1
ELECTRICAL WORK

1. GENERAL:

A. THE "GENERAL CONDITIONS OF THE CONTRACT FOR CONSTRUCTION," AIA DOCUMENT A201, LATEST EDITION, AND THESE SPECIFICATIONS AS APPLICABLE ARE PART OF THE CONTRACT DOCUMENTS.

B. ALL APPLICABLE CODES, LAWS AND REGULATIONS GOVERNING OR RELATING TO ANY PORTION OF THIS WORK ARE HEREBY INCORPORATED INTO AND MADE A PART OF THESE SPECIFICATIONS, AND THEIR PROVISIONS SHALL BE CARRIED OUT BY THE CONTRACTOR WHO SHALL INFORM THE OWNER, PRIOR TO SUBMITTING A PROPOSAL, OF ANY WORK OR MATERIAL WHICH VIOLATES ANY OF THE ABOVE LAWS AND REGULATIONS. ANY WORK DONE BY THE CONTRACTOR CAUSING SUCH VIOLATION SHALL BE CORRECTED BY THE CONTRACTOR.

C. INVESTIGATE EACH SPACE THROUGH WHICH EQUIPMENT MUST BE MOVED. WHERE NECESSARY, EQUIPMENT SHALL BE SHIPPED FROM MANUFACTURER IN SECTIONS OF SIZE SUITABLE FOR MOVING THROUGH AVAILABLE RESTRICTIVE SPACES. ASCERTAIN FROM BUILDING OWNER AND TENANT AT WHAT TIMES OF DAY EQUIPMENT MAY BE MOVED THROUGH ALL AREAS.

D. DRAWINGS ARE DIAGRAMMATIC AND INDICATE GENERAL ARRANGEMENT OF SYSTEMS AND WORK. CONDUIT ROUTING IS SHOWN DIAGRAMMATICALLY AND DOES NOT SHOW ALL OFFSETS, DROPS, PULL BOXES AND RISES OF RUNS. THE CONTRACTOR SHALL INCLUDE ALL COSTS AND MATERIAL FOR ROUTING OF CONDUIT TO AVOID OBSTRUCTIONS. COORDINATION WITH EXISTING SERVICES, INCLUDING THOSE OF OTHER TRADES, IS REQUIRED. MAINTAIN HEADROOM AND SPACE CONDITIONS.

E. FOR LOCATIONS AND QUANTITIES OF EQUIPMENT REFER TO FLOOR PLANS, DETAILS, SCHEDULES AND DIAGRAMS. WHERE THERE ARE DISCREPANCIES BETWEEN THESE DRAWINGS, THE GREATER OF EACH QUANTITY OR COST OR EQUIPMENT SPECIFICATIONS SHALL BE USED.

F. CONNECTIONS TO COMBINATION FIRE SMOKE DAMPERS ARE DIAGRAMMATIC. THE SYMBOL MAY REPRESENT MORE THAN ONE CONNECTION BASED ON DUCT SIZE, CONFIGURATION AND ACTUATOR MAKE AND MODEL AS SELECTED BY MECHANICAL INSTALLER AND/OR CONTRACTOR. ELECTRICAL INSTALLER AND/OR CONTRACTOR SHALL INCLUDE ALL CONNECTIONS AND WIRING AS REQUIRED TO PROVIDE A COMPLETE AND OPERATIONAL SYSTEM. COORDINATE WITH MECHANICAL CONTRACTOR.

G. CONNECTIONS TO MOTORIZED WINDOW SHADES ARE DIAGRAMMATIC. CONTRACTOR SHALL INCLUDE AS PART OF BASE BID AT A MINIMUM IF DETAILS AND OR WIRING IS NOT SPECIFICALLY SHOWN OR NOTED 4#12 IN 3/4" CONDUIT FROM A CENTRAL CONTROL PANEL FOR EVERY TWO FEET OF WINDOW. A 120V POWER CONNECTION SHALL BE INCLUDED TO THE CENTRAL CONTROL PANEL AS WELL AS 4#12, 3/4" CONDUIT FROM CENTRAL CONTROL PANEL TO EACH ROOM ENTRY DOORS.

H. INSTALL WORK TO BE READILY ACCESSIBLE FOR OPERATION, MAINTENANCE AND REPAIR. MINOR DEVIATIONS FROM DRAWINGS MAY BE MADE TO ACCOMPLISH THIS, BUT CHANGES THAT INVOLVE EXTRA COST SHALL NOT BE MADE WITHOUT APPROVAL.

I. REMOVAL AND RELOCATION OF CERTAIN EXISTING WORK MAY BE NECESSARY FOR THE PERFORMANCE OF THE GENERAL WORK. ALL EXISTING CONDITIONS CANNOT BE COMPLETELY DETAILED ON THE DRAWINGS. THE CONTRACTOR SHALL CAREFULLY REVIEW SITE CONDITIONS AS NECESSARY TO INCLUDE ALL REASONABLE MATERIAL AND LABOR TO EXECUTE WORK.

J. CONNECTIONS TO EXISTING WORK: INSTALL NEW WORK AND CONNECT TO EXISTING WORK WITH MINIMUM INTERFERENCE TO EXISTING FACILITIES. TEMPORARY SHUTDOWNS OF EXISTING SERVICES SHALL BE PERFORMED AT NO ADDITIONAL CHARGES, AT TIMES NOT TO INTERFERE WITH NORMAL OPERATION OF EXISTING FACILITIES, AND ONLY WITH WRITTEN CONSENT OF OWNER. ALARM AND EMERGENCY SYSTEMS SHALL NOT BE INTERRUPTED. MAINTAIN CONTINUOUS OPERATION OF EXISTING FACILITIES AS REQUIRED WITH NECESSARY TEMPORARY CONNECTIONS BETWEEN NEW AND EXISTING WORK. CONNECT NEW WORK TO EXISTING WORK IN NEAT AND ACCEPTABLE MANNER. RESTORE EXISTING DISTURBED WORK TO ORIGINAL CONDITION, INCLUDING MAINTENANCE OF WIRING CONTINUITY AS REQUIRED.

K. DISCONNECT, REMOVE AND/OR RELOCATE EXISTING MATERIAL, EQUIPMENT AND OTHER WORK AS NOTED OR REQUIRED FOR PROPER INSTALLATION OF NEW WORK.

L. THE CONTRACTOR SHALL KEEP ALL EQUIPMENT AND MATERIALS, AND ALL PARTS OF THE BUILDING, EXTERIOR SPACES AND ADJACENT STREETS, SIDEWALKS AND PAVEMENTS, FREE FROM MATERIAL AND DEBRIS RESULTING FROM THE EXECUTION OF THIS WORK. EXCESS MATERIALS WILL NOT BE PERMITTED TO ACCUMULATE EITHER ON THE INTERIOR OR ON THE EXTERIOR.

M. SEAL OPENINGS THROUGH PARTITIONS, WALLS AND FLOORS WITH MINERAL WOOL OR OTHER NONCOMBUSTIBLE MATERIAL. ALL PENETRATIONS THROUGH NEW AND EXISTING RATED FIRE AND SMOKE PARTITIONS AND/OR FLOORS SHALL BE COMPLETELY SEALED USING MATERIALS AND METHODS DESCRIBED IN SUBSEQUENT "FIRE STOPPING" SPECIFICATIONS SECTIONS.

N. PROVIDE ALL NECESSARY FLASHING AND COUNTERFLASHING TO MAINTAIN THE WATERPROOFING INTEGRITY OF THE BUILDING AS REQUIRED BY THE INSTALLATION OR REMOVAL OF CONDUIT AND EQUIPMENT. PROVIDE EQUIPMENT CURBS AS REQUIRED. ALL ROOFING WORK SHALL BE EXECUTED BY THE BUILDINGS APPROVED ROOFING COMPANY RETAINED BY THIS CONTRACTOR.

O. PROVIDE 4-INCH HIGH CONCRETE EQUIPMENT PADS FOR ALL FLOOR-MOUNTED EQUIPMENT.

P. ALL EXISTING MATERIALS, EQUIPMENT AND CONSTRUCTION DEBRIS TO BE REMOVED UNDER THIS CONTRACT SHALL BECOME THE PROPERTY OF THE CONTRACTOR WITH THE EXCEPTION OF SPECIFIC EQUIPMENT AND APPARATUS REQUESTED BY THE BUILDING REPRESENTATIVE, ARCHITECT OR AS NOTED TO BE RELOCATED ON THE DRAWINGS. REMOVED EQUIPMENT SHALL BE PROPERLY DISPOSED OF BY THIS CONTRACTOR.

Q. THE CONTRACTOR'S PROPOSAL FOR ALL WORK SHALL BE PREDICATED ON THE PERFORMANCE OF THE WORK DURING REGULAR WORKING HOURS, EXCEPT WHERE NOTED OTHERWISE. WHEN SO DIRECTED, HOWEVER, THE CONTRACTOR SHALL INSTALL WORK DURING OVERTIME HOURS AND THE ADDITIONAL COST TO BE CHARGED THEREFORE SHALL BE ONLY THE "PREMIUM" PORTION OF THE WAGES PAID.

R. UNLESS OTHERWISE SPECIFICALLY NOTED OR SPECIFIED, INCLUDE ALL CUTTING AND PATCHING OF EXISTING FLOORS, WALLS, PARTITIONS AND OTHER MATERIALS IN THE EXISTING BUILDING. THE CONTRACTOR SHALL RESTORE THESE AREAS TO ORIGINAL CONDITION.

