

Request for Information (RFI)

GSA RFI – 14 - 004

**Pursuant to P.L. 32-009
re: “Secure Our Schools Act” of 2013**

ACKNOWLEDGEMENT RECEIPT FORM

Please be advised that to be considered a prospective bidder you must fill out this Acknowledgement receipt form. Please submit by fax form to (671) 472-4217 or (671) 475-1727

Name _____

Signature _____

Date _____

Time _____

Contact Number _____

Fax Number _____

Contact Person regarding RFI _____

Title _____

E-Mail Address _____

Company/Firm _____

Address _____

***All companies interested in providing a bid pursuant to Public Law 32-009 (Secure Our Schools Act of 2013), relative to the installation and maintenance of electronic or other security systems at all Guam Public Schools, should (1) Register your Interest and (2) Provide written questions, comments and suggestions for submission into the bid. The intent of this request is to acquire questions, suggestions and recommendations from all possible bidders to be incorporated into the bid.**

The deadline for registration and submission of the written questions, suggestions and recommendations which must be labeled “Response to GSA RFI-14-004 Secure Our Schools Act of 2013”, to the General Services Agency, is no later than close of business Friday, June 13, 2014.

Note: GSA will not be liable for failure to provide notice to any party who did not register contact information.

The petitioner said H.R. 4402 would restrict public access to Guam's best public beach, the oldest known and longest-lasting ancestral Chamorro settlement site.

Dr. Carson, adding that he is not aware any such comparison has yet been made.

He said it would be prudent to restrict public access to Guam's best public beach, the oldest known and longest-lasting ancestral Chamorro settlement site.

PUBLICATION NOTICE

In accordance with the provisions of Guam Code Annotated, Title XI, Chapter III, Section 3315, notice is hereby given that:

Young-Min Corporation
dba: 5 Eleven

has applied for a Class: Four General Off Sale Alcoholic Beverage License said premises being marked as Lot: 14 Blk 25#175 Y Seng Song Rd. Dededo

PUBLIC NOTICE

Guam Board of Allied Health Examiners Regular Session Meeting, Friday, June 6, 2014, 12 noon, Health Professional Licensing Office, Conference Room, Terlaje Professional Building, Ste. 209, 194 Hernan Cortez Avenue, Hagatna. Agenda: I) Call to Order. II) Adoption of Agenda. III) Approval of Minutes of May 2, 2014. IV) Old Business, A. Legal Counsel Report, B. Workgroup Report i) Rules/CE ii) Finance iii) Complaint V) New Business, A. Applications B. Renewal VI) Miscellaneous, VII) Next meeting VIII) Adjournment.

Persons with disabilities needing special accommodations, please call the ADA Coordinator, Jimmy Sian, Department of Public Health & Social Services, 123 Chalan Kareta, Mangilao, GU, 735-7127.

Funding Source for this ad is government funds.



GSA General Services Agency
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 Department of Administration
 Government of Guam
 148 Route 1 Marine Drive, Piti, Guam 96915
 Tel: 475-1707-13 Fax: 472-4217/475-1727



Eddie Baza Calvo
 Governor
 BENITA A. MANGLONA
 Director
 Dept Administration

REQUEST FOR INFORMATION (RFI)
GSA RFI-14-004

The "Draft" for the Security Design Specifications for the Guam Department of Education (Secure Our Schools Act of 2013) is available online from the GSA website: <http://gsa.doa.guam.gov/>. The intent of this request is to acquire questions, suggestions and recommendations from all possible bidders to be incorporated into the bid. All companies interested in providing a bid pursuant to Public Law 32-009, relative to the installation and maintenance of electronic or other security systems at all Guam Public Schools (Secure Our Schools Act of 2013) should (1) Register your interest and (2) provide written questions, comments and suggestions for submission into the bid.

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/s/ **CLAUDIA S. ACFALE**
 Chief Procurement Officer

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University archaeologist optimistic about access to Ritidian

By Alexie Villegas Zotomayor
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Variety News Staff

THOUGH he neither has a strong opinion for or against the proposed firing-range complex at Ritidian on Guam, an archaeologist expressed his optimism that a solution would be reached in favor of providing access to the public.

University of Guam's Micronesia Area Research Center assistant professor Dr. Mike T. Carson, who has been conducting research at Ritidian where he found evidence of a 3,500-year-old human settlement, said: "Part of my motivation to conduct research at Ritidian has been the direct contribution to public knowledge and appreciation. A shutdown of the refuge, even if it's only partial or periodic, would reduce the realistic benefits for the public. Ideally, a solution can be reached to avoid or minimize the shutdown and instead to continue as much public access as possible."

For Dr. Carson, nobody intends to sacrifice Guam's natural or cultural resources for the sake of building a new firing range and surface danger zone, or SDZ.

He said this is the reason the decision-making process is taking such a long time, so all options will be considered toward arriving at the most responsible decision.

In his personal opinion, Dr. Carson said he hopes the Department of Defense could keep "within its own rather



Ritidian is Guam's best public beach as well as the oldest known and longest-lasting ancestral Chamorro settlement site. FWS photo by Laura Beaurogard

large existing footprints on Guam."

He cited Andersen Air Force Base in northern Guam as an example.

He said he suspects there could be "plenty of buffer space that exists for building a firing range complex and accommodating the responsible surface danger zone that goes with it."

Real issue

He added: "In my perception, the SDZ is the real issue here. It needs to be very large, and it probably will extend over the adjacent ocean. Moreover, the plan is to use the firing range and the SDZ for as many as 39 weeks per year, leaving only 13 of the year's total 52 weeks open for other kinds of activity in the SDZ."

For Dr. Carson, an additional concern is that those 13 free weeks will need to be announced and scheduled with the public who may want to

have access to the area.

"Some people have expressed worries that those 13 weeks will become 12, 11, and even less over time," he said.

Constructing the firing range and SDZ near Ritidian is an option being considered.

For Dr. Carson, options may also be explored within "the very large (Andersen Air Force Base) property."

He said within the base, "a firing range and associated SDZ would require shutdown and relocation of existing facilities, such as a golf course, housing and other areas. Any location will come with its problems, but AAFB is a large place with plenty of options and excellent engineering minds at work to make virtually any possibility into a reality, no matter how challenging it may appear to be."

He also expressed his confidence in the planning engineers

and in the resource managers to overcome these challenges.

"I hope that their opinions are being considered in the decision-making process," he said.

If the firing range were to be constructed within AAFB, Dr. Carson said it will not require any major reconfiguration.

However, if the range were to be located near Ritidian, it will require shutting down the Ritidian unit of the Guam National Wildlife Refuge for 39 weeks per year.

Research programs

"In addition to the impact of vastly reducing the public access to this essential resource of the refuge, the scientific research programs will suffer and in some cases become eliminated. Some of the natural resources potentially will improve with absence of human entry into the SDZ, but others will become worse with neglect. The sustained access is what makes the refuge so important for public appreciation and learning, as well as for long-term scientific studies."

He said DOD could mitigate these problems by building a new road, access point, support buildings and utility service lines for the Ritidian unit.

"This is not a perfect solution, but it is worthy of consideration. It is a multimillion-dollar operation, and it will require several months to reach completion. It can be compared against the time and cost of reconfiguration of facilities within the existing AAFB footprint for a different location of the firing range and SDZ," said Dr. Carson, adding that he is not aware any such comparison has yet been made.

He said it would be prudent

to have one.

He sees that the archaeological sites and resources in the refuge will not suffer any direct damage.

However, Dr. Carson said the people will no longer be able to access the areas.

"The guided tours and school fieldtrips will no longer be realistic, but a partial solution may continue with the shift in access point as noted," he said.

He added that at least in principle, archaeological surveys and excavations possibly can be scheduled during times when the proposed SDZ is not active, and other studies may continue in the non-affected areas.

Restricted access

Meanwhile, restricted access to Ritidian is one of the main concerns of supporters of an online petition against H.R. 4402 that will authorize the Secretary of the Navy to establish a surface danger zone over the Guam National Wildlife Refuge or any portion in support of the operation of a live-fire training range complex.

As of yesterday, 1,132 supporters have signed the petition.

The petition underscores the site's critical role in conserving the natural and cultural heritage of Guam, and its place as an important recreational and educational destination of more than 92,000 Guam residents and tourists each year, including over 12,000 school children who come to the refuge each year to learn about conservation and the island's traditional habitat.

The petitioners said H.R. 4402 would restrict public access to Guam's best public beach, the oldest known and longest-lasting ancestral Chamorro settlement site.



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Chief Procurement Officer



Ray Tenorio
Lt. Governor

Anthony C. Blaz
Deputy Director
Dept. of Administration

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"DRAFT"

Security Design Specifications
For
Guam Department of Education
(Secure Our Schools Act)

BASIC SECURITY SYSTEM MATERIALS AND METHODS

PART 1 GENERAL

- 1.1 **STANDARD PRODUCTS:** Material and equipment shall be the standard products of a manufacturer regularly engaged in the manufacture of such products. Items of equipment shall essentially duplicate equipment that have been in satisfactory use at least 2 years prior to bid opening. Equipment shall be supported by successful bidder for a period of one (1) year from the time of acceptance by GDOE. Maximum response time for service shall be one (1) hour.

Comply: Yes No

- 1.2 **RELATED DOCUMENTS:** This section shall apply to all phases of work specified, on the specifications, and required to provide all security systems complete and operable for the project; coordinate all such work to attain fully operational systems throughout the project. The intent of this specification to provide a complete and operating security system in accordance with all bid documents.

Comply: Yes No

- 1.3 **WORK INCLUDED:** Provide all labor, materials, services and skilled supervision necessary for the installation, connection, testing, and adjustment of all circuits and security equipment required by the bid documents, complete in all respects and ready for use.
- 1.4 **SUPERVISION OF WORK:** Security System work shall be under the full supervision of a professional Security System Technician. Within 30 calendar days after the Bidder has received the Notice to Proceed, shall submit a certification from the Bidder stating that the work will be done under his full supervision. At the conclusion of the work, prior to final inspection, submit certification that the work was done in accordance with security documents and the installation complies with the latest Security Systems Code.

1.5 **COORDINATION OF WORK:**

- A. Plan all work so that it proceeds with a minimum of interference with other on going projects, if any.
- B. Work lines and established heights shall be in accordance with security system or electrical Codes as required by the Department of Public Works Building Codes.
- C. Lay-out and coordinate all work well in advance to avoid conflicts or interference with other work in progress so that in the event of interference, the security layout may be altered to suit the conditions, prior to the installation of any work, and without additional cost to the Owner. Conflicts arising from lack of coordination shall be the

Bidder's responsibility.

- D. Maintain all code required clearance around electrical/security equipment. Unless specifically noted otherwise, establish the exact location of electrical/security equipment based on the actual dimensions of equipment furnished.

1.6 COOPERATE WITH OTHER TRADES:

- A. Cooperate and coordinate all work of other on-going projects, if any; afford reasonable opportunity for the execution of their work. Properly connect and coordinate this work with the work of other on-going projects, if any; at such time and in such a manner as not to delay or interfere with their work.
- B. Promptly report to the General Services Agency any delay or difficulties encountered in the installation of this work which might prevent prompt and proper installation, or make it unsuitable to connect with or receive the work of others. Failure to report shall constitute an acceptance of the work of other projects as being fit and proper for the execution of this work.

1.7 CODES, PERMITS AND FEES:

- A. Perform work in accordance with the National Security Systems Code, applicable building ordinances, and other applicable codes, hereinafter referred to as the "Code". Where the bid documents exceed minimum requirements, the most stringent shall apply unless variance is approved.
- B. Complying with all requirements for permits, licenses, fees, and codes. Obtain all required permits, licenses, inspections, and pay all fees required to perform the work described in the bid documents.

- 1.8 CONTRACT DRAWINGS: The Bidder shall provide with their bid a diagram/drawing to convey the scope of work, indicating the intended general arrangement of security equipment. The Bidder will follow the drawings in laying out the work and verify spaces for the installation of materials and equipment based on actual dimensions of equipment furnished. Wherever a question exists regarding the intended location of equipment, circuiting, etc., obtain instructions from the GDOE Superintendent or his designee and concurred in writing by the Chief Procurement Officer of the General Services Agency (GSA).

- 1.9 NEW EQUIPMENT AND MATERIAL: Unless otherwise specified, equipment and materials of the same type of classification, and used for the same purpose shall be products of the same manufacturer. Use only new and un-weathered materials.

1.10 APPLICABLE DOCUMENTS:

- A. Manufacturer, testing and method of installation of all apparatus and materials furnished as per the specifications shall conform to the latest publications or standard rules of the following:

Institute of Electrical and Electronic Engineers
(Formerly American Institute of Electrical Engineers)- IEEE
American Society for Testing and Materials –ASTM
American National Standards Institute – ANSI
International Building Code – IBC
Insulated Power Cable Engineers Association – IPCEA
Department of Public Works Standards, Government of Guam – DPW

1.11 EXECUTION OF THE WORK:

- A. Installation equipment and materials in neat and workmanlike manner and align level and adjust for proper operation. Install equipment so that all parts are easily accessible for inspection, operation, maintenance, and repair.
- B. Where damage, marring or disfigurement has occurred, replace or refinish the damaged surfaces as directed, and to the satisfaction of the government.
- C. Provide the design, fabrication, and erection of all supplementary structural framing required for attachment of hangers or other devices supporting electrical/security equipments. Submit design/shop drawing to the GDOE Superintendent or his designee and concurred by the Chief Procurement Officer, GSA for review and approval.

1.12 SPECIAL CONSIDERATION:

- A. Cutting, Patching and Piercing: Obtain written permission from the Safety Administrator before cutting or piercing structural members.
 - 1. Use craftsmen skilled in their respective trades for cutting, fitting, repairing, patching of plaster and finishing of materials including carpentry work, metal work or concrete work required for by specifications. Do not weaken walls, partitions or floor by cutting. Holes required to be cut in floors must be drilled or cored without breaking or spalling around the holes. Do all necessary patching and/or refinishing as instructed by the GDOE Superintendent or his designee.
 - 2. Sleeves through floors and walls to be galvanized rigid steel flush with walls, ceiling or finished floors; size to accommodate the raceway.

3. Use care in piercing waterproofing. After the part piercing waterproofing has been set in place, seal opening and make absolutely watertight.
 4. Provide baked white enamel painted spring-clipped escutcheon plates where exposed pipe passes through walls, floors, or ceilings. Cover sleeves and entire opening made for the pipe with escutcheon plates. Field applied paint finish shall match color of surrounding finish. Seal all conduit openings through floor slabs, masonry walls, and continuous partitions to make air and watertight. Tightly caulk space between conduit and abutting materials with fiberglass insulation and nonflammable sealant.
- B. Seal equipment or components exposed to the weather and make watertight and insect-proof. Protect equipment outlets and conduit openings with temporary lugs or caps at all time that work is not in progress.
 - C. Equipment Access: Locate devices and pull boxes to allow easy Equipment Identification: Identify each piece of equipment with plastic laminate nameplates, black face with white core letters, having proper and complete identification. Clearly identify on the equipment served, and spell out the full name of the equipment.
 - D. Equipment Access: Locate devices and pull boxes to allow easy access for operation, repair and maintenance, and if concealed, provide access doors.
 - E. Equipment Bases: Provide equipment bases on all floor-mounted equipment furnished under this Bid.
 - F. Protection of apparatus, materials and equipment: Take all necessary precautions to properly protect all apparatus, fixtures, appliances, material, equipment and installations from damage of any kind. The Safety Administrator may reject any particular piece or pieces of material, apparatus, or equipment which has scratches, dents or otherwise damaged.
 - G. Operation and Maintenance Manuals: During the time of the Contract and before final acceptance of the security installation, submit to the GDOE Superintendent or his designee and the Chief Procurement Officer three copies of all descriptive literature, maintenance recommendations from the equipment manufacturer, data of initial operation, wiring diagrams and parts list of each item of security equipment installed under the Bid; submit all manufacturer's guarantees and warranties.
 - H. Painting Preparation: Prepare all exposed fittings, conduits, boxes, and supports for painting; remove traces of oil, grease and dirt. Employ all necessary

precautionary methods to prevent scratching or defacing of all security apparatus and devices.

- I. Painting: Exposed conduit, boxes installed after room has been painted, shall be painted to match room finish by the Bidder.
- J. Corrosion Control: All corrosive metal surfaces, conduits/fittings, pipelines and structures shall be provided with corrosion inhibiting primer before installation. Appropriate surface preparation shall be made before application of primer.
- K. Rust Prevention: Unless otherwise noted, provide hot dip galvanized finish for all ferrous materials. In addition, outdoor installations shall be field painted with two coats of epoxy paint inside and outside.
- L. Tests: Provide all tests as outlined hereinafter, and other tests necessary to establish the adequacy, quality, safety, completed status, and suitable operation of each system. Tests shall be conducted in the presence of the GDOE Superintendent or his designee.
- M. Seismic Consideration: Installation shall meet Seismic zone 4 requirements.
- N. Windload Consideration: Installation exposed to outdoors shall be designed to withstand 170 MPH wind speed IBC 2009 Exposure C and ASCE7-05.

1.13 QUALITY ASSURANCE:

- A. Use adequate numbers of skilled workmen who are thoroughly trained and experienced in the necessary crafts and who are completely familiar with the specified requirements and the methods needed for proper performance of the work and the specifications as provided.
- B. Without additional cost to the Government, Bidder shall provide such other labor and materials as are required to complete the work required by the specifications in accordance with the requirements of governmental agencies having jurisdiction, regardless of whether such materials and associated labor are called for elsewhere in these bid documents.

1.14 WARRANTY: Provide as specified in the individual specifications.

1.15 DRAWINGS:

- A. The Bidder shall maintain at the site one copy of all drawings, specifications, amendments, and other modifications, in good order and marked to record all changes made during installation. These shall be made available to the GDOE

Superintendent or his designee.

- B. At the conclusion of the work, the Bidder will be furnished by the GDOE Superintendent or his designee, at the Bidder's expense, a set of reproducible made from original contract plans. The Bidder shall then incorporate all changes made, as recorded, into the set of reproducible in a clear, legible and reproducible manner. All security lines, communication lines, and stub-outs shall be dimensionally located within the building structure. As a condition for acceptance of work, reproducible shall be signed by Bidder attesting that all changes have been incorporated, dated and delivered to the GDOE Superintendent or his designee and the Chief Procurement Officer.

1.16 SPARE PARTS AND MAINTENANCE PRODUCTS:

- A. Provide spare parts, maintenance, and extra Products in quantities specified in individual specification sections.
- B. Deliver to Project site and place in location as directed; obtain receipt prior to final payment.

2. INTERIOR WIRING SYSTEM

2.1 SUBMITTALS:

Manufacturer's Data Sheet shall be submitted to include the following:

- A. Conduit and fittings (each type)
- B. Insulated conductors
- C. Outlet and junction boxes

2.2 PRODUCTS:

Materials and Equipments: Materials, equipment and devices shall, as a minimum, meet the requirements of UL, where UL standards are established for those items, and the requirements of NFPA 70.

2.3 CONDUITS AND FITTINGS:

- A. Rigid Steel Conduit (Zinc-Coated) ANSI C80.1, UL 6
- B. Rigid Aluminum conduit ANSI C80.5, UL 6
- C. Electrical Metallic Tubing (EMT) UL 797, ANSI C80.3
- D. Flexible Metal Conduit UL 1
 - 1. Liquid-Tight flexible Metal Conduit (Steel) UL 360
- E. Fittings for Metal Conduit, EMT and Flexible Metal Conduit UL 514B. Ferrous fittings shall be cadmium- or zinc-coated in accordance with UL 514B.
 - 1. Fittings for Rigid Metal Conduit. Threaded type. Split couplings unacceptable.
 - 2. Fittings for EMT. Compression-type.

2.4 OUTLET BOXES AND COVERS. UL 514A, cadmium- or zinc-coated, if of ferrous metal. UL 514C, if nonmetallic.

2.5 CABINETS, JUNCTION BOXES AND PULL BOXES (WITH VOLUME GREATER THAN 100 CUBIC INCHES). UL 50, hot-dip zinc-coated, if of sheet steel.

- 2.6 WIRES AND CABLES: Wires and cables shall meet the applicable requirements of NFPA 70 and UL for the type of insulation, jacket and conductor specified or indicated. Wires and cables manufactured more than 12 months prior to date of delivery to the site shall not be used.
- A. Conductors. No. 10 AWG and smaller shall be solid; No. 8 AWG and larger shall be stranded. Conductors shall be copper, unless indicated otherwise.
 - B. Minimum conductor sizes: Minimum size for branch circuits shall be No. 12 AWG; for Class 1 remote-control and signal circuits, No. 14 AWG; and for Class 2 low-energy, remote-control and signal circuits, No. 16 AWG.
 - C. Color Coding: Provide for all service, feeder, branch, control, and signaling circuit conductors. Color shall be green for grounding conductors, and white for neutrals, except where neutrals of more than one system are installed in same raceway or box, the other neutral shall be white with a colored (not green) stripe. The color of the ungrounded conductors in different voltage systems shall be as follows: 120/208 volt, 3 phase: Phase A – Black; Phase B – Red; Phase C – Blue
 - D. Insulation: Unless specified or indicated otherwise or required by NFPA 70, all power and lighting wires shall be 600-volt, type THW, THWN, XHHW, or RHW, except that grounding wire may be Type TW; remote-control and signal circuits shall be Type TW, THW or TF. Conductors shall conform to UL 83. Where lighting fixtures require 90 degree C conductors, provide only conductors with 90 degree C insulation or better.
 - E. Bonding Conductors: ASTM B1, solid bare copper wire for sizes No. 8 AWG and smaller diameter; ASTM B 8, Class B, stranded bare copper wire for sizes No. 6 AWG and larger diameter.
- 2.7 SPLICES AND TERMINATION COMPONENTS: UL 486A for wire connectors, and UL 510 for insulating tapes. Connectors for wire No. 10 AWG and smaller diameter wires shall be insulated, pressure-type in accordance with UL 486A or UL 486C (twist-on splicing connector). Provide solderless terminal lugs on stranded conductors.

Part 3 Execution

3.1 **INSTALLATION:** Electrical installations shall conform to requirements of NEPA 70 and to requirements specified herein.

A. **Wiring Methods:** Provide insulated conductors installed in conduit, except where specifically indicated or specified otherwise, or required by NEPA 70 to be installed otherwise. Provide insulated, green equipment grounding conductor in all feeder and branch circuits. Grounding conductor shall be separate from electrical system neutral conductor. Provide insulated, green conductor for grounding conductors installed in conduit or raceways. Minimum conduit size shall be $\frac{3}{4}$ inch in diameter for low voltage lighting and power circuits. Conduit which penetrates fire walls, fire partitions, or floors shall be metallic on both sides of fire walls, fire partitions, or floors for minimum distance of 6 inches.

1. Aluminum conduit. Use in exposed installation and in unairconditioned spaces.

- a. Do not install underground or encase in concrete.
- b. Do not use brass or bronze fittings.

2. Electrical Metallic Tubing. Use in dry partitions and above drop ceiling.

- a. Do not use in feeder circuits.
- b. Do not install underground.
- c. Do not encase in concrete.
- d. Do not use in areas where subject to severe physical damage (including, but not limited to, mechanical equipment rooms and electrical equipment rooms).
- e. Do not use in hazardous areas.
- f. Do not use in outdoor work.

B. **Conduit installation:** Unless indicated otherwise, conceal conduit within finished walls, ceilings, and floors. Keep conduit minimum 6 inches away from parallel runs of flues and steam or hot-water pipes. Install conduit parallel with or at right angles to ceilings, walls, and structural members where located above accessible ceilings and where conduit will be visible after completion of project.

1. Where conduits rise through floor slabs, the curved portion of bends shall not be visible above the finish slab.

2. **Conduit Support:** Support conduit by pipe straps, wall brackets, hangers, or ceiling trapeze. Fasten by wood screws to wood; by toggle bolts on hollow masonry units; by concrete inserts or expansion bolts on concrete or brick; by machine screws, welded threaded studs, or spring-tension clamps on steel

work. Threaded C-clamps may be used on rigid steel conduit only. Do not weld conduits or pipe straps to steel structures. The load applied to fasteners shall not exceed one-fourth of the proof test load. Fasteners attached to concrete ceiling shall be vibration resistant and shock resistant. Holes cut to a depth of more than 1-1/2 inches in reinforced concrete beams or to a depth of more than 3/4-inch in concrete joints shall not cut the main reinforcing bars. Fill unused holes. In partitions of light steel construction, use sheet-metal screws. In ceiling, run conduit above the ceiling. Where conduit crosses building expansion joints provide a suitable watertight expansion/deflection fitting that maintains the conduit electrical continuity by bonding jumpers or other means.

3. Make changes in direction of runs with symmetrical bends or cast-metal fittings. Make field-made bends and offsets with a hickey or conduit-bending machine. Do not install crushed or deformed conduits. Avoid trapped conduits. Prevent plaster, dirt, or trash from lodging in conduits, boxes, fittings, and equipment during construction. Free clogged conduits of all obstructions.
 4. Install pull wires in empty conduit in which wire is to be installed by others. The pull wire shall be plastic having minimum 200-pound tensile strength. Leave a minimum 12 inches of slack at each end of the pull wire.
 5. Fasten conduits to sheet metal boxes and cabinets with two locknuts where required by NFPA 70, where insulated bushings are used, and where bushings cannot be brought into firm contact with the box; otherwise, use minimum single locknut and bushing. Locknuts shall have sharp edges for digging into the wall of metal enclosures. Install bushings on the ends of conduits and provide insulating type where required by NFPA 70
 6. Stub-Ups: Provide conduits stubbed up through concrete floor for connection to free-standing equipment with an adjustable top or coupling threaded inside for plugs, set flush with the finished floor. Extend conductors to equipment in rigid steel conduit, except that flexible metal conduit may be used 6 inches above the floor. Where no equipment connections are made, install screwdriver-operated threaded flush plugs in conduit end.
 7. Flexible Connections: Provide flexible connections of short length, 6 feet maximum. Provide liquid-tight flexible conduit in wet locations. Provide separate ground conductor across flexible connections.
- C. Boxes, Outlets and Supports: Provide boxes in the wiring or raceway systems wherever required for pulling of wires, making connections, and mounting of devices. Boxes for metallic raceways shall be of the cast-metal hub type when located in wet locations, when surface mounted on outside of exterior surfaces,

when installed exposed up to 7 feet above interior floors and walkways, or when installed in hazardous areas. Boxes in other locations shall be sheet steel, except that aluminum boxes may be used with aluminum conduit; nonmetallic boxes may be used with nonmetallic conduit system. Each box shall have the volume required by NFPA 70 for the number of conductors enclosed in the box. Boxes for use in masonry-block or tile walls shall be square cornered tile-type, or standard boxes having square-cornered tile-type covers. Provide gaskets for cast-metal boxes installed in wet locations and boxes installed flush with the outside of exterior surfaces. Fasten boxes and supports with wood screws on wood, with bolts and expansion shields on concrete or brick, with toggle bolts on hollow masonry units and with machine screws or welded studs on steel. In open overhead spaces, cast boxes threaded to raceways need not be separately supported except where used for fixture support; support sheet metal boxes directly from the buildings structure or by bar hangers. Where bar hangers are used, attach the bar to raceways on opposite sides of the box and support the raceway with an approved type fastener maximum 24 inches from the box. When penetrating reinforced-concrete members, avoid cutting any reinforcing steel.

