SECTION 16010 - GENERAL PROVISIONS

1.01 RELATED DOCUMENTS

A. THE GENERAL CONDITIONS, SUPPLEMENTARY CONDITIONS, AND GENERAL REQUIREMENTS APPLY TO THE WORK SPECIFIED IN THIS SECTION.

1.02 DESCRIPTION

A. THIS SECTION DEFINES THE GENERAL PROVISIONS WHICH ARE COMMON TO ALL SECTIONS OF DIVISION 16.

B. THE INFORMATION IN THE SPECIFICATIONS AND THE PLAN DRAWINGS ARE BASIC FACTS TO FOLLOW IN DETERMINING A REASONABLE AND COMPETITIVE PRICE FOR THE DISCIPLINES INTENDED. THE DRAWINGS AND SPECIFICATIONS DO NOT NECESSARILY INDICATE OR DESCRIBE EACH ITEM NECESSARY FOR THE FULL PERFORMANCE AND COMPLETION OF THE PARTICULAR WORK THE CONTRACTOR MAY BE BIDDING. THESE DOCUMENTS PROVIDE THE GENERAL INTENT NECESSARY TO INFORM THE CONTRACTOR OF THE OWNER'S DESIRE FOR THE SYSTEMS REQUIRED FOR ELECTRICAL. CONTRACTOR SHALL VISIT THE SITE PRIOR TO BIDDING TO BECOME FAMILIAR WITH THE EXISTING CONDITIONS UNDER WHICH THE WORK SHALL BE PERFORMED. FAILURE TO INSPECT THE SITE WILL NOT CONSIDERED JUSTIFICATION FOR AN ADJUSTMENT IN CONTRACT PRICE OR FAILURE TO PERFORM THE WORK UNDER THIS CONTRACT.

C. WORK INCLUDED:

1. ALL ELECTRICAL WORK HEREIN SPECIFIED AND/OR SHOWN ON DRAWINGS UNLESS NOTED OTHERWISE.
2. WORK BY THE UTILITY COMPANY FOR WHICH THERE IS A BACKCHARGE. ALL ELECTRICAL BACK CHARGES TO BE INCLUDED UNDER THIS DIVISION 16 CONTRACT.
3. INSTALLATION SHALL BE COMPLETE FROM THE LOCATION DESIGNATED BY THE ELECTRICAL UTILITY COMPANY AS THE POINT OF SERVICE CONNECTION, TO THE FINAL CONNECTION OF MOTORS, FIXTURES, DEVICES, APPARATUS OR PIECES OF EQUIPMENT, UNLESS MODIFIED BY DRAWINGS OR THESE SPECIFICATIONS.
4. THE ELECTRICAL DRAWINGS AND SPECIFICATIONS SHALL BE UNDERSTOOD TO COVER COMPLETE OPERATING SYSTEMS. THE DRAWINGS AND SPECIFICATIONS ARE TO BE TAKEN TOGETHER. WORK SPECIFIED AND NOT SHOWN, OR WORK SHOWN AND NOT SPECIFIED SHALL BE PERFORMED OR FURNISHED AS THOUGH MENTIONED IN BOTH DRAWINGS AND SPECIFICATIONS.
5. MINOR ITEMS AND ACCESSORIES REASONABLY INFERRED AS NECESSARY TO THE COMPLETE AND PROPER OPERATION OF ANY SYSTEM, SHALL BE PROVIDED BY THIS CONTRACTOR OR SUBCONTRACTOR FOR SUCH SYSTEMS.

D. DESCRIPTION OF SYSTEM:

1. COMPLETE POWER WIRING TO MAIN DISCONNECT SWITCH PANELS, MOTORIZED EQUIPMENT, MOTORS, EQUIPMENT CABINETS, AND MISCELLANEOUS OUTLETS.
2. GENERAL WIRING FOR POWER, LIGHTING, AND MISCELLANEOUS SYSTEMS.
3. MATERIALS AND EQUIPMENT FOR ELECTRICAL WORK.
4. ELECTRIC SERVICE AND DISTRIBUTION.
5. MOTOR AND EQUIPMENT WIRING, INCLUDING STARTERS IF REQUIRED.
6. GENERAL AND EMERGENCY LIGHTING AND POWER SYSTEMS.
7. CONTACTORS FOR LIGHTING AND SIGN CONTROL SYSTEMS.
8. TELEPHONE BACK BOXES AND EMPTY CONDUIT.
9. ARRANGE FOR SOURCES OF TEMPORARY CONSTRUCTION SERVICES. SUCH SERVICES SHALL BE NOMINALLY 120/208 VOLT, 3 PHASE, 4 WIRE FROM WHICH A COMPLETE SYSTEM OF TEMPORARY POWER AND LIGHTING SHALL BE INSTALLED FOR ALL CONSTRUCTION NEEDS AND AS REQUIRED BY THE OCCUPATIONAL SAFETY AND HEALTH DEPARTMENTS(OSHA) TEMPORARY SERVICES SHALL BE REMOVED UPON COMPLETION OF WORK.
10. COMPUTER SYSTEM EMPTY CONDUIT RACEWAY.
11. WIRING OF POWER CONNECTIONS TO EQUIPMENT FURNISHED AND INSTALLED BY OTHERS.
12. CUTTING, PATCHING, EXCAVATION AND BACKFILL, AND CONCRETE WORK REQUIRED TO COMPLETE THE WORK OF THIS SECTION. BACKFILL SHALL BE COMPACTED TO 95% OF STANDARD COMPACTION. ALL EXISTING SURFACES SHALL BE PATCHED OR REPLACED TO 'LIKE NEW' CONDITIONS.
13. ALL OTHER EQUIPMENT, MATERIAL, DEVICES, ACCESSORIES REQUIRED AND/OR SHOWN ON THE DRAWINGS.

