ELECTRICAL SPECIFICATIONS

1. SCOPE

1.1. THE CONTRACTOR SHALL FURNISH AND INSTALL ALL LABOR, MATERIALS, EQUIPMENT AND FIXTURES AND PERFORM ALL OPERATIONS REQUIRED FOR THE COMPLETE INSTALLATION OF ALL ELECTRICAL WORK AND RELATED SYSTEMS AS SHOWN ON THE DRAWINGS, SPECIFIED HEREIN, OR AS MAY BE REASONABLY REQUIRED.

1.2. IN ADDITION, THE CONTRACTOR SHALL VERIFY THE ELECTRICAL REQUIREMENTS, AND SHALL MAKE ALL CONNECTIONS REQUIRED TO EQUIPMENT BEING FURNISHED UNDER THIS CONTRACT, AS WELL AS TO EQUIPMENT FURNISHED BY OTHERS FOR INSTALLATION UNDER THIS CONTRACT.

2. PERMITS, CODES AND INSPECTIONS

2.1. THE CONTRACTOR SHALL SECURE AND PAY FOR ALL PERMITS AND INSPECTIONS REQUIRED FOR THE WORK INCLUDED IN THIS PROJECT. UPON COMPLETION OF THE WORK, THE CONTRACTOR SHALL DELIVER CERTIFICATES OF FINAL INSPECTION AND APPROVAL BY THE LOCAL AUTHORITY HAVING JURISDICTION, AS WELL AS THE FIRE UNDERWRITERS, TO THE OWNER.

2.2. ALL WORK INSTALLED UNDER THIS CONTRACT SHALL BE IN STRICT CONFORMANCE WITH THE LATEST EDITIONS OF THE FOLLOWING CODES, STANDARDS AND REQUIREMENTS:

2.2.1. NATIONAL ELECTRICAL CODE
2.2.2. UNDERWRITERS LABORATORIES, INC. – ALL APPLICABLE STANDARDS
2.2.3. NATIONAL FIRE PROTECTION ASSOCIATION – ALL APPLICABLE STANDARDS
2.2.4. AMERICANS WITH DISABILITIES ACT ACCESSIBILITIES GUIDELINES
2.2.5. ALL APPLICABLE STATE, COUNTY AND LOCAL CODES
2.2.6. LOCAL POWER COMPANY
2.2.7. LOCAL TELEPHONE COMPANY
2.2.8. LOCAL CABLE TELEVISION COMPANY

3. COORDINATION AND SUPERVISION

3.1. OUTLET AND EQUIPMENT LOCATIONS ARE DIAGRAMMATIC IN NATURE, AND SHALL BE SUBJECT TO MINOR MODIFICATIONS AS REQUIRED BY FIELD CONDITIONS OR AS DIRECTED BY THE ARCHITECT.

3.2. IT SHALL BE THE RESPONSIBILITY OF THE CONTRACTOR TO COORDINATE THE WORK AND EQUIPMENT SPECIFIED HEREIN WITH THE WORK TO BE PERFORMED AND EQUIPMENT TO BE FURNISHED BY OTHERS TO ASSURE A COMPLETE AND SATISFACTORY INSTALLATION MEETING WITH THE APPROVAL OF THE ARCHITECT.

3.3. THE CONTRACTOR SHALL MAINTAIN ON SITE AT ALL TIMES, A COMPETENT ELECTRICAL FOREMAN TO CHECK, LAYOUT, COORDINATE AND SUPERVISE ALL WORK TO BE PERFORMED ON THIS PROJECT.

4. MATERIAL AND EQUIPMENT

4.1. ALL MATERIALS AND EQUIPMENT INSTALLED AS PART OF THE PERMANENT INSTALLATION SHALL BE NEW, UNLESS OTHERWISE NOTED, AND SHALL BE APPROVED BY UL FOR INSTALLATION IN EACH PARTICULAR CASE WHERE STANDARDS HAVE BEEN ESTABLISHED. WHERE APPLICABLE, THE ITEM SHALL BEAR THE APPROVAL LABEL OF UNDERWRITERS LABORATORIES.

4.2. MANUFACTURER'S CATALOG DATA, DESCRIPTIONS AND NUMBERS USED HEREIN OR INDICATED ON THE DRAWINGS ARE TO INDICATE THE MINIMUM STANDARD OF QUALITY, APPEARANCE AND PERFORMANCE THAT WILL BE ACCEPTABLE. THE CONTRACTOR MAY SUBMIT EQUAL EQUIPMENT OF ANOTHER MANUFACTURER FOR APPROVAL BY THE ARCHITECT, HOWEVER THE ARCHITECT SHALL RESERVE THE RIGHT TO USE WHATEVER MEANS IS NECESSARY TO EVALUATE ANY PROPOSED SUBSTITUTIONS. WHERE REQUESTED BY THE ARCHITECT, THE CONTRACTOR SHALL SUBMIT SAMPLES OF BOTH THE SPECIFIED ITEM AS WELL AS THE PROPOSED SUBSTITUTION FOR EVALUATION BY THE ARCHITECT.

5. SHOP DRAWINGS

5.1. THE CONTRACTOR SHALL SUBMIT, IN A TIMELY MANNER, SHOP DRAWINGS OF AT LEAST THE FOLLOWING ITEMS AND SYSTEMS TO THE ARCHITECT FOR APPROVAL:

5.1.1. NOT USED
5.1.2. PANELBOARDS
5.1.3. NOT USED
5.1.4. LIGHTING FIXTURES
5.1.5. FIRE ALARM SYSTEM

6. EXISTING CONDITIONS

6.1. THE CONTRACTOR SHALL VISIT THE SITE, DETERMINE ALL CONDITIONS AND CIRCUMSTANCES UNDER WHICH THE WORK MUST BE DONE OR OTHER CIRCUMSTANCES WHICH WILL EFFECT THE WORK, AND MAKE ALL NECESSARY ALLOWANCES BEFORE SUBMITTING HIS BID. NO SUBSEQUENT ALLOWANCES SHALL BE MADE FOR WORK REQUIRED TO BE PERFORMED, BUT NOT INCLUDED IN THE BID.

