

MECHANICAL SPECIFICATIONS

A. GENERAL CONDITIONS OTHER CONTRACT DOCUMENTS

- 1. THE GENERAL CONDITIONS AND OTHER CONTRACT DOCUMENTS AS SET FORTH HEREBY ARE TO BE INCORPORATED INTO AND BECOME A PART OF THE SPECIFICATIONS FOR THE WORK UNDER THIS DIVISION.
B. CODES AND PERMITS
1. COMPLY WITH RULES, REGULATIONS OF STATE, COUNTY, AND CITY AUTHORITIES HAVING JURISDICTION OVER THE PREMISES, INCLUDING SAFETY REQUIREMENTS OF OSHA. DO NOT CONTRIBUTE THIS AS RELIEVING CONTRACTOR FROM COMPLYING WITH SPECIFICATIONS WHICH EXCEED CODE REQUIREMENTS AND NOT IN CONFLICT THEREWITH.
2. SECURE AND PAY FOR ALL PERMITS AND CERTIFICATES OF INSPECTION REQUIRED. MAKE PAYMENTS TO ALL PUBLIC UTILITIES FOR WORK PERFORMED BY THEM IN PROVIDING SERVICE CONNECTIONS.
C. LOCAL CONDITIONS
1. VISIT SITE, BECOME FAMILIAR WITH CONDITIONS AFFECTING THIS WORK. NO ADDITIONAL PAYMENT WILL BE MADE ON CLAIMS THAT ARISE FROM LACK OF KNOWLEDGE OF EXISTING CONDITIONS.
D. DRAWINGS
1. DRAWINGS AND SPECIFICATIONS ARE TO BE CONSIDERED AS SUPPLEMENTING EACH OTHER. WORK SPECIFIED SHALL BE PERFORMED OR FURNISHED AS THOUGH MENTIONED IN BOTH SPECIFICATIONS AND DRAWINGS.
E. SHOP DRAWINGS
1. THIS CONTRACTOR SHALL SUBMIT SHOP DRAWINGS ON THE ITEMS OF EQUIPMENT AND SYSTEMS AS NECESSARY TO CLEARLY SHOW EQUIPMENT AND CONSTRUCTION.

F. SUPERVISION

- 1. THIS CONTRACTOR SHALL HAVE IN CHARGE OF THE WORK, A COMPETENT SUPERINTENDENT WITH EXPERIENCE IN THE WORK TO BE INSTALLED UNDER THIS CONTRACT.

G. COORDINATION

- 1. THIS CONTRACTOR SHALL COORDINATE HIS WORK AND COOPERATE WITH THE OTHER CONTRACTORS. HE SHALL ARRANGE HIS WORK WITH THEIRS SO THAT THERE WILL BE NO DELAY IN THE PROPER INSTALLATION.
2. EXAMINE WORK OF OTHER TRADES WHICH COMES IN CONTACT WITH OR IS COVERED BY THIS WORK. DO NOT ATTACH TO, COVER, OR FINISH AGAINST ANY DEFECTIVE WORK, OR INSTALL WORK OF THIS DIVISION IN A MANNER WHICH WILL PREVENT OTHER TRADES FROM PROPERLY INSTALLING THEIR WORK. CONSULT ALL DRAWINGS, SPECIFICATIONS AND DETAILS OF OTHER DIVISIONS OF THE WORK.

H. CUTTING AND PATCHING

- 1. ALL CUTTING AND PATCHING WORK RELATED TO THIS CONTRACT WILL BE THE RESPONSIBILITY OF THIS CONTRACTOR.

I. GUARANTEE AND WARRANTIES

- 1. WARRANT THAT EQUIPMENT AND ALL WORK IS INSTALLED IN ACCORDANCE WITH GOOD ENGINEERING PRACTICE AND THAT ALL EQUIPMENT WILL MEET REQUIREMENTS SPECIFIED. ANY EQUIPMENT FAILING TO PERFORM OR FUNCTION AS SPECIFIED SHALL BE REPLACED WITH COMPLYING EQUIPMENT, WITHOUT COST TO THE OWNER.
2. GUARANTEE AGAINST DEFECTS IN WORKMANSHIP AND MATERIALS; MAKE GOOD REPAIR OR REPLACE ANY DEFECTIVE WORK, MATERIAL OR EQUIPMENT WITHIN ONE YEAR FROM DATE OF ACCEPTANCE.

J. INSTALLATION REQUIREMENTS

- 1. LOCATION OF EQUIPMENT, DUCTS, ETC., ON THE DRAWINGS IS DIAGRAMMATIC; INDICATED POSITIONS SHALL BE FOLLOWED AS CLOSELY AS POSSIBLE; EXACT LOCATIONS SHALL BE SUBJECT TO BUILDING CONSTRUCTION AND INTERFERENCES WITH OTHER WORK. ARCHITECT RESERVES RIGHT TO MAKE MINOR CHANGES IN LOCATION OF ANY PART OF THE WORK UP TO THE TIME OF ROUGH-IN WITHOUT ADDITIONAL COST.

K. TEST AND ADJUSTMENTS

- 1. OBTAIN ALL INSPECTIONS REQUIRED BY LAW, ORDINANCES, RULES, REGULATIONS OF AUTHORITIES HAVING JURISDICTION, FURNISH CERTIFICATES OF SUCH INSPECTIONS. PAY ALL FEES AND PROVIDE ALL EQUIPMENT, POWER AND LABOR NECESSARY FOR INSPECTIONS AND TEST.
2. PRESSURE TESTS
a. TEST MEDIUM FOR REFRIGERANT PIPING SHALL BE OIL PUMPED DRY NITROGEN. TWENTY-FOUR HOUR STANDING TIME MINIMUM. TEST THE LOW SIDE OF THE SYSTEM TO 150 PSI AND THE HIGH SIDE TO 300 PSI. TESTS SHALL CONFORM TO ANSI STANDARD B31.5 "REFRIGERATION PIPING."

L. HVAC SYSTEMS ADJUSTMENTS AND BALANCE

- 1. PUT ALL HEATING, VENTILATING, EXHAUST AND AIR CONDITIONING SYSTEMS AND EQUIPMENT INTO FULL OPERATION AND CONTINUE OPERATION OF SAME DURING EACH WORKING DAY OF TESTING AND BALANCING. ALL TESTING AND BALANCING SHALL BE DONE UNDER BOTH SUMMER AND WINTER DESIGN CONDITIONS.
2. PERFORM TESTS AND BALANCE SYSTEMS IN ACCORDANCE WITH FOLLOWING REQUIREMENTS:
a. BALANCE AND ADJUST ALL AIR HANDLING SYSTEMS FOR DESIGN FLOW OF SUPPLY, RETURN, RELIEF, EXHAUST AND OUTSIDE AIR TO WITHIN 10% OF DESIGN REQUIREMENTS.
b. AFTER OR DURING ONE COMPLETE HEATING-COOLING SEASON, MAKE ANY MINOR ADJUSTMENTS THAT MAY BE NECESSARY TO INSURE UNIFORM TEMPERATURES THROUGHOUT THE SPACE.

M. INSULATION

- 1. ALL INSULATION SHALL BE INSTALLED OVER CLEAN DRY SURFACES. INSULATION MUST BE DRY AND IN GOOD CONDITION. WET OR DAMAGED INSULATION WILL NOT BE ACCEPTABLE. NO INSULATION SHALL BE APPLIED PRIOR TO PRESSURE TEST COMPLETION OF THE RESPECTIVE PIPING SYSTEMS.
2. FIBERGLASS PIPE INSULATION SHALL BE INSTALLED WITH JOINTS BUTTED FIRMLY TOGETHER. JACKET LAPS TO BE SEALED WITH FACTORY APPLIED ADHESIVE. BUTT JOINTS TO BE SEALED WITH BUTT STRIPES, HAVING FACTORY APPLIED ADHESIVE. VALVES AND FITTINGS SHALL BE INSULATED USING MITERED SECTIONS OF INSULATION, INSULATION CEMENT, OR PREMOULDED FITTING INSULATION. THE INSULATION APPLIED TO THE VALVES AND FITTINGS SHALL BE COVERED WITH THE SAME TYPE OF COVERING AS USED ON THE PIPE INSULATION.
3. PROVIDE THE FOLLOWING INSULATION PRODUCTS AS MANUFACTURED BY OWENS-CORNING. INSULATION PRODUCTS AS MANUFACTURED BY ARMSTRONG, CERTAINTED OR KNAUF ARE ACCEPTABLE. ADHESIVE SHALL BE BENJAMIN FOSTER OR EQUAL.
4. OWENS CORNING KAYLO 10: 1 1/2" THICK CALCIUM SILICATE BLOCK INSULATION
SERVICE
KITCHEN HOOD EXHAUST DUCTWORK
5. OWENS CORNING FIBERGLAS 705: 1" THICK ASJ EQUIPMENT INSULATION (DENSITY 6 PCF) OR ARMSTRONG AP ARMAFLEX SHEET AND ROLL INSULATION (3/4")
SERVICE
EXPOSED SUPPLY AIR DUCTWORK (IN NON AIR CONDITIONED SPACES)
EXPOSED OUTSIDE AIR INTAKE DUCTWORK
A.C. UNIT MIXED AND SUPPLY AIR PLENUMS INCLUDING STANDING SEAMS AND STEEL ANGLE FRAMING

- 6. OWENS CORNING ED 150 FRK 25: 2" THICK FACED DUCTWRAP SERVICE CONCEALED SUPPLY AIR DUCTWORK (EXCEPT IN RETURN AIR PLENUMS) CONCEALED OUTSIDE AIR INTAKE DUCTWORK
7. DUCT LINING: OWENS-CORNING, 1" THICK "AEROFLEX DUCT LINER" TYPE 300. LINING SHALL BE INSTALLED WITH STICK-KLIPS AND ADHESIVE PER MANUFACTURER'S INSTRUCTIONS.
N. DUCTWORK
1. PROVIDE ALL SHEET METAL WORK AS SHOWN ON THE DRAWINGS IN ACCORDANCE WITH THE LATEST EDITION OF THE ASHRAE GUIDE AND DATA BOOK, SMACNA STANDARDS AND THIS SPECIFICATION, THE MOST DEMANDING OF WHICH SHALL BE THE MINIMUM STANDARD.
2. LOW PRESSURE DUCTWORK
a. ALL DUCTWORK SHALL BE CONSTRUCTED OF GALVANIZED STEEL EXCEPT WHERE NOTED ON PLANS TO BE ALUMINUM. EXPOSED DUCTWORK IN ARCHITECTURALLY FINISHED SPACES SHALL BE FABRICATED FROM "PAINT GRIP" GALVANIZED STEEL OR SIMILAR W/ SURFACE ETCH TREATMENT.
b. CONSTRUCT ALL DUCTWORK FOLLOWING SMACNA "HVAC DUCT CONSTRUCTION STANDARDS," 1995 EDITION.
c. ALL DUCTS, EXCEPT KITCHEN EXHAUST, SHALL BE CONSTRUCTED TO 1" W.G.
d. SEAL ALL DUCTS TO SEAL CLASS "C."
3. SPECIAL SERVICE DUCTWORK
a. KITCHEN HOOD EXHAUST - CONCEALED: 16 GAUGE BLACK STEEL, STEEL ANGLE REINFORCING, JOINTS AND SEAMS WELDED WATER TIGHT. EXPOSED: 18 GAUGE TYPE 302 STAINLESS STEEL, JOINTS AND SEAMS WELDED, GRIND AND POLISH TO A NO. 2 FINISH.
4. FLEXIBLE DUCTS
a. OMNIAIR MODEL 1300 LOW PRESSURE NON INSULATED FOR EXHAUST DUCTS AND SUPPLY AIR DUCTS IN CONDITIONED SPACES UP TO 6" STATIC PRESSURE.
b. INSTALL FLEXIBLE TUBING FULLY EXTENDED, FREE OF SAGS AND KINKS. MAXIMUM LENGTH OF TUBING SHALL BE 5' 0". FLEXIBLE TUBING SHALL BE CONNECTED TO SUPPLY AIR DUCTS WITH FLARED SPIN COLLAR FITTING.

O. WIRING

- 1. ALL WIRING INCIDENTAL TO THIS TEMPERATURE CONTROL SYSTEM SHALL BE PROVIDED BY THE MECHANICAL CONTRACTOR.
2. THE TERM "WIRING" SHALL BE CONSTRUED TO INCLUDE FURNISHING OF WIRE, CONDUIT, MISCELLANEOUS MATERIALS AND LABOR AS REQUIRED FOR MOUNTING AND CONNECTING ELECTRICAL CONTROL DEVICES, AND PROVIDING ELECTRICAL INTERLOCKS BETWEEN EQUIPMENT.
P. THERMOSTATIC CONTROLS:

6.4.3.1 ZONE THERMOSTATIC CONTROLS
6.4.3.1.1 GENERAL: THE SUPPLY OF HEATING AND COOLING ENERGY TO EACH "ZONE" SHALL BE INDIVIDUALLY CONTROLLED BY THERMOSTATIC CONTROLS RESPONDING TO TEMPERATURE WITHIN THE ZONE. FOR THE PURPOSES OF SECTION 6.4.3.1, A DWELLING UNIT SHALL BE PERMITTED TO BE CONSIDERED A SINGLE ZONE.
EXCEPTIONS: INDEPENDENT PERIMETER SYSTEMS THAT ARE DESIGNED TO OFFSET ONLY BUILDING ENVELOPE LOADS SHALL BE PERMITTED TO SERVE ONE OR MORE ZONES ALSO SERVED BY AN INTERIOR SYSTEM PROVIDED
a. THE PERIMETER SYSTEM INCLUDES AT LEAST ONE THERMOSTATIC CONTROL ZONE FOR EACH BUILDING EXPOSURE HAVING EXTERIOR WALLS FACING ONLY ONE ORIENTATION FOR 50 CONTIGUOUS FEET OR MORE, AND
b. THE PERIMETER SYSTEM HEATING AND COOLING SUPPLY IS CONTROLLED BY A THERMOSTATIC CONTROL(S) LOCATED WITHIN THE ZONE(S) SERVED BY THE SYSTEM.
EXTERIOR WALLS ARE CONSIDERED TO HAVE DIFFERENT ORIENTATIONS IF THE DIRECTIONS THEY FACE DIFFER BY MORE THAN 45 DEGREES.

6.4.3.1.2 DEAD BAND. WHERE USED TO CONTROL BOTH HEATING AND COOLING, ZONE THERMOSTATIC CONTROLS SHALL BE CAPABLE OF PROVIDING A TEMPERATURE RANGE OR DEAD BAND OF AT LEAST 5°F WITHIN WHICH THE SUPPLY OF HEATING AND COOLING ENERGY TO THE ZONE IS SHUT OFF OR REDUCED TO A MINIMUM.
EXCEPTIONS:
a. THERMOSTATS THAT REQUIRE MANUAL CHANGEOVER BETWEEN HEATING AND COOLING MODES.
b. SPECIAL OCCUPANCY OR SPECIAL APPLICATIONS WHERE WIDE TEMPERATURE RANGES ARE NOT ACCEPTABLE (SUCH AS RETIREMENT HOMES, PROCESS APPLICATIONS, MUSEUMS, SOME AREAS OF HOSPITALS) AND ARE APPROVED BY THE AUTHORITY HAVING JURISDICTION.

6.4.3.2 SET POINT OVERLAP RESTRICTION. WHERE HEATING AND COOLING TO A ZONE ARE CONTROLLED BY SEPARATE ZONE THERMOSTATIC CONTROLS LOCATED WITHIN THE ZONE, MEANS (SUCH AS LIMIT SWITCHES, MECHANICAL STOPS, OR, FOR DDC SYSTEMS, SOFTWARE PROGRAMMING) SHALL BE PROVIDED TO PREVENT THE HEATING SET POINT FROM EXCEEDING THE COOLING SET POINT MINUS ANY APPLICABLE PROPORTIONAL BAND.
6.4.3.3 OFF-HOUR CONTROLS. HVAC SYSTEMS SHALL HAVE THE OFF-HOUR CONTROLS REQUIRED BY SECTIONS 6.4.3.3.1 THROUGH 6.4.3.3.4.
EXCEPTIONS:
a. HVAC SYSTEMS INTENDED TO OPERATE CONTINUOUSLY.
b. HVAC SYSTEMS HAVING A DESIGN HEATING CAPACITY AND COOLING CAPACITY LESS THAN 15,000 BTU/H THAT ARE EQUIPPED WITH READILY ACCESSIBLE MANUAL ON/ OFF CONTROLS.

6.4.3.3.1 AUTOMATIC SHUTDOWN. HVAC SYSTEMS SHALL BE EQUIPPED WITH AT LEAST ONE OF THE FOLLOWING:
a. CONTROLS THAT CAN START AND STOP THE SYSTEM UNDER DIFFERENT TIME SCHEDULES FOR SEVEN DIFFERENT DAY-TYPES PER WEEK, ARE CAPABLE OF RETAINING PROGRAMMING AND TIME SETTING DURING LOSS OF POWER FOR A PERIOD OF AT LEAST TEN HOURS, AND INCLUDE AN ACCESSIBLE MANUAL OVERRIDE, OR EQUIVALENT FUNCTION, THAT ALLOWS TEMPORARY OPERATION OF THE SYSTEM FOR UP TO TWO HOURS.
b. AN OCCUPANT SENSOR THAT IS CAPABLE OF SHUTTING THE SYSTEM OFF WHEN NO OCCUPANT IS SENSED FOR A PERIOD OF UP TO 30 MINUTES.
c. A MANUALLY OPERATED TIMER CAPABLE OF BEING ADJUSTED TO OPERATE THE SYSTEM FOR UP TO TWO HOURS.
d. AN INTERLOCK TO A SECURITY SYSTEM THAT SHUTS THE SYSTEM OFF WHEN THE SECURITY SYSTEM IS ACTIVATED.
EXCEPTION: RESIDENTIAL OCCUPANCIES MAY USE CONTROLS THAT CAN START AND STOP THE SYSTEM UNDER TWO DIFFERENT TIME SCHEDULES PER WEEK.

6.4.3.3.2 SETBACK CONTROLS. HEATING SYSTEMS LOCATED IN CLIMATE ZONES 2-8 SHALL BE EQUIPPED WITH CONTROLS THAT HAVE THE CAPABILITY TO AUTOMATICALLY RESTART AND TEMPORARILY OPERATE THE SYSTEM AS REQUIRED TO MAINTAIN ZONE TEMPERATURES ABOVE A HEATING SET POINT ADJUSTABLE DOWN TO 55°F OR LOWER. COOLING SYSTEMS LOCATED IN CLIMATE ZONES 1B, 2B, AND 3B SHALL BE EQUIPPED WITH CONTROLS THAT HAVE THE CAPABILITY TO AUTOMATICALLY RESTART AND TEMPORARILY OPERATE THE SYSTEM AS REQUIRED TO MAINTAIN ZONE TEMPERATURES BELOW A COOLING SET POINT ADJUSTABLE UP TO 90°F OR HIGHER OR TO PREVENT HIGH SPACE HUMIDITY LEVELS.
EXCEPTION: RADIANT FLOOR AND CEILING HEATING SYSTEMS.

- Q. REFRIGERANT PIPING: TYPE ACR HARD DRAWN COPPER TUBING MEETING REQUIREMENTS OF ASTM B280, WITH WROUGHT COPPER FITTINGS MEETING REQUIREMENTS OF ANSI B16.22, WITH BRAZED JOINTS MEETING REQUIREMENTS OF AWS A 5.8, USING BAG-1 (SILVER) FILLER MATERIAL. INSULATE SUCTION LINE PIPING WITH 1" THICK ARMAFLEX TYPE AP. PAINT INSULATION LOCATED OUTDOORS WITH ARMAFLEX WB FINISH.

SECTION 230593 - TESTING, ADJUSTING, AND BALANCING FOR HVAC

1.1 SUMMARY

- A. TESTING, ADJUSTING, AND BALANCING FOR THE FOLLOWING:

- 1. AIR SYSTEMS: CONSTANT-VOLUME.

- 1.2 QUALITY ASSURANCE

- A. THE CONTRACTOR SHALL PROCURE THE SERVICES OF A TESTING, ADJUSTING AND BALANCING (TAB) SPECIALIST WHO SPECIALIZES INHEATING, VENTILATION AND AIR CONDITIONING SYSTEMS. THE TAB AGENT SHALL HAVE THE FOLLOWING QUALIFICATIONS: AABC, NEBB OR TABB CERTIFIED.

1.3 EXECUTION

- A. THE TAB SPECIALIST SHALL PERFORM FLOW MEASUREMENTS OF ALL NEW AIR AND HYDRONIC SYSTEMS AS LISTED ABOVE IN THE PROJECT SCOPE. A REPORT OF THESE MEASUREMENTS, INDICATING ANY AND ALL DEFICIENCIES SHALL BE SUBMITTED FOR OWNER REVIEW.
B. THE REPORT SHALL INDICATE A SCHEMATIC DIAGRAM INDICATING LOCATIONS OF ALL EQUIPMENT TESTED AND MEASUREMENT LOCATIONS.
C. PRIOR TO FINAL INSPECTION OF THE WORK, THE TAB SPECIALIST SHALL BALANCE ALL SYSTEMS AS INDICATED ABOVE TO THE REQUIREMENTS OF THE DESIGN.
D. THE CONTRACTOR SHALL HAVE FURNISH AND INSTALL ALL ADDITIONAL BALANCING EQUIPMENT, PRESSURE TAPS, GAUGES AND OTHER EQUIPMENT AS REQUIRED FOR A PROPERLY BALANCED SYSTEM AT NO ADDITIONAL COST TO THE OWNER. SUCH ADDITIONAL EQUIPMENT SHALL ADHERE IN STRICT ACCORDANCE WITH THE RESPECTIVE EQUIPMENT MANUFACTURER'S RECOMMENDATIONS.
E. THE CONTRACTOR SHALL HAVE THE TESTING AND BALANCING SPECIALIST COORDINATE ALL WORK OF THIS SECTION WITH THE BUILDING MANAGER. BALANCING WORK SHALL NOT CONFLICT WITH OTHER WORK SO AS TO MAINTAIN COMPLETION WITHIN THE SPECIFIED TIME.
F. TOLERANCES: PLUS OR MINUS 5 PERCENT OF DESIGN VALUES.
G. INSPECTIONS: RANDOM CHECKS BY OWNER OR ARCHITECT TO VERIFY FINAL TESTING, ADJUSTING, AND BALANCING REPORT.
H. ADDITIONAL TESTS: RANDOM TESTS WITHIN 90 DAYS OF COMPLETING TAB TO VERIFY BALANCE CONDITIONS AND SEASONAL TESTS.

END OF SECTION 230593

SECTION 230713 - DUCT INSULATION

1.1 QUALITY ASSURANCE

- SURFACE-BURNING CHARACTERISTICS: ALL INSULATION SHALL HAVE COMPOSITE (INSULATION JACKET OR FACING AND ADHESIVE USED TO ADHERE THE FACING OR JACKET TO THE INSULATION) A FLAME-SPREAD INDEX OF 25, AND SMOKE-DEVELOPED INDEX OF 50 FOR INSULATION INSTALLED INDOOR, 75, AND SMOKE-DEVELOPED INDEX OF 150 FOR INSULATION INSTALLED OUTDOORS; ACCORDING TO ASTM E 84.

1.2 FIELD QUALITY CONTROL

- A. FIELD INSPECTIONS: BY OWNER-ENGAGED AGENCY.

1.3 INDOOR DUCT AND PLENUM INSULATION SCHEDULE;

- A. CONCEALED, RECTANGULAR, ROUND AND FLAT-OVAL, SUPPLY-RETURN, OUTDOOR-AND EXHAUST-AIR DUCT AND AIR PLENUM INSULATION:
B. FLEXIBLE ELASTOMERIC, MINERAL-FIBER BLANKET, MINERAL-FIBER BOARD OR POLYOLEFIN WITH MINIMUM INSTALLED THERMAL RESISTANCE AS FOLLOWS:
SUPPLY DUCTS
EXTERIOR: R-6
VENTILATED ATTIC: R-6
UNVENTED ATTIC ABOVE INSULATED CEILING: R-6
UNVENTED ATTIC WITH ROOF INSULATION: R-1.9
UNCONDITIONED SPACES: R-3.5
RETURN DUCTS
EXTERIOR: R-3.5
VENTILATED ATTIC: R-3.5
UNVENTED ATTIC ABOVE INSULATED CEILING: R-3.5

1.4 ITEMS NOT INSULATED:

- 1. FIBROUS-GLASS DUCTS.
2. METAL DUCTS WITH DUCT LINER OR SUFFICIENT THICKNESS TO COMPLY WITH ENERGY CODE AND ASHRAE/IESNA 90.1.
3. FACTORY-INSULATED FLEXIBLE DUCTS.
4. FACTORY-INSULATED PLENUMS AND CASINGS.
5. FLEXIBLE CONNECTORS.
6. VIBRATION-CONTROL DEVICES.
7. FACTORY-INSULATED ACCESS PANELS AND DOORS.
8. DUCTS THAT HAVE INTERNAL ACOUSTICAL LINING.

1.5 PRODUCTS

- A. THE FOLLOWING INSULATION MANUFACTURERS WILL BE ACCEPTABLE:
1. JOHNS-MANVILLE
2. OWENS-CORNING

1.6 ACOUSTICAL TREATMENT

- 1. WHERE SHOWN ON THE DRAWINGS, LOW PRESSURE DUCTWORK SHALL BE LINED WITH 1.5" THICK R-6 AS MANUFACTURED BY DUCTMATE, 1-1/2 POUND MINIMUM DENSITY, NEOPRENE COATED, FLEXIBLE FIBERGLASS DUCT LINER. LINING SHALL COMPLY WITH NFPA 90A AND SHALL HAVE A FLAME SPREAD CLASSIFICATION OF NOT MORE THAN 25 AND A SMOKE DEVELOPED RATING NOT MORE THAN 50. DUCT SIZES WHERE LINING IS INDICATED ON PLANS ARE MINIMUM INSIDE CLEAR DIMENSIONS REQUIRED.
1.7 SEALANT MATERIALS
1. TWO-PART TAPE SEALING SYSTEM.
2. WATER-BASED JOINT AND SEAM SEALANT.
3. SOLVENT-BASED JOINT AND SEAM SEALANT.
4. FLANGED JOINT SEALANT.
5. FLANGE GASKETS.

END OF SECTION 230713

SECTION 0102 -REQUIRED DOCUMENTS

1.1 SHOP DRAWINGS

- A. A SET OF PRINTS FOR ANY MECHANICAL WORK INCLUDING BUT NOT LIMITED TO, DUCTWORK AND PIPING LAYOUT SHALL BE SUBMITTED FOR APPROVAL TO THE ENGINEER PRIOR TO CONSTRUCTION OR PURCHASE OF MATERIALS.

1.2 SUBMITTALS

- A. EQUIPMENT SUBMITTALS OF ALL PROPOSED MECHANICAL AND ANCILLARY EQUIPMENT INCLUDING ALL ACCESSORIES SHALL BE SUBMITTED TO THE ENGINEER FOR REVIEW. ALL PERTINENT MODELS, SIZES, ACCESSORIES AND CHOICES SHALL BE CLEARLY CHECKED, PRINTED OR OTHERWISE INDICATED ON THE SUBMITTALS.

1.3 RECORD DRAWINGS

- A. UPON COMPLETION OF THE WORK, A RECORD DRAWING SHALL BE SUBMITTED TO THE OWNER DEPICTING ALL SUBSEQUENT CHANGES, ADDITIONS AND OR CORRECTIONS TO THE CONTRACT DRAWINGS AND OR CONTRACT SCOPE MADE DURING CONSTRUCTION. THIS DRAWING SHALL REPRESENT A COMPLETE RECORD OF THE WORK INSTALLED.

1.4 EQUIPMENT OPERATING INSTRUCTIONS

- B. ON COMPLETION AND ACCEPTANCE OF WORK, THIS CONTRACTOR SHALL FURNISH WRITTEN INSTRUCTIONS,EQUIPMENT MANUALS AND DEMONSTRATE TO THE OWNER THE PROPER OPERATION AND MAINTENANCE OF ALL EQUIPMENT AND APPARATUS FURNISHED UNDER THIS CONTRACT.
C. THESE INSTRUCTIONS SHALL BE TYPED ON 8-1/2 IN. X 11 IN. PAPER AND BOUND IN THREE-RING BINDERS WITH CLEAR ACETATE COVERS. THE CONTRACTOR SHALL GIVE THREE COPIES OF THE INSTRUCTIONS TO THE OWNER AND ONE ELECTRONIC COPY TO THE ENGINEER.

- D. THE INSTRUCTION BOOKLET SHALL BE ORGANIZED IN SECTIONS, WITH ONE SECTION PER SYSTEM. THE COVER OF THE INSTRUCTION BOOKLET SHALL BEAR THE NAME, ADDRESS AND PHONE NUMBER OF THE PROJECT, ARCHITECT, ENGINEER, MECHANICAL CONTRACTOR AND SUBCONTRACTORS.

END OF SECTION 0102

INDIANA BUILDING DEPARTMENT NOTES

ALL WORK SHALL COMPLY WITH APPLICABLE SECTIONS OF INDIANA BUILDING CODE 2014 AND ALL AMENDMENTS AND RULES AND REGULATIONS OF THE DEPARTMENT OF BUILDINGS TO DATE.

- 1. THE CONTRACTOR SHALL ENGAGE THE THE SERVICES OF A PROFESSIONAL ENGINEER TO PROVIDE THE REQUIRED SPECIAL INSPECTIONS AND TESTS.
2. TESTS WILL BE CONDUCTED UNDER DIRECTION OF A LICENSED PROFESSIONAL ENGINEER, ARCHITECT OR OTHER PERSON HAVING NOT LESS THAN FIVE (5) YEARS EXPERIENCE SUPERVISING THE INSTALLATION OF SUCH MECHANICAL SYSTEMS. THE TESTS WILL SHOW COMPLIANCE WITH 2014 INDIANA BUILDING CODE REQUIREMENTS AS OUTLINES IN SECTION [CHAPTER 17].
3. THE LICENSED PROFESSIONAL ENGINEER, ARCHITECT OR OTHER PERSON HAVING NOT LESS THAN FIVE (5) YEARS EXPERIENCE SUPERVISING THE INSTALLATION OF SUCH MECHANICAL SYSTEMS AND CONDUCTING SUCH TESTS WILL FILE DOCUMENTATION AND REPORTS OF TESTS TO THE SYSTEM COMPLIES WITH THE CONSTRUCTION DOCUMENTS AND APPLICABLE LAWS.

- 4. TESTS OF MECHANICAL SYSTEMS SHALL BE PERFORMED IN ACCORDANCE WITH SECTION MC 107 AND THE FOLLOWING SECTIONS OF THE 2014 INDIANA MECHANICAL CODE (2012 IMC-INDIANA AMENDMENTS):
A. VENTILATION SYSTEM SERVING COMMERCIAL COOKING APPLIANCES - MC 507.16
B. REFRIGERATION SYSTEMS - MC 1108

- 5. THE FOLLOWING WORK ITEMS, COMPONENTS, MATERIALS, CAPACITIES, ETC. SHALL COMPLY WITH THE REFERENCED CODE OR STANDARD:
A. STANDARDS OF HEATING - MC 309.1
B. DUCT CONSTRUCTION AND INSTALLATION- MC 603
C. AIR INTAKES, EXHAUSTS AND RELIEFS - MC 401.5
D. AIR FILTERS - MC 605
E. GAS FIRED EQUIPMENT - FUEL GAS CODE

- 6. MINIMUM TEMPERATURE TO BE MAINTAINED IN OCCUPIED SPACES DURING HEATING SEASON: 68 DEG. FAHRENHEIT.
7. VENTILATION FOR ALL AREA SHALL COMPLY WITH MC 401.

- 8. A STATEMENT SHALL BE FILED BY THE OWNER OR TENANT IN POSSESSION THAT THE VENTILATION SYSTEM WILL BE KEPT IN CONTINUOUS OPERATION AT ALL TIMES DURING THE NORMAL OCCUPANCY OF THE STRUCTURE AS REQUIRED BY MC 403.3

- 9. REFER TO ARCHITECTURAL DRAWINGS FOR REQUIRED FIRE-RATED WALL AND SMOKE WALL CONSTRUCTION AND LOCATION.

- 10. THESE PLANS ARE APPROVED ONLY FOR THE WORK INDICATED ON THE APPLICATION SPECIFICATION SHEET. ALL OTHER MATTERS SHOWN ARE NOT TO BE RELIED UPON OR TO BE CONSIDERED AS EITHER BEING APPROVED OR IN ACCORDANCE WITH APPLICABLE CODES.

- 11. ALL HEATING AND COOLING LOADS CALCULATED PER ASHRAE/ACCA 183.

- 12. SMOKE DETECTOR SHALL MEET UL268A.

- 13. MECHANICAL SYSTEM SHALL BE COMMISSIONED PER ASHRAE 90.1-2007 SECTION 6.7.2.4. FINAL COMMISSIONING REPORT SHALL BE DUE WITHIN 90 DAYS OF RECEIPT OF CERTIFICATE OF OCCUPANCY PER ASHRAE 90.1-2007 SECTION 6.7.2.1 & 6.7.2.2.

- 14. A COMMISSIONING PLAN SHALL BE DEVELOPED BY A LICENSED DESIGN PROFESSIONAL, MECHANICAL ENGINEER OR APPROVED AGENCY.

- 15. A PRELIMINARY REPORT OF COMMISSIONING TEST PROCEDURES AND RESULTS SHALL BE COMPLETED AND CERTIFIED BY LICENSED PROFESSIONAL ELECTRICAL ENGINEER, MECHANICAL ENGINEER OR APPROVED AGENCY AND PROVIDED TO THE BUILDING OWNER OR OWNER'S AUTHORIZED AGENT.

- 16. A WRITTEN REPORT DESCRIBING THE ACTIVITIES AND MEASUREMENTS COMPLETED IN ACCORDANCE WITH THE SECTION ASHRAE 90.1-2007 SECTION 6.7.2.1 & 6.7.2.2.

MECHANICAL LEGEND table with columns SYMBOL and DESCRIPTION. Includes symbols for turning vane, air extractor, supply duct, return duct, exhaust duct, flexible duct connection, lined ductwork, thermostat, smoke detector test station, duct smoke detector, undercut door, connect to existing, fire & smoke damper, gas, and shut-off valve.

ABBREVIATIONS

Table of abbreviations: SR SUPPLY REGISTER, RG RETURN GRILLE, SA SUPPLY AIR, RA RETURN AIR, VD VOLUME DAMPER, FD FIRE DAMPER, UCD UNDERCUT DOOR, MD MOTORIZED DAMPER, RTU ROOFTOP UNIT, NIC NOT IN CONTRACT, OSA OUT SIDE AIR, G.C. GENERAL CONTRACTOR, M.C. MECHANICAL CONTRACTOR, P.C. PLUMBING CONTRACTOR, E.C. ELECTRICAL CONTRACTOR, C.L.G. CEILING, A.F.F. ABOVE FINISHED FLOOR, ETR EXISTING TO REMAIN, FSD FIRE & SMOKE DAMPER, WMS WIRE MESH SCREEN, BDD BACK DRAFT DAMPER

GENERAL MECHANICAL NOTES

- 1. PROVIDE ALL LOW PRESSURE DUCTWORK SIZED EQUAL TO OR LESS THAN 0.1" W.G./100' (TYP.) UNLESS SCHEDULED OTHERWISE. INDICATE ALL DUCT SIZES ON SHOP DRAWINGS.
2. PROVIDE MINIMUM DUCT RADIUS ON ELBOWS AT 1-1/2 TIMES DUCT SIZE.
3. PROVIDE 5'-0" MAX. FLEX DUCT CONNECTION TO DIFFUSERS, TYPICAL.
4. ALL CONCEALED SUPPLY DUCTWORK NOT LOCATED IN RETURN AIR PLENUM SHALL BE INSULATED.
5. ALL DUCTS SHALL BE FREE FROM CONTACT WITH ALL: PIPING, WALLS, ELECTRICAL CONDUITS, CEILING SUSPENSION SYSTEMS, ETC.
6. PROVIDE THROAT WITH PROPORTIONAL SPLIT AND TURNING VANES ON TEE TRANSITIONS. (BULLHEAD TEES WILL NOT BE PERMITTED.
7. CEILING DIFFUSER CORES AND BACK-PANS SHALL HAVE A FLAT BLACK ENAMEL FINISH. FACE TO BE OFF-WHITE BAKED ENAMEL ON PERFORATED PLATE AND MARGIN UNLESS SPECIFIED OTHERWISE BY ARCHITECT AND APPROVED BY MECHANICAL ENGINEER. NECK VELOCITIES NOT TO EXCEED 500 FPM MAXIMUM.
8. PROVIDE GALVANIZED SHEET METAL DUCTWORK. ALUMINUM OR ALUMINUM FLEX IS NOT PERMITTED.
9. ALL PIPING AND DUCTWORK SHALL FREELY PASS THROUGH ALL WALLS AND FLOORS WITHOUT RIGID CONNECTIONS. PENETRATION POINTS SHALL BE SLEEVED TO ALLOW PASSAGE OF PIPING OR DUCTWORK AND MAINTAIN 3/4" TO 1-1/4" CLEARANCE AROUND THE OUTSIDE SURFACES. THIS CLEARANCE SHALL BE TIGHTLY PACKED WITH ONE POUND DENSITY GLASS FIBER, AND CALKED AIR TIGHT WITH NON-HARDENING SEALANT AFTER INSTALLATION OF PIPING OR DUCTWORK.
10. CONDENSATE DRAIN LINES SHALL BE PROVIDED FOR ALL MECHANICAL EQUIPMENT WHICH PRODUCES CONDENSATE.
11. FABRICATE, INSTALL, SEAL, AND INSULATE ALL DUCTWORK IN STRICT CONFORMANCE WITH THE REQUIREMENTS OF THE INTERNATIONAL MECHANICAL CODE.
12. ALL EQUIPMENT, MATERIALS AND WORK SHALL CONFORM TO THE APPLICABLE CODES OF THE INTERNATIONAL BUILDING, FIRE, MECHANICAL, AND ELECTRICAL CODES AS ADOPTED BY THE CITY OF SHIRLEY AND ALL OTHER CODES, SAFETY ORDERS AND REGULATIONS AS ENFORCED BY THE THE STATE AND CITY FIRE MARSHALL'S PERTAINING TO THIS PROJECT.
13. PROTECTIVE BARRIERS SHALL BE INSTALLED IN FRONT OF EQUIPMENT WHERE EQUIPMENT IS SUBJECT TO MECHANICAL DAMAGE.

FIELD VERIFY ALL CONDITIONS

- DESIGN DRAWINGS ARE SCHEMATIC. THIS CONTRACTOR SHALL VISIT THE SITE PRIOR TO BIDDING OR AWARD OF CONTRACT TO INSPECT EXISTING FIELD CONDITIONS. THIS CONTRACTOR SHALL INCLUDE ALL LABOR AND MATERIALS NECESSARY FOR FIELD MODIFICATIONS DUE TO EXISTING CONDITIONS.
• THE CONTRACTOR SHALL CONTACT THE ARCHITECT, ENGINEER OR OWNER PRIOR TO BIDDING FOR INTERPRETATIONS AND CLARIFICATIONS OF THE DESIGN AND INCLUDE IN HIS BID ALL COSTS TO MEET THE DESIGN INTENT. CLARIFICATIONS MADE BY THE ARCHITECT, ENGINEER OR OWNER AFTER BIDDING WILL BE FINAL AND SHALL BE IMPLEMENTED AT CONTRACTORS COST.
• BIDDING CONTRACTORS SHALL HAVE A WORKING KNOWLEDGE OF LOCAL CODES AND ORDINANCES AND SHALL INCLUDE IN THEIR BIDS THE COSTS FOR ALL WORK INSTALLED IN STRICT ACCORDANCE WITH GOVERNING CODES, THE PLANS AND SPECIFICATIONS NOT WITHSTANDING, THE CONTRACTOR SHALL ALERT ARCHITECT, ENGINEER OR OWNER OF ANY APPARENT DISCREPANCIES BETWEEN GOVERNING CODES AND DESIGN INTENT.



ROOM NAME	AREA (SQ.FT.)	NUMBER OF PEOPLE/1000 SQ.FT. AS PER IMC 2012	NUMBER OF PEOPLE AS PER IMC 2012	NUMBER OF CHAIR	FINAL PEOPLE NO.	VENTILATION CALCULATION FOR RTU-1(N)		REQ. OA (CFM)	PROVIDED OA (CFM)	PROVIDED OA (CFM)	EXHAUST AIRFLOW RATE (CFM/FIXTURE/SQ.FT.)	TOTAL EXHAUST (CFM)
						MIN OUTSIDE AIR AS PER IMC 2012						
						CFM/PERSON	CFM/SQ.FT.					
COOKING	375	0	0	0	4	0	0	0	260		0.7	265
PREP	288	0	0	0	4	0	0	0	245		0.7	205
ORDER	44	5	1	0	1	7.5	0.12	15	20	530	-	0
TOTAL						15	0.12	15	525		-	470

ROOM NAME	AREA (SQ.FT.)	NUMBER OF PEOPLE/1000 SQ.FT. AS PER IMC 2012	NUMBER OF PEOPLE AS PER IMC 2012	NUMBER OF CHAIR	FINAL PEOPLE NO.	VENTILATION CALCULATION FOR RTU-2(N)		REQ. OA (CFM)	PROVIDED OSA (CFM)	PROVIDED OA (CFM)	EXHAUST AIRFLOW RATE (CFM/FIXTURE/SQ.FT.)	TOTAL EXHAUST (CFM)
						MIN OUTSIDE AIR AS PER IMC 2012						
						CFM/PERSON	CFM/SQ.FT.					
DINING	1092	70	77	55	80	7.5	0.18	797	800		0	0
HALLWAY	60	0	0	0	0	0	0.06	4	5		0	0
TOILET 1	50	0	0	0	0	0	0	0	-		70	70
TOILET 2	50	0	0	0	0	0	0	0	-		70	70
SALES	102	15	2	0	2	7.5	0.12	27	30	840	0	0
TOTAL						827	0.12	827	835		-	140

### ROOF TOP UNIT SCHEDULE

UNIT TAG	TR	SUPPLY AIRFLOW (CFM)	OUTSIDE AIR (CFM)	ESP (IN. OF W.C.)	SUPPLY FAN HP.	MCA/MOP (AMPS)	V/PH/HZ	COOLING CAPACITY TOTAL (MBH)	COOLING CAPACITY SENSIBLE (MBH)	HEATING CAPACITY MBH INPUT	HEATING CAPACITY MBH OUTPUT	GAS PRESS. INCH OF WC	MANUFACTURER & MODEL NO.	STEADY STATE EFFICIENCY	EER	WEIGHT (LBS.)	REMARKS
RTU-1(N)	6.0	2400	530	1.0	1.0	36.5/50	208/3/60	75	54.5	120	96	4.5-14	TRANE YSC072 (OR EQUIVALENT)	80%	11.2	950	1-14
RTU-2(N)	10.0	4000	840	1.0	3.75	49.6/60	208/3/60	119	92.7	200	160	4.5-14	TRANE YSC120 (OR EQUIVALENT)	80%	11.3	1300	1-14

- NOTES:-
- PROVIDE DISCONNECT SWITCH, NON-POWERED, GFI OUTLET.
  - HINGED ACCESS PANELS AND EXTERNAL GAUGE PORTS/PRESSURE RESETS.
  - MERV 13 PLEATED FILTER.
  - 14" ROOF CURB.
  - BOTTOM SUPPLY AND RETURN DUCTS.
  - PROVIDE 7-DAYS PROGRAMMABLE THERMOSTAT.
  - ALL T-STAT & H-STAT PROVIDED WITH LOCKING COVERS.
  - IF PROVIDED HOT GAS BYPASS SYSTEM, THEN CAPACITY OF HOT GAS BYPASS SHALL BE LIMITED TO 50% OF TOTAL UNIT CAPACITY.
  - WHERE REQUIRED PROVIDE LOW AMBIENT COOLING CAPABILITY DOWN TO 0 DEGREES F.
  - PROVIDE TEMPERATURE SENSORS AS PER REQUIREMENT FROM ARCHITECT/OWNER.
  - CONTRACTOR TO COORDINATE WITH MANUFACTURER FOR GAS PRESSURE REQUIREMENTS OF RTU. PROVIDE LOW PRESSURE GAS KIT/SWITCH IF REQUIRED.
  - ELECTRICAL CONNECTION TO BE SINGLE POINT AND THROUGH THE BOTTOM OF THE UNIT.
  - EQUIPMENT MUST BE MEETING THE BRAND MINIMUM REQUIREMENT.
  - CABINET WITH 1/2" FIBERGLASS INSULATION.

