SECTION 16B BASIC ELECTRICAL MATERIALS AND METHODS (CONT.)
16B PART 4 LIGHT FIXTURES, LAMPS AND BALLASTS (CONT.)
16B 4-5 PARKING LOT LIGHTING

PROVIDE ALL COMPONENTS OF THE OUTDOOR LIGHTING SYSTEM, INCLUDING POLE ASSEMBLIES AS DETAILED ON THE DRAWINGS AND DESCRIBED BELOW. ALL MATERIAL FURNISHED SHALL BE OF THE BEST QUALITY AND WORKMANSHIP, AND THE MANUFACTURER MAY BE REQUIRED TO FURNISH SATISFACTORY EVIDENCE OF THE ABILITY TO SUPPLY THE MATERIAL IN ACCORDANCE WITH THE DRAWINGS AND SPECIFICATIONS.

POLES AND LIGHT FIXTURES SHALL BE AS NOTED ON THE DRAWINGS. IF CONTRACTOR DESIRES TO SUBSTITUTE OTHER THAN THE SPECIFIED MANUFACTURER(S), REFER TO ARTICLE "SUBSTITUTIONS" IN THIS DIVISION, FOR REQUIREMENTS. NO ALTERNATE MANUFACTURERS WILL BE CONSIDERED FOR APPROVAL WITHOUT THIS PRIOR SUBMITTAL.

FURNISH ALL POLES WITH HAND HOLES AND NO LESS THAN FOUR HIGH-STRENGTH STEEL ANCHOR BOLTS FOR POLE MOUNTING. EACH ANCHOR BOLT SHALL BE THREADED AT THE TOP, FITTED WITH HEXAGON NUTS, AND SHALL HAVE AN "L" BEND ON THE BOTTOM OF THE BOLT. ALL ANCHOR BOLTS AND NUTS SHALL BE HOT-DIP GALVANIZED. ALL OTHER SMALL HARDWARE REQUIRED (BOLTS, NUTS, WASHERS, SHIMS, ETC.) SHALL BE GALVANIZED. PROVIDE POLE FINISHES AS NOTED ON THE DRAWINGS.

16B PART 5 MISCELLANEOUS ELECTRICAL
16B 5-1 WIRING OF MECHANICAL EQUIPMENT

PROVIDE ALL RACEWAYS AND POWER WIRING FOR ALL DIVISION 15 EQUIPMENT REQUIRING ELECTRICAL CONNECTIONS, INCLUDING, BUT NOT LIMITED TO, PUMPS, WATER HEATERS, AND HVAC EQUIPMENT, AND ALL LINE-VOLTAGE CONTROL AND INTERLOCK WIRING NOT PROVIDED UNDER DIVISION 15. CONNECT PER MANUFACTURERS' WIRING DIAGRAMS. COORDINATE WITH DIVISION 15 FOR DISCONNECTS FURNISHED WITH EQUIPMENT, AND PROVIDE ALL DISCONNECT SWITCHES AS REQUIRED. AFTER INSTALLING WIRING, VERIFY THAT EACH MOTOR LOAD HAS THE CORRECT PHASE ROTATION.

VERIFY THE ACTUAL "MAXIMUM OVERCURRENT PROTECTION" (MOCP) DEVICE RATINGS AND "MINIMUM CIRCUIT AMPACITY" (MCA) CONDUCTOR SIZING FOR MECHANICAL EQUIPMENT FROM THE EQUIPMENT NAMEPLATE. BASE ELECTRICAL INSTALLATIONS ON ACTUAL REQUIRED AMPERAGES, WHICH MAY VARY SOMEWHAT FROM THE CONDUCTOR AND EQUIPMENT SIZES SHOWN ON THE DRAWINGS; HOWEVER, IN NO CASE, REDUCE THE SIZE OF CONDUCTORS INDICATED ON THE DRAWINGS WITHOUT AUTHORIZATION FROM THE ENGINEER. PROVIDE PROPERLY SIZED ELECTRICAL WIRING AND EQUIPMENT WITHOUT EXTRA COST TO THE OWNER. NOTIFY THE ENGINEER OF ALL CHANGES REQUIRED IN THE ELECTRICAL INSTALLATION DUE TO EQUIPMENT VARIANCES SO THAT THE EFFECTS ON FEEDERS, BRANCH CIRCUITS, PANELBOARDS, FUSES AND CIRCUIT BREAKERS CAN BE CHECKED PRIOR TO PURCHASING AND INSTALLATION. BE RESPONSIBLE FOR COORDINATING WITH DIVISION 15 TO VERIFY THE ACTUAL AMPACITIES AND CORRECT SIZES OF ALL CONDUCTORS AND OVERCURRENT PROTECTIVE DEVICES FOR ALL EQUIPMENT, AND CORRECT OVERLOAD HEATERS FOR ALL MOTORS, WHEN STARTERS ARE PROVIDED UNDER DIVISION 16.

16B 5-2 WIRING OF THERMOSTATS, TIME AND TEMPERATURE CONTROLS

PROVIDE ALL RACEWAYS, POWER WIRING, AND LINE-VOLTAGE CONTROL AND INTERLOCK WIRING NOT PROVIDED UNDER DIVISION 15, FOR ALL THERMOSTATS, TEMPERATURE CONTROL DEVICES, AND CONTROLS, INCLUDING, BUT NOT LIMITED TO, NIGHT-STATS, WATER HEATER INTERLOCKS, TIME SWITCHES AND OVERRIDE TIMERS. SEE MECHANICAL DRAWINGS FOR LOCATIONS AND TEMPERATURE CONTROL DIAGRAMS. LOW-VOLTAGE CONDUCTORS FOR THERMOSTATS AND TEMPERATURE CONTROL SYSTEM MAY BE RUN EXPOSED ABOVE FINISHED ACCESSIBLE CEILINGS, IF APPROVED AND LISTED FOR THIS PURPOSE, BUT SHALL BE INSTALLED IN CONDUIT WITHIN WALLS AND WHERE EXPOSED IN THE WORK AREAS.

