

GENERAL ABBREVIATIONS	
DN	DOWN
EFF	EFFICIENCY
UP	UP
EQUIP	EQUIPMENT
EXH	EXHAUST
(E)	EXISTING
FPM	FEET PER MINUTE
FT	FEET
HP	HORSEPOWER
HZ	HERTZ
IN	INCHES
KW	KILOWATT
LB	POUND
MAX	MAXIMUM
MBH	THOUSAND BRITISH THERMAL UNITS PER HOUR
MCA	MINIMUM CIRCUIT AMPS
MECH	MECHANICAL
MFR	MANUFACTURER
MIN	MINIMUM
MOCP	MAXIMUM OVERCURRENT PROTECTION
N/A	NOT APPLICABLE
NTS	NOT TO SCALE
PH	PHASE
PLBG	PLUMBING
RPM	REVOLUTIONS PER MINUTE
SPEC	SPECIFICATION
SF	SQUARE FEET
TEMP	TEMPERATURE
TON	TONS OF REFRIGERATION
VEL	VELOCITY
VFD	VARIABLE FREQUENCY DRIVE
WB	WET BULB TEMPERATURE
RTU	ROOF TOP UNIT

MECHANICAL DRAWING LIST	
M-000	MECHANICAL SPECIFICATIONS (1 OF 3)
M-010	MECHANICAL SPECIFICATIONS (2 OF 3)
M-020	MECHANICAL SPECIFICATIONS (3 OF 3)
M-100	HVAC PLAN
M-200	MECHANICAL SCHEDULES
M-300	MECHANICAL DETAILS (1 OF 2)
M-301	MECHANICAL DETAILS (2 OF 2)
MP-100	MECHANICAL AND PLUMBING ROOF PLAN

## HERRIMAN, BUILDING DEPARTMENT NOTES

ALL WORK SHALL COMPLY WITH APPLICABLE SECTIONS OF 2021 INTERNATIONAL BUILDING CODE AND ALL AMENDMENTS AND RULES AND REGULATIONS OF THE DEPARTMENT OF BUILDINGS TO DATE.

- THE CONTRACTOR SHALL ENGAGE THE 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 2021 INTERNATIONAL BUILDING CODE REQUIREMENTS AS OUTLINES IN SECTION [BC 1704].
- 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 THE FOLLOWING SECTIONS OF THE 2021 INTERNATIONAL MECHANICAL CODE: VENTILATION SYSTEM BALANCING 2021 INTERNATIONAL MECHANICAL CODE-SECTION 403.
- THE FOLLOWING WORK ITEMS, COMPONENTS, MATERIALS, CAPACITIES, ETC. SHALL COMPLY WITH THE REFERENCED CODE OR STANDARD:
  - STANDARDS OF HEATING -2021 INTERNATIONAL MECHANICAL CODE-SECTION 309.1.
  - DUCT CONSTRUCTION AND INSTALLATION-2021 INTERNATIONAL MECHANICAL CODE- MECHANICAL-SECTION 603.
  - AIR INTAKES, EXHAUSTS AND RELIEF -2021 INTERNATIONAL MECHANICAL CODE- SECTION 401 AND 501.
  - AIR FILTERS- 2021 INTERNATIONAL MECHANICAL CODE- SECTION 605.
  - GAS FIRED EQUIPMENT - 2021 INTERNATIONAL MECHANICAL CODE- MECHANICAL-SECTION 901.
- MINIMUM TEMPERATURE TO BE MAINTAINED IN OCCUPIED SPACES DURING HEATING SEASON: 68 DEG. FAHRENHEIT.
- VENTILATION OF ALL AREA SHALL COMPLY WITH 2021 INTERNATIONAL MECHANICAL CODE- SECTION 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.
- 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.
- ALL HEATING AND COOLING LOADS CALCULATED PER ASHRAE/ACCA 183.
- A WRITTEN REPORT DESCRIBING THE ACTIVITIES AND MEASUREMENTS COMPLETED IN ACCORDANCE WITH 2021 INTERNATIONAL ENERGY CONSERVATION CODE- SECTION C408.2.5.3.
- SMOKE DETECTOR SHALL MEET UL268A.

## 2021 INTERNATIONAL ENERGY CONSERVATION CODE COMPLIANCE

TO THE BEST OF MY PROFESSIONAL KNOWLEDGE AND JUDGEMENT, THESE PLANS AND SPECIFICATION ARE IN COMPLIANCE WITH THE 2021 INTERNATIONAL ENERGY CONSERVATION CODE (ASHRAE 90.1- 2019).

### CODE COMPLIANCE

ALL WORK AND MATERIAL SHALL BE PERFORMED AND INSTALLED IN COMPLIANCE WITH THE FOLLOWING CODES AS ADOPTED AND AMENDED BY THE INSPECTING AUTHORITY. NOTHING IN THESE DRAWINGS IS TO BE CONSTRUCTED TO PERMIT WORK NOT CONFORMING TO THESE CODES OR OTHERS APPLICABLE TO THESE PROJECT:

- 2021 INTERNATIONAL BUILDING CODE
- 2021 INTERNATIONAL MECHANICAL CODE.
- 2021 INTERNATIONAL PLUMBING CODE.
- 2020 NATIONAL ELECTRICAL CODE.
- 2021 INTERNATIONAL FUEL GAS CODE.

## 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.
- DISCONNECT, REMOVE AND/OR RELOCATE EXISTING MATERIAL, EQUIPMENT AND OTHER WORK AS NOTED OR REQUIRED FOR PROPER INSTALLATION OF NEW SYSTEM.
- WHERE PENETRATIONS THROUGH FIRE RATED WALLS ARE NOT FIRE PROOFED THIS CONTRACTOR SHALL BE RESPONSIBLE TO SEAL SAME TO MAINTAIN THE RATED INTEGRITY.
- 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. MULTI-ROD SHALL BE SIMILAR TO FEE 8 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 WITH MINERAL WOOL OR OTHER NONCOMBUSTIBLE MATERIAL (FIBERGLASS INSULATION IS NOT ACCEPTABLE).
- 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.

## MECHANICAL 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.
- THE LOCATION OF EXISTING UNDERGROUND UTILITIES IS APPROXIMATELY SHOWN. THE CONTRACTOR SHALL DETERMINE THE EXACT LOCATION OF ALL EXISTING UTILITIES BEFORE COMMENCING WORK. THE CONTRACTOR SHALL PAY FOR AND REPAIR ALL DAMAGES CAUSED BY FAILURE TO EXACTLY LOCATE AND PRESERVE ANY AND ALL UNDERGROUND UTILITIES UNLESS OTHERWISE INDICATED.
- 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 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.
- PROVIDE VIBRATION ISOLATORS FOR ALL PIPING SUPPORTS CONNECTED TO, AND WITHIN 50 FT. OF, ISOLATED EQUIPMENT (EXCEPT AT BASE ELBOW SUPPORTS AND ANCHOR POINTS) THROUGHOUT MECHANICAL EQUIPMENT ROOMS, DO THE SAME FOR SUPPORTS OF STEAM MAINS WITHIN 50 FT. OF BOILER OR PRESSURE-REDUCING VALVES.
- PROVIDE VIBRATION ISOLATORS FOR ALL PIPING SUPPORTS OF STEAM MAINS WITHIN 50 FT. OF BOILERS AND PRESSURE-REDUCING VALVES.
- MAINTAIN A MINIMUM 6'-8" CLEARANCE TO THE UNDERSIDE OF PIPES, DUCTS, CONDUITS, SUSPENDED EQUIPMENT, ETC., THROUGHOUT ACCESS ROUTES IN MECHANICAL ROOMS.
- LOCATE ALL TEMPERATURE, PRESSURE, 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.
- ALL MECHANICAL ROOM DOORS SHALL BE A MINIMUM OF 4'-0" WIDE.
- WHERE BEAMS ARE INDICATED TO BE PENETRATED WITH DUCTWORK OR PIPING, COORDINATE DUCTWORK AND PIPING LAYOUT WITH BEAM OPENING SIZE AND OPENING LOCATION. 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 PIPING, 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 OF STRUCTURAL MEMBERS SHALL NOT BE PERMITTED. THE USE OF C-CLAMPS SHALL NOT BE PERMITTED.
- ALL ROOF-MOUNTED EQUIPMENT CURBS FOR EQUIPMENT PROVIDED BY THE MECHANICAL CONTRACTOR SHALL BE FURNISHED BY THE MECHANICAL CONTRACTOR AND INSTALLED BY THE GENERAL CONTRACTOR.
- 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.

ISSUED REVISIONS:


Nothing Bundt Cakes  
MECHANICAL SPECIFICATION (1 OF 3)

M-000

26. ALL AIR CONDITIONING CONDENSATE DRAIN LINES FROM EACH AIR HANDLING UNIT AND ROOFTOP 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.
27. REFER TO TYPICAL DETAILS FOR DUCTWORK, PIPING, AND EQUIPMENT INSTALLATION.
28. REINFORCEMENT, DETAILING, AND PLACEMENT OF CONCRETE SHALL CONFORM TO ASTM 315 AND ACI 318. CONCRETE SHALL CONFORM TO ASTM C94. CONCRETE WORK SHALL CONFORM TO ACI 318 PART ENTITLED "CONSTRUCTION REQUIREMENTS". COMPRESSIVE STRENGTH IN 28 DAYS SHALL BE 3,000 PSI. TOTAL AIR CONTENT OR EXTERIOR CONCRETE SHALL BE BETWEEN 5 AND 7 PERCENT BY VOLUME. SLUMP SHALL BE BETWEEN 3 AND 4 IN. CONCRETE SHALL BE CURED FOR 7 DAY AFTER PLACEMENT.
29. CONCRETE HOUSEKEEPING PADS TO SUIT MECHANICAL EQUIPMENT SHALL BE SIZED AND LOCATED BY THE MECHANICAL CONTRACTOR. MINIMUM CONCRETE PAD THICKNESS SHALL BE 6 IN. PAD SHALL EXTEND BEYOND THE EQUIPMENT A MINIMUM OF 6 IN. ON EACH SIDE. CONCRETE HOUSEKEEPING PADS SHALL BE PROVIDED BY THE GENERAL CONTRACTOR. IT SHALL BE THE RESPONSIBILITY OF THE MECHANICAL CONTRACTOR TO COORDINATE THE SIZE AND LOCATION OF CONCRETE HOUSEKEEPING PADS WITH THE GENERAL CONTRACTOR.
30. ALL TESTS SHALL BE COMPLETED BEFORE ANY MECHANICAL EQUIPMENT OR PIPING INSULATION IS APPLIED.
31. 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 SPECIFICATIONS

### 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 CLASS IS SPECIFIED BY THE DESIGNER, THE SMACNA 1 INCH WG PRESSURE, SEAL CLASS "A".
  - B. ALL DUCTWORK SHALL BE CONSTRUCTED TO SMACNA 1" WG DESIGN AND NOT LESS THAN THE FOLLOWING STANDARDS:
    1. CONSTRUCT SO THAT ALL INTERIOR SURFACES ARE SMOOTH, USE SLIP AND DRIVE OR FLANGED AND BOLTED CONSTRUCTION WHEN FABRICATING RECTANGULAR DUCTWORK. USE SPIRAL LOCK SEAM CONSTRUCTION WHEN FABRICATING ROUND SPIRAL DUCTWORK. SHEET METAL SCREWS MAY BE USED ON DUCT HANGERS, TRANSVERSE JOINTS AND OTHER SMACNA APPROVED LOCATIONS IF THE SCREW DOES NOT EXTEND MORE THAN 1/2 INCH INTO THE DUCT.
    2. SHEET STEEL SHALL COMPLY WITH ASTM A663 STANDARD SPECIFICATION FOR STEEL SHEET METAL, ZINC COATED (GALVANIZED) OR ZINC IRON ALLOY-COATED (GALVANNEAL) BY HOT DIP PROCESS, AND A924 STANDARD SPECIFICATION FOR GENERAL REQUIREMENT FOR SHEET METALLIC-COATED BY HOT DIP PROCESS. ALL ANGLE IRON USED FOR SUPPORT SHALL BE GALVANIZED. CONNECTIONS TO WALLS OR FLOOR SHALL BE AIR TIGHT WITH ANGLE IRON AND CAULKING. SEAL ALL DUCT SEAMS, TRANSVERSE AND LONGITUDINAL, AIR TIGHT. PROVIDE TURNING VANES ALL 90° ELBOWS.
    3. USE ELBOWS AND TEES WITH A CENTER LINE RADIUS TO WIDTH OR DIAMETER RATIO OF 1.5 WHEREVER SPACE PERMITS. WHEN A SHORTER RADIUS MUST BE USED DUE TO LIMITED SPACE, INSTALL SINGLE WALL SHEET METAL SPLITTER VANES IN ACCORDANCE WITH SMACNA PUBLICATIONS, TYPE RE 3. WHERE SPACE WILL NOT ALLOW AND THE C VALUE OF THE RADIUS ELBOW, AS GIVEN IN SMACNA PUBLICATIONS, EXCEEDS 0.31, USE RECTANGULAR ELBOWS WITH TURNING VANES AS SPECIFIED IN SECTION 23 33 00. SQUARE THROAT-RADIUS HEEL ELBOWS WILL NOT BE ACCEPTABLE. STRAIGHT TAPS OR BULLHEAD TEES ARE NOT ACCEPTABLE.
    4. WHERE RECTANGULAR ELBOWS ARE USED, PROVIDE TURNING VANES IN ACCORDANCE WITH SECTION 23 33 00.
    5. PROVIDE EXPANDED TAKE-OFFS OR 45 DEGREE ENTRY FITTINGS FOR BRANCH DUCT CONNECTIONS WITH BRANCH DUCTWORK AIRFLOW VELOCITIES GREATER THAN 700 FPM. SQUARE EDGE 90-DEGREE TAKE-OFF FITTINGS OR TRIGHT TAPS WILL NOT BE ACCEPTED.
    6. BUTTON PUNCH SNAP-LOCK CONSTRUCTION WILL NOT BE ACCEPTED ON ALUMINUM DUCTWORK.
    7. ROUND DUCTS MAY BE SUBSTITUTED FOR RECTANGULAR DUCTS IF SIZED IN ACCORDANCE WITH ASHRAE TABLE OF EQUIVALENT RECTANGULAR AND ROUND DUCTS. NO VARIATION OF DUCT CONFIGURATION OR SIZES PERMITTED EXCEPT BY WRITTEN PERMISSION OF THE ENGINEER.
- 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:
 

USG	MAX. SIDE INCHES	TRANSVERSE JOINTS AND BRACING
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 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 MEAT 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

### SECTION 230593 - TESTING, ADJUSTING, AND BALANCING FOR HVAC

#### 1.1 SUMMARY

- A. TESTING, ADJUSTING, AND BALANCING FOR THE FOLLOWING:
  1. AIR SYSTEMS: CONSTANT

#### 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

- 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.

#### 1.2 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:
 

	SUPPLY	RETURN
UNCONDITIONED SPACES WITHIN BUILDING:	R-6	R-6
WITHIN BUILDING ENVELOPE ASSEMBLY:	R-12	R-12
OUTSIDE OF BUILDING:	R-12	R-12
- B. FLEXIBLE ELASTOMERIC, MINERAL-FIBER BLANKET, MINERAL-FIBER BOARD OR POLYOLEFIN WITH MINIMUM INSTALLED THERMAL RESISTANCE AS FOLLOWS:
  1. JOHNS-MANVILLE
  2. OWENS-CORNING

	SUPPLY	RETURN
UNCONDITIONED SPACES WITHIN BUILDING:	R-6	R-6
WITHIN BUILDING ENVELOPE ASSEMBLY:	R-12	R-12
OUTSIDE OF BUILDING:	R-12	R-12

#### 1.4 ITEMS NOT INSULATED:

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

#### 1.5 PRODUCTS

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

#### 1.6 ACOUSTICAL TREATMENT

1. WHERE SHOWN ON THE DRAWINGS, LOW PRESSURE DUCTWORK SHALL BE LINED WITH 1.5" THICK R-6 AS MANUFACTURED BY DUCTMATE, 1-1/2 POUND MINIMUM DENSITY, NEOPRENE COATED, FLEXIBLE FIBERGLASS DUCT LINER, LINING SHALL COMPLY WITH NFPA 90A AND SHALL HAVE A FLAME SPREAD CLASSIFICATION OF NOT MORE THAN 25 AND A SMOKE DEVELOPED RATING NOT MORE THAN 50. DUCT SIZES WHERE LINING IS INDICATED ON PLANS ARE MINIMUM INSIDE CLEAR DIMENSIONS REQUIRED.

END OF SECTION 230713

#### REFRIGERANT PIPING:

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

### SECTION 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.

### SECTION 078413-PENETRATION FIRE-STOPPING

#### 1.1 QUALITY ASSURANCE

- A. INSTALLER QUALIFICATIONS: AN FM GLOBAL-APPROVED FIRE-STOP CONTRACTOR OR A UL-QUALIFIED FIRE-STOP CONTRACTOR.
- B. FIRE-TEST-RESPONSE CHARACTERISTICS: UL, INTERTEK ETL SEMKO OR FM GLOBAL
- 1.2 PENETRATION FIRESTOPPING
  - A. PENETRATIONS IN FIRE-RESISTANCE-RATED WALLS: F-RATINGS PER ASTM E 814 OR UL 1479.
  - B. PENETRATIONS IN HORIZONTAL ASSEMBLIES: F- AND T-RATINGS PER ASTM E 814 OR UL 1479:
  - C. PENETRATIONS IN SMOKE BARRIERS: L-RATINGS PER UL 1479.
  - D. W-RATINGS: PER UL 1479.

#### 1.3 INSTALLATION

- A. IDENTIFICATION: PREPRINTED METAL OR PLASTIC LABELS.

#### 1.4 FIELD QUALITY CONTROL

- A. 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:
- a. LATEX SEALANT
  - b. SILICONE SEALANT
  - c. INTUMESCENT PUTTY
  - d. MORTAR
  - e. SILICONE FOAM
  - f. PILLOWS/BAGS
  - g. INTUMESCENT WRAP STRIPS
  - h. INTUMESCENT COMPOSITE SHEET

#### 1.6 MANUFACTURERS

1. HILTI CONSTRUCTION CHEMICAL, INC
2. TREMCO INC.
3. 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 ANNUAL 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.

#### 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.

#### 1.5 MANUFACTURERS:

- 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.
- 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. 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

#### ISSUED REVISIONS:


Nothing Bundt Cakes

MECHANICAL SPECIFICATION (2 OF 3)

M-010

**SECTION 211000 - FIRE PROTECTION SYSTEMS**

**A. GENERAL**

- FURNISH ALL LABOR, MATERIALS AND EQUIPMENT AS REQUIRED TO INSTALL A COMPLETE FIRE PROTECTION SYSTEM FOR PROJECT.
- FIELD-VERIFY SIZES AND LOCATION OF EXISTING SPRINKLER PIPING BEFORE FABRICATION OF NEW.
  - THIS CONTRACTOR SHALL BE RESPONSIBLE FOR THE REMOVAL AND REINSTALLATION OF EXISTING CEILING TILES, AS REQUIRED, FOR THE INSTALLATION OF WORK SHOWN IN AREAS WHERE EXISTING CEILING ARE TO REMAIN. SEE ARCHITECTURAL DRAWINGS FOR AREAS WHERE EXISTING CEILING ARE TO REMAIN.
  - THIS REMOVAL AND REINSTALLATION OF EXISTING LAY-IN CEILING TILES SHALL BE THE RESPONSIBILITY OF THE FIRE PROTECTION CONTRACTOR (UNDER THE SUPERVISION OF THE GENERAL CONTRACTOR) AS REQUIRED TO PERFORM HIS WORK. ANY DAMAGE TO EXISTING CEILING TILES OR SUPPORTS SHALL BE THE RESPONSIBILITY OF THE GENERAL CONTRACTOR. CEILING TILES MAY BE LEFT OUT OF THE CEILING AREAS UNDER CONSTRUCTION ONLY IF STORED IN AREAS AS DIRECTED BY THE OWNER SO AS NOT TO HINDER THE DAILY OPERATIONS OF THE BUILDING'S OCCUPATIONS.
- THIS CONTRACTOR SHALL MODIFY AND RELOCATE SPRINKLER PIPING AND PROVIDE NEW SPRINKLER PIPING AND HEADS AS REQUIRED TO ACCOMMODATE NEW MECHANICAL WORK IN FULL COMPLIANCE WITH NFPA 13. THIS CONTRACTOR SHALL ALSO PERFORM HYDRAULIC CALCULATIONS FOR SPRINKLER PIPING IN THE REMODELED AREAS IN ACCORDANCE WITH NFPA 13.

**B. DESIGN BASIS**

- DESIGN BASIS FOR SYSTEM SHALL BE PER NFPA 13 (LATEST EDITION) BUILDING CODE REQUIREMENTS, LOCAL WATER DEPARTMENT, LOCAL FIRE DEPARTMENT, STATE FIRE MARSHAL, LOCAL CODE, AND OWNER AND OWNER'S FIRE INSURANCE UNDERWRITER REQUIREMENTS.
- SYSTEM SHALL BE HYDRAULICALLY CALCULATED AS REQUIRED BY CODE.
- PIPE SIZES INDICATED ON DRAWING ARE APPROXIMATE AND SHALL BE VERIFIED PER THE CONTRACTOR'S HYDRAULIC CALCULATIONS.

**C. DRAWINGS AND CALCULATIONS**

- CONTRACTOR SHALL PREPARE SUBMITTAL DRAWINGS AND HYDRAULIC CALCULATIONS WITH A 10% FACTOR OF SAFETY FOR BUILDING IN ACCORDANCE WITH OWNER'S INSURANCE COMPANY BUILDING DEPARTMENT, AND LOCAL FIRE AUTHORITY REQUIREMENTS, TENANT'S REQUIREMENTS FOR DESIGN DENSITY, WHICHEVER IS MOST STRINGENT.
- CONTRACTOR SHALL PERFORM A FLOW TEST DATA ON WATER MAIN AND SUBMIT DATA WITH CALCULATIONS.
- IT IS THE FIRE PROTECTION CONTRACTOR'S RESPONSIBILITY TO VERIFY EACH TENANT'S DESIGN DENSITY WITH AGREED UPON LEASE DOCUMENTATION AND THAT TENANT'S PROTOTYPE OR INSURANCE UNDERWRITERS REQUIREMENTS.
- PROVIDE SYSTEM FOR PROJECT IN ACCORDANCE WITH NFPA 14 REQUIREMENTS.
- CONTRACTOR AND DESIGNER SHALL BE STATE CERTIFIED.
- COORDINATE LAYOUT AND INSTALLATION OF SPRINKLERS WITH DUCTWORK AND EQUIPMENT ABOVE CEILING AND OTHER CONSTRUCTION THAT PENETRATES CEILING, INCLUDING BUT NOT LIMITED TO LIGHT FIXTURES, SPEAKERS, HVAC EQUIPMENT, DOORS AND PARTITION ASSEMBLIES. NO SPRINKLER PIPING SHALL BE ROUTED BENEATH EQUIPMENT ABOVE ANY CEILING THAT MUST BE DROPPED DIRECTLY DOWN FOR SERVICE, REPAIR, OR REPLACEMENT.
- EXAMINE AREAS AND CONDITIONS UNDER WHICH FIRE PROTECTION MATERIALS AND PRODUCTS ARE TO BE INSTALLED. DO NOT PROCEED WITH WORK UNTIL UNSATISFACTORY CONDITIONS HAVE BEEN CORRECTED IN MANNER ACCEPTABLE TO INSTALLER. SCHEDULE ROUGH-IN INSTALLATIONS WITH INSTALLATIONS OF OTHER BUILDING COMPONENTS.
- SHOP DRAWINGS REVIEW DOES NOT RELIEVE FIRE PROTECTION CONTRACTOR FROM RESPONSIBILITY TO MEET EACH TENANT'S REQUIREMENTS FOR SPRINKLER COVERAGE.
- FIRE PROTECTION CONTRACTOR IS RESPONSIBLE FOR VERIFYING ANY HIGH PILE STORAGE REQUIREMENTS OF FUTURE TENANTS AND PROVIDING AN INCLUDING SPRINKLER SERVICE SIZE AND RISERS TO MEET THE REQUIREMENTS FOR ADEQUATE SPRINKLER COVERAGE.

**D. PIPING**

- ALL PIPING SHALL BE INSTALLED IN ACCORDANCE WITH NFPA 13, 14 (LATEST EDITION) AND LOCAL CODE REQUIREMENTS.
  - FIRE PROTECTION PIPING SHALL BE AS FOLLOWS:
    - BELOW-GRADE OUTSIDE BUILDING - DUCTILE IRON, CEMENT LINED, CLASS OF PIPE AS DIRECTED BY LOCAL WATER PURVEYOR WITH MECHANICAL OR PUSH-ON TYPE JOINTS.
    - INSIDE BUILDING - PIPE AND TUBING SHALL BE STEEL OR COPPER IN ACCORDANCE WITH NFPA REQUIREMENTS.
    - PIPING SHALL MATCH EXISTING BUILDING STANDARDS.
    - CONTRACTOR SHALL ARRANGE WITH OWNER AND INSURANCE UNDERWRITER PRIOR TO SHUT DOWN OF EXISTING SYSTEMS.
  - FLUSH ALL PIPING UPON COMPLETION OF PROJECT AND TEST PER NFPA REQUIREMENTS.
  - NO PIPING SHALL BE INSTALLED AT LOCATIONS SUBJECT TO FREEZING.
  - EXCAVATION AND BACKFILL - SEE SECTION 200510, BASIC MATERIALS AND METHODS.

**E. SPRINKLER HEADS**

- SPRINKLER HEADS SHALL BE UL LISTED, MATCH EXISTING BUILDING STANDARDS AND BE MANUFACTURED BY CENTRAL, STAR OR VIKING.
  - SPRINKLER HEADS SHALL BE AS FOLLOWS:
    - AREAS WITH EXPOSED STRUCTURE UPRIGHT - ROUGH BRASS.
    - AREAS WITH CEILING RECESSED PENDENT - CHROME PLATED WITH MATCHING TWO (2) PIECE, FLUSH ESCUTCHEON.
    - CONCEALED - BRASS FINISH WITH OFF-WHITE CEILING COVER PLATE.
    - SIDEWALL - CHROME PLATED WITH OFF-WHITE, TWO (2) PIECE, SEMI-RECESSED ESCUTCHEON.
    - INSTALL CONCEALED HEADS WITH WHITE FLUSH MOUNTED COVER PLATE IN (SALES AREA).
    - INSTALL HIGHER TEMPERATURE SPRINKLER HEADS WHERE REQUIRED BY CODE OR APPLICATION.
    - SPRINKLER HEADS SHALL BE LOCATED IN THE CENTER OF CEILING TILES OR THE CENTER OF AN AREA OF A 24" X 24" TILE SECTION. SEE ARCHITECTURAL REFLECTED CEILING PLANS.
    - SUBMIT SAMPLES OF SPRINKLER HEADS TO ARCHITECT PRIOR TO FABRICATION OF ANY PIPING.
    - INSTALL INSPECTOR'S TEST CONNECTION WITH VALVE AND TERMINATE DRAIN THROUGH EXTERIOR WALL WITH TEXT FITTING AND SPLASH BLOCK.

**F. VALVES**

- INSTALL ALL VALVES AS REQUIRED BY NFPA 13, UL OR FM LISTED AND AS MANUFACTURED BY GRINNELL, HAMMOND OR MILWAUKEE.
  - ALL SHUT-OFF VALVES SHALL BE FITTED WITH TAMPER SWITCHES BY FIRE PROTECTION CONTRACTOR AND WIRED BY ELECTRICAL CONTRACTOR. TAMPER SWITCHES SHALL BE AS MANUFACTURED BY NOTIFIER, POTTER OR ELKHART AND APPROVED BY LOCAL AUTHORITIES.
  - INSTALL FLOW SWITCH IN RISER AS MANUFACTURED BY NOTIFIER, POTTER OR VIKING AND WIRED BY ELECTRICAL CONTRACTOR.
  - INSTALL UL LISTED ALARM CHECK VALVE WITH ALL REQUIRED TRIM, INCLUDING WATER MOTOR ALARM BELL AND DRAINS AS MANUFACTURED BY CENTRAL STAR OR VIKING.
  - INSTALL WALL MOUNTED INDICATOR VALVE AS MANUFACTURED BY POTTER ROEMER, CROKER OR ELKHART AND APPROVED BY LOCAL AUTHORITIES.
  - INSTALL DOUBLE CHECK DETECTOR ASSEMBLY BACKFLOW PREVENTER, AS REQUIRED BY LOCAL WATER PURVEYOR AND AS MANUFACTURED BY WATTS, ZURN OR CONBRACO.

**G. EXTRA MATERIALS**

- VALVE WRENCHES: FURNISH TO OWNER, 2 VALVE WRENCHES FOR EACH TYPE OF SPRINKLER HEAD INSTALLED.
- SPRINKLER HEADS AND CABINETS: FURNISH 2 EXTRA SPRINKLER HEADS OF EACH STYLE INCLUDED IN THE PROJECT. FURNISH EACH STYLE WITH ITS OWN SPRINKLER HEAD CABINET AND SPECIAL WRENCHES.
- OBTAIN RECEIPT FROM OWNER THAT EXTRA STOCK HAS BEEN RECEIVED AND GIVE ARCHITECT A COPY OF THIS RECEIPT.

**SECTION 224000 - PLUMBING FIXTURES AND EQUIPMENT**

**A. GENERAL**

- FURNISH ALL FIXTURES AND EQUIPMENT INDICATED AND SCHEDULED ON DRAWINGS, COMPLETE WITH ALL ACCESSORIES, CONTROLS, ETC., AS REQUIRED.
- PROVIDE FACTORY-FABRICATED FIXTURES OF TYPE, STYLE AND MATERIAL INDICATED. FOR EACH TYPE FIXTURE, PROVIDE FIXTURE MANUFACTURER'S STANDARD TRIM, CARRIER, SEATS AND VALVES AS SHOWN BY THEIR PUBLISHED PRODUCT INFORMATION AND INDICATED IN THE PLUMBING FIXTURES SCHEDULE. EITHER AS DESIGNED AND CONSTRUCTED OR AS RECOMMENDED BY MANUFACTURER AND AS REQUIRED FOR COMPLETE INSTALLATION, WHERE MORE THAN ONE TYPE IS INDICATED, SELECTION IS INSTALLER'S OPTION, BUT ALL FIXTURES OF SAME TYPE MUST BE FURNISHED BY SINGLE MANUFACTURER, WHERE TYPE IS NOT OTHERWISE INDICATED, PROVIDE FIXTURES COMPLYING WITH GOVERNING REGULATIONS.
  - WHERE FITTINGS, TRIM AND ACCESSORIES ARE EXPOSED OR SEMI-EXPOSED, PROVIDE BRIGHT CHROME-PLATED OR POLISHED STAINLESS STEEL UNITS. PROVIDE COPPER OR BRASS WHERE NOT EXPOSED.
  - WATER OUTLETS: AT LOCATIONS WHERE WATER IS SUPPLIED BY MANUAL, AUTOMATIC OR REMOTE CONTROL, PROVIDE COMMERCIAL QUALITY FAUCETS, VALVES OR DISPENSING DEVICES OF TYPE AND SIZE INDICATED AND AS REQUIRED TO OPERATE AS INDICATED. INCLUDE MANUAL SHUT-OFF VALVES AND CONNECTING STEM PIPES TO PERMIT OUTLET SERVICING WITHOUT SHUT-DOWN OF WATER SUPPLY PIPING SYSTEMS.
  - WATER HAMMER ARRESTORS: PROVIDE WATER HAMMER ARRESTORS WHERE SHOWN ON THE DRAWINGS AND AS REQUIRED TO PREVENT WATER HAMMER AND EXCESSIVE VIBRATION IN THE DOMESTIC WATER SYSTEM. ARRESTORS TO BE OF SIZE INDICATED OR AS RECOMMENDED BY THE MANUFACTURER.
  - P-TRAPS: INCLUDE REMOVABLE P-TRAPS (WITH CLEAN OUT PLUG) WHERE DRAINS ARE INDICATED FOR DIRECT CONNECTION TO DRAINAGE SYSTEM.
  - CARRIERS: PROVIDE CAST IRON SUPPORTS FOR FIXTURES OF EITHER GRAPHITIC GRAY IRON, DUCTILE IRON OR MALLEABLE IRON AS INDICATED.
  - ESCUTCHEONS: WHERE FIXTURE SUPPLIES AND DRAINS PENETRATE WALLS IN EXPOSED LOCATIONS, PROVIDE CHROME-PLATED SHEET STEEL ESCUTCHEONS WITH FRICTION SLIPS.
  - AERATORS: PROVIDE AERATORS OF TYPES APPROVED BY HEALTH DEPARTMENT HAVING JURISDICTION.
  - COMPLY WITH ADDITIONAL FIXTURE REQUIREMENTS CONTAINED IN FIXTURE SCHEDULE ON DRAWINGS.

**B. BACKFLOW PREVENTER**

- PROVIDE REDUCED PRESSURE BACKFLOW PREVENTER CONSISTING OF ASSEMBLY INCLUDING ABUTTING SHUTOFF VALVES ON INLET AND OUTLET, AND DISCHARGE FUNNEL. BACKFLOW PREVENTER SHALL INCLUDE A MINIMUM OF FOUR (4) TEST COCKS AND PRESSURE-DIFFERENTIAL RELIEF VALVE LOCATED BETWEEN TWO (2) POSITIVE SEATING CHECK VALVES. BACKFLOW PREVENTER AND SHUTOFF VALVES SHALL BE THE SAME SIZE AS THE UPSTREAM PIPE.
  - BACKFLOW PREVENTERS SIZES 2" AND SMALLER SHALL HAVE NPT CONNECTIONS, BE OF BRONZE BODY CONSTRUCTION WITH BRONZE BALL TYPE SHUT-OFF VALVES AS SPECIFIED IN SECTION 200523 AND TEST COCK AND BRONZE BODY RELIEF VALVES WITH STAINLESS STEEL TRIM.
  - COMPLETE BACKFLOW PREVENTER ASSEMBLY SHALL BE RATED TO 150 PSI WORKING PRESSURE AND WATER TEMPERATURE RANGE FROM 32° F TO 140° F.
  - PROVIDE EACH BACKFLOW PREVENTER WITH A DRAIN FUNNEL FURNISHED BY THE MANUFACTURER. EXTEND DRAIN FROM FUNNEL TO NEAREST FLOOR DRAIN.
  - BACKFLOW DEVICES MUST MEET ASSE STANDARDS 1013, 1015 AND 1020 AND SHALL BE TESTED AT THE TIME OF INSTALLATION BY A PERSON CERTIFIED BY THE OHIO DEPARTMENT OF HEALTH. THE PLUMBING CONTRACTOR SHALL PAY FOR ALL COSTS ASSOCIATED WITH THIS TEST.
  - MANUFACTURER: SUBJECT TO COMPLIANCE WITH REQUIREMENTS, PROVIDE BACKFLOW PREVENTERS OF ONE OF THE FOLLOWING:
    - CLA-VAL COMPANY
    - CONBRACO INDUSTRIES, INC.
    - FEBCO SALES, INC., SUB. OF CHARLES M. BAILEY CO., INC.
    - HERSEY PRODUCTS, INC.
    - WATTS REGULATOR COMPANY

**SECTION 230900 - INSTRUMENTATION AND CONTROLS**

**A. GENERAL**

- FURNISH AND INSTALL COMPLETE TEMPERATURE CONTROL FOR ALL HVAC SYSTEMS.
  - PROVIDE NEW CONTROL DEVICES INCLUDING THERMOSTATS, HUMIDISTATS, DAMPER OPERATORS, MOTORS, TEMPERATURE SENSORS, STAGING RELAYS, AND OTHER RELATED DEVICES FOR A COMPLETE OPERATIONAL SYSTEM PER THE OPERATING SEQUENCE AND INDUSTRY STANDARDS.
  - MOUNT ALL CONTROLS FURNISHED AS ACCESSORIES TO EQUIPMENT AND PROVIDE ALL CONTROL WIRING REQUIRED FOR PROPER OPERATION. ALL WIRING SHALL BE IN CONDUIT PER N.E.C. AND LOCAL CODE REQUIREMENTS.
  - MECHANICAL CONTRACTOR SHALL INSTALL ALL DUCT-MOUNTED SMOKE DETECTORS. ELECTRICAL CONTRACTOR SHALL FURNISH AND WIRE PHOTO-ELECTRIC DUCT SMOKE DETECTORS AT EACH UNIT TO SHUT DOWN FAN UPON ACTIVATION. DETECTOR SHALL BE LOCATED IN THE SUPPLY/RETURN AIR DUCT DOWNSTREAM/UPSTREAM OF THE UNIT CONNECTION. DETECTOR WILL HAVE MANUAL RESET AND WILL ACTIVATE A LOCAL ALARM PANEL.
- EXHAUST FANS
  - TOILET ROOM EXHAUST FAN (EF-1)
    - INTERLOCK FAN WITH LIGHT SWITCH TO OPERATE WHEN LIGHTS ARE TURNED ON (INTERLOCKING WIRING) BY ELECTRICAL CONTRACTOR.
  - UTILITY EXHAUST FAN (EF-2)
    - INTERLOCK FAN WITH TIME CLOCK TO OPERATE CONTINUOUSLY DURING OCCUPIED MODE.
- ROOFTOP UNITS
  - GAS FIRED ROOFTOP UNIT (RTU-1(N), RTU-2(N) & RTU-3(N))
    - WALL MOUNTED THERMOSTAT SHALL SEQUENCE HEATING AND COOLING. PROVIDE WITH SUB-BASE TO MANUALLY SELECT HEATING, COOLING, FAN ON-OFF, AUTO OPERATION.
    - UNIT SHALL OPERATE IN OCCUPIED OR UNOCCUPIED MODES BASED UPON TIME CLOCK SEQUENCE AS DETERMINED BY OWNER.
    - UNOCCUPIED MODE - THE SUPPLY FAN WILL BE OFF, THE OUTDOOR AIR DAMPER WILL GO TO 100% CLOSED POSITION AND UNIT WILL CYCLE ON WITH A CALL FOR HEATING OR COOLING.
    - OCCUPIED MODE - THE SUPPLY FAN SHALL RUN CONTINUOUSLY, THE OUTDOOR AIR DAMPER WILL OPEN TO THE MINIMUM AIR POSITION AND THE UNIT WILL GO INTO THE HEATING OR COOLING MODE, BASED UPON ROOM THERMOSTAT SETPOINT TEMPERATURE.
    - UPON A CALL FOR COOLING, AND THE OUTDOOR AIR TEMPERATURE IS 55 DEGREES F. (ADJUSTABLE) OR COOLER, THE UNIT SHALL GO INTO ECONOMIZER MODE. IF THE OUTDOOR AIR TEMPERATURE IS GREATER THAN 55 DEGREES F. (ADJUSTABLE), THE OUTSIDE AIR DAMPER SHALL GO TO MINIMUM POSITION, AND THE COMPRESSORS WILL BE ENERGIZED.
    - UPON A CALL FOR HEATING, THE GAS BURNER SHALL FIRE.
    - A LOW TEMPERATURE THERMOSTAT WILL DE-ENERGIZE THE SUPPLY FAN AND CLOSE THE OUTSIDE AIR DAMPER IF THE MIXED AIR TEMPERATURE IS SENSED AT 40 DEGREES F OR COLDER.
    - A DUCT MOUNTED, PHOTOELECTRIC SMOKE DETECTOR (FURNISHED BY ELECTRICAL CONTRACTOR AND INSTALLED BY MECHANICAL CONTRACTOR) SHALL SHUT DOWN THE UNIT, CLOSE THE OUTSIDE AIR DAMPER AND SEND A SIGNAL TO THE FIRE ALARM PANEL WHEN ACTIVATED. BOTH SAFETIES WILL REQUIRE MANUAL RESET, AND WILL ACTIVATE AN ALARM AT THE LOCAL CONTROL PANEL.

