WIRE GUARD

XFMR TRANSFORMER

WEATHERPROOF

EXPLOSION PROOF

DIVISION 26 SECTION 26 00 10S ELECTRICAL COMMON WORK RESULTS FOR ELECTRICAL

PART 1 — GENERAL

- 1.1 IT IS THE INTENT OF THESE DOCUMENTS THAT A COMPLETE AND WORKABLE ELECTRICAL INSTALLATION IS PROVIDED FOR ALL THE ELECTRICAL PRODUCTS DESCRIBED, OR SHOWN AS BEING PART OF THIS CONTRACT. PROVIDE ALL MATERIALS AND LABOR TO FURNISH AND INSTALL ALL APPARATUS, MATERIALS, EQUIPMENT AND APPURTENANCES, IN A FASHION COMPLYING WITH ALL APPLICABLE CODES, INCLUDING ITEMS REQUIRED BUT NOT NORMALLY SHOWN, SUCH AS LAMPS, COUPLINGS, HANGERS, BRACKETS, CLAMPS, BOXES, CONNECTORS, HARDWARE, MISCELLANEOUS IRON AND STEEL, WELDING, COMMISSIONING AND TESTING. APPLY FOR AND PAY FOR ALL PERMITS, FEES, LICENSES AND INSPECTIONS FOR THIS DIVISION OF WORK.
- 1.2 PROVIDE ALL ELECTRICAL EQUIPMENT AND MATERIAL IN ACCORDANCE WITH REQUIREMENTS OF LOCAL BUILDING CODES, GOVERNING AUTHORITIES, AND AS SPECIFIED, WHERE A CONFLICT EXISTS BETWEEN ANY CODES AND THE WORK SHOWN WITHIN THESE DOCUMENTS, THE MORE STRINGENT REQUIREMENT SHALL GOVERN.
- 1.3 COMPLY WITH THE REQUIREMENTS OF THE GENERAL CONDITIONS, SUPPLEMENTAL GENERAL CONDITIONS OF THE PROJECT SPECIFICATIONS, ALL CONTRACT DOCUMENTS, AND ANY BASE BUILDING SPECIFICATIONS AND BUILDING CRITERIA INCLUDED IN THIS PROJECT.
- A. INSTRUCTIONS SUCH AS "PROVIDE" SHALL MEAN THE SAME AS THOUGH THE WORDS "THE CONTRACTOR SHALL" PRECEDE EACH SUCH
- B. "PROVIDE" SHALL MEAN "FURNISH AND INSTALL, COMPLETE AND READY FOR THE INTENDED USE." 1.5 COORDINATE AND SCHEDULE THE PROGRESS OF ELECTRICAL WORK TO CONFORM TO THE OWNER'S SCHEDULE AND THE PROGRESS OF THE WORK OF OTHER TRADES. FOR CONNECTIONS TO MECHANICAL EQUIPMENT AND THE ASSOCIATED CONDUIT AND WIRE REQUIRED BUT NOT SHOWN ON THESE DOCUMENTS, REFER TO THE MECHANICAL AND PLUMBING DOCUMENTS. COORDINATE ALL SUCH CONNECTIONS WITH THE AFFECTED TRADES.
- 1.6 PROVIDE A ONE YEAR WARRANTY ON ALL MATERIAL, EQUIPMENT, APPURTENANCES, AND INSTALLATION, FROM THE DATE OF ACCEPTANCE. IF, AFTER HAVING RECEIVED NOTICE FROM THE OWNER, DEFECTS ARE NOT CORRECTED WITHIN A REASONABLE TIME. THE OWNER WILL HAVE THE RIGHT TO SECURE THE NECESSARY WORK FROM ANOTHER PARTY AND TO BILL THE CONTRACTOR FOR THE COST OF SUCH WORK.
- 1.7 PROVIDE TEMPORARY LIGHTING AND POWER AS REQUIRED.
- 1.8 THE LIMITS OF WORK FOR THIS EFFORT IS FOR ENTIRE FLOORS WHERE WORK IS BEING PERFORMED AS INDICATED ON THE PLAN DRAWINGS. EXTEND THE EFFORT BEYOND THE INDICATED FLOORS ONLY AS REQUIRED TO DOCUMENT BRANCH CIRCUITS FED FROM LOCAL PANELBOARDS FEEDING UTILIZATION DEVICES ON OTHER FLOORS, OR BRANCH CIRCUITS ORIGINATING ON OTHER FLOORS FEEDING UTILIZATION DEVICES ON THE INDICATED FLOORS.
- 1.9 PERFORM THE WORK IN COOPERATION WITH THE AREA OCCUPANTS TO MINIMIZE INTERFERENCE WITH THEIR ACTIVITIES. WORK CAN BE PERFORMED DURING NORMAL WORKING HOURS. WHEN REQUIRED BY THE OWNER, PERFORM THE WORK DURING AFTERHOURS. SCHEDULE WORK A MINIMUM OF ONE WEEK IN ADVANCE.
- 1.10 VISIT THE PROJECT SITE BEFORE SUBMITTING A BID; NO EXTRAS WILL BE ALLOWED FOR LACK OF KNOWLEDGE OF EXISTING CONDITIONS. THESE DRAWINGS HAVE BEEN PREPARED BASED ON INFORMATION PROVIDED BY OTHERS. DATA PRESENTED ON THIS DRAWING IS AS ACCURATE AS CAN BE DETERMINED, BUT ACCURACY IS NOT GUARANTEED. THE ENGINEER IS NEITHER RESPONSIBLE FOR ACCURACY NOR ERRORS NOR OMISSIONS THAT MAY HAVE BEEN INCORPORATED INTO THESE DOCUMENTS. FIELD VERIFICATION OF ALL AFFECTED COMPONENTS IS REQUIRED.
- 1.11 THESE DRAWINGS ARE DIAGRAMMATIC IN CHARACTER AND DO NOT SHOW MATERIALS FOR A COMPLETE INSTALLATION. THESE DOCUMENTS INDICATE DESIRED LOCATIONS AND ARRANGEMENT OF ELECTRICAL COMPONENTS, CONDUIT RUNS, OUTLETS, AND EQUIPMENT; FOLLOW LOCATIONS AS CLOSELY AS POSSIBLE. TAKE ALL DIMENSIONS FROM ARCHITECTURAL DRAWINGS, CERTIFIED EQUIPMENT DRAWINGS, AND FROM THE STRUCTURE ITSELF BEFORE FABRICATING ANY WORK. PROPER JUDGEMENT MUST BE EXERCISED IN EXECUTING WORK TO SECURE THE BEST POSSIBLE INSTALLATION IN THE AVAILABLE SPACE AND TO OVERCOME LOCAL DIFFICULTIES DUE TO SPACE LIMITATIONS OR INTERFERENCE WITH STRUCTURAL OR ARCHITECTURAL CONDITIONS. PROVIDE ALL DEVIATIONS FROM THESE DOCUMENTS REQUIRED TO CONFORM TO THE STRUCTURE OR TO FIT THE INSTALLED WORK OF OTHER TRADES AND CONTRACTORS WITHOUT ADDITIONAL COST TO THE OWNER.
- 1.12 SUBMITTALS
- A. SUBMIT SHOP DRAWINGS FOR ACCEPTANCE FOR SYSTEMS DESCRIBED IN THESE SPECIFICATIONS. AT COMPLETION OF WORK, DELIVER TO ARCHITECT/OWNER COMPLETED PROJECT RECORD DOCUMENTS MARKED WITH FIELD CHANGES; SUBMIT ALL MANUFACTURER'S DATA, HANDBOOKS, SCHEMATICS, ORDERING INFORMATION FOR ALL COMPONENTS
- B. REVIEW EACH SUBMITTAL AND CHECK FOR COORDINATION WITH OTHER WORK OF THE CONTRACT AND FOR COMPLIANCE WITH THE CONTRACT DOCUMENTS. NOTE CORRECTIONS AND FIELD DIMENSIONS. MARK WITH APPROVAL STAMP BEFORE SUBMITTING TO THE ARCHITECT AND CONSTRUCTION MANAGER.
- C. STAMP EACH SUBMITTAL WITH A UNIFORM, APPROVAL STAMP. INCLUDE PROJECT NAME AND LOCATION, SUBMITTAL NUMBER, SPECIFICATION SECTION TITLE AND NUMBER. NAME OF REVIEWER. DATE OF CONTRACTOR'S APPROVAL, AND STATEMENT CERTIFYING THAT SUBMITTAL HAS
- BEEN REVIEWED, CHECKED, AND APPROVED FOR COMPLIANCE WITH THE CONTRACT DOCUMENTS. D. COORDINATE PREPARATION AND PROCESSING OF SUBMITTALS WITH PERFORMANCE OF CONSTRUCTION ACTIVITIES. COORDINATE EACH SUBMITTAL WITH FABRICATION, PURCHASING, TESTING, DELIVERY, OTHER SUBMITTALS, AND RELATED ACTIVITIES THAT REQUIRE SEQUENTIAL ACTIVITY. COORDINATE TRANSMITTAL OF DIFFERENT TYPES OF SUBMITTALS FOR RELATED PARTS OF THE WORK SO PROCESSING WILL NOT BE DELAYED BECAUSE OF NEED TO REVIEW SUBMITTALS CONCURRENTLY FOR COORDINATION. ARCHITECT AND CONSTRUCTION MANAGER RESERVE THE RIGHT TO WITHHOLD ACTION ON A SUBMITTAL REQUIRING COORDINATION WITH OTHER SUBMITTALS UNTIL RELATED

SUBMITTALS ARE RECEIVED. 1.13 RECORD DOCUMENTS

- A. MAKE CAREFUL REVIEW AND INVESTIGATION TO DOCUMENT THE EXISTING BRANCH CIRCUIT LAYOUT AND OUTLET LOCATIONS FOR THE FOLLOWING SYSTEMS: LIGHTING, RECEPTACLES, MOTORS, EMERGENCY SYSTEMS, ACCESS CONTROLS (POWER ONLY), SECURITY SURVEILLANCE SYSTEMS (POWER ONLY), AND THE BRANCH CIRCUITS PROVIDING POWER TO ANY OTHER COMPONENTS IN THE REQUIRED
- B. INCLUDE DOCUMENTATION OF OUTLET LOCATION AND TYPE, BRANCH CIRCUIT, CONDUCTOR AND RACEWAY SIZE. EXECUTE DOCUMENTATION UPON DOCUMENTS PROVIDED BY THE ENGINEER, WHICH WILL INDICATE THE BEST KNOWN "AS-BUILT" CONDITIONS OF THE LIMITS OF WORK. MAKE DOCUMENTATION LEGIBLE, COMPLETE, WITH A DATE AND SIGNATURE OF THE RESPONSIBLE INDIVIDUAL DESIGNATED BY THE
- C. PERFORM THE WORK USING CIRCUIT TRACING DEVICES THAT DO NOT REQUIRE ANY INTERRUPTIONS OR INTERFERENCE WITH THE POWER ON THE SYSTEM.
- D. DOCUMENT ALL PANEL SCHEDULES ON AN APPROVED FORM. AFTER REVIEW AND AUTHORIZATION BY THE ENGINEER, PROVIDE TYPEWRITTEN PANEL DIRECTORIES FOR ALL PANELBOARDS ON THE INDICATED FLOORS. FOR EACH PANELBOARD SCHEDULE INDICATE THE FOLLOWING: FEEDER SIZE. MATERIAL, ORIGIN AND CONDUIT SIZE; BUS SIZE AND MATERIAL; MAIN BREAKER SIZE; PANEL TYPE; BOLT-ON OR PLUG-IN TYPE BREAKERS; SHORT CIRCUIT RATING; BREAKER SIZES AND POLE DESIGNATION; QUANTITY OF BREAKER SPACE.