1. Boxes for use with raceway systems shall be minimum 1-1/2, inches deep, except where shallower boxes required by structural conditions are approved. Boxes for other than lighting-fixture outlets shall be minimum 4 inches square, except that 4 inch by 2 inch boxes may be used where only one raceway enters the outlet.
 2. Pull boxes: At least the minimum size required by NFPA 70 of code-gage aluminum or galvanized sheet steel, compatible with nonmetallic raceway systems, except where cast-metal boxes are required in locations specified herein. Furnish boxes with screw-fastened covers.
- D. Conductor Identification: Provide conductor identification within each enclosure where a tap, splice, or termination is made. For conductors No. 6 AWG and smaller diameter, color coding shall be by factory-applied color-impregnated insulation. For conductors No. 4 AWG and larger diameter, color coding shall be by plastic-coated self-sticking markers, colored nylon cable ties and plates, or heat-shrink type sleeves. Identify control circuit terminations.
- E. Splices: Make splices in accessible locations. Make splices in conductors No. 10 AWG and smaller diameter with an insulated pressure type connector. Make splices in conductors No. 8 AW and larger diameter with a solderless connector and cover with an insulation material equivalent to the conductor insulation.
- F. Electrical Penetrations: Openings around electrical penetrations through fire resistance rated walls, partitions, floors, or ceilings shall be sealed to maintain fire resistive integrity as tested per ASTM E814.

G. Grounding and bonding: In accordance with NFPA 70. Ground all exposed non-current-carrying metallic parts of electrical equipment, metallic raceway systems, grounding conductor in metallic and nonmetallic raceways, and neutral conductor of wiring systems.

1. Grounding Conductor: Provide an insulated, green equipment grounding conductor in all feeder and branch circuits including lighting circuits. Grounding conductor shall be separated from the electrical system neutral conductor. Provide insulated, green conductor for grounding conductors installed in conduit or raceways.

H. Owner-Furnished Equipment: The Bidder shall make connections to Owner furnished equipment to make equipment operate if possible to interface with existing government equipment.

3.2 FIELD QUALITY CONTROL: Furnish test equipment and personnel and submit written copies of test results to the Safety Administrator. Give five working days notice prior to each test.

A. Devices Subject to Manual Operation: Each device subject to manual operation shall be operated at least five times, demonstrating satisfactory operation each time.

Part 4 INTRUSION DETECTION SYSTEM (IDS)

- 4.1 Standard Products: Material and equipment shall be the standard products of a manufacturer regularly engaged in the manufacture of such products. Items of equipment shall essentially duplicate equipment that have been in satisfactory use at least 2 years prior to bid opening. Maximum response time for service shall be one (1) hour.
- 4.2. System Description: Provide new intrusion detection system (IDS), including associated equipment and appurtenances. Provision of IDS shall include supervising installation of rigid or flexible conduit for IDS during site preparation, running system wires and cables, and system component installation, component testing, and system checkout. After functional testing and system acceptance by the GDOE Superintendent or his designee, each system shall be complete and ready for operation. Equipment, materials, installation, workmanship, inspection, and testing shall be as specified herein. Include materials not furnished by the manufacturer with IDS equipment.
- 4.3 Submittals: The General Services Agency (GSA) and the involvement of other government agencies with the expertise to assist the GSA to review and approve submittals requiring special review.

Submittals shall include wiring diagrams and installation details of equipment indicating proposed locations, layout and arrangement, control panels, accessories, piping, ductwork, and other items that must be shown to ensure a coordinated installation. Wiring diagrams shall identify circuit terminals and indicate the internal wiring for each item of equipment and the interconnection between each item of equipment. Drawings shall indicate adequate clearance for operation, maintenance, and replacement of operating equipment devices. Submittals shall include the nameplate data, size and capacity. Submittals shall also include applicable federal, industry and technical society publication references.

Shop Drawings:

IDS Components
Overall system schematic

Product Data:

Interior point sensors
Interior volumetric (space) sensors
Control communicators
Keypad
Communication cables
Communications interface devices
Central station receiver

Central station printer
Sirens
Batteries
Tamper switches
Strobes

Test Reports:

IDS operational test plan

Certificates:

IDS operational test plan
Bidder's qualifications
Instructor's qualifications
IDS equipment

Operation and Maintenance Data:

IDS

Closeout Submittals:

As-Built drawings for IDS
Posted operating instructions for IDS
Product catalog and price list for future procurement needs

4.4 Quality Assurance:

A. Drawings

1. IDS Components: Provide drawings that clearly and completely indicate the function of each component of the IDS. Indicate termination points of devices and indicate interconnections required for operation of the system. Indicate interconnection between modules and devices. In addition, provide a layout drawing which shows spacing of components, location, and details of mounting and positioning.
2. Overall System Schematic: The overall system schematic shall indicate the sequence of operation, the relationship of integrated components on one diagram, and show power source, system controls, impedance matches, plus number, size, identification, and maximum lengths of interconnecting wires. Drawings shall not be less than 24 by 36 inches.

B. Experience and Qualifications:

1. Bidder's Qualifications: The Bidder must demonstrate a minimum of 3 consecutive and recent years' experience successfully installing IDS of the same or similar type and design as specified herein. Provide names, locations, on-going operational and maintenance costs, and points of contact of at least five installations of the same type and design as specified herein within the past 3 years where the installer has installed such systems. Indicate the type and quantities of each system and certify that each system has performed satisfactorily in the manner intended for a period of not less than 1 year.
2. Instructor's Qualifications: Prior to installation, submit data of the instructor's experience and certified qualifications. Show that the instructor, who will train operating and maintenance personnel, has received a minimum of 24 hours of IDS training from a technical organization such as the National Burglar and Fire Alarm Association, and has 5 years' experience installing IDS of the type specified.

C. IDS Operational Test Plan: Bidder must submit for approval at least 30 days prior to commencement of formal operational testing an IDS testing plan. Include detailed procedures for comprehensive, operational testing of each IDS component and subsystem, and for performance of an integrated system test.

D. IDS Equipment: Submit manufacturer's certification of UL listing.

E. Regulatory Requirements: In each of the publications referred to herein, consider the advisory provisions to be mandatory, as though the word, "shall" had been substituted for "should" wherever it appears. Interpret references in these publications to the "authority having jurisdiction," or words of similar meaning to mean the Bidder. Equipment, materials, installation, and workmanship shall be in accordance with the mandatory and advisory provisions of NFPA 70 unless more stringent requirements are specified or indicated.

1. Reference Standard compliance: Where equipment or materials are specified to conform to industry and technical society reference standards of the organizations such as American National Standards Institute (ANSI), American Society for Testing and Materials (ASTM), National Electrical Manufacturers Association (NEMA), Underwriters Laboratories (UL), and Association of Edison Illuminating Companies (AEIC), submit proof of such compliance. The label or listing by the specified organization will be acceptable evidence of compliance.
2. Independent Testing Organization Certificate: In lieu of the label or listing, submit a certificate from an independent testing organization, competent to perform testing, and approved by the Bidder. The certificate

shall state that the item has been tested in accordance with the specified organization's test methods and that the item companies with the specified organization's reference standard. Provide only UL listed Security system equipment for both exterior and interior ESS sensors, access control, and closed-circuit television (CCTV) components.

F. Standard Products: Provide materials and equipment that are products of manufacturers regularly engaged in the production of such products which are of equal material, design and workmanship. Products shall have been in satisfactory commercial or industrial use for 2 years prior to bid opening. The 2-year period shall include applications of equipment and materials under similar circumstances and of similar size. The product shall have been on sale on the commercial market through advertisements, manufacturers' catalogs, or brochures during the 2-year period. Where two or more items of the same class of equipment area required, these items shall be products of a single manufacturer, however, the component parts of the item need not be the products of the same manufacturer unless stated.

1. Alternative Qualifications: Products having less than a 2-year field service record will be acceptable if a certified record of satisfactory field operation for not less than 6000 hours, exclusive of the manufacturers' factory or laboratory tests, is furnished.
2. Material and Equipment Manufacturing Date: Products manufactured more than 3 years prior to date of delivery to site shall not be used, unless specified otherwise.

4.5 Warranty: The equipment items shall be supported by service organizations in Guam in order to render satisfactory service to the equipment on a regular and emergency basis during the warranty period of the contract. Maximum response time for service shall be one (1) hour.

4.6 IDS Subsystems:

Provide a complete integrated IDS consisting of the following major subsystems:

- Detection
- Arm/disarm multiple function keypad
- Communications
- Assessment
- Alarm reporting
- Power

4.7 Integrated System Functional Requirements: Ensure that the IDS is fully integrated with the physical security and other elements of the overall facility security system. Except for multiple function keypads, other subsystems may be housed in a single enclosure. Specific subsystem functional requirements are as follows:

- Detection subsystem: Subsystem shall consist of sensors to detect intrusion attempts.
- Arm/disarm multiple function keypad: Subsystem shall consist of electronic digital keypads to monitor and control personnel movement through and between protected areas within the facility.
- Communications subsystem: Subsystem shall consist of elements required to ensure that pertinent data is transferred from the point of origin to the point where appropriate actions can be taken.
- Assessment subsystem: Subsystem shall consist of electronic devices required to visually and audibly verify the validity of IDS alarms.
- Alarm reporting subsystem: Subsystem shall consist of electronic devices to control, process integrate and annunciate IDS data.
- Power subsystem: Subsystem shall consist of components required to ensure continuous operation of the entire IDS.

4.8 Integrated System Performance Requirements: The installed and operating IDS shall be integrated into the overall facility to detect intrusion and shall perform as an entity, as specified below:

- A. Detection Coverage: Provide and adjust sensors so that coverage is maximized without mutual interference. IDS coverage shall include critical spaces within the facility.
- B. Detection Resolution (sensitivity): Sensitivity shall be capable of the following:
 1. Locating intrusions at individually protected assets and/or at an individual portal;
 2. Locating intrusions within volume/areas to within the coverage on any single volumetric sensor; and
 3. Locating failures and/or tampering at individual sensors.

C. Detection alarm and Reporting Capacity: The IDS shall have the capacity to collect, communicate, and display minimum of eight (8) programmable sensor Zone alarms and to enable control of one (1) or more response devices in each of the sensor zones. When a sensor zone includes a combination of multiple detection devices, the system shall maintain the capability to identify individual detection devices in an alarm state. A single alarm shall be annunciated within approximately two (2) seconds after sensor transducer or other detection device activation.

D. Alarms: alarm shall include, but not be limited to, the following:

- Intrusion detection
- Tamper
- Fail-safe
- Line fault
- AC power loss
- Low battery in control communicator.

1. Intrusion Detection: Sense and respond with visible and audible signals the activation of detection sensors.
2. Tamper: Tamper protection can be physical protection, line supervision, encryption, and tamper alarming of enclosures and components. All intrusion detection, access control, assessment systems and their associated data transmission media must be protected commensurate with the classification of asset being protected. All intrusion detection sensors and access control readers must have tamper resistant enclosures and integral tamper protection switches. All enclosures, cabinets, housing, and boxes, having hinged doors or removable covers that contain processors or connections must have tamper protection switches. All tamper alarm signals must be monitored continuously whether the system is in the access or secure mode of operation. Tamper alarms shall be annunciated to be clearly distinguishable from intrusion detection alarms. Tamper switches on doors which must be opened to make normal maintenance adjustments to the system and to service the power supplies shall be of the push/pull-set, automatic-reset type. Tamper switches shall have the following features:
 - a. Inaccessibility until the switch is activated;
 - b. Under electrical supervision at all times, irrespective of the protection mode in which the circuit is operating;

- c. Spring-loaded and held in the closed position by the door or cover protected; and
 - d. Wired to break the circuit when the door or cover is disturbed.
 - 3. The system shall provide capability in critical elements of the IDS, including, but not limited to, the capability to monitor communication link integrity and to provide self-testing. When diminished functional capabilities are detected, the system shall provide annunciation of the fault. Alarms shall be annunciated to be clearly distinguishable from other types of alarms.
 - 4. As a minimum, fault isolation at the systems level shall have the same geographic resolution as provided for intrusion detection. Communication links of the ISD shall have an active mode for line fault detection. The system shall be either a static system or a dynamic system. In a static system, the “no-alarm” condition shall always be represented by the same signal, which shall be different that the signal originally transmitted. The dynamic system shall represent “no-alarm” with a signal which continually changes with time.
 - 5. The system shall have the capability to detect when a critical component experiences temporary or permanent loss of power and to declare an alarm. The alarm shall be annunciated to clearly identify the component experiencing power loss.
- E. Electrical power shall be obtained by the normal commercial electrical distribution system. Power shall be continuously monitored and, if interrupted, automatic switching from primary to emergency backup sources shall be accomplished without interruption or degradation of critical system function. Intrusion alarms shall not be generated by power switching; however, an indication of power switching and on-line source shall be provided at the alarm monitor. Upon restoration of prime power, the system shall automatically switch back to the primary source. Low voltage condition of an on-line battery and battery charger circuit failure shall be detected and reported as a fault condition.
- 1. Primary Power: Furnish 120 volt AC service, transformed through a two-winding isolation transformer and rectified to low-voltage DC for system operation. Obtain primary power at the location indicated. Provide a circuit dedicated to power IDS from a panel-board at the location indicated. Label the circuit breaker in that panel-board: “Alarm System Do Not Turn Off.”

2. **Backup Power:** Provide backup power to the primary power by dedicated batteries in remotely located system elements such as individual sensors and in control communicators. Batteries shall be capable of operation in any position and shall be protected against venting caustic chemicals or fumes within an equipment cabinet. Batteries shall also be capable of continuous operation for up to 8 hours without recharge or replacement. If the sensors power requirements exceed the allowable UL rated capacity of the control communicator battery, provide the number of separate power supplies required to power the sensors. Provide each power supply with its own rechargeable battery and charger.
- 4.9. **System Performance Requirements:** Provide commercial of the shelf (COTS) system components to operate as described herein within the context of the integrated system performance previously described. Where inconsistencies occur between the following component performance requirements and integrated system level performance descriptions, integrated system performance descriptions shall take precedence.
- A. **Modularity:** Provide system components to facilitate modular subassembly and part replacement. Electronic components of the system shall be of the solid-state type, mounted on printed circuit boards conforming to UL 796. Circuitry shall not be so densely placed as to impede maintenance. Power-dissipating components shall incorporate safety margins of not less than 25 percent with respect to dissipation ratings, maximum voltages, and current-carrying capacity. Light duty relays and similar switching devices shall be solid-state or hermetically sealed electromechanical type.
 - B. **Reliability:** Provide only components in current manufacturing production. Components shall be manufactured to meet requirements specified herein and shall be free from characteristics and defects which affect appearance or serviceability or which render equipment unsuitable for the intended purpose. Provide components designed for continuous operation at specified conditions.
 - C. **Maintainability:** Components shall be capable of being maintained using commercially available standard tools and equipment. Components shall be arranged and assembled to be readily accessible to maintenance personnel without compromising the defeat resistance of the IDS.
 - D. **Environmental Conditions:**
 1. **Interior Conditions:** Equipment installed in environmentally protected interior areas shall meet performance requirements specified by UL for the specific equipment or device.

2. Exterior Conditions: Components mounted in locations exposed to weather shall be housed in corrosion-resistant enclosures with appropriate environmental protection. Component performance shall not degrade because of improper housing design. Components in enclosures shall meet performance requirements when exposed to ambient conditions specified by UL for the specific equipment or device.
 3. Transient voltage surge suppression: Intrusion detection and communication circuits shall be protected at both ends against transient voltage surges. Transient voltage surge suppressors (TVSS) or surge protection devices (SPD) are required for the protection, within specified limits, of AC electrical circuits and electronic equipment from the effects of lightning induced voltages, external switching transients and internally generated switching transients.
- E. Electromagnetic Interference (EMI): IDS components employing electromagnetic radiation shall be designed and constructed to provide maximum practical invulnerability to electronic countermeasures.
 - F. Electromagnetic Radiation (EMR): Provide only IDS components which are FCC licensed and approved. Provide system components which are electromagnetically compatible.
 - G. Interchangeability: Like components shall be physically and functionally interchangeable as complete items, without modification of either the original items or of other components with which the items are used.
 - H. Safety: IDS components shall conform to application rules and requirements of NFPA 70 and applicable Underwriters Laboratories publications.
 - I. Human Engineering: Aural considerations shall include location of annunciators, tone pitch, quality, and intensity. The number of different audible signals shall not exceed four. Component design shall provide for ease of accessibility for maintenance.
 1. Visual Annunciators: Annunciators shall be either liquid crystal displays (LCDs) or light emitting diodes (LEDs). Annunciators shall be so connected in the circuit that failure of the annunciator, socket, or protective circuitry shall not result in an improper or indeterminate signal. LCDs and LEDs shall be compatible with standby power supplies. LEDs shall be brightly lit and visible from a distance of 30 feet in an area illuminated at 75 footcandles. LEDs shall be used in outdoor applications or in the presence of sunlight.

2. Controls: Provide to ensure ease of operation of specified characteristics. Where applicable, clockwise rotation of controls shall result in an increasing function. Controls, switches, visual signals, and indicating devices, input and output connectors, terminals, and test points shall be clearly marked or labeled on hardware to permit quick identification, intended use, and location. Terminal markings and labels shall be of a permanent and legible type and located to be visible when the associated system wiring is in place. Identification markings shall be associated with each adjustment device or item requiring periodic maintenance. Safety warning or cautions shall be marked in conspicuous red letters. Control and indicator identifications that are exposed outside enclosures shall be permanent, machine-engraved letters, and painted to contrast with the background color. Controls not required for operation of the system shall be inaccessible to the system operator.
- J. Test Points: Test points, controls, and other adjustments inside enclosures shall be readily visible and accessible with minimum disassembly of equipment. Test points and other maintenance controls shall not be readily accessible to operator personnel.
- K. Component enclosures: Annunciator housings, power supply enclosures, sensor control and terminal cabinets, control communicators, wiring gutters, and other component housings, collectively referred to as enclosures, shall be formed and assembled to be sturdy and rigid.
1. Metal Thickness: thicknesses of metal in cast and sheet metal enclosures of all types shall not be less than those in Tables 8.1, 8.2, and 8.3 of UL 1610 for alarm components, and NEMA ICS 2 and NEMA ICS 6 for other enclosures.
 2. Doors and Covers: doors and covers shall be flanged. Where doors are mounted on hinges with exposed pins, hinges shall be of the tight-pin type, or ends of hinge pins shall be tack welded to prevent ready removal. Provide doors having a latch edge length of less than 24 inches with a single lock. Where the latch edge of a hinged door is 24 inches or more in length provide the door with a three-point latching device with lock; or alternatively with two locks, one located near each end. Covers of junction boxes provided to facilitate initial installation of the system shall be held in place by tack welding, brazing, or one-way screws.
 3. Ventilation: Ventilation openings in enclosures and cabinets shall conform to the requirements of UL 1610.

4. **Mounting:** Unless otherwise indicated, sheet metal enclosures shall be designed for wall mounting with top hole slotted. Mounting holes shall be in positions which remain accessible when major operating components are in place and the door is open, but shall be inaccessible when the door is closed.
 5. **Enclosure Locks:** Locks and key-lock-operated switches required to be installed on component enclosures shall be UL listed, round-key type with three dual, one mushroom, and three plain pin tumblers, or shall have a pick resistance equal to a lock having a combination of five cylinder pin and five-point three-position side bar in the same lock. Keys shall be stamped "DO NOT DUPLICATE." Key-lock-operated switches shall be keyed differently and shall be two-position, with the key retractable from either position. Furnish two (2) keys for each switch. Maintenance locks shall be of the one-way key-pull type arranged so that the key can be withdrawn only when the lock is in the locked position. Locks on components for maintenance access shall be keyed alike; furnish only two (2) keys for such locks. Deliver keys, tagged with metal tags, accompanied by a manufacturer's certificate which records the number of each key made.
- L. **Detection Sensors:** sensors shall detect penetration of protected zones by unauthorized personnel or intruders, and shall conform to UL 634 or UL 639, as applicable. Unless otherwise specified, required sensor power shall be plus 12 volts DC.
1. **Interior Point Sensors:**
 - a. **Door and window open detection:**
 - (1) **Magnetic Switches:** Magnetic switches shall be surface mounted or recessed. Magnetic switches shall have a magnetic field with a high probability of alarm if an external magnet is introduced in defeat attempts. Provide each magnetic switch with an over current protective device, rated to limit current to 80 percent of switch capacity. The magnetic switch housing shall be protected from unauthorized access by encapsulating reed switches in a polyurethane potting compound. The magnetic switch shall have a tamper resistant enclosure and integral tamper switch. Magnetic switch shall be rated for a minimum lifetime of one million operations. House magnetic switch components in enclosures made of nonferrous materials.

- (2) Surface mounted magnetic switches: House components used in outdoor applications in weatherproof enclosures. The switch mechanism shall have a minimum gap of $\frac{3}{4}$ inch and a maximum gap of $2\frac{1}{2}$ inches without internal adjustment. The housing for surface mounted magnetic switches, if made of cast aluminum, shall be secured by stainless steel screws. The magnetic switch shall have a tamper resistant enclosure and integral tamper switch. Conductors running from the door to alarm circuits shall be jumpered within a flexible armored cord constructed from corrosion-resistant metal. Each end of the armored cord shall terminate in a junction box or other enclosure. Armored cord ends shall be mechanically secured to junction boxes by clamps or bushings. Conductors within the armored cord shall be provided with lug terminals at each end. Jumpered conductors and the armored cord shall experience no mechanical strain as the door is removed from fully open to closed. The switch circuit shall initiate an alarm if a short circuit is applied to the door cord.
- (3) Recessed magnetic switches: The recessed magnetic switches shall have a gap up to $\frac{1}{2}$ inch in steel. Field adjustments in the fixed space between magnet and switch housing shall not be possible.

b. Glass breakage detection:

- (1) Glass breakage sensors: Sensors shall detect window breakage by responding to sonic or vibration frequencies that accompany breaking glass. Sensors shall selectively filter input to detect only frequency of breaking glass and to minimize false alarms from sources such as jangling keys, ringing phone, and slamming doors. Glass breakage sensors shall initiate alarm when the glass they protect is cracked or broken. Sensors shall provide positive detection of breakage of plate, safety, laminated, and tempered glass. Sensor shall have a sensitivity adjustment controlling the output voltage from the detecting element which triggers a solid-state latching device. Provide the sensor with an LED for adjusting the sensitivity. Sensor shall be contained in a fire-resistant ABS plastic housing and shall be ceiling or wall mounted, as indicated. Sensor shall provide 100% coverage of large glass areas. Sensor housing shall be tamper resistant and designed for screw mounting. Sensor

shall not initiate alarm in response to seismic vibrations or other ambient stimuli. The sensor shall have a tamper resistant enclosure and integral tamper switch.

- (2) Dual technology glassbreak sensor: Sensor shall detect window breakage by responding to acoustic frequencies that accompany breaking glass. The sensor shall be combined with a passive infrared motion detector (PIR) for the purpose of eliminating occupant-generated false alarms. It will extend coverage to occupied areas, allowing the sensors to be armed while people are present. The sensor shall have a tamper resistant enclosure and integral tamper switch.
- (3) Recessed glassbreak sensor: A recessed glassbreak sensor is to be used when appearance is a consideration. Recessed models can be mounted directly to the wall or ceiling or can be installed on a single gang box. The sensor shall employ pattern recognition technology that listens for the actual pattern of breaking glass. The sensor shall be able to detect the difference from breaking glass and normal room sounds by listening across the glassbreak frequency spectrum. The sensor shall provide 25 feet 360 degree coverage of the area to be protected. The sensor shall have a tamper resistant enclosure and integral tamper switch.

2. Interior Volumetric (Space) Sensors:

- a. Passive infrared (PIR) sensors: Sensors shall detect intruder presence by monitoring the level of infrared energy emitted by objects within a protected zone. Sensor shall initiate an alarm upon observing increased or fluctuating infrared energy caused by the presence and motion of an intruder whose temperature is as little as 3 degrees F different from the background temperature. Sensor shall be passive in nature; no transmitted energy shall be required for detection. Sensor shall be sensitive to infrared energy emitted at wavelengths corresponding to the human body and other objects at ambient temperatures. Detection pattern for wall-mounted sensors shall be 50 feet by 50 feet, unless otherwise indicated. Detection pattern for ceiling-mounted sensors shall be 360 degrees, unless otherwise indicated and have a tamper resistant enclosure and integral tamper switch. Sensor shall provide some means of indication an alarm condition during installation and calibration. A means of disabling the indication shall be provided within the sensor enclosure. Sensor shall alarm if an intruder moves within the area of protection more than 5 feet at a velocity

of 0.1 foot per second, and one step per second, assuming 6 inches per step. Detection sensitivity shall be irrespective of the direction of motion. Sensor shall also alarm at velocities faster than 0.1 foot per second, up to 10 feet per second. Sensor optimum detection range shall be a minimum of 35 feet. Sensor shall not alarm in response to general area thermal variations. Sensor shall have RFI and white light immunity.

b. Dual technology sensors: Provide sensor combining passive infrared and microwave sensors designed and manufactured specifically to be mounted in a single enclosure.

(1) Passive infrared (PIR) sensor section: Sensor shall detect intruder presence by monitoring the level of infrared energy emitted by objects within a protected zone. Sensor shall initiate an alarm upon observing increased or fluctuating infrared energy caused by the presence and motion of an intruder whose temperature is as little as 3 degrees F different from the background temperature. Sensor shall be passive in nature; no transmitting energy shall be required for detection. Sensor shall be sensitive to infrared energy emitted at wavelengths corresponding to the human body or other objects at ambient temperatures. Sensor detection pattern shall be 50 feet by 50 feet, unless otherwise indicated. Sensor shall come with clip-on mirror inserts that allow the choice of deferent coverage patterns: full and center curtain. Sensor shall have RFI and white light immunity. The sensor shall have a tamper resistant enclosure and integral tamper switch.

(2) Additional dual technology sensor requirements: The enclosure containing two sensor sections shall be tamper alarmed. Both microwave and PRI sections shall activate simultaneously to generate an alarm. Only an intrusion characterized by volumetric motion and radiant body heat shall be detected. Sensor shall provide some means of indicating an alarm condition during installation and calibration. A means of disabling the indicator shall be provided within the sensor enclosure. Sensor shall alarm if an intruder moves within the area of protection more than 5 feet at a velocity of 0.1 foot per second, and one step per second, assuming 6 inches per step. Detection sensitivity shall be irrespective of the direction of motion. Sensor shall also alarm at velocities faster than 0.1 foot per second, up to 10 feet per second. Sensor shall not alarm in response to general area thermal variations. Mount sensors

near the ceiling on vibration-free surfaces. Electronic circuitry shall be solid state and mounted on printed circuit boards. Sensor elements shall contain circuitry for transmitter drive, signal processing, tamper circuitry, and power supplies. Circuitry shall provide an alarm relay with Form C contacts capable of carrying 2 amperes at 100 volts DC minimum. The sensor shall have a tamper resistant enclosure and integral tamper switch.