**B. EXHAUST FANS**

- TOILET ROOM EXHAUST FAN (EF-1)
  - INTERLOCK FAN WITH LIGHT SWITCH TO OPERATE WHEN LIGHTS ARE TURNED ON (INTERLOCKING WIRING) BY ELECTRICAL CONTRACTOR.
- UTILITY EXHAUST FAN (EF-2)
  - INTERLOCK FAN WITH TIME CLOCK TO OPERATE CONTINUOUSLY DURING OCCUPIED MODE.
- ROOFTOP UNITS
  - GAS FIRED ROOFTOP UNIT (RTU-1(N), RTU-2(N) & RTU-3(N))
    - WALL MOUNTED THERMOSTAT SHALL SEQUENCE HEATING AND COOLING. PROVIDE WITH SUB-BASE TO MANUALLY SELECT HEATING, COOLING, FAN ON-OFF, AUTO OPERATION.
    - UNIT SHALL OPERATE IN OCCUPIED OR UNOCCUPIED MODES BASED UPON TIME CLOCK SEQUENCE AS DETERMINED BY OWNER.
    - UNOCCUPIED MODE - THE SUPPLY FAN WILL BE OFF, THE OUTDOOR AIR DAMPER WILL GO TO 100% CLOSED POSITION AND UNIT WILL CYCLE ON WITH A CALL FOR HEATING OR COOLING.
    - OCCUPIED MODE - THE SUPPLY FAN SHALL RUN CONTINUOUSLY, THE OUTDOOR AIR DAMPER WILL OPEN TO THE MINIMUM AIR POSITION AND THE UNIT WILL GO INTO THE HEATING OR COOLING MODE, BASED UPON ROOM THERMOSTAT SETPOINT TEMPERATURE.
    - UPON A CALL FOR COOLING, AND THE OUTDOOR AIR TEMPERATURE IS 55 DEGREES F. (ADJUSTABLE) OR COOLER, THE UNIT SHALL GO INTO ECONOMIZER MODE. IF THE OUTDOOR AIR TEMPERATURE IS GREATER THAN 55 DEGREES F. (ADJUSTABLE), THE OUTSIDE AIR DAMPER SHALL GO TO MINIMUM POSITION, AND THE COMPRESSORS WILL BE ENERGIZED.
    - UPON A CALL FOR HEATING, THE GAS BURNER SHALL FIRE.
    - A LOW TEMPERATURE THERMOSTAT WILL DE-ENERGIZE THE SUPPLY FAN AND CLOSE THE OUTSIDE AIR DAMPER IF THE MIXED AIR TEMPERATURE IS SENSED AT 40 DEGREES F OR COLDER.
    - A DUCT MOUNTED, PHOTOELECTRIC SMOKE DETECTOR (FURNISHED BY ELECTRICAL CONTRACTOR AND INSTALLED BY MECHANICAL CONTRACTOR) SHALL SHUT DOWN THE UNIT, CLOSE THE OUTSIDE AIR DAMPER AND SEND A SIGNAL TO THE FIRE ALARM PANEL WHEN ACTIVATED. BOTH SAFETIES WILL REQUIRE MANUAL RESET, AND WILL ACTIVATE AN ALARM AT THE LOCAL CONTROL PANEL.

**SECTION 233000 - AIR DISTRIBUTION SYSTEMS**

**A. GENERAL**

- FURNISH ALL MATERIALS, LABOR, EQUIPMENT AND ACCESSORIES REQUIRED TO INSTALL COMPLETE AIR DISTRIBUTION SYSTEMS.
- CONTRACTORS BIDDING THIS PROJECT SHALL VISIT THIS SITE AND FAMILIARIZE THEMSELVES WITH ALL CONDITION AFFECTING THEIR WORK. SUBMISSION OF A BID ON THIS PROJECT SHALL BE CONSTRUED AS HAVING SUCH KNOWLEDGE.
- VERIFY EXACT CONDITIONS IN FIELD AND COORDINATE WITH THESE DRAWINGS AND OTHER TRADES BEFORE BEGINNING NEW WORK.
- DETERMINE EXACT LOCATIONS FOR ALL NEW AND RELOCATED DUCTWORK AND ACCESSORIES IN FIELD.
- COORDINATE WORK OF THIS CONTRACT WITH OTHER TRADES.
- ANY DISCREPANCIES BETWEEN WHAT IS SHOWN ON DRAWINGS OR SPECIFIED AND THE ACTUAL CONDITIONS IN THE FIELD SHALL IMMEDIATELY BE BROUGHT TO THE ATTENTION OF THE ARCHITECT BEFORE PROCEEDING.
- BUILDING AND SURFACES DAMAGED DURING INSTALLATION SHALL BE REPAIRED, REPLACED, AND/OR RESTORED TO ORIGINAL CONDITION AFTER COMPLETION OF WORK AND BEFORE ACCEPTANCE BY OWNER.
- THIS CONTRACTOR IS ALSO REFERRED TO THE APPROPRIATE MECHANICAL AND PLUMBING SPECIFICATION SECTIONS THE ITEMS OF EQUIPMENT TO BE BID AS A PART OF THIS PROJECT.

**B. DUCTWORK**

- FABRICATE AND ERECT ALL DUCTWORK TO ASHRAE AND SMACNA STANDARDS FROM GALVANIZED STEEL, COMPLY WITH NFPA 90A REQUIREMENTS.
- DUCTWORK SHALL BE SMACNA LOW PRESSURE CONSTRUCTION 2" STATIC PRESSURE RATING WITH SEAL CLASS B SEAMS AND JOINTS, UNLESS OTHERWISE NOTED.
- INCLUDE ALL ACOUSTIC, RIGID SHAPED PERFORATED ALUMINUM TURNING VANES, MANUAL DAMPERS, FLEXIBLE CONNECTORS, GRILLES, AND DIFFUSERS, ACOUSTIC LINING, AND OTHER SHEET METAL ACCESSORIES FOR THE PROJECT.
- CHANGES IN DIRECTION, IN LOW VELOCITY SUPPLY AIR RECTANGULAR DUCTWORK, SHALL BE MADE WITH FULL RADIUS ELBOWS WITH RADIUS EQUAL TO 1 1/2 TIMES THE HORIZONTAL WIDTH OF THE DUCT, OR WITH SQUARE ELBOWS WITH TURNING VANES. TURNING VANES SHALL BE CONSTRUCTED OF THE SAME MATERIAL AS THE SURROUNDING DUCTWORK AND TWO (2) GAUGE NUMBERS HEAVIER.
- FURNISH AND INSTALL ALL MANUAL BALANCING DAMPERS, SPLITTER DAMPERS, EXTRACTORS, AND DEFLECTORS REQUIRED TO PROPERLY DISTRIBUTE THE AIR. ALL DAMPERS, EXTRACTORS AND DEFLECTORS SHALL BE CONSTRUCTED OF THE SAME MATERIAL AS THE SURROUNDING DUCTWORK, UNLESS NOTED OTHERWISE ON THE DRAWINGS. ALL MANUAL BALANCING DAMPERS SHALL BE THE OPPOSED BLADE TYPE.
- FURNISH AND INSTALL ALL AUTOMATIC CONTROL DAMPERS UNLESS NOTED OTHERWISE ON THE DRAWINGS. ALL CONTROL DAMPERS SHALL BE OPPOSED BLADE TYPE AND SHALL HAVE LEAKAGE OF LESS THAN 1 PERCENT WHEN CLOSING AGAINST 4" WATER COLUMN STATIC PRESSURE AND WHEN SIZED FOR 2000 FPM VELOCITY.
- ALL MANUAL BALANCING DAMPERS, SPLITTER DAMPERS, EXTRACTORS AND DEFLECTORS SHALL BE CONTROLLED BY YOUNG NO. 1 OR VENTLOCK NO. 888 REGULATORS. IF DUCTWORK IS ACCESSIBLE, MOUNT THE REGULATOR ON THE DUCTWORK. IF DUCTWORK WILL BE INACCESSIBLE AFTER THE INSTALLATION OF THE CEILING OR WALLS, MOUNT THE REGULATOR IN A STEEL, FLUSH MOUNTED BOX SPECIFICALLY DESIGNED FOR THIS PURPOSE. PROVIDE ALL LINKAGE, TOP BEARINGS AND/OR GEAR DRIVES REQUIRED FOR THE REMOTE INSTALLATION OF THE REGULATOR.
- ALL BRANCH CONNECTION FITTINGS IN RECTANGULAR DUCTWORK SHALL BE 45 DEGREE TRANSITION TYPE, CONICAL FITTINGS OR SPIRAL FITTINGS WITH INTEGRAL AIR SCOOPS. BUTT FITTINGS ARE NOT ACCEPTABLE.
- EXHAUST DUCT OUTLETS SHALL BE INSTALLED A MINIMUM OF 10'-0" FROM ALL OUTSIDE AIR INTAKES.
- KITCHEN HOOD EXHAUST DUCT SHALL BE MINIMUM THICKNESS .060" BLACK STEEL WITH LIQUID-TIGHT WELDED JOINTS, WHERE CONCEALED, AND OF 18-GA. MINIMUM STAINLESS STEEL WHERE EXPOSED. INSTALL PER LOCAL CODE AND NFPA 96 REQUIREMENTS. MAINTAIN 18" CLEARANCE FROM DUCT TO COMBUSTIBLES.
- ALTERNATIVE DESIGN: FURNISH DOUBLE WALL, ZERO CLEARANCE TO COMBUSTIBLES, FACTORY BUILT GREASE DUCT FOR USE WITH TYPE 1 KITCHEN HOODS, WHICH CONFORM TO THE REQUIREMENTS OF NFPA-96. PRODUCTS SHALL BE ETL LISTED TO UL-1978 AND UL-2211 FOR VENTING AIR AND GREASE VAPORS FROM COMMERCIAL COOKING OPERATION. THE DUCT SECTIONS SHALL BE CONSTRUCTED OF AN INNER DUCT WALL AND AN OUTER DUCT WALL WITH INSULATION BETWEEN. DUCT SHALL BE CAPTIVEAIRE DW-2R OR APPROVED EQUAL. INSTALL PER MANUFACTURERS INSTRUCTIONS.
- ALL EXPOSED ROUND DUCTWORK SHALL BE SPIRAL SEAM DUCTWORK AND PAINTED A COLOR AS SELECTED BY THE ARCHITECT.

**C. DRAIN PANS**

- INSTALL 2" DEEP SECONDARY DRAIN PAN BELOW ALL FURNACES AND DOMESTIC WATER HEATERS. PIPE 3/4" DRAIN TO FLOOR DRAIN INDEPENDENTLY OFF ALL THE OTHER DRAINS.

**D. DUCT LINER**

- ACOUSTIC LINE ALL RECTANGULAR DUCTS INDICATED ON DRAWINGS WITH 1" THICK NON-FLAKING, COATED MEDIUM DENSITY LINER. APPLY TO MANUFACTURER'S RECOMMENDATIONS.
- DUCT DIMENSIONS INDICATED ON DRAWINGS ARE CLEAR INSIDE DIMENSIONS (FREE AREA).
- DUCT LINER SHALL COMPLY WITH NFPA 90A AND 90B (LATEST EDITION) REQUIREMENTS.

**E. DUCT ACCESSORIES**

- FLEXIBLE DUCTWORK (AS MANUFACTURED BY CLEVAFLEX, FLEXMASTER OR WIREMOLD).
  - FLEXIBLE DUCTS SHALL BE INDEPENDENTLY SUPPORTED FROM THE STRUCTURE AND CONNECTED WITH PLASTIC DRAW BANDS AND TIGHTENED. FLEXIBLE DUCTS SHALL BE LIMITED TO 48" MAXIMUM STRAIGHT LENGTH. FLEXIBLE DUCTS SHALL BE CONSTRUCTED OF 1 1/2" INSULATION WITH VINYL VAPOR BARRIER JACKET AND RATED AT 10" W.C. FOR SIZES THROUGH 12", UL LISTED, AND MEET 25/50 FLAME AND SMOKE TEST. FLEXIBLE DUCTS ARE NOT PERMITTED IN ROOMS WITHOUT CEILING.
  - DAMPERS (AS MANUFACTURED BY RUSKIN, NAILOR OR SAFE-AIR)
    - FABRICATE IN ACCORDANCE WITH SMACNA STANDARDS. PROVIDE END BEARINGS AND LOCKING, INDICATING QUADRANT REGULATORS. BLADE TO BE SINGLE THICKNESS WITH CONTINUOUS HINGE OR ROD.
  - BACKDRAFT DAMPERS (AS MANUFACTURED BY RUSKIN, NAILOR OR SAFE-AIR)
    - MULTIPLE BLADE, PARALLEL TYPE DAMPER CONSTRUCTED OF GALVANIZED STEEL WITH FELT OR FLEXIBLE VINYL SEALED EDGES, BALL BEARINGS, PIVOT PIN AND ADJUSTMENT DEVICE FOR VARYING PRESSURES.
  - ACCESS DOORS (AS MANUFACTURED BY RUSKIN, NAILOR OR SAFE-AIR)
    - FABRICATE IN ACCORDANCE WITH SMACNA STANDARDS. DOORS TO BE FABRICATED OF GALVANIZED STEEL WITH SEALING GASKET AND QUICK LOCKING DEVICE.
    - FOR INSULATED DUCTWORK, DOORS SHALL HAVE MINIMUM 1" INSULATION WITH SHEET METAL COVER.

**F. HIGH EFFICIENT BOILERS AND DOMESTIC WATER HEATERS SHALL HAVE STAINLESS STEEL OR PVC COMBUSTION AIR INTAKES AND FLUE GAS OUTLETS AS RECOMMENDED BY THE EQUIPMENT MANUFACTURER.**

**G. DOMESTIC WATER HEATER FLUES SHALL CONFORM TO THE SPECIFICATION FOR LOW PRESSURE DUCTWORK.**

**H. ALL GRILLES, REGISTERS, DIFFUSERS AND LOUVERS SHALL BE OF THE SIZES, TYPE, ETC., AS SHOWN ON THE PLAN AND SCHEDULES.**

**I. GRILLES, REGISTERS, LOUVERS AND DIFFUSERS AS MANUFACTURED BY KRUEGER, ANEMOSTAT OR TITUS COMPANY WILL BE CONSIDERED PROVIDED DIMENSIONS, CAPACITIES, CONSTRUCTION AND SOUND CHARACTERISTICS ARE COMPATIBLE AND SO SHOWN BY SHOP DRAWINGS AND PERFORMANCE SPECIFICATIONS. ALL GRILLES, REGISTERS AND DIFFUSERS SHALL BE FINISHED A COLOR AS SELECTED BY THE ARCHITECT.**

**J. FURNISH AND INSTALL ALL HOODS AND HOOD EXHAUST DUCTWORK. THE CONSTRUCTION OF THE HOODS AND HOOD EXHAUST DUCTWORK SHALL BE AS INDICATED ON THE DRAWINGS.**

**K. CENTRIFUGAL ROOF EXHAUST FANS, INTAKE, AND RELIEF VENTS AS MANUFACTURED BY LOREN COOK OR GREENHECK WILL BE CONSIDERED PROVIDED SIZE, PERFORMANCE RATINGS AND DIMENSIONS ARE COMPATIBLE AND SO SHOWN BY SHOP DRAWINGS AND PERFORMANCE SPECIFICATIONS.**

**L. ROOF MOUNTED EQUIPMENT SHALL BE SUPPORTED USING PATE CURBS.**

**M. LOUVERS (AS MANUFACTURED BY AMERICAN WARMING, ARROW OR RUSKIN)**

- EXTRUDED ALUMINUM, STORM-PROOF, DRAINABLE TYPE, WITH A 6" DEEP FRAME, CHANNEL FRAME, 1/2" BIRDSCREEN MOUNTED ON THE INTERIOR FACE AND PRIME COAT FINISH. FINAL COLOR SELECTED BY ARCHITECT. WEATHER-PROOF ALL JOINTS AROUND LOUVER.

**SECTION 235000 - HEAT GENERATION EQUIPMENT**

**A. GENERAL**

- FURNISH ALL MATERIAL, LABOR, EQUIPMENT, AND ACCESSORIES AS REQUIRED TO INSTALL EQUIPMENT AS INDICATED ON MECHANICAL DRAWINGS.
  - INSTALL IN FULL ACCORDANCE WITH LOCAL CODE REQUIREMENTS, OTHER SPECIFICATION SECTION REQUIREMENTS, AND MANUFACTURER RECOMMENDATIONS.

**B. SEE EQUIPMENT SCHEDULES ON MECHANICAL DRAWINGS.**

**SECTION 236000 - REFRIGERATION EQUIPMENT**

**A. GENERAL**

- FURNISH ALL MATERIAL, LABOR, EQUIPMENT, AND ACCESSORIES AS REQUIRED TO INSTALL EQUIPMENT AS INDICATED ON MECHANICAL DRAWINGS.
  - INSTALL IN FULL ACCORDANCE WITH LOCAL CODE REQUIREMENTS, OTHER SPECIFICATION SECTION REQUIREMENTS, AND MANUFACTURER RECOMMENDATIONS.

**B. SEE EQUIPMENT SCHEDULES ON MECHANICAL DRAWINGS.**

**SECTION 237000 - HVAC SYSTEMS AND EQUIPMENT**

**A. GENERAL**

- FURNISH ALL EQUIPMENT, MATERIAL, LABOR, TOOLS, ETC., FOR THE COMPLETE HVAC SYSTEM. INSTALL COMPLETE AND PLACE IN OPERATION.
  - CONTRACTORS BIDDING THIS PROJECT SHALL VISIT THIS SITE AND FAMILIARIZE THEMSELVES WITH ALL CONDITIONS AFFECTING THEIR WORK. SUBMISSION OF A BID ON THIS PROJECT SHALL BE CONSTRUED AS HAVING SUCH KNOWLEDGE.
  - VERIFY EXACT CONDITIONS IN FIELD AND COORDINATE WITH THESE DRAWINGS AND OTHER TRADES BEFORE BEGINNING NEW WORK.
  - DETERMINE EXACT LOCATIONS FOR ALL NEW AND RELOCATED EQUIPMENT, PIPING, CONDUITS AND DUCTWORK IN FIELD.
  - COORDINATE WORK OF THIS CONTRACT WITH OTHER TRADES. CONFLICTS SHALL IMMEDIATELY BE BROUGHT TO THE ATTENTION OF THE ARCHITECT. ARCHITECT'S RESOLUTION TO CONFLICTS SHALL BE FINAL.
  - ANY DISCREPANCIES BETWEEN WHAT IS SHOWN ON DRAWINGS OR SPECIFIED AND THE ACTUAL CONDITIONS IN THE FIELD SHALL IMMEDIATELY BE BROUGHT TO THE ATTENTION OF THE ARCHITECT BEFORE PROCEEDING.
  - BUILDING AND SURFACES DAMAGED DURING INSTALLATION SHALL BE REPAIRED, REPLACED, AND/OR RESTORED TO ORIGINAL CONDITION AFTER COMPLETION OF WORK AND BEFORE ACCEPTANCE BY OWNER.

**B. EQUIPMENT**

- MECHANICAL CONTRACTOR TO FURNISH ALL HVAC EQUIPMENT INDICATED AND/OR SCHEDULED ON THE DRAWINGS COMPLETE WITH BASES, ISOLATORS, SUPPORTS AND OTHER REQUIRED ACCESSORIES.
  - INSTALL COMPLETE AND PLACE IN PROPER OPERATION PER MANUFACTURER'S RECOMMENDATIONS, LUBRICATE AND ADJUST AS REQUIRED. FURNISH AND INSTALL CLEAN SET OF FILTERS PRIOR TO BALANCING.
  - EQUIPMENT TO BE MAKE AND MODEL AS SCHEDULED UNLESS ALTERNATE EQUIPMENT OF EQUIVALENT QUALITY AND PERFORMANCE IS SUBMITTED AS A SUBSTITUTION PRIOR TO BIDDING. ALL SUBSTITUTIONS ARE SUBJECT TO ACCEPTANCE WITHOUT QUALIFICATION BY OWNER, ENGINEER AND ARCHITECT.
  - CONTRACTOR SHALL PERFORM ROUTINE SERVICE INSPECTION OF ALL EXISTING HVAC EQUIPMENT TO REMAIN. LUBRICATE BEARING SERVICE CONTROL SYSTEMS, REPLACE FAN BELTS AND INSTALL NEW FILTERS IN EACH ROOFTOP UNIT.
  - CONTRACTOR SHALL FIELD VERIFY REFRIGERANT CHARGE AND ADD REFRIGERANT IF THE CHARGE IS LESS THAN MANUFACTURER'S SPECIFICATIONS.
  - SUBMIT SERVICE REPORT TO ANY MAJOR COMPONENT FAILURES OR MALFUNCTIONS. REPORT SHALL INCLUDE COST TO SERVICE ALL MALFUNCTIONING OR DAMAGED ITEMS LISTED. COST SHALL INCLUDE PARTS AND LABOR. EQUIPMENT SHALL BE PLACED IN FULL OPERATION WITH CONTROLS CALIBRATED UPON COMPLETION OF PROJECT.

**C. SEE EQUIPMENT SCHEDULES ON MECHANICAL DRAWINGS.**

ISSUED REVISIONS:

Nothing Bundt Cakes  
MECHANICAL SPECIFICATION (3 OF 3)



**ROOF TOP UNIT SCHEDULE**

UNIT ID	MANUFACTURER	MODEL	AREA SERVED	NOMINAL TONS	SUPPLY FAN				COOLING CAPACITY				HEATING CAPACITY (MBH)		ELECTRICAL DATA			EER/EER	OPERATING WEIGHT (LBS.)	REMARK
					SUPPLY AIR (CFM)	OUTSIDE AIR (CFM)	MAX. ESP (IN. OF W.G.)	TOTAL MBH	SENSIBLE MBH	AMBIENT TEMP. DB (°F)	ENTERING TEMP. DB / WB (°F)	INPUT(MBH)	OUTPUT(MBH)	VOLTS/PH/HZ	MCA (A)	MOCF (A)				
RTU-4A (E)	CARRIER(V.I.F.)	48HCFD07D2M5-G8211(V.I.F.)	SEE PLAN	6.0(V.I.F.)	2400(V.I.F.)	500	S.A.E	S.A.E	S.A.E	98.3	79.2/63.7	120(V.I.F.)	82.5(V.I.F)	208-230/3/60(V.I.F.)	43(V.I.F.)	50(V.I.F.)	16.0/(V.I.F.)	1300(V.I.F.)	1-10	
RTU-4B (N)	CARRIER(OR EQUIVALENT)	48FEEM07C2A50W9A0	SEE PLAN	6.0	2400	500	0.751	76.4	57.1	98.3	79.2/63.7	150	120	208-230/3/60	31	45	11.2/15.0	900	11-25	

**NOTES:**

- S.A.E - SAME AS EXISTING, V.I.F - VERIFY IN FIELD.
- EXISTING RTUs WITH ALL ACCESSORIES TO REMAIN AND TO BE REUSED.
- CONTRACTOR TO CONFIRM IF RTU IS WORKING AT ITS 100% RATED CAPACITY.
- CONTRACTOR TO FIELD VERIFY EXACT LOCATION AND CONFIGURATION OF RTU ON SITE.
- IF REQUIRED, PROVIDE NEW THERMOSTAT AND TEMPERATURE SENSOR COMPATIBLE WITH EXISTING RTUs. COORDINATE FINAL LOCATION WITH ARCHITECT/OWNER.
- CONTRACTOR TO REBALANCE OUTSIDE AIR & RETURN AIR DAMPER ON EXISTING RTUs TO MATCH VALUES MENTIONED IN ABOVE TABLE.
- REPLACE ALL FILTERS, IF REQUIRED. PROVIDE MINIMUM MERV-13 FILTERS.
- REUSE EXISTING SMOKE DETECTOR ON RETURN AIR SIDE. IF EXISTING SMOKE DETECTOR IS NOT IN GOOD CONDITION TO REUSE, THEN INSTALL NEW ONE.
- PROVIDE ENTHALPY ECONOMIZER WITH BAROMETRIC RELIEF AND FDD.
- EXISTING CONDENSATE DRAIN FROM EXISTING RTU TO REMAIN AS IS. CONTRACTOR TO FLUSH THE EXISTING DRAIN LINES. REPLACE AS/IF REQUIRED.
- ALL EQUIPMENT MUST BE HIGH EFFICIENT, MEETING OR EXCEEDING THE BRANDS MINIMUM REQUIREMENTS.
- ELECTRICAL CONNECTION TO BE SINGLE POINT AND TO BE THROUGH THE BOTTOM OF THE UNIT.
- PROVIDE DISCONNECT SWITCH AND AN UNPOWERED GFCI RECEPTACLE.
- 14" ROOF CURB - CONTRACTOR SHALL FIELD INSULATE. SHIP ASAP AHEAD OF THE UNIT.
- CONDENSATE DRAIN WITH 2" DEEP VENTED TRAP DISCHARGE TO SPLASH BLOCK ON ROOF.
- CABINET WITH 1/2" FIBERGLASS INSULATION.
- DRY BULB & ENTHALPY ECONOMIZER WITH BAROMETRIC RELIEF / 25% MANUAL OUTSIDE AIR DAMPER ASSEMBLY WITH HOOD (ZONE 'E' ONLY). PROVIDE FDD.
- PROVIDE 8-WIRE, 24 VAC, AUTOMATIC CHANGEOVER, 2-STAGE HEAT / COOL, REMOTELY PROGRAMMABLE THERMOSTAT.
- REMOTE SENSORS SHALL BE PROVIDED IN SPACE WIRED BACK TO PROGRAMMABLE, 24 HOUR, 7 DAY, THERMOSTATS.
- ANTI SHORT CYCLE TIMER.
- THROWAWAY 2" FILTERS (MERV 13).
- WHERE REQUIRED, PROVIDE LOW AMBIENT COOLING CAPABILITY DOWN TO 0 DEGREES F.
- PROVIDE ALL COMPRESSORS WITH 5 YEAR WARRANTY.
- RETURN AIR SMOKE DETECTOR - UNIT MOUNTED.
- PROVIDE HOT GAS BYPASS FOR HUMIDITY CONTROL.

**EXHAUST FAN SCHEDULE**

UNIT ID	MANUFACTURER	MODEL	AREA SERVED	TYPE	CFM	FAN RPM	E.S.P. (IN. W.G.)	ELECTRICAL DETAILS				WEIGHT (LBS)	NOTES
								PH/VOLT/HZ	WATTS (W)	MCA	MOCF		
EF-1(N)	GREENHECK OR EQUIVALENT	SP-B110	RESTROOM	CEILING MOUNTED	70	950	0.68	1/115/60	80	1.4	15	20	1-6,8,9
EF-2(N)	GREENHECK OR EQUIVALENT	SP-1P0810W	UTILITY	CEILING MOUNTED	100	894	0.5	1/115/60	2	0.4	15	20	1-5,8-10
EF-3(N)	GREENHECK OR EQUIVALENT	CUE-140HP-VG	OVEN HOOD	ROOF EXHAUST	800	1468	1	1/115/60	-	8.2	15	85	1-5,7-9, 11-12

**NOTES / ACCESSORIES:**

- VARIABLE SPEED CONTROL.
- SPEED CONTROL SWITCH.
- AMCA SEAL & UL CERTIFIED.
- THERMAL OVERLOAD PROTECTION.
- GRAVITY BACKDRAFT DAMPER.
- INTERLOCK THE RESTROOM FANS WITH THE LIGHT SWITCH.
- INTERLOCK EF-3(N) WITH RTU-4A(N) TO OPERATE WHEN OVEN IS IN USE.
- PROVIDE ROOF VENT CAP WITH BIRDSCREEN AND BACKDRAFT DAMPER FOR EXHAUST FANS.
- PROVIDE ACCESS DOOR FOR SERVICE AND MAINTENANCE IN HARD CEILINGS.
- FAN TO RUN CONTINUOUSLY DURING OCCUPIED HOURS VIA TIME CLOCK. E.C TO PROVIDE AND INSTALL TIME CLOCK.
- INTERLOCK FAN WITH RTU-4A(E) AND RTU-4B(N) TO OPERATE WHEN OVEN IS IN USE.
- MECHANICAL CONTRACTOR SHALL PROVIDE X-LINE STARTER. PROVIDE WITH VARI-GREEN MOTOR. PROVIDE WITH VENTED ROOF CURB. FAN SHALL BE RATED FOR KITCHEN DUTY. COORDINATE WITH OVEN/HOOD EQUIPMENT SUBMITTAL SHEETS.

**AIR BALANCE**

UNIT	AREA SERVED	SUPPLY AIR	OUTSIDE AIR	RETURN AIR	EXHAUST AIR
RTU-4A(E)	SEE PLAN	2400 CFM	500 CFM	1900 CFM	-
RTU-4B(N)	SEE PLAN	2400 CFM	500 CFM	1900 CFM	-
EF-1(N)	SEE PLAN	-	-	-	70 CFM
EF-2(N)	SEE PLAN	-	-	-	100 CFM
EF-3(N)	SEE PLAN	-	-	-	800 CFM
<b>TOTAL:</b>		<b>4800 CFM</b>	<b>1000 CFM</b>	<b>3800 CFM</b>	<b>970 CFM</b>
<b>BUILDING PRESSURE:</b>		30 CFM		<b>POSITIVE</b>	

1. CONTRACTOR TO BALANCE OUTSIDE AIR & RETURN AIR DAMPERS ON RTU TO MATCH VALUES MENTIONED IN ABOVE TABLE.

**DEHUMIDIFICATION UNIT**

UNIT ID	MANUFACTURER	MODEL	AREA SERVED	CFM	E.S.P. (IN. W.G.)	ELECTRICAL DETAILS			DRAIN	DIMENSIONS (IN)	NOTES
						PH/VOLT/HZ	WATTS (W)	AMPS			
DU-1(N)	QUEST OR EQUIVALENT	155 DUAL	SALES	350	0.2	1/120/60	920	8	3/4"	20x22x38	1,2,3
DU-2(N)	QUEST OR EQUIVALENT	155 DUAL	BAKING	350	0.2	1/120/60	920	8	3/4"	20x22x38	1,2,3

**NOTES / ACCESSORIES:**

- SUSPEND UNIT FROM STRUCTURAL WHILE MAINTAINING ACCESSIBILITY.
- 3/4" DRAIN TO BE ROUTED TO NEAREST OPEN SITE DRAIN AND PROVIDED WITH 1" AIR GAP. PROVIDE EXTERNAL CONDENSATE PUMP.
- UTILISE MANUFACTURER'S RECOMMENDED OUTLET DUCT COLLARS FOR DISCHARGE.

**VENTILATION CALCULATION TABLE**

ROOM NAME	AREA (SQ.FT.)	NUMBER OF PEOPLE/1000sq.ft AS PER IMC 2021	NUMBER OF PEOPLE AS PER IMC 2021	NUMBER OF PEOPLE AS PER ARCH SET	FINAL PEOPLE NO.	MIN OUTSIDE AIR AS PER IMC 2021		REQUIRED OUTSIDE AIR	REQUIRED OUTSIDE AIR WITH EFFECTIVENESS (0.8)	PROVIDED OUTSIDE AIR (CFM)	EXHAUST AIRFLOW RATE (CFM/SQ.FT) OR (CFM/FIXTURE)	REQUIRED EXHAUST (CFM)	PROVIDED EXHAUST (CFM)
						CFM/PEOPLE	CFM/SQ.FT						
LOBBY/SALES	323	15	5	5	5	7.5	0.12	77	96	450	0	0	0
UTILITY	280	20	6	6	6	7.5	0.12	79	99	250	0.7	100	900
CRAFT AREA	190	100	19	5	5	7.5	0.18	72	90	150	0	0	0
FROST/BAKING AREA	280	100	28	5	5	7.5	0.18	88	110	150	0	0	0
RESTROOM	47	0	0	0	0	0	0	0	0	0	70	70	70
<b>TOTAL</b>	<b>1120</b>	<b>-</b>	<b>-</b>	<b>-</b>	<b>21</b>	<b>-</b>	<b>-</b>	<b>316</b>	<b>-</b>	<b>1000</b>	<b>-</b>	<b>170</b>	<b>970</b>

**MECHANICAL AIR TERMINAL DEVICES SCHEDULE**

TAG	MANUFACTURER	MODEL	FRAME OR BORDER TYPE	MODULE SIZE	MATERIAL	FINISH	NOTES
CDS-1	TITUS	TDC-AA	LAY-IN	24"x24"/12"x12"	ALUMINUM	WHITE	1-4
CDR-1	TITUS	50F	LAY-IN	24"x24"	ALUMINUM	WHITE	1-4

**NOTES:**

- UNLESS OTHERWISE NOTED, BRANCH DUCTS SERVING AIR DEVICES SHALL BE SAME SIZE AS NECK OF AIR DEVICE.
- PROVIDE FRAMES FOR SURFACE MOUNTING IN AREAS WITH HARD CEILINGS.
- COORDINATE FINAL COLOUR/FINISH WITH ARCHITECT/OWNER.
- MENTIONED SIZES ON PLAN ARE NECK SIZE OTHER THAN SQUARE FACE DIFFUSERS.

**FOR ROUND NECK DIFFUSER NECK SIZE SHALL BE :**

- 16" DIA : 751-900
- 14" DIA : 551-750
- 12" DIA : 401-550
- 10" DIA : 226-400
- 8" DIA : 101-225
- 6" DIA : 0-100

**THERMOSTAT SCHEDULE**

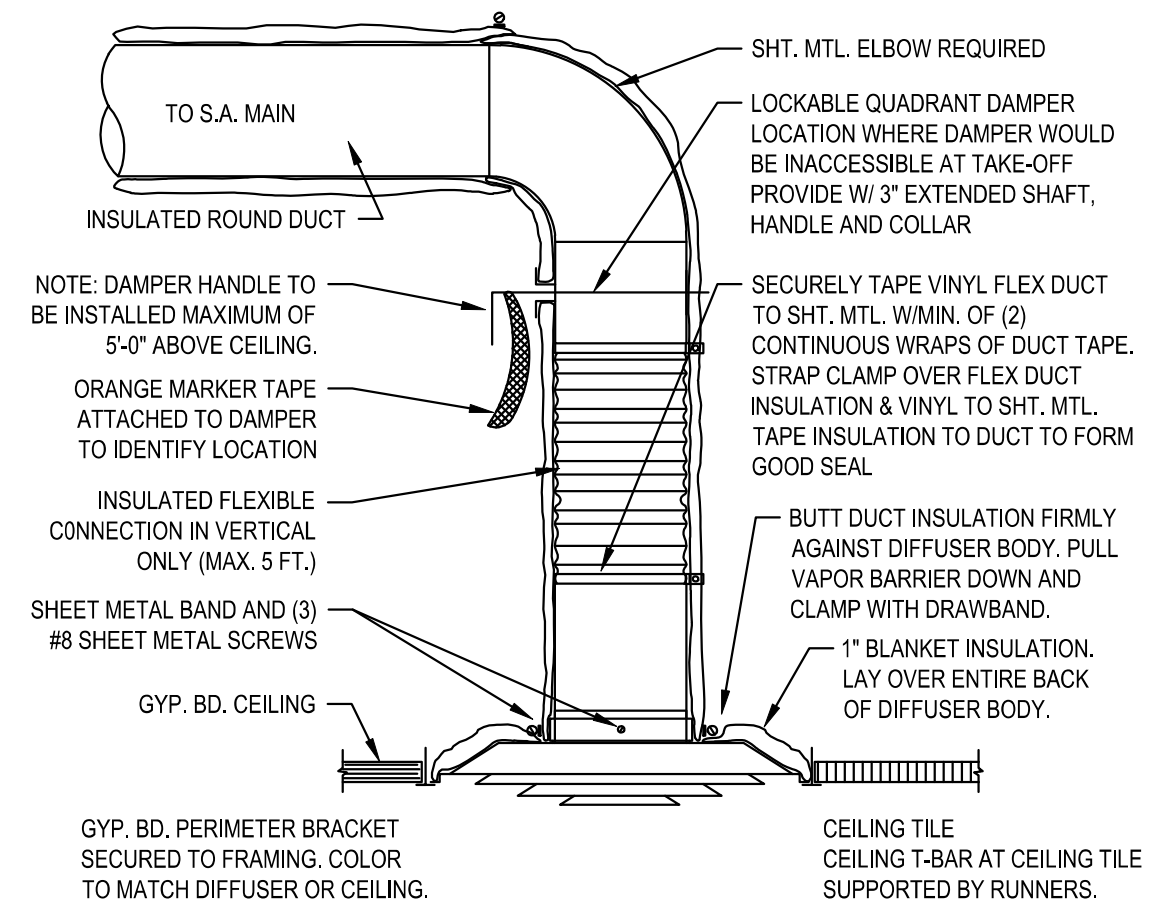
TAG	SERVICE AND LOCATION	OCCUPIED		UNOCCUPIED		NOTES
		COOLING	HEATING	COOLING	HEATING	
RTU-4A (E)	SALES	75	70	78	60	1-3
RTU-4B (N)	BAKING AREA	75	70	78	60	1-3

**NOTES:**

- CONTRACTOR SHALL COORDINATE EXACT OPERATIONAL TIMES WITH OWNER/MANAGER PRIOR TO PROGRAMMING.
- CONTRACTOR SHALL COORDINATE RESTROOM EXHAUST FAN TIMER.
- CONTRACTOR MUST VERIFY THAT HUMIDITY CONTROLS AND SENSORS FUNCTION PER MANUFACTURER'S SPECIFICATIONS. SET TO 50% RELATIVE HUMIDITY IN THE SPACE.