E. RELATED WORK TO BE COMPLETED BY OTHERS:

1. TELEPHONE SYSTEM WIRING.
2. COMPUTER SYSTEM WIRING.
3. TELEVISION SYSTEM WIRING.
4. TEMPERATURE CONTROLS AND THERMOSTAT WIRING.

F. DEFINITIONS - AS USED WITHIN THE CONTRACT DOCUMENT:

1. THE TERM "CONTRACTOR" SHALL BE UNDERSTOOD TO MEAN THE ELECTRICAL CONTRACTOR OR ELECTRICAL SUBCONTRACTOR.
2. "CIRCUITRY" OR "WIRING" SHALL MEAN ANY ELECTRIC WORK.
3. "PACKAGE UNIT" SHALL MEAN AN ITEM OF EQUIPMENT HAVING ONE OR MORE MOTORS OR OTHER ELECTRIC ENERGY CONSUMING ELEMENTS INTEGRALLY FACTORY MOUNTED ON A SINGLE BASE, COMPLETE WITH ALL ASSOCIATED CONTROL DEVICES AND INTERCONNECTING WIRING.

G. PERMITS:

1. OBTAIN ALL PERMITS AND PAY ALL FEES REQUIRED FOR THE COMPLETE ELECTRICAL SYSTEM.

1.03 QUALITY ASSURANCE

A. QUALIFICATIONS:

1. MATERIALS AND EQUIPMENT SHALL BE NEW AND SHALL CONFORM TO NEMA, AND UNDERWRITERS LABORATORIES (UL) STANDARDS IN EVERY CASE WHERE SUCH STANDARD HAS BEEN ESTABLISHED. ALL EQUIPMENT OF SIMILAR TYPE SHALL BE OF THE SAME MANUFACTURER.

B. REQUIREMENTS OF REGULATORY AGENCIES:

1. ALL ELECTRICAL WORK SHALL BE IN ACCORDANCE WITH THE NATIONAL ELECTRICAL CODE (NEC), CURRENT EDITION, AND ANY AMENDMENTS TO THE NATIONAL ELECTRICAL CODE MADE BY THE LOCAL CODE OFFICIALS.
2. WHERE APPLICABLE, ALL FIXTURES, EQUIPMENT AND MATERIALS SHALL BE AS APPROVED OR LISTED BY THE FOLLOWING AGENCIES:
   A. FACTORY MUTUAL LABORATORIES.
   B. NATIONAL FIRE PROTECTION ASSOCIATION.
   C. UNDERWRITERS LABORATORIES, INC. (UL)
   D. NATIONAL ELECTRICAL MANUFACTURERS ASSOCIATION (NEMA)
   E. AMERICANS WITH DISABILITIES ACT (ADA)

C. ALLOWABLE TOLERANCES:

1. REVIEW ARCHITECTURAL, STRUCTURAL AND MECHANICAL DRAWINGS FOR ALL DIMENSIONS, LOCATIONS, PARTITIONS AND WALLS, STRUCTURAL DETAILS, AND LOCATION OF MECHANICAL PIPES AND DUCTS SO THAT THE ELECTRICAL INSTALLATION SHALL BE IN COORDINATION WITH THAT OF THE OTHER TRADES.
2. EXACT LOCATION AND ELECTRICAL REQUIREMENTS OF EQUIPMENT FURNISHED BY OTHER TRADES AND WIRED BY THIS CONTRACTOR SHALL BE OBTAINED FROM THE DRAWINGS OF THE OTHER TRADES.

1.04 SUBMITTALS

A. SHOP DRAWINGS FOR ALL FIXTURES, EQUIPMENT, MATERIALS, ETC., SHALL BE SUBMITTED AS SPECIFIED IN DIVISION 1.

B. INSTALLATION, MAINTENANCE AND OPERATING MANUALS AND INSTRUCTIONS FOR ALL EQUIPMENT SHALL BE PROVIDED AS SPECIFIED IN DIVISION 1.

1.05 APPROVAL DRAWINGS

A. PREPARE AND SUBMIT FOR APPROVAL SUCH ADDITIONAL ELECTRICAL DRAWINGS, DIAGRAMS, AND SPECIFICATIONS AS ARE REQUIRED BY:

1. LOCAL FIRE PREVENTION BUREAU
2. LOCAL BUILDING DEPARTMENT - ELECTRICAL INSPECTION SECTION
3. LOCAL UTILITY COMPANIES

1.06 COORDINATION AND COOPERATION

A. THE CONTRACTOR SHALL EXAMINE THE PREMISES AND SATISFY HIMSELF OF EXISTING CONDITIONS UNDER WHICH HE WILL BE OBLIGATED TO OPERATED IN PERFORMING HIS PART OF THE WORK OR THAT WILL IN ANY MANNER AFFECT THE WORK UNDER THE CONTRACT. THE CONTRACTOR SHALL COOPERATE WITH OTHER TRADES SO THAT THE INSTALLATION OF ALL EQUIPMENT MAY BE PROPERLY COORDINATED.

