

ELECTRICAL LEGEND - RISER

	PANELBOARD
	DISTRIBUTION BOARD
	FUSED DISCONNECT SWITCH U.O.N.
	FUSE
	DISCONNECT SWITCH
	DISCONNECT SWITCH
	DRAWOUT TYPE CIRCUIT BREAKER
	AUTOMATIC TRANSFER SWITCH
	METER AND CURRENT TRANSFORMER
	GROUND CONNECTION
	TRANSFORMER
	FLOOR MOUNTED TRANSFORMER
	GROUNDING RESISTER

ABBREVIATIONS

A	AMPIAMPERE
ACU	AIR CONDITIONING UNIT
ADA	AMERICANS WITH DISABILITIES ACT
AFF	ABOVE FURNISHED FLOOR
AHJ	AUTHORITIES HAVING JURISDICTION
AHU	AIR HANDLING UNIT
AL	ALUMINUM
ATS	AUTOMATIC TRANSFER SWITCH
AV	AUDIO VISUAL
AWG	AMERICAN WIRE GAUGE
BDS	BATTERY DIAGNOSTIC SYSTEM
C, CDT	CONDUIT
CAC	COMPUTER ROOM GRADE AIR CONDITIONING UNIT
CB	CIRCUIT BREAKER
CKT	CIRCUIT
CP	CONDENSATE PUMP
CT	COOLING TOWER
CU	COPPER
DISC	DISCONNECT
DWG	DRAWING
E	EXISTING TO REMAIN
EC	ELECTRICAL CONTRACTOR
EF	EXHAUST FAN
EHC	ELECTRIC HEAT COIL
ELEC	ELECTRICAL
EM	EMERGENCY
EPO	EMERGENCY POWER OFF
EW	ELECTRIC HOT WATER HEATER
(ER)	EXISTING TO BE RELOCATED
FA	FIRE ALARM
FBO	FURNISHED BY OTHERS, INSTALLED AND WIRED BY THE ELECTRICAL CONTRACTOR
FCU	FAN COIL UNIT
FIBO	FURNISHED AND INSTALLED BY OTHERS, WIRED BY THE ELECTRICAL CONTRACTOR
FT	FEET
G, GND	GROUND
GEN	GENERATOR
GFI	GROUND FAULT INTERRUPTER
HZ	HERTZ
IG	ISOLATED GROUND
IDF	INFORMATION DISTRIBUTION FRAME
IT	INFORMATION TECHNOLOGY
JB	JUNCTION BOX
KVA	KILOVOLT AMPERE
KCMIL	THOUSAND CIRCULAR MILS
LCP	LIGHTING CONTROL PANEL
LD	LEAK DETECTOR
LDP	LEAK DETECTION PANEL
LTG	LIGHTING
MAX	MAXIMUM
MCB	MAIN CIRCUIT BREAKER
MD	MOTORIZED DAMPER
MECH	MECHANICAL
MER	MECHANICAL EQUIPMENT ROOM
MLO	MAIN LUG ONLY
MS	MOTORIZED SHADE
MTD	MOUNTED
(N)	NEW
N	NEUTRAL
NE	NEW TO REPLACE EXISTING
NF	NON-FUSED
NIC	NOT IN CONTRACT
NL	NIGHT LIGHT
NTS	NOT TO SCALE
P	POLE
PB	PULL BOX
PDU	POWER DISTRIBUTION UNIT
PH	PHASE
PS	PROJECTION SCREEN
PNL	PANEL
R	REMOVE EXISTING EQUIPMENT
RE	RELOCATED EXISTING (NEW LOCATION)
RECEPT	RECEPTACLE
RGB	REFERENCE GROUND BAR
RM	ROOM
SD	SMOKE DETECTOR
SRG	SIGNAL REFERENCE GROUND BAR
SPEC	SPECIFICATION
SW	SWITCH
SWBD	SWITCHBOARD
TEL	TELEPHONE
TF	TRANSFER FAN
TV	TELEVISION
TVSS	TRANSIENT VOLTAGE SURGE SUPPRESSOR
TYP	TYPICAL
UNF	UNFUSED
UNO	UNLESS OTHERWISE NOTED
UPS	UNINTERRUPTIBLE POWER SUPPLY
V	VOLT/VOLTAGE
VA	VOLT-AMPERE
VAV	VARIABLE AIR VOLUME
W	WIRE
WP	WEATHERPROOF
X	REMOVE

POWER LEGEND

	WALL MOUNTED SPECIAL RECEPTACLE. LETTER DENOTES TYPE.
	WALL MOUNTED DUPLEX RECEPTACLE, 20A, 125V, 2P, 3W NEMA 5-20R.
	WALL MOUNTED DUPLEX RECEPTACLE, ISOLATED GROUND, 20A, 125V, 2P, 3W.
	WALL MOUNTED DUPLEX RECEPTACLE, GROUND FAULT CIRCUIT INTERRUPTING, 20A, 125V, 2P, 3W.
	WALL MOUNTED DEDICATED DUPLEX RECEPTACLE, 20A, 125V, 2P, 3W NEMA CONFIGURATION 5-20R.
	WALL MOUNTED DOUBLE DUPLEX RECEPTACLE, 20A, 125V, 2P, 3W (GROUNDED) NEMA CONFIGURATION 5-20R, IN 2 GANG BOX.
	CLOCK RECEPTACLE
	ELECTRIFIED FURNITURE MOUNTED DUPLEX RECEPTACLE. FURNISHED BY FURNITURE VENDOR. INSTALLED AND WIRED BY ELECTRICAL CONTRACTOR.
	FLUSH FLOOR MOUNTED ELECTRICAL RECEPTACLE
	SLAB MOUNTED ELECTRICAL RECEPTACLE
	CABLE TRAY MOUNTED ELECTRICAL RECEPTACLE
	SURFACE FLOOR MOUNTED DUPLEX
	WALL MOUNTED DATA OUTLET
	WALL MOUNTED TELEPHONE OUTLET
	WALL MOUNTED TELEPHONE/DATA OUTLET
	CEILING MOUNTED TELECOMMUNICATION OUTLET
	FLUSH FLOOR MOUNTED TELECOMMUNICATION OUTLET
	FLOOR MOUNTED POWER CIRCUITRY INFEEED FOR ELECTRIFIED FURNITURE SYSTEM
	FLOOR MOUNTED TELECOM INFEEED FOR ELECTRIFIED FURNITURE SYSTEM
	WALL MOUNTED POWER CIRCUITRY INFEEED FOR ELECTRIFIED FURNITURE SYSTEM
	WALL MOUNTED TELECOM INFEEED FOR ELECTRIFIED FURNITURE SYSTEM
	FLOOR MOUNTED ELECTRICAL & COMBINATION TYPE POKE THRU FITTING
	ELECTRICAL/COMMUNICATION FLUSH MOUNTED RAISED FLOOR BOX
	ELECTRICAL FLUSH MOUNTED RAISED FLOOR BOX

LIGHTING LEGEND

	20A, 120/277V LIGHTING CONTROL SWITCH ("a" DENOTES LIGHTING FIXTURES CONTROLLED). IF NO LETTER SHOWN SWITCH SHALL CONTROL ALL LIGHT FIXTURES IN THE ROOM OR SPACE.
	20A, 277V KEY OPERATED SWITCH
	LOW VOLTAGE LIGHTING SWITCH ("a" DENOTES RELAY ZONE CONTROL).
	LOW VOLTAGE LIGHTING SWITCH ("a" DENOTES RELAY ZONE CONTROL).
	DIGITAL TIME SWITCH
	WEATHERPROOF SWITCH
	3-WAY LIGHTING CONTROL SWITCH
	4-WAY LIGHTING CONTROL SWITCH
	20A, 277V SWITCH WITH PILOT LIGHT
	MANUAL WALL DIMMER SWITCH
	WALL MOUNTED VACANCY SENSOR
	CEILING MOUNTED VACANCY SENSOR
	WALL MOUNTED OCCUPANCY SENSOR
	CEILING MOUNTED OCCUPANCY SENSOR
	FLUORESCENT LIGHT FIXTURE "A" - UPPER CASE LETTER DENOTES FIXTURE TYPE. "a" - LOWER CASE LETTER DENOTES SWITCH CONTROL. IF NO LETTER SHOWN SWITCH SHALL CONTROL ALL LIGHTS IN SPACE. "2" - NUMBER DENOTES CIRCUIT TO SWITCH FIXTURE IS CONNECTED.
	FLUORESCENT LIGHT FIXTURE "A" - UPPER CASE LETTER DENOTES FIXTURE TYPE. "a" - LOWER CASE LETTER DENOTES SWITCH CONTROL. IF NO LETTER SHOWN SWITCH SHALL CONTROL ALL LIGHTS IN SPACE. "2" - NUMBER DENOTES CIRCUIT TO SWITCH FIXTURE IS CONNECTED.
	CONTINUOUS LIGHTING STRIP FIXTURE
	CEILING MOUNTED WASH LIGHT FIXTURE
	CEILING MOUNTED EXIT SIGN WITH OUTLET BOX WITH OR WITHOUT DIRECTIONAL ARROWS. SHADED PORTION INDICATES ILLUMINATED FACE.
	WALL MOUNTED EXIT SIGN WITH OUTLET BOX WITH OR WITHOUT DIRECTIONAL ARROWS. SHADED PORTION INDICATES ILLUMINATED FACE.
	WALL MOUNTED BATTERY LIGHT FIXTURE
	EMERGENCY BATTERY UNIT WITH REMOTE LIGHTING FIXTURE (1 HEAD)
	EMERGENCY BATTERY UNIT WITH REMOTE LIGHTING FIXTURE (2 HEAD)

ELECTRICAL LEGEND

	HOMERUN WITH PANEL DESIGNATION. NUMERAL WHERE USED INDICATES CIRCUIT NUMBER. IT SHALL CONSIST OF 2#12-5°C, UNLESS OTHERWISE NOTED.
	CONCEALED WIRING (IN WALL OR CEILING)
	EXPOSED WIRING
	CEILING MOUNTED JUNCTION BOX
	WALL MOUNTED JUNCTION BOX
	SLAB MOUNTED JUNCTION BOX
	PULL/TAP BOX
	MOTOR
	FINAL EQUIPMENT CONNECTION
	TOGGLE-TYPE DISCONNECT SWITCH WITH FLEXIBLE EQUIPMENT CONNECTION.
	ELECTRICAL SYMBOL FOR MISCELLANEOUS CONNECTION: PS-PROJECTION SCREEN PJ-PROJECTION EQUIPMENT MS-MOTORIZED SHADE MD-MOTORIZED DRAPE SEC SECURITY EQUIPMENT FA-FIRE ALARM
	UNFUSED DISCONNECT SWITCH U.O.N.
	FUSED DISCONNECT SWITCH U.O.N.
	COMBINATION MOTOR STARTER/DISCONNECT SWITCH
	ELECTRICAL SYMBOL FOR MECHANICAL EQUIPMENT CONNECTION: AHU-AIR HANDLING UNIT FVAV-FAN POWERED VAV BOX FCU-FAN COIL UNIT AC-AIR CONDITIONING UNIT VAV-VARIABLE AIR VOLUME BOX UH-UNIT HEATER EHC-ELECTRIC HEAT COIL EWC-ELECTRIC WATER COOLER MD-MOTORIZED DAMPER HWH-HOT WATER HEATER ECH-ELECTRIC CABINET HEATER CP-CONDENSATE PUMP
	NEW LIGHTING RELAY PANEL
	NEW SURFACE MOUNTED PANELBOARD
	NEW FLUSH MOUNTED PANELBOARD
	EXISTING LIGHTING RELAY PANEL
	EXISTING SURFACE MOUNTED PANELBOARD
	EXISTING FLUSH MOUNTED PANELBOARD
	TRANSIENT VOLTAGE SURGE SUPPRESSION DEVICE
	AUTOMATIC TRANSFER SWITCH
	VARIABLE FREQUENCY DRIVE
	TRANSFORMER

DRAWING NOTATIONS

	DRAWING KEYNOTE TAG
	SECTION DESIGNATION ON DRAWING WHERE SECTION IS CUT A-SECTION DESIGNATION B-DRAWING NO.
	REVISION DELTA

DRAWING LIST

E-001	ELECTRICAL SYMBOLS
E-002	ELECTRICAL NOTES
E-003	ELECTRICAL SPECIFICATIONS
E-004	ELECTRICAL SPECIFICATIONS
E-005	ELECTRICAL SPECIFICATIONS
E-101	ELECTRICAL LIGHTING PLAN - 1ST FLOOR
E-102	ELECTRICAL POWER PLAN - 1ST FLOOR
E-501	ELECTRICAL DETAILS, RISERS AND SCHEDULE

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EUROPEAN WAX CENTER

ISSUE:
100% CD'S
DECEMBER 01, 2021
REVISED FOR BOTTLE FILLER
JANUARY 19, 2022
CONSTRUCTION DOCUMENTS
JANUARY 26, 2022

DRAWN BY:
RS

PROJECT ENGINEER:
RS

DRAWING:
ELECTRICAL SYMBOLS

SCALE:
NOT TO SCALE

SEAL



DRAWING NO.