- M. Communications: Communications shall link together the subsystems of the IDS. IDS communications links shall be via hardwire cable. Communications links shall be supervised. Common communications interface devices shall be provided throughout the IDS. Sensor to Premise Control Unit (PCU) interface shall be by dry relay contact normally open or normally closed, except as specified otherwise. PCU to central alarm reporting Digital Receiver shall be digital, asynchronous or multiplexed data. The system shall be capable of communication using the IBM Synchronous Data Link Control format, and at least two other standard industry formats. The system shall be capable of supporting Network communication with digital dialer backup, existing Ethernet or token ring data networks, satellite communication, fiber optic networks, local area networks, wide area networks, cellular communication, and retail data networks. The PCU shall be capable of asynchronous network communication with a retry time between 3 and 15 seconds for a total of one (1) minute. If communication is unsuccessful the PCU shall be capable of attempting backup communication through any of the available communication methods to the same receiver or a backup receiver. Network communication between the PCU and the receiver shall be in a proprietary communication format. The PCU shall be capable of supporting Dynamic Host Communication Protocol (DHCP) Internet Protocol (IP) addressing. Underwriters Laboratories (UL) shall list network communication by the PCU for Grade AA High-Line Security. The PCU shall be capable of two-way network communication using standard Ethernet 10Base T in a LAN, WAN, or Internet configuration. The PCU shall be capable of communication by means of a 128 Bit AES Rijndael Encryption process certified by NIST (National Institute of Standards and Technology) to a digital receiver with a built-in Encryption Alarm Router. The PCU shall be capable of meeting DCID 6/9 and UL 2050 standards. The PCU shall be capable of having communication set to Network operation. When a trap is set in remote Link, the software receiver. The digital receiver shall store the trap and monitor the PCU for the next message. When the PCU sends its next message, the receiver shall then send a message to the PCU to contact Remote Link at the IP address contained in the original trap message. The trap message shall be stored in the digital receiver for up to four hours. If the trap message is not sent to the PCU within the four-hour window, the PCU trap message shall be discarded and a new trap message must be sent from Remote Link.

1. **Sensor to PCU Link Supervision:** Provide hardwire direct current line supervision for sensor to PCU links which are within the DIS protected area. Circuit shall be supervised by monitoring changes in the current that flows through the detection circuit and a terminating resistor of at least 1.0 kohm. Supervision circuitry shall initiate an alarm in response to opening, closing, shorting, or grounding of the conductors by employing Class C, Standard Line Security. Class C circuit supervisor units shall provide an alarm response in the annunciator in not more than one second as a result of the following changes in normal transmission line current.
 - a. Five percent or more in normal line signal when it consists of direct current from 0.5 milliamperes through 30 milliamperes.
 - b. Ten percent or more in normal line signal when it consists of direct current from 10 microamperes to 0.5 milliamperes.
 - c. Five percent or more of any element or elements of a complex signal upon which security integrity of the system is dependent. This tolerance will be applied for frequencies up to 100 Hz.
 - d. Fifteen percent or more of any element or elements of a complex signal upon which security integrity of the system is dependent. This tolerance will be applicable for frequencies above 100 Hz.

2. **Control Communicator Hardwire Link:** The control communicator to central alarm reporting processor communications link shall operate over a maximum of 4 standard voice grade telephone leased or proprietary lines. Digital communicator shall conform to UL 1635. The link shall be capable of operating half duplex over a type 3002 data transmission pair and shall be capable of modular expansion. Telephone lines will be provided by the GDOE. Coordinate and check out system operation. General characteristics and telephone line service shall be as follows:
 - a. Connections: Two- or four-wire
 - b. Impedance at 1000 Hz: 600 ohms
 - c. Transmitting level: 0 to 12 dBm
 - d. Transmitting level adjustment: 3 dB increments
 - e. Type: Data

- f. Direction: Two-way alternate (half duplex)
 - g. Maximum speed: 1.2
 - h. Maximum loss at 1000 Hz: 33 dB.
- N. Premise Control Unit (PCU): PCU shall include a command processor installed in an attached and tamper resistant enclosure. The PCU shall be packaged and include a power transformer, battery(s), network connection cable, keypad(s), keypad connection cable(s) and additional components as required. All system electronic components shall be solid-state type, mounted on printed circuit boards. Light duty relays and similar switching devices shall be solid-state type or electromechanical. The PCU shall have an over current notification LED that lights when devices connected to the Keypad Bus or communication Bus(es) draw more current than the PCU is rated for. When the over current LED lights, the communications Bus(es) and Keypad bus are to shut down. The PCU shall provide at a minimum but not limited to, the following capabilities:
- 1. Premise Control Unit (PCU):
 - a. The PCU areas and zones shall be programmable, and the system shall store, log, display, and transmit specific custom designations for system areas, zones, and user names.
 - b. The system shall support user interaction by way of a keypad, web browser, system software, key switch, or radio frequency wireless control, using integrated or auxiliary devices provide by the system manufacturer.
 - c. The PCU shall support zone input connections, system keypads, system zone expansion modules, and wireless zone input modules, and must support zone input connections by way of at least two competitive products. The system shall offer a seamless integrated compatibility with hard-wire and/or wireless zone expansion equipment for a t least 200 wireless zones and/or a maximum of 550 hardwired zones.
 - d. The PCU shall be capable of offering at least 5 zone expansion buses, each of which can support the connection of up to 15,000 feet of four-wire cable. Zone expansion and keypad data buses that exceed 2,500 feet of cable must include splitter/repeater modules to boost data voltage and maintain data integrity.

- e. The PCU shall provide a seamless capability to provide a minimum of 500 addressable relays, which can be located at any connection location upon a zone expansion bus.
- f. PCU relay outputs shall have the capability of being triggered as a result of a command from the user interface, changes in system status, changes in zone status, or by a programmable schedule.
- g. PCU relay output states shall be programmable for momentary, maintained, pulsed, or must follow the state of an associated zone input.
- h. The PCU shall be completely programmable either locally from a keypad or remotely through a standard dial-up, and network connections by way of a LAN, WAN, and/or by way of the Internet. Remote configuration or control is not permissible for installation that must conform to DCID 6/9 requirements.
- i. The PCU shall be completely programmable remotely using remote annunciators, and/or using upload/download software that communicates using SDLC 300 baud, 2400 baud, or IP Addressed data network. On-site programming from a personal computer shall also be permitted. Remote configuration or control is not permissible for installation that must conform to DCID 6/9 requirements.
- j. The PCU shall be equipped with an anti-reversing circuit breaker to prevent damage due to accidental reversal of battery leads.

2. Input/Output Capacity:

- a. The PCU shall be capable of monitoring a maximum of 550 individual zones and controlling a maximum of 500 output relays.
- b. The PCU shall have, as an integral part of the assembly, 2 SPDT Form C relays rated at 1 Amp at 30 VDC and four open collector 12 VDC outputs rated at 50mA each. It shall also have the capacity of a maximum of 125 output expander modules with 500 switched ground, open collector outputs, 50mA maximum and 502 auxiliary relays (Form C rated at 1.0 Amp at 30 VDC).
- c. The PCU shall also provide 100 programmable output schedules, and include an integral bell alarm circuit providing at least 1.5 Amps of steady, pulsed, or temporal bell output. Output type shall be programmable by zone type. Relays and voltage outputs shall

be capable of being independently programmed to turn on and/or off at selected times each day.

3. **User/Authorization Level Capacity:** The system shall be capable of operation by 10,000 unique Personal Identification Number (PIN) codes with each code having one (1) of ninety-nine (99) custom user profiles. This allows for limitation of certain functional to authorized users. The operation of all keypads shall be limited to authorized users.
4. **Keypad:**
 - a. The PCU shall support a maximum of sixteen 16 keypads with alphanumeric display. Each keypad shall be capable of arming and disarming any system area based on a pass code authorization. The keypad alphanumeric display shall provide complete prompt messages during all stages of operation and system programming and display all relevant operating and test data.
 - b. Communication between the PCU and all keypads and zone expanders shall be multiplexed over a non-shielded multi-conductor cable, as recommended by the manufacturer. This cable shall also provide the power to all keypads, zone expanders, output expanders, and other power consuming detection devices.
 - c. If at any time a keypad does not detect polling, the alphanumeric display shall indicate "SYSTEM TROUBLE". If at any time two devices are programmed for the same address, the alphanumeric keypad shall display "4 WIRE BUS TROUBLE". If at any time a keypad detects polling but not for its particular address, the alphanumeric display shall indicate "NON POLLED ADDR". The system shall display all system troubles at selected keypads with distinct alphanumeric messages.
 - d. The keypad shall include self-test diagnostics enabling the installer to test all keypad functions: display test, key test, zone test, LED test, relay test, tone test, and address test.
 - e. The keypad shall provide an easy-to-read English text display. The text shall exactly match the text seen in all software reports, keypad displays, and central station reports.
 - f. The keypad user interface shall be a simple-to-use, menu-driven help system that is completely user friendly.

- g. The PCU shall support sub-control keypads with four 4 built-in zones and capable of functioning in the following modes:
 - (1) Monitors all for 4 keypad zones independently with a maximum of 125 keypads attached to the PCU.
 - (2) PCU assigns one 1 zone to each keypad and monitors all keypad zones as a single zone with a maximum of 500 keypads attached to the PCU.
 - (3) Stand-alone mode allowing keypad to operate as a self-contained security system independent of the PCU.

5. Zone Configuration:

- a. A minimum of 4 Class B ungrounded zones shall be available at each keypad or zone expander on the system. The system shall have the capacity for a maximum of sixteen 16 keypads and a maximum of 125 four (4) zone expanders or 500 single zone expanders. It shall also have the capacity of a maximum of 125 supervised relay output expanders. All class B zones shall be 2-wire, 22 AWG minimum, supervised by an end-of-line (EOL) device and shall be able to detect open and short conditions in excess of 500ms duration.
- b. Each zone shall function in any of the following configurations: Night, Day, Exit, Fire, Supervisory, Emergency, Panic, Auxiliary 1, Auxiliary 2, Fire Verification, Cross Zone, Priority, and key switch Arming.
- c. The digital SLCs and the annunciator/keypad bus shall be able to operate at a maximum wiring distance of 2500 feet from the control panel on unshielded, non-twisted cable. This distance may be extended to a total of 15,000 feet when bus repeater modules are installed.
- d. The PCU shall have the capability to incorporate up to 200 zone expander points.

- O. Siren:
- a. Siren: Provide 30 watt, 8 ohm speaker and siren driver rated for 6 to 12 volts DC and having two distinct sound outputs. Siren shall produce a sound level output of 103 to 106 dB at 3050 mm 10 feet. Siren shall conform to UL 464 and UL 609, as applicable. Provide siren in metal enclosed, weather-resistant box having tamper switches on front cover and on back of box.
 - b. Chime: Provide for keypad audible indication of a device activation. Audible chime shall sound when select devices activate in order to alert personnel of access into an area during normal access times. The audible chime may be activated when a magnetic switch is activated at a main entrance leading into an un-secured area during working hours.
- P. Strobes: Provide for visual indication of alarm activation: Strobe shall flash simultaneously with siren and shall be 75 candela minimum with flash rate of 60 minute. Strobe shall be designed to operate on 12 volts DC and shall conform to UL 1638.
- Q. Central Station Receiver/Printer: Provide a microprocessor based digital alarm receiver conforming to UL 1610 to receive and display information transmitted by alarm control panels/communicators over the standard telephone network. Receiver shall be capable of handling Ademco low or high speed, Sescoc, Radionics, and BFSK formats with either three- or four-digit subscriber identification and four plus two formats on the same line card. Receiver shall have built-in battery backup and shall be able to monitor a minimum of 999 accounts. Telephone connection shall be RJ31X jack. AC input shall have built-in MOV surge protection.
1. Printer: Printer shall conform to UL 1610 and shall provide a hard copy record of incoming information including time, date, account number, and code number. Printer shall have built-in battery backup and built-in MOV surge protection on AC input. Clock shall be 24-hour real time. Calendar shall be 100 year with leap years built in.
 2. Operation: When the receiver receives a transmission over standard telephone network lines from a remote communicator, the receiver shall immediately answer the incoming call and acknowledge the call by returning a tone signal (handshake) to the communicator. Upon receipt of the handshake, the communicator shall transmit one or two rounds of coded pulses which are the account and code numbers. When a valid statement of data is received from the communicator, the receiver's internal audible

signal shall sound to alert the monitoring person that a valid round of data is on line. The receiver shall also alert the printer and shall display on the receiver's front panel the account number and code number of the communicator. When the receiver has received the communicator's data, the receiver shall send a signal to the communicator causing the communicator to hang up (kiss off). The receiver shall then automatically shut itself down within 10 seconds.

R. Standalone Electronic Door Access: The PCU shall be capable of integrating area access control capability where specified into the same PCU with the ability to have up to 10,000 user credentials. User access is limited to custom profiles and/or schedules. Anti-passback shall be available. Networked version shall support a Two-Man rule feature. The system shall support up to sixteen 16 access doors, connected to the system using a manufacturer-approved interface module. Access Control equipment shall communicate to the system by way of the PCU keypad bus.

4.10 Field Fabricated Nameplates: ASTM D709. Provide laminated plastic nameplates for each equipment enclosure, relay, switch, and device. Each nameplate inscription shall identify the function and, when applicable, the position. Nameplates shall be melamine plastic, 0.125 inch thick, white with black center core. Surface shall be matte finish. Corners shall be square. Accurately align lettering and engrave into the core. Minimum size of nameplates shall be 1 by 2.5 inches. Lettering shall be a minimum of 0.25 inch high normal block style.

A. Manufacturer's Nameplate:

Each item of equipment shall have a nameplate bearing the manufacturer's name, address, model number, and serial number securely affixed in a conspicuous place; the nameplate of the distributing agent will not be acceptable.

4.11 Factory Applied Finish: Electrical equipment shall have factory-applied painting systems which shall, as a minimum, meet the requirements of NEMA 250 corrosion-resistance test.

4.12 Execution: Equipment Installation: UL 609, UL 639, UL 681, UL 1076, and UL 1610, and the appropriate installation manual for each equipment type. Components within the system shall be configured with appropriate "service points" to pinpoint system trouble in less than 20 minutes.

A. Cable/Wire Runs: NFPA 70 and as specified herein.

- B. Soldering: ASTM B32. For soldering electrical connections, use composition Sn60, for general purposes; use composition Sn62 or Sn63, for special purposes. Flux shall conform to ASTM B32.
- C. Galvanizing: Ferrous metal shall be hot-dip galvanized in accordance with ASTM A123/A123M. screws, bolts, nuts, and other fastenings and supports shall be corrosion resistant.
- D. Tamper Switches: Tamper switches shall be an integral part of all intrusion sensor devices. An initiation of an alarm signal will occur when the door or cover is moved as little as ¼ inch from the normally closed position. Tamper switches shall also be located within enclosures, cabinets, housings, boxes, raceways, and fittings to prevent direct line of sight to any internal components and to prevent tampering with switch or circuitry. Conceal tamper switch mounting hardware so that the location of the switch within the enclosure cannot be determined from the exterior.
- E. Fungus Treatment: Completely treat system components for fungus resistance; treating materials containing mercury-bearing fungicide shall not be used. Treating materials shall not increase the flammability of the material or surface being treated nor cause skin irritation or other personnel injury during fabrication, transportation, operation, or maintenance of the equipment, or during use of the finished items when used for the purpose intended.
- F. Conduit: Install in accordance with NFPA 70.

4.13 Field quality Control:

- A. IDS Operational Test Plan: Tests shall ensure that the requisite degree of intrusion detection is provided. Initially, test each sensor and subsystem component individually. Test glass breakage sensors by using test units supplied by the manufacturer which simulate glass breakage. When the function of each component within a particular subsystem, such as each sensor within a particular zone, is verified, certify that subsystem of the entire IDS has satisfactorily met the specifications. Test each subsystem similarly until each detection zone has been certified. When subsystem certification is complete, test the entire integrated system to ensure that the subsystem elements are compatible and function as a complete system. The integrated system test shall be accomplished in linear fashion, end-to-end, and shall verify that each simulated intrusion performed within each detection zone produces an appropriate alarm or signal, and that alarm is correctly annunciated at the keypad and central station receiver. Provide for approval, not later than 30 days prior to formal inspection and test, a detailed operational test plan of how each component, subsystem, and entire IDS will be tested. When tests are complete and corrections made, submit a signed and dated certificate with a request for formal inspection and tests.

B. System Acceptance Test:

1. Posted Operating Instructions: System Acceptance testing shall be performed as follows:
 - a. The GDOE will participate in final acceptance testing of the system.
 - b. Prior to the final acceptance test, security contractor shall conduct a complete test of the entire IDS system and provide the GDOE with a written report.
 - c. Following completion of the initial testing and correction of any noted deficiencies, conduct a five-day burn-in test; intent of the burn-in test shall be to prove the IDS by placing it in near real operating conditions. During this period the IDS shall be fully functional and programmed such that all points, interfaces, controls, reports, messages, prompts, etc. can be exercised and validated. Record and correct any system anomaly, deficiency, or failure noted during this period. Scheduling of the final acceptance test shall be based on a review of the results of this burn-in test.
 - d. Deliver a report describing the results of the functional tests, burn-in test, diagnostics, calibrations, corrections, and repairs including written certification to the GDOE that the installed complete IDS has been calibrated, tested, and is fully functional as specified herein.
 - e. Prior to the final acceptance test, complete all clean-up and patch work requirements. Security equipment rooms/spaces and similar areas shall be free of accumulation of waste materials or rubbish caused by operations under the Contract. At completion of the Work, remove all waste materials, rubbish, contractor tools, construction equipment, machinery and all surplus materials.
 - f. Upon written notification from the Bidder that the IDS is completely installed, integrated and operational, and the burn-in testing completed, the GDOE will participate in a final acceptance test of the entire system at a mutually acceptable time.
 - g. During the final acceptance test, no adjustments, repairs or modifications to the system shall be conducted without the permission of the GDOE.

- h. During the course of the final acceptance test by GDOE, the Bidder shall be responsible for demonstrating that, without exception, the completed and integrated IDS complies with the contract requirements. Physical and functional requirements of the project shall be demonstrated and shown. This demonstration will begin by comparing item by item the drawings submitted by the Bidder with its bid offer on the conditions of the IDS requirements. Based on the compliance review, IDS and SCCd equipment will be evaluated.
- i. The functionality of the various interfaces between systems will be tested.
- j. The installation of all field devices will be inspected. This field inspection will weigh heavily on the general neatness and quality of installation, complete functionality of each device, and compliance with mounting, back box and conduit requirements.
- k. All equipment shall be on and fully operational during any and all testing procedures. Provide personnel, equipment, and supplies necessary to perform all site testing. Provide a minimum of two contractor employees familiar with the IDS for the final acceptance test. One contractor employee shall be responsible for monitoring and verifying alarms while the other will be required to demonstrate the function of each device. Supply at least two radios or portable telephones for use during the test.
 - (1) The GDOE retains the right to suspend, terminate or reschedule testing at any time when the IDS is found to be incomplete or fails to perform as specified. In the event that it becomes necessary to suspend, terminate or reschedule the test, all of the GDOE's personnel costs and travel expenses related to the test shall be deducted from the Bidder's retainers fee. In the event it becomes necessary to suspend, terminate or reschedule the test, the Bidder shall work diligently to complete schedule outlining task-by-task completion dates and a tentative date for a subsequent retest. During the final acceptance test, no adjustments, repairs or modifications to the system shall be conducted without the permission of the GDOE.

4.14 Adjustment/Alignment/Synchronization/Cleaning:

- A. Subsequent to installation, clean each system component of dust, dirt, grease, or oil incurred during installation or accrued subsequent to installation from other project activities. Prepare for system activation by following manufacturer's recommended procedures for adjustment, alignment, or synchronization. Prepare each component in accordance with appropriate provisions of the component's installation, operations, and maintenance manuals.

4.15 Field Applied Painting:

- A. Paint electrical equipment as required to match finish of adjacent surfaces or to meet the indicated or specified safety criteria.

4.16 Nameplate Mounting:

- A. Provide number, location, and letter designation of nameplates as indicated. Fasten nameplates to the device with a minimum of two sheet-metal screws or two rivets.

Part 5 ACCESS CONTROL SYSTEM (ACS)

5.1 Standard Products: Material and equipment shall be the standard products of a manufacturer regularly engaged in the manufacture of such products. Items of equipment shall essentially duplicate equipment that have been in satisfactory use at least 2 years prior to bid opening. Maximum response time for service shall be one (1) hour.

5.1.1 Definitions:

- A. Intrusion Alarm: An alarm resulting from the detection of a specified target, attempting to intrude into the protected area or when entry into an entry-controlled area is attempted without successfully using entry control procedures.
- B. Nuisance Alarm: An alarm resulting from the detection of an appropriate alarm stimulus, or failure to use established entry control procedures, but which does not represent an attempt to intrude into the protected area.
- C. Environmental Alarm: A nuisance alarm resulting from environmental factors.
- D. False Alarm: An alarm when there is no alarm stimulus.
- E. Duress Alarm: A normally covert alarm condition which results from a set of pre-established conditions such as entering a special code into a keypad or by activating a switch indicating immediate personal danger. This alarm category shall take precedence over other alarm categories.
- F. Fail-Safe Alarm: An alarm resulting from detection of diminished functional capabilities.
- G. Power Loss Alarm: An alarm resulting from improper use of entry control procedures or equipment.
- H. Entry Control Alarm: An alarm resulting from improper use of entry control procedures or equipment.
- I. Identifier: a card credential, keypad personal identification number or code, biometric characteristic or any other unique identification entered as data into the entry control database for the purpose of verifying the identity of an individual. Identifiers shall be used by the Access Control System for the purpose of validating passage requests for areas equipped with entry control equipment.
- J. Entry Control Devices: any equipment which gives a user the means to input identifier data into the entry control system for verification.

- K. Facility Interface Device: a facility interface device shall be any type of mechanism which is controlled in response to passage requests and allows passage through a portal.
- L. Portal: specific control point, such as a door or a gate, providing entry or access from one security level to another.
- M. Probability of detection: Forty-five successful detections out of 46 tests or 98 successful detections out of 103 tests.
- N. Standard Intruder: Person that weighs 100 pounds or less and is 5 ft tall or less, dressed in a long-sleeved shirt, slacks and shoes and walking, running, crawling or jumping through a protected zone in the most advantageous manner for the intruder.

5.2 System Description:

Provide an Access Control System as described and shown on the drawing submitted by Bidder. All computing devices, as defined in 47 CFR 15, shall be certified to comply with the requirements for Class A computing devices and labeled as set forth in 47 CFR 15. Electronic equipment shall comply with 47 CFR 15.

- A. Central Station: configure the central station to provide operator interface, interaction, dynamic and real time monitoring, display, and control. The central station shall control system networks to interconnect all system components including peer or subordinate workstations, enrollment stations and field equipment. The system shall be able to manage up to 16,000 uniquely identifiable inputs and outputs.
- B. Systems Networks: System networks shall interconnect all components of the system. These networks shall include communications between a central station and any peer or subordinate workstations, enrollment stations, local annunciation stations, portal control stations or redundant central stations. The systems network shall provide totally automatic communication of status changes, commands, field initiated interrupts and any other communications required for proper system operation. System communication shall not require operator initiation or response. System communication shall return to normal after any partial or total network interruption such as power loss or transient upset. The system shall automatically annunciate communication failures to the operator with identification of the communication link that has experienced a partial or total failure. A communications controller may be used as an interface between the central station display systems and the field device network. The communications controller shall provide those functions needed to attain the specified network communications performance.

1. **Field Device Network:** The field device network shall provide communication between a central control station and field devices of the system. The field device network shall be configured as submitted in the Bidders drawings. Field devices shall consist of alarm annunciation local processors and entry control local processors. Each field device shall be interrogated during each interrogation cycle. The field device network shall provide line supervision that detects and annunciates communications interruptions or compromised communications between any field device and the central station.

- C. **Field Equipment:** Field equipment shall include local processors, sensors and controls. Local processors shall serve as an interface between the central station and sensors and controls. Data exchange between the central station and the local processors shall include down-line transmission of commands, software and databases to local processors. The up line data exchange from the local processor to the central station shall include status data such as intrusion alarms, status reports and entry control records. Local processors are categorized as alarm annunciation or entry control or a combination thereof.

- D. **CCTV System Interface:** Provide an interface for connection of the central station to the CCTV system. This shall not be accomplished by using an electro-mechanical relay assembly.

- E. **Error Detection and Retransmission:** Use a cyclic code error detection method, between local processors and the central station, which will detect single and double bit errors, burst errors of 8 bits or less, and at least 99 percent of all other multibit and burst error conditions. Interactive or product error detection codes alone will not be acceptable. A message is in error if 1 bit is received incorrectly. The system shall retransmit messages with detected errors. A 2-digit decimal number shall be operator assignable to each communication link representing the number of retransmission attempts. When the number of consecutive retransmission attempts equals the assigned quantity, the central station shall print a communication failure alarm message. The system shall monitor the frequency of data transmission failure for display and logging.

- F. **Probability of Detection:** Each zone shall have a continuous probability of detection greater than 90 percent and shall be demonstrated with a confidence level of 95 percent. The actual number of tests performed, per sensor, to demonstrate system performance shall be nominated by the Bidder in the performance verification test procedures submitted to the GDOE for approval.

- G. **Standard Intruder:** The system shall be able to detect a standard intruder moving through a protected zone.

- H. False Alarm Rate:
1. Interior: Provide a false alarm rate of no more than 1 false alarm per sensor per 30 days at the specified probability of detection.
 2. Exterior: Provide a false alarm rate of no more than 1 false alarm per sensor per 5 days at the specified probability of detection.
- I. Environmental Nuisance Alarm Rate: Environmental alarms during nominal conditions shall not exceed 1 per day per sensor.
- J. Error and Throughput Rates: Error and throughput rates shall be single portal performance rates obtained when processing individuals one at a time.
1. Type 1 Error Rate: Type 1 error rate is an error where the system denies entry to an authorized, enrolled identifier or individual. The rate shall be less than 1 percent.
 2. Type II Error Rate: Type II error rate is an error where the system grants entry to an unauthorized identifier or individual. The entry control Type II error rate shall be less than 0/1 percent.
- K. Passage: Passage is ingress and/or egress past an entry control device, or through a portal. Entry control procedures and equipment shall be implemented for passage through each portal as shown on Bidders drawings.
- L. Detection Resolution: The system shall have detection resolution sufficient to locate intrusions at each device and zone; and tampering at individual devices.
- M. Electrical Requirements: Electrically powered equipment shall operate on 120 volt 60 Hz AC. Equipment shall be able to tolerate variations in the voltage source of plus or minus 10 percent, and variations in the line frequency of plus or minus 2 percent with no degradation of performance.
1. System Response: The field device network shall provide a system end-to-end response time of 4 seconds or less for every device connected to the system. Alarms shall be annunciated at the central station within 1 second of the alarm occurring at a local processor or device controlled by a local processor, and within 100 milliseconds if the alarm occurs at the central station. Alarm and status changes shall be displayed within 100 milliseconds after receipt of data by the central station. All graphics shall be displayed, including graphics generated map displays, on the console monitor within 5 seconds of alarm receipt at the security console. This response time shall be maintained during system heavy load.

2. System Heavy Load Condition: For the purpose of system heavy load condition, the system shall consist of central station equipment, communication controllers and all local processors. System heavy load condition is the occurrence of alarms at the rate of 10 alarms per second distributed evenly among all local processors in the system. The alarm printer shall continue to print out all occurrences, including time of occurrence, to the nearest second.
- N. System Capacity: the system will be comprised of scalable central servers, monitoring stations, and administrative stations. The system shall also monitor and control the inputs and outputs. The system will discriminate to the individual sensors, switches, and terminal devices and report status at the appropriate workstations. Include a minimum expansion capability of 25 percent through additional software capacity, hardware capacity at the local panel level, or hardware capacity at the input module level.
- O. Console: Console equipment, unless designated otherwise, shall be rated for continuous operation under ambient environmental conditions of 36 to 122 degrees F and a relative humidity of 20 to 95 percent relative humidity, non-condensing.

