

# MECHANICAL SYMBOLS LIST

EQUIPMENT SYMBOL		CONTROLS AND SENSORS	
	AC-1		THERMOSTAT
	TXF-1		TEMPERATURE SENSOR
	RISER SYMBOL		CO2 DETECTOR
AIR DEVICES			DUCT SMOKE DETECTOR
	CEILING DIFFUSER SUPPLY	DUCTWORK	
	CEILING DIFFUSER RETURN		AIR DUCT W/ 1.5" ACOUSTICAL LINING
	SIDEWALL/DUCT MOUNTED GRILLE-SUPPLY		FLEXIBLE DUCT
	SIDEWALL/DUCT MOUNTED GRILLE-RETURN		FLEXIBLE CONNECTION
DUCT ACCESSORIES			RECTANGULAR DUCT (WIDTH X DEPTH)
	BACK DRAFT DAMPER		ROUND DUCT (DIAMETER)
	FIRE DAMPER		ROUND DUCT CROSS SECTION
	MOTORIZED DAMPER W/ ACCESS DOOR		SUPPLY AIR RECTANGULAR DUCT CROSS SECTION
	VOLUME DAMPER W/ ACCESS DOOR		RETURN AIR RECTANGULAR DUCT CROSS SECTION

### 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.

### MECHANICAL DRAWING LIST

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### GEORGIA BUILDING DEPARTMENT NOTES

ALL WORK SHALL COMPLY WITH APPLICABLE SECTIONS OF 2018-IBC AND RULES AND REGULATIONS OF THE DEPARTMENT OF BUILDINGS TO DATE.

- THE CONTRACTOR SHALL ENGAGE THE SERVICES OF A PROFESSIONAL ENGINEER TO PROVIDE THE REQUIRED SPECIAL INSPECTIONS AND TESTS.
- 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 2018 INTERNATIONAL BUILDING CODE REQUIREMENTS AS OUTLINES IN SECTION.
- 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 THAT THE SYSTEM COMPLIES WITH THE CONSTRUCTION DOCUMENTS AND APPLICABLE LAWS.
- TESTS OF MECHANICAL SYSTEMS SHALL BE PERFORMED IN ACCORDANCE WITH SECTION 2018 IMC 107 AND THE FOLLOWING SECTIONS OF THE 2018 IMC:
  - MECHANICAL VENTILATION - SECTION 403.
- THE FOLLOWING WORK ITEMS, COMPONENTS, MATERIALS, CAPACITIES, ETC. SHALL COMPLY WITH THE REFERENCED CODE OR STANDARD:
  - STANDARDS OF HEATING - 2018 IMC 309.1
  - DUCT CONSTRUCTION AND INSTALLATION- 2018 IMC 603
  - AIR INTAKES, EXHAUSTS AND RELIEFS - 2018 IMC 401.5
  - AIR FILTERS - 2018 IMC 605
- INTERIOR SPACES INTENDED FOR HUMAN OCCUPANCY SHALL BE CAPABLE OF MAINTAINING A MINIMUM OF 68 DEG. F AT A POINT 3 FEET ABOVE THE FLOOR.
- VENTILATION FOR ALL AREA SHALL COMPLY WITH 2018 IMC 401.
- 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 2018 IMC 403.3
- REFER TO ARCHITECTURAL DRAWINGS FOR REQUIRED FIRE-RATED WALL AND SMOKE WALL CONSTRUCTION AND LOCATION.
- 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.
- MECHANICAL SYSTEMS SHALL BE COMMISSIONED PER IECC 2015 C403.2.2, C408.2.1, C408.2.5 FINAL COMMISSIONING REPORT SHALL BE DUE WITHIN 90 DAYS OF RECEIPT OF CERTIFICATE OF OCCUPANCY.
- A COMMISSIONING PLAN SHALL BE DEVELOPED BY A LICENSED DESIGN PROFESSIONAL, MECHANICAL ENGINEER OR APPROVED AGENCY.
- A PRELIMINARY REPORT OF COMMISSIONING TEST PROCEDURES AND RESULTS SHALL BE COMPLETED AND CERTIFIED BY THE LICENSED DESIGN PROFESSIONAL, ELECTRICAL ENGINEER, MECHANICAL ENGINEER OR APPROVED AGENCY AND PROVIDED TO THE BUILDING OWNER OR OWNER'S AUTHORIZED AGENT AS PER IECC 2015, C408.2.4.
- A WRITTEN REPORT DESCRIBING THE ACTIVITIES AND MEASUREMENTS COMPLETED IN ACCORDANCE WITH SECTION IECC 2015, C408.2.2.
- ALL HEATING AND COOLING LOADS CALCULATED PER ASHRAE/ACCA 183.
- SMOKE DETECTOR SHALL MEET UL268A.
- SMOKE DETECTION SYSTEMS SHALL BE INSTALLED AND SEQUENCED TO FOLLOW CONTROLS OPERATIONS WITH THE REQUIREMENTS OF SECTION 606, 2018 INTERNATIONAL MECHANICAL CODE TO CLOSE DAMPERS AND AUTOMATICALLY STOP THE FAN.

### GENERAL NOTES

- CONTRACTOR SHALL SURVEY THE AREA OF THIS WORK BEFORE SUBMITTING A BID AND SHALL BE RESPONSIBLE FOR NOTIFYING THE ARCHITECT OF ANY CONDITIONS WHICH WOULD PREVENT THE INSTALLATION OF THE WORK AS SHOWN ON DRAWINGS.
- ALL APPLICABLE CODES, LAWS AND REGULATIONS GOVERNING OR RELATING TO ANY PORTION OF THIS WORK ARE HEREBY INCORPORATED INTO AND MADE A PART OF THESE SPECIFICATIONS, AND THEIR PROVISIONS SHALL BE CARRIED OUT BY THE CONTRACTOR WHO SHALL INFORM THE OWNER, PRIOR TO SUBMITTING A PROPOSAL, OF ANY WORK OR MATERIALS WHICH VIOLATE ANY OF THE ABOVE LAWS AND REGULATIONS. ANY WORK DONE BY THE CONTRACTOR CAUSING SUCH VIOLATION SHALL BE CORRECTED BY THE CONTRACTOR.
- BEFORE PROCEEDING WITH ANY WORK IN OCCUPIED OR USED AREAS, THE CONTRACTOR SHALL APPLY TO OWNER FOR PERMISSION TO ENTER SUCH AREAS. THE CONTRACTOR IS OBLIGED TO PERFORM HIS WORK ONLY AT THE TIMES DESIGNATED BY OWNER. THERE WILL BE NO ADDITIONAL COMPENSATION FOR THE WORK PERFORMED AFTER HOURS OR ON OFF-DAYS WITHOUT PRIOR WRITTEN APPROVAL.
- THE WORK IN THE BUILDING SHALL BE DONE WHEN AND AS DIRECTED, AND IN A MANNER SATISFACTORY TO THE OWNER. THE WORK SHALL BE PERFORMED SO AS TO CAUSE THE LEAST POSSIBLE INCONVENIENCE AND DISTURBANCE TO THE PRESENT OCCUPANTS.

- THE CONTRACTOR'S PROPOSAL FOR ALL WORK SHALL BE PREDICATED ON THE PERFORMANCE OF THE WORK DURING REGULAR WORKING HOURS. WHEN SO DIRECTED, HOWEVER, THE CONTRACTOR SHALL INSTALL WORK IN OVERTIME AND THE ADDITIONAL COST TO BE CHARGED THEREFORE SHALL BE ONLY THE "PREMIUM" PORTION OF THE WAGES PAID.
- CONTRACTOR SHALL ASCERTAIN THE APPROPRIATE METHOD FOR BRINGING THE UNITS INTO AND THROUGH THE BUILDING TO POSITION UNIT IN LOCATION SHOWN ON THE PLANS. WHERE NECESSARY, EQUIPMENT SHALL BE SHIPPED FROM MANUFACTURER IN SECTIONS OF SIZE SUITABLE FOR MOVING THROUGH RESTRICTIVE SPACES. COORDINATE WITH BUILDING OWNER APPROPRIATE TIMES OF DAY SUCH EQUIPMENT MAY BE MOVED THROUGH ALL AREAS.
- REMOVAL AND RELOCATION OF CERTAIN EXISTING WORK WILL BE NECESSARY FOR THE PERFORMANCE OF THE GENERAL WORK. ALL EXISTING CONDITIONS CANNOT BE COMPLETELY DETAILED ON THE DRAWINGS. THE CONTRACTOR SHALL SURVEY THE SITE AND INCLUDE ALL CHANGES IN MAKING UP THE WORK PROPOSAL.
- DISCONNECT, REMOVE AND/OR RELOCATE EXISTING MATERIAL, EQUIPMENT AND OTHER WORK AS NOTED OR REQUIRED FOR PROPER INSTALLATION OF NEW SYSTEM.
- CONNECT NEW WORK TO EXISTING WORK IN NEAT AND APPROVED MANNER. RESTORE EXISTING WORK DISTURBED WHILE INSTALLING NEW WORK TO ACCEPTABLE CONDITION AS DETERMINED BY ARCHITECT.
- PLAN INSTALLATION OF NEW WORK AND CONNECTIONS TO EXISTING WORK TO INSURE MINIMUM INTERFERENCE WITH REGULAR OPERATION OF EXISTING FACILITIES. ALL SYSTEM SHUTDOWNS AFFECTING OTHER AREAS SHALL BE COORDINATED WITH BUILDING OWNER. INSTALL ISOLATION VALVES AT POINT OF CONNECTION TO THE EXISTING PIPING. PROVIDE TEMPORARY DUCT CAPS AND/OR CONNECTIONS TO MINIMIZE SHUTDOWN TIME.
- SUPPORT ALL DUCTWORK AND PIPING FROM BUILDING STRUCTURE AND/OR FRAMING IN AN APPROVED MANNER. WHERE OVERHEAD CONSTRUCTION DOES NOT PERMIT FASTENING OR SUPPORTS FOR EQUIPMENT, FURNISH ADDITIONAL FRAMING. INSERTS SHALL BE STEEL, SLOTTED TYPE AND FACTORY PAINTED. SINGLE ROD SHALL BE SIMILAR TO GRINNELL FIG. 281. MULTI-ROD SHALL BE SIMILAR TO FEE & MASON SERIES 9000 WITH END CAPS AND CLOSURE STRIPS. MAXIMUM LOADING INCLUDING PIPES, DUCTWORK, CONTENTS AND COVERING SHALL NOT EXCEED 75% OF RATED INSERT CAPABILITY. WHEN SUPPORTING FROM BUILDING USE BEAM CLAMPS IN APPROVED MANNER.
- PROVIDE ALL NECESSARY FLASHING AND COUNTER FLASHING TO MAINTAIN THE WATERPROOFING INTEGRITY OF THIS BUILDING AS REQUIRED BY THE INSTALLATION OR REMOVAL OF PIPES, DUCTS, LOUVERS, CONDUIT, AND EQUIPMENT. PROVIDE EQUIPMENT CURBS AND DUNNAGE STEEL AS REQUIRED.
- SEAL OPENINGS AROUND DUCTS AND PIPING THROUGH PARTITIONS, WALLS AND FLOORS (NOT IN SHAFTS) WITH MINERAL WOOL OR OTHER NONCOMBUSTIBLE MATERIAL (FIBERGLASS INSULATION IS NOT ACCEPTABLE).
- WHERE PENETRATIONS THROUGH FIRE RATED WALLS ARE NOT FIRE PROOFED THIS CONTRACTOR SHALL BE RESPONSIBLE TO SEAL SAME TO MAINTAIN THE RATED INTEGRITY.
- INSTALL WORK SO AS TO BE READILY ACCESSIBLE FOR OPERATION, MAINTENANCE AND REPAIR. MINOR DEVIATIONS FROM DRAWINGS MAY BE MADE TO ACCOMPLISH THIS, BUT CHANGES WHICH INVOLVE EXTRA COST SHALL NOT BE MADE WITHOUT APPROVAL.
- ACCESS DOORS ARE REQUIRED FOR ALL BUILDING SERVICE VALVES THAT RUN THROUGH THE SPACE, AND ACCESS DOOR SHALL HAVE THE EQUAL RATED CAPACITY (1HR, 2HR, ETC.) AS WALL. COORDINATE ALL LOCATIONS OF ACCESS DOORS WITH THE ARCHITECT.
- REMOVABLE ACCESS TILE AND/OR ACCESS DOOR ARE REQUIRED IN HUNG CEILINGS, SHAFTS AND WALLS FOR ALL VOLUME AND FIRE DAMPERS, AUTOMATIC DAMPERS AND ALL OTHER MECHANICAL EQUIPMENT AND DEVICES. HVAC CONTRACTOR TO FURNISH ACCESS LOCATION REQUIREMENTS TO GENERAL CONTRACTOR. ACCESS TILE IDENTIFICATION: PROVIDE BUTTONS, TABS, AND MARKERS TO IDENTIFY LOCATION OF CONCEALED VALVES, DAMPERS AND EQUIPMENT.
- THE CONTRACTOR SHALL KEEP ALL EQUIPMENT AND MATERIALS, AND ALL PARTS OF THE BUILDING, EXTERIOR SPACES AND ADJACENT STREETS, SIDEWALKS AND PAVEMENTS, FREE FROM MATERIAL AND DEBRIS RESULTING FROM THE EXECUTION OF THIS WORK. EXCESS MATERIALS WILL NOT BE PERMITTED TO ACCUMULATE EITHER ON THE INTERIOR OR THE EXTERIOR.
- UNLESS OTHERWISE SPECIFICALLY SPECIFIED, INCLUDE ALL CUTTING AND PATCHING OF EXISTING FLOORS, WALLS, PARTITIONS AND OTHER MATERIALS IN THE EXISTING BUILDING. THE CONTRACTOR SHALL RESTORE THESE AREAS TO ORIGINAL CONDITION.
- MATERIALS AND WORKMANSHIP, UNLESS OTHERWISE NOTED, SHALL BE IN ACCORDANCE WITH BUILDING STANDARDS.
- ALL EQUIPMENT SHALL BE PROVIDED WITH ONE YEAR WARRANTY PARTS AND LABOR AND FIVE YEARS ON COMPRESSORS. WARRANTY PERIOD BEGINS UPON PROJECT ACCEPTANCE
- ALL MATERIAL AND EQUIPMENT TO BE NEW UNLESS OTHERWISE NOTED AND SHALL BE IN ACCORDANCE WITH BUILDING STANDARDS.
- THE CONTRACTOR SHALL BE RESPONSIBLE FOR HIS WORK WITH ITS COMPLETION AND FINAL ACCEPTANCE AND SHALL REPLACE ANY OF THE SAME WHICH MAY BE DAMAGED, LOST, OR STOLEN WITHOUT ADDITIONAL COST TO THE OWNER.

- THE CONTRACTOR SHALL BE RESPONSIBLE FOR THE FAILURE OF ANY DUCTWORK SYSTEM OR EQUIPMENT TO FUNCTION PROPERLY UPON COMPLETION OF HIS WORK UPON SAID SYSTEM OR EQUIPMENT.
- SUBMIT SHOP DRAWING OF ALL WORK WHICH MUST BE APPROVED BY THE ARCHITECT AND ENGINEER BEFORE WORK COMMENCES.
- ALL MATERIAL AND EQUIPMENT TO BE NEW UNLESS OTHERWISE NOTED AND SHALL BE IN ACCORDANCE WITH BUILDING STANDARDS.
- SUBMISSION OF A PROPOSAL SHALL BE CONSTRUED AS EVIDENCE THAT A CAREFUL EXAMINATION OF THE PORTIONS OF THE EXISTING BUILDING, EQUIPMENT, ETC., WHICH AFFECT THIS WORK, AND THE ACCESS TO SUCH SPACES, HAS BEEN MADE AND THAT THE CONTRACTOR IS FAMILIAR WITH EXISTING CONDITIONS AND DIFFICULTIES THAT WILL AFFECT THE EXECUTION OF THE WORK. LATER CLAIMS SHALL NOT BE MADE FOR LABOR, EQUIPMENT OR MATERIALS REQUIRED BECAUSE OF DIFFICULTIES ENCOUNTERED WHICH COULD HAVE BEEN FORESEEN DURING SUCH AN EXAMINATION. THE ON-SITE INSPECTION SHALL VERIFY EXISTING DUCTWORK, PIPING (SIZES, CLEARANCES, ETC) AND CONDITIONS.
- INSURANCE: IN ACCORDANCE WITH BUILDING REQUIREMENTS THE CONTRACTOR SHALL INCLUDE A HOLD HARMLESS CLAUSE FOR OWNER AND ENGINEER.
- THE FINAL ACCEPTANCE WILL BE MADE AFTER THE CONTRACTOR HAS ADJUSTED HIS EQUIPMENT, BALANCED THE VARIOUS SYSTEMS, DEMONSTRATED THAT IT FULFILLS THE REQUIREMENTS OF THE DRAWINGS AND SPECIFICATIONS AND HAS FURNISHED ALL THE REQUIRED CERTIFICATES OF INSPECTION AND APPROVAL.
- SPECIFICATIONS ARE OF SIMPLIFIED FORM AND INCLUDE INCOMPLETE SENTENCES. WORDS OR PHRASES SUCH AS "THE CONTRACTOR SHALL," "SHALL BE," "FURNISH," "PROVIDE," "A," "THE," AND "ALL" HAVE BEEN OMITTED FOR BREVITY.
- WHERE A CONFLICT EXISTS BETWEEN THE DRAWINGS, THE SPECIFICATIONS OR ANY OTHER CONSTRUCTION DOCUMENT, THE ONE WITH THE MOST STRINGENT REQUIREMENT(S) SHALL APPLY.

### DEFINITIONS:

- "PROVIDE": TO SUPPLY, INSTALL AND CONNECT UP COMPLETE AND READY FOR SAFE AND REGULAR OPERATION THE PARTICULAR WORK REFERRED TO UNLESS SPECIFICALLY OTHERWISE NOTED.
- "INSTALL": TO ERECT, MOUNT AND CONNECT COMPLETE WITH RELATED ACCESSORIES.
- "FURNISH" OR "SUPPLY": TO PURCHASE, PROCURE, ACQUIRE AND DELIVER COMPLETE WITH RELATED ACCESSORIES.

### SCOPE OF WORK

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- THE WORK UNDER CONTRACT INCLUDES ALL LABOR, MATERIALS AND APPLIANCES NECESSARY FOR THE FURNISHING, INSTALLING AND TESTING, COMPLETE AND READY FOR SAFE OPERATION OF THE SYSTEMS AS DESCRIBED IN THE SPECIFICATIONS, FLOOR PLAN(S) DESIGN, DETAIL DRAWINGS, NOTES, RFI'S, ETC. FOR THIS PROJECT. WORK SHALL BE INSTALLED IN A NEAT, WORKMANLIKE MANNER.
- THE CONTRACTOR SHALL GIVE NECESSARY NOTICE, FILE DRAWINGS AND SPECIFICATIONS WITH THE DEPARTMENT HAVING JURISDICTION, OBTAIN PERMITS OR LICENSES NECESSARY TO CARRY OUT THIS WORK AND PAY ALL FEES THEREFORE. THE CONTRACTOR SHALL ARRANGE FOR INSPECTION AND TESTS OF ANY OR ALL PARTS OF THE WORK IF SO REQUIRED BY AUTHORITIES AND PAY ALL CHARGES FOR SAME. THE CONTRACTOR SHALL PAY ALL COSTS FOR, AND FURNISH TO THE OWNER BEFORE FINAL BILLING, ALL CERTIFICATES NECESSARY AS EVIDENCE THAT THE WORK INSTALLED CONFORMS WITH ALL REGULATIONS WHERE THEY APPLY TO THIS WORK.
- THE CONTRACTOR SHALL FURNISH A WRITTEN GUARANTEE TO REPLACE OR REPAIR PROMPTLY AND ASSUME RESPONSIBILITY FOR ALL EXPENSES INCURRED FOR ANY WORKMANSHIP AND EQUIPMENT IN WHICH DEFECTS DEVELOP WITHIN ONE YEAR FROM THE DATE OF FINAL CERTIFICATE FOR PAYMENT AND/OR FROM DATE OF ACTUAL USE OF EQUIPMENT OR OCCUPANCY OF SPACES, BY OWNER, INCLUDED UNDER THE VARIOUS PARTS OF THE WORK, WHICHEVER DATE IS EARLIER. THIS WORK SHALL BE DONE AS DIRECTED BY THE OWNER. THIS GUARANTEE SHALL ALSO PROVIDE THAT WHERE DEFECTS OCCUR, THE CONTRACTOR WILL ASSUME RESPONSIBILITY FOR ALL EXPENSES INCURRED IN REPAIRING AND REPLACING WORK OF OTHER TRADES AFFECTED BY DEFECTS, REPAIRS OR REPLACEMENTS IN EQUIPMENT SUPPLIED BY THE CONTRACTOR.



## GENERAL HVAC NOTES

### GENERAL:

- PROVIDE ALL MATERIAL AND EQUIPMENT AND PERFORM ALL LABOR REQUIRED TO INSTALL COMPLETE AND OPERABLE MECHANICAL SYSTEMS AS INDICATED ON THE DRAWINGS, AS SPECIFIED AND AS REQUIRED BY CODE.
- CONTRACT DOCUMENT DRAWINGS FOR MECHANICAL WORK (HVAC, PLUMBING, AND FIRE PROTECTION) ARE DIAGRAMMATIC AND ARE INTENDED TO CONVEY SCOPE AND GENERAL ARRANGEMENT ONLY.
- THE LOCATIONS OF ALL ITEMS SHOWN ON THE DRAWINGS OR CALLED FOR IN THE SPECIFICATIONS THAT ARE NOT FIXED BY DIMENSIONS ARE APPROXIMATE ONLY. THE EXACT LOCATIONS NECESSARY TO SECURE THE BEST CONDITIONS AND RESULTS MUST BE DETERMINED BY THE PROJECT SITE CONDITIONS AND SHALL HAVE THE APPROVAL OF THE ENGINEER BEFORE BEING INSTALLED. DO NOT SCALE DRAWINGS.
- WHEN MECHANICAL WORK (HVAC, PLUMBING, SHEET METAL, FIRE PROTECTION, ETC.) IS SUBCONTRACTED, IT SHALL BE THE MECHANICAL CONTRACTOR'S RESPONSIBILITY TO COORDINATE SUBCONTRACTORS AND THE ASSOCIATED CONTRACTS. WHEN DISCREPANCIES ARISE PERTAINING TO WHICH CONTRACTOR PROVIDES A PARTICULAR ITEM OF THE MECHANICAL CONTRACT OR WHICH CONTRACTOR PROVIDES FINAL CONNECTIONS FOR A PARTICULAR ITEM OF THE MECHANICAL CONTRACT, IT SHALL BE BROUGHT TO THE ATTENTION OF THE MECHANICAL CONTRACTOR, WHOSE DECISION SHALL BE FINAL.
- COORDINATE CONSTRUCTION OF ALL MECHANICAL WORK WITH ARCHITECTURAL, STRUCTURAL, CIVIL, ELECTRICAL WORK, ETC., SHOWN ON OTHER CONTRACT DOCUMENT DRAWINGS.
- INSTALL ALL MECHANICAL EQUIPMENT AND APPURTENANCES IN ACCORDANCE WITH MANUFACTURER'S RECOMMENDATIONS, CONTRACT DOCUMENTS, AND APPLICABLE CODES AND REGULATIONS.
- WHERE TWO OR MORE ITEMS OF THE SAME TYPE OF EQUIPMENT ARE REQUIRED, THE PRODUCT OF ONE MANUFACTURER SHALL BE USED.
- COORDINATE ALL EQUIPMENT CONNECTIONS WITH MANUFACTURERS' CERTIFIED DRAWINGS. COORDINATE AND PROVIDE ALL DUCT AND PIPING TRANSITIONS REQUIRED FOR FINAL EQUIPMENT CONNECTIONS TO FURNISHED EQUIPMENT. FIELD VERIFY AND COORDINATE ALL DUCT AND PIPING DIMENSIONS BEFORE FABRICATION.
- ALL CONTROL WIRE AND CONDUIT SHALL COMPLY WITH THE NATIONAL ELECTRIC CODE AND ELECTRICAL DIVISION OF THE SPECIFICATION.
- PROVIDE VIBRATION ISOLATION FOR ALL MECHANICAL EQUIPMENT TO PREVENT TRANSMISSION OF VIBRATION TO BUILDING STRUCTURE.
- LOCATE ALL TEMPERATURE, AND FLOW MEASURING DEVICES IN ACCESSIBLE LOCATIONS WITH THE STRAIGHT SECTION OF PIPE OR DUCT UP- AND DOWNSTREAM AS RECOMMENDED BY THE MANUFACTURER FOR GOOD ACCURACY.
- WHERE BEAMS ARE INDICATED TO BE PENETRATED WITH DUCTWORK OR PIPING, COORDINATE DUCTWORK AND PIPING LAYOUT WITH BEAM OPENING SIZE AND OPENING LOCATIONS. COORDINATION SHALL BE DONE PRIOR TO THE FABRICATION OF DUCTWORK, CUTTING OF PIPING, OR FABRICATION OF BEAMS.
- ALL MISCELLANEOUS STEEL REQUIRED TO ENSURE PROPER INSTALLATION AND AS SHOWN IN THE DETAILS FOR DUCTWORK, AND EQUIPMENT (UNLESS OTHERWISE NOTED) SHALL BE FURNISHED AND INSTALLED BY THE MECHANICAL CONTRACTOR.
- PROVIDE ACCESS PANELS FOR INSTALLATION IN WALLS AND CEILINGS, WHERE REQUIRED, TO SERVICE DAMPERS, VALVES, SMOKE DETECTORS, AND OTHER CONCEALED MECHANICAL EQUIPMENT. ACCESS PANELS SHALL BE TURNED OVER TO THE GENERAL CONTRACTOR FOR INSTALLATION. ACCESS PANELS SHALL HAVE THE EQUAL RATED CAPACITY (1HR, 2HR, ETC.) AS WALL.
- MECHANICAL EQUIPMENT, DUCTWORK, AND PIPING SHALL NOT BE SUPPORTED FROM A METAL DECK.
- ALL EQUIPMENT, PIPING, DUCTWORK, ETC., SHALL BE SUPPORTED AS DETAILED, SPECIFIED AND REQUIRED TO PROVIDE A VIBRATION-FREE INSTALLATION.
- ALL DUCTWORK, PIPING, AND EQUIPMENT SUPPORTED FROM STRUCTURAL STEEL SHALL BE COORDINATED WITH THE GENERAL CONTRACTOR. ALL ATTACHMENTS TO STEEL BAR JOISTS, TRUSSES, OR JOIST GIRDERS SHALL BE AT PANEL POINTS. PROVIDE BEAM CLAMPS MEETING MSS STANDARDS. WELDING TO STRUCTURAL MEMBERS SHALL NOT BE PERMITTED. THE USE OF C-CLAMPS SHALL NOT BE PERMITTED.
- LOCATIONS AND SIZES OF ALL FLOOR, WALL, AND ROOF OPENINGS SHALL BE COORDINATED WITH ALL OTHER TRADES INVOLVED.
- ALL OPENINGS IN FIRE WALLS DUE TO DUCTWORK, PIPING, CONDUIT, ETC., SHALL BE FIRE STOPPED WITH A PRODUCT SIMILAR TO 3M OR APPROVED EQUAL.
- ALL AIR CONDITIONING CONDENSATE DRAIN LINES FROM EACH AIR HANDLING UNIT SHALL BE PIPED FULL SIZE OF THE UNIT DRAIN OUTLET, WITH "P" TRAP, AND PIPED TO THE NEAREST DRAIN. SEE THE DETAILS SHOWN IN THE DRAWINGS OR THE CONTRACT SPECIFICATIONS FOR THE DEPTH OF THE AIR CONDITIONING CONDENSATE TRAP.
- REFER TO TYPICAL DETAILS FOR DUCTWORK, PIPING, AND EQUIPMENT INSTALLATION.
- ALL TESTS SHALL BE COMPLETED BEFORE ANY MECHANICAL EQUIPMENT OR PIPING INSULATION IS APPLIED.

- TESTING, ADJUSTING, AND BALANCING AGENCY SHALL BE A MEMBER OF THE ASSOCIATED AIR BALANCE COUNCIL (AABC) OR THE NATIONAL ENVIRONMENTAL BALANCING BUREAU (NEBB). TESTING, ADJUSTING, AND BALANCING SHALL BE PERFORMED IN ACCORDANCE WITH THE AABC STANDARDS.

### HVAC DUCTWORK - SHEET METAL

- CERTAIN ITEMS SUCH AS RISES AND DROPS IN DUCTWORK, ACCESS DOORS, VOLUME DAMPERS, ETC., ARE INDICATED ON THE CONTRACT DOCUMENT DRAWINGS FOR CLARITY FOR A SPECIFIC LOCATION REQUIREMENT AND SHALL NOT BE INTERPRETED AS THE EXTENT OF THE REQUIREMENTS FOR THESE ITEMS.
- CONTRACTOR TO CHECK AND CORRECT ANY AND ALL DEFICIENCIES IN EXISTING DUCTS. ALL NEW DUCTWORK WILL COMPLY WITH THE LATEST SMACNA GUIDELINES AND CONFORM WITH REQUIREMENTS OF THE LATEST HANDBOOKS PUBLISHED BY ASHRAE.
- PROVIDE VOLUME DAMPER AT EACH TAP TO MAIN DUCT AND WHERE NECESSARY TO PROPERLY BALANCE SYSTEM.
- SUPPLY AND RETURN DUCTWORK 20' FROM ALL AC UNITS SHALL BE LINED WITH 1.5" ACOUSTICAL LINING.
- RE-INSULATE ALL DUCTWORK AND PIPING IN WHICH INSULATION HAS BEEN REMOVED OR DAMAGED WITH INSULATION EQUAL TO THE EXISTING INSULATION.
- CONTRACTOR SHALL SUPPLY AND INSTALL ALL NECESSARY SUPPLY DIFFUSERS AND RETURN AIR REGISTERS WHERE INDICATED ON THE DRAWING. COORDINATE LOCATION OF DIFFUSERS AND REGISTERS WITH REFLECTED CEILING PLAN.
- IN CORRIDORS WHERE CEILING SPEAKERS AND AIR DIFFUSERS ARE INDICATED BETWEEN THE SAME LIGHT FIXTURES, INSTALL BOTH DEVICES AT THE QUARTER POINTS BETWEEN THE FIXTURES.
- ALL DUCTWORK SHALL CLEAR DOORS AND WINDOWS.
- ALL DUCTWORK DIMENSIONS, AS SHOWN ON THE DRAWINGS, ARE INTERNAL CLEAR DIMENSIONS AND DUCT SIZE SHALL BE INCREASED TO COMPENSATE FOR DUCT LINING THICKNESS.
- PROVIDE ALL 90-DEGREE SQUARE ELBOWS WITH DOUBLE RADIUS TURNING VANES UNLESS OTHERWISE INDICATED. ELBOWS IN DISHWASHER, KITCHEN, AND LAUNDRY EXHAUSTS SHALL BE OF UN-VANED SMOOTH RADIUS CONSTRUCTION WITH A RADIUS EQUAL TO 1-1/2 TIMES THE WIDTH OF THE DUCT. PROVIDE ACCESS DOORS UPSTREAM OF ALL ELBOWS WITH TURNING VANES.
- COORDINATE DIFFUSER, REGISTER, AND GRILLE LOCATIONS WITH ARCHITECTURAL REFLECTED CEILING PLANS, LIGHTING, AND OTHER CEILING ITEMS AND MAKE MINOR DUCT MODIFICATIONS TO SUIT.
- ALL AIR HANDLING UNITS SHALL OPERATE WITHOUT MOISTURE CARRYOVER.
- LOCATE ALL MECHANICAL EQUIPMENT FOR UNOBSTRUCTED ACCESS TO UNIT ACCESS PANELS, CONTROLS, AND VALVING.
- PROVIDE FLEXIBLE CONNECTIONS IN ALL DUCTWORK SYSTEMS (SUPPLY, RETURN, AND EXHAUST) CONNECTED TO AIR HANDLING UNITS, FANS, AND OTHER EQUIPMENT THAT REQUIRE VIBRATION ISOLATION. FLEXIBLE CONNECTIONS SHALL BE PROVIDED AT THE POINT OF CONNECTION TO THE EQUIPMENT UNLESS OTHERWISE INDICATED.
- UNLESS OTHERWISE NOTED, ALL DUCTWORK IS OVERHEAD, TIGHT TO THE UNDERSIDE OF THE STRUCTURE, WITH SPACE FOR INSULATION IF NEEDED.
- RUNS OF FLEXIBLE DUCT SHALL NOT EXCEED 5 FT.
- ALL DUCTWORK SHALL BE COORDINATED WITH ALL TRADES INVOLVED. OFFSETS IN DUCTS, INCLUDING DIVIDED DUCTS AND TRANSITIONS AROUND OBSTRUCTIONS, SHALL BE PROVIDED AT NO ADDITIONAL COST TO THE OWNER.
- PROVIDE ACCESS DOORS IN DUCTWORK TO PROVIDE ACCESS FOR ALL SMOKE DETECTORS, FIRE DAMPERS, SMOKE DAMPERS, VOLUME DAMPERS, COILS, AND OTHER ITEMS LOCATED IN THE DUCTWORK THAT REQUIRE SERVICE AND/OR INSPECTION.
- PROVIDE ACCESS DOORS IN DUCTWORK FOR THE OPERATION, ADJUSTMENT, AND MAINTENANCE OF ALL FANS, VALVES, AND MECHANICAL EQUIPMENT.
- ALL DUCTS SHALL BE GROUNDED ACROSS FLEXIBLE CONNECTIONS WITH FLEXIBLE COPPER GROUNDING STRAPS. GROUNDING STRAPS SHALL BE BOLTED OR SOLDERED TO BOTH THE EQUIPMENT AND THE DUCT.
- SMOKE DETECTORS SHALL BE FURNISHED AND WIRED BY THE ELECTRICAL CONTRACTOR. THE MECHANICAL CONTRACTOR SHALL BE RESPONSIBLE FOR MOUNTING THE SMOKE DETECTOR IN DUCTWORK AS SHOWN ON THE DRAWINGS AND IN ACCORDANCE WITH THE MANUFACTURER'S PRINTED INSTRUCTIONS.
- SEE SPECIFICATIONS FOR DUCTWORK GAUGES, BRACING, HANGERS, AND OTHER REQUIREMENTS.
- EXTERIOR LOUVERS ARE INDICATED FOR SIZE, GENERAL LOCATION AND PERFORMANCE ONLY. DETAILED LOUVER DESCRIPTIONS ARE PROVIDED IN THE ARCHITECTURAL SPECIFICATIONS.

### PIPING

- PROVIDE ALL MATERIALS AND EQUIPMENT AND PERFORM ALL LABOR REQUIRED TO INSTALL COMPLETE AND OPERABLE PIPING SYSTEMS AS INDICATED ON THE DRAWINGS AND AS SPECIFIED AND REQUIRED BY CODE.
- ELEVATIONS AS SHOWN ON THE DRAWINGS ARE TO THE BOTTOM OF ALL PRESSURE PIPING AND TO THE INVERT OF

ALL GRAVITY PIPING UNLESS OTHERWISE NOTED.

- UNLESS OTHERWISE NOTED, ALL PIPING IS OVERHEAD, TIGHT TO THE UNDERSIDE OF THE STRUCTURE OR SLAB, WITH SPACE FOR INSULATION IF REQUIRED.
- INSTALL PIPING SO ALL VALVES, STRAINERS, UNIONS, TRAPS, FLANGES, AND OTHER APPURTENANCES REQUIRING ACCESS ARE ACCESSIBLE.
- ALL VALVES SHALL BE INSTALLED SO THAT THE VALVE REMAINS IN SERVICE WHEN EQUIPMENT OR PIPING ON THE EQUIPMENT SIDE OF THE VALVE IS REMOVED.
- ALL VALVES (EXCEPT CONTROL VALVES) AND STRAINERS SHALL BE THE FULL SIZE OF THE PIPE BEFORE REDUCING IN SIZE TO MAKE CONNECTIONS TO EQUIPMENT AND CONTROLS.
- INSTALL ALL PIPING WITHOUT FORCING OR SPRINGING.
- ALL PIPING SHALL CLEAR DOORS AND WINDOWS.
- ALL VALVES SHALL BE ADJUSTED FOR SMOOTH AND EASY OPERATION.
- ALL PIPING SHALL BE COORDINATED WITH ALL TRADES INVOLVED. OFFSETS IN PIPING AROUND OBSTRUCTIONS SHALL BE PROVIDED AT NO ADDITIONAL COST TO THE OWNER.
- SLOPED REFRIGERANT PIPING 1% IN THE DIRECTION OF OIL RETURN. LIQUID LINES MAY BE INSTALLED LEVEL.
- INSTALL HORIZONTAL REFRIGERANT HOT GAS DISCHARGE PIPING WITH 1/2" PER 10 FT. DOWNWARD SLOPE AWAY FROM THE COMPRESSOR.
- INSTALL HORIZONTAL REFRIGERANT SUCTION LINES WITH 1/2" PER 10 FT. DOWNWARD SLOPE TO THE COMPRESSOR, WITH NO LONG TRAPS OR DEAD ENDS THAT MAY CAUSE OIL TO SEPARATE FROM THE SUCTION GAS AND RETURN TO THE COMPRESSOR IN DAMAGING SLUGS.
- PROVIDE LINE SIZE LIQUID INDICATORS IN THE MAIN LIQUID LINE LEAVING THE CONDENSER OR RECEIVER. INSTALL MOISTURE-LIQUID INDICATORS IN LIQUID LINES BETWEEN FILTER DRYERS AND THERMOSTATIC EXPANSION VALVES, AND IN LIQUID LINE TO RECEIVER.
- PROVIDE A LINE SIZE STRAINER UPSTREAM OF EACH AUTOMATIC VALVE. PROVIDE A SHUT-OFF VALVE ON EACH SIDE OF A STRAINER.
- PROVIDE PERMANENT FILTER DRYERS IN LOW-TEMPERATURE SYSTEMS AND SYSTEMS USING HERMETIC COMPRESSORS.
- PROVIDE REPLACEABLE CARTRIDGE FILTER DRYERS WITH A THREE-VALVE BYPASS ASSEMBLY FOR SOLENOID VALVES, ADJACENT TO RECEIVERS.
- PROVIDE REFRIGERANT CHARGING VALVE CONNECTIONS IN THE LIQUID LINE BETWEEN THE RECEIVER SHUTOFF VALVE AND THE EXPANSION VALVE.

### COMMERCIAL KITCHEN EXHAUST DUCTWORK

A. ALL HORIZONTAL AND VERTICAL KITCHEN EXHAUST DUCTWORK SHALL BE CONSTRUCTED OF 16 GAUGE MINIMUM BLACK IRON OR PREFABRICATED DOUBLE WALL GREASE DUCTWORK APPROVED FOR KITCHEN EXHAUST APPLICATION WITH ETL LISTED TO UL 1978 AND UL 2221 SHALL BE INSTALLED IN ACCORDANCE WITH MANUFACTURER INSTALLATION INSTRUCTIONS AND LOCAL CODES. ALL SEAMS AND JOINTS SHALL HAVE A LIQUID TIGHT CONTINUOUS EXTERNAL WELD AS PER NFPA 98 FOR BLACK IRON DUCTWORK. THE EXTERIOR OF ALL KITCHEN RANGE BLACK IRON EXHAUST DUCTS SHALL HAVE 1-1/2" X 1-1/2" X 1/8" WELDED ANGLES, PUNCHED FOR SECURING BLOCK INSULATION. WHERE KITCHEN RANGE BLACK IRON EXHAUST DUCT RISER PASSED VERTICALLY THROUGH FLOORS OF THE BUILDING, PROVIDE ANGLE CLIPS WELDED TO THE DUCT OF REQUIRED SIZES TO SUPPORT THE WEIGHT OF THE RISER SECTIONS ON THE BUILDING STRUCTURE AT EACH OF THE FLOOR LEVELS. PROVIDE AND INSTALL ALL SUPPLEMENTARY STRUCTURAL STEEL IN SHAFTS TO PROPERLY SUPPORT EXHAUST DUCTWORK FROM BUILDING CONSTRUCTION. PROVIDE MINIMUM 12"x12" ACCESS DOOR ON SIDE OF HORIZONTAL DUCTS AT 12' SPACING. ACCESS DOORS SHALL BE SIMILAR TO DESCRIPTION IN "ACCESS DOORS IN SHEET METAL WORK" EXCEPT THAT DOOR GAUGE SHALL BE THE SAME AS DUCT GAUGE. ALL HORIZONTAL DUCTS SHALL BE PITCHED BACK TO HOODS 1/4" PER FOOT OR MAXIMUM PITCH ATTAINABLE. THIS TRADE SHALL DRILL OR CUT ALL REQUIRED OPENING AS REQUIRED BY THE DUCTS EXTINGUISHING SYSTEM AND AS COORDINATED WITH THE TRADE SUPPLYING THE EXTINGUISHING SPRAY HEADS. MAINTAIN 6" CLEARANCE BETWEEN SHEET METAL DUCT AND ANY SURFACE SUCH AS SLAB, BEAM OR SHAFT ENCLOSURE.

B. ALL HORIZONTAL AND VERTICAL KITCHEN RANGE BLACK IRON EXHAUST DUCTWORK GAUGES SHALL BE AS FOLLOWS.

SIZE	GAUGE BLACK IRON
LESS THEN 155 SQIN	16
155-200 SQIN	14
201-255 SQIN	12

## SPECIFICATIONS

### SECTION 0001 - NOTICE TO BIDDERS

#### 1.1 BIDDERS REPRESENTATIONS

- THE BIDDER BY MAKING A BID REPRESENTS THAT:
  - THE BIDDER HAS READ AND UNDERSTANDS THE BIDDING DOCUMENTS, TO THE EXTENT THAT SUCH DOCUMENTATION RELATES TO THE WORK FOR WHICH THE BID IS SUBMITTED, AND FOR OTHER PORTIONS OF THE PROJECT, IF ANY, BEING BID CONCURRENTLY OR PRESENTLY UNDER CONSTRUCTION.
  - THE BID IS MADE IN COMPLIANCE WITH THE BIDDING DOCUMENTS.
  - THE SPECIFICATIONS AND DRAWINGS ARE INTENDED TO SERVE JOINTLY AS A BASIS FOR THE BIDDER TO SUBMIT A CONTRACT PRICE FOR THE MATERIAL AND LABOR.
  - SHOULD CONFLICTS OR DISCREPANCIES OCCUR WITHIN THE BIDDING DOCUMENTS, THE ITEM OR ITEMS IN DISPUTE THAT REPRESENT THE GREATER COST SHALL PREVAIL IN THE FINAL BID.
  - THE BID IS BASED UPON THE MATERIALS, EQUIPMENT AND SYSTEMS REQUIRED BY THE BIDDING DOCUMENTS WITHOUT EXCEPTION.

#### 1.2 EXISTING CONDITIONS AND COORDINATION

- THE BIDDER HAS VISITED THE SITE, BECOME FAMILIAR WITH LOCAL CONDITIONS UNDER WHICH THE WORK IS TO BE PERFORMED AND HAS CORRELATED THE BIDDER'S PERSONAL OBSERVATIONS WITH THE REQUIREMENTS OF THE PROPOSED BIDDING DOCUMENTS.
- THE BIDDER SHALL PROPOSE COORDINATION OF WORK SUCH THAT CONFLICTS WITH OTHER TRADES AND SPACE ALLOCATIONS ARE AVOIDED.

#### 1.3 RESPONSIBILITIES

- THE BIDDER UNDERSTANDS THAT ANY CONTRACTOR SHALL BE FULLY RESPONSIBLE FOR THE TIMELY COMPLETION AND ACCEPTANCE OF THEIR WORK AND THAT ANY ITEMS DAMAGED, LOST OR STOLEN DURING TIME OF CONSTRUCTION SHALL BE REPAIRED OR REPLACED WITHOUT ANY ADDITIONAL COST TO THE OWNER.
- THE BIDDER UNDERSTANDS THAT ANY PROPOSED WORK IN OCCUPIED TENANT SPACES SHALL BE PERFORMED DURING TIMES OF NON-TENANT OCCUPANCY OR AS SCHEDULED OR DIRECTED BY THE BUILDING MANAGER.
- THE BIDDER UNDERSTANDS THAT ANY PROPOSED SHUT-DOWN OF EXISTING SYSTEMS DURING CONSTRUCTION SHALL BE PRE-ARRANGED WITH THE BUILDING MANAGER AND THAT SUCH SHUT-DOWNS ARE TO BE KEPT TO A MINIMUM.

END OF SECTION 0001

### SECTION 0101 - QUALITY OF WORK

#### 1.1 WORKMANSHIP

- ALL WORK SHALL BE FREE FROM DEFECTS IN MATERIALS AND WORKMANSHIP FOR A PERIOD OF ONE YEAR FROM DATE OF FINAL ACCEPTANCE.
- ALL DEFECTS WHICH DEVELOP OR ARE DISCOVERED WITHIN THIS PERIOD SHALL BE REPAIRED BY THE CONTRACTOR TO THE SATISFACTION OF THE ARCHITECT OR BUILDING MANAGER AT NO ADDITIONAL COST TO THE OWNER.
- UPON COMPLETION OF THE WORK THE CONTRACTOR SHALL REMOVE FROM THE SITE, ALL TOOLS, DEMOLISHED APPLIANCES AND ANY SURPLUS MATERIAL.

#### 1.2 CODE COMPLIANCE

- ALL WORK SHALL MEET ALL STATE AND LOCAL CODES HAVING JURISDICTION.

END OF SECTION 0101

### SECTION 0101 - QUALITY OF WORK

#### 1.1 WORKMANSHIP

- ALL WORK SHALL BE FREE FROM DEFECTS IN MATERIALS AND WORKMANSHIP FOR A PERIOD OF ONE YEAR FROM DATE OF FINAL ACCEPTANCE.
- ALL DEFECTS WHICH DEVELOP OR ARE DISCOVERED WITHIN THIS PERIOD SHALL BE REPAIRED BY THE CONTRACTOR TO THE SATISFACTION OF THE ARCHITECT OR BUILDING MANAGER AT NO ADDITIONAL COST TO THE OWNER.
- UPON COMPLETION OF THE WORK THE CONTRACTOR SHALL REMOVE FROM THE SITE, ALL TOOLS, DEMOLISHED APPLIANCES AND ANY SURPLUS MATERIAL.

#### 1.2 CODE COMPLIANCE

- ALL WORK SHALL MEET ALL STATE AND LOCAL CODES HAVING JURISDICTION.

END OF SECTION 0101

### SECTION 0102 -REQUIRED DOCUMENTS

#### 1.1 SHOP DRAWINGS

- 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

- 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

- 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

- 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.
- 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.
- 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

### SECTION 078413-PENETRATION FIRE-STOPPING

#### 1.1 QUALITY ASSURANCE

- INSTALLER QUALIFICATIONS: AN FM GLOBAL-APPROVED FIRE-STOP CONTRACTOR OR A UL-QUALIFIED FIRE-STOP CONTRACTOR.
- FIRE-TEST-RESPONSE CHARACTERISTICS: UL, INTERTEK ETL SEMKO OR FM GLOBAL

#### 1.2 PENETRATION FIRESTOPPING

- PENETRATIONS IN FIRE-RESISTANCE-RATED WALLS: F-RATINGS PER ASTM E 814 OR UL 1479.
- PENETRATIONS IN HORIZONTAL ASSEMBLIES: F- AND T-RATINGS PER ASTM E 814 OR UL 1479:
- PENETRATIONS IN SMOKE BARRIERS: L-RATINGS PER UL 1479.
- W-RATINGS: PER UL 1479.

#### 1.3 INSTALLATION

- IDENTIFICATION: PREPRINTED METAL OR PLASTIC LABELS.

#### 1.4 FIELD QUALITY CONTROL

- INSPECTION OF INSTALLED FIRE-STOPPING: BY OWNER-ENGAGED AGENCY ACCORDING TO ASTM E 2174.

#### 1.5 THROUGH-PENETRATION FIRESTOP SYSTEM SCHEDULE

WHERE UL-CLASSIFIED SYSTEMS ARE INDICATED, THEY REFER TO SYSTEM NUMBERS IN UL'S "FIRE RESISTANCE DIRECTORY" UNDER PRODUCT CATEGORY XHEZ.

#### FOR THE FOLLOWING SYSTEMS:

METALLIC AND NON-METALLIC PIPES, CONDUIT, OR TUBING, ELECTRICAL CABLES, CABLE TRAYS WITH ELECTRIC CABLES, MISCELLANEOUS ELECTRICAL PENETRANTS, INSULATED PIPES, GROUPINGS OF PENETRANTS, USE ON OR MORE THE FOLLOWING MATERIALS:

- LATEX SEALANT
- SILICONE SEALANT
- INTUMESCENT PUTTY
- MORTAR
- SILICONE FOAM
- PILLOWS/BAGS
- INTUMESCENT WRAP STRIPS
- INTUMESCENT COMPOSITE SHEET

#### 1.6 MANUFACTURERS

- HILTI CONSTRUCTION CHEMICAL, INC
- TREMCO INC.
- 3M FIRE PROTECTION PRODUCTS

END OF SECTION 078413



SECTION 230517 - SLEEVES AND SLEEVE SEALS FOR HVAC PIPING

1.1 SLEEVE-SEAL SYSTEMS

- A. FIELD-ASSEMBLED, MODULAR SEALING-ELEMENT UNIT FOR FILLING ANNULAR SPACE BETWEEN PIPING AND SLEEVE.
1. SEALING ELEMENTS: EPDM RUBBER OR NBR.
2. PRESSURE PLATES: CARBON STEEL, PLASTIC, STAINLESS STEEL.
3. CONNECTING BOLTS AND NUTS: CARBON STEEL WITH CORROSION-RESISTANT COATING, STAINLESS STEEL.
B. MANUFACTURERS: SUBJECT TO COMPLIANCE WITH REQUIREMENTS, AVAILABLE MANUFACTURERS OFFERING PRODUCTS THAT MAY BE INCORPORATED INTO THE WORK INCLUDE, BUT ARE NOT LIMITED TO, THE FOLLOWING:
1. ADVANCE PRODUCTS & SYSTEMS, INC.
2. CALPICO, INC.
3. METRAFLEX COMPANY (THE).
4. PIPELINE SEAL AND INSULATOR, INC.
5. PROCO PRODUCTS, INC.

1.2 SLEEVE-SEAL FITTINGS

- A. MANUFACTURED PLASTIC, SLEEVE-TYPE, PLASTIC OR RUBBER WATER-STOP ASSEMBLY MADE FOR IMBEDDING IN CONCRETE SLAB OR WALL.

1.3 GROUT

- A. NON-SHRINK, FACTORY PACKAGED.

1.4 SLEEVE AND SLEEVE-SEAL SCHEDULE

- A. USE SLEEVES AND SLEEVE SEALS FOR THE FOLLOWING PIPING-PENETRATION APPLICATIONS:
1. INTERIOR PARTITIONS:
a. PIPING SMALLER THAN NPS 6 (DN 150): GALVANIZED-STEEL-PIPE SLEEVES, PVC-PIPE SLEEVES.
b. PIPING NPS 6 (DN 150) AND LARGER: GALVANIZED-STEEL-SHEET SLEEVES.

END OF SECTION 230517

SECTION 230518 - ESCUTCHEONS FOR HVAC PIPING

PART 2 - PRODUCTS

2.1 ESCUTCHEONS

- A. ONE-PIECE, CAST-BRASS TYPE: WITH POLISHED, CHROME-PLATED AND ROUGH-BRASS FINISH AND SETSCREW FASTENER.
B. ONE-PIECE, DEEP-PATTERN TYPE: DEEP-DRAWN, BOX-SHAPED BRASS WITH CHROME-PLATED FINISH AND SPRING-CLIP FASTENERS.
C. ONE-PIECE, STAMPED-STEEL TYPE: WITH CHROME-PLATED FINISH AND SPRING-CLIP FASTENERS.

2.2 FLOOR PLATES

- A. ONE-PIECE FLOOR PLATES: CAST-IRON FLANGE WITH HOLES FOR FASTENERS.

PART 3 - EXECUTION

3.1 INSTALLATION

- A. INSTALL ESCUTCHEONS FOR PIPING PENETRATIONS OF WALLS, CEILINGS, AND FINISHED FLOORS.
B. INSTALL ESCUTCHEONS WITH ID TO CLOSELY FIT AROUND PIPE, TUBE, AND INSULATION OF PIPING AND WITH OD THAT COMPLETELY COVERS OPENING.

1. ESCUTCHEONS FOR NEW PIPING:

- a. PIPING WITH FITTING OR SLEEVE PROTRUDING FROM WALL: ONE-PIECE, DEEP-PATTERN TYPE.
b. INSULATED PIPING: ONE-PIECE, STAMPED-STEEL TYPE.
c. BARE PIPING AT WALL AND FLOOR PENETRATIONS IN FINISHED SPACES: ONE-PIECE, CAST-BRASS TYPE WITH POLISHED, CHROME-PLATED FINISH OR STAMPED-STEEL TYPE.
d. BARE PIPING AT CEILING PENETRATIONS IN FINISHED SPACES: ONE-PIECE, CAST-BRASS TYPE WITH POLISHED, CHROME-PLATED FINISH OR STAMPED-STEEL TYPE.

3.2 FIELD QUALITY CONTROL

- A. REPLACE BROKEN AND DAMAGED ESCUTCHEONS AND FLOOR PLATES USING NEW MATERIALS.

END OF SECTION 230518

SECTION 230529 - HANGERS AND SUPPORTS FOR HVAC PIPING AND EQUIPMENT

1.1 PERFORMANCE REQUIREMENTS

- A. DELEGATED DESIGN: DESIGN TRAPEZE PIPE HANGERS AND EQUIPMENT SUPPORTS, INCLUDING COMPREHENSIVE ENGINEERING ANALYSIS BY A QUALIFIED PROFESSIONAL ENGINEER, USING PERFORMANCE REQUIREMENTS AND DESIGN CRITERIA INDICATED.

- B. STRUCTURAL PERFORMANCE: HANGERS AND SUPPORTS FOR HVAC PIPING AND EQUIPMENT SHALL WITHSTAND THE EFFECTS OF GRAVITY LOADS AND STRESSES WITHIN LIMITS AND UNDER CONDITIONS INDICATED ACCORDING TO ASCE/SEI 7.

- 1. DESIGN SUPPORTS FOR MULTIPLE PIPES CAPABLE OF SUPPORTING COMBINED WEIGHT OF SUPPORTED SYSTEMS, SYSTEM CONTENTS, AND TEST WATER.
2. DESIGN EQUIPMENT SUPPORTS CAPABLE OF SUPPORTING COMBINED OPERATING WEIGHT OF SUPPORTED EQUIPMENT AND CONNECTED SYSTEMS AND
3. DESIGN SEISMIC-RESTRAINT HANGERS AND SUPPORTS FOR PIPING AND EQUIPMENT AND OBTAIN APPROVAL FROM AUTHORITIES HAVING JURISDICTION.

1.2 SUBMITTALS

- A. SHOP DRAWINGS: SIGNED AND SEALED BY A PROFESSIONAL ENGINEER

1.3 QUALITY ASSURANCE

- A. AWS D1.1/D1.1M, "STRUCTURAL WELDING CODE - STEEL."

1.4 COMPONENTS

- A. METAL PIPE HANGERS AND SUPPORTS: CARBON OR STAINLESS STEEL
B. TRAPEZE PIPE HANGERS: CARBON OR STAINLESS STEEL
C. FIBERGLASS PIPE HANGERS: -CLEVIS, CENTURY COMPOSITES, COOPER B-LINE
D. METAL FRAMING SYSTEMS: MFMA MANUFACTURER
E. FIBERGLASS STRUT SYSTEMS: COOPER B-LINE
F. THERMAL-HANGER SHIELD INSERTS:
G. FASTENER SYSTEMS: POWDER-ACTUATED FASTENERS OR MECHANICAL-EXPANSION ANCHORS
H. PIPE STANDS: COMPACT, LOW TYPE, SINGLE PIPE, HIGH TYPE, SINGLE PIPE, HIGH TYPE, MULTIPLE PIPES, CURB-MOUNTED TYPE
I. EQUIPMENT SUPPORTS.

END OF SECTION 230529

SECTION 230548 - VIBRATION CONTROLS FOR HVAC PIPING AND EQUIPMENT

PART 1 - GENERAL

1.1 COMPONENTS

- A. VIBRATION ISOLATORS:

- 1. ISOLATOR PADS: NEOPRENE, RUBBER, HERMETICALLY AND/OR SEALED COMPRESSED FIBERGLASS
2. MOUNTS: DOUBLE-DEFLECTION TYPE.
3. RESTRAINED MOUNTS: ALL DIRECTIONAL MOUNTINGS WITH SEISMIC RESTRAINT; CAST-DUCTILE-IRON HOUSING.
4. SPRING ISOLATORS: FREESTANDING, LATERALLY STABLE, OPEN-SPRING TYPE.
5. RESTRAINED SPRING ISOLATORS: FREESTANDING, STEEL, OPEN-SPRING TYPE WITH SEISMIC RESTRAINT.
6. HOUSED SPRING MOUNTS: DUCTILE-IRON OR STEEL HOUSING, WITH INTEGRAL, VERTICALLY ADJUSTABLE SEISMIC SNUBBERS.
7. ELASTOMERIC HANGERS: DOUBLE-DEFLECTION TYPE.
8. SPRING HANGERS: COMBINATION COIL-SPRING AND ELASTOMERIC-INSERT HANGERS WITH SPRING AND INSERT IN COMPRESSION.
9. SPRING HANGERS WITH VERTICAL-LIMIT STOP: COMBINATION COIL-SPRING AND ELASTOMERIC-INSERT HANGERS WITH SPRING AND INSERT IN COMPRESSION AND WITH VERTICAL-LIMIT STOP.
10. PIPE RISER RESILIENT SUPPORT: ALL-DIRECTIONAL, ACOUSTICAL PIPE ANCHOR.
11. RESILIENT PIPE GUIDES.

B. AIR-MOUNTING SYSTEMS:

- 1. AIR MOUNTS: FREESTANDING, SINGLE OR MULTIPLE, COMPRESSED-AIR BELLOW.
2. RESTRAINED AIR MOUNTS: HOUSED COMPRESSED-AIR BELLOW.
C. RESTRAINED VIBRATION ISOLATION ROOF-CURB RAILS: FACTORY-ASSEMBLED, FULLY ENCLOSED, INSULATED, AIR-AND WATERTIGHT CURB RAIL WITH SPRING ISOLATORS MOUNTED ON ELASTOMERIC ISOLATION PADS, AND SNUBBER BUSHINGS.

D. VIBRATION ISOLATION EQUIPMENT BASES:

- 1. STEEL BASE: FACTORY-FABRICATED, WELDED, STRUCTURAL-STEEL BASES AND RAILS.
2. INERTIA BASE: FACTORY-FABRICATED, WELDED, STRUCTURAL-STEEL BASES AND RAILS READY FOR FIELD-APPLIED, CAST-IN-PLACE CONCRETE

1.2 FIELD QUALITY CONTROL

- A. TESTING: BY EITHER: OWNER-ENGAGED AGENCY, CONTRACTOR-ENGAGED AGENCY, OR CONTRACTOR.

PART-2 PRODUCTS

1.1 VIBRATION ISOLATORS & SEISMIC-RESTRAINT DEVICES

- I. AVAILABLE MANUFACTURERS: SUBJECT TO COMPLIANCE WITH REQUIREMENTS, MANUFACTURERS OFFERING PRODUCTS THAT MAY BE INCORPORATED INTO THE WORK INCLUDE, BUT ARE NOT LIMITED TO, THE FOLLOWING:
J. MANUFACTURERS: SUBJECT TO COMPLIANCE WITH REQUIREMENTS, PROVIDE PRODUCTS BY ONE OF THE FOLLOWING:

- 1. ACE MOUNTINGS CO., INC.
2. AMBER/BOOTH COMPANY, INC.
3. CALIFORNIA DYNAMICS CORPORATION.
4. HILTI, INC.
5. ISOLATION TECHNOLOGY, INC.
6. KINETICS NOISE CONTROL.
7. LOOS & CO.; CABLEWARE DIVISION.
8. MASON INDUSTRIES.
9. TOLCO INCORPORATED; A BRAND OF NIBCO INC.
10. UNISTRUT; TYCO INTERNATIONAL, LTD.

END OF SECTION 230548

SECTION 230593 - TESTING, ADJUSTING, AND BALANCING FOR HVAC

1.1 SUMMARY

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

- 1. AIR SYSTEMS: CONSTANT-VOLUME SYSTEMS.
2. MOTORS.
3. CONDENSING UNITS.
4. EXISTING SYSTEMS.

1.2 QUALITY ASSURANCE

- A. THE CONTRACTOR SHALL PROCURE THE SERVICES OF A TESTING, ADJUSTING AND BALANCING (TAB) SPECIALIST WHO SPECIALIZES IN HEATING, 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 EXISTING AIR AND HYDRONIC SYSTEMS THAT ARE TO REMAIN OR TO BE INCORPORATED INTO NEW WORK PRIOR TO THE STARTING OF WORK IN THE PROJECT SCOPE. A REPORT OF THESE MEASUREMENTS, INDICATING ANY AND ALL DEFICIENCIES SHALL BE SUBMITTED FOR OWNER REVIEW.
B. 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.
C. THE REPORT SHALL INDICATE A SCHEMATIC DIAGRAM INDICATING LOCATIONS OF ALL EQUIPMENT TESTED AND MEASUREMENT LOCATIONS.
D. PRIOR TO FINAL INSPECTION OF THE WORK, THE TAB SPECIALIST SHALL BALANCE ALL SYSTEMS AS INDICATED ABOVE TO THE REQUIREMENTS OF THE DESIGN.
E. 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.
F. 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.
G. ALL INSTRUMENTS USED FOR TAB SHALL BE MAINTAINED IN GOOD WORKING CONDITION AND ACCURATELY CALIBRATED.
H. TOLERANCES: PLUS OR MINUS 5 PERCENT OF DESIGN VALUES.
I. INSPECTIONS: RANDOM CHECKS BY OWNER OR ARCHITECT TO VERIFY FINAL TESTING, ADJUSTING, AND BALANCING REPORT.
J. 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: UNCONDITIONED SPACES WITHIN BUILDING: R-6 WITHIN BUILDING ENVELOPE ASSEMBLY: R-8 OUTSIDE OF BUILDING: R-8

1.4 ITEMS NOT INSULATED:

- 1. FIBROUS-GLASS DUCTS.
2. METAL DUCTS WITH DUCT LINER OR SUFFICIENT THICKNESS TO COMPLY WITH ENERGY CODE ANDASHRAE/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.

END OF SECTION 230713

SECTION 233113 - METAL DUCTS

1.1 CONSTRUCTION

- A. EACH DUCT SYSTEM SHALL BE CONSTRUCTED FOR THE SPECIFIC SMACNA DUCT PRESSURE CLASSIFICATIONS SHOWN ON THE CONTRACT DRAWINGS. WHERE NO PRESSURE CLASSES ARE SPECIFIED BY THE DESIGNER, THE SMACNA 2-1/2 INCH WG PRESSURE CLASS IS THE BASIS OF COMPLIANCE WITH THESE STANDARDS, REGARDLESS OF THE VELOCITY IN THE DUCT.
B. ALL DUCTWORK SHALL BE CONSTRUCTED TO SMACNA 2" WG DESIGN AND NOT LESS THAN THE FOLLOWING STANDARDS:
1. DUCTWORK SHALL BE TRANSVERSELY JOINTED BY CONNECTING SEAMS OF COMPANION ANGLES, FORMED FROM 1-1/2"x1-1/2"x1/8" GALVANIZED ANGLES, TACK-WELDED OR RIVETED TO THE DUCT. THE ANGLE FRAME SHALL BE CONTINUOUSLY FLANGED UP INTO UPRIGHT OF ANGLE AND EACH CORNER SHALL BE FILLED IN AND GROUND SMOOTH. JOINTS SHALL BE GASKETED WITH 1/8" THICK REINFORCED GASKET, OVERLAPPED AT CORNERS. GASKET SIMILAR TO 3M-1202 OR APPROVED EQUAL.
2. RECTANGULAR FITTINGS AND ALL TRANSITION PIECES FROM RECTANGULAR TO ROUND SHALL BE NO. 16 GAUGE ALL WELDED CONSTRUCTION.
3. HORIZONTAL DUCTS SHALL BE SUPPORTED ON NOT MORE THAN 6' CENTERS. VERTICAL RISERS SHALL BE SUPPORTED AT EACH FLOOR.
4. LONGITUDINAL SEAMS FOR RECTANGULAR DUCTWORK SHALL BE PITTSBURGH LOCK SEAMS WITH SEALING COMPOUND, EQUAL TO BENJAMIN FOSTER NO. 30-03 INSERTED INTO SEAM. ALL SEAMS SHALL BE BRUSHED WITH NO. 30-02 AND COVERED WITH APPROVED SEALING TAPE.
5. RECTANGULAR DUCTWORK 18 GAUGE AND HEAVIER, FILLER RODS SHALL BE IN ACCORDANCE WITH SPECIFICATIONS FOR IRON AND STEEL GAS WELDING RODS, ASTM 215; AWG A5.2.
6. ALL FITTINGS SUCH AS ELBOWS, TEES, ETC., SHALL BE NO. 20 GAUGE ZINC COATED STEEL. ELBOWS SHALL BE OF FIVE (5) PIECE WELDED AIRTIGHT CONSTRUCTION.