E-001

ELECTRICAL SPECIFICATIONS

PART 1 GENERAL

1.01 GENERAL REQUIREMENTS

- A. ALL WORK SHALL COMPLY WITH REQUIREMENTS OF THE NATIONAL ELECTRICAL CODE, BUILDING CODE, BUILDING MANAGEMENT AND ALL AUTHORITIES HAVING JURISDICTION (A.H.J.), APPLICABLE NATIONAL, STATE AND LOCAL CODES, LAWS AND REGULATIONS GOVERNING OR RELATING TO ANY PORTION OF THIS WORK SHALL BE INCORPORATED INTO AND MADE A PART OF THESE SPECIFICATIONS.
- B. IF A CONFLICT OCCURS IN THE SPECIFICATIONS AND/OR ON THE DRAWINGS, THE MORE STRINGENT SITUATION SHALL APPLY.
- C. ALL MATERIALS AND WORKMANSHIP SHALL BE GUARANTEED FOR A PERIOD OF ONE YEAR FROM DATE OF FINAL ACCEPTANCE OF THIS WORK. FINAL ACCEPTANCE SHALL BE DEFINED AS THE TIME AT WHICH THE ELECTRICAL WORK IS TAKEN OVER AND ACCEPTED BY THE OWNER. ENGAGE THE SERVICES OF VARIOUS MANUFACTURERS SUPPLYING THE EQUIPMENT FOR THE PROPER STARTUP, OPERATION AND TRAINING OF ALL SYSTEMS INSTALLED. INSTRUCT THE OWNERS PERSONNEL IN THE PROPER OPERATION AND SERVICING OF THE EQUIPMENT.
- D. ELECTRICAL CONTRACTOR SHALL VISIT AND EXAMINE CAREFULLY THE EXISTING AREAS AFFECTED BY THIS WORK TO BECOME FAMILIAR WITH EXISTING CONDITIONS AND WITH DIFFICULTIES THAT WILL ATTEND THE EXECUTION OF THE WORK. CONTRACTOR SHALL PERFORM THIS, PRIOR TO SUBMITTING HIS PROPOSAL. SUBMISSION OF A PROPOSAL WILL BE CONSTRUED AS EVIDENCE THAT SUCH AN EXAMINATION HAS BEEN MADE AND LATER CLAIMS WILL NOT BE RECOGNIZED FOR EXTRA LABOR, EQUIPMENT OR MATERIALS REQUIRED BECAUSE OF DIFFICULTIES ENCOUNTERED WHICH COULD HAVE BEEN FORESEEN HAD SUCH AN EXAMINATION BEEN UNDERTAKEN.
- E. DRAWINGS ARE DIAGRAMMATIC AND INDICATE GENERAL ARRANGEMENT OF WORK. REFER TO ARCHITECTURAL DRAWINGS FOR EXACT LOCATIONS OF ALL DEVICES INCLUDING DIMENSIONS AND ELEVATIONS. WORK SHALL BE COORDINATED WITH OTHER TRADES TO AVOID CONFLICTS.
- F. ALTHOUGH NOT SPECIFICALLY MENTIONED HEREIN OR SHOWN ON THE DRAWINGS, ANY EQUIPMENT, MATERIALS, ACCESSORIES, OR LABOR REQUIRED FOR PROPER AND COMPLETE INSTALLATION OF THE ELECTRICAL WORK SHALL BE FURNISHED AND INSTALLED AS PART OF THE ORIGINAL BID.
- G. THIS CONTRACTOR SHALL BE RESPONSIBLE FOR OBTAINING THE LATEST COPY OF THE BUILDING RULES AND REGULATIONS TO DETERMINE THE EXTENT OF PREMIUM TIME WORK REQUIRED. BASE BUILDING SYSTEM INTERRUPTIONS ARE TO BE PERFORMED OUTSIDE OF NORMAL BUSINESS HOURS. COORDINATE WITH BUILDING OWNER FOR ANY SERVICE INTERRUPTION OF EXISTING SYSTEMS AND GIVE NOTICE AS REQUIRED BY BUILDING RULES AND REGULATIONS.
- H. ANY DAMAGE TO EXISTING PARTITIONS, FLOORS, CEILINGS OR ANY PART OF THE BUILDING OR EQUIPMENT HOUSED THEREIN CAUSED BY THE WORK OF THE CONTRACTOR SHALL BE REPAIRED AT NO ADDITIONAL EXPENSE TO THE OWNER.
- I. ALL NEW MATERIALS REQUIRED SHALL CONFORM WITH THE STANDARDS OF THE UNDERWRITERS LABORATORIES, INC. (UL) IN EVERY CASE WHERE SUCH A STANDARD EXISTS.
- J. DURING THE PROJECT DURATION, THE BUILDING MANAGEMENT OFFICE AND ITS DESIGNATED REPRESENTATIVE SHALL BE ABLE TO INSPECT THE WORK IN PROGRESS. ANY WORK WHICH THE BUILDING MANAGEMENT DEEMS UNACCEPTABLE SHALL BE REMOVED AND REPLACED AT THE EXPENSE OF CONTRACTOR/TENANT.
- K. ALL EQUIPMENT INSTALLED OR CONNECTED INTO THE BUILDING RISERS, SYSTEMS AND INFRASTRUCTURE SHALL BE APPROVED IN ADVANCE BY THE BUILDING PRIOR TO INSTALLATION.

1.02 SCOPE OF WORK

- A. PROVIDE ALL LABOR, MATERIALS AND EQUIPMENT NECESSARY FOR COMPLETE, SAFE INSTALLATION OF ALL ELECTRICAL WORK. THE SCOPE OF WORK SHALL INCLUDE, BUT NOT BE LIMITED TO, THE FOLLOWING:
 1. INSTALLATION OF LIGHTING FIXTURES AND LAMPS INCLUDING EXIT AND EMERGENCY LIGHTING.
 2. INSTALLATION OF WALL SWITCHES, RECEPTACLES, VOICEDATA, OUTLETS, ETC.
 3. INSTALLATION OF NEW RACEWAY AND CONDUCTORS FOR LIGHTING AND POWER.
 4. ADDITION OR MODIFICATION OF EXISTING ELECTRICAL DISTRIBUTION EQUIPMENT.
 5. INSTALLATION OF MECHANICAL EQUIPMENT FEEDERS AND FINAL CONNECTIONS TO MECHANICAL EQUIPMENT.
 6. GROUNDING OF ALL EQUIPMENT AS REQUIRED BY CODE AND AS SPECIFIED.
 7. MODIFICATION OF EXISTING FIRE ALARM SYSTEM.
 8. TEMPORARY LIGHTING AND POWER DURING CONSTRUCTION.
 9. CUTTING, CHANNELING, CORING, AND CHASING REQUIRED TO ACCOMMODATE ELECTRIC INSTALLATION AND ROUGH PATCHING.
 10. DEMOLITION AND REMOVAL OF ELECTRICAL EQUIPMENT AS REQUIRED INCLUDING ALL CONDUCTORS AND CONDUIT BACK TO THEIR SOURCE.
 11. MAINTENANCE AND PROPER OPERATION OF EXISTING BASE BUILDING SYSTEMS WITHIN THE CONTRACT AREA IN ACCORDANCE WITH THE REQUIREMENTS OF BUILDING MANAGEMENT.
 12. PROVISION OF IT INFRASTRUCTURE AS DETAILED.
 13. PROVISION OF SECURITY SYSTEM INFRASTRUCTURE AS DETAILED.
 14. PROVISION OF AUDIO VISUAL SYSTEM INFRASTRUCTURE AS DETAILED.
 15. RECEIPT AND INSTALLATION OF DEVICES, EQUIPMENT, SYSTEMS, SUPPLIED BY OTHERS AS DETAILED.
 16. COORDINATION WITH OTHER TRADES.
 17. COMMISSIONING
 18. GROUND TESTING RESULTS.
 19. SHORT-CIRCUIT, COORDINATION AND ARC-FLASH HAZARD ANALYSIS.
 20. INSTALLATION OF LIGHTNING PROTECTION SYSTEM.
 21. INSTALLATION OF POWER MONITORING SYSTEM.

1.03 SUBSTITUTIONS

- A. NO SUBSTITUTE MATERIAL OR MANUFACTURER OF EQUIPMENT SHALL BE PERMITTED WITHOUT A FORMAL WRITTEN SUBMITTAL TO THE ENGINEER WHICH INCLUDES ALL DIMENSIONAL, PERFORMANCE AND MATERIAL SPECIFICATIONS. ANY CHANGES IN LAYOUT, MECHANICAL CHARACTERISTICS, STRUCTURAL REQUIREMENTS, OR DESIGN DUE TO THE USE OF A SUBSTITUTION SHALL BE SUBMITTED TO THE ENGINEER AS PART OF THIS PROPOSAL. THE CONTRACTOR TAKES FULL RESPONSIBILITY FOR THE SUBSTITUTION AND ALL CHANGES RESULTING FROM SUBSTITUTION. ALL ITEMS SHALL BE SUBMITTED FOR REVIEW IN CONJUNCTION WITH THE SUBMITTAL OF THE ALTERNATE. ANY SUBSTITUTION MUST BE SUBMITTED WITH AN EXPLANATION WHY SUBSTITUTION IS BEING UTILIZED. IF THE SUBSTITUTED ITEM DEVIATES FROM THE SPECIFIED ITEM, THOSE DEVIATIONS ARE TO BE IDENTIFIED ON A LINE BY LINE BASIS. IF THE SUBSTITUTION IS BEING UTILIZED FOR FINANCIAL REASONS, THE ASSOCIATED CREDIT MUST BE SIMULTANEOUSLY SUBMITTED.
- B. ALL SUBSTITUTED EQUIPMENT SHALL CONFORM TO SPACE REQUIREMENTS AND PERFORMANCE REQUIREMENTS SHOWN ON CONTRACT DOCUMENTS.
- C. CONTRACTOR SHALL SUBMIT BID BASED ON SPECIFIED ITEMS AND SHALL SUPPLY AS AN ALTERNATE PRICE ANY SUBSTITUTIONS.
- D. ALL EQUIPMENT SHALL BE APPROVED FOR USE IN THE STATE OF NEW JERSEY.

1.04 SHOP DRAWINGS

- A. SHOP DRAWINGS SUBMISSION SHALL INCLUDE, BUT NOT BE LIMITED TO, THE FOLLOWING:
 1. DISTRIBUTION EQUIPMENT (PANELS, SWITCHES, ETC.).
 2. OVERCURRENT PROTECTIVE DEVICES (FUSES AND BREAKERS).
 3. LIGHTING FIXTURES.
 4. WIRING DEVICES.
 5. FIRE ALARM EQUIPMENT, WIRING SCHEMATIC AND SEQUENCE OF OPERATION.
 6. COORDINATION DRAWINGS OF ELECTRIC CLOSET LAYOUTS INCLUDING ELEVATIONS AND MOUNTING DETAILS OF PANELBOARDS, TRANSFORMERS, ETC.
 7. FLOOR BOXES/POKE THRU DEVICES.
 8. GROUNDING EQUIPMENT/DEVICES.
 9. CONDUIT, RACEWAYS, WIREWAYS
 10. WIRING
 11. LIGHTING CONTROL SYSTEMS
 12. TESTING AND COMMISSIONING SCHEDULE.
 13. SCALED FIELD DRAWINGS.
 14. TRANSFORMERS.
 15. UPS SYSTEMS.
 16. GENERATORS.
 17. AUTOMATIC TRANSFER SWITCHES.
 18. SHORT-CIRCUIT COORDINATION, ARC-FLASH HAZARD ANALYSIS.
 19. SURGE PROTECTION DEVICES.
- B. PROVIDE A MINIMUM OF THREE (3) COPIES OF 8-1/2" x 11" SUBMISSIONS AND TWO (2) SETS OF ALL DRAWINGS.
- C. CHANGES MADE TO SHOP DRAWINGS BY THE CONSULTANT WILL NOT AFFECT THE CONTRACT PRICE.

1.05 QUALITY ASSURANCE

- A. ELECTRICAL COMPONENTS, DEVICES, AND ACCESSORIES, LISTED AND LABELED AS DEFINED IN NFPA 70, ARTICLE 100, BY A TESTING AGENCY ACCEPTABLE TO AUTHORITIES HAVING JURISDICTION, AND MARKED FOR INTENDED USE.
 - B. COMPLY WITH NFPA 70
- ### 1.06 COORDINATION
- A. COORDINATE CHASES, SLOTS, INSERTS, SLEEVES, AND OPENINGS WITH GENERAL CONSTRUCTION WORK AND ARRANGE IN BUILDING STRUCTURE DURING PROGRESS OF CONSTRUCTION TO FACILITATE THE ELECTRICAL INSTALLATIONS THAT FOLLOW.
 1. SET INSERTS AND SLEEVES IN POURED-IN-PLACE CONCRETE, MASONRY WORK, AND OTHER STRUCTURAL COMPONENTS AS THEY ARE CONSTRUCTED.
 - B. SEQUENCE, COORDINATE, AND INTEGRATE INSTALLING ELECTRICAL MATERIALS AND EQUIPMENT FOR EFFICIENT FLOW OF THE WORK. COORDINATE INSTALLING LARGE EQUIPMENT REQUIRING POSITIONING BEFORE CLOSING IN THE BUILDING.
 - C. COORDINATE ELECTRICAL SERVICE CONNECTIONS TO COMPONENTS FURNISHED BY UTILITY COMPANIES.
 1. COORDINATE INSTALLATION AND CONNECTION OF EXTERIOR UNDERGROUND AND OVERHEAD UTILITIES AND SERVICES, INCLUDING PROVISION FOR ELECTRICITY-METERING COMPONENTS.
 2. COMPLY WITH REQUIREMENTS OF AUTHORITIES HAVING JURISDICTION AND OF UTILITY COMPANY PROVIDING ELECTRICAL POWER AND OTHER SERVICES.
 - D. COORDINATE LOCATION OF ACCESS PANELS AND DOORS FOR ELECTRICAL ITEMS THAT ARE CONCEALED BY FINISHED SURFACES. ACCESS DOORS AND PANELS ARE SPECIFIED IN A SEPARATE DIVISION OF THE SPECIFICATIONS.
 - E. WHERE ELECTRICAL IDENTIFICATION DEVICES ARE APPLIED TO FIELD-FINISHED SURFACES, COORDINATE INSTALLATION OF IDENTIFICATION DEVICES WITH COMPLETION OF FINISHED SURFACE.
 - F. WHERE ELECTRICAL IDENTIFICATION MARKINGS AND DEVICES WILL BE CONCEALED BY ACOUSTICAL CEILINGS AND SIMILAR FINISHES, COORDINATE INSTALLATION OF THESE ITEMS BEFORE CEILING INSTALLATION.
- ### 1.07 AS-BUILT DRAWINGS
- A. CONTRACTOR SHALL MAINTAIN RECORD DRAWING PRINTS ON JOB SITE AND RECORD, AT TIME OF OCCURRENCE, DEVIATIONS FROM CONTRACT DOCUMENTS.
 - B. AT THE COMPLETION OF WORK AND BEFORE FINAL ACCEPTANCE, PROVIDE AS-BUILT DRAWINGS OF THE INSTALLATION. IN AUTOCAD 2004 OR NEWER, AN ELECTRONIC COPY (AUTOCAD FORMAT) OF ALL DRAWINGS WILL BE PROVIDED TO THE ELECTRICAL CONTRACTOR BY THE CONSULTANT AT NO COST. THE DRAWINGS WILL REFLECT THE BID AND/OR CONSTRUCTION SET OF DRAWINGS. SHOULD THE CONTRACTOR REQUIRE ADDITIONAL ELECTRONIC COPIES DURING CONSTRUCTION, A COST OF \$250.00 PER DRAWING WILL BE CHARGED BY THE CONSULTANT.
 - C. INCORPORATE ALL CHANGES AND DEVIATIONS FROM BID DRAWINGS, UTILIZING NORMAL, RECOGNIZED DRAFTING PROCEDURES THAT MATCH THE ORIGINAL DRAFTING METHODOLOGY.
 - D. ALL MAIN BRANCH CONDUIT RUNS, JUNCTION BOX LOCATIONS, CONDUIT RUNS FOR ALL FLOOR OUTLETS, ETC., MUST BE REFLECTED ON THE DRAWINGS.
 - E. REMOVE THE ELECTRICAL ENGINEER'S STAMP FROM ALL AS-BUILT DRAWINGS.
 - F. REMOVE ALL ELECTRICAL ENGINEER'S DRAWING DIRECTIVE NOTES TO CONTRACTOR
 - G. CLEARLY INDICATE THE WORDS "AS-BUILT" IN THE TITLE BLOCK COLUMN OF THE DRAWINGS AS WELL AS THE ELECTRICAL CONTRACTOR'S NAME AND ADDRESS.
 - H. SUBMIT A SINGLE (1) PRINT TO CONSULTANT FOR REVIEW. WHEN FOUND ACCEPTABLE BY THE CONSULTANT, SUBMIT THREE (3) SETS OF PRINTS TOGETHER WITH THE CAD DISK FOR PRESENTATION TO THE LANDLORD AND TENANT.

