ELECTRICAL ABBREVIATIONS

(D)	Demo
(E)	Existing
(N)	New
(R)	Relocate
(RM)	Remove Existing Equipment
(R'D)	Relocated Equipment
AC	Alternating Current
AF	Ampere Fuse
AFF	Above Finished Floor
AHJ	Authority Having Jurisdiction
AIC	Ampere Interrupting Capacity
AMP	Ampere
AT	Ampere Trip
ATS	Automatic Transfer Switch
AWG	American Wire Gauge
C	Conduit
CB	Circuit Breaker
CFCI	Contractor Furnished Contractor Installed
CKT	Circuit
CLG	Ceiling
CT	Current Transformer
CU	Copper
DISC.	Disconnect
DIST.	Distribution
EA	Each
E.C.	Electrical Contractor
FA	Fire Alarm
FAAP	Fire Alarm Annunciation Panel
FACP	Fire Alarm Control Panel
FLA	Full Load Amps
G.C.	General Contractor
GFI	Ground Fault Interrupter
GRD	Ground
GRS	Galvanized Rigid Steel
HP	Horsepower
IDF	Intermediate Distribution Frame
I.P.S.	Inverter Power System
JB	Junction Box
KVA	Kilo-Volt-Ampere
KW	Kilowatt
LAN	Local Area Network
LTS	Lights
LTG	Lighting
MCB	Main Circuit Breaker
MDF	Main Distribution Frame
MLO	Main Lugs Only
MTD	Mounted
MTG	Mounting
NEC	National Electrical Code
NEMA	National Electrical Manufacturers Association
NF	Non-Fused
NTS	Not to Scale
OFCI	Owner Furnished Contractor Installed
OFOI	Owner Furnished Owner Installed
OC	Overcurrent
OCP	Overcurrent Protection
P	Pole
PA	Public Address
PB	Push Button
PH	Phase
PNL	Panel
RCPT	Receptacle
REC	Receptacle
RECP	Receptacle
REQ'D	Required
SN	Solid Neutral
SPECS	Specifications
SPKR	Speaker
SWBD	Switchboard
SWGR	Switchgear
TEL	Telephone
TTB	Telephone Terminal Board
TVSS	Transient Voltage Surge Suppressor
TYP.	Typical
UC, U/C	Under Counter
U.N.O.	Unless Noted Otherwise
V	Volt
VA	Volt-Ampere
VSD	Variable Speed Drive
W	Watt or Wire
W/	With
W/O	Without
WP	Weatherproof
XFMR	Transformer
XFR	Transfer

ELECTRICAL LEGEND

All Symbols Shown Are Not Necessarily Used In This Project

(E)——	Existing
(R)——	Relocated
(N)——	New
(D)- - -	Demo
	New or relocated light fixture. Letter indicates type. Refer to light fixture schedule for more information.
	New emergency light fixture. Letter indicates type. Provide with emergency power source. Refer to light fixture schedule for more information. Provide with integral emergency battery backup UNO.
	Exit light. Provide directional chevron(s) arrow(s) as indicated on plans. Provide with integral battery pack UNO. Connect to unswitched power leads.
$	Single pole switch
$M	Manual Motor Starter With Proper Thermal Element Installed.
$MC	Switch, Three-Way Momentary Contact Toggle Type With Center Neutral Position. Similar To ASCO # 173A2.
	Duplex Receptacle, 20Amp, 125Volt, 2Pole, 3Wire, Grounding Type, NEMA 5-20R UNO.
	Double (QUAD) Duplex Receptacle with Common Cover Plate. Similar to Duplex Receptacle.
GFI	Ground Fault Interruptor (GFI) Duplex Receptacle. Similar To Duplex Receptacle Above.
WP	Weatherproof (WP) Duplex Receptacle. Similar to Duplex Receptacle Above.
GFI/WP	Ground Fault Interruptor (GFI) & Weatherproof (WP) Duplex Receptacle. Similar to Duplex Receptacle Above.
USB	Combination Duplex Receptacle with USB Charger. 15Amp, 125Volt, NEMA 5-15R, 3.6Amps, 5VDC, 2.0 Type A USB Chargers.
	Dedicated receptacle, provide gray color (Confirm w/ architect) receptacle and cover Plate, with intended usages of receptacles engraved on coverplate (E.G. "Copier"). Electrician shall confirm receptacle type required with owner/eqpm vendor prior to install.
▽	Data Outlet. Provide Back Box/Cover Plate. Install 3/4"C. with Bushing and Pull String, Stubbed to Accessible Ceiling.
	Poke-Thru or recessed floor box for power and data. Type specified on plans.
Ⓙ	Junction Box.
	Electrical Panel Boards.
	Disconnect Switch. All Switches Shall Be Heavy Duty Type (E.G. 30A/3P/600/NF/NEMA 1)
-PRI-	Underground Primary circuit conduit and conductors
-SEC-	Underground Secondary circuit conduit and conductors
-E-	Underground branch circuit/duct bank conduit and conductors
-COM-	Underground communication duct bank conduit and conductors
-OHE-	Overhead secondary circuit conduit and conductors
	Conduit Run Concealed in Wall or Ceiling
	Conduit Run Concealed in Floor
	Homerun to Electrical Panelboards

Legend Notes:

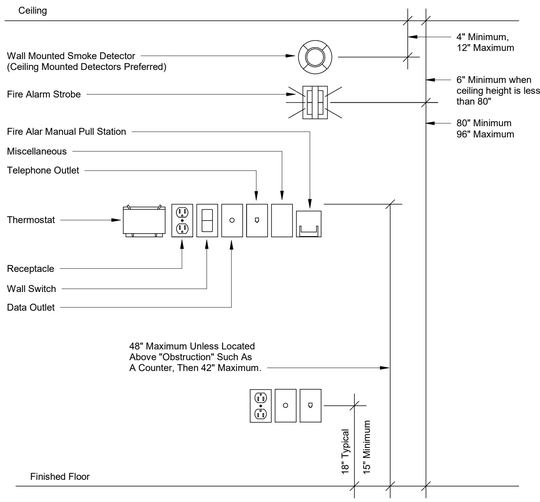
1. The word "provide" as used in these drawings shall mean "materials and labor furnished and installed by Electrical Contractor".
2. Mounting height of all light switches, dimmers, receptacles, telephone, data and signal outlets shall be in accordance with the 'American with Disabilities Act'.
   Light Switches, Dimmers, etc. (+42")
   Receptacles, Telephone, Data, etc. (+18")
   All mounting heights are measured from finished floor to center of device. Mounting heights shown on the architect drawings and specifications take precedence. Verify exact mounting height required with architect and install accordingly.

LIGHTING CONTROLS LEGEND

$OS	ACUITY WALL SWITCH OCCUPANCY SENSOR. MODEL #WSX-PDT-VA. OCCUPANCY SENSOR PROVIDES UP TO 600 SQ. FT. OF COVERAGE. PROVIDE APPROPRIATE ACCESSORIES AS NEEDED.
$OSX	ACUITY WALL SWITCH OCCUPANCY SENSOR WITH DIMMING. MODEL #WSX-PDT-D-VA. OCCUPANCY SENSOR PROVIDES UP TO 600 SQ. FT. OF COVERAGE. PROVIDE APPROPRIATE ACCESSORIES AS NEEDED.
$#LV	ACUITY nLIGHT DIGITAL WALL SWITCH. nPODM SERIES. # = NUMBER OF ZONES REQUIRED. COORDINATE EXACT SPEC WITH OWNER PRIOR TO PURCHASE. PROVIDE APPROPRIATE POWER PACKS AND OTHER nLIGHT ACCESSORIES AS NEEDED.
$#LVX	ACUITY nLIGHT DIGITAL WALL SWITCH WITH DIMMING. nPODM DX SERIES. # = NUMBER OF ZONES REQUIRED. COORDINATE EXACT SPEC WITH OWNER PRIOR TO PURCHASE. PROVIDE APPROPRIATE POWER PACKS AND OTHER nLIGHT ACCESSORIES AS NEEDED.
OS CM	ACUITY nLIGHT CEILING MOUNTED OCCUPANCY SENSOR. MODEL #nCM PDT 10 RJB. PROVIDES UP TO 2,500 SQ. FT. OF COVERAGE. PROVIDE APPROPRIATE POWER PACKS AND OTHER nLIGHT ACCESSORIES AS NEEDED.
OS WV	ACUITY nLIGHT WIDE VIEW OCCUPANCY SENSOR; DESIGNED TO MOUNT IN CORNER. MODEL #nWV PDT 16 KIT. PROVIDES DETECTION UP TO 40 FT. FROM SENSOR. PROVIDE APPROPRIATE POWER PACKS AND OTHER nLIGHT ACCESSORIES AS NEEDED.
OS HW	ACUITY nLIGHT HALLWAY OCCUPANCY SENSOR. MODEL #nHW 13. PROVIDES DETECTION UP TO 130 FT. FROM SENSOR. PROVIDE APPROPRIATE POWER PACKS AND OTHER nLIGHT ACCESSORIES AS NEEDED.
PS	ACUITY nLIGHT PHOTOCELL SENSOR. MODEL #nCM ADCX RJB. PROVIDES AUTOMATIC DIMMING OF FIXTURES IN DAYLIGHT ZONE INDICATED. PROVIDE APPROPRIATE POWER PACKS AND OTHER nLIGHT ACCESSORIES AS NEEDED.
	DAYLIGHTING ZONE. PROVIDE PHOTOCELL SENSOR. ALL FIXTURES WITHIN ZONE SHALL BE AUTOMATICALLY DIMMED AS DAYLIGHT LEVELS RISE.

NOTES:

1. All occupancy sensors shall be type 'CM', unless noted otherwise.
2. All occupancy sensors shall be calibrated and settings adjusted by the E.C. all occupancy sensors shall have the time delay set to the maximum setting.
3. All occupancy sensors shall pass NEMA WD7 testing.
4. Refer to lighting control schedule for more information. The electrical contractor shall provide and install a complete, operational and code compliant lighting control system. The contractor shall be responsible for providing all wiring, cabling, devices, components, etc. as required by the manufacturer. Refer to installation manuals and wiring diagrams provided by the manufacturer.
5. The basis of design for lighting controls is Acuity nLIGHT. Any additional cost incurred by an approved substitution (including engineering costs of redesign) will be at contractor's expense.
6. Products by Leviton, Greengate and/or Watt-Stopper that are equivalent to nLIGHT are acceptable.
7. **FOR SUBMITTALS**: Submit dimensioned drawings of lighting control system and accessories including, but not limited to: relay panels, switches, photocells, controllers and other interfaces. Shop drawings shall indicate location of each device or an RFI to confirm location. Plans are floor plan diagrams. "Cut Sheet" submittal not acceptable. Submit a one-line diagram of the system configuration indicating the type, size and number of conductors between each component if it differs from that illustrated in the riser diagram in these specifications. Submittals that show typical riser diagrams are not acceptable.



Note: All devices shown may not be used. Detail indicates typical mounting heights only. Mounting heights shown on the architect drawings and specifications take precedence. Verify exact mounting height required with architect and install accordingly.

1 TYPICAL MOUNTING HEIGHTS

NOT TO SCALE

FIRE ALARM SYSTEM

FIRE ALARM SYSTEM DESIGN (DEVICES AND LAYOUT) ARE BY THE FIRE ALARM CONTRACTOR.

FIRE ALARM SYSTEM CONSTRUCTION DOCUMENTS FOR THE SCOPE OF WORK INDICATED IN THIS PROJECT SHALL BE SUBMITTED TO THE CITY OF ***SAN ANTONIO*** FOR APPROVAL PRIOR TO COMMENCING FIRE ALARM WORK AND THE INSTALLATION MUST BE APPROVED BY THE CITY AND LOCAL AUTHORITY HAVING JURISDICTION AFTER COMPLETION.

1. AN EXISTING FIRE ALARM SYSTEM IS IN PLACE. REUSE ALL EXISTING DEVICES WHERE PRACTICAL AND PROVIDE NEW DEVICES MATCHING EXISTING DEVICES WHERE NECESSARY. COORDINATE WITH MECHANICAL AND PLUMBING DRAWINGS. COORDINATE DEVICE LOCATIONS WITH ARCHITECTURAL DRAWINGS. SUBMIT SHOP DRAWINGS AND SEQUENCE OF OPERATIONS TO ENGINEER FOR REVIEW.
2. THE FIRE ALARM SYSTEM MODIFICATIONS FOR THIS PROJECT SHALL BE DESIGNED BY A LICENSED FIRE ALARM CONTRACTOR AND BE IN ACCORDANCE WITH NFPA 72 & 101 AND CITY BUILDING CODE. CONTRACTOR IS RESPONSIBLE FOR SUBMISSION OF PLANS TO THE CITY FOR APPROVAL AND ALL ASSOCIATED FEES.
3. ALL 120V CIRCUITS REQUIRED FOR THE OPERATION OF THE FIRE ALARM SYSTEM SHALL BE INCLUDED. LOCATIONS OF ALL PANELS AND BOOSTERS SHALL BE COORDINATED WITH ARCHITECT. CONTRACTOR SHALL TEST THE SYSTEM IN THE PRESENCE OF LOCAL AUTHORITIES AND MAKE ALL REQUIRED MODIFICATIONS AND ADDITIONS TO HIS DESIGN AT NO ADDITIONAL COST.

2018 IECC

A COMMISSIONING PLAN MUST BE DEVELOPED BY A REGISTERED DESIGN PROFESSIONAL OR APPROVED AGENCY. THE PLAN SHALL INCLUDE THE FOLLOWING ITEMS:

- A NARRATIVE DESCRIPTION OF THE ACTIVITIES THAT WILL BE ACCOMPLISHED DURING EACH PHASE OF COMMISSIONING.
- A LISTING OF THE SPECIFIC EQUIPMENT, APPLIANCES OR SYSTEMS TO BE TESTED AND A DESCRIPTION OF THE TESTS TO BE PERFORMED.
- FUNCTIONS TO BE TESTED.
- CONDITIONS UNDER WHICH THE TEST WILL BE PERFORMED.
- MEASURABLE CRITERIA FOR PERFORMANCE

CONTRACTOR SHALL BE RESPONSIBLE FOR THE DEVELOPMENT AND IMPLEMENTATION OF THE COMMISSIONING PLAN.

LIGHTING COMMISSIONING NOTES

- LIGHTING SYSTEM COMMISSIONING ACTIVITIES INCLUDE BUT SHALL NOT BE LIMITED TO:
  - SUBMITTAL REVIEWS
  - FIELD OBSERVATION
  - ENSURE ALL FIXTURES HAVE LAMPS AND ARE OPERATIONAL
  - TEST EMERGENCY LIGHTING (INCLUDING EXIT SIGNS)
  - ENSURE ALL OCCUPANCY & DAYLIGHT SENSORS HAVE BEEN INSTALLED PER THE MANUFACTURERS INSTRUCTIONS AND ARE OPERATING AS INTENDED.
  - VERIFY STATUS INDICATORS ON DEVICES ARE CORRECT.
  - CONFIRM SWITCHES AND DEVICES CONTROL LIGHT FIXTURES AS INDICATED ON THE DRAWINGS.
- THE LIST OF COMMISSIONED SYSTEMS INCLUDES, BUT SHALL NOT BE LIMITED TO:
  - LIGHT FIXTURES
  - EXIT SIGNS
  - EMERGENCY EGRESS LIGHTING
  - OCCUPANCY SENSORS
  - DAYLIGHT SENSORS
  - TIME-CLOCK & TIME-SWITCH CONTROLS
  - DIMMER SYSTEMS
  - BAS INTERFACE
- DOCUMENTATION CERTIFYING THE INSTALLED LIGHTING CONTROLS MEET DOCUMENTED PERFORMANCE CRITERIA OF SECTION C405 OF THE 2018 IECC ARE TO BE PROVIDED TO THE BUILDING OWNER WITHIN 90 DAYS OF THE RECEIPT OF THE CERTIFICATE OF OCCUPANCY.