- C. WHERE LATEST EDITION OF SMACNA DOES NOT CLEARLY STATE GAUGES AND/OR STIFFENERS TO BE USED OR, WHERE SMACNA STANDARDS REQUIRE INTERPRETATION, THE FOLLOWING MINIMUM METAL GAUGES AND BRACING SHALL BE USED:

Table with 4 columns: USG, MAX. SIDE INCHES BRACING, TRANSVERSE JOINTS AND, and a description of the duct type and size. Rows include: 22 UP TO 12 S SLIP, DRIVE SLIP, ONE INCH POCKET LOCK ON 8 FOOT CENTERS; 22 13 TO 24 1"x1"x1/8" ANGLES ON 4 FOOT CENTERS; 20 25 TO 35 1"x1"x1/8" ANGLES ON 2 FOOT CENTERS

- D. PROVIDE TAPPING IN DUCTS FOR THERMOMETERS WHERE SPECIFIED. IN ADDITION, PROVIDE AN AIRTIGHT PLUGGED TAPPING LOCATED AS FOLLOWS:

- 1. UPSTREAM OF EACH REHEAT COIL AND VAV BOX.
2. DOWNSTREAM OF EACH REHEAT COIL AND VAV BOX.

- E. FLAT OVAL OR ROUND DUCTWORK MAY BE PROVIDED IN LIEU OF RECTANGULAR DUCTWORK WITH THE REINFORCEMENT FOR FLAT SIDES SAME AS SPECIFIED FOR THE RECTANGULAR DUCTWORK, AND AS PER SMACNA FLAT OVAL DUCT CONSTRUCTION STANDARDS SHOWN IN FIG. 3-6 AND AS SHOWN IN FIG. 3-1 AND 3-2 FOR ROUND DUCTWORK.

- F. ALL DUCTWORK SHALL BE SEALED TO CLASS "A" AND LEAK TESTED TO MEET SMACNA CLASS 6 FOR RECTANGULAR AND CLASS 3 FOR ROUND DUCTS.

1.2 MATERIALS

- A. SINGLE-WALL RECTANGULAR DUCTS AND FITTINGS.
B. SINGLE-WALL ROUND AND FLAT-OVAL DUCTS AND FITTINGS.
C. SHEET METAL MATERIALS:
1. GALVANIZED SHEET STEEL.
2. STAINLESS-STEEL SHEETS.
3. ALUMINUM SHEETS.
4. FACTORY-APPLIED ANTI-MICROBIAL COATING.
D. DUCT LINER:
1. FIBROUS GLASS, TYPE I, FLEXIBLE.
a. WITH ANTI-MICROBIAL EROSION-RESISTANT COATING.
2. FLEXIBLE ELASTOMERIC.
3. NATURAL FIBER.
E. 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.
6. ROUND DUCT JOINT O-RING SEALS.

1.3 DUCT CLEANING

- A. CLEAN EXISTING DUCT SYSTEM(S) BEFORE TESTING, ADJUSTING, AND BALANCING.
B. CLEAN THE FOLLOWING ITEMS:

- 1. AIR OUTLETS AND INLETS.
2. SUPPLY, RETURN, AND EXHAUST FANS.
3. AIR-HANDLING UNITS.
4. COILS AND RELATED COMPONENTS.
5. RETURN-AIR DUCTS, DAMPERS, ACTUATORS, AND TURNING VANES.
6. SUPPLY-AIR DUCTS, DAMPERS, ACTUATORS, AND TURNING VANES.
7. DEDICATED EXHAUST AND VENTILATION COMPONENTS AND MAKEUP AIR SYSTEMS.

1.4 DUCT SCHEDULE

- A. ALL DUCTS SHALL BE GALVANIZED STEEL EXCEPT AS FOLLOWS:
8. MOIST ENVIRONMENT DUCT MATERIAL: ALUMINUM.

END OF SECTION 233113

SECTION 233713 - DIFFUSERS, REGISTERS, AND GRILLES

1.1 PRODUCTS

- A. DIFFUSERS, REGISTERS AND GRILLES SHALL BE FURNISHED AND INSTALLED FOR CAPACITIES AND IN LOCATIONS INDICATED ON DRAWINGS. ALL REGISTERS AND DIFFUSERS SHALL BE PRIME COATED STEEL OR EXTRUDED ALUMINUM FINISHED UNLESS OTHERWISE NOTED IN BAKED WHITE ENAMEL.
B. MANUFACTURERS: TITUS
1. SUBJECT TO COMPLIANCE WITH REQUIREMENTS, PROVIDE PRODUCT BY ONE OF THE FOLLOWING:
a. CARNES.
b. HART & COOLEY INC.
c. KRUEGER.
d. METALAIR, INC.
e. NAILOR INDUSTRIES INC.

- C. ALL DIFFUSERS SHALL HAVE CONTROLLING/EQUALIZING GRID AND OPPOSED BLADE DAMPER UNLESS OTHERWISE NOTED.
D. ALL DUCTED RETURN REGISTERS SHALL HAVE AN OPPOSED BLADE DAMPER UNLESS OTHERWISE NOTED.

END OF SECTION 233713



PIPING INSULATION

- A. INSULATE ALL PIPING IN ACCORDANCE WITH INSULATION SCHEDULE EXCEPT AS OTHERWISE NOTED.

SERVICE	INSULATION SCHEDULE - PIPING		
	SIZE	THICKNESS	MATERIAL FINISH
CONDENSER DRAIN PIPING (IF RUNNING THROUGH EXTERIOR WALL)	1.0"		P-6

B. MATERIAL:

- 1) TYPE P-1: MINIMUM 4 LB DENSITY MOLDED FIBERGLASS, MAXIMUM 0.24 K-FACTOR AT 75 DEG F MEAN TEMPERATURE WITH FACTORY-APPLIED FIRE-RETARDANT FOIL-SKRIM-KRAFT FACING. ALL SERVICE JACKET. SIMILAR TO OWENS-CORNING 650 ASJ.
- 2) TYPE P-3: MINIMUM 4 LB DENSITY MOLDED FIBERGLASS FITTING, MAXIMUM 0.23 K-FACTOR AT 75 DEG F MEAN TEMPERATURE SIMILAR TO EPOLUX HAMFAB MOLDED FITTINGS.
- 3) TYPE P-4: MINIMUM 1 LB DENSITY FIBERGLASS FITTING INSERTS, MAXIMUM 0.27 K-FACTOR AT 75 DEG F MEAN TEMPERATURE SIMILAR TO MANVILLE HI-LO TEMP INSULATION INSERTS.
- 4) TYPE P-6: MINIMUM 6 LB MOLDED FOAMED PLASTIC. MAXIMUM 0.27 K-FACTOR AT 75 DEG F MEAN TEMPERATURE. MAXIMUM 0.17 PERMEANCE. SIMILAR TO ARMSTRONG ARMAFLEX II.

C. FINISH:

- 1) TYPE F-1: FITTING COVER, MOLDED WHITE PVC JACKET, UL CLASS 1, MAXIMUM PERMEANCE 0.05 SIMILAR TO MANVILLE ZESTRON.
- 2) TYPE F-2: WHITE VAPOR BARRIER COATING WITH 10X10 OR 20X20 MESH WHITE GLASS, POLYESTER OR NYLON CLOTH REINFORCING MEMBRANE, MINIMUM 31 MIL DRY FILM THICKNESS, SIMILAR TO FOSTER TITE-FIT, UL LABEL.
- 3) TYPE F-4: ALUMINUM JACKETING WITH MINIMUM 0.016 IN. WALL THICKNESS AND LONGITUDINAL JOINTS WITH LOCK SEAMS.
- 4) TYPE F-6: WHITE FINISHING AND INSULATING CEMENT APPLIED OVER HEXAGONAL WIRE MESH. CEMENT SIMILAR TO KEENE SUPERSLICK.

D. INSTALLATION:

- 3) BEFORE APPLYING INSULATION ALL PRESSURE AND LEAK TESTS SHALL BE COMPLETED AND APPROVED.
- 4) ALL INSULATION SHALL BE BUTTED FIRMLY TOGETHER. PROVIDE 2 IN. LAMP STRIPS AT ALL SEAMS SECURED WITH ADHESIVE. USE VAPOR BARRIER TAPE AND VAPORSEAL ADHESIVE WHERE REQUIRED. STAPLES NOT PERMITTED. REFRIGERANT PIPING INSULATION SHALL HAVE MITERED FITTINGS.
- 5) ALL INSULATION AND VAPOR BARRIERS SHALL BE CONTINUOUS PASSING THROUGH SLEEVES, HANGERS, ETC., OR OTHER OPENINGS. PROVIDE SADDLES OR SHIELDS FOR PROTECTION AT ALL HANGINGS.
- 6) INSULATION FOR STRAINERS OR OTHER FITTINGS OR ACCESSORIES REQUIRING SERVICING OR INSPECTION SHALL HAVE INSULATION REMOVABLE AND REPLACEABLE WITHOUT DAMAGE.

THERMOSTATIC CONTROLS:

A. 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.

B. 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.

C. SETBACK CONTROLS:

THERMOSTATIC SETBACK CONTROLS SHALL BE CONFIGURED TO SET BACK OR TEMPORARILY OPERATE THE SYSTEM TO MAINTAIN ZONE TEMPERATURES DOWN TO 55°F (13°C) OR UP TO 85°F (29°C).

D. AUTOMATIC SETBACK AND SHUTDOWN.

AUTOMATIC TIME CLOCK OR PROGRAMMABLE CONTROLS SHALL BE CAPABLE OF STARTING AND STOPPING THE SYSTEM FOR SEVEN DIFFERENT DAILY SCHEDULES PER WEEK AND RETAINING THEIR PROGRAMMING AND TIME SETTING DURING A LOSS OF POWER FOR NOT FEWER THAN 10 HOURS. ADDITIONALLY, THE CONTROLS SHALL HAVE A MANUAL OVERRIDE THAT ALLOWS TEMPORARY OPERATION OF THE SYSTEM FOR UP TO 2 HOURS; A MANUALLY OPERATED TIMER CONFIGURED TO OPERATE THE SYSTEM FOR UP TO 2 HOURS; OR AN OCCUPANCY SENSOR.

E. SETPOINT 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 SETPOINT FROM EXCEEDING THE COOLING SETPOINT MINUS ANY APPLICABLE PROPORTIONAL BAND.

SEQUENCE OF OPERATIONS

1) FIRE DAMPER

a) FIRE OPERATION

WHEN TEMPERATURES IN EXCESS OF 165°F/74°C (212°F/100°C, 250°F/121°C OR 350°F/177°C OPTIONAL) ARE DETECTED, THE DAMPER WILL CLOSE AND LOCK. AT NO TIME SHALL THE DAMPER BE DISENGAGED FROM THE ACTUATOR. UPON CESSATION OF THE FIRE CONDITIONS, THE DAMPER CAN BE REOPENED BY PRESSING THE RESET BUTTON LOCATED ON THE DAMPER ASSEMBLY.

2)

AC UNITS: UNIT SHALL BE STARTED AND STOPPED BY WALL MOUNTED PROGRAMMABLE THERMOSTAT. DURING "ON" MODE UNIT THERMOSTAT SHALL ENERGIZE COMPRESSOR(S) AND SUPPLY FAN TO MAINTAIN ROOM SET POINT OF 75°F ADJUSTABLE; WHEN ROOM TEMPERATURE DROPS BELOW SET POINT COMPRESSOR(S) SHALL DE-ENERGIZE AND FAN SHALL REMAIN ON.

EQUIPMENT SPECIFICATIONS

ROOF-TOP UNITS

SIZE RANGE:

NOMINAL COOLING CAPACITY RANGE: 90,000 TO 150,000 BTU/H  
NOMINAL HEATING CAPACITY RANGE: 120,000 TO 150,000 BTU/H

TRANE MODEL NUMBER:

- 7.5 TON- YS1090A3SOL
- 8.5 TON- YS1102A3SOL
- 10 TON- YS1120A3SOL
- 12.5 TON- YS1150A3SOL

PART 1 - GENERAL

- 1. PACKAGED ROOFTOP UNITS COOLING, HEATING CAPACITIES, AND EFFICIENCIES ARE AHRI CERTIFIED WITHIN SCOPE OF AHRI STANDARD 210-240 FOR 6 TO 25 TONS AND ANSIZ21.47 AND 10 CFR PART 431 PERTAINING TO COMMERCIAL WARM AIR FURNACES (ALL GAS HEATING UNITS).
- 2. CONVERTIBLE AIRFLOW.
- 3. SYMBIO CONTROLS OPERATING RANGE IS FROM 0-125.0 F FROM FACTORY; IF DESIGNING FOR COOLING MODE OPERATION BELOW 40.0 F AMBIENT TEMP, ADD LOW AMBIENT KIT TO ASSURE CONTINUOUS AND RELIABLE OPERATION.
- 4. FACTORY ASSEMBLED, INTERNALLY WIRED, FULLY CHARGED WITH R-410A, AND 100 PERCENT RUN TESTED TO CHECK COOLING OPERATION, FAN AND BLOWER ROTATION, AND CONTROL SEQUENCE BEFORE LEAVING THE FACTORY.
- 5. COLORED AND NUMBERED WIRING INTERNAL TO THE UNIT FOR SIMPLIFIED IDENTIFICATION.
- 6. UNITS SHALL BE LISTED AND LABELED, CLASSIFIED IN ACCORDANCE FOR CENTRAL COOLING AIR CONDITIONERS.

PART 2 - CASING

- 1. ZINC COATED, HEAVY GAUGE, GALVANIZED STEEL.
- 2. WEATHER RESISTANT PRE-PAINTED METAL WITH GALVANIZED SUBSTRATE.
- 3. MEETS ASTM B117, 672 HOUR SALT SPRAY TEST.
- 4. REMOVABLE SINGLE SIDE MAINTENANCE ACCESS PANELS.
- 5. LIFTING HANDLES IN MAINTENANCE ACCESS PANELS (CAN BE REMOVED AND REINSTALLED BY REMOVING FASTENERS WHILE PROVIDING A WATER AND AIR TIGHT SEAL).
- 6. EXPOSED VERTICAL PANELS AND TOP COVERS IN THE INDOOR AIR SECTION INSULATED WITH A CLEANABLE FOIL-FACED, FIRE-RETARDANT PERMANENT, ODORLESS GLASS FIBER MATERIAL.
- 7. BASE PAN SHALL HAVE NO PENETRATIONS WITHIN THE PERIMETER OF THE CURB OTHER THAN THE RAISED 1 INCH HIGH DOWNFLOW SUPPLY/RETURN OPENINGS TO PROVIDE AN ADDED WATER INTEGRITY PRECAUTION, IF THE CONDENSATE DRAIN BACKS UP.
- 8. BASE OF THE UNIT INSULATED WITH 1/8 INCH, FOIL-FACED, CLOSED-CELL INSULATION.
- 9. UNIT BASE PROVISIONS FOR FORKLIFT AND/OR CRANE LIFTING ON THREE SIDES OF UNIT.

PART 3 - HAIL GUARDS

- 1. PROVIDES CONDENSER COIL PROTECTION.

PART 4 - MICROCHANNEL COILS

- 1. OPTIMAL HEAT TRANSFER PERFORMANCE DUE TO FLAT, STREAMLINED TUBES WITH SMALL PORTS, AND METALLURGICAL TUBE-TO-FIN BOND.
- 2. REDUCE SYSTEM REFRIGERANT CHARGE BY UP TO 50% LEADING TO BETTER COMPRESSOR RELIABILITY.
- 3. COMPACT ALL-ALUMINUM MICROCHANNEL COILS REDUCE THE UNIT WEIGHT.
- 4. RECYCLABLE ALL ALUMINUM COILS ALL ALUMINUM CONSTRUCTION MINIMIZES GALVANIC CORROSION.
- 5. STRONG ALLUMINUM BRAZED STRUCTURE PROVIDES BETTER FIN PROTECTION.
- 6. FLAT STREAMLINED TUBES MORE DUST RESISTANT AND EASY TO CLEAN.
- 7. COILS LEAK TESTED AT THE FACTORY TO ENSURE THE PRESSURE INTEGRITY.

PART 5 - COMPRESSORS

- 1. ALL UNITS HAVE DIRECT-DRIVE, HERMETIC, SCROLL TYPE COMPRESSORS WITH CENTRIFUGAL TYPE OIL PUMPS.
- 2. SUCTION GAS-COOLED MOTOR WITH VOLTAGE UTILIZATION RANGE OF PLUS OR MINUS 10 PERCENT OF UNIT NAMEPLATE VOLTAGE.
- 3. INTERNAL OVERLOADS STANDARD WITH SCROLL COMPRESSORS.
- 4. CRANKCASE HEATERS ARE STANDARD ON ALL COMPRESSORS.
- 5. ALL UNITS HAVE DUAL COMPRESSORS.
- 6. THREE STAGES OF COOLING AVAILABLE ON 6 TO 17.5 TONS UNITS AND FOUR STAGES OF COOLING AVAILABLE ON 20 AND 25 TONS UNITS.

PART 6 - FILTERS

- 1. TWO INCH PLEATED MEDIA FILTERS SHALL BE AVAILABLE ON ALL MODELS.

PART 7 - FROSTAT

- 1. UTILIZED AS A SAFETY DEVICE.
- 2. OPENS TO PREVENT FREEZING TEMPERATURES ON EVAPORATOR COIL.
- 3. TEMPERATURE WILL NEED TO RISE TO 50°F BEFORE CLOSING.
- 4. UTILIZED IN LOW AIRFLOW OR HIGH OUTSIDE AIR APPLICATIONS (COOLING ONLY).

PART 8 - GAS HEATING SECTION

- 1. THE HEATING SECTION SHALL HAVE A PROGRESSIVE TUBULAR HEAT EXCHANGER WITH CORROSION-RESISTANT ALUMINIZED STEEL TUBES AND BURNERS AS STANDARD ON ALL MODELS.
- 2. STAINLESS STEEL HEAT EXCHANGER WITH 409 STAINLESS STEEL TUBES AND 439 STAINLESS STEEL BURNERS SHALL BE OPTIONAL.
- 3. INDUCED DRAFT COMBUSTION BLOWER SHALL BE USED TO PULL THE COMBUSTION PRODUCTS THROUGH THE FIRING TUBES.
- 4. HEATER SHALL USE A DIRECT SPARK IGNITION (DSI) SYSTEM.
- 5. ON INITIAL CALL FOR HEAT, THE COMBUSTION BLOWER SHALL PURGE THE HEAT EXCHANGER FOR 20 SECONDS BEFORE IGNITION.
- 6. AFTER THREE UNSUCCESSFUL IGNITION ATTEMPTS, ENTIRE HEATING SYSTEM SHALL BE LOCKED OUT UNTIL MANUALLY RESET AT THE THERMOSTAT/ZONE SENSOR.
- 7. UNITS SHALL BE SUITABLE FOR USE WITH NATURAL GAS OR PROPANE (FIELD-INSTALLED KIT).

PART 9 - HEAT EXCHANGER

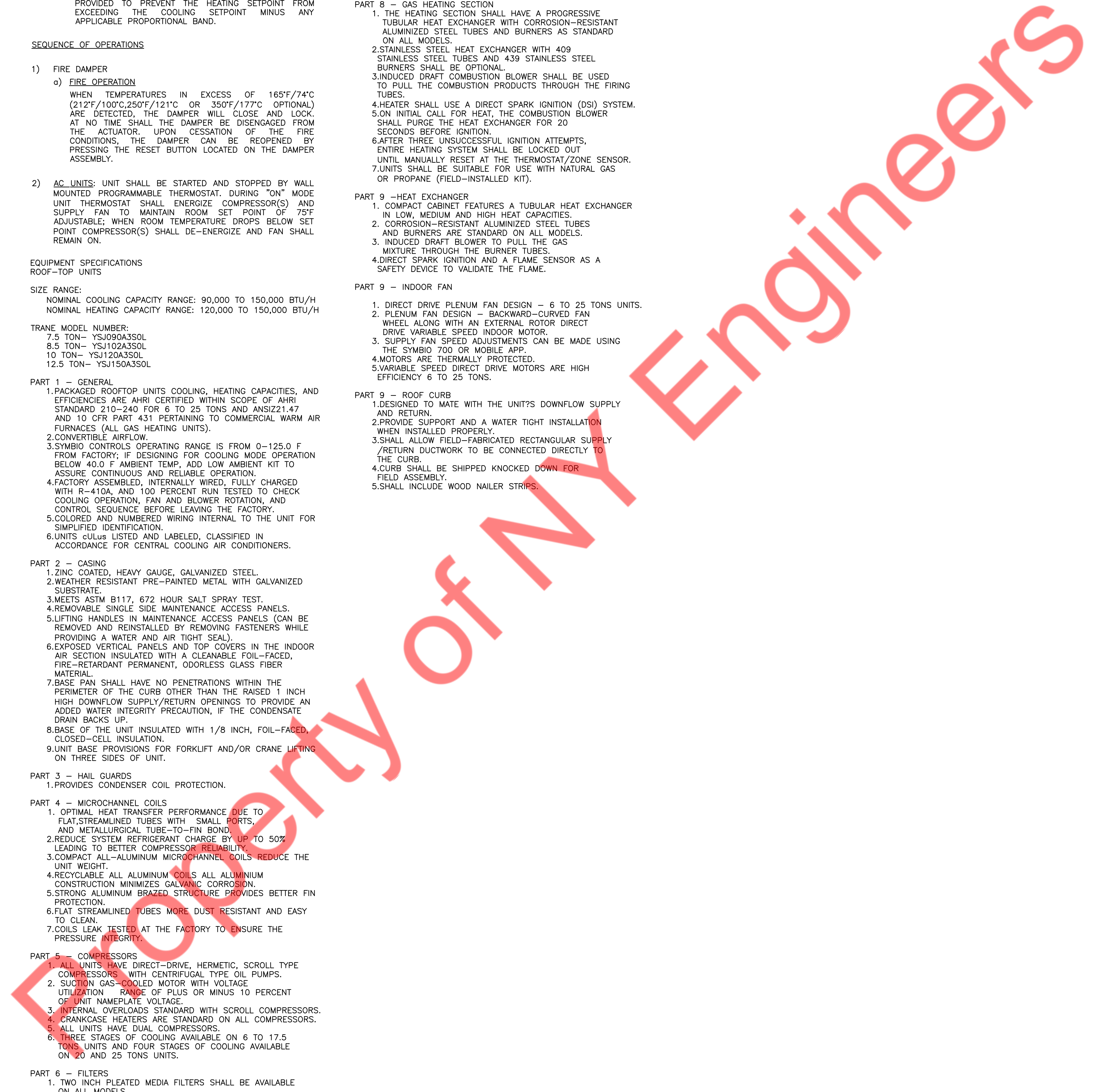
- 1. COMPACT CABINET FEATURES A TUBULAR HEAT EXCHANGER IN LOW, MEDIUM AND HIGH HEAT CAPACITIES.
- 2. CORROSION-RESISTANT ALUMINIZED STEEL TUBES AND BURNERS ARE STANDARD ON ALL MODELS.
- 3. INDUCED DRAFT BLOWER TO PULL THE GAS MIXTURE THROUGH THE BURNER TUBES.
- 4. DIRECT SPARK IGNITION AND A FLAME SENSOR AS A SAFETY DEVICE TO VALIDATE THE FLAME.

PART 9 - INDOOR FAN

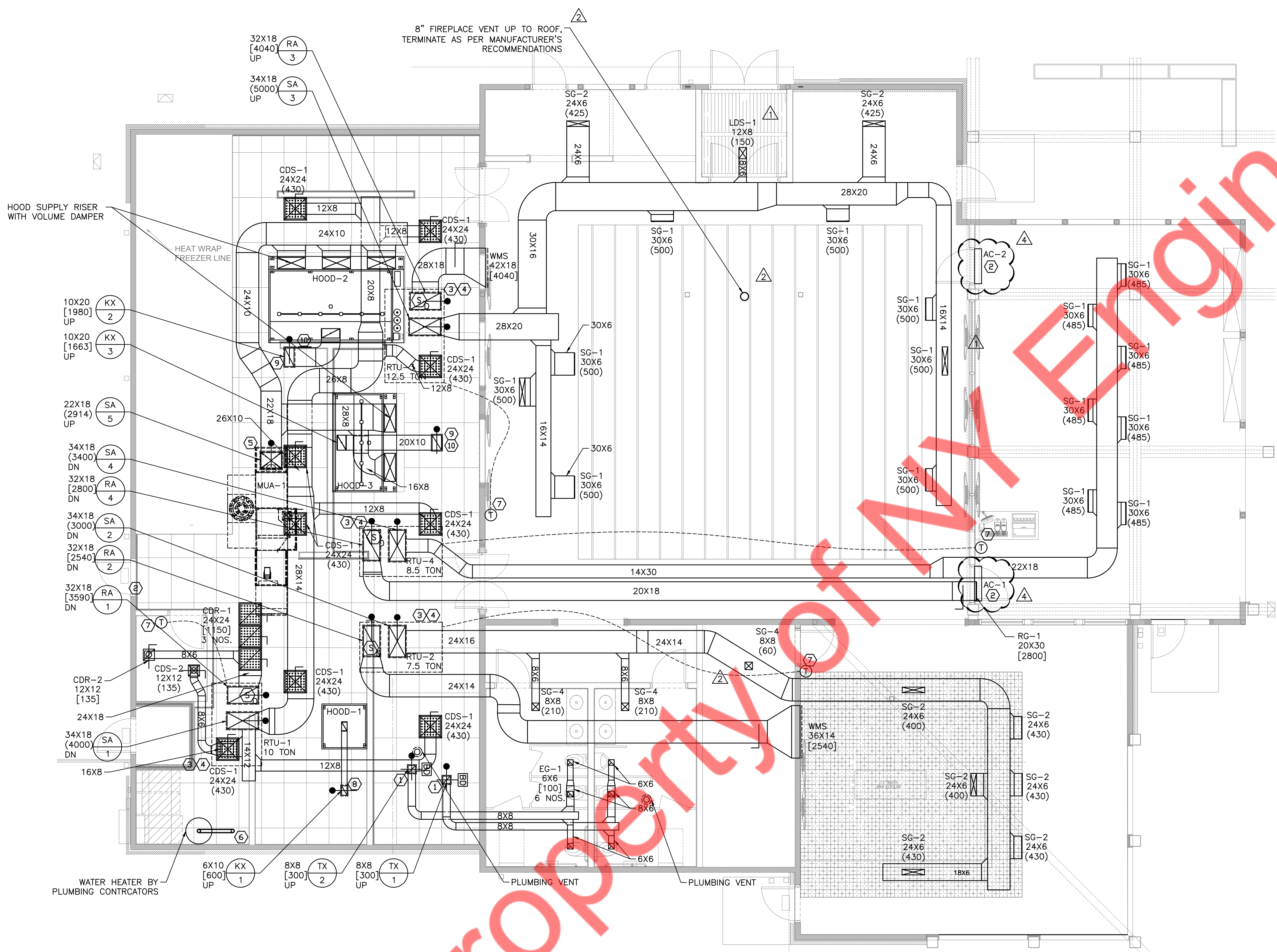
- 1. DIRECT DRIVE PLENUM FAN DESIGN - 6 TO 25 TONS UNITS.
- 2. PLENUM FAN DESIGN - BACKWARD-CURVED FAN WHEEL ALONG WITH AN EXTERNAL ROTOR DIRECT DRIVE VARIABLE SPEED INDOOR MOTOR.
- 3. SUPPLY FAN SPEED ADJUSTMENTS CAN BE MADE USING THE SYMBIO 700 OR MOBILE APP.
- 4. MOTORS ARE THERMALLY PROTECTED.
- 5. VARIABLE SPEED DIRECT DRIVE MOTORS ARE HIGH EFFICIENCY 6 TO 25 TONS.

PART 9 - ROOF CURB

- 1. DESIGNED TO MATE WITH THE UNIT'S DOWNFLOW SUPPLY AND RETURN.
- 2. PROVIDE SUPPORT AND A WATER TIGHT INSTALLATION WHEN INSTALLED PROPERLY.
- 3. SHALL ALLOW FIELD-FABRICATED RECTANGULAR SUPPLY /RETURN DUCTWORK TO BE CONNECTED DIRECTLY TO THE CURB.
- 4. CURB SHALL BE SHIPPED KNOCKED DOWN FOR FIELD ASSEMBLY.
- 5. SHALL INCLUDE WOOD NAILER STRIPS.







① FIRST FLOOR MECHANICAL PLAN  
SCALE: 3/16" = 1'-0"

**GENERAL NOTES:**

- A. PENETRATIONS OF THE AIR BARRIER SHALL BE CAULKED, GASKETED OR OTHERWISE SEALED IN A MANNER COMPATIBLE WITH THE CONSTRUCTION MATERIALS AND LOCATION. SEALING SHALL ALLOW FOR EXPANSION, CONTRACTION AND MECHANICAL VIBRATION. JOINTS AND SEAMS ASSOCIATED WITH PENETRATIONS SHALL BE SEALED IN THE SAME MANNER OR TAPED. SEALING MATERIALS SHALL BE SECURELY INSTALLED AROUND THE PENETRATION SO AS NOT TO DISLODGE, LOOSEN OR OTHERWISE IMPAIR THE PENETRATIONS' ABILITY TO RESIST POSITIVE AND NEGATIVE PRESSURE FROM WIND, STACK EFFECT AND MECHANICAL VENTILATION.
- B. ALL EQUIPMENT AND MATERIALS WILL BE INSTALLED ACCORDING TO THE MANUFACTURER'S INSTRUCTIONS AND ACCORDING TO THE BEST PRACTICE.
- C. PLUMBING WATER HEATER VENTS SHALL BE INSTALLED AS PER MANUFACTURER'S INSTALLATION MANUAL, LOCAL CODES AND AHJ. COORDINATE WITH PLUMBING CONTRACTOR FOR WATER HEATER LOCATIONS.
- D. ALL DUCTWORK SHALL BE COORDINATED WITH OTHER TRADES.
- E. PROVIDE PROGRAMMABLE THERMOSTATS WITH SUB-BASE AND REMOTE TEMPERATURE SENSOR.
- F. DUCTWORK LOCATED IN EXPOSED CEILING SHALL BE INTERNALLY INSULATED.
- G. PROVIDE DOOR UNDERCUT FOR RESTROOM, MIN. 1/2" FOR MAKE-UP AIR.
- H. ALL DUCT SIZES SHOWN ON MECHANICAL FLOOR PLANS ARE CLEAR INSIDE DIMENSIONS. INTERNAL INSULATION THICKNESS OF DUCTS SHALL BE CONSIDERED SEPARATELY.
- I. PROVIDE ACOUSTICAL LINING FOR THE FIRST 10 FT OF SUPPLY AND RETURN DUCTWORK AS PER FRANCHISEE REQUIREMENTS.

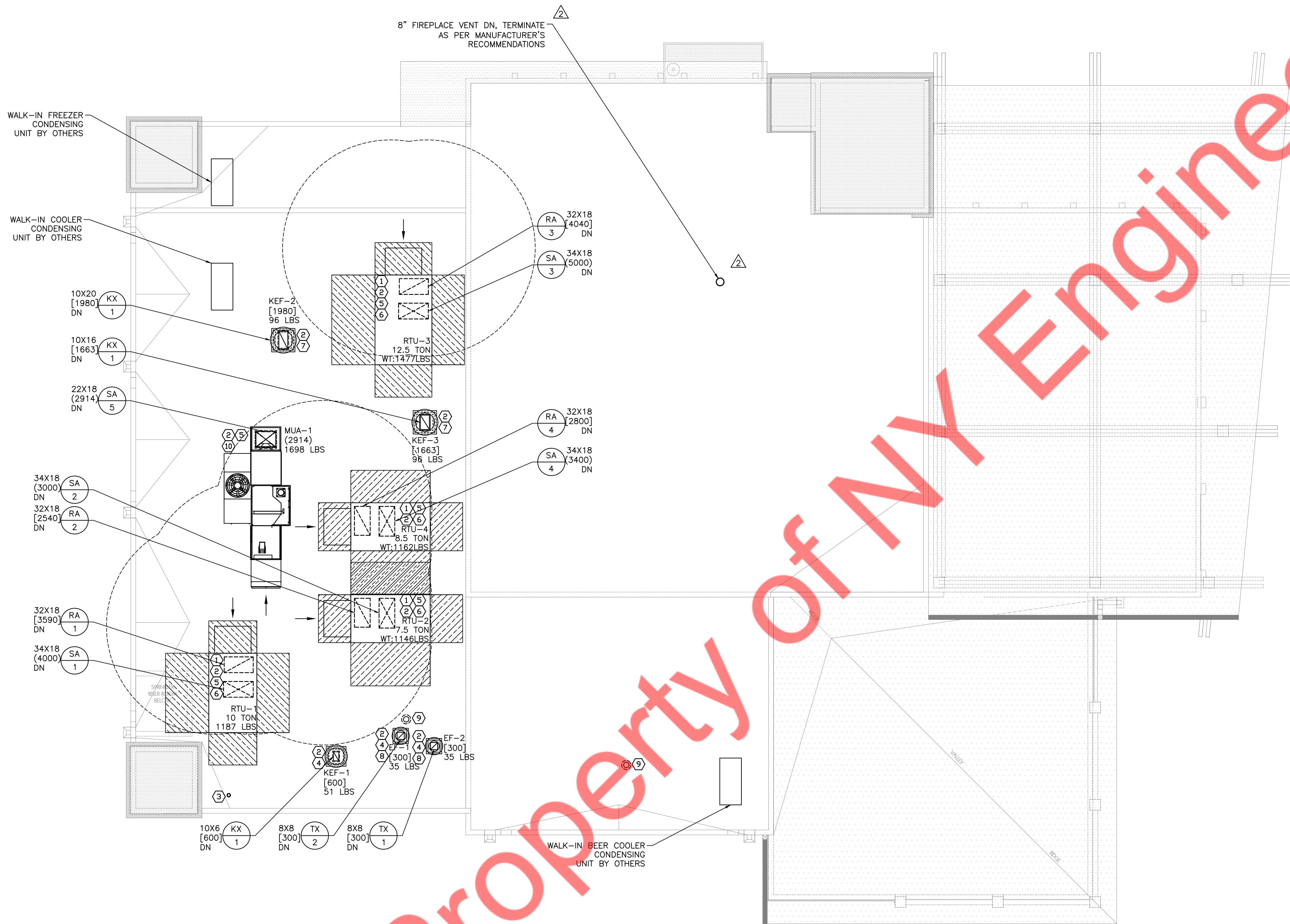
**MECHANICAL KEYED NOTES:**

- ① EXHAUST DUCT UP TO ROOF MOUNTED FAN. REFER TO DETAIL #2 ON SHEET M-502. PROVIDE OFFSET AND TRANSITION AS NEEDED. PROVIDE GRAVITY/ BACKDRAFT DAMPER AND FIRE DAMPER AT ROOF PENETRATION AS REQUIRED BY LOCAL CODES.
- ② PROVIDE AIR CURTAINS AS SHOWN PLANS. VERIFY AIR CURTAIN MOUNTING LEVEL AS PER DOOR HEIGHT. COORDINATE COLOR/FINISH WITH ARCHITECT.
- ③ EXTEND FULL SIZE SUPPLY AND RETURN DUCTWORK FROM ROOFTOP UNIT TO SPACE, EXTEND AS SHOWN. PROVIDE FIRE DAMPER AT ROOF PENETRATION AS REQUIRED BY LOCAL CODES.
- ④ MECHANICAL CONTRACTOR TO FURNISH AND INSTALL SMOKE DETECTOR IN THE RETURN AIR DUCT, IN ACCORDANCE WITH LOCAL CODES. DUCT SMOKE DETECTOR SHALL BE WIRED TO SHUT DOWN RESPECTIVE RTU UNDER FIRE CONDITIONS BY ELECTRICAL CONTRACTOR.
- ⑤ EXTEND FULL SIZE SUPPLY DUCTWORK FROM MAKE-UP AIR UNIT TO SPACE, EXTEND AS SHOWN. PROVIDE FIRE DAMPER AT ROOF PENETRATION AS REQUIRED BY LOCAL CODES.
- ⑥ FURNISH AND INSTALL 3"ø/4"ø WATER HEATER CONCENTRIC VENT TO ROOF. ROUTE VENT PIPING FROM RESPECTIVE UNIT TO LOCATION INDICATED ON ROOF PLAN. ROUTE PIPING WITH MINIMAL AMOUNT OF BENDS AND MINIMUM LENGTH AS REQUIRED BY RESPECTIVE UNIT MANUFACTURER'S REQUIREMENTS. COORDINATE WITH PLUMBING CONTRACTOR.
- ⑦ COORDINATE THERMOSTAT FINAL LOCATION WITH ARCHITECT. AVOID SOURCES OF HEAT.
- ⑧ 6X10 DUCT SERVING TYPE-2 KITCHEN HOOD (HOOD -1), PROVIDE OFFSET AND TRANSITION AS NECESSARY TO CONNECT TO EXHAUST HOOD. REFER TO HOOD DETAILS ON SHEETS FROM M-401.
- ⑨ 10X20 GREASE DUCT SERVING TYPE-1 KITCHEN HOOD (HOOD -2& HOOD-3), PROVIDE OFFSET AND TRANSITION AS NECESSARY TO CONNECT TO EXHAUST HOOD. REFER TO HOOD DETAILS ON SHEETS FROM M-401.
- ⑩ PROVIDE CLEAN OUT ON SIDE OF THE GREASE DUCT OF DIMENSION 14X10.

**THERMOSTATIC CONTROLS:**

- A. 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.
- B. 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: THERMOSTATS THAT REQUIRE MANUAL CHANGEOVER BETWEEN HEATING AND COOLING MODES.
- C. 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 SETPOINT 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 SETPOINT ADJUSTABLE UP TO 90°F OR HIGHER OR TO PREVENT HIGH SPACE HUMIDITY LEVELS.
- D. AUTOMATIC SHUTDOWN: HVAC SYSTEMS SHALL BE EQUIPPED WITH AT LEAST ONE OF THE FOLLOWING: CONTROLS THAT CAN START AND STOP THE SYSTEM UNDER DIFFERENT TIME SCHEDULES FOR SEVEN DIFFERENT DAY-TYPES PER WEEK 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.
- E. SETPOINT 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 DDG SYSTEMS, SOFTWARE PROGRAMMING) SHALL BE PROVIDED TO PREVENT THE HEATING SETPOINT FROM EXCEEDING THE COOLING SETPOINT MINUS ANY APPLICABLE PROPORTIONAL BAND.





- MECHANICAL KEYED NOTES:**
- EXTEND FULL SIZE SUPPLY AND RETURN DUCTWORK FROM ROOFTOP UNIT TO SPACE, EXTEND AS SHOWN.
  - COORDINATE FINAL LOCATION OF EQUIPMENT WITH STRUCTURAL DRAWINGS.
  - Ø3"/Ø4" CONCENTRIC VENT LINE FOR COMBUSTION AIR INTAKE / EXHAUST FROM GAS FIRED EQUIPMENT TO ROOF TERMINATION KIT. ROUTE PIPING FROM RESPECTIVE UNIT TO LOCATION INDICATED ON ROOF PLAN. ROUTE PIPING WITH MINIMAL AMOUNT OF BENDS AND MINIMUM LENGTH AS REQUIRED BY MANUFACTURER'S REQUIREMENTS.
  - BATHROOM/ DISHWASHER EXHAUST SHALL TERMINATE 3 FEET FROM THE PROPERTY/ LOT LINE, 3 FEET FROM THE OPERABLE OPENING INTO THE BUILDING AND 10 FEET FROM THE MECHANICAL OUTSIDE AIR INTAKE OPENINGS.
  - CONTRACTOR TO FIELD VERIFY THAT THE LOCATION OF ANY EXHAUST SOURCE SHOULD BE AT LEAST 10' AWAY FROM THE RTU'S/MUA'S OUTSIDE AIR INTAKE.
  - CONTRACTOR TO RUN CONDENSATE DRAIN FROM RTU'S AND MAU INDICATED IN DETAIL #4 ON SHEET M-501 . COORDINATE IN FIELD.
  - KITCHEN EXHAUST TERMINATION SHALL TERMINATE 10 FEET FROM PROPERTY/ LOT LINE, 30 INCH ABOVE ROOF, 3 FEET AWAY FROM OPENING INTO BUILDING AND 10 FEET AWAY FROM ANY OUTSIDE AIR INTAKES.
  - VERIFY EXACT LOCATION OF BATHROOM EXHAUST FAN ON THE ROOF PRIOR TO INSTALLATION.
  - Ø4" PLUMBING VENT TERMINATE 3 FEET FROM THE PROPERTY LINE, 3 FEET FROM THE EXTERIOR WALL AND ROOFS, 3 FEET FROM THE OPERABLE OPENING INTO THE BUILDING AND 10 FEET FROM THE OUTSIDE AIR INTAKE OPENINGS.
  - EXTEND FULL SIZE SUPPLY DUCTWORK FROM MAKE-UP AIR UNIT TO SPACE, EXTEND AS SHOWN.

- SEQUENCE OF OPERATION:**
- MUA-1 OPERATION SHALL BE INTERLOCKED WITH HOOD-2 & 3 OPERATION TO SUPPLY THE AIR AT 70-75 DEG F AND 50% RH.
  - RTU-1,RTU-2,RTU-3 & RTU-4 SHALL BE PROVIDED WITH 7-DAY PROGRAMMABLE THERMOSTAT WITH REMOTE TEMPERATURE SENSORS AS INDICATED ON FLOOR PLANS. BOTH THE ROOFTOP UNITS ARE CONSTANT VOLUME SYSTEM AND ARE DESIGNED TO SUPPLY AIR AS INDICATED IN RTU'S SCHEDULE TO MAINTAIN THE SPACE TEMPERATURE OF 70-75 DEG F AND 50% RH.
  - BATHROOM EXHAUST FAN SHALL BE INTERLOCK WITH RTU-2 OPERATION.

1 ROOF MECHANICAL PLAN  
SCALE: 3/16"=1'-0"



**HOOD INFORMATION**

HOOD NO.	MARK	MODEL	HOOD DIMENSIONS (IN.)			HOOD CONSTR.	COOKING LOAD / DUTY RATING	TOTAL CFM	EXHAUST COLLAR(S)					SUPPLY		TOTAL WEIGHT LBS.	SECTION LOCATION
			LENGTH	WIDTH	HEIGHT				WIDTH	LENGTH	DIA.	CFM	S.P.	MUA CFM	AC CFM		
1	27 - DISH	XD1-48-S	48.0	48	24	430 SS 100%		600	6	9		600	0.307			97	SINGLE
2	46.1 - PIZZA	XBEW-132-S	132	78	24	430 SS WHERE EXPOSED	MEDIUM	1980	10	19		1980	0.353	1584		377.505	SINGLE
3	46.2 - GRIDDLE, OVEN	XBEW-105-S	105	54	24	430 SS WHERE EXPOSED	MEDIUM	1663	9	16		1663	0.426	1330		261.93	SINGLE

**HOOD INFORMATION**

HOOD NO.	MARK	LIGHTING DETAILS			BAFFLE FILTRATION DETAILS			UTILITY CABINET(S)					
		FIXTURE TYPE	BULB / LAMP INFO	QTY	FOOT CANDLES	TYPE / MODEL MATERIAL	QTY	SIZE (IN.)	LOCATION	FIRE SYSTEM TYPE	SIZE	MODEL	CONTROLS INTERFACE
1	27 - DISH												
2	46.1 - PIZZA	INCANDESCENT (GLOBE)	100W A19 (BULBS NOT INCL.)	6	50.1	BAFFLE STAINLESS STEEL	7	16	LEFT	ANSUL R102	9	XKC	TOUCHSCREEN
3	46.2 - GRIDDLE, OVEN	INCANDESCENT (GLOBE)	100W A19 (BULBS NOT INCL.)	5	48.27	BAFFLE STAINLESS STEEL	4	16					

**SUPPLY PLENUM INFORMATION**

HOOD NO.	MARK	POS.	TYPE	SIZE (IN.)			INSULATED	DAMPER(S)	LED LIGHT(S)		TOTAL CFM	TOTAL S.P.	COLLARS				VEL.		
				L	W	H			SUPPLIED	QTY			TYPE	MOUNTING	QTY	W		L	DIA.
2	46.1 - PIZZA	FRONT	ASP	144	14	4	NO	YES	NO		1584	0.01	MUA	FACTORY	3	12	30	528	211
3	46.2 - GRIDDLE, OVEN	FRONT	ASP	105	14	4	NO	NO	NO		1330	0.01	MUA	FACTORY	2	12	30	665	266

**HOOD OPTIONS**

18 IN HIGH CEILING ENCLOSURES - FRONT LEFT RIGHT - FIELD INSTALLED  
FACTORY MOUNTED EXHAUST COLLAR(S)

**HOOD OPTIONS**

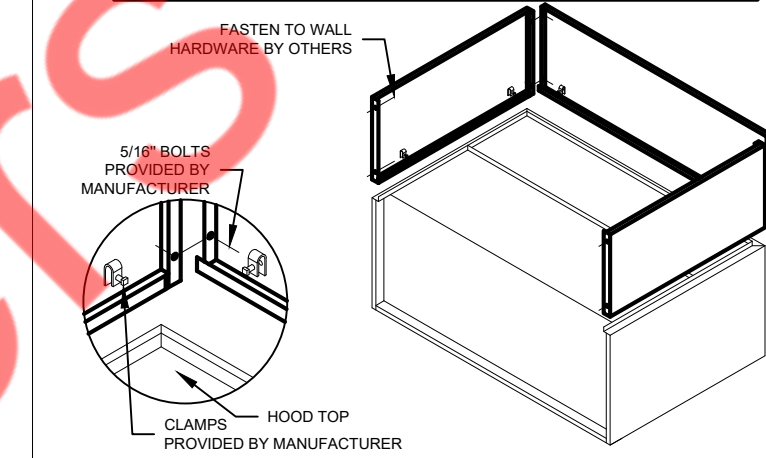
UL 710 LISTED W/ OUT EXHAUST FIRE DAMPER - UL #R25625  
BACK INTEGRAL AIR SPACE - 3 IN WIDE  
18 IN HIGH CEILING ENCLOSURES - FRONT LEFT RIGHT - FIELD INSTALLED  
FACTORY MOUNTED EXHAUST COLLAR(S)  
PERFORMANCE ENHANCING LIP (PEL) TECHNOLOGY  
STANDING SEAM CONSTRUCTION FOR SUPERIOR STRENGTH

**HOOD OPTIONS**

UL 710 LISTED W/ OUT EXHAUST FIRE DAMPER - UL #R25625  
BACK INTEGRAL AIR SPACE - 3 IN WIDE  
18 IN HIGH CEILING ENCLOSURES - FRONT LEFT RIGHT - FIELD INSTALLED  
FACTORY MOUNTED EXHAUST COLLAR(S)  
PERFORMANCE ENHANCING LIP (PEL) TECHNOLOGY  
STANDING SEAM CONSTRUCTION FOR SUPERIOR STRENGTH

contact the Accurex Piedmont office w/ questions:  
Mark Bowman  
mark.bowman@accurex.com  
828.579.1123

**ENCLOSURE PANEL INSTALLATION DETAIL**

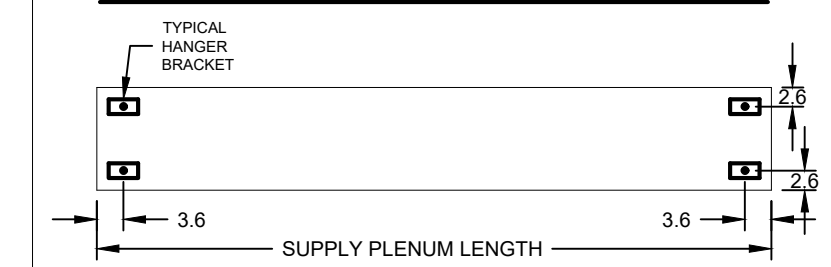


**HOOD HANGING HEIGHT FOR FIRE SYSTEMS**

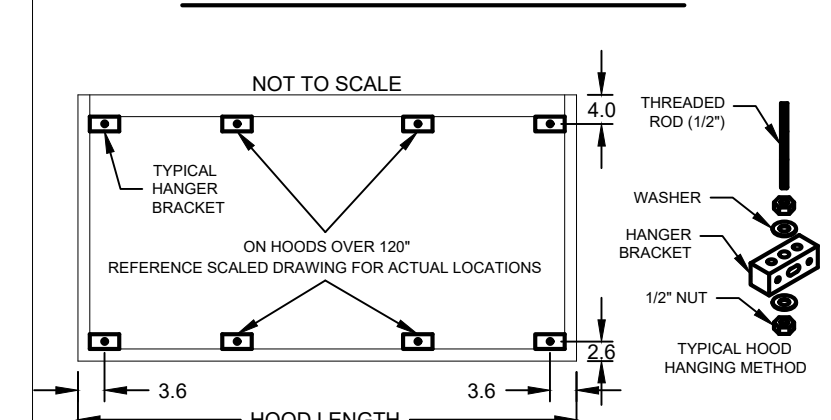
VERIFICATION OF HOOD HANGING HEIGHT ABOVE FINISHED FLOOR (A.F.F.) IS REQUIRED FOR CORRECT PLACEMENT OF FIRE SYSTEM NOZZLES.

- RECOMMENDED HANGING HEIGHT = 90" FROM FINISHED FLOOR TO LOWER FRONT EDGE OF HOOD.
- OTHER HANGING HEIGHT = \_\_\_\_\_" FROM FINISHED FLOOR TO LOWER EDGE OF HOOD.

**SUPPLY PLENUM HANGER BRACKET DETAIL**



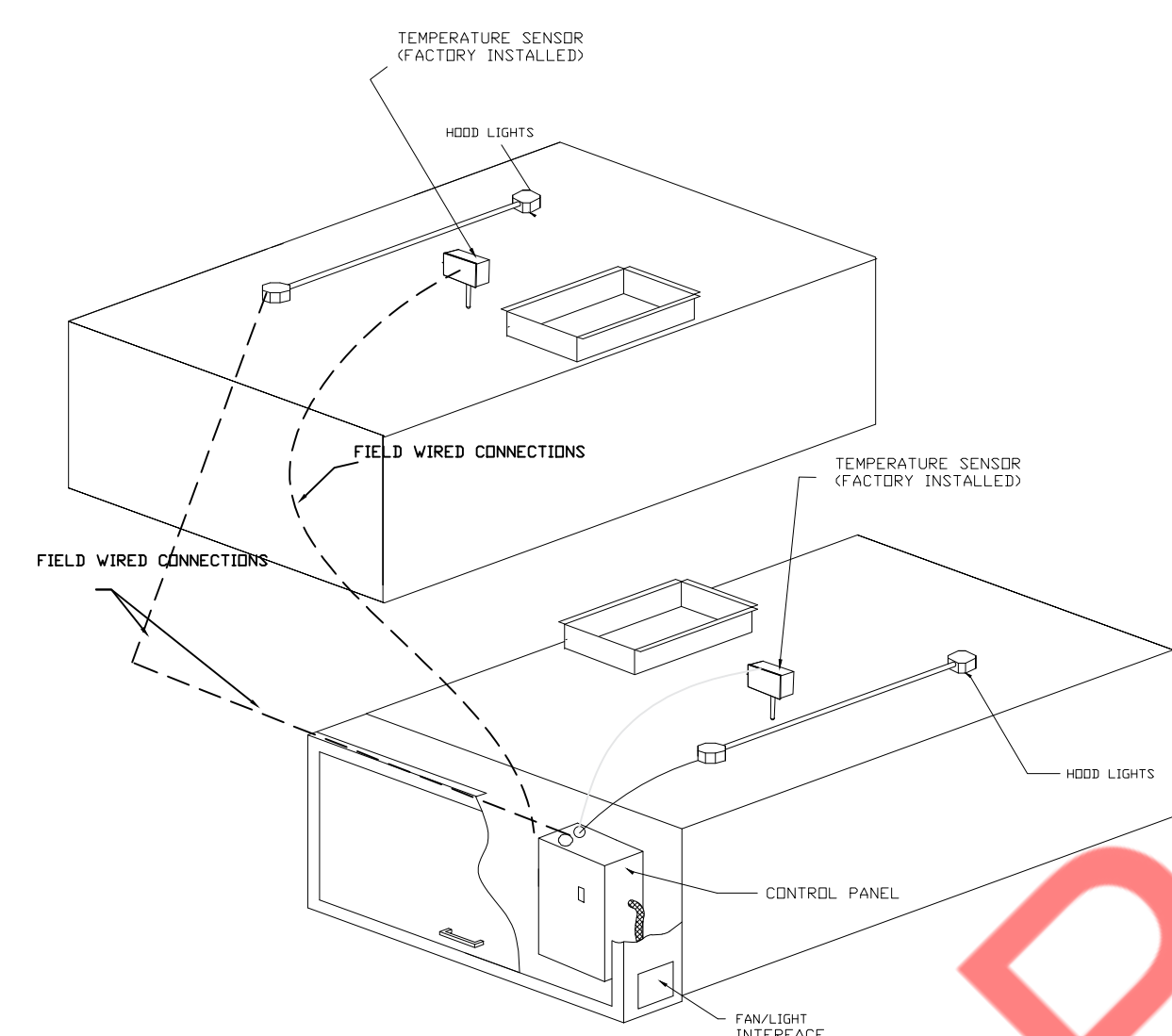
**HOOD HANGER BRACKET DETAIL**



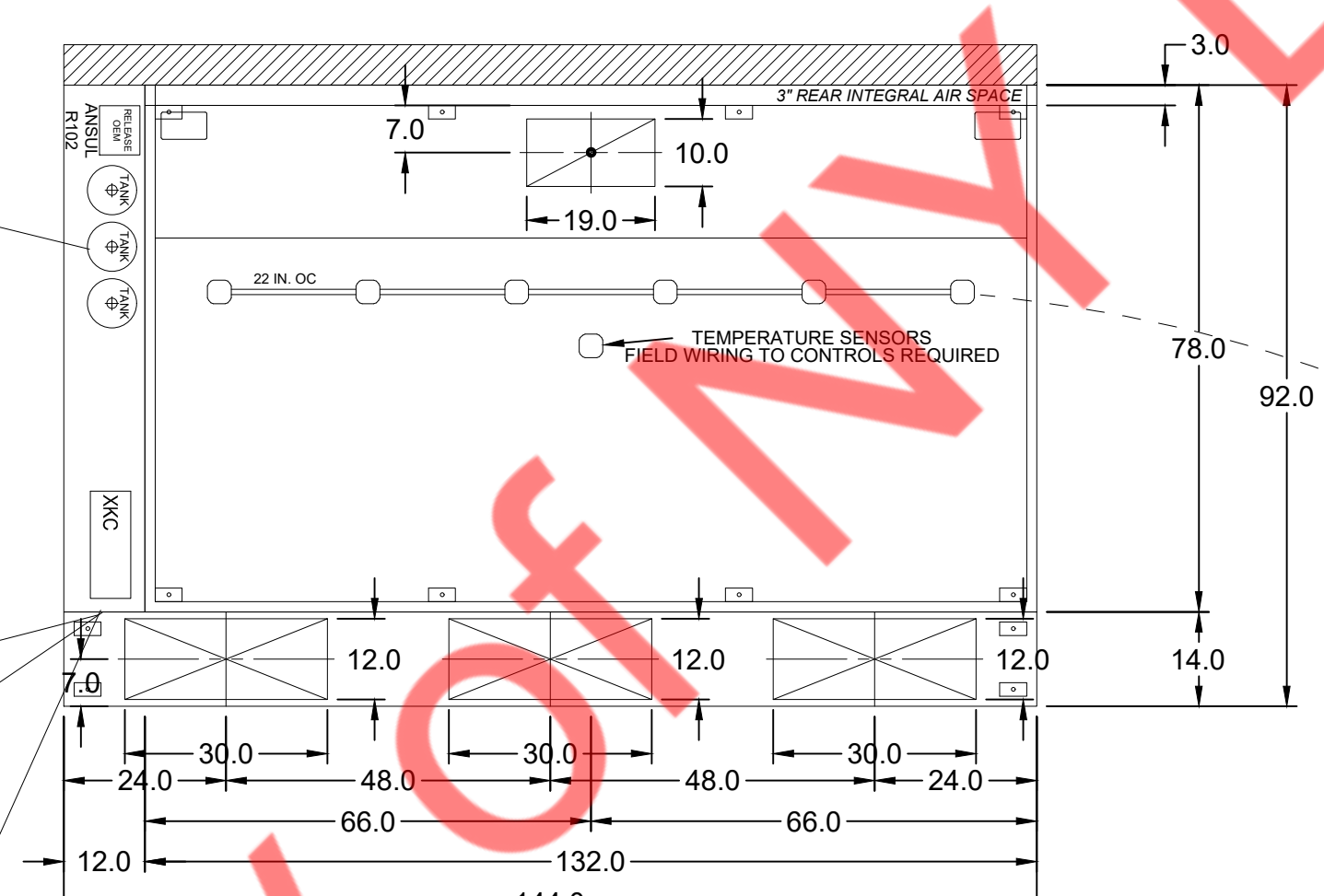
\*\*\* NOTE \*\*\*  
ALL WALLS THAT COME WITHIN 18" OF HOOD MUST BE METAL STUDS AND SHEETROCK. WOOD STUDS NOT ALLOWED.