1.08 OPERATION AND MAINTENANCE MANUALS

- A. PROVIDE 2 (TWO) SETS OF OPERATION AND MAINTENANCE MANUALS SUBMITTED IN HARD COVER 3-RING BINDERS. INCLUDE THE FOLLOWING INFORMATION IN THE OPERATIONS AND MAINTENANCE MANUALS:
 1. NAMES AND ADDRESS OF LOCAL SUPPLIERS FOR THE ITEMS INCLUDED.
 2. TECHNICAL DATA, PRODUCT DATA, SUPPLEMENTED BY BULLETINS, COMPONENT ILLUSTRATIONS, EXPLODED VIEWS, TECHNICAL DESCRIPTIONS OF ITEMS, AND PARTS LISTS. ADVERTISING OR SALES LITERATURE IS NOT ACCEPTABLE.
 3. THE CONSULTANTS REVIEWED SHOP DRAWINGS.
 4. CERTIFICATE(S) OF ACCEPTANCE FROM THE AUTHORITIES INSPECTION DEPARTMENT.
 5. VERIFICATION REPORTS AND CERTIFICATE(S) FOR ANY NEW FIRE ALARM COMPONENTS OR TIE-INS AND ANY BASE BUILDING TIE-INS FOR MISCELLANEOUS SYSTEMS (I.E. SECURITY, LIGHTING CONTROL, DIGITAL METERING).
 6. LOAD BALANCE REPORT.
 7. WRITTEN GUARANTEE.
 8. LIST OF EACH FIXTURE TYPE IDENTIFYING TYPE OF LAMP, WATTAGE AND MANUFACTURER'S CONTACT INFO.
 9. COORDINATION STUDY.
- B. REVIEW INFORMATION PROVIDED IN THE MAINTENANCE INSTRUCTIONS AND MANUALS WITH THE TENANT'S OPERATING PERSONNEL AND LANDLORD'S OPERATING PERSONNEL WHERE BASE BUILDING SYSTEMS ARE REVISED, TO ENSURE A COMPLETE UNDERSTANDING OF THE ELECTRICAL EQUIPMENT AND SYSTEMS AND THEIR OPERATION.

1.09 MATERIALS AND EQUIPMENT

- A. ALL MATERIALS AND EQUIPMENT SHALL BE NEW, CERTIFIED BY A NATIONALLY RECOGNIZED TESTING LABORATORY AND MANUFACTURED TO THE STANDARDS SPECIFIED.
- B. WHERE THERE IS NO ALTERNATIVE TO SUPPLYING EQUIPMENT WHICH IS NOT NRTL CERTIFIED, OBTAIN SPECIAL APPROVAL FROM THE LOCAL ELECTRICAL SAFETY AUTHORITY.

1.10 INSURANCE

- A. PROVIDE AND MAINTAIN INSURANCE TO PROTECT THE LANDLORD, TENANT AND TRADES FROM ALL POSSIBLE CLAIMS. SUBMIT WITH BID FOR AN AMOUNT ACCEPTABLE TO LANDLORD AND TENANT.

1.11 CONTRACT DOCUMENTS

- A. THE DRAWINGS FOR THE ELECTRICAL WORK ARE DIAGRAMMATIC PERFORMANCE DRAWINGS ONLY. INTENDED TO CONVEY THE SCOPE OF WORK AND INDICATE THE GENERAL ARRANGEMENT AND APPROXIMATE SIZE AND LOCATION OF ELECTRICAL EQUIPMENT. THE DRAWINGS DO NOT INTEND TO SHOW ARCHITECTURAL, INTERIOR DESIGN, MECHANICAL, STRUCTURAL OR BASE BUILDING DETAILS. BE RESPONSIBLE FOR A THOROUGH KNOWLEDGE OF SAME BEFORE PROCEEDING WITH THE WORK.
- B. DO NOT SCALE OR MEASURE DRAWINGS, BUT OBTAIN INFORMATION REGARDING ACCURATE DIMENSIONS FROM THE DIMENSIONS SHOWN ON THE DESIGN CONSULTANT/ARCHITECT'S DRAWINGS, OR BY SITE MEASUREMENTS.
- C. ANY DISCREPANCIES BETWEEN DRAWINGS AND/OR SPECIFICATIONS AND EXISTING CONDITIONS, MUST BE REFERRED TO THE DESIGN CONSULTANT/ARCHITECT BEFORE ANY WORK AFFECTED IS BEGUN.
- D. COOPERATE AND COORDINATE WITH OTHER CONTRACTORS IN LAYING OUT OF WORK SO AS NOT TO CONFLICT WITH THE WORK OF OTHER CONTRACTORS. CARRY OUT WORK PROMPTLY AS PER CONSTRUCTION SCHEDULE AND COORDINATE WITH WORK OF OTHER CONTRACTORS.
- E. MAKE, AT NO ADDITIONAL COST, ANY CHANGES OR ADDITIONS TO MATERIALS AND EQUIPMENT NECESSARY TO ACCOMMODATE STRUCTURAL CONDITIONS (OFFSETS AROUND BEAMS, COLUMN, ETC.)

1.12 INTENT

- A. IT IS THE INTENT OF THESE DRAWINGS AND SPECIFICATIONS THAT THE CONTRACTOR PROVIDES COMPLETE AND OPERATIONAL SYSTEMS AS REQUIRED, WHERE DIFFERENCES OCCUR, THE MAXIMUM CONDITION SHALL GOVERN.
- B. ANY MISCELLANEOUS ITEMS, HARDWARE, DEVICES, WIRING, ETC., NOT SPECIFICALLY DESCRIBED, BUT REQUIRED FOR THE OPERATION OF THE SYSTEM, MUST BE PROVIDED AND INCLUDED AS PART OF THE BID.

1.13 LOCATIONS OF OUTLETS

- A. REFER TO DESIGN CONSULTANT'S/ARCHITECT'S DRAWINGS FOR EXACT LOCATIONS OF ALL LIGHTING FIXTURES AND WIRING DEVICES.
- B. CHANGE LOCATION OF OUTLETS AT NO COST OR CREDIT, PROVIDING DISTANCE DOES NOT EXCEED (10'-0") AND INFORMATION IS GIVEN PRIOR TO INSTALLATION.
- C. ALL OUTLETS TO BE MARKED ON JOB SITE FOR APPROVAL BY DESIGN CONSULTANT/ARCHITECT PRIOR TO INSTALLATION.

1.14 PLYWOOD

- A. ALL SURFACE MOUNTED ELECTRICAL DISTRIBUTION EQUIPMENT SHALL BE MOUNTED ON PLYWOOD BACKBOARDS. PROVIDE ALL PLYWOOD BACKBOARDS REQUIRED FOR THE WORK OF THIS DIVISION. PLYWOOD BACKBOARDS SHALL BE 3/4" THICK, OF HIGHEST QUALITY FIRE RETARDANT FIR, PRIME AND PAINT BACKBOARDS WITH FIRE RETARDANT PAINT COLOR AS SELECTED BY THE DESIGN CONSULTANT/ARCHITECT.

1.15 ACCESS DOORS

- A. WHEREVER ANY BASE BUILDING EQUIPMENT REQUIRES ACCESSIBILITY, MAINTENANCE OR ADJUSTMENT, PROVIDE ACCESS DOORS APPROVED BY DESIGN CONSULTANT/ARCHITECT AND LANDLORD. ARRANGE FOR ITS INSTALLATION BY THE DIVISION IN WHOSE WORK IT OCCURS.

1.16 DRY WALL CEILINGS

- A. IN ALL DRYWALL CEILING AREAS, DIVISION 16 IS TO REMOVE AND RELOCATE ALL EXISTING JUNCTION BOXES TO ACCESSIBLE CEILING SPACE.
- B. PROVIDE ACCESS PANELS FOR ALL NEW AND EXISTING DEVICES AS REQUIRED

1.17 CORE DRILLING/TRENCHING/CHASING

- A. BEFORE CORE DRILLING/CHASING FLOOR SLAB OR STRUCTURAL WALLS, X-RAY SLABS OR WALLS AND HAVE THE LOCATIONS APPROVED BY THE LANDLORD IN WRITING.
- B. ANY EXISTING BUILDING SERVICE DAMAGED BY CORE DRILLING SHALL BE REPAIRED IMMEDIATELY AT NO COST TO LANDLORD OR TENANT.
- C. FLOOR DRILLING TO BE PERFORMED AFTER NORMAL WORKING HOURS AND AT A TIME ACCEPTABLE TO LANDLORD AND ALLOWANCES FOR THIS WORK SHALL BE INCLUDED IN BID PRICE SUBMITTED.
- D. ALL ELECTRICAL CONDUCTORS AND IT WORK INSTALLED IN THE CEILING OF ANOTHER TENANT SPACE SHALL BE IN CONDUIT. ARMORED CABLING AND USE OF EXPOSED PLENUM IT CABLING SHALL NOT BE PERMITTED.

1.18 NOISE AND VIBRATION

- A. ELECTRICAL EQUIPMENT IS TO OPERATE WITHOUT OBJECTIONABLE NOISE OR VIBRATION, IF, IN THE OPINION OF THE LANDLORD, ARCHITECT OR CONSULTANT, THE EQUIPMENT OPERATES WITH EXCESSIVE NOISE OR VIBRATION, THEN THE EQUIPMENT MUST BE REPLACED OR NOISE OR VIBRATION ELIMINATED.
- B. CONNECTIONS TO NOISE-PRODUCING AND VIBRATING EQUIPMENT MUST BE MADE WITH LIQUID-TIGHT FLEXIBLE CONDUIT AND ASSOCIATED CONNECTORS. THIS INCLUDES TRANSFORMERS, DIMMING EQUIPMENT RACKS, AND MOTORS. USE A MINIMUM OF 3 FT OF FLEXIBLE CABLE WITH SLACK AT EACH DEVICE.
- C. VIBRATION ISOLATORS ARE TO BE PROVIDED WHERE INDICATED OR REQUIRED. TRANSFORMERS TO BE ISOLATED FROM THE STRUCTURE, WITH SPRING AND RUBBER ISOLATORS WHEN WALL MOUNTED OR SUSPENDED AND 1/2" HIGH DENSITY NEOPRENE SANDWICH PADS (TYPE MPW) WHEN FLOOR MOUNTED.

1.19 TENANT'S EQUIPMENT

- A. WHERE SPECIFIED, INSTALL ALL EQUIPMENT PROVIDED BY THE TENANT. RECEIVE, STORE AND INSTALL EQUIPMENT AND ACCEPT FULL RESPONSIBILITY FOR ITS CORRECT OPERATION. PROVIDE CONDUIT, WIRE, BOXES, SWITCHES, OUTLETS, DEVICES, FLEX CONNECTIONS, ETC., AS REQUIRED.

1.20 INTERRUPTION OF SERVICES

- A. INTERRUPTION OF ELECTRICAL SERVICE TO ANY PART OF THE BUILDING SHALL OCCUR ONLY BY PRE-ARRANGEMENT WITH AND AT TIMES SUITABLE TO THE LANDLORD.
- B. INTERRUPTIONS SHALL ONLY OCCUR DURING PREMIUM TIME PERIODS, ALL ALLOWANCES FOR THIS SHALL BE INCLUDED IN THE PRICE SUBMITTED.

1.21 VALUATION OF CHANGES

- A. PROVIDE COMPLETE BREAKDOWN OF MATERIAL, LABOR, OVERHEAD, PROFIT, ETC., WHEN SUBMITTING QUOTATIONS FOR CHANGE NOTICES ON THIS PROJECT.
- B. THE HOURLY LABOR RATE SHALL BE INCLUSIVE OF ALL CHARGES FOR SUPERVISION, VARIABLE LABOR FACTORS, HAND TOOLS, PAYROLL BURDENS, HEIGHT FACTORS, WARRANTIES, STORAGE, RENTALS, ADDITIONAL BONDING, PARKING, CLEAN-UP, AS-BUILT DRAWINGS, HOISTING, FREIGHT AND DELIVERY, BUT EXCLUSIVE OF OVERHEAD AND PROFIT.

1.22 ENGINEER'S FINAL INSPECTION

- A. FINAL INSPECTION IS IMPERATIVE. PRIOR TO CLOSING OF CEILINGS, THIS CONTRACTOR SHALL CONTACT THE ENGINEER OF RECORD AND THE LANDLORD'S REPRESENTATIVE TO PERFORM A FINAL INSPECTION. WHEN CEILING TILES HAVE BEEN INSTALLED IT WILL BE NECESSARY FOR THE CONTRACTOR TO REMOVE PORTIONS FOR INSPECTION.

1.23 COMPLETION OF CONTRACT

- A. ALL EQUIPMENT MUST BE CLEANED AND TESTED BEFORE FINAL ACCEPTANCE BY THE CONSULTANT.
- B. DEFECTS AND DEFICIENCIES WHICH ORIGINATE OR BECOME EVIDENT DURING THE WARRANTY PERIOD MUST BE REPAIRED OR REPLACED, AT NO COST.
- C. REPLACE, AT NO COST, ALL INCANDESCENT LAMPS BURNED-OUT DURING A THIRTY (30) DAY PERIOD AND ALL BURNED-OUT FLUORESCENT AND HID LAMPS FOR A PERIOD OF NINETY (90) DAYS AFTER DATE OF ISSUANCE OF CERTIFICATE OF "SUBSTANTIAL PERFORMANCE" FOR THE CONTRACT FOR THE WORK.
- D. IF DURING THE WARRANTY PERIOD, TRANSFORMERS, BALLASTS OR OTHER NOISE AND VIBRATION PRODUCING EQUIPMENT ARE CONSIDERED BY THE CONSULTANT TO EXCEED ACCEPTABLE STANDARDS, THEN THESE MUST BE REPLACED WITHOUT DELAY OR ADDITIONAL COST TO THE TENANT. ALL WORK RELATING TO THE REPLACEMENT OF DEFECTIVE ITEMS, MUST BE CARRIED OUT AFTER NORMAL WORKING HOURS AND AT A TIME WHICH IS ACCEPTABLE TO THE TENANT.