5.3 Submittal of Technical Data and Computer Software:

All items of computer software and technical data (including technical data which relates to computer software), which is specifically identified in this specification shall be delivered to the GDOE. All data delivered shall be identified by reference to the particular specification paragraph against which it is furnished.

- A. Group I - Technical Data Package: The data package shall include the following as required:
1. System Drawings:
 - a. Functional system block diagram, identifying communications protocols, wire type and quantity, and approximate distances.
 - b. Security console installation, including block and wiring diagrams and equipment layout.
 - c. Local processor installation, including typical block and wiring diagrams.
 - d. Field equipment enclosures with local processor installation and schematics.

- e. Device wiring and installation drawings.
 - f. Details of connections to power sources, including power supplies and grounding.
 - g. Details of surge protection device installation.
 - h. Entry control system block diagram and layout.
 - i. CCTV assessment block diagram and layout.
2. Intrusion detection system block diagram and sensor layout (including exterior and interior zones) as well as sensor detection patterns.
3. **Manufacturer's Data:** The data package shall include manufacturer's data for all materials and equipment, including terminal devices, local processors and central station equipment provided under this specification.
4. **System Description and Analyses:** The data package shall include system descriptions, analyses, and calculations used in sizing equipment specified. Descriptions and calculations shall show how the equipment will operate as a system to meet the performance of this specification. The data package shall include the following:
- a. On-board Random Access Memory (RAM).
 - b. Communication speeds and protocol descriptions.
 - c. Hard disk size and configuration.
 - d. DVD/DVD-RW drive speed and protocol descriptions.
 - e. Streaming tape back-up speed and capacity.
 - f. Alarm response time calculations.
 - g. Command response time calculations.
 - h. Start-up operations including system and database backup operations.
 - i. Expansion capability and method of implementation.

- j. Sample copy of each report specified.
- k. Color output of typical graphics.
- l. System throughput calculation.

The data package shall also include a table comparing the above information for the equipment supplied and the minimum required by the software manufacturer.

- 5. Software Data: The software data package shall consist of descriptions of the operation and capability of system, and application software as specified.
 - 6. Overall System Reliability Calculations: The overall system reliability calculations data package shall include all manufacturer's reliability data and calculations required to show compliance with the specified reliability in accordance with paragraph, overall system reliability requirements.
 - 7. Certifications: Specified manufacturer's certifications shall be included with the data package certification.
 - 8. Key Control Plan: Provide a key control plan including the following:
 - a. Procedures that will be used to log and positively control all keys during installation.
 - b. A listing of all keys and where they are used.
 - c. A listing of all persons allowed access to the keys.
- B. Group II - Technical Data Package: Prepare and submit a report of "Current Site Conditions: to the GDOE documenting site conditions that significantly differ from the design drawings or conditions that affect performance of the system to be installed. Provide specification sheets, or written functional requirements to support the findings, and a cost estimate to correct those site changes or conditions. Do not correct any deficiency without written permission from the GDOE.
- C. Group III - Technical Data Package: Prepare test procedures and reports for the pre-delivery test.
- D. Group IV - Technical Data Package: Prepare test procedures and reports for the performance verification test and the endurance test. Deliver the performance verification test and endurance test procedures to the GDOE for approval.

1. Operation and Maintenance Manuals: Delivery draft copies in hard and soft format of the operator's, software, hardware, functional design, and maintenance manuals, as specified below, to the GDOE 30 days prior to beginning the performance verification test for use during the test period.
2. Operator's Manuals: The operator's manual shall fully explain all procedures and instructions for the operation of the system, including:
 - a. Computers and peripherals.
 - b. User enrollment.
 - c. System start-up and shutdown procedures.
 - d. Use of system and application software.
 - e. Recovery and restart procedures.
 - f. Graphic alarm presentation.
 - g. Use of report generator and generation of reports, including sample reports.
 - h. Data entry.
 - i. Operator commands.
 - j. Alarm and system messages and printing formats.
 - k. System entry requirements.
3. Software Manual: The software manual shall describe the functions of all software and shall include all other information necessary to enable proper loading, testing, and operation. The manual shall include:
 - a. Definition of terms and functions.
 - b. Use of system and application software.
 - c. Procedures for system initialization, start-up and shutdown.
 - d. Alarm reports.
 - e. Reports generation.
 - f. Database format and data entry requirements.
 - g. Directory of all disk files.
 - h. Description of all communication protocols, including data formats, command characters, and a sample of each type of data transfer.
 - i. Interface definition.
4. Hardware Manual: A manual describing all equipment furnished including:
 - a. General description and specifications.
 - b. Installation and checkout procedures.
 - c. Equipment electrical schematics and layout drawings.
 - d. System schematics and layout drawings.
 - e. Alignment and calibration procedures.

- f. Manufacturer's repair parts list indicating sources of supply.
 - g. Interface definition.
5. Function design Manual: The functional design manual shall identify the operational requirements for the system and explain the theory of operation, design philosophy, and specific functions. A description of hardware and software functions, interfaces, and requirements shall be included for all system operating modes.
6. Data Entry: Enter all data needed to make the system operational. Deliver the data to the GDOE on data entry forms, utilizing data from the contract documents. Bidder's field surveys, and other pertinent information in the Bidder's possession required for complete installation of the database. Identify and request from the GDOE, any additional data needed to provide a complete and operational Access Control System. The completed forms shall be delivered to the GDOE for review and approval at least 30 days prior to the Bidder's scheduled date. When the Access Control System database is to be populated in whole or in part from an existing or GDOE furnished electronic database, demonstrate the field mapping scheme to correctly input the data.
- E. Group V – Technical Data Package: Deliver final copies of the manuals as specified, in PDF format and bound in hardback, loose-leaf binders, to the GDOE within 30 days after completing the endurance test. The draft copy used during site testing shall be updated with any changes required prior to final delivery of the manuals. Each manual's contents shall be identified on the cover. The manual shall include names, addresses, and telephone numbers of each subcontractor installing equipment and systems and nearest service representative for each item of equipment. The manuals shall have a table of contents and tab sheets. Tab sheets shall be placed at the beginning of each chapter or section and at the beginning of each appendix. The final copies delivered after completion of the endurance test shall include modifications made during installation, checkout, and acceptance. The number of copies of each manual to be delivered shall be as specified below:
- 1. Operator's Manual: A copy of the final and approved Operator's Manual.
 - 2. Software Manual: A copy of the final and approved software Manual.
 - 3. Hardware Manual: A copy of the final and approved Hardware Manual.
 - 4. Functional Design Manual: A copy of the final and approved Functional Design Manual.

5. Maintenance Manual: A copy of the final and approved Maintenance Manual.
6. Final System Drawings: Maintain a separate set of drawings, elementary diagrams and wiring diagrams of the system to be used for final system drawings. This set shall be accurately kept up-to-date with all changes and additions to the Access Control System and shall be delivered to the GDOE with the final endurance test report. In addition to being complete and accurate, this set of drawings shall be kept neat and shall not be used for installation purposes. Final drawings submitted with the endurance test report shall be finished drawings on optical disk in AutoCAD 2010 format.

5.5 Quality Assurance:

- A. Pre-Delivery Testing: Perform pre-delivery testing, site performance verification testing, and adjustment of the complete Access Control System. Provide qualified personnel, equipment, instrumentation, and supplies necessary to perform testing. Written notification of planned testing shall be given to the GDOE at least 14 days prior to the test; notice shall not be given until after the Bidder has received written approval of the specific test procedures.
 1. Assemble the test system as specified, and perform tests to demonstrate that performance of the system complies with specified requirements in accordance with the approved pre-delivery test procedures. The tests shall take place during regular daytime working hours on weekdays. Model numbers of equipment tested shall be identical to those to be delivered to the site. Original copies of all data produced during pre-delivery testing, including results of each test procedure, shall be delivered to the GDOE at the conclusion of pre-delivery testing, prior to GDOE approval of the test. The test report shall be arranged so that all commands, stimuli, and responses are correlated to allow logical interpretation.
 2. Test Setup: The pre-delivery test setup shall include the following:
 - All central station equipment.
 - At least 1 of each type Data Transmission System (DTS) link, but not less than 2 links, and associated equipment to provide a fully integrated system.
 - The number of local processors shall equal the amount required by the site design.

- At least 1 of each type sensor used.
 - Enough sensor simulators to provide alarm signal inputs to the system equal to the number of sensors required by the design. The alarm signals shall be manually or software generated.
 - At least 1 of each type of terminal device used.
 - At least 1 of each type of portal configuration with all facility interface devices as specified or shown.
 - Prepare test procedures and reports for the pre-delivery test, and deliver the pre-delivery test procedures to the GDOE for approval. Deliver the final pre-delivery test report after completion of the pre-delivery test.
- B. Test Procedures and Reports: Test procedures shall explain in detail, step-by-step actions and expected results, demonstrating compliance with the requirements specified. Test reports shall be used to document results of the tests. Reports shall be delivered to the GDOE within 7 days after completion of each test.
- C. Line Supervision:
1. Signal and Data Transmission System (DTS) Line Supervision: all signal and DTS lines shall be supervised by the system. The system shall supervise the signal lines by monitoring the circuit for changes or disturbances in the signal and for conditions as described in UL 1076 for line security equipment. The system shall initiate an alarm in response to a current change of 10 percent or greater. The system shall also initiate an alarm in response to opening, closing, shorting, or grounding of the signal and DTS lines.

5.6 Environmental Requirements:

- A. Interior, Controlled Environment: System components, except the console equipment installed in interior locations, having controlled environments shall be rated for continuous operation under ambient environmental conditions of 36 to 122 degrees F dry bulb and 20 to 95 percent relative humidity, non-condensing.
- B. Interior, Uncontrolled Environment: System components installed in interior locations having uncontrolled environments shall be rated for continuous operation under ambient environmental conditions of 0 to 122 degrees F dry bulb and 10 to 95 percent relative humidity, non-condensing.

- C. Exterior Environment: System components that are installed in locations exposed to weather shall be rated for continuous operation under ambient environmental conditions of -30 to plus 122 degrees F dry bulb and 10 to 95 percent relative humidity, condensing. In addition, the system components shall be rated for continuous operation when exposed to performance conditions as specified in UL 294 and UL 639 for outdoor use equipment. Components shall be rated for continuous operation when exposed to rain as specified in NEMA 250, winds up to 170 mph.

5.7 Maintenance and Service:

- A. Warranty Period: Provide all labor, equipment, and materials required to maintain the entire system in an operational state as specified, for a period of one year after formal written acceptance of the system to include scheduled and non-scheduled adjustments.
- B. Description: of Work: The adjustment and repair of the system includes all computer equipment, software updates, communications transmission equipment and DTS, local processors, sensors and entry control, facility interface, and support equipment. Responsibility shall be limited to Bidder installed equipment. Repair, calibration, and other work shall be provided and performed in accordance with the manufacturer's documentation and instruction. The maintenance manual shall include descriptions of maintenance for all equipment including inspection, periodic prevention maintenance, fault diagnosis, and repair or replacement of defective components.
- C. Personnel: Service personnel shall be certified in the maintenance and repair of the specific type of equipment installed and qualified to accomplish work promptly and satisfactorily. The GDOE shall be advised in writing of the name of the designated service representative, and of any change in personnel.
- D. Schedule of Work: Perform two minor inspection at 6 month intervals (or more often if required by the manufacturer), and two major inspections offset equally between the minor inspections to effect quarterly inspection of alternating magnitude. Bidder to provide the GDOE an inspection report for both minor and major inspections within 6 days after the work is accomplished. These reports shall document the conditions of the system and recommend any corrective action necessary.
 - 1. Minor Inspections: Minor inspections shall include visual checks and operational tests of console equipment, peripheral equipment, local processors, sensors, and electrical and mechanical controls. Minor inspections shall also include mechanical adjustment of laser printers.

2. Major Inspections: Major inspections shall include work described under paragraph Minor Inspections and the following work:
 - a. Clean interior and exterior surfaces of all system equipment and local processors, including workstation monitors, keyboards, and console equipment.
 - b. Perform diagnostics on all equipment.
 - c. Check, walk test, and calibrate each sensor.
 - d. Run all system software diagnostics and correct all diagnosed problems.
 - e. Resolve any previous outstanding problems.
 - f. Purge and compress data bases.
 - g. Review network configuration.
 3. Scheduled Work: Scheduled work shall be performed during regular working hours, Monday through Friday, excluding federal holidays.
- E. Emergency Service: The GDOE will initiate service calls when the system is not functioning properly. Qualified personnel shall be available to provide service to the complete system. The GDOE shall be furnished with a telephone number where the service supervisor can be reached at all times. Service personnel shall be at site within 1 hour after receiving a request for service. The system shall be restored to proper operating condition within 8 hours after service personnel arrive onsite and obtain access to the system.
- F. Operation: Performance verification test procedures shall be used after all scheduled maintenance and repair activities to verify proper component and system operation.
- G. Records and Logs: Keep records and logs of each task (electronic and hard copy), and organize cumulative records for each component, and for the complete system chronologically resulting in a continuous log to be maintained for all devices. The log shall contain all initial settings. Complete logs shall be kept and shall be available for inspection onsite, demonstrating that planned and systematic adjustments and repairs have been accomplished for the system.
- H. Work Requests: Separately record each service call request, as received. The form shall include the serial number identifying the component involved, its location, date and time the call was received, specific nature of trouble, names of

service personnel assigned to the task, instructions describing what has to be done, the amount and nature of the material to be used, the time and date work started, and the time and date of completion. Deliver a record of the work performed within 5 days after work is accomplished.

- I. **System Modifications:** Make any recommendations for system modification in writing to the GDOE. System modifications shall not be made without prior written approval of the GDOE. Any modifications made to the system shall result in the updating of the operation and maintenance manuals as well as any other documentation affected.
- J. **Software:** Provide a description of all software updates to the GDOE, who will then decide whether or not they are appropriate for implementation. After written notification by the GDOE, implement the designated software updates and verify operation in the system. These updates shall be accomplished in a timely manner, fully coordinated with system operators, and shall be incorporated into the operation and maintenance manuals, and software documentation. Make a system image file so the system can be restored to its original state if the software update adversely affects system performance.

5.8 Material/Product Requirements:

- A. **Materials and Equipment:** Units of equipment that perform identical, specified functions shall be products of a single manufacturer. All material and equipment shall be new and currently in production. Each major component of equipment shall have the manufacturer's model and serial number in a conspicuous place. Systems equipment shall conform to UL 294 and UL 1076.
- B. **Nameplates:** Laminated plastic nameplates shall be provided for local processors. Each nameplate shall identify the local processor and its location within the system. Laminated plastic shall be 1/8 inch thick, white with black center core. Nameplates shall be a minimum of 1 x 3 inches, with minimum 1/4 inch high engraved block lettering. Nameplates shall be attached to the inside of the enclosure housing the local processor. Other major components of the system shall have the manufacturer's name, address, type or style, model or serial number, and catalog number on a corrosion resistant plate secured to the item of equipment. Nameplates will not be required for devices smaller than 1 x 3 inches.
- C. **Power Line Surge Protection:** Equipment connected to alternating current circuits shall be protected from power line surges. Equipment protection shall withstand surge
- D. **Sensor Device Wiring and Communication Circuit Surge Protection Inputs** shall be protected against surges induced on device wiring. Outputs shall be protected against surges induced on control and device wiring installed outdoors and as shown. Communications equipment shall be protected against surges induced on

any communications circuit. Cables and conductors, except fiber optics, which serve as communications circuits from console to field equipment, and between field equipment, and additional triple electrode gas surge protectors rated for the application on each wire line circuit shall be installed within 3 feet of the building cable entrance. Fuses shall not be used for surge protection. The inputs and outputs shall be tested in both normal mode and common mode using the following two waveforms:

1. A 10 microsecond rise time by 1000 microsecond pulse width waveform with a peak voltage of 1500 Volts and peak current of 60 amperes.
 2. An 8 microsecond rise time by 20 microsecond pulse width waveform with a peak voltage of 1000 Volts and peak current of 500 amperes.
- E. Power Line Conditioners: A power line conditioner shall be furnished for the console equipment and each local processor. The power line conditioners shall be of the ferro-resonant design, with no moving parts and no tap switching, while electrically isolating the secondary from the power line side. The power line conditioners shall be sized for 125 percent of the actual connected kVA load. Characteristics of the power line conditioners shall be as follows:
- F. Field Enclosures:
1. Interior Sensor: Sensors to be used in an interior environment shall have a housing that provides protection against dust, falling dirt, and dripping noncorrosive liquids.
 2. Exterior Sensor: Sensors to be used in an exterior environment shall have a housing that provides protection against windblown dust, rain and splashing water, and hose directed water.
 3. Interior Electronics: System electronics to be used in an interior environment shall be housed in enclosures which meet the requirements of NEMA 250 Type 12.
 4. Exterior Electronics: System electronics to be used in an exterior environment shall be housed in enclosures which meet the requirements of NEMA 250 Type 4X.
 5. Corrosion Resistant: System electronics to be used in a corrosive environment as defined in NEMA 250 shall be housed in metallic non-corrosive enclosures which meet the requirements of NEMA 250 Type 4X.

G. Fungus Treatment: System components located in fungus growth inductive environments shall be completely treated for fungus resistance. Treating materials containing a mercury bearing fungicide shall not be used. Treating materials shall not increase the flammability of the material or surface being treated. Treating materials shall cause no skin irritation or other injury to personnel handling it during fabrication,, transportation, operation, or maintenance of the equipment, or during use of the finished items when used for the purpose intended.

H. Tamper Provisions:

Tamper Switches: Enclosures, cabinets, housings, boxes, and fittings having hinged doors or removable covers and which contain circuits or connections of the system and its power supplies, shall be provided with cover operated, corrosion-resistant tamper switches, arranged to initiate an alarm signal when the door or cover is moved. The enclosure and the tamper switch shall function together and shall not allow direct line of sight to any internal components before the switch activates. Tamper switches shall be inaccessible until the switch is activated; have mounting hardware concealed so that the location of the switch cannot be observed from the exterior of the enclosure; be connected to circuits which are under electrical supervision at all times, irrespective of the protection mode in which the circuit is operating; shall be spring-loaded and held in the closed position by the door or cover; and shall be wired so that the circuit is broken when the door or cover is disturbed.

- a. Non-sensory Enclosures: Tamper switches must be installed on all non-sensory enclosures.
- b. Sensory Enclosures: Tamper switches must be installed on all sensory enclosures or housings.
- c. Enclosure Covers: Covers of pull and junction boxes provided to facilitate initial installation of the system need not be provided with tamper switches if they contain no splices or connections, but shall be protected by tack welding or brazing the covers in place or by tamper resistant security fasteners. Labels shall be affixed to such boxes indicating they contain no connections.

I. Locks and Key-Lock Switches:

1. Locks: Locks shall be provided on system enclosures for maintenance purposes. Locks shall be UL listed, round-key type with 3 dual, 1 mushroom, 3 plain pin tumblers or conventional key type lock having a combination of 5 cylinder pin and 5-point 3 position side bar. Keys shall be stamped "DO NOT DUPLICATE." The locks shall be arranged so that

the key can only be withdrawn when in the locked position.

Maintenance locks shall be keyed alike and only 2 keys shall be furnished for all of these locks. These keys shall be controlled in accordance with the key control plan as specified in paragraph Key Control Plan.

2. Construction Locks: A set of temporary locks shall be used during installation and construction. The final set of locks installed and delivered to the GDOE shall not include any of the temporary locks.
- J. System Components: System components shall be designed for continuous operation. Electronic components shall be solid state type, mounted on printed circuit boards conforming to UL 796. Printed circuit board connectors shall be plug-in, quick-disconnect type. Power dissipating components shall incorporate safety margins of not less than 25 percent with respect to dissipation ratings, maximum voltages, and current carrying capacity. Control relays and similar switching devices shall be solid state type or sealed electro-mechanical.
1. Modularity: Equipment shall be designed for increase of system capability by installation of modular components. System components shall be designed to facilitate maintenance through replacement of modular subassemblies and parts.
 2. Maintainability: Components shall be designed to be maintained using commercially available tools and equipment. Components shall be arranged and assembled so they are accessible to maintenance personnel. There shall be no degradation in tamper protection, structural integrity, EMI/RFI attenuation, or line supervision after maintenance when it is performed in accordance with manufacturer's instructions.
 3. Interchangeability: The system shall be constructed with off-the-shelf components which are physically, electrically and functionally interchangeable with equivalent components as complete items. Replacement of equivalent components shall not require modification of either the new component or of other components with which the replacement items are used. Custom designed or one-of-a-kind items shall not be used. Interchangeable components or modules shall not require trial and error matching in order to meet integrated system requirements, system accuracy, or restore complete system functionality.
 4. Product Safety: System components shall conform to applicable rules and requirements of NFPA 70 and UL 294. System components shall be equipped with instruction plates including warnings and cautions describing physical safety, and special or important procedures to be followed in operating and servicing system equipment.

- K. Controls and Designations: Controls and designations shall be as specified in NEMA ICS 1.
- L. Alarm Output: The alarm output of each sensor shall be a single pole double throw (SPDT) contact rated for a minimum of 0.25 a AT 24 Volts dc.

5.9 Central Station Hardware:

The central station computer(s) shall be standard, off the shelf, unmodified digital computer of modular design. The requirements indicated below are minimum requirements.

- A. Processor Speed: The processor shall utilize a minimum architecture of a 32-bit CSIC. The operating speed of the processor shall be a minimum of: Workstation 2.4 GHZ; Server 2.4 GHZ.
- B. Memory: The minimum installed and expandable RAM memory sizes are as follows: Workstation Installed 16 MB; Expandable 32 GB; Server 16 GB; Expandable 32 GB.
- C. Power Supply: The power supply, have a minimum capacity of: Workstation 300 Watts; Server 500 Watts.
- D. Real Time clock (RTC): An RTC shall be provided. Accuracy shall be within plus or minus 1 minute per month. The clock may be made accurate by automatic time-syncing software using standard protocols. The RTC shall maintain time in a 24-hour format including seconds, minutes, hours, date, and month and shall be resettable by software. The clock shall continue to function for a period of 1 year without power.
- E. Serial Ports: The following ports shall be provided on each workstation type, as a minimum:
 - 1. Two TIA-232 serial.
 - 2. Serial ports shall have adjustable data transmission rates from 9600 to 115.2 Kbps and shall be selectable under program control.
 - 3. One enhanced parallel port.

4. One RJ-45 Network Interface Connector.
 5. Two PS/2 or 6-pin mini-DIN ports for keyboard and mouse.
 6. Two USB ports.
- F. Network Interface Card: A Network Interface Card (NIC) shall be provided for each computer type with a minimum speed of: Workstation 100 MBPS; Server 100 MBPS.
- G. Color Monitor: The monitor shall be no less than 17 inches with a minimum resolution of 1280 by 1024 pixels, non-interlaced, and a maximum dot pitch of 0.28 millimeters. The video card shall support at least 256 colors at a resolution of 1280 by 768. The workstations shall operate with the following minimum size and types of video RAM: Workstation 64 MB shared memory; Server Integrated controller with 8 MB of SDRAM.
- H. Keyboard: A101: A keyboard having a minimum 64 character, standard ASCII character, based on ANSI INCITS 154 shall be furnished.
- I. Enhancement Hardware: Enhancement hardware, such as special function keyboards, special function keys, touch screen devices, or mouse shall be provided for frequently used operator commands, or as shown, such as: Help, Alarm Acknowledge, Place Zone In Access, Place Zone In Secure, System Test, Print Reports, Change Operator, and Display Graphics.
- J. Disk Storage: A hard disk with controller having a maximum average access time of 10 milliseconds shall be provided. The hard disk shall provide a minimum formatted storage: Workstation 200 GB SCI/EIDE @7200 RPM; Server 500 GB SCI/EIDE @7200 RPM.
- K. Magnetic Tape System: A 4 mm cartridge magnetic tape system shall be provided. Each tape shall be computer grade, in a rigid cartridge with spring-loaded cover and write-protect. The tape drives shall utilize uncompressed and compressed capacity tapes as follows: Workstation N/A; Server 20/40 GB, DDS4.
- L. Modem: A modem shall be provided and operate at 57,600 bps, full duplex on circuits using asynchronous communications. Modem shall have error detection, auto answer/autodial, and call-in-progress detection. The modem shall meet the requirements of ITU V.34, ITU V.92 for error correction and ITU V.42 for data compression standards, and shall be suitable for operating on unconditioned voice grade telephone lines in conformance with 47 CFR 68.

- M. Audible Alarm: The manufacturer's standard audible alarm shall be provided. Each of the computer station types shall include a soundboard and speakers to provide audio indications for the operator.
- N. Mouse: A mouse with a minimum resolution of 400 dots per inch shall be provided.
- O. DVD/DVD-RW nominal storage capacity of 4.7 Gigabytes shall be provided. These drives shall have the following minimum characteristics:
1. Data Transfer Rate: 3.6 Mbps.
 2. Average Access Time: 150 milliseconds.
 3. Cache memory: 256 Kbytes.
 4. Data throughput: 3.6 Mbyte/second, minimum.
 5. Read speed: 12x.
 6. Write speed: 4x.
- P. Alarm and Report Printer: A printer shall be provided and interconnected to the central station equipment. The printer shall be a laser printer with printer resolution of at least 600 dots per inch. The printer shall have at least 8 megabytes of RAM. Printing speed shall be at least 15 pages per minute with a 100-sheet paper cassette and with automatic feed.
- Q. Controllers: Controllers required for operation of specified peripherals, serial, and parallel ports shall be provided.
- R. Central Station Equipment Enclosures: Provide color coordinated consoles and equipment cabinets. Equipment cabinets shall have front and back plexiglass doors, thermostatic controlled bottom-mounted fan, and metal fitted and louvered tops. One locking cabinet approximately 6 feet high, 3 feet wide, 18 to 36 inches deep with 3 adjustable shelves, and 4 storage racks for storage of disks, tapes, printouts, printer paper, ribbons, manuals, and other documentation shall be provided.
- S. Uninterruptible Power Supply (UPS) A self-contained UPS, suitable for installation and operation at the central station, shall be provided. The UPS shall be sized to provide a minimum of six (6) hours of operation of the central station equipment. If the facility is without an emergency backup generator, the UPS

shall provide necessary battery backup power for 24 hours. Equipment connected to the UPS shall not be affected by a power outage of a duration less than the rated capacity of the UPS. UPS shall be complete with necessary power supplies, transformers, batteries, and accessories and shall include visual indication of normal power operation, UPS operation, abnormal operation and visual and audible indication of low battery power. The UPS condition shall be monitored by the Access Control System and displayed at the Central Station through the use of outputs or data stream from the UPS.

- T. Enrollment Center Equipment: Enrollment stations shall be provided and located as shown to enroll personnel into, and disenroll personnel from the system database. The enrollment equipment shall only be accessible to authorized entry control enrollment personnel. The enrollment equipment shall include subsystem configuration controls and electronic diagnostic aids for subsystem setup and troubleshooting with the central station.

