PROJECT MANUAL

VA Sierra Nevada Health Care System
Reno, Nevada

Install Proximity Card Devices – Pharmacy, OI&T, Boiler Plant

Project 654-18-801

BID DOCUMENTS

July 5, 2017

SECTION 01 00 00
GENERAL REQUIREMENTS

1.1 GENERAL INTENTION

A. Contractor to provide professional construction services to install Physical Access Control System (PACS) proximity card devices throughout the VA Reno facility located at 975 Kirman Avenue. The installation will include conduit rough-in for the doors, power and signal cabling, access control devices including card readers, door contacts, request-to-exit detectors, electric door strikes, etc.

B. Visits to the site by Bidders may be made only by appointment with the Contracting Officer.

C. 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.

D. Prior to commencing work, general contractor shall provide proof that a OSHA certified “competent person” (CP) (29 CFR 1926.20(b)(2) will maintain a presence at the work site whenever the general or subcontractors are present.

E. Training:

1. All employees of general contractor or subcontractors shall have the (10-hour and 30-hour where applicable by position) OSHA certified Construction Safety course and /or other relevant competency training, as determined by VA CP with input from the ICRA team.

2. Submit training records of all such employees for approval before the start of work.

F. Facility Specific Requirements:

1. Contractor shall set in place and maintain a confined space program for all applicable work as outlined in this section.

a. Confined Space

Permit Required Confined Space. Permit form is required. Among other requirements, a person stationed at the entry point is required. Formal training for workers and entry person is required.

Locations:

Permit-required confined space:

Tunnel	Mech Room / Boiler Plant
Tunnel	CLC under flag pole to Bldg 1D
Bldg 1 Crawl Space	begins at half-height door at each end
Bldg 12 Crawl Space	Includes basement access BC100
Bldg 1-1 Clinical Lab	Access to HVAC/Plumbing
Utility Chase	Boiler Plant routes under Kirman to east end of Bldg 1 Center Wing
Heat Aerator	Bldg 8 Boiler Plant

Condensate Tank in pit	Bldg 8 Boiler Plant
Boiler Mud Drums (3ea)	Bldg 8 Boiler Plant
Boiler Steam Drums(3ea)	Bldg 8 Boiler Plant
Boiler Fire boxes (3ea)	Bldg 8 Boiler Plant
Electrical Vaults	Adjacent to Bldgs 1D & 12, Courtyard
Sewers/Storms Drains	Facility Grounds
Communication Vaults	Facility Grounds

Non-permit confined space:

This category does not apply to contractors – even for investigative purposes they must treat the area as permit required and implement their confined space program accordingly. Exception: If a VA employee escorts the contractor and remains with them 100% of the investigative time then the permit will not be required. In general, we should not plan on being their escort except for very short durations.

Permit-required confined space:

Every space identified in the list above is to be treated as permit- required.

Implement an approved confined space program.

Contractor must submit for approval their confined space program.

2. Rules for the Contractor is set-up as a facility specific guide for the contractor.

a. Rules of the Facility for Construction Contractors

VA Sierra Nevada Health Care System is a multi-faceted health care facility tasked with providing health care to the men and women who have served in the armed forces of the United States of America in order to provide for the defense of this county. At all times while working within the facility grounds all contractor’s employees must follow the below listed rules of the facility and treat all patients who they may come in contact with utmost respect and dignity. Any contractor employee who mistreats a veteran or violates any of the rules listed below will be removed from the facility.

1. **All patient information is private and cannot be disclosed to others**.

   - If a contractor employee sees a friend, neighbor or other acquaintance receiving health care at the facility they are not to discuss who they saw at the facility with anyone regardless of the circumstances.

   - Any information overheard or seen regarding a patient’s medical condition is likewise not to be shared with anyone regardless of the circumstances.

2. **Safety is a top priority for the facility**.

   - Contractor must present evidence that each on-site employee has completed the 10 hour OSHA safety training course and

evidence that each supervisor has completed the 30 hour OSHA safety training course for supervisors.

- Contractor employees shall at all times wear proper safety attire for the work being accomplished. Further, all contractor equipment and work areas shall be observed at all times. Unattended ladders, doors to electrical closets or mechanical rooms being left open, access panels or manholes covers being moved and not protected are serious safety violations and could result in the dismissal of the responsible employee and a stand-down for the prime and all subs. The General or Controlling Contractor is responsible for site safety, and the employer is responsible for the performance of the tasks of his/her employees. Note that the extent of the measures that a controlling employer must take to satisfy its duty to exercise reasonable care to prevent and detect violations is less than what is required of an employer with respect to protecting its own employees.

3. **Electrical: De-energized Panels and Lockout/Tagout**

- All contracting firms have sole responsibility for the systems given that they install and maintain. If contractors work on energy producing systems that are normally serviced by FMS personnel, or need to control the energy to the systems for which they have responsibility, then the **lockout/tagout operations** will be performed by the contractor and overseen by the primary COTR who validates that the contractors have applied their lockouts/tagouts in the appropriate locations.

- Likewise, work on **electrical panels can only occur if the panel is de-energized**. Likewise, all utility systems are to be shut-down and certified as being off line prior to the contractor tapping into the system.

4. **Infection control is a top priority for the facility.** No work will be allowed to occur anywhere within the facility until an Infection Control Risk Assessment (ICRA) form has been filled out and all required work activities properly required by the completed ICRA have been implemented including, but not limited to construction of dust barriers and **installation of HEPA filters. The hospital side of job access points must be kept pristine; use of sticky mats and** continual sweeping/mopping and other appropriate measures to keep facility areas clean are to be provided by the contractor as needed

5. **Contractor employee parking**. No contractor is permitted to park on hospital property with either their personal or business vehicle – use the streets. Contractor's employees' vehicles found parking on campus are subject to being ticketed (with fine) by VA Police with notification to the CEO of the prime.

6. **Contractor discussions regarding project details or related impact** are **NOT** to occur with anyone at the VA without the

permission or presence of the COTR or other authorized representative from FMS.

7. **Contractor employee use of facility toilets and restrooms**. Unless otherwise specified in the contract drawings and/or specifications no contractor employees are to use facility toilets or restrooms.

8. **Facility work hours.** The facility is an operating health care center and as such activities occur on a 24-7 basis. However, the majority or services provided by the facility occur between the hours of 7a and 5p, Monday through Friday. The contractor is to schedule all work activities as necessary to minimize the impact of the construction activities on the day-to-day operations of the facility. Unless otherwise arranged, contractor work hours are limited to 7:30a to 4p.

9. **Utility shutdown**. No utility shutdowns will be allowed without proper prior coordination with the medical center. Minor utility shutdowns (those which in no way impact patient care activities) are to be scheduled no less than 72 hours in advance of the planned shutdown. Major utility shutdowns (those which do impact patient care activities) are to be formally requested no less than 21 days in advance of the requested shutdown.

10. **Contractor's staging area.** There is limited space available for the contractor to use as a staging location. Unless otherwise noted in the contract drawings or specifications, all staging of equipment and materials is to occur within the boundaries of the limits of construction as shown on the contract documents. Coordination for street use for dumpsters and storage is between the contractor and the City of Reno.

11. **Fire alarm or fire sprinkler work and/or tie-ins.** No removal, relocation, disconnection, disabling or connection to the existing facility fire alarm or fire sprinkler systems are to occur until the contractor has obtained the approval of the facility safety manager. It is recommended that wire guards be installed over sprinkler heads within construction boundaries. The contractor is responsible for paying the cost of any fire department response when said the response is due to negligence by the contractor.

12. **Hot work.** No hot work is to occur until the contractor has received an approved hot work permit from the facility safety manager via the COR.

13. **Firearms, knifes, etc.** This facility is located on federal property. In accordance with federal law, no person, unless authorized to do so (Federal police and government agents only at this facility) are allowed to carry firearms or knifes on property grounds.

14. **Alcohol.** This facility is located on federal property. Therefore, the possession, sale of or use of alcohol on the grounds is strictly prohibited.

15. **Smoking.** Smoking is not allowed anywhere in the facility inside buildings and only in selected areas outside buildings as defined by marks on the pavement.

16. **Fire Egress.** As a functioning medical facility, it is imperative that, in the event of a disaster which requires evacuation, the evacuation routes are available to patients and staff. Blocking of stairwells, corridors, exit doors and other means of evacuation are strictly prohibited unless approved by the Facility Safety Manager as evidenced by his signature on a posted Interim Life Safety Measure (ISLM) document.

17. **Handicap Accessibility.** As a functioning medical facility, it is imperative that all handicap access areas, including ramps, sidewalks, handrails, etc. remain unobstructed at all times unless approved by the Facility Safety Manager as evidenced by his signature on a posted Interim Life Safety Measure (ISLM) document.

18. **Debris removal.** All debris to be removed from a construction site off site for disposal is to be properly covered whenever it exits a construction area and enters an area occupied by the facility. Tossing of debris materials out of windows or off roof areas without proper use of a trash chute is strictly prohibited.

19. **Use of electronic equipment**. As a medical facility, there is a large amount of electronic equipment that is used by the facility to track patient condition. Hand held electronic equipment such as cell phones, walkie-talkies, radios, Ipods, has the potential to impact the signals provided by the medical equipment thereby impacting patient care. Therefore, no hand held electronic equipment is to be used by any contractor employee in the vicinity of areas where health care is provided.

20. **Badges.** Identification badges are provided for use of all contractor employees. These badges are to be worn by the employee at all times they are on facility grounds. Any contractor employee who is either not wearing or cannot, upon questioning, produce their badge is subject to be removed from the facility. A background check is performed for any employee who will be on-site more than seven days.

21. **Project Submittals on Site.** At all times when work is in progress the contractor is to have a set of approved submittals on site for verification that the specified and approved items are being installed. These are to be made available at any time per request of the Contracting Officer or the project COR.

22. **Confined Space.** Several areas within hospital grounds are considered Confined Spaces and some of those require Permit.

You must have submitted and received COR approval of a contractor implemented Confined Space program prior to any access of these areas.

23. Keys. No VA key will be provided to a contractor. Access must either be via VA employee or through a contractor locking system. (Reminder: **DO NOT** prop open a door or tape the strike, etc to get around the proper key use – such action may result in employee removal and contractor safety stand down.) The contractor must provide the COTR five spare keys to any contractor implemented locking system.

24. COR Notification. No contractor is permitted to perform on-site contract work without COTR knowledge.

3. It is the responsibility of the contractor to obtain a permit from the Washoe County Health District, Air Quality Management Division (1001 E. 9th Street, Building A, Suite 115A, Reno, NV 89512) (775) 784-7200 prior to commencement of renovation/demolition activities. The Air Quality Management Division requires an asbestos survey to be conducted by a U.S. EPA AHERA certified person before any potential asbestos containing materials are disturbed. The survey must be completed to the satisfaction of the Control Officer or additional samples may be required. A complete, signed copy of an asbestos survey report must be filed at the Washoe County District Health Department and an "Asbestos Assessment Acknowledgment Form" obtained before any permit for demolition or renovation, as noted above, is issued.” The permit issued by the District must be provided to the government to begin work.

4. Weekly COR Construction Site Safety Inspection is to ensure the contractor is complying with safety and infectious controls. Complete the form below for each inspection.

VA Sierra Nevada Health Care System
Reno, Nevada

WEEKLY SAFETY INSPECTION CHECKLIST

FOR CONSTRUCTION/RENOVATION SITES

Project: _____ Location: _____

Date: _____ COR/Inspector: _____

	Hazard Exists (*Mark X*) Yes	No	Comments
1. Have the construction workers been informed and trained regarding facility ID badges and smoking ?	☐	☐	_____
2. Is appropriate signage installed and followed?	☐	☐	_____
3. Are hazardous materials properly identified and Material Safety Data Sheets (MSDS) accessible?	☐	☐	_____
4. Is material storage satisfactory?	☐	☐	_____
5. Is means of egress clear in construction area?	☐	☐	_____
6. Is the integrity of the fire detection/sprinkler system being maintained?	☐	☐	_____
7. Are flammables stored in approved containers and properly secured?	☐	☐	_____
8. Is hot work authorization permit on site?	☐	☐	_____
9. Is there a fire watch during hot work?	☐	☐	_____
10. Are the construction workers wearing adequate personal protective equipment?	☐	☐	_____
11. Is proper ventilation installed (negative pressure)?	☐	☐	_____

12. Is construction site closed to public thoroughfare?	☐	☐	_____
13. Are construction partitions and fire/smoke barrier penetrations being maintained?	☐	☐	_____
14. Are good housekeeping practices being used in construction area and flammable/ combustible loads being kept at a minimum?	☐	☐	_____
15. Are scaffold handrails installed?	☐	☐	_____
16. Are all points of operation machinery guarded and utilized properly?	☐	☐	_____
17. Are fire extinguishers available and checked?	☐	☐	_____
18. Is electrical ground on equipment intact?	☐	☐	_____
19. Is there evidence of smoking or eating on site?	☐	☐	_____
20. Do the construction workers know the location of medical services, emergency room (ER)?	☐	☐	_____
21. Is the lockout/tag out program in place?	☐	☐	_____

ADDITIONAL NOTES FROM INSPECTION

1.2 STATEMENT OF BID ITEM(S)

A. Work includes general construction, mechanical and electrical work, necessary for installation of multiple card reader devices and access panels throughout the medical facility.

1.3 SPECIFICATIONS AND DRAWINGS FOR CONTRACTOR

A. Additional sets of drawings and specifications may be made by the Contractor, at Contractor's expense.

1.4 CONSTRUCTION SECURITY REQUIREMENTS

A. Security Plan:

1. The security plan defines both physical and administrative security procedures that will remain effective for the entire duration of the project.

2. The General Contractor is responsible for assuring that all sub-contractors working on the project and their employees also comply with these regulations.

B. Security Procedures:

1. 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.

2. For working outside the “regular hours” as defined in the contract, The General Contractor shall give 7 days notice to the Contracting Officer Representative (COR) so that VA Police can be notified that construction personnel will be on site after hours. This notice is separate from any notices required for utility shutdown described later in this section.

3. No photography of VA premises is allowed without written permission of the Contracting Officer.

4. 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 Contracting Officer.

C. Key Control:

1. The General Contractor shall provide duplicate keys and lock combinations to the COR for the purpose of security inspections of every area of project including parked machines to take any emergency action.

D. Document Control:

1. Before starting any work, the General Contractor/Sub Contractors shall submit an electronic security memorandum describing the approach to following goals and maintaining confidentiality of “sensitive information”.

2. The General Contractor is responsible for safekeeping of all drawings, project manual and other project information. This

information shall be shared only with those with a specific need to accomplish the project.

3. All paper waste or electronic media such as CD's and diskettes shall be shredded and destroyed in a manner acceptable to the VA.

4. Notify Contracting Officer and Site Security Officer immediately when there is a loss or compromise of "sensitive information".

E. Motor Vehicle Restrictions

1. Vehicles are not authorized to park on VA property at any time. Access shall be restricted to picking up and dropping off materials and supplies.

1.5 FIRE SAFETY

A. Applicable Publications: Publications listed below form part of this Article to extent referenced. Publications are referenced in text by basic designations only.

1. American Society for Testing and Materials (ASTM):

E84-2009.....Surface Burning Characteristics of Building Materials

2. National Fire Protection Association (NFPA):

10-2010.....Standard for Portable Fire Extinguishers

30-2008.....Flammable and Combustible Liquids Code

51B-2009.....Standard for Fire Prevention During Welding, Cutting and Other Hot Work

70-2011.....National Electrical Code

241-2009.....Standard for Safeguarding Construction, Alteration, and Demolition Operations

3. Occupational Safety and Health Administration (OSHA):

29 CFR 1926.....Safety and Health Regulations for Construction

B. 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 COR and Facility Safety Manager 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 Resident Engineer that individuals have undergone contractor's safety briefing.

C. 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.

D. Means of Egress: Do not block exiting for occupied buildings, including paths from exits to roads. Minimize disruptions and coordinate with COR and facility Safety Manager.

E. Egress Routes for Construction Workers: Maintain free and unobstructed egress. Inspect daily. Report findings and corrective actions weekly to COR and facility Safety Manager.

F. Fire Extinguishers: Provide and maintain extinguishers in construction areas and temporary storage areas in accordance with 29 CFR 1926, NFPA 241 and NFPA 10.

G. Flammable and Combustible Liquids: Store, dispense and use liquids in accordance with 29 CFR 1926, NFPA 241 and NFPA 30.

H. 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 COR and facility Safety Manager.

I. Smoke Detectors: Prevent accidental operation. Remove temporary covers at end of work operations each day. Coordinate with COR and facility Safety Manager.

J. Hot Work: Perform and safeguard hot work operations in accordance with NFPA 241 and NFPA 51B. Coordinate with COR. Obtain permits from facility Safety Manager at least 72 hours in advance.

K. Fire Hazard Prevention and Safety Inspections: Inspect entire construction areas weekly. Coordinate with, and report findings and corrective actions weekly to COR and facility Safety Manager.

L. Smoking: Smoking is prohibited in and adjacent to construction areas inside existing buildings and additions under construction. In separate and detached buildings under construction, smoking is prohibited except in designated smoking rest areas.

M. Dispose of waste and debris in accordance with NFPA 241. Remove from buildings daily.

N. Perform other construction, alteration and demolition operations in accordance with 29 CFR 1926.

1.6 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 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. Working space and space available for storing materials shall be determined by the COR.

C. Workmen are subject to rules of Medical Center applicable to their conduct.

D. 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. 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 five work days. Provide unobstructed access to Medical Center areas required to remain in operation.

E. Phasing: To insure such executions, Contractor shall furnish the COR with a schedule of approximate 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 Resident Engineer two weeks in advance of the proposed date of starting work in each specific area of site, building or portion thereof. Arrange such dates to insure accomplishment of this work in successive phases mutually agreeable to COR and Contractor, as follows:

F. 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 Resident Engineer.

1. 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 COR. 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. Refer to specification Sections 26 05 11, REQUIREMENTS FOR ELECTRICAL INSTALLATIONS, 27 05 11 REQUIREMENTS FOR COMMUNICATIONS INSTALLATIONS and 28 05 11, REQUIREMENTS FOR ELECTRONIC SAFETY AND SECURITY INSTALLATIONS for additional requirements.

2. Contractor shall submit a request to interrupt any such services to COR, in writing, 72 hours in advance of proposed interruption. Request shall state reason, date, exact time of, and approximate duration of such interruption.

3. 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 may occur at other than Contractor's normal working hours.

4. Major interruptions of any system must be requested, in writing, at least 21 calendar days prior to the desired time and shall be performed as directed by the COR.

G. Abandoned Lines: All service lines such as wires, cables, conduits, ducts, pipes and the like, and their hangers or supports, which are to be removed shall be remove in their entirety.

H. To minimize interference of construction activities with flow of Medical Center traffic, comply with the following:

1. 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.

I. Coordinate the work for this contract with other construction operations as directed by COR. This includes the scheduling of traffic and the use of roadways, as specified in Article, USE OF ROADWAYS.

1.7 ALTERATIONS

A. Survey: Before any work is started, the Contractor shall make a thorough survey with the COR of areas of buildings in which alterations occur and areas which are anticipated routes of access, and furnish a report to the Contracting Officer.

1. Existing condition and types of resilient flooring, doors, windows, walls and other surfaces not required to be altered throughout building.

2. 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 COR.

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 COR, 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. Protection: Provide the following protective measures:

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.

1.8 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 as specified here. Prior to start of work, prepare a plan detailing project-specific dust protection measures, including periodic status reports, and submit to COR and Facility ICRA team for review for compliance with contract requirements in accordance with Section 01 33 23, SHOP DRAWINGS, PRODUCT DATA AND SAMPLES.

C. Medical center Infection Control personnel shall monitor for airborne disease (e.g. aspergillosis) as appropriate during construction. A baseline of conditions may 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. The RE 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.

2. 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 Resident Engineer. Blank off ducts and diffusers to prevent circulation of dust into occupied areas during construction.

2. Do not perform dust producing tasks within occupied areas without the approval of the Resident Engineer. 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 two hour fire-rated temporary drywall construction barriers to completely separate construction from the operational areas of the hospital in order to contain dirt debris and dust. 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. 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, and

an agreement is reached with the Resident Engineer 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. Insure continuous negative air pressures occurring within the work area. HEPA filters should have ASHRAE 85 or other prefilter 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 Resident Engineer and the Medical Center. When, approved, debris shall be hauled in enclosed dust proof containers or wrapped in plastic and sealed with duct tape. 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.

f. 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.

g. 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.

h. 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.

3. All new air ducts shall be cleaned prior to final inspection.

1.9 DISPOSAL AND RETENTION

A. Materials and equipment accruing from work removed and from demolition of buildings or structures, or parts thereof, shall be disposed of as follows:

1. Reserved items which are to remain property of the Government are noted on drawings or in specifications as items to be stored. Items that remain property of the Government shall be removed or dislodged from present locations in such a manner as to prevent damage which would be detrimental to re-installation and reuse. Store such items were directed by COR.

2. Items not reserved shall become property of the Contractor and be removed by Contractor from Medical Center.

3. Items of portable equipment and furnishings located in rooms and spaces in which work is to be done under this contract shall remain the property of the Government. When rooms and spaces are vacated by the Department of Veterans Affairs during the alteration period, such items which are NOT required by drawings and specifications to be either relocated or reused will be removed by the Government in advance of work to avoid interfering with Contractor's operation.

1.10 PROTECTION OF EXISTING VEGETATION, STRUCTURES, EQUIPMENT, UTILITIES, AND IMPROVEMENTS

A. The Contractor shall protect from damage all existing improvements and utilities at or near the work site and on adjacent property of a third party, the locations of which are made known to or should be known by the Contractor. The Contractor shall repair any damage to those facilities, including those that are the property of a third party, resulting from failure to comply with the requirements of this contract or failure to exercise reasonable care in performing the work. If the Contractor fails or refuses to repair the damage promptly, the Contracting Officer may have the necessary work performed and charge the cost to the Contractor.

(FAR 52.236-9)

B. Refer to Section 01 57 19, TEMPORARY ENVIRONMENTAL CONTROLS, for additional requirements on protecting vegetation, soils and the environment. Refer to Articles, "Alterations", "Restoration", and "Operations and Storage Areas" for additional instructions concerning repair of damage to structures and site improvements.

1.11 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 COR. Existing work to be altered or extended and that is found to be

defective in any way, shall be reported to the Resident Engineer 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.

D. Expense of repairs to such utilities and systems not shown on drawings or locations of which are unknown will be covered by adjustment to contract time and price in accordance with clause entitled "CHANGES" (FAR 52.243-4 and VAAR 852.236-88) and "DIFFERING SITE CONDITIONS" (FAR 52.236-2).

1.12 PHYSICAL DATA

A. Data and information furnished or referred to below is for the Contractor's information. The Government shall not be responsible for any interpretation of or conclusion drawn from the data or information by the Contractor.

B. Government does not guarantee that other materials will not be encountered nor that proportions, conditions or character of several materials will not vary from those indicated by explorations. Bidders are expected to examine site of work and logs of borings; and, after investigation, decide for themselves character of materials and make their bids accordingly. Upon proper application to Department of Veterans Affairs, bidders will be permitted to make subsurface explorations of their own at site.

1.13 AS-BUILT DRAWINGS

A. The contractor shall maintain one set 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 Resident Engineer's review, as often as requested.

C. Contractor shall deliver one approved completed sets of as-built drawings to the COR within 15 calendar days after the acceptance of the project by the Resident Engineer.

D. Paragraphs A, B, & C shall also apply to all shop drawings.

1.14 USE OF INSTALLED MECHANICAL AND ELECTRICAL EQUIPMENT

A. Use of new installed mechanical and electrical equipment to provide heat, ventilation, plumbing, light and power will be permitted subject to compliance with the following provisions:

1. Permission to use each unit or system must be given by COR. If the equipment is not installed and maintained in accordance with the following provisions, the COR will withdraw permission for use of the equipment.

2. Electrical installations used by the equipment shall be completed in accordance with the drawings and specifications to prevent damage to the equipment and the electrical systems, i.e. transformers, relays, circuit breakers, fuses, conductors, motor controllers and their overload elements shall be properly sized, coordinated and adjusted. Voltage supplied to each item of equipment shall be verified to be correct and it shall be determined that motors are not overloaded. The electrical equipment shall be thoroughly cleaned before using it and again immediately before final inspection including vacuum cleaning and wiping clean interior and exterior surfaces.

B. Prior to final inspection, the equipment or parts used which show wear and tear beyond normal, shall be replaced with identical replacements, at no additional cost to the Government.

C. This paragraph shall not reduce the requirements of the mechanical and electrical specifications sections.

1.15 AVAILABILITY OF UTILITIES

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.

1.16 NEW TELEPHONE EQUIPMENT

The contractor shall coordinate with the work of installation of telephone equipment by others. This work shall be completed before the system is turned over to VA.

1.17 TESTS

A. Pre-test 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 required in various sections of specifications in presence of an authorized representative of the Contracting Officer. Contractor shall furnish all labor, materials, equipment, instruments, and forms, to conduct and record such tests.

C. All related components as defined above shall be functioning when any system component is tested. Tests shall be completed within a reasonably short period of time during which operating and environmental conditions remain reasonably constant.

D. Individual test result of any component, where required, will only be accepted when submitted with the test results of related components and of the entire system.

1.18 INSTRUCTIONS

A. Contractor shall furnish Maintenance and Operating manuals and verbal instructions when required by the various sections of the specifications and as hereinafter specified.

B. Manuals: Maintenance and operating manuals (four copies each) for each separate piece of equipment shall be delivered to the COR coincidental with the delivery of the equipment to the job site. 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. 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. 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. 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.

C. Instructions: Contractor shall provide qualified, factory trained manufacturers' representatives to give detailed instructions to assigned Department of Veterans Affairs personnel in the operation and complete maintenance for each piece of equipment. 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. 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. All instruction periods shall be at such times as scheduled by the Resident Engineer and shall be considered concluded only when the Resident Engineer is satisfied in regard to complete and thorough coverage. The Department of Veterans Affairs reserves the right to request the removal of, and substitution for, any instructor who, in the opinion of the Resident Engineer, does not demonstrate sufficient qualifications in accordance with requirements for instructors above.

1.19 PHOTOGRAPHIC DOCUMENTATION

A. Coordinate with the COR for all contractual photos. Contractual photos are described below.

B. Video may not be substituted for the contractual photos.

C. Contractual photos include:

1. Pre-construction photos. Before construction, a set of photos shall be taken of the project associated exterior and interior features. Ensure any discrepancies in the existing conditions are noted. Any

discrepancies not noted will be initially considered as contractor caused.

2. Weekly Construction Progress photos. Once work has started, up to Final Inspection, photos are to be taken weekly documenting construction progress (or lack thereof) for that week. Especially critical are photos documenting all utility runs/fixtures prior to installation of any building feature covering those locations.

D. Photos shall be submitted not later than two weeks following the date of the photograph.

E. Photos shall be submitted to the VA in digital form (JPG) in the highest resolution which results in a file size of less than 4MB. Photos shall be submitted on CD or a FTP site created by the contractor (and accessible by the VA). A CD/DVD containing all the contractual photos shall be submitted within one week of Final Inspection.

F. File Name. The filename shall be formatted as follows: date, title. The date shall be first to allow sorting by date, the date shall be formatted as yyyymmdd to indicate the date the photograph was taken. The title shall describe the location and purpose. Ex: 140603 Room C2345 east wall utilities.

1.20 HISTORIC PRESERVATION

A. Where the Contractor or any of the Contractor's employees, prior to, or during the construction work, are advised of or discover any possible archeological, historical and/or cultural resources, the Contractor shall immediately notify the Resident Engineer verbally, and then with a written follow up.

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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 (COTR).

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 COTR, 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 COTR 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 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 an electronic file in the previously approved CPM schedule program. The submittal shall also include 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.

D. 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.

E. 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.

F. The Complete Project Schedule shall contain a sufficient number of work activities/events to specify work tasks to the lowest level necessary.

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 COTR 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 COTR. 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 COTR’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 COTR 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 COTR 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 resident 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 resident 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 resident 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 COTR 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.

D. 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.

E. 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 COTR 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.

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SECTION 01 33 23
SHOP DRAWINGS, PRODUCT DATA, AND SAMPLES

1-1. Refer to Articles titled SPECIFICATIONS AND DRAWINGS FOR CONSTRUCTION (FAR 52.236-21) and, SPECIAL NOTES (VAAR 852.236-91), in GENERAL CONDITIONS.

1-2. For the purposes of this contract, samples test reports, certificates, and manufacturers' literature and data shall also be subject to the previously referenced requirements. The following text refers to all items collectively as SUBMITTALS.

1-3. Submit for approval, all of the items specifically mentioned under the separate sections of the specification, with information sufficient to evidence full compliance with contract requirements. Materials, fabricated articles and the like to be installed in permanent work shall equal those of approved submittals. After an item has been approved, no change in brand or make will be permitted unless:

A. Satisfactory written evidence is presented to, and approved by Contracting Officer, that manufacturer cannot make scheduled delivery of approved item or;

B. Item delivered has been rejected and substitution of a suitable item is an urgent necessity or;

C. Other conditions become apparent which indicates approval of such substitute item to be in best interest of the Government.

1-4. Forward submittals in sufficient time to permit proper consideration and approval action by Government. Time submission to assure adequate lead time for procurement of contract - required items. Delays attributable to untimely and rejected submittals will not serve as a basis for extending contract time for completion.

1-5. Submittals will be reviewed for compliance with contract requirements by Architect-Engineer, and action thereon will be taken by Resident Engineer on behalf of the Contracting Officer.

1-6. Upon receipt of submittals, Architect-Engineer will assign a file number thereto. Contractor, in any subsequent correspondence, shall refer to this file and identification number to expedite replies relative to previously approved or disapproved submittals.

1-7. The Government reserves the right to require additional submittals, whether or not particularly mentioned in this contract. If additional submittals beyond those required by the contract are furnished pursuant to request therefor by Contracting Officer, adjustment in contract price and time will be made in accordance with Articles titled CHANGES (FAR 52.243-4) and CHANGES - SUPPLEMENT (VAAR 852.236-88) of the GENERAL CONDITIONS.

1-8. Schedules called for in specifications and shown on shop drawings shall be submitted for use and information of Department of Veterans Affairs and Architect-Engineer. However, the Contractor shall assume responsibility for coordinating and verifying schedules. The Contracting Officer and Architect- Engineer assumes no responsibility for checking schedules or layout drawings for exact sizes, exact numbers and detailed positioning of items.

1-9. Submittals must be submitted by Contractor only and shipped prepaid. Contracting Officer assumes no responsibility for checking quantities or exact numbers included in such submittals.

A. Submit samples in single units unless otherwise specified. Submit shop drawings, schedules, manufacturers' literature and data, and certificates in quadruplicate, except where a greater number is specified.

B. Submittals will receive consideration only when covered by a transmittal letter signed by Contractor. Letter shall be sent via first class mail and shall contain the list of items, name of Medical Center, name of Contractor, contract number, applicable specification paragraph numbers, applicable drawing numbers (and other information required for exact identification of location for each item), manufacturer and brand, ASTM or Federal Specification Number (if any) and such additional information as may be required by specifications for particular item being furnished. In addition, catalogs shall be marked to indicate specific items submitted for approval.

1. A copy of letter must be enclosed with items, and any items received without identification letter will be considered "unclaimed goods" and held for a limited time only.
2. Each sample, certificate, manufacturers' literature and data shall be labeled to indicate the name and location of the Medical Center Cemetery, name of Contractor, manufacturer, brand, contract number

and ASTM or Federal Specification Number as applicable and location(s) on project.

3. Required certificates shall be signed by an authorized representative of manufacturer or supplier of material, and by Contractor.

D. If submittal samples have been disapproved, resubmit new samples as soon as possible after notification of disapproval. Such new samples shall be marked "Resubmitted Sample" in addition to containing other previously specified information required on label and in transmittal letter.

E. Approved samples will be kept on file by the Resident Engineer at the site until completion of contract, at which time such samples will be delivered to Contractor as Contractor's property. Where noted in technical sections of specifications, approved samples in good condition may be used in their proper locations in contract work. At completion of contract, samples that are not approved will be returned to Contractor only upon request and at Contractor's expense. Such request should be made prior to completion of the contract. Disapproved samples that are not requested for return by Contractor will be discarded after completion of contract.

F. Submittal drawings (shop, erection or setting drawings) and schedules, required for work of various trades, shall be checked before submission by technically qualified employees of Contractor for accuracy, completeness and compliance with contract requirements. These drawings and schedules shall be stamped and signed by Contractor certifying to such check.

1. For each drawing required, submit one legible photographic paper or vellum reproducible.
2. Reproducible shall be full size.
3. Each drawing shall have marked thereon, proper descriptive title, including Medical Center location, project number, manufacturer's number, reference to contract drawing number, detail Section Number, and Specification Section Number.
4. A space 120 mm by 125 mm (4-3/4 by 5 inches) shall be reserved on each drawing to accommodate approval or disapproval stamp.
5. Submit drawings, ROLLED WITHIN A MAILING TUBE, fully protected for shipment.

6. One reproducible print of approved or disapproved shop drawings will be forwarded to Contractor.
7. When work is directly related and involves more than one trade, shop drawings shall be submitted to Architect-Engineer under one cover.

1-10. Samples, shop drawings, test reports, certificates and manufacturers' literature and data, shall be submitted for approval to the COR.

- - - E N D - - -

SECTION 01 35 26
SAFETY REQUIREMENTS

1.1 APPLICABLE PUBLICATIONS:

A. Latest publications listed below form part of this Article to extent referenced. Publications are referenced in text by basic designations only.

B. American Society of Safety Engineers (ASSE):

A10.1-2011.....Pre-Project & Pre-Task Safety and Health Planning

A10.34-2012.....Protection of the Public on or Adjacent to Construction Sites

A10.38-2013.....Basic Elements of an Employer’s Program to Provide a Safe and Healthful Work Environment American National Standard Construction and Demolition Operations

C. American Society for Testing and Materials (ASTM):

E84-2013.....Surface Burning Characteristics of Building Materials

D. The Facilities Guidelines Institute (FGI):

FGI Guidelines-2010Guidelines for Design and Construction of Healthcare Facilities

E. National Fire Protection Association (NFPA):

10-2013.....Standard for Portable Fire Extinguishers

30-2012.....Flammable and Combustible Liquids Code

51B-2014.....Standard for Fire Prevention During Welding, Cutting and Other Hot Work

70-2014.....National Electrical Code

70B-2013.....Recommended Practice for Electrical Equipment Maintenance

70E-2012 .....Standard for Electrical Safety in the Workplace

99-2012.....Health Care Facilities Code

241-2013.....Standard for Safeguarding Construction, Alteration, and Demolition Operations

F. The Joint Commission (TJC)

TJC Manual .....Comprehensive Accreditation and Certification Manual

G. U.S. Nuclear Regulatory Commission

10 CFR 20 .....Standards for Protection Against Radiation

H. U.S. Occupational Safety and Health Administration (OSHA):

29 CFR 1904 .....Reporting and Recording Injuries & Illnesses

29 CFR 1910 .....Safety and Health Regulations for General Industry

29 CFR 1926 .....Safety and Health Regulations for Construction Industry

CPL 2-0.124.....Multi-Employer Citation Policy

I. VHA Directive 2005-007

1.2 DEFINITIONS:

A. OSHA “Competent Person” (CP). One who is capable of identifying existing and predictable hazards in the surroundings and working conditions which are unsanitary, hazardous or dangerous to employees, and who has the authorization to take prompt corrective measures to eliminate them (see 29 CFR 1926.32(f)).

B. "Qualified Person" means one who, by possession of a recognized degree, certificate, or professional standing, or who by extensive knowledge, training and experience, has successfully demonstrated his ability to solve or resolve problems relating to the subject matter, the work, or the project.

C. High Visibility Accident. Any mishap which may generate publicity or high visibility.

D. 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.

E. Recordable Injuries or Illnesses. Any work-related injury or illness that results in:

1. Death, regardless of the time between the injury and death, or the length of the illness;

2. Days away from work (any time lost after day of injury/illness onset);

3. Restricted work;

4. Transfer to another job;

5. Medical treatment beyond first aid;

6. Loss of consciousness; or

7. 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.

1.3 REGULATORY REQUIREMENTS:

A. In addition to the detailed requirements included in the provisions of this contract, comply with 29 CFR 1926, comply with 29 CFR 1910 as incorporated by reference within 29 CFR 1926, comply with ASSE A10.34, and all applicable federal, state, and local laws, ordinances, criteria, rules and regulations. Submit matters of interpretation of standards 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 except with specific approval and acceptance by the Project Manager and Facility Safety Officer or Contracting Officer Representative or Government Designated Authority.

1.4 ACCIDENT PREVENTION PLAN (APP):

A. The APP (aka Construction Safety & Health Plan) 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 ensure it is site-specific. The Government considers the Prime Contractor to be the "controlling authority" for all worksite safety and health of each subcontractor(s). 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.

B. The APP shall be prepared as follows:

1. Written in English by a qualified person who is employed by the Prime Contractor articulating the specific work and hazards pertaining to the contract (model language can be found in ASSE A10.33). Specifically articulating the safety requirements found within these VA contract safety specifications.

2. Address both the Prime Contractors and the subcontractors work operations.

3. State measures to be taken to control hazards associated with materials, services, or equipment provided by suppliers.

4. Address all the elements/sub-elements and in order as follows:

a. **SIGNATURE SHEET.** Title, signature, and phone number of the following:

1) Plan preparer (Qualified Person such as corporate safety staff person or contracted Certified Safety Professional with construction safety experience);

2) Plan approver (company/corporate officers authorized to obligate the company);

3) Plan concurrence (e.g., Chief of Operations, Corporate Chief of Safety, Corporate Industrial Hygienist, project manager or superintendent, project safety professional). Provide

concurrence of other applicable corporate and project personnel (Contractor).

b. **BACKGROUND INFORMATION**. List the following:

1) Contractor;

2) Contract number;

3) Project name;

4) Brief project description, description of work to be performed, and location; phases of work anticipated (these will require an AHA).

c. **STATEMENT OF SAFETY AND HEALTH POLICY**. Provide a copy of current corporate/company Safety and Health Policy Statement, detailing commitment to providing a safe and healthful workplace for all employees. The Contractor’s written safety program goals, objectives, and accident experience goals for this contract should be provided.

d. **RESPONSIBILITIES AND LINES OF AUTHORITIES**. Provide the following:

1) A statement of the employer’s ultimate responsibility for the implementation of his SOH program;

2) Identification and accountability of personnel responsible for safety at both corporate and project level. Contracts specifically requiring safety or industrial hygiene personnel shall include a copy of their resumes.

3) The names of Competent and/or Qualified Person(s) and proof of competency/qualification to meet specific OSHA Competent/Qualified Person(s) requirements must be attached.;

4) Requirements that no work shall be performed unless a designated competent person is present on the job site;

5) Requirements for pre-task Activity Hazard Analysis (AHAs);

6) Lines of authority;

7) Policies and procedures regarding noncompliance with safety requirements (to include disciplinary actions for violation of safety requirements) should be identified;

e. SUBCONTRACTORS AND SUPPLIERS. If applicable, provide procedures for coordinating SOH activities with other employers on the job site:

1) Identification of subcontractors and suppliers (if known);

2) Safety responsibilities of subcontractors and suppliers.

f. **TRAINING.**

1) Site-specific SOH orientation training at the time of initial hire or assignment to the project for every employee before working on the project site is required.

2) Mandatory training and certifications that are applicable to this project (e.g., explosive actuated tools, crane operator, rigger, crane signal person, fall protection, electrical lockout/NFPA 70E, machine/equipment lockout, confined space, etc…) and any requirements for periodic retraining/recertification are required.

3) Procedures for ongoing safety and health training for supervisors and employees shall be established to address changes in site hazards/conditions.

4) OSHA 10-hour training is required for all workers on site and the OSHA 30-hour training is required for Trade Competent Persons (CPs)

g. SAFETY AND HEALTH INSPECTIONS.

1) Specific assignment of responsibilities for a minimum daily job site safety and health inspection during periods of work activity: Who will conduct (e.g., “Site Safety and Health CP”), proof of inspector’s training/qualifications, when inspections will be conducted, procedures for documentation, deficiency tracking system, and follow-up procedures.