1.24 DEMOLITION

- A. VISIT THE SITE, EXAMINE THE EXISTING CONDITIONS AND BECOME FAMILIAR WITH THE EXTENT OF THE NECESSARY REMOVAL, RELOCATION, RECONNECTING AND REROUTING OF ELECTRICAL EQUIPMENT AND WIRING AS NECESSARY FOR THE COMPLETION OF THE PROJECT.
- B. REVIEW AND CONFIRM WITH THE ARCHITECT/DESIGNER'S DRAWINGS FOR THE COMPLETE EXTENT OF DEMOLITION AND ALTERATION.
- C. MAKE SAFE AND DISCONNECT ALL POWER AND SYSTEMS, AS AND WHEN, AND TO THE EXTENT REQUIRED TO FACILITATE WITH THE DEMOLITION.
- D. ENSURE THAT ALL ELECTRICAL, LIFE SAFETY SERVICES, AND SERVICES FOR EXISTING EQUIPMENT, IN AREAS OUTSIDE THE AREAS OF THIS WORK, THAT ARE REQUIRED TO REMAIN IN SERVICE, SHALL DO SO.
- E. RELOCATE ANY ELECTRICAL FEEDERS OR EQUIPMENT THAT ARE REQUIRED TO REMAIN IN SERVICE, THAT ARE SECURED TO EXISTING WALLS, FLOORS OR CEILINGS TO BE DEMOLISHED OR THAT ARE BURIED AND REQUIRED TO BE EXCAVATED FOR NEW WORK.
- F. REMOVE AND REPLACE ANY ELECTRICAL EQUIPMENT ON WALLS OR CEILINGS THAT WILL BE DEMOLISHED AND REBUILT.
- G. WHEN DELETING AND/OR MAKING SAFE EXISTING ELECTRICAL WORK, ENSURE THAT IT INCLUDES ALL CONDUITS AND WIRING BACK TO THE ASSOCIATED PANELBOARD OR CONTROL PANEL. WHERE FLOORBOARDS ARE BEING REMOVED, ENSURE UNDER-FLOOR CONDUIT IS REMOVED BACK TO SOURCE AND FILL ALL CORE HOLES, IN FLOORS AND WIN WALLS, WITH APPROPRIATE CONCRETE.
- H. DISCONNECT AND REMOVE EXISTING LIGHT FIXTURES, DEVICES, OUTLETS, ETC. WHICH ARE NOT TO BE REUSED. SUCH ITEMS SHALL BE CARTONED AND TURNED OVER TO THE LANDLORD AT A PLACE DESIGNATED BY THE LANDLORD. CUT BACK AND CAP UNUSED RACEWAY AND OUTLETS AND REMOVE UNUSED WIRING BACK TO PANELBOARD IN AN APPROVED MANNER.
- I. INCLUDE IN DEMOLITION WORK FOR REMOVAL OF ALL COMMUNICATION DEVICES, OUTLETS, CABLES, CONDUITS ETC., WHICH ARE NOT TO BE REUSED. ALL REDUNDANT CABLING AND CONDUIT SHALL BE REMOVED IN ITS ENTIRETY FROM TENANT SPACE BACK TO BASE BUILDING RISER ROOMS. REMOVE ALL UNNECESSARY CABLES AND EQUIPMENT IN HUB ROOMS AND/OR TELEPHONE ROOMS WITH EXTREME CARE TO AVOID ANY ACCIDENTAL SHUTDOWN TO EXISTING SERVICES SERVING OTHER PARTS OF THE BUILDING.
- J. PROVIDE BLANK COVERPLATE WHERE OUTLETS ARE REMOVED FROM EXISTING WALLS TO REMAIN.
- K. ALL EXISTING ELECTRICAL EQUIPMENT WHICH IS NO LONGER REQUIRED SHALL BE REMOVED AND DISPOSED OF, OFF SITE.
- L. BE RESPONSIBLE AND PAY FOR ANY DAMAGE TO THE BASE BUILDING INCURRED BY WORK OF THIS DIVISION, OR REPAIR TO THE SATISFACTION OF THE CONSULTANT.
- M. CARRY OUT THE WORK WITH MINIMUM OF NOISE, DUST AND DISTURBANCE.

1.25 WORK IN NEW AND RENOVATED AREAS

- A. WHEN DELETING AND/OR MAKING SAFE EXISTING ELECTRICAL WORK, ENSURE THAT IT INCLUDES REMOVAL OF ALL DISCONNECTED WIRING BACK TO THE ASSOCIATED PANELBOARD OR DISTRIBUTION EQUIPMENT.
- B. DISCONNECT AND REMOVE EXISTING LUMINAIRES, DEVICES, OUTLETS, ETC., WHICH ARE NOT TO BE REUSED. SUCH ITEMS SHALL BE CARTONED AND TURNED OVER TO THE LANDLORD AT A PLACE DESIGNATED BY THE LANDLORD. CUT BACK AND CAP UNUSED RACEWAY AND OUTLETS AND REMOVE UNUSED WIRING BACK TO PANELBOARD IN AN APPROVED MANNER. REMOVE ALL REDUNDANT COMMUNICATIONS CABLES BACK TO HUB ROOMS AND/OR TELEPHONE RISER ROOMS.
- C. ENSURE THAT ALL EXISTING EQUIPMENT WHICH IS TO BE REUSED AND/OR RELOCATED IS THOROUGHLY INSPECTED AND REPAIRS TO BE MADE TO ENSURE CORRECT OPERATION WHEN PUT BACK INTO SERVICE AND MEETS THE LOCAL ELECTRICAL SAFETY AUTHORITY'S APPROVAL. OUTLET BOXES AND WIRING AND/OR CONDUITS WHICH ARE CORRODED OR DAMAGED ARE TO BE REPLACED.

D. ALL EXISTING ELECTRICAL EQUIPMENT WHICH IS NO LONGER REQUIRED SHALL BE REMOVED AND DISPOSED OF, OFF SITE.

- E. WHERE EXISTING OUTLET BOXES ARE REMOVED FROM EXISTING UNDERFLOOR DUCTS, PLUG AND CAP EXISTING HOLES FLUSH WITH FLOOR USING APPROVED FITTINGS. REMOVE ALL REDUNDANT WIRE AND CABLE BACK TO SERVICE.
- F. BE RESPONSIBLE AND PAY FOR ANY DAMAGE TO THE BASE BUILDING INCURRED BY WORK OF THIS DIVISION, OR REPAIR TO THE SATISFACTION OF THE CONSULTANT.
- G. CARRY OUT THE WORK WITH A MINIMUM OF NOISE, DUST AND DISTURBANCE.
- H. PROVIDE TOOLS AND CLEAN UP EQUIPMENT. OBTAIN THE LANDLORD'S PERMISSION FOR THE USE OF ELECTRICAL, ELEVATOR, PLUMBING OR DRAINAGE OUTLETS.
- I. PROVIDE DAILY CLEAN UP AND PROPER DISPOSAL OF DEBRIS GENERATED BY DAILY OPERATIONS. ON COMPLETION OF THE WORK, ALL TOOLS, SURPLUS MATERIALS AND WASTE MATERIALS SHALL BE REMOVED AND THE PREMISES LEFT IN A CLEAN AND PERFECT CONDITION.
- J. REMOVE AND REROUTE EXISTING CONDUITS WHICH ARE TO REMAIN IN "FINISHED" AREAS WHICH ARE TO BE EXPOSED.
- K. CONDUITS WHICH ARE TO BE CUT BACK ARE TO TERMINATE IN A JUNCTION BOX.
- L. CLEAN LUMINAIRE REFLECTORS AND LENSES, LAMPS AND OTHER SURFACES THAT HAVE BEEN EXPOSED TO CONSTRUCTION DUST AND DIRT. CLEAN THE INSIDES AND OUTSIDES OF PANELBOARDS, SPLITTERS AND OTHER ELECTRICAL EQUIPMENT, AND COMPLETELY REMOVE ALL DEBRIS AND TOOLS FROM THE PROJECT.

1.26 SHORT CIRCUIT, DEVICE COORDINATION AND ARC-FLASH ANALYSIS

- A. ENSURE CIRCUIT PROTECTIVE DEVICES SUCH AS OVERCURRENT TRIPS, RELAYS, CIRCUIT BREAKERS AND FUSES ARE INSTALLED TO VALUES AND SETTINGS SO AS TO PROVIDE PROTECTION BY MEANS OF OPENING THE CLOSEST DEVICE TO THE FAULT.
- B. SUBMIT A SHORT CIRCUIT, COORDINATION AND ARC-FLASH STUDY AS FOLLOWS:
 1. UTILIZE COMPUTER SOFTWARE PROGRAMS CERTIFYING COMPLIANCE WITH IEEE 399, MANUAL CALCULATIONS ARE NOT ACCEPTABLE.
 2. OBTAIN AVAILABLE FAULT CURRENT AND UTILITY IMPEDANCE FROM UTILITY COMPANY.
 3. OBTAIN AND TABULATE ALL ELECTRICAL PROTECTION DATA FOR ALL THE EQUIPMENT.
 4. OBTAIN FEEDER LENGTHS AND RATINGS FOR ALL NEW AND EXISTING FEEDERS.
 5. PERFORM A SHORT CIRCUIT ANALYSIS TO DETERMINE SHORT CIRCUIT CURRENT AND GROUND FAULT CURRENT LEVELS AT EACH PIECE OF EQUIPMENT IN THE DISTRIBUTION SYSTEM. HAVING OBTAINED THE AVAILABLE SHORT CIRCUIT CURRENT AND IMPEDANCE OF UTILITY SERVICE ENTRANCE FROM THE LOCAL ELECTRICAL SUPPLY AUTHORITY.
 6. PERFORM ANALYSIS FOR EACH SYSTEM SCENARIO.
 7. GENERATE AN EQUIPMENT EVALUATION REPORT FOR ALL ELECTRICAL EQUIPMENT AND OVERCURRENT PROTECTIVE DEVICES COMPARING CALCULATED AVAILABLE FAULT CURRENTS TO EQUIPMENT WITHSTAND RATINGS.
 8. GENERATE APPROPRIATE SETTINGS FOR ALL RELAYS AND PROTECTIVE DEVICES FROM THE LEVEL OF THE LOCAL ELECTRICAL SUPPLY AUTHORITY FEEDER PROTECTIVE DEVICES TO ALL DOWNSTREAM DEVICES.
- C. PERFORM AN ARC-FLASH HAZARD ANALYSIS IN ACCORDANCE WITH IEEE 1584 EQUATIONS AS PRESENTED IN NFPA 70E.
 1. CALCULATE THE FLASH PROTECTION BOUNDARY AND THE INCIDENT ENERGY AT EACH PIECE OF ELECTRICAL EQUIPMENT.
 2. CALCULATIONS MUST BE PERFORMED FOR ALL SYSTEM SCENARIOS AND GREATEST INCIDENT ENERGY SHALL BE REPORTED.
 3. WHERE "DANGEROUS" INCIDENT ENERGY LEVELS EXIST, MAKE RECOMMENDATIONS TO REDUCE ENERGY LEVELS.
 4. PROVIDE ARC-FLASH LABELS FOR EACH PIECE OF EQUIPMENT.
- D. PROVIDE A COMPLETE, COMPREHENSIVE REPORT AT THE CONCLUSION OF THE SHORT CIRCUIT, COORDINATION AND ARC-FLASH STUDY CONSISTING OF THE FOLLOWING:
 1. A SET OF TIME CURRENT CURVE CHARACTERISTICS OF ALL PROTECTIVE DEVICES IN THE SYSTEM PLOTTED ON LOG-LOG GRAPH PAPER WITH CORRESPONDING SHORT CIRCUIT CURRENT LEVELS.
 2. TIME CURRENT DAMAGE CURVES FOR ALL TRANSFORMERS, MOTORS, AND CABLES
 3. PROVIDE A COMPLETE SCHEDULE OF ALL MAIN PROTECTIVE RELAYS, FUSES AND OTHER PROTECTIVE DEVICES LISTING DEVICE LOCATIONS, MANUFACTURER, MODEL NUMBER, SIZE, RANGE, SETTING, ETC.
 4. ENTIRE REPORT SHALL BE PERFORMED BY A PROFESSIONAL ENGINEER LICENSED IN THE STATE WHERE THE PROJECT IS LOCATED, WHO SHALL SIGN AND STAMP THE STUDY.
- E. THE COMPLETE STUDY WILL ILLUSTRATE AND ENSURE THAT THE SETTINGS AND SIZES OF ALL PROTECTIVE DEVICES FOR EACH VOLTAGE LEVEL, HAVE BEEN CHOSEN TO ENSURE MAXIMUM OR OPTIMAL PROTECTION AND COORDINATION DURING ELECTRICAL FAULT OR OVERLOAD CONDITIONS.
- F. THESE GENERATED SETTINGS WILL THEN BE APPLIED BY "IN-FIELD" TESTING METHODS TO THE RESPECTIVE DEVICES.

1.27 UNIT PRICES

- A. SUBMIT THE FOLLOWING LIST OF UNIT PRICES:
 1. LIGHT FIXTURES - FOR EACH TYPE SPECIFIED ON DRAWINGS (\$/FIXTURE).
 2. RECEPTACLES - ADD/Deduct PRICE FOR EACH TYPE SPECIFIED ON DRAWINGS (\$/RECEPTACLE).
 3. DATA/TELEPHONE OUTLET - ADD/Deduct PRICE FOR WALL MOUNTED TELEPHONE OUTLET WITH 1" CONDUIT STUBBED INTO HUNG CEILING (\$/OUTLET).
 4. RACEWAYS - ALL SIZES ON PROJECT (\$/LIN FT), CONDUCTORS (\$/LIN FT), MC CABLE (\$/LIN FT)
 5. FIRE ALARM DEVICES.
 6. ELECTRICAL PANELS - ALL TYPES INDICATED ON DRAWINGS.
 7. TRANSFORMERS - ALL RATINGS INDICATED ON DRAWINGS.

PART 2 PRODUCT/APPLICATION

2.01 RACEWAYS

- A. EMT: ANSI C80.3, ZINC-COATED STEEL, WITH SET-SCREW OR COMPRESSION FITTINGS.
- B. FMC: ZINC-COATED STEEL.
- C. RMC: ANSI C80.1, HOT-DIPPED GALVANIZED STEEL WITH THREADED FITTINGS
- D. IMC: ANSI C80.6, ZINC-COATED STEEL, WITH THREADED FITTINGS.
- E. LFMC: ZINC-COATED STEEL WITH SUNLIGHT-RESISTANT AND MINERAL-OIL-RESISTANT PLASTIC JACKET.
- F. RMC: NEMA TC 2, SCHEDULE 40/SCHEDULE 80 PVC, WITH NEMA TC3 FITTINGS.
- G. RACEWAY FITTINGS: SPECIFICALLY DESIGNED FOR THE RACEWAY TYPE WITH WHICH USED.
- H. ELECTRIC METALLIC TUBING SHALL BE INDUSTRY STANDARD THIN WALL CONDUIT, HOT DIPPED GALVANIZED STEEL (3/4" MIN. 4" MAX).
- I. THE FLEXIBLE METALLIC CONDUIT SHALL BE OF THE GROUNDING TYPE. IT SHALL CONSIST OF GALVANIZED STEEL TAPE FORMED INTO AN INDUSTRY STANDARD INTERLOCKING COIL (3/4" MIN).
- J. RIGID METAL CONDUIT SHALL BE INDUSTRY STANDARD STEEL CONDUIT (3/4" MIN. 4" MAX).
- K. THREADED FITTINGS SHALL BE USED WITH RIGID CONDUIT. DOUBLE SET SCREW OR COMPRESSION FITTINGS SHALL BE USED WITH EMT.