5.10 Central Station Software:

Software shall support all specified functions. The central station shall be online at all times and shall perform required functions as specified. Software shall be resident at the central station, server, and/or the local processor as required to perform specified functions.

- A. System Software: System software shall perform the following functions:

1. Support multi-user operation with multiple tasks for each user.
2. Support operation and management of peripheral devices.
3. Provide file management functions for disk I/O, including creation and deletion of files, copying files, a directory of all files including size and location of each sequential and random ordered record.
4. Provide printer spooling.
5. The system shall be designed to support any industry standard net protocol and topology listed below:

- TCP/IP
- Novel Netware (IPX/SPX)
- Digital PATHWORKS
- Banyan VINES
- IBM LAN Server (NetBEUI)
- IBM SNA Networks
- Microsoft LAN Manager (NetBEUI)

- NFS Networks
- Remote Access Service (RAS) via ISDN, x .25, and standard phone lines

6. The system shall be Open Database Connectivity (ODBC) compliant.
 7. 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 2000, Oracle Server 8i/9i, or IBM B2 Universal Server 7.2.
 8. The system shall be portable across multiple platforms to take full advantage of multiple hardware architectures, without changing system software.
 9. The system shall support any standard video input source that utilizes a Red/Green/Blue (RGB), Composite, or S-Video signal. Monitor resolution shall support a minimum of 1024 x 768 pixels with SVGA graphics standards.
 10. The system shall be designed to support an advanced distributed network architecture, where intelligent system controllers (ISCs) do not need to be home-run wired back to the database server. ISCs shall be wired to any authorized PC that is licensed to run the system software. Network based ISCs shall be able to communicate back with the database server through 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. ISCs shall be connected to the Local Area Network (LAN) Wide Area Network (WAN) via industry standard TCP/IP or Dial-up communications protocol. As such, any alarm in the system shall be capable of being routed to any client workstation(s) on the network, regardless of the ISC that generated the alarm.
- B. **Software Scalability:** The system software shall be scalable. The software shall have the capability of managing the total operations of the Access Control System capacity of credential readers, alarm inputs, control outputs, and peripheral equipment as shown, as governed by licensing agreements. Minimum requirements for regional server additions shall be driven by bandwidth and latency calculations provided by the manufacturer of the Access Control System.
- C. **System Architecture:** Criticality, operations requirements, and/or limiting points of failure may dictate the development of an enterprise and regional server architecture as opposed to system capacity. Provide server and workstation configurations with all necessary connectors, interfaces, and accessories as shown.

- D. Real Time Clock Synchronization: The system shall synchronize each real time clock within 1 second and at least once per day automatically, without operator intervention and without requiring system shutdown.
- E. Database Definition Process: Software shall be provided to define and modify each point in the database using operator commands. The definition shall include all parameters and constraints associated with each sensor, commandable output, zone, facility interface device, terminal device, etc. Data entry software shall provide mass enrollment capability, such that multiple devices may be assigned similar parameters with a single entry. Each database item shall be callable for display or printing, including EPROM, ROM and RAM resident data. The database shall be defined and entered into the Access Control System based upon input from the GDOE.
- F. Software Tamper: The Access Control System shall annunciate a tamper alarm when unauthorized changes to the system database files are attempted. Three consecutive unsuccessful attempts to log onto the system shall generate a software tamper alarm. A software tamper alarm shall also be generated when an operator or other individual makes 3 consecutive unsuccessful attempts to invoke central processor functions beyond their authorization level. The Access Control System shall maintain a transcript file of the last 5000 commands entered at each central station to serve as an audit trail. The system shall not allow write access to the system transcript files by any person, regardless of their authorization level. The system shall only allow acknowledgement of software tamper alarms and read access to the system transcript files by operators and managers with the highest password authorization level available in the system.
- G. Conditional Command Event: The Access Control System software shall provide a programmable timeframe and alarm output for failure of the operator to acknowledge an alarm condition. If an alarm is not acknowledged within the specified timeframe, the alarm and notice of lack of response shall be communicated to other stations on the system. If no other stations are manned 24 hours per day, then an automatic alert must be provided for security response personnel.
- H. Peer Computer Control Software: The peer computer control software shall detect a failure of a central computer, and shall cause the other central computer to assume control of all system functions without interruption of operation. Drivers shall be provided in both central computers to support this mode of operation.
- I. Application Software: The application software shall provide the interface between the alarm annunciation and entry control local processors, monitor all sensors and DTS links; operate displays; report alarms; generate reports; and

assist in training system operators. Application software shall perform the following functions:

- Support operation and management of peripheral devices.
 - Provide printer spooling.
 - The system shall be Open Database Connectivity (ODBC) compliant.
1. Operator's Commands: The operator's commands shall provide the means for entry of monitoring and control commands, and for retrieval of system information. Processing of operator commands shall commence within one (1) second of entry, with some form of acknowledgment provided at that time. The operator's commands shall perform tasks including:
 - a. Request help with the system operation.
 - b. Acknowledge alarms.
 - c. Clear alarms.
 - d. Place zone in access.
 - e. Place zone in secure.
 - f. Test the system.
 - g. Generate and format reports.
 - h. Print reports.
 - i. Change operator.
 - j. Request any graphic displays implemented in the system. Graphic displays shall be completed within 3 seconds from time of operator command.
 - k. Entry control functions.
 2. Command Input: Operator's commands shall be full English language words, acronyms, or graphic symbols selected to allow operators to use the system without extensive training or data processing backgrounds. The system shall prompt the operator in English word, phrase, or acronym, or graphic symbols. Commands shall be available in an abbreviated

mode, in addition to the full English language (words and acronyms) commands, allowing an experienced operator to disregard portions, or all, of the prompt-response requirements.

3. **Command Input Errors:** The system shall supervise operator inputs to ensure they are correct for proper execution. Operator input assistance shall be provided whenever a command cannot be executed because of operator input errors. The system shall explain to the operator, in English words and phrases, why the command cannot be executed. Error responses requiring an operator to look up a code in a manual or other document will not be accepted. Conditions for which operator error assist messages shall be generated shall be generated include:
 - a. The command used is incorrect or incomplete.
 - b. The operator is restricted from using that command.
 - c. The command addresses a point which is disabled or out of service.
 - d. The command addresses a point which does not exist.
 - e. The command would violate constraints.
 - f. Additionally, the system shall write all input keystrokes to a file on the hard drive for subsequent audit purposes.

4. **Enhancements:** The system shall implement the following enhancements by use of special function keys, touch screen, or mouse, in addition to all other command inputs specified:
 - a. **Help:** Used to produce a display for all commands available to the operator. The help command, followed by a specific command, shall produce a short explanation of the purpose, use, and system reaction to that command.
 - b. **Acknowledge Alarms:** Used to acknowledge that the alarm message has been observed by the operator.
 - c. **Clear alarms:** Used to remove an alarm from the active screen.
 - d. **Input Guard Response:** The system shall provide preprogrammed guard responses to allow the monitoring force to create a log of responses to alarm events. The preprogrammed guard inputs shall include phrases such as “dispatched security personnel”,

“contacted supervisor”, or “false alarm”.

- e. Place Zone in Access: Used to remotely disable intrusion alarm circuits emanating from a specific zone. The system shall be structured so that tamper circuits cannot be disabled by the console operator.
 - f. Place Zone in Secure: Used to remotely activate intrusion alarm circuits emanating from a specific zone.
 - g. System Test: Allows the operator to initiate a system wide operational test.
 - h. Zone Test: Allows the operator to initiate an operational test for a specific zone.
 - i. Print Reports: Allows the operator to initiate printing of reports.
 - j. Change Operator: Used for changing operators.
 - k. Display Graphics: Used to display any graphic displays implemented in the system.
5. System Access Control: The system shall provide a means to define system operator capability and functions through multiple, password protected operator levels. At least 3 operator levels shall be provided. System operators and managers with appropriate password clearances shall be able to change operator levels for all operators. Three successive attempts by an operator to execute functions beyond their defined level during a 24-hour period shall initiate a software tamper alarm. A minimum of 32 passwords shall be usable with the system software. The system shall display the operator's name or initials in the console's first field. The system shall print the operator's name or initials, action, date, and time on the system printer at log-on and log-off. The password shall not be displayed or printed. Each password shall be definable and assignable for the following:
- a. Commands usable.
 - b. Menus available for display.
 - c. Access to system software.
 - d. Access to application software.

- e. Individual zones which are to be accessed.
 - f. Access to database.
6. **Alarm Monitoring Software:** This program shall monitor all sensors, local processors, and DTS circuits and notify the operator of an alarm condition. Alarms shall be printed in red on the alarm printer and displayed first; and within alarm priorities, the oldest unacknowledged alarm shall be displayed first. An alarm is latched into the system upon activation/annunciation. Once in alarm, no subsequent alarms from that specific device/sensor need be annunciated until the current alarm is investigated and cleared. The system may provide a counter to indicate the number of subsequent alarms from that specific device/sensor that occurred after the initial alarm, but no additional alarms are to be annunciated until the current alarm is "cleared". Operator acknowledgment of one alarm silences the audible alarm and changes associated map and text icons from flashing red to steady state red. These icons remain red to indicate that the alarm is still open and the system is awaiting identification of the cause and resolution by the operator. The operator can resolve the alarm by either the use of CCTV assessment to identify the cause or by dispatching guards/response force to investigate. After the operator has satisfactorily determined the cause of the alarm and is prepared to enter pertinent information into the log, the operator will "clear" the alarm. Clearing the alarm indicates to the system that the operator needs to be notified of any new alarms from that device/sensor. Programmable alarm data to be displayed shall include type of alarm, location of alarm, and secondary alarm messages. Alarm data to be printed shall include: type of alarm, location of alarm, date and time (to nearest second) of occurrence, operator acknowledgement instructions, and operator response. A unique message field with a width of 60 characters shall be provided for each alarm. Assignment of messages to a zone or sensor shall be an operator editable function. Secondary messages shall be assignable by the operator for printing to provide further information and shall be editable by the operator. The system shall provide for 25 secondary messages with a field of 4 lines of 60 characters each. The most recent 1000 alarms shall be stored and shall be recallable by the operator using the report generator.
7. **Monitor Display Software:** Monitor display software shall provide for text and graphics map displays that include zone status integrated into the display. Different colors shall be used for the various components and real time data. Colors shall be uniform on all displays. The following color coding shall be followed:

- a. Flashing Red to alert an operator that a zone has gone into an alarm or that primary power has failed.
 - b. Red to alert an operator that a zone is in alarm and that the alarm has been acknowledged.
 - c. Yellow to advise an operator that a zone is in access.
 - d. Green to indicate that a zone is secure or that power is on.
8. Map Displays/Graphics Linked to Alarms:
- a. The System shall relate map displays or other graphics to alarms. Whenever one of the predefined alarm is annunciated on a system control terminal, the map display or graphic related to the alarm shall be automatically displayed. The definition of which maps or graphics shall be displayed with each alarm shall be selectable by system operators through simple menu choices as part of the system initial configuration.
 - b. System graphics shall be provided to allow multiple levels of information for the system operator. The initial level shall provide an overall site map distinguishing sensed facilities and assets. Active links or icons shall be used to trigger the display of subsequent maps, providing greater detail and definition of the area symbolized. These active links or icons shall be color dynamic, reflecting in real-time the highest priority off-normal conditions of the device or map it represents. Multiple layers may be used to arrive at the specific device locations.
 - c. The system may utilize two (2) monitors for text and map displays respectively for enhancing operator performance.
9. User Defined Prompts/Messages Linked to Alarms: The System shall provide a means to relate operator defined prompts and other messages to predefined alarms. Whenever one of the predefined alarms is annunciated on a system control terminal, the prompts or messages related to the alarm shall be automatically displayed.
10. System Test Software: This software shall enable the operator to initiate a test of the system. This test can be of the entire system or of a particular portion of the system at the operator's option. The results of each test shall be sorted for future display or print out in report form.

11. Report Generator: software shall be provided with commands to generate reports for displaying, printing, and storing on disk and tape. Reports shall be stored by type, date, and time and shall be printed on the report printer. Reports shall be spooled, allowing the printing of one report to be complete before the printing of another report commences. The dynamic operator for the system shall not be interrupted to generate a report. The report generation mode, either periodic, automatic or on request shall be operator selectable. The report shall contain the time and date when the report was printed, and the name of operator generating the report. The exact format of each report type shall be operator configurable.
 - a. Periodic automatic Report Modes: The system shall allow for specifying, modifying, or inhibiting the report to be generated, the time the initial report is to be generated, the time interval between reports, end of period, and the output peripheral.
 - b. Request Report Mode: The system shall allow the operator to request at any time an immediate printout of any report.
 - c. Alarm report: The alarm report shall include all alarms recorded by the system over an operator selectable time. The report shall include such information as: type of alarm (intrusion, tamper, etc.); type of sensor; location including zone; date; time; and action taken.
 - d. System test Report: This report documents the operational status of all system components following a system test.
 - e. Access/Secure Report: This report documents all zones placed in access, the time placed in access, and the time placed in secure mode.
 - f. Entry Control Reports: The system shall generate hard copy reports of identifier, terminal, and guard tour tracking reports, and versions with defined parameters of the manufacturer's standard management and activity reports.
12. Entry Control Enrollment Software: The enrollment station shall provide database management functions for the system, and shall allow an operator to change and modify the data entered in the system as needed. The enrollment station shall not have any alarm response or acknowledgment functions as a programmable function of the system. Multiple, password protected access levels shall be provided at the enrollment station. Database management and modification functions shall require a higher operator access level than personnel enrollment

functions. The program shall provide a means for disabling the enrollment station when it is unattended to prevent unauthorized use. The program shall provide a method to enter personnel identifying information into the entry control database files through enrollment stations to include a credential unit in use at the installation. The program shall allow entry of data into the system database files through the use of simple menu selections and data fields. The data field names shall be customized to suit user and site needs. All personnel identity verification subsystems selected for use with the system shall fully support the enrollment function and shall be compatible with the entry control database files.

5.11 Field Processing Hardware:

- A. Alarm annunciation Local Processor: The alarm annunciation local processor shall respond to interrogations from the field device network, recognize and store alarm status inputs until they are transmitted to the central station and change outputs based on command received from the central station. The local processor shall also automatically restore communication within ten (10) seconds after an interruption with the field device network and provide dc line supervision on each of its alarm inputs.
- Inputs. Local processor inputs shall monitor dry contacts for changes of state that reflect alarm conditions. The local processor shall have at least eight (8) alarm inputs which allow wiring as normally open or normally closed contact for alarm condition. It shall also provide line supervision for each input by monitoring each input for abnormal open, grounded, or shorted conditions using dc current change measurements. The local processor shall report line supervision alarms to the central station. Alarms shall be reported for any condition that remains off normal at an input for longer than 500 milliseconds. Each alarm condition shall be transmitted to the central computer during the next interrogation cycle.
 - Outputs. Local processor outputs shall reflect the state of commands issued by the central station. The outputs shall be a form C contact and shall include normally open and normally closed contacts. The local processor shall have at least four (4) command outputs.
 - Communications. The local processor shall be able to communicate with the Central Station via RS485 or TCP/IP as a minimum.

- B. **Processor Power Supply:** Local processor and sensors shall be powered from an uninterruptible power source. The uninterruptible power source shall provide eight (8) hours of battery back-up power in the event of primary power failure and shall automatically fully recharge the batteries within twelve (12) hours after primary power is restored. If the facility is without an emergency generator, the uninterruptible power source shall provide 24 hours of battery backup power. There will be no equipment malfunctions or perturbations or loss of data during the switch from primary to battery power and vice versa. Batteries shall be sealed, non-outgassing type. The power supply shall be equipped with an indicator for ac input power and an indication for dc output power. Loss of primary power shall be reported to the central station as an alarm.
- C. **Auxiliary Equipment Power:** A GFI service outlet shall be furnished inside the local processor's enclosure.
- D. **Entry Control Local Processor:** The entry control local processor shall respond to interrogations from the field device network, recognize and store alarm status inputs until they are transmitted to the central station and change outputs based on commands received from the central station. The local processor shall also automatically restore communication within 10 seconds after an interruption with the field device network and provide dc line supervision on each of its alarm inputs. The entry control local processor shall provide local entry control functions including communicating with field devices such as card readers, keypads, biometric personal identity verification devices, door strikes, magnetic latches, gate and door operators and exit push buttons. The processor shall also accept data from entry control field devices as well as database downloads and updates from the central station that include enrollment and privilege information. The processor shall also send indications of success or failure of attempts to use entry control field devices and make comparisons of presented information with stored identification information. "the processor shall grant or deny entry by sending control signals to portal control devices and mask intrusion alarm annunciation for sensors stimulated by authorized entries. The entry control local processor shall use inputs from entry control devices to change modes between access and secure. The local processor shall maintain a date-time and location stamped record of each transaction and transmit transaction records to the central station. The processor shall operate as a stand-alone portal controller using the downloaded data base during periods of communication loss between the local processor and the central station. The processor shall store a minimum 4000 transactions during periods of communication loss between the local processor and the central station for subsequent upload to the central station upon restoration of communication.

- Inputs. Local processor inputs shall monitor dry contacts for changes of state that reflect alarm conditions. The local processor shall have at least eight (8) alarm inputs which allow wiring as normally open or normally closed contact for alarm condition. It shall also provide line supervision for each input by monitoring each input for abnormal open, grounded, or shorted conditions using dc current change measurements. The local processor shall report line supervision alarms to the central station. Alarms shall be reported for any condition that remains off normal at an input for longer than 500 milliseconds. Each alarm condition shall be transmitted to the central computer during the next interrogation cycle. The entry control local processor shall include the necessary software drivers to communicate with entry control field devices. Information generated by the entry control field devices shall be accepted by the local processor and automatically processed to determine valid identification of the individual present at the portal. Upon authentication of the credentials or information presented, the local processor shall automatically check privileges of the identified individual, allowing only those actions granted as privileges. Privileges shall include, but not be limited to, time of day control, day of week control, group control, and visitor escort control. The local processor shall maintain a date-time and location stamped record of each transaction. A transaction is defined as any successful or unsuccessful attempt to gain access through a controlled portal by the presentation of credentials or other identifying information.
 - Outputs. Local processor outputs shall reflect the state of commands issued by the central station. The outputs shall be a form C contact and shall include normally open and normally closed contacts. The local processor shall have at least four (4) addressable outputs. The entry control local processor shall also provide control outputs to portal control devices.
 - Communications. The local processor shall be able to communicate with the Central Station via RS485 or TCP/IP as a minimum. The system manufacturer shall provide strategies for downloading database information for panel configurations and cardholder data to minimize the required download time when using IP connectivity.
- E. Processor Power Supply: Local processor and sensors shall be powered from an uninterruptible power source. The uninterruptible power source shall provide eight (8) hours of battery back-up power in the event of primary power failure and shall automatically fully recharge the batteries within twelve (12) hours after

primary power is restored. If the facility is without an emergency generator, the uninterruptible power source shall provide 24 hours of battery backup power. There will be no equipment malfunctions or perturbations or loss of data during the switch from primary to battery power and vice versa. Batteries shall be sealed, non-outgassing type. The power supply shall be equipped with an indicator for ac input power and an indication for dc output power.

- F. Auxiliary Equipment Power: A GFI service outlet shall be furnished inside the local processor's enclosure.

5.12 Field Processing Software: All field processing software described in this specification shall be furnished as part of the complete system.

- A. Operating System: Each local processor shall contain an operating system that controls and schedules that local processor's activities in real time. The local processor shall maintain a point database in its memory that includes all parameters, constraints, and the latest value or status of all points connected to that local processor. The execution of local processor application programs shall utilize the data in memory resident files. The operating system shall include a real time clock function that maintains the seconds, minutes, hours, date and month, including day of the week. Each local processor real time clock shall be automatically synchronized with the central station at least once per day to plus or minus 10 seconds (the time synchronization shall be accomplished automatically, without operator action and without requiring system shutdown).

- 1. Startup: The local processor shall have startup software that causes automatic commencement of operation without human intervention, including startup of all connected Input/Output functions. A local processor restart program based on detection of power failure at the local processor shall be included in the local processor software. The startup software shall initiate operation of self-test

- 2. Operating Mode: Each local processor shall control and monitor inputs and outputs as specified, independent of communications with the central station or designated workstations. Alarms, status changes and other data shall be transmitted to the central station or designated workstations when communications circuits are operable. If communications are not available, each local processor shall function in a stand-alone mode and operational data, including the status and alarm data normally transmitted to the central station or designated workstations shall be stored for later transmission to the central station or designated workstations. Storage for the latest 4000 events shall be provided at each local processor, as a minimum. Each local processor shall accept software downloaded from the central station. The panel shall support flash ROM technology to accomplish firmware downloads from a central location.

3. Failure Mode: Upon failure for any reason, each local processor shall perform an orderly shutdown and force all local processor outputs to a predetermined (failure mode) state, consistent with the failure modes shown and the associated control device.
- B. Functions: Provide software necessary to accomplish the following functions, as appropriate, fully implemented and operational, within each local processor:
1. Monitoring of inputs.
 2. Control of outputs.
 3. Reporting of alarms automatically to the central station.
 4. Reporting of sensor and output status to central station upon request.
 5. Maintenance of real time, automatically updated by the central station at least once a day.
 6. Communication with the central station.
 7. Execution of local processor resident programs.
 8. Diagnostics.
 9. Download and upload data to and from the central station.

5.13 Interior Sensors and Control Devices: Interior sensor housing shall provide protection against dust, falling dirt, and dripping non-corrosive liquids.

- A. Balanced Magnetic Switch (BMS): The BMS shall detect a ¼ inch of separating relative movement between the magnet and the switch housing. Upon detecting such movement, the BMS shall transmit an alarm signal to the alarm annunciation system.
1. BMS Subassemblies: The BMS shall consist of a switch assembly and an actuating magnet assembly. The switch mechanism shall be of the balanced magnetic type or triple-biased reeds to provide detection of tamper attempts. The switches shall provide supervision and pry timer capability. Each switch shall be provided with an over current protective device, rated to limit current to 80 percent of the switch capacity. Switches shall be rated for a minimum lifetime of 1,000,000 operations. The magnet assembly shall house the actuating magnet.

2. **Housing:** The housings of surface mounted switches and magnets shall be made of nonferrous metal and shall be weatherproof. The housings of recess mounted switches and magnets shall be made of nonferrous metal or plastic.
 3. **Remote Test:** A remote test capability shall be provided. The remote test shall be initiated when commanded by the alarm annunciation system. The remote test shall activate the sensor's switch mechanism causing an alarm signal to be transmitted to the alarm annunciation system. The remote test shall simulate the movement of the actuating magnet relative to the switch subassembly.
- B. **Access/Secure Switches:** An access/secure switch shall be used to place a protected zone in the ACCESS or SECURE mode. The switch shall consist of a double pull key-operated switch housed in a NEMA 12 equivalent enclosure. The switch shall disable zone sensor alarm outputs, but shall not disable tamper alarms, duress alarms, and other 24 hr. sensors.

5.14 Entry Control Devices:

- A. **Keypads:** Entry control keypads shall use a unique combination of alphanumeric and other symbols as an identifier. Keypads shall contain an integral alphanumeric/special symbols keyboard with symbols arranged in ascending ASCII code ordinal sequence. Communications protocol shall be compatible with the local processor.
1. **Keypad Display:** Keypads shall include an LED or other type of visual indicator display and provide visual status indications and user prompts. The display shall indicate power on/off, and whether user passage requests have been accepted or rejected. The design of the keypad display or keypad enclosure shall limit the maximum horizontal and vertical viewing angles of the keypad. The maximum horizontal viewing angle shall be plus and minus 5 degrees or less off a vertical plane perpendicular to the plane of the face of the keypad display. The maximum vertical viewing angle shall be plus and minus 15 degrees or less off a horizontal plane perpendicular to the plane of the face of the keypad display.
 2. **Keypad Response Time:** The keypad shall respond to passage requests by generating a signal to the local processor. The response time shall be 800 milliseconds or less from the time the last alphanumeric symbol is entered until a response signal is generated.

3. Keypad Power: The keypad shall be powered from the source as shown and shall not dissipate more than 150 Watts.
4. Keypad Mounting Method: Keypads shall be suitable for surface, semi-flush, pedestal, or weatherproof mounting as required.
5. Keypad Duress Codes: Keypads shall provide a means for users to indicate a duress situation by entering a special code.

B. Portal Control Devices:

1. Push-button Switches: Provide momentary contact, back lighted push buttons and stainless steel switch enclosures for each push button as shown. Switch enclosures shall be suitable for flush, or surface mounting as required. Push buttons shall be suitable for flush mount in the switch enclosures. The push button switches shall meet the requirements of NEMA 250 for the area in which they are to be installed. Where multiple push buttons are housed within a single switch enclosure, they shall be stacked vertically with each push button switch labeled with ¼ inch high text and symbols as required. The push button switches shall be connected to the local processor associated with the portal to which they are applied and shall operate the appropriate electric strike, electric bolt or other facility release device. The continuous current of the IDS circuit shall be no more than 50 percent of the continuous current rating of the device supplied. The push button switches shall have double-break silver contacts that will make 720 VA at 60 amperes and break 720 VA at 10 amperes.
2. Electric Door Strikes/Bolts: Electric door strikes/bolts shall be designed to remain secure in case of power failure. These facility interface devices shall use dc power to energize the solenoids. Electric strikes/bolts shall incorporate end of line resistors to facilitate line supervision by the system. If not incorporated into the electric strike or local controller, metal-oxide resistors (MOVs) shall be installed to protect the controller from reverse current surges. Electric strikes shall have a minimum forcing strength of 2300 lbs.
 - a. Solenoid: The actuating solenoid for the strikes/bolts furnished shall not dissipate more than 12 Watts and shall operate on 12 or 24 Volts dc. The inrush current shall not exceed 1 ampere and the holding current shall not be greater than 500 milliamperes. The actuating solenoid shall move from the fully secure to fully open positions in not more than 500 milliseconds.

- b. **Signal Switches:** The strikes/bolts shall include signal switches to indicate to the system when the bolt is not engaged or the strike mechanism is unlocked. The signal switches shall report a forced entry to the system.
- c. **Tamper Resistance:** The electric strike/bolt mechanism shall be encased in hardened guard barriers to deter forced entry.
- d. **Size and Weight:** Electric strikes/bolts shall be compatible with standard door frame preparations.
- e. **Mounting Method:** The electric door strikes/bolts shall be suitable for use with single and double door with mortise or rim type hardware as shown, and shall be compatible with right or left hand mounting.
- f. **Astragals:** Astragal lock guards shall be installed to prevent tampering with the latch bolt of the locking hardware or the latch bolt keeper of the electric strike. The astragals shall bolt through the door using tamper-resistant screws. The astragals shall be made of 1/8 inch thick brass and are 11-1/4 inch high by 1-5/8 inch wide, with a 5/32 inch wide offset, at a minimum.

5.15 **Entry Controls Software:**

- A. **Interface Device:** The entry control software shall control passage. The decision to grant or deny passage shall be based upon identifier data to be input at a specific location. If all conditions are met, a signal shall be sent to the input device location to activate the appropriate electric strike, bolt, electromagnetic lock or other type of portal release or facility interface device.
- B. **Operator Interface:** Entry control operation shall be entirely automatic under control of the central station and local processors except for simple operations required for map display, alarm acknowledgment, zone and portal status change operations, audible or visual alarm silencing and audio annunciation. The system shall immediately annunciate changes in zone and portal status. The alarm printer shall print a permanent record of each alarm and status change. The map displays or graphics screens shall display the current status of system zones and portals. The central station shall immediately display the current status of any zone or portal upon command. While the system is annunciating an unacknowledged zone or portal alarm, keyboard operations at the central station, other than alarm acknowledgment, shall not be possible. The system shall provide the capability to change zone and portal status from alarm (after alarm acknowledgment) or access to secure; from alarm (after alarm acknowledgment) or secure to access, or from

access to secure by simple control operations. If the operator attempts to change zone status to secure while there is an alarm output for that zone or portal, the system shall immediately annunciate an alarm for that zone or portal.

