

ELECTRICAL GENERAL PROVISION

PART 1 - GENERAL

A. GENERAL CONDITIONS AND REQUIREMENTS:

THIS WORK IS SUBJECT TO THE GENERAL CONDITIONS AND THE GENERAL REQUIREMENTS BOUND THEREIN. THE FOLLOWING CODES AND REGULATIONS (LATEST VERSION) SHALL GOVERN THE EXTENT AND INSTALLATION OF ELECTRICAL WORK UNLESS MORE STRINGENT REQUIREMENTS ARE SHOWN ON THE DRAWINGS OR SPECIFIED HEREIN:

- A) 2014 N.E.C. F.B.C. 6TH EDITION 2017
B) NATIONAL FIRE PROTECTION ASSOCIATION STANDARDS (NFPA 72, 2013 EDITION)
C) UNDERWRITERS LABORATORIES, INC (UL)
D) NATIONAL ELECTRICAL MANUFACTURERS ASSOCIATION (NEMA)
E) APPLICABLE LOCAL AND STATE BUILDING CODES

B. SCOPE:

- 1. THE WORK OF THIS DIVISION CONSISTS OF FURNISHING ALL PLANT LABOR, EQUIPMENT, SUPERVISION, APPLIANCE, MATERIALS AND PERFORMING ALL OPERATIONS REQUIRED TO COMPLETE ALL ITEMS OF WORK IN ACCORDANCE WITH THESE SPECIFICATIONS, APPLICABLE DRAWINGS AND ALL OTHER APPLICABLE PORTIONS OF THE COMPLETE CONTRACT DOCUMENTS.
2. THE WORK PROVIDED UNDER THIS DIVISION SHALL INCLUDE ALL LABOR, MATERIALS, PERMITS, INSPECTIONS AND RE-INSPECTION FEES, TOOLS, EQUIPMENT, TRANSPORTATION, INSURANCE, TEMPORARY PROTECTION, TEMPORARY LIGHTING, SUPERVISION AND INCIDENTAL ITEMS ESSENTIAL FOR PROPER INSTALLATION AND OPERATION, EVEN THOUGH NOT SPECIFICALLY MENTIONED OR INDICATED BUT WHICH ARE USUALLY PROVIDED OR ARE ESSENTIAL FOR PROPER INSTALLATION AND OPERATION OF ALL ELECTRICAL SYSTEMS AS INDICATED IN THE CONTRACT DOCUMENTS.

C. SUBSTITUTIONS/APPROVED EQUAL:

- 1. PROVIDE ONLY UL LABELED PRODUCTS (WHERE APPLICABLE) OF TYPES INDICATED. ALL MATERIALS SHALL BE NEW AND IN PERFECT CONDITION, NOTWITHSTANDING ANY REFERENCE IN THESE DRAWINGS TO ANY ARTICLE, DEVICE, PRODUCT, MATERIAL, FORM OR TYPE OF CONSTRUCTION BY NAME, MAKE OR CATALOG NUMBER. SUCH REFERENCES SHALL BE INTERPRETED AS ESTABLISHING A STANDARD OF QUALITY AND SHALL NOT BE CONSTRUED AS LIMITING CONDITION. THE CONTRACTOR IN SUCH CASES MAY AT HIS OPTION USE ANY ARTICLE, DEVICE, PRODUCT, MATERIAL, FORM OR TYPE OF CONSTRUCTION WHICH IN THE JUDGMENT OF THE ARCHITECT/ENGINEER, EXPRESSED IN WRITING, IS EQUAL TO THAT SPECIFIED.

D. COST SAVINGS SHALL BE FORWARDED TO THE OWNER.

E. FEES, PERMITS AND REGULATIONS:

- 1. CONFORM TO ALL GOVERNING CODES, ORDINANCES OR REGULATIONS OF CITY, COUNTY, AND STATE HAVING JURISDICTION, WHERE LOCAL CODES ARE NOT APPLICABLE, CONFORM TO NATIONAL ELECTRIC CODE, LATEST REVISION.
2. BID WORK TO CONFORM TO CODE AT NO ADDITIONAL EXPENSE TO OWNER.

F. CONTRACTOR'S RESPONSIBILITIES:

- 1. COORDINATE WORK WITH OTHER TRADES, POWER AND TELEPHONE COMPANIES
2. COORDINATE WORK SCHEDULE AND MATERIAL DELIVERY.
3. PROVIDE A COMPETENT SUPERINTENDENT IN CHARGE OF WORK AT ALL TIME. REPLACE SUPERINTENDENT NOT DEEMED COMPLETE BY ARCHITECT. DO NOT WITHDRAW OR CHANGE SUPERINTENDENT WITHOUT PRIOR APPROVAL OF ARCHITECT.
4. PROVIDE QUALIFIED MECHANICS. INSTALL MATERIALS AND EQUIPMENT IN NEAT, WORKMANLIKE MANNER. REMOVE AND REPLACE ANY MATERIAL OR EQUIPMENT, WHICH IS IMPROPERLY INSTALLED, OR DAMAGED IN THE OPINION OF THE ARCHITECT, AT CONTRACTOR'S EXPENSE.
5. EXAMINE WORK OF OTHERS. NOTIFY ARCHITECT IMMEDIATELY IN WRITING IF ANY CONDITION EXISTS WHICH WILL PREVENT SATISFACTORY INSTALLATION OF MATERIALS, OR EQUIPMENT. STARTING OF WORK WITHOUT NOTIFICATION INDICATES ACCEPTANCE. AND SUBSEQUENT CHANGES REQUIRED WILL BE AT CONTRACTOR'S EXPENSE.
6. THE INTEGRITY OF FIRE-RATED PARTITIONS SHALL BE MAINTAINED AROUND PENETRATING ELECTRICAL ELEMENTS. FIRE-RATED SEALANT, SLEEVES, ESCUTCHEONS AND SIMILAR UNITS SHALL BE PROVIDED WHERE REQUIRED BY REFERENCED CODES AND AUTHORITIES HAVING JURISDICTION. ALL PENETRATIONS IN RATED ASSEMBLIES SHALL BE PROTECTED IN ACCORDANCE TO SECTION 714 OF FBCB.

