

GENERAL NOTES	
1.	SCOPE: CONTRACT DRAWINGS FOR ELECTRICAL WORK ARE DIAGRAMMATIC INTENDED TO CONVEY SCOPE AND GENERAL ARRANGEMENT. CONTRACTOR SHALL FURNISH ALL LABOR, EQUIPMENT AND MATERIALS NECESSARY FOR THE INSTALLATION OF THE COMPLETE ELECTRICAL SYSTEM AS SPECIFIED HEREIN AND SHOWN ON THE CONTRACT DRAWINGS. OUTLINE DESCRIPTION AND DIAGRAMMATIC REPRESENTATION OF SYSTEM OPERATION AND EQUIPMENT DOES NOT LIMIT CONTRACTOR LIABILITY FOR PROVIDING COMPLETE AND OPERABLE SYSTEMS. IN CASE OF ANY OBSERVED DISCREPANCIES OR OMISSIONS ON THE DRAWINGS AND/OR SPECIFICATIONS, CONTRACTOR SHALL NOTIFY THE ENGINEER OF SUCH CONDITIONS PRIOR TO BID. OTHERWISE, IT WILL BE UNDERSTOOD THAT THE DRAWINGS AND SPECIFICATIONS ARE CLEAR AS TO WHAT IS INTENDED AND SHALL BE INDICATED BY THE ENGINEER.
2.	APPLICABLE CODES: ALL WORK INSTALLED UNDER THIS CONTRACT SHALL BE IN STRICT CONFORMANCE WITH THE LATEST EDITIONS OF THE FOLLOWING CODES, AND ALL APPLICABLE STANDARDS AND REQUIREMENTS: <ul style="list-style-type: none"> NATIONAL ELECTRICAL CODE UNDERWRITERS LABORATORIES INC. NATIONAL FIRE PROTECTION ASSOCIATION AMERICANS WITH DISABILITIES ACT ALL APPLICABLE STATE, COUNTY, AND LOCAL CODES ALL LOCAL UTILITY CODES
3.	PERMITS: THE CONTRACTOR SHALL INCLUDE IN THE BID PRICE THE PAYMENT OF ALL NECESSARY PERMITS. PROVIDE THE OWNER PRIOR TO THE FINAL PAYMENT A CERTIFICATE FROM THE ELECTRICAL INSPECTION DEPARTMENT HAVING JURISDICTION OVER THE ELECTRICAL WORK MEETS ALL REQUIREMENTS OF THE LOCAL INSPECTION AUTHORITIES AND/OR THE NATIONAL BOARD OF FIRE UNDERWRITERS.
4.	VERIFICATION: IN CASES OF DOUBT AS TO THE WORK INTENDED, OR IN THE EVENT OF NEED FOR EXPLANATION THEREOF, THE CONTRACTOR SHALL REQUEST SUPPLEMENTARY INSTRUCTIONS FROM THE ENGINEER. NO CHANGES ARE TO BE MADE TO THE WORK OF THIS CONTRACT WITHOUT PRIOR KNOWLEDGE AND APPROVAL OF THE ENGINEER. THE CONTRACTOR SHALL HOLD THE OWNER AND ITS CONSULTANTS HARMLESS AGAINST ALL CLAIMS AND JUDGMENTS ARISING OUT OF THE CONTRACTORS PERFORMANCE OF THE WORK OF THIS CONTRACT. THE CONTRACTOR SHALL NOT PROCEED WITH ANY WORK, WHICH HE EXPECTS ADDITIONAL COMPENSATION BEYOND THE CONTRACT AMOUNT, WITHOUT WRITTEN AUTHORIZATION FROM THE APPROPRIATE AUTHORITY. FAILURE TO OBTAIN SUCH AUTHORIZATION SHALL INVALIDATE ANY CLAIM FOR EXTRA COMPENSATION.