- 2.1 MATERIALS SHALL BE NEW AND IN PERFECT CONDITION; ALL MATERIALS FOR SIMILAR USES SHALL BE OF THE SAME TYPE, MATERIAL, AND MANUFACTURER. MATERIALS SHALL BE LISTED BY A RECOGNIZED NRTL OR BEAR A UL LABEL WHERE SUBJECT TO SUCH APPROVAL AND COMPLY WITH ANSI, IEEE AND NEMA STANDARDS. MAKE PROVISIONS FOR SAFE DELIVERY AND SECURE STORAGE OF ALL MATERIALS.
- 2.2 CONNECTORS AND FITTINGS SHALL BE MANUFACTURED BY APPLETON, STEEL CITY, T & B, TOMIC, RACO, OR O.Z./GEDNEY.
- 2.3 FUSES SHALL BE MANUFACTURED BY BUSSMANN, LITTLEFUSE, OR MERSEN.
- 2.4 CONDUITS SHALL BE RIGID STEEL, INTERMEDIATE METAL CONDUIT, ELECTRICAL METALLIC TUBING, FLEXIBLE METALLIC CONDUIT, LIQUID TIGHT FLEXIBLE CONDUIT, NON-METALLIC, REINFORCED THERMOSETTING RESIN CONDUIT, AND RIGID PVC SCHEDULE 40. UNLESS SPECIFICALLY SHOWN TO BE LARGER, ALL CONDUITS SHALL BE SIZED PER THE NEC.
- 2.5 SURFACE RACEWAYS SHALL BE WIREMOLD OR APPROVED EQUAL. ALL WIREMOLD G-3000, G-4000, G-6000, RACEWAYS TO INCLUDE DIVIDER TO SEPARATE POWER FROM TELECOM AND DATA. PROVIDE EXPANSION JOINTS IN ACCORDANCE WITH MANUFACTURER'S RECOMMENDATIONS. 2.6 LOW-VOLTAGE ELECTRICAL POWER CONDUCTORS AND CABLES
- A. CONDUCTORS SHALL BE MANUFACTURED BY ALPHA, CAROL BRAND, COLONIAL, TRIANGLE, ENCORE, GENERAL CABLE, OKONITE, SENATOR, OR
- B. CONDUCTORS SHALL BE COPPER, 600 V, TYPE THW, THWN, OR THHN. CONDUCTORS #10 AND SMALLER SHALL BE SOLID; #8 GAUGE AND LARGER SHALL BE STRANDED. MINIMUM WIRE SIZE SHALL BE #12; EXCEPT USE #14 FOR CONTROL WIRING. CONDUCTORS #1/0 AND LARGER SHALL BE THW, THWN, XHHW, OR RHW-USE. THE USE OF ALUMINUM CONDUCTORS IS PROHIBITED.
- C. CONDUCTORS #1 AND SMALLER SHALL HAVE A MINIMUM 60°C RATING. FOR WET LOCATIONS, AND WHERE DERATED DUE TO HIGH AMBIENT TEMPERATURE, PROVIDE CONDUCTORS SUITABLE FOR WET LOCATIONS WITH MINIMUM 90°C RATING. D. SIZE AND INSTALL ALL CONDUCTORS PER THE NEC.
- E. INCREASE CONDUCTOR SIZE AS NECESSARY TO LIMIT BRANCH CIRCUIT VOLTAGE DROP TO 3%; AND SERVICE/FEEDER VOLTAGE DROP TO
- F. WIRE CONNECTIONS:
- 1. PROVIDE CONNECTORS, LUGS, AND DEVICES RATED FOR 75°C.
- 2. MAKE CONNECTIONS FOR WIRE #8 AWG AND SMALLER WITH TWIST—ON WIRE CONNECTORS. 3. MAKE CONNECTIONS FOR WIRE #6 AWG AND LARGER WITH PROPERLY SIZED SOLDERLESS LUGS OR CONNECTORS.
- G. ASD/VFD MOTOR SUPPLY CABLE:
- 1. MOTOR FEEDER CABLES INSTALLED BETWEEN A 3-PHASE ADJUSTABLE SPEED DRIVE (ASD) OR VARIABLE FREQUENCY DRIVE (VFD) AND A MOTOR SHALL BE SHIELDED MULTI-CONDUCTOR CABLE ASSEMBLY LISTED FOR ASD/VFD MOTOR APPLICATIONS. 2. MANUFACTURERS OF SHIELDED MULTI-CONDUCTOR CABLE ASSEMBLY LISTED FOR ASD/VFD: SERVICE WIRE COMPANY, BELDEN INC., OR APPROVED EQUAL.
- 3. CONDUCTOR INSULATION TYPE:
- a. 480V SYSTEMS AND LOWER: XHHW-2, RHW-2, 90°C WET/DRY b. 600V SYSTEMS: 1000V, XLPE, 90°C WET/DRY
- 4. CABLE ASSEMBLY SHIELD: HELICAL COPPER FOIL TAPE OR CORRUGATED ARMOR.
- 2.7 GROUNDING AND BONDING A. GROUNDING CONDUCTOR MATERIAL: COPPER.
- B. EQUIPMENT GROUNDING CONDUCTORS: INSULATED WITH GREEN-COLORED INSULATION PER COLOR CODING OF PHASE CONDUCTORS
- C. GROUNDING ELECTRODE CONDUCTORS: STRANDED CABLE. D. UNDERGROUND CONDUCTORS: BARE, TINNED, STRANDED, UNLESS OTHERWISE INDICATED.
- 2.8 RACEWAYS AND BOXES FOR ELECTRICAL SYSTEMS
- A. MANUFACTURERS: BOXES SHALL BE MANUFACTURED BY APPLETON, RACO, STEEL CITY, OR THOMAS & BETTS CO.
- B. OUTLET BOXES: 1. FLUSH-MOUNTED OUTLET BOXES SHALL BE GALVANIZED OR ZINC COATED, PRESSED STEEL OUTLET BOXES. BOXES SHALL BE MINIMUM 4-INCHES SQUARE AND OF DEPTH REQUIRED; 1-1/2 INCHES MINIMUM BOX DEPTH. PROVIDE OUTLET BOXES OF PROPER TYPE AND DESIGN FOR THE PARTICULAR LUMINAIRE OR DEVICE TO BE INSTALLED.
- 2. PROVIDE SINGLE OR DOUBLE GANG MUD RING, AS REQUIRED BY THE DEVICE. 3. PROVIDE 3/8-INCHES NO-BOLT LUMINAIRE STUDS.
- C. SURFACE-MOUNTED BOXES SHALL BE CAST METAL, MULTI-GANG AND OF DEPTH REQUIRED.
- D. ALL PULL BOXES SHALL BE CODE GAUGE METAL, UNLESS OTHERWISE SHOWN ON THE DRAWINGS.
- 2.9 IDENTIFICATION
- A. PROVIDE ALL LABELS REQUIRED BY THE NEC.
- B. COLOR CODING OF PHASE CONDUCTORS:
- 1. CONDUCTORS #2 AND SMALLER SHALL BE FACTORY COLOR CODED. CONDUCTORS #1 AND LARGER MAY BE COLOR CODED BY FIELD PAINTING OR COLOR TAPING A 6-INCH LENGTH OF EXPOSED END.
- 2. PROVIDE THE FOLLOWING COLOR CODING FOR THE A-B-C-N-G-IG PHASE SEQUENCE:
- a. 120/240V, 1-PHASE BLACK, RED, WHITE, GREEN
- b. 120/208V, 3-PHASE BLACK, RED, BLUE, WHITE, GREEN, GREEN/WHITE c. 277/480V, 3-PHASE BROWN, ORANGE, YELLOW, GRAY, GREEN/GRAY, GREEN/YELLOW
- d. SWITCH TRAVELERS PINK, PURPLE, AND TURQUOISE
- 3. WIRING FOR CONTROL SYSTEMS SHALL BE COLOR CODED IN ACCORDANCE WITH THE WIRING DIAGRAMS FURNISHED WITH THE EQUIPMENT.

- C. PROVIDE 3/8-INCHES TAPE LABELS ON ALL RECEPTACLES AND SWITCHES THAT INDICATES PANELBOARD AND CIRCUIT NUMBER. LABELS SHALL BE: 1. NORMAL BRANCH BLACK BACKGROUND WITH WHITE LETTERING
- LABELS SHALL BE OF SUFFICIENT DURABILITY TO WITHSTAND THE ENVIRONMENT. EACH PANEL SHALL HAVE A SCREW MOUNTED NAMEPLATE FABRICATED FROM LAMINATED BLACK PHENOLIC WITH WHITE CENTER. THE 3/8-INCHES HIGH VERTICAL ENGRAVED LETTERING SHALL SHOW PANEL DESIGNATION, VOLTAGE, PHASE, FREQUENCY, THE AIC RATING, AND WHERE THE PANEL IS FED FROM; I.E., PANEL AND CIRCUIT
- D. PROVIDE UPDATED PANEL DIRECTORIES FOR ALL PANELBOARDS AFFECTED BY CONSTRUCTION. TYPE PANEL DIRECTORIES IN ACCORDANCE WITH THE DRAWING PANEL SCHEDULES, INCORPORATE CHANGES THAT WERE MADE IN THE FIELD. LIST WHERE PANEL IS FED FROM; I.E.,
- E. PROVIDE LABELING FOR RACEWAYS AND CABLES. 1. POWER-CIRCUIT IDENTIFICATION: METAL TAGS OR ALUMINUM, WRAPAROUND MARKER BANDS FOR CABLES, FEEDERS, AND POWER CIRCUITS IN VAULTS, PULL AND JUNCTION BOXES, MANHOLES, AND SWITCHBOARD ROOMS.
- 2. CONDUCTORS: INDICATE SOURCE AND CIRCUIT NUMBERS. F. MULTIPLE POWER OR LIGHTING CIRCUITS IN SAME ENCLOSURE: IDENTIFY EACH CONDUCTOR WITH SOURCE, VOLTAGE, CIRCUIT NUMBER, AND PHASE. USE COLOR-CODING TO IDENTIFY CIRCUITS' VOLTAGE AND PHASE.