B. ALL EQUIPMENT FURNISHED SHALL FIT THE SPACE AVAILABLE, WITH CONNECTION, ETC. IN THE REQUIRED LOCATIONS AND WITH ADEQUATE SPACE FOR OPERATING AND SERVICING. THE DRAWINGS ARE GENERALLY DIAGRAMMATIC AND INDICATE THE MANNER AND METHOD OF THE INSTALLATION WHILE THE SPECIFICATIONS AND FIXTURE LIST DENOTE THE TYPE AND QUALITY OF MATERIAL AND WORKMANSHIP TO BE USED. WHERE A CONFLICT EXISTS BETWEEN THE DRAWINGS AND THE SPECIFICATIONS, THE CONTRACTOR SHALL PROMPTLY NOTIFY THE ARCHITECT WHOSE DECISION SHALL BE FINAL. NO ALLOWANCE WILL BE MADE SUBSEQUENTLY IN THIS CONNECTION ON BEHALF OF THE CONTRACTOR AFTER AWARD OF THE CONTRACT.

1.06 GUARANTEE

A. PROVIDE ONE YEAR GUARANTEE FOR ALL FIXTURES, EQUIPMENT, MATERIALS AND WORKMANSHIP. UPON FINAL ACCEPTANCE BY OWNER, ANY DEFECTIVE MATERIAL OR FAULTY WORKMANSHIP SHALL BE REPLACED WITHOUT COST TO OWNER.

2.01 PROTECTION

A. THE CONTRACTOR SHALL BE RESPONSIBLE FOR PROTECTING ALL EQUIPMENT AND SYSTEMS AGAINST HARMFUL EXPOSURE, OR ACCUMULATION OF DUST/MOISTURE, FLOODING, CORROSION, OR OTHER FORMS OF DAMAGE. CLEAN AND RESTORE DAMAGED FINISHES AND EQUIPMENT TO PLACE INSTALLATION IN A LIKE-NEW CONDITION.

2.02 INSTALLATION/APPLICATION/ PERFORMANCE/ERECTION

A. APPLICATION, INSTALLATION:

1. NO MEASUREMENTS OF A DRAWING BY SCALE SHALL BE USED AS A DIMENSION TO WORK BY. THE DRAWINGS ARE NOT INTENDED TO SHOW COMPLETE OR ACCURATE DETAILS OF THE BUILDING IN EVERY RESPECT. EXACT LOCATIONS AND RELATIONS ARE TO BE DEFINED IN THE FIELD AND SHALL BE SATISFACTORY TO THE ARCHITECT/ENGINEER. THIS CONTRACTOR SHALL TAKE ALL FIELD MEASUREMENTS AND SHALL BE RESPONSIBLE THEREFORE.
2. COMPARE DRAWINGS AND SPECIFICATIONS, CHECKING ALL MEASUREMENTS AND DETERMINE INTENT OF CONTRACT DOCUMENTS. DISCREPANCIES SHALL BE BROUGHT TO THE ARCHITECT/ENGINEER'S ATTENTION FOR INTERPRETATION PRIOR TO ANY INSTALLATION.
3. THE RIGHT IS RESERVED TO MAKE ANY REASONABLE CHANGE IN LOCATION OF OUTLETS AND EQUIPMENT PRIOR TO ROUGHING-IN WITHOUT INVOLVING ADDITIONAL EXPENSES. ANY CHANGE FROM THE ELECTRICAL DRAWINGS, AS IS NECESSARY TO MAKE THE WORK OF THIS CONTRACTOR CONFORM TO THE BUILDING AS CONSTRUCTED AND TO FIT THE WORK OF OTHER TRADES SHALL BE INCLUDED IN CONTRACTOR'S CONTRACT AND INSTALLED WITHOUT EXTRA COST.
4. PERFORM ALL WORK IN COMPLIANCE WITH ALL APPLICABLE SAFETY REGULATIONS INCLUDING OSHA REGULATIONS.
5. COORDINATE ALL WORK WITH OTHER TRADES PRIOR TO ANY INSTALLATION.
6. PROVIDE CODE APPROVED CLEARANCES AROUND ELECTRICAL EQUIPMENT.
7. COORDINATE STAGING OF MATERIAL WITH BUILDING MANAGEMENT REPRESENTATIVE AT TIME OF BIDDING.

2.03 FIELD QUALITY CONTROL

A. TESTING:

1. AFTER WIRES ARE IN PLACE AND CONNECTED TO DEVICES AND EQUIPMENT, THE SYSTEM SHALL BE TESTED FOR SHORTS AND GROUNDS. ALL HOT WIRES, IF SHORTED OR GROUNDED, SHALL BE REMOVED AND REPLACED.
2. ALL METERS, INSTRUMENTS, CABLE CONNECTIONS EQUIPMENT, AND APPARATUS NECESSARY FOR MAKING ALL TESTS, SHALL BE FURNISHED BY THIS CONTRACTOR AT HIS OWN EXPENSE.

2.04 ADJUST AND CLEAN

A. CLEANING EQUIPMENT, COMPLETED WORK, AND PREMISES: AFTER THE COMPLETION OF ALL INSTALLATIONS, EACH SYSTEM SHALL BE THOROUGHLY CLEANED TO REMOVE ALL PAINT, OIL AND OTHER FOREIGN MATERIAL. CONTRACTOR SHALL ALSO CLEAN ALL FOREIGN PAINT, GREASE, OIL, DIRT, LABELS AND STICKERS, ETC. FROM ALL FIXTURES, EQUIPMENT, ETC. THE CONTRACTOR SHALL REMOVE ALL RUBBISH, DEBRIS, ETC. ACCUMULATED FROM HIS OPERATIONS FROM THE PREMISES.