### GRILLE AND DIFFUSER SCHEDULE

UNIT TAG	MANUF. & MODEL NO.	DAMPER NO.	FRAME/BORDER	CFM	MODULE SIZE	PATTERN	TYPE	REMARK
A	TITUS TMS	OB	LAY-IN	AS NOTED	24"x24"	4-WAY	SUPPLY	1
B	TITUS TMS	OB	LAY-IN	AS NOTED	12"x12"	4-WAY	SUPPLY	1
C	TITUS PAR OR EQUIVALENT	OB	LAY-IN	AS NOTED	24"x24"	4-WAY	PERFORATED	1
D	TITUS S300FS	---	SURFACE	AS NOTED	AS NOTED	DOUBLE DEFLECTION	SUPPLY	1
E	TITUS 50F	---	LAY-IN	AS NOTED	AS NOTED	EGGCRATE	RETURN	1

- REMARKS
- COORDINATE FINAL FINISH & FRAME/BORDER TYPE WITH ARCHITECT.

### KITCHEN EXHAUST FAN SCHEDULE

UNIT TAG	SERVICE	EXH. AIR FLOW (CFM)	E.S.P. (IN. OF WG)	HP	ELECT. (V/PH)	MANUF. & MODEL NO.	WEIGHT (LBS)	REMARK
KEF-1(N)	HOOD-1(N)	1050	0.4	0.5	115/1	CAPTIVEAIRE EADU50H	94	1-2
KEF-2(N)	HOOD-2(N)	1650	1.4	1.0	208/1	CAPTIVEAIRE EADU55H	128	1-2

- REMARKS
- SEE CAPTIVE AIRE HOOD DRAWING FOR ADDITIONAL INFORMATION.
  - PROVIDED WEIGHT IS INCLUDING ROOF CURB.

### KITCHEN MAKE UP AIR UNIT SCHEDULE

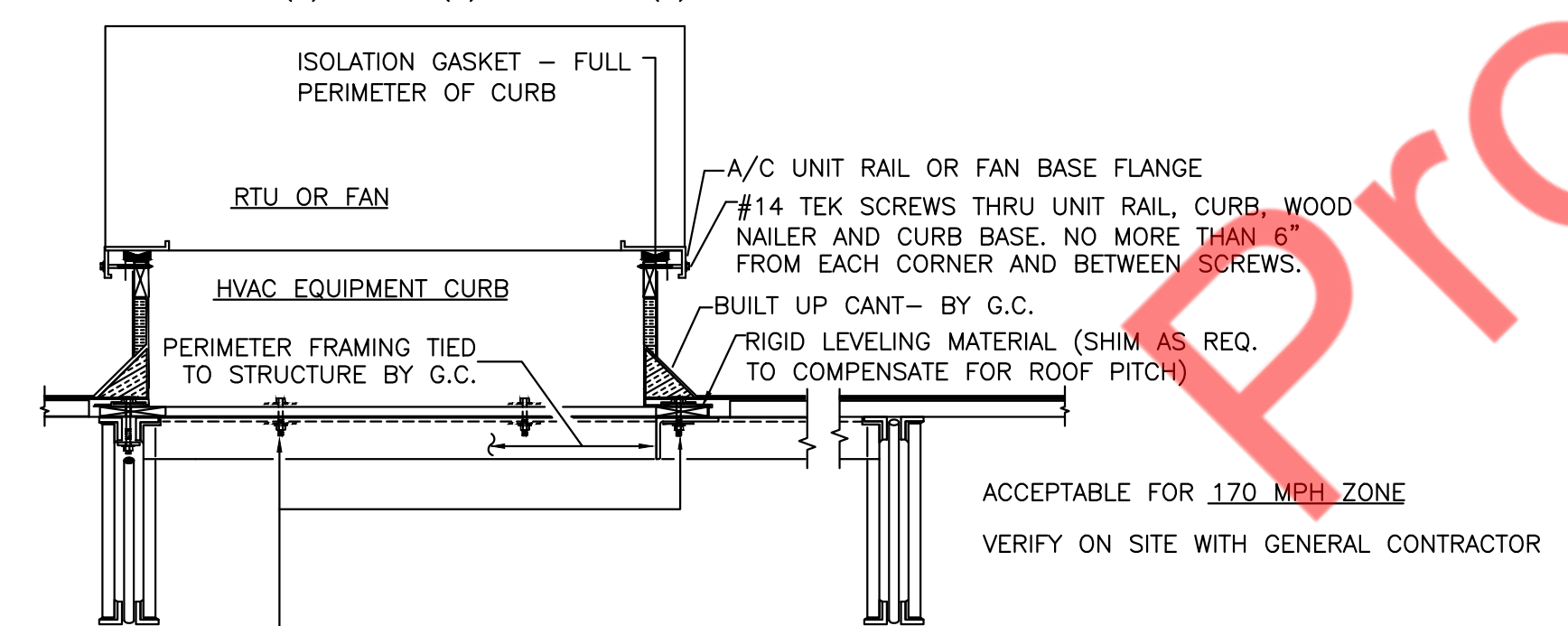
UNIT TAG	SERVICE	MUA CFM	E.S.P. (IN. OF WG)	INPUT MBH	EFFICIENCY	PRESS. RANGE IN WC	HP	ELECT. (V/PH)	MANUF. & MODEL NO.	WEIGHT (LBS)	REMARK
MUA-1(N)	HOOD-1(N)	1485	0.5	131	92%	7-14	1.0	208/1	CAPTIVEAIRE EA1-D.250-15D	545	1-2

- REMARKS
- SEE CAPTIVE AIRE HOOD DRAWING FOR ADDITIONAL INFORMATION.
  - PROVIDED WEIGHT IS INCLUDING ROOF CURB.

### TOILET EXHAUST FAN SCHEDULE

UNIT TAG	SERVICE	CFM	E.S.P. (IN. OF W.G.)	RPM/HP	ELECT. (V/PH)	MANUF. & MODEL NO.	REMARK
EF-1(N)	TOILET	70	0.5	838/6W	115/1	GREENHECK SP-A50-90-VG	1-2
EF-2(N)	TOILET	70	0.5	838/6W	115/1	GREENHECK SP-A50-90-VG	1-2

- REMARKS
- DISCONNECT SWITCH GRAVITY BACKDRAFT DAMPER, FLEXIBLE DUCT COLLAR CONNECTION.
  - INTERLOCK EF-1(N) & EF-2(N) WITH RTU-2(N)



### ROOF TOP UNIT INSTALLATION DETAILS

NO SCALE

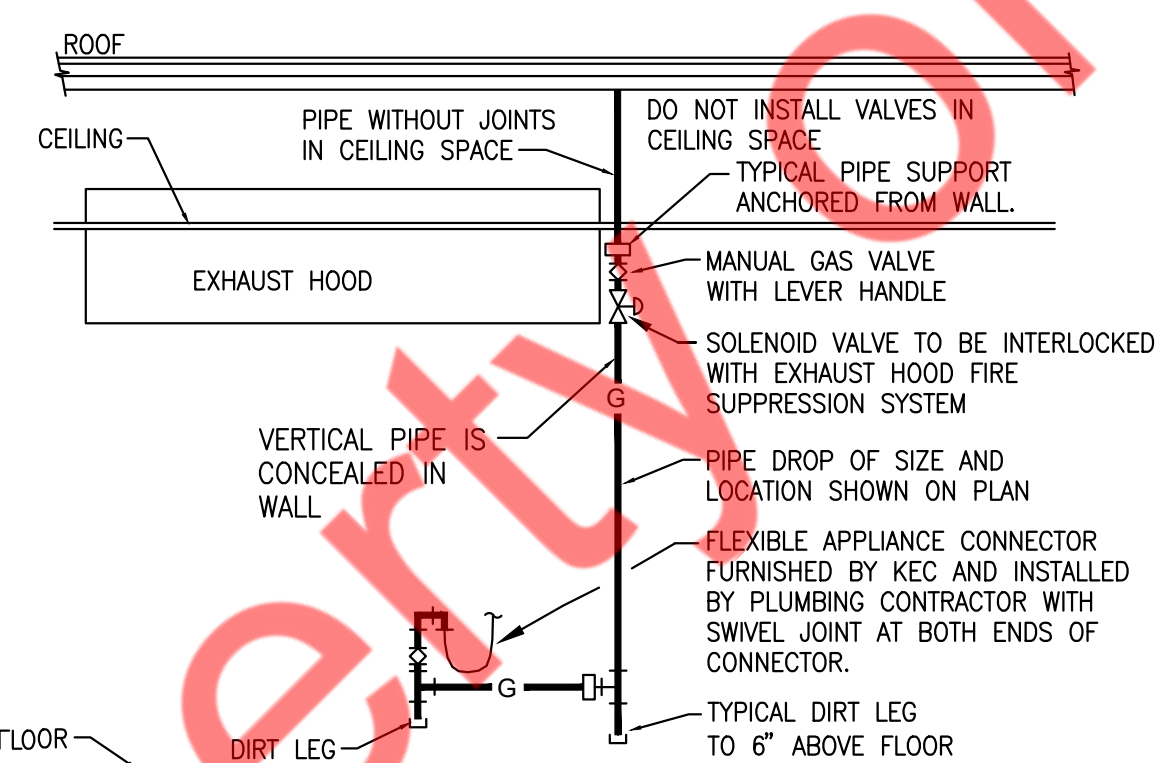
SECURE CURB TO MIN. 3 x 3 x 1/2 ANGLE IRON WITH MIN. 1/2" BOLTS BY REQUIRED LENGTH WITH FENDER WASHERS, LOCK WASHERS & NUTS @ EA. SIDE OF FAN CURBS & 4 PER LONG SIDE OF ROOF TOP CURBS & 2 AT EA. SHORT END EQUALLY SPACED - START FROM CORNER A MIN. OF 6". ON ROOF TOP A/C CURBS. GENERAL CONTRACTOR SHALL PROVIDE STRUCTURAL PERIMETER FRAMING FOR EDGE SUPPORT OF CURB AS ILLUSTRATED IN THIS DETAIL FOR HURRICANE FASTENING

### TABLE- DUCT CONSTRUCTION MIN. SHEET METAL THICKNESS

ROUND DUCT DIAMETER (inches)	STATIC PRESSURE			
	1/2-inch water gage		1-inch water gage	
	Galvanized	Aluminum	Galvanized	Aluminum
<12	0.013	0.018	0.013	0.018
12 to 14	0.013	0.018	0.016	0.023
15 to 17	0.016	0.023	0.019	0.027
18	0.016	0.023	0.024	0.034
19 to 20	0.019	0.027	0.024	0.034

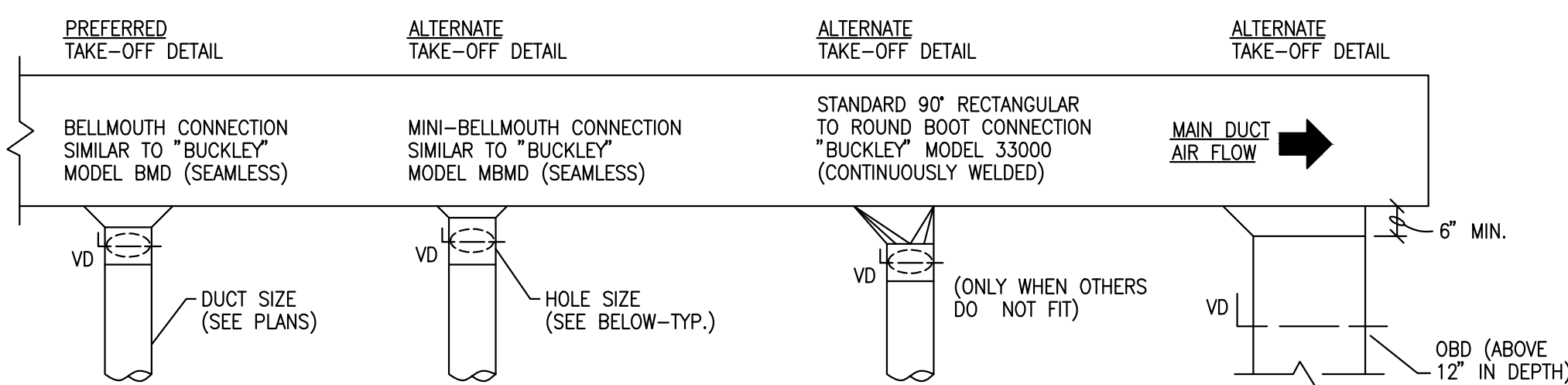
  

RECTANGULAR DUCT DIMENSION (inches)	STATIC PRESSURE			
	1/2-inch water gage		1-inch water gage	
	Galvanized	Aluminum	Galvanized	Aluminum
≤ 8	0.013	0.018	0.013	0.018
9 to 10	0.013	0.018	0.016	0.023
11 to 12	0.016	0.023	0.019	0.027
13 to 16	0.019	0.027	0.019	0.027
17 to 18	0.019	0.027	0.024	0.034
19 to 20	0.024	0.034	0.024	0.034



### COOKING APPLIANCE GAS PIPE DETAIL LOW PRESSURE END OF SUPPLY AIR DUCT DETAIL

NOT TO SCALE N.T.S.



THIS DETAIL APPLIES TO SINGLE TAKEOFFS TO DIFFUSER AS WELL AS BRANCH TAKEOFFS. IT ALSO APPLIES TO TAKEOFFS IN THE HORIZONTAL AS WELL AS VERTICAL DIRECTION.

NOTE: ALTERNATE FITTINGS SHALL BE USED WHEN DUCT HEIGHTS DOES NOT PERMIT THE USE OF THE PREFERRED FULL SIZE BELLMOUTH. SUBMIT FITTINGS FOR REVIEW BY ENGINEER PRIOR TO INSTALLATION.

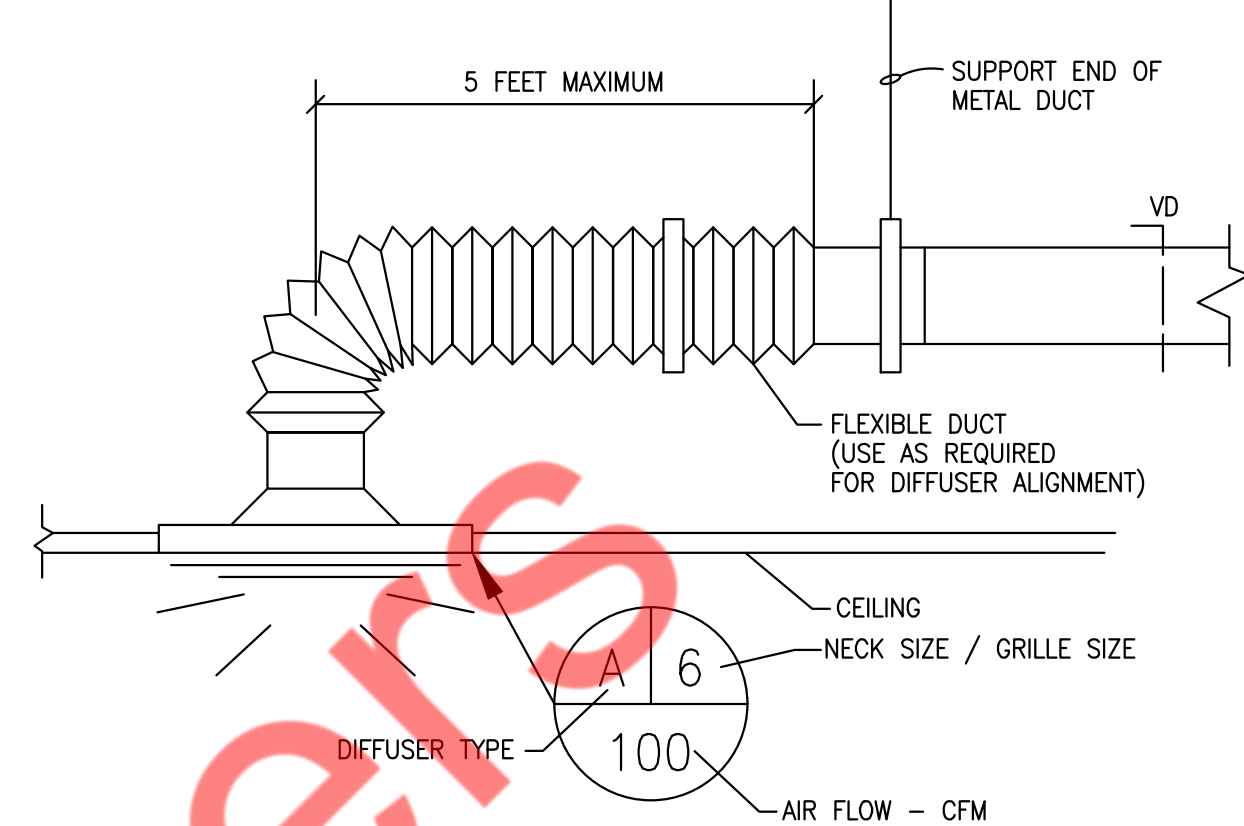
### DUCT TAKEOFFS

NO SCALE

UNIT	SUPPLY AIR (CFM)	OUTSIDE AIR		RETURN AIR (CFM)	EXHAUST AIR (CFM)
		SUPPLY (CFM)	%OA		
RTU-1(N)	2400	530	22.08	1870	-
RTU-2(N)	4000	840	21.00	3160	-
MUA-1(N)	1485	1485	-	-	-
KEF-1(N)	-	-	-	-	1050
KEF-2(N)	-	-	-	-	1650
EF-1(N)	-	-	-	-	70
EF-2(N)	-	-	-	-	70
TOTAL	7885	2855	-	5030	2840
BUILDING PRESSURE:				15 CFM	POSITIVE

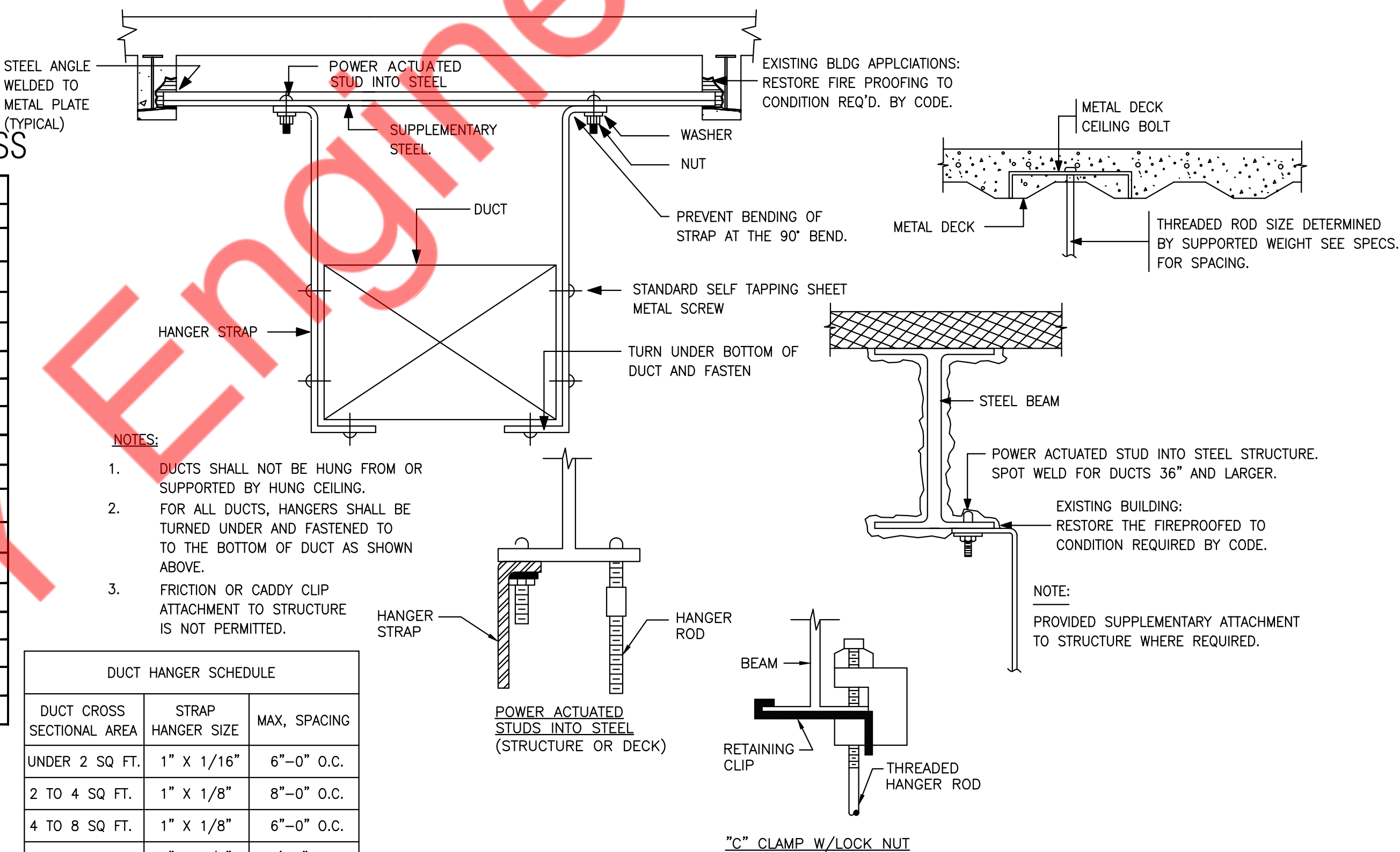
NOTES:-

- CONTRACTOR TO ADJUST MOTORIZED DAMPER ON FRESH AIR TAP TO PROVIDE OUTSIDE AIR AS MENTIONED IN ABOVE TABLE.



### CEILING DIFFUSER BRANCH DUCTS W/ FLEX CONNECTION

NO SCALE



NOTES:

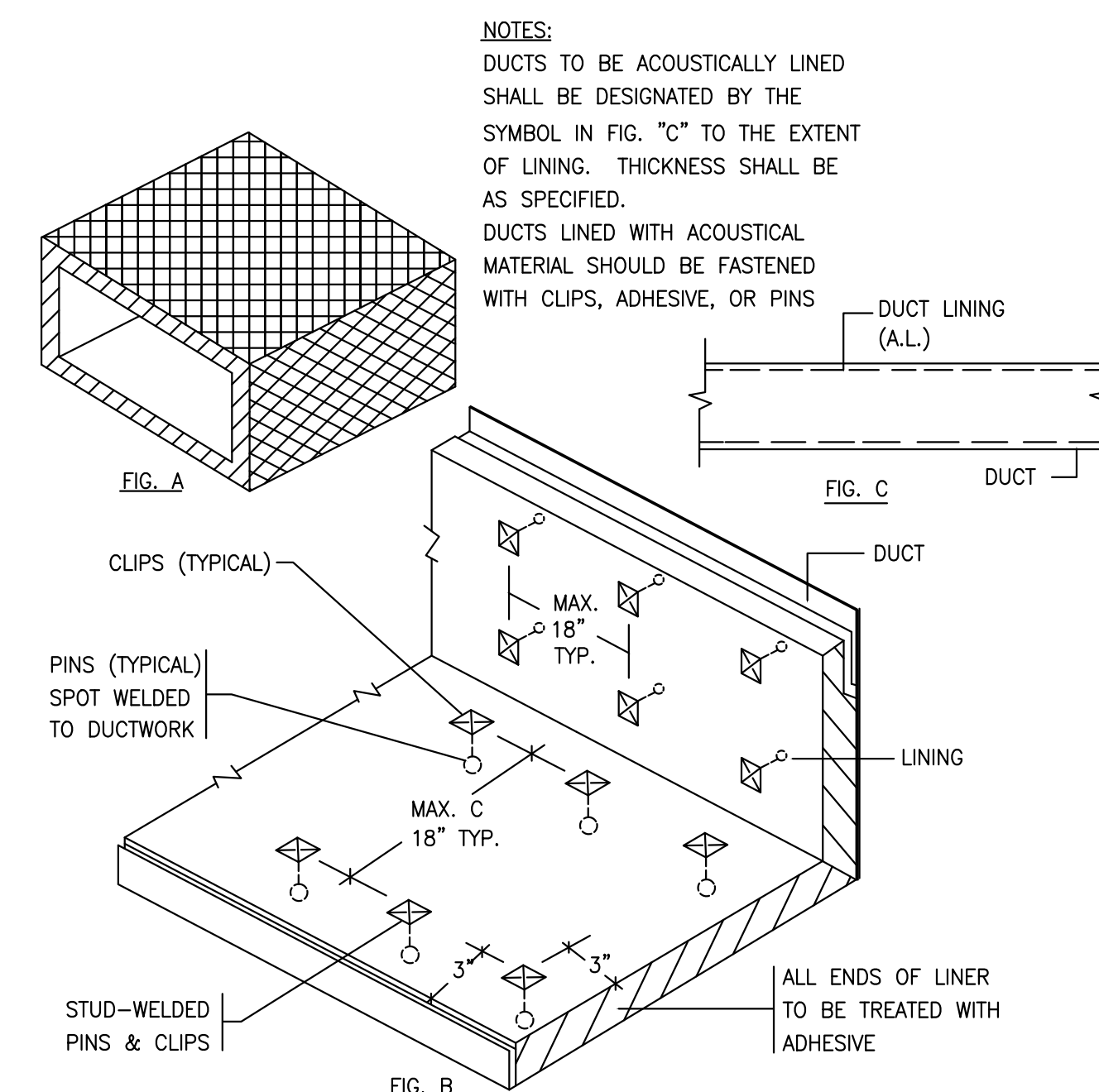
- DUCTS SHALL NOT BE HUNG FROM OR SUPPORTED BY HUNG CEILING. FOR ALL DUCTS, HANGERS SHALL BE TURNED UNDER AND FASTENED TO THE BOTTOM OF DUCT AS SHOWN ABOVE.
- FRICION OR CADDY CLIP ATTACHMENT TO STRUCTURE IS NOT PERMITTED.

### DUCT HANGER SCHEDULE

DUCT CROSS SECTIONAL AREA	STRAP HANGER SIZE	MAX. SPACING
UNDER 2 SQ. FT.	1" x 1/16"	6'-0" O.C.
2 TO 4 SQ. FT.	1" x 1/8"	8'-0" O.C.
4 TO 8 SQ. FT.	1" x 1/8"	6'-0" O.C.
OVER 8 SQ. FT.	1" x 1/8"	4'-0" O.C.

### DUCT HANGING & SUPPORT DETAILS

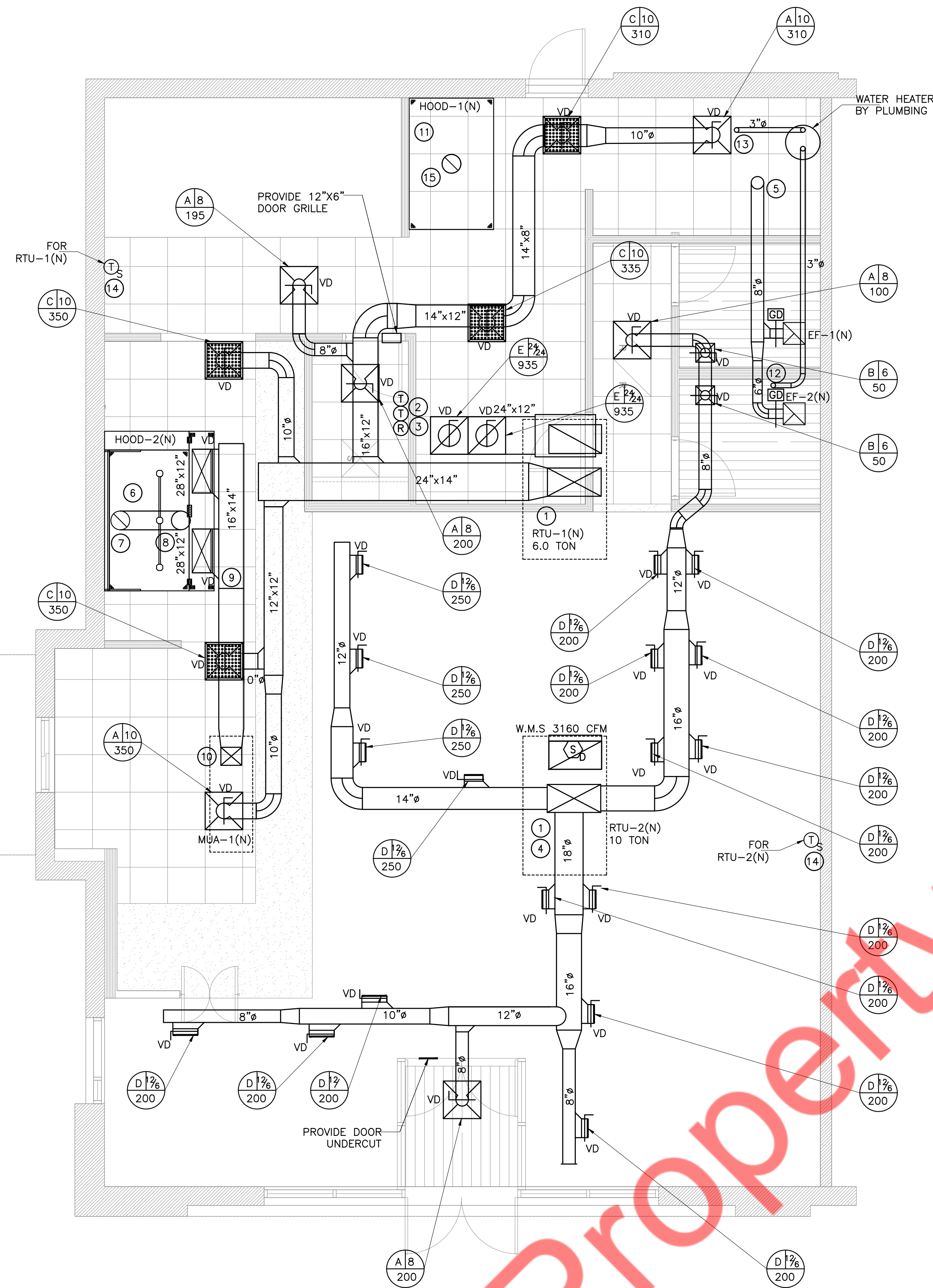
NO SCALE



### ACOUSTICAL DUCT LINING DETAILS

NO SCALE





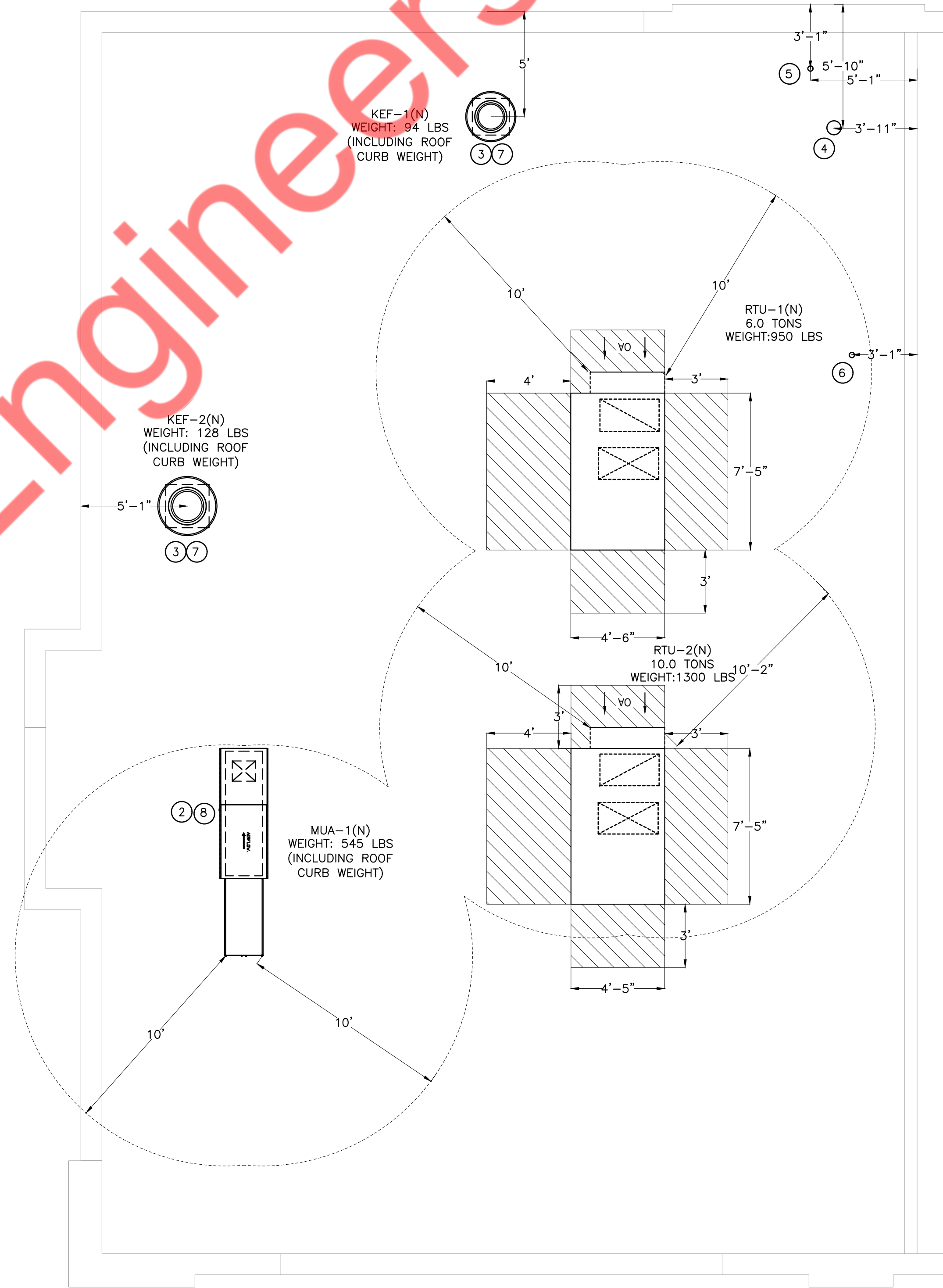
1 MECHANICAL FLOOR PLAN  
SCALE: 1/4" = 1'-0"

MECHANICAL PLAN NOTES

- EXTEND FULL SIZE SUPPLY & RETURN DUCTWORK FROM RTU-1(N) & RTU-2(N) TO SPACE. EXTEND AS SHOWN. ACOUSTICALLY LINE THE FIRST 10'-0" OF BOTH SUPPLY AND RETURN MAIN DUCTS.
- PROVIDE, INSTALL AND WIRE NEW 7-DAY PROGRAMMABLE THERMOSTAT/HUMIDISTAT. COORDINATE EXACT LOCATION WITH ARCHITECT AND OWNER PRIOR TO ROUGH-IN.
- MECHANICAL CONTRACTOR TO MOUNT SMOKE DETECTOR REMOTE KEY STATUS AND TEST STATIONS (WITH AUDIO AND VISUAL ALARM). NEXT TO UNIT THERMOSTAT. MC. TO INDICATE DETECTOR SERVING AIR CONDITIONING UNIT. COORDINATE EXACT LOCATION WITH FIRE MARSHAL PRIOR TO ROUGH-IN. ALL WIRING SHALL BE BY ELECTRICAL CONTRACTOR IN CONDUIT PER N.E.C. REMOTE STATION SHALL BE A SYSTEM SENSOR MODEL SSK451 OR EQUAL.
- SMOKE DETECTOR SHALL BE FURNISHED/INSTALLED BY MECHANICAL CONTRACTOR AND WIRED BY ELECTRICAL CONTRACTOR TO SHUT DOWN CORRESPONDING ROOF TOP UNIT UNDER ALARM CONDITIONS. ALL WIRING SHALL BE IN CONDUIT PER N.E.C. SMOKE DETECTOR SHALL BE SYSTEM SENSOR MODEL DHT00ACDCLP OR EQUAL.
- ROUTE 8" EXHAUST DUCT UP THROUGH ROOF WITH GOOSENECK AND BIRDSCREEN. MAINTAIN A MINIMUM OF 10'-0" FROM ALL OUTSIDE AIR INTAKES.
- INSTALL TYPE 1 GREASE EXHAUST HOOD. SUPPORT HOOD PER MANUFACTURER'S INSTALLATION INSTRUCTIONS. PROVIDE TRAPEZE HANGERS FOR ALL THREAD SUPPORT UNDER DUCTWORK AS REQUIRED. TRANSITION FROM HOOD CONNECTION TO WELDED KITCHEN EXHAUST DUCT SIZES SHOWN.
- GREASE DUCT TO BE PROVIDED WITH KITCHEN EQUIPMENT AND INSTALLED BY MECHANICAL CONTRACTOR. INSTALL PER MANUFACTURER'S INSTRUCTIONS.
- 12" GREASE EXHAUST DUCT FROM HOOD UP THRU ROOF TO KEF-2(N).
- EXTEND MAKE-UP AIR DUCT FROM HOOD COLLAR UP TO MOUNTED MAKE-UP AIR UNIT ON ROOF (MUA-1(N)).
- MAKEUP DUCT UP THRU ROOF TO MUA-1(N).
- INSTALL TYPE 2 EXHAUST HOOD. SUPPORT HOOD PER MANUFACTURER'S INSTALLATION INSTRUCTIONS. PROVIDE TRAPEZE HANGERS FOR ALL THREAD SUPPORT UNDER DUCTWORK AS REQUIRED. TRANSITION FROM HOOD CONNECTION TO WELDED KITCHEN EXHAUST DUCT SIZES SHOWN.
- 3" WATER HEATER AIR INTAKE PIPE UP THROUGH ROOF.
- 3" WATER HEATER EXHAUST VENT PIPE UP THROUGH ROOF.
- TEMPERATURE SENSOR FOR THERMOSTAT SERVING DESIGNATED ROOF TOP UNITS.
- 12" EXHAUST DUCT FROM HOOD UP THRU ROOF TO KEF-1(N)

MECHANICAL ROOFTOP PLAN NOTES

- PROVIDE FLEXIBLE CONNECTORS ON SUPPLY AND RETURN DUCT CONNECTIONS. SET OUTSIDE AIR AS INDICATED ON ROOFTOP UNIT SCHEDULES. MECHANICAL CONTRACTOR SHALL SCRIBE INTO UNIT POSITION OF OUTSIDE AIR DAMPER AND LABEL OUTSIDE AIR VOLUME AND PERCENT OF OUTSIDE AIR.
- MAKE-UP AIR UNIT AND ROOF CURB ARE OWNER PROVIDED. COORDINATE LOCATION OF UNIT WITH LANDLORD AND EXISTING CONDITIONS. ADJUST DUCTWORK ROUTING ACCORDINGLY. PROVIDE FLEXIBLE CONNECTION ON THE SUPPLY DUCT CONNECTION TRANSITION TO DUCT SIZE INDICATED. FIELD VERIFY EXISTING CONDITIONS PRIOR TO BID.
- COORDINATE INSTALLATION OF FANS WITH LANDLORD AND EXISTING CONDITIONS TO ENSURE THAT FAN IS NOT INSTALLED WITHIN 10 FEET OF ANY OUTSIDE AIR INTAKE.
- 8" EXHAUST DUCT UP THROUGH ROOF. MAINTAIN A MINIMUM OF 10'-0" FROM ALL OUTSIDE AIR INTAKES.
- 3" WATER HEATER FLUE PIPE UP THROUGH ROOF WITH GOOSENECK AND BIRDSCREEN. MAINTAIN A MINIMUM OF 10'-0" FROM ALL OUTSIDE AIR INTAKE AND TERMINATES 36" ABOVE ROOF.
- 3" WATER HEATER AIR INTAKE PIPE UP THROUGH ROOF WITH GOOSENECK AND BIRDSCREEN. MAINTAIN A MINIMUM OF 10'-0" FROM ALL EXHAUST AIR VENTS AND TERMINATES 36" ABOVE ROOF.
- CONTRACTOR TO FIELD VERIFY THAT THE LOCATION OF ANY INTAKE SOURCE FROM ADJACENT TENANTS SHOULD BE AT LEAST 10' AWAY FROM THE KEF-1(N), KEF-2(N) AND OTHER EXHAUST DUCT TERMINATING ON ROOF.
- CONTRACTOR TO FIELD VERIFY THAT THE LOCATION OF ANY EXHAUST SOURCE FROM ADJACENT TENANTS SHOULD BE AT LEAST 10' AWAY FROM THE RTU-1(N), RTU-2(N) & MUA-1(N).



