ELECTRICAL SPECIFICATIONS & NOTES:

1. ALL WORK SHALL BE PERFORMED IN ACCORDANCE WITH THE 2017 NATIONAL ELECTRICAL CODE (NFPA 70), AS MODIFIED BY THE STATE, COUNTY, CITY AND/OR OTHER LOCAL CODES. THE SERVICE AND METERING SHALL COMPLY WITH THE REQUIREMENTS OF THE ELECTRICAL UTILITY. PRIOR TO DISTURBING THE SOIL, CONTACT THE UNDERGROUND UTILITY LOCATION SERVICE TO LOCATE AND FLAG ALL EXISTING UNDERGROUND PIPING, COMMUNICATION AND ELECTRICAL DISTRIBUTION CABLES/CONDUIT.
2. THE CONTRACTOR SHALL PROVIDE ALL MATERIAL, LABOR, AND EQUIPMENT NECESSARY TO FURNISH A COMPLETE AND OPERABLE ELECTRICAL SYSTEM. ALL WORK SHALL BE PERFORMED IN A NEAT AND PROFESSIONAL MANNER.
3. THE CONTRACTOR SHALL VERIFY THE FOLLOWING ITEMS WITH THE ELECTRICAL UTILITY AND THE OWNER AND REPORT ANY DISCREPANCY TO THE ARCHITECT PRIOR TO THE START OF WORK:
   A. LOCATION, SIZE, NUMBER AND TYPE OF SERVICE TRANSFORMERS AND SERVICE LATERALS
   B. AVAILABLE VOLTAGE, PHASE, AND CAPACITY.
   C. AVAILABLE FAULT CURRENT AT RATED VOLTAGE, SUBMIT THIS INFORMATION WITH THE SHOP DRAWINGS ON PANELBOARDS, ALONG WITH LETTER FROM THE POWER COMPANY. THIS INFORMATION SHALL BE USED FOR LABELING OF PANELBOARDS PER NEC 110.24(A).
   D. METERING EQUIPMENT.
   E. THAT THE REQUIRED NUMBER OF SERVICE CONDUCTORS SHOWN CAN BE CONNECTED TO THE TRANSFORMER LUGS.
   F. WORK REQUIRED BY THE CONTRACTOR, IF ANY, TO MEET THE NEEDS AND/OR REQUIREMENTS OF THE UTILITY COMPANY FOR THIS PROJECT.
   G. THE CONTRACTOR SHALL BE RESPONSIBLE FOR OBTAINING AND PAYING THE COST FOR ALL NECESSARY TEMPORARY ELECTRICAL POWER FOR CONSTRUCTION USE.
4. THE CONTRACTOR SHALL OBTAIN, PURCHASE, AND MAINTAIN ALL PERMITS, AND INSPECTIONS REQUIRED BY THE GOVERNING AUTHORITIES FOR THE DURATION OF THIS PROJECT.
5. THE CONTRACTOR SHALL COORDINATE ALL ELECTRICAL REQUIREMENTS, AND MAKE ALL FINAL CONNECTIONS, TO EQUIPMENT FURNISHED BY OTHER TRADES. THE CONTRACTOR SHALL GUARANTEE ALL MATERIALS, EQUIPMENT, AND WORKMANSHIP FOR A PERIOD OF ONE YEAR AFTER FINAL ACCEPTANCE OF THE COMPLETED PROJECT.
6. PANELBOARDS AND OTHER ELECTRICAL EQUIPMENT SHALL BE INSTALLED AS SHOWN ON THE PLANS, UNLESS NOTED OTHERWISE. MOUNT ALL WALL-MOUNTED, SURFACE TYPE, GROUPED ELECTRICAL EQUIPMENT ON 3/4" THICK EXTERIOR GRADE PLYWOOD, PAINTED GRAY, OR CONCRETE BLOCK WALLS, WHERE APPROVED BY THE STRUCTURAL ENGINEER. VERIFY THE DEPTH OF RECESSED PANELS AND WALL CAVITIES, AND COORDINATE THE INSTALLATION WITH THE ARCHITECTURAL DRAWINGS, AND THE GENERAL CONTRACTOR. WORKING CLEARANCES SHALL BE 36" (FOR 208 VOLT SYSTEM) MINIMUM, AND WIDTH OF EQUIPMENT OR 30" MINIMUM, WHICHEVER IS GREATER, WIDE, PER NEC ARTICLE 110.26. WHERE A PANELBOARD OR LOADCENTER IS LOCATED IN A STORAGE OR EQUIPMENT ROOM (NOT A CORRIDOR OR THE KITCHEN) THAT IS NOT PARTITIONED FROM OTHER USES, PAINT THE LIMITS OF THE WORKING CLEARANCES FROM NEC ARTICLE 110.26 ON THE FLOOR IN FRONT OF THE EQUIPMENT.
7. THE CONTRACTOR SHALL COORDINATE THE WIDTH, DEPTH, HEIGHT, DOOR SWINGS, AND NEC ARTICLE 110.26 CLEARANCES FOR ALL PANELS, TRANSFORMERS, STARTERS, AND SAFETY SWITCHES TO INSURE THAT ALL EQUIPMENT FITS WITHIN THE SPACE ALLOWED.
8. IDENTIFY PANELBOARDS, SAFETY SWITCHES, STARTERS, CONTROLS, AND OTHER ELECTRICAL EQUIPMENT WITH ENGRAVED PLASTIC NAMEPLATES HAVING CONTRASTING 1/4" HIGH (OR LARGER) LETTERS, WITH NAMES TO MATCH THE SCHEDULES OR OTHER DRAWING REFERENCES. TYPEWRITTEN PANEL DIRECTORIES SHALL BE PROVIDED IN ALL PANELBOARDS IN ACCORDANCE w/ NEC 408.4(A), AND SHALL REFLECT AS-BUILT CONDITIONS. ALSO, LABEL ALL PANELBOARDS IN ACCORDANCE w/ NEC 110.24(A) AND 408.4(B).
9. ALL WIRING, CONSISTING OF INDIVIDUAL CONDUCTORS, SHALL BE INSTALLED IN CONDUIT, EXCEPT WHERE SPECIFICALLY SHOWN ON THE DRAWINGS. ALL EXTERIOR CONDUITS AND EXPOSED CONDUITS SHALL BE RIGID GALVANIZED STEEL, OR INTERMEDIATE METAL CONDUIT, BUT THEY SHALL NOT BE MIXED ON THIS PROJECT. WHERE USED INDOORS MAY BE EMT. CONCEALED CIRCUITS MAY BE RUN IN EMT OR BE TYPE MC CABLE (BX). NON-METALLIC SHEATHED (TYPE NM) CABLE IS NOT PERMITTED ON THIS PROJECT. IN FINISHED AREAS WITH CAVITY TYPE WALL CONSTRUCTION, ALL CONDUIT SHALL BE CONCEALED, UNLESS NOTED OTHERWISE. IN FINISHED AREAS WITH NON-CAVITY TYPE WALL CONSTRUCTION, SURFACE MOUNTED GRS, IMC, OR EMT SHALL BE USED. CONDUITS, SERVING AREAS OUTSIDE THE KITCHEN AREA, SHALL NOT BE RUN UNDER THE FLOOR IN THE KITCHEN AREA, UNLESS NOTED OTHERWISE. ALL EMPTY CONDUITS SHALL BE PROVIDED WITH A NYLON PULL CORD RATED FOR 200 POUND TENSION. ANY OF THE FOLLOWING TYPES OF RACEWAYS MAY BE USED, SUBJECT TO THE NEC AND THE ADDITIONAL RESTRICTIONS LISTED, IF ANY.