- A. DEVICE PLATES SHALL BE, SCREW-ON, BRUSHED STAINLESS STEEL. EMERGENCY POWER DEVICES SHALL BE RED COLOR. ISOLATED GROUND DEVICES SHALL BE ORANGE COLOR.
- B. WALL PLATES IN UNFINISHED SPACES SHALL BE BRUSHED STAINLESS STEEL.
- C. DEVICES SHALL BE AS SPECIFIED OR APPROVED EQUAL BY ARROW HART, BRYANT, GENERAL ELECTRIC, HUBBELL, LEVITON, PASS & SEYMOUR, OR SQUARE-D. 1. A-C QUIET OPERATING TYPE SWITCHES, THAT ARE NOT INTEGRAL TO LIGHTING CONTROL SYSTEM, SHALL BE: 120/277V, 20A HUBBELL
- HBL1221 SERIES, OR APPROVED EQUAL. 2. MOMENTARY-CONTACT LIGHT SWITCHES, THAT ARE NOT INTEGRAL TO LIGHTING CONTROL SYSTEM, SHALL BE 120/277V, 20 AMP, SPDT, NORMALLY-OPEN, CENTER-OFF, THREE-POSITION, HUBBELL CATALOG NO. HBL1557. 3. SPECIFICATION GRADE RECEPTACLES: 20A HUBBELL HBL5362 SERIES. WHERE A SINGLE DEVICE IS INSTALLED ON A BRANCH CIRCUIT THE DEVICE RATING SHALL MATCH THE CIRCUIT BREAKER RATING.
- 4. SPECIAL PURPOSE RECEPTACLES SHALL BE SPECIFICATION GRADE, STANDARD COLOR, AND OF THE APPROPRIATE CODE AND NEMA CONFIGURATION TO MATCH THE SUPPLY CIRCUIT AND LOAD INVOLVED. 5. HOSPITAL GRADE RECEPTACLES: 20A HUBBELL HBL8300 SERIES, OR APPROVED EQUAL
- 6. GFCI RECEPTACLES: 20A HUBBELL GF20 SERIES.

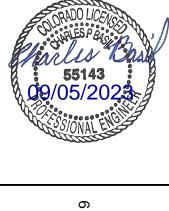
PART 3 – INSTALLATION

- A. PROVIDE ALL CORE DRILLING, CHANNELING, CUTTING, PATCHING, AND SLEEVES REQUIRED FOR INSTALLATION OF ELECTRICAL EQUIPMENT. SEAL HOLES, FIREPROOF WHERE NECESSARY, AND REFINISH ALL WORK TO ORIGINAL CONDITION WHERE DAMAGED BY ELECTRICAL WORK. B. PROVIDE HANGERS AND SUPPORTS FOR EQUIPMENT, RACEWAYS, AND CABLES, INCLUDING WEIGHT OF WIRE IN RACEWAYS.
- C. USE STEEL MATERIAL FOR DRY LOCATIONS.
- D. PAINT ALL EXPOSED CONDUIT, SUPPORTS, BOXES, ETC., TO MATCH SURROUNDING CEILING AND WALLS.
- E. CLEAN THE AREA AFTER WORK IS COMPLETED, AND AT THE END OF EACH WORK DAY.
- F. DO NOT USE CEILING GRID SUPPORT WIRES TO SUPPORT CONDUIT.
- G. PRESERVE AND PROTECT USABLE CONDITION OF ALL EQUIPMENT TO BE REMOVED AND REINSTALLED. REPLACE ANY EQUIPMENT DAMAGED
- H. PROVIDE ALL CUTTING AND PATCHING NECESSARY FOR THE WORK. PATCH AND PAINT DAMAGED SURFACES TO MATCH EXISTING CONDITIONS DUE TO DEMOLITION AND DAMAGE CAUSED DURING WORK. 3.2 CONDUIT LOCATIONS:
- A. PROVIDE ELECTRICAL METALLIC TUBING (EMT) FOR ALL DRY, ABOVE GRADE OR ABOVE FLOOR APPLICATIONS IN ACCORDANCE WITH THE
- B. PROVIDE RIGID METAL CONDUIT (RMC) FOR ABOVE AND BELOW GRADE APPLICATIONS IN ACCORDANCE WITH THE NEC. PROVIDE THREADED COUPLINGS FOR RMC. PROVIDE RMC INDOORS WHERE EXPOSED BELOW 96-INCHES. ALL INSTALLATIONS EXPOSED OUTDOORS, IN CRAWL SPACES, IN LOCATIONS SUBJECT TO MECHANICAL INJURY, FOR ALL ELBOWS ON ABOVE GRADE PVC CONDUIT INSTALLATIONS, AND WHERE INDICATED ON THE DRAWINGS.

- A. ROUTE ALL CONDUIT PARALLEL OR PERPENDICULAR WITH THE BUILDING WALLS. SUPPORT CONDUIT AS REQUIRED BY THE NEC. INSTALL GROUPED CONDUIT USING SWEEPS STRUCK FROM THE SAME RADIUS. PERFORM WORK BY SKILLED TRADESMEN USING THE BEST STANDARD PRACTICES OF THE TRADE.
- B. CONCEAL ALL CONDUITS IN FINISHED AREAS. MINIMUM CONDUIT SIZE 3/4 INCHES.
- C. UNLESS INDICATED OTHERWISE, ENCLOSE ALL CONDUCTORS IN CONDUIT SIZED IN ACCORDANCE WITH THE NEC.
- D. PROVIDE SUPPORTS AND HANGARS FOR A GOOD AND SUBSTANTIAL INSTALLATION. SUPPORT CONDUIT AND RACEWAY IN ACCORDANCE WITH THE NEC. SUPPORT RACEWAYS, LUMINAIRES, CABINETS, BOXES, ETC., ON APPROVED TYPES OF TRAPEZE HANGERS OR WALL BRACKETS. PROVIDE MINIMUM 3/8-INCH STEEL HANGER RODS SECURELY FASTENED TO THE BUILDING STRUCTURE FOR ALL TRAPEZES. PROVIDE FASTENERS SUCH AS "CADDY CLIPS" OR SIMILAR TYPE OF OTHER MANUFACTURER. DO NOT SUSPEND FROM MECHANICAL PIPING OR DUCTWORK OR FROM CEILING SUSPENSION WIRE. PERFORATED PLUMBER'S STRAPS OR WIRE ARE NOT PERMITTED.
- E. MAKE ALL BENDS USING AN APPROVED BENDING TOOL AND REAM ALL CUTS TO REMOVE BURRS. CLEAN AND DRY ALL CONDUITS PRIOR TO PULLING CONDUCTORS.
- F. SEAL ALL FIREWALL AND FLOOR PENETRATIONS WITH APPROPRIATE SEALANT AT BOTH SIDES AFTER INSTALLATION OF CONDUITS.
- G. USE STEEL COMPRESSION FITTINGS THROUGHOUT; DIE CAST ZINC FITTINGS ARE PROHIBITED.
- H. DO NOT RUN ANY CONDUIT IN A SLAB WHERE THE CONDUIT DIAMETER EXCEEDS 1/3 THE THICKNESS OF THE SLAB. LOCATE EMBEDDED CONDUIT WITHIN THE INNER 1/3 OF THE SLAB. WHERE EMBEDDED CONDUITS RUN IN PARALLEL, SPACE CONDUITS NOT LESS THAN 3-INCHES APART. WHERE EMBEDDED CONDUITS CROSS, THICKEN THE SLAB PROPORTIONATELY OVER AN AREA TEN TIMES THE DIAMETER OF THE LARGEST CONDUIT.
- I. IN EACH CONDUIT WITHOUT CONDUCTORS, PROVIDE A NYLON PULLING CORD WITH A TAG IDENTIFYING THE LOCATION OF THE OPPOSITE
- J. PROVIDE EXPANSION TYPE FITTINGS FOR ALL CONDUITS WHICH CROSS EXPANSION JOINTS.
- K. PROVIDE ALL REQUIRED PULL BOXES AND JUNCTION BOXES. SIZE BOXES IN ACCORDANCE WITH THE NEC.
- L. PROVIDE SLEEVES WHERE RACEWAYS PASS THROUGH CONCRETE CONSTRUCTION. WHERE HORIZONTAL RACEWAYS PASS THROUGH WALLS AND VERTICAL RACEWAYS PASS THROUGH FLOORS, SEAL OFF VOID BETWEEN OPENING AND RACEWAY USING FIRE RATED SEALANTS THAT MEET THE FIRE RATING OF THE WALL OR FLOOR PENETRATED.
- M. AVOID PROXIMITY OF CONDUIT TO SOURCES OF HEAT SUCH AS FLUES AND HOT WATER LINES.
- A. ROUTE ALL CONDUCTORS THROUGH RACEWAY REGARDLESS OF VOLTAGE APPLICATION, UNLESS SPECIFIED OTHERWISE.
- B. UNLESS OTHERWISE INDICATED, ALL WIRING FOR BRANCH CIRCUITS SHALL BE #12 AWG PROTECTED BY 20A CIRCUIT BREAKERS. ACCOUNT FOR VOLTAGE DROP, INCREASE CONDUCTOR SIZE FOR ALL 120V CIRCUITS OVER 75 FEET, AND ALL 277V CIRCUITS OVER 150 FEET. PROVIDE UNIFORM CONDUCTOR SIZE FOR THE ENTIRE LENGTH OF THE CIRCUIT UNLESS NOTED OTHERWISE. HOMERUNS THAT INDICATE UPGRADING CIRCUIT CONDUCTORS FOR VOLTAGE DROP, E.G., #10 AWG WIRE ON 20A CIRCUIT, SHALL HAVE THE INDICATED CONDUCTOR SIZE CARRIED THROUGHOUT THE CIRCUIT TO ALL JUNCTION BOXES UP TO AND INCLUDING THE J-BOX NEAREST THE LAST DEVICE OR OUTLET.
- C. DO NOT SPLICE FEEDERS OR DEDICATED BRANCH CIRCUITS UNLESS OTHERWISE INDICATED. INSTALL ALL WIRE CONTINUOUS FROM OUTLET TO OUTLET AND TERMINAL TO TERMINAL. PROVIDE SPLICES IN CABLES WHEN REQUIRED UTILIZING SOLDERLESS CONNECTORS IN HANDHOLES, PULL BOXES, OR JUNCTION BOXES. MAKE UP SPLICES IN OUTLET BOXES WITH 8 INCHES OF CORRECTLY COLOR-CODED TAILS LEFT IN BOX. MAKE SPLICES IN WIRES SIZE #8 AWG AND SMALLER WITH INSULATED SPRING TYPE WIRE CONNECTORS, "SCOTCHLOK." MAKE SPLICES IN LARGER WIRE AND CABLES WITH INDENT CONNECTORS. ALL INSULATING TAPE USED ON CIRCUITS OF 600V AND LESS SHALL BE 3-M #88 OR PLYMOUTH SLIPKNOT GREY.
- D. MAKE CONNECTIONS, SPLICES, TAPS AND JOINTS WITH SOLDERLESS DEVICES, MECHANICALLY AND ELECTRICALLY SECURE. PROVIDE ONLY APPROVED CONNECTORS IN WET OR DAMP AREAS.
- E. INSTALL COMPRESSION CONNECTORS WITH HYDRAULIC DIE, EMBOSSING DIE CODE INTO CONNECTOR. CONNECT TO BUS WITH BELLEVILLE TYPE WASHERS FOR POSITIVE PRESSURE OVER COMPLETE CONTACT AREA. INSULATE WITH 600V HEAT SHRINK HEAVY-WALL CABLE
- F. INSTALL WIRING FOR CONTROL SYSTEMS IN CONJUNCTION WITH MECHANICAL AND MISCELLANEOUS EQUIPMENT.
- G. MAKE ALL GROUND, NEUTRAL, AND LINE CONNECTIONS TO RECEPTACLE AND WIRING DEVICE TERMINALS BY MEANS OF THE SIDE TERMINAL SCREW CONNECTIONS. DO NOT TERMINATE BRANCH CONDUCTORS TO THE DEVICE WITH BACKSIDE "PUSH-IN" CONNECTORS. PROVIDE GROUND JUMPER FROM OUTLET BOX TO GROUND TERMINAL OF RECEPTACLE.