G. INTERPRETATION OF DRAWINGS

- 1. THE DRAWINGS ARE DIAGRAMMATIC AND ARE NOT INTENDED TO SHOW EXACT LOCATIONS OF CONDUIT RUNS, OUTLET BOXES, JUNCTION BOXES, PULL BOXES, ETC. THE LOCATIONS OF EQUIPMENT, APPLIANCES, FIXTURES, CONDUIT, OUTLETS, BOXES AND SIMILAR DEVICES SHOWN ON THE DRAWINGS ARE APPROXIMATE ONLY. EXACT LOCATIONS SHALL BE AS ACCEPTED BY THE ENGINEER DURING CONSTRUCTION. OBTAIN IN THE FIELD ALL INFORMATION RELEVANT TO THE PLACING OF ELECTRICAL WORK AND IN CASE OF INTERFERENCE WITH OTHER WORK, PROCEED AS DIRECTED BY THE ENGINEER AND PROVIDE ALL LABOR AND MATERIALS NECESSARY TO COMPLETE THE WORK IN AN ACCEPTABLE MANNER.
2. NOTIFY ARCHITECT/ENGINEER OF ANY DISCREPANCIES FOUND DURING CONSTRUCTION OF THE PROJECT AND DO NOT PROCEED WITH THAT PORTION OF THE PROJECT, UNTIL A WRITTEN DEFINITIVE STATEMENT IS RECEIVED PROVIDING CLEAR DIRECTION. IF A CONFLICT EXISTS BETWEEN THE CONTRACT DOCUMENTS AND ANY APPLICABLE CODE OR STANDARD, THE MOST STRINGENT REQUIREMENT SHALL BE INCLUDED FOR THIS PROJECT. THE ENGINEER SHALL MAKE THE DECISION REGARDING QUESTIONABLE AREAS OF CONFLICT.

- 3. COMPARE ALL DRAWINGS AND VERIFY FIGURES BEFORE LAYING OUT WORK AND BE RESPONSIBLE FOR ANY ERRORS WHICH MIGHT HAVE BEEN AVOIDED THEREBY. SPECIAL NOTICE SHALL BE TAKEN OF CODE REQUIRED ELECTRICAL CLEARANCE AND ARCHITECT SHALL BE NOTIFIED IMMEDIATELY OF DISCREPANCIES.
4. WHEN MEASUREMENTS ARE AFFECTED BY CONDITIONS ALREADY ESTABLISHED, CONTRACTOR TO TAKE MEASUREMENTS NOTWITHSTANDING GIVING SCALE OR FIGURE DIMENSIONS ON DRAWINGS.

H. SERVICE AND METERING

- 1. COMPANY: THE UTILITY COMPANY SERVING THIS PROJECT, WHICH WILL BE REFERRED TO AS THE UTILITY COMPANY HEREIN.
2. SERVICE: MAKE ALL ARRANGEMENTS WITH THE UTILITY COMPANY FOR OBTAINING A COMPLETE SERVICE. PAY ALL CHARGES AND PROVIDE ALL LABOR AND MATERIAL FOR THE SERVICE. SERVICE SHALL BE OBTAINED AT 120/ 208 OR 277/480 VOLTS FROM THE UTILITY COMPANY. PROVIDE UNDERGROUND CABLES AND CONDUITS FOR INCOMING SERVICES FROM THE UTILITY'S PAD MOUNTED TRANSFORMER TO DISTRIBUTION EQUIPMENT. INSTALL METER SOCKET, AND PROVIDE CT CABINET AND WIRING. CONTRACTOR SHALL ALSO INCLUDE INSTALLATION COST OF UTILITY REQUIRED CONDUITS FROM THE UTILITY POLE TO PAD MOUNTED TRANSFORMER.

- 3. FEES: CONTACT THE UTILITY COMPANY TO DETERMINE IF ANY FEES, CHARGES OR COSTS WILL BE DUE THE COMPANY, AS REQUIRED FOR TEMPORARY POWER, PERMANENT POWER, INSTALLATIONS, HOOK-UPS, ETC. THIS FEE, CHARGE OR COST SHALL BE INCLUDED IN THE BID PRICE.
4. PAYMENT: PAY FOR ALL REQUIRED LICENSES, FEES AND INSPECTIONS. INCLUDE ALL COSTS IN THE PROPOSED CONSTRUCTION COST SUBMISSION. THESE COSTS SHALL INCLUDE BUT NOT BE LIMITED TO ALL APPLICABLE TAXES, PERMITS, NECESSARY NOTICES, CERTIFICATES AND ALL COSTS REQUIRED TO OBTAIN IT.

I. CUTTING AND PATCHING

THE ELECTRICAL CONTRACTOR SHALL COORDINATE ALL OPENING REQUIREMENTS WITH THE GENERAL CONTRACTOR. GENERAL CONTRACTOR SHALL PROVIDE ALL OPENINGS AND CLOSE IT IF GENERAL CONTRACTOR IS NOT PROPERLY INFORMED THIS DIVISION WILL PROVIDE OPENINGS AT HIS OWN EXPENSE. CUTTING OF STEEL, WOOD OR OTHER MAIN STRUCTURAL PARTS MUST BE APPROVED BY ARCHITECT PRIOR TO CUTTING.