2 MECHANICAL ROOFTOP PLAN  
SCALE: 1/4" = 1'-0"







EXHAUST FAN INFORMATION - JOB#671255																
FAN UNIT	TAG	QTY	FAN UNIT MODEL #	MANUFACTURER	CFM	ESP	HPM	MOTOR ENCL.	HP	BHP	PHASE	VOLT.	FLA	DISCHARGE VELOCITY	WEIGHT (LBS)	EDGES
1	PROFFER	1	EAD20H	ECON-HOR	1050	6.400	1.41	TEAD-ECM	E500	2.295	1	115	6.3	299 FPM	74	137
2	GREASE	1	EAD20H	ECON-HOR	1050	6.400	1.41	TEAD-ECM	E500	2.295	1	208	6.9	302 FPM	90	136

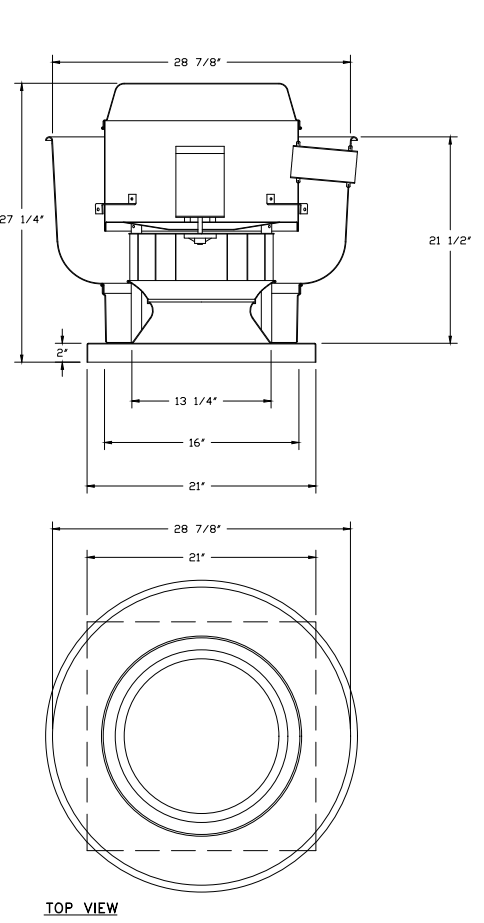
MIA FAN INFORMATION - JOB#671255																			
FAN UNIT	TAG	QTY	FAN UNIT MODEL #	BLOWER HOUSING	MIN CFM	DESIGN CFM	ESP	HPM	MOTOR ENCL.	HP	BHP	PHASE	VOLT.	FLA	MCA	MCCP	WEIGHT (LBS)	EDGES	
3	MIA	1	EAI-5250-103	5HP-11HOD	40-5250	1000	1495	1500	1695	TEAD-ECM	1.000	0.7200	1	208	6.9	8.7A	15A	480	145

GAS FIRED MAKE-UP AIR UNITS						
FAN UNIT	TAG	INPUT BTU/H	OUTPUT TEMP	REGULATED INPUT GAS PRESSURE	BURNER TYPE/CONTROL	
3	MIA	133920	120645	80°F	7 IN. W.C. - 14 IN. W.C. NATURAL	92

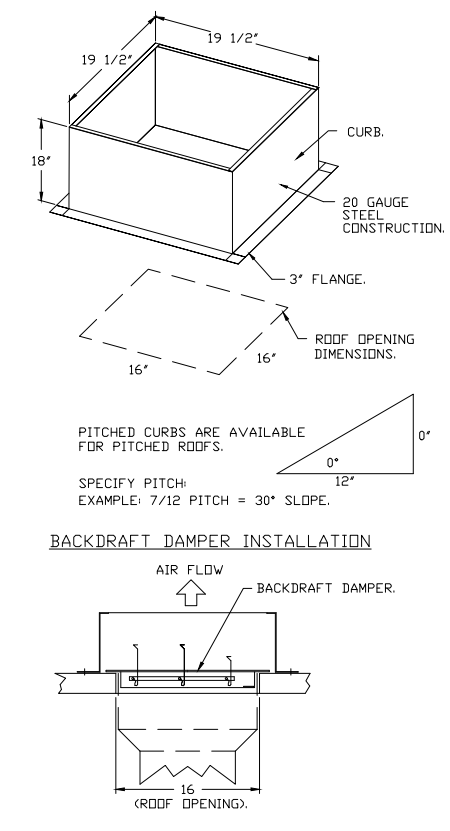
FAN OPTIONS		DESCRIPTION
1	PROFFER	1. ECM WINDING PACKAGE - MANUAL OR 0-30VDC REFERENCE SPEED CONTROL - RTIC - CELECO MOTOR, ECM WINDING
1	PROFFER	1. 15-300 DAMPER
1	PROFFER	1. 1 YEAR PARTS WARRANTY
2	GREASE	1. GREASE BOX
2	GREASE	1. ECM WINDING PACKAGE - PUMP SIGNAL FROM ECM3D PREVISE (TELECO MOTOR), ECM WINDING
2	GREASE	1. 1 YEAR PARTS WARRANTY
2	GREASE	1. SIZE 1 TEMPERED COMMERCIAL, BURNER DISCHARGE FOR DIRECT DRIVE AMIS
2	GREASE	1. LINE PRESSURE GAUGE, 15-25
2	GREASE	1. MANIFOLD PRESSURE GAUGE, -5 TO 15" WC
2	GREASE	1. LOW FUSE START
2	GREASE	1. SHIP LOOSE GAS STRAINER 3/4"
2	GREASE	1. METORIZED BACKDRIFT DAMPER FOR 40-0 HOUSING - MEETS AREA CLASS 1A RATING
2	GREASE	1. ECM WINDING PACKAGE - 30 SUPPLY - PUMP SIGNAL FROM ECM3D PREVISE (TELECO MOTOR)
2	GREASE	1. 1 YEAR PARTS WARRANTY

FAN ACCESSORIES			
FAN UNIT	TAG	EXHAUST	SUPPLY
1	PROFFER	GREASE DRAIN DAMPER	WALL DAMPER
1	PROFFER	YES	YES
2	GREASE	YES	YES
2	MIA		

CURB ASSEMBLIES					
NO.	FAN TAG	WEIGHT	ITEM	SIZE	
1	PROFFER	20 LBS	CURB	20.000" X 19.500" X 10.000" ALONG LENGTH, RIGHT INSULATED	
2	GREASE	36 LBS	CURB	20.000" X 20.000" X 10.000" ALONG LENGTH, RIGHT INSULATED VENTED HONKER	
3	MIA	60 LBS	CURB	20.000" X 20.000" X 10.000" ALONG LENGTH, RIGHT INSULATED	



- FEATURES:**
- DIRECT DRIVE CONSTRUCTION AND MULTI-POLARIZED
  - ROOF MOUNTED FANS
  - UL-1978
  - VARIABLE SPEED CONTROL
  - INTERNAL WIRING
  - THERMAL OVERLOAD PROTECTION (SINGLE PHASE)
  - NON-3Ø SAFETY DISCONNECT SWITCH
- DESIGN:**
- ECM WINDING PACKAGE - MANUAL OR 0-30VDC REFERENCE SPEED CONTROL - RTIC - CELECO MOTOR, ECM WINDING
  - 1 YEAR PARTS WARRANTY



**CAPTIVE**  
Wisconsin Mechanical

Cousin's Subs - Indianapolis

10/5/2022

5671255

DS-134

3/4" = 1'-0"

**MASTER DRAWING**

5

**CAPTIVE**  
Wisconsin Mechanical

Cousin's Subs - Indianapolis

10/5/2022

5671255

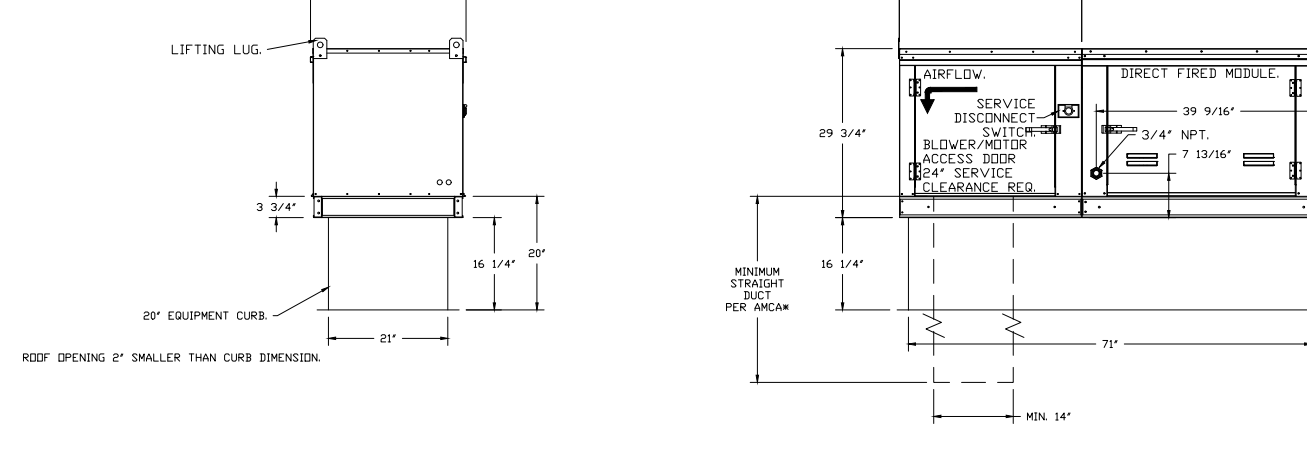
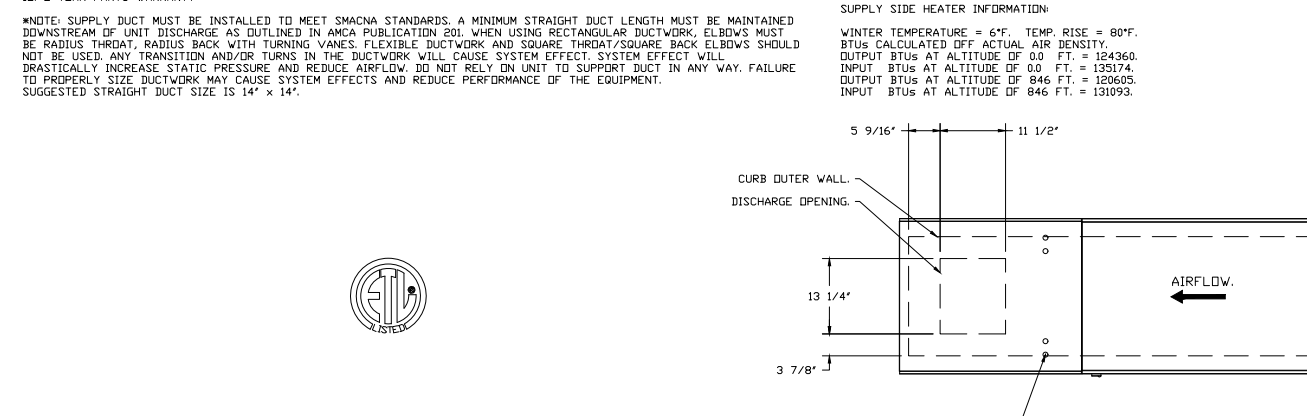
DS-134

3/4" = 1'-0"

**MASTER DRAWING**

6

FAN AS EAI-5250-103 - HEATER DRUM  
 1. HEATER DRUM SHALL BE MADE OF AN UNIT WITH 10" WIDE FLOW DIRECT DRIVE FAN  
 2. HEATER DRUM SHALL BE MADE OF AN UNIT WITH 10" WIDE FLOW DIRECT DRIVE FAN  
 3. HEATER DRUM SHALL BE MADE OF AN UNIT WITH 10" WIDE FLOW DIRECT DRIVE FAN  
 4. HEATER DRUM SHALL BE MADE OF AN UNIT WITH 10" WIDE FLOW DIRECT DRIVE FAN  
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 8. HEATER DRUM SHALL BE MADE OF AN UNIT WITH 10" WIDE FLOW DIRECT DRIVE FAN  
 9. HEATER DRUM SHALL BE MADE OF AN UNIT WITH 10" WIDE FLOW DIRECT DRIVE FAN  
 10. HEATER DRUM SHALL BE MADE OF AN UNIT WITH 10" WIDE FLOW DIRECT DRIVE FAN



**PROPERTY**

**CAPTIVE**  
Wisconsin Mechanical

Cousin's Subs - Indianapolis

10/5/2022

5671255

DS-134

3/4" = 1'-0"

**MASTER DRAWING**

7

**GREASE DUCT & CHIMNEY SPECIFICATIONS:**  
 PROVIDE GREASE DUCT EQUAL TO ECON-AIR MODEL "EDW" ROUND 20 GAUGE 430 STAINLESS STEEL DUCTWORK. MODEL "EDW" IS LISTED TO UL-1978 AND IS INSTALLED USING "V" CLAMP LOCKING CONNECTIONS SEALED WITH 3M FIRE BARRIER 2000 PLUS. MODEL "EDW" DOES NOT REQUIRE WELDING PROVIDING IT HAS BEEN INSTALLED PER THE MANUFACTURER'S INSTALLATION GUIDE.  
 PROVIDE RATED ACCESS DOORS AT EVERY CHANGE IN DIRECTION AND EVERY 12' ON CENTER. PER MANUFACTURER LISTING MODEL "EDW" HORIZONTAL RUNS LESS THAN 75 FT. CAN BE SLOPED 1/16" PER 12". HORIZONTAL RUNS MORE THAN 75 FT. CAN BE SLOPED 3/16" PER 12". DUCT SHOULD BE SLOPED AS MUCH AS POSSIBLE TO REDUCE THE CHANCE OF GREASE ACCUMULATION IN HORIZONTAL RUNS.  
 IF THE DUCT OR CHIMNEY IS WITHIN 18 INCHES OF COMBUSTIBLE MATERIAL, PROVIDE UL-2221 OR UL-103 HT LISTED DOUBLE WALL GREASE DUCT OR DOUBLE WALL CHIMNEY EQUAL TO ECON-AIR MODEL "EDW" - 2R, 2R TYPE HT, 3R, OR 32" ROUND 20 GAUGE 430 STAINLESS INNER DUCT INSULATED WITH A 24 GAUGE 430 STAINLESS OUTER SHELL.

**CUSTOMER APPROVAL TO MANUFACTURE:**

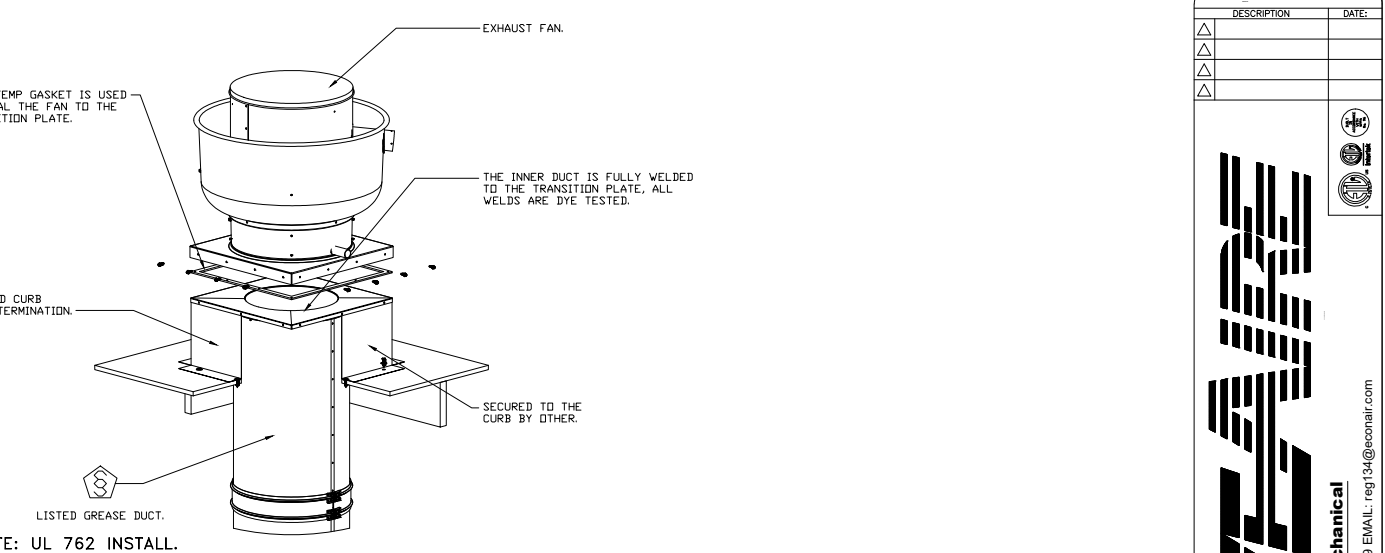
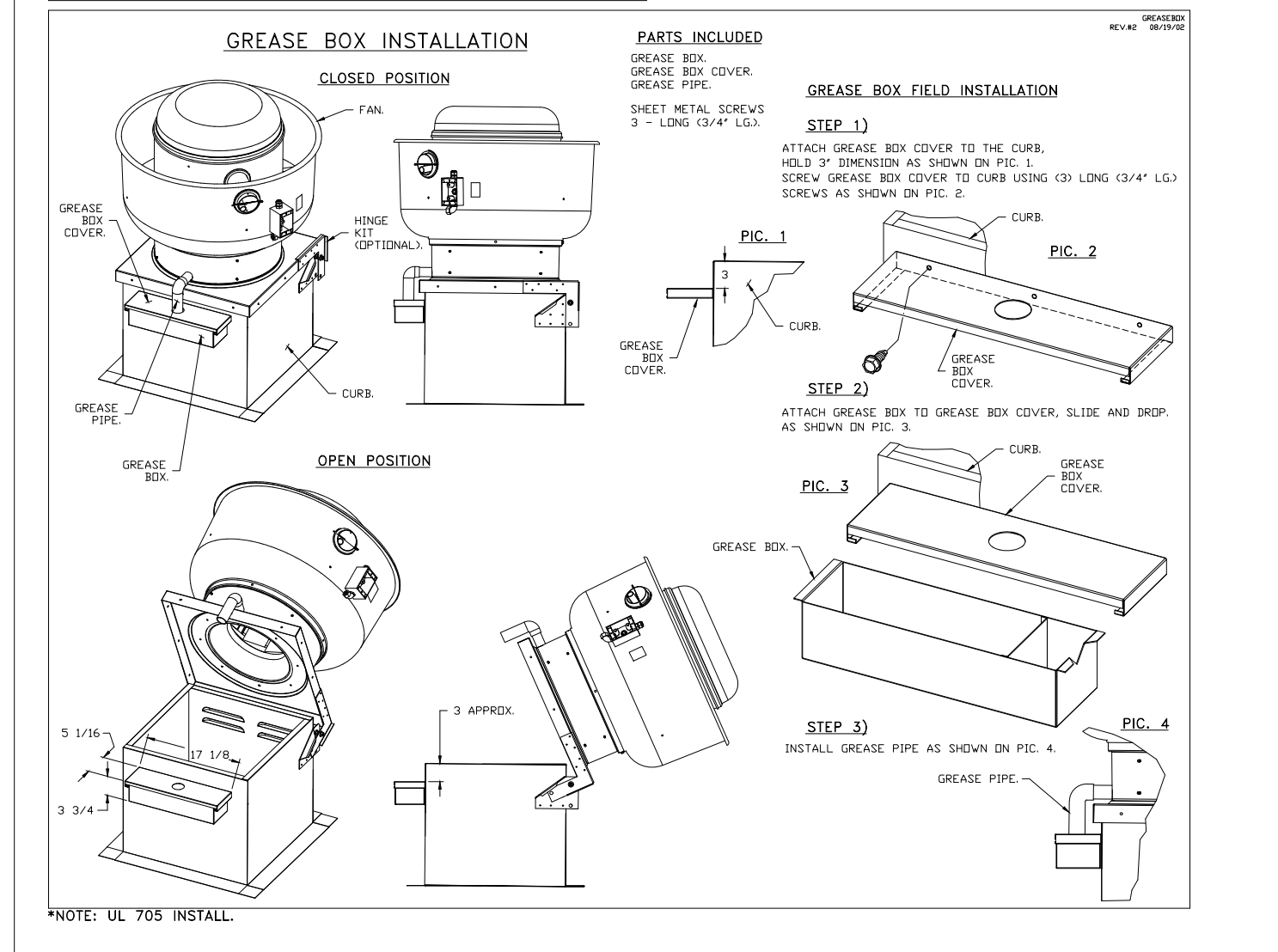
APPROVED AS NOTED

APPROVED WITH NO EXCEPTION TAKEN

REVISE AND RESUBMIT

SIGNATURE \_\_\_\_\_ DATE \_\_\_\_\_

YOUR TITLE \_\_\_\_\_



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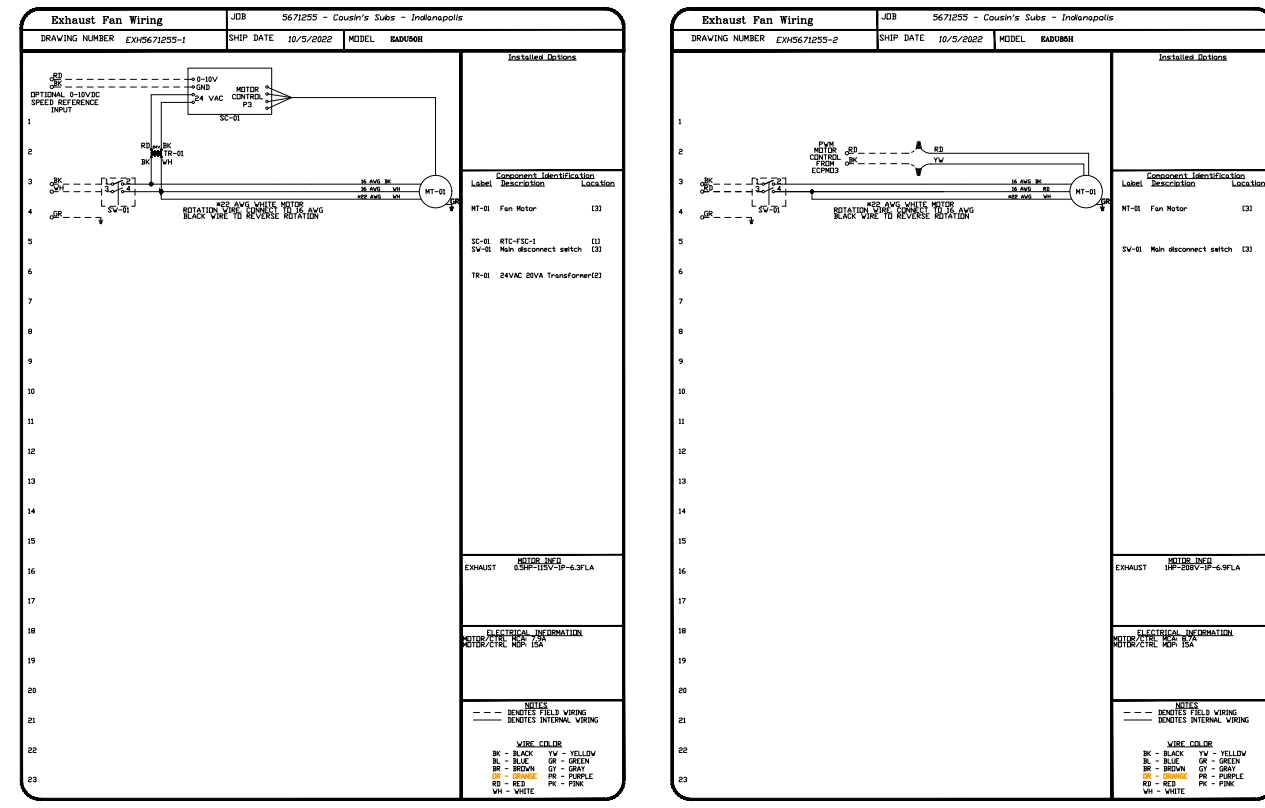
DS-134

3/4" = 1'-0"

**MASTER DRAWING**

8



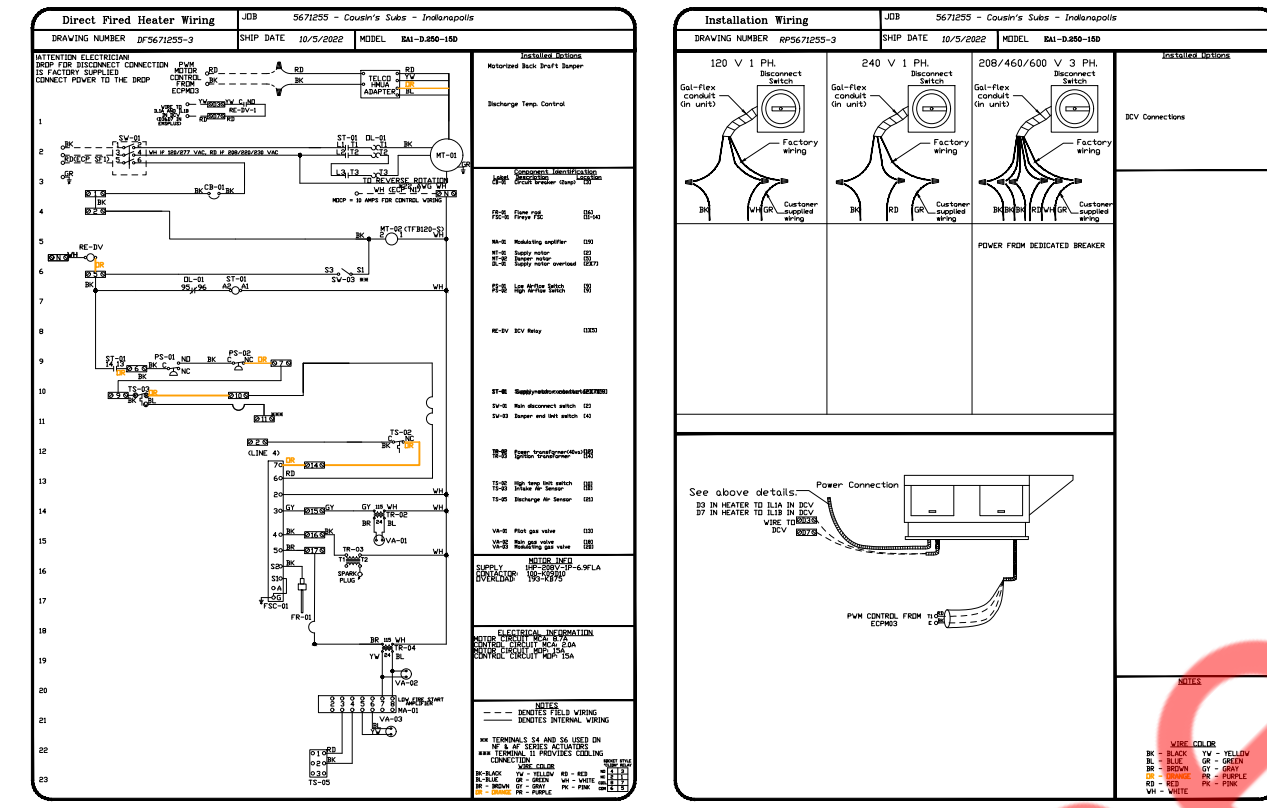


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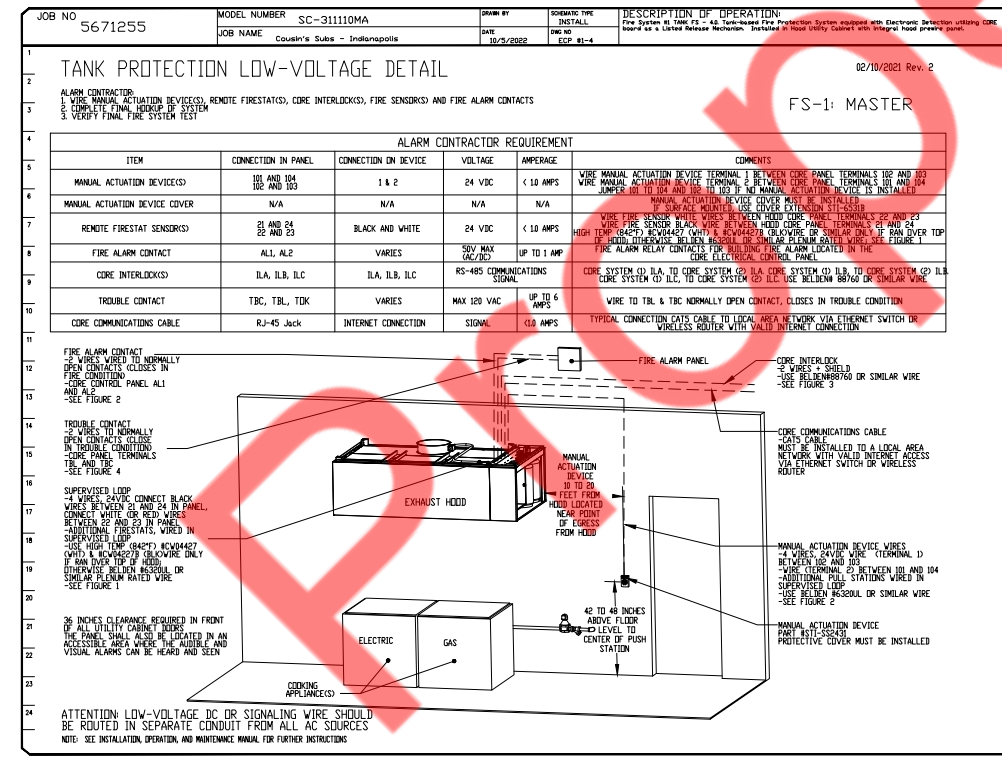
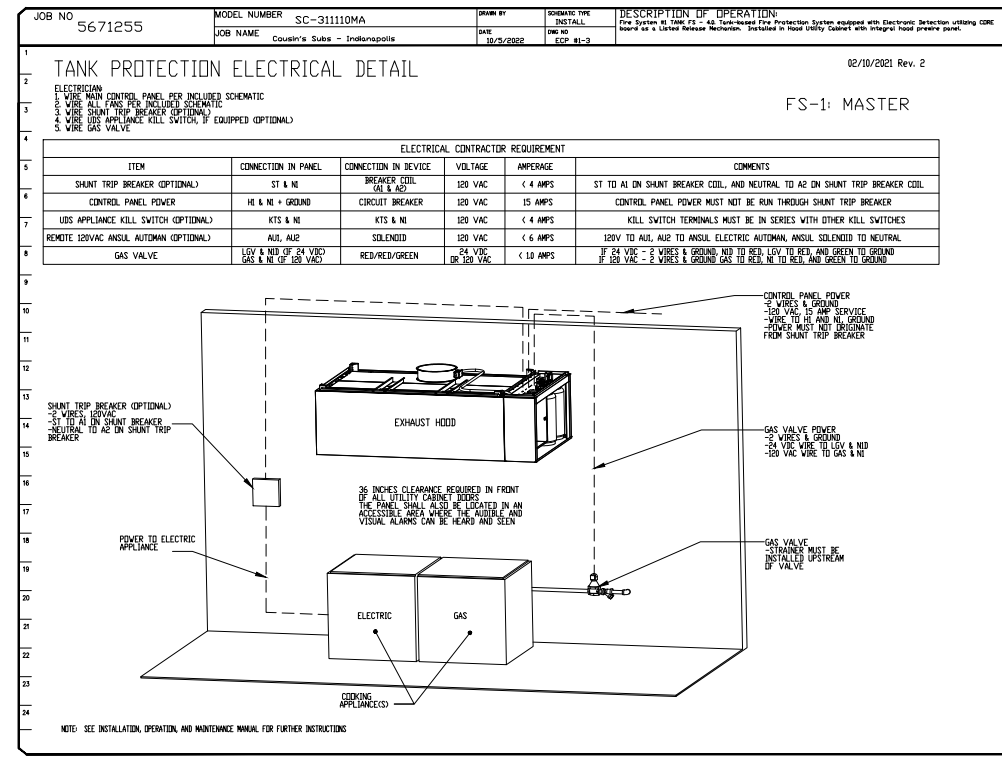
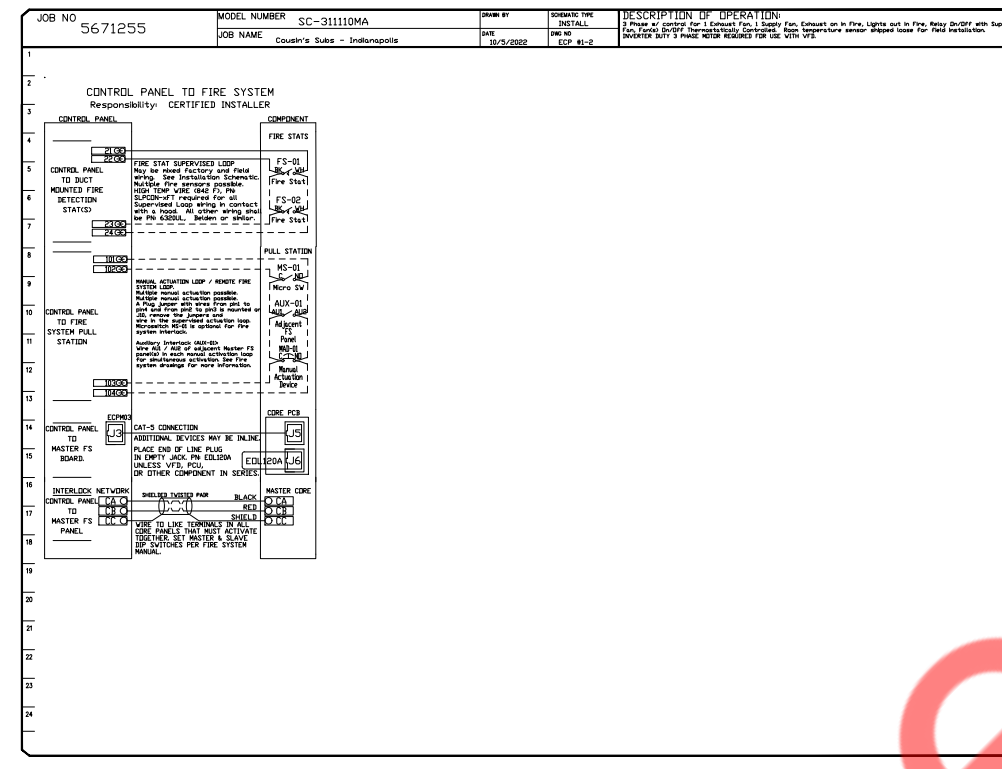
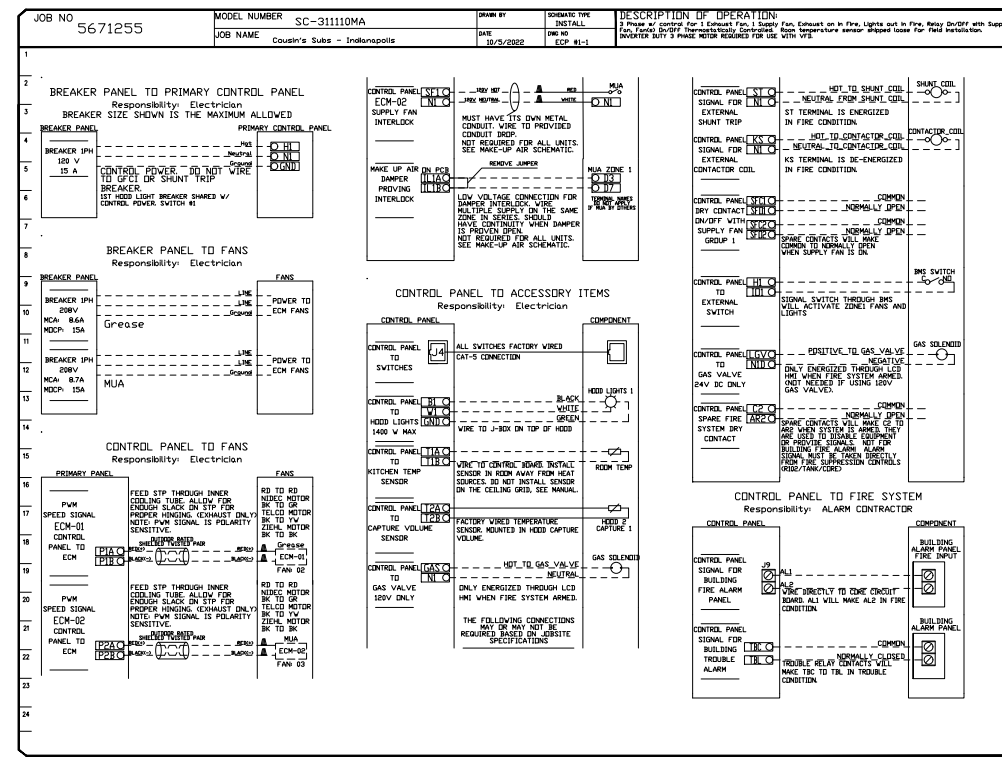
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ELECTRICAL PACKAGE - J0845671255

NO.	PKG.	PACKAGE #	LOCATION	QUANTITY	SWITCHES	OPTION	FANS CONTROLLED
1	SC-30388A	UTILITY CABINET ASSEMBLY	MECH # 2	1 PAN	SMART CONTROL THERMOSTATIC CONTROL 4" RELAY DRIVE WITH SUPPLY	Green	1 1000 200 413 1 1000 200 427

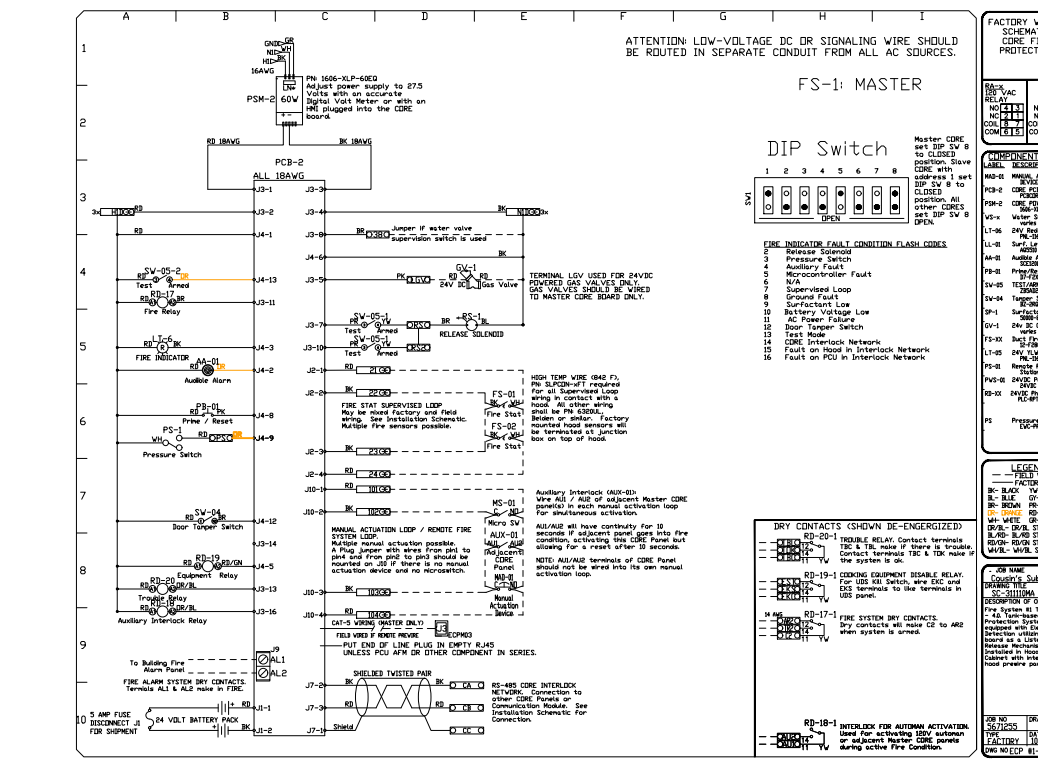
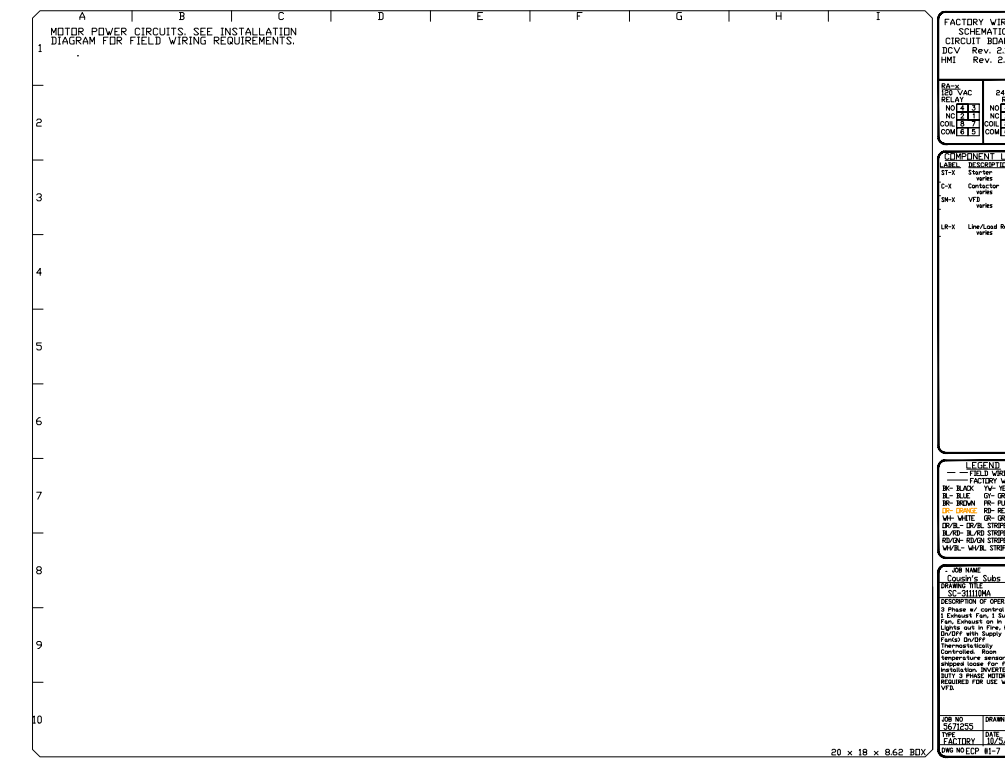
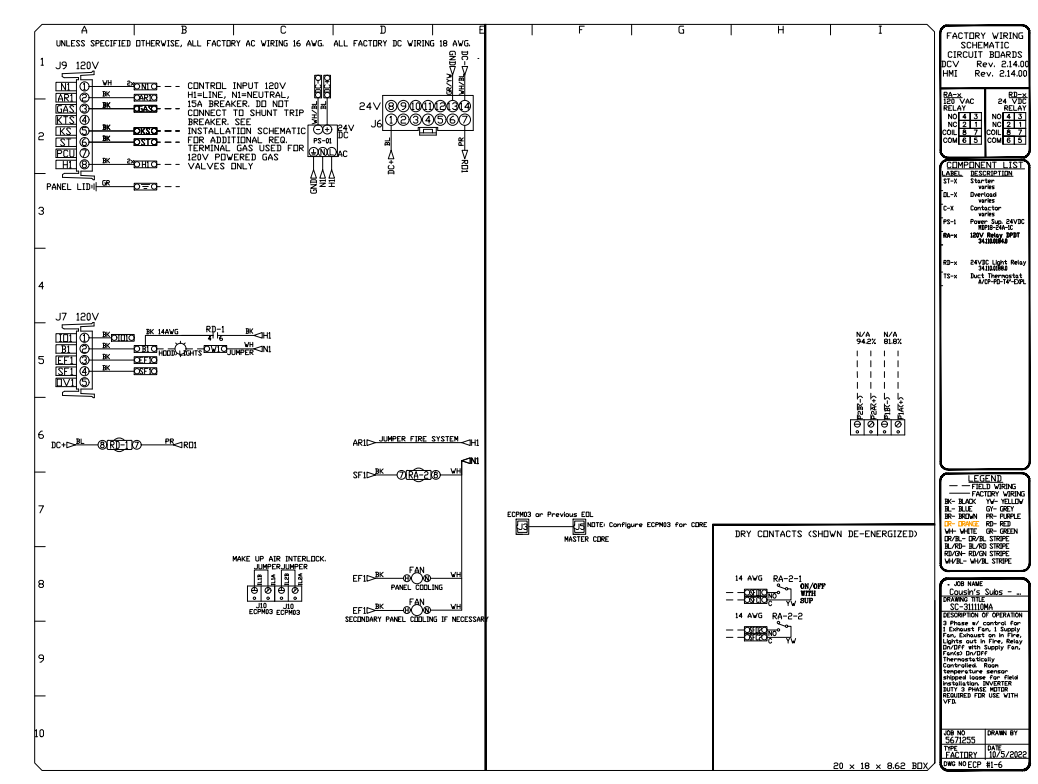
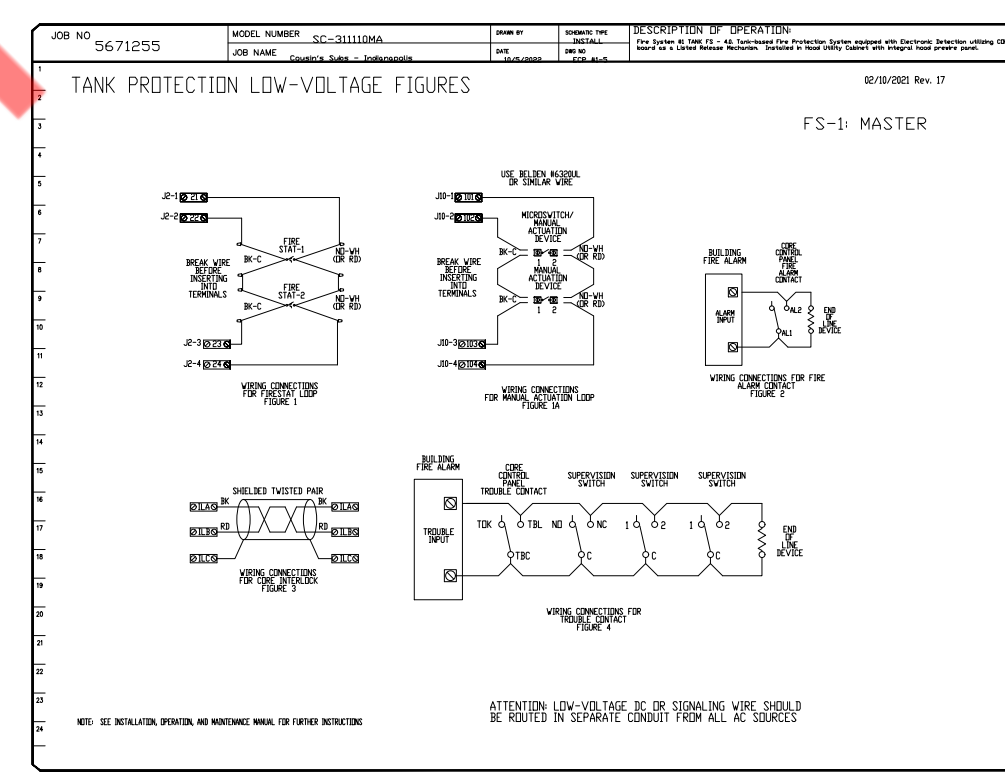