   A. CONCEALED:
      1). GRS, OR IMC.
      2). EMT. COMPRESSION, OR SET SCREW FITTINGS, BUT NOT BOTH TYPES.
      3). PVC. SCHEDULE 40. SCHEDULE 80 WHERE INDICATED ON THE DRAWINGS. UNDERGROUND ONLY.
      4). TYPE MC CABLE. ONLY ABOVE ACCESSIBLE CEILINGS, IN WALL CAVITIES, AND ADDITIONAL USAGES AS APPROVED BY AUTHORITY HAVING JURISDICTION, AND OWNER.
   B. EXPOSED:
      1). GRS, OR IMC.
      2). EMT. COMPRESSION, OR SET SCREW FITTINGS. ONLY WHERE USED INDOORS AND NOT SUBJECT TO PHYSICAL DAMAGE.
      3). FLEXIBLE METAL CONDUIT.
      4). LIQUIDTIGHT FLEXIBLE METAL CONDUIT. OUTSIDE AND WHERE MOISTURE IS PRESENT.
10. PROVIDE EXPANSION FITTINGS IN ALL RIGID RACEWAYS CROSSING STRUCTURAL EXPANSION JOINTS. FURNISH AND INSTALL ALL SUPPORTS REQUIRED FOR CONDUIT, MATERIALS, DEVICES, EQUIPMENT AND THE LIKE, WHERE THE BUILDING STRUCTURE IS NOT ADAPTED OR SUITABLE FOR MOUNTING SAME DIRECTLY THEREON. RACEWAYS SHALL NOT BE USED AS SUPPORTS FOR BOXES OR OTHER ELECTRICAL EQUIPMENT. PLENUM CABLE SUPPORT BRACKETS SHALL BE OPEN ON ONE SIDE, AND CABLES SHALL BE ATTACHED WITH PLASTIC CABLE TIES. ALL RACEWAY PENETRATIONS, THROUGH FIREWALLS, SHALL BE SEALED WITH UL LISTED SEALING COMPOUNDS TO MAINTAIN THE FIRE RATING OF THE WALL. ALL RACEWAYS/SLEEVES PASSING THROUGH AREAS OF DIFFERENT TEMPERATURES, I.E. FROM WARMER AREAS TO WALK-IN COOLERS, AND FREEZERS, INSIDE TO OUTSIDE OF BUILDINGS AND CONNECTIONS TO REFRIGERATED EQUIPMENT, SHALL BE SEALED WITH AN APPROVED PUTTY OR DUCT-SEAL TO PREVENT THE CIRCULATION OF WARM AIR TO A COLDER SECTION OF THE RACEWAY OR SLEEVE. ALL RACEWAY PENETRATIONS THROUGH EXTERIOR AND INTERIOR WALLS AND FLOORS SHALL BE PROPERLY SEALED.
11. THE CONTRACTOR SHALL COORDINATE THE INSTALLATION OF RACEWAY SYSTEMS AND ROUGHING-IN FOR ALL LOW VOLTAGE (LV) EQUIPMENT [COMPUTER, DATA, SECURITY, POINT-OF-SALE (POS), MUSIC, PAGING, INTERCOM, FIRE DETECTION, TV, AND TELEPHONE] WITH THE OWNER AND EQUIPMENT SUPPLIER(S) PRIOR TO THE INSTALLATION OF CONDUITS, JUNCTION BOXES, WIRING DEVICES, AND WIRING. ALL EMPTY CONDUITS SHALL BE PROVIDED WITH A NYLON PULL CORD. ALL WIREWAYS, PULL BOXES, DEVICE BOXES, AND JUNCTION BOXES SHALL BE SIZED PER JIC, NEMA, AND THE NATIONAL ELECTRICAL CODE. ALL WIRING WITHIN BOXES AND WIREWAYS SHALL BE TAGGED WITH PANEL AND CIRCUIT NUMBERS.
12. TWENTY AMP BRANCH CIRCUITS MAY BE SHOWN WITH EITHER SINGLE CIRCUIT, OR THREE CIRCUIT (MULTIWIRE BRANCH CIRCUIT) HOME RUNS. THREE CIRCUIT HOME RUNS SHARE A COMMON NEUTRAL, UNLESS NOTED OTHERWISE AND GROUND IN A SINGLE CONDUIT. THE CONTRACTOR MAY ELECT TO COMBINE SINGLE CIRCUIT HOME RUNS TO MAKE THREE CIRCUIT HOME RUNS OR TO CHANGE THREE CIRCUIT HOME RUNS TO SINGLE CIRCUIT HOME RUNS. ALL MULTIWIRE BRANCH CIRCUITS SHALL HAVE A MEANS TO SIMULTANEOUSLY DISCONNECT ALL UNGROUNDED CONDUCTORS AT THE PANEL TO COMPLY w/ NEC 210.4(B).
13. PROVIDE SEPARATE GREEN, INSULATED GROUND WIRE IN ALL RACEWAYS.
14. REFER TO SINGLE LINE DIAGRAM, GROUND THE FULL SIZE SERVICE GROUNDING ELECTRODE CONDUCTOR TO THE BUILDING STEEL (IF AVAILABLE), A METALLIC COLD WATER PIPE (IF AVAILABLE) AHEAD OF THE WATER METER AND WITHIN 5' OF ITS ENTRANCE INTO THE BUILDING, THE BURIED GROUND RING (IF ONE IS TO BE PROVIDED), THEN CONNECT TO A 6 AWG (MIN.) CONNECTED TO TWO, 3/4" BY TEN FOOT COPPERCLAD STEEL GROUND RODS SEPARATED BY 7' MINIMUM, AND THEN CONNECT TO A 4 AWG (MIN.) CONNECTED TO A 1/2" DIAMETER (MIN.) BY 20' REBAR IN THE FLOOR SLAB OR FOUNDATION (IF AVAILABLE/ACCESSIBLE), ALL PER NEC ARTICLE 250.66, UNLESS NOTED OTHERWISE.
15. BONDING OF METAL PIPING SYSTEMS AND EXPOSED STRUCTURAL METAL SHALL COMPLY WITH NEC 250.104(A) THRU (D).
16. ALL WIRING SHALL BE 600 VOLT, COPPER, STRANDED, WITH TYPE XHHW OR THHN/THWN INSULATION. MINIMUM SIZE FOR POWER AND LIGHTING CIRCUITS SHALL BE 12 AWG. SIZES 10 AWG AND SMALLER SHALL BE SOLID. PROVIDE AN EQUIPMENT GROUND WIRE IN ALL RACEWAYS, AND CABLE ASSEMBLIES. SIZE EQUIPMENT GROUNDS PER TABLE 250.122 OF THE NATIONAL ELECTRICAL CODE.
17. VOLTAGE DROP: THE CONTRACTOR FIELD VERIFY ACTUAL CONDUCTOR LENGTHS FOR FEEDERS AND BRANCH CIRCUITS AND IF NECESSARY ADJUST THE WIRE GAGE SUCH THAT THE VOLTAGE DROP ON FEEDERS DOES NOT EXCEED 2% AND THE VOLTAGE DROP ON BRANCH CIRCUITS DOES NOT EXCEED 3%.
18. CONDUCTOR COLOR CODES SHALL BE AS FOLLOWS:

BLACK, RED, BLUE:	208/120 VOLT PHASE A,B,C
WHITE:	NEUTRAL
GREEN:	ALL EQUIPMENT GROUNDS
BARE:	ALL NON-ISOLATED GROUNDS
GREEN WITH YELLOW STRIPE	ALL ISOLATED GROUNDS

USE CONDUCTORS #8 AND SMALLER WITH COLOR FACTORY-APPLIED THE ENTIRE LENGTH OF THE CONDUCTORS. COLOR CODING FOR THE LARGER SIZES MAY BE ACCOMPLISHED BY USING COLORED, 1 INCH WIDE, PRESSURE-SENSITIVE PLASTIC TAPE IN HALF-LAPPED TURN FOR A DISTANCE OF 6 INCHES FROM TERMINAL POINTS. APPLY THE LAST TWO LAPS OF TAPE WITH NO TENSION TO PREVENT POSSIBLE UNWINDING.

POST IDENTIFICATION MEANS IN ACCORDANCE WITH NEC 210.5 (C).

19. ALL ELECTRICAL EQUIPMENT SHALL BE LISTED BY UNDERWRITERS LABORATORIES (OR OTHER INDEPENDENT NATIONALLY RECOGNIZED TESTING AGENCY, WHERE APPLICABLE), AND SHALL BE RATED FOR THE MAXIMUM AVAILABLE VOLTAGE AND AVAILABLE FAULT CURRENT FOR THIS PROJECT.
20. ALL DEVICE BOXES SHALL BE INSTALLED FLUSH, AND CONDUITS RUN CONCEALED IN FINISHED AREAS, EXCEPT AS SPECIFICALLY SHOWN OR NOTED OTHERWISE. VERIFY ALL DOOR SWINGS BEFORE INSTALLING SWITCH BOXES. SEE ARCHITECTURAL DRAWINGS FOR CABINET WORK, WALL SECTIONS, ELEVATIONS, AND OTHER DETAILS AFFECTING THE MOUNTING HEIGHT AND LOCATION OF OUTLET BOXES.
21. WIRING DEVICES: DUPLEX RECEPTACLES SHALL BE 20A., 125 VOLTS, COMMERCIAL SERIES, HEAVY DUTY, SPECIFICATION GRADE, BACK AND SIDE WIRED, WITH GROUNDING TERMINAL AND SHALL BE IVORY UNLESS NOTED OTHERWISE, HUBBELL 5362I OR APPROVED EQUAL, CONTINGENT UPON FULL COMPLIANCE WITH ALL CRITERIA. ISOLATED GROUND DUPLEX RECEPTACLES SHALL BE 20A., 125 VOLTS, HUBBELL CR5352IGI OR APPROVED EQUAL, CONTINGENT UPON FULL COMPLIANCE WITH ALL CRITERIA. AC TOGGLE SWITCHES SHALL BE 20A., 120-277 VOLTS, COMMERCIAL SERIES, HEAVY DUTY, SPECIFICATION GRADE, BACK AND SIDE WIRED, WITH GROUNDING TERMINAL AND SHALL BE IVORY UNLESS NOTED OTHERWISE, HUBBELL CSB120I, TWO POLE, HUBBELL CSB220I, THREE WAY, HUBBELL CSB320I, FOUR WAY, HUBBELL CSB420I OR APPROVED EQUAL, CONTINGENT UPON FULL COMPLIANCE WITH ALL CRITERIA. GROUND FAULT CIRCUIT INTERRUPTER DUPLEX RECEPTACLES SHALL BE 20A., 125 VOLTS, COMMERCIAL SPECIFICATION GRADE, HUBBELL GF20ILA OR APPROVED EQUAL, CONTINGENT UPON FULL COMPLIANCE WITH ALL CRITERIA. GROUND FAULT CIRCUIT INTERRUPTER DUPLEX RECEPTACLES SHALL NOT BE THE FEED THROUGH TYPE, BUT STAND ALONE GROUND FAULT CIRCUIT INTERRUPTER DUPLEX RECEPTACLES. NEW INTERIOR EXPOSED DEVICE PLATES, IN ALL LOCATIONS WHERE SPECIFIED AND/OR THE KITCHEN SHALL BE TYPE 302/304 STAINLESS STEEL. ALL OTHER INTERIOR PLATES SHALL BE NYLON, STANDARD SIZE, AND GANGED FOR MULTIPLE DEVICES AT A SINGLE LOCATION. VERIFY THE DECOR THEME WITH THE ARCHITECT AND COORDINATE COLOR AS REQUIRED. WHERE USED OUTDOORS OR IN WET LOCATIONS ALL 15 OR 20A 125 OR 250V NON-LOCKING RECEPTACLES SHALL BE WEATHER-RESISTANT LISTED, IN DAMP AREAS, THE OUTLET COVERS FOR 15 OR 20A, 125 OR 250V DEVICES SHALL BE "WEATHERPROOF WHILE IN USE", HUBBELL WP26E OR APPROVED EQUAL, CONTINGENT UPON FULL COMPLIANCE WITH ALL CRITERIA.