J. HANDLING OF MATERIALS AND EQUIPMENT

- 1. RECEIVE, HOUSE, HANDLE AND DELIVER TO PROPER LOCATION, MATERIALS AND EQUIPMENT.
2. PROTECT FROM DAMAGE, MOISTURE, DIRT, DEBRIS AND WORK OF OTHER TRADES. USE OF PAPER, CARDBOARD, OTHER FLUENT MATERIAL WILL NOT BE PERMITTED. REPLACE OR REFINISH MARKED OR DAMAGED SURFACES TO SATISFACTION OF ARCHITECT/ENGINEER.

K. CLEAN UP

- 1. KEEP PREMISES FREE FROM ACCUMULATIONS OF WASTE MATERIAL OR RUBBISH.

- A) LEAVE PREMISES AND WORK IN CLEAN, ORDERLY CONDITION ACCEPTABLE TO ARCHITECT/ENGINEER. B) CLEAN ALL MATERIALS AND EQUIPMENT OF DIRT, DUST, PAINT, SPOTS, STAINS, SOIL, MARKS, ETC. ANY MATERIAL IN LESS THAN NEW CONDITION WILL BE REPLACED AT CONTRACTOR'S EXPENSE.

L. LABELS

- 1. PROVIDE FOR ALL EQUIPMENT, APPARATUS, DISCONNECT AND REMOTE CONTROL SWITCHES, ETC., RIGID, LAMINATED, PHONEMIC LABELS, BLACK WITH WHITE LETTERS SELF ADHESIVE BACK. TAPE LABELS OR ADHESIVE NOT PERMITTED.
2. SPECIFIC EQUIPMENT (I.E. ELECTRICAL PANELS AND EQUIPMENT) SHALL BE IDENTIFIED WITH ONE INCH HIGH, 3-INCHES LONG, 1/16-INCH THICK LABEL WITH 1/4-INCH LETTERS.

M. AS BUILT DRAWINGS

- 1. DURING PROGRESS OF WORK, KEEP ONE SET OF PRINTS OR JOB SHOWING ANY CHANGES FROM ORIGINAL PLANS.
2. UPON COMPLETION OF WORK, FURNISH ARCHITECT/ENGINEER WITH CLEAN SET OF LEGIBLE AND ACCURATELY MARKED PRINTS INDICATING ALL CHANGES FROM ORIGINAL PLANS.

M. GUARANTEE AND SERVICE

- 1. CONTRACTOR AND MANUFACTURER TO GUARANTEE EQUIPMENT FOR ONE (1) YEAR AFTER FINAL ACCEPTANCE
2. CONTRACTOR TO GRANTEE MATERIAL AND WORKMANSHIP FOR ONE (1) YEAR AFTER FINAL ACCEPTANCE AND REPLACE ANY DEFECTS WITHOUT EXPENSE TO OWNER. FURNISH SERVICE FOR ONE (1) YEAR AFTER ACCEPTANCE. SERVICE TO INCLUDE LUBRICATION, CLEANING NECESSARY ADJUSTMENTS AND/OR REPLACEMENTS, PREVENTATIVE MAINTENANCE, ETC.
3. LIGHT BULB REPLACEMENT LIMITED TO 30 DAYS.

N. SUBMITTALS

- 1. WITHIN FIVE (5) DAYS AFTER AWARD OF CONTRACT THE CONTRACTOR SHALL ORDER AND SCHEDULE DELIVERY OF ALL MATERIALS AND EQUIPMENT CONCERNED WITH THIS PORTION OF THE WORK. WITHIN TEN (10) DAYS AFTER AWARD OF CONTRACT SUBMIT TO ENGINEER, IN QUADRUPPLICATE, A STATEMENT OF CONFIRMATION LISTING EQUIPMENT SUPPLIER, DATE ORDERED AND DELIVERY DATE. WHERE CHOICE OF MANUFACTURER IS GIVEN TO THE CONTRACTOR, LIST THE ONE ORDERED. THE FOLLOWING ITEMS MUST BE INCLUDED IN SUBMITTAL LETTER: PANELS, SWITCHBOARD, DISCONNECTS, STARTERS, WIRE, CONDUIT, ELECTRIC METALLIC TUBING, OUTLET BOXES, DEVICES, PLATES, PLASTIC NAME PLATES, SPECIAL PURPOSE EQUIPMENT AND LIGHTING FIXTURES.
2. SHOP DRAWINGS TO BE SUBMITTED NO LATER THAN FORTY-FIVE (45) DAYS AFTER AWARD OF CONTRACT AND PRIOR TO INSTALLATION OF MATERIAL REQUIRING APPROVAL. SHOP DRAWINGS ARE TO BE SUBMITTED COMPLETE THROUGH THE GENERAL CONTRACTOR AT ONE TIME. INTERMITTENT OR INCOMPLETE SUBMITTALS WILL NOT BE CONSIDERED. MATERIAL OR EQUIPMENT REQUIRING SHOP DRAWINGS APPROVAL IS NOT TO BE INSTALLED ON PROJECT UNTIL APPROVED SHOP DRAWINGS HAVE BEEN RETURNED BY THE ARCHITECT/ENGINEER.

O. INSPECTIONS

- 1. DURING THE PROGRESS OF THE WORK, THE ENGINEER, OR OWNER'S REPRESENTATIVE, WILL MAKE OBSERVATIONS AT THE SITE TO DETERMINE CONFORMANCE OF WORK WITH PLANS, SPECIFICATIONS AND INTENT THEREOF. DEFICIENCIES, VIOLATIONS AND INCORRECT WORKMANSHIP OR MATERIALS AND EQUIPMENT AND CORRECTIVE ACTION THEREOF WILL BE BROUGHT TO THE ATTENTION OF THE CONTRACTOR, FOR HIS IMMEDIATE REMEDIAL ACTION.