S. ALL MATERIAL AND EQUIPMENT SHALL BE NEW UNLESS OTHERWISE NOTED AND SHALL BE IN ACCORDANCE WITH BUILDING STANDARDS. REFURBISHED OR RECONDITIONED ELECTRICAL EQUIPMENT SHALL NOT BE UTILIZED AND WILL NOT BE ACCEPTED.

T. SUBMISSION OF A PROPOSAL SHALL BE CONSTRUED AS EVIDENCE THAT A CAREFUL EXAMINATION OF THE PORTIONS OF THE BUILDING, EQUIPMENT, ETC., WHICH AFFECT OR ARE AFFECTED BY THIS WORK, AND THE ACCESS TO SUCH SPACES HAVE BEEN MADE, AND THE CONTRACTOR IS FAMILIAR WITH EXISTING CONDITIONS AND DIFFICULTIES THAT WILL AFFECT THE EXECUTION OF THE WORK. THE CONTRACTOR IS RESPONSIBLE TO INDICATE ANY DISCREPANCIES BETWEEN THE CONTRACT DRAWINGS AND ACTUAL FIELD CONDITIONS PRIOR TO SUBMITTAL OF BID. LATER CLAIMS SHALL NOT BE MADE FOR LABOR; EQUIPMENT OR MATERIALS REQUIRED BECAUSE OF DIFFICULTIES ENCOUNTERED WHICH COULD HAVE BEEN FORESEEN DURING SUCH AN EXAMINATION. THE ON-SITE INSPECTION SHALL VERIFY EXISTING FEEDERS AND EQUIPMENT (SIZES, CLEARANCES, ETC.), CONDITIONS RELATIVE TO THE PROJECT AND INSTALLERS MEANS AND METHODS.

U. INSURANCE SHALL BE IN ACCORDANCE WITH BUILDING REQUIREMENTS AND SHALL INCLUDE A HOLD HARMLESS CLAUSE FOR OWNER AND ENGINEER.

V. AS A CONDITION OF CONTRACTOR'S USE OF THESE SPECIFICATIONS, CONTRACTOR AGREES (I) TO NAME LEGACY AS ADDITIONAL INSURED ON CONTRACTOR'S INSURANCE POLICIES WHEREVER PERMITTED, (II) TO PROVIDE LEGACY, UPON REQUEST, WITH A CERTIFICATE OF INSURANCE AND COPIES OF SPECIFIC ENDORSEMENTS TO CONTRACTOR'S INSURANCE POLICIES EVIDENCING SAID ADDITIONAL INSURED STATUS, AND (III) TO WAIVE ALL RIGHTS OF RECOVERY AGAINST LEGACY BY WAY OF SUBROGATION, ASSIGNMENT, OR OTHERWISE WITH REGARD TO INSURED CLAIMS.

W. ALL WORK SHALL BE DONE WHEN AND AS DIRECTED BY THE CLIENT OR THE CLIENT'S APPOINTED REPRESENTATIVE AND IN A MANNER SATISFACTORY TO THE BUILDING OWNER. WORK SHALL BE PERFORMED SO AS TO CAUSE LIMITED TO NO INCONVENIENCE OR DISTURBANCE TO OTHER BUILDING OCCUPANTS AND ADJACENT SPACES NOT INCLUDED AS PART OF THE SCOPE OF WORK.

X. THE FINAL ACCEPTANCE SHALL BE MADE AFTER THE CONTRACTOR HAS ADJUSTED HIS EQUIPMENT, TESTED THE VARIOUS SYSTEMS, DEMONSTRATED THAT IT FULFILLS THE REQUIREMENTS OF THE DRAWINGS AND SPECIFICATIONS, AND HAS FURNISHED ALL THE REQUIRED CERTIFICATES OF INSPECTION AND APPROVALS.

2. SCOPE OF WORK:

A. SCOPE OF WORK SHALL CONSIST OF PROVIDING LABOR, MATERIALS, EQUIPMENT, SERVICES AND FEES NECESSARY FOR COMPLETE AND SAFE INSTALLATION IN CONFORMITY WITH THE APPLICABLE VERSIONS OF THE NATIONAL ELECTRICAL CODE, NATIONAL ELECTRICAL SAFETY CODE, APPLICABLE BUILDING CODE, BUILDING STANDARDS AND ALL APPLICABLE INDUSTRY, NATIONAL AND LOCAL CODES AND AUTHORITIES HAVING JURISDICTION, AS INDICATED ON DRAWINGS, HEREIN SPECIFIED, AS APPLICABLE AND REQUIRED.

B. ALL DRAWINGS, PLANS, DETAILS, SPECIFICATIONS AND SPECIFICATION ADDENDA ARE MADE PART OF THIS CONTRACT AND SHALL APPLY TO ALL WORK UNDER THE CONTRACT UNLESS OTHERWISE AMENDED, MODIFIED, SUPPLEMENTED OR SPECIFIED HEREIN.

C. THE CONTRACTOR SHALL FURNISH A WRITTEN GUARANTEE TO REPLACE OR REPAIR PROMPTLY AND ASSUME RESPONSIBILITY FOR ALL EXPENSES INCURRED, FOR ANY WORKMANSHIP AND EQUIPMENT IN WHICH DEFECTS DEVELOP WITHIN ONE YEAR FROM THE DATE OF FINAL CERTIFICATE FOR PAYMENT AND/OR FROM DATE OR ACTUAL USE OF EQUIPMENT OR OCCUPANCY OF SPACES BY OWNER, INCLUDED UNDER THE VARIOUS PARTS OF THE WORK, WHICHEVER DATE IS EARLIER. THIS WORK SHALL BE DONE AS DIRECTED BY THE OWNER. THIS GUARANTEE SHALL ALSO PROVIDE THAT WHERE DEFECTS OCCUR, THE CONTRACTOR WILL ASSUME RESPONSIBILITY FOR ALL EXPENSES INCURRED IN REPAIRING AND REPLACING WORK OF OTHER TRADES AFFECTED BY DEFECTS, REPAIRS OR REPLACEMENTS IN EQUIPMENT SUPPLIED BY THE CONTRACTOR.

D. THE CONTRACTOR SHALL GIVE NECESSARY NOTICE, FILE DRAWINGS AND SPECIFICATIONS WITH ALL DEPARTMENTS HAVING JURISDICTION INCLUDING BUT NOT LIMITED TO THE BUILDING DEPARTMENT AND FIRE DEPARTMENT, OBTAIN PERMITS AND LICENSES NECESSARY TO CARRY OUT THIS WORK AND PAY ALL ASSOCAITED FEES. THE CONTRACTOR SHALL ARRANGE FOR INSPECTIONS AND TESTS OF ALL WORK AS REQUIRED BY THE AUTHORITIES HAVING JURISDICTION AND PAY ALL FEES ASSOCIATED WITH SAME. THE CONTRACTOR SHALL FURNISH TO THE OWNER BEFORE FINAL BILLING, ALL CERTIFICATES AND PERMIT SIGN-OFFS AS EVIDENCE OF COMPLETION AND ACCEPTANCE BY THE AUTHORITIES HAVING JURISDICTION.

3. SHOP DRAWINGS

A. PRIOR TO THE INSTALLATION OF ANY WORK AND PROCUREMENT OF EQUIPMENT, CONTRACTOR SHALL PROVIDE COMPLETE SETS OF COORDINATED SHOP DRAWINGS OF EQUIPMENT, INDICATING CAPACITY, WIRING, DIMENSIONS AND SEQUENCE OF OPERATION FOR WRITTEN APPROVAL BY THE ARCHITECT AND ENGINEER.

B. INDICATE ON EACH SHOP DRAWINGS SUBMITTED:

1) PROJECT NAME AND LOCATION
2) NAME OF ARCHITECT AND ENGINEER
3) ITEM IDENTIFICATION
4) APPROVAL STAMP OF PRIME CONTRACTOR

C. SUBMISSIONS:

1) ALL SUBMITTALS SHALL BE IN ELECTRONIC FORMAT. ALL CATALOG CUTS SHALL BE COMPLETE WITH ALL OPTIONS, DETAILS, MODEL NUMBERS AND PARTS CLEARLY IDENTIFIED. GENERIC SHOP DRAWINGS WILL NOT BE ACCEPTED.

D. SUBMIT SHOP DRAWINGS AND WIRING DIAGRAMS FOR THE FOLLOWING:

1) SWITCHES, VACANCY SENSORS, ETC.
2) DISCONNECT AND SAFETY SWITCHES
3) FUSES
4) CIRCUIT BREAKERS
5) PANELBOARD DRAWINGS (INCLUDING DIMENSIONS, SCHEDULES, AND CATALOG CUTS).
6) RACEWAYS
7) WIRE AND CABLE
8) WALL SWITCHES, DIMMERS AND SENSORS
9) INSERTION RECEPTACLES
10) LIGHTING FIXTURES AND EXIT SIGNS
11) FIRE ALARM EQUIPMENT, DEVICES, WIRING DIAGRAMS AND OPERATIONS MATRIX
12) LIGHTING DIMMING AND CONTROL SYSTEMS
13) TEST PROCEDURES AND REPORTS.

4. AS-BUILT DRAWINGS AND EQUIPMENT OPERATIONAL INSTRUCTIONS

A. UPON COMPLETION AND ACCEPTANCE OF WORK, CONTRACTOR SHALL FURNISH WRITTEN INSTRUCTIONS AND EQUIPMENT MANUALS AND DEMONSTRATE TO THE OWNER THE PROPER OPERATION AND MAINTENANCE OF ALL EQUIPMENT AND APPARATUS FURNISHED UNDER THIS CONTRACT.

