to the VA's Project Engineer for background checks of all personnel prior to the time when access is planned for the contracted work. Failure to receive the required clearances will mean denial of access to site for that individual. The Contractor will allow for this activity in their project schedule.
    - 1) All contractors and sub-contractors shall be required to follow all campus security procedures as required to ensure the safety of staff, patients and visitors and not compromise the daily operations of the Station. Personnel shall abide by all Government HIPAA regulations and the prohibition of carrying, transporting or possessing of any weapons, alcohol, narcotics or other contraband on Federal Facilities.
    - 2) Failure to abide by any of the above referenced requirements can at the minimum cause restriction of access to the facility for the offending individual, fines and/or penalties to Prime and/or sub-contractor. Imprisonment of the offending individual as set forth by Local, State and Federal laws.

### 1.3 REFERENCES

- A. References to industry and trade association standards as well as all building codes are minimum installation requirements. The codes, standards and agencies listed below shall form a part of this specification section and all work shall comply with the latest adopted standards.
- B. Where the contract drawings and specifications mandate a greater requirement or performance than those specified by any of the below referenced codes and standards, the Contract Documents shall then be the governing requirements for this project. The minimum codes and standards to be applied for this project shall be the following;
  - 1. All applicable requirements of NFPA 70 "National Electrical Code" including, but not limited to:
    - a. Article 250, Grounding
    - b. Article 300, Part A. Wiring Method
    - c. Article 310, Conductors for General Wiring
    - d. Article 725, Remote Control, Signaling Circuits
    - e. Article 800, Communication Systems
  - 2. National Fire Protection Association:
    - a. NFPA-72: National Fire Alarm and Signaling Code
    - b. NFPA-75: Standard for the Protection of Electronic Computer/Data Processing Equipment
    - c. NFPA-99: Standard for Health Care Facilities
    - d. NFPA-101: Life Safety Code
  - 3. ANSI/TIA Compliance: Comply with the following Electronics Industries Association Standards:
    - a. ANSI/TIA-568C: "Commercial Building Telecommunication Standard"
    - b. ANSI/TIA-569: "Commercial Building Standard for Telecommunications Pathways and Spaces"
    - c. ANSI/TIA-455: "FOTP-61, Measurement of Fiber or Cable Attenuation Using an OTDR"
    - d. ANSI/TIA-606: "The Administration Standard for the Telecommunications Infrastructure of Commercial Building"
    - e. ANSI/TIA-607A: "Commercial Building Grounding and Bonding Requirements for Telecommunications"
    - f. ANSI/TIA-492A: "Detail Specification for 850-nm Laser Optimized 50-µm Core Diameter/125µm Cladding Diameter Class 1a Graded Index Multi-Mode Optical Fibers"
    - g. ANSI/TIA-1179: "Healthcare Facility Telecommunications Infrastructure Standard"
  - 4. Underwriters Laboratories, Inc.:
    - a. UL 486A: "Wire connectors and soldering lugs for use with copper conductors"

- b. UL 1449: "Transient voltage surge suppressors"
  - c. UL 1581: "Standard for Electrical Wires, Cables, and Flexible Cords"
  - d. UL 478: "Standard for Electronic Data-Processing Units and Systems"
  - e. UL 83: "Thermoplastic-Insulated Wires and Cables,"
  - f. UL 910: "Test Method for Fire and Smoke Characteristics of Cables Used in Air-Handling Spaces." Provide products which are UL-listed and labeled.
  - g. UL 1069: Hospital Signaling and Nurse Call Equipment
5. Federal Communications Commission:
- a. FCC Regulations Part 15 Title 47.
6. Institute of Electrical and Electronic Engineers (IEEE)
- a. IEEE 802.3 - "Carrier Sense Multiple Access with Collision Detection," and all applicable supplements a through af".
  - b. IEEE 802.3.u-100-"Base T/100-Base-TX, Fast Ethernet"
  - c. IEEE 802.3.z-"Gigabit Ethernet"
  - d. IEEE 802.3.ab-"1000 Base T"
  - e. IEEE 802.3.ae-"10 Gigabit Ethernet"
  - f. IEEE 802.3.af-"Data Terminal Equipment (DTE) Power via Media Dependent Interface (MDI) that"
  - g. IEEE 802.11.b/g/n-"Wireless Transmission Standard"
  - h. IEEE 802.11.af-"Power over Ethernet"
7. ISO/TC - International Organization for Standardization's (ISO) Technical Committee (TC)
- a. 21730 - Health informatics - Use of mobile wireless communication and computing technology in healthcare facilities.
8. NEMA/ICEA Compliance:
- a. WC-5 - "Thermoplastic-Insulated Wire and Cable for the Transmission and Distribution of Electrical Energy,"
  - b. WC30 - "Color Coding of Wires and Cables," pertaining to control and signal transmission media.
9. Internet Networking Standards: Network hardware and software shall be able to communicate with the Internet and provide for the creation of IP based networks for the Agency. All supplied hardware shall comply with the following minimum standards and RFC's as appropriate.
- a. MIL-STD - 1777, RFC 971 - Internet Protocol
  - b. MIL-STD - 1778, RFC 793 - Transmission Control Protocol
  - c. MIL-STD - 1780, RFC 959 - File Transfer Protocol
  - d. MIL-STD - 1781, RFC 821 - Simple Mail Transfer Protocol
  - e. MIL-STD - 1782, RFC 854 - TELNET Protocol
  - f. RFC 950 - Internet Standard Sub-netting Procedure
  - g. RFC 1140 - Official Protocol Standards

- h. RFC 1156 - MIB Base for IP Networks
  - i. RFC-1213 - MIB-II
  - j. RFC-1757 - Remote Monitoring (RMON)
  - k. RFC 1157 - Simple Network Management Protocol
  - l. RFC 1720 - TCP/IP, OSI Compliant
  - m. RFC 1918 - Address Allocation for Private Subnets
  - n. RFC 1583 - OSPF, Version II
  - o. RFC 1723 - RIP -II
- 10. ASTM Compliance: Comply with applicable requirements of D-2219 and D-2220. Provide copper conductors with conductivity of not less than 98% at 20°C (68°F).
  - 11. NECA (National Electrical Contractors Association) Standard of Installation
  - 12. BICSI -TDM 12<sup>th</sup> edition
  - 13. ADA Standards for Accessible Design
  - 14. Veterans Health Administration (VHA) Telecommunications Support Services
  - 15. The Joint Commission (TJC) formally - Joint Commission on Accreditation of Healthcare Organizations (JCAHO)
  - 16. Local Authority Having Jurisdiction
  - 17. National Electrical Manufacturers Association (NEMA)

#### 1.4 SUBMITTALS

- A. In addition, to all submittal requirements as stipulated by Division 01 specifications sections, the Contractor shall provide all shop drawing submittals in accordance with the following:
  - 1. The VA's Project Engineer and Design Professional approval shall be obtained for all equipment and material before delivery to the job site. Delivery, storage, or installation of equipment or material which has not had prior approval will not be permitted at the job site.
  - 2. All submittals shall include adequate descriptive literature, catalog cuts, shop drawings, and other data necessary for the Government to ascertain that the proposed equipment and materials comply with specification requirements. Catalog cuts submitted for approval shall be legible and clearly identify equipment being submitted.
  - 3. Submittals shall be provided as a complete submission; no partial submissions will be accepted. Failure to provide a complete submission shall result in all submittals being returned for resubmission.
    - a. In addition to all paper submission requirements as stipulated by Division 01 the Contractor shall also submit one complete set of electronic submittals in a PDF format.
  - 4. No substituted equipment shall be reviewed without prior approval in accordance with the requirements of "substitutions" under Division 1 specification section.
  - 5. Mark the submittals, "SUBMITTED UNDER SECTION\_\_\_\_\_".
    - a. Submittals shall be marked to show specification reference including the section and paragraph numbers.

6. The Contractor shall schedule submittals in order to maintain the project schedule. For coordination requirements refer to Division 01 Specification Sections, which outline basic submittal requirements and coordination. All Division 01 Specification Sections requirements shall be used in conjunction with this specification section.
7. Prior to any submission the contractor shall be responsible for performing the following quality control items to ensure compliance with all project requirements:
  - a. Review all Shop Drawings and Product Data
  - b. Review all field measurement criteria.
  - c. Review all field construction criteria and methodologies.
  - d. Review all catalog numbers and similar data.
  - e. Review all coordination requirements of affected trades.
  - f. Review conformance to all appropriate specification sections.
8. All shop drawings shall be prepared using latest version of AutoCAD, drawn accurately, and in accordance with the VA's CAD Standards "CAD Standard Application Guide". The Contractor shall not reproduce the Contract Documents or copy standard information as the basis of the technical data, hand drawn mark-ups of the original project drawings shall not be acceptable. Failure to provide a complete set of "contractor prepared" installation drawings at the time of submittal shall result in all submittals being returned for resubmission.
9. Submission Packaging: The Contractor shall organize the submissions according to the following packaging requirements.
  - a. Electronic Copy Submission: One complete set of electronic equipment data sheets and drawings submitted in PDF format and collated in two distinct files:
    - 1) Equipment Data Sheets, equipment schedules, alarm matrixes cable termination spread sheets, and all related pertinent information.
    - 2) Drawings including all site plans, floor plans, risers, point to point wiring, grounding, installation details and mounting elevations.
  - b. Hard Copy Submission: For each manual, provide heavy duty, commercial quality, durable three (3) ring vinyl covered loose leaf binders, sized to receive 8.5 x 11 in paper, and appropriate capacity to accommodate the contents. Provide a clear plastic sleeve on the spine to hold labels describing the contents. Provide pockets in the covers to receive folded sheets.



- 1) Binders: For each manual, provide heavy duty, commercial quality, durable three (3) ring vinyl covered loose leaf binders, sized to receive 8.5 x 11 in paper, and appropriate capacity to accommodate the contents. Provide a clear plastic sleeve on the spine to hold labels describing the contents. Provide pockets in the covers to receive folded sheets.
    - a) Where two (2) or more binders are required to accommodate data; correlate the data in each binder into related groupings according to the Project Manual table of contents. Cross-reference other binders where necessary to provide essential information for communication of proper operation and/or maintenance of the component or system.
    - b) Identify each binder on the front and spine with printed binder title, Project title or name, and subject matter covered. Indicate the volume number if applicable.
  - 2) Dividers: Provide heavy paper dividers with celluloid tabs for each Section. Mark each tab to indicate contents.
  - 3) Protective Plastic Jackets: Provide protective transparent plastic jackets designed to enclose diagnostic software for computerized electronic equipment.
  - 4) Text Material: Where written material is required as part of the manual use the manufacturer's standard printed material, or if not available, specially prepared data, neatly typewritten on 8.5 inches by 11 inches 20 pound white bond paper.
  - 5) Drawings: Where drawings and/or diagrams are required as part of the manual, provide reinforced punched binder tabs on the drawings and bind them with the text.
    - a) Where oversized drawings are necessary, fold the drawings to the same size as the text pages and use as a foldout.
    - b) If drawings are too large to be used practically as a foldout, place the drawing, neatly folded, in the front or rear pocket of the binder. Insert a type written page indicating the drawing title, description of contents and drawing location at the appropriate location of the manual.
    - c) Drawings shall be sized to ensure details and text is of legible size. Text shall be no less than 1/16" tall.
10. The ITSI shall have a registered RCDD professional review and seal shop drawings related to network designs, installations, testing, certifications and structured cabling layouts for communications systems. Failure to provide RCDD sealed shop drawings shall result in all shop drawings being returned for resubmission without any reviews taking place.
11. The VA's Project Engineer and Design Professional's review of the shop drawings and/or samples does not relieve the Contractor from

compliance with the requirements of the project documents. Unless the Contractor has informed the VA's Project Engineer and Design Professional in writing of such deviation at the time of submission, has noted the deviation on the shop drawings, and the VA's Project Engineer and Design Professional has given written approval of the specific deviation to the project document.

- a. All project requirements shall stand. The VA's Project Engineer and Design Professional's review does not relieve the Contractor from responsibility for any errors of omission in the submission of shop drawings and/or samples.
12. Submit all system testing, commissioning and startup procedures to be employed. Include all estimated times for performance of all tests; all test equipment and manpower necessary for testing.
13. Submit all integrator qualifications and certifications in accordance with the requirements as specified elsewhere in this specification section.
14. Submit project schedule outlining the time frames for all equipment with long lead times for equipment deliveries; include all system commissioning, testing and training time expectations. Project schedule shall be submitted as CPM schedule and shall utilize a software based project management program.
15. The system integrator shall have a registered RCDD professional review and seal the designs, installation and testing certification of all structured cabling networks. Failure to provide RCDD sealed shop drawings shall result in all shop drawings being returned for resubmission without any reviews taking place.
16. The Government and Design Professional's review of the shop drawings and/or samples does not relieve the Contractor from compliance with the requirements of the project documents. Unless the Contractor has informed the Agency representative and Design Professional in writing of such deviation at the time of submission, has noted the deviation on the shop drawings, and the Design Professional has given written approval of the specific deviation to the project document all project requirements shall stand. The Design Professional's review also does not relieve the Contractor from responsibility for any errors of omission in the submission of shop drawings and/or samples.
17. Submit all system testing and startup procedures to be employed. Include all estimated times for performance of all tests, test equipment and manpower necessary for testing.
18. Submit all integrator qualifications and certifications in accordance with the requirements as specified elsewhere in this specification section.
19. Submit project schedule outlining the time frames for all equipment with long lead times for equipment deliveries; include all system commissioning, testing and training time expectations. Project schedule shall be submitted as CPM schedule and shall utilize a software based project management program.

B. Shop Drawings:

1. All shop drawings shall include sufficient information, clearly presented, to determine full compliance with all project drawings and specifications. Include the following information as applicable for review, failure to provide all information listed below shall result in all shop drawing submittals being returned for resubmission:
  - a. All Building Floor and Site Plans.
  - b. All equipment, devices and components with manufacturer's name(s), model numbers,
  - c. All equipment, device and component electrical ratings and power requirements
  - d. All equipment, device and component performance ratings.
  - e. All equipment /device battery calculations,
  - f. All equipment /device voltage drop calculations,
  - g. All db losses for all passive video devices and cabling,
  - h. All Speaker taps, voltages and zoning
  - i. All equipment rack/cabinet layouts and rack/cabinet sizes.
  - j. All device-mounting elevations.
  - k. All device wiring details.
  - l. All grounding and bonding connections.
  - m. Complete point-to-point-wiring diagrams for all systems. Include all equipment and wiring termination schedules and/or matrixes.
2. Provide a complete set of "contractor prepared" installation drawings. Drawings at the minimum shall consist of floor plans indicating all; passive and active electronic component locations, field devices, device identifications, distribution racks, patch panels, control panels, auxiliary control panels, power supplies, conduit and cable requirements as well as all 120 volt electrical circuit locations and designations.
  - a. Drawings shall include at the minimum the following;
    - 1) Detailed equipment layouts for all communications rooms. Coordinate all room layouts with affected trades.
    - 2) Floor plan drawings showing locations of all equipment, devices, equipment cabinets and/or rack locations. Identify type and sizes of all equipment cabinets and/or racks.
    - 3) All cable tray layouts, and conduit routing of all conduits 2 inches in diameter or greater.
    - 4) System riser diagrams and single line drawings
    - 5) Equipment wattage for each location and estimated BTU production.
    - 6) Detailed equipment layouts for all equipment consoles. Indicate all equipment locations, power connections and installation details.

- 7) All equipment mounting hardware/brackets and installation details, Identify type size, load capacities of all mounting hardware/brackets; include all mounting and installation details, all space requirements, any special architectural modifications required.
  - 8) Outline drawings of all equipment cabinets/racks showing the relative position of all major components, all-wiring and grounding terminations. Include all panel, cabinet and/or rack dimensions.
  - 9) All grounding and bonding termination points
  - 10) All electrical circuit numbers and distribution panel locations.
3. Provide a complete termination schedule of all communications device drop/outlet locations; indicate on the installation drawings all device drops/outlets' unique identification which shall correspond with schedule and drawings.
  4. All shop drawing submissions shall have a registered RCDD professional review and seal all shop drawings confirming that the proposed network infrastructure is in conformance with all stipulated standards and requirements as herein specified.

C. Equipment Submittals:

1. Sufficient information, clearly presented, shall be included to determine compliance with drawings and specifications.
  - a. Include all equipment data sheets pertinent to equipment provided. All data sheets shall be highlighted indicating specific equipment supplied. Failure to provide the proper annotation of all equipment shall result in submittals being returned for resubmission.
2. Submit complete technical data necessary to evaluate the material and equipment. Include a complete technical specification for the submitted equipment, noting differences and adherence to this Section. Failure to provide the required data will result in all submittals being returned for resubmission.
3. Submit performance data, equipment ratings, cable requirements, control sequences, GUI based control panels, programming matrixes, logic diagrams and all other descriptive data necessary to describe the installation and operations of the system being provided. Failure to provide the required data will result in all submittals being returned for resubmission.
4. Parts list which shall include those replacement parts recommended by the equipment manufacturer, quantity of parts, current price and availability of each part.

D. Maintenance and Operation Manuals: Submit in accordance with all requirements of Division 01 specification sections and as herein specified.

1. Maintenance and Operation Manuals: Submit as required for systems and equipment specified in the technical sections. Furnish four copies, bound in hardback binders, (manufacturer's standard binders) or an approved equivalent. Furnish one complete manual as specified in the technical section but in no case later than prior to performance of systems or equipment test, and furnish the remaining manuals prior to contract completion.
2. Inscribe the following identification on the cover: the words "Maintenance and Operations Manual", include the name and location of the system, equipment, building, name of Contractor, and contract number. Include in the manual the names, addresses, and telephone numbers of each subcontractor installing the system or equipment and the local representatives for the system or equipment.
3. Provide a "Table of Contents" and assemble the manual to conform to the table of contents, with tab sheets placed before instructions covering the subject. The instructions shall be legible and easily read, with large sheets of drawings folded in.
4. The manuals shall include:
  - a. Internal and interconnecting wiring and control diagrams with data to explain detailed operation and control of the equipment.
  - b. A control sequence describing start-up, operation, and shutdown.
  - c. Description of the function of each principal item of equipment.
  - d. Installation and maintenance instructions.
  - e. Safety precautions.
  - f. Diagrams and illustrations.
  - g. Testing methods.
  - h. Performance data.
  - i. Pictorial "exploded" parts list with part numbers. Emphasis shall be placed on the use of special tools and instruments. The list shall indicate sources of supply, recommended spare parts, and name of servicing organization.
  - j. Appendix; list qualified permanent servicing organizations for support of the equipment, including addresses and certified qualifications.
5. Approvals will be based on complete submission of manuals together with shop drawings.
6. After approval and prior to installation, furnish the Resident Engineer with one sample of each of the following:
  - a. A 300 mm (12 inch) length of each type and size of wire and cable along with the tag from the coils of reels from which the samples were taken.
  - b. Each type of conduit and pathway coupling, bushing and termination fitting.

- c. Raceway and pathway hangers, clamps and supports.
- d. Duct sealing compound.

#### 1.5 QUALITY ASSURANCE

- A. Integrator Qualifications: The projects' Information Technology System (ITS) integrator shall be an accredited and authorized distributor of the appropriate equipment manufacturer and shall be fully certified in the installation, testing and programming of all equipment being provided.
1. The ITS integrator shall be capable of providing documented successful work experience of at least three (3) facilities of equivalent size and technical requirements utilizing the proposed equipment being provided. The system integrator shall have on staff a minimum of one full time individual that holds a current RCDD registration.
    - a. All information technology system work shall be certified in writing to the VA's Project Engineer and Design Professional by on staff RCDD professional asserting that all communications network system shop drawings and structured cabling is in conformance with all appropriate NEC requirements, EIA/TIA standards; BICSI recognized installation practices and all related specification sections.
  2. Cable Installer Qualifications: The cable installation contractor shall demonstrate not less than three (3) years' experience in the installation of structured cabling systems and shall have on staff a minimum of one full time member that holds a current BICSI level II installer credential.
    - a. NOTE: The installation of all communications cabling shall be under the direct supervision of a current BICSI level II installer who shall be knowledgeable in the following technical applications:
      - 1) The Routing and installation of shielded, unshielded, twisted pair, coaxial and fiber optic cables.
      - 2) Bonding and grounding of cable tray and equipment racks.
      - 3) Fusion splicing of fiber optic cabling.
      - 4) Testing copper conductors for electrical continuity.
      - 5) Testing and Certifying of UTP structured cabling for attenuation and worst case near end cross talk.
      - 6) Testing and Certifying of ALL fiber optic cabling employing an Optical Time Domain Reflectometer (OTDR) in accordance with TIA/EIA protocols.
      - 7) Testing and Certifying of coaxial cable networks for RF leakage
      - 8) Termination, connection, and testing of shielded and unshielded twisted pair cable, coaxial cabling and fiber optic cabling on all specified connectors, electrical protection blocks, termination blocks and patch panels.
      - 9) Generally accepted industry standards, as well as manufacturers written installation instructions, will be

used for in-process quality control and final acceptance of the work installation.

3. The Government reserves the right to require the Contractor to submit a list of installations where the products have been in operation before approval
  - a. Experience shall be defined as the completion of the specific system being provided, with that system being successfully operated by the Owner for its intended purpose for at least three (3) years.
  - b. In addition to the above "Experience" shall also be defined as the completion of modifications and renovations to any associated system being provided in any existing occupied facility of this size and magnitude.
  - c. For each facility submit the following:
    - 1) Name and location of facility
    - 2) Date of Occupancy or beneficial use by Owner
    - 3) Owner's representative to contact and telephone number
    - 4) Construction Manager or General Contractor
    - 5) Project Architect or Engineer
    - 6) Provide information on the installed locations with operational equipment
    - 7) Registration number and expiration date of RCDD professional
    - 8) Registration number and expiration date of Level II installer.
4. Service Qualifications: The ITS integrator shall be a permanent service organization maintained and/or trained by the product manufacturer on the products being provided for this project.
  - a. The integrator shall be (where required) properly licensed by the governing municipality to provide the services and work for the specific system being installed. In addition all integrators shall be capable of providing full service for the entire warranty period within an 8-hour response time upon notification of a service emergency.
- F. Manufacturers Qualifications: The manufacturer shall regularly and presently produce, as one of the manufacturer's principal products, the equipment and materials specified for this project, and shall have manufactured the items for at least three years.
  1. Product Qualification: The Manufacturer's product shall have been in satisfactory operation, on three installations of similar size and type as this project, for approximately three years.
    - a. The manufacturers shall submit the appropriate documentation certifying that the project integrator is a qualified service provider of all manufacturers' products being provided for this project.

#### 1.6 RECORD DOCUMENTS

- A. In addition to all general provisions of the Contract, including but not limited to all; General and Supplementary Conditions, Division 01 Specification Sections include the following project requirements;
1. Provide complete set of finalized copies of record documents prior to final acceptance of the project by VA's Project Engineer and Design Professional in accordance with all requirements of Division 01 specification sections. At the minimum the record documents shall contain all information, data and drawings as described in Chapter 1.4 "Submittals" of this specification section.
    - a. As-built documents shall be submitted in both paper and electronic media formats in the quantities as specified by Division 1 specification requirements.
      - 1) All electronic record drawings shall be prepared and submitted utilizing an AutoCAD based program as manufactured by Autodesk. Where electronic documents are prepared using other than an AutoCAD program manufactured by Autodesk, the contractor shall provide to the VA's Project Engineer and Design Professional the necessary software to electronically view the submitted documents.
      - 2) All electronic data sheets, control sequences, programming matrixes and other descriptive data shall be provided in PDF formatted documents.
      - 3) Copies of all current system programming and associated software shall be provided on downloadable media formatted for the use in restoration all system operations and functionality in the event of a catastrophic failure.

#### **1.7 SOFTWARE AGREEMENT**

- A. Included as part of the scope of work for this project the Government shall retain the ownership and access rights of ALL system programs and software associated with all systems installed and/or modified as part of this project.
1. The contractor shall provide to VA's Project Engineer complete copies of all current software programming and software licenses related to the operation of each system prior to final acceptance of the related Contract scopes of work.
    - a. All programming shall include but not be limited to all device identifications, device descriptions, Programming Logic Matrixes, all program access level passwords as well as all function and sub-function routines.
  2. Programming and software copies shall be provided to the VA's Project Engineer on CD or DVD digital formatted media. In addition, the contractor shall provide a complete hard copy printout of all system programming and shall be included as part of closeout documentation for review by the VA's Project Engineer and Design Professional.



- B. Software and firmware upgrade provisions shall be included as part of this specification requirement and shall include the automatic upgrades as required to maintain all software and firmware to the manufacturers most current revision on all system components installed and or modified as part of this project for duration of the warranty period. This upgrade policy shall require the contractor to install, test and certify all software and firmware upgrades that become available from manufacturer for a period of one year from date of final acceptance to the expiration of the warranty.
1. Upgrading of software shall include all revised/new software, labor, testing certification as well as all licenses, software and all programming copies as described in Chapter 1.6 of this section associated with the installation of all revised software.
  2. These updates shall be accomplished in a timely manner, fully coordinated with the system operators, and incorporated into the operations\maintenance and software documentation manuals.
    - a. One (1) scheduled final update shall be provided near the end of the warranty period, at which time the Contractor shall install and validate the latest released version of the Manufacturer's software and firmware for all systems installed and\or modified for this project.
    - b. All software changes shall be recorded in a log maintained in the unit control. An electronic copy of the most current software update shall be maintained within the log.
      - 1) At a minimum, the contractor shall provide a description of the modification, when the modification occurred, and name and contact information of the individual performing the modification. The log shall be maintained in a white 3 ring binder and the cover marked "Software Change Log".
  3. Provide not less than thirty days' notice to the VA's Project Engineer and Design Professional to allow scheduling and access to system and to allow the Government to upgrade computer equipment if necessary.

#### **1.8 EXTRA MATERIAL**

- A. In addition to all general provisions of the Contract, including but not limited to all; General and Supplementary Conditions, Division 01 Specification Sections refer to related specification sections "Extra Material" for specific requirements.

- B. All Extra materials shall be provided at the time of final acceptance of the project and a signed packing list shall be obtained at the time of delivery. At no time is the contractor to use the extra materials provided for this project to replace malfunctioning or damaged equipment and or components.

## **PART 2 - PRODUCTS**

### **2.1 MANUFACTURED PRODUCTS**

- A. Materials and equipment furnished shall be of current production by manufacturers regularly engaged in the manufacture of such items, that meet and/or exceed the specified performance and features of the equipment and/or systems and for which replacement parts shall be readily available to the system integrator and/or using agency.
1. When more than one unit, device or component of the same class of equipment is required, such units, devices or components shall be the product of a single manufacturer.
  2. Acceptable manufacturers for each system shall be as specified and shall be provided in full compliance with the requirements of this and all related specification sections and contract drawings.
    - a. Manufacturers listed as acceptable shall not negate the contractors' responsibility for providing all equipment, devices, components and/or systems, in accordance with all functions and performance requirements of the Contract Documents.
    - b. Where manufacturer and/or manufacturer model numbers reference specific system components in the related specification sections, it is to establish the performance requirements and quality of the systems and components only.
      - 1) It is in no way an inference that the referenced model numbers are the manufacturer's current product and are the only acceptable components for this project unless specifically referenced as "no substitutions".
    - c. The Contractor shall provide the manufacturers' most current product that shall meet and/or exceed the specified performance and features of the equipment and/or systems.
    - d. Equivalent UL- listed equipment may be substituted for the approved manufacturers unless stipulated by other specification sections as "No Substitutions". All substitutions shall be submitted for approval by VA's Project Engineer and Design Professional in accordance with all requirements of Division 01 specification sections and Chapter 1.4 "Submittals" of this specification section.
      - 1) Where systems and/or components are referenced as "no substitutions" the specific system and/or components shall be provided.
      - 2) All substitutions shall comply with all requirements as specified above and all system performance standards shall be maintained.

- 3) The contractor shall stipulate the following information impacted by such a substitution.
  - a) Any and all extensions in time impacted by the substitution.
  - b) Any changes to the architectural or structural elements to the project
  - c) Differences in operation and/or performance from intended system criteria.
- 4) Failure to provide the required substitution information shall result in "without consideration" the immediate rejection of the substituted equipment and/or systems.

B. Equipment Assemblies and Components:

1. Components of an assembled unit need not be products of the same manufacturer.
  - a. Manufacturers of equipment assemblies, which include components made by others, shall assume complete responsibility for the final assembled unit.
  - b. Components shall be compatible with each other and with the total assembly for the intended service.
  - c. Constituent parts which are similar shall be the product of a single manufacturer.
  - d. Factory wiring shall be identified on the equipment being furnished and on all wiring diagrams.

C. Where Factory or Off-Premises Testing of any equipment, product or assembly is recommended by the product manufacturer or where specified as part of this section and/or any related specification section:

1. The VA's Contracting Officer, Design Professional and/or Government representatives shall have the option of witnessing all factory tests. The Contractor shall notify the VA's Project Engineer and Design Professional at a minimum of thirty (30) working days prior to the performance of any factory or off-premises tests.
  - a. Where the factory or assembly point for all off-premises testing is not within two (2) hours driving time from the project location, the system integrator shall include as part of this project all per diem costs (travel, meals and lodging) for a minimum of two representatives from the using agency and the project Design Professional to witness all testing.
2. Provide four (4) copies of certified test reports containing all preliminary test data and testing procedures shall be furnished to the VA's Project Engineer and Design Professional prior to any final testing and not more than ninety (90) days after completion of any tests.

3. When equipment, product or assembly fails to meet any factory or off-premises tests, retesting of equipment, product or assembly shall be mandated, the manufacturer/integrator shall be liable for all additional expenses, including all expenses incurred by the VA's Project Engineer and Design Professional for witnessing the retesting of any equipment, product or assembly.

### **PART 3 - EXECUTION**

#### **3.1 EQUIPMENT PROTECTION**

- A. Protect all materials, equipment, devices or components permanently installed and/or stored on the job site. Protect all materials, equipment, cabling, devices or components during construction and after installation, provide appropriate protection of all materials, equipment, components and/or devices until time of substantial completion. All materials, equipment, components and/or devices shall be protected during shipment and storage against any physical damage, dirt, moisture, cold, snow or rain:
  1. During installation, enclosures, racks\cabinets, equipment, controls, controllers, circuit protective devices, and other like items, shall be protected against entry of any foreign matter; and shall be vacuum cleaned both inside and outside before testing and operating and repainting if required.
  2. Any materials, equipment, components and/or devices, stored on site which have been deemed by the VA's Project Engineer or Design Professional to exhibit any indications of damage or exposure dust or moisture shall not be installed and shall returned to the source of supply for immediate replacement.
    - a. The use of spare parts or the return of defective equipment for repair to mitigate the damage of defective materials, equipment, components and/or devices shall not be acceptable. All materials, equipment, components and/or devices shall be new and unused until final acceptance by the Design Professional.
  3. Provide and apply protective material immediately upon receiving the products and maintain throughout the construction process.
    - a. Painted surfaces shall be protected with factory installed removable heavy kraft paper, sheet vinyl or equal.
    - b. Any damaged paint on equipment and materials shall be refinished with the same quality of paint and workmanship as used by the manufacturer so repaired areas is not obvious or detectable.
  4. Failure to properly protect all materials, equipment, components and/or devices prior to final acceptance shall constitute sufficient cause for rejection of materials, equipment, components and/or devices should any defects, damage or degradation in performance is observed.
- B. Immediately replace all malfunctioning materials, equipment, components and/or devices with new unused products up until the time the Design

Professional issues final acceptance of the system. The returning of any malfunctioning equipment, devices and/or components to the manufacturer for repair and then reinstallation at the project site shall not be acceptable.

1. All replacement materials, equipment, components and/or devices shall be factory new and not scavenged from the Project's spare parts inventory or factory recycled products unless expressly identified by contractor prior to replacement and approved beforehand by the Design Professional.

### **3.2 WORK PERFORMANCE**

- A. Installation, final termination, testing, start-up and commissioning of all systems, system components and cabling infrastructures shall be under the direct supervision of the appropriate system integrator. The integrator shall be an accredited and authorized distributor of the appropriate equipment manufacturer and shall be fully certified in the installation, testing, commissioning and programming of all equipment, devices, components and/or systems being provided as part of this project.
- B. Job site safety and worker safety is the responsibility of the Contractor. Ensure that safe access and egress from all work areas is maintained during movement and installation of materials. Clean up all debris generated by installation activities. Keep all communications equipment rooms free of debris at all times.
- C. Pre-installation Conferences: Include provisions to attend all pre-installation conferences at Project site in compliance with all requirements in Division 01 specification section and as herein specified. Review methods and procedures related to installation and operations of all communications systems, including, but not limited to, the following:
  1. Inspect and discuss electrical and equipment roughing-in related to all communications systems as well as other preparatory work required to be performed by other trades.
  2. Review and discuss all work, equipment deliveries, installation procedures and related scopes as required to conform to the phased construction schedule.
  3. Review sequence of operations for each type of system, control, cabling and/or integration to any systems and/or equipment provided by other trades
  4. Review and finalize construction schedule and verify availability of materials, installation personnel, equipment, and any preparatory work by other trades needed to make progress and avoid delays.
  5. Review required start-up, testing, commissioning and certifying procedures to be employed for each system and any impacts to other trades.
- D. For work on existing facilities, arrange, phase and perform work to assure the operation of all communications systems for other buildings and contiguous spaces at all times. Refer to Division 1 specification section for additional information.

- E. All new work shall be installed and connected to existing work neatly and carefully. Disturbed or damaged work shall be replaced or repaired to its prior conditions, as required by Division 1 specification sections.
- F. Coordinate the installation of all cabling, conduits/raceways and cable trays and equipment with applicable trades to ensure proper operation and function of all integrated systems in accordance with all related specification sections. Refer to Division 1 specification section for additional project coordination requirements.
  - 1. Coordinate with all trades at the time of shop drawing submission detailing all space and/or room conditions. The contractor shall coordinate with the appropriate trade all conditions impacting the installation of any system, conduit or cable tray including but not limited to all equipment locations, site conditions, ceilings, lighting fixtures, fire protection piping and ductwork layouts to the satisfaction of all concerned trades, subject to final review by the Design Professional.
    - a. Coordinate exact location of all desktop/counter/wall mounted equipment with the VA's Contracting Officer, Design Professional and all affected trades prior to the installation of any equipment and/or cabling.
    - b. Coordinate exact location(s) of all cable, conduits, equipment and/or devices installations with all architectural plans, site plans, reflected ceiling plans and affected trades prior to installation.
      - 1) Equipment installations requiring coordination with other trades the contractor shall provide all templates, back-boxes and equipment anchor bolts for mounting or flush mounting preparation, (e.g. pedestals or other devices requiring mounting on walls, concrete pads or other materials). Coordinate delivery of templates and equipment anchor bolts to preclude any delay in the construction schedule or the work of the affected trade.
    - c. If installation of equipment, devices, cabling, raceways, cable trays and/or conduit is performed prior to coordination with other trades, which interferes with work of other trades or operation and maintenance of the facility, make necessary changes to correct the condition at no additional cost to the Government.
    - d. Prior to the final programming of any systems review with VA's Project Engineer and Design Professional all system features, functions, system operations, network mapping, system integrated responses and all related programming as required for the proper operation of the respective communications systems.
- G. The Contractor shall maintain a complete set of current and up to date set of shop drawings and equipment submissions at the job site at all times. The Shop drawings and all other submissions shall be marked up to reflect all as-built conditions and shall be made available for review by the Design Professional at request.

### 3.3 EQUIPMENT/CABLE INSTALLATION AND REQUIREMENTS

- A. All system wiring and equipment installation shall be in accordance with good engineering practices and by all IEEE, EIA, NEC and manufacturer's requirements. Wiring shall comply with all state and local electrical codes. All wiring shall test free from all grounds, shorts, stray voltages and EMI.
- B. Follow manufacturers' instructions for installing, components and adjusting all equipment and cabling. Submit two (2) copies of such instructions to the VA's Project Engineer and Design Professional before installing any equipment. Provide a copy of such instructions at the equipment during any work on the equipment. Where no instructions are included with the equipment, follow accepted industry practices and workmanlike installation standards.
- C. Ensure that all communications systems cabling supports (conduits, support grips, cable tray and J-hooks) are fully installed before proceeding with cable installation.
  - 1. At no times shall any cables be installed and left unsupported, nor shall cables be tie-wrapped to any other supporting structure in lieu of specified cable supports. Do not tie-wrap or permanently affix cable bundles to approved cable supports.
    - a. NOTE: Cable bundles shall not be cinched too tightly; all cable ties shall be VELCRO type tie-wraps only. Plastic wire ties shall not be accepted on any communications cabling.
  - 2. Do not leave any system cabling unprotected on the floor at any time. If cables must be left on any floor, protect the cables so that they may not be walked on or have any material or equipment placed or rolled on top. Replace all damaged cables from demarcation to termination point; no splicing of damaged cables shall be permitted.
  - 3. Maintain manufacturers recommended minimum bend radiuses of all cabling. Do not stretch, stress, tightly coil, bend or crimp the backbone, horizontal, patch or workstation cables. The Contractor shall keep all cabling out of the way of other trades during staging of any work. The contractor at the contractor's expense will replace all severely stressed or damaged cables, equipment and materials as determined by the VA's Project Engineer and Design Professional.
- D. Equipment location shall be as close as practical to locations as indicated on the contract drawings.

1. Provide all equipment clearances in accordance with NEC requirements. Arrange equipment to facilitate unrestricted access for maintenance and service around all equipment, components and/or cable terminations.

E. Inaccessible Equipment:

1. Where the VA's Project Engineer and Design Professional determines that the Contractor has installed equipment not conveniently accessible for operation and maintenance, the equipment shall be removed and reinstalled as directed at no additional cost to the project.
  - a. "Conveniently accessible" is defined as being capable of being reached without the use of ladders, or without climbing or crawling under or over obstacles such as, but not limited to, motors, pumps, belt guards, transformers, piping, ductwork, conduit and raceways.