2.02 WIRE AND CABLE

- A. CONDUCTORS, NO. 10 AWG AND SMALLER: SOLID COPPER.
- B. CONDUCTORS, LARGER THAN NO. 10 AWG: STRANDED COPPER.
- C. INSULATION: THERMOPLASTIC, RATED AT 75 DEG C MINIMUM.
- D. ALL CONDUCTORS SHALL BE SOFT 98% MINIMUM CONDUCTIVITY PROPERLY REFINED COPPER, TYPE THIN/TW/N INSULATED RATED AT 600V, UNLESS OTHERWISE NOTED.
- E. REFER TO SECTION 3.09 FOR COLOR-CODING OF ALL WIRING.

2.03 SUPPORTING DEVICES

- A. MATERIAL: COLD-FORMED STEEL, WITH CORROSION-RESISTANT COATING ACCEPTABLE TO AUTHORITIES HAVING JURISDICTION.
- B. METAL ITEMS FOR USE OUTDOORS OR IN DAMP LOCATIONS: HOT-DIP GALVANIZED STEEL.
- C. SLOTTED-STEEL CHANNEL SUPPORTS: FLANGE EDGES TURNED TOWARD WEB AND 9/16-INCH DIAMETER SLOTTED HOLES AT A MAXIMUM OF 2 INCHES O.C., IN WEBS.
- D. SLOTTED-STEEL CHANNEL SUPPORTS: COMPLY WITH DIVISION 5 SECTION "METAL FABRICATIONS" FOR SLOTTED CHANNEL FRAMING.
 1. CHANNEL THICKNESS: SELECTED TO SUIT STRUCTURAL LOADING.
 2. FITTINGS AND ACCESSORIES: PRODUCTS OF THE SAME MANUFACTURER AS CHANNEL SUPPORTS.

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REVISED FOR BOTTLE FILLER
JANUARY 19, 2022
CONSTRUCTION DOCUMENTS
JANUARY 26, 2022

DRAWN BY:
RS

PROJECT ENGINEER:
RS

DRAWING:
ELECTRICAL
SPECIFICATIONS

SCALE:
NOT TO SCALE

SEAL



DRAWING NO.

E-003

ELECTRICAL SPECIFICATIONS

3.03 RACEWAY APPLICATION

A. USE THE FOLLOWING RACEWAYS FOR INDOOR INSTALLATIONS:

1. EXPOSED: EMT.
2. CONCEALED: EMT (MC CABLE WHERE PERMISSIBLE ACCORDING TO SECTION 3.06B).
3. CONNECTION TO VIBRATING EQUIPMENT: FMC; EXCEPT IN WET OR DAMP LOCATIONS, USE LFMC.
4. DAMP OR WET LOCATIONS: IMCRMC.
5. BOXES AND ENCLOSURES: NEMA 250, TYPE 1, UNLESS OTHERWISE INDICATED.

B. USE THE FOLLOWING RACEWAYS FOR OUTDOOR INSTALLATIONS:

1. EXPOSED: IMCRMC.
2. CONCEALED: IMCRMC.
3. UNDERGROUND, BELOW SLAB: RNC - SCHEDULE 40 PVC.
4. UNDERGROUND, ALL OTHER LOCATIONS: RNC - SCHEDULE 80 PVC.
5. CONNECTION TO VIBRATING EQUIPMENT: LFMC.
6. BOXES AND ENCLOSURES: NEMA 250, TYPE 3R OR TYPE 4.

3.04 RACEWAY AND CABLE INSTALLATION

A. CONCEAL RACEWAYS AND CABLES, UNLESS OTHERWISE INDICATED, WITHIN FINISHED WALLS, CEILINGS, AND FLOORS.

B. INSTALL RACEWAYS AND CABLES AT LEAST 6 INCHES (150 MM) AWAY FROM PARALLEL RUNS OF FLUES AND STEAM OR HOT-WATER PIPES. LOCATE HORIZONTAL RACEWAY RUNS ABOVE WATER AND STEAM PIPING.

C. USE TEMPORARY RACEWAY CAPS TO PREVENT FOREIGN MATTER FROM ENTERING.

D. MAKE CONDUIT BENDS AND OFFSETS SO ID IS NOT REDUCED. KEEP LEGS OF BENDS IN THE SAME PLANE AND STRAIGHT LEGS OF OFFSETS PARALLEL, UNLESS OTHERWISE INDICATED.

E. USE RACEWAY AND CABLE FITTINGS COMPATIBLE WITH RACEWAYS AND CABLES AND SUITABLE FOR USE AND LOCATION.

F. INSTALL RACEWAYS EMBEDDED IN SLABS IN MIDDLE THIRD OF SLAB THICKNESS WHERE PRACTICAL, AND LEAVE AT LEAST 1-INCH CONCRETE COVER. OBTAIN STRUCTURAL ENGINEER'S APPROVAL PRIOR TO INSTALLATION.

1. SECURE RACEWAYS TO REINFORCING RODS TO PREVENT SAGGING OR SHIFTING DURING CONCRETE PLACEMENT.
2. SPACE RACEWAYS LATERALLY TO PREVENT VOIDS IN CONCRETE.
3. INSTALL CONDUIT LARGER THAN 1-INCH TRADE SIZE (DN27) PARALLEL TO OR AT RIGHT ANGLES TO MAIN REINFORCEMENT. WHERE CONDUIT IS AT RIGHT ANGLES TO REINFORCEMENT, PLACE CONDUIT CLOSE TO SLAB SUPPORT.
4. TRANSITION FROM SCHEDULE 40 NONMETALLIC TUBING TO SCHEDULE 80 NONMETALLIC CONDUIT, RIGID STEEL CONDUIT, OR IMC BEFORE RISING ABOVE FLOOR.
5. MAKE BENDS IN EXPOSED PARALLEL OR BANKED RUNS FROM SAME CENTERLINE TO MAKE BENDS PARALLEL. USE FACTORY ELBOWS ONLY WHERE ELBOWS CAN BE INSTALLED PARALLEL; OTHERWISE, PROVIDE FIELD BENDS FOR EXPOSED PARALLEL RACEWAYS.

G. INSTALL PULL WIRES IN EMPTY RACEWAYS. USE NO. 14 AWG ZINC-COATED STEEL OR MONOFILAMENT PLASTIC LINE WITH NOT LESS THAN 200-LB TENSILE STRENGTH. LEAVE AT LEAST 12 INCHES OF SLACK AT EACH END OF THE PULL WIRE.

H. INSTALL TELEPHONE AND SIGNAL SYSTEM RACEWAYS, 2-INCH TRADE SIZE AND SMALLER, IN MAXIMUM LENGTHS OF 100 FEET AND WITH A MAXIMUM OF TWO 90-DEGREE BENDS OR EQUIVALENT. SEPARATE LENGTHS WITH PULL OR JUNCTION BOXES WHERE NECESSARY TO COMPLY WITH THESE REQUIREMENTS, IN ADDITION TO REQUIREMENTS ABOVE.

I. CONNECT MOTORS AND EQUIPMENT SUBJECT TO VIBRATION, NOISE TRANSMISSION, OR MOVEMENT WITH A MAXIMUM OF 72-INCH (1830-MM) FLEXIBLE CONDUIT. INSTALL LFMC IN WET OR DAMP LOCATIONS. INSTALL SEPARATE GROUND CONDUCTOR ACROSS FLEXIBLE CONNECTIONS.

J. SET FLOOR BOXES LEVEL AND TRIM AFTER INSTALLATION TO FIT FLUSH TO FINISHED FLOOR SURFACE.

3.05 WIRING METHODS FOR POWER, LIGHTING, AND CONTROL CIRCUITS

A. FEEDERS: TYPE THHN/TW/IN INSULATED CONDUCTORS IN RACEWAY

B. UNDERGROUND FEEDERS AND BRANCH CIRCUITS: TYPE THWN OR SINGLE-WIRE, TYPE UF INSULATED CONDUCTORS IN RACEWAY.

C. BRANCH CIRCUITS: TYPE THW OR THHN/TW/IN INSULATED CONDUCTORS IN RACEWAY WHERE EXPOSED. METAL-CLAD CABLE SHALL BE PERMITTED WHERE PERMITTED BY AUTHORITIES HAVING JURISDICTION AND WHEN APPROVED BY LANDLORD RULES AND REGULATIONS. METAL-CLAD CABLE SHALL NOT BE INSTALLED WITHIN ELECTRIC CLOSETS OR DIRECTLY INTO PANELBOARDS.

D. REMOTE-CONTROL SIGNALING AND POWER-LIMITED CIRCUITS: TYPE THHN/TW/IN INSULATED CONDUCTORS IN RACEWAY FOR CLASSES 1, 2, AND 3, UNLESS OTHERWISE INDICATED.

E. MULTI-WIRE BRANCH CIRCUITS SHALL BE PROVIDED WITH A MEANS TO DISCONNECT SIMULTANEOUSLY ALL UNGROUNDED CONDUCTORS AT THE PANELBOARD WHERE THE BRANCH CIRCUIT ORIGINATES.

3.06 WIRING INSTALLATION

A. ALL CONDUCTORS SHALL BE RUN IN CONDUIT. [SEE WIRE AND CABLE SECTION 3.06B FOR ALTERNATE PRICING TO UTILIZE MC CABLE WHERE PERMISSIBLE.]

B. METAL CLAD (TYPE MC) FOR CONCEALED BRANCH CIRCUITRY IN TENANT SPACE ONLY MAY BE USED WHEN APPROVED BY TENANT AND BUILDING MANAGEMENT AND WHERE PERMITTED BY CODE. EMT SHALL BE USED OUTSIDE TENANT SPACE AND IN BUILDING CLOSETS. CONTRACTOR SHALL SUBMIT A DEDUCT ALTERNATE PRICE FOR USE OF MC IN LIEU OF EMT THROUGHOUT IN SUBMISSION OF BID. METAL CLAD (TYPE MC) SHALL NOT BE INSTALLED INTO PANELBOARDS.

C. WIRE CONNECTORS AND SPLICES: UNITS OF SIZE, AMPACITY RATING, MATERIAL, TYPE, AND CLASS SUITABLE FOR SERVICE INDICATED.

D. THE MINIMUM WIRE SIZE FOR BRANCH CIRCUITS SHALL BE NO. 12 AWG EXCEPT 120 VOLT CIRCUITS OVER 100' IN LENGTH SHALL BE NO. 10 AWG.

E. ALL FEEDER CONDUCTORS SHALL BE SIZED FOR MAXIMUM 2% VOLTAGE DROP PER ASHRAE 90.1-2010 8.4.1.1. BRANCH CIRCUITS SHALL ALSO BE SIZED FOR 2.5% VOLTAGE DROP

F. TAG ALL FEEDERS IN ALL PULL BOXES, GUTTER SPACES, AND WIREWAYS THROUGH WHICH THEY PASS.

G. TERMINATE STRANDED CONDUCTORS NO. 8 AWG AND LARGER, AT SWITCHBOARDS, TRANSFORMERS, UPS SYSTEMS WITH COMPRESSION TYPE CONNECTORS. TERMINATE WITH MECHANICAL LUGS AT PANELBOARDS.

H. JOIN OR TAP STRANDED CONDUCTORS (NO. 6 AWG AND LARGER) WITH PRESSURE INDENT TYPE CONNECTORS BURNDY, NEPCO, OR O.Z./GEDNEY WITH COMPOSITION INSULATING COVERS.

I. SPLICES IN BRANCH WIRING (NO. 8 AWG AND SMALLER) SHALL BE TWISTED AND MADE MECHANICALLY TIGHT; THEN SECURED WITH PIGTAIL CONNECTORS, CRIMP TYPE CONNECTORS SHALL NOT BE USED. UTILIZE UL LISTED, "SILICON FILLED" PIGTAIL CONNECTORS WHERE LOCATED IN WET ENVIRONMENTS OR OUTDOORS.

J. SUPPORT CONDUCTORS IN VERTICAL RACEWAYS IN ACCORDANCE WITH THE NEC BASED ON CONDUCTOR SIZE AND VERTICAL DISTANCE.

K. WALL MOUNTED DEVICES SHALL BE FED VERTICALLY. HORIZONTAL RUNS THROUGH PARTITIONS SHALL NOT BE PERMITTED, EXCEPT IN LOW HEIGHT PARTITIONS OR WHERE NOTED ON DRAWINGS

L. INSTALL WIRING AT OUTLETS WITH AT LEAST 12 INCHES (300 MM) OF SLACK CONDUCTOR AT EACH OUTLET.

M. CONNECT OUTLET AND COMPONENT CONNECTIONS TO WIRING SYSTEMS AND TO GROUND, TIGHTEN ELECTRICAL CONNECTORS AND TERMINALS, ACCORDING TO MANUFACTURER'S PUBLISHED TORQUE-TIGHTENING VALUES. IF MANUFACTURER'S TORQUE VALUES ARE NOT INDICATED, USE THOSE SPECIFIED IN UL 486A.

N. FOR ALL SIZES OF CONDUIT LARGER THAN 1-1/2", USE STANDARD ELBOW.

O. CONDUIT SHALL BE SECURELY FASTENED IN PLACE AND HANGERS, SUPPORTS OR FASTENINGS SHALL BE PROVIDED AT EACH ELBOW AND AT EACH END OF EACH STRAIGHT RUN TERMINATED AT A BOX OR CABINET.

P. PROVIDE EXPANSION FITTINGS IN EACH CONDUIT RUN WHEREVER IT CROSSES AN EXPANSION JOINT AND WHEREVER THE CONDUIT LENGTH EXCEEDS 200 FEET.

Q. UNLESS OTHERWISE INDICATED OR SPECIFIED, ALL WIRING SHALL BE INSTALLED CONCEALED.

R. FEEDERS AND BRANCH CIRCUITRY ABOVE HUNG CEILING AND IN PARTITIONS SHALL BE RUN IN ELECTRICAL METALLIC TUBING (EMT) UNLESS OTHERWISE NOTED. FINAL CONNECTIONS TO MOTORS, LIGHT FIXTURES, TRANSFORMERS, AND EQUIPMENT SUBJECT TO VIBRATION WILL BE DONE WITH FLEXIBLE METALLIC CONDUIT (GREENFIELD). LENGTH SHALL NOT EXCEED 6 FEET.

S. ALL CONDUIT IN MECHANICAL ROOMS, ELECTRIC CLOSETS AND WHERE CONCEALED IN CONCRETE OR INSTALLED OUTDOORS SHALL BE RIGID THREADED REGARDLESS OF SIZE.

T. ALL CONDUITS INSTALLED IN CONCRETE OR OUTDOORS SHALL BE PROVIDED WITH WEATHERPROOF CONNECTORS.

U. ALL METAL CONDUIT TERMINATING IN A METAL ENCLOSURE SHALL HAVE AN INSULATED BUSHING. PROVIDE "GROUNDING" TYPE BUSHING WHERE REQUIRED.

V. WHERE CONDUITS ARE RUN IN THE CEILING SPACE OF THE FLOOR BELOW, THEY SHALL BE CONTINUOUS AND HAVE NO JUNCTION OR PULL BOXES UNLESS PRIOR APPROVAL IS GIVEN BY BUILDING MANAGEMENT/CLIENT.