C. Entry Control Functions:

1. Multiple Security Levels: The system shall have multiple security levels. Each of the security levels shall be delineated by facility barriers. Access to each security level shall be through portals in the facility barriers using designated entry control procedures. The system shall provide at least 8 security levels. Any attempt to access an area beyond an individual's security level shall initiate an access denial alarm.
2. Immediate Access Change: The system shall provide functions to disenroll and deny access to an identifiers without consent of the individual or recovery of a credential. The design of the system shall provide entry change capability to system operators and managers with appropriate passwords at the system operator or enrollment consoles.

D. Electronic Entry Control system Capacities: The system shall be designed and configured to provide the following capacities:

1. Enrollees: The system shall be configured for 100 enrollees. The system shall provide a facility-tailorable reference file database containing personal, access authorization, identifier and verification data for each enrollee as required.
2. Transaction History file Size: The system capacity shall be at least the amount of transactions for the system during one (1) year without any loss of transaction data. Examples of transaction data that are to be retained are: each system alarm, event and status change including operator commands, and the time and date of each occurrence.

E. Entry Control System Alarms: The system shall annunciate an alarm when the following conditions occur. Alarms shall be annunciated at the console both audibly and visually. An alarm report shall also be printed on the system printer. The alarm annunciation shall continue until acknowledged by the system operator. Only one (1) control key shall be needed to acknowledge an alarm. The system shall control, monitor, differentiate, rank, annunciate, and allow operators to acknowledge, in real time, alarm signals generated by system equipment. The system shall also provide a means to define and customize the annunciation of each alarm type. The system shall use audio and visual information to

differentiate the various types of alarm, each alarm type shall be assigned an audio and a unique visual identifier.

1. Duress: The system shall annunciate a duress alarm when a duress code is entered at a keypad or a duress switch is activated. Duress alarms shall be annunciated in a manner that distinguishes them from all other system alarms. Duress alarms shall not be annunciated or otherwise indicated locally nor shall a duress alarm cause any special or unusual indications at the portal or area initiating the duress alarm. As an option through programming, individual privileges may have the ability to be carried out in the same as an authorized entry to the protected area. Duress alarms shall only be annunciated at the central station and remote displays. Alarms shall be annunciated on the monitor and shall be logged on the printer.
2. Entry Denial: The system shall annunciate an alarm when an attempt has been made to pass through a controlled portal and entry has been denied.
3. Portal Open: The system shall annunciate an alarm when an entry controlled portal has been open longer than a predefined time delay. The time delay shall be adjustable, under operator control, over a range of at least one (1) second to one (1) minute with a maximum resolution of one (1) second. The system shall have the capability of resetting the door condition based upon the door monitoring position switch indicating opening and then close.
4. Strike Not Secured: The system shall annunciate an alarm when the strike at an entry controlled portal has been left unsecured longer than a predefined time delay and generate an entry control alarm. The time delay shall be adjustable, under operator control, over a range of at least one (1) second to one (1) minute with a maximum resolution of one (1) second. The system shall have the capability of resetting the door condition based upon the door monitoring position switch indicating opening and then close.
5. Alarm Shunting/System Bypass: The system shall provide a means to ignore operator selected alarm types at operator selected portals in order to allow standard entry control procedures to be bypassed (shunted). Predefined alarm shunting shall only be available to system operators with the proper password. The system shall also provide for redefined alarm shunting based upon time zones. This capability shall only apply to the entry control alarm type.

- 5.16 Wire and Cable: Provide all wire and cable not indicated as GDOE furnished equipment. Wiring shall meet NFPA 70 standard.
- A. Above Ground Sensor Wiring: Sensor wiring shall be 20 AWG minimum, twisted and shielded, 2, 3, 4, or 6 pairs to match hardware. Multiconductor wire shall have an outer jacket of PVC.
 - B. Direct Burial Sensor Wiring: Not permitted.
 - C. Local Area Network (LAN) Cabling: LAN cabling shall be in accordance with TIA-568-C.1, category 5e.
 - D. Cable Construction: All cable components shall withstand the environment in which the cable is installed for a minimum of 20 years.
 - E. Power Line Surge Protection: Equipment connected to alternating current circuits shall be protected from power line surges. Equipment protection shall withstand surge test waveforms described in IEEE C62.41.1 and IEEE C62.41.2. Fuses shall not be used for surge protection.
 - F. Sensor Device Wiring and Communication Circuit Surge Protection: Inputs shall be protected against surges induced on device wiring. Outputs shall be protected against surges induced on control and device wiring installed outdoors and as shown. Communications equipment shall be protected against surges induced on any communications circuits. Cables and conductors, except fiber optics, which serve as communications circuits from console to field equipment, and between field equipment, shall have surge protection circuits installed at each end. Protection shall be furnished at equipment, and additional triple electrode gas surge protectors rated for the application on each wire line circuit shall be installed within 3 feet of the building cable entrance. Fuses shall not be used for surge protection. The inputs and outputs shall be tested in both normal mode and common mode using the following two waveforms:
 - 1. A 10-microsecond rise time by 1000 microsecond pulse width waveform with a peak voltage of 1500 Volts and a peak current of 60 amperes.
 - 2. An 8-microsecond rise time by 20-microsecond pulse width waveform with a peak voltage of 1000 Volts and a peak current of 500 amperes.
 - G. Power Line Conditioners: A power line conditioner shall be furnished for the console equipment. The power line conditioners shall be of the ferro-resonant design, with no moving parts and no tap switching, while electrically isolating the secondary from the power line side. The power line conditioners shall be sized for 125 percent of the actual connected KVA load. Characteristics of the power line conditioners shall be as follows:

- a. At 85 percent load, the output voltage shall not deviate by more than plus or minus 1 percent of nominal when the input voltage fluctuates between minus 20 percent to plus 10 percent of nominal.
 - b. During load changes of zero to full load, the output voltage shall not deviate by more than plus or minus 3 percent of nominal. Full correction of load switching disturbances shall be accomplished within five cycles. And 95 percent correction shall be accomplished within two cycles of the onset of the disturbance.
 - c. Total harmonic distortion shall not exceed 3.5 percent at full load.
- 5.17 Execution/Examination: Verify that site conditions are in agreement with the design package and report any changes in the site, or conditions that will affect performance of the system to the GDOE in a report as defined in paragraph Group II Technical Data Package. Do not take any corrective action without written permission from the GDOE.
- 5.18 General Requirements: Install all system components, including GDOE furnished equipment, and appurtenances in accordance with the manufacturer's instructions, IEEE C2 and as shown. Furnish necessary interconnections, services and adjustments required for a complete and operable system as specified and shown. Control signal, communications, and data transmission line grounding shall be installed as necessary to preclude ground loops, noise, and surges from adversely affecting system operation.
- A. Installation: Install the system in accordance with the standards for safety. NFPA 70, UL 681, UL 1037 and UL 1076, and the appropriate installation manual for each equipment type. Components within the system shall be configured with appropriate service points to pinpoint system trouble in less than twenty (20) minutes. Conduit shall be rigid galvanized steel or as shown and a minimum of ½ inch in diameter. DTS shall not be pulled into conduits or placed in raceways, compartments, outlet boxes, junction boxes, or similar fittings with other building wiring. Flexible cords or cord connections shall not be used to supply power to any components of the system, except where specifically noted.
 - B. Enclosure Penetrations: Enclosure penetrations shall be from the bottom unless the system design requires penetrations from other directions. Penetrations of interior enclosures involving transitions of conduit from interior to exterior, and penetrations on exterior enclosures shall be sealed with rubber silicone sealant to preclude the entry of water. The conduit riser shall terminate in a hot-dipped galvanized metal cable terminator. The terminator shall be filled with an approved sealant as recommended by the cable manufacturer, and in a manner that does not damage the cable.

- C. Cold Galvanizing: Field welds and/or brazing on factory galvanized boxes, enclosures, conduits, etc., shall be coated with a cold galvanized paint containing at least 95 percent zinc by weight.
- D. Installation Software: Load software as specified and required for an operational system including data bases and specified programs. Upon successful completion of the endurance test, provide original and backup copies on optical disk of all accepted software, including diagnostics.

5.19 System Startup: Satisfaction of the requirements below does not relieve the Bidder of responsibility for incorrect installations, defective equipment items, or collateral damage as a result of Bidder work/equipment. Do not apply power to the system until after:

- System equipment items and DTS have been set up in accordance with manufacturer's instructions.
- A visual inspection of the system has been conducted to ensure that defective equipment items have not been installed and that there are no loose connections.
- System wiring has been tested and verified as correctly connected.
- System grounding and transient protection systems have been verified as properly installed.
- Power supplies to be connected to the system have been verified as the correct voltage, phasing, and frequency.

5.20 Supplemental Bidder Quality Control: Provide the services of technical representatives who have working experience with all components and installation procedures of the installed system; and are approved by the Safety Administrator. These representatives shall be present on the job site during the preparatory and initial phases of quality control to provide technical assistance. The representative shall also be available on an as needed basis to provide assistance with follow-up phases of quality control. These technical representatives shall participate in the testing and validation for the system and shall provide certification that their respective system portions meet the contractual requirements.

5.21 Training:

- A. General: No less than thirty (30) days prior to scheduled training, deliver lesson plans and training manuals for the training phases, including type of training to be provided, and a list of reference material, for GDOE approval. Conduct training courses for designated personnel in the maintenance and operation of the system as specified. The training shall be oriented to the specific system being installed. Training manuals shall be delivered for each trainee with two (2) additional copies delivered for archiving at the project site. The manuals shall include an agenda, defined objectives for each lesson, and a detailed description of the subject matter for each lesson. An electronic copy of the manual shall be provided to the GDOE. Furnish audio-visual equipment and other training materials and supplies. Where the Bidder presents portions of the course by audio-visual material, copies of the audio-visual material shall be delivered to the GDOE either as a part of the printed training manuals or on the same media as that used during the training sessions. A training day is defined as eight (8) hours of classroom instruction, including two (2) 15-minute breaks and excluding lunchtime. Monday through Friday, during the daytime shift in effect at the training facility. For guidance in planning the required instruction, assume that attendees will have a high school education or equivalent and are familiar with Access Control System. Approval of the planned training schedule shall be obtained from the GDOE at least 30 days prior to the training.
- B. Operator's Training I: The first course shall be taught at the project site for a period of up to five (5) consecutive training days at least 3 months prior to the scheduled performance verification test. A maximum of 12 personnel shall attend this course. Upon completion of this course, each student, using appropriate documentation, shall be able to perform elementary operations with guidance and describe the general hardware architecture and functionality of the system. This course shall include:
- General System hardware architecture.
 - Functional operation of the system.
 - Operator commands.
 - Data base entry.
 - Reports generation.
 - Alarm reporting.
 - Diagnostics.

- C. Operator's Training II: The second course shall be taught at the project site for a period of up to five (5) consecutive training days during or after the Bidder's field testing, but before commencing the performance verification test. A maximum of 12 personnel shall attend the course. No part of the training given during this course will be counted toward completion of the performance verification test. The course shall include instruction on the specific hardware configuration of the installed system and specific instructions for operating the installed system. Upon completion of this course, each student shall be able to start the system, operate the system, recover the system after a failure, and describe the specific hardware architecture and operation of the system. Specific application of the results of this course should enable the students to proficiently monitor the alarm workstations during the performance e verification test.
- D. Operator's Training III: The third course shall be taught while the endurance test is in progress for a total of 16 hours of instruction per student, in time blocks of four (4) hours. A maximum of twelve (12) personnel shall attend the course. The schedule of instruction shall allow for each student to receive individual instruction for a 4-hour period in the morning (or afternoon) of the same weekday. Schedule the activities during this period so that the specified amount of time will be available during the endurance test for instructing the students. The course shall consist of hands-on-training under the constant monitoring of the instructor. The instructor shall be responsible for determining the appropriate password to be issued to the student commensurate with each student's acquired skills at the beginning of each of these individual training sessions. Upon completion of this course, the students shall be fully proficient in the operation of the system.
- E. System Manager Training: System managers shall be trained for at least three (3) consecutive days. The system manager training shall consist of the operator's training and the following:
1. Enrollment/deactivation.
 2. Assignments of identifier data.
 3. Assign operator password/levels.
 4. Change database configuration.
 5. System network configuration and management.
 6. Modify graphics.
 7. Print special or custom reports.

8. System backup.
 9. Any other functions necessary to manage the system.
- F. Maintenance Personnel Training: The system maintenance course shall be taught at the project site after completion of the endurance test for a period of five (5) training days. A maximum of five (5) personnel, designated by the GDOE, will attend the course. The training shall include:
1. Physical layout of each piece of hardware.
 2. Troubleshooting and diagnostics procedures.
 3. Component repair and/or replacement procedures.
 4. Maintenance procedures and schedules to include system testing after repair.
 5. Calibration procedures. Upon completion of this course, the students shall be fully proficient in the maintenance of the system.
 6. Review of site-specific drawing package, device location, communication, topology, and flow.

5.22 Testing:

- A. General Requirements for Testing: Provide personnel, equipment, instrumentation, and supplies necessary to perform site testing. The GDOE
- B. Contractor's Field Testing: Calibrate and test all equipment verify DTS operation, place the integrated system I service, and test the integrated system. Test installed ground rods as specified in IEEE 142. Deliver a report describing results of functional tests, diagnostics, and calibrations, including, written certification to the GDOE that the installed complete system has been calibrated, tested, and is ready to begin performance verification testing. It is recommended that the Bidder use the approved performance verification test as a guideline when the field test is conducted.
- C. Performance Verification Test: Demonstrate that the completed system complies with the contract requirements. Using approved test procedures, all physical and functional requirements of the project shall be demonstrated and shown. The performance verification test, as specified, shall not be started until after receipt by the Bidder of written permission from the GDOE, based on the Bidder's written report. The report shall include certification of successful based on the bidder's written report. The report shall include certification of successful

completion of testing as specified in paragraph Bidder's Field Testing and upon successful completion of training as specified. The GDOE may terminate testing at any time when the system fails to perform as specific. Upon termination of testing by the GDOE or by the Bidder, commence an assessment period as described for Endurance Testing Phase II. Upon successful completion of the performance verification test, deliver test reports and other documentation as specified to the GDOE prior to commencing the endurance test.

D. Endurance Test:

1. General: Demonstrate system reliability and operability at the specified throughput rates for each portal, and the Type I and Type II error rates specified for the completed system. Calculate false alarm rates and the system shall yield false alarm rates within the specified maximums at the specified probability of detection. The endurance test shall be conducted in phases as specified. The endurance test shall not be started until the GSOE notifies the Bidder, in writing, that the performance verification test is satisfactorily completed, training as specified has been completed, and correction of all outstanding deficiencies has been satisfactorily completed. Provide 1 operator to operate the system 24 hours per day, including weekends and holidays, during Phase I and Phase III endurance testing in addition to any GDOE personnel that may be made available. The GDOE may terminate testing at any time the system fails to perform as specified. Upon termination of testing by the GDOE or by the Bidder, commence an assessment period as described for Phase II. Verify the operation of each terminal device during the last day of the test. Upon successful completion of the endurance test deliver test reports and other documentation as specified to the GDOE prior to acceptance of the system.
2. Phase I testing: The test shall be conducted 24 hours per day for fifteen (15) consecutive calendar days, including holidays, and the system shall operate as specified. No repairs may be made during this phase of testing unless authorized by the GDOE in writing. If the system experiences no failures during Phase I testing, the Bidder may proceed directly to Phase III testing after receipt of written permission from the GDOE.
3. Phase II Assessment: After the conclusion of Phase I, identify all failures, determine causes of all failures, and deliver a written report to the GDOE. The report shall explain in detail the nature of each failure, corrective action taken, results of tests performed and shall recommend the point at which testing should be resumed. After delivering the written report, convene a test review meeting at the jobsite to present the results and recommendations to the GDOE. The meeting shall not be scheduled earlier than five (5) business days after receipt of the report by the GDOE. As a part of this test review meeting, demonstrate that all failures have been corrected by performing appropriate portions of the performance

4. verification test. Based on the Bidder's report and the test review meeting, the GDOE will determine the restart date, or may require that Phase I be repeated. If the retest is completed without any failures, the Bidder may proceed directly to Phase III testing after receipt of written permission from the GDOE.
5. Phase III Testing: The test shall be conducted 24 hours per day for fifteen (15) consecutive calendar days, including holidays, and the system shall operate as specified. Make no repairs during this phase of testing unless authorized by the GDOE in writing.
6. Phase IV Assessment: After the conclusion of Phase III, identify all failures, determine root causes of failures, repair failures, and deliver a written report to the GDOE. The report shall explain in detail the nature of each failure, corrective action taken, results of tests performed and shall recommend the point at which testing should be resumed. After delivering the written report, convene a test review meeting at the jobsite to present the results and recommendations to the GDOE. The meeting shall not be scheduled earlier than five (5) business days after receipt of the report by the GDOE. As a part of this test review meeting, demonstrate that all failures have been corrected by repeating appropriate portions of the performance verification test. Based on the Bidder's report and the test review meeting, the GDOE will determine the restart date, and may require that Phase III be repeated. Do not commence any required retesting until after receipt of written notification by GDOE. After the conclusion of any retesting which the GDOE may require, the Phase IV assessment shall be repeated as if Phase III had just been completed.
7. Exclusions: The Bidder will not be held responsible for failures in system performance resulting from the following:
 - An outage of the main power in excess of the capability of any backup power source, provided that the automatic initiation of all backup sources was accomplished and that automatic shutdown and restart of the Access Control System performed as specified.
 - Failure of a GDOE furnished communications circuit, provide that the failure was not due to Bidder furnished equipment, installation or software.

- Failure of existing GDOE owned equipment, provide that the failure was not due to Bidder furnished equipment, installation, or software.
- The occurrence of specified nuisance alarms.
- The occurrence of specified environmental alarms.

Part VI. Closed Circuit Television System (CCTV)

6.1 Standard Products Material and equipment shall be the standard products of a manufacturer regularly engaged in the manufacture of such products. Items of equipment shall essentially duplicate equipment that have been in satisfactory use at least 2 years prior to bid opening. Equipment shall be supported by successful bidder for a period of one (1) year from the time of acceptance by GDOE. Maximum response time for service shall be one (1) hour.

6.2 System Description:

- A. General: A closed circuit television system (CCTV) is required to provide security coverage for the exhibit areas, valuable storage areas and for the general monitoring of the daily operations of the facility and surrounding grounds. The CCTV system should be flexible, easily expandable and fully capable of providing real-time video. The system should be supported with Digital Video Manager (DVM) capability. Configure the system as described and shown. All television equipment shall conform to CEA 170 specifications. Include in the system all connectors, adaptors, and terminators, necessary to interconnect all equipment. Supply all cabling necessary to interconnect the closed circuit television (CCTV) equipment installed in the Security Center. Interface the CCTV system with the intrusion detection system (IDS) and access control system (ACS).
- B. Configuration: CCTV camera viewing angles and desired field of view will be coordinated with architectural and exhibit elements and with GDOE's operational staff. CCTV system configuration of ACS automatic alarm calls up and preset views shall provide system operators a live view of areas surrounding alarms.
- C. System Overall Reliability Requirement: Configure and install the system, including all components and appurtenances, to yield a mean time between failure (MTBF) of at least 10,000 hours.
- D. Power Line Surge Protection: Protect all equipment connected to AC power line surges. Equipment protection shall withstand surge test waveforms described in IEEE C62.41.1 and IEEE C62.41.2 Fuse shall not be used for surge protection.
- E. Video and Sync Signal Transmission Line Surge Protection: All cable, except fiber optic cable, used for sync or video signal transmission shall include protective devices to safeguard the CCTV equipment against surges. The surge suppression device shall not attenuate or reduce the video or sync signal under normal conditions. The surge suppression device shall be capable of dissipating not less than 1500 watts for 1 millisecond, and the response time from zero volts to clamping shall not be greater than 5 nanoseconds. Fuses shall not be used for surge protection.

- F. Control Line Surge Protection: All cables and conductors, except fiber optic cables, which serve as communication, control, or signal lines shall be protected against surges and shall have surge protection installed at each end. Protection shall be furnished at the equipment and additional triple electrode gas surge protectors rated for the application on each wireline circuit shall be installed within 3 feet of the building cable entrance. Fuses shall not be used for surge protection. Test the inputs and outputs in both normal mode and common mode using the following waveforms:
 - 1. A 10 microsecond rise time by 1000 microsecond pulse width waveform with a peak voltage of 1500 volts and a peak current of 60 amperes.
 - 2. An 8 microsecond rise time by 20 microsecond pulse width waveform with a peak voltage of 1000 volts and a peak current of 500 amperes.
- G. Power Line Conditioners: Furnish a power line conditioner for the security console CCTV equipment. The power line conditioner shall be sized for 125 percent of the actual connected KVA load.
- H. Video and Control Signal Data Transmission Media: Provide a video and data and control, Communications between servers, workstations, and cameras will utilize a dedicated local area network (LAN). All network-based cameras will be connected to the LAN using CAT 5e copper cabling at a minimum.
- I. Electrical Requirements: Fixed cameras will be supplied with power over the network using standard Power over Ethernet (PoE) technology. However, PTZ cameras, which typically require more power than PoE can provide, will require a separate power distribution system. Outdoor cameras will be powered using standard 120 VAC due to additional power requirements associated with heating/moisture control elements.
- J. Uninterrupted Power Supply: All electrical and electronic equipment in the console shall be powered from a UPS. The UPS shall be sized to provide at least 24 hours battery back-up in the event of primary failure. Batteries shall be sealed non-outgassing type.

6.3 Delivery of Technical Data and Computer Software:

- A. Group I Technical Data Package:

1. System Drawings: The data package shall include the following:
 - a. System block diagram.
 - b. CCTV system console installation, block diagrams, and wiring diagrams.
 - c. Security center CCTV equipment installation, interconnection with console equipment, block diagrams and wiring diagrams.
 - d. Remote control/monitoring station installation, interconnection to security center including block diagrams and wiring diagrams.
 - e. Camera wiring and installation drawings.
 - f. Pan/tilt mount wiring and installation drawings.
 - g. Interconnection with video signal transmission system, block diagrams and wiring diagrams.
 - h. Surge protection device installation.
 - i. Details of interconnection with Access Control System.
 - j. Camera viewing angles and field of view drawings coordinated with architectural and exhibit elements.
2. Manufacturers' Data: The data package shall include manufacturers' data for all materials and equipment and security center equipment provided under this specification.
3. System Description and Analyses: The data package shall include complete system descriptions, analyses and calculations used in sizing the equipment required by these specifications. Descriptions and calculations shall show how the equipment will operate as a system to meet the performance of this specification. The data package shall include the following:
 - a. Switcher matrix size.
 - b. Camera call-up response time.

- c. System start-up and shut-down operations.
 - d. Switcher programming instructions.
 - e. Switcher operating and maintenance instructions.
 - f. Manuals for CCTV equipment.
 - g. Data entry forms.
4. Software Data: The data package shall consist of descriptions of the operation and capability of system and application software as specified. Contractor shall provide required software licenses for all servers, workstations, cameras, storage devices.
5. Overall System Reliability Calculations: The data package shall include all manufacturers' reliability data and calculations required to show compliance with the specified reliability. The calculations shall be based on all CCTV equipment associated with one camera circuit and the console CCTV equipment, excluding the data transmission media (DTM).
6. Certifications: all specified manufacturer's certifications shall be included with the data package.
- B. Group II Technical Data Package: Verify that site conditions are in agreement with the design package. Submit to the GDOE a report documenting changes to the site, or conditions that affect performance of the system to be installed. For those changes or conditions which affect system installation or performance provide (with the report) specification sheets, or written functional requirements to support the findings, and a cost estimate to correct the deficiency. Do not correct any deficiency without written permission from the GDOE.
- C. Group III Technical Data Package: Prepare test procedures and reports for the pre-delivery test. Submit the pre-delivery test procedures, in Part 2, to the GDOE for approval. Schedule the pre-delivery test after receipt of written approval of the pre-delivery test procedures. The final pre-delivery test report shall be delivered after completion of the pre-delivery test.
- D. Group IV Technical Data Package: Prepare test procedures and reports for the performance verification test and the endurance test. Deliver the performance verification test and endurance test procedures to the GDOE for approval. Schedule the tests after receipt of written approval of the test procedures. Provide a report detailing the results of the field test and a video tape as specified in paragraph "Contractor's Field testing." The final performance verification and endurance test report shall be delivered after completion of the tests.

1. Operation and Maintenance Manuals: Provide 5 draft copies and an electronic copy of the operation and maintenance manuals, as specified for the Group V technical data package, shall be delivered to the GDOE prior to beginning the performance verification test for use during site testing.
 2. Training Documentation: Lesson plans and training manuals for the training phases, including type of training to be provided with a sample training report, and a list of reference material, shall be delivered for approval.
 3. Data Entry: Enter all data needed to make the system operational. Delivery the data to the GDOE on data entry forms, utilizing data from the contract documents, Bidder's field surveys, and all other pertinent information in the Bidder's possession required for complete installation of the data base. Identify and request from the GDOE, any additional data needed to provide a complete and operational CCTV system. The completed forms shall be delivered to the GDOE for review and approval at least 90 days prior to the Bidder's, scheduled need date.
 4. Graphics: Where graphics are required and are to be delivered with the system, create and install all graphics needed to make the system operational. Graphics shall have sufficient level of detail for the system operator to assess the alarm. Supply hard copy, color examples at least 8 by 10 inches in size, of each type of graphic to be used for the completed CCTV system. If the video switcher does not use a monitor for display of system information, provide examples of the video annotation used for camera identification. The graphics examples shall be delivered to the GDOE for review and approval at least 90 days prior to the Bidder's scheduled need date.
- E. Group V Technical Data Package: Final copies of each of the manufacturer's commercial manuals arranged as specified bound in hardback, loose-leaf 3-ring binders, shall be delivered to the GDOE within 30 days after completing the endurance test. The draft copy used during the site testing shall be updated prior to final delivery of the manuals. Each manual's contents shall be identified on the cover. The manual shall include names, addresses, and telephone numbers of each subcontractor installing equipment and systems, and nearest service representative for each item of equipment for each system. The manuals shall have a table of contents and tab sheets. Tab sheets shall be placed at the beginning of each chapter or section and at the beginning each appendix. The final copies delivered after completion of the endurance test shall include all modifications made during installation, checkout, and acceptance.

1. Functional Design Manual: The function design manual shall identify the operational requirements for the system and explain the theory of operation, design philosophy, and specific functions. A description of hardware and software functions, interfaces and requirements shall be included for all system operating modes.
2. Hardware Manual: A manual shall describe all equipment furnished, including:
 - a. General hardware description and specifications.
 - b. Installation and checkout procedures.
 - c. Equipment electrical schematics and layout drawings.
 - d. System schematics and wiring lists.
 - e. System setup procedures.
 - f. Manufacturer's repair parts list indicating sources of supply.
 - g. Interface definition.
3. Software Manual: The software manual shall describe the functions of all software, and shall include all other information necessary to enable proper loading, testing and operation, including:
 - a. Definitions of terms and functions.
 - b. Procedures for system boot-up.
 - c. Description of using the programs.
 - d. Description of required operational sequences.
 - e. Directory of all disk files.
 - f. Description of all communications protocols, including data formats, command characters, and a sample of each type of data transfer.