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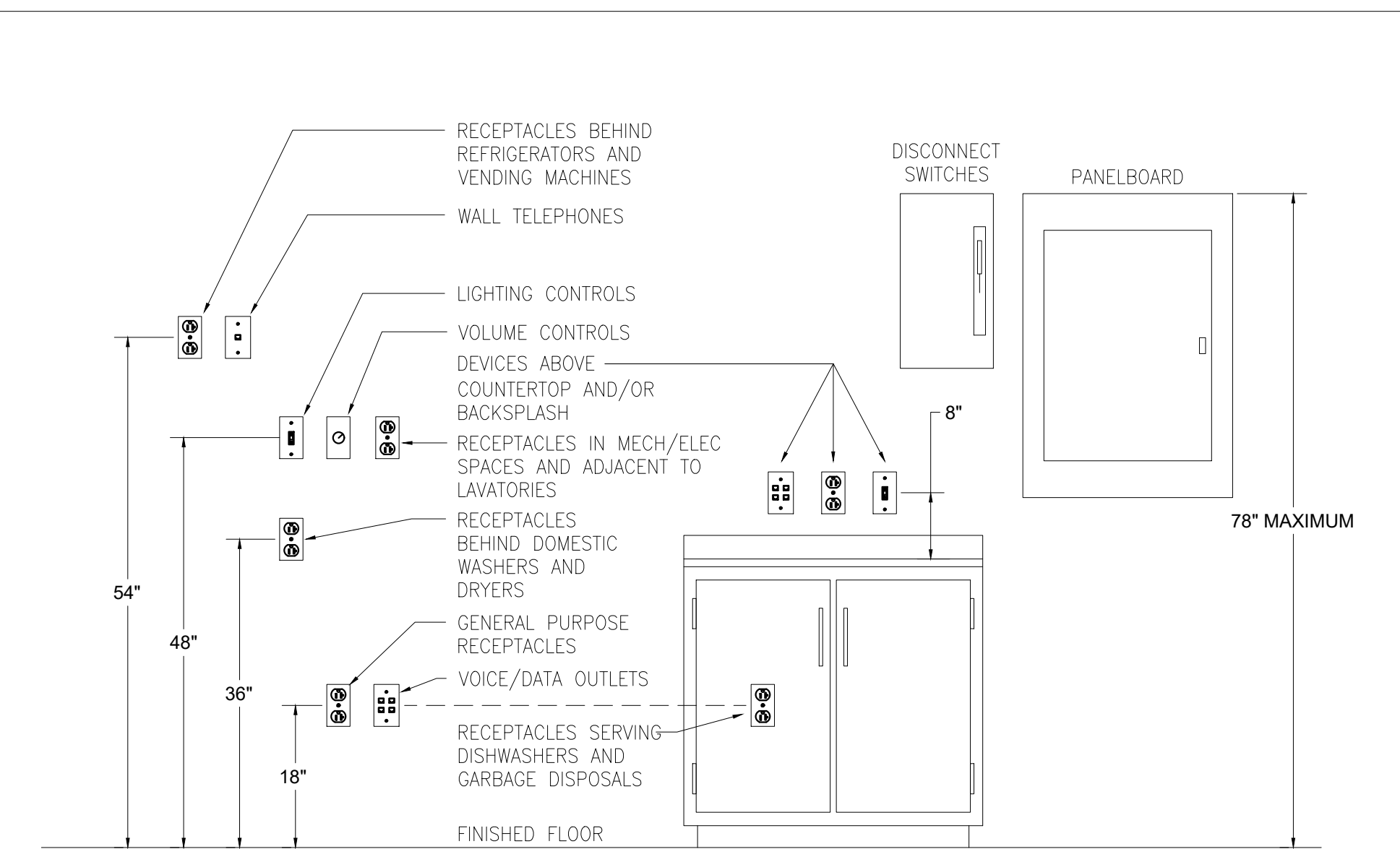
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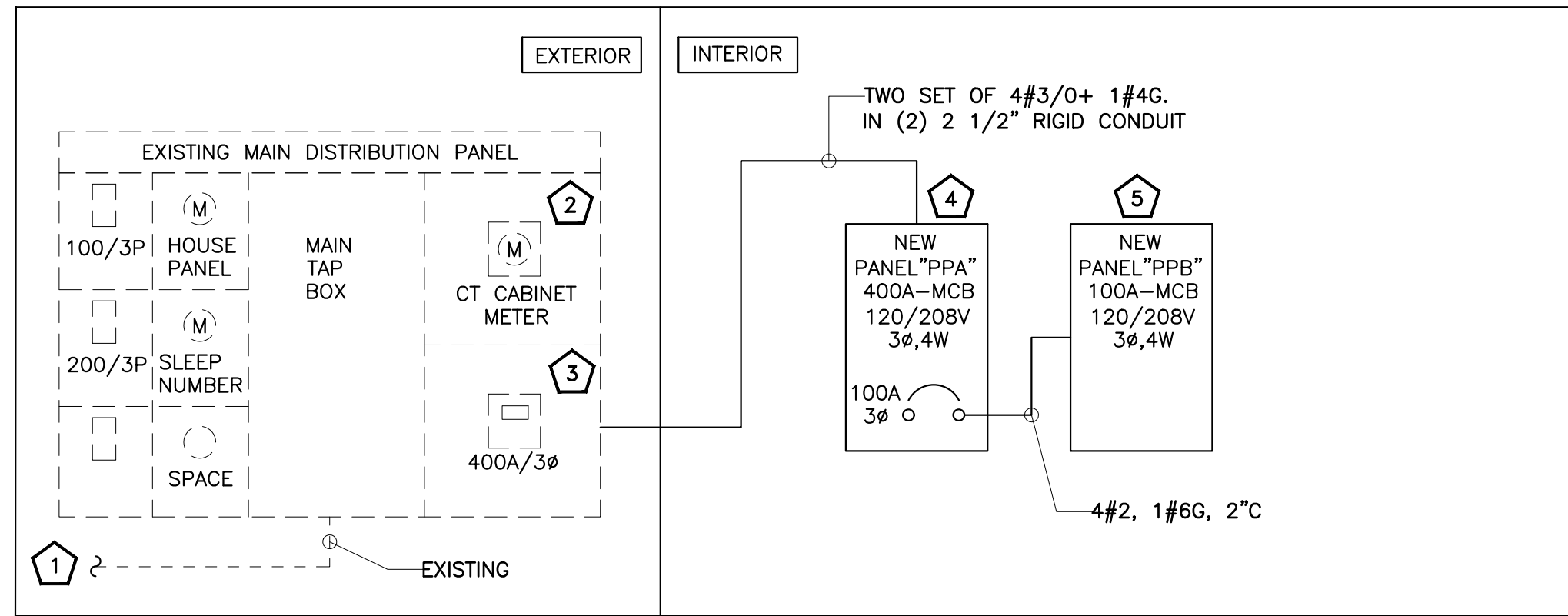
GENERAL ELECTRICAL NOTES	SYMBOL LEGEND	ABBREVIATIONS	
1. ANY AND ALL "BUILDING STANDARDS" AND/OR "BUILDING SPECIFICATIONS" SHALL BE CONSIDERED AN INTEGRAL PART OF THESE DOCUMENTS AND THE CONTRACTOR SHALL BE RESPONSIBLE TO OBTAIN A COPY OF THESE REQUIREMENTS/THIS DOCUMENT AND COMPLY WITH ALL REQUIREMENTS AND STANDARDS CONTAINED WITHIN.	LED LIGHTING FIXTURE AND OUTLET BOX. HALF SHADED FIXTURE OR "EM" INDICATES FIXTURES WITH INTEGRAL BATTERY PACK FOR EMERGENCY SERVICE, U.O.N.	A AMPERES AFF ABOVE FINISHED FLOOR AS AMP SWITCH AIC AMPS INTERRUPTING CAPACITY AT AMP TRIP AWG AMERICAN WIRE GAUGE C CONDUIT C/B,CB CIRCUIT BREAKER CKT CIRCUIT CLG CEILING. SHADED AREA DENOTES FACE(S). ISOLITE ELITE SERIES LED EXIT SIGN CU COPPER DWG DRAWING KCMIL ONE THOUSAND CIRCULAR MILS KVA KILOVOLT-AMPERES KW KILOWATTS LTG LIGHTING MAX MAXIMUM MCB MAIN CIRCUIT BREAKER MIN MINIMUM N NEUTRAL TYP TYPICAL UON UNLESS OTHERWISE NOTED V VOLT/VOLTAGE WP WEATHER PROOF	EF EXHAUST FAN EM EMERGENCY EMT ELECTRICAL METALLIC TUBING EQUIP EQUIPMENT ER EXISTING TO BE RELOCATED FDR FEEDER FIXT FIXTURE FL FLOOR G GROUND GFI GROUND FAULT INTERRUPTER GP GENERAL PURPOSE HP HORSEPOWER HZ HERTZ IC INTERRUPTING CAPACITY PP POWER PANEL REC RECEPTACLE NIC NOT IN CONTRACT NTS NOT TO SCALE P POLES PNL PANEL IG ISOLATED GROUND W WATT VA VOLT AMPERE
2. THESE DRAWINGS ARE GENERALLY DIAGRAMMATIC AND ARE INTENDED TO CONVEY THE SCOPE OF WORK AND INDICATE GENERAL ARRANGEMENT OF LIGHTING FIXTURES, DEVICES, CONTROLS, ELECTRICAL FIXTURES, MOTORS, PANELBOARDS, EQUIPMENT, ETC. THE LOCATIONS OF ALL ITEMS SHOWN ON THESE DRAWINGS OR CALLED FOR IN THE SPECIFICATIONS THAT ARE NOT DEFINITELY FIXED BY DIMENSIONS ARE APPROXIMATE. THE EXACT LOCATIONS NECESSARY TO SECURE THE BEST CONDITIONS AND RESULTS MUST BE DETERMINED AT THE PROJECT. ALL LOCATIONS OF WORK EXPOSED TO VIEW ARE SUBJECT TO APPROVAL OF THE ARCHITECT PRIOR TO INSTALLATION.	LUMINAIRE TYPE : INDICATE BY LIPPERCASE LETTER SEE LIGHTING EXTURE SCHEDULE. CIRCUIT NUMBER : INDICATED BY NUMBER SWITCHING INDICATED BY LOWER CASE LETTERS. DENOTES LUMINAIRE ON EMERGENCY CIRCUIT. DENOTES FIXTURES DESIGNATED AS NIGHTLIGHT, WIRED TO 24 HOURS UNSWITCHED CIRCUIT.		
3. THE ELECTRICAL CONTRACTOR SHALL VERIFY EXISTING CONDITIONS TO INSURE THAT ALL NEW WORK WILL FIT INTO THE EXISTING STRUCTURE IN THE MANNER INTENDED AND AS SHOWN ON THE DRAWINGS. THE CONTRACTOR SHALL NOTIFY THE ARCHITECT/OWNERS REPRESENTATIVE PRIOR TO ANY ROUGH-INS, FABRICATIONS, OR PERFORMING ANY WORK IN THE AREA INVOLVING DIFFERENCES. NOTIFICATION SHALL BE IN THE FORM OF A DRAWING OR SKETCH INDICATING FIELD MEASUREMENTS AND NOTES RELATED TO THE AREA.	CEILING/WALL MOUNTED SELF POWERED EXIT LIGHT FIXTURE WITH DIRECTIONAL ARROWS AS INDICATED. SHADED AREA DENOTES FACE(S). ISOLITE ELITE SERIES LED EXIT SIGN		
4. ANY DISCREPANCIES BETWEEN DRAWINGS AND SPECIFICATIONS SHALL BE PROMPTLY BROUGHT TO THE ATTENTION OF THE ENGINEER FOR CLARIFICATION DURING THE BIDDING PERIOD. NO ALLOWANCE SHALL SUBSEQUENTLY BE MADE TO THE CONTRACTOR BY REASON OF HIS FAILURE TO HAVE BROUGHT SAID DISCREPANCIES TO THE ATTENTION OF THE ENGINEER DURING THE BIDDING PERIOD OR OF ANY ERROR ON THE CONTRACTOR'S PART.	COMBINATION OF EXIT SIGN AND EMERGENCY BUG-EYE FIXTURE. EMERGENCY BATTERY UNIT WITH ATTACHED EMERGENCY FIXTURES AND OUTLET BOX.		
5. ALL EQUIPMENT SHALL BE INSTALLED IN A NEAT, PROFESSIONAL AND WORKMANLIKE MANNER, RECTILINEAR TO BUILDING STRUCTURE.	LIGHT SWITCH. SINGLE POLE, 20A		
6. ALL COMPONENTS SHOWN ON THE RISER/ONE-LINE DIAGRAMS BUT NOT ON THE PLAN OR VICE VERSA, SHALL BE INCLUDED AS IF SHOWN ON BOTH.	"o" CONTROL OF SPECIFIED LUMINAIRES "3" 3-WAY TYPE "OS" LINE VOLTAGE MULTI TECHNOLOGY WALL SWITCH OCCUPANCY SENSOR WITH MANUAL ON/OFF SWITCH. "VS" LINE VOLTAGE MULTI TECHNOLOGY WALL SWITCH VACANCY SENSOR WITH MANUAL ON/OFF SWITCH.		
7. REVIEW ALL TRADES' CONTRACT DOCUMENTS TO DETERMINE SPECIFIC MOUNTING LOCATIONS FOR ELECTRICAL EQUIPMENT. COORDINATE EXACT MOUNTING LOCATIONS WITH THE ARCHITECT.	WALL MOUNTED OCCUPANCY SENSOR SWITCH.		
8. REFER TO ARCHITECTURAL ELEVATIONS TO DERIVE EXACT LOCATIONS OF ALL RECEPTACLES, OUTLETS/JACKS, SWITCHES, ETC. LUMINAIRES AND CEILING MOUNTED EQUIPMENT SHALL BE COORDINATED WITH THE ARCHITECTURAL REFLECTED CEILING PLANS.	MANUAL OVERRIDE SWITCH		
9. EXACT LOCATION OF MECHANICAL EQUIPMENT THAT REQUIRE ELECTRICAL CONNECTION ARE SHOWN ON THE MECHANICAL DRAWINGS. FIELD VERIFY EXACT LOCATIONS WITH MECHANICAL CONTRACTOR PRIOR TO ANY ROUGH-INS.	POWER OR LIGHTING CIRCUITRY HOMERUN WITH PANELBOARD DESIGNATION, NUMBER WHERE USED INDICATES CIRCUIT NUMBER. IT SHALL CONSISTS OF 1#12 Ø, 1#12 N. & 1#12 G. IN 3/4"Ø, UNLESS OTHERWISE NOTED.		
10. ALL CIRCUITING SHALL BE RUN CONCEALED UNLESS SPECIFIED OTHERWISE.	POWER OR LIGHTING CIRCUITRY HOMERUN WITH PANELBOARD DESIGNATION, NUMBER WHERE USED INDICATES CIRCUIT NUMBER. IT SHALL CONSISTS OF 2#12 Ø, 2#12 N. & 2#12 G. IN 3/4"Ø, UNLESS OTHERWISE NOTED.		
11. ALL RACEWAYS RUNNING THROUGH BUILDING EXPANSION JOINTS SHALL BE EQUIPPED WITH EXPANSION FITTINGS.	POWER OR LIGHTING CIRCUITRY HOMERUN WITH PANELBOARD DESIGNATION, NUMBER WHERE USED INDICATES CIRCUIT NUMBER. IT SHALL CONSISTS OF 3#12 Ø, 3#12 N. & 3#12 G. IN 3/4"Ø, UNLESS OTHERWISE NOTED.		
12. CONDUIT HOME RUNS SHOWN ON THE DRAWING WITH MORE THAN (3) CURRENT CARRYING CONDUCTORS ARE SHOWN DIAGRAMMATICALLY. THIS CONTRACTOR SHALL NOT INSTALL MORE THAN (3) CURRENT CARRYING CONDUCTORS IN A RACEWAY UNLESS NATIONAL ELECTRIC CODE (N.E.C.), ARTICLE 310.15 DERATING FACTORS ARE APPLIED.	30A/240V NON UNFUSED DISCONNECT SWITCH		
13. ALL LIGHTING AND GENERAL POWER BRANCH CIRCUITS SHALL INCLUDE A SEPARATE NEUTRAL CONDUCTOR, UNLESS SPECIFICALLY NOTED OTHERWISE.	60A/240V NON UNFUSED DISCONNECT SWITCH		
14. THE ELECTRICAL CONTRACTOR SHALL REFER TO THE ELECTRICAL SPECIFICATIONS FOR ACCEPTABLE CONDUIT TYPES/LOCATIONS. ALL CONDUIT SIZES ON THE DRAWINGS ARE BASED ON THE LATEST EDITION OF THE N.E.C. CONDUIT FILL TABLES FOR ELECTRICAL METALLIC TUBING (E.M.T). CONDUIT SIZES SHALL BE REVISED TO THE SIZE REQUIRED, RELATIVE TO THE ACTUAL CONDUIT TYPE TO BE INSTALLED.	100A/240V NON UNFUSED DISCONNECT SWITCH		
15. IT IS NOT INTENDED THAT THE PLANS INDICATE ALL THE NECESSARY BENDS, OFFSETS, PULL BOXES AND OBSTRUCTIONS. IT SHALL BE THE RESPONSIBILITY OF THE CONTRACTOR TO INSTALL HIS WORK TO CONFORM TO THE STRUCTURE, MAINTAIN HEADROOM AND KEEP OPENINGS AND PASSAGEWAYS CLEAR. REFER TO THE ARCHITECTURAL DRAWINGS FOR ALL DIMENSIONS AS REQUIRED.	200A/240V NON UNFUSED DISCONNECT SWITCH		
16. IT IS NOT INTENDED THAT THE PLANS INDICATE ALL CONDUIT ROUTES, PULL BOXES, ETC. CONTRACTOR SHALL BE RESPONSIBLE FOR DETERMINING ACTUAL CONDUIT ROUTING, QUANTITY AND LOCATION OF PULL BOXES WITHIN ACCESSIBLE LOCATIONS.	JUNCTION BOX WITH BLANK COVER PLATE, FLUSH IN FLOOR.		
17. PROVIDE SCREW-COVER PULL BOXES IN CONDUIT RUNS AS REQUIRED TO LIMIT THE NUMBER OF BENDS TO NO MORE THAN THREE (3) OR 270 DEGREES TOTAL. SIZE PULL BOXES IN ACCORDANCE WITH NEC, ARTICLE 314.28. DOCUMENT ON RECORD DRAWINGS, SIZE AND LOCATION OF PULL BOXES USED IN FEEDER CONDUIT RUNS.	JUNCTION BOX WITH BLANK COVER PLATE, WALL MOUNTED, +18" AFF OR AS NOTED.		
18. ALL OUTLET BOXES IN WALLS SHALL HAVE A MINIMUM OF ONE (1) DEDICATED VERTICAL CONDUIT ENTERING AT THE TOP OF THE BOX. HORIZONTAL CONDUIT CONNECTIONS SHALL ONLY BE PERMITTED UNDER WINDOWS OR UNLESS OTHERWISE NOTED ON DRAWINGS.	DUPLEX CONVENIENCE RECEPTACLE, +18" AFF OR AS NOTED.		
19. WHERE MULTIPLE DEVICES ARE INDICATED IN A COMMON LOCATION, GANG INTO A SINGLE COVER PLATE.	DEDICATED DUPLEX RECEPTACLE, +18" AFF OR AS NOTED.		
20. ALL EXISTING PANELS SHALL BE PROVIDED WITH ENGRAVED NAMEPLATES AS DESIGNATED ON PANEL SCHEDULES SECURED TO PANEL FACE AND NEW ENGRAVED NAMEPLATES DENOTING ORIGIN OF FEEDER FROM WHICH PANEL IS SERVED.	DOUBLE DUPLEX RECEPTACLE - 20A-1P, 125V, NEMA 5-20R.		
	DUPLEX CONVENIENCE GFCI RECEPTACLE, +18" AFF OR AS NOTED.		
	DUPLEX CEILING MOUNTED RECEPTACLE.		
	DUPLEX FLOOR MOUNTED RECEPTACLE.		
	TELEPHONE/DATA OUTLET, 4" SQUARE OUTLET BOX WITH SINGLE GANG COLLAR AND BLANK PLATE. PROVIDE 3/4" E.C., U.O.N., UP TO HUNG CEILING AND TERMINATE WITH 90° ELBOW, BUSHING AND DRAG WIRE.		
	DATA OUTLET		
	VOICE OUTLET		
	UNIT MOTOR AS NOTED WITH CONTROLLER AND DISCONNECT SWITCH WITH WEATHER PROOF.		
	MOTORIZED DAMPER.		
	MANUAL MOTOR SWITCH		
	PHOTOCCELL IN NEMA 3R ENCLOSURE.		
	ELECTRICAL HEATER, NUMBER DENOTES HEATER RATING		



**TYPICAL DEVICE MOUNTING DETAIL**  
SCALE: NOT TO SCALE

- NOTES:
- ALL MOUNTING HEIGHTS SHALL BE MEASURED FROM FINISHED FLOOR TO THE CENTERLINE OF DEVICE EXCEPT FIRE ALARM A/V DEVICES.
  - NO WIRING DEVICES OR OUTLET BOXES SHALL BE MOUNTED BACK TO BACK.
  - ALL MOUNTING DEVICES SHALL BE INSTALLED AT MOUNTING HEIGHTS AS INDICATED ON THIS DETAIL UNLESS OTHERWISE NOTED.
  - FOR ALL ELEVATIONS (WHERE APPLICABLE), CASEWORK DETAILS, FIRE WALLS, SMOKE WALLS, LOCATION OF COUNTERTOP RECEPTACLES, LIGHTING FIXTURE SWITCHES, TELEPHONE OUTLETS, EQUIPMENT ROUGH-INS, HEADWALLS, ETC., SEE ARCH DRAWINGS. WHERE NO ARCHITECTURAL ELEVATIONS OR DETAILS OCCUR, THE ELECTRICAL CONTRACTOR SHALL USE MEANS AND METHODS AS WELL AS THEIR FIELD KNOWLEDGE TO SPOT DEVICES IN THE BEST LOCATIONS FOR THE PROJECT.

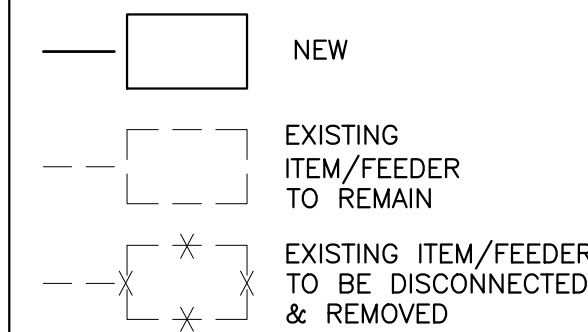




**RISER DIAGRAM GENERAL NOTES:**

- E.C. TO CO-ORDINATE FAULT CURRENT RATING WITH UTILITY COMPANY, AHJ AND CALCULATE ACTUAL AIC REQUIRED PRIOR TO BID.
- RISER DIAGRAM IS FOR REFERENCE PURPOSES ONLY. E.C. SHALL VERIFY EXACT POWER DISTRIBUTION IN FIELD AND INFORM ENGINEER ON RECORD FOR ANY DISCREPANCY.
- E.C. SHALL VERIFY INCOMING SERVICE AMPERAGE, WIRE SIZING AND DISTRIBUTION IN FILED COORDINATION WITH OWNER/ARCHITECT.
- E.C. SHALL VERIFY THE EXACT SCOPE OF WORK WITH THE LANDLORD\OWNER PRIOR TO BID.

**ELECTRICAL RISER SYMBOLS**



**RISER DIAGRAM KEYED NOTES:**

- EXISTING 120/208V, 3 $\phi$  ELECTRICAL SERVICE FEEDERS FROM UTILITY. E.C. SHALL VERIFY THE EXACT POWER DISTRIBUTION IN THE FIELD.
- EXISTING 400A, 120/208V, 3 $\phi$ , CT CABINET AND METER TO BE PROVIDED BY LANDLORD FOR COUSIN'S SUB SPACE. VERIFY EXACT LOCATION OF THE CT CABINET AND METER IN THE FIELD WITH THE ARCHITECT\LANDLORD.
- EXISTING 400A, 120/208V, 3 $\phi$ , DISCONNECT SWITCH TO BE PROVIDED BY LANDLORD FOR COUSIN'S SUB SPACE. VERIFY EXACT LOCATION OF THE DISCONNECT SWITCH IN THE FIELD WITH THE ARCHITECT\LANDLORD.
- NEW 400A, 120/208V, 3 $\phi$ , 4W ELECTRICAL PANEL "A" FOR THE SPACE. E.C. SHALL COORDINATE WITH ARCHITECT\OWNER FOR THE EXACT LOCATION OF THE PANEL IN THE FIELD.
- NEW 100A, 120/208V, 3 $\phi$ , 4W ELECTRICAL PANEL "B" FOR THE SPACE. E.C. SHALL COORDINATE WITH ARCHITECT\OWNER FOR THE EXACT LOCATION OF THE PANEL IN THE FIELD.

**EQUIPMENT SCHEDULE**

EQUIPMENT TAG	REMARKS	VOLTAGE (V)	PHASE	AMPS (A)	BREAKER	LOAD (VA)	NOTES
3 - CASH REGISTER	GENERAL	120	1	18	20/1P	2160	1
7 - SODA DISPENSER	GENERAL	120	1	4	20/1P	480	1
7A - SODA DISPENSER	GENERAL	120	1	20	30/1P	2400	1
8 - REMOTE PRINTER	GENERAL	120	1	20	30/1P	2400	1
9 - MICROWAVE OVEN	GENERAL	120	1	13	20/1P	1560	1
10 - OVEN PROOFER	GENERAL	208	1	45	60/2P	9360	1
16 - SLICER	GENERAL	120	1	2	20/1P	240	1
19 - SOUP COOKER/WARMER	GENERAL	120	1	12.5	20/1P	1500	1
21 - BAG-IN-BOX STAND	GENERAL	120	1	8	20/1P	960	1
24 - ICE MAKER	GENERAL	115	1	11.5	20/1P	1323	1
33 - SHAKE MACHINE	GENERAL	115	1	13	20/1P	1495	1
34 - GLASS DOOR MERCHANDISER	GENERAL	120	1	20	30/1P	2400	1
37 - REFRIG. SANDWICH UNIT	GENERAL	115	1	3.5	20/1P	403	1
37A - REFRIG. SANDWICH UNIT	GENERAL	115	1	7.2	20/1P	828	1
44 - HOT SANDWICH WARMER	GENERAL	120	1	4.2	20/1P	504	1
48 - GRIDDLE (5'-0")	GENERAL	120	1	20	30/1P	2400	1
50 - HOOD	GENERAL	120	1	5	20/1P	600	2
51 - FIRE SUPPRESSION SYSTEM	GENERAL	120	1	20	30/1P	2400	3,4
52 - FRY DUMP STATION	GENERAL	120	1	10	20/1P	1200	1
53 - WORKTOP FREEZER	GENERAL	115	1	2.3	20/1P	265	1
54 - WORKTOP REFRIGERATOR	GENERAL	115	1	3	20/1P	345	1
COOLER COIL	GENERAL	115	1	0.9	20/1P	104	1
COOLER CONDENSING UNIT	GENERAL	208	3	5.6	20/3P	2017	1
FREEZER COIL	GENERAL	208	1	7.8	20/2P	1622	1
FREEZER CONDENSING UNIT	GENERAL	208	3	18.6	30/3P	6701	1

**EQUIPMENT SCHEDULE KEYED NOTES:**

- THE ELECTRICAL CONTRACTOR SHALL COORDINATE TO CONFIRM ALL ELECTRICAL SPECIFICATIONS, CONNECTIONS, ROUGH-IN REQUIREMENTS, MOUNTING HEIGHTS, CORD TYPES/LENGTHS, ETC. WITH THE FOOD SERVICE EQUIPMENT CONTRACTOR PRIOR TO PLACING PURCHASE ORDER FOR ANY DEVICES, DISTRIBUTION EQUIPMENTS AND ROUGH-IN, FIXTURE AND EQUIPMENTS LOCATIONS SHOWN ARE SCHEMATIC IN NATURE. COORDINATE FINAL CONFIGURATION & LOCATION WITH OWNER PRIOR TO BID SUBMISSION.
- THE EXHAUST HOOD, SUPPLY FAN, AND EXHAUST FAN WILL BE PROVIDED AS A COMPLETE MANUFACTURED SYSTEM. ALL CONTROL PANELS, STARTERS, LIGHT SWITCHES, DISCONNECT SWITCHES, PUSHBUTTON STATIONS, ETC. SHALL BE PROVIDED WITH THE EQUIPMENT AND/OR SYSTEM. THE E.C. SHALL PROVIDE ALL WIRING BETWEEN EACH ITEM LISTED AND SERVING PANELBOARD, CONTROL PANEL, CONTROL DEVICES, RESPECTIVE FANS, ETC. FOR A FULLY FUNCTIONAL SYSTEM PER THE MANUFACTURER'S WIRING DIAGRAMS.
- ALL ITEM LOCATED BELOW HOOD SHALL BE AUTOMATICALLY SHUTDOWN UPON INITIATION OF THE EXHAUST HOOD FIRE SUPPRESSION SYSTEM IN ACCORDANCE WITH NFPA 86. PROVIDE AN ELECTRICALLY HELD CONTACTOR IN NEMA 1 ENCLOSURE INSTALLED ABOVE CEILING. HOLDING COIL OF CONTACTOR SHALL BE MAINTAINED BY A MICROSWITCH LOCATED IN THE HOOD FIRE SUPPRESSION CONTROL CABINET. VERIFY WITH THE KITCHEN DESIGNER IF MICROSWITCHES OR SHUNT TRIP BREAKERS ARE BEING USED. PROVIDE ALL CONTROL PANEL PER MANUFACTURER'S WIRING DIAGRAM. ALSO INCLUDE WIRING THROUGH THE CONTACTOR TO INCORPORATE A 120V GAS SOLENOID VALVE FOR FUEL SHUTDOWN.
- THE HOOD FIRE SUPPRESSION SYSTEM SHALL SHUTDOWN ALL FUEL AND POWER FOR EQUIPMENT LOCATED BELOW THE HOOD UPON INITIATION IN ACCORDANCE WITH NFPA 96.

PANEL:		PPA	(NEW)					MOUNTING:		SURFACE				
120/208	VOLTS			3	PHASE	4	WIRE			LOCATION	BOH			
MCB	400A			BUS:	400A	MINIMUM				FED FROM:	EL. METER			
<b>NOTE:</b>														
CKT NO.	TRIP AMPS	DESCRIPTION OF LOAD	LOAD TYPE	LOAD (KVA)	MINIMUM BRANCH CIRCUIT	PER PHASE (KVA)			MINIMUM BRANCH CIRCUIT	LOAD (KVA)	LOAD TYPE	DESCRIPTION OF LOAD	TRIP AMPS	CKT NO.
						A	B	C						
1	20	03 - CASH REGISTER	E	1.80	2#12, 1#12, 3/4" C	1.90			2#12, 1#12, 3/4" C	0.10	E	COOLER COIL	20	2
3	20	03 - CASH REGISTER	E	1.80	2#12, 1#12, 3/4" C		2.47			0.67	E			4
5	20	03 - CASH REGISTER	E	1.80	2#12, 1#12, 3/4" C			2.47		0.67	E	COOLER CONDENSING UNIT	20/3P	6
7	20	03 - CASH REGISTER	E	1.80	2#12, 1#12, 3/4" C	2.47				0.67	E			8
9	20	07 - SODA DISPENSER	E	0.48	2#12, 1#12, 3/4" C		0.84		2#12, 1#12, 3/4" C	0.36	E	COOLER LIGHTS AND DOOR HEATER	20	10
11	30	7A - SODA DISPENSER	E	2.40	2#10, 1#10, 3/4" C			3.20	2#12, 1#12, 3/4" C	0.80	E	FREEZER COIL	20/2P	12
13	30	08 - REMOTE PRINTER	E	2.40	2#10, 1#10, 3/4" C	3.20				0.80	E			14
15	20	09 - MICROWAVE OVEN	E	1.50	2#12, 1#12, 3/4" C			3.70		2.20	E			16
17	60/2P	10 - OVEN PROOFER	E	4.50				6.70	3#10, 1#10, 3/4" C	2.20	E	FREEZER CONDENSING UNIT	30/3P	18
19	60/2P	10 - OVEN PROOFER	E	4.50	2#6, 1#10, 3/4" C	6.70				2.20	E			20
21	60/2P	10 - OVEN PROOFER	E	4.50				4.86	2#12, 1#12, 3/4" C	0.36	E	FREEZER LIGHTS AND DOOR HEATER	20	22
23			E	4.50				8.80		4.30	H			24
25	20	KEF-1(N)	H	0.50	2#12, 1#12, 3/4" C	4.80			3#8, 1#10, 3/4" C	4.30	H	RTU-1 (N)	50/3P	26
27	20/2P	KEF-2(N)	H	0.90	2#12, 1#12, 3/4" C		5.20			4.30	H			28
29	20/2P	MUA-1(N)	H	0.90	2#12, 1#12, 3/4" C	6.80		6.80		5.90	H	RTU-2 (N)	60/3P	30
31	20/2P		H	0.90						5.90	H			32
33	20	SPARE						6.80		5.90	H			34
35	20	SPARE						0.72	2#12, 1#12, 3/4" C	0.72	R	SERVICE RECEPTACLE ON ROOF	20	36
37	20	SPARE				10.29				10.29	O			38
39	20	SPARE						10.29		10.29	O	TO PANEL B	100/3P	40
41	20	SPARE						10.29	4#3, 1#8, 1 1/4" C	10.29	O			42
43	20	DRIVE THRU WINDOW POWER	R	0.18	2#12, 1#12, 3/4" C	0.18						SPARE	20	44
45	20	PRE MENU BOARD	R	1.00	2#12, 1#12, 3/4" C		1.00					SPARE	20	46
47	20	DIGITAL ORDER SCREEN	R	1.00	2#12, 1#12, 3/4" C			1.00				SPARE	20	48
49	20	VEHICLE DETECTOR LOOP	R	1.00	2#12, 1#12, 3/4" C	1.00						SPARE	20	50
51	20	LIGHT BAR	R	1.00	2#12, 1#12, 3/4" C		1.00					SPARE	20	52
53	20	DIRECTIONAL SIGNAGE	R	1.00	2#12, 1#12, 3/4" C			1.00				SPARE	20	54
						37.34	36.16	40.98						

PANEL:		PPB	(NEW)					MOUNTING:		SURFACE				
120/208	VOLTS			3	PHASE	4	WIRE			LOCATION	BOH			
MCB	100A			BUS:	125A	MINIMUM				FED FROM:	PANEL PPA			
<b>NOTE:</b>														
CKT NO.	TRIP AMPS	DESCRIPTION OF LOAD	LOAD TYPE	LOAD (KVA)	MINIMUM BRANCH CIRCUIT	PER PHASE (KVA)			MINIMUM BRANCH CIRCUIT	LOAD (KVA)	LOAD TYPE	DESCRIPTION OF LOAD	TRIP AMPS	CKT NO.
						A	B	C						
1	20	44 - HOT SANDWICH WARMER	E	0.50	2#12, 1#12, 3/4" C	1.70			2#12, 1#12, 3/4" C	1.20	L	LIGHTING KITCHEN AREA	20	2
3	30	48 - GRIDDLE (5'-0")	E	2.40	2#10, 1#10, 3/4" C		3.90		2#12, 1#12, 3/4" C	1.50	L	LIGHTING OFFICE & RESTROOM	20	4
5	20	HCP - HOOD CONTROL PANEL	E	0.50	2#12, 1#12, 3/4" C			1.80	2#12, 1#12, 3/4" C	1.30	L	LIGHTING WAITING & DINING AREA	20	6
7	30	51 - FIRE SUPPRESSION SYSTEM	E	2.40	2#10, 1#10, 3/4" C	3.90			2#12, 1#12, 3/4" C	1.50	L	EXTERIOR LIGHTING	20	8
9	20	52 - FRY DUMP STATION	E	1.20	2#12, 1#12, 3/4" C		1.56		2#12, 1#12, 3/4" C	0.36	R	RESTROOM GFI RECEPTACLES	20	10
11	20	53 - WORKTOP FREEZER	E	0.27	2#12, 1#12, 3/4" C			1.77	2#12, 1#12, 3/4" C	1.50	O	HAND DRYER	20	12
13	20	54 - WORKTOP REFRIGERATOR	E	0.30	2#12, 1#12, 3/4" C	1.80			2#12, 1#12, 3/4" C	1.50	O	HAND DRYER	20	14
15	20	54 - WORKTOP REFRIGERATOR	E	0.30	2#12, 1#12, 3/4" C			1.02	2#12, 1#12, 3/4" C	0.72	R	DINING AREA GENERAL RECEPTACLE	20	16
17	20	CEILING RECEPTACLE MENUBOARD	R	0.54	2#12, 1#12, 3/4" C			1.04	2#12, 1#12, 3/4" C	0.50	R	EXTERIOR SIGNAGE	20	18
19	20	WATER HEATER (WH-1)	R	0.50	2#12, 1#12, 3/4" C	2.10			2#12, 1#12, 3/4" C	1.60	R	SHOW WINDOW RECEPTACLE	20	20
21	20	RECIRCULATION PUMP (RCP-1)	R	0.50	2#12, 1#12, 3/4" C		2.10		2#12, 1#12, 3/4" C	1.60	R	SHOW WINDOW RECEPTACLE	20	22
23	20	24 - ICE MAKER	E	1.30	2#12, 1#12, 3/4" C			2.70	2#12, 1#12, 3/4" C	1.40	E	33 - SHAKE MACHINE	20	24
25	30	34 - GLASS DOOR MERCHANDISER	E	2.40	2#10, 1#10, 3/4" C	2.64			2#12, 1#12, 3/4" C	0.24	E	16 - SLICER	20	26
27	20	37 - REFRIG. SANDWICH UNIT	E	0.40	2#12, 1#12, 3/4" C		1.90		2#12, 1#12, 3/4" C	1.50	E	19 - SOUP COOKER/WARMER	20	28
29	20	37A - REFRIG. SANDWICH UNIT	E	0.80	2#12, 1#12, 3/4" C			2.30	2#12, 1#12, 3/4" C	1.50	E	19 - SOUP COOKER/WARMER	20	30
31	20	TIME CLOCK RECEPTACLE	R	0.10	2#12, 1#12, 3/4" C	1.06			2#12, 1#12, 3/4" C	0.96	E	21 - BAG-IN-BOX STAND	20	32
33	20	OFFICE RECEPTACLE	R	0.54	2#12, 1#12, 3/4" C		1.84		2#12, 1#12, 3/4" C	1.30	E	24 - ICE MAKER	20	34
35	20	OFFICE RECEPTACLE	R	0.18	2#12, 1#12, 3/4" C			0.90	2#12, 1#12, 3/4" C	0.72	R	DINING AREA GENERAL RECEPTACLE	20	36
37	20	TTB RECEPTACLE	R	0.36	2#12, 1#12, 3/4" C	0.36						SPARE	20	38
39	20	SPARE						0.00				SPARE	20	40
41	20	SPARE						0.00				SPARE	20	42
						13.56	12.32	10.51						

**PANEL SCHEDULE ABBREVIATIONS:**

- L = LIGHTING
- R = RECEPTACLE
- H = HVAC
- E = EQUIPMENT
- M = MOTOR
- O = OTHER



**ELECTRICAL LIGHTING PLAN GENERAL NOTES:**

- ALL EXIT SIGNS, EMERGENCY LIGHTING BATTERY PACKS, EMERGENCY LUMINAIRES (ON GENERATOR OF EMERGENCY LIGHTING BATTERY PACKS INTEGRAL TO LUMINAIRE), AND NIGHT LIGHTS (DENOTED "NL") SHALL BE CONNECTED TO THE LOCAL LIGHTING CIRCUIT AHEAD OF ANY CONTROLS SUCH AS: SWITCHES (DEVICES), OCCUPANCY SENSORS AND/OR RELAY CONTROLS.
- EXACT LOCATION OF ALL LUMINAIRES, AND EXACT MOUNTING HEIGHT OF ALL PENDANT MOUNTED LUMINAIRES SHALL BE COORDINATED WITH ARCHITECTURAL DRAWINGS PRIOR TO ANY ROUGH-INS.
- MINIMUM CONDUCTOR SIZE FOR 120V BRANCH CIRCUITS SHALL BE 12-AWG. FOR 120V BRANCH CIRCUITS WITH HOME RUN OVER 100 LINEAR FEET, A MINIMUM WIRE SIZE OF 10-AWG SHALL BE PROVIDED FROM FIRST JUNCTION/OUTLET BOX TO BRANCH CIRCUIT PANEL BOARD. FOR 120V BRANCH CIRCUITS WITH HOME RUN OVER 150 LINEAR FEET, A MINIMUM OF 8-AWG SHALL BE PROVIDED FROM FIRST JUNCTION/OUTLET BOX TO BRANCH CIRCUIT PANELBOARD.
- ALL WIRING SHALL BE IDENTIFIED BY PANEL BOARD AND CIRCUIT NUMBERS IN ALL CABINETS, JUNCTION BOXES, WIRING TROUGHS, ENCLOSURES, SPLICE OR TERMINATION POINTS, ETC.
- A NEW TYPED PANEL BOARD DIRECTORY CARD SHALL BE PROVIDED FOR ALL PANELS INSTALLED OR MODIFIED UNDER THIS CONTRACT. NEW DIRECTORY CARDS SHALL BE LOCATED ON THE INSIDE DOOR OF ASSOCIATED PANELS.

**ELECTRICAL LIGHTING PLAN KEYED NOTES:**

- OUTLINE OF WALK-IN COOLER\FREEZER WITH LIGHT FIXTURES AND LAMPS FURNISHED BY COOLER MANUFACTURER, AND INSTALLED BY ELECTRICAL CONTRACTOR. PROVIDE DIRECT CONNECTION TO JUNCTION BOX ON PRE-FABRICATED COOLER\FREEZER. INCLUDE ALL INCOMING WIRING FOR ALL CONTROL DEVICES, THERMOSTATS, LIGHT SWITCHES, LIGHT FIXTURES, ETC. FOR A COMPLETE INSULATION.
- CONNECT ALL EMERGENCY EGRESS AND NIGHT LIGHTING FIXTURES TO NEAREST LIGHTING BRANCH CIRCUIT AHEAD OF ALL SWITCHING AND CONTROLS PER STATE AND LOCAL CODES. EXIT SIGNS SHALL NOT EXCEED 5 WATTS PER FACE.
- WALL MOUNTED OCCUPANCY SENSOR WITH SWITCH, COORDINATE EXACT LOCATION AND MOUNTING IN THE FIELD.
- PROVIDE POWER\JUNCTION BOX(ES) FOR EXTERIOR SIGNAGE. COORDINATE EXACT LOCATION WITH SIGNAGE PROVIDER. CIRCUIT EXTERIOR SIGN(S) THROUGH TIMECLOCK. VERIFY QUANTITY AND LOCATION WITH ARCHITECTURAL DRAWINGS.
- PROVIDE 120V POWER FOR HOOD LIGHTING. INCLUDE ALL SWITCHING FOR EXHAUST HOOD LIGHTS FIXTURES AND FAN. ALL THE LIGHT FIXTURES LOCATED BELOW HOOD SHALL BE WIRED VIA KITCHEN HOOD CONTROL PANEL. CO-ORDINATE WITH KITCHEN HOOD MANUFACTURER FOR DETAILS.
- WIRE LIGHTING CIRCUITS THROUGH TIME CLOCK.
- CEILING MOUNTED RECEPTACLES FOR THE SHOW WINDOW. E.C. SHALL COORDINATE FINAL LOCATION OF RECEPTACLES IN THE FIELD.
- SWITCHBANK LOCATION. COORDINATE EXACT REQUIREMENTS WITH OWNER AND ARCHITECT PRIOR TO BID.