B. THE INSTRUCTION BOOKLET SHALL BEAR THE NAME, ADDRESS AND TELEPHONE NUMBER OF THE PROJECT, ARCHITECT AND ENGINEER AND BE SUBMITTED IN ELECTRONIC FORMAT.

C. AS-BUILT DRAWINGS SHALL BE PROVIDED IN ELECTRONIC FORMAT (LATEST VERSION OF AUTOCAD OR BIM AS APPLICABLE) INDICATING THE INSTALLED CONDITIONS OF THE WORK. "AS-BUILT" DRAWINGS SHALL BE PROVIDED TO THE OWNER AFTER COMPLETION OF THE INSTALLATION.

5. INSPECTIONS / TESTING

A. INDEPENDENT 3^{RD} PARTY TESTING AND/OR INSPECTIONS AS WELL AS SYSTEMS START-UP, SHALL BE PROVIDED BY THIS CONTRACTOR WHO SHALL RETAIN SERVICES OF THE TESTING AGENCY, INSPECTOR OR MANUFACTURERS AUTHORIZED ACCREDITED REPRESENTATIVE.

6. GENERAL PROVISIONS FOR ELECTRICAL WORK:

A. SPECIFICATIONS ARE OF SIMPLIFIED FORM AND INCLUDE INCOMPLETE SENTENCES. WORDS OR PHRASES SUCH AS "THE CONTRACTOR SHALL," "SHALL BE," "FURNISH," "PROVIDE," "A," "THE," AND "ALL" HAVE BEEN OMITTED FOR BREVITY.

B. DEFINITIONS:

1) "PROVIDE": TO FURNISH, INSTALL AND CONNECT UP COMPLETE AND READY FOR SAFE AND REGULAR OPERATION THE PARTICULAR WORK REFERRED TO UNLESS SPECIFICALLY OTHERWISE NOTED.

2) "INSTALL": TO ERECT, MOUNT AND CONNECT COMPLETE WITH RELATED ACCESSORIES.

3) "FURNISH": TO PURCHASE, PROCURE, ACQUIRE AND DELIVER COMPLETE WITH RELATED ACCESSORIES.

4) "WORK": LABOR, MATERIALS, EQUIPMENT, APPARATUS, CONTROLS, ACCESSORIES AND OTHER ITEMS REQUIRED FOR PROPER AND COMPLETE INSTALLATION.

5) "WIRING": RACEWAY, FITTINGS, WIRE, WIRING CONNECTIONS, BOXES AND RELATED ITEMS.

6) "CONCEALED": EMBEDDED IN MASONRY OR OTHER CONSTRUCTION, INSTALLED IN FURRED SPACES, WITHIN DOUBLE PARTITIONS OR HUNG CEILINGS, IN TRENCHES, IN CRAWL SPACES, OR IN ENCLOSURES.

7) "EXPOSED": NOT INSTALLED UNDERGROUND OR "CONCEALED" AS DEFINED ABOVE.

8) "SIMILAR" OR "EQUAL": EQUAL IN MATERIALS, WEIGHT, SIZE, DESIGN AND EFFICIENCY OF SPECIFIED PRODUCT.

C. GENERAL

1) THE DRAWINGS SHOW THE APPROXIMATE LOCATION OF ALL APPARATUS. THE EXACT LOCATIONS OF WHICH ARE SUBJECT TO THE APPROVAL OF THE OWNER WHO RESERVES THE RIGHT TO MAKE ANY REASONABLE CHANGES IN THE LOCATION WITHOUT EXTRA COST. WHILE THE GENERAL RUN OF CONDUIT AND CABLES MAY BE INDICATED ON THE DRAWINGS, IT IS NOT INTENDED THAT THE EXACT ROUTING OR LOCATIONS OF CONDUIT & CABLES BE DETERMINED THEREFROM. WHERE CONTRACTOR UTILIZES EQUIPMENT THAT IS PHYSICALLY LARGER OR HAS A CONFIGURATION DIFFERENT THAN THE MANUFACTURER UTILIZED AS THE BASIS OF DESIGN, THE CONTRACTOR IS RESPONSIBLE FOR ANY COSTS ASSOCIATED WITH UTILIZING SUBSTITUTE MANUFACTURERS IF ADDITIONAL WORK OR WIRING IS REQUIRED AS A RESULT OF ITS APPROVAL.

2) THE ELECTRICAL INSTALLER/CONTRACTOR SHALL BE RESPONSIBLE FOR ALL REQUIRED BENDS, OFFSETS, PULL AND SPLICE BOXES AND CLEARING OF OBSTRUCTIONS THAT EXIST AND ARE CREATED. IT IS THE CONTRACTORS RESPONSIBILITY TO COORDINATE WITH EXISTING CONDITIONS AND OTHER TRADES AS REQUIRED TO MAINTAIN HEADROOM, CLEARANCES, CEILING HEIGHTS, ACCESS, OPENINGS AND PASSAGEWAYS.

3) THE INSTALLER/CONTRACTOR SHALL BE RESPONSIBLE TO COORDINATE WITH ALL TRADES AS IT AFFECTS EXECUTION OF WORK. NO CLAIMS FOR CONTRACT EXTRAS ASSOCIATED WITH CONFLICTS WILL BE REVIEWED OR APPROVED FOR WORK THAT WAS EXECUTED PRIOR TO COORDINATION.

4) WIRE ALL FIXTURES, DEVICES, ETC., TO RESPECTIVE PANELS AND CONTROLS AS SHOWN ON PLANS IN SYMBOL FORM.

5) THE CONTRACTOR SHALL BE RESPONSIBLE FOR CLEAN-UP AND REMOVAL FROM THE SITE OF RESULTING DEBRIS.

6) PROVIDE SEPARATE SYSTEMS AND ENCLOSURES FOR 208/120 AND 480/277 VOLT POWER, CONTROL WIRING, AND FOR EMERGENCY, LEGALLY REQUIRED, OPTIONAL STANDBY AND NORMAL POWER. COMMON PULL BOXES AND JUNCTION BOXES ARE NOT ACCEPTABLE UNLESS OTHERWISE NOTED.

7) LOCATIONS INDICATED FOR LOCAL SWITCHES & OTHER LIGHTING CONTROLS ARE SUBJECT TO RELOCATION AS REQUIRED BY ARCHITECT AND/OR OWNER. AT OR NEAR DOORS, INSTALL AT INSIDE ON OPPOSITE SIDE OF HINGE. VERIFY FINAL DOOR HINGE LOCATION IN FIELD WITH ARCHITECT PRIOR TO WIRING DEVICE INSTALLATION.

8) HEIGHTS OF OUTLETS FROM FINISHED FLOOR TO CENTERLINE OF OUTLETS SHALL CONFORM TO ADA REQUIREMENTS AND ARCHITECTURAL DRAWINGS.

9) ERECT WALL RECEPTACLE AND SWITCH OUTLETS IN ADVANCE OF FURRING AND FIREPROOFING. OUTLET BOXES SHALL BE SET SQUARE AND TRUE WITH BUILDING FINISH. SECURE TO WALL CONSTRUCTION BY ADJUSTABLE STRAP IRONS (GROUT IN MASONRY). VERIFY OUTLET LOCATIONS IN FINISHED SPACES WITH ARCHITECTURAL DRAWINGS OF DETAILS AND FINISHES. PROVIDE BARRIERS BETWEEN SWITCHES CONNECTED TO DIFFERENT PHASES AND WHERE VOLTAGE EXCEEDS 150 VOLTS TO GROUND. PROVIDE BARRIERS BETWEEN NORMAL AND EMERGENCY SWITCHES INSTALLED IN A COMMON OUTLET BOX.

10) PANEL BOXES AND PULL BOXES SHALL BE LOCATED CLEAR OF OTHER TRADES. CONCEAL JUNCTION AND PULL BOXES IN FINISHED SPACES. WHERE NECESSARY, REROUTE RACEWAYS OR MAKE OTHER ARRANGEMENTS FOR CONCEALMENT. BOXES SHALL BE ACCESSIBLE. SUPPORT BOXES FROM BUILDING STRUCTURE INDEPENDENT OF CONDUIT. PROVIDE FLOOR-TO-CEILING CHANNELS FOR MOUNTING ON DRYWALL AND LIGHTWEIGHT CONSTRUCTION. OUTLET BOXES FOR FIXTURES RECESSED IN HUNG CEILINGS SHALL BE ACCESSIBLE THROUGH OPENING CREATED BY REMOVAL OF FIXTURE. SECURE TO BLACK IRON SUPPORT. MOTOR TERMINAL BOXES: COORDINATE WITH MOTOR BRANCH CIRCUIT WIRING. ADD BOX VOLUME WHERE REQUIRED.

D. TEMPORARY LIGHT AND POWER: PROVIDE TEMPORARY LIGHT AND POWER SYSTEMS AT EARLIEST POSSIBLE DATE WITHIN THE CONSTRUCTION AREAS FOR THE REQUIREMENTS OF ALL TRADES AS SPECIFIED BY GENERAL CONTRACTOR OR CONSTRUCTION MANAGER. MAINTAIN SYSTEM DURING WORKING HOURS OF ALL TRADES. PROVIDE ALL REQUIRED MAINTENANCE, INCLUDING LAMPS AND SOCKETS. SYSTEM REMOVAL OR CONNECTION TO PERMANENT DISTRIBUTION SHALL BE INCLUDED AS REQUIRED.