16B 5-3 TELEPHONE SYSTEM PROVISIONS

PROVIDE INCOMING TELEPHONE SERVICE RACEWAYS AS INDICATED ON DRAWINGS OR AS REQUIRED BY THE SERVING TELEPHONE COMPANY. PROVIDE 3/4-INCH THICK PLYWOOD BOARD, FIRE-RETARDANT-TREATED AND STAMPED FRT, SECURELY ANCHORED TO THE WALL, AT THE LOCATION AND OF THE SIZE AS INDICATED ON THE DRAWINGS. PROVIDE FLUSH MOUNTED TELEPHONE OUTLET BOXES WITH 1-INCH EMT STUB-UP CONCEALED TO ACCESSIBLE CEILING SPACE AT LOCATIONS AS INDICATED ON THE DRAWINGS.

16B 5-4 DATA SYSTEM PROVISIONS

PROVIDE FLUSH MOUNTED DATA OUTLET BOXES WITH 1-INCH CONDUIT STUB-UP CONCEALED TO ACCESSIBLE CEILING SPACE AT LOCATIONS AS INDICATED ON THE DRAWINGS.

16B 5-5 TIME SWITCHES

TIME SWITCHES: TYPE INDICATED, WITH MANUAL BYPASS SWITCH, NEMA ENCLOSURE SUITABLE FOR THE ENVIRONMENT INSTALLED; NUMBER AND TYPES OF CONTACTS, SEQUENCE, AND VOLTAGE AS INDICATED ON THE DRAWINGS, OR AS REQUIRED, BASED ON THE TIME SWITCH FUNCTION AND THE NUMBER OF BRANCH CIRCUITS OR CONTACTORS CONTROLLED. PROVIDE WIRING TO PHOTOCELLS, CONTACTORS, RELAYS OR OTHER CONTROL POINTS AS REQUIRED. MANUFACTURERS: INTERMATIC, PARAGON OR TORK.

TYPE: MECHANICAL.

16B 5-6 PHOTO CONTROL

THE PHOTO CONTROL SHALL:

1. PROVIDE AUTOMATIC SWITCHING FOR LIGHTING LOADS USING A THERMAL DESIGN WITH BUILT-IN DELAY TO ENSURE THAT THE CONTROLLED LIGHTING DOES NOT SWITCH OFF DUE TO AMBIENT LIGHT OR LIGHTNING STRIKING THE PHOTOCELL.
2. HAVE A RATING BASED ON UL TESTING AT 50% POWER FACTOR FOR BALLAST LOADS, BE UL LISTED, AND MEET ALL APPLICABLE AGENCY REQUIREMENTS
3. BE STEM-MOUNTING TYPE WITH ALL NECESSARY MOUNTING HARDWARE AND INSTRUCTIONS; HAVE A HOUSING CONSTRUCTED OF HIGH IMPACT POLYCARBONATE; PHOTO CONTROL COMPONENTS CONSISTING OF A METAL FILM RESISTOR, DUAL TEMPERATURE COMPENSATING BI-METAL BLADES, SNAP ACTION CONTACT BLADES, CHEMICALLY TREATED/POLYMER ENCAPSULATED CADMIUM SULFIDE PHOTOCELL AND SILVER ALLOY CONTACTS TO ENSURE RELIABLE 5 YEAR MANUFACTURER WARRANTED OPERATION. PHOTO CONTROL SHALL BE 100% FACTORY TESTED FOR FUNCTION WITHIN MANUFACTURER'S SPECIFIED LIGHT LEVELS.
4. BE FROM THE SAME MANUFACTURER OF AND TOTALLY COMPATIBLE WITH THE TIME SWITCHES SPECIFIED ABOVE.

16B 5-7 LIGHTING CONTACTORS

LIGHTING CONTACTORS:

1. INDUSTRIAL DUTY TYPE; SILVER ALLOY, DOUBLE BREAK CONTACTS, CONVERTIBLE WITH NO AND NC INDICATORS; CAPABLE OF ADDING POLES IN THE FIELD; NUMBER AND RATING OF POLES AS INDICATED ON THE DRAWINGS OR REQUIRED BY THE LOAD CONTROLLED; TYPED DIRECTORY AFFIXED TO THE INSIDE OF THE ENCLOSURE DOOR LISTING ALL BRANCH CIRCUITS SWITCHED AND THE CONTROL POWER BRANCH CIRCUIT.
2. SHORT CIRCUIT CURRENT RATING:
   A. 22,000A AT 240V MAXIMUM
   B. 100,000A IF AIC RATING FOR HOUSE PANELBOARD IS ABOVE 22,000A
3. FUSING:
   A. PROVIDE FUSE BLOCKS AND FUSES IN THE CONTACTOR ENCLOSURES, OF THE AMPACITY AND CLASS RECOMMENDED BY THE MANUFACTURER TO OBTAIN A CONTACTOR MINIMUM RMS SYMMETRICAL SHORT CIRCUIT CURRENT RATING OF 100,000A. MOUNT FUSE BLOCKS AHEAD OF THE INPUT TO EACH CONTACT, BOTH USED AND SPARE (IF ANY). ALSO PROVIDE A FUSE PULLER AND SPARE FUSES (25-PERCENT OF TOTAL FUSES OR A MINIMUM OF 2 OF EACH RATING, WHICHEVER IS GREATER) AFFIXED TO THE INSIDE OF THE ENCLOSURE.
4. ENCLOSURES: NEMA 1
5. COIL VOLTAGE: 120V AC

16B 5-8 SIGNALING SYSTEM

PROVIDE A COMPLETE AND FUNCTIONING 24V SIGNALING SYSTEM FOR LOADING DOOR SIGNALS, AND OTHERS AS INDICATED ON THE DRAWINGS. LOW-VOLTAGE CONDUCTORS FOR SIGNALING SYSTEM MAY BE RUN EXPOSED ABOVE FINISHED CEILINGS, BUT SHALL BE INSTALLED IN CONDUIT WITHIN WALLS AND WHERE EXPOSED IN THE WORK AREAS.