Lighting Controls

SPACE TYPE	MOTION SENSOR	# OF ZONES	DAYLIGHT SENSOR	FIXTURE EMBEDDED CONTROLS	PART OF NETWORKED SYSTEM	BMS INTEGRATION	TIME CLOCK FUNCTION	DIMMING	MANUAL OVERRIDE	LUMEN MANAGEMENT	A/V INTEGRATION	TOUCHSCREEN CONTROL	PASSWORD PROTECTED CONTROLS	EMERGENCY TRANSFER DEVICE	NOTES
PRIVATE OFFICE	VACANCY	1	0												
HALLWAY	--	1	0												
TRAINING RM	VACANCY	1	0												

- PROVIDE A POWERPACK FOR EACH ZONE.
- INSTALL ALL DEVICES PER MANUFACTURER INSTALLATION INSTRUCTIONS.
- VACANCY = MANUAL ON, AUTO OFF AFTER 15 MINUTES OF VACANCY.
  OCCUPANCY = AUTO ON, AUTO OFF AFTER 15 MINUTES OF VACANCY.
- SEE PLAN FOR DAYLIGHTING ZONE(S). PROVIDE A PHOTOCELL FOR EACH ZONE.
- PROVIDE UL 924 LISTED CONTROL DEVICE FOR EMERGENCY TRANSFER DEVICE.

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DATE: 06/16/20

REVISED:

ISSUE FOR PERMIT	06-16-2020

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06-16-2020

SHEET TITLE: ELECTRICAL LEGENDS, SYMBOLS, & NOTES

SHEET: **E1**

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GENERAL NOTES AND ELECTRICAL SPECIFICATION

IN CASE OF CONFLICTS BETWEEN DRAWINGS, OR SPECS AND DRAWINGS, CONTRACTORS SHALL REQUEST CLARIFICATIONS IN WRITING FROM ARCHITECT/ENGINEER, OTHERWISE THE MORE STRINGENT REQUIREMENTS SHALL BE PROVIDED.

CODE INFORMATION:
APPLICABLE CODES INCLUDE BUT ARE NOT LIMITED TO: NATIONAL ELECTRICAL CODE (2017 N.E.C.), INTERNATIONAL BLDG CODE 2017, INTERNATIONAL ENERGY CONSERVATION CODE (IECC 2018), LIFE SAFETY CODE (NFPA 101), TEXAS ACCESSIBILITY STANDARDS, AMERICANS WITH DISABILITIES ACT.
OCCUPANCY CLASSIFICATION: B

26 05 00 BASIC ELECTRICAL REQUIREMENTS
PERMITS AND CODES: OBTAIN AND PAY FOR ALL NECESSARY PERMITS AND REQUIRED INSPECTIONS. COMPLY WITH ALL NATIONAL, STATE AND MUNICIPAL LAWS, CODES AND ORDINANCES RELATING TO BUILDING AND PUBLIC SAFETY. PROVIDE ANY REQUIRED TEMPORARY POWER AND UTILITIES FOR ALL TRADES AND ALL CONSTRUCTION TRAILERS. PROVIDE TEMPORARY CONSTRUCTION LIGHTING AND POWER. ELECTRICAL CONTRACTOR SHALL INCLUDE TEMPORARY ELECTRIC SERVICE: ALL TEMPORARY ELECTRIC SHALL BE IN ACCORDANCE WITH OSHA CONSTRUCTION STANDARDS 29FCR, PART 1926 AND ARTICLE 305 OF THE NATIONAL ELECTRICAL CODE. TEMPORARY LIGHTING AND POWER SHALL BE PROVIDED IN ACCORDANCE WITH OSHA STANDARDS. THE OSHA MINIMUM ILLUMINATION IS 5 FOOTCANDLES IN GENERAL CONSTRUCTION AREAS, AND 10 FC IN MECHANICAL / ELECTRICAL ROOMS AND WORKROOMS. INCLUDED ARE CONNECTIONS TO ALL CONSTRUCTION TRAILERS. THE COST OF THIS WORK IS TO BE INCLUDED IN THE BASE ELECTRICAL BID FOR THE PROJECT.
TRENCH SAFETY: SEE SUBCHAPTER C OF CHAPTER 756 OF THE TEXAS HEALTH AND SAFETY CODE FOR REQUIREMENTS APPLICABLE TO TRENCH SAFETY. IT IS THE RESPONSIBILITY OF THE CONTRACTOR TO ASSURE COMPLIANCE WITH APPLICABLE STATE AND FEDERAL LAWS, AND NO PROVISION OF THESE DRAWINGS OR SPECIFICATIONS SHALL BE DEEMED TO EXCUSE COMPLIANCE WITH APPLICABLE STATE AND FEDERAL REQUIREMENTS FOR TRENCH SAFETY.

VISITING THE JOB SITE: VISIT THE SITE OF THE PROPOSED CONSTRUCTION IN ORDER TO FULLY UNDERSTAND THE FACILITIES, DIFFICULTIES AND RESTRICTIONS ATTENDING THE EXECUTION OF THE WORK. NO ADDITIONAL COMPENSATION WILL BE ALLOWED THIS CONTRACTOR FOR WORK OR ITEMS OMITTED FROM HIS ORIGINAL PROPOSAL DUE TO HIS FAILURE TO INFORM HIMSELF REGARDING SUCH MATTERS AFFECTING THE PERFORMANCE OF THE WORK IN THIS CONTRACT OR NECESSARY FOR THE INSTALLATION AND COMPLETION OF THE WORK INCLUDED HEREIN.

DRAWINGS: DRAWINGS ARE DIAGRAMMATIC, CONFIRM DIMENSIONS & LOCATIONS IN THE FIELD. IF CONFLICTING DIMENSIONS ARE SHOWN, USE LARGER DIMENSIONS AND VERIFY WITH ARCHITECT. SEE ARCHITECTURAL PLANS AND ELEVATIONS FOR EXACT LOCATION OF FIXTURES AND WALL MOUNTED DEVICES.

MATERIAL: ALL MATERIALS SHALL BE NEW, **MADE IN USA AND U.L. LISTED**. MATERIAL INSTALLATION SHALL COMPLY WITH NEC REQUIREMENTS AND PERFORM BY CRAFTSMAN SKILLED IN THIS PARTICULAR WORK.

EQUIPMENT PROTECTION: PROTECT EQUIPMENT AND WORK FROM DAMAGE DURING HANDLING AND INSTALLATION UNTIL COMPLETION OF CONSTRUCTION.

COOPERATION WITH OTHER TRADES: COOPERATION WITH TRADES OF ADJACENT, RELATED OR AFFECTED MATERIALS OR OPERATIONS, AND WITH TRADES PERFORMING CONTINUATIONS OF THIS WORK UNDER SUBSEQUENT CONTRACTS, IS CONSIDERED A PART OF THIS WORK IN ORDER TO EFFECT TIMELY AND ACCURATE PLACING OF WORK AND TO BRING TOGETHER, IN PROPER AND CORRECT SEQUENCE, THE WORK OF SUCH TRADES. PROVIDE OTHER TRADES, AS REQUIRED, ALL NECESSARY TEMPLATES, PATTERNS, SETTING PLANS AND SHOP DETAILS FOR THE PROPER INSTALLATION OF THE WORK AND FOR THE PURPOSE OF COORDINATING ADJACENT WORK. ELECTRICAL POWER CONNECTIONS FOR MECHANICAL AND PLUMBING EQUIPMENT ARE IN THIS DIVISION UNLESS NOTED OTHERWISE. VERIFY CHARACTERISTICS OF ALL EQUIPMENT WITH DIVISION 15 AND OTHER SPECIAL DIVISIONS (ELEVATORS ETC) BEFORE ROUGHING IN THE ELECTRICAL CONNECTIONS AND ENERGIZING THE EQUIPMENT.
MECH/PLUMBING/SPECIAL EQPT ACCESS AND CLEARANCE AREAS: REMOVE ANY IMPROPERLY INSTALLED ELECTRICAL EQPT AND CONDUIT THAT ARE LIMITING PROPER ACCESS FOR EQPT SERVICE AND MAINTENANCE.

ACCESS PANEL: PROVIDE ACCESS PANELS OR DOORS FOR ALL DEVICES REQUIRING ADJUSTMENT. SIMILARLY FOR ALL JUNCTION BOXES, PULL BOXES ETC THAT ARE REQUIRED TO BE ACCESSIBLE PER CODE AND/OR THE LOCAL AUTHORITY HAVING JURISDICTION. APPEARANCE OF ACCESS PANELS/DOORS SHALL BE ACCEPTABLE TO ARCHITECT. PANELS/DOORS SHALL BE DESIGNED FOR THE FIRE RATING OF WALL OR CEILING IN WHICH THEY ARE INSTALLED. ALL ACCESS PANELS SHALL BE LOCKABLE AND SHALL BE KEYED ALIKE (SAME KEYING AS PANELS FROM OTHER DIVISIONS).

PLENUMS: PLENUMS ARE CROWDED AND NOT ALL OBSTACLES ARE INDICATED. ALLOW FOR CONDUIT OFFSETS AND PULL BOXES NOT INDICATED ON DRAWINGS.

PLASTER, GYPSUM BOARD OR OTHER NON-ACCESSIBLE CEILINGS: CONTRACTOR SHALL MINIMIZE CUTTING AND PATCHING BY INSTALLING CONDUIT PRIOR TO CEILING/WALL/PARTITION COVER-UP.

LOSS OR DAMAGE TO EXISTING FACILITIES:
THE CONTRACTOR SHALL BE RESPONSIBLE FOR LOSS OR DAMAGE TO THE EXISTING FACILITIES CAUSED BY HIM AND HIS WORKMEN, AND SHALL BE RESPONSIBLE FOR REPAIRING OR REPLACING SUCH LOSS OR DAMAGE. THE CONTRACTOR SHALL SEND PROPER NOTICES, MAKE NECESSARY ARRANGEMENTS, AND PERFORM OTHER SERVICES REQUIRED FOR THE CARE, PROTECTION AND IN-SERVICE MAINTENANCE OF ALL ELECTRICAL SERVICES FOR THE <NEW AND EXISTING> FACILITIES. THE CONTRACTOR SHALL ERECT TEMPORARY BARRICADES, WITH NECESSARY SAFETY DEVICES, AS REQUIRED TO PROTECT PERSONNEL AND THE GENERAL PUBLIC FROM INJURY, REMOVING ALL SUCH TEMPORARY PROTECTION UPON COMPLETION OF THE WORK.
THE CONTRACTOR SHALL MODIFY, REMOVE AND/OR REPLACE ALL MATERIALS AND ITEMS SO INDICATED ON THE DRAWINGS OR REQUIRED BY THE INSTALLATION OF NEW FACILITIES. **SALVAGE MATERIALS SHALL REMAIN THE PROPERTY OF THE OWNER AND SHALL BE DELIVERED TO SUCH DESTINATION AS DIRECTED BY THE OWNER. DISPOSE OF SALVAGE MATERIAL IF NOT RETAINED BY OWNER.**
WHERE EXISTING CONSTRUCTION IS REMOVED TO PROVIDE WORKING AND EXTENSION ACCESS TO EXISTING UTILITIES, CONTRACTOR SHALL REMOVE CEILING GRID, TILES, DOORS, PIPING, AIR CONDITIONING DUCTWORK AND EQUIPMENT, ETC., TO PROVIDE THIS ACCESS AND SHALL REINSTALL SAME UPON COMPLETION OF WORK IN THE AREAS AFFECTED.

WORK IN OCCUPIED AREAS: WORK IN, ABOVE, BELOW OR NEAR OCCUPIED AREAS SHALL BE AT OWNER'S CONVENIENCE AND MAY BE DURING EVENINGS OR WEEKENDS. SCHEDULE ALL REQUIRED POWER OUTAGES A MINIMUM OF 7 DAYS IN ADVANCE WITH FACILITY ENGINEER/OWNER. **DO NOT TURN OFF ANY POWER SOURCES. ONLY FACILITY ENGINEER/OWNER OR HIS AUTHORIZED REPRESENTATIVE MAY DO SO.**

ELECTRICAL SERVICE OUTAGE: SERVICE TO THE EXISTING BUILDING SHALL BE MAINTAINED DURING NORMAL WORKING HOURS. ANY SERVICE OUTAGE REQUIRED TO COMPLETE THE WORK SHALL BE THE TIME AND FOR THE LENGTH OF TIME AS DIRECTED BY THE OWNER. ALL PREMIUM TIME SHALL BE INCLUDED IN CONTRACTOR'S BID.

FIRE STOPS AND PENETRATION SEALS: ALL PENETRATIONS THROUGH FIRE RATED FLOORS AND WALLS SHALL BE SEALED WITH 3M FIRE RESISTANT FOAM SEALANT, TO PREVENT THE SPREAD OF SMOKE, FIRE, TOXIC GAS OR WATER THROUGH THE PENETRATION EITHER BEFORE, DURING OR AFTER A FIRE. THE FIRE RATING OF THE PENETRATION SEAL SHALL BE AT LEAST THAT OF THE FLOOR OR WALL INTO WHICH IT IS INSTALLED, SO THAT THE ORIGINAL FIRE RATING OF THE FLOOR OR WALL IS MAINTAINED AS REQUIRED BY ARTICLE 300.21 OF THE NATIONAL ELECTRICAL CODE.

CLEAN UP: A) PROVIDE FOR ISOLATION OF WORK AREAS AND DAILY REMOVAL OF DEBRIS. B) CLEAN ALL EQUIPMENT AND FIXTURE LENSES. C) REPLACE ALL BURNED OUT LAMPS. D) TOUCH UP WITH PAINT WHERE REQUIRED.