E. QUALITY ASSURANCE

1) QUALITY AND GAUGE OF MATERIALS: NEW, BEST OF THEIR RESPECTIVE KINDS, FREE FROM DEFECTS AND LISTED BY UNDERWRITERS LABORATORIES, INC., OR OTHER NATIONALLY APPROVED TESTING AGENCY AND BEARING THEIR LABEL. MATERIALS AND EQUIPMENT OF SIMILAR APPLICATION SHALL BE OF SAME MANUFACTURER, EXCEPT AS NOTED.

2) ELECTRICAL CHARACTERISTICS:

a) SERVICE: 277/480 VOLT (AND 120/208 VOLT), 3 PHASE, 4 WIRE, 60 HERTZ WITH GROUNDED NEUTRAL.

b) DISTRIBUTION: 277/480 VOLT (AND 120/208 VOLT), 3 PHASE, 4 WIRE, 60 HERTZ WITH GROUNDED NEUTRAL.

3) HEIGHTS OF OUTLETS: CONTRACTOR SHALL BE RESPONSIBLE FOR COORDINATING AND CONFIRMING ALL FINAL MOUNTING HEIGHTS WITH ARCHITECT AND ARCHITECTURAL DRAWINGS.

a) FROM FINISHED FLOOR TO CENTERLINE OF OUTLETS FOR:

- RECEPTACLES:	1 FT-6 IN.
- WALL SWITCHES:	3 FT-10 IN.
- MOTOR CONTROLLERS:	5 FT-0 IN.
- STROBE LIGHTS	6 FT-8 IN. (TO BOTTOM) OR 6 IN. BELOW CEILING (WHICHEVER IS LOWER)
- COMBNATION HORN/STROBE	6 FT-8 IN. (TO BOTTOM) OR 6 IN. BELOW CEILING (WHICHEVER IS LOWER)
- COMBNATION SPEAKER/STROBE	6 FT-8 IN. (TO BOTTOM) OR 6 IN. BELOW CEILING (WHICHEVER IS LOWER)
- SPEAKERS OR HORNS:	NOT LESS THAN 7 FT-6 IN
- MANUAL PULL STATIONS:	4 FT-0 IN.

b) EXCEPTIONS: AT JUNCTION OF DIFFERENT WALL FINISH MATERIALS, ON MOLDING OR BREAK IN WALL SURFACE, IN VIOLATION OF CODE, OR AS NOTED OR DIRECTED.

F. PRODUCT DELIVERY, STORAGE AND HANDLING

1) MOVING OF EQUIPMENT: WHERE NECESSARY, SHIP IN CRATED SECTIONS OF SIZE TO PERMIT PASSING THROUGH AVAILABLE SPACES AND TO ACCOMMODATE RESTRICTIONS ASSOCIATED WITH BUILDING ELEVATORS.

2) ACCESSIBILITY: FOR OPERATION, MAINTENANCE AND REPAIR. MINOR DEVIATIONS SHALL BE PERMITTED. CHANGES OF MAGNITUDE OR INVOLVING EXTRA COST ARE NOT PERMISSIBLE WITHOUT REVIEW. GROUP CONCEALED ELECTRICAL EQUIPMENT REQUIRING ACCESS WITH EQUIPMENT FREELY ACCESSIBLE THROUGH ACCESS DOORS.

G. MATERIALS

1) NAMEPLATES: PROVIDE BLACK LAMICOID SHEET WITH 3/4 IN. WHITE LETTERING, FASTENED WITH EPOXY CEMENT FOR EACH DISCONNECT SWITCH, CIRCUIT BREAKER, PANEL, CABINET, TRANSFORMER, ENCLOSURE, MOTOR CONTROLLER AND THE LIKE. NAMEPLATES SHALL DESCRIBE THE NAME AND NUMBER OF EACH COMPONENT.

2) CABLE TAGS: TAG EACH CONDUCTOR PASSING THROUGH SPLICE OR PULLBOX WITH A WHITE LINEN TAG, INDICATING POINT OF ORIGIN AND TERMINATION OF THE CIRCUIT.

3) INSERTS AND SUPPORTS:

a) INSERTS: STEEL, SLOTTED TYPE, FACTORY PAINTED.

- SINGLE ROD: SIMILAR TO ANVIL INTERNATIONAL FIG. 281.
- MULTI-ROD: SIMILAR TO MASON INDUSTRIES SERIES 9000 WITH END CAPS AND CLOSURE STRIPS.
- CLIP FORM NAILS FLUSH WITH INSERTS.
- MAXIMUM LOADING 75 PERCENT OF RATING.

b) SUPPORTS FROM BUILDING CONSTRUCTION: INSERTS, BEAM CLAMPS, STEEL FISHPLATES (IN CONCRETE FILL ONLY), CANTILEVER BRACKETS OR OTHER MEANS. SUBMIT FOR REVIEW.

c) GROUPED LINES AND SERVICES: TRAPEZE HANGERS OF BOLTED ANGLES OR CHANNELS.

d) WHERE BUILDING CONSTRUCTION IS INADEQUATE: PROVIDE ADDITIONAL FRAMING. SUBMIT FOR REVIEW.

H. PAINT SHALL BE THE BEST GRADE FOR ITS PURPOSE. DELIVER IN ORIGINAL SEALED CONTAINERS AND APPLY IN ACCORDANCE WITH MANUFACTURER'S INSTRUCTIONS. COLORS SHALL BE AS SELECTED BY ARCHITECT OR ENGINEER. UTILIZE GALVANIZED IRON PRIMER ON PANEL AND PULL BOXES, AFTER FABRICATION. UTILIZE HOT DIPPED GALVANIZED OR DIPPED IN ZINC BASED PRIMER FOR: OUTLET BOXES, JUNCTION BOXES, CONDUIT HANGERS, RODS, INSERTS AND SUPPORTS. ZINC BASED PRIMER WITH FINISH TO MATCH SURROUNDINGS SHALL BE USED FOR MARRED SURFACES OF STEEL EQUIPMENT AND RACEWAYS. A FIELD-APPLIED ZINC BASED PRIME COAT SHALL BE UTILIZED FOR STEEL OR IRONWORK.

I. BRUSH, CLEAN, REMOVE DEBRIS AND REPAIR ALL WORK PRIOR TO CONCEALING AND INSTALLATION ACCEPTANCE.

J. FINAL LOCATIONS AND MOUNTING ORIENTATIONS OF ALL SWITCHES, RECEPTACLES AND LIGHT FIXTURES SHALL BE VERIFIED WITH ARCHITECT.

K. PROVIDE ACCESS DOORS WHEN CONCEALED ELECTRICAL EQUIPMENT REQUIRES ACCESS. ALL ACCESS DOOR FINAL LOCATIONS SHALL BE COORDINATED WITH THE ARCHITECT PRIOR TO INSTALLATION.

7. DEMOLITION

A. "SELECTIVE DEMOLITION": IS HEREBY DEFINED TO INCLUDE BUT IS NOT NECESSARILY LIMITED TO THE REMOVAL OF THE FOLLOWING EXISTING MATERIALS, ITEMS AND EQUIPMENT.

1) REFER TO ARCHITECTURAL/ELECTRICAL DEMOLITION PLANS AND RELATED NOTES FOR EXTENT OF DEMOLITION.

2) REFER TO EXISTING DRAWINGS AND SITE CONDITIONS FOR ALL REMOVAL OF WORK NECESSARY FOR COMPLETION OF NEW WORK AS SHOWN. EACH BIDDER SHALL CAREFULLY EXAMINE THE PREMISES AND DOCUMENTS DURING THE BIDDING PERIOD AND ASCERTAIN THE EXTENT OF REMOVAL OF EXISTING WORK. IF ADDITIONAL WORK IS NOTED BY THE CONTRACTOR, CALL IT TO THE ATTENTION OF THE ARCHITECT PRIOR TO SUBMITTING BID. BY SUBMITTING A BID, THE CONTRACTOR WILL HAVE DEEMED TO HAVE MADE SUCH EXAMINATION, TO ACCEPT SUCH CONDITIONS, AND TO HAVE MADE ALLOWANCES IN PREPARING HIS BID.

3) ITEMS OF SALVAGE SHALL BE CAREFULLY REMOVED WITHOUT DAMAGE; NAILS AND OTHER FASTENERS REMOVED THAT ARE NOT INTEGRAL TO THEIR CONSTRUCTION; AND STORED AND PROTECTED AT LOCATIONS DIRECTED BY THE OWNER. IDENTIFY AND TAG ALL SALVAGE MATERIALS REGARDING LOCATION IN EXISTING BUILDING AND RELATIONSHIP OF PARTS.

4) ALL DEMOLISHED AND/OR REMOVED MATERIALS NOT REQUIRED BY OWNER TO BE RETAINED OR TURNED OVER TO THE OWNER SHALL BE REMOVED FROM THE PREMISES, AND SHALL BE PROPERLY DISPOSED OF IN A LEGAL MANNER, OFF-SITE.

5) CARE MUST BE TAKEN NOT TO DISTURB EXISTING WIRING, WHICH IS NOT AFFECTED BY DEMOLITION. RESTORE ALL CIRCUITS AND EQUIPMENT DISRUPTED OR DISTURBED BY THE REMOVAL OF ONLY PARTS OF EXISTING SYSTEMS. MAINTAIN CONTINUOUS OPERATION OF EXISTING FACILITIES AS REQUIRED WITH NECESSARY TEMPORARY CONNECTIONS BETWEEN NEW AND EXISTING WORK. ALARM AND EMERGENCY SYSTEMS SHALL NOT BE INTERRUPTED.