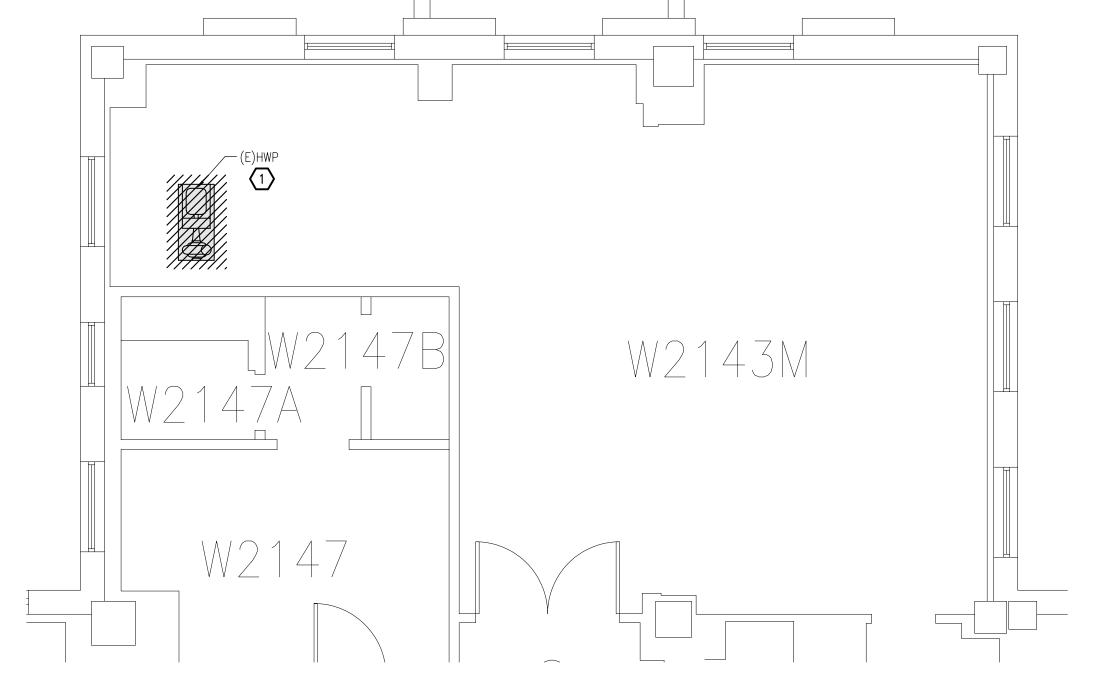
- A. PROVIDE ALL BONDING JUMPERS AND WIRE, GROUNDING BUSHINGS, CLAMPS, FOR COMPLETE GROUNDING. INSTALL COMPLETE GROUNDING SYSTEM IN ACCORDANCE WITH NEC AND AS INDICATED.
- B. BOND CONDUIT SYSTEMS, SUPPORTS, CABINETS, EQUIPMENT, METALLIC CABLE TRAYS, INTERIOR METAL PIPING SYSTEMS, VENT STACKS, AND METAL AIR DUCTS TO EQUIPMENT GROUNDING CONDUCTORS OF ASSOCIATED PUMPS, FANS, BLOWERS, ELECTRIC HEATERS, AND AIR CLEANERS. BOND ALL HEATING AND VENTILATION DUCT RUNS CONTAINING FLEXIBLE JOINTS IN A MINIMUM OF TWO PLACES WITH BRAIDED-TYPE BONDING STRAPS AND GROUNDING LUGS. PROVIDE CONNECTIONS WITH A MACHINE SCREW, HEX NUT, AND LOCK
- C. GROUND CONNECTIONS SHALL HAVE CLEAN CONTACT SURFACES, TINNED AND SWEATED WHILE BOLTING.
- D. INSTALL ALL GROUND CONDUCTORS IN CONDUIT. PROVIDE A SEPARATE INSULATED GROUND CONDUCTOR IN ALL FEEDERS AND BRANCH

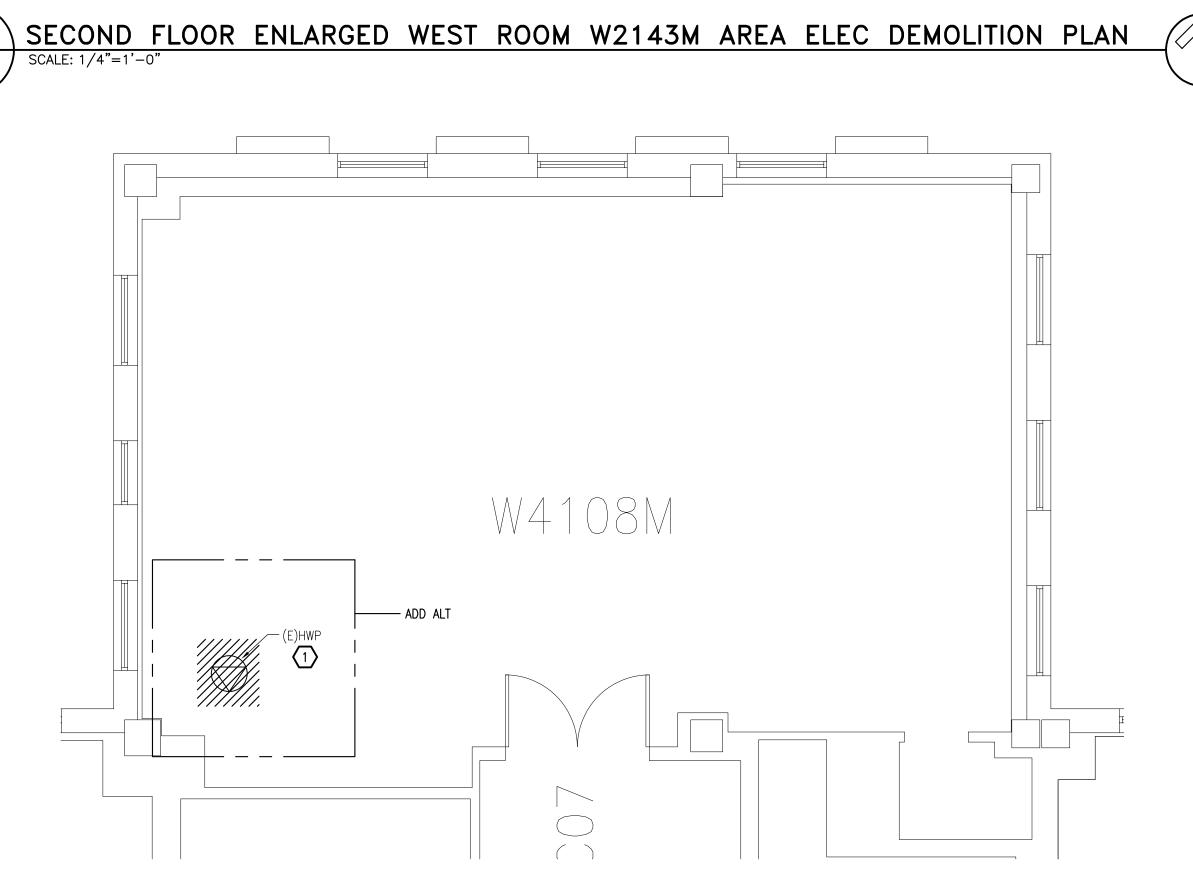
- A. LOCATE OUTLET BOXES SO THAT TRANSMISSION OF SOUND THROUGH COMMON WALLS WILL NOT OCCUR.
- B. EXCEPT WHERE INDICATED OTHERWISE, MOUNT DEVICES IN ACCORDANCE WITH THE FOLLOWING: 1. CONVENIENCE RECEPTACLES: LONG AXIS VERTICALLY 18-INCHES AFF
- 2. LIGHT SWITCHES: 44-INCHES AFF
- 3. STANDARD VOICE/DATA: LONG AXIS VERTICALLY 18-INCHES AFF 4. VOICE/DATA OUTLET MARKED AS WALL: 44-INCHES AFF
- C. MOUNT TELEPHONE OUTLETS AT THE SAME HEIGHT AS ADJACENT RECEPTACLE OUTLETS, UNLESS NOTED OTHERWISE.
- D. DO NOT USE "BACK-TO-BACK" OUTLETS IN THE SAME WALL, OR "THRU-WALL" TYPE BOXES. PROVIDE (MINIMUM) 12-INCH-LONG NIPPLE TO OFFSET ALL OUTLETS SHOWN ON OPPOSITE SIDES OF A COMMON WALL TO MINIMIZE SOUND TRANSMISSION.





