

PART 1 GENERAL INSTRUCTIONS

1.1 GENERAL REQUIREMENTS

- A. ALL REQUIREMENTS IN THE ARCHITECTURAL SPECIFICATIONS, ARCHITECTURAL GENERAL NOTES, AND THE GENERAL AND SUPPLEMENTARY CONDITIONS OF THESE SPECIFICATIONS APPLY TO THIS SECTION AND DIVISION. WHERE THE REQUIREMENTS OF THIS SECTION AND DIVISION EXCEED THOSE OF THE ARCHITECTURAL SPECIFICATIONS AND ARCHITECTURAL GENERAL NOTES, THIS SECTION AND DIVISION TAKE PRECEDENCE. BECOME THOROUGHLY FAMILIAR WITH ALL REQUIREMENTS THAT AFFECT THIS DIVISION, SECTION OR BOTH. WORK REQUIRED UNDER THIS DIVISION INCLUDES ALL MATERIAL, EQUIPMENT, THE APPLIANCES, AND LABOR REQUIRED TO COMPLETE THE ENTIRE ELECTRICAL SYSTEM AS REQUIRED BY THE DRAWINGS AND SPECIFICATIONS, OR REASONABLY INFERRED TO BE NECESSARY TO FACILITATE EACH SYSTEM'S FUNCTIONALITY AS IMPLIED BY THE DESIGN AND THE EQUIPMENT SPECIFIED.
- B. THE SPECIFICATIONS AND DRAWINGS FOR THE PROJECT ARE COMPLEMENTARY, AND PORTIONS OF THE WORK DESCRIBED IN ONE, SHALL BE PROVIDED AS IF DESCRIBED IN BOTH. IN THE EVENT OF DISCREPANCIES, NOTIFY THE ENGINEER AND REQUEST CLARIFICATION PRIOR TO PROCEEDING WITH THE WORK INVOLVED. DRAWINGS ARE GRAPHIC REPRESENTATIONS OF THE WORK UPON WHICH THE CONTRACT IS BASED. THEY SHOW THE MATERIALS AND THEIR RELATIONSHIP TO ONE ANOTHER, INCLUDING SIZES, SHAPES, LOCATIONS, AND CONNECTIONS. THEY ALSO CONVEY THE SCOPE OF WORK, INDICATING THE INTENDED GENERAL ARRANGEMENT OF THE EQUIPMENT, FIXTURES, OUTLETS AND CIRCUITS WITHOUT SHOWING ALL OF THE EXACT DETAILS AS TO ELEVATIONS, OFFSETS, CONTROL LINES, AND OTHER REQUIREMENTS. USE THE DRAWINGS AS A GUIDE WHEN LAYING OUT THE WORK AND TO VERIFY THAT MATERIALS AND EQUIPMENT WILL FIT INTO THE DESIGNATED SPACES AND WHICH, WHEN INSTALLED PER MANUFACTURER'S REQUIREMENTS, WILL ENSURE A COMPLETE, COORDINATED, SATISFACTORY AND PROPERLY OPERATING SYSTEM.
1. DRAWINGS ARE NOT TO SCALE. SHOW UNPACKING, ASSEMBLING, ERECTING, PLACING, ANCHORING, APPLYING, WORKING TO DIMENSION, FINISHING, CURING, PROTECTING, CLEANING, TESTING, COMMISSIONING, STARTING UP AND SIMILAR OPERATIONS, COMPLETE, AND READY FOR THE INTENDED USE.
- C. PROVIDE TO FURNISH AND INSTALL COMPLETE, AND READY FOR THE INTENDED USE.
- D. FURNISHED BY OWNER (OR OWNER-FURNISHED) OR FURNISHED BY OTHERS: AN ITEM FURNISHED BY THE OWNER OR UNDER OTHER DIVISIONS OR CONTRACTS, AND INSTALLED UNDER THE REQUIREMENTS OF THIS DIVISION, COMPLETE, AND READY FOR THE INTENDED USE, INCLUDING ALL ITEMS AND SERVICES INCIDENTAL TO THE WORK NECESSARY FOR PROPER INSTALLATION AND OPERATION. INCLUDE THE INSTALLATION UNDER THE WARRANTY REQUIRED BY THIS DIVISION.
- E. ENGINEER: WHERE REFERENCED IN THIS DIVISION, "ENGINEER" IS THE ENGINEER OF RECORD AND THE DESIGN PROFESSIONAL FOR THE WORK UNDER THIS DIVISION, AND IS A CONSULTANT TO, AND AN AUTHORIZED REPRESENTATIVE OF, THE ARCHITECT, AS DEFINED IN THE GENERAL AND/OR SUPPLEMENTARY CONDITIONS. WHEN USED IN THIS DIVISION, IT MEANS INCREASED INVOLVEMENT BY, AND OBLIGATIONS TO, THE ENGINEER, IN ADDITION TO INVOLVEMENT BY, AND OBLIGATIONS TO, THE "ARCHITECT".
- F. AHJ: THE LOCAL CODE AND/OR INSPECTION AGENCY. AUTHORITY HAVING JURISDICTION OVER THE WORK, TESTING LABORATORY, AS DEFINED AND LISTED BY OSHA IN 28 CFR 1910.7 (E.G., UL, ETL, CSA), AND ACCEPTABLE TO THE AHJ OVER THIS PROJECT.
- H. THE TERMS "EQUIVALENT", OR "EQUAL" ARE USED SYNONYMOUSLY AND SHALL MEAN "ACCEPTED BY OR ACCEPTABLE TO THE ENGINEER AS EQUIVALENT TO THE ITEM OR MANUFACTURE" "EQUIVALENT" OR "EQUAL" PRODUCTS SHALL BE LABELED, LISTED, CERTIFIED, OR ALL THREE, BY AN NRTL, AND ACCEPTABLE TO THE AHJ OVER THIS PROJECT.

1.2 DEFINITIONS

- A. FURNISH: TO SUPPLY AND DELIVER TO THE PROJECT SITE, READY FOR UNLOADING, UNPACKING, ASSEMBLING, INSTALLING, AND SIMILAR OPERATIONS.
- B. INSTALL: TO PERFORM ALL OPERATIONS AT THE PROJECT SITE, INCLUDING, BUT NOT LIMITED TO, ARRANGING, UNLOADING, UNPACKING, ASSEMBLING, ERECTING, PLACING, ANCHORING, APPLYING, WORKING TO DIMENSION, FINISHING, CURING, PROTECTING, CLEANING, TESTING, COMMISSIONING, STARTING UP AND SIMILAR OPERATIONS, COMPLETE, AND READY FOR THE INTENDED USE.
- C. PROVIDE: TO FURNISH AND INSTALL COMPLETE, AND READY FOR THE INTENDED USE.
- D. FURNISHED BY OWNER (OR OWNER-FURNISHED) OR FURNISHED BY OTHERS: AN ITEM FURNISHED BY THE OWNER OR UNDER OTHER DIVISIONS OR CONTRACTS, AND INSTALLED UNDER THE REQUIREMENTS OF THIS DIVISION, COMPLETE, AND READY FOR THE INTENDED USE, INCLUDING ALL ITEMS AND SERVICES INCIDENTAL TO THE WORK NECESSARY FOR PROPER INSTALLATION AND OPERATION. INCLUDE THE INSTALLATION UNDER THE WARRANTY REQUIRED BY THIS DIVISION.
- E. ENGINEER: WHERE REFERENCED IN THIS DIVISION, "ENGINEER" IS THE ENGINEER OF RECORD AND THE DESIGN PROFESSIONAL FOR THE WORK UNDER THIS DIVISION, AND IS A CONSULTANT TO, AND AN AUTHORIZED REPRESENTATIVE OF, THE ARCHITECT, AS DEFINED IN THE GENERAL AND/OR SUPPLEMENTARY CONDITIONS. WHEN USED IN THIS DIVISION, IT MEANS INCREASED INVOLVEMENT BY, AND OBLIGATIONS TO, THE ENGINEER, IN ADDITION TO INVOLVEMENT BY, AND OBLIGATIONS TO, THE "ARCHITECT".
- F. AHJ: THE LOCAL CODE AND/OR INSPECTION AGENCY. AUTHORITY HAVING JURISDICTION OVER THE WORK, TESTING LABORATORY, AS DEFINED AND LISTED BY OSHA IN 28 CFR 1910.7 (E.G., UL, ETL, CSA), AND ACCEPTABLE TO THE AHJ OVER THIS PROJECT.
- H. THE TERMS "EQUIVALENT", OR "EQUAL" ARE USED SYNONYMOUSLY AND SHALL MEAN "ACCEPTED BY OR ACCEPTABLE TO THE ENGINEER AS EQUIVALENT TO THE ITEM OR MANUFACTURE" "EQUIVALENT" OR "EQUAL" PRODUCTS SHALL BE LABELED, LISTED, CERTIFIED, OR ALL THREE, BY AN NRTL, AND ACCEPTABLE TO THE AHJ OVER THIS PROJECT.

1.3 PRE-BID SITE VISIT

- A. PERSONALLY INSPECT THE SITE OF THE PROPOSED WORK AND BECOME FULLY INFORMED OF 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.

