County of El Paso Purchasing Department
500 East San Antonio, Room 500
El Paso, Texas 79901
(915) 546-2048 / Fax: (915) 546-8180

ADDENDUM 5

To: All Interested Proposers

From: Claudia Sepulveda, Bid Clerk/Buyer

Date: December 20, 2006

Subject: Bid# 06-106, Sheriff's Headquarters Remodeling Project

ADD 1.00 Scope:

The following constitutes an addendum to the following Drawings and/ or Specifications for the project title hereon. It shall be considered as part of and shall be attached to each set of these documents. The addendum shall be acknowledged by the Contractor in writing on the bid form. Unless specifically modified or indicated on the construction documents as originally issued.

ADD 1.01 Architectural - Selective Demolition, Sheet A-3.0 - Electrical Room #185.

1. Reference attached sheets SD-1.
2. Reference attached details 2/SD-4 & 3/SD-4.

ADD 1.02 Architectural - New Concrete Stab, Sheet A-3.1 - Electrical Room #185.

1. New slab portion details are issued attached, reference 1/SD-4.

ADD 1.03 Architectural - Metal Louvers, Sheet A-3.1 - Electrical Room #185 & Vehicle Storage #186.

1. A new metal louver is required for Electrical Room #185 See attached specification & detail 1/SD-6
2. Remove & salvage to owner existing louvers in Room #186, Reference 1/SD-5 for additional instructions.

ADD 1.04 Architectural - General Clarifications.

1. Reference the attached specifications for interior signage requirements.
2. Toilet accessories will only required in new Restroom #174.
3. Lockers & storage equipment in Room #126 will be supplied and installed by owner.
4. Window type “D” to have a bullet resistant glazing as recommended by transaction window manufacturer.

ADD 1.05 Mechanical - Stand by Generator Accessories & Related Items.

1. Provide & install stand by generator, including accessories & additional items as per manufacturer's recommendations. See attached sheet MS-1
2. Revise the Construction Documents as follows:
   a. Sheet M2.6: Provide sheet metal shroud connecting electric generator and exterior wail mounted louver. Contractor to install generator flue, muffler and associated connectors, provided by others. Provide gooseneck and flashing as required thru roof, see attached drawing.
   b. Sheet M2.6: Change common boiler flue thru roof to be 34-inch diameter.
   c. Sheet P1.3 Re-route existing roof drainage as shown on attached drawing PS-1.

ADD 1.06 Electrical - Plans.

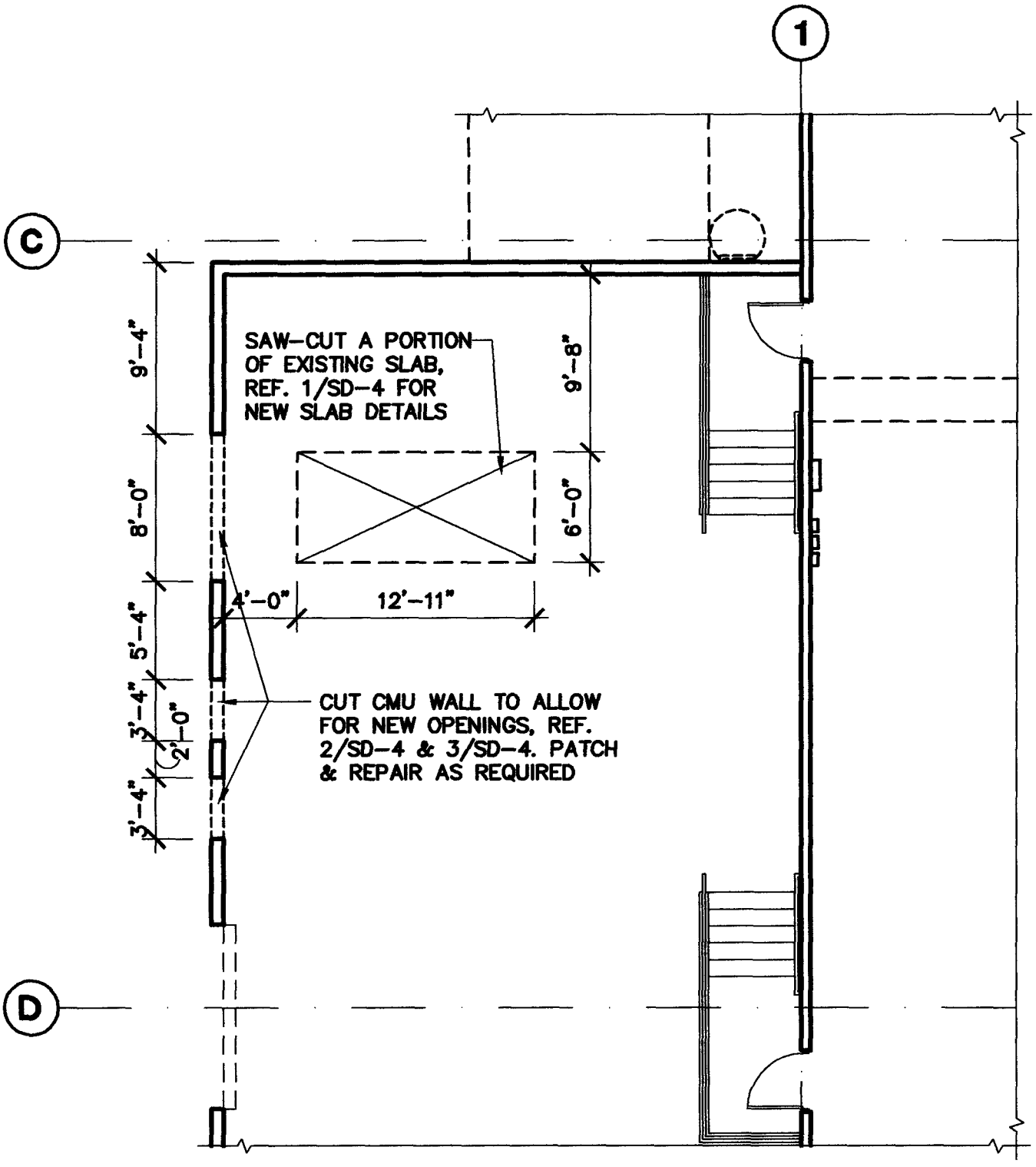
1. Sheet E-1.1 thru E-1.4:
   a. Remove the existing sound system in its entirety to include ail associated conduit and wiring. Salvage to owner.
   b. Connect the existing CCTV Camera Surveillance System to the stand-by engine generator; Panels ELA, ELB, ELC, ELD and ELE. This shall include camera power supplies, monitors, vide recording equipment, etc.
2. Sheets E-1.6, E-1.8, E-1.10 and E-1.12:
   a. Receptacles and voice data outlets shall be installed on new or existing modular furniture as and where directed by the owner. This applies only where modular furniture is shown on these sheets.
3. Sheets E-1.5 thru E-1.8:
   a. All devices, equipment and material in laboratories 119 and 129 shall be corrosion resistant against the chemicals used in these areas.
4. Sheets E-1.8, E-1.12, E-1.16 and E-1.20:
   a. Install new Intrusion Detection balanced magnetic switches and motion sensors at all new and existing doors leading to the exterior of the building.
   b. Provide the following at each card reader door:
      i. Request to exit sensor.
      ii. Request to exit button.
      iii. Electromagnetic lock
   c. Electromagnetic door locks shall be released during a fire alarm condition.
5. Sheets E-1.2:
   a. Remove the existing ADT Focus combination burglar alarm/ fire alarm.
   b. Provide a new fire detection and alarm system as specified. Locate new F.A. Panel in existing Security Room in Area 'B". Extend and/ or revise existing cabling and conduit as necessary. Replace existing initiating devices and notification appliances as necessary for compatibility and to provide a complete code compliant system. Provide a remote annunciator at the main entry and one adjacent to the control panel. Electromagnetic door looks shall be released during a fire alarm condition.
   c. Provide a new Intrusion Detection Alarm System as specified. Locate I.D. Panel in existing Security Room in Area "B". Extend and/ or revise existing cabling and conduit as necessary. Provide a keypad at the main entry and one adjacent to the control panel. Interface Intrusion Detection System with new Automatic Card Access System as specified.
6. Sheets E-1.14:
   a. See supplemental architectural sheets for exact location of the stand-by engine generator in Electrical Room 185.
7. Sheets E-2.2:
   a. Type 'P" light fixture shall be Lithonia #KSF2, 400M, R4W, TB, RP09, LPI.

ADD 1.07 Electrical - Specifications.

1. Add new Section 16400 Stand-by Engine Generator.
2. Add new Section 16500 Automatic Transfer Switch.
3. Add new Section 16600 Fire Detection and Alarm System.
4. Add new Section 16700 Intrusion Detection and Alarm System.
5. Add new Section 16800 Access Control/ Security System.

ADD 1.08 Electrical - General.

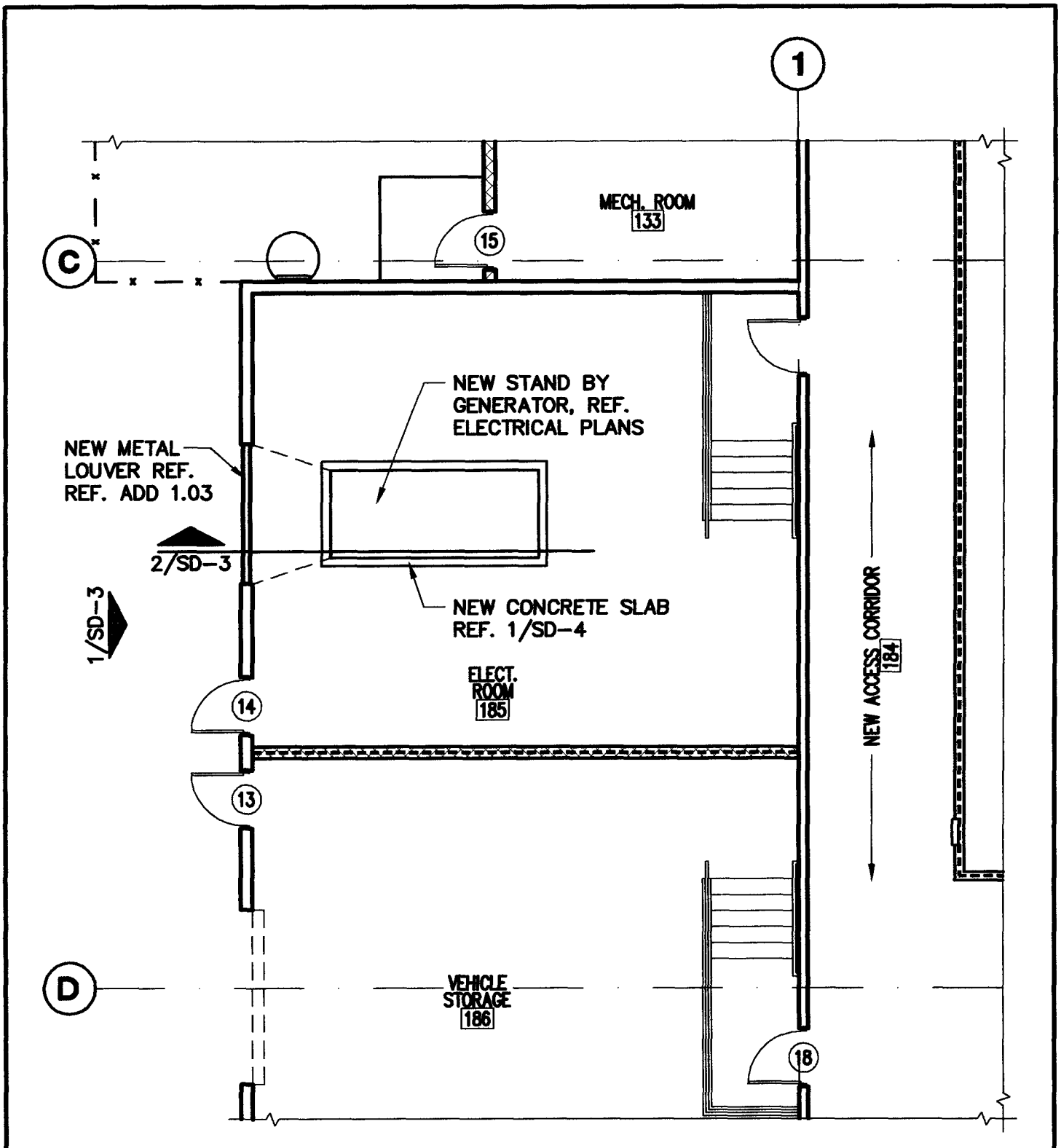
1. The following shall be connected to the stand-by engine generator; panels ELA, ELB, ELC, ELD, and ELE:
   a. Fife Detection and Alarm System.
   b. Intrusion Detection and Alarm System.
   c. Automatic Card Access System.
2. The Intrusion Detection and Alarm System shall be interfaced with the Automatic Card Access System as specified.



1 ENLARGED PLAN

SCALE: 1/8" = 1'-0"

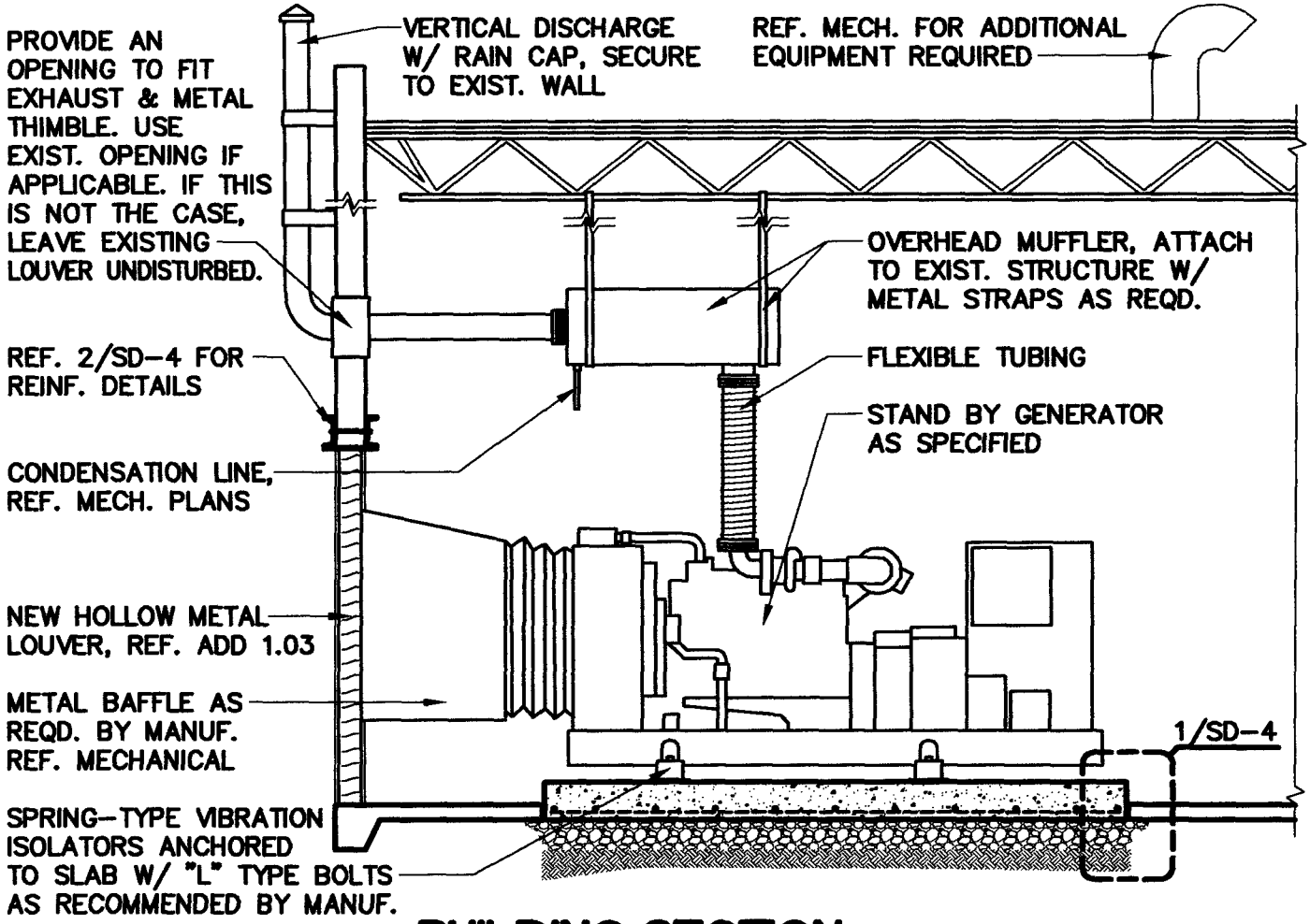
DATE DEC. 15, 2006 PROJECT NO. 0515	EL PASO AREA TEACHERS FEDERAL CREDIT UNION ADDENDUM # 5 EL PASO, TEXAS	SHEET No.: SD-1



1 ENLARGED PLAN

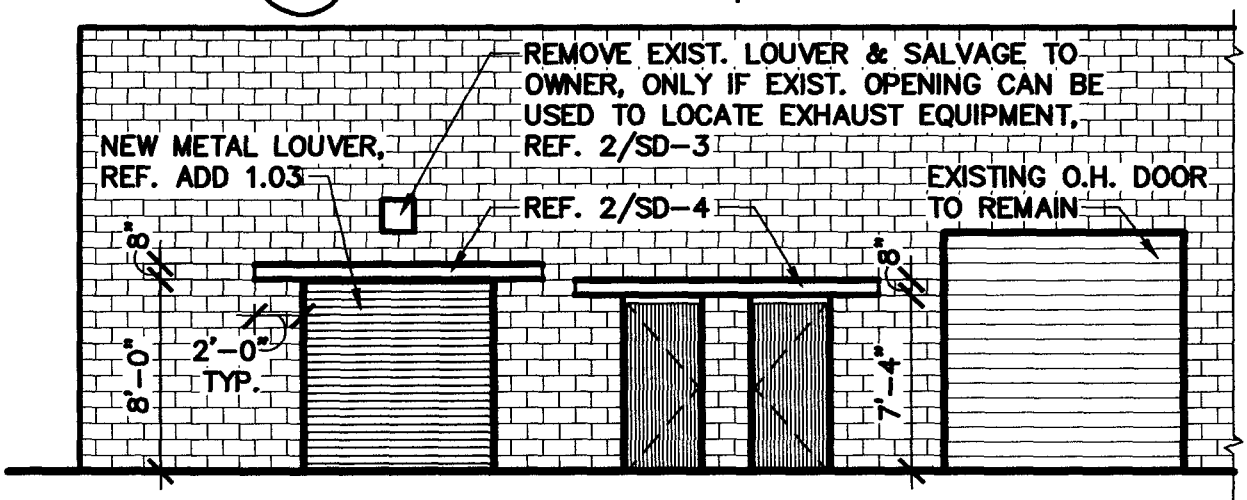
SCALE: 1/8" = 1'-0"

DATE DEC. 15, 2006 PROJECT NO. 0515	EL PASO AREA TEACHERS FEDERAL CREDIT UNION ADDENDUM # 5 EL PASO, TEXAS	SHEET No.: **SD-2**



2 BUILDING SECTION

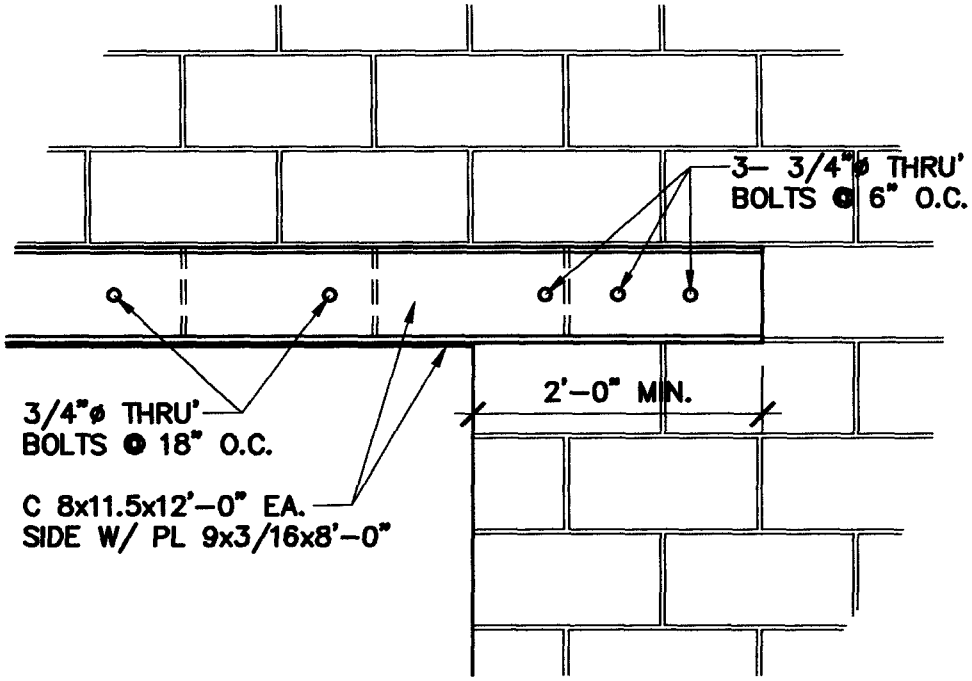
SCALE: 1/4" = 1'-0"



1 EXTERIOR ELEVATION

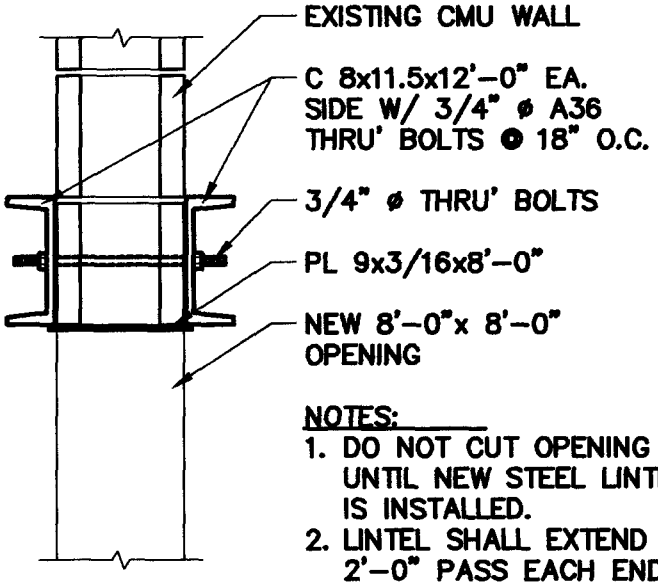
SCALE: 1/8" = 1'-0"

DATE DEC. 15, 2006 PROJECT NO. 0515	EL PASO AREA TEACHERS FEDERAL CREDIT UNION ADDENDUM # 5 EL PASO, TEXAS	SHEET No.: SD-3



3 DETAIL

SCALE: 3/4" = 1'–0"

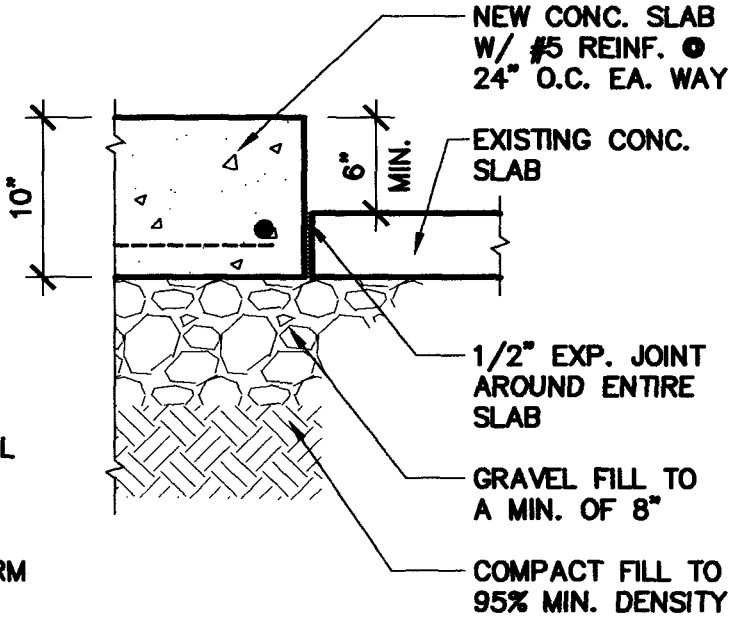


NOTES:

1. DO NOT CUT OPENING UNTIL NEW STEEL LINTEL IS INSTALLED.
2. LINTEL SHALL EXTEND 2'–0" PASS EACH END.
3. WELDING SHALL CONFORM TO AWS D 1.1

2 DETAIL

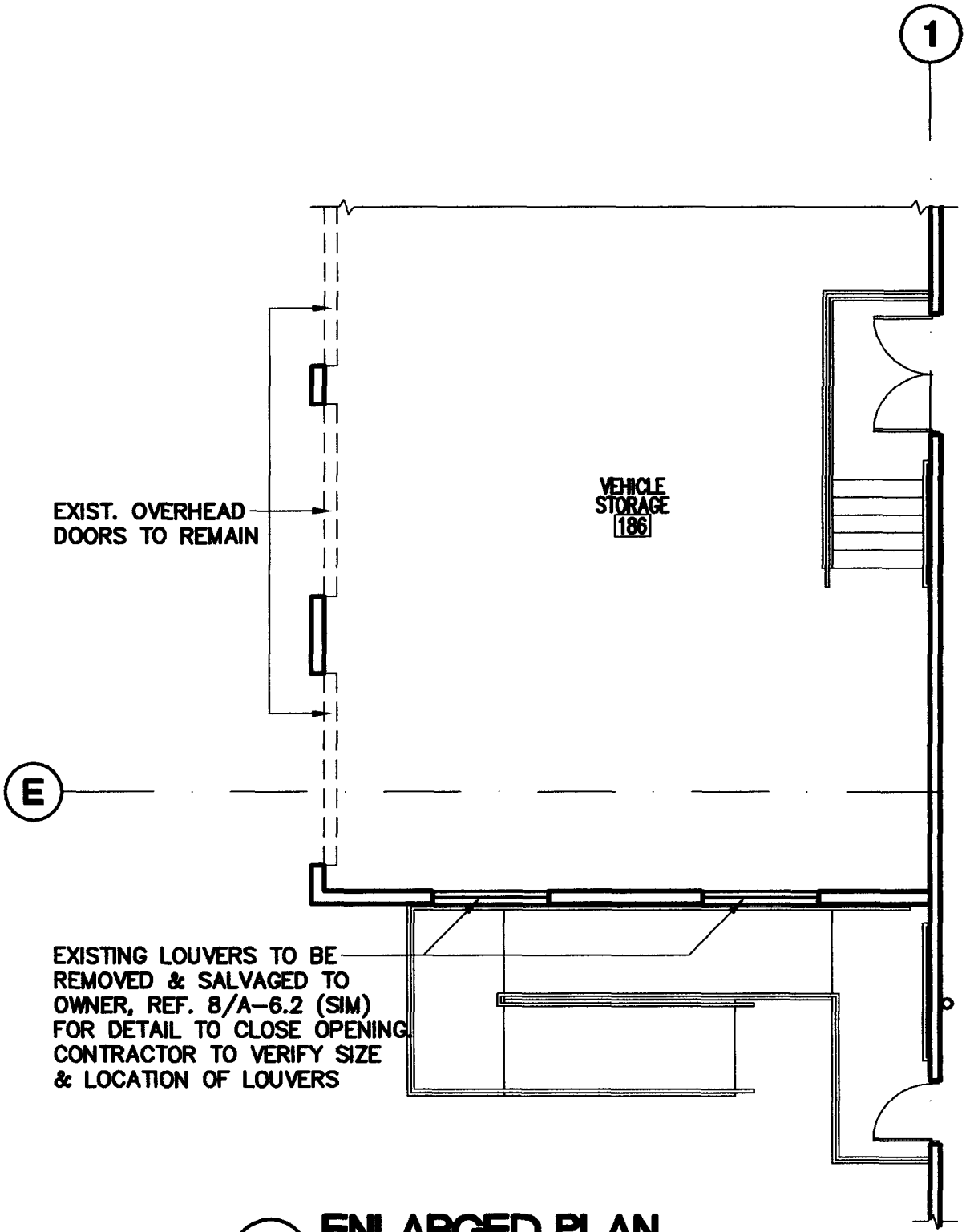
SCALE: 1" = 1'–0"



1 SLAB DETAIL

SCALE: 1" = 1'–0"

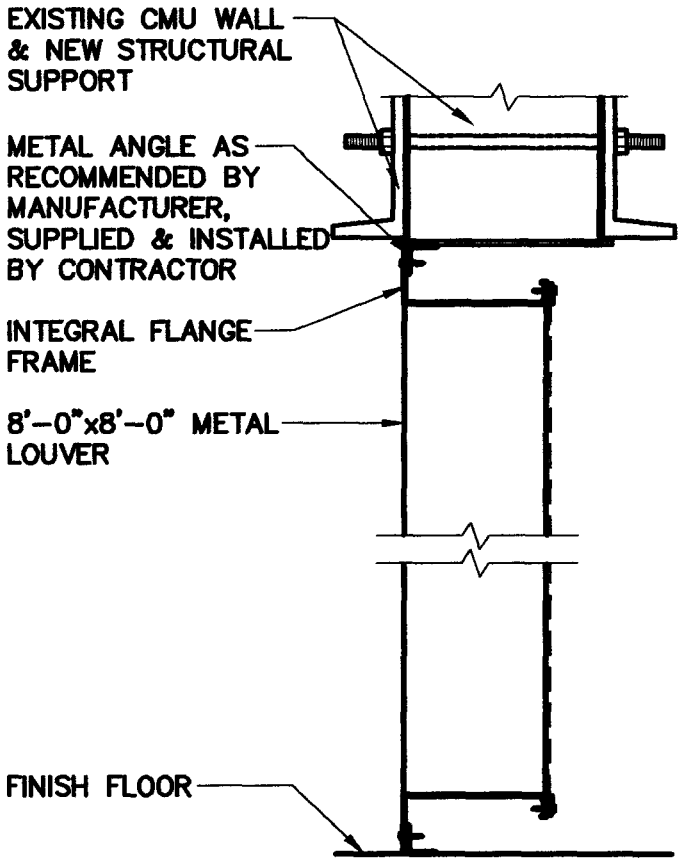
DATE DEC. 15, 2006 PROJECT NO. 0515	EL PASO AREA TEACHERS FEDERAL CREDIT UNION ADDENDUM # 5 EL PASO, TEXAS	SHEET No.: SD-4



1 ENLARGED PLAN

SCALE: 1/8" = 1'-0"

DATE DEC. 15, 2006 PROJECT NO. 0515	EL PASO AREA TEACHERS FEDERAL CREDIT UNION ADDENDUM # 5 EL PASO, TEXAS	SHEET No.: SD-5



1 LOUVER DETAIL

SCALE: 1 1/2" = 1'-0"

DATE DEC. 15, 2006 PROJECT NO. 0515	EL PASO AREA TEACHERS FEDERAL CREDIT UNION ADDENDUM # 5 EL PASO, TEXAS	SHEET No.: SD-6

RUSKIN®

3900 Dr. Greaves Rd. • Kansas City, MO 64030 • (816) 761-7476 • FAX (816) 765-8955

ELF6811 STATIONARY LOUVER
EXTRUDED ALUMINUM

STANDARD CONSTRUCTION

FRAME
6" (152) deep, 6063T5 extruded aluminum with .125" (3.2) nominal wall thickness. Caulking surfaces provided.