P. INTERRUPTION OF EXISTING SERVICE

- 1. 48 HOURS ADVANCE NOTICE IS REQUIRED FOR OUTAGES ON FEEDER AND BRANCH CIRCUIT CONSIDERED VITAL TO OPERATION BY OWNER. CONTRACTOR SHALL REQUEST SUCH OUTAGE, WITH ANTICIPATED DURATION THEREOF, IN WRITING FROM OWNER AND SHALL OBTAIN OWNER'S PERMISSION THEREFOR.

Q. SAMPLES

- 1. PHYSICAL SAMPLES OF MATERIAL AND EQUIPMENT PROPOSED FOR INSTALLATION ON THIS PROJECT SHALL BE SUBMITTED TO ARCHITECT/ENGINEER UPON REQUEST.

- 2. SAMPLES SHALL BE SUBMITTED THROUGH THE GENERAL CONTRACTOR WITH ALL SHIPPING AND HANDLING CHARGES PREPAID. ANY EXPENSE INCURRED IN SECURING, DELIVERY AND RETURN OF SAMPLES IS RESPONSIBILITY OF CONTRACTOR. SAMPLES SHALL BE DELIVERED TO LOCATION DESIGNATED BY ARCHITECT/ENGINEER. IDENTIFY SAMPLE WITH SHIPPING TAG, WIRED IN PLACE, CONTAINING THE FOLLOWING INFORMATION:
A) NAME OF PROJECT.
B) NAME OF CONTRACTOR.
C) SPECIFICATION SECTION NUMBER COVERING SAMPLE.
D) MANUFACTURER'S NAME AND CATALOG NUMBER.
E) DATE SUBMITTED.

R. SPARE PARTS AND TOOLS

- 1. FURNISH TO THE OWNER, AND OBTAIN RECEIPT FOR IT, THE FOLLOWING:
A) ONE SET OF FUSES FOR EACH SIZE AND TYPES INSTALLED ON PROJECT, INCLUDING RELAYS FOR MAGNETIC STARTERS.
B) TWO KEYS EACH FOR PANEL LOCKS, WEATHERPROOF OUTLETS, PADLOCKS, TERMINAL CABINETS, ETC.
C) SPECIAL TOOLS FOR FIXTURES, PANELS, FIRE ALARM SYSTEM, TAMPERPROOF SCREWS, ETC. ALL ITEMS TO BE IDENTIFIED.
3. SAMPLES SHALL REMAIN THE POSSESSION OF CONTRACTOR EXCEPT AS FOLLOWS:
A) APPROVED SAMPLES, WITHOUT PHYSICAL DAMAGE, MAY BE INSTALLED ON THE PROJECT.
B) SAMPLES NOT CALLED FOR WITHIN 14 DAYS AFTER NOTIFICATION WILL BE DISPOSED OF BY THE ARCHITECT/ENGINEER.

S. SPARE PARTS AND TOOLS

- 1. FURNISH TO THE OWNER, AND OBTAIN RECEIPT FOR IT, THE FOLLOWING:
A) ONE SET OF FUSES FOR EACH SIZE AND TYPES INSTALLED ON PROJECT, INCLUDING RELAYS FOR MAGNETIC STARTERS.
B) TWO KEYS EACH FOR PANEL LOCKS, WEATHERPROOF OUTLETS, PADLOCKS, TERMINAL CABINETS, ETC.
C) SPECIAL TOOLS FOR FIXTURES, PANELS, FIRE ALARM SYSTEM, TAMPERPROOF SCREWS, ETC. ALL ITEMS TO BE IDENTIFIED.

T. FINAL INSPECTION AND TESTS

- 1. AS PRECEDENT TO FINAL INSPECTION AND ACCEPTANCE THE CONTRACTOR SHALL:
A) HAVE ALL PREVIOUSLY LISTED DEFECTS CORRECTED.
B) COMPLETE ALL WORK.
C) TEST ALL SYSTEMS AND HAVE DATA ON SUCH TEST.
D) HAVE ALL DIRECTORIES, LABELS AND INSTRUCTIONS.
E) COMPLIED WITH APPLICABLE PARAGRAPHS OF THIS SECTION.

- 2. FURNISH ADEQUATE MECHANICS AND PERSONNEL TO OPERATE SYSTEMS, MAKE ADJUSTMENTS, AND ASSIST WITH FINAL INSPECTION AS DIRECTED BY ARCHITECT/ENGINEER.

ELECTRICAL WORK

PART 1 - PRODUCTS

A. CONDUIT:

CONDUIT SHALL BE PROVIDED AS FOLLOWS, UNLESS OTHERWISE NOTED:

ELECTRICAL METALLIC TUBING (EMT): PROVIDE IN STUD AND HOLLOW MASONRY WALLS, ABOVE SUSPENDED AND FURRED CEILING, AND EXPOSED IN DRY LOCATIONS. MAXIMUM ID SHALL BE 2". ALL FITTING SHALL BE STEEL COMPRESSION TYPE. RIGID CONDUIT AND ELECTRIC METALLIC TUBING AS MANUFACTURED BY ONE OF THE FOLLOWING (OR APPROVED EQUAL): A) ARMO, B) REPUBLIC STEEL, C) TRIANGLE CONDUIT AND WIRE COMPANY, D) K. PORTER COMPANY, E) STEEL CITY, F) WHEATLAND TUBE.

FLEXIBLE METAL CONDUIT: PROVIDE FOR CONNECTIONS FROM JUNCTION BOX TO LIGHT FIXTURE IN ACCESSIBLE CEILING, (MAXIMUM RUN LENGTH OF 6' 0") AND ALL TERMINATION TO EQUIPMENT SUBJECT TO VIBRATION. (MAXIMUM RUN LENGTH OF 4' 0") ALL FITTINGS SHALL BE APPLETON AST SERIES OR APPROVED EQUAL. LIQUID-TIGHT SHALL BE USED IN DAMP OR WET LOCATIONS AND FOR EQUIPMENT CONTAINING LIQUIDS. ALL FITTINGS SHALL BE O.Z. GEONEY AKC SERIES OR APPROVED EQUAL.