22. ALL WALL OUTLETS THAT ARE SHOWN BACK TO BACK, IN FIRE RATED WALLS, SHALL BE INSTALLED WITH A MINIMUM OF 24" OF HORIZONTAL SEPARATION (TWO STUDS) PER NEC ARTICLE 300.21, AND UL REQUIREMENTS. IN WALL SPACES WHERE THE 24" SEPARATION IS NOT POSSIBLE, BLOCKING AND GYPSUM BOARD PROVISIONS, TO MAINTAIN THE FIRE RATING OF THE WALL, SHALL BE PROVIDED BY OTHERS, NOT BY THIS CONTRACTOR.
23. OUTLETS WITHIN 6'-0" OF ANY PLUMBING FIXTURE, AND/OR WHERE INDICATED, SHALL BE 20A., 125 VOLTS, COMMERCIAL SERIES, HEAVY DUTY, SPECIFICATION GRADE, BACK AND SIDE WIRED, WITH GROUNDING TERMINAL GROUND FAULT INTERRUPTER OUTLETS, HUBBELL GF20ILA, OR APPROVED EQUAL, CONTINGENT UPON FULL COMPLIANCE WITH ALL CRITERIA.
24. ALIGN ALL SIMILAR WIRING DEVICES IN THE SAME ROOM AT THE SAME HEIGHTS AND DISTANCES FROM ARCHITECTURAL FEATURES, UNLESS NOTED OTHERWISE. GANG ALL DEVICE BOXES AT THE SAME LOCATION, WHERE ALLOWED BY CODE. PROVIDE DIVIDERS TO SEPARATE LOW VOLTAGE (I.E., THERMOSTAT) DEVICES FROM POWER DEVICES (I.E., SWITCHES). ALL EXTERIOR WIRING DEVICES SHALL BE BLACK, OR GRAY, OR BROWN, UNLESS NOTED OTHERWISE.
25. ALL UNIT EQUIPMENT FOR EMERGENCY LIGHTING SHALL BE CONNECTED TO BRANCH CIRCUITS FOR NORMAL LIGHTING IN THE SAME AREA, UNLESS NOTED OTHERWISE, AHEAD OF ANY LOCAL SWITCHES OR CONTACTORS PER NEC ARTICLE 700.12(F).
26. ALL NIGHT LIGHTING SHALL BE CONNECTED TO BRANCH CIRCUITS FOR NORMAL LIGHTING IN THE SAME AREA, UNLESS NOTED OTHERWISE, AHEAD OF ANY LOCAL SWITCHES OR CONTACTORS.
27. LUMINAIRES INSTALLED IN INSULATED CEILINGS SHALL BE IC RATED, AND INSTALLED PER THE LUMINAIRE MANUFACTURER'S AND UL LISTING REQUIREMENTS.
28. LUMINAIRES RECESSED IN FIRE RATED CEILINGS SHALL HAVE AN UL LISTED ASSEMBLY AROUND THE FIXTURE HOUSING THAT MEETS OR EXCEEDS THE RATING OF THE CEILING. THE FIXTURE SHALL BE INSTALLED PER THE LUMINAIRE MANUFACTURER'S AND UL LISTING REQUIREMENTS. THE CONTRACTOR SHALL VERIFY WITH THE ARCHITECT PRIOR TO BID THE LOCATION OF ALL FIRE RATED ASSEMBLIES.
29. THIS PROJECT MAY UTILIZE BOTH ACCESSIBLE AND NON-ACCESSIBLE TYPE CEILINGS. REFER TO ARCHITECTURAL DRAWINGS FOR ACTUAL CEILING TYPES IN EACH AREA. LIGHTING CIRCUITS IN NON-ACCESSIBLE CEILINGS MUST UTILIZE FIXTURE-MOUNTED JUNCTION BOXES WHICH ARE USUALLY LIMITED TO EIGHT (8) WIRES IN THEIR CAPACITY. CIRCUITING FOR THE LIGHTING IS SCHEMATIC, BUT GENERALLY ATTEMPTS TO SHOW THESE CONSIDERATIONS. HOWEVER, CONTRACTOR MAY WANT TO PROVIDE SUPPLEMENTARY JUNCTION BOXES IN ACCESSIBLE AREAS, OR OVERSIZE FIXTURE BOXES TO OPTIMIZE THE WIRING.
30. ELECTRICAL DRAWINGS ARE IN PART DIAGRAMMATIC. LOCATE LIGHTING FIXTURES SYMMETRICALLY OR IN PROPER RELATION TO FINISHED AREAS, UNLESS OTHERWISE DIMENSIONED OR DETAILED. THE CONTRACTOR SHALL COORDINATE ALL LUMINAIRE LOCATIONS AND CLEARANCES WITH THE DUCTWORK, THE REFLECTED CEILING PLAN, HVAC PLAN, AND OTHER DRAWINGS TO AVOID CONFLICTS.
31. A NUMERAL BESIDE BRANCH CIRCUIT OUTLET INDICATES PANELBOARD CIRCUIT CONNECTION. UPPER-CASE LETTER OR LETTER-GROUP BESIDE LIGHTING FIXTURE INDICATES FIXTURE TYPE. LOWER-CASE LETTER BESIDE LIGHTING FIXTURE OUTLET INDICATES LOCAL SWITCH LEG CONNECTION. ELECTRICAL SYMBOLS USED ARE APPLICABLE GENERALLY; FOR EXACT REQUIREMENTS REFER TO APPLICABLE SCHEDULES AND DETAILS AND TO THE SPECIFICATIONS. HOWEVER, COMBINING OF CIRCUITS IN RACEWAYS, OTHER THAN DETAILED, WILL NOT BE PERMITTED. RUNNING OF BRANCH CIRCUITS, OTHER THAN THE ONE SERVING THE FIXTURE, THROUGH LIGHTING FIXTURE CHANNELS OR HOUSINGS WILL NOT BE PERMITTED.