REV: 06/29/2020

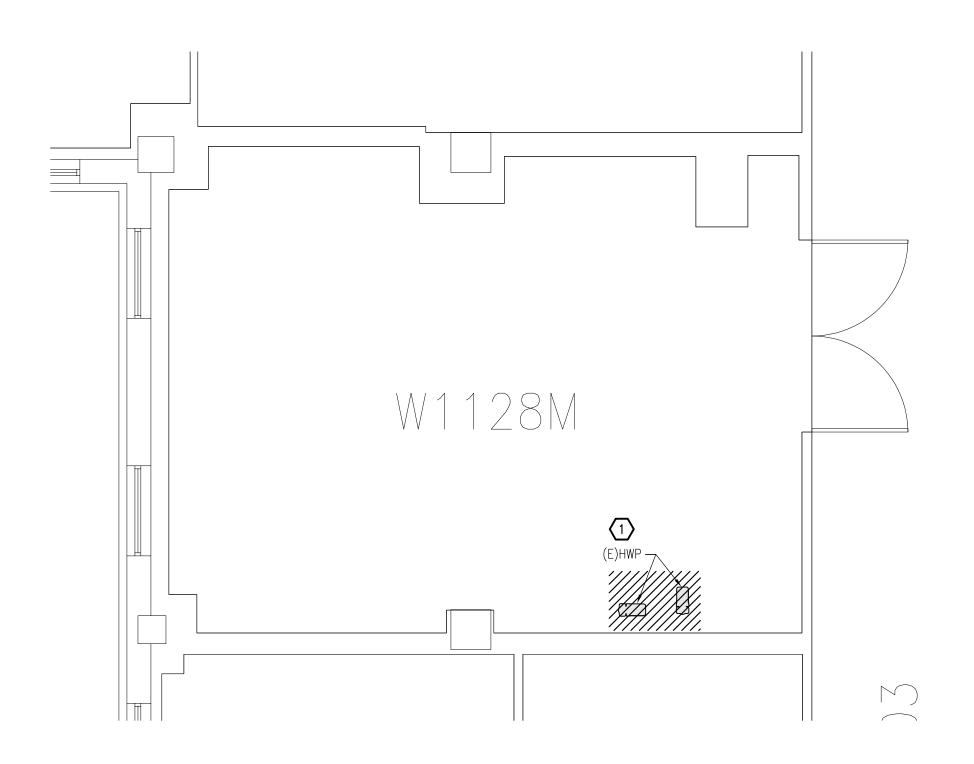




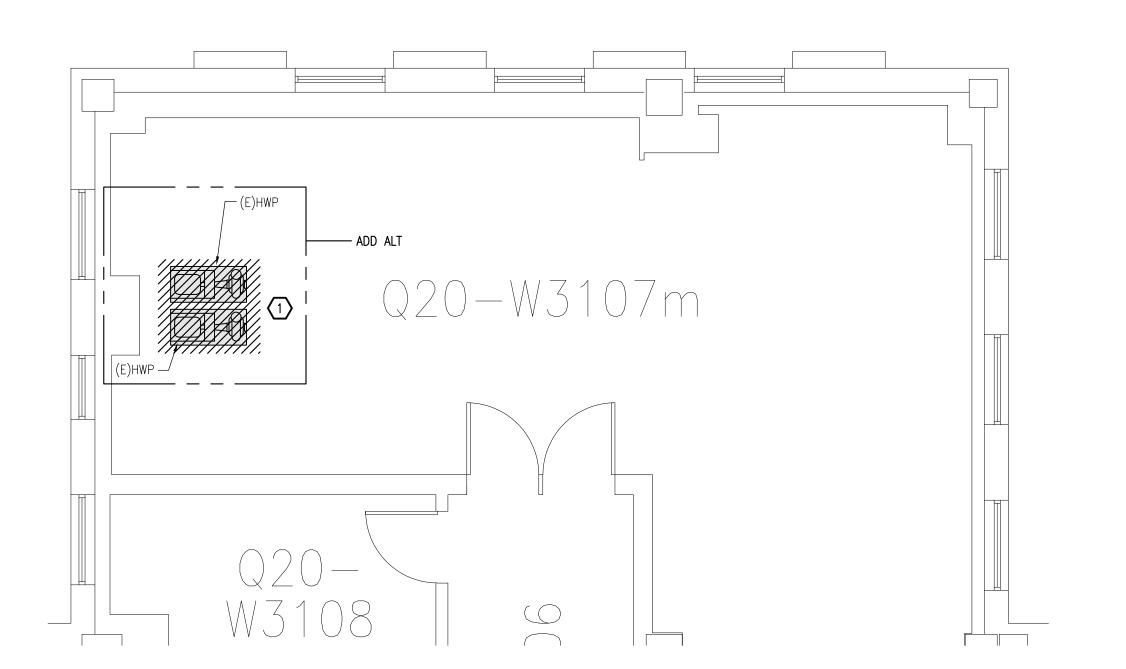
FOURTH FLOOR ENLARGED WEST ROOM W4108M AREA ELEC DEMOLITION PLAN

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

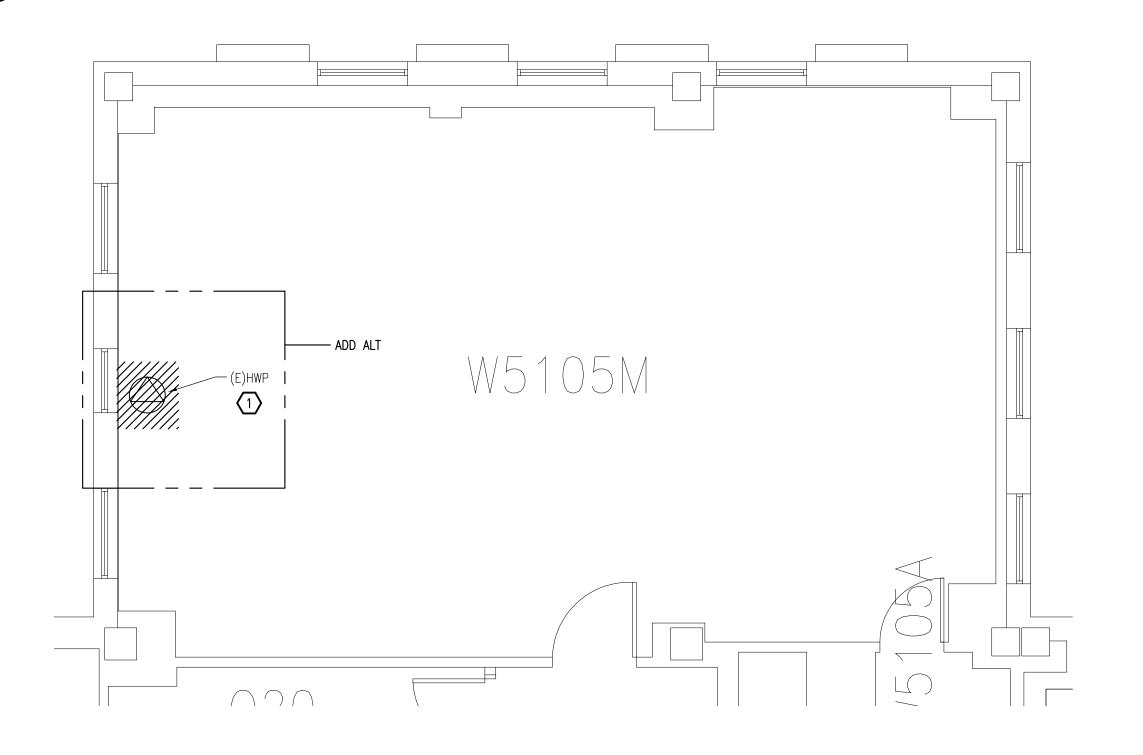
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FIRST FLOOR ENLARGED WEST ROOM W1128M AREA ELEC DEMOLITION PLAN SCALE: 1/4"=1'-0"



THIRD FLOOR ENLARGED WEST ROOM W3107M AREA ELEC DEMOLITION PLAN SCALE: 1/4"=1'-0"



FIFTH FLOOR ENLARGED WEST ROOM W5105M AREA ELEC DEMOLITION PLAN

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

SHEET NOTES

1. LIGHT LINE WEIGHT INDICATES EXISTING. HATCHING INDICATES DEMOLITION.

2. UNLESS OTHERWISE INDICATED, DEMOLITION WASTE BECOMES PROPERTY OF CONTRACTOR. REMOVE DEMOLITION WASTE MATERIALS FROM PROJECT SITE AND DISPOSE OF THEM IN AN APPROVED CONSTRUCTION AND DEMOLITION WASTE LANDFILL ACCEPTABLE TO AUTHORITIES HAVING

3. COORDINATE DISPOSAL LOCATION WITH OWNERS REPRESENTATIVE PRIOR TO DISPOSING OF ANY REMOVED ELECTRICAL EQUIPMENT.

4. PATCH AND PAINT ANY DAMAGED SURFACES DUE TO DEMOLITION AND CONSTRUCTION TO MATCH EXISTING CONDITIONS. SEAL ALL PENETRATIONS THROUGH RATED CEILINGS AND WALLS WITH UL LISTED SEALANTS AND FIRESTOPPING MATERIALS.

5. UPDATE PANEL SCHEDULES TO REFLECT INSTALLED CONDITIONS AFTER CONSTRUCTION IS

6. WORK SHOWN HATCHED IS EXISTING TO BE REMOVED. REMOVE ALL DEVICES ON WALLS WHICH ARE REMOVED. WHERE DEVICES ARE REMOVED, REMOVE ASSOCIATED CIRCUIT CONDUCTORS AND CONDUIT BACK TO THE SERVING PANELBOARD OR NEXT DEVICE ON THE CIRCUIT WHICH REMAINS (MAINTAIN CIRCUIT CONTINUITY).

7. INFORMATION ON THE DRAWINGS HAS BEEN TAKEN FROM RECORD DRAWINGS. DEMOLITION DRAWINGS ARE INTENDED TO GIVE A COMMON BASIS FOR WORK. VISIT THE SITE, PRIOR TO FINAL PRICING AND BECOME FAMILIAR WITH THE EXTENT OF WORK REQUIRED. NO EXTRAS WILL BE ALLOWED FOR ALTERATIONS OF A FORESEEABLE NATURE REQUIRED TO ACHIEVE THE END RESULT AS INDICATED BY THE CONTRACT DOCUMENTS.

8. COORDINATE WITH DIVISION 23 CONTRACTOR FOR ADDITIONAL MECHANICAL DEMOLITION REQUIRING ELECTRICAL CONTRACTOR WORK.

9. REVIEW PROJECT RECORD DOCUMENTS OF EXISTING CONSTRUCTION, OTHER EXISTING CONDITIONS AND HAZARDOUS MATERIAL INFORMATION PROVIDED BY OWNER. OWNER DOES NOT GUARANTEE THAT EXISTING CONDITIONS ARE SAME AS THOSE INDICATED IN PROJECT RECORD DOCUMENTS.

10. THESE DRAWINGS HAVE BEEN PREPARED BASED ON INFORMATION PROVIDED BY OTHERS. DATA PRESENTED ON THIS DRAWING IS AS ACCURATE AS CAN BE DETERMINED, BUT ACCURACY IS NOT GUARANTEED. WHILE THIS INFORMATION IS BELIEVED TO BE RELIABLE, THE ENGINEER IS NEITHER RESPONSIBLE FOR ITS ACCURACY, NOR ERRORS NOR OMISSIONS WHICH MAY HAVE BEEN INCORPORATED INTO THESE DOCUMENTS. FIELD VERIFICATION OF ALL AFFECTED COMPONENTS IS

KEY NOTES

DISCONNECT POWER FROM EXISTING MOTORS TO ACCOMMODATE REMOVAL. REMOVE CONDUIT AND CONDUCTORS BACK TO THEIR SOURCE.

FITZSIMONS BUILDING 500 HEATING UPGRADE MASTERPI

ED3.0

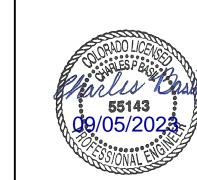


SHEET NOTES

- 1. LIGHT LINE WEIGHT INDICATES EXISTING. HEAVY LINE WEIGHT INDICATES NEW CONSTRUCTION.
- 2. PATCH AND PAINT ANY DAMAGED SURFACES DUE TO DEMOLITION AND CONSTRUCTION TO MATCH EXISTING CONDITIONS. SEAL ALL PENETRATIONS THROUGH RATED CEILINGS AND WALLS WITH UL LISTED SEALANTS AND FIRESTOPPING MATERIALS.
- 3. CONFIRM EXACT MOUNTING LOCATION OF MECHANICAL EQUIPMENT WITH THE MECHANICAL CONTRACTOR PRIOR TO ROUGH-IN.
- 4. COORDINATE CEILING CONDUIT ROUGH-IN WITH MECHANICAL CONTRACTOR TO ENSURE NO CONFLICTS IN LIMITED ABOVE CEILING SPACE.
- 5. UPDATE PANEL SCHEDULES TO REFLECT INSTALLED CONDITIONS AFTER CONSTRUCTION IS
- 6. THESE DRAWINGS HAVE BEEN PREPARED BASED ON INFORMATION PROVIDED BY OTHERS. DATA PRESENTED ON THIS DRAWING IS AS ACCURATE AS CAN BE DETERMINED, BUT ACCURACY IS NOT GUARANTEED. WHILE THIS INFORMATION IS BELIEVED TO BE RELIABLE, THE ENGINEER IS NEITHER RESPONSIBLE FOR ITS ACCURACY, NOR ERRORS NOR OMISSIONS WHICH MAY HAVE BEEN INCORPORATED INTO THESE DOCUMENTS. FIELD VERIFICATION OF ALL AFFECTED COMPONENTS IS

KEY NOTES

- PROVIDE 120V, 20A BRANCH CIRCUIT FOR CONNECTION TO HVAC CONTROL PANEL. COORDINATE FINAL LOCATION AND CONNECTION WITH THE CONTROLS CONTRACTOR.
- PROVIDE RECEPTACLE LOCATED IN AVAILABLE SPACE VACATED BY THE EXISTING HOT WATER RADIATOR BEING REMOVED AS PART OF THIS PROJECT.
- PROVIDE DATA DROP FOR CONNECTION TO HVAC CONTROL PANEL. COORDINATE FINAL LOCATION AND CONNECTION WITH THE CONTROLS CONTRACTOR.