4. Operator's Manual: The operator's manual shall explain all procedures and instructions for operation of the system including:
 - a. Video switcher.
 - b. Video multiplexer.
 - c. Cameras and video recording equipment.
 - d. Use of the software.
 - e. Operator commands.
 - f. System start-up and shut-down procedures.
 - g. Recovery and restart procedures.

6.4 Submittals: The Security System Bidder's DOR – Designer of Record will review and approval submittals requiring special review in this section. Drawing and descriptive data shall be approved prior to procurement fabrication, and installation. A schedule of required submittals shall be prepared to be integrated with the overall construction management schedule to ensure adequate review and necessary corrective work before installation.

Submittals shall include wiring diagrams and installation details of equipment indicating proposed locations, layout and arrangement, control panels, accessories, piping, ductwork, and other items that must be shown to ensure a coordinated installation. Wiring diagrams shall identify circuit terminals and indicate the internal wiring for each item of equipment and the interconnection between each item of equipment. Drawings shall indicate adequate clearance for operation, maintenance, and replacement of operating equipment devices. Submittals shall include the nameplate data, size, and capacity. Submittals shall also include applicable federal, industry, and technical society publication references.

Bid Submittals shall include:

- Site Survey Report
- Shop Drawings:
 - Graphics
 - System Layout Plan

- Product Data:
CCTV Technical Data Packages
Training Documentation
Software Updates
Copies of the Audio-Visual Materials
- Test Reports:
Performance Verification Test
Endurance Test Procedures
Test Procedures and Reports
Original copies of all Test Data
Report describing All Results
- Certificates:
Supplemental Bidder Quality Control
Letter of Certification
- Manufacturer's Instructions:
Group V Technical Data Package
- Operation and Maintenance Data:
Operation and Maintenance Manuals Operator's Training
Report
- Closeout Submittals:
Data Entry

6.5 Quality assurance:

- A. Pre-delivery testing: Perform pre-delivery testing, and adjustment of the completed CCTV system. Provide all personnel, equipment, instrumentation, and supplies necessary to perform all testing. Written notification of planned testing shall be given to the GDOE at least 14 days prior to the test, and in no case shall notice be given until after the Bidder has received written approval of the specific test procedures.
- B. Test Procedures and Reports: Test procedures shall explain, in detail, step-by-step actions and expected results demonstrating compliance with the requirements of the specification. Test reports shall be used to document results of the tests. Reports shall be submitted to the GDOE within 7 days after completion of each test.
- C. Layout Drawings: Maintain a separate set of drawings, elementary diagrams and wiring diagrams of the CCTV system to be used for layout drawings. This set shall be accurately kept up to date with all changes and additions to the CCTV system and shall be delivered to the GDOE with the final endurance test report.

In addition to being complete and accurate, this set of drawings shall be kept neat and shall not be used for installation purposes. Upon completion of the final system drawings, a representative of the GDOE will review the final system work with the Bidder. If the final system work is not complete the Bidder will be so advised and shall complete the work as required. Final drawings submitted with the endurance test report shall be furnished drawings on mylar or vellum, and as AutoCAD files and a pdf file copy on optical disk.

6.6 Environmental Requirements:

- A. **Field Equipment:** The cameras and all other field equipment shall be rated for continuous operation under ambient environmental conditions of up to 20 degrees F using no auxiliary heating or cooling equipment. Equipment shall be rated for continuous operation under the ambient environmental temperature, humidity, wind loading, and vibration conditions specified or encountered for the installed location.
- B. **Security Center Equipment:** security Center and remote control/monitoring station equipment shall, unless designated otherwise, be rated for continuous operation under ambient environmental conditions of 60 to 85 degrees F and a relative humidity of 20 to 80 percent.
- C. **Existing Conditions:** Visit the site and verify that site conditions are in agreement with the design package. Report all changes to the site or conditions that will affect performance of the system to the GDOE in a report as defined in paragraph Group II Technical Data Package. Do not take any corrective action without written permission from the GDOE.

6.7 Maintenance and Service:

- A. **General Requirements:** Provide all required services, material and equipment necessary for the work to maintain the entire CCTV system in an operational state as specified for a period of 1 year after completion of the endurance test. Impacts on facility operations shall be minimized when performing scheduled adjustments or other unscheduled work.
- B. **Description of Work:** The adjustment and repair of the CCTV system includes all computer equipment, software updates, signal transmission equipment, and video equipment. Provide the manufacturer's required adjustments and all other work necessary.
- C. **Personnel:** Service personnel shall be qualified to accomplish all work promptly and satisfactorily. The GDOE shall be advised in writing of the name of the designated service representative, and of any changes in personnel.

- D. **Schedule of Work:** Perform two inspections at 6-month intervals or less. This work shall be performed during regular working hours, Monday through Friday, excluding legal holidays. These inspections shall include:
1. Visual checks and operational tests of the CPU, switcher, peripheral equipment, interface panels, recording devices, monitors, video equipment electrical and mechanical controls, and a check of the picture quality from each camera.
 2. Run system software and correct all diagnosed problems.
 3. Resolve any previous outstanding problems.
- 6.8 **Emergency Service:** The GDOE will initiate service calls when the CCTV system is not functioning properly. Qualified personnel shall be available to provide service to the complete CCTV system. The GDOE shall be furnished with a telephone number where the service supervisor can be reached at all times. Service personnel shall be at the site within 24 hours after receiving a request for service.
- 6.9 **Operation:** Performance of scheduled adjustments and repair shall verify operation of the CCTV system as demonstrated by the applicable portions of the performance verification test.
- 6.10 **Records and Logs:** Keep records and logs of each task in hard copy and electronic file format and organize cumulative records for each major component, and for the complete system chronologically. Maintain a continuous log for all devices containing calibration, repair, and programming data. Keep logs available for inspection on site, demonstrating that planned and systematic adjustments and repairs have been accomplished for the CCTV system.
- 6.11 **Work Requests:** Separately record each service call request, as received. The form shall include the serial number identifying the component involved, its location, date and time the call was received, nature of trouble, names of the service personnel assigned to the task, instructions describing what has to be done, the amount and nature of the materials to be used, the time and date work started, and the time and date of completion. Deliver a record of the work performed within 5 days after work is completed.
- 6.12 **System Modifications:** Make any recommendations for system modification in writing to the GDOE. No system modifications, including operating parameters and control settings, will be made without prior approval of the GDOE. Incorporate any modifications made to the systems into the operations and maintenance manuals, and other documentation affected.

- 6.13 Submit all software updates to the GDOE for approval. Upon GDOE approval, updates shall be accomplished in a timely manner, fully coordinated with the CCTV system operators, operation in the system verified, and incorporated into the operations and maintenance manuals, and software documentation. There shall be at least one scheduled update near the end of the first year's warranty period, at which time install and validate the latest released version of the manufacturer's software.
- 6.14 **Warranty:** Provide a two (2) year warranty for all parts and labor to include all software updates during the warranty period. The system shall be supported by service organizations in Guam in order to render satisfactory service to the equipment on a regular and emergency basis during the warranty period of the contract. Maximum response time for service shall be 1 hour.
- 6.15 **Maintenance Manual:** The maintenance manual shall describe maintenance for all equipment including inspection, periodic preventive maintenance fault diagnosis, and repair or replacement of defective components.
- 6.16 **Products: Materials and Equipment:** Provide system hardware and software components produced by Manufacturers regularly engaged in the production of CCTV equipment. Units of the same type of equipment shall be products of a single manufacturer. All material and equipment shall be new and currently in production. Each major component of equipment shall have the manufacturer's name and address, and the model and serial number in a conspicuous place. Equipment located at the security center or a remote control/monitoring station shall be rack mounted as shown. Both Television and Computing, devices shall comply with 47 CFR 15, Subpart B.
- A. **Fungus Treatment:** system components located in fungus growth inductive environments shall be completely treated for fungus resistance. Treating materials containing a mercury bearing fungicide shall not be used. Treating materials shall not increase the flammability of the component or surface being treated. Treating materials shall not cause skin irritation or other injury to personnel handling it during fabrication, transportation, operation, maintenance, or during the use of the finished items when used for the purpose intended.
- B. **Soldering:** All soldering shall be done in accordance with standard industry practices.
- 6.17 **Enclosures:** Provide metallic enclosures as needed for equipment not housed in racks or supplied with a housing. The enclosures shall be as specified or shown.
- A. **Interior:** Enclosures to house equipment in an interior environment shall meet the requirements of NEMA 250 Type 12.
- B. **Exposed-to-Weather:** Enclosures to house equipment in an outdoor environment shall meet the requirements of NEMA 250 Type 4X.

- C. Corrosion-resistant: Enclosures to house equipment in a corrosive environment shall meet the requirements of NEMA 250 Type 4X.
- 6.18 Tamper Provisions: Enclosures, cabinets, housings (other than environmental camera housings), boxes, raceways, conduits, and fittings of every description having hinged doors or removable covers, and which contain any part of the CCTV equipment or power supplies, shall be provided with cover operated, corrosion-resistant tamper switches, arranged to initiate an alarm signal when the door or cover is moved. Tamper switches shall be mechanically mounted to maximize the defeat time when enclosure covers are opened or removed. The enclosure and the tamper switch shall function together to not allow direct line of sight to any internal components and tampering with the switch or the circuits before the switch activates. Tamper switches shall be inaccessible until the switch is activated; have mounting hardware concealed so that the location of the switch cannot be observed from the exterior of the enclosure; be connected to circuits which are under electrical supervision at all times, irrespective of the protection mode in which the circuit is operating; shall be spring-loaded and held in the closed position by the door cover; and shall be wired so that they break the circuit when the door or cover is disturbed. Tamper switches on the doors which must be opened to make routine maintenance adjustments to the system and to service the power supplies shall be push/pull-set, automatic reset type.
- A. Enclosure Covers: Covers of pull and junction boxes provided to facilitate installation of the system need not be provided with tamper switches if they contain no splices or connections, but shall be protected by tack welding or brazing the covers in place. Zinc labels shall be affixed to such boxes indicating they contain no connections. These labels shall not indicate that the box is part of the security system.
 - B. Conduit-Enclosure Connections: All conduit-enclosure connections shall be protected by tack welding or brazing the conduit to the enclosure. Tack welding or brazing shall be done in addition to standard conduit-enclosure connection methods as described in NFPA 70.
- 6.19 System Integration: The CCTV system shall provide automatic, alarm actuated call-up of the camera associate with the alarm zone. Equipment shall be supplied with all adapters, terminators, cables, main frames, card cages, power supplies, rack mounts, and appurtenances as needed.
- 6.20 Solid State Cameras:
- A. High Resolution IP Camera: All electronic components and circuits shall be solid state. Signal-to-noise ratio shall not be less than 50 dB unweighted. The camera shall exhibit no geometric distortion. The lens mount shall be a C-mount, and the camera shall have a back focus adjustment. The camera shall operate up to 131 degrees F without auxiliary heating or cooling, and with no change in picture

quality or resolution. Camera types shall be digital and will include both fixed and pan/tilt/zoom (PTZ). All cameras will be network (IP) based, or have network encoders located near the cameras. Bidder shall coordinate with the GDOE to determine camera types desired. Fixed cameras will be supplied with power over the network using standard Power over Ethernet (PoE) technology. However, PTZ cameras, which typically require more Power than PoE can provide, will require a separate power distribution system. Outdoor cameras will be powered using standard 120 VAC connected to emergency power generators due to additional power requirements associated with heating/moisture control elements.

1. Solid State Image Array: The camera shall have a solid state array, and the picture produced by the camera shall be free of blemishes. The camera shall provide not less than 460 lines of horizontal resolution, and resolution shall not vary over the life of the camera. The imager shall have at least 768 horizontal x 494 vertical active picture elements.
2. Sensitivity: Camera shall provide full video output with the infrared cut-off filter installed, without camera automatic gain, and a scene reflectivity of 75 percent using an f/1.2 lens given a camera faceplate illumination at 3200K of 0.2 footcandle minimum.
3. Camera Synchronization: The camera shall have an input for external sync, and shall automatically switch over to internal sync if external sync is not present. The camera shall also have the capability of synchronization by line-locking to the AC power line frequency at the zero crossing point, and shall provide not less than plus or minus 90 degrees of vertical phase adjustment.
4. Connectors: Cameras with lenses having auto iris, manual iris, or zoom and focus functions shall be supplied with connectors and wiring as needed to operate the lens functions. Cameras with integral fiber optic video transmitters shall have straight-tip bayonet type fiber optic video output connectors. A connector shall be provided for external sync input.
5. Automatic Circuits: the camera shall have circuitry for through the lens (TTL) white balancing, fixed white balancing, and automatic gain control.

B. Dome Cameras:

1. Interior Dome Camera System: An interior dome cameras system shall be provided with integral camera installed and integrated into the dome housing. The camera shall meet the requirements of Paragraph: High resolution color IP Camera as shown or specified. The dome housing shall be nominally 6 inches and shall be furnished in a pendant mount or ceiling mount as shown. The lower dome shall be tinted acrylic and shall have a light attenuation factor of not more than 1 f-stop. The housing shall be equipped with integral pan/tilt complete with wiring, wiring harnesses, connectors, receiver/driver, pan/tilt control system, pre-position cards, or any other hardware and equipment as needed to provide a fully functional pan/tilt dome. The pan/tilt shall have heavy duty bearings and hardened steel gears. The pan/tilt shall be permanently lubricated. The motors shall be thermally or impedance protected against overload damage. Pan movement shall be 360 degrees and tilt movement shall not be less than plus and minus 90 degrees. Pan speed shall not be less than 20 degrees per second and tilt speed shall not be less than 10 degrees per second. There shall not be less than 64 preset positions, with positioning speeds of at least 360 degrees per second in the automatic mode, and not less than 120 degrees pre second in the manual positioning mode, with a positioning accuracy of plus or minus ½ degree. Each set of preset position data shall include auto focus, auto iris, pan, tilt, and zoom functions. The system shall be able to automatically scan between any two electronically-set limits, and shall be able to operate in the “tour” mode covering up to all presets in a user defined sequence. The dome system shall withstand temperature ranges up to 122 degrees f over a humidity range of 0 to 90 percent, non-condensing.
2. Exterior dome Camera system: An exterior dome camera system shall be provided with integral camera installed and integrated into the dome housing. The camera shall have a minimum horizontal resolution of 425 lines (color). The dome housing shall be nominally 6 inches and shall be furnished in a NENA 4 pendant mount, pole mount ceiling mount surface mount, or corner munt as shown. The housing shall be constructed to be dust and water tight, and fully operational in 100 percent condensing humidity. The housing shall be equipped with supplementary camera mounting blocks or supports as needed to position the specified camera and lens to maintain the proper optical centerline. All electrical and signal connections required for operation of the camera and lens shall be supplied. The housing shall protect the internal drives, positioners, and camera from the environment encountered for camera operation. The lower dome shall be tinted acrylic and shall have a light attenuation factor of not more than 1 f-stop. The housing shall be equipped with integral pan/tilt.

Complete with wiring, wiring harnesses, connectors, receiver/driver, pan/tilt control system, pre-position cards, or any other hardware and equipment as needed to provide a fully functional pan/tilt dome. The pan/tilt shall have heavy duty bearings and hardened steel gears. The pan/tilt shall be permanently lubricated. The motors shall be thermally or impedance protected against overload damage. Pan movement shall be 360 degrees and tilt movement shall not be less than plus and minus 90 degrees. Pan speed shall not be less than 20 degrees per second, and tilt speed shall not be less than 10 degrees per second. There shall not be less than 99 preset positions, with positioning speeds of at least 360 degrees per second in the automatic mode, and not less than 120 degrees per second in the manual positioning mode, with a positioning accuracy of plus or minus ½ degree. Each set of preset position data shall include auto focus, auto iris, pan, tilt, and zoom functions. The system shall be able to automatically scan between an two electronically-set limits, and shall be able to operate in the “tour” mode covering up to all presets in a user defined sequence. The dome system shall withstand temperature range up to 122 degrees F over a humidity range of 0 to 90 percent, non-condensing.

- 6.21 Camera Lenses: Camera lenses shall be all glass with coated optics. The lens mount shall be a C or CS mount, compatible with the cameras selected. The lens shall be supplied with the camera, and shall have a maximum f-stop opening of f/1.2 or the maximum available for the focal length specified. The lens shall be equipped with an auto-iris mechanism unless otherwise specified. Lenses having auto iris, manual iris, or zoom and focus functions shall be supplied with connectors, wiring, receiver/drivers, and controls as needed to operate the lens functions. Lenses shall have sufficient circle of illumination to cover the image sensor evenly. Lenses shall not be used on a camera with an image format larger than the lens is designed to cover. Lens focal lengths shall be as shown or specified in the manufacturer’s lens selection tables.
- 6.22 Camera Housing and Mounts: The camera and lens shall be enclosed in a tamper resistant housing as specified below. Any ancillary housing mounting hardware needed to install the housing at the camera location shall be provided as part of the housing. The camera and lens contained in a camera housing shall be installed on a camera support as shown. Any ancillary mounting hardware needed to install the support and to install the camera on the support shall be provided as part of the support. The camera support shall be capable of supporting the equipment to be mounted on it including wind and ice loading normally encountered at the site.
- A. Environmentally Sealed Camera Housing: The housing shall be designed to provide a condensation free environment for camera operation. The housing shall be constructed to be dust and water tight, and fully operational in 100 percent condensing humidity. The housing shall be purged of atmospheric air and

pressurized with dry nitrogen, shall be equipped with a fill valve, overpressure valve, and shall have a humidity indicator visible from the exterior. Housing shall not have a leak rate greater than 2 psi at sea level within a 90 day period. The housing shall be equipped with supplementary camera mounting blocks or supports as needed to position the specified camera and lens to maintain the proper optical centerline. All electrical and signal connections required for operation of the camera and lens shall be supplied. The housing shall provide the environment needed for camera operation, and shall keep the viewing window free of fog. The housing shall be equipped with a sunshield, and both the housing and the sunshield shall be white. A mounting bracket which can be adjusted to center the weight of the housing and camera assembly shall be provided as part of the housing.

- B. Indoor Camera Housing: The housing shall be designed to provide a tamper resistant enclosure for indoor camera operation. The housing shall be equipped with tamper proof latches, and shall be supplied with the proper mounting brackets for the specified camera and lens. The housing and appurtenances shall be a color that does not conflict with the building interior color scheme.
- C. Interior Mount: The camera mount shall be suitable for either wall or ceiling mounting and shall have an adjustable head for mounting the camera. The wall mount and head shall be constructed of aluminum or steel with a corrosion-resistant finish. The head shall be adjustable for 360 degrees of pan, and not less than 90 degrees of tilt.
- D. Low Profile Ceiling Mount: A tamperproof ceiling housing shall be provided for the camera. The housing shall be low profile and shall be suitable for replacement of 2 by 2 foot ceiling tiles. The housing shall be equipped with a camera mounting bracket and shall allow a 360 degree viewing setup.
- E. Interior Dome Housing: An interior dome housing shall be provided for each camera as shown. The dome housing shall be a pendant mount, pole mount, ceiling mount, surface mount, or corner mount as shown. The lower dome shall be black opaque acrylic and shall have a light attenuation factor of not more than 1 f-stop. The housing shall be equipped with integral pan/tilt complete with wiring, wiring harnesses, connectors, receiver/driver, pan/tilt control system, pre-position cards, or any other hardware and equipment as needed to provide a fully functional pan/tilt dome. The pan/tilt shall have heavy duty bearings and hardened steel gears. The pan/tilt shall be permanently lubricated. The motors shall be thermally or impedance protected against overload damage. Pan movement shall be 360 degrees and tilt movement shall not be less than plus and minus 90 degrees. Pan speed shall not be less than 20 degrees per second, and tilt speed shall not be less than 10 degrees per second.

- F. Exterior Dome Housing: An exterior dome housing shall be provided for each camera as shown. The dome housing shall be a pendant mount, pole mount, ceiling mount, surface mount, or corner mount as shown. The housing shall be constructed to be dust and water tight, and fully operational in 100 percent condensing humidity. The housing shall be purged of atmospheric air and pressurized with dry nitrogen, shall be equipped with a fill valve and overpressure valve, and shall have a pressure indicator visible from the exterior. The housing shall be equipped with supplementary camera mounting blocks or supports as needed to position the specified camera and lens to maintain the proper optical centerline. All electrical and signal connections required for operation of the camera and lens shall be supplied. The housing shall provide the environment needed for camera operation. The lower dome shall be black opaque acrylic and shall have a light attenuation factor of not more than 1 f-stop. The housing shall be equipped with integral pan/tilt complete with wiring, wiring harnesses, connectors, receiver/driver, pan/tilt control system, pre-position cards, or any other hardware and equipment as needed to provide a fully functional pan/tilt dome. The pan/tilt shall have heavy duty bearings and hardened steel gears. The pan/tilt shall be permanently lubricated. The motors shall be thermally or impedance protected against overload damage. Pan movement shall be 360 degrees and tilt movement shall not be less than plus and minus 90 degrees. Pan speed shall not be less than 20 degrees per second, and tilt speed shall not be less than 10 degrees per second.
- G. Exterior wall Mount: The exterior camera wall mount shall be 24 inches long, and shall have an adjustable head for mounting the camera. The wall mount and head shall be constructed of aluminum, stainless steel, or steel with a corrosion-resistant finish. The head shall be adjustable for not less than plus and minus 90 degrees of pan, and not less than plus and minus 45 degrees of tilt. If the bracket is to be used in conjunction with a pan/tilt the bracket shall be supplied without the adjustable mounting head and shall have a bolt hole pattern to match the pan/tilt base.
- H. Pan/Tilt Mount: The pan/tilt mount shall be capable of supporting the camera, lens and housing specified. If the pan/tilt is to be mounted outdoors, the pan/tilt shall be weatherproof, and sized to accommodate the camera, lens and housing weight plus maximum wind loading encountered at the installation site. The pan/tilt shall have heavy duty bearings, hardened steel gears externally adjustable limit stops for a pan and tilt, and mechanical, dynamic or friction brakes. Pa/tilt shall be permanently lubricated. The motors shall be thermally or impedance protected against overload damage. Pan movement shall not be less than 0 to 350 degrees tilt movement shall not be less than plus and minus 90 degrees. Pan speed shall not be less than 6 degrees per second, and tilt speed shall not be less than 3 degrees per second. The pan/tilt shall be supplied complete with wiring, wiring harnesses, connectors, receiver/driver, pan/tilt control system, pre-position

cards, or any other hardware and equipment as needed to provide a fully functional pan/tilt mount to fulfill the site design requirements.

6.23 Video Monitor:

- A. Video Monitor: All electronic components and circuits shall be solid state except for the picture tube. The monitor shall have a stabilized high voltage power supply, and regulated low voltage power supplies. The monitor shall have automatic frequency control (AFC) and horizontal resolution not less than 280 lines at the center of the picture tube. The video input shall allow switchable loop-through or 75 ohm termination. The monitor shall have circuitry for automatic degaussing. The monitor shall operate on 60 Hz AC power, and shall be capable of operating at a voltage of 105 to 130 Volts.
- B. Picture Tube: The monitor shall have a 20 inch picture tube measured diagonally.
- C. Configuration: The monitor shall be configured in a rack mount. The rack mount shall fit in a standard EIA 19 inch rack as described in ECA EIA/ECA 310. Monitors shall not interfere with each other when rack mounted or operated next to each other.
- D. Controls: Front panel controls shall be provided for power on/off, horizontal hold, vertical hold contrast, and brightness. The monitor shall have switchable DC restoration.
- E. Connectors for Video Monitor: Video signal input and output shall be by BNC connectors.

6.24 Video Switcher: The switcher shall conform to CEA 170 specifications, and shall be a vertical interval switcher. Electronic components, subassemblies, and circuits of the switcher shall be solid state. The switcher shall be microprocessor based and software programmable. The switcher shall be a modular system that shall allow for expansion or modification of inputs, outputs, alarm interfaces, and secondary control stations by addition of the appropriate modules. Switcher components shall operate on 120 volts 60 Hz AC power. The switcher central processor unit shall be capable of being interfaced facility security system for integrated operation and control. The video switcher central processing unit (CPU) shall have the capability of accepting time from a master clock supplied in ASCII format through a TIA-232 input. All components, modules, cables, power supplies, software, and other items needed for a complete and operable CCTV switching system shall be provided. Switcher equipment shall be rack mounted unless otherwise specified. Rack mount hardware shall be supplied to mount the switcher components in a standard 19 inch rack as described in ECA EIA/ECA 310.

- A. **Switcher Software:** The switcher shall be software programmable, and the software shall be supplied as part of the switcher. The software shall be installed in the switcher CPU, and shall be configured as required by the site design. Changes or alterations of features under software control shall be accomplished through software programming without changes in hardware or system configuration. The switcher shall retain the current program for at least 6 hours in the event of power loss, and shall not require reprogramming in order to restart the system.
- B. **Switcher Matrix:** The switcher shall be a programmable crosspoint switcher capable of switching any video input to any video output. The switcher to be installed at the site shall be configured to switch 16 cameras to 2 monitors, and shall have an expansion capability of not less than 10 percent.
- C. **Switcher Modular Expansion:** The switcher shall be expandable in minimum increments as specified below.
- D. **Input Module:** Hardware expansion modules shall be provided to expand the switcher matrix configuration in increments of at least 8 camera inputs.
- E. **Output Module:** Hardware expansion modules shall be provided to expand the switcher matrix configuration in increments of at least 4 video outputs.
- F. **Alarm Interface:** an alarm interface shall be furnished with the switcher. The interface shall be compatible with the IDS and ACS alarm annunciation system. The alarm interface shall monitor alarm closures for processing by the switcher CPU. Alarm inputs to the alarm interface shall be relay contact or through an ITA-232 interface. The alarm interface shall be modular and shall allow for system expansion. The alarm interface to be installed at the site shall be configured to handle alarm points, and shall have an expansion capability of not less than 10 percent. An output shall be provided to actuate a video recorder.
- G. **Switcher response Time and Alarm Processing:** The switcher response time shall not be greater than 200 milliseconds from the time the alarm is sensed at the switcher alarm interface, until the picture is displayed on the monitor. The switcher shall continue to process subsequent alarms and shall put them in a queue. The operator shall be able to view the alarms in queue by operating an alarm release function which switches the subsequent alarms to the monitor in the order of occurrence.
- H. **Control Keyboards:** control and programming keyboards shall be supplied for the video switcher at the security center. The control keyboard shall provide the interface between the operator and the CCTV system, and shall relay commands from the operator to the switcher CPU. The keyboard shall provide control of the

video switcher functions needed for operation and programming of the video switcher. Controls shall include, but not be limited to: programming the switcher, switcher control, lens function control, pan/tilt/zoom (PTZ) control, control of environmental housing accessories, and annotation programming. If the switcher CPU requires an additional text keyboard for system management functions, the keyboard shall be supplied as part of the video switcher.