BLADES
6063T5 extruded aluminum with .090" (2.3) nominal wall thickness. J-style blades (formerly "weatherproof") are positioned at 45° angle and spaced approximately 6" (152) center to center.

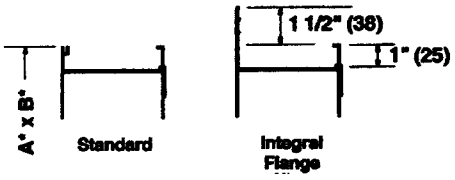
SCREEN
3/4" x .051" (19 x 1.3) expanded, flattened aluminum bird screen in removable frame. Screen adds approximately 1/2" (13) to louver depth.

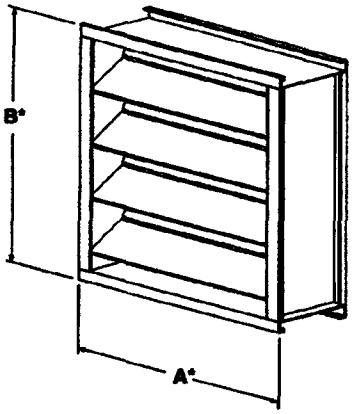
FINISH
Mill.

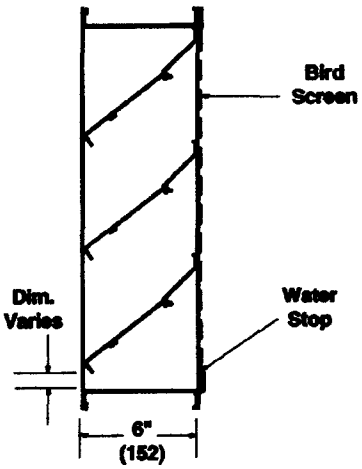
MINIMUM SIZE
12"w x 12"h (305 x 305).

MAXIMUM FACTORY ASSEMBLY SIZE
Shall be 64 sq. ft. (6m²) per section, not to exceed 120" wide and 90" high (3048 and 2286) or 90" wide and 120" high (2286 and 3048). Louvers larger than the maximum factory assembly size will require field assembly of smaller sections.

FRAME CONSTRUCTION







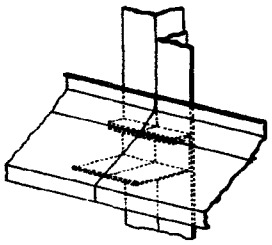
FEATURES

The ELF6811 offers:
- Hidden mullions for attractive appearance.
- All aluminum construction for low maintenance and high resistance to corrosion.
- Low pressure drop with high free area.

VARIATIONS

Variations to the basic design of the louver are available at additional cost. They include:
- Extended sill.
- Hinged frame.
- Front or rear security bars.
- Filter racks.
- A variety of bird and insect screens.
- Selection of finishes: baked enamel (modified fluoropolymer), epoxy, Kynar, Acrodize, prime coat, integral color and clear anodize, (Some variation in anodize color consistency is possible.)

Consult Ruskin for other special requirements.



Hidden Mullion Detail

Dimensions in inches, parenthesis ( ) indicate millimeters. *Units furnished 1/4" (6) smaller than given opening dimensions.

TAG	QTY.	SIZE		FRAME	VARIATIONS
		A"-WIDE	B"-HIGH		
	1	8'-0"	8'-0"	I.F.	

PROJECT	LOCATION
ARCH./ENGR.	CONTRACTOR
REPRESENTATIVE	DATE

 ALL STATED SPECIFICATIONS ARE SUBJECT TO CHANGE WITHOUT NOTICE OR OBLIGATION. ©Ruskin Manufacturing 1994

PART 1 – GENERAL

1.01 SCOPE:

A. Extent of specialty signs is shown on drawings and indicated by provisions of this section.

B. Forms of specialty signs required include the following:

1. All new rooms.

C. Related Documents: Drawings and general provisions of Contract, including General, Supplementary and Special Conditions, and Division 1 Specifications, apply to work of this Section.

1.02 SUBMITTALS:

A. Submit shop drawings for fabrication and erection of specialty signs. Include plans, elevations, and large-scale details of sign wording and lettering layout.

1. Submit schedule including location and message for all signs.

B. Product Data: Submit manufacturer's technical data and installation instructions for each type of sign required.

C. Samples: Submit samples of each sign form and material finishes, colors, surface textures and qualities of manufacturer and design of each sign component including graphics.

1. Submit full-size sample units.

PART 2 – PRODUCTS

2.01 MATERIALS:

A. Acrylic Sheet: Cast methyl methacrylate monomer plastic sheet with minimum flexural strength of 16,000 psi per ASTM D 790, minimum allowable continuous service temperature of 176 deg. F (80 deg. C).

1. Opaque Sheet: Acrylic sheet in colors and finishes selected by Architect from manufacturer's standard colors.

B. Fasteners: Concealed non-corrosive metal fasteners.

C. Anchors and Inserts: Nonferrous metal or hot-dipped galvanized. Furnish inserts, as required, to be set into concrete or masonry work.

2.02 FABRICATION:

A. Graphic Content and Style: Provide copy that complies with size, style, spacing, content, position, material finishes and colors of letters, numbers, and other graphic devices indicated.

2.03 SIGNS:

A. Aluminum Framed Plaque Signs: Fabricate frames to profile indicated; comply with the following, for materials and corner conditions:

1. Material: Acrylic plastic
2. Edge Condition: Square cut
3. Corner Condition: Rounded to ½" radius.

B. Graphic Content and Style: Provide copy that complies with size, style, spacing, content, position, material, finishes and colors of letters, numbers, and other graphic devices indicated.

1. Comply with ANSI A 117.1 and Texas Civil Statutes, Article 601b, Article 7 for character proportion, color contrast, and for tactile characters and symbols.

   a. Raised Copy: 1/32" minimum height.
   b. Size: ¾" minimum height.
   c. Character Style: Helvetica, sans serif characters.

2. Raised Copy: Machine-cut copy characters of thickness indicated from matte-finish opaque acrylic sheet; chemically weld onto acrylic sheet forming sign panel face.

   a. Panel Material: Matte-finished opaque acrylic sheet.

PART 3 – EXECUTION

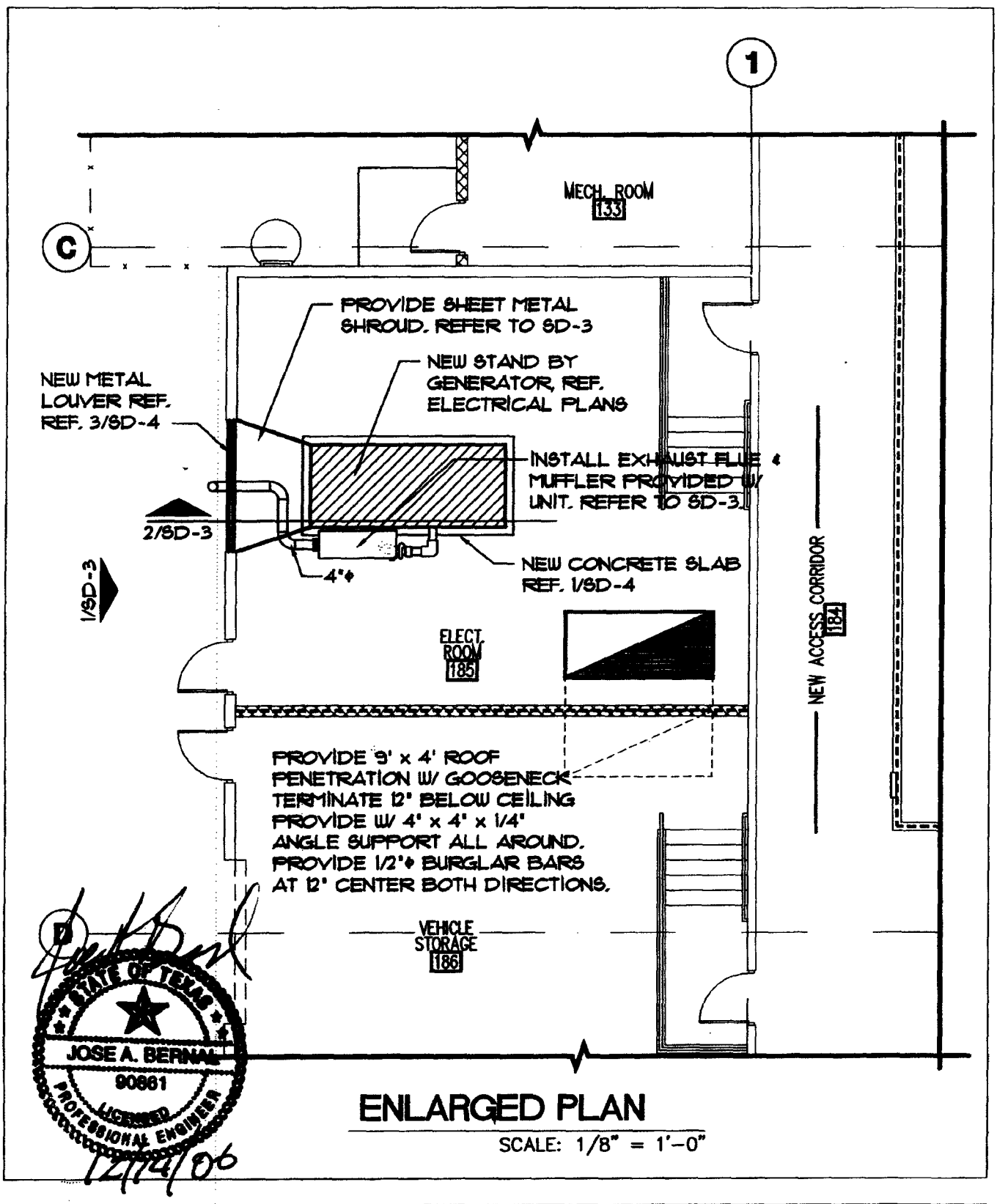
3.01 INSTALATION

A. Locate signs where indicated, using mounting methods described in compliance with manufacturer's instructions and EP County standards.

1. Also comply with applicable handicapped regulations and codes.

B. Install signs level, plumb, and at the height indicated, with surfaces free from distortion or other defects in appearance.

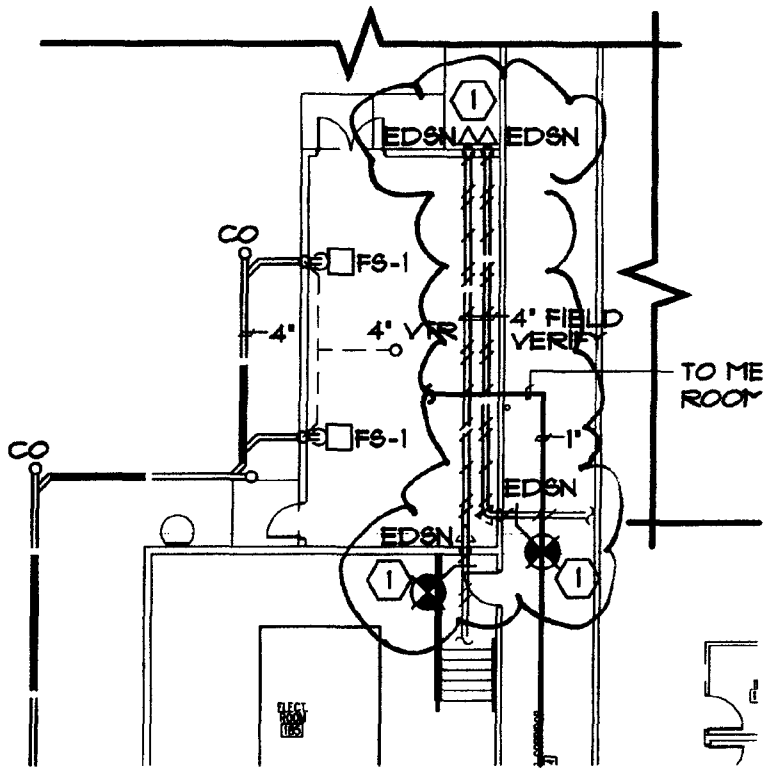
END OF SECTION 10440



ENLARGED PLAN

SCALE: 1/8" = 1'-0"

DATE DEC. 15, 2006 PROJECT NO. 0515	EL PASO SHERRIFFS HEADQUARTERS ADDENDUM # 5 EL PASO, TEXAS	SHEET No.: MS-1



N

FIRST FLOOR PLUMBING PLAN

SCALE: 1/16" = 1'-0"

KEYED NOTES

(1) RE-ROUTE EXISTING ROOF-DRAINAGE. RELOCATE EXISTING DOWNSPOUT NOZZLES.

STATE OF TEXAS
JOSE A. BERNAL
90861
LICENSED PROFESSIONAL ENGINEER
12/15/06

DATE DEC. 15, 2006 PROJECT NO. 0515	EL PASO SHERRIFFS HEADQUARTERS ADDENDUM # 5 EL PASO, TEXAS	SHEET No.: PS-1

SECTION 16400
STAND-BY ENGINE GENERATOR SET

Part 1. GENERAL

1.01 Scope

A. Provide complete factory assembled generator set equipment with digital (microprocessor-based) electronic controls.

B. Provide factory test, startup by a supplier authorized by the manufacturer, and on-site testing of the system.

C. The generator set manufacturer shall warrant all equipment provided under this section, whether or not it is manufactured by the generator set manufacturer, so that there is one source for warranty and product service. Technicians specifically trained and certified by the manufacturer to support the product and employed by the generator set supplier shall service the generator sets.

1.02 Codes and Standards

A. The generator set installation and on-site testing shall conform to the requirements of the following codes and standards, as applicable. The generator set shall include necessary features to meet the requirements of these standards.

1. CSA 282, 1989 Emergency Electrical Power Supply for Buildings
2. IEEE446 – Recommended Practice for Emergency and Standby Power Systems for Commercial and Industrial Applications
3. NFPA37 –
4. NFPA70 – National Electrical Code. Equipment shall be suitable for use in systems in compliance to Article 700, 701, and 702.
5. NFPA99 – Essential Electrical Systems for Health Care Facilities
6. NFPA110 – Emergency and Standby Power Systems. The generator set shall meet all requirements for Level 1 systems. Level 1prototype tests required by this standard shall have been performed on a complete and functional unit, component level type tests will not substitute for this requirement.

B. The generator set and supplied accessories shall meet the requirements of the following standards:

1. NEMA MG1-1998 part 32. Alternator shall comply with the requirements of this standard.
2. UL142 – Sub-base Tanks
3. UL1236 – Battery Chargers
4. UL2200. The generator set shall be listed to UL2200 or submit to an independent third party certification process to verify compliance as installed.

C. The control system for the generator set shall comply with the following requirements.

1. CSA C22.2, No. 14 – M91 Industrial Control Equipment.
2. EN50082-2, Electromagnetic Compatibility – Generic Immunity Requirements, Part 2: Industrial.
3. EN55011, Limits and Methods of Measurement of Radio Interference Characteristics of Industrial, Scientific and Medical Equipment.
4. FCC Part 15, Subpart B.
5. IEC8528 part 4. Control Systems for Generator Sets
6. IEC Std 801.2, 801.3, and 801.5 for susceptibility, conducted, and radiated electromagnetic emissions.
7. UL508. The entire control system of the generator set shall be UL508 listed and labeled.
8. UL1236 –Battery Chargers.

D. The generator set manufacturer shall be certified to ISO 9001 International Quality Standard and shall have third party certification verifying quality assurance in design/development, production, installation, and service, in accordance with ISO 9001.

1.03 Acceptable Manufacturers

Only approved bidders shall supply equipment provided under this contract. Equipment specifications for this project are based on microprocessor-based generator sets manufactured by Cummins Power Generation. Equipment by other suppliers that meets the requirement of this specification are acceptable, if approved not less than 2 weeks before scheduled bid date. Proposals must include a line by line compliance statement based on this specification.

Part 2. PRODUCTS

2.01 Generator set

A. Ratings

1. The generator set shall operate at 1800 rpm and at a voltage of: 480/277 Volts AC, Three phase, 4-wire, 60 hertz.
2. The generator set shall be rated at 175kW, 219 kVA at 0.8 PF, Stand-by rating, based on site conditions of : Altitude 4000 ft., ambient temperatures up to 115 degrees F
3. The generator set rating shall be based on emergency/standby service.

B. Performance

1. Voltage regulation shall be plus or minus 0.5 percent for any constant load between no load and rated load for both parallel and non-parallel applications. Random voltage variation with any steady load from no load to full load shall not exceed plus or minus 0.5 percent.
2. Frequency regulation shall be isochronous from steady state no load to steady state rated load. Random frequency variation with any steady load from no load to full load shall not exceed plus or minus 0.25%.
3. The engine-generator set shall be capable of single step load pick up of 100% nameplate kW and power factor, less applicable derating factors, with the engine-generator set at operating temperature.
4. Motor starting capability shall be a minimum of 904 kVA. The generator set shall be capable of sustaining a minimum of 90% of rated no load voltage with the specified kVA load at near zero power factor applied to the generator set.
5. The alternator shall produce a clean AC voltage waveform, with not more than 5% total harmonic distortion at full linear load, when measured from line to neutral, and with not more than 3% in any single harmonic. Telephone influence factor shall be less than 40.

C. Construction

1. The engine-generator set shall be mounted on a heavy-duty steel base to maintain alignment between components. The base shall incorporate a battery tray with hold-down clamps within the rails
2. All switches, lamps, and meters in the control system shall be oil-tight and dust-tight, and the enclosure door shall be gasketed. There shall be no exposed points in the control (with the door open) that operate in excess of 50 volts.

D. Connections

1. The generator set load connections shall be composed of silver or tin plated copper bus bars, drilled to accept mechanical or compression terminations of the number and type as shown on the drawings. Sufficient lug space shall be provided for use with cables of the number and size as shown on the drawings.
2. Power connections to auxiliary devices shall be made at the devices, with required protection located at a wall-mounted common distribution panel.
3. Generator set control interfaces to other system components shall be made on a common, permanently labeled terminal block assembly.

2.02 Engine and Engine Equipment

A. The engine shall be natural gas fueled, radiator and fan cooled. Minimum displacement shall be 855 cubic inches, with 6 cylinders. The horsepower rating of the engine at it's minimum tolerance level shall be sufficient to drive the alternator and all connected accessories. Engine accessories and features shall include:

B. Complete engine fuel system, including all pressure regulators, strainers, and control valves. The fuel system shall be plumbed to the generator set skid for ease of site connections to the generator set. For dual fuel systems, changeover from primary to secondary fuel shall be automatic.

C. An electronic governor system shall provide automatic isochronous frequency regulation. The governing system dynamic capabilities shall be controlled as a function of engine coolant temperature to provide fast, stable operation at varying engine operating temperature conditions. The control system shall actively control the fuel rate and excitation as appropriate to the state of the generator set. Fuel rate shall be regulated as a function of starting, accelerating to start disconnect speed, accelerating to rated speed, and operating in various isochronous or parallel states.

D. Skid-mounted radiator and cooling system rated for full load operation in 104 degrees F (40 degrees C) ambient as measured at the generator air inlet, based on 0.5 in H_2O external static head. Radiator shall be sized based on a core temperature that is 20F higher than the rated operation temperature, or prototype tested to verify cooling performance of the engine/radiator/fan operation in a controlled environment. Radiator shall be provided with a duct adapter flange. The equipment manufacturer shall fill the cooling system with a 50/50-ethylene glycol/water mixture. Rotating parts shall be guarded against accidental contact.

E. Electric starter(s) capable of three complete cranking cycles without overheating.

F. Positive displacement, mechanical, full pressure, lubrication oil pump.

G. Full flow lubrication oil filters with replaceable spin-on canister elements and dipstick oil level indicator.

H. Replaceable dry element air cleaner with restriction indicator.

I. Flexible fuel lines.

J. Engine mounted battery charging alternator, 40-ampere minimum, and solid-state voltage regulator.

K. Coolant heater

1. Engine mounted, thermostatically controlled, coolant heater(s) for each engine. Heater voltage shall be as shown on the project drawings. The coolant heater shall be UL499 listed and labeled.

2. The coolant heater shall be installed on the engine with high temperature silicone hose connections. Steel tubing shall be used for connections into the engine coolant system wherever the length of pipe run exceeds 12 inches. The coolant heater installation shall be specifically designed to provide proper venting of the system. The coolant heaters shall be installed using quick disconnect couplers to isolate the heater for replacement of the heater element. The quick disconnect/automatic sealing couplers shall allow the heater element to be replaced without draining the engine cooling system or significant coolant loss.

3. The coolant heater shall be provided with a 24VDC thermostat, installed at the engine thermostat housing. An AC power connection box shall be provided for a single AC power connection to the coolant heater system.

4. The coolant heater(s) shall be sized as recommended by the engine manufacturer to warm the engine to a minimum of 100F (40C) in a 40F ambient, in compliance with NFPA110 requirements, or the temperature required for starting and load pickup requirements of this specification.

L. Provide vibration isolators, spring/pad type or as recommended by the manufacturer, quantity as recommended by the generator set manufacturer. Isolators shall include seismic restraints if required by site location.

M. Starting and Control Batteries shall be calcium/lead antimony type, 24 volt DC, sized as recommended by the engine manufacturer, complete with battery cables and connectors.

N. Provide exhaust silencer for each engine of size and type as recommended by the generator set manufacturer and approved by the engine manufacturer. The mufflers shall be critical grade. Exhaust system shall be installed according to the engine manufacturer's recommendations and applicable codes and standards.

2.03 AC Generator

A. The AC generator shall be; synchronous, four pole, 2/3 pitch, revolving field, drip-proof construction, single prelubricated sealed bearing, air cooled by a direct drive centrifugal blower fan, and directly connected to the engine with flexible drive disc. All insulation system components shall meet NEMA MG1 temperature limits for Class H insulation system. Actual temperature rise measured by resistance method at full load shall not exceed 105 degrees Centigrade.

B. The generator shall be capable of delivering rated output (kVA) at rated frequency and power factor, at any voltage not more than 5 percent above or below rated voltage.

C. A permanent magnet generator (PMG) shall be included to provide a reliable source of excitation power for optimum motor starting and short circuit performance. The PMG and controls shall be capable of sustaining and regulating current supplied to a single phase or three phase fault at approximately 300% of rated current for not more than 10 seconds.

D. The subtransient reactance of the alternator shall not exceed 15 percent, based on the standby rating of the generator set.

E. The alternator shall be capable of operation with reverse kVAR of 0.15 per unit.

2.04 Generator set Control. The generator set shall be provided with a microprocessor-based control system that is designed to provide automatic starting, monitoring, and control functions for the generator set. The control system shall also be designed to allow local monitoring and control of the generator set, and remote monitoring and control as described in this specification.

The control shall be mounted on the generator set, or may be mounted in a free-standing panel next to the generator set if adequate space and accessibility is available. The control shall be vibration isolated and prototype tested to verify the durability of all components in the system under the vibration conditions encountered.

The generator set mounted control shall include the following features and functions:

A. Control Switches

1. Mode Select Switch. The mode select switch shall initiate the following control modes. When in the RUN or MANUAL position the generator set shall start, and accelerate to rated speed and voltage as directed by the operator. A separate push-button to initiate starting is acceptable. In the OFF position the generator set shall immediately stop, bypassing all time delays. In the AUTO position the generator set shall be ready to accept a signal from a remote device to start and accelerate to rated speed and voltage.

2. EMERGENCY STOP switch. Switch shall be Red "mushroom-head" push-button. Depressing the emergency stop switch shall cause the generator set to immediately shut down, and be locked out from automatic restarting.

3. RESET switch. The RESET switch shall be used to clear a fault and allow restarting the generator set after it has shut down for any fault condition.

4. PANEL LAMP switch. Depressing the panel lamp switch shall cause the entire panel to be lighted with DC control power. The panel lamps shall automatically be switched off 10 minutes after the switch is depressed, or after the switch is depressed a second time.

B. Generator Set AC Output Metering. The generator set shall be provided with a metering set including the following features and functions:

1. Digital metering set, 1% accuracy, to indicate generator RMS voltage and current, frequency, output current, output KW, KW-hours, and power factor. Generator output voltage shall be

available in line-to-line and line-to-neutral voltages, and shall display all three-phase voltages (line to neutral or line to line) simultaneously.

2. Analog voltmeter, ammeter, frequency meter, power factor meter, and kilowatt (KW) meter. Voltmeter and ammeter shall display all three phases. Meter scales shall be color coded in the following fashion: green shall indicate normal operating condition, amber shall indicate operation in ranges that indicate potential failure, and red shall indicate failure impending. Metering accuracy shall be within 1% at rated output. Both analog and digital metering are required.
3. The control system shall monitor the total load on the generator set, and maintain data logs of total operating hours at specific load levels ranging from 0 to 110% of rated load, in 10% increments. The control shall display hours of operation at less than 30% load and total hours of operation at more than 90% of rated load.
4. The control system shall log total number of operating hours, total kWH, and total control on hours, as well as total values since reset.

C. Generator Set Alarm and Status Display.

1. The generator set control shall include LED alarm and status indication lamps. The lamps shall be high-intensity LED type. The lamp condition shall be clearly apparent under bright room lighting conditions. Functions indicated by the lamps shall include:

   a. The control shall include five configurable alarm-indicating lamps. The lamps shall be field adjustable for any status, warning, or shutdown function monitored by the genset. They shall also be configurable for color, and control action (status, warning, or shutdown).
   b. The control shall include green lamps to indicate that the generator set is running at rated frequency and voltage, and that a remote start signal has been received at the generator set. The running signal shall be based on actual sensed voltage and frequency on the output terminals of the generator set.
   c. The control shall include a flashing red lamp to indicate that the control is not in automatic state, and red common shutdown lamp.
   d. The control shall include an amber common warning indication lamp.