SIGNAL BELL UNITS SHALL BE 4-INCH, SINGLE-STROKE TYPE, EDWARDS SIGNALING & SECURITY SYSTEMS (EDWARDS) NO. 332-4G5, OR EQUAL, FOR 24V AC OPERATION, INSTALLED ON A STANDARD SINGLE-GANG BOX. TRANSFORMERS SHALL BE EDWARDS 590 SERIES, OR EQUAL,, HAVING ADEQUATE CAPACITY FOR THE CONNECTED LOAD, PLUS 10-PERCENT AT 24V AC, AND MOUNTED IN A STANDARD TWO-GANG BOX. EXTERIOR PUSH BUTTON SHALL BE EDWARDS NO. 1786-C WITH SOLID BRASS CAP.

END OF SECTION 16B

SECTION 16C: FIRE ALARM SYSTEM
16C1 GENERAL
16C 1-1 GENERAL REQUIREMENTS

THE WORK COVERED BY THIS SECTION OF THE SPECIFICATIONS INCLUDES THE FURNISHING OF ALL LABOR, EQUIPMENT, AND MATERIAL AS HEREIN SPECIFIED.

THIS SECTION REQUIRES THE CONTRACTOR TO FURNISH ALL MATERIALS REQUIRED TO INSTALL THE FIRE ALARM SYSTEM. THE CONTRACTOR SHALL BE RESPONSIBLE FOR INSTALLING, TESTING, AND START-UP OF A COMPLETE FUNCTIONING FIRE ALARM SYSTEM, AND EACH ELEMENT THEREOF, AS SPECIFIED OR INDICATED ON THE DRAWINGS OR REASONABLY INFERRED, INCLUDING EVERY ARTICLE, DEVICE OR ACCESSORY (WHETHER OR NOT SPECIFICALLY CALLED FOR BY ITEM) REASONABLY NECESSARY TO FACILITATE EACH SYSTEM'S FUNCTION AS INDICATED BY THE DESIGN AND THE EQUIPMENT SPECIFIED. ELEMENTS OF THE WORK INCLUDE MATERIALS, LABOR, SUPERVISION, SUPPLIES, EQUIPMENT, TRANSPORTATION AND UTILITIES. INSTALLATION OF DEVICES SHALL BE PERFORMED BY A TECHNICIAN CERTIFIED BY THE NATIONAL INSTITUTE FOR CERTIFICATION OF ENGINEERING TECHNOLOGIES (NICET) LEVEL 2 OR HIGHER IN THE FIRE PROTECTION TECHNOLOGY CERTIFICATION PROGRAM. SUBMIT COPIES OF THE CERTIFICATION FOR EMPLOYEES THROUGH SHOP DRAWING SUBMITTALS.

16C 1-2 SCOPE OF WORK

THE SCOPE OF WORK IN THIS SECTION INCLUDES: FIRE ALARM CONTROL PANELS; REMOTE ANNUNCIATOR PANELS; MANUAL FIRE ALARM PULL STATIONS; AUTOMATIC SMOKE AND HEAT DETECTORS; FIRE ALARM NOTIFICATION APPLIANCES; AUXILIARY FIRE ALARM EQUIPMENT; ACTIVATION AND POWERING OF COMBINATION FIRE AND SMOKE DAMPERS; SPRINKLER SYSTEM WATERFLOW AND VALVE TAMPER ALARMS; AIR HANDLING UNIT SHUTDOWN; ELEVATOR RECALL; BATTERY STAND-BY POWER.

16C 1-3 CODES AND STANDARDS

PROVIDE AN INTEGRATED FIRE ALARM SYSTEM, WHICH MEETS THE CURRENT VERSIONS OF NFPA 70, NATIONAL ELECTRICAL CODE; NFPA 72, NATIONAL FIRE ALARM CODE; AND ALL LOCAL BUILDING AND FIRE CODES. ALL FIRE ALARM EQUIPMENT SHALL BE UNDERWRITERS LABORATORY (UL) AND FACTORY MUTUAL (FM) APPROVED FOR THE TYPE AND CLASS OF SERVICE PERFORMED.

16C 1-4 SYSTEM DESCRIPTION

THE FIRE ALARM SYSTEM SHALL BE A NON-CODED MANUAL AND AUTOMATIC FIRE ALARM SYSTEM WITH CONNECTIONS TO A REMOTE SUPERVISING STATION. CONTROL PANEL SHALL BE MICRO-PROCESSOR BASED, WITH FULLY ADDRESSABLE ALARM DEVICES

16C 1-5 SUBMITTAL REQUIREMENTS

SUBMIT A DETAILED SEQUENCE OF OPERATION. PRE-PRINTED, GENERIC MATERIAL WILL NOT BE ACCEPTED AND WILL BE REJECTED.