W. INSTALL CONDUITS TO CONSERVE HEADROOM, PARALLEL AND PERPENDICULAR TO BUILDING LINES. DO NOT CLIP CONDUITS TO CEILING HANGER

X. INSTALL TWO (2) (1") SPARE CONDUITS UP TO CEILING SPACE FOR EACH RECESSED PANELBOARD. TERMINATE THESE CONDUITS IN A 6" X 6" X 4" COVERED JUNCTION BOX IN CEILING SPACE.

Y. WALL COMMUNICATIONS CONDUIT SHALL BE REAMED AND INSTALLED COMPLETE WITH INSULATED BUSHINGS AT EACH END.

3.07 ELECTRICAL SUPPORTING DEVICE APPLICATION

A. DAMP LOCATIONS AND OUTDOORS: HOT-DIP GALVANIZED MATERIALS OR NONMETALLIC, U-CANNEL SYSTEM COMPONENTS.

B. DRY LOCATIONS: STEEL MATERIALS.

C. SUPPORT CLAMPS FOR PVC RACEWAYS: CLICK-TYPE CLAMP SYSTEM.

D. SELECTION OF SUPPORTS: COMPLY WITH MANUFACTURER'S WRITTEN INSTRUCTIONS.

E. STRENGTH OF SUPPORTS: ADEQUATE TO CARRY PRESENT AND FUTURE LOADS, TIMES A SAFETY FACTOR OF AT LEAST FOUR; MINIMUM OF 200-LB (90-KG) DESIGN LOAD.

3.08 SUPPORT INSTALLATION

A. INSTALL SUPPORT DEVICES TO SECURELY AND PERMANENTLY FASTEN AND SUPPORT ELECTRICAL COMPONENTS.

B. INSTALL INDIVIDUAL AND MULTIPLE RACEWAY HANGERS AND RISER CLAMPS TO SUPPORT RACEWAYS. PROVIDE U-BOLTS, CLAMPS, ATTACHMENTS, AND OTHER HARDWARE NECESSARY FOR HANGER ASSEMBLIES AND FOR SECURING HANGER RODS AND CONDUITS.

C. SUPPORT PARALLEL RUNS OF HORIZONTAL RACEWAYS TOGETHER ON TRAPEZE- OR BRACKET-TYPE HANGERS.

D. SIZE SUPPORTS FOR MULTIPLE RACEWAY INSTALLATIONS SO CAPACITY CAN BE INCREASED BY A 25 PERCENT MINIMUM IN THE FUTURE.

E. SUPPORT INDIVIDUAL HORIZONTAL RACEWAYS WITH SEPARATE, MALLEABLE-IRON PIPE HANGERS OR CLAMPS.

F. INSTALL 1/4-INCH (6-MM) DIAMETER OR LARGER THREADED STEEL HANGER RODS, UNLESS OTHERWISE INDICATED.

G. SPRING-STEEL FASTENERS SPECIFICALLY DESIGNED FOR SUPPORTING SINGLE CONDUITS OR TUBING MAY BE USED INSTEAD OF MALLEABLE-IRON HANGERS FOR 1-1/2-INCH (38-MM) AND SMALLER RACEWAYS SERVING LIGHTING AND RECEPTACLE BRANCH CIRCUITS ABOVE SUSPENDED CEILINGS AND FOR FASTENING RACEWAYS TO SLOTTED CHANNEL AND ANGLE SUPPORTS.

H. ARRANGE SUPPORTS IN VERTICAL RUNS SO THE WEIGHT OF RACEWAYS AND ENCLOSED CONDUCTORS IS CARRIED ENTIRELY BY RACEWAY SUPPORTS, WITH NO WEIGHT LOAD ON RACEWAY TERMINALS.

I. SIMULTANEOUSLY INSTALL VERTICAL CONDUCTOR SUPPORTS WITH CONDUCTORS.

J. SEPARATELY SUPPORT CAST BOXES THAT ARE THREADED TO RACEWAYS AND USED FOR FIXTURE SUPPORT. SUPPORT SHEET-METAL BOXES DIRECTLY FROM THE BUILDING STRUCTURE OR BY BAR HANGERS. IF BAR HANGERS ARE USED, ATTACH BAR TO RACEWAYS ON OPPOSITE SIDES OF THE BOX AND SUPPORT THE RACEWAY WITH AN APPROVED FASTENER NOT MORE THAN 24 INCHES (610 MM) FROM THE BOX.

K. INSTALL METAL CHANNEL RACKS FOR MOUNTING CABINETS, PANELBOARDS, DISCONNECT SWITCHES, CONTROL ENCLOSURES, PULL AND JUNCTION BOXES, TRANSFORMERS, AND OTHER DEVICES UNLESS COMPONENTS ARE MOUNTED DIRECTLY TO STRUCTURAL ELEMENTS OF ADEQUATE STRENGTH.

L. INSTALL SLEEVES FOR CABLE AND RACEWAY PENETRATIONS OF CONCRETE SLABS AND WALLS UNLESS CORE-DRILLED HOLES ARE USED. INSTALL SLEEVES FOR CABLE AND RACEWAY PENETRATIONS OF MASONRY AND FIRE-RATED GYPSUM WALLS AND OF ALL OTHER FIRE-RATED FLOOR AND WALL ASSEMBLIES. INSTALL SLEEVES DURING ERECTION OF CONCRETE AND MASONRY WALLS.

M. SECURELY FASTEN ELECTRICAL ITEMS AND THEIR SUPPORTS TO THE BUILDING STRUCTURE, UNLESS OTHERWISE INDICATED. PERFORM FASTENING ACCORDING TO THE FOLLOWING UNLESS OTHER FASTENING METHODS ARE INDICATED:

1. WOOD: FASTEN WITH WOOD SCREWS OR SCREW-TYPE NAILS.
2. MASONRY: TOGGLE BOLTS ON HOLLOW MASONRY UNITS AND EXPANSION BOLTS ON SOLID MASONRY UNITS.
3. NEW CONCRETE: CONCRETE INSERTS WITH MACHINE SCREWS AND BOLTS.
4. EXISTING CONCRETE: EXPANSION BOLTS.
5. INSTEAD OF EXPANSION BOLTS, THREADED STUDS DRIVEN BY A POWDER CHARGE AND PROVIDED WITH LOCK WASHERS MAY BE USED IN EXISTING CONCRETE.
6. STEEL: WELDED THREADED STUDS OR SPRING-TENSION CLAMPS ON STEEL.
 - a. FIELD WELDING: COMPLY WITH AWS D1.1.
 7. WELDING TO STEEL STRUCTURE MAY BE USED ONLY FOR THREADED STUDS, NOT FOR CONDUITS, PIPE STRAPS, OR OTHER ITEMS.
 8. LIGHT STEEL: SHEET-METAL SCREWS.
 9. FASTENERS: SELECT SO THE LOAD APPLIED TO EACH FASTENER DOES NOT EXCEED 25 PERCENT OF ITS PROOF-TEST LOAD.

3.09 IDENTIFICATION MATERIALS AND DEVICES

A. INSTALL AT LOCATIONS FOR MOST CONVENIENT VIEWING WITHOUT INTERFERENCE WITH OPERATION AND MAINTENANCE OF EQUIPMENT.

B. COORDINATE NAMES, ABBREVIATIONS, COLORS, AND OTHER DESIGNATIONS USED FOR ELECTRICAL IDENTIFICATION WITH CORRESPONDING DESIGNATIONS INDICATED IN THE CONTRACT DOCUMENTS OR REQUIRED BY CODES AND STANDARDS. USE CONSISTENT DESIGNATIONS THROUGHOUT PROJECT.

C. SELF-ADHESIVE IDENTIFICATION PRODUCTS: CLEAN SURFACES BEFORE APPLYING.

D. IDENTIFY RACEWAYS AND CABLES WITH COLOR BANDING AS FOLLOWS:

1. BANDS: PRETENSIONED, SNAP-AROUND, COLORED PLASTIC SLEEVES OR COLORED ADHESIVE MARKING TAPE MAKE EACH COLOR BAND 2 INCHES (51 MM) WIDE, COMPLETELY ENCIRCLING CONDUIT, AND PLACE ADJACENT BANDS OF TWO-COLOR MARKINGS IN CONTACT, SIDE BY SIDE.
2. BAND LOCATIONS: AT CHANGES IN DIRECTION, AT PENETRATIONS OF WALLS AND FLOORS, AT 50-FOOT (15-M) MAXIMUM INTERVALS IN STRAIGHT RUNS, AND AT 25-FOOT (8-M) MAXIMUM INTERVALS IN CONGESTED AREAS.
3. COLORS: AS FOLLOWS:
 - a. FIRE ALARM SYSTEM: RED.
 - b. SECURITY SYSTEM: BLUE AND YELLOW.
 - c. TELECOMMUNICATION SYSTEM: GREEN AND YELLOW.

E. TAG AND LABEL CIRCUITS DESIGNATED TO BE EXTENDED IN THE FUTURE. IDENTIFY SOURCE AND CIRCUIT NUMBERS IN EACH CABINET, PULL AND JUNCTION BOX, AND OUTLET BOX. COLOR-CODING MAY BE USED FOR VOLTAGE AND PHASE IDENTIFICATION.

F. INSTALL CONTINUOUS UNDERGROUND PLASTIC MARKERS DURING TRENCH BACKFILLING. FOR EXTERIOR UNDERGROUND POWER, CONTROL, SIGNAL, AND COMMUNICATION LINES LOCATED DIRECTLY ABOVE POWER AND COMMUNICATION LINES, LOCATE 6 TO 8 INCHES BELOW FINISHED GRADE. IF WIDTH OF MULTIPLE LINES INSTALLED IN A COMMON TRENCH OR CONCRETE ENVELOPE DOES NOT EXCEED 16 INCHES, OVERALL, USE A SINGLE LINE MARKER.

G. COLOR-CODE 208/120-V SYSTEM SECONDARY SERVICE, FEEDER, AND BRANCH-CIRCUIT CONDUCTORS THROUGHOUT THE SECONDARY ELECTRICAL SYSTEM SHALL BE SIMILAR TO (MATCHING BUILDING STANDARDS):

1. PHASE A: BLACK
2. PHASE B: RED
3. PHASE C: BLUE
4. NEUTRAL: WHITE
5. GROUND: GREEN

H. COLOR-CODE 480/277-V SYSTEM SECONDARY SERVICE, FEEDER, AND BRANCH-CIRCUIT CONDUCTORS THROUGHOUT THE SECONDARY ELECTRICAL SYSTEM SHALL BE SIMILAR TO (MATCHING BUILDING STANDARDS):

1. PHASE A: YELLOW
2. PHASE B: BROWN
3. PHASE C: ORANGE
4. NEUTRAL: GRAY OR WHITE WITH A COLORED STRIPE (NOT GREEN).
5. GROUND: GREEN

I. PROVIDE NAMEPLATES FOR ALL NEW AND EXISTING EQUIPMENT AS DESCRIBED ABOVE AND/OR DETAILED ON THE ENGINEERING DRAWINGS.

J. PROVIDE TYPED WRITTEN DIRECTORIES FOR NEW AND EXISTING PANELS. CONFIRM EXISTING IDENTIFICATION AND CORRECT WHERE NECESSARY.

3.18 EXISTING EQUIPMENT REFURBISHMENT:

A. WHERE PANELBOARDS, SWITCHES, CIRCUIT BREAKERS, TRANSFORMERS, ETC. ARE EXISTING TO BE REUSED THE CONTRACTOR SHALL CLEAN AND REFURBISH THE EQUIPMENT. THIS SHALL INCLUDE TIGHTENING ALL CONNECTIONS, REPLACING DEFECTIVE MECHANISMS, EXERCISING MECHANISMS AND PROVIDING ANY MISCELLANEOUS COMPONENTS SO THE EQUIPMENT IS IN FIRST CLASS WORKING ORDER.

B. ELECTRICAL CONTRACTOR SHALL BE RESPONSIBLE TO FIELD SURVEY ALL EXISTING BASE BUILDING RECEPTACLE LIGHTING AND EQUIPMENT CIRCUITS WHICH ARE EXISTING TO REMAIN. PROVIDE AS BUILT SURVEY PRIOR TO THE START OF ANY WORK AND SUBMIT TO ENGINEER FOR RECORD. CIRCUITS SHALL REMAIN IN EXISTING PANELS OR WHEN PANELBOARDS ARE REPLACED, REITERMINATED IN NEW PANELBOARD.

3.19 ELECTRICAL FURNITURE SYSTEMS

A. THE ELECTRIFIED FURNITURE VENDOR WILL SUPPLY ALL RECEPTACLES, FURNITURE TASK LIGHTING FIXTURES, WIRING HARNESSSES, CONNECTORS AND FITTINGS TO THE ELECTRICAL CONTRACTOR FOR THE COMPLETE WIRING INSTALLATION. ALL WIRING AND COMPONENTS SHALL BE INSTALLED AS DIRECTED BY VENDOR. ELECTRICAL CONTRACTOR SHALL FURNISH AN 18" MAXIMUM LIQUID TIGHT FLEXIBLE CONDUIT CONNECTIONS WITH REQUIRED PHASE CONDUCTORS, NEUTRAL CONDUCTORS AND GROUND CONDUCTORS AS INDICATED FROM WALL OR FLOOR OUTLET.

B. THE FURNITURE VENDOR SHALL CHALK THE FURNITURE SYSTEM OUTLINE ON THE FLOOR FOR COORDINATION OF POWER AND COMMUNICATION IN-FEED LOCATIONS. IN-FEED LOCATIONS INDICATED ON PLAN DOCUMENTS ARE FOR CLARITY PURPOSES. IN-FEED LOCATIONS AND QUANTITY SHALL BE APPROVED IN FIELD BY ARCHITECT AND FURNITURE SYSTEM VENDOR PRIOR TO INSTALLATION.

3.11 FIRESTOPPING

A. APPLY FIRESTOPPING TO CABLE AND RACEWAY PENETRATIONS OF FIRE-RATED FLOOR AND WALL ASSEMBLIES TO ACHIEVE FIRE-RESISTANCE RATING OF THE ASSEMBLY. FIRESTOPPING MATERIALS AND INSTALLATION REQUIREMENTS ARE SPECIFIED IN DIVISION 7 SECTION "FIRESTOPPING."

3.12 CONCRETE BASES

A. CONSTRUCT CONCRETE BASES OF DIMENSIONS INDICATED, BUT NOT LESS THAN 4 INCHES (100 MM) LARGER, IN BOTH DIRECTIONS, THAN SUPPORTED UNIT. FOLLOW SUPPORTED EQUIPMENT MANUFACTURER'S ANCHORAGE RECOMMENDATIONS AND SETTING TEMPLATES FOR ANCHOR-BOLT AND TIE LOCATIONS, UNLESS OTHERWISE INDICATED. USE 3000 PSI (20.7 MPa), 28-DAY COMPRESSIVE-STRENGTH CONCRETE AND REINFORCEMENT AS SPECIFIED A SEPARATE DIVISION OF THE SPECIFICATIONS.