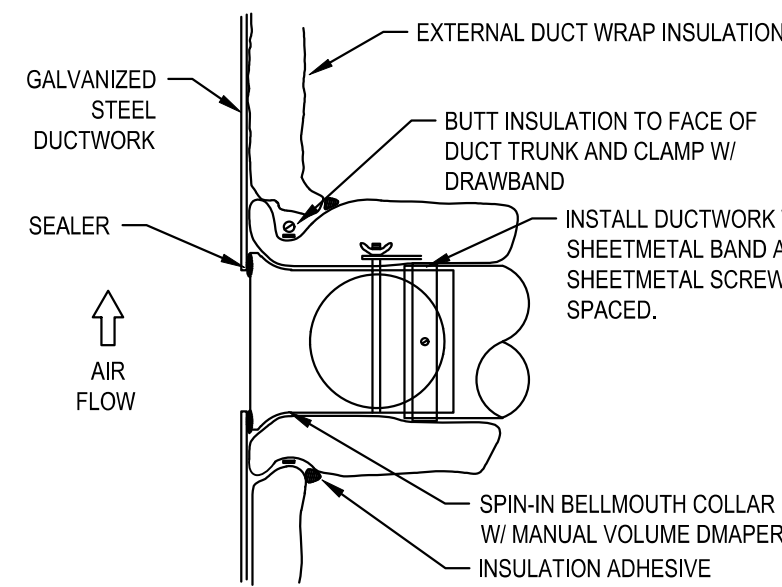
ISSUED REVISIONS:


Nothing Bundt Cakes  
MECHANICAL SCHEDULES



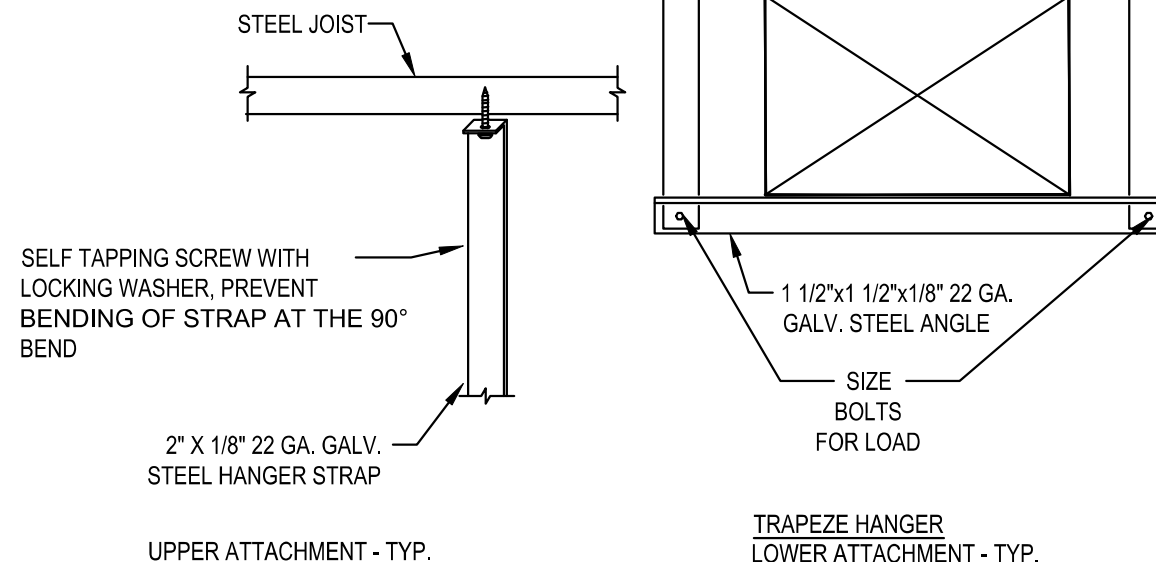
**CONNECTION DIFFUSER DETAIL**

N.T.S.



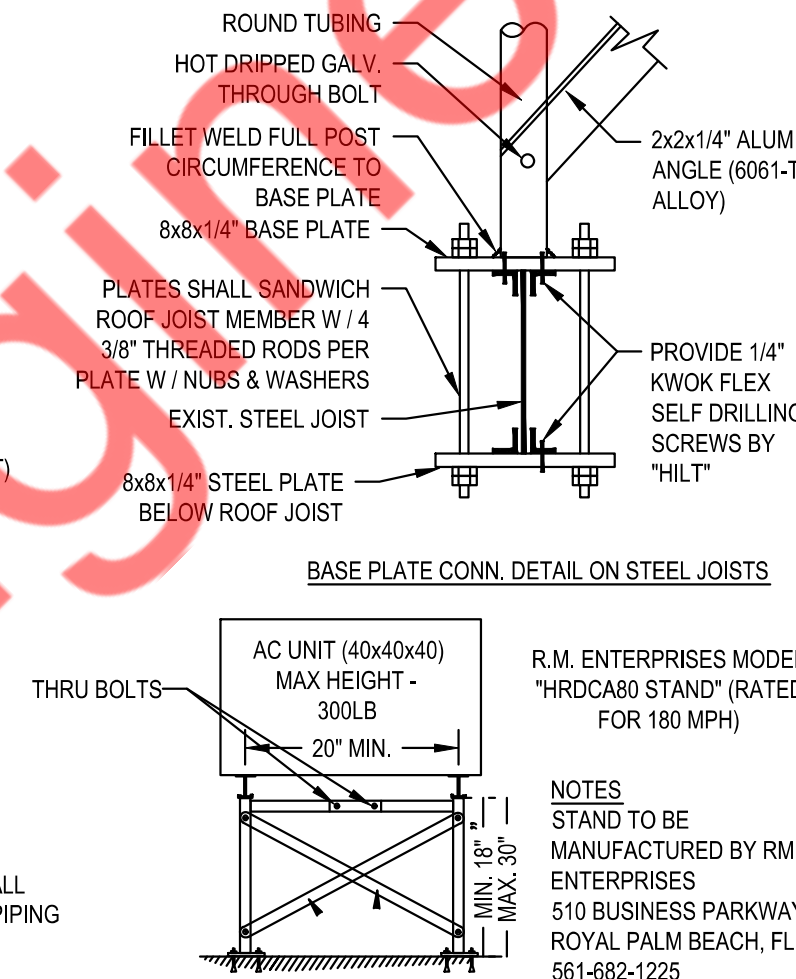
**CONNECTION DUCT FITTING DETAIL**

N.T.S.



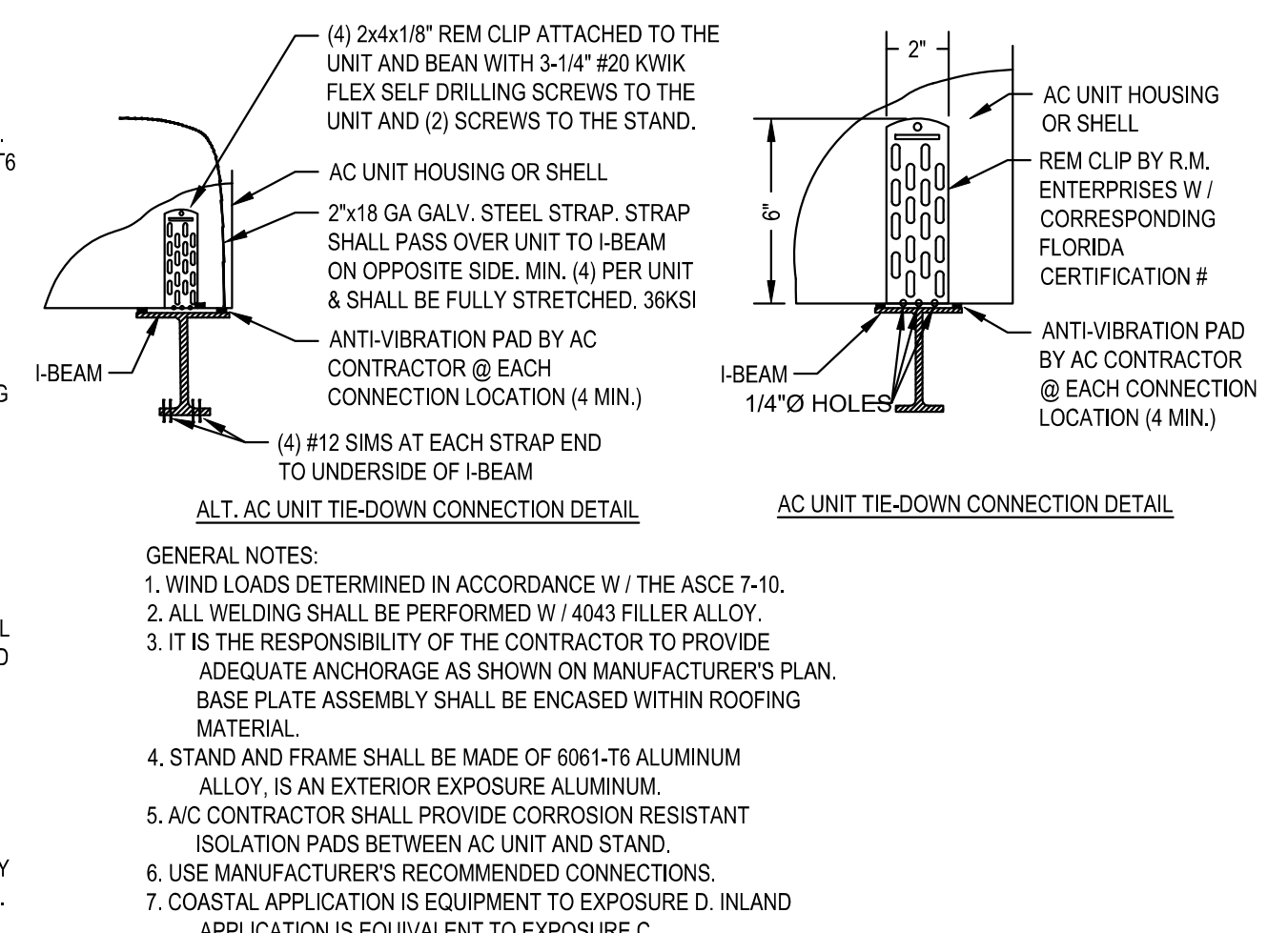
**TYPICAL DUCT HANGER DETAIL**

N.T.S.



**REFRIGERATION SYSTEM FRAMING SUPPORT**

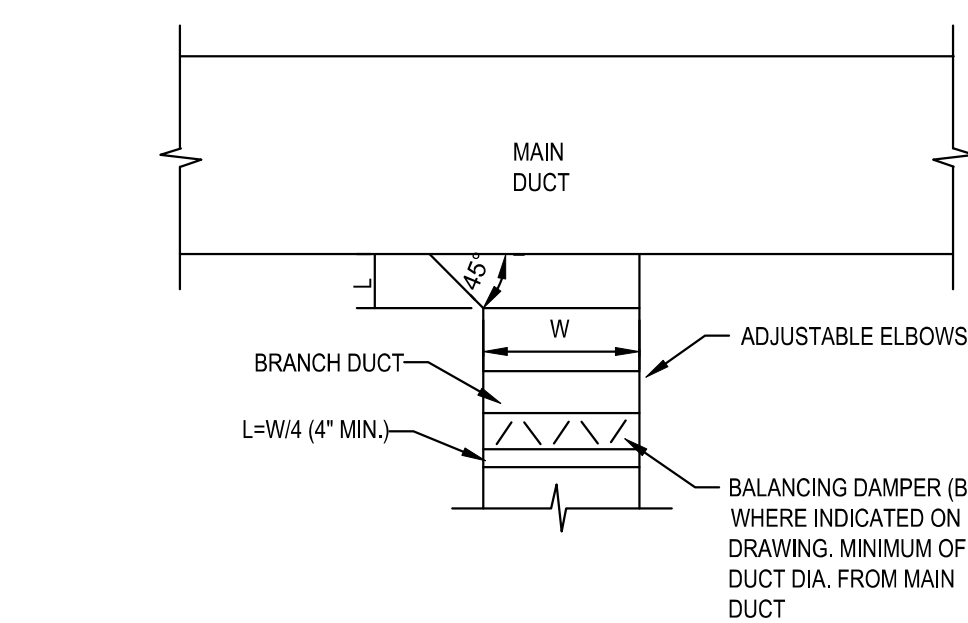
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**ALT. AC UNIT TIE-DOWN CONNECTION DETAIL**

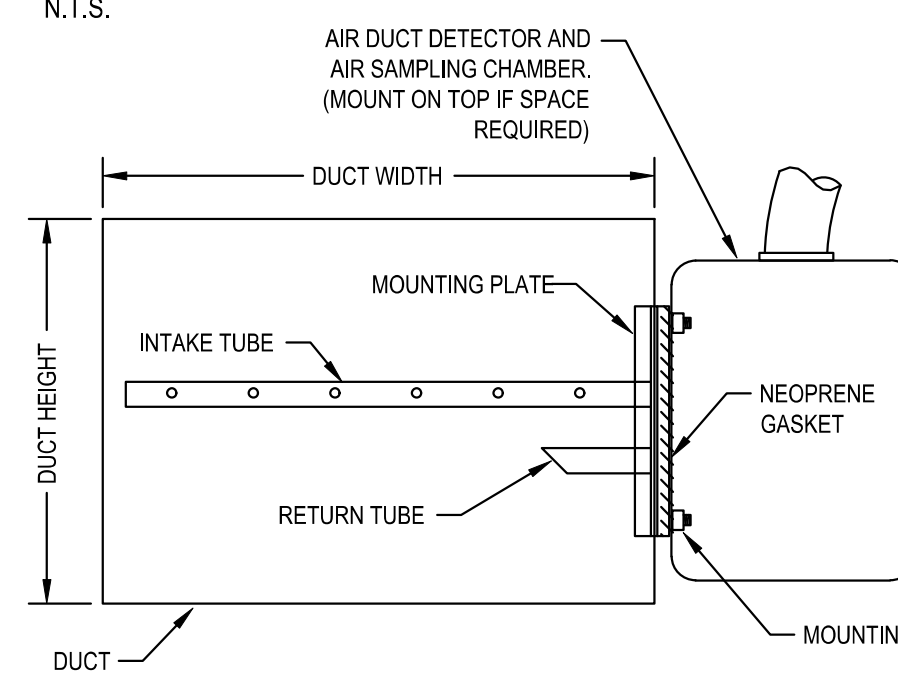
**AC UNIT TIE-DOWN CONNECTION DETAIL**

- GENERAL NOTES:
1. WIND LOADS DETERMINED IN ACCORDANCE W/ THE ASCE 7-10.
  2. ALL WELDING SHALL BE PERFORMED W/ 4043 FILLER ALLOY.
  3. IT IS THE RESPONSIBILITY OF THE CONTRACTOR TO PROVIDE ADEQUATE ANCHORAGE AS SHOWN ON MANUFACTURER'S PLAN. BASE PLATE ASSEMBLY SHALL BE ENCASED WITHIN ROOFING MATERIAL.
  4. STAND AND FRAME SHALL BE MADE OF 6061-T6 ALUMINUM ALLOY. IS AN EXTERIOR EXPOSURE ALUMINUM.
  5. A/C CONTRACTOR SHALL PROVIDE CORROSION RESISTANT ISOLATION PADS BETWEEN AC UNIT AND STAND.
  6. USE MANUFACTURER'S RECOMMENDED CONNECTIONS.
  7. COASTAL APPLICATION IS EQUIPMENT TO EXPOSURE D. INLAND APPLICATION IS EQUIVALENT TO EXPOSURE C.



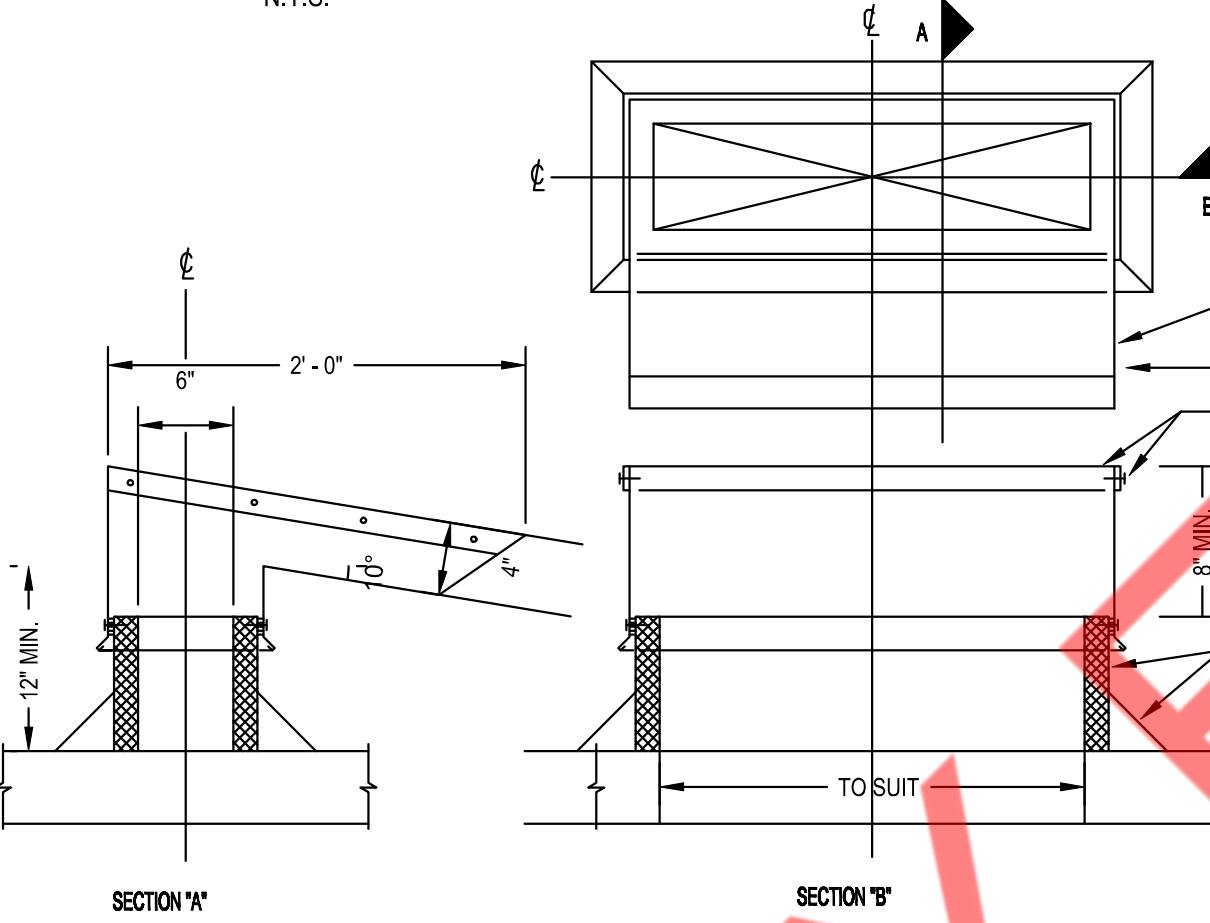
**RECTANGULAR BRANCH CONNECTION**

N.T.S.



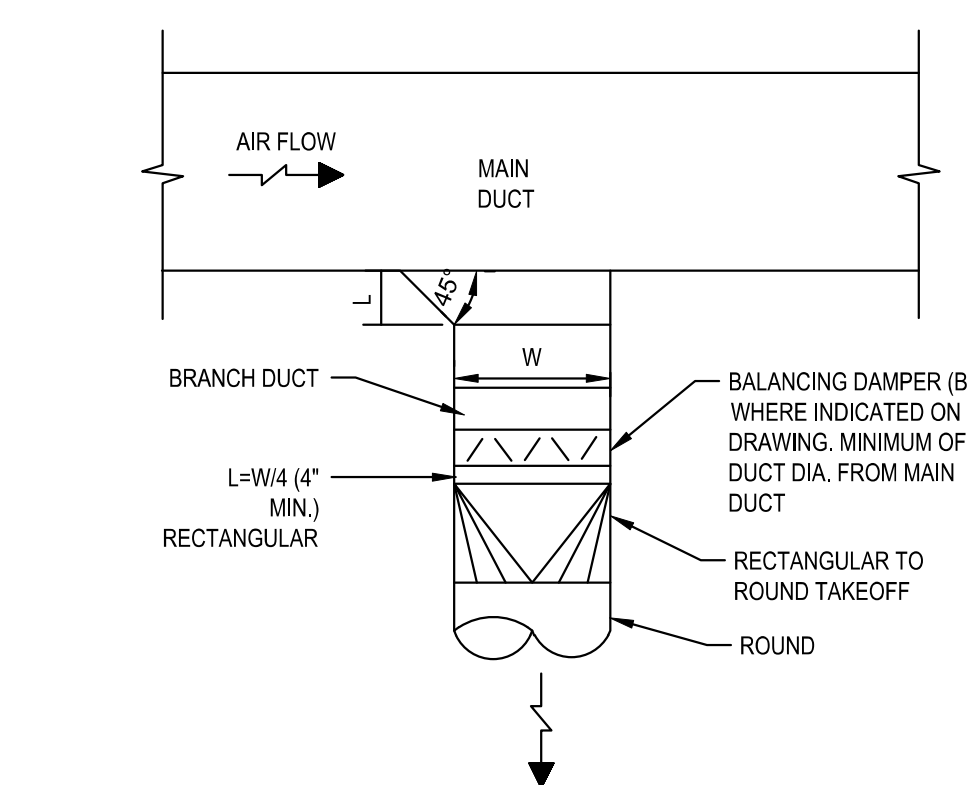
**SMOKE DETECTOR MOUNTING DETAIL**

N.T.S.



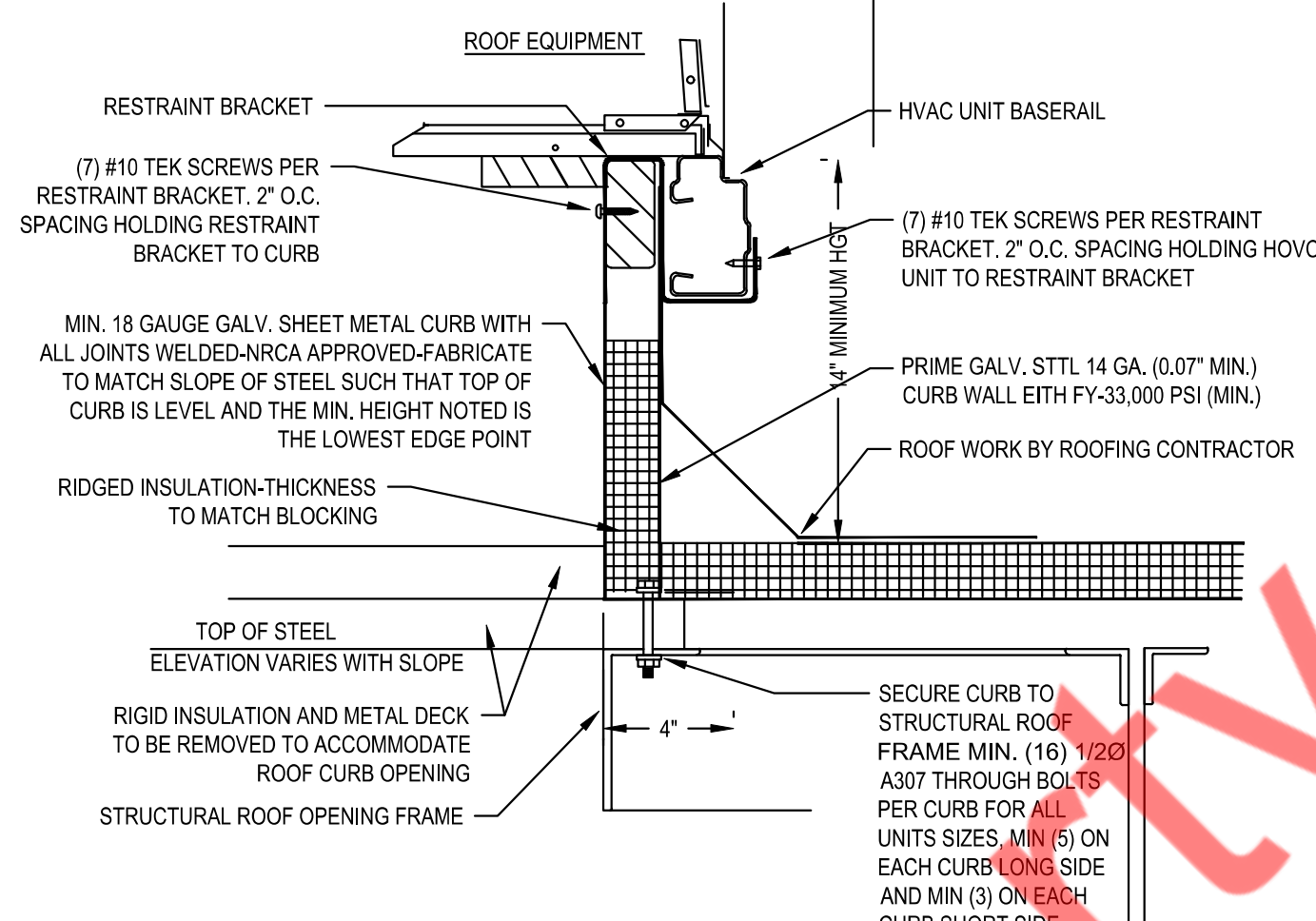
**REFRIGERANT PIPING CURB DETAIL**

N.T.S.



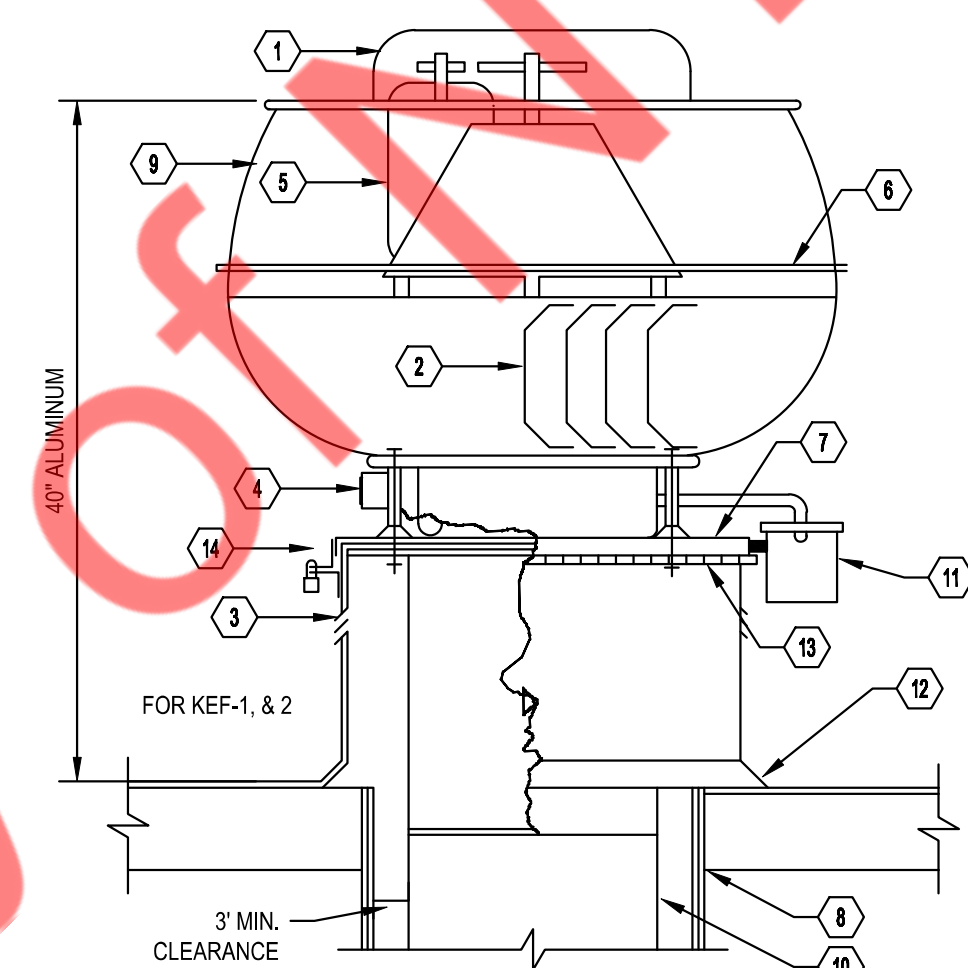
**ROUND BRANCH CONNECTION**

N.T.S.



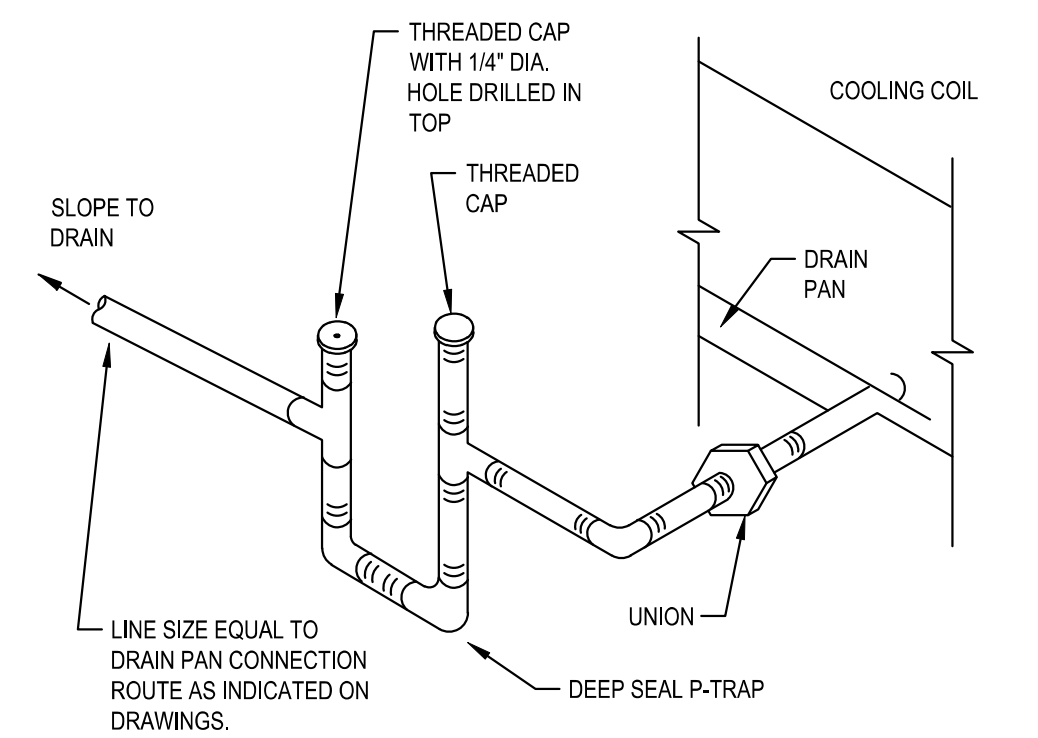
**TYPICAL EQUIPMENT TIE DOWN DETAIL**

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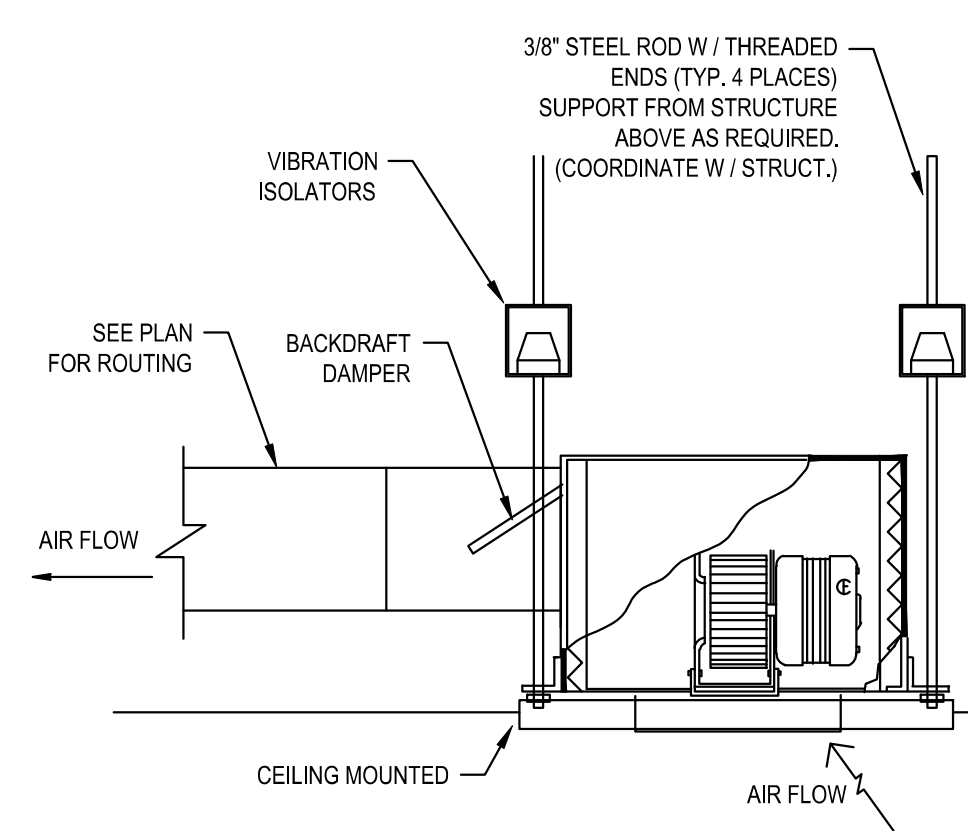
**HOOD EXHAUST FAN DETAIL**

N.T.S.



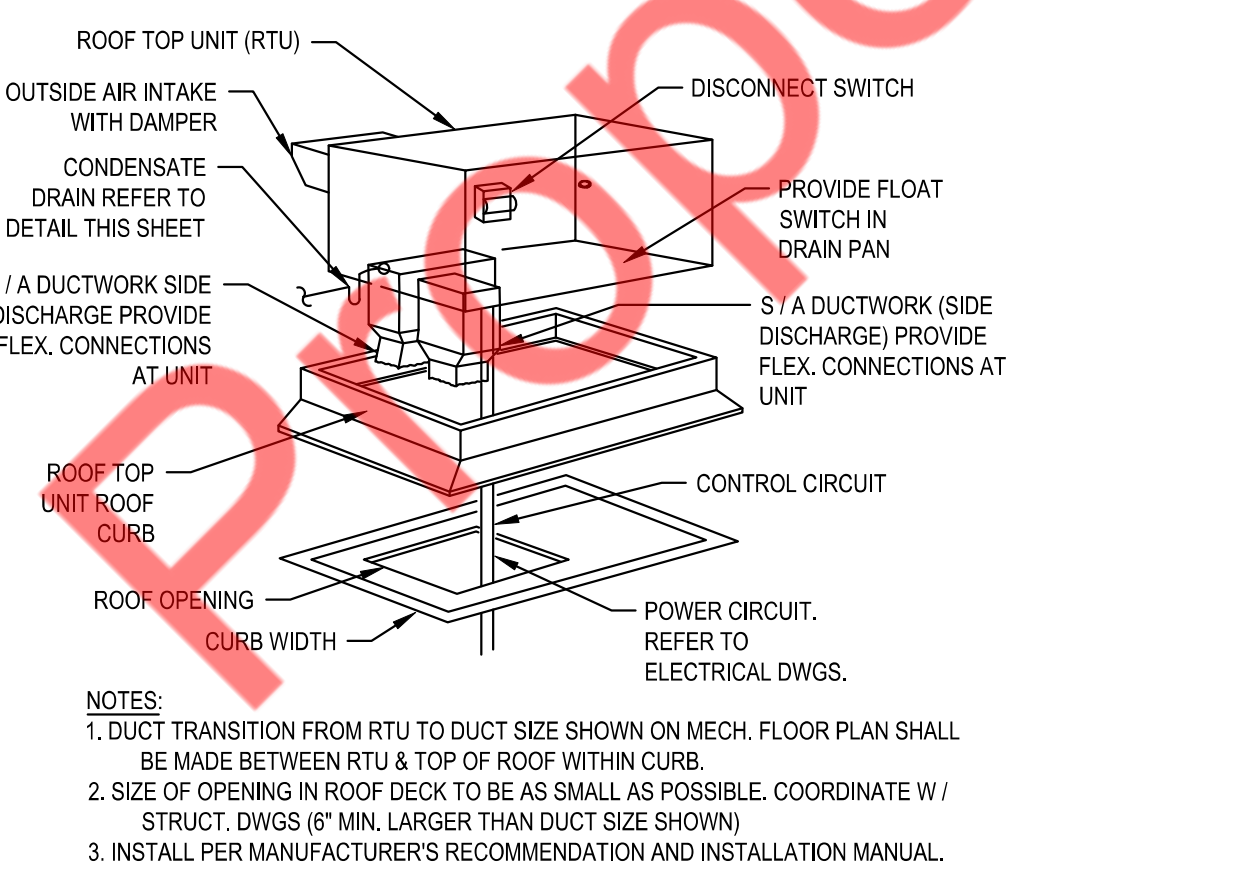
**CONDENSATE P-TRAP DETAIL**

N.T.S.



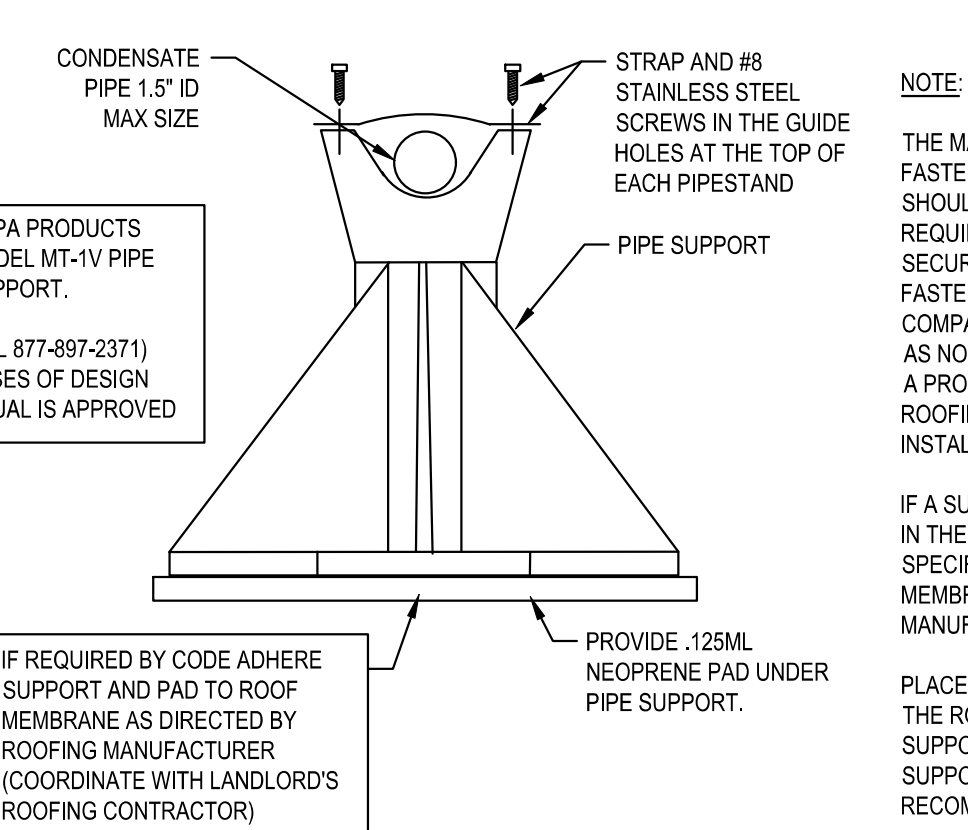
**CABINET EXHAUST FAN DETAIL**

N.T.S.