SHOP DRAWINGS SHOWING FIRE ALARM FLOOR PLANS AND A FULL BUILDING RISER DIAGRAM. FIRE ALARM FLOOR PLANS AND RISER DIAGRAM SHALL SHOW FIRE ALARM CONTROL PANEL, ANNUNCIATOR, ALL FIRE ALARM INITIATING DEVICES AND NOTIFICATION APPLIANCES. SHOW TYPICAL WIRING DIAGRAMS OF CONTROL PANEL/S, ANNUNCIATOR AND EACH DEVICE AND WIRING CONNECTIONS REQUIRED. SHOW ALL INTERFACES TO OTHER SYSTEMS, SUCH AS TEMPERATURE CONTROL SYSTEMS, AND SECURITY SYSTEMS.

SUBMIT A BILL OF MATERIAL AND MANUFACTURERS PRODUCT DATA FOR ALL DEVICES AND EQUIPMENT.

16C 1-6 QUALIFICATIONS

THE MANUFACTURER SHALL BE A COMPANY SPECIALIZING IN MANUFACTURING THE PRODUCTS SPECIFIED IN THIS SECTION WITH MINIMUM THREE YEARS DOCUMENTED EXPERIENCE. THE INSTALLER SHALL BE A COMPANY SPECIALIZING IN INSTALLING THE PRODUCTS SPECIFIED IN THIS SECTION WITH MINIMUM THREE YEARS DOCUMENTED EXPERIENCE. SHALL BE BONDABLE AND LICENSED CONTRACTOR AND MERCHANT OF ELECTRONIC AUTOMATED FIRE ALARM SYSTEMS AND EMPLOY FULL-TIME FACTORY-TRAINED INSTALLERS AND TECHNICIANS. THE EQUIPMENT MANUFACTURER'S SERVICE DEPARTMENT SHALL BE FULLY STOCKED IN STANDARD PARTS AND COMPONENTS AND ENGAGED IN THE MAINTENANCE OF FIRE ALARM SYSTEMS. ON-THE-PREMISES SERVICE SHALL BE AVAILABLE WITHIN 4 HOURS OF NOTIFICATION, 7 DAYS A WEEK, 24 HOURS A DAY. FURNISH SERVICE AND MAINTENANCE OF FIRE ALARM SYSTEM FOR ONE YEAR FROM DATE OF SUBSTANTIAL COMPLETION.

16C 1-7 SERVICE AND GUARANTEE

FURNISH SERVICE AND MAINTENANCE OF FIRE ALARM SYSTEM INCLUDING WIRING AND RACEWAYS FOR ONE YEAR FROM DATE OF SUBSTANTIAL COMPLETION. ALL COMPONENTS, SYSTEM SOFTWARE, PARTS AND ASSEMBLIES SHALL BE GUARANTEED AGAINST DEFECTS IN MATERIALS AND WORKMANSHIP FOR ONE-YEAR. LABOR (INCLUDING TRAVEL EXPENSES) TO TROUBLE-SHOOT, REPAIR, REPROGRAM, OR REPLACE COMPONENTS SHALL BE FURNISHED BY THIS CONTRACTOR AT NO CHARGE DURING THE WARRANTY PERIOD. ALL CORRECTIVE SOFTWARE MODIFICATIONS MADE DURING WARRANTY PERIODS SHALL BE UPDATED ON ALL USER DOCUMENTATION AND ON USER AND MANUFACTURER ARCHIVED SOFTWARE DISKS.

16C 2 EQUIPMENT

16C 2-1 MANUFACTURERS

SUBJECT TO COMPLIANCE WITH REQUIREMENTS, PROVIDE PRODUCTS MANUFACTURED BY SIMPLEXGRINNELL.

16C 2-2 FIRE ALARM CONTROL PANEL

THE FIRE ALARM SYSTEM SHALL BE A MICROPROCESSOR-BASED SYSTEM DESIGNED SPECIFICALLY FOR FIRE APPLICATIONS. THE SYSTEM SHALL BE SHALL BE UL LISTED UNDER STANDARDS 864 (CONTROL UNITS FOR FIRE-PROTECTIVE SIGNALING SYSTEMS). MODULAR CONSTRUCTION WITH A FLUSH MOUNTED ENCLOSURE.

POWER SUPPLY: PROVIDE TWO SEPARATE AND RELIABLE POWER SUPPLIES. THE CONTROL PANEL SHALL RECEIVE 120 VAC POWER VIA A DEDICATED FUSED DISCONNECT CIRCUIT OF THE BUILDING'S ELECTRICAL SYSTEM. EACH SHALL HAVE ADEQUATE CAPACITY FOR THE SYSTEM. THE FIRE ALARM CONTRACTOR SHALL SUBMIT BATTERY CALCULATIONS FOR REVIEW AND APPROVAL. THE CALCULATIONS SHALL INDICATE EACH DEVICE AND THE LOAD REQUIRED IN STAND-BY AND ALARM MODE. THE SECONDARY POWER SYSTEM SHALL BE A BATTERY-OPERATED EMERGENCY POWER SUPPLY AND CHARGER WITH CAPACITY FOR OPERATING SYSTEM IN STANDBY MODE FOR 60 HOURS FOLLOWED BY ALARM MODE FOR 5 MINUTES.

SYSTEM SUPERVISION: AUTOMATICALLY DETECTS AND REPORTS OPEN CIRCUITS, SHORTS, AND GROUNDS OF WIRING FOR INITIATING DEVICE, SIGNALING LINE, AND NOTIFICATION APPLIANCE CIRCUITS. ALARM, SUPERVISORY AND TROUBLE SIGNALS SHALL BE MONITORED BY THE SUPERVISING STATION OVER A DIGITAL ALARM COMMUNICATOR TRANSMITTER (DACT), OR OTHER APPROVED METHOD.

INITIATING DEVICE CIRCUITS: PROVIDE CIRCUITRY, WHICH MEETS THE PERFORMANCE REQUIREMENTS DURING ABNORMAL CONDITIONS, BASED UPON THE STYLE AND CLASS OF THE CIRCUITRY SELECTED. INITIATING DEVICE CIRCUITS SHALL BE CLASS B, STYLE B.

NOTIFICATION APPLIANCE CIRCUITS: PROVIDE CIRCUITRY, WHICH MEETS THE PERFORMANCE REQUIREMENTS DURING ABNORMAL CONDITIONS, BASED UPON THE STYLE AND CLASS OF THE CIRCUITRY SELECTED. NOTIFICATION APPLIANCE CIRCUITS SHALL BE CLASS B, STYLE Y.

SIGNALING LINE CIRCUITS: PROVIDE CIRCUITRY, WHICH MEETS THE PERFORMANCE REQUIREMENTS DURING ABNORMAL CONDITIONS, BASED UPON THE STYLE AND CLASS OF THE CIRCUITRY SELECTED. SIGNALING LINE CIRCUITRY SHALL BE CLASS B, STYLE 4.

AUXILIARY RELAYS: PROVIDE SUFFICIENT SPDT AUXILIARY RELAY CONTACTS TO PROVIDE ACCESSORY FUNCTIONS SPECIFIED.

DIGITAL ALARM COMMUNICATOR TRANSMITTER: ELECTRICALLY SUPERVISED, CAPABLE OF TRANSMITTING ALARM, SUPERVISORY AND TROUBLE SIGNALS OVER TELEPHONE LINES TO REMOTE STATION RECEIVER.

PROVIDE TROUBLE ACKNOWLEDGE, DRILL, AND ALARM SILENCE SWITCH.

THE CONTROL PANEL AND REMOTE ANNUNCIATOR PANEL SHALL HAVE DEDICATED ALARM, SUPERVISORY AND TROUBLE LED'S AND DEDICATED ALARM, SUPERVISORY AND TROUBLE ACKNOWLEDGE SWITCHES.

LAMP TEST: MANUAL LAMP TEST FUNCTION CAUSES EACH LED TO FUNCTION AT FIRE ALARM CONTROL PANEL.

DRILL SEQUENCE OF OPERATION: MANUAL DRILL FUNCTION CAUSES ALARM MODE OPERATION AS DESCRIBED ABOVE.

ADDRESSABLE SYSTEMS SHALL HAVE SILENT WALK TEST, HISTORY LOGGING FOR A MINIMUM OF 400 EVENTS, 80 CHARACTER LCD DISPLAY.

16C 2-3 SEQUENCE OF OPERATIONS

TROUBLE SEQUENCE OF OPERATION: SYSTEM OR CIRCUIT TROUBLE PLACES SYSTEM IN TROUBLE MODE, WHICH CAUSES THE FOLLOWING SYSTEM OPERATIONS:

1) VISUAL AND AUDIBLE TROUBLE ALARM INDICATED AT FIRE ALARM CONTROL PANEL AND REMOTE ANNUNCIATOR PANEL (IF PROVIDED).

2) TROUBLE SIGNAL TRANSMITTED TO SUPERVISING STATION.

3) MANUAL ACKNOWLEDGE FUNCTION AT FIRE ALARM CONTROL PANEL SILENCES AUDIBLE TROUBLE ALARM; VISUAL ALARM IS DISPLAYED UNTIL INITIATING FAILURE OR CIRCUIT TROUBLE IS CLEARED.

SUPERVISORY SEQUENCE OF OPERATION: THE ACTIVATION OF ANY SPRINKLER VALVE TAMPER SWITCH OR DUCT-MOUNTED SMOKE DETECTOR PLACES SYSTEM IN SUPERVISORY MODE, WHICH CAUSES THE FOLLOWING SYSTEM OPERATIONS:

1) VISUAL AND AUDIBLE SUPERVISORY ALARM INDICATED BY ADDRESS AT FIRE ALARM CONTROL PANEL AND REMOTE ANNUNCIATOR PANEL (IF PROVIDED).

2) SUPERVISORY SIGNAL TRANSMITTED TO SUPERVISING STATION.

3) MANUAL ACKNOWLEDGE FUNCTION AT FIRE ALARM CONTROL PANEL AND REMOTE ANNUNCIATOR PANEL SILENCES AUDIBLE SUPERVISORY ALARM; VISUAL ALARM IS DISPLAYED UNTIL DEVICE IS RETURNED TO ITS NORMAL POSITION/SUPERVISORY CONDITION IS CLEARED.

ALARM SEQUENCE OF OPERATION: ACTUATION OF AN ALARM INITIATING DEVICE PLACES SYSTEM IN ALARM MODE, WHICH CAUSES THE FOLLOWING SYSTEM OPERATIONS.

1) AUDIBLE NOTIFICATION APPLIANCES SHALL SOUND UNTIL SILENCED BY THE ALARM SILENCE SWITCH AT THE CONTROL PANEL.

2) ALL VISIBLE ALARM NOTIFICATION APPLIANCES SHALL DISPLAY A CONTINUOUS SYNCHRONIZED PATTERN UNTIL RESET BY THE ALARM RESET SWITCH.

3) ALARM SIGNAL TRANSMITTED TO SUPERVISING STATION.

4) ALL AIR-HANDLING SYSTEMS THAT ARE MONITORED SHALL SHUTDOWN AND REMAIN DOWN UNTIL THE FIRE ALARM CONTROL PANEL IS RESET.

5) THE ALARM LED SHALL FLASH ON THE CONTROL PANEL AND REMOTE ANNUNCIATOR PANEL UNTIL THE ALARM HAS BEEN ACKNOWLEDGED AT THE CONTROL PANEL/REMOTE ANNUNCIATOR PANEL. ONCE ACKNOWLEDGED, THIS SAME LED SHALL LATCH ON AND THE CUSTOM LABEL FOR THE ADDRESS IN ALARM SHALL BE DISPLAYED ON THE ALPHANUMERIC LCD READOUT. A SUBSEQUENT ALARM RECEIVED FROM ANOTHER ADDRESS AFTER ACKNOWLEDGED SHALL FLASH THE ALARM LED ON THE CONTROL PANEL SHOWING THE NEW ALARM INFORMATION.

6) A PULSING ALARM TONE SHALL OCCUR WITHIN THE CONTROL PANEL UNTIL ACKNOWLEDGED.

ACTIVATION OF AN ELEVATOR LOBBY OR ELEVATOR MACHINE ROOM SMOKE DETECTOR SHALL PLACE THE SYSTEM IN ALARM MODE AND SHALL INITIATE PHASE I ELEVATOR RECALL PER ASME A17.1. PROVIDE OUTPUT SIGNALS AND LOGIC AS REQUIRED BY CODE AND BY THE ELEVATOR SYSTEM SUPPLIER AND INSTALLER.

16C 2-4 INITIATING DEVICES

MANUAL PULL STATION: PROVIDE SEMI-FLUSH, NON-CODED TYPE, DOUBLE ACTION MANUAL PULL STATION.

SMOKE DETECTOR (PHOTOELECTRIC TYPE): DEVICE SHALL HAVE VISUAL INDICATION OF DETECTOR ACTUATION, SELF-RESTORING, PLUG-IN WITH AN INTEGRAL ADDRESSABLE MODULE INDICATING THE DETECTOR STATUS. PHOTOELECTRIC DETECTORS SHALL HAVE SENSITIVITY BETWEEN 0.5 AND 3.5 PERCENT/FOOT SMOKE OBSCURATION.

DUCT MOUNTED SMOKE DETECTOR: PHOTOELECTRIC DETECTOR ALONG WITH A STANDARD, RELAY OR ISOLATOR DETECTOR MOUNTING BASE. PROVIDE FOR VARIATIONS IN DUCT AIR VELOCITY BETWEEN 300 AND 4000 FEET PER MINUTE. PROTECT THE MEASURING CHAMBER FROM DAMAGE AND INSECTS. PROVIDE AN AIR EXHAUST TUBE AND AN AIR SAMPLING INLET TUBE THAT EXTENDS INTO THE DUCT AIR STREAM UP TO TEN FEET. PROVIDE DRILLING TEMPLATES AND GASKETS TO FACILITATE LOCATING AND MOUNTING THE HOUSING. PROVIDE REMOTE ALARM LEDS AND REMOTE TEST STATIONS AS SHOWN ON THE PLANS.

16C 2-5 NOTIFICATION APPLIANCES

VISUAL ALARM NOTIFICATION APPLIANCES (STROBES): STROBES SHALL BE XENON OR EQUIVALENT, UNFILTERED OR CLEAR FILTERED WHITE LIGHT, A MINIMUM INTENSITY OF 15/75 CANDELA AND AS INDICATED ON DRAWINGS, FLASH RATE RANGE FROM 1 TO 3 HZ, A MAXIMUM PULSE DURATION OF 0.2 SEC WITH A MAXIMUM DUTY CYCLE OF 40%. STROBE SHALL MEET ALL REQUIREMENTS OF THE AMERICANS WITH DISABILITIES ACT (MINIMUM 75 CD AS TESTED PER UL 1971).

AUDIBLE/VISUAL ALARM NOTIFICATION APPLIANCES (HORN/STROBES): COMBINATION UNITS SHALL PROVIDE A COMMON ENCLOSURE FOR THE FIRE ALARM AUDIBLE AND VISUAL ALARM APPLIANCES AND BE UL LISTED FOR ITS PURPOSE. MINIMUM AUDIBLE LEVEL AND STROBE INTENSITY SHALL MEET ALL REQUIREMENTS FOR SEPARATE APPLIANCES.

16C 2-6 AUXILIARY DEVICES

WATERFLOW ALARM SWITCHES: SHALL BE PROVIDED BY THE FIRE SPRINKLER INSTALLER AND SHALL BE WIRED COMPLETE AND READY FOR USE BY THE FIRE ALARM SYSTEM INSTALLER. SWITCH SHALL HAVE AN ADJUSTABLE DELAY TO MINIMIZE FALSE ALARMS DUE TO FLUCTUATIONS IN WATER PRESSURE.

GATE VALVE (TAMPER) SWITCHES: SHALL BE PROVIDED BY THE FIRE SPRINKLER INSTALLER AND SHALL BE WIRED COMPLETE AND READY FOR USE BY THE FIRE ALARM SYSTEM INSTALLER.

CONTROL RELAY MODULE: PROVIDE INTELLIGENT CONTROL RELAY MODULES. THE CONTROL RELAY MODULE SHALL PROVIDE ONE FORM "C" DRY RELAY CONTACT RATED AT 2 AMPS @ 24 VDC TO CONTROL EXTERNAL APPLIANCES OR EQUIPMENT SHUTDOWN. THE CONTROL RELAY SHALL BE RATED FOR PILOT DUTY AND RELEASING SYSTEMS. THE POSITION OF THE RELAY CONTACT SHALL BE CONFIRMED BY THE SYSTEM FIRMWARE.

16C 2-7 FIRE ALARM WIRE AND CABLE

FIRE ALARM POWER BRANCH CIRCUITS: BUILDING WIRE AS SPECIFIED IN DIVISION 16.