3.13 DEMOLITION

A. PROTECT EXISTING ELECTRICAL EQUIPMENT AND INSTALLATIONS INDICATED TO REMAIN. IF DAMAGED OR DISTURBED IN THE COURSE OF THE WORK, REMOVE DAMAGED PORTIONS AND INSTALL NEW PRODUCTS OF EQUAL CAPACITY, QUALITY, AND FUNCTIONALITY.

B. ACCESSIBLE WORK: REMOVE EXPOSED ELECTRICAL EQUIPMENT AND INSTALLATIONS, INDICATED TO BE DEMOLISHED, IN THEIR ENTIRETY.

C. ABANDONED WORK: CUT AND REMOVE BURIED RACEWAY AND WIRING, INDICATED TO BE ABANDONED IN PLACE, 2 INCHES (50 MM) BELOW THE SURFACE OF ADJACENT CONSTRUCTION. CAP RACEWAYS AND PATCH SURFACE TO MATCH EXISTING FINISH.

D. REMOVE DEMOLISHED MATERIAL FROM PROJECT SITE.

E. REMOVE, STORE, CLEAN, REINSTALL, RECONNECT, AND MAKE OPERATIONAL COMPONENTS INDICATED FOR RELOCATION.

3.14 CUTTING AND PATCHING

A. CUT, CHANNEL, CHASE, AND DRILL FLOORS, WALLS, PARTITIONS, CEILINGS, AND OTHER SURFACES REQUIRED TO PERMIT ELECTRICAL INSTALLATIONS. PERFORM CUTTING BY SKILLED MECHANICS OF TRADES INVOLVED.

B. REPAIR AND REFINISH DISTURBED FINISH MATERIALS AND OTHER SURFACES TO MATCH ADJACENT UNDISTURBED SURFACES. INSTALL NEW FIREPROOFING WHERE EXISTING FIRESTOPPING HAS BEEN DISTURBED. REPAIR AND REFINISH MATERIALS AND OTHER SURFACES BY SKILLED MECHANICS OF TRADES INVOLVED.

3.15 REFINISHING AND TOUCHUP PAINTING

A. REFINISH AND TOUCH UP PAINT, PAINT MATERIALS AND APPLICATION REQUIREMENTS ARE SPECIFIED A SEPARATE DIVISION OF THE SPECIFICATIONS

1. CLEAN DAMAGED AND DISTURBED AREAS AND APPLY PRIMER, INTERMEDIATE, AND FINISH COATS TO SUIT THE DEGREE OF DAMAGE AT EACH LOCATION.
2. FOLLOW PAINT MANUFACTURER'S WRITTEN INSTRUCTIONS FOR SURFACE PREPARATION AND FOR TIMING AND APPLICATION OF SUCCESSIVE COATS.
3. REPAIR DAMAGE TO GALVANIZED FINISHES WITH ZINC-RICH PAINT RECOMMENDED BY MANUFACTURER.
4. REPAIR DAMAGE TO PVC OR PAINT FINISHES WITH MATCHING TOUCHUP COATING RECOMMENDED BY MANUFACTURER.

3.16 CLEANING AND PROTECTION

A. ON COMPLETION OF INSTALLATION, INCLUDING OUTLETS, FITTINGS, AND DEVICES, INSPECT EXPOSED FINISH. REMOVE BURRS, DIRT, PAINT SPOTS, AND CONSTRUCTION DEBRIS.

B. PROTECT EQUIPMENT AND INSTALLATIONS AND MAINTAIN CONDITIONS TO ENSURE THAT COATINGS, FINISHES, AND CABINETS ARE WITHOUT DAMAGE OR DETERIORATION AT TIME OF SUBSTANTIAL COMPLETION.

3.17 IDENTIFICATION OF EQUIPMENT:

A. ALL PANELBOARDS, CONTROL PANELS, AND CABINETS SPECIFIED HEREIN SHALL BE CLEARLY IDENTIFIED WITH THE EQUIPMENT DESIGNATION AND VOLTAGE RATING. IDENTIFICATION SHALL BE BY WHITE ON BLACK PLASTIC NAMEPLATE WITH 1/2" MINIMUM LETTERING ATTACHED BY SCREWS.

B. ALL PANELBOARDS, SPECIFIED HEREIN SHALL BE PROVIDED WITH A MEANS OF IDENTIFICATION OF THE MULTI-WIRE BRANCH CIRCUIT COLOR CODE IDENTIFICATION SYSTEM INSTALLED PER THE REQUIREMENTS OF NEC/NFPA ARTICLE 210.5. REFER TO SPECIFICATION SECTION 2.03.E FOR COLOR CODING DESIGNATIONS.

C. JUNCTION BOXES, SPLICE BOXES, ETC. SHALL BE IDENTIFIED WITH PANEL AND CIRCUIT NUMBERS, FOR CIRCUITS CONTAINED THEREIN. FACEPLATE OF SWITCHES FOR EQUIPMENT SUCH AS MOTORIZED SCREENS, ETC., SHALL BE IDENTIFIED WITH THE NAME OF THE DEVICE CONTROL. IDENTIFICATION SHALL BE BY INDELIBLE MARKER IN CONCEALED LOCATIONS AND ADHESIVE ("P" TOUCH TYPE) LABELS IN EXPOSED LOCATIONS. EQUIPMENT DEVICES SHALL BE IDENTIFIED IN RED.

D. CLEARLY LABEL ALL EXPOSED CONDUIT, PULLBOXES, JUNCTION BOXES, ETC TO LOCATE THE NATURE OF THE SERVICE.

E. EMPTY CONDUITS SHALL BE IDENTIFIED WITH TAGS AT BOTH ENDS INDICATING THE LOCATION OF TERMINATION OF THE OPPOSITE END.

F. FIRE ALARM SYSTEM JUNCTION BOXES SHALL BE PAINTED FIRE DEPARTMENT RED. APPROVED IDENTIFICATION CARDS SHALL BE FURNISHED ADJACENT TO ALL CONTROL PANELS AND MANUAL STATIONS.

G. ALL RECEPTACLES SHALL HAVE CIRCUIT NUMBERS AND ASSOCIATED PANEL DESIGNATION CLEARLY IDENTIFIED ON THE RECEPTACLE (OR DISCONNECT JUNCTION BOX, ETC.) FACEPLATE. IDENTIFICATION SHALL BE PERMANENT, INDELIBLE AND FAYE-TWENTEN.

H. PROVIDE SCREW-FASTENED TYPED WRITTEN ENGRAVED LAMCROID NAMEPLATE WITH MINIMUM 1/4" HIGH WHITE LETTERING ON BLACK BACKGROUND, CLEARLY INDICATING THE FUNCTION, DESIGNATION OR EQUIPMENT CONTROLLED FOR EACH OF THE FOLLOWING:

1. ALL PANEL AND SWITCH BOARDS
2. MOTOR STARTERS AND MISCELLANEOUS CONTROL SWITCHES
3. DISCONNECT SWITCHES
4. ENCLOSED CIRCUIT BREAKERS
5. CONTACTORS AND RELAYS
6. CONTROL SWITCHES
7. TRANSFORMERS
8. UPS
9. PRE-ACTION MANUAL PULL STATION.
10. PRE-ACTION CONTROL PANEL.
11. PRE-ACTION HORNS AND BELL.
12. UPS COMPONENTS
13. AUTOMATIC TRANSFER SWITCHES
14. LIGHTING CONTROL RELAY PANELS

I. PROVIDE NAMEPLATES FOR ALL NEW AND EXISTING EQUIPMENT AS DESCRIBED ABOVE AND/OR DETAILED ON THE ENGINEERING DRAWINGS.

J. PROVIDE TYPED WRITTEN DIRECTORIES FOR NEW AND EXISTING PANELS. CONFIRM EXISTING IDENTIFICATION AND CORRECT WHERE NECESSARY.

3.18 EXISTING EQUIPMENT REFURBISHMENT:

A. WHERE PANELBOARDS, SWITCHES, CIRCUIT BREAKERS, TRANSFORMERS, ETC. ARE EXISTING TO BE REUSED THE CONTRACTOR SHALL CLEAN AND REFURBISH THE EQUIPMENT. THIS SHALL INCLUDE TIGHTENING ALL CONNECTIONS, REPLACING DEFECTIVE MECHANISMS, EXERCISING MECHANISMS AND PROVIDING ANY MISCELLANEOUS COMPONENTS SO THE EQUIPMENT IS IN FIRST CLASS WORKING ORDER.

B. ELECTRICAL CONTRACTOR SHALL BE RESPONSIBLE TO FIELD SURVEY ALL EXISTING BASE BUILDING RECEPTACLE LIGHTING AND EQUIPMENT CIRCUITS WHICH ARE EXISTING TO REMAIN. PROVIDE AS BUILT SURVEY PRIOR TO THE START OF ANY WORK AND SUBMIT TO ENGINEER FOR RECORD. CIRCUITS SHALL REMAIN IN EXISTING PANELS OR WHEN PANELBOARDS ARE REPLACED, REITERMINATED IN NEW PANELBOARD.

3.19 ELECTRICAL FURNITURE SYSTEMS

A. THE ELECTRIFIED FURNITURE VENDOR WILL SUPPLY ALL RECEPTACLES, FURNITURE TASK LIGHTING FIXTURES, WIRING HARNESSSES, CONNECTORS AND FITTINGS TO THE ELECTRICAL CONTRACTOR FOR THE COMPLETE WIRING INSTALLATION. ALL WIRING AND COMPONENTS SHALL BE INSTALLED AS DIRECTED BY VENDOR. ELECTRICAL CONTRACTOR SHALL FURNISH AN 18" MAXIMUM LIQUID TIGHT FLEXIBLE CONDUIT CONNECTIONS WITH REQUIRED PHASE CONDUCTORS, NEUTRAL CONDUCTORS AND GROUND CONDUCTORS AS INDICATED FROM WALL OR FLOOR OUTLET.

B. THE FURNITURE VENDOR SHALL CHALK THE FURNITURE SYSTEM OUTLINE ON THE FLOOR FOR COORDINATION OF POWER AND COMMUNICATION IN-FEED LOCATIONS. IN-FEED LOCATIONS INDICATED ON PLAN DOCUMENTS ARE FOR CLARITY PURPOSES. IN-FEED LOCATIONS AND QUANTITY SHALL BE APPROVED IN FIELD BY ARCHITECT AND FURNITURE SYSTEM VENDOR PRIOR TO INSTALLATION.

C. FURNITURE SYSTEM CIRCUITRY DESIGN IS DEVELOPED BASED UPON A "2-2" WIRING CONFIGURATION. CONTRACTOR SHALL CIRCUIT 2 PHASE CONDUCTORS, WITH A NEUTRAL FOR CIRCUITS "1-2" AND 2 PHASE CONDUCTORS, WITH A NEUTRAL FOR CIRCUITS "3-4". BOTH PAIRS OF CIRCUITS SHALL BE PROVIDED WITH A GROUND CONDUCTOR. CONTRACTOR SHALL INSTALL 8/10 AWG CONDUCTORS TO EACH FURNITURE SYSTEM INFEED.

D. MULTI-FWIRE BRANCH CIRCUITS SUPPLYING POWER TO PERMANENTLY CONNECTED FREESTANDING PARTITIONS (ELECTRIFIED FURNITURE SYSTEMS) SHALL BE PROVIDED WITH A MEANS TO DISCONNECT SIMULTANEOUSLY ALL UNGROUNDED CONDUCTORS AT THE PANELBOARD WHERE THE BRANCH CIRCUIT ORIGINATES. CONTRACTOR SHALL COORDINATE WITH LOCAL A/H THE MEANS REQUIRED TO MEET NEC SECTIONS 605.7.

3.20 LIFE SAFETY TESTING

A. AFTER COMPLETION OF THE PROJECT, PERFORM A TEST OF THE EMERGENCY EGRESS LIGHTING SYSTEM. TEST SHALL BE PERFORMED AFTER DARK (AT LEAST 1 HOUR AFTER SUNSET); SIMULATE POWER FAILURE ON ALL LIGHTING CIRCUITS. TAKE LIGHT LEVEL READINGS ALONG PATHS OF EGRESS AT FLOOR LEVEL UTILIZING A FOOT CANDLE METER. RECORD READINGS ON A REDUCED SCALE (1/16"-1'-0") FLOOR PLAN. READINGS SHALL BE TAKEN ALONG THE ENTIRE EGRESS PATH, AND THE AVERAGE, MINIMUM, AND MAX TO MIN RATIO SHALL BE RECORDED. SUBMIT SEALED AND SIGNED COPY OF THE FLOOR PLAN READINGS TO THE ENGINEER.

3.21 WARNING LABELS

A. SWITCHBOARDS, PANELBOARDS AND ASSOCIATED EQUIPMENT (UPS, ETC.) THAT WILL REQUIRE ADJUSTMENT, SERVICING, INSPECTION, OR MAINTENANCE WHILE ENERGIZED SHALL BE FIELD MARKED INDICATING VOLTAGE AND WARNING QUALIFIED PERSONS OF POTENTIAL ELECTRIC ARC-FLASH HAZARDS PER NEC SECTION 110.16 AND NFPA 70E. REFER TO SECTION 1.26 FOR ADDITIONAL INFORMATION ON FLASH HAZARD ANALYSIS.

B. SERVICE EQUIPMENT SHALL BE FIELD MARKED INDICATING THE MAXIMUM AVAILABLE FAULT CURRENT IN ACCORDANCE WITH NEC 110.24 (A). CONTRACTOR IS RESPONSIBLE FOR OBTAINING CORRECT VALUES FROM THE UTILITY COMPANY.

3.22 PROTECTION

A. CONTRACTOR SHALL BE RESPONSIBLE FOR WORK AND EQUIPMENT UNTIL FINALLY INSPECTED, TESTED AND ACCEPTED. MATERIALS AND EQUIPMENT SHALL BE CAREFULLY STORED WHICH ARE NOT IMMEDIATELY INSTALLED AFTER DELIVERY TO SITE. CLOSE EXPOSED PARTS OF THE WORK WITH TEMPORARY COVERS, OR PLUGS DURING CONSTRUCTION, TO PREVENT ENTRY OF MOISTURE OR OBSTRUCTING MATERIALS.

B. PROTECT THE WORK AND MATERIAL OF OTHERS FROM DAMAGE INSTALLED AS PART OF THIS CONTRACT. RESTORE ANY WORK DAMAGED AND BE RESPONSIBLE FOR ALL CURRENT WORK AND ASSOCIATED COSTS.