PLASTIC CONDUIT AS MANUFACTURED BY ONE OF THE FOLLOWING: A. CARLON PLASTIC PRODUCTS CORP. B) CANTEX PLASTIC PRODUCTS C) HATFIELD WIRE AND CABLE COMPANY.

A NYLON PULL WIRE SHALL BE INSTALLED IN ALL EMPTY CONDUITS. IDENTIFY INTENDED USE AT BOTH ENDS.

B. COUPLINGS AND CONNECTORS:

- 1. COUPLINGS AND CONNECTOR MANUFACTURED BY ONE OF THE FOLLOWING (OR APPROVED EQUAL): A) APPLETON ELECTRIC COMPANY, B) RACO C), STEEL CITY

C. OUTLET BOXES:

- 1. GALVANIZED, STAMPED STEEL, 4-INCHES SQUARE BY 1-1/2 INCHES DEEP MINIMUM SIZE FOR WALL OUTLETS, MANUFACTURED BY, A) APPLETON ELECTRIC COMPANY, B) RACE ALL STEEL EQUIPMENT, C) STEEL CITY

- 2. FLOOR BOXES: HUBBELL #B-2536 WITH S-3182 BRASS CARPET FLANGE AND S-3925 FLAP TYPE COVER FOR DUPLEX RECEPTACLE.

D. PANELBOARDS:

- 1. SQUARE-D, GENERAL ELECTRIC OR SIEMENS.

E. WIRE:

- 1. WIRE FOR THIS PROJECT AS MANUFACTURED BY ONE OF THE FOLLOWING: A) AMACONDA, B) GENERAL CABLE COMPANY, C) HATFIELD WIRE AND CABLE, D) REYNOLDS METAL COMPANY, E) SIMPLEX WIRE AND CABLE, F) TRIANGLE CONDUIT AND WIRE COMPANY OR APPROVED EQUAL.

F. WIRING DEVICES:

- 1. SINGLE OR THREE WAY DIGITAL SWITCH SHALL BE RAISE/LOWER SWITCHES WITH LOCAL CONTROL OF LIGHTING ZONE. SWITCH MAY BE PROGRAMMED TO CONTROL ANY RELAY, DIMMER OR PANEL.
2. RECEPTACLE, DUPLEX (HUBBELL #5262, ARROW HART #5262)

- 3. RECEPTACLE GFI (ARROW HART GF5242-I WITH 4501 COVER, HUBBELL GF5262-I WITH WP-26 COVER)
4. SURGE PROTECTION DEVICE:

- 1. ADVANCED PROTECTION TECH. "TE/XGA SERIES"
2. CURRENT TECHNOLOGY "X SERIES"
3. INNOVATIVE TECHNOLOGY "PTX SERIES"
4. SQUARE D SURGEOLOGIC "EMA SERIES" 5. GENERAL ELECTRIC "TRANQUILL SERIES"

PART 2 EXECUTION

A. GROUNDING

- 1. PROVIDE EQUIPMENT GROUND SYSTEM IN ACCORDANCE WITH NATIONAL ELECTRIC CODE, ARTICLE 250.
A) ALL BRANCH CIRCUIT RACEWAY CONTAIN MINIMUM ONE NO. 12 AWG, TYPE TW, GREEN CODED GROUND WIRE.
B) GROUND CONDUCTOR FOR PANEL FEEDER AND BRANCH CIRCUITS WITH OVER CURRENT PROTECTION RATED MORE THEN 20 AMPERES SIZE.
C) ALL FIXTURES, RECEPTABLES, SWITCHES BONDED TO GROUNDING SYSTEM.
D) GREEN CODED GROUND CONTINUOUS FROM SERVICE ENTRANCE AND IN ADDITION TO NEUTRAL (1) NEUTRAL NOT USED AS GROUND FOR EQUIPMENT. EQUIPMENT GROUND BONDED TO NEUTRAL AT MAIN SERVICE ENTRANCE ONLY. (2) GREEN CODED GROUND CONDUCTORS TERMINATED UNDER EQUIPMENT GROUND BAR OF PANELS.

B. RACEWAYS:

- 1. PROVIDE ALL RACEWAYS FOR ALL SYSTEMS. RACEWAY LOCATIONS SHOWN ARE DIAGRAMMATIC, UNLESS SPECIFICALLY NOTED AND GOVERN OBSTRUCTIONS. EXPOSED RACEWAYS RUN IN NEAT MANNER ACCEPTABLE TO ARCHITECT. RACEWAYS SUPPORTED USING CONDUIT CLAMPS SUPPORT OR HOLD RACEWAYS IN PLACE.
A) RACEWAYS IMBEDDED IN EARTH, IN CONCRETE, IN DAMP OR WET LOCATIONS HOT DIPPED GALVANIZED RIGID, HEAVY WALL, THREADED NON-METALLIC, HIGH IMPACT DIRECT BURIAL TYPE II, P.V.C, WHERE PERMITTED BY CODES.
B) RACEWAYS IN WALL OR FURRED CEILING TO BE ELECTRIC METALLIC TUBING
C) RIGID STEEL CONDUIT USED FOR EXPOSED EXTERIOR RACEWAYS.

- 2. RACEWAYS REAMED SMOOTH AFTER CUTTING AND/OR THREADING.

- 3. RIGID STEEL, THREADED CONDUITS AND SCHEDULE 40 PVC TO HAVE DOUBLE LOCKNUTS AND O.Z. TYPE B BUSHING.

- 4. ELECTRIC METALLIC TUBING COUPLING AND CONNECTORS MACHINED STEEL, SET SCREW TYPE.

