DIVISION 26

SECTION 26A: ELECTRICAL

26A1 GENERAL INSTRUCTIONS

26A 1-1 GENERAL REQUIREMENTS.

ALL REQUIREMENTS UNDER DIVISION ONE AND THE GENERAL AND SUPPLEMENTARY CONDITIONS OF THESE SPECIFICATIONS SHALL BE A PART OF THIS SECTION. EACH CONTRACTOR SHALL BE RESPONSIBLE TO BECOME THOROUGHLY FAMILIAR WITH ALL ITS CONTENTS AS TO REQUIREMENTS WHICH AFFECT THIS DIVISION OR SECTION. THE WORK REQUIRED UNDER THIS SECTION INCLUDES ALL MATERIAL, EQUIPMENT, APPLIANCES, AND LABOR REQUIRED TO COMPLETE THE ENTIRE SYSTEM AS REQUIRED BY THE DRAWINGS AND SPECIFICATIONS, OR REASONABLY INFERRED TO BE NECESSARY TO FACILITATE EACH SYSTEMS FUNCTIONING AS INDICATED BY THE DESIGN AND THE EQUIPMENT SPECIFIED.

26A 1-2 INSPECTION OF SITE.

THE CONTRACTOR SHALL PERSONALLY INSPECT THE SITE OF THE PROPOSED WORK AND BECOME FULLY INFORMED AS TO THE CONDITIONS UNDER WHICH THE WORK IS TO BE DONE. FAILURE TO DO SO WILL NOT BE CONSIDERED SUFFICIENT JUSTIFICATION TO REQUEST OR OBTAIN EXTRA COMPENSATION OVER AND ABOVE THE CONTRACT PRICE.

26A 1-3 MATERIAL AND WORKMANSHIP.

ALL MATERIAL AND APPARATUS SHALL BE NEW AND IN FIRST CLASS CONDITION. ALL MATERIAL AND APPARATUS SHALL HAVE MARKINGS OR A NAMEPLATE IDENTIFYING THE MANUFACTURER AND PROVIDING SUFFICIENT REFERENCE TO ESTABLISH QUALITY, SIZE AND CAPACITY. ALL WORKMANSHIP SHALL BE OF THE FINEST POSSIBLE BY EXPERIENCED MECHANICS OF THE PROPER TRADE. IN GENERAL, ALL MATERIALS AND EQUIPMENT SHALL BE OF COMMERCIAL SPECIFICATION GRADE IN QUALITY. LIGHT DUTY AND RESIDENTIAL TYPE EQUIPMENT WILL NOT BE ACCEPTABLE. ALL HOISTS, SCAFFOLDS, STAGING, RUNWAYS, TOOLS, MACHINERY AND EQUIPMENT REQUIRED FOR THE PERFORMANCE OF THE ELECTRICAL WORK SHALL BE FURNISHED BY THIS CONTRACTOR. MATERIAL AND EQUIPMENT SHALL BE STORED AND MAINTAINED IN CLEAN CONDITION, AND PROTECTED FROM WEATHER, MOISTURE, AND PHYSICAL DAMAGE.

26A 1-4 COORDINATION

THE CONTRACTOR SHALL COORDINATE ALL WORK WITH OTHER CONTRACTORS AND SUBCONTRACTORS SO THAT VARIOUS COMPONENTS OF THE ELECTRICAL SYSTEMS WILL BE INSTALLED AT THE PROPER TIME, WILL FIT THE AVAILABLE SPACE, AND WILL ALLOW PROPER SERVICE ACCESS TO ALL EQUIPMENT. THE CONTRACTOR SHALL REFER TO ARCHITECTURAL, STRUCTURAL AND MECHANICAL DRAWINGS AND TO RELEVANT EQUIPMENT DRAWINGS TO DETERMINE THE EXTENT OF CLEAR SPACES. THE CONTRACTOR SHALL MAKE ALL OFFSETS REQUIRED TO CLEAR EQUIPMENT, BEAMS AND OTHER STRUCTURAL MEMBERS; AND TO FACILITATE CONCEALING CONDUIT IN THE MANNER ANTICIPATED IN THE DESIGN. THE CONTRACTOR SHALL PROVIDE MATERIALS WITH TRIM WHICH WILL FIT PROPERLY THE TYPES OF CEILING, WALL, OR FLOOR FINISHES ACTUALLY INSTALLED.

26A 1-5 DIMENSIONS AND LAYOUTS.

THE DRAWINGS ARE SCHEMATIC IN NATURE, BUT SHOW THE VARIOUS COMPONENTS OF THE SYSTEMS APPROXIMATELY TO SCALE AND ATTEMPT TO INDICATE HOW THEY ARE TO BE INTEGRATED WITH OTHER PARTS OF THE BUILDING. FIGURED DIMENSIONS SHALL BE TAKEN IN PREFERENCE TO SCALE DIMENSIONS. DETERMINE EXACT LOCATIONS BY JOB MEASUREMENTS, BY CHECKING THE REQUIREMENTS OF OTHER TRADES, AND BY REVIEWING ALL CONTRACT DOCUMENTS. THE CONTRACTOR WILL BE HELD RESPONSIBLE FOR ERRORS WHICH COULD HAVE BEEN AVOIDED BY PROPER CHECKING AND INSPECTION.