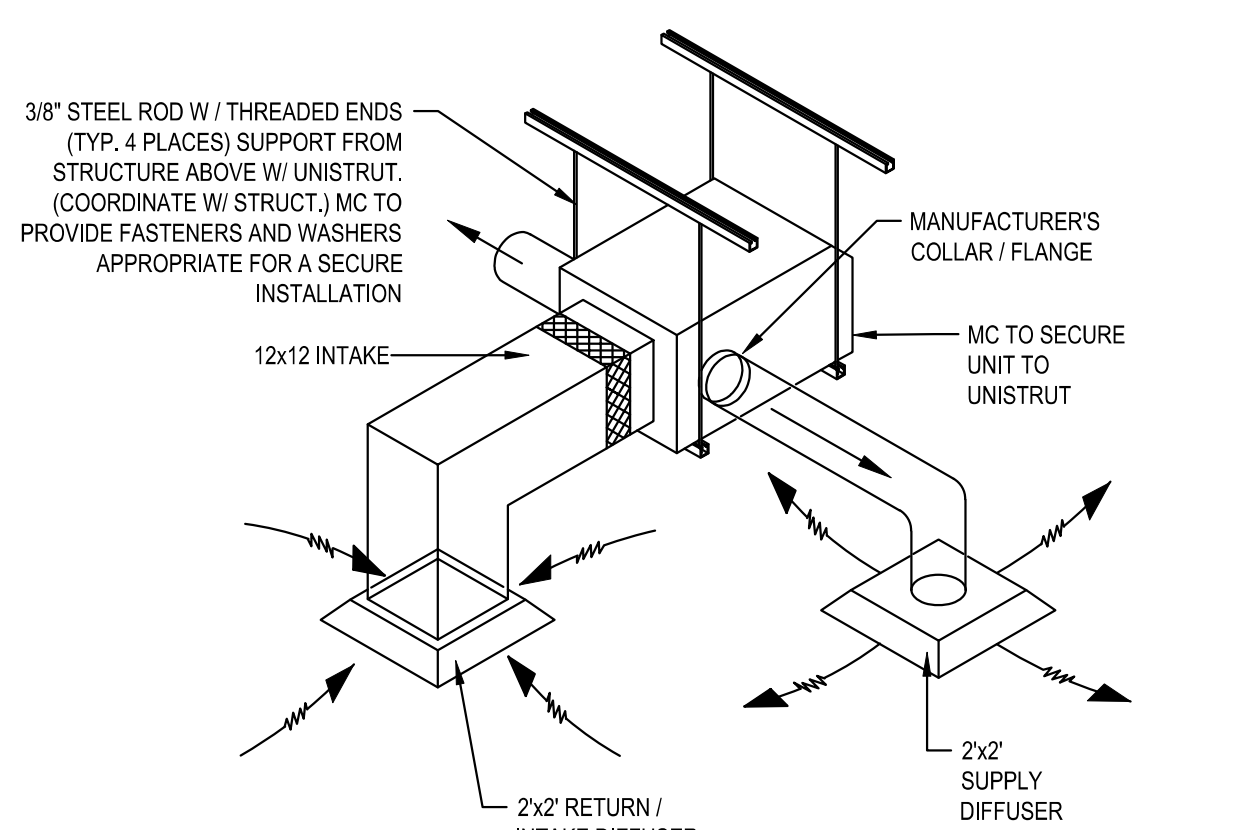
**ROOF TOP UNIT MOUNTING DETAIL**

N.T.S.



**CONDENSATE PIPE SUPPORT DETAIL**

N.T.S.



**DUCTED DEHUMIDIFIER DETAIL**

N.T.S.

ISSUED REVISIONS:


Item No.: \_\_\_\_\_  
Project: \_\_\_\_\_  
Quantity: \_\_\_\_\_

**Double Rack Oven - Gas**

**Model: LRO-2G4**



Model LRO-2G4 Shown (Rack not included)

Maximum Capacities per Oven:	
18" x 26" full-size Sheet Pans †	40
12" x 20" x 4" Hotel Pans ‡	26
1 lb loaves of bread	200
1-1/2 lb loaves of bread	150

† Based on 3" spacing ‡ Based on 6" Spacing



Meets ANSI Z83.11 and NSF 4 Standards

**Short Bid Specification:**

Rack oven shall be an **LBC Bakery Equipment Model LRO-2G4** 290 kBTU/hr gas heated, rotating, double rack capacity oven with: vertiflow heat exchanger, waterfall type steam generation system and 5" thick compartment insulation. Rated at 0" combustible wall clearance (sides and back) with heavy-duty rack lift with gear driven rotation system, digital control, integrated hood meeting NFPA 96 and Type I & II construction standards, plus all the features listed.

**Standard Product Warranty:**

1 Year Parts and Labor (Contiguous US, Alaska, Hawaii and Canada)

**Construction Features:**

- Heavy-duty stainless steel interior and exterior
- Cooking compartment insulated with 5" high-temp insulation
- Automatic, heavy-duty "B" style lift and gear-driven rotation system
- Interior door safety release mechanism
- Oven accommodates two single or one double rack

**Performance Features:**

- 100-525°F temperature range
- Vertiflow heat exchanger uses natural draft effect for combustion air
- Burner manifold uses inshot burners with hot surface ignitor
- High volume, waterfall steam system
- Three-point air circulation system with adjustable shutters
- Self adjusting clutch protects operator and prevents oven damage
- Rack drive automatically stops, lifts and lowers with door operation
- Racks load at floor level (no ramp)

**Integrated Hood Features and Performance:**

- Meets the construction requirements of NFPA 96 & UMC for Type I & II Hoods (fire system, if required, by others)
- Fully integrated hood with single point exhaust connection
- 20 ga fully welded stainless steel body construction
- 5.9 sqft hood capture area. Filter velocity = 120 fpm @ 0.3 inwc and 800 cfm.

**Control Features:**

- 99 programmable recipes
- 6 Quick Select recipe buttons
- Single-event cooking
- Steam, Vent, Blower Delay and Pulse Air
- Selectable Automatic Temperature Setback

Sheet Number LRO-2G4 (Rev C - 5/16)

**Double Rack Oven - Gas**

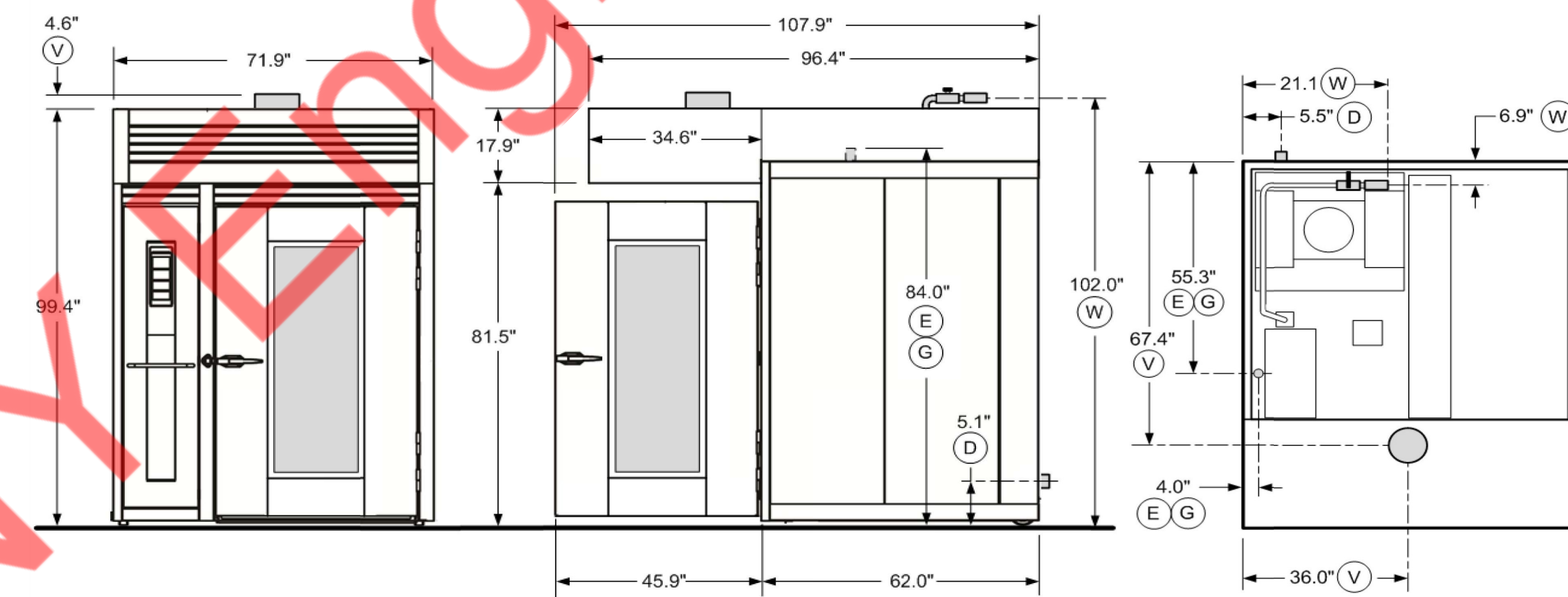
**Model: LRO-2G4**

**Installation Requirements:**

- Oven ships split into two halves for movement through 36" opening. Two (2) crates = 114"H x 46"W x 70"D each.
- 112" ceiling clearance required for tip-up
- No buried utilities
- Floor must be noncombustible supported by noncombustible structure
- Clearance from combustible surfaces: 0", sides and back

**Options & Accessories:**

- LP Gas
- "A" Lift
- "C" Lift
- 120V,3ph / 240V,3ph,60hz Electrical
- 120V,1ph / 480V,3ph,60Hz Electrical
- Manual Backup Control
- Single or Double Racks
- Correctional Package



(E) Electrical Requirements:					Utility Requirements:			
Elec Choices	Voltage	Total kW	MCA	MOP	(V) Vent	(G) Gas	(W) Water	(D) Drain
Standard	120V,3ph / 208V,3ph,60Hz	1.8	15	15	8" dia collar (vent not included)	1" NPT, 290 kBTU/hr, 5-14 inwc	1/2"NPT, 9 gpm flow @ 40 psi	3/4" NPT, 210 deg F, 1 gpm max
Option	120V,3ph / 240V,3ph,60Hz	1.8	15	15	†		‡	
Option	120V,1ph / 480V,3ph,60Hz	1.5 / 1.8	15 / 15	20 / 20				

**IMPORTANT:** Ensure your water supply meets these minimum water quality specs:

Water Quality Requirements:			
Parameter	Value	Parameter	Value
Alkalinity	< 22 ppm	Magnesium	< 0.65 ppm
Aluminum	< 17 ppb	pH	8.5
Calcium	< 3 ppm	Sodium	< 8.5 ppm
Free Chlorine Residual	< 0.6 ppm	Total Hardness	< 11.9 ppm

Shipping Information:			
Crate H x W x D	Weight		Freight Class
	Actual	Shipping	
2 ea 114"H x 46"W x 70"D	3380 lbs	4380 lbs	85

† Consult your local codes for installation requirements  
‡ Normal water consumption is approximately 4.5 gal/hr

ISSUED REVISIONS:

Nothing Bundt Cakes  
MECHANICAL DETAILS ( 2 OF 2 )

**THERMOSTATIC CONTROL NOTES:-**

**A. C403.2.4.1 THERMOSTATIC CONTROLS.**

THE SUPPLY OF HEATING AND COOLING ENERGY TO EACH ZONE SHALL BE CONTROLLED BY INDIVIDUAL THERMOSTATIC CONTROLS CAPABLE OF RESPONDING TO TEMPERATURE WITHIN THE ZONE. WHERE HUMIDIFICATION OR DEHUMIDIFICATION OR BOTH IS PROVIDED, AT LEAST ONE HUMIDITY CONTROL DEVICE SHALL BE PROVIDED FOR EACH HUMIDITY CONTROL SYSTEM.

EXCEPTION: INDEPENDENT PERIMETER SYSTEMS THAT ARE DESIGNED TO OFFSET ONLY BUILDING ENVELOPE HEAT LOSSES, GAINS OR BOTH SERVING ONE OR MORE PERIMETER ZONES ALSO SERVED BY AN INTERIOR SYSTEM PROVIDED:

- 1.THE PERIMETER SYSTEM INCLUDES AT LEAST ONE THERMOSTATIC CONTROL ZONE FOR EACH BUILDING EXPOSURE HAVING EXTERIOR WALLS FACING ONLY ONE ORIENTATION (WITHIN +/-45 DEGREES) (0.8 RAD) FOR MORE THAN 50 CONTIGUOUS FEET (15 240 MM); AND
- 2.THE PERIMETER SYSTEM HEATING AND COOLING SUPPLY IS CONTROLLED BY THERMOSTATS LOCATED WITHIN THE ZONES SERVED BY THE SYSTEM.

**B. C403.2.4.1.2 DEADBAND.**

WHERE USED TO CONTROL BOTH HEATING AND COOLING, ZONE THERMOSTATIC CONTROLS SHALL BE CAPABLE OF PROVIDING A TEMPERATURE RANGE OR DEADBAND OF AT LEAST 5°F (2.8°C) WITHIN WHICH THE SUPPLY OF HEATING AND COOLING ENERGY TO THE ZONE IS CAPABLE OF BEING SHUT OFF OR REDUCED TO A MINIMUM.

EXCEPTIONS:

- 1.THERMOSTATS REQUIRING MANUAL CHANGEOVER BETWEEN HEATING AND COOLING MODES.
- 2.OCCUPANCIES OR APPLICATIONS REQUIRING PRECISION IN INDOOR TEMPERATURE CONTROL AS APPROVED BY THE CODE OFFICIAL.

**C. C403.2.4.1.3 SET POINT OVERLAP RESTRICTION.**

WHERE A ZONE HAS A SEPARATE HEATING AND A SEPARATE COOLING THERMOSTATIC CONTROL LOCATED WITHIN THE ZONE, A LIMIT SWITCH, MECHANICAL STOP OR DIRECT DIGITAL CONTROL SYSTEM WITH SOFTWARE PROGRAMMING SHALL BE PROVIDED WITH THE CAPABILITY TO PREVENT THE HEATING SET POINT FROM EXCEEDING THE COOLING SET POINT AND TO MAINTAIN A DEADBAND IN ACCORDANCE WITH SECTION C403.2.4.1.2.

**D. C403.2.4.2 OFF-HOUR CONTROLS.**

EACH ZONE SHALL BE PROVIDED WITH THERMOSTATIC SETBACK CONTROLS THAT ARE CONTROLLED BY EITHER AN AUTOMATIC TIME CLOCK OR PROGRAMMABLE CONTROL SYSTEM.

EXCEPTIONS:

- 1.ZONES THAT WILL BE OPERATED CONTINUOUSLY.
- 2.ZONES WITH A FULL HVAC LOAD DEMAND NOT EXCEEDING 6,800 BTU/H (2 KW) AND HAVING A READILY ACCESSIBLE MANUAL SHUTOFF SWITCH.

**E. C403.2.4.2.1 THERMOSTATIC SETBACK CAPABILITIES.**

THERMOSTATIC SETBACK CONTROLS SHALL HAVE THE CAPABILITY 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).

**F. AUTOMATIC SETBACK AND SHUTDOWN CAPABILITIES**

AUTOMATIC TIME CLOCK OR PROGRAMMABLE 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 AT LEAST 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 CAPABLE OF BEING ADJUSTED TO OPERATE THE SYSTEM FOR UP TO 2 HOURS; OR AN OCCUPANCY SENSOR.

**G. C403.2.4.2.3 AUTOMATIC AND OPTIMUM START CAPABILITIES (MANDATORY).**

AUTOMATIC START CONTROLS SHALL BE PROVIDED FOR EACH HVAC SYSTEM. THE CONTROLS SHALL BE CONFIGURED TO AUTOMATICALLY ADJUST THE DAILY START TIME OF THE HVAC SYSTEM IN ORDER TO BRING EACH SPACE TO THE DESIRED OCCUPIED TEMPERATURE IMMEDIATELY PRIOR TO SCHEDULED OCCUPANCY.

INDIVIDUAL HEATING AND COOLING SYSTEMS WITH SETBACK CONTROLS AND DIRECT DIGITAL CONTROL SHALL HAVE OPTIMUM START CONTROLS. THE CONTROL ALGORITHM SHALL, AS A MINIMUM, BE A FUNCTION OF THE DIFFERENCE BETWEEN SPACE TEMPERATURE AND OCCUPIED SET POINT, THE OUTDOOR TEMPERATURE, AND THE AMOUNT OF TIME PRIOR TO SCHEDULED OCCUPANCY. MASS RADIANT FLOOR SLAB SYSTEMS SHALL INCORPORATE FLOOR TEMPERATURE INTO THE OPTIMUM START ALGORITHM.

**H. HUMIDISTATIC CONTROL:**

WHERE HUMIDIFICATION, DEHUMIDIFICATION OR BOTH IS PROVIDED, THE FOLLOWING SHALL BE MET:

- 1.AT LEAST ONE HUMIDITY CONTROL DEVICE SHALL BE PROVIDED FOR EACH HUMIDITY CONTROL SYSTEM.
- 2.CONTROLS SHALL BE PROVIDED CAPABLE OF PREVENTING SIMULTANEOUS OPERATION OF HUMIDIFICATION AND DEHUMIDIFICATION EQUIPMENT.

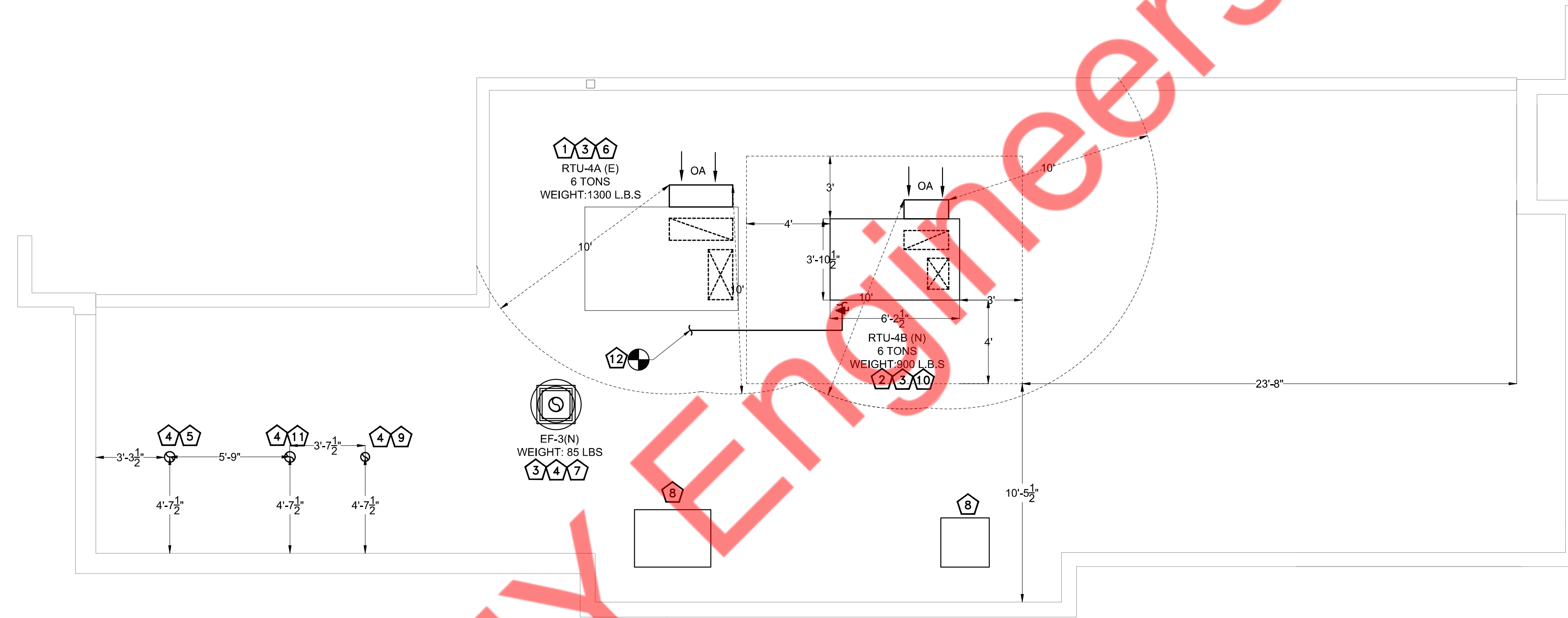
EXCEPTIONS:

- 1.ZONES SERVED BY DESICCANT SYSTEMS USED WITH DIRECT EVAPORATIVE COOLING IN SERIES.
- 2.SYSTEMS SERVING ZONES WHERE SPECIFIC HUMIDITY LEVELS ARE REQUIRED, SUCH AS COMPUTER ROOMS, MUSEUMS AND HOSPITALS, AS APPROVED BY THE BUILDING OFFICIAL.

**I. HEAT PUMP SUPPLEMENTARY HEAT:**

HEAT PUMPS HAVING SUPPLEMENTARY ELECTRIC RESISTANCE HEAT SHALL HAVE CONTROLS THAT LIMIT SUPPLEMENTAL HEAT OPERATION TO ONLY THOSE TIMES WHEN:

1. THE VAPOR COMPRESSION CYCLE CANNOT PROVIDE THE NECESSARY HEATING ENERGY TO SATISFY THE THERMOSTAT SETTING,
2. THE HEAT PUMP IS OPERATING IN DEFROST MODE,
3. THE VAPOR COMPRESSION CYCLE MALFUNCTIONS, OR
4. THE THERMOSTAT MALFUNCTIONS.



**MECHANICAL AND PLUMBING ROOF PLAN 1**

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

**MECHANICAL GENERAL NOTES:**

- COORDINATE LOCATION AND SIZES OF ROOF OPENINGS WITH OWNER AND STRUCTURAL ENGINEERS.
- EQUIPMENT SIZES, DIMENSIONS AND REQUIRED CONNECTIONS SHALL BE VERIFIED WITH THE ACTUAL EQUIPMENT SELECTED VENDOR DRAWINGS BEFORE FABRICATION OF DUCTWORK, PIPING ETC.
- CONTRACTOR SHALL COORDINATE ALL ELECTRICAL REQUIREMENTS FOR ALL HVAC BASED ON ACTUAL EQUIPMENT SELECTED PRIOR TO INSTALLATION.
- KEEP ALL ADJOINING AREAS ADJACENT TO THE WORK AREAS CLEAN AND FREE OF DEBRIS.
- EXHAUST SHALL 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 OPENING.
- MATERIAL FROM EXISTING SYSTEM WHICH IS RENDERED USELESS SHALL BE REMOVED AND DISPOSED OF OFF SITE.

**ROOF PLAN KEY NOTES:**

- EXISTING RTU ALONG WITH ALL ITS ACCESSORIES AND ITS GAS PIPING TO REMAIN AND TO BE REUSED. CONTRACTOR TO FIELD VERIFY THE EXACT LOCATION AND CONFIGURATION ON SITE. CLEAN AND REFURBISH TO "LIKE-NEW" CONDITION. REPAIR/REPLACE ANY ACCESSORIES AS REQUIRED TO PROVIDE A FULLY FUNCTIONING.
- NEW ROOFTOP UNIT IS PROVIDED. PROVIDE FLEXIBLE CONNECTORS ON SUPPLY AND RETURN DUCT CONNECTIONS. SET OUTSIDE AIR AS INDICATED ON ROOFTOP UNIT SCHEDULES. MECHANICAL CONTRACTOR SHALL SCRIBE INTO UNIT POSITION OF OUTSIDE AIR DAMPER AND LABEL OUTSIDE AIR VOLUME AND PERCENT OF OUTSIDE AIR. TRANSITION AND CONNECT SUPPLY AND RETURN DUCTWORK FROM BELOW. COORDINATE ROUTING THROUGH STRUCTURAL TRUSSES AND OFFSET AS REQUIRED IN CURB SPACE. COORDINATE LOCATIONS AND SIZES OF ROOF OPENINGS WITH OWNER AND STRUCTURAL DRAWINGS.
- COORDINATE FINAL LOCATION OF EQUIPMENT WITH STRUCTURAL DRAWINGS/ENGINEER OR OWNER/TENANT.
- CONTRACTOR TO FIELD VERIFY THAT LOCATION OF ANY EXHAUST SOURCE SHOULD BE AT LEAST 10'-0" AWAY FROM ANY OUTSIDE AIR INTAKE SOURCE.
- 6"Ø EXHAUST DUCT UP THROUGH ROOF WITH ROOF CAP AND BIRDSCREEN. MAINTAIN A MINIMUM OF 10'-0" FROM ALL OUTSIDE AIR INTAKES.
- CONDENSATE DRAIN LINES FROM EXISTING RTU TO REMAIN AS IT IS. CONTRACTOR TO FLUSH THE EXISTING DRAIN LINES. IF PIPING IS DAMAGED OR BLOCKED, REPAIR OR REPLACE AS/IF DAMAGED. USE SIMILAR MATERIAL OR APPROVED MATERIALS PER LOCAL CODE.
- PROVIDE ROOF MOUNTED EXHAUST FAN IN LOCATION AS SHOWN ON PLANS. CONNECT Ø8" EXHAUST DUCT FROM BELOW. COORDINATE EXHAUST ROUTING WITH STRUCTURAL TRUSS LAYOUT. MAINTAIN MINIMUM 10' DISTANCE FROM MECHANICAL AIR INTAKE.
- APPROXIMATE LOCATION OF REFRIGERATION EQUIPMENT CONDENSING UNIT. COORDINATE WITH FOOD SERVICE, ARCHITECTURAL AND ELECTRICAL DRAWINGS. PROVIDE RAILS FOR CONDENSING UNITS. COORDINATE RAIL SYSTEM WITH MANUFACTURERS REQUIREMENTS AND STRUCTURAL ENGINEERS. CONTRACTOR INSTALLING REMOTE CONDENSERS SHALL VERIFY EXACT SIZE OF CONDENSER STAND.
- PROVIDE Ø3"Ø5" CONCENTRIC VENT FOR WATER HEATER INTAKE AND EXHAUST VENT. INSTALL AS PER MANUFACTURER'S RECOMMENDATION/INSTRUCTION.
- CONDENSATE DRAIN FROM RTU SHALL BE CONVEYED TO AN APPROVED PLACE OF DISPOSAL. SUCH PIPING SHALL MAINTAIN A MINIMUM HORIZONTAL SLOPE IN THE DIRECTION OF DISCHARGE OF NOT LESS THAN THE 1/8TH UNIT VERTICAL IN 12 UNITS HORIZONTAL (1% SLOPE). CONDENSATE SHALL NOT DISCHARGE INTO A STREET, ALLEY OR OTHER AREAS SO AS TO CAUSE A NUISANCE.
- 8"Ø EXHAUST DUCT UP THROUGH ROOF WITH ROOF CAP AND BIRDSCREEN. MAINTAIN A MINIMUM OF 10'-0" FROM ALL OUTSIDE AIR INTAKES.
- EXTEND AND CONNECT NEW 3/4" GAS LINE IN SPACE. CONTRACTOR TO FIELD VERIFY THE SIZE, LOCATION AND ROUTING OF EXISTING GAS LINE. UPGRADE IF REQUIRED. BASE BID ACCORDINGLY.

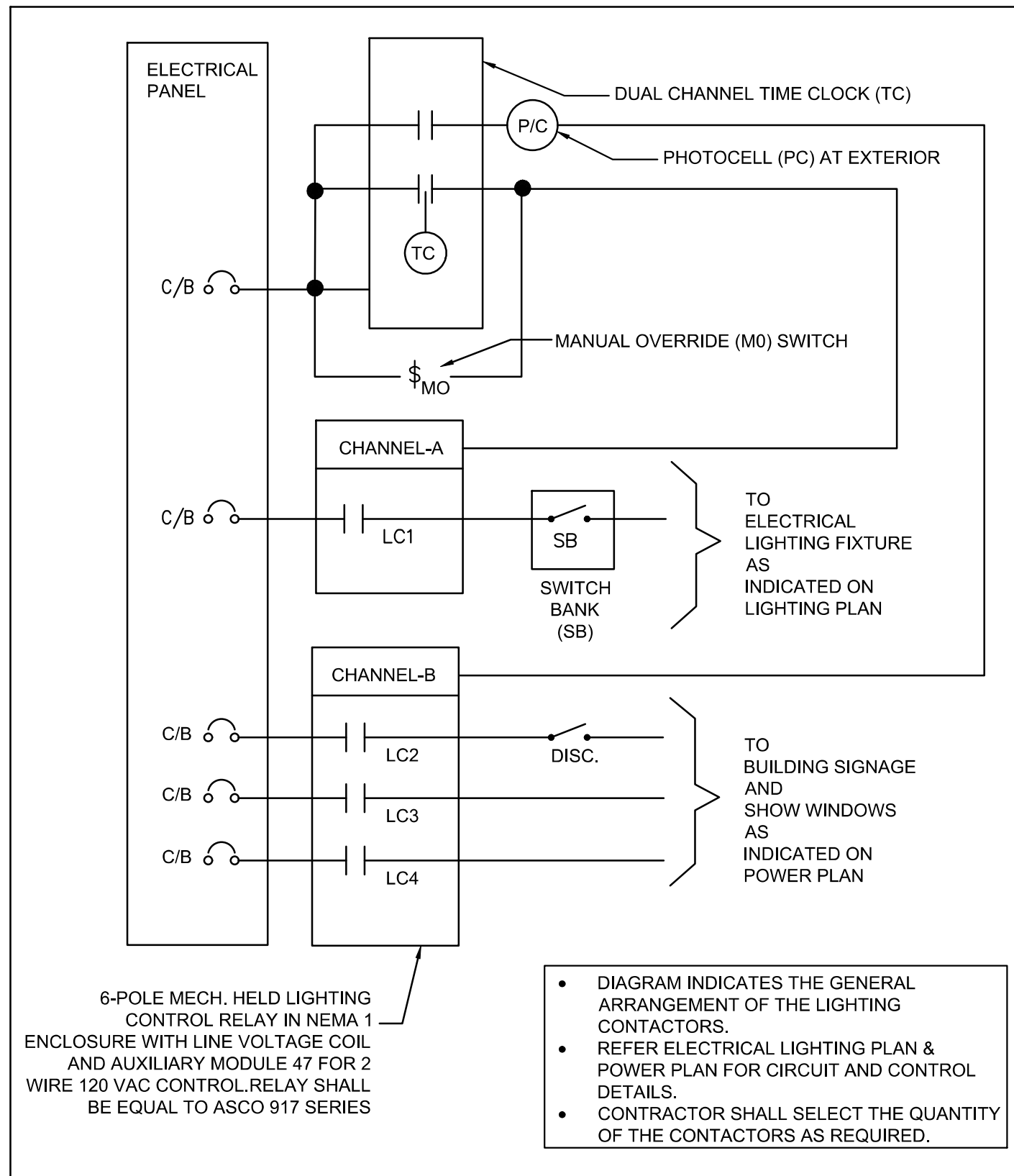
ISSUED REVISIONS:

**Nothing Bundt Cakes**  
MECHANICAL ROOF PLAN

**MP-100**



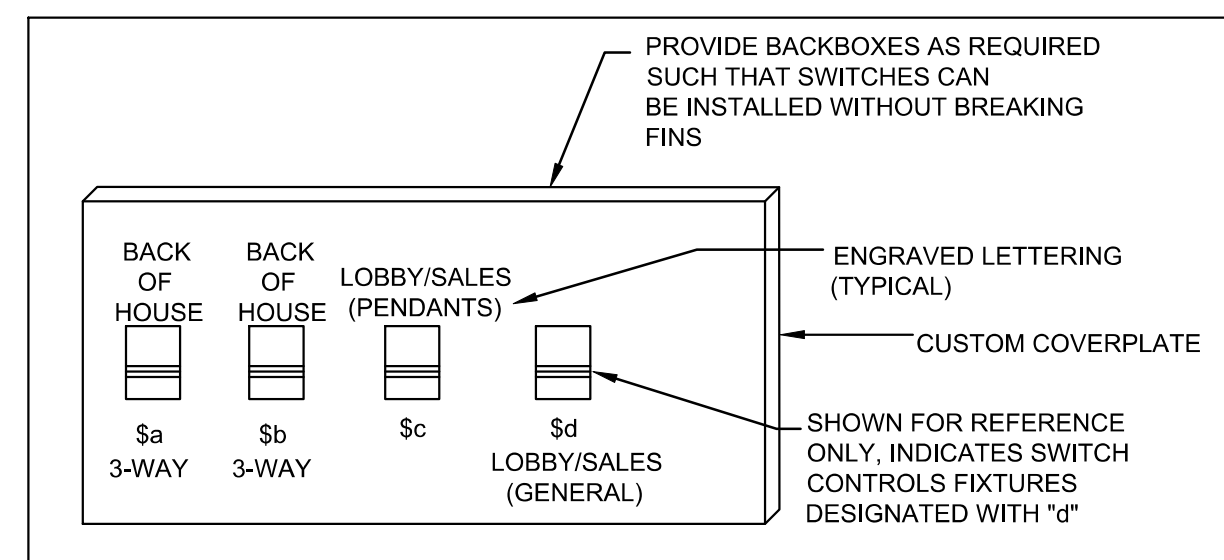




**LIGHTING CONTACTORS (LC) TYPICAL DETAIL**

SCALE: N.T.S

- LIGHTING FIXTURE SCHEDULE NOTES:**
- ALL (NEW) LIGHTING FIXTURES SHOWN ON THE LIGHTING FIXTURES SCHEDULE ARE SUBJECT TO THE ARCHITECT'S APPROVAL. E.C. SHALL COORDINATE MAKE, MODEL, FINISHES, AND OTHER CRITICAL PARAMETERS WITH THE ARCHITECT BEFORE PURCHASING.
  - THE ADDITIONAL ACCESSORIES (VIZ. DRIVERS AND CURRENT LIMITERS) REQUIRED FOR THE PROPER WORKING OF THE LIGHTING FIXTURES MIGHT NOT BE PROVIDED BY THE VENDOR. E.C. SHALL PURCHASE IT SEPARATELY.
  - ALL LIGHTING FIXTURES ARE RATED FOR 120V UNLESS OTHERWISE NOTED.
  - ALL EMERGENCY LIGHTING FIXTURES AND EXIT SIGNS SHALL HAVE A MINIMUM OF 90 MINUTES OF BATTERY BACKUP OR AS REQUIRED BY AHJ.
  - WATTS PER FACE FOR EXIT SIGNS SHALL NOT EXCEED 5 WATTS.
  - REFER TO ARCHITECTURAL REFLECTED CEILING PLAN AND/OR ROOM FINISH SCHEDULE TO DETERMINE PROPER TYPE OF LIGHT FIXTURE REQUIRED FOR THE CEILING CONSTRUCTION PRIOR TO ORDERING THE FIXTURES & PROVIDE FIXTURES THAT ARE COMPATIBLE WITH THE CEILING SYSTEM.
  - EMERGENCY BALLASTS IN EMERGENCY LIGHTS, NIGHT LIGHTS, AND EXIT SIGNS SHALL BE WIRED AHEAD OF ALL LOCAL CONTROL (NOT SWITCHED). THE EMERGENCY BALLASTS SHALL PROVIDE A MINIMUM OF NINETY (90) MINUTES OF CODE REQUIRED EMERGENCY LIGHTING. EACH EMERGENCY BALLAST PROVIDED SHALL PRODUCE THE MAXIMUM LUMEN OUTPUT AVAILABLE FOR THE LAMP USED. EMERGENCY LIGHTING BALLASTS SHALL BE BODINE OR APPROVED EQUAL.
  - ALL LIGHTING CONTROLS SHALL BE PER AHJ AND CODE COMPLIANCE.
  - ALL LIGHT FIXTURES OVER FOOD SERVICE AREA SHALL HAVE LENS COVERS OR SHATTER PROOF BULBS.
  - ALL FIXTURES ARE TO BE ORDERED BY E.C. FROM NBC APPROVED SUPPLIER.