SUBMITTAL DATA: SUBMITTALS ARE REQUIRED BUT NOT LIMITED TO THE FOLLOWING EQUIPMENT: LIGHTING FIXTURES; SWITCHGEAR; MCCS; DISTRIBUTION; PANELBOARDS; BRANCH CIRCUIT PANELBOARDS; TRANSFORMERS; SWITCHES ETC; EMERGENCY STANDBY GENERATOR SYSTEM; FIRE ALARM SYSTEM; NURSE CALL; SYSTEM; SECURITY SYSTEM; TELEPHONE SYSTEM; COMMUNICATION SYSTEM; CONDUIT/FITTINGS; WIRES; LIGHTNING PROTECTION SYSTEM

SHOP DRAWINGS: SHOP DRAWINGS AS REQUIRED SHALL BE PROVIDED BY THE ELECTRICAL CONTRACTOR AT NO ADDITIONAL COST TO THE ARCHITECT. THESE SHOP DRAWINGS SHALL BE PREPARED TO INDICATE INSTALLATION OF MAJOR EQUIPMENT WHERE SPECIAL COORDINATION PROBLEM EXIST.
OVERCURRENT & SAFETY DISCONNECT DEVICES FOR HVAC EQPT: OVERCURRENT (OC) & DISCONNECT DEVICES SHOWN ON PLANS ARE BASED ON A SPECIFIC HVAC EQUIPMENT MANUFACTURER. HVAC CONTRACTOR MAY SUBMIT OTHER MANUFACTURERS, DIFFERENT MODELS OR RATINGS. IT IS THE RESPONSIBILITY OF THE ELECTRICAL CONTRACTOR TO COORDINATE OC/DISCONNECT DEVICES WITH THE HVAC CONTRACTOR PRIOR TO SUBMITTING SUCH DEVICES FOR ENGINEER'S REVIEW. ANY DEVIATIONS FROM SIZES SHOWN ON DRAWINGS MUST BE NOTED IN THE SUBMITTALS. THE ELECTRICAL CONTRACTOR MUST CERTIFY THAT HE HAS REVIEWED AND COORDINATED WITH THE HVAC CONTRACTOR AND THAT ALL OC/DISCONNECT DEVICES SUBMITTED MATCH THE HVAC EQPT REQUIREMENTS. SHOP DRAWINGS WITHOUT SUCH CERTIFICATION WILL BE RETURNED TO THE CONTRACTOR. ONLY SUBMITTALS WITH SUCH CERTIFICATION WILL BE REVIEWED.

COMPLETE SYSTEMS: ALL SYSTEMS SHALL BE COMPLETE AND WORKING AT COMPLETION OF CONSTRUCTION.

FINAL INSPECTION & OPERATING TESTS: ALL ELECTRICAL SYSTEMS MUST BE CHECKED FOR PROPER POLARITY AND SEQUENCE, ALL MOTORS MUST BE CHECKED FOR PROPER ROTATION AND ALL EQUIPMENT (INCLUDING HVAC, ELEVATOR AND SPECIAL EQUIPMENT) CHECKED FOR PROPER VOLTAGE AND PHASING REQUIREMENTS. PRIOR TO THE APPLICATION OF ANY POWER, THE CONTRACTOR MUST CERTIFY THAT ALL CONNECTED EQUIPMENT MATCH THE CHARACTERISTICS OF THE SUPPLY CIRCUIT VOLTAGE, PHASING AND FEEDER REQUIREMENTS.
AT THE TIME DESIGNATED BY THE ARCHITECT, THE ENTIRE SYSTEM SHALL BE INSPECTED BY THE ARCHITECT AND THE ENGINEER. THE CONTRACTOR OR HIS REPRESENTATIVE SHALL BE PRESENT AT THIS INSPECTION.
AFTER ALL SYSTEMS HAVE BEEN COMPLETED AND PUT INTO OPERATION, SUBJECT EACH SYSTEM TO AN OPERATING TEST UNDER DESIGN CONDITIONS TO ENSURE PROPER SEQUENCE AND OPERATION THROUGHOUT THE RANGE OF OPERATION, MAKE ADJUSTMENTS AS REQUIRED TO ENSURE PROPER FUNCTIONING OF ALL SYSTEMS. SPECIAL TESTS ON INDIVIDUAL SYSTEMS ARE SPECIFIED UNDER INDIVIDUAL SECTIONS.
THE CONTRACTOR **SHALL PROVIDE A SET OF AS-BUILT DRAWINGS AND MYLAR REPRODUCIBLES TO THE OWNER/ARCH**. AFTER THE INSPECTION, ANY ITEMS WHICH ARE NOTED AS NEEDING TO BE CHANGED OR CORRECTED IN ORDER TO COMPLY WITH THESE SPECIFICATIONS AND THE DRAWINGS SHALL BE ACCOMPLISHED WITHOUT DELAY.

GUARANTEE: GUARANTEE ALL WORK AND MATERIALS FURNISHED UNDER THIS CONTRACT FOR A PERIOD OF ONE YEAR FROM THE DATE OF ACCEPTANCE BY THE OWNER AND ARCHITECT. GUARANTEE SHALL INCLUDE: ALL LABOR, PARTS, TRAVEL/SUBSISTENCE, SOFTWARE CHANGES/RE-PROGRAMMING, ETC.

RECORD DRAWINGS: MAINTAIN A CONTINUOUS DAILY RECORD DURING THE COURSE OF CONSTRUCTION OF ALL CHANGES AND DEVIATIONS IN THE WORK FROM THE ACCOMPANYING DRAWINGS. SHOW EXACT DIMENSIONS FOR ALL UNDER-SLAB CONDUIT. UPON COMPLETION OF WORK, PURCHASE A SET OF MYLAR REPRODUCIBLES AND MAKE CORRECTIONS AS REQUIRED TO REFLECT THE ELECTRICAL SYSTEMS AS INSTALLED. **SUBMIT THREE PRINTS OF THE TRACINGS FOR APPROVAL. MAKE CORRECTIONS TO TRACINGS AS DIRECTED AND DELIVER MYLAR TRACINGS TO THE OWNER.**

26 05 73 SHORT CIRCUIT CALCULATION, PROTECTIVE DEVICE COORDINATION AND ARC FLASH STUDIES
PROVIDE SHORT CIRCUIT CALCULATION, PROTECTIVE DEVICE COORDINATION AND ARC FLASH HAZARD STUDIES. STUDIES SHALL ENCOMPASS ELECTRICAL DISTRIBUTION SYSTEM FROM NORMAL POWER SOURCE OR SOURCES TO AND INCLUDING {BRANCH BREAKERS IN EACH PANELBOARD}. PREPARE STUDY PRIOR TO ORDERING DISTRIBUTION EQUIPMENT TO VERIFY EQUIPMENT RATINGS REQUIRED. PERFORM STUDY WITH AID OF COMPUTER SOFTWARE PROGRAMS. REPORT SHALL INCLUDE: (A) CALCULATION METHODS AND ASSUMPTIONS, (B) ONE LINE DIAGRAM, (C) STATE CONCLUSIONS AND RECOMMENDATIONS.
ARC FLASH HAZARD ANALYSIS SHALL NOT BE REQUIRED FOR EQUIPMENT RATED 240 VOLTS OR LESS AND SUPPLIED BY ONE TRANSFORMER RATED LESS THAN 125 KVA.
CONTRACTOR SHALL PROVIDE WARNING LABELS ON ELECTRICAL EQUIPMENT INDICATING INCIDENT ENERGY LEVEL, LEVEL OF HAZARD AND THE REQUIRED PERSONAL PROTECTION EQUIPMENT. EQUIPMENT SHALL INCLUDE, BUT NOT LIMITED TO, SWITCHBOARDS, DISTRIBUTION PANELS, MOTOR CONTROL CENTERS, PANELS, CONTACTORS, DISCONNECT SWITCHES AND MOTOR STARTERS.

26 05 33 CONDUIT AND BOXES
CONDUIT: SHALL BE RIGID GALVANIZED STEEL (RGS) OR ELECTRICAL METALLIC TUBING (EMT) AS MANUFACTURED BY ALLIED, TRIANGLE OR WHEATLAND.
· INDOORS ABOVE GRADE: EMT OR RGS.
· OUTDOORS ABOVE GRADE, STUB-UPS, OR ON ROOF: RGS OR IMC
· BELOW GRADE: SCHEDULE 40 OR 80 PVC OR RGS. PROVIDE TRANSITION FITTINGS FROM PVC SCH 40 OR 80 TO RGS FOR ALL ABOVE GRADE CONDUIT. ALL UNDERGROUND METALLIC CONDUIT SHALL HAVE 40-MIL THICK EXTERNAL PVC COATING FOR CORROSION PROTECTION. UNDERGROUND CONDUIT MINIMUM SIZE 3/4". MINIMUM 24" BURIAL DEPTH FROM FINISHED GRADE TO TOP OF CONDUIT, PROVIDE DEEPER BURIAL DEPTH IF REQUIRED BY LOCAL CODES. PROVIDE CONCRETE ENCASEMENT FOR ALL INCOMING SERVICE CONDUIT UNLESS SPECIFICALLY NOTED OTHERWISE. PROVIDE RED DETECTABLE WARNING TAPE OVER ENTIRE RUN OF SERVICE AND MAJOR CONDUIT RUNS.
· UNDER SLAB: RGS OR SCHEDULE 80 PVC .

INSTALL GROUND WIRES WHERE SHOWN ON THE DRAWINGS. COMPRESSION OR SET-SCREW TYPE FITTINGS MAY BE USED FOR EMT. MINIMUM CONDUIT SIZE 3/4 INCH, EXCEPT THAT DROPS TO SWITCHES MAY BE 1/2". TYPE "MC" METAL CLAD CABLE IS ACCEPTABLE IF APPROVED BY THE LOCAL AUTHORITY. MC CABLE, IF APPROVED, HOWEVER, MAY BE USED ONLY FOR DROPS FROM CEILING PLENUM JUNCTION BOXES TO LIGHT FIXTURES AND RECEPTACLES & LIGHT SWITCHES IN WALLS. MC CABLE MAY BE USED AS FIXTURE WHIPS FROM CEILING PLENUM JUNCTION BOXES TO LIGHT FIXTURES, WHIPS MUST BE 6-FT OR LESS AND SUPPORTED PER NEC 330.39. ALL MC CABLE MUST HAVE A SEPARATE EGC IN COMPLIANCE WITH NEC 330.108. HOMERUN CIRCUITS TO PANELS SHALL BE IN CONDUIT, MC HOMERUN TO PANELS IS NOT ACCEPTABLE. TYPE "AC" ARMORED CABLE (COMMONLY REFERRED TO AS "BX") IS NOT ACCEPTABLE AND SHALL NOT BE USED. ELECTRICAL NONMETALLIC TUBING (ENT, N.E.C. ARTICLE 362) SHALL NOT BE USED UNLESS SPECIFICALLY APPROVED BY THE ENGINEER. FLEXIBLE CONDUIT SHALL BE UTILIZED AS FINAL CONNECTIONS (3'-5' ONLY) AT THE FOLLOWING EQUIPMENT: MOTORS, LIGHTING FIXTURES, HEATER, POWER SUPPLIES, AND ANY OTHER VIBRATION PRODUCING EQUIPMENT. UTILIZE 1/2" FLEXIBLE METALLIC CONDUIT MINIMUM AND INCLUDE A GREEN GROUND WIRE. USE SEALTITE IN WET LOCATIONS SUCH AS OUTDOOR CONDENSING UNITS, WALK-IN COOLER/ FREEZER, KITCHEN, ROOFTOP HVAC EQPT ETC. CONDUIT SHALL BE SUPPORTED FROM STRUCTURE EVERY 5 FEET AND WITHIN 3 FEET OF ALL BOXES. USE LOCKNUTS INSIDE AND OUT AT BOXES. MAINTAIN MINIMUM 12" SEPARATION FROM ALL HIGH TEMPERATURE PIPES. ALL CONDUIT RUNS SHALL BE INSTALLED EITHER PARALLEL OR PERPENDICULAR TO BUILDING LINES. ROUTE CNDUIT AS DIRECTLY AS POSSIBLE WITH LARGEST RADIUS BENDS POSSIBLE. MAKE BENDS WITH STANDARD ELLS OR BENDS PER NEC. PROVIDE EXPANSIONS FITTINGS IF CONDUIT CROSSES STRUCTURAL EXPANSION JOINT. ALL CONDUIT ON ROOF SHALL BE SUPPORTED BY AN ENGINEERED, PREFABRICATED PORTABLE PIPE SYSTEM SPECIFICALLY DESIGNED TO BE INSTALLED ON THE ROOF WITHOUT ROOF PENETRATIONS, FLASHING OR DAMAGE TO THE ROOF MEMBRANE. PROVIDE PIPE SUPPORT SYSTEM BY ERICO, MODEL "CADDY PYRAMID" OR EQUAL BY COOPER B-LINE. SUPPORT AT INTERVAL NOT TO EXCEED 10' ON CENTER, AND WITHIN 5' OF ANY DEFLECTION OF CONDUIT. CONDUIT ON ROOF SHALL BE SUPPORTED ON 4"X4" REDWOOD SLEEPER AT 10-FOOT INTERVAL. CLEAN CONDUIT INTERIOR AFTER INSTALLATION; COAT SCRATCHES WITH ZINC PAINT. PROVIDE PULL WIRE IN ALL CONDUIT (POWER, FIRE ALARM, TELEPHONE AND OTHER COMMUNICATION CONDUIT). PULL WIRE ALSO REQUIRED IN ALL SPARE CONDUIT.
PROJECT RECORD DOCUMENTS: ACCURATELY RECORD ACTUAL ROUTING OF ALL UNDERSLAB AND UNDERGROUND CONDUITS; INCLUDE DIMENSIONS FROM KEY BUILDING POINTS AND DEPTH OF COVER.

OUTLET BOXES: SHALL BE GALVANIZED STEEL SUITABLE FOR LOCATION. CEILING OUTLET BOXES SHALL BE 4" OCTAGON. WALL OUTLET BOXES SHALL BE PROPER DESIGN TO ACCOMMODATE THE DEVICES REQUIRED - 4 INCH SQUARE WITH RAISED COVER. PROVIDE RACO, STEEL CITY OR APPLETON. ALL J-BOXES / SPLICE BOXES MUST BE ACCESSIBLE.

JUNCTION /PULL BOXES: (A) FOR EACH CONDUIT RUN: PROVIDE ONE JUNCTION/PULL BOX FOR EACH EQUIVALENT THREE QUARTER BENDS (270°). (B) UNDERGROUND FEEDERS: MINIMUM ONE PULL BOX FOR EACH 350 FEET OF CONDUIT RUN.

26 05 19 BUILDING WIRE AND CABLE
WIRE: (TRIANGLE, AMERICAN INSULATED CABLE CO., OR CABLEC)
ALL WIRING SHALL BE IN CONDUIT (EXCEPT PLENUM RATED LOW VOLTAGE CABLES). ALL WIRES MUST BE 75-DEGREE C RATED OR BETTER, 60-DEGREE C RATED WIRE SHALL NOT BE USED. 90-DEGREE C RATED WIRE MAY BE USED BUT ONLY AT 75-DEGREE C AMPACITY. EMERGENCY AND NORMAL CIRCUITS MUST BE INSTALLED IN SEPARATE CONDUIT AND DEVICE BOXES PER N.E.C. ARTICLE 700.9.(B).
A.) MINIMUM SIZE #12 EXCEPT CONTROLS MAY BE #14. USE #10 CONDUCTORS FOR 20 AMPERE, 120 VOLT BRANCH CIRCUITS LONGER THAN 100 FEET. USE #10 CONDUCTORS FOR 20 AMPERE, 277 VOLT BRANCH CIRCUITS LONGER THAN 200 FEET.
B.) TYPE THHN/THWN STRANDED COPPER THERMOPLASTIC IN DRY LOCATIONS.
C.) **TYPE THWN IN WET LOCATIONS (OUTDOOR, UNDERGROUND, ON ROOF, ETC...).**
D.) ALL WIRE SHALL BE 98% CONDUCTIVITY COPPER, 600 VOLT. NO ALUMINUM WIRES.
E.) WIRE #10 AND SMALLER MAY BE SOLID OR STRANDED, #8 OR LARGER SHALL BE STRANDED.
F.) COMMUNICATION WIRE (FIRE ALARM, TELEPHONE, HVAC THERMOSTAT, DATA ETC.): PLENUM RATED LOW-SMOKE CABLE MAY BE USED IN LIEU OF WIRE/CONDUIT TYPE INSTALLATION. ALL PLENUM RATED CABLE SHALL BE PROPERLY SUPPORTED BY BRIDAL RINGS, CABLE TIES, CLIPS ETC MADE BY ERICO (CADDY COMMUNICATION FASTENERS) OR EQUAL. DO NOT USE SCRAP WIRE TO WRAP AND SUPPORT COMMUNICATION WIRES. HOMEMADE SUPPORT DEVICES ARE NOT ACCEPTABLE. DO NOT LAY COMMUNICATION CABLE DIRECTLY ON TOP OF CEILING TILES, INSTALL CABLES A MINIMUM OF 12" ABOVE CEILING TILES AND 12" FROM HVAC DUCTWORK. PROVIDE A MINIMUM OF 6" SEPARATION BETWEEN POWER CONDUIT AND COMMUNICATION WIRINGS.