32. ALL SAFETY SWITCHES SHALL BE FURNISHED BY THE CONTRACTOR, UNLESS NOTED OTHERWISE AND SHALL NOT BE MOUNTED ON ACCESS PANELS OF EQUIPMENT. SAFETY SWITCHES SHALL BE GENERAL ELECTRIC, SQUARE D, CUTLER-HAMMER, SIEMENS ENERGY & AUTOMATION, OR APPROVED EQUAL, CONTINGENT UPON FULL COMPLIANCE WITH ALL CRITERIA, AND SHALL BE FUSED AND/OR NOT FUSED AS INDICATED, 240 VOLT, TWO OR THREE POLE, HEAVY DUTY, IN A NEMA 3R ENCLOSURE FOR OUTDOOR USE OR WHERE MOISTURE IS PRESENT, AND NEMA 1 ENCLOSURE FOR INDOOR USE. UNLESS NOTED OTHERWISE, ALL FUSES SHALL BE NON-RENEWABLE, DUAL ELEMENT, TIME DELAY, CURRENT LIMITING, CLASS J, L, RK-5, OR RK-1, WITH A 200,000 AMP AC RMS INTERRUPTING RATING, AND SHALL MEET UL STANDARD 198E.
33. ALL PANELBOARDS SHALL BE CIRCUIT BREAKER TYPE, AS MANUFACTURED BY SQUARE D, EATON CORP., GENERAL ELECTRIC, OR SIEMENS ENERGY & AUTOMATION.
   A. POWER DISTRIBUTION PANELBOARDS SHALL BE CUTLER-HAMMER POW-R-LINE 4B, SIEMENS TYPE S4 OR S5, GENERAL ELECTRIC TYPE SCP PLUS OR SPECTRA, SQUARE D I-LINE, OR APPROVED EQUAL, CONTINGENT UPON FULL COMPLIANCE WITH ALL CRITERIA. THE HIGHEST OPERATING HANDLE SHALL BE A MAXIMUM OF 78" AFF. POWER PANELS SHALL BE UL LISTED, AND MEET UL 67, UL 50, AND FEDERAL SPECIFICATION W-P-115B AS TYPE 1, CLASS 1, WITH SERIES RATED, BOLT-ON CIRCUIT BREAKERS, COPPER OR TIN-PLATED ALUMINUM BUS BARS, NEUTRAL BUS, GROUND BUS, ISOLATED GROUND BUS(WHERE REQUIRED), AND A HINGED LOCKABLE DOOR.
   B. LIGHTING AND APPLIANCE PANELBOARDS SHALL BE OF PANELBOARD CONSTRUCTION, 20 INCHES WIDE (MINIMUM), 5-3/4" TO 6-1/2" DEEP, UL LISTED, AND MEET UL 67, UL 50, UL CLASS CTL, AND FEDERAL SPECIFICATION W-P-115B AS TYPE 1, CLASS 1, WITH SERIES RATED, BOLT-ON CIRCUIT BREAKERS, COPPER OR TIN-PLATED ALUMINUM BUS BARS, NEUTRAL BUS, GROUND BUS, ISOLATED GROUND BUS(WHERE REQUIRED) AND A HINGED LOCKABLE DOOR.
   C. WHERE NOTED, PANELS MAY BE OF LOADCENTER CONSTRUCTION, 14 INCHES WIDE (MAX), 3" TO 3-3/4" DEEP, UL LISTED, AND MEET UL 67, UL 50, AND FEDERAL SPECIFICATION W-P-115B AS TYPE 1, CLASS 2, WITH SERIES RATED, PLUG-ON CIRCUIT BREAKERS, COPPER OR TIN-PLATED ALUMINUM BUS BARS, NEUTRAL BUS, GROUND BUS, AND A HINGED LOCKABLE DOOR. WHERE SPECIAL FEATURES AND/OR ACCESSORIES ARE REQUIRED AND ARE NOT AVAILABLE IN LOAD CENTER CONSTRUCTION, PROVIDE PANELBOARD CONSTRUCTION AS SPECIFIED ABOVE.
   PROVIDE THE NUMBER OF SPACES AND SPARE CIRCUIT BREAKERS AS SHOWN IN THE PANELBOARD SCHEDULES.
34. THE BRANCH CIRCUITS SHALL BE PHASE ADJUSTED TO PROVIDE APPROXIMATE BALANCED LOADING ON EACH PANEL, AND THE SERVICE.
35. RECORDS AND SUBMITTALS: PROVIDE THE OWNER A MINIMUM OF THREE COPIES OF SHOP DRAWINGS WITH TECHNICAL DATA HIGH-LIGHTED, INDICATING THAT IT MEETS THE REQUIREMENTS FOR ELECTRICAL EQUIPMENT INSTALLED ON THIS PROJECT. SHOP DRAWINGS ARE REQUIRED FOR: PANELBOARDS, SAFETY SWITCHES, LUMINAIRES, EMERGENCY LIGHTING EQUIPMENT, FIRE ALARM SYSTEM EQUIPMENT, RACEWAYS, CONDUCTORS, ISOLATED GROUND RECEPTACLES, LIGHTING CONTROLS AND WIRING DEVICES.