5.	COORDINATION: IT SHALL BE THE RESPONSIBILITY OF THE CONTRACTOR TO COORDINATE THE WORK AND EQUIPMENT SPECIFIED HEREIN WITH THE WORK TO BE PERFORMED AND EQUIPMENT TO BE FURNISHED BY OTHERS TO ASSURE A COMPLETE AND SATISFACTORY INSTALLATION MEETING WITH THE APPROVAL OF THE ENGINEER.
6.	MATERIALS AND SUBSTITUTIONS: THE CONTRACTOR SHALL SUBMIT A LIST OF ELECTRICAL MATERIAL MANUFACTURERS TO THE OWNER/ENGINEER FOR APPROVAL PRIOR TO ORDERING AND/OR INSTALLATION. NO SUBSTITUTIONS WILL BE ALLOWED WITHOUT PERMISSION OF THE ENGINEER IN WRITING. THE COST OF ANY REDESIGNING CAUSED BY UNAUTHORIZED SUBSTITUTION SHALL BE ASSUMED BY THE CONTRACTOR.
7.	SCHEDULING: THE CONTRACTOR SHALL COORDINATE WITH THE OWNER FOR ALL SCHEDULING OF WORK.
8.	ALL WORK SHALL BE INSTALLED IN A NEAT AND WORKMANLIKE MANNER.
9.	THE CONTRACTOR SHALL KEEP THE WORK SITE AND SURROUNDING AREA FREE FROM ACCUMULATION OF WASTE MATERIALS OR RUBBISH GENERATED BY WORK FROM THIS CONTRACT. CONTRACTOR SHALL PROPERLY AND LEGALLY DISPOSE OF ALL MATERIALS. CONTRACTOR SHALL TAKE NECESSARY PRECAUTIONS TO PROTECT BUILDING OCCUPANTS AND CONTENTS, AND PREVENT THE SPREAD OF DUST AND DIRT INTO OCCUPIED AREAS.
10.	THE CONTRACTOR SHALL BE AWARE OF ALL FLASH HAZARD REQUIREMENTS FOR THIS PROJECT. PROTECTIVE EQUIPMENT SHALL BE WORN, WHERE APPLICABLE, AND PRACTICES SHALL BE FOLLOWED IN ACCORDANCE WITH FLASH HAZARD LEVEL.
11.	THE CONTRACTOR SHALL PROVIDE ACCESS HATCHES WHERE REQUIRED FOR INACCESSIBLE CEILING, WALLS, FLOORS, ETC.
12.	SAFETY: ALL JOB SITE SAFETY IS THE RESPONSIBILITY OF THE CONTRACTOR AND SHALL BE IN STRICT ACCORDANCE WITH ALL LOCAL, STATE AND FEDERAL REQUIREMENTS.
13.	GROUNDING: ALL SYSTEMS SHALL BE GROUNDED AND BONDED IN ACCORDANCE WITH THE REQUIREMENTS OF THE NATIONAL ELECTRICAL CODE. ALL LOCAL CODES AND EQUIPMENT AS REQUIRED. PROVIDE EQUIPMENT GROUNDING CONDUCTORS FOR ALL FEEDERS AND CIRCUITS.
14.	THE CONTRACTOR SHALL VISIT THE SITE AND CAREFULLY EXAMINE ALL EXISTING CONDITIONS THAT MAY AFFECT THE BID. FAILURE TO VISIT THE SITE AND BECOME FAMILIAR WITH EXISTING CONDITIONS PRIOR TO BIDDING WILL NOT ABSOLVE THE CONTRACTOR OF RESPONSIBILITY FOR COMPLYING WITH THE CONTRACT DOCUMENTS.