2) Any external inspections/certifications that may be required (e.g., contracted CSP or CSHT)

h. ACCIDENT INVESTIGATION & REPORTING. The Contractor shall conduct mishap investigations of all OSHA Recordable Incidents. The APP shall include accident/incident investigation procedure & identify person(s) responsible to provide the following to the Project Manager and Facility Safety Manager Officer or Contracting Officer Representative or Government Designated Authority:

1) Exposure data (man-hours worked);

2) Accident investigations, reports, and logs.

i. PLANS (PROGRAMS, PROCEDURES) REQUIRED. Based on a risk assessment of contracted activities and on mandatory OSHA compliance programs, the Contractor shall address all applicable occupational risks in site-specific compliance and accident prevention plans. These Plans shall include but are not be limited to procedures for addressing the risks associates with the following:

1) Emergency response ;

2) Contingency for severe weather;

3) Fire Prevention ;

4) Medical Support;

5) Posting of emergency telephone numbers;

6) Prevention of alcohol and drug abuse;

7) Site sanitation (housekeeping, drinking water, toilets);

8) Night operations and lighting ;

9) Hazard communication program;

10) Welding/Cutting “Hot” work ;

11) Electrical Safe Work Practices (Electrical LOTO/NFPA 70E);

12) General Electrical Safety

13) Hazardous energy control (Machine LOTO);

14) Site-Specific Fall Protection & Prevention;

15) Excavation/trenching;

16) Asbestos abatement;

17) Lead abatement;

18) Crane Critical lift;

19) Respiratory protection;

20) Health hazard control program;

21) Radiation Safety Program;

22) Abrasive blasting;

23) Heat/Cold Stress Monitoring;

24) Crystalline Silica Monitoring (Assessment);

25) Demolition plan (to include engineering survey);

26) Formwork and shoring erection and removal;

27) PreCast Concrete.

C. Submit the APP to the Project Manager and Facility Safety Officer or Contracting Officer Representative or Government Designated Authority for review for compliance with contract requirements in accordance with Section 01 33 23, SHOP DRAWINGS,PRODUCT DATA AND SAMPLES 15 calendar days prior to the date of the preconstruction conference for acceptance. Work cannot proceed without an accepted APP.

D. Once accepted by the Project Manager and Facility Safety Officer or Contracting Officer Representative or Government Designated Authority, 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 Contracting Officer, until the matter has been rectified.

E. Once work begins, changes to the accepted APP shall be made with the knowledge and concurrence of the Project Manager project superintendent, project overall designated OSHA Competent Person, facility Safety Officer, or Government Designated Authority. 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 Contracting Officer within 24 hours of discovery. 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.

1.5 ACTIVITY HAZARD ANALYSES (AHAS):

A. AHAs are also known as Job Hazard Analyses, Job Safety Analyses, and Activity Safety Analyses. Before beginning each work activity involving a type of work presenting hazards not experienced in previous project operations or where a new work crew or sub-contractor is to perform the work, the Contractor(s) performing that work activity shall prepare an AHA (Example electronic AHA forms can be found on the US Army Corps of Engineers web site)

B. AHAs shall define the activities being performed and identify the work sequences, the specific anticipated hazards, site conditions, equipment, materials, and the control measures to be implemented to eliminate or reduce each hazard to an acceptable level of risk.

C. Work shall not begin until the AHA for the work activity has been accepted by the Project Manager and Facility Safety Officer or Contracting Officer Representative or Government Designated Authority and discussed with all engaged in the activity, including the Contractor, subcontractor(s), and Government on-site representatives at preparatory and initial control phase meetings.

1. The names of the Competent/Qualified Person(s) required for a particular activity (for example, excavations, scaffolding, fall protection, other activities as specified by OSHA and/or other State and Local agencies) shall be identified and included in the AHA. Certification of their competency/qualification shall be submitted to the Government Designated Authority (GDA) for acceptance prior to the start of that work activity.

2. The AHA shall be reviewed and modified as necessary to address changing site conditions, operations, or change of competent/qualified person(s).

a. If more than one Competent/Qualified Person is used on the AHA activity, a list of names shall be submitted as an attachment to the AHA. Those listed must be Competent/Qualified for the type of work involved in the AHA and familiar with current site safety issues.

b. If a new Competent/Qualified Person (not on the original list) is added, the list shall be updated (an administrative action not requiring an updated AHA). The new person shall acknowledge in writing that he or she has reviewed the AHA and is familiar with current site safety issues.

3. Submit AHAs to the Project Manager and Facility Safety Officer or Government Designated Authority for review for compliance with contract requirements in accordance with Section 01 33 23, SHOP DRAWINGS, PRODUCT DATA AND SAMPLES for review at least 15 calendar days prior to the start of each phase. Subsequent AHAs as shall be formatted 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.

4. The AHA list will be reviewed periodically (at least monthly) at the Contractor supervisory safety meeting and updated as necessary when procedures, scheduling, or hazards change.

5. Develop the activity hazard analyses using the project schedule as the basis for the activities performed. All activities listed on the project schedule will require an AHA. The AHAs will be developed by the contractor, supplier, or subcontractor and provided to the prime contractor for review and approval and then submitted to the Project Manager and Facility Safety Officer or Government Designated Authority.

1.6 PRECONSTRUCTION CONFERENCE:

A. Contractor representatives who have a responsibility or significant role in implementation of the accident prevention program, as required by 29 CFR 1926.20(b)(1), on the project shall attend the preconstruction conference to gain a mutual understanding of its implementation. This includes the project superintendent, subcontractor superintendents, and any other assigned safety and health professionals.

B. Discuss the details of the submitted APP to include incorporated plans, programs, procedures and a listing of anticipated AHAs that will be developed and implemented during the performance of the contract. This list of proposed AHAs will be reviewed at the conference and an agreement will be reached between the Contractor and the Contracting Officer's representative as to which phases will require an analysis. In addition, establish a schedule for the preparation, submittal, review, and acceptance of AHAs to preclude project delays.

C. Deficiencies in the submitted APP will be brought to the attention of the Contractor within 14 days of submittal, and the Contractor shall revise the plan to correct deficiencies and re-submit it for acceptance. Do not begin work until there is an accepted APP.

1.7 “SITE SAFETY AND HEALTH OFFICER” (SSHO) AND “COMPETENT PERSON” (CP):

A. The Prime Contractor shall designate a minimum of one SSHO at each project site that will be identified as the SSHO to administer the Contractor's safety program and government-accepted Accident Prevention Plan. Each subcontractor shall designate a minimum of one CP in compliance with 29 CFR 1926.20 (b)(2) that will be identified as a CP to administer their individual safety programs.

B. Further, all specialized Competent Persons for the work crews will be supplied by the respective contractor as required by 29 CFR 1926 (i.e. Asbestos, Electrical, Cranes, & Derricks, Demolition, Fall Protection,

Fire Safety/Life Safety, Ladder, Rigging, Scaffolds, and Trenches/Excavations).

C. These Competent Persons can have collateral duties as the subcontractor's superintendent and/or work crew lead persons as well as fill more than one specialized CP role (i.e. Asbestos, Electrical, Cranes, & Derricks, Demolition, Fall Protection, Fire Safety/Life Safety, Ladder, Rigging, Scaffolds, and Trenches/Excavations).

D. The SSHO or an equally-qualified Designated Representative/alternate will maintain a presence on the site during construction operations in accordance with FAR Clause 52.236-6: *Superintendence by the Contractor*. CPs will maintain presence during their construction activities in accordance with above mentioned clause. A listing of the designated SSHO and all known CPs shall be submitted prior to the start of work as part of the APP with the training documentation and/or AHA as listed in Section 1.8 below.

E. The repeated presence of uncontrolled hazards during a contractor's work operations will result in the designated CP as being deemed incompetent and result in the required removal of the employee in accordance with FAR Clause 52.236-5: Material and Workmanship, Paragraph (c).

1.8 TRAINING:

A. The designated Prime Contractor SSHO must meet the requirements of all applicable OSHA standards and be capable (through training, experience, and qualifications) of ensuring that the requirements of 29 CFR 1926.16 and other appropriate Federal, State and local requirements are met for the project. As a minimum the SSHO must have completed the OSHA 30-hour Construction Safety class and have five (5) years of construction industry safety experience or three (3) years if he/she possesses a Certified Safety Professional (CSP) or certified Construction Safety and Health Technician (CSHT) certification or have a safety and health degree from an accredited university or college.

B. All designated CPs shall have completed the OSHA 30-hour Construction Safety course within the past 5 years.

C. In addition to the OSHA 30 Hour Construction Safety Course, all CPs with high hazard work operations such as operations involving asbestos, electrical, cranes, demolition, work at heights/fall protection, fire safety/life safety, ladder, rigging, scaffolds, and trenches/excavations shall have a specialized formal course in the hazard recognition & control associated with those high hazard work operations. Documented "repeat" deficiencies in the execution of safety requirements will require retaking the requisite formal course.

D. All other construction workers shall have the OSHA 10-hour Construction Safety Outreach course and any necessary safety training to be able to identify hazards within their work environment.

E. Submit training records associated with the above training requirements to the Project Manager and Facility Safety Officer or Government Designated Authority for review for compliance with contract requirements in accordance with Section 01 33 23, SHOP DRAWINGS,

PRODUCT DATA AND SAMPLES 15 calendar days prior to the date of the preconstruction conference for acceptance.

F. Prior to any worker for the contractor or subcontractors beginning work, they shall undergo a safety briefing provided by the SSHO or his/her designated representative. As a minimum, this briefing shall include information on the site-specific hazards, construction limits, VAMC safety guidelines, means of egress, break areas, work hours, locations of restrooms, use of VAMC equipment, emergency procedures, accident reporting etc... Documentation shall be provided to the Resident Engineer that individuals have undergone contractor’s safety briefing.

G. Ongoing safety training will be accomplished in the form of weekly documented safety meeting.

1.9 INSPECTIONS:

A. The SSHO shall conduct frequent and regular safety inspections (daily) of the site and each of the subcontractors CPs shall conduct frequent and regular safety inspections (daily) of the their work operations as required by 29 CFR 1926.20(b)(2). Each week, the SSHO shall conduct a formal documented inspection of the entire construction areas with the subcontractors’ “Trade Safety and Health CPs” present in their work areas. Coordinate with, and report findings and corrective actions weekly to Project Manager and Facility Safety Officer or Government Designated Authority.

B. A Certified Safety Professional (CSP) with specialized knowledge in construction safety or a certified Construction Safety and Health Technician (CSHT) shall randomly conduct a monthly site safety inspection. The CSP or CSHT can be a corporate safety professional or independently contracted. The CSP or CSHT will provide their certificate number on the required report for verification as necessary.

1. Results of the inspection will be documented with tracking of the identified hazards to abatement.

2. The Project Manager and Facility Safety Officer or Government Designated Authority will be notified immediately prior to start of the inspection and invited to accompany the inspection.

3. Identified hazard and controls will be discussed to come to a mutual understanding to ensure abatement and prevent future reoccurrence.

4. A report of the inspection findings with status of abatement will be provided to the Resident Engineer and Facility Safety Officer or Contracting Officer Representative within one week of the onsite inspection.

1.10 ACCIDENTS, OSHA 300 LOGS, AND MAN-HOURS:

A. Notify the Project Manager and Facility Safety Officer or Government Designated Authority as soon as practical, but no more than four hours after any accident meeting the definition of OSHA Recordable Injuries or Illnesses or High Visibility Accidents, property damage equal to or greater than $5,000, or any weight handling equipment accident. Within notification include contractor name; contract title; type of contract;

name of activity, installation or location where accident occurred; date and time of accident; names of personnel injured; extent of property damage, if any; extent of injury, if known, and brief description of accident (to include type of construction equipment used, PPE used, etc.). Preserve the conditions and evidence on the accident site until the Project Manager and Facility Safety Officer or Government Designated Authority determine whether a government investigation will be conducted.

B. Conduct an accident investigation for recordable injuries and illnesses, for Medical Treatment defined in paragraph DEFINITIONS, and property damage accidents resulting in at least $20,000 in damages, to establish the root cause(s) of the accident. Complete the VA Form 2162, and provide the report to the Project Manager and Facility Safety Officer or Government Designated Authority within 5 calendar days of the accident. The Project Manager and Facility Safety Officer or Government Designated Authority will provide copies of any required or special forms.

C. A summation of all man-hours worked by the contractor and associated sub-contractors for each month will be reported to the Project Manager and Facility Safety Officer or Government Designated Authority monthly.

D. A summation of all OSHA recordable accidents experienced on site by the contractor and associated sub-contractors for each month will be provided to the Project Manager and Facility Safety Officer or Government Designated Authority monthly. The contractor and associated sub-contractors' OSHA 300 logs will be made available to the Project Manager and Facility Safety Officer or Government Designated Authority as requested.

1.11 PERSONAL PROTECTIVE EQUIPMENT (PPE):

A. PPE is governed in all areas by the nature of the work the employee is performing. For example, specific PPE required for performing work on electrical equipment is identified in NFPA 70E, Standard for Electrical Safety in the Workplace.

B. Mandatory PPE includes:

1. Hard Hats – unless written authorization is given by the Project Manager and Facility Safety Officer or Government Designated Authority in circumstances of work operations that have limited potential for falling object hazards such as during finishing work or minor remodeling. With authorization to relax the requirement of hard hats, if a worker becomes exposed to an overhead falling object hazard, then hard hats would be required in accordance with the OSHA regulations.

2. Safety glasses - unless written authorization is given by the Project Manager and Facility Safety Officer or Government Designated Authority appropriate safety glasses meeting the ANSI Z.87.1 standard must be worn by each person on site.

3. Appropriate Safety Shoes – based on the hazards present, safety shoes meeting the requirements of ASTM F2413-11 shall be worn by each person on site unless written authorization is given by the

Project Manager and Facility Safety Officer or Government Designated Authority.

4. Hearing protection - Use personal hearing protection at all times in designated noise hazardous areas or when performing noise hazardous tasks.

1.12 INFECTION CONTROL

A. Infection Control is critical in all medical center facilities. Interior construction activities causing disturbance of existing dust, or creating new dust, must be conducted within ventilation-controlled areas that minimize the flow of airborne particles into patient areas. Exterior construction activities causing disturbance of soil or creates dust in some other manner must be controlled.

B. An AHA associated with infection control will be performed by VA personnel in accordance with FGI Guidelines (i.e. Infection Control Risk Assessment (ICRA)). The ICRA procedure found on the American Society for Healthcare Engineering (ASHE) website will be utilized. Risk classifications of Class II or lower will require approval by the Project Manager and Facility Safety Officer or Government Designated Authority before beginning any construction work. Risk classifications of Class III or higher will require a permit before beginning any construction work. Infection Control permits will be issued by the Project Manager. The Infection Control Permits will be posted outside the appropriate construction area. More than one permit may be issued for a construction project if the work is located in separate areas requiring separate classes. The primary project scope area for this project is: **Class II**, however, work outside the primary project scope area may vary. The required infection control precautions with each class are as follows:

1. Class I requirements:

   a. During Construction Work:

      1) Notify the Project Manager and Facility Safety Officer or Government Designated Authority

      2) Execute work by methods to minimize raising dust from construction operations.

      3) Ceiling tiles: Immediately replace a ceiling tiles displaced for visual inspection.

   b. Upon Completion:

      1) Clean work area upon completion of task

      2) Notify the Project Manager and Facility Safety Officer or Government Designated Authority

2. Class II requirements:

   a. During Construction Work:

      1) Notify the Project Manager and Facility Safety Officer or Government Designated Authority

2) Provide active means to prevent airborne dust from dispersing into atmosphere such as wet methods or tool mounted dust collectors where possible.

3) Water mist work surfaces to control dust while cutting.

4) Seal unused doors with duct tape.

5) Block off and seal air vents.

6) Remove or isolate HVAC system in areas where work is being performed.

b. Upon Completion:

1) Wipe work surfaces with cleaner/disinfectant.

2) Contain construction waste before transport in tightly covered containers.

3) Wet mop and/or vacuum with HEPA filtered vacuum before leaving work area.

4) Upon completion, restore HVAC system where work was performed

5) Notify the Project Manager and Facility Safety Officer or Government Designated Authority

3. Class III requirements:

a. During Construction Work:

1) Obtain permit from the Project Manager and Facility Safety Officer or Government Designated Authority

2) Remove or Isolate HVAC system in area where work is being done to prevent contamination of duct system.

3) Complete all critical barriers i.e. sheetrock, plywood, plastic, to seal area from non-work area or implement control cube method (cart with plastic covering and sealed connection to work site with HEPA vacuum for vacuuming prior to exit) before construction begins. Install construction barriers and ceiling protection carefully, outside of normal work hours.

4) Maintain negative air pressure, 0.01 inches of water gauge, within work site utilizing HEPA equipped air filtration units and continuously monitored with a digital display, recording and alarm instrument, which must be calibrated on installation, maintained with periodic calibration and monitored by the contractor.

5) Contain construction waste before transport in tightly covered containers.

6) Cover transport receptacles or carts. Tape covering unless solid lid.

b. Upon Completion:

1) Do not remove barriers from work area until completed project is inspected by the Project Manager and Facility Safety Officer or Government Designated Authority and thoroughly cleaned by the VA Environmental Services Department.

2) Remove construction barriers and ceiling protection carefully to minimize spreading of dirt and debris associated with construction, outside of normal work hours.

3) Vacuum work area with HEPA filtered vacuums.

4) Wet mop area with cleaner/disinfectant.

5) Upon completion, restore HVAC system where work was performed.

6) Return permit to the Project Manager and Facility Safety Officer or Government Designated Authority

4. Class IV requirements:

a. During Construction Work:

1) Obtain permit from the Project Manager and Facility Safety Officer or Government Designated Authority

2) Isolate HVAC system in area where work is being done to prevent contamination of duct system.

3) Complete all critical barriers i.e. sheetrock, plywood, plastic, to seal area from non-work area or implement control cube method (cart with plastic covering and sealed connection to work site with HEPA vacuum for vacuuming prior to exit) before construction begins. Install construction barriers and ceiling protection carefully, outside of normal work hours.

4) Maintain negative air pressure within work site utilizing HEPA equipped air filtration units.

5) Seal holes, pipes, conduits, and punctures.

6) Construct anteroom and require all personnel to pass through this room so they can be vacuumed using a HEPA vacuum cleaner before leaving work site or they can wear cloth or paper coveralls that are removed each time they leave work site.

7) All personnel entering work site are required to wear shoe covers. Shoe covers must be changed each time the worker exits the work area.

b. Upon Completion:

1) Do not remove barriers from work area until completed project is inspected by the Project Manager and Facility Safety Officer or Government Designated Authority with thorough cleaning by the VA Environmental Services Dept.

2) Remove construction barriers and ceiling protection carefully to minimize spreading of dirt and debris associated with construction, outside of normal work hours.

3) Contain construction waste before transport in tightly covered containers.

4) Cover transport receptacles or carts. Tape covering unless solid lid.

5) Vacuum work area with HEPA filtered vacuums.

6) Wet mop area with cleaner/disinfectant.

7) Upon completion, restore HVAC system where work was performed.

8) Return permit to the Project Manager and Facility Safety Officer or Government Designated Authority

C. Barriers shall be erected as required based upon classification (Class III & IV requires barriers) and shall be constructed as follows:

1. Class III and IV - closed door with masking tape applied over the frame and door is acceptable for projects that can be contained in a single room.

2. Construction, demolition or reconstruction not capable of containment within a single room must have the following barriers erected and made presentable on hospital occupied side:

a. Class III & IV (where dust control is the only hazard, and an agreement is reached with the Resident Engineer and Medical Center) - Airtight plastic barrier that extends from the floor to ceiling. Seams must be sealed with duct tape to prevent dust and debris from escaping

b. Class III & IV - Drywall barrier erected with joints covered or sealed to prevent dust and debris from escaping.

c. Class III & IV - Seal all penetrations in existing barrier airtight

d. Class III & IV - Barriers at penetration of ceiling envelopes, chases and ceiling spaces to stop movement air and debris

e. Class IV only - Anteroom or double entrance openings that allow workers to remove protective clothing or vacuum off existing clothing

f. Class III & IV - At elevators shafts or stairways within the field of construction, overlapping flap minimum of two feet wide of polyethylene enclosures for personnel access.

D. Products and Materials:

1. Sheet Plastic: Fire retardant polystyrene, 6-mil thickness meeting local fire codes

2. Barrier Doors: Self closing fire-rated solid core wood in steel frame, painted

3. Dust proof fire-rated drywall

4. High Efficiency Particulate Air-Equipped filtration machine rated at 95% capture of 0.3 microns including pollen, mold spores and dust particles. HEPA filters should have ASHRAE 85 or other prefilter to extend the useful life of the HEPA. Provide both primary and secondary filtrations units. Maintenance of equipment and replacement of the HEPA filters and other filters will be in accordance with manufacturer’s instructions.

5. Exhaust Hoses: Heavy duty, flexible steel reinforced; Ventilation Blower Hose

6. Adhesive Walk-off Mats: Provide minimum size mats of 24 inches x 36 inches

7. Disinfectant: Hospital-approved disinfectant or equivalent product

8. Portable Ceiling Access Module

E. Before any construction on site begins, all contractor personnel involved in the construction or renovation activity shall be educated and trained in infection prevention measures established by the medical center.

F. A dust control program will be establish and maintained as part of the contractor’s infection preventive measures in accordance with the FGI Guidelines for Design and Construction of Healthcare Facilities. Prior to start of work, prepare a plan detailing project-specific dust protection measures with associated product data, including periodic status reports, and submit to Project Engineer and Facility CSC for review for compliance with contract requirements in accordance with Section 01 33 23, SHOP DRAWINGS, PRODUCT DATA AND SAMPLES.

G. Medical center Infection Control personnel will monitor for airborne disease (e.g. aspergillosis) during construction. A baseline of conditions will 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 with safe thresholds established.

H. In general, the following preventive measures shall be adopted during construction to keep down dust and prevent mold.

1. Contractor shall verify that construction exhaust to exterior is not reintroduced to the medical center through intake vents, or building openings. HEPA filtration is required where the exhaust dust may reenter the medical center.

2. Exhaust hoses shall be exhausted so that dust is not reintroduced to the medical center.

3. Adhesive Walk-off/Carpet Walk-off Mats 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.

4. 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 it is created. Transport these outside the construction area in containers with tightly fitting lids.

5. The contractor shall not haul debris through patient-care areas without prior approval of the Resident Engineer and the Medical Center. When, approved, debris shall be hauled in enclosed dust proof containers or wrapped in plastic and sealed with duct tape. 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.

6. 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.

7. 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.

I. 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.

3. All new air ducts shall be cleaned prior to final inspection.

J. Exterior Construction

1. Contractor shall verify that dust will not be introduced into the medical center through intake vents, or building openings. HEPA filtration on intake vents is required where dust may be introduced.

2. Dust created from disturbance of soil such as from vehicle movement will be wetted with use of a water truck as necessary

3. All cutting, drilling, grinding, sanding, or disturbance of materials shall be accomplished with tools equipped with either local exhaust ventilation (i.e. vacuum systems) or wet suppression controls.

1.13 TUBERCULOSIS SCREENING

A. Contractor shall provide written certification that all contract employees assigned to the work site have had a pre-placement tuberculin screening within 90 days prior to assignment to the worksite and been found have negative TB screening reactions. Contractors shall be required to show documentation of negative TB screening reactions for any additional workers who are added after the 90-day requirement before they will be allowed to work on the work site. NOTE: This can be the Center for Disease Control (CDC) and Prevention and two-step

skin testing or a Food and Drug Administration (FDA)-approved blood test.

1. Contract employees manifesting positive screening reactions to the tuberculin shall be examined according to current CDC guidelines prior to working on VHA property.

2. Subsequently, if the employee is found without evidence of active (infectious) pulmonary TB, a statement documenting examination by a physician shall be on file with the employer (construction contractor), noting that the employee with a positive tuberculin screening test is without evidence of active (infectious) pulmonary TB.

3. If the employee is found with evidence of active (infectious) pulmonary TB, the employee shall require treatment with a subsequent statement to the fact on file with the employer before being allowed to return to work on VHA property.

1.14 FIRE SAFETY

A. Fire Safety Plan: Establish and maintain a site-specific 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 Project Manager and Facility Safety Officer or Government Designated Authority for review for compliance with contract requirements in accordance with Section 01 33 23, SHOP DRAWINGS, PRODUCT DATA AND SAMPLES. This plan may be an element of the Accident Prevention Plan.

B. 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.

C. 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).

D. Temporary Construction Partitions:

1. Install and maintain temporary construction partitions to provide smoke-tight separations between construction areas the areas and adjoining areas. Construct partitions of gypsum board or treated plywood (flame spread rating of 25 or less in accordance with ASTM E84) on both sides of fire retardant treated wood or metal steel studs. Extend the partitions through suspended ceilings to floor slab deck or roof. Seal joints and penetrations. At door openings, install Class C, ¾ hour fire/smoke rated doors with self-closing devices.

2. Install fire-rated temporary construction partitions as shown on drawings to maintain integrity of existing exit stair enclosures, exit passageways, fire-rated enclosures of hazardous areas, horizontal exits, smoke barriers, vertical shafts and openings enclosures.

3. Close openings in smoke barriers and fire-rated construction to maintain fire ratings. Seal penetrations with listed through-penetration firestop materials in accordance with Section 07 84 00, FIRESTOPPING.

E. Temporary Heating and Electrical: Install, use and maintain installations in accordance with 29 CFR 1926, NFPA 241 and NFPA 70.

F. Means of Egress: Do not block exiting for occupied buildings, including paths from exits to roads. Minimize disruptions and coordinate with Project Manager and Facility Safety Officer or Government Designated Authority.

G. Egress Routes for Construction Workers: Maintain free and unobstructed egress. Inspect daily. Report findings and corrective actions weekly to Project Manager and Facility Safety Officer or Government Designated Authority.

H. Fire Extinguishers: Provide and maintain extinguishers in construction areas and temporary storage areas in accordance with 29 CFR 1926, NFPA 241 and NFPA 10.

I. Flammable and Combustible Liquids: Store, dispense and use liquids in accordance with 29 CFR 1926, NFPA 241 and NFPA 30.

J. Sprinklers: Install, test and activate new automatic sprinklers prior to removing existing sprinklers.

K. 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 Project Manager and Facility Safety Officer or Government Designated Authority. 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 Resident Engineer.

L. Smoke Detectors: Prevent accidental operation. Remove temporary covers at end of work operations each day. Coordinate with Project Manager and Facility Safety Officer or Government Designated Authority.

M. Hot Work: Perform and safeguard hot work operations in accordance with NFPA 241 and NFPA 51B. Coordinate with Facility Safety 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.

N. Fire Hazard Prevention and Safety Inspections: Inspect entire construction areas weekly. Coordinate with, and report findings and corrective actions weekly to Project Manager and Facility Safety Officer or Government Designated Authority.

O. Smoking: Smoking is prohibited in and adjacent to construction areas inside existing buildings and additions under construction. In separate

and detached buildings under construction, smoking is prohibited except in designated smoking rest areas.

P. Dispose of waste and debris in accordance with NFPA 241. Remove from buildings daily.

Q. If required, submit documentation to the Facility Safety Office or other Government Designated Authority that personnel have been trained in the fire safety aspects of working in areas with impaired structural or compartmentalization features.

1.15 ELECTRICAL

A. All electrical work shall comply with NFPA 70 (NEC), NFPA 70B, NFPA 70E, 29 CFR Part 1910 Subpart J – General Environmental Controls, 29 CFR Part 1910 Subpart S – Electrical, and 29 CFR 1926 Subpart K in addition to other references required by contract.

B. All qualified persons performing electrical work under this contract shall be licensed journeyman or master electricians. All apprentice electricians performing under this contract shall be deemed unqualified persons unless they are working under the immediate supervision of a licensed electrician or master electrician.

C. All electrical work will be accomplished de-energized and in the Electrically Safe Work Condition (refer to NFPA 70E for Work Involving Electrical Hazards, including Exemptions to Work Permit). Any Contractor, subcontractor or temporary worker who fails to fully comply with this requirement is subject to immediate termination in accordance with FAR clause 52.236-5(c). Only in rare circumstance where achieving an electrically safe work condition prior to beginning work would increase or cause additional hazards, or is infeasible due to equipment design or operational limitations is energized work permitted. The Project Manager and Facility Safety Officer or Government Designated Authority with approval of the Medical Center Director will make the determination if the circumstances would meet the exception outlined above. An AHA specific to energized work activities will be developed, reviewed, and accepted prior to the start of that work.

1. Development of a Hazardous Electrical Energy Control Procedure is required prior to de-energization. A single Simple Lockout/Tagout Procedure for multiple work operations can only be used for work involving qualified person(s) de-energizing one set of conductors or circuit part source. Task specific Complex Lockout/Tagout Procedures are required at all other times.

2. Verification of the absence of voltage after de-energization and lockout/tagout is considered “energized electrical work” (live work) under NFPA 70E, and shall only be performed by qualified persons wearing appropriate shock protective (voltage rated) gloves and arc rate personal protective clothing and equipment, using Underwriters Laboratories (UL) tested and appropriately rated contact electrical testing instruments or equipment appropriate for the environment in which they will be used.

3. Personal Protective Equipment (PPE) and electrical testing instruments will be readily available for inspection by the Project

Manager and Facility Safety Officer or Government Designated Authority.

D. Before beginning any electrical work, an Activity Hazard Analysis (AHA) will be conducted to include Shock Hazard and Arc Flash Hazard analyses (NFPA Tables can be used only as a last alterative and it is strongly suggested a full Arc Flash Hazard Analyses be conducted). Work shall not begin until the AHA for the work activity has been accepted by the Project Manager and Facility Safety Officer or Government Designated Authority and discussed with all engaged in the activity, including the Contractor, subcontractor(s), and Government on-site representatives at preparatory and initial control phase meetings.

E. Ground-fault circuit interrupters. All 120-volt, single-phase 15- and 20-ampere receptacle outlets on construction sites shall have approved ground-fault circuit interrupters for personnel protection. “Assured Equipment Grounding Conductor Program” only is not allowed.

1.16 FALL PROTECTION

A. The fall protection (FP) threshold height requirement is 6 ft (1.8 m) for ALL WORK, unless specified differently or the OSHA 29 CFR 1926 requirements are more stringent, to include steel erection activities, systems-engineered activities (prefabricated) metal buildings, residential (wood) construction and scaffolding work.

1. The use of a Safety Monitoring System (SMS) as a fall protection method is prohibited.

2. The use of Controlled Access Zone (CAZ) as a fall protection method is prohibited.

3. A Warning Line System (WLS) may ONLY be used on floors or flat or low-sloped roofs (between 0 - 18.4 degrees or 4:12 slope) and shall be erected around all sides of the work area (See 29 CFR 1926.502(f) for construction of WLS requirements). Working within the WLS does not require FP. No worker shall be allowed in the area between the roof or floor edge and the WLS without FP. FP is required when working outside the WLS.

4. Fall protection while using a ladder will be governed by the OSHA requirements.

1.17 SCAFFOLDS AND OTHER WORK PLATFORMS

A. All scaffolds and other work platforms construction activities shall comply with 29 CFR 1926 Subpart L.

B. Scaffolds shall be inspected by the competent person at the start of each shift.

C. The fall protection (FP) threshold height requirement is 6 ft (1.8 m) as stated in Section 1.16.

D. The following hierarchy and prohibitions shall be followed in selecting appropriate work platforms.

1. Scaffolds, platforms, or temporary floors shall be provided for all work except that can be performed safely from the ground or similar footing.

2. Ladders less than 20 feet may be used as work platforms only when use of small hand tools or handling of light material is involved.

3. Ladder jacks, lean-to, and prop-scaffolds are prohibited.

4. Emergency descent devices shall not be used as working platforms.

E. Contractors shall use a scaffold tagging system in which all scaffolds are tagged by the Competent Person. Tags shall be color-coded: green indicates the scaffold has been inspected and is safe to use; red indicates the scaffold is unsafe to use. Tags shall be readily visible, made of materials that will withstand the environment in which they are used, be legible and shall include:

1. The Competent Person’s name and signature;

2. Dates of initial and last inspections.

F. Mast Climbing work platforms: When access ladders, including masts designed as ladders, exceed 20 ft (6 m) in height, positive fall protection shall be used.

1.18 EXCAVATION AND TRENCHES

A. All excavation and trenching work shall comply with 29 CFR 1926 Subpart P.

B. All excavations and trenches 5 feet in depth or greater shall require a written trenching and excavation permit (NOTE – some States and other local jurisdictions require separate state/jurisdiction-issued excavation permits). The permit shall be completed and provided to the Project Manager and/or Facility Safety Officer and/or other Government Designated Authority prior to commencing work for the day. At the end of the day, the permit shall be closed out and provided to the Project Manager and/or Facility Safety Officer and/or other Government Designated Authority. The permit shall be maintained onsite and include the following:

1. Determination of soil classification

2. Indication that utilities have been located and identified. If utilities could not be located after all reasonable attempt, then excavating operations will proceed cautiously.

3. Indication of selected excavation protective system.

4. Indication that the spoil pile will be stored at least 2 feet from the edge of the excavation and safe access provided within 25 feet of the workers.

5. Indication of assessment for a potential toxic, explosive, or oxygen deficient atmosphere.

C. If not using an engineered protective system such as a trench box, shielding, shoring, or other Professional Engineer designed system and

using a sloping or benching system, soil classification cannot be Solid Rock or Type A. All soil will be classified as Type B or Type C and sloped or benched in accordance with Appendix B of 29 CFR 1926.

1.19 CRANES

A. All crane work shall comply with 29 CFR 1926 Subpart CC.

B. Prior to operating a crane, the operator must be licensed, qualified or certified to operate the crane. Thus, all the provisions contained with Subpart CC are effective and there is no “Phase In” date of November 10, 2014.

C. A detailed lift permit shall be submitted 14 days prior to the scheduled lift complete with route for truck carrying load, crane load analysis, siting of crane and path of swing. The lift will not be allowed without approval of this document.

D. Crane Ops are not permitted over occupied areas. Crane ops should be scheduled when occupants are not routinely under the crane ops area. All crane ops require a submittal detailing the crane lift particulars. Areas of more impact will require greater advance scheduling.

E. Crane Ops are not permitted over occupied areas. Crane ops should be scheduled when occupants are not routinely under the crane ops area. All crane ops require a submittal detailing the crane lift particulars. Areas of more impact will require greater advance scheduling

Crane operators shall not carry loads

1. over the general public or VAMC personnel

2. over any occupied building unless

   a. the top two floors are vacated

   b. or overhead protection with a design live load of 300 psf is provided

1.20 CONTROL OF HAZARDOUS ENERGY (LOCKOUT/TAGOUT)

A. All installation, maintenance, and servicing of equipment or machinery shall comply with 29 CFR 1910.147 except for specifically referenced operations in 29 CFR 1926 such as concrete & masonry equipment [1926.702(j)], heavy machinery & equipment [1926.600(a)(3)(i)], and process safety management of highly hazardous chemicals (1926.64). Control of hazardous electrical energy during the installation, maintenance, or servicing of electrical equipment shall comply with Section 1.15 to include NFPA 70E and other VA specific requirements discussed in the section.

1.21 CONFINED SPACE ENTRY

A. All confined space entry shall comply with 29 CFR 1910.146 except for specifically referenced operations in 29 CFR 1926 such as excavations/trenches [1926.651(g)].

B. A site-specific Confined Space Entry Plan (including permitting process) shall be developed and submitted to the Project Manager and/or Facility Safety Officer and/or other Government Designated Authority.

C. PERMIT REQUIRED CONFINED SPACE
Contractor must implement a permit required confined space program for any entry into the areas identified below. Written program must conform to OSHA requirements and be submitted for approval. Evidence of successful training for entrants, entry attendant, and entry supervisor must be included with the written program. Reclassification of the confined space(s) to a non-permit confined space in accordance with OSHA 1910.146 is possible based on the work being performed and the elimination/control of all hazards within the space. This would entail the contractor having an OSHA competent, responsible, trained person in confined space programs, who analyzes the confined space, the hazards inherent in the space, the work to be performed and reclassifies the space as allowed under 1910.146(c)(7). The contractor will document the basis for determining that all hazards in the permit space have been eliminated, though a certification that contains the reclassification rationale, the date, the location of the space, and the signature of the person making the determination. The determination must be approved by the VA/COTR and is valid for as long as the hazards remain eliminated. A copy of the reclassification document will be posted at the confined space site. Generally reclassifications must take place when work begins to ensure conditions do not change. If VA employees must enter a contractor controlled confined space site, they will coordinate with the COTR and comply with the current classification of the space.

Tunnel	Between Bldgs 7 & 8
Tunnel	CLC under flag pole to Bldg 1D
Bldg 1D Crawl Space	begins at half-height door at each end
Bldg 12 Basement	Includes basement access BC100
Bldg 1 Crawl Space	in its entirety
Bldg 1-1 Clinical Lab	Access to HVAC/Plumbing
Utility Chase	Boiler Plant routes under Kirman to east end of Bldg 1 Center Wing
Heat Aerator	Bldg 8 Boiler Plant
Condensate Tank in pit	Bldg 8 Boiler Plant
Boiler Mud Drums (3ea)	Bldg 8 Boiler Plant
Boiler Steam Drums (3ea)	Bldg 8 Boiler Plant
Boiler Fire boxes (3ea)	Bldg 8 Boiler Plant
Electrical Vaults	Adjacent to Bldgs 1D & 12, Courtyard
Sewers/Storms Drains	Facility Grounds
Communication Vaults	Facility Grounds

1.22 WELDING AND CUTTING

As specified in section 1.14, Hot Work: Perform and safeguard hot work operations in accordance with NFPA 241 and NFPA 51B. Coordinate with Project Manager and/or Facility Safety Officer and/or other Government Designated Authority. Obtain permits from Project Manager and/or Facility Safety Officer and/or other Government Designated Authority at least 24 hours in advance. Designate contractor's responsible project-site fire prevention program manager to permit hot work.

1.23 LADDERS

A. All Ladder use shall comply with 29 CFR 1926 Subpart X.

B. All portable ladders shall be of sufficient length and shall be placed so that workers will not stretch or assume a hazardous position.

C. Manufacturer safety labels shall be in place on ladders

D. Step Ladders shall not be used in the closed position

E. Top steps or cap of step ladders shall not be used as a step

F. Portable ladders, used as temporary access, shall extend at least 3 ft (0.9 m) above the upper landing surface.

1. When a 3 ft (0.9-m) extension is not possible, a grasping device (such as a grab rail) shall be provided to assist workers in mounting and dismounting the ladder.

2. In no case shall the length of the ladder be such that ladder deflection under a load would, by itself, cause the ladder to slip from its support.

G. Ladders shall be inspected for visible defects on a daily basis and after any occurrence that could affect their safe use. Broken or damaged ladders shall be immediately tagged "DO NOT USE," or with similar wording, and withdrawn from service until restored to a condition meeting their original design.

1.24 FLOOR & WALL OPENINGS

A. All floor and wall openings shall comply with 29 CFR 1926 Subpart M.

B. Floor and roof holes/openings are any that measure over 2 in (51 mm) in any direction of a walking/working surface which persons may trip or fall into or where objects may fall to the level below. See 21.F for covering and labeling requirements. Skylights located in floors or roofs are considered floor or roof hole/openings.

C. All floor, roof openings or hole into which a person can accidentally walk or fall through shall be guarded either by a railing system with toeboards along all exposed sides or a load-bearing cover. When the cover is not in place, the opening or hole shall be protected by a removable guardrail system or shall be attended when the guarding system has been removed, or other fall protection system.

1. Covers shall be capable of supporting, without failure, at least twice the weight of the worker, equipment and material combined.

2. Covers shall be secured when installed, clearly marked with the word “HOLE”, “COVER” or “Danger, Roof Opening-Do Not Remove” or color-coded or equivalent methods (e.g., red or orange “X”). Workers must be made aware of the meaning for color coding and equivalent methods.

3. Roofing material, such as roofing membrane, insulation or felts, covering or partly covering openings or holes, shall be immediately cut out. No hole or opening shall be left unattended unless covered.

4. Non-load-bearing skylights shall be guarded by a load-bearing skylight screen, cover, or railing system along all exposed sides.