7. TEMPORARY ELECTRIC SERVICE

7.1. THE CONTRACTOR SHALL FURNISH AND INSTALL TEMPORARY ELECTRICAL SERVICE TO THE SITE AS IS NECESSARY TO ENABLE HIS WORK AND THE WORK OF OTHERS ON THE JOB SITE TO PROCEED AND TO TEST THE OPERATION OF ALL APPARATUS, DEVICES, SYSTEMS, ETC. WHICH REQUIRE ELECTRICAL ENERGY. ALL COSTS AND CHARGES ASSOCIATED WITH THE TEMPORARY SERVICE SHALL BE PAID BY THE CONTRACTOR.

8. CUTTING, PATCHING AND WATERPROOFING

8.1. CUTTING: PROVIDE CUTTING, CHANNELING, CHASING AND DRILLING OF FLOORS, WALLS, PARTITIONS, CEILINGS AND OTHER SURFACES NECESSARY FOR INSTALLATION OF ELECTRICAL WORK. ALL CUTTING SHALL BE PERFORMED BY SKILLED MECHANICS OF THE TRADES INVOLVED.

8.1.1. NO CUTTING OF ANY STRUCTURE OR FINISHES SHALL BE DONE UNTIL THE CONDITION REQUIRING SUCH CUTTING HAS BEEN EXAMINED AND APPROVED BY THE ENGINEER.

8.1.2. WHEREVER ANY ROOFING AND/OR WATERPROOFING IS PIERCED, SUCH WORK SHALL BE DONE WITH CARE AND OPENINGS SHALL BE SEALED ABSOLUTELY WATERTIGHT. ALL WATERPROOFING SHALL BE DONE BY EXPERIENCED WATERPROOFERS AND SHALL BE INCLUDED IN THE GUARANTEE HEREINAFTER MENTIONED.

8.2. PATCHING: REPAIR CUT SURFACES TO MATCH ADJACENT SURFACES. ALL SURFACES DISTURBED AS A RESULT OF SUCH CUTTING SHALL BE RESTORED UNDER THIS DIVISION TO MATCH ORIGINAL WORK AND ALL MATERIALS USED FOR ANY PATCHING, MENDING OR FINISHING SHALL CONFORM TO THE CLASS OF MATERIALS ORIGINALLY INSTALLED.

9. CLOSING OF OPENINGS

9.1. FIRESTOPPING: UNUSED SLOTS, SLEEVES AND OTHER PENETRATIONS IN FLOORS, WALLS OR OTHER GENERAL CONSTRUCTION SHALL BE CLOSED AND SEALED WITH AN APPROVED FIRESTOPPING MATERIAL.

9.1.1. FIRESTOPPING MATERIAL SHALL BE UL LISTED AND TESTED SILICONE ELASTOMER SPECIFICALLY FORMULATED FOR USE IN HORIZONTAL AND VERTICAL APPLICATIONS. THE MATERIAL SHALL POSSESS INTUMESCENT CHARACTERISTICS AND UPON EXPOSURE TO HEAT ABOVE 250 DEGREES F. SHALL EXPAND TO NOT LESS THAN FIVE TIMES ITS ORIGINAL VOLUME TO FORM A FIREPROOF ENVELOPE, UL RATED FOR 2– AND 3–HOUR PROTECTION, WHEN APPLIED IN ACCORDANCE WITH THE MANUFACTURER'S RECOMMENDATION.

9.1.2. FLOOR SLOTS AND OPENINGS SHALL BE CLOSED WITH 16 GAUGE GALVANIZED STEEL SHEET SUPPORTED ON 1–INCH BY 1–INCH BY 1/8–INCH STRUCTURAL ANGLE DRILLED OR SUPPORTED WITH PONDER–DRIVEN STUDS INTO THE BUILDING STRUCTURE. FIRESTOP WITH A LAYER OF SILICONE ELASTOMER NOT LESS THAN 1–INCH THICK WHICH COMPLETELY FILLS THE OPENING. THE TOP SURFACE OF THE SILICONE ELASTOMER SHALL BE APPROXIMATELY 1–INCH BELOW THE FINISHED FLOOR SLAB.

9.1.3. OPENINGS IN WALLS SHALL BE CLOSED WITH 16 GAUGE GALVANIZED STEEL SHEET SECURELY ATTACHED AT THE MIDPOINT OF THE WALL THICKNESS AND FIRESTOPPED ON BOTH SIDES OF THE STEEL SHEET WITH NOT LESS THAN 1/2–INCH THICK LAYER OF NON–SAGGING SILICONE ELASTOMER TO FULLY COVER THE OPENING.

9.1.4. SINGLE OR MULTIPLE PIPES PASSING THROUGH WALLS AND FLOORS SHALL HAVE THE ANNULUS SPACE BETWEEN PIPES OR BETWEEN PIPES AND STRUCTURE FILLED WITH SILICONE ELASTOMER TO PROVIDE A 3–HOUR RATED FIRESTOP FOR FLOORS AND WALLS.

9.2. CONDUIT: THE ANNULUS BETWEEN EXPOSED CONDUIT AND WALLS OR FLOORS IN FINISHED SPACES SHALL BE FILLED, SEALED AND PAINTED TO MATCH ADJACENT SURFACES.