**LIGHTING CONTACTOR PANEL (LCP) SCHEDULE**

RELAY	ZONE TAG	CIRCUIT	DESCRIPTION
1	a	PPB-2	BACK KITCHEN AREA
2	b	PPB-2	KITCHEN AREA
3	c	PPB-6	WAITING AND DINING AREA
4	d	PPB-6	WAITING AND DINING AREA
5	e	PPB-2	WAITING AND DINING AREA
6	f	PPB-2	WAITING AND DINING AREA
7	g	PPB-20	SHOW WINDOW
8	h	PPB-22	SHOW WINDOW
9	i	PPB-18	EXTERIOR SIGNAGE
10	j	PPB-8	EXTERIOR LIGHTING
11	k	PPB-8	CANOPY LIGHTING
12	-	-	-
13	-	-	-
14	-	-	-
15	-	-	-
16	-	-	-

**LCP NOTES:**

- USE LEVITON GREEN-MAX RELAY PLUS 16 RELAY CABINET WITH MANUAL OF APPROVED EQUAL.
- EVENT: NORMAL BUSINESS HOURS (HOURS TO BE DETERMINED BY COUSIN'S PROJECT MANAGER.)  
- LIGHT SWITCHES AT THE LIGHTING SWITCH BANK SHALL CONTROL THE LIGHT FIXTURE.
- EVENT: CONCLUSION OF BUSINESS DAY (TIME TO BE DETERMINED BY COUSIN'S SUBS PROJECT MANAGER.)  
- TIME CLOCK SHALL SWEEP "OFF" STORE FRONT LIGHTING AND SIGNAGE.
- EVENT: AFTER BUSINESS HOURS  
- LIGHT FIXTURES SHALL REMAIN "OFF".
- EVENT: BEGINNING OF BUSINESS HOURS  
- LIGHT AT THE LIGHTING SWITCHES BANK SHALL CONTROL THE LIGHT FIXTURES.

**LUMINAIRE SCHEDULE GENERAL NOTES:**

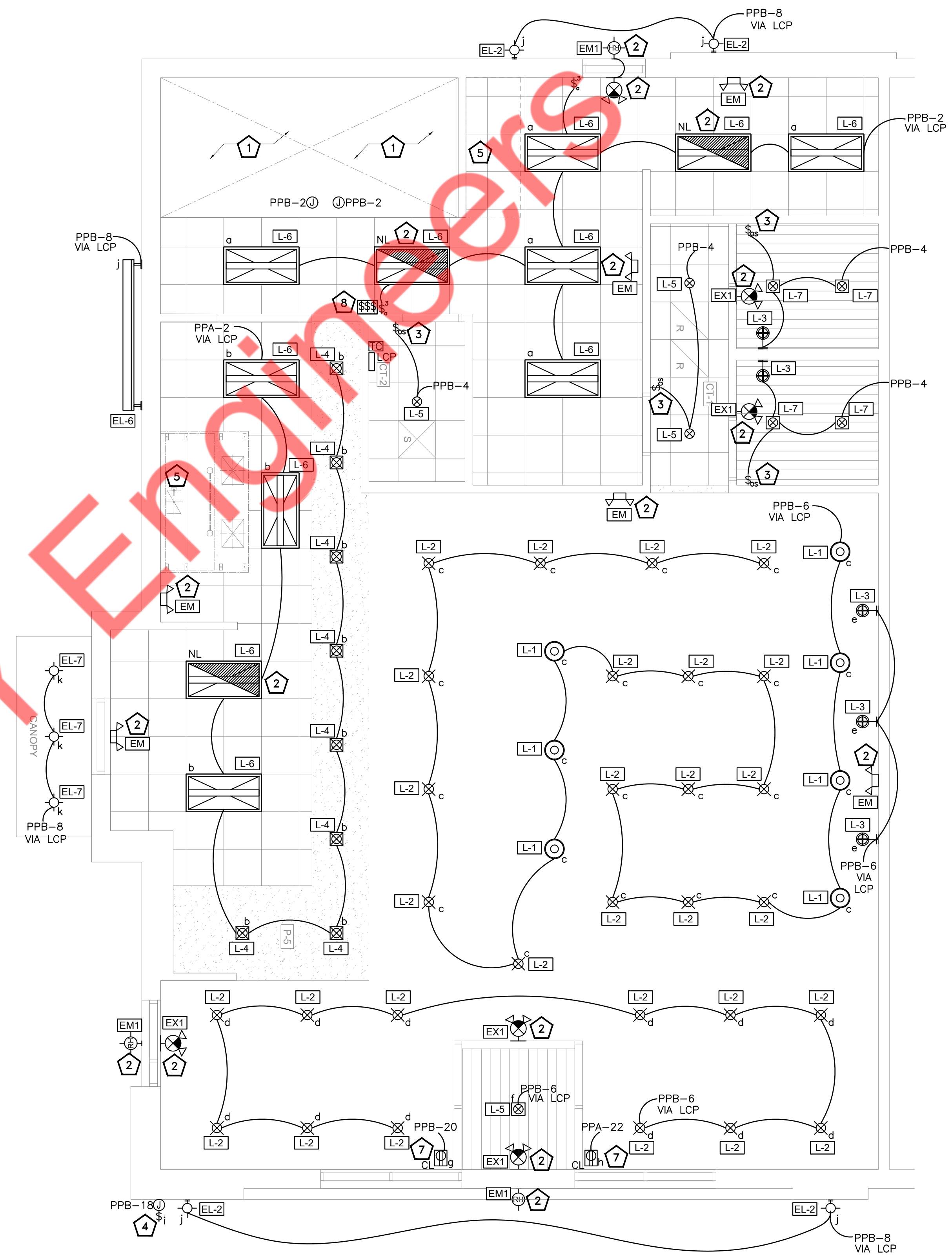
- VERIFY ALL LUMINAIRE COLORS, TRIMS, LENGTHS, ETC. WITH THE ARCHITECT PRIOR TO PLACING FINAL PURCHASE ORDERS. SUBMISSION PF SHOP DRAWINGS WILL BE INTERPRETED AS HAVING BEEN COORDINATED WITH THE ARCHITECTURAL DRAWINGS .
- PROVIDE ALL LENGTHS, FEEDS, ACCESSORIES, CONNECTORS, WIRING, POWER SUPPLIES, DRIVERS ETC. FOR A COMPLETE INSTALLATION. THE E.C. SHALL VERIFY THE COMPLETE BILL OF MATERIAL WITH MANUFACTURER'S REPRESENTATIVE AND ENSURE ALL EQUIPMENT ARE INCLUDED IN BID PRICE. COORDINATE INSTALLATION WITH ARCHITECTURAL DETAILS.
- VERIFY FINAL LUMINAIRE LOCATIONS WITH OTHER CEILING MOUNTED EQUIPMENTS SUCH AS DIFFUSER WITH ARCHITECTURAL REFLECTED CEILING PLANS.
- VERIFY EXACT MOUNTING HEIGHT AND LOCATIONS OF ALL WALL MOUNTED LUMINAIRE WITH ARCHITECTURAL PLANS AND ELEVATIONS PRIOR TO ROUGH-IN
- ANY PROPOSED ALTERNATE LUMINAIRES SHALL BE APPROVED BY THE ARCHITECT PRIOR TO FINAL BID PRICING.
- SHOULD THE CONTRACTOR PROPOSE TO FURNISH MATERIALS, EQUIPMENT AND DEVICES OTHER THAN THOSE SPECIFIED AND LISTED, THE CONTRACTOR SHALL SUBMIT A WRITTEN REQUEST FOR SUBSTITUTIONS, TO THE ENGINEERS AT LEAST TEN (10) BUSINESS DAYS PRIOR TO BID OPENING. THE REQUEST SHALL BE AN ALTERNATE TO THE ORIGINAL BID AND SHALL INCLUDE A COMPLETE SPECIFICATIONS CUTSHEET SUBMITTAL AS OUTLINED IN THE SPECIFICATIONS. COMPLETE WITH DESCRIPTIVE (MANUFACTURER, BRAND NAME, CATALOG NUMBER, ETC.) AND TECHNICAL DATA FOR ALL ITEMS. INDICATE ANY ADDITIONS OR DEDUCTIONS TO THE CONTRACT PRICE WITH THE SUBSTITUTION SUBMITTAL AND ON THE BID FORM.
- EXIT SIGNS SHALL BE DUAL VOLTAGE WITH RED FACE LETTERING.

**LIGHT FIXTURE LEGEND**

LEGEND	TAG	FIXTURE DESCRIPTION	REMARK
	L-1	16-INCH LED STEM MOUNT PENDANT	-
	L-2	MAXLITE MONZA MIX - SUSPENDED PENDANT	-
	L-3	WATSON DOUBLE WALL SCNCE	-
	L-4	RECESSED SQUARE LED DOWNLIGHT - BLACK	-
	L-5	6-INCH CAN LIGHT - BLACK TRIM	-
	L-6	2 X 4 LED FLAT PANEL RECESSED LIGHTING	WITH BATTERY BACKUP
	L-7	SURFACE MOUNTED BLACK CAN LIGHT	-
	EL-2	TBD	-
	EL-6	TBD	-
	EL-7	TBD	-
	EM	EMERGENCY LIGHTS WITH BATTERY BACKUP	-
	EX	EXIT SIGN	-
	EX1	EXIT SIGN WITH EMERGENCY LIGHT COMBO	-
	EM1	EXTERIOR GRADE EMERGENCY LIGHTS WITH BATTERY BACKUP	-

**LUMINAIRE SCHEDULE NOTES:**

- VERIFY FINAL SELECTION OF THE FIXTURES WITH THE ARCHITECT PRIOR TO BID.
- ALL LIGHT FIXTURES SHALL BE LED TYPE WITH 120VOLTS SUPPLY.



**1 LIGHTING PLAN**  
SCALE: 1/4" = 1'-0"



- ELECTRICAL POWER PLAN GENERAL NOTES:**
- EXACT LOCATION OF MECHANICAL, PLUMBING, KITCHEN, FURNITURE SYSTEMS, OWNER FURNISHED EQUIPMENT ETC. THAT REQUIRE ELECTRICAL CONNECTIONS ARE SHOWN ON THE MECHANICAL, PLUMBING, AND/OR ARCHITECTURAL DRAWINGS. COORDINATE EXACT LOCATIONS WITH RESPECTIVE CONTRACTORS AND/OR VENDORS PRIOR TO ANY ROUGH-INS.
  - REVIEW AND COORDINATE WITH ALL TRADES CONTRACT DOCUMENTS TO DETERMINE SPECIFIC MOUNTING LOCATIONS FOR EQUIPMENT WITH ELECTRICAL CONNECTIONS. COORDINATE EXACT MOUNTING LOCATIONS WITH THE SPECIFIC TRADE AND ARCHITECT.
  - MINIMUM CONDUCTOR SIZE FOR 120V BRANCH CIRCUITS SHALL BE 12-AWG. FOR 120V BRANCH CIRCUITS WITH HOME RUN OVER 100 LINEAR FEET, A MINIMUM WIRE SIZE OF 10-AWG SHALL BE PROVIDED FROM FIRST JUNCTION/OUTLET BOX TO BRANCH CIRCUIT PANEL BOARD. FOR 120V BRANCH CIRCUITS WITH HOME RUN OVER 150 LINEAR FEET, A MINIMUM OF 8-AWG SHALL BE PROVIDED FROM FIRST JUNCTION/OUTLET BOX TO BRANCH CIRCUIT PANEL BOARD.
  - ALL WIRING SHALL BE IDENTIFIED BY PANEL BOARD AND CIRCUIT NUMBERS IN ALL CABINETS, JUNCTION BOXES, WIRING TROUGHS, ENCLOSURES, SPLICE OR TERMINATION POINTS, ETC.
  - A NEW TYPED PANEL BOARD DIRECTORY CARD SHALL BE PROVIDED FOR ALL PANELS INSTALLED OR MODIFIED UNDER THIS CONTRACT. NEW DIRECTORY CARDS SHALL BE LOCATED ON THE INSIDE DOOR OF ASSOCIATED PANELS.
  - ALL RECEPTACLES IN THE KITCHEN/FOOD PREPARATION AREA SHALL BE OF GFCI TYPE.
  - E.C. SHALL VERIFY THAT WHEREVER CIRCUIT CONDUCTORS ARE SPLICED IN A BOX, ANY/ALL EQUIPMENT GROUNDING CONDUCTORS ASSOCIATED WITH THESE CIRCUITS MUST BONDED ("PIGTAILED") TO THE BOX.

- ELECTRICAL POWER PLAN KEYED NOTES:**
- ELECTRICAL CONTRACTOR SHALL COORDINATE WITH ARCHITECT/OWNER FOR EXACT LOCATION OF PANELS IN THE FIELD.
  - PROVIDE RED ILLUMINATED SWITCH FOR HOOD EXHAUST FAN CONTROL AND LIGHTS. PROVIDE TAG ABOVE SWITCH IDENTIFYING HOOD USE. HOOD TO BE CONTROLLED THROUGH HOOD CONTROL PANEL "HCP".
  - THE CONTRACTOR SHALL CONFIRM ELECTRICAL REQUIREMENTS AND MEANS OF DISCONNECT FOR EVAPORATOR COIL AND CONDENSING UNITS WITH THE WALK-IN BOX VENDOR. ALSO PROVIDE ELECTRICAL CONNECTION OF DOOR HEATER, CONDENSATE DRAIN AND HEAT TRACE TAPE.
  - PROVIDE ASTRONOMIC TIME CLOCK (INTERMATIC # ET1725C OR EQUAL) FOR ALL DD SITE LIGHTING, BUILDING SIGNS, ETC. PROVIDE ADDITIONAL ELECTRICALLY HELD CONTRACTOR (NUMBER OF POLES AS REQUIRED) TO SERVE EXTERIOR LIGHTING AND EXTERIOR SIGNAGE.
  - PROVIDE LOCKOUTS AT DISTRIBUTION PANEL FOR RESTROOM HAND DRYERS AS PER NEC 422.33.
  - PROVIDE 120 VOLT POWER SUPPLY AND DATA AT CEILING FOR MENUBOARD. E.C. SHALL COORDINATE WITH ARCHITECT/OWNER FOR EXACT LOCATION OF THE RECEPTACLE IN PRIOR TO ROUGH-IN.
  - E.C. SHALL CO-ORDINATE WITH FRANCHISEE/ARCHITECT FOR EXACT LOCATION AND MOUNTING HEIGHT OF ALL OUTLETS PRIOR TO ROUGH-IN.
  - NOT USED
  - EXHAUST FAN IN THE ROOM SHALL BE CIRCUITED TO THE LIGHTING FIXTURES IN THE SAME ROOM. COORDINATE WITH MECHANICAL DRAWINGS FOR PROVIDING INTERLOCKING WITH RTU-2(N).
  - E.C. SHALL COORDINATE WITH THE PLUMBING CONTRACTOR FOR EXACT LOCATION AND POWER REQUIREMENT OF THE PLUMBING EQUIPMENT. PROVIDE CIRCUIT AND CONTROL AS REQUIRED.
  - E.C. SHALL COORDINATE WITH THE MECHANICAL CONTRACTOR FOR EXACT LOCATION AND POWER REQUIREMENT OF THE MECHANICAL EQUIPMENT. PROVIDE CIRCUIT AND CONTROL AS REQUIRED.
  - ELECTRICAL CONTRACTOR TO PROVIDE WIRING AND MAKE FINAL CONNECTIONS FOR DIGITAL MENUBOARD, GROUND LOOP DETECTOR AND SPEAKER CANOPY ETC.. COORDINATE WITH THE SHELL DRAWINGS FOR MORE DETAIL.

**NOTE FOR ELECTRICAL CONTRACTOR**

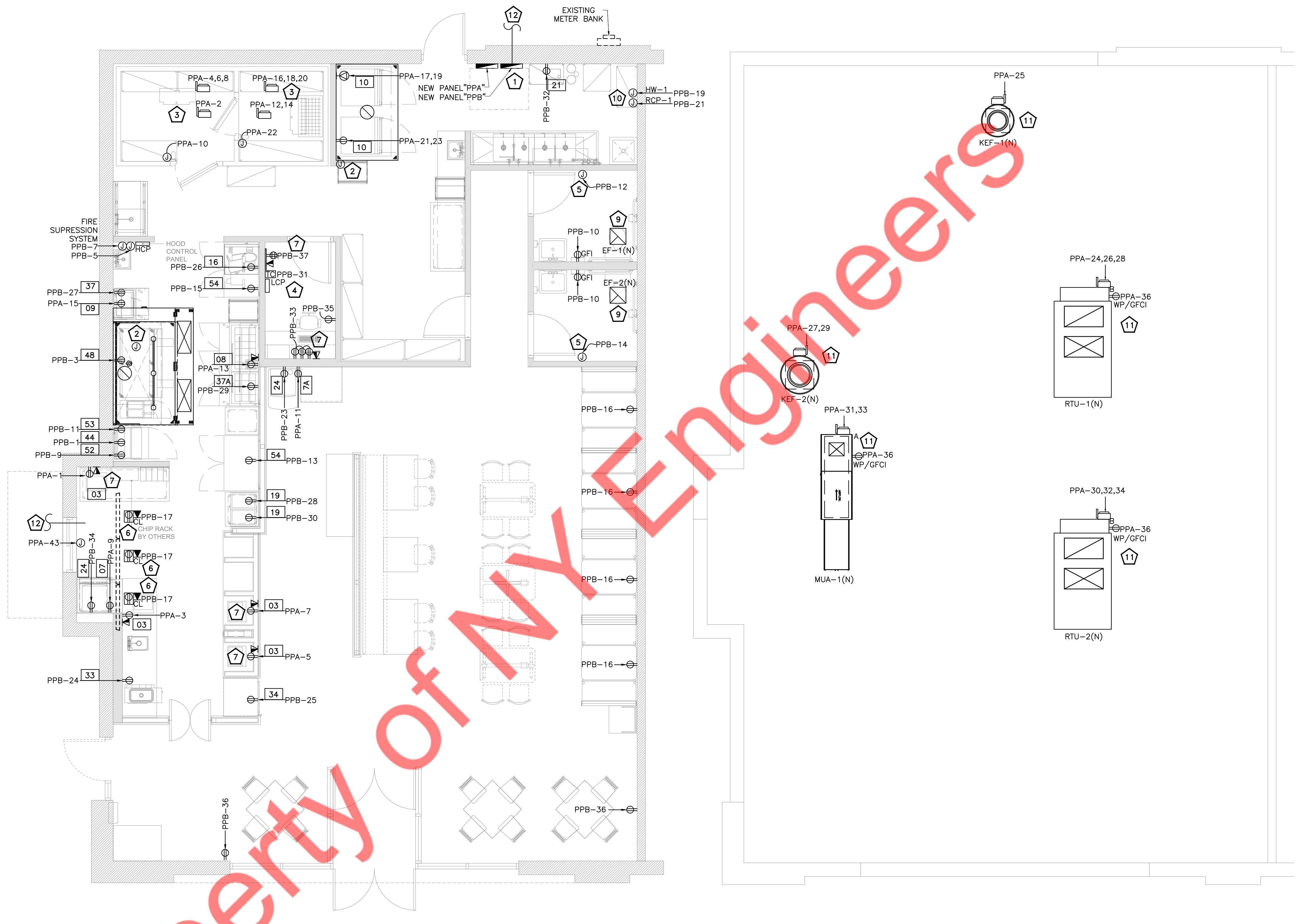
E.C. SHALL VERIFY THE FINAL SCOPE WORK WITH THE SHELL DRAWING, AND INFORM THE ENGINEER ON RECORD IN CASE OF ANY DISCREPANCY. BEFORE BID.

ELECTRICAL CONTRACTOR TO PROVIDE WIRING AND MAKE THE FINAL CONNECTION AS REQUIRED FOR THE DETECTOR LOOP TO OSC/ SPEAKER.

ELECTRICAL CONTRACTOR TO PROVIDE WIRING FOR DIGITAL ORDER SCREEN TO DRIVE-THRU WINDOW WITH PULL STRING FOR SPEAKER, MICROPHONE, DETECTOR LOOP DATA, AND CAMERA DATA. AND MAKE THE FINAL CONNECTION AS REQUIRED. VERIFY ALL REQUIREMENTS WITH THE EQUIPMENT MANUFACTURER BEFORE BIDDING. COORDINATE ROUTING OF LANDLORD-PROVIDED CONDUIT IN THE FIELD.

ELECTRICAL CONTRACTOR TO PROVIDE WIRING FOR PRE-ORDER MENU BOARD TO PANEL WITH PULL STRING, AND MAKE FINAL CONNECTION AS REQUIRED. VERIFY ALL REQUIREMENTS WITH THE EQUIPMENT MANUFACTURER BEFORE BIDDING. COORDINATE ROUTING OF LANDLORD-PROVIDED CONDUIT IN THE FIELD.

PROVIDE WIRING AND MAKE FINAL CONNECTIONS FOR PRE-MENU BOARD, DIGITAL ORDER SCREEN, VEHICLE DETECTOR LOOP, DOS CONTROL BOX, SPEAKER POST, LIGHT BAR, DIRECTIONAL SIGN.



**1 POWER PLAN**  
SCALE: 1/4" = 1'-0"

**2 POWER PLAN-ROOF**  
SCALE: 1/4" = 1'-0"



**PART I – ELECTRICAL GENERAL PROVISIONS**

**1.1. RELATED DOCUMENTS**

A. THE PROVISIONS OF THE INSTRUCTIONS TO BIDDERS, GENERAL CONDITIONS, SUPPLEMENTARY CONDITIONS, ALTERNATES, ADDENDAS', AND DIVISION 1 ARE A PART OF THIS SPECIFICATION. CONTRACTORS AND SUBCONTRACTORS SHALL EXAMINE SAME AS WELL AS OTHER DIVISIONS OF THE SPECIFICATIONS WHICH AFFECT WORK UNDER THIS DIVISION.

**1.2. SUMMARY**

A. THIS SECTION INCLUDES GENERAL ADMINISTRATIVE AND PROCEDURAL REQUIREMENTS FOR ELECTRICAL INSTALLATIONS COMMON TO ALL SECTIONS OF DIVISION 16. THE ADMINISTRATIVE AND PROCEDURAL REQUIREMENTS IN THIS SECTION EXPAND AND SUPPLEMENT THE REQUIREMENTS SPECIFIED IN DIVISION 1.

**1.3. DESCRIPTION OF WORK**

A. ELECTRICAL, ARCHITECTURAL, MECHANICAL, PLUMBING, FIRE PROTECTION, STRUCTURAL, ETC., AND ALL OTHER DRAWINGS AS WELL AS THE SPECIFICATIONS FOR ALL THE DIVISIONS ARE A PART OF THE CONTRACT DOCUMENTS.

B. DRAWINGS AND SPECIFICATIONS ARE TO BE CONSIDERED AS SUPPLEMENTING EACH OTHER. WORK SPECIFIED BUT NOT SHOWN, OR SHOWN BUT NOT SPECIFIED, SHALL BE PERFORMED OR FURNISHED AS THOUGH MENTIONED IN BOTH SPECIFICATIONS AND DRAWINGS.

C. VISIT THE SITE OF THE WORK AND BECOME FAMILIAR WITH CONDITIONS AFFECTING THE INSTALLATION. SUBMISSION OF A PROPOSAL SHALL PRESUPPOSE KNOWLEDGE OF SUCH CONDITIONS AND NO ADDITIONAL COMPENSATION SHALL BE ALLOWED WHERE EXTRA LABOR OR MATERIALS ARE REQUIRED BECAUSE OF IGNORANCE OF THESE CONDITIONS.

**1.4. WORK INCLUDES**

A. INCLUDE ALL LABOR, MATERIAL, EQUIPMENT, SERVICES, AND PERMITS NECESSARY FOR THE PROPER COMPLETION OF ALL ELECTRICAL WORK SHOWN. ITEMS OMITTED, BUT NECESSARY TO MAKE THE ELECTRICAL SYSTEM COMPLETE AND WORKABLE, SHALL BE UNDERSTOOD TO FORM PART OF THE WORK.

B. IT IS THE PURPOSE OF THE ELECTRICAL DRAWINGS TO INDICATE THE APPROXIMATE LOCATION OF ALL EQUIPMENT, OUTLETS, ETC. ASCERTAIN EXACT LOCATIONS AND ARRANGE WORK ACCORDINGLY. THE RIGHT IS RESERVED TO EFFECT REASONABLE CHANGES IN THE LOCATION OF OUTLETS UP TO THE TIME OF ROUGH-IN, WITHOUT ADDITIONAL COST TO THE OWNER. CHANGES IN LOCATION OF OUTLETS OR EQUIPMENT NECESSITATED BY INTERFERENCE WITH THE WORK OF OTHER TRADES SHALL BE MADE ONLY WITH THE CONSENT OF THE ARCHITECT AND ENGINEER OR OWNER'S REPRESENTATIVE, AND AT NO ADDITIONAL COST.

C. AS USED IN THIS SPECIFICATION, "PROVIDE" MEANS "FURNISH AND INSTALL" AND "HANG" MEANS "HEATING, VENTILATING AND AIR CONDITIONING" AND "POST" MEANS "PROVIDED UNDER OTHER SECTIONS". "TURNISH" MEANS TO PURCHASE AND DELIVER TO THE PROJECT SITE COMPLETE WITH EVERY NECESSARY APPURTENANCE AND SUPPORT, AND "INSTALL" MEANS TO UNLOAD AT THE DELIVERY POINT AT THE SITE AND PERFORM EVERY OPERATION NECESSARY FOR PROPER INSTALLATION PER CODES AND MANUFACTURERS REQUIREMENTS, TO ESTABLISH SECURE MOUNTING AND CORRECT OPERATION AT THE PROPER LOCATION IN THE PROJECT.

D. WORK INCLUDES, BUT IS NOT LIMITED TO:

1. RE-USE OF AND NEW PANELBOARDS AND CIRCUIT BREAKERS
2. FEEDERS AND BRANCH CIRCUIT WIRING
3. HANGERS AND SUPPORTS FOR ELECTRICAL SYSTEMS
4. ELECTRICAL IDENTIFICATION
5. CONDUCTORS AND CABLES
6. GROUNDING AND BONDING
7. RACEWAYS AND BOXES
8. WIRING DEVICES
9. LIGHTING CONTROL DEVICES
10. LUMINAIRES, INCLUDING LAMPS
11. LIFE-SUPPORTING AND NEW DEVICES TO THE EXISTING FIRE ALARM SYSTEM
12. FIRE STOPPING
13. ELECTRICAL CONNECTIONS TO MECHANICAL HVAC AND PLUMBING EQUIPMENT
14. NAMEPLATES, LABELS, AND TAGS
15. COORDINATION DRAWINGS
16. SHOP DRAWINGS
17. OPERATION AND MAINTENANCE INSTRUCTIONS AND MANUALS
18. TESTING

E. THE ELECTRICAL DESIGN IS BASED ON THE CURRENT ADDED EDITION NFPA 70 – 'THE NATIONAL ELECTRICAL CODE', THE CONTRACTOR SHALL INCLUDE IN THEIR BID THE COST OF INSTALLING MATERIALS AND EQUIPMENT NECESSARY TO SATISFY ALL LOCAL, AND/OR STATE CODES.

**1.5. WORK OR MATERIALS NOT INCLUDED**

A. THE EXACT WIRING REQUIREMENTS SHALL BE AS RECOMMENDED BY THE MANUFACTURER OF THE EQUIPMENT AND SHALL BE VERIFIED BY THE ELECTRICAL CONTRACTOR WITH THE EQUIPMENT MANUFACTURER BEFORE SUBMITTING THE BID.

B. STARTERS SUPPLIED AS AN INTEGRAL PART OF THE EQUIPMENT SHALL BE FURNISHED UNDER THE DIVISION PROVIDING THE EQUIPMENT. POWER WIRING DISCONNECT SHALL BE UNDER DIVISION 16. ALL OTHER STARTERS AND AUXILIARY CONTROL EQUIPMENT SHALL BE SUPPLIED AND WIRED UNDER DIVISION 16, UNLESS OTHERWISE SHOWN.

**1.6. RELATED WORK SPECIFIED ELSEWHERE**

A. DIVISION 13 – SPECIAL CONSTRUCTION

DIVISION 16 – MECHANICAL

**1.7. CODES, PERMITS, AND FEES**

A. INSTALL WORK IN FULL ACCORDANCE WITH RULES AND REGULATIONS OF STATE, COUNTY, AND CITY AUTHORITIES HAVING JURISDICTION (HAJ) OVER PREMISES. THIS SHALL INCLUDE SAFETY REQUIREMENTS OF THE STATE OF NEW YORK DEPARTMENTS OF COMMERCE AND NATURAL RESOURCES. DO NOT CONSTITUTE THIS AS RELYING CONTRACTOR FROM COMPLIANCE WITH ANY REQUIREMENTS OF SPECIFICATION WHICH ARE IN EXCESS OF CODE REQUIREMENTS AND NOT IN CONFLICT THEREWITH. WORK SHALL BE INSTALLED IN ACCORDANCE WITH ALL APPLICABLE PROVISIONS OF THE NATIONAL ELECTRICAL CODE, AS INTERPRETED BY THE LOCAL AUTHORITY HAVING JURISDICTION, AS WELL AS ANY FURTHER MODIFICATIONS OR REGULATIONS PUBLISHED BY LOCAL OR STATE AUTHORITIES.

B. GIVE PROPER AUTHORITIES NOTICE AS REQUIRED BY LAW RELATIVE TO THE WORK IN THEIR CHARGE. COMPLY WITH THE REGULATIONS REGARDING TEMPORARY ENCLOSURES, OBSTRUCTIONS, OR EXCAVATIONS AND PAY ALL LEGAL FEES INVOLVED.

C. SECURE AND PAY FOR PERMITS AND CERTIFICATES OF INSPECTIONS INCIDENTAL TO THIS WORK, AS REQUIRED BY ALL FOREGOING AUTHORITIES. BE RESPONSIBLE FOR PAYMENTS TO ALL PUBLIC UTILITIES FOR WORK PERFORMED BY THEM IN CONNECTION WITH PROVISION OF SERVICE CONNECTIONS REQUIRED UNDER THIS DIVISION OF SPECIFICATIONS. TURN OVER CERTIFICATES OF APPROVAL TO THE CONSTRUCTION MANAGER AND/OR OWNER PROMPTLY WHEN RECEIVED, AND BEFORE PAYMENT IS MADE FOR THE WORK. DELIVER ALL CERTIFICATES TO ARCHITECT IN DUPLICATE.

D. PROVISIONS OF THE LATEST REVISIONS TO THE FOLLOWING CODES AND STANDARDS SHALL BE FOLLOWED WHERE APPLICABLE:

1. NFPA 70 – NATIONAL ELECTRIC CODE (NEC)
2. NFPA 101 – LIFE SAFETY CODE
3. TIA/EIA – 568, 569, AND 1-10D-507
4. AMERICANS WITH DISABILITIES ACT (ADA)
5. FEDERAL OCCUPATIONAL SAFETY AND HEALTH ACT (OSHA)

**1.8. COORDINATION WITH OTHER TRADES**

A. CONSULT THE DRAWINGS, PRODUCT DATA, AND SHOP DRAWINGS COVERING THE WORK FOR VARIOUS OTHER TRADES, THE FIELD LAYOUTS OF THE CONTRACTORS FOR THE TRADE AND MAKE ADJUSTMENTS ACCORDINGLY IN LAYING OUT THE ELECTRICAL WORK.

B. KEEP FULLY INFORMED OF THE PROGRESS OF THE GENERAL CONSTRUCTION. INSTALL WORK THAT IS TO BE CONCEALED WITHIN THE BUILDING CONSTRUCTION IN SUFFICIENT TIME TO SECURE PROPER LOCATION WITHOUT DELAY TO THE WORK OF OTHER TRADES. ALL CONDUIT AND OUTLET BOXES CONCEALED IN MASONRY CONSTRUCTION SHALL BE INSTALLED DURING WALL CONSTRUCTION. ATTEND TO ELECTRICAL WORK DURING THE PROGRESS OF BUILDING-IN TO PREVENT MEASUREMENTS AND DAMAGES TO THE ELECTRICAL WORK.

C. EXAMINE THE WORK OF OTHER TRADES WHEN IT COMES IN CONTACT WITH, OR IS COVERED BY WORK IN THIS DIVISION. DO NOT ATTACH TO, COVER UP, OR FINISH AGAINST ANY DEFECTIVE WORK, OR INSTALL WORK IN A MANNER WHICH WILL PREVENT PROPER INSTALLATION OF THE WORK OF OTHER TRADES.

D. ALL OUTLETS, SWITCHES, AND RECEPTACLES SHALL BE CENTERED WITH REGARD TO PANELING, WALL COVERINGS, TRIM, EQUIPMENT, ETC., AND SHALL LINE UP WITH EITHER BOTTOM OR TOP OF MASONRY COURSES. CHANGES TO THE SPECIFIED MOUNTING HEIGHTS OF ANY DEVICE SHALL BE APPROVED BY THE OWNER'S REPRESENTATIVE BEFORE ROUGH-IN.

E. TAKE ALL FIELD MEASUREMENTS NECESSARY AND ASSUME RESPONSIBILITY FOR THEIR ACCURACY.

F. BEFORE BEGINNING CONSTRUCTION OF THE PROJECT, THE CONTRACTOR SHALL PROVIDE TO THE MECHANICAL CONTRACTOR, MARKED-UP PRINTS INDICATING ALL ELECTRICAL ITEMS WHICH AFFECT THE LOCATION OF HEATING, VENTILATING, AIR CONDITIONING, PLUMBING, PIPING, AND DUCTWORK. THESE SHALL INCLUDE BUT NOT BE LIMITED TO PULL BOXES, CONDUIT, ETC.

**1.9. EQUIPMENT AND MATERIALS**

A. ALL EQUIPMENT, DEVICES, AND MATERIALS USED ON THIS PROJECT SHALL BE NEW AND U.L. LISTED AND LABELED FOR THE APPLICATION.

B. PROVIDE MATERIAL AND LABOR WHICH IS NEITHER DRAWN NOR SPECIFIED, BUT WHICH IS OBVIOUSLY A COMPONENT PART OF, AND NECESSARY TO COMPLETE WORK WHICH IS CUSTOMARILY A PART OF WORK OF SIMILAR CHARACTER.

C. EQUIPMENT AND MATERIALS FOR THE CONSTRUCTION SHALL BE THE RESPONSIBILITY OF THE CONTRACTOR AND SHALL BE PROTECTED BY SAME UNTIL FORMALLY ACCEPTED BY THE OWNER.

D. ALL MANUFACTURERS OF ELECTRICAL EQUIPMENT SHALL VERIFY TO THE SATISFACTION OF THE CONTRACTOR AND ENGINEER THAT THEIR EQUIPMENT WILL FUNCTION PROPERLY UNDER THE CONDITIONS OF USE, AS SHOWN ON THE DRAWINGS AND AS SPECIFIED HEREIN, DIMENSIONS, WEIGHTS, OPERATING CHARACTERISTICS AND ALL OTHER RELATED APPURTENANCES SHALL BE VERIFIED BEFORE SUBMITTAL OF SHOP DRAWINGS.

**1.10. MATERIAL SUBSTITUTIONS**

A. BIDS SHALL BE BASED UPON THE SPECIFIED PRODUCTS OR LISTED ALTERNATIVES. DRAWINGS AND SPECIFICATIONS ARE BASED ON THE PRODUCTS SPECIFIED BY TYPE, MODEL, AND SIZE AND THUS ESTABLISH MINIMUM QUALITIES, WHICH SUBSTITUTES MUST MEET TO QUALIFY FOR REVIEW.

B. SHOULD THE CONTRACTOR PROPOSE TO FURNISH MATERIALS, EQUIPMENT, AND DEVICES, OTHER THAN THOSE SPECIFIED AND LISTED, THE CONTRACTOR SHALL SUBMIT A WRITTEN REQUEST FOR SUBSTITUTIONS, TO THE ENGINEER AT LEAST TEN (10) BUSINESS DAYS PRIOR TO BID OPENING. THE REQUEST SHALL BE AN ALTERNATE TO THE ORIGINAL BID AND SHALL INCLUDE AND BE ACCOMPANIED WITH COMPLETE SPECIFICATIONS CUT SHEET SUBMITTAL AS OUTLINED IN THIS SPECIFICATION SECTION, COMPLETE WITH DESCRIPTIVE (MANUFACTURER, BRAND NAME, CATALOG NUMBER, ETC.) AND TECHNICAL DATA FOR ALL ITEMS. INDICATE ANY ADDITIONS OR DEDUCTIONS TO THE CONTRACT PRICE WITH THE SUBSTITUTION SUBMITTAL AND ON THE BID FORM.

C. ACCEPTANCE OR REJECTION OF THE PROPOSED SUBSTITUTIONS SHALL BE SUBJECT TO APPROVAL OF THE ARCHITECT AND ENGINEER. IF REQUESTED, THE CONTRACTOR SHALL SUBMIT INSPECTION SAMPLES OF BOTH THE SPECIFIED AND THE PROPOSED SUBSTITUTE ITEMS.

D. IF ANY SUBSTITUTIONS ARE APPROVED, AN ADDENDUM LISTING THE APPROVED ITEM(S) WILL BE ISSUED TO ALL BIDDING CONTRACTORS PRIOR TO THE BID DATE.

E. IN ALL CASES WHERE SUBSTITUTIONS ARE PERMITTED, THE CONTRACTOR SHALL BEAR ANY EXTRA COST OF EVALUATING THE EQUALITY OF THE MATERIAL AND EQUIPMENT TO BE INSTALLED.

F. WHERE ONLY ONE MAKE IS NAMED IN THE SPECIFICATIONS OR ON THE DRAWINGS, IT SHALL BE PROVIDED.

G. VERBAL REQUESTS OR APPROVALS SHALL NOT BE BINDING ON THE ENGINEER OR OWNER.

**1.11. QUALITY ASSURANCE**

A. ELECTRICAL COMPONENTS, DEVICES, AND ACCESSORIES: UNDERWRITER LABORATORIES, INC. (UL) LISTED AND LABELED AS DEFINED IN NFPA 70, ARTICLE 100, BY A TESTING AGENCY ACCEPTABLE TO AUTHORITIES HAVING JURISDICTION, AND MARKED FOR INTENDED USE.

**1.12. SUBMITTALS**

**A. SHOP DRAWINGS AND PRODUCT DATA**

1. PREPARE SHOP DRAWINGS AND PRODUCT DATA FOR ELECTRICAL EQUIPMENT WITH ADEQUATE DETAILS AND SCALES AS NECESSARY TO CLEARLY SHOW CONSTRUCTION. INDICATE OPERATING CHARACTERISTICS FOR EACH REQUIRED ITEM AND DESIGN CONDITIONS FOR EACH. CLEARLY IDENTIFY EACH ITEM ON THE DRAWINGS AS TO MARK, LOCATION, AND USE.

2. THIS CONTRACTOR SHALL REVIEW, STAMP WITH APPROVAL AND SUBMIT, WITH REASONABLE PROMPTNESS AND IN ORDERLY SEQUENCE SO AS TO CAUSE NO DELAY IN WORK OR IN THE WORK OF ANY OTHER CONTRACTOR. ALL SHOP DRAWINGS AND SAMPLES REQUIRED BY THE CONTRACT DOCUMENTS, SHOP DRAWINGS NOT STAMPED WITH CONTRACTOR APPROVAL WILL BE RETURNED FOR REPROCESSING. THE SUBMITTALS WILL BE REVIEWED ONLY FOR GENERAL COMPLIANCE AND NOT FOR DIMENSIONS, QUANTITIES, ETC.

3. IF THE SUBMITTAL SHOWS VARIATIONS FROM THE REQUIREMENTS OF THE CONTRACT DOCUMENTS FOR ANY REASON, THE CONTRACTOR SHALL MAKE MENTION OF SUCH VARIATION IN A LETTER OF TRANSMITTAL. THE CONTRACTOR SHALL NOTE IN RED ON THE SUBMITTAL ANY CHANGE IN DESIGN OR DIMENSION ON THE ITEMS SUBMITTED INCLUDING CHANGES MADE BY THE MANUFACTURER WHICH MAY DIFFER FROM CATALOG INFORMATION.

4. CONTRACTOR FURTHER AGREES THAT IF DEVIATIONS, DISCREPANCIES, OR CONFLICTS BETWEEN SHOP DRAWING SUBMITTALS AND THE CONTRACT DOCUMENTS IN THE FORM OF DESIGN DRAWING AND SPECIFICATIONS ARE DISCOVERED, EITHER PRIOR TO OR AFTER SHOP DRAWING SUBMITTALS ARE PROCESSED BY THE ENGINEER, THE DESIGN DRAWINGS, AND SPECIFICATIONS SHALL CONTROL AND SHALL BE FOLLOWED.

5. THE SUBMITTALS THAT ARE RETURNED SHALL BE USED FOR PROCUREMENT. THE RESPONSIBILITY OF CORRECT PROCUREMENT REMAINS SOLELY WITH THE CONTRACTOR. THE SUBMITTAL REVIEW SHALL NOT RELIEVE THE CONTRACTOR OF RESPONSIBILITY FOR ERRORS OR OMISSIONS AND DEVIATIONS FROM THE CONTRACT REQUIREMENTS.

6. IN CHECKING SHOP DRAWINGS, THE ARCHITECT AND ENGINEER WILL MAKE EVERY EFFORT TO DETECT AND CORRECT ERRORS, OMISSIONS, AND INACCURACIES IN SUCH DRAWINGS. HOWEVER, FAILURE TO DETECT ERRORS, OMISSIONS, AND INACCURACIES SHALL NOT RELIEVE THE CONTRACTOR OF RESPONSIBILITY FOR THE PROPER AND COMPLETE INSTALLATION IN ACCORDANCE WITH THE INTENT OF THE CONTRACT DOCUMENTS.

7. CONTRACTOR AGREES THAT SHOP DRAWING SUBMITTALS PROCESSED BY THE ENGINEER ARE NOT CHANGE ORDERS; THAT THE PURPOSE OF SHOP DRAWING SUBMITTALS IS TO DEMONSTRATE TO THE ENGINEER THAT THE CONTRACTOR UNDERSTANDS THE DESIGN, THAT THEY DEMONSTRATE THEIR UNDERSTANDING BY INDICATING WHICH EQUIPMENT AND MATERIAL THEY INTEND TO FURNISH AND INSTALL, AND BY DETAILING THE FABRICATION AND INSTALLATION METHODS THEY INTEND TO USE.

8. SHOP DRAWINGS SHALL CLEARLY INDICATE ALL DIMENSIONAL DATA FOR ALL PARTS OF THE ITEM, TYPES AND MATERIALS FOR ALL CONNECTIONS, FINISHES, THE EXACT RELATION OF THE ITEM TO ADJACENT MATERIALS AND EQUIPMENT IN THE COMPLETED STRUCTURE, INCLUDING CLEARANCE, ANY NECESSARY ISOLATION AND FASTENING METHODS AND DEVICES AND MECHANICAL AND ELECTRICAL CONNECTIONS.

9. SUBMIT NEWLY PREPARED INFORMATION, DRAWN TO ACCURATE SCALE, HIGHLIGHT, ENCASE, OR OTHERWISE INDICATE DEVIATIONS FROM THE CONTRACT DOCUMENTS. DO NOT REPRODUCE CONTRACT DOCUMENTS OR COPY STANDARD INFORMATION AS THE BASIS OF SHOP DRAWINGS. STANDARD INFORMATION PREPARED WITHOUT SPECIFIC REFERENCE TO THE PROJECT IS NOT CONSIDERED SHOP DRAWINGS AND WILL BE CAUSE FOR REJECTION.

10. SHOP DRAWINGS AND PRODUCT DATA SHALL BE SUBMITTED AS FOLLOWS:

- a. CONFORM TO SUBMITTAL REQUIREMENTS OUTLINED IN DIVISION 1 OF THESE SPECIFICATIONS.
- b. WHERE CONTENTS OF SUBMITTAL LITERATURE INCLUDE DATA NOT PERTINENT TO THE SUBMITTAL, CLEARLY INDICATE WHICH PORTION OF CONTENT IS BEING SUBMITTED FOR REVIEW.