5. Workers are prohibited from standing/walking on skylights.

- - - E N D - - -

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:

DEPARMENT 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. http://www.aluminum.org
AABC	Associated Air Balance Council http://www.aabchq.com
AAMA	American Architectural Manufacturer's Association http://www.aamanet.org
AAN	American Nursery and Landscape Association http://www.anla.org
AASHTO	American Association of State Highway and Transportation Officials http://www.aashto.org

AATCC	American Association of Textile Chemists and Colorists http://www.aatcc.org
ACGIH	American Conference of Governmental Industrial Hygienists http://www.acgih.org
ACI	American Concrete Institute http://www.aci-int.net
ACPA	American Concrete Pipe Association http://www.concrete-pipe.org
ACPPA	American Concrete Pressure Pipe Association http://www.acppa.org
ADC	Air Diffusion Council http://flexibleduct.org
AGA	American Gas Association http://www.aga.org
AGC	Associated General Contractors of America http://www.agc.org
AGMA	American Gear Manufacturers Association, Inc. http://www.agma.org
AHAM	Association of Home Appliance Manufacturers http://www.aham.org
AISC	American Institute of Steel Construction http://www.aisc.org
AISI	American Iron and Steel Institute http://www.steel.org
AITC	American Institute of Timber Construction http://www.aitc-glulam.org
AMCA	Air Movement and Control Association, Inc. http://www.amca.org
ANLA	American Nursery & Landscape Association http://www.anla.org
ANSI	American National Standards Institute, Inc. http://www.ansi.org
APA	The Engineered Wood Association http://www.apawood.org
ARI	Air-Conditioning and Refrigeration Institute http://www.ari.org
ASAE	American Society of Agricultural Engineers http://www.asae.org
ASCE	American Society of Civil Engineers http://www.asce.org
ASHRAE	American Society of Heating, Refrigerating, and Air-Conditioning Engineers http://www.ashrae.org
ASME	American Society of Mechanical Engineers http://www.asme.org
ASSE	American Society of Sanitary Engineering http://www.asse-plumbing.org

ASTM	American Society for Testing and Materials http://www.astm.org
AWI	Architectural Woodwork Institute http://www.awinet.org
AWS	American Welding Society http://www.aws.org
AWWA	American Water Works Association http://www.awwa.org
BHMA	Builders Hardware Manufacturers Association http://www.buildershardware.com
BIA	Brick Institute of America http://www.bia.org
CAGI	Compressed Air and Gas Institute http://www.cagi.org
CGA	Compressed Gas Association, Inc. http://www.cganet.com
CI	The Chlorine Institute, Inc. http://www.chlorineinstitute.org
CISCA	Ceilings and Interior Systems Construction Association http://www.cisca.org
CISPI	Cast Iron Soil Pipe Institute http://www.cispi.org
CLFMI	Chain Link Fence Manufacturers Institute http://www.chainlinkinfo.org
CPMB	Concrete Plant Manufacturers Bureau http://www.cpmb.org
CRA	California Redwood Association http://www.calredwood.org
CRSI	Concrete Reinforcing Steel Institute http://www.crsi.org
CTI	Cooling Technology Institute http://www.cti.org
DHI	Door and Hardware Institute http://www.dhi.org
EGSA	Electrical Generating Systems Association http://www.egsa.org
EEI	Edison Electric Institute http://www.eei.org
EPA	Environmental Protection Agency http://www.epa.gov
ETL	ETL Testing Laboratories, Inc. http://www.et1.com
FAA	Federal Aviation Administration http://www.faa.gov
FCC	Federal Communications Commission http://www.fcc.gov
FPS	The Forest Products Society http://www.forestprod.org

GANA	Glass Association of North America http://www.cssinfo.com/info/gana.html/
FM	Factory Mutual Insurance http://www.fmglobal.com
GA	Gypsum Association http://www.gypsum.org
GSA	General Services Administration http://www.gsa.gov
HI	Hydraulic Institute http://www.pumps.org
HPVA	Hardwood Plywood & Veneer Association http://www.hpva.org
ICBO	International Conference of Building Officials http://www.icbo.org
ICEA	Insulated Cable Engineers Association Inc. http://www.icea.net
\ICAC	Institute of Clean Air Companies http://www.icac.com
IEEE	Institute of Electrical and Electronics Engineers http://www.ieee.org\
IMSA	International Municipal Signal Association http://www.imsasafety.org
IPCEA	Insulated Power Cable Engineers Association
NBMA	Metal Buildings Manufacturers Association http://www.mbma.com
MSS	Manufacturers Standardization Society of the Valve and Fittings Industry Inc. http://www.mss-hq.com
NAAMM	National Association of Architectural Metal Manufacturers http://www.naamm.org
NAPHCC	Plumbing-Heating-Cooling Contractors Association http://www.phccweb.org.org
NBS	National Bureau of Standards See - NIST
NBBPVI	National Board of Boiler and Pressure Vessel Inspectors http://www.nationboard.org
NEC	National Electric Code See - NFPA National Fire Protection Association
NEMA	National Electrical Manufacturers Association http://www.nema.org
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 http://www.rfci.com
RIS	Redwood Inspection Service See - CRA
RMA	Rubber Manufacturers Association, Inc. http://www.rma.org
SCMA	Southern Cypress Manufacturers Association http://www.cypressinfo.org
SDI	Steel Door Institute http://www.steeldoor.org
IGMA	Insulating Glass Manufacturers Alliance http://www.igmaonline.org
SJI	Steel Joist Institute http://www.steeljoist.org
SMACNA	Sheet Metal and Air-Conditioning Contractors National Association, Inc. http://www.smacna.org
SSPC	The Society for Protective Coatings http://www.sspc.org
STI	Steel Tank Institute http://www.steeltank.com
SWI	Steel Window Institute http://www.steelwindows.com
TCA	Tile Council of America, Inc. http://www.tileusa.com

TEMA	Tubular Exchange Manufacturers Association http://www.tema.org
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

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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 effect 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.
   4. Solid Waste: Rubbish, debris, garbage, and other discarded solid materials resulting from industrial, commercial, and agricultural operations and from community activities.
   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 Resident 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 Resident 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.

f. Methods for protection of features to be preserved within authorized work areas including trees, shrubs, vines, grasses, ground cover, landscape features, air and water quality, fish and wildlife, soil, historical, and archeological and cultural resources.

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.

i. Drawings showing locations of any proposed temporary excavations or embankments for haul roads, material storage areas, structures, sanitary facilities, and stockpiles of excess or spoil materials. Include as part of an Erosion Control Plan approved by the District Office of the U.S. Soil Conservation Service and the Department of Veterans Affairs.

j. Environmental Monitoring Plans for the job site including land, water, air, and noise.

k. Work Area Plan showing the proposed activity in each portion of the area and identifying the areas of limited use or nonuse. Plan should include measures for marking the limits of use areas. This plan may be incorporated within the Erosion Control Plan.

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. Protect environmental resources within the project boundaries and those affected outside the limits of permanent work during the entire period of this contract. Confine activities to areas defined by the specifications and drawings.

B. Protection of Land Resources: Prior to construction, identify all land resources to be preserved within the work area. Do not remove, cut, deface, injure, or destroy land resources including trees, shrubs, vines, grasses, top soil, and land forms without permission from the Resident Engineer. Do not fasten or attach ropes, cables, or guys to trees for anchorage unless specifically authorized, or where special emergency use is permitted.

1. Work Area Limits: Prior to any construction, mark the areas that require work to be performed under this contract. Mark or fence isolated areas within the general work area that are to be saved and protected. Protect monuments, works of art, and markers before construction operations begin. Convey to all personnel the purpose of marking and protecting all necessary objects.

2. Protection of Landscape: Protect trees, shrubs, vines, grasses, land forms, and other landscape features shown on the drawings to be preserved by marking, fencing, or using any other approved techniques.

a. Box and protect from damage existing trees and shrubs to remain on the construction site.
b. Immediately repair all damage to existing trees and shrubs by trimming, cleaning, and painting with antiseptic tree paint.
c. Do not store building materials or perform construction activities closer to existing trees or shrubs than the farthest extension of their limbs.

3. Reduction of Exposure of Unprotected Erodible Soils: Plan and conduct earthwork to minimize the duration of exposure of unprotected soils. Clear areas in reasonably sized increments only as needed to use. Form earthwork to final grade as shown. Immediately protect side slopes and back slopes upon completion of rough grading.
4. Temporary Protection of Disturbed Areas: Construct diversion ditches, benches, and berms to retard and divert runoff from the construction site to protected drainage areas approved under paragraph 208 of the Clean Water Act.

9. 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.
11. Handle discarded materials other than those included in the solid waste category as directed by the Resident Engineer.

C. Protection of Air Resources: Keep construction activities under surveillance, management, and control to minimize pollution of air resources. Burning is not permitted on the job site. Keep activities, equipment, processes, and work operated or performed, in strict accordance with the State of Nevada and Federal emission and performance laws and standards. Maintain ambient air quality standards set by the Environmental Protection Agency, for those construction operations and activities specified.

1. Particulates: Control dust particles, aerosols, and gaseous by-products from all construction activities, processing, and preparation of materials (such as from asphaltic batch plants) at all times, including weekends, holidays, and hours when work is not in progress.
4. Odors: Control odors of construction activities and prevent obnoxious odors from occurring.

F. 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 Resident 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 7:00 a.m. and 5:00 p.m unless otherwise permitted by local ordinance or the Resident 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		
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.

G. 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.

H. 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 Resident 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.

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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 Resident 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, 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

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 net total costs for each disposal).

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SECTION 07 84 00
FIRESTOPPING

PART 1 GENERAL

1.1 DESCRIPTION

A. Closures of openings in walls, floors, and roof decks against penetration of flame, heat, and smoke or gases in fire resistant rated construction.

B. Closure of openings in walls against penetration of gases or smoke in smoke partitions.

1.2 RELATED WORK

A. Sealants and application: Section 07 92 00, JOINT SEALANTS.

1.3 SUBMITTALS

A. Submit in accordance with Section 01 33 23, SHOP DRAWINGS, PRODUCT DATA, AND SAMPLES.

B. Manufacturers literature, data, and installation instructions for types of firestopping and smoke stopping used.

C. List of FM, UL, or WH classification number of systems installed.

D. Certified laboratory test reports for ASTM E814 tests for systems not listed by FM, UL, or WH proposed for use.

1.4 DELIVERY AND STORAGE

A. Deliver materials in their original unopened containers with manufacturer’s name and product identification.

B. Store in a location providing protection from damage and exposure to the elements.

1.5 WARRANTY

A. Firestopping work subject to the terms of the Article “Warranty of Construction”, FAR clause 52.246-21, except extend the warranty period to five years.

1.6 QUALITY ASSURANCE

A. FM, UL, or WH or other approved laboratory tested products will be acceptable.

1.7 APPLICABLE PUBLICATIONS

A. Publications listed below form a part of this specification to the extent referenced. Publications are referenced in the text by the basic designation only.

B. American Society for Testing and Materials (ASTM):

E84-10.....Surface Burning Characteristics of Building Materials

E814-11.....Fire Tests of Through-Penetration Fire Stops

PART 2 – PRODUCTS

2.1 FIRESTOP SYSTEMS

A. Use either factory built (Firestop Devices) or field erected (through-Penetration Firestop Systems) to form a specific building system maintaining required integrity of the fire barrier and stop the passage of gases or smoke.

B. Through-penetration firestop systems and firestop devices tested in accordance with ASTM E814 or UL 1479 using the "F" or "T" rating to maintain the same rating and integrity as the fire barrier being sealed. "T" ratings are not required for penetrations smaller than or equal to 100 mm (4 in) nominal pipe or 0.01 m^2 (16 sq. in.) in overall cross sectional area.

C. Products requiring heat activation to seal an opening by its intumescence shall exhibit a demonstrated ability to function as designed to maintain the fire barrier.

D. Firestop sealants used for firestopping or smoke sealing shall have following properties:

1. Contain no flammable or toxic solvents.

2. Have no dangerous or flammable out gassing during the drying or curing of products.

3. Water-resistant after drying or curing and unaffected by high humidity, condensation or transient water exposure.

4. When used in exposed areas, shall be capable of being sanded and finished with similar surface treatments as used on the surrounding wall or floor surface.

E. Firestopping system or devices used for penetrations by glass pipe, plastic pipe or conduits, unenclosed cables, or other non-metallic materials shall have following properties:

1. Classified for use with the particular type of penetrating material used.

2. Penetrations containing loose electrical cables, computer data cables, and communications cables protected using firestopping systems that allow unrestricted cable changes without damage to the seal.

3. Intumescent products which would expand to seal the opening and act as fire, smoke, toxic fumes, and, water sealant.

a. Basis-of-Design Product: Subject to compliance with requirements, provide EZ-PATH Fire Rated Pathway, by Specified Technologies Inc., or a comparable product by another manufacturer. **http://www.stifirestop.com/ezpath/**

F. Maximum flame spread of 25 and smoke development of 50 when tested in accordance with ASTM E84.

G. FM, UL, or WH rated or tested by an approved laboratory in accordance with ASTM E814.

H. Materials to be asbestos free.

2.2 SMOKE STOPPING IN SMOKE PARTITIONS

A. Use silicone sealant in smoke partitions as specified in Section 07 92 00, JOINT SEALANTS.

B. Use mineral fiber filler and bond breaker behind sealant.

C. Sealants shall have a maximum flame spread of 25 and smoke developed of 50 when tested in accordance with E84.

D. When used in exposed areas capable of being sanded and finished with similar surface treatments as used on the surrounding wall or floor surface.

PART 3 – EXECUTION

3.1 EXAMINATION

Submit product data and installation instructions, as required by article, submittals, after an on site examination of areas to receive firestopping.

3.2 PREPARATION

A. Remove dirt, grease, oil, loose materials, or other substances that prevent adherence and bonding or application of the firestopping or smoke stopping materials.

B. Remove insulation on insulated pipe for a distance of 150 mm (six inches) on either side of the fire rated assembly prior to applying the firestopping materials unless the firestopping materials are tested and approved for use on insulated pipes.

3.3 INSTALLATION

A. Do not begin work until the specified material data and installation instructions of the proposed firestopping systems have been submitted and approved.

B. Install firestopping systems with smoke stopping in accordance with FM, UL, WH, or other approved system details and installation instructions.

C. Install smoke stopping seals in smoke partitions.

3.4 CLEAN-UP AND ACCEPTANCE OF WORK

A. As work on each floor is completed, remove materials, litter, and debris.

B. Do not move materials and equipment to the next-scheduled work area until completed work is inspected and accepted by the Resident Engineer.

C. Clean up spills of liquid type materials.

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SECTION 07 92 00
JOINT SEALANTS

PART 1 - GENERAL

1.1 DESCRIPTION:

Section covers all sealant and caulking materials and their application, wherever required for complete installation of building materials or systems.

1.2 RELATED WORK:

A. Firestopping penetrations: Section 07 84 00, FIRESTOPPING.

1.3 QUALITY CONTROL:

A. Installer Qualifications: An experienced installer who has specialized in installing joint sealants similar in material, design, and extent to those indicated for this Project and whose work has resulted in joint-sealant installations with a record of successful in-service performance.

B. Source Limitations: Obtain each type of joint sealant through one source from a single manufacturer.

C. Product Testing: Obtain test results from a qualified testing agency based on testing current sealant formulations within a 12-month period.

1. Testing Agency Qualifications: An independent testing agency qualified according to ASTM C1021.

2. Test elastomeric joint sealants for compliance with requirements specified by reference to ASTM C920, and where applicable, to other standard test methods.

3. Test elastomeric joint sealants according to SWRI’s Sealant Validation Program for compliance with requirements specified by reference to ASTM C920 for adhesion and cohesion under cyclic movement, adhesion-in peel, and indentation hardness.

4. Test other joint sealants for compliance with requirements indicated by referencing standard specifications and test methods.

D. Preconstruction Field-Adhesion Testing: Before installing elastomeric sealants, field test their adhesion to joint substrates in accordance with sealant manufacturer’s recommendations:

1. Locate test joints where indicated or, if not indicated, as directed by Contracting Officer.

2. Conduct field tests for each application indicated below:

a. Each type of elastomeric sealant and joint substrate indicated.

b. Each type of non-elastomeric sealant and joint substrate indicated.

3. Notify Resident Engineer seven days in advance of dates and times when test joints will be erected.

E. VOC: Acrylic latex and Silicon sealants shall have less than 50g/l VOC content.

F. Mockups: Before installing joint sealants, apply elastomeric sealants as follows to verify selections made under sample Submittals and to demonstrate aesthetic effects and qualities of materials and execution:

1. Joints in mockups of assemblies specified in other Sections that are indicated to receive elastomeric joint sealants, which are specified by reference to this section.

1.4 SUBMITTALS:

A. Submit in accordance with Section 01 33 23, SHOP DRAWINGS, PRODUCT DATA, AND SAMPLES.

B. Manufacturer's installation instructions for each product used.

C. Cured samples of exposed sealants for each color where required to match adjacent material.

D. Manufacturer's Literature and Data:

1. Caulking compound

2. Primers

3. Sealing compound, each type, including compatibility when different sealants are in contact with each other.

E. LEED Submittals:

1. Provide date for Credit IEQ 4.1: For adhesives and sealants used inside of weatherproofing system, including printed statement of VOC content.

1.5 PROJECT CONDITIONS:

A. Environmental Limitations:

1. Do not proceed with installation of joint sealants under following conditions:

a. When ambient and substrate temperature conditions are outside limits permitted by joint sealant manufacturer or are below 4.4 °C (40 °F).

b. When joint substrates are wet.

B. Joint-Width Conditions:

1. Do not proceed with installation of joint sealants where joint widths are less than those allowed by joint sealant manufacturer for applications indicated.

C. Joint-Substrate Conditions:

1. Do not proceed with installation of joint sealants until contaminants capable of interfering with adhesion are removed from joint substrates.

1.6 DELIVERY, HANDLING, AND STORAGE:

A. Deliver materials in manufacturers' original unopened containers, with brand names, date of manufacture, shelf life, and material designation clearly marked thereon.

B. Carefully handle and store to prevent inclusion of foreign materials.

C. Do not subject to sustained temperatures exceeding 32° C (90° F) or less than 5° C (40° F).

1.7 DEFINITIONS:

A. Definitions of terms in accordance with ASTM C717 and as specified.

B. Back-up Rod: A type of sealant backing.

C. Bond Breakers: A type of sealant backing.

D. Filler: A sealant backing used behind a back-up rod.

1.8 WARRANTY:

A. Warranty exterior sealing against leaks, adhesion, and cohesive failure, and subject to terms of "Warranty of Construction", FAR clause 52.246-21, except that warranty period shall be extended to two years.

B. General Warranty: Special warranty specified in this Article shall not deprive Government of other rights Government may have under other provisions of Contract Documents and shall be in addition to, and run concurrent with, other warranties made by Contractor under requirements of Contract Documents.

1.9 APPLICABLE PUBLICATIONS:

A. Publications listed below form a part of this specification to extent referenced. Publications are referenced in text by basic designation only.

B. American Society for Testing and Materials (ASTM):

C509-06.....Elastomeric Cellular Preformed Gasket and Sealing Material.

C612-10.....Mineral Fiber Block and Board Thermal Insulation.

C717-10.....Standard Terminology of Building Seals and Sealants.

C834-10.....Latex Sealants.

C919-08.....Use of Sealants in Acoustical Applications.

C920-10.....Elastomeric Joint Sealants.

C1021-08.....Laboratories Engaged in Testing of Building Sealants.

C1193-09.....Standard Guide for Use of Joint Sealants.

C1330-02 (R2007).....Cylindrical Sealant Backing for Use with Cold Liquid Applied Sealants.

D1056-07.....Specification for Flexible Cellular Materials—Sponge or Expanded Rubber.

E84-09.....Surface Burning Characteristics of Building Materials.

C. Sealant, Waterproofing and Restoration Institute (SWRI).

The Professionals’ Guide

PART 2 - PRODUCTS

2.1 LEED:

A. All products used inside the building envelope shall meet the requirements for low emitting materials. See Section 01 81 13.16 SUSTAINABLE DESIGN REQUIREMENTS FOR COMMERCIAL INTERIORS.

2.2 SEALANTS:

A. S-1:

1. ASTM C920, polyurethane or polysulfide.

2. Type M.

3. Class 25.

4. Grade NS.

5. Shore A hardness of 20-40

B. S-2:

1. ASTM C920, polyurethane or polysulfide.

2. Type M.

3. Class 25.

4. Grade P.

5. Shore A hardness of 25-40.

C. S-3:

1. ASTM C920, polyurethane or polysulfide.

2. Type S.

3. Class 25, joint movement range of plus or minus 50 percent.

4. Grade NS.

5. Shore A hardness of 15-25.

6. Minimum elongation of 700 percent.

D. S-4:

1. ASTM C920 polyurethane or polysulfide.

2. Type S.

3. Class 25.

4. Grade NS.

5. Shore A hardness of 25-40.

E. S-5:

1. ASTM C920, polyurethane or polysulfide.

2. Type S.

3. Class 25.

4. Grade P.

5. Shore hardness of 15-45.

F. S-6:

1. ASTM C920, silicone, neutral cure.

2. Type S.

3. Class: Joint movement range of plus 100 percent to minus 50 percent.

4. Grade NS.

5. Shore A hardness of 15-20.

6. Minimum elongation of 1200 percent.

G. S-7:

1. ASTM C920, silicone, neutral cure.

2. Type S.

3. Class 25.

4. Grade NS.

5. Shore A hardness of 25-30.

6. Structural glazing application.

H. S-8:

1. ASTM C920, silicone, acetoxy cure.

2. Type S.

3. Class 25.

4. Grade NS.

5. Shore A hardness of 25-30.

6. Structural glazing application.

I. S-9:

1. ASTM C920 silicone.

2. Type S.

3. Class 25.

4. Grade NS.

5. Shore A hardness of 25-30.

6. Non-yellowing, mildew resistant.

J. S-10:

1. ASTMC C920, coal tar extended fuel resistance polyurethane.

2. Type M/S.

3. Class 25.

4. Grade P/NS.

5. Shore A hardness of 15-20.

K. S-11:

1. ASTM C920 polyurethane.

2. Type M/S.

3. Class 25.

4. Grade P/NS.

5. Shore A hardness of 35 to 50.

L. S-12:

1. ASTM C920, polyurethane.

2. Type M/S.

3. Class 25, joint movement range of plus or minus 50 percent.

4. Grade P/NS.

5. Shore A hardness of 25 to 50.

2.3 CAULKING COMPOUND:

A. C-1: ASTM C834, acrylic latex.

B. C-2: One component acoustical caulking, non drying, non hardening, synthetic rubber.

2.4 COLOR:

A. Sealants used with exposed masonry shall match color of mortar joints.

B. Sealants used with unpainted concrete shall match color of adjacent concrete.

C. Color of sealants for other locations shall be light gray or aluminum, unless specified otherwise.

D. Caulking shall be light gray or white, unless specified otherwise.

2.5 JOINT SEALANT BACKING:

A. General: Provide sealant backings of material and type that are nonstaining; are compatible with joint substrates, sealants, primers, and other joint fillers; and are approved for applications indicated by sealant manufacturer based on field experience and laboratory testing.

B. Cylindrical Sealant Backings: ASTM C1330, of type indicated below and of size and density to control sealant depth and otherwise contribute to producing optimum sealant performance:

1. Type C: Closed-cell material with a surface skin.

C. Elastomeric Tubing Sealant Backings: Neoprene, butyl, EPDM, or silicone tubing complying with ASTM D1056, nonabsorbent to water and gas, and capable of remaining resilient at temperatures down to minus 32° C (minus 26° F). Provide products with low compression set and of size and shape to provide a secondary seal, to control sealant depth, and otherwise contribute to optimum sealant performance.

D. Bond-Breaker Tape: Polyethylene tape or other plastic tape recommended by sealant manufacturer for preventing sealant from adhering to rigid, inflexible joint-filler materials or joint surfaces at back of joint where such adhesion would result in sealant failure. Provide self-adhesive tape where applicable.

2.6 FILLER:

A. Mineral fiber board: ASTM C612, Class 1.

B. Thickness same as joint width.

C. Depth to fill void completely behind back-up rod.

2.7 PRIMER:

A. As recommended by manufacturer of caulking or sealant material.

B. Stain free type.

2.8 CLEANERS-NON POUROUS SURFACES:

Chemical cleaners acceptable to manufacturer of sealants and sealant backing material, free of oily residues and other substances capable of staining or harming joint substrates and adjacent non-porous surfaces and formulated to promote adhesion of sealant and substrates.

PART 3 – EXECUTION

3.1 INSPECTION:

A. Inspect substrate surface for bond breaker contamination and unsound materials at adherent faces of sealant.

B. Coordinate for repair and resolution of unsound substrate materials.

C. Inspect for uniform joint widths and that dimensions are within tolerance established by sealant manufacturer.

3.2 PREPARATIONS:

A. Prepare joints in accordance with manufacturer's instructions and SWRI.

B. Clean surfaces of joint to receive caulking or sealants leaving joint dry to the touch, free from frost, moisture, grease, oil, wax, lacquer paint, or other foreign matter that would tend to destroy or impair adhesion.

1. Clean porous joint substrate surfaces by brushing, grinding, blast cleaning, mechanical abrading, or a combination of these methods to produce a clean, sound substrate capable of developing optimum bond with joint sealants.

2. Remove loose particles remaining from above cleaning operations by vacuuming or blowing out joints with oil-free compressed air. Porous joint surfaces include the following:

   a. Concrete.

   b. Masonry.

   c. Unglazed surfaces of ceramic tile.

3. Remove laitance and form-release agents from concrete.

4. Clean nonporous surfaces with chemical cleaners or other means that do not stain, harm substrates, or leave residues capable of interfering with adhesion of joint sealants.

   a. Metal.

   b. Glass.

   c. Porcelain enamel.

   d. Glazed surfaces of ceramic tile.

C. Do not cut or damage joint edges.

D. Apply masking tape to face of surfaces adjacent to joints before applying primers, caulking, or sealing compounds.

   1. Do not leave gaps between ends of sealant backings.

   2. Do not stretch, twist, puncture, or tear sealant backings.

   3. Remove absorbent sealant backings that have become wet before sealant application and replace them with dry materials.

E. Apply primer to sides of joints wherever required by compound manufacturer's printed instructions.

   1. Apply primer prior to installation of back-up rod or bond breaker tape.

   2. Use brush or other approved means that will reach all parts of joints.

F. Take all necessary steps to prevent three sided adhesion of sealants.

3.3 BACKING INSTALLATION:

A. Install back-up material, to form joints enclosed on three sides as required for specified depth of sealant.

B. Where deep joints occur, install filler to fill space behind the back-up rod and position the rod at proper depth.

C. Cut fillers installed by others to proper depth for installation of back-up rod and sealants.

D. Install back-up rod, without puncturing the material, to a uniform depth, within plus or minus 3 mm (1/8 inch) for sealant depths specified.

E. Where space for back-up rod does not exist, install bond breaker tape strip at bottom (or back) of joint so sealant bonds only to two opposing surfaces.

F. Take all necessary steps to prevent three sided adhesion of sealants.

3.4 SEALANT DEPTHS AND GEOMETRY:

A. At widths up to 6 mm (1/4 inch), sealant depth equal to width.

B. At widths over 6 mm (1/4 inch), sealant depth 1/2 of width up to 13 mm (1/2 inch) maximum depth at center of joint with sealant thickness at center of joint approximately 1/2 of depth at adhesion surface.

3.5 INSTALLATION:

A. General:

1. Apply sealants and caulking only when ambient temperature is between 5° C and 38° C (40° and 100° F).

2. Do not use polysulfide base sealants where sealant may be exposed to fumes from bituminous materials, or where water vapor in continuous contact with cementitious materials may be present.

3. Do not use sealant type listed by manufacture as not suitable for use in locations specified.

4. Apply caulking and sealing compound in accordance with manufacturer's printed instructions.

5. Avoid dropping or smearing compound on adjacent surfaces.

6. Fill joints solidly with compound and finish compound smooth.

7. Tool joints to concave surface unless shown or specified otherwise.

8. Finish paving or floor joints flush unless joint is otherwise detailed.

9. Apply compounds with nozzle size to fit joint width.

10. Test sealants for compatibility with each other and substrate. Use only compatible sealant.

B. For application of sealants, follow requirements of ASTM C1193 unless specified otherwise.

C. Where gypsum board partitions are of sound rated, fire rated, or smoke barrier construction, follow requirements of ASTM C919 only to seal all cut-outs and intersections with the adjoining construction unless specified otherwise.

1. Apply a 6 mm (1/4 inch) minimum bead of sealant each side of runners (tracks), including those used at partition intersections with dissimilar wall construction.

2. Coordinate with application of gypsum board to install sealant immediately prior to application of gypsum board.

3. Partition intersections: Seal edges of face layer of gypsum board abutting intersecting partitions, before taping and finishing or application of veneer plaster-joint reinforcing.

4. Openings: Apply a 6 mm (1/4 inch) bead of sealant around all cut-outs to seal openings of electrical boxes, ducts, pipes and similar penetrations. To seal electrical boxes, seal sides and backs.

5. Control Joints: Before control joints are installed, apply sealant in back of control joint to reduce flanking path for sound through control joint.

3.6 FIELD QUALITY CONTROL:

A. Field-Adhesion Testing: Field-test joint-sealant adhesion to joint substrates as recommended by sealant manufacturer:

1. Extent of Testing: Test completed elastomeric sealant joints as follows:

   a. Perform 10 tests for first 300 m (1000 feet) of joint length for each type of elastomeric sealant and joint substrate.

B. Inspect joints for complete fill, for absence of voids, and for joint configuration complying with specified requirements. Record results in a field adhesion test log.

3.7 CLEANING:

A. Fresh compound accidentally smeared on adjoining surfaces: Scrape off immediately and rub clean with a solvent as recommended by the caulking or sealant manufacturer.

B. After filling and finishing joints, remove masking tape.

C. Leave adjacent surfaces in a clean and unstained condition.

3.8 LOCATIONS:

A. Exterior Building Joints, Horizontal and Vertical:

1. Metal to Metal: Type S-1, S-2

2. Metal to Masonry or Stone: Type S-1

3. Masonry to Masonry or Stone: Type S-1

4. Stone to Stone: Type S-1

5. Cast Stone to Cast Stone: Type S-1

6. Threshold Setting Bed: Type S-1, S-3, S-4

7. Masonry Expansion and Control Joints: Type S-6

8. Wood to Masonry: Type S-1

B. Metal Reglets and Flashings:

1. Flashings to Wall: Type S-6

2. Metal to Metal: Type S-6

C. Sanitary Joints:

1. Walls to Plumbing Fixtures: Type S-9

2. Counter Tops to Walls: Type S-9

3. Pipe Penetrations: Type S-9

D. Horizontal Traffic Joints:

1. Concrete Paving, Unit Pavers: Type S-11 or S-12

2. Garage/Parking Decks: Type S-10

E. High Temperature Joints over 204 degrees C (400 degrees F):

1. Exhaust Pipes, Flues, Breech Stacks: Type S-7 or S-8

F. Interior Caulking:

1. Typical Narrow Joint 6 mm, (1/4 inch) or less at Walls and Adjacent Components: Types C-1 and C-2.

2. Perimeter of Doors, Windows, Access Panels which Adjoin Concrete or Masonry Surfaces: Types C-1 and C-2.

3. Joints at Masonry Walls and Columns, Piers, Concrete Walls or Exterior Walls: Types C-1 and C-2.

4. Perimeter of Lead Faced Control Windows and Plaster or Gypsum Wallboard Walls: Types C-1 and C-2.

5. Exposed Isolation Joints at Top of Full Height Walls: Types C-1 and C-2.

6. Exposed Acoustical Joint at Sound Rated Partitions Type C-2.

7. Concealed Acoustic Sealant Types S-4, C-1 and C-2.

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SECTION 08 71 00
DOOR HARDWARE

PART 1 - GENERAL

1.1 DESCRIPTION

A. Door hardware and related items necessary for complete installation and operation of doors.

1.2 RELATED WORK

A. Section 28 13 50, Door Access Control Basic Requirements.

B. Section 28 13 53, Door Access Control Devices and Cabling.

1.3 GENERAL

A. All hardware shall comply with UFAS, (Uniform Federal Accessible Standards) unless specified otherwise.

1.4 MAINTENANCE MANUALS

A. In accordance with Section 01 00 00, GENERAL REQUIREMENTS Article titled "INSTRUCTIONS", furnish maintenance manuals and instructions on all door hardware. Provide installation instructions with the submittal documentation.

1.5 SUBMITTALS

A. Submittals shall be in accordance with Section 01 33 23, SHOP DRAWINGS, PRODUCT DATA AND SAMPLES. Submit 6 copies of the schedule per Section 01 33 23. Submit 2 final copies of the final approved schedules to VAMC Locksmith as record copies (VISN Locksmith if the VAMC does not have a locksmith).

B. Hardware Schedule: Prepare and submit hardware schedule in the following form:

Hardware Item	Quantity	Size	Reference Publication Type No.	Finish	Mfr. Name and Catalog No.	Key Control Symbols	UL Mark (if fire rated and listed)	ANSI/BHMA Finish Designation

SAMPLE

C. Samples and Manufacturers' Literature:

1. Samples: All hardware items (proposed for the project) that have not been previously approved by Builders Hardware Manufacturers

Association shall be submitted for approval. Tag and mark all items with manufacturer's name, catalog number and project number.

2. Samples are not required for hardware listed in the specifications by manufacturer's catalog number, if the contractor proposes to use the manufacturer's product specified.

D. Certificate of Compliance and Test Reports: Submit certificates that hardware conforms to the requirements specified herein. Certificates shall be accompanied by copies of reports as referenced. The testing shall have been conducted either in the manufacturer's plant and certified by an independent testing laboratory or conducted in an independent laboratory, within four years of submittal of reports for approval.

1.6 DELIVERY AND MARKING

A. Deliver items of hardware to job site in their original containers, complete with necessary appurtenances including screws, keys, and instructions. Tag one of each different item of hardware and deliver to Resident Engineer for reference purposes. Tag shall identify items by Project Specification number and manufacturer's catalog number. These items shall remain on file in Resident Engineer's office until all other similar items have been installed in project, at which time the Resident Engineer will deliver items on file to Contractor for installation in predetermined locations on the project.

1.7 PREINSTALLATION MEETING

A. Convene a preinstallation meeting not less than 30 days before start of installation of door hardware. Require attendance of parties directly affecting work of this section, including Contractor and Installer, Project Engineer and VA Locksmith, Hardware Consultant, and Hardware Manufacturer’s Representative. Review the following:

1. Inspection of door hardware.
2. Job and surface readiness.
3. Coordination with other work.
4. Protection of hardware surfaces.
5. Substrate surface protection.
6. Installation.
7. Adjusting.
8. Repair.
9. Field quality control.
10. Cleaning.

1.8 INSTRUCTIONS

A. Hardware Set Symbols on Drawings: Except for protective plates, door stops, mutes, thresholds and the like specified herein, hardware requirements for each door are indicated on drawings by symbols. Symbols for hardware sets consist of letters (e.g., "HW") followed by a number. Each number designates a set of hardware items applicable to a door type.

1.9 APPLICABLE PUBLICATIONS

A. The publications listed below form a part of this specification to the extent referenced. The publications are referenced in the text by the basic designation only. In text, hardware items are referred to by series, types, etc., listed in such specifications and standards, except as otherwise specified.

B. American Society for Testing and Materials (ASTM):
E2180-07.....Standard Test Method for Determining the Activity of Incorporated Antimicrobial Agent(s) In Polymeric or Hydrophobic Materials

C. American National Standards Institute/Builders Hardware Manufacturers Association (ANSI/BHMA):
A156.31-07 .....Electric Strikes and Frame Mounted Actuators
A250.8-03.....Standard Steel Doors and Frames

D. National Fire Protection Association (NFPA):
80-10.....Fire Doors and Fire Windows
101-09.....Life Safety Code

E. Underwriters Laboratories, Inc. (UL):
Building Materials Directory (2008)

PART 2 - PRODUCTS

2.1 ELECTRIC STRIKES

A. ANSI/ BHMA A156.31 Grade 1.

B. General: Use fail-secure electric strikes at fire-rated doors.

2.2 FINISHES

A. Exposed surfaces of hardware shall have ANSI A156.18, finishes as specified below. Finishes on all hinges, pivots, closers, thresholds, etc., shall be as specified below under "Miscellaneous Finishes." For

field painting (final coat) of ferrous hardware, see Section 09 91 00, PAINTING.

B. 626 or 630: All surfaces on exterior and interior of buildings, except where other finishes are specified.

2.3 BASE METALS

A. Apply specified U.S. Standard finishes on different base metals as following:

Finish	Base Metal
652	Steel
626	Brass or bronze
630	Stainless steel

PART 3 - EXECUTION

3.1 FINAL INSPECTION

A. Installer to provide letter to VA Resident/Project Engineer that upon completion, installer has visited the Project and has accomplished the following:
   1. Re-adjust hardware.
   2. Evaluate maintenance procedures and recommend changes or additions, and instruct VA personnel.
   3. Identify items that have deteriorated or failed.
   4. Submit written report identifying problems.

3.2 DEMONSTRATION

A. Demonstrate efficacy of mechanical hardware and electrical, and electronic hardware systems, including adjustment and maintenance procedures, to satisfaction of Resident/Project Engineer and VA Locksmith.

3.3 HARDWARE SETS

A. Hardware sets shown on drawings and assorted contract files will be required.

B. Hardware Consultant working on a project will be responsible for providing additional information regarding these hardware sets.

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SECTION 26 05 11

REQUIREMENTS FOR ELECTRICAL INSTALLATIONS

PART 1 - GENERAL

1.1 DESCRIPTION

A. This section applies to all sections of Division 26.

B. Furnish and install electrical systems, materials, equipment, and accessories in accordance with the specifications and drawings. Capacities and ratings of motors, conductors and cable, switchboards, panelboards, generators, automatic transfer switches, and other items and arrangements for the specified items are shown on the drawings.

C. Conductor ampacities specified or shown on the drawings are based on copper conductors, with the conduit and raceways sized per NEC. Aluminum conductors are prohibited.

1.2 MINIMUM REQUIREMENTS

A. The International Building Code (IBC), National Electrical Code (NEC), Underwriters Laboratories, Inc. (UL), and National Fire Protection Association (NFPA) codes and standards are the minimum requirements for materials and installation.

B. The drawings and specifications shall govern in those instances where requirements are greater than those stated in the above codes and standards.

1.3 TEST STANDARDS

A. All materials and equipment shall be listed, labeled, or certified by a Nationally Recognized Testing Laboratory (NRTL) to meet Underwriters Laboratories, Inc. (UL), standards where test standards have been established. Materials and equipment which are not covered by UL standards will be accepted, providing that materials and equipment are listed, labeled, certified or otherwise determined to meet the safety requirements of a NRTL. Materials and equipment which no NRTL accepts, certifies, lists, labels, or determines to be safe, will be considered if inspected or tested in accordance with national industrial standards, such as ANSI, NEMA, and NETA. Evidence of compliance shall include certified test reports and definitive shop drawings.

B. Definitions:

1. Listed: Materials and equipment included in a list published by an organization that is acceptable to the Authority Having Jurisdiction and concerned with evaluation of products or services, that

maintains periodic inspection of production or listed materials and equipment or periodic evaluation of services, and whose listing states that the materials and equipment either meets appropriate designated standards or has been tested and found suitable for a specified purpose.

2. Labeled: Materials and equipment to which has been attached a label, symbol, or other identifying mark of an organization that is acceptable to the Authority Having Jurisdiction and concerned with product evaluation, that maintains periodic inspection of production of labeled materials and equipment, and by whose labeling the manufacturer indicates compliance with appropriate standards or performance in a specified manner.
3. Certified: Materials and equipment which:
   a. Have been tested and found by a NRTL to meet nationally recognized standards or to be safe for use in a specified manner.
   b. Are periodically inspected by a NRTL.
   c. Bear a label, tag, or other record of certification.
4. Nationally Recognized Testing Laboratory: Testing laboratory which is recognized and approved by the Secretary of Labor in accordance with OSHA regulations.

1.4 QUALIFICATIONS (PRODUCTS AND SERVICES)

A. Manufacturer’s Qualifications: The manufacturer shall regularly and currently produce, as one of the manufacturer's principal products, the materials and equipment specified for this project, and shall have manufactured the materials and equipment for at least three years.