**LIGHTING CONTROL DETAIL**

SCALE: N.T.S

- LIGHTING PLAN GENERAL NOTES:**
- ELECTRICAL SWITCHES: CONTROLS AND SWITCHES INTENDED TO BE USED BY THE OCCUPANT OF A ROOM OR AREA TO CONTROL LIGHTING AND RECEPTACLE OUTLETS, APPLIANCES OR COOLING, HEATING AND VENTILATING EQUIPMENT, SHALL COMPLY WITH CODE EXCEPT THE LOW REACH SHALL BE MEASURED TO THE BOTTOM OF THE OUTLET BOX AND THE HIGH REACH SHALL BE MEASURED TO THE TOP OF THE OUTLET BOX.
  - E.C. TO VERIFY REQUIREMENT OF THE NO. OF SWITCHES AND CONTROL PER PLAN AND PROVIDE ACCORDINGLY.
  - MINIMUM #12 AWG COPPER WIRING SHALL BE USED FOR THE LIGHTING CIRCUIT.
  - THE NEUTRAL AND GROUNDING ARE NOT SHOWN ON THE DRAWING. E.C. TO PROVIDE AS REQUIRED.
  - EMERGENCY LIGHT SHALL TURN ON DURING POWER FAILURE WHEREAS ALL EXIT SIGNS SHALL BE PERMANENTLY ON.
  - 1 RECEPTACLE PER 20 LINEAR FEET OF PERIMETER WALL, MINIMAL LIGHTING (ABOUT 1 LIGHT PER 96 S.F.) WITH 3-WAY SWITCH AT THE FRONT AND REAR DOOR. POWER FOR BUILDING SIGN ON FRONT FACADE ON TIMER.
  - EXIT SIGNS COMPLYING WITH 101.5-10 SHALL DEFINE EXITS AND ACCESS TO EXITS WHERE THE EXIT IS NOT IMMEDIATELY APPARENT.
  - IF THERE IS AN EXISTING FIRE ALARM SYSTEM, MODIFICATIONS SHALL BE DONE IN ACCORDANCE WITH NFPA 101, NFPA 72 AND ADAAG.
  - ALL LIGHT FIXTURES OVER FOOD SERVICE AREA SHALL HAVE LENS COVERS OR SHATTER PROOF BULBS.
  - ALL WORK SHOWN SHALL COMPLY WITH ALL NATIONAL, STATE AND LOCAL CODES, ORDINANCES, ETC.
  - ALL EXIT SIGNS AND EMERGENCY LIGHTING COMPONENTS TO BE WIRED AHEAD OF LOCAL SWITCHES AND CONTROLS. NIGHT LIGHTS SHALL BE WIRED AHEAD OF ALL LOCAL CONTROLS.
  - EXIT SIGNS AND EMERGENCY LIGHTS SHALL HAVE THEIR OWN SELF-CONTAINED (MINIMUM 90 STANDBY BATTERY POWER SUPPLY. IF LOCAL CODE REQUIRES A DIRECT TAP BEFORE ANY CIRCUIT BREAKERS THEN INCORPORATE INTO THE FEEDER DIAGRAM.
  - LUMINAIRES INSTALLED IN CONTINUOUS ROWS SHALL BE GROUNDED WITH A CONDUCTOR ROUTED FROM LUMINAIRE TO LUMINAIRE, ATTACHED TO EACH WITH GROUNDING LUG OR ALIGNING CLIPS ARE NOT ACCEPTABLE. LUMINAIRE GROUNDING SHALL BE INSTALLED IN COMPLIANCE WITH NATIONAL ELECTRICAL CODE, ARTICLE 410-44.
  - PROVIDE ENTIRELY SEPARATE RACEWAY SYSTEM FOR EMERGENCY LIGHTS OR EXIT SIGNS ONLY WHERE REQUIRED, SUCH AS CHICAGO. CONNECT TO NORMAL ELECTRICAL SYSTEM WHERE ACCEPTABLE TO THE LOCAL CODE AUTHORITY.
  - CONDUIT SHALL BE ELECTRICAL METALLIC (STEEL) TUBING (EMT), RIGID STEEL ( SIZE IN ACCORDANCE WITH NEC), OR MC CABLE WHERE ALLOWED BY CODE. WHERE MC CABLE IS USED, PROPER SECUREMENT AND SUPPORT (AT INTERVALS NOT EXCEEDING 6 FEET) SHALL BE FOLLOWED PER NEC ART. 330-30.
  - PROVIDE EMERGENCY LIGHTING TO MEET THE REQUIRED FOOT CANDLE LEVEL PER LOCAL CODE.
  - VERIFY ALL FIXTURE SPECIFICATIONS, COLOR TEMPERATURES, AND LUMEN OUTPUT VALUES WITH ARCHITECT PRIOR TO BID.
  - E.C. SHALL REARRANGE (IF REQUIRED) THE EMERGENCY FIXTURES TO PROVIDE INITIAL ILLUMINATION THAT IS NOT LESS THAN AN AVERAGE OF 1 FOOTCANDLE (11 LUX) AND A MINIMUM AT ANY POINT OF 0.1 FOOTCANDLE (1 LUX) MEASURED ALONG THE PATH OF EGRESS AT FLOOR LEVEL. ILLUMINATION LEVELS SHALL BE PERMITTED TO DECLINE TO 0.6 FOOTCANDLE (6 LUX) AVERAGE AND A MINIMUM AT ANY POINT OF 0.06 FOOTCANDLE (0.6 LUX) AT THE END OF THE EMERGENCY LIGHTING TIME DURATION. A MAXIMUM-TO-MINIMUM ILLUMINATION UNIFORMITY RATIO OF 40 TO 1 SHALL NOT BE EXCEEDED.

- LIGHTING PLAN KEYED NOTES:**
- WALL MOUNTED OCCUPANCY SENSOR. SET OFF TIME TO 20 MINUTES FOR RESTROOM. SET DIP SWITCH TO AUTOMATIC ON.
  - LOOP ALL EMERGENCY LIGHT FIXTURES, AND EXIT SIGNS AND WIRE THEM BACK TO THE HEAD OF NEAREST LIGHTING CIRCUIT.
  - E.C. SHALL COORDINATE EXACT LOCATION OF MANUAL OVERRIDE SWITCH WITH ARCHITECT/OWNER IN THE FIELD.
  - E.C. SHALL COORDINATE EXACT LOCATION OF SWITCH BANK (SB) WITH ARCHITECT/OWNER IN THE FIELD.
  - E.C. SHALL COORDINATE EXACT LOCATION OF TIME CLOCK & LIGHTING CONTACTOR WITH ARCHITECT/OWNER IN THE FIELD.
  - E.C. SHALL COORDINATE WITH ARCHITECT/OWNER FOR SHOW WINDOW RECEPTACLE MOUNTING HEIGHT & LOCATION. RECEPTACLE TO BE CONTROLLED BY LIGHTING CONTACTOR.
  - E.C. SHALL COORDINATE WITH ARCHITECT/OWNER FOR EXACT LOCATION OF PHOTOCELL IN THE FIELD.
  - E.C. SHALL COORDINATE WITH THE W.I.B. VENDOR FOR THE LIGHTING FIXTURES, SWITCHES, AND ELECTRICAL CONNECTION REQUIREMENTS. PROVIDE SWITCH AND CONTROLS FOR WALK-IN BOX AS REQUIRED.
  - E.C. SHALL COORDINATE WITH ARCHITECT/OWNER FOR EXACT LOCATION OF THE SIGANCE DISCONNECT. COORDINATE WITH SIGNAGE VENDOR FOR EXACT POWER REQUIREMENT & CONNECTION TYPE PROVIDE AS NEEDED. BASE BID ACCORDINGLY.

LIGHT FIXTURE SCHEDULE						
TAG	QTY	FIXTURE DETAIL	MAKE	MODEL	WATTAGE	NOTES
A	9	2'-0"X 4'-0" FLAT LED PANELS	QUALITY LIGHT SOURCE	EZPAN2X4-50YN/D10	50W	-
A/EM/NL	3	2'-0"X 4'-0" FLAT LED PANELS	TBD	TBD	50W	1,3
B	4	2'-0"X 2'-0" LAY IN LIGHT TROFFER	METALUX	SWISH2X2- 19N/D10	19W	-
B/EM	2	2'-0"X 2'-0" LAY IN LIGHT TROFFER	TBD	TBD	19W	1,3
B1	2	2'-0"X 2'-0" FLAT LED PANELS	QUALITY LIGHT SOURCE	EZPAN2X2-30YN/D10	30W	-
C	2	6" LED RECESSED RETROFIT MODULE-TRIM CAN LIGHT	HALO	H750ICAT LT560WH12930, 3000K	11.9W	-
D	1	2" ADJUSTABLE RECESSED DOWNLIGHT	H.E.WILLIAMS, INC	2AR-L7-9-27-XX-UNV/R-W-O-F-WH-N	11.5W	1
S	4	PENDANT	CFRAFT MADE	GAZE-56892-SB-WG	20W	1,2
EX1	4	COMBINATION EMERGENCY EXIT SIGN W/(2) LED EMERGENCY FLOOD LAMPS	LITHONIA	ECC-R-M6	-	3
EM	1	EMERGENCY BUG EYE LIGHT	TBD	TBD	-	1,3

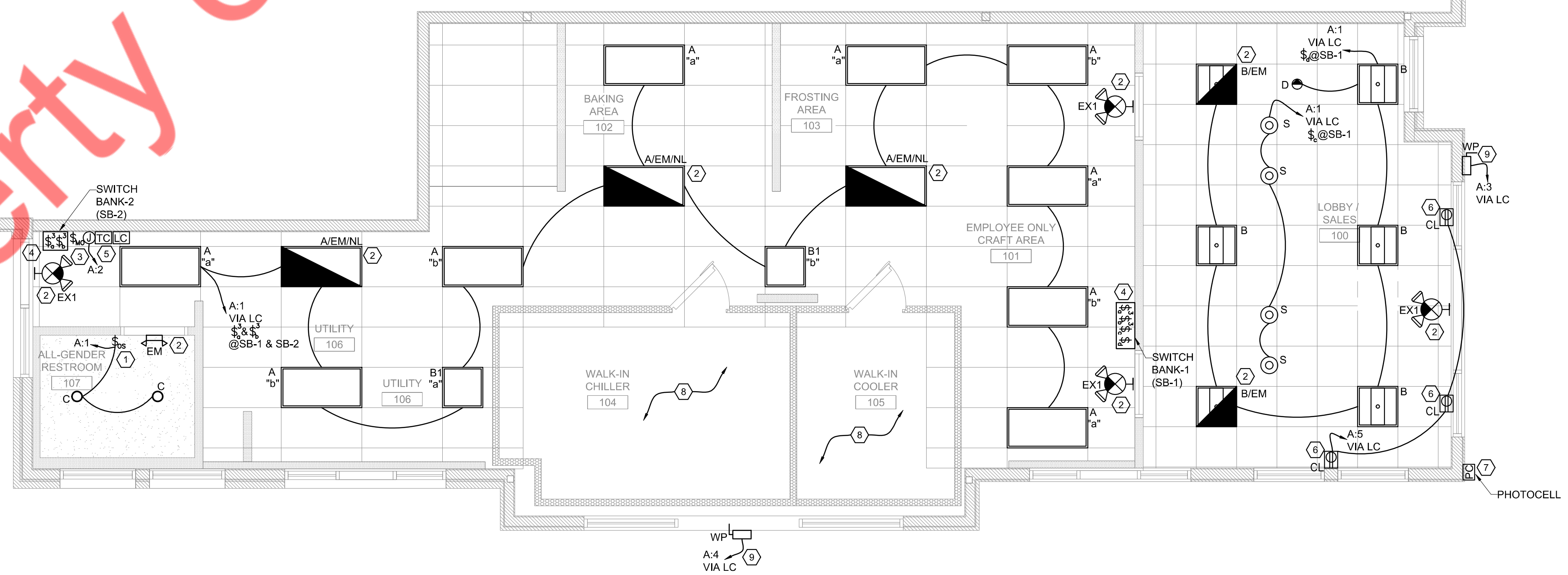
**NOTES:**

- COORDINATE EXACT MAKE/MODEL NUMBER/ WATTAGE WITH THE OWNER/ARCHITECT.
- THE LIGHTING FIXTURE WATTAGE HAS BEEN ASSUMED FOR THE COMCHECK AND LOAD CALCULATION PURPOSES ONLY.
- THE LIGHT FIXTURE SHALL HAVE MINIMUM OF 90 MINUTES OF BATTERY BACKUP.

LIGHT SWITCHING SCHEDULE							
CIRCUIT #	CONTACTOR#	AUTOMATIC CONTROL	SWITCH#	SWITCH TYPE	SWITCH BANK	LOAD IN VA	NOTES
A:1	CONTACTOR#1	TIME CLOCK	35a	3 WAY	SB1, SB2	280	1,2
A:1	CONTACTOR#1	TIME CLOCK	35b	3 WAY	SB1, SB2	230	
A:1	CONTACTOR#1	TIME CLOCK	35c	REGULAR	SB1	80	
A:1	CONTACTOR#1	TIME CLOCK	35d	REGULAR	SB1	76	
A:1	-	OCCUPANCY	S	-	RESTROOM	24	

**NOTES:**

- COORDINATE EXACT LOADING CAPACITY OF THE SWITCH AND SENSOR WITH THE VENDOR.
- NUMBER OF SENSOR AND SWITCHES REQUIRED MAY VARY BASED ON THE LOADING



**ELECTRICAL LIGHTING PLAN**

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

**ISSUED REVISIONS:**


**Nothing Bundt Cakes**  
ELECTRICAL LIGHTING PLAN

**ROOF PLAN GENERAL NOTES:**

- ALL THE ELECTRICAL ELEMENT VIZ. CONDUITS, WIRING, AND DISCONNECT SWITCHES SHALL BE RATED FOR THE EXTERIOR USE.
- THE DISCONNECT SWITCHES FOR THE BRANCH CIRCUIT SHOWN ON THE PLAN SHALL BE RATED EQUAL TO OR HIGHER THAN THE BREAKER RATING. REFER BREAKER RATING IN THE PANEL SCHEDULE AND PROVIDE DISCONNECT AS NEEDED.
- GFI MARKED ON THE PLAN INDICATES THAT THE CIRCUIT SHALL BE GFI PROTECTED. E.C. SHALL PROVIDE A GFI BREAKER IN THE PANEL FOR THE INDICATED CIRCUIT IF EITHER THE RECEPTACLE IS NOT AVAILABLE OR NOT ACCESSIBLE.
- A 125-VOLT, SINGLE-PHASE, 15- OR 20-AMPERE-RATED RECEPTACLE OUTLET SHALL BE INSTALLED AT AN ACCESSIBLE LOCATION WITHIN 7.5 M (25 FT) OF THE EQUIPMENT AS SPECIFIED IN 210.63(A) AND (B) AS PER NEC 210.63.

**ROOF PLAN KEY NOTES:**

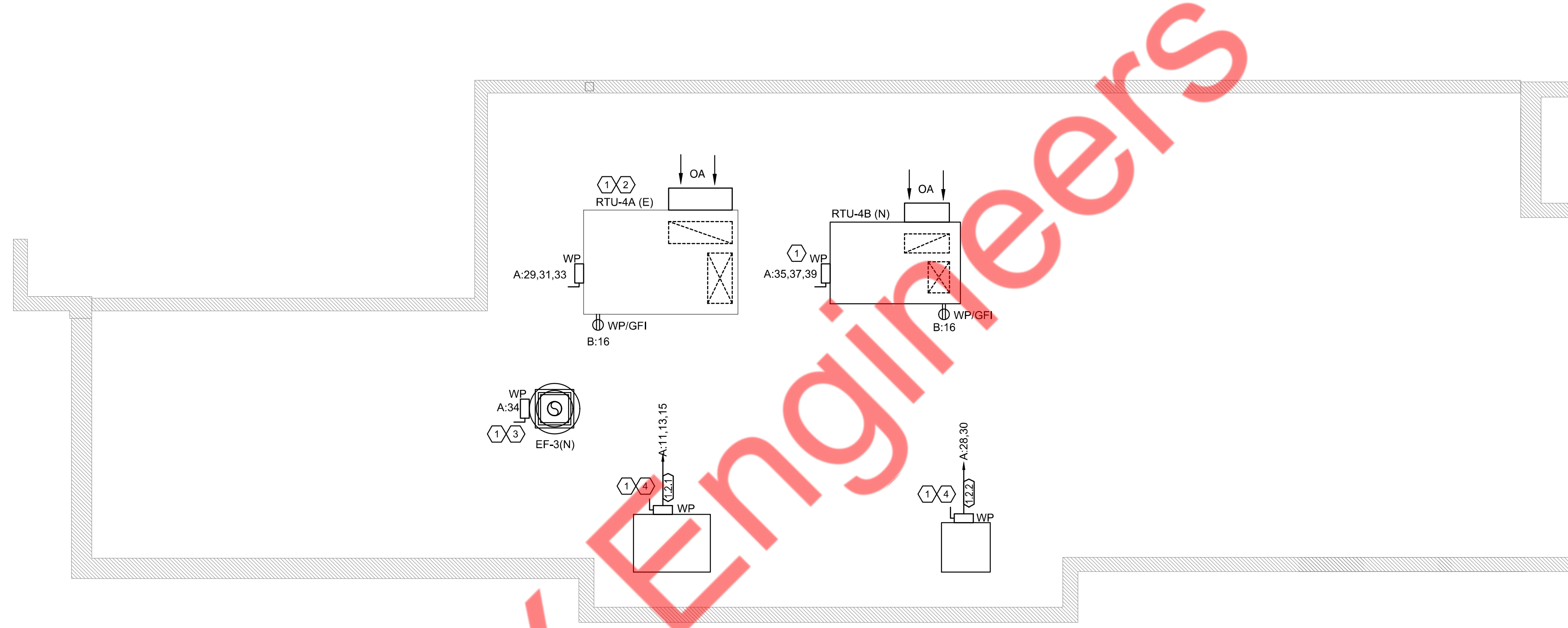
- E.C. SHALL COORDINATE WITH THE MECHANICAL CONTRACTOR FOR THE EXACT LOCATION AND ELECTRICAL CONNECTION REQUIREMENT OF THE HVAC UNIT IN THE FIELD. PROVIDE CIRCUIT AND CONTROLS AS REQUIRED.
- FOR EXISTING HVAC UNIT WILL BE PROVIDED BY THE LANDLORD, E.C., TO COORDINATE THE EXACT SCOPE, LOCATION, AND ELECTRICAL CONNECTION IN THE FIELD. PROVIDE THE NEW POWER PROVISION FOR THE EQUIPMENT IF IT HAS NOT ALREADY BEEN PROVIDED. BASE BID ACCORDINGLY.
- INTERLOCK FAN WITH RTU-4A(E) & RTU-4B(N) TO OPERATE WHEN OVEN IS IN USE.
- CONDENSERS FOR WALK IN COOLER AND CHILLER PLACED FOR REFERENCE ONLY. FURNISHED AND INSTALLED BY APPROVED W.I.C. VENDOR, FINAL CONNECTION TO BE MADE BY E.C. COMPLETE. VERIFY EXACT LOCATION PRIOR TO ROUGH-IN.

**ELECTRICAL POWER PLAN KEY NOTES:**

- E.C. SHALL COORDINATE WITH THE ARCHITECT/OWNER FOR THE EXACT LOCATION OF PANELS IN THE FIELD. ALSO, ENSURE CLEAR WORKING AND DEDICATED SPACE AS PER CODE.
- E.C. SHALL COORDINATE WITH THE MECHANICAL CONTRACTOR FOR THE EXACT LOCATION AND ELECTRICAL CONNECTION REQUIREMENT & INTERLOCKING OF THE HVAC UNIT IN THE FIELD. PROVIDE CIRCUIT AND CONTROLS AS REQUIRED.
- E.C. SHALL COORDINATE WITH THE PLUMBING CONTRACTOR FOR THE EXACT LOCATION AND ELECTRICAL CONNECTION REQUIREMENT OF THE PLUMBING UNIT IN THE FIELD. PROVIDE CIRCUIT AND CONTROLS AS REQUIRED.
- E.C. SHALL VERIFY /COORDINATE WITH ARCHITECT OR EQUIPMENT VENDOR FOR EXACT POWER REQUIREMENT, CONTROLS AND CONNECTION TYPE FOR EQUIPMENT. PROVIDE ACCORDINGLY ON THE FIELD.
- E.C. SHALL PROVIDE 30A DISCONNECT WITH (3) 20A FUSES MOUNTED AT 48" AFF.
- PROVIDE A 24"x24"x3/4" FIRE RETARDANT BACKBOARD WITH VISIBLE LABEL INDICATING FIRE RATING. DO NOT PAINT BACKBOARD. EXTEND EXISTING TELEPHONE SERVICE CONDUIT AND PROVIDE WIRE FROM LANDLORD'S DEMARC TO LOCATION SHOWN. PROVIDE EQUIPMENT GROUNDING CONDUCTORS AND GROUND BUS ATTACHED TO BACKBOARD. PROVIDE EQUIPMENT GROUNDING #2 CONDUCTORS AND GROUND BUS ATTACHED TO BACKBOARD.
- E.C. SHALL COORDINATE WITH ARCHITECT/OWNER FOR EXACT LOCATION & RECEPTACLE MOUNTING HEIGHT IN THE FIELD. PROVIDE ACCORDINGLY.
- PROVIDE FLY CONTROL (LURALITE 405435FL OR EQUIVALENT) AND RECEPTACLE AT 96" AFF. MOUNT FLY CONTROL 36"-72" FROM DOOR.
- PROVIDE RECEPTACLES MOUNTED TO MILLWORK FOR EQUIPMENT. E.C. SHALL COORDINATE EXACT LOCATION AND MOUNTING HEIGHT WITH OWNER PRIOR TO BID AND ROUGH-IN.
- MOUNTED POWER AND DATA 16" TO RIGHT OF CENTER OF MENU WALL.
- COORDINATE WITH FLOOR SLAB FOR THE INSTALLATION OF UNDERGROUND CONDUITS TO SERVE MILLWORK. VERIFY NO STRUCTURAL ELEMENTS ARE BELOW GRADE PRIOR TO SAW CUTTING. PROVIDE NEW CONCRETE FLOOR PATCH IN AREA OF SLAB REMOVAL. INSTALL NEW FLOOR FINISH OVER NEW SLAB PATCH AS INDICATED ON ARCHITECTURE FINISH SCHEDULE. ANY DAMAGE TO STRUCTURAL ELEMENTS MADE DURING CONSTRUCTION SHALL BE REPAIRED AT CONTRACTOR'S SOLE EXPENSE.
- PROVIDE JUNCTION BOX IN CEILING FOR SPEAKER. ROUTE 3/4" CONDUIT WITH PULL STRING BACK TO NETWORK BOARD. VERIFY EXACT ROUTING AND REQUIREMENTS WITH OWNER PRIOR TO ROUGH-IN.
- PROVIDE 3/4" EMPTY CONDUIT WITH PULL STRING AND JUNCTION BOX WITH A COVER PLATE FOR FUTURE DIGITAL CAKE BOOK. PLACE JUNCTION BOX HORIZONTAL AT 18" AFF. CONDUIT TO TERMINATE 6" ABOVE CEILING.
- PROVIDE 1/2" CONDUIT AND CONTROL WIRES FROM THE CONDENSING UNIT ON THE ROOF TO THE CORRESPONDING EVAPORATOR IN THE WALK IN PER MANUFACTURER INSTRUCTIONS.
- PROVIDE 120V POWER FOR WALK-IN COOLER AND WALK-IN FREEZER LIGHTS AND DOOR HEATER. PROVIDE WIRE AND LAMPS FOR WALK-IN FREEZER LIGHTS. VERIFY EXACT REQUIREMENTS WITH MANUFACTURER EQUIPMENT DRAWINGS.
- MAKE PENETRATIONS IN WALK-IN COOLER/CHILLER WITH CONDUIT SEALING FITTINGS AND NIPPLE TO CAST FIXTURE J-BOX. AS REQUIRED BY CODE, PROVIDE JOINTS TO COMPENSATE FOR THERMAL EXPANSION/CONTRACTION WHERE CIRCULATION OF AIR FROM WARMER TO COLDER SECTIONS OF INTERIOR RACEWAY SYSTEM ARE EXPOSED TO WIDELY DIFFERENT TEMPERATURES.
- THE EXHAUST FAN IN THE ROOM SHALL BE CIRCUITED AND CONTROLLED ALONG WITH THE LIGHTING FIXTURES IN THE SAME ROOM. COORDINATE WITH HVAC DRAWING.
- ROUTE POWER FOR OVEN ACROSS TOP OF OVEN IN CONDUIT TO BACK WALL AND THEN UP BACK WALL AND THROUGH CEILING TO ELECTRICAL PANEL.
- REQUIREMENTS FOR WALK-IN COOLER/CHILLER:
  - PROVIDE WIRING TO EVAPORATOR.
  - PROVIDE CONTROL WIRING BETWEEN CONDENSER AND EVAPORATOR.
  - INSTALL FREEZER AND COOLER LIGHT FIXTURES THAT ARE SHIPPED LOOSE.
  - PROVIDE POWER AND CONTROL WIRING FOR FREEZER CONDENSER AND HEAT TAPE DIRECTLY FROM FREEZER CONDENSER.
  - VAPOR SEAL ALL CONDUIT PENETRATIONS. PENETRATIONS MUST BE PROPERLY SEALED AGAINST COLD LOSS AND INFILTRATION TO PREVENT CONDENSATION AND ICE FORMATION. SILICONE CAULKING IS THE RECOMMENDED SEALANT.
- E.C. SHALL COORDINATE WITH ARCHITECT FOR EXACT LOCATION AND POWER REQUIREMENTS FOR DATA/TELEPHONE RACK PROVIDE AS REQUIRED. PROVIDE NEW CABLING IN THE EXISTING CONDUIT.
- EXISTING STUB (1) OF 2" CONDUIT WITH PULL STRING FOR LOW VOLTAGE FROM BUILDING DEMARCATION BOARD TO PROJECT SPACE & EXISTING STUB (1) OF 2.5" CONDUIT WITH PULL STRING FOR POWER FROM BUILDING MODULAR METERING TO PROJECT SPACE. EXTEND UP TO NEW LOCATION AS REQUIRED. E.C. SHALL COORDINATE WITH ARCHITECT/OWNER FOR EXACT LOCATION IN THE FIELD.
- FAN TO BE CONTROLLED VIA TIMECLOCK ( OPERATIONAL DURING OCCUPIED HOURS)

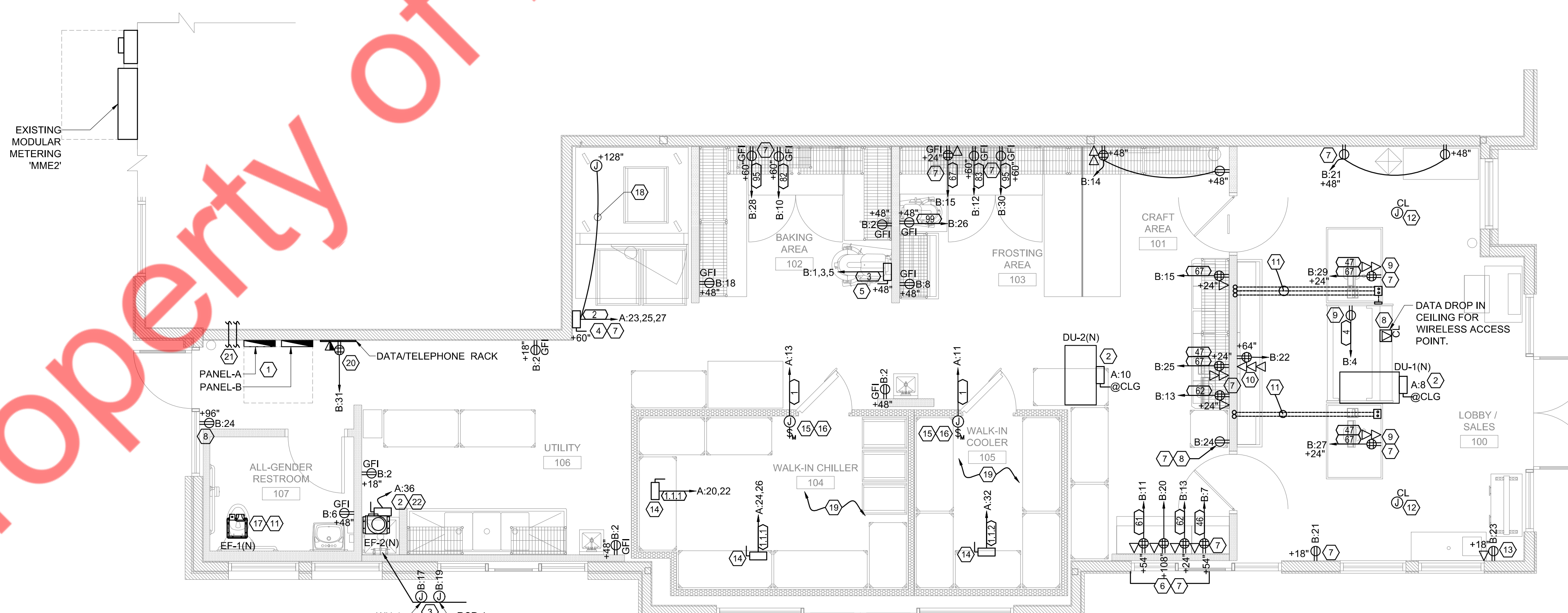
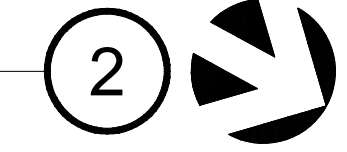
**POWER PLAN GENERAL NOTES:**

- THE LOCATION OF ALL ELECTRICAL EQUIPMENT (NOT PROVIDED IN THE ARCHITECTURAL PLAN) SHALL BE VERIFIED WITH THE ARCHITECT/OWNER BEFORE BID.
- POWER AND LOCATION OF ALL THE MECHANICAL AND PLUMBING UNITS SHALL BE COORDINATED WITH THE RESPECTIVE CONTRACTORS BEFORE BID.
- ELECTRICAL OUTLETS PLACED ON BOTH SIDES OF THE WALL PARTITION TO BE LOCATED OFFSET OF EACH OTHER.
- THE DISCONNECT SWITCHES FOR THE BRANCH CIRCUIT SHOWN ON THE PLAN SHALL BE RATED EQUAL TO OR HIGHER THAN THE BREAKER RATING. REFER BREAKER RATING IN THE PANEL SCHEDULE AND PROVIDE DISCONNECT AS NEEDED.
- ALL 125V-250V RECEPTACLES SUPPLIED BY SINGLE-PHASE CIRCUITS RATED 150V OR LESS TO GROUND, 50A OR LESS, AND ALL RECEPTACLES SUPPLIED BY THREE PHASE BRANCH CIRCUIT RATED 150V OR LESS TO GROUND, 100A OR LESS INSTALLED IN THE LOCATIONS SPECIFIED IN NEC 210.8(B)(1) THROUGH (12) SHALL HAVE GFCI PROTECTION.
- GFI MARKED ON THE PLAN INDICATES THAT THE CIRCUIT SHALL BE GFI PROTECTED. E.C. SHALL PROVIDE A GFI RECEPTACLE DISCONNECT IN THE READILY ACCESSIBLE LOCATION. PROVIDE GFI BREAKER IN THE PANEL IF EITHER THE RECEPTACLE IS NOT AVAILABLE OR NOT ACCESSIBLE WHEN INSTALLED IN THE DESIRED LOCATION.
- E.C. TO VERIFY WITH AHJ FOR ANY OTHER INSTALLATION REQUIREMENTS FOR EXPOSED CONDUIT.
- COORDINATE THE EXACT LOCATION AND ELECTRICAL CONNECTION REQUIREMENTS OF THE DUCT SMOKE DETECTORS, FIRE DAMPERS, FIRE SMOKE DAMPERS, MOTORIZED DAMPERS, AND THERMOSTATS IN THE FIELD WITH THE MECHANICAL DRAWING. PROVIDE WIRING AS REQUIRED.
- E.C. SHALL COORDINATE WITH ARCHITECT/OWNER FOR RECEPTACLE HEIGHT MOUNTING HEIGHT IN THE FIELD.



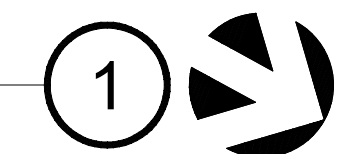
**ROOF POWER PLAN**

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



**FLOOR POWER PLAN**

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



ISSUED REVISIONS:


**Nothing Bundt Cakes**  
ELECTRICAL FLOOR & ROOF POWER PLAN

**E-200**

ELECTRICAL PANEL SCHEDULE

PANEL:	A	(NEW)	PHASE	3	AIC RATING (in kA)	22kA	DEMAND LOAD		69.73	MOUNTING: SURFACE	PANEL LOCATION: BOH	FED FROM: EXIST. ELEC. METER/SERV. DISC			
							DEMAND CURRENT	193.78							
208Y/120	MCB		WIRE	4											
CKT NO.	TRIP AMPS	DESCRIPTION OF LOAD	LOAD TYPE	LOAD (KVA)	NOTES	PER PHASE (KVA)			NOTES	LOAD (KVA)	LOAD TYPE	DESCRIPTION OF LOAD	TRIP AMPS	CKT NO.	
1	20/1P	INTERIOR LIGHTING	L	1.30	RWC	1.80				RWC	0.50	O	TIME CLOCK	20/1P	2
3	20/1P	EXTERIOR SIGNAGE	L	1.20	RWC		2.40			RWC	1.20	O	EXTERIOR SIGNAGE	20/1P	4
5	20/1P	SHOW WINDOW RECEPT	R	1.80	RWC			1.80					SPARE	20/1P	6
7	20/1P	SPARE				0.96				RWC	0.96	H	DU-1(N)	20/1P	8
9	20/1P	SPARE								RWC	0.96	H	DU-2(N)	20/1P	10
11	20/1P	WALK IN COOLER MISCELLANEOUS LOAD	O	1.20	RWC								SPARE	20/1P	12
13	20/1P	WALK IN CHILLER MISCELLANEOUS LOAD	O	1.20	RWC					RWC	1.80	O	EQ1.2.1_REMOTE CONDENSER UNIT (CHILLER)	30/3P*	14
15	20/1P	SPARE									1.80	O			16
17	20/1P	SPARE									1.80	O			18
19	20/1P	SPARE				1.23				RWC	1.23	O	EQ1.1.1_EVAPORATOR COIL - CHILLER	20/2P*	20
21	20/1P	SPARE									1.23	O			22
23										RWC	1.23	O	EQ1.1.1_EVAPORATOR COIL - CHILLER	20/2P*	24
25	20/3P	EQ2_ROTATING RACK OVEN	E	0.60	RWC	1.83					1.23	O			26
27			E	0.60						RWC	1.56	O	EQ1.2.2_REMOTE CONDENSER UNIT (REFRIGERATOR)	15/2P	28
29			H	5.00				6.56			1.56	O			30
31	50/3P	RTU-4A (E)	H	5.00	RWC, HACR					RWC	0.10	O	EQ1.2.1_EVAPORATOR COIL REFRIGERATOR	20/1P	32
33			H	5.00				5.98		RWC	0.98	M	EF-3 (N)	15/1P	34
35			H	3.00				3.05		RWC	0.05	M	EF-2 (N)	15/1P	36
37	45/3P	RTU-4B (N)	H	3.00	RWC, HACR						6.16	X			38
39			H	3.00				9.16		RRF	6.16	X	TO PANEL-B	100/3P	40
41	20/1P	SPARE						6.16			6.16	X			42
						23.08	23.70	22.40							

PANEL:	B	(NEW)	PHASE	3	AIC RATING (in kA)	22kA	DEMAND LOAD		18.48	MOUNTING: SURFACE	PANEL LOCATION: BOH	FED FROM: PANEL-A			
							DEMAND CURRENT	51.36							
208Y/120	MLO		WIRE	4											
CKT NO.	TRIP AMPS	DESCRIPTION OF LOAD	LOAD TYPE	LOAD (KVA)	NOTES	PER PHASE (KVA)			NOTES	LOAD (KVA)	LOAD TYPE	DESCRIPTION OF LOAD	TRIP AMPS	CKT NO.	
1			E	1.93		2.83				RWC	0.90	R	GENERAL RECEPTACLE	20/1P	2
3	20/3P	EQ3_80-QUART MIXER	E	1.93	RWC, GFI			3.51		RWC	1.58	E	EQ4_REFRIGERATOR DISPLAY CASE	20/1P	4
5			E	1.93				2.11		RWC	0.18	R	RESTROOM RECEPTACLE	20/1P	6
7	20/1P	EQ46_DATA RACK	R	0.36	RWC			1.56		RWC	1.20	R	RECEPTACLE FROSTING AREA	20/1P	8
9	20/1P	SPARE				0.80				RWC	0.80	E	EQ82_CUTTER / MIXER AND SCALE	20/1P	10
11	20/1P	EQ61_ALL IN ONE MACHINE	R	1.00	RWC			2.15		RWC	1.15	E	EQ83_MICROWAVE	20/1P	12
13	20/1P	EQ62_COMPUTER - (3)	R	0.72	RWC			1.26		RWC	0.54	R	GENERAL RECEPTACLE	20/1P	14
15	20/1P	EQ67_POS PRINTERS	R	0.72	RWC			1.08		RWC	0.36	R	ROOF RECEPTACLE	20/1P	16
17	20/1P	WH-1 (WATER HEATER)	O	0.10	RWC			1.30		RWC	1.20	R	RECEPTACLE BAKING AREA	20/1P	18
19	20/1P	RCP-1 ( RECIRCULATION PUMP)	M	0.30	RWC	0.66				RWC	0.36	R	RECEPTACLE AUDIO-EQ	20/1P	20
21	20/1P	RECEPTACLE LOBBY	R	0.54	RWC			1.14		RWC	0.60	R	MENU BOARD RECEPTACLE	20/1P	22
23	20/1P	REC- CAKE DISPLAY BOOK	R	0.20	RWC			0.40		RWC	0.20	R	REC- FLY CONTROL	20/1P	24
25	20/1P	EQ67_47_POS, PRINTERS	R	0.36	RWC	2.04				RWC	1.68	E	EQ99_20 QUART MIXER	20/1P	26
27	20/1P	EQ67_47_POS, PRINTERS	R	0.36	RWC			0.82		RWC	0.46	E	EQ95_REF. WORK TOP TABLES	20/1P	28
29	20/1P	EQ67_47_POS, PRINTERS	R	0.36	RWC			0.82		RWC	0.46	E	EQ95_REF. WORK TOP TABLES	20/1P	30
31	20/1P	DATA/TELEPHONE RACK RECEPTACLE	R	0.36	RWC			0.36					SPARE	20/1P	32
33	20/1P	SPARE				0.00							SPARE	20/1P	34
35	20/1P	SPARE						0.00					SPARE	20/1P	36
37	20/1P	SPARE				0.00							SPARE	20/1P	38
39	20/1P	SPARE						0.00					SPARE	20/1P	40
41	20/1P	SPARE						0.00					SPARE	20/1P	42
						8.71	7.35	6.78							

PANEL SCHEDULE GENERAL NOTES:

- ELECTRICAL CONTRACTOR SHALL VERIFY THE BREAKER AND CABLE RATING WITH EQUIPMENT SUPPLIER/OWNER AND ACCORDINGLY UPDATE THE BREAKER RATING CABLE SIZE IN FIELD.
- GFI MARKED ON THE POWER PLAN INDICATES THAT THE CIRCUIT SHALL BE GFCI PROTECTED. E.C. SHALL PROVIDE GFCI BREAKER FOR THE GFI MARKED RECEPTACLES, IF EITHER RECEPTACLE IS NOT ACCESSIBLE OR NOT AVAILABLE.
- PROVIDE HACR BREAKER FOR HVAC UNITS. COORDINATE WITH HVAC DRAWINGS.
- PROVIDE LOCKING DEVICES ON CIRCUIT BREAKER WHERE EVER REQUIRED.
- E.C. TO VERIFY SCOPE OF WORK WITH OWNER/ARCHITECT. PRIOR TO BID.
- VERIFY EXACT POWER DISTRIBUTION AND EXACT MOUNTING HEIGHT OF RECEPTACLE FOR ALL EQUIPMENTS IN FIELD.
- THE CONTRACTOR IS TO PROVIDE A CIRCUIT DIRECTORY FOR EACH PANEL BOARD.