11. SHOP DRAWINGS SHALL INCLUDE FABRICATION AND INSTALLATION DRAWINGS, SETTING DIAGRAMS, SCHEDULES, PATTERNS, TEMPLATES AND SIMILAR DRAWINGS. ALSO, INCLUDE THE FOLLOWING INFORMATION:

- a. DIMENSIONS.
- b. FLOOR PLANS INDICATING LOCATION OF ALL FIRE ALARM DEVICES.
- c. COMPLIANCE WITH SPECIFIED STANDARDS.
- d. NOTATION OF COORDINATION REQUIREMENTS.
- e. NOTATION OF DIMENSIONS ESTABLISHED BY FIELD MEASUREMENT.

12. WHERE ADDITIONAL INSTALLATION DRAWINGS, WIRING DIAGRAMS OR OTHER DRAWINGS ARE SPECIFIED AS A PART OF THE SUBMITTAL, THEY SHALL BE SUBMITTED AT THE SAME TIME WITH SHOP DRAWINGS AND PRODUCT DATA. PARTIAL SUBMITTALS ARE NOT ACCEPTABLE.

13. SHOP DRAWINGS SHALL BE SUBMITTED FOR ALL MATERIAL ITEMS AS OUTLINED IN THESE SPECIFICATIONS. ANY DEVIATIONS FROM CONTRACT REQUIREMENTS MUST BE CLEARLY INDICATED ON SHOP DRAWINGS AND JUSTIFICATION FOR THEIR CONSIDERATION MUST BE INCLUDED.

14. APPROVAL OF SUBMITTAL ITEMS SHALL NOT PRECLUDE REJECTION OF THOSE ITEMS UPON DISCOVERY OF DEFECTS IN THEM PRIOR TO FINAL ACCEPTANCE OF COMPLETE WORK.

15. WHEN TWO OR MORE ITEMS OF THE SAME EQUIPMENT ARE REQUIRED (I.E. – LUMINAIRES, WIRING DEVICES, ETC.), EQUIPMENT ITEMS SHALL BE OF THE SAME MANUFACTURER.

16. SUBMIT A MINIMUM OF SIX (6) COPIES OF SHOP DRAWINGS TO THE ARCHITECT. THE ARCHITECT AND ENGINEER SHALL EACH RETAIN ONE (1) COPY AND RETURN THE REMAINDER TO THE CONTRACTOR WHO SHALL DISTRIBUTE COPIES AS REQUIRED TO PROPERLY CONDUCT THE WORK, INCLUDING REQUIREMENTS OF THE OPERATING MANUAL.

17. SHOP DRAWINGS AND PRODUCT DATA INCLUDES:

- a. WIRING DEVICES
- b. LIGHTING CONTROL DEVICES
- c. LUMINAIRES, LAMPS, AND BALLASTS
- d. FIRE ALARM DEVICES AND SYSTEM MODIFICATION DRAWINGS DESIGNED AND STAMPED BY A STATE CERTIFIED FIRE ALARM SYSTEM DESIGNER, INCLUDING BUT NOT LIMITED TO THE FOLLOWING:
  1. BATTERY CALCULATIONS
  2. FLOOR PLANS INDICATING LOCATION OF ALL FIRE ALARM DEVICES.
  3. VOLTAGE DROP CALCULATIONS FOR ALL WIRING AND WIRE TYPES.
  4. MANUFACTURER MODEL NUMBER AND LISTING INFORMATION FOR ALL DEVICES AND WIRING BEING PROVIDED.
  5. LOCATION OF ALL REQUIRED SYNCHRONIZATION UNITS IF REQUIRED.
  6. POWER EXTENDER PANELS, ADDRESSABLE MODULES, ETC.

**B. DESIGN DRAWINGS**

1. THE DESIGN DRAWINGS, AS SUBMITTED, ARE DIAGRAMMATIC AND ARE NOT INTENDED TO SHOW EXACT LOCATION OF EQUIPMENT, CONDUITS, ETC. UNLESS DIMENSIONS ARE GIVEN. DRAWINGS ARE NOT TO BE SCALED. EQUIPMENT, CONDUIT, ETC. TO BE INSTALLED ALONG THE GENERAL PLANS SHOWN ON THE DRAWINGS, BUT KEEPING IN MIND ACTUAL BUILDING CONDITIONS WHICH MUST BE CONFIRMED WITHIN THE ACTUAL WORK.

2. IF THIS CONTRACTOR PROPOSES TO INSTALL EQUIPMENT REQUIRING SPACE CONDITIONS OTHER THAN THOSE AS SPECIFIED AND/OR SHOWN ON THE DESIGN DRAWINGS, OR TO REARRANGE THE EQUIPMENT, HE SHALL ASSUME FULL RESPONSIBILITY FOR THE REARRANGEMENT OF THE SPACE AND SHALL OBTAIN THE FULL APPROVAL OF THE ARCHITECT BEFORE PROCEEDING WITH THE WORK.

**C. COORDINATION DRAWINGS**

1. BEFORE BEGINNING CONSTRUCTION OF THE PROJECT, THE CONTRACTOR SHALL PROVIDE TO THE MECHANICAL CONTRACTOR MARKED UP PRINTS INDICATING ALL ELECTRICAL WORK WHICH AFFECTS LOCATION OF HEATING, VENTILATING, AIR CONDITIONING, PLUMBING PIPING, FIRE PROTECTION, AND DUCTWORK. REFER TO DIVISION 1 AND DIVISION 15 FOR RELATED WORK.

2. COORDINATION DRAWINGS: REFLECTED CEILING PLANS DRAWN TO SCALE AND COORDINATING PENETRATIONS AND CEILING-MOUNTED ITEMS, SHOW THE FOLLOWING:

- a. CEILING SUSPENSION ASSEMBLY MEMBERS.
- b. METHOD OF ATTACHING HANGERS TO BUILDING STRUCTURE.
- c. CEILING-MOUNTED ITEMS INCLUDING LIGHTING FIXTURES, EXIT SIGNAGE, FIRE ALARM DEVICES, CCTV, SPEAKERS, ACCESS PANELS, ETC.

**D. RECORD DRAWINGS**

1. EACH CONTRACTOR OR SUBCONTRACTOR FOR ELECTRICAL WORK SHALL KEEP ONE COMPLETE SET OF THE CONTRACT WORKING DRAWINGS ON THE PROJECT SITE ON WHICH THEY SHALL RECORD ANY DEVIATIONS OR CHANGES FROM SUCH CONTRACT DRAWINGS MADE DURING CONSTRUCTION. THESE CHANGES SHALL BE ACCURATELY RECORDED IN RED INK ON THE PRINTS. RECORD DRAWINGS SHALL SHOW CHANGES IN:

- a. SIZE, TYPE, CAPACITY, ETC. OF ANY MATERIAL, DEVICE, OR PIECE OF EQUIPMENT.
- b. LOCATION OF ANY DEVICE OR PIECE OF EQUIPMENT.
- c. LOCATION OF ANY OUTLET OR DEVICE AND ASSOCIATED WIRING.
- d. APPROVAL OF FEEDER CONDUITS.
- e. BRANCH CIRCUIT NUMBER ASSIGNMENTS.

2. RECORD DRAWINGS SHALL BE KEPT CLEAN AND UNMARRIED, AND SHALL NOT BE USED FOR ANY PURPOSE OTHER THAN RECORDING DEVIATIONS FROM WORKING DRAWINGS.

3. AFTER THE PROJECT IS COMPLETED, RECORD SETS OF DRAWINGS SHALL BE DELIVERED TO THE TENANT AND BUILDING MANAGEMENT IN GOOD CONDITION, AS A PERMANENT RECORD OF THE INSTALLATION AS CONSTRUCTED. ALL COSTS FOR PRODUCTION, PRINTING, ETC. SHALL BE BORNE BY THE CONTRACTOR AND SHALL BE INCLUDED IN THE BID.

4. REFER TO DIVISION 1 SPECIFICATIONS FOR ADDITIONAL REQUIREMENTS RELATED TO RECORD DRAWINGS.

5. THIS CONTRACTOR SHALL RECORD ALL CHANGES FROM ORIGINAL DESIGN DRAWINGS WHICH WERE THE INSTALLATION OF THE WORK. THESE CHANGES SHALL BE RECORDED IN RED INK ON THE PRINTS. CHANGES SHALL BE ACCURATELY DIMENSIONED.

6. THIS CONTRACTOR SHALL KEEP AN UPDATED SET OF PRINTS, INCLUDING CHANGES, ON THE JOB SITE AT ALL TIMES AND SHALL SUBMIT ONE (1) SET OF UPDATED AND LEGIBLE "AS-BUILT" PRINTS TO THE ARCHITECT WHEN THE WORK IS COMPLETE.

7. PREPARE RECORD DOCUMENTS IN ACCORDANCE WITH THE REQUIREMENTS IN DIVISION 1 SECTION "PROJECT CLOSURE".

8. IN ADDITION TO THE REQUIREMENTS SPECIFIED IN DIVISION 1, INDICATE THE FOLLOWING INSTALLED CONDITIONS (ACCORDATELY DIMENSIONED):

- a. CONCEALED EQUIPMENT, UNITS, DEVICES, ETC., REQUIRING PERIODIC MAINTENANCE OR REPAIR.

9. APPROVED SUBSTITUTIONS, CONTRACT MODIFICATIONS AND ACTUAL EQUIPMENT AND MATERIALS INSTALLED. EQUIPMENT LOCATIONS (EXPOSED AND CONCEALED), DIMENSIONED FROM FINISHED BUILDING LINES.

**1.13. OPERATING/MAINTENANCE MANUALS**

A. PREPARE FOUR (4) COMPLETE BOUND SETS OF OPERATING/MAINTENANCE MANUALS IN ACCORDANCE WITH DIVISION 1 SECTION "PROJECT CLOSURE". COORDINATING OPERATING AND MAINTENANCE INSTRUCTIONS, AND MANUFACTURER START-UP REPORTS FOR ALL ELECTRICAL EQUIPMENT AND CONTROLS.

B. SERVICE MANUALS SHALL BE ASSEMBLED INTO ONE VINYL COVERED THREE RING (3) RING BINDER WITH HARD COVER AND WITH WRITTEN INSTRUCTIONS FOR EACH SYSTEM LISTED IN THE SPECIFICATIONS.

C. WRITTEN OPERATING INSTRUCTIONS, SUBMITTAL DRAWINGS, WIRING DIAGRAMS, EQUIPMENT CATALOG DATA SHEETS AND MANUFACTURER'S INSTRUCTIONS SHALL BE ACCOMMODATED INTO 8-1/2" X 11" AND/OR 11" X 17" SIZE. EACH SECTION SHALL BE TABULATED AND INDEXED AS FOLLOWS:

1. FIRST PAGE ---- TITLE OF PROJECT, OWNER, ADDRESS, DATE OF SUBMITTAL, NAME OF CONTRACTOR, AND NAME OF ARCHITECT AND ENGINEER.
2. SECOND PAGE ---- INDEX

3. FIRST SECTION ---- WRITTEN DESCRIPTION OF SYSTEM CONTROLS WHERE ACTUALLY LOCATED IN BUILDING, HOW EACH PART FUNCTIONS INDIVIDUALLY, AND HOW SYSTEM WORKS AS A WHOLE. CONCLUDE WITH A LIST OF ITEMS REQUIRING SERVICE AND EITHER STATE THE SERVICE NEEDED OR REFER TO THE MANUFACTURER'S DATA IN THE BINDER THAT DESCRIBES THE PROPER SERVICE.

4. SECOND SECTION ---- A COPY OF EACH SUBMITTAL DRAWING WITH AN INDEX AT THE BEGINNING OF THE SECTION.

5. THIRD SECTION ---- A COPY OF EACH MANUFACTURER'S OPERATING INSTRUCTIONS WITH AN INDEX AT THE BEGINNING OF THE SECTION, AND A COPY OF EACH MANUFACTURER'S START UP REPORT FOR (FIRE ALARM, ETC.)

6. FOURTH SECTION ---- A COPY OF ALL TEST RESULTS, IN CHART FORM, PERFORMED BY THE CONTRACTOR

7. FIFTH SECTION ---- COPIES OF ALL WARRANTIES, APPROVALS, ETC.

8. SUBMIT ONE (1) COPY TO THE ENGINEER FOR APPROVAL. AFTER APPROVAL, SUBMIT THREE (3) COPIES TO THE ARCHITECT FOR DELIVERY TO THE OWNER.

**1.14. PRODUCT DELIVERY, STORAGE, AND HANDLING**

A. DELIVER PRODUCTS TO THE PROJECT PROPERLY IDENTIFIED WITH NAMES, MODEL NUMBERS, TYPES, COMPLIANCE LABELS AND SIMILAR INFORMATION NEEDED FOR IDENTIFICATION. MATERIALS MUST BE ADEQUATELY PACKAGED OR PROTECTED TO PREVENT DETERIORATION DURING SHIPMENT, STORAGE AND HANDLING.

B. THE CONTRACTOR SHALL MAKE PROVISIONS FOR THE DELIVERY AND SAFE STORAGE OF HIS MATERIALS AND EQUIPMENT IN COORDINATION WITH THE WORK OF OTHERS. MATERIALS AND EQUIPMENT SHALL BE DELIVERED AT SUCH STAGES OF THE WORK AS WILL EXPEDITE THE WORK AS A WHOLE AND SHALL BE MARKED AND STORED IN SUCH A WAY AS TO BE EASILY CHECKED AND INSPECTED. THE ARRIVAL AND PLACING OF LARGE EQUIPMENT ITEMS SHALL BE SCHEDULED EARLY ENOUGH TO PERMIT ENTRY AND SETTING WHEN THERE IS NO RESTRICTION OR PROBLEM DUE TO SIZE AND WEIGHT.

C. MATERIALS SHALL BE STORED TO PROTECT THEM FROM INJURY PRIOR TO INSTALLATION. MATERIAL SHOULD NOT BE STORED DIRECTLY ON THE GROUND OR FLOOR AND SHALL BE KEPT AS CLEAN AND DRY AS POSSIBLE AND FREE FROM DAMAGE OR DETERIORATING ELEMENTS.

D. IN GENERAL, DO NOT DELIVER ITEMS OF ELECTRICAL EQUIPMENT TO THE PROJECT SUBSTANTIALLY BEFORE THE TIME OF INSTALLATION. LIMIT EACH SHIPMENT OF BULK AND MULTIPLE-USE MATERIALS TO THE QUANTITIES NEEDED FOR INSTALLATION WITHIN 3-WEEKS OF RECEIPT.

**1.15. PROTECTION OF WORK AND PROPERTY**

A. THE CONTRACTOR SHALL BE RESPONSIBLE FOR SAFEGUARDING WORK, PROPERTY, AND FACILITIES AGAINST DAMAGE, BOTH HIS OWN AS WELL AS OTHERS, WITH WHICH HE MAY COME INTO CONTACT IN THE PERFORMANCE OF HIS WORK.

B. STORED MATERIALS SHALL BE PROTECTED AGAINST DAMAGE FROM WEATHER. PIPE AND DUCT OPENINGS SHALL BE CLOSED WITH CAPS OR PLUGS DURING INSTALLATION. ALL FIXTURES AND EQUIPMENT SHALL BE COVERED AND PROTECTED AGAINST DAMAGE. ANY MATERIALS OR EQUIPMENT DAMAGED AT ANY STAGE IN THE CONSTRUCTION SHALL BE REPLACED OR REPAIRED AND AT THE FINAL CLOSURE, ALL WORK SHALL BE IN A CLEAN, UNBLENDED CONDITION.

C. FURNISH INFORMATION TO GENERAL CONTRACTOR AS TO SIZE AND LOCATION OF ALL BUILT-IN OPENINGS REQUIRED. DO NOT CUT, REMOVE OR ALTER GENERAL OR MECHANICAL INSULATION, FIRE RATED WALLS OR CEILINGS, OR STEEL WORK, WITHOUT PRIOR PERMISSION AND INSTRUCTION.

**1.16. CUTTING AND PATCHING**

A. GENERAL: ALL CUTTING AND PATCHING FOR THE INSTALLATION OF THIS BRANCH OF THE WORK SHALL BE THE RESPONSIBILITY OF THIS CONTRACTOR.

B. PERFORM CUTTING AND PATCHING IN ACCORDANCE WITH DIVISION 1 SECTION "PROCEDURES, SEPARATE PRIMES". IN ADDITION TO THE REQUIREMENTS SPECIFIED IN DIVISION 1, PERFORM CUTTING, FITTING AND PATCHING OF MECHANICAL EQUIPMENT AND MATERIALS REQUIRED TO:

1. INSTALL NEW WORK.
2. UNCOVER WORK TO PROVIDE FOR INSTALLATION OF ILL-TIMED WORK.
3. REMOVE AND REPLACE DEFECTIVE WORK.
4. REMOVE AND REPLACE WORK NOT CONFORMING TO REQUIREMENTS OF THE CONTRACT DOCUMENTS.
5. INSTALL EQUIPMENT AND MATERIALS IN EXISTING STRUCTURE THAT IS COVERED AND PROTECTED AGAINST DAMAGE.
6. UPON WRITTEN INSTRUCTIONS FROM THE ENGINEER, UNCOVER AND RESTORE WORK TO PROVIDE FOR ENGINEER OBSERVATION OF CONCEALED WORK.
7. CUT, REMOVE AND LEGALLY DISPOSE OF SELECTED ELECTRICAL EQUIPMENT, COMPONENTS AND MATERIALS AS INDICATED, INCLUDING BUT NOT LIMITED TO REMOVAL OF CONDUITS AND CONDUCTORS, JUNCTION BOXES, LUMINAIRES AND TRIM, AND OTHER ELECTRICAL ITEMS MADE OBSOLETE BY THE NEW WORK.

C. PROTECTION OF INSTALLED WORK: DURING CUTTING AND PATCHING OPERATIONS, PROTECT ADJACENT INSTALLATIONS.

D. PROVIDE AND MAINTAIN TEMPORARY PARTITIONS OR DUST BARRIERS ADEQUATE TO PREVENT THE SPREAD OF DUST AND DIRT TO ADJACENT AREAS.

E. ALL OPENINGS REQUIRED FOR THIS BRANCH OF WORK SHALL BE ACCOMPLISHED IN TIME TO BE INCORPORATED IN, AND BE COMPATIBLE WITH THE CONSTRUCTION PROGRAM, OTHERWISE THIS CONTRACTOR SHALL BE RESPONSIBLE AND PART FOR ALL CHANGES MADE NECESSARY FOR HIS FAILURE TO DO SO. PIPE HOLES IN CONCRETE SHALL BE CODE (CP-25), OR COMPOSITE SHEET (CS-195), OR EQUIPMENT. ALL PENETRATIONS SHALL BE SEALED IN ACCORDANCE WITH UL FIRE RESISTANCE VOLUME II.

F. PATCH EXISTING FINISHED SURFACES AND BUILDING COMPONENTS USING NEW MATERIALS MATCHING EXISTING MATERIALS AND EXPERIENCED INSTALLERS. FOR INSTALLERS' QUALIFICATIONS, REFER TO THE MATERIALS AND METHODS REQUIRED FOR THE SURFACE AND BUILDING COMPONENTS BEING PATCHED.

**1.17. FIRE STOPPING**

A. ANY CORE DRILLING OR CUTTING OF FIRE RATED FLOORS, PARTS AND WALLS SHALL BE FIRE STOPPED PRIOR TO FINISH PATCHING. ALL FIRE STOPPING MATERIALS SHALL BE U.L. "CLASSIFIED", INTUMESCING COMPOUND, DEVICE, OR SHEET RATED TO FUNCTION FOR THIS PURPOSE. ACCORDING TO INSTRUCTIONS PROVIDED, ALL PENETRATIONS IN 1-HOUR, 2-HOUR, AND 3-HOUR FIRE RATED WALLS, FLOORS OR PARTITION ASSEMBLIES SHALL BE SEALED WITH 3M BRANCO FIRE BARRIER CAULK, CP-25, OR COMPOSITE SHEET CS-195, OR EQUIPMENT. ALL PENETRATIONS SHALL BE SEALED IN ACCORDANCE WITH UL FIRE RESISTANCE VOLUME II.

1. CAULK P-25 FILL MATERIAL TO COMPLETELY FILL THE ANNULAR SPACE BETWEEN THE INDIVIDUAL CONDUIT AND GYPSUM WALLBOARD WITH A MINIMUM 1/4" DIAMETER BEAD OF CAULK APPLIED TO THE PERIMETER OF CONDUIT (UL SYSTEM WL1001).

2. MULTIPLE CONDUITS SHALL BE CONTAINED WITHIN A 28 GAUGE STEEL SLEEVE. CAULK CP-25 FILL MATERIAL TO A DEPTH OF 1" COMPLETELY AROUND THE STEEL SLEEVE. A NOMINAL 1/4" DIAMETER BEAD SHALL BE APPLIED ON BOTH SIDES OF WALL ASSEMBLY. A MINIMUM 1" THICKNESS OF MINERAL WOOL BATT INSULATION SHALL BE PACKED FIRMLY INTO THE STEEL SLEEVE ON BOTH SIDES OF WALL ASSEMBLY AS A PERMANENT FORM. PACKING MATERIAL SHALL BE RECESSED 5/8" FROM SURFACE OF WALL ON BOTH SIDES OF WALL ASSEMBLY. FILL RECESSED CAVITY WITH 1" OF CP-25 CAULK (UL SYSTEMS WL1016).

3. A MINIMUM 1" THICKNESS OF MINERAL WOOL BATT INSULATION SHALL BE PACKED FIRMLY INTO THE MAXIMUM 2" ANNULAR SPACE AS A PERMANENT FORM. A MINIMUM OF 1" OF CP-25 CAULK SHALL FILL THE RECESSED CAVITY. (FOR WALLS, THIS SHALL BE APPLIED ON BOTH SIDES OF THE WALL) (UL SYSTEM WL1014).

4. COORDINATE WITH THE ARCHITECT FOR ALL EXACT MATERIAL AND RATINGS AND EXACT DETAILS FOR FIRE STOPPING MATERIALS AND INSTALLATIONS PER ALL NFPA AND UL REQUIREMENTS.

**1.18. INTERFERENCES**

A. BEFORE INSTALLING ANY WORK, THIS CONTRACTOR SHALL SEE THAT IT DOES NOT INTERFERE WITH CLEARANCE REQUIRED FOR LIGHTS, CONDUIT, AND CEILING AND FOR FINISH ON BEAMS, COLUMNS, PLASTER, WALLS OR OTHER STRUCTURAL OR ARCHITECTURAL MEMBERS, AS SHOWN ON CONTRACT DRAWINGS. IF ANY WORK IS SO INSTALLED AND IT LATER DEVELOPS THAT ORIGINAL DESIGN CANNOT BE FOLLOWED, THIS CONTRACTOR SHALL, AT HIS OWN EXPENSE, MAKE SUCH CHANGES IN HIS WORK AS ARCHITECT MAY DIRECT TO PERMIT COMPLETION OF WORK IN ACCORDANCE WITH PLANS AND SPECIFICATIONS.

B. INSTALL ADDITIONAL OFFSETS ON PIPING OR DUCTWORK WHERE REQUIRED TO OBTAIN MAXIMUM HEADROOM OR TO AVOID CONFLICT WITH OTHER WORK WITHOUT ADDITIONAL COST TO OWNER.

**1.19. INTERRUPTION OF SERVICE**

A. WHEN WORK PROGRESS MAKES TEMPORARY SHUTDOWN OF SERVICES UNAVOIDABLE, SHUTDOWN SHALL BE COORDINATED WITH AND APPROVED BY OWNER SO AS TO CAUSE MINIMUM INTERFERENCE TO ESTABLISHED OPERATING ROUTINE. ARRANGE TO WORK AS NECESSARY TO RE-ESTABLISH SERVICE WITHIN SHORTEST POSSIBLE DOWNTIME. IN THOSE INSTANCES WHERE THE LENGTH OF TIME REQUIRED FOR THE SERVICE INTERRUPTION IS NOT ACCEPTABLE TO THE OWNER, UNLESS OTHERWISE INDICATED, FURNISH AND INSTALL TEMPORARY CONNECTIONS AS REQUIRED TO REDUCE THE LENGTH OF TIME OF SERVICE INTERRUPTION TO AN ACCEPTABLE LEVEL.

B. REPORT ANY INTERFERENCE BETWEEN WORK IN THIS DIVISION AND THAT OF ANY OTHER CONTRACTORS TO ARCHITECT AS SOON AS THEY ARE DISCOVERED. ARCHITECT WILL DETERMINE WHICH EQUIPMENT SHALL BE RELOCATED, REGARDLESS OF WHICH WAS FIRST INSTALLED, AND HIS DECISION SHALL BE FINAL.

**1.20. WORKMANSHIP**

A. WORKMANSHIP SHALL BE IN ACCORDANCE WITH THE BEST PRACTICES OF THE TRADE AND IN A WORK LIKE MANNER AND SHALL NEAT AND RECTILINEAR TO FINISHES.

B. ELECTRICAL WORK SHALL BE INSTALLED BY JOURNEMENT ELECTRICIANS UNDER THE SUPERVISION OF A COMPETENT FOREMAN.

**1.20. WORKMANSHIP**



## INSTALLATION

- A. WIRING DEVICES AND WALL PLATES
1. SINGLE AND COMBINATION TYPES TO MATCH CORRESPONDING WIRING DEVICES.
    - a. SMOOTH HIGH-IMPACT THERMOPLASTIC MATERIAL FOR FINISHED SPACES;
    - b. GALVANIZED STEEL MATERIAL FOR UNFINISHED SPACES;
    - c. VOICE/DATA JACKS SHALL UTILIZE THE SAME TYPE OF PLATE USED FOR RECEPTACLES
    - d. DEVICES PLATES SHALL BE BY THE SAME MANUFACTURER AS THE WIRING DEVICE.
    - e. DEVICE/PLATE COLOR SELECTED BY ARCHITECT.
  - B. RECEPTACLE ORIENTATION:
    1. INSTALL GROUND PIN OF VERTICALLY MOUNTED RECEPTACLES UP AND ON HORIZONTALLY MOUNTED RECEPTACLES TO THE RIGHT.
  - C. DO NOT USE OVERSIZED OR EXTRA-DEEP PLATES. REPAIR WALL FINISHES AND REMOUNT OUTLET BOXES WHEN STANDARD DEVICE PLATES DO NOT FIT FLUSH OR DO NOT COVER ROUGH WALL OPENING.
  - D. ARRANGEMENT OF DEVICES, UNLESS OTHERWISE INDICATED, MOUNT FLUSH, WITH LONG DIMENSION VERTICAL GROUP ADJACENT SWITCHES UNDER A SINGLE, MULTI-GANG WALL PLATE.
- 2.8 WIRING DEVICE PLATES
- A. PROVIDE TYPE AND COLOR AS DIRECTED BY ARCHITECT.
  - B. VOICE/DATA OUTLET PLATES SHALL BE SAME AS USED FOR RECEPTACLES.
  - C. DEVICE PLATES SHALL BE BY MANUFACTURER OF WIRING DEVICES.
  - D. OUTLETS SHALL BE FLUSH TO SURFACE.
- 2.9 LUMINAIRES
- A. PROVIDE LUMINAIRES, EQUIPMENT, AND COMPONENTS WHERE SHOWN ON DRAWINGS, AS LISTED IN LUMINAIRE SCHEDULE AND AS SPECIFIED, WIRED AND ASSEMBLED. PROVIDE APPROVED ALIGNERS, CANOPIES, HANGERS AND OTHER APPURTENANCES AS REQUIRED FOR A COMPLETE SYSTEM PER MANUFACTURER'S INSTRUCTIONS AND N.E.C. REQUIREMENTS.
  - B. REFER TO LUMINAIRE SCHEDULE FOR SPECIFIC LAMP AND BALLAST TYPE AND MANUFACTURER REQUIREMENTS.
  - C. PROVIDE POLYESTER COVERS TO PROTECT FLUORESCENT LUMINAIRES WITH LOUVERS, BASKETS, OR LENSES DURING CONSTRUCTION.
- 2.10 FUSIBLE SWITCHES
- A. MANUFACTURERS
    1. CUTLER HAMMER
    2. GENERAL ELECTRIC
  - B. QUICK-MAKE/QUICK-BREAK FUSIBLE SWITCHES
    1. PROTECTIVE DEVICES SHALL BE QUICK-MAKE/QUICK-BREAK FUSIBLE SWITCHES AS MANUFACTURED BY CUTLER HAMMER TYPE FDP. FUSIBLE SWITCHES 30 AMPERES THROUGH 600 AMPERES FRAMES SHALL BE FURNISHED WITH REJECTION CLASS "R" OR "L" TYPE FUSE CLIPS UNLESS OTHERWISE SCHEDULED. FUSIBLE SWITCHES 800 AMPERES THROUGH 1200 AMPERES SHALL BE FURNISHED WITH CLASS "L" FUSE CLIPS. SWITCHES SHALL INCORPORATE SAFETY COVER INTERLOCKS TO PREVENT OPENING THE COVER WITH THE SWITCH IN THE "ON" POSITION OR PREVENT PLACING THE SWITCH IN THE "ON" POSITION WITH THE COVER OPEN. PROVIDE DEFEATER FOR AUTHORIZED PERSONNEL. ANDLES SHALL HAVE PROVISIONS FOR PADLOCKING AND SHALL CLEARLY INDICATE THE "ON" OR "OFF" POSITION. FRONT COVER DOORS SHALL BE PADLOCKABLE IN THE CLOSED POSITION.
  - C. WARNING LABEL
    1. PROVIDE ARC-FLASH HAZARD WARNING LABEL FOR EACH SWITCH PER NATIONAL ELECTRIC CODE (N.E.C.) ARTICLE 110.16.
- 2.11 PANELBOARDS
- A. MANUFACTURERS
    1. CUTLER HAMMER
    2. GENERAL ELECTRIC
    3. SQUARE D
    4. SIEMENS
- THE LISTING OF SPECIFIC MANUFACTURERS ABOVE DOES NOT IMPLY ACCEPTANCE OF THEIR PRODUCTS THAT DO NOT MEET THE SPECIFIED RATINGS, FEATURES AND FUNCTIONS. MANUFACTURERS LISTED ABOVE ARE NOT RELIEVED FROM MEETING THESE SPECIFICATIONS IN THEIR ENTIRETY. PRODUCTS IN COMPLIANCE WITH THE SPECIFICATION AND MANUFACTURED BY OTHERS NOT NAMED WILL BE CONSIDERED ONLY IF PRE-APPROVED BY THE ENGINEER TEN (10) DAYS PRIOR TO BID DATE.
- B. RATINGS
1. PANELBOARDS RATED 240V AC OR LESS SHALL HAVE SHORT-CIRCUIT RATINGS AS SHOWN ON THE DRAWINGS OR AS HEREIN SCHEDULED, BUT NOT LESS THAN 10,000 AMPERES RMS SYMMETRICAL.
  2. PANELBOARDS RATED 480V AC OR LESS SHALL HAVE SHORT-CIRCUIT RATINGS AS SHOWN ON THE DRAWINGS OR AS HEREIN SCHEDULED, BUT NOT LESS THAN 14,000 AMPERES RMS SYMMETRICAL.
  3. PANELBOARDS SHALL BE LABELED WITH A UL SHORT-CIRCUIT RATING. WHEN SERIES RATINGS ARE APPLIED WITH INTEGRAL OR REMOTE UPSTREAM DEVICES, A LABEL OR MANUAL SHALL BE PROVIDED. IT SHALL STATE THE CONDITIONS OF THE UL SERIES RATINGS INCLUDING:
    - a. SIZE AND TYPE OF UPSTREAM DEVICE
    - b. UL RECOGNIZED BRANCH DEVICES THAT CAN BE USED
    - c. UL SERIES SHORT-CIRCUIT RATING.
- C. CONSTRUCTION
1. INTERIORS SHALL BE COMPLETELY FACTORY ASSEMBLED DEVICES. THEY SHALL BE DESIGNED SUCH THAT SWITCHING AND PROTECTIVE DEVICES CAN BE REPLACED WITHOUT DISTURBING ADJACENT UNITS AND WITHOUT REMOVING THE MAIN BUS CONNECTORS.
  2. TRIMS FOR BRANCH CIRCUIT PANELBOARDS SHALL BE SUPPLIED WITH A HINGED DOOR OVER ALL CIRCUIT BREAKER HANDLES. DOORS IN PANELBOARD TRIMS SHALL NOT UNCOVER ANY LIVE PARTS. DOORS SHALL HAVE A SEMI FLUSH CYLINDER LOCK AND CATCH ASSEMBLY. DOORS OVER 48 INCHES IN HEIGHT SHALL HAVE AUXILIARY FASTENERS.
  3. DISTRIBUTION PANELBOARD TRIMS SHALL COVER ALL LIVE PARTS. SWITCHING DEVICE HANDLES SHALL BE ACCESSIBLE.
  4. SURFACE TRIMS SHALL BE SAME HEIGHT AND WIDTH AS BOX. FLUSH TRIMS SHALL OVERLAP THE BOX BY 3/4 OF AN INCH ON ALL SIDES.
  5. A DIRECTORY CARD WITH A CLEAR PLASTIC COVER SHALL BE SUPPLIED AND MOUNTED ON THE INSIDE OF EACH DOOR.
  6. ALL LOCKS SHALL BE KEYED ALIKE.
- D. BUS
1. MAIN BUS BARS SHALL BE TIN-PLATED ALUMINUM SIZED IN ACCORDANCE WITH UL STANDARDS TO LIMIT TEMPERATURE RISE ON ANY CURRENT CARRYING PART TO A MAXIMUM OF 65 DEGREES C ABOVE AN AMBIENT OF 40 DEGREES C MAXIMUM.
  2. A SYSTEM GROUND BUS SHALL BE INCLUDED IN ALL PANELS.
  3. FULL-SIZE (100%-RATED) INSULATED NEUTRAL BARS SHALL BE INCLUDED FOR PANELBOARDS SHOWN WITH NEUTRAL BUS BAR TAPS FOR PANELS WITH SINGLE-POLE BRANCHES SHALL BE ARRANGED FOR SEQUENCE PHASING OF THE BRANCH CIRCUIT DEVICES. NEUTRAL BUSING SHALL HAVE A SUITABLE LUG FOR EACH OUTGOING FEEDER AND/OR BRANCH CIRCUIT REQUIRING A NEUTRAL CONNECTION.
- E. DISTRIBUTION PANELBOARDS
1. DISTRIBUTION PANELBOARDS SHALL HAVE OVERCURRENT DEVICES AS INDICATED ON DRAWINGS.
  2. DISTRIBUTION PANELBOARDS WITH BOLT-ON DEVICES CONTAINED THEREIN SHALL HAVE INTERRUPTING RATINGS AS SPECIFIED HEREIN OR AS INDICATED ON THE DRAWINGS. PANELBOARDS SHALL BE FULLY RATED.
  3. MOLDED CASE CIRCUIT BREAKERS SHALL BE PROVIDED WITH INVERSE TIME AND INSTANTANEOUS TRIPPING CHARACTERISTICS. ADJUSTABLE MAGNETIC TRIP SETTINGS SHALL BE PROVIDED FOR CIRCUIT BREAKER FRAME SIZES 400 AMPERES AND LARGER.
  4. CIRCUIT BREAKERS SHALL BE OPERATED BY A TOGGLE-TYPE HANDLE AND SHALL HAVE A QUICK-MAKE, QUICK-BREAK OVER-CENTER SWITCHING MECHANISM THAT IS MECHANICALLY TRIP-FREE. AUTOMATIC TRIPPING OF THE BREAKER SHALL BE CLEARLY INDICATED BY THE HANDLE POSITION. CONTACTS SHALL BE HONEYWELL SILVER ALLOY AND ARC EXTINCTION SHALL BE ACCOMPLISHED BY MEANS OF DE-ION ARC CHUTES.
  5. CIRCUIT BREAKERS INTERRUPTING CAPACITY SHALL MATCH THAT OF THE PANELBOARD INSTALLED.
  6. FUSIBLE SWITCHES SHALL BE AS INDICATED UNDER FUSIBLE SWITCHES.
- F. BRANCH CIRCUIT PANELBOARDS
1. THE MINIMUM SHORT-CIRCUIT RATING FOR BRANCH CIRCUIT PANELBOARDS SHALL BE AS SPECIFIED HEREIN OR AS INDICATED ON THE DRAWINGS. PANELBOARDS SHALL BE FULLY RATED.
  2. BOLT-ON TYPE, HEAVY-DUTY, QUICK-MAKE, QUICK-BREAK, SINGLE AND MULTI-POLE CIRCUIT BREAKERS OF THE TYPES SPECIFIED HEREIN, SHALL BE PROVIDED FOR EACH CIRCUIT WITH TOGGLE HANDLES THAT INDICATE WHEN UNIT HAS TRIPPED.
  3. CIRCUIT BREAKERS SHALL BE THERMAL-MAGNETIC TYPE WITH COMMON TYPE HANDLE FOR ALL MULTIPLE POLE CIRCUIT BREAKERS. CIRCUIT BREAKERS SHALL BE MINIMUM 100-AMPERE FRAME AND THROUGH 100-AMPERE TRIP SIZES SHALL TAKE UP THE SAME POLE SPACING. CIRCUIT BREAKERS SHALL BE UL LISTED AS TYPE "SWD" FOR LIGHTING CIRCUITS, AND UL LISTED AS TYPE "HACR" FOR HEATING, AIR-CONDITIONING AND REFRIGERATING EQUIPMENT.
    - a. CIRCUIT BREAKER HANDLE LOCKS SHALL BE PROVIDED FOR ALL CIRCUITS THAT SUPPLY EXIT SIGNS, EMERGENCY LIGHTS, ENERGY MANAGEMENT, AND CONTROL SYSTEM (EMCS) PANELS AND FIRE ALARM PANELS.
  4. BRANCH CIRCUIT BREAKERS SHALL HAVE A MINIMUM INTERRUPTING RATING OF 10,000 AMPERES SYMMETRICAL AT 240 VOLTS.
- H. ENCLOSURES
1. ENCLOSURES SHALL BE AT LEAST 20 INCHES WIDE MADE FROM GALVANIZED STEEL. PROVIDE MINIMUM GUTTER SPACE IN ACCORDANCE WITH THE NATIONAL ELECTRICAL CODE, WHERE FEEDER CABLES SUPPLYING THE MAINS OF A PANEL ARE CARRIED THROUGH ITS BOX TO SUPPLY OTHER ELECTRICAL EQUIPMENT, THE BOX SHALL BE SIZED TO INCLUDE THE ADDITIONAL REQUIRED WIRING SPACE. AT LEAST FOUR INTERIOR MOUNTING STUDS WITH ADJUSTABLE NUTS SHALL BE PROVIDED.
  2. ENCLOSURES SHALL BE PROVIDED WITH BLANK ENDS.
  3. EXTERIOR MOUNTED PANELBOARD SHALL BE NEMA 3R AND RATED FOR EXTERIOR APPLICATIONS
- I. SERVICE ENTRANCE LABEL
1. EQUIPMENT WITH MAIN SERVICE DISCONNECT SWITCH(ES) SHALL BE UL LABELED FOR USE AS SERVICE ENTRANCE EQUIPMENT.

- J. FUTURE DEVICES
1. PANELBOARDS SHALL BE FULLY PROVISIONED WITH ALL NECESSARY MOUNTING BRACKETS, BUS CONNECTIONS AND APPURTENANCES REQUIRED FOR INSTALLATION OF FUTURE DEVICES.
- K. ACCESSORY COMPONENTS AND FEATURES
1. PROVIDE ACCESSORY SET INCLUDING TOOLS AND MISCELLANEOUS ITEMS REQUIRED FOR OVERCURRENT PROTECTIVE DEVICE TEST, INSPECTION, MAINTENANCE AND OPERATION.
- L. NAMEPLATES
1. PROVIDE AN ENGRAVED NAMEPLATE FOR EACH PANEL SECTION.
- M. WARNING LABEL
1. PROVIDE ARC-FLASH HAZARD WARNING LABEL FOR EACH PANEL SECTION PER NATIONAL ELECTRIC CODE (N.E.C.) ARTICLE 110.16.
- N. FINISH
1. SURFACES OF THE TRIM ASSEMBLY SHALL BE PROPERLY CLEANED, PRIMED, AND A FINISH COAT OF GRAY ANSI 61 PAINT APPLIED.

## PART 3 - EXECUTION

### 3.1 TESTING, INSPECTION, AND CLEANING

- A. TEST WIRING AND CONNECTIONS FOR CONTINUITY AND GROUNDS BEFORE EQUIPMENT IS CONNECTED; DEMONSTRATE INSULATION RESISTANCE BY MEGGER TEST AS REQUIRED. INSULATION RESISTANCE BETWEEN CONDUCTORS AND GROUNDS FOR SECONDARY DISTRIBUTION SYSTEMS SHALL MEET NEC REQUIREMENTS.
- B. VERIFY AND CORRECT AS NECESSARY: VOLTAGES, TAP SETTINGS, TRIP SETTINGS AND PHASING ON EQUIPMENT FROM SECONDARY DISTRIBUTION SYSTEM TO POINTS OF USE. TEST SECONDARY VOLTAGES AT BUS IN MAIN SWITCHBOARD, AT PANELBOARDS, AND AT OTHER LOCATIONS ON DISTRIBUTION SYSTEMS AS NECESSARY. TEST SECONDARY VOLTAGES UNDER NO-LOAD AND FULL-LOAD CONDITIONS.
- C. TEST LUMINAIRES WITH SPECIFIED LAMPS IN PLACE FOR 10 HOURS. DO NOT OPERATE LAMPS OTHER THAN FOR TESTING BEFORE FINAL INSPECTION BY ARCHITECT. REPLACE LAMPS THAT FAIL WITHIN 90 DAYS AFTER ACCEPTANCE BY ARCHITECT.
- D. PROVIDE NECESSARY TESTING EQUIPMENT AND TESTING.
- E. FAILURE OR DEFECTS IN WORKMANSHIP OR MATERIALS REVEALED BY TESTS OR INSPECTION SHALL BE CORRECTED PROMPTLY AND RETESTED. REPLACE DEFECTIVE MATERIAL.
- F. CLEAN PANELS AND OTHER EQUIPMENT. PANELBOARD INTERIORS SHALL BE CLEANED AND VACUUMED. EQUIPMENT WITH DAMAGE TO PAINTED FINISH SHALL BE REPAIRED TO ARCHITECT'S SATISFACTION.

### 3.2 NAMEPLATES

- A. PROVIDE NAMEPLATES ON SWITCHBOARDS, PANELBOARDS, JUNCTION BOXES AND CABINETS, AND FOR SPECIAL PURPOSE SWITCHES, MOTOR DISCONNECT SWITCHES, REMOTE CONTROL STATIONS, STARTERS OR OTHER CONTROLS FURNISHED OR INSTALLED UNDER THIS SECTION. NAMEPLATES SHALL DESIGNATE EQUIPMENT CONTROLLED AND FUNCTION.

### 3.3 ACCESS AND ACCESS PANELS

- A. PROVIDE PROPER ACCESS TO MATERIAL OR EQUIPMENT THAT REQUIRE INSPECTION, REPLACEMENT, REPAIR OR SERVICE AND COORDINATE THEIR DELIVERY WITH THE INSTALLING TRADE. IF PROPER ACCESS CANNOT BE PROVIDED, CONFER WITH ARCHITECT AS TO BEST METHOD OF APPROACH TO MINIMIZE EFFECTS OF REDUCED ACCESS.
- B. ACCESS PANELS SHALL HAVE SAME FIRE RATING CLASSIFICATION AS SURFACE PENETRATED.
- C. PANELS SHALL BE AT LEAST 12" X 12"; ACCESS PANELS AT EQUIPMENT SHALL BE 18" X 18".