SUBSTITUTIONS FOR LIGHTING FIXTURES SHALL BE PRE-APPROVED PRIOR TO BID. THE CONTRACTOR SHALL PROVIDE THE PHOTOMETRIC CALCULATIONS FOR THE EXTERIOR LIGHTING TO INDICATED THE LIGHTING COMPLIES w/ THE LOCAL REQUIREMENTS. THE REVISED PHOTOMETRIC PLANS MAY BE REQUIRED TO BE APPROVED BY THE AHJ PRIOR TO INSTALLATION. IF THE WATTAGE OF THE SUBSTITUTED FIXTURES INCREASE FROM THE SPECIFIED FIXTURES THE CONTRACTOR MAY BE REQUIRED TO PROVIDE THE ENERGY CODE CALCULATIONS FOR THE LIGHTING AND SUBMIT TO THE AHJ FOR APPROVAL.

CONTRACTOR SHALL VERIFY AVAILABLE FAULT CURRENT WITH UTILITY COMPANY FOR PROPER PANEL ASYMMETRICAL INTERRUPTING RATINGS. SUBMIT THIS INFORMATION WITH THE SHOP DRAWINGS ON PANELBOARDS, ALONG WITH LETTER FROM THE POWER COMPANY.

36. SUBSTITUTIONS: ALL COSTS INCURRED BY THE ACCEPTANCE OF SUBSTITUTIONS SHALL BE BORNE BY THE CONTRACTOR. THE ONUS SHALL BE ON THE CONTRACTOR TO PROVE THAT THE SUBSTITUTIONS ARE EQUAL TO THE BASIS OF DESIGN SPECIFIED.
37. MAINTAIN AS-BUILT DRAWINGS, UPDATED DAILY DURING CONSTRUCTION, AND PRESENT THE OWNER, WITHIN 30 DAYS AFTER THE DATE OF SYSTEM ACCEPTANCE, WITH TWO SETS OF AS-BUILT DRAWINGS. PROVIDE THE OWNER'S PERSONNEL WITH ON-SITE INSTRUCTION IN THE OPERATION AND MAINTENANCE OF THE COMPLETED ELECTRICAL SYSTEM PRIOR TO SYSTEM ACCEPTANCE.
38. PROVIDE THE OWNER WITH TWO SETS OF OPERATIONS AND MAINTENANCE (O & M) MANUALS IN ACCORDANCE WITH ASHRAE/IESNA STANDARD 90.1-2001. THE MANUALS SHALL INCLUDE, AT A MINIMUM, THE FOLLOWING:
   A. SUBMITTAL DATA STATING EQUIPMENT RATING AND SELECTED OPTIONS FOR EACH PIECE OF EQUIPMENT REQUIRING MAINTENANCE.
   B. OPERATION MANUALS AND MAINTENANCE MANUALS FOR EACH PIECE OF EQUIPMENT REQUIRING MAINTENANCE. REQUIRED ROUTINE MAINTENANCE ACTIONS SHALL BE CLEARLY IDENTIFIED.
   C. NAMES AND ADDRESSES OF AT LEAST ONE QUALIFIED SERVICE AGENCY.
   D. A COMPLETE NARRATIVE OF HOW EACH SYSTEM IS INTENDED TO OPERATE.
   E. EQUIPMENT FOR CONSIDERATION, BUT NOT LIMITED TO, IS AS FOLLOWS: EMERGENCY LIGHTING EQUIPMENT, FIRE ALARM SYSTEM EQUIPMENT, AND LIGHTING CONTROLS.
39. ALL COMMUNICATIONS [CONDUITS] CABLES SHALL BE ROUTED AND SECURED AT LEAST 12" FROM FLUORESCENT FIXTURES AND POWER CIRCUITS, CROSS OTHER CIRCUITS AT 90 DEGREE ANGLE.
40. MOUNT OUTLET BOXES, ABOVE ACCESSIBLE CEILINGS FOR RECESSED LUMINAIRES, ON THE BOTTOM OF BAR JOISTS, WOOD JOISTS, OR BEAMS, AND ROUTE FOUR TO SIX FOOT (4' TO 6'), TYPE MC CABLE WHIPS TO EACH FIXTURE, AS REQUIRED. COORDINATE THE LOCATIONS OF OUTLET/JUNCTION BOXES WITH THE HVAC CONTRACTOR AND OTHER TRADES TO AVOID INTERFERENCE WITH THE INSTALLATION OF DUCT WORK.
41. WHERE RECESSED, OUTLET BOXES ARE INDICATED LOCATED IN FIRE RATED CEILINGS, COORDINATE THE LOCATIONS OF OUTLETS WITH THE ARCHITECTURAL REFLECTED CEILING PLAN, CEILING FINISH PLAN, HVAC CONTRACTOR AND OTHER TRADES TO AVOID INTERFERENCE WITH THE INSTALLATION OF DUCT WORK. PROVIDE FIRE RATED ENCLOSURES LOCATED OVER THE OUTLET TO MAINTAIN THE SPECIFIED FIRE RATING OF THE CEILING.
42. VERIFY THE AMPACITY REQUIREMENTS (FLA, MCA, AND MOCP), POLES (1, 2, OR 3), AND VOLTAGE FOR ALL EQUIPMENT FURNISHED BY OTHERS WITH THE CONTRACTOR OR VENDOR SUPPLYING THE EQUIPMENT PRIOR TO THE PURCHASE AND INSTALLATION OF THE SAFETY SWITCHES, RACEWAYS, WIRING, AND BRANCH CIRCUIT BREAKERS.
43. PROVIDE A 4'X4'X3/4" EXTERIOR GRADE PLYWOOD COMMUNICATIONS BACKBOARD, PAINTED WITH TWO COATS, FIRE RESISTANT GRAY PAINT. PROVIDE A QUADRUPLEX OUTLET MOUNTED ON THE BOARD, AND A 4 AWG GROUND WIRE CONNECTED TO THE SERVICE GROUND FOR THE TELEPHONE SERVICE EQUIPMENT.
44. DURING TRENCH BACKFILLING, FOR ELECTRICAL EXTERIOR, UNDERGROUND DUCTS AND CONDUIT(S), INSTALL CONTINUOUS, STANDARD, 4-MIL, POLYETHYLENE, 3 INCH WIDE, DETECTABLE TYPE, BURIED CONDUIT MARKER, RED WITH BLACK LETTERS, AND IMPRINTED WITH "CAUTION BURIED ELECTRIC LINE BELOW". LOCATE DIRECTLY ABOVE DUCT AND CONDUITS AT 12 INCHES BELOW FINISHED GRADE.