15.	THE CONTRACTOR SHALL PROVIDE ONE ELECTRONIC COPY OF SUBMITTALS INCORPORATING PRODUCT DATA (CATALOG CUTS) AND SHOP DRAWINGS FOR APPROVAL OF ALL MATERIAL TO BE USED ON THIS PROJECT. PRODUCT DATA/SHOP DRAWINGS SHALL BE SUBMITTED FOR ITEMS TO INCLUDE, BUT NOT BE LIMITED TO, THE FOLLOWING AS APPLICABLE FOR THE PROJECT: CONDUCTORS, CABLES, CONDUIT, CONDUIT FITTINGS, CONDUIT BOXES, SUPPORT HARDWARE, DEVICE BOXES, DEVICE COVERS, JUNCTION BOXES, PULL BOXES, ENCLOSURES, SAFETY SWITCHES, FUSES, CIRCUIT BREAKERS, PANELBOARDS, MOTOR CONTROLS, WIRING DEVICES, LIGHTING FIXTURES, IDENTIFICATION LABELS, ETC. PRIOR TO SUBMITTING CONTRACTOR SHALL REVIEW ALL SUBMITTALS FOR COMPLIANCE WITH CONTRACT DOCUMENTS, CONFLICTS WITH OTHER TRADES, AND CONSTRUCTION. CONTRACTOR SHALL IDENTIFY ANY DEVIATIONS IN SUBMITTALS FROM CONTRACT DOCUMENTS. ENGINEER'S REVIEW OF SUBMITTALS DOES NOT INCLUDE REVIEW OF DIMENSIONS, DETAILS, OR QUANTITIES. REVIEW DOES NOT WAIVE ANY REQUIREMENTS OF CONTRACT DOCUMENTS, INCLUDING REQUIREMENT TO PROVIDE A COMPLETE AND FUNCTIONAL SYSTEM.
16.	THE CONTRACTOR SHALL MAINTAIN ON SITE A MARKED UP (RED LINED) COMPLETE SET OF PRINTS FOR THE PROJECT AND RECORD ANY CHANGES TO THE ORIGINAL DESIGN. THESE PRINTS SHALL BE SUBMIT TO THE ENGINEER WITHIN 2 WEEKS OF THE SCHEDULED COMPLETION OF THE PROJECT.
17.	PROVIDE THREE (3) COPIES OF OPERATION AND MAINTENANCE (O&M) MANUALS FOR ALL NEW EQUIPMENT AND DEVICES INSTALLED AS PART OF THIS WORK. MANUALS SHALL INCLUDE THE FOLLOWING ITEMS BOUND IN A SUBSTANTIAL BINDER: <ul style="list-style-type: none"> SUBMITTAL DATA STATING EQUIPMENT RATINGS AND SELECTED OPTIONS FOR EACH PIECE OF EQUIPMENT REQUIRING MAINTENANCE. O&M MANUALS FOR EACH PIECE OF EQUIPMENT REQUIRING MAINTENANCE. REQUIRED ROUTINE MAINTENANCE ACTIONS SHALL BE CLEARLY IDENTIFIED. SPARE PARTS LISTS FOR ALL EQUIPMENT. NAME AND ADDRESS OF AT LEAST ONE QUALIFIED SERVICE AGENCY.

ELECTRICAL NOTES	
1.	WHEN MOUNTING ELECTRICAL WORK IN AREAS SUBJECT TO PEDESTRIAN TRAFFIC, CONTRACTOR SHALL MAINTAIN EXISTING HEADROOM CLEARANCES. CONTRACTOR SHALL PROVIDE AND INSTALL ALL NECESSARY SUPPORT AND HARDWARE FOR MOUNTING OF ELECTRICAL EQUIPMENT AND CONDUIT IN THIS PROJECT. MOUNTING HEIGHTS AND RESTRICTIONS SHALL BE PER LOCAL E.C. REQUIREMENTS.
2.	ALL ELECTRICAL MATERIALS AND EQUIPMENT SHALL BE ETL LISTED AND SHALL CONFORM TO ALL APPLICABLE NATIONAL STANDARDS AS APPLICABLE.
3.	ALL WIRING SHALL BE INSTALLED IN ACCORDANCE WITH ALL APPLICABLE REQUIREMENTS.
4.	UNLESS OTHERWISE NOTED, ALL CONDUCTORS SHALL BE COPPER #12 AWG AND SHALL BE RATED AT 600V OR GREATER. REFER TO ELECTRICAL SPECIFICATION FOR ALL OTHER REQUIREMENTS.