3.23 FIELD QUALITY CONTROL

A. INSPECT INSTALLED COMPONENTS FOR DAMAGE AND FAULTY WORK, INCLUDING BUT NOT LIMITED TO THE FOLLOWING:

1. RACEWAYS
2. BUILDING WIRE AND CONNECTORS.
3. SUPPORTING DEVICES FOR ELECTRICAL COMPONENTS.
4. ELECTRICAL IDENTIFICATION.
5. ELECTRICITY-METERING COMPONENTS.
6. CONCRETE BASES.
7. ELECTRICAL DEMOLITION.
8. CUTTING AND PATCHING FOR ELECTRICAL CONSTRUCTION.
9. TOUCHUP PAINTING.
10. PANELBOARDS
11. SWITCHBOARDS
12. AUTOMATIC TRANSFER SWITCHES
13. UPS COMPONENTS

B. TEST OWNER'S ELECTRICITY-METERING INSTALLATION FOR PROPER OPERATION, ACCURACY, AND USABILITY OF OUTPUT DATA.

1. CONNECT A LOAD OF KNOWN KW RATING, 1.5 KW MINIMUM, TO A CIRCUIT SUPPLIED BY THE METERED FEEDER.
2. TURN OFF CIRCUITS SUPPLIED BY THE METERED FEEDER AND SECURE THEM IN THE "OFF" CONDITION.
3. RUN THE TEST LOAD CONTINUOUSLY FOR EIGHT HOURS, MINIMUM, OR LONGER TO OBTAIN A MEASURABLE METER INDICATION. USE A TEST LOAD PLACEMENT AND SETTING THAT ENSURE CONTINUOUS, SAFE OPERATION.
4. CHECK AND RECORD METER READING AT END OF TEST PERIOD AND COMPARE WITH ACTUAL ELECTRICITY USED BASED ON TEST LOAD RATING, DURATION OF TEST, AND SAMPLE MEASUREMENTS OF SUPPLY VOLTAGE AT THE TEST LOAD CONNECTION. RECORD TEST RESULTS.
5. REPAIR OR REPLACE MALFUNCTIONING METERING EQUIPMENT OR CORRECT TEST SETUP; THEN REPEAT. REPEAT FOR EACH METER IN INSTALLATION UNTIL PROPER OPERATION OF ENTIRE SYSTEM IS VERIFIED.

3.24 EXTRA MATERIALS:

A. IN ADDITION TO ALL MATERIALS AND INSTALLATION COMPONENTS INDICATED ON THE DRAWINGS, ELECTRICAL CONTRACTOR SHALL PROVIDE THE FOLLOWING (INCLUSIVE OF ALL MATERIAL AND LABOR ASSOCIATED WITH INSTALL):

1. TWENTY-FIVE (25) DUPLEX RECEPTACLES
2. FIVE (5) CEILING MOUNTED OCCUPANCY/VACANCY SENSORS
3. TWELVE (12) 20 AMPERE, 1-POLE BRANCH CIRCUITS CONSISTING OF 100' OF 3/4" 3/4" CONDUIT.
4. ALLOW FOR SIX (6) ADDITIONAL EXIT SIGNS PER FLOOR TO BE INSTALLED AS PER BUILDING INSPECTORS REQUIREMENTS UPON FINAL INSPECTION. INCLUDE FOR 30 FEET OF RACEWAY, WIRING AND FINAL CONNECTION TO EMERGENCY LIGHTING CIRCUIT.

3.25 COMMISSIONING:

A. ELECTRICAL SYSTEMS TO BE COMMISSIONED:

1. LIGHTING CONTROL SYSTEM
2. OCCUPANCY/VACANCY SENSORS
3. LIGHTING CONTROL DEVICES
4. EXISTING ELECTRICAL SUB-METERING

B. ELECTRICAL CONTRACTOR SHALL ASSIST OWNER SELECTED COMMISSIONING AGENT WITH THE COMMISSIONING OF THE LIGHTING CONTROL SYSTEM FOR COMPLIANCE ALL APPLICABLE CODE REQUIREMENTS (I.E. ENERGY CODE, ELECTRICAL CODE, ETC.).

C. ELECTRICAL CONTRACTOR SHALL INCLUDE IN THEIR BASE BID, THE SERVICES OF THE LIGHTING CONTROL SYSTEM AND SENSOR SYSTEM MANUFACTURER'S REPRESENTATIVES TO ATTEND AND ASSIST IN THE FINAL COMMISSIONING OF THE SYSTEMS.

D. COMMISSIONING SHALL ENSURE THAT ALL CONTROL HARDWARE AND SOFTWARE ARE CALIBRATED, ADJUSTED, PROGRAMMED AND IN PROPER WORKING CONDITION IN ACCORDANCE WITH CONSTRUCTION DOCUMENTS AND MANUFACTURER'S INSTALLATION INSTRUCTIONS.

E. COORDINATE ALL WORK ASSOCIATED WITH THE FUNDAMENTAL COMMISSIONING ACTIVITIES, INCLUDING:

1. ATTEND ALL COMMISSIONING MEETINGS WITH ASSOCIATED SUB-CONTRACTORS AND MANUFACTURER'S REPRESENTATIVES THAT ARE REQUIRED TO COMPLETE THE COMMISSIONING OF THE EQUIPMENT PROVIDED.
2. PERFORM AND DOCUMENT TESTINGS OUTLINED IN THE COMMISSIONING AUTHORITY PROCEDURES.
3. WORK CLOSELY WITH THE COMMISSIONING AUTHORITY IN IDENTIFYING ALL OPERATING, MAINTENANCE, FAILURE MODES THAT MUST BE DEMONSTRATED AS PART OF THE COMMISSIONING PROCESS.
4. COMPLETE PRE-STARTUP AND STARTUP ON ALL INSTALLED EQUIPMENT PRIOR TO ALL COMMISSIONING ACTIVITIES.
5. COORDINATE, SCHEDULE, AND COMPLETE COMMISSIONING TASKS WITH THE COMMISSIONING AUTHORITY. THE ELECTRICAL CONTRACTOR SHALL BE MADE READILY AVAILABLE FOR OPERATING AND TESTING ALL EQUIPMENT TO BE COMMISSIONED.
6. PROVIDE MANUFACTURER ACCEPTABLE TESTING DOCUMENTATION (STARTUP MANUALS) PRIOR TO START OF COMMISSIONING TESTING PROCEDURES.
7. RESPONSIBLE FOR ALL COSTS FOR TESTING, INCLUDING PRE-TESTING DUE TO DEFICIENCIES/NON-COMPLIANCE WITH TESTINGS/SPECIFICATIONS.
8. RESPONSIBLE TO SUPPLY AND CONNECT ALL TESTING EQUIPMENT REQUIRED FOR ANY PART OF THE COMMISSIONING PROCESS (I.E. LOAD BANKS, CABLES, INFRARED SCANNING, TEMPORARY COOLING MEANS, ETC.).

F. SYSTEM REVIEW SHALL INCLUDE THAT ALL SENSORS, SWITCHES, PROGRAMMED SCHEDULE CONTROLS, PHOTOSENSORS OR DAYLIGHT CONTROLS MEET THE FOLLOWING REQUIREMENTS:

1. COMMISSIONING AGENT SHALL CONFIRM PLACEMENT, SENSITIVITY AND TIME OUT ADJUSTMENTS FOR OCCUPANT SENSORS YIELD ACCEPTABLE PERFORMANCE.
2. COMMISSIONING AGENT SHALL CONFIRM THAT TIME SWITCHES AND PROGRAMMABLE SCHEDULE CONTROLS ARE PROGRAMMED TO TURN OFF LIGHTING

3. COMMISSIONING AGENT SHALL CONFIRM THAT THE PLACEMENT AND SENSITIVITY ADJUSTMENTS FOR PHOTOSENSOR CONTROLS REDUCE ELECTRIC LIGHT BIAS ON THE AMOUNT OF USABLE DAYLIGHT IN THE SPACE AS SPECIFIED.

G. ELECTRICAL CONTRACTOR SHALL PRETEST ALL SYSTEMS AND DEVICES AND SHALL SUBMIT A COMPLETION CERTIFICATE FROM THE MANUFACTURER'S REPRESENTATIVE, ON MANUFACTURER'S LETTERHEAD, THAT ALL SYSTEMS ARE OPERATIONAL AND PERFORM TO CONTRACT DOCUMENT SPECIFICATIONS. MANUFACTURER'S CERTIFICATE SHALL BE DELIVERED TO GENERAL CONTRACTOR/ CONSTRUCTION MANAGER, TENANT, AND ENGINEER A MINIMUM OF FIVE (5) DAYS PRIOR TO TENANT MOVE IN.

H. COMMISSIONING OF LIGHTING CONTROL SYSTEM PROGRAMMABLE SYSTEM CONTROLS, OCCUPANT SENSORS, PHOTOSENSORS, AND DAYLIGHT CONTROLS SHALL BE READY FOR COMMISSIONING AGENT NO FEWER THAN TEN (10) WORKING DAYS PRIOR TO TENANT MOVE IN



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ISSUE:
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DECEMBER 01, 2021
REVISED FOR BOTTLE FILLER
JANUARY 19, 2022
CONSTRUCTION DOCUMENTS
JANUARY 26, 2022

DRAWN BY:
RS

PROJECT ENGINEER:
RS

DRAWING:
ELECTRICAL
SPECIFICATIONS

SCALE:
NOT TO SCALE

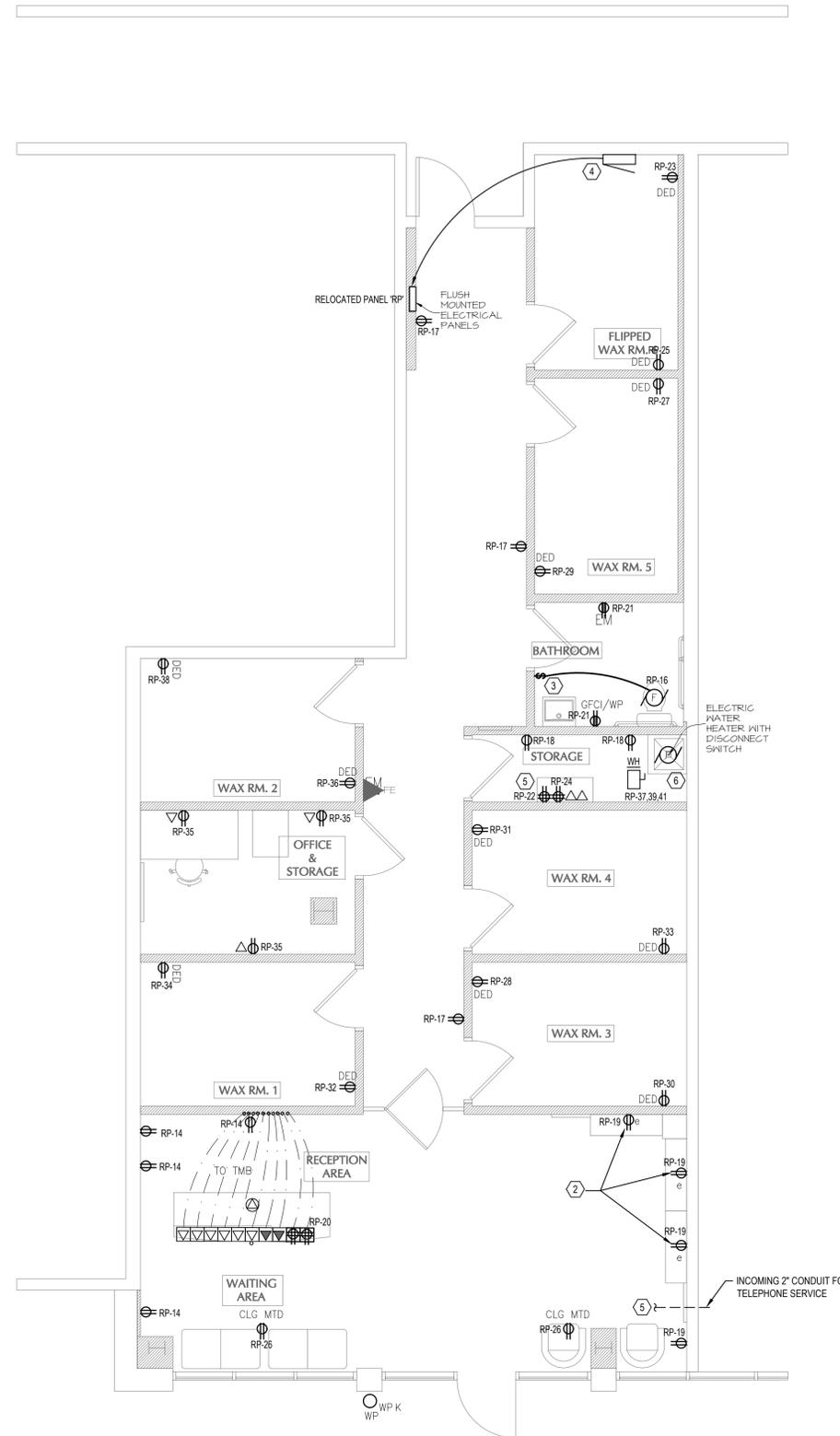
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POWER NOTES

1. ALL OUTLET ARE TO BE LOCATED AT 18" A.F.F. U.N.O ALL TOP OF SWITCHES ARE TO BE LOCATED AT 48" A.F.F. U.N.O.
2. LOCATE ALL ELECTRICAL BOXES TO ALLOW FOR FACE PLACE INSULATION OVER THE MILLWORK FINISH, TYPICAL.
3. PROVIDE DEDICATED CIRCUIT OUTLET FOR EACH WAX CABINET.
4. ELECTRICIAN TO REVIEW PLAN AND CIRCUIT SCHEDULE WITH ARCHITECT PRIOR TO COMMENCEMENT OF ANY WORK.
5. ALL OUTLETS AND OUTLET COVERS TO BE WHITE IN COLOR.
6. CONTRACTOR SHALL COORDINATE ALL LOW VOLTAGE SCOPE OF WORK AND VOLUME CONTROL WITHIN IT RACK WITH ARCHITECT.
7. UPON COMPLETION OF WORKS THE CONTRACTOR SHALL ENSURE THAT PANEL DIRECTORIES COMPLY WITH NEC 408.4.
8. ALL RECEPTACLES SHALL BE TAMPER RESISTANT.

KEY NOTES

- ① CONTRACTOR TO CONNECT EXHAUST FAN TO LIGHT CIRCUIT SERVING SPACE.
- ② SWITCHED RECEPTACLES. REFER TO LIGHTING PLAN FOR SWITCH LOCATION.
- ③ EXHAUST FAN TO BE SWITCHED INTEGRAL WITH BATHROOM LIGHTS. REFER TO LIGHTING PLAN FOR MORE INFORMATION.
- ④ EXISTING PANEL "RP" TO BE RELOCATED AS SHOWN. EXTEND CONDUIT AND WIRING AS REQUIRED.
- ⑤ EXISTING 2" CONDUIT FOR TELEPHONE SERVICE TO BE EXTENDED FROM INCOMING LOCATION TO STORAGE ROOM FOR CIRCUITS #22 AND #24.
- ⑥ PROVIDE 120v CIRCUIT TO NEW TRAP PRIMER AND LEAK DETECTOR. COORDINATE WITH PLUMBING DRAWINGS FOR LOCATION.

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DRAWN BY:
 RS

PROJECT ENGINEER:
 RS

DRAWING:
 ELECTRICAL
 FIRST FLOOR POWER PLAN

SCALE:
 1/4" = 1'-0"

SEAL



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