SIGNALING LINE, INITIATING DEVICE AND NOTIFICATION APPLIANCE CIRCUITS: POWER LIMITED FIRE-PROTECTIVE SIGNALING CABLE, SOLID COPPER CONDUCTOR, 300 VOLTS INSULATION RATED 105 DEGREES C. MINIMUM WIRE SIZE SHALL BE 16 AWG FOR INITIATING AND CONTROL CIRCUITS AND MINIMUM 14 AWG FOR NOTIFICATION APPLIANCE CIRCUITS. WIRE AND CABLE SHALL BE SIZED (ABOVE MINIMUMS NOTED ABOVE), OR TWISTED AND SHIELDED IF RECOMMENDED BY THE SYSTEM MANUFACTURER OR REQUIRED FOR POWER CAPACITY. INITIATING, NOTIFICATION, AND CONTROL CIRCUITS SHALL BE SIZED (ABOVE MINIMUMS NOTED ABOVE) BASED ON 20% ADDITIONAL POWER CONSUMING DEVICES. THE CONDUCTORS SHALL MEET THE REQUIREMENTS OF NEC ARTICLE 760.

THE TYPE OF CABLE CHOSEN SHOULD BE BASED ON FIRE ALARM SYSTEM REQUIREMENTS, SPECIFICATION REQUIREMENTS AND APPLICABLE CODE REQUIREMENTS. CONSIDERATION SHOULD ALSO BE GIVEN TO THE LENGTH OF CABLE RUNS AND POTENTIAL INTERFERENCE.

ALL WIRING PROVIDED ON THIS PROJECT SHALL BE UL LISTED FOR THE INTENDED USE. ALL WIRING INCLUDING WIRING TO EXISTING MODIFIED DEVICES AND APPLIANCES SHALL BE NEW.

16C 3 EXECUTION

16C 3-1 GENERAL

THE CONTRACTOR SHALL INSTALL, PROGRAM AND TEST ALL NEW EQUIPMENT IDENTIFIED IN THIS CONTRACT AND REVISE EXISTING EQUIPMENT AS NOTED.

THE INSTALLATION SUPERVISOR SHALL BE ON THE JOB SITE DURING THE ENTIRE INSTALLATION. THE INSTALLATION SUPERVISOR SHALL MAINTAIN MARKED UP COPIES OF THE DRAWINGS AT THE JOB SITE SHOWING AS-BUILT CONDITIONS. THESE DRAWINGS SHALL BE UPDATED DAILY AND AVAILABLE FOR OWNER REVIEW.

THE CONTRACTOR SHALL PROVIDE ALL REQUIRED CONDUIT AND ALL ASSOCIATED HARDWARE, AND SHALL INSTALL (PULL), CONNECT, AND TEST ALL CABLE FOR A COMPLETE FIRE ALARM SYSTEM. ALL WIRING SHALL BE INSTALLED IN ACCORDANCE WITH THE GUIDELINES OF THESE SPECIFICATIONS AND DOCUMENTS AS WELL AS THE NFPA CODES AND STANDARDS LISTED IN THESE SPECIFICATIONS.

16C 3-2 INSTALLATION

MINIMUM ALLOWABLE CONDUIT SIZE SHALL BE 3/4 INCH. THE CONDUIT SHALL BE SIZED SO THAT CONDUIT FILL DOES NOT EXCEED 75% OF NFPA 70 MAXIMUM FILL REQUIREMENTS. CABLES IN VERTICAL RISERS SHALL NOT EXCEED 50% OF NFPA 70 MAXIMUM FILL REQUIREMENTS. CONDUIT INSTALLATION SHALL BE AS REQUIRED BY THE CONTRACTOR'S LAYOUT AND AS DESCRIBED IN THESE SPECIFICATIONS. ALL CONDUIT FIELD ROUTING SHALL BE ACCEPTABLE TO THE OWNER. ROUTING NOT ACCEPTABLE SHALL BE REROUTED AND REPLACED WITHOUT EXPENSE TO THE OWNER.

ALL WIRE, CABLE, CONDUIT AND RACEWAYS SHALL BE CONCEALED IN WALLS, CEILING SPACES, ELECTRICAL SHAFTS OR CLOSETS IN FINISHED AREAS EXCEPT AS SPECIFICALLY NOTED OTHERWISE. CONDUIT AND RACEWAYS MAY BE EXPOSED IN UNFINISHED AREAS OR WHERE SPECIFICALLY APPROVED BY THE OWNER.

EXCEPT AS OTHERWISE SPECIFIED OR INDICATED ON THE DRAWINGS, ALL CONDUIT SHALL BE INSTALLED PARALLEL OR PERPENDICULAR TO DOMINANT SURFACES WITH RIGHT ANGLE TURNS MADE OF SYMMETRICAL BENDS OR FITTINGS. EXCEPT WHERE PREVENTED BY THE LOCATION OF OTHER WORK, A SINGLE CONDUIT OR A CONDUIT GROUP SHALL BE CENTERED ON STRUCTURAL MEMBERS.

CONDUIT SHALL BE LOCATED AT LEAST SIX INCHES FROM HOT WATER OR STEAM PIPES, AND FROM OTHER HOT SURFACES. CONDUIT SHALL NOT BLOCK ACCESS TO ANY EXISTING EQUIPMENT OR FIXTURES.

ALL CONDUITS AND JUNCTION BOXES SHALL BE LABELED AS SPECIFIED IN DIVISION 16 (RED).

ALL WIRING SHALL BE TERMINATED AT DEVICES OR PANELS USING TERMINAL CONNECTORS FOR SCREW TYPE TERMINALS. ALL TERMINAL CONNECTORS FOR CONDUCTORS SHALL BE PRE-INSULATED RING TYPE OR PRE-INSULATED SPADE TYPE. PRE-INSULATED TERMINAL CONNECTORS SHALL INCLUDE A VINYL SLEEVE, COLOR CODED TO INDICATE CONDUCTOR SIZE. PRE-INSULATED TERMINAL CONNECTORS SHALL INCLUDE A METALLIC SUPPORT SLEEVE BONDED TO THE VINYL-INSULATING SLEEVE AND DESIGNED TO GRIP THE CONDUCTOR INSULATION.