Fire System

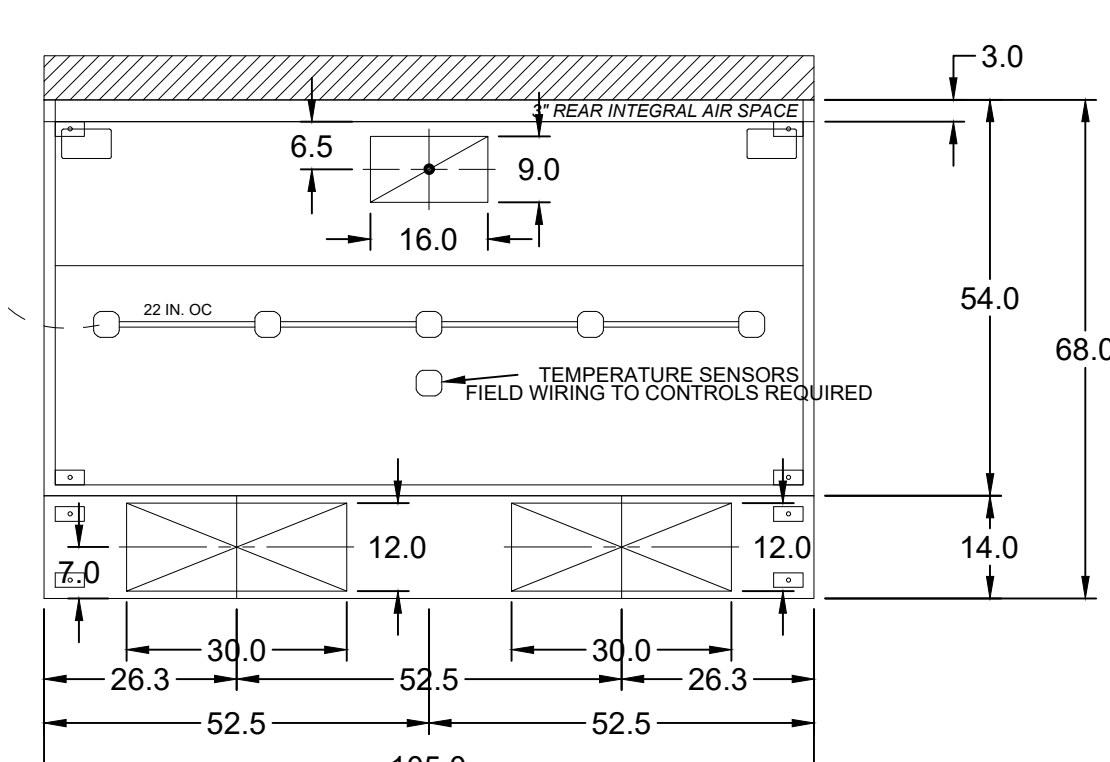
Light/Fan Controls



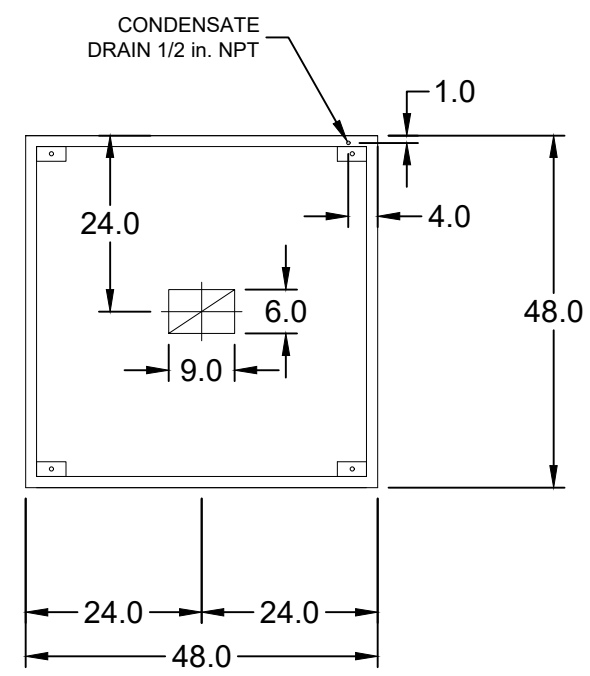
CAT-5 CONNECTION ON REVERSE CONNECTED TO HOOD CONTROL PANEL  
CAN MOUNT IN STANDARD DOUBLE GANG JUNCTION BOX



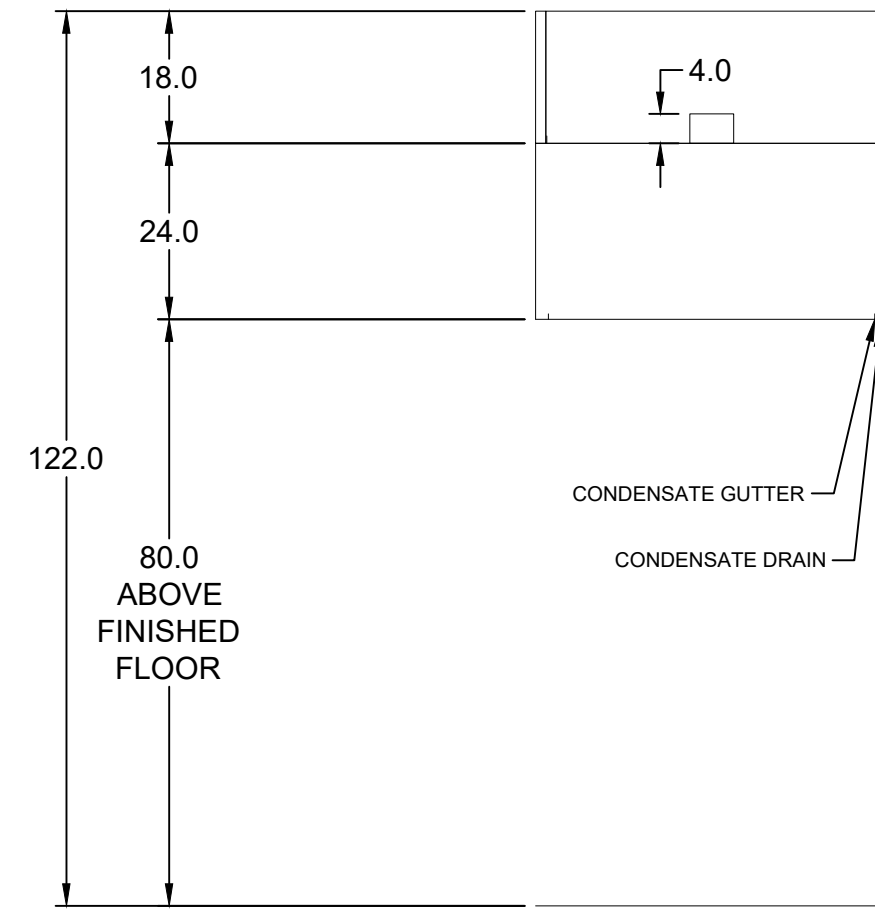
Flex Conduit Between Sections Provided By Others



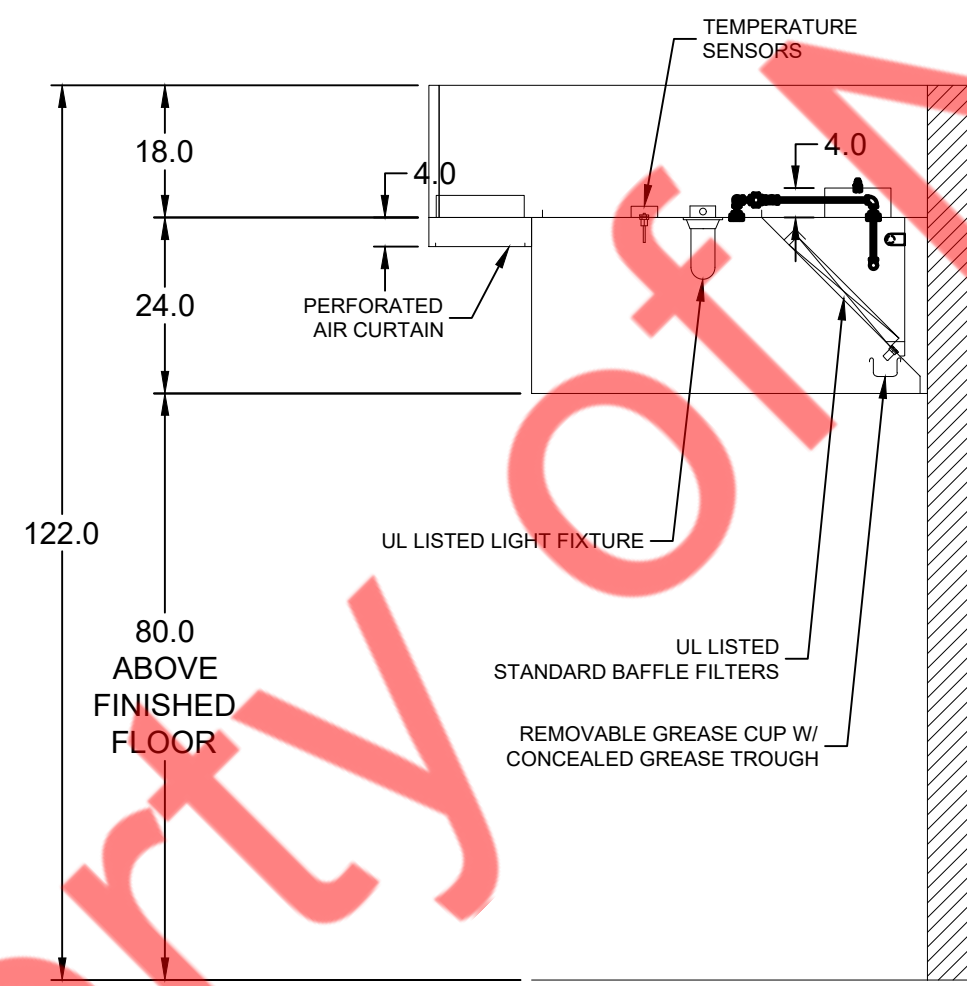
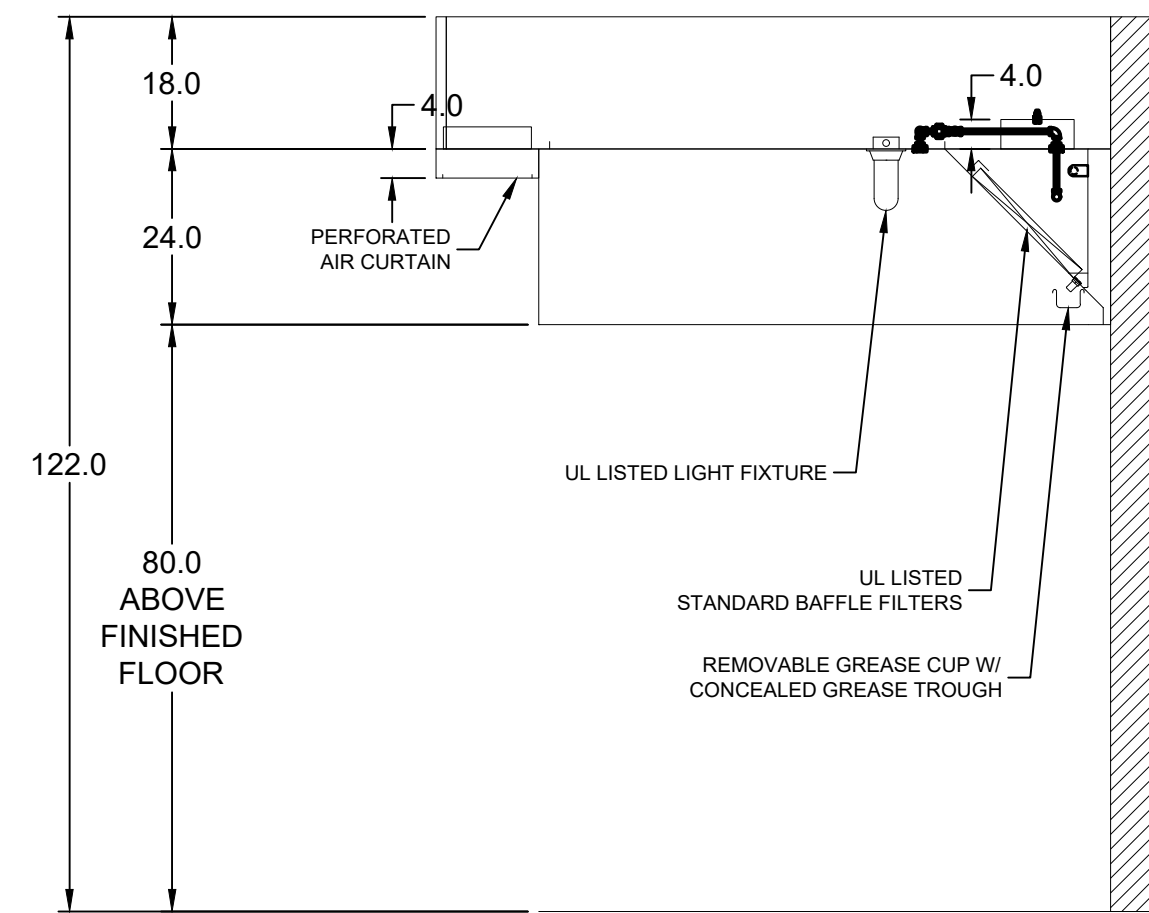




MARK: 27 - Dish - SECTION 1  
PLAN VIEW



MARK: 27 - Dish  
SECTION VIEW



Property of ACCUREX ENGINEERS



**MELLOW MUSHROOM**  
DAWSONVILLE GA

Hood Info

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PROJECT:  
5/11/2023

MARK:  
MARK

PROJECT:  
5/11/2023

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ACCUREX CENTRAL CAROLINAS & CHARLOT  
MARK.BOWMAN@ACCUREX.COM  
MARK.BOWMAN@ACCUREX.COM  
(828)579-1123





Direct Drive Upblast Centrifugal Roof Exhaust Fan

QTY	MARK INFORMATION		FAN INFORMATION					MOTOR INFORMATION					
	MARK	MODEL	VOLUME (CFM)	TOTAL EXTERNAL SP (IN WG)	FAN RPM	OPERATING POWER (HP)	WEIGHT (LB.)	SIZE (HP)	V/C/P	ENCLOSURE	MOTOR RPM	WINDINGS	NEC FLA*
1	KEF-1 (27)	XCUE-099-VG	600	0.807	1,516	0.15	51	0.25	115/60/1	TN	1725	1	5.8
1	KEF-2 (46.1 Pizza)	XCUE-140-A	1,980	1.053	1,536	0.68	96	1	208/60/3	OP	1725	1	4.6
1	KEF-3 (46.2 Griddle, Oven)	XCUE-140-A	1,663	1.026	1,425	0.53	96	1	208/60/3	OP	1725	1	4.6

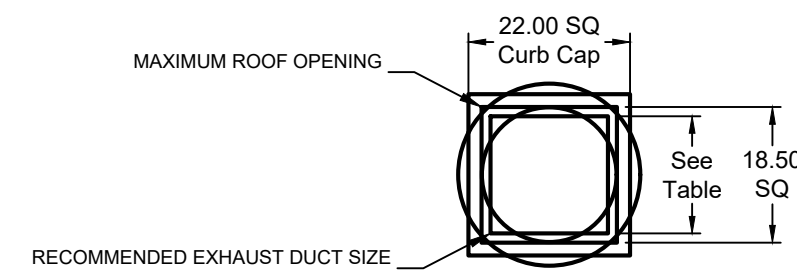
DUCT DIMENSIONS ARE LARGEST POSSIBLE DUCT TO FIT THROUGH CURB.  
CONSULT SYSTEM DESIGN ENGINEER FOR RECOMMENDED DUCT SIZE.

OVERALL HEIGHT MAY BE GREATER DEPENDING ON MOTOR, ADAPTER, AND/OR HINGE BASE.

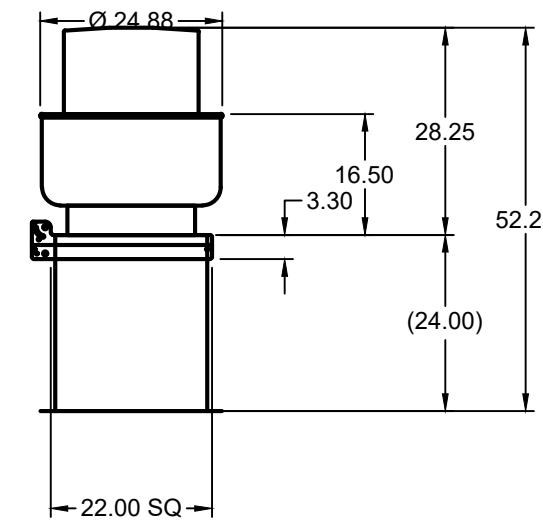
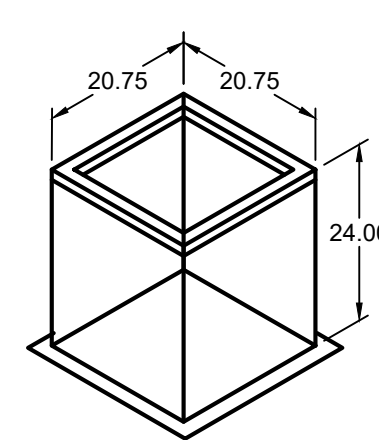
### KEF-1

KEF-1 (27) : SELECTED OPTIONS AND ACCESSORIES

One piece fully welded windband  
Tapered bushing wheel hub  
Breather tube outlet area min. 4.4 sq. in. (sizes 99-480), 2.0 sq. in. (sizes 60-95)  
Min. windband material thickness: 0.051" aluminum (060-240), 0.064" aluminum (240HP, 240XP), 0.080" aluminum (sizes 300-480)  
Larger Curb Cap Size - 22 Square  
UL/cUL 705 Listed - Supplement SC - "Power Ventilators for Restaurant Exh. Appliances" (Formerly UL 762)  
Switch, NEMA-3R, Toggle, Shipped with Unit  
Hinge, Factory Installed



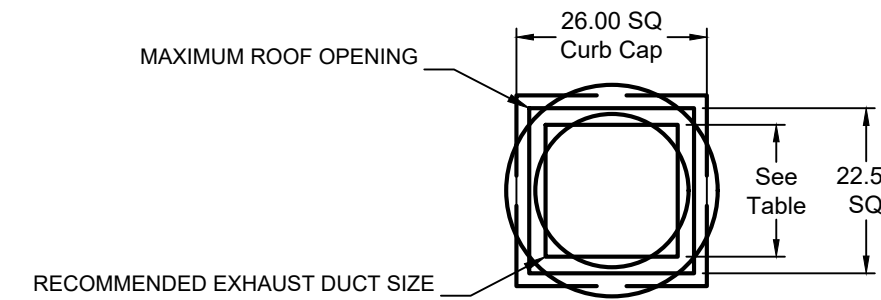
DUCT TYPE	SIZE
STANDARD	16 SQ
FIRE-WRAPPED	8 SQ



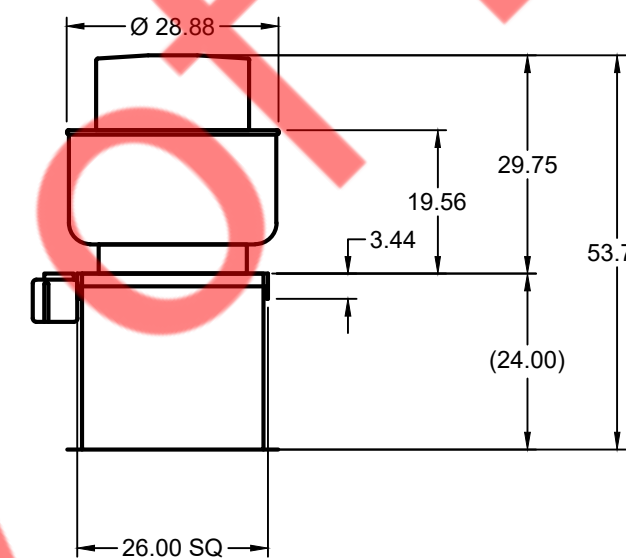
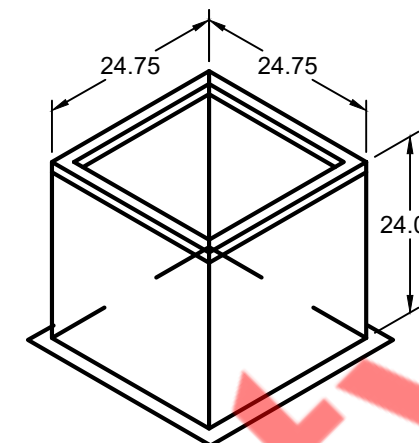
### KEF-2

KEF-2 (46.1 Pizza) : SELECTED OPTIONS AND ACCESSORIES

Motor VFD Rated without Shaft Grounding Protection  
One piece fully welded windband  
Tapered bushing wheel hub  
Breather tube outlet area min. 4.4 sq. in. (sizes 99-480), 2.0 sq. in. (sizes 60-95)  
Min. windband material thickness: 0.051" aluminum (060-240), 0.064" aluminum (240HP, 240XP), 0.080" aluminum (sizes 300-480)  
Larger Curb Cap Size - 26 Square  
UL/cUL 705 Listed - Supplement SC - "Power Ventilators for Restaurant Exh. Appliances" (Formerly UL 762)  
Switch, NEMA-3R, Toggle, Shipped with Unit  
Hinge, Factory Installed  
Grease Trap (PN 475538)



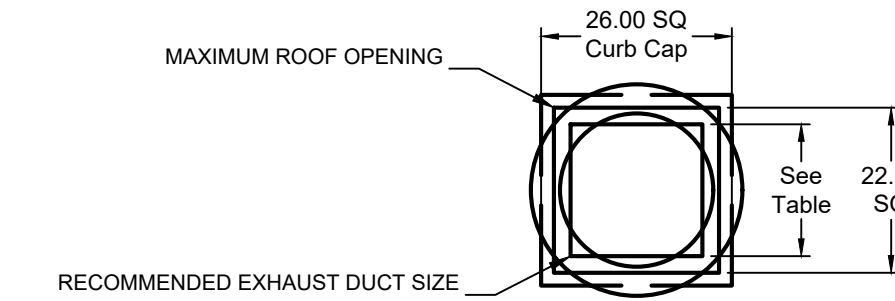
DUCT TYPE	SIZE
STANDARD	18 SQ
FIRE-WRAPPED	12 SQ



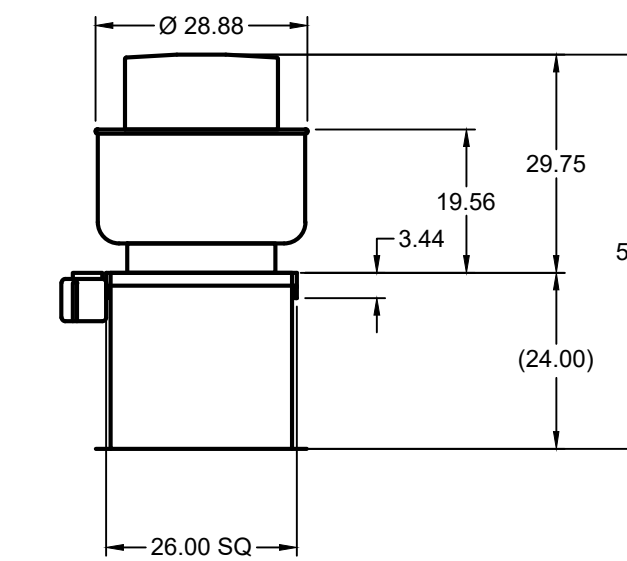
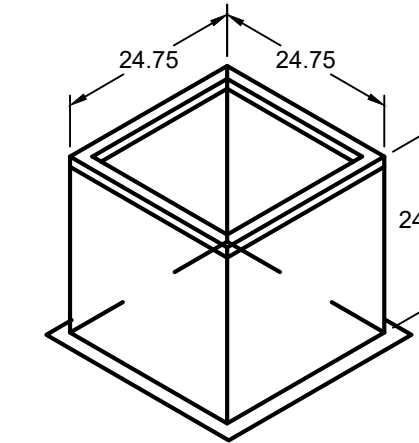
### KEF-3

KEF-3 (46.2 Griddle, Oven) : SELECTED OPTIONS AND ACCESSORIES

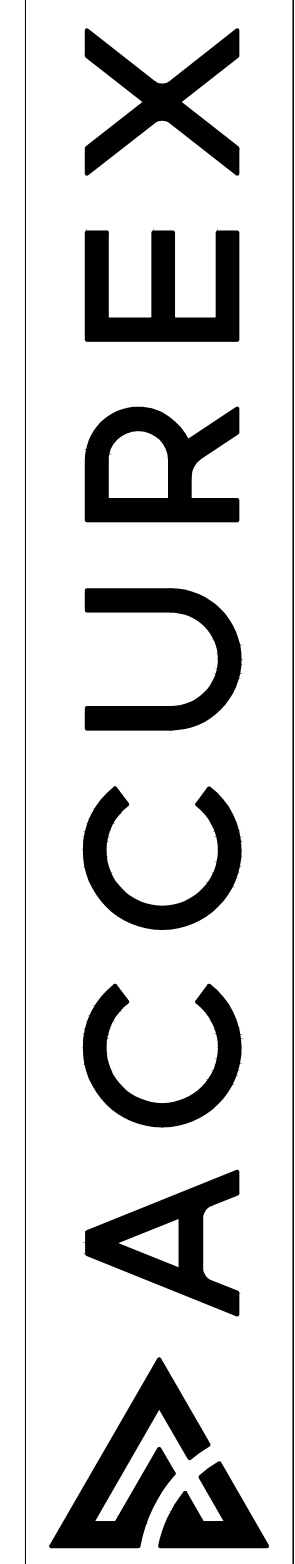
Motor VFD Rated without Shaft Grounding Protection  
One piece fully welded windband  
Tapered bushing wheel hub  
Breather tube outlet area min. 4.4 sq. in. (sizes 99-480), 2.0 sq. in. (sizes 60-95)  
Min. windband material thickness: 0.051" aluminum (060-240), 0.064" aluminum (240HP, 240XP), 0.080" aluminum (sizes 300-480)  
Larger Curb Cap Size - 26 Square  
UL/cUL 705 Listed - Supplement SC - "Power Ventilators for Restaurant Exh. Appliances" (Formerly UL 762)  
Switch, NEMA-3R, Toggle, Shipped with Unit  
Hinge, Factory Installed  
Grease Trap (PN 475538)



DUCT TYPE	SIZE
STANDARD	18 SQ
FIRE-WRAPPED	12 SQ



PROJECT: 5/11/2023  
MARK  
MELLOW MUSHROOM DAWSONVILLE GA  
Exhaust Fans  
UL NSF  
ACCUREX CENTRAL CAROLINAS & CHARLOTTE  
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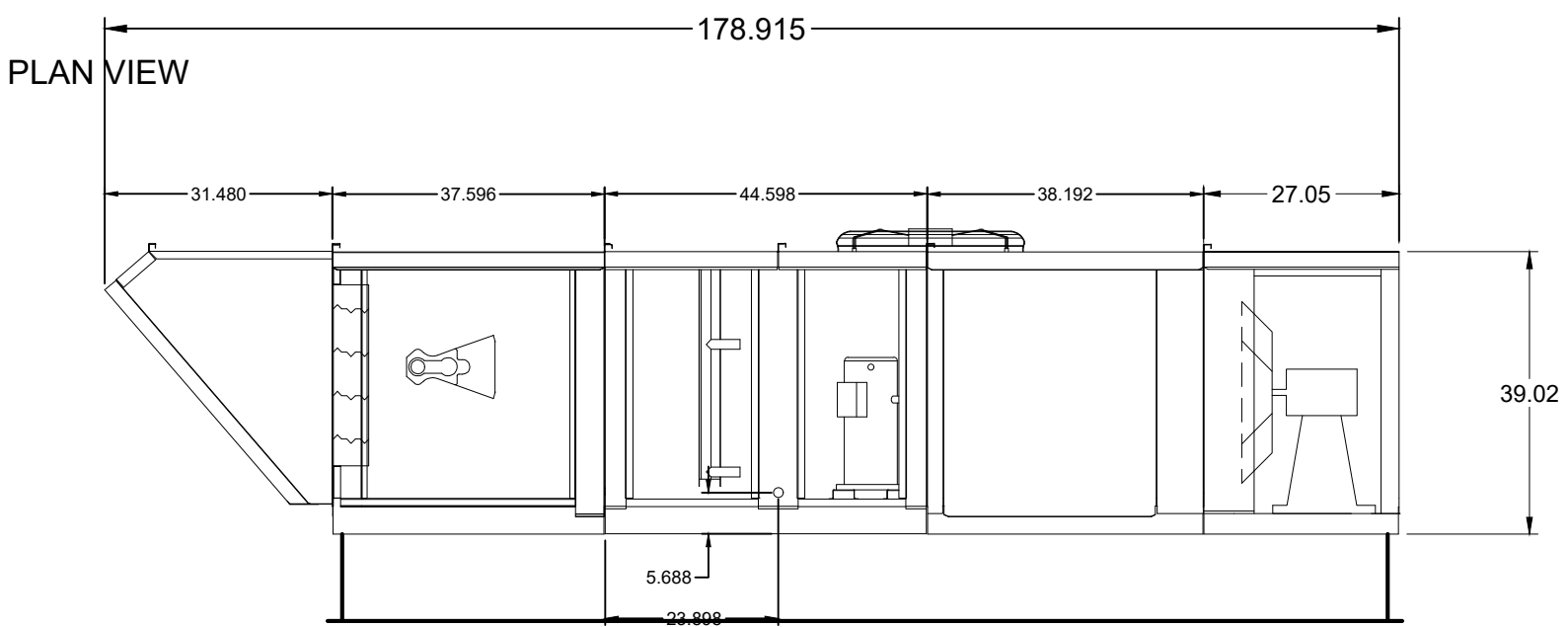
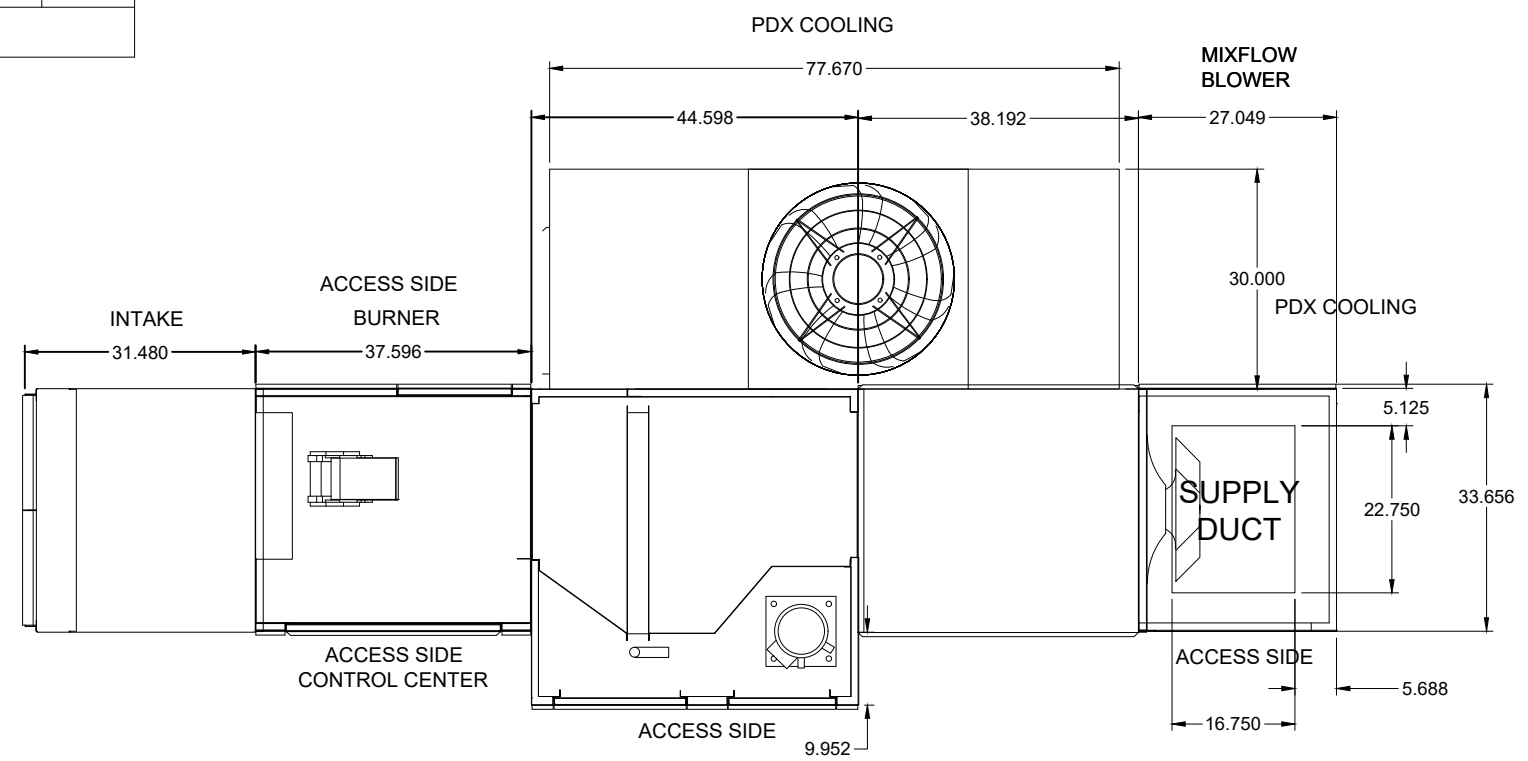


EQUIPMENT SCHEDULE										
<b>Tempered Make-Up Air Unit</b>										
Qty	Accurex Model	Volume	External SP	Total SP	MCA	MCP	Weight	SCCR	Mark: <b>KMUA-1</b>	
1	XDGX-P115-H12-MF-4	2,914 CFM	0.51 in. wg	1,514 in. wg	27.9	40	1,698 lb	5KA		
<b>Motor Information</b>										
Size	V/CP	Enclosure	Motor with Shaft Grounding	Motor RPM	Operating Power					
2 hp	208/60/3	ODP	No	1725	1.32 hp					
<b>Heating</b>										
Type	Gas Type	Temperature	Energy	Connection	Building	Control	Gas Pressure			
Direct Gas	Natural	Winter DB Max Δ 47.4 F Max LAT 70.0 F	Input 162.2 MBH Output 149.2 MBH Efficiency 92%	3/4"	1/2 PSI	Right Hand	7 in. wg 0.5 PSI			
<b>Cooling</b>										
Cooling Type	Coil Model	Rows Deep	Fins Per Inch	Face Velocity	Total Energy	Sensible Energy	Entering Air (F)	Leaving Air (F)		
Packaged DX	DX36501S10-30x30	1	10	466 f/min	55.0 MBH	34.1 MBH	77.7 Dry 77.7 Wet	82.7 F	72.7 F	
Coil SP	Refrigerant	Suction Temp	Liquid Temp	Super Heat	Code 18/19	Suction Conn Qty / Size	Liquid Conn Qty / Size			
NA	R-410a	45.9 F	110 F	8 F	0	NA	NA			
<b>Outlet Sound Power By Octave Band</b>										
62.5	125	250	500	1000	2000	4000	8000	LWA	dBA	Sones
75.3	72.3	75.5	80.3	74.9	74.1	73.2	68.5	81.9	70.9	17.7

**OPTIONS AND ACCESSORIES**

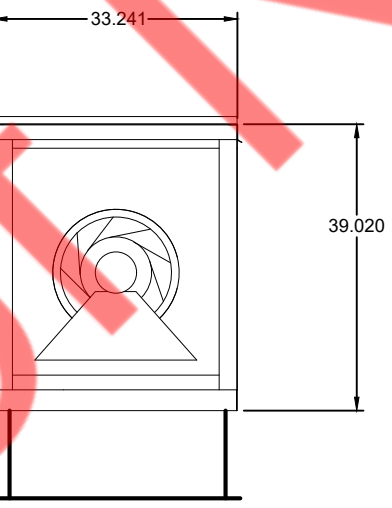
Air Flow Arrangement: Outdoor Air Only  
 Weatherhood: Aluminum Mesh, 16x20x2 - (4)  
 Damper: Inlet  
 Outdoor Air Intake Position: End  
 Discharge Position: Bottom  
 Coating: Galvanized  
 Cooling Coil Coating: None  
 Insulation: Double Wall - Tempering On  
 Supply Fan Control: VFD  
 VFD Control: Constant Volume  
 Access Side: Right-Hand  
 Control Center  
 Heat Inlet Air Sensor  
 Cool Inlet Air Sensor  
 Unit Controls: Terminal Strip  
 Temperature Control: Discharge  
 Direct Gas Options/Accessories  
 Approvable: ETL  
 FM Compliant  
 Flame Sensing: Flame Rod  
 Ignition Control: Pilot

**KMUA-1**

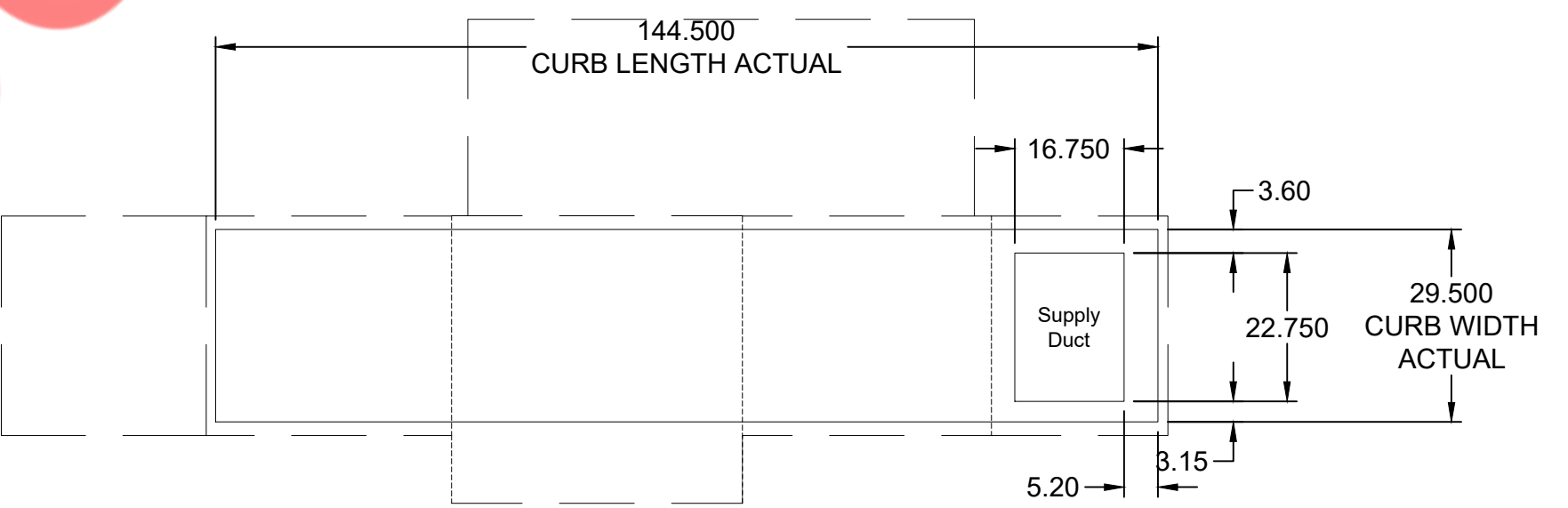


ELEVATION VIEW

Low Voltage Interlock to be field wired



END VIEW



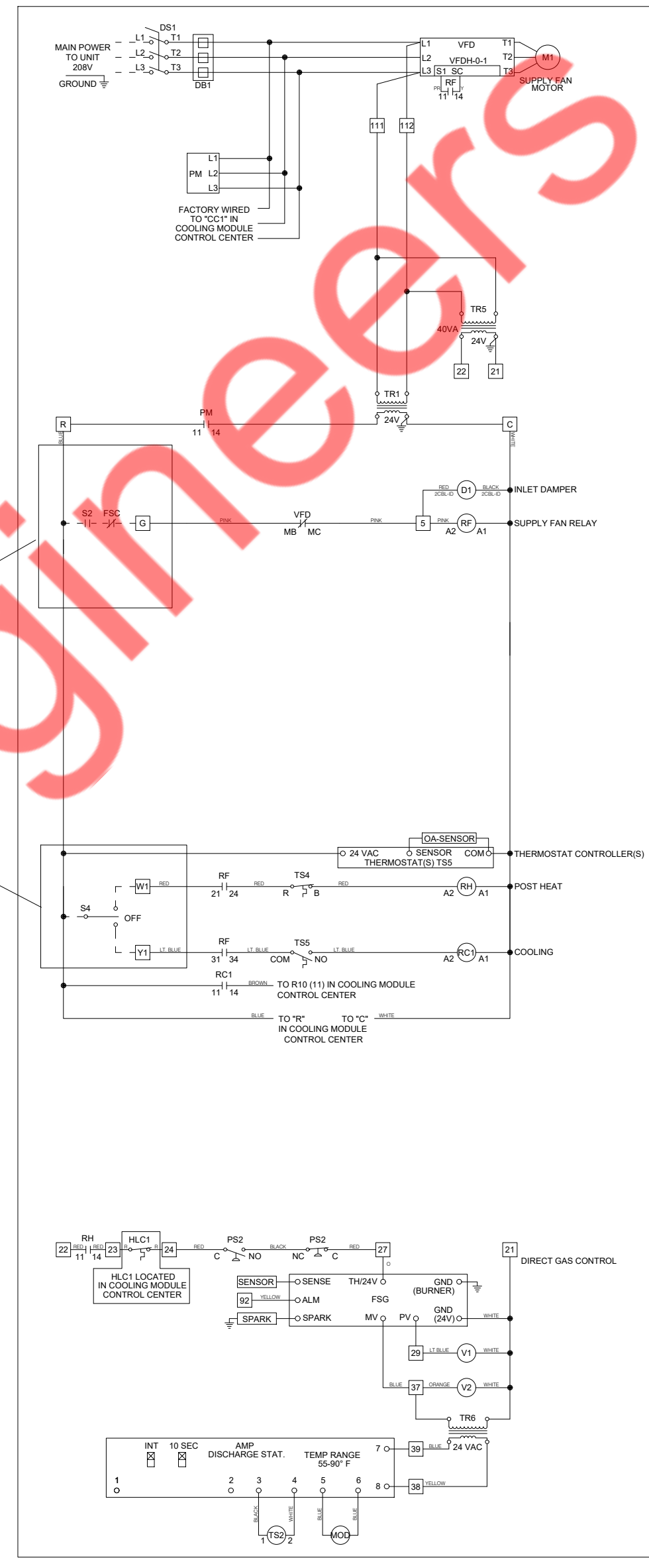
FOOTPRINT

**NOTE: Roof Opening Requirements:**

**Minimum Roof Opening:** The minimum roof opening size is the illustrated duct diameter plus 0.25 in. on all sides.  
 For example: If the duct size is 14 x 14 in. square, the minimum roof opening size is 14.5 x 14.5 in. square.

**Maximum Roof Opening:** There must be a minimum perimeter of 1.75 in. between the roof opening and the roof curb.  
 For example: If the roof curb is 75 x 30 in. square, the maximum roof opening is 71.5 x 26.5 in. inches square.

**NOTE:** The weatherhood and filter sections of the make-up air unit are not supported by the curb. This is by design, in order to help alleviate water infiltration issues.



**ACCUREX**

Wiring Diagram Code: **AD61N402B013A30NM25**

**CAUTION**  
 UNIT SHALL BE GROUNDING IN ACCORDANCE WITH N.E.C.  
 POWER MUST BE OFF WHILE SERVICING.

**NOTES**  
 USE COPPER CONDUCTORS ONLY  
 60°C FOR TERMINALS RATED LESS THAN 100 AMPS.  
 75°C FOR TERMINALS RATED 100 AMPS OR MORE.  
 FIELD CONTROL WIRING RESISTANCE SHOULD NOT EXCEED 0.75 OHM.  
 FIELD WIRING: \_\_\_\_\_  
 FACTORY SUPPLIED AND WIRED: \_\_\_\_\_

**WIRE COLOR CODE**

BL	BLACK	BL	BLUE	BR	BROWN
GY	GRAY	LT BL	LIGHT BLUE	OR	ORANGE
PK	PINK	PV	PURPLE	R	RED
W	WHITE	Y	YELLOW		

**LEGEND**

- AMP: AMPLIFIER
- CCP: COMPRESSOR CONTACTOR
- CF: CONDENSER FAN CONTACTOR
- CH: CHAMBER HEATER
- D1: INLET DAMPER
- DE: DISCHARGE AIR SENSOR
- DS1: MAIN DISCONNECT SWITCH
- FSG: FUSE SYSTEM CONTACT
- FSG: FUSE SAFETY GUARD
- FLS: FUSE
- HIC: HIGH LIMIT CONTROL
- HPS: HIGH PRESSURE SWITCH
- LPS: LOW PRESSURE SWITCH
- MM: MOTOR
- MOD: MODULATING VALVE
- PM: PHASE MONITOR
- PS: PHASE SEQUENCE SWITCH
- RIS: RELAY INTERLOCK RELAY
- RIS: RELAY INTERLOCK RELAY
- RF: RELAY FAN RELAY
- RF: RELAY FAN RELAY
- RH: RELAY HEAT
- S4: HEAT AND COOL SWITCH
- SG: SPRINKLER GENERATOR
- STW: MOTOR STARTER
- TRN: TRANSFORMER
- TS4: DISCHARGE AIR SENSOR
- TS4: INLET AIR SENSOR - HEAT
- TS4: INLET AIR SENSOR - HEAT
- TS4: INLET AIR SENSOR - COOL
- JUMPER: HEAT - DIFFERENTIAL + 2
- JUMPER: COOL - DIFFERENTIAL + 2
- V1: PILOT VALVE
- V2: MAIN VALVE
- VFD: VARIABLE FREQUENCY DRIVE

Wiring Template: M25    DOC NUMBER: #####    REV: #####

**UL NSF**

**MELLOW MUSHROOM DAWSONVILLE GA**

**ACCUREX CENTRAL CAROLINAS CHARLOTTE**  
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**ACCUREX**



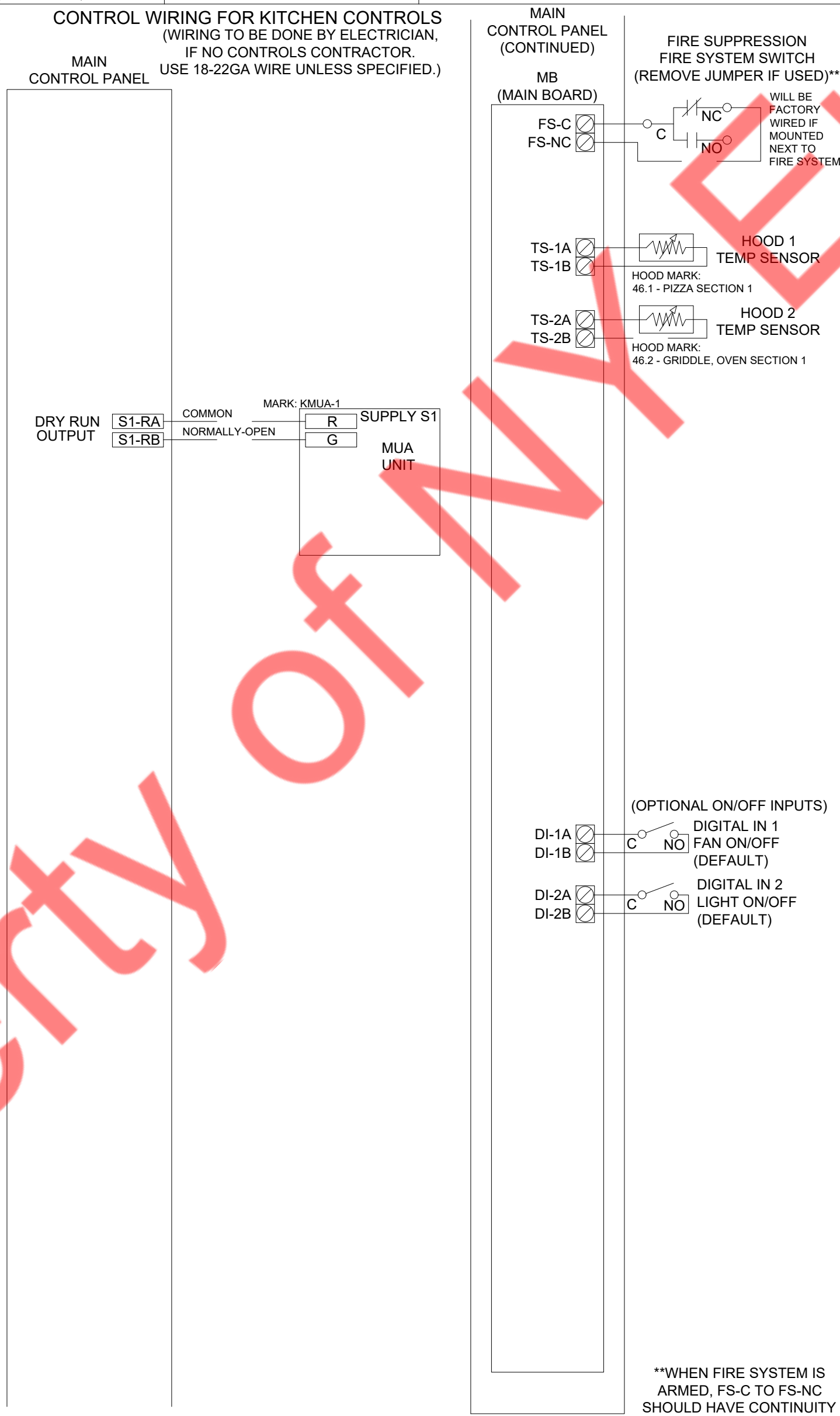
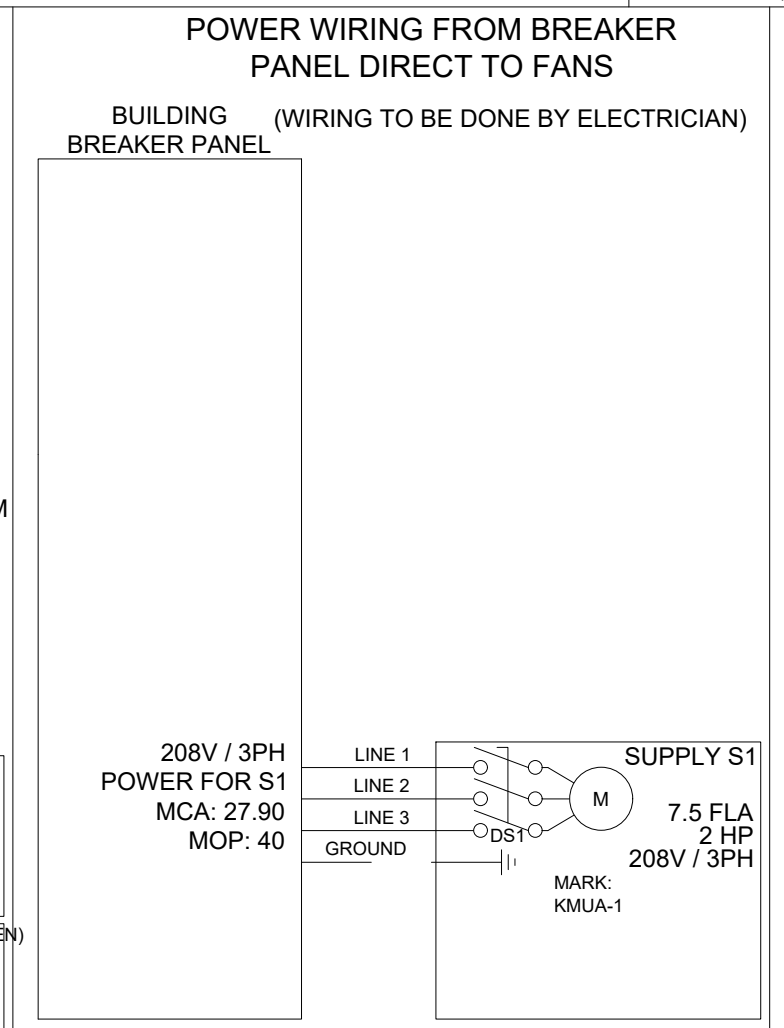
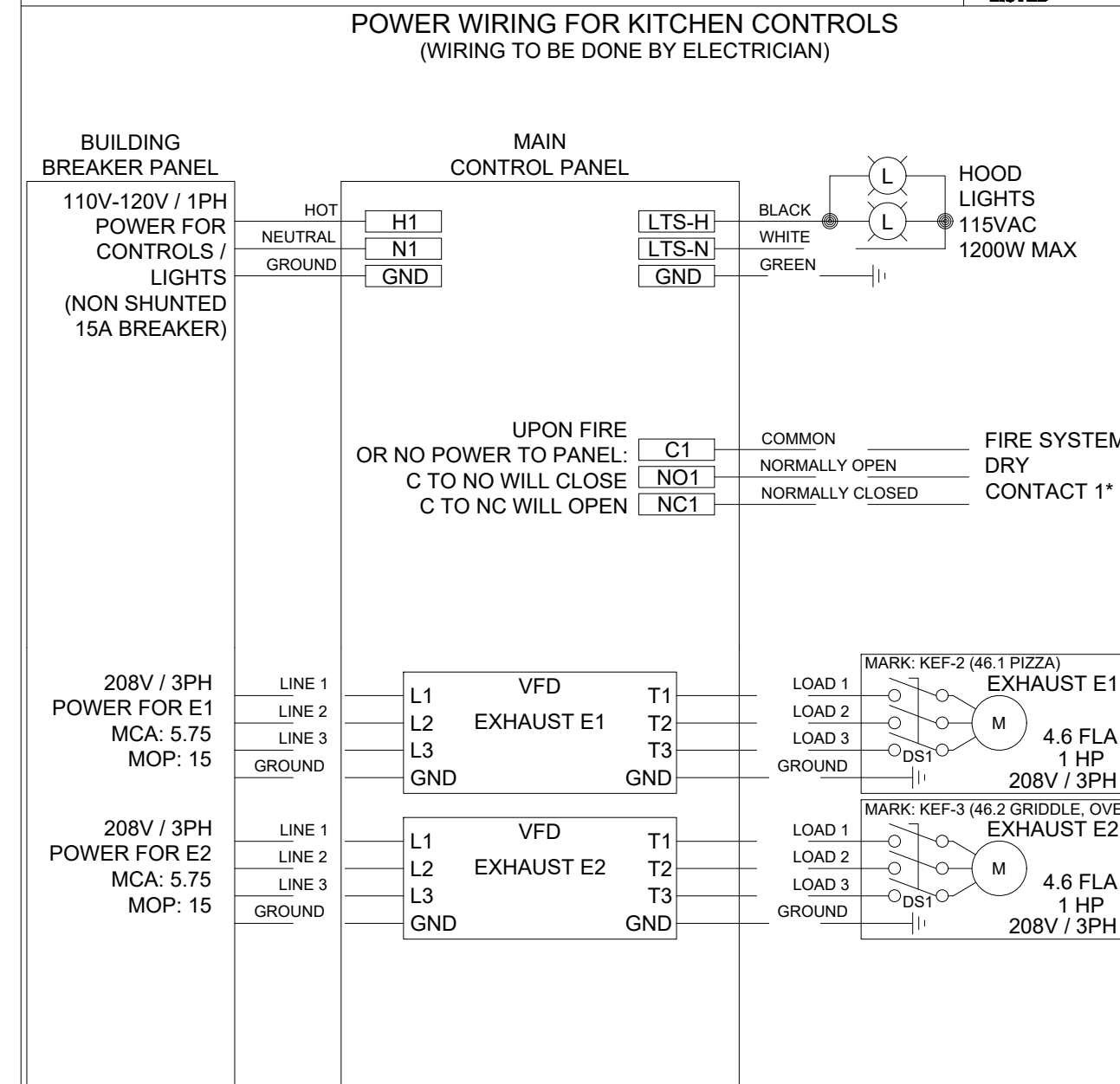
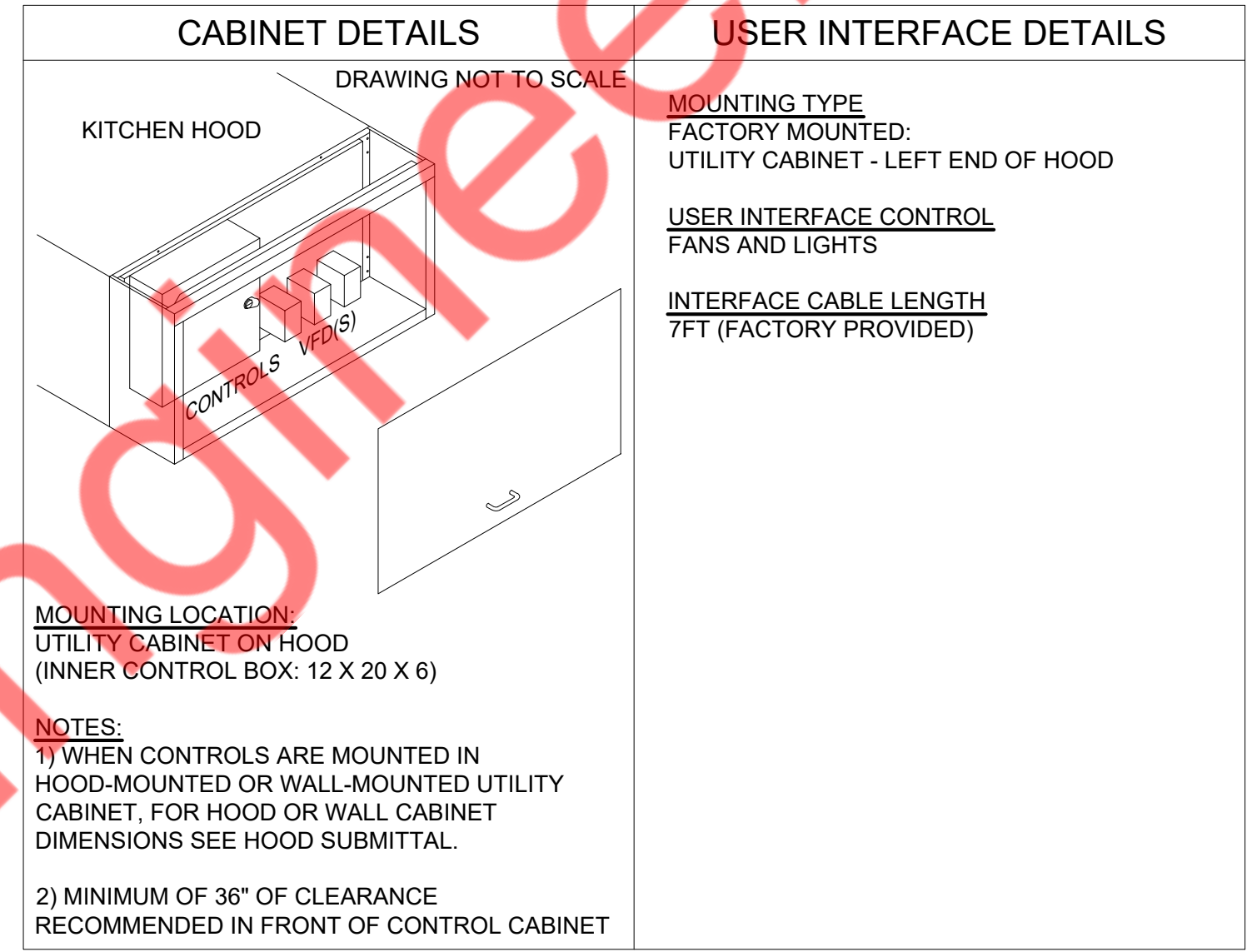
CONTROL INFORMATION

MARK	ELECTRICAL CONTROL PACKAGE		USER INTERFACE		FANS CONTROLLED											
	MODEL	LOCATION	TYPE	LOCATION	FAN #	TYPE	FAN	FAN MARK	ZONE	CFM	MOTOR HP	MOTOR VOLT	CYCLE	MOTOR PHASE	MOTOR STARTER IN PANEL	VFD IN PANEL
CONTROLS	XKC-CV-S-21-2-1-0	LEFT CABINET ON 46.1 - PIZZA	FULL COLOR TOUCHSCREEN	CABINET - LEFT CABINET ON 46.1 - PIZZA	1	EXHAUST	E1	KEF-2 (46.1 PIZZA)	1	1980	1	208	53	3	NO	YES
					2	EXHAUST	E2	KEF-3 (46.2 GRIDDLE, OVEN)	1	1663	1	208	50	3	NO	YES
					3	SUPPLY	S1	KMUA-1	1	2914	2	208	60	3	NO	NO

**CONTROL FEATURES**  
 HOOD LIGHT CONTROL  
 TEMP SENSORS (FACTORY INSTALLED) - QTY. 2  
 DRY FIRE CONTACTS - QTY. 1  
 LIGHTS OFF DURING FIRE  
 EXHAUST MAX DURING FIRE  
 SUPPLY OFF DURING FIRE  
 VFD(S) IN CONTROL PANEL PROVIDED FOR BALANCING



DOC NUMBER: ##### REV: #####  
**CAUTION**  
 UNIT MUST BE GROUNDED IN ACCORDANCE WITH N.E.C. POWER MUST BE OFF WHILE SERVICING.  
**ATTENTION**  
 L'APPAREIL DOIT ÊTRE MIS À LA TERRE CONFORMÉMENT AU CODE C.E. L'ALIMENTATION DOIT ÊTRE COUPÉE DURANT L'ENTRETIEN.  
 THESE DRAWINGS SHALL NOT BE REMOVED FROM THIS EQUIPMENT. USE COPPER CONDUCTORS RATED TO 90°C UNLESS SPECIFIED. TORQUE CONTROL & GROUND BOLTS TO 8 LBS. IN. TORQUE POWER LUGS/SCREWS TO COMPONENT RATINGS LISTED. TORQUE CONTROL BOARD SCREW TERMINALS TO 3.5 LBS. IN. FIELD CONTROL WIRING RESISTANCE SHOULD NOT EXCEED 0.75 OHM. SEE JOM FOR ADDITIONAL INFORMATION. OR CALL FACTORY AT 1-800-371-6858.  
 NE PAS RETIRER CES DESSINS DE CET ÉQUIPEMENT. SAUF INDICATION CONTRAIRE, UTILISER DES CONDUCTEURS EN CUivre CLASSÉS 90 °C. SERRER LES BORNES DE COMMANDE ET DE MISE À LA TERRE À 8 LB-PO. SERRER LES COSSÉS/VIS D'ALIMENTATION AUX COUPLES INDICQUÉS POUR LE COMPOSANT. SERRER LES BORNES À VIS DE LA CARTE DE COMMANDE À 3,5 LB-PO. LA RÉSISTANCE DU CÂBLAGE DE COMMANDE LOCAL NE DOIT PAS DÉPASSER 0,75 OHM. POUR PLUS D'INFORMATION, CONSULTER LE MANUEL OU APPELER 1-800-371-6858.  
 WIRING DIAGRAM CODE: #####  
 JOB NAME: MELLOW MUSHROOM DAWSONVILLE GA  
 MODEL: XKC-CV-S-21-2-1-0  
 SERIAL NUMBER: WDSN#  
 MARK: CONTROLS



WIRING DIAGRAM CODE: #####  
 JOB NAME: MELLOW MUSHROOM DAWSONVILLE GA  
 MODEL: XKC-CV-S-21-2-1-0  
 SERIAL NUMBER: WDSN#  
 MARK: CONTROLS  
 DOC NUMBER: ##### REV: #####

**DEFAULT SETTINGS / PARAMÈTRES PAR DÉFAUT**

**FACTORY SETTINGS**  
 TYPE: CY  
 CONFIGURATION: STANDARD  
 ZONES: 1  
 HOODS: 2  
 SUMPS: 0  
 EXHAUST FANS: 2  
 SUPPLY FANS: 1  
 MB ROOM SENSOR: NO  
 MB TEMP SENSORS: 2  
 HIGH TEMP FAULT: NO  
 FREEZE PROTECTION: YES  
 GAS RESET: NO  
 FAN PROVING: NO  
 BMS: NONE

**ZONE SETTINGS**  
 SEE ZONE CONFIGURATION IN TABLE ON LEFT

**HOOD SETTINGS**  
 SEE HOOD CONFIGURATION IN TABLE ON LEFT

**EXHAUST FAN SETTINGS**  
 SEE FAN CONFIGURATION IN TABLE ON LEFT

**SUPPLY FAN SETTINGS**  
 SEE FAN CONFIGURATION IN TABLE ON LEFT

**SENSOR SETTINGS**  
 SEE HOOD CONFIGURATION IN TABLE ON LEFT

**USER INTERFACE SETTINGS (MB)**  
 FAN & LIGHT BUTTONS: SHOW BOTH (SEPARATE)  
 NA

**USER INTERFACE SETTINGS (HCB)**  
 NA

**GENERAL SETTINGS**  
 TIME ZONE: CENTRAL DAYLIGHT (DEFAULT)

**FIRE/FAULT SETTINGS**  
 EXHAUST DURING FIRE: MAX  
 SUPPLY DURING FIRE: OFF  
 LIGHTS DURING FIRE: OFF

**BMS SETTINGS**  
 NA

PRG VERSION: V4

**ZONE CONFIGURATION**

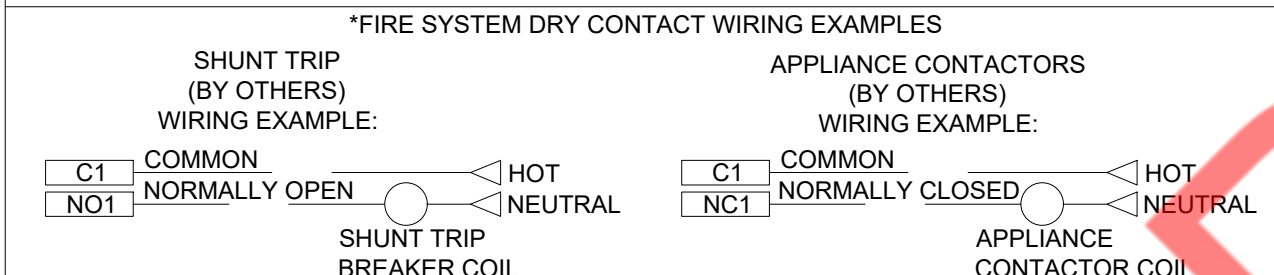
ZONE #	ZONE	ROOM TEMP
1	Z1	PRESET

**HOOD CONFIGURATION**

HOOD #	HOOD	HOOD MARK	ZONE	EXHAUST	SUPPLY	MB-TEMP SENSORS	HCB
1	H1	46.1 - PIZZA SECTION 1	Z1	E1	S1	TS1	NO
2	H2	46.2 - GRIDDLE, OVEN SECTION 1	Z1	E2	S1	TS2	NO

**FAN CONFIGURATION**

FAN #	TYPE	FAN	FAN MARK	ZONE	MIN CFM	MAX CFM	MODBUS VFD	VFD ADDRESS	MIN FREQ.	MAX FREQ.	MIN VDC	MAX VDC
1	EXHAUST	E1	KEF-2 (46.1 PIZZA)	Z1	-	1980	YES	1	27	53	-	-
2	EXHAUST	E2	KEF-3 (46.2 GRIDDLE, OVEN)	Z1	-	1663	YES	2	25	50	-	-
3	SUPPLY	S1	KMUA-1	Z1	-	2914	NO	-	-	-	-	10.0