10. REACTIVATION OF EXISTING EQUIPMENT OR CIRCUITS

10.1. THE CONTRACTOR SHALL BE RESPONSIBLE FOR THE REACTIVATION OF EQUIPMENT OR CIRCUITS NOTED ON THE DRAWINGS. PRIOR TO ENERGIZING ANY EQUIPMENT OR CIRCUIT, THE CONTRACTOR SHALL INSPECT THE EQUIPMENT TO SEE IF ALL NECESSARY COMPONENTS ARE PRESENT AND ARE IN SUITABLE CONDITION, NOT HAVING ANY BROKEN OR MISSING PIECES. AFTER INSPECTION IS MADE, FURNISH AND INSTALL ANY MISSING PARTS AND MAKE ALL REPAIRS TO THE EQUIPMENT WHICH MIGHT BE REQUIRED TO MAKE THE EQUIPMENT OR CIRCUIT FUNCTIONALLY OPERATIONAL.

11. GROUNDING AND BONDING

11.1. THE ENTIRE INSTALLATION SHALL BE THOROUGHLY AND EFFECTIVELY GROUNDED AND BONDED IN ACCORDANCE WITH ALL REQUIREMENTS OF THE NATIONAL ELECTRIC CODE.

12. CONDUIT

12.1. EXCEPT AS SPECIFIED HEREINAFTER, ALL WIRING INSTALLED UNDER THIS CONTRACT SHALL BE RUN IN CONDUIT. CONDUIT SHALL BE AS FOLLOWS:

12.1.1. OUTDOORS: USE THE FOLLOWING WIRING METHODS:

A) EXPOSED: RIGID STEEL OR IMC
B) UNDERGROUND: SCHEDULE 40 PVC
C) CONNECTIONS TO VIBRATING EQUIPMENT: LIQUIDTIGHT FLEXIBLE METAL CONDUIT
D) SERVICE ENTRANCE CONDUCTORS: CONCRETE–ENCASED PVC

12.1.2. INDOORS: USE THE FOLLOWING WIRING METHODS:

A) EXPOSED: ELECTRICAL METALLIC TUBING.
B) CONCEALED: ELECTRICAL METALLIC TUBING (MC CABLE MAY BE USED FOR BRANCH CIRCUITS RATED 30 AMPS AND LESS)
C) CONNECTIONS TO VIBRATING EQUIPMENT: FLEXIBLE METAL CONDUIT.
D) BELOW RAISED FLOOR: ELECTRICAL METALLIC TUBING.
E) IN CONCRETE SLAB: SCHEDULE 40 PVC

12.2 WHERE CONDUIT IS SPECIFIED TO BE USED ABOVE, IT SHALL BE SIZED IN ACCORDANCE WITH THE NATIONAL ELECTRICAL CODE, EXCEPT THAT THE MINIMUM CONDUIT SIZE SHALL BE 3/4".

13. WIRING

13.1. ALL CONDUCTORS SHALL BE SOFT DRAWN COPPER. MINIMUM WIRE SIZE SHALL BE NUMBER 12 AWG. INSULATION SHALL BE TYPE THHN OR THWN.

13.2. THE USE OF ALUMINUM WIRE SHALL NOT BE PERMITTED, UNLESS APPROVED BY THE ARCHITECT, AND THEN ONLY FOR FEEDERS OR CIRCUITS RATED 60 AMPS OR MORE.

14. OUTLET BOXES AND EQUIPMENT CABINETS

14.1. OUTLET AND DEVICE BOXES SHALL BE GALVANIZED STEEL AND OF SUFFICIENT SIZE TO ACCOMMODATE ALL WIRING AND DEVICES TO BE INSTALLED.

14.2. EQUIPMENT AND PANELBOARD CABINETS, LARGE PULL BOXES AND SIMILAR CABINETS SHALL BE GALVANIZED STEEL OF GAUGE REQUIRED BY THE NATIONAL ELECTRICAL CODE.

15. WIRING DEVICES

15.1. WIRING DEVICES USED ON THIS PROJECT SHALL BE "SPECIFICATION GRADE" OF AS MANUFACTURED BY ARROW–HART, BRYANT, EAGLE, HUBBELL, LEVITON, PASS & SEYMOUR OR APPROVED EQUAL.

16. LIGHTING FIXTURES

16.1. FURNISH AND INSTALL A COMPLETE UL LISTED LIGHTING FIXTURE FOR EACH OUTLET SHOWN ON THE DRAWINGS.

16.2. EACH LIGHTING FIXTURE SHALL BE FURNISHED COMPLETE WITH ALL ACCESSORIES, HANGERS, TRIMS, LAMPS, BALLASTS, ETC., AS RECOMMENDED BY THE MANUFACTURER OR AS REQUIRED FOR A COMPLETE AND SATISFACTORY INSTALLATION.

16.3. ALL PLASTIC EMPLOYED IN LIGHTING FIXTURES SHALL BE 100% VIRGIN ACRYLIC.

16.4. FLUORESCENT BALLASTS SHALL BE ELECTRONIC WITH SOUND RATING "A" AND LESS THAN 20% THD.

16.5. PERMANENT LIGHTING FIXTURES SHALL NOT BE USED FOR TEMPORARY LIGHTING DURING CONSTRUCTION.

16.6. ALL LIGHTING FIXTURES SHALL BE ADEQUATELY SUPPORTED FROM THE BUILDING STRUCTURE OR AS REQUIRED.

16.7. LIGHTING FIXTURES SHALL BE AS INDICATED IN THE LIGHTING FIXTURE SCHEDULE ON THE DRAWINGS.

17. SWITCHBOARDS AND PANELBOARDS

17.1. SWITCHBOARDS: NOT USED

17.2. DISTRIBUTION TYPE PANELBOARDS SHALL BE SQUARE D I–LINE OR EQUAL BY SIEMENS, GENERAL ELECTRIC OR WESTINGHOUSE.

17.3. BRANCH CIRCUIT PANELBOARDS SHALL BE PLUG–IN CIRCUIT BREAKER TYPE, SQUARE D TYPE NQOD OR NF OR EQUAL BY SIEMENS, GENERAL ELECTRIC OR WESTINGHOUSE.