5.	UNLESS OTHERWISE NOTED CONDUCTORS FOR BRANCH CIRCUITS SHALL BE SIZED TO PREVENT VOLTAGE DROP EXCEEDING 3% FOR BRANCH CIRCUITS AND 2% AT FEEDER CIRCUITS AT THE FURTHEST POINT. HOMERUN BRANCH CIRCUIT CONDUCTORS SHALL BE SIZED FROM THE PANELBOARD TO THE FIRST OUTLET IN ACCORDANCE WITH THE FOLLOWING MAXIMUM CIRCUIT LIMITS, USING CENTER OF LOAD SERVED AS BASIS FOR COMPUTING CIRCUIT LENGTHS: #12 AWG #10 AWG 120 VOLT (20A) 100FT 120 VOLT (20A) 165FT

ELECTRICAL NOTES CONTINUED	
6.	WHERE BRANCH CIRCUIT HOME RUNS ARE NOT SHOWN, THE CONTRACTOR MAY COMBINE CIRCUITS IN ACCORDANCE WITH THE NEC AS FOLLOWS: A. ALL SINGLE PHASE CIRCUITS SHALL HAVE A DEDICATED NEUTRAL. B. MAXIMUM OF THREE 20A, 1-POLE BRANCH CIRCUITS MAY BE COMBINED IN A COMMON HOMERUN FOR A TOTAL OF SIX CURRENT CARRYING CONDUCTORS IN A SINGLE RACEWAY. C. ALL BRANCH CIRCUITS LARGER THAN 20A SHALL BE SEPARATELY HOMERUN TO PANEL.
7.	LABELING: THE CONTRACTOR SHALL PROVIDE IDENTIFICATION LABELING OF CIRCUITS, WIRING DEVICES, CONDUIT AND CONDUCTORS AS FOLLOWS: A. THE CONTRACTOR SHALL PROVIDE NEW TYPEWRITTEN PANEL SCHEDULES FOR ALL PANELS INVOLVED IN THE PROJECT INCLUDING EXISTING PANELS. B. ALL INDIVIDUAL CONDUCTORS WITHIN PULL BOXES, JUNCTION BOXES AND AT POINTS OF USE SHALL BE IDENTIFIED BY PANEL AND CIRCUIT NUMBERS. CONDUCTORS SHALL BE IDENTIFIED VIA HEAT SHRINK IDENTIFICATION LABELS. COLOR CODE SHALL FOLLOW N.E.C. AND STANDARD U.S. CONVENTIONS. C. ALL PULL BOXES AND JUNCTION BOXES ENCLOSING FEEDERS, SUB-FEEDERS AND BRANCH CIRCUITS SHALL IDENTIFY THE CIRCUITS WITHIN BY PANEL AND CIRCUIT NUMBERS. IDENTIFICATION SHALL BE ACCOMPLISHED VIA 1/4 INCH "P-TOUCH" (CLEAR W/BLACK) LABELS AFFIXED TO COPPER PLATES. D. ALL WIRING DEVICES (RECEPTACLES, TOGGLE SWITCHES, ETC.) AFFECTED BY THIS PROJECT SHALL HAVE 1/4 INCH "P-TOUCH" (CLEAR W/BLACK) LABELS AFFIXED TO COVER PLATES. CONNECTED BRANCH CIRCUITS SHALL BE IDENTIFIED BY PANEL AND CIRCUIT NUMBERS. E. ALL EMERGENCY EGRESS LIGHTING SHALL HAVE 1/4 INCH "P-TOUCH" (WHITE W/RED) LABELS THAT READ "EMER". F. ALL PANELBOARDS, SAFETY SWITCHES, MOTOR CONTROLS, CONTROL CABINETS, ETC. SHALL HAVE BLACK LAMINATED PLASTIC IDENTIFICATION PLATES WITH WHITE LETTERS INDICATING VOLTAGE CONTAINED WITHIN, EQUIPMENT SERVED AND POWER SOURCE (PANEL AND CIRCUIT NUMBER), REFER TO EXAMPLES AS LISTED BELOW. SAFETY SWITCH: PANEL BOARD: CU-1 PANEL "PPA" 208V, 3Ø 120/208V, 3Ø, 4W FED FROM PP-1,3,5 FED VIA METER "X" IN ELEC RM