FIELD INSULATION TESTING: INSULATION RESISTANCE OF ALL CONDUCTORS SHALL BE TESTED. EACH CONDUCTOR SHALL HAVE ITS INSULATION RESISTANCE TESTED AFTER THE INSTALLATION IS COMPLETED AND ALL SPLICES, TAPS AND CONNECTIONS ARE MADE EXCEPT CONNECTION TO OR INTO ITS SOURCE AND POINT (OR POINTS) OF TERMINATION. INSULATION RESISTANCE OF CONDUCTORS WHICH ARE TO OPERATE AT 600 VOLTS OR LESS SHALL BE TESTED BY USING A BIDDLE MEGGER OF NOT LESS THAN 1000 VOLTS DC. INSULATION RESISTANCE OF CONDUCTORS RATED AT 600 VOLTS SHALL BE FREE OF SHORTS AND GROUNDS AND HAVE A MINIMUM RESISTANCE PHASE-TO-PHASE AND PHASE-TO-GROUND OF AT LEAST 10 MEGOHMS. CONDUCTORS THAT DO NOT EXCEED INSULATION RESISTANCE VALUES LISTED ABOVE SHALL BE REMOVED AT CONTRACTOR'S EXPENSE AND REPLACED AND TEST REPEATED. THE CONTRACTOR SHALL FURNISH AL INSTRUMENTS AND PERSONNEL REQUIRED FOR TESTS, SHALL TABULATE READINGS OBSERVED, AND SHALL FORWARD COPIES OF THE TEST READINGS TO THE OWNER. THESE TESTS REPORTS SHALL IDENTIFY EACH CONDUCTOR TESTED, DATE AND TIME OF TEST AND WEATHER CONDITIONS. EACH TEST SHALL BE SIGNED BY THE PARTY MAKING THE TEST.

26 27 26 WIRING DEVICES
WIRING DEVICES: FURNISH AND INSTALL WHERE INDICATED ON DRAWINGS. **MATCH EXISTING OR BASE BUILDING DEVICES IF APPLICABLE. ALL DEVICES SHALL BE LEVITON "DECORA" TYPE (WHITE COLOR, CONFIRM W/ARCHITECT) OR APPROVED EQUAL UNLESS SPECIFIED OTHERWISE BY ARCHITECT. ALL RECEPTACLES SHALL BE FED SPEC TYPE. TOGGLE LIGHT SWITCHES AND COVER PLATES ON EMERGENCY POWER SHALL BE RED COLOR. EMERGENCY POWER OUTLETS AND COVER PLATES TO BE RED. ALL POWER OUTLETS SHALL HAVE CIRCUIT NUMBERS AND PANEL NAME ENGRAVED ON FACEPLATE.**
DIMMER SWITCHES: PROVIDE DEDICATED NEUTRAL FOR DIMMER CONTROLLED LIGHTING CIRCUIT. DO NOT SHARE NEUTRAL WITH 2 OR MORE BRANCH CIRCUITS. DO NOT BREAK FINS (HEAT SINKS) ON DIMMER SWITCH. DERATED DIMMER SWITCHES MAY BE USED ONLY WHERE SPECIFICALLY APPROVED BY ENGINEER.
GROUND FAULT CIRCUIT INTERRUPTER (GFCI) RECEPTACLE SHALL COMPLY WITH 2006 UL 943 SAFETY STANDARD. GFCI RECEPTACLE SHALL HAVE INTEGRAL END-OF-LIFE LED INDICATOR LIGHT, AND CONTINUOUS SENSING AND SELF-TESTING EVERY 60 SECONDS. PROVIDE HUBBELL GFR5352 OR APPROVED EQUAL.
ISOLATED POWER RECEPTACLES (IF USED) TO BE ORANGE COLOR, WITH CIRCUIT NUMBER AND PANEL NAME ENGRAVED ON FACE PLATE.
COVER PLATES: HIGH ABUSE NYLON OR STAINLESS STEEL PER ARCHITECT. PROVIDE CIRCUIT NUMBER LABEL ON ALL DEVICE PLATES.
ALL ELECTRICAL BOXES ON OPPOSITE SIDES OF CORRIDOR WALLS AND FIREWALLS MUST BE SEPARATED BY A HORIZONTAL DISTANCE OF NOT LESS THAN 24 INCHES.

TESTING AND CERTIFICATION: CONTRACTOR SHALL DELIVER A WRITTEN REPORT CERTIFYING THAT EVERY RECEPTACLE HAS BEEN TESTED AS FOLLOWS AND FOUND ACCEPTABLE: (A) THE PHYSICAL INTEGRITY OF EACH RECEPTACLE SHALL BE CONFIRMED BY VISUAL INSPECTION. (B) THE CONTINUITY OF THE GROUNDING CIRCUIT IN EACH ELECTRICAL RECEPTACLE SHALL BE VERIFIED. (C) CORRECT POLARITY OF THE HOT AND NEUTRAL CONNECTIONS IN EACH ELECTRICAL RECEPTACLE SHALL BE CONFIRMED. (D) THE RETENTION FORCE OF THE GROUNDING BLADE OF EACH ELECTRICAL RECEPTACLE (EXCEPT LOCKING-TYPE RECEPTACLES) SHALL BE NOT LESS THAN 115 GRAMS (4 OZ.).

26 05 26 GROUNDING AND BONDING
GROUNDING: ALL CONDUIT WORK AND ELECTRICAL EQUIPMENT SHALL BE EFFECTIVELY AND PERMANENTLY GROUNDED IN ACCORDANCE WITH NEC REQUIREMENTS. PROVIDE GREEN EQUIPMENT GROUNDING CONDUCTOR WITH ALL POWER AND RECEPTACLE AND LIGHTING CIRCUITS. GREEN EQUIPMENT GROUNDING CONDUCTOR SHALL BE ROUTED FROM PANEL GROUND BUS TO FINAL DEVICES.
GROUNDING ELECTRODES: PROVIDE 3/4" X 10-FT LONG, COPPER-CLAD, STEEL GROUNDING ROD. FOR BELOW-GRADE CONNECTIONS PROVIDE EXOTHERMIC WELDED TYPE; FOR ABOVE GRADE CONNECTIONS PROVIDE MECHANICAL BOLTED-TYPE CONNECTIONS UTILIZING HIGH CONDUCTIVE COPPER ALLOY OR BRONZE LUGS OR CLAMPS. SERVICE GROUND RESISTANCE: MUST BE LESS THAN 25 OHMS. PROVIDE ADDITIONAL GROUND RODS AS REQUIRED TO OBTAIN 25 OHMS OR LESS.

26 05 53 ELECTRICAL IDENTIFICATION
IDENTIFICATION: LABEL ALL JUNCTION AND PULL BOXES WITH PANELS AND CIRCUIT NUMBERS. ALL JUNCTION AND PULL BOXES IN CEILING PLENUM SHALL BE PAINTED YELLOW FOR 480 VOLT HIGH VOLTAGE SYSTEM; BLUE FOR LOW VOLTAGE SYSTEM (240 VOLT AND/OR 208 VOLT). FURNISH MARKERS OR PAINT BAND FOR EACH CONDUIT LONGER THAN 6 FEET, SPACING 20 FEET ON CENTER. COLOR OF PAINT BAND (CONFIRM COLOR MATCHES EXISTING COLOR CODE.) : (A) 480 VOLT SYSTEM - BLACK, (B) 208 VOLT SYSTEM - BLACK W/BLUE STRIPES, (C) FIRE ALARM SYSTEM - RED, (D) TELEPHONE SYSTEM - YELLOW, (E) OTHER SYSTEM - BY SPECIFIC LETTER DESCRIPTION. LABEL ALL HOMERUN AND MAJOR CONDUIT WITH HOME PANELS/SWITCHES ETC. AT EVERY 10-FT. INTERVAL IF ACCESSIBLE AND/OR VISIBLE, EXAMPLE: PANEL "X", SW. "X", COND UNIT XXX, XFMR DISC. SW., X-RAY FEEDER XXX, ETC. MARK ALL BRANCH CONDUIT WITH CIRCUIT NUMBERS AT EACH SURFACE MOUNTED PANEL LOCATION. FOR RECESSED PANELS, MARK BRANCH CONDUIT IN CEILING PLENUM JUST ABOVE PANELS.
COLOR CODE: CONDUCTORS SHALL BE COLOR CODED AS FOLLOWS **(FOLLOW LOCAL AHJ OR EXISTING COLOR CODES IF APPLICABLE)**:

	480Y/277V 3PH/4W	208Y/120V 3PH/4W	240/120V 3PH/4W	120/240V 1PH/3W
PHASE A	BROWN	BLACK	BLACK	BLACK
PHASE B	PURPLE	RED	ORANGE (HIGH LEG)	RED
PHASE C	YELLOW	BLUE	BLUE	BLUE
NEUTRAL	GRAY OR WHITE	WHITE	WHITE	WHITE
GROUND	GREEN	GREEN	GREEN	GREEN

ALL PANELS SHALL BE IDENTIFIED USING NAMEPLATES WITH 4 ROWS OF TEXT (LETTER HEIGHT SHALL BE 1/4" MINIMUM), EXAMPLE:
PANEL "XX", SECTION # 1 OF 2-SECT PNL
225 AMPS BUS, 150A MCB, 208Y/120V
FED FROM DIST PANEL "XXX", 1ST FLOOR
FEEDER SIZE 4 # 1/0 THWN, 1 # 6 G, 2 1/2"C.
PANEL NAMEPLATES SHALL BE ENGRAVED THREE-LAYER LAMINATED PLASTIC, WHITE LETTERS ON BLACK BACKGROUND FOR NORMAL POWER, RED LETTER/BLACK BACKGROUND FOR EMERGENCY POWER. SECURE NAMEPLATES TO EQUIPMENT USING SCREWS OR RIVETS. IN ADDITION TO THE 4 ROWS OF TEXT, ALL EMERGENCY POWER PANELS SHALL BE IDENTIFIED AS TO THE BRANCHES THEY SERVE. PROVIDE LABELS "EMERGENCY LIFE SAFETY BRANCH", "EMERGENCY CRITICAL BRANCH" AND "EMERGENCY EQUIPMENT BRANCH" FOR ALL EMERGENCY PANELS. USE RED LETTER ON BLACK BACKGROUND FOR ALL EMERGENCY PANELS. LETTER HEIGHT SHALL BE 1/4" MINIMUM. ALL SWITCHES, STARTERS, COMBINATION STARTERS / DISCONNECTS, TRANSFORMERS, WIREWAYS, COMMUNICATION CABINETS, JUNCTION AND PULL BOXES ETC SHALL BE SIMILARLY IDENTIFIED. PROVIDE LABEL FOR EACH BRANCH CIRCUIT ON DISTRIBUTION PANELS, SWITCHBOARDS AND MCC'S.
ACCU-1
208V, 3 PHASE, 3 WIRE
FEEDER SIZE 3 # 4/0 THWN, 1 # 4 G, 2 1/2"C.
FED FROM DIST PANEL "XXX", 1ST FLOOR

ALL EMERGENCY PANELS, JUNCTION BOXES WITH EMERGENCY CIRCUITS, ETC. SHALL BE PAINTED RED.

33 71 73 ELECTRICAL SERVICE
CONTRACTOR SHALL MAKE ARRANGEMENTS FOR TEMPORARY AND PERMANENT SERVICE. COMPLY WITH ALL SERVICE INSTALLATION STANDARDS OF THE SERVING UTILITY. ELECTRICAL SERVICE CHARACTERISTICS SHALL BE AS SHOWN ON THE ELECTRICAL ONE LINE DIAGRAM. CONTRACTOR SHALL COORDINATE LOCATION OF SERVICE ENTRANCE WITH THE POWER COMPANY. PROVIDE MATERIALS AND EQUIPMENT REQUIRED TO CONNECT THE PROJECT SERVICE TO THE UTILITY SYSTEM. CONTRACTOR SHALL SUBMIT TO THE POWER COMPANY AN APPLICATION FOR SERVICE. **CONTRACTOR SHALL SUBMIT SERVICE APPLICATION TO THE POWER COMPANY WITHIN 30 DAYS AFTER AWARD OF PROJECT CONTRACT**. CONTRACTOR SHALL SECURE A SERVICE OUTLET AND DATA STATEMENT ("STATEMENT") FROM THE POWER COMPANY. VERIFY THAT THE INFORMATION ON THE STATEMENT IS CORRECT, INCLUDING VOLTAGE, PHASE AND NUMBER OF WIRES, TYPES OF SERVICE, SERVICE FACILITY ARRANGEMENTS, AND LOCATION OF SERVICE OUTLET. **PROVIDE A COPY OF THE STATEMENT FOR ENGINEER'S REVIEW**. FAILURE TO SUBMIT SERVICE APPLICATION IN A TIMELY MANNER MAY CAUSE PROJECT DELAY AND ADDITIONAL COST. ALL SUCH COST DUE TO CONTRACTOR'S FAILURE TO APPLY AND COORDINATE FOR SERVICE IN A TIMELY MANNER SHALL BE BORNE BY THE CONTRACTOR. CONTRACTOR SHALL COORDINATE AND ASSIST OWNER IF APPLICATION IS REQUIRED TO BE SUBMITTED BY OWNER. **OUTAGES: SCHEDULE POWER OUTAGES TO AVOID INTERFERENCE WITH THE OWNER'S ACTIVITIES. OBTAIN APPROVAL FROM OWNER AT LEAST 30 DAYS PRIOR TO THE REQUESTED OUTAGES. IF REQUIRED BY THE OWNER, PROVIDE A SCHEDULE SHOWING SEQUENCE AND DURATION OF ALL ACTIVITIES DURING THE REQUESTED OUTAGES**.