B. Product Qualification:
   1. Manufacturer's materials and equipment shall have been in satisfactory operation, on three installations of similar size and type as this project, for at least three years.
   2. The Government reserves the right to require the Contractor to submit a list of installations where the materials and equipment have been in operation before approval.

C. Service Qualifications: There shall be a permanent service organization maintained or trained by the manufacturer which will render satisfactory service to this installation within four hours of receipt of notification that service is needed. Submit name and address of service organizations.

D. Installer Qualifications: The installer of all electrical equipment shall be a licensed journeyman electrician with a minimum of 5 years' experience in similar electrical work.

1.5 APPLICABLE PUBLICATIONS

A. Applicable publications listed in all Sections of Division 26 are the latest issue, unless otherwise noted.

B. Products specified in all sections of Division 26 shall comply with the applicable publications listed in each section.

1.6 MANUFACTURED PRODUCTS

A. Materials and equipment furnished shall be of current production by manufacturers regularly engaged in the manufacture of such items, and for which replacement parts shall be available. Materials and equipment furnished shall be new, and shall have superior quality and freshness.

B. When more than one unit of the same class or type of materials and equipment is required, such units shall be the product of a single manufacturer.

C. Equipment Assemblies and Components:

1. Components of an assembled unit need not be products of the same manufacturer.
2. Manufacturers of equipment assemblies, which include components made by others, shall assume complete responsibility for the final assembled unit.
3. Components shall be compatible with each other and with the total assembly for the intended service.
4. Constituent parts which are similar shall be the product of a single manufacturer.

D. Factory wiring and terminals shall be identified on the equipment being furnished and on all wiring diagrams.

E. When Factory Tests are specified, Factory Tests shall be performed in the factory by the equipment manufacturer, and witnessed by the contractor. In addition, the following requirements shall be complied with:

1. The Government shall have the option of witnessing factory tests. The Contractor shall notify the Government through the COR a minimum of thirty (30) days prior to the manufacturer's performing of the factory tests.

2. When factory tests are successful, contractor shall furnish four (4) copies of the equipment manufacturer's certified test reports to the COR fourteen (14) days prior to shipment of the equipment, and not more than ninety (90) days after completion of the factory tests.
3. When factory tests are not successful, factory tests shall be repeated in the factory by the equipment manufacturer, and witnessed by the Contractor. The Contractor shall be liable for all additional expenses for the Government to witness factory re-testing.

1.7 VARIATIONS FROM CONTRACT REQUIREMENTS

A. Where the Government or the Contractor requests variations from the contract requirements, the connecting work and related components shall include, but not be limited to additions or changes to branch circuits, circuit protective devices, conduits, wire, feeders, controls, panels and installation methods.

1.8 MATERIALS AND EQUIPMENT PROTECTION

A. Materials and equipment shall be protected during shipment and storage against physical damage, vermin, dirt, corrosive substances, fumes, moisture, cold and rain.
1. Store materials and equipment indoors in clean dry space with uniform temperature to prevent condensation.
2. During installation, equipment shall be protected against entry of foreign matter, and be vacuum-cleaned both inside and outside before testing and operating. Compressed air shall not be used to clean equipment. Remove loose packing and flammable materials from inside equipment.
3. Damaged equipment shall be repaired or replaced, as determined by the COR.
4. Painted surfaces shall be protected with factory installed removable heavy kraft paper, sheet vinyl or equal.
5. Damaged paint on equipment shall be refinished with the same quality of paint and workmanship as used by the manufacturer so repaired areas are not obvious.

1.9 WORK PERFORMANCE

A. All electrical work shall comply with the requirements of NFPA 70 (NEC), NFPA 70B, NFPA 70E, OSHA Part 1910 subpart J – General Environmental Controls, OSHA Part 1910 subpart K – Medical and First

Aid, and OSHA Part 1910 subpart S – Electrical, in addition to other references required by contract.

B. Job site safety and worker safety is the responsibility of the Contractor.

C. Electrical work shall be accomplished with all affected circuits or equipment de-energized. When an electrical outage cannot be accomplished in this manner for the required work, the following requirements are mandatory:

1. Electricians must use full protective equipment (i.e., certified and tested insulating material to cover exposed energized electrical components, certified and tested insulated tools, etc.) while working on energized systems in accordance with NFPA 70E.
2. Before initiating any work, a job specific work plan must be developed by the Contractor with a peer review conducted and documented by the COR and Medical Center staff. The work plan must include procedures to be used on and near the live electrical equipment, barriers to be installed, safety equipment to be used, and exit pathways.
3. Work on energized circuits or equipment cannot begin until prior written approval is obtained from the COR.

D. For work that affects existing electrical systems, arrange, phase and perform work to assure minimal interference with normal functioning of the facility. Refer to Article OPERATIONS AND STORAGE AREAS under Section 01 00 00, GENERAL REQUIREMENTS.

E. New work shall be installed and connected to existing work neatly, safely and professionally. Disturbed or damaged work shall be replaced or repaired to its prior conditions, as required by Section 01 00 00, GENERAL REQUIREMENTS.

F. Coordinate location of equipment and conduit with other trades to minimize interference.

1.10 EQUIPMENT INSTALLATION AND REQUIREMENTS

A. Equipment location shall be as close as practical to locations shown on the drawings.

B. Working clearances shall not be less than specified in the NEC.

C. Inaccessible Equipment:

1. Where the Government determines that the Contractor has installed equipment not readily accessible for operation and maintenance, the

equipment shall be removed and reinstalled as directed at no additional cost to the Government.

2. "Readily accessible" is defined as being capable of being reached quickly for operation, maintenance, or inspections 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.

1.11 EQUIPMENT IDENTIFICATION

A. In addition to the requirements of the NEC, install an identification sign which clearly indicates information required for use and maintenance of items such as switchboards and switchgear, panelboards, cabinets, motor controllers, fused and non-fused safety switches, generators, automatic transfer switches, separately enclosed circuit breakers, individual breakers and controllers in switchboards, switchgear and motor control assemblies, control devices and other significant equipment.

B. Identification signs for Normal Power System equipment shall be laminated black phenolic resin with a white core with engraved lettering. Identification signs for Essential Electrical System (EES) equipment, as defined in the NEC, shall be laminated red phenolic resin with a white core with engraved lettering. Lettering shall be a minimum of 12 mm (1/2 inch) high. Identification signs shall indicate equipment designation, rated bus amperage, voltage, number of phases, number of wires, and type of EES power branch as applicable. Secure nameplates with screws.

C. Install adhesive arc flash warning labels on all equipment as required by NFPA 70E. Label shall show specific and correct information for specific equipment based on its arc flash calculations. Label shall show the followings:

1. Nominal system voltage.
2. Arc flash boundary (inches).
3. Available arc flash incident energy at the corresponding working distance (calories/cm2).
4. Required PPE category and description.
5. limited approach distance (inches), restricted approach distance (inches).
6. Equipment/bus name, date prepared, and manufacturer name and address.

1.12 SUBMITTALS

A. Submit to the COR in accordance with Section 01 33 23, SHOP DRAWINGS, PRODUCT DATA, AND SAMPLES.

B. The Government's approval shall be obtained for all materials and equipment before delivery to the job site. Delivery, storage or installation of materials and equipment which has not had prior approval will not be permitted.

C. All submittals shall include six copies of adequate descriptive literature, catalog cuts, shop drawings, test reports, certifications, samples, and other data necessary for the Government to ascertain that the proposed materials and equipment comply with drawing and specification requirements. Catalog cuts submitted for approval shall be legible and clearly identify specific materials and equipment being submitted.

D. Submittals for individual systems and equipment assemblies which consist of more than one item or component shall be made for the system or assembly as a whole. Partial submittals will not be considered for approval.

1. Mark the submittals, "SUBMITTED UNDER SECTION_____".
2. Submittals shall be marked to show specification reference including the section and paragraph numbers.
3. Submit each section separately.

E. The submittals shall include the following:

1. Information that confirms compliance with contract requirements. Include the manufacturer's name, model or catalog numbers, catalog information, technical data sheets, shop drawings, manuals, pictures, nameplate data, and test reports as required.

2. Submittals are required for all equipment anchors and supports. Submittals shall include weights, dimensions, center of gravity, standard connections, manufacturer's recommendations and behavior problems (e.g., vibration, thermal expansion, etc.) associated with equipment or piping so that the proposed installation can be properly reviewed. Include sufficient fabrication information so that appropriate mounting and securing provisions may be designed and attached to the equipment.

3. Elementary and interconnection wiring diagrams for communication and signal systems, control systems, and equipment assemblies. All terminal points and wiring shall be identified on wiring diagrams.
4. Parts list which shall include information for replacement parts and ordering instructions, as recommended by the equipment manufacturer.

F. Maintenance and Operation Manuals:

1. Submit as required for systems and equipment specified in the technical sections. Furnish in hardcover binders or an approved equivalent.
2. Inscribe the following identification on the cover: the words "MAINTENANCE AND OPERATION MANUAL," the name and location of the system, material, equipment, building, name of Contractor, and contract name and 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 material 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 instructions.
   e. Safety precautions for operation and maintenance.
   f. Diagrams and illustrations.
   g. Periodic maintenance and testing procedures and frequencies, including replacement parts numbers.
   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 and replacement parts, and name of servicing organization.
   j. List of factory approved or qualified permanent servicing organizations for equipment repair and periodic testing and

maintenance, including addresses and factory certification qualifications.

G. Approvals will be based on complete submission of shop drawings, manuals, test reports, certifications, and samples as applicable.

H. After approval and prior to installation, furnish the COR with one sample of each of the following:

1. A minimum 300 mm (12 inches) length of each type and size of wire and cable along with the tag from the coils or reels from which the sample was taken. The length of the sample shall be sufficient to show all markings provided by the manufacturer.
2. Each type of conduit coupling, bushing, and termination fitting.
3. Conduit hangers, clamps, and supports.
4. Duct sealing compound.
5. Each type of receptacle, toggle switch, lighting control sensor, outlet box, manual motor starter, device wall plate, engraved nameplate, wire and cable splicing and terminating material, and branch circuit single pole molded case circuit breaker.

1.13 SINGULAR NUMBER

A. Where any device or part of equipment is referred to in these specifications in the singular number (e.g., "the switch"), this reference shall be deemed to apply to as many such devices as are required to complete the installation as shown on the drawings.

1.15 ACCEPTANCE CHECKS AND TESTS

A. The Contractor shall furnish the instruments, materials, and labor for tests.

B. Where systems are comprised of components specified in more than one section of Division 26, the Contractor shall coordinate the installation, testing, and adjustment of all components between various manufacturer’s representatives and technicians so that a complete, functional, and operational system is delivered to the Government.

C. When test results indicate any defects, the Contractor shall repair or replace the defective materials or equipment, and repeat the tests. Repair, replacement, and retesting shall be accomplished at no additional cost to the Government.

1.16 WARRANTY

A. All work performed and all equipment and material furnished under this Division shall be free from defects and shall remain so for a period of

one year from the date of acceptance of the entire installation by the Contracting Officer for the Government.

1.17 INSTRUCTION

A. Instruction to designated Government personnel shall be provided for the particular equipment or system as required in each associated technical specification section.

B. Furnish the services of competent and factory-trained instructors to give full instruction in the adjustment, operation, and maintenance of the specified equipment and system, including pertinent safety requirements. Instructors shall be thoroughly familiar with all aspects of the installation, and shall be factory-trained in operating theory as well as practical operation and maintenance procedures.

C. A training schedule shall be developed and submitted by the Contractor and approved by the COR at least 30 days prior to the planned training.

PART 2 - PRODUCTS (NOT USED)

PART 3 - EXECUTION (NOT USED)

---END---

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

PART 1 - GENERAL

1.1 DESCRIPTION

A. This section specifies the furnishing, installation, connection, and testing of the electrical conductors and cables for use in electrical systems rated 600 V and below, indicated as cable(s), conductor(s), wire, or wiring in this section.

1.2 RELATED WORK

A. Section 07 84 00, FIRESTOPPING: Sealing around penetrations to maintain the integrity of fire-resistant rated construction.

B. Section 26 05 11, REQUIREMENTS FOR ELECTRICAL INSTALLATIONS: Requirements that apply to all sections of Division 26.

C. Section 26 05 26, GROUNDING AND BONDING FOR ELECTRICAL SYSTEMS: Requirements for personnel safety and to provide a low impedance path for possible ground fault currents.

D. Section 26 05 33, RACEWAY AND BOXES FOR ELECTRICAL SYSTEMS: Conduits for conductors and cables.

E. Section 26 05 41, UNDERGROUND ELECTRICAL CONSTRUCTION: Installation of conductors and cables in manholes and ducts.

1.3 QUALITY ASSURANCE

A. Refer to Paragraph, QUALIFICATIONS (PRODUCTS AND SERVICES), in Section 26 05 11, REQUIREMENTS FOR ELECTRICAL INSTALLATIONS.

1.4 FACTORY TESTS

A. Conductors and cables shall be thoroughly tested at the factory per NEMA to ensure that there are no electrical defects. Factory tests shall be certified.

1.5 SUBMITTALS

A. Submit six copies of the following in accordance with Section 26 05 11, REQUIREMENTS FOR ELECTRICAL INSTALLATIONS.

1. Shop Drawings:
   a. Submit sufficient information to demonstrate compliance with drawings and specifications.
   b. Submit the following data for approval:
      1) Electrical ratings and insulation type for each conductor and cable.
      2) Splicing materials and pulling lubricant.

2. Certifications: Two weeks prior to final inspection, submit the following.
   a. Certification by the manufacturer that the conductors and cables conform to the requirements of the drawings and specifications.
   b. Certification by the Contractor that the conductors and cables have been properly installed, adjusted, and tested.

1.6 APPLICABLE PUBLICATIONS

A. Publications listed below (including amendments, addenda, revisions, supplements and errata) form a part of this specification to the extent referenced. Publications are reference in the text by designation only.

B. American Society of Testing Material (ASTM):

D2301-10.....Standard Specification for Vinyl Chloride Plastic Pressure-Sensitive Electrical Insulating Tape

D2304-10.....Test Method for Thermal Endurance of Rigid Electrical Insulating Materials

D3005-10.....Low-Temperature Resistant Vinyl Chloride Plastic Pressure-Sensitive Electrical Insulating Tape

C. National Electrical Manufacturers Association (NEMA):

WC 70-09.....Power Cables Rated 2000 Volts or Less for the Distribution of Electrical Energy

D. National Fire Protection Association (NFPA):

70-latest edition.....National Electrical Code (NEC)

E. Underwriters Laboratories, Inc. (UL):

44-10.....Thermoset-Insulated Wires and Cables

83-08.....Thermoplastic-Insulated Wires and Cables

467-07.....Grounding and Bonding Equipment

486A-486B-03.....Wire Connectors

486C-04.....Splicing Wire Connectors

486D-05.....Sealed Wire Connector Systems

486E-09.....Equipment Wiring Terminals for Use with Aluminum and/or Copper Conductors

493-07.....Thermoplastic-Insulated Underground Feeder and Branch Circuit Cables

514B-04.....Conduit, Tubing, and Cable Fittings

PART 2 - PRODUCTS

2.1 CONDUCTORS AND CABLES

A. Conductors and cables shall be in accordance with NEMA, UL, as specified herein, and as shown on the drawings.

B. All conductors shall be copper.

C. Single Conductor and Cable:

1. No. 12 AWG: Minimum size, except where smaller sizes are specified herein or shown on the drawings.
2. No. 8 AWG and larger: Stranded.
3. No. 10 AWG and smaller: Solid; except shall be stranded for final connection to motors, transformers, and vibrating equipment.
4. Insulation: THHN-THWN and XHHW-2. XHHW-2 shall be used for isolated power systems.

D. Color Code:

1. No. 10 AWG and smaller: Solid color insulation or solid color coating.
2. No. 8 AWG and larger: Color-coded using one of the following methods:
   a. Solid color insulation or solid color coating.
   b. Stripes, bands, or hash marks of color specified.
   c. Color using 19 mm (0.75 inches) wide tape.
4. For modifications and additions to existing wiring systems, color coding shall conform to the existing wiring system.
5. Conductors shall be color-coded as follows:

208/120 V	Phase	480/277 V
Black	A	Brown
Red	B	Orange
Blue	C	Yellow
White	Neutral	Gray *
* or white with colored (other than green) tracer.		

6. Lighting circuit “switch legs”, and 3-way and 4-way switch “traveling wires,” shall have color coding that is unique and distinct (e.g., pink and purple) from the color coding indicated above. The unique color codes shall be solid and in accordance with the NEC. Coordinate color coding in the field with the COR.
7. Color code for isolated power system wiring shall be in accordance with the NEC.

2.2 SPLICES

A. Splices shall be in accordance with NEC and UL.

B. Above Ground Splices for No. 10 AWG and Smaller:

1. Solderless, screw-on, reusable pressure cable type, with integral insulation, approved for copper and aluminum conductors.
2. The integral insulator shall have a skirt to completely cover the stripped conductors.
3. The number, size, and combination of conductors used with the connector, as listed on the manufacturer's packaging, shall be strictly followed.

C. Above Ground Splices for No. 8 AWG to No. 4/0 AWG:

1. Compression, hex screw, or bolt clamp-type of high conductivity and corrosion-resistant material, listed for use with copper and aluminum conductors.
2. Insulate with materials approved for the particular use, location, voltage, and temperature. Insulation level shall be not less than the insulation level of the conductors being joined.

D. Above Ground Splices for 250 kcmil and Larger:

1. Long barrel “butt-splice” or “sleeve” type compression connectors, with minimum of two compression indents per wire, listed for use with copper and aluminum conductors.
2. Insulate with materials approved for the particular use, location, voltage, and temperature. Insulation level shall be not less than the insulation level of the conductors being joined.

E. Underground Splices for No. 10 AWG and Smaller:

1. Solderless, screw-on, reusable pressure cable type, with integral insulation. Listed for wet locations, and approved for copper and aluminum conductors.
2. The integral insulator shall have a skirt to completely cover the stripped conductors.
3. The number, size, and combination of conductors used with the connector, as listed on the manufacturer's packaging, shall be strictly followed.

F. Underground Splices for No. 8 AWG and Larger:

1. Mechanical type, of high conductivity and corrosion-resistant material. Listed for wet locations, and approved for copper and aluminum conductors.

2. Insulate with materials approved for the particular use, location, voltage, and temperature. Insulation level shall be not less than the insulation level of the conductors being joined.
3. Splice and insulation shall be product of the same manufacturer.

G. Plastic electrical insulating tape: Per ASTM D2304, flame-retardant, cold and weather resistant.

2.3 CONNECTORS AND TERMINATIONS

A. Mechanical type of high conductivity and corrosion-resistant material, listed for use with copper and aluminum conductors.

B. Long barrel compression type of high conductivity and corrosion-resistant material, with minimum of two compression indents per wire, listed for use with copper and aluminum conductors.

2.4 CONTROL WIRING

A. Unless otherwise specified elsewhere in these specifications, control wiring shall be as specified herein, except that the minimum size shall be not less than No. 14 AWG.

B. Control wiring shall be sized such that the voltage drop under in-rush conditions does not adversely affect operation of the controls.

2.5 WIRE LUBRICATING COMPOUND

A. Lubricating compound shall be suitable for the wire insulation and conduit, and shall not harden or become adhesive.

PART 3 - EXECUTION

3.1 GENERAL

A. Install conductors in accordance with the NEC, as specified, and as shown on the drawings.

B. Install all conductors in raceway systems.

C. Splice conductors only in outlet boxes, junction boxes, pullboxes, or handholes.

D. Conductors of different systems (e.g., 120 V and 277 V) shall not be installed in the same raceway.

E. Install cable supports for all vertical feeders in accordance with the NEC. Provide split wedge type which firmly clamps each individual cable and tightens due to cable weight.

F. In panelboards, cabinets, wireways, switches, enclosures, and equipment assemblies, neatly form, train, and tie the conductors with non-metallic ties.

G. For connections to motors, transformers, and vibrating equipment, stranded conductors shall be used only from the last fixed point of connection to the motors, transformers, or vibrating equipment.

H. Seal conduits entering a building, after installation of conductors with an approved non-hardening compound.

I. Conductor and Cable Pulling:

1. Provide installation equipment that will prevent the cutting or abrasion of insulation during pulling. Use lubricants approved for the cable.
2. Use nonmetallic pull ropes.
3. Attach pull ropes by means of either woven basket grips or pulling eyes attached directly to the conductors.
4. All conductors in a single conduit shall be pulled simultaneously.
5. Do not exceed manufacturer’s recommended maximum pulling tensions and sidewall pressure values.

J. No more than three branch circuits shall be installed in any one conduit.

K. When stripping stranded conductors, use a tool that does not damage the conductor or remove conductor strands.

3.2 SPLICE AND TERMINATION INSTALLATION

A. Splices and terminations shall be mechanically and electrically secure, and tightened to manufacturer’s published torque values using a torque screwdriver or wrench.

B. Where the Government determines that unsatisfactory splices or terminations have been installed, replace the splices or terminations at no additional cost to the Government.

3.3 CONDUCTOR IDENTIFICATION

A. When using colored tape to identify phase, neutral, and ground conductors larger than No. 8 AWG, apply tape in half-overlapping turns for a minimum of 75 mm (3 inches) from terminal points, and in junction boxes, pullboxes, and manholes. Apply the last two laps of tape with no tension to prevent possible unwinding. Where cable markings are covered by tape, apply tags to cable, stating size and insulation type.

3.4 FEEDER CONDUCTOR IDENTIFICATION

A. In each pullbox or junction box install brass tags on all feeder conductors to clearly designate their circuit identification and voltage. The tags shall be the embossed type, 40 mm (1-1/2 inches) in diameter and 40 mils thick. Attach tags with plastic ties.

3.5 EXISTING CONDUCTORS

A. Unless specifically indicated on the plans, existing conductors shall not be reused.

3.6 CONTROL WIRING INSTALLATION

A. Unless otherwise specified in other sections, install control wiring and connect to equipment to perform the required functions as specified or as shown on the drawings.

3.7 CONTROL WIRING IDENTIFICATION

A. Install a permanent wire marker on each wire at each termination.

B. Identifying numbers and letters on the wire markers shall correspond to those on the wiring diagrams used for installing the systems.

C. Wire markers shall retain their markings after cleaning.

D. In each manhole and handhole, install embossed brass tags to identify the system served and function.

3.8 ACCEPTANCE CHECKS AND TESTS

A. Perform in accordance with the manufacturer's recommendations. In addition, include the following:

1. Visual Inspection and Tests: Inspect physical condition.
2. Electrical tests:
   a. After installation but before connection to utilization devices, such as fixtures, motors, or appliances, test conductors phase-to-phase and phase-to-ground resistance with an insulation resistance tester. Existing conductors to be reused shall also be tested.
   b. Applied voltage shall be 500 V DC for 300 V rated cable, and 1000 V DC for 600 V rated cable. Apply test for one minute or until reading is constant for 15 seconds, whichever is longer. Minimum insulation resistance values shall not be less than 25 megohms for 300 V rated cable and 100 megohms for 600 V rated cable.
   c. Perform phase rotation test on all three-phase circuits.

---END---

SECTION 26 05 26
GROUNDING AND BONDING FOR ELECTRICAL SYSTEMS

PART 1 - GENERAL

1.1 DESCRIPTION

A. This section specifies the furnishing, installation, connection, and testing of grounding and bonding equipment, indicated as grounding equipment in this section.

B. “Grounding electrode system” refers to grounding electrode conductors and all electrodes required or allowed by NEC, as well as made, supplementary, and lightning protection system grounding electrodes.

C. The terms “connect” and “bond” are used interchangeably in this section and have the same meaning.

1.2 RELATED WORK

A. Section 26 05 11, REQUIREMENTS FOR ELECTRICAL INSTALLATIONS: Requirements that apply to all sections of Division 26.

B. Section 26 05 19, LOW-VOLTAGE ELECTRICAL POWER CONDUCTORS AND CABLES: Low-voltage conductors.

C. Section 26 05 33, RACEWAY AND BOXES FOR ELECTRICAL SYSTEMS: Conduit and boxes.

D. Section 26 23 13, GENERATOR PARALLELING CONTROLS: Generator paralleling controls.

E. Section 26 23 00, LOW-VOLTAGE SWITCHGEAR: Low-voltage switchgear.

F. Section 26 24 16, PANELBOARDS: Low-voltage panelboards.

G. Section 26 32 13, ENGINE GENERATORS: Engine generators.

H. Section 26 36 23, AUTOMATIC TRANSFER SWITCHES: Automatic transfer switches.

1.3 QUALITY ASSURANCE

A. Refer to Paragraph, QUALIFICATIONS (PRODUCTS AND SERVICES), in Section 26 05 11, REQUIREMENTS FOR ELECTRICAL INSTALLATIONS.

1.4 SUBMITTALS

A. Submit six copies of the following in accordance with Section 26 05 11, REQUIREMENTS FOR ELECTRICAL INSTALLATIONS.

1. Shop Drawings:

a. Submit sufficient information to demonstrate compliance with drawings and specifications.

b. Submit plans showing the location of system grounding electrodes and connections, and the routing of aboveground and underground grounding electrode conductors.

2. Test Reports:

a. Two weeks prior to the final inspection, submit ground resistance field test reports to the COR.

3. Certifications:

a. Certification by the Contractor that the grounding equipment has been properly installed and tested.

1.5 APPLICABLE PUBLICATIONS

A. Publications listed below (including amendments, addenda, revisions, supplements, and errata) form a part of this specification to the extent referenced. Publications are referenced in the text by designation only.

B. American Society for Testing and Materials (ASTM):

B1-07.....Standard Specification for Hard-Drawn Copper Wire

B3-07.....Standard Specification for Soft or Annealed Copper Wire

B8-11.....Standard Specification for Concentric-Lay-Stranded Copper Conductors, Hard, Medium-Hard, or Soft

C. Institute of Electrical and Electronics Engineers, Inc. (IEEE):

81-83.....IEEE Guide for Measuring Earth Resistivity, Ground Impedance, and Earth Surface Potentials of a Ground System Part 1: Normal Measurements

D. National Fire Protection Association (NFPA):

70-latest edition.....National Electrical Code (NEC)

70E-12.....National Electrical Safety Code

99-12.....Health Care Facilities

E. Underwriters Laboratories, Inc. (UL):

44-10 .....Thermoset-Insulated Wires and Cables

83-08 .....Thermoplastic-Insulated Wires and Cables

467-07 .....Grounding and Bonding Equipment

PART 2 - PRODUCTS

2.1 GROUNDING AND BONDING CONDUCTORS

A. Equipment grounding conductors shall be insulated stranded copper, except that 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 identified per NEC.

B. Bonding conductors shall be bare stranded copper, except that sizes No. 10 AWG and smaller shall be bare solid copper. Bonding conductors shall be stranded for final connection to motors, transformers, and vibrating equipment.

C. Conductor sizes shall not be less than shown on the drawings, or not less than required by the NEC, whichever is greater.

2.2 GROUND RODS

A. Steel or copper clad steel, 19 mm (0.75 inch) diameter by 3 M (10 feet) long.

B. Quantity of rods shall be as shown on the drawings, and as required to obtain the specified ground resistance.

2.3 CONCRETE ENCASED ELECTRODE

A. Concrete encased electrode shall be No. 4 AWG bare copper wire, installed per NEC.

2.4 GROUND CONNECTIONS

A. Below Grade and Inaccessible Locations: Exothermic-welded type connectors.

B. Above Grade:

1. Bonding Jumpers: For wire sizes No. 8 AWG and larger, use compression-type connectors. For wire sizes smaller than No. 8 AWG, use mechanical type lugs. Connectors or lugs shall use zinc-plated steel bolts, nuts, and washers. Bolts shall be torqued to the values recommended by the manufacturer.
2. Connection to Building Steel: Exothermic-welded type connectors.
3. Connection to Grounding Bus Bars: Use mechanical type or compression type lugs listed for the application.
4. Connection to Equipment Rack and Cabinet Ground Bars: Use mechanical type or compression type lugs listed for the application.

2.5 EQUIPMENT RACK AND CABINET GROUND BARS

A. Provide solid copper ground bars designed for mounting on the framework of open or cabinet-enclosed equipment racks. Ground bars shall have minimum dimensions of 6.3 mm (0.25 inch) thick x 19 mm (0.75 inch) wide, with length as required or as shown on the drawings. Provide insulators and mounting brackets.

2.6 GROUND TERMINAL BLOCKS

A. At any equipment mounting location (e.g., backboards and hinged cover enclosures) where rack-type ground bars cannot be mounted, provide screw-lug type ground terminal blocks.

2.7 GROUNDING BUS BAR

A. Pre-drilled rectangular copper bar with stand-off insulators, minimum 0.25 inch [6.3 mm] thick x 4 inches [100 mm] high in cross-section, length as shown on the drawings, with 0.281 in [7.1 mm] holes spaced 1.125 in [28 mm] apart.

PART 3 - EXECUTION

3.1 GENERAL

A. Install grounding equipment in accordance with the NEC, as shown on the drawings, and as specified herein.

B. System Grounding:

1. Separately derived systems: Ground the secondary neutral.

C. Equipment Grounding: Metallic piping, building structural steel, electrical enclosures, raceways, junction boxes, outlet boxes, cabinets, machine frames, and other conductive items in close proximity with electrical circuits, shall be bonded and grounded.

3.2 INACCESSIBLE GROUNDING CONNECTIONS

A. Make grounding connections, which are normally buried or otherwise inaccessible (except connections for which access for periodic testing in required), by exothermic weld.

3.3 SECONDARY VOLTAGE EQUIPMENT AND CIRCUITS

A. Main Bonding Jumper: Bond the secondary service neutral to the ground bus in the service equipment.

B. Metallic Piping, Building Structural Steel, and Supplemental Electrode(s):

1. Provide a grounding electrode conductor sized per NEC between the service equipment ground bus and all metallic water pipe systems, building structural steel, and supplemental or made electrodes. Provide jumpers across insulating joints in the metallic piping.
2. Provide a supplemental ground electrode as shown on the drawings and bond to the grounding electrode system.

C. Switchgear, Switchboards, Unit Substations, Panelboards, Motor Control Centers, Engine-Generators, Automatic Transfer Switches, and other electrical equipment:
1. Connect the equipment grounding conductors to the ground bus.
2. Connect metallic conduits by grounding bushings and equipment grounding conductor to the equipment ground bus.

D. Transformers:
1. Exterior: Exterior transformers supplying interior service equipment shall have the neutral grounded at the transformer secondary. Provide a grounding electrode at the transformer.
2. Separately derived systems (transformers downstream from service equipment): Ground the secondary neutral at the transformer. Provide a grounding electrode conductor from the transformer to the nearest component of the grounding electrode system.

3.4 RACEWAY

A. Conduit Systems:
1. Ground all metallic conduit systems. All metallic conduit systems shall contain an equipment grounding conductor.
2. Non-metallic conduit systems, except non-metallic feeder conduits that carry a grounded conductor from exterior transformers to interior or building-mounted service entrance equipment, shall contain an equipment grounding conductor.
3. Metallic conduit that only contains a grounding conductor, and is provided for its mechanical protection, shall be bonded to that conductor at the entrance and exit from the conduit.
4. Metallic conduits which terminate without mechanical connection to an electrical equipment housing by means of locknut and bushings or adapters, shall be provided with grounding bushings. Connect bushings with a equipment grounding conductor to the equipment ground bus.

B. Feeders and Branch Circuits: Install equipment grounding conductors with all feeders, and power and lighting branch circuits.

C. Boxes, Cabinets, Enclosures, and Panelboards:
   1. Bond the equipment grounding conductor to each pullbox, junction box, outlet box, device box, cabinets, and other enclosures through which the conductor passes.
   2. Provide lugs in each box and enclosure for equipment grounding conductor termination.

D. Wireway Systems:
   1. Bond the metallic structures of wireway to provide electrical continuity throughout the wireway system, by connecting a No. 6 AWG bonding jumper at all intermediate metallic enclosures and across all section junctions.
   2. Install insulated No. 6 AWG bonding jumpers between the wireway system, bonded as required above, and the closest building ground at each end and approximately every 16 M (50 feet).
   3. Use insulated No. 6 AWG bonding jumpers to ground or bond metallic wireway at each end for all intermediate metallic enclosures and across all section junctions.
   4. Use insulated No. 6 AWG bonding jumpers to ground cable tray to column-mounted building ground plates (pads) at each end and approximately every 15 M (49 feet).

E. Receptacles shall not be grounded through their mounting screws. Ground receptacles with a jumper from the receptacle green ground terminal to the device box ground screw and a jumper to the branch circuit equipment grounding conductor.

F. Ground lighting fixtures to the equipment grounding conductor of the wiring system. Fixtures connected with flexible conduit shall have a green ground wire included with the power wires from the fixture through the flexible conduit to the first outlet box.

G. Fixed electrical appliances and equipment shall be provided with a ground lug for termination of the equipment grounding conductor.

3.5 CORROSION INHIBITORS

A. When making grounding and bonding connections, apply a corrosion inhibitor to all contact surfaces. Use corrosion inhibitor appropriate for protecting a connection between the metals used.

3.6 CONDUCTIVE PIPING

A. Bond all conductive piping systems, interior and exterior, to the grounding electrode system. Bonding connections shall be made as close as practical to the equipment ground bus.

3.7 ELECTRICAL ROOM GROUNDING

A. Provide ground bus bar inside main switchgear / switchboard where incoming feeders are terminated. Connect to pigtail extensions of the building grounding ring, as shown on the drawings.

3.8 GROUND RESISTANCE

A. Grounding system resistance to ground shall not exceed 5 ohms. Make any modifications or additions to the grounding electrode system necessary for compliance without additional cost to the Government. Final tests shall ensure that this requirement is met.

3.9 GROUND ROD INSTALLATION

A. For outdoor installations, drive each rod vertically in the earth, until top of rod is 610 mm (24 inches) below final grade.

B. For indoor installations, leave 100 mm (4 inches) of each rod exposed.

C. Where buried or permanently concealed ground connections are required, make the connections by the exothermic process, to form solid metal joints. Make accessible ground connections with mechanical pressure-type ground connectors.

D. Where rock or impenetrable soil prevents the driving of vertical ground rods, install angled ground rods or grounding electrodes in horizontal trenches to achieve the specified ground resistance.

3.10 ACCEPTANCE CHECKS AND TESTS

A. Resistance of the grounding electrode system shall be measured using a four-terminal fall-of-potential method as defined in IEEE 81. Ground resistance measurements shall be made before the electrical distribution system is energized, and shall be made in normally dry conditions not fewer than 48 hours after the last rainfall.

B. Resistance measurements of separate grounding electrode systems shall be made before the systems are bonded together. The combined resistance of separate systems may be used to meet the required resistance, but the specified number of electrodes must still be provided.

C. Below-grade connections shall be visually inspected by the COR prior to backfilling. The Contractor shall notify the COR 24 hours before the connections are ready for inspection.

---END---

SECTION 26 05 33
RACEWAY AND BOXES FOR ELECTRICAL SYSTEMS

PART 1 - GENERAL

1.1 DESCRIPTION

A. This section specifies the furnishing, installation, and connection of conduit, fittings, and boxes, to form complete, coordinated, grounded raceway systems. Raceways are required for all wiring unless shown or specified otherwise.

B. Definitions: The term conduit, as used in this specification, shall mean any or all of the raceway types specified.

1.2 RELATED WORK

A. Section 07 60 00, FLASHING AND SHEET METAL: Fabrications for the deflection of water away from the building envelope at penetrations.

B. Section 07 84 00, FIRESTOPPING: Sealing around penetrations to maintain the integrity of fire rated construction.

C. Section 07 92 00, JOINT SEALANTS: Sealing around conduit penetrations through the building envelope to prevent moisture migration into the building.

D. Section 09 91 00, PAINTING: Identification and painting of conduit and other devices.

E. Section 13 05 41, SEISMIC RESTRAINT REQUIREMENTS FOR NON-STRUCTURAL COMPONENTS: Conduits bracing.

F. Section 26 05 11, REQUIREMENTS FOR ELECTRICAL INSTALLATIONS: General electrical requirements and items that are common to more than one section of Division 26.

G. Section 26 05 26, GROUNDING AND BONDING FOR ELECTRICAL SYSTEMS: Requirements for personnel safety and to provide a low impedance path for possible ground fault currents.

H. Section 26 05 41, UNDERGROUND ELECTRICAL CONSTRUCTION: Underground conduits.

1.3 QUALITY ASSURANCE

Refer to Paragraph, QUALIFICATIONS, in Section 26 05 11, REQUIREMENTS FOR ELECTRICAL INSTALLATIONS.

1.4 SUBMITTALS

A. Submit six copies of the following in accordance with Section 26 05 11, REQUIREMENTS FOR ELECTRICAL INSTALLATIONS.

1. Shop Drawings:

a. Size and location of main feeders.
b. Size and location of panels and pull-boxes.
c. Layout of required conduit penetrations through structural elements.
d. Submit the following data for approval:
1) Raceway types and sizes.
2) Conduit bodies, connectors and fittings.
3) Junction and pull boxes, types and sizes.

2. Certifications: Two weeks prior to final inspection, submit the following:
a. Certification by the manufacturer that raceways, conduits, conduit bodies, connectors, fittings, junction and pull boxes, and all related equipment conform to the requirements of the drawings and specifications.
b. Certification by the Contractor that raceways, conduits, conduit bodies, connectors, fittings, junction and pull boxes, and all related equipment have been properly installed.

1.5 APPLICABLE PUBLICATIONS

A. Publications listed below (including amendments, addenda, revisions, supplements, and errata) form a part of this specification to the extent referenced. Publications are referenced in the text by designation only.

B. American National Standards Institute (ANSI):
C80.1-05.....Electrical Rigid Steel Conduit
C80.3-05.....Steel Electrical Metal Tubing

C. National Fire Protection Association (NFPA):
70-latest edition.....National Electrical Code (NEC)

D. Underwriters Laboratories, Inc. (UL):
1-05.....Flexible Metal Conduit
5-11.....Surface Metal Raceway and Fittings
6-07.....Electrical Rigid Metal Conduit - Steel
50-95.....Enclosures for Electrical Equipment
360-13.....Liquid-Tight Flexible Steel Conduit
467-13.....Grounding and Bonding Equipment
514A-13.....Metallic Outlet Boxes
514B-12.....Conduit, Tubing, and Cable Fittings
514C-07.....Nonmetallic Outlet Boxes, Flush-Device Boxes and Covers

651-11.....Schedule 40 and 80 Rigid PVC Conduit and Fittings

651A-11.....Type EB and A Rigid PVC Conduit and HDPE Conduit

797-07.....Electrical Metallic Tubing

E. National Electrical Manufacturers Association (NEMA):

TC-2-13.....Electrical Polyvinyl Chloride (PVC) Tubing and Conduit

TC-3-13.....PVC Fittings for Use with Rigid PVC Conduit and Tubing

FB1-12.....Fittings, Cast Metal Boxes and Conduit Bodies for Conduit, Electrical Metallic Tubing and Cable

FB2.10-13.....Selection and Installation Guidelines for Fittings for use with Non-Flexible Conduit or Tubing (Rigid Metal Conduit, Intermediate Metallic Conduit, and Electrical Metallic Tubing)

FB2.20-12.....Selection and Installation Guidelines for Fittings for use with Flexible Electrical Conduit and Cable

F. American Iron and Steel Institute (AISI):

S100-2007.....North American Specification for the Design of Cold-Formed Steel Structural Members

PART 2 - PRODUCTS

2.1 MATERIAL

A. Conduit Size: In accordance with the NEC, but not less than 0.5 in [13 mm] unless otherwise shown. Where permitted by the NEC, 0.5-inch [13 mm] flexible conduit may be used for tap connections to recessed lighting fixtures.

B. Conduit:

1. Size: In accordance with the NEC, but not less than 0.5-inch [13 mm].
2. Rigid Steel Conduit (RMC): Shall conform to UL 6 and ANSI C80.1.
3. Electrical Metallic Tubing (EMT): Shall conform to UL 797 and ANSI C80.3. Maximum size not to exceed 4 inches [105 mm] and shall be permitted only with cable rated 600 V or less.
4. Flexible Metal Conduit: Shall conform to UL 1.