ELECTRICAL SERVICE LOAD CALCULATION						
LOAD DESCRIPTION	LOAD TAG	CONNECTED LOAD (KVA)		TOTAL kVA	D.F.	DEMAND (KVA)
		PANEL A	PANEL B			
TOTAL LIGHTING	L	3.70	0.00	3.70	125%	4.63
TOTAL RECEPTACLE	R	1.80	10.52	12.32	#	11.16
TOTAL EQUIPMENT	E	1.80	11.92	13.72	65%	8.92
TOTAL OTHER	O	16.44	0.10	16.54	100%	16.54
TOTAL HVAC	H	25.92	0.00	25.92	100%	25.92
NON COINCIDENT	N	0.00	0.00	0.00	0%	0.00
TOTAL MOTOR	M	1.03	0.30	0.00	100%	0.00
LARGEST MOTOR					25%	0.00
# = Demand factor 100% for first 10kVA and 50% for rest of the receptacle load						
SERVICE VOLTAGE	208Y/120					
DEMAND (KVA)	67.16					
DEMAND (AMPS)	186.65					
SERVICE SIZE	200.00					
SPARE	0%					
SWITCH SIZE	200A					

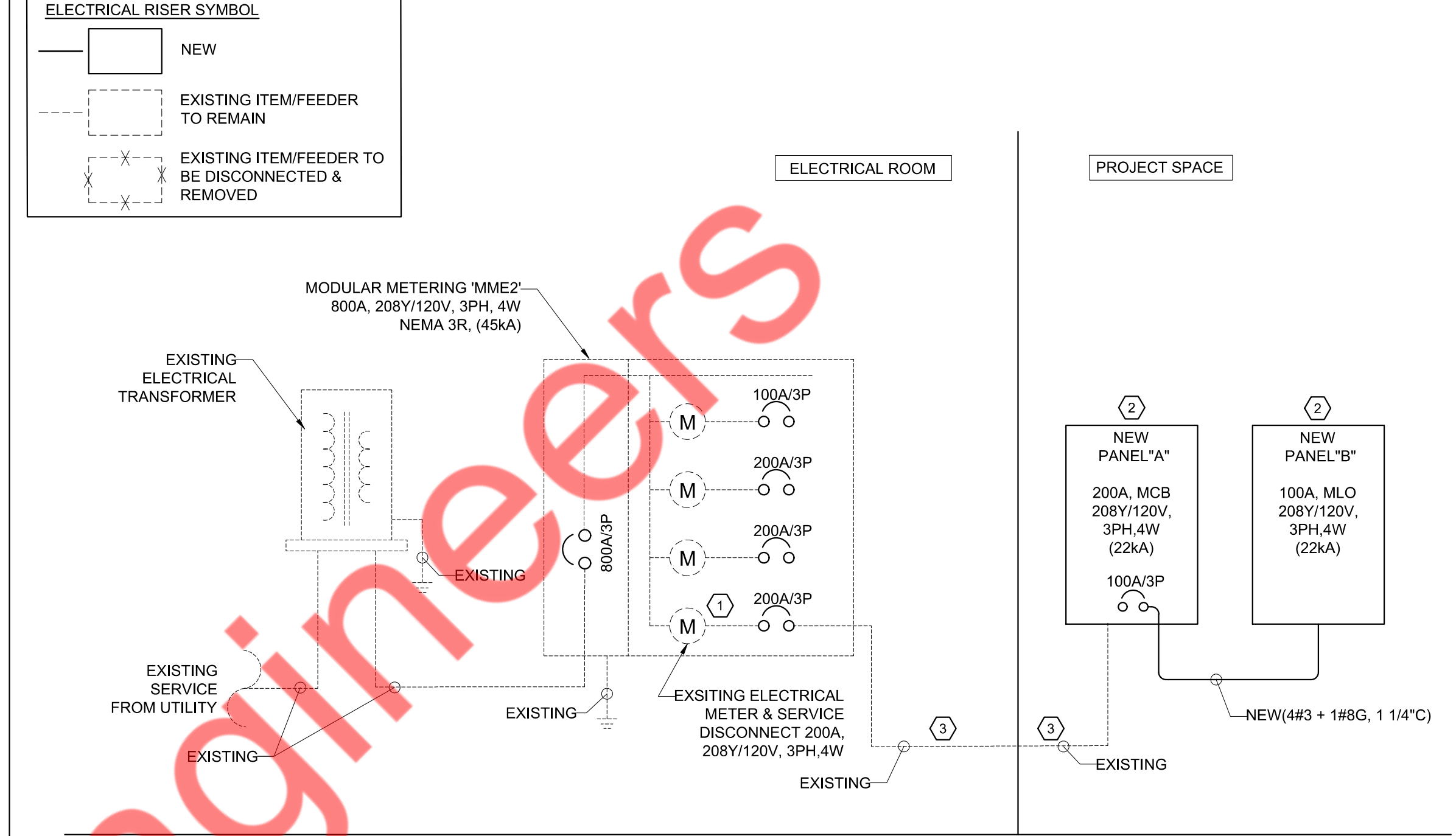
KITCHEN EQUIPMENT GENERAL NOTES:

- ALL COVER PLATES AND DISCONNECT SWITCHES IN KITCHEN AREA SHALL BE STAINLESS STEEL.
- ALL ELECTRICAL WORK FOR FOOD SERVICE EQUIPMENT SHALL BE COMPLETELY INTERWIRED BY ELECTRICAL CONTRACTOR. FINAL CONNECTIONS TO EQUIPMENT STARTERS AND FULLY INTERWIRED SYSTEM WITH ALL POWER INTERRUPTION DEVICES BUILT INTO HOOD AND FIRE PROTECTION SYSTEM AS REQUIRED BY NFPA #96, NATIONAL, STATE AND/OR LOCAL CODES APPLICABLE. ELECTRICAL CONTRACTOR TO PROVIDE LOCK-OUT DEVICES ON CONTROL BOXES FOR EXHAUST HOOD FANS, SYSTEM AND FIRE PROTECTION SYSTEM.
- THE ELECTRICAL CONTRACTOR SHALL PROVIDE ALL ROUGH-IN AND FINAL CONNECTION TO THE FOOD SERVICE EQUIPMENT. ALL WORK TO BE IN CONFORMANCE WITH ALL NATIONAL, STATE AND LOCAL CODES APPLICABLE.
- VERIFY OUTLET RATING AND CONFIGURATION WITH EQUIPMENT SUPPLIER PRIOR TO ROUGH-IN.
- VERIFY EXACT LOCATION AND MOUNTING HEIGHTS OF ALL OUTLETS WITH EQUIPMENT SUPPLIER PRIOR TO ROUGH-IN. E.C. SHALL MAKE ADJUSTMENTS IN FIELD TO MATCH ACTUAL EQUIPMENT BEING INSTALLED, AS DIRECTED BY THE EQUIPMENT SUPPLIER.
- ELECTRICAL CONTRACTOR TO FURNISH AND INSTALL ALL PLUGS AND CORDS REQUIRED. ALL CORDS SHALL BE NEMA RATED AND UL APPROVED FOR MANUFACTURER AND EQUIPMENT.
- ELECTRICAL CONTRACTOR TO FURNISH AND INSTALL ALL JUNCTION BOXES, PVC OR METAL CONDUIT, CONVENIENCE TO ANY ADDITIONAL COMPONENTS, INCLUDE THE PROPER SIZE DISCONNECTS OR CIRCUIT BREAKERS. ALL WIRING FOR LOW AND MEDIUM TEMPERATURE CONDENSING UNIT TO BE ROUTED THROUGH DEFROST TIME CLOCK AND THEN WIRED TO EVAPORATOR COIL FOR PROPER POWER SUPPLY WITH THE REQUIRED QUANTITY OF WIRES. THE EVAPORATOR COIL DEFROST HEATER AND FAN MOTOR VOLTAGES AND LOADS ARE AS NOTED ON PLAN. VERIFY LOCATION OF COMPRESSORS AND COORDINATE WITH REFRIGERATION CONTRACTOR FOR FINAL CONNECTIONS. (VERIFY REQUIREMENTS WITH EQUIPMENT SUPPLIER)
- ELECTRICAL CONTRACTOR TO FURNISH AND INSTALL ALL DISCONNECTS OR CIRCUIT BREAKERS AS REQUIRED BY CODES FOR EACH CONNECTION. COORDINATE LOCATION WITH THE KITCHEN EQUIPMENT CONTRACTOR.
- ELECTRICAL CONTRACTOR TO FURNISH AND INSTALL WALL SWITCH FOR FACTORY INSTALLED LIGHTING FIXTURES IN EXHAUST VENTILATOR HOODS PER APPLICABLE STATE AND LOCAL CODES APPLICABLE. ELECTRICAL CONTRACTOR SHALL PROVIDE WIRE AND CONNECTION TO EACH LIGHT FIXTURE. THE ELECTRICAL CONTRACTOR SHALL FULLY CONVEAL ALL WIRING BETWEEN POWER SOURCE, WALL SWITCH, AND JUNCTION BOX ON HOOD. THE ELECTRICAL CONTRACTOR SHALL BE RESPONSIBLE FOR PROVIDING ANY INNER WIRING OF LIGHT FIXTURES BETWEEN VENTILATOR HOOD SECTIONS AS REQUIRED. ALL WIRING WITHIN HOOD AND POWER SOURCE TO BE IN STRICT ACCORDANCE WITH MANUFACTURER'S RECOMMENDATIONS, NFPA #96 AND ALL OTHER APPLICABLE CODES.
- IN ACCORDANCE WITH NFPA #96 AND MANUFACTURER'S RECOMMENDATIONS, THE ELECTRICAL CONTRACTOR SHALL FURNISH AND INSTALL A PUSH BUTTON STATION WITH PILOT LIGHT FOR VENTILATOR FAN MOTOR(S). THE ELECTRICAL CONTRACTOR IS TO BE RESPONSIBLE FOR, AND TO PROVIDE ALL REQUIRED WIRING FROM POWER SUPPLY THROUGH FAN SWITCH TO FAN MOTOR(S) AND PROVIDE MAGNETIC STARTERS AND FULLY INTERWIRED SYSTEM WITH ALL POWER INTERRUPTION DEVICES BUILT INTO HOOD AND FIRE PROTECTION SYSTEM AS REQUIRED BY NFPA #96, NATIONAL, STATE AND/OR LOCAL CODES APPLICABLE. ELECTRICAL CONTRACTOR TO PROVIDE LOCK-OUT DEVICES ON CONTROL BOXES FOR EXHAUST HOOD FANS, SYSTEM AND FIRE PROTECTION SYSTEM.
- ELECTRICAL CONTRACTOR SHALL PROVIDE FINAL CONNECTION TO A JUNCTION BOX MOUNTED ON TOP OF A PREFABRICATED REFRIGERATOR AND/OR FREEZER WALL AT APPROXIMATELY 8'-6" AFF. INTERWIRED THE LIGHT ADJACENT TO THE DOOR WITH THE FACTORY MOUNTED LIGHT SWITCH. ALL CONDUIT SHALL BE RUN EXPOSED ON TOP OF WALK-IN. NO EXPOSED CONDUIT WILL BE ALLOWED ON INSIDE OF WALK-IN. ELECTRICAL SERVICE REQUIRED FOR WALK-IN SHALL BE AS SHOWN FOR LIGHTS, DOOR AND DOOR FRAME HEATER, THRESHOLD PLATE HEATERS (WHERE SPECIFIED), HEATED PRESSURE RELIEF PORT (ON FREEZERS) AND ALARM SYSTEMS (WHERE SPECIFIED). (VERIFY REQUIREMENTS WITH EQUIPMENT SUPPLIER)
- ELECTRICAL CONTRACTOR TO PROVIDE THE REQUIRED POWER SUPPLY AND FINAL CONNECTIONS TO THE TERMINAL BLOCK AT THE CONDENSING UNIT AND TO FULLY INTERWIRED TO ANY ADDITIONAL COMPONENTS, INCLUDE THE PROPER SIZE DISCONNECTS OR CIRCUIT BREAKERS. ALL WIRING FOR LOW AND MEDIUM TEMPERATURE CONDENSING UNIT TO BE ROUTED THROUGH DEFROST TIME CLOCK AND THEN WIRED TO EVAPORATOR COIL FOR PROPER POWER SUPPLY WITH THE REQUIRED QUANTITY OF WIRES. THE EVAPORATOR COIL DEFROST HEATER AND FAN MOTOR VOLTAGES AND LOADS ARE AS NOTED ON PLAN. VERIFY LOCATION OF COMPRESSORS AND COORDINATE WITH REFRIGERATION CONTRACTOR FOR FINAL CONNECTIONS. (VERIFY REQUIREMENTS WITH EQUIPMENT SUPPLIER)
- ALL SINGLE-PHASE RECEPTACLES RATED 150 VOLTS TO GROUND OR LESS, 50 AMPERES OR LESS AND THREE-PHASE RECEPTACLES RATED 150 VOLTS TO GROUND OR LESS, 100 AMPERES OR LESS INSTALLED IN LOCATIONS IDENTIFIED IN 210-8(B)(1) THRU (10) SHALL HAVE GROUND-FAULT CIRCUIT-INTERRUPTER PROTECTION FOR PERSONNEL. WHERE DEVICE IS READILY ACCESSIBLE, THE DEVICE SHALL BE PROVIDED WITH INTEGRAL GROUND FAULT PROTECTION. WHERE DEVICE IS NOT READILY ACCESSIBLE AND/OR NOT AVAILABLE WITH INTEGRAL GROUND FAULT PROTECTION, THE BRANCH CIRCUIT BREAKER SERVING THE DEVICE(S) SHALL BE GROUND FAULT TYPE. GFCI RECEPTACLES MUST BE ACCESSIBLE FOR RESET.

PANEL SCHEDULE ABBREVIATIONS AND NOTES

- L LIGHTING
- R RECEPTACLE
- H HVAC
- E KITCHEN EQUIPMENT
- M LARGEST MOTOR
- O OTHER
- N NON COINCIDENT
- X LINKED CELL
- \* VERIFY IN FIELD
- RWC REFER TO THE WIRING CHART FOR WIRE SIZE
- GFI GROUND FAULT CIRCUIT INTERRUPTER
- AFI ARC FAULT CIRCUIT INTERRUPTER
- NBEP NEW BREAKER IN THE EXISTING PANEL
- HACR HEAT AIR CONDITIONING AND REFRIGERATION
- PAN PROVIDE ADDITIONAL WIRE FOR NEUTRAL
- LO LOCKOUT BREAKER
- STB SHUNT TRIP BREAKER
- ETR EXISTING TO REMAIN
- SAE SAME AS EXISTING
- RRF REFER RISER FOR FEEDER SIZE

ELECTRICAL RISER DIAGRAM



RISER DIAGRAM GENERAL NOTES

- THE ELECTRICAL WORK SHALL BE PERFORMED IN COMPLIANCE WITH THE NEC, LOCAL CODES AND AHJ.
- ELECTRICAL CONTRACTOR TO COORDINATE FAULT CURRENT (ISC) RATING WITH UTILITY COMPANY AND AHJ AND CALCULATE ACTUAL AIC REQUIRED PRIOR TO BID.
- E.C. TO VERIFY EXACT POWER DISTRIBUTION IN FIELD. VERIFY SCOPE OF WORK WITH OWNER/LANDLORD PRIOR TO BID.
- ENSURE THE COMBINED VOLTAGE DROP OF THE FEEDER AND BRANCH CIRCUIT SHALL NOT EXCEED 5% PER CODE.
- THE PART OF RISER MARKED AS EXISTING IS FOR REFERENCE PURPOSE ONLY. E.C. SHALL VERIFY THE RISER IN THE FIELD. INFORM THE ENGINEER ON RECORD OF ANY DISCREPANCY FOUND.
- ADDITION OR ALTERATION TO THE EXISTING SYSTEM SHALL NOT BE DONE WITHOUT THE WRITTEN CONSENT OF THE OWNER.
- VERIFY THE LOCATION, RATING, AND OPERABLE CONDITION OF ALL THE EXISTING DEVICES BEING REUSED. REPLACE IF FOUND INOPERABLE (WITHIN THE SCOPE OF WORK). BASE BID ACCORDINGLY.
- COORDINATE THE EXACT LOCATION OF ALL THE NEW ELECTRICAL DEVICES SHOWN ON THE RISER, AND ENSURE THE CLEAR WORKING AND DEDICATED SPACE HAS BEEN PROVIDED AS PER NEC 110.26.
- REFER POWER PLAN FOR THE PROPOSED LOCATION OF THE ELECTRICAL PANELS. INFORM THE ENGINEER OF ANY DISCREPANCY.

RISER DIAGRAM KEY NOTES

- EXISTING 200A, 208Y/120V, 3PH, 4W ELECTRICAL SERVICE FOR PROJECT SPACE (PROVIDED BY LANDLORD). E.C. SHALL VERIFY LOCATION, RATING, AND OPERABLE CONDITION IN THE FIELD. INFORM THE ENGINEER OF THE RECORD OF ANY DISCREPANCY, BEFORE BID.
- E.C. SHALL COORDINATE WITH ARCHITECT/OWNER THE EXACT LOCATION OF THE NEW ELECTRICAL EQUIPMENT IN THE FIELD.
- CONDUIT AND FEEDER BY LL. PROVIDE NEW IF NEEDED. INFORM EOR OF ANY DISCREPANCY BEFORE BID.

RISER ABBREVIATIONS:

M = METER

KITCHEN EQUIPMENT SCHEDULE

ITEM NO.	QTY.	EQUIPMENT DESCRIPTION	MAKE	MODEL	VOLTAGE	PHASE	KVA	AMPS	CONNECTION TYPE	HEIGHT	NOTES
1	2	WALK-IN CHILLER / COOLER	-	CUSTOM	120	1	1.2	10	-	CEILING	
1.1.1	2	EVAPORATOR COIL - CHILLER	RUSSELL	#RL6E06DDARSF	208	1	2.45	11.8	-	-	
1.1.2	1	EVAPORATOR COIL - REFRIGERATOR	RUSSELL	#RL6A06GADARSF	120	1	0.1	0.8	-	-	1,2,3
1.2.1	1	REMOTE CONDENSER UNIT (CHILLER)	RUSSELL	#RF0400L45EB-NT	208	3	5.4	15	-	ROOF	
1.2.2	1	REMOTE CONDENSER UNIT (REFRIGERATOR)	RUSSELL	#RFH08045D8B-NT	208	1	3.12	15	-	ROOF	
2	1	ROTATING RACK OVEN	IBC	LRO-2G4, -2G5 OR -2G6	208	3	1.8	5	-	CEILING	2,3
3	1	80-QUART MIXER, FLOOR	PRECISION	HD-60	208	3	5.8	16.1	-	48"	1,2
4	1	REFRIGERATOR DISPLAY CASE	STRUCTURAL CONCEPT	HV56R	120	1	1.584	13.2	NEMA 5-15P	16"	-
46	1	DATA RACK ABOVE	-	-	120	1	-	-	-	-	1,2,3
47	3	POINT OF SALE TERMINALS	-	-	120	1	-	-	-	-	1,2,3
61	1	ALL IN ONE MACHINE	-	-	120	1	-	-	-	24"	1,2,3
62	2	COMPUTER - (3) IF 3rd POS STATION	-	-	120	1	-	-	-	24"	1,2,3
67	5	POS PRINTERS	-	-	120	1	-	-	-	24"	1,2,3
82	1	CUTTER / MIXER AND SCALE	ROBOT COUPE	R2B CLR	120	1	0.8				

- GENERAL NOTES:**
- DRAWINGS ARE DIAGRAMMATIC ONLY AND REPRESENT THE GENERAL SCOPE OF THE WORK. PRIOR TO SUBMITTING BID, VISIT THE JOB SITE TO OBSERVE THE EXISTING CONDITIONS OF THE PROJECT. REVIEW THE GENERAL NOTES, SPECIFICATIONS AND PLANS FOR ADDITIONAL REQUIREMENTS THAT MAY NOT BE SPECIFICALLY CALLED OUT IN THIS PORTION OF THE CONSTRUCTION DOCUMENTS. NOTIFY OWNER'S CONSTRUCTION MANAGER OF ANY CONFLICTS OR DISCREPANCIES PRIOR TO SUBMISSION OF BID.
  - PROVIDE A CONSTRUCTION RECORD SET OF "AS-BUILT" DOCUMENTS TO THE OWNER'S CONSTRUCTION MANAGER REFLECTING ANY VARIANCES OF INSTALLED PIPING LOCATIONS OR EQUIPMENT CONTRARY TO THE CONSTRUCTION DOCUMENTS, REFER TO SPECIFICATIONS.
  - PROVIDE TO THE OWNER'S CONSTRUCTION MANAGER A COPY OF INSPECTION REPORTS AND APPROVAL CERTIFICATES FROM LOCAL AND STATE INSPECTIONS, REFER TO SPECIFICATIONS.
  - INSTALLATION SHALL COMPLY WITH LEGALLY CONSTITUTED CODES AND THE REQUIREMENTS OF AUTHORITIES HAVING JURISDICTION AND ALSO MEET ALL REQUIREMENTS OF THE LANDLORD. OBTAIN A COPY OF THE LANDLORD'S REQUIREMENTS AND REVIEW PRIOR TO SUBMITTING BID.
  - PLANS AND SPECIFICATIONS GOVERN WHERE THEY EXCEED CODE REQUIREMENTS.
  - VERIFY LOCATION AND DEPTH OF UTILITIES AT POINTS OF CONNECTION BEFORE START OF PIPING INSTALLATION.
  - REFER TO ARCHITECTURAL PLANS FOR EXACT LOCATION AND MOUNTING HEIGHTS OF PLUMBING FIXTURES.
  - DO NOT SCALE FLOOR PLANS FOR EXACT HORIZONTAL LOCATION OF PIPE ROUTING.
  - INSTALL CONCEALED PIPING TIGHT TO THE STRUCTURE AND AS HIGH AS POSSIBLE. INSTALL EXPOSED PIPING TIGHT TO THE STRUCTURE, WALL OR CEILING AND AS HIGH AS POSSIBLE. COORDINATE WITH OTHER TRADES TO AVOID CONFLICTS.
  - VALVES SHALL BE LINE SIZE UNLESS OTHERWISE NOTED.
  - PIPING IN FINISHED AREAS SHALL BE ROUTED CONCEALED.
  - COORDINATE ALL WORK WITH OTHER TRADES AND CONTRACTORS.
  - COORDINATE PIPING INSTALLATION WITH STRUCTURAL GRADE BEAMS, FOOTINGS, COLUMN PIERS, ETC. SLEEVE PIPING THROUGH GRADE BEAMS, FOOTING, ETC. WHERE REQUIRED AND AS NOTED ON PLANS. COORDINATE SLEEVE INSTALLATIONS WITH THE ARCHITECT, STRUCTURAL ENGINEER, STRUCTURAL CONTRACTOR AND GENERAL CONTRACTOR BEFORE CONCRETE IS INSTALLED.
  - CLEAN FAUCET AERATORS AND PIPE STRAINERS PRIOR TO TURNING BUILDING OVER TO THE OWNER.
  - PROVIDE TRAP PRIMERS WHERE REQUIRED BY LOCAL AUTHORITIES.
  - COORDINATE PIPE ROUTING AWAY FROM ELECTRICAL PANELS. DO NOT INSTALL PIPING OVER ELECTRICAL PANELS.
  - PAINT ALL EXPOSED GAS AND WATER PIPING USING RUST INHIBITOR PAINT. PAINT AND COLOR SHALL BE COORDINATED WITH THE ARCHITECT.
  - COORDINATE ALL ROOF PENETRATIONS WITH OTHER TRADES. MAINTAIN 10' MINIMUM CLEARANCE FROM ALL AIR INTAKES. MAINTAIN 2' CLEARANCE FROM ALL OTHER EQUIPMENT.
  - INSULATE PIPING ROUTED IN EXTERIOR BUILDING WALLS WITH MINIMUM 2" BATT INSULATION TO PREVENT FREEZING.
  - EXAMINE THE CONTRACT DRAWINGS AND ALL AVAILABLE INFORMATION CONCERNING EXISTING INSTALLATION, STRUCTURE, AND LOCAL CONDITIONS. VISIT THE SITE TO UNDERSTAND THE NATURE AND SCOPE OF ALL WORK TO BE PERFORMED AND VERIFY EXISTING CONDITIONS. THE SUBMISSION OF A BID WILL BE TAKEN AS EVIDENCE THAT SUCH AN EXAMINATION HAS BEEN MADE AND THAT ALL EXISTING CONDITIONS HAVE BEEN CONSIDERED. NO ALLOWANCES WILL BE MADE AFTER THE PROJECT HAS BEEN AWARDED FOR FAILURE TO VERIFY EXISTING CONDITIONS. CONTRACTOR SHALL NOTIFY ENGINEER OF ANY DISCREPANCIES BETWEEN ACTUAL FIELD CONDITIONS AND THAT OF THESE DRAWINGS PRIOR TO BEGINNING CONSTRUCTION.
  - PLUMBING CONTRACTOR MUST PROVIDE CAMERA VERIFICATION OF EXACT LOCATION OF WASTE LINE TO GC DURING BID. VERIFICATION MUST BE MADE PRIOR TO ISSUANCE OF PERMIT AND AFTER ACCEPTANCE OF CONTRACT TO PROCEED.
  - CONTRACTOR TO FIELD VERIFY EXISTING DOMESTIC WATER SYSTEM IS IF (RPBP). PROVIDED WITH A REDUCED PRESSURE BACKFLOW PREVENTER NOT EXISTING, ASSEMBLY SIZED TO MATCH PROVIDE AN APPROVED RPBP BUILDING WATER METER, INSTALL NEW RPBP BETWEEN THE WATER METER AND THE BUILDING PER LOCAL JURISDICTION'S REQUIREMENTS.

- KITCHEN GENERAL NOTES:**
- REFERENCE THE KITCHEN EQUIPMENT PLUMBING CONNECTION SCHEDULE FOR ITEMS TO BE FURNISHED AND / OR INSTALLED AS REQUIRED TO COMPLETE THE INSTALLATION OF PLUMBING SYSTEMS FOR KITCHEN EQUIPMENT. REFERENCE THE KITCHEN EQUIPMENT SHOP DRAWINGS FOR EXACT REQUIREMENTS PRIOR TO THE START OF INSTALLATION. PROVIDE ITEMS AND WORK AS REQUIRED FOR A COMPLETE AND WORKING.
  - PLUMBING INSTALLATION FOR EACH PIECE OF KITCHEN EQUIPMENT. PROVIDE ROUGH-INS AND CONNECT TO THE KITCHEN EQUIPMENT WITH TRAP, SUPPLIES, SHUTOFF VALVES, PIPES TO THE WALL, ESCUTCHEONS, ETC AS SHOWN, SPECIFIED AND REQUIRED.
  - PROVIDE INDIRECT WASTE LINE OF SAME SIZE AS CONNECTION TO EQUIPMENT WITH 3/4" BEING MINIMUM SIZE. ROUTE FROM EQUIPMENT CONNECTION POINTS INDICATED TO FLOOR DRAIN OR FLOOR SINK. PROVIDE AIR GAP OF TWO PIPE DIAMETERS MINIMUM PER CODE.
  - COMPLY WITH HEALTH DEPARTMENT REGULATIONS. PROVIDE CLEARANCE FOR CLEANING BEHIND AND UNDER EXPOSED PIPING AS REQUIRED BY HEALTH DEPARTMENT. CONFORM TO HEALTH DEPARTMENT REQUIREMENTS FOR LOCATIONS OF FLOOR SINKS.
  - PROVIDE AIRTIGHT SEAL AROUND PIPING PENETRATIONS THROUGH WALK-IN COOLER OR FREEZER WALLS OR CEILINGS.
  - DO NOT INSTALL PIPING IN COOLER OR FREEZER WALLS. INSTALL EXPOSED PIPING IN A NEAT APPEARING MANNER.
  - INSTALL RIM OF FLOOR DRAINS AND FLOOR SINKS BELOW FINISHED FLOOR LEVEL. SLOPE FLOOR TO DRAINS, REFER TO ARCHITECTURAL DRAWINGS FOR EXACT LOCATION.
  - COORDINATE LOCATION OF VENT, WATER, AND GAS PIPING TO AVOID CONFLICT WITH OTHER TRADES.
  - CLEAN INSTALLED PLUMBING FIXTURES AND EQUIPMENT.
  - PROVIDE WALL BACKING OR SPECIFIED CARRIERS FOR THE PROPER SUPPORT OF INSTALLED WALL HUNG FIXTURES AND EQUIPMENT.
  - PROVIDE VERTICAL LIFT SPRING LOADED CHECK VALVES IN HOT AND COLD WATER SUPPLIES FOR 3-COMPARTMENT SINKS, PRE-RINSE UNITS, JANITOR SINKS, MIXING HOSE BIBBS & MIXING WALL HYDRANTS DOWNSTREAM OF SHUTOFF VALVES.
  - SEAL AROUND INSTALLED FIXTURES AND KITCHEN EQUIPMENT WITH CAULK.
  - PROVIDE APPROPRIATE BACKFLOW PREVENTION DEVICES FOR KITCHEN EQUIPMENT REQUIRING THEM PER LOCAL AUTHORITIES REQUIREMENTS. INSTALL BACKFLOW PREVENTION DEVICES FURNISHED WITH KITCHEN EQUIPMENT.

PLUMBING FIXTURE SCHEDULE												
ITEM ID	EQUIPMENT & FIXTURE TYPE	MANUFACTURER / MODEL #	SANITARY CONNECTIONS				WATER CONNECTIONS			GAS (MBH)	REMARKS	
			WASTE	VENT	TRAP SIZE	INDIRECT WASTE	CW	HW	TW			
EWC	ELECTRIC WATER COOLER	IGO PRODUCTS STANDARD POU H/C	-	-	-	-	-	-	-	-	-	BY OWNER BASED ON JURISDICTION REQUIREMENTS (FREESTANDING OR WITH DEDICATED WATER LINE)
CO	FLOOR CLEAN OUT	SIOUX CHIEF 834 SERIES	-	-	-	-	-	-	-	-	-	4" SQUARE FLOOR CLEANOUT.
FD	FLOOR DRAIN	SIOUX CHIEF 832-4 P/NQ	3"	2"	3"	-	-	-	-	-	-	4" SQUARE FLOOR DRAIN. ORDER WITH TRAP PRIMER CONNECTION.
FS	FLOOR SINK	QATEY PVC FLOOR SINK	3"	2"	3"	-	-	-	-	-	-	1/2 GRATE, SQUARE. USE IN LIGHT TRAFFIC AREAS.
WH-1	GAS WATER HEATER	RINNAI - CX199i	-	-	-	-	1"	1"	-	-	-	RINNAI - CX199i TANKLESS WATER HEATER. 199 MBH MAX. 6.0 GPM AT 60°F RISE. 120V 0.98 UEF. SET AT 120°
HD	HUB DRAIN	-	3"	2"	3"	-	-	-	-	-	-	-
GT	GREASE TRAP	E	E	E	-	-	-	-	-	-	-	EXISTING TO REMAIN
RCP-1	HOT WATER RECIRCULATION PUMP	B & G 100	-	-	-	-	-	-	-	-	-	HOT WATER RECIRCULATION PUMP; 1/12 H.P. 115V/1PH. 2 GPM MAX. 10 FT. HD. ALL BRONZE. ORDER WITH AQUASTAT OPTION. EQUAL GRUNDFOSS OR TACO UNITS ARE ACCEPTABLE.
LAV	HANDICAPPED LAVATORY ADA/TAS	AMERICAN STANDARD/ LUCERNE 0355 012	2"	1 1/2"	1 1/4"	-	1/2"	-	1/2"	-	-	VITREOUS CHINA WALL HUNG LAVATORY FOR CONCEALED ARM SUPPORT (JOSAM 17100). PROVIDE WITH MOEN 8279 BLADE HANDLES 4" CENTERSET, OFFSET TAILPIECE MCGUIRE CHROME SUPPLIES. LOOSE KEY ANGLE STOPS, 1-1/4"x1/2" C.P. 17 GAUGE ADJUSTABLE P-TRAP WITH CLEANOUT AND CHROME SET SCREW ESCUTCHEONS THROUGH WALL. "TURBO LAV-GUARD" INSTALLATION KIT NO. 101. INSTALLATION SHALL COMPLY WITH ADA REQUIREMENTS. PROVIDE ASSE 1070 TEMPERING VALVE SET AT 110° F.
MS	MOP SINK	FIAT MS82424	3"	2"	3"	-	3/4"	3/4"	-	-	-	PROVIDE WITH FIAT 830-AA VACUUM RELIEF MOP FAUCET WITH WALL HANGER.
S.A.	SHOCK ABSORBER/ WATER HAMMER ARRESTOR	JOSAM 75000-S	-	-	-	-	-	-	-	-	-	PROVIDE ACCESS WALL PANEL.
SK	POT FILL FAUCET	T&S BRASS B-0210	-	-	-	-	1/2"	-	-	-	-	PROVIDE WITH 18" SWING. PROVIDED BY KES.
HS	HAND SINK	JOHN BOOS PBHS-W-1410-P-SSLR-X	2"	1 1/2"	-	-	1/2"	1/2"	-	-	-	PROVIDE WITH MOEN 8279 BLADE HANDLES. PROVIDED BY KES.
3 COMP. SINK	3 COMPARTMENT SINK	JOHN BOOS E3S8-1824-14T24-X	-	-	-	-	TO FLOOR SINK	3/4"	3/4"	-	-	18 GA. TYPE 300 STAINLESS STEEL 3 COMPARTMENT SINK. 18"x24"x14" BOWLS. 10" HIGH BACKSPLASH WITH 1" FAUCET HOLES. PROVIDE WITH JOHN BOOS PBF-4-S FAUCET. PROVIDED BY KES.
TMV	THERMOSTATIC MIXING VALVE	WATTS/ LFMMV	-	-	-	-	1/2"	1/2"	-	-	-	THERMOSTATIC MIXING VALVE, MIN.TEMP 105F.
TP	TRAP PRIMER	PRECISION PLUMBING / NO. 1	-	-	-	-	1/2"	-	-	-	-	MOUNT IN ACCESSIBLE LOCATION.
WC	WATER CLOSET ADA/TAS	KOHLER/ SANTA ROSA K-3810	4"	2"	-	-	3/4"	-	-	-	-	HANDICAPPED VITREOUS CHINA TANKED WATER CLOSET WITH ELONGATED SIPHON JET BOWL 1.28 GPF. FURNISH COMPLETE WITH KOHLER K-4774 OPEN FRONT TOILET SEAT.

**NOTES:**

PRE-RINSE SPRAYER LINE SHALL BE PROVIDED WITH A WATTS N9 (DUAL CHECK WITH ATMOSPHERIC VENT) BACKFLOW PREVENTER.

PLUMBING CONTRACTOR SHALL PROVIDE AND INSTALL DESIGNATED WATER LINES WITH TESTABLE RPZ BFP FOR ANY CHEMICAL FEEDS AT MOP BASIN AND/OR 3-COMP SINK.

AT TIME OF ORDER, PLUMBING CONTRACTOR SHALL VERIFY THAT ALL PLUMBING EQUIPMENT IS NSF LISTED. PLUMBING CONTRACTOR SHALL ORDER/PROVIDE LAVATORY FAUCETS WITH BLADE HANDLES.

3-COMPARTMENT SINK SHALL HAVE LEVER WASTES.

ALL HAND SINKS SHALL BE TIGHT CONNECTED.

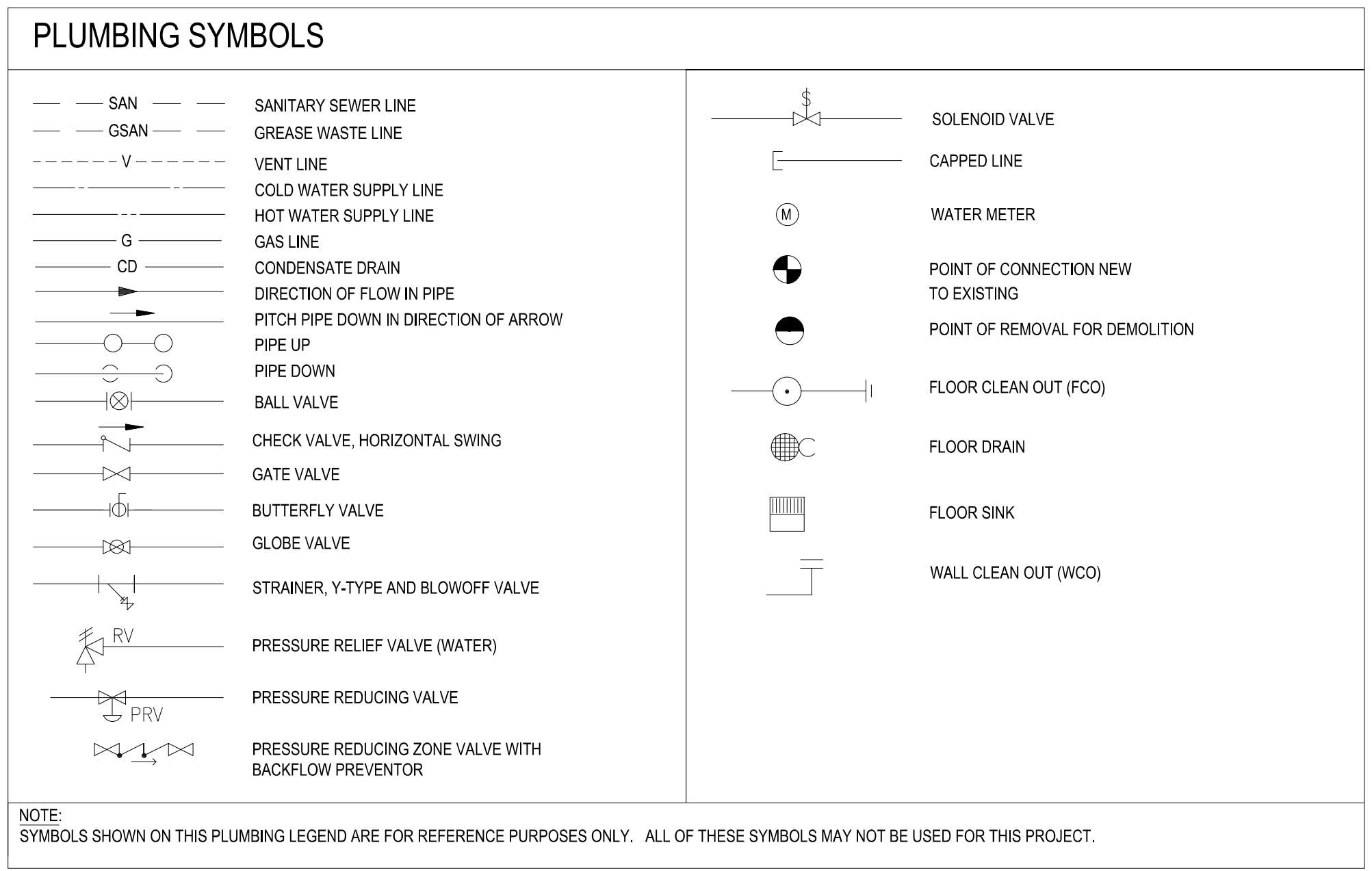
**FIELD VERIFY ALL CONDITIONS**

**NOTE:**

AS NOTED IN THE SPECIFICATIONS, ALL WIRING LAYOUTS, PIPING LAYOUTS AND DUCT LAYOUTS ARE SCHEMATIC. EXACT LOCATIONS SHALL BE DETERMINED BY THE CONTRACTOR AND STRUCTURE OF THE BUILDING AND SHALL BE VERIFIED AND COORDINATED IN THE FIELD. EACH TRADE CONTRACTOR SHALL VERIFY WITH THE GENERAL CONTRACTOR THAT THEY HAVE THOROUGHLY REVIEWED AND COORDINATED ALL LOCATIONS AND ROUTINGS WITH ALL OTHER TRADES PRIOR TO FABRICATION OF CONDUITS, DUCTS, OR PIPING, AND START OF INSTALLATION OF SAME (INCLUDING SPRINKLER PIPING WHEN PRESENT ON JOB). ANY INSTALLATION OR CONSTRUCTION CONFLICTS WHICH OCCUR IN THE FIELD SHALL BE RESOLVED BY THE TRADE CONTRACTOR TO THE SATISFACTION OF THE OWNER AND ARCHITECT AND AT NO EXPENSE TO THE OWNER, ARCHITECT AND/OR GENERAL CONTRACTOR.