2. The generator set control shall indicate the existence of the warning and shutdown conditions on the control panel. All conditions indicated below for warning shall be field-configurable for shutdown. Conditions required to be annunciated shall include:

   low oil pressure (warning)
   low oil pressure (shutdown)
   oil pressure sender failure (warning)
   low coolant temperature (warning)
   high coolant temperature (warning)
   high coolant temperature (shutdown)
   high oil temperature (warning)
   engine temperature sender failure (warning)
   low coolant level (warning)
   fail to crank (shutdown)
   fail to start/overcrank (shutdown)
   overspeed (shutdown)
   low DC voltage (warning)
   high DC voltage (warning)
   weak battery (warning)
   low fuel-daytank (warning)
   high AC voltage (shutdown)
   low AC voltage (shutdown)
   under frequency (shutdown)
   over current (warning)
   over current (shutdown)
   short circuit (shutdown)
   over load (warning)
   emergency stop (shutdown)
   (4) configurable conditions

3. Provisions shall be made for indication of four customer-specified alarm or shutdown conditions. Labeling of the customer-specified alarm or shutdown conditions shall be of the same type and quality as the above-specified conditions. The non-automatic indicating lamp shall be red, and shall flash to indicate that the generator set is not able to automatically respond to a command to start from a remote location.

D. Engine Status Monitoring.

1. The following information shall be available from a digital status panel on the generator set control :

   engine oil pressure (psi or kPA)
   engine coolant temperature (degrees F or C)
   engine oil temperature (degrees F or C)
   engine speed (rpm)
   number of hours of operation (hours)
   number of start attempts
   battery voltage (DC volts)

2. The control system shall also incorporate a data logging and display provision to allow logging of the last 10 warning or shutdown indications on the generator set, as well as total time of operation at various loads, as a percent of the standby rating of the generator set.

E. Engine Control Functions.

1. The control system provided shall include a cycle cranking system, which allows for user selected crank time, rest time, and # of cycles. Initial settings shall be for 3 cranking periods of 15 seconds each, with 15-second rest period between cranking periods.
2. The control system shall include an idle mode control, which allows the engine to run in idle mode in the RUN position only. In this mode, the alternator excitation system shall be disabled.
3. The control system shall include an engine governor control, which functions to provide steady state frequency regulation as noted elsewhere in this specification. The governor control shall include adjustments for gain, damping, and a ramping function to control engine speed and limit exhaust smoke while the unit is starting.
4. The control system shall include time delay start (adjustable 0-300 seconds) and time delay stop (adjustable 0-600 seconds) functions.
5. The control system shall include sender failure monitoring logic for speed sensing, oil pressure, and engine temperature which is capable of discriminating between failed sender or wiring components, and an actual failure conditions.

F. Alternator Control Functions:

1. The generator set shall include a full wave rectified automatic digital voltage regulation system that is matched and prototype tested by the engine manufacturer with the governing system provided. It shall be immune from misoperation due to load-induced voltage waveform distortion and provide a pulse width modulated output to the alternator exciter. The voltage regulation system shall be equipped with three-phase line to neutral RMS sensing and shall control buildup of AC generator voltage to provide a linear rise and limit overshoot. The system shall include a torque-matching characteristic, which shall reduce output voltage in proportion to frequency below an adjustable frequency threshold. Torque matching characteristic shall be adjustable for roll-off frequency and rate, and be capable of being curve-matched to the engine torque curve with adjustments in the field. The voltage regulator shall include adjustments for gain, damping, and frequency roll-off. Adjustments shall be broad range, and made via digital raise-lower switches, with an alphanumeric LED readout to indicate setting level. Rotary potentiometers for system adjustments are not acceptable.
2. Controls shall be provided to monitor the output current of the generator set and initiate an alarm (over current warning) when load current exceeds 110% of the rated current of the generator set on any phase for more than 60 seconds. The controls shall shut down and lock out the generator set when output current level approaches the thermal damage point of the alternator (over current shutdown). The protective functions provided shall be in compliance to the requirements of NFPA70 article 445. The protection for this function shall be 3rd party certified to very performance.

3. Controls shall be provided to individually monitor all three phases of the output current for short circuit conditions. The control/protection system shall monitor the current level and voltage. The controls shall shut down and lock out the generator set when output current level approaches the thermal damage point of the alternator (short circuit shutdown). The protective functions provided shall be in compliance to the requirements of NFPA70 article 445. The protection for this function shall be 3rd party certified to very performance.
4. Controls shall be provided to monitor the KW load on the generator set, and initiate an alarm condition (over load) when total load on the generator set exceeds the generator set rating for in excess of 5 seconds. Controls shall include a load shed control, to operate a set of dry contacts (for use in shedding customer load devices) when the generator set is overloaded.
5. An line to neutral sensing AC over/under voltage monitoring system that responds only to true RMS voltage conditions shall be provided. The system shall initiate shutdown of the generator set when alternator output voltage exceeds 110% of the operator-set voltage level for more than 10 seconds, or with no intentional delay when voltage exceeds 130%. Under voltage shutdown shall occur when the output voltage of the alternator is less than 85% for more than 10 seconds.

G. Other Control Functions

1. The generator set shall be provided with a network communication module to allow LonMark compliant communication with the generator set control by remote devices. The control shall communicate all engine and alternator data, and allow starting and stopping of the generator set via the network in both test and emergency modes.
2. A battery monitoring system shall be provided which initiates alarms when the DC control and starting voltage is less than 25VDC or more than 32 VDC. During engine cranking (starter engaged), the low voltage limit shall be disabled, and DC voltage shall be monitored as load is applied to the battery, to detect impending battery failure or deteriorated battery condition.

H. Control Interfaces for Remote Monitoring:

1. The control system shall provide four programmable output relays. These relay outputs shall be configurable for any alarm, shutdown, or status condition monitored by the control. The relays shall be configured to indicate: (1) generator set operating at rated voltage and frequency, (2) common warning, (3) common shutdown, (4) load shed command.
2. A fused 10 amp switched 24VDC power supply circuit shall be provided for customer use. DC power shall be available from this circuit whenever the generator set is running.
3. A fused 10 amp 24VDC power supply circuit shall be provided for customer use. DC power shall be available from this circuit at all times from the engine starting/control batteries.
4. The control shall be provided with a direct serial communication link for the LonWorks communication network interface as described elsewhere in this specification and shown on the drawings.

2.05 Other equipment to be provided with the generator set

A. Provide and install a 20-light LED type remote alarm annunciator with horn, located as shown on the drawings or in a location that can be conveniently monitored by facility personnel. The remote annunciator shall provide all the audible and visual alarms called for by NFPA Standard 110 for level 1 systems for the local generator control panel. Spare lamps shall be provided to allow future addition of other alarm and status functions to the annunciator. Provisions for labeling of the annunciator in a fashion consistent with the specified functions shall be provided. Alarm silence and lamp test switch(es) shall be provided. LED lamps shall be replaceable, and indicating lamp color shall be capable of changes needed for specific application requirements. Alarm horn shall be switchable for all annunciation points. Alarm horn (when switched on) shall sound for first fault, and all subsequent faults, regardless of whether first fault has been cleared, in compliance with NFPA110 3-5.6.2. The interconnecting wiring between the annunciator and other system components shall be monitored and failure of the interconnection between components shall be displayed on the annunciator panel.

B. The annunciator shall include the following alarm labels, audible annunciation features, and lamp colors:

Condition	Lamp Color	Audible Alarm
Normal Power (to Loads)	Green	No
Genset Supplying Load	Amber	No
Genset Running	Green	No
Not in Auto	Red (Flashing)	Yes
High Battery Voltage	Red	Yes
Low Battery Voltage	Red	Yes
Charger AC Failure	Red	Yes
Fail to Start	Red	Yes
Low Engine Temperature	Amber	Yes
Pre-High Engine Temperature	Amber	Yes
High Engine Temperature	Red	Yes
Pre-Low Oil Pressure	Amber	Yes
Low Oil Pressure	Red	Yes
Overspeed	Red	Yes
Low Coolant Level	Amber	Yes
Low Fuel Pressure	Amber	Yes
Network OK	Green	Yes
(4) Spares	Configurable	Configurable

Low battery voltage lamp shall also be lighted for low cranking voltage or weak battery alarm.

C. The generator set shall be provided with a mounted main line circuit breaker, sized to carry the rated output current of the generator set. The circuit breaker shall incorporate an electronic trip unit that operates to protect the alternator under all overcurrent conditions, or a thermal-magnetic trip with other overcurrent protection devices that positively protect the alternator under overcurrent conditions. The supplier shall submit time overcurrent characteristic curves and thermal damage curve for the alternator, demonstrating the effectiveness of the protection provided.

Part 3. OPERATION

3.01 Sequence of Operation

A. Generator set shall start on receipt of a start signal from remote equipment. The start signal shall be via hardwired connection to the generator set.

B. The generator set shall complete a time delay start period as programmed into the control.

C. The generator set control shall initiate the starting sequence for the generator set. The starting sequence shall include the following functions:

1. The control system shall verify that the engine is rotating when the starter is signaled to operate. If the engine does not rotate after two attempts, the control system shall shut down and lock out the generator set, and indicate "fail to crank" shutdown.

2. The engine shall fire and accelerate as quickly as practical to start disconnect speed. If the engine does not start, it shall complete a cycle cranking process as described elsewhere in this specification. If the engine has not started by the completion of the cycle cranking sequence, it shall be shut down and locked out, and the control system shall indicate "fail to start".

3. The engine shall accelerate to rated speed and the alternator to rated voltage. Excitation shall be disabled until the engine has exceeded programmed idle speed, and regulated to prevent over voltage conditions and oscillation as the engine accelerates and the alternator builds to rated voltage.

D. On reaching rated speed and voltage, the generator set shall operate as dictated by the control system in isochronous, synchronize, load share, load demand, or load govern state.

E. When all start signals have been removed from the generator set, it shall complete a time delay stop sequence. The duration of the time delay stop period shall be adjustable by the operator.

F. On completion of the time delay stop period, the generator set control shall switch off the excitation system and shall shut down.

1. Any start signal received after the time stop sequence has begun shall immediately terminate the stopping sequence and return the generator set to isochronous operation.

Part 4. OTHER REQUIREMENTS

4.01 Submittals. Within 10 days after award of contract, provide six sets of the following information for review:

- Manufacturer's product literature and performance data, sufficient to verify compliance to specification requirements.
- A paragraph by paragraph specification compliance statement, describing the differences between the specified and the proposed equipment.
- Manufacturer's certification of prototype testing.
- Manufacturer's published warranty documents.
- Shop drawings showing plan and elevation views with certified overall dimensions, as well as wiring interconnection details.
- Interconnection wiring diagrams showing all external connections required; with field wiring terminals marked in a consistent point-to-point manner.
- Manufacturer's installation instructions.

4.02 Factory Testing.

A. The generator set supplier shall perform a complete operational test on the generator set prior to shipping from the factory. A certified test report shall be provided. Equipment supplied shall be fully tested at the factory for function and performance.

B. Factory testing may be witnessed by the owner and consulting engineer. Costs for travel expenses will be the responsibility of the owner and consulting engineer. Supplier is responsible to provide two weeks notice for testing.

C. Generator set factory tests on the equipment shall be performed at rated load and rated power factor. Generator sets that have not been factory tested at rated power factor will not be acceptable. Tests shall include: run at full load, maximum power, voltage regulation, transient and steady-state governing, single step load pickup, and function of safety shutdowns.

4.03 Installation

A. Equipment shall be installed by the contractor in accordance with final submittals and contract documents. Installation shall comply with applicable state and local codes as required by the authority having jurisdiction. Install equipment in accordance with manufacturer's instructions and instructions included in the listing or labeling of UL listed products.

B. Installation of equipment shall include furnishing and installing all interconnecting wiring between all major equipment provided for the on-site power system. The contractor shall also perform interconnecting wiring between equipment sections (when required), under the supervision of the equipment supplier.

C. Equipment shall be installed on concrete housekeeping pads. Equipment shall be permanently fastened to the pad in accordance with manufacturer's instructions and seismic requirements of the site.

D. Equipment shall be initially started and operated by representatives of the manufacturer.

E. All equipment shall be physically inspected for damage. Scratches and other installation damage shall be repaired prior to final system testing. Equipment shall be thoroughly cleaned to remove all dirt and construction debris prior to final testing of the system.

4.04 On-Site Acceptance Test:

A. The complete installation shall be tested for compliance with the specification following completion of all site work. Testing shall be conducted by representatives of the manufacturer, with required fuel supplied by Contractor. The Engineer shall be notified in advance and shall have the option to witness the tests.

B. Installation acceptance tests to be conducted on-site shall include a "cold start" test, a two hour full load test, and a one step rated load pickup test in accordance with NFPA 110. Provide a resistive load bank and make temporary connections for full load test.

C. Perform a power failure test on the entire installed system. This test shall be conducted by opening the power supply from the utility service, and observing proper operation of the system for at least 2 hours. Coordinate timing and obtain approval for start of test with site personnel.

4.05 Training

A. The equipment supplier shall provide training for the facility operating personnel covering operation and maintenance of the equipment provided. The training program shall be not less than 4 hours in duration and the class size shall be limited to 5 persons. Training date shall be coordinated with the facility owner.

4.06 Service and support

A. The manufacturer of the generator set shall maintain service parts inventory at a central location which is accessible to the service location 24 hours per day, 365 days per year.

B. The generator set shall be serviced by a local service organization that is trained and factory certified in generator set service. The supplier shall maintain an inventory of critical replacement parts at the local service organization, and in service vehicles. The service organization shall be on call 24 hours per day, 365 days per year.

C. The manufacturer shall maintain model and serial number records of each generator set provided for at least 20 years.

4.07 Warranty

A. The generator set and associated equipment shall be warranted for a period of not less than 5 years from the date of commissioning against defects in materials and workmanship.

B. The warranty shall be comprehensive. No deductibles shall be allowed for travel time, service hours, repair parts cost, etc.

END OF SECTION 16400

SECTION 16500
AUTOMATIC TRANSFER SWITCH

Part 1. GENERAL

1.01 Scope

A. Provide complete factory assembled power transfer equipment with field programmable digital electronic controls designed for fully automatic operation and including: surge voltage isolation, voltage sensors on all phases of both sources, linear operator, permanently attached manual handles, positive mechanical and electrical interlocking, and mechanically held contacts for both sources.

B. The generator set manufacturer shall warrant transfer switch to provide a single source of responsibility for all the products provided. Technicians specifically trained to support the product and employed by the generator set supplier shall service the transfer switch.

1.02 Codes and Standards

A. The automatic transfer switch installation and application shall conform to the requirements of the following codes and standards:

1. CSA 282, Emergency Electrical Power Supply for Buildings
2. NFPA70 – National Electrical Code. Equipment shall be suitable for use in systems in compliance to Article 700, 701, and 702.
3. NFPA99 – Essential Electrical Systems for Health Care Facilities
4. NFPA110 – Emergency and Standby Power Systems. The transfer switch shall meet all requirements for Level 1 systems.
5. IEEE446 – Recommended Practice for Emergency and Standby Power Systems for Commercial and Industrial Applications.
6. NEMA ICS10-1993 – AC Automatic Transfer Switches.

B. The transfer switch assembly shall comply with the following standards:

1. CSA C22.2, No. 14 – M91 Industrial Control Equipment.
2. EN55011, Class B Radiated Emissions
3. EN55011, Class B Conducted Emissions
4. IEC 1000-4-5 (EN 61000-4-5); AC Surge Immunity.
5. IEC 1000-4-4 (EN 61000-4-4) Fast Transients Immunity
6. IEC 1000-4-2 (EN 61000-4-2) Electrostatic Discharge Immunity
7. IEC 1000-4-3 (EN 61000-4-3) Radiated Field Immunity
8. IEC 1000-4-6 Conducted Field Immunity
9. IEC 1000-4-11 Voltage Dip Immunity.
10. IEEE 62.41, AC Voltage Surge Immunity.
11. IEEE 62.45, AC Voltage Surge.
12. UL1008 – Transfer Switches. Transfer switches shall be UL1008 listed. UL1008 transfer switches may be supplied in UL891 enclosures if necessary to meet the physical requirements of the project.

C. The transfer switch manufacturer shall be certified to ISO 9001 International Quality Standard and shall have third party certification verifying quality assurance in design/development, production, installation, and service, in accordance with ISO 9001.

1.03 Acceptable Manufacturers

Only approved bidders shall supply equipment provided under this contract. Equipment specifications for this project are based on microprocessor-based transfer switches manufactured by Cummins Onan. Equipment by other suppliers that meets the requirement of this specification

are acceptable, if approved not less than 2 weeks before scheduled bid date. Proposals must include a line by line compliance statement based on this specification.

Part 2. PRODUCTS

2.01 Power Transfer Switch

A. Ratings

1. 225 amps, 480 volts, 4-pole, WCR=30,000 at 480 volts, NEMA 1 enclosure.
2. Main contacts shall be rated for 600 Volts AC minimum.
3. Transfer switch shall be rated to carry 100 percent of rated current continuously in the enclosure supplied, in ambient temperatures of -40 to +60 degrees C, relative humidity up to 95% (non-condensing), and altitudes up to 10,000 feet (3000M).
4. Transfer switch equipment shall have withstand and closing ratings (WCR) in RMS symmetrical amperes greater than the available fault currents at the specified voltage. The transfer switch and its upstream protection shall be coordinated. The transfer switch shall be third party listed and labeled for use with the specific protective device(s) installed in the application.

B. Construction

1. Transfer switches shall be double-throw, electrically and mechanically interlocked, and mechanically held in the source 1 and source 2 positions. The transfer switch shall be specifically designed to transfer to the best available source if it inadvertently stops in a neutral position.
2. Transfer switch shall be equipped with permanently attached manual operating handles and quick-break, quick-make over-center contact mechanisms.
3. Main switch contacts shall be high-pressure silver alloy. Contact assemblies shall have arc chutes for positive arc extinguishing. Arc chutes shall have insulating covers to prevent inter-phase flashover.
4. Transfer switch internal wiring shall be composed of pre-manufactured harnesses that are permanently marked for source and destination. Harnesses shall be connected to the control system by means of locking disconnect plug(s), to allow the control system to be easily disconnected and serviced without disconnecting power from the transfer switch mechanism.
5. Power transfer switch shall be provided with flame retardant transparent covers to allow viewing of switch contact operation but prevent direct contact with components that could be operating at line voltage levels.
6. Transfer switch designated as 4-pole shall be provided with a switched neutral pole. The neutral pole shall be of the same construction and have the same ratings as the phase poles. All poles shall be switched simultaneously using a common crossbar. Substitute equipment using overlapping neutral contacts is not acceptable.

C. Connections

1. Field control connections shall be made on a common terminal block that is clearly and permanently labeled.
2. Transfer switch shall be provided with AL/CU mechanical lugs sized to accept the full output rating of the switch. Lugs shall be suitable for the number and size of conductors shown on the drawings.

2.02 Transfer Switch Control

A. Operator Panel. Each transfer switch shall be provided with a control panel to allow the operator to view the status and control operation of the transfer switch. The operator panel shall be a sealed membrane panel rated NEMA 3R/IP53 or better (regardless of enclosure rating) that is permanently labeled for switch and control functions. The operator panel shall be provided with the following features and capabilities.

1. High intensity LED lamps to indicate the source that the load is connected to (source 1 or source 2); and which source(s) are available. Source available LED indicators shall operate from the control microprocessor to indicate the true condition of the sources as sensed by the control.

2. High intensity LED lamps to indicate that the transfer switch is "not in auto" (due to control being disabled or due to bypass switch (when used) enabled or in operation) and "Test/Exercise Active" to indicate that the control system is testing or exercising the generator set.
3. "OVERRIDE" pushbutton to cause the transfer switch to bypass any active time delays for start, transfer, and retransfer and immediately proceed with its next logical operation.
4. "TEST" pushbutton to initiate a preprogrammed test sequence for the generator set and transfer switch. The transfer switch shall be programmable for test with load or test without load.
5. "RESET/LAMP TEST" pushbutton that will clear any faults present in the control, or simultaneously test all lamps on the panel by lighting them.
6. The control system shall continuously log information on the number of hours each source has been connected to the load, the number of times transferred, and the total number of times each source has failed. This information shall be available via a PC-based service tool and an operator display panel.
7. Analog AC meter display panel, to display 3-phase AC Amps, 3-phase AC Volts, Hz, KW load level, and load power factor. The display shall be color-coded, with green scale indicating normal or acceptable operating level, yellow indicating conditions nearing a fault, and red indicating operation in excess of rated conditions for the transfer switch.
8. Vacuum fluorescent alphanumeric display panel with push-button navigation switches. The display shall be clearly visible in both bright (sunlight) and no light conditions. It shall be visible over an angle of at least 120 degrees. The Alphanumeric display panel shall be capable of providing the following functions and capabilities:
   a) Display source condition information, including AC voltage for each phase of normal and emergency source, frequency of each source. Voltage for all three phases shall be displayed on a single screen for easy viewing of voltage balance. Line to neutral voltages shall be displayed for 4-wire systems.
   b) Display source status, to indicate source is connected or not connected.
   c) Display load data, including 3-phase AC voltage, 3-phase AC current, frequency, KW, KVA, and power factor. Voltage and current data for all phases shall be displayed on a single screen.
   d) The display panel shall allow the operator to view and make the following adjustments in the control system, after entering an access code:
      i. Set nominal voltage and frequency for the transfer switch.
      ii. Adjust voltage and frequency sensor operation set points.
      iii. Set up time clock functions.
      iv. Set up load sequence functions.
      v. Enable or disable control functions in the transfer switch, including program transition.
      vi. Set up exercise and load test operation conditions, as well as normal system time delays for transfer time, time delay start, stop, transfer, and retransfer.
   e) Display Real time Clock data, including date, and time in hours, minutes, and seconds. The real time clock shall incorporate provisions for automatic daylight savings time and leap year adjustments. The control shall also log total operating hours for the control system.
   f) Display service history for the transfer switch. Display source connected hours, to indicate the total number of hours connected to each source. Display number of times transferred, and total number of times each source has failed.
   g) Display fault history on the transfer switch, including condition, and date and time of fault. Faults to include controller checksum error, low controller DC voltage, ATS fail to close on transfer, ATS fail to close on retransfer, battery charger malfunction, network battery voltage low, network communications error.

B. Internal Controls

1. The transfer switch control system shall be configurable in the field for any operating voltage level up to 600VAC. Provide RMS voltage sensing and metering that is accurate to within plus or

minus 1% of nominal voltage level. Frequency sensing shall be accurate to within plus or minus 0.2%. Voltage sensing shall be monitored based on the normal voltage at the site. Systems that utilize voltage monitoring based on standard voltage conditions that are not field configurable are not acceptable.

2. Transfer switch voltage sensors shall be close differential type, providing source availability information to the control system based on the following functions:

a) Monitoring all phases of the normal service (source 1) for under voltage conditions (adjustable for pickup in a range of 85 to 98% of the normal voltage level and dropout in a range of 75 to 98% of normal voltage level).

b) Monitoring all phases of the emergency service (source 2) for under voltage conditions (adjustable for pickup in a range of 85 to 98% of the normal voltage level and dropout in a range of 75 to 98% of pickup voltage level).

c) Monitoring all phases of the normal service (source 1) and emergency service (source 2) for voltage imbalance.

d) Monitoring all phases of the normal service (source 1) and emergency service (source 2) for loss of a single phase.

e) Monitoring all phases of the normal service (source 1) and emergency service (source 2) for phase rotation.

f) Monitoring all phases of the normal service (source 1) and emergency service (source 2) for over or under frequency conditions.

3. All transfer switch sensing shall be configurable from a Windows 95, 98, or NT PC-based service tool, to allow setting of levels, and enabling or disabling of features and functions. Selected functions including voltage sensing levels and time delays shall be configurable using the operator panel. Designs utilizing DIP switches or other electromechanical devices are not acceptable. The transfer control shall incorporate a series of diagnostic LED lamps.

4. The transfer switch shall be configurable to control the operation time from source to source (program transition operation). The control system shall be capable of enabling or disabling this feature, and adjusting the time period to a specific value. A phase band monitor or similar device is not an acceptable alternate for this feature.

5. The transfer switch shall incorporate adjustable time delays for generator set start (adjustable in a range from 0-15 seconds); transfer (adjustable in a range from 0-120 seconds); retransfer (adjustable in a range from 0-30 minutes); and generator stop (cooldown) (adjustable in a range of 0-30 minutes).

6. The transfer switch shall be configurable to accept a relay contact signal and a network signal from an external device to prevent transfer to the generator service.

7. The control system shall be designed and prototype tested for operation in ambient temperatures from -40C to +70C. It shall be designed and tested to comply with the requirements of the noted voltage and RFI/EMI standards.

8. The control shall have optically isolated logic inputs, high isolation transformers for AC inputs, and relays on all outputs, to provide optimum protection from line voltage surges, RFI and EMI.

9. The transfer switch shall be provided with a battery charger for the generator set starting batteries. The battery charger shall be a float type charger rated 2 amps. The battery charger shall include an ammeter for display of charging current and shall have fused AC inputs and DC outputs.

C. Control Interface

1. The transfer switch will provide an isolated relay contact for starting of a generator set. The relay shall be normally held open, and close to start the generator set. Output contacts shall be form C, for compatibility with any generator set.

2. Provide one set Form C auxiliary contacts on both sides, operated by transfer switch position, rated 10 amps 250 VAC.

3. The transfer switch shall provide relay contacts to indicate the following conditions: source 1 available, load connected to source 1, source 2 available, source 2 connected to load.

2.03 Enclosure

A. Enclosures shall be UL listed. The enclosure shall provide wire bend space in compliance to the latest version of NFPA70. The cabinet door shall include permanently mounted key type latches.

B. Transfer switch equipment shall be provided in a NEMA 1 or better enclosure.

C. Enclosures shall be the NEMA type specified. The cabinet shall provide code-required wire bend space at point of entry as shown on the drawings. Manual operating handles and all control switches (other than key-operated switches) shall be accessible to authorized personnel only by opening the key-locking cabinet door. Transfer switches with manual operating handles and/or non key-operated control switches located on outside of cabinet do not meet this specification and are not acceptable.

2.04 Two Source Manual Bypass

A. Transfer switches shown on the project drawings as bypass switches shall include (integral to the transfer switch assembly) transfer switch bypass and isolation equipment as described in this section. The bypass-isolation switch shall provide a means for manually bypassing the transfer switch from either source (Normal or Emergency) to the load, while under load if necessary, and to isolate the transfer switch from both sources for maintenance or repair. Designs that bypass to only one source are not acceptable under this specification.

B. Bypass-isolation switch equipment shall be UL Listed per Standard 1008, CSA Approved; with continuous current rating, voltage and frequency ratings, and withstand and closing ratings equal to the transfer switch ratings at the specified conditions of ambient temperature, humidity, and altitude.

C. The bypass-isolation and transfer switches shall be mechanically held in each position. Switching mechanisms shall be break before make on all poles, including the neutral pole on four pole switches. The switch mechanism shall be an over center toggle device which provides stored energy contact operation during both opening and closing. The speed of contact operation shall be independent of the force applied to the operating handles, which permit manual operation under load.

D. Bypass switch shall be a fully rated manually operated switch, rated for the same loads as the automatic transfer switch. Bypass switch shall provide bypass to either normal or emergency source by use of a door-mounted keyed source selector switch and a permanently mounted external-operating handle. Equipment shall provide manual bypass without disturbance of the power supply to the load. Equipment requiring load isolation before bypass is not acceptable for use on this project.

E. Equipment shall provide for manual bypass operation to the source opposite that to which the transfer switch is connected. This shall cause the transfer switch to go automatically to a position disconnected from both sources. Equipment that does not provide a rapid means of opposite source bypass is not acceptable under this specification.

F. Positive mechanical interlocks shall prevent all possible source to source interconnections. Designs which depend on electrical interlocks to prevent source to source interconnections, or which intentionally interconnect the sources, are not acceptable. The interlock system shall assure a properly sequenced, mechanically guided bypass and isolation action.

G. The equipment shall utilize automatic, solenoid-activated mechanical stops to prevent manually bypassing to a dead source. Equipment that does not prevent dead source bypass is not acceptable.

H. A drawout isolation mechanism shall provide closed-door isolation of the transfer switch, using a permanently mounted, external handle. The isolation mechanism shall be interlocked so that either the transfer switch must be bypassed or the transfer switch must be open, before the mechanism will permit isolation of the transfer switch.