8.	UNLESS OTHERWISE INDICATED, ALL HVAC STARTERS, VFD'S, CONTROL DEVICES, CONTROL WIRING AND CONTROL CONDUIT SHALL BE PROVIDED AS REQUIRED UNDER MECHANICAL DIVISION. ALTHOUGH THEY MAY NOT BE SHOWN ON THE MECHANICAL OR ELECTRICAL DRAWINGS, BRANCH CIRCUIT BREAKERS, POWER WIRING, POWER CONDUIT AND THE LOCAL DISCONNECTING MEANS SHALL BE PROVIDED UNDER ELECTRICAL DIVISION. PROVIDE "HAGY" TYPE CIRCUIT BREAKERS FOR ALL CIRCUITS SUPPLYING HVAC EQUIPMENT. CIRCUIT BREAKER, WIRING AND CONDUIT SIZES INDICATED ON THE ELECTRICAL DRAWINGS ARE BASED ON SPECIFIC MECHANICAL EQUIPMENT DESIGN SELECTIONS. WHEN THE ACTUAL MECHANICAL EQUIPMENT SUPPLIED HAS DIFFERENT ELECTRICAL REQUIREMENTS, THE MECHANICAL DIVISION AND ELECTRICAL DIVISION INSTALLERS MUST COORDINATE ANY REQUIRED CHANGES. WHEN THE MECHANICAL EQUIPMENT MANUFACTURER REQUIRES FUSE-ONLY PROTECTION, THE LOCAL DISCONNECTING MEANS SHALL BE A FUSED DISCONNECT, FUSED AS PER THE RECOMMENDATION OF THE MANUFACTURER. WHEN DISCONNECTS ARE SHIPPED LOOSE WITH THE MECHANICAL EQUIPMENT, THEY SHALL BE INSTALLED BY THE ELECTRICAL CONTRACTOR. ALL COORDINATION BETWEEN THE MECHANICAL DIVISION AND ELECTRICAL DIVISION INSTALLERS SHALL BE FINALIZED PRIOR TO BID. ALL REQUIRED CHANGES SHALL BE AT NO ADDITIONAL COST TO THE OWNER.
9.	ALL ELECTRICAL WORK SHALL BE CONCEALED IN ALL FINISHED AREAS SHOWN ON THE ARCHITECTURAL DRAWINGS. CONDUIT MAY BE EXPOSED ON SURFACE OF MASONRY BRICK OR CONCRETE WALLS AND WITHIN MECHANICAL AND/OR ELECTRICAL ROOMS AND CLOSETS.
10.	ELECTRICAL SERVICE PROVISIONS: THE CONTRACTOR SHALL BE RESPONSIBLE FOR OBTAINING ELECTRICAL SERVICE FROM THE LOCAL UTILITY. ALL COORDINATION AND SCHEDULING WITH THE UTILITY IS THE RESPONSIBILITY OF THE CONTRACTOR. THE CONTRACTOR IS RESPONSIBLE FOR PAYMENT OF ALL SERVICE FEES CHARGED BY THE UTILITY. THE CONTRACTOR SHALL PROVIDE ALL EQUIPMENT, MATERIALS AND WORK AS REQUIRED BY THE UTILITY FOR COMPLETE AND FUNCTIONAL ELECTRICAL SERVICES. ALL COSTS ASSOCIATED WITH THE PROVISION FOR THE SERVICES ARE TO BE INCLUDED IN THE CONTRACTOR'S BID PRICE.