2.05 APPROVALS

A. OBTAIN ALL PERMITS AND APPROVALS FROM THE GOVERNING BODIES WHICH HAVE JURISDICTION OVER THIS PROJECT.

2.06 IDENTIFICATION AND TAGGING

A. IDENTIFICATION OF DISTRIBUTION SWITCHES OR CIRCUIT BREAKERS INDIVIDUALLY MOUNTED OR OF PANEL BOARDS SHALL BE BY MEANS OF ENGRAVED LAMACOID NAMEPLATES PERMANENTLY FASTENED ON THE FRONT FACE OF THE HOUSING, SHOWING 1/4" HIGH WHITE LETTERING ON A BLACK BACKGROUND. PROVIDE ALL PANEL BOARDS WITH TYPEWRITTEN DIRECTORY.

2.07 SLEEVES

A. PROVIDE SLEEVES IN WALLS AND FLOOR SLABS FOR THE PASSAGE OF ALL CONDUITS, PIPES AND DUCTS INSTALLED. SLEEVES SHALL BE SET IN PLACE IN SUFFICIENT TIME AHEAD OF CONCRETE WORK, SO AS NOT TO DELAY THAT WORK.

2.08 CUTTING AND PATCHING

A. PERFORM ALL CUTTING AND PATCHING REQUIRED TO COMPLETE THE WORK, EXCEPT WHERE SPECIFICALLY SHOWN ON THE ARCHITECTURAL OR STRUCTURAL DRAWINGS. PATCHING SHALL MATCH EXISTING AND SHALL BE COORDINATED WITH OWNER'S REPRESENTATIVE.

SECTION 16010 - BASIC MATERIALS AND METHODS

2.01 MATERIALS

A. CONDUIT:

1. ELECTRICAL METALLIC TUBING: EMT, "THINWALL" CONDUIT SHALL IN GENERAL BE UTILIZED WHERE PERMITTED BY CODE EXCEPT WHERE DESCRIBED HEREIN. MINIMUM SIZE CONDUIT SHALL BE 3/4", UNLESS SPECIFICALLY NOTED OTHERWISE.
2. HEAVY-WALL STEEL CONDUIT AND IMC SHALL BE EITHER HOT DIPPED GALVANIZED OR SHERARDIZED.
3. FLEXIBLE CONDUIT SHALL BE GREENFIELD TYPE EXCEPT WHERE EXPOSED TO OIL, GREASE, OR WATER -CONDUIT SHALL BE SEALTITE.
4. PLASTIC CONDUIT SHALL BE PVC SCHEDULE 40.
5. CONDUIT SHALL BE AS MANUFACTURED BY ALLIED, TRIANGLE OR APPROVED EQUAL.
6. PROVIDE EXPANSION FITTINGS FOR CONDUITS CROSSING EXPANSION JOINTS.
7. CONDUIT FITTINGS:
   A. RIGID: THREADED.
   B. THIN-WALL: COMPRESSION TYPE.
   C. FLEXIBLE: CONNECTORS SHALL BE COMPATIBLE WITH FLEXIBLE CONDUIT USED.
8. PROVIDE BUSHING AND LOCKNUTS FOR ALL CONDUIT ENTRIES TO BOXES.

B. WIRES AND CABLES:

1. UNLESS SPECIFICALLY NOTED OTHERWISE, ALL WIRING SHALL BE INSTALLED IN CONDUIT.
2. ALL WIRE SHALL BE TYPE THW OR THWN COPPER. NO ALUMINUM CONDUCTORS WILL BE ALLOWED.
3. WIRE SMALLER THAN #8 SHALL BE SOLID: #8 AND LARGER, STRANDED.
4. CABLE AND WIRE SHALL BE AS MANUFACTURED BY TRIANGLE, GENERAL CABLE, CANADA OR CAROL.

C. COLOR CODING: COLOR CODING SHALL BE USED THROUGHOUT THE ENTIRE ELECTRICAL SYSTEM. PROVIDE INDUSTRY STANDARD COLOR CODING FOR THE VOLTAGES INVOLVED. CONTROL WIRING SHALL BE NUMBERED FOR EASY IDENTIFICATION OF TERMINAL POINTS. NUMBER TERMINAL BLOCKS ACCORDINGLY.

D. DISCONNECT SWITCHES:

1. SWITCHES SHALL MEET NEMA ENCLOSED SWITCH STANDARDS KS1, CURRENT EDITION. SWITCHES SHALL BE QUICK-MAKE, QUICK-BREAK SO THAT OPERATION OF THE CONTACTS SHALL NOT BE CAPABLE DURING NORMAL OPERATION OF THE SWITCH OF BEING RESTRAINED BY THE OPERATING HANDLE AFTER THE OPENING OR CLOSING OF THE CONTACTS HAS STARTED.
2. ALL SAFETY SWITCHES SHALL BE HEAVY DUTY OF VOLTAGE MATCHING EQUIPMENT SERVED, NEMA 1 FOR INDOOR USE AND NEMA 3R FOR OUTDOOR USE. SWITCHES SHALL BE AS MANUFACTURED BY WESTINGHOUSE, GENERAL ELECTRIC, SQUARE D, OR SIEMENS.