F. Cabling Requirements

1. Communications cabling and equipment installations shall be in accordance with good engineering practices as established by the EIA, IEEE and the NEC. All cabling shall meet all state and local electrical codes. All cabling shall test free from all grounds, shorts and EMI.
  - a. Contractors shall have the option to combine all cable home runs and conductors of same type and voltage "class" in accordance with NEC requirements unless specified elsewhere. Size all conduits and install all conductors in accordance with NEC requirements and manufacturers recommendations.
  - b. All TCP/IP based communications cabling located above accessible suspended ceilings may be installed without conduit and shall be supported by "J" hooks.
    - 1) Cabling installed above hard ceiling spaces shall be installed in dedicated conduits.
    - 2) No exposed cabling will be acceptable in finished or occupied spaces of the facility without approval by the VA's Project Engineer and Design Professional.
    - 3) Any communications system cabling installed exterior to the building and/or all cabling being routed from the facility to any remote location external to the project location shall be installed in OSP rated fiber optic cable.
2. Do not install bruised, kinked, scored, deformed, or abraded cable. Do not splice cable between indicated terminations, taps, or junction points. Remove and discard cable where damaged during installation and replace it with new cable.
3. Data Network UTP Cabling



- a. All data network UTP cabling is to be Category-6 and concealed above suspended ceilings, bundled and supported to the building structure. All cabling bundles shall be plenum rated and shall not contain any AC carrying conductors or non-associated communications network cables. All TCP/IP based communications cabling located above accessible suspended ceilings may be installed without conduit and shall be supported by "J" hooks.
  - 1) All horizontal data drops shall be Category-6 and shall be terminated on patch panels installed on the 19" equipment racks\cabinets.
  - 2) Copper station cabling may be run outside of conduits and above suspended ceilings only when between the cable tray and the conduit wall stub-up.
  - 3) All data drops and backbone cable installed above accessible ceilings shall be installed on J-hooks, cable trays, dedicated conduits, or in cable chases and/or a combination thereof as indicated contract drawing or specified. In no case shall cable be supported on ceiling tiles, T-bars, or tie- wrapped to any conduit or pipes.
    - a) Category-6 cables shall not be cinched too tightly; cable ties at patch panel locations shall be VELCRO type tie-wraps only. Plastic wire ties shall not be accepted on any Category-6 cabling.
  - 4) Each network drop shall be a dedicated Category-6 cable and shall not exceed a maximum distance of 294 feet from the associated MDF/IDF to the furthestmost data port for that network address.
  - 5) Cable Support: Securely secure to the permanent building structure where not installed in raceway. Provide "J" hooks at regular intervals appropriate to the cable and wire size.
  - 6) Cable and wiring shall not lay loose on ceiling tiles or grids. Cable must be supported in all areas. Bridle rings and tie-wrapped supporting methods are not acceptable j-hooks must be used between conduit stub-ups and cable trays for support.
  - 7) Install all cabling parallel to building lines and follow building structure. Use cable support equipment/hardware recommended by the manufacturer and/or as herein specified.
  - 8) Provide all terminations, cross-connects, wire management, surge protectors, etc. for a complete and operational system.
  - 9) Any data communications system cabling installed exterior to the building and/or all cabling being routed from the facility to any remote location external to the project location shall be installed in OSP rated Category-6 cable.

#### 4. Fiber Optic Cabling

- a. All fiber optic cabling shall be provided to meet the communications requirements for all network communications and/or audio/video systems, at the minimum all fiber optic cabling shall be sized in accordance with the project documents. All fiber optic cabling shall be a minimum of 62.5/125 OM4 or 8.9/125 OS2 type cabling or hybrid type containing both multi and single mode fiber strands as indicated by the contract drawings and/or related specification sections.
  - 1) All fiber optic cabling shall be a continuous segment from demarcation to termination point and shall be installed above accessible ceilings wherever possible. All fiber shall supported to the building structure and shall be plenum rated armored type cabling installed on "J" hooks or in cable trays or shall be standard type fiber optic cable which shall be installed in dedicated conduits.
    - a) Installation of all fiber optic cabling shall be in accordance with all guidelines established by the product manufacturer and all referenced industry standards.
    - b) Installation of the fiber cable segments when installed in conduits, special care shall be taken to avoid damage to the cable. While under pulling tension, the cable shall not be bent into a curve with a radius of less than twenty (20) times the cable diameter, or no less than manufacturers minimum.
      - (1) Pulling tension shall not exceed manufacturer's recommended maximum tensile load. Contractor shall utilize a winch with tension control or a "break-away" link designed to break away at or below the recommended maximum pulling tension.
      - (2) Use methods and lubricating compounds on cables and wires to prevent damage to material and products during pulling-in. Provide compounds that are not injurious to the cable and wire jackets that do not harden or become adhesive.
  - c) Category-6 "J"-hooks," supporting fiber optic cabling shall not exceed a maximum of 2 armored fiber cables per 2" "J"-hook, or 4 per 4" "J"-hook.
- 2) All exterior fiber optic cabling shall be rated for exterior (OSP) applications and installed in dedicated inner-duct conduit system, and routed in the exterior conduit ducts in accordance with the requirements of the contract documents. Outside plant cable shall not extend more than fifty (50) feet into a building interior unless enclosed in RGS or IMC steel conduits.

- 3) Fiber optic cabling shall be provided as the primary media for all exterior and remote building security communications networks, as well as all network communications links for all backbone communications. Each fiber optic link shall be comprised of dedicated transmitter and receiver shall be capable of providing all communication transmissions at a minimum of 1,280 feet.
  - a) The contractor shall be responsible for the determination of actual segment lengths. Actual quantities will be calculated by the routing as indicated on the contract drawings and/or in the field based on existing conditions.
- 4) Conductive fiber optic cable shall be provided for all exterior system components requiring control and/or power capabilities in the support of their operation, include all necessary surge protection and grounding for conductive cabling.
- 5) Refer to related specification sections for additional information related to cabling types, sizes and testing requirements.

5. Analog Cable Terminations:

- a. Splice, Taps and Terminations of all analog cabling: Use numbered terminal strips in junction, pull and outlet boxes, terminal cabinets, and equipment enclosures. Tighten connections to comply with tightening torques specified in UL Standard 486A.
- b. Tighten connectors and terminals, including screws and bolts, in accordance with equipment manufacturers published torque-tightening values for equipment connectors.
- c. Rack and terminal cabinet wiring shall be neatly routed or bundled and routed along rack sides. All splices and connections shall be by plug, solder or screw terminal strips, etc. Splices shall not hang in racks or terminal cabinets.

G. Environmental Conditions

1. Systems, components, devices materials and equipment shall be capable of withstanding the environmental conditions of the space without mechanical or electrical damage or degradation of operating capabilities or performance.
  - a. Interior, Controlled Environment: System components, installed in temperature-controlled interior environments shall be rated for continuous operation in ambient conditions of 2 to 50 deg C (36 to 122 deg F) dry bulb and 20 to 90 percent relative humidity, non-condensing and shall utilize NEMA 250, Type 1 enclosures.

- b. Interior, Uncontrolled Environment: System components installed in non-temperature-controlled interior environments shall be rated for continuous operation in ambient conditions of -18 to 50 deg C (0 to 122 deg F) dry bulb and 20 to 90 percent relative humidity, non-condensing and shall utilize NEMA 250, Type 4X enclosures.
- c. Exterior Environment: System components, conduits and back-boxes installed in locations exposed to weather shall be rated for continuous operation in ambient conditions of -34 to 50 deg C (-30 to 122 deg F) dry bulb and 20 to 90 percent relative humidity, condensing. Rated for continuous operation where exposed to rain as specified in NEMA 250, winds up to 137 km/h (85 mph) and snow cover up to 610 mm (24 in) thick shall utilize NEMA 250, Type 4X enclosures.
- d. Hazardous Environment: System components, conduits and back-boxes located in areas where fire or explosion hazards may exist because of flammable gases or vapors, flammable liquids, combustible dust, or ignitable fibers shall be rated, listed, and installed according to NFPA 70.
- e. Corrosive Environment: System components, conduits and back-boxes subjected to corrosive fumes, vapors, and wind-driven salt spray in coastal zones, shall utilize NEMA 250, Type 4X enclosures.
- f. Submersible Environment: System components, conduits and back-boxes subjected to prolonged submersion in water, shall utilize NEMA 250, Type 6P enclosures.
- g. Areas where equipment and devices may be subject to damage by the general population shall be installed in vandal resistant enclosures, all fire alarm devices shall be provided with wire guards.
- h. Console: All console equipment shall, unless noted otherwise, be rated for continuous operation under ambient environmental conditions of 15.6 to 29.4 deg C (60 to 85 deg F) and a relative humidity of 20 to 80 percent.

H. Conduits/raceway/Cable Trays:

- 1. Provide conduit and raceway systems for all security communications networks as indicated below. Refer to all related specification sections for additional conduit and raceway information.
  - a. Accessible suspended ceilings: Provide conduit stub-up from each outlet location to plenum space above ceiling. All conduit stub-up shall include nylon bushing at exposed edge of conduit for protection of all cabling
  - b. Exposed structure: Provide conduit run from each drops to a height of 12 feet to cable tray where provided.
  - c. Use Vertical Wire runway shall be installed in dedicated conduits and shall be supported any /all risers between floors in closets or accessible locations; in no case shall any cable risers be unsupported.
  - d. Cables entering all communications equipment rooms shall be supported with Cable tray from entrance to rack/cabinet location as indicated on the contract drawings and/or herein specified.

- e. Wire basket cable tray system shall be provided in all corridors as indicated on the contract drawings and installed as herein specified.
2. All conduits/raceways shall be concealed and shall be installed above accessible finished ceilings and/or in walls. Any conduits/raceways installed in areas requiring installation to be exposed, shall be installed tight to ceilings at right angles to walls and shall not obstruct any access hatches, equipment service panels, lighting or other equipment and/or devices. No exposed conduits/raceways shall be installed without prior approval of the VA's Project Engineer and Design Professional.
- a. Where conduits cannot be concealed above ceilings or in walls and must be installed in finished or occupied areas of the building, all conduits shall be finished wire-mold type raceways or approved equal. Finished wire-mold type raceways shall not be installed without prior approval in writing by the VA's Project Engineer and Design Professional.
  - b. Where any equipment and/or junction boxes are installed above non-accessible finished ceilings, the contractor shall provide access hatches listed for the intended application. Access hatches shall be located so that service access to the equipment and/or junction boxes is unimpeded.
    - 1) Access hatches shall not obstruct any equipment, service panels, lighting equipment, devices or any architectural elements of the ceiling. At the time of submittals the contractor shall submit all proposed access hatch locations for review by the Design Professional.
  - c. All conduits/raceways shall be supported in accordance with NEC requirements and shall be affixed in such a manner that tampering and/or removal without the use of specialized tools shall be prevented.
  - d. All conduits/raceways shall be installed in a manner that prevents tampering or removal when installed in areas exposed to the general population.
    - 1) Provide tamper-resistant installation utilizing "torx with peg" security-fastening devices for all conduits/raceways, equipment, devices and appurtenances in all areas accessible to the general population and/or areas subjected to tampering or vandalism.
  - e. Interior raceways shall be a minimum 1 inch unless otherwise noted. Exterior raceways shall be a minimum 1 1/4-inch. Size all raceways and install conductors in accordance with NEC requirements. Fill ratio shall not exceed 40 percent for indoor raceways or exterior raceways.
    - 1) EMT conduit with compression fittings and/or MC cabling may be utilized in all inaccessible ceiling areas unless otherwise restricted by code.

- 2) Threaded Rigid metal conduit shall be used on all exterior applications, stub-ups and all interior areas where concealed conduit requirements cannot be met and are exposed to tampering or damage by the general population.
  - a) All areas considered being of high risk due to the nature of the occupancy or the need to protect and maintain the integrity of the cabling shall be installed in rigid threaded conduits.
- f. Exterior raceways: PVC schedule 40 conduit at the minimum shall be utilized in all underground applications unless otherwise specified by related specification sections. The conduit shall be buried at a minimum 36" below grade. Warning flagging tape shall be buried 12" below grade to indicate the conduit routing location. Refer to related specification sections for additional information.
  - 1) All exterior conduits larger than 2" in diameter shall be provided with dedicated inner-duct conduit systems, segregated by network type (i.e. security, etc.) and shall include a minimum of one spare empty inner-duct conduit.
  - 2) The Contractor shall have the option to utilize the same trench/routing location as other utilities. In no case shall any system conduits or duct banks be combined with other electrical utilities without providing the required separation between conduits as necessary to ensure the minimal transmission or conduction of any RF and/or EMI signals.
- g. Outlet Boxes: shall be 4 x4 x 2-1/8 inches deep for all data outlet locations and single gang for wall mounted telephone locations.
  - 1) All outlet boxes shall be provided with single or dual gang device mud-rings flush to finished wall as required based on type and configuration of outlet and type of wall construction.
  - 2) Use deep masonry boxes at masonry construction. T-Bar hangers or other appropriate mounting hardware shall be utilized to support boxes mounted in the ceiling.

#### I. Penetrations of Walls and Floors

1. All wall/floor penetrations are to be sleeved and fire stopped with approved fire stopping material or sealant as applicable for the type of penetration. Coordinate all cable and conduit penetrations of building with all affected trades. Refer to all related specification sections for additional wall/floor penetration requirements.
  - a. All penetrations of rated walls and floors shall be fire stopped in accordance with the ASTM and NFPA standards. Refer to related specification sections for additional information.
  - b. Floor penetrations shall be sleeved with a minimum sleeve diameter of 4 inches. An additional penetration shall be

- provided for future use, sleeved and capped and fire stopped as required.
- c. Coordinate size of wall penetration with conduit size, number of conductors. Comply with all NEC requirements.
  - d. The fire rating of all penetrated walls, floors, and ceiling structures shall be strictly maintained. All penetrations shall be fire-stopped and sealed by the Contractor.
  - e. Install fire-stopping in open penetrations and in the annular space of penetrations for fire rated barriers.
  - f. Installation of fire-stops shall be performed by an applicator/installer qualified and trained by the manufacturer. Installation shall be performed in strict accordance with manufacturer's detailed installation procedures.
  - g. Installation of all fire-stopping shall be in accordance with fire test reports, fire resistance requirements, acceptable sample installations, manufacturer's recommendations, local fire and building authorities, and applicable codes and shall be installed in a manner acceptable to the authority having jurisdiction.

### **3.4 ELECTRICAL POWER DISTRIBUTION**

- A. All 120\208 emergency electrical power shall be provided by this Contractor from the nearest emergency distribution panel as required for the proper operation of all security communications systems, devices and/or components. Coordinate with VA's Project Engineer and Design Professional prior to connections and/or modifications to the electrical distribution panels. Additional locations requiring electrical power by the specific products and/or integrator selected equipment shall be the responsibility of this Contractor to include as part of this project.
- 1. Primary power for all security system controls, sub-control panels, processors, and power supplies shall be configured to switch to emergency backup power sources automatically when primary power is interrupted without degradation of any critical system functions.
  - a. All electrical power shall be hardwired to the panel, system components or panels employing the use of plug-in transformers, extension cords or cheater cords for the connection to electrical power shall not be acceptable.
  - 1) If no spare 20A/1P circuits are available for use, the contractor shall provide a new subpanel adjacent to the existing panel. Remove (3) 20A/1P breakers and replace with a 60A/3P breaker to feed the subpanel.
  - 2) Subpanel shall be 60A MLO with 18 circuits. Reconnect the (3) 20A/1P circuits to this new panel. Extend branch wiring as required. The Contractor shall size feeder to subpanel per the national electric code.

### 3.5 TRANSIENT VOLTAGE SUPPRESSION

- A. Transient Voltage Surge Suppression: All cables and conductors extending beyond building façade, except fiber optic cables, which serve as communications, control, or signaling circuits shall be protected against Transient Voltage surges and have Transient Voltage Surge Suppression (TVSS) protection.
1. The TVSS device shall be UL listed in accordance with Standard TIA 497B installed at each end. Lightning and surge suppression shall be a multi-strike variety and include a fault indicator.
  2. Protection shall be furnished at the equipment and additional triple solid state surge protectors rated for the application on each wire line circuit shall be installed within 914.4 mm (3 ft) of the building cable entrance. Fuses shall not be acceptable for surge protection applications. All inputs and outputs shall be tested in both normal mode and common mode to verify there is no interference at the minimum surge suppression test shall meet the following criteria.
    - a. All system power supplies serving exterior system components or devices shall be provided with the appropriate transient surge suppression protection on both the line side as well as the load side.
      - 1) A 10-microsecond rise time by 1000 microsecond pulse width waveform with a peak voltage of 1500 volts and a peak current of 60 amperes shall be the minimum performance requirements. Provide surge suppression in accordance with all manufacturers requirements.
      - 2) An 8-microsecond rise time by 20-microsecond pulse width waveform with a peak voltage of 1000 volts and a peak current of 500 amperes shall be the minimum performance requirements. Provide surge suppression in accordance with all manufacturers requirements.
      - 3) Maximum series current: 2 AMPS. Provide units manufactured by Advanced Protection Technologies, model # TE/FA 10B or TE/FA 20B or approved equal.
      - 4) Operating Temperature and Humidity: -40 to 85 degrees C (-40 to 185 degrees) shall be the minimum performance requirements. Provide surge suppression in accordance with all manufacturers requirements.

### 3.6 GROUNDING AND BONDING

- A. All electronic equipment, conduits, cable trays, racks/cabinets and cable shields shall be properly grounded and bonded in accordance with all requirements of EIA/TIA 607-A, NEC 250 and IEEE 1100. Where identified as applicable to the project, all equipment grounding and bonding shall be in accordance with all related specification sections and Motorola R56 Standards and Guidelines for Communications Sites.



1. A Telecommunications Grounding System shall be installed in all communications equipment rooms in order to provide equalization of the grounding potentials between the building power system and the telecommunications main grounding busbar (TMGB) as well as all telecommunications grounding bus-bars (TGB) in order to provide the diversion of electrical transients from the telecommunications cables and to provide a safety ground for all equipment racks/cabinets, conduits, cable trays and cable shields as well as providing the required coupling to cancel and/or reduce transients.
  - a. The TMGB and each TGB shall be provided where indicated on the drawings and shall provide an effective bonding connection to the nearest approved building grounding electrode (e.g., structural steel) as well as to the local power distribution panel grounding system (e.g., ac branch circuit panel board's equipment grounding busbar).
    - 1) The minimum bonding shall be #6 AWG copper conductor connected to the TMGB and all TGB's. Connections shall be 2-hole NEMA type compression or exothermic welded connections.
2. All grounding connections shall provide the equalization of all grounding potentials between the building power system and the grounding terminations at the communications equipment in order to provide the diversion of electrical transients as well as providing the necessary coupling in order to cancel and/or reduce any voltage transients.
  - a. Equipment Grounding: Metallic structures, equipment racks, cabinets and enclosures as well as all raceways, cable trays, junction boxes, outlet boxes, machine frames, and other conductive items shall be bonded and grounded.
  - b. Duct Banks and Manholes: Provide an insulated equipment grounding conductor in each duct containing any voltage conductors, sized per NEC except that minimum size shall be No. 2 AWG. Bond the equipment grounding conductors to the grounding bus, to all manhole hardware and ground rods, to the cable shielding grounding provisions for all cable splices, terminations and equipment enclosures.
  - c. Metallic Fences equipped with communications equipment: Fences shall be grounded with a ground rod at each fixed gate post and at each corner post.
    - 1) Drive ground rods until the top is 300 mm (12 inches) below grade. Attach a No. 4 AWG copper conductor, by exothermic weld to the ground rods and extend underground to the immediate vicinity of fence post. Lace the conductor vertically into 300 mm (12 inches) of fence mesh and fasten by two approved bronze compression fittings, one to bond wire to post and the other to bond wire to fence.
    - 2) Each gate section shall be bonded to its gatepost by a 3 by 25 mm (1/8 by one inch) flexible braided copper strap and ground post clamps. Clamps shall be of the anti-electrolysis type.

3. All connections of grounding conductors to ground rods, bus bars, rebar, structural members, pipes and fences, as well as splices of any ground conductors, shall be made by exothermic welds except where otherwise noted. All connections to bar lugs shall be exothermic weld or compression type connections. Bolted type connection of ground conductors may only be made where terminal lugs or blocks have been furnished and installed in equipment by the manufacturer.
  - a. Equipment grounding conductors shall be insulated stranded copper, except for sizes No. 10 AWG and smaller shall be solid copper. Insulation color shall be continuous green for all equipment grounding conductors, except that wire sizes No. 4 AWG and larger shall be permitted to be identified per the NEC.
    - 1) At the minimum bonding connection shall be a #6 AWG copper conductor. All grounding shall provide an effective bonding connection between the protected equipment to the nearest approved building grounding electrode (structural steel) as well as to the local power distribution panel grounding system (e.g., ac branch circuit panel board's equipment grounding busbar). All bonding and grounding connections shall be NEMA type compression or exothermic welded connections.
4. Refer to related specification sections for any additional grounding and bonding requirements.

### **3.7 EQUIPMENT IDENTIFICATION**

- A. Identify all system controls, components and equipment cabinets using plastic laminate engraved labels, or approved equal. Firmly affix to the panel, device and/or component. Refer to all related specification sections for additional information.
  1. Nameplates shall be laminated black phenolic resin with a white core with engraved lettering, a minimum of 6 mm (1/4 inch) high. Secure nameplates with screws. Nameplates that are furnished by manufacturer as a standard catalog item or where other method of identification is herein specified. Dymo or Kroy tap adhesive backed lettering shall not be acceptable.
  2. Color-code all junction boxes and enclosures per NEC recommendations. At the minimum provide all communications junction boxes as follows:
    - a. Color for Data\Telecommunications circuits - Yellow.
    - b. Color for Audio\Visual circuits - White
    - c. Letter all pull boxes and junction boxes located in service areas, tunnels, above accessible ceilings and pipe chases with laminated black phenolic resin with a white core with engraved lettering, a minimum of 6 mm (1/4 inch) high. Secure nameplates with screws.
      - 1) Example: Telecommunications "TEL" Circuit Number TEL-126. Engraved laminated plastic tags shall be used for

identification and securely fastened in accordance with all project requirements.

3. Permanently label all cabling at both ends with self-adhering plastic labels.
  - a. Labeling: hand written labels are not acceptable. All labels shall be machine printed on clear or opaque tape, stenciled onto adhesive labels, or type written onto adhesive labels. The font shall be at least one-eighth inch (1/8") in height, block characters, and legible.
    - 1) The text shall be of a color contrasting with the label such that it may be easily read. If labeling tape is utilized, the width of the tape shall not exceed 3/8," and the font color shall contrast with the background.
    - 2) All data patch panels shall exhibit data drop numbers, in sequential order, for all workstations served by the associated security equipment.
    - 3) Each fiber optic cable segment shall be labeled at each end with its respective security communications network identifier.
    - 4) Warning Tags: At each location where the fiber cable is exposed to human intrusion, it shall be marked with warning tags. These tags shall be yellow or orange in color, and shall contain the warning: "CAUTION FIBER OPTIC CABLE." The text shall be permanent, black, block characters, and at least 3/16" high.
      - (a) A warning tag shall be permanently affixed to each exposed cable or bundle of cables, at intervals of not more than five (5) feet. Any section of exposed cable which is less than five (5) feet in length shall have at least one warning tag affixed to it.
4. Provide typewritten circuit directories installed in 3-ring binders with transparent page protectors in each control and sub control cabinet and/or equipment rack.

### **3.8 MAINTENANCE & SERVICE**

#### **A. General Requirements**

1. The Contractor shall provide all services required and equipment necessary to maintain the all communications systems associated with this project in fully operational state as specified after formal written acceptance of the system.
  - a. Provide all necessary material required for performing scheduled adjustments or other non-scheduled work. Impacts on facility operations shall be minimized when performing scheduled adjustments or other non-scheduled work. Refer to Division 1 specification section for additional information.

- b. The adjustment and repair of the communications systems shall include all software and firmware up-dates on all computers, CPU's, HMI terminals, devices, communications and data transmission medias' (DTM), facility interface processors, signal transmission equipment and processors.
- c. Test, inspect and service each system on a semi-annual basis at six month intervals during the warranty period from the time of final acceptance. The contractor shall compare each six month test results with the test results at the time of final acceptance.
  - 1) The contractor shall include as part of the semi-annual test the calibration and/or adjustment of any device, component and/or system that has deviated from the original test results at the time of final acceptance.
- d. For each semi-annual maintenance period, provide written notification to the VA's Project Engineer of the systems condition before and after service, the exact components that were tested and serviced, and overall status of the system.

B. Personnel

- 1. Service personnel shall be manufacturer certified in the maintenance, testing and repair of the type of system and equipment provided for the project. Provide the VA's Project Engineer and Design Professional the name of the designated service representative, and of any change in personnel.
  - a. The VA's Project Engineer and Design Professional shall be provided copies of system manufacturer certifications for all designated service representatives.
- 2. Schedule of all work to be performed during regular working hours, Monday through Friday, excluding federal holidays.

C. Emergency Service

- 1. The Government shall initiate service calls whenever the system is not functioning properly. The Contractor shall provide the VA's Project Engineer with an emergency service center telephone number. The emergency service center shall be staffed 24 hours a day 365 days a year. The Government shall have sole authority for determining catastrophic and non-catastrophic system failures.
  - a. For catastrophic system failures, the Contractor shall provide same day eight (8) hour service response with a defect correction time not to exceed sixteen (16) hours from [notification] [arrival on site]. Catastrophic system failures are defined as any system failure that the Government determines will place the facility(s) at increased risk.
  - b. For non-catastrophic failures, the Contractor within 1 business day with a defect correction time not to exceed 48 hours from time of notification.

D. Records & Logs

1. The Contractor shall maintain records and logs of each task and organize cumulative records for each component and for the complete system chronologically. A continuous log shall be submitted for all devices. The log shall contain all initial settings, calibration, repair, and programming data. Complete logs shall be maintained and available for inspection on site, demonstrating planned and systematic adjustments and repairs have been accomplished for the system.

E. Work Request

1. The Contractor shall separately record each service call request, as received. The record shall include the serial number identifying the component involved, its location, date and time the call was received, specific nature of trouble, names of service personnel assigned to the task, instructions describing the action taken, the amount and nature of the materials used, and the date and time of commencement and completion.
2. The Contractor shall deliver a record of the work performed within five (5) working days after the work was completed.

F. System Modifications

1. The Contractor shall make any recommendations for system modification in writing to the Design Professional. No system modifications, including operating parameters and control settings, shall be made without prior written approval from the Design Professional. Any modifications made to the system shall be incorporated into the operation and maintenance manuals and all related documentation.

**3.9 WARRANTY**

- A. Warrant material and workmanship for a period as specified in Division 1 of the contract documents and all related specification sections. The warranty period shall commence from the date the Contractor received written notification of final acceptance from the Design Professional. At the minimum the contractor shall provide warranty provisions:
1. Warrant the replacement of defective components/materials and/or correct defective work when given notice by the Government during the warranty period.
  2. Warranty excludes liability for consequential incidental, or special damages due to vandalism, misuse, or acts of God.
  3. Onsite warranty response time by qualified technician shall be within 8 hours upon receipt of request from Government.
  4. Warranty repairs shall be provided to the Government at no cost. This shall include but not limited to all repairs and/or replacement of defective components/materials, all labor charges, all travel costs and all vehicle charges.
  5. Response time shall be 7 days a week / 24 hours a day / 365 days a year.
  6. Provide test, inspection and service of each system on a semi-annual basis at six month intervals.

7. Contractor must provide verification that they maintain their principle base of operation along with the personnel that will be responsible for providing service within 3 hours driving time to the project site. This tenet of the warranty shall remain in effect for the life of the warranty.
  8. All TCP/IP based communications systems cabling and related appurtenances shall be provided with the manufacturers 25 year extended warranty in addition to all requirements above.
- B. The Contractor shall, as a condition of final payment, execute a written warranty certifying all contract requirements have been completed according to all requirements of the Contract Documents.
1. All system testing, commissioning, demonstration and training shall be performed prior to final system acceptance. All defects or damages due to faulty materials or workmanship shall be repaired or replaced without delay, to the satisfaction of the VA's Project Engineer and Design Professional, at the Contractor's expense.
    - a. The contractor shall provide written documentation of test results and stating what was done to correct any deficiencies. The first inspection shall occur 90 calendar days after the acceptance date. The last inspection shall occur 30 calendar days prior to the end of the warranty.
    - b. The warranty period shall be extended until the last inspection and associated corrective actions are complete. When equipment and labor covered by the Contractor's warranty, or by a manufacturer's warranty, have been replaced or restored because of its failure during the warranty period, the warranty period for any replaced or repaired equipment or restored work shall be reinstated for a period equal to the original warranty period, and commencing with the date of completion of the replacement or restoration work.
  2. In the event any manufacturer customarily provides a warranty period greater than one (1) year, the Contractor's warranty shall be for the same duration for that component.

### **3.10 FIELD SERVICES**

- A. Notify the VA's Project Engineer and Design Professional in writing, prior to the closing of any ceilings and ten (10) days advance of testing all system cabling to prevent delays in construction schedules.
1. Test all cabling to confirm that no grounds, shorts, sneak currents, RFI and EMI conditions exist prior to start-up and commissioning of all, components, devices, equipment and/or systems.

- a. Before requesting a final inspection, the Contractor shall perform a series of end to end installation performance tests. The Contractor shall submit for approval by the VA's Project Engineer and Design Professional all test procedures to be employed, test result forms, and timetable for testing all fiber optic and copper plant wiring.
- b. Acceptance of the simple test procedures discussed below is predicated on the Contractor's use of the recommended products including but not limited to twisted pair cable, cross-connect blocks, and outlet devices specified and adherence to the inspection requirements and practices set forth. Acceptance of the completed installation will be evaluated in the context of each of these factors.

B. UTP Cable Testing

1. Minimum Test Parameter requirements for Category-6 horizontal cabling.
  - a. Category-6: Each wire/pair shall be tested at both ends for the following utilizing Contractor generated test results forms:
    - 1) Wire Map.
    - 2) Length.
    - 3) Insertion Loss.
    - 4) Near-end crosstalk (NEXT) loss.
    - 5) Power sum near-end crosstalk (PSNEXT).
    - 6) Equal-level far-end crosstalk (ELFEXT).
    - 7) Power sum equal-level far-end crosstalk (PSELFEXT).
    - 8) Return loss.
    - 9) Propagation delay.
    - 10) Delay Skew.
    - 11) Power Sum ACR.
  - b. All cable testing described herein shall exceed Category-6 transmission requirements of ANSI/TIA-568-C. In addition all cable and component transmission performance parameters shall exceed 10 Gb/s transmission requirements for connecting hardware, per the requirements of TSB-155.
    - 1) Additionally, the installed channel system shall exceed IEEE 802.3 DTE Power specification to (4) times the rated current limits with no degradation of performance or materials and shall be error free Gigabit Ethernet performance to the referenced standard. (All performance requirements shall be verified and documented by a RCCD technician at the time of testing)
  - c. Channel system shall exceed 4 Gb/s data transmission capacity within the bandwidth of 1 - 250 MHz when configured in a 4-connector channel. The 4-connector channel test configuration shall utilize a Category-6 jack, patch panel, optional 6-110 block, and patch cords, all from the same manufacturer, with qualified Category-6 cable.

- d. The 4-connector Category-6 channel performance margins in the table below shall be guaranteed provided the configuration satisfies above requirements

Electrical Parameter (1 - 250MHz)	Guaranteed Margins to Category-6 Channel Specifications
Insertion Loss	3 %
NEXT	4 dB
PSNEXT	5 dB
ELFEXT	4 dB
PSELFEXT	5 dB
Return Loss	2 dB

2. When errors are found, the source of each error shall be determined, corrected, and the cable re-tested. All defective components shall be replaced and retested. Defective components not corrected shall be reported to the VA's Project Engineer and Design Professional with explanations of the corrective actions attempted.
3. Test records shall be maintained using the approved test result forms. The form shall record closet number, riser pair number or outlet ID, outcome of test, indication of errors found (e.g., a, b, c, d, or e) cable length, re-test results after problem resolution and signature of the technician completing the tests.
4. Test results for each 4 pair, Category 6, UTP cable must be submitted with identification to match labels on all patch panel ports and 8 position modular jacks, and identification to match as-built drawings associated with that cable.
5. VA's Project Engineer and Design Professional shall observe and verify the accuracy of test results submitted.
6. Contractor shall submit both hardcopy printouts and electronic copy of all trace test results.

#### C. Fiber Optic Testing

- A. Contractor shall test each fiber strand. The VA's Project Engineer and Design Professional reserve the right to have a representative present during all or a portion of the testing process.

If the VA's Project Engineer and Design Professional elect to be present during testing, test results will only be acceptable when conducted in the presence of the VA's Project Engineer and Design Professional.

1. Fiber Optic Cable: Each fiber strand shall undergo bi-directional testing for signal attenuation losses.

##### a. Test Equipment:

- 1) Multimode: Light Source and Power Meter.
- 2) Single mode: Light Source and Power Meter.
- 3) OTDR.



b. Tests:

- 1) Multi-mode: Signal attenuation at 850 and 1300 nm.
- 2) Single-mode: Bi-directional signal attenuation at 1310 and 1550 nm.
- 3) Test all Fiber cable on the reel before installation, with an optical light meter, to ensure fiber continuity and no factory defects.
- 4) Test Criteria: Signal loss of less than (3.6 dB for 1000 Base-SX @ 850NM for 50 uM fiber) through entire passive fiber path, including cable, couplers and jumpers.

2. Fiber Optic Testing Specifications

- a. All testing shall be performed by factory trained and certified personnel.
- b. For all installed fiber optic cable EIA 455-171 Method D procedures will be adhered to (Bi-directionally).
- c. Connector loss shall not exceed 0.75 dB per connector pair.
- d. The Fiber Optic Cable shall not exceed 1.0 dB kilometer tested at 1310nm and 1550nm for single mode cable.
- e. The Fiber Optic Cable shall not exceed 3.5dB per kilometer tested at 850 nm and 1.5dB per kilometer tested at 1300nm for multi-mode 50/125 fiber.
- f. The contractor is responsible for obtaining minimum loss in fiber connections and polishing per manufacturer's specifications.
- g. Pre-installation tests of Inter-plant fiber- pre-test each reel:
  - 1) Test each reel of fiber each strand for continuity with a light source. If continuity is not achieved:
  - 2) Then test with an OTDR to determine the nature and location of the defect: Measure end-to end attenuation and the distance to a high attenuation point.
  - 3) If it is determined by Design Professional that the fiber is defective the contractor shall contact the manufacturer and provide a completely new fiber reel.
- h. Tests for installed Inter-plant and Intra-plant fiber optic cable:
  - 1) Intra-plant and Inter-plant Multi-mode: Bi-directional signal attenuation at 850 and 1300 nm. power meter.
  - 2) Intra-plant and Inter-plant Single-mode: Bi-directional signal attenuation at 1310 and 1550 nm. power meter.
  - 3) Inter-plant Multi-mode: Bi-directional OTDR trace at 850 and 1300 nm. OSP ONLY
  - 4) Interplant Single-mode: Bi-directional OTDR trace at 1310 and 1550 nm. OSP ONLY

NOTE: Obtain the actual index of refraction from the cable Manufacturer before testing.

3. Test Criteria.

- a. Total signal loss must not exceed the maximum Attenuation Coefficient plus the maximum Connector Attenuation as listed in ANSI/TIA 568-C.
  - b. Maximum Link Attenuation shall be as calculated below:
    - 1) Link attenuation is calculated as:
    - 2)  $\text{Link Attenuation} = \text{Cable Attn} + \text{Connector Attn} + \text{Splice Attn}$
    - 3)  $\text{Cable Attn (db)} = \text{Attenuation coefficient (db/km)} \times \text{Length(Km)}$
    - 4) Attenuation Coefficient
      - a) 3.5 dB/km @ 850 nm for 50/125 um
      - b) 1.5 dB/km @ 1300 nm for 50/125 um
      - c) 0.5 dB/km @ 1310 nm for single-mode outside plant cable
      - d) 0.5 dB/km @ 1550 nm for single-mode outside plant cable
      - e) 1.0 dB/km @ 1310 nm for single-mode inside plant cable
      - f) 1.0 dB/km @ 1550 nm for single-mode inside plant cable
    - 5)  $\text{Connector Attn (db)} = \text{number of connector pairs} \times \text{connector loss (dB)}$ 
      - a)  $= 2 \times 0.75 \text{ dB}$
      - b)  $= 1.5 \text{ dB}$
    - 6)  $\text{Splice Attn (dB)} = \text{number of splices (S)} \times \text{splice loss (dB)}$ 
      - a)  $= 2 \times 0.75 \text{ dB}$
      - b)  $= 1.5 \text{ dB}$
  - c. "Measured" Link Attenuation shall be compared to "Calculated" Link Attenuation to determine acceptance. The Contractor at no additional cost shall correct any Links that fail.
  - d. Single-mode backbone links shall be tested at 1310 nm and 1550 nm in accordance with ANSI/TIA/EIA-526-7, Method A.1, using not more than one reference jumper. All 50/125 um backbone links shall be tested at 850 nm and 1300 nm in accordance with ANSI/EIA/TIA-526-14A, Method A.1, using not more than one reference jumper.
  - e. Submit all test reports for approval; an OTDR signature report for every OM4, OS2 and OSP cables by strand and a fiber optic link attenuation record report for every cable by strand.
- D. Notify the VA's Project Engineer and Design Professional in writing, ten (10) days advance of testing of all equipment and/or components to prevent delays in construction schedules.
1. Perform all tests, as required, by authorities having jurisdiction throughout the facility.
  2. Test system for grounds to demonstrate that the ground resistance does not exceed the requirements of the National Electric Codes (NEC).
  3. Test all cabling to confirm that no grounds, shorts, sneak currents, RFI and EMI conditions exist prior to start-up and commissioning of all, components, devices, equipment and/or systems.

4. Test all systems and components for proper function and operation; certify that all systems are in proper working operation in accordance with the Contract Documents prior to scheduling any system demonstrations.
5. Test all fiber optic cabling with Optical Time Domain Reflectometer (OTDR) in accordance with all TIA/EIA protocols.
6. Testing of all communications systems shall be in the presence of the VA's Project Engineer and Design Professional as well as all appropriate representatives of the authorities having jurisdiction.
  - a. All completed communications systems shall be fully tested in accordance with all requirements of EIA/TIA. Upon completion of a successful testing, the contractor shall so certify in writing to the VA's Project Engineer and Design Professional that all testing was completed, certified and left in first class operational condition, include all completed copper and fiber testing read-outs, certifications and test reports.
  - b. The service of a competent, factory-trained engineer or technician authorized by the equipment manufacturer shall be provided to technically supervise installation and participate during initial system programming, start-up, final testing, assist in the final acceptance testing and Government demonstrations.
  - c. At the minimum all acceptance testing, demonstrations and training shall include, but not be limited to the following:
    - 1) Security Communications Systems Network
    - 2) Integration of all Auxiliary Systems
7. In addition provide all testing, commissioning and certifications as specified by Division 1 specification sections and any manufacturer's recommendations or requirements.