6) ALL RACEWAYS TO BE ABANDONED SHALL BE REWORKED AS DEFINED WITHIN THE DEMOLITION NOTES. WHERE IT IS IMPRACTICAL TO REMOVE RACEWAY BACK TO SOURCE, DISCONNECT WIRING AT LOAD (EQUIPMENT) AND AT LINE SIDE, CUT AND CAP, FLUSH TO SURFACE. REMOVE CONDUCTORS FROM EXISTING RACEWAYS TO BE REWIRED. CLEAN RACEWAY AS REQUIRED PRIOR TO REWIRING.

7) ALL REQUIRED WORK FOR TIE-IN TO THE EXISTING EQUIPMENT SHALL BE ACCOMPLISHED AFTER HOURS, THE EXACT DAY AND TIME SHALL BE DIRECTED BY OWNER, AND AT NO ADDITIONAL CHARGE.

8. CUTTING AND PATCHING

A. THE CONTRACTOR SHALL BE RESPONSIBLE FOR ALL CUTTING AND PATCHING OF THE EXISTING AND NEW CONSTRUCTION WORK, WHICH MAY BE REQUIRED FOR THE PROPER INSTALLATION OF THE ELECTRICAL WORK. ALL PATCHING SHALL BE OF THE SAME MATERIALS, WORKMANSHIP, AND FINISH, AND SHALL ACCURATELY MATCH ALL SURROUNDING WORK.

B. CORE BORING OF CONCRETE FLOORS AND/OR WALLS IF REQUIRED, SHALL BE PROVIDED BY THE ELECTRICAL INSTALLER/CONTRACTOR.

9. COORDINATION

A. THE CONTRACTOR SHALL VERIFY FINAL LOCATIONS OF ALL ELECTRICAL DEVICES AND EQUIPMENT WITH OTHER TRADES AND ARCHITECT. IN CENTERING OUTLETS AND LOCATING BOXES AND OUTLETS, ALLOW FOR OVERHEAD PIPES, DUCTS, AND MECHANICAL EQUIPMENT, VARIATIONS IN FIRE PROOFING AND PLASTERING, WINDOW AND DOOR TRIM, PANELING, HUNG CEILINGS, AND THE LIKE, AND CORRECT ANY INACCURACY RESULTING FROM FAILURE TO DO SO WITHOUT EXPENSES TO THE OWNER

10. EQUIPMENT PROVIDED BY OTHERS

A. THE CONTRACTOR SHALL FURNISH AND INSTALL WIRING FOR EQUIPMENT FURNISHED BY OTHERS, AS SHOWN ON DRAWINGS. COORDINATE WITH ALL OTHER TRADES OR DETAILS FOR INSTALLATION. THE TERM "WIRING" AS USED HERE-IN, INCLUDES, BUT IS NOT LIMITED TO, FURNISHING AND INSTALLING CONDUIT, WIRE, JUNCTION BOXES, DISCONNECTS AND MAKING CONNECTIONS. CONTRACTOR SHALL CHECK ARCHITECTURAL, MECHANICAL, FIRE PROTECTION, PLUMBING AND LOW VOLTAGE SYSTEMS. DRAWINGS AND SPECIFICATIONS FOR EQUIPMENT TO BE PROVIDED BY OTHERS. INSTALLER/CONTRACTOR SHALL BE RESPONSIBLE FOR PROPER WIRING AND NECESSARY ELECTRICAL ADJUSTMENTS TO EQUIPMENT TO CONFORM TO SPECIFIED REQUIREMENTS OF THE EQUIPMENT.

11. LOW-VOLTAGE DISTRIBUTION EQUIPMENT:

A. PROVIDE COMPLETE EQUIPMENT INCLUDING BUT NOT LIMITED TO: SWITCHES, FUSES, CIRCUIT BREAKERS, PANELS AND TRANSFORMERS, ETC.

B. ALL EQUIPMENT SHALL BE NEW AND CONFORM TO NEMA, ANSI AND IEEE STANDARDS AS WELL AS JURISDICTIONAL CODE REQUIREMENTS. EQUIPMENT SHALL BE LISTED BY A NATIONALLY RECOGNIZED TESTING LABORATORY (NRTL) FOR USE INTENDED. "RECOGNIZED" PRODUCTS SHALL NOT BE UTILIZED. IN ADDITION, REMANUFACTURED, RECONDITIONED OR USED PRODUCTS SHALL NOT BE UTILIZED.

C. DISCONNECT SWITCHES SHALL BE FUSED OR NONFUSED AS NOTED. VOLTAGE SHALL BE AS REQUIRED. SWITCHES SHALL BE HEAVY DUTY AND HORSEPOWER RATED FOR MOTOR LOADS. DISCONNECT SWITCHES UTILIZED IN ELEVATOR MACHINE ROOMS SHALL BE NEMA 4 BUSMANN POWER MODULE SWITCH WITH FIRE SAFETY INTERFACE RELAY, FIRE ALARM VOLTAGE MONITORING RELAY, CONTROL POWER TRANSFORMER, KEY-TO-TEST SWITCH AND PILOT LIGHT OR APPROVED EQUAL BY EATON.

TOGGLE TYPE SWITCHES SHALL BE NONFUSED, LOAD BREAK, UTILIZED WITH A MAXIMUM RATING OF 20 AMPS AT 600 VOLTS AND 30 AMPS AT 240 VOLTS. TWO-POLE SWITCHES SHALL BE SIMILAR TO LEVITON MS 302. THREE-POLE SWITCHES SHALL BE SIMILAR TO LEVITON MS 303.

KNIFE-BLADE TYPE SWITCHES SHALL BE UL LISTED, LOAD BREAK, QUICK-MAKE-QUICK-BREAK WITH ARC QUENCHERS, UL CLASS R FUSES UP TO 600 AMP. SWITCHES SHALL BE GENERAL ELECTRIC QMR OR APPROVED EQUAL OF EATON OR SIEMENS. ALL SWITCH ENCLOSURES SHALL BE DEAD FRONT, NEMA TYPE 1, EXCEPT AS NOTED.

SWITCHES RATED 800 AMPS AND ABOVE SHALL BE BOLTED PRESSURE TYPE CONTACT SWITCHES, MANUALLY OPERATED SIMILAR TO PRINGLE BOLTED PRESSURE SWITCH, TYPE QA WITH A MINIMUM INTERRUPTING CAPACITY OF 7-1/2 TIMES THE CONTINUOUS CURRENT RATING. SHORT CIRCUIT CURRENT CARRYING CAPACITY SHALL BE 200,000 AMPERES UNLESS OTHERWISE NOTED ON DRAWINGS. ALL SWITCHES SERVING STEP-UP TRANSFORMERS 300KVA AND ABOVE SHALL BE HIGH PRESSURE CONTACT SWITCH, GENERAL ELECTRIC TYPE HPC.

D. FUSES:

1) CIRCUITS 601 TO 6000 AMPERES SHALL BE PROTECTED BY FUSES SIMILAR TO CURRENT LIMITING BUSSMANN LOW-PEAK TIME-DELAY FUSES KRP-C (AMP) SP, CLASS L LISTED BY UL WITH AN INTERRUPTING RATING OF 200,000 AMPERES RMS SYMMETRICAL.

2) CIRCUITS 0 TO 600 AMPERES SHALL BE PROTECTED BY FUSES SIMILAR TO CURRENT LIMITING BUSSMAN LOW-PEAK DUAL-ELEMENT TIME-DELAY LPN-RK (AMP) SP (250V) /LPS-RK (AMP) SP (600V) OR LPJ (AMP) SP (600V) (UL CLASS RK1 OR **CLASS J IN RESTRICTED SPACE ONLY**), AND BE LISTED BY UL WITH AN INTERRUPTING RATING OF 200,000 AMPERES RMS SYMMETRICAL.

3) MOTOR CIRCUITS - ALL INDIVIDUAL MOTOR CIRCUITS WITH FULL LOAD AMPERE RATINGS (FLA) OF 480 AMPERES OR LESS SHALL BE PROTECTED BY FUSES SIMILAR TO CURRENT LIMITING BUSSMANN LOW-PEAK DUAL-ELEMENT TIME-DELAY LPN-RK (AMP) SP (250V) /LPS-RK (AMP)SP (600V) OR LPJ (AMP)SP (600V) (UL CLASS RK1 OR **CLASS J IN RESTRICTED SPACE ONLY**), AND BE LISTED BY UL WITH AN INTERRUPTING RATING OF 200,000 AMPERES RMS SYMMETRICAL.

4) ALL FUSES SHALL BE PROVIDED BY SAME MANUFACTURER.

5) PROVIDE 1 SPARE MATCHING FUSE FOR EACH SET OF 3 AND A MINIMUM OF 3 SPARE PER SIZE AND TYPE.