I. The isolation mechanism shall provide for three-position operation; Connected, Test, and Isolated. In the Connected position, isolation contacts shall be fully engaged and closed, with the transfer switch control cable connected. In the Test position, isolation contacts shall be open and the transfer switch control cable connected. The Test position shall allow operational testing of

transfer switch and controls without power disruption to the load. In the Isolated position, the transfer switch and control shall be completely isolated from all power sources. In the isolated position, safety shutters shall close to cover bypass switch power terminals minimizing the possibility of accidental contact with energized parts. In the isolated position, the transfer switch shall be capable of being withdrawn from the cabinet, and removed using overhead lifting equipment. Mechanisms that do not allow for drawout and removal for servicing using overhead lifting equipment are not acceptable under this specification. When re-installing the transfer switch, from isolated to connected position, the isolation mechanism shall not permit connection of the transfer switch unless it is in the open position, and shall automatically open the transfer switch if necessary regardless of the availability of electrical power. When the transfer switch is fully connected and locked in place, the mechanism shall move the transfer switch from the open position to the closed position on the same source as the bypass switch.

J. The bypass and isolation process for the automatic transfer switch shall be capable of being fully accomplished without opening the cabinet door.

K. Note size and access requirements for the transfer switch with bypass isolation and provide equipment that will fit into the space allowed and comply with code-specified access requirements.

Part 3. OPERATION

3.01 Open Transition Sequence of Operation

A. Transfer switch normally connects an energized utility power source (source 1) to loads and a generator set (source 2) to the loads when normal source fails. The normal position of the transfer switch is source 1 (connected to the utility), and no start signal is supplied to the genset.

B. Generator Set Exercise (Test) With Load Mode. The control system shall be configurable to test the generator set under load. In this mode, the transfer switch shall control the generator set in the following sequence:

1. Transfer switch shall initiate the exercise sequence at a time indicated in the exercise timer program, or when manually initiated by the operator.
2. The transfer switch shall issue a compatible start command to the generator set, and cause the generator set to start and run at idle until it has reached normal operating temperature.
3. When the generator set has reached normal operating temperature or after an adjustable time period (whichever is shorter), the control system shall accelerate the generator set to rated voltage and frequency.
4. When the control systems senses the generator set at rated voltage and frequency, it shall operate to connect the loads to the generator set by opening the normal source contacts, and closing the alternate source contacts a predetermined time period later. The timing sequence for the contact operation shall be programmable in the controller.
5. The generator set shall operate connected to the load for the duration of the exercise period. If the generator set fails during this period, the transfer switch shall automatically reconnect the generator set to the normal service.
6. On completion of the exercise period, the transfer switch shall operate to connect the loads to the normal source by opening the alternate source contacts, and closing the normal source contacts a predetermined time period later. The timing sequence for the contact operation shall be programmable in the controller.
7. The transfer switch shall operate the generator set unloaded for a cooldown period, and then remove the start signal from the generator set. If the normal power fails at any time when the generator set is running, the transfer switch shall immediately connect the system loads to the generator set.

C. Generator Set Exercise (Test) Without Load Mode. The control system shall be configurable to test the generator set without transfer switch load connected. In this mode, the transfer switch shall control the generator set in the following sequence:

1. Transfer switch shall initiate the exercise sequence at a time indicated in the exercise timer program, or when manually initiated by the operator.

2. The transfer switch shall issue a compatible start command to the generator set, and cause the generator set to start and run at idle until it has reached normal operating temperature.
3. When the generator set has reached normal operating temperature or after an adjustable time period (whichever is shorter), the control system shall accelerate the generator set to rated voltage and frequency.
4. When the control systems senses the generator set at rated voltage and frequency, it shall operate the generator set unloaded for the duration of the exercise period.
5. At the completion of the exercise period, the transfer switch shall remove the start signal from the generator set. If the normal power fails at any time when the generator set is running, the transfer switch shall immediately connect the system loads to the generator set.

Part 4. OTHER REQUIREMENTS

4.01 Factory Testing. The transfer switch manufacturer shall perform a complete operational test on the transfer switch prior to shipping from the factory. A certified test report shall be available on request. Test process shall include calibration of voltage sensors.

4.02 Service and support

A. The manufacturer of the transfer switch shall maintain service parts inventory at a central location which is accessible to the service location 24 hours per day, 365 days per year.

B. The transfer switch shall be serviced by a local service organization that is trained and factory certified in both generator set and transfer switch service. The supplier shall maintain an inventory of critical replacement parts at the local service organization, and in service vehicles. The service organization shall be on call 24 hours per day, 365 days per year.

C. The manufacturer shall maintain model and serial number records of each transfer switch provided for at least 20 years.

D. The manufacturer shall supply to the owner a complete set of service and maintenance software for use in properly supporting the product. The software shall be provided at a training class attended by the user, to qualify the user in proper use of the software. The software shall have the following features and capabilities:

1. The software shall be 32 bit and shall be Windows '95, Windows '98, XP, and NT compatible.
2. The software shall use the Windows "Explorer" format, for ease of use and commonality with other software in use at the facility.
3. The software shall allow adjustment of all functions described herein via the tool; adjustment of operating levels of all protective functions; and programming of all optional functions in the controller. Adjustments shall be possible over modem from a facility that is remote from the generator set.
4. The software shall allow simulation of fault conditions, to verify operation of all protective devices.
5. The software shall include the ability to store and display data for any function monitored by the generator set control. This data shall be available in common file formats, and on graphical "strip chart" displays.
6. The software shall automatically record all control operations and adjustments performed by any operator or software user, for tracking of changes to the control.
7. The software shall display all warning, shutdown, and status changes programmed into transfer switch controller. For each event, the control shall provide information on the nature of the event, when it last occurred, and how many times it has occurred.
8. The software shall include detailed operation and service information on the specific generator set supplied, so that no other documentation (other than schematic and wiring diagram drawings) is necessary for service of the product.
9. The software shall have been developed under strict quality control guidelines, and comply with the requirements of ISO9001 and Mil Standard 498 for software development.

E. After generator set installation, the generator set supplier shall conduct a complete operation, basic maintenance, and emergency service seminar for up to 10 persons employed by the owner. The seminar shall include instruction on operation of the transfer equipment, normal testing and exercise, adjustments to the control system, use of the PC based service and maintenance tools provided under this contract, and emergency operation procedures. The class duration shall be at least 8 hours in length, and include practical operation with the installed equipment.

END OF SECTION 16500

SECTION 16600
FIRE DETECTION AND ALARM SYSTEM

PART 1 Installation

All equipment shall be attached to walls and ceiling/floor assemblies and shall be mounted firmly in place. Detectors shall not be supported solely by suspended ceilings. Fasteners and supports shall be sized to support the required load.

1.1 Conductors

The requirement of this section apply to all system conductors, including all signaling line, initiating device, notification appliance, auxiliary function, remote signaling, AC and DC power and grounding/shield drain circuits, and any other wiring installed by the Contractor pursuant to the requirements of these Specifications.

All circuits shall be rated power limited in accordance with NEC Article 760.

Installed in conduit.

All new system conductors shall be of the type(s) specified herein.

All initiating circuit, signaling line circuit, AC power conductors, shield drain conductors and grounding conductors, shall be solid copper, stranded or bunch tinned (bonded) stranded copper.

All signaling line circuits, including all addressable initiating device circuits shall be 18 AWG minimum multi-conductor jacketed twisted cable or twisted shielded or as per manufacturer's requirements.

All non-addressable initiating device circuits, 24 VDC auxiliary function circuits shall be 18 AWG minimum or per manufacturer's requirements.

All notification appliance circuit conductors shall be solid copper or bunch tinned (bonded) stranded copper. Where stranded conductors are utilized, a maximum of 7 strands shall be permitted for No. 16 and No. 18 conductors, and a maximum of 19 strands shall be permitted for No. 14 and larger conductors.

All audible notification appliance circuits shall be 14 AWG minimum twisted pairs or twisted pairs shielded or per manufacturer's requirements.

All visual notification appliance circuits shall be 14 AWG minimum THHN or twisted pairs or twisted shielded pairs or per manufacturer's requirements.

PART 2 Summary

Drawings and conditions of the contract, including but not limited to General Conditions, and the Special Conditions listed below, apply to work of this section.

Supplementary Instructions to Bidders.
Supplementary Conditions.
Summary of the Work.
Project Coordination.
Cutting and Patching.
Definitions and Standards.
Submittals.
Schedules and Reports.
Temporary Facilities.
Security Regulations.
Safety and Health.
Products.

Project Closeout.

PROJECT/WORK IDENTIFICATION

Project Name and Location: SHERIFF'S HEADQUARTERS BUILDING
Architect: CARSON FRANCO ASSOCIATES, INC.
Owners Representative for this project is: LORIE LOHMAN
Contract documents indicate the work of contract, and related requirements and conditions that have an impact on the project. Related requirements and conditions that are indicated on the contract documents include, but are not necessarily limited to, the following:

Existing site conditions and restrictions.
Other work prior to work of contract.
Alterations and coordination with existing work.

2.1 Alternates

2.1.1 Alternates

Strict conformance to this specification is required to ensure that the installed and programmed system will function as designed, and will accommodate the future requirements and operations of the building owner. All specified operational features must be met without exception.

The authorized representative of the manufacturer of the major equipment shall be responsible for the satisfactory installation of the complete system.

All equipment and components shall be the manufacturer's current model. The materials, appliances, equipment and devices shall be tested and listed by a nationally recognized approvals agency for use as part of a protected premises protective signaling system, access control, and smoke control. The authorized representative of the manufacturer of the major equipment, such as control panels, shall be responsible for the satisfactory installation of the complete system.

All control panel assemblies and connected field appliances shall be provided by the same system supplier, and shall be designed and tested to ensure that the system operates as specified. The system shall utilize independently addressed, microprocessor-based smoke detectors, heat detectors, as described in this specification.

All equipment and components shall be installed in strict compliance with the manufacturer's recommendations.

The equipment to be supplied will be considered only if it meets all sections of the performance specification. Any deviations of system performance outlined in this specification will only be considered when the following requirements have been met:

A complete description of proposed alternate system performance methods with three (3) copies of working drawings thereof for approval by the Owner, not less than ten (10) calendar days prior to the scheduled date for submission of bids.

The supplier shall furnish evidence that the proposed or alternate system performance is equal or superior to the system operation stated in the specification. Such evidence shall be submitted to and accepted by the Owner, not less than ten (10) calendar days prior to the scheduled date for submission of bids.

The supplier shall submit a point-by-point statement of compliance for all sections in this specification. The statement of compliance shall consist of a list of all paragraphs within these sections. Where the proposed system complies fully with the paragraph as written, placing the word "comply" opposite the paragraph number shall indicate such. Where the proposed system does not comply with the paragraph as written, and the supplier feels the proposed

system will accomplish the intent of the paragraph, a full description of the function as well as a full narrative description of how its proposal will meet its intent shall be provided. Any submission that does not include a point by point statement of compliance as described herein shall be disqualified. Where a full description is not provided, it shall be assumed that the proposed system does not comply.

The acceptability of any alternate proposed system shall be the sole decision of the Engineer.

2.2 Definitions

ADA: Americans with Disabilities Act.
AFF: Above Finished Floor.
AHJ: Authority Having Jurisdiction.
Approved: Unless otherwise stated, materials, equipment or submittals approved by the Authority or AHJ.
Circuit: Wire path from a group of devices or appliances to a control panel or transponder.
CPU: The central computer of a multiplex fire alarm or voice command control system.
CRC: Card Reader Controller
CRT: Cathode Ray Tube.
FACP: Fire Alarm Control Panel.
FCC: Fire Command Center.
FSCP: Firefighter's Smoke Control Panel

HVAC: Heating Ventilating and Air Conditioning.
IDC: Initiating Device Circuit.
LED: Light Emitting Diode.
LCD: Liquid Crystal Display.
NFPA: National Fire Protection Association.
NAC: Notification Appliance Circuit.
NCP: Local Network Control Panel.
PTR: Printer.
RCP Remote Control Panel
SLC: Signaling Line Circuit.
Style 1: As defined by NFPA 72, Class B.
Style 4: As defined by NFPA 72, Class B.
Style 6: As defined by NFPA 72, Class A.
Style 7: As defined by NFPA 72, Class A.
Style B: As defined in NFPA 72, Class B.
Style D: As defined in NFPA 72, Class A.
Style Y: As defined in NFPA 72, Class B.
UL or ULI: Underwriters Laboratories, Inc.
UL Listed: Materials or equipment listed and included in the most recent edition of the UL Fire Protection Equipment Directory.
Zone: Combination of one or more circuits or devices in a defined building area, i.e. 3 speaker circuits on a floor combined to form a single zone.

2.3 Interpretation

No interpretations of the meaning of the bid documents will be made to any bidder orally. Each request for such interpretation shall be made to the engineer in writing, addressed to: Gonzalo Aguilar (915) 581-5622

Provide written requests for interpretation. The Engineer will issue written interpretations and supplemental instructions.

2.4 Manufacturer

Acceptable fire alarm system manufacturers include:
Edwards Systems Technology, Inc.

All equipment and components shall be the manufacturer's current model. The materials, appliances, equipment and devices shall be tested and listed by a nationally recognized

approvals agency for use as part of a protected premises protective signaling (fire alarm) system and smoke control system. The authorized representative of the manufacturer of the major equipment, such as control panels, shall be responsible for the satisfactory installation of the complete system.

The contractor shall provide, from the acceptable manufacturer's current product lines, equipment and components, which comply, with the requirements of these specifications. Equipment or components, which do not provide the performance and features, required by these specifications are not acceptable, regardless of manufacturer.

2.5 Project Conditions

It shall be the Contractor's responsibility to inspect the job site and become familiar with the conditions under which the work will be performed. Inspection of the building may be made by appointment with the Owner. Contractors are urged to inspect the building prior to submitting bids.

The Contractor shall be responsible for prior coordination of all work and demolition with the Owner.

2.6 Summary

This performance specification provides the minimum requirements for the Life Safety System. The system shall include, but not limited to all equipment, materials, labor, documentation and services necessary to furnish and install a complete, operational system to include but not limited to the following functions:

Smoke and fire detection.
Sprinkler suppression system monitoring and control.
Off-premise notification.
Smoke control.
Releasing Service

2.7 Training

The System Supplier shall schedule and present a minimum of 8 hours of documented formalized instruction for the building owner, detailing the proper operation of the installed System.

The instruction shall be presented in an organized and professional manner by a person factory trained in the operation and maintenance of the equipment and who is also thoroughly familiar with the installation.

The instruction shall cover the schedule of maintenance required by NFPA 72 and any additional maintenance recommended by the system manufacturer.

Instruction shall be made available to the Local Municipal Fire Department if requested by the Local Authority Having Jurisdiction.

PART 3 References

All work and materials shall conform to all applicable Federal, State and local codes and regulations governing the installation. If there is a conflict between the referenced standards, federal, state or local codes, and this specification, it is the bidder's responsibility to immediately bring the conflict to the attention of the Engineer for resolution. National standards shall prevail unless local codes are more stringent. The bidder shall not attempt to resolve conflicts directly with the local authorities unless specifically authorized by the Engineer.

System components proposed in this specification shall be ULI listed to operate together as a system. The supplier shall provide evidence, with his submittal, of listings of all proposed equipment and combinations of equipment. The supplier shall be responsible for filing of all documents, paying all fees (including, but not limited to plan checking and permit) and securing all permits, inspections and

approvals. Upon receipt of approved drawings from the authority having jurisdiction, the supplier shall immediately forward two sets of drawings to the Owner. These drawings shall either be stamped approved or a copy of the letter stating approval shall be included.

3.1 Codes

3.1.1 Codes (Fire)

The equipment and installation shall comply with the current provisions of the following codes and standards:

NFPA 70 - 2002 National Electric Code®
NFPA 72 - 1999 National Fire Alarm Code®
NFPA 90A - 1999 Air Conditioning Systems
NFPA 92A - 2000 Smoke Control Systems
NFPA 92B - 2000 Smoke Management Systems in Malls, Atria, and Large Areas
NFPA 101- 2000 Life Safety Code®
UL 864 - Control Units for Fire Protective Signaling Systems.

UL 268 - Smoke Detectors for Fire Protective Signaling Systems.
UL 268A - Smoke Detectors for Duct Applications.
UL 217 - Single and Multiple Station Smoke Alarms
UL 521 - Heat Detectors for Fire Protective Signaling Systems.
UL 228 - Door Closers-Holders, With or Without Integral Smoke Detectors.
UL 464 - Audible Signaling Appliances.
UL 38 - Manually Actuated Signaling Boxes for Use with Fire-Protective Signaling Systems
UL 346 - Waterflow Indicators for Fire Protective Signaling Systems.
UL 1971 - Signaling Devices for the Hearing-Impaired.
UL 1481 - Power Supplies for Fire Protective Signaling Systems.
UL 1711 - Amplifiers for Fire Protective Signaling Systems.
UL 1635 - Digital Alarm Communicator System Units

El Paso Fire Department

Federal Codes and Regulations

Texas Accessibility Standards (TAS)

Americans with Disabilities Act (ADA)

Factory Mutual (FM) approval

International Standards Organization (ISO)
ISO-9000
ISO-9001

European Union (EU)
EMC Directive 89/336/EEC

Electromagnetic Compatibility Requirements

CENELL - Appropriate European Committee for Electro-Technology Standardization Standards.

PART 4 Submittals

4.1 Close Out

Ten (10) copies of the following documents shall be delivered to the building owner's representative at the time of system acceptance. The close out submittals shall include:

Project specific operating manuals covering the installed integrated life safety system. The manual shall contain a detailed narrative description of the system architecture, inputs, notification signaling, auxiliary functions, annunnciation, sequence of operations, expansion capability, application considerations and limitations. Manufacturer's data sheets and installation manuals/instructions for all equipment supplied. A generic or typical owner's instruction and operation manual shall not be acceptable to fulfill this requirement.

As-Built drawings consisting of: a scaled plan of each building showing the placement of each individual item of the Integrated Life Safety System equipment as well as raceway size and routing, junction boxes, and conductor size, quantity, and color in each raceway. All drawings must reflect point to point wiring, device address and programmed characteristics as verified in the presence of the engineer and/or the end user unless device addressing is electronically generated, and automatically graphically self-documented by the system.

All drawings shall be provided in standard .DXF format. A vellum plot of each sheet shall also be provided.

The application program listing for the system as installed at the time of acceptance by the building owner and/or local AHJ (disk, hard copy printout, and all required passwords).

Provide the name, address and telephone of the authorized factory representative.

A filled out Record of Completion similar to NFPA 72, 1999 edition figure 1-6.2.1.

4.2 Project

The contractor shall purchase no equipment for the system specified herein until the engineer has approved the project submittals in their entirety and has returned them to the contractor. It is the responsibility of the contractor to meet the entire intent and functional performance detailed in these specifications. Approved submittals shall only allow the contractor to proceed with the installation and shall not be construed to mean that the contractor has satisfied the requirements of these specifications. The contractor shall submit three (3) complete sets of documentation within 30 calendar days after award of purchase order.

Each submittal shall include a cover letter providing a list of each variation that the submittal may have from the requirements of the contract documents. In addition the Contractor shall provide specific notation on each shop drawing, sample, catalog cut, data sheet, installation manual, etc. submitted for review and approval, of each such variation.

All drawings and diagrams shall include the contractor's title block, complete with drawing title, contractor's name, address, date including revisions, and preparer's and reviewer's initials

Product Data
Data sheets with the printed logo or trademark of the manufacturer for all equipment. Indicated in the documentation will be the type, size, rating, style, and catalog number for all items proposed to meet the system performance detailed in this specification. The proposed equipment shall be subject to the approval of the Architect/Engineer.

Shop Drawings
A complete set of shop drawings shall be supplied. The shop drawings shall be reproduced electronically in digital format. This package shall include but not be limited to:

Control panel wiring and interconnection schematics.
Complete point to point wiring diagrams.
Riser diagrams.
Complete floor plan drawing locating all system devices and 1/4' = 1'-0 scale plan and elevation of all equipment in the Fire Command Station. Including showing the placement of each individual item of fire alarm, security, and access control equipment as well as raceway size and routing, junction boxes, and conductor size, quantity, and color in each raceway.

Detailed system operational description. Any Specification differences and deviations shall be clearly noted and marked.
Complete system bill of material.
All drawings shall be reviewed and signed off by an individual having a minimum NICET level III certification in fire protection engineering technology, subfield of fire alarm systems.

Samples
A sample of each smoke detector, intelligent modules, horn, strobes, card reader controller, card reader, and door locking mechanism shall be provided to the contractor for their familiarization.

Quality Assurance/Control Submittals
Installer's Certification

The engineered systems distributor must be licensed in the state of Texas and have been incorporated in the business in Texas for a minimum of 5 years.
Submit a copy of the system supplier's training certification issued by the manufacturer of the integrated life safety system, and a copy of the installing technician's NICET certification.

System Calculations
Complete calculations shall be provided which show the electrical load on the following system components:
Each system power supply, including stand alone booster supplies.
Each standby power supply (batteries).
Each notification appliance circuit.
Each auxiliary control circuit that draws power from any system power supply.

PART 5 Quality Assurance

5.1 Manufacturer

5.1.1 Fire Alarm System
The manufacturer of the system equipment shall be regularly involved in the design, manufacture, and distribution of all products specified in this document. These processes shall be monitored under a quality assurance program that meets the ISO 9000 requirements.

All System components shall be the cataloged products of a single supplier. All products shall be listed by the manufacturer for their intended purpose.

Edwards Systems Technology, Inc. products constitute the minimum type and quality of equipment to be installed.

All control panel assemblies and connected field appliances shall be both designed and manufactured by the same company, and shall be tested and cross-listed as to ensure that a fully functioning is designed and installed. The system supplied under this specification shall be a microprocessor-based direct wired, multi-priority peer-to-peer networked system. The system shall utilize independently addressed, microprocessor-based smoke detectors, heat detectors, and modules as described in this specification.

5.2 Qualifications of Contractor

5.2.1 Fire Only
The contractor shall have successfully installed similar system fire detection, evacuation voice and visual signaling control components on a previous project of comparable size and complexity. The owner reserves the right to reject any control components for which evidence of a successful prior installation performed by the contractor cannot be provided.

The contractor shall have in-house engineering and project management capability consistent with the requirements of this project. Qualified and approved representatives of the

system manufacturer shall perform the detailed engineering design of central and remote control equipment. Qualified and approved representatives of the system manufacturer shall produce all panel and equipment drawings and submittals, operating manuals. The contractor is responsible for retaining qualified and approved representative(s) of those system manufacturers specified for detailed system design and documentation, coordination of system installation requirements, and final system testing and commissioning in accordance with these specifications.

PART 6 System Description

6.1 Description

6.1.1 Description

Provide and install a new fire detection and alarm system consisting of:

Fire command center shall be located in existing Security Room, Area "B"

LCD annunciator shall be located at main entry and adjacent to panel.

Manual pull stations shall be located as shown on the drawings.

Area smoke detection shall be provided as shown on drawings.

Area heat detection shall be provided as shown on drawings.

Duct smoke detection shall be provided as shown on the drawings.

Monitor the sprinkler system waterflow(s) and valve supervisory switch(s).

Monitor the stand alone suppression systems as shown on the drawings.

Provide audible appliances located throughout the building, as shown on the drawings.

Provide synchronized visual appliances located throughout the building, as shown on the drawings.

Provide fan shutdown controls as shown on drawings.

Provide direct interface to the building automation system.

Provide elevator recall functions for primary and alternate floors and elevator power shunt trip activation.

Provide connection to a central station. The owner shall arrange for two dedicated phone lines to be terminated as directed by the installing contractor.

Remove the existing fire detection and alarm system(s).

Replace existing initiating and notification devices as necessary to provide a compatible and code compliant installation.

6.2 General

6.2.1 General

The Contractor shall furnish all labor, services and materials necessary to furnish and install a complete, functional fire alarm system (System). The System shall comply with all pertinent codes, rules, regulations and laws of the Authority, and local jurisdiction. The System shall comply in all respects with the requirements of the specifications, manufacturer's

recommendations and Underwriters Laboratories Inc. (ULI) listings.

Upon completion of this work, the Owner shall be provided with:

Complete information and drawings describing and depicting the entire system(s) as installed, including all information necessary for maintaining, troubleshooting, and/or expanding the system(s) at a future date.

Complete documentation of system(s) testing.

Certification that the entire system has been inspected and tested; is installed entirely in accordance with the applicable codes, standards, manufacturer's recommendations and ULI listings, and is in proper working order. Contractor shall use "Fire Alarm System Certification and Description" as required by Section 1-6.2 of NFPA 72 - 1999 edition.

6.3 Operations

6.3.1 *Sequence of Operations*

6.3.1.1 General

Upon the alarm activation of any area smoke detector, heat detector, manual pull station, sprinkler waterflow, the following functions shall automatically occur:

The internal audible device shall sound at the control panel or command center.
The LCD display shall indicate all applicable information associated with the alarm condition including; zone, device type, device location and time/date.
Any remote or local annunciator LCD/LED's associated with the alarm zone shall be illuminated.
Activate notification audible appliances for general alarm evacuation.
Activate visual strobes notification for general alarm evacuation. The visual strobe shall continue to flash until the system has been reset. The visual strobe shall not stop operating when the "Alarm Silence" is pressed.
Transmit signal to the building automation system.
Transmit signal to the central station with point identification.
Activate automatic smoke control sequences.
All automatic events programmed to the alarm point shall be executed and the associated outputs activated.
All stairwell/exit doors and electromagnetic locks shall unlock throughout the building.
All self-closing fire/smoke doors held open shall be released.
All card access magnetic door locks shall be released.

6.3.1.2 Duct Smoke Activation-Supervisory

The supervisory activation of any duct smoke detector, the following functions shall automatically occur:

The internal audible device shall sound at the control panel or command center.
The LCD display shall indicate all applicable information associated with the supervisory condition including; zone, device type, device location and time/date.
Any remote or local annunciator LED's associated with the alarm zone shall be illuminated.
Transmit signals to remote annunciators located in building security desk, the engineer's office and the building management office.
Transmit signal to the building automation system.
Transmit signal to the central station with point identification.
Shutdown the local air handling unit.
All automatic events programmed to the alarm point shall be executed and the associated outputs activated.

All card access magnetic door locks shall be released.

6.4 System Configuration

To maximize survivability, each panel/node including annunciators shall use a multiple microprocessor design so that the failure of a single microprocessor will not result in a total failure.

6.4.1.1 General

All Life Safety System equipment shall be arranged and programmed to provide the early detection of fire, the notification of building occupants, the automatic summoning of the local fire department, the override of the HVAC system operation, and the activation of other auxiliary systems to inhibit the spread of smoke and fire, and to facilitate the safe evacuation of building occupants.

6.4.1.2 Power Supply

Standby power supply shall be an electrical battery with capacity to operate the system under maximum supervisory load for 24 hours and capable of operating the system for 5 minutes in the alarm mode at 100% load. The system shall include a charging circuit to automatically maintain the electrical charge of the battery. The system shall automatically adjust the charging of the battery to compensate for temperature.

6.4.1.3 Display

The main display interface shall show the first and most recent highest priority system events without any operator intervention. All system events shall be directed to one of four message queues. Messages of different types shall never intermixed to eliminate operator confusion. A "Details" switch shall provide additional information about any device highlighted by the operator.

6.4.1.4 Initiating Device Circuits

Initiating device circuits monitoring manual fire alarm stations, smoke and heat detectors, waterflow switches, valve supervisory switches, fire pump functions, and air pressure supervisory switches shall be Class B (Style "A").

6.4.1.5 Notification Appliance Circuits

All notification appliance circuits shall be Class B (Style "Y"). All notification appliance circuits shall have a minimum circuit output rating of: 2 amps @ 24 vdc; 50 watts @ 25V audio, and 35 watts @ 70V audio. The notification circuits shall be power limited. Non-power limited circuits are not acceptable.

6.4.1.6 Signaling Line Circuits

When a signaling line circuit covers more than one fire/smoke compartment, a wire-to-wire short shall not effect the operation of the circuit from the other fire/smoke compartments. The signaling line circuit connecting network panel/nodes, annunciators, command centers, shall be Class A (style 7). The media shall be copper except where fiber optic cable is specified on the drawings.

The signaling line circuit connecting to addressable/analog devices including, detectors, monitor modules, control modules, isolation modules, intrusion detection modules and notification circuit modules shall be Class A (style 7).