1.4 MATERIAL AND WORKMANSHIP

- A. PROVIDE ALL MATERIAL AND EQUIPMENT NEW AND IN FIRST CLASS CONDITION. PROVIDE MARKINGS OR A NAMEPLATE FOR ALL MATERIAL AND EQUIPMENT 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, PROVIDE THE FOLLOWING QUALITY GRADE(S) FOR ALL MATERIALS AND EQUIPMENT (LIGHT DUTY AND RESIDENTIAL TYPE EQUIPMENT WILL NOT BE ACCEPTABLE).
- B. COMMERCIAL SPECIFICATION GRADE.
- C. PROVIDE ALL HOISTS, SCARFOLDS, STAGING, RUNWAYS, TOOLS, MACHINERY AND EQUIPMENT REQUIRED FOR THE INSTALLATION AND PERFORMANCE OF THE ELECTRICAL WORK. STORE AND MAINTAIN MATERIAL AND EQUIPMENT IN CLEAN CONDITION, AND PROTECTED FROM WEATHER, MOISTURE, AND PHYSICAL DAMAGE.
- D. FURNISH ONLY MATERIAL AND EQUIPMENT THAT ARE LISTED, LABELED, CERTIFIED, OR ALL THREE, BY A NATIONALLY RECOGNIZED TESTING LABORATORY, WHENEVER ANY LISTING OR LABELING EXISTS FOR THE TYPES OF MATERIAL AND EQUIPMENT SPECIFIED. AT A MINIMUM, GENERAL WORK PRACTICES FOR ELECTRICAL CONSTRUCTION SHALL BE IN ACCORDANCE WITH NECA 1 (LATEST EDITION), "STANDARD PRACTICES FOR GOOD WORKMANSHIP IN ELECTRICAL CONSTRUCTION".

1.5 MANUFACTURERS

- A. IN OTHER ARTICLES WHERE LISTS OF MANUFACTURERS ARE INTRODUCED, SUBJECT TO COMPLIANCE WITH REQUIREMENTS, PROVIDE PRODUCTS BY ONE OF THE MANUFACTURERS SPECIFIED.
- B. WHERE MANUFACTURERS ARE NOT LISTED, PROVIDE PRODUCTS SUBJECT TO COMPLIANCE WITH REQUIREMENTS FROM MANUFACTURERS THAT HAVE BEEN ACTIVELY INVOLVED IN MANUFACTURING THE SPECIFIED PRODUCT FOR NO LESS THAN 5 YEARS.

1.6 COORDINATION

- A. COORDINATE ALL WORK WITH OTHER DIVISIONS AND TRADES SO THAT VARIOUS COMPONENTS OF THE ELECTRICAL SYSTEMS ARE INSTALLED AT THE PROPER TIME, FIT THE AVAILABLE SPACE, AND ALLOW PROPER SERVICE ACCESS TO ALL EQUIPMENT. REFER TO THE DRAWINGS AND SPECIFICATIONS AND TO RELEVANT ARCHITECTURAL, STRUCTURAL, MECHANICAL AND PLUMBING, AND TO RELEVANT EQUIPMENT SUBMITTALS AND SHOP DRAWINGS TO DETERMINE THE EXTENT OF CLEAR SPACES. MAKE ALL OFFSETS REQUIRED TO CLEAR EQUIPMENT, BEAMS AND OTHER STRUCTURAL MEMBERS, AND TO FACILITATE CONCEALING RACEWAYS IN THE MANNER ANTICIPATED IN THE DESIGN. PROVIDE MATERIALS WITH TRIM THAT WILL FIT PROPERLY THE TYPES OF CEILING, WALL, OR FLOOR FINISHES ACTUALLY INSTALLED.

1.7 ORDINANCE, CODES, AND CLIENT STANDARDS

- A. COMPLY WITH NATIONAL FIRE PROTECTION ASSOCIATION (NFPA) STANDARDS, STATE AND LOCAL BUILDING CODES, AND ALL OTHER APPLICABLE CODES AND ORDINANCES FOR PERFORMANCE, WORKMANSHIP, EQUIPMENT, AND MATERIALS. ADDITIONALLY, COMPLY WITH RULES AND REGULATIONS OF PUBLIC UTILITIES AND MUNICIPAL DEPARTMENTS AFFECTED BY CONNECTION OF SERVICES.
- B. WHERE CONFLICTS BETWEEN VARIOUS CODES, ORDINANCES, RULES, AND REGULATIONS EXIST, COMPLY WITH THE MOST STRINGENT ELECTRICAL CODES. BRING ALL CONFLICTS OBSERVED BETWEEN CODES, ORDINANCES, RULES, REGULATIONS, REFERENCED STANDARDS, AND THESE DOCUMENTS TO THE ENGINEER'S ATTENTION FOR FINAL RESOLUTION. CONTRACTOR WILL BE HELD RESPONSIBLE FOR ANY VIOLATION OF THE LAW.
- C. PROVIDE AND MAINTAIN NECESSARY SIGNAL LIGHTS AND GUARDS FOR THE SAFETY OF THE PUBLIC. OBTAIN AND PAY FOR ALL PERMITS FOR WORK IN THIS DIVISION.

1.8 PROTECTION OF EQUIPMENT AND MATERIALS

- A. STORE AND PROTECT FROM DAMAGE EQUIPMENT AND MATERIALS DELIVERED TO JOB SITE, IN ACCORDANCE WITH MANUFACTURER'S A. RECOMMENDATIONS, FOR MATERIALS AND EQUIPMENT SUSCEPTIBLE TO CHANGING WEATHER CONDITIONS, DAMAGED, OR TEMPORARY FLUCTUATIONS, STORED OR EXPOSED TO UNDESIRABLE CONDITIONS. PROVIDE PROTECTION FOR MATERIALS AND EQUIPMENT NOT SUSCEPTIBLE TO THESE CONDITIONS. COVER WITH WATERPROOF, TEAR-RESISTANT, HEAVY TARP OR POLYETHYLENE PLASTIC AS REQUIRED TO PROTECT FROM PLASTER, DIRT, PAINT, WATER, OR PHYSICAL DAMAGE. EQUIPMENT AND MATERIAL THAT HAS BEEN DAMAGED BY CONSTRUCTION ACTIVITIES WILL BE REJECTED, AND THE CONTRACTOR SHALL FURNISH NEW EQUIPMENT AND MATERIAL OF A LIKE KIND.
- B. PLUG OR CAP OPEN ENDS OF CONDUITS WHILE STORED AND INSTALLED DURING CONSTRUCTION WHEN NOT IN USE, TO PREVENT THE ENTRANCE OF DEBRIS INTO THE SYSTEMS.
- C. RE-ESTABLISH SERVICE TO EXISTING EQUIPMENT THAT MAY HAVE BEEN INTERRUPTED DUE TO REMODELING.

1.9 SUBSTITUTIONS

- A. INCLUDE IN THE BASE BID THE PRODUCTS SPECIFICALLY NAMED IN THESE SPECIFICATIONS OR BID ON THE DRAWINGS. SUBMIT, IN THE FORM OF A. ALTERNATES, WITH THE BID, PROPOSALS OF ANY OTHER MANUFACTURERS FOR SIMILAR USE, PROVIDED THE DIFFERENCES IN COST, IF ANY, ARE INCLUDED FOR EACH PROPOSED ALTERNATE. PRIOR TO THE BID DATE, SUBSTITUTIONS WILL NOT BE CONSIDERED UNLESS SUBMITTED TO THE ARCHITECT, FOR ENGINEER'S REVIEW, AT LEAST TEN CALENDAR DAYS PRIOR TO THE DATE FOR RECEIPT OF BIDS. IN ALL CASES, THE MATERIAL OR MATERIAL OF A LIKE KIND WHICH IT IS TO BE SUBSTITUTED AND A COMPLETE DESCRIPTION OF THE PROPOSED SUBSTITUTE INCLUDING OUTSHEETS, PHOTOMETRIC DATA, AND ALL OTHER INFORMATION NECESSARY FOR AN EVALUATION FOR EACH SUCH REQUEST. PROVIDE FACTORY GENERATED POINT-BY-POINT CALCULATIONS FOR ALL EXTERIOR FIXTURES. SHOW THE ADVISORY COMMENTS OF THE ENGINEER CAN GENERATE A POINT-BY-POINT DO NOT SUFFICE FOR THE POINT-BY-POINT CALCULATIONS). PROVIDE INTERIOR POINT-BY-POINT CALCULATIONS AT THE DISCRETION OF THE ENGINEER. SUBMIT A \$100.00 REVIEW FEE TO THE ENGINEER WITH EACH SUCH POINT-BY-POINT CALCULATION FOR USE OF ELECTRONIC BASE FILES.
- B. THE ENGINEER WILL HAVE THE FINAL AUTHORITY AS TO WHETHER THE PRODUCT IS AN ACCEPTABLE REPLACEMENT TO THE SPECIFIED ITEM. THE PROPOSED SUBSTITUTION MAY ALSO BE REJECTED BY THE ARCHITECT FOR AESTHETIC REASONS IF FELT NECESSARY OR DESIRABLE. IN B. THE EVENT THE PROPOSED SUBSTITUTIONS HEREIN DESCRIBED ARE REJECTED, FURNISH THE SPECIFIED ITEM.

1.10 SUBMITTALS

- A. ASSEMBLE AND SUBMIT TO THE ARCHITECT, FOR ENGINEER'S REVIEW. MANUFACTURERS' PRODUCT LITERATURE FOR ALL MATERIAL AND ALL EQUIPMENT TO BE FURNISHED, INSTALLED, OR BOTH, UNDER THIS DIVISION, INCLUDING SHOP DRAWINGS, MANUFACTURERS' PRODUCT DATA AND PERFORMANCE SHEETS, SAMPLES, AND OTHER SUBMITTALS REQUIRED BY THIS DIVISION. PROVIDE THE NUMBER OF SUBMITTALS REQUIRED BY THE ARCHITECTURAL SPECIFICATIONS; HOWEVER, AT A MINIMUM, SUBMIT SIX (6) SETS, OR SUBMIT ELECTRONIC PDFS. BEFORE SUBMITTING, OBTAIN PERMISSION OF THE ARCHITECT. OWNER, AND OWNER'S DESIGNATED STRUCTURAL ENGINEER BEFORE DOING ANY CUTTING. CUT ALL HOLES AS SMALL AS POSSIBLE. PATCH WALLS, FLOORS, AND OTHER PORTIONS OF THE FACILITY AS REQUIRED BY WORK UNDER THIS DIVISION. ALL PATCHING SHALL BE FIRST CLASS AND SHALL MATCH THE ORIGINAL MATERIAL AND CONSTRUCTION REQUIRED BY THE DRAWINGS. IF APPLICABLE, DO NOT CUT OR PENETRATE MATERIAL AND CONSTRUCTION, INCLUDING FIRE RATINGS, DO NOT CUT OR PENETRATE STRUCTURAL ELEMENTS.
- B. BEFORE ANY NEW FLOOR CORES ARE MADE, PROVIDE A LETTER FROM THE BUILDING OWNERS STRUCTURAL ENGINEER APPROVING THE LOCATION OF EACH NEW FLOOR CORE. THE LETTER SHALL ADDRESS CORES FOR: FOR CONDUIT AND POKE-THRU'S, WHERE A LETTER IS NOT SUPPLIED TO THE ENGINEER AND ARCHITECT OF RECORD BEFORE ANY FLOOR CORES ARE MADE, THE CONTRACTOR ASSUMES ALL LIABILITY FOR ANY AND ALL ISSUES THAT MAY OR COULD ARISE FROM CORING THE FLOOR.
2. THE PROJECT NAME AND LOCATION (STREET ADDRESS, FLOOR/SUITE NUMBER, CITY AND STATE).
3. THE APPLICABLE SPECIFICATION SECTION AND PARAGRAPH.
4. THE SUBMITTAL DATE.
5. THE CONTRACTOR'S STAMP, WHICH SHALL CERTIFY THAT THE STAMPED DRAWINGS HAVE BEEN CHECKED BY THE CONTRACTOR, COMPLY WITH THE DRAWINGS AND SPECIFICATIONS, AND HAVE BEEN COORDINATED WITH OTHER TRADES.
6. BLANK PAGE FOR PLACEMENT OF ENGINEERS REVIEW STAMP.
7. TRANSMIT SUBMITTALS AS EARLY AS REQUIRED TO SUPPORT THE PROJECT SCHEDULE. ALLOW TWO WEEKS FOR ENGINEER REVIEW TIME, PLUS MAILING TIME, ALLOW AN ADDITIONAL TWO WEEKS FOR RE-SUBMITTALS, IF REQUIRED. TRANSMIT SUBMITTALS AS SOON AS POSSIBLE AFTER NOTICE TO PROCEED AND BEFORE CONSTRUCTION STARTS. THE ENGINEER'S SUBMITTAL REVIEWS WILL NOT MAINTAIN THE CONTRACTOR'S RESPONSIBILITY FOR ERRORS IN DIMENSIONS, DETAILS, SIZE OF MEMBERS, OR QUANTITIES, OR FOR OMITTING COMPONENTS OR FITTINGS; OR FOR NOT COORDINATING ITEMS WITH ACTUAL BUILDING CONDITIONS.

1.11 ELECTRONIC DRAWINGS FILES

- A. IN PREPARATION OF SHOP DRAWINGS, CONTRACTOR MAY, AT HIS OPTION, OBTAIN ELECTRONIC DRAWING FILES IN AUTOCAD DWG OR DXF FORMAT FROM THE ENGINEER FOR A NON-REFUNDABLE SHIPPING AND HANDLING FEE OF \$200 FOR A DRAWING SET UP TO 12 SHEETS AND \$15 PER SHEET FOR A DRAWING SET OF MORE THAN 12 SHEETS. CONTRACTOR SHALL CONTACT THE ENGINEER FOR THE WRITTEN AUTHORIZATION. CONTRACTOR SHALL INDICATE ON THE FORM THE DESIRED SHIPPING METHOD AND DRAWING FORMAT CONTRACTOR SHALL INCLUDE PAYMENT WITH THE SIGNED AUTHORIZATION FORM. THE SIGNED AUTHORIZATION FORM AND PAYMENT MUST BE RECEIVED BY THE ENGINEER BEFORE ANY ELECTRONIC FILES WILL BE SENT.

1.12 TRAINING

- A. AT A TIME MUTUALLY AGREED UPON BETWEEN THE OWNER AND CONTRACTOR, TRAIN OWNER'S DESIGNATED PERSONNEL ON THE OPERATION AND MAINTENANCE OF THE EQUIPMENT PROVIDED FOR THIS PROJECT.
- B. PROVIDE TRAINING TO INCLUDE, BUT NOT BE LIMITED TO, AN OVERVIEW OF THE SYSTEMS AND/OR EQUIPMENT AS IT RELATES TO THE FACILITY AS A WHOLE; OPERATION AND MAINTENANCE PROCEDURES AND SCHEDULES RELATED TO STARTUP AND SHUTDOWN, TROUBLESHOOTING, SERVICING, PREVENTIVE MAINTENANCE AND APPROPRIATE OPERATOR INTERVENTION; AND REVIEW OF DATA INCLUDED IN THE OPERATION AND MAINTENANCE INSTRUCTIONS.
- C. SCHEDULE TRAINING WITH OWNER WITH AT LEAST 30 DAYS IN ADVANCE NOTICE.

1.13 WARRANTIES

- A. WARRANT EACH SYSTEM AND EACH ELEMENT THEREOF AGAINST ALL DEFECTS DUE TO FAULTY WORKMANSHIP. PROVIDE INSTALLATION, PRODUCT DESIGN OR MATERIALS FOR A PERIOD OF 12 MONTHS FROM DATE OF SUBSTANTIAL COMPLETION, UNLESS SPECIFIC ITEMS ARE NOTED TO CARRY A LONGER WARRANTY IN THE CONSTRUCTION DOCUMENTS OR MANUFACTURER'S STANDARD WARRANTY EXCEEDS 12 MONTHS. REMEDY ALL DEFECTS, OCCURRING WITHIN THE WARRANTY PERIOD(S), AS STATED IN THE GENERAL CONDITIONS AND DIVISION 1. ALSO WARRANT THE FOLLOWING ADDITIONAL ITEMS:
1. ALL RACEWAYS ARE FREE FROM OBSTRUCTIONS, HOLES, CRUSHING, OR BREAKS OF ANY NATURE.
2. ALL RACEWAY SEALS ARE EFFECTIVE.
3. THE ENTIRE ELECTRICAL SYSTEM IS FREE FROM ALL SHORT CIRCUITS AND UNWANTED OPEN CIRCUITS AND GROUNDS.
- C. THE ABOVE WARRANTIES SHALL INCLUDE LABOR AND MATERIAL. MAKE REPAIRS OR REPLACEMENTS WITHOUT ANY ADDITIONAL COSTS TO THE OWNER.
- D. PERFORM THE REMEDIAL WORK PROMPTLY, UPON WRITTEN NOTICE FROM THE ENGINEER AND/OR OWNER.
- E. AT THE TIME OF SUBSTANTIAL COMPLETION, DELIVER TO THE OWNER ALL WARRANTIES, IN WRITING AND PROPERLY EXECUTED, INCLUDING E. TERM LIMITS FOR WARRANTIES EXTENDING BEYOND THE ONE YEAR PERIOD, EACH WARRANTY INSTRUMENT BEING ADDRESSED TO THE OWNER AND STATING THE COMMENCEMENT DATE AND TERM.

1.14 MISCELLANEOUS REMODELING WORK

- A. PROVIDE ALL DEMOLITION OF EXISTING ELECTRICAL SYSTEMS AND NEW ELECTRICAL SYSTEM MODIFICATIONS REQUIRED BECAUSE OF BUILDING REMODELING, AS NOTED ON THE DRAWINGS, OR NECESSARY FOR PROPER OPERATION AND NEW CONSTRUCTION. REMOVE ALL ABANDONED CABLES AND WIRING ABOVE ACCESSIBLE CEILINGS AND VENTILATION SHAFTS.
- B. EXERCISE EXTREME CAUTION IN THE INSTALLATION OF THIS WORK TO AVOID AN ELECTRICAL SHOCK ACCIDENT. THE FACILITY IS EXISTING AND MAY REMAIN IN OPERATION DURING THIS WORK. COORDINATE ALL WORK SCHEDULES WITH THE BUILDING MANAGEMENT PRIOR TO DE-ENERGIZING ANY ELECTRICAL CIRCUITS TO AVOID CONFLICTS WITH ANY OTHER TENANT'S OPERATION. ALLOW 3 DAYS PRIOR CONFIRMED NOTIFICATION.
- C. VERIFY THAT NEW AND EXISTING TO REMAIN INSTALLATIONS ARE CODE COMPLIANT, AND MAKE CORRECTIONS AS REQUIRED.
- D. DEVELOP AND MAINTAIN A SET OF "RED-LINE AS-BUILT" DRAWINGS. THESE DRAWINGS SHALL BE MAINTAINED AT THE PROJECT CONSTRUCTION SITE AND AVAILABLE TO THE ENGINEER UPON REQUEST. THEY SHALL BE CURRENT AND SHALL REFLECT ALL ACTUAL ASPECTS OF THE ELECTRICAL INSTALLATION WHICH DEVIATED FROM THE PRESENT ELECTRICAL DESIGN DRAWINGS. THESE DRAWINGS SHALL BE SUBMITTED TO THE ENGINEER FOR REVIEW AND APPROVAL. SUBSTANTIAL COMPLETION OF THE WORK AND MUST INCLUDE ALL PUNCH LIST ITEMS.

- E. VERIFY THE LOADING OF EACH CIRCUIT AFFECTED BY THE REMODELING. DO NOT LOAD CIRCUITS TO MORE THAN 80% OF ITS RATING.
- F. PROVIDE UPDATED, TYPED DIRECTORY FOR EACH PANELBOARD BEING USED OR MODIFIED UNDER THIS CONTRACT. DESIGNATE NEW CIRCUITS AND SUITE BEING SERVED BY THE PROJECT.
- G. NO BX CABLE SHALL BE INSTALLED FOR THIS PROJECT.
- H. FLEXIBLE STEEL CONDUIT SHALL BE USED TO WIRE ALL LIGHT FIXTURES AND EQUIPMENT CONNECTIONS REQUIRED FOR VIBRATION OR EASE OF MAINTENANCE IN LENGTHS FROM 18 INCHES TO 72 INCHES ONLY.
- I. CONDUIT AND CABLE ABOVE CEILING SHALL BE SUPPORTED BY A UNISTRUT AND ALL-THREAD ROD TRAPEZE. EACH PIECE OF CONDUIT SHALL BE SECURED TO THE TRAPEZE WITH A CONDUIT STRAP. THE TRAPEZE SUPPORTS SHALL BE INSTALLED PER CODE PLUS A MINIMUM OF 12" ABOVE THE CEILING.
- J. PRIOR TO BID, THE EXISTING LIGHTING INSTALLATION SHALL BE INSPECTED TO VERIFY FOR THE PROJECT, BY WORK EXPANSION AND DUAL SWITCHING. NO CHANGE ORDER SHALL BE ISSUED DURING CONSTRUCTION FOR CHANGES DUE TO INCOMPATIBILITY.
- K. NO CHANGES SHALL BE MADE TO THE CIRCUITING SHOWN WITHOUT PRIOR WRITTEN APPROVAL OF THE ENGINEER OF RECORD. CIRCUIT NUMBERS SHALL BE INDICATED ON EACH JUNCTION BOX.
- L. AT THE TIME OF FINAL PUNCH LIST, (3) ELECTRICIANS SHALL BE PRESENT TO ASSIST IN THE REMOVAL OF PANEL COVERS, JUNCTION BOX COVERS, RECEPTACLES, SWITCHES, AND OTHER ELECTRICAL DEVICES.

(END OF PART 1)

PART 2 ELECTRICAL WORK

2.1 BUILDING OPERATION

- A. THE SCHEDULE OF OPERATIONS AS OUTLINED IN THE ARCHITECTURAL PORTIONS OF THIS SPECIFICATION. BUILDING FACILITY SHALL BE MAINTAINED IN CONTINUOUS OPERATION. ACCOMPLISH WORK THAT REQUIRES INTERRUPTION OF BUILDING AND BUILDING TENANT OPERATIONS AT A TIME WHEN THE BUILDING IS NOT IN OPERATION, AND ONLY WITH WRITTEN APPROVAL OF BUILDING OWNER AND/OR AFFECTED TENANT(S). COORDINATE INTERRUPTION OF BUILDING OPERATION WITH THE OWNER AND/OR TENANT(S) A MINIMUM OF DAYS IN ADVANCE OF WORK.

2.2 COINCIDENTAL DAMAGE

- A. REPAIR ALL STREETS, SIDEWALKS, DRIVES, PAVING, WALLS, FLOORING, FINISHES, AND OTHER FACILITIES DAMAGED IN THE COURSE OF THIS WORK. REPAIR MATERIALS SHALL MATCH EXISTING CONSTRUCTION. ALL BACKFILLING AND REPAIRING SHALL MEET ALL REQUIREMENTS OF THE OWNER, CITY AND OTHERS HAVING JURISDICTION. REPAIR WORK SHALL BE FIRST CLASS UTILIZING THE BEST MATERIALS AND TRADESMEN TO PERFORM ALL NECESSARY REPAIR WORK. CONFORM TO ALL REQUIREMENTS OF DIVISION 2 OF THESE SPECIFICATIONS.

2.3 CUTTING AND PATCHING

- A. FOLLOWING THE REQUIREMENTS IN DIVISION 1, CUT WALLS, FLOORS, CEILINGS, AND OTHER PORTIONS OF THE FACILITY AS REQUIRED TO PERFORM WORK UNDER THIS DIVISION. VERIFY THAT ALL MATERIALS AND CONSTRUCTION SUBMITTED ARE MUTUALLY COMPATIBLE AND SUITABLE FOR THE INTENDED USE, FIT THE AVAILABLE SPACES, AND ALLOW AMPLE AND CODE-REQUIRED ROOM FOR ACCESS AND MAINTENANCE. SUBMITTALS SHALL CONTAIN THE FOLLOWING INFORMATION. SUBMITTALS NOT SO IDENTIFIED WILL BE RETURNED TO THE CONTRACTOR WITHOUT THE WARRANTY REQUIRED BY THIS DIVISION.
1. THE PROJECT NAME AND LOCATION (STREET ADDRESS, FLOOR/SUITE NUMBER, CITY AND STATE).
2. THE APPLICABLE SPECIFICATION SECTION AND PARAGRAPH.
3. THE SUBMITTAL DATE.
4. THE CONTRACTOR'S STAMP, WHICH SHALL CERTIFY THAT THE STAMPED DRAWINGS HAVE BEEN CHECKED BY THE CONTRACTOR, COMPLY WITH THE DRAWINGS AND SPECIFICATIONS, AND HAVE BEEN COORDINATED WITH OTHER TRADES.
5. BLANK PAGE FOR PLACEMENT OF ENGINEERS REVIEW STAMP.
6. TRANSMIT SUBMITTALS AS EARLY AS REQUIRED TO SUPPORT THE PROJECT SCHEDULE. ALLOW TWO WEEKS FOR ENGINEER REVIEW TIME, PLUS MAILING TIME, ALLOW AN ADDITIONAL TWO WEEKS FOR RE-SUBMITTALS, IF REQUIRED. TRANSMIT SUBMITTALS AS SOON AS POSSIBLE AFTER NOTICE TO PROCEED AND BEFORE CONSTRUCTION STARTS. THE ENGINEER'S SUBMITTAL REVIEWS WILL NOT MAINTAIN THE CONTRACTOR'S RESPONSIBILITY FOR ERRORS IN DIMENSIONS, DETAILS, SIZE OF MEMBERS, OR QUANTITIES, OR FOR OMITTING COMPONENTS OR FITTINGS; OR FOR NOT COORDINATING ITEMS WITH ACTUAL BUILDING CONDITIONS.

2.4 ROUGH-IN

- A. COORDINATE WITHOUT DELAY ALL ROUGHING-IN WITH OTHER DIVISIONS. CONCEAL ALL RACEWAYS EXCEPT IN UNFINISHED AREAS AND WHERE OTHERWISE INDICATED ON THE DRAWINGS.

2.5 SUPPORT SYSTEMS

- A. STEEL SLOTTED SUPPORT SYSTEMS (SLOTTED CHANNEL): COMPLY WITH MFMA-3, FACTORY-FABRICATED COMPONENTS FOR FIELD ASSEMBLY; 12-GAUGE, 1-5/8-INCH BY 1-5/8-INCH; COOPER B-LINE; ERICO INTERNATIONAL CORPORATION, POWER-STRUT; THOMAS & BETTS CORPORATION, UNISTRUT.
- B. FINISHES:

1. METALLIC COATINGS: HOT-DIP GALVANIZED AFTER FABRICATION AND APPLIED ACCORDING TO MFMA-3.
2. NONMETALLIC COATINGS: MANUFACTURER'S STANDARD PVC, POLYURETHANE, OR POLYESTER. CONDUIT COATING APPLIED ACCORDING TO MFMA-3.
3. PAINTED COATINGS: MANUFACTURER'S STANDARD PAINTED COATING APPLIED ACCORDING TO MFMA-3.
4. STAINLESS STEEL: TYPE 304, PER ASTM A240.
5. ALUMINUM (EXTRUDED): TYPE 6063-T6, PER ASTM B221.

- C. FIELD FABRICATION:
1. WHERE FIELD CUTTING OF STANDARD LENGTHS OF CHANNEL ARE REQUIRED, MAKE CUTS STRAIGHT AND PERPENDICULAR TO MANUFACTURED SURFACES.
2. FOR FIELD-CUT OR DAMAGED SURFACES OF COATED CHANNELS, DRESS CUT ENDS, DAMAGED SURFACES, OR BOTH, WITH AN ABRASIVE MATERIAL (E.G., FILE, GRINDING STONE, OR SIMILAR) AND CLEANSER TO REMOVE OILS, RUST, AND SHARP EDGES AND SHARPEN.
3. FOR CHANNEL WITH A FACTORY-APPLIED COATING, RE-FINISH CUT EDGES WITH A COATING COMPATIBLE WITH THE FACTORY FINISH AND AS RECOMMENDED BY THE MANUFACTURER (E.G., MANUFACTURER'S TOUCH-UP PAINT OR ZINC-RICH COAT-GALVANIZING COMPOUND, AS APPLICABLE).

2.6 PENETRATIONS

- A. COORDINATE SLEEVE SELECTION AND APPLICATION WITH SELECTION AND APPLICATION OF FIRE-STOPPING MATERIALS. MAINTAIN FIRE AND UL RATINGS OF WALL AND FLOOR TYPE.
- B. WALLS AND FLOORS:
1. SLEEVES FOR RACEWAYS AND CABLES:
2. STEEL PIPE SLEEVES: ASTM A 53/A 53M, TYPE E, GRADE B, SCHEDULE 40, GALVANIZED STEEL, PLAIN ENDS AND DRIP RINGS.
3. CAST-IRON PIPE SLEEVES: CAST OR FABRICATED "WALL PIPE," EQUIVALENT TO WARRIOR STEEL PIPE, WITH PLAIN ENDS AND INTEGRAL WATERSTOP, UNLESS OTHERWISE INDICATED.
4. SLEEVES FOR RECTANGULAR OPENINGS: GALVANIZED STEEL STEEL WITH MINIMUM 0.052-INCH THICKNESS AS INDICATED AND OF LENGTH TO SUIT APPLICATION.

2.7 FIRE STOPPING FLOOR AND WALL PENETRATIONS

- A. FIRE RESISTANT PENETRATION SEALANTS: TWO PART, FOAMED IN PLACE, SILICONE SEALANT FORMULATED FOR USE IN THROUGH PENETRATION FIRE STOPPING AROUND CABLES, RACEWAYS, AND CABLE TRAY PENETRATIONS. CONCRETE AND FLOORING. SEALANTS AND ACCESSORIES SHALL HAVE FIRE RESISTANCE RATINGS INDICATED, AS ESTABLISHED BY TESTING IDENTICAL ASSEMBLIES IN ACCORDANCE WITH ASTM E 814, BY UNDERWRITERS' LABORATORIES, INC., OR OTHER NRTL ACCEPTABLE TO AHJ.
- B. PRODUCTS: SUBJECT TO COMPLIANCE WITH REQUIREMENTS, PROVIDE ONE OF THE FOLLOWING:
1. "3M FIRE STOP" FOAM #2001, 3M CORP.
2. "METACALK 835+", RECTORSSEAL
3. "SPECSEAL PENSTYL 200 SILICONE FOAM"; SPECIFY TECHNOLOGY INC.
4. "FIRE STOP SYSTEM"; UNITED STATES GYPSUM COMPANY.

2.8 ACCESS DOORS

- A. PROVIDE ACCESS DOORS IN CEILINGS AND WALLS, WHERE INDICATED OR REQUIRED FOR ACCESS OR MAINTENANCE TO CONCEALED EQUIPMENT INSTALLED UNDER THIS SECTION. PROVIDE CONCEALED HINGES, SCREWDRIVER-TYPE LOCK, AND ANCHOR STRAPS. MANUFACTURED BY MILCOR, ZURN, TITUS, OR EQUIVALENT. OBTAIN APPROVAL OF TYPE, SIZE, LOCATION AND COLOR BEFORE ORDERING.

2.9 EQUIPMENT FURNISHED BY OTHERS

- A. PROVIDE NECESSARY EQUIPMENT AND ACCESSORIES THAT ARE NOT PROVIDED BY THE OWNER OR SUPPLIER TO THE CONTRACTOR TO COMPLETE THE INSTALLATION OF EQUIPMENT FURNISHED BY OTHERS, IN LOCATIONS AS INDICATED ON THE DRAWINGS, SPECIFIED HEREIN, OR BOTH. EQUIPMENT AND ACCESSORIES NOT PROVIDED BY THE EQUIPMENT SUPPLIER MAY INCLUDE SUCH ITEMS AS FLEXIBLE CORDS AND PLUGS, AS REQUIRED FOR PROPER OPERATION OF THE COMPLETE DRAWINGS. THE SYSTEM SHALL BE SUBMITTED TO THE ENGINEER FOR REVIEW AND APPROVAL. MAINTAIN ALL CORRECT ROUGH-IN DIMENSIONS, AND VERIFY THEM WITH ARCHITECT, OWNER'S REPRESENTATIVE, EQUIPMENT SUPPLIER, OR ALL THREE, PRIOR TO ROUGH-IN AND SERVICE INSTALLATIONS.

2.10 CLEANING

- A. IN ADDITION TO THE REQUIREMENTS SET FORTH IN THE ARCHITECTURAL DRAWINGS AND SPECIFICATIONS, REMOVE FROM THE PREMISES DIRT AND REFUSE RESULTING FROM THE PERFORMANCE OF THE ELECTRICAL WORK, AS REQUIRED, TO PREVENT ACCUMULATION. COOPERATE IN MAINTAINING REASONABLY CLEAN PREMISES AT ALL TIMES, IMMEDIATELY PRIOR TO FINAL INSPECTION, MAKE A FINAL CLEANUP OF DIRT AND REFUSE RESULTING FROM THE WORK. CLEAN ALL MATERIAL AND EQUIPMENT INSTALLED UNDER THIS DIVISION. REMOVE DIRT, DUST, PLASTER, STAINS AND FOREIGN MATTER FROM ALL SURFACES. TOUCH-UP AND RESTORE ALL DAMAGED FINISHES TO THEIR ORIGINAL CONDITION.

2.11 ADJUSTING, ALIGNING, AND TESTING

- A. ADJUST, ALIGN, AND TEST ALL ELECTRICAL EQUIPMENT ON THIS PROJECT PROVIDED UNDER THIS DIVISION AND ALL ELECTRICAL EQUIPMENT FURNISHED BY OTHERS FOR INSTALLATION OR WIRING UNDER THIS DIVISION, FOR PROPER OPERATION.
- B. TEST ALL SYSTEMS AND EQUIPMENT ACCORDING TO THE REQUIREMENTS IN NETA ATS (LATEST EDITION) AND ALL ADDITIONAL REQUIREMENTS SPECIFIED IN THE BUILDING SECTIONS. PROVIDE COPIES OF ALL TEST REPORTS TO THE ENGINEER OF RECORD.
- C. MAINTAIN THE FOLLOWING ON THE PROJECT PREMISES AT ALL TIMES: A TRUE RMS READING VOLTMETER, A TRUE RMS READING AMMETER, AND A MEGOHMMETER INSULATION RESISTANCE TESTER. PROVIDE TEST DATA READINGS AS REQUESTED OR AS REQUIRED BY THE ENGINEER.

2.12 EQUIPMENT IDENTIFICATION

- A. PROVIDE EQUIPMENT IDENTIFICATION NAMEPLATES:
1. ON ALL PANELBOARDS, SWITCHES, STARTERS, AND DIMMERS, A/C UNITS, AND METERS.
2. WHERE INDICATED ON THE DRAWINGS.
3. RECEPTACLE FACEPLATES AND JUNCTION BOXES WITH CIRCUIT AND PANEL.
4. LIGHT SWITCH FACEPLATES BACKSIDE WITH CIRCUIT AND PANEL.
- B. NAMEPLATES:
1. ENGRAVED, CONTRASTING COLOR, THREE-LAYER, LAMINATED PLASTIC INDICATING THE NAME OF THE EQUIPMENT, LOAD, OR CIRCUIT AS DESIGNATED ON THE DRAWINGS AND IN THE SPECIFICATIONS.
2. SELF-ADHERING, WITH A PERMANENT, WEATHERPROOF ADHESIVE.
3. ATTACHMENT METHOD SHALL BE ACCEPTABLE TO THE MANUFACTURERS OF THE EQUIPMENT TO WHICH THE NAMEPLATES ARE BEING APPLIED.
4. COLOR: BLACK BACKGROUND WITH WHITE LETTERS FOR NORMAL POWER. LETTER HEIGHT: 1/4-INCH MINIMUM.
5. LIGHT SWITCH FACEPLATES: PERMANENT BLACK MAGIC MARKER.

2.13 SYSTEM START UP

- A. PRIOR TO STARTING UP THE ELECTRICAL SYSTEMS:
1. CHECK ALL COMPONENTS AND DEVICES.
2. LUBRICATE ITEMS ACCORDINGLY.
3. TIGHTEN SCREWS AND BOLTS FOR CONNECTORS AND TERMINALS ACCORDING TO MANUFACTURER'S PUBLISHED TORQUE-TIGHTENING VALUES. IF MANUFACTURER'S TORQUE VALUES ARE NOT INDICATED, USE THE VALUES SPECIFIED IN UL 488A AND UL 488B.
4. ADJUST TAPS ON EACH TRANSFORMER FOR RATED SECONDARY VOLTAGE.
5. CHECK AND RECORD BUILDING'S SERVICE ENTRANCE VOLTAGE, GROUNDING CONDITIONS, GROUNDING RESISTANCE, AND PROPER PHASING.
6. BALANCE ALL SINGLE-PHASE LOADS AT EACH PANELBOARD, REDISTRIBUTING BRANCH CIRCUIT CONNECTIONS UNTIL BALANCE IS ACHIEVED. DO NOT TYPE UP FINAL PANELBOARD DIRECTORIES UNTIL ALL REBALANCING AND REDISTRIBUTION OF CIRCUITS ARE COMPLETE.
7. REPLACE ALL BURNED-OUT LAMPS, LAMPS NOT UNIFORM IN COLOR, AND LAMPS USED FOR TEMPORARY CONSTRUCTION LIGHTING IN PERMANENT LIGHT FIXTURES.
8. AFTER ALL SYSTEMS HAVE BEEN INSPECTED AND ADJUSTED, CONFIRM ALL OPERATING FEATURES REQUIRED BY THE DRAWINGS AND SPECIFICATIONS AND MAKE FINAL ADJUSTMENTS AS NECESSARY.

(END OF PART 2)

PART 3 EXISTING EQUIPMENT REUSE AND REMOVAL

- A. REMOVE ALL EXISTING WIRING, LIGHT FIXTURES, EXPOSED CONDUITS AND OTHER EXISTING INSTALLATIONS NOT REUSED PRIOR TO SUBSTANTIAL COMPLETION OF THE WORK.
- B. EXISTING RACEWAYS MAY BE REUSED IF THEIR POINTS OF TERMINATION ARE SUITABLE; IF THEY MEET OR EXCEED CURRENT APPLICABLE CODES; IF THEY ARE CLEAN INSIDE WITH NO EVIDENCE OF TRUST OR BURRS; IF THEY ARE FREE FROM CRACKS, PLASTER OR CONCRETE, OR SHARP EDGES AND UNDESIRABLE LOCATED TO AVOID CONFLICTS WITH OTHER TRADES OR INSTALLATIONS. CAREFULLY "FISH" ALL EXISTING CONDUITS REUSED UNDER THIS CONTRACT TO REMOVE ALL DEBRIS AND OBSTRUCTIONS, AND SWAB UNTIL ALL MOISTURE IS REMOVED.
- C. CUT, PATCH, AND REPAIR WHERE REQUIRED FOR NEW ELECTRICAL CONDUIT, PATCHING AND PATCH AND REPAIR ALL SURFACE DAMAGE RESULTING FROM THIS WORK. CUT FURNISH WITH THE FLOOR AND PLUG AT BOTH ENDS, RACEWAYS STUBBED ABOVE THE FLOOR AND NOT USED AT SUBSTANTIAL COMPLETION OF THE WORK.
- D. RELOCATE ALL EXISTING ELECTRICAL SYSTEMS REQUIRED TO BE IN OPERATION AT SUBSTANTIAL COMPLETION OF THE CONTRACT, IF REQUIRED, AS A RESULT OF WORK UNDER THIS CONTRACT, EVEN IF NOT SPECIFICALLY INDICATED IN THE DRAWINGS OR SPECIFICATIONS.

(END OF PART 3)

PART 4 BASIC ELECTRICAL MATERIALS AND METHODS

4.1 METHODS

4.1.1 RACEWAYS

- A. RACEWAY CONDUIT AND TUBING:
1. ELECTRICAL METALLIC TUBING AND FITTINGS (EMT): ANSI C80.3, UL 797.
2. FLEXIBLE METAL CONDUIT (FMC): ZINC-COATED STEEL OR ALUMINUM, UL 1.
3. INTERMEDIATE METAL CONDUIT (IMC): HOT-DIP GALVANIZED RIGID STEEL CONDUIT; ANSI C80.8, UL 1242.
4. WALLS AND FLOORS:
5. RIGID METAL CONDUIT (RMC): HOT-DIP GALVANIZED RIGID STEEL CONDUIT (GRS); ANSI C80.1, UL 6.
6. RIGID ALUMINUM CONDUIT (RAC): ANSI C80.5, UL 6A.
7. PLASTIC COATED IMC, RMC, AND FITTINGS: NEMA RB 1, UL LISTED.
8. IMC AND RMC FITTINGS: NEMA FB 1, COMPATIBLE WITH CONDUIT TYPE AND MATERIAL, UL LISTED.
- B. NON-METALIC CONDUIT AND TUBING:
1. RIGID NONMETALLIC CONDUIT (RNC); SCHEDULE 40 PVC, 90 DEG C RATED, NEMA TC-2, UL 651; FITTINGS: NEMA TC 3, TO 6, UL 514, COMPATIBLE WITH CONDUIT/TUBING TYPE AND MATERIAL, UL LISTED.

4.1.2 RACEWAY INSTALLATION

- A. INSTALL ALL RACEWAYS A MINIMUM OF 12" ABOVE SUSPENDED CEILINGS, CONDUITS AND CABLES ABOVE CEILINGS EXCEPT WHERE OTHERWISE INDICATED. FOR AREAS WHERE CONDUITS MUST BE ROUTED CLOSER THAN 12", WRITTEN APPROVAL FROM THE ENGINEER OF RECORD MUST BE OBTAINED.
- B. PROVIDE RGSC FOR ALL CONDUITS RUN UNDERGROUND, EXPOSED TO WEATHER, OR EXPOSED TO OTHER HAZARDOUS CONDITIONS. PROVIDE RGSC INSTALLED BELOW GRADE WITH CORROSION RESISTANT NON-FLAMMABLE PLASTIC OR APPROVED MASTIC COATING. THIS SHALL INCLUDE THE 90-DEGREE BENDS BELOW GRADE AND THE ENTIRE VERTICAL TRANSITION TO ABOVE GRADE.
- C. ALL OTHER RACEWAY MAY BE EMT WHERE APPROVED BY LOCAL CODE. USE COMPRESSION TYPE FITTINGS FOR EMT, WITH ALL FITTINGS UL LISTED FOR THE ENVIRONMENT IN WHICH THEY ARE USED.
- D. AT CONDUIT JOINTS, OPTION, PVC CONDUIT MAY BE USED UNDERGROUND WHERE PERMITTED BY LOCAL CODE AND WHERE NOT SPECIFICALLY RESTRICTED BY THESE DOCUMENTS. WHEN USED, PROVIDE COATED GRS, AS SPECIFIED ABOVE, FOR ALL BENDS GREATER THAN 30 DEGREES, INCLUDING THE 90-DEGREE ELBOWS BELOW GRADE AND THE ENTIRE VERTICAL RISERS FOR TRANSITIONS TO ABOVE GRADE.
- E. USE FMC FOR FINAL CONNECTION TO EACH MOTOR AND TRANSFORMER, AND TO ANY DEVICE THAT WOULD OTHERWISE TRANSMIT MOTION, VIBRATION, OR NOISE, WHERE EXPOSED TO LIQUIDS, VAPORS OR SUNLIGHT. USE LFMC. PROVIDE ALL FMC AND LFMC WITH AN INSULATED BONDING CONDUCTOR.
- F. USE LFMC FOR FINAL CONNECTION TO EACH MOTOR AND TRANSFORMER, AND TO ANY DEVICE THAT WOULD OTHERWISE TRANSMIT MOTION, VIBRATION, OR NOISE, WHERE EXPOSED TO LIQUIDS, VAPORS OR SUNLIGHT. USE LFMC. PROVIDE ALL FMC AND LFMC WITH AN INSULATED BONDING CONDUCTOR.
- G. INSTALL RACEWAYS PARALLEL AND PERPENDICULAR TO BUILDING LINES.

- H. INSTALL RACEWAYS TO REQUIREMENTS OF STRUCTURE AND TO REQUIREMENTS OF ALL OTHER WORK ON THE PROJECT. INSTALL RACEWAY TO CLEAR ALL OPENINGS, DEPRESSIONS, PIPES, DUCTS, REINFORCING STEEL, AND OTHER IMMovable OBSTACLES. INSTALL RACEWAYS SET IN FORMS FOR CONCRETE STRUCTURES IN SUCH A MANNER THAT INSTALLATION WILL NOT AFFECT THE STRENGTH AND INTEGRITY OF THE STRUCTURE. EXCEPT WHERE APPROVED IN WRITING BY THE ENGINEER, INSTALL NO RACEWAY IN A SLAB-ON-GRADE. LOCATE RACEWAY IN GRANULAR FILL BELOW SLABS-ON-GRADE.
- I. INSTALL RACEWAYS CONTINUOUS BETWEEN CONNECTIONS TO OUTLETS, BOXES, AND CABLES WITH A MINIMUM POSSIBLE NUMBER OF BENDS AND NOT MORE THAN THE EQUIVALENT OF FOUR 90-DEGREE BENDS BETWEEN CONNECTIONS. USE MANUFACTURED ELBOWS FOR ALL 45-DEGREE AND 90-DEGREE BENDS, UNLESS APPROVED BY THE ENGINEER IN ADVANCE. MAKE OTHER BENDS SMOOTH AND EVEN AND WITHOUT FLATTENING RACEWAY OR FLAKING GALVANIZING OR ENAMEL. RADI OF BENDS SHALL BE AS LONG AS POSSIBLE AND NEVER SHORTER THAN THE CORRESPONDING TRADE ELBOW. USE LONG RADIUS ELBOWS WHERE NECESSARY, INDICATED, OR BOTH.
- J. SECURELY FASTEN RACEWAYS IN PLACE WITH APPROVED STRAPS, HANGERS AND STEEL SUPPORTS AS REQUIRED. ATTACH RACEWAY SUPPORTS TO THE BUILDING STRUCTURE. SUPPORT RACEWAYS FOR

LIGHT FIXTURE SCHEDULE								
ID	MANUFACTURER	MODEL NUMBER	LAMP	VOLTS	LUMENS	WATTS	LLF	REMARKS
T2	LITHONIA LIGHTING	DSX1 LED P6 40K 80CRI T2M HS EGS-F	LED	120	10579	165	0.8	LED AREA LIGHT WITH ONE TYPE II HEAD, MOUNTED ON A 22'-6" ROUND POLE. PROVIDE POLE COMPATIBLE WITH FIXTURE IN SAME FINISH
T3	LITHONIA LIGHTING	DSX1 LED P6 40K 80CRI T3M HS EGS-F	LED	120	10294	165	0.8	LED AREA LIGHT WITH ONE TYPE III HEAD, MOUNTED ON A 22'-6" ROUND POLE. PROVIDE POLE COMPATIBLE WITH FIXTURE IN SAME FINISH
T4	LITHONIA LIGHTING	DSX1 LED P6 40K 80CRI BL04 EGS	LED	120	13026	165	0.8	LED AREA LIGHT WITH ONE TYPE IV HEAD, MOUNTED ON A 22'-6" ROUND POLE. PROVIDE POLE COMPATIBLE WITH FIXTURE IN SAME FINISH
REMARKS: 1. EQUAL MANUFACTURER'S MAY BE SUBSTITUTED. 2. PROVIDE POLE BASE PER DETAIL ON THIS SHEET.								

IESNA PARKING LOT LEVELS OF ACTIVITY	IESNA MAINTAINED HORIZONTAL ILLUMINANCE STANDARDS (FOOT-CANDLES)		
	GENERAL PARKING AND PEDESTRIAN AREA		
	AVE.	MIN.	UNIFORMITY RATIO (AVG/MIN)
	2.4	0.6	4:1

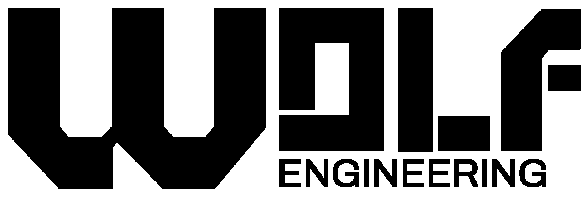
CALCULATION SUMMARY					
LABEL	UNITS	AVG	MAX	MIN	AVG/MIN
PARKING AND DRIVEWAY AREAS	FC	2.29	4.6	0.6	3.82
WHOLE SITE	FC	0.22	2.7	0.0	N/A

GENERAL NOTES

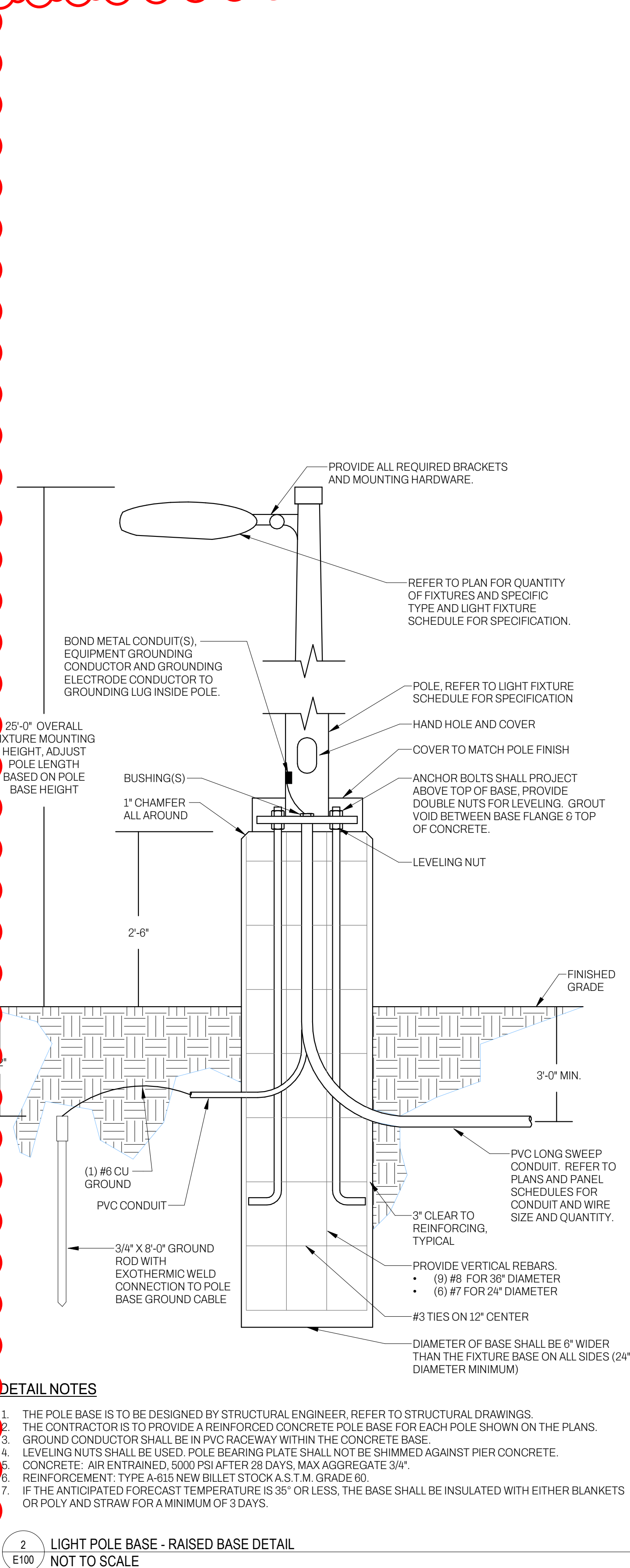
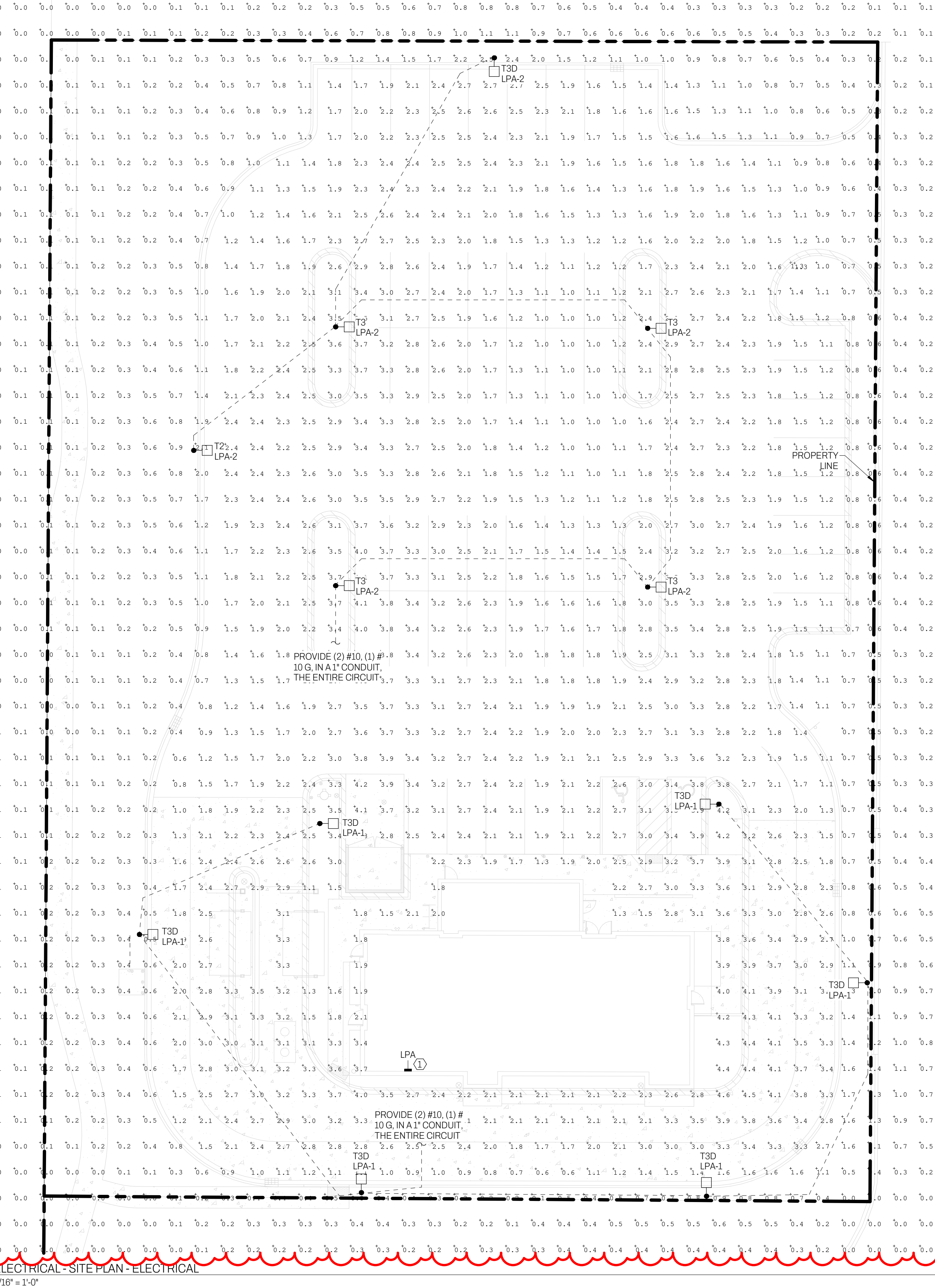
- ALL EXTERIOR LIGHTING CIRCUITS TO BE ROUTED THROUGH A TIMECLOCK.
- ALL EXTERIOR LIGHT FIXTURE TO BE FED WITH #6 COPPER, UNLESS NOTED OTHERWISE.
- ALL PVC CONDUITS MUST HAVE A MINIMUM OF #12 COPPER GROUND CONDUCTOR INSTALLED.
- ALL EXTERIOR ELECTRICAL EQUIPMENT TO BE NEMA-3R RATED.
- CONTRACTOR TO COORDINATE EXACT SITE LIGHTING FIXTURE LOCATIONS WITH CIVIL/LANDSCAPE DRAWINGS.