E. CIRCUIT BREAKERS: MOLDED CASE BREAKERS SHALL BE THERMAL-MAGNETIC, QUICK-MAKE-QUICK-BREAK, BOLT-ON TYPE, MANUALLY OPERATED WITH INSULATED TRIP-FREE HANDLE. ALL BREAKERS 250 AMPS AND ABOVE SHALL INCLUDE LSI ELECTRONIC TRIP UNITS UNLESS OTHERWISE NOTED. MULTI-POLE TYPE BREAKERS SHALL CONTAIN INTERNAL TRIP BAR. TERMINALS SHALL BE SUITABLE FOR COPPER OR ALUMINUM CABLE. PROVIDE INTERCHANGEABLE TRIP FOR 225A FRAME AND ABOVE. FURNISH AUXILIARY DEVICES WHERE REQUIRED FOR SHUNT TRIPPING, OPEN AND CLOSE MOTOR OPERATOR AND ALARM INDICATION. PROVIDE ARC-FAULT TYPE CIRCUIT BREAKERS AS REQUIRED IN DWELLING UNITS. ENCLOSURES SHALL BE DEAD FRONT, NEMA TYPE 1, EXCEPT AS NOTED. FRAMES AIC SHALL BE AS FOLLOWS, UNLESS OTHERWISE NOTED: ALL BREAKERS SERVING MECHANICAL EQUIPMENT SHALL BE HACR RATED. PROVIDE 30mA GROUND FAULT BREAKERS FOR ALL ELECTRICAL HEAT TRACING CIRCUITS.

1) 120 VOLTS, 100-AMP FRAME: 10,000 AMPS MINIMUM.

2) 240 VOLTS, 100 AMP FRAME, 2 OR 3 POLES: 18,000 AMPS MINIMUM

3) 240 VOLTS, 225-AMP FRAME: 22,000 AMPS MINIMUM.

240 VOLTS, 225 AMP FRAME, 2 OR 3 POLE (WITH INTERCHANGEABLE TRIP): 50,000 AMPS MINIMUM

4) 277 VOLTS, 100-AMP FRAME: 14,000 AMPS MINIMUM.

5) 480 VOLTS, 100 AMP FRAME, 2 OR 3 POLE: 20,000 AMPS MINIMUM

6) 480 VOLTS, 225-AMP FRAME: 25,000 AMPS MINIMUM.

7) OVER 225 AMP FRAME: 65,000 AMPS MINIMUM

8) CIRCUIT BREAKERS TO BE INSTALLED IN EXISTING PANEL BOARDS SHALL BE OF THE SAME MANUFACTURER, TYPE AND AIC RATING AS PRESENTLY IN USE.

9) ALL CIRCUIT BREAKERS SERVING COMMERCIAL KITCHEN EQUIPMENT MOUNTED BENEATH A HOOD SHALL INCLUDE SHUNT TRIP FEATURE.

10) ALL 120V 15 AND 20 AMP CIRCUIT BREAKERS SERVING BRANCH CIRCUITS IN DWELLING UNITS AS DEFINED BY NEC 210.12 SHALL BE LISTED ARC FAULT CIRCUIT INTERRUPTER.

11) PANEL SCHEDULES FOR EXISTING PANELS IDENTIFIED ON PLANS INDICATE FINAL CIRCUIT BREAKER ARRANGEMENT ASSOCIATED WITH PROJECT. CONTRACTOR SHALL PROVIDE NEW BREAKERS AS REQUIRED TO PROVIDE BREAKER TYPE, SIZE AND ARRANGEMENT SHOWN AND AS REQURIED TO FACILITATE WORK. REMOVE AND REPLACE ANY BREAKERS WHICH ARE OF DIFFERENT MANUFACTURER. FURINISH AND INSTALL NEW PANEL INTERIOR IF EXISTING CANNOT BE RE-USED. ALL EXISTING SINGLE POLE 15 AMP CIRCUIT BREAKERS SHALL BE REPLACED WITH NEW SINGLE POLE 20 AMP CIRCUIT BREAKERS.

F. SWITCHBOARD MANUFACTURED BY EATON, GENERAL ELECTRIC, SIEMENS, SQUARE-D OR APPROVED EQUAL, UNLESS OTHERWISE NOTED HEREIN OR ON CONTRACT DRAWINGS. INSTALLATIONS SHALL MEET THE REQUIREMENTS OF THE LOCAL MUNICIPALITY AND UTILITY COMPANY.

THIS CRITERIA APPLIES TO ALL DISTRIBUTION EQUIPMENT WITH AN AMPERE RATING EQUAL TO AND GREATER THAN 800 AMP. PROVIDE AMPERE RATING AS NOTED WITH A SHORT CIRCUIT WITHSTAND RATING OF 200,000 AMP IC.

BUS BARS: PROVIDE HARD DRAWN COPPER, MINIMUM 98% CONDUCTIVITY, SILVER OR TIN PLATED AT JOINTS. CAPACITY SHALL BE AS NOTED. RATINGS FOR MAINS: MINIMUM SHALL BE EQUAL TO SIZE OF MAIN DISCONNECT OR SUPPLY FEEDER PROTECTIVE DEVICE AND CONTINUOUS FULL CAPACITY THROUGHOUT SWITCHBOARD.

SECTION: UP TO 2 BRANCH CIRCUITS IN SECTION, PROVIDE 100% OF SUM OF SWITCH RATINGS. OVER 2 BRANCH CIRCUITS IN SECTION, PROVIDE 80% OF SUM OF SWITCH RATINGS OR EQUAL TO SUM OF FUSE SIZES, WHICHEVER GREATER. INDIVIDUAL BRANCH: MINIMUM SHALL BE EQUAL TO CONNECTED SWITCH RATING OR CIRCUIT BREAKER FRAME SIZE. BUS TO SUPPLY AND LOAD SIDE OF DEVICES SHALL CLEAR SUPPLY BUS BEFORE CONNECTING FEEDER CABLES. SUPPORT INSULATORS ENCLOSING BUS AND SECURED TO SWITCHBOARD STRUCTURE. CONTACT SURFACES SHALL BE SILVER OR TIN-PLATED. FOR BLANK (SPACE) SWITCHBOARD COMPARTMENTS, PROVIDE FULL BUS DISTRIBUTION RATED FOR INDICATED CAPACITY.

GROUND BUS: GROUND SHALL BE 25% OF MAINS BUT NOT LESS THAN 1/2 SQ. IN. EXTEND LENGTH OF SWITCHBOARD AND BOLT TO EACH SECTION. LOCATE TO PERMIT DRILLING FOR FUTURE EXTENSION. IN SERVICE SWITCHBOARDS, CONNECT TO NEUTRAL BUS WITH DISCONNECTING LINK.

ENCLOSURE: PROVIDE FRONT AND REAR (WHERE SHOWN AND/OR FEASIBLE UNLESS OTHERWISE NOTED) ACCESSIBLE GROUP MOUNTED DEVICES. PROVIDE SWITCHING UNITS: AS INDICATED. METAL-ENCLOSED STRUCTURE SHALL BE BOLTED OR WELDED STEEL FRAMING OF SUFFICIENT STRENGTH TO MAINTAIN ALIGNMENT AND WITHSTAND RATED A.I.C. PANELS: PROVIDE PAN TYPE CONSTRUCTION, LOUVERED, MINIMUM NO. 12 USSG STEEL WITH HINGED ACCESS COVERS. PULL BOX (CROWN BOX): ENCLOSURE CONSTRUCTION SHALL BE THE SAME AS SWITCHBOARD WITH REMOVABLE COVERS. BOTTOM SHALL HAVE A MINIMUM 1 IN. APPROVED INSULATING MATERIAL WITH INDIVIDUAL CABLE OPENINGS AND SHALL BE FULLY ACCESSIBLE. CABLE SUPPORTS SHALL BE INSULATED. INCREASE ENCLOSURE GUTTER SPACE AS REQUIRED TO ACCOMMODATE WIRE BENDING RADIUS LIMITATIONS.

FINISH SHALL BE RUST-RESISTIVE BAKED-ON PRIMER AND FINISH COAT OF MANUFACTURER'S SWITCHBOARD GRAY LACQUER, EXCEPT AS NOTED. PROVIDE NAMEPLATES FOR SWITCHBOARD, SWITCHING UNITS AND DEVICES.

CURRENT TRANSFORMER CABINETS: PROVIDE IN ACCORDANCE WITH RULES OF UTILITY COMPANY AND SUBJECT TO ITS APPROVAL. METER PANS: PROVIDE TRANSFORMER TYPE WITH 10-POINT TEST BLOCK COMPLYING WITH UTILITY STANDARDS.

G. DISTRIBUTION PANELS: SWITCHING UNITS SHALL BE 3 PHASE, 4-WIRE CIRCUIT-BREAKER OR FUSED SWITCH TYPE AS SHOWN ON DRAWINGS AND NOTED ON PANEL SCHEDULES. BUS BARS SHALL BE HARD DRAWN COPPER, MINIMUM 98 PERCENT CONDUCTIVITY, SILVER OR TIN-PLATED JOINTS. FOR BLANK (SPACE) COMPARTMENTS, PROVIDE FULL BUS DISTRIBUTION RATED FOR INDICATED CAPACITY. GROUND SHALL BE 25% OF MAINS AND NEUTRAL FULLY RATED, BOTH COPPER.

1) CABINETS SHALL BE GALVANIZED SHEET STEEL BACK BOX, WITH DOOR AND TRIM AND LAPPED AND WELDED CORNERS. HARDWARE SHALL BE CHROME PLATED WITH FLUSH LOCK/LATCH HANDLE ASSEMBLY (UP TO 48 IN. HIGH DOORS) OR VAULT HANDLE, LOCK AND 3-POINT CATCH (LARGER THAN 48 IN. HIGH DOORS). HINGES SHALL BE SEMI-CONCEALED, 5-KNUCKLE STEEL WITH NONFERROUS PINS, 180-DEG OPENING, LOCATED A MAXIMUM 26 IN. ON CENTERS. MINIMUM GUTTER SPACES FOR 400A PANEL AND UNDER SHALL BE 9 IN. SIDES, 8 IN. TOP AND BOTTOM; OVER 600A PANEL SHALL BE MINIMUM 9 IN. SIDES, 12 IN. TOP AND BOTTOM, INCREASES AS REQUIRED.