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FITZSIMONS BUILDING 500
HEATING UPGRADE MASTERPL
GROUND FLOOR
ELECTRICAL PLANS

E3.G

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FITZSIMONS BUILDING 500 HEATING UPGRADE MASTERPI

SHT.NO.

350 2[(4#2/0 & 1#3G)2"C]

NOTES: a. GROUNDING ELECTRODE CONDUCTOR SIZED PER TABLE 250—94 OF N.E.C.

b. EQUIPMENT GROUNDING CONDUCTOR SIZED PER TABLE 250-95 OF N.E.C.

150 (3#1/0 & 1#6G)1-1/2°C 312.6

- c. SUBSCRIPT LETTER BY TRANSFORMER INDICATES MOUNTING: F=FLOOR; S=SUSPENDED; W=WALL.
- d. FOR K13 RATED TRANSFORMER SECONDARY FEEDER TO BE: (3#1/0, 1#350KCMIL N & 1#6G)2"C.

PANEL DESIGNATION	
FIRST CHARACTER: SYSTEM DESIGNATION N = NORMAL E = EMERGENCY S = STANDBY	
SECOND CHARACTER: FLOOR DESIGNATION B = BASEMENT G = GROUND 1-9 = FLOOR ONE THRU 9	
THIRD CHARACTER: BUILDING AREA OR DISTRIBUTION PA E = EAST N = NORTH W = WEST	NEI.
FOURTH CHARACTER:	

#1/0

FIRST CHARACTER: SYSTEM DESIGNATION N = NORMAL E = EMARKEDY	FIRST CHARACTER: R = RISER
S = STANDBY SECOND CHARACTER: FLOOR DESIGNATION B = BASEMENT G = GROUND 1-9 = FLOOR ONE THRU 9	SECOND CHARACTER: SUBSTATON NO. 6 = SUBSTATION NO. 6 7 = SUBSTATION NO. 7 8 = SUBSTATION NO. 8
THIRD CHARACTER: BUILDING AREA OR DISTRIBUTION PANEL E = EAST N = NORTH W = WEST	THIRD CHARACTER: FLOOR 0 = GROUND 1-9 = FLOOR ONE THRU 9
FOURTH CHARACTER: D = DISTRIBUTION PANEL MCC = MOTOR CONTROL CENTER	FOURTH CHARACTER: RISER NUMBER 1 - 9 = RISER ONE, RISER NINE
FIFTH CHARACTER: VOLTAGE H = 277/480V L = 120/208V	
SIXTH CHARACTER: PANEL NUMBER 1 = PANEL NO. 1 2 = PANEL NO. 2, ETC.	

RISER DESIGNATION

,	9W18 *9W12 N *9W13 9 *8W11 D	9W14 N 9 W H 1			
			9TH FLOOR		
	N 8 W H 1 1 8W12		8TH FLOOR		
	OW12		OTH FLOOR		

7TH FLOOR

6TH FLOOR

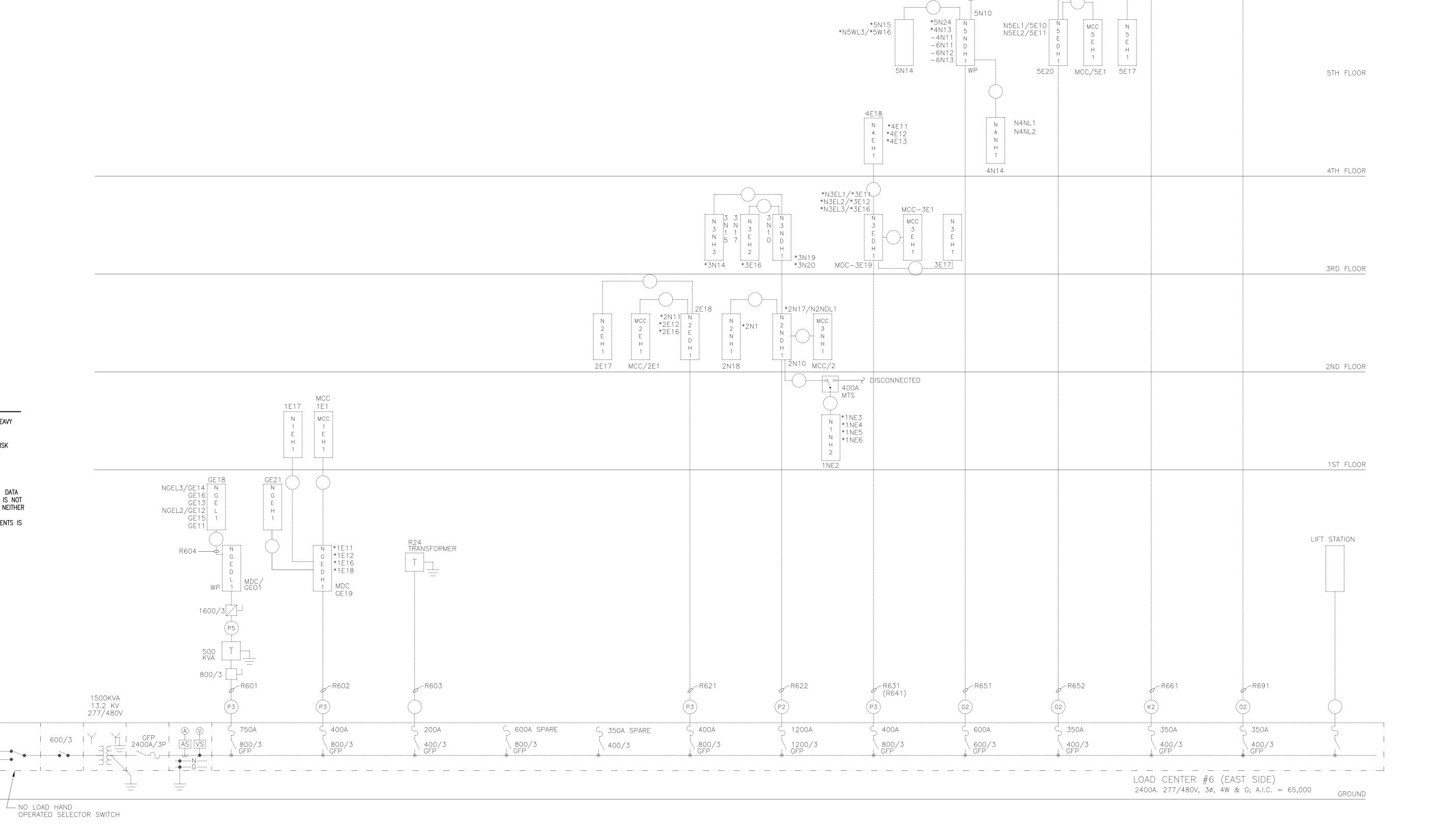
BASEMENT

	FEEDER SCHEDULE	
KEY	DESCRIPTION	NOTES
A1	(3 #12 & 1 #12G) 1/2°C.	
B1	(3 #10 & 1 #12G) 1/2"C.	
B2	(4 #10 & 1 #12G) 3/4"C.	
C1	(3 #8 & 1 #10G) 3/4°C.	
C2	(4 #8 & 1 #10G) 1"C.	
D1	(3 #6 & 1 #10G) 1"C.	
D2	(4 #6 & 1 #10G) 1-1/2°C.	
D3	(4 #6 & 1 #8G) 1"C.	
E1	(3 #4 & 1 #8G) 1-1/2°C.	
E2	(4 #4 & 1 #8G) 1-1/4°C.	
E3	(3#4, 1#1/ON & 1#8G)1-1/4"C	
F1	(3 #2 & 1 #8G) 1-1/2°C.	
F2	(4 #2 & 1 #8G) 1-1/2°C.	
G1	(3 #1 & 1 #6G) 1-1/2°C.	
G2	(4 #1 & 1 #6G) 1-1/2°C.	
G3	(4#1 & 1#8G)1-1/2"C	
H1	(3 #1/0 & 1 #2G) 2°C.	
H2	(4 #1/0 & 1 #2G) 2"C.	
Н3	(4#1/0 & 1#6G)2"C	
J1	(3 #2/0 & 1 #2G) 2-1/2°C.	
J2	(4 #2/0 & 1 #2G) 2-1/2°C.	
K1	(3#3/0 & 1#6G)2"C.	
L1	(3 #4/0 & 1 #2G) 2-1/2°C.	
L2	(4 #4/0 & 1 #2G) 2-1/2°C.	
L3	2[(4 #4/0 & 1 #2G) 2-1/2"C.]	
L4	(4#4/0 & 1#4G)2-1/2°C.	
L5 	2[(4#4/0 & 1#3G)2-1/2°C] (4#4/0 & 1#6G)2-1/2°C	
	(3 #250KCMIL & 1 #2G) 3"C.	
M1		
M2	(4 #250KCMIL & 1 #2G) 3"C.	
M3	2[(4 #250KCMIL & 1 #2G) 3"C.]	
01	(3 #350KCMIL & 1 #1/0G) 3-1/2"C.	
02	(4 #350KCMIL & 1 #1/0G) 3-1/2"C.	
03	2[(4 #350KCMIL & 1 #1/0G) 4"C.]	
<u>P1</u>	(3 #500KCMIL & 1 #1/0G) 4"C.	
<u>P2</u>	(4 #500KCMIL & 1 #1/0G) 4"C.	
P3	2[(4 #500KCMIL & 1 #1/0G) 4"C.]	
P4	3[(4 #500KCMIL & 1 #1/0G) 4"C.]	
P5 P,S,G	4[(4 #500KCMIL & 1 #1/0G) 4"C.] REFER TO TRANSROMER SCHEDULE	

ONE-LINE NOTES

1. REUSE EXISTING CONDUIT. PROVIDE NEW WIRES.

- 1. DASHED LINE AND LIGHT TEXT INDICATES EXISTING, HATCHING INDICATES REMOVAL AND HEAVY LINE AND TEXT INDICATES NEW WORK.
- 2. ASTERISK (*) INDICATES 120/208V PANEL FED VIA DRY TYPE TRANSFORMER. NO ASTERISK INDICATES 120/208V PANEL SAME VOLTAGE AS DISTRIBUTION PANELS.
- 3. FORMER PANEL DESIGNATION SHOWN OUTSIDE PANEL BOX IN LIGHT TEXT. NEW PANEL DESIGNATION SHOWN INSIDE PANEL BOX IN HEAVY TEXT, TYPICAL.
- 4. THESE DRAWINGS HAVE BEEN PREPARED BASED ON INFORMATION PROVIDED BY OTHERS. DATA PRESENTED ON THIS DRAWING IS AS ACCURATE AS CAN BE DETERMINED, BUT ACCURACY IS NOT GUARANTEED. WHILE THIS INFORMATION IS BELIEVED TO BE RELIABLE, THE ENGINEER IS NEITHER RESPONSIBLE FOR ITS ACCURACY, NOR ERRORS NOR OMISSIONS WHICH MAY HAVE BEEN INCORPORATED INTO THESE DOCUMENTS. FIELD VERIFICATION OF ALL AFFECTED COMPONENTS IS REQUIRED.