- 5. CONNECTIONS TO MOTORS AND VIBRATING EQUIPMENT MADE WITH SUFFICIENT FLEXIBLE CONDUIT SO VIBRATION IS NOT TRANSMITTED TO:
A) USE FLEXIBLE, NON-METALLIC, LIQUID-TIGHT CONDUIT, UL APPROVED, FOR MOTOR CONNECTIONS.
B) FLEXIBLE CONDUIT NOT USED FOR FIXTURE CONNECTIONS, EXCEPT RECESSED OR LAY-IN TYPE FIXTURES.
C) MINIMUM SIZE 1/2-INCH.

- 6. MINIMUM 24" RADIUS ELBOWS AND CONDUITS TO BE USED WHEN RISING FROM BELOW FLOOR ON SURFACE OF WALLS EXCEPT FOR LOW VOLTAGE RACEWAYS

- 7. LOW VOLTAGE RACEWAYS (SYSTEMS OPERATING AT 70 VOLTS OR BELOW) TYPE 4 POLYVINYL CHLORIDE, UL FORMULA NON-METALLIC
A) LOW VOLTAGE RACEWAYS TO HAVE BUSHING AT ALL TERMINALS.
B) NYLON PULL CORD, 5W POUND TEST MINIMUM, LEFT IN ALL RACEWAYS, IN WHICH CONDUCTORS ARE NOT INSTALLED.

C. OUTLET BOXES:

- 1. EXCEPT AS NOTED OTHERWISE, ALL OUTLETS LOCATED AS FOLLOWS: (MEASURED FROM FINISHED FLOOR LEVEL TO BOTTOM OF BOX):
A) SWITCHES-----48" TO OPERABLE PART
B) RECEPTABLES-----15"
C) WALL TELEPHONES-----48"

- 2. PROVIDE REQUIRED OUTLETS, SWITCH, PULL AND JUNCTION BOXES OF SUITABLE TYPE FOR MOUNTING INDICATED. BOXES SHALL BE GALVANIZED STEEL, NOT LESS THEN 4" SQUARE AND 1-1/2" DEEP UNLESS OTHERWISE INDICATED. BOXES SHALL BE SECURED TO STRUCTURE INDEPENDENT OF CONDUIT SUPPORTS. PLASTER RINGS SHALL BE PROVIDED FOR RECESSED UNITS.

- 3. CONTRACTOR SHALL COORDINATE LOCATIONS OF UNITS INDICATED ON ELECTRICAL DRAWINGS WITH ACTUAL LOCATIONS ESTABLISHED BY ARCHITECT OR MECHANICAL CONTRACTOR FOR CLARIFICATION BEFORE PRECEDING WITH INSTALLATION.

D. PANELBOARDS (SHOP DRAWINGS REQUIRED):

- 1. BRANCH CIRCUIT PANEL BOARDS CIRCUIT BREAKER TYPE WITH BOLT-ON BREAKERS DEAD FRONT, LOCKING DOOR, FLUSH LOCK MASTER KEYED.

- 2. BREAKERS CLEARLY NUMBERED, WHERE SPACES ARE CALLED FOR, PROVIDE HARDWARE REQUIRED FOR FUTURE INSTALLATION OF BREAKERS. BUS AND HARD WARE BRACED FOR INTERRUPTING CAPACITY OF LARGEST BREAKER IN PANEL, INTERRUPTING RATING AS SHOWN ON DRAWINGS.

- 3. PROVIDE TYPE CIRCUIT DIRECTORY UNDER TRANSPARENT SHIELD, ON INSIDE OF COVER OF EACH PANEL BOARD. DIRECTORY TO ACCURATELY LIST CIRCUIT NUMBER, LOCATION, TYPE OF OUTLETS INDICATE CONTROLLED AND CONNECTED LOAD ON CIRCUIT

- 4. PROVIDE LAMINATED, RIGID PLASTIC LABEL BELOW DIRECTORY WORDED AS FOLLOWS: INSTALLED BY (NAME OF THE CONTRACTOR) (YEAR)

- 5. PROVIDE EACH PANEL BOARD WITH GREEN CODED GROUND BAR, NOT CONNECTED TO NEUTRAL, FOR GREEN EQUIPMENT GROUND WIRES, BACK BAR TO HAVE MINIMUM CAPACITY OF 11 TERMINAL WITH SOLDERLESS BOX LUGS FOR WIRE SIZE #12 MINIMUM TO #4 MAXIMUM. LOCATE BAR ADJACENT TO NEUTRAL BAR, BOLT OR WELD TO PANEL CAN.

- 6. PROVIDE PLASTIC LABEL LISTING PANEL DESIGNATION, VOLTAGE AND PHASE ON INSIDE OF PANEL COVER ABOVE DIRECTORY.

E. DISCONNECT SWITCHES (SHOP DRAWINGS REQUIRED):

- 1. PROVIDE DISCONNECT SWITCHES, FUSED AND NON-FUSED AS REQUIRED BY CODES.
A) SWITCHES NEMA RATED DUTY, FED. SPEC. W-S-865C
B) RATED 240 VOLTS FOR 208 VOLT SYSTEM, AND 600 VOLTS FOR 480 VOLT SYSTEM.
2. EACH MOTOR, REMOVE FROM PANEL LOCATION, TO HAVE NON-FUSED DISCONNECT SWITCH OR BREAKER WITHIN SIGHT OF MOTOR LOCATION. SAFETY SWITCHES SAME MANUFACTURER AS BRANCH CIRCUIT PANELBOARDS.
A) EXTERIOR SWITCH NEMA 3R.