UL LISTED

MELLOW MUSHROOM DAWSONVILLE GA

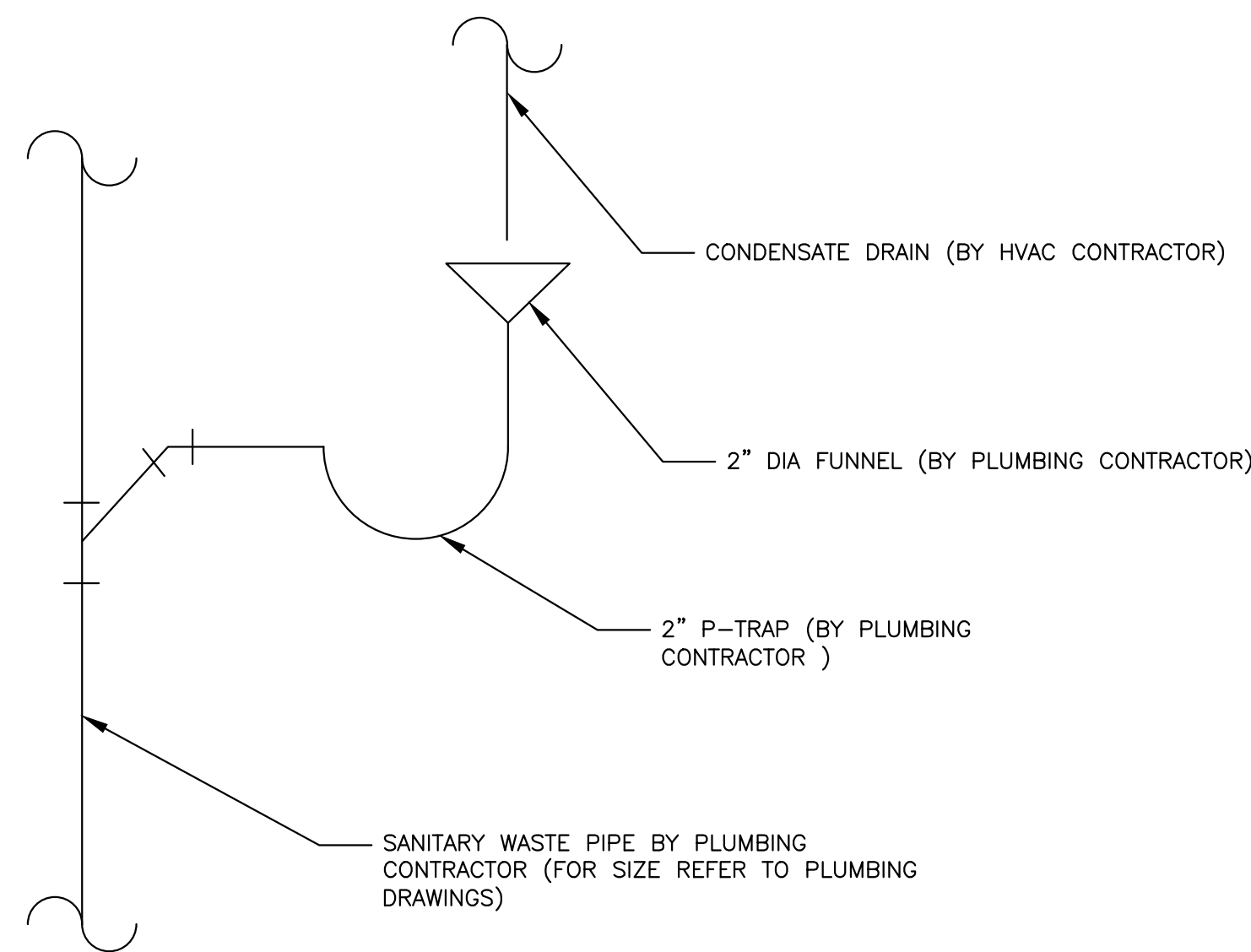
CONTROLS

PROJECT 5/11/2023

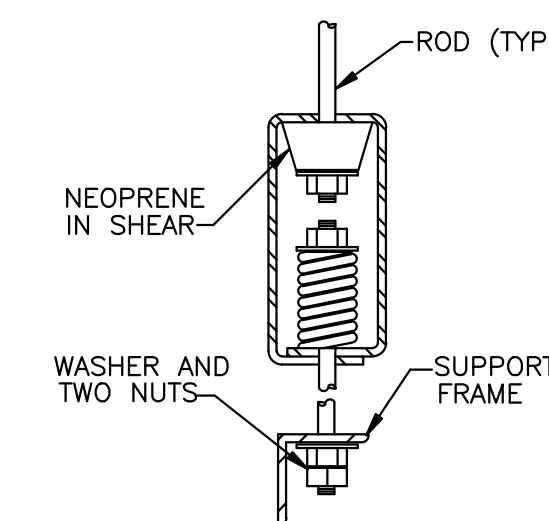
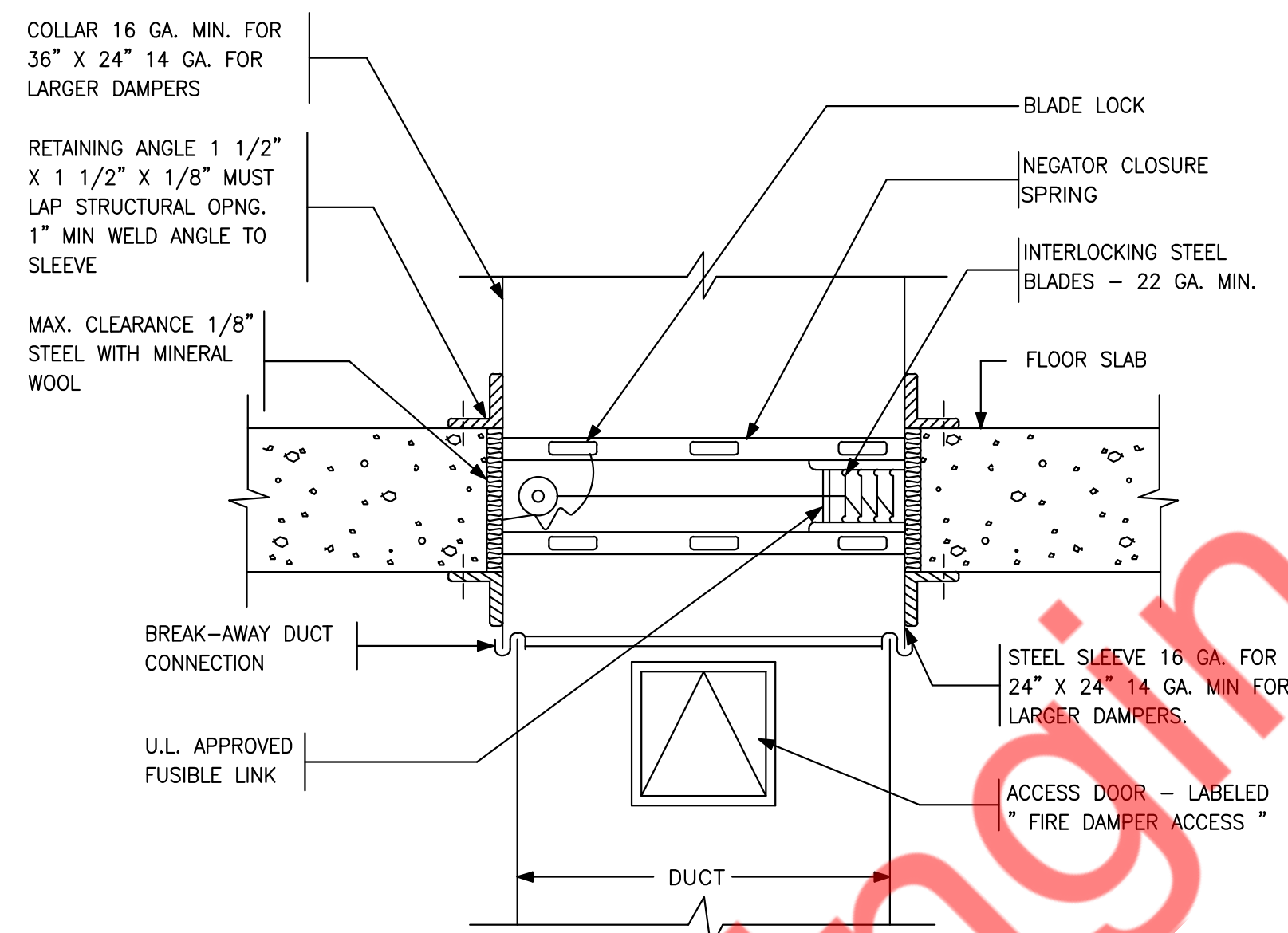
ACCUREX CENTRAL CAROLINAS & CHARLOTTE  
 MARK BOWMAN  
 MARK.BOWMAN@ACCUREX.COM  
 (828)579-1123

ACCUREX

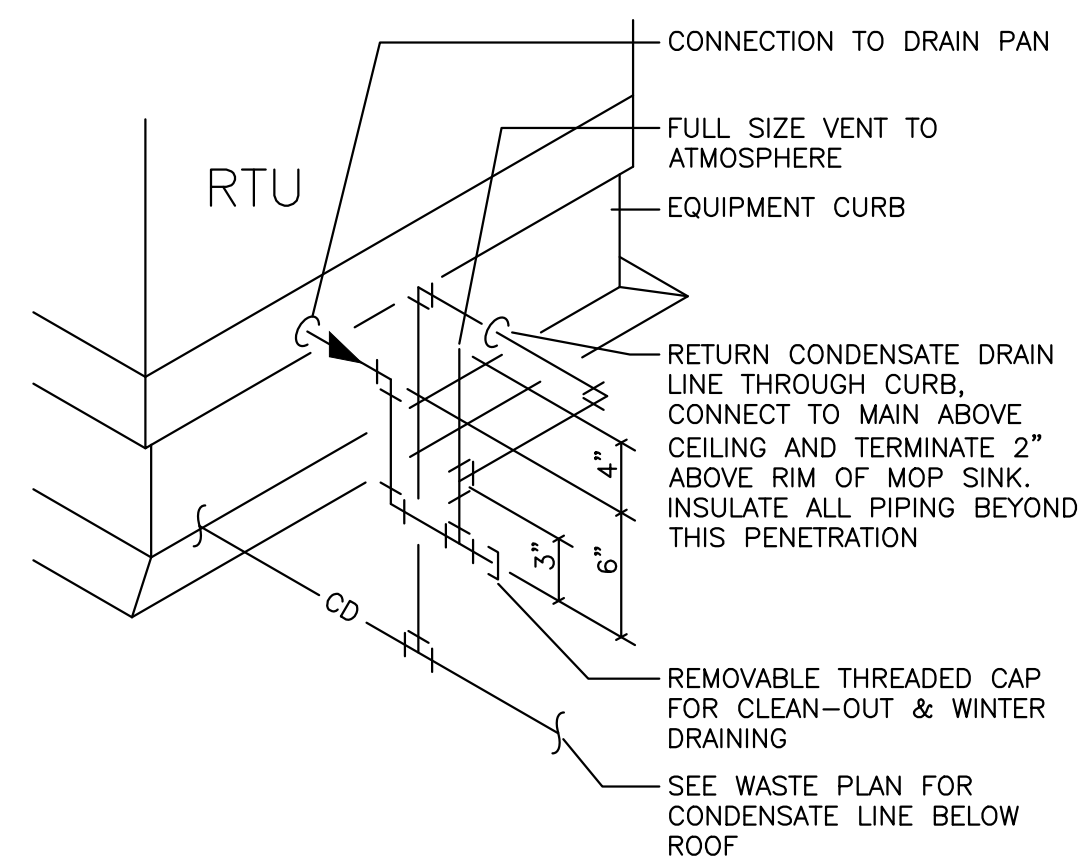




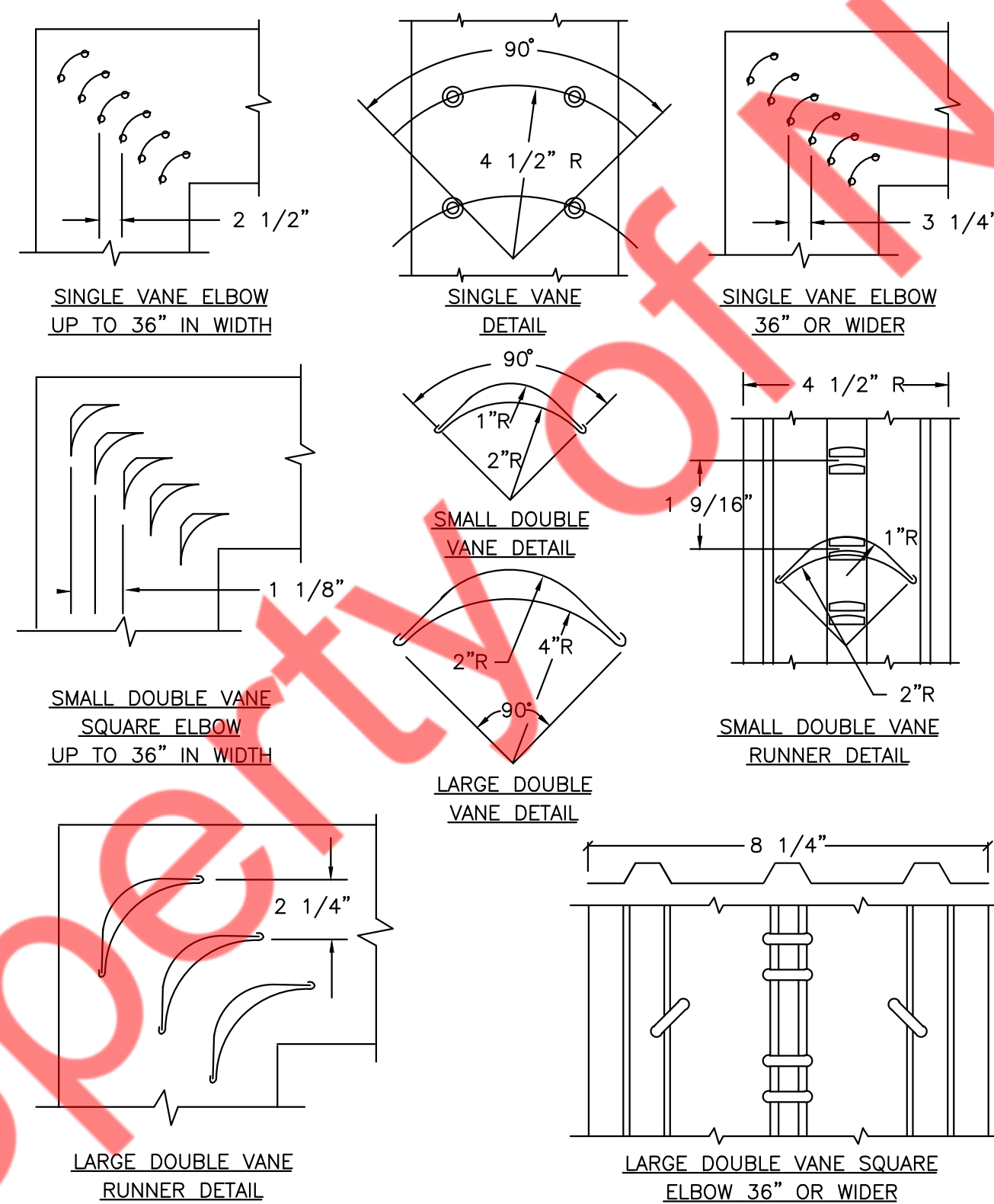
1 FUNNEL DRAIN INSTALLATION DETAIL  
M-501 N.T.S



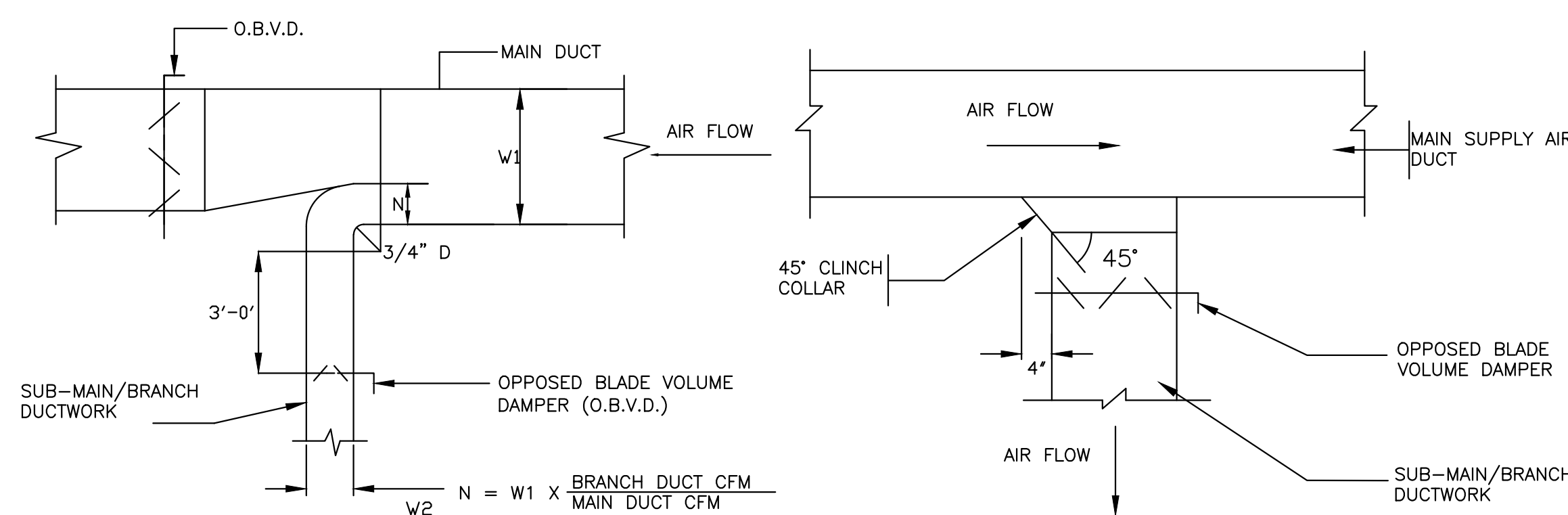
3 VIBRATION ISOLATOR DETAIL  
M-501 N.T.S



4 RTU/ MUA CONDENSATE DRAIN  
M-501 N.T.S

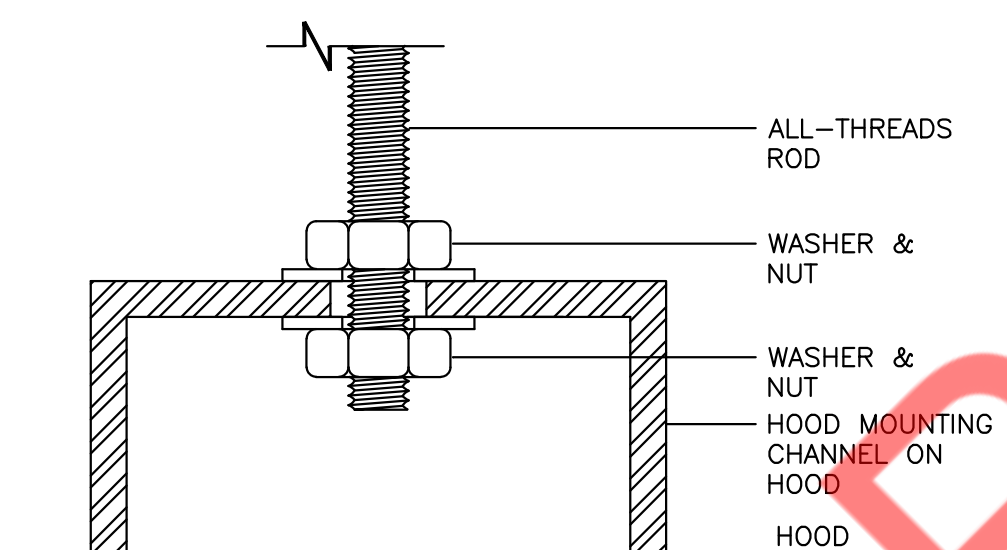


6 LOW VELOCITY DUCTWORK ELBOWS  
M-501 N.T.S



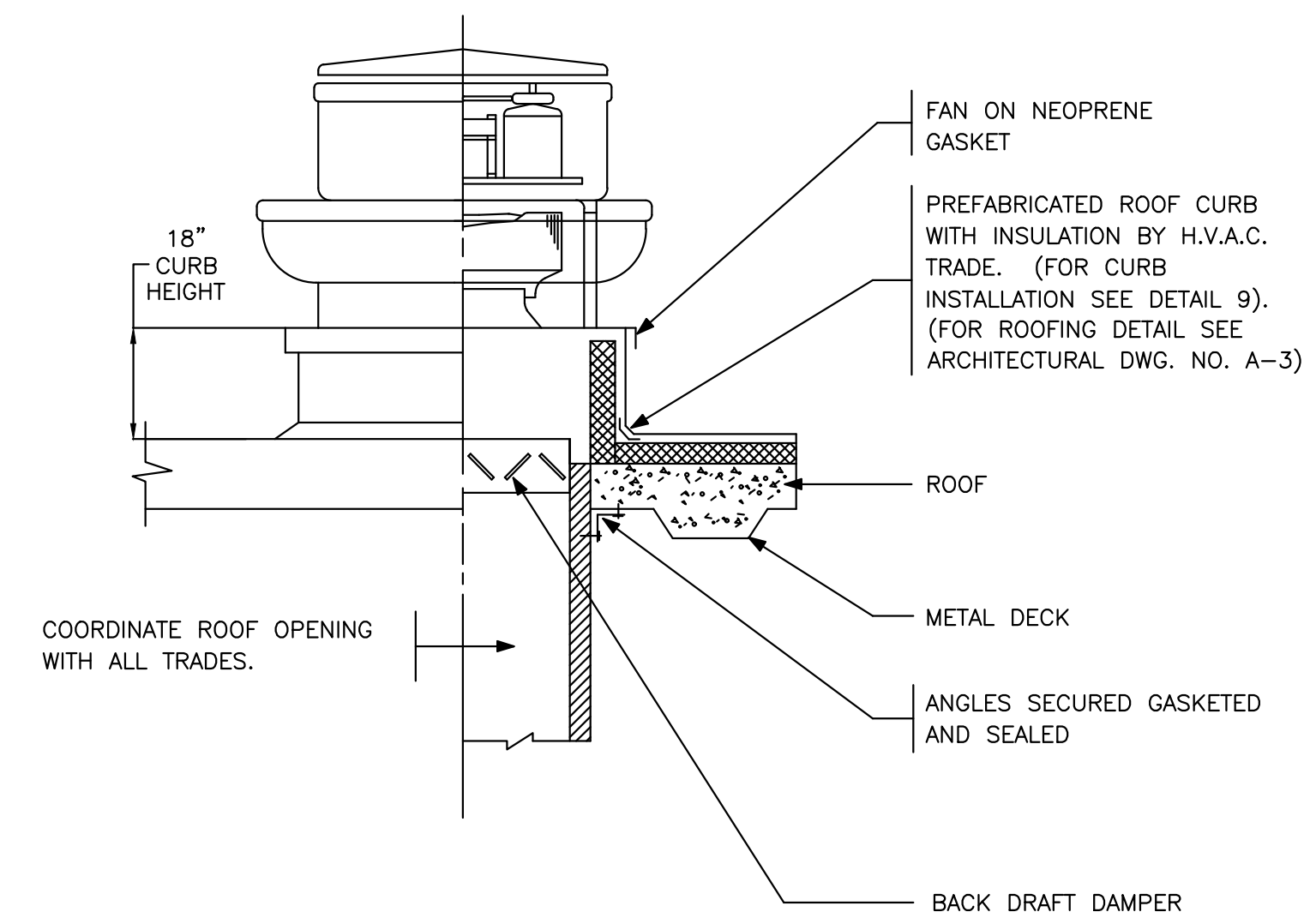
NOTE:  
FURNISH THIS TYPE CONNECTION WHEN SINGLE LINE DUCTWORK IS INDICATED AS THIS

7 SUPPLY AIR DUCTWORK SUB-MAIN BRANCH DUCT CONNECTION  
M-501 N.T.S

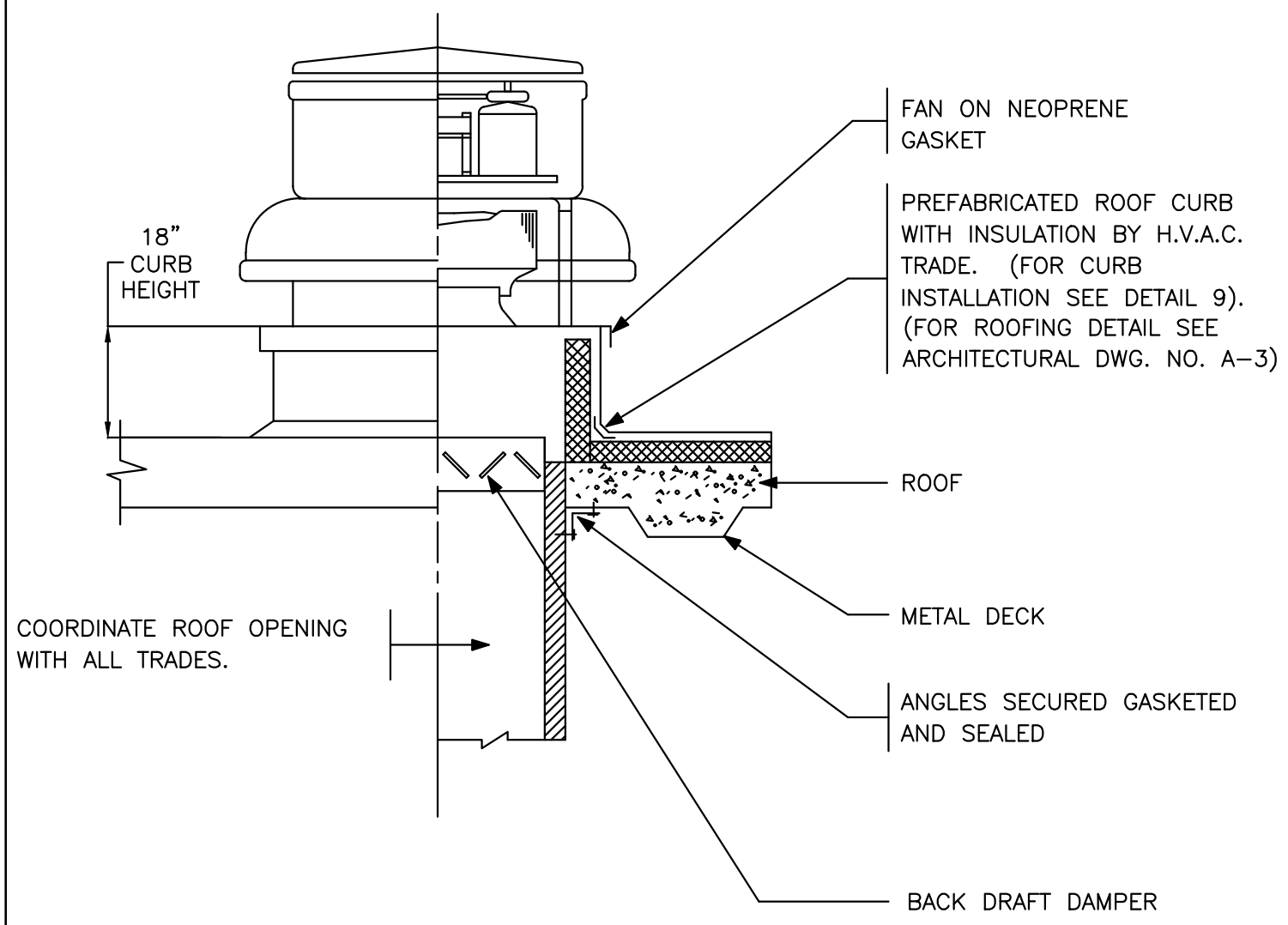


5 BOLT CONNECTION TO HOOD  
M-501 N.T.S

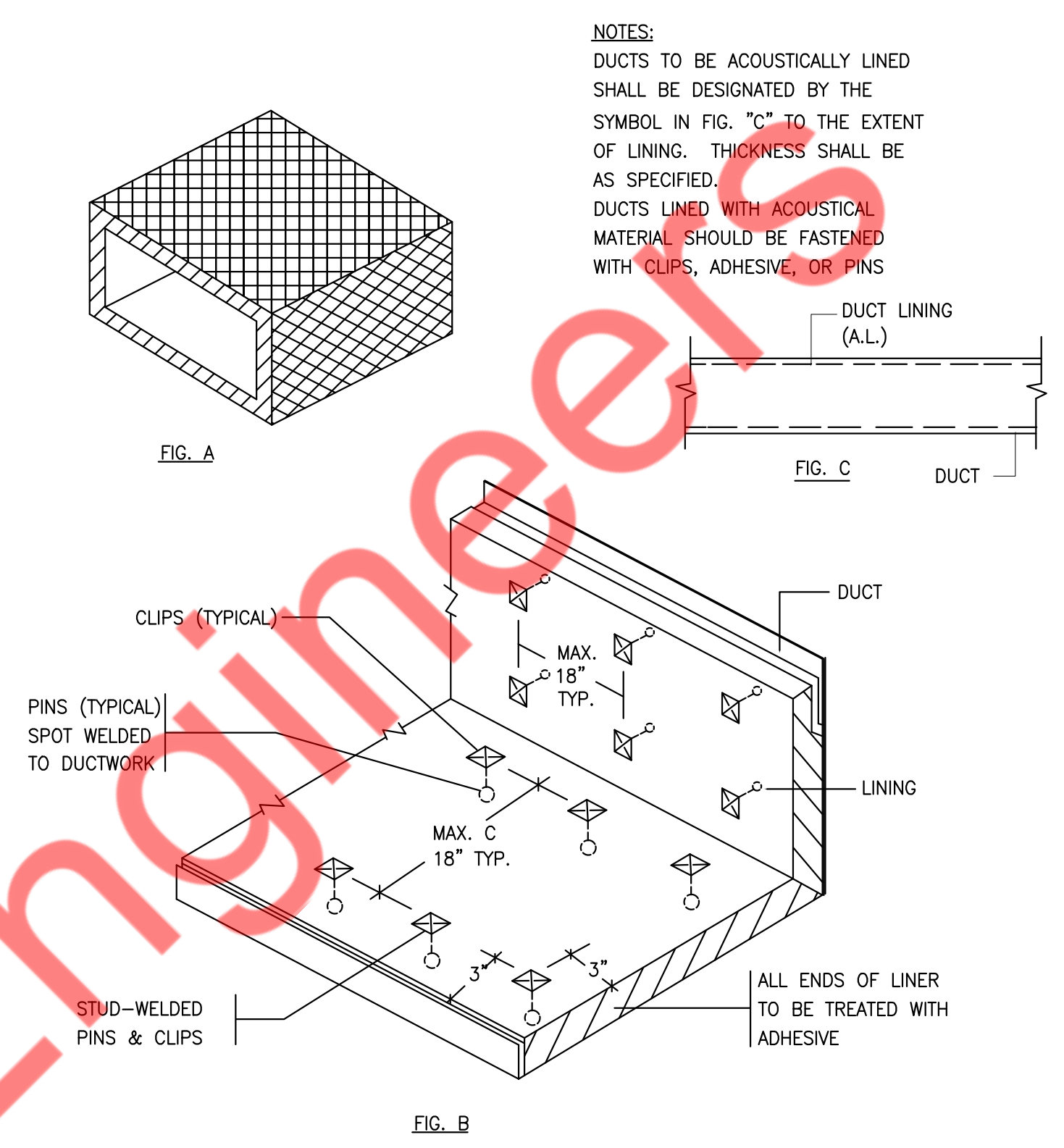




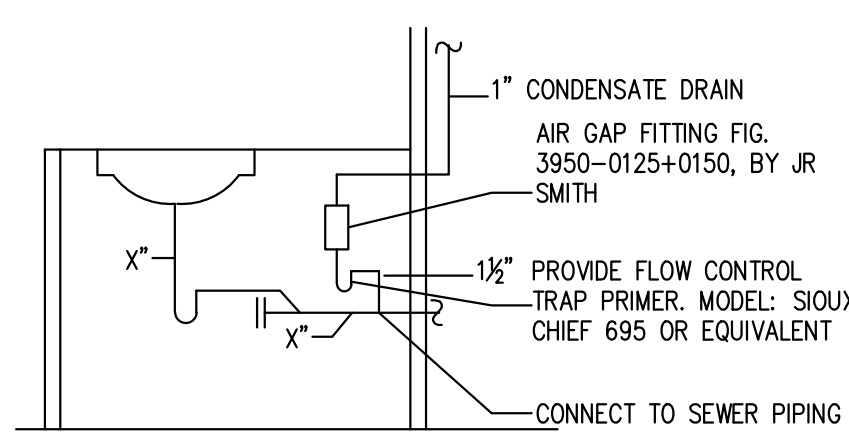
1 UP BLAST EXHAUST FAN DETAIL  
M-502 N.T.S.



2 DOWN BLAST FAN  
M-502 N.T.S.

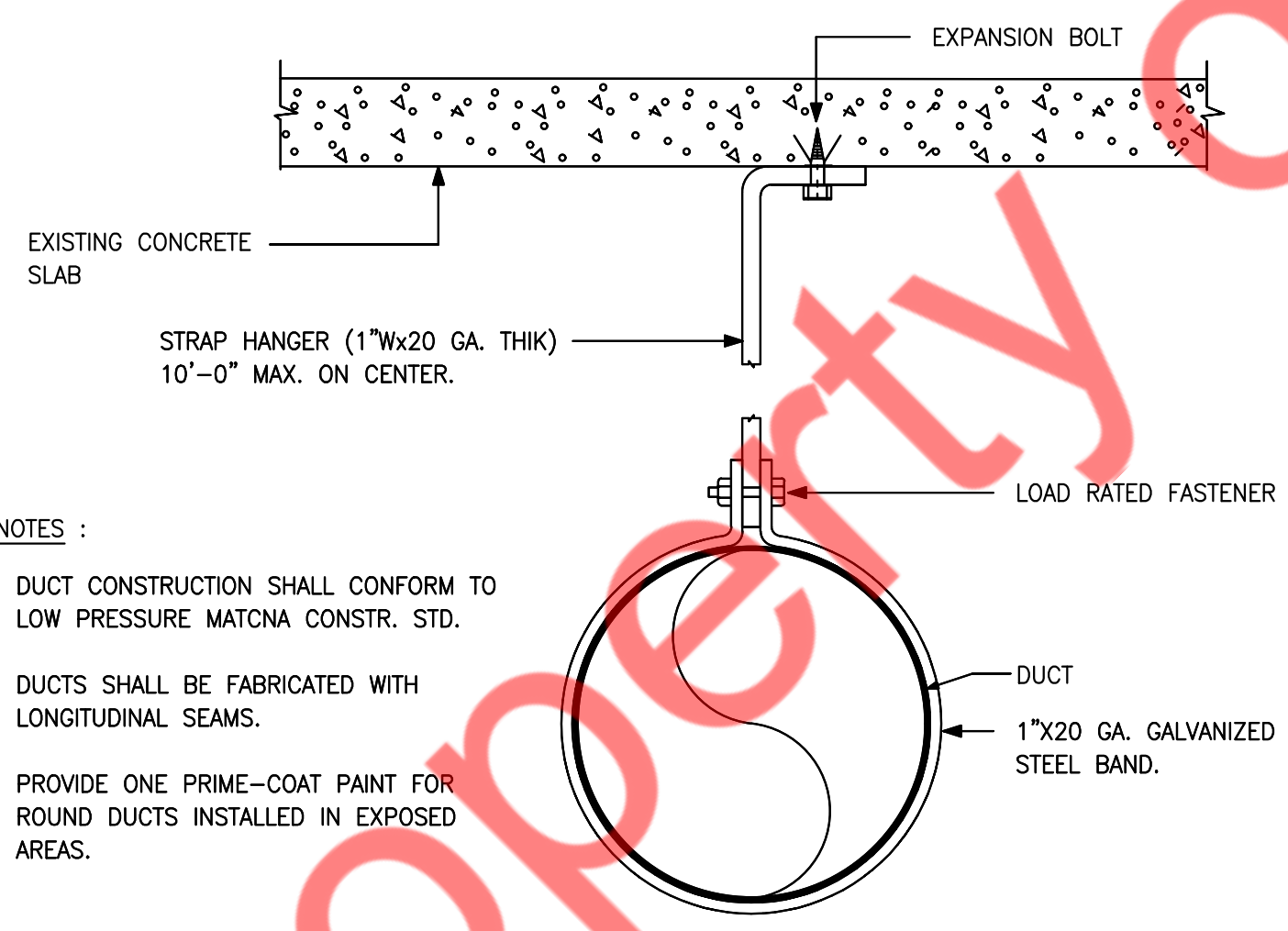


3 ACOUSTICAL TREATMENT DUCT LINING  
M-502 N.T.S.



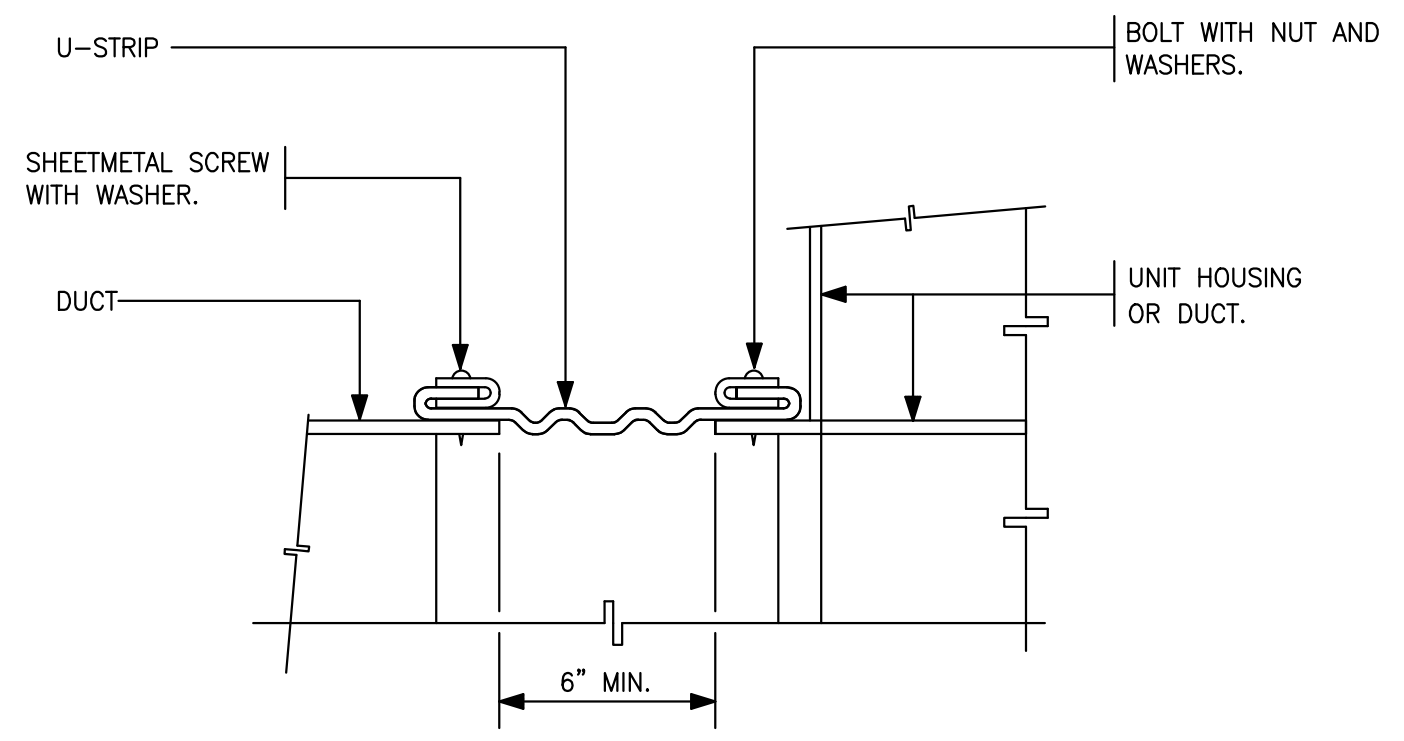
NOTE: LOCATE AIR GAP FITTING AND PIPING WITHIN SINK/LAVATORY ENCLOSURE.

4 AIR GAP FITTING DETAIL  
M-502 N.T.S.



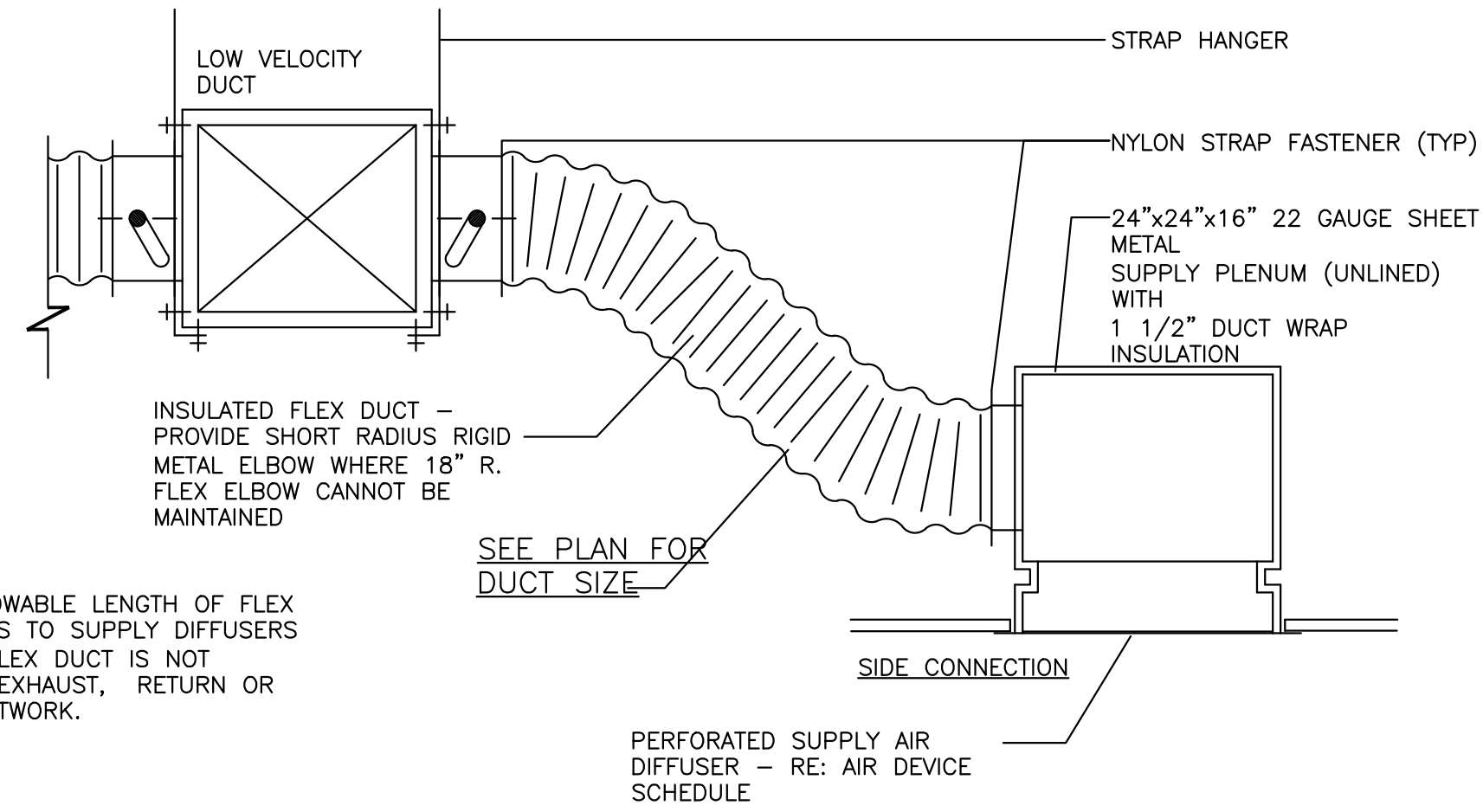
- NOTES :
1. DUCT CONSTRUCTION SHALL CONFORM TO LOW PRESSURE MATCHNA CONSTR. STD.
  2. DUCTS SHALL BE FABRICATED WITH LONGITUDINAL SEAMS.
  3. PROVIDE ONE PRIME-COAT PAINT FOR ROUND DUCTS INSTALLED IN EXPOSED AREAS.

5 METHOD OF HANGING DUCTWORK  
M-502 N.T.S.



6 FLEXIBLE CONNECTION (DUCT-EQUIPMENT)  
M-502 N.T.S.



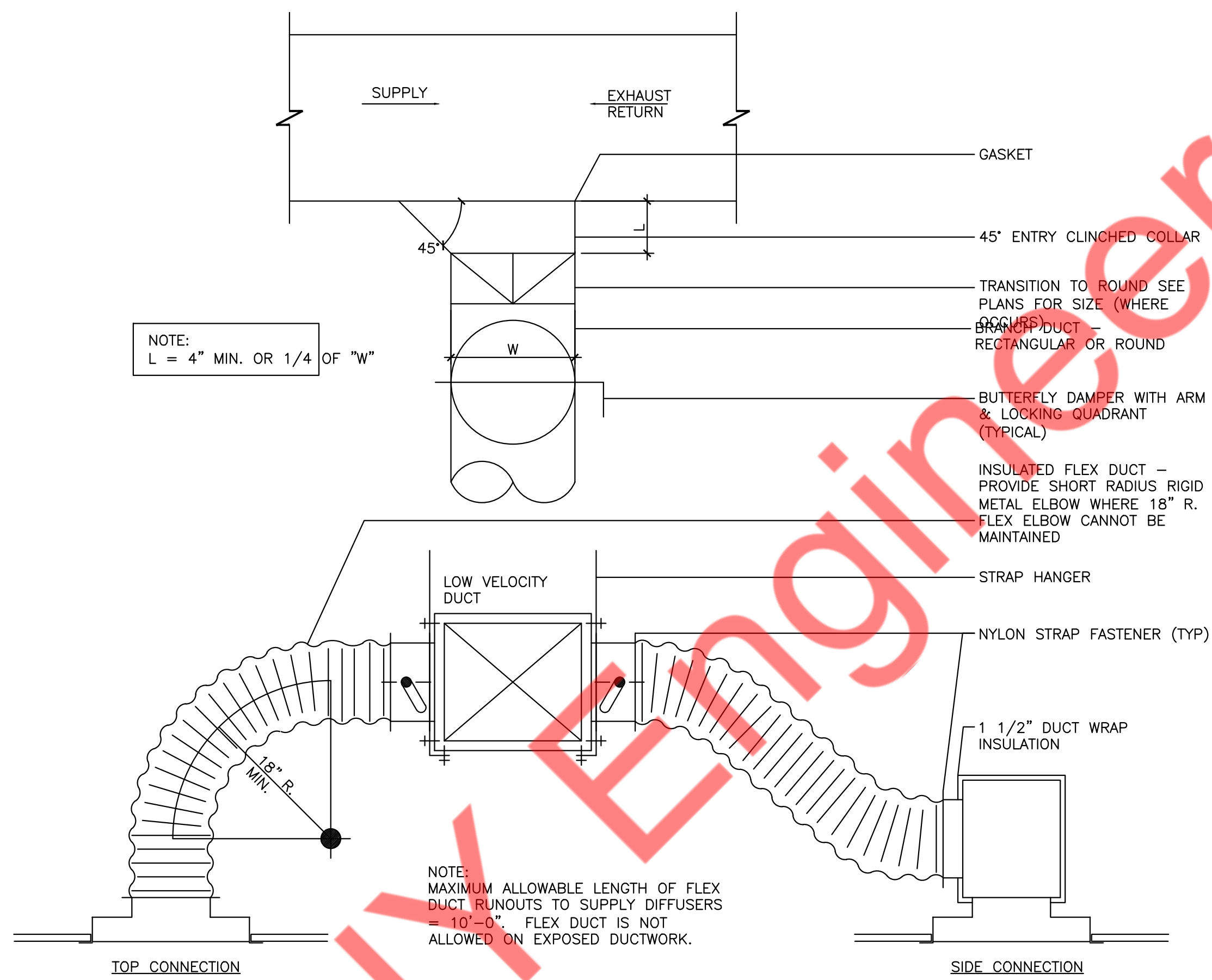


NOTE:  
 MAXIMUM ALLOWABLE LENGTH OF FLEX  
 DUCT RUNOUTS TO SUPPLY DIFFUSERS  
 = 10'-0". FLEX DUCT IS NOT  
 ALLOWED ON EXHAUST, RETURN OR  
 EXPOSED DUCTWORK.

SEE PLAN FOR  
 DUCT SIZE

PERFORATED SUPPLY AIR  
 DIFFUSER - RE: AIR DEVICE  
 SCHEDULE

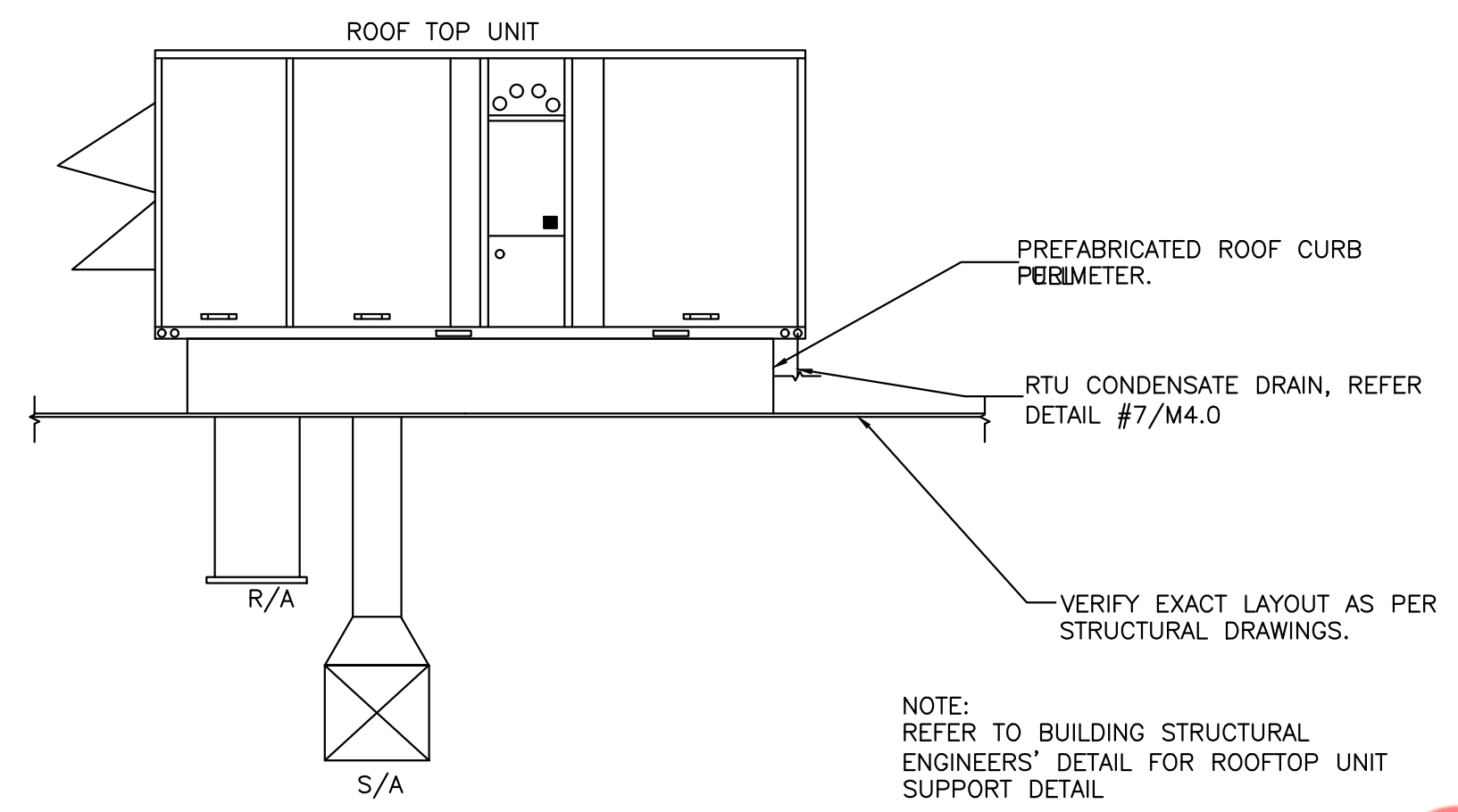
1 OPTIONAL KITCHEN AREA CEILING DIFFUSER CONNECTION DETAIL  
 M-503 N.T.S



NOTE:  
 L = 4" MIN. OR 1/4 OF "W"

NOTE:  
 MAXIMUM ALLOWABLE LENGTH OF FLEX  
 DUCT RUNOUTS TO SUPPLY DIFFUSERS  
 = 10'-0". FLEX DUCT IS NOT  
 ALLOWED ON EXPOSED DUCTWORK.

2 CEILING DIFFUSER CONNECTIONS  
 M-503 N.T.S



NOTE:  
 REFER TO BUILDING STRUCTURAL  
 ENGINEERS' DETAIL FOR ROOFTOP UNIT  
 SUPPORT DETAIL

3 RTU DETAILS  
 M-503 N.T.S



ROOF TOP UNIT SCHEDULE																										
UNIT ID	MANUFACTURER	EFFICIENCY	MODEL	AREA SERVED	NOMINAL TONS	SUPPLY FAN			GAS HEAT				COOLING				ELECTRICAL				EER	IEER / SEER	STEADY STATE EFFICIENCY	OPERATING WEIGHT (LBS)	NOTES	
						TOTAL CFM	OUTSIDE AIR CFM	EXTERNAL STATIC PRESSURE(IN. W.G.)	INPUT MBH	OUTPUT MBH	HEATING LAT( DEG.F)	HEATING TEMP RISE	TOTAL MBH	SENSIBLE MBH	AMBIENT DB (°F)	ENTERING DB / WB(°F)	STAGES	VOLTS	PHASE	MCA(A)						MOC(PA)
RTU-1	TRANE	STANDARD	YSJ120A3SOL	KITCHEN	10	4000	410	1	150	121.5	87.95	27.75	120	97.5	95	78/65	2	208-230	3	54	70	11.00	14.6	81%	1187	1-14
RTU-2	TRANE	STANDARD	YSJ090A3SOL	BAR	7.5	3000	460	1	120	97.2	91.23	29.56	90	73.12	95	78/65	2	208-230	3	42	50	11.00	14.6	81%	1146	
RTU-3	TRANE	STANDARD	YSJ150A3SOL	DINING	12.5	5000	960	1	150	121.5	82.68	21.99	150	120.17	95	78/65	2	208-230	3	64	90	10.80	14.00	81%	1477	
RTU-4	TRANE	STANDARD	YSJ102A3SOL	PATIO	8.5	3400	600	1	120	97.2	87.14	25.96	102	82.26	95	78/65	-	208-230	3	48	60	11.00	14.6	81%	1162	

FAN SCHEDULE															
UNIT ID	MANUFACTURER	HOOD LENGTH	MODEL	CFM	TYPE	DRIVE	FAN RPM	WEIGHT (LBS)	E.S.P. (IN. W.G.)	MOTOR			SERVICE	INTERLOCKED WITH	NOTES / ACCESSORIES
										HP	VOLTS	PHASE			
KEF-1	CAPTIVE-AIRE	4'	XCUE-99-VG	600	ROOF	DIRECT	1516	51	0.807	1/4	115	1	DISH WASHER	HOOD CONTROL	1,2,3,4,5,7,8
KEF-2	CAPTIVE-AIRE	11'	XCUE-140-A	1980	ROOF	DIRECT	1536	96	1.053	1	208	1	PIZZA	HOOD CONTROL	1,2,3,4,5,7,8
KEF-3	CAPTIVE-AIRE	8'-9"	XCUE-140-A	1663	ROOF	DIRECT	1425	96	1.026	1	208	1	GRIDDEN,OVEN	HOOD CONTROL	1,2,3,4,5,7,8
EF-1	GREENHECK	-	CUE-080-VG	300	ROOF	DIRECT	1662	35	0.5	1/10	115	1	WOMEN REST ROOM	RTU-2	1,2,3,4,5,7,8
EF-2	GREENHECK	-	CUE-080-VG	300	ROOF	DIRECT	1662	35	0.5	1/10	115	1	MEN REST ROOM	RTU-2	1,2,3,4,5,7,8

**NOTES / ACCESSORIES:**

- BIRDSCREEN
- WEATHER PROOF DISCONNECT SWITCH
- VARIABLE SPEED CONTROL
- SPEED CONTROL SWITCH
- THERMAL OVERLOAD PROTECTION
- GRAVITY BACKDRAFT DAMPER
- ROOF CURB
- AMCA SEAL & UL CERTIFIED

AIR BALANCE					
UNIT	AREA SERVED	SUPPLY AIR	OUTSIDE AIR	RETURN AIR	EXHAUST AIR
RTU-1	KITCHEN	4000	410	3590	-
RTU-2	BAR	3000	460	2540	-
RTU-3	DINING	5000	960	4040	-
RTU-4	PATIO	3400	600	2800	-
KEF-1	DISH	-	-	-	600
KEF-2	PIZZA	-	-	-	1980
KEF-3	OVEN	-	-	-	1663
EF-1	WOMEN	-	-	-	300
EF-2	MEN	-	-	-	300
MUA-1	KITCHEN	-	-	2914	-
<b>TOTAL:</b>		<b>15400</b>	<b>5344</b>	<b>12970</b>	<b>4843</b>

**BUILDING PRESSURE:** ..... **501 CFM POSITIVE**

MAKE UP AIR UNIT SCHEDULE																							
UNIT TAG	LOCATION	CFM	ESP IN. WG.	HEATING					COOLING					ELECTRICAL			SOUND DBA	MAKE & MODEL					
				TYPE	INPUT MBH	OUTPUT MBH	ENTERING DB (DEG F)	MAX LAT (DEG F)	EFFICIENCY	TYPE	TOTAL MBH	SENSIBLE MBH	ENTERING DB (DEG F)	ENTERING WB (DEG F)	LEAVING DB (DEG F)	LEAVING WB (DEG F)			SEER	V/PH/Hz	MCA (AMPS)	MOC (AMPS)	WEIGHT (LBS)
MUA-1	ROOF	2914	0.51	NATURAL GAS	162	150	22.6	70	92%	PACKAGED DX	55	34	92.3	73.3	82.7	72.7	14	208/3/60	27.9	40	1,698	70.9	ACCUREX XDGX-P115-H12-MF-4

**NOTES**

- CONTRACTOR TO INSTALL VENDOR PROVIDED OPTIONS AND ACCESSORIES, REFER TO ACCUREX HOOD DETAIL DRAWINGS.
- UNIT SHALL BE COMPLETE WITH GAS HEATING SECTION. GAS REGULATOR TO RECEIVE (4.5-14)" GAS PRESSURE FROM MAIN. COORDIANTE WITH PLUMBING CONTRACTOR.
- ROUTE 1 1/2" CONDENSATE TO ROOF DRAIN.

HOODS											
TAG	MANUFACTURER	LENGTH	MODEL	SERVICE	COOKING			EXHAUST		CONSTRUCTION	WEIGHT (LBS)
					LOAD/DUTY RATING	AIR (CFM)	COLLAR (INCH)	E.S.P. (IN. W.G.)			
HOOD-1	ACCUREX	4'	XD1-48-S	DISH WASHER	-	600	9"X6"	0.307	430 STAINLESS STEEL	97	
HOOD-2	ACCUREX	11'	XBW-132-S	PIZZA	MEDIUM	1980	19"X10"	0.353	430 STAINLESS STEEL WHERE EXPOSED	377.5	
HOOD-3	ACCUREX	8'-9"	XBW-105-S	GRIDDLE,OVEN	MEDIUM	1663	16"X9"	0.426	430 STAINLESS STEEL WHERE EXPOSED	261.9	

**NOTES:**

- REFER TO HOOD DETAILS SHEET FOR ALL OPTIONS AND ACCESSORIES.

SCHEDULE OF SQUARE DIFFUSERS								BASIS OF DESIGN: TITUS	
TAG	TYPE	CFM RANGE	NECK SIZE (IN)	DIMENSION (IN)	MAX STATIC PRESSURE	MODEL NO.	MAX NC dBA		
CDS-1	SUPPLY DIFFUSER	400-550	12X12	24X24	0.092	PAR-AA	27		
CDR-1	RETURN DIFFUSER	1150	22X22	24X24	0.01	PAR-AA	20		
CDS-1	SUPPLY DIFFUSER	0-150	6	12X12	0.044	OMNI	13		
CDR-1	RETURN DIFFUSER	0-150	6	12X12	0.044	OMNI	13		

**NOTES:**

- CONTRACTOR SHALL COORDINATE WITH LATEST ARCHITECTURAL REFLECTED CEILING PLANS PLANS TO
- REFER ARCHITECTURAL DRAWINGS FOR CEILING TYPE.

SCHEDULE OF LINEAR SLOT DIFFUSERS(JET THROW)						BASIS OF DESIGN: TITUS		
TAG	TYPE	AIRFLOW CFM/FT	NO OF SLOTS	SLOT WIDTH (IN)	PLENUM LENGTH (IN)	MAX NC dBA	MODEL NO.	
LDS-1	LINEAR SUPPLY DIFFUSER	0-150	2	1.5"	SEE PLAN	10	FL-15	

**NOTES:**

- CONTRACTOR SHALL COORDINATE WITH LATEST ARCHITECTURAL REFLECTED CEILING PLANS PLANS TO ENSURE PROPER AIR DEVICE BORDER SELECTION.
- REFER ARCHITECTURAL DRAWINGS FOR CEILING TYPE.
- TO BE PROVIDED WITH ACOUSTIC INSULATED PLENUM
- COLOR AND BORDER TYPE TO BE FINALYZE WITH ARCHITECT.

SCHEDULE OF GRILLES			BASIS OF DESIGN: TITUS		
TAG	TYPE	CFM RANGE	DIMENSION (IN)	MODEL NO.	MAX NC dBA
SG-1	SUPPLY GRILLE	485-500	30X6	CT-480	25
SG-2	SUPPLY GRILLE	430	24X6	CT-480	25
SG-4	SUPPLY GRILLE	210	8X8	300FL	18
RG-1	RETURN GRILLE	2800	20X30	350FL	15
EG-1	EXHAUST GRILLE	100	6X6	350FL	15

**NOTES FOR GRILLES**

- CONTRACTOR SHALL COORDINATE WITH LATEST ARCHITECTURAL REFLECTED CEILING PLANS PLANS TO ENSURE PROPER AIR DEVICE BORDER SELECTION FOR GRILLE.
- COORDINATE COLOR/FINISH WITH ARCHITECT.
- PROVIDE GRILLE WITH OPPOSED BLADE DAMPER.

AIR CURTAIN SCHEDULE								
MANUFACTURER	UNIT ID	MODEL	LENGTH (IN)	CFM	QUANTITY	V/PH/Hz	HP	AMPS
BERNER	AC-1, AC-2	ALC08-1036A	37.25	1036	2	120/1/60	1/5	3.4

**NOTES / ACCESSORIES:**

- PROVIDE MANUFACTURER RECOMMENDED ACCESSORIES.
- COORDINATE WITH ELECTRICAL CONTRACTOR FOR POWER REQUIREMENT.