E. FUSES: FURNISH AND INSTALL ALL FUSES. FUSES SHALL BE AS SPECIFIED ON THE DRAWINGS.

F. OUTLET, PULL AND JUNCTION BOXES: OUTLET, PULL AND JUNCTION BOXES SHALL BE 12 GAUGE, OR HEAVIER, STEEL WITH REMOVABLE KNOCKOUTS. BOXES SHALL BE AS MANUFACTURED BY APPLETON, STEEL CITY OR RACO. SIZE BOXES AS REQUIRED FOR THE INTENDED DUTY. MINIMUM SIZE AS REQUIRED BY THE NATIONAL ELECTRICAL CODE.

G. SWITCHES:

1. WALL SWITCHES SHALL BE LOCATED AS INDICATED ON THE DRAWINGS, ARRANGED SINGLY OR IN GANGS AND AT THE HEIGHT SPECIFIED OR INDICATED AND SHALL HAVE PROPER COVERS WITH FINISHES SPECIFIED HEREIN. SWITCHES SHALL BE AS FOLLOWS UNLESS OTHERWISE CALLED FOR ON DRAWINGS OR HEREINAFTER SPECIFIED.
   A. SWITCHES, 20 AMPERES, 120/277 VOLT SPECIFICATION GRADE, QUIET RATED: BY LEVITON, EAGLE, HUBBELL, OR PASS & SEYMOUR. SWITCH SHALL BE WHITE.

H. RECEPTACLES:

1. RECEPTACLE SHALL BE LOCATED AS SHOWN ON THE DRAWINGS AND AT THE HEIGHTS SPECIFIED OR INDICATED. RECEPTACLE AND POWER OUTLETS SHALL BE OF THE GROUNDING TYPE SPECIFICATION GRADE AND AS MANUFACTURED BY HUBBELL, GENERAL ELECTRIC, PASS & SEYMOUR, EAGLE OR LEVITON. RECEPTACLE SHALL BE WHITE.

I. SWITCH AND RECEPTACLE PLATES:

1. PLATES IN FINISHED AREAS FOR SWITCHES AND RECEPTACLES SHALL BE WHITE. IDENTIFY ALL DEDICATED CIRCUITS WITH A LASER PRINTED ADHESIVE LABEL INDICATING PANEL AND CIRCUIT NUMBER.

J. ELECTRICAL CONTRACTOR SHALL PROVIDE ALL ELBOWS, CONNECTORS, ETC. AND INSTALL OUTLETS COMPLETE.

K. LIGHTING AND APPLIANCE PANEL BOARDS:

1. PANELS SHALL BE TYPE INDICATED ON THE DRAWINGS, WITH MAIN LUGS, MAIN BREAKERS, BRANCH BREAKERS, SPARES AND SPACES AS SCHEDULED.
2. PANELS SHALL COMPLY WITH U.S. FEDERAL SPECIFICATION WP115A, TYPE I, CLASS I.
3. ALL CIRCUIT BREAKERS SHALL BE BOLT-ON TYPE.
4. THE ELECTRICAL CONTRACTOR SHALL BALANCE ALL CIRCUITS. ALL CONDUCTORS SHALL BE CONTINUOUS WITHOUT SPLICING FROM LAST OUTLET TO THEIR TERMINALS IN CABINET.
5. CONTRACTOR SHALL PROVIDE A DIRECTORY OF CIRCUITS FOR CABINET. DIRECTORY SHALL BE TYPEWRITTEN DESIGNATING ROOM OR EQUIPMENT AND CIRCUIT NUMBERS. INCLUDE ANY EXISTING CIRCUITS WHICH REMAIN.
6. WHERE 2 OR 3 POLE BREAKER UNITS ARE CALLED FOR, THEY SHALL BE ON UNIT WITH COMMON TRIP AND NOT SINGLE POLE UNITS WITH HANDLE TIES. CAPACITY OF MAIN BUSSES SHALL BE AS SHOWN ON THE DRAWINGS.
7. PANEL BOARDS SHALL BE MANUFACTURED BY WESTINGHOUSE, SQUARE D, SIEMENS OR GENERAL ELECTRIC.

L. OUTSIDE DELIVERY DOOR BUZZER: A BUZZER SYSTEM SHALL BE FURNISHED AND INSTALLED BY THE ELECTRICAL CONTRACTOR INCLUDING 24VAC TRANSFORMER AND WIRE. BUZZER SHALL BE EDWARDS CAT. #115-4G5, PUSHBUTTON SHALL BE EDWARDS CAT. #664 WITH STAINLESS STEEL PLATE.