26A 1-6 ORDINANCES AND CODES.

CONTRACTOR'S PERFORMANCE, WORKMANSHIP AND MATERIALS SHALL COMPLY WITH NATIONAL FIRE PROTECTION ASSOCIATION CODES, STATE AND LOCAL BUILDING CODES, AND/OR ALL OTHER APPLICABLE CODES AND ORDINANCES. CONTRACTOR SHALL COMPLY WITH RULES AND REGULATIONS OF PUBLIC UTILITIES AND MUNICIPAL DEPARTMENTS AFFECTED BY CONNECTION OF SERVICES. OBTAIN AND PAY FOR ALL PERMITS. CONTRACTOR SHALL BE HELD RESPONSIBLE FOR ANY VIOLATION OF THE LAW. CONTRACTOR SHALL MAINTAIN ALL NECESSARY SIGNAL LIGHTS AND GUARDS FOR THE SAFETY OF THE PUBLIC.

26A 1-7 SUBSTITUTIONS.

THIS SPECIFICATION PROVIDES THAT THE BASE BID OF ALL CONTRACTORS SHALL INCLUDE THE PRODUCTS SPECIFICALLY NAMED, THE CONTRACTOR BEING PERMITTED TO SUBMIT IN THE FORM OF ALTERNATES, WITH HIS PROPOSAL, PRODUCTS OF ANY OTHER MANUFACTURERS FOR SIMILAR USE, PROVIDED THE DIFFERENCE IN COST, IF ANY, IS SPECIFIED IN EACH CASE. THE TERMS "APPROVED", "APPROVED EQUAL", "EQUIVALENT", OR "EQUAL" SHALL MEAN APPROVED BY THE ENGINEER AS AN ACCEPTABLE ALTERNATE BID.

PRIOR TO THE BID DATE, SUBSTITUTIONS WILL NOT BE CONSIDERED UNLESS WRITTEN REQUEST FOR APPROVAL HAS BEEN RECEIVED BY THE ARCHITECT OR ENGINEER AT LEAST TEN CALENDAR DAYS PRIOR TO THE DATE FOR RECEIPT OF BIDS. EACH SUCH REQUEST SHALL INCLUDE THE NAME OF THE MATERIAL OR EQUIPMENT FOR WHICH IT IS TO BE SUBSTITUTED AND A COMPLETE DESCRIPTION OF THE PROPOSED SUBSTITUTE INCLUDING CUTSHEETS, PHOTOMETRIC DATA, AND ANY OTHER INFORMATION NECESSARY FOR AN EVALUATION. FACTORY GENERATED POINT-BY-POINT CALCULATIONS SHALL BE PROVIDED FOR ALL EXTERIOR LIGHTING FIXTURES (PHOTOMETRIC FILES SUPPLIED SO THE ENGINEER CAN GENERATE A POINT-BY-POINT DO NOT SUFFICE FOR THE POINT-BY-POINT CALCULATIONS). POINT-BY-POINT SHOULD INCLUDE LO2 AND LO3 LUMINAIRES. LIGHT LEVELS ON SIDEWALK, LIGHT LEVELS VERTICALLY AT 5' AND LIGHT LEVELS ON WALLS THAT ARE BEING WASHED.

AFTER THE BID DATE, PROPOSALS TO SUBSTITUTE LIGHT FIXTURES FOR THOSE SHOWN ON THE DRAWINGS OR SPECIFIED HEREIN, WILL ONLY BE CONSIDERED AS A DEDUCT. PROPOSED SUBSTITUTIONS SHALL BE SUBMITTED SEPARATELY, IN SHOP DRAWING FORM, WITH A LIST OF PROPOSED SUBSTITUTIONS TOGETHER WITH A DEDUCT PRICE FOR EACH SUBSTITUTION. PROPOSED SUBSTITUTIONS WILL THEN BE REVIEWED BY THE ARCHITECT/ENGINEER.

THE ARCHITECT/ENGINEER SHALL HAVE THE FINAL AUTHORITY AS TO WHETHER THE FIXTURE IS AN ACCEPTABLE REPLACEMENT TO THE SPECIFIED ITEM. THE PROPOSED SUBSTITUTION MAY ALSO BE REJECTED FOR THE AESTHETIC REASONS IF FELT NECESSARY OR DESIRABLE. IN THE EVENT THE PROPOSED SUBSTITUTIONS HEREIN DESCRIBED ARE REJECTED, THE SPECIFIED ITEM SHALL BE FURNISHED.

26A 1-8 SHOP DRAWINGS.

SUBMIT FOR APPROVAL SIX SETS OF MANUFACTURERS SHOP DRAWINGS OF ALL MAJOR ITEMS OF EQUIPMENT AND ALL ITEMS REQUIRING COORDINATION BETWEEN CONTRACTORS. BEFORE SUBMITTING SHOP DRAWINGS AND MATERIAL LISTS, THE CONTRACTOR SHALL VERIFY THAT ALL EQUIPMENT SUBMITTED IS MUTUALLY COMPATIBLE AND SUITABLE FOR THE INTENDED USE, AND SHALL FIT THE AVAILABLE SPACE AND ALLOW AMPLE ROOM FOR MAINTENANCE. THE ENGINEER'S CHECKING AND SUBSEQUENT APPROVAL OF SUCH SHOP DRAWINGS SHALL NOT RELIEVE THE CONTRACTOR FROM RESPONSIBILITY FOR ERRORS IN DIMENSIONS, DETAILS, SIZE OF MEMBERS, OR QUANTITIES; OR OMISSIONS OF COMPONENTS OR FITTINGS; OR FOR COORDINATING ITEMS WITH ACTUAL BUILDING CONDITIONS.