- I. Accessory Control Equipment: The video switcher shall be equipped with signal distribution units, preposition cards, expansion units, cables, software or any other equipment needed to ensure that the CCTV system is complete and fully operational.
- J. Connectors for Video Switcher: Video signal input and output shall be by BNC connectors.
- K. Video Annotation: Video annotation equipment shall be provided for the video switcher. The annotation shall be alphanumeric and programmable for each video source. Annotation to be generated shall include, but not be limited to: individual video source identification number, time (hour, minute, second) in a 24 hour format, date (month, day, year), and a unique, user-defined title with at least 8 characters. The annotation shall be inserted onto the source video so that both shall appear on a monitor recording. The lines of annotation shall be movable for horizontal and vertical placement on the video picture. The annotation shall be automatically adjusted for date. Programmed annotation information shall be retained in memory for at least 4 hours in the event of power loss.

6.25 Video Multiplexer: The video multiplexer shall be a multi-channel record and playback system with the capability of color real time multi-screen viewing. Electronic components, sub-assemblies, and circuits of the multiplexer shall be solid state. The multiplexer, using time division multiplexing, shall permit up to 16 camera inputs to be recorded simultaneously. All 16 camera inputs shall be capable of being viewed on a video monitor either live or recorded. The multiplexer shall allow for viewing of either live video or input from the DVM (simplex Operation). The inputs shall be capable of simultaneous viewing on the monitor or full screen individually and in other multi-screen modes such as 2x2, 3x3, 4x4 or other configurations. The viewing format shall also permit 2x dynamic zoom capability, full screen. The multiplexer shall be compatible with EIA/NTSC video cameras. External camera synchronization shall not be required for proper operation of the video multiplexer. Control of all functions of the multiplexer shall be provided either by a full function keyboard or by pushbutton selection with on-screen menu driven set-up. The multiplexer shall retain the current program for a t least 6 hours in the event of power loss.

6.26 Digital Video Management (DVM): The DVM shall be specifically designed as a time lapse recorder for use in security systems. The DVM shall operate on 120 volts 60 Hz AC power. Resolution of the DVM in normal play mode shall not be less than 300 horizontal lines in color. Signal-to-noise ratio shall not be less than 40 dB. DVM

Recording Resolution (2CIF) with a minimum of 5 frames per second (FPS) and a real time event recording rate of no less than 15 FPS. Bidder shall coordinate with GDOE on final desired FPS for event recording. A 24 hour battery back-up shall be provided to protect time/date and programmed information. Quantity of Digital Video Managers (DVMs), servers, monitoring workstations, printers, shall be provided by Bidder and coordinated with GDOE. DVM shall provide adequate space for seven (7) days recording at a rate of 5 frames per second PLUS 10 percent expansion capability. DVM recording protocols will be coordinated with GDOE's operational staff.

- A. Recording and Playback: The DVM shall have a contact closure alarm signal input which shall automatically switch the recorder into standard play, record mode when an alarm is initiated. The DVM shall put a cue mark on the tape at the beginning of an alarm event recording. The alarm event record time shall be selectable for up to 3 minutes of automatic recording as a minimum. Playback functions shall include: alarm search, fast forward search, fast rewind search, rewind/fast forward, play, slow motion or step field/frame, and pause/still. The DVM shall provide connectors for alarm trigger signal input and output. All video signals will be recorded to a digital video manager (DVM) for a predetermined period of time no less than seven (7) days to be coordinated with the GDOE's operational staff. System shall have the capability to have recordings archived to permanent media. Depending on the GDOE's policy, recording may also be completely erased from the system. Bidder shall coordinate with GDOE for archiving policy. DVM recording protocols will be coordinated with GDOE's operational staff.

6.27 Video Signal Equipment: The following video signal equipment shall conform to CEA 170. Electrically powered equipment shall operate on 120 Volts 60 Hz AC power. All video signal inputs and outputs shall be by BNC connectors.

- A. Ground Loop Corrector: The ground loop corrector shall eliminate the measured ground loop interference (common mode voltage) in wireline or coaxial video transmission lines. The ground loop corrector shall pass the full transmitted video bandwidth with no signal attenuation or loss. Clamping ground loop correctors shall be capable of rejecting at least an 8 volt peak-to-peak 60 Hz common mode signal. Ground isolation transformers shall be capable of rejecting at least a 10 volt peak-to-peak 60 Hz common mode signal. Ground isolation amplifiers shall be capable of rejecting at least a 30 volt peak-to-peak 60 Hz common mode signal. Differential ground loop correctors shall be capable of rejecting at least a 100 volt peak-to-peak 60 Hz common mode signal.
- B. Video Loss/Presence Detector: the video loss/presence detector shall monitor video transmission lines for presence of the video signal. The detector shall announce an alarm when the video signal drops below a pre-set threshold level. A threshold level adjustment shall be provided for each video channel and the threshold level shall be continuously adjustable through a lockable front panel control. A front panel reset control shall be provided for each video channel,

which shall reset the detector after an alarm. The video loss alarm shall be annunciated through a front panel LED and a contact closure as a minimum. Video input shall be loop-through, and the video shall be unaffected when the detector is turned off. The detector shall not attenuate or reduce the level of the video signal passing through it.

- C. **Video Equalizing Amplifier:** The video equalizing amplifier shall be designed to correct loss in video signal level and high frequency attenuation caused by long distance video signal transmission over wireline DTM. The amplifier shall have independent signal gain and equalization controls. The amplifier shall be capable of equalizing at least 3000 feet of RG-11/U coaxial cable conforming to paragraph CCTV Equipment Video Signal Wiring. The amplifier shall provide a minimum of plus or minus 6 dB of video gain and 12 dB of high frequency compensation. At least one video output shall be provided for each video input. Bandwidth shall be 10 MHz or greater, and frequency response to 8 MHz shall be plus or minus 1 dB or less. Hum and noise shall be 50 dB below 1 volt peak-to-peak or better. Video inputs shall be 75 ohm unbalanced, terminating, differential grounded. Video outputs shall be 75 ohm, differential, source terminated, 1 volt peak-to-peak. Output isolation shall be 40 dB or greater at 5 MHz.
- D. **Video Distribution Amplifier:** The video distribution amplifier shall be designed to distribute a single, 75 ohm, unbalanced video input signal to a minimum of 4, 75 ohm, source terminated video outputs. The distribution amplifier shall have not less than plus or minus 3 dB of gain adjustment for the video output. Output isolation shall be 40 dB or greater at 5 MHz. Bandwidth shall be 10 MHz or greater, and frequency response to 8 MHz shall be plus or minus 0.5 dB or less. Hum and noise shall be 55 dB below 1 volt peak-to-peak or better.
- E. **Master Video Sync Generator:** The master video sync generator shall generate horizontal drive, vertical drive, blanking, and sync signals as a minimum, with at least one 75 ohm output provided for each signal. The master oscillator crystal shall be pre-aged, and temperature stabilized, ovenized or temperature compensated. The sync generator shall have a composite video input and shall lock to the incoming video signal. If no video is present at the video input, the sync generator shall switch to internal crystal control. Not less than 2.5 microseconds advance and 2.5 microseconds delay of horizontal phase shall be provided. Vertical blanking width adjustment shall be provided. Vertical blanking width adjustment shall have a minimum selection range of 19, 20, and 21 lines.
- F. **Video Sync Distribution Amplifier:** The sync distribution amplifier shall be a regenerative amplifier designed to distribute a sync signal input to not less than 6, 75 ohm outputs. Output level shall remain constant and shall not be affected by input level variation. Output isolation shall be greater than 35 dB at 5 MHz. A high impedance loop through shall be provide in addition to the 6 outputs. The distribution amplifier shall have continuously variable delay range of at least 250

nanoseconds to 2.2 microseconds. The delay shall be adjustable through a front panel control.

- 6.28 Accessories: standard 19 inch electronic rack cabinets conforming to ECA EIA/ECA 310 shall be provided for the CCTV system at the security center and remote control/monitoring sites as shown.
- 6.29 Wire and Cable: Provide all wire and cable not indicated as GDOE Furnished Equipment. All wire and cable components shall be able to withstand the environment the wire or cable is installed in for a minimum of 20 years.
- A. Low Voltage Control Wiring: Twisted pair low voltage control wiring shall be provided. Plenum or riser cables shall be IEEE C2 CL2P certified.
 - B. Digital Data Interconnection Wiring: Interconnecting cables carrying digital data between equipment located at the security center shall be not less than 20 AWG and shall be stranded copper wire for each conductor. The cable or each individual conductor within the cable shall have a shield that provides 100 percent coverage. Cables with a single overall shield shall have a tinned copper shield drain wire. Plenum or riser cables shall be IEEE C2 CL2P certified.
- 6.30 Pre-Delivery Testing:
- A. General: Assemble the test CCTV system as specified, and perform tests to demonstrate that the performance of the system complies with the contract requirements in accordance with the approved pre-delivery test procedures. The tests shall take place during regular daytime working hours on weekdays. Model numbers of equipment tested shall be identical to those to be delivered to the site. Original copies of all data produced during pre-delivery testing, including results of each test procedure, shall be delivered to the GDOE at the conclusion of pre-delivery testing prior to GDOE approval of the test. The test report shall be arranged so that all commands, stimuli, and responses are correlated to allow logical interpretation.
 - B. Test Setup: Provide the equipment needed for the test setup and configure it to provide alarm actuated camera call-up and alarm recording as required to emulate the installed system. The test setup shall consist of at least 4 complete camera circuits. The alarm signal input to the CCTV test setup shall be by the same method that is used in the installed system. The video switcher shall be capable of switching any camera to any monitor and any combination of cameras to any combination of monitors. The minimum test setup shall include.
 - 1. Four video cameras and lenses, including dome cameras if required for the installed system.

2. Video monitors.
3. Digital Video Manager.
4. Video switcher including video input modules, video output modules, and control and applications software.
5. Alarm input panel if required for the installed system.
6. Pan/tilt mount and pan/tilt controller.
7. Any ancillary equipment associated with a camera circuit such as equalizing amplifiers, video loss/presence detectors, terminators, ground loop correctors, surge protectors. Or other in-line video devices.
8. Cabling for all components.

6.31 Execution:

- A. Installation: Install all system components and appurtenances in accordance with the manufacturer's instructions sand IEED C2, and furnish all necessary connectors, terminators, interconnections, services, and adjustments required for a complete and operable system. DTM shall not be pulled into conduits or placed in raceways, compartments, outlet boxes, junction boxes, or similar fittings with other building wiring. All other electrical work shall be as specified in the above sections including grounding to preclude ground loops, noise, and surges from adversely affecting system operation. Cameras, peripherals, servers and system software will be installed and maintained by an authorized vendor or contractor that is certified in the installation and maintenance of the CCTV equipment.
- B. Existing Equipment: Connect to and utilize existing video equipment, video and control signal transmission lines, and devices as shown. Video equipment and signal lines that are usable in their original configuration without modification may be used with GDOE approval. Perform a field survey, including testing and inspection of all existing video equipment and signal lines intended to be incorporated into the CCTV system, and submit a report to the GDOE as part of the site survey report defined in paragraph "Group II Technical Data Package." For those items considered nonfunctioning, provide (with the report) specification sheets, or written functional requirements to support the findings and the estimated cost to correct the deficiency. As part of the report, include the scheduled need date for connection to all existing equipment. Make written

requests and obtain approval prior to disconnecting any signal lines and equipment, and creating equipment downtime. Such work shall proceed only after receiving GDOE approval of these requests. If any device fails after the Bidder has commenced work on that device, signal or control line, diagnose the failure and perform any necessary corrections to the equipment. The GDOE is responsible for maintenance and repair of GDOE equipment. The Bidder will be held responsible for repair costs due to Bidder negligence or abuse of GDOE equipment.

- C. Enclosure Penetrations: All enclosure penetrations shall be from the bottom unless the system design requires penetrations from other directions. Penetrations of interior enclosures involving transitions of conduit from interior to exterior, and all penetrations on exterior enclosures involving transitions of conduit from interior to exterior, and all penetrations on exterior enclosures shall be sealed with rubber silicone sealant to preclude the entry of water. The conduit riser shall terminate in a hot-dipped galvanized metal cable terminator. The terminator shall be filled with an approved sealant as recommended by the cable manufacturer and in such a manner that the cable is not damaged.
- D. Cold Galvanizing: All field welds and brazing on factory galvanized boxes, enclosures, and conduits shall be coated with a cold galvanized paint containing at least 95 percent zinc by weight.
- E. Interconnection of Console Video Equipment: Connect signal paths between video equipment with RG-6/U coaxial cable. Cables shall be as short as practicable for each signal path without causing strain at the connectors. Rack mounted equipment on slide mounts shall have cables of sufficient length to allow full extension of the slide rails from the rack.
- F. Cameras: Install the cameras with the proper focal length lens as determined for each zone; connect power and signal lines to the camera; set cameras with fixed iris lenses to the proper f-stop to give full video level; aim camera to give field of view as needed to cover the alarm zone; aim fixed mount cameras installed outdoors facing the rising or setting sun sufficiently below the horizon to preclude the camera looking directly at the sun; focus the lens to give a sharp picture over the entire field of view; and synchronize all cameras so the picture does not roll on the monitor when cameras are selected. Dome cameras shall have all preset positions defined and installed.
- G. Monitors: Install the monitors as shown and specified; connect all signal inputs and outputs as shown and specified; terminate video input signals as required; and connect the monitor to AC power.

- H. Switcher: Install the switcher according to manufacturer's instructions; connect all subassemblies as specified by the manufacturer and as shown; connect video signal inputs and outputs as shown and specified; terminate video inputs as required; connect alarm signal inputs and outputs as shown and specified; connect control signal inputs and outputs for ancillary equipment or secondary control/monitoring sites as specified by the manufacturer and as shown; connect the switcher CPU and switcher subassemblies to AC power; load all software as specified and required for an operational CCTV system configured for the site requirements, including data bases, operational parameters, and system, command, and application programs; provide the original and 2 backup copies for all accepted software upon successful completion of the endurance test; and program the video annotation for each camera.
- I. Video Recording Equipment: Install the video recording equipment as shown and as specified by the manufacturer; connect video signal inputs and outputs as shown and specified; connect alarm signal inputs and outputs as shown and specified; and connect video recording equipment to AC power.
- J. Video Signal Equipment: Install the video signal equipment as specified by the manufacturer and as shown; connect video or signal inputs and outputs as shown and specified; terminate video inputs as required; connect alarm signal inputs and outputs as required; connect control signal inputs and outputs as required; and connect electrically powered equipment to AC power.
- K. Camera Housings, Mounts, and Polls: Install the camera housings and mounts as specified by the manufacturer and as shown, provide mounting hardware sized appropriately to secure each camera, housing and mount with maximum wind loading encountered at the site; provide a foundation for each camera pole as specified and shown; provide a ground rod for each camera pole and connect the camera pole to the ground rod; provide electrical and signal transmission cabling to the mount location; connect signal lines and AC power to mount interfaces; and connect pole wiring harness to camera.

6.33 System Startup: Do not apply power to the CCTV system until the following items have been completed:

- A. CCTV system equipment items and DTM have been set up in accordance with manufacturer's instructions.
- B. A visual inspection of the CCTV system has been conducted to ensure that defective equipment items have not been installed and that there are no loose connections.

- C. System wiring has been tested and verified as correctly connected as indicated.
- D. All system grounding and transient protection systems have been verified as properly installed and connected as indicated.
- E. Power supplies to be connected to the CCTV system have been verified as the correct voltage, phasing, and frequency as indicated.
- F. Satisfaction of the above requirements shall not relieve the Bidder of responsibility for incorrect installation, defective equipment items, or collateral damage as a result of Bidder work/equipment.

6.34 Training:

- A. General: Conduct training courses for designated personnel in the maintenance and operation of the CCTV system as specified. The training shall be oriented to the specific system being installed under this contract. Training manuals shall be delivered for each trainee with two additional manuals delivered for archiving at the project site. The manuals shall include an agenda, defined objectives for each lesson, and a detailed description of the subject matter for each lesson. The Bidder is responsible for furnishing all audio-visual equipment and all other training materials and supplies. Where the Bidder presents portions of the course through the use of audio-visual material, copies of the audio-visual materials shall be delivered to the GDOE, either as a part of the printed training manuals or on the same media as that used during the training sessions. A training day is 8 hours of instruction, including two 15 minutes breaks and excluding lunchtime, Monday through Friday, during the daytime shift in effect at the facility. For guidance in planning the required instruction, assume the attendees will have a high school education or equivalent. Approval of the planned training schedule shall be obtained from the GDOE at least 30 days prior to the training.
- B. Operator's Training: The course shall be taught at the project site for five consecutive training days during or after the Bidder's filed testing. A maximum of 12 personnel will attend the course. No part of the training given during this course will be counted toward completion of the performance verification test. The course shall consist of classroom instruction, hands-on-training, instruction on the specific hardware configuration of the installed system, and specific instructions for operating the installed system. The course shall demonstrate system start up, system, operation, system shutdown, system recovery after a failure, the specific hardware configuration, and regarding operation of the installed CCRV system. Prepare and insert additional training material in the training manuals when the need for additional material becomes apparent during instruction. Prepare a written Operator's Training Report after the completion of the course. List in the report each student at the end of this course. Submit the report before the end of the performance verification test. The course shall include:

1. General CCTV hardware, installed system architecture and configuration.
2. Functional operation of the installed system and software.
3. Operator commands.
4. Alarm interfaces.
5. Alarm reporting.
6. Fault diagnostics and correction.
7. General system maintenance.
8. Replacement of failed components and integration of replacement components into the operating CCTV system.

6.35 Site Testing:

- A. General: Provide all personnel, equipment, instrumentation, and supplies necessary to perform all site testing. The GDOE will witness all performance verification and endurance testing. Written permission shall be obtained from the GDOE before proceeding with the next phase of testing. Original copies of all test data produced during performance verification and endurance testing shall be turned over to the GDOE at the conclusion of each phase of testing prior to GDOE approval of the test.
- B. Contractor's Field Testing: Calibrate and test all equipment, verify DTM operation, place the integrated system in service, and test the integrated system. Submit a report describing all results of functional tests, diagnostics, and calibrations including written certification to the GDOE that the installed complete system has been calibrated, tested, and is ready to begin performance verification testing. The report shall also include a copy of the approved performance verification test procedure. In addition, make a master DVD recording showing typical day and night views of each camera in the system and shall deliver the tape with the report. Note any objects in the field of view that might produce highlights that could cause camera blinding. Note any objects in the field of view or anomalies in the terrain which may cause blind spots. Note if a camera cannot be aimed to cover the zone and exclude the rising or setting sun from the picture. Note night assessment capabilities and whether lights or vehicle headlights cause blooming or picture degradation. If any of the above conditions or other conditions exist that cause picture degradation or interfere with the camera field of view, inform the GDOE. The DVD shall be recorded using the DVM installed as part of the CCRV system. Provide the GDOE with the original

DVD as part of the documentation of the system and submit a letter of certification stating that the CCTV system is ready for performance verification testing. The field testing shall, as a minimum, include:

1. Verification that the video transmission system and any signal or control cabling have been installed, tested, and approved as specified.
2. When the system includes remote control/monitoring stations or remote switch panels, verification that the remote devices are functional, communicate with the security center, and perform all functions as specified.
3. Verification that the switcher is fully functional and that the switcher software has been programmed as needed for the site configuration.
4. Verification that switcher software is functioning correctly. All software functions shall be exercised.
5. Verification that video multiplexers are functioning correctly.
6. Operation of all electrical and mechanical switcher controls and verification that the control performs the designed function.
7. Verification that all video sources and video outputs provide a full bandwidth signal that complies with CEA 170 at all video inputs.
8. Verification that all video signals are terminated properly.
9. Verification that all cameras are aimed and focused properly. Conduct a walk test of the area covered by each camera to verify the field of view.
10. Verification that cameras facing the direction of rising or setting sun are aimed sufficiently below the horizon so that the camera does not view the sun directly.
11. If vehicles are used in proximity of the assessment areas, verification of night assessment capabilities and determination if headlights cause blooming or picture degradation.
12. Verification that all cameras are synchronized and that the picture does not roll when cameras are switched.
13. Verification that the alarm interface to the IDS and ACS is functional and that automatic camera call-up is functional with appropriate video annotation for all designated IDS and ACS alarm points and cameras.

14. When pan/tilt mounts are used in the system, verification that the limit stops have been set correctly. Verification of all controls for pan/tilt or zoom mechanisms are operative and that the controls perform the desired function. If preposition controls are used, verification that all home positions have been set correctly, and have been tested for auto home functions and correct home position.
 15. When dome camera mounts are used in the system, verify that all preset positions are correct and that the dome also operates correctly in a manual control mode.
- C. Performance Verification Test: Demonstrate that the completed CCTV system complies with the bid requirements. Using approved test procedures, all physical and functional requirements of the project shall be demonstrated and shown. The performance verification test, as specified, shall not be started until receipt by the Bidder of written permission for the GDOE, based on the Bidder's written report. This shall include certification of successful completion of Bidder Field Testing as specified in paragraph "Bidder's Field Testing," and upon successful completion of training as specified. The GDOE may terminate testing at any time when the system fails to perform as specified. Upon termination of testing by the GDOE or by the Bidder, commence an assessment period as described for Endurance Testing Phase II. Upon successful completion of the performance verification test, deliver test reports and other documentation as specified to the GDOE prior to commencing the endurance test.
- D. Endurance Test:
1. Demonstrate the specified requirements of the completed system. The endurance test shall be conducted in phases as specified. The endurance test shall not be started until the GDOE notifies the Bidder, in writing, that the performance verification test is satisfactorily completed, training as specified has been completed, and correction of all outstanding deficiencies has been satisfactorily completed. If the CCTV system is being installed in conjunction with an ESS, the CCTV performance verification test shall be run simultaneously with the ESS performance verification test. Provide one operator to operate the system 234 hours per day, including weekends and holidays, during Phase I and Phase III endurance testing, in addition to any GDOE personnel that may be made available. The GDOE may terminate testing at any time the system fails to perform as specified. Upon termination of testing by the GDOE or by the Bidder, commence an assessment period as described for Phase II. During the last day of the test verify the operation of each camera. Upon successful completion of the endurance test, deliver test reports and other documentation as specified to the GDOE prior to acceptance of the system.

2. Phase I (Testing): The test shall be conducted 24 hours per day for 15 consecutive calendar days, including holidays, and the system shall operate as specified. Make no repairs during this phase of testing unless authorized by the GDOE in writing. If the system experiences no failures during Phase I testing, the Bidder may proceed directly to Phase III testing after receipt of written permission for the GDOE.
3. Phase II (Assessment): After the conclusion of Phase I, identify all failures, determine causes of all failures, repair all failures, and deliver a written report to the GDOE. The report shall explain in detail the nature of each failure, corrective action taken, results of tests performed, and shall recommend the point at which testing should be resumed. After delivering the written report, convene a test review meeting at the job site to present the results and recommendations to the GDOE. The meeting shall not be scheduled earlier than 5 business days after receipt of the report by the GDOE. As a part of this test review meeting, demonstrate that all failures have been corrected by performing appropriate portions of the performance verification test. Based on the Bidder's report and the test review meeting, the GDOE will determine the restart date, or may require that Phase I be repeated. If the retest is completed without any failures, the Bidder may proceed directly to Phase II testing after receipt of written permission from the GDOE.
4. Phase III (Testing): The test shall be conducted 24 hours per day for 15 consecutive calendar days, including holidays, and the system shall operate as specified. Make no repairs during this phase of testing unless authorized by the GDOE in writing.
5. Phase IV (Assessment): After the conclusion of Phase III, identify all failures, determine causes of all failures, repair all failures, and deliver a written report to the GDOE. The report shall explain in detail the nature of each failure, corrective action taken, results of tests performed, and shall recommend the point at which testing should be resumed. After delivering the written report, convene a test review meeting at the job site to present the results and recommendations to the GDOE. The meeting shall not be scheduled earlier than 5 business days after receipt of the report by the GDOE. As a part of this test review meeting, demonstrate that all failures have been corrected by repeating appropriate portions of the performance verification test. Based on the Bidder's report and the test review meeting, the GDOE will determine the restart date, and may require that Phase III be repeated. Do not commence any required retesting until after receipt of written notification by GDOE. After the conclusion of any retesting which the GDOE may require, the Phase IV assessment shall be repeated as if Phase III had just been completed.

6. Exclusions: The Bidder will not be held responsible for failures resulting from the following:
- a. An outage of the main power supply in excess of the capability of any backup power source, provided that the automatic initiation of all backup sources was accomplished.
 - b. Failure of GDOE furnished DTM circuit, provided that the failure was not due to Bidder furnished equipment, installation, or software.
 - c. Failure of existing GDOE owned equipment, provided that the failure was not due to Bidder furnished equipment, installation, or software.

Secure Our Schools Act
Site Surveys

*Motion Detectors
Cameras*

School	Main Office	Library	Cafeteria	Gym	Other	Gen Rm		Total # MD	Total # 360 Cams	Secure Room
Jose Rios Middle	1	2	4	4				11		Main Ofc
Southern High	3	4	5	6	8			26		Main Ofc
HS Truman Elementary	3		4		3	1		11		Main Ofc
JP Torres Alternative	2	2	4		2			10		Main Ofc
Marcial Sablan Elementary	6		3		3			12		Library
Oceanview Middle	6	2	4	4				16		Main Ofc
Merizo Elementary		2	4			1		7		Main Ofc
MU Lujan Elementary	3	2	5		10	1		21		Library
Talofof Elementary	2	2	3		6	1		14		Rm 4
Inarajan Middle	4		5			1		10		Library
Inarajan Elementary	2	2	4					8		
Ordot/Chalan Pago Elem.	3	2	5			1		11		Main Ofc
Aqueda Johnston Middle	3	2	5	3	8			21		
CL Taitano Elementary	3		4					7		Main Ofc
Agana Hts. Elementary	4		4		5			13		Library
JQ San Miguel Elementary		4	4		7			15		Main Ofc
Carbullido Elementary	4		4		3	1		12		Main Ofc
PC Lujan Elementary			5		2			7		Main Ofc
Price Elementary	3	2	6		5			16		Main Ofc
Untalan Middle	3	2	2	6	8			21		Main Ofc
GWHS	4	4	5	4	12	1		30	3	Main Ofc
JM Guerrero Elementary	3	3	6			1		13	2	
Liguan Elementary								0		IAS
Wettengel Elementary	2		5		12	1		20	3	Library
V Benevente Middle	5		5	3				13	2	Rm 32
M Ulloa Elementary		4	5		7	1		17		Main Ofc
Adacao Elementary								0		
Upi Elementary	5		4		5	1		15		Main Ofc
DL Perez Elementary	5	3	4		7			19		Rm 10
Simon Sanchez High	3	3	4	4	12			26		303
FB Leon Guerrero Middle	4	2	2	5	8	1		22	3	main ofc
Machananao Elementary	3		8		8	1		20	1	Main Ofc
Finegayan Elementary	3	2	5		10			20	5	Library
Astumbo Elementary	3		8		7	1		19	1	Library
Astumbo Middle								0		Library
Okkodo High	2							2	5	Main Ofc
LBJ Elementary	4		4		6			14		Library
Tamuning Elementary	3	3	11		5			22		A206
Chief Brodie Elementary	4	4	5		5			18		Main Ofc
JFK High	10	3	5	6	17			41		

(DOE is tenant not owner) **TOTAL 600 25**
Guam Educational Finance Fund **GEFF**
Capital Finance Association **CAPFA** **Need map w/notes for validation**