17.4. FURNISH AND INSTALL ENGRAVED PHENOLIC NAMEPLATES FOR SWITCHBOARD FEEDER BREAKERS. FURNISH AND INSTALL TYPED CIRCUIT DIRECTORIES FOR ALL NEW PANELBOARDS. DIRECTORIES SHALL IDENTIFY LOAD SERVED (E.G. "LIGHTING", "RECEPTACLES") AND AREA(S) SERVED (E.G. "ROOM 100").

17.5. WHERE INDICATED ON DRAWINGS, PROVIDE PANELS WITH 200 GROUND BUSES, FEED–THRU LUGS AND CABLE, SUBFEED BREAKERS, ETC. TO SUIT THE SPECIFIC APPLICATION. WHERE ISOLATED GROUND BUS IS INDICATED, PROVIDE IN ADDITION TO EQUIPMENT GROUND BUS.

18. SAFETY SWITCHES AND ENCLOSED CIRCUIT BREAKERS

18.1. FURNISH AND INSTALL SAFETY DISCONNECT SWITCHES AT ALL MOTOR LOCATIONS, AND % NEUTRAL BUSES, ISOLATED WHERE INDICATED ON THE DRAWINGS OR WHERE REQUIRED BY THE NATIONAL ELECTRICAL CODE, WHETHER INDICATED OR NOT.

18.2. SAFETY SWITCHES SHALL BE HEAVY DUTY TYPE, FUSED OR NON–FUSED AS REQUIRED, IN NEMA 1 ENCLOSURE FOR INDOOR LOCATIONS, OR IN NEMA 3R ENCLOSURE FOR EXTERIOR LOCATIONS AND FOR NORMALLY WET OR DAMP INTERIOR LOCATIONS.

18.3. SAFETY SWITCHES SHALL BE SQUARE D HEAVY DUTY TYPE, OR EQUAL BY SIEMENS, GENERAL ELECTRIC OR WESTINGHOUSE.

18.4. ENCLOSED CIRCUIT BREAKERS SHALL BE MOLDED CASE TYPE, SQUARE D CLASS 610 OR EQUAL BY SIEMENS, GENERAL ELECTRIC OR WESTINGHOUSE.

19. MOTOR CONTROLLERS

NOT USED

20. DRY–TYPE TRANSFORMERS

NOT USED

21. LIGHTING CONTROL DEVICES

21.1. TIME CLOCKS SHALL BE ELECTRONIC, SOLID STATE, PROGRAMMABLE UNITS WITH ALPHANUMERIC DISPLAY, WITH 30 AMP CONTACTS, MULTIPLE SET POINT CAPABILITY AND ASTRONOMICAL CONTROL. TIME CLOCKS SHALL BE AS MANUFACTURED BY INTERMATIC, PARAGON, TORK OR APPROVED EQUAL.

21.2. PHOTOELECTRIC SWITCHES SHALL BE RATED TO OPERATE RELAY/COIL OR LOAD AS REQUIRED.

21.3. MULTIPOLE CONTACTORS SHALL BE ELECTRONICALLY OPERATED AND MECHANICALLY HELD, WITH NUMBER OF POLES AND AMPERE RATING AS INDICATED. CONTROL COIL VOLTAGE SHALL MATCH CONTROL POWER SOURCE.

22. TRANSIENT VOLTAGE SURGE SUPPRESSION

22.1. SURGE SUPPRESSORS SHALL PROVIDE PROTECTION IN ALL MODES: L–N, L–G, N–G FOR WYE SYSTEMS.

22.2. SURGE SUPPRESSORS FOR SERVICE ENTRANCE APPLICATIONS SHALL BE MODULAR TYPE WITH MINIMUM SURGE RATING OF 240KA PER PHASE, 800 VOLT MAXIMUM CLAMPING RATING FOR 480/277 VOLT SERVICE OR 400 VOLT FOR 120/208 VOLT SERVICE. SUPPRESSORS SHALL BE APT MODEL TE/XGA/240 OR EQUAL BY CURRENT TECHNOLOGY, INNOVATIVE TECHNOLOGY, SIEMENS OR TRANSTECTOR SYSTEMS.

22.3. SURGE SUPPRESSORS FOR PANELBOARDS SHALL BE NON–MODULAR TYPE WITH MINIMUM SURGE RATING OF 80KA PER PHASE, 400 VOLT MAXIMUM CLAMPING RATING FOR 120/208 VOLT SERVICE. SUPPRESSORS SHALL BE APT MODEL TE/2XF OR EQUAL BY CURRENT TECHNOLOGY, INNOVATIVE TECHNOLOGY, SIEMENS OR TRANSTECTOR SYSTEMS.

23. FIRE ALARM SYSTEM

23.1. FIRE ALARM SYSTEM SHALL BE NON–CODED, ADDRESSABLE TYPE WITH BATTERY BACKUP, UL CERTIFIED AS PROTECTED PREMISES, CENTRAL STATION OR PROPRIETARY, OR IN ACCORDANCE WITH REQUIREMENTS OF AUTHORITY HAVING JURISDICTION. FIRE ALARM SYSTEMS SHALL BE AS MANUFACTURED BY CERBERUS PYROTRONICS, EDWARDS, FCI, NOTIFIER, SIMPLEX OR APPROVED EQUAL.