ELECTRICAL SYMBOLS LIST

GENERAL NOTES  
(APPLY TO ALL "E" DRAWINGS)

SWITCHES AND CONTROLS		POWER AND TELECOMMUNICATION		ELECTRICAL ABBREVIATIONS			
Ⓐ	20A SPST TOGGLE SWITCH U.O.N. "a" DENOTES LIGHTING FIXTURE CONTROLLED.	Ⓝ	JUNCTION BOX WITH BLANK COVER PLATE, FLUSH IN FLOOR.	A	AMPERES	EA	EACH
Ⓐ <sup>2</sup>	20A 3-WAY TOGGLE SWITCH U.O.N. "a" DENOTES LIGHTING FIXTURE CONTROLLED	Ⓝ	JUNCTION BOX WITH BLANK COVER PLATE, WALL MOUNTED, +18" AFF OR AS NOTED.	A/C, AC	AIR CONDITIONING UNIT	EC	EMPTY CONDUIT/ ELECTRICAL CONTRACTOR
Ⓐ <sup>3</sup>	20A 4-WAY TOGGLE SWITCH U.O.N. "a" DENOTES LIGHTING FIXTURE CONTROLLED	Ⓝ	JUNCTION BOX WITH BLANK COVER PLATE, CEILING MOUNTED.	AF	AMPERE FRAME/AMP FUSE	EF	EXHAUST FAN
Ⓐ <sub>OS</sub>	OCCUPANCY SENSOR SWITCH	Ⓝ	DUPLEX CONVENIENCE RECEPTACLE, +18" AFF OR AS NOTED.	AFF	ABOVE FINISHED FLOOR	EM	EMERGENCY
PC	WALL MOUNTED PHOTOCELL MOUNTED IN NEMA 3R ENCLOSURE.	Ⓝ	DUPLEX DEDICATED RECEPTACLE, +18" AFF OR AS NOTED.	AS	AMP SWITCH	EMT	ELECTRICAL METALLIC TUBING
Ⓞ <sub>A</sub>	CEILING OCCUPANCY SENSOR, NUMBER INDICATES TYPE; SEE OCCUPANCY SENSOR SCHEDULE. 'A' LETTER REFERES TO WIRING DIAGRAM.	Ⓝ	DUPLEX CONVENIENCE RECEPTACLE - 20A-1P, 125V, NEMA 5-20R MOUNTED FLUSH IN CEILING.	AIC	AMPS INTERRUPTING CAPACITY	EQUIP	EQUIPMENT
Ⓞ	WALL OCCUPANCY SENSOR, NUMBER INDICATES TYPE; SEE OCCUPANCY SENSOR SCHEDULE.	Ⓝ	DUPLEX CONVENIENCE RECEPTACLE, +18" AFF OR AS NOTED.	AT	AMP TRIP	ER	EXISTING TO BE RELOCATED
Ⓞ	WALL VACANCY SENSOR, NUMBER INDICATES TYPE; SEE OCCUPANCY SENSOR SCHEDULE.	Ⓝ	DUPLEX DEDICATED GFI RECEPTACLE, +18" AFF OR AS NOTED.	ATS	AUTOMATIC TRANSFER SWITCH	ETR	EXISTING TO REMAIN
Ⓞ	CEILING VACANCY SENSOR, NUMBER INDICATES TYPE; SEE OCCUPANCY SENSOR SCHEDULE.	Ⓝ	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.	AUTO	AUTOMATIC	EFW	ELECTRIFIED WORKSTATION FURNITURE
Ⓞ	CEILING MOUNTED DAYLIGHT SENSOR.	Ⓝ	TELEPHONE OUTLET, WALL-MOUNTED +48" AFF UNO TEL / DATA OUTLET TO BE PROVIDED WITH 1" CONDUIT U.O.N. TO H.C. AND TERMINATED WITH 90 DEGREE REE ELBOW AND BUSHING. TEL / DATA OUTLET PLATE SHALL BE PROVIDED WITH 1 1/4" DIAMETER GROMMETED OPENING.	AWG	AMERICAN WIRE GAUGE	EWH	ELECTRIC WATER HEATER
WIRING SYSTEMS				C	CONDUIT	FA	FIRE ALARM
3 UP-	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"C, UNLESS OTHERWISE NOTED.	Ⓝ	DATA OUTLET - (1) PORT UNO, +18" AFF, UNO TEL / DATA OUTLET TO BE PROVIDED WITH 1" CONDUIT U.O.N. TO H.C. AND TERMINATED WITH 90 DEGREE ELBOW AND BUSHING. TEL / DATA OUTLET PLATE SHALL BE PROVIDED WITH 1 1/4" DIAMETER GROMMETED OPENING.	C/B,CB	CIRCUIT BREAKER	FBO	FURNISHED BY OTHERS, INSTALLED & WIRED BY EC
3 5 UP-	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"C, UNLESS OTHERWISE NOTED.	Ⓝ	CABLE TV OUTLET, WALL-MOUNTED AT 18" AFF UNO.	CKT	CIRCUIT	FDR	FEEDER
3 5 7 UP-	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"C, UNLESS OTHERWISE NOTED.	MOTORS AND CONTROLS		CLG	CEILING	FIBO	FURNISHED & INSTALLED BY OTHERS, WIRED BY EC
---	UNDERGROUND	Ⓝ	AC INDOOR UNIT MOTOR AS NOTED WITH LIQUID TIGHT FLEXIBLE CONNECTION WITH JUNCTION BOX AND MOTOR SWITCH.	COMM	COMMUNICATION	FIXT	FIXTURE
-----	EXISTING	Ⓝ	30A NON FUSED DISCONNECT SWITCH	CT	CURRENT TRANSFORMER	FL	FLOOR
---	NEW	Ⓝ	60A NON FUSED DISCONNECT SWITCH	CU	COPPER	FLUOR	FLUORESCENT
ELECTRICAL DRAWING LIST				*C	DEGREE CELSIUS	G	GROUND
E-001	ELECTRICAL SYMBOL LIST, ABBREVIATIONS & GENERAL NOTES	Ⓝ	100A NON FUSED DISCONNECT SWITCH	*F	DEGREE FAHRENHEIT	GFI	GROUND FAULT INTERRUPTER
E-002	ELECTRICAL SPECIFICATIONS (1 OF 2)	Ⓝ	MANUAL MOTOR SWITCH	DIA	DIAMETER	GP	GENERAL PURPOSE
E-003	ELECTRICAL SPECIFICATIONS (2 OF 2)	ANNOTATION		DISC	DISCONNECT	HC	HUNG CEILING
E-101	ELECTRICAL LIGHTING PLAN	+24"	INDICATES MOUNTING HEIGHT, CENTER LINE TO FINISHED FLOOR.	DN	DOWN	HP	HORSEPOWER
E-201	ELECTRICAL POWER PLAN	Ⓝ	KEYED NOTE REFERENCE	DP	DISTRIBUTION PANEL	HWH	HOW WATER HEATER
E-202	ROOF POWER PLAN	Ⓝ	DETAIL REFERENCE: DETAIL NUMBER INDICATED ON TOP; DRAWING NUMBER INDICATED ON BOTTOM	DWH	DOMESTIC WATER HEATER	HZ	HERTZ
E-301	ELECTRICAL DETAILS	POWER DISTRIBUTION		DWG	DRAWING	IC	INTERRUPTING CAPACITY
E-401	ELECTRICAL SCHEDULE & RISER DIAGRAM	Ⓝ	DISTRIBUTION PANELBOARD, 208Y/120V-SURFACE OR FLUSH MOUNTED.	JB	JUNCTION BOX	PP	POWER PANEL
EN-001	ENERGY ANALYSIS	ANNOTATION		KOMIL	ONE THOUSAND CIRCULAR MILS	PVC	POLYVINYL CHLORIDE
				KV	KILOVOLT	PWR	POWER
				KVA	KILOVOLT-AMPERES	R	REMOVE
				KW	KILOWATTS	RE	RELOCATED EXISTING
				LP	LIGHTING PANEL	REC	RECEPTACLE
				LTG	LIGHTING	RGS	RIGID GALVANIZED STEEL
				MAX	MAXIMUM	RR	REMOVE & RELOCATE
				MC	MOTOR CONTROLLER	SECT	SECTION
				MCB	MAIN CIRCUIT BREAKER	SPDT	SINGLE POLE DOUBLE THROW
				MER	MECHANICAL EQUIPMENT ROOM	SPST	SINGLE POLE SINGLE THROW
				MIN	MINIMUM	SPEC	SPECIFICATION
				MLO	MAIN LUGS ONLY	SW	SWITCH
				MTD	MOUNTED	SWBD	SWITCHBOARD
				MTS	MANUAL TRANSFER SWITCH	SYM	SYMMETRICAL
				N	NEUTRAL	SYS	SYSTEMS
				NE	NEW DEVICE TO REPLACE EXISTING	TELE	TELEPHONE
				NIC	NOT IN CONTRACT	TEMP	TEMPERATURE
				NL	NIGHT LIGHT	TXF	TOILET EXHAUST FAN
				NTS	NOT TO SCALE	TYP	TYPICAL
				OC	ON CENTER	UON	UNLESS OTHERWISE NOTED
				P	POLES	V	VOLT/VOLTAGE
				PB	PULLBOX	VA	VOLT AMPERE
				PC	PERSONAL COMPUTER	VAV	VARIABLE AIR VOLUME
				∅	PHASE	VFD	VARIABLE FREQUENCY DRIVE
				PNL	PANEL	VP	VAPORPROOF
				W	WATT	WP	WEATHER PROOF
				W	WIRE	XFMR	TRANSFORMER
				WH	WALL HEATER	ZRT	ZONE REGISTER TERMINALS
				E	EXISTING	IG	ISOLATED GROUND

- ALL WORK SHALL BE PERFORMED IN STRICT ACCORDANCE WITH THE CURRENT VERSION OF THE NATIONAL ELECTRIC CODE(NEC) WITH AMENDMENTS, LOCAL JURISDICTION REQUIREMENTS, AND ALL GOVERNING LOCAL CODES, LAWS, AND REGULATIONS.
- CONTRACTOR SHALL VISIT THE SITE AND BECOME FAMILIAR WITH ALL EXISTING CONDITIONS THAT MAY AFFECT THE WORK. NO ADDITIONAL COMPENSATION WILL BE CONSIDERED FOR FAILURE TO DO SO.
- CONTRACTOR SHALL OBTAIN AND PAY FOR ALL PERMITS, TEST REPORTS, AND CERTIFICATIONS FOR TEMPORARY AND FINAL CERTIFICATE OF OCCUPANCY.
- FIRE STOP ALL PENETRATIONS OF FIRE RATED CONSTRUCTION IN A CODE APPROVED MANNER IN ORDER TO MAINTAIN FIRE RATING. ALL PENETRATIONS SHALL BE SLEEVED AND SEALED WATERTIGHT.
- SECURE ALL SUPPORTS TO BUILDING STRUCTURE UTILIZING TOGGLE BOLTS (HOLLOW MASONRY), EXPANSION SHIELDS OR INSERTS (CONCRETE AND BRICK), MACHINE SCREWS (METAL), BEAM CLAMPS (FRAMEWORK), WOOD SCREWS (WOOD) OR PAN THRU STRAPS (METAL DECK). NAILS, RAWL PLUGS AND WOOD PLUGS ARE NOT PERMITTED. WHERE REQUIRED BY STRUCTURE, PROVIDE THRU BOLTS AND FISH PLATES. SUPPORT HORIZONTAL RUNS OF METALLIC RACEWAYS NOT MORE THAN 10 FT APART. SUPPORT RACEWAY RISERS AT EACH FLOOR LEVEL. RUN EXPOSED RACEWAYS PARALLEL WITH OR AT RIGHT ANGLES TO WALLS.
- LEAVE WIRES WITH SUFFICIENT SLACK TO PERMIT MAKING FINAL CONNECTIONS. RACEWAYS OVER 10 FT LONG IN WHICH WIRING IS NOT INSTALLED: FURNISH FISH WIRE.
- VERIFY LOCATIONS OF OUTLETS AND SWITCHES IN FINISHED ROOMS WITH ARCHITECTURAL DRAWINGS OF INTERIOR DETAILS AND FINISH. IN CENTERING OUTLETS AND LOCATING BOXES AND OUTLETS, ALLOW FOR OVERHEAD PIPES, DUCTS AND MECHANICAL EQUIPMENT. EQUIPMENT, VARIATIONS IN FIREPROOFING AND PLASTERING WINDOW AND DOOR TRIM, PANELING, HUNG CEILINGS AND THE LIKE. CORRECT ANY INACCURACY RESULTING FROM FAILURE TO DO SO WITHOUT EXPENSE TO OWNER.
- CONTRACTOR SHALL PROVIDE A WARRANTY ON ALL MATERIALS, EQUIPMENT, AND WORKMANSHIP FOR A PERIOD OF ONE YEAR FROM THE DATE OF FINAL ACCEPTANCE.
- ALL UNUSED MATERIALS AND DEBRIS SHALL BE LEGALLY REMOVED AND DISPOSED OF AWAY FROM THE PREMISES ON A DAILY BASIS.
- CONTRACTOR SHALL PATCH, PAINT, AND RESTORE EXISTING SURFACES DAMAGED DURING THE COURSE OF THIS CONSTRUCTION TO PRE-EXISTING CONDITIONS OR BETTER.
- MINIMUM SIZE OF CONDUIT SHALL BE 3/4", AND TYPE SHALL BE ELECTRICAL METALLIC TUBING (EMT), UNLESS OTHERWISE NOTED. PROVIDE NYLON DRAG LINE AND CONDUIT CAP FOR ALL EMPTY CONDUITS.
- CONNECT CONDUIT TO MOTOR CONDUIT TERMINAL BOXES WITH FLEXIBLE CONDUIT (MINIMUM 18 IN. LENGTH AND 50% SLACK). DO NOT TERMINATE IN OR FASTEN RACEWAYS TO MOTOR FOUNDATION.
- PULL AND JUNCTION BOXES WHERE INDICATED ON THE DRAWINGS, SHALL BE CONSIDERED SHOWN AT THEIR APPROXIMATE LOCATION. THE CONTRACTOR SHALL LOCATE THEM AS FIELD CONDITIONS DICTATE. ADDITIONAL PULL AND JUNCTION BOXES NOT SHOWN ON DRAWINGS SHALL BE PROVIDED WHERE REQUIRED BY APPLICABLE CODE PROVISIONS OR WHERE CALLED FOR BY FIELD CONDITIONS. PULL AND JUNCTION BOXES SHALL BE SURFACE TYPE IN UNFINISHED AREAS AND INSTALLED CONCEALED IN FINISHED AREAS, AND ALL COVERS TO PULL & JUNCTION BOXES SHALL BE READILY ACCESSIBLE.
- SUPPORT PANEL, JUNCTION AND PULL BOXES INDEPENDENTLY TO BUILDING STRUCTURE WITH NO WEIGHT BEARING ON RACEWAYS.
- FOR EXACT LOCATION AND MOUNTING HEIGHT OF LIGHTING FIXTURES AND SWITCH/RECEPTACLE OUTLETS, REFER TO ARCHITECTURAL REFLECTED CEILING AND POWER PLANS.
- ALL ELECTRICAL ACCESSORIES AND EQUIPMENT INSTALLED OUTSIDE OR EXPOSED TO WEATHER SHALL HAVE NEMA 3R ENCLOSURES AND SHALL BE TIGHTLY GASKET FOR A COMPLETE RAIN TIGHT INSTALLATION. ALL BUILDING EXTERIOR MOUNTED RECEPTACLES SHALL BE GFCI RATED AND MOUNTED IN WEATHERPROOF ENCLOSURE.
- ALL ACCESS PANEL LOCATIONS SHALL BE REVIEWED BY ARCHITECT PRIOR TO INSTALLATION.
- ELECTRICAL CONTRACTOR SHALL COORDINATE THE LOCATION AND INSTALLATION OF NEW WORK WITH THE GENERAL CONTRACTOR AND OTHER ASSOCIATED TRADES IN A TIMELY MANNER. THE CONTRACTOR IS RESPONSIBLE FOR FIELD VERIFYING ALL DIMENSIONS AND CONDITIONS PRIOR TO CONSTRUCTION. REFER TO ALL GENERAL, MECHANICAL, AND ELECTRICAL, DRAWINGS AND SPECIFICATIONS FOR THIS PROJECT.
- ALL CONDUITS AND EQUIPMENT TO BE CONCEALED IN FINISHED SPACES UNLESS OTHERWISE NOTED. CONDUITS SHALL BE ENCASED IN THE CONCRETE FLOOR SLAB.
- ALL EQUIPMENT AND MATERIALS INSTALLED IN PLENUM CEILINGS SHALL BE APPROVED FOR THAT APPLICATION.
- OUTLET BOXES AND JUNCTION BOXES ON OPPOSITE SIDES OF FIRE-RATED WALLS SHALL BE SEPARATED BY A HORIZONTAL DISTANCE OF NOT LESS THAN 24 INCHES, UNLESS FIRE-RATED BOXES OR PUTTY PADS ARE UTILIZED.
- COORDINATE ALL FLOOR PENETRATIONS WITH THE STRUCTURAL AND ARCHITECTURAL DRAWINGS. CONFIRM PENETRATION LOCATIONS WITH THE ENGINEER AND OWNER BEFORE INSTALLATION.
- COORDINATE THE MOUNTING HEIGHT AND LOCATION OF RACEWAYS, COMMUNICATIONS OUTLETS, AND RECEPTACLES WITH THE ARCHITECTURAL CASEWORK DRAWINGS AND DETAILS. COORDINATE LOCATIONS OF LIGHT FIXTURES, SWITCHES, AND RELATED DEVICES WITH THE ARCHITECTURAL DRAWINGS AND DETAILS.
- REFER TO ARCHITECTURAL PLANS FOR FINAL LOCATIONS OF ALL LUMINARIES AND SWITCHES, AND FOR ALL FINISHED CEILING HEIGHTS.
- REFER TO ARCHITECTURAL PLANS FOR FINAL LOCATIONS OF ALL ELECTRICAL DEVICES, AND FOR FINAL CEILING AND WALL HEIGHTS AND LAYOUTS.
- LIGHTING FIXTURES PROVIDED WITH EMERGENCY BATTERY PACKS AND INDICATED WITH SWITCH CONTROL SHALL BE WIRED WITH BATTERY CHARGING/SENSING CIRCUIT WIRED AHEAD OF SWITCH CONTROL.
- NUMBER(S) SHOWN AT RECEPTACLES, JUNCTION BOXES AND EQUIPMENT INDICATES CIRCUIT NUMBERS IN PANEL BOARD. PROVIDE WIRE AND CONDUIT TO INTERCONNECT EQUIPMENT AND DEVICES WITH SAME CIRCUIT NUMBERS AND RUN TO PANEL BOARD.

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# ELECTRICAL SPECIFICATIONS

1. GENERAL:
  - A. THE "GENERAL CONDITIONS OF THE CONTRACT FOR CONSTRUCTION," AIA DOCUMENT, LATEST EDITION, AND THESE SPECIFICATIONS AS APPLICABLE ARE PART OF THIS CONTRACT.
  - B. DRAWING ARE DIAGRAMMATIC AND INDICATE GENERAL ARRANGEMENT OF SYSTEMS AND WORK. CONDUIT ROUTING IS SHOWN DIAGRAMMATICALLY AND DOES NOT SHOW ALL OFFSETS, DROPS AND RISES OF RUNS. THE CONTRACTOR SHALL ALLOW IN HIS PRICE FOR ROUTING OF CONDUIT TO AVOID OBSTRUCTIONS. COORDINATION WITH EXISTING SERVICES, INCLUDING THOSE OF OTHER TRADES, IS REQUIRED, MAINTAIN HEADROOM AND SPACE CONDITIONS.
  - C. BIDDERS, BEFORE SUBMITTING PROPOSALS, SHALL VISIT AND CAREFULLY EXAMINE THE AREA AFFECTED BY THIS WORK TO FAMILIARIZE THEMSELVES WITH THE EXISTING CONDITIONS AND THE DIFFICULTIES THAT WILL ATTEND THE EXECUTION OF THIS WORK. SUBMISSION OF A PROPOSAL WILL BE CONSTRUED AS EVIDENCE THAT SUCH AN EXAMINATION HAS BEEN MADE, AND LATER CLAIMS WILL NOT BE RECOGNIZED FOR EXTRA LABOR, EQUIPMENT, OR MATERIALS, REQUIRED BECAUSE OF DIFFICULTIES ENCOUNTERED WHICH COULD HAVE BEEN FORESEEN HAD SUCH AN EXAMINATION BEEN MADE.
  - D. INSTALL WORK SO AS TO BE READILY ACCESSIBLE FOR OPERATION, MAINTENANCE AND REPAIR. MINOR DEVIATIONS FROM DRAWING MAY BE MADE TO ACCOMPLISH THIS, BUT CHANGES WHICH INVOLVE EXTRA COST SHALL NOT BE MADE WITHOUT APPROVAL.
  - E. REMOVAL AND RELOCATION OF CERTAIN EXISTING WORK MAY BE NECESSARY FOR THE PERFORMANCE OF THE GENERAL WORK. ALL EXISTING CONDITIONS CANNOT BE COMPLETELY DETAILED ON THE DRAWINGS. THE CONTRACTOR SHALL SURVEY THE SITE AND INCLUDE ALL CHANGES AND CHARGES IN MAKING UP THE WORK PROPOSAL.
  - F. CONNECTIONS TO EXISTING WORK: INSTALL NEW WORK AND CONNECT TO EXISTING WORK WITH MINIMUM INTERFERENCE TO EXISTING FACILITIES. TEMPORARY SHUTDOWNS OF EXISTING SERVICES SHALL BE PERFORMED AT NO ADDITIONAL CHARGES. AT TIMES NOT TO INTERFERE WITH NORMAL OPERATION OF EXISTING FACILITIES AND ONLY WITH WRITTEN CONSENT OF OWNER, ALARM AND EMERGENCY SYSTEMS SHALL NOT BE INTERRUPTED. MAINTAIN CONTINUOUS OPERATION OF EXISTING FACILITIES AS REQUIRED WITH NECESSARY TEMPORARY CONNECTIONS BETWEEN NEW AND EXISTING WORK. CONNECT NEW WORK TO EXISTING WORK IN NEAT AND ACCEPTABLE MANNER. RESTORE EXISTING DISTURBED WORK TO ORIGINAL CONDITION, INCLUDING MAINTENANCE OF WIRING CONTINUITY AS REQUIRED.
  - G. DISCONNECT, REMOVE AND/OR RELOCATE EXISTING MATERIAL, EQUIPMENT AND OTHER WORK AS NOTED OR REQUIRED FOR PROPER INSTALLATION OF NEW WORK.
  - H. THE CONTRACTOR SHALL KEEP ALL EQUIPMENT AND MATERIALS, AND ALL PARTS OF THE BUILDING EXTERIOR SPACES AND ADJACENT STREETS, SIDEWALKS AND PAVEMENTS, FREE FROM MATERIAL AND DEBRIS RESULTING FROM THE EXECUTION OF THIS WORK. EXCESS MATERIALS WILL NOT BE PERMITTED TO ACCUMULATE EITHER ON THE INTERIOR OR THE EXTERIOR.
  - I. SEAL OPENINGS THROUGH PARTITIONS, WALLS AND FLOORS WITH MINERAL WOOL OR OTHER NONCOMBUSTIBLE MATERIAL, UNLESS OTHERWISE NOTED.
  - J. PROVIDE ALL NECESSARY FLASHING AND COUNTER FLASHING TO MAINTAIN THE WATERPROOFING INTEGRITY OF THE BUILDING AS REQUIRED BY THE INSTALLATION OR REMOVAL OF CONDUIT AND EQUIPMENT, PROVIDE EQUIPMENT CURBS AS REQUIRED.
  - K. ALL EXISTING MATERIAL, EQUIPMENT AND CONSTRUCTION DEBRIS TO BE REMOVED UNDER THIS CONTRACT SHALL BECOME THE PROPERTY OF THE CONTRACTOR WITH THE EXCEPTION OF SPECIFIC EQUIPMENT AND APPARATUS REQUESTED BY THE BUILDING REPRESENTATIVE, ARCHITECT OR AS NOTED TO BE RELOCATED ON THE DRAWINGS. REMOVED EQUIPMENT SHALL BE PROPERLY DISPOSED OF BY THIS CONTRACTOR.
  - L. THE CONTRACTOR'S PROPOSAL FOR ALL WORK SHALL BE PREDICATED ON THE PERFORMANCE OF THE WORK DURING REGULAR WORKING HOURS. WHEN SO DIRECTED, HOWEVER, THE CONTRACTOR SHALL INSTALL WORK DURING OVERTIME HOURS AND THE ADDITIONAL COST TO BE CHARGED THEREFORE SHALL BE ONLY THE "PREMIUM" PORTION OF THE WAGES PAID.
  - M. UNLESS OTHERWISE SPECIFICALLY NOTED OR SPECIFIED, INCLUDE ALL CUTTING AND PATCHING OF EXISTING FLOORS, WALLS, PARTITIONS AND OTHER MATERIALS IN THE EXISTING BUILDING. THE CONTRACTOR SHALL RESTORE THESE AREAS TO ORIGINAL CONDITION.
  - N. ALL MATERIAL AND EQUIPMENT SHALL BE NEW UNLESS OTHERWISE NOTED AND SHALL BE IN ACCORDANCE WITH BUILDING STANDARDS.
  - O. INSURANCE: PROVIDE IN ACCORDANCE WITH OWNER/BUILDING REQUIREMENTS AND SHALL INCLUDE A HOLD HARMLESS CLAUSE FOR OWNER AND ENGINEER.
  - P. THE FINAL ACCEPTANCE SHALL BE MADE AFTER THE CONTRACTOR HAS ADJUSTED HIS EQUIPMENT, TESTED THE VARIOUS SYSTEMS, DEMONSTRATED THAT IT FULFILLS THE REQUIREMENTS OF THE DRAWINGS AND SPECIFICATIONS AND HAS FURNISHED ALL THE REQUIRED CERTIFICATED OF INSPECTION AND APPROVAL.
2. GENERAL PROVISIONS FOR ELECTRICAL WORK:
  - A. DEFINITIONS:
    - 1) "PROVIDE": TO FURNISH, INSTALL AND CONNECT UP COMPLETE AND READY FOR SAFE AND REGULAR OPERATION THE PARTICULAR WORK REFERRED TO UNLESS SPECIFICALLY OTHERWISE NOTED.
    - 2) "INSTALL": TO ERECT, MOUNT AND CONNECT COMPLETE WITH RELATED ACCESSORIES.
    - 3) "FURNISH" OR "SUPPLY": TO PURCHASE, PROCURE, ACQUIRE, AND DELIVER COMPLETE WITH RELATED ACCESSORIES.
    - 4) "WORK": LABOR, MATERIALS, EQUIPMENT, APPARATUS, CONTROLS, ACCESSORIES AND OTHER ITEMS REQUIRED FOR PROPER AND COMPLETE INSTALLATION.
    - 5) "WIRING": RACEWAY, FITTINGS, WIRE, BOXES, AND RELATED ITEMS.
    - 6) "CONCEALED": EMBEDDED IN MASONRY OR OTHER CONSTRUCTION, INSTALLED IN FURRED SPACES, WITHIN DOUBLE PARTITIONS OR HUNG CEILINGS, IN TRENCHES, IN CRAWL SPACES, OR IN ENCLOSURES.
    - 7) "EXPOSED": NOT INSTALLED UNDERGROUND OR "CONCEALED" AS DEFINED ABOVE.
    - 8) "SIMILAR" OR "EQUAL": EQUAL IN MATERIALS, WEIGHT, SIZE, DESIGN AND EFFICIENCY OF SPECIFIED PRODUCT.
  - B. TEMPORARY LIGHT AND POWER: PROVIDE TEMPORARY LIGHT AND POWER SYSTEMS AT EARLIEST POSSIBLE DATE WITHIN THE CONSTRUCTION AREAS FOR THE REQUIREMENTS OF ALL TRADES AS HEREIN DESCRIBED. EXTEND SYSTEMS TO NEW CONSTRUCTION AS SOON AS PHYSICALLY POSSIBLE. MAINTAIN SYSTEM DURING WORKING OWNER. PROVIDE ALL REQUIRED MAINTENANCE, INCLUDING LAMPS AND SOCKETS.
  - C. QUALITY ASSURANCE
    - 1) QUALITY OF MATERIALS: ALL EQUIPMENT SHALL BE NEW SPECIFICATION GRADE, FREE FROM DEFECTS AND LISTED BY APPROVED TESTING AGENCY AND BEARING THEIR LABEL MATERIALS AND EQUIPMENT OF SIMILAR APPLICATION SHALL BE OF SAME MANUFACTURER, EXCEPT AS NOTED.
    - 2) GUARANTEE: ALL MATERIALS AND WORKMANSHIP SHALL BE GUARANTEED AS DEFINED IN PARAGRAPH 2.C.
    - 3) CURRENT CHARACTERISTICS:
      - a. SERVICE: 120/208 VOLT, 3 PHASE, 4 WIRE, 60 HERTZ WITH GROUNDED NEUTRAL.
      - b. DISTRIBUTION: 120/208 VOLT, 3 PHASE, 4 WIRE, 60 HERTZ WITH GROUNDED NEUTRAL.
    - 4) HEIGHTS OF OUTLETS:
      - a. FROM FINISHED FLOOR TO CENTERLINE OF OUTLETS FOR:
        - RECEPTACLES AND TELEPHONES: 1 FT-6 IN.
        - WALL SWITCHES: 4 FT-0 IN.
        - WALL FIXTURES: 7 FT-0 IN.
        - MOTOR CONTROLLERS: 5 FT-0 IN.
        - CLOCKS: 7 FT 6 IN
      - b. EXCEPTIONS: AT JUNCTION OF DIFFERENT WALL FINISH MATERIALS, ON MOLDING OR BREAK IN WALL SURFACE, IN VIOLATION OF CODE, OR AS NOTED OR DIRECTED.
    - D. PRODUCT DELIVERY, STORAGE AND HANDLING
      - 1) MOVING OF EQUIPMENT: WHERE NECESSARY, SHIP IN CARTED SECTIONS OF SIZE TO PERMIT PASSING THROUGH AVAILABLE SPACES.
      - 2) ACCESSIBILITY: FOR OPERATION, MAINTENANCE AND REPAIR, MINOR DEVIATIONS SHALL BE PERMITTED, CHANGES OF MAGNITUDE OR INVOLVING EXTRA COST ARE NOT PERMISSIBLE WITHOUT REVIEW. GROUP CONCEALED ELECTRICAL EQUIPMENT REQUIRING ACCESS WITH EQUIPMENT FREELY ACCESSIBLE THROUGH ACCESS DOORS.
    - E. MATERIALS
      - 1) NAMEPLATES: PROVIDE BLACK LAMICOID SHEET WITH 3/4 IN. WHITE LETTERING, FASTENED WITH EPOXY CEMENT FOR EACH DISCONNECT SWITCH, CIRCUIT BREAKER, PANEL, CABINET, TRANSFORMER, ENCLOSURE, MOTOR CONTROLLER AND THE LIKE. NAMEPLATES SHALL DESCRIBE THE NAME AND NUMBER OF EACH COMPONENT.
      - 2) CABLE TAGS: TAG EACH CONDUCTOR PASSING THROUGH SPLICE OR PULLBOX WITH A WHITE LINEN TAG, INDICATING POINT OF ORIGIN AND TERMINATION OF THE CIRCUIT.
      - 3) INSERTS AND SUPPORTS:
        - a. INSERTS: STEEL, SLOTTED TYPE, FACTORY PAINTED.
          - SINGLE ROD: SIMILAR TO GRINNELL FIG. 281.
          - MULTI-ROD: SIMILAR TO FEE AND MASON SERIES 9000 WITH END CAPS AND CLOSURE STRIPS.
          - CLIP FORM NAILS FLUSH WITH INSERTS.
          - MAXIMUM LOADING 75 PERCENT OF RATING.
        - b. SUPPORTS FROM BUILDING CONSTRUCTION: INSERTS, BEAM CLAMPS, STEEL FISHPLATES (IN CONCRETE FILL ONLY), CANTILEVER BRACKETS OR OTHER MEANS. SUBMIT FOR REVIEW.
        - c. GROUPED LINES AND SERVICES: TRAPEZE HANGERS OF BOLTED ANGLES OR CHANNELS.
        - d. WHERE BUILDING CONSTRUCTION IS INADEQUATE: PROVIDE ADDITIONAL FRAMING. SUBMIT FOR REVIEW.
      - F. PAINT SHALL BE THE BEST GRADE FOR ITS PURPOSE. DELIVER IN ORIGINAL SEALED CONTAINERS AND APPLY IN ACCORDANCE WITH MANUFACTURER'S INSTRUCTIONS. COLORS SHALL BE AS SELECTED BY ARCHITECT OR ENGINEER. UTILIZE GALVANIZED IRON PRIMER ON PANEL AND PULL BOXES, AFTER FABRICATION. UTILIZE HOT DIPPED GALVANIZED OR DIPPED IN ZINC BASED PRIMER FOR: OUTLET BOXES, JUNCTION BOXES, CONDUIT HANGERS, RODS, INSERTS AND SUPPORTS. ZINC BASED PRIMER WITH FINISH TO MATCH SURROUNDINGS SHALL BE USED FOR MARRED SURFACES OF STEEL EQUIPMENT AND RACEWAYS. A FIELD-APPLIED ZINC BASED PRIME COAT SHALL BE UTILIZED FOR STEEL OR IRONWORK.
      - G. BRUSH AND CLEAN WORK PRIOR TO CONCEALING, PAINTING AND ACCEPTANCE. PAINTED EXPOSED WORK SOILED OR DAMAGED; CLEAN AND REPAIR TO MATCH ADJOINING WORK BEFORE FINAL ACCEPTANCE. REMOVE DEBRIS FROM INSIDE AND OUTSIDE OF MATERIAL AND EQUIPMENT.
      - F. FINAL LOCATIONS AND MOUNTING ORIENTATIONS OF ALL SWITCHES, RECEPTACLES AND LIGHT FIXTURES SHALL BE VERIFIED WITH ARCHITECT.
      - G. ALL ACCESS DOOR LOCATIONS SHALL BE REVIEWED BY ARCHITECT PRIOR TO INSTALLATION.
    3. SCOPE OF WORK:
      - A. SCOPE OF WORK SHALL CONSIST OF PROVIDING LABOR, MATERIALS, EQUIPMENT, SERVICES AND FEES NECESSARY FOR COMPLETE AND SAFE INSTALLATION IN CONFORMING WITH THE NATIONAL ELECTRICAL CODE (NEC), AND ALL OTHER APPLICABLE INDUSTRY, NATIONAL AND LOCAL CODES AND AUTHORITIES HAVING JURISDICTION, AS INDICATED ON DRAWINGS AND HEREIN SPECIFIED.
      - B. ALL DRAWINGS, PLANS, DETAILS, SPECIFICATIONS AND SPECIFICATION ADDENDA ARE MADE PART OF THIS CONTRACT AND SHALL APPLY TO ALL WORK UNDER THE CONTRACT UNLESS OTHERWISE AMENDED, MODIFIED, SUPPLIED OR SPECIFIED HEREIN.
      - C. THE CONTRACTOR SHALL FURNISH A WRITTEN GUARANTEE TO REPLACE OR REPAIR PROMPTLY AND ASSUME RESPONSIBILITY FOR ALL EXPENSES INCURRED FOR ANY WORKMANSHIP AND EQUIPMENT IN WHICH DEFECTS DEVELOP WITHIN ONE YEAR FROM THE DATE OF FINAL CERTIFICATE FOR PAYMENT AND/OR FROM DATE OF ACTUAL USE OF EQUIPMENT OR OCCUPANCY OF SPACES BY OWNER INCLUDED UNDER THE VARIOUS PARTS OF THE WORK, WHICHEVER, DATE IS EARLIER, THIS WORK SHALL BE DONE AS DIRECTED BY THE OWNER. THIS GUARANTEE SHALL ALSO PROVIDED THAT WHERE DEFECTS OCCUR, THE CONTRACTOR WILL ASSUME RESPONSIBILITY OF OTHER TRADES AFFECTED BY DEFECTS, REPAIRS OR REPLACEMENTS IN EQUIPMENT SUPPLIED BY THE CONTRACTOR
    4. SHOP DRAWINGS
      - A. PRIOR TO THE INSTALLATION OF ANY WORK AND PROCUREMENT OF EQUIPMENT, CONTRACTOR SHALL PROVIDE COMPLETE SETS OF COORDINATED SHOP DRAWINGS OF ALL NEW AND EXISTING EQUIPMENT, INDICATING CAPACITY, DIMENSIONS AND SEQUENCE OF OPERATION FOR WRITTEN APPROVAL BY THE ARCHITECT AND ENGINEER.
      - B. INDICATE ON EACH SHOP DRAWINGS SUBMITTED:
        - 1) PROJECT NAME AND LOCATION
        - 2) NAME OF ARCHITECT AND ENGINEER
        - 3) ITEM IDENTIFICATION
        - 4) APPROVAL STAMP OF PRIME CONTRACTOR
      - C. SUBMISSIONS:
        - 1) SUBMISSIONS 11 IN. X 17 IN. OR SMALLER: IF THE SUBMISSION IS A CATALOG CUT, THEN THE CONTRACTOR SHALL SUBMIT ONE ORIGINAL AND TWO COPIES. OTHERWISE, HE SHALL SUBMIT THREE COPIES. THE ARCHITECT WILL FORWARD THE ORIGINAL AND ONE COPY (TWO COPIES WHEN NO ORIGINAL IS RECEIVED) TO THE ENGINEER. ALL CATALOG CUTS SHALL BE COMPLETE.
        - 2) SUBMISSIONS LARGER THAN 11 IN. X 17 IN.: SUBMIT TWO PRINTS AND ONE PAPER SEPIA TO THE ARCHITECT. THE ARCHITECT WILL FORWARD ONE PRINT AND THE PAPER SEPIA TO THE ENGINEER.
      - D. SUBMIT SHOP DRAWINGS FOR THE FOLLOWING:
        - 1) SAFETY/DISCONNECT SWITCHES
        - 2) FUSES
        - 3) CIRCUIT BREAKERS
        - 4) PANEL BOARDS/LOAD CENTER (INCLUDING DIMENSIONS, SCHEDULES, AND CATALOG CUTS).
        - 5) RACEWAYS
        - 6) WIRE AND CABLE
        - 7) WALL SWITCHES
        - 8) INSERTION RECEPTACLES
        - 9) MOMENTARY CONTACT SWITCHES
        - 10) TIME SWITCHES
        - 11) LIGHTING FIXTURES.
      - E. ASSIST AND PROVIDE ALL NECESSARY INFORMATION, DIAGRAMS, SKETCHES, ETC. TO THE HVAC CONTRACTOR, FOR THE PREPARATION OF COORDINATED SHOP DRAWINGS INDICATING ROUTING OF FEEDERS, CONTROL CONDUITS, RECESSED FIXTURES AND ADJACENT NEARBY PIPING AND DUCTWORK WHERE APPLICABLE, CERTIFIED BY ALL TRADES THAT COORDINATION HAS BEEN ESTABLISHED. SUBMIT FOUR(4) BOOKBOUND OPERATING AND SERVICE MANUALS WHICH SHALL INCLUDE COPIES OF ALL SHOP DRAWING, PROVIDE SHOP DRAWINGS FOR PANELS, FIXTURES, WIRING DEVICES, CONDUIT, CABLE, DISCONNECT SWITCH, RELAYS, CONTRACTORS, AND OTHER SYSTEMS AS DIRECTED BY THE ENGINEER.
    5. AS-BUILT DRAWINGS AND EQUIPMENT OPERATIONAL INSTRUCTIONS
      - A. UPON COMPLETION AND ACCEPTANCE OF WORK, CONTRACTOR SHALL FURNISH WRITTEN INSTRUCTIONS AND EQUIPMENT MANUALS AND DEMONSTRATE TO THE OWNER THE PROPER OPERATION AND MAINTENANCE OF ALL EQUIPMENT AND APPARATUS FURNISHED UNDER THIS CONTRACT.
      - B. THESE INSTRUCTIONS SHALL BE TYPED ON 8-1/2 IN. X 11 IN. PAPER AND BOUND IN THREE RING BINDERS WITH CLEAR ACETATE COVERS. CONTRACTOR SHALL GIVE THREE COPIES OF THE INSTRUCTIONS TO THE OWNER AND ONE COPY TO THE ENGINEER.
      - C. THE INSTRUCTION BOOKLET SHALL BEAR THE NAME, ADDRESS AND TELEPHONE NUMBER OF THE PROJECT, ARCHITECT AND ENGINEER.
      - D. REPRODUCIBLE "AS-BUILT" DRAWINGS SHALL BE PROVIDED INDICATING THE AS INSTALLED CONDITIONS OF THE WORK. "AS-BUILT" DRAWINGS SHALL BE PROVIDED TO THE ARCHITECT AFTER COMPLETION OF THE INSTALLATION.
    6. LOW-VOLTAGE DISTRIBUTION EQUIPMENT:
      - A. PROVIDE COMPLETE EQUIPMENT INCLUDING: SWITCHES, FUSES, CIRCUIT BREAKERS, PANELS AND TRANSFORMERS.
      - B. ALL EQUIPMENT SHALL CONFORM TO NEMA, ANSI AND IEEE STANDARDS.
      - C. DISCONNECT SWITCHES SHALL BE FUSED OR NONFUSED AS NOTED. VOLTAGE SHALL BE AS REQUIRED. SWITCHES SHALL BE HEAVY DUTY, EXCEPT AS NOTED, AND HORSEPOWER RATED FOR MOTOR LOADS. TOGGLE TYPE SWITCHES SHALL BE NONFUSED, LOAD BREAK; HAVING MAXIMUM RATINGS OF 20 AMP AT 600 VOLTS AND 30 AMP AT 240 VOLTS. TWO-POLE SWITCHES SHALL BE SIMILAR TO HART AND HEGEMAN NO. 6808F. THREE-POLE SWITCHES SHALL BE SIMILAR TO HART AND HEGEMAN NO. 7810F. KNIFE-BLADE TYPE SWITCHES SHALL BE LOAD BREAK, QUICK-MAKE- QUICK-BREAK, UL CLASS R UP TO 600 AMP, MAXIMUM RATING EXCEPT AS NOTED SHALL BE 800 AMP. ARC QUENCHERS SHALL BE PROVIDED. SWITCHES SHALL BE SIMILAR TO GENERAL ELECTRIC QMR. ALL SWITCH ENCLOSURES SHALL BE DEAD FRONT, NEMA TYPE 1, EXCEPT AS NOTED.
    7. FUSES:
      - A. CIRCUITS 0 TO 600 AMPERES SHALL BE PROTECTED BY FUSES SIMILAR TO CURRENT LIMITING BUSSMANN LOW-PEAK DUAL-ELEMENT TIME-DELAY LPN-RK (AMP)SP (250V) /LPS-RK (AMP)SP (600V) OR LPJ (AMP)SP (600V) (UL CLASS RK1 OR CLASS J), AND BE LISTED BY UL WITH AN INTERRUPTING RATING OF 300,000 AMPERES RMS SYMMETRICAL.
      - B. MOTOR CIRCUITS - ALL INDIVIDUAL MOTOR CIRCUITS WITH FULL LOAD AMPERE RATINGS (FLA) OF 480 AMPERES OR LESS SHALL BE PROTECTED BY FUSES SIMILAR TO CURRENT LIMITING BUSSMANN LOW-PEAK DUAL-ELEMENT TIME-DELAY LPN-RK (AMP)SP (250V) /LPS-RK (AMP)SP (600V) OR LPJ (AMP)SP (600V) (UL CLASS RK1 OR CLASS J), AND BE LISTED BY UL WITH AN INTERRUPTING RATING OF 300,000 AMPERES RMS SYMMETRICAL.
      - C. ALL FUSES SHALL BE PROVIDED BY SAME MANUFACTURER.
      - D. PROVIDE 1 SPACE MATCHING FUSE FOR EACH SET OF 3.
      - E. CIRCUIT BREAKERS: MOLDED CASE BREAKERS SHALL BE THERMAL-MAGNETIC, QUICK-MAKE-QUICK-BREAK, BOLT-ON TYPE, MANUALLY OPERATED WITH INSULATED TRIP-FREE HANDLE. MULTI-POLE TYPE BREAKERS SHALL CONTAIN INTERNAL TRIP BAR. TERMINALS SHALL BE SUITABLE FOR COPPER OR ALUMINUM CABLE. FURNISH AUXILIARY DEVICES WHERE REQUIRED FOR SHUNT-TRIPPING, OPEN AND CLOSE MOTOR OPERATOR AND ALARM INDICATION. ENCLOSURES SHALL BE DEAD FRONT, NEMA TYPE 1, EXCEPT AS NOTED. FRAMES, IC AND INTERCHANGEABLE TRIPS SHALL BE AS FOLLOWS, UNLESS OTHERWISE NOTED:
        - 1) 120 VOLTS, 100-AMP FRAME: 10,000 AMPS, 1 POLE.
        - 2) 120/240 VOLTS, 225-AMP FRAME: 22,000 AMPS MINIMUM
    8. DISTRIBUTION PANELBOARDS, CIRCUIT BREAKER TYPE:
      - A. THREE PHASE, 4 OR 5 WIRE, COPPER BUS BARS, WITH 2, 3, OR 4 WIRE BRANCHES, AS NOTED. CAPACITY OF PANEL AND CIRCUITS, AS NOTED BELOW. PANELBOARD TO HAVE GROUND BUS SAME SIZE AS PHASE BUSES.
      - B. CABINETS: CODE GAUGE GALVANIZED SHEET STEEL PRIMED AND PAINTED WITH TRIM AND DOOR, TYPE AS NOTED, LAP AND RIVET CORNERS OR FORM AS APPROVED.
      - C. TRIM: ONE PIECE FULL FINISH PRIMED AND PAINTED SHEET STEEL. TRIM SHALL BE COINTINGED WITH CONTINUOUS PIANO HINGE CONFIGURED IN SUCH A MANNER THAT IT SHALL BE POSSIBLE TO GAIN FULL ACCESS TO CIRCUIT BREAKERS AND WIRING GUTTERS WITHOUT REMOVING THE TRIM. PROVIDE A MULTI-PIN CYLINDER LOCK (YALE, CORBIN OR EQUAL) TO LATCH THE TRIM. KEYS SHALL BE MILLED.
      - D. HARDWARE: MULTI-PIN, CYLINDER LOCKS WITH MILLED KEYS. ALL PANELS SHALL BE KEYPED ALIKE. DOOR OVER 48" HIGH SHALL BE EQUIPPED WITH A CHROME PLATED VAULT HANDLE, BUILT-IN LOCK AND 3-POINT CATCH FASTENING DOOR AT TOP, BOTTOM AND CENTER.
      - E. HINGES: CONCEALED, CONTINUOUS PIANO HINGE AS DESCRIBED ABOVE.
      - F. DIRECTORY HOLDER: MEAL FRAME WITH NONBREAKABLE TRANSPARENT COVER AND IDENTIFIED ENTRIES TO BE TYPED BY ELECTRICAL CONTRACTOR. PROVIDE AN ENGRAVED LAMINATED NAMEPLATE ADJACENT TO EACH BRANCH BREAKER. MOUNT WITH SELF TAPPING MACHINE SCREWS.
      - G. FURNISH MULTI-CABLE LUGS WHERE REQUIRED. DOUBLE LUGGING NOT PERMITTED. SECURE LUGS TO BUS BY STUD BOLTS.
      - H. PANELBOARD CONSTRUCTION FOR BOLTED TYPE BREAKERS. MINIMUM SHORT CIRCUIT RATING 25,000 AMPERES, RMS SYMMETRICAL FOR ALL 120/208V APPLICATIONS. INDIVIDUAL CIRCUIT BREAKERS SHALL HAVE MINIMUM 100A FRAME, TRIPS SIZED AS SHOW ON THE PLANS.
      - I. MINIMUM GUTTER SPACES: PANELS WITH 225 AMPERE MAINS, 5-3/4" MINIMUM, 400 AMPERES AND OVER, MINIMUM GUTTERS 8". FOR PANELS WITH THROUGH FEEDERS, INCREASE GUTTER WIDTH BY 2" MINIMUM AND PROVIDE A SHEET STEEL BARRIER BETWEEN THE PANEL GUTTER AND THE THROUGH FEEDER PORTION OF THE BACK BOX. BRANCH CIRCUIT BREAKERS SHALL BE MECHANICALLY INTERLOCKED WHEN SHOWN ON DRAWINGS.
      - J. DISTRIBUTION AND SUB-DISTRIBUTION PANELBOARDS SHALL BE A MINIMUM OF 30" WIDE AND 10" DEEP.
      - K. PANELBOARD SHALL HAVE MAIN CIRCUIT BREAKER OR MAIN LUGS AS INDICATED ON THE DRAWINGS. QUANTITY, POLES AND TRIP RATINGS OF BRANCH CIRCUIT BREAKERS TO BE AS INDICATED ON DRAWINGS.
      - L. PANELBOARD SHALL HAVE ENGRAVED WHITE CORE, BLACK LAMACOID NAMEPLATE SCREWED ONTO PANE TRIM WITH DESIGNATION LISTED (PANELBOARD NAME, VOLTAGE, RATING OR MAINS IN AMPS).
    9. DISTRIBUTION PANELBOARDS, SWITCH AND FUSE:
      - A. THREE PHASE, 3 OR 4 WIRE WITH COPPER BUS BARS. ALL THROUGH BUS SHALL BE INSULATED.
      - B. NEMA CLASS 1 CONSTRUCTION TO ACCOMMODATE FUSIBLE, INDIVIDUALLY ENCLOSED SWITCHES. FRONT REMOVABLE, SWITCH AND DOOR INTERLOCKS. COVERS TO BE PAD-LOCKABLE.
      - C. PANELBOARD SHALL BE CONSTRUCTED OF CODE-GAUGE STEEL, GRAY FINISH OVER RUST INHIBITOR, FOR SURFACE MOUNTING. BOX AND PANEL FRAME SHALL BE FLANGED AND REINFORCED FOR RIGID SUPPORT OF INTERIOR AND ACCURATE ALIGNMENT OF INTERIOR WITH FRONT. TRIMS TO BE FASTENED TO BACK BOX WITH SCREWS.
      - D. ALL BRANCH SWITCHES SHALL HAVE INDIVIDUAL ENGRAVED LAMICOID NAMEPLATES (BLACK WITH WHITE CORE).
      - E. DISTRIBUTION PANELBOARD CONSTRUCTION MINIMUM SHORT CIRCUIT RATING 25,000 AMPERES, REMS SYMMETRICAL FOR ALL 120/208V APPLICATIONS. APPLICATIONS.
      - F. DISCONNECTS
        - 1) DISCONNECT SWITCHES SHALL CONFORM TO NEMA AND UL STANDARDS, AND SHALL BE HORSEPOWER RATED.
        - 2) SWITCHING MECHANISM SHALL BE QUICK-MAKE, QUICK-BREAK, SINGLE THROW WITH EXTERNAL OPERATING HANDLE MECHANICALLY INTERLOCKED WITH ENCLOSURE COVER TO PROVIDE ACCESS TO INTERIOR WHEN DISCONNECT IS IN OFF POSITION ONLY. PROVIDE MEANS TO LOCK OPERATING HANDLE IN THE OPEN AND CLOSED POSITION. DESIGNATE ON THE ENCLOSURE THE OPEN AND CLOSED POSITION OF THE OPERATING HANDLE.
        - 3) SWITCHES SHALL BE OF THE DOUBLE STATIONARY CONTACT TYPE.
        - 4) SWITCHES SHALL BE EQUIPPED WITH REJECTION TYPE FUSE HOLDERS, FUSIBLE AS SHOWN ON THE DRAWINGS; PROVIDE COMPLETE WITH FUSES AS SCHEDULED.



## ELECTRICAL SPECIFICATIONS (CONT.)

### BOXES:

OUTLET BOXES: EXCEPT AS OTHERWISE REQUIRED BY CONSTRUCTION, DEVICES OR WIRING, BOXES SHALL BE STAMPED STEEL, 4 IN. SQUARE OR OCTAGON FOR FIXTURES. BOXES ABOVE CEILING SHALL BE 1-1/2 IN. DEEP. BOXES IN CEILING OR SLAB SHALL BE 3 IN. DEEP. BOXES IN WALL FOR FIXTURES SHALL BE 2-3/4 IN. DEEP. BOXES IN WALL FOR RECEPTACLES AND SWITCHES SHALL BE 1-1/2 IN. DEEP. FURNISH WITH RAISED COVERS AND FIXTURE STUDS WHERE REQUIRED. WITHOUT FIXTURE OR DEVICE: FURNISH BLANK COVER. OFFSET BACK-TO-BACK OUTLETS WITH MINIMUM 6 IN. SEPARATION.

JUNCTION AND PULL BOXES: GALVANIZED SHEET STEEL WITH SCREW-ON COVERS, EXCEPT AS NOTED. FURNISH WITH INSULATED SUPPORTS FOR CABLES. LOCATIONS SHALL BE AS NOTED OR REQUIRED AND ACCESSIBLE. PROVIDE BARRIERS IN NEW AND RENOVATED BOXES BETWEEN 120/208 VOLT AND 265/460 VOLT WIRING AND BETWEEN EMERGENCY AND NORMAL WIRING. FLOOR BOXES SHALL BE SUITABLE FOR CONDUIT AND DEVICES NOTED. RAISED OUTLETS SHALL BE HUBBELL #B2414 SERIES WITH ABOVE FLOOR FITTING. TELEPHONE: BUSHED HOLE. POWER: DUPLEX RECEPTACLE OR OTHER AS NOTED. INCREASE SIZE TO SUIT AS NECESSARY. FLUSH OUTLETS SHALL BE HUBBELL #B2414 SERIES WITH FLUSH FLOOR FITTING FOR TELEPHONE AND FLUSH DUAL FLAP COVER WITH DUPLEX RECEPTACLE FOR POWER AS NOTED. INCREASE SIZE TO SUIT AS NECESSARY.

N. PROVIDE RACEWAYS ONLY AS HEREIN SPECIFIED, EXCEPT AS NOTED. RACEWAYS SHALL BE RUN CONCEALED, EXCEPT AS NOTED.

PROVIDE RACEWAY SUPPORT UTILIZING CEILING TRAPEZE, STRAP HANGERS, OR WALL BRACKETS. PROVIDE U-BOLTS AT EACH FLOOR LEVEL OF RISER RACEWAYS AND CONNECTED TO ACCEPTABLE SUPPORTS. PROVIDE RISER CLAMPS AT EACH FLOOR LEVEL OF RISER RACEWAYS AND RESTING ON SLAB, FOR THROUGH-THE-FLOOR SYSTEMS. UTILIZE AN ASSEMBLY SIMILAR TO HUBBELL FIRE RATED POKE-THROUGH-FLOOR BOX SYSTEM. FOR ABOVE FLOOR FITTINGS TELEPHONE SHALL BE BUSHED HOLE AND POWER SHALL BE DUPLEX RECEPTACLE OR OTHER AS NOTED. PROVIDE SEPARATION BARRIER BETWEEN POWER AND TELEPHONE COMPARTMENTS. PROVIDE JUNCTION BOX ON UNDERSIDE OF FLOOR. PACK FITTING TO RESTORE FIRE RATING OF FLOOR.

SECURE ALL RACEWAYS TO SUPPORTS WITH PIPE STRAPS OR U-BOLTS. SPACING OF SUPPORTS SHALL BE A MINIMUM OF 10 FT ON CENTER FOR METALLIC RACEWAY AND AS REQUIRED FOR NONMETALLIC RACEWAY. SPACING SHALL BE 5 FT ON CENTER FOR WIREWAYS AND PER CODE AND AS NOTED FOR OTHERS. MOUNT SUPPORTS TO STRUCTURE MASONRY WITH TOGGLE BOLTS ON HOLLOW MASONRY, EXPANSION SHIELDS OR INSERTS IN CONCRETE AND BRICK, MACHINE SCREWS ON METAL, BEAM CLAMPS ON FRAMEWORK, WOOD SCREWS ON WOOD, AND PAN THROUGH STRAPS IN METAL DECK. NAILS, RAWL PLUGS OR WOOD PLUGS SHALL NOT BE PERMITTED, WHERE REQUIRED BY STRUCTURE, FURNISH THROUGH BOLTS AND FISHPLATES.

EXPOSED RACEWAYS SHALL BE RUN PARALLEL WITH OR AT RIGHT ANGLES TO WALLS. PROVIDE CLEARANCE WITH WATER, STEAM OR OTHER PIPING (MINIMUM 3 IN. SEPARATION FROM STEAM AND HOT WATER PIPES, EXCEPT 1 IN. FROM PIPE COVER AT CROSSINGS AND 18 IN. FOR PARALLEL RUNS). FOR HUNG CEILING OUTLETS, RUN IN HUNG CEILING AND CONNECT TO CEILING SUPPORT CHANNELS, IN MASONRY AND POURED CONCRETE, RUN VERTICALLY ONLY.

MAINTAIN GROUNDING CONTINUITY OF INTERRUPTED METALLIC RACEWAYS WITH GROUND CONDUCTOR, AND IN FLEXIBLE CONDUIT FOR FEEDERS AND MOTOR TERMINAL CONNECTIONS.

EMPTY RACEWAYS OVER 10 FT LONG: PROVIDE FISH OR PULL WIRE, GALVANIZED OR NYLON ROPE.

RIGID STEEL CONDUIT SHALL BE PERMITTED FOR FEEDERS AND BRANCH CIRCUITS. PAINT MALE THREADED FIELD-MADE CONDUIT WITH GRAPHITE-BASE PIPE COMPOUND AND BUTT CONDUIT ENDS. TOUCH UP MARRED SURFACES AND FIELD-CUT THREADS, CRC-COLD GALVANIZED. EMT SHALL BE PERMITTED FOR BRANCH CIRCUITS ONLY, IN DRY LOCATIONS, DRY WALLS, HUNG CEILINGS, HOLLOW BLOCK WALLS AND FURRED SPACES. EMT SHALL NOT BE PERMITTED IN RAISED FLOORS. FLEXIBLE STEEL CONDUIT SHALL BE UTILIZED FOR SHORT CONNECTIONS WHERE RIGID CONDUIT IS IMPRACTICAL. FROM OUTLET BOX TO RECESSED LIGHTING FIXTURE: PROVIDE MINIMUM 4 FT AND MAXIMUM 6 FT LENGTHS. FOR FINAL CONNECTION TO MOTOR TERMINAL BOX, TRANSFORMER AND OTHER VIBRATING EQUIPMENT: PROVIDE WITH POLYVINYL SHEATHING AND GROUND CONDUCTOR. MINIMUM LENGTH: 18 IN. WITH SLACK. CONNECT GROUND CONDUCTOR TO ENCLOSURE OR RACEWAY AT EACH END. FOR EXPANSION JOINT CROSSINGS, CROSS AT RIGHT ANGLES AND ANCHOR ENDS.

CUT CONDUIT ENDS SQUARE. REAM SMOOTH. PAINT MALE THREADS OF FIELD THREADED RACEWAYS WITH GRAPHITE BASE PIPE COMPOUND. DRAW UP TIGHT WITH RACEWAY COUPLING.

ALL COUPLINGS SHALL BE COMPRESSION TYPE. NO SET SCREW FITTINGS.

EXPANSION FITTINGS SHALL BE INSTALLED AT RIGHT ANGLES WITH CLIP JOINT CENTERED IN EXPANSION JOINT. PROVIDE A LENGTH OF RUN IN ACCORDANCE MANUFACTURER'S RECOMMENDATIONS. PRESET FITTINGS SHALL ALLOW FOR TEMPERATURE VARIATION.

RACEWAYS PASSING THROUGH FIRE-RATED CONSTRUCTION: SEAL OPENING WITH FIRE SEALANT.

O. PROVIDE CABLE SUPPORTS IN ACCORDANCE WITH NATIONAL ELECTRIC CODE ARTICLE 300.19. CABLE SUPPORTS SHALL UTILIZE A ONE-PIECE PLUG WITH POZI-GRIP WEDGING PLUG AS MANUFACTURED BY OZ-GEDNEY. TYPE SF SHALL BE USED FOR ARMORED CABLE.

INSTALL CABLE SUPPORTS AT THE TOP OF A VERTICAL RISE AND PROVIDE INTERMEDIATE ADDITIONAL SUPPORTS AS REQUIRED TO LIMIT SUPPORTED CONDUCTOR LENGTHS TO NOT GREATER THAN THOSE SPECIFIED IN TABLE 300.19(A).

P. ERECT WALL AND SWITCH OUTLETS IN ADVANCE OF FURRING AND FIREPROOFING. OUTLET BOXES SHALL BE SET SQUARE AND TRUE WITH BUILDING FINISH. SECURE TO BUILDING STRUCTURE BY ADJUSTABLE STRAP IRON OR GROUT IN WITH MASONRY. VERIFY OUTLET LOCATIONS IN FINISHED SPACES WITH ARCHITECTURAL DRAWINGS OF INTERIOR DETAILS AND FINISHES.

PROVIDE BARRIERS BETWEEN SWITCHES CONNECTED TO DIFFERENT PHASES FOR VOLTAGES EXCEEDING 150 VOLTS TO GROUND.

Q. PANEL, JUNCTION AND PULL BOXES SHALL BE LOCATED CLEAR OF OTHER TRADES, CONCEAL JUNCTION AND PULL BOXES IN FINISHED SPACES, WHERE NECESSARY, REROUTE RACEWAYS OR MAKE OTHER ARRANGEMENTS FOR CONCEALMENT. BOXES SHALL BE ACCESSIBLE. SUPPORT BOXES FROM BUILDING STRUCTURE, INDEPENDENT OF CONDUIT. PROVIDE FLOOR-TO-CEILING CHANNELS FOR MOUNTING ON DRYWALL AND LIGHTWEIGHT CONSTRUCTION. OUTLET BOXES FOR FIXTURES RECESSED IN HUNG CEILINGS SHALL BE ACCESSIBLE THROUGH OPENING CREATED BY REMOVAL OF FIXTURE. SECURE TO BLACK IRON SUPPORT. MOTOR TERMINAL BOXES: COORDINATE WITH MOTOR BRANCH CIRCUIT CONDUIT AND WIRING; ADD BOX VOLUME WHERE REQUIRED.

R. FIRE SEALANTS: PROVIDE FOR RACEWAYS AND WIRE PASSING THROUGH FLOOR SLOTS, SLEEVES OR OPENINGS IN FIRE-PARTITIONS ROOMS.

S. PERFORM CONTINUITY TESTS OF RESISTANCE OF FEEDER CONDUITS FROM SERVICE TO POINT OF FINAL DISTRIBUTION USING 1 CONDUCTOR RETURN. MAXIMUM RESISTANCE SHALL BE 25 OHMS.

10. WIRE AND CABLE:

A. PROVIDE WIRE AND CABLE COMPLETE WITH ACCESSORIES. SIZE REFERENCE SHALL BE AWG EXCEPT AS NOTED.

B. CONDUCTORS SHALL BE COPPER, ASTM STANDARD SOLID (NO. 10 AND SMALLER) OR STRANDED (NO. 8 AND LARGER). GENERAL USE CABLING SHALL BE NO. 12 MINIMUM. AT 120 VOLTS AND OVER 100 FT CIRCUIT LENGTH PROVIDE NO. 10 MINIMUM. AT 265 VOLTS AND OVER 200 FT CIRCUIT LENGTH PROVIDE NO. 10 MINIMUM.

C. CONTROL AND ALARM CABLING, EXCEPT AS NOTED, SHALL BE NO. 14 MINIMUM. AT 120 VOLTS AND OVER 200 FT CIRCUIT LENGTH PROVIDE NO. 12 MINIMUM. OTHER VOLTAGES AND PHASES: ADJUST CABLE SIZING AS REQUIRED TO MAINTAIN VOLTAGE DROP. INCREASE RACEWAY SIZES FOR LARGER WIRE AS REQUIRED.

D. INSULATION SHALL BE RUBBER AND THERMOPLASTIC MEETING ASTM AND IPECA STANDARDS. TYPE THW OR THWN SHALL BE UTILIZED FOR FEEDERS AND BRANCH CIRCUITS EXCEPT AS NOTED. TYPE SFF-2 SHALL BE UTILIZED FOR BRANCH CIRCUITS LOCATED IN WIRING CHANNELS OF CONTINUOUS FLUORESCENT FIXTURES AND IN AMBIENT TEMPERATURES OVER 90 DEG C. FOR UNGROUNDED ISOLATED BRANCH CIRCUITS PROVIDE CROSS-LINKED POLYETHYLENE INSULATION (TYPE XHHW).

E. ARMORED CABLE (BX) SHALL BE UTILIZED FOR BRANCH CIRCUITS IN DRY HOLLOW LOCATIONS, HUNG CEILINGS, AND BLOCK WALLS. WHEN USED IN LIEU OF WIRING IN CONDUIT, STATE IN PROPOSAL THAT PRICE IS BASED UPON THE USE OF HOSPITAL GRADE 'BX'.

F. COLOR CODING SHALL BE AS FOLLOWS:

120/208 VOLT SYSTEM:  
BLACK FOR A PHASE  
RED FOR B PHASE  
BLUE FOR C PHASE

1)NEUTRAL WIRE SHALL UTILIZE WHITE OUTER COVERING THROUGHOUT. EQUIPMENT GROUND WIRE SHALL UTILIZE GREEN OUTER COVERING THROUGHOUT.

WHERE COLOR-CODED CABLE IS NOT AVAILABLE, CERTIFY IN WRITING AND REQUEST PERMISSION TO OVERLAP CONDUCTORS WITH 6 IN. OF COLOR TAPING IN ACCESSIBLE LOCATIONS.

G. PROVIDE FLAMEPROOF LINEN OR FIBER TAGS IN ACCESSIBLE LOCATIONS. FOR FEEDERS INDICATE FEEDER NUMBER, SIZE, PHASE AND POINTS OF ORIGIN AND TERMINATIONS. FOR CONTROL AND ALARM WIRING INDICATE TYPE (CONTROL OR ALARM), SIZE OF WIRE, AND POINTS OF ORIGIN AND TERMINATIONS.

H. TERMINATIONS, SPLICES AND TAPS UNDER 600 VOLTS: COPPER CONDUCTORS NO. 10 AND SMALLER SHALL UTILIZE COMPRESSION-TYPE OF TWIST-ON SPRING-LOADED CONNECTORS AND CLEAR NYLON-INSULATED COVERING. COPPER CONDUCTORS NO. 8 AND LARGER SHALL UTILIZE MECHANICAL BOLTED PRESSURE OR HYDRAULIC COMPRESSION TYPE USING MANUFACTURER'S RECOMMENDED TOOLING. CABLE LUGS AND CONNECTORS SHALL UTILIZE COMPRESSION TYPE OF SAME METAL AS CONDUCTOR. PROVIDE TO MATCH CABLE, WITH MARKING INDICATING SIZE AND TYPE. COPPER LUG CONNECTIONS TO BUS BARS: USE ANTISEIZE COMPOUND ON TANG.

I. NOT MORE THAN 3 LIGHTING OR CONVENIENCE OUTLET CIRCUITS SHALL BE INSTALLED IN ONE CONDUIT UNLESS OTHERWISE INDICATED. PULL NO THERMOPLASTIC WIRES AT TEMPERATURES LOWER THAN 32 DEG F. PROVIDE SEPARATE RACEWAYS FOR CONDUCTORS OF 120/208 AND 265/460 VOLT SYSTEMS, EXCEPT 460 VOLT MOTOR BRANCH CIRCUIT WIRING AND RELATED 120 VOLT CONTROL WIRING. THERMOPLASTIC WIRES SHALL NOT BE INSTALLED IN COMPUTER AREA RAISED FLOORS.