5. Liquid-tight Flexible Metal Conduit: Shall conform to UL 360.
6. Surface Metal Raceway: Shall conform to UL 5.

C. Conduit Fittings:

1. Rigid Steel Conduit Fittings:
   a. Fittings shall meet the requirements of UL 514B and NEMA FB1.
   b. Standard threaded couplings, locknuts, bushings, conduit bodies, and elbows: Only steel or malleable iron materials are acceptable. Integral retractable type IMC couplings are also acceptable.
   c. Locknuts: Bonding type with sharp edges for digging into the metal wall of an enclosure.
   d. Bushings: Metallic insulating type, consisting of an insulating insert, molded or locked into the metallic body of the fitting. Bushings made entirely of metal or nonmetallic material are not permitted.
   e. Erickson (Union-Type) and Set Screw Type Couplings: Approved for use in concrete are permitted for use to complete a conduit run where conduit is installed in concrete. Use set screws of case-hardened steel with hex head and cup point to firmly seat in conduit wall for positive ground. Tightening of set screws with pliers is prohibited.
   f. Sealing Fittings: Threaded cast iron type. Use continuous drain-type sealing fittings to prevent passage of water vapor. In concealed work, install fittings in flush steel boxes with blank cover plates having the same finishes as that of other electrical plates in the room.
2. Electrical Metallic Tubing Fittings:
   a. Fittings and conduit bodies shall meet the requirements of UL 514B, ANSI C80.3, and NEMA FB1.
   b. Only steel or malleable iron materials are acceptable.
   c. Compression Couplings and Connectors: Concrete-tight and rain-tight, with connectors having insulated throats.
   d. Indent-type connectors or couplings are prohibited.
   e. Die-cast or pressure-cast zinc-alloy fittings or fittings made of "pot metal" are prohibited.
4. Flexible Metal Conduit Fittings:

a. Conform to UL 514B. Only steel or malleable iron materials are acceptable.
b. Clamp-type, with insulated throat.

5. Liquid-tight Flexible Metal Conduit Fittings:
   a. Fittings shall meet the requirements of UL 514B and NEMA FB1.
   b. Only steel or malleable iron materials are acceptable.
   c. Fittings must incorporate a threaded grounding cone, a steel or plastic compression ring, and a gland for tightening. Connectors shall have insulated throats.
6. Direct Burial Plastic Conduit Fittings: Fittings shall meet the requirements of UL 514C and NEMA TC3.
7. Surface Metal Raceway Fittings: As recommended by the raceway manufacturer. Include couplings, offsets, elbows, expansion joints, adapters, hold-down straps, end caps, conduit entry fittings, accessories, and other fittings as required for complete system.
8. Expansion and Deflection Couplings:
   a. Conform to UL 467 and UL 514B.
   b. Accommodate a 19 mm (0.75-inch) deflection, expansion, or contraction in any direction, and allow 30 degree angular deflections.
   c. Include internal flexible metal braid, sized to guarantee conduit ground continuity and a low-impedance path for fault currents, in accordance with UL 467 and the NEC tables for equipment grounding conductors.
   d. Jacket: Flexible, corrosion-resistant, watertight, moisture and heat-resistant molded rubber material with stainless steel jacket clamps.

D. Conduit Supports:
1. Parts and Hardware: Zinc-coat or provide equivalent corrosion protection.
2. Individual Conduit Hangers: Designed for the purpose, having a pre-assembled closure bolt and nut, and provisions for receiving a hanger rod.
3. Multiple Conduit (Trapeze) Hangers: Not less than 1.5 x 1.5 inches [38 mm x 38 mm], 12-gauge steel, cold-formed, lipped channels; with not less than 0.375-inch [9 mm] diameter steel hanger rods.
4. Solid Masonry and Concrete Anchors: Self-drilling expansion shields, or machine bolt expansion.

E. Outlet, Junction, and Pull Boxes:
   1. UL-50 and UL-514A.
   2. Rustproof cast metal where required by the NEC or shown on drawings.
   3. Sheet Metal Boxes: Galvanized steel, except where shown on drawings.

F. Metal Wireways: Equip with hinged covers, except as shown on drawings. Include couplings, offsets, elbows, expansion joints, adapters, hold-down straps, end caps, and other fittings to match and mate with wireways as required for a complete system.

PART 3 - EXECUTION

3.1 PENETRATIONS

A. Cutting or Holes:
   1. Cut holes in advance where they should be placed in the structural elements, such as ribs or beams. Obtain the approval of the COR prior to drilling through structural elements.
   2. Cut holes through concrete and masonry in new and existing structures with a diamond core drill or concrete saw. Pneumatic hammers, impact electric, hand, or manual hammer-type drills are not allowed, except when permitted by the COR where working space is limited.

B. Firestop: Where conduits, wireways, and other electrical raceways pass through fire partitions, fire walls, smoke partitions, or floors, install a fire stop that provides an effective barrier against the spread of fire, smoke and gases as specified in Section 07 84 00, FIRESTOPPING.

C. Waterproofing: At floor, exterior wall, and roof conduit penetrations, completely seal the gap around conduit to render it watertight, as specified in Section 07 92 00, JOINT SEALANTS.

3.2 INSTALLATION, GENERAL

A. In accordance with UL, NEC, NEMA, as shown on drawings, and as specified herein.

B. Raceway systems used for Essential Electrical Systems (EES) shall be entirely independent of other raceway systems.

C. Install conduit as follows:
   1. In complete mechanically and electrically continuous runs before pulling in cables or wires.

2. Unless otherwise indicated on the drawings or specified herein, installation of all conduits shall be concealed within finished walls, floors, and ceilings.
3. Flattened, dented, or deformed conduit is not permitted. Remove and replace the damaged conduits with new conduits.
4. Assure conduit installation does not encroach into the ceiling height head room, walkways, or doorways.
5. Cut conduits square, ream, remove burrs, and draw up tight.
6. Independently support conduit at 2.4 M (8 feet) on centers with specified materials and as shown on drawings.
7. Do not use suspended ceilings, suspended ceiling supporting members, lighting fixtures, other conduits, cable tray, boxes, piping, or ducts to support conduits and conduit runs.
8. Support within 300 mm (12 inches) of changes of direction, and within 300 mm (12 inches) of each enclosure to which connected.
9. Close ends of empty conduits with plugs or caps at the rough-in stage until wires are pulled in, to prevent entry of debris.
10. Conduit installations under fume and vent hoods are prohibited.
11. Secure conduits to cabinets, junction boxes, pull-boxes, and outlet boxes with bonding type locknuts. For rigid steel conduit installations, provide a locknut on the inside of the enclosure, made up wrench tight. Do not make conduit connections to junction box covers.
12. Flashing of penetrations of the roof membrane is specified in Section 07 60 00, FLASHING AND SHEET METAL.
13. Conduit bodies shall only be used for changes in direction, and shall not contain splices.

D. Conduit Bends:
1. Make bends with standard conduit bending machines.
2. Conduit hickey may be used for slight offsets and for straightening stubbed out conduits.
3. Bending of conduits with a pipe tee or vise is prohibited.

E. Layout and Homeruns:
1. Install conduit with wiring, including homeruns, as shown on drawings.
2. Deviations: Make only where necessary to avoid interferences and only after drawings showing the proposed deviations have been submitted and approved by the COR.

3.3 CONCEALED WORK INSTALLATION

A. In Concrete:

1. Conduit: Rigid steel or EMT. Do not install EMT in concrete slabs that are in contact with soil, gravel, or vapor barriers.
2. Align and run conduit in direct lines.
3. Install conduit through concrete beams only:
   a. Where shown on the structural drawings.
   b. As approved by the COR prior to construction, and after submittal of drawing showing location, size, and position of each penetration.
4. Installation of conduit in concrete that is less than 75 mm (3 inches) thick is prohibited.
   a. Conduit outside diameter larger than one-third of the slab thickness is prohibited.
   b. Space between conduits in slabs: Approximately six conduit diameters apart, and one conduit diameter at conduit crossings.
   c. Install conduits approximately in the center of the slab so that there will be a minimum of 19 mm (0.75-inch) of concrete around the conduits.
5. Make couplings and connections watertight. Use thread compounds that are UL approved conductive type to ensure low resistance ground continuity through the conduits. Tightening setscrews with pliers is prohibited.

B. Above Furred or Suspended Ceilings and in Walls:

1. Conduit for Conductors 600 V and Below: Rigid steel or EMT. Mixing different types of conduits in the same system is prohibited.
2. Align and run conduit parallel or perpendicular to the building lines.
3. Connect to conduit runs with maximum 1.8 M (6 feet) of flexible metal conduit extending from a junction box to the fixture.
4. Tightening set screws with pliers is prohibited.
5. For conduits running through metal studs, limit field cut holes to no more than 70% of web depth. Spacing between holes shall be at least 457 mm (18 inches). Cuts or notches in flanges or return lips shall not be permitted.

3.4 EXPOSED WORK INSTALLATION

A. Unless otherwise indicated on drawings, exposed conduit is only permitted in mechanical rooms, switchgear rooms, electrical rooms and utility spaces or where indicated on the drawings.

B. Conduit for Conductors 600 V and Below: Rigid steel or EMT. Mixing different types of conduits in the system is prohibited.

C. Align and run conduit parallel or perpendicular to the building lines.

D. Install horizontal runs close to the ceiling or beams and secure with conduit straps.

E. Support horizontal or vertical runs at not over 2.4 M (8 feet) intervals.

F. Surface Metal Raceways: Use only where shown on drawings.

G. Painting:

1. Paint exposed conduit as specified in Section 09 91 00, PAINTING.

3.5 DIRECT BURIAL INSTALLATION

Refer to Section 26 05 41, UNDERGROUND ELECTRICAL CONSTRUCTION.

3.6 HAZARDOUS LOCATIONS

A. Use rigid steel conduit only.

B. Install UL approved sealing fittings that prevent passage of explosive vapors in hazardous areas equipped with explosion-proof lighting fixtures, switches, and receptacles, as required by the NEC.

3.7 WET OR DAMP LOCATIONS

A. Use rigid steel conduits unless as shown on drawings.

B. Provide sealing fittings to prevent passage of water vapor where conduits pass from warm to cold locations, i.e., refrigerated spaces, constant-temperature rooms, air-conditioned spaces, building exterior walls, roofs, or similar spaces.

C. Use rigid steel within 1.5 M (5 feet) of the exterior and below concrete building slabs in contact with soil, gravel, or vapor barriers, unless as shown on drawings. Conduit shall be half-lapped with 10 mil PVC tape before installation. After installation, completely recoat or retape any damaged areas of coating.

D. Conduits run on roof shall be supported with integral galvanized lipped steel channel, attached to UV-inhibited polycarbonate or polypropylene blocks every 2.4 M (8 feet) with 9 mm (3/8-inch) galvanized threaded rods, square washer and locknut. Conduits shall be attached to steel channel with conduit clamps.

3.8 MOTORS AND VIBRATING EQUIPMENT

A. Use flexible metal conduit for connections to motors and other electrical equipment subject to movement, vibration, misalignment, cramped quarters, or noise transmission.

B. Use liquid-tight flexible metal conduit for installation in exterior locations, moisture or humidity laden atmosphere, corrosive atmosphere, water or spray wash-down operations, inside airstream of HVAC units, and locations subject to seepage or dripping of oil, grease, or water.

C. Provide a green equipment grounding conductor with flexible and liquid-tight flexible metal conduit.

3.9 EXPANSION JOINTS

A. Conduits 75 mm (3 inch) and larger that are secured to the building structure on opposite sides of a building expansion joint require expansion and deflection couplings. Install the couplings in accordance with the manufacturer's recommendations.

B. Provide conduits smaller than 75 mm (3 inch) with junction boxes on both sides of the expansion joint. Connect flexible metal conduits to junction boxes with sufficient slack to produce a 125 mm (5 inch) vertical drop midway between the ends of the flexible metal conduit. Flexible metal conduit shall have a green insulated copper bonding jumper installed. In lieu of this flexible metal conduit, expansion and deflection couplings as specified above are acceptable.

C. Install expansion and deflection couplings where shown.

D. Seismic Areas: In seismic areas, provide conduits rigidly secured to the building structure on opposite sides of a building expansion joint with junction boxes on both sides of the joint. Connect conduits to junction boxes with 375 mm (15 inches) of slack flexible conduit. Flexible conduit shall have a copper bonding jumper installed.

3.10 CONDUIT SUPPORTS

A. Safe working load shall not exceed one-quarter of proof test load of fastening devices.

B. Use pipe straps or individual conduit hangers for supporting individual conduits.

C. Support multiple conduit runs with trapeze hangers. Use trapeze hangers that are designed to support a load equal to or greater than the sum of the weights of the conduits, wires, hanger itself, and an

additional 90 kg (200 lbs). Attach each conduit with U-bolts or other approved fasteners.

D. Support conduit independently of junction boxes, pull-boxes, fixtures, suspended ceiling T-bars, angle supports, and similar items.

E. Fasteners and Supports in Solid Masonry and Concrete:

1. New Construction: Use steel or malleable iron concrete inserts set in place prior to placing the concrete.
2. Existing Construction:
   a. Steel expansion anchors not less than 6 mm (0.25-inch) bolt size and not less than 28 mm (1.125 inch) in embedment.
   b. Power set fasteners not less than 6 mm (0.25-inch) diameter with depth of penetration not less than 75 mm (3 inch).
   c. Use vibration and shock-resistant anchors and fasteners for attaching to concrete ceilings.

F. Hollow Masonry: Toggle bolts.

G. Bolts supported only by plaster or gypsum wallboard are not acceptable.

H. Metal Structures: Use machine screw fasteners or other devices specifically designed and approved for the application.

I. Attachment by wood plugs, rawl plug, plastic, lead or soft metal anchors, or wood blocking and bolts supported only by plaster is prohibited.

J. Chain, wire, or perforated strap shall not be used to support or fasten conduit.

K. Spring steel type supports or fasteners are prohibited for all uses except horizontal and vertical supports/fasteners within walls.

L. Vertical Supports: Vertical conduit runs shall have riser clamps and supports in accordance with the NEC and as shown. Provide supports for cable and wire with fittings that include internal wedges and retaining collars.

3.11 BOX INSTALLATION

A. Boxes for Concealed Conduits:

1. Flush-mounted.
2. Provide raised covers for boxes to suit the wall or ceiling, construction, and finish.

B. In addition to boxes shown, install additional boxes where needed to prevent damage to cables and wires during pulling-in operations or where more than the equivalent of 4-90 degree bends are necessary.

C. Locate pullboxes so that covers are accessible and easily removed. Coordinate locations with piping and ductwork where installed above ceilings.

D. Remove only knockouts as required. Plug unused openings. Use threaded plugs for cast metal boxes and snap-in metal covers for sheet metal boxes.

E. Outlet boxes mounted back-to-back in the same wall are prohibited. Unless one of the other exceptions listed in UBC 714.3.2.1 is incorporated a minimum 600 mm (24 inch) center-to-center lateral spacing shall be maintained between boxes mounted on the opposite of a common wall.

F. Flush-mounted wall or ceiling boxes shall be installed with raised covers so that the front face of raised cover is flush with the wall. Surface-mounted wall or ceiling boxes shall be installed with surface-style flat or raised covers.

G. Minimum size of outlet boxes for ground fault circuit interrupter (GFCI) receptacles is 100 mm (4 inches) square x 55 mm (2.125 inches) deep, with device covers for the wall material and thickness involved.

H. Stencil or install phenolic nameplates on covers of the boxes identified on riser diagrams; for example "SIG-FA JB No. 1."

I. On all branch circuit junction box covers, identify the circuits with black marker.

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SECTION 28 13 50
BASIC DOOR ACCESS CONTROL REQUIREMENTS

PART 1 – GENERAL

1.1 DESCRIPTION OF WORK

A. The contractor shall include all labor, materials, tools, transportation, storage costs, training, equipment, insurance, temporary protection, permits, inspections, taxes and all necessary and related items required to provide a complete and operational door security and card access control system as shown on the Drawings and described in the Specifications.
B. The system shall include door access control devices at the doors including card readers, door position contacts, request to exit motion detectors and electric strikes. At existing motor operated doors, the contractor shall interlock the operator with the access control system.
C. The system shall include raceway, power cabling and signal cabling for all access control devices.
D. The system shall include a security panel with system control boards, I/O boards, relays, power supplies, battery chargers, batteries, etc.
E. The contractor shall provide electrical outlets and network data drops at the security panel location as shown on the drawings.
F. The system shall interface with the head-end server and access control software to control the access control system for the doors shown on the drawings and all future doors to be installed at the Reno VA.
G. The contractor shall program, test and demonstrate the system to the VA. The contractor shall provide training to the VA on the operation of the system at the completion of the project.

1.2 QUALITY ASSURANCE

A. The Contractor installing security equipment and cabling must have a minimum of (5) years experience installing security and card access systems of similar size and scope.
B. The Contractor must be licensed by the Nevada State Contractors Board.
C. The Contractor shall be a trained and authorized installer for the Lenel “OnGuard” equipment and software.

1.3 RELATED SECTIONS

A. See specification section 28 13 53 for access control devices, panels, cabling and software.

1.4 SUBMITTALS

A. Manufacturer’s Data Sheets
   1. Submit minimum 6 copies. Architect/Engineer will retain a minimum of 3 copies and return balance to Contractor.
   2. Data sheets must be bound in 3-ring binders. Provide a table of contents for each binder indicating the products submitted. Products listed in the table of contents should be in the same order as they appear in the Specifications.
   3. Where pre-printed data covers more than one distinct item, mark data sheet to clearly indicate which item is to be provided. Delete or cross-out non-applicable data.
B. Shop Drawings
   1. Submit floor plans indicating all security devices installed at each door.
   2. Provide a spreadsheet for each security device and its ID (point) within the security system.
   3. Submit point-to-point wiring diagrams and block diagrams showing all door security devices, power supplies, relays, card reader panels, security panel I/O boards, battery backups, etc.

4. Submit layout drawings of the components mounted in the Hoffman security cabinet including security panels, card access controllers, power supplies, battery chargers, relays, batteries, cable management wireways, overhead gutters, data outlets, electrical outlets, etc.
5. Submit security panel battery calculations.
6. Submit shop drawings for all items identified in Section 28 13 53.

C. Test Reports
1. Submit cable and security device test reports signed and dated by the technician performing the testing.

D. Other Submittals
1. See individual Specification Sections for requirements.

E. Substitutions
1. No material substitutions will be allowed except by written acceptance from the Consultant. Specified catalog numbers are used for description of equipment and standard of quality only. Equivalent material will be given consideration only if adequate comparison data including samples are provided.

1.5 REGULATIONS AND CODE COMPLIANCE

A. The Contractor will comply with all applicable governmental regulations including Federal, State, City, and local applicable codes and ordinances.

B. References to codes and standards called for in the Specifications refer to the latest edition, amendments, and revisions to the codes and standards in effect on the date of these Specifications.

C. All work and materials shall conform to and be installed, inspected and tested in accordance with the governing rules and regulations of the security industry, as well as federal, state and local governmental agencies, including, but not limited to the following
1. ANSI/NFPA-70, 2002 -- National Electrical Code (NEC).
2. Underwriter’s Laboratories, Inc. (UL) 294 – Access Control Systems.
3. Underwriter’s Laboratories, Inc. (UL) 1076 – Burglar Alarm and Systems
4. Federal Communications Commission (FCC).
5. Americans with Disabilities Act (ADA).

1.6 WARRANTY AND SERVICES

A. The complete Security System and all portions thereof, shall be guaranteed to be free from defects in workmanship and materials for a minimum period of one (1) year from date of final acceptance. Promptly remedy such defects and any subsequent damage caused by the defects or repair thereof at no expense to the owner.

B. The contractor shall have service facilities near the project site and shall respond to service calls onsite within a four (4) hour period after receipt of a service call. This includes weekends and holidays. At the time of service, the contractor shall provide all equipment, material and personnel necessary to perform all repairs.

PART 2 – PRODUCTS

2.1 EQUIPMENT AND MATERIALS MINIMUM REQUIREMENTS

A. Electrical equipment and systems shall meet UL Standards and requirements of the National Electric Code. This listing requirement applies to the entire assembly. Any modifications to equipment to suit the intent of the Specifications shall be performed in accordance with these requirements.

B. Equipment shall meet all applicable FCC Regulations.

C. All materials, unless otherwise specified, shall be new and be the standard products of the manufacturer. Used equipment or damaged material will be rejected.
D. The listing of a manufacturer as “acceptable” does not indicate acceptance of a standard or cataloged item of equipment. All equipment and systems must conform to the Specifications.

2.2 WORKMANSHIP, SUBSTITUTIONS, WARRANTY

A. Materials and workmanship shall meet or exceed industry standards and be fully guaranteed for a minimum of one (1) year from the date of final acceptance. Cable integrity and associated terminations shall be thoroughly inspected, fully tested and guaranteed free from defects, transpositions, open shorts, tight kinks, damaged jacket insulation, etc.
B. All labor must be thoroughly competent, skilled and trained, and all work shall be executed in strict accordance with the best practice of the trades.
C. The Contractor shall be responsible for and make good, without expense to the Owner, any and all defects arising during this warranty period that are due to imperfect materials, improper installation or poor workmanship.
D. After the Contract is awarded, requests to substitute for specified materials shall be submitted by the Contractor to the Owner or Owner’s Representative within seven (7) days, complete with reasons for the substitution and savings which accrue to the Owner if the substitutions are approved. Substitutions after Contract award will be considered only if the substitutions are equal or superior to the products specified.
E. No material substitutions will be allowed except by written acceptance from the Consultant. Specified catalog numbers are used for description of equipment and standard of quality only. Equivalent material will be given consideration only if adequate comparison data including samples are provided.
F. Approval of alternate or substitute equipment or material in no way voids the Specification requirements.
G. Under no circumstances shall the Owner be required to prove that an item proposed for substitution is not equal to the specified item. It shall be mandatory that the Contractor submit to the Owner or Owner’s Representative all evidence to support the contention that the item proposed for substitution is equal to the specified item. The Owner’s decision as to the equality of substitution shall be final and without further recourse.

2.3 FACTORY ASSEMBLED PRODUCTS

A. Manufacturers of equipment assemblies that include components made by others shall assume complete responsibility for the final assembled unit.
   1. All components of an assembled unit need not be products of the same manufacturer.
   2. Component parts, which are alike, shall be from a single manufacturer.
   3. Components shall be compatible with each other and with the total assembly for the intended service.
   4. Components of equipment shall bear the manufacturer’s name or trademark model number and serial number on a name plate securely affixed in a conspicuous place, or cast integral with, stamped or otherwise permanently marked upon the components of the equipment.
B. Major items of equipment that serve the same function must be the same make and model.

C. Equipment and materials installed shall be compatible in all respects with other items being furnished and with existing items so that a complete and fully operational system will result.
D. Maximum standardization of components shall be provided to reduce spare part requirements.

PART 3 – EXECUTION

3.1 ROUGH-IN

A. Before construction work commences, the Contractor shall visit the site and identify the exact routing of cabling from the doors to the security panels.

3.2 CUTTING AND PATCHING

A. The Contractor shall be responsible for all cutting, patching, painting, coring and associated work to complete the security system. Patch adjacent work disturbed by installation of new work including insulation, walls and wall covering, ceiling and floor covering or other finished surfaces.

3.3 FIRESTOPPING

A. All penetrations through fire-rated building structures (walls and floors) shall be sealed with an appropriate fire stop system. This requirement applies to through penetrations (complete penetration) and membrane penetrations (through one side of a hollow fire rated structure). Any penetrating item i.e., riser slots and sleeves, cables, conduit, cable tray, and raceways, etc. shall be properly fire stopped.
B. Fire stopping References:
   1. ASTM E814, Standard Method of Fire Tests of Through-Penetration Fire Stops.
   2. ASTM E 119, Fire Tests of Building Construction and Materials (for fire-rated architectural barriers).
   3. 2002 NFPA National Electrical Code, Section 800-52, Paragraph 2(b), Spread of Fire and Products of Combustion.

3.4 GROUNDING AND BONDING

A. The security panel including all devices and components shall be bonded to ground with a #6 green insulated ground conductor. The security panel shall be grounded to the electrical panel serving the room.

3.5 CONCEALMENT

A. All security cable is to be routed in conduit. Drill and/or core walls, floors and ceilings as required to route raceway. Exterior penetrations shall be sealed and made watertight. Exposed conduit shall be routed tight to structure and painted to match existing surfaces.

3.6 GENERAL INSTALLATION REQUIREMENTS

A. Coordinate ordering and installation of all equipment with long lead times or having a major impact on work by other trades so as not to delay the job or impact the schedule.
B. Where mounting heights are not dimensioned, install systems, materials and equipment to provide the maximum headroom possible.
C. Set all equipment to accurate line and grade, level all equipment and align all equipment components.
D. Provide all scaffolding, rigging, hoisting and services necessary for erection and delivery of equipment and apparatus furnished into the premises.
E. All work shall be installed level and plumb, parallel and perpendicular to other building systems and components.
F. The Contractor shall replace all ceiling tiles damaged by work performed as part of the security contract.

G. Storage and security of material and equipment shall be the responsibility of the Contractor.

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SECTION 28 13 53
DOOR ACCESS CONTROL DEVICES AND CABLING

PART 1 – GENERAL

1.1 SUMMARY

A. Section includes security door access control devices, control panels, signal and control wiring, head-end server, software and licenses.
B. Related Sections:
   1. Section 28 13 50 – Door Access Control Basic Requirements
   2. Drawings and general provisions of the Contract, Including General and Supplementary Conditions and other Division 1 Specification Sections, apply to this section.

1.2 SCOPE OF WORK

A. Furnish and install door access control devices including contactless smart card readers, magnetic door position contacts, request to exit motion detection devices, electric door strikes, etc. as shown on the drawings.
B. Prep existing door frames to receive access control devices.
C. Furnish and install raceway for access control cabling.
D. Furnish, install, terminate and label signal and power cabling for all door access control devices.
E. Interlock existing automatic door operators to the access control system to enable them to function with a card reader.
F. Furnish, install and program security panels and associated security panel add-in boards, power supplies, battery chargers, batteries, relays, etc as identified on the drawings.
G. Integrate new card readers and access panels with existing access control system head-end server, server operating system and SQL Server software. Coordinate server mounting location with the VA IT staff.
H. Integrate with existing access control software and access control software licenses as described in these specifications. Provide training to the VA on the use of the software.
I. Coordinate with the access control system software manufacturer and the VA IT staff to populate the access control system database with a list of VA employees.
J. Integrate with door access control monitoring software on (1) client workstation at the VA police office. Provide training to the police on the operation of the monitoring software and printing reports.
K. Furnish and install relays, input devices and cabling to interface the access control system panel with the existing fire alarm system. In the event of a fire alarm, egress doors shall fail open.
L. Perform system testing for all security devices shown on the drawings.
M. Meet with the Reno VA Police Department to determine the required operation and functionality of the system. Program the security system in accordance with the Owner’s requirements (provide an allowance of 12 hours for programming).
N. Demonstrate the entire security system to the Owner at the completion of the project. Provide qty (4) hours of training to the VA FMS personnel and VA Police on the system including card printing functions.
O. Provide a 1-year parts and labor warranty for the entire system.
   1. During the warranty period, the contractor shall have service facilities near the project site and shall respond to service calls onsite within a four (4) hour time period after receipt of a service call. This includes weekends and holidays. At the time of service, the contractor shall provide all equipment, materials and personnel necessary to perform all system maintenance and repairs.

1.3 DESCRIPTION OF WORK

A. The Contractor shall provide all equipment, materials, labor, and services necessary to complete an operable security system and to ensure that the system is in compliance with requirements stated or reasonably inferred by the Specifications and the Contract Drawings.
B. Provide all components, devices, accessories, interconnect cabling, etc as normally provided for a complete operational security system.
C. Minimum requirements and installation methods are included for the following:
   1. Security Panels.
   2. Main Card Access Control Panel.
   3. Card Reader Control Boards.
   4. Security Panel Add-in I/O Boards.
   5. Power Supplies & Battery Chargers.
   6. Batteries.
   7. Proximity/Smart Card Readers.
   8. Magnetic Door Contacts.
   9. Request to Exit Motion Detectors.
   10. Electric Strikes.
   11. Conduit and Boxes.
   12. Security Cabling.
   13. Labeling.
   14. Head-End Server Hardware, Server Operating System and SQL Software.
   15. Client Workstation.
   16. Card Printer, Card Printing Software and Contactless Smart Cards.
   17. Access Control System Software, Card Printing Software, Windows Active Directory LDAP Connector Software and Software Licenses.
   18. System Programming.
   19. System Testing, Demonstration and Training.

1.4 REGULATIONS AND CODE COMPLIANCE

A. The Contractor will comply with all applicable governmental regulations including Federal, State, City, and local applicable codes and ordinances.
B. References to codes and standards called for in the Specifications refer to the latest edition, amendments, and revisions to the codes and standards in effect on the date of these Specifications.
C. All work and materials shall conform to and be installed, inspected and tested in accordance with the governing rules and regulations of the security industry, as well as federal, state and local governmental agencies, including, but not limited to the following
   1. ANSI/NFPA-70, 2002 -- National Electrical Code (NEC).
   2. Underwriter’s Laboratories, Inc. (UL) 294 – Access Control Systems.
   3. Underwriter’s Laboratories, Inc. (UL) 1076 – Burglar Alarm and Systems.
   4. Federal Communications Commission (FCC).
   5. Americans with Disabilities Act (ADA).

1.5 QUALITY ASSURANCE

A. Provide new and un-used devices, equipment and cabling. Comply with all manufacturers’ installation instructions.
B. All work shall comply with local building codes, local and State fire marshal regulations and OSHA.
C. All cable, raceways and equipment shall be installed in a neat and workmanlike manner. All methods of construction that are not specifically described or indicated in the Specifications shall be subject to the control and approval of the Owner's Representative.

D. All work shall be supervised on a daily basis by qualified and competent personnel. The contractor shall keep the same foreman and workman on the job throughout the duration of the project.
E. See Specification Section 28 13 50 for Warranty and repair service requirements.

1.6 SUBMITTALS

A. Manufacturer's Data Sheets: Submit manufacturer's data sheets for the following items
   1. Access Control System Panel Enclosures.
   2. Access Control System Controllers, Card Reader Boards & I/O Boards.
   3. Relays.
   4. Power Supplies & Battery Chargers.
   5. Batteries.
   6. Proximity/Smart Card Readers.
   7. Magnetic Door Contacts.
   8. Request to Exit Motion Detectors.
   9. Electric Strikes.
   10. Conduit and Boxes.
   11. Security Cabling.
   12. Access Control System Software and Licenses.
B. Bill of Materials: Submit a detailed bill-of-materials listing all manufacturers, part numbers, and quantities proposed for use on this project.
C. Shop Drawings:
   1. Submit floor plans indicating all security devices installed at each door.
   2. Provide a spreadsheet for each security device and its ID (point) within the security system.
   3. Submit point-to-point wiring diagrams and block diagrams showing all door security devices, power supplies, relays, card reader panels, security panel I/O boards, battery backups, etc.
   4. Submit layout drawings of the components mounted in the Hoffman security cabinet including security panels, card access controllers, power supplies, battery chargers, relays, batteries, cable management wireways, overhead gutters, data outlets, electrical outlets, etc.
   5. Submit security panel battery calculations.
   6. Submit shop drawings for all items identified in Section 28 13 53.

1.7 DELIVERY, STORAGE & HANDLING

A. Protect all security panels and security devices from moisture, dust and debris prior to installation.

PART 2 – PRODUCTS

2.1 ACCESS CONTROL SYSTEM PANEL ENCLOSURES

A. Provide 30″ wide x 36″ high x 8″ deep Hoffman equipment enclosure where shown on the drawings.
B. The contractor may provide a separate lockable equipment enclosure to house the batteries and power supplies immediately adjacent or below the security panel.
C. Equipment enclosures shall have a lockable hinged door. Lock shall be keyed alike with other security enclosures on the project.
D. Install plastic slotted duct to route cabling within the enclosure.
E. Ground security equipment enclosures to ground bar in telecom room with #6 green insulated ground conductor.
F. Label outside of enclosure with an engraved plate.
G. Provide the following accessories inside the enclosures.

1. Tamper switch on each equipment enclosure door.
2. 5″ electric fan to cool enclosure.

2.2 ACCESS CONTROL SYSTEM CONTROLLERS AND ADD-IN BOARDS

A. Furnish and install new security panel controller and add-in boards as shown on the drawings. Security Panel will serve all doors on the project.
B. Mount security panel controllers and add-in boards in Hoffman enclosure.
C. Security panels shall meet the following physical specifications
   1. UL 294 and UL 1076 approved.
   2. 16 card readers inputs.
   3. 32 supervised inputs.
   4. 16 Form C Relay 2.5A Outputs.
   5. 2 Ethernet connections.
D. Acceptable Products:
   1. Lenel Door Access System Controller w/ 2-Reader Module (Lenel P/N LNL-2220). Provide 1 system controller for every 16 card reader doors.
   2. 2-Door Reader Interface Module (Lenel P/N LNL-1320). Provide qty of 2-door reader modules to accommodate all card reader doors. Do not exceed qty (7) 2-door reader modules per LNL-2220 system controller (total 16 card reader doors per security panel).
   3. 16-Input Control Module (Lenel P/N LNL-1100). Provide qty of 16-input control modules to accommodate all required inputs shown on the drawings.
   4. 16-Output Control Module (Lenel P/N LNL-1200). Provide qty of 16-output control modules to accommodate all required outputs shown on the drawings.
   5. Or Approved Equal.

2.3 RELAYS

A. Provide DIN rail mounted relays for all equipment requiring relay activation. Separate relays located outside the Lenel output modules are required. Mount relays in Hoffman enclosures.
B. Provide 24V plug-in type relays with LED lights that indicate when the relay is energized.
   1. Acceptable Manufacturers:
      a. IDEC.
         (1) Or Approved Equal.

2.4 POWER SUPPLIES & BATTERY CHARGERS FOR SYSTEM CONTROLLERS AND I/O BOARDS

A. Provide UL listed supervised power supplies for security panel system controllers and I/O control modules as shown on the drawings.
B. Power supply input shall be 120v. Output shall be 12V 5A.
C. Power supplies shall have integrated battery charger.
D. Mount power supplies / battery chargers in Hoffman enclosures.
   1. Acceptable Products:
      a. ESD P/N SPS-6B.
         (1) Or Approved Equal.

2.5 POWER SUPPLIES FOR ELECTRIC STRIKES

A. Provide UL listed supervised power supplies for electrified door hardware including electric strikes. Provide quantity of power supplies to accommodate all electric strikes.
B. Power supply input shall be 120v. Output shall be 24V 3A.
C. Power supplies shall have integrated battery charger.
D. Power supplies shall be provided with UL listed fused power distribution modules for electric locks, local alarms (sounders) and

request to exits. Power distribution modules shall have status LED's and 1,500 watt surge protector.

E. Mount all power supplies / battery chargers in Hoffman security enclosures. Power supplies located at doors will not be accepted.
   1. Acceptable Products:
      a. ESD P/N SPS-6ED8.
         (1) Or Approved Equal.

2.6 POWER SUPPLIES & BATTERY CHARGERS FOR OTHER SECURITY DEVICES

A. Provide non-supervised power supplies for all other security devices including request-to-exits, local audible alarms, annunciator panels, etc. Provide quantity of power supplies to accommodate all devices.
B. Power supply input shall be 120v. Output shall be 24V 3A.
C. Power supplies shall have integrated battery charger.
D. Power supplies shall be provided with UL listed fused power distribution modules for electric locks, local alarms (sounders) and request to exits. Power distribution modules shall have status LED's and 1,500 watt surge protector.
E. Mount power supplies / battery chargers in Hoffman enclosures.
   1. Acceptable Products:
      a. ESD P/N SPS-6ED8.
         (1) Or Approved Equal.

2.7 BATTERIES

A. Provide UL listed batteries to backup all security power supplies. Mount relays in Hoffman enclosures.
B. Provide 12V 12Ah, leak proof lead acid batteries.
C. Batteries shall be equipped with safety release valves designed to operate between and 2 and 5 psi and shall automatically reseal.
D. The Contractor shall perform calculations to determine the number of batteries required to backup each power supply. In the case of a power failure, the batteries shall provide a minimum of 2 hours of continuous backup for the entire door access control system.
E. Acceptable products:
   1. Yuasa NP 12-12.
      a. Or Approved Equal.

2.8 PROXIMITY / CONTACTLESS SMART CARD READERS

A. Provide proximity / contactless smart card readers as shown on the drawings.
B. Readers shall be color black.
C. Provide narrow mullion mounts where required.
D. Provide readers with a 12V operating voltage and 4" read range.
   1. Acceptable Products:
      a. HID pivCLASS RP40-H.
         (1) Or Approved Equal.

2.9 MAGNETIC DOOR POSITION CONTACTS

A. Provide recessed magnetic door contacts where indicated on the drawings.
B. Door contacts shall be double pole, double throw type.
C. Acceptable Products:
   1. GE/Sentrol 1078 for embedded applications.
      a. Or approved equal.
   2. GE/Sentrol 2507 for surface-mounted applications.
      a. Or approved equal.

2.10 REQUEST TO EXIT MOTION DETECTORS

A. Provide UL listed 24V request to exit motion detectors as shown on the drawings (color white).
B. Devices shall have 2 form "C" contacts adjustable up to 60 seconds.

C. Devices shall have programmable fail safe and fail secure modes.
D. Provide device trim plates as necessary.
E. Acceptable Products:
1. Bosch P/N DS160.
a. Or approved equal.

2.11 SECURITY CABLING

A. Install plenum rated 18/6 shielded twisted pair cable from proximity/smart card readers to the reader processor boards in the security panel.
1. Acceptable Products:
a. Alpha Wire 5386C.
(1) Or Equal by Belden, CommScope or WestPenn.
B. Install 18/2 stranded twisted pair from request to exit devices, door contacts and remote audible alarms to the input board located in the security panel.
1. Acceptable Products:
a. Belden 8461.
(1) Or Equal by Alpha Wire, CommScope or Westpenn.
C. Install 18/2 stranded twisted cables to provide power to locks, request to exits and local alarms from the power supplies located at the security panel.
1. Acceptable Products:
a. Belden 8461.
(1) Or Equal by Alpha Wire, CommScope or Westpenn.

2.12 CABLE SHEATH LABELS

A. Label cable sheaths at the point of termination with laser printed self laminating wrap around vinyl labels.
B. Labels shall be white with black type. Label size shall be 1.0″ wide by 1.5″ high.
1. Acceptable Manufacturers:
a. Brady.
b. Belden.
c. Hellermann Tyton.
d. Or Approved Equal.