26A 1-9 ADJUSTING, ALIGNING AND TESTING.

ALL ELECTRICAL EQUIPMENT ON THIS PROJECT FURNISHED UNDER THIS DIVISION AND ALL ELECTRICAL EQUIPMENT FURNISHED BY OTHERS SHALL BE ADJUSTED, ALIGNED AND TESTED FOR PROPER OPERATION BY THE ELECTRICAL CONTRACTOR. COMPLETE WIRING SYSTEMS SHALL BE FREE FROM SHORT CIRCUITS.

THE CONTRACTOR SHALL MAINTAIN ON THE PROJECT PREMISES THE FOLLOWING AT ALL TIMES: A TRUE RMS READING VOLTMETER, A TRUE RMS READING AMMETER, AND A MEGGER INSULATION RESISTANCE TESTER. THE CONTRACTOR SHALL PROVIDE TEST DATA READINGS AS REQUESTED OR AS REQUIRED.

26A 1-10 OPERATION AND MAINTENANCE INSTRUCTIONS.

SUBMIT TO THE ARCHITECT THREE COPIES EACH OF MATERIAL FOR MAINTENANCE AND OPERATION INSTRUCTION MANUALS, APPROPRIATELY BOUND INTO MANUAL FORM INCLUDING APPROVED COPIES OF THE FOLLOWING, REVISED IF NECESSARY TO SHOW SYSTEM AND EQUIPMENT AS ACTUALLY INSTALLED:

MANUFACTURERS CATALOG SHEETS
WIRING DIAGRAMS
MAINTENANCE INSTRUCTIONS
OPERATING INSTRUCTIONS
PARTS LISTS

CONTRACTOR SHALL ALSO PROVIDE ADEQUATE VERBAL INSTRUCTIONS OF SYSTEM OPERATION TO OWNER'S REPRESENTATIVE AT THE TERMINATION OF THE WORK.

26A 1-11 START UP OF SYSTEMS.

PRIOR TO START-UP OF THE ELECTRICAL SYSTEMS, THE CONTRACTOR SHALL CHECK ALL COMPONENTS AND DEVICES, LUBRICATE ITEMS ACCORDINGLY, AND TIGHTEN ALL SCREWED AND BOLTED CONNECTIONS. ADJUST TAPS ON EACH TRANSFORMER FOR RATED SECONDARY VOLTAGE. CHECK AND RECORD BUILDING'S SERVICE ENTRANCE VOLTAGE, GROUNDING CONDITIONS, GROUNDING RESISTANCE AND PROPER PHASING. BALANCE ALL SINGLE PHASE LOADS AT EACH PANELBOARD, REDISTRIBUTING BRANCH CIRCUIT CONNECTIONS UNTIL BALANCE IS ACHIEVED. REPLACE ALL BURNED-OUT LAMPS. AFTER ALL SYSTEMS HAVE BEEN INSPECTED AND ADJUSTED, CONFIRM ALL OPERATING FEATURES REQUIRED BY THE DRAWINGS AND SPECIFICATIONS AND MAKE FINAL ADJUSTMENTS AS NECESSARY.

26A 1-12 GUARANTEE.

GUARANTEE AGAINST DEFECTIVE WORKMANSHIP AND MATERIAL FOR A PERIOD OF ONE YEAR FROM DATE OF FINAL PAYMENT. GUARANTEE SHALL INCLUDE MATERIAL TO BE REPLACED AND ALL LABOR REQUIRED.

26A2 ELECTRICAL INSTALLATION

26A 2-1 EXCAVATION AND BACKFILLING.

DO ALL EXCAVATION OF ALL MATERIALS ENCOUNTERED INCLUDING ROCK REQUIRED FOR WORK UNDER THIS SECTION. BACKFILL ALL TRENCHES, TAMPING WELL IN 6" LAYERS. SYSTEM SHALL BE TESTED, MADE TIGHT AND ACCEPTED BEFORE BACKFILL. REMOVE FROM PREMISES ALL EXCESS MATERIAL NOT USED IN BACKFILLING. REPAIR ALL STREETS, SIDEWALKS, DRIVES, PAVING, ETC. DAMAGED. REPAIR MATERIALS SHALL GENERALLY MATCH EXISTING CONSTRUCTION. ALL BACKFILLING AND REPAIRING SHALL MEET ALL REQUIREMENTS OF THE CITY AND OTHERS HAVING JURISDICTION. REPAIR WORK SHALL BE THOROUGHLY FIRST CLASS. CONFORM TO ALL REQUIREMENTS OF DIVISION TWO OF THIS SPECIFICATION.

26A 2-2 CLEANING.