26 24 13 DISTRIBUTION SWITCHBOARDS
ALL EQUIPMENT SHALL HAVE **COPPER BUSES OR WINDINGS**.
PROVIDE SWITCHBOARD WHICH PERMITS ACCESS TO BUSES AND DEVICES FOR INSTALLATION AND FUTURE MAINTENANCE FROM THE FRONT, BACK AND SIDES.
BUSES: SHALL BE 98% IACS CONDUCTIVITY, TIN- OR SILVER-PLATED COPPER WITH ROUNDED EDGES. DETERMINE CURRENT RATING FOR SECTION BUS AND BRANCH BUS ON THE BASIS OF SERVICE TO ALL DEVICES INCLUDING SPARES AND SPACES FOR FUTURE ADDITION. SIZE SECTION BUS A MINIMUM OF 60 PERCENT OF THE MAIN BUS RATING. IN EACH SWITCHBOARD SECTION INCLUDE AN UNINSULATED NEUTRAL BUS ON INSULATED BUS SUPPORTS SECURED TO THE SECTION FRAME AND BOLT TO NEUTRAL BUS BARS IN ADJACENT SECTIONS, THUS PROVIDING A CONTINUOUS NEUTRAL BUS. IN EACH SWITCHBOARD SECTION INCLUDE AN UNINSULATED COPPER GROUND BUS BAR FOR THE EQUIPMENT. SECURE THE BAR TO THE UNIT FRAME AND BOLT TO THE GROUND BUS BARS IN ADJACENT SECTIONS, THUS PROVIDING A CONTINUOUS EQUIPMENT GROUND BUS. INCLUDE TERMINATIONS AT THE BUS BAR FOR FEEDER AND BRANCH CIRCUIT GROUNDING CONDUCTORS. THE TERMINATIONS MUST BE EXOTHERMICALLY WELDED ON OR BE OF AN APPROVED PRESSURE CONNECTOR TYPE. MAKE AREA OF GROUND BUS NOT LESS THAN ¼ X 2 SQUARE INCHES. EXTEND ALL BUSES THE ENTIRE LENGTH OF THE SWITCHBOARD. BUSES MUST HAVE THE REQUIRED CAPACITY FOR THEIR TOTAL LENGTH. MAKE PROVISIONS FOR EXTENSIONS FROM EITHER END OF BUSES.
MAIN AND BRANCH CIRCUIT PROTECTIVE DEVICES: SEE DRAWINGS FOR SIZE. ALL DEVICES SHALL BE 100% RATED.
METERING: EQUIP THE SWITCHBOARD WITH AMMETERS, VOLTMETERS AND DEMAND METERS.

GROUND-FAULT PROTECTION: PROVIDE GROUND FAULT PROTECTION ON CIRCUIT PROTECTIVE DEVICES WHERE INDICATED ON THE DRAWINGS. THE UNIT SHALL INCLUDE COORDINATED CURRENT SENSORS, SOLID STATE RELAY AND MONITOR PANEL OF THE SAME MANUFACTURER. CURRENT SENSORS -PROVIDE GROUND-FAULT PROTECTION AS AN INTEGRAL PART OF THE CIRCUIT PROTECTIVE DEVICE. A RESIDUAL SCHEME SHALL BE USED WHICH INCORPORATES AN ADDITIONAL CURRENT TRANSFORMER WHICH WILL MONITOR THE NEUTRAL.

SUBMITTALS: SUBMIT DIMENSIONED DRAWINGS OF THE SWITCHBOARD, INCLUDING TOP AND BOTTOM VIEWS SHOWING ENTRY AND EXIT SPACE FOR CONDUITS AND BUSWAYS, FRONT AND SIDE ELEVATIONS SHOWING ARRANGEMENT OF ALL DEVICES AND ALSO INCLUDE DIMENSIONAL DATA ON ALL BUSES INCLUDING MATERIAL TYPE AND CAPACITY OF THE BUSES. SUBMIT ONE LINE DIAGRAMS FOR EQUIPMENT BEING PROVIDED. ALSO SUBMIT INFORMATION ON ALL PROTECTIVE DEVICES INCLUDING TYPE RATINGS AND SETTINGS OF ALL TRIPS PROVIDED TO INCLUDE GROUND FAULT RELAY SETTINGS. PROVIDE COORDINATION STUDY OF ALL PROTECTIVE DEVICES. PROVIDE COORDINATION CURVES ON LOG-LOG PAPER FOR THE MAIN PROTECTIVE DEVICE AND FOR THE LARGEST BRANCH CIRCUIT DEVICES. THESE CURVES SHALL ALSO SHOW THE GROUND FAULT PROTECTIVE RELAY.

TESTING: AFTER INSTALLATION AND BEFORE ACCEPTANCE BY THE OWNER, THE CONTRACTOR SHALL PROVIDE THE SERVICES OF AN INDEPENDENT TESTING ORGANIZATION SUCH AS GENERAL ELECTRIC INSTALLATION AND SERVICE ENGINEERING, TESTCO OR WESTINGHOUSE ENGINEERING SERVICES TO PERFORMANCE TEST ALL GROUND FAULT RELAYS IN ACCORDANCE WITH NEC PARAGRAPH 230.95. THIS TEST SHALL INVOLVE PASSING A PRIMARY CURRENT THROUGH THE CURRENT SENSOR WITH A SUITABLE, LOW-VOLTAGE TEST SET AND TIMER, WHICH SHALL ALLOW VERIFICATION THAT THE GROUND FAULT RELAYS TRACK THEIR PUBLISHED CURVES AND THAT THEY ACTUALLY TRIP THE DEVICES ON WHICH THEY ARE APPLIED. THIS TEST SHALL ALSO INCLUDE THE POLARITY OF THE CURRENT SENSORS AND GIVE AN INDICATION OF SATISFACTORY OPERATION OF VOLTMETERS, AMMETERS AND THEIR SELECTOR SWITCHES. THE CONTRACTOR SHALL NOTIFY THE ARCHITECT/ENGINEER OF THIS TEST DATE 2 DAYS IN ADVANCE SO THAT TESTS CAN BE PROPERLY WITNESSED.

ACCEPTABLE MANUFACTURERS ARE GE, SQUARE D, EATON/CUTLER-HAMMER, AND SIEMENS. **MATCH EXISTING WHERE REQUIRED BY OWNER.**

26 24 16 PANELBOARDS
ALL PANELBOARDS SHALL HAVE **COPPER BUSES**. LOAD CENTER TYPE PANELBOARDS ARE NOT ACCEPTABLE AND SHALL NOT BE USED. PROVIDE BREAKERS WHICH ARE QUICK-MAKE AND QUICK-BREAK ON BOTH MANUAL AND AUTOMATIC OPERATION. USE A TRIP-FREE BREAKER WHICH IS TRIP INDICATING. INCORPORATE INVERSE TIME CHARACTERISTICS BY BIMETALLIC OVERLOAD ELEMENTS AND INSTANTANEOUS CHARACTERISTICS BY MAGNETIC TRIP. FOR 2-POLE AND 3-POLE BREAKERS, USE THE COMMON-TRIP TYPE SO THAT AN OVERLOAD OR FAULT ON ONE POLE WILL TRIP ALL POLES SIMULTANEOUSLY. HANDLE TIES ARE NOT ACCEPTABLE. ALL BREAKERS SHALL BE BOLT-ON THERMAL MAGNETIC TYPE. STAB-ON BREAKERS ARE NOT ACCEPTABLE. DO NOT USE TANDEM CIRCUIT BREAKERS. ALL CIRCUIT BREAKERS RATED 100 AMP OR LESS SHALL BE SUITABLE FOR TERMINATING 75-DEGREE C WIRE (BREAKERS RATED FOR ONLY 60-DEGREE C WIRE IS NOT ACCEPTABLE. SEE SECTION 16123 – BUILDING WIRE AND CABLE).
ALL EQUIPMENT SHALL BE LABELED, PANELBOARDS SHALL BE LABELED BOTH ON THE COVERPLATES AND THE INTERIORS. **ALL EMERGENCY PANELS SHALL BE PAINTED RED WITH RED-LETTER NAME TAGS.**
PANELBOARD DIRECTORIES: PROVIDE A STEEL DIRECTORY FRAME MOUNTED INSIDE THE DOOR WITH A HEAT-RESISTANT TRANSPARENT FACE AND A DIRECTORY CARD FOR IDENTIFYING THE LOADS SERVED. IDENTIFY EACH CIRCUIT WITH LOAD AND **LOCATIONS** (ROOM NAMES AND ROOM NUMBERS) AND INDICATE WITH TYPED DIRECTORIES. (EXAMPLE: 5 DUPLEX RECEPTACLES, OFFICE, RM XXX).
INSTALL THE PANELBOARDS SUCH THAT THE CENTER OF THE SWITCH OR CIRCUIT BREAKER IN THE HIGHEST POSITION WILL NOT BE MORE THAN 6 ½ FEET ABOVE THE FLOOR OR WORKING PLATFORM.
FOR EACH PANEL: FURNISH & INSTALL ONE SPARE 3/4" CONDUIT FOR EVERY 6 SPARES AND/OR SPACES IN THE PANEL. EACH SPARE CONDUIT SHALL BE INSTALLED WITH PULL STRING STUBBED TO A J-BOX LOCATED IN ACCESSIBLE CEILING/PLENUM SPACE. INSTALL A MINIMUM OF ONE SPARE 3/4" CONDUIT FOR EVERY PANEL SHOWN ON PLANS, EVEN IF THERE ARE NO SPARES/SPACES IN SOME PANELS.
ACCEPTABLE MANUFACTURERS ARE GE, SQUARE D, EATON/CUTLER-HAMMER, AND SIEMENS. **MATCH EXISTING WHERE REQUIRED BY OWNER.**

26 28 19 ENCLOSED SAFETY SWITCHES
ALL SAFETY SWITCHES SHALL BE HEAVY-DUTY TYPE WITH QUICK-MAKE, QUICK-BREAK CONTACTS AND SUITABLE FOR TERMINATING 75-DEGREE C WIRE.
PROVIDE EACH SWITCH WITH A GROUND LUG. PROVIDE A DEFEATABLE, FRONT ACCESSIBLE, COIN-PROOF DOOR INTERLOCK TO PREVENT OPENING THE DOOR WHEN THE SWITCH IS IN THE ON POSITION AND TO PREVENT TURNING THE SWITCH ON WHEN THE DOOR IS OPEN. PROVIDE INCOMING LINE TERMINALS WITH AN INSULATED SHIELD SO THAT NO LIVE PARTS ARE EXPOSED WHEN THE DOOR IS OPEN. PROVIDE EACH SWITCH WITH AN ISOLATED, FULLY RATED NEUTRAL BLOCK WITH PROVISIONS FOR BONDING THE BLOCK TO THE ENCLOSURE. WHERE FUSIBLE SWITCHES ARE SHOWN, PROVIDE SWITCHES WITH REJECTION-TYPE FUSE HOLDERS WHICH ARE SUITABLE FOR USE WITH FUSES. IN GENERAL, MOUNT SWITCHES SO THAT OPERATING HANDLE IS APPROXIMATELY 44 INCHES ABOVE FINISHED FLOOR; WHERE GROUPED, ALIGN TOPS OF SWITCHES.
ACCEPTABLE MANUFACTURERS ARE GE, SQUARE D, EATON/CUTLER-HAMMER, AND SIEMENS. **MATCH EXISTING WHERE REQUIRED BY OWNER.**

26 22 00 DRY TYPE TRANSFORMERS
PROVIDE DRY TYPE QUIET TRANSFORMERS (PER ANSI -C89 AND UL 506), SELF-COOLED NEMA CLASS AA. COPPER WIRE WINDINGS. ALUMINUM-WINDING TRANSFORMER IS ACCEPTABLE, PROVIDED THAT SUBSTITUTE ALUMINUM TRANSFORMER IS IN COMPLIANCE WITH NEC CLEARANCE REQUIREMENTS. TRANSFORMERS MUST MEET OR EXCEED NEMA TP-1 ENERGY EFFICIENCY STANDARDS.

FURNISH FULL-LOAD TAPS IN THE PRIMARY WINDINGS AS FOLLOWS:

KVA RATING	TAPS
3-15 KVA, SINGLE PHASE	(2) 5%TAPS BELOW RATED VOLTAGE
9-15 KVA, THREE PHASE	(2) 5% TAPS BELOW RATED VOLTAGE
25-100 KVA, SINGLE PHASE	(6) 2.5% TAPS, (4) BELOW & (2) ABOVE RATED VOLTAGE
30-300 KVA, THREE PHASE	(6) 2.5% TAPS, (4) BELOW & (2) ABOVE RATED VOLTAGE
167-250 KVA, SINGLE PHASE	(4) 2.5% TAPS, (2) BELOW & (2) ABOVE RATED VOLTAGE
500 KVA, THREE PHASE	(4) 2.5% TAPS, (2) BELOW & (2) ABOVE RATED VOLTAGE

SELECT THE APPROPRIATE TAP SETTING ON TRANSFORMER SO THAT THE ACTUAL SECONDARY VOLTAGE IS ±1/2 OF A TAP SPAN AT FULL LOAD. RECORD THE TRANSFORMER SERIAL NUMBER, KVA RATING, SELECTED TAP SETTING AND SECONDARY VOLTAGE READINGS. SUBMIT COPIES OF THE RECORD TO THE ARCHITECT/ENGINEER.

AVERAGE SOUND LEVELS MUST NOT EXCEED THE FOLLOWING VALUES:

KVA	DB
0-9	40
10-50	45
51-150	50
151-300	55
301-500	60

PROVIDE A 220C INSULATION SYSTEM FOR A MAXIMUM 115-DEGREE C TEMPERATURE RISE OVER A 40-DEGREE C AMBIENT. SPECIAL TRANSFORMERS: 150-DEGREE C RISE FOR SHIELDED ISOLATION TYPE; 115-DEGREE C RISE FOR K-RATED TRANSFORMERS.
MAKE TRANSFORMER CABLE CONNECTIONS WITH COMPRESSION-TYPE LUGS SUITABLE FOR TERMINATIONS OF 75C RATED CONDUCTORS. CONSTRUCT CONCRETE PAD FOR FLOOR-MOUNTED TRANSFORMERS. MAINTAIN A MINIMUM OF 6 INCHES FREE AIR SPACE BETWEEN ENCLOSURE AND WALL. MOUNT TRANSFORMERS ON VIBRATION ISOLATING PADS SUITABLE FOR ISOLATING THE TRANSFORMER NOISE FROM THE BLDG STRUCTURE.
PROVIDE DOUBLE OR ADDITIONAL LUGS AS REQUIRED WHERE TWO OR MORE SECONDARY FEEDERS ARE CONNECTED TO TRANSFORMERS. PROVIDE VIBRATION ISOLATORS FOR ALL TRANSFORMERS.
ACCEPTABLE MANUFACTURERS ARE GE, SQUARE D, EATON/CUTLER-HAMMER, AND SIEMENS. MATCH EXISTING WHERE REQUIRED BY OWNER.