6.4.1.7 DACT

The system shall provide off premise communications capability (DACT) for transmitting system events to multiple Central Monitoring Station (CMS) receivers. The system shall provide the CMS(s) with point identification of system events using Contact ID or SIA DCS protocols. The system shall provide an individual CMS account for each tenant, and send the required signals to the one or more CMS(s) and account(s) specified by each tenant. In the event of a panel CPU failure during a fire alarm condition, the DACT degrade mode shall transmit a general fire alarm signal to the CMS.

PART 7 Field Mounted System Components

7.1 Fire Initiating Devices

7.1.1 Detector Bases

7.1.2 Detector Base - Standard

Provide standard detector mounting bases suitable for mounting on either North American 1-gang, 3½ or 4 inch octagon box and 4 inch square box, or European BESA or 1-gang box. The base shall, contain no electronics and support all series detector types.

7.1.3 Duct Smoke Detector

7.1.3.1 Duct Detector Housing

Provide smoke detector duct housing assemblies to mount an analog/addressable detector along with a standard, relay or isolator detector mounting base. The housing shall also protect the measuring chamber from damage and insects. The housing shall utilize an air exhaust tube and an air sampling inlet tube that extends into the duct air stream up to ten feet. Drilling templates and gaskets to facilitate locating and mounting the housing shall also be provided. The housing shall be finished in baked red enamel. Remote alarm LED indicators and remote test stations shall be provided.

7.1.4 General - Signature

7.1.5 Manual Stations

7.1.5.1 Manual Station - Double Action Single Stage

Provide analog/addressable double action, single stage fire alarm stations at the locations shown on the drawings. The fire alarm station shall be of polycarbonate construction and incorporate an internal toggle switch. A locked test feature shall be provided. The station shall be finished in red with silver "PULL IN CASE OF FIRE" lettering. The manual station shall be suitable for mounting on North American 2 ½ (64mm) deep 1-gang boxes and 1 ½ (38mm) deep 4 square boxes with 1-gang covers.

7.1.6 Multi-Sensor Ion-Photo Smoke Detector

7.1.6.1 Smoke Detector - Multi-Sensor Ion Photo

Provide analog/addressable multisensor smoke detectors at the locations shown on the drawings. Alarm condition shall be based upon the combined input from the photoelectric, and ionization and thermal detection elements. Separately mounted photoelectric detectors, ionization detectors and heat detectors in the same location, clustered at the manufacturer's listed spacing is an acceptable alternative. The detector shall have the ability to set the sensitivity and alarm verification of each individual detector on the circuit. It shall be possible to automatically set the sensitivity of individual analog/addressable detectors for the day and night periods.

Each smoke detector shall be capable of transmitting prealarm and alarm signals in addition to the normal, trouble and need cleaning information. It shall be possible to program control panel activity to each level. Each smoke detector may be individually programmed to operate at any one of five (5) sensitivity settings. Each detector microprocessor shall contain an environmental compensation algorithm that identifies and sets ambient environmental thresholds approximately six times an hour. The microprocessor shall monitor the environmental compensation value and alert the system operator when the detector approaches 75% and 100% of the allowable environmental compensation value.

7.1.7 ROR-Fixed Temperature Heat Detectors

7.1.7.1 Fixed Temperature-ROR Heat Detector

Provide analog/addressable combination fixed temperature / rate-of-rise detectors at the locations shown on the drawings. The heat detector shall have a nominal fixed temperature alarm point rating of 135°F (57°C) and a rate of rise alarm point of 15°F(9°C) per minute. The heat detector shall be rated for ceiling installation at a minimum of 70 ft (21.3m) centers and be suitable for wall mount applications.

7.2 Initiation & Control Modules

7.2.1 Relay Module

Provide addressable control relay circuit modules at the locations shown on the drawings. The module shall provide one (1) form C dry relay contacts rated at 24Vdc @ 2 amps (pilot duty) to control external appliances or equipment. The position of the relay contact shall be confirmed by the system firmware.

7.2.2 Notification Appliance Circuits

Provide addressable notification appliance circuit modules at the locations shown on the drawings. The module shall provide one (1) supervised Class B notification circuit. The module shall provide polarized audible / visual selection for 24Vdc @ 2amps, audio outputs at 25Vrms @ 50 watts or 70 Vrms @ 35 watts.

7.3 Notification Appliances

All appliances which are supplied for the requirements of this specification shall be UL Listed for Fire Protective Service, and shall be capable of providing the "equivalent facilitation" which is allowed under the Americans with Disabilities Act Accessabilities Guidelines (ADA(AG)), and shall be UL 1971 Listed.

All appliances shall be of the same manufacturer as the fire alarm control panel specified to insure absolute compatibility between the appliances and the control panels, and to insure that the application of the appliances are done in accordance with the single manufacturer's instructions.

Any appliances that do not meet the above requirements, and are submitted for use must show written proof of their compatibility for the purpose intended. Such proof shall be in the form of documentation from all manufacturers that clearly states that their equipment (as submitted) is 100% compatible with each other for the purpose intended. All strobes shall be provided with lens markings oriented for wall mounting.

All notification appliances shall be white unless noted otherwise on the drawings.

7.3.1 Horn-Strobes

7.3.1.1 Low Profile Horn-Strobes

Provide low profile wall mount horn/strobes at the locations shown on the drawings. The horn/strobe shall provide an audible output of 84 dBA at 10 ft. when measured in reverberation room per UL-464. Strobes shall provide synchronized flash outputs. The strobe output shall be determined as required by its specific location and application from a family of 15cd, 30cd, 60cd, 75cd & 110cd devices. The horn shall have a selectable steady or synchronized temporal output. In and out screw terminals shall be provided for wiring. Low profile horn/strobes shall mount in a North American 1-gang box.

PART 8 Panel Components & Functions

8.1 Dialer

8.1.1 DACT

The system shall provide off premise communications capability using a digital alarm

communications transmitter (DACT) for sending system events to multiple central monitoring station (CMS) receivers. The system shall provide the CMS(s) with point identification of system events using Contact ID or SIA DCS protocols. The system shall provide an individual CMS account for each tenant, and send the required signals to the one or more CMS(s) and account(s) specified by each tenant. In the event of a panel CPU failure during a fire alarm condition, the DACT degrade mode shall transmit a general fire alarm signal to the CMS.

8.2 General

8.2.1 Control Panel

The control panel(s) shall be a multi-processor based networked system designed specifically for fire, one-way and two-way emergency audio communications, smoke control, extinguishing agent releasing system, and guard patrol applications. The control panel shall be listed and approved for the application standard(s) as listed under the General section.

The control panel shall include all required hardware, software and site specific system programming to provide a complete and operational system. The control panel(s) shall be designed such that interactions between any application can be configured, and modified using software provided by a single supplier. The control panel(s) operational priority shall assure that life safety takes precedence among the activities coordinated by the control panel.

The control panel shall include the following capacities:
Support up to 2500 analog/addressable points.
Support network connections up to 63 other control panels and annunciators.
Support multiple digital dialers and modems
Support multiple communication ports and protocols
Support up to 1740 chronological events.
The network of control panels shall include the following features:
Ability to download all network applications and firmware from the configuration computer from the configuration computer from a single location on the system.
Provide electronic addressing of analog/addressable devices.
Provide an operator interface control/display that shall annunciate, command and control system functions.
Provide an internal audible signal with different programmable patters to distinguish between alarm, supervisory, trouble and monitor conditions.
Provide a discreet system control switch provided for reset, alarm silence, panel silence, drill switch, previous message switch, next message switch and details switch.
Provide system reports that provide detailed description of the status of system parameters for corrective action or for preventative maintenance programs. Reports shall be displayed by the operator interface or capable of being printed on a printer.
Provide an authorized operator with the ability to operate or modify system functions like system time, date, passwords, holiday dates, restart the system and clear control panel event history file.
Provide an authorized operator to perform test functions within the installed system.

The control panel shall contain a standby power supply that automatically supplies electrical energy to the system upon primary power supply failure. The system shall include a charging circuit to automatically maintain the electrical charge of the battery.

8.3 Power Supply

8.3.1 Power Supply

System power supply(s) shall provide multiple power limited 24 VDC output circuits as required by the panel.

Upon failure of normal (AC) power, the affected portion(s) of the system shall automatically switch over to secondary power without losing any system functions.

Each system power supply shall be individually supervised. Power supply trouble signals shall identify the specific supply and the nature of the trouble condition.

All standby batteries shall be continuously monitored by the power supply. Low battery and disconnection of battery power supply conditions shall immediately annunciated as battery trouble and identify the specific power supply affected.

All system power supplies shall be capable of recharging their associated batteries, from a fully discharged condition to a capacity sufficient to allow the system to perform consistent with the requirements of this section, in 48 hours maximum.

All AC power connections shall be to the building's designated emergency electrical power circuit and shall meet the requirements of NFPA 72 - The AC power circuit shall be installed in conduit raceway. The power circuit disconnect means shall be clearly labeled FIRE ALARM CIRCUIT CONTROL and shall have a red marking. The location of the circuit disconnect shall be labeled permanently inside the each control panel the disconnect serves.

8.4 Reports

8.4.1 Reports

The system shall provide the operator with system reports that give detailed description of the status of system parameters for corrective action, or for preventative maintenance programs. The system shall provide these reports via the main LCD, and shall be capable of being printed on any system printer.

The system shall provide a report that gives a sensitivity listing of all detectors that have less than 75% environmental compensation remaining. The system shall provide a report that provides a sensitivity (% Obscuration per foot) listing of any particular detector.

The system shall provide a report that gives a listing of the sensitivity of all of the detectors on any given panel in the system, or any given analog/addressable device loop within any given panel.

The system shall provide a report that gives a chronological listing of up to the last 1740 system events.

The system shall provide a listing of all of the firmware revision listings for all of the installed network components in the system.

8.5 Ancillary Equipment/and Cabling

8.5.1 Ancillary Equipment/and Cabling

Provide all equipment and cabling necessary to incorporate the existing fire alarm system into the new Fire Alarm Control Panel.

PART 9 Warranty and Maintenance

9.1 Spare Parts

9.1.1 Spare Parts

The Contractor shall supply the following spare parts:

Automatic detection devices - Two (2) percent of the installed quantity of each type.

Manual fire alarm stations - Two (2) percent of the installed quantity of each type.

Audible and visible devices - One (1) percent of the installed quantity of each type, but no less than two (2) devices.

Keys - A minimum of three (10) sets of keys shall be provided and appropriately identified.

9.2 Warranty

The contractor shall warranty all materials, installation and workmanship for one (1) year from date of written acceptance. A copy of the manufacturer's warranty shall be provided with close-out documentation and included with the operation and installation manuals.

The System Supplier shall maintain a service organization with adequate spare parts stock within 75 miles of the installation. Any defects that render the system inoperative shall be repaired within 24 hours of the owner notifying the contractor.

END OF SECTION 16600

SECTION 16700
INTRUSION DETECTION ALARM SYSTEM

PART 1 GENERAL

1.01 SUMMARY

A. Section Includes
   1. Control Panel
   2. Associated Equipment

B. Related Sections
   1. Section 13700 - Security Access and Surveillance
   2. Section 13800 - Building Automation and Control

1.02 REFERENCES

A. Underwriters Laboratories (UL):
   1. UL 365 – Police Station Connected Burglar Alarm Units and Systems
   2. UL 609 – Local Burglar Alarm Units and Systems
   3. UL 611 – Central Station Burglar-Alarm Units
   4. UL 985 – Household Fire Warning System Units
   5. UL 1023 – Household Burglar-Alarm System Units
   6. UL 1076 – Proprietary Burglar Alarm Units and Systems
   7. UL 1610 – Central Station Burglar-Alarm Units

B. Federal Communications Commission (FCC):
   1. Code of Federal Regulations Title 47 - Part 15 – Radio Frequency Devices.
   2. Code of Federal Regulations Title 47 - Part 68 – Connection of Terminal Equipment to the Telephone Network.

C. National Fire Protection Association (NFPA):
   1. NFPA70 – National Electrical Code.

1.03 SYSTEM DESCRIPTION

A. The system shall be a Burglary Alarm System that includes the following capabilities:
   1. Listed for UL Commercial Burglary
   2. Supports up to 250 zones.
   3. Supports up to eight (8) separate partitions.
   4. Supports up to 250 users.
   5. Provides integrated security, access control, and CCTV switching capability.
   6. Provides supervision of peripheral devices.
   7. Supports up to 96 optional relay outputs.
   8. Supports long-range radio (LRR) communication.
   9. Provides scheduling capability to allow for automated operations.
   10. Supports up to eight (8) alphanumeric paging devices.
   11. Supports panel linking.
   12. Supports alarm reporting via Internet.
   13. Interfaces with automation software.

1.04 SUBMITTALS

A. Submittals shall include manufacturer data sheets for all major system components.

1.05 QUALITY ASSURANCE

A. The alarm manufacturer shall be certified as being compliant with ISO9001.

PART 2 PRODUCTS

The control panel shall be the ADEMCO VISTA-250BP Commercial Burglary Partitioned Security System or approved equal.

2.01 SYSTEM PERFORMANCE

A. Control Panel - The control panel shall be an eight (8)-partition, UL commercial burglary control panel that supports up to 250 zones using basic hardwired, polling loop, and wireless zones. It shall also provide supervision of the bell output, RF receivers, and relay modules. In addition, the control shall provide the ability to schedule time-driven events, and allow certain operations to be automated by pressing a single button. The system shall be capable of interfacing with an ECP long range radio (LRR) unit that can send Contact ID messages, and alphanumeric paging devices. The control shall provide integrated access control and CCTV-switching capability.

1. Basic Hardwired Zones - The control shall provide nine (9) style-B hardwire zones with the following characteristics:

   a. EOLR supervision (optional for zones 2-8): Shall support N.O. or N.C. sensors (EOLR supervision required for UL installations).

   b. Individually assignable to one of eight (8) partitions.

   c. Support up to 50 two-wire latching glass break detectors on one selected zone.

2. Optional Expansion Zones

   a. Polling Loop Expansion – The control shall support up to 241 additional hardwire zones using a built-in two-wire polling (multiplex) loop interface. The polling loop shall provide power and data to remote point modules, and constantly monitor the status of all zones on the loop. Maximum current draw shall not exceed 128 mA. The polling loop zones shall have the following characteristics:

      (1) Interface with RPM (Remote Point Module) devices that provide Class B, Style Y (e.g., 4208U/4208SN) or a combination of Class B, Style Y, and Class A, Style Z (e.g., 4208SNF) zones.

      (2) Individually assignable to one of eight (8) partitions.

      (3) Supervised by the control panel.

      (4) A 12,000 ft (3658 m) wire run capability without using shielded cable.

      (5) Each RPM (Remote Point Module) enclosure shall be tamper protected.

3. Partitions – The control shall provide the ability to operate eight (8) separate areas, each functioning as if it had its own control. Partitioning features shall include:

   a. A Common Lobby partition (1-8), which can be programmed to perform the following functions:

      (1) Arm automatically when the last partition that shares the common lobby is armed.

      (2) Disarm when the first partition that shares the common lobby is disarmed.

   b. A Master partition (9), used strictly to assign keypads for the purpose of viewing the status of all eight (8) partitions at the same time (master keypads).

   c. Assignable by zone.

d. Assignable by keypad.

e. Assignable by relay to one or all eight (8) partitions.

f. Ability to display fire and/or burglary and panic and/or trouble conditions at all other partitions' keypads (selectable option).

g. Certain system options selectable by partition, such as entry/exit delay and subscriber account number.

4. User Codes – The control shall accommodate 250 user codes, all of which can operate any or all partitions. Certain characteristics must be assignable to each user code, as follows:

   a. Authority level (Master, Manager, or several other Operator levels). Each User Code (other than the installer code) shall be capable of being assigned the same or a different level of authority for each partition that it will operate.

   b. Opening/Closing central station reporting option.

   c. Specific partitions that the code can operate.

   d. Global arming capability (ability to arm all partitions the code has access to in one command).

   e. Use of an RF (button) to arm and disarm the system (RF key must first be enrolled into the system).

5. Peripheral Devices – The control shall support up to 30 addressable ECP devices, which can be any combination of keypads, RF receivers, relay modules, annunciator modules, and interactive phone modules. Peripheral devices have the following characteristics:

   a. Each device set to an individual address according to the device's instructions.

   b. Each device enabled in system programming.

   c. Each device's address shall be supervisable (via a programming option).

6. Keypad/Annunciator – The control shall accommodate up to (6) touch-screen (i.e.; advanced user interface) keypads. The keypads shall be capable of the following:

   a. Performing all system arming functions.

   b. Being assigned to any partition.

   c. Providing four programmable single-button function keys, which can be used for:

      (1) Panic Functions –activated by wired and wireless keypads; reported separately by partition.

      (2) Keypad Macros –32 keypad macro commands per system (each macro is a series of keypad commands). Assignable to the A, B, C, and D keys by partition.

7. Output Relays - The system shall be capable of handling a total of 96 relay outputs using relay modules. Each relay module shall provide four (4) Form C (normally open and normally closed) relays for general-purpose use or two (2) Class-B, Style-Y supervised notification appliance circuit outputs, when using the 4204CF module. The relays shall be capable of being:

   a. Programmed to activate in response to system events.

   b. Programmed to activate using time intervals.

   c. Activated manually.

   d. Assigned an alpha descriptor.

e. Used for Class B, Style-Y supervised bell outputs (4204CF module).

f. A combination of 4204 (ECP) and 4101SN (polling loop) relays.

8. Voltage Triggers – The system shall provide voltage triggers, which change state for different conditions. Used with LRR (Long Range Radio) equipment or other devices such as a remote keypad sounder, keyswitch ARMED and READY LEDs, or a printer to print the system's event log.

9. Event Log – The System shall maintain a log of different event types (enabled in programming). The event log shall provide the following characteristics:

   a. Stores up to 1,000 events.

   b. Viewable at the keypad or through the use of Compass software.

   c. Printable on a serial printer using a 4100SM Module including zone alpha descriptors.

   d. Stores PassPoint access control events.

   e. Sends printed events to up to eight (8) alphanumeric pagers.

10. Scheduling - Provides the following scheduling capabilities:

   a. Open/close schedules (for control of arming/disarming and reporting).

   b. Holiday schedules (allows different time windows for open/close schedules).

   c. Timed events (for activation of relays, auto-bypassing and un-bypassing, auto-arming and disarming, etc.).

   d. Access schedules (for limiting system access to users by time)

   e. End User Output Programming Mode (provides 20 timers for relay control).

   f. The system shall automatically adjust for daylight savings time.

11. Communication Features - Supports the following formats and features for the primary and secondary central station receivers:

   a. Formats

      (1) ADEMCO Low Speed (Standard or Expanded).

      (2) Sescoa/Radionics.

      (3) ADEMCO Express.

      (4) ADEMCO High Speed.

      (5) ADEMCO Contact ID.

   b. Backup reporting – The system shall support backup reporting via the following:

      (1) Secondary phone number.

      (2) ECP long-range radio (LRR) interface.

      (3) Option to select long range radio (LRR) or dialup as the primary reporting method (dynamic signaling feature).

   c. Internet reporting – The system shall be capable of communicating with the central station via the internet using Alarmnet-i. It shall shall provide the user with the ability to control the system via a browser interface (i.e., AOL, Netscape, Internet Explorer). All packet data transmitted to the monitoring station shall be encrypted with a minimum of 1024 bits of encryption.

12. Audio Alarm Verification Option - Provides a programmable Audio Alarm Verification (AAV) option that can be used in conjunction with an output relay to permit voice dialog between an operator at the central station and a person at the premises.

13. Cross-Zoning Capability - Helps prevent false alarms by preventing a zone from going into alarm unless its cross-zone is also faulted within 5 minutes.

14. Pager Interface – The Control Panel shall be capable of sending event information to an alphanumeric pager via a VA-8201 pager interface device.

15. Exit Error False Alarm Prevention Feature – The System shall be capable of differentiating between an actual alarm and an alarm caused by leaving an entry/exit door open. If not subsequently disarmed, the control panel shall:
    a. Bypass the faulted E/E zone(s) and/or interior zones and arm the system.
    b. Generate an Exit Error report by user and by zone so the central station knows it was an exit alarm and who caused it.

16. Built-in User's Manual and Descriptor Review - For end-user convenience, the control panel shall contain a built-in User's Manual. It shall include the following capabilities:
    a. By depressing any of the function keys on the keypad for five (5) seconds, a brief explanation of that function shall scroll across the alphanumeric display.
    b. By depressing the READY key for five (5) seconds, all programmed zone descriptors shall be displayed (one at a time). This feature shall provide a check for installers and ensure all descriptors have been entered properly.

17. Programming - The Control shall be capable of being programmed locally or remotely using the ADEMCO Compass Downloader and shall be capable of:
    a. Uploading and downloading all programming information at 300 baud.
    b. Uploading and displaying firmware revision levels from the control.

18. Panel Linking - The Control shall be capable of being networked together with up to eight other controls and being operated by any keypad within the system. It shall provide the ability for users to:
    a. Control multiple zones, partitions, and/or buildings from a central location.
    b. Check status, arm and disarm any partition from any keypad in the system.
    c. Globally arm or disarm partitions based upon user authority.

19. Automation Software - The Control shall be capable of interfacing with automation software via an RS232 input on a single partition.

2.02 ENCLOSURE

A. The Control Panel shall be enclosed in a metal cabinet, suitable for wall mounting. The dimensions shall not exceed 14.5 inches (36.8 cm) in height, 12.5 inches (31.8 cm) in width or 3 inches (7.6 cm) in depth.

2.03 ELECTRICAL POWER REQUIREMENTS

A. System Power – The Burglary Alarm System shall operate using standard 120 volts AC, 50/60 Hz power. Connect to stand-by engine generator power.

1. Control Primary Power – Transformer power shall be 16.5 VAC, 40VA.

2. Backup Battery – A rechargeable 12 VDC, gel type, lead acid backup battery shall be provided. The battery shall be rated between 7 and 34-ampere hours (AH).

3. Alarm Power – Alarm power shall be 10 - 13.8 VDC, 1.7 amps for each bell output

4. Auxiliary Standby Power – Standby power shall be 9.6 - 13.8 VDC, 750 mA maximum.

5. Fusing – The battery input, auxiliary, and bell outputs shall be protected using PTC circuit breakers. All outputs shall be power limited.

2.04. ENVIRONMENTAL CONDITIONS

A. Environmental Conditions – The Burglary Alarm System shall be designed to meet the following environmental conditions.

1. Storage Temperature – The system shall be designed for a storage temperature of -10° C to 70°C (14° F to 158°F).

2. Operating Temperature - The system shall be designed for an operating temperature of 0° C to 50°C (32° F to 120°F).

3. Humidity - The system shall be designed for normal operation in an 85% relative humidity environment.

4. Electromagnetic Interference – The system shall meet or exceed the requirements of FCC Part 15, Class B devices, FCC Part 68, IEC EMC directive.

2.05. MOTION DETECTORS

A. Motion Detectors shall be Ademco Model # Quest2260SN (Microwave/PIR polling loop motion) or equivalent.

2.06. GLASS BREAK SENSORS

A. Glass Break Detectors shall be Ademco Model # FG1625SN or equivalent.

2.07. DOOR CONTACTS

A. Door Contacts shall be Ademco Model # 4944SN or equivalent.

1. Use 913WH (3/4" diameter) adapter for steel-door applications.

2.08. CONTROL KEYPAD

A. Control Keypads shall be Ademco Model # 6160 Alpha Display Keypad or equivalent.

2.09. ANCILLARY EQUIPMENT

A. Provide all equipment and cabling necessary to incorporate the existing Intrusion Detection devices and sensors into the new control panel.

PART 3 EXECUTION

3.01 EXAMINATION

A. The site shall be visited on a regular basis to appraise ongoing progress of other trades and contracts, make allowances for all ongoing work, and coordinate the requirements of this contract in a timely manner.

3.02 INSTALLATION

A. The System shall be installed and tested in accordance with the Manufacturer's Installation instructions. The following conditions are applicable:

1. In order to ensure a complete, functional System, for bidding purposes, where information is not available from the Owner upon request, the worst case condition shall be assumed.

2. Interfaces shall be coordinated with the Owner's representative, where appropriate.

3. All necessary backboxes, pullboxes, connectors, supports, conduit, cable, and wire shall be furnished and installed to provide a complete and reliable System installation. Exact location of all boxes, conduit, and wiring runs shall be presented to the Engineer for approval in advance of any installation.

4. All conduit, cable, and wire shall be installed parallel and square with building lines, including raised floor areas. Conduit fill shall not exceed forty percent (40%). All wires shall be gathered and tied up to create an orderly installation.

3.03 TESTING AND CERTIFICATION

A. The Contractor shall demonstrate the functionality of the System upon completion of installation, documenting the result of all tests and providing these results to the Owner. The System shall be tested in accordance with the following:

1. The Contractor shall conduct a complete inspection and test of all installed equipment. This includes testing and verifying connection to equipment of other Divisions.

2. The Contractor shall provide staff to test all devices and all operational features of the System for witness by the Owner's representative. The Contractor shall provide two-way radio communications to assist in the testing. All testing must be witnessed by the owner's representative, prior to acceptance.

3. The testing and certification shall take place as follows:

a. System shall be tested in conjunction with the manufacturer's representative.

b. All deficiencies noted in the above test shall be corrected.

c. Test results shall be submitted to the consultant or owner's representative.

d. System test witnessed by owner's representative and correction of any deficiencies noted.

e. The owner's representative shall accept the System.

f. System test shall be witnessed by the Authority having Jurisdiction, and any deficiencies that are noted shall be corrected.

4. A letter of certification shall be provided to indicate that the tests have been performed and all devices are operational.

END OF SECTION 16700

SECTION 16800
ACCESS CONTROL/SECURITY SYSTEM

GENERAL

1.1 SUMMARY

A. Related Documents: Provisions established within the General and Supplementary Conditions of the Contract, Division 1 - General Requirements, and the Drawings are collectively applicable to this Section.

1. Complete access control and alarm monitoring including:
   a) Access control.
   b) Security:
      1) Threat Level Management
      2) Time Zones controlled with Linking Logic
      3) Hot-Swap Communications Server
      4) Point Monitoring
      5) High Level Elevator Control Interface
      6) Photo ID Badging
      7) Guard Tour
      8) Time and Attendance
      9) Key Tracking
      10) Image Recall with Historic and User Accountability Reporting
      11) Live CCTV display/control
      12) Interface with Paging, CCTV, Parking, Central Station Automated Alarm Systems, HVAC, and Elevator Control Systems
      13) Digital Video Recorder Integration

SYSTEM OVERVIEW

B. PC based: The system is a PC based Building/Facility Management and Monitoring System used to control and monitor personnel and alarm activity. The DSX system shall provide 5 different controllers that offer various configurations of card reader inputs, relay outputs and alarm inputs. These controllers shall be combined to provide the exact number of inputs and outputs required for each application. DSX controllers shall use fully distributed database architecture with real-time processing performed at each controller.

C. Distributed Processing: This fully distributed processing provides that all information (time, date, valid codes, access levels, etc) is downloaded to the controllers so that each controller makes its own access control decisions. There are no hierarchical or intermediate processors to make decisions for the controllers. Also the PC is not required to make any decisions for the controllers including any global functions. This provides Instant response to card reads regardless of system size. This also provides for no degradation of system performance in the event of communication loss to the host (or actual loss of host). All time zones, access levels, linking events, holiday schedules, and global functions remain operational. Upon communication loss to the host all controllers shall automatically buffer event transactions until the host communications is restored, at which time the buffered events will be automatically uploaded to the host. The system maintains full feature capability regardless of the style of the communications from the PC. The DSX dial-up modem sites shall utilize all standard features like elevator control and linking between controllers without the PC needing to be online.

D. System Size: The system shall be designed to support up to 32,000 separate Locations using a single PC with combinations of direct connect, dial-up or TCP/IP LAN connections to each Location. DSX defines a loop of up to 64 controllers as one Location. Each Location has its own database and history at the host PC. Locations may be combined to share a common database and create a very large network of controllers. Each Location can have up to 128 devices.

E. Intelligent Controllers: Each DSX controller shall be an Intelligent Control Unit. The first controller of every Location is designated as the "Master". All subsequent controllers at the same Location are designated as "Slaves". Any DSX controller may be selected by

dipswitch settings to work as the Master controller. The Master controller performs all the same functions as a Slave controller, but it is also responsible for polling all Slave controllers and communicating with the host PC. The Master controller does not make any access decisions for the Slave controllers. It is simply the messenger for information from the controllers to the PC and for information from the PC to the controllers.

F. Controller operating system resides in Flash ROM on each controller. It is upgradeable thru a download from the Host PC to each of the 1040 Series and 1022 controllers in the system. Upgrades in controller operating system shall NOT require PROM changes.