### 3.4 WIRING METHODS

- A. ALL RACEWAYS, CABLE ASSEMBLIES, BOXES, CABINETS, FITTINGS, ETC. SHALL BE SECURED AND SUPPORTED IN ALL ASSEMBLIES AS REQUIRED PER N.E.C. ARTICLE 300.11.
- B. INSTALL WIRE AND CABLE AS SPECIFIED AND AS APPROVED BY AUTHORITIES HAVING JURISDICTION. ALL CONDUITS OR RACEWAYS SHALL BE CONCEALED WHERE POSSIBLE EXCEPT FOR UNFINISHED AREAS, SUCH AS EQUIPMENT ROOMS. PROVIDE STAND-OFF CLIPS WHERE CONDUITS ARE INSTALLED ON MASONRY WALLS.
- C. RUN CONCEALED CONDUIT IN AS DIRECT LINES AS POSSIBLE WITH MINIMUM NUMBER OF BENDS OF LONGEST POSSIBLE RADIUS. RUN CONDUIT PARALLEL TO OR AT RIGHT ANGLES TO BUILDING LINES TIGHT TO BUILDING STRUCTURE.
- D. CONDUIT RUNS SHALL BE MECHANICALLY AND ELECTRICALLY CONTINUOUS FROM SERVICE ENTRANCE TO OUTLETS. CONDUIT SHALL ENTER AND BE SECURED TO CABINET, JUNCTION BOX, PULL BOX OR OUTLET BOX WITH LOCKNUT OUTSIDE AND BUSHING INSIDE.
- E. ALL RACEWAY SHALL BE 3/4" TRADE SIZE MINIMUM, AS INDICATED ON THE DRAWINGS OR AS REQUIRED BY THE NEC AND SHALL CONTAIN AN EQUIPMENT GROUNDING CONDUCTOR. PROVIDE INSERTS, HANGERS, ANCHORS AND STEEL SUPPORTS AS NECESSARY.
- F. INSTALL CONDUIT SYSTEMS COMPLETE BEFORE DRAWING IN CONDUCTORS. BLOW THROUGH AND SWAB AFTER PLASTER IS FINISHED AND DRY, AND BEFORE CONDUCTORS ARE INSTALLED.
- G. WIRE FROM POINT OF SERVICE CONNECTION TO RECEPTACLES, LUMINAIRES, DEVICES, EQUIPMENT, AND OTHER ELECTRICAL APPARATUS AS SHOWN ON DRAWINGS. PROVIDE SLACK WIRE FOR CONNECTIONS.
- H. CONDUCTORS 10-AWG AND SMALLER IN BRANCH CIRCUIT PANELBOARDS, SIGNAL CABINETS, SIGNAL CONTROL BOARDS, SWITCHBOARDS AND MOTOR CONTROL CENTERS SHALL BE BUNDLED. CONDUCTORS LARGER THAN 10-AWG IN SWITCHBOARDS, MOTOR CONTROL CENTERS, AND PULL BOXES SHALL BE CABLED IN INDIVIDUAL CIRCUITS.
- I. FOLLOW HOMERUN CIRCUIT NUMBERS SHOWN ON DRAWINGS TO CONNECT CIRCUITS TO PANELBOARDS. CONNECT EACH BRANCH CIRCUIT HOMERUN WITH TWO OR MORE CIRCUITS AND COMMON NEUTRAL TO CIRCUIT BREAKER AND SWITCH IN THREE-WIRE OR FOUR-WIRE BRANCH CIRCUIT PANELBOARD SO THAT NO TWO CIRCUITS ARE FED FROM SAME BUS. WHERE PANELBOARD CABINETS ARE RECESSED, PROVIDE CONDUITS WITH SUFFICIENT CAPACITY FOR FUTURE CONDUCTORS FOR SPARE BRANCH CIRCUIT PROTECTIVE DEVICES AND SPACES IN PANELBOARD; STUB UP CONCEALED TO JUNCTION BOX. PROVIDE EXTENSIONS ABOVE CEILING.
- J. ELECTRICAL METALLIC TUBING (EMT) MAY BE USED FOR INTERIOR APPLICATIONS ABOVE GRADE, WHERE PERMITTED BY CODES. FOR LUMINAIRE AND RECEPTACLE CIRCUITS, TELEPHONE, INTER-COMMUNICATIONS, SIGNAL AND INSTRUMENTATION CIRCUITS, AND FOR CONTROL CIRCUITS. EMT MAY BE USED ABOVE HUNG CEILING, IN EQUIPMENT ROOMS, IN MECHANICAL AND ELECTRICAL CHASES AND CLOSETS, IN EXPOSED LOCATIONS ALONG CEILING OR WALLS ABOVE NORMAL TRAFFIC LEVEL AND WHERE NOT SUBJECT TO ACCIDENTAL DAMAGE OR ABUSE.
- K. INSTALL CONNECTORS AND COUPLINGS AS RECOMMENDED BY MANUFACTURERS. COMPRESSION FITTINGS SHALL BE USED IN AREAS SUBJECT TO MOISTURE.
- L. FLEXIBLE METAL CONDUIT (FMC) SHALL BE USED FOR CONNECTIONS TO ELECTRICAL EQUIPMENT AND TO EQUIPMENT FURNISHED UNDER DIVISIONS 14 AND 15 THAT ARE SUBJECT TO MOVEMENT AND VIBRATION. FMC SHALL BE LIMITED TO LENGTHS OF 6 FEET AND SHALL CONTAIN GROUNDING CONDUCTOR.
- N. ALL LOW VOLTAGE CABLE NOT IN CONDUIT AND INSTALLED IN RETURN AIR PLENUM SHALL BE U.L. LISTED PLENUM TYPE CABLE.
- O. OPENINGS AROUND ELECTRICAL PENETRATIONS THROUGH FIRE RESISTANT RATED WALLS, PARTITIONS, FLOORS, OR CEILING SHALL BE FIRESTOPPED USING U.L. APPROVED METHODS PER MANUFACTURER'S GUIDELINES (HLL FIRE STOP SYSTEMS OR JM FIRE PROTECTION PRODUCTS) TO MAINTAIN THE FIRE RESISTANCE RATING OF STRUCTURE. REFER TO ARCHITECTURAL DRAWINGS FOR FIRE RATINGS REQUIREMENTS TO BE MAINTAINED.

### 3.5 INSTALLATION OF LUMINAIRES

- A. THE ELECTRICAL CONTRACTOR SHALL VERIFY ALL CEILING CONSTRUCTION TYPES, HEIGHTS, CEILING SPACE CLEARANCES, ETC. WITH THE ARCHITECTURAL, MECHANICAL, PLUMBING, AND FIRE PROTECTION PLANS, ELEVATIONS, AND DETAILS. PROVIDE PROPER FRAMES, ROUGH-IN KITS, TRIM RINGS, MOUNTING HARDWARE, N.E.C. REQUIRED ACCESS, ANCILLARY ACCESSORIES, ETC. FOR A COMPLETE N.E.C. AND U.L. LISTED INSTALLATION PER ALL MANUFACTURER'S REQUIREMENTS.
- B. COORDINATE INSTALLATION OF ALL LUMINAIRES WITH ALL TRADES AND THE INSTALLATION OF CEILING MATERIALS AND SUSPENSION SYSTEMS PRIOR TO ANY ROUGH-INS.
- C. DO NOT INSTALL LUMINAIRES UNTIL WORK OF OTHER TRADES THAT MAY DAMAGE LUMINAIRES IS COMPLETED.
- D. INVESTIGATE LUMINAIRE LOCATIONS AND SUPPORTS TO ENSURE THAT NO INTERFERENCE EXISTS WITH HANGERS, DUCTS, SPRINKLERS, PIPES AND ALL OTHER EQUIPMENT.
- E. PROVIDE PROPER PLASTER FRAMES FOR LUMINAIRES RECESSED IN GYPSUM BOARD OR PLASTER CEILING.
- F. DO NOT SUSPEND OR SUPPORT LUMINAIRES OR SAFETY CHAINS FROM HUNG CEILING, CONDUIT OR DUCT. SUPPORT LUMINAIRES FROM STRUCTURAL BUILDING MEMBERS ONLY.
- G. FRAMING MEMBERS OF SUSPENDED CEILING SYSTEMS USED TO SUPPORT LUMINAIRES SHALL BE SECURELY FASTENED TO EACH OTHER AND SHALL BE SECURELY ATTACHED TO THE BUILDING STRUCTURE AT APPROPRIATE INTERVALS. LUMINAIRES SHALL BE SECURELY FASTENED TO THE CEILING FRAMING MEMBER BY MECHANICAL MEANS SUCH AS BOLTS, SCREWS, OR RIVETS. LISTED CLIPS IDENTIFIED FOR USE WITH THE TYPE OF CEILING FRAMING MEMBER(S) AND LUMINAIRE(S) SHALL ALSO BE PERMITTED PER N.E.C. ARTICLE 410.36(b).
- H. PROVIDE STRUT BELOW DUCTS, WHERE LUMINAIRE LOCATIONS COINCIDE WITH DUCT RUNS. PROVIDE A COMPLETE THREADED ROD SYSTEM TO SUPPORT STRUT.
- I. PATCH ALL EXISTING SPRAY-ON FIREPROOFING DAMAGED DURING INSTALLATION.
- J. SUPPORT SURFACE-MOUNTED LUMINAIRES AT LEAST TWO CONCEALED POINTS TO PREVENT ROTATION.
- K. LOCATE CEILING AND WALL MOUNTED LUMINAIRES AS SHOWN ON ARCHITECTURAL REFLECTED CEILING PLANS AND ELEVATIONS.

### 3.6 GROUNDING

- A. PROVIDE EQUIPMENT GROUNDING SYSTEM AS SHOWN ON DRAWINGS. EQUIPMENT GROUNDING SYSTEM SHALL BE DESIGNED SO METALLIC DISTRIBUTION ENCLOSURES, RACEWAYS, JUNCTION BOXES, CABINETS, MACHINE FRAMES, PORTABLE EQUIPMENT AND OTHER CONDUCTIVE ITEMS IN CLOSE PROXIMITY WITH ELECTRICAL CIRCUITS OPERATE CONTINUOUSLY AT GROUND POTENTIAL AND PROVIDE LOW IMPEDANCE PATH FOR POSSIBLE GROUND FAULT CURRENTS.
- B. SYSTEM SHALL MEET NEC REQUIREMENTS, MODIFIED AS SHOWN ON DRAWINGS AND AS SPECIFIED.
- C. PROVIDE SEPARATE GREEN INSULATED EQUIPMENT GROUNDING CONDUCTOR FOR EACH BRANCH CIRCUIT. INSTALL GROUNDING CONDUCTOR IN COMMON CONDUIT WITH RELATED PHASE OR NEUTRAL CONDUCTORS, OR BOTH. PARALLEL FEEDERS INSTALLED IN MORE THAN ONE RACEWAY SHALL HAVE INDIVIDUAL FULL SIZE GREEN INSULATED EQUIPMENT GROUND CONDUCTORS.
- D. DETERMINE NUMBERS AND SIZES OF SCREW TERMINALS FOR EQUIPMENT GROUNDING BARS IN PANELBOARDS AND OTHER ELECTRICAL EQUIPMENT. PROVIDE SCREW TERMINALS FOR ACTIVE CIRCUITS, SPARES AND SPACES.
- E. PROVIDE GREEN INSULATED GROUNDING CONDUCTOR IN NONMETALLIC CONDUITS OR DUCTS UNLESS SPECIFIED OTHERWISE.

### 3.7 TELECOMMUNICATIONS CONDUIT SYSTEM

- A. PROVIDE SYSTEM OF EMPTY CONDUIT, OUTLETS AND MOUNTING BOARDS, AS SPECIFIED AND AS SHOWN ON DRAWINGS.
- B. NYLON PULL-IN WIRE SHALL BE INSTALLED IN TELECOMMUNICATIONS CONDUITS FOR USE BY OWNER.

## 3.8 TEMPORARY ELECTRIC SERVICE

- A. FURNISH AND INSTALL (AND REMOVE AS REQUIRED) ALL TEMPORARY POWER AND LIGHTING IN ALL AREAS WHERE NEEDED BY ALL TRADES IN THE PERFORMANCE OF THEIR WORK. PROVIDE A MINIMUM OF 20 FOOT CANDLES OF ILLUMINATION FOR TEMPORARY LIGHTING. TEMPORARY ELECTRIC SERVICE(S) SHALL CONFORM TO ALL FEDERAL, OSHA, STATE, INCLUDING THE NATIONAL ELECTRIC CODE.

## 3.9 MAIN ELECTRICAL SERVICE

- A. CONTACT AND FULLY COORDINATE EXISTING ELECTRIC SERVICE WITH THE LOCAL ELECTRIC UTILITY COMPANY. PROVIDE NECESSARY CONDUITS, CONDUCTORS, METERING CABINETS AND EQUIPMENT IN ACCORDANCE WITH UTILITY CO. STANDARDS. IF REQUIRED.
- B. SCHEDULE NEW SERVICE AND INCLUDE ELECTRIC UTILITY COMPANY CHARGES IN BID, IF REQUIRED.
- C. PROVIDE A GROUNDING ELECTRODE SYSTEM IN FULL COMPLIANCE WITH N.E.C. 250.52 TO INCLUDE BONDING ITEMS 1 THROUGH 6 WHERE AVAILABLE, i.e: METAL UNDERGROUND WATER PIPE, METAL FRAME OF THE BUILDING OR STRUCTURE, CONCRETE-ENCASED ELECTRODE, GROUND RING, ROD AND PIPE ELECTRODES, PLATE ELECTRODES. SIZED PER NEC TABLE 250.66.



**PLUMBING SPECIFICATIONS**

**A. GENERAL CONDITIONS OTHER CONTRACT DOCUMENTS**

- THE GENERAL CONDITIONS AND OTHER CONTRACT DOCUMENTS AS SET FORTH HEREBY ARE TO BE INCORPORATED INTO AND BECOME A PART OF THE SPECIFICATIONS FOR THE WORK UNDER THIS DIVISION.

**B. CODES AND PERMITS**

- COMPLY WITH RULES, REGULATIONS OF STATE, COUNTY, AND CITY AUTHORITIES HAVING JURISDICTION OVER THE PREMISES, INCLUDING SAFETY REQUIREMENTS OF OSHA. DO NOT CONSTRUCT THIS AS RELIEVING CONTRACTOR FROM COMPLYING WITH SPECIFICATIONS WHICH EXCEED CODE REQUIREMENTS AND NOT IN CONFLICT THEREWITH.
- SECURE AND PAY FOR ALL PERMITS AND CERTIFICATES OF INSPECTION REQUIRED. MAKE PAYMENTS TO ALL PUBLIC UTILITIES FOR WORK PERFORMED BY THEM IN PROVIDING SERVICE CONNECTIONS.

**C. LOCAL CONDITIONS**

- VISIT SITE, BECOME FAMILIAR WITH CONDITIONS AFFECTING THIS WORK. NO ADDITIONAL PAYMENT WILL BE MADE ON CLAIMS THAT ARISE FROM LACK OF KNOWLEDGE OF EXISTING CONDITIONS.
- THIS CONTRACTOR SHALL BE HELD TO HAVE EXAMINED THE PREMISES AND SITE SO AS TO COMPARE THEM WITH THE DRAWINGS AND SPECIFICATIONS. NO ALLOWANCE SHALL BE MADE TO THE CONTRACTOR BY REASON OF HIS FAILURE TO HAVE MADE SUCH EXAMINATION OR OF ANY ERROR ON HIS PART.

**D. DRAWINGS**

- DRAWINGS AND SPECIFICATIONS ARE TO BE CONSIDERED AS SUPPLEMENTING EACH OTHER. WORK SPECIFIED SHALL BE PERFORMED OR FURNISHED AS THOUGH MENTIONED IN BOTH SPECIFICATIONS AND DRAWINGS.
- THE DRAWINGS ARE SCHEMATIC ONLY AND ARE INTENDED TO SHOW THE APPROXIMATE LOCATIONS. DO NOT SCALE.

**E. SHOP DRAWINGS**

- THIS CONTRACTOR SHALL SUBMIT SHOP DRAWINGS ON THE ITEMS OF EQUIPMENT AND SYSTEMS AS NECESSARY TO CLEARLY SHOW EQUIPMENT AND CONSTRUCTION.

**F. SUPERVISION**

- THIS CONTRACTOR SHALL HAVE IN CHARGE OF THE WORK, A COMPETENT SUPERINTENDENT WITH EXPERIENCE IN THE WORK TO BE INSTALLED UNDER THIS CONTRACT.

**G. COORDINATION**

- THIS CONTRACTOR SHALL COORDINATE HIS WORK AND COOPERATE WITH THE OTHER CONTRACTORS. HE SHALL ARRANGE HIS WORK WITH THEIRS SO THAT THERE WILL BE NO DELAY IN THE PROPER INSTALLATION.
- EXAMINE WORK OF OTHER TRADES WHICH COMES IN CONTACT WITH OR IS COVERED BY THIS WORK. DO NOT ATTACH TO, COVER, OR FINISH AGAINST ANY DEFECTIVE WORK, OR INSTALL WORK IN THIS DIVISION IN A MANNER WHICH WILL PREVENT OTHER TRADES FROM PROPERLY INSTALLING THEIR WORK. CONSULT ALL DRAWINGS, SPECIFICATIONS AND DETAILS OF OTHER DIVISIONS OF THE WORK.

**H. CUTTING AND PATCHING**

- ALL CUTTING AND PATCHING WORK RELATED TO THIS CONTRACT WILL BE THE RESPONSIBILITY OF THIS CONTRACTOR.

**I. GUARANTEE AND WARRANTIES**

- WARRANTY THAT EQUIPMENT AND ALL WORK IS INSTALLED IN ACCORDANCE WITH GOOD ENGINEERING PRACTICE AND THAT ALL EQUIPMENT WILL MEET REQUIREMENTS SPECIFIED. ANY EQUIPMENT FAILING TO PERFORM OR FUNCTION AS SPECIFIED SHALL BE REPLACED WITH COMPLYING EQUIPMENT, WITHOUT COST TO THE OWNER.
- GUARANTEE AGAINST DEFECTS IN WORKMANSHIP AND MATERIALS; MAKE GOOD REPAIR OR REPLACE ANY DEFECTIVE WORK, MATERIAL OR EQUIPMENT WITHIN ONE YEAR FROM DATE OF ACCEPTANCE.

**J. INSTALLATION REQUIREMENTS**

- LOCATION OF PIPING, EQUIPMENT, ETC., ON THE DRAWINGS IS DIAGRAMMATIC; INDICATED POSITIONS SHALL BE FOLLOWED AS CLOSELY AS POSSIBLE; EXACT LOCATIONS SHALL BE SUBJECT TO BUILDING CONSTRUCTION AND INTERFERENCES WITH OTHER WORK. ARCHITECT RESERVES RIGHT TO MAKE MINOR CHANGES IN LOCATION OF ANY PART OF THE WORK UP TO THE TIME OF ROUGHING-IN WITHOUT ADDITIONAL COST.

**K. TEST AND ADJUSTMENTS**

- OBTAIN ALL INSPECTIONS REQUIRED BY LAW, ORDINANCES, RULES, REGULATIONS OF AUTHORITIES HAVING JURISDICTION, FURNISH CERTIFICATES OF SUCH INSPECTIONS. PAY ALL FEES AND PROVIDE ALL EQUIPMENT, POWER AND LABOR NECESSARY FOR INSPECTIONS AND TEST.

**2. PRESSURE TESTS**

- ALL PIPING SHALL BE GIVEN THE FOLLOWING PRESSURE TEST WITHOUT APPRECIABLE PRESSURE DROP. EQUIPMENT WHICH WOULD BE DAMAGED BY THE REQUIRED TEST PRESSURE SHALL BE ISOLATED FROM THE SYSTEM DURING TESTING.

SERVICE	MEDIUM	(PSI)	HRS.
DOMESTIC WATER	WATER	125	6
GAS PIPING	AIR	50	24

- SANITARY SEWERS PER STATE PLUMBING CODE AND LOCAL AUTHORITY.

**L. MATERIALS**

**1. PIPE & FITTINGS**

DOMESTIC WATER - TYPE "L" HARD COPPER  
 WASTE & DRAIN PIPING (ABOVE GROUND INTERIOR) - CAST IRON PIPE  
 BUILDING SEWERS & DRAINS (UNDERGROUND) - CAST IRON PIPE  
 REFRIGERANT - TYPE "L" HARD COPPER.

**M. VALVES**

- VALVES IN WATER PIPING: BALL VALVES WITH SCREWED ENDS, MIN. 150 LBS., SWP. VALVES USED FOR SHUT-OFF AND BALANCING SHALL BE EQUIPPED WITH MEMORY STOP.

**N. INSULATION**

- ALL INSULATION SHALL BE INSTALLED OVER CLEAN DRY SURFACES. INSULATION MUST BE DRY AND IN GOOD CONDITION. WET OR DAMAGED INSULATION WILL NOT BE ACCEPTABLE. NO INSULATION SHALL BE APPLIED PRIOR TO PRESSURE TEST COMPLETION OF THE RESPECTIVE PIPING SYSTEMS.

- FIBERGLASS PIPE INSULATION SHALL BE INSTALLED WITH JOINTS BUTTED FIRMLY TOGETHER. JACKET LAPS TO BE SEALED WITH FACTORY APPLIED ADHESIVE. BUTT JOINTS TO BE SEALED WITH BUTT STRIPES, HAVING FACTORY APPLIED ADHESIVE. VALVES AND FITTINGS SHALL BE INSULATED USING MITERED SECTIONS OF INSULATION, INSULATION CEMENT, OR PREMOULDED FITTING INSULATION. THE INSULATION APPLIED TO THE VALVES AND FITTINGS SHALL BE COVERED WITH THE SAME TYPE OF COVERING AS USED ON THE PIPE INSULATION.

- PROVIDE THE FOLLOWING INSULATION PRODUCTS AS MANUFACTURED BY OWENS-CORNING. INSULATION PRODUCTS AS MANUFACTURED BY ARMSTRONG, CERTAINTED OR KNAUF ARE ACCEPTABLE. ADHESIVE SHALL BE BENJAMIN FOSTER OR EQUAL.

**4. MATERIAL**

DOMESTIC HOT WATER - 1/2" THICK ASJ/SSL FIBERGLASS  
 DOMESTIC COLD WATER - 1/2" THICK ASJ/SSL FIBERGLASS

**O. WASTE SYSTEMS**

- RUN ALL DRAINAGE PIPING AS DIRECT AS POSSIBLE. ACTUAL LOCATION OF DRAINS AND WASTE PIPING SHALL MEET THE VARIOUS BUILDING CONDITIONS. DO ANY WORK NECESSARY TO CONCEAL PIPING OR CLEAR PIPING OF OTHER TRADES.

**P. WATER SUPPLY SYSTEMS**

- EXTEND WATER SERVICE FROM LANDLORD SUPPLIED WATER METER CONNECTION PROVIDED OUTSIDE OF BUILDING WITH HOT AND COLD WATER BEING SUPPLIED AND CONNECTED TO ALL FIXTURES AND EQUIPMENT.

**Q. GAS PIPING SYSTEMS**

- EXTEND NEW GAS PIPING FROM THE EXISTING METER LOCATED OUTSIDE OF BUILDING WHICH IS ALLOCATED FOR SPACE, AND CONNECT TO ALL ROOFTOP HVAC UNITS & WATER HEATER. INSTALL DRIP LEG AND SHUTOFF VALVE AT CONNECTION.

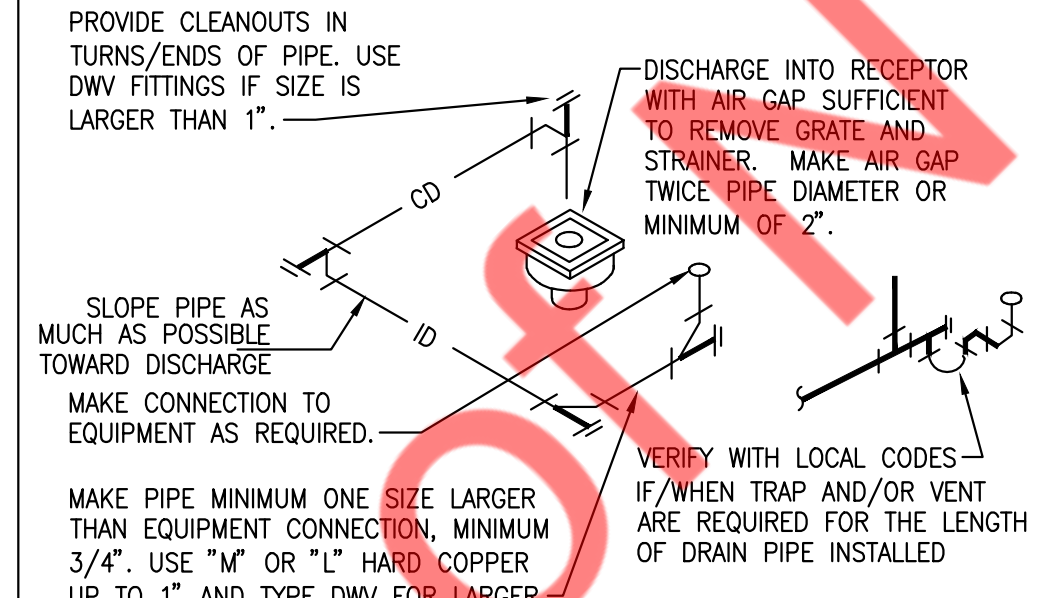
END OF SECTION

**PLUMBING LEGEND**

SYMBOL	DESCRIPTION
— SAN —	SANITARY WASTE
--- SAN ---	SANITARY SEWER (UNDERFLOOR)
--- GSAN ---	GREASE SANITARY (UNDERFLOOR)
--- EX.SAN ---	EX.SANITARY SEWER (UNDERGROUND)
--- EX.GSAN ---	EX.GREASE SANITARY SEWER (UNDERGROUND)
----	VENT PIPING
----	COLD WATER
----	EX. COLD WATER
----	HOT WATER
----	RECIRCULATING HOT WATER
G	GAS
⌊	CHECK VALVE
⌊	BALANCING VALVE
⌊	FLOOR SINK WITH HALF GRATE
⌊	FLOOR DRAIN
⌊	PIPE DOWN
⌊	PIPE UP
⌊	UNION
⌊	SHUT-OFF VALVE IN RISER
⌊	CAP ON END OF PIPE
⌊	CLEANOUT
⌊	DOUBLE CHECK VALVE ASSEMBLY
⌊	REDUCED PRESSURE BACKFLOW PREVENTER
⌊	SOLENOID VALVE
⌊	POINT OF NEW CONNECTION
⌊	ISOLATION VALVE
⌊	BACKFLOW PREVENTER

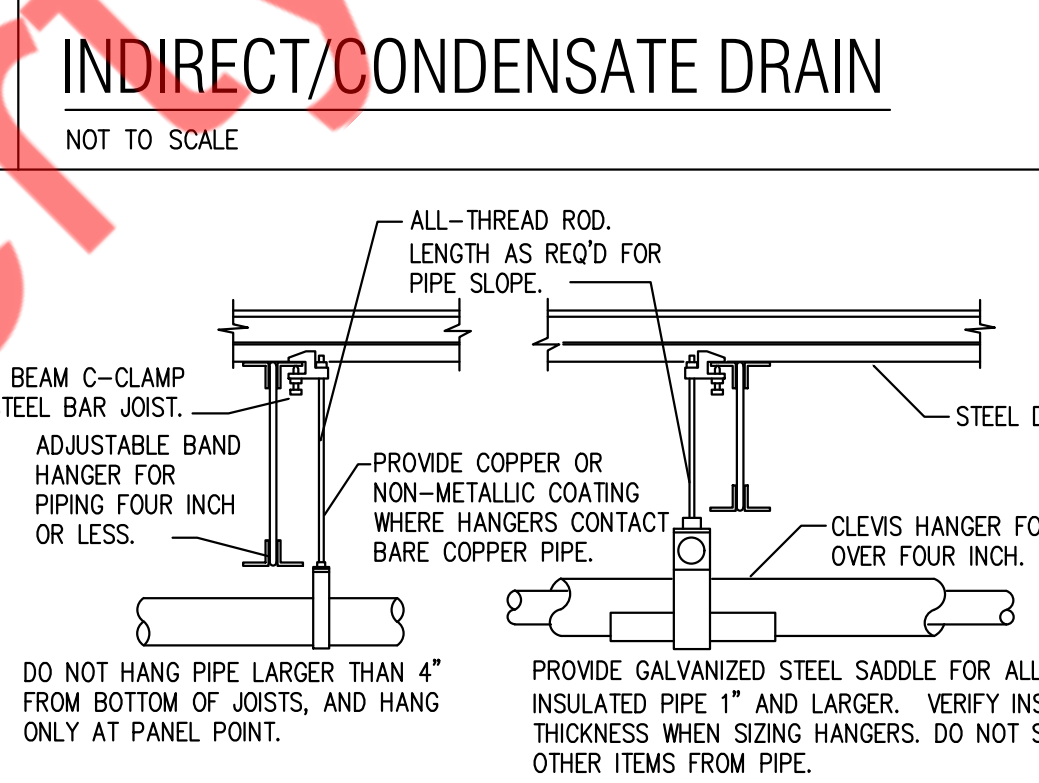
**ABBREVIATIONS**

EL ELEVATION	HB HOSE BIBB
ETR EXISTING TO REMAIN	INV INVERT
FD FLOOR DRAIN	LAV LAVATORY
MTR MTR VENT THRU ROOF	MC MECHANICAL CONTRACTOR
P-1 P-1 FIXTURE DESIGNATION	MH MANHOLE
PC PLUMBING CONTRACTOR	GC GENERAL CONTRACTOR
WC WATER CLOSET	CO CLEAN OUT



**INDIRECT CONDENSATE DRAIN**

NOT TO SCALE



**COMMENTS:**

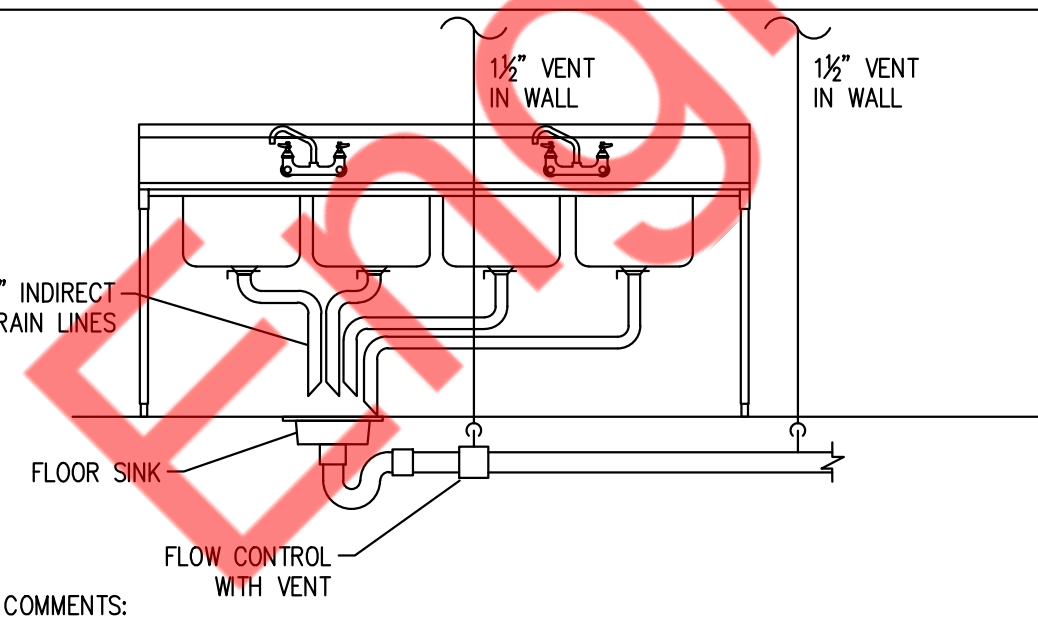
- PROVIDE UPPER ATTACHMENT AS REQUIRED FOR CASES NOT SHOWN HERE. DO NOT INSTALL HANGER INSIDE INSULATION OR OTHERWISE PENETRATE VAPOR BARRIER. DO NOT HANG ONE PIPE FROM ANOTHER EXCEPT IN CHASES. TRAPEZE HANGERS MAY BE USED FOR MULTIPLE PARALLEL PIPES. SLOPE ALL WATER PIPING SLIGHTLY TOWARD DRAINABLE LOCATIONS. HANGER SPACING FOR PIPE SIZE: COPPER: 2'-9" 1 1/2"-6" 1 1/2"-7" 1 1/2"-8" 3/4"-6" 3/4"-5" CAST IRON: 1' AND ONE NEAR ALL JOINTS. STEEL: 3'-12" 2 1/2"-11" 2"-10" 1 1/2"-9" 1 1/2"-7" 3/4"-6" 1/2"-5". LOCATE HANGERS AS CLOSE AS POSSIBLE TO TURNS AND TEES OF PIPE. PROVIDE SUPPLEMENTARY STEEL STRUTS BETWEEN JOISTS IF REQUIRED. LOCATE HANGERS TO TAKE LOAD OFF OF EQUIPMENT CONNECTIONS. ANCHOR WATER PIPE AGAINST SWAYING DUE TO CHANGES IN WATER VELOCITY. PROVIDE SEISMIC BRACING AS REQUIRED BY LOCAL AUTHORITIES. CHAINS OR PERFORATED STRAP IRON OR STEEL IS NOT ACCEPTABLE. DO NOT SUSPEND PIPE FROM JOIST BRACING MEMBERS. REFER TO CODES AND SPECIFICATIONS FOR FURTHER INFORMATION.

**PIPE HANGERS DETAIL**

NOT TO SCALE

**ENERGY CONSERVATION NOTES:**

- AS PER ASHRAE 90.1-2007, PIPING FROM A WATER HEATER TO THE TERMINATION OF HEATED WATER FIXTURE SUPPLY PIPE SHALL BE INSULATED IN ACCORDANCE WITH TABLE 6.8.3 OF MINIMUM PIPE INSULATION THICKNESS.
- AS PER ASHRAE 90.1 2007 EDITION, 7.4.4.1, TEMPERATURE CONTROLS SHALL BE PROVIDED THAT ALLOW FOR STORAGE TEMPERATURE ADJUSTMENT FROM 120°F OR LOWER TO A MAXIMUM TEMPERATURE COMPATIBLE WITH THE INTENDED USE.
- AS PER ASHRAE 90.1 2007 EDITION, 7.4.4.2, SYSTEMS DESIGNED TO MAINTAIN USAGE TEMPERATURES IN HOT WATER PIPES, SUCH AS RECIRCULATING HOT WATER SYSTEM OR HEAT TRACE, SHALL BE EQUIPPED WITH AUTOMATIC TIME SWITCHES OR OTHER CONTROLS THAT CAN BE SET TO SWITCH OFF THE USAGE TEMPERATURE MAINTENANCE SYSTEM DURING EXTENDED PERIODS WHEN HOT WATER IS NOT REQUIRED.
- AS PER ASHRAE 90.1 2007 EDITION, 7.4.4.3, TEMPERATURE CONTROLLING MEANS SHALL BE PROVIDED TO LIMIT THE MAXIMUM TEMPERATURE OF WATER DELIVERED FROM LAVATORY FAUCETS IN PUBLIC FACILITY RESTROOMS TO 110°F.
- AS PER ASHRAE 90.1 2007 EDITION, 7.4.4.4, WHEN USED TO MAINTAIN STORAGE TANK WATER TEMPERATURE, RECIRCULATING PUMPS SHALL BE EQUIPPED WITH CONTROLS LIMITING OPERATION TO A PERIOD FROM THE START OF HEATING CYCLE TO A MAXIMUM OF 5 MINUTES AFTER THE END OF HEATING CYCLE.

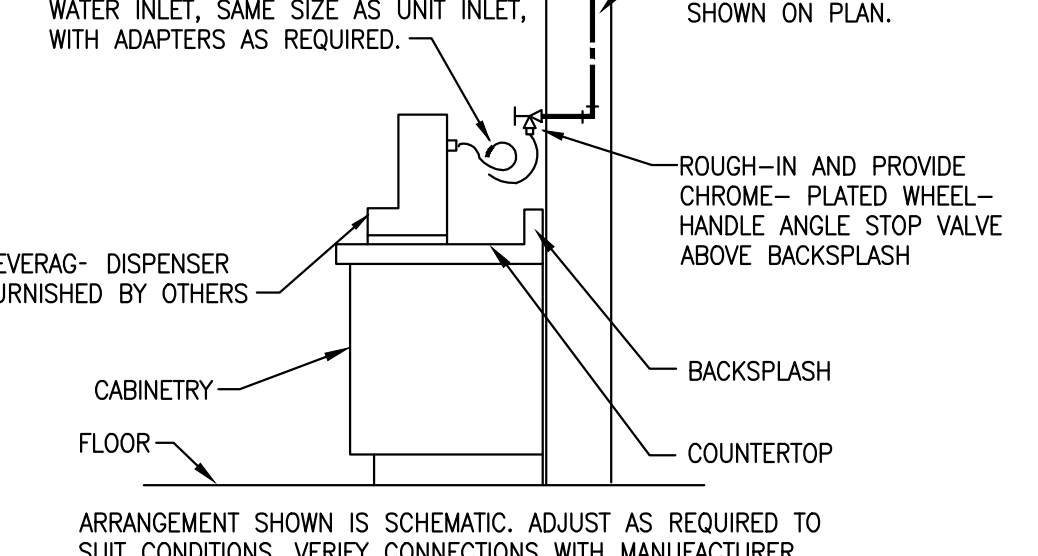


COMMENTS:

- ARRANGEMENT SHOWN IS SCHEMATIC. ADJUST TO SUIT FIELD CONDITIONS OR MEET LOCAL CODE REQUIREMENTS. HUBLESS CAST IRON PIPE, FITTINGS AND CONNECTORS ALL AROUND SINK AND TRAP. CONNECT GREASE TRAP FROM CENTER COMPARTMENT.
- COORDINATE INDIVIDUAL BAY DRAINAGE, AIR GAP, & DRAIN FUNNEL WITH LOCAL CODE REQUIREMENTS.

**4 COMPARTMENT SINK DETAIL**

NO SCALE



**BEVERAGE DISPENSER WATER**

NOT TO SCALE

PDI SIZE	PIPE SIZE	FIXTURE UNIT LOAD	FIXTURE UNIT TABULATION		
			COLD	HOT	
A	1/2"	1-11	VALVE WATER CLOSET	10	--
B	3/4"	12-32	TANK WATER CLOSET	5	--
C	1"	33-60	URINAL	5	--
D	1-1/4"	61-113	LAVATORY/SINK	1.5	1.5
E	1-1/2"	114-154	JANITOR'S SINK	3	3
F	2"	154-330	SHOWER/BATH/TUB	2	2

PC TO PROVIDE WATER HAMMER ARRESTERS BY SIOUX CHIEF, PRECISION PLUMBING PRODUCTS, WATTS OR APPROVED EQUIVALENT WITH PISTON AND O-RING CONSTRUCTION, HAVING PDI #WH-201, ASSE #1010 AND ANSI #A112.26.1M CERTIFICATION. INSTALL IN HORIZONTAL OR VERTICAL POSITION, BUT NEVER UPSIDE DOWN. INSTALL IN LINE WITH WATER FLOW DIRECTION IF POSSIBLE. SIZE THE UNITS AS SHOWN ON THE DRAWINGS AND/OR PER THE TABLES SHOWN ABOVE.

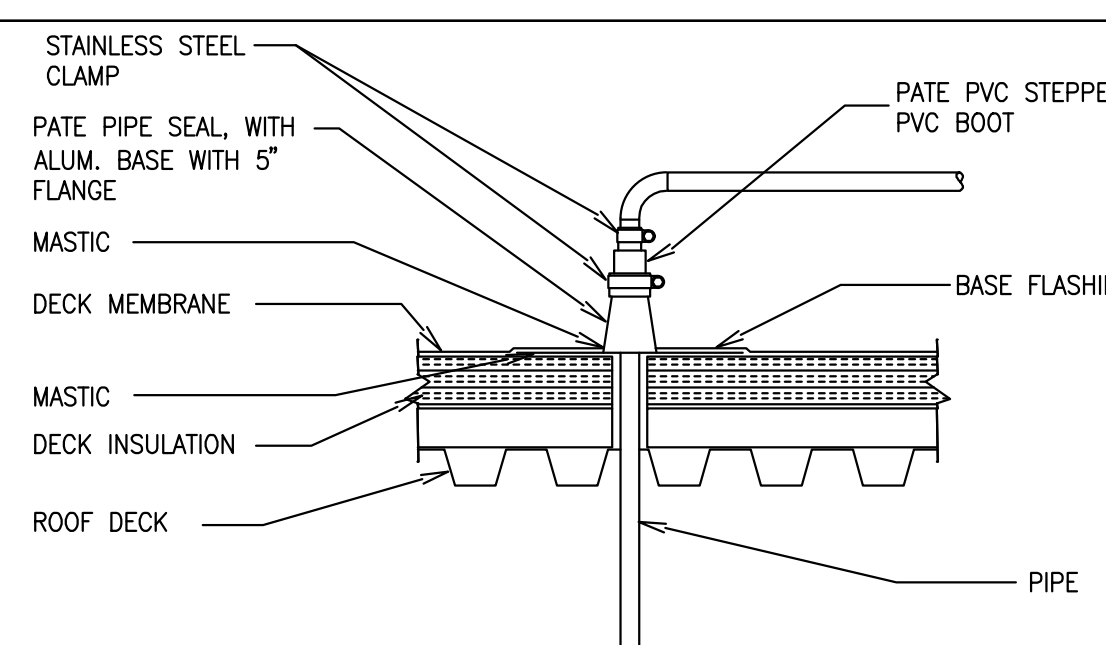
**WATER HAMMER ARRESTORS**

NOT TO SCALE

**GENERAL PLUMBING NOTES**

- CONTRACTOR SHALL VERIFY EXACT LOCATIONS OF ALL UTILITIES TO BE USED FOR POINTS OF CONNECTION PRIOR TO SUBMITTING BID AND START OF WORK, AND SHALL IMMEDIATELY NOTIFY THE ARCHITECT OF ANY DISCREPANCIES.
- FIXTURE: EXACT LOCATIONS, MOUNTING HEIGHTS AND COLORS OF PLUMBING FIXTURES SHALL BE OBTAINED FROM THE ARCHITECTURAL AND KITCHEN EQUIPMENT DRAWINGS.
- DISABLED ACCESS FIXTURES: SEE ARCHITECTURAL DRAWINGS FOR LOCATIONS AND MOUNTING HEIGHTS. INSTALLATION SHALL COMPLY WITH A.D.A. REQUIREMENTS.
- INTERFERENCE: ALL PLUMBING WORK SHALL BE INSTALLED SO AS TO AVOID STRUCTURAL FRAMING, MECHANICAL AND ELECTRICAL EQUIPMENT.
- CLEANOUTS: ALL CLEANOUTS SHALL BE INSTALLED WHERE READILY ACCESSIBLE, WHERE INDICATED AND AS REQUIRED BY CODE. THE CONTRACTOR SHALL COORDINATE ALL CLEAN OUTS LOCATIONS WITH EQUIPMENT, CABINETS, ETC., AND THE ARCHITECT PRIOR TO ANY INSTALLATION.
- VENT TERMINATION: ALL PLUMBING FIXTURE VENTS TO TERMINATE A MIN. OF 12 INCHES FROM ANY VERTICAL SURFACE AND 10 FEET FROM OR TERMINATED 3'-0" ABOVE ANY OUTSIDE AIR INTAKES.
- FULL SIZE: ALL VALVES, UNIONS, ETC. TO BE SAME SIZE AS LINE SIZE UNLESS OTHERWISE INDICATED ON DRAWINGS.
- LATERAL SUPPORT: ALL EQUIPMENT SHALL BE LATERALLY SUPPORTED IN ALL DIRECTIONS TO RESIST A MIN. OF 50% OF THE EQUIPMENT'S OPERATING WEIGHT.
- CODE COMPLIANCE: ALL WORK AND MATERIAL SHALL BE PERFORMED AND INSTALLED IN COMPLIANCE WITH THE FOLLOWING CODES AS ADOPTED AND AMENDED BY THE INSPECTING AUTHORITY. NOTHING IN THESE DRAWINGS IS TO BE CONSTRUED TO PERMIT WORK NOT CONFORMING TO THESE CODES OR OTHERS APPLICABLE TO THIS PROJECT:
  - INDIANA BUILDING CODE 2014 (ADOPTS IBC 2012)
  - INDIANA MECHANICAL CODE 2014 (ADOPTS IMC 2012)
  - INDIANA PLUMBING CODE 2012 (ADOPTS IPC 2006)
  - INDIANA FIRE CODE 2014 (ADOPTS IFC 2012)
  - INDIANA ENERGY CONSERVATION CODE (ADOPTS ASHRAE 90.1, 2007)
  - INDIANA FUEL GAS CODE 2014 (ADOPTS IFGC 2012)

- FIELD VERIFICATION: BEFORE FABRICATION OR INSTALLATION, THIS CONTRACTOR SHALL VERIFY EXACT LOCATIONS OF ALL MECHANICAL EQUIPMENT AND EQUIPMENT PROVIDED UNDER ANOTHER SECTION OF SPECIFICATIONS. EXACT ROUGH-IN LOCATIONS AND REQUIREMENTS SHALL BE COORDINATED IN FIELD.
- ISOMETRICS: THE CONTRACTOR SHALL PROVIDE ALL RISER DIAGRAMS OR ISOMETRICS THAT MAYBE REQUIRED BY GOVERNING AUTHORITIES.
- COORDINATION: THE PLUMBING CONTRACTOR SHALL COORDINATE ALL REQUIREMENTS FOR ALL POINTS OF CONNECTION WITH THE GENERAL CONTRACTOR AND OTHER TRADES PRIOR TO BID.
- PIPE SLOPE: ALL WASTE AND VENT PIPING SHALL SLOPE AT 2% UNLESS OTHERWISE INDICATED.
- ACCESSIBILITY: ALL VALVES, OR OTHER EQUIPMENT SHOWN IN WALLS OR ABOVE NON-ACCESSIBLE CEILINGS SHALL BE INSTALLED WITHIN 24" OF, AND BEHIND, AN ACCESS PANEL.
- SPECIFICATION: THESE DRAWINGS SHALL BE READ IN CONJUNCTION WITH, AND BE CONSIDERED TO BE A PART OF THE SPECIFICATIONS.
- PATCHING: THE CONTRACTOR SHALL BE RESPONSIBLE FOR PATCHING AND REPAIRING ALL AREAS WHICH ARE EXCAVATED AND/OR DAMAGED BY HIS OPERATIONS.
- EXISTING PIPING DAMAGED: ALL EXISTING PIPING DAMAGED DURING EXCAVATION SHALL BE REPAIRED WITH MATERIALS TO MATCH EXISTING BY THE CONTRACTOR.
- SAW CUTTING/CORE DRILLING: ALL CUTTING OF EXISTING PAVING, WALKS AND/OR FLOORS SHALL BE BY MACHINE SAW CUTTING. HOLES FOR PIPING IN CONCRETE WALLS OR FLOORS SHALL BE DONE USING CORE DRILLING EQUIPMENT.
- INCOMPATIBLE MATERIAL CONNECTION: CONNECTION BETWEEN INCOMPATIBLE MATERIALS ABOVE GRADE AND INSIDE BUILDING SHALL BE MADE WITH 2 DIELECTRIC UNIONS SEPARATED BY A 12" SECTION OF RED BRASS PIPE.
- SUBMITTALS AND SHOP DRAWINGS: THE PLUMBING CONTRACTOR SHALL SUBMIT SHOP DRAWING ON ALL WORK AND SUBMITTALS ON ALL FIXTURES, EQUIPMENT AND ACCESSORIES FOR REVIEW PRIOR TO ORDERING, FABRICATION AND INSTALLATION.