2.13 ACCESS CONTROL SYSTEM SOFTWARE AND LICENSES

A. SECTION I - SYSTEM ARCHITECTURE
1. System Overview
a. The Security Management System (SYSTEM) shall provide a number of functions including the ability to regulate access through specific doors and gates to secured areas of the CUSTOMER facility and provide computer generated color employee and visitor credentials for that use. The SYSTEM shall also record and store digital video of activities occurring in the facility as well as manage and track corporate assets. The SYSTEM must utilize a single seamlessly integrated relational database for all functionality. This integration shall be provided with one operating environment. The SYSTEM’s operating environment shall be the fully multi-tasking multi-threading Microsoft® Windows 7/2008/2003/XP/Vista Operating System. The SYSTEM's Web-enabled client applications shall be capable of running on independent client operating systems including Windows 7, Windows 2008, Windows 2003, Windows XP, Macintosh, UNIX, Linux, and Solaris. The Web-enabled applications shall utilize the same common database as the other SYSTEM modules. The SYSTEM shall be written so that all SYSTEM modules (access control, alarm monitoring, credential management, digital video, visitor

management, intrusion detection, asset management, etc.) are 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.

b. The SYSTEM shall allow the configuration of an enrollment and badging client workstation, an Alarm Monitoring client workstation, an administrative client workstation, an asset management client workstation, a digital video management client workstation, an intrusion detection client workstation, a visitor enrollment client workstation, a remote access level management client workstation, and an integrated client workstation (which shall include any combination of the above client workstations). The SYSTEM shall be expandable to support an unlimited number of individual module or integrated client workstations. All access control field hardware, including Intelligent System Controllers (ISCs), shall be connected to every/any Windows 7/2008/2003/XP/Vista based access control SYSTEM workstation on the network.

c. The Alarm Monitoring client workstation must be able to connect to, and monitor, field hardware devices, such as card readers and ISCs. Administrative tasks including defining asset information, access groups, timezones, intrusion detection devices, configuring digital video devices, generating reports, creating maps, etc. shall be provided from any client workstation on the network that is licensed to do so. The enrollment and badging client workstation shall serve as both the credential creation and data input client workstation for the credential management module of the SYSTEM. The visitor management client workstation shall allow for the enrollment of visitors and the scheduling of visits. The integrated client workstation shall allow for any combination of functions of the SYSTEM to be available from the single client workstation. All SYSTEM data must reside on a single database on the network and must be accessible in real time to every/any SYSTEM workstation 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.

d. The SYSTEM must be designed to perform a wide variety of feature rich functions. These SYSTEM functions are categorized into nineteen primary "system modules" which shall include:
   (1) Access Control
   (2) Alarm Monitoring
   (3) Credential Management
   (4) Digital Video Management
   (5) Intrusion Detection Management
   (6) Asset Management
   (7) Visitor Management
   (8) Remote Access Level Management
   (9) Third-party Interfaces
   (10) System Administration
   (11) Mobile Enterprise Solutions
   (12) Badge Layout Creation
   (13) Screen/Forms Creation
   (14) Graphical Map Creation
   (15) Application Programming Interfaces

(16) Data Import
(17) Bi-Directional Data Exchange
(18) API Development Toolkit
(19) Server Redundancy

2. Access Control
   a. One of the SYSTEM's primary purposes shall be to provide access control. The SYSTEM shall be able to make access granted or denied decisions, define access levels, and set timezones and holidays. An input/output linkage feature shall allow linking of monitor zone points to output control points within Intelligent System Controllers (ISCs). The SYSTEM shall support features such as area control (two man control, hard, soft, and timed anti-passback), database segmentation, and timezone/holiday overrides.
3. Alarm Monitoring
   a. The SYSTEM shall be used for alarm monitoring. Alarms are to be prioritized. The Main Alarm Monitoring window shall provide information about the time and location of the alarm, along with its priority. The Main Alarm Monitoring window must be able to sort pending and/or insert new alarms based on any of the following attributes: priority, date/time, alarm description, Intelligent System Controller, Card Reader, Input Control Module, asset name, or cardholder. Date/time sorts must be System Operator selectable to be either ascending or descending and must have the option of displaying the seconds of the minute in which the alarm arrived into the SYSTEM. All columns of information in the Main Alarm Monitoring window shall be able to be arranged in any order by the System Operator.
   b. The SYSTEM must allow unique emergency instructions to be specified for each type of alarm. It shall also allow for the automatic sending of alphanumeric pages or e-mail messages upon alarm arrival. A real-time graphical system status tree on the screen shall indicate if card readers, alarm panels, digital video recorders, video cameras, intrusion detection panels, or Intelligent System Controllers are secured, unsecured, in alarm, or offline. Output control operations must be available to lock, unlock or pulse control points as a standard feature. An automatic cardholder call-up feature shall allow the quick search and display of images in the database. A System Operator journal shall be available to log important daily events. A trace function shall be available for System Operators to locate and track activity on specific cardholders, assets, video cameras, or card readers. An image comparison feature must be provided for use in conjunction with a CCTV interface. All alarms and hardware icons MUST have the ability to control the associated hardware via right-mouse clicks.
   c. The SYSTEM must provide the option to be used as a UL 1981 Classified Central Station Automation System. This option must be classified by Underwriters Laboratories for use as a Commercial Burg Central Station Automation System, to allow the monitoring station where it is used to be made compliant with the UL 1981 standard and listed by UL. This classification shall apply to alarm panels monitored through a connected, UL approved Central Station Alarm Receiver.
4. Credential Management

a. The SYSTEM shall include a seamlessly integrated credential management module. The credential management functionality must allow the enrollment of cardholders into the database, capturing of images, biometric data, and signatures, as well as the import/export of employee data. This functionality shall also allow the System Operator to assign and/or modify the access rights of a cardholder.
b. The SYSTEM shall include a seamlessly integrated state-of-the-art, 32-bit, credential creation and production system. This shall allow for the creation of different badge types based on a database field, the linking of that field to a badge type to automate the process of credential production, and the use of security colors, chromakey, and ghosting, to allow officers to quickly identify personnel access authority.
c. The SYSTEM shall have capabilities for biometric verification. Through the enrollment and comparison of hand geometry (the size and shape of an individual’s hand and fingers), or fingerprints, the identity of an individual shall be verified.
d. The SYSTEM shall have the ability to crop and rotate an image automatically based on the orientation of the eyes found in the image. This shall include photographs captured from digital cameras, live cameras, scanned images and imported images.

5. Digital Video Management
   a. The SYSTEM shall include a seamlessly integrated digital video management module. It shall support real time linkage of digital video clips to their associated alarms from the access control and alarm monitoring system. System Administrators shall configure video segments by specifying pre and post-alarm time marks, then link those defined video segments to specific alarms. Each camera shall be configured to have its own unique set of pre- and post-alarm time marks, video quality settings, and failover recorder. The SYSTEM shall allow for the central administration, monitoring, and archiving of digital video and the associated cameras. The SYSTEM shall support Digital Video Recorders from multiple manufacturers. The SYSTEM shall also support IP based digital cameras and digital video encoders/servers from multiple manufacturers for advanced video surveillance. The SYSTEM shall support MJPEG, MPEG4 simple profile encoding standards and frame rates to include both PAL and NTSC respectively at maximum of 25/30 frames per second. In addition, the SYSTEM shall support a network based digital video recorder.
6. Intrusion Detection Management
   a. The Intrusion Detection Management System shall provide advanced, seamless integration with Intrusion Detection Panels from BOSCH® (D9412 and D7412), Detection Systems (7400xi and 7400xi 4+), Honeywell (Galaxy 8, 18, 60, 128, 500, 504, 512, Galaxy Dimension GD48, Galaxy Dimension GD520), Lenel NGP, and Guardall (PX, QX, and RX), allowing customers to monitor intrusion detection alarms inside the SYSTEM Alarm Monitoring application, in addition to giving CUSTOMER command and control of supported intrusion detection devices (such as arming and disarming an area). Once alarms are brought into the SYSTEM, they shall be linked to digital video, global I/O activity can be triggered, and they shall be stored in the SYSTEM audit trail. In addition, System Operators shall monitor the status of

intrusion detection devices from the SYSTEM Alarm Monitoring workstation.

7. Asset Management
   a. The SYSTEM shall include a seamlessly integrated asset management module to include real time management and tracking of CUSTOMER assets. The SYSTEM shall allow for the centralized management of assets. System Administrators shall be able to generate reports on current asset assignments as well as the history of cardholder assignments for assets. The SYSTEM shall also be able to restrict assets from passing through checkpoints with unauthorized personnel and report assets that pass through checkpoints with authorized personnel. The SYSTEM shall also allow specified readers to require an authorized asset before granting access.
8. Visitor Management
   a. The SYSTEM shall include a seamlessly integrated visitor management module. The visitor management module shall be a desktop-based application utilizing technology that allows CUSTOMER to enroll and track visitors of the organization.
   b. It shall allow CUSTOMER to enroll visitors, sign them in or out, assign them to an employee, capture a photo, capture a signature, and track the visitors as they move throughout the facilities. It shall allow System Operators to enter and pre-schedule visits. It shall allow System Operators to print visitor badges and shall incorporate complete audit trail and reporting capabilities.
9. Remote Access Level Management
   a. The SYSTEM shall include a seamlessly integrated remote access level management module. The remote access level module shall be a desktop-based application technology that allows CUSTOMER managers to assign and remove access levels to/from cardholders in the existing SYSTEM database. All transactions relating to the adding and/or removal of access levels shall be recorded complete with a time/date stamp and the System Operator who made the change.
10. Third-party Interfaces
   a. The SYSTEM shall integrate with a number of third-party hardware and software products. The SYSTEM shall provide an industry standard OPC Server utility to allow the export of any and all SYSTEM alarms and events to industry standard OPC Clients, such as building automation and/or process control systems. The SYSTEM shall also provide the ability for an Alarm Monitoring workstation to function as an OPC Client that shall accept alarms and events from industry standard OPC Servers, such as those from Building Automation/Process Control Systems. The SYSTEM shall provide seamless integration with fire alarm systems such as Pyrotronics and Notifier, personal safety systems such as Visonic Spider Alert, intercom systems such as Zenitel Alphacom/AlphaNet, and central station alarm receivers such as BOSCH 6500/6600 and Osborne Hoffman 2020. The SYSTEM shall allow alarms and events from the third-party systems to report into the same Main Alarm Monitoring window as access control alarms. Third-party interface hardware shall be configured in the SYSTEM access control module. In some cases, System Operators shall be able to control third-party hardware devices from the Alarm Monitoring workstation. Third-party

hardware alarms and events shall be stored in the SYSTEM database for audit trail and reporting purposes.

11. System Administration
    a. System Administrative tasks such as defining client workstation and System Operator permissions set-up, access groups, timezones, reports, maps, etc. shall be provided from any client workstation on the network. Initial setup of the cardholder screen layout shall occur on the database server. The SYSTEM shall support the use of strong passwords.
12. Mobile Enterprise Solutions
    a. The SYSTEM shall support a Mobile Enterprise Architecture for customers with mobile computing needs. Mobile Enterprise functionality shall be a seamlessly integrated, robust solution that transports virtually all SYSTEM client functions to a wearable, portable computer. The portable computer shall connect to the network and SYSTEM server via 802.11b wireless Ethernet online, or shall be operated as a stand-alone solution that synchronizes with the SYSTEM server on an operational basis.
13. Badge Layout Creation and Editing
    a. The SYSTEM shall provide a Badge Layout Creation and Editing Module to allow for the creation of custom badge designs to be created by the CUSTOMER. The SYSTEM shall support credit card, government, and custom credential sizes in either a landscape or portrait format and shall support double sided and edge-to-edge printing.
14. Screens/Forms Creation
    a. Should the SYSTEM standard fields not be suitable, the SYSTEM shall provide a Forms Designing and Editing Module that gives System Administrators the ability to modify any standard field to customize the cardholder, asset, and/or visitor forms, as desired. The SYSTEM shall also allow System Administrators to add custom fields in addition to any standard fields on a minimum of 32 pages each of information for cardholder, visitor, and visit related data. User-defined fields absolutely shall not be pre-defined, meaning only the labels can change while the properties cannot. System Administrators shall have a minimum of 96 pages of which to design their cardholder, visitor, and visit screens with standard and custom fields.
15. Graphical Map Creation
    a. The SYSTEM shall provide Graphical Map Creation and Editing Software that must allow System Administrators to import customized map backgrounds of their facility and to attach custom icons to those maps.
16. Application Programming Interfaces
    a. The SYSTEM shall provide a set of standard Application Programming Interfaces (API's) and supporting documentation that allows hardware manufacturers and software application developers to integrate their products into the SYSTEM. The Application Programming Interfaces shall allow requests from CUSTOMER to integrate a third-party hardware or software solution based on SYSTEM open architecture and SYSTEM device independence.
17. Data Import
    a. The SYSTEM shall support an import utility that will allow the CUSTOMER or VAR to import cardholder information into the SYSTEM database. This shall allow the CUSTOMER or VAR to pre-populate

the SYSTEM database with existing cardholder data and/or add new records to the existing SYSTEM database.

18. Bi-Directional Data Exchange
    a. The SYSTEM shall support a real time, bi directional data interface to external databases such as Human Resources, Time and Attendance, Food Service Systems. The interface shall allow data to be imported into or exported out of the SYSTEM in real time or in a batch mode basis. Data used for import shall be retrieved directly from an external database or through an import file. Data provided for export shall be applied directly to an external database or through an export file. Any data shall be imported or exported including image data. The file used for import or created by export shall have the ability to be structured in a wide variety of ways, but shall always be in ASCII text format.
    b. The SYSTEM shall also support a one step download and distribution process of cardholder and security information from the external database to the SYSTEM database, all the way down to the Intelligent Field Controller (ISC) database. This shall be a guaranteed process, even if the communication path between the SYSTEM database server and the ISC is broken. If the communication path is broken, the data shall be stored in a temporary queue and shall be automatically downloaded once the communication path is restored.
19. API Development Toolkit
    a. The SYSTEM shall allow, through API toolkits, System Administrators to expose specific SYSTEM data and events that are relevant to IT information or other third-party systems. Conversely, the SYSTEM shall allow, through these same API toolkits, System Administrators to accept and process information exposed from the IT information or other third-party systems. This shall permit System Administrators to develop scripts and applications that allow events in either the IT domain to cause appropriate actions in the Security domain, and vice versa.
20. Server Redundancy
    a. The SYSTEM shall support a fault tolerant server and redundant database architecture. It shall also allow for a server clustering architecture. It shall allow for normal operations to occur in the event that the Database Server fails. In the event of a server failure, the switch over to a backup server from a primary server shall be automatic and not impede the operation of the SYSTEM.

B. Application Design
1. Single, Unified Source Code Set
    a. All SYSTEM application modules, features, and functions MUST be generated from a single source code set. In addition, the source code must be designed using object-oriented software development techniques and compile into native 32-bit applications. The access control, alarm monitoring, credential management, digital video management asset management, intrusion detection management, visitor management, and remote access level management modules of the software shall be created from this single source code set. There absolutely shall not be separate source code bases for separate modules. Thus, a single manufacturer must develop all SYSTEM modules.

b. This shall allow for the ease of maintaining the SYSTEM and allow for the ease of future upgrades and enhancements. All SYSTEM features and functionality listed in the proceeding pages shall ship with each SYSTEM. Features and functionality available to CUSTOMER shall be determined through licensing and shall be controlled by a hardware/software license key.

2. Microsoft Gold Certified Partner
   a. A Microsoft Gold Certified Partner must develop the SYSTEM.
3. Microsoft Windows XP Certification
   a. The SYSTEM shall have passed Microsoft Windows XP certification testing and shall be officially Microsoft Windows XP Certified. The Microsoft Windows XP Certification Program for applications shall help CUSTOMER identify reliable and manageable applications. The SYSTEM, that shall meet the specifications for Windows XP certification, shall provide a robust, self-repairing installation that shall help minimize conflicts among shared components. This shall enable better co-existence of applications, facilitate easier software deployment, and reduce support and training costs.
4. Compatible with Microsoft Windows 7
   a. The SYSTEM shall have passed Microsoft-designed tests for compatibility and reliability on Windows 7.
5. UL1076 Certification (pending)
   a. The SYSTEM shall be UL1076 Listed (pending).
6. FIPS 140-2 Certification (pending)
   a. The SYSTEM shall have FIPS 140-2 certification (pending).
7. Single License Key Systems
   a. The SYSTEM shall only require a single license key to be present on the database server for the SYSTEM to operate. The license key shall either be a physical device or a software license key. The SYSTEM shall allow the SYSTEM USER the ability to activate, return, or repair the software license key. The software license shall only be used on a physical computer or in a VMware virtual environment. License keys shall not be required at the client workstations. The license key on the database server shall determine the number of client workstations that shall be able to connect to the SYSTEM as well as all SYSTEM functionality. An alarm shall be generated in the SYSTEM’s Alarm Monitoring application as the license expiration date approaches.
   b. The License Administration login and password shall be encrypted when they are passed to the License Server. The hash shall not be the same data even with the same logon credentials on different systems. This is a requirement for U.S. government DIACAP certification.
8. Concurrent Licensing
   a. The SYSTEM shall support concurrent licensing with respect to client licenses. CUSTOMER shall purchase a fixed number of client workstation licenses (or connections) that shall be programmed into the database server license file. The SYSTEM shall be installed on any number of client workstations in the CUSTOMER facility. Then, any of the client workstations that have the SYSTEM software installed shall have the ability to connect to the database server as long as the maximum number of concurrent connections purchased has not been reached. Connections shall be licensed on a per module basis. This shall

provide CUSTOMER with great flexibility in system design and layout.

9. Single Sign-On Support
   a. The SYSTEM shall provide support for single sign-on capability. Single sign-on shall allow System Administrators/System Operators to authenticate into SYSTEM applications using their Windows domain account.

   b. Single sign-on shall support the following scenarios:
      (1) Allow System Administrators/System Operators to interactively run SYSTEM applications without having to enter a username or password. This shall make administration of the SYSTEM easier since maintenance of separate SYSTEM usernames and passwords is not required.
      (2) Allow SYSTEM API scripts to authenticate. These scripts shall be run using a Windows account allowing a seamless and secure way to authenticate the account and restricting the script to those actions that the user is permitted to perform.
10. Unicode Support
   a. The SYSTEM shall be designed to support Unicode allowing for easier translation into specific languages.
11. Open Architecture
   a. The SYSTEM shall have an open architecture design. It shall be a true open architecture design and support industry standards for databases, networks, credential printers, and video cameras. No customized or proprietary PC or credential creation software or hardware shall be required to operate the SYSTEM. The SYSTEM shall be both scalable and portable to give CUSTOMER the ability to increase performance based on CUSTOMER requirements. This shall give CUSTOMER maximum flexibility and room for unlimited growth.
      (3) Open Database Connectivity Compliance
         (a) The SYSTEM shall be Open Database Connectivity (ODBC) compliant. The SYSTEM shall support a relational database management system with the proper 32-bit ODBC drivers. Examples of these databases include, but are not limited to, Microsoft SQL Server 2008 or SQL Server 2005 or Oracle® Server 10g or 11g.
         (b) The SYSTEM shall be designed so that two methods of integrating these aforementioned relational database management systems are possible. The first method shall be to use one of these databases as the SYSTEM’s dedicated database server, meaning only the SYSTEM’s information is stored in the database.
         (c) The other method is to use one of these databases as a non-dedicated database server and attach SYSTEM database tables to the existing database that shall be used by one or many systems.
      (4) Open Application Architecture
         (a) The SYSTEM shall support an Open Application Architecture. It shall provide a set of standard Application Programming Interfaces (API's) and supporting documentation that allows hardware manufacturers and software application developers to integrate their products into the SYSTEM. The Application Programming Interfaces shall allow requests from CUSTOMER to

integrate a third-party hardware or software solution based on SYSTEM open architecture and SYSTEM device independence. Examples of hardware interfaces include fire alarm panels, intercom systems, central station alarm receivers, and personal safety and asset devices. Examples of software interfaces include time and attendance systems, human resource databases, and risk management systems.

(5) Scalability

(a) The SYSTEM shall be scalable to support Symmetric Multi-Processing (SMP) machines. The Relational Database Management System (RDBMS) within the SYSTEM shall use a single-process, multi-threaded architecture known as Symmetric Server Architecture, which provides scalable, high system performance with very efficient use of SYSTEM resources.

(b) The SYSTEM shall provide Symmetric Multiprocessor Support, allowing it to execute threads in parallel on multiple CPUs. The RDBMS shall use native Windows 7/2008/2003/XP/Vista threads and it shall automatically scale to multiprocessor hardware with no special configuration or programming required.

(6) Portability

(a) The SYSTEM shall be portable across multiple platforms to take full advantage of multiple hardware architectures, without changing SYSTEM software. The SYSTEM software shall work on platform architectures including Intel® x86, Digital Alpha AXP, and Symmetric Multi-Processing machines.

(7) Network Support

(a) The SYSTEM shall be designed to support any industry standard network protocol and topology listed below:

(i) TCP/IP
(ii) Novell NetWare (IPX/SPX)
(iii) Digital PATHWORKS
(iv) Banyan VINES
(v) IBM LAN Server (NetBEUI)
(vi) IBM SNA Networks
(vii) Microsoft LAN Manager (NetBEUI)
(viii) NFS Networks
(ix) Remote Access Service (RAS) via ISDN, x.25, and standard phone lines

(8) Video Input Support

(a) The SYSTEM shall support any industry standard video input source that utilizes a Red/Green/Blue (RGB), Composite, or S-Video signal. The SYSTEM shall allow cardholder, visitor, and asset photos to be taken from any one of the live video signals listed above or to be scanned in using any industry standard scanning device that utilizes an industry standard TWAIN interface.

(b) SYSTEM support for other methods of inputting a cardholder’s, visitors’, and asset’s photo, such as through the use of an industry standard digital camera with an industry standard TWAIN interface, or by importing a photo from any industry standard image file format, shall also be available.

(9) Credential Printer Support
(a) The SYSTEM shall be designed to support any industry standard thermal dye or re-transfer credential printer with a Microsoft certified industry standard Windows 7/2008/2003/XP/Vista driver. The SYSTEM shall also support any ink jet, laser, or dot matrix printer with a Microsoft certified industry standard Windows 7/2008/2003/XP/Vista drivers.

12. 32-bit Application
    a. The SYSTEM shall operate on a Windows 7/2008/2003/XP/Vista multi-tasking, multi-threading 32-bit or 64-bit operating system. The SYSTEM software shall be a true, native 32-bit application built ‘from the ground up’ for Windows 7/2008/2003/XP/Vista. The SYSTEM absolutely SHALL NOT be ported over from another operating system (that is, UNIX, Windows, or OS/2) and shall not be a Win-16, UNIX or OS/2 program utilizing a Windows 7/2008/2003/XP/Vista Server.
13. Application Partitioning
    a. The SYSTEM shall employ an application partitioning design so that applications are broken into separate distinct programs capable of running independent of other SYSTEM applications. Applications shall include, but not be limited to, alarm monitoring, system administration and configuration, credential management, access panel drivers, asset management, import modules, digital video management, credential designing modules, visitor management, remote access level management, and cardholder forms designing modules. Each client workstation shall have the ability to be installed with any combination of the above listed modular applications. A system written as a single monolithic code base shall not be acceptable.
14. Easy to Use, Graphical User Interface
    a. The SYSTEM shall support a user friendly, Windows graphical user interface that shall be intuitive. All messages and interface text shall support localization. Selection and use of any language supported by MANUFACTURER other than English shall be accomplished with the installation of the SYSTEM language pack in addition to the core SYSTEM. All functions shall be either keyboard or mouse driven to allow the System Operators to choose the method of navigating through the screens. In the Alarm Monitoring application of the SYSTEM software, all major functions (opening a door, acknowledging alarms, launching video, etc.) shall be accomplished in one or two mouse clicks. This shall allow for ease of operation, especially in emergency situations.
    b. The SYSTEM shall support Windows XP/Vista themes for buttons, lists, trees, check boxes and radio buttons. The SYSTEM shall support Office themes for menus and toolbars. The SYSTEM colors scheme shall be based on the active Windows XP/Vista theme. The SYSTEM shall also support the new menu and toolbar based on Office theme, when the Windows XP/Vista themes are disabled.
15. Support for Microsoft Windows Installer
    a. The SYSTEM shall support Microsoft’s Windows Installer that shall allow efficient system deployment. This means that the SYSTEM shall be loaded onto a server running Windows Installer and all client workstations and any future upgrades shall be installed from the server utilizing network communications.

16. Distributed Local Decision Making
    a. The SYSTEM shall employ a distributed architecture so that all cardholder, visitor, and asset access decisions are made locally at the Intelligent System Controller (ISC).
17. Application Installation
    a. The SYSTEM shall support a simplified installation procedure using Installation Wizards that guide System Administrators through the installation of the database server and any client workstations. The SYSTEM shall automatically detect previous versions installed on the client workstations for fast and efficient upgrade installations.
18. System Management Console
    a. The SYSTEM shall provide a utility that provides system information and access to log files that can be used to aid in troubleshooting SYSTEM issues.
19. System User Feedback Tool
    b. The SYSTEM shall provide a tool to allow the SYSTEM USER the ability to provide feedback from a menu item available in multiple SYSTEM applications. The tool shall launch a Web feedback form that allows the SYSTEM USER to send feedback about the SYSTEM to the MANUFACTURER.
20. Device Discovery Utility
    a. The SYSTEM shall provide a Device Discovery Utility (UTILITY). The UTILITY shall allow the ability to discover IP cameras, device servers, access controllers, and wireless access points. The UTILITY shall discover devices in the local subnet as well as across the multiple subnets configured on the network.
    b. The UTILITY shall allow searching and discovering IP cameras on a network, specifically for the purpose of identifying the IP cameras’ IP addresses. The UTILITY shall be able to search and discover cameras produced by at least six (6) different camera manufacturers.
    c. The UTILITY shall allow the ability to discover Lantronix® device servers, LNL-2210, LNL-2220 and LNL-3300 access controllers, and Lenel ILS wireless access points.
    d. The UTILITY shall support the ability to turn on/off discovery based on device types and manufacturer. The UTILITY shall support displaying the devices grouped by Brand, Discovery Service, Device Status, and Device Type. The UTILITY shall support displaying the devices sorted by Brand, Model, Version, Command Status, IP Address and Port, Hardware Address, Discovery Service, and Device Type.
    e. The UTILITY shall support performing functions (depending on the type of device selected) such as Ping Device, Reboot Device, Check for Default Password, Get Version, Launch Device Web Site, Save Credentials, and Change IP Address.
21. Hardware Devices Notes Field
    a. The SYSTEM shall allow users to enter text as notes for the following types of devices: access panels, readers, video recorders, cameras, fire, intercom, personal safety, receivers, intrusion detection, PLC, POS, and SNMP. These notes shall be available from the SYSTEM’s Alarm Monitoring application. The Notes field shall be able to hold a maximum of 1999 characters. The Notes field shall not allow more text to be entered than can be saved. The Notes field shall support Unicode characters for SYSTEM Language Packs.

22. Multimedia Integration
    a. The SYSTEM shall extensively integrate and utilize multimedia throughout the SYSTEM software. Real-time, dynamic graphical maps mean that the map screen does not have to re-paint or refresh each time a new alarm or event condition occurs. Map device icons shall also dynamically change shape based on the state of the device. The SYSTEM shall support a CUSTOMER customizable voice alarm annunciation and a flashing colored system icon for each alarm in the SYSTEM. The SYSTEM shall also support customizable voice instructions so that each alarm or event in the SYSTEM can have both sets of text instructions and pre-recorded audio voice instructions. Real-time live user video verification seamlessly integrated into alarm monitoring shall also be available to view cardholder activity in high priority areas.
23. Advanced Network Architecture
    a. The SYSTEM shall be designed to support advanced distributed network architecture, whereas Intelligent System Controllers do not need to be home-run wired back to the database server. Intelligent System Controllers shall be wired to any Windows 7/2008/2003/XP/Vista based PC that is licensed to run the SYSTEM software. Also, Intelligent System Controllers shall be connected to a Local Area Network/Wide Area Network via industry standard TCP/IP communication protocol. Network based Intelligent System Controllers shall be able to communicate back with the database server through industry standard network switches and routers and shall not have to be on the same subnet. The SYSTEM shall also support dual path upstream communications between the ISC and client workstations/database server. Secondary communications paths shall include direct connection (RS-232/485), network (TCP/IP) or dialup connections. As such, any alarm in the SYSTEM shall be routed to any client workstation(s) on the network, regardless of the Intelligent System Controller that generated the alarm.
24. Object Oriented Programming
    a. The SYSTEM shall be designed using the latest programming techniques and advanced 32-bit programming tools to optimize SYSTEM performance. Thus, the SYSTEM shall be designed utilizing object oriented programming. This shall give the SYSTEM a modular design and allow the CUSTOMER to pick and choose the desired functionality required.
    b. Object Oriented Programming shall allow for ease of SYSTEM maintenance and will allow the SYSTEM to be easily expanded and upgraded as the CUSTOMER needs grow.
25. Operating System
    a. The SYSTEM shall support the 32-bit Microsoft Windows 7/2008/2003/XP/Vista multi-tasking, multi-threading operating system. The SYSTEM must meet the below requirements for a Windows 7/2008/2003/XP/Vista based system.
        (1) Interface
            (a) The operating system shall offer the look and feel of the Windows operating system to enhance usability and efficiency. The operating system shall come complete with administrative wizards and interactive help to guide System Administrators in the configuration of the SYSTEM.
        (2) Networking

(a) The operating system shall support a minimum of 15 networking protocols including, but not limited to, TCP/IP, IPX/SPX, RAS, and NetBEUI. The SYSTEM shall also support peer-to-peer and FTP server capabilities.

(3) Remote Management

(a) The operating system shall utilize remote management utilities such as event viewers and performance monitors to fine tune and optimize the operating system that will in turn optimize the SYSTEM. It shall support both dial-out capabilities to remote servers as well as remote dial in capabilities.

(4) Remote Access Services (RAS)

(a) The operating system shall support full remote diagnostics abilities through its remote access services. Full network functionality shall be available over remote links using NetBEUI, IPX/SPX, and TCP/IP protocols. Dial in capability to remote Windows 2008/2003 Servers using remote access service shall also be available.

(5) Security

(a) The operating system shall support multiple user profiles on the same client workstation so System Administrators can assign which programs shall be available to System Operators based on their operating system user log-on.

(b) Local desktop security shall be available through User ID and required password log-on. The operating system MUST also offer government C-2 level certifiable security.

(c) The SYSTEM shall support a data encryption utility. In utilizing encryption technologies, data communication shall be protected between workgroups, local area network computers, domain clients and servers, branch sites which may be physically remote, extranets, roving clients, and remote administration of computers.

(d) Encryption shall be achieved through either Windows Internet Protocol Security (IPSec), which is a part of Microsoft Windows 2008/2003 Server/Professional, or through IRE SafeNet/Speed™.

(e) IPSec shall support two encryption modes: transport and tunnel. Using transport mode, end-to-end security from client-to-server, server-to-server, and client-to-client shall be accomplished. Using Layer Two Tunneling Protocol secured by IPSec, secure remote access from client-to-gateway over the Internet shall be accomplished.

(f) IRE SafeNet/Speed shall automatically encrypt user data with the Triple-Data Encryption Standard (Triple-DES) for public key encryption.

(g) The encryption that occurs with the SYSTEM shall be broken down into two main segments: peer-to-peer (which occurs between a workstation within the secured area and a server outside the secured area) and peer-to-panel (which occurs between a workstation within the secured area and the panel via the IRE SafeNet/Speed device). Peer-to-panel (ISC) encryption shall also be able to be accomplished with 128-bit AES encryption. The only peer computer to talk to the ISC shall be the computer running the communication server, which is typically the SYSTEM

server. These segments shall utilize different keys to encrypt or decrypt the data.

26. Virtual Environment
    a. The SYSTEM shall support the loading of the application on a virtual environment. The SYSTEM shall allow the Communication service to run in a virtual environment. The guest operating system must meet the requirements of the SYSTEM operating system.
    b. The SYSTEM shall support the use of VMware Server. VMware is supported for running the SYSTEM and for use as the Database Server or the Communication Server.
27. Client/Server Relational Database Management Systems
    a. The SYSTEM shall support industry standard Open Database Connectivity (ODBC) compliant relational database management systems. This shall include relational database management systems such as Microsoft SQL Server 2008 or Microsoft SQL Server 2005 and Oracle Server11g or 10g.
    b. These databases, through ODBC, shall be true client/server, high performance, and ANSI standard capable of handling high transaction rates and multiple users concurrently accessing and modifying the database.
    c. The SYSTEM shall store dates and times in UTC time.
28. Preservation of Data Integrity
    a. The SYSTEM’s RDBMS shall preserve data integrity in the following ways:
        (1) Transaction Processing
            (a) Transaction processing guarantees the consistency and recoverability of the RDBMS. Transaction processing shall assure that all transactions are performed as a single unit of work, even in the presence of a hardware or general SYSTEM failure.
        (2) Enforced Data Integrity
            (a) The SYSTEM’s RDBMS shall enforce data integrity within the database itself, guaranteeing that complex business policies shall be followed. “Referential Integrity” maintains consistency between multiple tables of a database. For example, you do not want to delete an access level from the database without removing that access level from all cardholders that are assigned the access level.
            (b) The SYSTEM’s RDBMS shall use advanced data integrity features such as data types, defaults, and rules to enforce data integrity. Stored procedures and triggers shall also be used to insure the integrity and security of data.
        (3) User-Defined Data Types
            (a) The SYSTEM’s RDBMS shall utilize data types, which provide the simplest form of data integrity by restricting what kinds of information (for example: characters, numbers, or dates) may be stored in the columns of the database tables.
        (4) Encrypted User-defined Fields
            (a) The SYSTEM shall allow the encryption of user-defined fields in the database. The SYSTEM shall decrypt and display the data in the client application. The SYSTEM shall leave the data encrypted in the database.

(5) Defaults
(a) The SYSTEM’s RDBMS shall also utilize Defaults, which allow the SYSTEM to specify a value that the RDBMS inserts if no explicit field value is entered.
(6) Rules
(a) The SYSTEM’s RDBMS shall enforce rules, which are integrity constraints that go beyond those implied by a field’s data type. Whenever a user enters a value, the RDBMS shall check the value against any rule that has been created for the specified field. For example, rules can require that a value fall within a particular range, match a particular pattern, or match one of the entries in a specified list.
(b) The SYSTEM’s RDBMS shall also provide two powerful and flexible features for enforcing programming integrity and business rule logic centrally at the server: stored procedures and triggers.
(c) The RDBMS shall incorporate stored procedures for increased data integrity. For example, whenever a SQL command is sent to the RDBMS for processing, the server shall parse the command, check its syntax to see if it makes sense, check to see if the requester has the permissions necessary to execute the command, and formulate an execution plan to process the request.
(d) Triggers are a special type of stored procedure. Triggers are associated with particular pieces of data and are automatically initiated whenever attempts to modify that data are made.

29. Mature Client/Server Architecture
a. The SYSTEM shall support a two tier mature client/server architecture in which the central database server performs all of the data processing. The clients shall be one of many types of client workstations including administrative, alarm monitoring, access control, asset management, digital video management, visitor management, intrusion detection management, or enrollment and badging client workstations. The client workstation shall send all requests to the database server, which does all of the processing. The database server then sends only the results of the request back to the client workstation. This minimizes network traffic and ensures data integrity as a central database is performing all processing.

30. N-tier architecture
a. The SYSTEM shall support the use of N-tier architecture for some applications. Applications that support N-tier architecture will be specifically described as such. The SYSTEM shall support the expansion of the architecture (layers) so that the CUSTOMER can deploy the SYSTEM in a manner that meets their requirements and architecture. The SYSTEM shall allow for, but not require, the separation of the database, application server, Web server, and client interface. The SYSTEM shall require that all connections to the database are performed through a trusted link from the client or interface.

31. Advanced Thin Client Architecture
a. The SYSTEM shall also provide an advanced thin client architecture. This architecture shall provide CUSTOMER with complete access to configure and operate their SYSTEM software

through a simple Web browser interface. The need for installed SYSTEM desktop client software shall not be required. The SYSTEM thin client architecture shall allow for the installation of Web server software and, once the Web server is configured, shall allow an unlimited number of client workstations (based on SYSTEM licensing connections) to attach to the server and run any of the SYSTEM applications. Virtually any desktop operating system that supports a Web browser shall be able to utilize the SYSTEM thin client architecture. This shall include Windows 7, Windows 2008, Windows 2003, Windows XP, Windows Vista, Macintosh, UNIX, Solaris, and Linux. The SYSTEM thin client architecture shall also support mobile computing environments, such as Windows CE. The interface shall display a minimum color depth of 8 bits (256 colors).

b. The SYSTEM thin client architecture shall work in conjunction with Citrix® Presentation Server 4.5 for Windows Server 2003. Such thin client architecture shall be achieved through Independent Computing Architecture (ICA®) technology.

c. Use of the Citrix Presentation Server 4.5 for Windows Server 2003 shall be in a one- or two-server configuration, allowing the SYSTEM to be deployed as three-tier applications. Each client workstation shall have an appropriate browser installed and shall consist of any combination of access control, system administration, asset management, alarm monitoring, digital video management, visitor management, or Credential Management functions.

32. Network Design

a. The SYSTEM shall be designed to allow it to work with any industry standard network protocol and topology listed below:
   (1) TCP/IP
   (2) Novell Netware (IPX/SPX)
   (3) Digital PATHWORKS
   (4) Banyan VINES
   (5) IBM LAN Server (NetBEUI)
   (6) IBM SNA Networks
   (7) Microsoft LAN Manager (NetBEUI)
   (8) NFS Networks
   (9) Remote Access Service (RAS) via ISDN, x.25, and standard phone lines

b. There shall not be a limit to the number of client workstations that shall be attached to the database server. Each client workstation shall have the ability to consist of any combination of access control, system administration, asset management, alarm monitoring, digital video management, visitor management, intrusion detection management, or credential management functions.

c. The SYSTEM shall be able to operate transparently in both a LAN and WAN environment, as long as one of the above protocols or network topologies is utilized.

d. The SYSTEM shall be designed so that any Windows 7/2008/2003/XP/Vista based client workstation on the network that is licensed to operate the SYSTEM Software can have Intelligent System Controllers connected to them. This design shall save installation and wiring costs, as Intelligent System Controllers do not have to be home-run wired back to the database server.

e. As such, any alarm in the SYSTEM, regardless of the Intelligent System Controller that generated the alarm, shall be routed to any client workstation on the network. Alarms shall also be routed to multiple client workstations on the network and shall have the ability to be routed to different client workstations during different hours of the day through timezone control.

33. Graphical User Interface
    a. The SYSTEM shall have an easy to use Windows Graphical User Interface. It shall be intuitive and all messages and commands shall have the capability to support multiple languages. All functions shall be both keyboard and mouse driven.
    b. Within the Alarm Monitoring application of the SYSTEM, all major functions (such as acknowledging alarms, opening doors, and viewing cardholder information, etc.) MUST be accomplished in one or two mouse clicks. Any more than two mouse clicks is not acceptable.
    c. The SYSTEM shall have the ability to have SYSTEM information that shall be viewed in the application windows to be in a user-defined typeface and point size. The SYSTEM shall support a minimum of 55 Fonts. These fonts shall be available from a pick list to the System Administrators. This shall be especially important in the Alarm Monitoring application of the software. The SYSTEM shall integrate toolbars that shall be movable and sizable as shortcuts to different forms within the SYSTEM.
    d. A Help icon shall be available in all modules of the software giving System Operators/System Administrators the ability to obtain online help with a single-click of the mouse. The help command shall also be keyboard driven.
    e. The SYSTEM shall utilize a tabular format within the software to group procedures and forms together to guide the System Administrator through SYSTEM configuration.
34. Migration and Upgrades
    a. The SYSTEM shall support a seamless upward and horizontal migration path from system to system. The SYSTEM shall ship to the customer with the ability to support the largest system in the product line complete with all the modules, features and functionality described above and below. The CUSTOMER’s system size and feature set shall be controlled by a software/hardware license key and shall be programmed based on licensing.
    b. Upgrading from SYSTEM level to SYSTEM level shall be efficient, easy, and require only a change in the software/hardware license key code for the application portion of the SYSTEM.
    c. Adding new modules, activating features, increasing card reader capacity, and enabling additional functionality shall all be accomplished over the telephone without the vendor having to go to the CUSTOMER site.
    d. All systems shall be 100% upward compatible. Access control field hardware shall be compatible with all systems. Access control field hardware (Intelligent System Controllers, Input Control Modules, Card Readers, etc.) shall not have to be replaced or upgraded as the CUSTOMER migrates from one SYSTEM level to the next.
    e. Client workstations, cameras, printers, and data shall also be compatible from one SYSTEM level to the next. These devices shall not have to be replaced as the SYSTEM grows from small to large.

f. The Graphical User Interface shall be IDENTICAL for all systems, regardless of the size, number of client workstations, or operating system that is being utilized. The SYSTEM shall be designed so that the average System Operator will not know that the SYSTEM was even upgraded or modified. This shall prevent the re-training of System Operators/System Administrators each time the SYSTEM migrates to the next level.

35. Seamless Integration
    a. All SYSTEM application modules, features, and functions MUST be generated from a single source code set. The access control, alarm monitoring, asset management, digital video management, intrusion detection, remote access level management, and visitor management, and credential management modules of the software shall be created from this single source code set. There absolutely shall not be separate source code bases for different modules. Thus, a single manufacturer must develop all modules of software. All SYSTEM modules shall be seamlessly integrated to feature a single system, single code base, single graphical user interface, and single database.
    b. This shall allow for the ease of maintaining the SYSTEM and allow for the ease of future upgrades and enhancements. All SYSTEM features and functionality listed in the proceeding pages shall ship with each system. Features and functionality available to CUSTOMER shall be determined through licensing and shall be controlled by a hardware/software license key.
    c. All SYSTEM data must reside in a single database on the network and must be instantly accessible from every/any client workstation connected to the network that is licensed to do so. This shall provide 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. As such, any modifications made to cardholders, timezones, assets, or access levels shall be downloaded in real-time to all related Intelligent System Controllers.

B. Section II - FUNCTIONAL and OPERATIONAL REQUIREMENTS
1. General
    a. The design of the SYSTEM shall include devices and equipment to monitor and control access of cardholders, visitors, and assets to restricted areas, detect and deny unauthorized attempted entries within specific buildings or areas, annunciate alarms, record and store digital video, and generate reports. The SYSTEM shall also include devices and equipment to detect ‘changes of state’ for alarm points such as motion detectors or dry contacts. Credential management and badging capabilities shall be seamlessly integrated so that the SYSTEM shall also be capable of generating and managing credentials for cardholders. Once incorporated with the daily operations of the designated facility, the SYSTEM shall detect and deny unauthorized entry into restricted areas, while granting entry to individuals who have proper access rights. The SYSTEM is to be designed and configured to provide operational flexibility, reliable performance, and ease of use.
2. Customer Responsibilities
    a. CUSTOMER shall have the responsibility for configuring, managing, and operating the SYSTEM, as well as creating and maintaining the graphical representations of the designated

facility for use in conjunction with the SYSTEM’s Graphical Map Creation and Editing Module.

3. Operational Concept
   a. The SYSTEM shall consist of equipment and devices placed at predetermined locations to ensure that only cardholders, visitors, and assets that are authorized to enter secured areas through certain doors or gates can do so. This shall be accomplished by means of a computer(s) and electronic devices used in conjunction with door locks, gate operators, card readers, and/or closed circuit television.
   b. When a new cardholder presents himself/herself to the Enrollment Operator or is changing job responsibilities and is in need of a new or replacement credential, a personnel form shall be available on the SYSTEM. This employee data screen shall contain at a minimum 20 data entry fields of information that will include, but not be limited to, the following:
      (1) First Name
      (2) Address
      (3) Department
      (4) Last Name
      (5) Middle Initial
      (6) Social Security Number
      (7) Badge Type
      (8) Home Phone
      (9) Birth Date
      (10) Title
      (11) Cardholder Number
      (12) Office Phone
   c. The employee data screen shall allow for a minimum of 32 pages each of cardholder, visitor, and visit information that shall be input upon enrollment. Above and beyond the fixed fields such as Last Name, First Name, Social Security #, there shall also be user-definable fields which the SYSTEM can designate, if desired, as drop-downs to ensure data integrity. These fields shall vary in character length as dictated by the System Administrator. Data fields shall be assigned as alphanumeric, numeric, date, or unique. Numeric, date, and unique fields shall be generated by the SYSTEM if desired.
   d. As a fundamental operation, the SYSTEM shall provide a seamlessly integrated link between the Credential Management and Access Control and Alarm Monitoring functionality. This shall allow specific information concerning cardholders to be automatically downloaded to all Intelligent System Controllers and to be shared by both the access control and credential management modules utilizing a single database, thus enabling the SYSTEM to grant or deny access to card reader controlled access points. This is to be provided under a single operating environment.
   e. After the applicant's picture is captured by the SYSTEM, the photo image is to be printed on a badge and appear in a pre-defined format.
4. SYSTEM Capacities
   a. The SYSTEM shall support an unlimited number of card readers, input points, video cameras, intrusion detection points, and relay outputs. The SYSTEM database server shall support an unlimited number of cardholders, visitors, and assets limited

only by the memory located in the Intelligent System Controllers in which cardholder information shall be downloaded. The database server shall also support an unlimited number of system events and System Operator transactions in the history file. The SYSTEM shall support an unlimited number of client workstations, so long as the network supports them. A fully loaded system shall guarantee a one half-second response time for access granted/denied decisions from the time that a cardholder swipes his/her badge.

5. SYSTEM Features and Requirements
   a. All SYSTEM applications must be easy to use and visually attractive. The SYSTEM shall utilize a user friendly Windows Graphical User Interface. It shall utilize keyboard and mouse operations with graphical presentations of screen information. System Operators/System Administrators shall change the look and feel of the applications by setting the typeface and size of font for the way they wish for the SYSTEM information to be displayed. A minimum of 255 typeface combinations shall be available from which System Operators will choose. Each application shall provide a consistent user interface across all operations of the SYSTEM. All routine information displayed and requiring input must be in a language supported by the SYSTEM language pack. No operation must require the interpretation of machine code, the use of mnemonics, or the use of function keys.
6. Access Control
   a. Timezones
      (1) The SYSTEM must be capable of creating and storing up to 255 timezones. Each timezone must have a minimum of six (6) intervals. Each interval shall be assignable to any day of the week and capable of being restricted on a minimum of eight (8) types of holidays. Timezones shall be assigned an alphanumeric name using up to 64 characters and shall act as templates to be applied to access levels, card reader modes, alarm inputs, alarm outputs, and alarm masking and logging functions. Timezones must be able to be added, modified, and deleted quickly by the System Administrator without vendor intervention. All timezones shall be downloaded to all related Intelligent System Controllers for distributed processing and local decision-making.
   b. Access Levels
      (1) All cardholders shall have access based on facility, card reader, time, and day. For example, some badges must only allow access to the facility on weekdays between 9:00 a.m. and 6:00 p.m., while other badges shall allow access on weekends between 12:00 p.m. and 4:00 p.m. and so on. These timezones for each day are to be pre-defined by CUSTOMER and must be able to be modified quickly by the System Administrator without vendor intervention.
      (2) The SYSTEM shall allow the System Administrator to define access levels which shall be assigned an alphanumeric name using up to 64 characters and which combine card readers and timezones. Card readers shall have the ability to be assigned to any or all access levels defined in the SYSTEM. As such, an access level can consist of any or all card readers in the SYSTEM. Timezones shall be allowed to belong to any or all access levels so that the timezone only has to be defined

once. Access levels must be able to consist of multiple card reader assignments; each card reader shall be capable of having a distinct timezone assigned.

(3) The card readers must grant access to cardholders assigned to the appropriate access levels. The capability to define a minimum of 32,000 access levels is required to provide the System Administrator flexibility in assigning access privileges to cardholders. Up to 128 access levels shall be assignable to each badge. The SYSTEM shall support a minimum of 10,000,000 access level combinations for assignment to the cardholders.

(4) The SYSTEM shall also allow an ‘Allow User Commands’ option to be assigned on an access level by access level basis. All cardholders assigned an access level with the “Allow User Commands’ option checked will have the ability to activate and utilize functions at card readers with keypads (that also have the ‘Allow User Commands’ option checked) through use of the card reader’s keypad. Additionally, access levels shall have the option to be assigned ‘first card unlock’ authority, meaning that cardholders with that access level assigned shall have the authority to place a card reader into an unlocked mode (based on them entering the area at the assigned card reader) after a pre-defined time of day based on that card reader’s settings.

(5) The SYSTEM shall allow for access level options. The System Administrator shall have the option to configure the SYSTEM to allow or disallow duplicate access levels. The System Administrator shall also have the option to configure the SYSTEM to allow or disallow empty access levels.

c. Temporary Access Levels

(1) Inclusive of the above 32,000 Access Levels, the SYSTEM shall allow the System Administrator to define Temporary Access Levels that combine card readers and timezones. Card readers shall have the ability to be assigned to all temporary access levels and a temporary access level can consist of all card readers in the SYSTEM. Timezones shall be allowed to belong to any or all temporary access levels so that the timezone only has to be defined once. Temporary Access levels must be able to consist of multiple card reader assignments; each card reader shall be capable of having a distinct timezone assigned.

(2) Temporary Access Levels shall be assigned an alphanumeric name using up to 64 characters and shall allow System Administrators the ability to assign activation and deactivation dates and times to the access level, thus giving a date/time when the access level will become active and a date/time when the access level will no longer be valid. These temporary access levels shall then be assigned to cardholders for special occasions or visitor privileges, giving them temporary access to specific card readers.

(3) Temporary access levels shall be stored in the ISC such that they function properly in the event the ISC is offline with the database server.

d. Access Groups

(1) Access Groups shall be assigned an alphanumeric name using up to 64 characters and shall allow System Administrators to

group access levels together for ease of assignment of access levels to cardholders. Access Groups allow System Operators to assign a single access group to a cardholder in the enrollment process instead of multiple access levels. Up to thirty-two (32) access levels shall be assignable per access group. The SYSTEM shall allow System Administrators to define an unlimited number of access groups.

e. Precision Access Levels

(1) The SYSTEM shall include the ability to utilize Precision Access Levels above and beyond the aforementioned 32,000 standard and temporary access levels. This shall offer the ability to assign “unlimited card reader/timezone combinations.”

(a) Inclusion Access Levels shall be assigned an alphanumeric name using up to 64 characters and shall offer the ability to assign unique inclusion access level groups (card reader/timezone combinations) for each individual cardholder, in addition to the cardholder’s thirty-two (32) standard access levels. This shall give System Administrators the ability to assign as many card reader/timezone combinations as desired for each cardholder, thus removing the restriction of thirty-two (32) access levels per cardholder.

f. Holidays

(1) The SYSTEM must allow the System Administrator to designate certain dates as holidays. As well, the dates for Daylight Saving Time shall be definable and shall automatically take effect without System Administrators/System Operators intervention.

(2) The SYSTEM shall support a minimum of 255 Holiday assignments. A cardholder’s access rights, card reader modes, and alarm masking schedules must be able to be altered when the current date is designated a Holiday. Holidays shall be assigned an alphanumeric name using up to 64 characters and shall be grouped into eight (8) types of holidays, and shall be assignable to individual timezones.

(3) The SYSTEM shall support Holiday Ranges that shall allow a single holiday to span across multiple calendar days.

(4) The SYSTEM shall support an embedded calendar in which System Administrators can select the Holiday dates. The calendar shall support a minimum of one hundred (100) years beyond the current date. This shall allow System Administrators to program holidays for upcoming years if desired, so long as they do not exceed more than 255 holidays in the SYSTEM at any one time.

g. First Card Unlock

(1) The SYSTEM shall support a First Card Unlock feature. When configuring the default attributes of a card reader in System Administration, a first card unlock setting shall be selectable. First Card Unlock requires that a valid access grant shall be received at a card reader (by an authorized cardholder) after the timezone change has occurred before placing the reader into an unsecured mode.

(2) For example, a card reader in a lobby is programmed to unlock at 9:00 AM Monday through Friday. Each day after 9:00 AM, the card reader will await a valid access grant from an

authorized cardholder before setting the mode to unlocked. An authorized cardholder is one that has the ‘first card unlock’ authority configured as part of their access level. Thus, certain cardholders could enter the area after 9:00 AM and not cause the card reader to unlock due to their authority level.

(3) If a card reader currently has first card unlock enabled and its online mode is changed, then first card unlock shall be disabled.

h. Database Segmentation

(1) The SYSTEM shall employ advanced database segmentation functionality. Each segment shall be allowed to have its own unique set of cardholders, hardware, and system parameters including access control field hardware, timezones, access levels, etc., which shall allow System Administrators to expand upon current hardware constraints. For example, each segment shall have its own 32,000 access levels, 255 timezones, and 255 holidays. As such, only credentials that are assigned access levels to card readers in a segment need to be downloaded to the Intelligent System Controllers in that segment.

(2) Cardholders shall be allowed to belong to one segment, many segments, or all segments.

(3) The SYSTEM’s database segmentation functionality shall also provide a “segment/landlord” architecture to object records in the SYSTEM, where segment System Administrators and Operators can only view, add, modify, delete, and manipulate cardholders, system parameters and access control field hardware that belong to their respective segments. As such, Landlord Administrators shall have complete control over the entire system.

(4) System Administrators and System Operators shall be assigned the segments they are allowed to view and control. System Administrators and System Operators may be assigned to more than one segment and a segment may be assigned to more than one System Administrator and System Operator. A one-to-many relationship shall exist for System Administrators and System Operators with respect to segments. For example in a 10 segment system, a System Administrator or System Operator shall be able to belong to one, two, five, seven, or all ten segments. The SYSTEM shall support a minimum of 65,000 segments.

(5) System Administrators and System Operators shall also be assigned which ‘pages’ of the Cardholder Form that they are able to view and edit.

(6) The following database objects shall be available for segmentation:

(a) Access Groups
(b) Access Levels
(c) Actions
(d) Action Groups
(e) Alarm Inputs
(f) Alarm Mask Groups
(g) Alarm Outputs
(h) Alarms
(i) Areas

(j) Badge Types
(k) Card Formats
(l) Cardholders
(m) Device Groups
(n) Digital Video Archive Server
(o) Fire Panels
(p) Guard Tours
(q) Global I/O Function Lists
(r) Global I/O Links
(s) Holidays
(t) Intercom Panels
(u) Intercom Stations
(v) Intrusion Detection Panels
(w) ISCs
(x) Maps
(y) Monitor Zones
(z) Personal Safety Panels
(aa) Precision Access Groups
(bb) Receiver Accounts
(cc) Tour Groups
(dd) Card Readers
(ee) Central Station Receivers
(ff) System Operators
(gg) Timezones
(hh) Visitors
(ii) User Permission Groups

i. Field Hardware Communications

(1) The SYSTEM shall communicate with the Intelligent System Controllers (ISC) by either RS-485 or RS-232 EIA and/or TCP/IP communications protocol. The SYSTEM shall also have the ability to communicate with the ISCs through remote dialup capabilities.

(2) The communication baud rate shall be SYSTEM selectable from 1,200 to 115,200 bits per second. The SYSTEM software shall take full advantage of its multi-tasking capabilities, allowing downloads of cardholder data and any ISC information to take place while monitoring and receiving alarms from the field hardware. 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 ISC(s) shall be interleaving so that alarms will still report to their respective Alarm Monitoring client workstations while downloads are occurring.

(3) Upon losing and then restoring communications between the ISC and the SYSTEM database, database synchronization between the SYSTEM database and the local database in each ISC shall be fast and efficient. Every change made to the ISC database shall establish a time/date stamp for the change. When communications are 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 offline event. Any changes made to the

SYSTEM database while the SYSTEM was offline shall also be simultaneously downloaded to all ISC databases configured in the SYSTEM.

j. Dual Path Field Hardware Communications
   (1) The SYSTEM shall support dual path communications between the database server and the Intelligent System Controllers. This shall allow for two paths of communication: a primary and secondary path. The primary path shall communicate between the database server and the Intelligent System Controllers (ISC) by either RS-485 or RS-232 EIA standard, LAN/WAN connections utilizing TCP/IP communications protocol, or through remote dialup capabilities using modems. The secondary path shall communicate via RS-485 or RS-232 EIA standard (dialup shall not be the primary connection using this method), LAN/WAN connections utilizing TCP/IP communications protocol or remote dialup capabilities using modems.
   (2) Upon sensing a loss of communications via the primary communication path, the ISC shall automatically initiate the switching of communications to the secondary communications path. Once communications is switched from the primary path to the secondary path, the host shall periodically check and determine if the primary communications path has been restored. Upon restoration of the primary communications path, the host shall restore communications back to the primary communications path. Alarms shall be posted to Alarm Monitoring client workstations when the primary communications path is lost and/or restored. The currently active path shall be displayed with the Intelligent System Controller status in the System Hardware Status Tree.

k. Multi-Drop Panel Support
   (1) The SYSTEM shall support a multi-drop Intelligent System Controller architecture whereby up to eight (8) ISCs shall be multi-dropped on a single RS-485 communications line and whereby all eight panels communicate back to a single serial communications port.
   (2) The multi-drop panel support shall be used in conjunction with other ISC wiring support such as the star wiring configuration, home-run wire architecture, and advanced distributed network architecture.

l. Intelligent System Controller Remote Dialup Support
   (1) The SYSTEM shall support Remote Dialup operations to and from the Intelligent System Controller (ISC). The dialup connection shall be either a constant connection or a scheduled connection. If the connection is constant, then every panel shall have its own modem at the host. If the connection is scheduled, then all panels using remote dialup shall have the ability to share the same host modem(s).
   (2) System Administrators shall have the ability to define the modems available in the pool. For each modem, System Administrators shall be able to define the modem type and the client workstation that it is installed to.
   (3) System Administrators shall have the ability to configure specific ISCs to receive selective cardholder downloads of access permissions for cardholders to either be on demand access or resident access permission or both. This ability

shall allow a System Administrator to perform a database download, and depending on the ISC's configuration, either a full download of all cardholders or a selective download of specified access level shall occur.

(4) Dialup sessions shall occur under any of the user-defined scenarios:

(a) On Demand Connection – A System Operator shall have the ability to automatically initiate a dial in session to an ISC via the Alarm Monitoring application.

(b) Scheduled Connection – System Administrators shall have the ability to configure the SYSTEM so that the ISC dials into the SYSTEM at a pre-determined times through use of timezones.

(c) Critical Alarm Activated – System Administrators shall have the ability to configure the SYSTEM so that the ISC initiates a dialup session with the SYSTEM when a critical alarm is activated in the field.

(d) Buffer Threshold – System Administrators shall have the ability to configure the SYSTEM so that the ISC initiates a dialup session with the SYSTEM when a pre-determined number of events are stored in the ISC memory buffer.

m. SYSTEM to Intelligent System Controller Encryption

(1) Data security for encrypted connections between SYSTEM and Intelligent System Controllers shall be provided by the full implementation of the Federal Information Processing Standard, FIPS-197, utilizing the 128-bit Advanced Encryption Standard (AES), also known as Rijandael, a symmetric encryption algorithm. The 128-bit AES encryption MUST be certified by the National Institute of Standards and Technology (NIST). Implementation of FIPS-197 shall solve the data security requirements for open network connections by providing a means to secure the data over the non-secure network by encryption.

(2) The Intelligent System Controllers shall also support a 32-bit issue code. This shall only be used when implementing a Physical Access Control Systems (PACS) low and medium security profile enhancement.

n. Intelligent System Controller to Reader Interface and I/O Module Encryption

(1) Data security for encrypted connections between Intelligent System Controller and downstream modules (Reader interface and I/O Modules) shall be provided by utilizing the 128-bit Advanced Encryption Standard (AES), also known as Rijandael, a symmetric encryption algorithm.

(2) The encryption between the ISC and downstream modules must support use of a diversified session key derived from a shared secret master key algorithm. The shared secret master key must be settable to insure uniqueness, and to authenticate connected modules prior to activating them for the session.

o. Area Control

(1) The SYSTEM shall provide eight (8) area control features: Global Hard Anti-passback, Global Soft Anti-passback, Timed Anti-passback, Two Person Control, Designated One Person Control, Designated Two Person Control, Tail Gate 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.

(a) The Global 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. Entry and Exit Readers shall be able to span across multiple ISCs. Areas shall be logically defined under the SYSTEM, and area control shall not be required at all areas of CUSTOMER facility to be utilized. Global 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. 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 Global Hard Anti-passback rules shall apply.

(b) The Global Soft Anti-passback feature shall require that a badge be used to enter and exit an area. The controlled areas shall have both entry and exit card readers at all portals. Entry and Exit Readers shall be able to span across multiple ISCs. Areas shall be logically defined under the SYSTEM, and area control shall not be required at all areas of CUSTOMER facility to be utilized. Global 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. 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 allowed access (if that cardholder has the appropriate access level to access the new area), and an alarm shall be reported to the Alarm Monitoring client workstation. It shall be possible to have an area within an area, and/or multiple areas that are independent of each other.The following summary criteria shall apply under Global Hard or Soft Anti-passback:

(i) Initially (Time 0) all card holders are reset to Area 0.

(ii) Any cardholder shall enter a controlled area anytime after Time 0 by presenting a badge to a SYSTEM entry card reader.

(iii) A cardholder shall not exit the controlled area unless he has entered the area presenting a badge to the SYSTEM entry card reader

(iv) A cardholder shall not enter the controlled area a second time unless the cardholder has exited that area previously.

(v) A cardholder shall be able to enter through any entry card reader and exit through any exit card reader of a single controlled area.

(vi) 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 timezone command.

(vii) 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.

(viii) The SYSTEM shall also have a “forgiveness” feature that will allow the System Administrator to assign “one free pass” to an individual cardholder. This shall allow the System Administrator to reset the anti-passback of an individual cardholder to Time 0 Area 0.

(c) 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.

(d) The SYSTEM shall also have a Timed Area Anti-passback feature that shall provide all the functionality of Timed Anti-passback but be enforceable across a group of readers. This option shall not be useable with the Global Anti-passback feature.

(e) 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:

(i) 1. The card reader shall grant access only if two (2) 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.

(ii) 2. Once two (2) people occupy an area, individual access shall be granted.

(iii) 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.

(f) The SYSTEM shall allow for a special One Person Mode. This mode shall require that a designated cardholder is present before anyone else is allowed to access a certain area. This restricts individuals from accessing a restricted or highly secure area when not accompanied by the designated cardholder. When an area is configured for One Person Mode, the following criteria shall prevail:
(i) 1. The card reader shall grant access only if the designated cardholder (with authorized access level) swipes their badge.
(ii) 2. Once the designated cardholder occupies an area, individual access shall be granted normally.
(iii) 3. Individual exit shall be permitted until an area is occupied by only the designated cardholder, once the specific cardholder leaves, the area will again require the specific cardholder to be present before any other individual is allowed to gain access.

(g) The SYSTEM shall allow for a special Two Person Rule to restrict access to certain areas unless there are two (2) cardholders present and they are designated a special “Team Member” distinction. This restricts individuals from being alone in restricted or highly secure areas as well as restricting the type of personnel allowed in a certain area. When an area is configured for the Designated Two Person Rule, the following criteria shall prevail:
(i) 1. The card reader shall grant access only if two valid cardholders (with authorized access levels and special Team Member distinction) 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.
(ii) 2. Once two (2) people occupy an area, individual access shall only be granted to other cardholders who have been designated the Team Member special distinction.
(iii) 3. A Second designation, “Supervisor” can be assigned to other cardholders. Cardholders with the Supervisor designation shall be announced by means of a contact closure then their card is presented at the entry reader of the restricted area. The occupants of the restricted area may then choose to grant access to the supervisor by closing an external contact connected to the reader interface module, which will in turn energize the door strike output. Closing this contact at any other time shall not open the door.
(iv) 4. Individual exits shall be permitted until an area is occupied by only two (2) cardholders with special Team Member distinction at which point the Designated Two Person Rule applies for exit.

(h) The SYSTEM shall allow for a tailgate sensor mode. This shall be triggered when a person receives an access

granted. Upon receiving an access granted, an output will be fired momentarily, duration must not exceed one (1) second. If two people are granted access, the output shall be fired twice momentarily, duration must not exceed one (1) second. The output shall be configured to auxiliary output one of the reader.

(i) Occupancy Limit shall restrict the number of cardholders that shall 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 65,000 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. Multiple Occupancy Limit Areas shall be definable.

p. Interlock group readers

(1) The SYSTEM shall have Interlock support. In the Anti-passback area, there shall be an option to make an area an interlock area. Interlocked areas shall be able to be configured, allowing only one door to be opened at a time within the area. This function shall only be able to be enabled for local anti-passback and shall be unavailable for global anti-passback.

(2) The SYSTEM shall support interlocking group readers. As soon as one door's strike is energized or door is open in the group, all other doors will be denied access until a condition is met. When the SYSTEM USER creates an area with the Interlock set, when one door strike of the area is active or if the door is open, then no door shall be allowed to open and there shall be an alarm.

(3) There shall be an alarm for when access is denied due to interlock reader group. There shall be the alarm, “Interlock Area Busy,” that shall show up when trying to get access from a card. There shall be the alarm, “Exit Request Denied: Interlock Area Busy,” that shall show up when pressing the REX button on the panel. There shall be the alarm, “Cannot Open Door: Interlock Area Busy,” that shall show up when opening a door from the SYSTEM’s Alarm Monitoring application. All alarms shall have a priority of 100 in the SYSTEM’s System Administration application.

q. Field Hardware Configuration

(1) All field hardware configuration windows shall be accessed from either the SYSTEM Icon Toolbar or from menu options in the menu bar within the SYSTEM configuration module of the software. When a field hardware device is configured, the device shall appear in the graphical system overview tree and in all appropriate forms.

(2) Configuration of Intelligent System Controllers (ISCs), Input Control Modules (ICMs), Output Control Modules (OCMs), and card readers shall be provided in a Windows format and shall include the following features:

(a) A tab format to logically group information into a series of forms within an icon or menu option. This shall allow for ease of configuration. For example, all forms that

relate to the configuration of card readers shall be grouped together in the 'Card reader' icon.

(b) Drop-downs to define features

(c) Check boxes

(d) Spin buttons

(e) Browse buttons for ease of locating client workstations

(f) Sortable lists

(g) Graphical System Overview Tree controls for ease of navigation and use

(3) The SYSTEM shall have the ability for bulk add, modify, and delete privileges for ISCs and card readers to allow for the ease of addition and maintenance of these field hardware devices.

(4) The SYSTEM shall provide the ability to search large lists of devices for a string or substring in the device name.

r. Mustering

(1) The SYSTEM shall support advanced Mustering functionality. The Mustering function shall provide an automatic capability for registering cardholders that are on site during an incident. Designated exit and entry card readers shall be used to enter and leave hazardous locations and safe locations. When an incident occurs, a Muster Report shall be generated that consists of a listing of all personnel that are within the hazardous locations as well as all personnel that have registered in a safe location.

(a) A Hazardous Location shall be defined using entry and exit readers associated with the location. Hazardous Locations shall have both entry and exit card readers at all portals. Hazardous Locations shall require that a badge always be used to enter and exit the area. Entry and exit readers shall be able to span across multiple ISCs. The System shall support nested Hazardous Areas (areas within areas).

(b) A Safe Location shall be defined using entry and exit readers associated with the location. Safe Locations shall have both entry and exit card readers at all portals. Safe Locations shall require that a badge always be used to enter and exit an area. Entry and exit readers shall be able to span across multiple ISCs.

(c) One or more Safe Locations shall be specified for a given Hazardous Location.

(d) A Muster Mode shall mean that an incident has occurred and an evacuation is required of one or more Hazardous Locations. A Hazardous Location shall enter into Muster Mode either automatically via an occurrence of a given hardware event transaction (such as an Alarm Input going active) or manually via a System Operator placing the Hazardous Location into Muster Mode.

(e) When a Hazardous Location goes into Muster Mode, all associated Alarm Monitoring workstations shall be notified with a breakthrough notification and Muster Reporting shall begin.

(f) A Muster Mode shall be reset by a manual operation that shall mark a given Hazardous Location as no longer in Muster Mode.

(g) Depending on the configuration of the Hazardous Location, a Muster Reset shall logically move all personnel recorded in the Safe Locations into another area. This area shall typically be the Hazardous Location itself or the “outside area” in which the Hazardous Exit Readers lead.
(h) A Muster Reset shall optionally remove all Badges from all associated Safe Locations.
(i) The SYSTEM shall allow for System Operators to move one badge, or all badges inside an area, from one area (Hazardous Location or Safe Location) to another.
(j) Upon entering a Muster Mode, a Live Muster Mode Report shall be activated. The Live Muster Report shall be configurable to activate immediately upon entering into Muster Mode, after a specified time period from Muster Mode activation, or after the number of personnel in the Hazardous Location reaches a given count.
(k) The Live Muster Report shall be configurable to automatically refresh over time and automatically end once the count of personnel in the Hazardous Location reaches zero.
(l) The Online Muster Status Reporting shall include a current total head count of personnel in the Hazardous Location as well as listing each individual cardholder. An online status indicator in Alarm Monitoring shall show the total number of Cardholders carded into a Hazardous Location and the total number of Cardholders carded into a Safe Location during a Muster Mode.
(m) An Alarm Monitoring workstation that logs on after a Muster Mode has been initiated shall automatically be notified that a Muster Mode is in progress and shall begin displaying a Muster Report according to the reporting configuration.
(n) The Live Hazardous Location and Safe Location Reports shall have the ability to select a Cardholder in the report and bring up their related cardholder record. The Live Muster Report shall display the last location, based on card swipe at a card reader, of each cardholder.
(o) The Live Hazardous Location and Safe Location Reports shall display a summary head count total. The Live Hazardous Location and Safe Location Reports shall be able to be sent to a printer. If there are any Safe Locations associated with the Hazardous Location, the Live Muster Report shall include a split screen Safe Location Report consisting of a report on all associated Safe Locations.
(p) Hazardous Locations and Safe Locations shall be placed on graphical maps as Area Icons. A System Operator shall be able to click onto these icons and either run the Hazardous Locations/Safe Location Report or launch the Live Muster/Safe Location Trace Window. A counter shall be located below the icon to show the total count of personnel in the Hazardous Location/Safe Location.
(q) Hazardous Locations and Safe Locations shall be placed on the System Hardware Status Tree as Area Icons. A System Operator shall be able to click onto these icons and

either run the Hazardous Location/Safe Location Report or launch the Live Muster/Safe Location Trace Window. A counter shall be located next to the icon to show the total count of personnel in the Hazardous Location/Safe Location.

s. Alarm Masking Groups
   (1) The SYSTEM shall support a group alarm masking feature whereas System Administrators shall be able to create groups of alarm inputs that enable them to mask or unmask multiple Input Control Module inputs and card reader inputs simultaneously.
   (2) The following events shall have the ability to be part of an alarm masking group:
      (a) Input Control Module Events
         (i) Alarm Input Active
      (b) Card Reader Events
         (i) Auxiliary Input Active
         (ii) Denied Count Exceeded
         (iii) Door Contact Tamper
         (iv) Door Forced Open
         (v) Door Held Open
      (c) Card Reader Input Tamper
   (3) Alarm Masking Groups shall be able to be masked as a group or as individual points. System Administrators shall have the ability to specify the maximum number of alarms that shall be individually masked at any one time within an Alarm Masking Group. For example: There is a bank vault with 5 motion detectors that are grouped in an Alarm Mask Group called Vault Detectors. Masking the Vault Detectors group (so that a guard may enter the room) shall mask all motion detectors. However, when masking motion detectors individually (for example: because they are malfunctioning), a guard is only allowed to mask up to 2 motion detectors. Attempting to mask a third motion detector in the group shall be prevented.
   (4) Alarm Masking Groups must support the ability to be masked multiple times. For example, when a mask group is initially created it has a mask count of zero (0). The count increments each time that the group is masked. If the group is masked two (2) times, it needs to be unmasked two (2) times for the alarms to begin reporting. The SYSTEM must also support Supervisor (System Administrator) override to reduce the alarm masking group count to zero with one command.
   (5) Alarm Masking Groups shall be able to be masked and/or unmasked via alarm monitoring commands by guards, via card reader keypad function keys, or via global linkage commands.
   (6) The SYSTEM shall support “2-Man Control” for masking Alarm Masking Groups whereby two guards at 2 different locations are required in order to mask an Alarm Masking Group.
   (7) The SYSTEM shall support an Alarm Masking Group status change (Masked to Unmasked or Unmasked to Masked) action to be linked to a function list that is capable of performing many system actions, such as activating a relay output. For example, when an Alarm Mask Group is unmasked, an LED by a door will not be illuminated. However, when the Alarm Mask Group is masked (either by PIN Code/Card reader functionality

or by a System Operator in Alarm Monitoring), the LED by the door will illuminate.

(8) The SYSTEM shall support a minimum of 64 Alarm Masking Groups per Intelligent System Controller with a minimum of 200 alarm inputs per Alarm Masking Group.

t. Global Input/Output/Event Linkage

(1) The SYSTEM shall support a global linkage feature whereby any input/output/event shall be linked to any other input/output/event in the SYSTEM. Input/Output Linkages shall be able to span across Intelligent System Controllers.

(2) System Administrators shall be able to create global I/O function lists, each consisting of a sequence of actions to be performed, such as changing card reader modes, activating outputs, and opening or closing anti-passback areas. Each function list may include up to six actions.

(3) System Administrators shall then be able to link events to the aforementioned global I/O function lists such that a particular device change will execute a function.

(4) The SYSTEM shall allow for the creation of correlation logic to execute a function only when two or more events occur within a specified time window. This correlation logic shall support both mandatory correlation of ALL members of a user specified a set of inputs (AND), and correlation of ANY members of a user specified set of inputs (OR). This correlation function must accommodate events that occur in close proximity but not necessarily overlapping. Simple Boolean logic does not satisfy this requirement.

(5) Inputs shall include ANY System Event, including but not be limited to:

(a) From the Database Server or Client PC
- (i) Communication loss

(b) From the Intelligent System Controller
- (i) Cabinet tamper
- (ii) Power failure

(c) From the Input Control Module
- (i) Communication loss
- (ii) Cabinet tamper
- (iii) Power failure
- (iv) Input points

(d) From the Card Reader
- (i) Access activity from any cardholder
- (ii) Access activity of a specific cardholder
- (iii) Invalid access activity of any cardholder
- (iv) Invalid access activity of a specific cardholder
- (v) Auxiliary inputs active
- (vi) Cabinet tamper
- (vii) Communication loss
- (viii) Door contact tamper
- (ix) Door forced open
- (x) Door held open
- (xi) Power failure
- (xii) Card reader tamper

(e) From the Intrusion Detection Panel
- (i) Communication loss
- (ii) Intrusion activity
- (iii) Access activity

(6) Additional filters shall be applied so that a System Event Input can be filtered to a specific hardware device AND/OR a specific cardholder Badge ID.
(7) When spanning ISCs, a timer shall be included to specify how long an input active will attempt to trigger its associated output in the event the output resides on an ISC that is temporarily offline.
(a) Actions that are able to be a part of a function list shall include, but not be limited to:
(b) Activating an Output Control Module Output
(c) Activate a Card reader Auxiliary Output
(d) Mask an Alarm Masking Group
(e) Unmask an Alarm Masking Group
(f) Open an Area
(g) Close an Area
(h) Chain to another function list
(i) Log the function execution to the database
(j) Set the active mode of a card reader
(k) Test for Active Alarms in an Alarm group
(l) Activate an Action Group
(m) Activate a Timezone
(n) Deactivate a Timezone
(o) ISC Dial Back to the Host
(p) Test Alarms within a Device Group
(q) Activate Muster Mode
(r) Print a Report
(8) Other Events that shall be used to trigger function lists shall include, but not be limited to:
(a) Acknowledging an alarm – Multiple function lists shall be linked to an alarm acknowledgment regardless of the ISC that the alarm was generated from
(b) Minimum area occupancy
(c) Maximum area occupancy
(d) Host Communication Loss
(e) Card Reader Keypad Commands and Function Keys
(f) Performing a direct command from Alarm Monitoring
(9) For each function list that is linked to an input, event, or other function, System Administrators shall have the ability to state how the function will behave based on the current state of the input devices. Input events have several states (depending on the event type), each of which shall be programmed to affect a function list’s state variable in a different way. These states shall be as follows:
(a) Setting a logic term of its state variable to TRUE.
(b) Setting a logic term of its state variable to FALSE.
(c) Pulsing the function list.

u. Cardholder Escort Control
(1) The SYSTEM shall support advanced cardholder Escort functionality in conjunction with credential holder access levels. In addition, the SYSTEM’s access levels shall support activation/deactivation dates. When a cardholder is given an access level with Escorted Cardholder privileges, the cardholder shall require an Escort to gain access to areas in which they are to have escorted access. The access level shall only be valid in the system during its activation and deactivation interval.

(2) An access level shall be set as:
  (a) Not an escort and does not require an escort
  (b) An escort
  (c) Requires an escort
(3) A cardholder shall receive a specific type of access to an area depending on the access level they are assigned. For some areas, a cardholder may be an escort and in others they may be need to be escorted, depending on their access level.
  (a) The Escort functionality shall work as follows:
  (b) Initially, if a card is read that does not require an escort (and has access), the door shall open.
  (c) If a card is read (and has access) that requires an Escort, the door will not open but instead the escorted cardholder will be placed in a “queue” and a timeout of 15 seconds shall begin.
  (d) If the reader supports an LED, the message “Next Badge” shall be displayed.
  (e) Before the timeout is reached, if another card is read that is not an escort, the door will not open, but the cardholder is queued and the timeout is restarted. This includes both escorted and normal cardholders.
  (f) This cycle shall continue until either the timeout is reached or an escort cardholder’s card is read.
  (g) If the timeout is reached, the access denied buzzer, LED (if exists), and text patterns are executed at the reader. In addition, a special access denied alarm shall be sent from the ISC for each cardholder in the queue.
  (h) Once an escort cardholder’s card is read, the door opens and each of the queued escorted cardholders in the queue, normal cardholders in the queue, and escort enter. In addition, an access granted event is sent from the ISC for each of the queued cardholders.

v. Cardholder Use Limits
(1) The SYSTEM shall support a Cardholder Use Limit feature that shall allow System Administrators to specify the maximum number of times that a cardholder may use his or her credential at card readers in the SYSTEM. The SYSTEM shall allow for System Administrators to modify the number of uses a specific badge has left. This modification shall occur immediately to reflect the new use limit assigned.
(2) The System Administrator shall have the ability to not allow a badge holder access to any readers that enforce the use limit. A System Administrator shall also have the ability to grant someone unlimited number of uses to readers that enforce the use limit.
(3) Any card reader in the SYSTEM shall have the ability to have the Cardholder Use Limit enforced. Assignment for use limits shall be on a cardholder by cardholder basis. Thus, cardholder A may have unlimited access to Card Reader 1, but cardholder B may only be able to access Card Reader 1 five times. As such, Cardholder A may only have access to Card Reader 2 nine times while Cardholder B has unlimited access to Card Reader 2.
(4) Every intelligent system controller (ISC) shall be able to keep track of each badge’s current uses left. These updates

shall be provided to the database as badge transactions that are grants with entry are reported to the ISC.

(5) A cardholder shall have the ability to be given a maximum of 2,000,000 days of usage at card readers that have the cardholder use limit option enforced.

w. Extended Individual Strike Times

(1) The SYSTEM shall support Extended Individual Strike Times that allows a card reader’s strike to be active for an extended period of time beyond the pre-determined standard strike time on a per cardholder basis. The extended strike time shall be user-definable up to 255 seconds.

(2) Extended strike times shall be set on a card reader by card reader basis. System Administrators shall have the ability to determine which cardholders are granted the extended strike times.

(3) For example when Cardholder A swipes his card, the card reader strike shall be active for five (5) seconds, but when Cardholder B swipes his card, the strike shall be active for sixty (60) seconds.

x. Extended Individual Door Held Open Times

(1) The SYSTEM shall support Extended Individual Door Held Open Times that allows a card reader’s door to be held open for an extended period of time beyond the pre-determined standard held open time on a per cardholder basis. The extended held open time shall be user-definable up to 131,070 seconds.

(2) Extended held open times shall be set on a card reader by card reader basis. System Administrators shall have the ability to determine which cardholders are granted the extended held open times.

(3) For example when Cardholder A swipes his card, the card reader door shall be allowed to be held open for five (5) seconds, but when Cardholder B swipes his card, the door shall be allowed to be held open for sixty (60) seconds.

y. Extended, on Demand, Door Held Open Times

(1) The SYSTEM shall support extended, on demand, door held times via a command keypad. The Extended Held Open command configuration shall consist of a command key sequence that shall be from 3 to 6 keys used to enter the number of minutes to extend the door held open time (up to 999 minutes) and a pre alarm time (from 0 to 30 minutes).

(2) Only those cardholders having Command Authority at a given card reader configured for ‘Allow User Commands’ shall have the ability to execute the Extended Held Open command at that card reader.

(3) The Extended Held Open command shall be available after a valid cardholder has received an Access Grant at the card reader. The cardholder shall have a period of fifteen seconds after the Access Grant to enter the extended held open command sequence.

(4) If the command is accepted, the card reader shall be considered to be in extended held open mode. The extended held open time shall apply for a single door cycle. When the door is closed, the standard held open time shall again be used at that door for subsequent door cycles.

(5) If the cardholder entry for number of minutes does not fall within the defined range, the command shall be rejected and

feedback shall be given consisting of an ‘access denied’ buzzer pattern at the card reader and an appropriate text display at the LCD reader.

(6) At an LCD Command Reader currently in extended held mode, the time remaining until the extended door held open time expires shall be displayed.

(7) When a cardholder enters an accepted Extended Held Open command at a card reader, a transaction indicating the cardholder initiated the command shall be reported and stored in the SYSTEM audit trail. It shall include the number of minutes entered with the command.

z. Guard Tour

(1) The SYSTEM shall support advanced Guard Tour functionality. A tour shall consist of one or more checkpoints defined as card readers or alarm inputs that a guard shall check during a guard tour.

(a) Each tour shall be assigned a name of up to 128 characters and subsequently assigned to one or more Alarm Monitoring workstations that indicate from where automatic tours are to be launched.

(b) Each tour shall consist of a series of checkpoints that shall include card readers and/or alarm inputs. Tour checkpoints shall be ordered in the sequence within which they are to be visited. Tour checkpoints shall be assigned minimum and maximum times within which to be reached. A “Tour Beginning” Checkpoint shall also be defined to be linked with output actions. Checkpoints shall be able to be placed onto a graphical map.

(c) A tour shall additionally be linked to live video. Instruction text shall be assigned to a tour. These instructions shall be viewed and printed prior to launching the tour from an Alarm Monitoring workstation.

(d) One or more output actions shall optionally be associated with a checkpoint event or a Tour Beginning Event. Actions shall include:

(i) Activating/Deactivating Outputs
(ii) Masking/Unmasking Inputs
(iii) Changing Reader Modes
(iv) Executing Function Lists
(v) Opening/Closing Areas
(vi) Sending Email
(vii) Issuing a Page

(e) One or more input masks shall optionally be associated with a checkpoint event. If a checkpoint event has been associated with an input mask or an output, a timer shall be configured (in seconds). Once that timer expires, the input mask or output shall be restored to its default state.

(f) The following checkpoint events shall be available to link to:

(i) Checkpoint Reached on Time
(ii) Checkpoint Reached Early
(iii) Checkpoint Overdue
(iv) Checkpoint Reached Late

(g) Tour groups shall be created and assigned a name of up to 128 characters. Tour groups will consist of zero or more tours, listed by name.
(h) Security clearance levels shall optionally be created and assigned a name. Security clearance levels shall be assigned to one or more guard tours. A Security Clearance Level is a means of limiting the number of ‘tour guards’ when a tour is launched. Particular Security Clearance Levels shall be assigned only to guards who will need access where the tour will take them. When a tour is launched, only those guards with the security clearance levels shall be listed.
(i) Guards shall be selected from the general cardholder population. Guards shall optionally be assigned one or more security clearance levels. Guards shall be associated with one or more monitoring zones.
(j) Tours shall be optionally scheduled. When scheduling a guard tour, a single tour shall be scheduled for a specific time or recurring time. When scheduling a guard tour, a list of tours and tour groups may be associated with a specific time for random selection.
(k) Tours shall be assigned a “notification” value in minutes. When a given tour is scheduled for automatic launch, this value shall represent the amount of notice the System Operator is given before the tour is to begin.
(l) All available tours and tour groups shall be listed within the System Hardware Tree inside of the System Administration module. Tour groups shall be expanded to reveal all tour members.
(m) A tour shall be manually launched or launched based on a pre-defined schedule. For a scheduled tour, the Alarm Monitoring workstations assigned to that tour shall display a notification X minutes (where X is defined by the System Administrator) prior to the scheduled time.
(n) The SYSTEM shall allow the System Operator to manually enter a Badge ID rather than selecting a guard from the list.
(o) Upon launching of the tour, a Guard Tour Live Tracking view shall automatically open.
(p) The Guard Tour Live Tracking Window shall be opened automatically at the initiating monitoring station whenever a tour is launched. The Guard Tour Live Tracking Window shall consist of a series of columns including:
    (i) Checkpoint Sequence Number
    (ii) Checkpoint Name
    (iii) Checkpoint Status
    (iv) Checkpoint Min Time
    (v) Checkpoint Max Time
    (vi) Checkpoint Time (0 if status is “not reached” or “missed”)
(q) The following checkpoint statuses shall be supported:
    (i) Checkpoint Not Reached
    (ii) Checkpoint Reached On Time
    (iii) Checkpoint Reached Early
    (iv) Checkpoint Overdue
    (v) Checkpoint Reached Late

(vi) Checkpoint Out of Sequence
(vii) Checkpoint Missed
(viii) Guard Tour Initiated
(ix) Guard Tour Completed
(x) Guard Tour Completed With Errors
(xi) Guard Tour Cancelled
(xii) Guard Tour Terminated

(r) The SYSTEM shall support random tours.

(s) Multiple live camera views shall be displayed simultaneously in a “sliding window” format. The next checkpoint to be hit shall be highlighted within the video matrix. The matrix shall include a number of cameras before and after that checkpoint.

aa. Elevator Control

(1) The SYSTEM shall provide elevator control using standard access control field hardware that will permit the restriction of cardholder access to certain floors while also allowing general access to other floors. The elevator control feature shall allow, at the elevator, the use of any card reader and all card reader modes used on any other card reader in the SYSTEM. For example, the card reader mode shall be timezone controlled to allow visitor access during business hours, and create higher security levels after working hours.

(2) An elevator card reader shall be located in the cab of the elevator. Each elevator card reader shall control access for a minimum of 128 floors. The card reader shall integrate to the standard Input Control and Output Control Modules and restrict which floor select buttons are accessible when a badge is swiped based on the cardholder’s access level. A single card swipe shall permit only one authorized floor to be selected. A request for another restricted floor shall require a second card swipe. Those floors programmed as public access (that is, lobby) shall not require a swipe and shall be selected by any passenger.

(3) The SYSTEM shall support a separate ‘Day Mode’ for each floor to allow visitor/general access to different floors during different times of the day.

(4) The SYSTEM shall also have the option of assigning a single timezone to all floors for a particular access level for ease of configuration.

(5) Elevator access levels shall be assignable to regular access levels for ease of assignment. A summary screen shall be provided for review of access level configurations.

(6) The SYSTEM shall be able to track which floor was selected by an individual cardholder for auditing and reporting purposes. System Operators shall be able to have control of each floor controlled by an elevator in the Alarm Monitoring application.

(7) The SYSTEM shall have the ability for a System Operator to individually control any floor that is controlled by the elevator card reader. For example, a System Operator can select to send the elevator cab to floor 4 from the Alarm Monitoring client workstation.

(8) The SYSTEM shall have the ability to assign user friendly names to each of the floors being controlled by the elevator card reader.

bb. Graphical System Overview Tree

(1) A graphical system overview tree shall be available to depict a graphical representation of all field hardware (including ISCs, fire panels, intrusion detection devices, personal safety devices, intercom systems, and central station alarm receivers), digital video hardware, access levels, timezones, access groups, holidays, and card formats that have been configured in the SYSTEM. If System Administrators wish to modify a device that is depicted on the graphical system overview tree or see its properties, they shall be able to double-click on the icon and the SYSTEM shall bring them to the appropriate form.

cc. Pre-Alarm

(1) The SYSTEM shall support a pre-alarm at the card readers in the field. The pre-alarm will sound a tone at the card reader after a valid access has been granted, the door contact opened, AND if the door remains open for a pre-defined period of time. This shall act as a reminder for the cardholder to close the door at the card reader. The card reader shall be able to be configured so that a pre-alarm warning starts providing an audible beep at a predefined time before an alarm state is triggered. This predefined time shall be definable by the System Administrator. Should the door not be closed within a System Administrator defined time after the pre-alarm sounds (up to 131,070 seconds), and a pre alarm warning sounds, a ‘door held open’ alarm shall be generated and sent to the appropriate Alarm Monitoring client workstations. The held open time shall be configurable up to 131,070 seconds and have the capability to be different for different card readers. For example, the front door may be able to be held open for up to sixty (60) seconds, while the research lab door may only be able to be held open for fifteen (15) seconds.

dd. Alarm/Event Logging

(1) All alarms and events in the SYSTEM shall by default log to the database that shall be used for reporting and backup capabilities. However, the SYSTEM shall give System Administrators the ability to select on a timezone basis, the times that they require the SYSTEM to log specific events to the database. For example, in non secure areas, System Administrators may not want to log access grants for a particular card reader in the database during normal working hours, but want to know who accessed the area after hours. Alarm/Events shall be set to log or not log particular alarms/events on an individual card reader by card reader and input by input basis.

ee. Scheduling Utility

(1) The SYSTEM shall support an advanced Scheduling Utility. The Scheduling Utility shall allow System Administrators to schedule actions to occur on a one-time or a recurring basis. Recurring schedules shall be configured to begin immediately, last indefinitely, or have optional start and end dates.

(2) The Scheduling Utility shall be available from both the System Administration and Alarm Monitoring applications.
(3) The types of actions that shall be schedulable include but are not limited to:
    (a) Event Archiving/Purging
    (b) Arm/Disarm Area
    (c) Start of Guard Tour
    (d) Execution of DataExchange Scripts
    (e) Activate, Deactivate, Pulse Device Output
    (f) Activate, Deactivate, Pulse Device Output Group
    (g) Global Anti-passback Reset
    (h) Download Firmware to ISCs
    (i) Download Firmware to Lenel Network Video Recorders
    (j) Download Firmware to IP Cameras
    (k) Download Database to ISCs
    (l) Execute Function List
    (m) Mask/Unmask Inputs
    (n) Mask/Unmask Input Groups
    (o) Mask/Unmask Alarm Mask Group
    (p) Mask/Unmask Door Forced Opens
    (q) Mask/Unmask Door Forced Opens for Reader Group
    (r) Mask/Unmask Door Held Opens
    (s) Mask/Unmask Door Held Opens for Reader Group
    (t) Open Door
    (u) Open Door Group
    (v) Change Reader Mode
    (w) Automatic Reports
    (x) Reset Use Limit
    (y) Move Bulk Badges From Area
    (z) Deactivate Badges
    (aa) Logout Visitors
    (bb) Schedule PTZ preset
(4) The Scheduling Utility shall provide a flexible scheduling mechanism to satisfy a wide range of scheduling needs, such as:
    (a) Every day, on the hour
    (b) Every Monday at 8:00 am
    (c) The first Sunday of every month
    (d) The last Friday of every three months
(5) The Scheduling Utility shall allow the System Administrator to configure an action to occur one time, on a given date and time.
(6) The scheduling utility shall allow the System Administrator to configure an action to be performed many times over a period of time or indefinitely.
(7) The Scheduling Utility shall allow events to be scheduled. This shall include:
    (a) Daily: Every n day(s).
    (b) Weekly: Every n week(s). Furthermore, the System Administrator shall choose which day(s) during the week to perform the action. For example, every Monday, or every Monday, Wednesday and Friday.
    (c) Monthly: This shall provide two options:
        (i) Day n of every m month(s). For example, “Day 1 of every 3 months”.

(ii) The nth (day of the week) of every m month(s). For example: “The 1st Sunday of every 1 month”.

(8) On each day that the action is performed as per the frequency, the System Administrator shall also be able to specify the number of times the action is performed on that day. The options shall be:
(a) Once, at a given time.
(b) Every n hours or minutes. For this option, the System Administrator shall specify, “starting at” and “ending at” times, which default to 12:00 AM – 11:59 PM.

(9) For a recurring task, the System Administrator shall be able to specify the date range for which the schedule is valid:
(a) Start date (defaults to current date).
(b) Either “No end date” (indefinitely) or a specific end date.

(10) For recurring actions, the Scheduling Utility shall provide a mechanism to perform an action once immediately, then resume its normal schedule.

(11) The Scheduling Utility shall provide means for the System Administrator to monitor its activities and the status of scheduled tasks. The information available shall include:
(a) Next Start Date/Time
(b) Last Start Date/Time
(c) Last End Date/Time
(d) Last Run Duration (calculated from start and end times).
(e) Last Run Status (for example: Successful, Error)
(f) Current status (for example: Started, Paused, Stopped)

(12) The Scheduling Utility shall maintain a history log in the database for actions that it executes.

ff. Multiple Card Formats

(1) The SYSTEM shall support an unlimited number of card formats. Magnetic stripe and Wiegand card formats shall be supported. Each ISC shall support a minimum of eight (8) access control card formats and if applicable, eight (8) asset formats. As such, each card reader shall also be able to support a minimum of eight (8) access control card formats. If applicable, asset readers shall be able to support a minimum of eight (8) access control card formats and eight (8) asset management card formats. The SYSTEM shall support any magnetic stripe format that uses card number, facility code, and issue code combinations with a maximum of a nine digit card number and two digit issue code. The SYSTEM shall support any industry standard Wiegand card format.

gg. Card Reader Cipher Mode

(1) The SYSTEM shall support a card reader Cipher Mode that shall allow authorized cardholders to enter their Badge ID by typing it into a card reader keypad, thus emulating the presentation of the credential to the card reader.

(2) When a card reader is configured for cipher mode, an access attempt made by entering *<badge number># at the keypad shall be accepted as a magnetic card read. The number of keys pressed shall be consistent with the length of one of the assigned magnetic card formats. An access attempt made by entering *<number># at the keypad where the number of keys pressed is not consistent with the length of any of the

assigned magnetic formats shall report an event transaction and deny access to the card reader.

(3) When cipher mode is configured for a given card reader, it shall remain in effect for any reader mode changes that are made other than facility code mode.

hh. Denied Access Attempts Counter

(1) The SYSTEM shall support a denied access attempts count on a per card reader basis. The “Denied Attempts Count” value shall be configurable from 0 to 255. The following access denial types shall cause the current denied count to be incremented:

(a) Unknown PIN entry at a card reader configured as ‘PIN or Card’ mode

(b) Invalid cipher entry at a card reader in Cipher Mode

(c) Invalid PIN entered for a given card at a card reader configured as ‘Card and PIN’ mode

(d) Non-matching biometric presented for a given card at a card reader in biometric verify mode.

(2) The following events shall cause the counter to rest to zero:

(a) 10 minutes pass without any of the above denial types

(b) An access grant at the given card reader

(3) When the current denied count reaches the Denied Attempts Count configured for the card reader, a ‘Deny Count Exceeded’ transaction shall be reported. This transaction shall only be reported when the limit is initially reached. It shall not report on subsequent denials.

(4) Through Global I/O functionality, the System Administrator shall be able to configure a Function List to execute when the ‘Deny Count Exceeded’ transaction occurs for a given card reader, such as locking down the card reader or annunciating a local siren.

ii. Card Reader Timezone Overrides

(1) The SYSTEM shall allow for the pre-defined default card reader settings to be overridden or temporarily changed on a timezone basis. At the beginning of the a selected timezone, the selected card reader’s operational mode shall be modified from its default mode to any one of the following modes: locked, unlocked, facility code, card only, card or PIN, card and PIN, card and Biometric, card or PIN and biometric, and/or card and PIN and biometric. The aforementioned options shall be available depending on the type of card reader utilized. For example, the card reader mode cannot be set to card and PIN if the card reader does not have a keypad. At the end of the timezone, the card reader can return to its default operational mode or be set to any of the aforementioned modes.

(2) Each card reader shall have the ability to have multiple timezone setting overrides assigned to them as required by the System Administrator.

jj. Online Context-Sensitive Help

(1) The SYSTEM shall provide online context-sensitive help files to guide System Administrators and System Operators in the configuration and operation of the SYSTEM. The help menu shall be available from any window in the SYSTEM by pressing the F1 function key or clicking on the Help icon in the toolbar. Help windows shall be context-sensitive so System

Administrators can move from form to form without leaving the help window. Standard Windows help commands for Contents, Search, Back, and Print shall also be available. The SYSTEM shall also come with complete online documentation on the product disc.

kk. Monitor Zones

(1) The SYSTEM shall provide System Administrators with the ability to segment their access control SYSTEM field hardware devices into various zones or areas, which can then be monitored from Alarm Monitoring client workstations. These zones shall be assigned an alphanumeric name using up to 128 characters and shall consist of one or more access panels, card readers, alarm panels, alarm inputs, alarm outputs, card reader auxiliary alarm inputs, card reader auxiliary alarm outputs, digital video recorders, video cameras, fire panels, intrusion detection panels, intercom exchanges, intercom stations, personal safety panels, central station alarm receivers, offline lock panels, a graphical map, along with any associated alarm/event/timezone associations. These zones shall then be assigned to the Alarm Monitoring client workstations that will monitor the assigned areas.

(2) The SYSTEM shall allow subset relationship devices (such as card readers or ICMs to Intelligent System Controllers) to be automatically part of the monitoring zone when an ISC is selected AND it shall allow the System Administrator to define which subset devices (card readers, ICMs, etc.) belong to that monitor zone.

(3) The SYSTEM shall allow for the real time updating of monitor zones. It is unacceptable for System Operators to have to log off of the SYSTEM and re log on each time a monitor zone is modified or updated.

(4) In addition, the SYSTEM shall allow for Monitor Zones to be assigned to one or more System Operators. Upon logging into the Alarm Monitoring workstation, a System Operator shall have the option to override the Monitor Zone to Monitor Station assignment and load the Monitor Zone that is assigned to the System Operator.

ll. Advanced Field Device Control

(1) The SYSTEM shall allow a System Operator to monitor all alarms in their assigned monitor zone, but only be capable of performing field device control actions on specified devices in the assigned monitor zone.

(2) The SYSTEM shall allow System Administrators to set permission control for individual devices within a monitoring zone for command override. For example, System Operators are required to monitor a group of 20 card readers and 100 inputs. However, they are only allowed to override (unlock door, mask alarm, etc.) for five (5) of the doors and 15 of the inputs.

(3) The current list of permissions for control under the monitor permission groups shall include the following:

(a) Access modes
(b) Open doors
(c) Relay and reader
(d) Set panel clock
(e) Mask alarms and inputs

(f) Unmask alarms and inputs
(g) Mask alarm mask groups
(h) Unmask alarm mask groups
(i) Execute function lists
(j) Paging outputs
(k) E-mail
(l) Panel dialup
(m) Standalone test mode
(n) Download firmware
(o) Arm areas
(p) Disarm areas
(q) Silence area alarms

mm. Alarm/Event Routing

(1) The SYSTEM shall be capable of allowing System Administrators to route alarms and events to various Alarm Monitoring client workstations on the network. The SYSTEM shall allow any alarm or event to be routed to one or multiple client workstations on the network regardless of where the alarm is generated in the field. Alarms shall be routed to client workstations on a device by device level.

(2) The SYSTEM shall also allow for the System Administrators to automatically have alarms re-routed from one Alarm Monitoring client workstation to another Alarm Monitoring client workstation if a system operator has not responded to the alarm within a specified amount of time.

(3) The SYSTEM shall have network synchronization so that if an alarm/event is routed to multiple client workstations, once the first client workstation ‘grabs’ the alarm, the alarm/event shall be cleared from all other client workstations. As such, alarms that are routed to an Alarm Monitoring client workstation which does not have a System Operator logged in shall be queued so that all unacknowledged alarms will report to that client workstation once a System Operator has logged into the SYSTEM.

(4) Alarms/Events shall be routed based on default settings or timezone control. The SYSTEM shall allow for alarms and events to be placed into groups that can then be assigned to monitor zones. Each alarm/event that is associated with a group can have its own unique timezone association. The group shall later be used to define when that alarm/event shall be routed to the assigned Alarm Monitoring client workstation.

nn. Text Instructions

(1) The SYSTEM shall allow for a set of text instructions to be associated with each alarm that arrives into the SYSTEM. The text instruction function shall allow the System Administrator to enter a minimum of 32,000 characters of text for procedures to follow for each alarm that arrives at the Alarm Monitoring client workstations. Each alarm or event in the SYSTEM shall have its own unique set of text instructions should the System Administrator desire.

oo. Customizable Voice Instructions

(1) The SYSTEM shall allow for a customizable voice instruction to be associated with each alarm that arrives into the SYSTEM. The customizable voice instruction feature shall allow the System Administrator to record a voice instruction of unlimited length. This voice instruction shall explain the

procedures to follow once the alarm has been selected for acknowledgment at the Alarm Monitoring client workstation. Each alarm or event in the SYSTEM shall have its own unique customizable voice instruction should the System Administrator desire. The SYSTEM shall allow both a text instruction and a customizable voice instruction to be associated with each alarm/event configured in the SYSTEM.

(2) A BROWSE button shall be available to allow the use of pre-existing wave (.wav) files for customized voice instructions.

pp. Customizable Voice Annunciation

(1) The SYSTEM shall allow for a customizable voice annunciation to be associated with each alarm that arrives into the SYSTEM to be used as an additional attention grabber for high priority alarms. The customizable voice annunciation shall allow the System Administrator to record a voice annunciation of unlimited length, which will annunciate at the Alarm Monitoring client workstation when the alarm arrives at the SYSTEM. Each alarm or event in the SYSTEM shall have its own unique customizable voice annunciation. This annunciation shall also be user configurable to repeat in user-defined one second increments until the alarm is acknowledged. This feature shall have the ability to be ‘muted’ at the Alarm Monitoring client workstation at the System Operator’s discretion.

(2) A BROWSE button shall be available to allow the use of pre-existing wave (.wav) files for customized voice annunciations.

qq. Alarm Attributes

(1) The System Administrator shall have the capability to configure how the SYSTEM handles the annunciation of alarms on an individual basis. Each alarm and/or event shall have the option(s) to:

(a) Display at one or more Alarm Monitoring client workstation.

(b) Allow higher priority alarms to be displayed on the Alarm Monitoring client workstation ahead of lower priority alarms.

(c) Require that the field device that generated the alarm be restored to its normal state before the alarm can be cleared from the Alarm Monitoring window.

(d) Print the alarm to the local event printer.

(e) Have a customized voice message annunciate at the client workstation.

(f) Have the alarm breakthrough to the Alarm Monitoring window should the System Operator be working on another application on the Alarm Monitoring client workstation.

(g) Allow System Operators to change the journal entry once the alarm has been acknowledged.

(h) Require that the alarm not be deleted from the Alarm Monitoring window upon acknowledgment.

(i) Display text and audio instructions outlining the procedures to follow when responding to the alarm.

(j) Automatically call-up associated maps upon grabbing an alarm.

(k) Automatically call up the associated cardholder record with photo when the alarm displays.

(l) Automatically call up the associated cardholder photo in the video verification function when the alarm displays for comparison to a live video image at the card reader.
(m) Require System Operators to enter in a password to view the alarm.
(n) Require System Operators to enter in a password to acknowledge the alarm.
(o) Require System Operator acknowledgment to clear.
(p) Allow mandatory journal entry upon acknowledgment.
(q) Have pre-defined “canned” journal entries for alarms in the SYSTEM.
(r) Allow non-essential events to be cleared without requiring System Operator journal entry, while other alarms shall require System Operator journal entry.
(s) Send CCTV interface commands to appropriate matrix switchers.
(t) Automatically send an e-mail message to one or more e-mail recipients.
(u) Automatically send an alphanumeric page to one or more pagers.
(v) Have the alarm appear on the Alarm Monitoring window with a flashing colored bar across the alarm for high priority alarms. Each priority in the SYSTEM shall have its own unique color assigned to it. A minimum of 255 colors must be available for assignment to a minimum of 255 priority levels.
(w) Have the alarm, when acknowledged, display a different flashing colored bar across the alarm than for the original alarm color. Each acknowledged priority in the SYSTEM shall have its own unique color assigned to it. A minimum of 255 colors must be available for assignment to a minimum of 255 priority levels.
(x) Have a function list(s) assigned to it that will trigger when the alarm is acknowledged. The function lists shall be configured to execute only within a specified amount of time from when the alarm was generated.
(y) Require User Logon for Acknowledgment – This feature shall require a user ID and password to be entered when the given alarm is acknowledged. This ID shall be different than the User ID that is currently logged onto the SYSTEM.

rr. Alarm-Event Mappings

(1) The SYSTEM attributes described above shall be assignable on a ‘global’ basis by System Administrators to all devices that share an alarm description. Thus, the ‘door forced open’ alarm attributes shall apply to any door with a card reader that is forced opened in the SYSTEM. System Administrators shall have the ability to assign a unique group of alarm attributes to specific device/alarm combinations to override the global settings for specific case settings. For example, System Administrators may assign a different set of attributes to be applied to a ‘door forced open’ at a bank vault or research facility than they would if the front door was forced open. The SYSTEM MUST allow for this type of flexibility. Each device/alarm combination shall have the

ability to have its own unique attribute set if the System Administrator desires.

ss. System Downloads

(1) After configuring field hardware devices, the SYSTEM shall allow database information to be downloaded to the Intelligent System Controllers (ISCs). Downloads shall load SYSTEM information (timezones, access levels, alarm configurations, etc.) into the ISCs first, followed by cardholder information and card reader configurations.

(2) The SYSTEM shall have the ability to configure individual ISCs to receive selective downloads. This ability shall allow a System Administrator to perform a database download, and depending on the ISC's configuration, either a full download of all allowed Access Levels or a selective download of specified Access Levels shall occur. When Selective Download is enabled for an ISC, badge holders who are in an Access Level that was not downloaded shall be required to present their badge twice the initial time they present their badge at a panel. The badge data shall be downloaded after the first presentation. The first presentation will result in a "Badge not in Panel" alarm in Alarm Monitoring. The badge shall then operate normally for all following presentations. Downloading the database to a panel shall delete from that panel all badge holders not in an Access Level designated for download.

(3) Bi-directional information flow shall occur so that alarms will still report to their respective Alarm Monitoring client workstations as cardholder information is being downloaded.

(4) The SYSTEM shall allow for System Administrators to grant permission to System Users to download firmware and the database to the entire system. System Users without permission to complete firmware downloads to the entire system still shall be able to perform database downloads, but not be able to download the entire system.

(5) Downloads of ISCs shall have the ability to be scheduled such that they will automatically occur at a pre-determined time without System Operator intervention.

(6) A complete database download of 10,000 cardholder records to all ISCs (regardless of the number of ISCs) must be complete within ten (10) minutes.

(7) Information on cardholder status, badge status, timezones or access levels shall not require System Operator intervention to download to the ISCs and shall download in a real time basis as they are added, modified, or deleted from the SYSTEM. Thus, any change made to the aforementioned items shall be downloaded immediately to all ISCs in the SYSTEM.

tt. Card Reader Options

(1) System Administrators shall have the ability to set the following options for each card reader configured in the SYSTEM:

(a) Allow User Commands- This feature shall allow keypad functions to be performed at the card reader's keypad. All cardholders assigned an access level with the "Allow User Commands' option checked will have the ability to activate and utilize functions at the card reader with its keypad.

(b) Rename Auxiliary Inputs- This feature shall allow System Administrators to rename the card reader’s auxiliary inputs. As an example, “aux input 1” at the front door card reader shall now be renamed “Motion Detector at Front Door”. Card Reader Auxiliary Inputs shall be supported in the SYSTEM as separate, distinct inputs not associated with the card reader. Each card reader auxiliary input shall appear in the SYSTEM Alarm Monitoring application as its own alarm and shall appear on graphical maps as its own device icon.
(c) Rename Auxiliary Outputs- This feature shall allow System Administrators to rename the card reader’s auxiliary outputs. Card Reader Auxiliary Outputs shall be supported in the SYSTEM as separate, distinct outputs not associated with the card reader. On graphical maps, each output shall appear as its own device icon.
(d) Independently Supervise Request to Exit and Door Contacts - This feature shall allow the System Administrator to independently configure the Request to Exit and Door Contacts as Supervised or Unsupervised.
(e) Configure Request to Exit and Door Contacts as Normally Open or Normally Closed - This feature shall allow the System Administrator to independently configure the Request to Exit and Door Contacts as Normally Open or Normally Closed.
(f) Deny if Duress - This feature shall deny a cardholder access into an area if a duress code is entered at the card reader’s keypad. It shall generate an alarm at the Alarm Monitoring client workstation.
(g) Assume Door Used - This option assumes that there is not a door contact at the door to monitor door position. This option is generally used for doors located inside a building.
(h) Alarm Masking - This feature shall allow System Administrators to mask any combination of door forced open, door held open, or the card reader auxiliary input alarms on a timezone basis. Different timezones shall be allowed to be assigned to different door alarm types.
(i) Activate Outputs - This feature shall allow System Administrators to activate auxiliary outputs attached to the card reader on a timezone basis.
(j) Two Card Control - This feature shall instruct the card reader to grant access only if two valid cardholders (with authorized access levels) swipe their cards one after the other. In the event that a second authorized card is not presented within 10 seconds of the first authorized card, the card reader shall reset and the first card will have to be swiped again.
(k) Checkpoint – This feature shall instruct the SYSTEM that this card reader is a designated stop on one or more guard tours.
(l) Do Not Activate Strike on REX - This feature shall allow the SYSTEM NOT to activate the door strike on a request to exit command.
(m) The SYSTEM shall have the ability to allow System Administrators to decide, on a timezone basis, when they

wish to log access grants, access denies, and card reader status alarms to the database on a card reader by card reader basis. Different timezones shall be allowed to be assigned to different events. Thus, access grants may be logged only after hours, while access denies are logged twenty-four hours a day, seven days a week for the lobby card reader. However, at the research lab card reader, all events including access grants are logged twenty-four hours a day, seven days a week.

(n) The SYSTEM shall allow for user-definable door strike functionality for each card reader in the SYSTEM. For each card reader, System Administrators shall have the option for the door strike to be active for the entire strike time after a valid card read or have the strike close as soon as the door is opened after a valid card read.

(o) The SYSTEM shall allow for user-definable door strike functionality for each card reader in the SYSTEM. For each card reader, System Administrators shall be able to specify whether or not to activate the card reader’s door strike upon a valid request to exit.

(p) The SYSTEM shall allow for each card reader to be selected as either an ‘in’ reader, ‘out’ reader, or ‘none’ to allow for ease of reporting time and attendance basic ‘time in’ and ‘time out’ data.

(q) Enforce Use Limit – This option shall enable Card Use Limits at the card reader limiting the number of times that cardholders may use their credential to gain access at the card reader.

(r) Alarm Shunt – The SYSTEM shall have the ability to shunt a door contact of separate intrusion detection systems. When the SYSTEM provides an access granted a dedicated auxiliary output shall first trigger and bypass the door contact of the separate intrusion detection system, and then the door locking mechanism shall unlock. Once the door returns to a secure state the door contact of the separate intrusion detection system shall return to its normal state.

(s) Supervise Door – Sets the SYSTEM so that the card reader door contact is wired as a supervised input.

(t) Relaxed door forced open detection – The SYSTEM shall provide an option that when selected shall allow for the door to be opened for an additional three (3) seconds time period after the request-to-exit sensor has been returned to the normal state.

(u) The SYSTEM shall allow for one or more access points in a specific area to be armed and disarmed directly from a command control keypad. Only a cardholder assigned an access level with the “Arm/Disarm Command Authority” option checked shall have the ability to activate and utilize these functions at the keypad. There shall be a LCD display on the command control keypad which shall provide the cardholder with feedback about whether or not a point in the area is armed or disarmed, and which points are in a state of alarm. The user shall then be provided an option to arm or disarm each point in the

area. All cardholder control commands, whether successful or not, shall be recorded and displayed at the monitoring station and shall also appear in the audit trail and all relevant reports.

uu. Input Control Module Options

(1) System Administrators shall have the ability to set the following options for each input or output configured on the Input Control Modules in the SYSTEM:

(a) Alarm Masking - This feature shall allow System Administrators to mask the alarm input on a timezone basis.

(b) Local Linkage - This feature shall allow System Administrators to locally link outputs with inputs that are attached to the same ICM/Output Control Module (OCM). Inputs shall be linked to multiple outputs and outputs shall be triggered by multiple inputs.

(c) Activate Output - This feature shall allow System Administrators to activate an output tied to the ICM/OCM on a timezone basis.

(d) Activate Output Always- This feature shall allow System Administrators to activate an output always.

(e) Configuration of Debounce Times - Debounce time configuration allows System Administrators to control the amount of time that an input state change must remain consistent in order for it to be considered a real change of state, ideal for preventing contact "flickers" from being reported up as changes of state.

(f) Configuration of Hold Times - When configuring an Alarm Input, a hold time setting shall be settable from 0-15. When an input goes active and is restored, the hold time is the amount of time in seconds to wait until reporting the input activation as restored. This feature is useful when there is no advantage to log the specific number of times a point is tripped after the initial event.

(g) Checkpoint – This feature shall instruct the SYSTEM that this input is a designated stop on one or more guard tours.

(h) Supervised Input – The System Administrator shall specify if the alarm contact on the ICM is a supervised or unsupervised contact. ICMs shall have the ability to consist of supervised and unsupervised alarm contacts on the same ICM if desired.

vv. Entry/Exit Delay

(1) System Administrators shall have the ability to set up entry/exit delays for inputs that are attached to any Input Control Module, Single Reader Interface Module, or Dual Reader Interface Module. System Administrators shall have three options for entry/exit delay:

(a) Non-Latched Entry: System Administrators shall have the ability to set an input to non-latched entry. When non-latched entry mode is selected and an entry delay is specified, the following procedure ensues. When an input activates, the alarm will not be reported until the Entry delay expires. If the input is still active when the entry delay expires, the alarm will be reported. If the input is not active when the entry delay expires, then

the alarm will not report. This is useful to filter out invalid motion detector reads.

(b) Latched Entry: System Administrators shall have the ability to set an input to latched entry. When latched mode is selected and an entry delay is specified, the following procedure ensues. When an input activates, the alarm will not be reported until the Entry delay expires. If the input is still active when the entry delay expires AND the alarm has NOT BEEN MASKED, the alarm will be reported. If the input has been masked when the entry delay expires, then the alarm will not report.

(c) Exit Delay: System Administrators shall have the ability to set an input to Exit Delay. When an exit delay is specified, the following procedure ensues. When an input activates, the alarm will not be reported (operates as if masked) until the Exit delay expires. If the input is still active when the exit delay expires, the alarm will be reported. If the input is not active when the exit delay expires, the alarm will not be reported. This is useful to secure a door when an individual is leaving.

ww. Intelligent System Controller Options

(1) System Administrators shall have the ability to group add, modify, and delete Intelligent System Controllers (ISCs) in the SYSTEM. The SYSTEM shall have a copy command, allowing System Administrators to easily and efficiently add ISCs. The copy command will copy all information configured for an ISC selected and apply those same characteristics to the new ISC being added.

(2) System Administrators shall also have the ability mark ISCs as ‘online’ or ‘offline’ depending on whether those panels are online. The SYSTEM shall also prompt the System Administrator if the System Administrator attempts to configure the number of cardholders (and assets, if applicable) that will be downloaded to an ISC to a number greater than that which the ISC’s memory can handle.

xx. Basic Integrated Intrusion Functionality

(1) System Administrators shall have the ability to define Alarm Mask Groups for sets of points within an ISC or IDRC. These sets of points can then be treated as an intrusion area. Indication of events from these points can be masked (disarmed) or unmasked (armed) through the Alarm Monitoring application, from a command keypad, and/or from a supported Open Supervised Device Protocol (OSDP) LCD/Keypad device.

(2) The SYSTEM shall support Intrusion Mask Groups. The Intrusion Mask Group shall contain intrusion points. These intrusion points shall be individually configured in the SYSTEM. Once intrusion points are assigned to an intrusion mask group it shall be monitored by the SYSTEM to determine the current state of the intrusion mask group. Alarms shall be reported for the intrusion mask group by the SYSTEM based on the current arming mode and state of the intrusion mask group.

(3) For each Command Keypad and supported Open Supervised Device Protocol (OSDP) LCD/Keypad device, the System Administrator shall be able to define which Integrated Intrusion commands (Arm/Disarm/Force Arm/View Faulted points) are allowed and whether a credential is required to execute each of them. The

System Administrator shall also be able to assign each Integrated Intrusion command to a function key (if supported by the device), and define up to eight 16-character ASCII strings to be continuously scrolled on the device display (if so equipped).

(4) The command keypad or OSDP LCD/Keypad device shall have the option of providing at least the following capabilities:
(a) Visual and Audible indication of entry and exit delays
(b) Current status of any faulted points in the group
(c) Audible and visual indication that an alarm has occurred
(d) After an alarm occurs, a list of points faulted during the previous armed period leading up to the alarm
(e) When disarmed, an audible chime when programmed point in the group change state

(5) The SYSTEM shall provide support for disabling Intrusion Commands from the SYSTEM’s Alarm Monitoring application. The option shall configure the SYSTEM so that Intrusion Commands may only be performed from the LNL-CK or HID command keypads. This is a requirement for DIACAP certification.

yy. Strike Follower
(1) An output for a reader can be overridden so that it is configured to activate and deactivate timed with a door strike. It can be set for a delay time and/or pulse.
(2) There shall be a mode called "Strike Follower". The mode shall be optional and mutually exclusive with alarm shunt and tailgate. Strike Follower shall override the auxiliary 1 output and shall allow the output to follow the strike pulse. It shall be configurable with a delay and a pulse time.
(3) The settings shall include:
(a) • Activation delay
(b) • Mode: Pulse or Follower
(c) • Pulse time: When pulse is used, a pulse time can be specified.

zz. Support for iCLASS® serial number read and Badge ID lookup using Fargo® DTC400e printer
(1) The Fargo DTC400e printer shall be supported for prox badge number import or iCLASS serial number import. The DTC400e with iCLASS module shall be supported for serial number import only; the iCLASS badge number shall not be imported. The feature shall allow a customer-provided cross-reference table to be used to read the iCLASS serial number, look up the badge number in the table, and store the badge number in the SYSTEM badge record. Utilizing this workflow shall require significant customer-provided scripting, and the MANUFACTURER’s Professional Engineering Services shall be highly recommended to aid in implementing this workflow.

C. Acceptable Products:
1. Lenel OnGuard ADV Software including the following components:
a. Qty (1) Lenel SWS-ADV OnGuard Software with 64 Reader Licenses.
b. Qty (1) Lenel SWC-ADV OnGuard Advanced Client License.
c. Qty (1) Lenel SWC-IDADV OnGuard Card Printing License.
d. Qty (1) Lenel CS-DEV-AD OnGuard LDAP Connector for Windows Active Directory.
2. Or Approved Equal.

PART 3 – EXECUTION

3.1 SECURITY CABLE ROUTING AND TERMINATION

A. Route all security cable in conduit. Paint exposed conduit to match existing surfaces.
B. Install access panels as necessary for reasonable access to security cable and junction boxes located above inaccessible ceilings.
C. Ten feet of cable slack shall be stored in the security cable above the security panel enclosure.
D. Cables shall be installed in continuous lengths from origin to destination (no splices).
E. The cable's minimum bend radius and maximum pulling tension shall not be exceeded. Refer to manufacturer requirements & reference documents.
F. Cables shall not be attached to ceiling grid or lighting fixture wires.
G. Any cable damaged or exceeding recommended installation parameters during installation shall be replaced by the Contractor prior to final acceptance at no cost to the Owner.
H. Cables shall be labeled with self-adhesive labels. At the security panel, each cable shall be clearly labeled on the cable jacket 1″ from the termination location.
I. Terminate security cables with insulated crimp type lugs.
J. When installing security cable raceway, the Contractor shall maintain the following minimum clearance from sources of electro-magnetic interference (EMI).
   1. 6″ clear from power conductors.
   2. 12″ clear from fluorescent lighting fixtures and ballasts.
   3. 36″ clear from transformers and motors.

3.2 LABELING

A. Label all security devices. Labels shall be placed in a concealed location and shall identify the ID of the device.
B. Label all security enclosures, power supplies and relays.
C. Label all batteries with the date that the batteries were installed.
D. Label all cables at the security panels. Affix labels a minimum of 1 inch from the point of termination. Labels shall be placed so that they are clearly visible. Labels shall identify the ID of the device.
E. Install engraved name plates on all security enclosures.

3.3 SYSTEM PROGRAMMING, TESTING, DEMONSTRATION AND TRAINING

A. Install, configure, program and test access control software on the head-end server and the client monitoring workstation.
B. Install and configure access control system LDAP Active Directory connector software. Meet with the VA IT department to determine the requirements and configuration of this software.
C. Meet with the VA Reno Police Department and determine the required operation, functionality and scheduling of the system. Program the security system in accordance with the Owner’s requirements (provide an allowance of 12 hours for programming).
D. Provide custom maps (floor plans) and alarm notifications (visual and audible) for monitoring the system. AutoCAD drawings will be provided by the engineer to create the necessary maps.
E. The contractor shall perform 100% testing of the security doors and devices. All deficiencies shall be corrected and the devices re-tested.
F. The contractor shall demonstrate operation of the entire system to the VA Reno. Any punchlist items identified shall be corrected by the contractor.
G. Provide qty (4) hours of training to the VA FMS staff and VA Police on the operation of the system including card design and printing.

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