J. LEAVE WIRES WITH SUFFICIENT SLACK TO PERMIT MAKING FINAL CONNECTIONS.

K. PERFORM CONTINUITY AND INSULATION TESTS. MEGGER TEST 100 PERCENT OF FEEDERS, 10 PERCENT OF BRANCH CIRCUITS AND ALL MOTOR BRANCH CIRCUITS OVER 25 HP.

PERFORM TESTS PRIOR TO CONNECTING EQUIPMENT AND IN PRESENCE OF AUTHORIZED REPRESENTATIVES. SUBMIT WRITTEN REPORT OF RESULTS. CORRECT OR REPLACE CABLE TESTING BELOW MANUFACTURER'S STANDARDS.

11. WIRING DEVICES:

A. WIRING DEVICES SHALL BE SPECIFICATION GRADE UNLESS OTHERWISE SPECIFIED. ALL DEVICES SHALL BE FLUSH MOUNTED, UNLESS OTHERWISE NOTED. PROVIDE COMPLETE MATERIAL AND ACCESSORIES AS NOTED.

B. LOCAL WALL SWITCHES SHALL BE ROCKER TYPE, QUIET OPERATING, RATED 20 AMP, 120/277 VOLT, AC. SIMILAR TO LEVITON DECORA SERIES A5621 (SINGLE POLE), A5623 (3-WAY) AND A5624 (4-WAY).

C. STRAIGHT BLADE RECEPTACLES SHALL BE COMMERCIAL SPECIFICATION GRADE DUPLEX CONVENIENCE 125 VOLTS, 2 POLE, 3 WIRE, U GROUND SLOT, DECORA SERIES BY LEVITON. GROUNDED, EXCEPT AS NOTED.

1)SINGLE GANG, RECESSED, DUPLEX RECEPTACLE: TAMPER RESISTANT, 2-POLE, 3-WIRE GROUNDING, 15A, 125V, NEMA 5-20R; LEVITON 689 SERIES (COLOR AS SPECIFIED BY ARCHITECT).

2) USB CHARGER/ DUPLEX TAMPER-RESISTANT RECEPTACLE: TAMPER RESISTANT.

D. DEVICE PLATES: SEE ARCHITECT FOR TYPE. FOR RECEPTACLES WITH OTHER THAN 120 VOLT, INSCRIBED VOLTAGE AVAILABLE.

E. COLORS: COORDINATE COLORS WITH ARCHITECT.

F. MOUNTING ORIENTATION OF RECEPTACLES (HORIZONTAL OR VERTICAL): COORDINATE WITH ARCHITECT.

12. LIGHTING FIXTURES:

A. FIXTURES TO BE AS SPECIFIED BY ARCHITECT AND SHALL BE COMPLETELY FACTORY ASSEMBLED, WIRED AND EQUIPPED WITH ALL NECESSARY SOCKETS, BALLASTS, SUPPORTING HARDWARE AND ACCESSORIES. REFER TO DRAWINGS FOR INDIVIDUAL FIXTURE DESCRIPTIONS.

B. FIXTURE CATALOG NUMBERS USED TO ILLUSTRATE EQUIPMENT TYPE DO NOT NECESSARILY DENOTE REQUIRED MOUNTING EQUIPMENT OR ACCESSORIES. PROVIDE ACCESSORIES TO SUIT.

C. BALLAST: CLASS P, HIGH POWER FACTOR, LOWEST AVAILABLE NEMA RATED NOISE LEVEL, ET1 AND CBM APPROVED. ENERGY SAVING TYPE. TRIGGER START FOR 24-INCH LAMPS AND RAPID START FOR 48-INCH. TWO LAMP BALLASTS; NO THREE LAMP BALLASTS. BALLASTS SHALL BE ADVANCE MAGNETEK, UNIVERSAL OR EQUAL.

D. LED DRIVERS SHALL BE ELECTRONIC TYPE, LABELED AS COMPLIANT WITH RADIO FREQUENCY INTERFERENCE (RFI) REQUIREMENTS OF FCC TITLE 47, PART 15 AND COMPLY WITH NEMA SSL 1 "ELECTRONIC DRIVERS FOR LED DEVICES, ARRAYS OR SYSTEMS". LED DRIVERS SHALL HAVE A SOUND RATING OF "A", HAVE A MINIMUM EFFICIENCY OF 85% AND BE RATED FOR A THD OF LESS THAN 20% AT ALL INPUT VOLTAGES.

E. DIMMABLE LED DRIVERS SHALL BE CAPABLE OF DIMMING WITHOUT LED STROBING OR FLICKER ACROSS THEIR FULL DIMMING RANGE. PROVIDE TYPE OF LED DRIVER AS PER LIGHTING FIXTURE SCHEDULE. DIMMABLE LED DRIVERS SHALL BE 0-10V WHERE NOT INDICATED.

F. CONTINUOUS ROW, TWO LAMP STRIP FIXTURES SHALL BE STAGGERED TYPE.

G. FLUORESCENT LIGHTING FIXTURES, INCLUDING GENERAL CONSTRUCTION, LAMPS AND BALLASTS SHALL CONFORM TO THE ENERGY EFFICIENCY REQUIREMENTS OF CONSOLIDATED EDISON CO. AND QUALITY FOR A UTILITY REBATE TO OWNER UNDER CON EDISON'S ENLIGHTENED ENERGY LIGHTING REBATE PROGRAM. CONTRACTOR SHALL COORDINATE REBATE PROGRAM WITH CON EDISON AND ARRANGE FOR CON EDISON TO PERFORM A SURVEY TO INVENTORY ALL EXISTING FIXTURES PRIOR TO DEMOLITION.

H. EXIT SIGNS SHALL BE PRECISION DIE-CAST ALUMINUM HOUSING WITH LASER-FORMED ACRYLIC LEGEND. EXIT SIGNS SHALL COMPLY WITH UL 924 AND BE MEA APPROVED. AC POWERED WITH PREMIUM LONG-LIFE NICKEL CADMIUM BATTERY WITH STANDARD UL LISTED 3-HOUR RUN TIME. PROVIDE WITH INTEGRAL AUTOMATIC CHARGER IN A SELF CONTAINED POWER PACK. LED INDICATOR WITH PUSH TO TEST SWITCH.

13. TELEPHONE CONDUIT SYSTEM:

A. PROVIDE COMPLETE SYSTEM OF RACEWAYS AND ACCESSORIES, OUTLET BOXES, SLEEVES AND FISHWIRES.

B. EQUIPMENT SHALL CONFORM TO REQUIREMENTS OF TELEPHONE COMPANY.

C. OUTLETS SHALL BE:

WALL: 4 IN. SQUARE WITH BUSHED COVER PLATE.

D. PROVIDE FISHWIRES, IN RACEWAYS OVER 10 FT LONG.

E. CONDUIT SHALL BE 3/4 IN. MINIMUM. FURNISH EMPTY CONDUIT FROM OUTLET BOX TO BUSHED END THRU WALL 6" BELOW THE PLASTER CEILING.

F. ACE RACEWAYS IN ROOMS SHALL HUBBELL HBL500, HBL750 OR HBL2000 SERIES OR AS ACCEPTABLE.

14. GROUNDING AND BONDING:

A. PROVIDE GROUNDING SYSTEM IN ACCORDANCE WITH (NATIONAL ELECTRICAL CODE), AND THESE SPECIFICATIONS. THE WIRING SYSTEM SHALL BE INSTALLED AS REQUIRED TO PROVIDE A CONTINUOUSLY GROUNDED SYSTEM. WHERE FLEXIBLE CONDUIT IS USED FOR PART OF A CONDUIT RUN, EXCEPT LIGHTING BRANCH CIRCUITS, AN INSULATED GROUNDING CONDUCTOR SHALL BE PROVIDED IN THE CONDUIT AND CONNECTED TO GROUNDING BUSHINGS AT EACH END OF THE RUN.

B. USE EXOTHERMIC WELDING PROCESS FOR INACCESSIBLE CONNECTIONS.

C. EXTEND EXISTING SYSTEM GROUND TO INCLUDE ALL THE ELECTRICAL EQUIPMENT IN THE SCOPE OF WORK.

D. WHERE FLEXIBLE METALLIC CONDUIT IS USED AN INTERNAL BONDING CONDUCTOR SHALL BE INSTALLED.

E. IN ADDITION, FURNISH A SEPARATE INSULATED GREEN EQUIPMENT GROUND CONDUCTOR WHERE INDICATED ON DRAWINGS AND FOR THE FOLLOWING BRANCH CIRCUITS:

1)CIRCUITS SERVING ANY WALL BOX DIMMER.

2)CIRCUITS SERVING ANY ISOLATED GROUND RECEPTACLES. TERMINATE GROUND DIRECTLY AT AN EQUIPMENT GROUNDING CONDUCTOR TERMINAL OF THE SOURCE AT THE SOURCE, OR AS OTHER WISE NOTED ON DRAWINGS.

3)CIRCUITS SERVING ANY DUPLEX OR SIMPLEX COMPUTER RECEPTACLES

4)ANY CIRCUIT SERVED VIA AN ISOLATION TRANSFORMER OR COMPUTER POWER DISTRIBUTION UNIT.

PANEL BOARDS:

A. PANELBOARDS SHALL BE OF THE DEAD FRONT TYPE MANUFACTURED IN CODE GAUGE AND SIZE BOXES FOR MOUNTING AS INDICATED ON PLANS COMPLETE WITH TRIM, DOORS AND LOCKS. ALL LOCKS SHALL BE KEYED ALIKE.

B. CIRCUIT BREAKERS SHALL BE OF THE BOLT-ON THERMAL MAGNETIC MOLDED CASE TYPE, AND SHALL HAVE THE TRIP RATINGS AND NUMBER OF POLES SHOWN IN SCHEDULES ON THE CONTRACT DRAWINGS. FOR BLANK (SPACE) COMPARTMENTS, PROVIDE FULL RATED BUS. MINIMUM GUTTER SPACES SHALL BE 5-3/4". SIDES, TOP AND BOTTOM, INCREASE FOR THROUGH FEEDERS. PROVIDE 25% COPPER GROUND BUS AND 100% COPPER NEUTRAL BUS AND INCREASE NEUTRAL BUS INDICATED.

C. LOCKING TABS SHALL BE PROVIDED ON ALL CIRCUIT BREAKERS SERVING EMERGENCY LIGHTING, FIRE ALARM SYSTEM, SECURITY SYSTEMS AND OTHER EMERGENCY OR CRITICAL EQUIPMENT AND AS NOTED ON THE CONTRACT DRAWINGS. A TOTAL OF 5 SPARE LOCKING TABS SHALL BE FURNISHED TO THE OWNER.

D. BUSES SHALL BE HARD DRAWN COPPER OF 98 PERCENT CONDUCTIVITY AND SHALL HAVE CROSS SECTIONAL AREAS LARGE ENOUGH TO LIMIT THE TEMPERATURE RISE, WHEN CARRYING FULL LOAD, TO 35 DEGREES C. ABOVE AN AMBIENT INSIDE THE ENCLOSURE OF 55 DEGREES C. AS DEFINED IN IEEE STANDARD RULES. MAIN BUS CAPACITY SHALL BE AS SHOWN ON THE CONTRACT DRAWINGS.

E. ENCLOSURES SHALL BE SURFACE OR FLUSH AS INDICATED. TRIMS SHALL BE SECURED TO PANEL WITH MACHINE SCREWS. COVERS SHALL BE HINGED DOOR-IN-DOOR CONSTRUCTION WITH CYLINDER LOCKS AND CATOPES. LOCKS MUST BE COMPATIBLE WITH BUILDING STANDARD KEY SYSTEM AND WHEN NONE EXISTS, THEY SHALL BE SIMILAR TO A YALE NO. 911 KEY.

F. DISTRIBUTION AND SUB-DISTRIBUTION PANELBOARD SHALL BE A MINIMUM OF 30" WIDE AND 10" DEEP.

G. ALL STANDARD PANELBOARDS SHALL BE A MINIMUM OF 20" WIDE AND 5 3/4" DEEP.

H. FURNISH ALL PANELBOARDS WITH FEED-THRU LUGS UNLESS OTHERWISE INDICATED ON THE DRAWINGS.

I. ALL NEW PANELBOARDS SHALL BE PROVIDED WITH AN ENGRAVED WHITE CORE LAMACOID NAMEPLATE, WITH 3/4 IN. WHITE LETTERING ON A BLACK BACKGROUND, WITH DESIGNATION LISTED (PANELBOARD NAME), FASTENED WITH EPOXY CEMENT OR OVAL HEAD CHROME PLATED MACHINE SCREWS.

J. THE CIRCUIT DIRECTORY SHALL BE TYPEWRITTEN AND PROVIDED INSIDE EACH PANEL DOOR TO INDICATE EQUIPMENT AND/OR AREA SERVED. DIRECTORY HOLDER SHALL BE METAL FRAME WITH CLEAR PLASTIC, TRANSPARENT COVER. THE TYPEWRITTEN LIST INDICATING CIRCUIT NUMBERS, OUTLETS PLUGS AND THEIR LOCATIONS SHALL BE PROVIDED.

K. TIE-BARS SHALL NOT BE USED TO CREATE MULTI-POLE CIRCUITS. MAXIMUM 42 CIRCUITS ALLOWED.

L. ONLY ONE WIRE SHALL BE INSTALLED UNDER EACH CIRCUIT BREAKER LUG.

M. SHORT CIRCUIT RATING OF PANELBOARDS SHALL NOT BE LESS THAN AS INDICATED ON THE CONTRACT DRAWINGS OR SPECIFIED HEREIN. WHERE NOT INDICATED OR SPECIFIED THE MINIMUM SHORT CIRCUIT RATING SHALL BE EQUAL TO THE INTERRUPTING CAPACITY OF THE LOWEST RATED CIRCUIT BREAKER IN THE PANELBOARD, BUT IN NO CASE LESS THAN 10,000 AMPERES R.M.S. SYMMETRICAL FOR 208Y/120 VOLT SYSTEM AND 14,000 AMPERES R.M.S. SYMMETRICAL FOR 480Y/277 VOLT SYSTEM. SERIES RATED PANELBOARDS SHALL BE USED TO ACHIEVE REQUIRED SHORT CIRCUIT RATINGS.

N. FOR ALL EXISTING PANELBOARDS, CONTRACTOR SHALL PROVIDE NEW CIRCUIT BREAKERS TO REPLACE EXISTING AS REQUIRED AS INDICATED ON DRAWINGS.

16. INTERCOM CONDUIT SYSTEM:

A. PROVIDE COMPLETE SYSTEM OF RACEWAYS AND ACCESSORIES, OUTLET BOXES, SLEEVES AND FISHWIRES.

B. EQUIPMENT SHALL CONFORM TO REQUIREMENTS OF INTERCOM MANUFACTURER.

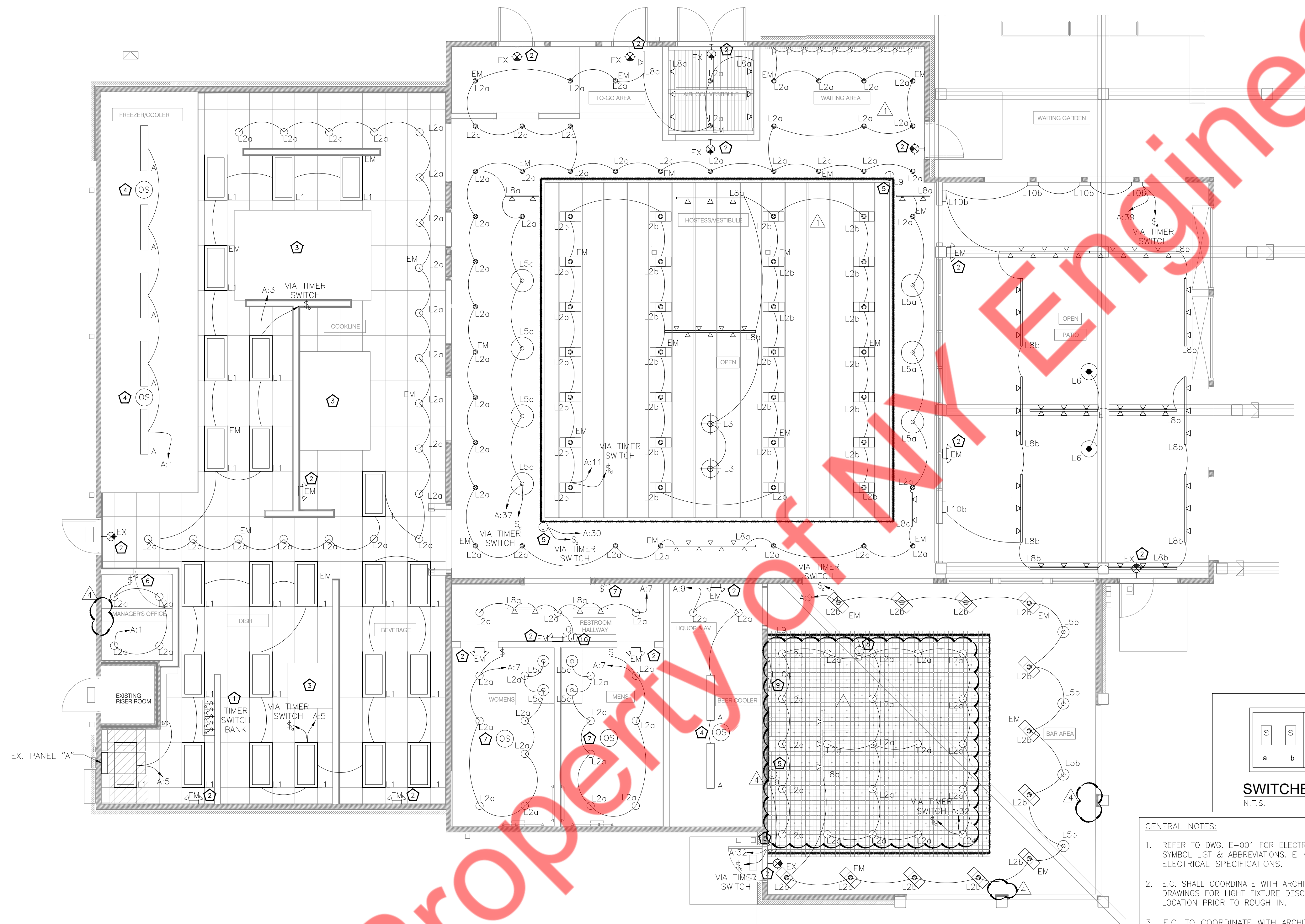
C. OUTLETS SHALL BE:

1)WALL: 4 IN. SQUARE WITH SINGLE GANG COVER PLATE.

D. PROVIDE FISHWIRES, IN RACEWAYS OVER 10 FT LONG.

E. CONDUIT SHALL BE 3/4 IN. MINIMUM. FURNISH EMPTY CONDUIT FROM EACH APARTMENT TO MAIN INTERCOM CONTROLLER AT ENTRANCE.

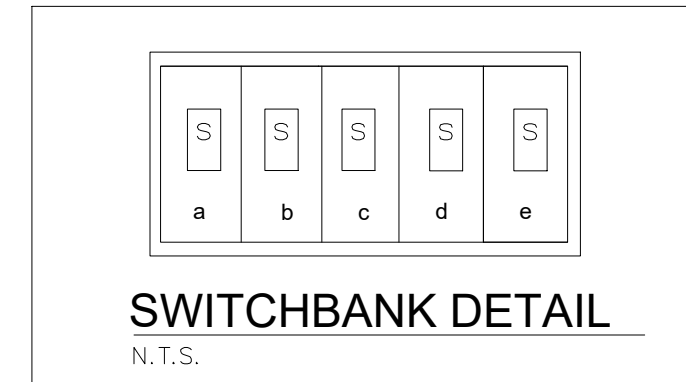
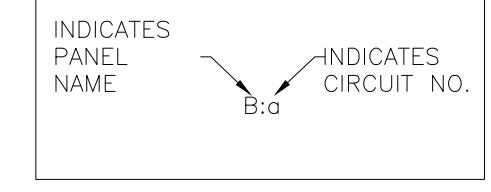




LIGHTING FIXTURE SCHEDULE:

TYPE SYMBOL	LIGHT FIXTURE DESCRIPTION	MANUFACTURER/ MODEL NO.	WATTAGE	QUANTITY
A	TBD	TBD	30W*	7
L1	2X4 HALCO PRO-LED EDGE LIT PANEL W/ BATTERY BACKUP	#24EPL50/835 /EM/LED	25W*	24
L2a	DOWNLIGHT @ RESTROOMS & BAR AREA	SOLAIS/XR3NC	12W*	64
L2a	DOWNLIGHT @ DINING	SOLAIS/YR3NC	27*W	42
L8a	DIRECTIONAL FIXTURE TRACK MOUNTED	SOLAIS	16W*	37
L8b	DIRECTIONAL FIXTURE TRACK MOUNTED	SOLAIS	16W*	50
L6	OUTDOOR CHANDELIER (FEATURED TABLE) BRAND SUPPLIED, GC INSTALLED	LUMENS	45W	2
L5a	PENDANT FIXTURE	LUMENS	12W	7
L9	LED STRIP LIGHT	NOVA FLEX	4.9W/FT	191FT
L5b	PENDANT LIGHT @ BAR HIGH TOP TABLES	JONATHAN Y LIGHTING/ JYL6125A	15W*	4
L5c	LUMENS CYLINDRICAL MINI LED PENDANT	DALS Lighting	10W*	4
L10b	WALL SCONCE	SSJCVD*	15W*	5
P	WALL SCONCE	TBD	5W*	10
Q	DEER HEAD WALL SCONCE	POPOP LIGHTING	24W*	1
L10c	MOON WALL LIGHT	LEDIARY	40W	1
L2b	DOWNLIGHT @ EXPOSED DINING W/BRIDGE BETWEEN TRUSSES (BY GC)	SOLAIS	27W*	40
EX	EXIT LIGHT WALL MOUNT/CEILING MOUNT	EXITRONIX/ S900U-WB-SR-AG	05W*	04
EM	COMBO LED EXIT SIGN W/LIGHT HEADS (WHITE)	EXITRONIX/ EBU-W-LED-51-52	05W	16
L3	FAUX ANTLER CHANDELIER (FEATURED TABLE) BRAND SUPPLIED, GC INSTALLED	LUMENS	36W	2

NOTE:  
 1. E.C. SHALL COORDINATE WITH ARCHITECT/OWNER FOR FINAL SELECTION OF LIGHT FIXTURE, WATTAGE & LIGHTING CONTROL.  
 2. E.C. SHALL COORDINATE WITH LIGHTING CONTROL PACKAGE SUPPLIER/VENDOR/MANUFACTURER FOR THE EXACT REQUIREMENT/SELECTION OF THE SAME ON THE FIELD AND PROVIDE LIGHTING CONTROLS AS PER SELECTION. BASE BID ACCORDINGLY.

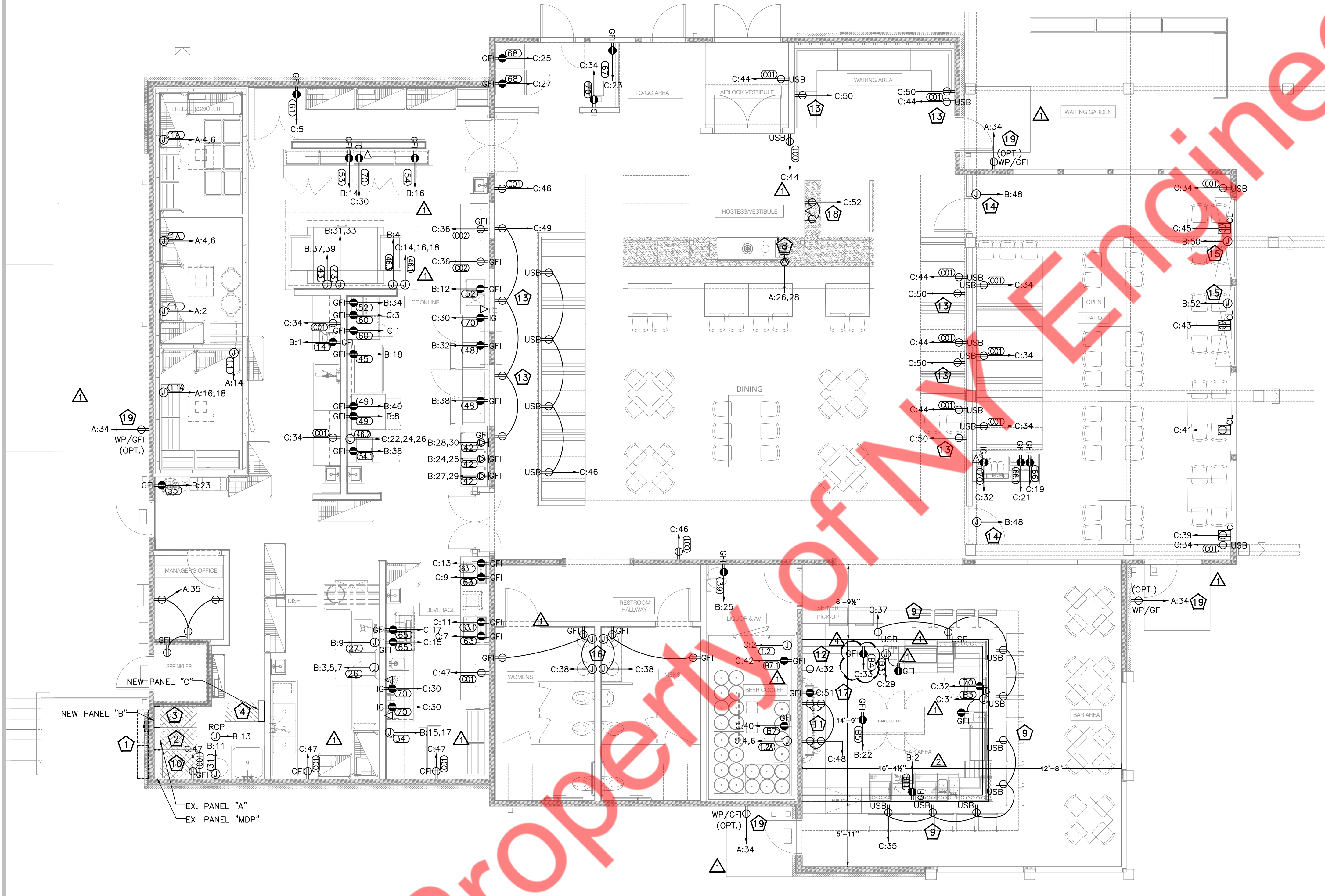


- GENERAL NOTES:
- REFER TO DWG. E-001 FOR ELECTRICAL GENERAL NOTES, SYMBOL LIST & ABBREVIATIONS. E-002 & E-003 FOR ELECTRICAL SPECIFICATIONS.
  - E.C. SHALL COORDINATE WITH ARCHITECT/LIGHTING CONSULTANT'S DRAWINGS FOR LIGHT FIXTURE DESCRIPTION, HEIGHTS AND LOCATION PRIOR TO ROUGH-IN.
  - E.C. TO COORDINATE WITH ARCHITECT/ LIGHTING SPECIALIST FOR EXACT LIGHTING CONTROL AND DIMMING REQUIREMENTS FOR ALL THE LIGHTING FIXTURES.
  - E.C. SHALL COORDINATE FINAL FIXTURE MAKE AND MODEL WITH ARCHITECT.
  - ALL EMERGENCY AND EXIST LIGHTS SHALL BE CONNECTED TO NEAREST LIGHTING CIRCUIT IN THE AREA AHEAD OF ALL LIGHTING CONTROL MEANS IN ORDER TO BE IN OPERATION AT ALL TIME.
  - E.C. SHALL PROVIDE ADDITIONAL LIGHTING CONTROLS AS PER AHJ REQUIREMENTS IF ANY TO COMPLETE THE PERMIT REQUIREMENTS.
  - ALL DIMMING SWITCHES SHALL BE 0-10V.

- KEY NOTE:
- TIMER SWITCH BANK. E.C. TO COORDINATE EXACT LOCATION FOR TIMER SWITCH BANK WITH ARCHITECT/OWNER.
  - WIRE ALL EMERGENCY AND EXIT FIXTURE AHEAD OF SWITCHING & CONTROL FOR CONTINUOUS OPERATIONS.
  - HOOD LIGHTS PROVIDED BY HOOD MANUFACTURER. E.C. TO PROVIDE POWER PROVISION FOR HOOD CONTROL PANEL.
  - PROVIDE LOW VOLTAGE SPECIAL TYPE OF OCCUPANCY SENSOR FOR FREEZER/COOLER AREA. INTERCONNECT OCCUPANCY SENSORS SO THAT ANY SENSOR WILL TRIGGER ALL LIGHTS. SET OFF TIME FOR 20 MINUTES.
  - JUNCTION BOX FOR LED STRIPE LIGHT. E.C. TO COORDINATE EXACT LOCATION ON J-BOX WITH ARCHITECT.
  - WALL MOUNTED VACANCY SENSOR SWITCH.
  - PROVIDE LOW VOLTAGE OCCUPANCY SENSOR EQUAL TO WATTSTOPPER DT-305. PROVIDE WATTSTOPPER BZ POWER PACK(S) AS REQUIRED. INTERCONNECT OCCUPANCY SENSORS SO THAT ANY SENSOR WILL TRIGGER ALL LIGHTS. SET OFF TIME FOR 20 MINUTES.
  - JUNCTION BOX FOR LED ILLUMINATED COLUMN. E.C. SHALL COORDINATE EXACT PLACEMENT/MOUNTING OF JUNCTION BOX WITH ARCHITECT/OWNER ON FIELD.
  - REFER ELECTRICAL SHEET NO. E-201 FOR POWER REQUIREMENT OF LED MOON WALL SCONCE.
  - JUNCTION BOX FOR DEER HEAD WALL SCONCE. E.C. SHALL REFER ARCHITECT INTERIOR ELEVATIONS DETAIL NO. 9 SHEET NO. A8.2 FOR EXACT MOUNTING DETAILS OF WALL SCONCE JUNCTION BOX.

1 ELECTRICAL LIGHTING PLAN  
 SCALE: 3/16" = 1'-0"

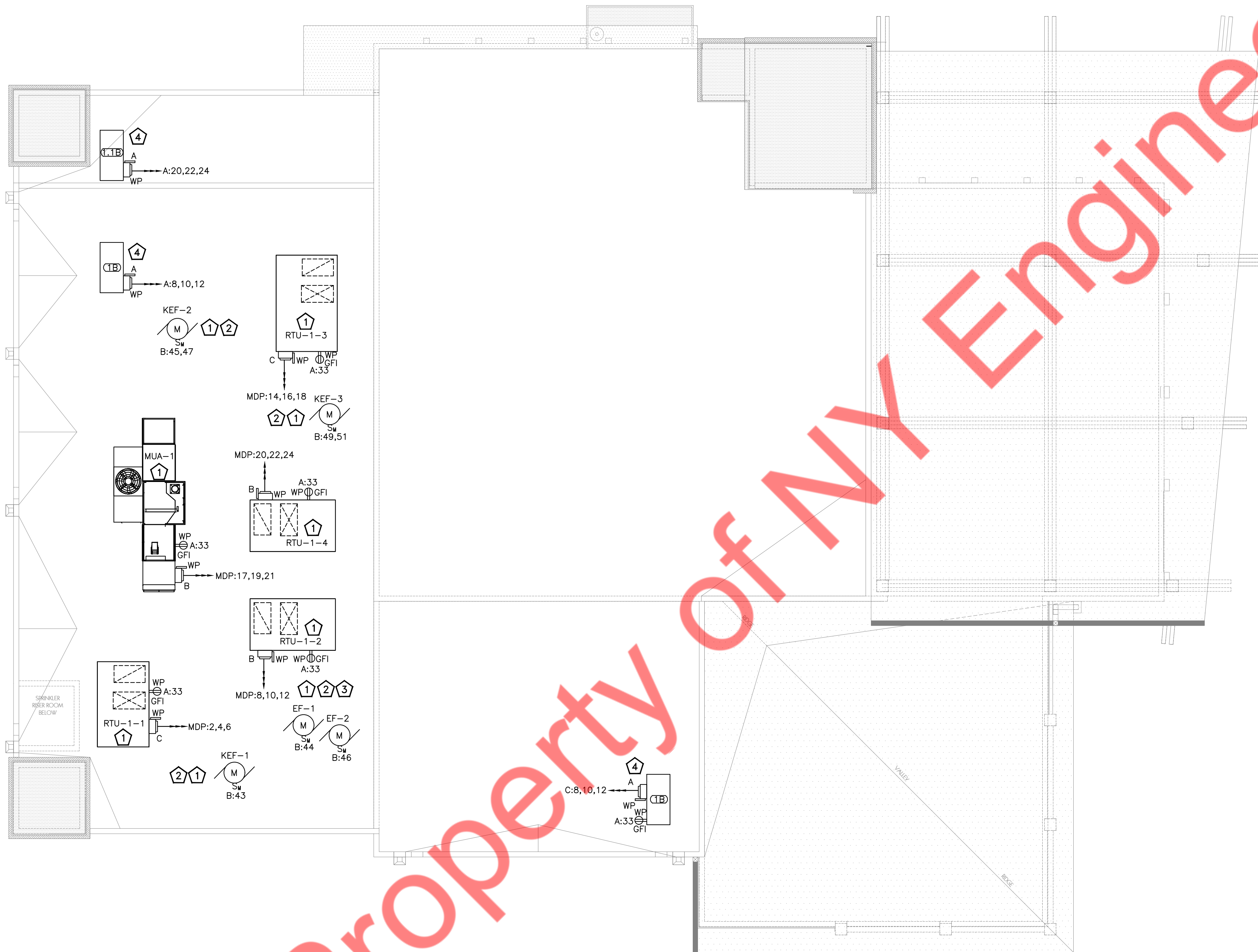




1 ELECTRICAL POWER PLAN  
SCALE: 3/16" = 1'-0"

- POWER PLAN KEYED NOTES**
- 1 EXISTING 800A, 120/208V, 3-PHASE ELECTRICAL METER, CT CABINET AND DISCONNECT SWITCH FOR THE PROJECT SPACE. E.C. SHALL COORDINATE WITH OWNER/UTILITY COMPANY FOR EXACT LOCATION AND APPLY TO UTILITY COMPANY FOR NEW 600 AMP ELECTRICAL SERVICE, DISCONNECT SWITCH AND METER FOR THE PROJECT SPACE.
  - 2 EXISTING 225A (MLO), 120/208V, 3-PHASE ELECTRICAL PANEL "A". E.C. SHALL VERIFY EXACT RATING, LOCATION AND OPERABLE CONDITION OF EXISTING PANEL "A". INFORM ENGINEER IF FOUND ANY DISCREPANCY. BASE BID ACCORDINGLY.
  - 3 NEW 225A (MLO), 120/208V, 3-PHASE ELECTRICAL PANEL "B" FOR THE PROJECT SPACE. E.C. SHALL COORDINATE EXACT LOCATION WITH OWNER/ARCHITECT IN FIELD.
  - 4 NEW 225A (MLO), 120/208V, 3-PHASE ELECTRICAL PANEL "C" FOR THE PROJECT SPACE. E.C. SHALL COORDINATE EXACT LOCATION WITH OWNER/ARCHITECT IN FIELD.
  - 5 EXHAUST FANS SHALL BE CIRCUITED AND CONTROLLED ALONG WITH THE LIGHT FIXTURES IN THE SAME ROOM.
  - 6 E.C. SHALL COORDINATE FINAL LOCATION OF ALL MECHANICAL EQUIPMENT WITH RESPECTIVE CONTRACTOR.
  - 7 E.C. TO COORDINATE FINAL LOCATION OF EXTERIOR STANDING SMOKER WITH ARCHITECTURE.
  - 8 E.C. TO COORDINATE EXACT LOCATION & REQUIREMENT OF ELECTRICAL OUTLET INCLUDING RECEPTACLE/J-BOX WITH ARCHITECT/MANUFACTURER FOR FIRE PLACE ON FIELD AND PROVIDE/PLACE ELECTRICAL OUTLET ACCORDINGLY.
  - 9 E.C. TO COORDINATE EXACT MOUNTING HEIGHT OF UNDERCOUNTER USB RECEPTACLE OUTLETS WITH ARCHITECT AS PER THE FURNITURE LAYOUT.
  - 10 EXISTING 800A (MCB), 120/208V, 3-PH, 4W MAIN DISTRIBUTION PANEL "MDP". SHALL VERIFY EXACT RATING, LOCATION AND OPERABLE CONDITION OF EXISTING PANEL "MDP". INFORM ENGINEER IF FOUND ANY DISCREPANCY. BASE BID ACCORDINGLY.
  - 11 WALL MOUNTED TV RECEPTACLE ONE ABOVE OTHER. E.C. SHALL REFER ARCHITECT INTERIOR ELEVATIONS DETAIL NO. 5 SHEET NO. A8.3 FOR EXACT MOUNTING DETAILS OF TV RECEPTACLES.
  - 12 RECEPTACLE FOR LED MOON WALL SCONCE. E.C. SHALL REFER ARCHITECT INTERIOR ELEVATIONS DETAIL NO. 5 SHEET NO. A8.3 FOR EXACT MOUNTING DETAILS OF RECEPTACLE FOR WALL SCONCE.
  - 13 WALL MOUNTED TV RECEPTACLE. E.C. SHALL REFER ARCHITECT INTERIOR ELEVATIONS DETAIL NO. 4&5 SHEET NO. A8.0 FOR EXACT MOUNTING DETAILS OF TV RECEPTACLES.
  - 14 JUNCTION BOX FOR FAN FLY. E.C. TO COORDINATE WITH EQUIPMENT VENDOR/MANUFACTURER FOR EXACT MOUNTING DETAILS & EXACT ELECTRICAL REQUIREMENT. PROVIDE ELECTRICAL CONNECTIONS ACCORDINGLY.
  - 15 JUNCTION BOX FOR OVERHEAD DOOR AIR CURTAIN. E.C. TO COORDINATE WITH EQUIPMENT VENDOR / MANUFACTURER FOR EXACT MOUNTING DETAILS & EXACT ELECTRICAL REQUIREMENT. PROVIDE ELECTRICAL CONNECTIONS ACCORDINGLY.
  - 16 CONCEALED JUNCTION BOX FOR WATER FAUCETS. E.C. SHALL COORDINATE WITH ARCHITECT/OWNER/MANUFACTURER FOR THE EXACT ELECTRICAL OUTLET REQUIREMENT INCLUDING RECEPTACLE OR JUNCTION BOX AND EXACT LOCATION OF THE SAME ON THE FIELD. BASE BID ACCORDINGLY.
  - 17 E.C. SHALL COORDINATE WITH ARCHITECT/EQUIPMENT SUPPLIER/MANUFACTURER FOR EXACT POWER, OUTLET REQUIREMENT INCLUDING RECEPTACLE/JUNCTION BOX/DISCONNECT & MOUNTING DETAILS OF ELECTRICAL OUTLET FOR LIQUOR TOWER IN FIELD. BASE BID ACCORDINGLY.
  - 18 E.C. TO COORDINATE EXACT MOUNTING DETAILS OF ELECTRICAL/DATA OUTLET FOR COUNTER WITH ARCHITECT/OWNER ON THE FIELD.
  - 19 OPTIONAL EXTERIOR RECEPTACLE. E.C. SHALL COORDINATE WITH OWNER FOR THE REQUIREMENT OF THE SAME ON THE FIELD. BASE BID ACCORDINGLY.





1 ROOF POWER PLAN  
SCALE: 3/16" = 1'-0"

ROOF PLAN KEYED NOTES	
1	E.C. TO COORDINATE THE EXACT LOCATION AND ELECTRICAL REQUIREMENT OF MECHANICAL EQUIPMENTS WITH MECHANICAL CONTRACTOR/EQUIPMENT SUPPLIER. PROVIDE THE ELECTRICAL CONNECTION AS PER FINAL SELECTION OF MECHANICAL EQUIPMENTS IN FIELD. BASE BID ACCORDINGLY.
2	EXHAUST FANS FURNISHED AND INSTALLED BY MECHANICAL CONTRACTOR. E.C. SHALL COORDINATE FOR SWITCHING AND CONTROLS AND PROVIDE ALL NECESSARY WIRING REQUIRED. BASE BID ACCORDINGLY.
3	EXHAUST FAN EF-1 & EF-2 TO BE CONTROLLED VIA TIMER SWITCH "T". FOR EXACT LOCATION OF TIMER SWITCH FOR THESE EXHAUST FAN REFER LIGHTING PLAN SHEET NO. E101.
4	E.C. TO VERIFY EXACT LOCATION OF CONDENSERS OF WALK IN COOLER/FREEZER WITH MANUFACTURER/MECHANICAL CONTRACTOR.

GENERAL NOTES	
1.	COORDINATE EXACT LOCATION OF HVAC EQUIPMENTS ON ROOF WITH MECHANICAL CONTRACTOR/ARCHITECT.
2.	ELECTRICAL CONTRACTOR SHALL COORDINATE DISCONNECT AND FUSE REQUIREMENT FOR MECHANICAL UNIT WITH MECHANICAL CONTRACTOR AND EQUIPMENT MANUFACTURER PRIOR TO ROUGH-IN AND PROVIDE AS REQUIRED. COORDINATE LOCATION OF DISCONNECT WITH MANUFACTURER AND MECHANICAL CONTRACTOR PRIOR TO ROUGH-IN. LOCATE AS REQUIRED TO MAINTAIN NEC CLEARANCES.



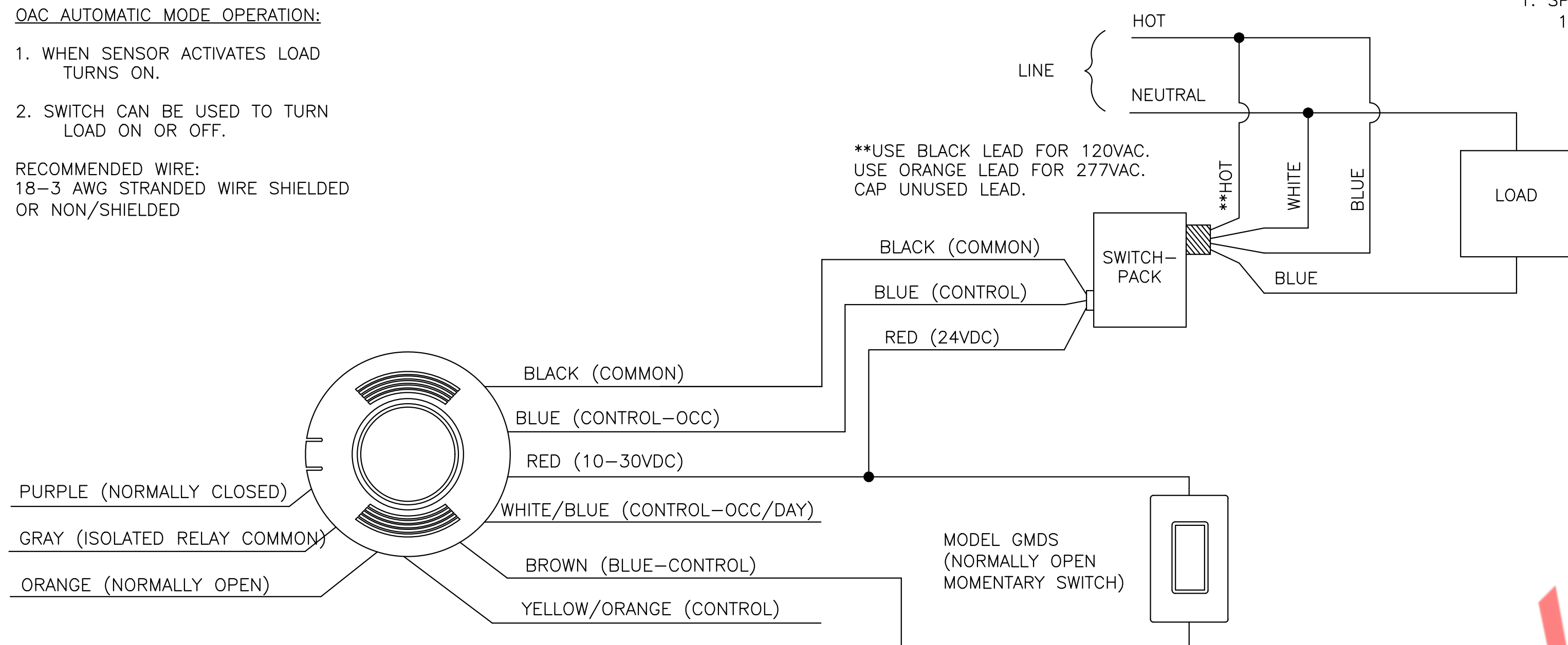
OAC AND VAC MANUAL MODE OPERATION:

- SWITCHES ARE REQUIRED TO TURN LOAD ON.
- LOAD TURNS OFF WHEN SENSOR TIMES OUT OR WITH SWITCH.

OAC AUTOMATIC MODE OPERATION:

- WHEN SENSOR ACTIVATES LOAD TURNS ON.
- SWITCH CAN BE USED TO TURN LOAD ON OR OFF.

RECOMMENDED WIRE:  
18-3 AWG STRANDED WIRE SHIELDED OR NON/SHIELDED



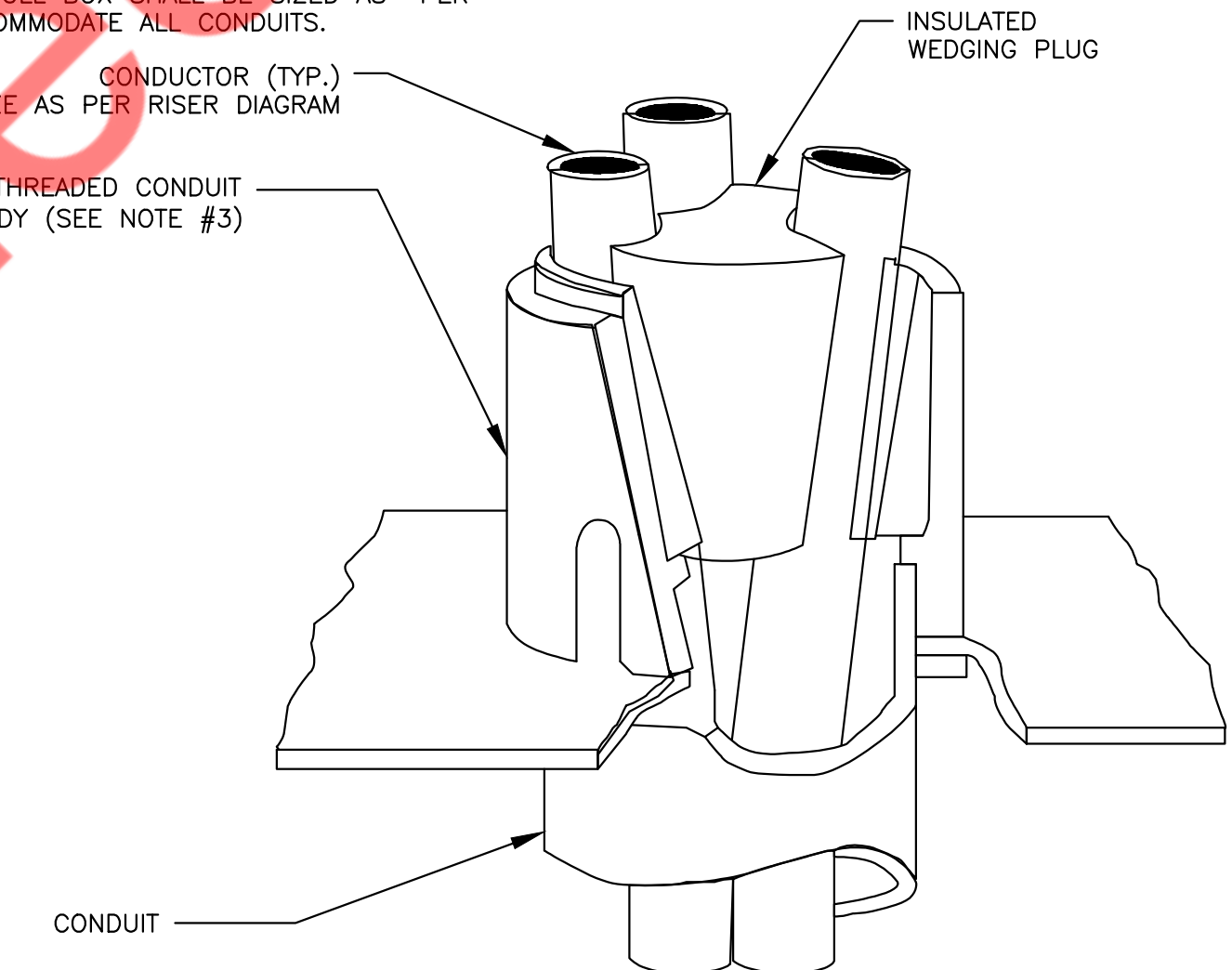
NOTES

- SP20-RD4 SWITCHPACK SHOWN. 120/277VAC 20AMP RATING.

\*\*USE BLACK LEAD FOR 120VAC.  
USE ORANGE LEAD FOR 277VAC.  
CAP UNUSED LEAD.

NOTES:

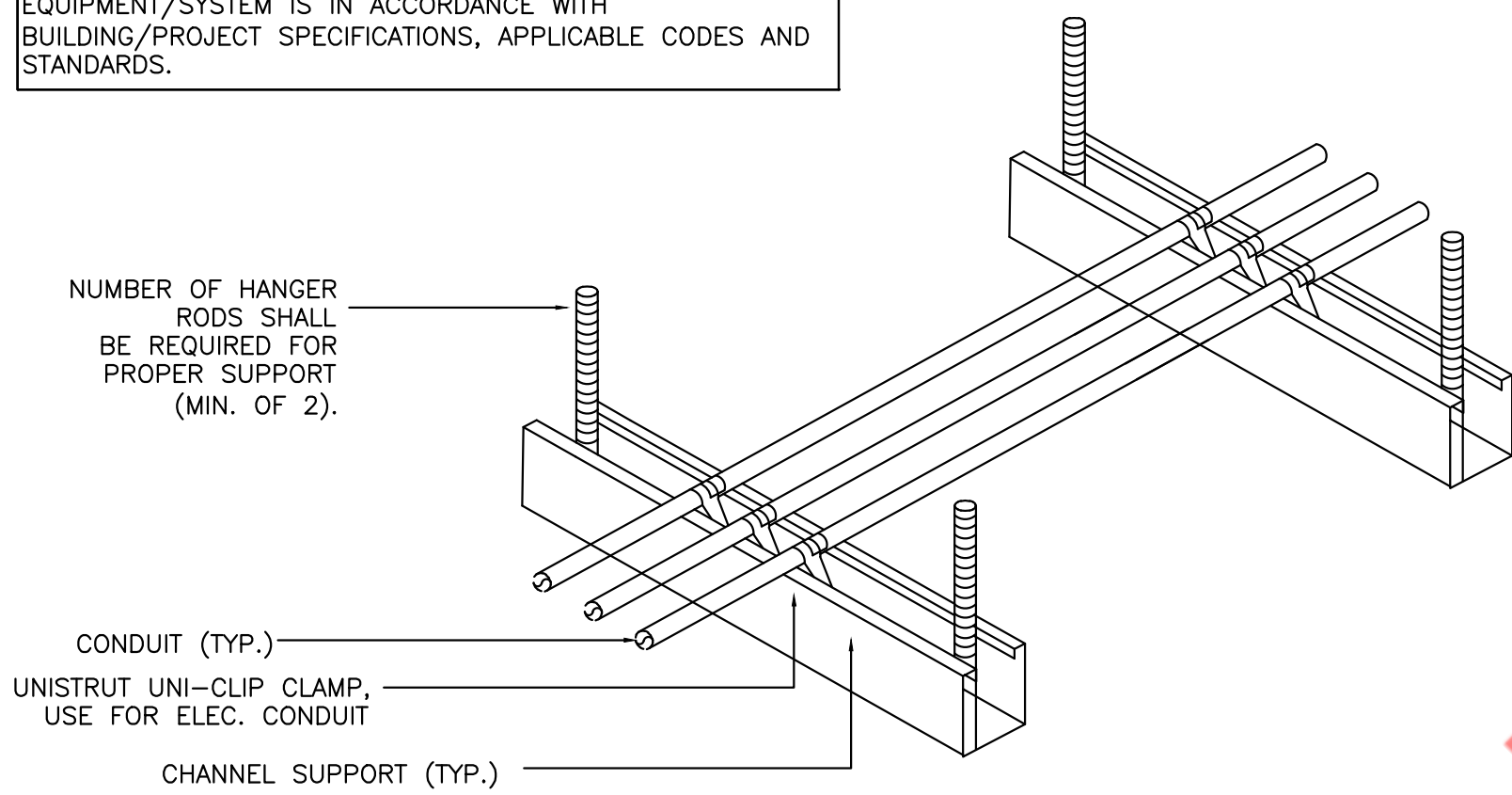
- ALL CONDUCTORS IN VERTICAL RACEWAYS SHALL BE SUPPORTED IN ACCORDANCE WITH ARTICLE 300.19 OF NEC. CABLE SUPPORTS SHALL BE LOCATED AT THE INTERVALS REQUIRED BY THE NEC.
- CABLE SUPPORT SYSTEM SHALL BE AS MANUFACTURED BY O-Z GEDNEY WITH pOZI-GRIP "S-STYLE" WEDGING PLUG OR APPROVED EQUAL.
- FOR THREADLESS CONDUIT (RIGID, IMC OR EMT), ATTACH CONDUIT BODY TO MALE THREADS OF A SET SCREW OR COMPRESSION CONNECT, AS PERMITTED BY SPECIFICATIONS.
- PROVIDE PULL BOX AT EACH LOCATION OF CABLE SUPPORTS. PULL BOX SHALL BE SIZED AS PER CODE TO ACCOMMODATE ALL CONDUITS.



1 OCCUPANCY - AUTO ON/OFF.  
WIRING DIAGRAM - LOW VOLTAGE CEILING SENSOR  
E-301 N.T.S

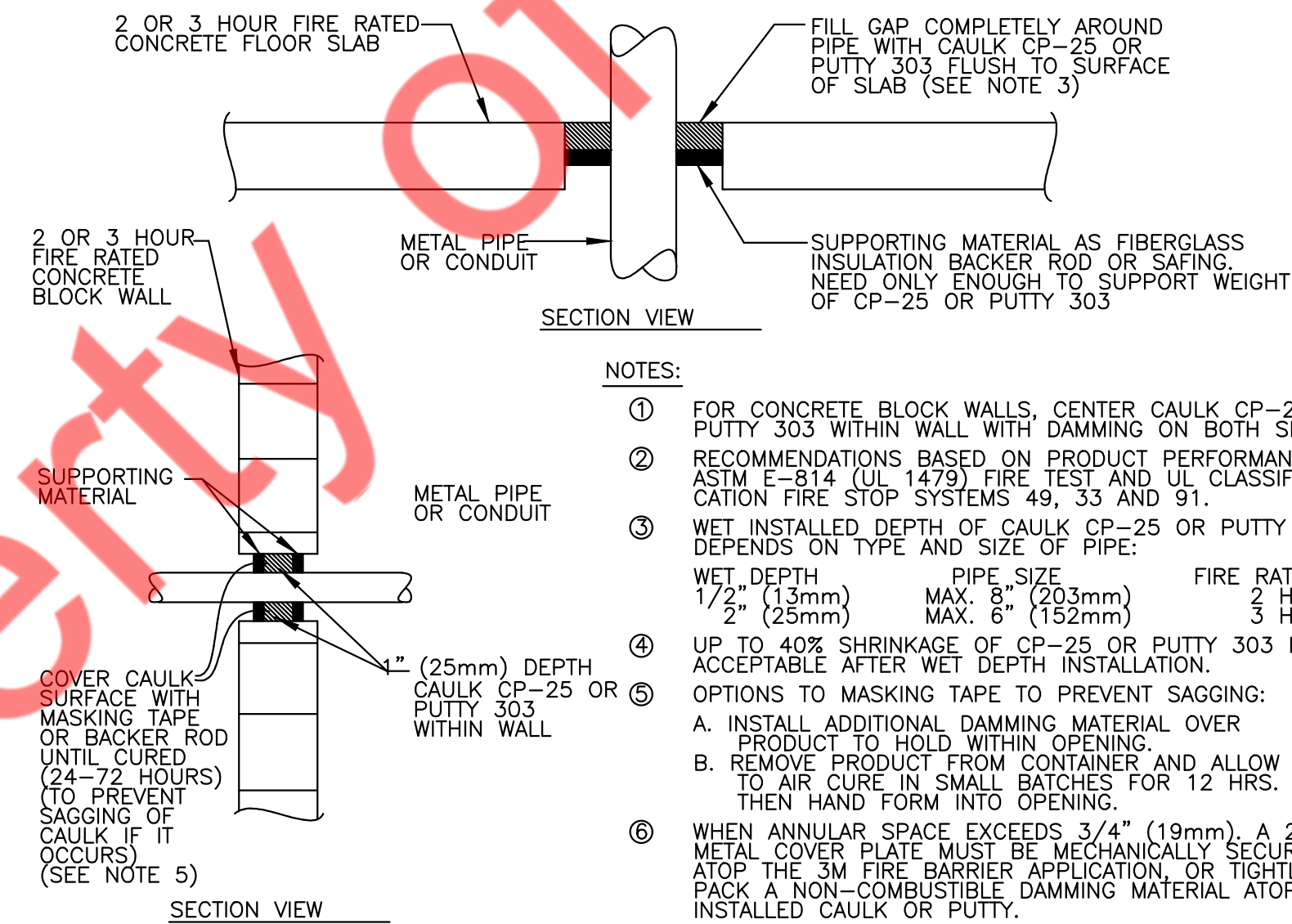
2 VERTICAL CABLE SUPPORT DETAIL  
E-301 N.T.S

NOTE:  
THIS INFORMATION MAY NOT CONTAIN ALL DETAILS REQUIRED FOR CONSTRUCTION. APPROPRIATE MODIFICATION MAY BE REQUIRED TO ENSURE SUITABILITY OF THESE DRAWINGS FOR THE SPECIFIC APPLICATION. IT IS THE USER'S RESPONSIBILITY TO ENSURE INSTALLATION OF THE EQUIPMENT/SYSTEM IS IN ACCORDANCE WITH BUILDING/PROJECT SPECIFICATIONS, APPLICABLE CODES AND STANDARDS.



NOTES:

- ALL CONDUIT MAY BE COMBINED ON SAME SUPPORT CHANNEL WHERE PRACTICAL.
- SUPPORT CHANNEL LENGTH SHALL NOT BE DETERMINED UNTIL ALL PIPING, CONDUIT, ETC. TO BE SUPPORTED IS COORDINATED.
- SUPPORT CHANNEL SPACING SHALL BE NO MORE THAN 10'-0".
- UNISTRUT AND CONDUIT INSTALLATION MAY BE REVERSED.



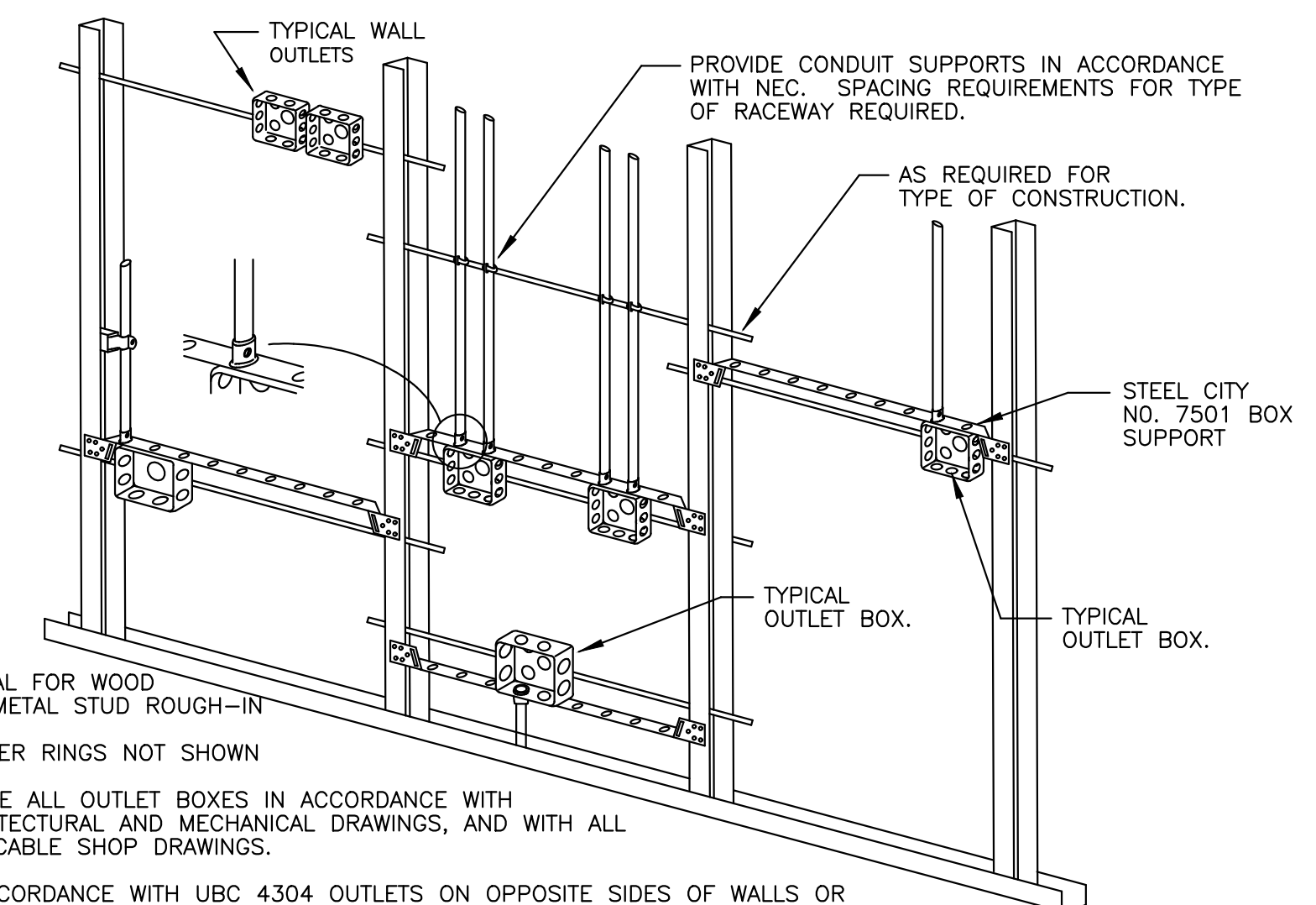
NOTES:

- FOR CONCRETE BLOCK WALLS, CENTER CAULK CP-25 OR PUTTY 303 WITHIN WALL WITH DAMMING ON BOTH SIDES.
- RECOMMENDATIONS BASED ON PRODUCT PERFORMANCE PER ASTM E-814 (UL 1479) FIRE TEST AND UL CLASSIFICATION FIRE STOP SYSTEMS 49, 33 AND 91.
- WET INSTALLED DEPTH OF CAULK CP-25 OR PUTTY 303 DEPENDS ON TYPE AND SIZE OF PIPE:  

WET DEPTH	PIPE SIZE	FIRE RATING
1 1/2" (38mm)	MAX. 8" (203mm)	2 HRS.
2" (51mm)	MAX. 6" (152mm)	3 HRS.
- UP TO 40% SHRINKAGE OF CP-25 OR PUTTY 303 IS ACCEPTABLE AFTER WET DEPTH INSTALLATION.
- OPTIONS TO MASKING TAPE TO PREVENT SAGGING:  
 A. INSTALL ADDITIONAL DAMMING MATERIAL OVER PRODUCT TO HOLD WITHIN OPENING.  
 B. REMOVE PRODUCT FROM CONTAINER AND ALLOW TO AIR CURE IN SMALL BATCHES FOR 12 HRS. THEN HAND FORM INTO OPENING.
- WHEN ANNULAR SPACE EXCEEDS 3/4" (19mm), A 28 AWG METAL COVER PLATE MUST BE MECHANICALLY SECURED ATOP THE 3M FIRE BARRIER APPLICATION, OR TIGHTLY PACK A NON-COMBUSTIBLE DAMMING MATERIAL ATOP INSTALLED CAULK OR PUTTY.