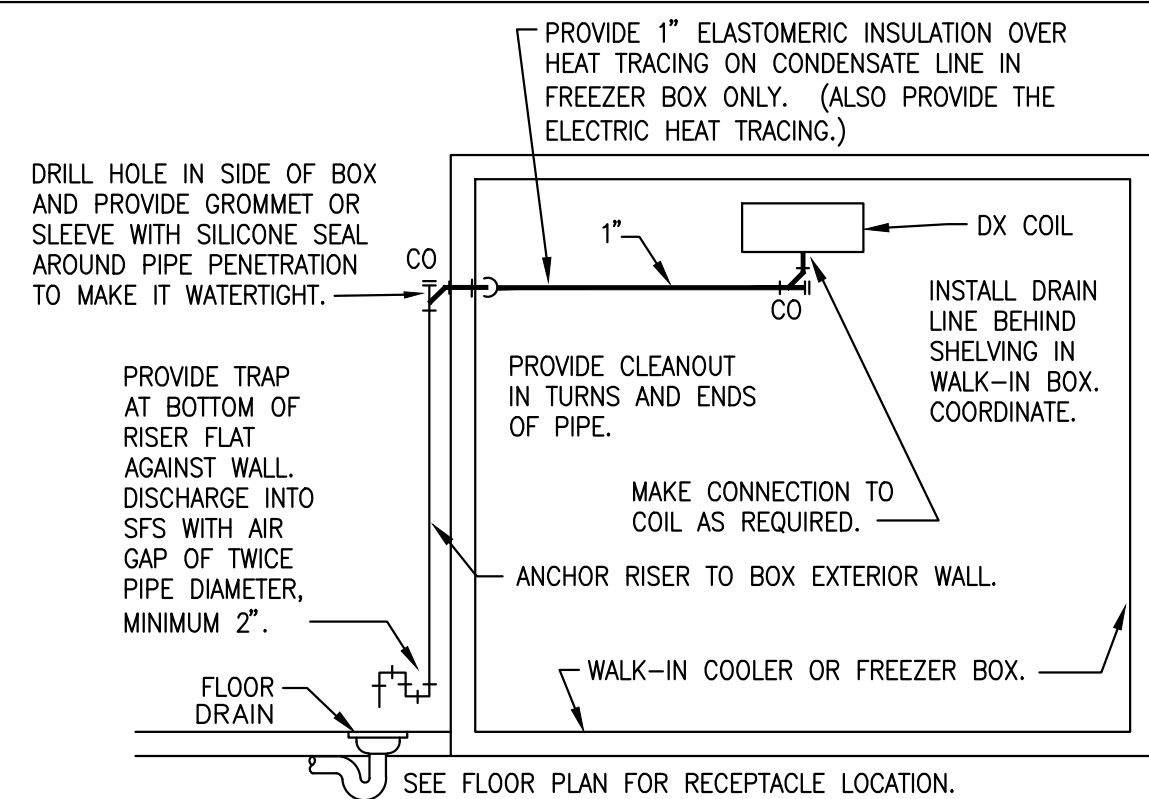


**PIPE ROOF PENETRATION DETAIL**

NO SCALE

- FIELD VERIFY ALL CONDITIONS**
- DESIGN DRAWINGS ARE SCHEMATIC. THIS CONTRACTOR SHALL VISIT THE SITE PRIOR TO BIDDING OR AWARD OF CONTRACT TO INSPECT EXISTING FIELD CONDITIONS. THIS CONTRACT SHALL INCLUDE ALL LABOR AND MATERIALS NECESSARY FOR FIELD MODIFICATIONS DUE TO EXISTING CONDITIONS.
  - THE CONTRACTOR SHALL CONTACT THE ARCHITECT, ENGINEER OR OWNER PRIOR TO BIDDING FOR INTERPRETATIONS AND CLARIFICATIONS OF THE DESIGN AND INCLUDE IN HIS BID ALL COSTS TO MEET THE DESIGN INTENT. CLARIFICATIONS MADE BY THE ARCHITECT, ENGINEER OR OWNER AFTER BIDDING WILL BE FINAL AND SHALL BE IMPLEMENTED AT CONTRACTORS COST.
  - BIDDING CONTRACTORS SHALL HAVE A WORKING KNOWLEDGE OF LOCAL CODES AND ORDINANCES AND SHALL INCLUDE IN THEIR BIDS THE COSTS FOR ALL WORK INSTALLED IN STRICT ACCORDANCE WITH GOVERNING CODES, THE PLANS AND SPECIFICATIONS NOT WITHSTANDING. THE CONTRACTOR SHALL ALERT ARCHITECT, ENGINEER OR OWNER OF ANY APPARENT DISCREPANCIES BETWEEN GOVERNING CODES AND DESIGN INTENT.

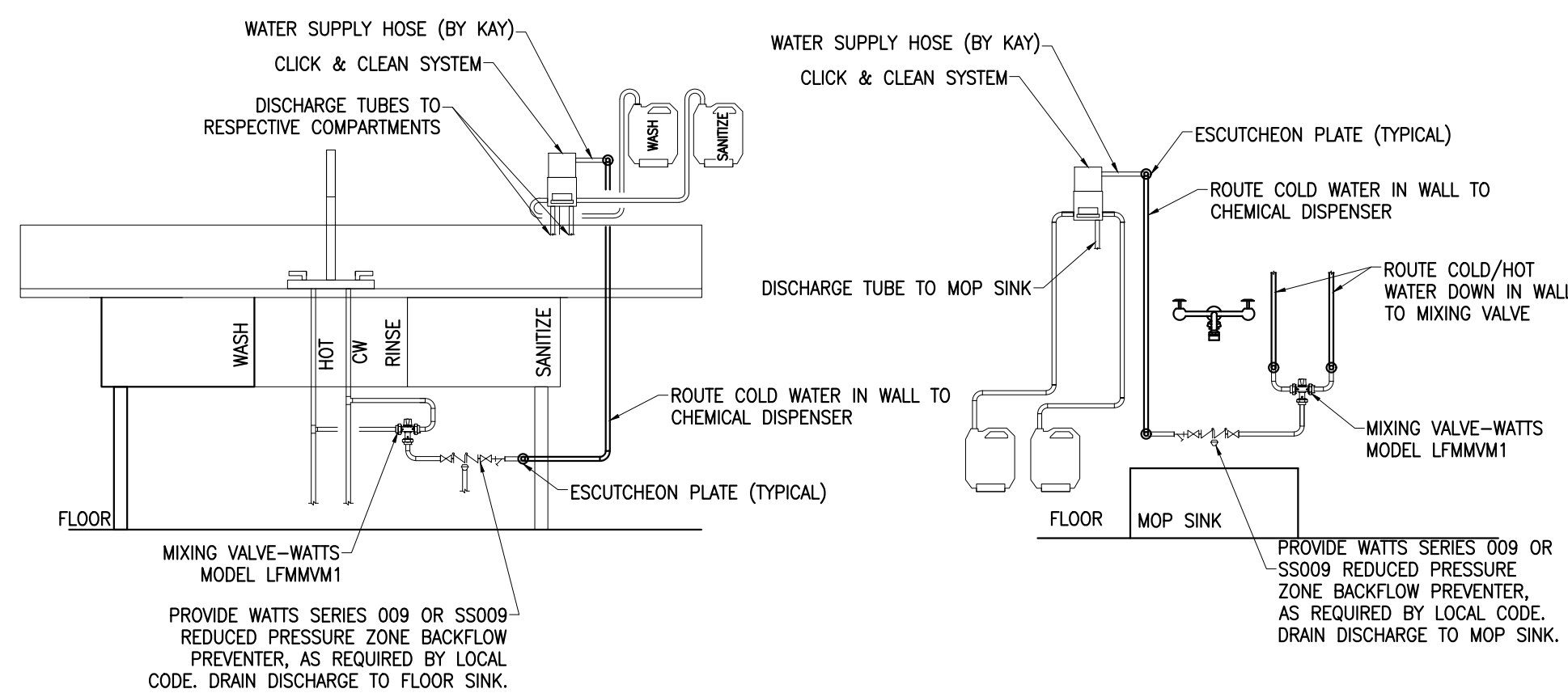




INSTALL PIPE HIGH AS POSSIBLE, ANCHORED TO WALL OF BOX WITH SUPPORTS AT MAXIMUM SIX FOOT CENTERS. USE TYPE "M" HARD COPPER TUBE AND FITTINGS WITH LEAD-FREE SOLDER JOINTS. SLOPE HORIZONTAL PIPE AT MINIMUM TWO PERCENT. PROVIDE CHROMATONE PAINT ON PIPE EXTERIOR TO BOX. REFER TO "INDIRECT DRAIN" DETAIL FOR OTHER REQUIREMENTS.

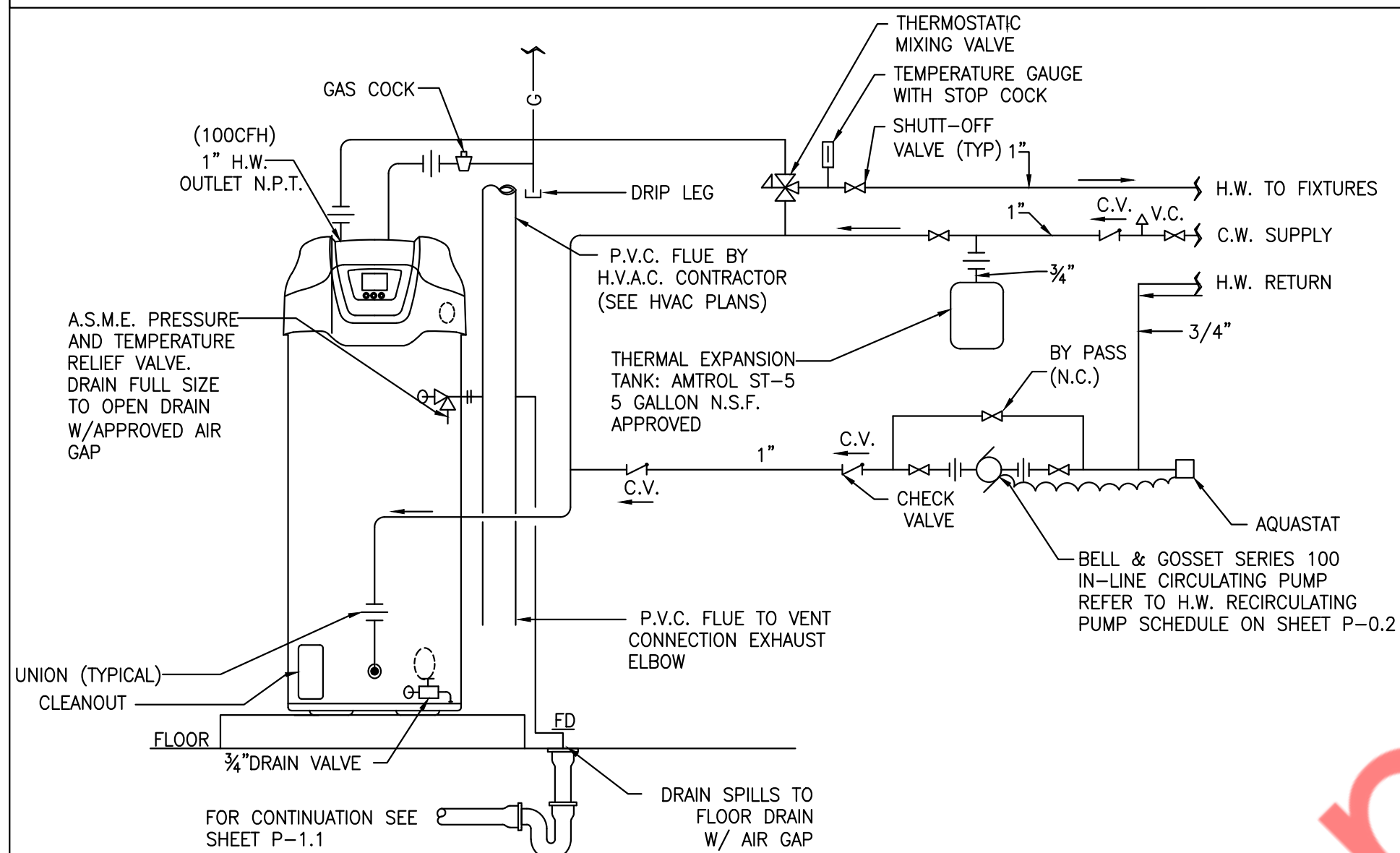
### WALK-IN BOX CONDENSATE DRAIN

NOT TO SCALE



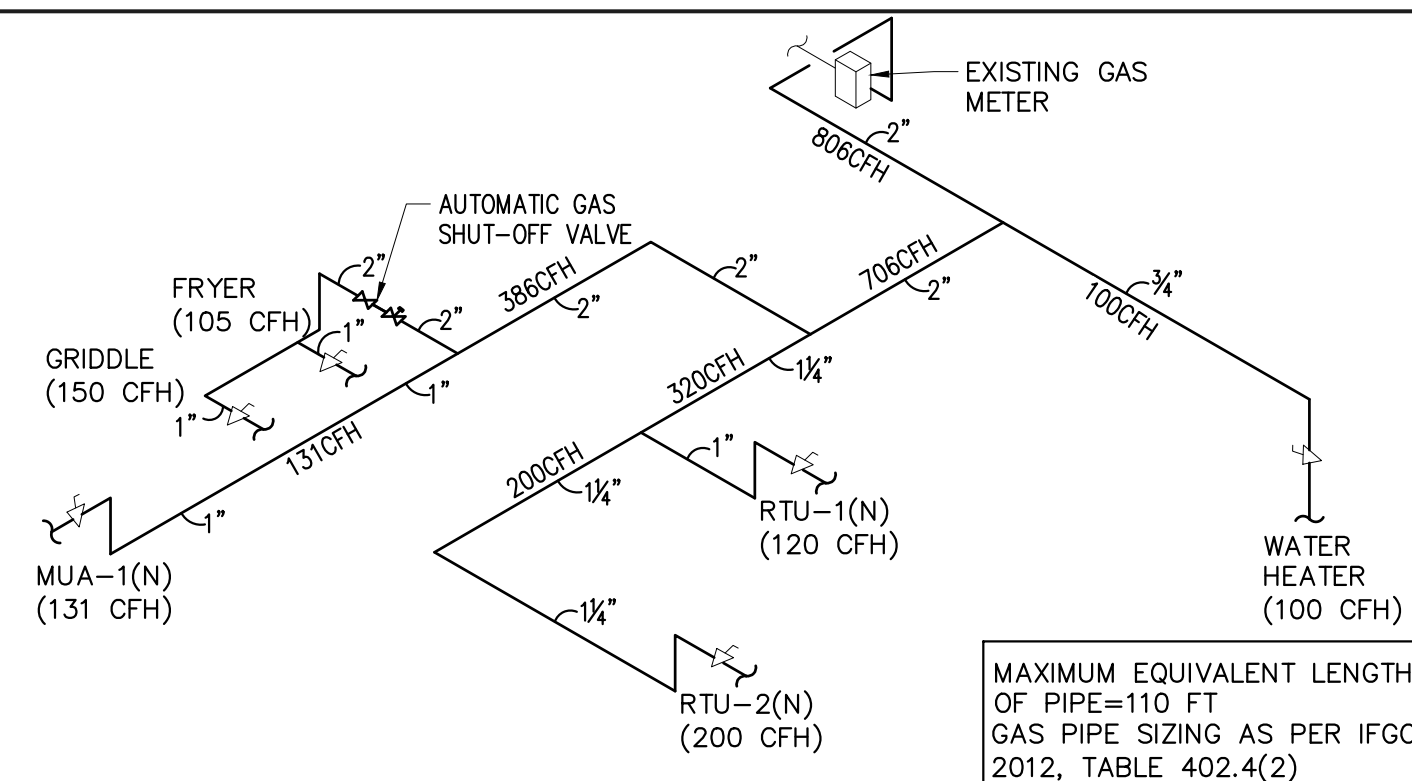
### CHEMICAL DISPENSER SYSTEM

NOT TO SCALE



### GAS FIRED HOT WATER HEATER

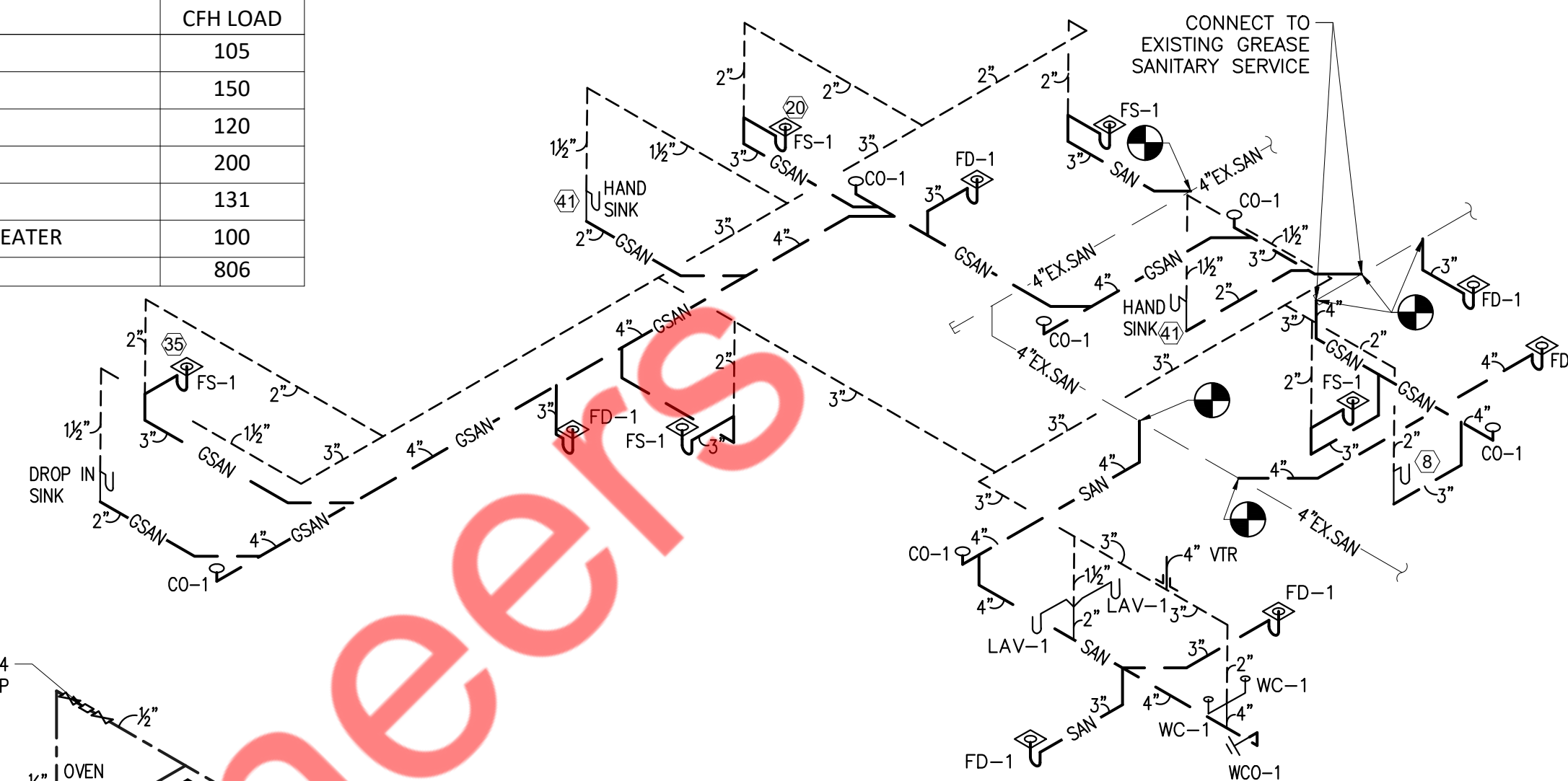
NOT TO SCALE



### GAS ISOMETRIC

NOT TO SCALE

GAS LOAD SUMMARY	
EQUIPMENT TAG	CFH LOAD
FRYER	105
GRIDDLE	150
RTU-1(N)	120
RTU-2(N)	200
MUA-1(N)	131
STORAGE WATER HEATER	100
<b>TOTAL LOAD</b>	<b>806</b>

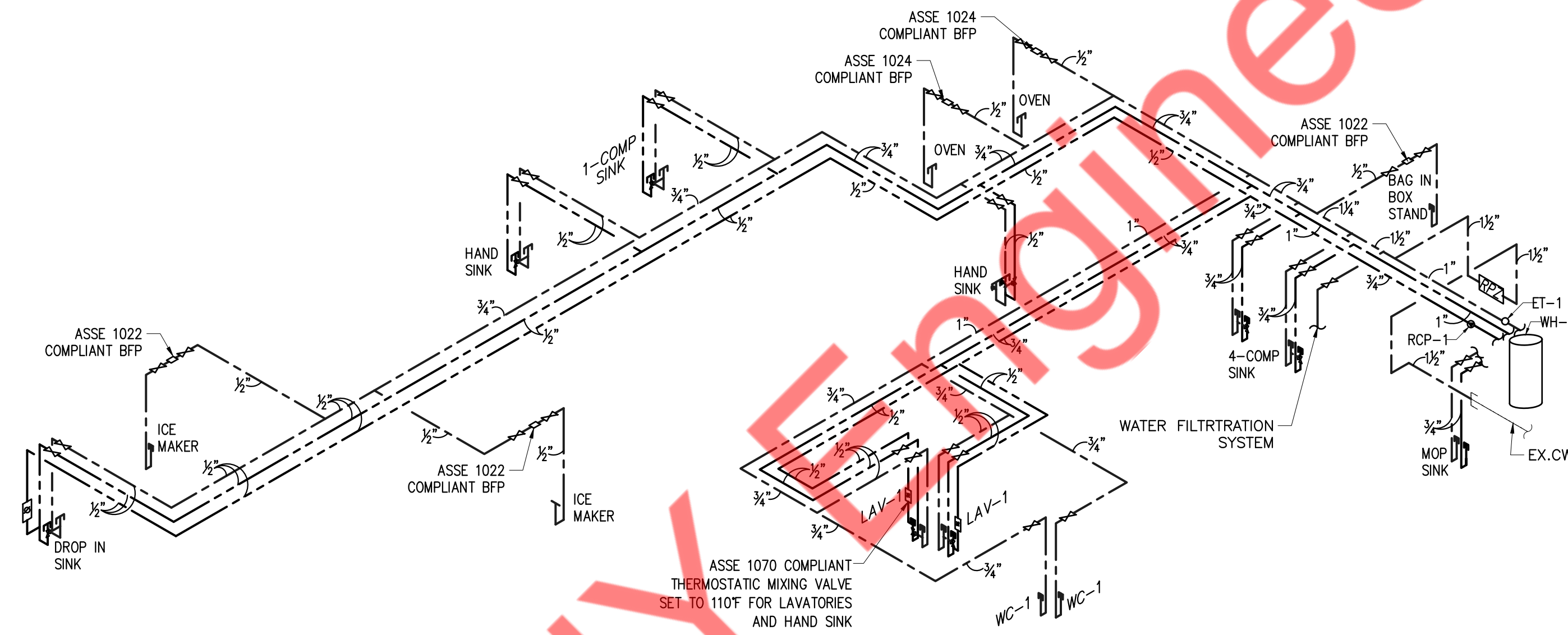


### SANITARY ISOMETRIC

NOT TO SCALE

#### SANITARY ISOMETRIC DIAGRAM GENERAL NOTES

1. ALL SANITARY PIPING TO BE 3" DIAMETER UNLESS STATED OTHERWISE.
2. ALL VENT PIPING TO BE 1-1/2" DIAMETER UNLESS STATED OTHERWISE.
3. CONNECT SANITARY & VENT PIPING TO EXISTING PIPING IN AREA. FIELD VERIFY EXACT TIE-IN LOCATIONS.



### WATER SUPPLY ISOMETRIC

NOT TO SCALE

HOT WATER HEATER								
TAG No.	QUANTITY	FIXTURES SERVING	CAPACITY	RECOVERY CAP. (GPM @ RISE)	TYPE	GAS		REMARKS
						BTU/H	MANUFACTURER & MODEL NO.	
WH-1	1	4 COMP SINK, 1 COMP SINK, DROP IN SINK, HAND SINK, MOP SINK, LAVATORY.	75 GAL	129 GPH @ 90°F	STORAGE WATER HEATER (GAS)	100,000	A.O SMITH GDHE-75	-DIMENSIONS 27-3/4"X66-3/4" H -GAS SHALL HAVE 3.5"W.C. TO 10.5"W.C. WORKING PRESSURE.

PLUMBING EQUIPMENT SCHEDULE								
ITEM NO.	QTY.	EQUIPMENT CATEGORY	GAS SIZE(N)	CFH	COLD WATER SIZE(N)	HOT WATER SIZE(N)	INDIRECT DRAIN SIZE	DIRECT DRAIN SIZE
17	1	4-COMPARTMENT SINK	-	-	3/4"	3/4"	2"	-
25	1	MOP SINK	-	-	1/2"	1/2"	-	3"
41	2	HAND SINK	-	-	1/2"	1/2"	-	2"
35	1	DROP IN SINK	-	-	1/2"	1/2"	-	2"
20	1	1-COMPARTMENT SINK	-	-	3/4"	3/4"	2"	-
7	1	SODA DISPENSER	-	-	-	-	1"	-
10	2	OVEN/PROOFER	-	-	1/2"	-	3/4"	-
24	1	ICE MAKER	-	-	1/2"	-	1/2"	-
21	1	BAG IN BOX	-	-	1/2"	-	-	-
WH-1	1	STORAGE WATER HEATER	3/4"	76	1"	1"	-	-

SEE KITCHEN EQUIPMENT PLAN FOR ADDITIONAL INFO

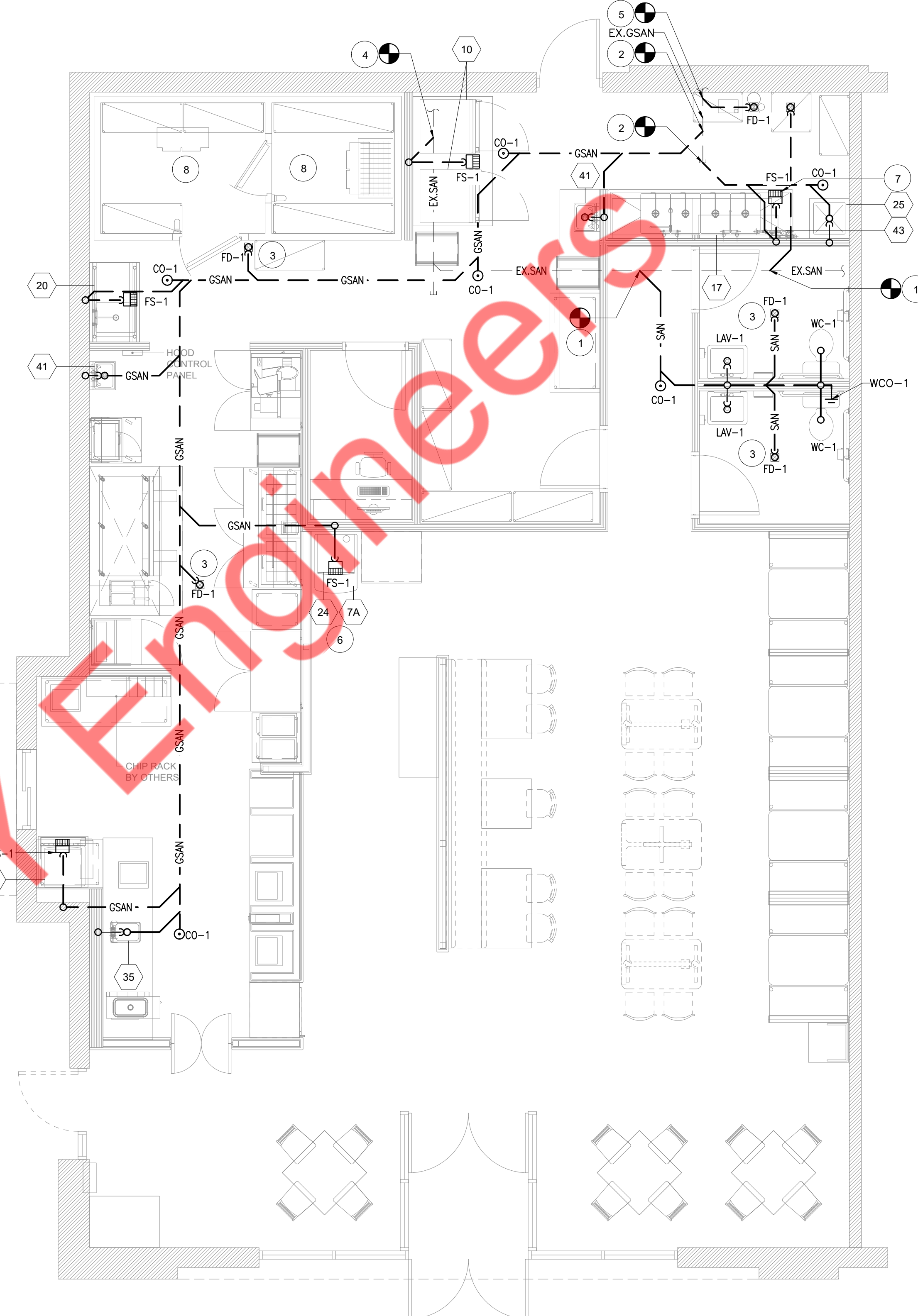
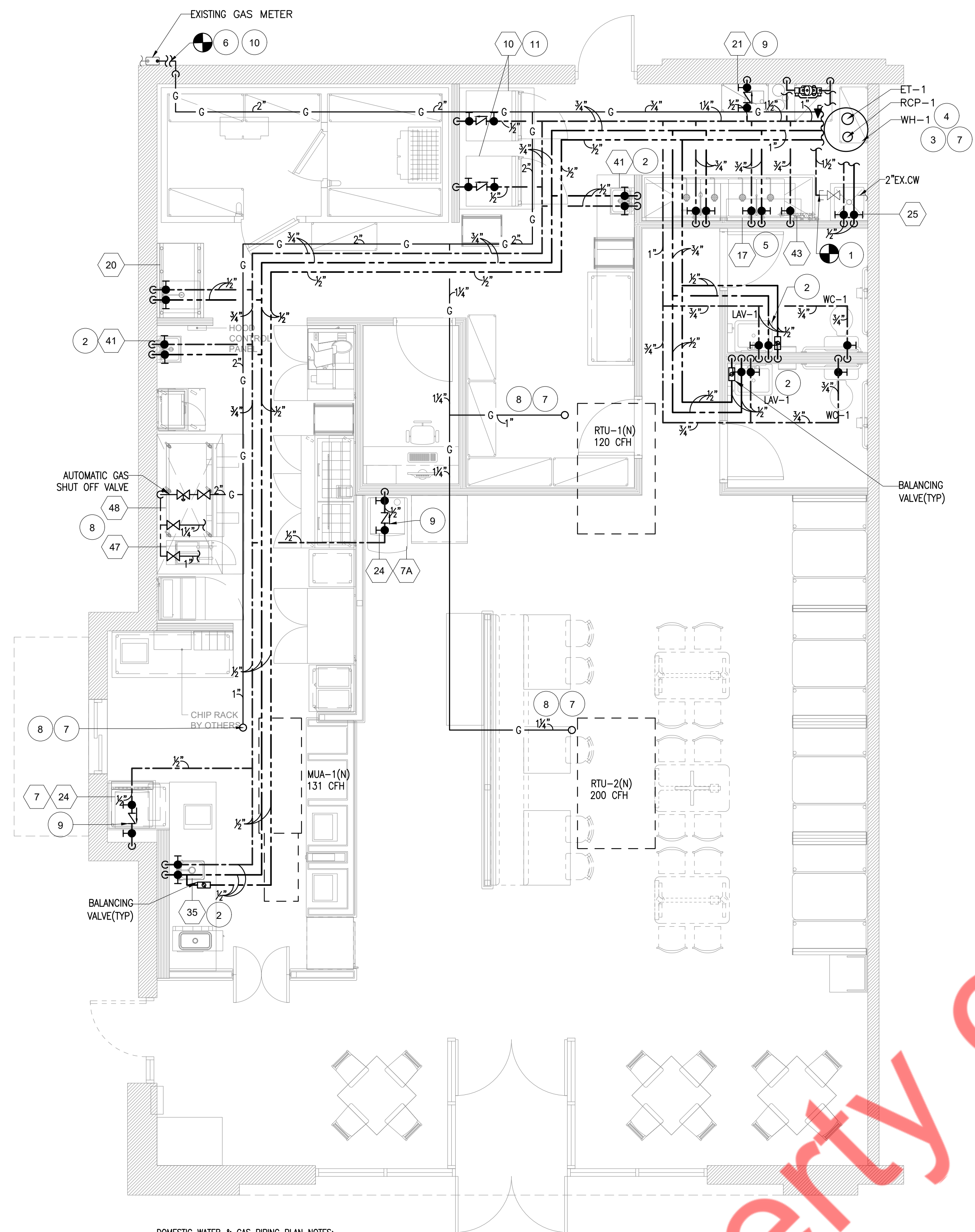
EXPANSION TANK SCHEDULE						
ITEM	LOCATION	SERVICE	CAPACITY (GALLONS)	MANUFACTURER	MODEL	WEIGHT
EXPANSION TANK (ET-1)	CELLAR	HOT WATER	2	THERM-X-TROL	ST-5	8"x13"

PUMP SCHEDULE													
TAG	SERVICE	LOCATION	PERFORMANCE DATA			PUMP CONSTRUCTION DATA		MOTOR DATA				REMARKS	
			GPM PER PUMP	TDH PER PUMP (FT)	WATER TEMP. (°F)	PUMP TYPE	MHP PER PUMP	STARTER TYPE	V/PH/Hz	RPM	ROTATION		MFR MODEL
RCP-1	HWR	ABOVE WH	2	8	120	INLINE, NORYL	1/12	AQUA STAT	115/1/60	1725	PER MFG	BELL & GOSSETT SERIES 100	-INLINE ON HW RETURN LINE AT WATER HEATER -PUMP SHOULD BE LEAD FREE

PLUMBING FIXTURE SCHEDULE							
LEGEND	PLUMBING FIXTURE	CONNECTION SIZE - INCHES					REMARKS
		SOIL/WASTE	VENT	COLD WATER	HOT WATER	THERMOSTATIC MIXING VALVE	
WC-1	FLOOR MOUNTED WATER CLOSET	4"	2"	3/4"	-	-	FLUSH TANK
LAV-1	LAVATORY	2"	1 1/2"	1/2"	1/2"	PROVIDE	-
FD-1	FLOOR DRAIN	3", 4"	-	-	-	-	-
FS-1	FLOOR SINK	3"	2"	-	-	-	-
CO-1	CLEAN OUT	3", 4"	-	-	-	-	-

NOTE: CONTRACTOR TO COORDINATE WITH ARCHITECTURAL DRAWINGS FOR ALL PLUMBING FIXTURES SPECIFICATIONS AND MOUNTING HEIGHT INSTALLATION.





**DOMESTIC WATER & GAS PIPING PLAN NOTES:**

- 1 CONNECT NEW 1-1/2" CW PIPING TO EXISTING 2" WATER STUB OUT. CONTRACTOR TO CONFIRM WATER SUBMETER, BACKFLOW PREVENTER REQUIREMENTS WITH LANDLORD. CONTRACTOR TO FIELD VERIFY SIZE, ROUTING AND LOCATION OF EXISTING PLUMBING SYSTEM PRIOR TO BID.
- 2 PROVIDE A TEMPERING VALVE FOR LAVATORIES AND HAND SINK. POWER HYDROGUARD SERIES LFLM495, ASSE 1070 OR EQUAL. SET TEMPERATURE TO A MAXIMUM OF 110°F.
- 3 1" CW/HW PIPING TO STORAGE WATER HEATERS. PLUMBING CONTRACTOR SHALL EXTEND WATER HEATERS FLUE TO EXTERIOR PER MANUFACTURER'S INSTRUCTIONS.
- 4 PROVIDE HOT WATER RECIRCULATION PUMP & STRAP ON AQUASTAT. INSTALL AQUASTAT ON FIXTURE FURTHEST AWAY FROM HOT WATER HEATER. EXTEND RECIRCULATION PIPING TO TANKLESS WATER HEATERS PER MANUFACTURER'S INSTRUCTIONS.
- 5 PROVIDE KITCHEN FAUCET HAND HELD SPRAYER WITH WATTS N9 SERIES DUAL CHECK VALVE VACUUM BREAKER (OR EQUAL) INSTALLED AFTER THE CONTROL VALVE.
- 6 CONTRACTOR TO VERIFY IF EXISTING GAS METER'S CAPACITY IS EQUAL TO OR GREATER THAN 850 CFH. COORDINATE ALL WORK WITH UTILITY COMPANY AND LANDLORD. EXTEND NEW GAS PIPING UP TO ROOFTOP TO EQUIPMENT AS SHOWN.
- 7 EXTEND GAS LINE TO MUA-1(N), RTU-1(N) & RTU-2(N) PROVIDE SHUTOFF VALVE, UNION AND DIRTLEG.
- 8 CONTRACTOR TO FIELD VERIFY EXISTING AVAILABLE GAS PRESSURE AND MAKE SURE TO PROVIDE ADEQUATE INLET PRESSURE REQUIRED FOR GAS FIRED WATER HEATER, RTU-1(N), RTU-2(N), MUA-1(N), GRIDDLE AND GAS FRYER.
- 9 PROVIDE ASSE-1022 APPROVED OR EQUIVALENT 1/2" BFP BY WATTS MODEL SD-3 OR EQUIVALENT. CONTRACTOR TO FIELD VERIFY AND INSTALL BFP AT AN ACCESSIBLE LOCATION.
- 10 CONNECT NEW 2" GAS TO EXISTING GAS MAIN IN THIS AREA FOR TENANT. EXTEND NEW PIPING AS INDICATED. FIELD VERIFY EXACT SIZE AND LOCATION OF EXISTING MAIN.
- 11 PROVIDE ASSE-1024 APPROVED OR EQUIVALENT 1/2" BFP BY WATTS MODEL LF-7 OR EQUIVALENT. CONTRACTOR TO FIELD VERIFY AND INSTALL BFP AT AN ACCESSIBLE LOCATION.

**SANITARY PIPING PLAN NOTES:**

- 1 CONNECT NEW 4" SANITARY LINE TO EXISTING SANITARY LINE IN SPACE. PLUMBING CONTRACTOR SHALL VERIFY EXACT LOCATION AND INVERT OF EXISTING SANITARY LINE. SAWCUT AND TRENCH FLOOR AS REQUIRED AND PATCH FLOOR TO MATCH EXISTING.
- 2 CONNECT NEW 4" GREASE SANITARY LINE TO EXISTING GREASE LINE IN SPACE. PLUMBING CONTRACTOR SHALL VERIFY EXACT LOCATION AND INVERT OF EXISTING GREASE SANITARY LINE. SAWCUT AND TRENCH FLOOR AS REQUIRED AND PATCH FLOOR TO MATCH EXISTING.
- 3 3/4" FLOOR DRAIN. PROVIDE WATERLESS SURESEAL TRAP SEALER FOR FLOOR DRAIN. COORDINATE EXACT LOCATION WITH ARCHITECT/OWNER.
- 4 CONNECT NEW 3" SANITARY LINE TO EXISTING SANITARY LINE IN SPACE. PLUMBING CONTRACTOR SHALL VERIFY EXACT LOCATION AND INVERT OF EXISTING SANITARY LINE. SAWCUT AND TRENCH FLOOR AS REQUIRED AND PATCH FLOOR TO MATCH EXISTING.
- 5 CONNECT NEW 3" GREASE SANITARY LINE TO EXISTING GREASE LINE IN SPACE. PLUMBING CONTRACTOR SHALL VERIFY EXACT LOCATION AND INVERT OF EXISTING GREASE SANITARY LINE. SAWCUT AND TRENCH FLOOR AS REQUIRED AND PATCH FLOOR TO MATCH EXISTING.
- 6 ROUTE INDIRECT WASTE FROM ICE MAKER AND SODA DISPENSER MACHINE TO FLOOR SINK WITH APPROVED AIR GAP.
- 7 ROUTE INDIRECT WASTE FROM WATER FILTRATION SYSTEM TO FLOOR SINK WITH APPROVED AIR GAP.
- 8 EXTEND CONDENSATE FOR WALK IN COOLER/FREEZER EVAPORATOR TO FUNNEL FLOOR DRAIN. SEE DETAIL ON SHEET P0.2 FOR ADDITIONAL INFORMATION.

**1 DOMESTIC WATER AND GAS PIPING PLAN**  
SCALE: 1/4" = 1'-0"

**2 SANITARY PIPING PLAN**  
SCALE: 1/4" = 1'-0"