F. BRANCH CIRCUIT WIRING:

- 1. CONDUCTORS TO BE COPPER. NO WIRE SMALLER THAN NUMBER # 12 AWG ANY BRANCH CIRCUIT

- 2. CONDUCTOR INSULATION, UNLESS OTHERWISE NOTED, TYPE THIN, INSULATION CODED AS FOLLOWS:
A) 120/208 VOLT SYSTEM:
(1) PHASE A, BLACK
(2) PHASE B, RED
(3) NEUTRAL, WHITE
(4) TRAVELERS, PURPLE
(5) GROUND, GREEN

- B) 277/480 VOLT SYSTEM
(1) PHASE A, YELLOW
(2) PHASE B, ORANGE
(3) PHASE C, BROWN
(4) NEUTRAL, GRAY
(5) TRAVELERS, 3 WAY, PINK
(6) GROUND, GREEN

- 3. SAME COLOR INSULATION FOR PARTICULAR PHASE OR PART OF CIRCUIT RUN WITH SAME COLOR THROUGHOUT JOB. COLOR CODE INTEGRAL PART OF INSULATION, PAINTED OR TAPED CONDUCTORS NOT ACCEPTED EXCEPT AS FOLLOWS:
A) WIRE SIZED NO. 1 AND LARGER MAY BE COLOR CODED BY WRAPPING WITH 3M TAPE (NO. 35) FOR ENTIRE LENGTH OF EXPOSED AREA IN GUTTERS, PANEL CANS, SWITCHBOARDS, OR WIREWAYS.

- 4. SPLICES OR JOINTS IN CONDUCTORS MECHANICALLY AND ELECTRICALLY SOUND, MADE IN OUTLET BOXES ONLY, EXCEPT BALLAST CONNECTION. ALL JOINT MADE USING TYPE Y, G, R, B SCOTCH-LOCK CONNECTORS ONLY.
A) AT EACH OUTLET, LOOP WIRE 8-INCHES LONG LEFT FOR CONNECTION TO DEVICE.
B) FLUORESCENT FIXTURE WIRING TO CONFIRM TO NATIONAL ELECTRIC CODE, ARTICLE 410-24; USE THIN INSULATION.

- 5. OUTLETS CONNECTED AS INDICATED ON PLANS, ALTERING CIRCUITS NOT PERMITTED WITHOUT WRITTEN APPROVAL OF ENGINEER.

- 6. ALL BRANCH CIRCUIT AND FEEDER RACEWAYS CONTAIN GREEN CODED, TW, GROUND WIRE IN ADDITION TO OTHER CONDUCTORS.

G. WIRING DEVICES (SHOP DRAWINGS REQUIRED):

- 1. PROVIDE ALL WIRING DEVICES INDICATED ON PLANS. COLOR OF DEVICE SELECTED BY ARCHITECT AT TIME OF SUBMITTAL.

H. DEVICE PLATES (SHOP DRAWINGS REQUIRED):

- 1. WIRING DEVICES TO HAVE PLASTIC TYPE PLATE AS REQUIRED BY DEVICE. COLOR BY ARCHITECT. OUTLET WITHOUT DEVICES, EXCEPT TELEPHONE, TO HAVE BLANK PLATE. PLATES HOLD IN PLACE BY OVAL HEAD, STAINLESS STEEL SCREWS, MATCHING PLATE BY COLOR.

I. FIXTURES (SHOP DRAWINGS REQUIRED):

- 1. PROVIDE FIXTURES AS LISTED ON FIXTURE SCHEDULE, COMPLETELY WIRED AND LAMPED WHERE DESIGNATED ON DRAWINGS. CORRELATE SUPPORT AND MOUNTING METHOD WITH ALL SUBCONTRACTORS INVOLVED WITH SURROUNDING SURFACE.
A) FIXTURE SUPPORT BOLTED OR WELDED TO SUPPORTING SURFACE.

- 2. FLORESCENT FIXTURE BALLAST CBM CERTIFIED, SOUND RATING A WITH AUTOMATIC THERMAL RESET. JEFFERSON, ADVANCE, SOLA OR APPROVED EQUAL ENERGY SAVING TYPE.

J. LAMPS:

- PROVIDE NEW LAMPS IN ACCORDANCE WITH THE FOLLOWING:
A) FLUORESCENT, 3500K/4 FT T5/CTRKN
B) INCANDESCENT, INSIDE FROSTED WITH A MINIMUM RATING OF 130 VOLTS UNLESS OTHERWISE INDICATED.
C) LOW VOLTAGE MR-16 MEDIUM SPOT

K. EXIT LIGHTS (SHOP DRAWINGS REQUIRED):

PROVIDE EXIT LIGHT UNITS WHERE INDICATED ON DRAWINGS AND IN ACCORDANCE WITH ALL LOCAL CODE REQUIREMENT, INCLUDING FIRE DEPARTMENT.

L. POWER AND CONTROL WIRING TO EQUIPMENT:

- 1. PROVIDE ALL ELECTRICAL POWER CONNECTIONS TO EQUIPMENT INDICATED ON PLANS UNLESS OTHERWISE DIRECTED.
A) PROVIDE ALL CONDUITS AND WIRING FROM PANEL TO MOTOR TERMINAL.
B) PROVIDE ALL DISCONNECTS REQUIRED AND MAKE ALL POWER CONNECTIONS IN THESE CIRCUITS

- 2. CONTROL EQUIPMENT, MOTOR STARTERS, RELAYS, LINE VOLTAGE CONTROLS, TRANSFORMER, LOW VOLTAGE CONTROLS AND DEVICES NECESSARY FOR THE OPERATION OF HEATING, AIR CONDITIONING, VENTILATION AND PLUMBING SYSTEM FURNISHED AND SET IN PLACE BY RESPECTIVE SUBCONTRACTOR.
3. ALL CONTROL WIRING UNDER DIVISION 15 OF SPECIFICATIONS.