MOUNT END-OF-LINE DEVICE IN BOX WITH LAST DEVICE OR SEPARATE BOX ADJACENT TO LAST DEVICE IN CIRCUIT FOR CONVENTIONAL HARDWIRED CLASS B INITIATING AND NOTIFICATION APPLIANCE CIRCUITS.

CONDUIT SHALL BE SECURELY FASTENED TO ALL BOXES AND CABINETS. THREADS ON METALLIC CONDUIT SHALL PROJECT THROUGH THE WALL OF THE BOX TO ALLOW THE BUSHING TO BUTT AGAINST THE END OF THE CONDUIT. THE LOCKNUTS BOTH INSIDE AND OUTSIDE SHALL THEN BE TIGHTENED SUFFICIENTLY TO BOND THE CONDUIT SECURELY TO THE BOX. CONDUIT SHALL ENTER CABINETS FROM THE BOTTOM AND SIDES ONLY.

INSTALL MANUAL STATION WITH OPERATING HANDLE 48 INCHES ABOVE FLOOR UNLESS NOTED OTHERWISE ON DRAWINGS.

INSTALL VISUAL AND AUDIBLE/VISUAL NOTIFICATION APPLIANCES WITH VISUAL ELEMENT (STROBE) BETWEEN 80 INCHES AND 96 INCHES ABOVE FINISHED FLOOR UNLESS NOTED OTHERWISE ON DRAWINGS.

INSTALL AUDIBLE DEVICES WITH THE TOP OF THE DEVICE AT LEAST 90 INCHES ABOVE FINISHED FLOOR OR 6 INCHES BELOW THE CEILING, WHICHEVER IS LOWER, UNLESS NOTED OTHERWISE ON DRAWINGS. IF COMBINATION DEVICES ARE INSTALLED, THEY SHALL BE INSTALLED PER THE VISUAL SIGNAL DEVICE REQUIREMENTS.

MAKE CONDUIT AND WIRING CONNECTIONS TO EQUIPMENT PROVIDED BY OTHERS LISTED IN SECTION 1.1.E.

PROVIDE STROBE SYNCHRONIZATION AS REQUIRED PER NFPA 72.

16C 3-3 FIELD QUALITY CONTROL

SYSTEMS SHALL BE CHECKED AND TESTED IN ACCORDANCE WITH THE INSTRUCTIONS PROVIDED BY THE MANUFACTURER TO INSURE THAT THE SYSTEM FUNCTIONS AS REQUIRED AND IS FREE OF GROUNDS, OPENS, AND SHORTS. EACH DEVICE SHALL BE TESTED. SMOKE DETECTORS SHALL BE TESTED WITH PRODUCTS OF COMBUSTION.

UPON COMPLETION OF THE SYSTEM INSTALLATION AND BEFORE THE DATE OF FINAL ACCEPTANCE, A FACTORY-TRAINED TECHNICIAN SHALL PERFORM ALL NECESSARY TESTS AND ADJUSTMENTS AND SHALL THEN FILE A LETTER OF CERTIFICATION AND A CERTIFICATE OF COMPLETION (NFPA 72) WITH THE OWNER INDICATING THAT THE SYSTEM FUNCTIONS AND CONFORMS TO THE FIRE ALARM SYSTEM SPECIFICATIONS.

TEST IN ACCORDANCE WITH NFPA 72 AND LOCAL FIRE DEPARTMENT REQUIREMENTS.

16C 3-4 MANUFACTURER'S FIELD SERVICES

INCLUDE SERVICES OF FACTORY TRAINED AND CERTIFIED TECHNICIAN TO SUPERVISE INSTALLATION, ADJUSTMENTS, FINAL CONNECTIONS, AND SYSTEM TESTING AS PERFORMED BY THE FIRE ALARM CONTRACTOR'S FACTORY-TRAINED TECHNICIANS.

THE EQUIPMENT SUPPLIER'S FACTORY TRAINED TECHNICIAN SHALL TRAIN THE OWNER'S PERSONNEL IN THE PROPER USE AND MAINTENANCE OF THE SYSTEM. TRAINING SESSIONS SHALL BE CONDUCTED AS NEEDED, NOT TO EXCEED A TOTAL OF 2 SESSIONS, WITH EACH SESSION LASTING A MAXIMUM OF 4 HOURS EACH.

16C 3-2 ACCEPTANCE TESTING

UPON COMPLETION OF THE SYSTEM INSTALLATION, A FACTORY-TRAINED TECHNICIAN SHALL PERFORM ALL NECESSARY TESTS AND ADJUSTMENTS IN THE PRESENCE OF THE OWNER'S DESIGNATED PERSONNEL.

END OF SECTION 16C

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0750001106

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	REVISION	

DDG DUPLANTIS DESIGN GROUP, PC
Respect• Integrity• Client Satisfaction• Excellence
THIBODAUX MANDEVILLE HOUSTON
Civil Engineering • Site Development • Land Planning • Public Works • Architecture
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DATE:

STAMP

STATE OF LOUISIANA
CRAIG R. LANHAM
REG. No.25558
REGISTERED PROFESSIONAL ENGINEER
IN
ELECTRICAL ENGINEERING
8-13-07

PROPOSED RETAIL DEVELOPMENT
CITY OF BOUTTE
ST. CHARLES PARISH, LOUISIANA

FOR THE SPECTRA GROUP, INC.
MEMPHIS, TENNESSEE

DRAWN	FLS
CHECKED	DWL
DATE	8/13/07
SCALE	AS NOTED ON DWG
PROJECT NO.	0750001106
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