G. Processing Power: Each intelligent controller uses an Intel microprocessor (same as a PC) as its engine. In a large system, the total processing may approach, or even exceed that of a Mini Computer. Instead of all the processing power being centralized in one "Mini" it is distributed throughout the system.

1.2 SYSTEM REQUIREMENTS

A. Software Requirements:
1. WinDSX program based on 32-bit Windows NT application, and compatible with Windows NT Workstation 4.0 w/ Service Pack 6a, Windows 2000/XP Professional and Windows 2000/2003 Server utilizing Active Directory.
2. WinDSX-SQL program utilizes Microsoft SQL Server 2000/2005 for database deployment and management.
3. Multi-user and multi-tasking capability allowing for independent activities and monitoring to occur simultaneously at different Workstation PCs.
4. Utilize graphical user interface with simple pull-down menus and a menu tree format that conform to interface guidelines defined by Microsoft Corporation.
5. Allow for language localization.
6. Allow LAN/WAN network applications, using TCP/IP protocol, with up to 1000 Workstation PCs.
7. System shall be site licensed, not seat licensed.
8. System shall have open architecture that allows importing and exporting of data and ability to interface with other systems.
9. Operator Identification logon password protected.

B. Hardware Requirements:
1. Server PC: Windows NT Workstation 4.0 w/ Service Pack 6a, Windows 2000/XP Professional and Windows 2000/2003 Server capable PC with a 1 GHz Pentium processor / 256MB RAM (minimum) or greater depending on system parameters.
2. Workstation PC: Windows NT Workstation 4.0 w/ Service Pack 6a, Windows 2000/XP Professional capable PC with a 800 MHz Pentium processor / 128MB RAM (minimum) or greater depending on system parameters.
3. Other requirements as indicated herein.

1.3 QUALITY ASSURANCE

A. Manufacturer:
1. Minimum of 10 years experienced in providing security access control components for projects of similar nature and complexity.
2. Maintain a 24-hour toll free telephone assistance line for installing dealer support.

B. Installer:
1. Minimum of 5 years experience in performing work of this section who has specialized in the installation of work similar to that required for this project.
2. Have at least one technician trained by the manufacturer.
3. Maintain adequate supply of replacement parts for system components provided.

C. Regulatory Requirements: Installed products shall meet standards of a recognized testing laboratory (UL. or comparable).

1.4 SUBMITTALS

A. Submit in accordance with requirements of Section 01330.

B. Shop Drawings: Detailing all connected devices, of sufficient detail to adequately communicate that recommended software meets access system requirements, including:

1. System device locations on architectural floor plans.
2. Full schematic wiring information for all devices. Wiring information shall include cable type, conductor routings, quantities, and connection details at devices.
3. A complete access control system one-line block diagram.
4. System sequence operation description.

C. Product Data:
1. Manufacturer's data for all material and equipment, including terminal devices, local processors, computer equipment, access cards, and any other equipment required for the complete access management and alarm monitoring system.
2. System description, including analysis and calculations used in sizing equipment, and also indicating how equipment will operate as a system to meet the performance requirements of the access control and alarm monitoring system.
3. A description of the operating system and application software.

D. Contract Close-out Submittals:
1. Operating instructions.
2. Recommended maintenance required and maintenance intervals.
3. Parts list, including: wiring and connection diagrams.
4. Record Documents: Maintained on a separate hard copy set of drawings, elementary diagrams, and wiring diagrams of the access control and alarm monitoring system, accurately reflecting all changes and additions to the access control and alarm monitoring system.

1.5 DELIVERY, STORAGE, AND HANDLING

A. Comply with requirements of Section 01600.
1. Deliver materials in manufacturer's original, unopened, undamaged containers with identification labels intact.
2. Store materials protected from exposure to harmful environmental conditions and at temperature conditions recommended by manufacturer.
3. Handle products and systems in accordance with manufacturer's instructions.

1.6 WARRANTY

A. Project Warranty: Comply with requirements of General and Special Conditions.

B. Manufacturer's Warranty: Submit manufacturer's standard warranty document executed by authorized company official. Manufacturer's warranty is in addition to, and not a limitation of, other rights Owner may have under the Contract Documents.
1. Warranty Period: Two years from date of Written Final Completion.

2 PRODUCTS

2.1 ACCEPTABLE MANUFACTURER

A. DSX Access Systems, Inc.
10731 Rockwall Road
Dallas, Texas 75238
(214) 553-6140 voice
(214) 553-6147 facsimile
(800) 346-5288 voice

2.2 SERVER or WORKSTATION CONFIGURATION

A. 100% IBM compatible PC approved by Microsoft Corporation for running the Microsoft Windows NT Workstation 4.0, Windows 2000/XP Professional or Windows 2000/2003 Server operating system and having the following minimum requirements: (Provide One)
1. Processors:
a) Pentium 800 MHz / 128 MB RAM (minimum) Host PC single PC, single Location system, or LAN Workstation for single Location system.
b) Pentium 1 GHz / 256 MB RAM (minimum) for LAN Comm. Server or File Server for single Location.
c) Pentium 1.8 GHz / 512 MB RAM (minimum) for LAN Comm. Server and/or combination File Server for multiple Location system.

2. Operating System: Windows NT Workstation 4.0 w/ Service Pack 6a, Windows 2000/XP Professional or Windows 2000/2003 Server.
3. Hard Disk: 1 Gigabyte free space.
4. Drives:
   a) 3.5-inch- floppy drive
   b) 6x CD-ROM drive or higher.
5. Sound Card: Windows and Sound Blaster compatible; required for sound operations; not required for system operation.
6. Super VGA monitor, 800 x 600 pixels minimum resolution; 17-inch recommended.
7. Backup Device: Tape, Zip or CD-Rom recommended but not required for system operation.
8. Peripherals:
   a) Serial Ports: Minimum of 1 for either direct or dial-up modem communications.
   b) Mouse: Microsoft IntelliMouse or equivalent recommended but not required.
   c) Modem: DSX provided external dial-up modem only.
9. LAN:
   a) Adapter Card: Required for LAN applications only. 100Mbit is optimum.
   b) If no LAN is required, an MS Loopback Adapter (provided by Windows NT and Windows 2000/XP) shall be used.

B. Printer: All Windows NT/2000/XP supported printers; required for transaction hard copy. (Provide One)

2.3 SOFTWARE

A. Software: WinDSX or WinDSX-SQL Software, complete with the following features and functions:

1. 32-bit access control and alarm monitoring system that conforms to the programming and interface guidelines defined by Microsoft Corporation for Windows NT 4.0 w/ Service Pack 6a, Windows 2000/XP Professional, Windows 2000/2003 Server or Microsoft SQL Server 2000/2005 compatible software.

2. Basic Functions:
   a) Access Control.
   b) Activity Monitoring.
   c) Database Management.
   d) Database Reporting.
   e) Point status and overrides.

3. System Capacities:
   a) Support a minimum of 32,000 Locations having grouping capabilities to share cardholder databases between sites.
   b) Support a minimum of 4,096,000 readers or 128 reader-controlled doors per Location.
   c) Support a minimum of 170 different card reader formats
   d) Support 1.6-billion cardholders total or up to 50,000 access codes/cards per Location.
   e) Support a minimum of 32,000 supervised alarm inputs or a minimum of 2048 per Location.
   f) Support a minimum of 32,000 programmable outputs or a minimum of 2048 per Location.
   g) Support up to 32,000 facility codes (site codes) total or a minimum of 2048 per Location.
   h) Support a minimum of 32,000 time zones or a minimum of 2048 per Location with each time zone having 3 holiday overrides

i) Support a minimum of 32,000 companies/card holder groups.

j) Support a minimum of 32,000 self-purging/auto-renewing holidays.

k) Support a minimum of 99 user defined fields per Location.

l) Support a minimum of 32,000 system operators.

m) Support a minimum of 32,000 password profiles to determine accessibility of system functions for each operator.

n) Support a minimum of 999 operator comments.

o) Support a minimum of 32,000 graphic alarm maps for full input, output, CCTV control, DVR control, and alarm handling.

p) Support a minimum import of 21 graphic file types for maps.

q) Support a minimum of 32,000 custom action messages per Location to instruct operator on action required when alarm is received.

r) Support a minimum of 32,000 ASCII output messages per Location for use to interface with CCTV and pager systems.

s) Support a minimum of 32,000 input to output links.

t) Support a minimum of 32,000 code to output links.

u) Support a minimum of 999 guard tours.

v) Each controlled entry/exit shall have the ability to be locked (secured) and unlocked (open) up to 4 times a day through time zone programming.

w) Each monitored input shall have the ability to be armed and disarmed up to 4 times a day through time zone programming.

x) Each reader/keypad shall have the ability to be enabled/disabled up to 2 times a day through time zone programming.

y) Each card/code shall have the ability to be enabled/disabled up to 4 times per day per entry point through access level programming.

z) Provide for support up to 9999 cameras displayed per workstation with live video and Pan, Tilt, Zoom, Scan and Auxiliary controls in video window.

aa) Support a minimum of 32,000 Access Levels.

bb) Support a minimum of 4 Anti-Passback zones per Location.

4. Basic System Features: These features are considered to be standard without the need for any add-on software or hardware.

a) Shall have up to 1000 Workstations with one site license.

b) Each workstation shall have access to all features if password profile allows. In addition if workstation is used for other tasks (applications) system has option of having an Alarm Pop-up window appear to alert of pending alarms while the operator is using some other program.

c) Password profiles shall be individually customized to allow or disallow operator access to any program function for each Location.

d) Workstation Event Filtering: Shall allow user to define events and alarms that will be displayed at each workstation. Each workstation shall be able to define and assign time zone controlled filters. In addition if an alarm is unacknowledged (not handled by another workstation) for a preset amount of time the alarm will automatically appear on the filtered workstation.

e) Stackable Device Types: Shall allow for a different Wiegand Device Type to be assigned to each Device and all Devices within the same Location sharing the various formats between them.

f) Threat Level Management: With a click of a mouse, press of a button, or presentation of a Card, the system shall be instantly reconfigured to

coincide with the Homeland Security Advisory System and meet any heightened security requirements.

g) CCTV Alarm Interface: Shall allow commands to be sent to CCTV systems during alarms (or input change of state) thru serial ports.

h) Animated Response Graphics: Provide for highlighting Alarms with flashing Icons on graphic maps. The current status of alarm inputs and outputs shall be displayed and constantly updated to display changes in real time through animated Icons.

i) Provide the ability to view and control cameras from the graphic maps.

j) Multimedia Alarm Annunciation: Provide for WAV files to be associated with alarm events for audio annunciation or instructions.

k) Alarm Handling: Each input may be configured so that an alarm cannot be cleared unless it has returned to normal, and/or option of requiring the operator to enter a comment about disposition of alarm.

l) Provide 99 User Defined Fields for cardholder data. System shall have the ability to run searches and reports off of any combination of these fields. Each UDF can be configured with any combination of the following features. MASK: Determines a specific format that data must comply with. REQUIRED: Operator is required to enter data into field before saving. UNIQUE: Data entered must be unique. DE-ACTIVATE DATE: Data entered will be evaluated as an additional de-activate date for all cards assigned to this cardholder. NAME ID: Data entered will be considered a unique id for the cardholder. AUTO INCREMENTING CARD NUMBER: Badge serial number that prompts the operator to increment the number each time the badge is printed. UDF DATA IS HIDDEN: The system shall also provide the ability to restrict the viewing of certain UDFs containing sensitive information on a field-by-field basis. SELECT DATA FROM LIST: This allows data to be predefined and lets the user pick one of the selections from a drop down list. The choices and the order in which they are viewed can be predefined.

m) Time and Attendance reporting shall be provided to match in/out reads and display cumulative time in for each day and cumulative time in for length of the report.

n) Guard Tour: Shall provide ability to Plan, Track and Route tours. Shall produce alarm during tour if guard fails to make a station. Tours can be programmed for sequential or random tour station order.

o) Pager System Interface: Alarms shall be able to activate a pager system with customized message for each input alarm.

p) Floor Select Elevator Control and Reporting: Provide for any Card read to activate any floor from the appropriate Cab and report what floor was selected by which cardholder.

q) After Hours HVAC control: Provide for any Card read to activate or control individual HVAC zones based on access and linking level.

r) A means for importing of custom Icons for representation of Inputs, Outputs, or Cameras shall be provided.

s) Photo ID Badging: Provide ability to import images from bitmap file formats, digital cameras, TWAIN cameras, scanners, or live video. Allows image cropping and editing, WYSIWYG badge building application, and full badge printing/print preview capabilities.

t) Photo Recall on Card Use: Provide means that Images can be automatically displayed on a workstation in response to any card read on any reader, as dictated by Time zone per card reader.

u) Photo Recall on Event Selection: Provide means that Images can be manually displayed on a workstation by clicking on the Access Granted or Denied event.

v) Four Zones of Global Anti-Passback: Provide four separate zones per Location that can operate without requiring interaction with the host PC (done at controller level). In addition each anti-Passback reader can be further designated as Hard, Soft or Timed in each of the four anti-Passback zones.

w) Global IO Linking: Provide that any Input or Output can link to any other Input or Output within the same Location without requiring interaction with the host PC (done at controller level).

x) Global Code to IO linking: Provide that any access granted event can link to any input or output within the same Location without requiring interaction with the Host PC (done at controller level).

y) Alarm Automation Interface (Smart Port): Provide High level interface to central station alarm automation software systems. Allows input alarms to be passed to and handled by automation systems in the same manner as burglar alarms, using an RS-232 ASCII interface.

z) Alarm Echo Offsite Monitoring: Provide the ability to allow a Same software remote access control system at a central site to provide after hours monitoring of other Same software primary access control system(s) via dial-up modems.

aa) Remote Control/Diagnostics: Provide the ability to allow a Same software remote access control system at a central site operator to call the Host PC at a another Same software primary access control system and control inputs, outputs and card readers via dial-up modems without performing a download or affecting the downloaded data.

bb) Visitor Management: Provide for and allow an operator to be restricted to only working with visitors. Shall have ability to enroll codes for visitors and can only assign access levels that have designated as approved for visitors. Provides for an automated Logbook of, visitor name, date and whom visitor contacted.

cc) Reports: Provide for but not be limited to:

1) Custom History Report Generation: Reports shall be tailored to exact requirements of who, what, when, where, and report parameters can be stored for future recreation of report.
2) Custom History Reports can be previewed, printed to local or network printer or saved to file.
3) Automatic History Report Generator: Provides history reports to be named, saved, and scheduled for automatic generation, printing and/or emailed.
4) Card Holder Reports shall have options to include complete cardholder data or selected parts as well as ability to be sorted by Name, Card number, Imprinted number or by User Defined Fields.
5) Card Holder By Reader Reports: Provide ability to run Card Holder reports based on who has access to a specific reader or group of readers by selecting the readers from a list.
6) Card Holder By Access Level Reports: Provide ability to run Card Holder reports that display everyone that has been assigned to the specified access level.
7) Card Holder by Output Linking Level Reports: Provide ability to run Card Holder reports that display everyone that has been assigned to the specified Output linking level.
8) Card Holder Photo Roster Report: Provide the ability to print from 1 to 50 card holder pictures per page along with any other card holder data as required.
9) Emergency "Who is IN" report (or Muster report): Provide for one Click operation on tool bar to launch report. "Who is IN" must also have ability to be initiated by alarm defined separately by workstation. Input alarm can be any input on any controller.

10) Management reports to include but not be limited to, Number Of People With Activity, Card Holders Currently On Site, Ins And Outs, Activity Summary sorted by Company, Daily Activity and Card Holders Currently Not On Site.

11) Number of Uses: Provides total number of uses at specified reader. This report is useful for the billing of after hours HVAC use. Report must have option to be sorted by Cardholder or by Company.

12) Panel Labels report. Provide ability to print out the control panel field documentation including the actual Location of equipment, programming parameters, and wiring identification. The system shall be capable of maintaining system installation data within the system database so that it is available on site at all times.

13) Scheduled Override Report: Allows for a report of Scheduled Overrides programmed in the Workstation screen.

14) Activity/Alarm On Line Printing: Provide activity printers to be used at any workstation, printing all events or just alarms.

dd) Key Control Software: Provide ability to store what (conventional metal) keys are issued and to whom, along with key construction information. Reports can be generated to list everyone that has possession of a specified key. Key assignments can be included in Card Holder Reports.

ee) All messages from PC to controllers and controllers to controllers shall be on a polled network that utilizes check summing and acknowledgement of each message. All communication shall be verified and will automatically be buffered and retransmitted if the message is not acknowledged.

ff) TCP/IP Host PC to Controller Communications: Host PC provides for communications to be redirected through a LAN/WAN to a TCP/IP address, rather than through a conventional serial port connection.

gg) Regional Time Zone Settings: Provide for the adjustment of Time Zone references for both Workstation PC's and sets of controllers based on their physical locale.

hh) Selectable Poll Frequency and Message Time Out settings: Provide means to deal with bandwidth and latency issues for TCP/IP, RF and other PC to Controller communications methods by changing the polling frequency and the amount of time the system waits for a response.

ii) Scheduled Override of individual Input and Outputs. Provide the ability to schedule temporary future date overrides to Arm or Bypass inputs, and Secure or Open Outputs. A scheduled override shall consist of a start time/date and an action to perform coupled with a stop time/date and action to perform.

jj) Override Groups: Provide Groups (or sets) of inputs and outputs that can be monitored and controlled through one Icon. A summary Icon shall be used to display status of all items in the override group. Override group Icons may be placed on graphic maps and may have Scheduled Overrides applied.

kk) Automatic and Encrypted Backups: Provide for database and history back-ups to be automatically stored (anywhere on network) and encrypted with a 9 character alpha-numeric password which must be used to restore or read data contained in the back-up. Shall provide ability to set the number of automatic sequential back-ups before the oldest backup becomes overwritten, (FIFO mode).

ll) Operator Audit Trail: Provide for recording and reporting of all changes made to the database. This option shall have the ability to be toggled off.

mm) Copy command in database: Provide for like data to copied and then edited for specific requirements, (eliminates redundant data entry).

nn) Inputs, outputs, and maps shall have a display order assigned that determine the order shown under status and over-ride windows.

oo) Cardholder: Provide for but not limited to the following;

1) Shall have the ability to create multi-Location access levels combined with the ability to assign an unlimited number of access levels to a card. Each access level may include any combination of doors from any Location. Each door within the access level may have 4 time zones associated with it.
2) Temporary Access Levels: Provide temporary access levels to be assigned to a card using user defined start and stop dates.
3) Shall have the ability to assign an unlimited number of Access Levels per cardholder.
4) Card Use it or Lose it: Shall be able to specify on a per company basis the length of time a card holder can go without using their card before their card is deactivated.
5) Shall have Name search engine with capabilities such as, can search by Last name, First name, Company, User defined data, Codes not used in "X" days, Skills or by 7 other methods. Shall have ability In Workstation to display anti-Passback status to quickly verify if user is in facility.
6) Multiple De-Activate Dates for Cards: Provide user defined fields to be configured as additional Stop Dates to deactivate any cards assigned to the card holder.
7) Shall have the ability to set a Start/Stop time as well as date for card activation/de-activation.
8) Data Base program shall have Active/De-activate buttons in the tool bar that can quickly change users status. Simultaneous multiple selections is an option.
9) Batch card printing shall be provided as standard.
10) Default Card data can be programmed to speed data entry for sites where most card data will is similar.
11) Enhanced ASCII File Import Utility shall be provided to allow the importing of cardholder data and images.
12) Provide a Cards Expire When Used At This Reader option that allows readers to be configured to deactivate cards when a card is used at that device. Typically used at Visitor badge return.

pp) Shall Automatically define an Output (reader controlled output relay) and Input (door position switch) with the name of the card reader each time a card reader is added to the system to speed data entry.

qq) Re-Occurring Holiday Schedules: Provide option for holidays to be set to re-occur each year, preventing holiday from being purged from system once the date passes.

rr) The date time shall be displayed and printed in the format that matches that of the host PC, referred to as windows short date format.

5. Additional Enhancements: These enhancements require additional software and/or hardware to be provided under this contract.

a) A PC Master program that allows a PC to perform the polling and communication duties normally handled by a Location's Master panel. Advantages to this configuration are as follows:

1) Communications to the Slave panels can be routed through multiple serial ports and/or TCP/IP LAN/WAN network connections.
2) Greater control can be exerted over the Master to Slave polling frequency. This allows the system to function over slower communication methods.

3) The communications to the Slave panels can be separated into several different channels that operate simultaneously thus providing a substantial increase in the rate of data collection and data distribution.

b) A Soft I/O program that provides the ability to integrate other external systems such as HVAC, intercom, fire and elevator control via serial data links between the systems.

c) A Hot Swap Redundancy program that provides continued availability of system communications and control through the implementation of Primary and Backup Communications Server PCs.

d) A DVR Driver interface that provides the ability to integrate with various OEM Digital Video Recorders thus allowing stored and live video from the DVR to be accessed from within the Access Control program via a LAN/WAN connection.

2.4 HARDWARE

A. Starter/Update Kit: WinStart: (Provide one)

1. Consists of one copy of the WinDSX software on CD, one copy of the Tech Binder that contains a minimum of 1each of the Software Installation manual, Hardware Installation manual, Design Guide (or Product Catalog), and two separately bound copies of the User's Manual. Provide in version [Current Production release (default)] [or specific Previous to Current release].

2. Model DSX-1042PKG Intelligent 2 Door I/O Controller: (Provide as required)
   a) Designed for two-door reader/key pad with future growth capabilities to 8 readers application. May add individual 1042, 1043 or 1044 controllers for additional capacity of Readers, Relays or Inputs.
   b) Inputs: 8 EOL supervised inputs
      1) Each capable of 2, 3, or 4 state point monitoring with trouble reports.
   c) Outputs: 2 relay, 2-Open collector outputs, 2 pre-warn, 6 LED drivers, as follows:
      1) 2 - Form C, 5 amp rated relay outputs.
      2) 2 - Open collector outputs 100ma
      3) 2 - pre-warn outputs for door being held open sounders.
      4) 6 - LED output Drivers to show lock status and or valid card read status at the reader or keypad.
   d) Basic Features:
      1) UL 294 compliant.
      2) Complete distributed processing: Never any reliance on host PC for any decision making.
      3) Access verifications for all cards performed at controller.
      4) Linking: Input to Input, Input to Output, Output to Input, Output to Output, Code to Input and Code to Output Linking. Done locally at controller AND/OR controller to controller within same Location.
      5) Status LED for each Input.
      6) Status LED for each Output.
      7) Controller Polled LED.
      8) Separate communication received and transmitted LEDs.
      9) Processor functioning properly LED.
      10) Dynamic Battery load test: Programmable using a spare output to trip the Battery Test Input. Battery test may also be manually initiated thru PC at any time.
      11) Battery Load shed circuit.

12) Controller can report to PC a loss of DC power, and low battery as separate alarms.
13) Status LED for DC power to Controller.
14) Real time on board clock/calendar generation that is synchronized with host PC clock/calendar.
15) Dynamic memory allocation.
16) Change to/from auto buffering of all transactions based on communications status.
17) Point to point RS-485 4 wire controller communications allowing up to 4,000 feet between each 1042PKG.
18) Wiring Management System that includes wire chases, cable ties and mounting clips.
19) Silkscreen detailing displays wiring termination and function of all terminals on controller.
20) Controller operating system resides in Flash ROM that is upgradeable thru the Host PC. Upgrades in controller operating system shall NOT require PROM changes.

e) Power Supplies: DSX-1040PDP (power distribution panel) and DSX-1040CDM (communications distribution module), Included in 1042PKG
1) 10-15 VDC, 12 VDC nominal / 10A power for controllers. (Battery backed up).
2) 8-12 VDC 10A / 24 VDC 5.6A power for locks (optional battery backup).
3) 5 VDC @ .375 amps for 5 volt devices.
4) UL294 compliant.
5) AC loss and low battery supervisory outputs.
6) Battery load test control input.
7) Lock power override input.
8) Provides individual fused output for 8 locks.
9) Provides for 8 individual sets of termination of Lock wiring and control relay wiring with removable terminals.

f) Controller Architecture:
1) RDC 186 20 MHz processor, RAM, ROM, and removable field wiring terminals.

g) Compatibility:
1) Controller is compatible with any identification device that transmits data using Wiegand, clock/data, or RS-232 ASCII at 1200-baud, 8N1. This includes but is not limited to proximity, barium ferrite, bar code, magnetic stripe, Wiegand, keypads, and biometric readers.

h) Memory:
1) RAM: 512K
2) ROM: 512K Flash

i) Communications:
1) Via direct serial port, dial-up modem, or TCP/IP. TCP/IP communications require additional hardware.
2) Communication Ports: PC to controller 1 - RS-232 in; 50 feet max. 50ft – 4,000 feet requires two MCI modules.
3) Controller to controller in the same enclosure; RS232 via the 1040CDM. 1042 PKG to 1048 PKG to 1022 regenerative RS485 4,000 feet max via the 1040CDM.
4) 1040CDM (communications distribution module) handles RS232 between controllers in the same enclosure, and serves as RS485 connection point for other 1040 Series PKG units or 1022 controllers in controller network.

j) Physical Specifications:
1) Cabinet: DSX-1040E 15.5 inches wide x 22.5 inches tall x 6 inches deep, key locale. Total Weight: 25.0 lbs.
2) Cabinet: DSX-1040PE 15.5 inches wide x 14 inches tall x 6 Inches deep, key locale. Total Weight: 25.0 lbs.

3) Cabinet Finish: Black powder coat with white silkscreen.
4) Operating Temperature: 32 to 131 degrees F.
5) Operating Humidity: 0-95% RD
6) Battery Charging Output:
Trickle Charge: 13.5 VDC. 500ma, fused.
Standby Time: 11 hours under minimum load and 3.25 hours under maximum load w/ 2-12 VDC 7AH battery.

3. Model DSX-1042 Intelligent 2 Door I/O Controller: (Provide as required to accommodate doors as shown on plans).
a) Designed for two-door card reader/key pad applications. Adds additional 2-reader capacity to the 1042PKG. 3 (three) additional 1042 controllers may be added to the 1042PKG for a total of 8-reader capacity.
b) Inputs: 8 EOL supervised inputs
1) Each capable of 2, 3, or 4 state point monitoring with trouble reports.
c) Outputs: 2 relay, 2-Open collector outputs, 2 pre-warn, 6 LED drivers, as follows:
1) 2 - Form C, 5 amp rated relay outputs.
2) 2 - Open collector outputs 100ma
3) 2 - pre-warn outputs for door being held open sounders.
4) 6 - LED output Drivers to show lock status and or valid card read status at the reader or keypad.
d) Basic Features:
1) UL 294 compliant.
2) Complete distributed processing: Never any reliance on host PC for any decision making.
3) Access verifications for all cards performed at controller.
4) Linking: Input to Input, Input to Output, Output to Input, Output to Output, Code to Input and Code to Output Linking. Done locally at controller AND/OR controller to controller within same Location..
5) Status LED for each Input.
6) Status LED for each Output.
7) Controller Polled LED.
8) Separate communication received and transmitted LEDs.
9) Processor functioning properly LED.
10) Status LED for DC power.
11) Real time on board clock/calendar generation that is synchronized with host PC clock/calendar.
12) Dynamic memory allocation.
13) Change to/from auto buffering of all transactions based on communications status.
14) Point to point RS-232 - 3 wire controller communications within the 1042PKG.
15) Silkscreen detailing displays wiring termination and function of all terminals on controller.
16) Controller operating system resides in Flash ROM that is upgradeable thru the Host PC. Upgrades in controller operating system shall NOT require PROM changes.
e) Controller Architecture:
1) RDC 186 20 MHz processor, RAM, ROM, and removable field wiring terminals.

f) Compatibility:
1) Controller is compatible with any identification device that transmits data using Wiegand, clock/data, or RS-232 ASCII at 1200 baud 8N1. This includes but is not limited to proximity, barium ferrite, bar code, magnetic stripe, Wiegand, keypads, and biometric readers.

g) Memory:
   1) RAM: 512K
   2) ROM: 512K Flash

h) Communications:
   1) Controller to controller in the same enclosure; Parallel RS232 via the 1040CDM. 1042 PKG to 1048 PKG to 1022 regenerative RS485 4000 feet max via the 1040CDM.

i) Physical Specifications:
   1) DSX-1042 11 inches wide x 4.5 inches tall x 1.5 inches deep.
   2) Total Weight: 1.2 lbs.
   3) Operating Temperature: 32 to 131 degrees F.
   4) Operating Humidity: 0-95% RD

4. Model DSX-1043 Intelligent Output Controller: (Provide one for Intrusion alarm interface. This Output controller shall be configured to provide zone status on the intrusion alarm system. 8 zones total must be programmed).
   a) Designed for systems requiring large number of relays for control type of application.
   b) Outputs: 16 relays Form C, 5 amp 24 Volts.
   c) Inputs: 2 non-supervised NC inputs.
   d) 1 Output Override control input.
   e) Basic Features:
      1) UL 294 compliant.
      2) Linking: Input to Input, Input to Output, Output to Input, Output to Output, Code to Input and Code to Output Linking. Done locally at controller AND/OR controller to controller within same Location.
      3) Status LED for each Output.
      4) Status LED for each Input.
      5) Controller polled LED.
      6) Separate communication received and transmitted LEDs.
      7) Processor functioning properly LED.
      8) Real time on board clock/calendar generation that is synchronized with host PC clock/calendar.
      9) Dynamic memory allocation.
      10) Change to/from auto buffering of all transactions based on communications status.
      11) Point to point RS-232 - 3 wire controller communications within the 1042PKG.
      12) Silkscreen detailing displays wiring termination and function of all terminals on controller.
      13) Controller operating system resides in Flash ROM that is upgradeable thru the Host PC. Upgrades in controller operating system shall NOT require PROM changes.
      14) Can be connected to Slave 1042\1022 to become an Output Extender adding an additional 12 Outputs to original controller.
   f) Controller Architecture:
      1) RDC 186 20 MHz processor, RAM, ROM, and removable field wiring terminals.
   g) Compatibility:
      1) Controller is compatible with any identification device that transmits data using Wiegand, clock/data, or RS-232 ASCII at 1200 baud 8N1. This includes but is not limited to proximity, barium ferrite, bar code, magnetic stripe, Wiegand, keypads, and biometric readers.
   h) Memory:
      1) RAM: 512K
      2) ROM: 512K Flash
   i) Communications:

1) Controller to controller in the same enclosure; RS232 via the 1040CDM. 1042 PKG to 1048 PKG to 1022 regenerative RS485 4,000 feet max via the 1040CDM.

j) Physical Specifications:
1) DSX-1043 11 inches wide x 4.5 inches tall x 1.5 inches deep.
2) Total Weight: 1.6 lbs.
3) Operating Temperature: 32 to 131 degrees F.
4) Operating Humidity: 0-95% RD.