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.



- ISSUED REVISIONS:**
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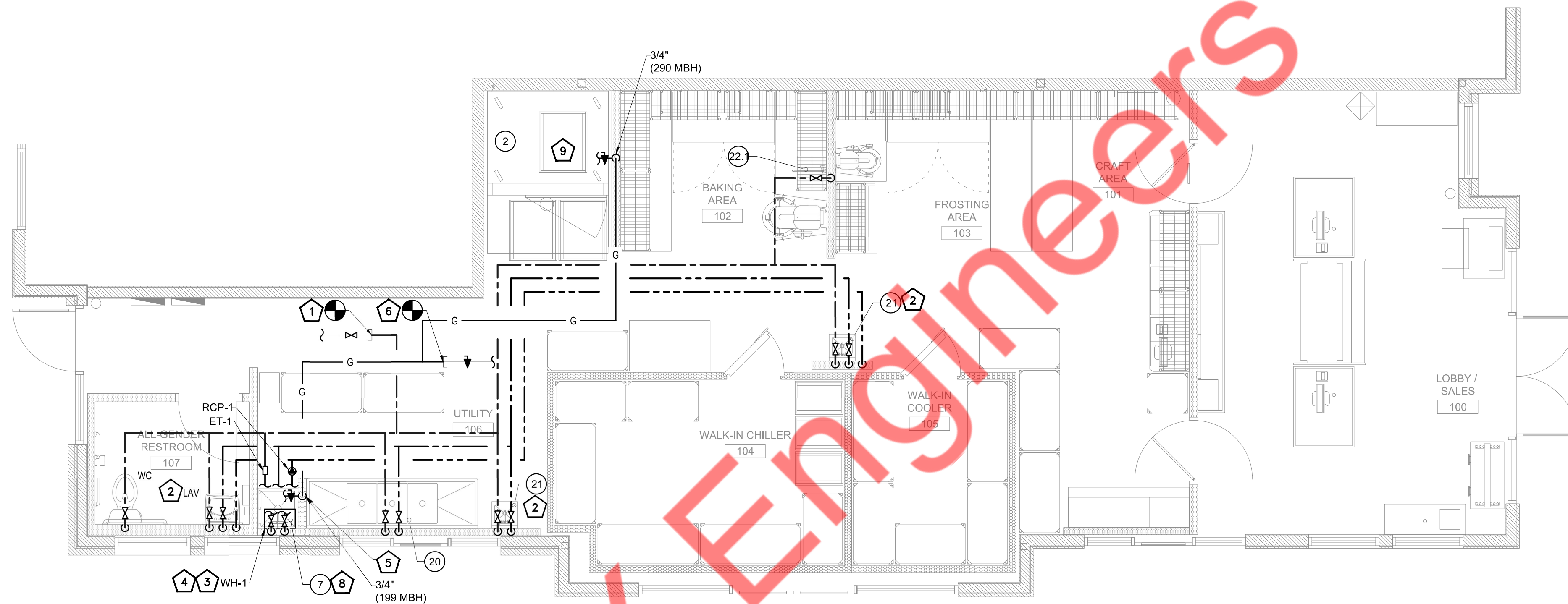
**Nothing Bundt Cakes**  
PLUMBING SCHEDULES

**WATER SUPPLY PIPING GENERAL NOTES:**

- A. DRAWINGS ARE DIAGRAMMATIC ONLY AND REPRESENT THE GENERAL SCOPE OF THE WORK. PRIOR TO SUBMITTING BID, VISIT THE JOB SITE TO OBSERVE THE EXISTING CONDITIONS OF THE PROJECT. REVIEW GENERAL NOTES, SPECIFICATIONS AND PLANS FOR ADDITIONAL REQUIREMENTS THAT MAY NOT BE SPECIFICALLY CALLED OUT IN THIS PORTION OF THE CONSTRUCTION DOCUMENTS. NOTIFY ARCHITECT OF ANY CONFLICTS OR DISCREPANCIES PRIOR TO SUBMISSION OF BID.
- B. REFER TO RISER DIAGRAMS FOR MORE PIPE SIZES.
- C. PROVIDE A CONSTRUCTION RECORD SET OF AS BUILT DOCUMENTS TO THE OWNER REFLECTING ANY VARIANCES OF INSTALLED PIPING LOCATIONS OR EQUIPMENT CONTRARY TO THE CONSTRUCTION DOCUMENTS.
- D. PROVIDE TO THE OWNER A COPY OF INSPECTION REPORTS AND APPROVAL CERTIFICATES FROM LOCAL AND STATE INSPECTIONS. REFER TO SPECIFICATIONS.
- E. INSTALLATION SHALL COMPLY WITH LEGALLY CONSTITUTED CODES AND THE REQUIREMENTS OF AUTHORITIES HAVING JURISDICTION AND ALSO MEET ALL REQUIREMENTS OF THE LANDLORD. OBTAIN A COPY OF THE LANDLORD'S REQUIREMENTS AND REVIEW PRIOR TO SUBMITTING BID.
- F. PLANS AND SPECIFICATION GOVERN WHERE THEY EXCEED CODE REQUIREMENTS.
- G. VERIFY LOCATION AND DEPTH OF UTILITIES AT POINTS OF CONNECTION BEFORE START OF PIPING INSTALLATION.
- H. REFER TO ARCHITECTURAL PLANS FOR EXACT LOCATION AND MOUNTING HEIGHTS OF PLUMBING FIXTURES.
- I. DO NOT SCALE FLOOR PLANS FOR EXACT HORIZONTAL LOCATION OF PIPE ROUTING.
- J. INSTALL CONCEALED PIPING TIGHT TO THE STRUCTURE AND AS HIGH AS POSSIBLE. INSTALL EXPOSED PIPING TIGHT TO THE STRUCTURE, WALL OR CEILING AND AS HIGH AS POSSIBLE. COORDINATE WITH OTHER TRADES TO AVOID CONFLICTS.
- K. PIPING VALVES SHALL BE LINE SIZE UNLESS OTHERWISE NOTED.
- L. PIPING IN FINISHED AREAS SHALL BE ROUTED CONCEALED.
- M. COORDINATE ALL WORK WITH OTHER TRADES AND CONTRACTORS.
- N. INSPECT AND TEST ALL EXISTING SANITARY SEWER LINES AND WATER SUPPLY LINES. REPAIR OR REPLACE AS REQUIRED.
- O. WATER HEATER SHALL BE CERTIFIED BY THE MANUFACTURER AND MUST COMPLY WITH THE ENERGY STANDARDS OF THE 2021 INTERNATIONAL ENERGY CONSERVATION CODE.

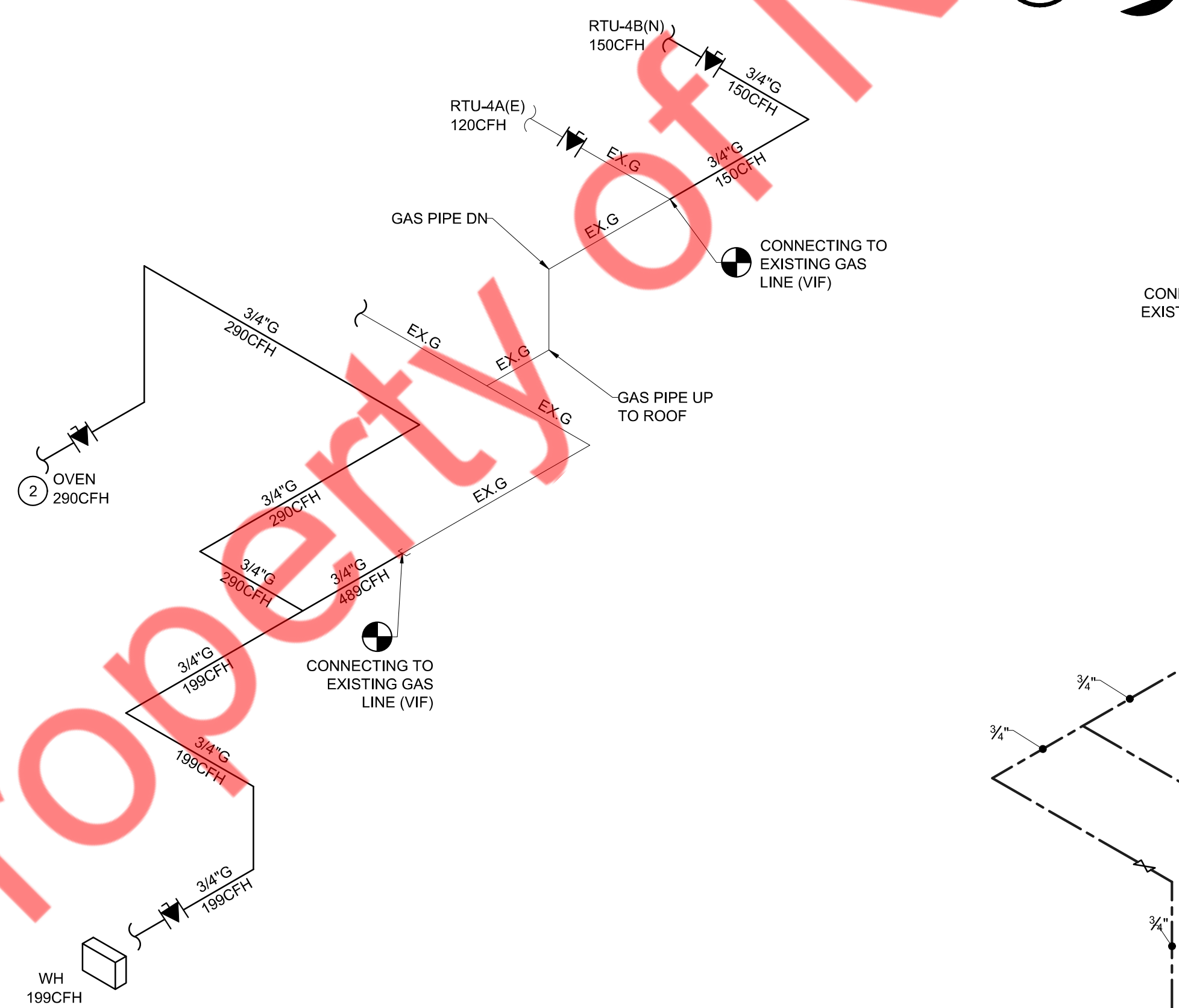
**WATER AND GAS PLAN KEYED NOTES:**

- 1 EXTEND AND CONNECT NEW 1-1/4" CW LINE WITH SHUT OFF VALVE TO EXISTING CW LINE IN SPACE. CONTRACTOR TO FIELD VERIFY THE SIZE, LOCATION AND ROUTING OF EXISTING CW LINE. BASE BID ACCORDINGLY.
- 2 PROVIDE ASSE 1070 OR SIMILAR APPROVED TEMPERING VALVE FOR LAVATORIES AND HAND SINK. SET AT TEMPERATURE TO A MAXIMUM 110°F.
- 3 PROVIDE NEW WATER HEATERS (WH-1) WITH RE-CIRCULATION PUMP (RCP-1) AND THERMAL EXPANSION TANK (ET-1). CONTRACTOR TO INSTALL WATER HEATER AS PER INSTALLATION GUIDELINE. PROVIDE CLEARANCE AS REQUIRED.
- 4 ROUTE T&P DRAIN FROM PROPOSED WATER HEATER TO THE NEAREST MOP SINK WITH APPROVED AIR GAP.
- 5 GAS CONNECTION DOWN TO GAS WATER HEATER (199 MBH). PROVIDE GAS COCK & UNION. MOUNT WATER HEATER AT 7'-0" A.F.F.
- 6 EXTEND AND CONNECT NEW 3/4" GAS LINE TO EXISTING GAS LINE IN SPACE. CONTRACTOR TO FIELD VERIFY THE SIZE, LOCATION AND ROUTING OF EXISTING GAS LINE. BASE BID ACCORDINGLY.
- 7 PROVIDE TRAP PRIMER. SEE DETAIL SHEET P-310.
- 8 PROVIDE VACUUM RELIEF AT MOP SINK VIA NSF LISTED ANTI-SIPHON FAUCET.
- 9 GAS CONNECTION TO ROTATING RACK OVEN (290 MBH). PROVIDE GAS COCK & UNION.



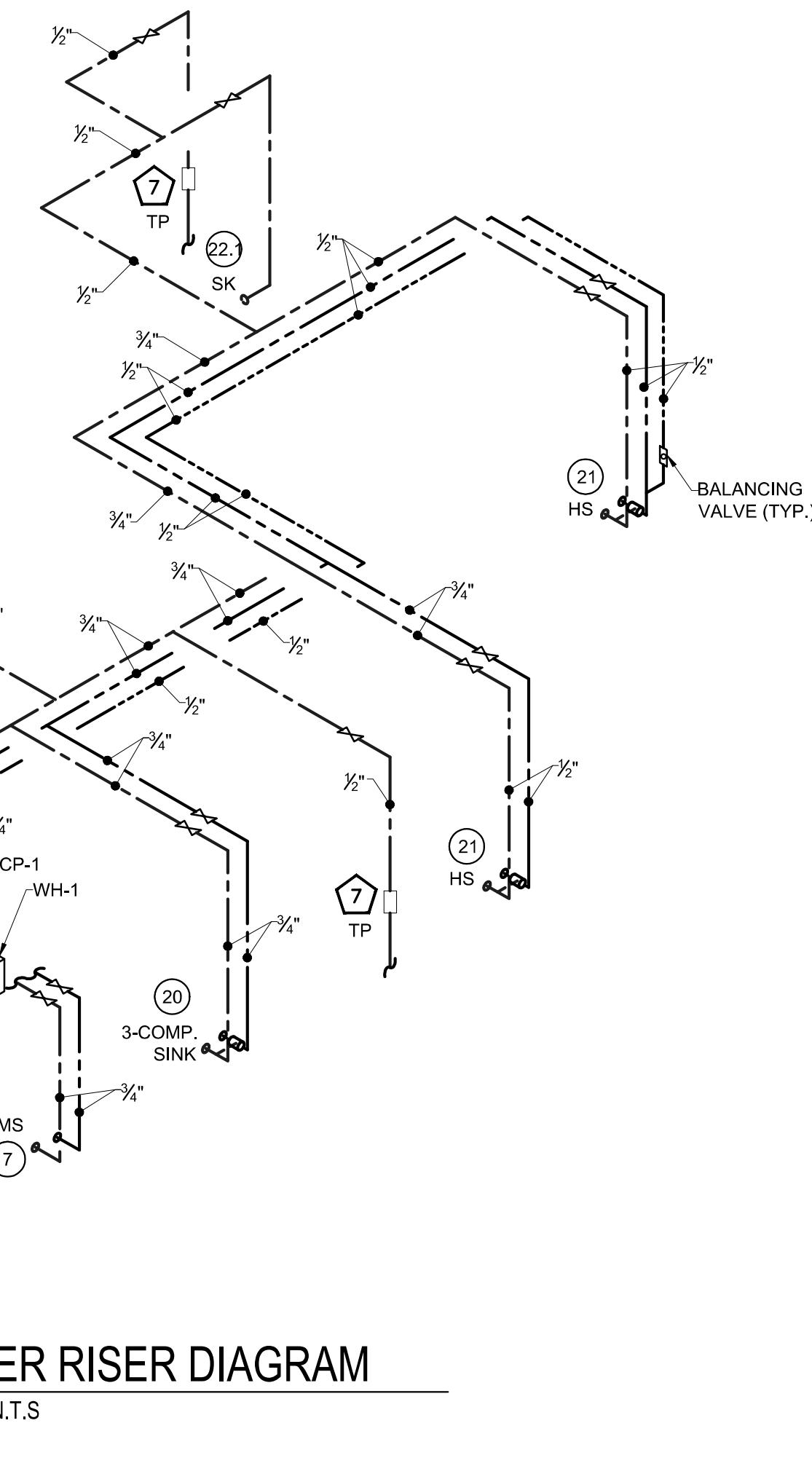
**PLUMBING WATER FLOOR PLAN**

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



**GAS RISER DIAGRAM**

SCALE: N.T.S



**WATER RISER DIAGRAM**

SCALE: N.T.S

DOMESTIC WATER SUPPLY FIXTURE UNITS									
TYPE OF FIXTURE	FIXTURE DESIGNATION	QTY.	TYPE OF SUPPLY CONTROL	HW (EACH)	HW (TOTAL)	CW (EACH)	CW (TOTAL)	FUS (EACH)	FUS (TOTAL)
HAND SINK	HS	2	FAUCET	0.5	1.0	0.5	1.0	0.7	1.4
3-COMP. SINK	3-COMP. SINK	1	FAUCET	3.0	3.0	3.0	3.0	4.0	4.0
WATER CLOSET	WC	1	VALVE	-	-	5.0	5.0	5.0	5.0
LAVATORY	LAV	1	FAUCET	1.5	1.5	1.5	1.5	2.0	2.0
MOP SINK	MS	1	FAUCET	2.25	2.25	2.25	2.25	3.0	3.0
ELECTRIC WATER COOLER	EWC	-	VALVE	-	-	-	-	-	-
POT FILL	SK	1	FAUCET	-	-	0.25	0.25	0.25	0.25
SERVICE TOTAL FIXTURE UNITS				-	7.75	-	13.0	-	15.65
MINIMUM REQUIRED SERVICE SIZE				1" CW SIZE REQUIRED.					

WATER HEATER SCHEDULE						
ID	DESCRIPTION	QTY.	MANUFACTURER	MODEL NUMBER	HEATING CAPACITY	FLOW RATE
WH-1	WATER HEATER	1	RINNAI	CX199	199000 BTU/HR	6 GPM @60°F

REMARKS:  
 - DIMENSION 18.50"(W)X25.75"(H)X11.41"(D)  
 - PROVIDE CLEARANCES FOR HEATER AS PER MANUFACTURER'S RECOMMENDATION.  
 - PROVIDE DRAIN PAN.  
 - PROVIDE RECIRCULATION PUMP (RCP-1) AND EXPANSION TANK (ET-1) AS PER SCHEDULE.  
 - PROVIDE CONDENSATE DRAIN NEUTRALIZATION KIT  
 - CO-ORDINATE WITH MECHANICAL CONTRACTOR FOR COMBUSTION AIR INTAKE & EXHAUST CONNECTIONS.

PUMP SCHEDULE						
ID	DESCRIPTION	QTY.	MANUFACTURER	MODEL NUMBER	VOLT	PH
RCP-1	RECIRCULATION PUMP	1	GRUNDFOS	ALPHA2	120 V	1

REMARKS:  
 2 GPM @ 3.0 FT. HD. INSTALL NEAR WATER HEATER PER MANUFACTURER'S RECOMMENDATIONS. PROVIDE AQUASTAT WITH TIMER KIT

TOTAL GAS DEMAND LOAD					
NO.	DESCRIPTION	CONN. SIZE	QTY.	INPUT (MBHEA)	TOTAL (MBH)
1	WATER HEATER	3/4"	1	199	199
2	OVEN	3/4"	1	290	290
3	RTU-4A(E)	3/4"	1	120	120
4	RTU-4B(N)	3/4"	1	150	150
				PLUMBING SUB-TOTAL	759
				GAS DEMAND TOTAL	759

- NOTES:  
 1. GAS PIPING SIZE IS BASED ON LONGEST RUN METHOD.  
 2. THE GAS SYSTEM SIZED FOR THE RTUS, OVEN AND WATER HEATER IS SIZED FOR A TOTAL DEVELOPED LENGTH OF MAXIMUM 150'-0" FROM THE GAS METER.  
 3. PIPE SIZES SHOWN ON THE RISER DIAGRAM ARE BASED ON 2021 INTERNATIONAL FUEL GAS CODE. VERIFY FIELD CONDITIONS FOR ACTUAL DEVELOPED LENGTH AND POSSIBLE ADJUSTMENTS TO PIPE SIZES.

ISSUED REVISIONS:

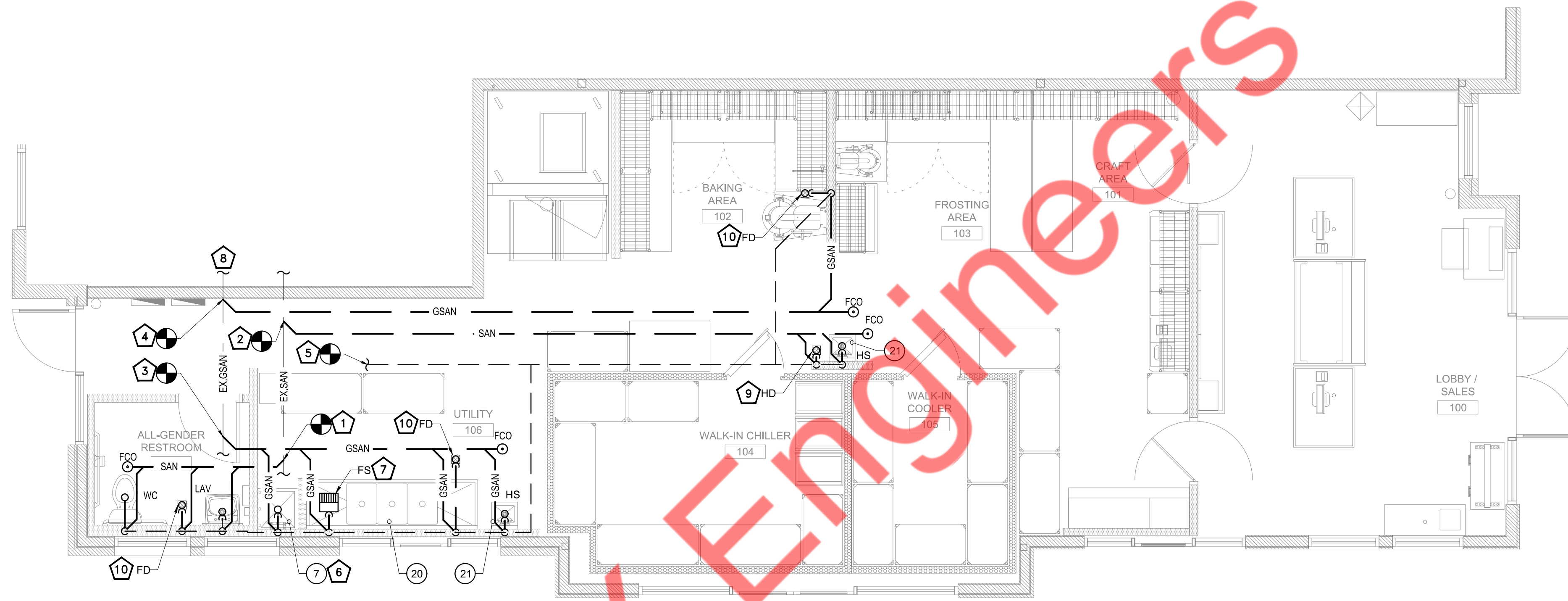
**Nothing Bundt Cakes**  
PLUMBING WATER & GAS PLAN

**SANITARY PIPING GENERAL NOTES:**

- A. REFER RISER DIAGRAMS FOR PIPE SIZING.
- B. UNLESS OTHERWISE NOTED, SLOPE OF DRAINAGE SYSTEM TO BE 1/8" PER FOOT OF RUN FOR PIPE 3" OR LARGER AND 1/4" PER FOOT FOR PIPE SMALLER THAN 3".
- C. CONTRACTOR TO FIELD VERIFY FEASIBILITY OF SLAB PENETRATION AS PER STRUCTURAL REQUIREMENT.
- D. PROVIDE ACCESS PANELS FOR WATER HAMMER ARRESTOR, CLEANOUTS & SHUT-OFF VALVES AS REQUIRED.
- E. ANY UNUSED PLUMBING PIPING MUST BE COMPLETELY REMOVED OR DO NOT ABANDON IN PLACE.
- F. PROVIDE TRAP PRIMER SEAL IN FLOOR DRAIN AS PER LOCAL JURISDICTION

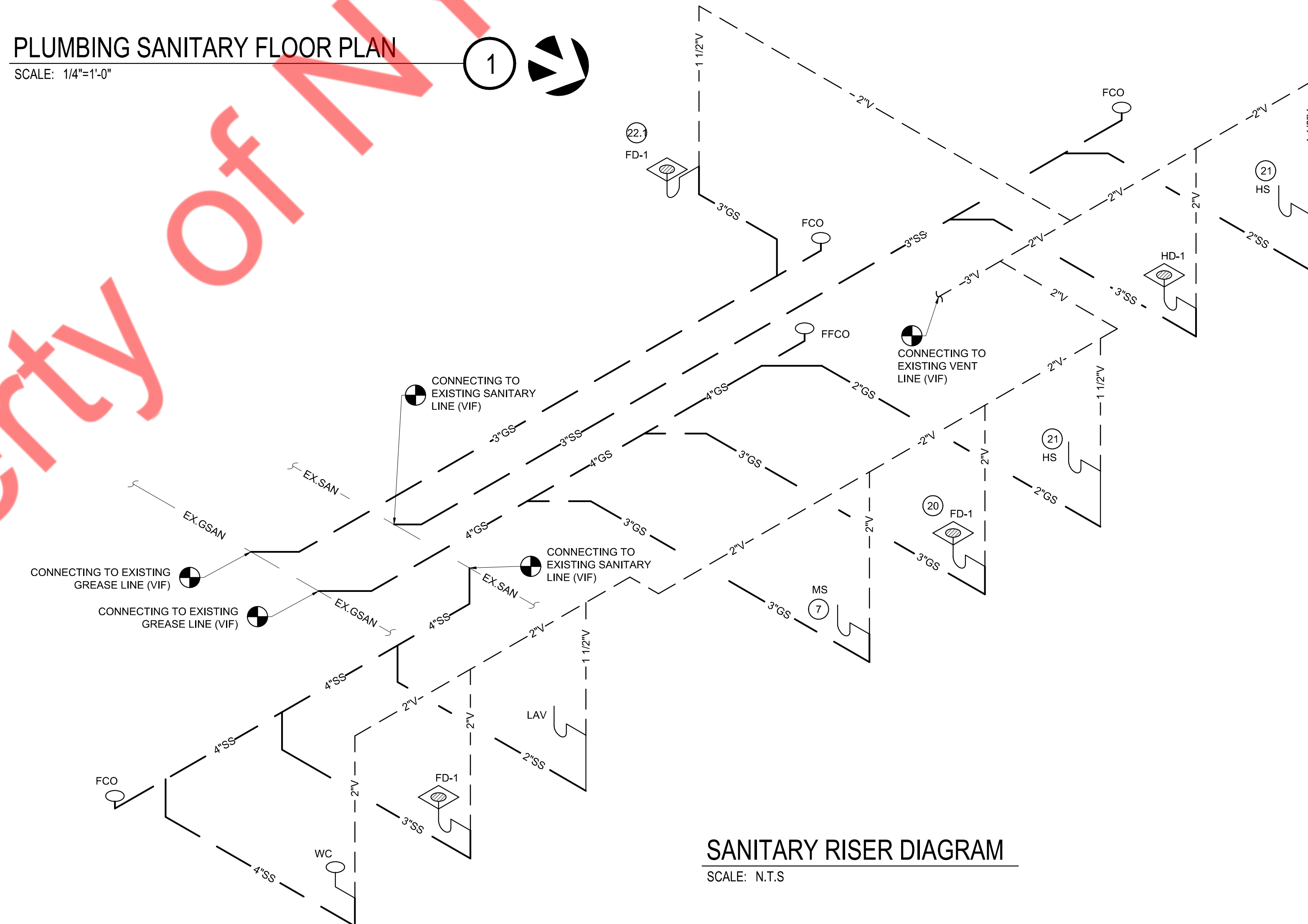
**SANITARY KEYED NOTES:**

- 1 EXTEND AND CONNECT NEW 4" SANITARY LINE TO EXISTING 4" SANITARY WASTE LINE IN SPACE. CONTRACTOR TO FIELD VERIFY EXISTING SANITARY SIZE, ROUTING AND INVERT ON SITE.
- 2 EXTEND AND CONNECT NEW 4" SANITARY LINE TO EXISTING 4" SANITARY WASTE LINE IN SPACE. CONTRACTOR TO FIELD VERIFY EXISTING SANITARY SIZE, ROUTING AND INVERT ON SITE.
- 3 EXTEND AND CONNECT NEW 3" GREASE WASTE PIPING TO EXISTING 4" GREASE WASTE LINE IN SPACE. CONTRACTOR TO FIELD VERIFY SIZE, ROUTING AND INVERT.
- 4 EXTEND AND CONNECT NEW 4" GREASE WASTE PIPING TO EXISTING 4" GREASE WASTE LINE IN SPACE. CONTRACTOR TO FIELD VERIFY SIZE, ROUTING AND INVERT.
- 5 EXTEND AND CONNECT NEW 3" VENT LINE TO EXISTING VTR. CONTRACTOR TO FIELD VERIFY EXISTING VTR LOCATION, SIZE AND UPGRADE IF REQUIRED.
- 6 ROUTE WATER HEATER T&P RELIEF TO MOP SINK.
- 7 INDIRECT WASTE FROM 3 COMP SINK (20) TO ADJACENT FLOOR SINK WITH APPROVED AIR GAP.
- 8 CONTRACTOR TO FIELD VERIFY THE LOCATION, CONDITION AND CAPACITY OF EXISTING GREASE INTERCEPTOR IS MORE OR EQUAL THAN 750 GALLONS AND PROVIDE NEW IF EXISTING IS NOT SUFFICIENT.
- 9 CONDENSATE DRAIN FROM WALK-IN COOLER AND WALK-IN CHILLER TO HUB DRAIN WITH APPROVED AIR GAP.
- 10 PROVIDE TRAP PRIMER. SEE DETAIL SHEET P-310.



**PLUMBING SANITARY FLOOR PLAN**

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



**SANITARY RISER DIAGRAM**

SCALE: N.T.S

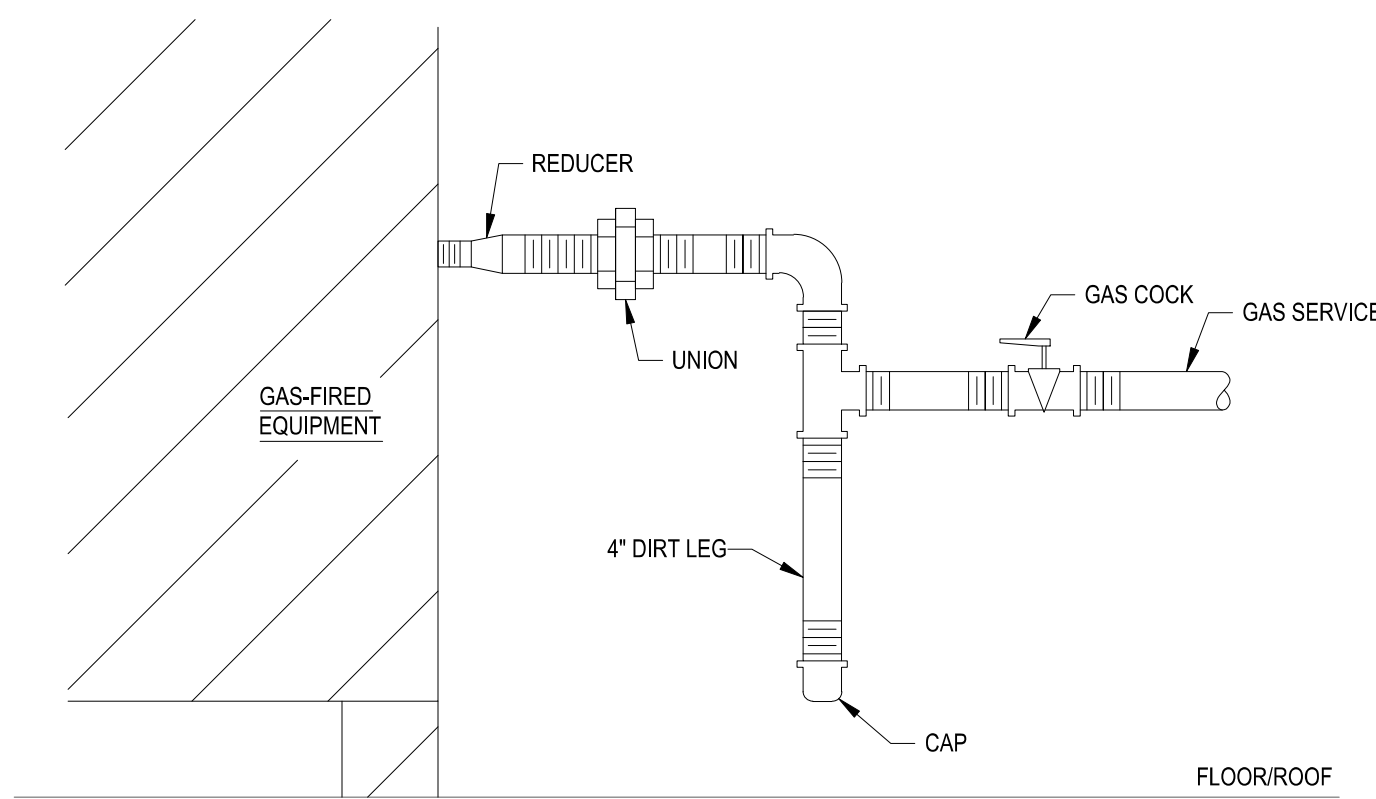
DRAINAGE FIXTURE UNITS SCHEDULE					
TYPE OF FIXTURE	FIXTURE DESIGNATION	QTY.	FIXTURE UNITS (EACH)	MINIMUM FIXTURE TRAP AND DRAIN SIZE	TOTAL FIXTURE UNITS
HAND SINK	HS	2	1.0	1-1/4"	2.0
FLOOR DRAIN	FD	3	5.0	2"	15.0
FLOOR SINK	FS	1	5.0	2"	5.0
HUB DRAIN	HD	1	5.0	2"	5.0
LAVATORY	LAV	1	1.0	1-1/4"	1.0
WATER CLOSET	WC	1	6.0	3"	6.0
MOP SINK	MS	1	2.0	3"	5.0
TOTAL DRAINAGE FIXTURE UNITS					39.0

GREASE INTERCEPTOR CALCULATION				
TYPE OF FIXTURE	FIXTURE DESIGNATION	QTY.	DFU PER FIXTURE	TOTAL FIXTURE UNITS
HAND SINK	HS	1	1.0	1.0
3-COMP. SINK	3-COMP. SINK	1	IW TO FS	-
POT FILL	SK	1	IW TO FD	-
MOP SINK	MS	1	2.0	2.0
FLOOR DRAIN	FD	2	5.0	10
FLOOR SINK	FS	1	5.0	5.0
TOTAL DRAINAGE FIXTURE UNITS (DFU) CONNECTED TO GREASE INTERCEPTOR				18.0

AS PER 2021 INTERNATIONAL PLUMBING CODE, CHAPTER 7 SECTION 709.3 CONVERSION OF GPM VALUE FOR 18 DFU IS 9.0 GPM.  
 AS PER 2021 INTERNATIONAL PLUMBING CODE, PLUMBING, CHAPTER 10 SECTION 1003.3.7 THE CAPACITY OF GREASE INTERCEPTOR IS PEAK DRAIN FLOW MULTIPLIED BY 30 MINUTES RETENTION TIME.  
 9.0 (GPM) X 30 (MIN.) = 270 GALLONS.

ISSUED REVISIONS:

**Nothing Bundt Cakes**  
**PLUMBING SANITARY PLAN**

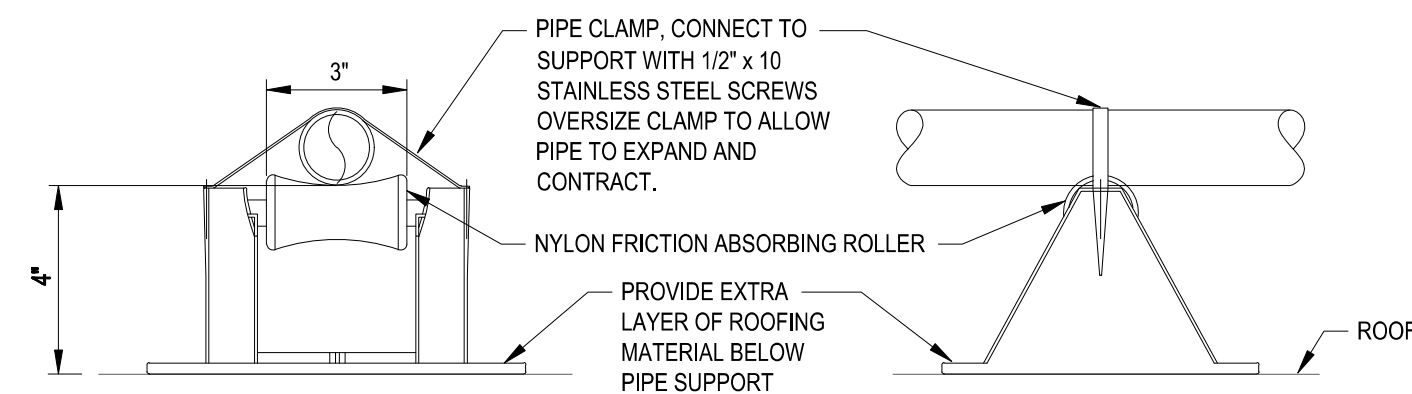


**GAS LOW PRESSURE PIPING CONNECTION DETAIL**  
N.T.S.

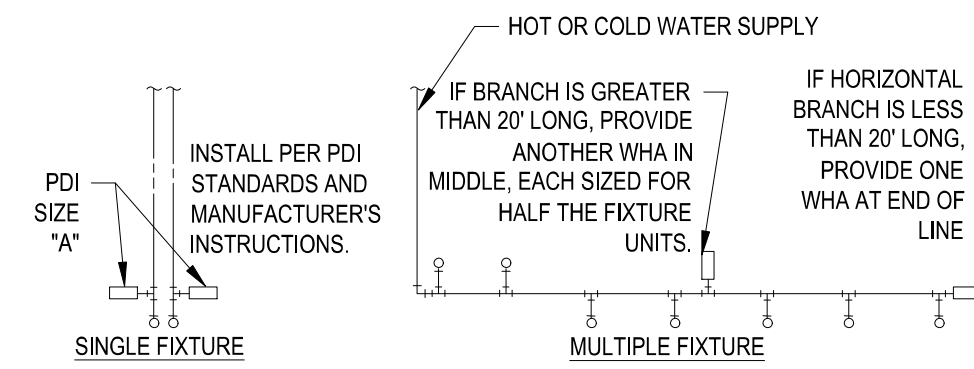
NATURAL GAS PIPING RECOMMENDED SUPPORT SPACING FOR BLACK STEEL PIPE	
PIPE SIZE (IN)	DISTANCE BETWEEN SUPPORTS (FT)
1/2	4
3/4 - 1	6
1-1/4 - 3	7

GAS PIPE, CLEAN PIPE OF OIL AND DEBRIS, PAINT WITH TWO COATS OF PRIMER AND TWO COATS OF RUST INHIBITING PAINT. COLOR: YELLOW OR BY ARCHITECT.