- ALL CIRCUIT NUMBERS SHOWN ARE FOR REFERENCE ONLY. FIELD VERIFY ACTUAL CIRCUIT NUMBERS REQ'D AND ADJUST ACCORDINGLY. PROVIDE TYPE-WRITTEN DIRECTOR(IES) REFLECTING ACTUAL CIRCUIT NUMBERS USED, WITH FIELD REVISED/ RELOCATED CIRCUITS CLEARLY INDICATED. DIRECTOR(IES) SHALL INCLUDE DATE AND PROJECT DESCRIPTION, EXAMPLE : 2006 NEW BLDG.
- EACH CIRCUIT IS SHOWN WITH AN INDIVIDUAL HOMERUN. E.C. MAY ELECT TO COMBINE TWO OR MORE CIRCUITS IN ONE COMMON CONDUIT AND WITH COMMON NEUTRAL WHERE ALLOWED (CIRCUITS WITH HIGH CONTENT OF HARMONIC CURRENTS MAY NOT USE COMMON NEUTRAL, EXAMPLE: CIRCUITS WITH NON-LINEAR ELECTRONIC POWER SUPPLIES SUCH AS COMPUTERS, COPIERS, PRINTERS, ETC). NOTE: AMPACITIES OF CONDUCTORS SHALL BE REDUCED IF MORE THAN THREE CURRENT CARRYING CONDUCTORS ARE INSTALLED IN A RACEWAY. SEE N.E.C. ARTICLE 310.15(B)(2)(A) "ADJUSTMENT FACTORS". **CONDUCTORS SHALL BE DERATED IF 4 OR MORE WIRES ARE INSTALLED IN ONE CONDUIT (SEE RELATED NOTE "G3" ON TEMPERATURE LIMITATION OF CONDUCTOR AMPACITY)**, TYPICAL EXAMPLES FOR 20-AMP CIRCUITS ARE SHOWN BELOW:

CURRENT CARRYING CONDUCTORS	IN TABLES AS ADJUSTED FOR TEMP IF NECESSARY	OR MORE WIRE IN ONE CONDUIT 60°C WIRE (E.G.: TW)	OR MORE WIRE IN ONE CONDUIT 75°C WIRE (E.G.: THWN)	OR MORE WIRE IN ONE CONDUIT 90°C WIRE (E.G.: THHN)
4 THRU 6	80%	#12	#12	#12
7 THRU 9	70%	#10	#10	#12
10 THRU 20	50%	#8	#8	#10
21 THRU 30	45%	#6	#8	#8
31 THRU 40	40%	#6	#8	#8
41 AND ABOVE	35%	#4	#6	#6

- TEMPERATURE LIMITATIONS ON AMPACITY OF CONDUCTOR: THE AMPACITY OF A CONDUCTOR SHALL BE SELECTED BASED ON THE NATIONAL ELECTRICAL CODE ARTICLES 310.15 AND 110.14.(C)(1),(2). THE TEMPERATURE LIMITATIONS NOTED IN 110.14.(C)(1),(2) MAY BE PARAPHRASED AS FOLLOWS : (A) CIRCUITS RATED 100 AMP OR LESS: USE 60-DEGREE C RATED CONDUCTORS ONLY. 75-DEGREE C AND 90-DEGREE C CONDUCTOR MAY BE USED BUT ONLY AT 60-DEGREE C AMPACITY. EXCEPTIONS: HIGHER TEMPERATURE CABLE ARE ALLOWED PROVIDED THE EQUIPMENT IS LISTED AND IDENTIFIED FOR USE WITH THE HIGHER RATED CONDUCTORS. (B) CIRCUITS RATED MORE THAN 100 AMP OR CONDUCTOR LARGER THAN #1 AWG: USE 75-DEGREE C RATED CONDUCTORS ONLY. 90-DEGREE C CONDUCTOR MAY BE USED BUT ONLY AT 75-DEGREE C AMPACITY. EXCEPTIONS: HIGHER TEMPERATURE CABLE ARE ALLOWED PROVIDED THE EQUIPMENT IS LISTED AND IDENTIFIED FOR USE WITH THE HIGHER RATED CONDUCTORS.
- WIRES OVERSIZED TO ALLEVIATE VOLTAGE DROP: WHERE OVERSIZED WIRES ARE USED TO ALLEVIATE VOLTAGE DROP, CONTRACTOR TO PROVIDE REDUCER LUGS AND/OR J-BOXES AS REQUIRED TO TERMINATE WIRES IN EQUIPMENT.
- ALL CONDUIT AND WIRE MUST BE CONCEALED FROM VIEW. EXPOSED CONDUIT AND WIRE ARE NOT ACCEPTABLE, EXCEPTIONS ARE CENTRAL PLANT, MECHANICAL/ELECTRICAL ROOMS.
- EXISTING CONSTRUCTION: ALL NEW WIRINGS INSTALLED IN EXISTING WALL/CEILING/MILLWORK SHALL BE CONCEALED, INCLUDING CONCRETE BLOCK WALL. PATCH ANY CUT AREAS TO MATCH EXISTING CONDITION.
- ALL ELECTRICAL AND COMMUNICATION DEVICES (LIGHT SWITCHES, RECEPTACLES, TELEPHONE, DATA ETC.) SHALL BE RECESSED MOUNTED UNLESS NOTED OTHERWISE. FIELD VERIFY RECEPTACLE MOUNTING REQUIREMENTS WITH OWNER/ ARCH., MOUNT ALL DUPLEX RECEPTACLES WITH THE "U" GROUND TERMINAL ON TOP, UNLESS NOTED OTHERWISE OR AS REQUIRED BY OWNER/ARCH. NEUTRAL TERMINAL SHALL BE ON TOP FOR HORIZONTALLY MOUNTED RECEPTACLES.
- ALL OUTLETS ON DEDICATED CIRCUITS (MARKED "DED" OR "D" ON PLANS) SHALL BE PROPERLY IDENTIFIED BY USING DISTINCTIVE COLOR DEVICES (USE BROWN OR GRAY DEVICES. CONFIRM COLOR REQUIREMENTS WITH ARCHITECT/OWNER.). COVER PLATES SHALL BE MARKED WITH CIRCUIT NUMBER(S) AND LOADS SERVED. EXAMPLE : CKT # LA-1 COPY MACHINE.
- EQUIPMENT LAYOUT IS BASED ON SQUARE D AND/OR SIEMENS. EQUIPMENT BY OTHER MANUFACTURERS SUCH AS GE MAY HAVE LARGER DIMENSIONS. IT IS THE RESPONSIBILITY OF THE ELECTRICAL CONTRACTOR TO PROVIDE EQUIPMENT WITH SIMILAR DIMENSIONS THAT WOULD FIT IN THE SPACE NOTED.
- VERIFY LOCATION OF ALL OUTLETS (POWER & COMMUNICATION) WITH OWNER/ARCH PRIOR TO ROUGH-IN. OWNER RESERVES THE RIGHT TO MOVE ANY OUTLETS 5 FEET IN ANY DIRECTION PRIOR TO ROUGH-IN. ALL RECEPTACLES WITHIN 6 FEET OF ANY WET AREA (EXAMPLE : SINK, DISHWASHER, ETC..) SHALL HAVE GROUND FAULT PROTECTION, WHETHER SPECIFICALLY INDICATED OR NOT ON DRAWINGS.
- MOUNTING HEIGHTS OF ALL OUTLETS (RECEPTACLES, SWITCHES, TELEPHONE, DATA, ETC.) IN AREAS WITH COUNTERTOP **SHALL BE VERIFIED WITH ARCH/OWNER**. GENERALLY ALL OUTLETS ARE TO BE MOUNTED ABOVE COUNTERTOP EXCEPT OUTLETS FOR DISPOSERS, UNDERCOUNTER DISHWASHER, UNDERCOUNTER REFRIGERATORS ETC. REFER TO ARCH INTERIOR ELEVATIONS.
- ALL WEATHERPROOF/WET LOCATION AND/OR OUTDOOR RECEPTACLES SHALL HAVE "WEATHERPROOF-IN-USE" COVERS (NEC ARTICLE 406.8(B)). PROVIDE RACO BELL RAYNTITE II COVERS OR EQUAL.
- SWITCHES/STARTERS FOR MECH AND OTHER EQUIPMENT : LOCATION OF DISCONNECT SWITCHES, STARTERS, CONTROL STATIONS ETC ARE SHOWN DIAGRAMMATICALLY ON THE DRAWINGS. E.C. SHALL INSTALL SUCH DEVICES IN COMPLIANCE WITH CODE REQUIRED CLEARANCE REQUIREMENTS. ALL SUCH DEVICES SHALL BE ACCESSIBLE AFTER EQUIPMENT ARE IN PLACE AND SATISFY CODE CLEARANCE REQUIREMENTS. **REMOVE AND RE-INSTALL DEVICES THAT ARE INACCESSIBLE OR WITH INADEQUATE CODE CLEARANCE.** COORDINATE INSTALLATION W/HVAC.
- HVAC EQUIPMENT : OVERCURRENT DEVICES, DISCONNECT SWITCHES, CONDUIT/WIRE ARE SELECTED BASED ON EQUIPMENT SHOWN ON MECHANICAL DRAWINGS. FIELD VERIFY RATINGS OF EQPT SUPPLIED BY HVAC, REVISE ELECTRICAL AS REQUIRED TO MATCH ACTUAL EQPT SUPPLIED BY MECH CONTRACTOR.
- OUTDOOR PAD-MOUNTED A/C EQUIPMENT : CONNECT A/C EQUIPMENT TO OUTDOOR NEMA 3R DISCONNECT SWITCHES WITH UNDERGROUND RIGID CONDUIT FEEDER, STUB UP CONDUIT NEAR EQUIPMENT CONNECTION POINT. PROVIDE SEALTITE FROM CONDUIT STUBUP TO EQUIPMENT, MAXIMUM LENGTH OF SEALTITE 5 FEET. SEALTITE LONGER THAN 5 FEET IS NOT ALLOWED.
- ESTIMATED LOADS : INFORMATION AND DATA ON SPECIALTY EQUIPMENT MAY NOT BE AVAILABLE DURING THE DESIGN PROCESS. SOME LOADS ARE NECESSARILY ESTIMATED. SUCH ESTIMATED LOADS ARE INDICATED AS (EST.) ON PLANS, RISER DIAGRAMS AND/OR PANEL SCHEDULES. CONTRACTOR SHALL BID THE PROJECT USING THE ESTIMATED FEEDER/BREAKER/SWITCHES SHOWN ON DRAWINGS. HOWEVER, THE CONTRACTOR IS RESPONSIBLE FOR CONFIRMATION AND VERIFICATION OF ALL SUCH ESTIMATED LOADS WITH THE APPROPRIATE VENDORS/SUPPLIERS. ALL SHOP DRAWINGS SUBMITTED BY THE CONTRACTOR SHALL INCLUDE CERTIFICATION THAT THE CONTRACTOR HAS CONFIRMED/VERIFIED ANY ESTIMATED LOADS SHOWN ON THE DRAWINGS. CONTRACTOR WILL NOT BE DUE ANY ADDITIONAL COMPENSATION FOR HIS FAILURE TO VERIFY THE ESTIMATED LOADS SHOWN ON DRAWINGS. PROVIDE CREDIT TO THE OWNER IF ACTUAL LOADS ARE SMALLER THAN ESTIMATED LOADS, CREDIT SHALL BE GIVEN FOR SIZE REDUCTION ON FEEDER/ BREAKER/ SWITCHES.
- EXAMPLE OF EQUIPMENT LOADS THAT ARE TYPICALLY ESTIMATED : SPECIAL COPY MACHINE, WELDING EQPT OUTLET, ELEVATOR MACHINERY, ...
- EXHAUST FANS : WHERE EXHAUST FANS ARE INDICATED AS INTERLOCKED WITH HVAC EQUIPMENT, E.C. SHALL PROVIDE ALL REQUIRED RELAYS, CONDUIT/CONTROL WIRES ETC AS REQUIRED FOR A COMPLETE AND OPERATING SYSTEM. COORDINATE INTERLOCK REQUIREMENTS WITH HVAC CONTRACTOR.
- PROVIDE HOUSE KEEPING CONCRETE PAD (MINIMUM 4" HIGH) FOR ALL FLOOR MOUNTED ELECTRICAL EQUIPMENT INCLUDING TRANSFORMERS, SWITCHBOARDS, M.C.C., TRANSFER SWITCHES ETC. PROVIDE ALL REQUIRED AND NECESSARY GALVANIZED UNISTRUT SUPPORT FOR ALL INDOOR/OUTDOOR ELECTRICAL EQUIPMENT.
- FIRE WALL : DO NOT INSTALL RECEPTACLES, TELEPHONE, DATA OUTLETS ETC. BACK-TO-BACK IN FIRE/SMOKE PARTITIONS OR WITHIN THE SAME SPACE ENCLOSED BY TWO ADJACENT STUDS. ALSO APPLY TO ALL CORRIDOR WALLS.

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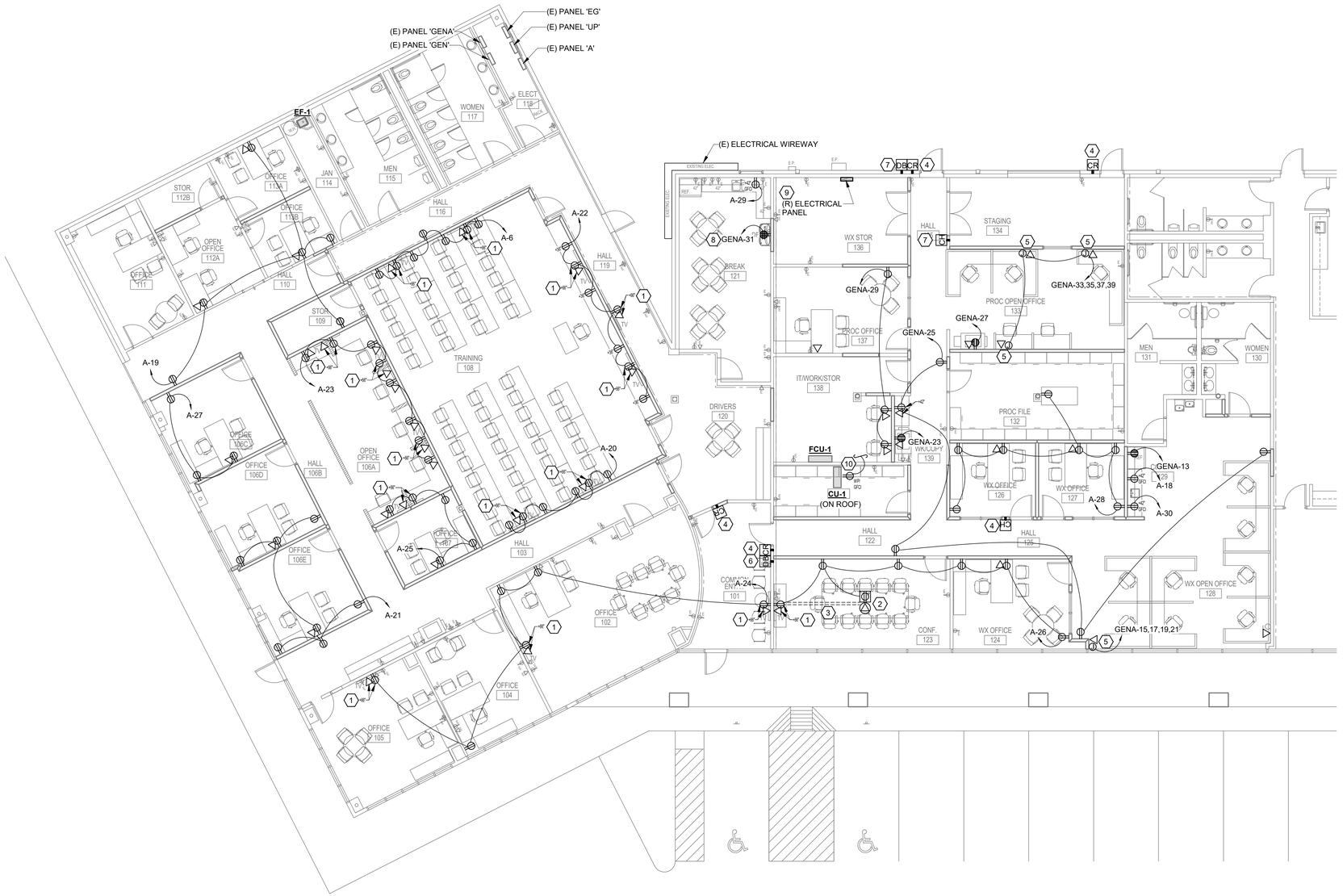
SHEET TITLE:
ELECTRICAL
SPECIFICATIONS