### **3.11 TRAINING**

- A. In addition to all demonstration and training as specified by Division 1 specification section and all related Division 27 specification sections, system demonstrations and training shall be provided in accordance with all requirements of this section.
  1. Prior to acceptance of the work, the System Integrator shall demonstrate to the VA's Project Engineer and Design Professional, all systems and sub-systems all features and functions of each system, and shall instruct the Government Representatives in the proper operation, event sequences, programming and maintenance of all systems and sub-systems.
  2. The System Integrator shall furnish the necessary trained personnel to perform all demonstrations and instructions and arrange to have the manufacturer's representatives present to assist with the demonstrations.

3. Training time shall include, as a minimum, the total time determined by the sum of the times per system as specified in this and related specification sections, for performing the prescribed demonstrations/training. Refer to related specification sections for additional training requirements.
  - a. Allow a minimum of 16 hours' time for each system provided for performing the prescribed demonstrations/training.
    - 1) Provide a minimum of (4) four 4-hour training classes performed at the project location and spaced over a three week interval. Training classes shall be scheduled not less than 48 hours apart to allow the Government User\Operators to familiarize themselves with all system operations.
4. Provide operation, parts and maintenance manuals defining operation and troubleshooting methods of all systems and review with Government User\Operators as part of training demonstrations.
5. Provide detailed video recordings in high quality digitally formatted media of all demonstration and training of all systems and system operations.
  - a. Utilize remote microphones as may be required to ensure high quality audio of the recorded demonstrations.
  - b. Permanently and professionally label all recorded materials and provide self-sealing plastic cases.

B. Inspections

1. At the completion of the project and prior to final acceptance of the Work, provide evidence of final inspections and approvals to the VA's Project Engineer and Design Professional, in accordance with all requirements of the Contract Documents as well as required by the authorities having jurisdiction.

- - - END - - -

**SECTION 27 11 00**  
**NETWORK COMMUNICATIONS SYSTEMS**

**PART 1 - GENERAL**

**1.1 STIPULATIONS**

A. Project drawings and general provisions of the Contract, including but not limited to all; General and Supplementary Conditions, Division 01 Specification Sections and all stipulated Specification Sections shall apply to this and all related Division 27 specification sections.

B. Related Sections:

1. Division 26 - Common Work Results for Electrical.
2. Division 26 - Low Voltage Electrical Power Conductors and Cables.
3. Division 26 - Grounding and Bonding for Electrical Systems
4. Division 26 - Hangers and Supports for Electrical Systems
5. Division 26 - Raceways and Boxes for Electrical Systems
6. Division 26 - Identification for Electrical Systems
7. Division 27 - Common Work Results for Communications Systems
8. Division 28 - Common Work Results for Electronic Safety and Security
9. Division 28 - Physical Access Control System (PACS)
10. Division 28 - Patient Elopement System (PES)

C. Reference Symbols:

1. All device symbols are defined by the appropriate symbol schedules. Because of the scale of the drawings, symbols are shown on drawings as close as possible to the mounting location.
  - a. Contractor shall coordinate exact locations with all architectural drawings, site plans, reflected ceiling plans, furniture plans, mechanical and electrical drawings as well as all affected trades prior to submittal of any shop drawings.

D. Abbreviations:

1. Refer to Specification Section 27 05 00 for additional information.
2. 10base2 - 10 Mbps data throughput over coaxial wire medium.
3. 10baseT - 10 Mbps data throughput over twisted pair medium.
4. 10baseF1 - 10 Mbps data throughput over fiber optic medium.
5. 100baseT - 100 Mbps data throughput over twisted pair medium.
6. 100baseF1 - 100 Mbps data throughput over fiber optic medium.
7. ACR - Attenuation to Crosstalk Ratio.
8. AP- Wireless Access Transceiver.
9. AUI - Attachment Unit Interface.
10. CATV - Cable TV.
11. CSU - Channel Service Unit.
12. dB - Decibel.
13. DSU - Data Service Unit.
14. ELFEXT - Equal Level Far End Crosstalk.
15. FEXT - Far End Crosstalk.

- 16. IDF - Intermediate Distribution Frame.
- 17. IR - Infrared.
- 18. Lab - Computer, Science and/or Education Laboratory.
- 19. Mbps - Megabits per second.
- 20. MDF - Main Distribution Frame.
- 21. NMM - Network Management Module.
- 22. NEXT - Near End Crosstalk.
- 23. O.T.D.R. - Optical Time Domain Reflectometer.
- 24. TIA - Telecommunications Industry Association.
- 25. TSB - Technical Service Bulletin.

E. Definitions:

- 1. Refer to Specification Section 27 05 00 for additional information.

**1.2 SUMMARY**

- A. The intent of this specification is to establish a standard of quality, overall system configuration and equipment requirements for the installation of a new TCP/IP network. The contractor shall be responsible for providing all design, installation, programming, commissioning, testing and certifications as necessary to provide complete infrastructure to support all TCP/IP security cabling networks in accordance with the Contract Drawings and/or as herein specified.
  - 1. The installation, performance, features, functions, software and programming criteria as specified herein as well as all related specification sections have been designed to offer the maximum system efficiency ease of operation, occupant safety and the protection of equipment as recommended by the design Professional.
    - a. Any deviations from the specified criteria shall be documented, reviewed and agreed to in writing by the VA's Project Engineer and Design Professional prior to submission of bids. Refer to Division 1, Division 28 and all related Division 27 specification section for product substitutions.
  - 2. It is the responsibility of the contractor to insure that the installed system meets or exceeds every standard set forth in these specifications. The contractor shall provide all cabling, communications outlets, active communications electronics, conduits, system components, termination equipment, racks/cabinets, emergency electrical power, software, programming and all appurtenances as well as all necessary testing, commissioning and certifications as required to provide a complete and fully operational TCP/IP based security network whether specifically included in this section or not.
- B. The contractor shall furnish all labor, equipment, materials, testing, commissioning, programming and certification in connection

with the installation of a complete premise security communications network systems as indicated on the drawings and as herein specified.

1. The systems shall be complete with all equipment as indicated on the contract drawings and/or described herein. The contractor shall turn over to Government a complete and fully operational security communications network infrastructure in full compliance with the contract documents.
  - a. The systems shall include at the minimum but not limited to the following;
    - (1) Category-6 Plenum rated cabling.(Security Data Drops)
    - (2) Fiber Optic Cabling (Network Backbone)
    - (3) Conduit\Duct\Raceway\Cable Tray Systems
    - (4) Distribution/Termination Panels
    - (5) Active Electronics (Layer II and Layer III Switches)
    - (6) Equipment Racks\Cabinets
    - (7) Communications Outlets/Jacks
- C. The contractor and all sub-contractors for this work shall have read all of the General Conditions, Special Requirements, General Requirements and all applicable related specification sections and in the execution of all work shall be bound by all of the conditions and requirements therein.
- D. Prior to the submission of the Bid, any discrepancies or inconsistencies noted within these specifications and/or the project drawings shall be brought to the immediate attention of the VA's Project Engineer and Design Professional
  1. Project specifications and drawings may not deal individually with every component, control, device, or appurtenance, which may be required to produce the specified system configuration, and/or as necessary to meet the equipment and cabling requirements. Coordinate all integration requirements with the VA's Project Engineer and Design Professional and all appropriate systems providers.
  2. Because of the scale of the drawings, symbols are shown on drawings as close as possible to the mounting location. The contractor shall coordinate the installation of all cabling, materials, equipment, devices, jacks, cable trays and conduits with all affected trades and document all coordination at the time of shop drawing submittals.
- E. This contractor shall assume total responsibility for coordinating all inter-building wiring, any common carrier provided network equipment, and/or Government provided equipment as it relates to the operation of these systems.

### **1.3 SCOPE OF WORK**

- A. The contractor shall furnish all labor, equipment, materials, cabling, and the performance of all testing, commissioning and certification in connection with the installation of a complete premise TCP/IP based security communications network infrastructure

in accordance with all requirements of the project drawings and/or as herein specified.

1. Provide and install all equipment described herein, including, but not limited to all, jacks/outlets, Category-6 cabling, distribution hardware, as well as all conduits, outlet boxes and appurtenances necessary to provide complete and fully operating security communications network system.

a. Communication Network Architecture:

- 1) 100 Base TX, Fast Ethernet (IEEE802.3).
- 2) 1000 Base SX, Gigabit Ethernet (IEEE802.3).
- 3) 1000 Base -T, GigE over copper (IEEE802.3)
- 4) 1000 Base LX, Gigabit Ethernet (IEEE802.3).
- 5) 10 BASE-FL, 10 Mbit/s over Fiber (IEEE802.3)
- 6) Wireless IEEE 802.11n
- 7) Protocols: TCP/IP (RFC1720)-OSI Compliant, AppleShare IP

- B. Provide integration of all systems where indicated on drawings and/or herein specified. Provide interconnection between the facility's data switching equipment (provided by Government) and the security network switching equipment. Provide all equipment racks, fiber optic and Category-6 patch panels as required to support all horizontal, communications, fiber optic and multi-pair UTP backbone cabling.

C. Communications Systems Design Requirements:

1. Provide a complete operational security communications network infrastructure including but not limited to all cabling, jacks, active communications equipment, cabling distribution and termination components as indicated on the contract drawings and as herein specified.

- a. All horizontal network connections shall utilize Category-6 copper cabling and hardware for distribution to all security control equipment as indicated on the contract drawings. All horizontal cabling shall be bundled and routed through the facility on "J" hooks sized to support the network cabling requirements and shall terminate on Category-6 patch panels in the communications equipment enclosures.

- 1) NOTE: Category-6 cables shall not be cinched too tightly; cable ties at patch panel locations shall be VELCRO type tie-wraps only. Plastic wire ties shall not be accepted on any Category-6 cabling.

- b. All communications cabling shall be terminated at both ends of the basic link at all equipment locations, fiber optic and Category-6 patch panels.
- c. The Contractor is responsible for the installation of the entire security communications infrastructure: including all workmanship, standards of quality, adherence to the contract documents, certification testing, as-built documentation, labeling, and final warranty in relationship to the



VA Project No. 642-12-110  
AE Works Project No. 12030

Philadelphia VAMC  
Rekey VA Medical Center  
Bid Documents

performance and installation of the structured cabling systems in accordance with the contract drawings and/or as herein specified.

D. Backbone Performance Requirements:

1. The intended function of the communications network is to transmit data communications signals from a central location to several individual security data drop locations. Upon completion of the work in accordance with the contract documents, the system shall be capable of transmitting data signals at a rate of 1000 Mbps minimum over Category-6 cable and a minimum of 10Gbps over single and multi-mode fiber optic cables based upon the transmitting distance, laser attenuation and number of links.
  - a. The 62.5/125 micron multi-mode optical fiber cable shall be capable of transmitting signals with a minimum modal bandwidth of 500 MHz-km at both 850 and 1300 nm (i.e. 500/500) capable of providing a nominal 600 meters @ 1GBPS and 82 meters @ 10GBPS transmission rates.
  - b. The single-mode 8.3/125 micron (nominal) optical fiber cable shall be capable of transmitting signals at both 1310 and 1550 nm capable of providing a nominal 5km @ 1GBPS @1000 Base LX and nominal 10km @ 10GBPS @10GBASE-LX4 transmission rates.
2. Note: The Contractor must certify in writing that the structured cabling system(s) are installed in accordance to the project documents, the referenced standards as well as all manufacturer requirements.
  - a. In addition, the contractor shall provide in writing all extended manufacturers' warranties for matching compatibility of the structured cabling system as well as all as-built drawings and field test reports for both the fiber and copper cabling systems before the VA's Project Engineer and Design Professional will accept the installation.

**1.4 REFERENCE STANDARDS**

- A. Refer to Specification Section 27 05 00 for additional information.

**1.5 SUBMITTALS**

- A. Refer to Specification Section 27 05 00 for additional information.

**1.6 RECORD DOCUMENTS**

- A. Provide Owner with complete set of record drawings in accordance with the requirements of section 27 05 00.

**1.7 EXTRA MATERIAL**

- A. NOT USED

## **PART 2 - PRODUCTS**

### **2.1 General**

- A. Manufacturers listed as acceptable or equal shall not negate the contractor's responsibility for providing all systems in accordance with all functions and performance requirements of the Contract Documents.
- B. Where manufacturer and/or model numbers reference specific system components in this specification, it is to establish the performance requirements and quality of the systems and components only.
  - 1. It is in no way an inference that the referenced model numbers are the manufacturer's current product and are the only acceptable components for this project unless specifically referenced as "no substitutions".
  - 2. Contractor shall provide the manufacturers' most current product that shall meet and/or exceed the specified performance and features of all data, and telecommunications equipment and/or systems.
  - 3. Equivalent UL- listed equipment may be substituted for the approved manufacturers in accordance with all requirements of Division 1 specification section titled "Substitutions" and/or General Conditions to the Construction Contract and where approved equal is referenced in the specific specification section.
    - a. Where systems and/or components are referenced as "no substitutions" the specific system and/or components shall be provided.
    - b. All substitutions shall comply with all requirements as specified in related specification sections and all system performance standards shall be maintained.
    - c. The contractor shall stipulate at the time of submission of bid the following information impacted by such a substitution.
      - 1) Any and all extensions in time impacted by the substitution.
      - 2) Any changes to the architectural or structural elements to the project.
      - 3) Differences in operation and/or performance from intended system criteria.
    - d. Failure to provide the required substitution information shall result in "without consideration" the immediate rejection of the substituted equipment and/or systems.
- C. Unless specified otherwise, the equipment furnished shall fall into six classes, and with the exception of Class 6, all of the material within a single class shall be the standard product of one manufacturer. Exceptions are annotated (Class Exempt). The six classes are as follows:

1. CLASS ONE: Fiber Optic Cable, Category-6 and Category-3 UTP copper cable (both station and backbone), fiber optic jumpers, Category-6 patch cords, blocking kits, interconnection devices, connectors (fiber and copper), wiring blocks, patch panels, and telecommunications outlets. Refer to applicable specification paragraphs for acceptable product manufacturers.
    - a. Note: All material covered in "Class One" shall conform to all manufacturers' cable/component matching connectivity requirements for the connection of all communications outlets, patch panels and cabling appurtenances provided as part of this project.
    - b. Other cabling systems meeting the listed performance and warranty requirements will be considered following compliance with all substitution requirements in accordance with Division 1 specification section titled "Substitutions".
  2. CLASS TWO: Inner-duct systems. All material covered in "Class Two" shall be equal in quality and performance to that manufactured by Pyramid, Carlon or Endot or approved equal..
  3. CLASS THREE: Equipment racks, Wire Management Systems and Cable Trays. All material covered in "Class Three" shall be equal in quality and performance to that manufactured by B-Line, CPI or approved equal.
  4. CLASS FOUR: Communications Equipment Cabinets and Wire Management Panels. All material covered in "Class Four" shall be manufactured by Hubbell Premise Wiring, B-Line E2, or CPI Mega-frame or approved equal..
  5. CLASS FIVE: Velcro wire ties/cable wraps, storage rings, labels, "D" rings (metal only), nuts, bolts, screws, and other miscellaneous and appurtenant hardware or approved equal.
  6. CLASS SIX: Systems/Equipment/Hardware
    - a. CISCO model Catalyst 6506-E (Layer III)
    - b. CISCO model 3560-XX series w/POE (Layer II)
    - c. Approved Equal Manufacturers
      - 1) Hewlett Packard
      - 2) Juniper Networks
- D. All equipment and peripheral devices shall be the standard product of a single manufacturer and shall display the manufacturer's name on each component.

## **2.2 EQUIPMENT AND COMPONENTS**

- A. Data Communications Outlets (Wall /Ceiling Mount).
1. Security Data Jacks/Faceplates: 4 pair, T568B pinning, Category-6 compliant, red in color. Acceptable manufacturers for this project shall be Hubbell, Ortronics, Leviton or Systimax. (All security communications outlets, patch panels and cabling appurtenances shall conform to manufacturers' cable matching requirements).

- a. Modular Outlet Jacks & Faceplates: Hubbell (Xcelerator™) XJ6 Series Category-6 modular in Hubbell IFP Series rear load faceplates. Standard 8-position, RJ-45 style, un-keyed, designed for 4-pair, 100 ohm balanced unshielded twisted pair (UTP) cable, 26-22 AWG solid or stranded conductors.
  2. Accessories: Hubbell XJ6 Category-6 Jacks or approved equal include a translucent stuffer cap for wire retention and to permit visual inspection. Jacks accept optional hinged dust covers and Snap-on icons green for security; 'Secur Icon' for security network drop terminations in quantities in accordance with contract drawings. Jacks shall have attached wiring instruction labels to permit either T568A or T568B wiring configurations.
  - a. Modular Mounting Frames: Hubbell, Part #IFP120W or approved equal, two-port, supplied with mounting screws, clear screw covers and paper labels, and color matched screw covers. Office White - flush mounted with screws.
  - b. Modular Mounting Frames: Hubbell, Part #IFP140W or approved equal, four-port, supplied with mounting screws, clear screw covers and paper labels, and color matched screw covers. Office White - flush mounted with screws.
  - c. Modular Mounting Frames: Hubbell, Part #IFP160W or approved equal, six-port, supplied with mounting screws, clear screw covers and paper labels, and color matched screw covers. Office White - flush mounted with screws
- B. Equipment Racks/Patch Panels/Appurtenances
1. Provide floor mounted equipment cabinets where indicated on the contract drawings in quantities and size to provide sufficient capacity to install all necessary components and cabling as required to fulfill the system requirements and shall be provided with a minimum of 30% spare capacity for the installation of additional components or future expansion.
  - a. Cabinets shall be at the minimum 19"w X 83"h X 36"d (44 RU) floor unit with both a vertical and horizontal cable management systems providing a minimum of 1.45 inches of cable capacity per side. The cabinet shall include all necessary appurtenances to properly support the intended applications and shall include separate locks on the center swing frame section and the front viewing door. All cabinets shall be provided with the following minimum requirements:
    - 1) Rear housing with removable top and bottom covers
    - 2) Smoked glass front viewing door with lock
    - 3) Rear, side and top vented cabinet panels
    - 4) Two vertical system bars
    - 5) Cable collecting rail and wire management system
    - 6) Adjustable 19" rails
    - 7) Dual A/B circuited power distribution unit
    - 8) Grounding busbar
    - 9) Air circulation fans with filters

- a) The Contractor shall size fans to maintain manufacturers recommended operating temperatures for all electronic components installed in cabinet. At the minimum provide a one dual 114 cfm fan.
2. Wall mounted communications equipment enclosures shall be provided for all Layer II data switch locations as indicated on the contract drawings. The enclosure shall be a UL listed, EIA compliant 19" horizontal distribution rack. Overall dimensions shall be 24"W x 36"H x 7-1/2"D, constructed of 16-gauge fully welded steel and finished in a durable powder coat, with a weight capacity of 150 lbs.
  - a. The enclosure shall have two rack bays: upper (2 RU) panel bay shall pivot 100 degrees with positive stop for punch-downs, the lower (2 RU) equipment bay shall pivot 15 degrees for access to connections with 18" useable component depth. Rack rails shall be constructed of 11-gauge steel with tapped 10-32 mounting holes in universal EIA spacing with black e-coat finish and shall include 2-gang electrical box, 1/4-20 grounding and bonding stud, and a 24" length of hook and loop fasteners.
    - 1) All enclosures shall be provided with a hinged door with keyed locking mechanism and protected by a interior mounted tamper switch connected to the PACS DGP as an alarm input.
  - b. Cable management features shall include a 7" x 4" cable pass-through on back-pan, and integral lacing bar with abundant cable tie points and 4" cable duct knockouts on top, bottom and sides of the enclosure. The unit shall be model # HDR-4 as manufactured by Middle Atlantic Products or equal.
3. Provide Fiber Optic Patch Panels (FOPP's) in sufficient quantities to support all fiber terminations as indicated on the contract drawings: FOPP's shall Hubbell FCR Series rack mount fiber enclosure PART # FCR525SPR or approved equal, installed at both demarcation and termination room locations.
4. Provide Modular Patch Panels HUBBELL NEXTSPEED®. Part #P6E48U or approved equal. 48-port T568B wired Category 6 Patch Panel or approved equal.
5. Patch Cables, Category 6, high performance: Hubbell NEXTSPEED®. Part # PCX6 or approved equal.
  - a. Lengths shall be three (03), five (05), seven (07), or ten (10) feet; and cord color shall be green for all security system connections.
  - b. Provide Two (2) patch cables for each populated patch panel port; one seven foot long in the closet. All patch cables shall be 568-B approved and meet all product matching criteria. Supply minimum 7-foot and ten-foot lengths and cord colors as indicated for security network connectivity.
  - c. All Category 6 Patch cord must be provided by the same manufacturer as part of a certified structured cabling system

and shall be color coordinated in accordance with cable and jack color coding requirements

1) Security - Green

6. Required Accessories and Quantities:

- a. Provide Hubbell FSP Series or approved equal adapter panels for the FCR525SPR rack mount enclosure panel - 24 2-port simplex SC Coupler Bezels, colors as selected by the Architect - Eight (8) packages of 6-port ST coupler bezels are required for each FOPP installed.
- b. Fiber patch cords: Hubbell, part #DFPCSTSCD3MM or approved equal. Provide at demarcation and each termination room locations 9.8 ft. (3.0 m) - Duplex 62.5\125, and 8.3\125 SC-LC Fiber patch cords. Provide One Fiber Jumper for every two strands of multi-mode and single mode fiber originating in the demarcation room and all termination room locations.
- c. Provide all wire management: Hubbell part #HC219ME3N-19 or approved equal. 3.5" or equal. front cord manager; Rear Cord Manager velcro tie cable managers; B-LINE, CPI PART #02006-201 or approved equal. Provide 4" or 6" cable bundles as required;
  - 1) Provide one Rear Cable Management Panel for each patch panel; One front Cable manager panel between each set of patch panels; number of velcro hook and loop tie-wraps as required for neat and tidy rear cable management.
  - 2) Provide Vertical Cable Manager 6"Wx14.94"Dx7'H for all 19-inch Equipment Racks as required; B-LINE, CPI PART #40098-703 or approved equal.

C. Category 6 Cable

1. Acceptable Cable Manufacturers pending full compliance with the performance requirements herein specified and meeting CISCO systems standards:
  - a. Hubbell Xcelerator 6 with Hubbell Category 6 C6 ERPB Series Cable
  - b. General Cable GenSpeed 6600 with Hubbell Xcelerator.
  - c. Mohawk/CDT: GigaLan Enhanced with Hubbell Xcelerator.
  - d. Berk-Tek: LanMark 2000 with Ortronics Clarity or Siemon.
  - e. Superior Essex: NextGain with Leviton eXtreme.
2. Horizontal security cable drop: 4 pair, #24 AWG, solid conductors, Category 6 Compliant minimum, jacket stamped with 'UL' or 'ETL' verified to Category 6. Hubbell model C6SRGY or approved.
  - a. Category 6 cable color coding requirements shall be as follows:
    - 1) Security - Green

D. Fiber Optic Cable

1. Product: Provide fiber cabling in accordance with the requirements of all related specification sections, at the minimum 12/12 (24 strands), hybrid MM/SM cable unless otherwise indicated by the contract drawings. Premises Distribution (inside), 900 micron, type OFNP, tight buffered laser enhanced, with UV resistant outer jacket, all dielectric, 12 multi-mode 62.5/125uM "OM4" fiber strands, 12 single-mode 8.3/125uM "OS2" fiber strands.
  - a. Multi-mode maximum optical transmission loss shall be: 3.0 dB/km at 850 nm and 1.0 dB/km at 1300 nm; effective modal bandwidth (EMB) of 4700 MHz\*km at 850 nm @ 10 Gb/s and a OFL bandwidth of 3500 MHz\*km at 850 nm and 500 MHz\*km bandwidth at 1300 nm. Multi-mode fiber shall conform to: TIA/EIA 568-B; EIA/TIA - 492 AAAC-B; and ANSI/ICEA S-83-596. (Use plenum rated armored cable only).
  - b. Single-mode maximum optical transmission loss 1.0 dB/km at both 1310 and 1550 nm. Single mode fiber shall conform to TIA/EIA - 568 B; EIA/TIA - 492BAAA; and ANSI/ICEA S - 83 - 596. (Use plenum rated armored cable only).
  - c. All exterior fiber optic cable shall be rated for exterior applications and listed as Outside Plant (OSP) type fiber and installed in dedicated inner-duct conduit system segregated by network type and routed through dedicated conduits
2. Manufactured by General Cable Corp. NextGen, Systimax GigaSPEED Fiber or Corning Cable Systems. Substitutions are permitted in accordance with all requirements of Division 1 specification section.
3. Fiber Optic Housing Unit: Hubbell FCR350SP36R, Systimax LST1U-072/7 for all 12/6 backbone cables, or Corning Cable equivalent. All SC, and/or SC-LC SFP connectors shall be provided as required for termination on ALL active electronic switches in the project.
4. Required Accessories and Quantities:
  - a. Kit of Parts: Sufficient quantities to block and buffer both ends of each cable segment.
  - b. Sealant: Sealant sufficient quantities to block each end of each cable segment (outside plant cable only).
  - c. Provide Fan-Out kit for termination of the indoor fiber to the SC connectors.
  - d. Adapters: Multimode and Single-mode SC Fiber Optic Adaptors. Two (2) simplex SC adaptors for each end of each fiber pair. Shall meet 568B requirements. Color beige (or light gray) for multi-mode and blue for single-mode.
5. Fiber Optic Cable Terminations
  - e. Products: Hubbell "2-Click" SC connectors, Systimax STII connectors or approved equal (for Multi-Mode).
  - f. Products: Hubbell "2-Quick" SC connectors, Systimax STII connectors or approved equal (for single-mode).
  - g. Products: Hubbell "2-Click" LC connectors, Systimax STII connectors or approved equal (for Multi-Mode).



- h. Products: Hubbell "2-Quick" LC connectors, Systimax STII connectors or approved equal (for single-mode).

### 2.3 FIBER CHANNEL MULTILAYER FABRIC CORE SWITCH (LAYER III SWITCH)

- A. Provide Multilayer Fabric Core Switch, sized to act as the primary aggregation point for all fiber optic cabling serving the security system fiber network cabling. The switch shall be configured in accordance with IEEE 802.1x, for 10 Gigabit Ethernet, OSPF, RIP, IGMP, ACL port capabilities. The basis of design is the Catalyst 6506-E switch. All Layer III Core switches shall be provided by this contractor and shall be manufactured by CISCO model number Catalyst 6506-E or approved equal.
1. Where manufacturer model numbers reference specific system components in this specification, it is to establish the performance requirements and quality and may not be a representation of the most current manufacturers' part numbers. It shall be the contractors' responsibility to provide the most current network components by the specified manufacturer to meet the performance criteria as specified
- B. Provide as required 10 Gigabit Ethernet modules in sufficient quantities to support all security network configurations. LAN campus/site aggregation configuration shall support a minimum of up to 130 - 10 Gigabit Ethernet ports in a single chassis and/or a total of 260 10 Gigabit Ethernet ports in a virtual switching system (VSS) configuration shall be available.
1. Each module shall consist of 4 port groups of 4 ports each. Users can operate each port group in either over-subscription mode (2 to 4 ports used per port group) or performance mode (1 port used per port group), allowing maximum flexibility for connection to servers in performance mode and some other uplinks to equipment cabinet/racks in over-subscription mode.
2. The contractor shall provide all required long haul and short haul GBICS equipped with LC SFP connectors in sufficient quantities to support the required fiber optic connectivity from all security equipment cabinet/racks.
- a. The switch shall be sized to provide shall be configured to provide a minimum bandwidth transmission of 10 Gigabit per connected port to support all aggregation requirements of the fiber optic backbone cabling for the project and shall include all necessary switch modules, GBIC's, power supply's, card cages, SFP connectors, patch cords and appurtenances as required to provide a fully operational Layer III aggregation switch. At the minimum the Layer III aggregation switch shall include but not limited to the following:
- 1) Provide - Catalyst 6506-E Switch Chassis CAT 6506-E-CHASSIS FAN SUP720- 10G-VSS Req. Pwr. Sup 6 x Expansion Slot Cisco Part # VS-C6506E-S720-10G.

- 2) Provide - Cisco Catalyst 16 port 10 Gigabit Switching Modules CATALYST 6500 16 PORT GIGE Module Fabric-Enabled minimum SFPS 32 x SFP. (mini-GBIC) Cisco Part # WS-X6724-SFP.
  - 3) Provide Cisco X2-10G Base - LRM modules as required with a minimum link length of 26m on standard FDDI grade MMF. Using 2000 MHz km MMF (OM3) (include all Dual SC/PC connectors as required to support connectivity requirements project (LC/PC and/or SMF X2); InfiniBand 4x connector (CX4) Cisco Part # Cisco X2-10GB-SR.
  - 4) Provide - Catalyst 6500 3000W AC PC SPARE. Cisco Part # WS-CAC-3000W.
  - 5) Provide - Power Cord 250VAC 16A Twist Lock NEMA L6-20 PLUG. Cisco Part # CAB-AC-C6K-TWLK.
- b. The above switch configuration is designed to provide an aggregation point for all fiber optic cabling provided as part of this project and shall at the minimum include the termination and operational integration of all fiber backbone cabling associated with the communications system network. The above switch configuration may not represent all required components necessary to meet the intended network performance.
- c. It shall be the contractor's responsibility to provide the necessary components, devices, software and programming for this project. In addition the Contractor shall provide all coordination with the Governments' ITS department to ensure the necessary components, switch configurations and programming conforms to the Governments' ITS requirements for performance, operation and integration of the communications network.
- 1) This contractor shall be responsible for all set-up, programming and commissioning related to the installation, performance and integration of the Layer III data switch and shall coordinate with Governments' ITS department for all IP, VLAN and VSS addressing schemes.
  - 2) All programming, set-up, commissioning and testing of the Layer III core switch shall be by manufacturer certified technicians. Provide manufacturer's certification credentials at the time of shop drawing submission.
- d. In addition to all warranty requirements as stipulated by Division 1, Speciation section 280500 and paragraph 1.8 of this section the contractor shall also include a 1 year Manufacturers' Service Contract. The Contractor shall secure and transfer to Owner all rights and privileges included as part of the Manufacturers Service Contract. At the minimum the transfer of the service contract shall include but not limited to:
- 1) Around-the-clock, global access to Manufacturers Technical Assistance Center (TAC)

- 2) Access to on-line Manufacturers technical assistance and tools
  - 3) Hardware replacement options include 2-hour, 4-hour, Next-business-day (NBD) advance replacement, as well as Return for Repair (RFR)
  - 4) Ongoing operating system software updates including both minor and major releases within the licensed feature set
  - 5) Manufacturers' software support to extend the life of all devices with improved security, increased performance, bandwidth management, new protocol support, and greater interoperability
  - 6) Proactive diagnostics and real-time alerts on select devices with Smart Call Home
- e. This contractor shall be responsible for all programming related to the performance and integration of the Layer III data switch and shall coordinate with Governments' ITS department for all IP and VLAN addressing schemes and/or configurations.

#### **2.4 LAYER II NETWORK DATA SWITCHES**

- A. Provide POE+ Layer II Data switches in sufficient quantities supporting all Category-6 drops as required to support all video surveillance system network requirements. Provide sufficient 1.2-meter cables with identical 14-pin connectors on each end to meet all system requirements. The Data switches shall deliver a minimum of 10.4 Gbps of dedicated bandwidth; units shall be stackable for easy scalability and support Power over Ethernet at 48 watts (POE+) and shall be 19" rack mountable.
1. Each switch shall consist of 44 10/100/1000 Mbps ports and 4 SFP-based 10 Gigabit Ethernet ports. Up to three member switches shall be capable of being linked to one control switch, providing a total of four units providing 144 auto-negotiating ports of non-blocking performance in a stack. Data switches shall include all current software revisions and matching patch cords.
    - a. The Contractor shall provide a minimum of 2 LC/PC or 2 SMF X2 10base GBICS with LC SFP Connectors for the first Layer II data switch installed in each communications equipment rack\cabinet and 2 SX 1000 base GBICS with LC SFP Connectors for each additional Layer II switch in each stack located within the same communications equipment rack\cabinet location.
  2. All Layer II switches shall be manufactured by CISCO model 3560-XX or approved equal. Each switch shall be configured in either 24 or 48-Port configurations as applicable.
    - a. Where manufacturer model numbers reference specific system components in this specification, it is to establish the performance requirements and quality and may not be a representation of the most current manufacturers' part numbers. It shall be the contractors' responsibility to

provide the most current network components by the specified manufacturer to meet the performance criteria as specified.

3. It shall be the contractor's responsibility to provide the necessary components, devices, software and programming for this project. In addition the Contractor shall provide all coordination with the Owners' IT department to ensure the necessary components, switch configurations and programming conforms to the Governments' ITS department requirements.
  - a. This contractor shall be responsible for all programming related to the performance and integration of the Layer II data switch and shall coordinate with Governments' FITS department for all IP addressing schemes and/or configurations.

## **2.5 EQUIPMENT CABINET POWER DISTRIBUTION**

### **A. Rack Mounted Power Distribution Unit**

1. Provide rack mounted power distribution switch with surge protection for the distribution of all UPS connected power for each rack. The unit shall consist of 12 AC power outlets (4 Front, 8 Rear) dual fed A/B circuiting, rated at 15 amps each and shall be equipped with integral surge protection circuitry (with bypass switch) capable of auto-resetting over-voltage and under-voltage protection.
2. The unit shall include a front mounted power switch (with guard) which shall control all 12 outlets. The four front mounted power outlets shall be spaced as transformer convenience outlets. The overall unit shall be single-height rack mountable chassis (1U) with three front panel indicator lights: (Power, Ground OK and Unsafe Voltage) and shall include front panel circuit breaker for protect or disconnect circuitry and dual 10-foot power cords for electrical power connectivity. The rear panel grounding lug shall be provided.
3. In addition to the above requirement the power distribution unit shall meet the following minimum requirements:
  - a. Integral Surge Protection Circuitry (with by-pass switch): Yes
  - b. Dual A/B Incoming Power Circuiting
  - c. Protect or Disconnect Circuitry: Yes
  - d. Thermal Fusing: Yes
  - e. Catastrophic Surge Circuit: Yes
  - f. Over/Under voltage Protection: Yes
  - g. Overvoltage Shutoff Gate: 144V  $\pm$ 11V
  - h. Under voltage Shutoff Gate: 84V  $\pm$ 6V
  - i. Single Pulse Energy Dissipation: 1350 Joules
  - j. Peak Impulse Current: 32,000A
  - k. EMI/RFI Noise Filtration: 50db (99.7%)
  - l. Line Voltage: 120VAC, 50/60Hz
  - m. Initial Clamping Level: 200V Peak, 141 Rms
  - n. UL 1449 Rating: 500V L-N, 500V L-G, 400V N-G
  - o. Protection Modes: L-N, L-G, N-G
  - p. Maximum Current Rating: 15A (1800W)
  - q. Response Time: 1-5 Nanoseconds

- r. Plug Configuration: Straight
- s. Number of Outlets: 12 (4 front, 8 rear)
- t. Switched Outlets: All

**B. Maintenance Bypass and Power Distribution Switch**

1. Provide rack mounted maintenance bypass and power output distribution switch for UPS unit. The bypass switch shall permit the manual transfer of connected UPS loads to utility power via a maintenance bypass switch, permitting scheduled maintenance or UPS replacement without discontinuing power to the critical load. Transferring the unit back to UPS power shall be accomplished turning the switch to the load position and transferring the protected back to UPS service.
2. The maintenance bypass and power output distribution switch shall provide hardwired connections rated at 120V or 208V and include all brackets and hardware for rack mounting. The maintenance bypass and power output distribution switch shall be Liebert model MicroPOD or approved equal.

**PART 3 - EXECUTION**

**3.1 EQUIPMENT PROTECTION**

- A. Comply with all requirements of specification section 27 05 00.
1. Examine all physical and environmental conditions, equipment and device locations, auxiliary system connectivity requirements impacting the installation of all network systems and report any unsatisfactory conditions in writing to the VA's Project Engineer and Design Professional.

**3.2 WORK PERFORMANCE**

- A. In addition to all requirements as specified by Specification Section 27 05 00 the network communications systems shall also be provided in accordance with the following requirements:
1. Prior to the final commissioning and/or programming of any network communications components, the Contractor shall provide a review with the VA's Project Engineer and Design Professional addressing all network integrations, programming and related operational connectivity.
    - a. Failure to provide this review and get final sign-off prior to programming shall result in any costs related to changes requested by the VA's Project Engineer and Design Professional as not being charged to the project.

**3.3 EQUIPMENT/CABLE INSTALLATION AND REQUIREMENTS**

- A. In addition to all requirements as specified by Specification Section 27 05 00 the network communications systems shall also be provided in accordance with the following requirements:

1. All system cabling shall be of the type, size and specification as required by all contract documents as well as stipulated by all codes and standards as specified by specification section 27 05 00.

2. All network communications cabling shall utilize Category-6 UTP cables and installed in accordance with the requirements of specification section 27 05 00. All network cabling bundles shall not contain any AC carrying conductors or non-associated network communications cables within the cable raceways\conduits or cable bundles.
  - a. In addition, all structured cabling associated with the installation of any network communications system shall comply with all requirements of EIA\TIA standards for the proper installation, termination and testing of all fiber optic and Category-6 UTP cabling.
  - b. Contractor shall provide all equipment, components, devices, hardware, equipment racks\cabinets, patch panels and all appurtenances necessary to provide fully operational network communications systems utilizing a UTP cabling topography. Coordinate all structured cabling with all trades and contractors prior to shop drawing submission.

#### **3.4 ELECTRICAL POWER DISTRIBUTION**

- A. All 120-Volt emergency electrical power shall be provided by this Contractor and supplied from the nearest appropriate emergency electrical distribution panel. All electrical power connections shall be hardwired to the panel, system components or panels employing the use of plug-in transformers, extension cords or cheater cords for the connection to electrical power shall not be acceptable.
  1. If no spare 20A/1P circuits are available for use, the contractor shall provide a new subpanel adjacent to the existing panel. Remove (3) 20A/1P breakers and replace with a 60A/3P breaker to feed the subpanel.
    - a. Subpanel shall be 60A MLO with 18 circuits. Reconnect the (3) 20A/1P circuits to this new panel. Extend branch wiring as required. The Contractor shall size feeder to subpanel per the national electric code.
  2. All system power supplies serving system components or devices on the exterior of the facility shall be provided with the appropriate transient surge and suppression protection on both the line side as well as the load side. Refer to specification section 27 05 00 for additional requirements.
  3. Installation of all equipment and devices that pertain to other work in the contract shall be closely coordinated with the appropriate trade contractors.

#### **3.5 TRANSIENT VOLTAGE SUPPRESSION**

- A. Comply with all requirements of specification section 27 05 00.

#### **3.6 GROUNDING AND BONDING**

- A. Comply with all requirements of specification section 27 05 00.

### **3.7 EQUIPMENT IDENTIFICATION**

- A. Comply with all requirements of specification section 27 05 00.

### **3.8 MAINTENANCE & SERVICE**

- A. Comply with all requirements of specification section 27 05 00.

### **3.9 WARRANTY**

- A. Comply with all requirements of Specification Section 27 05 00
- B. Provide all manufacturers extended cable warranties based on matching wire to component compatibility requirements. All cable warranties shall be in effect for a period of not less than 20 years.
- C. The warranty must include the following statements regarding the cabling system:
  - 1. "That all communications networks have been certified and will support and conform to ANSI/TIA-568-C specifications covering any current or future application which supports transmission over a properly constructed and horizontal cabling system premises network which meets the channel and/or basic link performance as described in ANSI/TIA-568-C."
  - 2. "That all communications networks are free from defects in material or faulty workmanship."

### **3.10 FIELD SERVICES**

- A. Comply with all requirements of Specification Section 27 05 00

### **3.11 TRAINING**

- A. Comply with all requirements of specification section 27 05 00.
- B. Documentation:
  - 1. Contractor shall provide documentation to include all test results and as-built drawings, test results shall be computer generated and shall include all trace reports indicating each pair tested in accordance with all requirements of specification section 27 05 00.
    - a. One Hard Copy shall also be provided to the VA's Project Engineer and Design Professional. Software for viewing the test results shall also be provided in the soft copy package.
- C. Final Acceptance
  - 1. Acceptance of all network communications systems, by the VA's Project Engineer and Design Professional, shall be based on the results of testing, functionality, and the receipt of documentation. The testing, of all UTP cabling, fiber segments and



all security data cables must meet the criteria established in the specification sections 27 05 00.

2. The Contractor must demonstrate to the VA's Project Engineer and Design Professional that 1000 Mbps data signals can be successfully transmitted, bi-directionally, from the layer II switch to and from a minimum of 10% of individual data drops on each floor, witness tested by the VA's Project Engineer and Design Professional. The number of data drop locations to be tested shall be determined by VA's Project Engineer and Design Professional. With regard to documentation, all required documentation shall be submitted to VA's Project Engineer and Design Professional.

D. As-Built Documentation:

1. Contractor shall provide clean copies of the technology drawings depicting all as-built conditions for all data drop locations, cable routing and identification, patch panel, data switch port terminations, component layouts and all information as required by division 1 specification section.

- - - END - - -

VA Project No. 642-12-110  
AE Works Project No. 12030

Philadelphia VAMC  
Rekey VA Medical Center  
Bid Documents

**SECTION 28 05 00**  
**COMMON WORK RESULTS FOR ELECTRONIC SAFETY AND SECURITY**

**PART 1 - GENERAL**

**1.1 STIPULATIONS**

- A. Project drawings and general provisions of the Contract, including but not limited to all; General and Supplementary Conditions, Division 01 Specification Sections and as stipulated by all Division 26, Division 27 Specification Sections shall apply to this and all related Division 28 specification sections.
- B. Related Specification Sections:
1. Division 26 - Common Work Results for Electrical.
  2. Division 26 - Low Voltage Electrical Power Conductors and Cables.
  3. Division 26 - Grounding and Bonding for Electrical Systems
  4. Division 26 - Hangers and Supports for Electrical Systems
  5. Division 26 - Raceways and Boxes for Electrical Systems
  6. Division 26 - Identification for Electrical Systems
  7. Division 27 - Common Work Results for Communications Systems
  8. Division 27 - Network Communications
  9. Division 28 - Physical Access Control System (PACS)
  10. Division 28 - Patient Elopement System (PES)
- C. Reference Symbols:
1. All device symbols are defined by the appropriate symbol schedule on the symbols and abbreviations sheet in the security system drawing package. Not all device symbols as indicated may be required for the project.
    - a. Because of the scale of the drawings, symbols are shown on the drawings as close as possible to the mounting location. Contractor shall coordinate exact locations with project drawings and all affected trades prior to submittal of shop drawings.
- D. Abbreviations:
1. ASIS: American Society Industrial Security (International)
  2. AP: Wireless Access Point
  3. A/V: Audio Visual Systems - For purposes of this specification section A/V systems shall include all Media Management, Video Broadcasting, Intercommunications (Paging/Public Address, Clock, Auxiliary Sound), Video Intercom, Emergency Communications, Mass Notification, Master Antenna (MATV) and Distance Learning Systems

- 4. AVI      Audio Visual Systems Integrator: Shall be a qualified contractor experienced in the installation and certification of A/V systems. The AVI contractor shall be responsible for the design, testing and certification of all audio/visual systems including but not limited to Intercommunications, TV Distribution, Audio/Visual, Master Antenna and Bi-Directional Antenna systems as well as all structured cabling systems supporting these technologies. The AVI shall be RCDD registered certified for the installation and commissioning of all structured cabling networks and communications systems.
- 5. BACnet:    A communications protocol for building automation and control networks as outlined in ISO 16484-5 and ASHRAE/ANSI Standard 135.
- 6. BAS:      Building Automation System
- 7. BICSI:     Building Industry Consultant Services International - International organization whose primary objective is to enhance the reputation and skills of companies and individuals employed in the telecommunications and security industries by ensuring that current and developing standards are maintained.
- 8. CATV:     Community Antenna Television System - Cable TV Network
- 9. CCD:      Charge-coupled device.
- 10. CCTV:   Closed Circuit Television Surveillance System.
- 11. CMOS:    Complementary metal-oxide-semiconductor
- 12. CP:       Consolidation Point - Local Interconnection Point between horizontal cables from the building IDF/MDF rooms and horizontal cables for the furniture drops.
- 13. CPU:      Central Processing Unit
- 14. DP:       Demarcation Point - The point of interface between the Communications Networks, MATV, any Auxiliary Systems, and the associated Service Providers or Public Utilities. Also known as Entrance Facility. Shall also serve as the primary termination point for all incoming OSP cabling as well as the primary main grounding bus-bar for all communications systems. Refer to project documents for exact location and termination requirements.
- 15. DVR      Digital Video Recorder.
- 16. DGP      Data Gathering Panel- component of the Physical Access Control System (PACS) which provides the portal at the door location to communicate, store and process information received from readers, reader modules, input modules, output modules with the Security Management System CPU and software.
- 17. DTS:      Digital Termination Service: A microwave-based, line-of-sight communications provided directly to the end user.
- 18. DVT      Remote digital viewing terminal which shall serve as the video surveillance systems' operator HMI terminal remote from the primary rack mounted HMI.
- 19. EMI:      Electromagnetic interference.
- 20. EMT:      Electric Metallic Tubing.

- 21. ESS      Electronic Security Systems - Including but not limited to; intrusion detection, physical access control, CCTV video surveillance, electronic perimeter detection, duress alarm, programmable logic controllers (PLC), supervisory control and data acquisition (SCADA), integrated security management platforms and electronic screening systems.
- 22. ESSI:    Electronic Security Systems Integrator - Shall be a qualified contractor experienced in the design, programming, installation, testing and certification of all Intrusion Alarm, Access Control, CCTV Surveillance and Security Management Systems. The ESSI shall have a registered RCDD professional review and seal the designs, installations and certifications of all structured cabling networks related to the installation of any IP based electronic security system.
- 23. EVAC:    UL Listed Emergency Voice Evacuation System. Not to be confused with the building; Public Address/Intercom, Intercommunications and/or Mass Notification systems.
- 24. FAS:      Fire Alarm System
- 25. FASI:     Fire Alarm System Integrator - Shall be a NICET Level III certified contractor experienced in the installation, programming, testing and certification of Rescue Assistance, Protected Premises and Central Station Signaling Fire Alarm Systems as defined by NFPA 72.
- 26. GAP      Graphic Annunciator Panel - A custom fabricated fixed display panel providing operational control and visual display of all alarm and system functions related to the operation of the FAS and/or ESSM as described in related specification sections.
- 27. GFI:      Ground fault interrupter.
- 28. GUI:      Graphic User Interface - A specialized program employing graphical display maps of a facility and/or site which, also provides a manual user interface for all system functions and operations by utilizing control and annunciation ICON's from dedicated human machine interface terminals.
- 29. HMI:      Human Machine Interface - A Computer-operated, video control terminal complying with FCC Part 15 CFR Title 47, Subparts A and B, and shall utilize multiple dynamic GUI based displays for annunciation and control LCD flat panel computer monitor or display screen as defined by related specification sections.
- 30. ICS:      Intercommunications system - Shall include but not limited to all intercoms, public address, clock, program, and auxiliary sound or emergency communications systems as defined by related specification sections.
- 31. IDF:      Intermediate Distribution Frame - The room/space that shall serve as the local termination point for all horizontal and backbone cabling. Also shall be known as Equipment Room (ER), Horizontal Cross-Connect (HC) or Floor Distribution (FD).
- 32. IDS:      Intrusion Detection System.
- 33. I/O:      Input/Out - Commonly associated with dry/contact relay based digital integration.

- 34. ITS: Information Transport Systems - For purposes of this specification section ITS shall include all data and telecommunications communications systems including but not limited to all Data, Telephone, Intercommunications (Paging/Public Address), TV Distribution Systems (MATV) and Audio Visual Systems (A/V) and IP based CCTV Surveillance Systems.
- 35. ITSI: Information Technology System Integrator - Shall be a qualified contractor experienced in the installation and certification of all data, telecommunications and A/V systems. The ITSI shall be responsible for the design, testing and certification of Data, Telephone communications systems and all structured cabling systems supporting these technologies.
- 36. LAN: Local Area Network
- 37. LCD: Liquid-crystal display.
- 38. LED: Light Emitting Diode.
- 39. LV: Low Voltage: As defined in NFPA 70 for circuits and equipment operating at less than 50 V or for remote-control and signaling power-limited circuits.
- 40. MATV: Master Antenna System - Shall include all TV and media management distribution cabling, termination jacks, head-end components, control, equipment racks, amplifiers, projection equipment and video monitoring devices as defined by the project drawings and related specification sections.
- 41. MDF: The Main Distribution Frame - The room/space that shall serve as the primary termination point for all backbone cabling to each IDF locations and horizontal connection point for local communication drops. May also serve as a local IDF location as well as the cross-connection and interconnection of all entrance cables from the DP for all PSTN and WAN connections. Also shall be known as Main Cross Connect (MC), Telecommunications Room (TR) and/or Campus Distributor (CD)
- 42. M-JPEG: Motion - Joint Photographic Experts Group.
- 43. MPEG: Moving picture experts group.
- 44. NEC: National Electric Code
- 45. NEMA: National Electrical Manufacturers Association
- 46. NFPA: National Fire Protection Association
- 47. NTSC: National Television System Committee.
- 48. NRTL: Nationally Recognized Testing Laboratory.
- 49. NVR: Network Video Recorder
- 50. NVS: Network Video Server
- 51. OTDR: Optical Time Domain Reflectometer
- 52. OSP: Outside Plant - All cabling associated with building services supporting the incoming service connections to Service Providers, Public Utilities and Wide Area Networks.
- 53. PA: Public Address or Building Intercommunications System.
- 54. PACS: Physical Access Control System.
- 55. PIDS: Perimeter Intrusion Detection System
- 56. PIR: Passive Infrared
- 57. POTS: Plain Old Telephone Service - Analog Telephone Circuit used for the connection of FAX machines, BAS and FAS communications devices and shall be wired upstream of the facility's telephone switch.

- 58. PSP: Physical Security Professional as registered by the American Society of Industrial Security-International (ASIS)
- 59. PSTN: Public Switched Telephone Network - Connection to local telephone utility providing local telephony communications service.
- 60. RCDD: BICSI accredited Reregistered Communications Distribution Designer
- 61. RFI: Radio-frequency interference.
- 62. RIGID: Rigid conduit is galvanized steel tubing, with a tubing wall that is thick enough to allow it to be threaded.
- 63. RS-232: A TIA/EIA standard for asynchronous serial data communications protocol between terminal devices. This standard defines a 25-pin connector and certain signal characteristics for interfacing computer equipment.
- 64. RS-485: A TIA/EIA standard for multipoint communications protocol.
- 65. SCADA: Supervisory Control and Data Acquisition - A system used in to monitor and control plant status of facilities scattered over wide geographic areas.
- 66. SMS: Security Management System - A system incorporating security alarms, door controls, emergency intercoms/paging, duress alarms and surveillance systems all integrated through a single operating platform, providing centralized command and control capability for the various systems via dedicated human machine interface terminals.
- 67. TCP/IP: The standard communications protocol that implement protocol stack on which the Internet and data communications networks operate
- 68. TGB: Telecommunications Grounding Busbar - Located in each IDF
- 69. TMGB: Main Grounding Busbar - Located at the building DP/MDF
- 70. TP: Transition Point - A location in the horizontal cabling where flat under-carpet cable transitions to a horizontal cabling consolidation point (CP).
- 71. TVSS: Transient voltage surge suppressor
- 72. VLAN: Virtual LAN - A technique made possible by switching technologies that permits the logical grouping of any number of network devices into one or more sub- networks.
- 73. UPS: Uninterruptible Power Supply
- 74. UTP: Unshielded Twisted Pair
- 75. VMS: Video Management Software which shall software that incorporates multiple security subsystems (e.g., physical access control, intrusion detection, closed circuit television, intercom) into a single platform and graphical user interface.
- 76. VoIP: Voice Over IP telephone Network
- 77. WAN: Wide Area Network
- 78. WLAN: Wireless Local Area Network

E. Definitions:

- 1. Contract Documents: The documents consisting of the Form of Agreement between Government and Contractor, Conditions of the Contract, (General, Supplementary, and other Conditions), Drawings, Specifications and all Addenda issued prior to the execution of the Contract.

2. Contract Drawings: The drawings that form a part of the Contract Documents that provides the graphical representation of the project requirements intended design and/or performance criteria to be delivered by the Contractor.
3. Reference Drawings: A drawing and/or set of drawings produced by a proprietary supplier, manufacturer, subcontractor, or fabricator included in the Contract Documents for informational purposes, providing specific information related to the installation of related appurtenances, components, devices, hardware, products and/or systems. Reference Drawings shall also include any Contract Drawings from prior bid packages that may have pertinent information or require coordination of trades related to this contract.
4. Shop Drawings: A drawing and/or set of drawings produced by the contractor, supplier, manufacturer, subcontractor, or fabricator as a detailed representation of the proper installation of the related, appurtenance, component, device, hardware, product and/or system to be delivered in conformance to the requirements of the Contract Documents.

## 1.2 Summary

- A. This section contains the overall requirements associated with all Division 28 Specification Sections, and includes the project design intent for the installation of a new Physical Access Control System (PACS), the integration of all door locations with the new PACS and the installation of a new Patient Elopement System (Building 30).
- B. In addition, this section shall address all requirements for submittals, quality assurance, product handling, record documents, project conditions, installation, system performance, demonstrations, testing, training and certifications related to all scopes of work as identified by all related Division 28 specification sections.
  1. The intent of this project is to award as a single prime contract the successful Contractor shall act as the prime contractor for the project and who herein shall be known as the "Contractor".
    - a. The ESSI shall be a sub-contractor to the prime contractor and shall have overall responsibility for all designs, equipment and all technical support related to all Division 27 and Division 28 scopes of work and shall ensure full coordination of all work as required to provide the following fully operational systems in accordance with all related specification sections and contract drawings.
      - 1) Physical Access Control System
      - 2) Patient Elopement system
- C. It shall be the responsibility of the Contractor to furnish and install all necessary cabling, conduits/raceways, cable terminations, controls, systems, devices, equipment, servers, software, materials, devices, components, emergency electrical power, equipment racks/cabinets and software as well as all appurtenances, programming, commissioning and testing necessary to deliver complete and fully operational systems as indicated by all division 28 specification sections and related contract drawings.



- a) The installation, performance, features, functions, software and programming criteria as specified herein as well as all related Division 28 specification sections have been designed to offer the maximum system efficiency, ease of operation, occupant safety and the protection of equipment as recommended by the Veterans Administration(VA)and Design Professional.
  - a. Any deviations from the specified criteria shall be documented, reviewed and agreed to in writing by VA's Project Engineer and Design Professional prior to submission of bids. Refer to Division 1, and all related Division 28 specification sections for any substitutions and/or project deviation requests.
    - 1) The required information shall include but not limited to: reason for deviation, all differences in performance, operation and function from the herein specified requirements, all benefits and added features to the Government as a result of the deviations and any additional incurred costs to the Government for maintenance and long term ownership.
    - 2) Failure to provide the VA's Project Engineer and Design Professional with the required information shall result in any shop drawing submissions being returned for non-conformance with the contract requirements.
  - b. The contractor and all sub-contractors for this work shall have read all of the General Conditions, Special Requirements, General Requirements, Division 1 and all related specification sections and in the execution of all work shall be bound by all of the conditions and requirements therein.
  - c. Prior to the submission of the Bid any discrepancies or inconsistencies noted within these specifications and/or the project drawings shall be brought to the immediate attention of the VA's Project Engineer and Design Professional.
- b) All device symbols are defined by the appropriate symbol schedules as indicated by the symbol and abbreviation drawing sheets for each discipline. The Contractor shall coordinate exact locations with all drawings and specifications as well as any affected trades prior to submittal of bids.
  - a. Symbols are shown on the contract drawings as close as possible to their intended location. Contractor shall coordinate the installation of all equipment, devices, controls, components, cabling conduits/raceways and integration of other systems with all affected trades and specified system integrators. The contractor shall document all coordination requirements at the time of shop drawing submission.

- b. Drawings for this work are diagrammatic and intended to convey the extent, general arrangement and locations of the work. Because of the scale of the drawings, certain basic items such as access panels, conduits, cabinet sizes, penetration sleeves, pull boxes, back-boxes and junction boxes may or may not be shown on the contract drawings. Include all items where required by code and related specification sections for proper installation of all work.
  - c. Where ambiguity exists between the project specifications and the contract drawings, the superior in system performance regardless of cost shall prevail and shall be delivered by the Contractor at no additional expense to the project.
- c) Project specifications and drawings may not individually deal with every part, control, device, component, programming or appurtenance which may be required to produce the equipment performance for the specified system and/or as required for compliance with all specified systems integration.
- a. Include such items and components, as required, for complete operational systems as defined by the project documents, whether or not specifically indicated. The contractor shall be responsible for providing conduits/raceways, cable terminations, controls, systems, equipment, materials, devices, components, electrical power, equipment racks/cabinets, software, programming, commissioning, testing and all appurtenances as well as the integration of any ancillary systems or Government provided equipment/components/systems.
  - b. Coordinate with other applicable trades in submittal of shop drawings and the installation of all systems. All shop drawings shall detail space conditions in order to accommodate other concerned trades, all equipment locations are subject to final review by the VA's Project Engineer and Design Professional.

D. Use Of Premises

- 1. General: In addition to all stipulations as specified by Division 01 the Contractor shall have limited use of premises for construction operations only as required to meet the scopes of work as delineated by the Contract Documents.
  - a. The Contractor is reminded that this is and will continue to be an operating healthcare facility. It shall be the contractor's responsibility to become completely familiar with all existing conditions at the Station, and review prior to the commencement of any all proposed equipment and cable installation requirements which shall have any impact to the daily operations of the Station.
- 1) All Division 28 scopes of work shall be planned and executed as a phased construction project and shall be considered critical to all construction activities.

- 2) The Contractor shall plan; schedule and install all scopes of work in accordance with the requirements of the project construction schedule and shall be coordinated with all the appropriate VAMC agencies prior to commencement. Refer to all related specification sections for additional information related to project scheduling and facility access.
- b. Prior to the submission of shop drawings and the commencement of any work the Contractor shall perform a complete and comprehensive testing assessment of all existing Physical Access Control System components and related cabling currently deployed throughout the entire station.
  - 1) At the completion of this assessment the contractor shall submit documentation of all results as well as any discovery to the VA's Project Engineer and Design Professional for review and evaluation.
  - 2) It shall be noted that the results of the aforementioned security assessment shall establish the current systems performance, operational capabilities and existing wiring conditions and shall establish the benchmark of all existing conditions for all physical access control systems on site.
    - a) Note: The survey of the existing PACS shall be completed, reviewed and approved by all agencies prior to the commencement of any construction activities throughout the facility.
2. The Contractor shall prepare, schedule and coordinate all system installations, modifications and demolition without disruption of any existing security system functions or the daily operation of the facility. All systems shall be installed in such a manner that all new controls, equipment and/or devices shall be installed, programmed and tested prior to switch over and/or disconnecting of any existing electronic security systems.
  - a. The contractor shall coordinate all installation activities so as not to disrupt the daily routines of the facility and shall include any costs related to a phased construction methodology including but not limited all necessary temporary equipment, devices, components or systems as well as any labor costs associated with any installation, commissioning, testing demolition of any systems required to be performed after normal business hours of the facility.
    - 1) The Contractor plan all work in accordance with requirements of the project construction schedule, all Division 01 stipulations and infection control measures. Refer to related specification sections for additional information related to project scheduling and facility access.

- b. Prior to the disabling, switchover and/or demolition of the existing PACS and/or PES components and associated cabling, all new system components, equipment, processors, servers, devices, conduits, cabling, software and programming shall be in place, tested and fully operational.
  - c. Upon completion of the new PACS and/or PES and prior to the switchover of all existing field devices and wiring the contractor shall coordinate with the VA Project Engineer and Design Professional all proposed system conversions and/or switchover methodologies. This coordination shall include all affected systems, areas of change over, change over procedures and duration of work to be performed.
    - 1) The contractor shall coordinate all demolition activities so as not to disrupt the daily routine of the facility or negatively impact the integrality of the facility's security and life safety measures.
    - 2) Contractor shall demolish all existing electronic security systems, cabling, devices, components and/or controls not integrated with the new PACS or PES at the completion of each project phase and only after final acceptance by the Government, Government Representatives and the Design Professionals.
      - a) The removal or demolition of all existing security system devices and/or field wiring not incorporated into the new system shall be performed in such a manner consistent with all requirements of NFPA 70.
    - 3) Contractor shall submit a demolition plan for review by the VA Project Engineer, VA Police Department and the Design Professionals outlining all procedures, means, methods and precautions to be employed in the demolition of all existing electronic security systems.
      - b) No demolition of any existing systems shall commence until all new and/or temporary systems are installed, operational, fully tested and accepted by the VA Project Engineer, VA Police Department and the Design Professionals.
3. All employees of the contractor and all sub-contractors shall comply with the Philadelphia VMAC security management program and obtain all required security clearances from the VA Police Department for all personnel and staff requiring access to the Station and contiguous spaces.
- a. The Contractor shall submit all required information to the VA's Project Engineer for background checks of all personnel prior to the time when access is planned for the contracted work. Failure to receive the required clearances will mean denial of access to site for that individual. The Contractor will allow for this activity in their project schedule.

- 1) All contractors and sub-contractors shall be required to follow all Station security procedures as required to ensure the safety of staff, patients and visitors and not compromise the daily operations of the Station. Personnel shall abide by all Government HIPAA regulations and the prohibition of carrying, transporting or possessing of any weapons, alcohol, narcotics or other contraband on Federal Facilities.
- 2) Failure to abide by any of the above referenced requirements can at the minimum cause restriction of access to the facility for the offending individual, fines and/or penalties to Prime and/or sub-contractor. Imprisonment of the offending individual as set forth by Local, State and Federal laws.
- 3) Refer to Division 01 "General Requirements" for additional information.

### 1.3 REFERENCES

- A. References to industry and trade association standards as well as all building codes are minimum installation requirements. The codes, standards and agencies listed below shall form a part of this specification section and all work shall comply with the latest adopted standards.
- B. The publications listed below (including amendments, addenda, revisions, supplement, and errata) form a part of this and all related division 28 specification sections to the extent referenced. The publications are referenced in the text by the basic designation only.
- C. Where the contract drawings and specifications mandate a greater requirement or performance than those specified by any of the below referenced codes and standards, the Contract Documents shall then be the governing requirements for this project. The minimum codes and standards to be applied for this project shall be the following;
  1. American National Standards Institute (ANSI)/ International Code Council (ICC):
    - a. A117.1 - Standard on Accessible and Usable Buildings and Facilities
  2. American National Standards Institute (ANSI)/ Security Industry Association (SIA):
    - a. AC-03 - Access Control: Access Control Guideline Dye Sublimation Printing Practices for PVC Access Control Cards
    - b. CP-01-00 - Control Panel Standard-Features for False Alarm Reduction
    - c. PIR-01-00 - Passive Infrared Motion Detector Standard - Features for Enhancing False Alarm Immunity
    - d. TVAC-01 - CCTV to Access Control Standard - Message Set for System Integration.

3. American National Standards Institute (ANSI)/Electronic Industries Alliance (EIA):
  - a. 330-09 - Electrical Performance Standards for CCTV Cameras
  - b. 375A-76 - Electrical Performance Standards for CCTV Monitors
4. American National Standards Institute (ANSI):
  - a. ANSI S3.2-99 - Method for measuring the Intelligibility of Speech over Communications Systems
5. American Society for Testing and Materials (ASTM)
  - a. B1-07 - Standard Specification for Hard-Drawn Copper Wire
  - b. B3-07 - Standard Specification for Soft or Annealed Copper Wire
  - c. B8-04 - Standard Specification for Concentric-Lay-Stranded Copper Conductors, Hard, Medium-Hard, or Soft
  - d. C1238-97 (R03) - Standard Guide for Installation of Walk-Through Metal Detectors
  - e. D2301-04 - Standard Specification for Vinyl Chloride Plastic Pressure Sensitive Electrical Insulating Tape
6. Architectural Barriers Act (ABA), 1968
7. Department of Justice: American Disability Act (ADA)
  - a. 28 CFR Part 36-2010 - ADA Standards for Accessible Design
8. Department of Veterans Affairs:
  - a. VHA National CAD Standard Application Guide, 2006
  - b. VA BIM Guide, V1.0 10
9. Federal Communications Commission (FCC):
  - a. (47 CFR 15) Part 15 - Limitations on the Use of Wireless Equipment/Systems
10. Federal Information Processing Standards (FIPS):
  - a. FIPS-201-1 - Personal Identity Verification (PIV) of Federal Employees and Contractors
11. Federal Specifications (Fed. Spec.):
  - a. A-A-59544-08 - Cable and Wire, Electrical (Power, Fixed Installation)
12. Government Accountability Office (GAO):
  - a. GAO-03-8-02 - Security Responsibilities for Federally Owned and Leased Facilities
13. Homeland Security Presidential Directive (HSPD):
  - a. HSPD-12 - Policy for a Common Identification Standard for Federal Employees and Contractors.

14. Institute of Electrical and Electronics Engineers (IEEE):

- a. 81-1983 - IEEE Guide for Measuring Earth Resistivity, Ground Impedance, and Earth Surface Potentials of a Ground System
- b. 802.3af-08 - Power over Ethernet Standard
- c. 802.3at-09 - Power over Ethernet (PoE) Plus Standard
- d. C2-07 - National Electrical Safety Code
- e. C62.41-02 - IEEE Recommended Practice on Surge Voltages in Low-Voltage AC Power Circuits
- f. C95.1-05 - Standards for Safety Levels with Respect to Human Exposure in Radio Frequency Electromagnetic Fields

15. International Building Code (IBC), 2009

16. International Organization for Standardization (ISO):

- a. 7810 - Identification cards - Physical characteristics
- b. 7811 - Physical Characteristics for Magnetic Stripe Cards
- c. 7816-1 - Identification cards - Integrated circuit(s) cards with contacts - Part 1: Physical characteristics
- d. 7816-2 - Identification cards - Integrated circuit cards - Part 2: Cards with contacts -Dimensions and location of the contacts
- e. 7816-3 - Identification cards - Integrated circuit cards - Part 3: Cards with contacts - Electrical interface and transmission protocols
- f. 7816-4 - Identification cards - Integrated circuit cards - Part 11: Personal verification through biometric methods
- g. 7816-10 - Identification cards - Integrated circuit cards - Part 4: Organization, security and commands for interchange
- h. 14443 - Identification cards - Contactless integrated circuit cards; Contactless Proximity Cards Operating at 13.56 MHz in up to 5 inches distance
- i. 15693 - Identification cards -- Contactless integrated circuit cards - Vicinity cards; Contactless Vicinity Cards Operating at 13.56 MHz in up to 50 inches distance
- j. 19794 - Information technology - Biometric data interchange formats

17. The Joint Commission (TJC) formally - Joint Commission on Accreditation of Healthcare Organizations (JCAHO)

18. National Electrical Contractors Association

- a. 303-2005 - Installing Closed Circuit Television (CCTV) Systems

19. National Electrical Manufacturers Association (NEMA):

- a. 250-08 - Enclosures for Electrical Equipment (1000 Volts Maximum)
- b. TC-3-04 - PVC Fittings for Use with Rigid PVC Conduit and Tubing
- c. FB1-07 - Fittings, Cast Metal Boxes and Conduit Bodies for Conduit, Electrical Metallic Tubing and Cable

20. National Fire Protection Association (NFPA):

- a. 70-2011 - National Electrical Code (NEC)
- b. 72-2010 - National Fire Alarm and Signaling Code
- c. 90A 2009 - Installation of Air Conditioning and Ventilating Systems
- d. 101-2009 - Life Safety Code
- e. 731-2008 - Standards for the Installation of Electric Premises Security Systems
- f. 99-2005 - Health Care Facilities

21. National Institute of Justice (NIJ)

- a. 0601.02-03 - Standards for Walk-Through Metal Detectors for use in Weapons Detection
- b. 0602.02-03 - Hand-Held Metal Detectors for Use in Concealed Weapon and Contraband Detection

22. National Institute of Standards and Technology (NIST):

- a. IR 6887 V2.1 - Government Smart Card Interoperability Specification (GSC-IS)
- b. Special Pub 800-37 - Guide for Applying the Risk Management Framework to Federal Information Systems
- c. Special Pub 800-63 - Electronic Authentication Guideline
- d. Special Pub 800-73-3 - Interfaces for Personal Identity Verification (4 Parts)
  - 1) Pt. 1- End Point PIV Card Application Namespace, Data Model & Representation
  - 2) Pt. 2 - PIV Card Application Card Command Interface
  - 3) Pt. 3 - PIV Client Application Programming Interface
  - 4) Pt. 4 - The PIV Transitional Interfaces & Data Model Specification
- e. Special Pub 800-76-1 - Biometric Data Specification for Personal Identity Verification
- f. Special Pub 800-78-2 - Cryptographic Algorithms and Key Sizes for Personal Identity Verification
- g. Special Pub 800-79-1 - Guidelines for the Accreditation of Personal Identity Verification Card Issuers
- h. Special Pub 800-85B-1 - DRAFT-PIV Data Model Test Guidelines
- i. Special Pub 800-85A-2 - PIV Card Application and Middleware Interface Test Guidelines (SP 800-73-3 compliance)
- j. Special Pub 800-96 - PIV Card Reader Interoperability Guidelines
- k. Special Pub 800-104A - Scheme for PIV Visual Card Topography

23. Occupational and Safety Health Administration (OSHA):

- a. CFR 1910.97 - Nonionizing radiation

24. Section 508 of the Rehabilitation Act of 1973.



25. Security Industry Association (SIA):

- a. AG-01 - Security CAD Symbols Standards

26. Underwriters Laboratories, Inc. (UL):

- a. 1-05 - Flexible Metal Conduit
- b. 5-04 - Surface Metal Raceway and Fittings
- c. 6-07 - Rigid Metal Conduit
- d. 44-05 - Thermoset-Insulated Wires and Cables
- e. 50-07 - Enclosures for Electrical Equipment
- f. 83-08 - Thermoplastic-Insulated Wires and Cables
- g. 294-99 - The Standard of Safety for Access Control System Units
- h. 305-08 - Standard for Panic Hardware
- i. 360-09 - Liquid-Tight Flexible Steel Conduit
- j. 444-08 - Safety Communications Cables
- k. 464-09 - Audible Signal Appliances
- l. 467-07 - Electrical Grounding and Bonding Equipment
- m. 486A-03 - Wire Connectors and Soldering Lugs for Use with Copper Conductors
- n. 486C-04 - Splicing Wire Connectors
- o. 486D-05 - Insulated Wire Connector Systems for Underground Use or in Damp or Wet Locations
- p. 486E-00 - Equipment Wiring Terminals for Use with Aluminum and/or Copper Conductors
- q. 493-07 - Thermoplastic-Insulated Underground Feeder and Branch Circuit Cable
- r. 514A-04 - Metallic Outlet Boxes
- s. 514B-04 - Fittings for Cable and Conduit
- t. 51-05 - Schedule 40 and 80 Rigid PVC Conduit
- u. 609-96 - Local Burglar Alarm Units and Systems
- v. 634-07 - Standards for Connectors with Burglar-Alarm Systems
- w. 636-01 - Standard for Holdup Alarm Units and Systems
- x. 639-97 - Standard for Intrusion-Detection Units
- y. 651-05 - Schedule 40 and 80 Rigid PVC Conduit
- z. 651A-07 - Type EB and A Rigid PVC Conduit and HDPE Conduit
- aa. 752-05 - Standard for Bullet-Resisting Equipment
- bb. 797-07 - Electrical Metallic Tubing
- cc. 827-08 - Central Station Alarm Services
- dd. 864-08 - Standard for Control Units and Accessories for Fire Alarm Systems
- ee. 1037-09 - Standard for Anti-theft Alarms and Devices
- ff. 1635-10 - Digital Alarm Communicator System Units
- gg. 1076-95 - Standards for Proprietary Burglar Alarm Units and Systems
- hh. UL 1069: Hospital Signaling and Nurse Call Equipment
- ii. 1242-06 - Intermediate Metal Conduit
- jj. 1479-03 - Fire Tests of Through-Penetration Fire Stops
- kk. 1981-03 - Central Station Automation System
- ll. 2058-05 - High Security Electronic Locks
- mm. 60950 - Safety of Information Technology Equipment
- nn. 60950-1 - Information Technology Equipment/Safety/Part 1:

27. Uniform Federal Accessibility Standards (UFAS) 1984.

28. United States Department of Commerce:

- a. Special Pub 500-101 - Care and Handling of Computer Magnetic Storage Media

**1.4 SUBMITTALS**

- A. In addition, to all submittal requirements as stipulated by Division 01 specifications sections, the Contractor shall provide all shop drawing submittals in accordance with the following:

1. The VA's Project Engineer and Design Professional's approval of all submittals shall be obtained for all equipment and material before delivery to the job site. Delivery, storage, or installation of equipment or material which has not had prior approval will not be permitted at the job site.
2. All submittals shall include adequate descriptive literature, catalog cuts, shop drawings, and other data necessary for the Government to ascertain that the proposed equipment and materials comply with specification requirements. Catalog cuts submitted for approval shall be legible and clearly identify equipment being submitted.
3. Submittals shall be provided as a complete submission; no partial submissions will be accepted. Failure to provide a complete submission shall result in all submittals being returned for resubmission.
  - a. In addition to all paper submission requirements as stipulated by Division 01 the Contractor shall also submit one complete set of electronic submittals in a PDF format.
4. No substituted equipment shall be reviewed without prior approval in accordance with the requirements of "substitutions" under Division 1 specification section.
5. Mark the submittals, "SUBMITTED UNDER SECTION\_\_\_\_\_".
  - a. Submittals shall be marked to show specification reference including the section and paragraph numbers.
6. The Contractor shall schedule submittals in order to maintain the project schedule. For coordination requirements refer to Division 01 Specification Sections, which outline basic submittal requirements and coordination. All Division 01 Specification Sections requirements shall be used in conjunction with this specification section.
7. Prior to any submission the contractor shall be responsible for performing the following quality control items to ensure compliance with all project requirements:
  - a. Review all Shop Drawings and Product Data
  - b. Review all field measurement criteria.
  - c. Review all field construction criteria and methodologies.
  - d. Review all catalog numbers and similar data.
  - e. Review all coordination requirements of affected trades.
  - f. Review conformance to all appropriate specification sections.

8. All drawings shall be prepared using latest version of AutoCAD®, drawn accurately, and in accordance with the VA's CAD Standards "CAD Standard Application Guide". The Contractor shall not reproduce the Contract Documents or copy standard information as the basis of the technical data, hand drawn mark-ups of the original project drawings shall not be acceptable. Failure to provide a complete set of "contractor prepared" installation drawings at the time of submittal shall result in all submittals being returned for resubmission.
9. Packaging: The Contractor shall organize the submissions according to the following packaging requirements.
  - a. Electronic Copy Submission: One complete set of electronic equipment data sheets and drawings submitted in PDF format and collated in two distinct files:
    - 1) Equipment Data Sheets, equipment schedules, alarm matrixes cable termination spread sheets, and all related pertinent information.
    - 2) Drawings including all site plans, floor plans, risers, point to point wiring, grounding, installation details and mounting elevations.
  - b. Paper Submission: Provide paper submissions in quantities as required by all Division requirements and shall include all information as herein specified and by all related specification sections.
    - 1) Binders: For each manual, provide heavy duty, commercial quality, durable three (3) ring vinyl covered loose leaf binders, sized to receive 8.5 x 11 in paper, and appropriate capacity to accommodate the contents. Provide a clear plastic sleeve on the spine to hold labels describing the contents. Provide pockets in the covers to receive folded sheets.
      - a) Where two (2) or more binders are required to accommodate data; correlate the data in each binder into related groupings according to the Project Manual table of contents. Cross-reference other binders where necessary to provide essential information for communication of proper operation and/or maintenance of the component or system.
      - b) Identify each binder on the front and spine with printed binder title, Project title or name, and subject matter covered. Indicate the volume number if applicable.
    - 2) Dividers: Provide heavy paper dividers with celluloid tabs for each Section. Mark each tab to indicate contents.
    - 3) Protective Plastic Jackets: Provide protective transparent plastic jackets designed to enclose diagnostic software for computerized electronic equipment.

- 4) Text Material: Where written material is required as part of the manual use the manufacturer's standard printed material, or if not available, specially prepared data, neatly typewritten on 8.5 inches by 11 inches 20 pound white bond paper.
- 5) Drawings: Where drawings and/or diagrams are required as part of the manual, provide reinforced punched binder tabs on the drawings and bind them with the text.
  - a) Where oversized drawings are necessary, fold the drawings to the same size as the text pages and use as a foldout.
  - b) If drawings are too large to be used practically as a foldout, place the drawing, neatly folded, in the front or rear pocket of the binder. Insert a type written page indicating the drawing title, description of contents and drawing location at the appropriate location of the manual.
  - c) Drawings shall be sized to ensure details and text is of legible size. Text shall be no less than 1/16" tall.
- 10. The ESSI shall have a registered RCDD professional review and seal all system designs, installations and testing certification for all electronic security systems and associated structured cabling. Failure to provide RCDD sealed shop drawings shall result in all shop drawings being returned for resubmission without any reviews taking place.
- 11. The VA's Project Engineer and Design Professional review of the shop drawings and/or samples does not relieve the Contractor from compliance with the requirements of the project documents. Unless the Contractor has informed the VA's Project Engineer and Design Professional in writing of such deviation at the time of submission, has noted the deviation on the shop drawings, and the VA's Project Engineer and Design Professional has given written approval of the specific deviations to the project documents, all project requirements shall stand. The VA's Project Engineer and Design Professional review also does not relieve the Contractor from responsibility for any errors of omission in the submission of shop drawings and/or samples.
- 12. Submit all system testing and startup procedures to be employed. Include all estimated times for performance of all tests, all test equipment and manpower necessary for testing.
- 13. Submit all integrator qualifications, certifications and licenses in accordance with the requirements as specified elsewhere in this specification section.
- 14. Submit project schedule outlining the time frames for all equipment with long lead times for equipment deliveries; include all system commissioning, testing and training time expectations. Project schedule shall be submitted as CPM schedule and shall utilize a software based project management program.

B. Shop Drawings:

1. All shop drawings shall include sufficient information, clearly presented, to determine full compliance with all project drawings and specifications. Include the following information for review, failure to provide all information listed below shall result in all shop drawing submittals being returned for resubmission:
  - a. All Building Floor and Site Plans
  - b. All equipment with manufacturer's name(s), model numbers,
  - c. All equipment /device electrical ratings and power requirements
  - d. All equipment /device performance ratings.
  - e. All standby battery and wiring voltage drop calculations
  - f. All surge and\or transient protection devices and device locations
  - g. All equipment rack, panels and cabinet layouts, rack/cabinet sizes.
  - h. All equipment and device-mounting elevations.
  - i. All device wiring details.
  - j. Complete point-to-point-wiring diagrams for all systems. Include all equipment and wiring termination schedules and programming matrixes.
2. Provide a complete set of "contractor prepared" installation drawings. All drawings at the minimum shall consist of floor plans indicating all device locations, device identifications, control panels, auxiliary control panels, power supplies, annunciation panels, conduit and cabling requirements as well as all 120 volt electrical circuit locations and designations.
  - a. Drawings shall include at the minimum the following;
    - 1) Detailed equipment layouts for all equipment rooms. Coordinate all room layouts with affected trades.
    - 2) Floor plan drawings showing locations of all control panels, sub- panels, ancillary controls, equipment cabinets and/or racks, annunciator panels, HMI terminals, auxiliary power supplies, devices and sensors, electrical power and grounding terminations as well as all device\sensor identifications
    - 3) Conduit routing of all conduits 3/4 inches in diameter or greater.
    - 4) System riser diagrams and single line drawings representing interconnections of all system control panels, sub- panels, ancillary controls, equipment cabinets and/or racks, annunciator panels, HMI terminals, auxiliary power supplies, devices, sensors and components, include all cable types and sizes, electrical power connections and circuits, grounding connections, surge and\or transient protection devices and all field device\sensor identifications.

- 5) Block diagrams and Logic flow charts representing all systems architecture and interconnection of the security management systems (SMS) and fire management systems (FMS) all related integrated subsystems. Include detailed information on all system component integrations, data transmission and media conversions as well as logical functional data and performance criteria.
  - 6) Equipment wattage for all equipment room locations and estimated BTU production.
  - 7) Detailed equipment layouts for all equipment consoles. Indicate all equipment locations, power connections and installation details.
  - 8) All equipment mounting hardware/brackets and installation details, Identify type size, load capacities of all mounting hardware/brackets; include all mounting and installation details, all space requirements, any special architectural modifications required.
  - 9) Outline drawings of all equipment cabinets/racks showing the relative position of all major components, all-wiring and grounding terminations. Include all panel, cabinet and/or rack dimensions.
  - 10) Door Schedules for each door equipped with electronic security components. At a minimum, the door schedules shall be coordinated with Division 08 work and include the following information:
    - a) Door Number (Extracted from Architectural Drawings)
    - b) Door location on security floor plan drawing
    - c) Installation Details
    - d) Door Description (Extracted from alarm programming matrixes)
    - e) Data Gathering Panel Input Number
    - f) Door Position or Monitoring Device Type & Model Number
    - g) Lock Type, Model Number & Power Input/Draw (standby/active)
    - h) Card Reader Type & Model Number
    - i) Shunting Device Type & Model Number
    - j) Sounder Type & Model Number
    - k) Delayed Egress Type & Model Number
    - l) Intercom (video or standard)
    - m) Type of Electric Transfer Hinge
    - n) Electric Pass-through device
3. All shop drawing submissions shall have a registered RCDD professional review and seal all shop drawings confirming that the proposed cabling infrastructures and terminations are in conformance with all stipulated standards and requirements as herein specified or in related specification sections.
  4. Failure to provide all required documentation in accordance will ALL related specification requirements at the time of shop drawing submission shall result in all submittals to be returned for non-compliance to the contract requirements.

C. Equipment Submittals and Data Sheets:

1. Sufficient information, clearly presented, shall be included to determine compliance with drawings and specifications.
  - a. Include all equipment data sheets pertinent to equipment provided. All data sheets shall be highlighted indicating specific equipment supplied. Failure to provide the proper annotation of all equipment shall result in submittals being returned for resubmission.
2. Submit complete technical data necessary to evaluate the material and equipment. Include a complete technical specification for the submitted equipment, noting differences and adherence to this Section. Failure to provide the required data will result in all submittals being returned for resubmission.
3. Submit performance data, equipment ratings, cable requirements, control sequences, GUI based control panels, programming matrixes, logic diagrams and all other descriptive data necessary to describe the installation and operations of the system being provided. Failure to provide the required data will result in all submittals being returned for resubmission.
4. Provide a complete termination schedule of all system devices, sensors, components, equipment and controls, identify all locations as indicated on the installation drawings, include all unique identification numbers which correspond with shop drawing floor plans.
  - a. Include point to point wiring terminations and programming matrixes for all control panels, sub-control-panels, and access control DGP's alarm input panels associated with the project. Include all input and output modules and all I/O termination points for all panels
  - b. All Documentation shall be provided in current version Microsoft Excel spreadsheets following the format currently utilized by VA. A separate spreadsheet file shall be generated for each associated panel.
    - 1) All access control system DGP point to point wiring terminations and programming matrixes shall include at the minimum the additional information:
      - a) DGP panel number
      - b) First Reader Number
      - c) First Monitor Point Number
      - d) First Relay Number
      - e) DGP, input or output Location
      - f) DGP Chain Number
      - g) DGP Cabinet Tamper Input Number
      - h) DGP Power Fail Input Number
      - i) Number of Monitor Points Reserved For Expansion Boards
      - j) Number of Control Points (Relays) Reserved For Expansion Boards

- 2) The DGP, input module and output module spreadsheets shall automatically calculate the following information based upon the associated entries in the above fields:
  - a) System Numbers for Card Readers
  - b) System Numbers for Monitor Point Inputs
  - c) System Numbers for Control Points (Relays)
  - d) Next DGP or input module First Monitor Point Number
  - e) Next DGP or output module First Control Point Number
- 3) The DGP spreadsheet shall provide the following information for each card reader:
  - a) DGP Reader Number
  - b) System Reader Number
  - c) Cable ID Number
  - d) Description Field (Room Number)
  - e) Description Field (Device Type i.e.: In Reader, Out Reader, etc.)
  - f) Description Field
  - g) DGP Input Location
  - h) Date Test
  - i) Date Passed
  - j) Cable Type
- 4) The DGP and input module spreadsheet shall provide the following information for each monitor point (alarm input).
  - a) DGP Monitor Point Input Number
  - b) System Monitor Point Number
  - c) Cable ID Number
  - d) Description Field (Room Number)
  - e) Description Field (Device Type i.e.: Door Contact, Motion Detector, etc.)
  - f) DGP or input module Input Location
  - g) Date Test
  - h) Date Passed
  - i) Cable Type
- 5) The DGP and output module spreadsheet shall provide the following information for each control point (output relay).
  - a) DGP Control Point (Relay) Number
  - b) System (Control Point) Number
  - c) Cable ID Number
  - d) Description Field (Room Number)
  - e) Description Field (Device: Lock Control, Local Sounder, etc.)
  - f) Description Field
  - g) DGP and Output Module Location
  - h) Date Test
  - i) Date Passed Cable Type
  - j) Camera Number (of associated alarm event preset call-ups)



- 6) The DGP, input module and output module spreadsheet shall include the following information or directions in the header and footer:
  - a) Header
    - (1) DGP Input and Output Worksheet
    - (2) Enter Beginning Reader, Input, and Output Starting Numbers and Sheet Will Automatically Calculate the Remaining System Numbers.
  - b) Footer
    - (1) File Name
    - (2) Date Printed
    - (3) Page Number
5. FIPS-201 Compliance Certificates for all PACS systems and associated system components.
6. Provide a clear and concise sequence of operation that gives, in detail, all information required to properly operate all equipment and systems. Include detailed programming matrixes, indicating at the minimum all manual and automatic functions for all system, components and devices comprising the system being provided.
7. Provide copies of all preliminary graphic screens for all HMI configurations for this project. Graphic maps shall indicate all site plans, floor plan maps, utility screens, all door control functions, alarm indications, door interlock functions and ancillary controls.
8. Provide a listing of all recommended time zone and alarm shunting functions.
9. Provide a preliminary list of all on screen emergency response instructions and help menus.
10. Provide system parts list which shall include those replacement parts recommended by the equipment manufacturer, quantity of parts, current price and availability of each part.
11. Failure to provide all required documentation in accordance with ALL related specification requirements at the time of shop drawing submission shall result in all submittals to be returned for non-compliance to the contract requirements.
- D. Maintenance and Operation Manuals: Submit in accordance with all requirements of Division 01 specification sections and as herein specified.
  1. Maintenance and Operation Manuals shall be submitted for all systems and equipment specified in the technical sections. Furnish the number of copies as specified by Division 1, all manuals shall be bound in hardback binders, (manufacturer's standard binders) or an approved equivalent prior to the commissioning, testing and final acceptance of each system.

- a. The Contractor shall also furnish one complete set of manuals as specified herein at the time of shop drawing submission for Design Professional s' use in the review of all submittals.
2. Inscribe the following identification on the cover: "Maintenance and Operational Manual" include the name and location of the system, equipment, building, name of Contractor, and contract number. Include in the manual the names, addresses, and telephone numbers of each subcontractor installing the system or equipment and the local representatives for the system or equipment.
- b. The Maintenance and Operation Manuals at the minimum shall include:
  - 1) Copy of approved shop drawing and equipment submittals
  - 2) Internal and interconnecting wiring and control diagrams with data to explain detailed operation and control of all equipment, components, devices and servers.
  - 3) A complete control sequence describing start-up, operation, and shutdown of all equipment, components, devices and servers.
  - 4) Description of the function of each principal item of equipment.
  - 5) Installation and maintenance instructions
    - a) Safety precautions
    - b) Diagrams and illustrations.
    - c) Testing methods.
    - d) Performance data.
    - e) Pictorial "exploded" parts list with part numbers. Emphasis shall be placed on the use of special tools and instruments. The list shall indicate sources of supply, recommended spare parts, and name of servicing organization.
    - f) Appendix; list qualified permanent servicing organizations for support of the equipment, including addresses and certified qualifications.
- c. Failure to provide all required documentation in accordance will ALL related specification requirements at the time of shop drawing submission shall result in all submittals to be returned for non-compliance to the contract requirements.

#### **1.5 QUALITY ASSURANCE**

- A. In addition to all general provisions of the Contract, including but not limited to all; General and Supplementary Conditions, Division 01 Specification Sections include the following project requirements;

1. Integrator Qualifications: The projects' Electronic Security System Integrator (ESSI) shall be an accredited and authorized distributor of the appropriate equipment manufacturer and shall be fully certified in the installation, testing and programming of all equipment being provided. The ESSI shall be a licensed security Contractor with a minimum of five (5) years' experience installing and servicing systems of similar scope and complexity.
  - a. The ESS integrator shall be capable of providing documented successful work experience of at least three (3) facilities of equivalent size and technical requirements utilizing the proposed equipment being provided. The system integrator shall have on staff a minimum of one full time individual that holds a current RCDD registration.
    - 1) All electronic security systems and related work shall be certified in writing to the VA's Project Engineer and Design Professional by a RCDD professional asserting that all electronic security system shop drawings and all associated structured cabling is in conformance with all appropriate NEC requirements, EIA/TIA standards; NFPA 731 recommended practices, BICSI recognized installation practices and all related specification sections.
2. Cable Installer Qualifications: The cable installation contractor shall demonstrate not less than three (3) years' experience in the installation of structured cabling systems and shall have on staff a minimum of one full time member that holds a current BICSI level II installer credential.
  - a. NOTE: The installation of all cabling shall be under the direct supervision of a current BICSI level II installer who shall be knowledgeable in the following technical applications:
    - 1) The Routing and installation of shielded, unshielded, twisted pair, coaxial and fiber optic cables.
    - 2) Bonding and grounding of cable tray and equipment racks.
    - 3) Fusion splicing of fiber optic cabling.
    - 4) Testing copper conductors for electrical continuity.
    - 5) Testing and Certifying of Category 6 cabling for attenuation and worst case near end cross talk.
    - 6) Testing and Certifying of ALL fiber optic cabling employing an Optical Time Domain Reflectometer (OTDR) in accordance with TIA/EIA protocols.
    - 7) Testing and Certifying of coaxial cable networks for RF leakage
    - 8) Termination, connection, and testing of shielded and unshielded twisted pair cable, coaxial cabling and fiber optic cabling on all specified connectors, electrical protection blocks, termination blocks and patch panels.
    - 9) Generally accepted industry standards, as well as manufacturers written installation instructions, will be used for in-process quality control and final acceptance of the work installation.

- b. Provide registration number and expiration date of BICSI level II installer assigned to the project.
3. The VA's Project Engineer and Design Professional reserve the right to require the Contractor to submit a list of installations where the products have been in operation before approval of shop drawings.
  - a. Experience shall be defined as the completion of the specific system being provided, with that system being successfully operated by the Owner for its intended purpose for at least three (3) years.
  - b. In addition to the above "Experience" shall also be defined as the completion of modifications and renovations to any associated system being provided in any existing occupied facility of this size and magnitude.
  - c. For each facility submit the following:
    - 1) Name and location of facility.
    - 2) Date of Occupancy or beneficial use by Owner.
    - 3) Owner's representative to contact and telephone number.
    - 4) Construction Manager or General Contractor.
    - 5) Project Architect or Engineer.
    - 6) Provide detailed information on the installed locations with operational equipment.
4. Service Qualifications: The ESSI shall be a permanent service organization maintained and/or trained by the product manufacturer on the products being provided for this project.
  - a. The integrator shall be properly licensed by the governing municipality (where required) certified to provide the services and work of the specific system being provided.
  - b. In addition all integrators shall be capable of providing full service for the entire warranty period within an 4-hour response time upon notification of a service emergency.
  - c. Provide registration number and expiration date of RCDD professional.
5. Manufacturers Qualifications: The manufacturer shall regularly and presently produce, as one of the manufacturer's principal products, the equipment and materials specified for this project, and shall have manufactured the items for at least three years.
  - a. Product Qualification: The Manufacturer's product shall have been in satisfactory operation, on three installations of similar size and type as this project, for approximately three years.
  - b. The equipment manufacturer shall submit the appropriate documentation certifying that the project integrator is a qualified service provider and certified in the installation and programming of all manufacturers' products being provided for this project.

#### **1.6 RECORD DOCUMENTS**

- A. In addition to all general provisions of the Contract, including but not limited to all; General and Supplementary Conditions, Division 01 Specification Sections include the following project requirements;
1. Provide complete set of finalized copies of record documents prior to final acceptance of the project by VA's Project Engineer and Design Professional in accordance with all requirements of Division 01 specification sections. At the minimum the record documents shall contain all information, data and drawings as described in Chapter 1.4 "Submittals" of this specification section.
    - a. As-built documents shall be submitted in both paper and electronic media formats in the quantities as specified by Division 1 specification requirements.
      - 1) All electronic record drawings shall be prepared and submitted utilizing an AutoCAD based program as manufactured by Autodesk. Where electronic documents are prepared using other than an AutoCAD program manufactured by Autodesk, the contractor shall provide to the VA's Project Engineer and Design Professional the necessary software to electronically view the submitted documents.
      - 2) All electronic data sheets, control sequences, programming matrixes and other descriptive data shall be provided in PDF formatted documents.
      - 3) Copies of all current system programming and associated software shall be provided on downloadable media formatted for the use in restoration all system operations and functionality in the event of a catastrophic failure.

#### **1.7 SOFTWARE AGREEMENT**

- A. Included as part of the scope of work for this project the Government shall retain the ownership and access rights of ALL system programs and software associated with all systems installed and/or modified as part of this project.
1. The contractor shall provide to VA's Project Engineer complete copies of all current software programming and software licenses related to the operation of each system prior to final acceptance of the related Contract scopes of work.
    - a. All programming shall include but not be limited to all device identifications, device descriptions, Programming Logic Matrixes, all program access level passwords as well as all function and sub-function routines.
  2. Programming and software copies shall be provided to the VA's Project Engineer on CD or DVD digital formatted media. In addition, the contractor shall provide a complete hard copy printout of all system programming and shall be included as part of closeout documentation for review by the VA's Project Engineer and Design Professional.

- B. Software and firmware upgrade provisions shall be included as part of this specification requirement and shall include the automatic upgrades as required to maintain all software and firmware to the manufacturers most current revision on all system components installed and or modified as part of this project for duration of the warranty period. This upgrade policy shall require the contractor to install, test and certify all software and firmware upgrades that become available from manufacturer for a period of one year from date of final acceptance to the expiration of the warranty.
1. Upgrading of software shall include all revised/new software, labor, testing certification as well as all licenses, software and all programming copies as described in Chapter 1.6 of this section associated with the installation of all revised software.
  2. These updates shall be accomplished in a timely manner, fully coordinated with the system operators, and incorporated into the operations\maintenance and software documentation manuals.
    - a. One (1) scheduled final update shall be provided near the end of the warranty period, at which time the Contractor shall install and validate the latest released version of the Manufacturer's software and firmware for all systems installed and\or modified for this project.
    - b. All software changes shall be recorded in a log maintained in the unit control. An electronic copy of the most current software update shall be maintained within the log.
      - 1) At a minimum, the contractor shall provide a description of the modification, when the modification occurred, and name and contact information of the individual performing the modification. The log shall be maintained in a white 3 ring binder and the cover marked "Software Change Log".
  3. Provide not less than thirty days' notice to the VA's Project Engineer and Design Professional to allow scheduling and access to system and to allow the Government to upgrade computer equipment if necessary.

#### **1.8 EXTRA MATERIAL**

- A. In addition to all general provisions of the Contract, including but not limited to all; General and Supplementary Conditions, Division 01 Specification Sections refer to related specification sections "Extra Material" for specific requirements.
- B. All Extra materials shall be provided at the time of final acceptance of the project and a signed packing list shall be obtained at the time of delivery. At no time is the contractor to use the extra materials provided for this project to replace malfunctioning or damaged equipment and or components.

## **PART 2 - PRODUCTS**

### **2.1 MANUFACTURED PRODUCTS**

- A. Materials and equipment furnished shall be of current production by manufacturers regularly engaged in the manufacture of such items, that meet and/or exceed the specified performance and features of the equipment and/or systems and for which replacement parts shall be readily available to the system integrator and/or using agency.
1. When more than one unit, device or component of the same class of equipment is required, such units, devices or components shall be the product of a single manufacturer.
  2. Acceptable manufacturers for each system shall be as specified and shall be provided in full compliance with the requirements of this and all related specification sections and contract drawings.
    - a. Manufacturers listed as acceptable shall not negate the contractors' responsibility for providing all equipment, devices, components and/or systems, in accordance with all functions and performance requirements of the Contract Documents.
    - b. Where manufacturer and/or manufacturer model numbers reference specific system components in the related specification sections, it is to establish the performance requirements and quality of the systems and components only.
      - 1) It is in no way an inference that the referenced model numbers are the manufacturer's current product and are the only acceptable components for this project unless specifically referenced as "no substitutions".
    - c. The Contractor shall provide the manufacturers' most current product that shall meet and/or exceed the specified performance and features of the equipment and/or systems.
    - d. Equivalent UL- listed equipment may be substituted for the approved manufacturers unless stipulated by other specification sections as "No Substitutions". All substitutions shall be submitted for approval by VA's Project Engineer and Design Professional in accordance with all requirements of Division 01 specification sections and Chapter 1.4 "Submittals" of this specification section.
      - 1) Where systems and/or components are referenced as "no substitutions" the specific system and/or components shall be provided.
      - 2) All substitutions shall comply with all requirements as specified above and all system performance standards shall be maintained.
      - 3) The contractor shall stipulate the following information impacted by such a substitution.
        - a) Any and all extensions in time impacted by the substitution.
        - b) Any changes to the architectural or structural elements to the project

c) Differences in operation and/or performance from intended system criteria.

4) Failure to provide the required substitution information shall result in "without consideration" the immediate rejection of the substituted equipment and/or systems.

B. Equipment Assemblies and Components:

1. Components of an assembled unit need not be products of the same manufacturer.

- a. Manufacturers of equipment assemblies, which include components made by others, shall assume complete responsibility for the final assembled unit.
- b. Components shall be compatible with each other and with the total assembly for the intended service.
- c. Constituent parts which are similar shall be the product of a single manufacturer.
- d. Factory wiring shall be identified on the equipment being furnished and on all wiring diagrams.

C. Where Factory or Off-Premises Testing of any equipment, product or assembly is recommended by the product manufacturer or where specified as part of this section and/or any related specification section:

1. The Government and/or Government representatives shall have the option of witnessing all factory tests. The Contractor shall notify the Design Professional at a minimum of thirty (30) working days prior to the performance of any factory or off-premises tests.

- a. Where the factory or assembly point for all off-premises testing is not within two (2) hours driving time from the project location, the ESSI shall include as part of this project all per diem costs (travel, meals and lodging) for a minimum of two representatives of the using agency and the project Design Professional to witness all testing.

2. Provide four (4) copies of certified test reports containing all preliminary test data and testing procedures shall be furnished to the VA's Project Engineer and Design Professional prior to any final testing and not more than ninety (90) days after completion of any tests.

3. When equipment, product or assembly fails to meet any factory or off-premises tests, retesting of equipment, product or assembly shall be mandated, the manufacturer/integrator shall be liable for all additional expenses, including all expenses incurred by the VA's Project Engineer and Design Professional for witnessing the retesting of any equipment, product or assembly.



### **PART 3 - EXECUTION**

#### **3.1 EQUIPMENT PROTECTION**

- A. Protect all materials, equipment, devices or components permanently installed and/or stored on the job site. Protect all materials, equipment, cabling, devices or components during construction and after installation, provide appropriate protection of all materials, equipment, components and/or devices until time of substantial completion. All materials, equipment, components and/or devices shall be protected during shipment and storage against any physical damage, dirt, moisture, cold, snow or rain:
1. During installation, enclosures, equipment, controls, controllers, circuit protective devices, and other like items, shall be protected against entry of any foreign matter; and shall be vacuum cleaned both inside and outside before testing and operating and repainting if required.
  2. Any materials, equipment, components and/or devices, stored on site which have been deemed by the Design Professional to exhibit any indications of damage or exposure dust or moisture shall not be installed and shall returned to the source of supply for immediate replacement.
    - a. The use of spare parts or the return of defective equipment for repair to mitigate the damage of defective materials, equipment, components and/or devices shall not be acceptable. All materials, equipment, components and/or devices shall be new and unused until final acceptance by the Design Professional.
  3. Provide and apply protective material immediately upon receiving the products and maintain throughout the construction process.
    - a. Painted surfaces shall be protected with factory installed removable heavy kraft paper, sheet vinyl or equal.
    - b. Any damaged paint on equipment and materials shall be refinished with the same quality of paint and workmanship as used by the manufacturer so repaired areas is not obvious or detectable.
  4. Failure to properly protect all materials, equipment, components and/or devices prior to final acceptance shall constitute sufficient cause for rejection of materials, equipment, components and/or devices should any defects, damage or degradation in performance is observed.
- B. Immediately replace all malfunctioning materials, equipment, components and/or devices with new unused products up until the time the Design Professional issues final acceptance of the system. The returning of any malfunctioning equipment, devices and/or components to the manufacturer for repair and then reinstallation at the project site shall not be acceptable.
1. All replacement materials, equipment, components and/or devices shall be factory new and not scavenged from the Project's spare parts

inventory or factory recycled products unless expressly identified by contractor prior to replacement and approved beforehand by the Design Professional.

### **3.2 WORK PERFORMANCE**

- A. Installation, final termination, testing, start-up and commissioning of all systems, system components and cabling infrastructures shall be under the direct supervision of the appropriate system integrator. The integrator shall be an accredited and authorized distributor of the appropriate equipment manufacturer and shall be fully certified in the installation, testing, commissioning and programming of all equipment, devices, components and/or systems being provided as part of this project.
- B. Job site safety and worker safety is the responsibility of the contractor. Ensure that safe access and egress from all work areas is maintained during movement and installation of materials. Clean up all debris generated by installation activities. Keep all security electronic equipment rooms free of debris at all times.
- B. Pre-installation Conferences: Include provisions to attend all pre-installation conferences at Project site in compliance with all requirements in Division 01 specification section and as herein specified. Review methods and procedures related to installation and operations of all safety and security systems, including, but not limited to, the following:
  - 1. Inspect and discuss electrical and control system roughing-in related to all safety and security systems as well as other preparatory work required to be performed by other trades.
  - 2. Review and discuss all work, equipment deliveries, installation procedures and related scopes as required to conform to the phased construction schedule.
  - 3. Review sequence of operations for each type of system, controls and/or integration to any systems and/or equipment provided by other trades
  - 4. Review and finalize construction schedule and verify availability of materials, installation personnel, equipment, and any preparatory work by other trades needed to make progress and avoid delays.
  - 5. Review required start-up, testing, commissioning and certifying procedures to be employed for each system and any impacts to other trades.
- C. For work on existing facilities, arrange, phase and perform work to assure the operation of all security systems for other buildings and contiguous spaces at all times. Refer to Division 1 specification section for additional information.
- D. All new work shall be installed and connected to existing work neatly and carefully. Disturbed or damaged work shall be replaced or repaired to its prior conditions, as required by Division 1 specification sections.
- E. Coordinate the installation of all cabling, conduits/raceways and cable trays and equipment with applicable trades to ensure proper operation

and function of all integrated systems in accordance with all related specification sections. Refer to Division 1 specification section for additional project coordination requirements.

1. Coordinate with all trades at the time of shop drawing submission detailing all space and/or room conditions. The contractor shall coordinate with the appropriate trade all conditions impacting the installation of any system including but not limited to all equipment locations, ceilings, lighting fixtures, fire protection piping and ductwork layouts to the satisfaction of all concerned trades, subject to final review by the Design Professional.
  - a. Coordinate exact location of all desktop/counter/wall mounted equipment with the VA's Project Engineer and Design Professional and affected trades prior to the installation of any equipment and/or cabling.
  - b. Coordinate exact location(s) of all ceiling mounted cable, conduits, equipment and/or devices with all architectural plans, reflected ceiling plans and affected trades prior to installation.
  - c. Equipment installations requiring coordination with other trades the contractor shall provide all templates, back-boxes and equipment anchor bolts for mounting or flush mounting preparation, (e.g. pedestals or other devices requiring mounting on walls, concrete pads or other materials). Coordinate delivery of templates and equipment anchor bolts to preclude any delay in the construction schedule or the work of the affected trade.
  - d. If installation of equipment, devices, cabling, raceways, cable trays and/or conduit is performed prior to coordination with other trades, which interferes with work of other trades or operation and maintenance of the facility, make necessary changes to correct the condition at no additional cost to the Government.
  - e. Prior to the final programming of any systems review with VA's Project Engineer and Design Professional all system features, functions, system operations, network mapping, system integrated responses and all related programming as required for the proper operation of the respective security systems.
- F. The Contractor shall maintain a complete set of current and up to date set of shop drawings and equipment submissions at the job site at all times. The Shop drawings and all other submissions shall be marked up to reflect all as-built conditions and shall be made available for review by the Design Professional at request.

### **3.3 EQUIPMENT/CABLE INSTALLATION AND REQUIREMENTS**

- A. All system wiring and equipment installation shall be in accordance with good engineering practices and by all IEEE, EIA, NEC and manufacturer's requirements. Wiring shall comply with all state and local electrical codes. All wiring shall test free from all grounds, shorts, stray voltages and EMI.
- B. Follow manufacturers' instructions for installing, components and adjusting all equipment and cabling. Submit two (2) copies of such

instructions to the Design Professional before installing any equipment. Provide a copy of such instructions at the equipment during any work on the equipment. Where no instructions are included with the equipment, follow accepted industry practices and workmanlike installation standards.

- C. Ensure that all security system cabling supports (conduits, support grips, cable tray and J-hooks) are fully installed before proceeding with cable installation. At no times shall any cables be installed and left unsupported. At no times shall cables be tie-wrapped to any other supporting structure in lieu of specified cable supports. Do not bundle or tie-wrap the cables even within the approved cable supports.
  - 1. Do not leave any system cabling unprotected on the floor at any time. If cables must be left on any floor, protect the cables so that they may not be walked on or have any material or equipment placed or rolled on top. Replace all damaged cables from demarcation to termination point; no splicing of damaged cables shall be permitted.
  - 2. Maintain manufacturers recommended minimum bend radiuses of all cabling. Do not stretch, stress, tightly coil, bend or crimp the backbone, horizontal, patch or workstation cables. The Contractor shall keep all cabling out of the way of other trades during staging of any work. The contractor at the contractor's expense will replace all severely stressed or damaged cables, equipment and materials as determined by the Design Professional.
- D. Equipment location shall be as close as practical to locations as indicated on the contract drawings.
  - 1. Provide all equipment clearances in accordance with NEC requirements. Arrange equipment to facilitate unrestricted access for maintenance and service around all equipment, components and/or cable terminations.
- E. Inaccessible Equipment:
  - 1. Where the Design Professional determines that the Contractor has installed equipment not conveniently accessible for operation and maintenance, the equipment shall be removed and reinstalled as directed at no additional cost to the project.
    - a. "Conveniently accessible" is defined as being capable of being reached without the use of ladders, or without climbing or crawling under or over obstacles such as, but not limited to, motors, pumps, belt guards, transformers, piping, ductwork, conduit and raceways.

F. Cabling Requirements

1. Contractors shall have the option to combine all home runs and conductors of same type and voltage "class" in accordance with NEC requirements unless specified elsewhere. Size all conduits and install all conductors in accordance with NEC requirements and manufacturers recommendations.
  - a. All TCP/IP based security system cabling shall be Category-6 concealed above suspended ceilings, bundled and supported to the building structure. All cabling bundles shall be plenum rated and shall not contain any AC carrying conductors or non-associated security network cables. All TCP/IP based security cabling located above accessible suspended ceilings shall be installed without conduit and shall be supported by "J" hooks.
    - 1) Category-6 cabling installed above hard ceiling spaces shall be installed in dedicated conduits.
    - 2) No exposed cabling will be acceptable in finished or occupied spaces of the facility without approval by the VA's Project Engineer and Design Professional.
    - 3) Any PACS TCP/IP cabling installed exterior to the building and/or all cabling being routed from the facility to any remote location external to the project location shall be installed in fiber optic cable.
    - 4) Refer to related Division 27 specification sections for additional information associated with the installation of all TCP/IP network cabling types, sizes and testing requirements.
  - b. All analog based security system cabling is to be provided in accordance with manufacturers requirements and shall be concealed above suspended ceilings installed in dedicated conduits and supported above ceiling tiles to the building structure. All analog based security system conduits shall not contain any AC carrying conductors or non-associated security system cables.
    - 1) All analog security cabling shall be installed in dedicated conduits.
    - 2) Security conductors shall be twisted pair, minimum 16 AWG unless otherwise noted.
    - 3) Twisted pair, minimum 14 AWG wire unless otherwise noted, and shall be utilized for all control wiring on electrically controlled motorized doors and gates.
    - 4) Refer to related specification sections for additional information for additional information related to cabling types, sizes and testing requirements.

- c. All fiber optic cabling shall be provided to meet the communications requirements for all network security communications at the minimum all fiber optic cabling shall be sized in accordance with the project documents. All fiber optic cabling shall be minimum 62.5/125 micron / 8.3/125 micron, hybrid type cabling containing both multi and single mode fiber strands.
  - 1) All fiber optic cabling shall be plenum rated armored type cabling installed above suspended ceilings and supported to the building structure or all fiber shall be standard fiber optic cable installed in dedicated conduits.
  - 2) Fiber optic cabling shall be provided as the primary communications and control media for all exterior and remote building network communications links for security. Each fiber optic link shall be comprised of dedicated transmitter and receiver shall be capable of providing all communication transmissions at a minimum of 1,280 feet. Refer to related specification sections for all additional Fiber optic-cabling requirements.
  - 3) Conductive fiber optic cable shall be provided for all exterior system components requiring control and/or power capabilities in the support of their operation, include all necessary surge protection and grounding for conductive cabling.
  - 4) Refer to related Division 27 specification sections for additional information for additional information associated with the installation of all cabling types, sizes and testing requirements.

#### G. Environmental Conditions

- 1. Systems, components, devices materials and equipment shall be capable of withstanding the environmental conditions of the space without mechanical or electrical damage or degradation of operating capabilities or performance.
  - a. Interior, Controlled Environment: System components, installed in temperature-controlled interior environments shall be rated for continuous operation in ambient conditions of 2 to 50 deg C (36 to 122 deg F) dry bulb and 20 to 90 percent relative humidity, non-condensing and shall utilize NEMA 250, Type 1 enclosures.
  - b. Interior, Uncontrolled Environment: System components installed in non-temperature-controlled interior environments shall be rated for continuous operation in ambient conditions of -18 to 50 deg C (0 to 122 deg F) dry bulb and 20 to 90 percent relative humidity, non-condensing and shall utilize NEMA 250, Type 4X enclosures.

- c. Exterior Environment: System components, conduits and back-boxes installed in locations exposed to weather shall be rated for continuous operation in ambient conditions of -34 to 50 deg C (-30 to 122 deg F) dry bulb and 20 to 90 percent relative humidity, condensing. Rated for continuous operation where exposed to rain as specified in NEMA 250, winds up to 137 km/h (85 mph) and snow cover up to 610 mm (24 in) thick shall utilize NEMA 250, Type 4X enclosures.
- d. Hazardous Environment: System components, conduits and back-boxes located in areas where fire or explosion hazards may exist because of flammable gases or vapors, flammable liquids, combustible dust, or ignitable fibers shall be rated, listed, and installed according to NFPA 70.
- e. Corrosive Environment: System components, conduits and back-boxes subjected to corrosive fumes, vapors, and wind-driven salt spray in coastal zones, shall utilize NEMA 250, Type 4X enclosures.
- f. Submersible Environment: System components, conduits and back-boxes subjected to prolonged submersion in water, shall utilize NEMA 250, Type 6P enclosures.
- g. Areas where equipment and devices may be subject to damage by the general population shall be installed in vandal resistant enclosures, all fire alarm devices shall be provided with wire guards.
- h. Console: All console equipment shall, unless noted otherwise, be rated for continuous operation under ambient environmental conditions of 15.6 to 29.4 deg C (60 to 85 deg F) and a relative humidity of 20 to 80 percent.

#### H. Conduits/raceway/Cable Trays:

- 1. All conduits/raceways shall be concealed and shall be installed above accessible finished ceilings and/or in walls. Any conduits/raceways installed in areas requiring installation to be exposed, shall be installed tight to ceilings at right angles to walls and shall not obstruct any access hatches, equipment service panels, lighting or other equipment and/or devices. No exposed conduits/raceways shall be installed without prior approval of the Design Professional prior to installation.
  - a. Where conduits cannot be concealed above ceilings or in walls and must be installed in finished or occupied areas of the building, all conduits shall be finished wire-mold type raceways or approved equal. No exposed conduits/raceways shall be installed without prior approval of the Design Professional prior to installation.
  - b. Where any equipment and/or junction boxes are installed above non-accessible finished ceilings, the contractor shall provide access hatches listed for the intended application. Access hatches shall be located so that service access to the equipment and/or junction boxes is unimpeded.

- 1) Access hatches shall not obstruct any equipment, service panels, lighting equipment, devices or any architectural elements of the ceiling. At the time of submittals the contractor shall submit all proposed access hatch locations for review by the Design Professional.
- c. All raceways shall be supported in accordance with NEC requirements and shall be affixed in such a manner that tampering and/or removal without the use of specialized tools shall be prevented.
- d. All conduits/raceways shall be installed in a manner that prevents tampering or removal when installed in areas exposed to the general population.
  - 1) Provide tamper-resistant installation utilizing "torx with peg" security-fastening devices for all conduits/raceways, equipment, devices and appurtenances in all areas accessible to the general population and/or areas subjected to tampering or vandalism.
- e. Interior raceways shall be a minimum 3/4 inches unless otherwise noted. Exterior raceways shall be a minimum 1-inch. Size all raceways and install conductors in accordance with NEC requirements. Fill ratio shall not exceed 40 percent for indoor raceways or exterior raceways.
  - 1) EMT conduit with compression fittings and/or MC cabling may be utilized in all inaccessible ceiling areas unless otherwise restricted by code.
  - 2) Threaded Rigid metal conduit shall be used on all exterior applications, stub-ups and all interior areas where concealed conduit requirements cannot be met and are exposed to tampering or damage by the general population.
    - a) All areas considered being of high risk due to the nature of the occupancy or the need to protect and maintain the integrity of the cabling shall be installed in rigid threaded conduits.
  - 3) PVC schedule 40 conduit shall be utilized in all underground applications. The conduit shall be buried at a minimum 36" below grade. Warning flagging tape shall be buried 12" below grade to indicate the conduit routing location.
    - a) The Contractor shall have the option to utilize the same trench/routing location as other utilities. In no case shall any systems conduits or duct banks be combined with other electrical utilities.
- f. All raceways shall be supported in accordance with NEC requirements and shall be affixed in such a manner that tampering and/or removal by the general population without the use of specialized tools shall be prevented.