11.	EQUIPMENT LOCATIONS: THE CONTRACTOR SHALL REFER TO THE ARCHITECTURAL DRAWINGS FOR EXACT LIGHT FIXTURE LOCATIONS AND THE MECHANICAL DRAWINGS FOR EXACT MECHANICAL EQUIPMENT LOCATIONS. LOCATIONS OF ALL ELECTRICAL EQUIPMENT & CONDUIT ARE SHOWN DIAGRAMMATICALLY. EXACT LOCATIONS TO BE DETERMINED IN FIELD BY CONTRACTOR, WHEREVER POSSIBLE. THE CONTRACTOR SHALL OBTAIN ACTUAL ROUGH-IN DRAWINGS FOR THE ACTUAL ITEM OF EQUIPMENT TO BE INSTALLED PRIOR TO ROUGH-IN. THIS SHALL APPLY TO ALL EQUIPMENT, WHETHER IT IS TO BE INSTALLED BY THE CONTRACTOR OR BY THE OWNER.
12.	CLEARANCES: ARRANGE CONDUIT, WIRING, EQUIPMENT AND OTHER WORK GENERALLY AS SHOWN, PROVIDING PROPER CLEARANCE AND CAREFULLY EXAMINE ALL CONTRACT DRAWINGS AND COORDINATE THE WORK WITH ALL TRADES, WHERE DEPARTURES ARE REQUIRED BECAUSE OF FIELD CONDITIONS OR OTHER CAUSES. PREPARE AND SUBMIT DETAILED DRAWINGS FOR ACCEPTANCE.
13.	GUARANTEE: THE ENTIRE ELECTRICAL INSTALLATION, MATERIALS, AND WORKMANSHIP SHALL BE GUARANTEED FOR A PERIOD OF ONE YEAR FROM THE DATE OF FINAL ACCEPTANCE. CONTRACTOR SHALL REPAIR OR MAKE GOOD AT THEIR OWN EXPENSE AND ALL DEFECTS WHICH MAY ARISE DURING THE TIME PERIOD OF THE GUARANTEE. THE ENGINEER'S SUCH DEFECTS SHALL BE FROM DEFECTIVE WORKMANSHIP AND/OR IMPERFECT OR INFERIOR MATERIAL.
14.	PRIOR TO ACCEPTANCE OF THE PROJECT BY THE OWNER, ALL SYSTEMS SHALL BE TESTED AND OPERATED TO DEMONSTRATE TO THE OWNER'S REPRESENTATIVE THAT THE INSTALLATION AND PERFORMANCE OF THESE SYSTEMS AND/OR PARTS THEREOF CONFORM TO THE DESIGN INTENT.
15.	SEALING FITTINGS AND APPROVED SEALING COMPOUND SHALL BE INSTALLED IN ACCORDANCE WITH THE NATIONAL ELECTRICAL CODE. SEAL AROUND ALL CONDUIT PENETRATIONS OF FIRE-RATED WALLS WITH AN APPROVED SEALANT.
16.	CONDUIT, FITTINGS, AND JUNCTION BOXES SHALL BE SUITABLE FOR THE DATA CLASSIFICATION IN WHICH THEY ARE TO BE INSTALLED.