2) DIRECTORY HOLDER SHALL BE METAL FRAME WITH CLEAR PLASTIC, TRANSPARENT COVER. A TYPEWRITTEN LIST INDICATING FEEDER CABLE AND CONDUIT SIZE, CIRCUIT NUMBERS, OUTLETS SUPPLIED AND THEIR LOCATIONS SHALL BE PROVIDED.

H. PANELBOARDS: SWITCHING UNITS SHALL BE 3 PHASE, 4-WIRE BOLT-ON CIRCUIT BREAKER TYPE. BUS BARS SHALL BE HARD DRAWN COPPER, MINIMUM 98 PERCENT CONDUCTIVITY. FOR BLANK (SPACE) COMPARTMENTS, PROVIDE FULL RATED BUS. MINIMUM GUTTER SPACES SHALL BE 5-3/4 IN. SIDES, TOP AND BOTTOM, INCREASE FOR THROUGH FEEDERS. PROVIDE 25% COPPER GROUND BUS AND 100% COPPER NEUTRAL BUS AND INCREASE NEUTRAL BUS AS INDICATED. DIRECTORY HOLDER SHALL BE METAL FRAME WITH CLEAR PLASTIC, TRANSPARENT COVER. A TYPEWRITTEN LIST INDICATING FEEDER CABLE AND CONDUIT SIZE, CIRCUIT NUMBERS, OUTLETS SUPPLIED AND THEIR LOCATIONS SHALL BE PROVIDED.

1) PROVIDE MULTI-SECTION PANELS AS REQUIRED TO PROVIDE THE APPROPRIATE NUMBER OF POLES. WHERE THE PANEL SCHEDULE INDICATES A MAIN DEVICE FOR THE PANEL AND CONTRACTOR ELECTS TO PROVIDE MULTIPLE SECTIONS, PROVIDE SEPARATE MAIN DEVICES FOR EACH SECTION. SPLIT THE LOADING AND BRANCH BREAKERS BETWEEN EACH SECTION.

2) PROVIDE COMMON TRIP HANDLES FOR MULTI-WIRE BRANCH CIRCUITS PER NEC SECTION 210.4.

3) ENCLOSURES SHALL BE SURFACE OR FLUSH AS INDICATED. TRIMS SHALL BE SECURED TO PANEL WITH MACHINE SCREWS. COVERS SHALL BE HINGED DOOR-IN-DOOR CONSTRUCTION WITH CYLINDER LOCKS AND CATCHES. LOCKS MUST BE COMPATIBLE WITH BUILDING STANDARD KEY SYSTEM AND WHEN NONE EXISTS, THEY SHALL BE SIMILAR TO A YALE NO. 911 KEY.

I. TRANSFORMERS SHALL BE UL LISTED, NEMA 1 VENTILATED, DRY TYPE, CLASS H INSULATION, 115°C (OR 150°C RISE WHERE INCREASED ENERGY EFFICIENCY IS ACHIEVED) TEMPERATURE RISE ABOVE 40 DEGREES C AMBIENT BASED ON 220 DEGREES C INSULATION SYSTEM. WINDINGS SHALL BE COPPER. TRANSFORMER CORE AND COIL ASSEMBLY SHALL BE VACUUM PRESSURE IMPREGNATED WITH RESIN COMPOUND SEALING OUT MOISTURE AND AIR. DIPPED AND BAKED CORE AND COILS ARE NOT ACCEPTABLE. PRIMARY AND SECONDARY WINDING SHALL BE DELTA AND WYE TYPE INCLUDING STEP UP TRANSFORMER OTHER TYPES OF WINDING SHALL BE NOTED. TRANSFORMER SHALL INCLUDE ELECTROSTATIC SHIELD. PRIMARY TAPS SHALL CONSIST OF TWO 2 1/2% TAPS ABOVE AND FOUR 2-1/2% BELOW RATED VOLTAGE. TRANSFORMERS SHALL HAVE A MINIMUM OF 10 KV BIL RATING ON BOTH HIGH AND LOW VOLTAGE SIDES. THREE PHASE TRANSFORMERS RATED 15 KVA TO 1000 KVA AND SINGLE PHASE TRANSFORMERS 15KVA TO 333 KVA SHALL HAVE EFFICIENCY PERFORMANCE THAT MEETS OR EXCEEDS THE DEPARTMENT OF ENERGY (DOE) LATEST STANDARDS. HARMONIC CAPABILITY SHALL BE 'K13'. TRANSFORMERS SHALL NOT EXCEED NOISE LEVELS AS PER NEMA ST-20. ALL TRANSFORMERS SHALL INCLUDE A 10 YEAR WARRANTY. ACCEPTABLE MANUFACTURERS INCLUDE HAMMOND POWER SOLUTIONS, REX POWER MAGNETICS, EATON, SQUARE-D, SIEMENS OR GENERAL ELECTRIC. REFERENCE PLANS AND DETAILS FOR ADDITIONAL REQUIREMENTS OR PROJECT SPECIFIC SPECIFICATIONS. ALL TRANSFORMERS 300 KVA AND ABOVE SHALL BE DESIGNED TO LIMIT MAGNETIZING INRUSH CURRENT TO A MAXIMUM OF 6 TIMES TRANSFORMER FULL LOAD CURRENT. TRANSFORMERS SHALL MEET THE LATEST DOE EFFICIENCY STANDARDS. ALL FLOOR MOUNTED TRANSFORMERS SHALL BE MOUNTED ON VIBRATION ISOLATORS SIMILAR TO COOPER INDUSTRIES RM-D SERIES (225 KVA AND BELOW) OR MASON INDUSTRIES MBSW SERIES (300 KVA AND ABOVE) WITH FINAL SELECTION BASED ON TRANSFORMER WEIGHT. FOR CEILING HUNG TRANFORMERS REFERENCE DRAWNG DETAIL FOR ADDITIONAL INFORMATION. WHERE TRANSFORMERS ARE INDICATED TO SERVE MORE THAN ONE PANEL AND TRANSFORMER DOES NOT HAVE A DEDICATED SECONDARY OVERCURRENT PROTECTION DEVICE, PROVIDE LUGS AS REQUIRED TO ACCOMDOATE A DEDICATED FEEDER TO EACH PANEL.

J. CONTACTORS FOR BRANCH CIRCUIT CONTROL IF SPECIFIED SHALL BE SIMILAR TO ASCO MODEL NO. 918 WITH TWO WIRE CONTROL OPTION AND ADDITIONAL REQUIRED ACCESSORIES, MOUNTED IN A NEMA 1 ENCLOSURE. CONTACTORS FOR PANELBOARDS SHALL BE SIMILAR TO ASCO MODEL NO. 920, MATCHING BUS AMPACITY WITH REQUIRED ACCESSORIES AND MOUNTED IN A NEMA 1 ENCLOSURE OR INTERNAL TO PANEL AS REQUIRED.

K. BALANCE THE LOAD OVER PHASES TO WITHIN ±10% WHEN NEW CIRCUITS ARE ADDED TO NEW OR EXISTING PANELS. LOADING SHALL BE BALANCED WITH ALL LAMPS OPERATING EQUIPMENT IN OPERATION AFTER THE SPACE IS OCCUPIED.

L. PROVIDE MULTI-CABLE LUGS WHERE REQUIRED. DOUBLE LUGGING SHALL NOT BE PERMITTED.

M. MOUNTING HEIGHT SHALL BE A MAXIMUM OF 6 FT-6 IN. FROM FLOOR TO TOP SWITCH UNIT.

N. UPDATE DIRECTORIES ON EXISTING PANELBOARDS WHERE CIRCUITING IS CHANGED.

O. TESTS: OPEN AND CLOSE LOAD BREAK SWITCHING DEVICES UNDER LOAD.

12. RACEWAYS:

A. PROVIDE RACEWAYS COMPLETE WITH BOXES, FITTINGS AND ACCESSORIES. CONDUIT OR TUBING SIZES REFERRED TO IN SPECIFICATIONS AND ON DRAWINGS ARE NOMINAL DIAMETERS. MINIMUM DIAMETER SHALL BE 3/4 IN. RACEWAYS SHALL RUN CONCEALED, EXCEPT AS NOTED.

B. MATERIALS

1) RACEWAYS:

a) RIGID STEEL CONDUIT: FULL-WEIGHT PIPE, GALVANIZED, THREADED.

b) ELECTRICAL METALLIC TUBING (EMT): THIN WALL PIPE, GALVANIZED, THREADLESS.

c) FLEXIBLE METAL CONDUIT: CONTINUOUS SINGLE STRIP, GALVANIZED.

d) WIREWAYS: WIRE SHALL BE AS NOTED, MINIMUM NO. 16 GAUGE STEEL WITH GROUND CONTINUITY. FINISH SHALL BE BAKED ENAMEL. COVERS SHALL BE SCREW-ON.

e) SURFACE METAL RACEWAY: SIZE AS NOTED. BASE 0.04 IN., COVER 0.25 IN. MATERIAL SHALL BE STEEL. FINISH SHALL BE BAKED ENAMEL. COVERS SHALL BE SCREW-ON.

f) RIGID ALUMINUM CONDUIT. FULL-WEIGHT PIPE, THREADED

g) LIQUIDTIGHT FLEXIBLE METAL CONDUIT: SUNLIGHT RESISTANT OUTER JACKET WITH A FLEXIBLE METAL CORE.