- g. Outlet Boxes: shall be 4 x4 x 2-1/8 inches deep for all data jack locations and single gang for wall mounted telephone locations.
  - 1) All outlet boxes shall be provided with single or dual gang device mud-rings flush to finished wall as required based on type and configuration of outlet and type of wall construction.
  - 2) Use deep masonry boxes at masonry construction. T-Bar hangers or other appropriate mounting hardware shall be utilized to support boxes mounted in the ceiling.
- 2. Provide conduit and raceway systems for all security communications network in accordance the requirements below. Refer to related Division 27 specification sections for additional conduit and raceway information related to network communications.
  - a. Accessible suspended ceilings: Provide conduit stub-up from each outlet location to plenum space above ceiling. All conduit stub-up shall include nylon bushing at exposed edge of conduit for protection of all cabling
  - b. Exposed structure: Provide conduit run from each drops to a height of 12 feet to cable tray where provided.
  - c. Use Vertical Wire runway shall be installed in dedicated conduits and shall be supported any /all risers between floors in closets or accessible locations; in no case shall any cable risers be unsupported.
  - d. Cables entering all communications equipment rooms shall be supported with Cable tray from entrance to rack/cabinet location where indicated on the contract drawings.
  - e. Wire basket cable tray system shall be provided in all corridors where indicated on the contract and installed in accordance with Division 27 requirements.

I. Penetrations of Walls and Floors

- 1. All wall/floor penetrations are to be sleeved and fire stopped with approved fire stopping material. Coordinate all cable and conduit penetrations of the structure with all trades.
  - a. All penetrations of walls and floors shall be fire stopped in accordance with the ASTM and NFPA standards. Refer to related specification sections for additional information.
  - b. Floor penetrations shall be sleeved with a minimum sleeve diameter of 4 inches. An additional penetration shall be provided for future use, sleeved and capped and fire stopped as required.
  - c. Coordinate size of wall penetration with conduit size, number of conductors. Comply with all NEC requirements.
  - d. The fire rating of all penetrated walls, floors, and ceiling structures shall be strictly maintained. All penetrations shall be fire-stopped and sealed by the Contractor.
  - e. Install fire-stopping in open penetrations and in the annular space of penetrations for fire rated barriers.

- f. Installation of fire-stops shall be performed by an applicator/installer qualified and trained by the manufacturer. Installation shall be performed in strict accordance with manufacturer's detailed installation procedures.
- g. Installation of all fire-stopping shall be in accordance with fire test reports, fire resistance requirements, acceptable sample installations, manufacturer's recommendations, local fire and building authorities, and applicable codes and shall be installed in a manner acceptable to the authority having jurisdiction.

### **3.4 ELECTRICAL POWER DISTRIBUTION**

- A. All 120\208 emergency electrical power shall be provided by this Contractor from the nearest emergency distribution panel as required for the proper operation of all security systems, devices and/or components. Coordinate with VA's Project Engineer and Design Professional prior to connections and/or modifications to the electrical distribution panels. Additional locations requiring electrical power by the specific products and/or integrator selected equipment shall be the responsibility of this Contractor to include as part of this project.
  - 1. Primary power for all security system controls, sub-control panels, processors, and power supplies shall be configured to switch to emergency backup power sources automatically when primary power is interrupted without degradation of any critical system functions.
    - a. All electrical power shall be hardwired to the panel, system components or panels employing the use of plug-in transformers, extension cords or cheater cords for the connection to electrical power shall not be acceptable.
      - 1) If no spare 20A/1P circuits are available for use, the contractor shall provide a new subpanel adjacent to the existing panel. Remove (3) 20A/1P breakers and replace with a 60A/3P breaker to feed the subpanel.
      - 2) Subpanel shall be 60A MLO with 18 circuits. Reconnect the (3) 20A/1P circuits to this new panel. Extend branch wiring as required. The Contractor shall size feeder to subpanel per the national electric code.

### **3.5 TRANSIENT VOLTAGE SUPPRESSION**

- A. Transient Voltage Surge Suppression: All cables and conductors extending beyond building façade, except fiber optic cables, which serve as communications, control, or signal lines shall be protected against Transient Voltage surges and have Transient Voltage Surge Suppression (TVSS) protection.
  - 1. The TVSS device shall be UL listed in accordance with Standard TIA 497B installed at each end. Lighting and surge suppression shall be a multi-strike variety and include a fault indicator.

2. Protection shall be furnished at the equipment and additional triple solid state surge protectors rated for the application on each wire line circuit shall be installed within 914.4 mm (3 ft) of the building cable entrance. Fuses shall not be acceptable for surge protection applications. All inputs and outputs shall be tested in both normal mode and common mode to verify there is no interference at the minimum surge suppression test shall meet the following criteria.
  - a. All system power supplies serving exterior system components or devices shall be provided with the appropriate transient surge suppression protection on both the line side as well as the load side.
    - 1) A 10-microsecond rise time by 1000 microsecond pulse width waveform with a peak voltage of 1500 volts and a peak current of 60 amperes shall be the minimum performance requirements. Provide surge suppression in accordance with all manufacturers requirements.
    - 2) An 8-microsecond rise time by 20-microsecond pulse width waveform with a peak voltage of 1000 volts and a peak current of 500 amperes shall be the minimum performance requirements. Provide surge suppression in accordance with all manufacturers requirements.
    - 3) Maximum series current: 2 AMPS. Provide units manufactured by Advanced Protection Technologies, model # TE/FA 10B or TE/FA 20B or approved equal.
    - 4) Operating Temperature and Humidity: -40 to 85 deg C (-40 to 185 deg) shall be the minimum performance requirements. Provide surge suppression in accordance with all manufacturers requirements.

### 3.6 GROUNDING AND BONDING

- A. All electronic equipment, conduits, cable trays, racks/cabinets and cable shields shall be properly grounded and bonded in accordance with all requirements of EIA/TIA 607-A, NEC 250 and IEEE 1100.
  1. All grounding connections shall provide the equalization of all grounding potentials between the building power system and the grounding terminations at the security equipment in order to provide the diversion of electrical transients as well as providing the necessary coupling in order to cancel and/or reduce any voltage transients.
    - a. Equipment Grounding: Metallic structures, equipment racks, cabinets and enclosures as well as all raceways, cable trays, junction boxes, outlet boxes, machine frames, and other conductive items shall be bonded and grounded.

- b. Duct Banks and Manholes: Provide an insulated equipment grounding conductor in each duct containing any voltage conductors, sized per NEC except that minimum size shall be No. 2 AWG. Bond the equipment grounding conductors to the grounding bus, to all manhole hardware and ground rods, to the cable shielding grounding provisions for all cable splices, terminations and equipment enclosures.
- c. Metallic Fences equipped with Electronic Security: Fences shall be grounded with a ground rod at each fixed gate post and at each corner post.
  - 1) Drive ground rods until the top is 300 mm (12 inches) below grade. Attach a No. 4 AWG copper conductor, by exothermic weld to the ground rods and extend underground to the immediate vicinity of fence post. Lace the conductor vertically into 300 mm (12 inches) of fence mesh and fasten by two approved bronze compression fittings, one to bond wire to post and the other to bond wire to fence.
  - 2) Each gate section shall be bonded to its gatepost by a 3 by 25 mm (1/8 by one inch) flexible braided copper strap and ground post clamps. Clamps shall be of the anti-electrolysis type.
- 2. All connections of grounding conductors to ground rods, bus bars, rebar, structural members, pipes and fences, as well as splices of any ground conductors, shall be made by exothermic welds except where otherwise noted. All connections to bar lugs shall be exothermic weld or compression type connections. Bolted type connection of ground conductors may only be made where terminal lugs or blocks have been furnished and installed in equipment by the manufacturer.
  - a. Equipment grounding conductors shall be insulated stranded copper, except for sizes No. 10 AWG and smaller shall be solid copper. Insulation color shall be continuous green for all equipment grounding conductors, except that wire sizes No. 4 AWG and larger shall be permitted to be identified per the NEC.
    - 1) At the minimum bonding connection shall be a #6 AWG copper conductor. All grounding shall provide an effective bonding connection between the protected equipment to the nearest approved building grounding electrode (structural steel) as well as to the local power distribution panel grounding system (e.g., ac branch circuit panel board's equipment grounding busbar). All bonding and grounding connections shall be NEMA type compression or exothermic welded connections.
- 3. Refer to related specification sections for any additional grounding and bonding requirements.

### **3.7 EQUIPMENT IDENTIFICATION**

- A. Identify all system controls, components and equipment cabinets using plastic laminate engraved labels, or approved equal. Firmly affix to the panel, device and/or component.

1. Nameplates shall be laminated black phenolic resin with a white core with engraved lettering, a minimum of 6 mm (1/4 inch) high. Secure nameplates with screws. Nameplates that are furnished by manufacturer as a standard catalog item or where other method of identification is herein specified. Dymo or Kroy tap adhesive backed lettering shall not be acceptable.
2. Color-code all junction boxes and enclosures per NEC recommendations. At the minimum provide all security junction boxes as follows:
  - a. Color for Security circuits - Green.
  - b. Letter all pull boxes and junction boxes located in service area tunnels, above accessible ceilings and pipe chases with laminated black phenolic resin with a white core with engraved lettering, a minimum of 6 mm (1/4 inch) high. Secure nameplates with screws.
    - 1) Example: Security system "SS," Circuit Number SS-126.  
Engraved laminated plastic tags shall be used for identification and securely fastened in accordance with the project requirements.
3. Permanently label all wiring at both ends with self-adhering plastic labels.
4. Provide typewritten circuit directories installed in 3-ring binders with transparent page protectors in each control and sub control cabinet and/or equipment rack.

### **3.8 MAINTENANCE & SERVICE**

#### **A. General Requirements**

1. The Contractor shall provide all services required and equipment necessary to maintain the electronic security systems in an operational state as specified after formal written acceptance of the system.
  - a. Provide all necessary material required for performing scheduled adjustments or other non-scheduled work. Impacts on facility operations shall be minimized when performing scheduled adjustments or other non-scheduled work. Refer to Division 1 specification section for additional information.
  - b. The adjustment and repair of the security systems shall include all software and firmware up-dates on all computers, CPU's, HMI terminals, devices, communications and data transmission medias' (DTM), facility interface processors, signal transmission equipment, and security management software and processors.
  - c. Test, inspect and service each system on a quarterly basis at three month intervals during the warranty period from the time of final acceptance. The contractor shall compare each three month test results with the test results at the time of final acceptance.

- 1) The contractor shall include as part of the quarterly test the calibration and/or adjustment of any device, component and/or system that has deviated from the original test results at the time of final acceptance.
- d. For each quarterly maintenance period, provide written notification to the VA's Project Engineer of the systems condition before and after service, the exact components that were tested and serviced, and overall status of the system.

B. Personnel

1. Service personnel shall be manufacturer certified in the maintenance, testing and repair of the type of system and equipment provided for the project. Provide the VA's Project Engineer and Design Professional the name of the designated service representative, and of any change in personnel. The VA's Project Engineer and Design Professional shall be provided copies of system manufacturer certification for the designated service representative.
- a. Schedule of work to be performed during regular working hours, Monday through Friday, excluding federal holidays.

C. Emergency Service

1. The Government shall initiate service calls whenever the system is not functioning properly during the course of the warranty period. The Contractor shall provide the VA's Project Engineer with an emergency service center telephone number. The emergency service center shall be staffed 24 hours a day 365 days a year. The Government shall have sole authority for determining catastrophic and non-catastrophic system failures.
- a. For catastrophic system failures, the Contractor shall provide same day eight (8) hour service response with a defect correction time not to exceed sixteen (16) hours from [notification] [arrival on site]. Catastrophic system failures are defined as any system failure that the Government determines will place the facility(s) at increased risk.
- b. For non-catastrophic failures, the Contractor within 1 business day with a defect correction time not to exceed 48 hours from time of notification.

D. Records & Logs

1. The Contractor shall maintain records and logs of each task and organize cumulative records for each component and for the complete system chronologically. A continuous log shall be submitted for all devices. The log shall contain all initial settings, calibration, repair, and programming data. Complete logs shall be maintained and available for inspection on site, demonstrating planned and systematic adjustments and repairs have been accomplished for the system.

E. Work Request

1. The Contractor shall separately record each service call request, as received. The record shall include the serial number identifying the component involved, its location, date and time the call was received, specific nature of trouble, names of service personnel assigned to the task, instructions describing the action taken, the amount and nature of the materials used, and the date and time of commencement and completion. The Contractor shall deliver a record of the work performed within five (5) working days after the work was completed.

F. System Modifications

1. The Contractor shall make any recommendations for system modification in writing to the Design Professional. No system modifications, including operating parameters and control settings, shall be made without prior written approval from the Design Professional. Any modifications made to the system shall be incorporated into the operation and maintenance manuals and all related documentation.

**3.9 WARRANTY**

- A. Warrant material and workmanship for a period as specified in Division 1 of the contract documents and all related specification sections. The warranty period shall commence from the date the Contractor received written notification of final acceptance from the Design Professional. At the minimum the contractor shall provide warranty provisions:
1. Warrant the replacement of defective components/materials and/or correct defective work when given notice by the Government during the warranty period.
  2. Warranty excludes liability for consequential incidental, or special damages due to vandalism, misuse, or acts of God.
  3. Onsite warranty response time by qualified technician shall be within 8 hours upon receipt of request from Government.
  4. Warranty repairs shall be provided to the Government at no cost. This shall include but not limited to all repairs and/or replacement of defective components/materials, all labor charges, all travel costs and all vehicle charges.
  5. Response time shall be 7 days a week / 24 hours a day / 365 days a year.
  6. Provide test, inspection and service of each system on a quarterly basis at three month intervals.
  7. Contractor must provide verification that they maintain their principle base of operation along with the personnel that will be responsible for providing service within 3 hours driving time to the project site. This tenet of the warranty shall remain in effect for the life of the warranty.
  8. All TCP/IP based security communications cabling and related appurtenances shall be provided with the manufacturers 25 year extended warranty in addition to all requirements above.

B. The Contractor shall, as a condition of final payment, execute a written warranty certifying all contract requirements have been completed according to all requirements of the Contract Documents.

1. All system testing, commissioning, demonstration and training shall be performed prior to final system acceptance. All defects or damages due to faulty materials or workmanship shall be repaired or replaced without delay, to the satisfaction of the VA's Project Engineer and Design Professional, at the Contractor's expense.
  - a. The contractor shall provide written documentation of test results and stating what was done to correct any deficiencies. The first inspection shall occur 90 calendar days after the acceptance date. The last inspection shall occur 30 calendar days prior to the end of the warranty.
  - b. The warranty period shall be extended until the last inspection and associated corrective actions are complete. When equipment and labor covered by the Contractor's warranty, or by a manufacturer's warranty, have been replaced or restored because of its failure during the warranty period, the warranty period for any replaced or repaired equipment or restored work shall be reinstated for a period equal to the original warranty period, and commencing with the date of completion of the replacement or restoration work.
2. In the event any manufacturer customarily provides a warranty period greater than one (1) year, the Contractor's warranty shall be for the same duration for that component.

### **3.10 FIELD SERVICES**

- A. Notify VA's Project Engineer and Design Professional in writing, ten (10) days advance of testing of all system cabling to prevent delays in construction schedules.
  1. Test all cabling to confirm that no grounds, shorts, sneak currents, RFI and EMI conditions exist prior to start-up and commissioning of all, components, devices, equipment and/or systems.
    - a. Before requesting a final inspection, the Contractor shall perform a series of end to end installation performance tests. The Contractor shall submit for approval by Design Professional all test procedures to be employed, test result forms, and timetable for testing all fiber optic and copper plant wiring.
    - b. Acceptance of the simple test procedures discussed below is predicated on the Contractor's use of the recommended products including but not limited to twisted pair cable, cross-connect blocks, and outlet devices specified and adherence to the inspection requirements and practices set forth. Acceptance of the completed installation will be evaluated in the context of each of these factors.



B. UTP Cable Testing

1. In addition to all requirements of the related Division 27 specification requirements the minimum Test Parameter requirements for Category 6 horizontal cabling shall be observed.
  - a. Category 6: Each wire/pair shall be tested at both ends for the following utilizing Contractor generated test results forms:
    - 1) Wire Map.
    - 2) Length.
    - 3) Insertion Loss.
    - 4) Near-end crosstalk (NEXT) loss.
    - 5) Power sum near-end crosstalk (PSNEXT).
    - 6) Equal-level far-end crosstalk (ELFEXT).
    - 7) Power sum equal-level far-end crosstalk (PSELFEXT).
    - 8) Return loss.
    - 9) Propagation delay.
    - 10) Delay Skew.
    - 11) Power Sum ACR.
  - b. All cable testing described herein shall exceed Category 6 transmission requirements of ANSI/TIA/EIA-568-B.2-1. In addition all cable and component transmission performance parameters shall exceed 10 Gb/s transmission requirements for connecting hardware, per the requirements of TSB-155. Additionally, the installed channel system shall exceed IEEE 802.3 DTE Power specification to (4) times the rated current limits with no degradation of performance or materials and shall be error free Gigabit Ethernet performance to the referenced standard. (All performance requirements shall be verified and documented by a RCCD technician at the time of testing)
  - c. Channel system shall exceed 4 Gb/s data transmission capacity within the bandwidth of 1 - 250 MHz when configured in a 4-connector channel. The 4-connector channel test configuration shall utilize a Category 6 jack, patch panel, optional 6-110 block, and patch cords, all from the same manufacturer, with qualified Category 6 cable.
  - d. The 4-connector Category 6 channel performance margins in the table below shall be guaranteed provided the configuration satisfies above requirements

Electrical Parameter (1 - 250MHz)	Guaranteed Margins to Category 6 Channel Specifications
Insertion Loss	3 %
NEXT	4 dB
PSNEXT	5 dB
ELFEXT	4 dB
PSELFEXT	5 dB
Return Loss	2 dB

2. When errors are found, the source of each error shall be determined, corrected, and the cable re-tested. All defective components shall be replaced and retested. Defective components not corrected shall be reported to the VA's Project Engineer and Design Professional with explanations of the corrective actions attempted.
3. Test records shall be maintained using the approved test result forms. The form shall record closet number, riser pair number or outlet ID, outcome of test, indication of errors found (e.g., a, b, c, d, or e) cable length, re-test results after problem resolution and signature of the technician completing the tests.
4. Test results for each 4 pair, Category 6, UTP cable must be submitted with identification to match labels on all patch panel ports and 8 position modular jacks, and identification to match as-builts associated with that cable.
5. VA's Project Engineer and Design Professional shall observe and verify the accuracy of test results submitted.
6. Contractor shall submit both hardcopy and electronic floppy disc format of all test results.

#### C. Fiber Optic Testing

1. In addition to all requirements of the related Division 27 specification requirements the Contractor shall test each fiber strand. The VA's Project Engineer and Design Professional reserve the right to have a representative present during all or a portion of the testing process. If the VA's Project Engineer and Design Professional elect to be present during testing, test results will only be acceptable when conducted in the presence of the VA's Project Engineer and Design Professional.
2. Fiber Optic Cable: Each fiber strand shall undergo bi-directional testing for signal attenuation losses.

##### a. Test Equipment:

- 1) Multimode: Light Source and Power Meter.
- 2) Single mode: Light Source and Power Meter.
- 3) OTDR.

##### b. Tests:

- 1) Multi-mode: Signal attenuation at 850 and 1300 nm.
- 2) Single-mode: Bi-directional signal attenuation at 1310 and 1550 nm.
- 3) Test all Fiber cable on the reel before installation, with an optical light meter, to ensure fiber continuity and no factory defects.
- 4) Test Criteria: Signal loss of less than (3.6 dB for 1000 Base-SX @ 850NM for 50 uM fiber) through entire passive fiber path, including cable, couplers and jumpers.

#### 3. Fiber Optic Testing Specifications

- a. All testing shall be performed by factory trained and certified personnel.
- b. For all installed fiber optic cable EIA 455-171 Method D procedures will be adhered to (Bi-directionally).

- c. Connector loss shall not exceed 0.75 dB per connector pair.
- d. The Fiber Optic Cable shall not exceed 1.0 dB kilometer tested at 1310nm and 1550nm for single mode cable.
- e. The Fiber Optic Cable shall not exceed 3.5dB per kilometer tested at 850 nm and 1.5dB per kilometer tested at 1300nm for multi-mode 62.5/125 fiber.
- f. The contractor is responsible for obtaining minimum loss in fiber connections and polishing per manufacturer's specifications.
- g. Pre-installation tests of Inter-plant fiber- pre-test each reel:
  - 1) Test each reel of fiber each strand for continuity with a light source. If continuity is not achieved:
  - 2) Then test with an OTDR to determine the nature and location of the defect: Measure end-to end attenuation and the distance to a high attenuation point.
  - 3) If it is determined by Design Professional that the fiber is defective the contractor shall contact the manufacturer and provide a completely new fiber reel.
- h. Tests for installed Inter-plant and Intra-plant fiber optic cable:
  - 1) Intra-plant and Inter-plant Multi-mode: Bi-directional signal attenuation at 850 and 1300 nm. power meter.
  - 2) Intra-plant and Inter-plant Single-mode: Bi-directional signal attenuation at 1310 and 1550 nm. power meter.
  - 3) Inter-plant Multi-mode: Bi-directional OTDR trace at 850 and 1300 nm. OSP ONLY
  - 4) Interplant Single-mode: Bi-directional OTDR trace at 1310 and 1550 nm. OSP ONLY

NOTE: Obtain the actual index of refraction from the cable Manufacturer before testing.

#### 4. Test Criteria.

- a. Total signal loss must not exceed the maximum Attenuation Coefficient plus the maximum Connector Attenuation as listed in TIA/EIA 568-B.
- b. Maximum Link Attenuation shall be as calculated below:
  - 1) Link attenuation is calculated as:
  - 2)  $\text{Link Attenuation} = \text{Cable Attn} + \text{Connector Attn} + \text{Splice Attn}$
  - 3)  $\text{Cable Attn (db)} = \text{Attenuation coefficient (db/km)} \times \text{Length(Km)}$
  - 4) Attenuation Coefficient
    - a) 3.5 dB/km @ 850 nm for 50/125 um
    - b) 1.5 dB/km @ 1300 nm for 50/125 um
    - c) 0.5 dB/km @ 1310 nm for single-mode outside plant cable
    - d) 0.5 dB/km @ 1550 nm for single-mode outside plant cable
    - e) 1.0 dB/km @ 1310 nm for single-mode inside plant cable
    - f) 1.0 dB/km @ 1550 nm for single-mode inside plant cable

- 5) Connector Attn (db) = number of connector pairs connector loss (dB)
    - a) =2 x 0.75 dB
    - b) =1.5 dB
  - 6) Splice Attn (dB) = number of splices (S) splice loss (dB)
    - a) =2 x 0.75 dB
    - b) =1.5 dB
  - c. "Measured" Link Attenuation shall be compared to "Calculated" Link Attenuation to determine acceptance. The Contractor at no additional cost shall correct any Links that fail.
  - d. Single-mode backbone links shall be tested at 1310 nm and 1550 nm in accordance with ANSI/TIA/EIA-526-7, Method A.1, One Reference Jumper. 50/125 um backbone links shall be tested at 850 nm and 1300 nm in accordance with ANSI/EIA/TIA-526-14A, Method A.1, One Reference Jumper.
  - e. Submit all test reports for approval; an OTDR signature report for every OSP cable by strand and a fiber optic link attenuation record report for every cable by strand.
- D. Notify VA's Project Engineer and Design Professional in writing, ten (10) days advance of testing of all equipment and/or components to prevent delays in construction schedules.
- 1. Perform all tests, as required, by authorities having jurisdiction throughout the facility.
  - 2. Test system for grounds to demonstrate that the ground resistance does not exceed the requirements of the National Electric Codes (NEC).
  - 3. Test all cabling to confirm that no grounds, shorts, sneak currents, RFI and EMI conditions exist prior to start-up and commissioning of all, components, devices, equipment and/or systems.
  - 4. Test all systems and components for proper function and operation; certify that all systems are in proper working operation in accordance with the Contract Documents prior to scheduling any system demonstrations.
  - 5. Testing of all electronic security systems shall be in the presence of the VA's Project Engineer and Design Professional as well as all appropriate representatives of the authorities having jurisdiction.
    - a. All completed the security systems shall be fully tested in accordance with all requirements of NFPA 731. Upon completion of a successful testing, the contractor shall so certify in writing to the VA's Project Engineer and Design Professional that all testing was completed, certified and left in first class operational condition, include all completed NFPA 731 certification and test reports.
    - b. The service of a competent, factory-trained engineer or technician authorized by the equipment manufacturer shall be provided to technically supervise installation and participate during initial system programming, start-up, final testing, assist in the final acceptance testing and Government demonstrations.

c. At the minimum all acceptance testing, demonstrations and training shall include, but not be limited to the following:

- 1) Security Monitoring/Control Systems
- 2) HMI Operations
- 3) CCTV Surveillance System Performance and Functions
- 4) Remote Security Monitoring/Control Systems
- 5) CCTV Surveillance System programming and configurations
- 6) UPS and Battery Back-up Functions.
- 7) Integration of all Auxiliary Systems

6. In addition provide all testing, commissioning and certifications as specified by Division 1 specification sections and any manufacturer's recommendations or requirements.

E. Training

1. In addition to all demonstration and training as specified by Division 1 specification section and all related Division 28 specification sections, system demonstrations and training shall be provided in accordance with all requirements of this section.
2. Prior to acceptance of the work, the System Integrator shall demonstrate to the VA's Project Engineer and Design Professional, all systems and sub-systems all features and functions of each system, and shall instruct the Government Representatives in the proper operation, event sequences, programming and maintenance of all systems and sub-systems.
3. The System Integrator shall furnish the necessary trained personnel to perform all demonstrations and instructions and arrange to have the manufacturer's representatives present to assist with the demonstrations.
4. Training time shall include, as a minimum, the total time determined by the sum of the times per system as specified by each related specification sections, for performing the prescribed demonstrations/training. Refer to related specification sections for additional training requirements.
  - a. Training classes shall be performed at the project location and spaced over a multi-week interval. Training classes shall be scheduled not less than 48 hours apart to allow the Government User\Operators to familiarize themselves with all system operations.
  - b. At each training session the Contractor shall prepare an attendance sheet documenting subject matter, date, time, duration and attendees. Submit the recorded information to the VA's Project Engineer and Design Professional and include a record copy as part of the mandatory final close out documentation for the project.
    - 1) Failure to provide the required information demonstrating that all training has been provided and completed in accordance with the contract documents shall result in the Contractor repeating all training sessions.

5. Provide operation, parts and maintenance manuals defining operation and troubleshooting methods of all systems and review with Government User\Operators as part of training demonstrations.
6. Provide detailed video recordings in high quality digitally formatted media of all demonstration and training of all systems and system operations.
  - a. Utilize remote microphones as may be required to ensure high quality audio of the recorded demonstrations.
  - b. Permanently and professionally label all recorded materials and provide self-sealing plastic cases.

F. Inspections

- a. At the completion of the project and prior to final acceptance of the Work, provide evidence of final inspections and approvals to the VA's Project Engineer and Design Professional, as required by the authorities having jurisdiction as well as all requirements of Division 01 specification sections.

- - - END - - -

**SECTION 28 13 00**  
**PHYSICAL ACCESS CONTROL SYSTEM (PACS)**

**PART 1 GENERAL**

**1.1 STIPULATIONS**

- A. Project drawings and general provisions of the Contract, including but not limited to all; General and Supplementary Conditions, Division 01 and all related specification sections shall apply to this section.
- B. Related Sections:
  - 1. Division 26 - Common Work Results for Electrical.
  - 2. Division 26 - Low Voltage Electrical Power Conductors and Cables.
  - 3. Division 26 - Grounding and Bonding for Electrical Systems
  - 4. Division 26 - Hangers and Supports for Electrical Systems
  - 5. Division 26 - Raceways and Boxes for Electrical Systems
  - 6. Division 26 - Identification for Electrical Systems
  - 7. Division 27 - Common Work Results for Communications Systems
  - 8. Division 27 - Network Communications
  - 9. Division 28 - Common Work Results for Safety and Security Systems
  - 10. Division 28 - Patient Elopement System (PES)
- C. Reference Symbols:
  - 1. All device symbols are defined by the appropriate symbol schedules. Because of the scale of the drawings, symbols are shown on drawings as close as possible to the mounting location.
    - a. Contractor shall coordinate exact locations of all equipment with all site plan and architectural floor plan drawings as well as related specification sections for all affected systems and prior to submittal of any shop drawings.
- D. Abbreviations:
  - 1. Refer to Specification Section 28 05 00 for additional information.
- E. Definitions:
  - 1. Refer to Specification Section 28 05 00 for additional information.

**1.2 SUMMARY**

- A. The intent of this specification is to establish a standard of quality; functions and features for the installation of a new TCP/IP based Physical Access Control System (PACS) as indicated on the Contract drawings and/or herein specified. The PACS shall be a fully enterprise based system in full compliance with HSPD-12, the Federal Information Processing Standard Publication 201 (FIPS 201) and shall include all work, materials, infrastructure, equipment, software and programming as required to provide a fully operational system as herein specified.

1. The installation, performance, features, functions, software and programming modifications as specified herein as well as all related specification sections have been designed to offer the maximum system efficiency ease of operation, occupant safety and the protection of equipment as recommended by the design Professional.
  - a. Any deviations from the specified criteria shall be documented, reviewed and agreed to in writing by the VA's Project Engineer and Design Professional prior to submission of bids. Refer to Division 1, Division 27 and related Division 28 specification sections for product substitutions.
2. It shall be the responsibility of the contractor to insure that the installed system meets or exceeds every standard set forth in these specifications. The contractor shall be responsible for providing a complete functional enterprise based system, including all necessary components, devices, servers, door hardware, active network electronics, emergency electrical power, software, programming, commissioning and testing as well as the integration to all ancillary systems as necessary to provide a complete and fully operational system whether specifically included in this section or not.
  - a. The system shall consist of but not limited to all, equipment, devices, servers, client workstations, network servers, remote processors panels (data gathering panels) (DGP), active network communications equipment, power supplies, printers, conduits, cabling, software, programming, door hardware and all appurtenances as well as the integration of the Stations' Fire Alarm System and all related ancillary systems necessary to provide a complete operating TCP\IP based networked system in accordance with the contract documents.
    - 1) The utilization of the facility's data network to support the distribution, performance and/or operation of the TCP/IP based Physical Access Control System shall be strictly prohibited (other than where specified).
    - 2) The Contractor shall have a registered RCDD professional review and seal all system shop drawings demonstrating industry standard design, installations and certifications of all structured cabling networks related to the installation and operation of the TCP\IP based Physical Access Control System and all related TCP\IP based electronic security systems.
    - 3) Refer to related Division 27 specification sections for additional information related to network communications infrastructure, active communications equipment (Layer II and Layer III Data Switches) and all testing requirements.
- B. The installation of the PACS shall comply with the applicable sections of NFPA-70 National Electrical Code (Article 760). The system shall be electrically supervised and monitor the integrity of all conductors.



1. In addition, the system shall meet all applicable requirements of NFPA standards 101 and 72 for the integration of physical access control system, NFPA Standard 731 for the Installation of Electronic Premises Security Systems and HSPD-12 and Federal Information Processing Standard Publication 201 (FIPS 201).
- C. The contractor and all sub-contractors for this work shall have read all of the General Conditions, Special Requirements, General Requirements and all applicable related specification sections and in the execution of all work shall be bound by all of the conditions and requirements therein.
- D. Prior to the submission of the Bid, any discrepancies or inconsistencies noted within these specifications and/or project drawings shall be brought to the immediate attention of the VA's Project Engineer and Design Professional.
1. All equipment symbols are shown on drawings as close as possible to their intended location. Contractor shall coordinate the installation of all equipment, devices, controls, cabling and integration of any systems with all affected trades and system integrators. The Contractor shall document all coordination requirements at the time of shop drawing submissions.
  2. The Contract Drawings for this work are diagrammatic and intended to convey the extent, general arrangement and locations of the work. Because of the scale of these drawings, certain basic items such as access panels, conduits, cabinet sizes, penetration sleeves, pull boxes, backboxes and junction boxes may not be shown.
    - a. The contractor shall include all equipment, materials, components, device, controls and all appurtenances where required by code, by manufacturers' recommendations, and all related Contract Documents in order to ensure proper installation operation and integration of all components, equipment, devices and/or systems.
- E. The Contract drawings and specifications may not deal individually with every part, control, device, software or programming, which may be required to produce the equipment and/or system performance specified or as necessary for the installation and integration of all door hardware and systems in accordance with all requirements of the Contract Documents.
1. The Contractor shall include all such items and components, as required, for the complete and operational installation of all system components as defined by the Contract Documents, whether or not specifically indicated and/or specified.
    - a. Include such items, as required, for a complete operational system, whether or not specifically indicated.
    - b. Coordinate with other applicable trades in submittal of shop drawings and the installation of all systems.

- c. Shop drawings shall detail space conditions to accommodate other concerned trades, subject to final review by the VA's Project Engineer and Design Professional.
  - d. If installation of equipment, raceways, cable trays and/or conduit is performed prior to coordination with other trades, which interferes with work of other trades, make necessary changes to correct the condition at no additional cost to the Government.
  - e. The contractor shall be responsible for providing all wiring, connections to all equipment, circuits and devices as well as all coordination and programming for the integration of all electronic door hardware, ancillary systems impacting the operation of physical access control system. Refer to the contract drawings and related specification sections for additional information.
- F. All references to industry and trade association standards as well as all building codes are minimum installation requirements for this system. The codes, standards and agencies listed in specification section 28 05 00 shall form a part of this specification section and all work shall comply with the latest adopted standards.
  - 1. The publications listed in specification section 28 05 00 (including all amendments, addenda, revisions, supplement, and errata) shall form a part of this specification section to the extent referenced. The publications are referenced in the aforementioned specification section by the basic designation only.
    - a. Where the contract drawings and/or specification sections mandate a greater requirement or performance than those specified by the aforementioned referenced codes and standards in section 28 05 00, shall then be the governing requirements for this project. Refer to specification section 28 05 00 for all minimum codes and standards to be applied for this project.
- G. The PACS shall be modular in construction for ease of expansion and service. The system shall be a full enterprise based system, fully scalable and shall include all necessary equipment, components, modules, devices, door hardware, network servers, (ACNS), remote TCP/IP based processor panels (DGP), HMI client workstations, active network electronics, electrical power, UPS units, software, programming, commissioning and testing as necessary to provide a complete fully operational system. In addition, the PACS shall be fully capable of remote communications employing TCP/IP protocols over the Governments' wide area network for off-campus operations and FIPS-201 authentication via a dedicated WAN connection at the primary server.
  - 1. The PACS shall include the full operational integration of all doors, garage doors, gates, and related systems where indicated on the contract drawings and/or as herein specified.
  - 2. The PACS shall support to use of Government issued PIV-I 13.56 MHz contact-less smart card technology.

3. The PACS shall support the automatic importation of the Station's existing identification and informational databases to permit the population of authentication and access rights for all Government employees currently residing in the existing PACS database.
  - a. Where the provided system does not support the automatic third party database importation the Contractor shall include in their bid all labor costs for the manual programming of all authentication and access rights to be performed by the Contractor's personnel.
4. The PACS shall fully integrate with the Station's existing fire alarm system for all buildings in accordance with NFPA 101 article 7.2.1.6.2. The integration of the PACS and related electronically locked doors shall conform to all of the following criteria:
  - a. A sensor shall be provided on the egress side, arranged to unlock the door in the direction of egress upon detection of an approaching occupant.
    - 1) Door shall automatically unlock in the direction of egress upon loss of power to the sensor or to the part of the access control system that locks the door.
  - b. Door locks shall be arranged to unlock in the direction of egress from a manual release device complying with all of the following criteria:
    - 1) The manual release device shall be located on the egress side, 40 in. to 48 in. vertically above the floor, and within 60 in. of the secured door openings.
    - 2) The manual release device shall be readily accessible and clearly identified by a sign that reads as follows: PUSH TO EXIT.
    - 3) When operated, the manual release device shall result in direct interruption of power to the lock - independent of the locking system electronics - and the lock shall remain unlocked for not less than 30 seconds.
  - c. Activation of the building fire-protective signaling system, if provided, shall automatically unlock the door in the direction of egress, and the door shall remain unlocked until the fire-protective signaling system has been manually reset.
    - 1) The activation of manual fire alarm boxes that activate the building fire-protective signaling system specified in NFPA 101 - 7.2.1.6.2(4) shall not be required to unlock the door.
  - d. Activation of the building automatic sprinkler or fire detection system, if provided, shall automatically unlock the door leaves in the direction of egress, and the door shall remain unlocked until the fire-protective signaling system has been manually reset.

5. It shall be the Contractors responsibility to include in the base bid all costs for sub-contracting with the Station's fire alarm system provider to furnish all necessary modifications to the existing fire alarm system as required. The scope of work shall include all devices, components, programming and testing as required to provide the full integration of all access controlled doors as necessary to release upon activation of any building fire alarm system as herein specified and in accordance with all requirements of NFPA 101 and NFPA 72.
  - a. The current fire alarm system is based on a Gamewell fire alarm platform as provided by N. B. Barber Company of Uwchland, PA 19480. Contact Dominic Macchione at 610-458-8202, Fax 610-458-8228 for all required fire alarm system integrations.
- H. All PACS components shall be on replaceable panels and/or modules to accommodate functional changes when required. All system wiring and components shall be fully supervised so as to annunciate a trouble signal if removed or disconnected.
- I. The contractor shall be responsible for providing all wiring, connections to all equipment, circuits and devices as well as all coordination and programming for the integration of all ancillary systems impacting the operation of the physical access control system. Refer to the contract drawings and related specification sections for additional information.
  1. Note: The physical access control system shall be based on a TCP/IP protocols and shall be configured as a dedicated structured cabled LAN. The Contractor shall be responsible for providing all necessary Layer II and Layer III active communications switches, patch panels, all peripheral network components as well as all Category-6 UTP, fiber optic cabling and appurtenances in accordance with all contract documents. Refer to specification section 27 11 00 for additional information related to active network communications equipment requirements.
    - a. The utilization of the facility's data network to support the distribution, performance and/or operation of the physical access control system shall be strictly forbidden (Any integration with the buildings' data network shall be only with expressed consent of the Government in writing).
  2. The contractor shall assume total system responsibility for providing all inter-building wiring, any connections to the Stations local and wide area networks (for remote off premises communications by Government), any Government provided common carrier network equipment, integration of any Government provided systems, equipment, and/or databases as it relates the operation of the physical access control system.