M. MOTOR STARTER

- 1. ALL MOTORS SHALL BE FURNISHED AND INSTALLED BY MECHANICAL AND CONNECTED BY ELECTRICAL CONTRACTOR. ELECTRICAL CONTRACTOR SHALL PROVIDE ALL MOTORS STARTER NOT FURNISHED WITH EQUIPMENT.

N. TELEPHONE SYSTEM:

- 1. PROVIDE ALL RACEWAYS, PULL BOXES, OUTLETS AND TERMINAL BOARDS REQUIRED FOR SYSTEM SHOWN.
A) TERMINATE RACEWAYS IN MANNER SUITABLE TO TELEPHONE COMPANY, IN LOCATIONS SHOWN
B) COORDINATE ENTIRE SYSTEM WITH TELEPHONE COMPANY PRIOR TO INSTALLATION
C) GROUNDING AS INDICATED AND/OR DIRECTED BY LOCAL TELEPHONE COMPANY
D) ALL TELEPHONE SYSTEM, INCLUDING EQUIPMENT, SWITCHES, AND WIRING TO BE PROVIDED BY OWNER/REPRESENTATIVE.

GENERAL NOTES:

- 1. CONCRETE WORK REQUIRED FOR THE INSTALLATION OR CONSTRUCTION OF ANY OF THE ELECTRICAL WORK SPECIFIED HEREIN SHALL CONFORM TO THE REQUIREMENTS OF THE APPLICABLE SECTIONS OF THE SPECIFICATIONS.
2. CONDUITS RUN EXPOSED AND VULNERABLE TO MECHANICAL INJURY SHALL BE RIGID, HEAVY-WALL, GALVANIZED STEEL OR ALUMINUM. ALUMINUM CONDUITS MAY NOT BE USED BELOW GRADE OR EMBEDDED IN CONCRETE.
3. CONDUITS RUN EXPOSED OUTSIDE OR IN FLOOR SLABS SHALL BE RIGID, HEAVY-WALL, GALVANIZED OR SHERARDIZED STEEL OR SCHEDULE 80 PVC.
4. CONDUITS RUN BELOW GRADE, EXTERIOR TO THE BUILDING SHALL BE SCHEDULE 40 HEAVY-WALL, HIGH IMPACT POLYVINYL CHLORIDE ELECTRICAL CONDUIT.
5. OUTLET BOXES AND CONDUITS SHALL BE GALVANIZED OR SHERARDIZED, ONE-PIECE PRESSED STEEL, KNOCKOUT TYPE, AND OF AN APPROVED MAKE.
6. OUTLET BOXES SHALL BE EQUIPPED WITH PLASTER RING, EXTENSION RINGS OR FIXTURE STUDS AS MAY BE REQUIRED. DO NOT INSTALL BOXES BACK TO BACK.
7. BOXES EXPOSED TO RAIN OR OTHER MOISTURE SHALL BE CROUSE-HINDS TYPE FS, FD CONDUIT BOXES WITH APPROPRIATE INUSE COVERS AND GASKETS.
8. DUPLEX 20 AMP CONVENIENCE RECEPTABLES (COLOR AS SELECTED BY ARCHITECT ) 120 VOLT GROUNDING TYPE. SHALL HAVE TWO CURRENT-CARRYING CONTACTS AND ONE GROUNDING CONTACT WHICH IS INTENTIONALLY CONNECTED TO THE FRAME. (ONLY PAS OR HUBBELL #5242 OR LEVITON #5014 ARE APPROVED)
9. GROUND FAULT RECEPTACLE SHALL BE DUPLEX TYPE.
10. WEATHERPROOF DEVICES.
11. ALL RECEPTABLES, SWITCHES AND JUNCTION BOXES ON THE EXTERIOR OF THE BUILDING, ON THE ROOF, OR IN LANDSCAPED AREAS SHALL HAVE A WEATHERPROOF LIFT COVER PLATE.
12. FURNISH & INSTALL CONDUCTORS OF THE SIZE AND TYPE SHOWN ON THIS DRAWING. ALL CONDUCTORS SHALL BE COPPER, TYPE THIN AND RATED AT 600 VOLTS. ALL SIZES ARE THE MINIMUM ACCEPTABLE TO SATISFY AMPACITY REQUIREMENT. CONSIDERATION SHALL BE GIVEN TO VOLTAGE DROP AND INSULATION SCOR WHERE NECESSARY. 20A CIRCUITS GREATER THEN 75 FT IN LENGTH SHALL BE #10 AWG MINIMUM 20A CIRCUITS GREATER THAN 130 FT IN LENGTH SHALL BE #8 AWG MINIMUM, CHANGE TO #12 AT J-BOX AHEAD OF FIRST RECEPTACLE.
13. CONTRACTOR IS RESPONSIBLE TO IDENTIFY ALL UNDERGROUND UTILITIES PRIOR TO START OF EXCAVATION, THE ENGINEER'S DRAWING SHALL ONLY BE USED AS A GUIDE. BASED ON EXISTING INFORMATION THAT WAS AVAILABLE. THE CONTRACTOR IS RESPONSIBLE TO FIELD VERIFY LOCATION OF ALL CONDUITS.
14. THE CONTRACTOR IS RESPONSIBLE TO VERIFY THE FIXTURE CATALOG NUMBERS TO ENSURE COMPLIANCE WITH THE OTHER FACILITIES. IF THERE IS ANY DISCREPANCY, OR THE EXISTING MATERIAL IS NO LONGER AVAILABLE, THEN CONTRACTOR SHALL SPECIFY THAT IN HIS BID AND SUBMIT AN EQUIVALENT SUBSTITUTE FOR APPROVAL BY THE OWNER.
15. CONNECT ALL EMERGENCY LIGHTING (EXIT LIGHTS) ON THE SAME CIRCUIT AS THE NORMAL LIGHTING IN THE AREA AHEAD OF ANY SWITCHES AND/OR COMPLY WITH NEC 700-12.
16. PROVIDE