23.2. OPERATION OF PULL STATION, DETECTOR OR FLOW SWITCH SHALL INITIATE ALARM AND ELEVATOR RECALL, TRANSMIT VIA INTEGRAL DIGITAL COMMUNICATOR, DE–ENERGIZE MAGNETIC DOOR HOLDERS AND UNLOCK SECURE DOORS IN EGRESS PATHS.

23.3. ACTIVATION OF ELEVATOR SHAFT OR MACHINE ROOM HEAT DETECTORS SHALL SHUT DOWN ELEVATORS. ACTIVATION OF ELEVATOR SHAFT OR MACHINE ROOM SMOKE DETECTORS SHALL ILLUMINATE FIREMAN'S HAT SYMBOL IN ELEVATOR CAB. FIRE PUMP CONDITIONS SHALL BE SUPERVISED.

23.4. REMOTE ANNUNCIATOR SHALL BE LCD DISPLAY TIME WITH ADJACENT FRAMED PLAN OF BUILDING TO INCLUDE LOCATIONS OF SIAMESE CONNECTION, SPRINKLER AND STANDPIPE CONTROL VALVES, FIRE PUMP, ETC.

23.5. ALL FIRE ALARM SYSTEM WIRING SHALL BE INSTALLED IN EMT OR IN ACCORDANCE WITH BUILDING STANDARD. FIRE ALARM SYSTEM WIRING QUANTITIES, SIZES AND ROUTING SHALL BE IN STRICT ACCORDANCE WITH THE RECOMMENDATIONS AND REQUIREMENTS OF THE FIRE ALARM SYSTEM MANUFACTURER, EXCEPT WHERE MINIMUM SIZES ARE INDICATED. NOTHING ON THESE DRAWINGS SHALL BE CONSTRUDED SO AS TO CONTRADICT THE FIRE ALARM SYSTEM MANUFACTURER'S INSTRUCTION. THE MINIMUM FIRE ALARM SYSTEM WIRE SIZE SHALL BE #14 AWG FOR INDICATING CIRCUITS AND #18 AWG FOR INITIATING AND ANNUNCIATION CIRCUITS. THE MINIMUM CONDUIT SIZE SHALL BE 3/4". NO WIRING OTHER THAN THAT DIRECTLY ASSOCIATED WITH THE FIRE ALARM SYSTEM AND ITS AUXILIARY FUNCTIONS SHALL BE PERMITTED IN FIRE ALARM RACEWAYS. ALL FIRE ALARM SYSTEM JUNCTION BOXES, ETC. SHALL BE PAINTED RED AND SHALL BE NEATLY STENCILED IN BLACK LETTERS "FIRE ALARM".

23.6. FIRE ALARM STROBES SHALL MEET REQUIREMENTS OF NFPA 72 AND ADA FOR LOCATIONS AND INTENSITIES.

23.7. PROVIDE ALL INTERLOCK WIRING BETWEEN DUCT SMOKE DETECTORS AND AIR HANDLING UNITS AS REQUIRED FOR SHUTDOWN.

24. NAMEPLATES

24.1. FURNISH AND INSTALL ENGRAVED PHENOLIC NAMEPLATES ON ALL SWITCHBOARDS, PANELBOARDS, MOTOR CONTROLLERS, SAFETY SWITCHES, ETC. TO INDICATE NAME, VOLTAGE AND WHERE FED FROM.

25. OUTAGES

25.1. ALL OUTAGES OF ELECTRICAL SERVICE SHALL BE SCHEDULED WITH THE OWNER IN WRITING SEVEN DAYS IN ADVANCE OF THE PLANNED OUTAGE. SCHEDULED OUTAGES MAY BE CANCELLED BY THE OWNER AT ANY TIME. WHEREVER POSSIBLE, OUTAGES SHALL BE SCHEDULED AT NIGHT OR ON HOLIDAYS OR WEEKENDS, IN ORDER TO MINIMIZE DISRUPTION TO PLANT OPERATIONS.

26. AS–BUILT DRAWINGS AND OPERATION AND MAINTENANCE MANUALS

26.1. THE CONTRACTOR SHALL TURN OVER TO THE ARCHITECT AT THE FINAL INSPECTION ONE BROCHURE CONTAINING A CLEAN SET OF MARKED–UP "AS BUILT" DRAWINGS, AS WELL AS A COMPLETE SET OF WIRING DIAGRAMS FOR EACH SYSTEM AND/OR EQUIPMENT ITEM.

26.2. THE CONTRACTOR SHALL ALSO FURNISH TO THE OWNER THREE (3) COPIES OF A BUILDING OPERATION AND MAINTENANCE MANUAL. EACH MANUAL SHALL CONSIST OF ONE OR MORE VINYL CLAD THREE RING BINDERS CONTAINING ONE COPY OF EACH SHOP DRAWING OF EQUIPMENT USED ON THE PROJECT, A COMPLETE PARTS LIST FOR EACH ITEM OF EQUIPMENT OR SYSTEM, FULL WIRING DIAGRAMS, COMPLETE MAINTENANCE INSTRUCTIONS, AND A LOCAL NAME, ADDRESS AND TELEPHONE NUMBER OF THE SUPPLIER OR SOURCE OF SERVICE AND REPLACEMENT PARTS.