2) FITTINGS AND ACCESSORIES:

a) RIGID STEEL: NONSPLIT, THREADED, STEEL OR MALLEABLE IRON. ZINC DIE CAST NOT PERMITTED.

b) ELECTRICAL METALLIC TUBING: COMPRESSION TYPE OR DOUBLE SETSCREWS. GALVANIZED RIGID STEEL ELBOWS, 2 IN. OR LARGER.

c) FLEXIBLE METAL CONDUIT: ANGLE WEDGE TYPE WITH INSULATED THROAT.

d) BUSHINGS: METALLIC INSULATED TYPE.

e) FOR RIGID ALUMINUM CONDUIT, PROVIDE NON-SPLIT, THREADED COPPER FREE ALUMINUM ALLOY OR HOT DIPPED GALVANIZED.

f) LIQUIDTIGHT FLEXIBLE METAL CONDUIT: LIQUID-TIGHT WITH SEALING RING AND INSULATED THROAT.

g) EXPLOSION PROOF TYPE-COMPLYING WITH THE CLASS AND TYPE OF SPACE.

3) BOXES:

a) OUTLET BOXES: EXCEPT AS OTHERWISE REQUIRED BY CONSTRUCTION, DEVICES OR WIRING, BOXES SHALL BE STAMPED STEEL, 4 IN. SQUARE OR OCTAGON FOR FIXTURES. BOXES ABOVE CEILING SHALL BE 1-1/2 IN. DEEP. BOXES IN CEILING OR SLAB SHALL BE 3 IN. DEEP. BOXES IN WALL FOR FIXTURES SHALL BE 2-3/4 IN. DEEP. BOXES IN WALL FOR RECEPTACLES AND SWITCHES SHALL BE 1-1/2 IN. DEEP. FURNISH WITH RAISED COVERS AND FIXTURE STUDS WHERE REQUIRED. WITHOUT FIXTURE OR DEVICE: FURNISH BLANK COVER. OFFSET BACK-TO-BACK OUTLETS WITH MINIMUM 6 IN. SEPARATION.

b) JUNCTION AND PULL BOXES: GALVANIZED SHEET STEEL WITH SCREW-ON COVERS, EXCEPT AS NOTED. FURNISH WITH INSULATED SUPPORTS FOR CABLES. LOCATIONS SHALL BE AS NOTED OR REQUIRED AND ACCESSIBLE.

c) FLOOR BOX TYPES SHALL COORDINATED WITH ARCHITECT AND BE SUITABLE FOR CONDUIT, DEVICES NOTED AND FLOOR TYPE UNLESS OTHERWISE INDICATED ON DRAWINGS. RAISED OUTLETS SHALL BE HUBBELL #B2414 SERIES WITH ABOVE FLOOR FITTING. FLUSH OUTLETS UTILIZING CONDUIT RUN IN OR CHOPPED IN SLAB SHALL BE HUBBELL #B2414 SERIES WITH FLUSH FLOOR FITTING. INCREASE SIZE TO SUIT AS NECESSARY. PROVIDE RACEWAYS ONLY AS HEREIN SPECIFIED, EXCEPT AS NOTED. RACEWAYS SHALL BE RUN CONCEALED, EXCEPT AS NOTED.

4) PROVIDE RACEWAY SUPPORT UTILIZING CEILING TRAPEZE, STRAPHANGERS, OR WALL BRACKETS. PROVIDE U-BOLTS AT EACH FLOOR LEVEL OF RISER RACEWAYS AND CONNECTED TO ACCEPTABLE SUPPORTS. PROVIDE RISER CLAMPS AT EACH FLOOR LEVEL OF RISER RACEWAYS RESTING ON SLAB. SPACING OF SUPPORTS SHALL BE A MINIMUM OF 10 FT ON CENTER FOR METALLIC RACEWAY AND AS REQUIRED FOR NONMETALLIC RACEWAY. SPACING SHALL BE 5 FT ON CENTER FOR WIREWAYS AND PER CODE AND AS NOTED FOR OTHERS. MOUNT SUPPORTS TO STRUCTURE MASONRY WITH TOGGLE BOLTS ON HOLLOW MASONRY, EXPANSION SHIELDS OR INSERTS IN CONCRETE AND BRICK, MACHINE SCREWS ON METAL, BEAM CLAMPS ON FRAMEWORK, WOOD SCREWS ON WOOD, AND PAN THROUGH STRAPS IN METAL DECK. NAILS, RAWL PLUGS OR WOOD PLUGS SHALL NOT BE PERMITTED. WHERE REQUIRED BY STRUCTURE, FURNISH THROUGH BOLTS AND FISHPLATES.

EXPOSED RACEWAYS SHALL BE RUN PARALLEL WITH OR AT RIGHT ANGLES TO WALLS AND BUILDING STRUCTURE. PROVIDE CLEARANCE FROM WATER, STEAM OR OTHER PIPING (MINIMUM 3 IN. SEPARATION FROM STEAM AND HOT WATER PIPES, EXCEPT 1 IN. FROM PIPE COVER AT CROSSINGS AND 18 IN. FOR PARALLEL RUNS). FOR SUSPENDED CEILING OUTLETS, RUN ABOVE CEILING AND CONNECT TO CEILING SUPPORT CHANNELS. IN MASONRY AND POURED CONCRETE, RUN VERTICALLY ONLY.

MAINTAIN GROUNDING CONTINUITY OF INTERRUPTED METALLIC RACEWAYS WITH GROUND CONDUCTOR, AND IN FLEXIBLE CONDUIT FOR FEEDERS AND MOTOR TERMINAL CONNECTIONS.

EMPTY RACEWAYS OVER 10 FT LONG: PROVIDE FISH OR PULL WIRE, GALVANIZED OR NYLON ROPE.

RIGID STEEL CONDUIT SHALL BE PERMITTED FOR FEEDERS AND BRANCH CIRCUITS AND SHALL BE UTLIZED WHERE RUN IN MECHANCIAL ROOMS, OUTDOORS, EXPOSED CEILINGS, OR IN CONCRETE SLABS. PAINT MALE THREADS OF FIELD-THREADED CONDUIT WITH GRAPHITE-BASE PIPE COMPOUND AND BUTT CONDUIT ENDS. TOUCH UP MARRED SURFACES AND FIELD-CUT THREADS, CRC-COLD GALVANIZED.

EMT SHALL BE PERMITTED FOR INTERIOR FEEDERS AND BRANCH CIRCUITS, IN DRY LOCATIONS, DRY WALLS, EXPOSED CEILINGS (WHERE NOT SUBJECT TO PHYSICAL DAMAGE), SUSPENDED CEILINGS, HOLLOW BLOCK WALLS, FURRED SPACES AND WHERE NOT SUBJECT TO PHYSICAL DAMAGE.

FLEXIBLE STEEL CONDUIT SHALL BE UTILIZED FOR SHORT CONNECTIONS WHERE RIGID CONDUIT IS IMPRACTICAL. FROM OUTLET BOX TO RECESSED LIGHTING FIXTURE: PROVIDE MINIMUM 4 FT AND MAXIMUM 6 FT LENGTHS. FOR FINAL CONNECTION TO MOTOR TERMINAL BOX, TRANSFORMER AND OTHER VIBRATING EQUIPMENT: PROVIDE WITH POLYVINYL SHEATHING AND GROUND CONDUCTOR. MINIMUM LENGTH: 18 IN. WITH SLACK. CONNECT GROUND CONDUCTOR TO ENCLOSURE OR RACEWAY AT EACH END.

CUT CONDUIT ENDS SQUARE. REAM SMOOTH. PAINT MALE THREADS OF FIELD THREADED RACEWAYS WITH GRAPHITE BASE PIPE COMPOUND. DRAW UP TIGHT WITH RACEWAY COUPLING.

EXPANSION FITTINGS SHALL BE INSTALLED AT RIGHT ANGLES WITH CLIP JOINT CENTERED IN EXPANSION JOINT. PROVIDE A LENGTH OF RUN IN ACCORDANCE WITH MANUFACTURER'S RECOMMENDATIONS. PRESET FITTINGS SHALL ALLOW FOR TEMPERATURE VARIATION. FOR EXPANSION JOINT CROSSINGS, CROSS AT RIGHT ANGLES AND ANCHOR ENDS. FOR RACEWAY NOT IN SLAB, PROVIDE FLEXIBLE CONDUIT WITH EXTERNAL BONDING JUMPER STRIP. IN SLAB, PROVIDE O-Z/GEDNEY TYPE "AX" OR APPLETON TYPE "XJ" OR "XJF" WITH GROUND CONTINUITY.

C. FOR THROUGH-THE-FLOOR SYSTEMS (FIRE RATED POKE-THRU), UTILIZE AN ASSEMBLY SIMILAR TO WIREMOLD EVOLUTION SERIES AV6 FIRE RATED POKE-THROUGH-FLOOR BOX SYSTEM. FOR CONFERENCE ROOMS UTILIZE

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No.	Description	Date
1	ISSUED FOR BID	11/03/23

SPRING VALLEY POLICE LOCKER UPGRADES

DRAWING TITLE
ELECTRICAL SPECIFICATIONS

DRAWING NO.
E-700.00

SEAL & SIGNATURE

ISSUE DATE: 9-27-23
SCALE: NTS
DWG BY: DWN
CHK BY: CHECK

JOB NUMBER
23025-00