SHEET:
E2



1 ELECTRICAL POWER PLAN

1/8" = 1'-0"

GENERAL NOTES

A. REMOVE ALL UNUSED CABLING, WIRE AND CONDUIT IN THIS SPACE. TERMINATE CONDUITS OUTSIDE ELECTRICAL ROOM WITH A JUNCTION BOX. TURN BREAKER OFF AND UPDATE PANEL DIRECTORY TO INDICATE SPARE BREAKER AND DATE OF CHANGE.
B. COORDINATE LOCATIONS OF ALL DEVICES AND JUNCTION BOXES WITH THE EQUIPMENT INSTALLER.
C. CONTRACTOR SHALL NOT INSTALL MORE THAN THREE CIRCUITS (3 PHASE WIRES, 1 NEUTRAL + 1 GROUND) IN A COMMON CONDUIT, EXCEPT WHERE SPECIFICALLY NOTED AND ALLOWED. WHERE MORE THAN THREE CURRENT CARRYING CONDUCTORS (EXAMPLES: 3 PHASE WIRES + 1 CURRENT CARRYING NEUTRAL CONDUCTOR) ARE INSTALLED IN A COMMON CONDUIT, THE AMPACITY OF ALL CURRENT-CARRYING CONDUCTORS SHALL BE DERATED PER 2017 NEC ARTICLE 310.15 (B)(3)(A). EXAMPLE: (6)-20AMP CKTS WITH 8 CURRENT CARRYING WIRES IN A COMMON CONDUIT MUST USE MINIMUM #10 WIRE 70% X 35A = 24.5 AMPS. PROVIDE COMMON TRIP BREAKERS FOR MULTIWIRE CIRCUITS PER 2017 NEC ARTICLE 210.4 (B).
D. REFER TO ARCHITECTURAL DRAWINGS FOR PORT QUANTITY AT EACH DATA DROP LOCATION.

KEYED NOTES

1 PROVIDE RECESSED TV BOX WITH RECEPTACLE, PHONE/DATA OUTLET, AND CABLE TV OUTLET FOR NEW FLAT SCREEN TELEVISION. LEGRAND #TV1WTVSSW OR EQUIVALENT. VERIFY EXACT MOUNTING HEIGHT AND LOCATION WITH TENANT/ARCHITECT PRIOR TO ROUGH-IN AND INSTALLATION.

2 NEW CONCRETE FLOOR BOX SHALL BE WIREMOLD #RFB6E-OG. VERIFY EXACT FINISHES WITH ARCHITECT BEFORE INSTALLATION. PROVIDE 1"C FOR DATA, 1"C FOR A/V, AND 3/4"C FOR POWER UNDER SLAB TO NEAREST WALL, STUBBED TO ACCESSIBLE CEILING. COORDINATE EXACT LOCATION WITH TENANT/ARCHITECT PRIOR TO ROUGH-IN AND INSTALLATION.

3 PROVIDE EMPTY CONDUIT(S) WITH PULL STRING: ONE (1) 1-1/4" C. ROUTED FROM FLOOR POKE THRU TO WALL TELEVISION. REFER TO A/V CONSULTANT EQUIPMENT DRAWINGS FOR EXACT ROUTING AND POINTS OF TERMINATION. COORDINATE AND FIELD VERIFY EXACT MOUNTING LOCATION AND ROUTING WITH A/V CONSULTANT/TENANT/ARCHITECT PRIOR TO ROUGH-IN AND INSTALLATION.

4 PROVIDE CARD READER (CR), DOOR LOCK (DL) AND PROXIMITY SENSOR (PS) FOR SECURITY ACCESS TO DOOR. COORDINATE WITH TENANT'S SECURITY VENDOR. MAKE CONNECTIONS TO BUILDING SYSTEMS AS REQUIRED. PROVIDE J-BOXES AND CONDUIT W/PULL STRING STUBBED TO ACCESSIBLE CEILING. PROVIDE ALL NECESSARY ACCESSORIES AS REQUIRED FOR A COMPLETE & OPERATING SYSTEM. COORDINATE AND FIELD VERIFY EXACT LOCATION AND MOUNTING HEIGHT WITH ARCHITECT/TENANT PRIOR TO ROUGH-IN AND INSTALLATION.

5 PRE-WIRED FURNITURE IS 8-WIRE 4-CIRCUIT. PROVIDE A JUNCTION BOX AND CIRCUITING AS SHOWN FOR POWER CONNECTION AND ONE FOR DATA CONNECTION. PROVIDE QUANTITY OF WIRES PER VENDOR'S REQUIREMENTS. PROVIDE FLEX CONNECTION TO PRE-WIRED FURNITURE AS REQUIRED.

6 PROVIDE REQUIRED POWER AND WIRING FOR DOORBELL BUTTON. PROVIDE TRANSFORMER AND PUSH BUTTON TO OPERATE CHIME. PROVIDE ALL NECESSARY ACCESSORIES AS REQUIRED FOR A COMPLETE & OPERATING SYSTEM. COORDINATE AND FIELD VERIFY EXACT MOUNTING HEIGHT AND LOCATION WITH TENANT/ARCHITECT PRIOR TO ROUGH-IN AND INSTALLATION.

7 PROVIDE REQUIRED POWER AND WIRING FOR DOORBELL CHIME. PROVIDE TRANSFORMER AND PUSH BUTTON TO OPERATE CHIME. PROVIDE ALL NECESSARY ACCESSORIES AS REQUIRED FOR A COMPLETE & OPERATING SYSTEM. COORDINATE AND FIELD VERIFY EXACT MOUNTING HEIGHT AND LOCATION WITH TENANT/ARCHITECT PRIOR TO ROUGH-IN AND INSTALLATION.

8 PROVIDE GFCI RATED CIRCUIT BREAKER AT PANEL.

9 RELOCATE EXISTING PANEL TO NEW LOCATION. INTERCEPT AND EXTEND ALL EXISTING BRANCH CIRCUITS, WIRE, CONDUIT, ETC TO NEW LOCATION. REFER TO ARCHITECTURAL DEMO PLAN FOR EXISTING LOCATION.

10 CONTRACTOR TO VERIFY THAT THERE IS A 120V WP/GFCI REFCEPTACLE LOCATED WITHIN 25' OF CONDENSING UNIT LOCATION ON ROOFTOP. IF THERE IS NOT CURRENTLY A RECEPTACLE WITHIN 25', PROVIDE AN ADDITIONAL WP/GFCI UNISTRUT MOUNTED RECEPTACLE AND TIE TO THE NEAREST CIRCUIT.

HVAC & PLUMBING EQUIPMENT CIRCUITING

EQUIPMENT TAG	PANEL-CKT	NOTES
CU-1	GENA-22,24	1
EF-1	GENA-20	3
FCU-1	--	2,4
FIRE SMOKE DAMPERS	GENA-26	5

NOTES:

1. PROVIDE DISCONNECT FOR EACH UNIT. FIELD VERIFY MOUNTING LOCATION WITH MECHANICAL CONTRACTOR. REFER TO PANEL SCHEDULE.
2. INDOOR UNIT RECEIVES POWER FROM CORRESPONDING OUTDOOR UNIT. PROVIDE WIRING BETWEEN UNITS PER MANUFACTURER'S INSTRUCTIONS.
3. PROVIDE FAN WITH MOTOR RATED TOGGLE SWITCH. HOMERUN THROUGH RELAY PANEL 'RP'.
4. CONTRACTOR TO PROVIDE 120V POWER TO CONCEALED CONDENSATE PUMP FOR FAN COOLED UNIT.
5. PROVIDE ELECTRICAL CONNECTION TO FIRE SMOKE DAMPERS. REFER TO MECHANICAL PLAN FOR FIRE SMOKE DAMPER LOCATIONS. COORDINATE WITH MECHANICAL CONTRACTOR.

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SHEET TITLE: ELECTRICAL POWER PLAN

SHEET: **E3**

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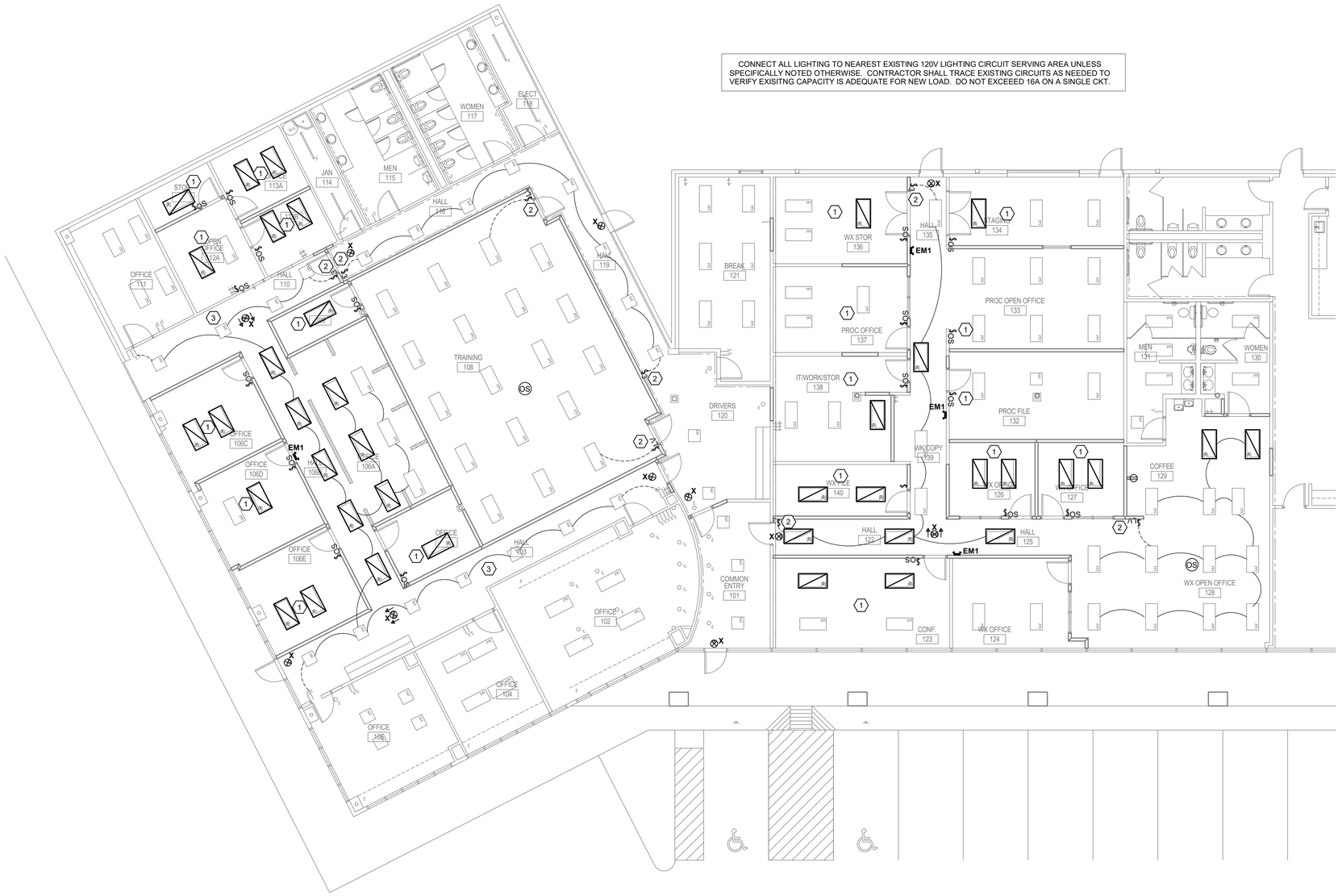
CONNECT ALL LIGHTING TO NEAREST EXISTING 120V LIGHTING CIRCUIT SERVING AREA UNLESS SPECIFICALLY NOTED OTHERWISE. CONTRACTOR SHALL TRACE EXISTING CIRCUITS AS NEEDED TO VERIFY EXISITNG CAPACITY IS ADEQUATE FOR NEW LOAD. DO NOT EXCEEED 16A ON A SINGLE CKT.



1 ELECTRICAL LIGHTING PLAN

1/8" = 1'-0"

GENERAL NOTES

A. CONNECT ALL EXIT LIGHTS TO UN-SWITCHED POWER AHEAD OF ALL LIGHT SWITCHES. EXIT LIGHTS ARE SWITCHED AT PANEL ONLY.
B. ALL LIGHT SWITCHES TO BE GANGED TOGETHER WHERE POSSIBLE.
C. CONTRACTOR SHALL NOT INSTALL MORE THAN THREE CIRCUITS (3 PHASE WIRES, 1 NEUTRAL + 1 GROUND) IN A COMMON CONDUIT, EXCEPT WHERE SPECIFICALLY NOTED AND ALLOWED. WHERE MORE THAN THREE CURRENT CARRYING CONDUCTORS (EXAMPLES: 3 PHASE WIRES + 1 CURRENT CARRYING NEUTRAL CONDUCTOR) ARE INSTALLED IN A COMMON CONDUIT, THE AMPACITY OF ALL CURRENT-CARRYING CONDUCTORS SHALL BE DERATED PER 2017 NEC ARTICLE 310.15 (B)(3)(A). EXAMPLE: (6)-20AMP CKTS WITH 8 CURRENT CARRYING WIRES IN A COMMON CONDUIT MUST USE MINIMUM #10 WIRE 70% X 35A = 24.5 AMPS. PROVIDE COMMON TRIP BREAKERS FOR MULTIWIRE CIRCUITS PER 2017 NEC ARTICLE 210.4 (B).

KEYED NOTES

1 PROVIDE NEW SWITCH(ES) FOR LIGHTING IN THIS ROOM. REWIRE EXISTING AND RELOCATED FIXTURES AS NEEDED.
2 NEW SWITCH TO CONTROL EXISTING AND RELOCATED FIXTURES AS INDICATED. REWIRE FIXTURES AS NEEDED.
3 CONTRACTOR TO VERIFY EMERGENCY LIGHTING IS PRESENT IN CORRIDOR AND ALONG EGRESS PATH. PROVIDE ADDITIONAL BUG EYE FIXTURE WITH BATTERY PACK IF REQUIRED TO MEET 1 FOOT CANDLE AVERAGE AND 0.1 FOOT CANDLE MINIMUM LIGHTING LEVELS.

LIGHT FIXTURE SCHEDULE

TYPE	MFG. AND CATALOG NO.	DESCRIPTIONS	MOUNTING	LAMP	WATTAGE	VOLTS	REMARKS
EM1	BUILDING STANDARD	BUG EYE W/ 90 MIN. BATTERY BACKUP	SURFACE	LED	5W	UNV	1
X	BUILDING STANDARD	EXIT SIGN W/ 90 MIN. BATTERY BACKUP	SURFACE	LED	5W	UNV	1,2

NOTES:
1. SELECTION TO BE APPROVED BY OWNER/ARCHITECT PRIOR TO PURCHASE. COORDINATE ALL FINISHES AND COLORS WITH ARCHITECT.
2. PROVIDE ARROW(S) AND FACEPLATE(S) AS INDICATED ON LIGHTING PLAN.

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SHEET TITLE: ELECTRICAL LIGHTING PLAN
SHEET: **E4**

208Y/120V 3Ph 4W,full size neutral,w/copper ground bus

PANEL "GENA"

NORMAL POWER PANEL

Copper Bus Rating 125 AMP
Mains Rating (M.C.B.) 125 AMP
1 run of 4#1, 1 #6 G, 2 1/2"C.
Feeder Ampacity = 130A
(All Branch Breakers Shall Be Bolt-On Type)

X MCB — Existing Panel
X MLO — Isolated Ground Bus
Feed Thru Lugs — SEE PLAN Location
Shunt-Trip MCB — Surface Mounting
VIF A.I.C. — 1 Enclosure (NEMA)

LOAD DESCRIPTION	TYPE	LOAD KVA	LOAD AMP	WIRE/CONDUIT SIZE (Note 1)	TRIP/POLE (Note 2)	CKT #	PH	CKT #	TRIP/POLE (Note 2)	WIRE/CONDUIT SIZE (Note 1)	LOAD AMP	LOAD KVA	TYPE	LOAD DESCRIPTION
EXISTING	MIS	0.50	4.2	2#12,1#12G,1/2"C	20 /1	1	A	2	20 /1	2#12,1#12G,1/2"C	4.2	0.50	MIS	EXISTING
EXISTING	MIS	0.50	4.2	2#12,1#12G,1/2"C	20 /1	3	B	4	20 /1	2#12,1#12G,1/2"C	4.2	0.50	MIS	EXISTING
EXISTING	MIS	0.50	4.2	2#12,1#12G,1/2"C	20 /1	5	C	6	20 /1	2#12,1#12G,1/2"C	4.2	0.50	MIS	EXISTING
EXISTING	MIS	0.50	4.2	2#12,1#12G,1/2"C	20 /1	7	A	8	20 /1	2#12,1#12G,1/2"C	4.2	0.50	MIS	EXISTING
EXISTING	MIS	0.50	4.2	2#12,1#12G,1/2"C	20 /1	9	B	10	20 /1	2#12,1#12G,1/2"C	4.2	0.50	MIS	EXISTING
EXISTING	MIS	0.50	4.2	2#12,1#12G,1/2"C	20 /1	11	C	12	20 /1	2#12,1#12G,1/2"C	4.2	0.50	MIS	EXISTING
1 D.R.	R	0.18	1.5	2#12,1#12G,1/2"C	20 /1	13	A	14	20 /1	2#12,1#12G,1/2"C	4.2	0.50	MIS	EXISTING
4 D.R. GEN PURPOSE (SYSTEM FURNITURE)	R	0.72	6.0	2#10,1#10N,1#10G,1/2"C	20 /2	15	B	16	20 /1	2#12,1#12G,1/2"C	4.2	0.50	MIS	EXISTING
4 D.R. GEN PURPOSE (SYSTEM FURNITURE)	R	0.72	6.0	(Multiwire Circuit, 2+2 System)	--	17	C	18	20 /1	2#12,1#12G,1/2"C	4.2	0.50	MIS	EXISTING
4 D.R. PC (SYSTEM FURNITURE)	R	0.72	6.0	2#10,1#10N,1#10G,1/2"C	20 /2	19	A	20	15 /1	2#12,1#12G,3/4"C	1.3	0.2	MT	EF-1,1/20HP Manual Mtr Sw NEMA1
4 D.R. PC (SYSTEM FURNITURE)	R	0.72	6.0	(Multiwire Circuit, 2+2 System)	--	21	B	22	20 /2	3#12,1#12G,1/2"C (Note 3)	18.3	1.9	C	CU/FCU-1
1 D.R.	R	0.18	1.5	2#12,1#12G,1/2"C	20 /1	23	C	24			18.3	1.9	C	**18.3 FLA,3.8 KVA-Disc30A/2P/240V/NF/N3R
5 D.R.	R	0.90	7.5	2#12,1#12G,1/2"C	20 /1	25	A	26	20 /1	2#12,1#12G,1/2"C	4.2	0.50	MIS	FIRE SMOKE DAMPERS
1 D.R.	R	0.18	1.5	2#12,1#12G,1/2"C	20 /1	27	B	28	/1					SPACE
3 D.R.	R	0.54	4.5	2#12,1#12G,1/2"C	20 /1	29	C	30	/1					SPACE
2 D.R.	R	0.36	3.0	2#12,1#12G,1/2"C	20 /1	31	A	32	/1					SPACE
5 D.R. GEN PURPOSE (SYSTEM FURNITURE)	R	0.90	7.5	2#10,1#10N,1#10G,1/2"C	20 /2	33	B	34	/1					SPACE
5 D.R. GEN PURPOSE (SYSTEM FURNITURE)	R	0.90	7.5	(Multiwire Circuit, 2+2 System)	--	35	C	36	/1					SPACE
5 D.R. PC (SYSTEM FURNITURE)	R	0.90	7.5	2#10,1#10N,1#10G,1/2"C	20 /2	37	A	38	/1					SPACE
5 D.R. PC (SYSTEM FURNITURE)	R	0.90	7.5	(Multiwire Circuit, 2+2 System)	--	39	B	40	/1					SPACE
SPACE					/1	41	C	42	/1					SPACE

PANEL "GENA" LOAD ANALYSIS

LOAD DESCRIPTION	TYPE	DEMAND FACTOR	LOAD (KVA) CONNECTED	LOAD (KVA) CALCULATED	NEC CALCULATION REFERENCE
[illegible] (non-coincident w/cooling)	[illegible]	1	[illegible]	[illegible]	Cooling loads larger than heating
[illegible] LOADS (KVA)	MIS	0.25	8.0	[illegible]	
TOTAL LOAD (KVA)			20.8 KVA	20.8 KVA	
TOTAL LOAD (AMP AVG)			57.7 AMP	57.8 AMP	Calc'd Amps: PhA=54A, PhB=72A, PhC=61A, Neut=14A

84%

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208Y/120V 3Ph 4W,full size neutral,w/copper ground bus

PANEL "A"

NORMAL POWER PANEL

Copper Bus Rating 125 AMP
Mains Rating (M.L.O.) 125 AMP
1 run of 4#1, 1 #6 G, 2 1/2"C.
Feeder Ampacity = 130A
(All Branch Breakers Shall Be Bolt-On Type)

MCB — Existing Panel
X MLO — Isolated Ground Bus
Feed Thru Lugs — SEE PLAN Location
Shunt-Trip MCB — Surface Mounting
VIF A.I.C. — 1 Enclosure (NEMA)

LOAD DESCRIPTION	TYPE	LOAD KVA	LOAD AMP	WIRE/CONDUIT SIZE (Note 1)	TRIP/POLE (Note 2)	CKT #	PH	CKT #	TRIP/POLE (Note 2)	WIRE/CONDUIT SIZE (Note 1)	LOAD AMP	LOAD KVA	TYPE	LOAD DESCRIPTION
EXISTING	MIS	0.50	4.2	2#12,1#12G,1/2"C	20 /1	1	A	2	20 /1	2#12,1#12G,1/2"C	4.2	0.50	MIS	EXISTING
EXISTING	MIS	0.50	4.2	2#12,1#12G,1/2"C	20 /1	3	B	4	20 /1	2#12,1#12G,1/2"C	4.2	0.50	MIS	EXISTING
EXISTING	MIS	0.50	4.2	2#12,1#12G,1/2"C	20 /1	5	C	6	20 /1	2#12,1#12G,1/2"C	10.5	1.26	R	7 D.R.
EXISTING	MIS	0.50	4.2	2#12,1#12G,1/2"C	20 /1	7	A	8	20 /1	2#12,1#12G,1/2"C	4.2	0.50	MIS	EXISTING
EXISTING	MIS	0.50	4.2	2#12,1#12G,1/2"C	20 /1	9	B	10	20 /1	2#12,1#12G,1/2"C	4.2	0.50	MIS	EXISTING
EXISTING	MIS	1.6	15.0	3#10,1#10G,1/2"C	30 /2	11	C	12	20 /1	2#12,1#12G,1/2"C	4.2	0.50	MIS	EXISTING
**15 FLA,3.1 KVA	MIS	1.6	15.0			13	A	14	20 /1	2#12,1#12G,1/2"C	4.2	0.50	MIS	EXISTING
EXISTING	MIS	0.50	4.2	2#12,1#12G,1/2"C	20 /1	15	B	16	20 /1	2#12,1#12G,1/2"C	4.2	0.50	MIS	EXISTING
EXISTING	MIS	0.50	4.2	2#12,1#12G,1/2"C	20 /1	17	C	18	20 /1	2#12,1#12G,1/2"C	1.5	0.18	R	1 D.R.
6 D.R.	R	1.08	9.0	2#12,1#12G,1/2"C	20 /1	19	A	20	20 /1	2#12,1#12G,1/2"C	7.5	0.90	R	5 D.R.
7 D.R.	R	1.26	10.5	2#12,1#12G,1/2"C	20 /1	21	B	22	20 /1	2#12,1#12G,1/2"C	10.5	1.26	R	7 D.R.
8 D.R.	R	1.44	12.0	2#12,1#12G,1/2"C	20 /1	23	C	24	20 /1	2#12,1#12G,1/2"C	9.0	1.08	R	6 D.R.
5 D.R.	R	0.90	7.5	2#12,1#12G,1/2"C	20 /1	25	A	26	20 /1	2#12,1#12G,1/2"C	12.0	1.44	R	8 D.R.
3 D.R.	R	0.54	4.5	2#12,1#12G,1/2"C	20 /1	27	B	28	20 /1	2#12,1#12G,1/2"C	10.5	1.26	R	7 D.R.
1 D.R.	R	0.18	1.5	2#12,1#12G,1/2"C	20 /1	29	C	30	20 /1	2#12,1#12G,1/2"C	1.5	0.18	R	1 D.R.

PANEL "A" LOAD ANALYSIS

LOAD DESCRIPTION	TYPE	DEMAND FACTOR	LOAD (KVA) CONNECTED	LOAD (KVA) CALCULATED	NEC CALCULATION REFERENCE
RECEPTACLES	R	---	13.0	11.5	NEC2014 Art. 220.44, First 10KVA @100%, Remainder @50%
MISC. NON-CONTINUOUS LOADS	MIS	1	10.1	10.1	
TOTAL LOAD (KVA)			23.1 KVA	21.6 KVA	
TOTAL LOAD (AMP AVG)			64.1 AMP	60.0 AMP	Calc'd Amps: PhA=68A, PhB=57A, PhC=59A, Neut=11A

90%

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NOTES - PANEL SCHEDULES

Abbreviations: D.R. =DUPLEX RECEPTACLE S.R. = SINGLE RECEPTACLE PC=PERSONAL COMPUTER HACR=HEATING/AIR CONDITIONING RATED BKR
SWD=SWITCHING DUTY BKR VIF=VERIFY IN FIELD GP=GENERAL PURPOSE (E)=EXISTING (N)=NEW

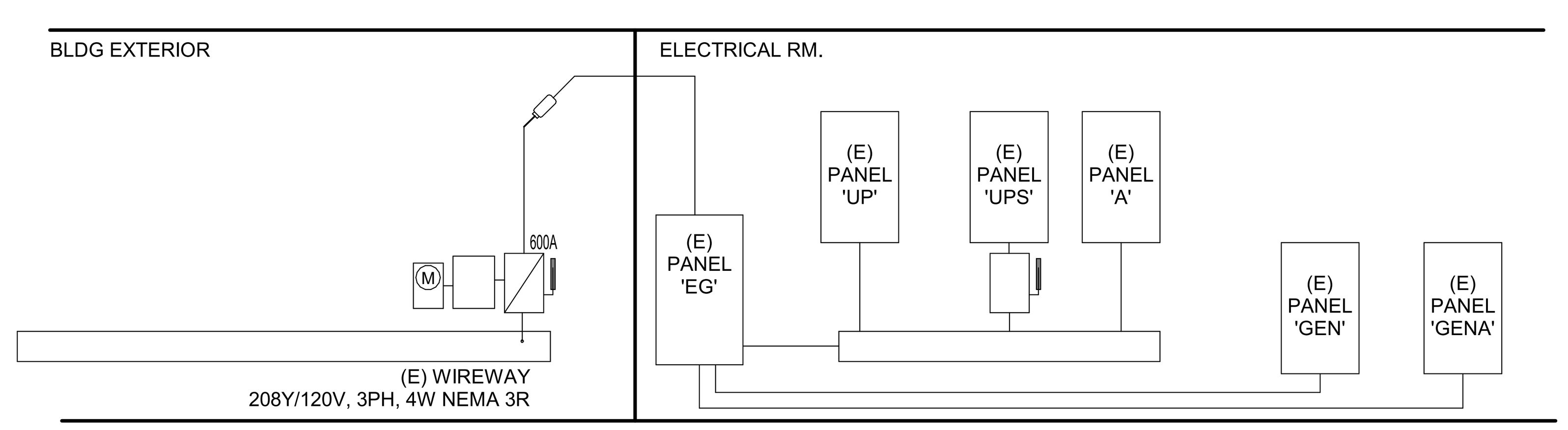
Note 1: Each circuit is shown as an individual homerun. Contractor may elect to combine two or three non-harmonics producing circuits in a common raceway. Contractor shall not install more than three circuits in a common conduit, except where specifically noted and allowed. Where more than three conductors are installed in a common raceway, the ampacity of all current-carrying conductors shall be derated and conductor size increased per N.E.C. 2017 Article 310.15(B)(3)(a). All wires shall have THHN/THWN insulation unless noted otherwise.
Voltage drop - Use #10 wires for 20Amp 120V ckts longer than 75 feet, use #10 wires for 20Amp 277V ckts longer than 200 feet.

Note 2: All breakers 100Amp or less shall be rated for 75/60C wire termination. Breakers rated for only 60C wire termination shall not be used. All breakers greater than 100Amp shall be rated for 75C termination. N.E.C. 2017 Article 110.14(C)(1).

Note 3: For 3-pole breaker, provide 3 wires + grd where neutral is not used or req'd. Similarly for 2-pole bkr, provide 2 wires + grd if neut. is not req'd.

General Notes:
(A) Quantity and type of duplex & quad receptacles, light fixtures etc shown in panel schedule are for reference only, refer to plans for exact quantity of outlets, light fixtures and other devices.
(B) All underground conduit shall be a minimum size of 3/4".
(C) Each PC circuit shall have separate neutral wire. Do not share neutral wire between 2 or more circuits. Similarly for all harmonics-producing circuits, provide dedicated neutral for each circuit serving such equipment.
(D) Provide isolated ground for each PC circuit in pre-wired furniture system.
(E) Provide HACR rated breaker for all air-conditioning /heating eqpt.
(F) Provide type-written Panel Directory with room name and devices served. Example: OFFICE 124, 3 RECEPTS

NOTE: ALL EQUIPMENT IS EXISTING UNLESS NOTED OTHERWISE.



1 RISER DIAGRAM
NOT TO SCALE

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06-16-2020

SHEET TITLE: PANEL SCHEDULES AND RISER

SHEET: E5

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