27. PROJECT CLOSEOUT

27.1. AT THE COMPLETION OF THE PROJECT, THE CONTRACTOR SHALL GATHER IN ONE PLACE AND AT ONE TIME ALL LOOSE EQUIPMENT, KEYS, OPERATION MANUALS, AS–BUILT DRAWINGS, ETC. THIS MATERIAL SHALL BE ITEMIZED ON A TYPEWRITTEN TRANSMITTAL, WHICH SHALL BE SIGNED BY THE OWNER'S REPRESENTATIVE AS A RECEIPT FOR THE MATERIALS.

28. TESTS

28.1. UPON COMPLETION OF THE WORK AND AT SUCH TIME AS THE ARCHITECT MAY DIRECT, THE CONTRACTOR SHALL CONDUCT AN OPERATING TEST FOR APPROVAL. ALL SYSTEMS SHALL BE DEMONSRATED TO BE IN ACCORDANCE WITH THE DRAWINGS AND SPECIFICATIONS. DEFECTS REVEALED SHALL BE CORRECTED PROMPTLY AND THE TEST RE–CONDUCTED AS THE ARCHITECT MAY DIRECT.

29. GUARANTEE

29.1. THE CONTRACTOR SHALL GUARANTEE THE ENTIRE INSTALLATION FREE FROM ANY MECHANICAL OR ELECTRICAL DEFECTS FOR ONE YEAR OR FOR THE PERIOD ESTABLISHED BY THE PROJECT GENERAL CONDITIONS.

BRANCH CIRCUIT WIRE SIZING
(20 AMPERE SINGLE PHASE CIRCUITS) ⟨1⟩

LENGTH OF RUN	HOMERUN SIZE ⟨2⟩	CIRCUIT WIRE SIZE ⟨3⟩
120 VOLT SYSTEM		
0' – 100'	#12	#12
100' – 150'	#10	#12
150' – 250'	#8	#10
208 OR 240 VOLT SYSTEM		
0' – 175'	#12	#12
175' – 250'	#10	#12
250' – 400'	#8	#10
277 VOLT SYSTEM		
0' – 200'	#12	#12
200' – 300'	#10	#12
300' – 500'	#8	#10

NOTES

⟨1⟩ WIRING FOR BRANCH CIRCUITS PROTECTED BY 20 AMPERE OVERCURRENT PROTECTIVE DEVICES SHALL BE SIZED IN ACCORDANCE WITH THE ABOVE TABLE. WIRING FOR OTHER BRANCH CIRCUITS SHALL BE SIZED AS SHOWN ON DRAWINGS. EQUIPMENT GROUNDING CONDUCTOR SHALL BE SIZED THE SAME AS THE HOMERUN/CIRCUIT CONDUCTOR.

⟨2⟩ HOMERUN LENGTH SHALL BE FROM THE PANELBOARD TO THE CLOSEST OUTLET, DEVICE OR FIXTURE ON THE CIRCUIT.

⟨3⟩ CIRCUIT LENGTH SHALL BE FROM THE CLOSEST TO THE FARTHEST OUTLET, DEVICE OR FIXTURE.

ELECTRICAL ABBREVIATIONS

A	AMPERE(S)	HV	HIGH VOLTAGE	PT	POTENTIAL TRANSFORMER
ADA	AMERICAN DISABLITY ACT	HZ,~	HERTZ	RL	RELOCATE EXISTING
AFF	ABOVE FINISHED FLOOR	IG	ISOLATED GROUND	RLA	RUNNING LOAD AMPERES
AIC	AMPERES INTERRUPTING CAPACITY	Isc	SHORT CIRCUIT INTERRUPING CAPACITY(RMS SYMM AMPERES)	RMS	ROOT MEAN SQUARE
ATS	AUTOMATIC TRANSFER SWITCH			RX	REMOVE EXISTING
AWG	AMERICAN WIRE GAUGE	JB	JUNCTION BOX	SEC	SECONDARY
BGE	BALTIMORE GAS AND ELECTRIC COMPANY	Kcmil	THOUSAND CIRCULAR MILLS	S/N	SOLID NEUTRAL
C	CONDUIT	KV	KILOVOLTS	SPDT	SINGLE POLE, DOUBLE THROW
CATV	CABLE TELEVISION	KVA	KILO–VOLT–AMPERES	SPST	SINGLE POLE, SINGLE THROW
C/B	CIRCUIT BREAKER	KW	KILOWATTS	SS	SURGE SUPPRESSOR
CKT	CIRCUIT	LTG	LIGHTING	ST	SINGLE THROW
CLG	CEILING	LV	LOW VOLTAGE	SWBD	SWITCHBOARD
CONT	CONTINUATION	LVC	LOW VOLTAGE CONTROL	SWGR	SWITCHGEAR
CT	CURRENT TRANSFORMER	MATV	MASTER ANTENNA TELEVISION	SYM	SYMMETRICAL
Δ	DELTA CONNECTED	MCB	MAIN CIRCUIT BREAKER	TELE	TELEPHONE
DISC	DISCONNECT	MCC	MOTOR CONTROL CENTER	TTB	TELEPHONE TERMINAL BOARD
DT	DOUBLE THROW	MCP	MOTOR CIRCUIT PROTECTOR	TVSS	TRANSIENT VOLTAGE SURGE SUPPRESSION
DWG	DRAWING	MH	MOUNTING HEIGHT	TYP	TYPICAL
DPDT	DOUBLE POLE, DOUBLE THROW	MISC	MISCELLANEOUS	UG	UNDERGROUND
DPST	DOUBLE POLE, SINGLE THROW	MLO	MAIN LUGS ONLY	UNO	UNLESS NOTED OTHERWISE
EC	EMPTY CONDUIT	N	NEW	V	VOLTS
ETR	EXISTING TO REMAIN	NC	NORMALLY CLOSED	VA	VOLT–AMPERE
EX	EXISTING	NEC	NATIONAL ELECTRICAL CODE	W	WIRE, WATTS
FAA	FIRE ALARM ANNUNCIATOR	NFSS	NON–FUSED SAFETY SWITCH	WP	WEATHERPROOF
FACP	FIRE ALARM CONTROL PANEL	NIC	NOT IN CONTRACT	Y	WYE CONNECTED
FLA	FULL LOAD AMPERES	NO	NORMALLY OPEN	XFMR	TRANSFORMER
FSS	FUSED SAFETY SWITCH	NTS	NOT TO SCALE	XP	EXPLOSION–PROOF
GFI	GROUND FAULT CIRCUIT INTERRUPTER	OH	OVERHEAD	1P	SINGLE POLE
GRD	GROUND	ø	PHASE	2P	DOUBLE POLE
HID	HIGH INTENSITY DISCHARGE	P	POLE	3P	THREE POLE
HOA	HAND–OFF–AUTOMATIC	PF	POWER FACTOR	4P	FOUR POLE
HP	HORSEPOWER	PNL	PANELBOARD		
HPS	HIGH PRESSURE SODIUM	PRI	PRIMARY		