45. FURNISH AND INSTALL WIRING AND RACEWAYS TO ALL SIGNS. VERIFY WITH SIGN PROVIDER THE REQUIRED NUMBER AND SIZE OF CONDUCTORS, I.E. DEDICATED GROUND CONDUCTOR, ETC.. SEE ARCHITECTURAL DRAWINGS FOR LOCATIONS.
46. ALL BRANCH CIRCUIT, COMMUNICATION, SIGNALING, AND CONTROL WIRING TO KITCHEN, FIRE PROTECTION, AND OTHER EQUIPMENT SHALL BE ROUTED ABOVE THE CEILING. THE SPACE ABOVE THE CEILING IS NOT USED AS A SPACE FOR RETURN AIR FOR THE ENVIRONMENTAL AIR SYSTEM IN THIS PROJECT. APPROVED LOW VOLTAGE CABLES MEETING THE REQUIREMENTS OF NEC ARTICLES 725 AND 760 MAY BE RUN WITHOUT RACEWAYS, UNLESS NOTED OTHERWISE. TO INSTALL RACEWAYS TO ISLAND EQUIPMENT, THE CONTRACTOR SHALL INSTALL RACEWAYS IN A CHASE AS SHOWN ON THE DRAWINGS. UPON EXITING THE CHASE, AT THE ISLAND, THE CONTRACTOR SHALL CONTINUE WITH A SURFACE MOUNTED FLEXIBLE METALLIC RACEWAY. THE SURFACE MOUNTED RACEWAY SHALL BE CONCEALED FROM VIEW. THE SURFACE MOUNTED RACEWAY SHALL BE SUPPORTED EVERY 2 FEET WITH AN APPROVED DEVICE. REFER TO ARCHITECTURAL DETAILS FOR CASEWORK AND SPECIFIC MOUNTING LOCATIONS.
47. REFER TO THE KITCHEN EQUIPMENT SUPPLIER DRAWINGS FOR FINAL MOUNTING HEIGHTS AND LOCATIONS OF ALL DEVICE AND JUNCTION BOXES FOR KITCHEN EQUIPMENT. REFER TO FRANCHISE STANDARD ELECTRICAL DRAWINGS FOR GENERAL REQUIREMENTS, INSTALLATION DETAILS, STANDARDS, AND NON-SPECIFIC CRITERIA.
48. VERIFY ALL SPECIAL OUTLET TYPES, MOUNTING HEIGHTS, AND LOCATIONS SHOWN IN THE SCHEDULE WITH THE KITCHEN EQUIPMENT SUPPLIER(S) PRIOR TO PURCHASE AND INSTALLATION. VERIFY THE AMPACITY REQUIREMENTS (FLA, MCA, AND MOCP), POLES (1, 2, OR 3), AND VOLTAGE FOR ALL KITCHEN EQUIPMENT WITH THE KITCHEN EQUIPMENT SUPPLIER(S) PRIOR TO PURCHASE AND INSTALLATION OF THE PANELS AND CIRCUITS.
49. PROVIDE 7 DAY CALENDAR DIAL TIME CLOCK WITH BYPASS PROVISIONS FOR EXTERIOR LIGHTS. UPON COMPLETION OF THE INSTALLATION SET THE TIME CONTROLS PER THE OWNER'S REPRESENTATIVE'S SCHEDULE
50. TEST: UPON COMPLETION OF THE WORK, PERFORM A TEST OF THE INDIVIDUAL SYSTEMS INCLUDING FEEDERS, BRANCHES, OUTLETS, LIGHTING, MOTOR APPARATUS AND APPLIANCES, TO ASSURE COMPLIANCE WITH THESE SPECIFICATIONS AND DRAWINGS. A LETTER WITH ALL PERTINENT TEST DATA RESULTS SHALL BE SUBMITTED TO THE ARCHITECT AT LEAST FIVE(5) DAYS PRIOR TO THE COMPLETION OF THE PROJECT. THE ELECTRICAL CONTRACTOR SHALL PROVIDE ALL INSTRUMENTS, LABOR, AND MATERIALS FOR ANY ESSENTIAL INTERMEDIATE AND FINAL TESTS TO PROVIDE COMPLIANCE WITH THESE SPECIFICATIONS.
51. THE CONTRACTOR'S ATTENTION IS PARTICULARLY DIRECTED TO REQUIREMENTS REGARDING: SEALING OF RACEWAYS; APPROVED TYPES OF RACEWAY FITTINGS; SUPPORT OF RACEWAYS, BOXES, AND OTHER SYSTEM COMPONENTS; TAGGING OF CIRCUITS; GROUNDING JUMPERS FOR FLEXIBLE CONDUIT; IDENTIFICATION OF REMOTE CONTROL DEVICES, PANELBOARDS, ETC.; FILLING-IN OF PANELBOARD DIRECTORIES; MOUNTING HEIGHTS OF OUTLETS, CABINETS, ETC.; BUILDING AND SYSTEM GROUNDING; AND CHECKING, TESTING, AND PLACING IN SERVICE OF ALL ELECTRICAL SYSTEMS AND COMPONENTS.

NOTE:

IF THE CONTRACTOR ELECTS TO PROVIDE AND/OR INSTALL ELECTRICAL SYSTEMS, INCLUDING LOW VOLTAGE SYSTEMS, AND EQUIPMENT FOR THIS PROJECT, DIFFERENTLY FROM THESE CONTRACT DOCUMENTS, WHICH REQUIRES AN APPROVAL LETTER OR DRAWING REVISIONS FROM MARSHALL & BOLLWERK ENGINEERING, INC.(MBE), TO THE AUTHORITY HAVING JURISDICTION, THERE WILL BE A MINIMUM FEE OF $1,000.00, MADE PAYABLE TO MARSHALL & BOLLWERK, IN ADVANCE BY THE CONTRACTOR. ACTUAL FEE WILL DEPEND ON THE COMPLEXITY OF THE DEVIATION. ALLOW MINIMUM OF TEN (10) WORKING DAYS FOR LETTER AND/OR REVISED DRAWINGS. THE CONTRACTOR SHALL BE RESPONSIBLE FOR PROVIDING ALL NECESSARY INFORMATION BEFORE ANY EVALUATION WILL BE STARTED.