ZSIMONS BUILDING

NORMAL SYSTEM ELECTRICAL ONE-LINE DIAGRAM NO SCALE, FOR REFERENCE ONLY

8TH FLOOR

7TH FLOOR

6TH FLOOR

5TH FLOOR

4TH FLOOR

3RD FLOOR

2ND FLOOR

1ST FLOOR

← R701 ← R709 ← R708 ← R706

\ 600/3 ! GFP

LOAD CENTER #7 (WEST) 277/480, 2500a, 3ø, 4w&G; aic = 100ka

\ 600/3 ! GFP

CONTINUES
ON DRAWING

E1L E/S

Wh A 2400A/3P 1 2400A/3P 3000/5

13.2KV, 3ø, (4#4/0)CU CIRCUIT #11 —

BASEMENT

NON-LOAD BREAK —

13.2 KV TO 277/480V Z=6.22% 13.2KV, 3ø, (4#4/0)CU/ CIRCUIT #12

\ 400/3 ' | GFP____

\ 800/3 ! GFP

\ 800/3 L GFP

500KVA T ---

800A/3 750A

ф— R704

400A

600/3 GFP

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FITZSIMONS BUILDING 500 HEATING UPGRADE MASTERP ELECTRICAL ONE-LINE DIAGRAMS

NORMAL SYSTEM ELECTRICAL ONE-LINE DIAGRAM NO SCALE, FOR REFERENCE ONLY

- NON-LOAD BREAK

6W12 *N5WL1 1 N5WL2 5W18 MCC N *3W17 *2W15 N 2 *2W13 2W14 *2W14 P 1 2W15 2W16 P 2W17 2W20 N MDC/ 2 2M20 N D H 400/3 1N25 N *1N11 1 *1N12 N *1N13 H *1N14 1W22 MCC N *1W17 1 1 *1W19 3 W W *1W21 1N23 N 1 - N D = 800/3 1 700AF MCC2

800/3 400/3 400/3

MTS MTS

L3

400A

-, 400A

400/3 | GFP

400/3 GFP

ф— R841 ф— R861

⁽→ 400A

400/3 GFP

400A

(400/3 | GFP

~, 400A

3000/5

13.2 KV TO 277/480V

Ž=

ф— R801

⁽→ 800A

\\\ 800/3 ! GFP

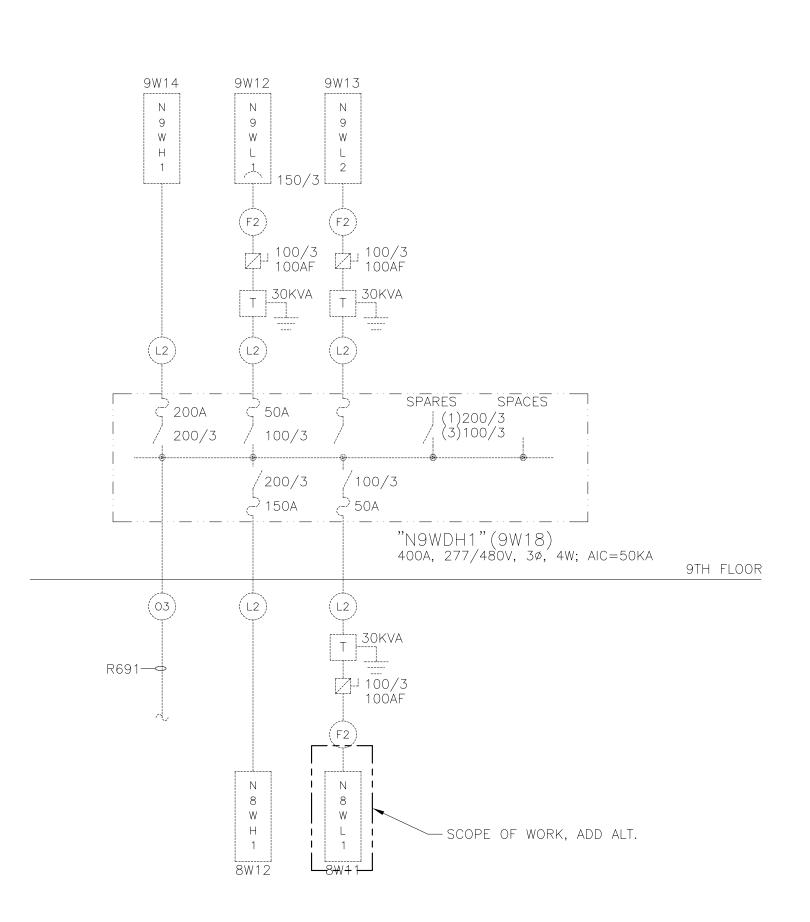
*GN32 - TO ATS-B

EXISTING 2400A OUTDOOR BUS DUCT A008

TIE 2400/3 \ GFP \ \ \ 400/3 GFP 800/3 GFP 800/3 GFP

LOAD CENTER #8 (WEST) 277/480v, 3000a, 3ø, 4w&g; aic = 65ka

800A/3P 800A KRPC



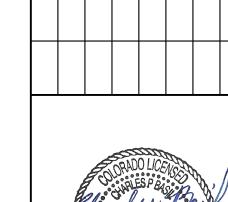
"N9WDH1"

E5.2 (9W18), FOR REFERENCE ONLY

8TH FLOOR

- DASHED LINE AND LIGHT TEXT INDICATES EXISTING, HATCHING INDICATES REMOVAL AND HEAVY LINE AND TEXT INDICATES NEW WORK.
- 2. ASTERISK (*) INDICATES 120/208V PANEL FED VIA DRY TYPE TRANSFORMER. NO ASTERISK INDICATES 120/208V PANEL SAME VOLTAGE AS DISTRIBUTION PANELS.
- 3. FORMER PANEL DESIGNATION SHOWN OUTSIDE PANEL BOX IN LIGHT TEXT. NEW PANEL DESIGNATION SHOWN INSIDE PANEL BOX IN HEAVY TEXT, TYPICAL.
- 4. THESE DRAWINGS HAVE BEEN PREPARED BASED ON INFORMATION PROVIDED BY OTHERS. DATA PRESENTED ON THIS DRAWING IS AS ACCURATE AS CAN BE DETERMINED, BUT ACCURACY IS NOT GUARANTEED. WHILE THIS INFORMATION IS BELIEVED TO BE RELIABLE, THE ENGINEER IS NEITHER RESPONSIBLE FOR ITS ACCURACY, NOR ERRORS NOR OMISSIONS WHICH MAY HAVE BEEN INCORPORATED INTO THESE DOCUMENTS. FIELD VERIFICATION OF ALL AFFECTED COMPONENTS IS REQUIRED.





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FITZSIMONS BUILDING 500 HEATING UPGRADE MASTERPL

SHT.NO. **E5.2**

GREATER THAN THE AVAILABLE FAULT CURRENT INDICATED. IF THE NAMEPLATE SCCR IS LESS THAN THE AVAILABLE FAULT CURRENT, PROTECT COMPONENT OR EQUIPMENT TO AVAILABLE SHORT-CIRCUIT CURRENT INDICATED ACCORDING TO ANSI/UL 508A, SUPPLEMENT SB, USING NRTL LISTED COMPONENTS. SUBMIT FOR REVIEW COMPONENTS DATA AND TIME-CURRENT CURVES SUBSTANTIATING COMPLIANCE.

2. REFER TO PANEL SCHEDULES FOR EXACT CIRCUIT NUMBER.

3. IF A FUSE SIZE IS INDICATED, PROVIDE A FUSED DISCONNECT UNLESS INDICATED OTHERWISE. 4. FUSE SIZE INDICATED MUST BE USED IN COMBINATION WITH PROPERLY SIZED OVERLOAD RELAYS. UNLESS INDICATED OTHERWISE, FUSES SHALL BE BUSSMANN LPS-RK OR LPN-RK. CONFIRM ACTUAL

NAMEPLATE DATA OF EQUIPMENT AND PROVIDE FUSES RECOMMENDED BY MANUFACTURER. 5. COORDINATE THE REQUIREMENTS WITH THE VFD SUPPLIED. PROVIDE THE AC SUPPLY TO THE DRIVE WITH SUITABLE PROTECTION AGAINST OVERLOAD AND SHORT-CIRCUITS. MATCH OVERCURRENT PROTECTION, AND FEEDER SIZE TO THAT REQUIRED BY THE VFD NAMEPLATE DATA. IF THE INSTALLED MOTOR CIRCUIT CONDUCTOR LENGTH EXCEEDS THE INDICATED LENGTH, PROVIDE DC CHOKE IF

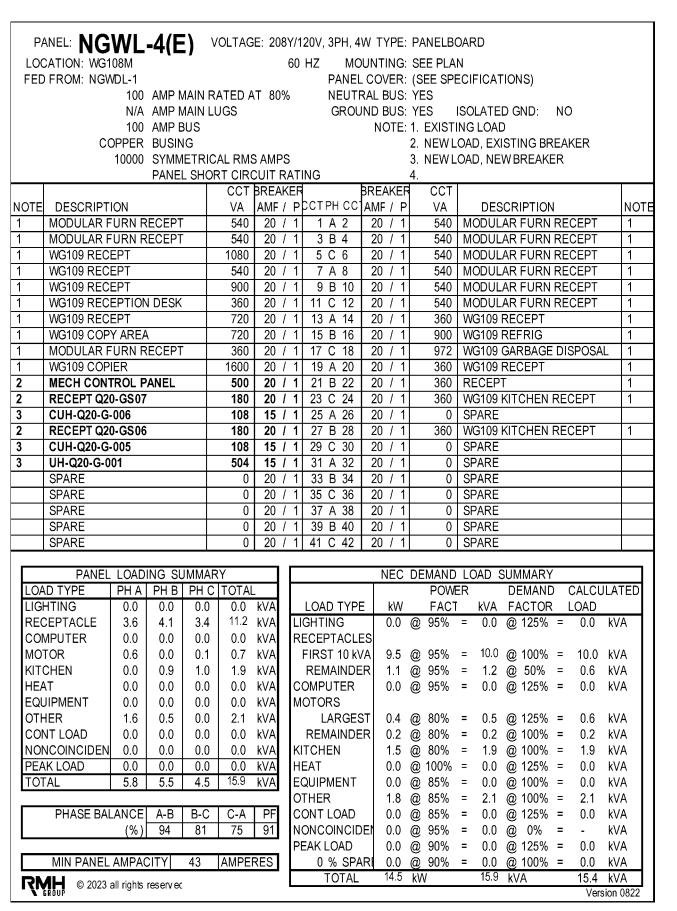
1. COORDINATE ELECTRICAL EQUIPMENT REQUIREMENTS WITH THE ACTUAL MECHANICAL EQUIPMENT SUPPLIED. VERIFY THE COMPONENT OR EQUIPMENT MARKED NAMEPLATE SCCR IS EQUAL TO OR