- J. Prior to final programming of the access control system coordinate with the VA's Project Engineer and Design Professional, all GUI based graphic screens, all alarm functions as well as all operational features for the entire system. The contractor shall provide to the VA's Project Engineer and Design Professional a functional demonstration of all system graphics and operational features and functions prior to final programming.
  - 1. This demonstration shall be performed on site and shall include an operational demonstration of the system for this facility. The functional demonstration shall include but not limited to, all door alarm and control functions, graphic maps, as well as all automatic and manual threat level system responses.
    - a. Failure to provide the required coordination with the VA's Project Engineer and Design Professional shall require the contractor to provide any and all system modifications and programming changes necessary to meet the requirements of the Governments Agency security procedures.
- K. The HMI for the system operation shall include GUI based graphic floor and/or site plans of the facility, and shall display all alarm origins, threat level responses complete with emergency response instructions.
  - 1. The security management programming for the system shall provide the security operator the information needed to properly assess and respond to situations without the need to manually access information. Security Operators shall be capable of managing the Physical Access Control System as well as all integrated systems from the client workstation(s).
    - a. Physical access control systems not capable of providing full physical security information management capability of all integrated security systems in a seamless manner shall not be acceptable.

### 1.3 REFERENCES

- A. All references to industry and trade association standards as well as all building codes are minimum installation requirements for this system. The codes, standards and agencies listed in specification section 28 05 00 shall also form a part of this specification section and all work shall comply with the latest adopted standards.
  - 1. The publications listed in specification section 28 05 00 (including all amendments, addenda, revisions, supplement, and errata) shall form a part of this specification section to the extent referenced. The publications are referenced in the aforementioned specification section by the basic designation only.

- a. Where the contract drawings and/or specification sections mandate a greater requirement or performance than those specified by the aforementioned referenced codes and standards in section 28 05 00, shall then be the governing requirements for this project. Refer to specification section 28 05 00 for all minimum codes and standards to be applied for this project.

#### **1.4 SUBMITTALS**

- A. In addition to all requirements as specified by Division 01 and Specification Section 28 05 00 the physical access control systems submittals shall also be provided in accordance with the following requirements:
  1. Provide a complete termination schedule of all door locations; indicate on the construction drawings door identifications corresponding with schedule.
  2. Provide a complete alarm matrix for all door locations, indicate all associated alarm call-ups and camera pre-sets for every camera indicated on the contract drawings, include the related device activation and/or event for each pre-set and alarm call-up.
  3. Provide a complete video surveillance camera integration schedule (where included) indicating each camera position relevant to door input location as well as a diagram indicating each termination position in the appropriate equipment cabinet and/or DGP.
  4. Provide a complete integration schedule indicating all ancillary system locations as well as a diagram indicating each termination position in the appropriate equipment cabinet and/or DGP.
  5. All integration protocols, communications connectivity and interface components to all, fire alarm, intrusion detection, emergency call, local door management alarm and video surveillance systems as well as any ancillary systems.
    - a. Wiring diagrams shall indicate all wiring for each field device as well as all wiring interconnections between each device and all controls and/or associated equipment, In addition, all electrical power connections with electrical circuit numbers shall be indicated to all equipment requiring electrical power.

#### **1.5 QUALITY ASSURANCE**

- A. In addition to all requirements as specified by Specification Section 28 05 00 the Access Control system shall also be provided in accordance with the following requirements:
  1. The physical access control system equipment manufacturer shall be an ISO 9001 certified company and meet the requirements of BS EN9001: ANSI/ASQ Q9001-1997.
  2. All control equipment must have transient protection. Where security circuits leave the building, additional transient protection must be provided for each circuit. Devices must be UL listed under standard #497B (Isolated Loop Protectors).

- a. Refer to specification section 28 05 00 for additional information related to the installation of all surge and transient protection requirements.
3. The Electronic Security Systems Integrator (ESSI) shall be an established security alarm provider, dully licensed to provide security systems within in the municipality of the project location and is an authorized distributor of the equipment supplied for this project with full manufacturer's warranty privileges.
4. Installation and start-up of all systems shall be under the direct supervision of the Electronic Security Systems Integrator (ESSI). This system supplier shall be an accredited and authorized distributor of the equipment manufacturer of all equipment being provided and be prepared to offer a service contract for system maintenance at completion of the guarantee period.
5. The contractor shall show satisfactory evidence, upon request, that the equipment supplier maintains a fully equipped service organization capable of furnishing adequate inspection and service to the system. The supplier shall maintain at his facility the necessary spare parts in the proper proportion as recommended by the manufacturer to maintain and service the equipment being supplied.
6. Electronic Security System Integrator shall coordinate the installation and wiring terminations of all applicable door hardware associated with any doors equipped with electronic security protection. Refer to related electronic security system drawings and related all Division 08 and 28 specification sections for additional information.

#### **1.6 RECORD DOCUMENTS**

- A. Comply with all requirements of specification section 28 05 00.

#### **1.7 SOFTWARE AGREEMENT**

- A. Comply with all requirements of specification section 28 05 00.

#### **1.8 Extra material**

- A. In addition to all requirements as specified by specification section 28 05 00 the following extra materials shall be provided as part of this project:
  1. Six (6) Piv-Class 13.56 MHz proximity card readers of each type used in the project as spares.
  2. Six (6) Surface mounted magnetic locking mechanisms of each type used in the project as spares.
  3. Six (6) Electric door strike locking mechanisms of each type used in the project as spares.
  4. Six (6) PIR motion request to exit devices of each type used in the project as spares.
  5. Six (6) Pushbutton request to exit devices of each type used in the project as spares.
- B. All extra materials shall be delivered at the time of final acceptance of the system(s). At no time is the contractor to use the extra

materials provided for this project to replace malfunctioning equipment and or components prior to final acceptance

## **PART 2 - PRODUCTS**

### **2.1 MANUFACTURED PRODUCTS**

- A. Comply with all requirements of specification section 28 05 00.

### **2.2 MANUFACTURERS**

- A. Acceptable manufacturer's for this project, providing full compliance with this specification section and all requirements of specification 28 05 00 shall be as follows:

1. Identocard
2. Hirsch Electronics
3. LENEL
4. DSX
5. Approved Equal

- a. Substitutions will be considered providing compliance of all system performance as here in specified and in accordance with all substitution requirements of the Contract documents.

- B. Manufacturers listed as acceptable shall not negate the contractor's responsibility for providing the PACS system in accordance with all functions and performance requirements of this specification.

### **2.3 SYSTEM DESCRIPTION**

- A. The contractor shall provide a fully operational TCP/IP enterprise based physical access control system (PACS) compliant with all FIPS-201 standards. The scope of work shall include but not limited to the furnishing and installation of all, access control network servers, (ACNS), remote field processor panels (DGP's-data gathering panels), auxiliary power supplies, Piv-Class proximity readers, door hardware, request to exit devices, electric locking mechanisms, client work stations, active network electronics, cabling, conduits, printers, and all appurtenances as required to meet the design and performance requirements as indicated on the contract drawings and/or as herein specified.

1. In addition provide the necessary integration of all electronic door hardware with the building fire alarm system, intrusion detection devices, patient elopement system (Bldg. 30)and suicide alerting system (SAS) (Bldg. 1) as well as all system programming and training required to provide a fully operating system as indicated on the contract drawings and/or as herein specified.

- B. The PACS shall have an open architecture design. It shall be a true open architecture design and support the downloading of third party industry standard databases such as tab/space/comma-delimited formats, JPEG images, SQL server, ID card printers, and video cameras.



1. No customized or proprietary ID badge creation software or hardware shall be required to operate the Access Control system. The system shall be both scalable and portable to provide the capability to increase the system performance based on Government requirements. Where systems provided are not capable supporting the importing of third party industry standard databases, the contractor shall include provisions for manually importing any Government provided databases.
- C. The PACS shall communicate with all network servers (ACNS), data gathering panels (DGP) and client workstations residing on the access control systems' dedicated network by standard TCP/IP communications protocols.
- D. The communication baud rate for the PACS shall be selectable from 1,200 to 38,400 bits per second. The system software shall take full advantage of its multi-tasking capabilities, allowing downloads of cardholder data as well as any ACNS information to occur simultaneously while monitoring and receiving alarms from the field hardware.
1. Downloading database changes shall not interfere with any output control, access decisions, alarm monitoring, traces, or any other required function of the field hardware and alarm monitoring client workstation. Communications between the system client workstation(s) and the ACNS(s) shall be interleaving so that all alarms will still report to any client workstation while downloads are occurring.
  2. In the event of loss and then restoration of communications between the ACNS and the system database, database synchronization between the main ACNS system database and the local database in each remote ACNS and DGP's shall be fast and efficient.
    - a. Every change made to the ACNS database shall establish a time/date stamp for the change. Once communications has been restored, database synchronization shall occur immediately and without System Operator intervention. The time-date stamp shall be compared with any changes in the system database, hardware configuration, events, or output control commands and the system shall log which changes occurred after the off-line event.
      - 1) Any changes made to the Access Control system database while the system was off-line shall also be simultaneously downloaded to all ACNS databases configured in the system.
- E. The PACS shall be provided with dual path communications capability between the access control network servers (ACNS) and any database servers. This capability shall allow for two paths of communication: a primary and secondary path. The primary path shall communicate between all database servers access control network servers (ACNS) and remote processors (DGP'S) by TCP/IP communications protocol. The secondary communications path shall be available and capable of communicating via RS-485, 20ma, and/or RS-232 EIA standards via remote dial up capable modems.

- F. The PACS shall allow access to authorized personnel within pre-determined areas of the site, based on time and/or authority level. The basis of this design is to incorporate a CPU driven system with proximity card access, and to accommodate multiple door locations as well as future expansion.
- G. The PACS shall provide all functions as herein specified by this document, including but not limited to the following capabilities:
1. Provide the ability to regulate access through specific doors and gates to secured areas of the facility and provide computer generated color employee and visitor credentials.
  2. Shall be provided with the ability to disarm/shunt the building intrusion detection devices and related system components through the use of programmed card reader locations by authorized users at all primary and secondary building entrances.
  3. Shall be provided be with the functional capability to automatically and/or manually call-up pre-selected video surveillance cameras, recordings and resourcing of any digital video activities occurring within the facility (independent of the CCTV digital recording system)
    - a. Integration of video surveillance system is not included as part of the scope of work for this project. The system shall support the capability to seamlessly integrate any video surveillance system without any modifications or installation of additional software or firmware to the new PACS client workstations.
  4. Shall utilize a single seamlessly integrated relational database for all functionality. This integration shall be provided with one operating environment. The systems operating environment shall be the fully multi-tasking multi-threading and compatible with Microsoft Windows 2007, UNIX and LINUX operating systems.
  5. The PACS shall utilize web enabled client applications capable of running on independent client operating systems including Windows, UNIX, LINUX and SQL Server platforms. The web-enabled applications shall utilize the same common database as the other system modules.
  6. The system shall be written so that all system modules (access control, alarm monitoring, ID Management, visitor management, digital video, etc.) are at the minimum developed and built from a unified 32-bit source code set. There absolutely shall not be separate source code bases for the individual modules of the system.
  7. The PACS shall perform all Security Management Systems (SMS) functions utilizing Human Machine Interface (HMI) terminals or Client Workstations. The HMI shall provide the principle operation platform for the control and monitoring of individual security devices, doors/gates, CCTV surveillance cameras.
  8. All Client Workstations shall employ Graphic User Interface based software (GUI) that graphically indicates all building floor/site plans and depicts all access controlled doors, intrusion alarmed doors, and ancillary systems. The security management systems programming shall facilitate simple user-friendly operation and allow operators to graphically interact with the PACS.

- a. The PACS shall also include a Threat Level Management feature that allows an operator to make system-wide security changes by simply changing one parameter based on pre-set threat levels.
  - b. The Threat Level feature shall provide a minimum of 5 levels that can be custom configured to change from any level to any other level shall cause execution of a series of commands to make changes to security settings including, but not limited to: door lock and unlock status; multi-factor user authentication (i.e. PIV card, card+PIN, etc.); disabling certain readers or reader groups; triggering outputs or output groups; etc.
  - c. The Threat Level feature shall provide an option that requires authorized operators to input their username and password to elevate to selected levels.
  - d. The Threat Level feature shall provide an option that allows an authorized operator to select an ICON on the HMI will release magnetic hold open device on all PACS doors and automatically lock down the facility.
9. All client workstations residing on the network shall connect to, and monitor, all field hardware devices, such as readers, access control network servers (ACNS) and remote field processors (DGP) and all integrated systems. Administrative tasks including but not limited to: defining asset information, access groups, time zones, configuring digital video devices, generating reports, configuring graphic maps shall be user configurable. **Confirm with VA Information Technology department the desired parameters for access to this programming software prior to install.**
  - a. Any client workstations shall be capable serving as both the credential creation and data input client terminal for authentication and access management functions for the system. In addition any workstation on the network shall also capable serving as the visitor management workstation to allow for the enrollment of visitors and the scheduling of visits.
  - b. Any off-site client workstations shall allow for any combination of system functions and operations to be available or from any remote IP and/or dial-up client workstation that is licensed to do so. All system data must reside on a single database on the network and must be accessible in real time to all system workstations connected to the network. This shall allow for automatic change propagation to all client workstations on the system as well as a common database to consolidate all information and allow for better disaster recovery.
10. The PACS shall be fully scalable to support an unlimited number of individual modules or integrated client workstations. All access control field hardware, including access control network servers (ACNS), shall be connected to all access control system workstations on the network. All workstations shall utilize Windows 2007, UNIX, or LINUX based software as their principle operating system.
11. The PACS shall be designed to support any industry standard thermal dye transfer ID card printer with a certified industry standard Windows XP, UNIX, or LINUX drivers. The system shall also support any ink jet, laser, or dot matrix printer with a Microsoft certified industry standard drivers for the operating system being provided.

12. The PACS shall provide full seamless operational control and monitoring of all integrated systems.
- H. Any user programmed alarm event shall cause the access control system client workstation(s) to provide an audible and visual alarm requiring the operator to acknowledge the event and enter via the keyboard to generate a historical entry and a print-out a report of the event and cause.
1. The system shall include the functional capability to automatically shunt, disarm, silently monitor and/or acknowledge any alarm annunciation of access controlled door, intrusion protected door or ancillary system based on preprogrammed time/date parameters
- I. Client workstation(s) and servers shall be provided where indicated on the contract drawings and/or as herein specified and shall meet or exceed the requirements specified herein as well as all requirements of the access control system manufacturer.
1. All primary and remote client workstation(s) and servers shall be connected to dedicated UPS units sized to provide a minimum of 15 minutes operating time.
- J. All PACS remote field processor panels (Data Gathering Panels) (DGP) shall integrate with the access control network servers (ACNS) as well as all associated door position switches, egress devices, authentication readers and electric door locking hardware, hydraulic barricades, parking Gates, garage doors and vehicle loop detectors.
1. The programming at the access control network servers (ACNS) shall make the final determination of access granted and denials. All system output programs assigned via control-by-event interlock programming to be activated by valid access indication shall be executed, and the associated system outputs shall be activated.
  2. All remote field processor panels (DGP) shall be equipped with a minimum with 1 GB of on board memory and shall be configured to support at the minimum (8) access controlled doors at each DGP location. In addition, the processor shall also be equipped with a minimum of 24 programmable dry contacts for remote I/O operation.
  3. Each remote processor panels (DGP) shall be provided with an integral power supply and battery charger designed to charge required amp hour batteries in order to support up to 24-hours of standby system operation. All processor panels shall be connected to the nearest emergency electrical distribution panel.
    - a. All DGP enclosures shall be provided with a hinged door with keyed locking mechanism and protected by an interior mounted tamper switch connected to the respective DGP as an alarm input.
- K. The PACS must be designed to perform a wide variety of functions as part of a Total Security Management Solution.
1. Provide the at the minimum the following system modules and/or functions as part of the system installation:

- b. Access Control.
  - c. Alarm Monitoring.
  - d. ID Management.
  - e. Digital Video.
  - f. Remote Access Level Management.
  - g. Third Party Interfaces.
  - h. System Administration.
  - i. Importation of Third Party Data Bases and Photographs
  - j. Screen/Forms Creation.
  - k. Graphical Map Creation.
  - l. Application Programming Interfaces.
  - m. Data Import.
  - n. Bi-Directional Data Exchange.
  - o. Threat Management Functionality.
  - p. Video Surveillance Camera Call-up and Control
- L. The system shall be capable of logging and storing minimum of 1000 events in an alarm log and 1000 events in trouble log. These events shall be stored in a battery protected random access memory.
- 1. The Historical Event Recording printer shall include at the minimum the following functions:
    - a. Printer and memory are to record access control and use selected change-of-state activity.
    - b. The invalid card transactions and alarm conditions are to produce an audible signal when reported to the printer and memory.
    - c. The historical data shall include the month, date, day of week, hours, and minutes to identify the time of occupancy, and reader location identification.
    - d. In addition, at the minimum the following alarm events shall also be displayed on the system printer and shall be stored in the system Historical Alarm Log.
    - e. Alarms.
    - f. Alarm Acknowledgment.
    - g. Alarm Silence.
    - h. Alarm Historical log cleared.
  - 2. The minimum trouble events shall also be displayed on the system printer and shall be stored in the system Historical Trouble Log
    - a. Trouble conditions.
    - b. Trouble Acknowledgment.
    - c. Invalid Attempt.
    - d. Door Ajar Time out Indication.
    - e. Trouble Historical log cleared.
- M. Time Schedule Operations:
- 1. Provide a minimum 256 time schedules. Time schedules are to be used for:
    - a. Arm/disarming of any input.
    - b. On/off state of any output.

- c. Instructional text in response to alarms.
- d. Change in state/status of any previous operator commands.
- e. Enable/disable authentication readers and/or PIN keypads.
- f. Authorized access periods.

N. User Data Base:

- 1. Provide as a minimum the following fields and character space for card user identification:
  - a. Card Number: 9 digits.
  - b. Keypad PIN: Up to 6 digits.
  - c. User Time Zone: Minimum of 63.
  - d. Facility Office Code: 0-99.
  - e. User Number: 9 alphanumeric.
  - f. User Name: 32 alphanumeric.
  - g. User Address: Street - 25 alphanumeric.
  - h. User Address: City and Street - 25 alphanumeric.
  - i. Issue Date: MMDDYY.
  - j. Card Activation Date: MMDDYY.
  - k. Card Deactivation Date: MMDDYY.
  - l. Department/Division: 6 alphanumeric.
  - m. Work-Shift Number: 1, 2, 3.
  - n. Telephone Number: 12 numeric.
  - o. Car Tag Number: 12 numeric.
  - p. Personnel Status: 1 alphanumeric (employee, visitor, contractor, maintenance).
  - q. A minimum of 50 user definable personal data fields.

O. Event Levels:

- 1. As a minimum the system shall be capable of no less than six (6) different event levels.

P. Site Coding:

- 1. N/A. All PIV-1 access control card shall be provided by Government

Q. Auto-Lock-Up:

- 1. The System shall support a Bulk Cardholder functionality that will allow a administrator to sort and select multiple cardholders, and after making selections in various data fields including access codes, inactive date, badge type, etc. can be edited, saved and downloaded to DGP's, in order to facilitate the possibility of zeroing out specific car holders and voiding card(s) to deny access entries.

## 2.4 PERFORMANCE REQUIREMENTS

- A. The Access Control System shall provide five (5) area control features: Hard Anti-passback, Soft Anti-passback, Timed Anti-passback, Two Person Control, and Occupancy Limit. Area control shall be a security method of preventing a person from passing their badge to another person for dual entry into a single location utilizing one card.

1. Hard Anti-passback

- a. The Hard Anti-passback feature shall require that a badge always be used to enter and exit an area. The controlled areas shall have both entry and exit card readers at all portals. Areas shall be logically defined under the system, and area control shall not be required at all areas of the facility to be utilized.
- b. Hard Anti-passback shall work in the following manner. A cardholder must present his/her badge at the entry card reader of the area that the person wishes to enter. Once access has been granted into the area, the cardholder cannot present the badge to another entry card reader within the same area without first presenting his/her badge to the respective exit card reader of that area. Should a cardholder attempt to use any other card reader in the same area besides the occupied area's exit card reader once access has been granted to that area, the cardholder shall be denied access and an alarm shall be reported to the alarm monitoring client workstation.
- c. Nested control areas (areas inside areas) shall be definable with a minimum of 64 entry and exit card readers. It shall be possible to have an area within an area and/or multiple areas that are independent of each other in which Hard Anti-passback rules shall apply.

2. Soft Anti-passback

- a. The Soft Anti-passback feature shall require that a badge be used to enter an area. The controlled areas shall have entry card readers at all portals as indicated by the contract drawings. Areas shall be logically defined under the system, and area control shall not be required at all areas of the facility to be utilized. Soft Anti-passback shall work in the following manner. A cardholder must present his/her badge at the entry card reader of the area that the person wishes to enter. Once access has been granted into the area, the cardholder cannot present the badge to another entry card reader within the same area without first presenting his/her badge to the respective exit card reader of that area.
- b. It shall be possible to have an area within an area and/or multiple areas that are independent of each other.
  - 1) Should a cardholder attempt to use another card reader in the same area besides the occupied area's exit card reader, the cardholder shall be allowed access. (if that cardholder has the appropriate authorizations to the new area), and an alarm shall be reported to the alarm monitoring client workstation.
  - 2) The following summary criteria shall apply under Hard or Soft Anti-passback:
    - (a) Initially (Time 0) all cardholders are reset to Area 0.
    - (b) Any cardholder shall enter a controlled area any time after Time 0 by presenting a badge to a system entry card reader.

- (c) A cardholder shall not exit the controlled area unless he has entered the area presenting a badge to the system entry card reader.
- (d) A cardholder shall not enter the controlled area a second time unless the cardholder has exited that area previously.
- (e) A cardholder shall be able to enter through any entry card reader and exit through any exit card reader of a single controlled area.
- (f) These options include a "forgiveness" feature that will allow the System Administrator to reset the anti-passback of all cardholders to Time 0 Area 0, either through a manual override or a time zone command.
- (g) The system shall provide an anti-passback exempt option for privileged or VIP cardholders. Cardholders with this option will not have anti-passback rules applied to them.
- (h) The system shall also have a "forgiveness" feature that will allow the System Administrator to assign "one free pass" to an individual cardholder. This will allow the System Administrator to reset the anti-passback of an individual cardholder to Time 0 Area 0.

### 3. Timed Anti-passback

- a. Timed Anti-Passback shall allow the System Administrator to decide how long after a cardholder has swiped their badge that they will have to wait before the same badge will be accepted again at the same card reader. This helps prevent multiple swipes by an individual to allow access to others through turnstile doors.

### 4. Two Person Control

- a. Two Person Rule shall be provided to restrict access to certain areas unless there are two (2) cardholders present. This restricts individuals from being alone in restricted or highly secure areas. When an area is configured for Two Person Rule, the following criteria shall prevail:
  - 1) The card reader will grant access only if two valid cardholders (with authorized access levels) swipe their badges one after the other. In the event that a second authorized card is not presented within 10 seconds of the first authorized badge, the card reader shall reset and the first card will have to be swiped again.
  - 2) Once 2 people occupy an area, individual access shall be granted.
  - 3) Individual exit shall be permitted until an area is occupied by only 2 cardholders at which point the Two Person Rule applies for exit.



5. Occupancy Limit

- a. Occupancy Limit shall restrict the number of cardholders that will be present in an area at any given time. The Occupancy Limit area shall be able to be defined by the System Administrator to limit up to 999,999 cardholders to be in that area at any given time. Once the occupancy limit has been reached, a cardholder must swipe out of the exit card reader before the next cardholder may enter. Each area for which Occupancy Limit is enabled shall be definable with up to 64 entry/exit card readers.
- B. A valid read at any door, shall provide a valid access indication on the client workstation(s) and shall cause the door to unlock with the following exceptions:
  1. A heightened security condition exists within the facility.
  2. Individual does not have authorization to enter the protected space.
- C. A valid read at selected exterior door locations shall provide a valid access indication on the client workstation(s), cause the door to unlock and the intrusion detection system to disarm, with the following exceptions:
  1. A heightened security condition exists within the facility.
  2. Individual does not have authorization to enter the facility after hours.
- D. At a predetermined times according to the days of the week the access control system shall have the capability to automatically disarm intrusion detection systems, open and close parking garage doors, shunt interior controlled and alarmed doors. Coordinate with Government User Agency all operational requirements for this feature.
- E. Each individual door must have the capability of being assigned a Door Open Too Long (DOTL) Program that will initiate an alarm to the operator that the door has been left unsecured or has remained open longer than the user defined and programmed time interval.
- F. Make provisions to permit operator to "shunt" an individual door alarm if appropriate operator level is utilized for reasons of frequent use or trouble; cause the following to occur:
  1. Client workstation(s) will display door as zoned out of system.
  2. Historical data logger will record to memory: time, date, location, operator that is signed on, and event as "shunted."
  3. Journal printer will print activity.
- G. Any user programmed alarm event shall cause the access control system, Client workstation(s) to provide an audible and visual alarm requiring the operator to acknowledge the event and enter via the keyboard a report of the event and cause.

1. Cards shall be capable of being printed by Government User Agency with custom artwork, laminated photo ID, and shall include slot punching for strap or chain.
2. Proximity cards shall be "I-Class" 13.56 MHz contact-less smart cards technology as manufactured by HID. No Substitutions shall be accepted.

## **2.5 AUXILIARY POWER SUPPLIES**

- A. Provide as required UL listed auxiliary power supplies with battery backup in sufficient quantities to ensure proper operation of the entire system. Power supplies shall be 12/24 volts as required to support all power requirements associated with all electronic door locking mechanisms, ancillary system controls and all manufacturers recommendations. The auxiliary power supply units shall at the minimum meet the following requirements

1. The power supplies shall sized to provide power for all access control system communications equipment, electronic door locks and/or remote ancillary panels.
2. The power supply shall be rated at a minimum of 6.0 amps continuous of regulated 12/24-volt power as required by the manufacturer recommendations. It shall include an integral charger designed to charge required amp hour batteries in order to support 24-hour standby power for all alarm, processor and door lock operations
3. The power supplies shall include power limited circuitry, per 2003 UL standards and shall be be a class II power supply and UL listed releasing device conforming to NFPA 72 fire-protective signaling service requirements.
4. All power supplies shall be connected to the nearest emergency power distribution panel.

## **2.6 DOOR CONTROL DEVICES**

- A. Contactless Readers

1. Furnish and install where indicated on the contract drawings one of the following authentication type readers as designated for the protected space:
  - a. Contactless (proximity)
  - b. Combination contactless\keypad
  - c. Bio-metric (finger print)
  - d. Bio-metric (IRIS Scan)
  - e. Combination contactless\ Bio-metric (finger print or IRIS Scan)
  - f. Combination contactless\ keypad \ Bio-metric (finger print)
2. All contactless readers shall be ISO 14443A compliant operating at a minimum frequency of 13.56 MHz and shall conform to all requirements of HSPD-12, Federal Information Processing Standard Publication 201 (FIPS 201), National Institute of Standards and Technology (NIST) SP 800-116 and TWIC contactless reader specification guidelines as well as all NIST's "Controlled" security area assurance level requirements with a single-factor authentication modes(CHUID and CAK).

- a. In addition to the required PIV-I contactless reader requirements all readers shall also be capable of accepting multiple card types such as PIV, CAC, CIV (a.k.a., PIV-C), TWIC and FRAC, as well as iCLASS, HID Prox cards and PKI-enabled smart cards.
- b. All contactless readers in order to comply with the "Controlled" assurance level (as defined in NIST SP 800-116) shall be connected (out at each door location) to a FIPS 201 compliant authentication module capable of performing the following single-factor authentication modes:
  - 1) CHUID Authentication - The authentication module shall test the signature on the PIV card holder unique identifier (CHUID) data object. The CHUID signature check shall ensure the card is authentic (it came from a valid issuer) and has integrity (it has not been altered). Since the CHUID is a "free read" and data can be transmitted unencrypted the signature check shall identify cards which have been counterfeited or altered.
  - 2) CAK Authentication - The authentication module shall perform a PKI challenge-response in addition to a signature check to validate the card authentication key (CAK). The challenge response test shall ensure that the public key in the Card Authentication Certificate is bound to the private key on the card. CAK authentication shall identify cards which have been counterfeited, altered, copied or cloned.
3. The contactless readers and authentication modules shall be UL listed 294 and ISO certified and shall be Piv-Class series models as manufactured by HID or approved equal.

B. Request to Exit Device (Motion)

1. Furnish and install a motion based request to exit (REX) device on all access controlled door locations as indicated on the Contract drawings.
  - a. The REX device shall be a standalone device operating on passive infrared (PIR) motion detector listed for indoor use and operating on 12\24 VDC power with a maximum current draw of not more than 20-50 mA.
  - b. The device shall be white in color and include a field adjustable detector face to allow for precise pattern configurations for easy pattern adjustment and shall measure no greater than 7'L x 1 ¾" H x 2" W.
  - c. The device shall include an integral SPDT relay for signaling the access control processor panel while simultaneously shunting the door locking mechanism providing a failsafe operation. The device shall include a field effect transistor for direct control of electronic locking mechanisms and operating at 50 milliseconds before the transistor to suppress false alarms.

2. The device shall be UL listed and ISO 9001 certified, model XMS as manufactured by Securitron Magnalock Corp. or approved equal.

C. Emergency Exit Device (Pushbutton)

1. Furnish and install emergency exit pushbutton device in addition to PIR request to exit device on all access controlled doors equipped with magnetic locking mechanisms as indicated on the Contract drawings. The pushbutton shall be a wall mounted device installed at 48 inches on center AFF and within 5 feet of the controlled door.
  - a. The emergency exit device shall be a standalone device mounted on a stainless steel single gang faceplate with integral timer and operating on 12\24 VDC power with internal double break wiring and minimum of 3 amp resistive contacts.
  - b. The pushbutton shall be a wall mounted device installed at 48 inches on center AFF and within 5 feet of the controlled door and shall meet all Life Safety Codes when used in conjunction with a PIR request to exit motion sensors. The pushbutton shall be a non-illuminated industrial grade button with protective cowling measuring a minimum of 2" by 2" and labeled 'PUSH TO EXIT'.
  - c. The pushbutton shall be equipped with re-triggerable, non-adjustable 30 second timing function as mandated by code and shall be automatically activated with double break control function to the magnetic locking mechanism for additional safety.
    - 1) Note Emergency Exit Device shall be provided at all access controlled door locations equipped with magnetic type locking mechanisms in addition to the PIR request to exit motion sensor and fire alarm system interface in accordance with all requirements of NFPA 101 and IBC-2012 Chapter 10.
2. The device shall be UL listed and ISO 9001 certified, model EEB2 as manufactured by Securitron Magnalock Corp. or approved equal.

D. Door Position Switch/Magnetic Door Contact (DPS)

1. Furnish and install magnetic door position switches (DPS) on all access controlled doors as indicated on the Contract drawings. The switch shall be a triple biased magnetic switch, UL634; listed for Connectors and Switches used in Burglar Alarm Systems, Level 2 High Security applications.
2. The DPS shall be configured with either single pole or double pole alarm contracts and installed as surface or concealed mounted devices dependent of the door application as shown on the Contract drawings and existing field conditions.
  - a. Surface Mounted Switch: The switch shall be have integrated Removal Tamper Circuit and hardware, which shall activate on removal of switch from mounting surface must be used with, or contain Embedded End of Line (EOL) resistors compatible with system control panels that accept contact inputs. The switch shall be rated for both interior and exterior applications and

utilize a universal cross-hole mounting configuration for in-swing or out-swing door installations.

- 1) The switch and magnet Housings shall be made of anodized aluminum. Housing dimensions to be nominally 4.25"L x 1.5"H x 1"D, with mounting holes for #10 screws, and #6 screw for removal tamper. Internal contacts must be fully potted using 94HB rated material or better, all wire leads shall be solid color coded and routed through integral stainless steel armored jacket.
  - 2) Contact configurations shall consist of: Open or Closed Loop Alarm contact. Closed Loop Tamper contact or Two Closed Loop Alarm Contacts, Closed Loop Tamper contact as required. Maximum electrical ratings for all contacts shall be 250 mA at 30 VDC (Resistive).
  - 3) The surface mounted switch shall be L2S AND L2D series as manufactured by Mgnasphere or approved equal.
- b. Concealed Switch: The switch shall be have integrated Removal Tamper Circuit and hardware, which shall activate on removal of switch from mounting surface must be used with, or contain Embedded End of Line (EOL) resistors compatible with control panels that accept contact inputs. The switch shall be rated for interior applications.
- 1) The switch and magnet housings shall be installed in a recessed cavity in door frame and door (either standard ANSI cut out or One inch (1") diameter hole.
  - 2) The switch and tamper housings shall be made of UL94 HB rated plastic, housing dimensions to be nominally 1" diameter X 1.0625" height. Magnet module shall be made of non-ferrous metal, nominally 1" diameter X 1.0625" height, with mounting flange (1.125"W X 2.625"L) requiring 2 X #10 mounting screws made of anodized aluminum.
  - 3) Internal contacts must be fully potted using 94HB rated material or better, all wire leads shall be solid color coded and routed through integral stainless steel armored jacket.
  - 4) Contact configurations shall consist of: Open or Closed Loop Alarm contact. Closed Loop Tamper contact or Two Closed Loop Alarm Contacts, Closed Loop Tamper contact as required. Maximum electrical ratings for all contacts shall be 250 mA at 30 VDC (Resistive).
  - 5) The concealed switch shall be L2C series as manufactured by Mgnasphere or approved equal.

E. Magnetic Locking Mechanism (MAG Lock)

1. Furnish and install magnetic locking mechanisms on all doors where indicated on the Contract drawings. The locking mechanism shall be listed under UL 1034 for burglary-resistant and UL10C with a 45 minute fire rating.

- a. The mechanism shall be a surface mounted device with an architectural brushed stainless steel finish with built-in integrated door position sensing switch (DPS), a lock status "Form C" contacts capable of monitoring status of the lock, status LED, adjustable auto-relock timer and an integral passive infrared motion detector for request-to-exit (REX) function.
  - b. The lock shall provide a minimum static holding force of 1,100 ft./lbs. with instant release circuitry and no residual magnetism and shall utilize a maximum of 9.3 watts of power (775mA @ 12VDC) or (390mA @ 24VDC).
  - c. The locking mechanism shall not exceed 11.5 inches x 2.5 inches x 3.13 inches in size. The lock be mounted with a bracket which is secured to the frame with two (2) .25 inch x 1 inch machine screws into blind finishing nuts and four (4) #12 x 1.5" screws. The locks strike plate shall provide a "floating" movement providing automatic self-alignment.
2. The magnetic locking mechanism shall be UL listed and ISO 9001 certified and shall include a lifetime replacement warranty. The lock shall model M680BDX as manufactured by Securitron Magnalock Corp. or approved equal.
    - a. Note: All locking mechanisms shall be integrated with the building fire alarm system in accordance with all requirements of NFPA 101 Article 7.2.1.6.2, IBC-2012 Chapter 10 and NFPA 72. Unless directed by the VA to follow a more stringent code. Contractor shall coordinate with the current VA Fire Alarm vendor to conduct testing of the new components.

F. Electronic Locking Mechanism (Door Strike)

1. Furnish and install electronic strike locking mechanisms including but not limited to all, keepers, faceplate trims, finish hardware and appurtenances on all doors as indicated on the Contract drawings. Selection of the appropriate electronic strike mechanism shall be based on all requirements of the existing door locking hardware and door frame type for the specific application as determined by the Contractor prior to installation.
  - a. The Contractor shall include all necessary modifications to frame as required for proper installation and ensure full operation in accordance with all manufacturers' requirements and compliance with all life safety codes.
  - b. The locking mechanism shall be tamper resistant, non-handed mounting capable of accommodating up to a 1" deadbolt in either wood or metal frames and shall employ a low profile keeper with an internally mounted solenoid installed in a 100% stainless steel cast case, tested to exceed 3,000 lbs. of static strength, 350 ft. lbs. of dynamic strength, factory tested to exceed 1,000,000 cycles of operation and shall utilize a maximum of .45 Amps @ 12VDC continuous duty or .25 Amps @ 24VDC. The mechanism shall be configured for 'fail secure" and

"fail safe" locking operation depending upon the VA needs and requirements for the individual space..

2. The locking device and all components and installation shall meet or exceed the following codes and standards:
  - a. UL 10 fire-rated, 3 hour single door (fail secure only)
  - b. UL 10C fire-rated, 1-1/2 hour double door (fail secure only)
  - c. CAN4-S104 (ULC-S104) fire door conformant
  - d. ANSI A250.13-2003 windstorm listed
  - e. UL 1034, burglary resistant listed
  - f. ANSI/BHMA A156.31, Grade 1
  - g. NFPA-252 fire door conformance
  - h. ASTM-E152 fire door conformance
3. The strike locking mechanism shall be listed as above and ISO 9001 certified and shall include a 5 year replacement warranty. The lock shall model 1006 series as manufactured by HES Innovations or approved equal.
  - a. Note: All locking mechanisms shall be integrated with the building fire alarm system in accordance with all requirements of NFPA 101 Article 7.2.1.6.2, IBC-2012 Chapter 10 and NFPA 72.

## **2.7 CLIENT WORKSTATION (HMI)**

- A. Provide all client work stations in conformance with all performance requirements as herein specified and located where indicated on the contract drawings. The HMI shall be an integrated panel PC (all-in-one) with integral Touch Screen and shall be provided in accordance with the all manufacturers recommendations in order to meet all system performance requirements.
  1. The integrated PC\Touch Screen HMI client workstation terminals' shall consist of a standalone slim panel computer with integral 22-inch 300 nits high brightness WSXGA LCD touch screen display with a minimum resolution of 1680 x 1050. The integrated panel PC\Touch Screen terminal shall be manufactured by Broadax Systems, Inc (BSI) approved equal. At the minimum integrated panel PC\Touch Screen terminal' shall include the following;
    - a. PC processor: Intel Core Duo/Celeron M processor powered by an Intel GM45+ICH9M core logic chipset with 256 MB sharing graphics memory, (2) x DDR3 SO-DIMM 4 GB of memory and a 2.5" SATA 160GB HDD.
      - 1) Video Processor:
        - a) On-board 32-bit graphics system type processor.
        - b) IBM or equivalent emulation modes - SVGA.
        - c) Capable of High Color (16 bit) with a minimum output resolution of 1680 x 1050 pixels, non-interlaced.
        - d) 256MB Video RAM, minimum.