17.	FLOOR PENETRATIONS: ALL PENETRATIONS THROUGH FLOORS OR WALLS SHALL BE CORE-DRILLED. THE USE OF JACK HAMMERS SHALL NOT BE PERMITTED. MAXIMUM HOLE DIAMETERS SHALL NOT EXCEED 6 INCHES. ALL HOLES SHALL BE SPACED AT LEAST 18 INCHES APART IN ALL DIRECTIONS. RE-USE OF EXISTING PENETRATIONS SHALL BE PERMITTED. PRIOR TO ANY CORE DRILLING THROUGH FLOORS OR WALLS, THE ELECTRICAL CONTRACTOR SHALL VISUALLY SURVEY BOTH SIDES TO SEE IF THERE ARE ANY PIPES, DUCTS, OR ELECTRICAL SERVICES THAT MAY PRESENT OBSTACLES. THE ELECTRICAL CONTRACTOR SHALL ALSO IDENTIFY LOCATIONS OF EXISTING CONCRETE SLAB REINFORCEMENT OR IN-SLAB UTILITIES USING A TACHOMETER, X-RAY, OR SIMILAR DEVICE. ALL CORE-DRILLED PENETRATIONS SHALL BE A MINIMUM OF 3 INCHES AWAY FROM EXISTING CONCRETE SLAB REINFORCEMENT OR IN-SLAB UTILITIES. ALL CONDUIT PENETRATIONS THROUGH FLOORS AND WALLS SHALL BE SEALED ON BOTH SIDES WITH FIREPROOFING CAULK SO AS TO MAINTAIN THE FIRE RATING OF THE FLOOR OR WALL.

ELECTRICAL NOTES CONTINUED	
18.	ROOF PENETRATIONS: COORDINATE WORK WITH CURRENT ROOFING CONTRACTOR. CONTRACTOR SHALL MINIMIZE THE NUMBER AND SIZE OF ALL ROOF PENETRATIONS. GROUPING MULTIPLE CONDUITS IN THE SAME PENETRATION WHEN POSSIBLE. WHEN APPLICABLE, CONTRACTOR SHALL COORDINATE WITH ORIGINAL ROOF MEMBRANE MANUFACTURER AND CURRENT ROOFING CONTRACTOR IN ORDER TO MAINTAIN ROOF WARRANTY. CONTRACTOR SHALL SEAL AROUND ALL ROOF PENETRATIONS WITH A LISTED SEALING COMPOUND. PROVIDE RUBBER BOOT, FLASHING, CAULKING, AND OTHER ITEMS AS REQUIRED FOR A WEATHERTIGHT INSTALLATION. PRIOR TO PENETRATING ROOF, CONTRACTOR MUST USE NON-DESTRUCTIVE MEANS TO LOCATE ALL REINFORCING STEEL OR TENDONS WITHIN THE PROPOSED AREA OR PENETRATION, IF APPLICABLE. WHEN PENETRATING ROOF, CONTRACTOR SHALL NOT CUT, BURN OR DAMAGE EXISTING REINFORCING STEEL OR TENDONS UNLESS APPROVED BY A STRUCTURAL ENGINEER. CONDUIT ROOF PENETRATIONS SHALL BE INCLUDED IN CONTRACTOR'S GUARANTEE OR WORK.
19.	HEAT TRACE REQUIREMENTS: THE CONTRACTOR SHALL PROVIDE A COMPLETE AND OPERABLE HEAT TRACE SYSTEM FOR ALL EXPOSED WATER SUPPLY AND DRAIN LINES. COORDINATE WITH OWNER, MECHANICAL CONTRACTOR, AND HEAT TRACE SUPPLIER TO PROVIDE HEAT TRACE CABLE, THERMOSTATIC CONTROL, POWER CONNECTION KITS, END TERMINATION KITS, POLYESTER FIBER TAPE, CIRCUIT BREAKER, POWER CABLE AND CONDUIT, AND ANY OTHER MATERIAL REQUIRED.