NOTES:

- TYPICAL FOR WOOD AND METAL STUD ROUGH-IN
- PLASTER RINGS NOT SHOWN
- LOCATE ALL OUTLET BOXES IN ACCORDANCE WITH ARCHITECTURAL AND MECHANICAL DRAWINGS, AND WITH ALL APPLICABLE SHOP DRAWINGS.
- IN ACCORDANCE WITH UBC 4304 OUTLETS ON OPPOSITE SIDES OF WALLS OR PARTITIONS IN THE SAME STUD SPACE MUST BE SEPARATED BY A MIN. OF 24" HORIZONTAL DISTANCE.



3 CONDUIT SUPPORT DETAIL  
E-301 N.T.S

4 FIRE STOP DETAIL  
E-301 N.T.S

5 DETAIL TYPICAL ROUGH-IN REQUIREMENTS  
E-301 N.T.S



PANEL: MDP										MOUNTING: SURFACE				
208Y/120 VOLTS,		3 PHASE,		4 WIRE		PANEL LOCATION: ELECTRICAL ROOM								
MAIN CB: NA		MLO: 800A		BUS: 800A		MIN,		FED FROM: UTILITY						
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.
1	20	EV CHARGER-1	E	4.16	2#8, #10G, 3/4" C	10.64			3#4, #8G, 3/4" C	6.48	H	RTU_1-1	3P-70	2
3	20	EV CHARGER-1	E	4.16						6.48	H			4
5	20	EV CHARGER-1	E	4.16						6.48	H			6
7	20	EV CHARGER-1	E	4.16		9.20				5.04	H	RTU_1-2	3P-50	8
9	20	EV CHARGER-1	E	4.16						5.04	H			10
11	20	EV CHARGER-1	E	4.16						5.04	H			12
13	20	EV CHARGER-1	E	4.16		11.85				7.69	H	RTU_1-3	3P-90	14
15	20	EV CHARGER-1	E	4.16						7.69	H			16
17	20	EV CHARGER-1	E	4.16						7.69	H			18
19	3P-40	46.6_MUA AIR FAN TEMPERED	M	3.35	3#8, #10G, 3/4" C	9.11				5.76	H	RTU_1-4	3P-60	20
21	20	SPARE	M	3.35						5.76	H			22
23	20	SPARE	M	3.35						5.76	H			24
25	20	SPARE	M	3.35		13.84				13.84	O			26
27	20	SPARE	M	3.35						10.33	O	PANEL-A	3P-200	28
29	20	SPARE	M	3.35						9.97	O			30
31	20	SPARE	M	3.35		20.14				20.14	O			32
33	20	SPARE	M	3.35						21.93	O	PANEL-B	3P-200	34
35	20	SPARE	M	3.35						18.58	O			36
37	20	SPARE	M	3.35		23.25				23.25	O			38
39	20	SPARE	M	3.35						22.00	O	PANEL-C	3P-200	40
41	20	SPARE	M	3.35						17.18	O			42
TOTAL LOAD(KVA)						98.04	95.06	82.38						

PANEL: A										MOUNTING: SURFACE				
208Y/120 VOLTS,		3 PHASE,		4 WIRE		PANEL LOCATION: ELECTRICAL ROOM								
MAIN CB: NA		MLO: 225A		BUS: 225A		MIN,		FED FROM: MDP						
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.
1	20	FREXER/COOLER & MANAGER LIGHTING	L	0.80	2#12, #12G, 3/4" C	2.38			2#12, #12G, 3/4" C	1.58	C	1_WALK-IN COOLER	20	2
3	20	COOKLINE LIGHTING	L	0.50			0.61	0.91		0.11	C	1A_WALK-IN COOLER COIL	2P-20	4
5	20	DISH & BEVERAGE LIGHTING	L	0.80						0.11	C			6
7	20	WOMENS, MENS & RESTROOM HALLWAY LIGHTING	L	0.40		2.32				1.92	C			8
9	20	BEER COOLER, LIQUOR & AV & BAR AREA LIGHTING	L	0.45						1.92	C	1B_WALK-IN COOLER CONDENSER	3P-20	10
11	20	HOTNESS/VESTIBULE LIGHTING	L	0.80						1.92	C			12
13	20	EXTERIOR LIGHTING - UPLIGHT	L	1.00		2.58				1.58	C	1.1_WALK-IN FREEZER	30	14
15	20	EXTERIOR LIGHTING - WS	L	0.30			1.29			0.99	C			16
17	20	EXTERIOR LIGHTING - O1	L	0.35						0.99	C	1.1A_WALK-IN FREEZER COIL	2P-20	18
19	20	EXTERIOR LIGHTING - G1	L	0.80		2.25				1.45	C			20
21	20	EXTERIOR LIGHTING - D1	L	0.30						1.45	C	1.1B_WALK-IN FREEZER CONDENSER	3P-20	22
23	20	JB FOR LOGO-1	L	1.20						1.45	C			24
25	20	JB FOR ROOF SIGNAGE	L	1.20		1.70				0.50	R	FIRE PLACE	2P-20	26
27	20	JB FOR LOGO-2	L	1.20			1.70			0.50	R			28
29	20	JB FOR LOGO-3	L	1.20				1.80		0.50	R			30
31	20	SCULPTURE ELEMENT	L	1.00		1.80				0.80	L	HOSTESS/VESTIBULE LIGHTING	20	32
33	20	ROOF RECEPTACLES	R	1.08						0.72	R	BAR AREA LIGHTING	20	34
35	20	OFFICE RECEPTACLES	R	0.54				0.54				EXTERIOR RECEPTACLE (OPTIONAL)	20	36
37	20	HOSTESS/VESTIBULE LIGHTING	L	0.80		0.80						SPARE	20	38
39	20	PATIO LIGHTING	L	0.80								SPARE	20	40
41	20	SPARE	L	0.80								SPARE	20	42
TOTAL LOAD(KVA)						13.84	10.33	9.97						

PANEL: B										MOUNTING: SURFACE				
208Y/120 VOLTS,		3 PHASE,		4 WIRE		PANEL LOCATION: ELECTRICAL ROOM								
MAIN CB: NA		MLO: 225A		BUS: 225A		MIN,		FED FROM: MDP						
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.
1	20	14_MEAT SLICER	E	0.46	2#12, #12G, 3/4" C	2.38			2#12, #12G, 3/4" C	1.92	E	B11_UNDERBAR SINK WITH GLASS WASHER	20	2
3	3P-60	26_DISHWASHER	E	5.62			7.42	5.62		1.80	E	46.3_FIRE SUPPRESSION CABINET	1P-20	4
5	20	27_CONDENSATE HOOD	E	0.13	2#12, #12G, 3/4" C					0.00	E	SHUNT TRIP		6
7	20	31_IGNITION FOR WATER HEATER	O	0.18						0.69	E	49_CONVCTION OVEN	1P-20	8
9	20	RECIRCULATING PUMP (RCP)	O	0.10						0.00	E	SHUNT TRIP		10
11	20	34_ICE MAKER	C	1.59	2#12, #12G, 3/4" C		2.34			0.75	C	54_PIZZA PREP REFRIGERATOR	20	16
13	20	34_ICE MAKER REMOTE CONDENSER	C	1.59						0.33	E	45_EQUIPMENT STAND REFRIGERATED BASE	1P-20	18
15	20	35_BAG-N-BOX, CARBONATOR	E	0.10	2#12, #12G, 3/4" C	0.10				0.00	E	SHUNT TRIP		20
17	20	39_NITROGEN GENERATOR	E	1.80			0.94			0.84	C	B5_UNDERBAR PASS THRU COOLER	20	22
19	20	42_RAPID COOK OVEN	E	2.08	2#10, #10G, 3/4" C		3.88			2.08	E	42_RAPID COOK OVEN	2P-30	24
21	20	43_CONVEYOR OVEN	E	1.04						2.08	E	42_RAPID COOK OVEN	2P-30	26
23	20	SHUNT TRIP	E	0.00						2.08	E	42_RAPID COOK OVEN	2P-30	28
25	20	43_CONVEYOR OVEN	E	1.04	2#12, #12G, 3/4" C	1.73				0.69	C	48_SANDWICH/SALAD PREP REFRIGERATOR	20	32
27	20	SHUNT TRIP	E	0.00						0.70	E	52_FOOD PAN WARMER	20	34
29	20	KEF-1	M	0.83						0.48	C	54.1_SANDWICH/SALAD PREP REFRIGERATOR	20	36
31	20	KEF-2	M	1.14						0.69	C	48_SANDWICH/SALAD PREP REFRIGERATOR	20	38
33	20	SHUNT TRIP	E	0.00						0.69	E	49_CONVCTION OVEN	1P-20	40
35	20	SHUNT TRIP	E	0.00						0.00	E	SHUNT TRIP		42
37	20	KEF-3	M	1.14						0.63	M	EF-1	20	44
39	20	SPARE	M	1.14						0.55	M	EF-2	20	46
41	20	SPARE	M	1.14						0.50	O	J-BOX FOR FAN FLY	20	48
43	20	SPARE	M	1.14						0.55	M	J-BOX FOR AIR CURTAIN	20	50
45	20	SPARE	M	1.14						0.55	M	J-BOX FOR AIR CURTAIN	20	52
47	20	SPARE	M	1.14								SPARE	20	54
TOTAL LOAD(KVA)						20.14	21.93	18.58						

PANEL: C										MOUNTING: SURFACE				
208Y/120 VOLTS,		3 PHASE,		4 WIRE		PANEL LOCATION: ELECTRICAL ROOM								
MAIN CB: NA		MLO: 225A		BUS: 225A		MIN,		FED FROM: MDP						
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.
1	20	60_MICROWAVE OVEN	E	1.61	2#12, #12G, 3/4" C	3.19			2#10, #10G, 3/4" C	1.58	C	1.2_WALK-IN BEER COOLER	30	2
3	20	61_REACH IN REFRIGERATOR	E	1.61			1.72	0.83		0.11	C	1.2A_WALK-IN BEER COOLER COIL	2P-20	4
5	20	63_SODA DISPENSER	E	2.40	2#12, #12G, 3/4" C					0.11	C			6
7	20	63_1_PUMP DECK	E	2.40						1.92	C			8
9	20	63_2_PUMP DECK	E	2.40						1.92	C	1B_WALK-IN BEER COOLER CONDENSER	3P-20	10
11	20	65_ICE TEA BREWER	E	1.68	2#12, #12G, 3/4" C		4.32			1.92	C			12
13	20	65_ICE TEA BREWER	E	1.68						0.55	E			14
15	20	66_COKE DISPENSER	E	2.40	2#12, #12G, 3/4" C		2.23			0.55	E	46.1_EXHAUST HOOD - PIZZA	3P-20	16
17	20	66_1_PUMP DECK	E	2.40						0.55	E			18
19	20	67_UNDERCOUNTER REFRIGERATOR	E	2.40	2#12, #12G, 3/4" C		2.40			0.00	E	SHUNT TRIP		20
21	20	68_HEATED HOLDING CABINET	E	2.40						0.55	E	46.2_EXHAUST HOOD - GRIDDLE OVEN	3P-20	22
23	20	68_HEATED HOLDING CABINET	E	2.40	2#12, #12G, 3/4" C		2.10			0.55	E			24
25	20	68_HEATED HOLDING CABINET	E	2.40						0.55	E			26
27	20	68_HEATED HOLDING CABINET	E	2.40	2#12, #12G, 3/4" C		1.55			0.00	E	SHUNT TRIP		28
29	20	B3_UNDERBAR BLENDER STATION	E	1.80	2#12, #12G, 3/4" C		2.52			0.72	R	E70_POS	20	30
31	20	B3_UNDERBAR BLENDER STATION	E	1.80						0.54	R	E70_POS	20	32
33	20	B4_GLASS FROSTER	E	0.36	2#12, #12G, 3/4" C		1.26			0.90	R	CO1_CONVENIENCE RECEPTACLES	20	34
35	20	BAR USB RECEPTACLES	R	0.90	2#12, #12G, 3/4" C		1.26			0.36	R	CO2_CONVENIENCE RECEPTACLES	20	36
37	20	BAR USB RECEPTACLES	R	0.72	2#12, #12G, 3/4" C		1.44			0.72	R	TOILET RECEPTACLES	20	38
39	20	SHOW WINDOW RECEPTACLE	R	1										



## PLUMBING SYMBOLS LIST

-----	COLD WATER PIPING
-----	HOT WATER PIPING
-----	HOT WATER RETURN PIPING
-----G-----	GAS PIPING
-----	GAS PIPING IN CORE & SHELL SCOPE
-----	VENT PIPING
-----SAN-----	UNGD. SANITARY PIPING
-----GSAN-----	UNGD. GRESASE WASTE PIPING
-----	CONDENSATE PIPING
-----	P-TRAP
-----	PIPE UP
-----	PIPE DROP
-----	FLOOR CLEANOUT
-----	CHECK VALVE
-----	BACK FLOW PREVENTER
-----	SLEEVE
-----	GAS SHUT-OFF VALVE
-----	BALANCING VALVE
-----	FLOOR SINK
-----	HUB DRAIN
-----	FLOOR DRAIN
-----	POINT OF NEW CONNECTION
-----	POINT OF DISCONNECTION

## PLUMBING ABBREVIATIONS

CO-1	CLEANOUT
FPHB	FREEZE PROOF HOSE BIB
CW	COLD WATER
HW	HOT WATER
HWR	HOT WATER RETURN
SAN	SANITARY
GSAN	GREASE SANITARY
V	VENT
W	WASTE
G	GAS
LAV	LAVATORY
WC	WATER CLOSET
UR	URINAL
GI	GREASE INTERCEPTOR
FD	FLOOR DRAIN
FS	FLOOR SINK
BFP	BACK FLOW PREVENTER
TYP.	TYPICAL
DN	DOWN
AFF	ABOVE FINISH FLOOR
RCP	RE-CIRCULATION PUMP
ET	EXPANSION TANK
TMV	THERMOSTATIC MIXING VALVE
HD	HUB DRAIN

## PLUMBING DRAWING LIST

P-001	PLUMBING SYMBOLS, LEGEND, NOTES & SPECIFICATIONS
P-002	PLUMBING SPECIFICATIONS
P-101	PLUMBING DRAINAGE FLOOR PLAN
P-102	PLUMBING WATER SUPPLY FLOOR PLAN
P-103	PLUMBING GAS FLOOR PLAN
P-501	PLUMBING DETAILS
P-601	PLUMBING SCHEDULES
P-602	PLUMBING ISOMETRIC RISER DIAGRAMS

## BUILDING DEPARTMENT PLUMBING NOTES

- ALL PLUMBING SYSTEMS (SANITARY, WASTE, VENT, WATER) AND ASSOCIATED EQUIPMENT SHALL BE INSTALLED, OPERATED AND MAINTAINED IN ACCORDANCE WITH THE REQUIREMENTS OF 2018 INTERNATIONAL PLUMBING CODE WITH GEORGIA AMENDMENTS 2020.
- INSTALLATION OF UNDERGROUND PIPING SHALL BE IN ACCORDANCE WITH THE REQUIREMENTS OF IPC 2018 SECTION PC 702.2
- PROTECTION OF PIPING AND PLUMBING SYSTEM COMPONENTS AS PER SECTION PC 305.
- TRENCHING, EXCAVATION AND BACKFILL AS PER SECTION PC 306.
- RODENT PROOFING AS PER PC 304
- MATERIALS USED IN PLUMBING SYSTEMS SHALL BE IN ACCORDANCE WITH THE REQUIREMENTS OF SECTION PC 303, PC 605, PC 702, PC 902, PC 1102.
- EQUIPMENT CONNECTIONS AND JOINING OF PIPING SHALL BE IN ACCORDANCE WITH THE REQUIREMENTS OF CHAPTERS 4, 5, 6, 7 AND 9.
- DEEP SEAL TRAPS FOR FLOOR DRAINS SHALL BE PROVIDED AS PER PC 1002, AND CLEAN-OUTS SHALL BE INSTALLED IN ACCORDANCE WITH THE REQUIREMENTS OF SECTION PC 708
- GAS EQUIPMENT & PIPING NETWORK SHALL BE IN ACCORDANCE WITH 2018 INTERNATIONAL FUEL GAS CODE WITH GEORGIA AMENDMENTS 2020.
- DRAINAGE PIPE CLEANOUTS AS PER SECTION PC 708.
- VERTICAL AND HORIZONTAL PIPING SHALL BE SUPPORTED IN ACCORDANCE WITH THE REQUIREMENTS OF SECTION PC 308
- WATER SUPPLY SYSTEMS SHALL BE INSTALLED AND MAINTAINED IN ACCORDANCE WITH THE REQUIREMENTS OF CHAPTER 6 SECTION PC 601-603, 604, 606, 607, 608, 610
- THE SANITARY DRAINAGE SYSTEM SHALL BE SIZED AND INSTALLED IN ACCORDANCE WITH THE REQUIREMENTS OF CHAPTER 7 SECTION PC 701, 704, 705, 706, 707, 708, 711.
- VENT PIPING FOR THE SANITARY DRAINAGE SYSTEM SHALL BE INSTALLED IN ACCORDANCE WITH THE REQUIREMENTS OF CHAPTER 9 SECTIONS PC 901 THROUGH PC 912 THROUGH PC 917.
- INSPECTION AND TESTING OF PLUMBING PIPING SYSTEMS SHALL BE IN ACCORDANCE WITH SECTION PC 107, 312.

## PLUMBING SPECIFICATIONS

- BASIC PLUMBING REQUIREMENTS, MATERIALS AND METHODS
  - SCOPE
    - PROVIDE ALL MATERIAL, TOOLS, SUPERVISION AND LABOR INCLUDING ALL MISCELLANEOUS AND INCIDENTAL ITEMS REQUIRED FOR COMPLETE AND OPERABLE PLUMBING INSTALLATIONS AS SHOWN OR DESCRIBED ON THE DRAWINGS AND IN THESE SPECIFICATIONS.
    - THE CONTRACTOR SHALL BE RESPONSIBLE FOR THE PROTECTION OF ALL NEW CONDITIONS AND MATERIALS WITHIN THE CONSTRUCTION AREA. ANY DAMAGE CAUSED BY THE CONTRACTOR SHALL BE REPAIRED TO THE OWNER'S SATISFACTION.
    - OBTAIN ALL PERMITS, PAY ALL PERMIT FEES AND SCHEDULE ALL REQUIRED INSPECTIONS. COPIES OF ALL PERMITS AND INSPECTION CERTIFICATES SHALL BE FORWARDED TO THE OWNER FOR RECORD.
    - THE GENERAL CONDITIONS OF THE CONTRACT AND ALL DIVISION 1 REQUIREMENTS APPLY TO THE WORK OF THIS SECTION.
    - THE CONTRACTOR SHALL VISIT THE SITE PRIOR TO SUBMITTING BID TO DETERMINE CONDITIONS AND THE EXTENT OF THE WORK. BY COMMENCING WORK, THE CONTRACTOR ACKNOWLEDGES HIS CONFIRMATION OF ALL CONDITIONS AS ACCEPTABLE WITH REFERENCE TO HIS CONTRACT, SCOPE OF WORK AND BID PRICE SUCH THAT NO ADDITIONAL COMPENSATION SHALL BE FORTHCOMING FOR UNFORESEEN EXISTING CONDITIONS.
    - IN ALL AREAS SUBJECT TO FREEZING CONDITIONS, THE CONTRACTOR SHALL PROVIDE FREEZE PROTECTION FOR ALL DOMESTIC WATER PIPING INSTALLED UNDER HIS CONTRACT.
    - ALL ELECTRICAL REQUIREMENTS SHALL BE COORDINATED WITH THE CONTRACTOR FOR ELECTRICAL WORK. THIS CONTRACTOR IS RESPONSIBLE FOR ALL LOW VOLTAGE WIRING FOR EQUIPMENT INSTALLED UNDER HIS CONTRACT. THE CONTRACTOR FOR ELECTRICAL WORK IS RESPONSIBLE FOR LINE VOLTAGE POWER WIRING ONLY.
    - COLOR AND FINISH SELECTIONS FOR ALL MATERIALS, INCLUDING PAINTING OF PIPING, SHALL BE AS DIRECTED AND/OR APPROVED BY THE ARCHITECT.
    - MINOR DETAILS NOT SHOWN OR SPECIFIED, BUT NECESSARY FOR THE PROPER AND ACCEPTABLE CONSTRUCTION, INSTALLATION OR OPERATION OF ANY PART OF THE WORK AS DETERMINED BY THE ENGINEER SHALL BE INCLUDED AS IF SPECIFIED OR INDICATED ON THE DRAWINGS.
    - THIS CONTRACTOR SHALL BE RESPONSIBLE FOR COORDINATING ALL REQUIREMENTS FOR THE INSTALLATION, CONNECTION, EXTENSION OR MODIFICATION TO ALL UTILITY SERVICES WITH RESPECTIVE PROVIDERS INCLUDING PAYMENT OF ALL ASSOCIATED FEES.
    - THE CONTRACTOR IS RESPONSIBLE FOR ALL PAINTING ASSOCIATED WITH CUTTING AND PATCHING. ALL PAINTING IN AREAS WITH COMPLETE FINISH RENOVATIONS SHALL BE PROVIDED BY THE GENERAL CONTRACTOR.
  - SUBMITTALS
    - PIPE AND FITTINGS
    - VALVES
    - HANGERS AND SUPPORTS
    - PLUMBING PIPING LAYOUT
    - TESTS
    - PLUMBING FIXTURES
    - WATER HEATERS & ACCESSORIES
    - FLOOR DRAINS
    - MIXING VALVES
    - ALL SCHEDULED PLUMBING EQUIPMENT
  - SUBMITTALS FROM SUPPLIERS OR MANUFACTURERS WHICH DO NOT BEAR THE STAMP OF THE SUBMITTING CONTRACTOR INDICATING THAT THE CONTRACTOR HAS REVIEWED THE SUBMITTAL FOR CONFORMANCE WITH THE PROJECT REQUIREMENTS WILL BE RETURNED REJECTED.
  - THE ENGINEER'S REVIEW OF SUBMITTALS IS A COURTESY WHICH DOES NOT RELIEVE THE CONTRACTOR FROM CONFORMING WITH THE CONSTRUCTION DOCUMENTS, REGARDLESS OF THE ACTION INDICATED BY THE SHOP DRAWINGS STAMP.
  - REVIEW OF SHOP DRAWINGS BY THE ENGINEER SHALL BE LIMITED TO THE INITIAL REVIEW, AND A SECOND REVIEW OF ANY REQUIRED RESUBMITTED DATA IF THE ENGINEER IS REQUIRED TO REVIEW SHOP DRAWINGS FOR A THIRD (OR MORE) SUBMISSION OF THE SAME ITEM, THE CONTRACTOR SHALL BE LIABLE FOR COMPENSATING THE ENGINEER FOR THESE SUBSEQUENT REVIEWS AS PER THE ENGINEER'S CURRENT HOURLY RATE SCHEDULE.
  - SUBMIT PROOF OF APPROVAL AND/OR CONFIRMATION OF SATISFACTORY TEST RESULTS TO THE OWNER AND THE ARCHITECT.
  - SUBMIT TO THE OWNER'S MAINTENANCE PERSONNEL OPERATION AND MAINTENANCE DATA FOR ALL SYSTEM COMPONENTS, SERVICING REQUIREMENTS, INSPECTION DATA, REPLACEMENT PART NUMBERS AND AVAILABILITY AND CONTACT INFORMATION FOR SERVICE/SUPPLY COMPANY.
  - FOR ALL BELOW GRADE PIPING WHERE ACTUAL INSTALLATION DEVIATES FROM CONSTRUCTION DRAWINGS, THE CONTRACTOR SHALL PROVIDE AS-BUILT DRAWINGS INDICATING BELOW GRADE PIPE LOCATIONS DIMENSIONED TO NEAREST COLUMN LINES.
  - RECORD AS-BUILT DRAWINGS SHALL BE SUPPLIED TO THE OWNER/TENANT AFTER COMPLETION OF THE WORK SHOWING ANY ALTERATIONS, ADDITIONS AND/OR DELETIONS TO THE SYSTEM(S) INSTALLED.
- SUBSTITUTIONS
  - ALL EQUIPMENT SHALL BE PRODUCTS OF THE SPECIFIED MANUFACTURER OR MANUFACTURERS. ALL BIDS SHALL BE BASED ON THE SPECIFIED MANUFACTURER OR MANUFACTURER'S EQUIPMENT. FOR SUBSTITUTIONS OF OTHER MANUFACTURER'S EQUIPMENT TO BE CONSIDERED, THE SUBSTITUTION MUST BE INDICATED PRIOR TO BIDDING WITH THE REASON FOR THE PROPOSED SUBSTITUTION IDENTIFIED, AND THE PROPOSED CREDIT TO THE OWNER INDICATED. THE ENGINEER SHALL DETERMINE THE ACCEPTABILITY OF ANY PROPOSED SUBSTITUTIONS.
  - THE CONTRACTOR ASSUMES ALL RESPONSIBILITY FOR COORDINATING THE WORK OF OTHER TRADES WHICH MAY BE AFFECTED BY SUBSTITUTIONS, INCLUDING ALL RELATED COSTS.
- DEFINITIONS
  - FURNISH: TO PURCHASE, PROCURE, ACQUIRE AND DELIVER, COMPLETE WITH RELATED ACCESSORIES.

B. INSTALL: TO ERECT, MOUNT AND CONNECT, COMPLETE WITH RELATED ACCESSORIES.

C. PROVIDE: TO FURNISH AND INSTALL.

D. PLUMBING CONTRACTOR, THE CONTRACTOR, THIS CONTRACTOR: THE CONTRACTOR FOR PLUMBING WORK WHICH IS SPECIFIED HEREIN AND SHOWN ON THESE DRAWINGS.

E. REFER TO THE NATIONAL STANDARD PLUMBING CODE FOR ADDITIONAL DEFINITIONS.

### 1.05 DRAWINGS

A. THE DRAWINGS ARE DIAGRAMMATIC AND ARE INTENDED TO ILLUSTRATE THE GENERAL ARRANGEMENT AND ROUTING OF PIPING AND GENERAL LOCATIONS OF EQUIPMENT. PRECISE LOCATIONS OF EQUIPMENT, RISERS AND STACKS, AND ROUTING AND ELEVATION OF ALL PIPING SYSTEMS SHALL BE COORDINATED IN THE FIELD WITH THE ARCHITECT, ARCHITECTURAL DRAWINGS, THE WORK OF OTHER TRADES, EXISTING AND NEW BUILDING CONDITIONS AND/OR THE PREFERENCES OF THE OWNER/TENANT AS CONSTRUCTION PROCEEDS. ALL PIPING SHALL BE INSTALLED CONCEALED IN FINISHED SPACES, UNLESS NOTED OTHERWISE.

B. PROVIDE ALL NECESSARY INCIDENTAL MATERIALS AND ACCESSORIES REQUIRED TO MAKE THE WORK COMPLETE IN ALL RESPECTS, EVEN IF NOT PARTICULARLY SHOWN OR SPECIFIED.

C. REFER TO PLUMBING EQUIPMENT/FIXTURE SCHEDULE ON THE DRAWINGS FOR ALL FIXTURE AND EQUIPMENT SPECIFICATIONS.

D. REFER TO FIXTURE CONNECTION SIZE SCHEDULE FOR ALL FIXTURE ROUGHING SIZE REQUIREMENTS.

E. VERIFY ALL INDICATED CONDITIONS BEFORE STARTING WORK AND REPORT ANY DISCREPANCIES. THE DRAWINGS REFLECT CONDITIONS WHICH CAN BE REASONABLY INTERPRETED FROM THE EXISTING VISIBLE CONDITIONS OR FROM DRAWINGS AND INFORMATION FURNISHED BY THE OWNER.

F. LOCATE ALL FIXTURES AND EQUIPMENT AS PER THE FINAL ARCHITECTURAL DRAWINGS.

### 1.06 PRODUCTS

- SANITARY AND VENT PIPING:
  - ABOVE GRADE PIPING SHALL BE HUBLESS CAST IRON PIPE WITH STAINLESS STEEL COUPLINGS AND ELASTOMERIC GASKETS WITH A MINIMUM NO. OF BANDS PER COUPLING AS PER CISPI 310-12.
  - SLOPE OF DRAINAGE SYSTEM SHALL BE 1/8" PER FOOT OF RUN FOR PIPE OVER 3" (I.D.) AND 1/4" PER FOOT OF RUN FOR PIPE 3" AND SMALLER (I.D.). VENT PIPING SHALL BE PITCHED TO DRAIN.
  - ALL CAST IRON SOIL PIPE AND FITTINGS SHALL BE MARKED WITH THE COLLECTIVE TRADEMARK OF THE CAST IRON SOIL PIPE INSTITUTE (CISPI) AND BE LISTED BY NSF INTERNATIONAL.
  - IN LIEU OF CAST IRON, PVC SCHEDULE 40 PIPE (WITH CORRESPONDING FITTINGS & SUPPORTS) MAY BE USED AS AN ALTERNATIVE. REFER IPCC 2018 SECTION 702 FOR PVC PIPE.

- DOMESTIC WATER PIPING:
  - ABOVE GRADE WATER PIPING SHALL BE TYPE 'L' HARD-DRAWN COPPER TUBE.
  - FITTINGS IN DOMESTIC WATER PIPING SHALL BE WROUGHT COPPER OR CAST BRASS.
  - JOINTS SHALL BE MADE WITH LEAD-FREE SOLDER.
  - IN LIEU OF COPPER, PEX PIPE (WITH CORRESPONDING FITTINGS & SUPPORTS) MAY BE USED AS AN ALTERNATIVE. REFER IPCC 2018 SECTION 605 FOR PEX PIPE.
  - THE ENTIRE DOMESTIC WATER DISTRIBUTION SYSTEM SHALL BE INSULATED INCLUDING ALL VALVES, FITTINGS, ETC.
  - COMPLY WITH NSF 61 FOR MATERIALS FOR WATER-SERVICE PIPING AND SPECIALTIES FOR DOMESTIC WATER.
  - ALL DOMESTIC WATER PIPING ABOVE GRADE SHALL BE FIRE-RETARDANT, FACTORY-APPLIED JACKET, PROVIDE COLD WATER PIPING WITH FACTORY-APPLIED VAPOR BARRIER. INSULATION REQUIREMENT SHOULD COMPLY SECTION C404.4 REFER WITH 2015 INTERNATIONAL ENERGY CONSERVATION CODE TABLE C403.2.10.

MINIMUM PIPE INSULATION THICKNESS						
FLUID OPERATING TEMPERATURE RANGE AND USAGE (°F)	INSULATION CONDUCTIVITY		NOMINAL PIPE OR TUBE SIZE (INCHES)			
	CONDUCTIVITY BTU · IN./ (H · FT <sup>2</sup> · °F)	MEAN RATING TEMPERATURE, °F	<1	1 to < 1½	1½ to < 4	4 to < 8
105-140	0.21-0.28	100	1.0	1.0	1.5	1.5 1.5
40-60	0.21-0.27	75	0.5	0.5	1.0	1.0 1.0

- WATER-HEATING EQUIPMENT AND HOT WATER STORAGE TANKS SHALL MEET THE MINIMUM PERFORMANCE REQUIREMENTS GIVEN IN THE IECC 2015, SECTION C404.2, TABLE C404.2. THE EFFICIENCY SHALL BE VERIFIED THROUGH DATA FURNISHED BY THE MANUFACTURER OF THE EQUIPMENT OR THROUGH CERTIFICATION UNDER AN APPROVED CERTIFICATION PROGRAM.
- HW SYSTEM PIPING IS DESIGNED AS PER MAXIMUM ALLOWED PIPE LENGTH METHOD AS PER INTERNATIONAL ENERGY CONSERVATION CODE 2015 C404.5. THE HW PIPE LENGTH FROM THE NEAREST SOURCE OF HEATED WATER TO THE TERMINATION OF THE FIXTURE SUPPLY PIPE SHALL BE AS PER FOLLOWING TABLE.

NOMINAL PIPE SIZE (INCHES)	MAXIMUM PIPING LENGTH (FEET)	
	PUBLIC LAV	OTHER FIXTURES
¾"	3'	50'
½"	2'	43'
¾"	0.5'	21'
1"	0.5'	13'
1½"	0.5'	8'
1½"	0.5'	6'
2" OR LARGER	0.5'	4'

- AS PER IECC 2015 EDITION, C404.7. WATER DISTRIBUTION SYSTEM HAVING ONE OR MORE RECIRCULATION PUMPS THAT PUMP WATER FROM A HEATED-WATER SUPPLY PIPE BACK TO THE HEATED-WATER SOURCE THROUGH A COLD-WATER SUPPLY PIPE SHALL BE A DEMAND RECIRCULATION WATER SYSTEM. PUMPS SHALL HAVE CONTROLS THAT COMPLY WITH BOTH OF THE FOLLOWING:
  - THE CONTROL SHALL START THE PUMP UPON RECEIVING A SIGNAL FROM THE ACTION OF A USER OF A FIXTURE, SENSING THE PRESENCE OF A USER OF A FIXTURE OR SENSING THE FLOW OF HOT OR TEMPERED WATER TO A FIXTURE.
  - THE CONTROL SHALL LIMIT THE TEMPERATURE OF THE WATER ENTERING THE COLD-WATER PIPING TO 104°F (40°C).

- AS PER IECC 2015, C404.6.1, CONTROLS ARE INSTALLED THAT LIMIT OPERATION OF A RECIRCULATION PUMP INSTALLED TO MAINTAIN TEMPERATURE OF A STORAGE TANK. SYSTEM RETURN PIPE IS A DEDICATED RETURN PIPE OR A COLD WATER SUPPLY PIPE.

- AS PER IECC 2015, C404.6.1, AUTOMATIC TIME SWITCHES MUST BE INSTALLED TO AUTOMATICALLY SWITCH OFF THE RE-CIRCULATING HOT WATER SYSTEM OR HEAT TRACE.

### C. MIXING VALVES

- VALVE BODY SHALL BE MADE OF CAST BRASS. THE INTERNAL COMPONENTS SHALL BE MADE OF BRASS OR STAINLESS STEEL.
- TYPES A, C & D VALVES: VALVE SHUTS OFF IN FULL COLD POSITION AND MUST PASS THROUGH COLD RANGE BEFORE DELIVERING WARM, AND/OR HOT WATER. TEMPERATURE LIMIT SET AT 105°F MAXIMUM DELIVERY TEMPERATURE. IF ONE SUPPLY SHOULD FAIL, THE OTHER WILL AUTOMATICALLY AND INSTANTLY SHUT DOWN. DELIVERY CAPACITY IS 5GPM @ 45 PSIG DIFFERENTIAL.

- TYPES OF VALVES: TYPE A- THERMOSTATICALLY OPERATED BY MEANS OF BI-METALLIC STRIP, OR EXPANSION BELLOWS; TYPE B-SINGLE HANDLE MECHANICAL MIXER, OR INDIVIDUAL HOT AND COLD CONTROL VALVES; TYPE C- PRESSURE BALANCING SHOWER VALVE/PISTON OPERATED MIXING VALVE; TYPE D- BALANCED PRESSURE OPERATED, WITH INTEGRAL DIAL THERMOMETER INDICATING DELIVERED WATER TEMPERATURE.

- EACH ELEMENT SHALL BE CONTROLLED BY AN INDIVIDUALLY MOUNTED THERMOSTAT AND HIGH TEMPERATURE CUT-OFF SWITCH. ALL INTERNAL CIRCUITS SHALL BE FUSED. THE OUTER JACKET SHALL BE OF BAKED ENAMEL FINISH AND SHALL BE PROVIDED WITH FULL SIZE CONTROL COMPARTMENT FOR PERFORMANCE OF SERVICE AND MAINTENANCE THROUGH HINGED FRONT PANEL AND SHALL ENCLOSE THE TANK WITH FOAM INSULATION. ELECTRICAL JUNCTION BOX WITH HEAVY DUTY TERMINAL BLOCK SHALL BE PROVIDED. THE DRAIN VALVE SHALL BE LOCATED IN THE FRONT FOR EASE OF SERVICING.

### D. HANGERS AND SUPPORTS:

- HANGERS SHALL BE STANDARD STEEL, MALLEABLE OR WROUGHT IRON, AS MANUFACTURED BY GRINNELL OR APPROVED EQUAL, SUITABLE FOR THE TYPE OF CONSTRUCTION. PIPING SHALL NOT BE HUNG FROM OTHER PIPE.

- SECTIONS OF INDIVIDUAL PIPE RUNS SHALL BE SUPPORTED BY CLEVIS HANGERS.

- ALL EQUIPMENT SHALL BE PROVIDED WITH APPROVED SUPPORTS.

- PROVIDE SEISMIC RESTRAINTS IN ACCORDANCE WITH ALL APPLICABLE FEDERAL, STATE AND LOCAL CODES AND STANDARDS AND THE REQUIREMENTS OF AUTHORITIES HAVING JURISDICTION.

- UNLESS OTHERWISE INDICATED OR REQUIRED BY AUTHORITIES HAVING JURISDICTION, THE FOLLOWING SHALL BE PROVIDED WITH SEISMIC RESTRAINTS AS REQUIRED BY THE BOCA NATIONAL BUILDING CODE, SECTION 1610.6.4: ALL EQUIPMENT AND MACHINERY, ALL NEW PIPING 2-1/2" AND LARGER (1-1/4" AND LARGER IN BOILER/MECHANICAL ROOMS) WITH HANGERS GREATER THAN 12" IN LENGTH FROM THE TOP OF PIPE TO THE STRUCTURE.

- SUPPORTS SHALL BE PROVIDED IN STRICT ACCORDANCE WITH THE RECOMMENDATIONS OF THE PIPING MANUFACTURER.

### E. DOMESTIC WATER HEATER (GAS FIRED)

- TANKS SHALL 100 GALLON CAPACITY AND SHALL HAVE 150 PSI WORKING PRESSURE AND BE EQUIPPED WITH GLASS LINING PERMANENTLY BONDED TO TANK INTERIOR SURFACE.
- BURNER SHALL BE ALUMINIZED STEEL OR CAST IRON, ADJUSTABLE, OR SELF-ADJUSTING AIR-GAS MIXTURE CONTROL.

- INSTALL THE WORK OF THIS SECTION IN ACCORDANCE WITH NFPA 54, NFPA 211, AND THE MANUFACTURER'S PRINTED INSTALLATION INSTRUCTIONS, UNLESS OTHERWISE SPECIFIED.

- THE OUTER JACKET SHALL BE STEEL WITH BAKED ENAMEL/ACRYLIC FINISH AND SHALL BE PROVIDED WITH ACCESS DOOR FOR SERVICING CONTROLS AND BURNER

- THE DRAIN VALVE SHALL BE LOCATED IN THE FRONT FOR EASE OF SERVICING.

### F. GAS PIPING

- ALL GAS PIPING WORK SHALL COMPLY WITH INTERNATIONAL FUEL GAS CODE 2018, LOCAL UTILITY GAS REQUIREMENTS.

- FURNISH AND INSTALL ALL NECESSARY GAS PIPING TO ALL EQUIPMENT INCLUDING GAS SUPPLY INCLUDING RECONNECTION TO EXISTING ACTIVE GAS BURNING EQUIPMENT

- PROVIDE A LUBRICATED GAS VALVE AT ALL CONNECTIONS TO EQUIPMENT.

- ALL GAS PIPING AND INSTALLATION SHALL BE IN ACCORDANCE WITH RULES AND REGULATIONS OF LOCAL UTILITY GAS COMPANY AND OTHER AUTHORITIES HAVING JURISDICTION.

- PROVIDE ADEQUATE SUPPORT FOR ALL PIPING.

- GAS PIPING SHALL BE BLACK STEEL SCHEDULE 40 THREADED PIPE CONFORMING TO ANSI B36-20.

- FITTINGS SHALL BE MALLEABLE IRON.



- G. VALVES:
1. PROVIDE GATE VALVES, BUTTERFLY OR BALL VALVES FOR SHUT-OFF DUTY ON MAIN AND BRANCH SUPPLY LINES. FOR ALL PIPE RUNS 2" AND SMALLER, PROVIDE BALL FOR ALL PIPE RUNS LARGER THAN 2" AND SMALLER THAN 4", PROVIDE GATE VALVES. PIPING 4" AND LARGER, PROVIDE BUTTERFLY VALVES FOR SHUT-OFF DUTY.
  2. ALL FIXTURES WITH THE EXCEPTION OF FLUSHOMETER-EQUIPPED WATER CLOSETS AND URINALS SHALL HAVE STOP VALVES TO CONTROL SUPPLY TO THE FIXTURE. WHERE SUPPLIES ARE EXPOSED PROVIDE CHROME-PLATED STOPS WITH CHROME-PLATED ESCUTCHEONS ON PIPING PENETRATIONS.
  3. ALL PLUMBING FIXTURES AND EQUIPMENT TO HAVE SHUT-OFF VALVES ON SUPPLY LINES.
  4. ALL BRANCH LINES TO HAVE SHUT-OFF VALVES.
  5. ALL VALVES SHALL BE ACCESSIBLE. PROVIDE ACCESS DOORS WHERE REQUIRED FOR VALVE ACCESS.
  6. PROVIDE GLOBE VALVES FOR THROTTLING/BALANCING OF THE HOT WATER CIRCULATING SYSTEM.
- H. SLEEVES AND ESCUTCHEONS:
1. SLEEVES THROUGH STRUCTURAL CONCRETE MEMBERS AND SLEEVES FOR WALLS BELOW GRADE AND FLOORS ON GRADE SHALL BE STANDARD WEIGHT GALVANIZED SCHEDULE 40 STEEL PIPE. SLEEVES THROUGH OTHER THAN STRUCTURAL COMPONENTS OF THE BUILDING SHALL BE 20 GAGE GALVANIZED SHEET METAL WITH LOCK SEAM JOINTS. USG TERMAFIBER SAFING INSULATION SHALL BE INSTALLED BETWEEN PIPE AND SLEEVE.
  2. PIPE ESCUTCHEON PLATES SHALL BE INSTALLED WHERE EXPOSED PIPING PASSES THROUGH WALLS, CEILINGS, AND FLOORS AND SHALL BE MINIMUM 20 GAGE STEEL. PROVIDE CHROME PLATED ESCUTCHEON PLATES IN FINISHED AREAS.
- I. DRAINAGE ACCESSORIES
1. GENERAL:
    - a. INSTALL THE WORK OF THIS SECTION IN ACCORDANCE WITH THE MANUFACTURER'S PRINTED INSTALLATION INSTRUCTIONS, UNLESS OTHERWISE SPECIFIED.
    - b. SECURE EXTERNAL COMPONENTS IN PLACE WITH VANDAL RESISTANT FASTENERS OR DEVICES WHICH CANNOT BE REMOVED WITHOUT SPECIAL TOOLS.
- J. DEVICES:
- a. CLEANOUT & CLEANOUT PLUG
    - THREADED PIPE FITTING OR CAST IRON FERRULE WITH GAS TIGHT CLEANOUT PLUG
    - PLUG SHOULD BE CAST BRASS OR BRONZE, WITH THREADED END, AND RAISED OR COUNTERSUNK HEAD.
    - LUBRICATE THREADS OF CLEANOUT PLUG WITH ANTI-SEIZE LUBRICANT BEFORE FINAL INSTALLATION.
  - b. CLEANOUT WALL PLATE
    - IT SHOULD BE ROUND, STAINLESS STEEL OR POLISHED CHROME PLATED BRONZE COVER PLATE WITH STAINLESS STEEL VANDAL RESISTANT FASTENER TO SECURE TO CLEANOUT PLUG.
    - c. CLEANOUT DECK PLATE
      - IT SHOULD BE STANDARD DUTY FLOOR CLEANOUT FITTING WITH COATED CAST IRON BODY, ROUND, POLISHED NICKEL BRONZE SCORRIATED TOP SECURED TO CLEANOUT PLUG WITH STAINLESS STEEL VANDAL RESISTANT FASTENER; THREADED HEIGHT ADJUSTMENT, CAST IRON HEAD, GAS TIGHT CLEANOUT PLUG, AND CONNECTION TO MATCH PIPING OPTION SELECTED.
      - GRILLE FREE AREA SHOULD BE AT LEAST EQUAL TO CROSS-SECTION AREA OF PIPE TO WHICH CONNECTION MADE AND MADE OF POLISHED NICKEL BRONZE, WITH REMOVABLE GRATE, EITHER PERFORATED OR BAR TYPE. GRATE ATTACHED TO GRILLE BODY WITH VANDAL RESISTANT FASTENER.
- K. INDIRECT WASTE FLOOR SINK
- a. IT SHOULD BE COMBINATION OF FUNNEL DRAIN AND P TRAP WITH POLISHED CHROME PLATED CAST BRASS CONSTRUCTION WITH 4" TOP DIA., 4" DEEP WITH THREADED OUTLET.
- L. INSTALL PIPING TO CONSERVE BUILDING SPACE. DO NOT INTERFERE WITH USE OF BUILDING SPACE AND THE WORK OF OTHER TRADES. ALL PIPING RUN IN CEILING SHALL BE INSTALLED TIGHT TO THE STRUCTURE ABOVE.
- M. INSTALL PIPING TO ALLOW FOR EXPANSION AND CONTRACTION WITHOUT STRESSING PIPE, JOINTS OR CONNECTED EQUIPMENT. PROVIDE PIPE ANCHORS, GUIDES AND EXPANSION JOINTS OR LOOPS IN ALL HOT WATER AND HOT WATER CIRCULATING MAIN SUPPLY PIPING AND SEGMENTS OF SUCH PIPE THAT EXCEED 30'-0" IN LENGTH.
- N. IN ALL AREAS WITH FINISHED SURFACES, SYSTEM PIPING AND COMPONENTS SHALL BE CONCEALED ABOVE OR WITHIN FINISHED SURFACES.
- O. REDUCTIONS IN PIPE SIZES SHALL BE MADE WITH ONE-PIECE REDUCING FITTINGS. BUSHINGS ARE NOT ACCEPTABLE. USE FLANGED FITTINGS AT THE BASE OF RISERS.
- P. VENT PENETRATIONS THROUGH THE ROOF SHALL BE FLASHED.
- Q. IF WATER PRESSURE EXCEEDS 80 PSI, A WATER PRESSURE REDUCING VALVE SHALL BE INSTALLED IN WATER PIPING AT CONNECTION TO MAIN.
- R. PROVIDE DIELECTRIC FITTINGS BETWEEN DISSIMILAR METALS.
- S. PIPE BACKFLOW PREVENTER DRAINS TO FLOOR DRAIN OR OTHER APPROVED INDIRECT WASTE SOURCE.

- T. PROVIDE ACCESS DOORS/PANELS FOR SERVICE AND ACCESS TO ALL VALVES AND OTHER SYSTEM COMPONENTS ENCLOSED IN WALLS AND CEILINGS. ACCESS DOORS SHALL BE FURNISHED BY THIS CONTRACTOR, INSTALLED BY THE GENERAL CONTRACTOR.
- U. ALL FIXTURES REQUIRING VACUUM BREAKERS SHALL BE EQUIPPED WITH INTEGRAL VACUUM BREAKERS.
- V. ANY PENETRATIONS THROUGH FIRE RATED PARTITIONS, FLOORS, OR CEILINGS SHALL BE STEEL SLEEVED AND SEALED WITH 3M BRAND UL RATED FIRE BARRIER CAULK OR APPROVED EQUAL.
- W. WHEN THE WATER PIPING SYSTEM IS COMPLETE, THOROUGHLY FLUSH ALL DIRT, SEDIMENT, SOLDER, ETC., OUT OF THE SYSTEM, REMOVING ALL STRAINERS, VALVE STEM SEATS, ETC., REQUIRED TO ACCOMPLISH THE FLUSHING.
- X. AT ALL INDIRECT WASTE DRAINS, MAINTAIN AIR GAP AS REQUIRED BY CODE.
- Y. INSTALL SLEEVES FOR ALL PIPES WHICH PASS THROUGH WALLS, FLOORS AND CEILINGS. WHERE PIPES ARE TO BE INSULATED, THE SLEEVE SHALL BE LARGE ENOUGH TO ACCOMMODATE INSULATION. SLEEVES SHALL BE FLUSH WITH FINISHED SURFACES AT BOTH ENDS. ON FINISHED SURFACES IN EXPOSED AREAS PROVIDE ESCUTCHEONS COMPATIBLE WITH FINISH.
- Z. PROVIDE WATER HAMMER ARRESTERS ON SUPPLY PIPING TO ALL FLUSHOMETER VALVES AND QUICK-CLOSING VALVES.
- AA. UNLESS OTHERWISE INDICATED, TRAPS SEALS AT ALL FLOOR DRAINS SHALL BE MAINTAINED BY AN APPROVED TRAP PRIMING DEVICE.
- AB. MAINTAIN ALL REQUIRED AND RECOMMENDED CLEARANCES FOR ALL PLUMBING SYSTEM COMPONENTS AND EQUIPMENT.
- AC. MAINTAIN MINIMUM 10'-0" CLEARANCE BETWEEN ALL PLUMBING V.T.R.S AND ALL OUTDOOR AIR INTAKES. OFFSET VENT STACKS AND STACK VENTS IF AND AS REQUIRED BELOW ROOF TO MAINTAIN SUCH CLEARANCE WHETHER OR NOT SUCH OFFSET IS INDICATED ON THE DRAWINGS. PROVIDE ALL REQUIRED SEISMIC SUPPORTS.
2. INSTALLATION
- 2.01 GENERAL
- A. ALL WORK WHICH REQUIRES DISRUPTION OF THE ROOFING SHALL BE DONE BY A CONTRACTOR CERTIFIED BY THE ROOFING MANUFACTURER AS REQUIRED TO MAINTAIN ANY EXISTING ROOF WARRANTIES.
  - B. EXTERIOR INSTALLATIONS TO BE WEATHER PROOF IN ALL RESPECTS.
  - C. EXTERIOR MATERIALS AND EQUIPMENT SHALL BE PAINTED TO PREVENT CORROSION, COLOR PER ARCHITECT.
  - D. COORDINATE THE PLUMBING WORK WITH ALL OTHER AFFECTED WORK AND THE CONSTRUCTION SCHEDULE.
  - E. REAM PIPE AND TUBE ENDS. REMOVE BURRS. BEVEL PLAIN AND FERROUS END PIPE.
  - F. REMOVE SCALE AND FOREIGN MATERIAL, FROM INSIDE AND OUTSIDE, BEFORE ASSEMBLY.
  - G. PREPARE PIPING CONNECTIONS TO EQUIPMENT WITH FLANGES AND UNIONS.
  - H. COORDINATION WITH THE WORK OF OTHER TRADES IS REQUIRED. PROVIDE OFFSETS IN PIPING SYSTEMS OR MINOR DEVIATIONS TO THE INDICATED PIPE ROUTING IN ORDER TO COORDINATE THE PLUMBING WORK WITH THE WORK OF ALL OTHER TRADES AND THE GENERAL BUILDING CONDITIONS.
  - I. NO DOMESTIC WATER PIPING SHALL BE INSTALLED IN UNHEATED SPACES.
  - J. PRIOR TO DISCONNECTING AND CONNECTING NEW WORK TO EXISTING SYSTEMS, THE PLUMBING CONTRACTOR SHALL NOTIFY THE PROPERTY MANAGER AND OFFER A PROPOSED SCHEDULE OF WORK. ESB WILL AUTHORIZE CONNECTIONS AND COORDINATE NECESSARY SHUT DOWNS AND DRAIN DOWNS AS REQUIRED. SHUT DOWNS AND DRAIN DOWNS MAY BE PERFORMED BY THE PLUMBING CONTRACTOR ONLY AFTER RECEIVING ESB AUTHORIZATION, AND SHOULD BE PERFORMED UNDER SUPERVISION OF ESB PERSONNEL. THREE (3) DAYS ADVANCE NOTICE TO THE PROPERTY MANAGER IS REQUIRED.
  - K. THE PLUMBING CONTRACTOR IS ADVISED THAT DUE TO THE NATURE OF THE OPERATIONS AND TENANT REQUIREMENTS, CONNECTIONS TO EXISTING SYSTEMS MAY HAVE TO BE MADE AFTER REGULAR WORKING HOURS. THE PROPERTY MANAGER WILL ADVISE THE PLUMBING CONTRACTOR OF THE TIME CONSTRAINTS UPON RECEIPT AND APPROVAL OF THE PLUMBING CONTRACTOR'S REQUEST FOR SHUT DOWN AND CONNECTION TO EXISTING SYSTEMS.
  - L. WHEN CONNECTING TO EXISTING STACKS AND RISERS, PROVISION IS TO BE MADE FOR FUTURE CONNECTIONS BY PROVIDING CAPPED AND VALVED OUTLETS ON DOMESTIC WATER RISERS AND PLUGGED OUTLETS ON THE SANITARY AND VENT STACKS.
- 2.02 ABOVE GRADE
- A. INSTALL PLUMBING PIPING IN ACCORDANCE WITH RECOGNIZED INDUSTRY PRACTICES TO ENSURE THAT PIPING COMPLIES WITH REQUIREMENTS AND SERVES INTENDED PURPOSES.
  - B. ROUTE PIPING IN AN ORDERLY MANNER, PLUMB AND PARALLEL TO BUILDING STRUCTURE. MAINTAIN GRADIENT. SLOPE PIPING AND ARRANGE SYSTEMS TO DRAIN. IN DOMESTIC WATER SYSTEMS, PROVIDE DRAIN VALVES AT MAIN SHUT-OFF VALVES AND ALL LOW POINTS IN PIPING.
  - C. USE EXISTING CONNECTIONS AT MAINS WHERE AVAILABLE FOR NEW BRANCH PIPING. LOCATE ALL RISERS AND PIPING BEFORE CONSTRUCTION COMMENCES AND TAKE CARE NOT TO DAMAGE SAME. ANY DAMAGE OCCURRING TO THE EXISTING PIPING WILL BE THE SOLE RESPONSIBILITY OF THE CONTRACTOR.

## 2.03 INSULATION (PIPE AND FITTINGS)

### A. PIPING

COVER ALL HOT WATER PIPE WITH 1" THICK FOR PIPE SIZE UP TO 1½" AND ½" THICK FOR PIPE SIZE 1½" AND GREATER WITH MANVILLE MICRO-LOK AP-1 PLUS FIBERGLASS INSULATION. COVER ALL COLD WATER PIPE WITH ½" THICK FOR PIPE SIZE UP TO 1½" AND 1" THICK FOR PIPE SIZE 1½" AND GREATER WITH 1" MANVILLE MICRO-LOK AP-1 PLUS FIBERGLASS INSULATION. FITTINGS AND VALVES SHALL BE INSULATED. INSTALL ALL INSULATION AS PER MANUFACTURERS RECOMMENDATIONS. ALL INSULATION MATERIAL SHALL COMPLY WITH THE 2018 INTERNATIONAL BUILDING CODE REQUIREMENT OF A FLAME SPREAD RATING NOT TO EXCEED 25 AND A SMOKE DEVELOPED RATING NOT TO EXCEED 50. ALL PIPE INSULATION SHALL COMPLY WITH 2018 INTERNATIONAL ENERGY CONSERVATION CODE.

### 3. TESTING

- A. AT THE COMPLETION OF THE PLUMBING WORK, COMPLETELY TEST THE ENTIRE INSTALLATION OF ALL SYSTEMS FOR PROPER OPERATION AND COMPLIANCE WITH APPLICABLE CODES AND LOCAL REQUIREMENTS. CORRECT ALL DEFICIENCIES FOUND.
  - B. TESTING OF THE INSTALLED SYSTEMS SHALL BE MADE BY THE CONTRACTOR IN THE PRESENCE OF A REPRESENTATIVE OF THE OWNER.
  - C. THE CONTRACTOR SHALL NOT COVER UP OR PERMANENTLY CONCEAL PIPING, DEVICES OR ANY PORTION OF NEWLY CONSTRUCTED PLUMBING SYSTEM(S) UNTIL SUCH SYSTEM, OR PORTION OF THE SYSTEM, HAS BEEN TESTED IN THE PRESENCE OF A REPRESENTATIVE OF THE OWNER AND INSPECTED BY THE LOCAL INSPECTOR AND APPROVED IN WRITING, EXCEPT PIPING PASSING THROUGH FLOORS, WALLS, PARTITIONS, OR BEAMS, FOR DISTANCES EQUAL TO THE THICKNESS OF SUCH FLOOR, WALL, PARTITION OR BEAM.
  - D. THIS CONTRACTOR SHALL NOTIFY THE VARIOUS DEPARTMENTS, BUREAUS AND INDIVIDUALS AT LEAST TWO WEEKS IN ADVANCE OF THE TIME THAT THE TESTS ARE TO BE CONDUCTED.
  - E. ALL DEFECTIVE PARTS SHALL BE REPLACED OR CORRECTED BY THIS CONTRACTOR AND AN EXTRA TEST OR TESTS SHALL BE MADE UNTIL THE OPERATION IS SATISFACTORY. ALL ARRANGEMENTS AND EXPENSES NECESSARY TO CONDUCT ALL TESTS REQUIRED BY THESE SPECIFICATIONS AND THE VARIOUS AGENCIES HAVING JURISDICTION OVER THE WORK INSTALLED UNDER THIS CONTRACT SHALL BE MADE BY THIS CONTRACTOR. NO EXTRA COMPENSATION WILL BE ALLOWED FOR THESE TESTS, THE COST THEREOF BEING INCLUDED IN THE LUMP SUM BID FOR THIS CONTRACT.
  - F. WHERE ANY EVIDENCE OF STOPPAGE IS FOUND IN PIPING OR EQUIPMENT, THIS CONTRACTOR SHALL DISCONNECT, CLEAN, REPAIR AND RECONNECT ALL OBSTRUCTED PIPING OR EQUIPMENT AND SHALL ALSO PAY FOR ALL NECESSARY CUTTING AND REPAIRS TO ADJOINING WORK.
  - G. ALL PIPING AND EQUIPMENT SHALL BE THOROUGHLY CLEANED INSIDE AND OUT, OF DIRT, CUTTINGS, OILS AND OTHER FOREIGN SUBSTANCES AND SHALL BE LEFT CLEAN.
  - H. ALL REQUIRED TESTS SHALL BE WITNESSED BY LOCAL AUTHORITIES AND THE OWNER'S REPRESENTATIVE.
  - I. ALL EQUIPMENT WILL BE FACTORY TESTED.
  - J. CONTRACTOR SHALL IDENTIFY TO THE OWNER'S REPRESENTATIVE ANY LEAKS OR DAMAGE THAT OCCURS AS A RESULT OF SYSTEM TESTING. CONTRACTOR SHALL TAKE NECESSARY PRECAUTIONS TO LIMIT ANY POTENTIAL DAMAGE. CORRECTIVE ACTION REQUIRED AS A RESULT OF TESTING SHALL BE PERFORMED IMMEDIATELY AND AT THE CONTRACTOR'S EXPENSE.
  - K. REPORT IN WRITING TO AUTHORITIES HAVING JURISDICTION, THE ARCHITECT AND THE OWNER THE RESULTS OF ALL TESTING.
  - L. TESTING REQUIREMENTS
    - a. TEST ALL DOMESTIC WATER PIPING HYDROSTATICALLY TO 125 PSIG.
    - b. HYDROSTATIC TEST PRESSURES SHALL REMAIN CONSTANT WITH NO VARIATION FOR 120 MINUTES.
    - c. TESTS SHALL BE WITNESSED BY THE BUILDING ENGINEER.
    - d. THE PLUMBING CONTRACTOR WILL BE HELD RESPONSIBLE FOR ALL DAMAGE DUE TO TEST FAILURES AND LEAKAGE IN THE TEST AREA AND ADJACENT TENANT OR ESB SPACES.
  - M. REFILL ENTIRE POTABLE HOT AND COLD WATER SUPPLY SYSTEM WITH CHLORINE SOLUTION (HTH OLN CHEMICAL CORP.) AT A STRENGTH TO MEET STANDARDS OF THE DEPARTMENT OF HEALTH, AND FOR A PERIOD OF RETENTION AS STIPULATED.
  - N. THOROUGHLY FLUSH PIPING SYSTEM WITH FRESH WATER IMMEDIATELY PRIOR TO FINAL ACCEPTANCE.
  - O. INSPECTION & TESTING SHALL BE AS PER 2018 INTERNATIONAL PLUMBING CODE SECTION 312.
4. WARRANTY
- A. EQUIPMENT, MATERIALS AND WORKMANSHIP FURNISHED UNDER THIS CONTRACT SHALL BE GUARANTEED BY THE CONTRACTOR FOR A PERIOD OF ONE YEAR FROM THE DATE OF FINAL ACCEPTANCE OF THE WORK BY THE OWNER. THE CONTRACTOR SHALL KEEP THE WORK IN GOOD REPAIR FOR ONE YEAR AFTER THE DATE OF FINAL APPROVAL. THE CONTRACTOR SHALL, AT HIS OWN EXPENSE, PROMPTLY CORRECT AND REPAIR ANY AND ALL BREAKS, FAILURES OR WEAR DUE TO FAULTY MATERIALS, WORKMANSHIP OR EQUIPMENT. ALL SETTLEMENTS OF SURFACES THAT MAY OCCUR WITHIN THAT PERIOD SHALL ALSO BE PROMPTLY REPAIRED.

## FIXTURE FLOW RATES

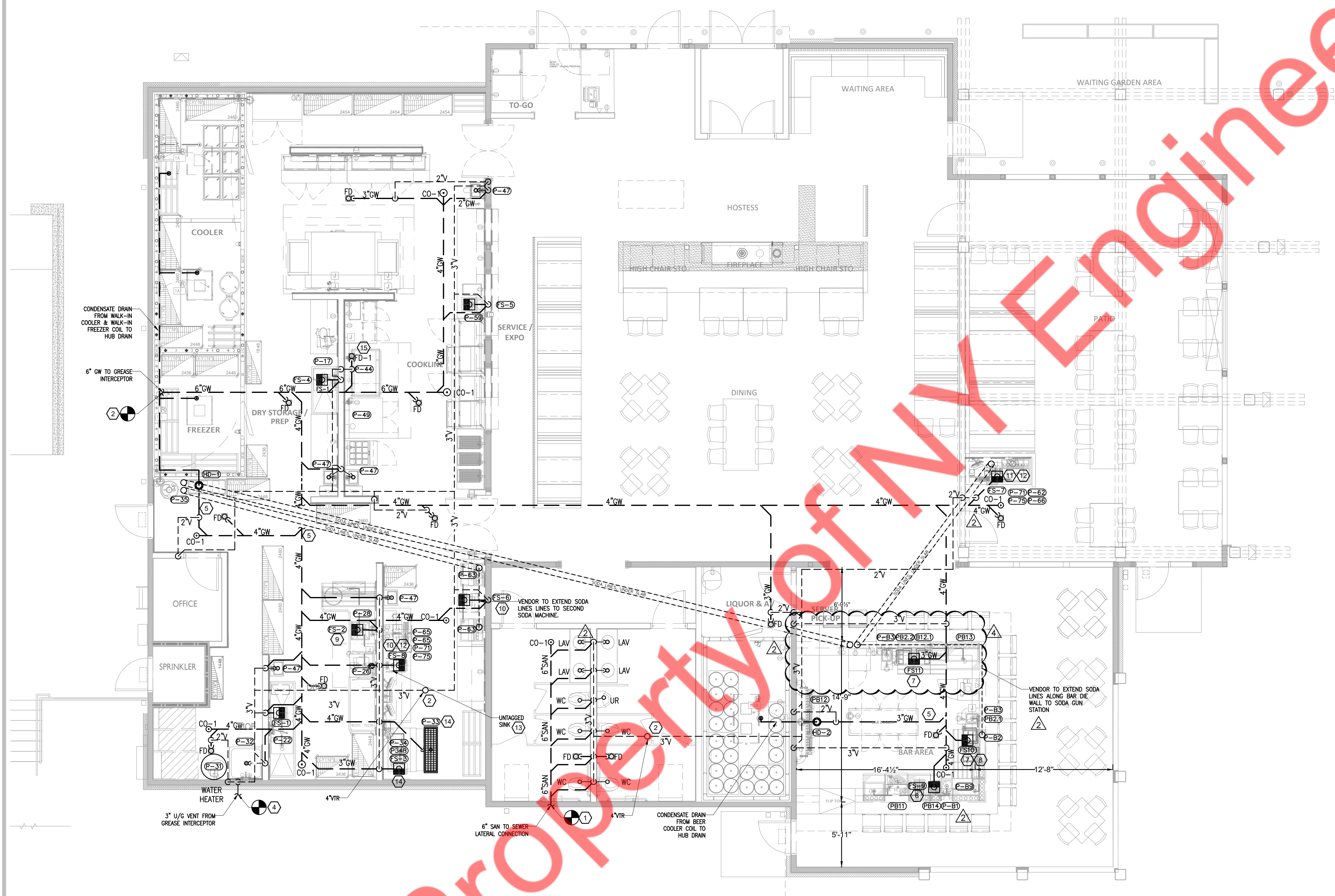
MAXIMUM FLOW RATES & CONSUMPTION FOR PLUMBING FIXTURES AND FIXTURE FITTINGS - PER TABLE 604.4 OF GEORGIA STATE MINIMUM STANDARD PLUMBING CODE 2018 (WITH 2020 AMENDMENTS)	
FIXTURE	MAX. FLOW RATE
LAVATORY, PRIVATE	1.5 GPM AT 60 PSI
LAVATORY, PUBLIC (METERING)	0.25 GPM PER METERING CYCLE
LAVATORY, PUBLIC (OTHER THAN METERING)	0.5 GPM AT 60 PSI
SHOWER HEAD	2.5 GPM AT 60 PSI
SINK FAUCET	2.0 GPM AT 60 PSI
URINAL	0.5 GALLON PER FLUSHING CYCLE
WATER CLOSET	1.28 GALLON PER FLUSHING CYCLE

### NOTES:

1. A HAND HELD SHOWER SPRAY IS A SHOWER HEAD.
2. CONSUMPTION TOLERANCES SHALL BE DETERMINED FROM REFERENCED STANDARDS.
3. FOR FLUSHOMETER VALVES AND FLUSHOMETER TANKS, AVERAGE FLUSH VOLUME SHALL NOT EXCEED 1.28 GALLONS.
4. FOR SINGLE FLUSH WATER CLOSETS, INCLUDING GRAVITY, PRESSURE ASSISTED AND ELECTRO-HYDRAULIC TANK TYPES, THE AVERAGE FLUSH VOLUME SHALL NOT EXCEED 1.28 GALLONS.
5. FOR DUAL FLUSH WATER CLOSETS, AVERAGE FLUSH VOLUME OF TWO REDUCED FLUSHES & ONE FULL FLUSH SHALL NOT EXCEED 1.28 GALLONS.