- e) The Touch Screen 22" LCD display shall utilize the full graphics resolution and color Capabilities of the graphic video co-processor.
  - f) Run all SVGA compatible software using high definition system fonts in all text modes.
- 
- b. Sound system: Sound Blaster Audio PCI 128D
  - c. Touch Screen: 22 inch, resistive type, 80% Light transmission and Touch life 35 million touches.
  - d. (1) - 24x CD/DVD-RW Drive
  - e. (2) - 10/100/1000Mbps Ethernet Ports
  - f. (2) - RS-232 (COM 2/3) Ports
  - g. (1) - RS-232/422/485 (COM 1) Port
  - h. (4) - USB 2.0 ports
  - i. (1) - VGA Port
  - j. Audio: (1) mic in\out
  - k. Power: 12 VDC w\ AC\DC Adaptor
  - l. Watchdog timer 255 level, 0-255 sec
  - m. Mounting: Versa Table Stand
  - n. Keyboard: 104+ keyboard
  - o. Mouse: MS IntelliMouse w/ mouse pad
  - p. Operating System: Microsoft Windows 2007

## **2.8 PRINTER (Historical Event Recording)**

- A. Furnish and install a 24 Pin dot matrix printer with paper tray at each Client workstation.
  - 1. The printer shall meet the following minimum requirements in addition to all manufacturers recommended requirements.
    - a. 9 pin serial impact dot matrix.
    - b. Minimum feed rate: 5 ips.
    - c. Printer shall use 80 serial character lines and print at a minimum 120 lines/minute.
    - d. Paper shall be top mounted pull tractor fed.
    - e. MTBF: 10,000 hours minimum.
    - f. Print-head life shall be at the minimum 200 million characters @ 25 percent duty cycle.
    - g. Printer shall be equipped with a 28K internal buffer memory.
    - h. Printer to use sprocket feed paper.

## **2.9 NETWORK ACCESS CONTROL SERVER (ACNS)**

- A. Provide network servers in sufficient quantities and properly sized in accordance with all manufacturers' requirements to support all physical access control system functions and user data bases in conformance with all system performance requirements and shall include a 25% built-in expansion capability. At the minimum the network server shall meet the following requirements:
  - 1. Intel Core II E8400 (6MB,3.0 GHz, 1333FSB) processor w/4GB SDRAM (Rack Mount)
  - 2. Hard Drive:750GB 7200RPM, SATA 3.0Gb/s, 16MB Cache
  - 3. One (1) 16x/10x/40x CD/DVD-Read/Write Drive



4. Two (2) - 10/100/1000 MB Ethernet ports
5. 128 MB SVGA card capable of displaying 1080p/1080i resolutions (64 bit true color)
6. 15" LCD Flat Panel Monitor (Rack Mount)
7. Keyboard and Mouse (Rack Mount)
8. Minimum Operating System: Windows 2007 (or newer)
9. All Required Manufacturers Software, Licenses and Software Keys

### **PART 3 - EXECUTION**

#### **3.1 EQUIPMENT PROTECTION**

- A. Comply with all requirements of specification section 28 05 00.
  1. Examine all physical and environmental conditions, door hardware specifications, equipment locations and wide area network connectivity requirements impacting the installation of the systems and report any unsatisfactory conditions in writing to the VA's Project Engineer and Design Professional.

#### **3.2 WORK PERFORMANCE**

- A. In addition to all requirements as specified by Specification Section 28 05 00 the Access Control system shall also be provided in accordance with the following requirements:
  1. Prior to the final programming of any systems, the Contractor shall provide a review with the VA's Project Engineer and Design Professional addressing all system features, functions, operations, integrated system responses, graphic maps and related operational programming.
    - a. Failure to provide this review and get final sign-off prior to programming shall result in any costs related to changes requested by the VA's Project Engineer and Design Professional at no additional costs to the project.

#### **3.3 EQUIPMENT/CABLE INSTALLATION AND REQUIREMENTS**

- A. In addition to all requirements as stipulated by Division 27 specification sections and by specification section 28 05 00 the PACS shall also be provided in accordance with the following requirements:
  1. All TCP\IP based physical access control system network cabling shall utilize Category-6 UTP cables and installed in accordance with the requirement of specification section 28 05 00.
    - a. All PACS cabling installed on the exterior to the building and/or all cabling being routed from the facility to buildings within the campus in the project shall be utilize fiber optic cable and installed in dedicated conduits.
    - b. Contractor shall provide equipment, components, devices, hardware, patch panels and all appurtenances necessary to provide a fully operational system utilizing a UTP cabling topography. Coordinate all system cabling with system provider prior to shop drawing submission.

VA Project No. 642-12-110  
AE Works Project No. 12030

Philadelphia VAMC  
Rekey VA Medical Center  
Bid Documents

- B. Installation of all equipment and devices that pertain to other work in the contract shall be closely coordinated with the appropriate trade contractors.

### **3.4 ELECTRICAL POWER DISTRIBUTION**

- A. In addition to all power requirements stipulated in specification section 28 05 00 and as herein specified, all electrical power for remote processors, controllers, servers, power supplies, and ancillary system components shall be obtained from dedicated emergency electrical circuit.

1. All 120-Volt emergency electrical power shall be provided by this Contractor and supplied from the nearest appropriate emergency electrical distribution panel. Electrical power connections shall be hardwired to the panel, system components or panels employing the use of plug-in transformers, extension cords or cheater cords for the connection to electrical power shall not be acceptable.
  - a. If no spare 20A/1P circuits are available for use, the contractor shall provide a new subpanel adjacent to the existing panel. Remove (3) 20A/1P breakers and replace with a 60A/3P breaker to feed the subpanel.
  - b. Subpanel shall be 60A MLO with 18 circuits. Reconnect the (3) 20A/1P circuits to this new panel. Extend branch wiring as required. The Contractor shall size feeder to subpanel per the national electric code.
2. All system power supplies serving system components or devices on shall be provided with the appropriate transient surge and suppression protection on both the line side as well as the load side. Refer to specification section 28 05 00 for additional requirements.

### **3.5 TRANSIENT VOLTAGE SUPPRESSION**

- A. Comply with all requirements of specification section 28 05 00.

### **3.6 GROUNDING AND BONDING**

- A. Comply with all requirements of specification section 28 05 00.

### **3.7 EQUIPMENT IDENTIFICATION**

- A. Comply with all requirements of specification section 28 05 00.

### **3.8 MAINTENANCE & SERVICE**

- A. Comply with all requirements of specification section 28 05 00.

### **3.9 WARRANTY**

- A. Comply with all requirements of specification section 28 05 00.

### 3.10 Field Services

#### A. TESTING

1. In addition to all requirements as specified by Specification Section 28 05 00 the physical access control system shall also comply with the following requirements:
  - a. The completed access control system shall be fully tested in accordance with all requirements of NFPA 731. Upon completion of a successful testing, the contractor shall so certify in writing to the VA's Project Engineer and Design Professional all was completed, tested, certified and left in first class operational condition, include all completed NFPA 731 certification and test reports.
  - b. The service of a competent, factory-trained engineer or technician authorized by the equipment manufacturer shall be provided to technically supervise installation and participate during initial system programming, start-up, final testing, assist in the final acceptance testing and Government Agency demonstrations.
  - c. At the minimum all acceptance testing, demonstrations and training shall include, but not be limited to the following:
    - 1) UPS Power and Secondary Power Distribution Capabilities
    - 2) Security Device Monitoring/Control Functions.
    - 3) Door Monitoring/Control Functions.
    - 4) HMI GUI map Integration and Functionality
    - 5) Automatic and Manual Threat Level Operations.
    - 6) Third Party Database Import Functions.
    - 7) Remote System Access (LAN\WAN) Functions.
    - 8) All programming and operational functions and features as herein specified.
    - 9) Cable Supervision System (random points to be selected by the VA's Project Engineer and Design Professional).
  - d. Demonstrate each system and subsystem. The demonstration shall include, but not be limited to the following:
    - 1) Designate actual location of each component of a system or subsystem and demonstrate its function and its relationship to other components within the system.
    - 2) Demonstrate the operation of all client servers, door interlock and bypass functions, camera call-up operations, graphic map functions, administration set-up, configurations and operations, badging functions and operations, emergency operations and system reboot procedures.
    - 3) Demonstrate all systems and subsystems operations by actual "LOCK/UNLOCK, ARM/DISARM" cycling showing how to work controls, how to reset devices, how to replace fuses and emergency operating/operations procedures.

- e. Upon final inspection a factory-trained and certified representative of the equipment manufacturer shall demonstrate to the VA's Project Engineer and Design Professional that the system functions properly in every respect and is in full compliance with the contract documents. This requirement is in addition, to all testing requirements listed in specification section 28 05 00 and related specification sections.
- 1) Provide a minimum of (8) eight 2-hour training classes performed at the project location and spaced over a four week interval. Training classes shall be scheduled not less than 48 hours apart to allow Government Agency operators to familiarize themselves with all system operations.
- 2) Include all training manuals, video instructions and hands-on demonstrations in the operation of all system components. Provide to the VA's Project Engineer and Design Professional in advance lesson plans outlining training procedures, course outlines and objectives. Coordinate with VA's Project Engineer and Design Professional in advance all training dates and schedules.

- - - END - - -

VA Project No. 642-12-110  
AE Works Project No. 12030

Philadelphia VAMC  
Rekey VA Medical Center  
Bid Documents

**SECTION 28 13 20**  
**PATIENT ELOPEMENT SYSTEM (PES)**

**PART 1 - GENERAL**

**1.1 STIPULATIONS**

- A. Project drawings and general provisions of the Contract, including but not limited to all; General and Supplementary Conditions, Division 01 and all related specification sections shall apply to this section.
- B. Related Sections:
1. Division 26 - Common Work Results for Electrical.
  2. Division 26 - Low Voltage Electrical Power Conductors and Cables.
  3. Division 26 - Grounding and Bonding for Electrical Systems
  4. Division 26 - Hangers and Supports for Electrical Systems
  5. Division 26 - Raceways and Boxes for Electrical Systems
  6. Division 26 - Identification for Electrical Systems
  7. Division 27 - Common Work Results for Communications Systems
  8. Division 27 - Network Communications Systems
  9. Division 28 - Common Work Results for Electronic Safety and Security
  10. Division 28 - Physical Access Control System (PACS)
- C. Reference Symbols:
1. All device symbols are defined by the appropriate symbol schedules. Because of the scale of the drawings, symbols are shown on drawings as close as possible to the mounting location.
    - a. Contractor shall coordinate exact locations with all architectural drawings, reflected ceiling plans, furniture plans, mechanical and electrical drawings as well as all affected trades prior to submittal of any shop drawings.
- D. Abbreviations:
1. Refer to Specification Section 28 05 00 for additional information.
- E. Definitions:
1. Refer to Specification Section 28 05 00 for additional information.

**1.2 SUMMARY**

- A. The intent of this specification is to establish a standard of quality; functions and features for the installation of UL listed RFID Wireless Patient Elopement System (PES) (Building 30). The system shall be a microprocessor based enterprise system, supervised and fully scalable. The Contractor shall include all work, materials, devices, components, infrastructure, equipment, power supplies, electrical power, software and programming as required to provide a fully operational and code compliant system in accordance with all requirements of the Contract Documents.

1. The installation, performance, features, functions, software, programming and integration of ancillary systems as specified herein as well as all related specification sections have been designed to offer the maximum system efficiency ease of operation, occupant safety and the protection of equipment as recommended by the design Professional.
  - a. Any deviations from the specified criteria shall be documented, reviewed and agreed to in writing by the VA's Project Engineer and Design Professional prior to submission of bids. Refer to Division 1 and all related specification section for product substitutions.
1. It is the responsibility of the contractor to insure that the installed systems meet or exceeds every standard set forth in these specifications. The contractor shall be responsible for providing complete functional systems, including all necessary components, devices, equipment, cabling, conduits, electrical power, software, programming, commissioning, testing and all appurtenances as necessary to provide complete and fully operational Patient Elopement System whether specifically included in this section or not.
  - a. The system shall consist of but not limited to all; central processors, door control stations, wireless antennas, patient RFID Wireless transmitters, HMI terminals, remote annunciator panels, and the integration with ancillary systems (PACS, Fire Alarm) as well as all appurtenances as required to deliver a fully operational code compliant system as herein specified and in accordance with all requirements of the contract documents.
    - 1) Note: Systems based on TCP/IP protocols shall include all connectivity requirements including but not limited to all Category-6 UTP cabling, peripheral network components, connections to security cable termination panels and active communications switches (Layer II and Layer III) as part of this project. Coordinate with ESSI and all affected trades for all connections to the security communications network.
      - a) The utilization of the facility's data network to support the distribution, performance and/or operation of a TCP/IP enterprise based system shall be strictly prohibited (other than where herein specified).
    - 2) The Contractor shall have a registered RCDD professional review and seal all system shop drawings demonstrating industry standard design, installations and certifications of all structured cabling networks related to the installation and operation of the TCP\IP based Physical Access Control System and all related TCP\IP based electronic security systems.



- 3) Refer to related Division 27 and Division 28 specification sections for additional information related to network communications infrastructure, active communications equipment (Layer II and Layer III Data Switches) and all testing requirements.
- b. The system shall provide at the minimum the following functions;
- 1) The system shall activate all electronically locked doors and provide annunciation at the protected door location and all remote monitoring locations when a RFID Wireless transmitter signal is detected. All alarms shall remain activated until manually reset at the alarmed location.
  - 2) The system shall be integrated with elevator controllers to disable elevator car operation and hold car at the event floor when a RFID Wireless transmitter signal is detected. Elevator car shall remain deactivated until manually reset at the alarmed location.
  - 3) Provide integration with building fire alarm system to automatically unlock the protected doors in accordance with all requirements of NFPA 101 Article 7.2.1.6.2.
    - a) It shall be the Contractors responsibility to include in the base bid all costs for sub-contracting with the Station's fire alarm system provider to furnish all necessary modifications to the existing fire alarm system as required.
    - b) The current fire alarm system is based on a Gamewell fire alarm platform as provided by N. B. Barber Company of Uwchland, PA 19480. Contact Dominic Macchione at 610-458-8202, Fax 610-458-8228 for all required fire alarm system integrations.
- B. The installation of the patient elopement system shall comply with the applicable sections of NFPA-70 National Electrical Code (Article 725 and 800) and shall be electrically supervised and monitor the integrity of all conductors, devices and components.
1. The contractor and all sub-contractors for this work shall have read all of the General Conditions, Special Requirements, General Requirements and all applicable related specification sections in the execution of all work and shall be bound by all stipulations and requirements therein.
- C. Prior to the submission of the Bid, any discrepancies or inconsistencies noted within these specifications and/or project drawings shall be brought to the immediate attention of the VA's Project Engineer and Design Professional.
1. All equipment symbols are shown on drawings as close as possible to their intended location. Contractor shall coordinate the installation of all equipment, devices, controls, cabling and integration of all systems with all affected trades and system integrators. The Contractor shall document all coordination requirements at the time of shop drawing submissions.

2. The Contract Drawings for this work are diagrammatic and intended to convey the extent, general arrangement and locations of the work. Because of the scale of these drawings, certain basic items such as access panels, conduits, cabinet sizes, penetration sleeves, pull boxes, backboxes and junction boxes may not be shown.
  - a. The contractor shall include all equipment, materials, components, devices, controls and appurtenances where mandated by code, required by manufacturer, or specified by related Contract Documents in order to ensure proper installation operation and integration of all components, equipment, devices and/or systems.
- D. The Contract drawings and specifications may not deal individually with every part, control, device, software or programming, which may be required to produce the operations and/or system performance specified or as necessary for the proper installation and integration of all components and systems in accordance with all requirements of the Contract Documents.
  1. The Contractor shall include all such items and components, as required, for the complete and operational installation of all system components as herein specified and/or defined by related specifications and drawings which make up Contract Documents, whether or not specifically indicated and/or specified.
    - a. Coordinate with other applicable trades in submittal of shop drawings and the installation of all systems.
    - b. Shop drawings shall detail space conditions and/or integration with ancillary systems to accommodate other concerned trades, subject to final review by the VA's Project Engineer and Design Professional.
    - c. If installation of equipment, raceways, cable trays and/or conduit is performed prior to coordination with other trades, which interferes with work of other trades, make necessary changes to correct the condition at no additional cost to the Government.
    - d. The contractor shall be responsible for providing all wiring, connections to all equipment, circuits and devices as well as all coordination and programming for the integration of all electronic door hardware, ancillary systems impacting the operation of the PES. Refer to the contract drawings and related specification sections for additional information.

### 1.3 REFERENCES

- A. The publications listed below (including amendments, addenda, revisions, supplement, and errata) shall form a part of this specification to the extent referenced. The publications are referenced in the text by the basic designation only.
  1. Health, (Public Law 96-88), CFR, Title 42, Chapter IV Health & Human Services, CFR, Title 46, Subpart 1395(a)(b)

- a. Guidelines as stipulated for Life, Personal and Public Safety; and, Essential and Emergency Communications.
2. The system shall listed for the following applications and/or agencies
  - a. UL 294 Access Control Systems
  - b. FCC Part 15-ID: JM7-IGWT-660076 (Receivers)
  - c. FCC Part 15-ID: JM7-IGWT-662002 (Sensors)
  - d. FCC Part 15-ID: JM7-IITYS-700035 (Controllers)
  - e. FCC Part 15-ID: JM7-IGWT-662008 (S-Tad Transmitters)
- B. All references to industry and trade association standards as well as all building codes are minimum installation requirements for this system. The codes, standards and agencies listed in specification section 28 05 00 shall also form a part of this specification section and all work shall comply with the latest adopted standards.
  1. The publications listed in specification section 28 05 00 (including all amendments, addenda, revisions, supplement, and errata) shall form a part of this specification section to the extent referenced. The publications are referenced in the aforementioned specification section by the basic designation only.
    - a. Where the contract drawings and\or specification sections mandate a greater requirement or performance than those specified by the referenced applicable codes and standards, the requirements of the contract drawings and\or specification sections shall be the governing requirements for this project and shall be delivered accordingly.

#### **1.4 SUBMITTALS**

- A. In addition to all requirements as specified by Specification Section 28 05 00 the Contractor shall submit the following information.
  1. Provide a complete termination schedule of all device locations; indicate on the construction drawings all component and device identifications corresponding with schedule.
  2. Provide point to point wiring diagrams for all communications edge door control devices, central processors, annunciator's, audible signaling devices and related interface components.
    - a. Wiring diagrams shall indicate all wiring for each field device as well as all wiring interconnections between each device and all controls and/or associated equipment, In addition, all electrical power connections with electrical circuit numbers shall be indicated to all equipment requiring electrical power.
  3. All shop drawing submissions for any system employing TCP\IP based protocols shall have a registered RCDD professional review and seal all shop drawings confirming that the proposed network infrastructure and structured cabling system meets all criteria

as herein specified and is in conformance with all stipulated standards and related specification sections.

**1.5 RECORD DOCUMENTS**

- A. Comply with all requirements of specification section 28 05 00.

**1.6 SOFTWARE AGREEMENT**

- A. In addition to all general provisions of the Contract, including but not limited to all; General and Supplementary Conditions, Division 01 Specification Sections Comply with all requirements of specification section 28 05 00.

**1.7 EXTRA MATERIAL**

- A. In addition to all requirements as specified by specification section 28 05 00 the following extra materials shall be provided as part of this project:
1. Six-(6) Door Antennas of each type utilized in the project.
  2. Two-(2) control/processor unit utilized in the project.
  3. One-(1) LED 8 Lamp Annunciator Panel utilized in the project.
- B. All extra materials shall be delivered at the time of final acceptance of the system(s). At no time is the contractor to use the extra materials provided for this project to replace malfunctioning equipment and or components prior to final acceptance.

**1.8 SOFTWARE AGREEMENT**

- A. Comply with all requirements of specification section 28 05 00.

**PART 2 - PRODUCTS**

**2.1 MANUFACTURED PRODUCTS**

- A. Comply with all requirements of specification section 28 05 00.

**2.2 MANUFACTURERS**

- A. Acceptable manufacturer's for this project shall be as follows, providing full compliance with this section, specification section 28 05 00 and all related specification sections:
- B. Acceptable Manufacturers:
1. RF Technologies
  2. Accutech
  3. WanderGuard
  4. Guard RFID Solutions
  5. Wander Control Systems
- C. Manufacturers listed as acceptable or equal shall not negate the contractor's responsibility for providing all systems in accordance

VA Project No. 642-12-110  
AE Works Project No. 12030

Philadelphia VAMC  
Rekey VA Medical Center  
Bid Documents

with all functions and performance requirements of the Contract Documents.

## **2.3 SYSTEM DESCRIPTION**

- A. The design intent is to create an open environment of care while assuring staff that residents are secure and not capable of exiting a protected area, floor or space. The PES shall monitor all egress doors, stairwells, hallways, and elevators as indicated on the contract drawings.
  - 1. The system shall provide the flexibility through programming to make the appropriate changes to the response and/or performance criteria to accommodate specific operational needs as they develop. In addition the system shall include an anti-tailgate feature which prevents a protected patient from following a visitor or staff member through an authorized exit. All alarms must be manually reset at the monitored door to assure proper response by staff.
    - a. The overall system performance shall alert staff immediately anytime a monitored resident wearing a water-resistant wrist or ankle RFID Wireless transmitter attempts to exit the protected area and shall immediately lock the protected door or shunt the elevator operation and shall sound a local alarm at that protected location.
    - b. Simultaneously the system shall automatically display point alarm indications on the local LED annunciator panel located at a designated nursing station and shall display a flashing ICON on the GUI based graphic maps on the HMI touch screen terminal located at the main lobby security desk.

## **2.4 DOOR CONTROL/PROCESSOR UNIT**

- A. A local control/processor unit with integral touchpad shall be installed at each protected door and/or elevator lobby location and shall receive data from dedicated RFID Wireless receiver/antennae installed in close proximity to the zone of protection. The unit shall automatically lock the protected door/elevator car and trigger an local audible sounder device while simultaneously transmitting a point ID alarm signal to all remote monitoring annunciators panels and HMI touch screen terminals. The control/processor shall be powered from a centralized power supply and shall be equipped with unit shall have standard USB port for updating the unit.
  - 1. The integral touchpad shall be a capacitive touch type keypad with backlit numerals that are only illuminated during use of the keypad or in an alarm condition. The touchpad shall be used to reset alarms and bypass the control/processor unit and reprogramming the control/processor.
  - 2. Three LED indicators shall be located on the control/processor unit. They shall be as follows:
    - a. Red shall indicate power to the system
    - b. Yellow shall indicate that the control/processor has received a signal from the receiver antennae
    - c. Green shall indicate the unit's status is in the bypass mode.

3. The control/processor unit shall have an "anti-tailgate" feature; the bypass interval shall end when the door closes to prevent a monitored person from following through the bypassed exit.
4. The touchpad exit control unit shall communicate to the HMI touch screen terminal via RS-485 communication protocols over standard Category 6 UTP cabling. This communication path shall employ unicast protocols providing supervision of the control/processor, notification of resident transports and remote lock down of doors/elevators.

## **2.5 RFID WIRELESS RECEIVER/ANTENNA UNIT**

- A. Each protected door and/or elevator door measuring up to 8 feet in width shall be equipped with a minimum of (2) receiver antennas one on each side of the protected opening creating a RFID Wireless protection field around the area and capable of responding to a wireless signal out to 8 feet when patient transmitter is detected which shall in turn transmit and signal via a cabled connection to the control/processor.
  1. The receiver/antenna shall be provided with (2) normally closed reed switches and LED which shall pulse when a transmitter is in the quiescent or monitoring mode.
    - a. Integrate the antennae with the PACS I/O board to provide an contact closure when the door's PIR or DPS is activated to assure that alarms are only generated when a transmitter enters the area while a door is open or the sensor is activated
  2. The receiver/antenna shall be multi-frequency capable receiving signals at both the 66 kHz and 262 kHz frequencies. The unit shall be capable of being switched in the field from the 262 kHz to the 66 kHz frequency range.
  3. The receiver/antenna shall be powered locally from the control/processor unit.

## **2.6 RFID WIRELESS PATIENT TRANSMITTER**

- A. Provide one hundred and fifty (150) RFID wireless adult patient transmitters. The wireless transmitters shall be powered by a 3.5 volt replaceable lithium battery with a 2 year battery life and shall operate in both the 262 kHz and 66 kHz frequency ranges which shall be field selectable. The unit shall broadcast a unique three-digit identification number which shall be recognized as the detected transmitter location and shall be broadcasted to all HMI terminals.
  1. The transmitter shall be both water and shock resistant and shall be easily cleaned using a soft-bristle brush with mild disinfectant soap in compliance with most standard disease control protocols.
  2. The transmitter shall be capable of being worn on either the wrist or the ankle and shall have a single use band which is replaceable.
  3. The transmitter unit shall have smooth, rounded edges and no moving parts that could pinch the resident or cause dermal abrasions and shall measure not greater than 2"w x 1.5"h x 5/8"d.

4. The unit shall be attached to the patient using a single-use, disposable, reinforced nylon band, the band material shall not contain any latex or latex products.
5. Provide two wireless transmitter testing stations used to verify proper operation of system transmitters. The transmitter tester shall have a pushbutton when depressed automatically tests the transmitter and shall cause a green led will blink and a tone will sound once per second demonstrating the transmitter is functioning properly. The tester shall rest both 66 kHz and 262 kHz frequencies.

## **2.7 CENTRALIZED DOOR CONTROL/PROCESSOR POWER SUPPLY**

- A. Provide a centralized power supply capable of connecting multiple control/processor units, the unit shall be a class II power supply and UL listed releasing device conforming to NFPA 72 fire-protective signaling service requirements.
  1. The power supply shall have over current protection from both ac input and dc output with fuses: 3.5a, 250v (ac) and 15a, 32v (dc). The input voltage requirements for the power supply shall be: 120v ac, 3 amp max single-phase power with an output voltage of: 15v dc, 9 amps.
    - a. The power supply shall be provided with built-in battery charger and battery back-up capable of supporting all connected control/processor units for a period of 24 hours.
  2. Coordinate with both the physical access control and fire alarm system integrators for the proper wiring configurations and door system functions at all locking mechanisms protected by the pes.
    - a. Upon activation of the building fire alarm system the power supply automatically deactivate all electronically locked doors regardless of the state of alarm of the door processor unit. All doors shall remain deactivated until the reset of the fire alarm.
    - b. In the event that door processor unit engaged the locked at any protected door and the proper access control credential is presented and authorization is granted the physical access control system shall override the engaged locking mechanism.

## **2.8 REMOTE LED ANNUNCIATOR PANEL**

- A. Provide remote zone annunciator panels where indicated on the contract drawings. The remote annunciator panel shall be hardwired to the control/processor unit and shall consist of one green LED lamp and eight red LED zone lamps.
  1. When the green led is illuminated it shall indicate that each connected control/processor unit is powered, when the LED is flashing it shall be an indication that the associated control/processor is on stand-by battery mode. The red LED's shall illuminate to indicate which door unit is in alarm. A space shall be provided to the right of the each red led for a typed description of the door control/processor unit location.



- a. When a monitored Exit Alarm Control Unit is in alarm, loses power, or if the wire from it to the Staff Alert Panel is disconnected, the remote annunciator shall provide an audible and visual alarm indication of trouble.

## **2.9 PATIENT ELOPEMENT MANAGEMENT SOFTWARE**

- A. Provide integrated management software platform installed on the main touch screen HMI terminal located at the main lobby security desk. The management software shall provide the operator the capability to monitor and interact with all system operations through the use of GUI based graphic floor plans of the facility, the HMI touch screen terminal shall display all alarm origins, control/processor status and individual control of all protected door locations.
  1. The management software shall also provide the operator on the graphic maps all information needed to properly assess and respond to situations without the need to manually access information such as resident's name, transmitter number, group/floor and room number as well as space to include pertinent information such as medical condition, dietary information, photograph, etc. A text - box may be selected if the resident is known to be a n elopement risk.
    - a. It shall also include the ability to require users to enter unique, personal passwords in order to perform system actions including: moving residents to ancillary departments, discharging residents from the system, clearing alarms and changing system settings.
    - b. In addition the software shall include the ability to record and archive the history of all active transmitters to the hard drive shall include transmitter identification, alarm status, location and reset information.
  2. The system shall generate an alarm whenever a transmitter signal enters the alarm area of an open door. It shall identify the specific transmitter number and the door location and display of the GUI maps when a transmitter enters the area while a door is open or the sensor is activated. The system shall also have the ability to generate alarms under the following conditions:
    - a. An authorized exit has occurred but the resident has not returned to the facility within a certain time period
    - b. An authorized exit has occurred and a second resident tries to "piggyback" through the protected exit.
  3. Prior to final programming of the access control system coordinate with the VA's project engineer and design professional, all GUI based graphic screens, all alarm functions as well as all operational features for the entire system. The contractor shall provide to the VA's project engineer and design professional a functional demonstration of all system graphics and operational features and functions prior to final programming.

- a. This demonstration shall be performed on site and shall include an operational demonstration of the system for this facility. The functional demonstration shall include but not limited to, all door alarm and control functions, graphic maps, as well as all automatic and manual threat level system responses.
  - 1) Failure to provide the required coordination with the VA's Project Engineer and Design Professional shall require the contractor to provide any and all system modifications and programming changes necessary to meet the requirements of the Governments Agency security procedures.
- B. Provide an HMI terminal and all associated software in conformance with all performance requirements as herein specified and located where indicated on the contract drawings. The HMI shall be an integrated panel PC (all-in-one) with integral Touch Screen and shall be provided in accordance with the all manufacturers recommendations in order to meet all system performance requirements.
  1. The integrated PC\Touch Screen HMI terminals' shall consist of a standalone slim panel computer with integral 22-inch 300 nits high brightness WSXGA LCD touch screen display with a minimum resolution of 1680 x 1050. The integrated panel PC\Touch Screen terminal shall be manufactured by Broadax Systems, Inc (BSI) approved equal. At the minimum integrated panel PC\Touch Screen terminal' shall include the following;
    - a. PC processor: Intel Core Duo/Celeron M processor powered by an Intel GM45+ICH9M core logic chipset with 256 MB sharing graphics memory, (2) x DDR3 SO-DIMM 4 GB of memory and a 2.5" SATA 160GB HDD.
      - 1) Video Processor:
        - a) On-board 32-bit graphics system type processor.
        - b) IBM or equivalent emulation modes - SVGA.
        - c) Capable of High Color (16 bit) with a minimum output resolution of 1680 x 1050 pixels, non-interlaced.
        - d) 256MB Video RAM, minimum.
        - e) The Touch Screen 22" LCD display shall utilize the full graphics resolution and color Capabilities of the graphic video co-processor.
        - f) Run all SVGA compatible software using high definition system fonts in all text modes.
    - b. Sound system: Sound Blaster Audio PCI 128D
    - c. Touch Screen: 22 inch, resistive type, 80% Light transmission and Touch life 35 million touches
    - d. (1) - 24x CD/DVD-RW Drive
    - e. (2) - 10/100/1000Mbps Ethernet Ports
    - f. (2) - RS-232 (COM 2/3) Ports
    - g. (1) - RS-232/422/485 (COM 1) Port
    - h. (4) - USB 2.0 ports
    - i. (1) - VGA Port

- j. Audio: (1) mic in\out
- k. Power: 12 VDC w\ AC\DC Adaptor
- l. Watchdog timer 255 level, 0-255 sec
- m. Mounting: Versa Table Stand
- n. Keyboard: 104+ keyboard
- o. Mouse: MS IntelliMouse w/ mouse pad
- p. Operating System: Microsoft Windows 2007

### **PART 3 - EXECUTION**

#### **3.1 EQUIPMENT PROTECTION**

- A. Comply with all requirements of specification section 28 05 00.
  - 1. Examine all physical and environmental conditions, equipment and bed locations, auxiliary system connectivity requirements impacting the installation of the systems and report any unsatisfactory conditions in writing to the VA's Project Engineer and Design Professional.

#### **3.2 WORK PERFORMANCE**

- A. In addition to all requirements as specified by Specification Section 28 05 00 the video surveillance system shall also be provided in accordance with the following requirements:
  - 1. Prior to the final programming of any systems, the Contractor shall provide a review with the VA's Project Engineer and Design Professional addressing all system features, functions, operations, integrated system responses, graphic maps and related operational programming.
    - a. Failure to provide this review and get final sign-off prior to programming shall result in any costs related to changes requested by the VA's Project Engineer and Design Professional as not being charged to the project.

#### **3.3 EQUIPMENT/CABLE INSTALLATION AND REQUIREMENTS**

- A. All system cabling shall be of the type, size and specifications as required by: the system Manufacturer; the configuration of all installed equipment provided; the system applications, design and cabling shall meet all requirements of UL 1069; as well as all stipulated codes and standards as specified by specification section 28 05 00.
  - 1. The size and type of all system cabling shall be calculated in accordance the Manufacturer's recommendations and system power requirements. Provide at the time of shop drawing submission all cabling requirements, voltage calculations and appropriate design data.

- B. NOTE: When the PES employs an TCP/IP based architecture in addition to all requirements as specified by section 28 05 00 and 27 11 00 the system shall be provided in accordance with the following requirements:

1. All system cabling shall utilize Category-6 UTP cables and installed in accordance with the requirements of all related Division 27 specification sections. All cabling shall not contain any AC carrying conductors or non-associated system cables within the cable raceways\conduits or cable bundles.
  - a. In addition, all structured cabling associated with the installation of the system shall comply with all requirements of EIA/TIA standards for the proper installation, termination and testing of all fiber optic and Category-6 UTP cabling.
  - b. Contractor shall provide all equipment, components, devices, hardware, UPS units, equipment racks\cabinets, patch panels and all appurtenances necessary to provide fully operational systems utilizing a UTP cabling topography. Coordinate all system cabling with the security system integrator prior to shop drawing submission.

#### **3.4 ELECTRICAL POWER DISTRIBUTION**

- A. In addition to all power requirements stipulated in specification section 28 05 00 and as herein specified, all electrical power for remote processors, controllers, servers, power supplies, and ancillary system components shall be obtained from dedicated emergency electrical circuit.
1. All 120-Volt emergency electrical power shall be provided by this Contractor and supplied from the nearest appropriate emergency electrical distribution panel. Electrical power connections shall be hardwired to the panel, system components or panels employing the use of plug-in transformers, extension cords or cheater cords for the connection to electrical power shall not be acceptable.
    - a. If no spare 20A/1P circuits are available for use, the contractor shall provide a new subpanel adjacent to the existing panel. Remove (3) 20A/1P breakers and replace with a 60A/3P breaker to feed the subpanel.
    - b. Subpanel shall be 60A MLO with 18 circuits. Reconnect the (3) 20A/1P circuits to this new panel. Extend branch wiring as required. The Contractor shall size feeder to subpanel per the national electric code.
  2. All system power supplies serving system components or devices on shall be provided with the appropriate transient surge and suppression protection on both the line side as well as the load side. Refer to specification section 28 05 00 for additional requirements.

#### **3.5 TRANSIENT VOLTAGE SUPPRESSION**

- A. Comply with all requirements of specification section 28 05 00.

#### **3.6 GROUNDING AND BONDING**

VA Project No. 642-12-110  
AE Works Project No. 12030

Philadelphia VAMC  
Rekey VA Medical Center  
Bid Documents

- A. Comply with all requirements of specification section 28 05 00.

**3.7 EQUIPMENT IDENTIFICATION**

- A. Comply with all requirements of specification section 28 05 00.

**3.8 MAINTENANCE & SERVICE**

- A. Comply with all requirements of specification section 28 05 00.

**3.9 WARRANTY**

- A. Comply with all requirements of specification section 28 05 00.

**3.10 Field Services**

- A. Testing

1. In addition to all requirements as specified by Division 1 and Specification Section 28 05 00 the patient elopement system shall also comply with the following requirements:

- a. The completed system shall be fully tested in accordance with all requirements as herein specified, Division 1, specification section 28 05 00 and all manufacturers' recommendations. Upon completion of successful testing, the contractor shall so certify in writing to the VA's Project Engineer and Design Professional that all was completed, tested, certified and left in first class operational condition, include all completed certification and test reports.
- b. The service of a competent, factory-trained engineer or technician authorized by the equipment manufacturer shall be provided to technically supervise installation and participate during initial system programming, start-up, final testing, assist in the final acceptance testing and Government user demonstrations.
- c. At the minimum all acceptance testing, demonstrations and training shall include, but not be limited to the following:
  - 1) Control/Processor Units.
  - 2) Local Door Operations
  - 3) Led Annunciator Panels
  - 4) Receiver/Antennas
  - 5) Fire Alarm And PACS Integrations
  - 6) System Supervision And Trouble Enunciations
  - 7) Ups/Battery Back-Up Functions
  - 8) Primary / Emergency Ac Power Requirements
  - 9) All Programming And Operational Functions And Features As Herein Specified.
- d. Demonstrate each system and subsystem. The demonstration shall include, but not be limited to the following:
  - 1) Designate actual location of each component of a system or subsystem and demonstrate its function and its relationship to other components within the system.

- 2) Demonstrate the operation of all HMI operations, GUI based graphics, system functions, and administration set-up, configurations and all system operations, emergency operations and system reboot procedures.
  - 3) Demonstrate all systems and subsystems operations by actual cycling through system features demonstrating how to work controls, how to reset devices, how to replace fuses and emergency operating/operations procedures.
- e. Upon final inspection a factory-trained and certified representative of the equipment manufacturer shall demonstrate to the VA's Project Engineer and Design Professional that all systems function properly in every respect and is in full compliance with the contract documents. This requirement is in addition, to all testing requirements listed in specification section 28 05 00 and all related specification sections.
- 1) Provide a minimum of (4) four 4-hour training classes performed at the project location and spaced over a two week interval. Training classes shall be scheduled not less than 48 hours apart to allow Government Users\Operators to familiarize themselves with all system operations.
  - 2) Include all training manuals, video instructions and hands-on demonstrations in the operation of all system components. Provide to the VA's Project Engineer and Design Professional in advance lesson plans outlying training procedures, course outlines and objectives. Coordinate with the VA's Project Engineer and Design Professional in advance all training dates and schedules.

A. Training

1. Comply with all requirements of specification section 28 05 00.

- - - END - - -

VA Project No. 642-12-110  
AE Works Project No. 12030

Philadelphia VAMC  
Rekey VA Medical Center  
Bid Documents