DIRT AND REFUSE RESULTING FROM THE PERFORMANCE OF THE WORK SHALL BE REMOVED FROM THE PREMISES AS REQUIRED TO PREVENT ACCUMULATION. THE CONTRACTOR SHALL COOPERATE IN MAINTAINING REASONABLY CLEAN PREMISES AT ALL TIMES. IMMEDIATELY PRIOR TO FINAL INSPECTION, THE CONTRACTOR SHALL MAKE A FINAL CLEANUP OF DIRT AND REFUSE RESULTING FROM HIS WORK. THE CONTRACTOR SHALL CLEAN ALL MATERIAL AND EQUIPMENT INSTALLED UNDER THE ELECTRICAL CONTRACT. DIRT, DUST, PLASTER, STAINS AND FOREIGN MATTER SHALL BE REMOVED FROM ALL SURFACES. DAMAGED FINISHES SHALL BE TOUCHED UP AND RESTORED TO THEIR ORIGINAL CONDITION.

26A 2-3 CUTTING AND PATCHING.

THIS CONTRACTOR SHALL DO ALL CUTTING OF WALLS, FLOORS, CEILINGS, ETC. AS REQUIRED TO INSTALL WORK UNDER THIS SECTION. CONTRACTOR SHALL OBTAIN PERMISSION OF THE ARCHITECT BEFORE DOING ANY CUTTING. ALL HOLES SHALL BE CUT AS SMALL AS POSSIBLE. CONTRACTOR SHALL PATCH WALLS, FLOORS, ETC. AS REQUIRED BY WORK UNDER THIS SECTION. ALL PATCHING SHALL BE THOROUGHLY FIRST CLASS AND SHALL MATCH THE ORIGINAL MATERIAL AND CONSTRUCTION.

26A 2-4 ROUGH-IN.

COORDINATE WITHOUT DELAY ALL ROUGHING-IN WITH GENERAL CONSTRUCTION. ALL CONDUIT ROUGH-IN SHALL BE CONCEALED EXCEPT IN UNFINISHED AREAS AND WHERE OTHERWISE SHOWN.

26A 2-5 CONDUIT.

ALL CONDUIT SHALL BE RUN CONCEALED EXCEPT WHERE OTHERWISE NOTED. ALL CONDUIT RUN UNDERGROUND, EXPOSED TO WEATHER, OR OTHER HAZARDOUS CONDITIONS SHALL BE RIGID METALLIC.

26A 2-6 CONDUIT INSTALLATION.

A. ALL WIRING SHALL BE RUN IN CONDUIT.

B. CONDUIT SHALL BE INSTALLED CONCEALED ABOVE SUSPENDED CEILINGS OR CONCEALED IN WALLS OR FLOORS WHEREVER POSSIBLE. RUN PARALLEL TO BUILDING LINES.

C. CONDUIT SHALL BE INSTALLED TO REQUIREMENTS OF STRUCTURE AND TO REQUIREMENTS OF ALL OTHER WORK ON THE PROJECT. CONDUIT SHALL BE INSTALLED TO CLEAR ALL OPENINGS, DEPRESSIONS, PIPES, DUCTS, REINFORCING STEEL, ETC. CONDUIT SET IN FORMS FOR CONCRETE STRUCTURE SHALL BE INSTALLED IN SUCH A MANNER THAT INSTALLATION WILL NOT AFFECT THE STRENGTH OF THE STRUCTURE. EXCEPT WHERE APPROVED IN WRITING BY THE ARCHITECT, NO CONDUIT SHALL BE RUN IN A SLAB ON GRADE. CONDUIT SHALL BE LOCATED IN GRANULAR FILL BELOW SLABS-ON GRADE.

D. CONDUITS SHALL BE INSTALLED CONTINUOUS BETWEEN CONNECTIONS TO OUTLETS, BOXES AND CABINETS WITH A MINIMUM POSSIBLE NUMBER OF BENDS AND NOT MORE THAN THE EQUIVALENT OF FOUR 90° BENDS BETWEEN CONNECTIONS. BENDS SHALL BE SMOOTH AND EVEN AND SHALL BE MADE WITHOUT FLATTENING CONDUIT OR FLAKING ENAMEL. RADIUS OF BENDS SHALL BE AS LONG AS POSSIBLE AND NEVER SHORTER THAN THE CORRESPONDING TRADE ELBOW. LONG RADIUS ELBOWS SHALL BE USED WHERE NECESSARY.

E. CONDUITS SHALL BE SECURELY FASTENED IN PLACE WITH APPROVED STRAPS, HANGERS AND STEEL SUPPORTS AS REQUIRED. ATTACH CONDUIT SUPPORTS TO THE BUILDING STRUCTURE. SINGLE CONDUITS FOR FEEDERS SHALL BE HUNG WITH MALLEABLE SPLIT RING HANGERS WITH ROD AND TURNBUCKLE SUSPENSION FROM INSERTS SPACED NOT OVER 10 FEET APART IN CONSTRUCTION ABOVE. GROUPS OF HORIZONTAL FEEDER CONDUITS SHALL BE CLAMPED TO UNISTRUT STEEL CHANNELS AND SUSPENDED FROM INSERTS SPACED NOT OVER 10 FEET APART IN CONSTRUCTION ABOVE. VERTICAL FEEDER CONDUITS SHALL BE SECURELY CLAMPED TO STRUCTURAL STEEL MEMBERS ATTACHED TO STRUCTURE. CABLE CLAMPS SHALL BE INSTALLED FOR SUPPORT OF VERTICAL FEEDERS WHERE REQUIRED. CONDUIT SUPPORTS SHALL BE ADDED WITHIN 12" AT ONE END OF ALL BENDS. CONDUIT SHALL NOT BE SUPPORTED FROM SUSPENDED CEILING COMPONENTS.