3.01 PREPARATION/INSTALLATION/ APPLICATION

A. CONDUIT:

1. INSTALLATION - ALL CONDUIT SHALL BE SIZED IN ACCORDANCE WITH THE NEC.:
   A. CONDUIT TO BE RUN EXPOSED IN UNFINISHED AREAS SUCH AS MECHANICAL AND ELECTRICAL ROOM USED AS ELECTRICAL CLOSETS. ALL OTHER CONDUIT SHALL BE CONCEALED.
   B. ALL CONDUIT AND WIRING SHALL BE CONCEALED WHEREVER POSSIBLE. WHERE CONDUIT AND WIRE CANNOT BE CONCEALED, OBTAIN DIRECTION FROM THE ARCHITECT. NO SURFACE MOUNTED CONDUIT, WIREMOLD OR POWER POLES WILL BE ACCEPTABLE UNLESS SPECIFICALLY INDICATED ON THE DRAWINGS.
   C. ALL EXPOSED CONDUITS SHALL BE RUN PARALLEL TO OR AT RIGHT ANGLES TO STRUCTURAL MEMBERS. CAREFULLY COORDINATE EXACT ROUTING WITH THE ARCHITECTS REPRESENTATIVE IN THE FIELD, PRIOR TO ANY INSTALLATION.
   D. ALL CONDUIT SHALL BE INDEPENDENTLY SUPPORTED FROM THE BUILDING STRUCTURE. CONDUIT SHALL NOT BE SUSPENDED FROM VENTILATING DUCTS, MECHANICAL PIPING, SUSPENDED CEILING GRIDS, OR THEIR HANGERS.
   E. ALL CONDUIT SHALL BE MECHANICALLY AND ELECTRICALLY CONTINUOUS FROM OUTLET TO OUTLET AND BOX TO BOX. SECURE CONDUIT FITTINGS AT ALL ENCLOSURES AND JUNCTIONS.
2. TYPES OF CONDUIT:
   A. CONDUIT, WITHIN BUILDING CONFINES RUN IN CONCRETE SLABS, WITHIN OUTSIDE MASONRY WALLS, IN EARTH FILL AND EXPOSED IN WET AREAS SHALL BE GALVANIZED STEEL HEAVY WALL OR IMC. COUPLINGS FOR CONDUIT RUN IN POURED CONCRETE SHALL BE CONCRETE TIGHT.
   B. CONDUIT RUN EXPOSED OR OUTDOORS SHALL BE GALVANIZED STEEL HEAVY WALL OR IMC WITH WATERTIGHT FITTINGS AND BOXES.
   C. CONDUIT RUN IN DRY AREAS WITHIN BUILDING CONFINES SHALL BE EMT, EXCEPT WHERE SPECIFICALLY NOTED OTHERWISE OR PROHIBITED BY LOCAL CODES. DRY AREAS ARE INSIDE PARTITIONS, CEILING CAVITIES, ABOVE GRADE SLABS, AND AREAS NOT SUBJECT TO DAMAGE.
   D. CONDUIT WITH TRADE SIZES OVER 1-1/2" AND/OR EXPOSED IN MECHANICAL ROOMS SHALL BE GALVANIZED STEEL HEAVY WALL OR IMC.
   E. CONDUITS RUN UNDER FLOOR SLABS AND IN CONTACT WITH EARTH MAY BE PVC SCHEDULE 40 ENCASED IN CONCRETE.
3. PROVIDE FULL SIZE GROUND WIRE IN ALL CONDUITS, PVC OR METALLIC. WHERE THE DRAWINGS DO NOT IDENTIFY THE SIZE OF THE EQUIPMENT GROUND WIRE, IT SHALL BE THE SAME SIZE AS THE PHASE CONDUCTORS.

B. BOXES, OUTLETS AND CABINETS:

1. INSTALL EQUIPMENT AND MATERIALS IN A NEAT AND WORKMANLIKE MANNER AND ALIGN, LEVEL AND ADJUST FOR SATISFACTORY OPERATION. INSTALL EQUIPMENT SO THAT ALL PARTS ARE EASILY ACCESSIBLE FOR INSPECTION, OPERATION, MAINTENANCE AND REPAIR. PROVIDE THE DESIGN, FABRICATION, AND ERECTION OF SUPPLEMENTARY STRUCTURAL FRAMING REQUIRED FOR ATTACHMENT OF HANGERS OR OTHER DEVICES SUPPORTING ELECTRICAL EQUIPMENT. RIGIDLY MOUNT ALL BOXES AND PROVIDE WITH SUITABLE SCREW FASTENED COVERS. PLUG OPEN KNOCKOUTS OR HOLES IN BOXES WITH SUITABLE BLANKING DEVICES.
2. CENTER ALL OUTLETS WITH REGARD TO PANELING, FURRING, AND TRIM. SYMMETRICALLY ARRANGE OUTLETS IN THE ROOM. SATISFACTORILY CORRECT OUTLETS IMPROPERLY LOCATED OR INSTALLED. REPAIR OR REPLACE DAMAGED FINISHES. SET OUTLETS PLUMB AND EXTEND TO THE FINISHED SURFACE OF THE WALL, CEILING OR FLOOR WITHOUT PROJECTING BEYOND SAME.

C. FIRE AND SMOKE PARTITION PENETRATIONS:

1. THE CONTRACTOR SHALL FAMILIARIZE HIMSELF WITH ALL FIRE RATED CONSTRUCTION AND INSTALL HIS WORK SO AS TO MAINTAIN THE INTEGRITY OF THE FIRE CODE RATING. MAINTAIN RATING OF FIRE RATED AND SMOKE RATED CONSTRUCTION. SLEEVES SHALL BE STEEL OR PRE-MANUFACTURED SLEEVES SIMILAR TO PIPE SHIELDS, INC. FOR BARE PIPE THROUGH FIRE WALLS AND FLOORS, MODEL WFB, DFB OR QDFB. FOR PLASTIC PIPE USE TYPE WFB WITH ONE INCH THICK CALCIUM SILICATE INSULATION ENCASED IN METAL SLEEVE EXTENSION TWO FEET EITHER SIDE OF FIRE RATED WALLS OR FLOOR. SEAL ANNULAR SPACE AROUND CONDUITS, FOR FIRE AND SMOKE RATED FLOORS, WALLS AND PARTITIONS, USE UL LISTED MATERIAL THAT MAINTAINS FIRE RATED WALL AND FLOOR INTEGRITY, SIMILAR TO RTV FOAM, DOW CORNING "FIRE STOP" OR PIPE SHIELDS, INC. MODEL WFB, DFB OR QDFB. FOR NON-RATED WALLS AND PARTITIONS, USE MINERAL OR GLASS FIBER INSULATION.