5. Model DSX-1044 Intelligent Input Controller: (Provide as required to monitor all Door Contacts, Motion Detectors, Glassbreak Sensors, and Overhead Door Contacts).
a) Designed for systems that require large number of Inputs to be monitored.
b) Inputs: 32 EOL supervised inputs
1) Each capable of 2, 3, or 4 state point monitoring with trouble reports.
c) Outputs: 4-open collector outputs, sink capacity 100ma ea.
d) Basic Features:
1) UL 294 compliant.
2) Linking: Input to Input, Input to Output, Output to Input, Output to Output, Code to Input and Code to Output Linking. Done locally at controller AND/OR controller to controller within same Location.
3) Status LED for each Input.
4) Status LED for each Output
5) Controller polled LED.
6) Separate communication received and transmitted LEDs.
7) Processor functioning properly LED.
8) Dynamic Battery load test.
9) Real time on board clock/calendar generation that is synchronized with host PC clock/calendar.
10) Dynamic memory allocation.
11) Change to/from auto buffering of all transactions based on communications status.
12) Silkscreen detailing displays wiring termination and function of all terminals on controller.
13) Real time clock calendar allowing time zone control with holiday overrides.
14) Dynamic memory allocation.
15) Controller operating system resides in Flash ROM that is upgradeable thru the Host PC. Upgrades in controller operating system shall NOT require PROM changes.
16) Can be connected to Slave 1042\1022 to become an Input Extender adding an additional 24 Inputs to original controller.
e) Controller Architecture:
1) RDC 186 20 MHz processor, RAM, ROM, and removable field wiring terminals.
f) Compatibility:
1) Controller is compatible with any identification device that transmits data using Wiegand, clock/data, or RS-232 ASCII at 1200 baud 8N1. This includes but is not limited to proximity, barium ferrite, bar code, magnetic stripe, Wiegand, keypads, and biometric readers.

g) Memory:
1) RAM: 512K
2) ROM: 512K Flash
h) Communications:

1) Controller to controller in the same enclosure; RS232 via the 1040CDM. 1042 PKG to 1048 PKG to 1022 regenerative RS485 4,000 feet max via the 1040CDM.

i) Physical Specifications:
1) DSX-1044 11 inches wide x 4.5 inches tall x 1.5 inches deep.
2) Total Weight: 1.2 lbs.
3) Operating Temperature: 32 to 131 degrees F.
4) Operating Humidity: 0-95% RD

B. Master Communication Interface: (Provide One)
1. Model DSX-MCI Single Channel RS-232 to RS-485 Converter:
a) Extends data communications between the PC and Master controller beyond the 50 feet limit of RS-232.
b) Can be used as an RS-232 to RS-485 converter.
c) Contains two communications LEDs to reflect the status of transmit and receive data terminals.
d) Contains voltage regulator to step 12 VDC to 9 VDC for Modem use at dial-up sites.

C. DSX-LAN Communications Interface with Modem Back-Up (Provide One)
1. Model DSX-LAN / DSX-LAN(M)
a) Contains both an RS-232 and RS-485 communication port for connection to any DSX Controller.
b) Auto-sensing for both 10 and 100 Mbit networks.
c) Auto-duplexing for compatibility with any router.
d) Power requirements of only 12 VDC @ 300ma, available from any DSX Controller.
e) Can be ordered with Dial-up (M)odem backup for redundant communications .
f) Can be programmed through a serial port using KB2CW.

D. Data Protection Module: (Provide as required for this project)
1. Provided with 3-stage surge protection, one module required at each end of communication line.
a) [Model DSX-DP232, RS232 Date Surge Protection Module].
b) [Model DSX-DP485, RS485 Data Surge Protection Module].
c)

E. Card Readers:
1. Provide HID Proximity Card Readers Model Thinline II or approved equal.

F. Card Readers:
1. Provide (qty. 200) HID Proximity Cards Model # ISOProx II or approved equal.

G. Electromagnetic Lock; At each door:
1. Provide Securitron Model # M68DT or approved equal.

H. Request to Exit Button; At each door:
1. Provide Securitron Model # PB2 or approved equal.

I. Request to Exit Sensor; At each door:
1. Provide Securitron Model # XMS or approved equal.

2.5 SYSTEM OPERATION AND CONTROL SPECIFICATIONS
A. System Integrity and Performance
1. Each controller shall operate as an autonomous intelligent processing unit. It shall be part of a fully distributed processing control network. Each controller shall maintain its own database, in its entirety, necessary for independent operation in its own RAM. It shall make all decisions about access control, alarm

monitoring, linking functions and door locking schedules for its operation independent of any other system components.

2. When controller is brought on-line all database parameters shall be automatically downloaded to it. After initial download is completed only database changes shall be downloaded to each controller. This shall be referred to as "Incremental downloads" or "Downloading of Changes Only".
3. I/O Linking and Anti-Passback functions shall operate globally between all controllers within the same Location without any Host PC intervention. Linking and Anti-Passback functions shall not depend on any decision-making process or macros from the Host PC and shall occur even with the Host PC off line.
4. Controller operating system resides in Flash ROM that is upgradeable thru a download from the Host PC. Upgrades in controller operating system shall NOT require PROM changes.
5. A Location shall be defined as a loop of up to 64 controllers (128 devices).
6. The first controller of every Location shall be designated as the "Master". All subsequent controllers at the same Location shall be designated as "Slaves". Any controller may be selected by dipswitch settings to work as a Master controller. A Master controller shall perform all the same functions as a Slave controller, but it shall also be responsible for polling all Slave controllers and reporting the history transactions to the host PC. The Master controller shall not make any access decisions for the Slave controllers. The Master controller shall be the messenger for information from the controllers to the PC, and from the PC to the controllers.
7. Each card reader port of a controller shall be custom configurable for over 120 different card reader or keypad formats. Multiple card reader/keypad formats may be used simultaneously at different controllers and even within the same controller.
8. The Controller shall provide a response to all Card Read or Keypad entries in less than .25 seconds regardless of System size.
9. All valid codes for a Location shall be downloaded and reside in the controllers. The controllers shall not depend on querying the Host PC database or any other controller or system component for code authorizations.
10. All communication between the Host PC & Master controller (Direct, Dial-up or TCP/IP), and between the Master & Slave controllers use a polled communication protocol that checksum and acknowledges (ACK) each message. All communication is verified and will automatically be buffered and retransmitted if it fails to be acknowledged.
11. There shall be NO degradation of System performance in the event of a communication loss between the Host PC and the Master controller. The Master controller shall automatically switch to buffer mode storing up to 10,000 events. There shall be NO loss of transactions in System history files until the controller buffer overflows.
12. A missing or failed controller shall not degrade the performance of the communicating controllers in the controller communication network. Missing controllers shall be ignored and sampled less often by the Master controller. Any functioning Slave controller not communicating with the Master will automatically switch to buffer mode storing up to 10,000 events.
13. Buffered events shall be handled in a FIFO (First in First Out) mode of operation.
14. All controllers shall have a built in dead man reset timer (watchdog circuit) that automatically reboots the controller in the event the processor is interrupted for any reason.
15. Any controller that is reset, or powered up form a non-powered state shall automatically request a parameter download and reboot to its proper working state. This shall happen with out any operator intervention.

16. The System shall provide a means for viewing the Communications Status of the intelligent controllers RS485 Communications loop.

17. The Communication Status window shall display which controllers are currently communicating, a total count of missed polls since midnight, and which intelligent controller last missed a poll. Missed polls reflect that messages had to be retransmitted and are an indication to the soundness or quality of the controller-to-controller network.

18. The Communication Status window shall show what type of CPU, what type of Input/Output board, and how much RAM Memory each controller has.

19. The chance that a controller will allow access to an unauthorized individual under normal operating conditions shall be less than 1 in 10,000.

20. The chance that an authorized individual will be denied access under normal operating conditions shall be less than 1 in 1,000.

B. PC to Controller Communications (All Types)

1. The System shall communicate using Serial ports for direct connections, and/or TCP/IP LAN and/or dial-up Modems for connections to Locations.

2. The System shall be able to use either one or both serial ports for dial-up modems, and either one or both serial ports for direct connect Locations and/or TCP/IP LAN connect Locations.

3. The serial ports used for communications shall be individually configurable for Direct Communications, Modem Communications Incoming & Outgoing, or Modem Communications Incoming only, or as an ASCII output port.

4. If more than 2 serial ports are needed, a Windows compatible Multi-Port Communications Board shall be used.
   a) The outboard multi-port serial board shall connect to an internal PCI bus adapter card. The port expander boards shall have an expandable and modular design. The port expansion modules shall be available in a 4, 8, or 16 Serial Port Configuration that is expandable to 32 or 64 serial ports.
   b) The Multi-Port Comm. Board shall allow multiple direct connect Masters to be connected to the System.
   c) The Multi-Port Comm. Board shall allow multiple dial-up modems to be connected to the System.

5. Direct serial, TCP/IP and Dial-up Modem Communications shall have no difference in monitoring or control of the System with the exception of the connection that must first be made to a dial-up Location.

6. For TCP/IP communications an option to set the Poll Frequency and Message Response Time Out settings shall be available. This will allow tuning for bandwidth and latency issues associated with network communications.

C. Direct Serial or TCP/IP PC to Controller Communications

1. The communication software on the PC shall supervise the Controller to PC Communications link.

2. The communications shall be supervised when using either direct serial port connections, or TCP/IP LAN connections.

3. Loss of communications to any Master Controller shall result in a Communication loss alarm at all PCs running the communications software. The Master controller shall then automatically buffer events.

4. When communications is restored to the Master Controller all buffered events shall automatically upload to the PC and any database changes shall automatically be sent to the Master controller.

D. Dial-up Modem PC to Controller Communications

1. The communication software on the PC shall supervise the Controller to PC Communications link during dial-up modem connect times.

2. The System shall be programmable to routinely poll each of the remote dial-up modem Locations collecting event logs and verifying phone lines each at different time intervals.
3. The System shall be programmable to dial and connect to all dial-up modem Locations and retrieve the accrued history transactions on an automatic basis as often as once every 10 minutes to once every 9999 minutes.
4. Failure to Communicate to a dial-up Location 3 times in a row shall result in an alarm at the PC.
5. Time offset capabilities shall be present so that Locations in a different geographical time zone than the Host PC will be set to and maintained at the proper local time. This feature shall allow for geographical time zones that are ahead or behind the host PC.
6. The Master of a dial-up modem-connected Location shall automatically buffer all normal transactions until it's buffer reaches 80% of capacity. When the transaction buffer reaches 80% the Master controller shall automatically initiate a phone call to the central monitoring PC and upload all transactions.
7. If an alarm event occurs, the Master controller shall initiate an immediate call to the PC to report the alarm event.
8. Modem Communications shall allow the use of 9600-baud dial-up modems provided by the manufacture of the System. Modems used at the Master Controller shall be powered and battery backed up by the controller.

E. Controller to Controller Communications
1. The Controller to Controller Communications shall be a true RS-485, 4-wire, point to point, regenerative (repeater) communications network methodology.
2. The RS-485 communications signal shall be re-generated at each controller without any additional modules or hardware.
3. The controller-to-controller communications shall be performed without the use of external modules or devices.
4. The Master Controller shall supervise the communications to each Slave controller. Communication Loss shall be reported immediately for direct serial port connected Locations. Controller communications loss shall be configurable to initiate a call to the PC for dial-up modem Locations.

F. Database Downloads
1. Controllers shall initially be downloaded with all Location data.
2. The System shall download all database changes to the intelligent controllers utilizing automatic non-invasive incremental updates also known as the Downloading of Changes Only.
3. When data is downloaded from the PC to the Master controller the PC shall request a complete database checksum to check the integrity of the download. If the data checksum does not match the PC, the full data download shall automatically be retransmitted to the Master controller.
4. When data is downloaded from the Master controller to a Slave controller the Master controller shall request a complete database checksum to check the integrity of the download. If the data checksum does not match the Master, the full data download shall automatically be retransmitted to the Slave controller.
5. When data is transferred from the Master controller to the Slave controllers the integrity of the data download is verified through checksums. A check sum on each message, each table, and a final table total checksum are calculated. If the checksums do not match the Masters the data shall be automatically retransmitted from the Master to Slave.
6. If the Master controller is reset for any reason, it shall automatically request a database parameter download from the PC. When the Master is a dial-up modem connect Location, it shall automatically dial the PC, and request and receive the database parameter download. The download shall restore the

remote site to its normal working state and shall take place with no operator intervention.

7. Slave controllers that have lost communication with the Master controller upon restoral shall have their database evaluated by the Master Controller. If the controllers' database is still current the controller is brought back on-line without downloading. If the controllers' database is not current it is brought back on-line and then fully downloaded. This download shall restore the Slave controller to its normal working state and shall take place with no operator intervention.
8. When changes are made to the database for a dial-up modem Location the PC shall automatically call and download those changes to that Location. No operator commands shall be necessary.
9. The System shall have the ability to schedule the download of changed data to a dial-up Location (for lower phone rates) between the hours of 2 and 5 AM.
10. The System shall also allow the data changes to be downloaded immediately or after a programmable delay from 1-999 minutes (prevents system from multiple sequential phone calls when editing a dial-up Locations' data).

G. Alarm Response and Handling

1. The System shall have manual and automatic responses to incoming point status change or alarms.
2. Each input shall have the ability to respond automatically with a link to inputs and or outputs, operator response plans, unique sound with the use of WAV files, maps or images that graphically represent the point Location.
3. Maps shall automatically display for each input assigned to it that has gone into alarm if the option is selected on a per input basis.
4. Alarm handling shall require a two-step process. When the alarm is first responded to it will be referred to as Acknowledged. This shall silence alarm beeping and any alarm WAV files being played. The alarm is then referred to as acknowledged but Un-Resolved. The next handling of the alarm will give the operator the ability to give a resolution (or operator comment) as to the final deposition of the event. The alarm shall then clear.
5. Each workstation shall display the total pending alarms and total un-resolved alarms.
6. Each alarm point shall be programmable to disallow the resolution of alarms until the alarm point has returned to its normal state.
7. Alarms shall be reported in a real time fashion barring any connection time for non-direct connect (dial-up) Locations to the Host PC where the operator shall be alerted and given an optional response plan or Action Message.
8. Operator response action messages shall be a minimum of 65,000 characters each with up to 32,000 messages.
9. Alarms shall be displayed and can be handled from a minimum of 4 different windows.
   a) The input status window: The status Icon will be overlaid with a large red blinking Icon. Selecting the Icon will acknowledge the alarm.
   b) The History log transaction window: The name, time, and date will display in red text. Selecting the red text will acknowledge the alarm.
   c) The Alarm log transaction window: The name, time, and date will display in red verbose. Selecting the red text will acknowledge the alarm.
   d) The graphic map display: The Icon for the input in alarm will flash with a large red blinking Icon. Selecting the Icon will acknowledge the alarm
10. Once the operator has acknowledged the alarm, they shall be automatically prompted to enter comments as to the nature of, and action taken on the alarm. The operator comments may be manually entered or selected from a predefined list or a combination of both.

11. Predefined Operator Comments shall have the ability to be used to resolve alarms where there are regular alarm occurrences. The operator shall have the means to choose from a list instead of typing the same message repeatedly.
12. The System shall track when and who acknowledged and resolved the alarm.
13. All identical alarms (from the same alarm point) shall be acknowledged at the same time the operator acknowledges the first one. All identical alarms shall be resolved when the first alarm is resolved. Restoral conditions, if set to be acknowledged shall follow the same operation as just described above for alarms.
14. The user shall have the ability to manually command inputs to arm, bypass, or follow their Time Zone from the PC with a one step command.
15. The System shall have an alarm popup message window and beep that informs the operator of an alarm that is pending. This shall occur even when the alarm monitoring application is not the top window.
16. The alarm popup message window shall display the alarm and precisely identify the point.
17. The popup alarm window shall also provide the operator the opportunity to ignore the alarm and clear the popup window or to jump to the alarm-handling window and deal with the alarm and any subsequent alarms.
18. Alarm Messages shall be receivable by the PC even when the PC is downloading or retrieving a Log from the Location Master.
19. The System shall have the ability to acknowledge and resolve alarms and control inputs and outputs during a download and Log retrieval.
20. When a reader-controlled output (relay) is opened the corresponding alarm point will automatically be bypassed.
21. All alarm points located on System controllers, with the exception of the 1043, shall accommodate 2,3,and 4-state point monitoring with trouble conditions.
22. All inputs, with the exception of the 1043 shall be individually programmable with at least 5 different circuit types to choose from.

H. Input and Output Control

1. All inputs in the System shall have two Icons representations, one for the normal state and one for the abnormal state.
2. When viewing and controlling inputs the Icons shall respond by changing and updating to the proper Icon to display that input's current state in real time. These Icons shall also display the inputs armed or bypassed state, and whether the input is in the armed or bypassed state due to a time zone or by a manual command.
3. All outputs in the System shall have two Icon representations, one for the secure (locked) state and one for the open (unlocked) state.
4. When viewing and controlling outputs the Icons shall respond by changing and updating to the proper Icon for that points current state in real time. These Icons shall also display whether the output is in the secured or open state due to a time zone or by a manual command.
5. Animation: The Icons used to display status of the Input or Output points shall be constantly updated without any prompting by the operator to show their current real time condition.
6. The operator shall be able to scroll the list of Inputs or Outputs and press the appropriate button on toolbar or right click to perform the desired function: arm, bypass or set to time zone for inputs, and secure, open, or set to time zone for outputs.
7. Graphic Maps containing Inputs, Outputs and Override groups:
   a) Full color Maps shall be importable from most any graphics file format. Maps shall allow for all input, output, and override group Icons to be placed on the maps in an easy one step drag and drop method.

b) Maps shall provide real-time display animation and allow for control of all points assigned to it.

c) The System shall allow the same inputs, outputs, and override groups to be defined on different maps. There shall also be the ability to navigate from one map to the next that the points are defined on. There shall also reside the ability to order or prioritize the order in which the Maps will be displayed.

8. Override Groups containing Inputs and Outputs:

a) The System shall incorporate override groups that provide the operator with the status and control over user defined "sets" of inputs and outputs with a single Icon.

b) The Icon shall change automatically to show the live summary status of all points in that group.

c) The Override Group Icon shall provide a method to manually control or set to time zone all points in the group.

d) The Override Group Icon shall allow the expanding of the group to show the Icons representing the live status for each point in the group, individual control over each point and the ability to compress the individual Icons back into one summary Icon.

9. Schedule Overrides of Inputs, Outputs and Override Groups:

a) To accommodate temporary schedule changes that do not fall within the holiday parameters the system shall incorporate scheduled overrides individually for each input, output, and override group in the System.

b) Each schedule shall be comprised of a minimum of two dates with separate times for each date.

c) The first time and date shall be assigned the Override State the point shall advance to, when the time and date become current.

d) The second time and date shall be assigned the state in which the point shall return to, when that time and date becomes current.

I. I/O Linking

1. The System shall support I/O Linking, which is an action initiated by an input, output, or card read that causes a reaction within a group of inputs and/or outputs. Linking to an input controls its armed state. Linking to an output controls its on/off state.

2. In regard to the before mentioned Linking characteristics the System shall fully facilitate Input to Input Linking, Input to Output Linking, Output to Output Linking, Output to Input Linking, Code to Input, and Code to Output Linking.

3. All Input, Output, and Code Linking shall operate on a global level within a Location. Global linking is any input, output, or card read use can initiate a link from any controller in the Location to any inputs and/or outputs on any controller(s) within the same Location without any interaction with the host PC.

4. The System shall provide Linking initiated by an input change of state or an input alarm.

5. The System shall provide Linking initiated by the transition of an output from secure to open and the transition from open to secure.

6. Code to input and/or output linking shall be initiated by a designated code used at a designated reader/keypad.

7. The reader/keypad used will determine which group of inputs and/or outputs will be activated. That is the same card can cause a different link to occur based on which reader the card was read at.

8. Responses to links shall include: follow, latch, pulse, toggle, and return to time zone.

9. In addition to inputs and outputs, time zones shall also have the ability to receive a link from an input, output, or card read. Within each time zone definition, there shall be the option for the time zone to be "On" or "Off" when a link is received.

J. LAN Installations

1. The Local Area Network shall allow multi-user capabilities to the system. It shall allow all functions to be executed at every Workstation on the LAN running the WinDSX software.
2. The software, running on a LAN, shall support as few as 2 Workstations or as many as 1000.
3. The System software shall be Local Area Network (LAN) compatible without any software supplements or upgrades.
4. The system shall be compatible with Windows NT 4.0 Service Pack 6 or Windows 2000/XP Professional.
5. The system shall utilize TCP/IP as the primary protocol.
6. The software shall be installed on the local hard disk of each Workstation so that each Workstation shall run the executable files of the program from the local hard disk, but reference the shared database on the File Server.
7. One PC shall be designated as the Comm. Server. This PC shall have the actual physical connection to the Intelligent Controllers by way of Direct Serial Port Connection, Dial-Up Phone Modem, or TCP/IP.
8. All Workstations shall have full control capabilities over the controllers. They shall be able to perform all administrative duties such as Reports and Database Management, and interact with a local or remote site as operator password privileges allow.

2.6 DATA BASE AND SYSTEM FEATURE SPECIFICATIONS

A. Database Operation

1. The System data management program general layout shall be in a hierarchical menu tree format with simple navigation through expandable menu branches and manipulated with the use of menus and Icons in a main menu and System toolbar.
2. The System shall use standard Icons in the toolbar for Add, Delete, Copy, Print, Capture Image, Activate, Deactivate, and Who-Is-In (Muster) report.
3. The System shall be programmable with English prompts, scrollable menus, and pull down windows.
4. All data entry shall automatically be checked for duplicate and illegal data. This field verification shall be used to insure that proper information is entered into the System.
5. The Database Management Program shall provide a Point and Click approach to data manipulation.
6. Upon making a selection in database, the view window shall immediately display a list of records for the selected topic. From the view window Add, Edit, or Delete commands may be selected. The process of adding, editing or deleting will then return operator to the View Mode giving immediate visual feedback to all the program entries, existing or those just changed.
7. There shall be a memo or note field for each item that is stored in the data. These note fields are useful for storing information about any defining characteristics of the item. These could be but are not limited to; the Location of, what purpose item was entered for, or reasons changes were made.
8. There shall be a next and previous command buttons visible when editing any database field for quickly navigating from one record to the next.
9. There shall be a copy command and copy tool in the tool bar to copy data from one record for the purpose of creating a new similar record.
10. The system shall check all database entries for valid data and shall automatically display an error describing any invalid data.

B. File Management

1. The operator shall be able to backup the System data at any time and may define that backups be performed unattended.

2. The Backup program shall be an integral part of the access control software. The backup System shall be easy to use with menu guidance.
3. The System shall incorporate an Integral Database Backup and Restoration System with selectable target media including 3.5" disk, Zip drives, and network resources as a minimum.
4. The System Backup feature shall have both a Manual and Automatic mode of operation.
5. The System shall incorporate a Manual and Auto-Backup History feature that allows history to be backed up to a specified target and storage media including 3.5" disk, Zip drives, and network resources as a minimum.
6. The System shall incorporate database restoration features that allow data to be selectively restored.
7. The backup program shall provide manual operation from any PC on the LAN and shall operate while the system remains operational.

C. Operator Passwords

1. The software shall support up to 32,000 individual operators each with a unique password.
2. Each password shall be from 1 to 8 alphanumeric characters.
3. Passwords shall be capable of being case sensitive.
4. The password shall be hidden and never displayed when entered.
5. Each password shall accept a unique and customizable password profile with the ability for several operators to share a password profile.
6. There shall be 32,000 definable operator password profiles.
7. One password profile shall be predetermined for access to all functions and areas of the program.
8. Each password profile may be customized to allow or disallow operator access to any program operation.
9. All software functions shall have the ability to restrict operators through settings in a password profile.
10. All database functions such as View, Add, Edit, and Delete shall have the ability to restrict operators by settings in a password profile.
11. Password restriction shall apply to each input and output individually. This restriction specifies which inputs and outputs the operator is able to manually manipulate.
12. Password shall be able to restrict which doors an operator can assign access to.
13. Operators shall use a User Name and Password to log on the System.
14. The same User Name and Password is used to access all areas and all programs.
15. Once logged on, only those menu items and functions that the operator is authorized for based on the operator's password profile are displayed.
16. There shall be an Icon that allows the operator to log off without fully exiting the program. User may be logged off but the program will remain running. The logon window shall then be displayed for the next operator.

D. Hardware Location Password

1. There shall be a Location password that will be utilized for PC to Dial-up Modem sites to prevent unauthorized communications with the Location.
2. Each Location password shall be from 1 to 8 alphanumeric characters.
   a) The Location Password shall be verified with the dial-up Location Master controller.

E. Reports and History

1. All history shall be initially stored on the hard disk of the host PC.
2. The system shall have the ability to view the History on any workstation or print History to any system printer.

3. All History Reports shall allow the user to select any date, time, event type, device, output, input, operator, Location, name, or cardholders to be included or excluded from the report.
4. The report shall be definable by a range of dates and times with the ability to have a daily start and stop time over a given date range.
5. Each report shall depict the date, time, event type, event description, device, or input/output name, cardholder company assignment, and the cardholder name or code number.
6. Each line of a printed report shall be numbered to insure that the integrity of the report has not been compromised.
7. The total number of lines of the report shall be given at the end of the report. If the report is run for a single event such as "Alarms" the total shall reflect how many alarms occurred during that period.
8. All reports shall have the 3 following options:
   a) View on Screen.
   b) Print to System Printer.
   c) Save to File with full path statement.
9. The System shall have the ability to produce a report indicating either:
   a) The status of the Systems inputs and outputs.
   b) The inputs and outputs that are abnormal, out of time zone, manually overridden, not reporting, or in alarm.
10. The System shall facilitate a Custom Code List Engine which allows the Access Codes of the System to be sorted and printed according to the following criteria:
    a) Active, Inactive, or Future Activate or De-activate
    b) Code number, Name, or Imprinted Card Number
    c) Company, Location, Access Levels
    d) Start and Stop Code Range
    e) Codes that have not been used since X number of days
    f) In, Out, or Either status
    g) Codes with Trace Designation
11. The System shall incorporate a Who Is In (Muster) report; One Button Report for cardholder locating. This report shall contain a count of all persons that are "In", Location wide, and a count with detailed listing of name, date and time of last use, grouped by the last reader used or by the company assignment. This report shall also be generated from a pre-defined alarm input. Any Workstation in the system shall be able to print the report for a particular Location.
12. The reports of the systems database shall allow options such that every data field may be printed.
13. The reports of the systems database shall be constructed such that the actual position of the printed data shall closely match the position of the data on the data entry windows.