F.

G. CONDUIT ENDS SHALL BE REAMED BEFORE INSTALLATION AND ALL CONDUIT SHALL BE THOROUGHLY CLEANED BEFORE INSTALLATION AND KEPT CLEAN AFTER INSTALLATION. OPENINGS AND BOXES SHALL BE PLUGGED OR COVERED AS REQUIRED TO KEEP CONDUIT CLEAN DURING CONSTRUCTION AND ALL CONDUIT SHALL BE FISHED CLEAR OF OBSTRUCTIONS BEFORE THE PULLING OF WIRES. ALL CONDUIT SHALL BE OF AMPLE SIZE FOR PULLING OF WIRE AND SHALL NOT BE SMALLER THAN CODE REQUIREMENTS AND NOT LESS THAN 1/2" IN SIZE.

H. ALL ELECTRICAL WORK SHALL BE PROTECTED AGAINST DAMAGE DURING CONSTRUCTION. ANY WORK DAMAGED OR MOVED OUT OF LINE AFTER ROUGHING-IN SHALL BE REPAIRED TO MEET ENGINEER'S APPROVAL WITHOUT ADDITIONAL COST TO THE OWNER.

I. CONDUIT TERMINATIONS AT PANELBOARDS AND JUNCTION BOXES SHALL BE ALIGNED AND INSTALLED TRUE AND PLUMB.

J. INSTALL APPROVED EXPANSION FITTINGS WHERE CONDUIT OR EMT PASSES THROUGH EXPANSION JOINTS.

K. INSTALL A PULL WIRE IN EACH EMPTY CONDUIT WHICH IS LEFT BY THE CONTRACTOR FOR INSTALLATION OF WIRES OR CABLES BY OTHERS.

L. MAKE ALL JOINTS AND CONNECTIONS IN A MANNER WHICH WILL INSURE MECHANICAL STRENGTH AND ELECTRICAL CONTINUITY.

M. THRU-WIRING OF LIGHT FIXTURES IS NOT PERMITTED.

N. METALLIC CONDUIT IN DIRECT CONTACT WITH EARTH SHALL BE COATED WITH AN ASPHALT BASE PAINT U.L. LISTED FOR THIS APPLICATION.

26A 2-7 BUSHINGS AND LOCKNUTS.

WHERE CONDUITS ENTER BOXES, THEY SHALL BE RIGIDLY CLAMPED TO THE BOX BY A BUSHING ON THE INSIDE AND A LOCKNUT ON THE OUTSIDE, AND CONDUIT SHALL ENTER THE BOX SQUARELY. BUSHINGS AND LOCKNUTS SHALL BE MADE OF GALVANIZED MALLEABLE IRON AND SHALL HAVE SHARP, CLEAN-CUT THREADS. WHERE THIN-WALL CONDUIT ENTERS BOX, PROVIDE APPROVED E.M.T. CONNECTORS. USE INSULATED GROUNDING BUSHINGS WHEREVER CONNECTION IS SUBJECT TO VIBRATION OR MOISTURE.

26A 2-8 WIRE.

ALL WIRE SHALL HAVE COPPER CONDUCTORS, WITH U.L. LABEL, AND 600 VOLT INSULATION. ALL WIRE SHALL BE RUN IN CONDUIT. SERVICE ENTRANCE CABLE SHALL BE TYPE USE, THWN OR XHHW WITH STRANDED CONDUCTORS. ALL FEEDER AND BRANCH CIRCUIT WIRE #8 AWG AND LARGER SHALL BE TYPE THWN OR XHHW, BOTH WITH STRANDED CONDUCTORS. ALL WIRE #10 AWG AND SMALLER SHALL BE TYPE THWN (WET OR DAMP LOCATIONS, OR IN CONDUIT BELOW GRADE OR SLAB) OR THHN (DRY LOCATIONS ONLY AND ABOVE GRADE), BOTH WITH SOLID CONDUCTORS. WIRE WITHIN FLUORESCENT FIXTURE CHANNELS SHALL BE TYPE THHN. ALL BRANCH CIRCUIT WIRING SHALL BE NOT SMALLER THAN #12 AWG WIRE. IF NO WIRE SIZE IS INDICATED ON THE PLANS FOR A BRANCH CIRCUIT, PROVIDE #12AWG WIRE AND A 20A CIRCUIT BREAKER. CONTROL WIRING SHALL HAVE 600V INSULATION AND BE OF THE PROPER TYPE, SIZE AND NUMBER AS REQUIRED TO ACCOMPLISHED SPECIFIED FUNCTION.

26A 2-9 WIRING INSTALLATION.

A. ALL WIRING SHALL BE INSTALLED IN APPROVED RACEWAY AND ENCLOSURES.

B. SUPPORT ALL WIRE AND CABLES IN VERTICAL INSTALLATIONS AS REQUIRED BY CODE BY INSTALLING CABLE SUPPORTERS OR PLUG-TYPE CONDUIT RISER SUPPORTS.

C. ALL WIRE AND CABLE IN CONDUIT SHALL BE CONTINUOUS WITHOUT TAPS OR SPLICES. ALL SPLICES OR TAPS SHALL OCCUR IN APPROVED BOXES AND ENCLOSURES AND SHALL BE KEPT TO THE MINIMUM REQUIRED, AND SHALL BE MADE UP WITH APPROVED SOLDERLESS CONNECTORS. ALL SPLICES, TAPS, AND JOINTS SHALL BE INSULATED AS REQUIRED BY CODE.

D. ALL MATERIALS USED TO TERMINATE, SPLICE OR TAP CONDUCTORS SHALL BE DESIGNED FOR, PROPERLY SIZED FOR, AND U.L. LISTED FOR THE SPECIFIC APPLICATION AND CONDUCTORS INVOLVED, AND SHALL BE INSTALLED IN STRICT ACCORDANCE WITH THE MANUFACTURER'S RECOMMENDATIONS, USING THE MANUFACTURER'S RECOMMENDED TOOLS.

E. WHERE WIRE IS INDICATED TO BE INSTALLED, BUT THE CONNECTION IS INDICATED "FUTURE" OR "BY OTHERS", CONTRACTOR SHALL LEAVE A MINIMUM OF 3 FEET OF "PIGTAIL" AT THE BOX, TAPE THE ENDS OF THE CONDUCTORS, AND COVER THE BOX.

F. THE NUMBER OF CONDUCTORS IN A SPECIFIC CONDUIT RUN ARE INDICATED WITH CROSS LINES ON EACH "CONDUIT RUN" ON THE DRAWINGS. IN GENERAL, DIRECTION OF BRANCH CIRCUIT "HOME RUN" ROUTING IS INDICATED ON THE DRAWINGS, COMPLETE WITH CIRCUIT NUMBERS AND PANELBOARD DESIGNATION. THIS CONTRACTOR SHALL CONTINUE ALL SUCH "HOME RUN" WIRING TO THE DESIGNATED PANELBOARD, AS THOUGH "CONDUIT RUNS" WERE INDICATED IN THEIR ENTIRETY.

G. CONDUCTORS SHALL HAVE INSULATION OF THE PROPER COLOR TO MATCH NEC COLOR CODE SYSTEM AND IN THE TABLE BELOW. IN LARGER WIRE SIZES WHERE PROPERLY COLORED INSULATION IS NOT AVAILABLE, THE CONTRACTOR SHALL USE VINYL PLASTIC ELECTRICAL TAPE OF THE APPROPRIATE COLOR AROUND EACH CABLE AT ALL TERMINATION POINTS, JUNCTION AND PULL BOXES.

SYSTEM VOLTAGE	CONDUCTOR TYPE	COLOR
208Y/120	PHASE A	BLACK
	PHASE B	RED
	PHASE C	BLUE
	NEUTRAL	WHITE
	EQUIPMENT GROUND	GREEN
	ISOLATED GROUND	GREEN W/YELLOW STRIPE

H. ALL TERMINAL BLOCKS AND WIRE TERMINALS FOR CONTROL WIRING SHALL BE PROPERLY NUMBERED FOR IDENTIFICATION WITH VINYL STICK-ON MARKERS OR EQUIVALENT.

I. ALL RECEPTACLE AND NON-LIGHTING EQUIPMENT BRANCH CIRCUITS SHALL HAVE AN EQUIPMENT GROUND CONDUCTOR INSTALLED IN THE BRANCH CIRCUIT RACEWAY, SIZED IN ACCORDANCE WITH NEC TABLE 250-95.

J. VOLTAGE DROP IN BRANCH CIRCUITS SHALL NOT EXCEED 2%.

26A 2-10 JUNCTION BOXES, PULL BOXES, CABINETS AND WIREWAYS.

PROVIDE JUNCTION BOXES, PULL BOXES, CABINETS AND WIREWAYS WHEREVER NECESSARY FOR PROPER INSTALLATION OF VARIOUS ELECTRICAL SYSTEMS ACCORDING TO THE NATIONAL ELECTRICAL CODE AND WHERE INDICATED ON THE DRAWINGS. SIZE AS REQUIRED FOR THE SPECIFIC FUNCTION OR AS REQUIRED BY THE NATIONAL ELECTRICAL CODE, WHICHEVER IS LARGEST. CONSTRUCTION SHALL BE OF A NEMA DESIGN SUITABLE FOR THE ENVIRONMENT INSTALLED.

26A 2-11 OUTLET BOXES.