ELECTRICAL SYMBOL LEGEND

Symbol	Description
X	SINGLE FACE EXIT LIGHT W/EMERGENCY BATTERY PACK AND TWO (2) EMERGENCY LIGHT HEADS. SEE FIXTURE SCHEDULE
R	REMOTE MOUNTED EMERGENCY EGRESS LIGHT FIXTURE, LETTER DENOTES MARK. SEE FIXTURE SCHEDULE
EM	EMERGENCY BATTERY LIGHT FIXTURE. LETTER DENOTES MARK. SEE FIXTURE SCHEDULE.
A	FLUORESCENT LIGHT FIXTURE. LETTER DENOTES MARK. SEE FIXTURE SCHEDULE.
B	RECESSED LIGHT FIXTURE. LETTER DENOTES MARK. SEE FIXTURE SCHEDULE.
I PC c	PHOTOCELL SENSOR – I = "DAYLIGHTING ZONE"; c = SWITCH.
c	RECESSED DOWN LIGHT FIXTURE. LETTER DENOTES MARK. SEE FIXTURE SCHEDULE.
$	TOGGLE SWITCH – SINGLE POLE
$3	TOGGLE SWITCH – THREE-WAY
$M	TOGGLE SWITCH – MOTOR RATED
	DUPLEX RECEPTACLE – MOUNTING HEIGHT 18" A.F.F., UON
C	CLOCK TYPE RECEPTACLE – MOUNTING HEIGHT 72" A.F.F., UON
WP/GFI	QUAD RECEPTACLE – MOUNTING HEIGHT 18" A.F.F., UON
	DUPLEX RECEPTACLE – IN WEATHER PROOF ENCLOSURE OR COVER, GROUND FAULT INTERRUPTER.
IG	DUPLEX RECEPTACLE – ISOLATED GROUND
	DUPLEX RECEPTACLE – MOUNTED 42" AFF OR 6" ABOVE COUNTER, UON.
	208V SPECIAL PURPOSE RECEPTACLE – REFER TO EQUIPMENT SCHEDULE FOR RATING
J	JUNCTION OR OUTLET BOX: CEILING MOUNTED.
J	JUNCTION OR OUTLET BOX: WALL MOUNTED 18" A.F.F., UON.
C 3/4"	COMM. SYSTEM JUNCTION BOX – NUMBER INDICATES CONDUIT SIZE TO ABOVE CEILING.
60 35	DISCONNECT SWITCH SIZE AS NOTED. FPN = "FUSED PER NAMEPLATE", NF = "NON-FUSED"
S 1	DOOR SWITCH MOUNTED IN DOOR FRAME (F.B.C.) SEE ELECTRICAL NOTES.
A-3	CONDUIT RUN CONCEALED IN WALLS OR CEILING SPACES. ARROWS INDICATE HOMERUNS. SUBSCRIPT INDICATES PANEL AND CIRCUIT NUMBERS. EQUIPMENT GROUNDING CONDUCTOR REQUIRED IN ALL CONDUITS.
A-3	SAME AS ABOVE NOTE EXCEPT RUN CONDUIT BELOW FLOOR
	EXHAUST FAN: PROVIDED AND INSTALLED BY MECHANICAL CONTRACTOR, WIRED BY ELECTRICAL CONTRACTOR.
	PANELBOARD
	COMMUNICATION OUTLET, 18" AFF, UON, WITH 1" EMPTY CONDUIT TO ABOVE CEILING. PROVIDE PULL STRING.
	COMBINATION DUAL COMMUNICATION OUTLET AND TELEPHONE OUTLET HEIGHT AS NOTED ON PLANS WITH 1" EMPTY CONDUIT TO ABOVE CEILING. PROVIDE PULL STRING.
	ELECTRIC DOOR PUSHBUTTON: EDWARDS #590 48" MOUNTING HEIGHT
B	120V DOOR BELL CHIME: 8" BELOW CEILING
TV	CABLE TV OUTLET: MOUNTED AT 18" AFF OR HEIGHT INDICATED.

ABBREVIATIONS

A.F.F.	ABOVE FINISHED FLOOR.	G.F.I.	GROUND FAULT INTERRUPTING
A.F.C.	ABOVE FINISHED CEILING.	I.G.	ISOLATED GROUND
A.H.J.	AUTHORITY HAVING JURISDICTION	RT	ROOF TOP UNIT
B.T.C.	BRANCH TO CONNECTION	U.O.N.	UNLESS OTHERWISE NOTED
F.B.C.	FURNISHED BY CONTRACTOR.	W.P.	WEATHERPROOF

WIRING SIZE CHART

CONTRACTOR SHALL PROVIDE WIRING FOR 120 V., 15 & 20 A. CIRCUITS (LINE TO NEUTRAL) OF SIZES BELOW DEPENDING UPON CIRCUIT LENGTH BELOW:

< 100 FT	#12 AWG (CU)
100-160 FT	#10 AWG (CU)
160-250 FT	#8 AWG (CU)

WHERE #8 AWG CONDUCTORS ARE REQUIRED USE #8 FOR ALL TRAVELERS AND SPLICE w/ #10 IN A CODE SIZED JUNCTION BOX WITHIN 10' OF DEVICE &/OR BREAKER FOR FINAL CONNECTIONS.

<u>OTHER THAN AS NOTED ABOVE THE ENTIRE LENGTH OF FEEDER SHALL BE THE SAME CONDUCTOR SIZE.</u>

R-2002

DATE	RELEASE
04.17.20	FOR CONSTRUCTION
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CHECKED BY: JMJ
DRAWN BY: JMJ

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ALABAMA LICENSED PROFESSIONAL ENGINEER No. 22441 J. MICHAEL JONES
4/22/2020

J.E. BRISCOE WAY & MADISON BLVD. PROJECT: R-2002
MADISON, MADISON COUNTY ALABAMA DATE: 04/17/20

Bojangles' **RESTAURANT**

ELECTRICAL SPECIFICATIONS & LEGEND

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