ELECTRICAL ABBREVIATIONS			
ABBREV	ABBREVIATION	ABBREV	ABBREVIATION
A	AMPERE	SW	SWITCH
AC	AIR CURTAIN	TELE	TELECOMMUNICATIONS
AF	AVAILABLE FAULT	TGB	TELECOMMUNICATIONS GROUND BUS
AFCI	ARC FAULT CIRCUIT INTERRUPTER	TMGB	TELECOMMUNICATIONS MAIN GROUND BUS
AFF	ABOVE FINISHED FLOOR	TTB	TELEPHONE TERMINAL BOARD
AFG	ABOVE FINISHED GRADE	TV	TELEVISION
AHU	AIR HANDLING UNIT	TYP	TYPICAL
AT	AMPERE TRIP RATING	UG	UNDERGROUND
AV	AUDIO/VISUAL	UH	UNIT HEATER
AWG	AMERICAN WIRE GAUGE	UNO	UNLESS NOTED OTHERWISE
BG	BELOW GRADE	V	VOLTAGE
BLDG	BUILDING	VAC	VOLTAGE ALTERNATING CURRENT
BOD	BASIS OF DESIGN	VDC	VOLTAGE DIRECT CURRENT
C	CONDUIT	VFD	VARIABLE FREQUENCY DRIVE
CB	CIRCUIT BREAKER	W	WIRE
CIS	CISCO CABINET	WH	WATER HEATER
CKT	CIRCUIT	WP	WEATHERPROOF
CLG	CEILING	WSA	WIRE SIZE AMPS
CU	CONDENSING UNIT	XFMR	TRANSFORMER
DISC	DISCONNECT		
DL	DOWN LEAD GROUNDING CONDUCTOR		
DWG	DRAWING		
ECH	ELECTRIC CEILING HEATER		
EF	EXHAUST FAN		
ELEC	ELECTRICAL		
EM	EMERGENCY FIXTURE		
EMT	ELECTRICAL METALLIC TUBING		
EP	EMERGENCY PANELBOARD		
EQUIP	EQUIPMENT		
EWI	ELECTRIC WATER HEATER		
EWL	ELECTRIC WALL HEATER		
EX	EXISTING		
FAAP	FIRE ALARM REMOTE ANNUNCIATION PANEL		
FACU	FIRE ALARM CONTROL UNIT/PANEL		
FC	FOOT CANDLE		
FLA	FULL LOAD AMPS		
FP	FITNESS CENTER PANELBOARD		
GACP	GENERATOR ANNUNCIATOR CONTROL PANEL		
GF	GROUND FAULT		
GI	GROUNDING INTERRUPTER		
GR	GROUND		
GRS	GALVANIZED RIGID STEEL		
HTR	HEATER		
HWRP	HOT WATER RE-CIRCULATION PUMP		
KAIC	KILO AMP INTERRUPTING CAPACITY, RMS SYMMETRICAL		
KCMIL	KILO AMP CIRCULAR MILS		
KVA	KILO VOLT AMPERE		
KWH	KILO WATT HOUR		
LAN	LOCAL AREA NETWORK		
LED	LIGHT EMITTING DIODE		
LCP	LIGHTING CONTROL PANEL		
LRC	LIGHTING RELAY CABINET		
LTG	LIGHTING		
LV	LOW VOLTAGE (DATA, CONTROL, AV, FA)		
MB	MAIN BREAKER		
MCB	MAIN CIRCUIT BREAKER		
MDP	MAIN DISTRIBUTION PANEL		
MH	METAL HALIDE		
MLO	MAIN LUG ONLY		
MP	MEDICAL CENTER PANELBOARD		
MSB	MAIN SWITCHBOARD		
MTD	MOUNTED		
N/A	NOT APPLICABLE		
N/C	NORMALLY CLOSED		
N/O	NORMALLY OPEN		
NEC	NATIONAL ELECTRICAL CODE		
NEU	NEUTRAL		
NF	NON-FUSED		
NIC	NOT IN CONTRACT		
NL	NIGHT LIGHT EMERGENCY FIXTURE		
NTS	NOT TO SCALE		
OC	ON CENTER		
P	POLE		
PH	PHASE		
PNL	PANEL		
PVC	POLY VINYL CHLORIDE		
RGS	RIGID GALVANIZED STEEL		
SCA	SHORT CIRCUIT AMPS		
SEC	SECURITY CABINET		
SF	SQUARE FOOT		
SP	SPACE		
SPD	SURGE PROTECTION DEVICE		
SPST	SINGLE POLE SINGLE THROW		

(NOT ALL SYMBOLS AND ABBREVIATIONS ARE USED ON THIS PROJECT)

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ELECTRICAL -
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