GENERAL NOTES – ELECTRICAL WORK

A. DRAWINGS SHALL NOT BE SCALED. REFER TO ARCHITECTURAL DRAWINGS FOR LOCATIONS AND MOUNTING HEIGHTS OF FIXTURES AND DEVICES.

B. THE ELECTRICAL CONTRACTOR SHALL COORDINATE HIS WORK WITH THAT OF ALL OTHER TRADES. THE ARCHITECTURAL, STRUCTURAL, MECHANICAL AND ALL OTHER DRAWINGS AND SPECIFICATIONS SHALL BE CONSULTED AND COORDINATED WITH PRIOR TO ROUGH–IN.

C. WHEREVER POSSIBLE, THE CONTRACTOR SHALL OBTAIN ACTUAL ROUGH–IN DRAWINGS FOR THE ACTUAL ITEM OF EQUIPMENT TO BE INSTALLED PRIOR TO ROUGH–IN. THIS SHALL APPLY TO ALL EQUIPMENT, WHETHER IT IS TO BE INSTALLED BY THE CONTRACTOR OR BY THE OWNER.

D. IT IS THE INTENT OF THESE DRAWINGS THAT ALL NEW ELECTRICAL WORK TO BE INSTALLED IN FINISHED AREAS, BE INSTALLED CONCEALED WITHIN NEW OR EXISTING WALLS, FLOORS OR CEILINGS. ANY AND ALL CUTTING AND PATCHING OF SURFACES SHALL BE PROVIDED BY THE CONTRACTOR. SURFACE METAL RACEWAYS SHALL BE PERMITTED IN FINISHED AREAS ONLY WHERE SPECIFICALLY APPROVED IN THE FIELD BY THE ARCHITECT.

E. PRIOR TO PURCHASE AND INSTALLATION OF ANY MOTOR CONTROL EQUIPMENT (STARTERS, ETC.), THE CONTRACTOR SHALL VERIFY THE ACTUAL MOTOR ELECTRICAL CHARACTERISTICS. STARTER OVERLOADS SHALL BE SIZED IN ACCORDANCE WITH THE ACTUAL MOTOR RUNNING LOAD AMPERES.

F. PROVIDE EQUIPMENT GROUNDING CONDUCTORS FOR ALL FEEDERS AND CIRCUITS.

G. WHERE CIRCUIT AND HOMERUN LINES ARE NOT SHOWN, PROVIDE MINIMUM 2#12+1#12 GROUND IN 3/4" CONDUIT. FOR CIRCUITS WITH SHARED NEUTRAL, PROVIDE NO MORE THAN 3#12 (PHASE), 1#12 (NEUTRAL) AND 1#12 GROUND IN 3/4" CONDUIT. PROVIDE ADDITIONAL CONDUCTORS FOR LIGHTING CIRCUITS FOR SWITCHLEGS, TRAVELLERS, FLUORESCENT DIMMING BALLASTS, ETC. FOR ISOLATED GROUND RECEPTACLES, PROVIDE #12 ISOLATED GROUND CONDUCTOR IN ADDITION TO EQUIPMENT GROUND CONDUCTOR. REFER TO BRANCH CIRCUIT WIRE SIZING CHART FOR SIZING OF CONDUCTORS FOR LONG CIRCUITS.

H. COORDINATE NUMBER OF CONDUCTORS REQUIRED FOR DIMMING CIRCUITS WITH TYPE OF DIMMING BALLAST/DIMMER SWITCHES TO BE PROVIDED.

I. FOR INTERIOR AND EXTERIOR LIGHTING FIXTURES WITH EMERGENCY BALLASTS, PROVIDE HOT CONDUCTOR IN ADDITION TO SWITCHLEG FROM WALL SWITCH, TIME CLOCK, CONTACTOR, ETC.

J. CIRCUITS RATED 30 AMPERES AND LESS WHERE RUN CONCEALED MAY BE TYPE MC CABLE. FEEDERS AND BRANCH CIRCUITS GREATER THAN 30 AMPERES, OR WHERE RUN EXPOSED, SHALL BE TYPE THHN/THWN IN EMT.

K. WHERE LIGHT SWITCHES ARE SHOWN GROUPED TOGETHER, THEY SHALL BE UNDER MULTIGANG PLATE. WHERE DIMMER SWITCHES ARE USED, SELECTION OF CAPACITY SHALL BE BASED ON LOAD SERVED AND ANY DERATING REQUIRED DUE TO GANGING OF SWITCHES.

L. REFER TO ARCHITECTURAL DRAWINGS FOR COLORS AND FINISHES FOR WIRING DEVICES AND COVERPLATES.

M. PROVIDE TYPED CIRCUIT DIRECTORIES FOR ALL PANELBOARDS TO INDICATE TYPE OF LOAD SERVED AND AREA SERVED (E.G. RECEPTACLES–OFFICE 201).

N. SUBMIT EQUIPMENT CUTS AND SHOP DRAWINGS FOR APPROVAL FOR PANELBOARDS, LIGHTING FIXTURES AND FIRE ALARM SYSTEM.

GENERAL NOTES – ELECTRICAL DEMOLITION

A. ANY EXISTING ELECTRICAL WORK SHOWN ON THESE DRAWINGS IS INDICATED FOR THE CONVENIENCE OF THE CONTRACTOR ONLY. THE OWNER, ARCHITECT AND ENGINEER IN NO WAY WARRANT OR GUARANTEE EITHER THE ACCURACY OR COMPLETENESS OF THIS INFORMATION. FINAL LOCATIONS AND QUANTITIES SHALL BE FIELD VERIFIED BY THE CONTRACTOR TO HIS OWN SATISFACTION.

B. THE EXTENT OF ELECTRICAL DEMOLITION SHALL BE AS GENERALLY NOTED ON THE DRAWINGS. SHOULD THERE BE ANY QUESTION AS TO THE DISPOSITION OF ANY EXISTING ELECTRICAL WORK, IT SHALL BE BROUGHT TO THE ATTENTION OF THE ARCHITECT. THE FINAL DISPOSITION OF SUCH WORK SHALL BE AS DIRECTED BY THE ARCHITECT.

C. WHEREVER EXISTING ELECTRICAL WORK IS INDICATED TO BE REMOVED, THE FOLLOWING NOTES SHALL APPLY:

D. ALL EXISTING WIRING SHALL BE REMOVED BACK TO ITS SOURCE.

E. ALL EXISTING CONDUIT WHICH IS EXPOSED, OR WHICH BECOMES EXPOSED AT ANY TIME DURING CONSTRUCTION SHALL BE REMOVED IN ITS ENTIRETY. CONDUIT STUBS THROUGH THE FLOOR SHALL BE CUT OFF FLUSH WITH THE FLOOR SLAB, FILLED WITH CONCRETE, AND MAKE READY TO ACCEPT NEW FLOOR FINISHES WHERE APPLICABLE.

F. CONDUIT WHICH REMAINS CONCEALED WITHIN WALLS OR SLABS SHALL BE ABANDONED IN PLACE AFTER REMOVAL OF ALL WIRING.

G. WHERE EXISTING CONDUIT STUBS THROUGH THE ROOF ARE NO LONGER REQUIRED, AND OCCUR IN AREAS WHERE THE EXISTING ROOF IS TO REMAIN, THE CONDUIT SHALL BE CUT OFF 6" ABOVE AND BELOW THE ROOF, FILLED WITH EXPANDABLE FOAM SEALANT (DOW CORNING SILICONE RTV OR APPROVED EQUAL). THE CONDUIT SHALL THEN BE CAPPED ABOVE THE ROOF AND MADE COMPLETELY WATERTIGHT.

H. WHEREVER EXISTING FLUSH MOUNTED BOXES WILL REMAIN EXPOSED. FURNISH AND INSTALL BLACK COVERPLATES ON THE EXISTING OUTLET BOXES.

I. ALL SURFACES WHICH ARE DISTURBED BY DEMOLITION UNDER THIS DIVISION SHALL BE PATCHED WITH MATERIALS TO MATCH THE EXISTING SURFACE. PATCHING SHALL MATCH THE EXISTING SURROUNDING SURFACES, AND SHALL BE DONE TO THE COMPLETE SATISFACTION OF THE ARCHITECT.

J. PRIOR TO REMOVAL OF ANY ELECTRICAL EQUIPMENT FROM THE PROJECT, THE CONTRACTOR SHALL DETERMINE WHETHER THE OWNER WISHES TO RETAIN THE MATERIAL. SHOULD THE OWNER DESIRE TO RETAIN AN ITEM, IT SHALL BE MOVED, BY THE CONTRACTOR, TO THE LOCATION ON SITE DIRECTED BY THE OWNER. SHOULD THE OWNER NOT DESIRE TO RETAIN THE ITEM, IT SHALL BE REMOVED FROM THE PROJECT SITE BY THE CONTRACTOR.

GENERAL NOTES – OCCUPANCY SENSORS

A. REFER TO SPECIFICATIONS FOR REQUIREMENTS FOR OCCUPANCY SENSORS FOR AUTOMATIC LIGHTING CONTROL.

B. PROVIDE LOW VOLTAGE TRANSFORMERS AS REQUIRED FOR OCCUPANCY SENSORS FOR CONNECTION TO LV CONTROL RELAY. TRANSFORMERS SHALL BE RATED 120V PRIMARY AND SHALL BE CONNECTED TO SAME CIRCUIT SERVING FIXTURES BEING CONTROLLED. TRANSFORMERS SHALL BE CONNECTED ON LOAD SIDE OF WALL SWITCHES INDICATED. TRANSFORMER SECONDARY SHALL BE COMPATIBLE WITH LV CONTROL RELAY VOLTAGE.

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SEAL

"Professional Certification. I hereby certify that these documents were prepared or approved by me, and that I am a duly licensed professional engineer under the laws of the State of Maryland, License No. 21805
Expiration Date: 12-11-2011

SHEET TITLE

ELECTRICAL SPECIFICATIONS & GRAL NOTES

SCALE

NOT APPLICABLE

SHEET NUMBER

E000