F. Graphics

1. The software shall support 32,000 Graphic Display Maps. . The system shall allow the maps to be imported from a minimum of 21 standard formats from another draw or graphics program including AutoCad™. The installing contractor shall provide a Map of the facility to illustrate all alarm inputs monitored. Text messages will not be acceptable.
2. All Inputs and Outputs shall have the ability to be placed on any graphic map in a drag and drop method.
3. Graphic maps shall display automatically the real time state of outputs and inputs in an animated fashion.
4. Camera Icons shall have the ability to be placed on any graphic map that when selected will open a live video window and display the camera associated with that Icon and provide for real time Pan/Tilt/Zoom control.
5. Any Input, Output or Camera placed on a map shall allow the ability to Arm or Bypass an input, Open or Secure an output, or control the Pan/Tilt/Zoom function of any camera.
6. Any alarm input activation shall optionally by input automatically pull up a graphic map associated with the alarm.

7. Any alarm activation shall give the operator the ability to manually pull up a graphic map associated with the alarm.
8. The operator shall be able to view the inputs or outputs and the point's name by simply moving the mouse cursor over the point on any graphic map.
9. All inputs and outputs may be placed on multiple graphic maps. The operator shall be able to toggle to view all Graphic Maps associated with any input or output.
10. Each graphic map shall have a display order sequence number associated with it to provide a predetermined order when toggled to different views.

G. Help

1. All main menus shall have a Help option listed.
2. The System Help selection shall provide a unique and descriptive context sensitive Help System for all selections and functions with the press of one function key.
3. The Help System shall provide a manner of navigation to any specific topic from within the first Help window.
4. The help system shall be accessible outside the program.

H. Access Card/Code Operation and Management

1. Access authorization shall support verification of the card/code by facility code (if implemented) first, by card/code and/or Pin validation second, by access level (time of day, day of week, date), by anti-Passback status, and by number of uses.
2. The System shall allow multiple cards/codes to be assigned to a cardholder.
3. Each card/code assigned to a cardholder shall have the ability for an unlimited number of access levels assigned to it across all Locations. Each access level shall have any combination of doors in it. Each door shall have the ability to have 4 time zones associated with it.
4. The System shall allow the grouping of Locations that allows cardholder data to be shared by all Locations in the group, thus preventing the redundant data entry.
5. The System shall facilitate the viewing, building, editing and issuing of access levels from the code entry window, through an Access Level Manager Engine that maintains and coordinates all access levels to prevent duplication or the incorrect building of levels.
6. The System shall allow a person to be entered into the System for visitor, data tracking or photo ID purposes without assigning that person a card or code.
7. Key Tracking shall be an integral function of Cardholder data. This shall allow the tracking and accountability of lock hardware keys (metal keys) issued to each cardholder. Reports can be generated displaying all keys assigned to this cardholder or all cardholders that have a specific key.
8. The System shall provide a special audible and visual annunciation at PC when a card/code selected to be traced is used at designated trace readers. In addition cardholder image shall be automatically displayed when a traced card is used at designated trace readers.
9. The System shall allow each Card Holder to be given either an unlimited number of uses or a number range from 1-9998 that regulates the number of times the card can be used before it is automatically disabled.
10. The System shall allow cards/codes to be activated and de-activated manually or automatically by date as well as time. The System shall allow for multiple de-activate dates to be pre-programmed.
11. The System shall have the ability to de-activate cards/codes by company based on lack of use for a pre-defined number of days.
12. Integral Photo ID Badging and Photo Verification shall use the same database as the Access Control System and may query data from cardholder, company, and other personal information to build a custom ID badge.
13. Automatic or manual image recall and manual access based on photo verification shall also be a means of access verification and entry.

14. The System shall allow a means of grouping cardholders together by Company (department) or other characteristic for a more efficient method of reporting on and enabling/disabling cards/codes.
15. The Access Codes may be up to 12 digits in length.

I. Facility Codes

1. The System shall accommodate up to 2048 Facility Codes per Location with the option of allowing the Facility Codes to work at all doors or just particular doors.

J. Operator Comments

1. With the press of one appropriate button on toolbar the user shall be permitted to make Operator Comments into History at anytime.
2. Automatic prompting of Operator comment shall occur before the resolution of each alarm.
3. Operator Comments shall be recorded with time, date, and operator number.
4. Comments shall be sorted and viewed through Reports and History.
5. The operator comments shall comprise of two parts and either or both may be utilized, predefined or manually entered.
   a) Manually entered through keyboard data entry (typed) up to 65,000 characters per each alarm
   b) Predefined and stored in the database for retrieval upon request.
6. The system shall have a minimum of 999 Predefined Operator Comments with up to 30 characters per comment. The Operator Comments that can be manually entered shall accept up to 65,000 characters per Comment.
7. Predefined Operator Comments shall have the ability to be used to resolve alarms where there are regular alarm occurrences. The operator shall have the means to choose from a list instead of typing the same message repeatedly.

K. Company

1. The System shall provide a means of assigning one of 32,000 company names to a group of cardholders.
2. Company names may be used to separate cardholders into groups that allow the operator to determine the tenant, vendor, contractor, department, or division of a company the person belongs.
3. The software shall have the ability to deactivate and re-activate all codes assigned to a particular company with one action.
4. History reports and code list printouts shall have provisions to be sorted by Company name.
5. Company names shall provide a means to give managers reports that pertain to their personnel only.

L. Time Zones

1. The System shall allow up to 32,000 Time Zones for each of the 32,000 Locations.
2. Each Time Zone shall contain a start and stop time for 7 the days of the week and 3 separate holiday schedules.
3. A Time Zone is assigned to inputs, outputs, or access levels to determine when an input shall automatically arm/disarm, when an output shall automatically open/secure, or when cards assigned to an access level shall be denied or granted access.
4. Dynamically linked bar graphs shall display the resultant active and inactive times for each day and holiday as start and stop times are entered or edited.
5. The System shall allow for up to 4 different Time Zones to be assigned to any input, output.

M. Holidays

1. The System shall have provisions for 32,000 Holidays.
2. Each Holiday shall be defined with MM/DD/YYYY and a description.
3. Up to 32,000 holidays may be entered in advance.
4. Holidays shall be defined as a minimum of three types. This will allow for 3 separate holiday schedules.
5. Holidays shall have an option to be designated as occurrence each year, those shall remain in system and not be purged.
6. Holidays not designated to occur each year shall be automatically purged from the database after the date expires and a new Holiday is added.
7. Each Holiday shall have the ability to be assigned to one of three types of Holiday. The type of holiday shall be relative to a time period of one twenty-four hour period.
8. Holidays may be created per Location or by Location Group.

N. Access Levels

1. The System shall allow for 32,000 access levels.
2. One level shall be predefined as the Master Access Level. The Master Access Level shall work at all doors at all times.
3. The System shall allow for access to be restricted to any area by reader and by time. Access Levels shall determine when and where a card is authorized.
4. The System shall be able to create multiple door and time zone combinations under the same Access Level so that a card may be valid during different time periods at different readers even if the readers are on the same controller.
5. Each door in an access level shall have the ability to have a minimum of 4 different time zones assigned to it.
6. The System shall incorporate an Access Level Manager Engine for menu guidance and assistance in creating, managing, and assigning access levels.
7. The manager shall be accessible from the card data entry window.
8. When assigning an Access Level, the access level manager engine shall provide door and time zone listings for the operator to choose from.
9. The system shall allow the ability to copy form one door assignment up to 4 time zone schedules with one operation for assignment to another door. This shall reduce operator data entry time when creating access levels that use like time zone schedules.

O. User Defined Fields

1. The System shall provide a minimum of 99 User Defined Fields for specific information about each access code holder.
2. User defined fields shall allow up to 50 characters per field.
3. The title of each field shall be programmable up to 20 characters.
4. There shall be a "Required" option for each user defined field that when selected forces the user to enter data in the user-defined field before the cardholder record can be saved.
5. There shall be a "Unique" option for each user defined field that when selected will not allow duplicate data from different cardholders to be entered.
6. There shall be a "UDF Data is Hidden" option for each user defined field that will require any given operator to have that option available in his/her password profile before that hidden data can be viewed.
7. Each User defined field shall have data masking in its setup that will require the data to be entered with certain character types in specific spots in the field entry window. This shall facilitate data to have like formatting display.
8. There shall be an option for each user defined field when selected will define the field as a deactivate date. The selection shall automatically cause the data mask to be formatted with the windows short date format. The system will order these fields and use the next future date of that order to set the deactivate date of that cardholder.
9. There shall be an option to select one of the 99 user defined fields as the Name ID. Data from this type of user-defined field will appear on the same window as the cardholder data entry window.

10. There shall be a search capability to allow any one user defined field or combination of user defined fields to be searched to find the appropriate cardholder.
11. String searches shall have the ability to be made on any field in conjunction with any other field searches.
12. The System shall have the ability to print cardholders based on and organized by the Used Defined Fields.

P. Code Tracing

1. The System shall perform Code Tracing selectable by cardholder and by reader.
2. Any code may be designated as a Traced Code with no limit to how many codes can be traced.
3. Any reader may be designated as a Trace Reader with no limit to which or how many readers can be used for Code Tracing.
4. When a Traced Code is used at a Trace Reader the Access Granted Message that usually appears on the Monitor window shall be highlighted with a different color than regular messages.
5. A short singular beep shall occur at the same time the highlighted message is displayed on the window.
6. The traced cardholder image (if image exists) shall appear on workstations when used at a trace reader.

2.7 APPLICATION SPECIFIC FEATURES

A. RS-232 ASCII Interface Specifications

1. The ASCII Interface shall allow for RS-232 connections to be made between the Host PC/Comm. Server and any equipment that will accept a RS-232 ASCII command strings such as CCTV switchers, intercoms and paging systems.
2. Each alarm input in the System shall allow for individual programming to output up to four unique ASCII character strings through two different Comm ports on the Host PC.
3. Each input shall have the ability to be defined to transmit a unique ASCII string for Alarm and one for Restoral through one Comm port and a unique ASCII string for a non-alarm abnormal condition and one for a normal condition through the same or different Comm port.
4. The predefined ASCII character strings shall have the ability to be up to 420 characters long with full use of all the ASCII control characters such as return or line feed. The character strings shall be defined in the database of the System and then assigned to the appropriate Inputs.
5. The Comm ports of the Host PC/Comm Server used to interface with external equipment shall be defined in the Setup portion of the software. The Comm port's baud rate, word length, stop bits, and parity shall be definable in the software to match that of the external equipment.
6. This RS-232 output shall be capable of connection to a pager interface that can be used to call a paging system or service and send a signal to a portable pager. The system shall allow an individual alphanumeric message per alarm input to be sent to the paging system. This interface shall support both numeric and alphanumeric pagers.
7. RS-232 used to transmit input alarms to central station automation software.
   a) The system shall be able to emulate the communications of a central station digital receiver to an alarm automation system. Thus allowing alarms that are received into the WinDSX system to be transferred to the alarm automation system just as if they were sent through a digital alarm receiver.
   b) The system shall be able to transmit an individual message from any alarm input to a burglar alarm automation monitoring system such as MAS or SIMMS.
   c) The system shall be able to append to each message a predefined set of character strings as a prefix and suffix.
   d) The system shall have the option of utilizing ACK and NAK messages from the automation system.

e) The system shall have the ability to automatically clear alarms from its alarm queue after it has successfully transmitted it to the automation software.

B. Real Time Guard Tour Specifications

1. Guard Tour shall be an integral part of the System.
2. A Tour Station is a physical Location a guard shall reach and perform an action indicating that the guard has arrived. This action, performed at the tour station, shall be one of 13 different events with any combination of station types within the same tour. A tour station shall be one of the following event types: Access Granted, Access Denied Code, Access Denied Card plus PIN, Access Denied Time Zone, Access Denied Level, Access Denied Facility, Access Denied Code Timer, Access Denied Anti-Passback, Access Granted Passback Violation, Alarm, Restoral, Input Normal and Input Abnormal.
3. Guard Tour shall allow proprietary (user controlled) direct connected Systems to make use of existing Access Control hardware to perform Guard Tour Management in a real time fashion.
4. Guard Tour and other system features shall operate simultaneously with no affect on each other.
5. The Tours shall be initiated at the PC.
6. Guard Tour shall allow the user to define specific routes or tours for the guard to take with time restrictions.
7. All guard tour activity shall be automatically logged to the computers Hard Disk.
8. The guard shall have a time window in which to reach every predefined Tour Station.
9. The guard, in making rounds, shall check in at predetermined Tour Stations within the specified times, otherwise an alarm shall be generated at the PC.
10. If the guard is late to a Tour Station, a unique alarm per station shall appear at the PC that indicates which station the guard failed to check in at.
11. If the guard is early to a station it shall be reported to the PC how early guard is.
12. The System shall allow the tours to be executed sequentially or in a random order with an overall time limit set for the entire tour instead of individual times for each tour station.
13. An optional user defined response plan shall be displayed for the operator or guard at the PC to follow should a "Failed to Check-In" Alarm occur.
14. There shall be 999 possible Guard Tour definitions with each Tour having up to 99 Tour Stations. All 999 Tours can be running at the same time.

C. Photo Badging Specifications

1. Photo Imaging shall be an integral part of the Access Control System.
2. The same software shall be configurable for Access Control only, Photo Badging only, or Access Control and Photo Badging.
3. The Number of badges shall be limited only by Hard Disk space.
4. The System shall have a true WYSIWYG badge building operation.
5. The System shall print on Paper or directly on Card Stock.
6. The Badge System shall operate in the Windows NT/2000/XP Professional Environment.
7. The Badge System shall be LAN compatible.
8. The Badge System shall be a video based and film-less identification System.
9. The Badge System shall allow the user to issue access codes and at the same time generate an identification card, or badge, for temporary or permanent use.
10. The Badge System shall be a true Windows NT 32 bit application providing all of the advantages of the graphical user interface.
11. The System shall have a print preview capability.
12. The System shall have the ability to create different badge templates for each department, tenant, or contractor.
13. Templates shall be automatically selected for the card being printed based on the company or department the cardholder is assigned to.

14. The operator shall be able to override the automatic selection of the badge template and choose which template they want to use when creating a badge.
15. Badge backgrounds shall be selectable along with any other graphic images to be placed on the template.
16. Any of the cardholder information in the access System such as Name, Code, Company, Access Level, and any of the 99 User Defined Fields shall be selectable with the ability to place them anywhere on the card.
17. The System shall have the ability to Ghost an image or graphic with varying degrees of transparency to be placed anywhere on the card.
18. The System shall support unlimited usage of the 99 User Definable Fields that allow any data to be recorded and/or printed on a Photo ID badge.
19. The System shall include shapes that can be placed on the badge without having to use a draw program. The shapes shall utilize size and color capability of Windows.
20. Custom Text shall be able to be created in the imaging software, and placed anywhere on the card, utilizing full font, size and color capability of Windows.
21. Text shall be placed and optionally automatically centered within any region of the badge layout.
22. The System shall provide the ability to rotate to any degree text and barcodes on the printed badge.
23. The System shall facilitate printing multiple Bar Codes in 3 of 9 and 2 of 5 formats with Security Blocks, directly on the access card.
24. The System shall also have provisions to encode Magnetic Stripe cards as they are being printed with full integration to the database that shall provide the number to be encoded.
25. The System shall have provisions to print on both sides of a direct print card with only 1 pass through the appropriate printer.
26. The System shall have the ability to recognize a UDF field as an auto-incrementing card number. This will allow for each card to be printed with a unique number automatically generated by the software.
27. The System shall allow Batch Card Printing as follows: The System shall allow the cardholders to be selected using the normal Windows conventions for selecting multiple records from a list. It shall then print the badges from the selected list of cardholders using the correct template for each one.
28. The System shall have provisions to import captured images or photos using a digital camera. There shall be a quick and easy way to attach a secondary or digital camera to the System.
29. The System shall facilitate simultaneous connections to both a RGB output CCD Camera, and a digital camera.
30. The system shall support multiple images stored for each cardholder. Including signatures, portrait views, profile views, etc..
31. The System shall facilitate virtual Camera Pan and Tilt so that the camera does not have to be physically adjusted while capturing an image.
32. The System shall allow for the importing of the cardholder picture from a file.
33. The System shall allow for an image in a standard format to be imported and a copy of it saved in the format the System requires.
34. The System shall accept live video from any device providing an MCI or TWAIN interface that is Windows NT/2000/XP Professional compatible.
35. The System shall allow multiple images on the same badge to include but not be limited to: Barcodes, Digital Photos, and Signatures.
36. The System shall support transparent backgrounds so the either a captured image photo or signature, is only surrounded by the intended background but not its immediate background.
37. The System shall facilitate the manual editing and cropping of the stored images. The System shall also have the ability to automatically edit the image and provide multiple views of the same image that have different characteristics and changes applied to each one for the operator to choose from.
38. The System shall have the ability to encode a Magstripe card in ABA Format on track 1, 2 or 3 at the same time the card is being printed.
39. The System shall be compatible with any Windows compatible direct card printer.

40. The System shall have an auto image retrieval feature that allows cardholder information and pictures to be automatically displayed on a PC running the same software.
41. The System shall support the automatic display of cardholder images on any or all selected readers when the cardholders use their card/code at the selected readers/keypads.
42. The System shall allow for a cardholder image to be recalled manually when the operator double clicks (selects) any access granted or denied event on the real time monitor window.
43. The System shall allow for automatic sizing of data fields placed on a badge to compensate for names that may otherwise be to large to fit in the area designated.

D. Visitor Assignment

1. The system shall have a means of allowing cardholders to be assigned with a visitor designation.
2. The system shall allow Names to be added that may or may not be assigned codes.
3. The system shall be able to restrict the access levels that may be assigned to cards that are issued to visitors.
4. There shall be an option on access levels that will designate an access level as visitor assignable.
5. The system shall utilize an online log book that during enrollment of a visitor the operator will have access to a search engine that will produce a view all names in the query and by point and click method enter the name of whom is being visited.
6. The system shall create an event for the history transaction as to the date time the visitor was added and to whom they were to visit.
7. Once a visitor is enrolled in the system upon the next visit the system shall allow the operator to recall that visitors' cardholder file and by utilizing the search engine query, point and click on the name of the person being visited on this occasion. The system shall create a transaction with visitors name and whom they were to visit on that date.
8. The system shall allow designation of any reader as one that deactivates the card after use at that reader, and logs to history as the return of the card.
9. The system shall have the ability to utilize the visitor designation in searches and reports. Reports shall be able to print all or any visitor activity.

E. Time and Attendance

1. The System shall facilitate Time and Attendance using the access control hardware to gather the Clock IN and Clock OUT times of the users at designated readers.
2. Reports shall show IN and OUT times for each day, total IN time for each day and a total IN time for period specified by the user.
3. Reports shall have the ability to be viewed, printed, or saved to a file.
4. Reports shall have the ability to alpha sort on the persons last name, by Location or Location group.
5. Reports shall include all cardholders or optionally the ability to select individual cardholders for the report.
6. There shall be provisions for a real time display module (TDM) that is DC powered from the Access System Controller.
7. This TDM shall have a 7 segment LED display that is visible from all viewing angles. The segments shall be at least 1 inch in height.
8. This Time Display Module shall be synchronized from the Access System Controller no less than once a minute. The TDM shall connect to the Access System Controller with a standard 4 conductor shielded cable and operate up to 500 feet from the controller.

F. Anti-Passback

1. The System shall have Global and Local Anti-Passback features by Location.
2. Synchronization of card IN/OUT status shall be global among up to 64 controllers, and shall not be dependent on the Host PC to be online for proper operation.
3. The System shall support Hard Anti-Passback. Hard Anti-Passback shall be defined as once a cardholder is granted access through a reader with one type of designation (IN or OUT), the cardholder may not pass through that type of reader designation until the cardholder passes though a reader of opposite designation.
4. The System shall support Soft Anti-Passback. Soft Anti-Passback shall be defined as should a violation of the proper IN/OUT sequence occur access shall be granted, but a unique alarm shall be transmitted to the Host PC reporting the cardholder and the door involved in the violation. A separate report may be run on this event.
5. The System shall support Timed Anti-Passback. Timed Anti-Passback shall be defined as capabilities by a controller that shall prevent an access code from being used twice at the same device (door) within in a user defined amount of time.
6. The Anti-Passback schemes shall be definable for each individual door.
7. Anti-Passback override shall also be an option on a per card basis.
8. The System shall have the ability to forgive (or reset) an individual cardholder or the entire cardholder population Anti-Passback status to a neutral status.
9. There shall be a minimum of four different zones of anti-Passback that may be utilized within each Location. Each reader shall be assignable to 1 or all 4 Anti-Passback zones.
10. The four zones of Anti-Passback shall operate independently.

G. Live Video and Camera Control

1. The system shall provide means of displaying in a separate window the live video from a CCTV source.
2. The display window shall have separate control buttons to represent Left, Right, Up, Down, Zoom In, Zoom Out, Scan and minimum of two custom command auxiliary controls.
3. The command structure shall be such that one command string shall be issued when the control button is pressed down and another command shall be sent when the button is released. There shall be an option to automatically repeat the pressed down command as long as the button is pressed.
4. An Icon shall represent each camera to be controlled. Standard mouse clicking shall open a window that will display the video. If the system is connected to a video switcher it shall automatically send a command through a comm. port to display the requested camera when the Icon is selected.
5. The system shall provide a minimum of 7 Icons to represent different types of cameras. The ability to import custom Icons shall be provided.
6. The Icons shall be able to be placed on graphic maps to represent their physical Location. Standard mouse clicking shall open the display window for selected camera.
7. Each camera shall provide the ability to display and control a specific output on the video display window. The Icon representing the output shall display its real time status and respond in an animated fashion to the data reported from the field controller.
8. Each Input and Output shall be definable as associated with a camera. Upon selecting an Input or an output the system shall provide a pop up option window that will allow the camera associated with the point to be displayed.
9. The alarm-handling window shall have a command button that will allow the display of the camera associated with the alarm point.

3 EXECUTION

3.1 GENERAL REQUIREMENTS

A. Install system components and appurtenances in accordance with the printed instructions.

B. Provide all necessary interconnections, services, and adjustments required for a complete and operable system.

C. Install control signal, communications, and data transmission line grounding as necessary to preclude ground loops, noise, and surges from adversely affecting system operation.

3.2 FIELD QUALITY CONTROL

A. Testing:
   1. Supply a proposed acceptance test procedure.
   2. Testing of system shall be the sole responsibility of the Contractor.
   3. Communications tests:
      a) Controllers to manager server.
      b) Manager server to client.
      c) Remote dial-up support.

B. Inspection:
   1. Provide an on-sight, factory-trained technician to assist, advise or manage installing personnel.
   2. All final connections shall be made under the direct supervision of the Systems Integrator.

C. Field Service:
   1. Provide first line support for both the hardware and software properties of the selected system.
   2. Provided second line support directly from the manufacturer for all component and computer hardware and all operating and application software that comprise the complete system.
   3. Determine and report all problems to the manufacturer's customer service departments.
   4. Support shall be available to the integrator via the following methods:
      a) Phone inquiries.
      b) Direct dial-in to the customer system for remote system troubleshooting by a qualified Field Service Engineer.
      c) On-site visits if required, upon approval by the manufacturer's Customer Service Manager.

3.3 ON SITE COMMISSIONING AND TRAINING

A. The installing company shall provide direct participation in the on-site commissioning activity of new systems. Not less than 16 hours of on-site training shall be provided for a maximum of 6 representatives of Owner.

B. Provide systems administrator that is factory trained with the expertise on installing, configuring and commissioning the system to the customer's specific requirements; and to provide on-site training on system operation and administration.

C. On-site shall be available for system administrators, Operators and other qualified personnel.

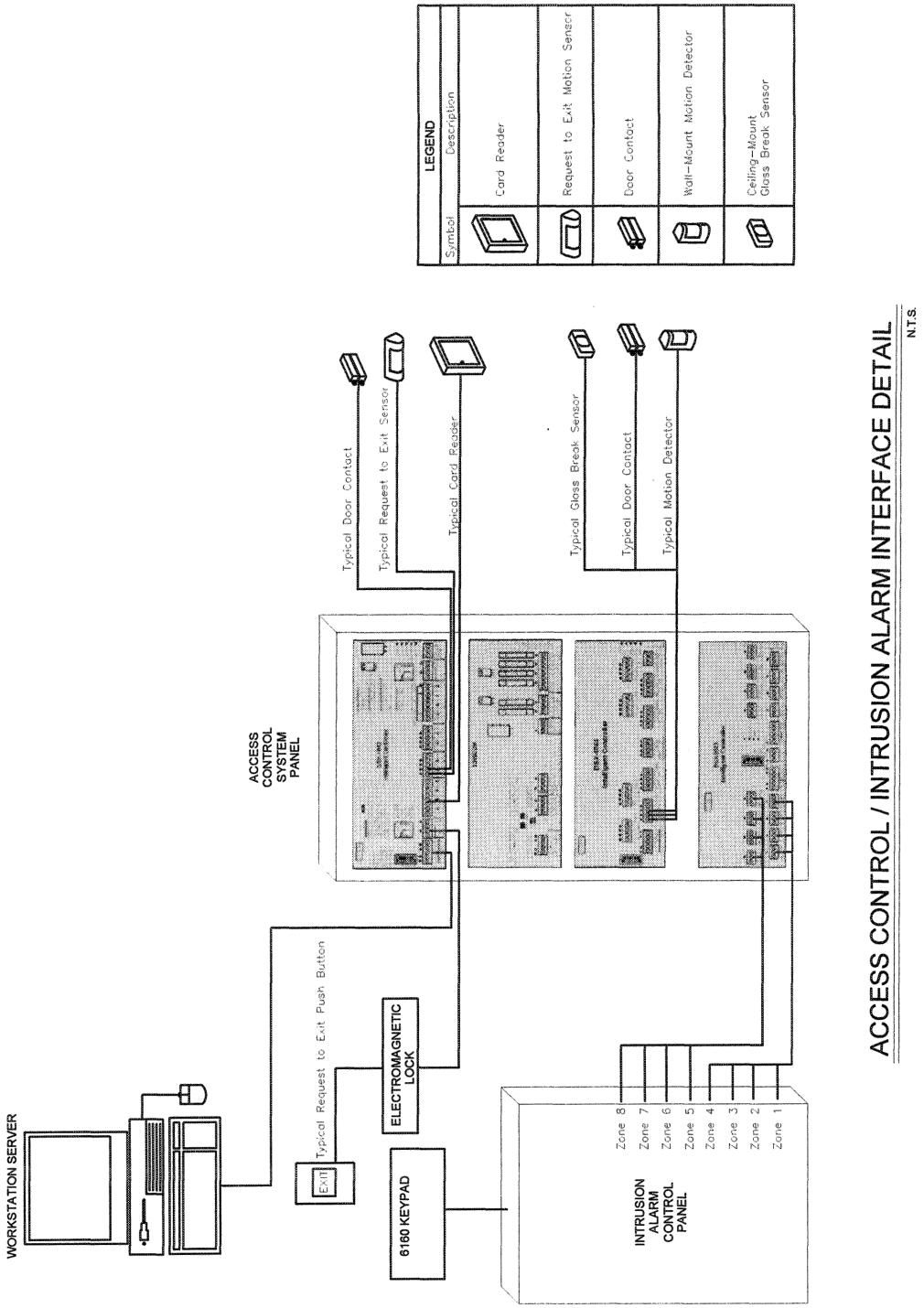
D. On site commissioning shall include:
   1. Hardware set-up and testing.
   2. Preventative maintenance and troubleshooting training.
   3. End User training.
   4. Database configuration and build assistance.

3.4 Interface the Intrusion Detection System with the Access Control System as shown on Interface Detail drawing on page 16800 - 34.

3.5 FINAL ACCEPTANCE

A. Perform the following performance standards before final acceptance:
   1. Operate all mechanical devices without down time for a period of 10 days.
   2. Operate all electronic devices and equipment without downtime or programming problems for a period of 30 days.

3. Upon completion of system testing and before the acceptance cycle, provide 2 copies of system manual to Owner.



ACCESS CONTROL / INTRUSION ALARM INTERFACE DETAIL

N.T.S.

END OF SECTION 16800