ALL OUTLETS INCLUDING LIGHT, SWITCH, RECEPTACLE, AND SIMILAR OUTLETS, SHALL BE NATIONAL ELECTRICAL, APPLETON, STEEL CITY, RACO OR APPROVED EQUAL GALVANIZED STEEL KNOCKOUT BOXES, SUITABLE IN DESIGN TO THE PURPOSE THEY SERVE AND THE SPACE THEY OCCUPY. SIZE AS REQUIRED FOR THE SPECIFIC FUNCTION OR AS REQUIRED BY THE NATIONAL ELECTRICAL CODE, WHICHEVER IS LARGEST. ALL OUTLET BOXES SHALL BE SET IN WALLS, COLUMNS, FLOORS, OR CEILINGS SO AS TO BE FLUSH WITH THE FINISHED SURFACE AND BE ACCURATELY SET AND RIGIDLY SECURED IN POSITION. PROVIDE PLASTER RINGS, EXTENSION RINGS AND MASONRY RINGS AS REQUIRED FOR FLUSH MOUNTING.

26A 2-12 OUTLET LOCATIONS.

OUTLETS ARE ONLY APPROXIMATELY LOCATED ON THE SMALL SCALE PLANS, AND GREAT CARE MUST BE USED IN THE ACTUAL LOCATION BY CONSULTING THE VARIOUS LARGE SCALE DETAILED DRAWINGS USED BY OTHER CONTRACTORS, AND BY SECURING DEFINITE LOCATIONS FROM THE ARCHITECT. THE HEIGHT OF THE CENTER OF OUTLETS ABOVE THE FINISHED FLOOR, IF NOT OTHERWISE SPECIFIED OR SHOWN ON THE DRAWINGS, SHALL GENERALLY BE AS FOLLOWS:

SWITCH OUTLETS 48" ABOVE FLOOR TO TOP OF OUTLET

26A 2-13 WIRING DEVICES.

FURNISH AND INSTALL THE FOLLOWING OUTLETS AND SWITCHES WHERE SHOWN OR REQUIRED. MINOR CHANGES RELATIVE TO THE LOCATION OF ELECTRICAL EQUIPMENT MAY BE MADE BY THIS CONTRACTOR TO COMPLY WITH STRUCTURAL AND BUILDING REQUIREMENTS AS DETERMINED IN THE COURSE OF CONSTRUCTION. ALL OUTLETS AND SWITCHES MUST BE OF THE SAME MANUFACTURER AND NOT MIXED ON THE PROJECT. COLOR OF TOGGLES AND RECEPTACLES SHALL BE AS REQUESTED BY THE ARCHITECT:

TYPE OF DEVICEHUBBELLPASS & SEYMOURLEVITONEAGLEWALL-BOX DIMMERAS1539158181500N/A

26A 2-14 SWITCH AND OUTLET COVER PLATES.

ALL SWITCH AND OUTLET PLATES SHALL BE P&S SIERRA SATIN STAINLESS STEEL. CONTRACTOR SHALL VERIFY DESIRED MATERIAL WITH ARCHITECT BEFORE INSTALLATION. SWITCH PLATES IN UNFINISHED ROOMS AND SPACES SHALL BE STAMPED STEEL PLATES, CADMIUM PLATED. GROUPS OF SWITCHES SHALL BE UNDER ONE GANG-PLATE, USUALLY MOUNTED HORIZONTALLY; WHERE REQUIRED BY DETAILS, VERTICAL MOUNTING SHALL BE USED INSTEAD. PLATES SHALL BE SET PLUMB, PARALLEL, AND SHALL FINISH FLUSH WITH THE WALL. WEATHERPROOF COVER PLATES SHALL BE STAINLESS STEEL TYPE 302 WITH PVC GASKETING. PLATES SHALL BE BY THE SAME MANUFACTURER AS THE WIRING DEVICES SPECIFIED HEREIN WITH SEPARATE LIFT COVERS FOR EACH DEVICE.

26A 2-15 WEATHERPROOF COVER PLATES.

EXTERIOR DIMMER SWITCHES SHALL BE LOCATED IN HINGED, LOCKABLE, WEATHERPROOF ENCLOSURE MOUNTED TO EDGE OF PANELBOARD SIMILAR TO INTERMATIC #WP1010 WEATHERPROOF COVER. PLATES SHALL BE BY THE SAME MANUFACTURER AS THE WIRING DEVICES SPECIFIED HEREIN.

26A 2-18 CONCRETE BASES.

CONTRACTOR SHALL FURNISH CONCRETE BASES FOR HIS EQUIPMENT WHERE INDICATED ON THE DRAWINGS.

26A 2-20 EQUIPMENT IDENTIFICATION.

THIS CONTRACTOR SHALL FURNISH AND INSTALL EQUIPMENT IDENTIFICATION NAMEPLATES ON ALL PANELBOARDS, SWITCHES, STARTERS, DIMMERS, ETC., INCLUDING SWITCHES IN DISTRIBUTION PANELS. NAMEPLATES SHALL BE ENGRAVED PHENOLIC PLASTIC, AND SHALL BE FIRMLY ATTACHED TO THE EQUIPMENT. NAMEPLATES SHALL CLEARLY IDENTIFY EACH ITEM AND WHAT IT CONTROLS.

26A3 ELECTRICAL SERVICE AND GROUNDING

26A 3-1 ELECTRICAL SERVICE.

SEE DRAWINGS FOR TYPE, SIZE, VOLTAGE, PHASE, ETC.

26A 3-2 CONNECTION TO SERVING UTILITIES.