**DRAINAGE KEYED NOTES:**

1. CONNECT NEW 6" SANITARY PIPE TO EXTERNAL 6" SANITARY NETWORK. REFER TO CORE & SHELL PLUMBING SHEET P-102 FOR EXACT LOCATION. CONTRACTOR TO FIELD VERIFY EXACT INVERT LEVEL ON SITE.
2. CONNECT NEW 6" GREASE WASTE LINE TO EXTERNAL GREASE WASTE LINE. REFER TO CORE & SHELL PLUMBING SHEET P-102 FOR EXACT LOCATION. CONTRACTOR TO FIELD VERIFY EXACT INVERT LEVEL ON SITE. CONTRACTOR TO ALSO VERIFY CAPACITY OF GREASE INTERCEPTOR. REFER CORE & SHELL PLUMBING SHEET P-101 FOR ITS SCHEDULE. INFORM OWNER IF GREASE INTERCEPTOR IS NOT SATISFACTORY.
3. CONNECT NEW 3" VENT PIPE TO NEW 4" VTR. ENSURE MINIMUM 10'-0" HORIZONTAL CLEARANCE FROM MECHANICAL INTAKES.
4. CONNECT 3" U/G VENT PIPE FROM GREASE INTERCEPTOR TO NEW VENT PIPE INSIDE BUILDING. REFER CORE & SHELL PLUMBING SHEET P-102 FOR EXACT LOCATION.
5. PLACE SANITARY & GREASE PIPE AT INVERT LEVEL TO AVOID CLASH WITH SODA LINES. LAY DRAINAGE PIPES BELOW THE SODA LINES TO AVOID INFILTRATION.
6. ROUTE INDIRECT WASTE FROM GLASS WASHER (TAG #P-11), UNDERBAR HAND SINK (TAG #P-B1), UNDERBAR DUMP SINK (TAG #P-B14) & UNDERBAR DRAIN BOARD (P-B9) TO FLOOR SINK WITH APPROVED AIR GAP.
7. ROUTE INDIRECT WASTE FROM UNDERBAR ICE BIN (TAG #P-B2), UNDERBAR SODA GUN (TAG #P-B2.2), UNDERBAR BLENDER STATION (TAG #P-B5) TO FLOOR SINK WITH APPROVED AIR GAP.
8. ROUTE INDIRECT WASTE FROM #2 UNDERBAR FILLER (P-B9) TO FLOOR SINK WITH APPROVED AIR GAP.
9. ROUTE INDIRECT WASTE FROM DISHWASHER (TAG #P-26) & DISHTABLE (TAG #P-29) TO FLOOR SINK WITH APPROVED AIR GAP.
10. ROUTE INDIRECT WASTE FROM #2 SODA DISPENSER (TAG #P-63) TO FLOOR SINK WITH APPROVED AIR GAP.
11. ROUTE INDIRECT WASTE FROM COKE DISPENSER (TAG #P-66) TO FLOOR SINK WITH APPROVED AIR GAP.
12. ROUTE INDIRECT WASTE FROM DRIP TRAY (TAG #P-71) & BEVERAGE COUNTER (TAG #P-75) TO FLOOR SINK WITH APPROVED AIR GAP.
13. ROUTE INDIRECT WASTE FROM UNTAGGED SINK TO FLOOR SINK WITH APPROVED AIR GAP.
14. ROUTE INDIRECT WASTE FROM ICE MAKER (TAG #P-34) & ICE BIN (TAG #P-34A) TO FLOOR SINK WITH APPROVED AIR GAP. CONTRACTOR TO VERIFY REQUIREMENT OF FLOOR TROUGH (TAG #P-33) WITH KITCHEN CONTRACTOR. IF NEEDED, REMOVE FLOOR SINK AND ROUTE INDIRECT WASTE TO FLOOR TROUGH.
15. ROUTE INDIRECT WASTE FROM GAS GRIDDLE (TAG #P-44) & GAS OVEN (TAG #P-49) TO FLOOR DRAIN WITH APPROVED AIR GAP. PLACE FLOOR DRAIN UNDER KITCHEN HOOD.

**SANITARY GENERAL NOTES:**

1. REFER RISER DIAGRAMS FOR ALL PIPE SIZES.
2. PROVIDE ELECTRONIC TRAP PRIMER TO ALL FLOOR DRAINS INSTALLED IN MECHANICAL ROOMS & FLOW CONTROLLED TRAP PRIMER ALL OTHER FLOOR DRAINS.
3. CONTRACTOR TO COORDINATE ALL PIPING, EQUIPMENT AND RELATED ACCESSORIES WITH OTHER TRADES FOR FEASIBILITY OF INSTALLATION AND MAINTAIN REQUIRED SERVICE CLEARANCES. ALL EQUIPMENT TO BE INSTALLED AS PER MANUFACTURER'S RECOMMENDATION.

NOTE: BATHROOM DRAINS MUST NOT GO THROUGH GREASE INTERCEPTOR. KITCHEN DRAINS ARE ONLY ALLOWED TO DRAIN THROUGH THE GREASE TRAP. PLUMBING CONTRACTOR TO VERIFY THIS IN THE DESIGN BEFORE COMMENCING CONSTRUCTION. DOUBLE CHECK THE LOCATIONS WHERE SANITARY & GREASE LINES OVERLAP.

1 PLUMBING DRAINAGE FLOOR PLAN  
SCALE: 3/16" = 1'-0"



**WATER SUPPLY KEYED NOTES:**

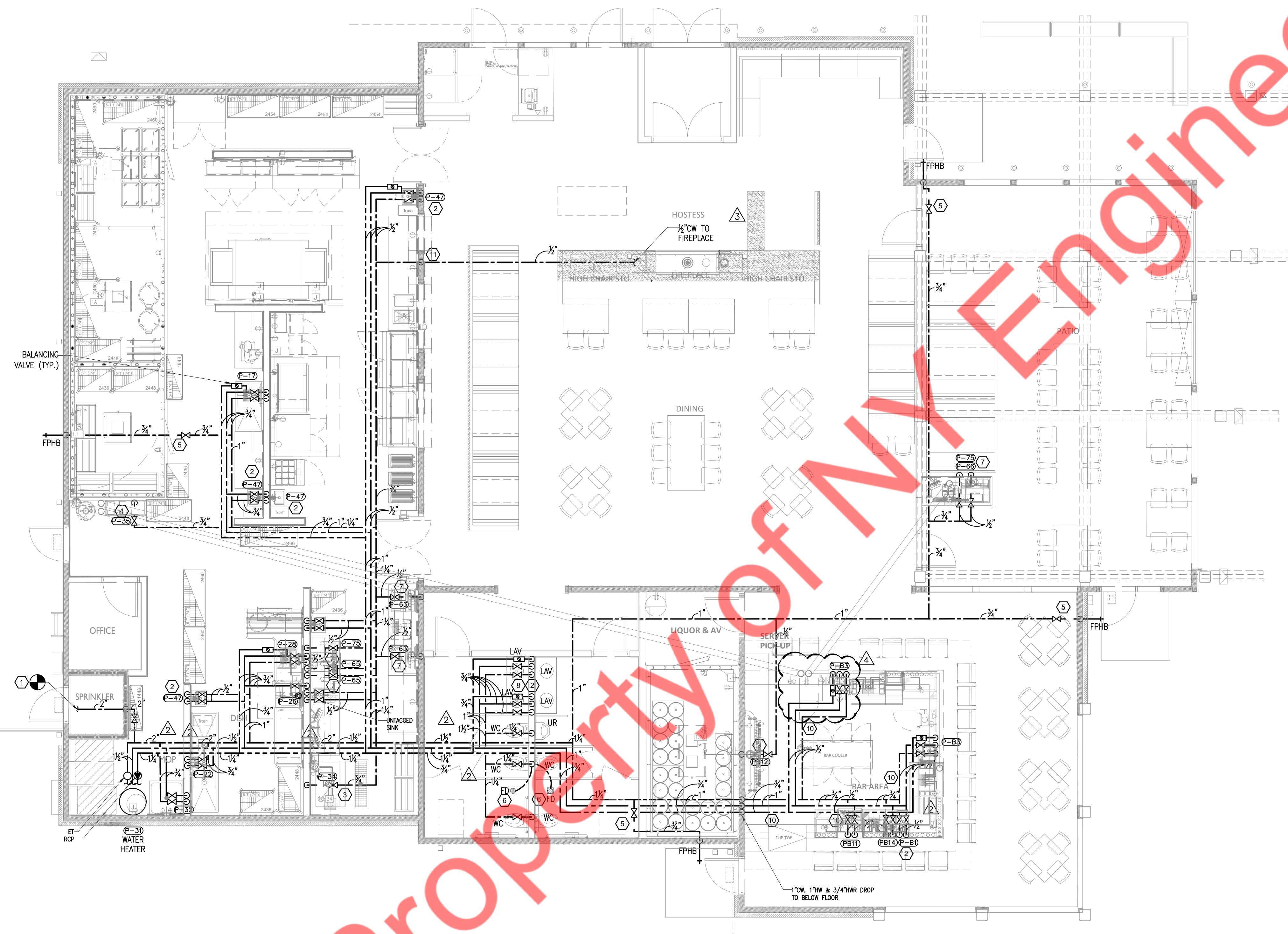
1. CONNECT NEW 2" CW PIPE TO CW TENANT CONNECTION FROM LANDLORD. REFER CORE & SHELL PLUMBING SHEET P-102 FOR EXACT LOCATION.
2. PROVIDE HAND SINKS (TAG #P-47) & LAVATORIES (LAV) WITH THERMOSTATIC MIXING VALVE (TMV). SET TEMPERATURE TO 110 DEG F.
3. PROVIDE 3/4" CW LINE TO ICE MACHINE (TAG #P-34). PROVIDE BACKFLOW PREVENTER BFP-1. REFER BACKFLOW PREVENTER SCHEDULE FOR DETAILS.
4. PROVIDE 3/4" CW LINE TO BAG & BOX (TAG #P-35). PROVIDE BACKFLOW PREVENTER BFP-2. REFER BACKFLOW PREVENTER SCHEDULE FOR DETAILS.
5. PROVIDE BACKFLOW PREVENTER BFP-3 TO FREEZE PROOF HOSE BIB (FPHB). REFER BACKFLOW PREVENTER SCHEDULE FOR DETAILS.
6. PROVIDE 1/2" CW LINE FROM TRAP PRIMER TO FLOOR DRAIN.
7. PROVIDE 1/2" CW LINE TO SODA DISPENSER (TAG #P-63 & #P-66), ICED TEA BREWER (TAG #P-65) & BEVERAGE COUNTER (TAG #P-75). PROVIDE BACKFLOW PREVENTER BFP-2. REFER BACKFLOW PREVENTER SCHEDULE FOR DETAILS.
8. DROP DOWN 3/4" CW, HW & HWR PIPE AND PROVIDE 1/2" CW & HW CONNECTION TO TWO LAVATORIES (LAV). PROVIDE BALANCING VALVE 2' AWAY FROM THE LAST CONNECTION.
9. PROVIDE 1/2" CW LINE TO DRIP PAN WITH GLASS RINSER (TAG #PB12). PROVIDE BACKFLOW PREVENTER BFP-2. REFER BACKFLOW PREVENTER SCHEDULE FOR DETAILS.
10. CW, HW & HWR WATER PIPING RUNNING UNDER FLOOR. PIPING WILL RISE UP TO CONNECT TO RESPECTIVE FIXTURE.
11. ROUTE 1/2" CW LINE DOWN IN WALL, THEN U/G IN SLAB HORIZONTALLY & RISE UP TO FIREPLACE SIDE WALL. PROVIDE SHUTOFF VALVE AND BACKFLOW PREVENTER.

**SPRINKLER NOTE:**

SPRINKLER MODIFICATIONS TO BE MADE UNDER SEPARATE PERMIT AND COVER.

**WATER SUPPLY GENERAL NOTES:**

1. CW/HW PIPING TO BE PROVIDED WITH INSULATION AS PER INTERNATIONAL ENERGY CONSERVATION CODE 2018 (REFER SHEET P0.1)
2. PROVIDE BRANCH PRV IF PRESSURE EXCEEDS 85 PSI.
3. REFER RISER DIAGRAMS FOR ALL PIPE SIZES.
4. PROVIDE ACCESS PANELS FOR WATER HAMMER ARRESTOR, CLEANOUTS & SHUT-OFF VALVES AS REQUIRED.
5. CONTRACTOR TO COORDINATE ALL PIPING, EQUIPMENT AND RELATED ACCESSORIES WITH OTHER TRADES FOR FEASIBILITY OF INSTALLATION AND MAINTAIN REQUIRED SERVICE CLEARANCES. ALL EQUIPMENT TO BE INSTALLED AS PER MANUFACTURER'S RECOMMENDATION.



1 PLUMBING WATER SUPPLY FLOOR PLAN  
SCALE: 3/16" = 1'-0"

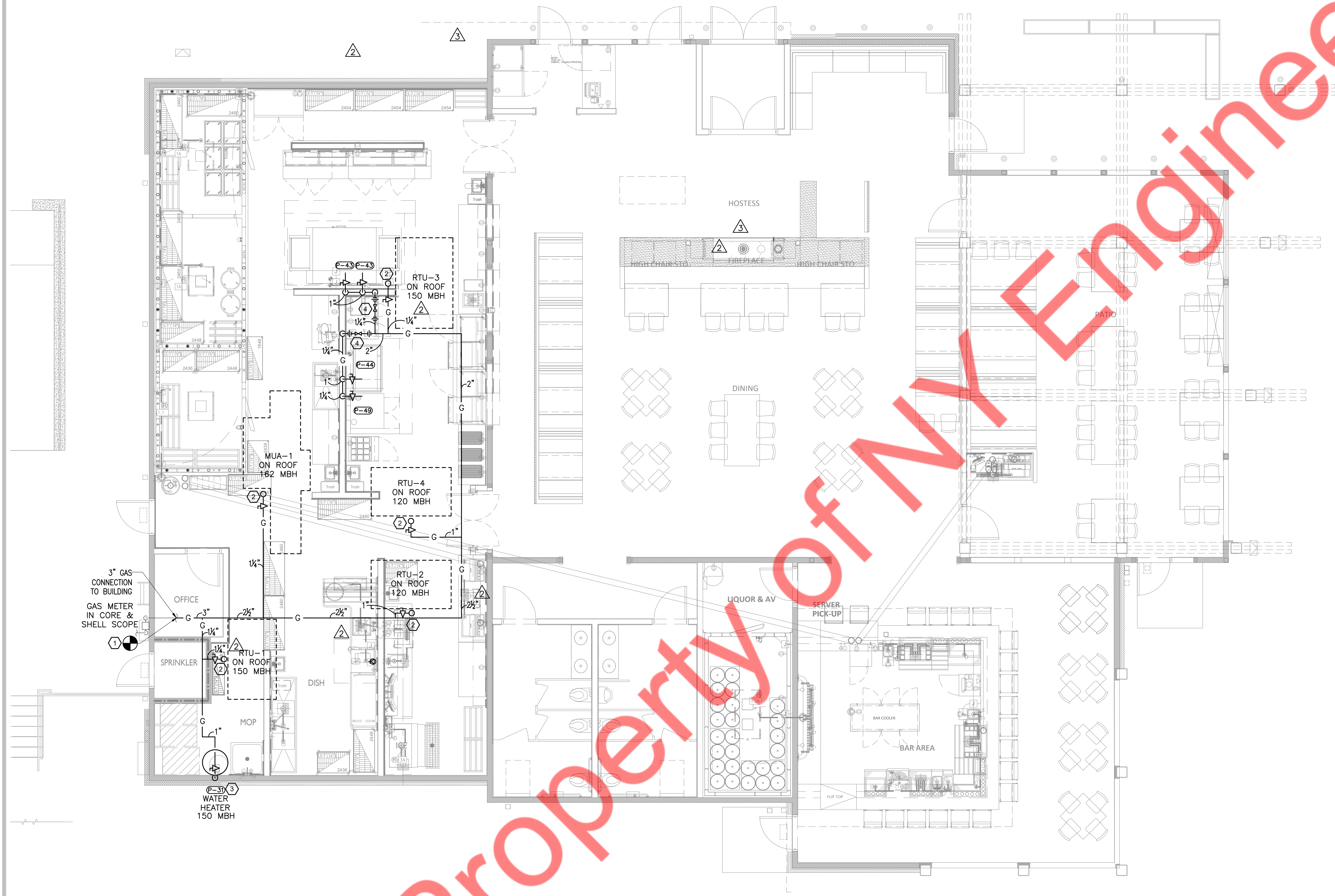


**GAS KEYED NOTES:**

- ① EXTEND AND CONNECT NEW 3" GAS PIPING TO GAS MAIN LINE WITH GAS METER PROVIDED BY LANDLORD AS SHOWN. REFER TO CORE & SHELL PLUMBING SHEET P-102 FOR EXACT LOCATION.
- ② ROUTE NATURAL GAS UP THROUGH ROOF TO ROOFTOP EQUIPMENT AS SHOWN PER PLAN. COORDINATE EXACT LOCATION WITH MECHANICAL CONTRACTOR PRIOR TO INSTALLATION.
- ③ ROUTE NATURAL GAS DOWN TO WATER HEATER AS SHOWN PER PLAN. VERIFY EXACT LOCATION AT SITE PRIOR TO INSTALLATION.
- ④ MASTER GAS SOLENOID VALVE SIZED FOR 250 CFH. DROP 1-1/4" GAS DOWN TO MANIFOLD. RUN NEAR FLOOR TIGHT TO WALL AND EXTEND TO EQUIPMENT (WITH QUICK DISCONNECT HOSE ASSEMBLY).

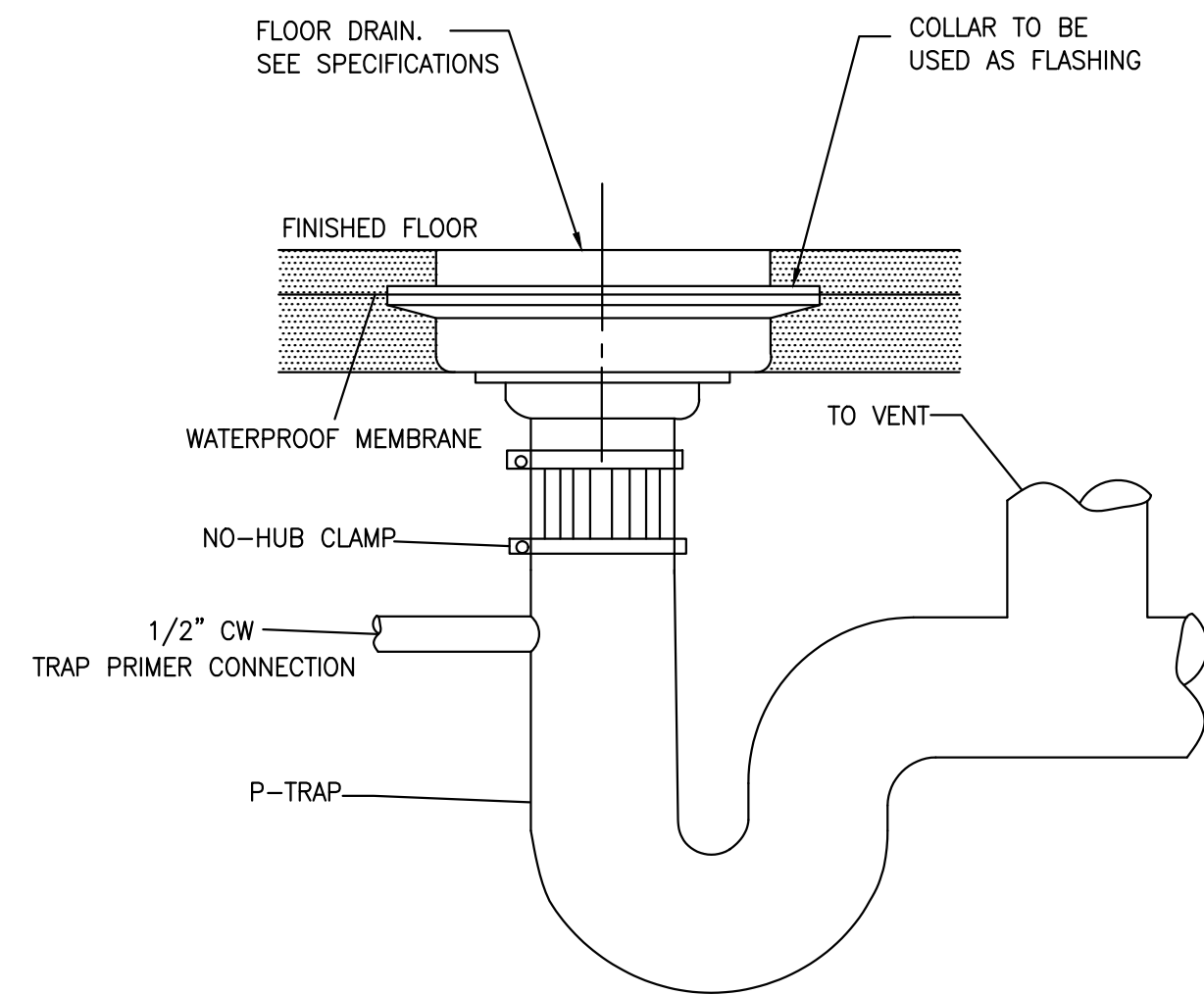
**GAS GENERAL NOTES:**

THE PLUMBING CONTRACTOR TO COORDINATE WITH FSEC AND INSTALL AUTOMATIC GAS SHUT-OFF VALVE (FURNISHED BY FOOD SERVICE EQUIPMENT CONTRACTOR) IN A 12" REMOVABLE SECTION OF PIPE OF THE MAIN FOOD SERVICE EQUIPMENT GAS SUPPLY LINE AS CLOSE AS POSSIBLE TO THE COOKING EQUIPMENT. THE AUTOMATIC GAS SHUT-OFF VALVE IS TO BE IN AN ACCESSIBLE AREA ABOVE CEILING. GENERAL CONTRACTOR IS TO PROVIDE ACCESS PANELS AS REQUIRED FOR THE AUTOMATIC GAS SHUT-OFF VALVE (NOT APPROVED IF CEILING AREAS IS BEING USED AS A RETURN AIR PLENUM) TO MEET ALL CODES AND REQUIREMENTS.

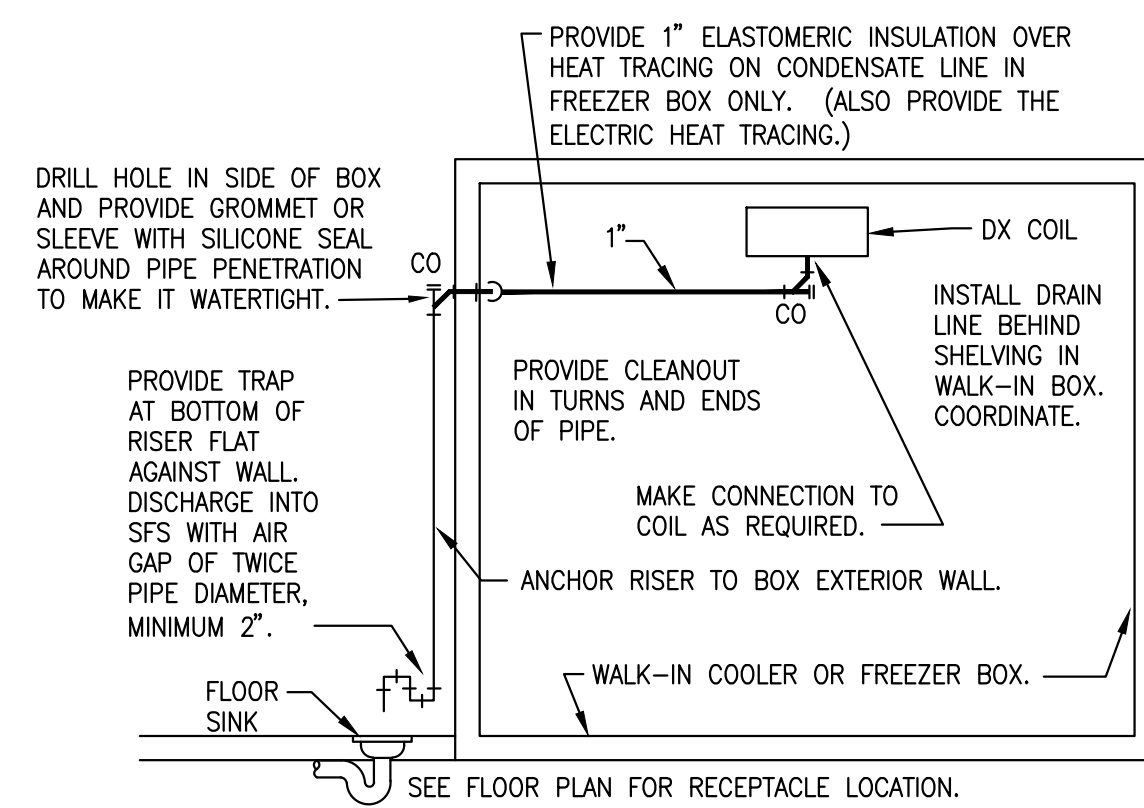


① PLUMBING GAS FLOOR PLAN  
SCALE: 3/16" = 1'-0"



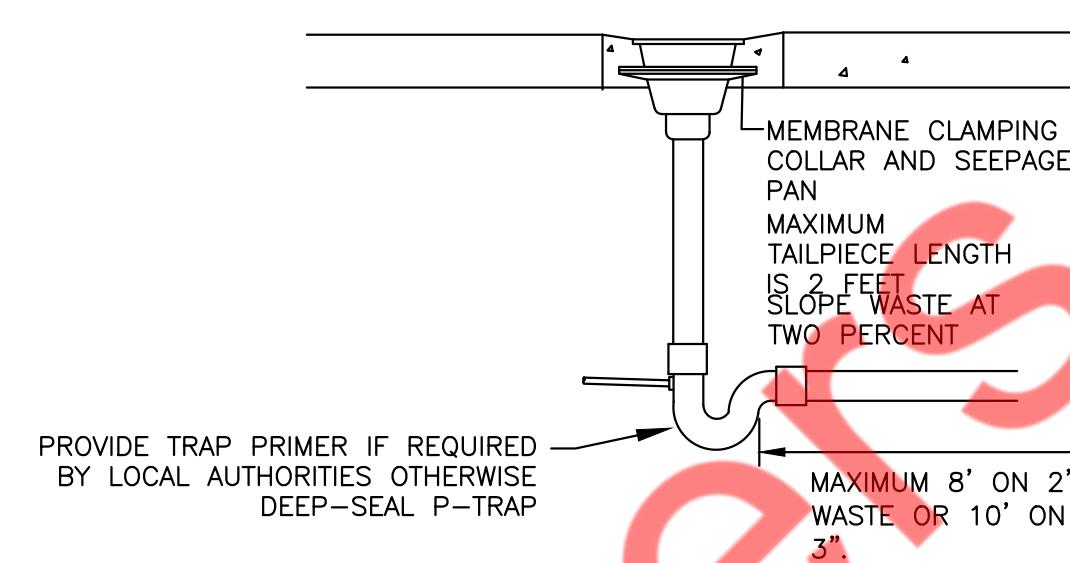


1 FLOOR DRAIN DETAIL  
P-501 N.T.S



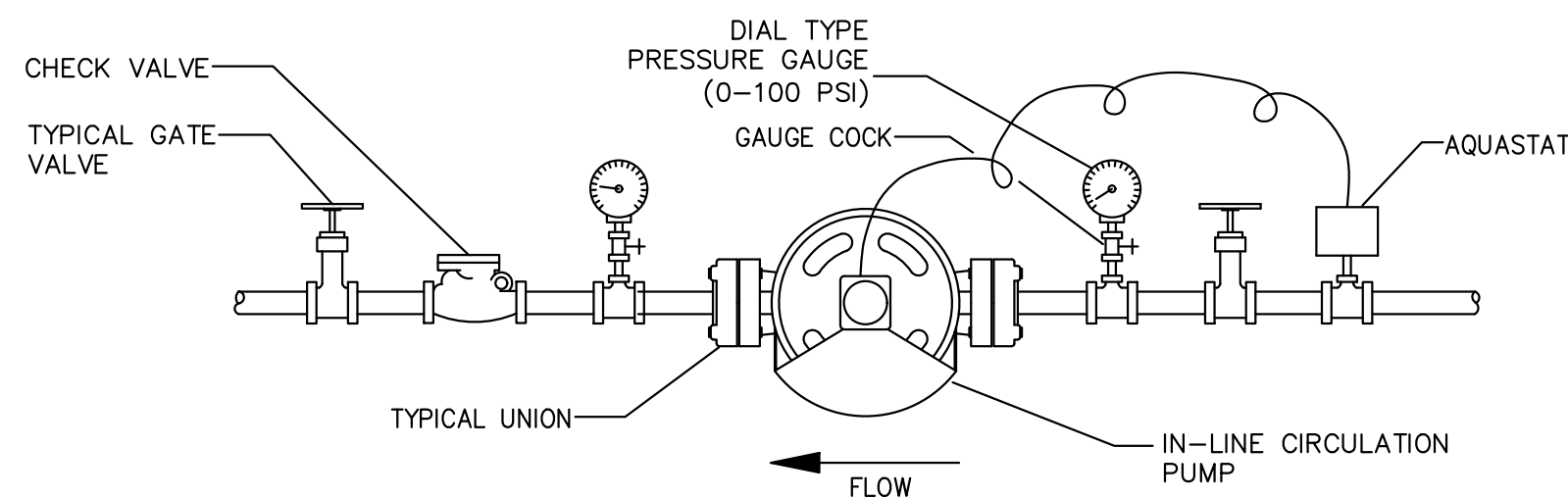
INSTALL PIPE HIGH AS POSSIBLE, ANCHORED TO WALL OF BOX WITH SUPPORTS AT MAXIMUM SIX FOOT CENTERS. USE TYPE "M" HARD COPPER TUBE AND FITTINGS WITH LEAD-FREE SOLDER JOINTS. SLOPE HORIZONTAL PIPE AT MINIMUM TWO PERCENT. PROVIDE CHROMATONE PAINT ON PIPE EXTERIOR TO BOX. REFER TO "INDIRECT DRAIN" DETAIL FOR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

2 CONDENSATER DRAIN(WALK-IN BOX)  
P-501 N.T.S

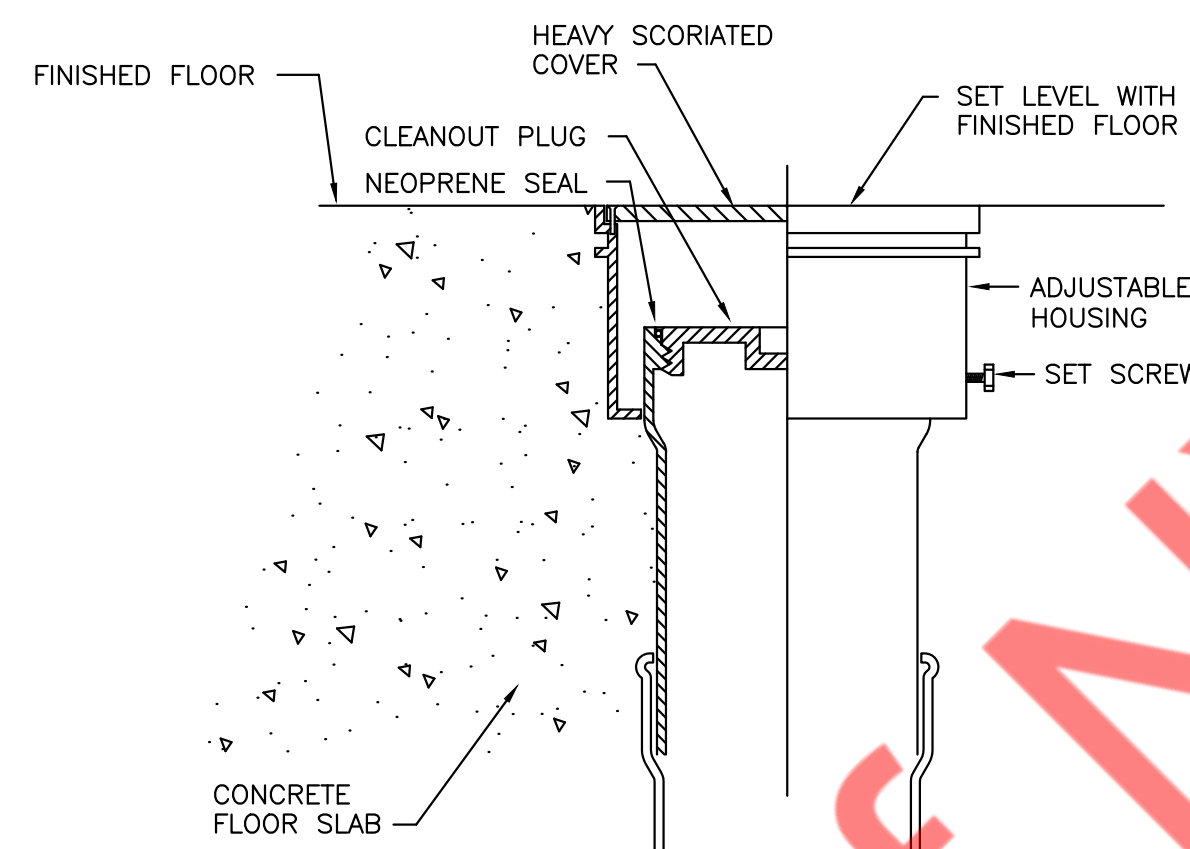


COMMENTS:  
1. LOCATE FLOOR DRAIN/SINK WHERE SHOWN ON DIMENSIONED FLOOR PLAN. IF SITUATION IS FLOOR SLAB ON GRADE, SET DRAIN BODY IN PLACE, PROVIDE BACKFILL, AND POUR AROUND IT. RECESS TOP OF FLOOR DRAINS 1/2" BELOW FLOOR DATUM AND SLOPE FLOOR TO IT. DO NOT RECESS FLOOR SINKS.  
2. OTHER VENTING METHODS MAY BE USED, IF APPROVED BY LOCAL CODE AND/OR LOCAL AUTHORITIES.

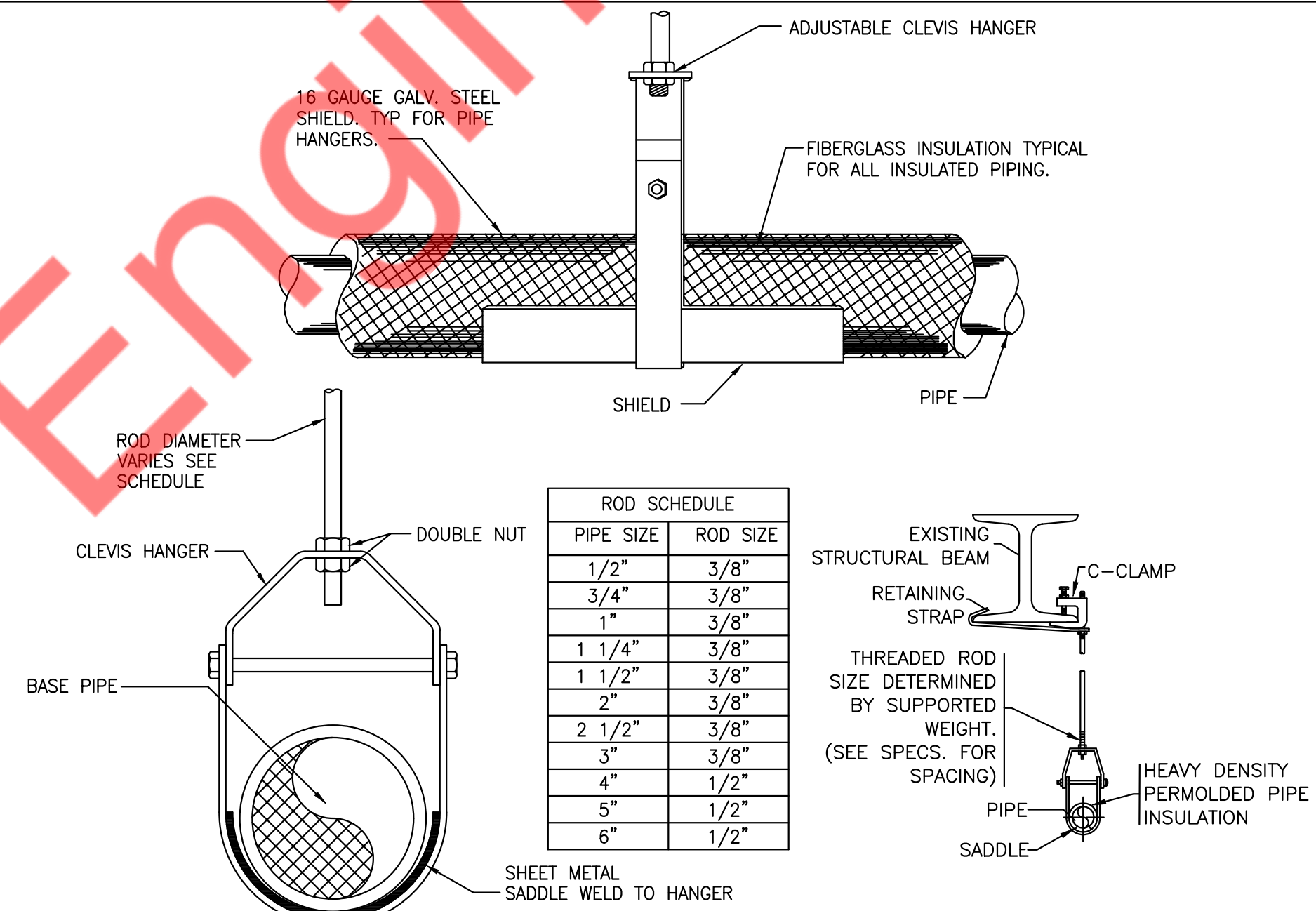
3 FLOOR SINK DETAILS  
P-501 N.T.S



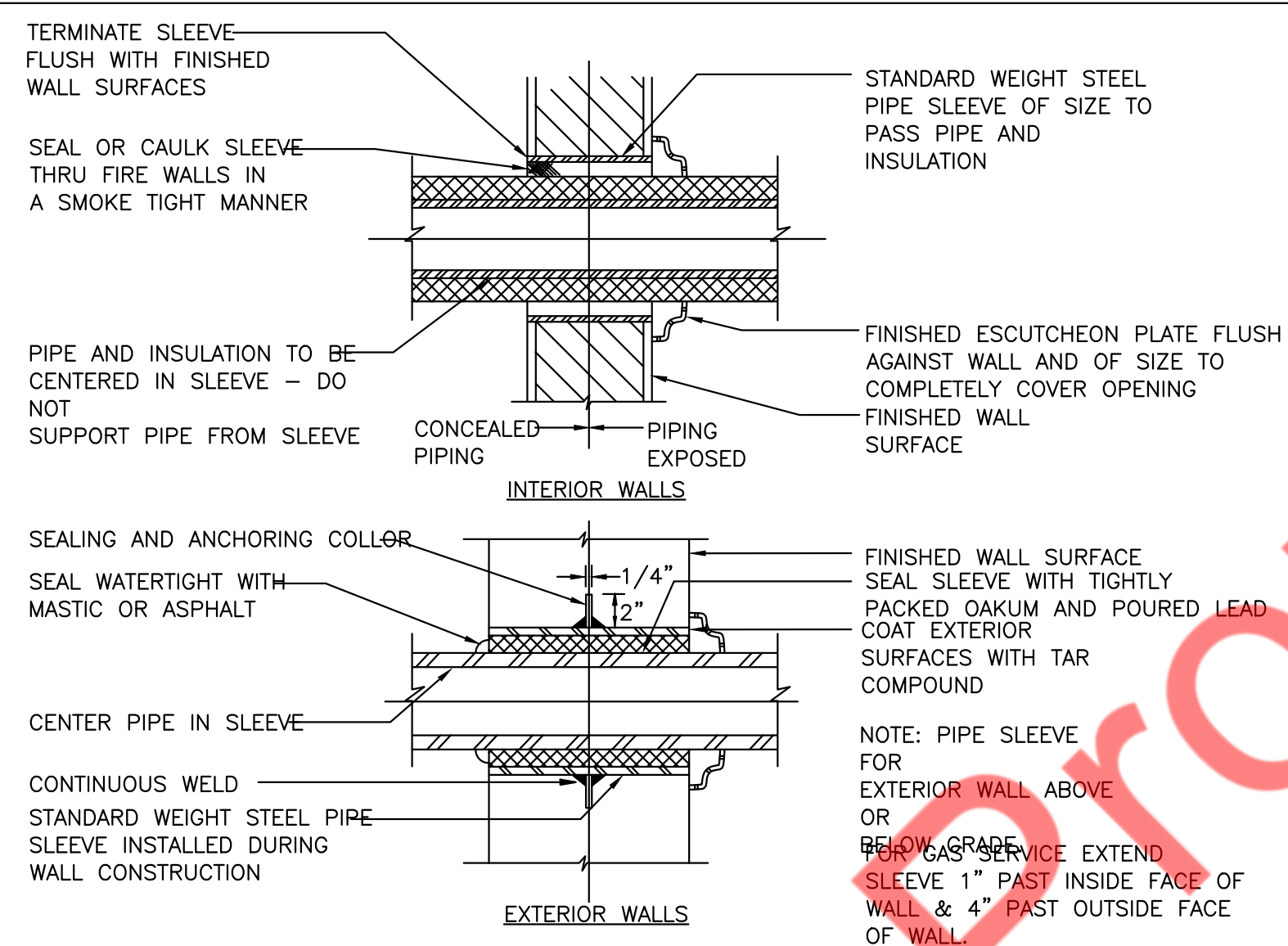
4 INLINE RECIRCULATING PUMP DETAIL  
P-501 N.T.S



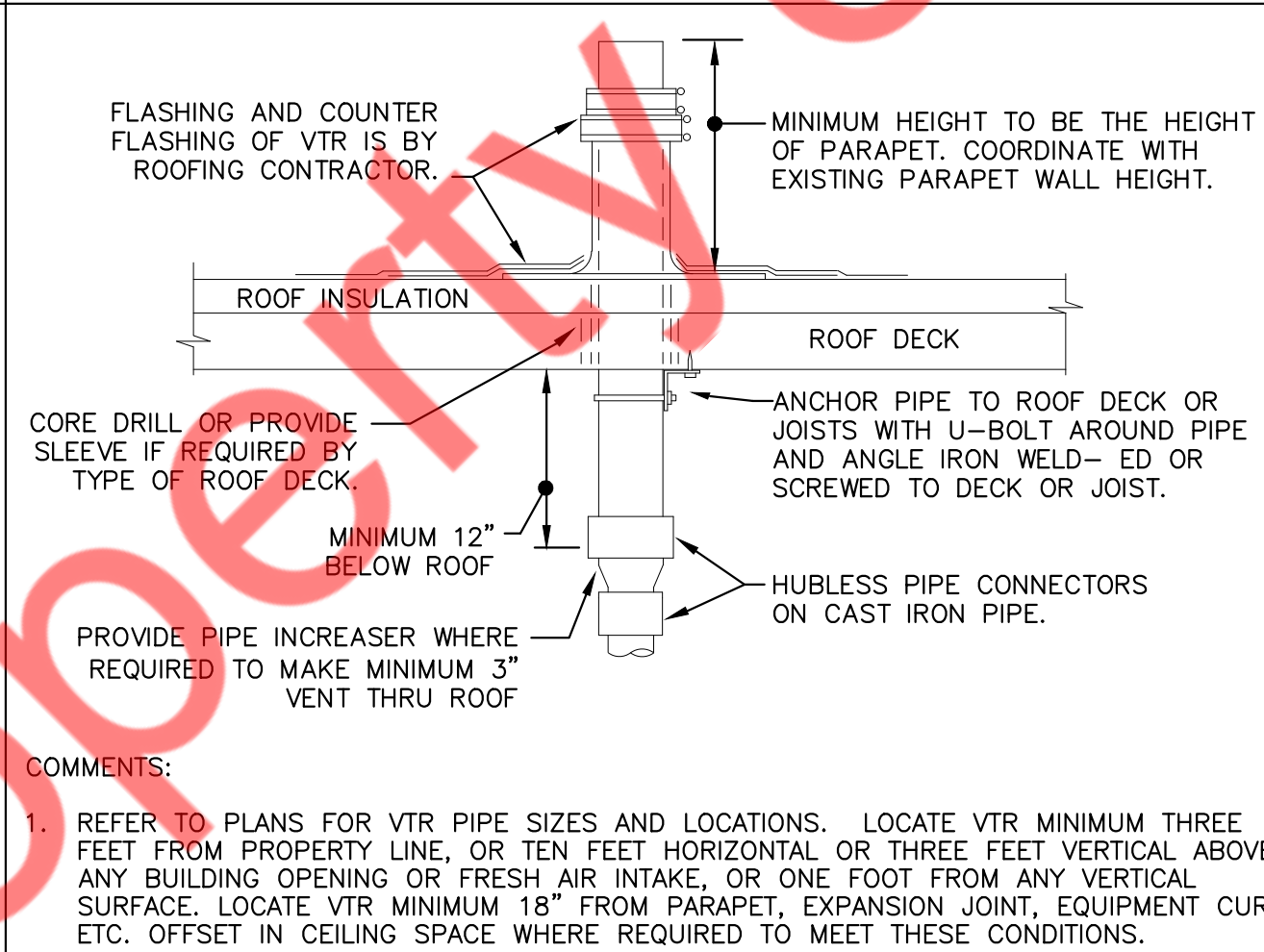
5 FLOOR CLEANOUT DETAIL  
P-501 N.T.S



6 HANGER DETAIL  
P-501 N.T.S

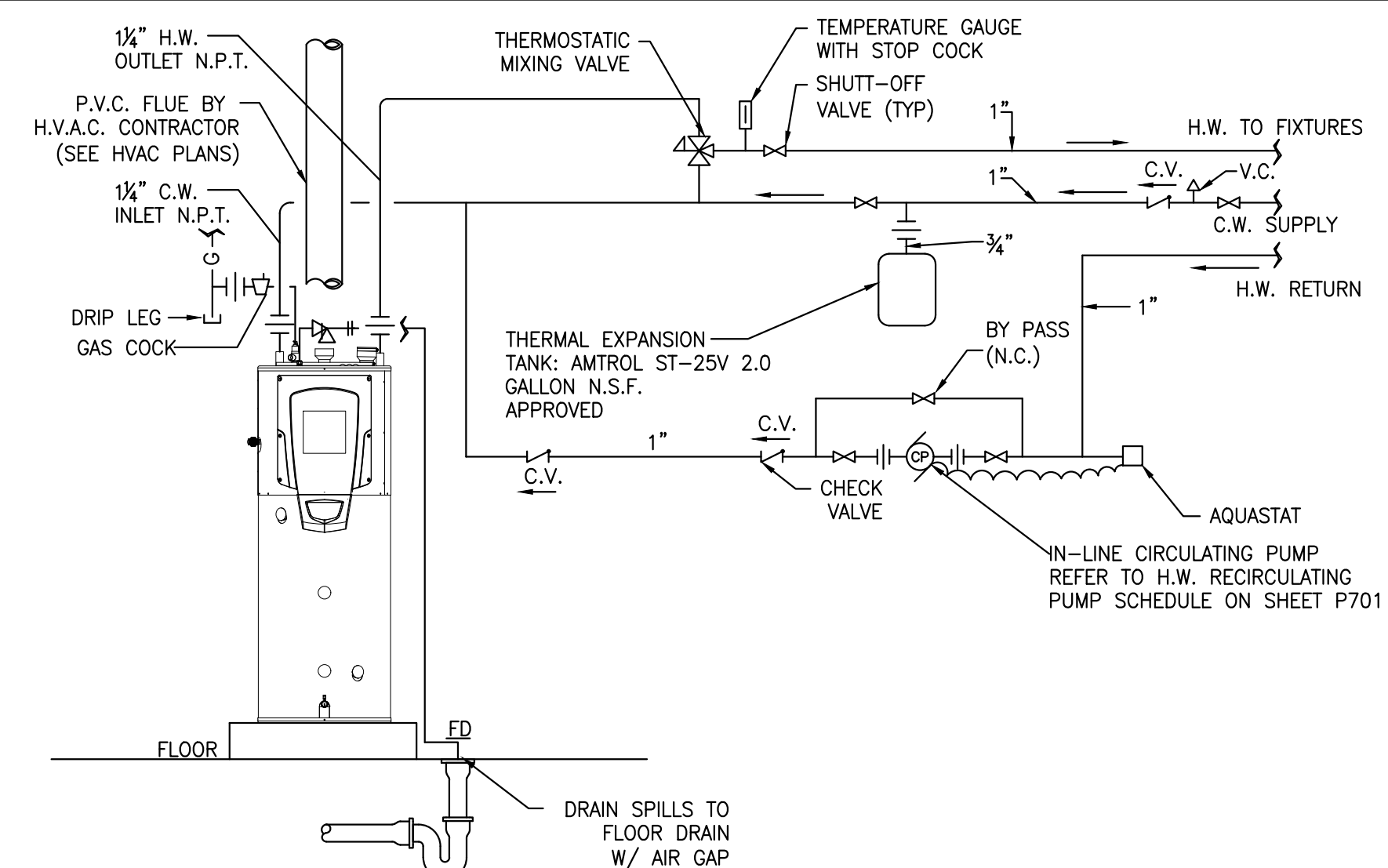


7 PIPE SLEEVE THRU WALL SECTION  
P-501 N.T.S



COMMENTS:  
1. REFER TO PLANS FOR VTR PIPE SIZES AND LOCATIONS. LOCATE VTR MINIMUM THREE FEET FROM PROPERTY LINE, OR TEN FEET HORIZONTAL OR THREE FEET VERTICAL ABOVE ANY BUILDING OPENING OR FRESH AIR INTAKE, OR ONE FOOT FROM ANY VERTICAL SURFACE. LOCATE VTR MINIMUM 18" FROM PARAPET, EXPANSION JOINT, EQUIPMENT CURB, ETC. OFFSET IN CEILING SPACE WHERE REQUIRED TO MEET THESE CONDITIONS.

8 VENT THRU ROOF  
P-501 N.T.S



9 GAS FIRED HOT WATER HEATER (FLOOR MOUNTED) DETAIL  
P-501 N.T.S



FOODSERVICE PLUMBING SCHEDULE														
ITEM NO.	DESCRIPTION	CW SIZE	CW AFF	HW SIZE	HW AFF	CONNECTION SIZE ON UNIT	DW SIZE	DW AFF	IW SIZE	IW ID NO.	GAS SIZE	GAS MBT U	GAS HGT AFF	PLUMBING REMARKS
P-1A	WALK-IN COOLER COIL								3/4"	HD-1				RUN DRAIN LINE TO HUB DRAIN
P-1.1A	WALK-IN FREEZER COIL								3/4"	HD-1				RUN DRAIN LINE TO HUB DRAIN, HEAT WRAP DRAIN LINE
P-1.2A	WALK-IN BEER COOLER COIL								3/4"	HD-2				RUN DRAIN LINE TO HUB DRAIN
P-17	ONE COMPARTMENT SINK	3/4"	16"	3/4"	16"				1 1/2"	FS-4				RUN DRAIN LINE TO FLOOR SINK
P-22	THREE COMPARTMENT SINK	3/4"	16"	3/4"	16"				(3) 1 1/2"	FS-1				MANIFOLD (3) DRAINS & RUN TO FLOOR SINK
P-26	DISHWASHER			3/4"	16"				1 1/2"	FS-2				RUN DRAIN LINE TO FLOOR SINK; VER. REQ. W/PROVIDER
P-28	SOILED DISHTABLE	3/4"	16"	3/4"	16"				1 1/2"	FS-2				RUN DRAIN LINE TO FLOOR SINK
P-31	WATER HEATER	1 1/4"	84"	1-1/4"	84"									VERIFY REQUIREMENTS W/PROVIDER. REFER SCHEDULE.
P-32	MOP SINK	3/4"	36"	3/4"	36"		2"	3"						VERIFY REQUIREMENTS W/PROVIDER
P-33	FLOOR TROUGH						4"	-4"						VERIFY REQUIREMENTS W/PROVIDER
P-34	ICE MAKER W/O BIN	3/4"	72"			3/8"			1/2"	FS-3				BTC THRU WATER FILTER #34A; RUN DRAIN LINE TO FLOOR SINK
P-34B	ICE BIN								1/2"	FS-3				RUN DRAIN LINE TO FLOOR SINK
P-35	BAG-N-BOX, CARBONATOR	3/4"	84"											VERIFY REQUIREMENTS W/PROVIDER
P-43	CONVEYOR OVEN, STACKED										(2)3/4"	(2)120	12"836"	BTC THRU GAS CONNECTOR
P-44	GRIDDLE										3/4"	113.2	12"	BTC THRU GAS CONNECTOR
P-46.6	MUA AIR FAN										3/4"	162.2	ROOF	VERIFY LOCATION OF UNIT; REFER TO MECH DRAWING
P-47	HAND SINK	1/2"	16"	1/2"	16"		1 1/2"	20"						
P-49	CONVECTION OVEN										3/4"	100	12"	BTC THRU GAS CONNECTOR
P-59	ICE BIN, DROP-IN								1 1/2"	FS-5				RUN DRAIN LINE TO FLOOR SINK
P-63	SODA DISPENSER	1/2"	24"						3/4"	FS-6				RUN DRAIN LINE TO FLOOR SINK; VERIFY REQUIREMENTS W/PROVIDER
P-65	ICED TEA BREWER	1/2"	48"			1/4"								
P-66	SODA DISPENSER	1/2"	24"						3/4"	FS-7				RUN DRAIN LINE TO FLOOR SINK
P-71	DRIP TRAY								1"	FS-8				RUN DRAIN LINE TO FLOOR SINK
P-75	BEVERAGE COUNTER	1/2"	16"	1/2"	16"				1 1/2"	FS-7; FS-8				RUN DRAIN LINE TO FLOOR SINK

**MAIN BAR EQUIPMENT PLUMBING SCHEDULE**

P-B1	UNDERBAR HAND SINK	1/2"	12"	1/2"	12"				1 1/2"	FS-9				RUN DRAIN LINE TO FLOOR SINK
P-B2	UNDERBAR ICE BIN								3/4"	FS-10; FS-11				RUN DRAIN LINE TO FLOOR SINK
P-B2.1	SODA GUN HOLDER								1/2"	FS-10; FS-11				RUN DRAIN LINE TO FLOOR SINK
P-B3	UNDERBAR BLENDER STATION	1/2"	12"	1/2"	12"				1 1/2"	FS-10; FS-11				RUN DRAIN LINE TO FLOOR SINK
P-B9	UNDERBAR CORNER DRAINBOARD								1/2"	FS-9				RUN DRAIN LINE TO FLOOR SINK
P-B11	UNDERBAR SINK TABLE	1/2"	12"	1/2"	12"				1 1/2"	FS-9				MANIFOLD (3) DRAINS & RUN TO FLOOR SINK
P-B12	DRIP PAN W/ GLASS RINSER	1/2"	16"						1/2"	HD-2				RUN DRAIN LINE TO HUB DRAIN
P-B12.1	DRIP PAN								1/2"	FS-10; FS-11				RUN DRAIN LINE TO FLOOR SINK
P-B13	UNDERBAR DRAINBOARD								1/2"	FS-11				RUN DRAIN LINE TO FLOOR SINK
P-B14	UNDERBAR DUMP SINK	1/2"	1/2"	1/2"	1/2"				1 1/2"	FS-9				RUN DRAIN LINE TO FLOOR SINK

NOTE: THIS SCHEDULE IS A PARTIAL LISTING OF THE EQUIPMENT SUPPLIED BY KITCHEN CONTRACTOR. REFER TO SHEET QF101 FOR COMPLETE LISTING OF EQUIPMENT, TYPES, SIZES, AND LOCATIONS. PLUMBING CONTRACTOR (PC) TO PROVIDE NECESSARY ITEMS TO INSTALL KITCHEN EQUIPMENT (INCLUDING VALVES, UNIONS, FITTINGS, ETC.) TO MAKE COMPLETE SYSTEM. THIS LISTING DOES NOT SUPERSEDE THE KITCHEN CONTRACTOR'S DRAWINGS.

**PLUMBING FIXTURE SCHEDULE**

LEGEND	PLUMBING FIXTURE	CONNECTION SIZE - INCHES						REMARKS
		TRAP	SOIL/WASTE	VENT	COLD WATER	HOT WATER	THERMOSTATIC MIXING VALVE	
WC	WATER CLOSET	-	4"	2"	1"	-	-	FLUSH VALVE
LAV	LAVATORY	2"	2"	2"	1/2"	1/2"	WATTS USG-B-M2 (ASSE 1070)	PROVIDE P-TRAP
UR	URINAL	2"	2"	2"	3/4"	-	-	PROVIDE P-TRAP
FD	FLOOR DRAIN	3"	3"	2"	-	-	-	PROVIDE TRAP PRIMER TO FLOOR DRAIN
HD-1 & 2	HUB DRAIN	3"	3"	2"	-	-	-	
FS-1&2	12"x12" FLOOR SINK	3"	3"	2"	-	-	-	FLOOR SINK MUST BE CAPABLE OF ACCOMMODATING 140 DEG F WATER
FS-3 TO 11	12"x12" FLOOR SINK	3"	3"	2"	-	-	-	
FPHB	FREEZE PROOF HOSE BIB	-	-	-	3/4"	-	-	JAY R SMITH #5609QT WITH INTEGRAL VACUUM BREAKER

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

**HOT WATER HEATER**

TAG No.	MAX INPUT (MBH)	CAPACITY (GALLONS)	FIXTURES SERVING	QUANTITY	RECOVERY CAP. (GPH @ 100°F RISE)	TYPE	THERMAL EFFICIENCY %	MANUFACTURER & MODEL NO.	REMARKS
P-31	150	90	3-COMPARTMENT SINK, 1-COMPARTMENT SINK, MOP SINK, HAND SINK, LAVATORY, DISHWASHER, DISHTABLE, BLENDER STATION, UNDERBAR DUMP SINK & UNDERBAR SINK TABLE.	1	175 GPH	GAS STORAGE TYPE WATER HEATER (FLOOR MOUNTED)	96	LOCHINVAR SWR150N	-DIMENSIONS 79.5"H X 28"DIA -FLOOR MOUNTED

**RECIRCULATING PUMP SCHEDULE**

MARK	SERVICE	QTY	GPM	TOTAL HEAD FT.	MOTOR HP	MANUFACTURER & REMARKS
RCP	HW RECIRCULATION	1	2	10	0.115	GRUNDFOS UPS 15-18 BUCS W/AQUASTAT + TIMER

**EXPANSION TANK SCHEDULE**

ITEM	SERVICE	QTY	GALLONS	MAKE	REMARKS
EXPANSION TANK (ET)	HOT WATER	1	4.4	THERM-X-TROL ST-12	DIMENSIONS-11"(H) x 15"(DIA.) SHIPPING WEIGHT- 9 LBS

**BACKFLOW PREVENTER SCHEDULE**

TAG	LOCATION	MODEL	ASSE
BFP-1	ICE MAKER	WATTS LF9D DCV	1012
BFP-2	BAG N' BOX, SODA DISPENSER, ICED TEA BREWER, BEVERAGE COUNTER, GLASS RINSER	WATTS SD-3 DCV	1022
BFP-3	HOSE BIB	WATTS SERIES NF8 OR EQUAL	1011

NOTE:  
 1. VERIFY BACKFLOW VALVE REQUIREMENTS FOR APPROVAL FOR ALL EQUIPMENT WITH AUTHORITIES HAVING JURISDICTIONS PRIOR TO INSTALLATION.  
 2. ENSURE ISOLATION VALVE BEFORE AND AFTER BFP FOR MAINTENANCE.

**GREASE INTERCEPTOR CALCULATIONS**

Step 1: Flow rate to grease interceptor  
 Fixture flow rate: (cu in / 231) = gal x 0.75 / 2 min flow rate

NAME	TYPE	DIMENSIONS	QTY	CU IN	FLOW RATE
FD	Floor Drain	N/A	6	N/A	0 GPM
FD-1	Floor Drain Emergency	N/A	7	N/A	0 GPM
FS	Floor Sink	N/A	11	N/A	16.5 GPM
P-17	Prep Sink One Bowl	24" x 24" x 12"	1	6,912	11.22 GPM
P-22	3 Compartment Sink	18" x 24" x 14" (3)	1	18,144	29.45 GPM
P-28	Pre-Rinse Sink One Bowl	18" x 18" x 5"	1	1,620	2.63 GPM
P-32	Mop Basin	32" x 32" x 8"	1	8,192	13.3 GPM
P-33 (TRENCH DRAIN)	Floor Sink	N/A	1	N/A	2 GPM
P-47	Hand Sink	10" x 14" x 5"	4	2,800	4.52 GPM
P-59	Ice Machine (with drain)	N/A	2	N/A	1 GPM
<b>Total</b>					<b>80.62 GPM</b>

Step 2: Grease Production  
 Number of Seats x 4 turns per seat x Grease Production Value x Days between pump-out = Grease output  
 Number of seats in facility: 157  
 Grease production value: 0.0455 lbs per serving (Pizza Restaurant: High / Flatware)  
 Days between pump-outs: 90 days  
 157 x 4 x 0.0455 x 90 = 2571.66 lbs of FOG  
 Per EWSA recommendation, select minimum 3000-Gallon Gravity Grease Interceptor.

NOTE: GREASE INTERCEPTOR IS IN CORE & SHELL SCOPE. REFER CORE & SHELL PLUMBING SHEET P-101 FOR GREASE INTERCEPTOR LOCATION & SCHEDULE. CONTRACTOR TO VERIFY WHETHER CAPACITY IS ADEQUATE TO MEET PROJECT DEMAND. IF INADEQUATE, INFORM OWNER BEFORE STARTING WORK.