SECTION 16400 - SERVICE AND DISTRIBUTION

1.01 DESCRIPTION

A. WORK INCLUDED:

1. CURRENT TRANSFORMERS CABINET.
2. MAIN SWITCHBOARD.
3. A COMPLETE DISTRIBUTION SYSTEM.
4. SYSTEM GROUNDING PER LOCAL CODES.
5. ALL WORK AND CHARGES REQUIRED BY THE LOCAL UTILITY COMPANY.

B. SERVICES:

1. INCOMING ELECTRICAL SERVICE IS 120/208 VOLTS, 3 PHASE, 4 WIRE.

1.02 SUBMITTALS

A. SHOP DRAWINGS FOR THE FOLLOWING ITEMS SHALL BE SUBMITTED FOR APPROVAL:

1. DISTRIBUTION PANEL BOARDS, LIGHTING PANEL BOARDS, MISCELLANEOUS PANEL BOARDS AS SCHEDULED, AND INCLUDING ALL PROTECTIVE DEVICES.

2.01 EQUIPMENT

A. MAIN SWITCHBOARD SHALL BE SERVICE ENTRANCE RATED AND FRONT ACCESSIBLE WITH REMOVABLE SCREW - ON COVERPLATES. GROUNDING AND METERING SHALL COMPLY WITH THE LOCAL UTILITY COMPANY AND ALL LOCAL CODE REQUIREMENTS.

2.02 DISTRIBUTION PANEL BOARDS

A. PANEL BOARD SHALL BE ENCLOSED IN STEEL CABINET OF RIGIDITY AND GAUGE OF STEEL PER UL STANDARD #50 FOR CABINETS. ALL PANEL BOARDS SHALL BE PROVIDED WITH DOOR LOCKS, ALL KEYED ALIKE.

B. BUS STRUCTURE SHALL BE COPPER.

C. SHORT CIRCUIT CURRENT RATING SHALL BE EQUAL TO OR GREATER THAN THE AVAILABLE SHORT CIRCUIT AT THE PANEL BOARD, BUT NOT LESS THAN 50,000 AMPERES SYMMETRICAL.

D. PANEL BOARDS SHALL BE AS SHOWN ON THE DRAWINGS WITH MAIN LUGS, MAIN BREAKERS, BRANCH BOLT-ON BREAKERS, SPARES AND SPACES AS SCHEDULED. PROVIDE G.F.I. BREAKERS AS REQUIRED. PANEL BOARDS SHALL BE MANUFACTURED BY GENERAL ELECTRIC, WESTINGHOUSE, SQUARE D OR SIEMENS.

E. PROVIDE A TYPEWRITTEN PANEL DIRECTORY FOR EACH PANEL IDENTIFYING THE USE OF EACH CIRCUIT INCLUDING ANY EXISTING CIRCUITS WHICH REMAIN.

2.03 CONNECTIONS

A. ALL MAIN FEEDER CONNECTIONS SHALL BE MADE WITH SOLDERLESS CONNECTORS, BOLTED TYPE. SMALLER WIRE SPLICES SHALL BE MADE WITH PRESSURE TYPE CONNECTORS - MINNESOTA MINING "SKOTCHLOCKS" OR IDEAL "WINGNUTS".

3.01 INSTALLATION

A. SYSTEM GROUNDING:

1. SHALL BE IN STRICT ACCORDANCE WITH THE NATIONAL ELECTRICAL CODE, LOCAL GOVERNING AUTHORITIES AND IN ACCORDANCE WITH THE RECOMMENDATIONS OF THE UTILITY COMPANY. SEE DETAILS ON DRAWINGS FOR ADDITIONAL GROUNDING REQUIREMENTS.

B. ELECTRICAL SERVICE:

1. ELECTRICAL SERVICE SHALL BE UNDERGROUND FROM THE UTILITY COMPANY'S SERVICE.
2. THE UTILITY COMPANY WILL FURNISH, INSTALL AND CONNECT ALL PRIMARY SERVICE CONDUCTORS.
3. THIS CONTRACTOR SHALL CONTACT THE UTILITY COMPANY AND LANDLORD TO OBTAIN ALL INFORMATION NECESSARY FOR THE WORK. INCORPORATE THEIR INSTRUCTIONS INTO THE WORK, AND OBTAIN THEIR APPROVAL OF ALL WORK AND MATERIAL. INCLUDE ALL COSTS IN BASE BID.

SECTION 16500 - LIGHTING SYSTEMS AND CONTROLS

1.01 DESCRIPTION

A. WORK INCLUDED:

1. FURNISHING AND INSTALLING LIGHTING FIXTURES WITH LAMPS, HANGERS AND CONTROLS AS SHOWN ON DRAWINGS AND LIGHTING FIXTURE SCHEDULES. PROVIDE ALL SPACERS, FIXTURE TRIM AND ACCESSORIES AS REQUIRED FOR A COMPLETE SECURE AND WORKING INSTALLATION.