CONTRACTOR SHALL PROVIDE PROPER TERMINATION, METERING PROVISIONS, ETC. FOR ELECTRICAL AND TELEPHONE SERVICES FOR CONNECTION BY THE SERVING UTILITY, IN STRICT COMPLIANCE WITH THE REQUIREMENTS OF ALL CODES HAVING JURISDICTION AND OF THE SERVING UTILITY INVOLVED. ALL SERVICE TERMINATIONS AND CONNECTION POINTS SHALL BE VERIFIED IN THE FIELD BY THIS CONTRACTOR, AND HE SHALL WORK IN CONJUNCTION WITH THE UTILITY INVOLVED IN THE INSTALLATION OF ALL SERVICES. THIS CONTRACTOR SHALL PROVIDE ALL CONDUIT, ACCESSORIES, ETC. REQUIRED FOR COMPLETE UTILITY CONNECTION AND NOT FURNISHED BY THE SERVING UTILITY. THE CONTRACTOR SHALL NOTIFY THE UTILITY COMPANIES INVOLVED WITHIN TWO WEEKS AFTER NOTICE TO PROCEED, OF ALL REQUIRED INFORMATION NECESSARY IN ORDER FOR THE UTILITY TO SUPPLY THE PROJECT WITHOUT DELAY. ELECTRICAL CONTRACTOR SHALL PAY ALL CHARGES OF THE SERVING UTILITY FOR THE ELECTRICAL SERVICE.

26A 3-3 GROUNDING.

THE ELECTRICAL SERVICE, ALL TRANSFORMERS, CONDUCTORS, CONDUITS, MOTOR FRAMES, ETC. IN THIS CONTRACT WHICH REQUIRE GROUNDING SHALL BE PERMANENTLY AND EFFECTIVELY GROUNDED BY THIS CONTRACTOR IN A THOROUGH AND EFFICIENT MANNER IN CONFORMANCE TO THE NATIONAL ELECTRICAL CODE.

26A4 DISTRIBUTION AND CONTROL EQUIPMENT

26A 4- CIRCUIT BREAKERS IN EXISTING PANELBOARDS

NEW CIRCUIT BREAKERS REQUIRED TO BE INSTALLED IN EXISTING PANELBOARDS SHALL BE OF THE SAME MANUFACTURER, TYPE AND HAVE THE SAME AIC RATINGS AS THE EXISTING PANELBOARD CIRCUIT BREAKERS.

26A5 LIGHT FIXTURES, LAMPS AND BALLASTS

26A 5-1 LIGHT FIXTURE LOCATIONS.

LIGHT FIXTURES SHOWN ON THE ELECTRICAL DRAWINGS REPRESENT GENERAL ARRANGEMENTS ONLY. COORDINATE LOCATION WITH ALL OTHER TRADES BEFORE INSTALLATION TO AVOID CONFLICTS.

26A 5-2 LAMPS.

LED LAMPS SHALL BE AS SHOWN ON DRAWINGS.

26A 5-3 DRIVERS.

HOUSING SUITABLE FOR INSTALLED ENVIRONMENT.

RATED FOR EXTERIOR APPLICATIONS IN LOCAL CLIMATE.

DIGITALLY DRIVE TO OPERATE LEDS AT CONSTANT REGULATED CURRENT LEVELS. LEDS SHALL NOT BE OVERDRIVEN BEYOND SPECIFIED NOMINAL VOLTAGE AND CURRENT.

26A 5-4 EXTERIOR LIGHTING.

THIS CONTRACTOR SHALL FURNISH AND INSTALL ALL COMPONENTS OF THE LIGHTING SYSTEM AS DETAILED ON THE DRAWINGS. 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.

26A6 EXISTING EQUIPMENT REUSE AND REMOVAL

THIS CONTRACTOR SHALL REMOVE ALL EXISTING WIRING, FIXTURES, EXPOSED CONDUITS AND OTHER ELECTRICAL INSTALLATIONS NOT REUSED PRIOR TO TERMINATION OF THE WORK.

IT SHALL BE THE RESPONSIBILITY OF THIS CONTRACTOR TO CUT, PATCH, AND REPAIR WHERE REQUIRED FOR NEW ELECTRICAL INSTALLATIONS, AND HE SHALL PATCH AND REPAIR ANY SURFACE DAMAGE RESULTING FROM HIS WORK. CONDUITS STUBBED ABOVE THE FLOOR AND NOT USED AT THE TERMINATION OF THE WORK SHALL BE CUT FLUSH WITH THE FLOOR AND PLUGGED AT BOTH ENDS.

ALL EXISTING ELECTRICAL SYSTEMS REQUIRED TO BE IN OPERATION AT THE TERMINATION OF THE CONTRACT SHALL BE RELOCATED, IF REQUIRED, AS A RESULT OF WORK INCLUDED UNDER THIS CONTRACT, EVEN IF NOT SPECIFICALLY INDICATED IN THE DRAWINGS OR SPECIFICATIONS.

END OF SECTION 26A OF THESE SPECIFICATIONS

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PRINTS ISSUED

DATE	PURPOSE	NO.
09.13.17	FOR CONSTRUCTION	

DOUGLAS AVE.-BNSF
RAILROAD UNDERPASS
IMPROVEMENTS
WICHITA, KS

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Architecture • Engineering • Planning • Interior Design • Landscape Architecture

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