KEY NOTES

- CONTRACTOR TO COORDINATE EXACT ELECTRICAL PANEL LOCATION, VOLTAGE, AND NAME.



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DETAIL NOTES

- THE POLE BASE IS TO BE DESIGNED BY STRUCTURAL ENGINEER. REFER TO STRUCTURAL DRAWINGS.
- THE CONTRACTOR IS TO PROVIDE A REINFORCED CONCRETE POLE BASE FOR EACH POLE SHOWN ON THE PLANS.
- GROUND CONDUCTOR SHALL BE IN PVC RACEWAY WITHIN THE CONCRETE BASE.
- LEVELING NUTS SHALL BE USED. POLE BEARING PLATE SHALL NOT BE SHIMMED AGAINST PIER CONCRETE.
- CONCRETE: AIR ENTRAINED, 5000 PSI AFTER 28 DAYS, MAX AGGREGATE 3/4".
- REINFORCEMENT: TYPE A-615 NEW BILLET STOCK A.S.T.M. GRADE 60.
- IF THE ANTICIPATED FORECAST TEMPERATURE IS 35° OR LESS, THE BASE SHALL BE INSULATED WITH EITHER BLANKETS OR POLY AND STRAW FOR A MINIMUM OF 3 DAYS.

D-Series Size 1 LED Area Luminaire

Specifications

EPA: 0.69 ft² (0.06 m²)

Length: 32.71" (833 mm)

Width: 14.26" (362 mm)

Height H1: 7.88" (200 mm)

Height H2: 2.73" (69 mm)

Weight: 6.1 lbs (2.8 kg)

Introduction

The modern styling of the D-Series features a highly refined aesthetic that blends seamlessly with its environment. The D-Series offers the benefits of the latest in LED technology into a high performance, high efficacy, long-life luminaire.

The photometric performance results in sites with excellent uniformity, greater pole spacing and lower power density. D-Series outstanding photometry aids in reducing the number of poles required in area lighting applications with typical energy savings of 65% and expected service life of over 100,000 hours.

Items marked by a shaded background qualify for the Design Select program and ship in 15 days or less. To learn more about Design Select, visit www.acuitybrands.com/designselect. *See website for details.

Ordering Information					
EXAMPLE: DSX1 LED P7 40K 70CRI T3M MVOLT SPA NLTAR2 PIRNH DBDXX					
Series	LEDs	Color temperature	Color Rendering Index	Classification	Mounting
DSX1 LED	Forward optics P1 P2 P3 P4 P5 P6 P7 P8 P9 P10 P11	Back 40K 50K 60K 70K 80K 90K 100K 110K 120K 130K 140K 150K 160K 170K 180K 190K 200K 210K 220K 230K 240K 250K 260K 270K 280K 290K 300K 310K 320K 330K 340K 350K 360K 370K 380K 390K 40K 41K 42K 43K 44K 45K 46K 47K 48K 49K 50K 51K 52K 53K 54K 55K 56K 57K 58K 59K 60K 61K 62K 63K 64K 65K 66K 67K 68K 69K 70K 71K 72K 73K 74K 75K 76K 77K 78K 79K 80K 81K 82K 83K 84K 85K 86K 87K 88K 89K 90K 91K 92K 93K 94K 95K 96K 97K 98K 99K 100K 101K 102K 103K 104K 105K 106K 107K 108K 109K 110K 111K 112K 113K 114K 115K 116K 117K 118K 119K 120K 121K 122K 123K 124K 125K 126K 127K 128K 129K 130K 131K 132K 133K 134K 135K 136K 137K 138K 139K 140K 141K 142K 143K 144K 145K 146K 147K 148K 149K 150K 151K 152K 153K 154K 155K 156K 157K 158K 159K 160K 161K 162K 163K 164K 165K 166K 167K 168K 169K 170K 171K 172K 173K 174K 175K 176K 177K 178K 179K 180K 181K 182K 183K 184K 185K 186K 187K 188K 189K 190K 191K 192K 193K 194K 195K 196K 197K 198K 199K 200K 201K 202K 203K 204K 205K 206K 207K 208K 209K 210K 211K 212K 213K 214K 215K 216K 217K 218K 219K 220K 221K 222K 223K 224K 225K 226K 227K 228K 229K 230K 231K 232K 233K 234K 235K 236K 237K 238K 239K 240K 241K 242K 243K 244K 245K 246K 247K 248K 249K 250K 251K 252K 253K 254K 255K 256K 257K 258K 259K 260K 261K 262K 263K 264K 265K 266K 267K 268K 269K 270K 271K 272K 273K 274K 275K 276K 277K 278K 279K 280K 281K 282K 283K 284K 285K 286K 287K 288K 289K 290K 291K 292K 293K 294K 295K 296K 297K 298K 299K 300K 301K 302K 303K 304K 305K 306K 307K 308K 309K 310K 311K 312K 313K 314K 315K 316K 317K 318K 319K 320K 321K 322K 323K 324K 325K 326K 327K 328K 329K 330K 331K 332K 333K 334K 335K 336K 337K 338K 339K 340K 341K 342K 343K 344K 345K 346K 347K 348K 349K 350K 351K 352K 353K 354K 355K 356K 357K 358K 359K 360K 361K 362K 363K 364K 365K 366K 367K 368K 369K 370K 371K 372K 373K 374K 375K 376K 377K 378K 379K 380K 381K 382K 383K 384K 385K 386K 387K 388K 389K 390K 391K 392K 393K 394K 395K 396K 397K 398K 399K 400K 401K 402K 403K 404K 405K 406K 407K 408K 409K 410K 411K 412K 413K 414K 415K 416K 417K 418K 419K 420K 421K 422K 423K 424K 425K 426K 427K 428K 429K 430K 431K 432K 433K 434K 435K 436K 437K 438K 439K 440K 441K 442K 443K 444K 445K 446K 447K 448K 449K 450K 451K 452K 453K 454K 455K 456K 457K 458K 459K 460K 461K 462K 463K 464K 465K 466K 467K 468K 469K 470K 471K 472K 473K 474K 475K 476K 477K 478K 479K 480K 481K 482K 483K 484K 485K 486K 487K 488K 489K 490K 491K 492K 493K 494K 495K 496K 497K 498K 499K 500K 501K 502K 503K 504K 505K 506K 507K 508K 509K 510K 511K 512K 513K 514K 515K 516K 517K 518K 519K 520K 521K 522K 523K 524K 525K 526K 527K 528K 529K 530K 531K 532K 533K 534K 535K 536K 537K 538K 539K 540K 541K 542K 543K 544K 545K 546K 547K 548K 549K 550K 551K 552K 553K 554K 555K 556K 557K 558K 559K 560K 561K 562K 563K 564K 565K 566K 567K 568K 569K 570K 571K 572K 573K 574K 575K 576K 577K 578K 579K 580K 581K 582K 583K 584K 585K 586K 587K 588K 589K 590K 591K 592K 593K 594K 595K 596K 597K 598K 599K 600K 601K 602K 603K 604K 605K 606K 607K 608K 609K 610K 611K 612K 613K 614K 615K 616K 617K 618K 619K 620K 621K 622K 623K 624K 625K 626K 627K 628K 629K 630K 631K 632K 633K 634K 635K 636K 637K 638K 639K 640K 641K 642K 643K 644K 645K 646K 647K 648K 649K 650K 651K 652K 653K 654K 655K 656K 657K 658K 659K 660K 661K 662K 663K 664K 665K 666K 667K 668K 669K 670K 671K 672K 673K 674K 675K 676K 677K 678K 679K 680K 681K 682K 683K 684K 685K 686K 687K 688K 689K 690K 691K 692K 693K 694K 695K 696K 697K 698K 699K 700K 701K 702K 703K 704K 705K 706K 707K 708K 709K 710K 711K 712K 713K 714K 715K 716K 717K 718K 719K 720K 721K 722K 723K 724K 725K 726K 727K 728K 729K 730K 731K 732K 733K 734K 735K 736K 737K 738K 739K 740K 741K 742K 743K 744K 745K 746K 747K 748K 749K 750K 751K 752K 753K 754K 755K 756K 757K 758K 759K 760K 761K 762K 763K 764K 765K 766K 767K 768K 769K 770K 771K 772K 773K 774K 775K 776K 777K 778K 779K 780K 781K 782K 783K 784K 785K 786K 787K 788K 789K 790K 791K 792K 793K 794K 795K 796K 797K 798K 799K 800K 801K 802K 803K 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