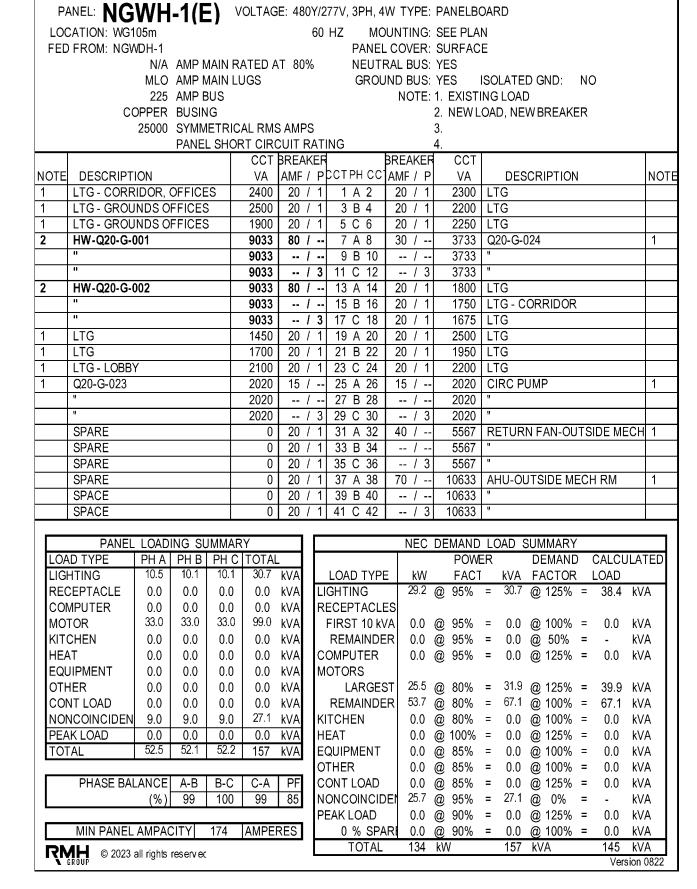
REQUIRED BY DRIVE MANUFACTURER'S RECOMMENDATIONS. 6. PROVIDE CONTINUOUS FERROUS METAL CONDUIT WITH XHHW-2 (90 C) CONDUCTORS. IF RACEWAY IS NOT CONTINUOUS FERROUS METAL CONDUIT, PROVIDE MOTOR FEEDER USING VFD/ASD CABLE ASSEMBLY WITH XHHW-2 (90 C) CONDUCTORS SUITABLE FOR VFD APPLICATIONS. IF CABLE IS INSTALLED IN A PLENUM SPACE PROVIDE VFD/ASD CABLE ASSEMBLY IN RACEWAY. SIZE RACEWAY TO ACCOMMODATE SELECTED CABLE ASSEMBLY. SEE DETAILS FOR FURTHER INFORMATION.

C - 2#12, 1#12G	20A, 2P	AT UNIT								
C - 2#12, 1#12G	20A, 2P	AT UNIT								
C - 2#12, 1#12G	20A, 2P	AT UNIT								
20A, 2P	= 2-POLE MOTO	R RATED SWI	TCH							
2S1W	= TWO SPEED,	ONE WINDING								
2S2W	= TWO SPEED,	TWO WINDING								
ECM	= ELECTRICALLY COMMUTATED MOTOR									
FVNR	= FULL VOLTAG	E NON-REVER	RSING							
FVR	= FULL VOLTAG	E REVERSING	;							
SM, 2P	= 2-POLE MANU	AL STARTER :	SWITCH							
SSRVS	= SOLID STATE	REDUCED VO	LTAGE							
STO, 2P	= MANUAL STAF	RTER SWITCH	WITH							
	THERMAL OVE	ERLOADS								
VFD	= VARIABLE SPI	EED DRIVE								

SHORT CIRCUIT CALCULATIONS BASED ON BUSSMANN PO	DINT TO POINT ME	THOD.							Ve	rsion V_0222				
	SHOF	RT CIRC	UIT S	CHED	ULE									
Fault Contributions														
Utility contribution: 1500 kVA, 480 V, 3 PH, 6.22% Z	29,007 A													
Point Fault Calculations														
							Length of							
		Short Circuit Isc				Line-Line	Run	Available	Xfmr	Xfmr				
DESCRIPTION	Circuit Bracing	SYM RMS	Multiplier M	F Factor	Constant C	Voltage V	(Note 1)	Isc	Rated kVA	Imped % 2				
Service XFMR to Load Center #7	35,000	28,923	0.997	0.003	180,500	480	5	29,007						
Load Center #7 to NGWDH-1	25,000	22,168	0.766	0.305	25,686	480	75	28,923						
NGWDH-1 to NGWH-1	22,000	18,678	0.843	0.187	12,843	480	30	22,168						
NGWH-1 to HW-Q20-G-001	10,000	6,341	0.340	1.945	2,425	480	70	18,678						
NGWH-1 to HW-Q20-G-002	10,000	6,655	0.356	1.807	2,425	480	65	18,678						
NGWDL-1 Feeder XFMR Max Let-through	10,000	8,327												
XFMR to NGWDL-1	10,000	8,155	0.979	0.021	32,966	208	10	8,327						
NGWDL-1 to NGWL-4	10,000	4,802	0.589	0.698	7,292	208	75	8,155						
NGWL-4 to CUH-Q20-G-005	5,000	279	0.058	16.213	617	120	125	4,802						
NGWL-4 to CUH-Q20-G-006	5,000	279	0.058	16.213	617	120	125	4,802						
NGWL-4 to UH-Q20-G-001	5,000	1,132	0.236	3.243	617	120	25	4,802						
N8WL-1 Feeder XFMR Max Let-through	10,000	6,405												
XFMR to N8WL-1	10,000	5,588	0.872	0.146	7,292	208	20	6,405						
N8WL-1 to CUH-Q20-G-008-001	5,000	654	0.117	7.547	617	120	50	5,588						

1. CONTRACTOR IS RESPONSIBLE FOR ALL QUANTITIES, FEEDER ROUTING AND INSTALLATION. INDICATED FEEDER LENGTH WAS USED TO CALCULATE FAULT CURRENT AND IS AN APPROXIMATE QUANTITY. IF THE INSTALLED FEEDER LENGTH IS 10% SHORTER OR LONGER THAN THE INDICATED FEEDER LENGTH FAULT CURRENT MUST BE RE-EVALUATED AND REQUIRED BRACING RESIZED.





	CATION: 8TH D FROM: N9W		K LORR	Y			bU	HZ MC PANEL			SEE		1				
1	DI NOIVI. 14344		AMP N	MAINI R	ΔTFD Δ	18 T	%					ווכ					
			AMP N			11 00		GROU				19	SOLATE	D GND.	NC)	
			AMP E		500			Ortoo					NG LOAE		110	,	
	CC		BUSIN											ISTING BF	RFA	KFR	
			SYMM		AL RM	S AMP	S							W BREAKI			
								ING			4.		-, ,		`		
						BREA			BRE/	KEF	C	СТ					
NOTE	DESCRIPT	ION			VA	AMF	/ P	рстрн сс	AMF	/ P	\	/A	DES	CRIPTION	١		N
2	RECEPT Q20				180	20	/ 1	1 A 2	20	/ 1	(900	EAST R	ECEPT			1
1	ROOFTOP W	VEST R	ECEPT		540	20	/ 1	3 B 4	20	/ 1	(900	EAST R	ECEPT			1
1	EISENHOWE	R SUIT	E REC	EPT	900	20	/ 1	5 C 6	20	/ 1	7	720	EAST R	ECEPT			1
1	WEST RECE	.PT			720	20	/ 1	7 A 8	20	/ 1	Ę	540	HALLW	AY RECEF	PΤ		1
1	WEST RECE	.PT			720	20	/ 1	9 B 10	20	/ 1	Ę	540	HALLW	AY RECEF	PΤ		1
1	WEST RECE	.PT			900	20	/ 1	11 C 12	20	/ 1	3	360	PROJEC	CTION BO	OTH	+	1
1	WEST RECE	.PT			900	20	/ 1	1		/ 1				OWER SU			1
1	AUDITORIUI				1200					/ 1				OWER SU			1
1	BUSHNELL S				1150	20	/ 1	1		/ 1		900	EISENH	OWER SU	JITE		1
1	WALL LIGHT				560		/ 1	1		/ 1			WEST F				1
1	WALL LIGHT				560		/ 1			/ 1				OOM REC	EP1	Γ	1
1	CEILING LIG	HTS, D	IMMER	₹	1350					/ 1				COOLER			1
	SPARE				0					/ 1			SPARE				
1	PROJECTIO		TH		540		/ 1			/ 1			SPARE				
3	CUH-Q20-00	8-001		\perp	108					/ 1			SPARE				
	SPARE			\perp	0					/ 1			SPARE				
	SPARE				0					/ 1			SPARE				
	SPARE			\rightarrow	0			1	20	/ 1			SPARE				
	SPACE				0		/ 1			/ 1			SPACE				\perp
	SPACE			\rightarrow	0			39 B 40		/ 1			SPACE				
	SPACE				0		/ 1	41 C 42		/ 1		U	SPACE				
	PANEL	LOAD	INC CI) \/	_	г			IEC	DEM	MD			,—		
	AD TYPE		PH B				⊦		 `	IEC			R	SUMMARY DEMAND		CALCI	II ATEI
	HTING	0.6	1.8	2.5		kVA		LOAD TYPE	<u>.</u>	kW		ACT		FACTOR			LAIC
	CEPTACLE	4.7	4.5	3.8		kVA	┢	IGHTING	_		@ 95			@ 125%			kVA
	MPUTER	0.0	0.0	0.0	0.0	kVA		ECEPTACLE		4.0	(U) 3(70	- 4.0	W 12070		0.0	KV/A
	TOR	0.0	0.0	0.0	0.0	kVA		FIRST 10 k\		9.5	@ 95	5%	= 10.0	@ 100%	=	10.0	k\/∆
	CHEN	0.0	0.0	0.0	0.0	kVA		REMAINDE			@ 95			@ 50%		1.5	kVA
HE		0.0	0.0	0.0	0.0	kVA		OMPUTER	- 1		@ 95			@ 125%		0.0	kVA
	VIPMENT	0.0	0.0	0.0	0.0	kVA		IOTORS		J.J	₩ ³⁰	. 10	0.0	æ .∠0/0		0.0	
	HER	0.0	0.0	0.5	0.5	kVA	'	LARGES	_{3T}	0.1	@ 80)%	= 0.1	@ 125%	=	0.1	kVA
	NT LOAD	0.0	0.0	0.0	0.0	kVA		REMAINDE			@ 80			@ 100%		0.0	kVA
	NCOINCIDEN		0.0	0.0	0.0	kVA	K	ITCHEN			@ 80			@ 100%		0.0	kVA
	AK LOAD	0.0	0.0	0.0	0.0	kVA		EAT			@ 10			@ 125%		0.0	kVA
	TAL	5.2	6.3	6.9	18.4	kVA		QUIPMENT			@ 85		= 0.0	~		0.0	kVA
								THER			@ 85		= 0.5	_		0.5	kVA
	PHASE BAL	ANCE	A-B	B-C	C-A	PF		ONT LOAD			@ 85		= 0.0	@ 125%		0.0	kVA
		(%)	82	90	72	95		ONCOINCID			@ 95		= 0.0	@ 0%	=	-	kVA
								EAK LOAD			@ 90		= 0.0	@ 125%	=	0.0	kVA
	MIN PANEL	AMPA	CITY	50	AMPE	RES		0 % SPA			@ 90		= 0.0	@ 100%		0.0	kVA
							_	TOTAL			kW		18.4	kVA		18.1	kVA

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500 FITZSIMONS BUILDING TING UPGRADE MASTE

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