B. REQUIREMENTS

1. ALL FLUORESCENT LAMP INCLUDING PL SHALL BE 41K COLOR TEMPERATURE, GE OR APPROVED EQUIVALENT. ALL LAMPS SHALL BE T-8 TYPE UNLESS SPECIFIED OTHERWISE. PROVIDE ALL LAMPS AS INDICATED ON THE LIGHTING FIXTURE SCHEDULE, OR AS RECOMMENDED BY THE FIXTURE MANUFACTURER.
2. ALL FLUORESCENT LAMP BALLASTS SHALL BE ELECTRONIC TYPE WITH MAXIMUM 10% TOTAL HARMONIC DISTORTION (THD).
3. PROVIDE RADIO INTERFERENCE FILTERS FOR THE LIGHT FIXTURES IN THE VIDEO CONFERENCE ROOM AND TELECOMMUNICATION CLOSET.
4. PROVIDE ALL EXIT AND EMERGENCY LIGHTING AS REQUIRED BY APPLICABLE CODE(S).

SECTION 16700 - COMMUNICATIONS

1.01 DESCRIPTION

A. WORK INCLUDED:

1. EMPTY BACKBOXES AND CONDUIT SHALL BE FURNISHED AND INSTALLED BY ELECTRICAL CONTRACTOR.

2.01 TELEPHONE SYSTEM/COMPUTER SYSTEM

A. TELEPHONE SYSTEM GROUNDING CONDUCTORS: FURNISH A #6 AWG, COPPER GROUNDING CONDUCTOR FROM EACH TELEPHONE SERVICE EQUIPMENT TO RESPECTIVE ELECTRICAL SERVICE GROUNDING ELECTRODE SYSTEM.

B. TELEPHONE/COMPUTER CONDUIT SYSTEM: FURNISH AS INDICATED ON THE DRAWINGS, INCLUDING THE FOLLOWING:

1. TELEPHONE SERVICE CONDUITS FOR UNDERGROUND SERVICE.
2. OTHER CONDUITS AS INDICATED ON THE DRAWINGS. FURNISH #14 AWG SOFT IRON PULL WIRE OR HEAVY NYLON CORD IN EACH CONDUIT FOR PULLING THE TELEPHONE CABLE TO EACH TERMINATION POINT.
3. OUTLET BOXES WITH A 3/4" CONDUIT STUBBED INTO ACCESSIBLE CEILING SPACE WITH PULLWIRE FOR CABLING BY OTHERS. PROVIDE SEPARATE DEDICATED CONDUITS FOR P.O.S. LINES. (DO NOT SHARE WITH OTHER TELEPHONE OR DATA LINES.)

C. NO ELECTRICAL CONDUITS OR POWER WIRING SHALL PASS OVER THE TELECOMMUNICATIONS CLOSET AND PANELS, EXCEPT FOR TELECOMMUNICATIONS ROOM LIGHT FIXTURES.

3.01 INSTALLATION

A. FURNISH AND INSTALL CONDUIT SYSTEM AS SHOWN. CABLING AND FINAL CONNECTION TO BE BY THE OWNERS SUBCONTRACTOR. THE SYSTEM SHALL CONSIST OF TELEPHONE/DATA OUTLETS IN LOCATIONS AS INDICATED, BRANCH CONDUITS, AND ALL ACCESSORIES REQUIRED BY THE TELEPHONE COMPANY FOR COMPLETE INSTALLATION.

1.01 DESCRIPTION

A. WORK INCLUDED:

1. ALL WORK SHALL COMPLY WITH THE LATEST NATIONAL ELECTRIC CODE (NEC) AND ALL LOCAL CODES. COORDINATE EXACT CODE REQUIREMENTS AND LOCAL AMENDMENTS WITH LOCAL INSPECTOR PRIOR TO ANY INSTALLATION.
2. CONTRACTOR SHALL CONTACT THE UTILITY COMPANY AND INCORPORATE ALL REQUIREMENTS INTO THE NEW WORK.
3. GROUND IN ACCORDANCE WITH THE NEC AND ALL LOCAL CODES. REFER TO DETAILS ON SHEET E-4 FOR ADDITIONAL INFORMATION.
4. ASSUMED AVAILABLE FAULT CURRENT IS 50,000 AMPS RMS. CONTRACTOR SHALL VERIFY WITH UTILITY COMPANY REPRESENTATIVE AND REPORT ANY DISCREPANCIES TO ARCHITECT/ENGINEER PRIOR TO ORDERING EQUIPMENT.
5. PROVIDE FUSES AT ALL LOCATIONS SHOWN ON THE DRAWINGS OR REQUIRED FOR SUPPLEMENTAL PROTECTION. WHERE AMP RATING OF PROTECTIVE DEVICE IS 600 AMPS OR LESS, PROVIDE BUSSMAN LOW-PEAK CURRENT LIMITING FUSES, CLASS RK1 ON PANELS, RK5 (WITH DUAL ELEMENT FUSETRON UP TO 100 A, ABOVE 100 A DUAL ELEMENT LOW PEAK), HAVING AN INTERRUPTING RATING OF 200,000 AMPS RMS, UNLESS NOTED 601 AMPS, PROVIDE BUSSMAN "LIMITRON" FUSES, CLASS "L", HAVING AN INTERRUPTING RATE OF 200,000 AMPS RMS UNLESS NOTED OTHERWISE. PROVIDE SIMILAR TYPE "HI-CAP" FUSES WHERE SHOWN. SPARE FUSES, DELIVER TO THE OWNER AT THE TIME OF FINAL INSPECTION. ONE SPARE SET OF 3 FUSES FOR EACH TYPE, SIZE AND VOLTAGE INSTALLED.

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project DOLLAR TREE
UNION STATION PLAZA DEAL #3813
PORTLAND, MAINE
drawing ELECTRICAL SPECIFICATIONS

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