ALL EXISTING AND NEW UTILITIES/PIPING RUNNING OVER ROOF MUST BE SUPPORTED VIA RUBBER ROOF BLOCK WITH UNDERLAYMENT (FACE-TO-FACE) MECHANICALLY SECURED TO SUPPORT BLOCK.



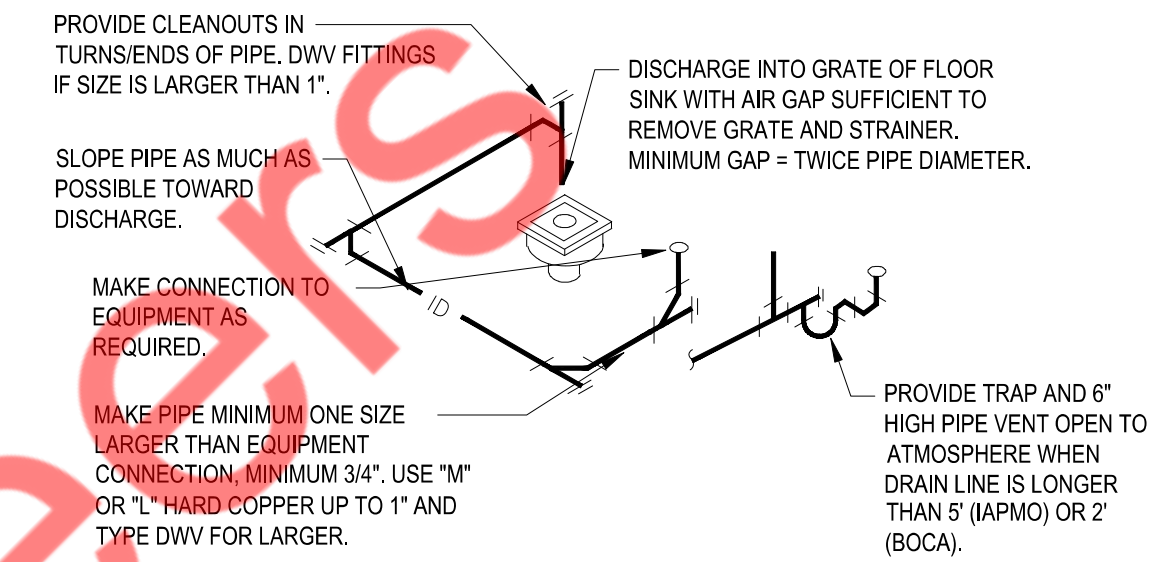
**PIPE ROOF SUPPORT DETAIL**  
N.T.S.



PDI SIZE	PIPE SIZE	FIXTURE UNIT LOAD	FIXTURE UNIT TABULATION	
			COLD	HOT
A	1/2"	1-11	10	--
B	3/4"	12-32	5	--
C	1"	33-60	5	--
D	1-1/4"	61-113	1.5	1.5
E	1-1/2"	114-154	3	3
F	2"	154-330	2	2

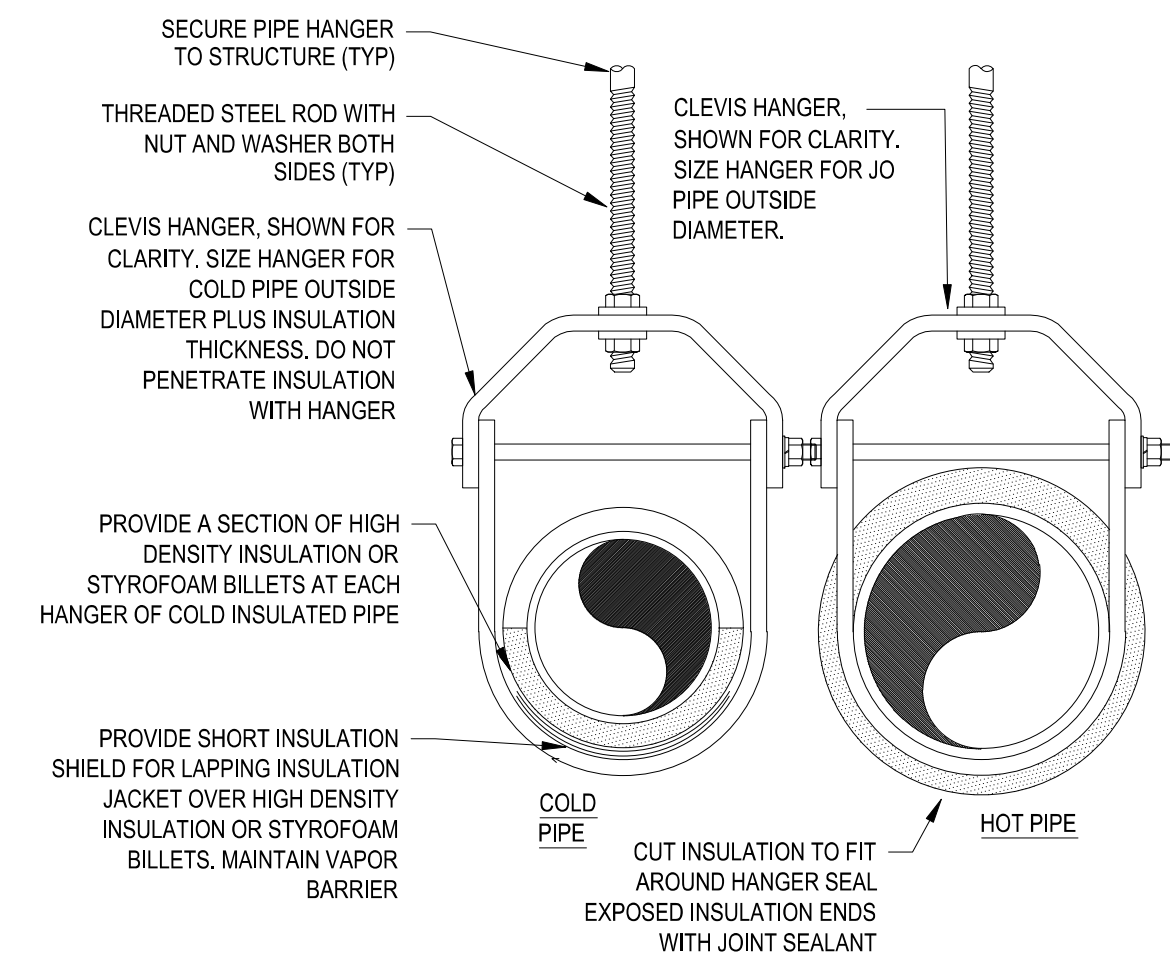
DO NOT PROVIDE AIR CHAMBERS. PROVIDE WATER HAMMER ARRESTORS BY SIOUX CHIEF PRECISION PLUMBING PRODUCTS, WATTS OR APPROVED EQUIVALENT WITH PISTON AND O-RING CONSTRUCTION, HAVING PDI #WH-201, ASSE #1010 AND ANSI #A112.26.11 CERTIFICATION. INSTALL IN HORIZONTAL OR VERTICAL POSITION, BUT NEVER UPSIDE DOWN. INSTALL IN LINE WITH WATER FLOW DIRECTION IF POSSIBLE. SIZE THE UNITS AS SHOWN ON THE DRAWINGS AND/OR PER THE TABLES SHOWN ABOVE.

**WATER HAMMER ARRESTORS**  
N.T.S.



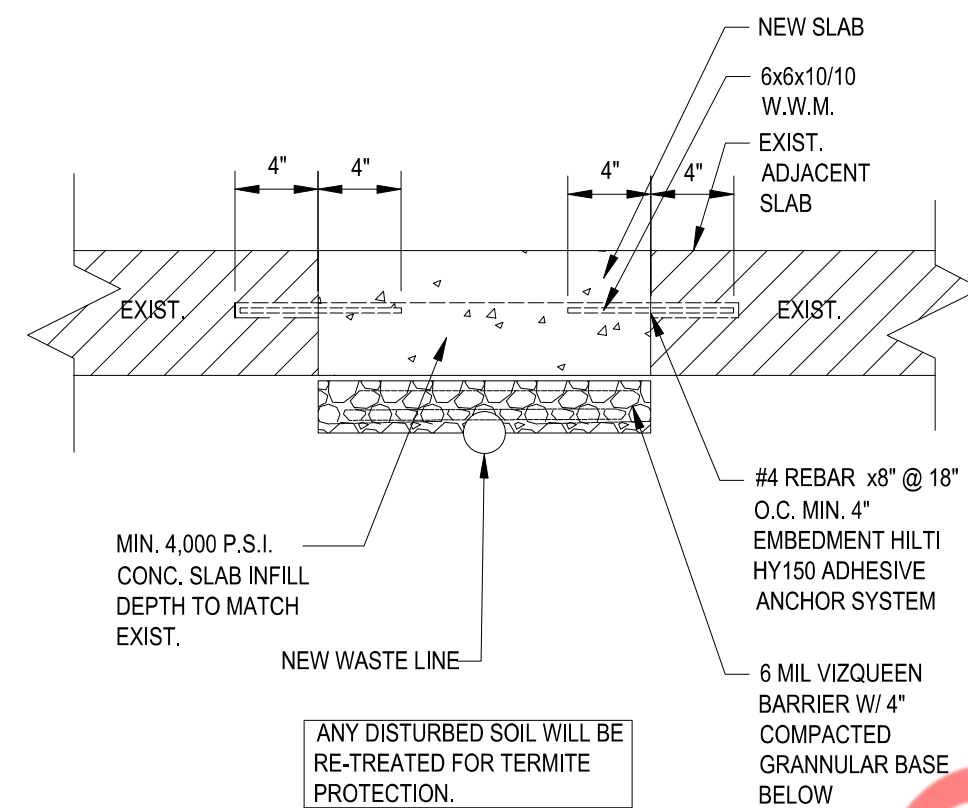
ROUTE PIPE INCONSPICUOUSLY AND UNOBTUSIVELY. HANG PIPE AS REQUIRED. DO NOT INSULATE INDIRECT DRAIN PIPE WHEN INSTALLED IN FOOD SERVICE FACILITY. REFER TO LOCAL CODES FOR FURTHER INFORMATION.

**INDIRECT DRAIN**  
N.T.S.

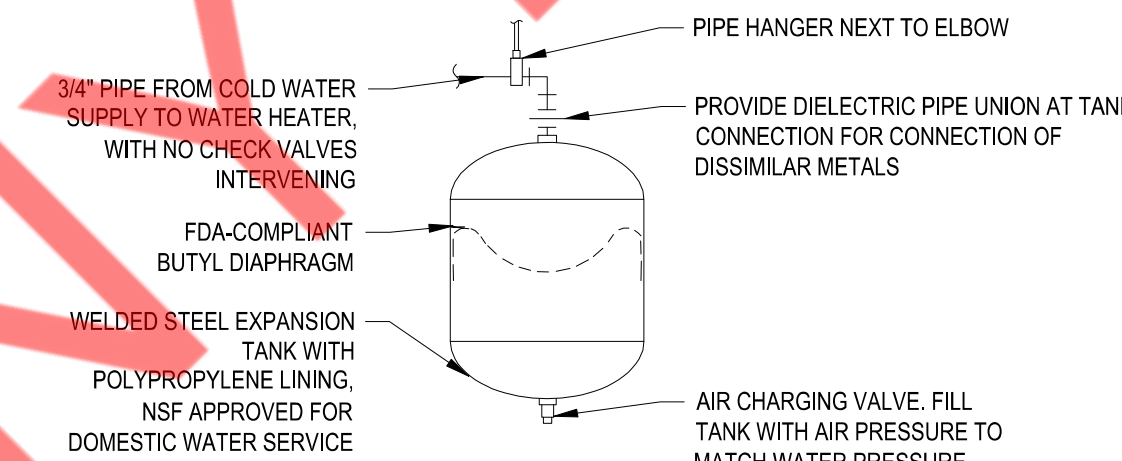


REFER TO SPECIFICATIONS FOR INSULATION TUBES, INSULATION THICKNESS, HANGER TYPES, HANGER ROD CONNECTIONS TO STRUCTURE AND HANGER SPACING.

**INSULATED PIPE HANGER DETAIL**  
N.T.S.

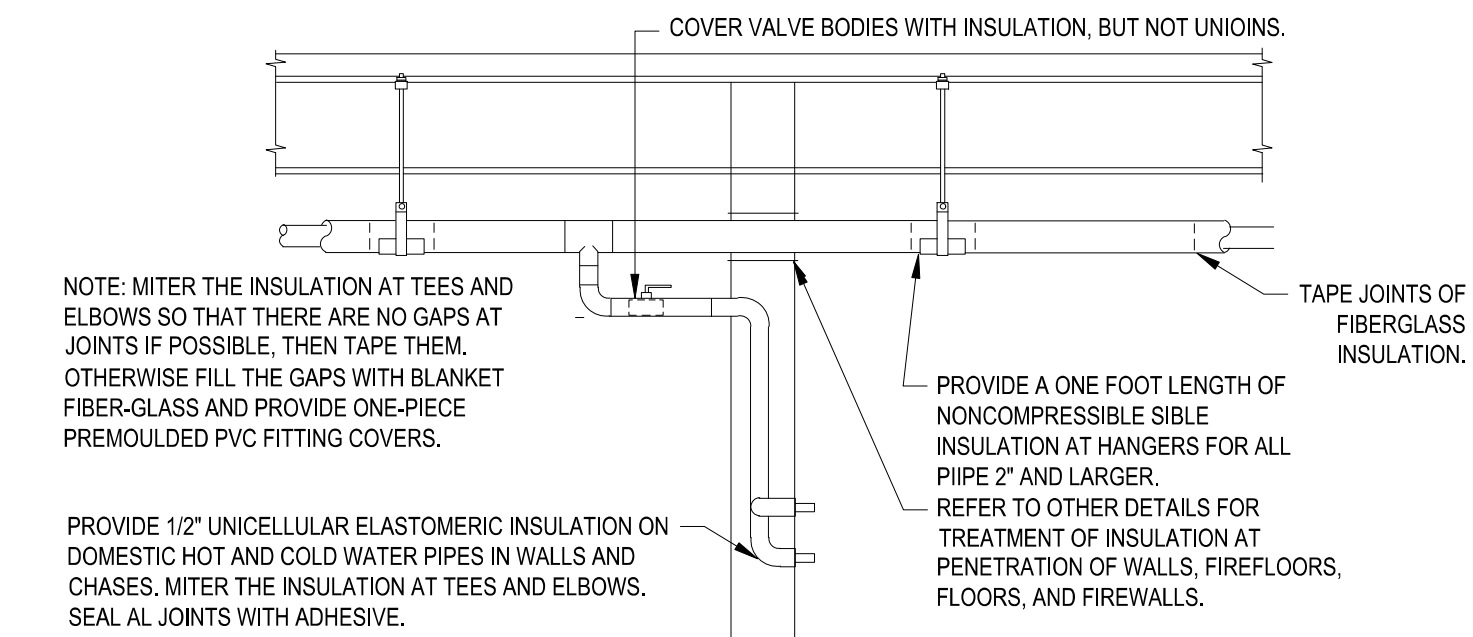


**SLAB REPAIR DETAIL**  
N.T.S.



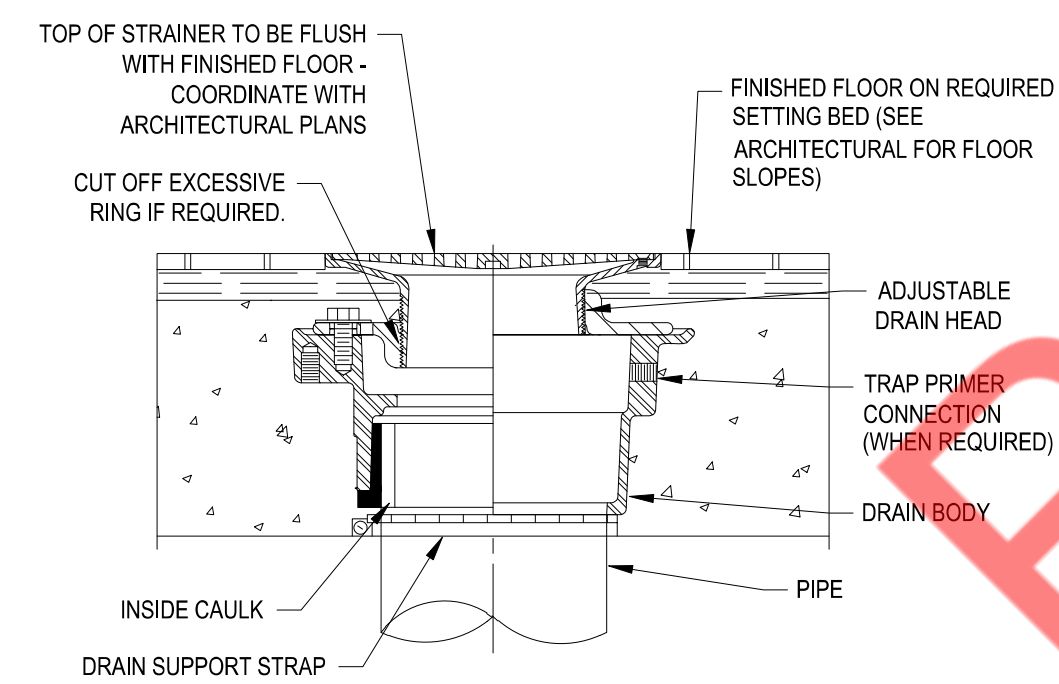
PIPING ARRANGEMENT SHOWN IS SCHEMATIC. ADJUST TO SUIT FIELD CONDITIONS. FOLLOW MANUFACTURER'S INSTRUCTIONS FOR INSTALLATION PROCEDURE. VERIFY PROPER OPERATION WHEN INSTALLED. PROVIDE SEISMIC STRAP OR BRACING WHEN REQUIRED BY LOCAL AUTHORITIES.

**SMALL EXPANSION TANK**  
N.T.S.

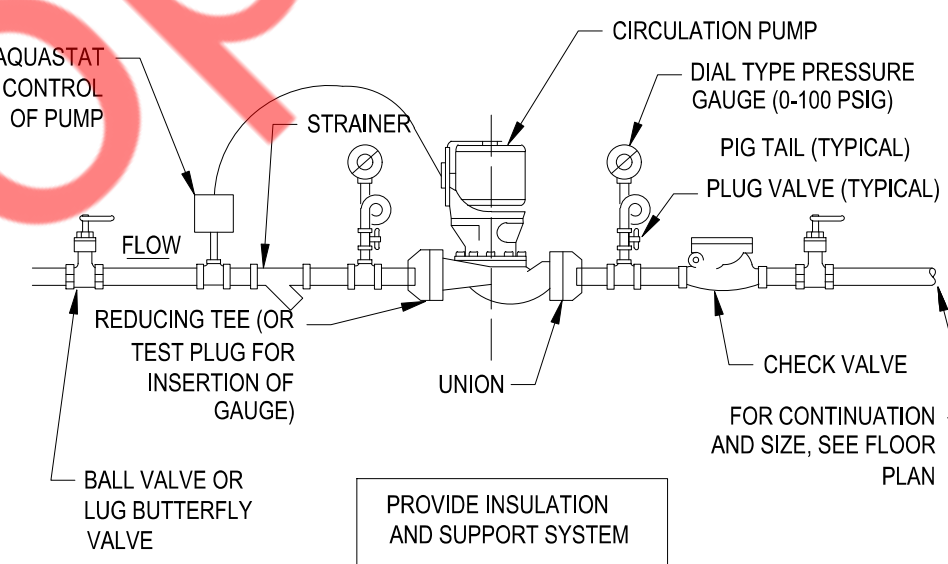


PROVIDE 1/2" FIBERGLASS INSULATION WITH ALL-SERVICE JACKET WITH VAPOR BARRIER ON ALL COLD WATER, CONDENSATE, AND STORM DRAIN PIPE UP TO 4". PROVIDE 1" INSULATION ON STORM DRAIN PIPE ABOVE 4" SIZE. PROVIDE 1" FIBER-GLASS INSULATION WITH ALL-SERVICE JACKET ON DOMESTIC HOT WATER PIPING. REFER TO SPECIFICATIONS FOR FURTHER INFORMATION REGARDING INSULATION. INSTALL ALL ITEMS PER SPECIFICATIONS AND MANUFACTURER'S INSTRUCTIONS. MAINTAIN VAPOR BARRIER ON COLD PIPING BY MEANS OF SEALANT AND TAPE. FLAME-SPREAD AND SMOKE-DEVELOPED INDEXES SHALL NOT EXCEED 25/50 SEAL EXPOSED ENDS OF FIBERGLASS INSULATION WITH ADHESIVE MASTIC.

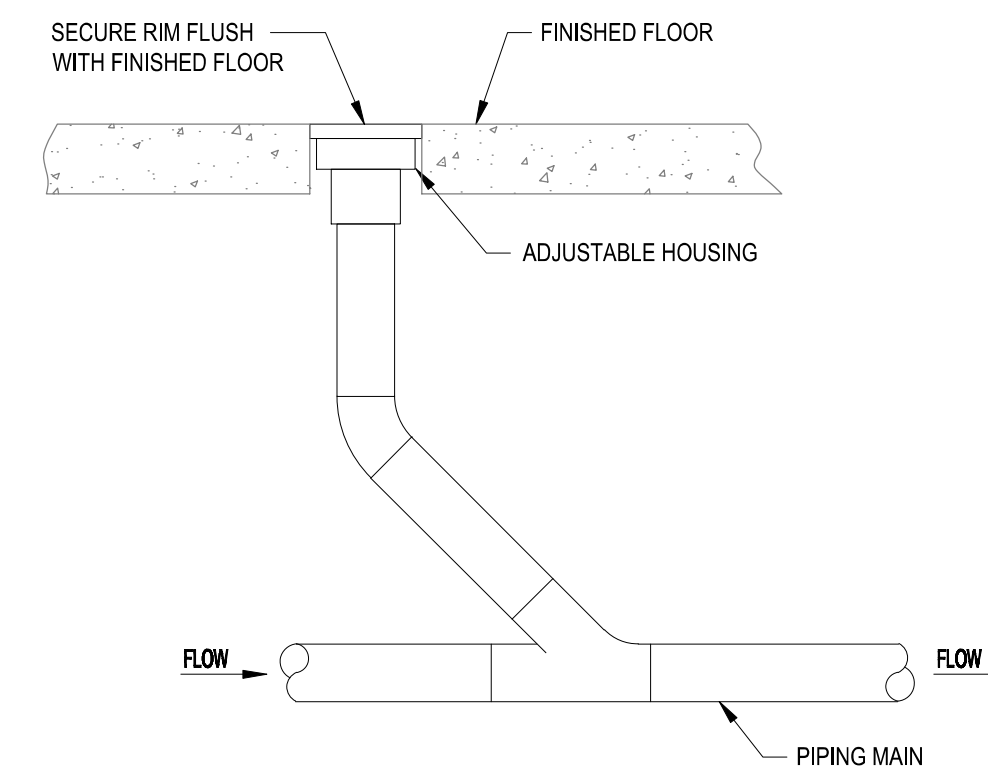
**PIPE INSULATION**  
N.T.S.



**FLOOR DRAIN DETAIL**  
N.T.S.



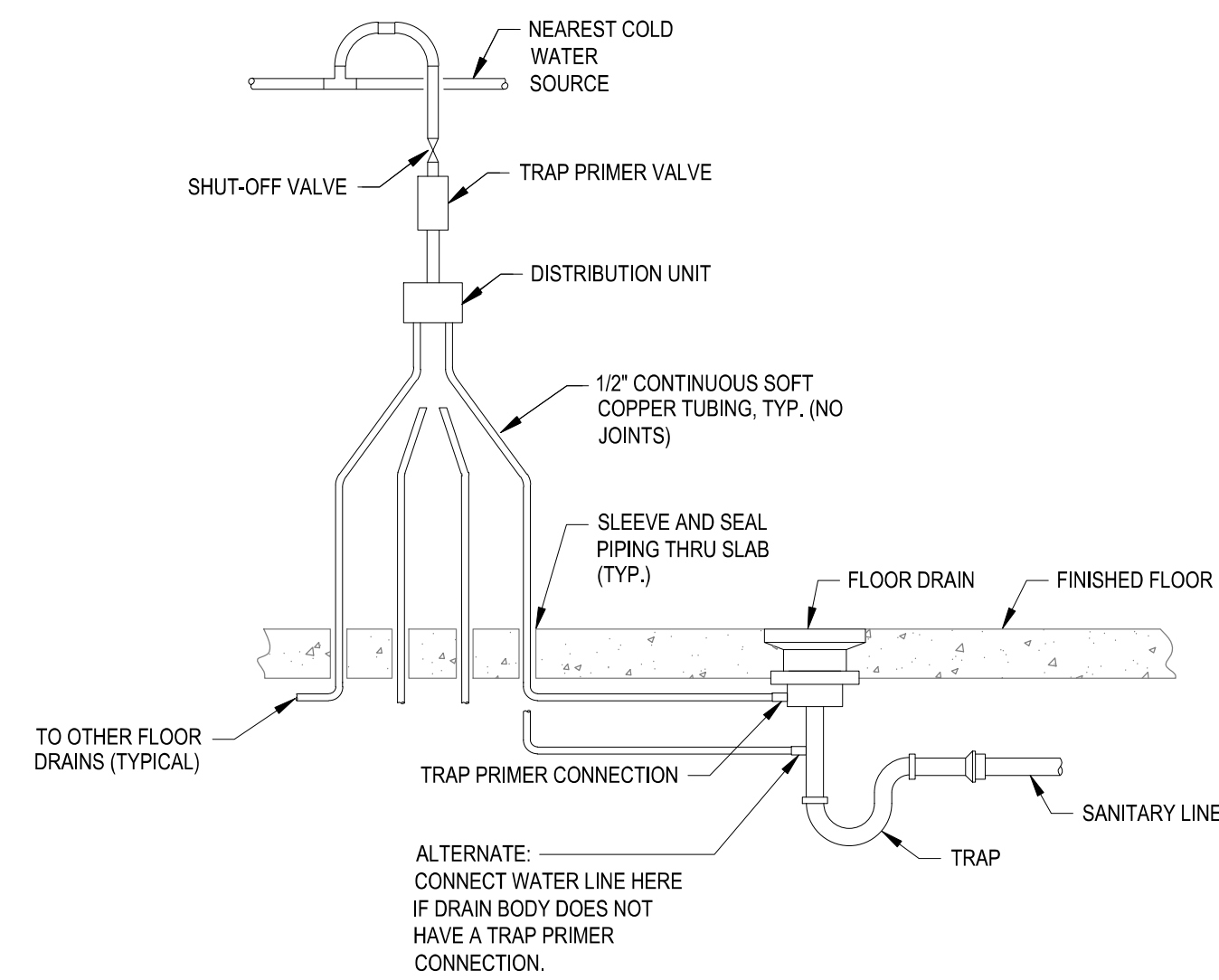
**IN-LINE CIRCULATING PUMP DETAIL**  
N.T.S.



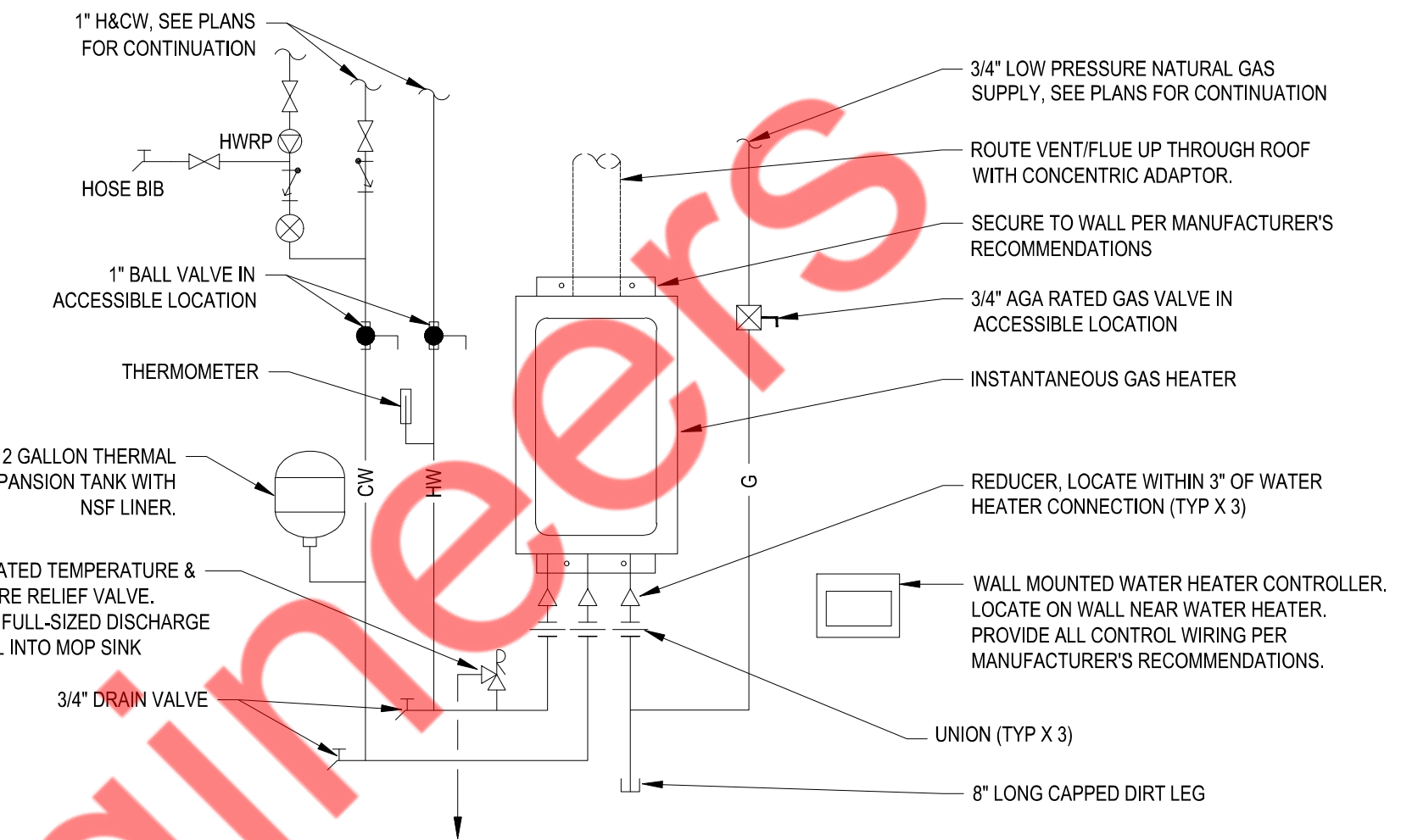
NOTE:  
1. CLEANOUT SHALL BE THE SAME SIZE AS THE PIPE TO WHICH IT IS CONNECTED UP TO 4". FOR PIPES LARGER THAN 4", THE MINIMUM SIZE OF THE CLEANOUT IS 4".

**FLOOR CLEANOUT DETAIL**  
N.T.S.

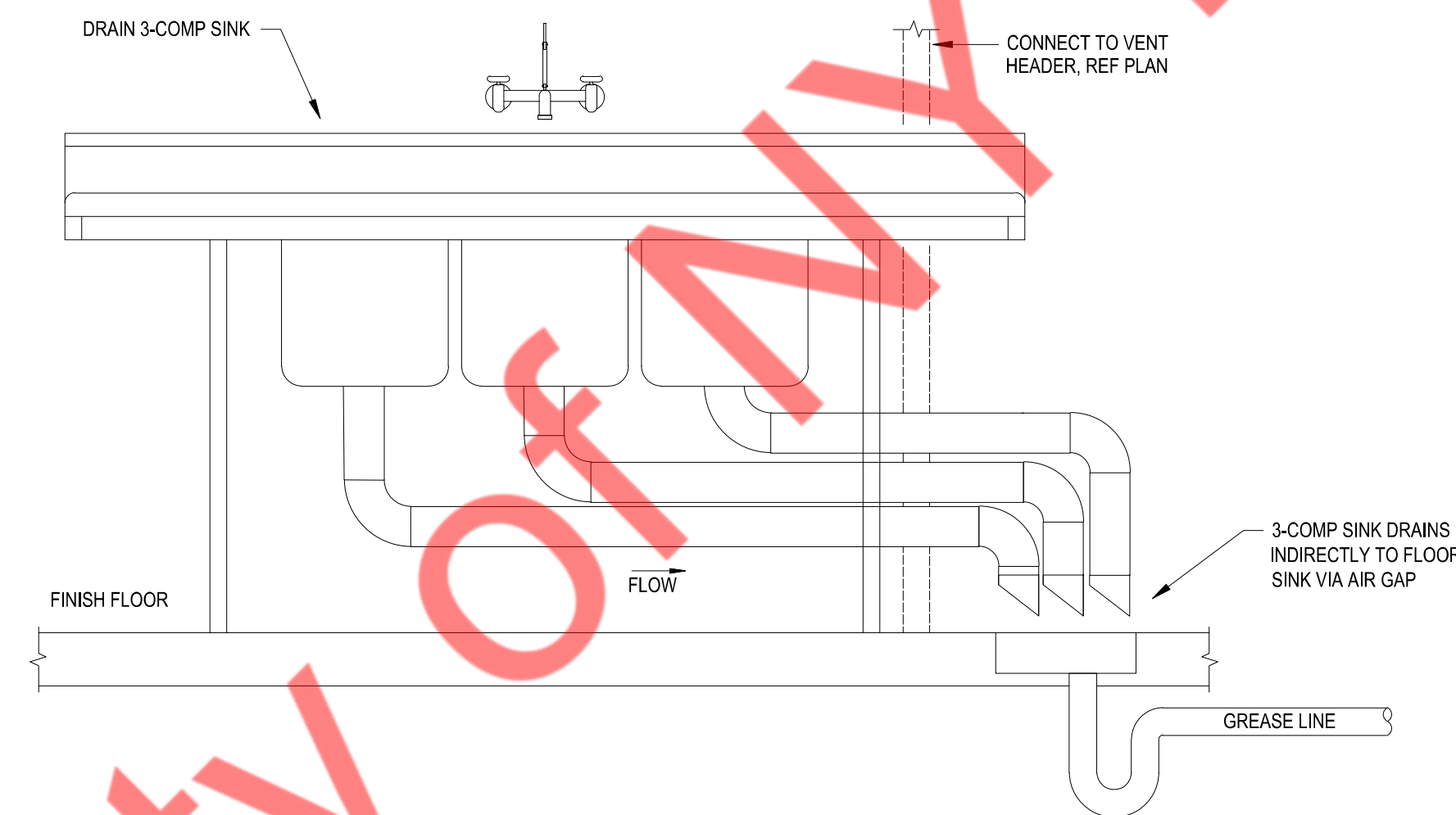
ISSUED REVISIONS:



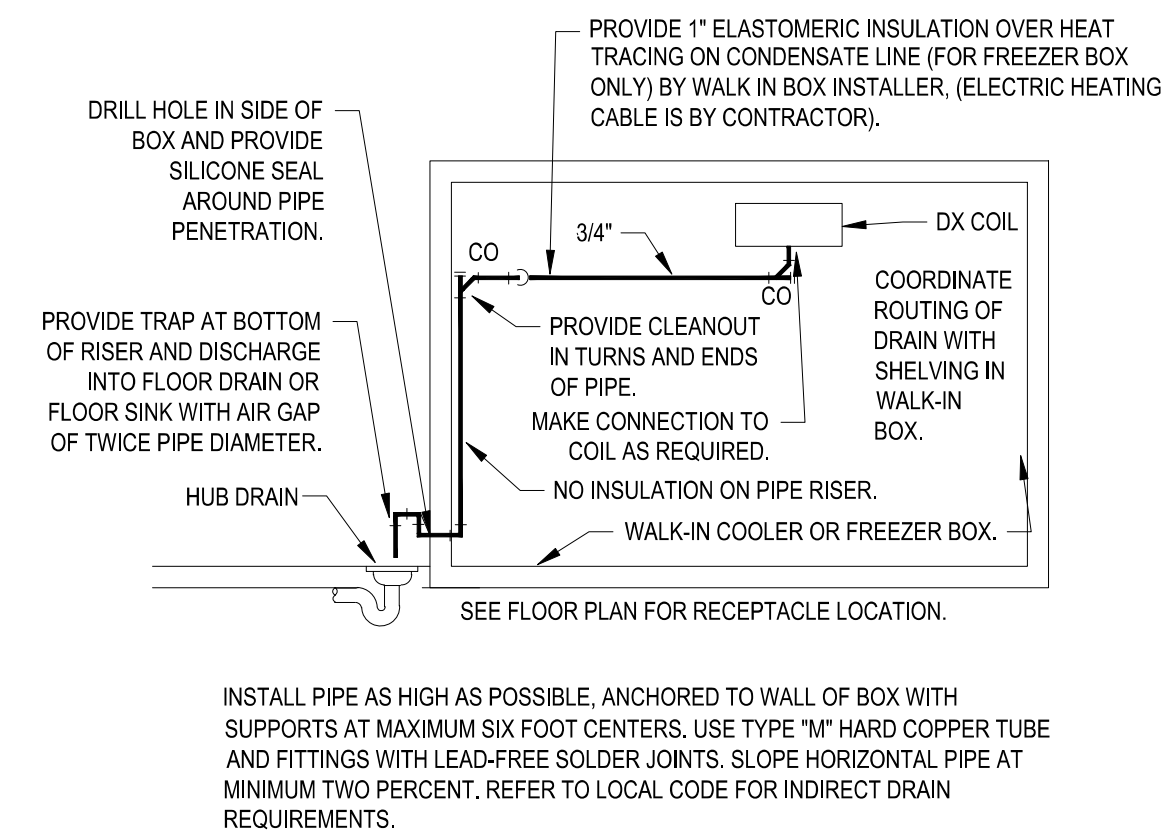
**TRAP PRIMER DETAIL**  
N.T.S.



**TANKLESS GAS WATER HEATER DETAIL**  
N.T.S.



**3-COMP SINK DETAIL**  
N.T.S.



**WALK-IN BOX CONDENSATE DRAIN**  
N.T.S.

ISSUED REVISIONS: