

MECHANICAL SYMBOLS LIST

EQUIPMENT SYMBOL	MECHANICAL ABBREVIATIONS	
	AC	AIR CONDITIONING UNIT
AC-1 Txf-1	ACCU	AIR COOLED CONDENSING UNIT
AIR DEVICES	AL	ACOUSTIC LINING
	AD	ACCESS DOOR
	GD	GRAVITY DAMPER
	CFM	CUBIC FEET OF AIR PER MINUTE
	COP	COEFFICIENT OF PERFORMANCE
	CP	CONDENSATE PUMP
	CD	CONDENSATE DRAIN PIPE
	DN	DOWN
	DX	DRYER EXHAUST RISER
	DXF	DRYER EXHAUST FAN
	EDH	ELECTRIC DUCT HEATER
	EER	ENERGY EFFICIENCY RATIO
	EUH	ELECTRIC UNIT HEATER
DUCT ACCESSORIES	EG	EXHAUST GRILLE
	EN	ENERGY ANALYSIS
	FC	FLEXIBLE CONNECTION
	FD/AD	FIRE DAMPER W/ACCESS DOOR
	FD	FIRE DAMPER W/FUSIBLE LINK
	FSD	FIRE SMOKE DAMPER
	GXF	GENERAL EXHAUST FAN
	HSFP	HEATING SEASONAL PERFORMANCE FACTOR
	IEER	INTEGRATED ENERGY EFFICIENCY RATIO
	MD	MOTORIZED DAMPER
	OI	OUTSIDE AIR INTAKE RISER
	OAF	OUTSIDE AIR INTAKE FAN
	REF	REFRIGERANT PIPING
	RG	RETURN GRILLE
	SEER	SEASONAL ENERGY EFFICIENCY RATIO
	SG	SUPPLY GRILLE
	TR	TRANSFER DUCT
	TX	TOILET EXHAUST RISER
	TXF	TOILET EXHAUST FAN
	VD	VOLUME DAMPER
	VFD	VARIABLE FREQUENCY DRIVE
	W.M.S.	WIRE MESH SCREEN
	COD	CABLE OPERATED DAMPER
	BD	BACK DRAFT DAMPER
	SD	SUPPLY DIFFUSER
	RD	RETURN DIFFUSER
	EG	EXHAUST GRILLE
HVAC PIPING		
	CP	NEW CONDENSATE PIPING
	REF	NEW REFRIGERANT PIPING
CONTROLS AND SENSORS	①	THERMOSTAT
	②s	TEMPERATURE SENSOR
	S	MANUAL ON/OFF SWITCH
	S	SMOKE DETECTOR
	S	SWITCH
DUCTWORK		
	=====	AIR DUCT W/ 1.5" ACOUSTICAL LINING
	~~~~~	FLEXIBLE DUCT
	FC FC	FLEXIBLE CONNECTION
	24x12	RECTANGULAR DUCT (WIDTH X DEPTH)
	ø12	ROUND DUCT (DIAMETER)
	⊗	ROUND DUCT CROSS SECTION
	⊠	SUPPLY AIR RECTANGULAR DUCT CROSS SECTION
	⊡	RETURN AIR RECTANGULAR DUCT CROSS SECTION
	⊢	EXHAUST AIR RECTANGULAR DUCT CROSS SECTION

MECHANICAL DRAWING LIST		
1	M-0.1	MECHANICAL GENERAL NOTES, SYMBOLS LIST & ABBREVIATIONS
2	M-0.2	MECHANICAL SPECIFICATIONS (1 OF 2)
3	M-0.3	MECHANICAL SPECIFICATIONS (2 OF 2)
4	M-1.1	MECHANICAL FLOOR PLAN
5	M-1.1	MECHANICAL FLOOR PLAN
6	M-6.1	MECHANICAL SCHEDULES

ENERGY CODE COMPLIANCE STATEMENT

TO THE BEST OF MY PROFESSIONAL KNOWLEDGE AND JUDGEMENT, THESE PLANS AND SPECIFICATION ARE IN COMPLIANCE WITH 2009 SOUTH CAROLINA ENERGY CONSERVATION CODE (2009 IECC).

SOUTH CAROLINA BUILDING DEPARTMENT NOTES

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

- THE CONTRACTOR SHALL ENGAGE THE SERVICES OF A PROFESSIONAL ENGINEER TO PROVIDE THE REQUIRED SPECIAL INSPECTIONS AND TESTS.
- 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 BUILDING CODE WITH SC AMENDMENTS.
- THE FOLLOWING WORK ITEMS, COMPONENTS, MATERIALS, CAPACITIES, ETC. SHALL COMPLY WITH THE REFERENCED CODE OR STANDARD:
  - DUCT CONSTRUCTION AND INSTALLATION- 2021 IMC WITH SC AMENDMENTS, 603
  - AIR INTAKES, EXHAUSTS AND RELIEF - 2021 IMC WITH SC AMENDMENTS, 401.1.5
  - STANDARDS OF HEATING - 2021 IMC WITH SC AMENDMENTS, 309.1
  - SMOKE DETECTORS AND FIRE AND SMOKE DAMPERS - 2021 IMC WITH SC AMENDMENTS, 606 & 607
  - RESPECTIVELY
  - MANUAL AND AUTOMATIC FIRE AND SMOKE CONTROLS FOR AIR DISTRIBUTION SYSTEMS - 2021 IMC WITH SC AMENDMENTS, 513
- MINIMUM TEMPERATURE TO BE MAINTAINED IN OCCUPIED SPACES DURING HEATING SEASON: 68 DEG. FAHRENHEIT.
- VENTILATION FOR ALL AREA SHALL COMPLY WITH 2021 IMC WITH SC AMENDMENTS, CHAPTER 4.
- A STATEMENT SHALL BE FILED BY THE OWNER OR TENANT IN POSSESSION THAT THE VENTILATION SYSTEM WILL BE KEPT IN CONTINUOUS OPERATION AT ALL TIMES DURING THE NORMAL OCCUPANCY OF THE STRUCTURE AS REQUIRED BY 2021 IMC WITH SC AMENDMENTS, 403.3.1.3.
- HVAC DUCTS AND PLENUMS SHALL BE INSULATED IN ACCORDANCE WITH 2009 SOUTH CAROLINA ENERGY CONSERVATION CODE (2009 IECC), SECTION 503.2.7 AND CONSTRUCTED IN ACCORDANCE WITH SECTION 503.2.7.1. VERIFICATION MAY NEED TO OCCUR DURING FOUNDATION INSPECTION.
- 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 BEING APPROVED OR IN ACCORDANCE WITH APPLICABLE CODES.
- ALL HEATING AND COOLING LOADS CALCULATED PER ASHRAE/ACCA 183.
- SMOKE DETECTOR SHALL MEET UL268A.
- A STATEMENT SHALL BE FILED BY THE OWNER OR TENANT IN POSSESSION THAT THE VENTILATION SYSTEM WILL BE KEPT IN CONTINUOUS OPERATION AT ALL TIMES DURING THE NORMAL OCCUPANCY OF THE STRUCTURE AS REQUIRED BY MC 403.3
- FIRE DAMPERS SHALL BE MANUFACTURED AND INSTALLED IN ACCORDANCE WITH UL 555, STANDARDS FOR FIRE DAMPERS AND CEILING DAMPERS.
- FIRE DAMPERS, SMOKE DAMPERS, COMBINATION FIRE/SMOKE DAMPERS AND CEILING DAMPERS LOCATED WITHIN THE AIR DISTRIBUTION AND SMOKE CONTROL SYSTEMS SHALL BE INSTALLED IN ACCORDANCE WITH THE REQUIREMENTS OF SECTION MC 607.
- REFER TO ARCHITECTURAL DRAWINGS FOR REQUIRED FIRE-RATED WALL AND SMOKE WALL CONSTRUCTION AND LOCATION.
- EQUIPMENT USE PERMIT SHALL BE OBTAINED BY CONTRACTOR.

SCOPE OF WORK

- PROVIDE 2 NOS. OF 3TR & 2 NOS. OF 4TR HEAT PUMP VRF SYSTEM WITH 5 NOS. CEILING SUSPENDED DUCTED UNITS TO MEET THE HEATING AND COOLING REQUIREMENT.
- CEILING MOUNTED ENERGY RECOVERY VENTILATOR TO BE USED FOR OUTSIDE AIR SUPPLY, GENERAL EXHAUST AND TOILET EXHAUST VENTILATION.
- ALL HVAC WORKS SHALL BE IN ACCORDANCE WITH THE DRAWING AND SPECIFICATION.

NOTE TO CONTRACTOR

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

GENERAL 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.
- DUCTWORK AND PIPING IS SHOWN DIAGRAMMATICALLY AND DOES NOT SHOW ALL OFFSETS, DROPS AND RISERS. RUNS, THE CONTRACTOR SHALL MAINTAIN ALLOWANCE IN PRICING FOR ROUTING OF DUCTWORK AND PIPING TO AVOID OBSTRUCTIONS. EXACT LOCATIONS ARE SUBJECTED TO THE APPROVAL OF ARCHITECT. COORDINATION WITH THE EXISTING SERVICES, INCLUDING THOSE OF OTHER TRADES IS REQUIRED.
- REMOVAL AND RELOCATION OF CERTAIN EXISTING WORK WILL BE NECESSARY FOR THE PERFORMANCE OF THE GENERAL WORK. ALL EXISTING CONDITIONS CANNOT BE COMPLETELY DETAILED ON THE DRAWINGS. THE CONTRACTOR SHALL SURVEY THE SITE AND INCLUDE ALL CHANGES IN MAKING UP THE WORK PROPOSAL.
- DISCONNECT, REMOVE AND/OR RELOCATE EXISTING MATERIAL, EQUIPMENT AND OTHER WORK AS NOTED OR REQUIRED FOR PROPER INSTALLATION OF NEW SYSTEM.
- SUPPORT ALL DUCTWORK AND PIPING FROM BUILDING STRUCTURE AND/OR FRAMING IN AN APPROVED MANNER. WHERE OVERHEAD CONSTRUCTION DOES NOT PERMIT FASTENING OR SUPPORTS FOR EQUIPMENT, FURNISH ADDITIONAL FRAMING. INSERTS SHALL BE STEEL SLOTTED TYPE AND FACTORY PAINTED. SINGLE ROD SHALL BE SIMILAR TO GRINNELL. MULTI-ROD SHALL BE SIMILAR TO FEE & 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 WATERPROOF INTEGRITY. THIS BUILDING AS REQUIRED BY THE INSTALLATION OR REMOVAL OF PIPES, DUCTS, LOUVERS, CONDUIT, AND EQUIPMENT. PROVIDE EQUIPMENT CURBS AND DUNNAGE STEEL AS REQUIRED.
- SEAL OPENINGS AROUND DUCTS AND PIPING THROUGH PARTITIONS, WALLS AND FLOORS (NOT IN SHAFTS) WITH MINERAL WOOL OR OTHER NONCOMBUSTIBLE MATERIAL (FIBERGLASS INSULATION IS NOT ACCEPTABLE).
- WHERE PENETRATIONS THROUGH FIRE RATED WALLS ARE NOT FIRE PROOFED THIS CONTRACTOR SHALL BE RESPONSIBLE TO SEAL SAME TO MAINTAIN THE RATED WALLS.
- INSTALL WORK SO AS TO BE READILY ACCESSIBLE FOR OPERATION, MAINTENANCE AND REPAIR. MINOR DEVIATIONS FROM DRAWINGS MAY BE MADE TO ACCOMPLISH THIS, BUT CHANGES WHICH INVOLVE EXTRA COST SHALL NOT BE MADE WITHOUT APPROVAL.
- ACCESS DOORS ARE REQUIRED FOR ALL BUILDING SERVICE VALVES THAT RUN THROUGH THE SPACE, AND ACCESS DOOR SHALL HAVE THE EQUAL RATED CAPACITY (1HR, 2HR, ETC.) AS WALL. COORDINATE ALL LOCATIONS OF ACCESS DOORS WITH THE ARCHITECT.
- REMOVABLE ACCESS TILE AND/OR ACCESS DOOR ARE REQUIRED IN HUNG CEILINGS, SHAFTS AND WALLS FOR ALL VOLUME AND FIRE DAMPERS, AUTOMATIC DAMPERS AND ALL OTHER MECHANICAL EQUIPMENT AND DEVICES. HVAC CONTRACTOR TO FURNISH ACCESS LOCATION REQUIREMENTS TO GENERAL CONTRACTOR. ACCESS TILE IDENTIFICATION: PROVIDE, BUTTONS, TABS AND MARKERS TO IDENTIFY LOCATION OF CONCEALED VALVES, DAMPERS AND EQUIPMENT.
- THE CONTRACTOR SHALL KEEP ALL EQUIPMENT AND MATERIALS, AND ALL PARTS OF THE BUILDING, EXTERIOR SPACES AND ADJACENT STREETS, SIDEWALKS AND PAVEMENTS, FREE FROM MATERIAL AND DEBRIS RESULTING FROM THE EXECUTION OF THIS WORK. EXCESS MATERIALS WILL NOT BE PERMITTED TO ACCUMULATE EITHER ON THE INTERIOR OR THE EXTERIOR.
- UNLESS OTHERWISE SPECIFICALLY SPECIFIED, INCLUDE ALL CUTTING AND PATCHING OF EXISTING FLOORS, WALLS, PARTITIONS AND OTHER MATERIALS IN THE EXISTING BUILDING. THE CONTRACTOR SHALL RESTORE THESE AREAS TO ORIGINAL CONDITION.
- MATERIALS AND WORKMANSHIP, UNLESS OTHERWISE NOTED, SHALL BE IN ACCORDANCE WITH BUILDING STANDARDS.
- ALL EQUIPMENT SHALL BE PROVIDED WITH ONE YEAR WARRANTY PARTS AND LABOR AND FIVE YEARS ON COMPRESSORS. WARRANTY PERIOD BEGINS UPON PROJECT ACCEPTANCE.
- ALL MATERIAL AND EQUIPMENT TO BE NEW UNLESS OTHERWISE NOTED AND SHALL BE IN ACCORDANCE WITH BUILDING STANDARDS.
- THE CONTRACTOR SHALL BE RESPONSIBLE FOR HIS WORK WITH ITS COMPLETION AND FINAL ACCEPTANCE AND SHALL REPLACE ANY OF THE SAME WHICH MAY BE DAMAGED, LOST, OR STOLEN WITHOUT ADDITIONAL COST TO THE OWNER.
- THE CONTRACTOR SHALL BE RESPONSIBLE FOR THE FAILURE OF ANY DUCTWORK SYSTEM OR EQUIPMENT TO FUNCTION PROPERLY UPON COMPLETION OF HIS WORK UPON SAID SYSTEM OR EQUIPMENT.
- SUBMIT SHOP DRAWING OF ALL WORK WHICH MUST BE APPROVED BY THE ARCHITECT AND ENGINEER BEFORE WORK COMMENCES.

- SUBMISSION OF A PROPOSAL SHALL BE CONSTRUED AS EVIDENCE THAT A CAREFUL EXAMINATION OF THE PORTIONS OF THE EXISTING BUILDING, EQUIPMENT, ETC., WHICH AFFECT THIS WORK, AND THE ACCESS TO SUCH SPACES, HAS BEEN MADE AND THAT THE CONTRACTOR IS FAMILIAR WITH EXISTING CONDITIONS AND DIFFICULTIES THAT WILL AFFECT THE EXECUTION OF THE WORK. LATER CLAIMS SHALL NOT BE MADE FOR LABOR, EQUIPMENT OR MATERIALS REQUIRED BECAUSE OF DIFFICULTIES ENCOUNTERED WHICH COULD HAVE BEEN FORESEEN DURING SUCH AN EXAMINATION. THE ON-SITE INSPECTION SHALL VERIFY EXISTING DUCTWORK, PIPING (SIZES, CLEARANCES, ETC) AND CONDITIONS.

- INSURANCE: IN ACCORDANCE WITH BUILDING REQUIREMENTS THE CONTRACTOR SHALL INCLUDE A HOLD HARMLESS CLAUSE FOR OWNER AND ENGINEER.

- THE FINAL ACCEPTANCE WILL BE MADE AFTER THE CONTRACTOR HAS ADJUSTED HIS EQUIPMENT, BALANCED THE VARIOUS SYSTEMS, DEMONSTRATED THAT IT FULFILLS THE REQUIREMENTS OF THE DRAWINGS AND SPECIFICATIONS AND HAS FURNISHED ALL THE REQUIRED CERTIFICATES OF INSPECTION AND APPROVAL.

- SPECIFICATIONS ARE OF SIMPLIFIED FORM AND INCLUDE INCOMPLETE SENTENCES, WORDS OR PHRASES SUCH AS "THE CONTRACTOR SHALL," "SHALL BE," "FURNISH," "PROVIDE," "A," "THE," AND "ALL" HAVE BEEN OMITTED FOR BREVITY.

- WHERE A CONFLICT EXISTS BETWEEN THE DRAWINGS, THE SPECIFICATIONS OR ANY OTHER CONSTRUCTION DOCUMENT, THE ONE WITH THE MOST STRINGENT REQUIREMENT(S) SHALL APPLY.

DEFINITIONS:

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

GENERAL HVAC NOTES

GENERAL:

- PROVIDE ALL MATERIAL AND EQUIPMENT AND PERFORM ALL LABOR REQUIRED TO INSTALL COMPLETE AND OPERABLE MECHANICAL SYSTEMS AS SHOWN 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 DIMENSIONS ARE APPROXIMATE. ONLY THE EXACT LOCATIONS NECESSARY TO SECURE THE BEST CONDITIONS AND RESULTS MUST BE DETERMINED BY THE PROJECT SITE CONDITIONS AND HAVE THE APPROVAL OF THE ENGINEER BEFORE BEING INSTALLED. DO NOT SCALE DRAWINGS.

- WHEN MECHANICAL WORK (HVAC, PLUMBING, SHEET METAL, FIRE PROTECTION, ETC.) IS SUBCONTRACTED IT SHALL BE THE MECHANICAL CONTRACTOR'S RESPONSIBILITY TO COORDINATE SUBCONTRACTORS AND THE ASSOCIATED CONTRACTS. WHEN DISCREPANCIES ARISE PERTAINING TO WHICH CONTRACTOR PROVIDES A PARTICULAR ITEM OF THE MECHANICAL CONTRACT OR WHICH CONTRACTOR PROVIDES FINAL CONNECTIONS FOR A PARTICULAR ITEM OF THE MECHANICAL CONTRACT, IT SHALL BE BROUGHT TO THE ATTENTION OF THE MECHANICAL CONTRACTOR, WHOSE DECISION SHALL BE FINAL.

- COORDINATE CONSTRUCTION OF ALL MECHANICAL WORK WITH ARCHITECTURAL, STRUCTURAL, CIVIL, ELECTRICAL WORK, ETC., SHOWN ON OTHER CONTRACT DOCUMENT DRAWINGS.

- INSTALL ALL MECHANICAL EQUIPMENT AND APPURTENANCES IN ACCORDANCE WITH MANUFACTURER'S RECOMMENDATIONS, CONTRACT DOCUMENTS, AND APPLICABLE CODES AND REGULATIONS.

- WHERE TWO OR MORE ITEMS OF THE SAME TYPE OF EQUIPMENT ARE REQUIRED, THE PRODUCT OF ONE MANUFACTURER SHALL BE USED.

- COORDINATE ALL EQUIPMENT CONNECTIONS WITH MANUFACTURERS' CERTIFIED DRAWINGS. COORDINATE AND PROVIDE ALL DUCT AND PIPING TRANSITIONS REQUIRED FOR FINAL EQUIPMENT CONNECTIONS TO FURNISHED EQUIPMENT. FIELD VERIFY AND COORDINATE ALL DUCT AND PIPING DIMENSIONS BEFORE FABRICATION.

- ALL CONTROL WIRE AND CONDUIT SHALL COMPLY WITH THE NATIONAL ELECTRIC CODE AND ELECTRICAL DIVISION OF THE SPECIFICATION.

- PROVIDE VIBRATION ISOLATION FOR ALL MECHANICAL EQUIPMENT TO PREVENT TRANSMISSION OF VIBRATION TO BUILDING STRUCTURE.

- 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 LOCATIONS. COORDINATION SHALL BE DONE PRIOR TO THE FABRICATION OF DUCTWORK, CUTTING OF PIPING, OR FABRICATION OF BEAMS.

- ALL MISCELLANEOUS STEEL REQUIRED TO ENSURE PROPER INSTALLATION AND AS SHOWN IN THE DETAILS FOR 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 BEAMS, JOISTS, TRUSSES, OR JOIST GIRDERS SHALL BE AT PANEL POINTS. PROVIDE BEAM CLAMPS MEETING MSS STANDARDS. WELDING TO STRUCTURAL MEMBERS SHALL NOT BE PERMITTED. THE USE OF C-CLAMPS SHALL NOT BE PERMITTED.

- LOCATIONS AND SIZES OF ALL FLOOR, WALL, AND ROOF OPENINGS SHALL BE COORDINATED WITH ALL OTHER TRADES INVOLVED.

- ALL OPENINGS IN FIRE WALLS DUE TO DUCTWORK, PIPING, CONDUIT, ETC., SHALL BE FIRE STOPPED WITH A PRODUCT SIMILAR TO 3M OR APPROVED EQUAL.

- ALL AIR CONDITIONING CONDENSATE DRAIN LINES FROM EACH AIR HANDLING UNIT 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.

- REFER TO TYPICAL DETAILS FOR DUCTWORK, PIPING, AND EQUIPMENT INSTALLATION.

- 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 6 AND 7 PERCENT BY VOLUME. SLUMP SHALL BE BETWEEN 3 AND 4 IN. CONCRETE SHALL BE CURED FOR 7 DAY AFTER PLACEMENT.

- 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.

- ALL TESTS SHALL BE COMPLETED BEFORE ANY MECHANICAL EQUIPMENT OR PIPING INSULATION IS APPLIED.

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

HVAC DUCTWORK – SHEET METAL

- CERTAIN ITEMS SUCH AS RISES AND DROPS IN DUCTWORK, ACCESS DOORS, VOLUME DAMPERS, ETC., ARE INDICATED ON THE CONTRACT DOCUMENT DRAWINGS FOR CLARITY. FOR A SPECIFIC LOCATION REQUIREMENT AND SHALL NOT BE INTERPRETED AS THE EXTENT OF THE REQUIREMENTS FOR THESE ITEMS.
- CONTRACTOR TO CHECK AND CORRECT ANY AND ALL DEFICIENCIES IN EXISTING DUCTWORK. ALL NEW DUCTWORK WILL COMPLY WITH THE LATEST SMACNA GUIDELINES AND CONFORM WITH REQUIREMENTS OF THE LATEST HANDBOOKS PUBLISHED BY ASHRAE.
- PROVIDE VOLUME DAMPER AT EACH TAP TO MAIN DUCT AND WHERE NECESSARY TO PROPERLY BALANCE SYSTEM.
- SUPPLY AND RETURN DUCTWORK 20" FROM ALL AC UNITS SHALL BE LINED WITH 1.5" ACOUSTICAL LINING.
- RE-INSULATE ALL DUCTWORK AND PIPING IN WHICH INSULATION HAS BEEN REMOVED OR DAMAGED WITH INSULATION EQUAL TO THE EXISTING INSULATION.
- CONTRACTOR SHALL SUPPLY AND INSTALL ALL NECESSARY SUPPLY DIFFUSERS AND RETURN AIR REGISTERS WHERE INDICATED ON THE DRAWINGS. COORDINATE LOCATION OF DIFFUSERS AND REGISTERS WITH REFLECTED CEILING PLAN.
- IN CORRIDORS WHERE CEILING SPEAKERS AND AIR DIFFUSERS ARE INDICATED BETWEEN THE SAME LIGHT FIXTURES, INSTALL BOTH DEVICES AT THE QUARTER POINTS BETWEEN THE FIXTURES.
- UNLESS OTHERWISE SHOWN, LOCATE ALL ROOM THERMOSTATS AND HUMIDISTAT 4'-0" (CENTER LINE) ABOVE THE FINISHED FLOOR. NOTIFY THE ENGINEER OF ANY ROOMS WHERE THE PRECEDING LOCATION CANNOT BE MAINTAINED OR WHERE THERE IS A QUESTION ON LOCATION.
- ALL DUCTWORK SHALL CLEAR DOORS AND WINDOWS.
- ALL DUCTWORK DIMENSIONS, AS SHOWN ON THE DRAWINGS, ARE INTERNAL CLEAR DIMENSIONS AND DUCT SIZE SHALL BE INCREASED TO COMPENSATE FOR DUCT LINING THICKNESS.
- PROVIDE ALL 90-DEGREE SQUARE ELBOWS WITH DOUBLE RADIUS TURNING VANES UNLESS OTHERWISE INDICATED. ELBOWS IN DISHWASHER, KITCHEN, AND LAUNDRY EXHAUSTS SHALL BE OF UN-WANED SMOOTH RADIUS CONSTRUCTION WITH A RADIUS EQUAL TO 1 1/2 TIMES THE WIDTH OF THE DUCT. PROVIDE ACCESS DOORS UPSTREAM OF ALL ELBOWS WITH TURNING VANES.
- COORDINATE DIFFUSER, REGISTER, AND GRILL LOCATIONS WITH ARCHITECTURAL REFLECTED CEILING PLANS, LIGHTING, AND OTHER CEILING ITEMS AND MAKE MINOR DUCT MODIFICATIONS TO SUIT.
- FIELD-ERECTED AND FACTORY-ASSEMBLED AIR HANDLING UNIT COILS SHALL BE ARRANGED FOR REMOVAL FROM THE UPSTREAM SIDE WITHOUT DISMANTLING SUPPORTS. PROVIDE GALVANIZED STRUCTURAL STEEL SUPPORTS FOR ALL COILS (EXCEPT THE LOWEST COIL) IN BANKS OVER TWO COILS HIGH TO PERMIT THE INDEPENDENT REMOVAL OF ANY COIL.
- ALL AIR HANDLING UNITS SHALL OPERATE WITHOUT MOISTURE CARRYOVER.
- LOCATE ALL MECHANICAL EQUIPMENT (SINGLE DUCT, DUAL DUCT, VARIABLE VOLUME, CONSTANT VOLUME, AND FAN POWERED BOXES, FAN COIL UNITS, CABINET HEATERS, UNIT HEATERS, UNIT VENTILATORS, COILS, STEAM HUMIDIFIERS, ETC.) FOR UNOBSTRUCTED ACCESS TO UNIT ACCESS PANELS, CONTROLS, AND VALVING.
- PROVIDE FLEXIBLE CONNECTIONS IN ALL DUCTWORK SYSTEMS (SUPPLY, RETURN, AND EXHAUST) CONNECTED TO AIR HANDLING UNITS, FANS, AND OTHER EQUIPMENT THAT REQUIRE VIBRATION ISOLATION. FLEXIBLE CONNECTIONS SHALL BE PROVIDED AT THE POINT OF CONNECTION TO THE EQUIPMENT UNLESS OTHERWISE INDICATED.
- UNLESS OTHERWISE NOTED, ALL DUCTWORK IS OVERHEAD, TIGHT TO THE UNDERSIDE OF THE STRUCTURE, WITH SPACE FOR INSULATION IF NEEDED.
- RUNS OF FLEXIBLE DUCT SHALL NOT EXCEED 5 FT.
- ALL DUCTWORK SHALL BE COORDINATED WITH ALL TRADES INVOLVED. OFFSETS IN DUCTS INCLUDING DIVIDED DUCTS AND TRANSITIONS AROUND OBSTRUCTIONS, SHALL BE PROVIDED AT NO ADDITIONAL COST TO THE OWNER.
- PROVIDE ACCESS DOORS IN DUCTWORK TO PROVIDE ACCESS FOR ALL SMOKE DETECTORS, FIRE DAMPERS, SMOKE DAMPERS, VOLUME DAMPERS, HUMIDIFIERS, COILS, AND OTHER ITEMS LOCATED IN THE DUCTWORK THAT REQUIRE SERVICE AND/OR INSPECTION.
- PROVIDE ACCESS DOORS IN DUCTWORK FOR THE OPERATION, ADJUSTMENT, AND MAINTENANCE OF ALL FANS, VALVES, AND MECHANICAL EQUIPMENT.
- ALL DUCTS SHALL BE GROUNDED ACROSS FLEXIBLE CONNECTIONS WITH FLEXIBLE COPPER GROUNDING STRAPS. GROUNDING STRAPS SHALL BE BOLTED OR SOLDERED TO BOTH THE EQUIPMENT AND THE DUCT.
- SMOKE DETECTORS SHALL BE FURNISHED AND WIRED BY THE ELECTRICAL CONTRACTOR. THE MECHANICAL CONTRACTOR SHALL BE RESPONSIBLE FOR MOUNTING THE SMOKE DETECTOR IN DUCTWORK AS SHOWN ON THE DRAWINGS AND IN ACCORDANCE WITH THE MANUFACTURER'S PRINTED INSTRUCTIONS.
- TERMINATE GAS VENTS FOR UNIT HEATERS, WATER HEATERS, HIGH-PRESSURE PARTS WASHERS, HIGH-PRESSURE CLEANERS, AND OTHER GAS APPLIANCES A MINIMUM OF 30 IN. ABOVE THE ROOF WITH RAIN CAP (EDIT ANY APPLIANCES AND THE HEIGHT ABOVE THE ROOF TO MEET THE CODE AND SUIT PROJECT REQUIREMENTS).
- SEE SPECIFICATIONS FOR DUCTWORK GAUGES, BRACING, HANGERS, AND OTHER REQUIREMENTS.
- EXTERIOR LOUVERS ARE INDICATED FOR SIZE, GENERAL LOCATION AND PERFORMANCE ONLY. DETAILED LOUVER DESCRIPTIONS ARE PROVIDED IN THE ARCHITECTURAL SPECIFICATIONS.

REVISIONS:

No.	Description	Date
	PERMIT SET	07.12.2024
Δ	REVISED PERMIT SET	08.20.2024

PROJECT: 2024 AV2  
DATE: 08.20.2024  
DRAWN BY: NYE  
CHECKED BY: NYE

MECHANICAL  
GENERAL NOTES,  
SYMBOLS LIST &  
ABBREVIATIONS

M-0.1

SPECIFICATIONS

SECTION 0001 — NOTICE TO BIDDERS

1.1 BIDDERS REPRESENTATIONS

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

1.2 EXISTING CONDITIONS AND COORDINATION

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

1.3 RESPONSIBILITIES

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

END OF SECTION 0001

SECTION 0101 — QUALITY OF WORK

1.1 WORKMANSHIP

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

1.2 CODE COMPLIANCE

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

END OF SECTION 0101

SECTION 0102 — REQUIRED DOCUMENTS

1.1 SHOP DRAWINGS

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

1.2 SUBMITTALS

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

1.3 RECORD DRAWINGS

- A. UPON COMPLETION OF THE WORK, A RECORDED DRAWING SHALL BE SUBMITTED TO THE ENGINEER FOR REVIEW AND APPROVAL. THE DRAWING SHALL BE SIGNED BY THE CONTRACTOR AND THE ENGINEER.

THERMOSTATIC CONTROLS:

503.2.4.1 THERMOSTATIC CONTROLS:

THE SUPPLY OF HEATING AND COOLING ENERGY TO EACH ZONE SHALL BE INDIVIDUALLY CONTROLLED BY THERMOSTATIC CONTROLS RESPONDING TO TEMPERATURE WITHIN THE ZONE.

503.2.4.1.1 HEAT PUMP SUPPLEMENTARY HEAT:

HEAT PUMPS HAVING SUPPLEMENTARY ELECTRIC RESISTANCE HEAT SHALL HAVE CONTROLS THAT, EXCEPT DURING DEFROST, PREVENT SUPPLEMENTARY HEAT OPERATION WHERE THE HEAT PUMP CAN PROVIDE THE HEATING LOAD.

503.2.4.2 SETPOINT OVERLAP RESTRICTION:

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

EXCEPTION: THERMOSTATS REQUIRING MANUAL CHANGE-OVER BETWEEN HEATING AND COOLING MODES.

503.2.4.3 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.

EXCEPTION:

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

503.2.4.3.1 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 DEG F (13 DEG C) OR UP TO 85 DEG F (29 DEG C).

503.2.4.3.2 AUTOMATIC SETBACK AND SHUTDOWN CAPABILITIES:

AUTOMATIC TIME CLOCK OR PROGRAMMABLE CONTROLS SHALL BE CAPABLE OF STARTING AND STOPPING THE SYSTEM FOR SEVEN DIFFERENT DAILY SCHEDULES PER WEEK AND RETAINING THEIR PROGRAMMING AND TIME SETTING DURING A LOSS OF POWER FOR 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.

OUTDOOR UNITS – MULTI V S HEAT PUMP (LG)

1) GENERAL

THE LG MULTI V S HEAT PUMP SYSTEM CONSISTS OF AN OUTDOOR UNIT, TWO OR MORE INDOOR UNITS, INTEGRATED SYSTEM CONTROLS, AND INTERCONNECTING FIELD-PROVIDED REFRIGERANT PIPE CONTAINING VARIOUS FITTINGS INCLUDING Y-BRANCH KITS AND HEADER KITS SUPPLIED BY LG. LG COMPONENTS ARE MANUFACTURED IN A FACILITY THAT MEETS OR EXCEEDS INTERNATIONAL ORGANIZATION FOR STANDARDIZATION (ISO) 9001 AND 14001. THE UNITS ARE LISTED BY INTERTEK (ETL) AND BEAR THE ETL LISTED MARK.

2) CASING

THE OUTDOOR UNIT CASE IS CONSTRUCTED FROM 22-GAUGE COATED METAL. EXTERIOR PANELS ARE CLEANED AND FINISHED WITH A WEATHER-RESISTANT BAKED ENAMEL FINISH. AN EASILY REMOVABLE FRONT CORNER PANEL IS PROVIDED TO ALLOW ACCESS TO MAJOR COMPONENTS AND CONTROL DEVICES. OUTDOOR UNIT FAN(S) ARE COVERED WITH GUARDS MADE OF HEAVY GAUGE, HEAVY DUTY POLYMERIC RESIN. THE OUTDOOR UNIT COIL IS PROTECTED WITH A HEAVY GAUGE STEEL WIRE GUARD FINISHED WITH BAKED ENAMEL. PAINT COLOR IS "WARM GRAY."

3) REFRIGERATION SYSTEM

THE REFRIGERATION SYSTEM CONSISTS OF A SINGLE REFRIGERATION CIRCUIT AND USES REFRIGERANT R410A. THE OUTDOOR UNIT IS PROVIDED WITH FACTORY INSTALLED COMPONENTS, INCLUDING A REFRIGERANT STRAINER, OIL SEPARATOR, ACCUMULATOR, HOT GAS BYPASS VALVE, LIQUID INJECTION VALVE, FOUR-WAY REVERSING VALVE, ELECTRONIC CONTROLLED EXPANSION VALVE (EEV), HIGH AND LOW SIDE CHARGING PORTS, SERVICE VALVES, AND INTERCONNECTING PIPING. ALSO INCLUDED IS AN INTEGRAL SUBCOOLER ASSEMBLY CONSISTING OF A DOUBLE SPIRAL TUBE TYPE HEAT EXCHANGER AND EEV PROVIDING REFRIGERANT SUBCOOLING.

WITH 4.0 (2-TON) OR 6.6 (3-, 4-, AND 4.4-TON) POUNDS OF REFRIGERANT.

4) REFRIGERATION OIL CONTROL

THE REFRIGERATION OIL LEVEL IN THE COMPRESSOR IS MAINTAINED USING A TWO-STAGE OIL CONTROL SYSTEM. THE COMPRESSOR DISCHARGE PORT IS EQUIPPED WITH AN OIL FILTERING DEVICE DESIGNED TO RESTRICT OIL LOSS FROM THE COMPRESSOR. THE HIGH-PRESSURE DISCHARGE VAPOR LEAVES THE COMPRESSOR AND IMMEDIATELY ENTERS A CENTRIFUGAL OIL SEPARATOR THAT HAS NO MOVING PARTS DESIGNED TO EXTRACT OIL FROM THE REFRIGERANT GAS STREAM. A GRAVITY DRAIN RETURNS CAPTURED OIL BACK TO THE COMPRESSOR SUMP. THE OUTDOOR UNIT MICROPROCESSOR IS PROGRAMMED TO FLUSH THE REFRIGERANT PIPING SYSTEM FOR A MINIMUM PERIOD OF THREE (3) MINUTES AFTER EIGHT (8) HOURS OF COMPRESSOR OPERATION.

5) SINGLE INVERTER/COMPRESSOR

THE OUTDOOR UNIT IS EQUIPPED WITH ONE HERMETIC, DIGITALLY-CONTROLLED, INVERTER STARTING COMPRESSOR. THE COMPRESSOR IS SPECIFICALLY DESIGNED FOR THE REFRIGERANT PROVIDED AND IS MANUFACTURED BY LG. THE FREQUENCY INVERTER IS DESIGNED BY LG AND IS CAPABLE OF PROVIDING A MODULATION RANGE FOR 2 TON UNITS FROM 20 HZ TO 75 HZ (COOLING AND HEATING), AND FOR 3 TO 4.4 TONS FROM 20 HZ TO 90 HZ (COOLING) AND 20 HZ TO 100 HZ (HEATING). THE COMPRESSOR MOTOR IS SUCTION GAS-COOLED AND HAS AN ACCEPTABLE VOLTAGE RANGE OF ±10% OF NAMEPLATE VOLTAGE. EXTERNAL SUCTION AND DISCHARGE TEMPERATURE AND PRESSURE SENSORS ARE PROVIDED TO PROTECT THE COMPRESSOR FROM DAMAGE CAUSED BY OVER / UNDER TEMPERATURE OR OVER / UNDER PRESSURE CONDITIONS. THE COMPRESSOR IS PROVIDED WITH A POSITIVE DISPLACEMENT OIL PUMP PROVIDING SUFFICIENT OIL FILM ON ALL BEARING SURFACES ACROSS THE ENTIRE INVERTER MODULATION RANGE. THE COMPRESSOR IS FACTORY CHARGED WITH POLYVINYL ETHER (PVE) REFRIGERATION OIL HAVING NO HYGROSCOPIC PROPERTIES. COMPRESSOR BEARINGS ARE TEFLON® COATED. THE COMPRESSOR IS WRAPPED WITH A HEAT RESISTANT SOUND ATTENUATING BLANKET AND MOUNTED ON RUBBER ISOLATION GROMMETS.

6) OUTDOOR UNIT COIL

OUTDOOR UNIT COILS ARE A MINIMUM OF TWO ROWS, 14 FINS PER INCH, AND MANUFACTURED USING COPPER TUBES WITH MECHANICALLY BONDED ALUMINUM LOUVERED FINS. FIN SURFACES ARE COATED WITH GOLD-FIN™ CORROSION RESISTANT HYDROPHILIC SILICA GEL COATING. COILS ARE PRESSURE TESTED AT A MINIMUM OF 551 PSIG.

7) FANS AND MOTORS

UNITS ARE FURNISHED WITH ONE (2-TON) OR TWO (3-, 4-, AND 4.4-TON) AXIAL FLOW FANS PROVIDING HORIZONTAL AIRFLOW FROM THE REAR AND DISCHARGING FROM THE FRONT OF THE UNIT. FAN BLADES ARE 20-1/2 INCH DIAMETER, BALANCED, AND MADE OF DURABLE (LUPOS (ABS) POLYMERIC RESIN. MOTORS ARE DESIGNED TO OPERATE BETWEEN 0 AND 850 RPM IN COOLING AND HEATING. BOTH FANS ARE DRIVEN BY DIGITALLY CONTROLLED INVERTERS THAT VARY THE FAN SPEED. MOTORS ARE BRUSHLESS, DIGITALLY CONTROLLED (BLDC) AND HAVE PERMANENTLY LUBRICATED AND SEALED BALL BEARINGS. ALL OUTDOOR UNIT FANS ARE CONTROLLED BY AN INVERTER DRIVE MOUNTED NEAR THE MAIN MICROPROCESSOR. THE OUTDOOR UNIT FAN SPEED IS CONTROLLED USING AN ALGORITHM THAT PROVIDES THREE PRE-PROGRAMMED FAN SPEEDS. DIP SWITCH ADJUSTABLE SETTINGS LIMIT NIGHT TIME (OFF PEAK) FAN SPEED TO REDUCE FAN GENERATED NOISE BY UP TO 10 DB(A).

INDOOR UNITS – DUCTED HIGH STATIC (LG)

1) CASING

THE CASE IS DESIGNED TO MOUNT CONCEALED ABOVE A FINISHED CEILING. FAN SUPPLY AIR IS FRONT HORIZONTAL WITH A DEDICATED REAR HORIZONTAL. THE UNIT IS MANUFACTURED WITH COATED METAL. COLD SURFACES ARE COVERED WITH A COATED POLYSTYRENE INSULATING MATERIAL. THE COLD SURFACE AREAS OF THE CASE ARE COVERED EXTERNALLY WITH SHEET INSULATION MADE OF ETHYLENE PROPYLENE DIENE MONOMER (M-DIASES) (EPDM) CONFORMING TO ASTM STANDARD D-1418. THE CASE IS PROVIDED WITH HANGER BRACKETS DESIGNED TO SUPPORT THE UNIT WEIGHT. ON FOUR CORNERS, HANGER BRACKETS HAVE PRE-PUNCHED HOLES DESIGNED TO ACCEPT FIELD SUPPLIED, ALL-THREAD ROD HANGERS.

2) FAN ASSEMBLY AND CONTROL

THE UNIT HAS SIROCCO FANS MADE OF HIGH STRENGTH ABS GP-2200 POLYMERIC RESIN. FANS ARE DIRECTLY DRIVEN AND MOUNTED ON A COMMON THE FAN MOTOR IS A BRUSHLESS DIGITALLY CONTROLLED (BLDC) DESIGN WITH PERMANENTLY LUBRICATED AND SEALED BALL BEARINGS. THE FAN MOTOR INCLUDES THERMAL, OVERCURRENT AND LOW RPM PROTECTION. THE FAN / MOTOR ASSEMBLY IS MOUNTED ON VIBRATION ATTENUATING RUBBER GROMMETS. THE FAN IMPELLER IS STATICALLY AND DYNAMICALLY BALANCED. THE FAN SPEED IS CONTROLLED USING A MICROPROCESSOR BASED, DIRECT DIGITAL CONTROL ALGORITHM THAT PROVIDES A HIGH FAN SPEED IN COOLING THERMAL ON AND LOW FAN SPEED IN COOLING THERMAL OFF, HIGH FAN SPEED IN HEATING THERMAL ON AND FAN OFF IN HEATING THERMAL OFF. THE FAN SPEEDS CAN BE FIELD ADJUSTED BETWEEN LOW, MEDIUM, AND HIGH SPEEDS. DIP SWITCH SETTINGS WILL ALLOW THE FAN TO RUN CONSTANTLY DURING DEFROST OR OIL RETURN MODES. EACH SETTING CAN BE FIELD ADJUSTED FROM THE FACTORY SETTING (RPM / ESP) TO COMPENSATE FOR ADDITIONAL RESISTANCE TO AIRFLOW CAUSED BY FIELD CONNECTED DUCTWORK OR OTHER AIRFLOW RESTRICTING DEVICES.

3) AIR FILTER

RETURN AIR IS FILTERED WITH A REMOVABLE, WASHABLE FILTER WITH ANTIFUNGAL TREATMENT. MERV 13 FILTER MODULES WITH PLENUMS AVAILABLE.

4) MICROPROCESSOR CONTROLS

THE UNIT IS PROVIDED WITH AN INTEGRATED MICROPROCESSOR-BASED CONTROLLER. THE CONTROLLER IS CAPABLE OF PERFORMING FUNCTIONS NECESSARY TO OPERATE THE SYSTEM WITHOUT THE USE OF A WALL-MOUNTED CONTROLLER. A TEMPERATURE THERMISTOR IS FACTORY-MOUNTED IN THE RETURN AIR STREAM. ALL UNIT OPERATION PARAMETERS, EXCLUDING THE UNIT OPERATING SCHEDULE, ARE STORED IN NON-VOLATILE MEMORY RESIDENT ON THE UNIT MICROPROCESSOR. OPERATING SCHEDULES ARE STORED IN SELECT MODELS OF THE OPTIONAL, WALL-MOUNTED, LOCAL OR CENTRAL CONTROLLER. THE FIELD SUPPLIED COMMUNICATION CABLE BETWEEN THE INDOOR

UNIT(S) AND OUTDOOR UNIT IS TO BE A MINIMUM OF 18 AWG, 2-CONDUCTOR, STRANDED, AND SHIELDED CABLE (RS-485), TERMINATED VIA SCREW TERMINALS ON THE CONTROL BOARDS. THE MICROPROCESSOR CONTROL PROVIDES THE FOLLOWING FUNCTIONS: AUTO ADDRESSING, SELF-DIAGNOSTICS, AUTO RESTART FOLLOWING POWER RESTORATION, TEST RUN, AND WILL OPERATE THE INDOOR UNIT USING ONE OF FIVE OPERATING MODES:

1. AUTO CHANGEOVER (HEAT RECOVERY ONLY)
2. HEATING
3. COOLING
4. DRY
5. FAN ONLY

FOR HEAT RECOVERY SYSTEMS THE AUTO CHANGEOVER SETTING AUTOMATICALLY SWITCHES CONTROL OF THE INDOOR UNIT BETWEEN COOLING AND HEATING MODES BASED ON SPACE TEMPERATURE CONDITIONS. FOR HEAT PUMP SYSTEMS, HEATED OR COOLED AIR DELIVERY IS DEPENDENT UPON OUTDOOR UNIT OPERATING MODE. IN HEATING MODE, THE MICROPROCESSOR CONTROL WILL ACTIVATE THE INDOOR UNIT WHEN INDOOR ROOM TEMPERATURE FALLS BELOW SETPOINT TEMPERATURE AND SIGNALS THE OUTDOOR UNIT TO BEGIN HEATING CYCLE. THE INDOOR UNIT FAN OPERATION IS DELAYED UNTIL COIL PIPE TEMPERATURE REACHES 76°F. SIGNIFICANT AIRFLOW GENERATED WHEN PIPE TEMPERATURE REACHES 80°F. IN LIEU OF FACTORY RETURN AIR THERMISTOR, SCREW TERMINALS ON THE MICROPROCESSOR CIRCUIT BOARD ACCOMMODATE VARIOUS MODELS OF WALL-MOUNTED LOCAL CONTROLLERS AND/OR A WALL-MOUNTED REMOTE TEMPERATURE. THE UNIT MICROPROCESSOR IS CAPABLE OF ACCEPTING SPACE TEMPERATURE READINGS CONCURRENTLY OR INDIVIDUALLY FROM EITHER:

1. WALL-MOUNTED WIRED CONTROLLER(S)
2. FACTORY MOUNTED RETURN AIR THERMISTOR OR THE OPTIONAL WALL MOUNTED WIRED REMOTE TEMPERATURE SENSOR.

A SINGLE INDOOR UNIT HAS THE CAPABILITY OF BEING CONTROLLED BY UP TO TWO LOCAL WIRED CONTROLLERS. THE MICROPROCESSOR CONTROLS SPACE TEMPERATURE USING THE VALUE PROVIDED BY THE TEMPERATURE SENSOR SENSING A SPACE TEMPERATURE THAT IS FARTHEST AWAY FROM THE TEMPERATURE SET-POINT. THE MICROPROCESSOR CONTROL PROVIDES A COOLING OR HEATING MODE TEST CYCLE THAT OPERATES THE UNIT FOR 18 MINUTES WITHOUT REGARD TO THE SPACE TEMPERATURE. IF THE SYSTEM IS PROVIDED WITH AN OPTIONAL WALL-MOUNTED LOCAL OR CENTRAL CONTROLLER, DISPLAYED DIAGNOSTIC CODES ARE SPECIFIC ALPHA NUMERIC, AND PROVIDE THE SERVICE TECHNICIAN WITH A REASON FOR THE CODE DISPLAYED.

5) CONDENSATE LIFT/PUMP

THE INDOOR UNIT IS PROVIDED WITH A FACTORY INSTALLED AND WIRED CONDENSATE LIFT/PUMP CAPABLE OF PROVIDING A MINIMUM 27.5 INCH LIFT FROM THE BOTTOM EXTERIOR SURFACE OF THE UNIT. CASING, THE UNIT DRAIN PAN IS PROVIDED WITH A SECONDARY DRAIN/PORT/PLUG ALLOWING THE PAN TO BE DRAINED FOR SERVICE. THE LIFT PUMP COMES WITH A SAFETY SWITCH THAT WILL SHUT OFF INDOOR UNIT IF CONDENSATE RISES TOO HIGH IN THE DRAIN PAN.

6) CONDENSATE DRAIN PAN

THE CONDENSATE DRAIN PAN IS CONSTRUCTED OF HIGH IMPACT POLYSTYRENE RESIN (HIPS).

7) COIL

THE INDOOR UNIT COIL IS CONSTRUCTED WITH GROOVED DESIGN COPPER TUBES WITH SLIT COIL FINS, TWO (2) TO THREE (3) ROWS, NINETEEN (19) TO TWENTY-ONE (21) FINS PER INCH.

8) CONTROLS FEATURES

- AUTO CHANGEOVER (HEAT RECOVERY ONLY)
- AUTO OPERATION
- AUTO RESTART
- EXTERNAL ON/OFF CONTROL
- DUAL THERMISTOR CONTROL
- DUAL SETPOINT CONTROL*
- FILTER LIFE AND POWER CONSUMPTION DISPLAY*
- MULTIPLE AUXILIARY HEATER APPLICATIONS*
- GROUP CONTROL
- EXTERNAL STATIC PRESSURE CONTROL
- HOT START
- SELF DIAGNOSTICS
- TIMER (ON / OFF)
- WEEKLY SCHEDULE
- FAN SPEED CONTROL
- VENTILATION (OUTSIDE AIR)

9) OUTDOOR UNIT CONTROLS

OUTDOOR UNITS ARE FACTORY WIRED WITH NECESSARY ELECTRICAL CONTROL COMPONENTS, PRINTED CIRCUIT BOARDS, THERMISTORS, SENSORS, TERMINAL BLOCKS, AND LUGS FOR POWER WIRING. THE CONTROL WIRING CIRCUIT IS LOW VOLTAGE AND INCLUDES A CONTROL POWER TRANSFORMER, FUSES, AND INTERCONNECTING WIRING HARNESS WITH PLUG CONNECTORS. MICROPROCESSOR BASED ALGORITHMS PROVIDE COMPONENT PROTECTION, SOFT-START CAPABILITY, REFRIGERATION SYSTEM PRESSURE AND TEMPERATURE CONTROL, DEFROST, AND AMBIENT CONTROL. THE UNIT IS DESIGNED TO PROVIDE CONTINUOUS COMPRESSOR OPERATION FROM -9.9°F TO +122°F IN COOLING MODE (WITH OPTIONAL LOW AMBIENT KIT). WHEN THE SYSTEM IS STARTED, THE CONNECTED INDOOR UNITS ARE AUTOMATICALLY ASSIGNED AN ELECTRONIC ADDRESS BY THE OUTDOOR UNITS MICROPROCESSOR. ADDITIONALLY, EACH INDOOR UNIT IS CAPABLE OF ACCEPTING A MANUAL ASSIGNMENT OF A SECONDARY ELECTRONIC ADDRESS THAT, IF USED, PROVIDES UNIT TAG IDENTIFICATION WHEN INTEGRATING WITH LG VNET CONTROL DEVICES. WHILE OPERATING IN THE HEATING MODE, THE OUTDOOR UNIT HAS A DEMAND BASED DEFROST CONTROL ALGORITHM AND A REFRIGERATION SYSTEM PUMP DOWN CYCLE DESIGNED TO STORE UP TO 6.6 LBS OF THE SYSTEM REFRIGERANT CHARGE IN THE OUTDOOR UNIT. IN HEATING MODE, A COOPERATIVE CONTROL ALGORITHM AUTOMATICALLY BALANCES, IN REAL-TIME, THE DISTRIBUTION OF REFRIGERANT TO THE INDOOR UNITS WHEN THE SYSTEMS REFRIGERANT MASS FLOW IS INSUFFICIENT TO SATISFY THE DEMAND OF ALL INDOOR UNITS. WHEN THE SYSTEM IS CALLED ON TO OPERATE, OUTSIDE THE SYSTEM DESIGN PARAMETERS, IN 10-SECOND INTERVALS, THE OUTDOOR UNIT MICROPROCESSOR WILL RECORD THE LAST THREE MINUTES OF SYSTEM ENTIRE INVERTER MODULATION RANGE. THE COMPRESSOR IS FACTORY CHARGED WITH POLYVINYL ETHER (PVE) REFRIGERATION OIL HAVING NO HYGROSCOPIC PROPERTIES. COMPRESSOR BEARINGS ARE TEFLON® COATED. THE COMPRESSOR IS WRAPPED WITH A HEAT RESISTANT, SOUND ATTENUATING BLANKET AND MOUNTED ON RUBBER ISOLATION GROMMETS.

10) OUTDOOR UNIT COIL

OUTDOOR UNIT COILS ARE A MINIMUM OF TWO ROWS, 14 FINS PER INCH, AND MANUFACTURED USING COPPER TUBES WITH MECHANICALLY BONDED ALUMINUM LOUVERED FINS. FIN SURFACES ARE COATED WITH GOLD-FIN™ CORROSION RESISTANT HYDROPHILIC SILICA GEL COATING. COILS ARE PRESSURE TESTED AT A MINIMUM OF 551 PSIG.

11) FANS AND MOTORS

UNITS ARE FURNISHED WITH ONE (2-TON) OR TWO (3-, 4-, AND 4.4-TON) AXIAL FLOW FANS PROVIDING HORIZONTAL AIRFLOW FROM THE REAR AND DISCHARGING FROM THE FRONT OF THE UNIT. FAN BLADES ARE 20-1/2 INCH DIAMETER, BALANCED, AND MADE OF DURABLE (LUPOS (ABS) POLYMERIC RESIN. MOTORS ARE DESIGNED TO OPERATE BETWEEN 0 AND 850 RPM IN COOLING AND HEATING. BOTH FANS ARE DRIVEN BY DIGITALLY CONTROLLED INVERTERS THAT VARY THE FAN SPEED. MOTORS ARE BRUSHLESS, DIGITALLY CONTROLLED (BLDC) AND HAVE PERMANENTLY LUBRICATED AND SEALED BALL BEARINGS. ALL OUTDOOR UNIT FANS ARE CONTROLLED BY AN INVERTER DRIVE MOUNTED NEAR THE MAIN MICROPROCESSOR. THE OUTDOOR UNIT FAN SPEED IS CONTROLLED USING AN ALGORITHM THAT PROVIDES THREE PRE-PROGRAMMED FAN SPEEDS. DIP SWITCH ADJUSTABLE SETTINGS LIMIT NIGHT TIME (OFF PEAK) FAN SPEED TO REDUCE FAN GENERATED NOISE BY UP TO 10 DB(A).

12) OUTDOOR UNIT CONTROLS

OUTDOOR UNITS ARE FACTORY WIRED WITH NECESSARY ELECTRICAL CONTROL COMPONENTS, PRINTED CIRCUIT BOARDS, THERMISTORS, SENSORS, TERMINAL BLOCKS, AND LUGS FOR POWER WIRING. THE CONTROL WIRING CIRCUIT IS LOW VOLTAGE AND INCLUDES A CONTROL POWER TRANSFORMER, FUSES, AND INTERCONNECTING WIRING HARNESS WITH PLUG CONNECTORS. MICROPROCESSOR BASED ALGORITHMS PROVIDE COMPONENT PROTECTION,

SOFT-START CAPABILITY, REFRIGERATION SYSTEM PRESSURE AND TEMPERATURE CONTROL, DEFROST, AND AMBIENT CONTROL. THE UNIT IS DESIGNED TO PROVIDE CONTINUOUS COMPRESSOR OPERATION FROM -9.9°F TO +122°F IN COOLING MODE (WITH OPTIONAL LOW AMBIENT KIT). WHEN THE SYSTEM IS STARTED, THE CONNECTED INDOOR UNITS ARE AUTOMATICALLY ASSIGNED AN ELECTRONIC ADDRESS BY THE OUTDOOR UNITS MICROPROCESSOR. ADDITIONALLY, EACH INDOOR UNIT IS CAPABLE OF ACCEPTING A MANUAL ASSIGNMENT OF A SECONDARY ELECTRONIC ADDRESS THAT, IF USED, PROVIDES UNIT TAG IDENTIFICATION WHEN INTEGRATING WITH LG VNET CONTROL DEVICES. WHILE OPERATING IN THE HEATING MODE, THE OUTDOOR UNIT HAS A DEMAND BASED DEFROST CONTROL ALGORITHM AND A REFRIGERATION SYSTEM PUMP DOWN CYCLE DESIGNED TO STORE UP TO 6.6 LBS OF THE SYSTEM REFRIGERANT CHARGE IN THE OUTDOOR UNIT. IN HEATING MODE, A COOPERATIVE CONTROL ALGORITHM AUTOMATICALLY BALANCES, IN REAL-TIME, THE DISTRIBUTION OF REFRIGERANT TO THE INDOOR UNITS WHEN THE SYSTEMS REFRIGERANT MASS FLOW IS INSUFFICIENT TO SATISFY THE DEMAND OF ALL INDOOR UNITS. WHEN THE SYSTEM IS CALLED ON TO OPERATE OUTSIDE THE SYSTEM DESIGN PARAMETERS, IN 10-SECOND INTERVALS, THE OUTDOOR UNIT MICROPROCESSOR WILL RECORD THE LAST THREE MINUTES OF SYSTEM RUN-TIME DATA IN NON-VOLATILE MEMORY. UPON UNIT MALFUNCTION, OR A POWER OUTAGE THAT RESULTS IN A SYSTEM SHUTDOWN, THE STORED SYSTEM OPERATIONAL DATA MAY BE RETRIEVED AND ANALYZED TO ASSIST IN DIAGNOSING A SYSTEM MALFUNCTION. THE OUTDOOR UNIT MICROPROCESSOR IS PROVIDED WITH A THREE-DIGIT, LED DISPLAY THAT COMMUNICATES ACTIVE SYSTEM INFORMATION AND / OR MALFUNCTION CODES. THE MICROPROCESSOR HAS AN ALGORITHM THAT ACTIVELY VERIFIES THE OPERATIONAL CONDITION OF SYSTEM SENSORS AND THERMISTORS. A REFRIGERANT AUTO-TRIM-CHARGE ALGORITHM ASSISTS THE INSTALLER WITH PROPERLY CHARGING THE SYSTEM. A POWER CONDITIONING CIRCUIT IS PROVIDED AND DESIGNED TO PROTECT THE UNITS INVERTER COMPRESSOR AND OUTDOOR UNIT FAN MOTORS FROM PHASE FAILURE, PHASE REVERSAL, SENSE AN UNDER-VOLTAGE OR OVER-VOLTAGE CONDITION, AND TO PREVENT TRANSMISSION OF POWER IRREGULARITIES TO THE SUPPLY POWER SOURCE. A SNOW THROW ALGORITHM IS PROVIDED AND DESIGNED TO REDUCE SNOW BUILDUP ON THE DISCHARGE SIDE LOUVERS GRILLE AT REGULAR INTERVALS.

REVISIONS:

No.	Description	Date
	PERMIT SET	07.12.2024
△	REVISED PERMIT SET	08.20.2024

PROJECT: 2024 AV2

DATE: 08.20.2024

DRAWN BY: NYE

CHECKED BY: NYE

MECHANICAL  
SPECIFICATIONS  
(2 OF 2)

M-0.3

**1 MECHANICAL FLOOR PLAN**  
1/4" = 1'-0"

## MECHANICAL FLOOR PLAN KEY NOTES:

- 1" CD WITH CONDENSATE DRAIN PUMP TO LAVATORY WASTE W/AIR GAP FITTING. COORDINATE W/ PLUMBING DRAWINGS.
- CONTRACTOR SHALL PROVIDE FIELD MANUFACTURED FILTER RACK AT THE UNIT INLET. COORDINATE WITH ARCHITECT FOR ACCESS DOOR FOR FILTER.
- CONTRACTOR TO PROVIDE EXHAUST LOUVER OF 30"x14" OR 2.8 SQFT FREE AREA. LOUVER TO BE TERMINATED 3' AWAY FROM ANY OPENING AND 10' AWAY FROM ANY AIR INTAKE.
- CONTRACTOR TO PROVIDE EXHAUST LOUVER OF 12"x8" OR 0.6 SQFT FREE AREA. LOUVER TO BE TERMINATED 3' AWAY FROM ANY OPENING AND 10' AWAY FROM ANY AIR INTAKE.
- CONTRACTOR TO PROVIDE LOUVER FOR OUTSIDE AIR INTAKE OF SIZE 40"x18" OR 4.6 SQFT FREE AREA. LOUVER TO BE TERMINATED 10' AWAY FROM ANY EXHAUST.
- LOCATION OF DIGITAL THERMOSTAT CONTROL. INSTALL AND WIRE NEW 7-DAY PROGRAMMABLE THERMOSTAT. COORDINATE EXACT LOCATION WITH ARCHITECT AND OWNER PRIOR TO ROUGH-IN. PROVIDE LOCKABLE COVER.
- MOTORISED DAMPER TO BE INTERLOCKED WITH ERV-1(N).
- GENERAL EXHAUST FAN TO BE INSTALLED FOR MEDGAS AND TO BE TERMINATED AS SHOWN IN THE PLAN.
- PROVIDE THE 4 INCH DIA METALLIC DUCT FOR DRYER AS PER MANUFACTURER RECOMMENDATION. INSULATE THE METALLIC DUCT IN AIR CONDITIONED AREA. EXHAUST TO BE MINIMUM 10FT AWAY FROM ANY OUTSIDE AIR INTAKE POINTS.
- DRYER VENT TO BE TERMINATED WITH MANUFACTURER TERMINATION CAPS.
- WATER HEATERS SHALL BE PROVIDED BY OTHERS. Ø3"/45" CONCENTRIC VENT LINE FOR COMBUSTION AIR INTAKE / EXHAUST FROM GAS FIRED EQUIPMENT TO ROOF TERMINATION KIT. ROUTE PIPING FROM RESPECTIVE UNIT TO LOCATION INDICATED ON ROOF PLAN. ROUTE PIPING WITH MINIMAL AMOUNT OF BENDS AND MINIMUM LENGTH AS REQUIRED BY RESPECTIVE UNIT MANUFACTURER'S REQUIREMENTS.
- SCAVENGER UNIT TO INSTALL AS PER MANUFACTURER RECOMMENDATION. 5 1/2" DIA OUTSIDE VENT TO BE PROVIDED.
- FEATURE CONTRACTOR TO PROVIDE AC UNIT WITH AIR DISTRIBUTION FOR THE TENANT SPACE.
- PROVIDE BLANK-OFF BETWEEN SUPPLY AND RETURN GRILLE.

## GENERAL NOTES:

- ALL WORK SHALL COMPLY WITH ALL LOCAL AND STATE CODES AND AUTHORITIES HAVING JURISDICTION.
- THE CONTRACTOR SHALL SECURE AND PAY FOR ALL REQUIRED PERMITS AND ARRANGE ALL REQUIRED INSPECTIONS.
- THE CONTRACTOR SHALL COORDINATE HIS WORK WITH OTHER CONTRACTORS AND TRADES.
- THESE DRAWINGS, AS PREPARED, ARE DIAGRAMMATIC BUT SHALL BE FOLLOWED AS CLOSELY AS CONSTRUCTION OF THE PROJECT AND THE WORK OF THE TRADES WILL PERMIT. EQUIPMENT LOCATIONS INDICATED ARE APPROXIMATE. COORDINATE EXACT LOCATIONS AND REQUIRED CLEARANCES WITH EQUIPMENT SUPPLIER AND ALL TRADES PRIOR TO INSTALLATION.
- THE CONTRACTOR SHALL FURNISH AND INSTALL ALL THE EQUIPMENT INDICATED WITHIN THE MECHANICAL DRAWINGS UNLESS OTHERWISE NOTED. ALL EQUIPMENT SHALL BE UL LISTED. VERIFY LOCATION AND DIMENSIONS IN THE FIELD PRIOR TO FABRICATION AND / OR INSTALLATION.
- DUCT SIZES SHOWN ON DRAWINGS ARE CLEAR INSIDE DIMENSIONS.
- FOR SUPPLY AND RETURN AIR DUCT PROVIDE 1.5" ACOUSTICAL LINING (R-6) UP TO 20' DUCT RUN FROM THE RTU UNIT. PROVIDE 1.5" THERMAL INSULATION (R-6) AFTER 20' OF DUCT RUN FROM RTU UNIT.
- ALL DUCTWORK SHALL BE FABRICATED, INSTALLED, SEALED, AND INSULATED PER THE LATEST ISSUE OF SMACNA LOW-VELOCITY DUCT MANUAL.
- ALL SUPPLY, RETURN, EXHAUST GRILLES ON THE ABOVE FLOOR. EXACT LOCATION TO VERIFY WITH ARCHITECTURE.
- THE CONTRACTOR IS TO MAKE ALL LOW-VOLTAGE WIRING CONNECTIONS FOR ALL HVAC EQUIPMENT INCLUDING TEMPERATURE CONTROLS, ROOF TOP UNITS, SMOKE DETECTORS AND CONTRACTOR PANEL.
- PROVIDE AND INSTALL SMOKE DUCT DETECTORS IN EACH AIR CONDITIONING UNIT SUPPLY DUCT GREATER THAN 2000 CFM. CONTRACTOR SHALL PROVIDE INTERCONNECTION AND WIRE TO THE FIRE ALARM CONTROL PANEL IF REQUIRED. DUCT DETECTORS SHALL HAVE REMOTE TEST STATIONS LOCATED NEAR THE RESPECTIVE THERMOSTATS. VERIFY CODE REQUIREMENTS FOR DUCT DETECTORS IN BOTH THE SUPPLY AND RETURN AIR STREAMS.
- PROVIDE FIRE OR FIRE-SMOKE DAMPER WHEREVER DUCTS ARE CROSSING FIRE/SMOKE RATED WALLS/ BARRIERS AS PER LOCAL CODE. COORDINATE WITH ARCHITECTURAL DRAWING FOR FIRE RATING OF THE WALLS.

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DATE: 08.20.2024  
DRAWN BY: NYE  
CHECKED BY: NYE

MECHANICAL  
FLOOR PLAN

M-1.1

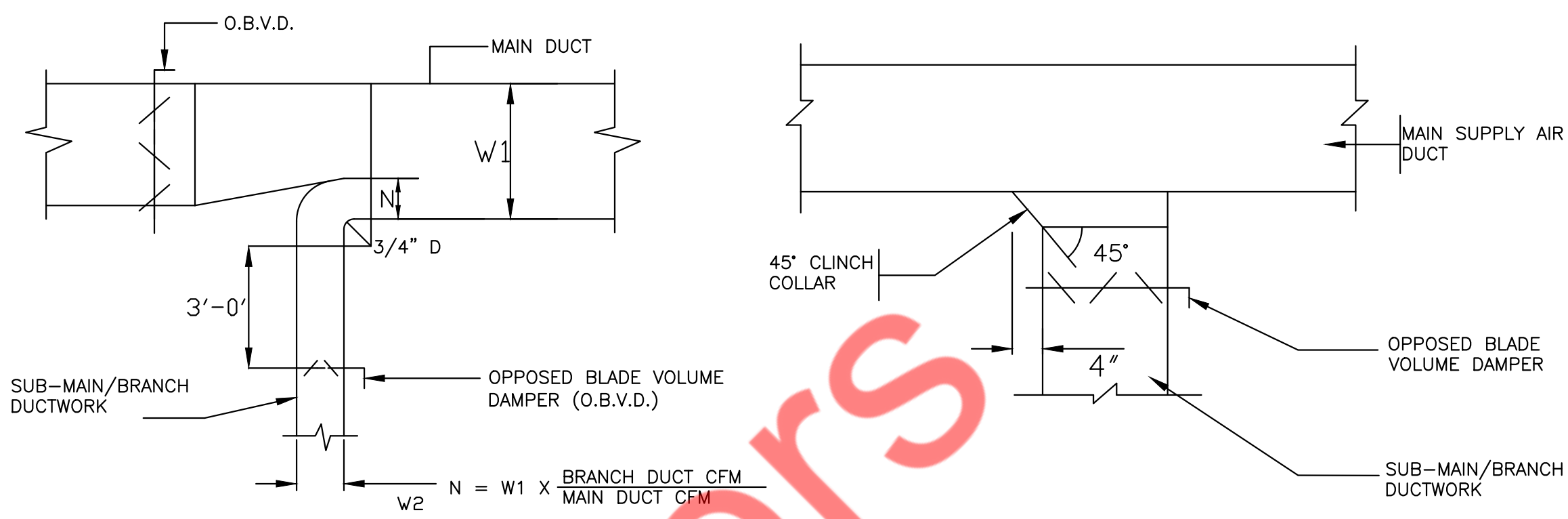
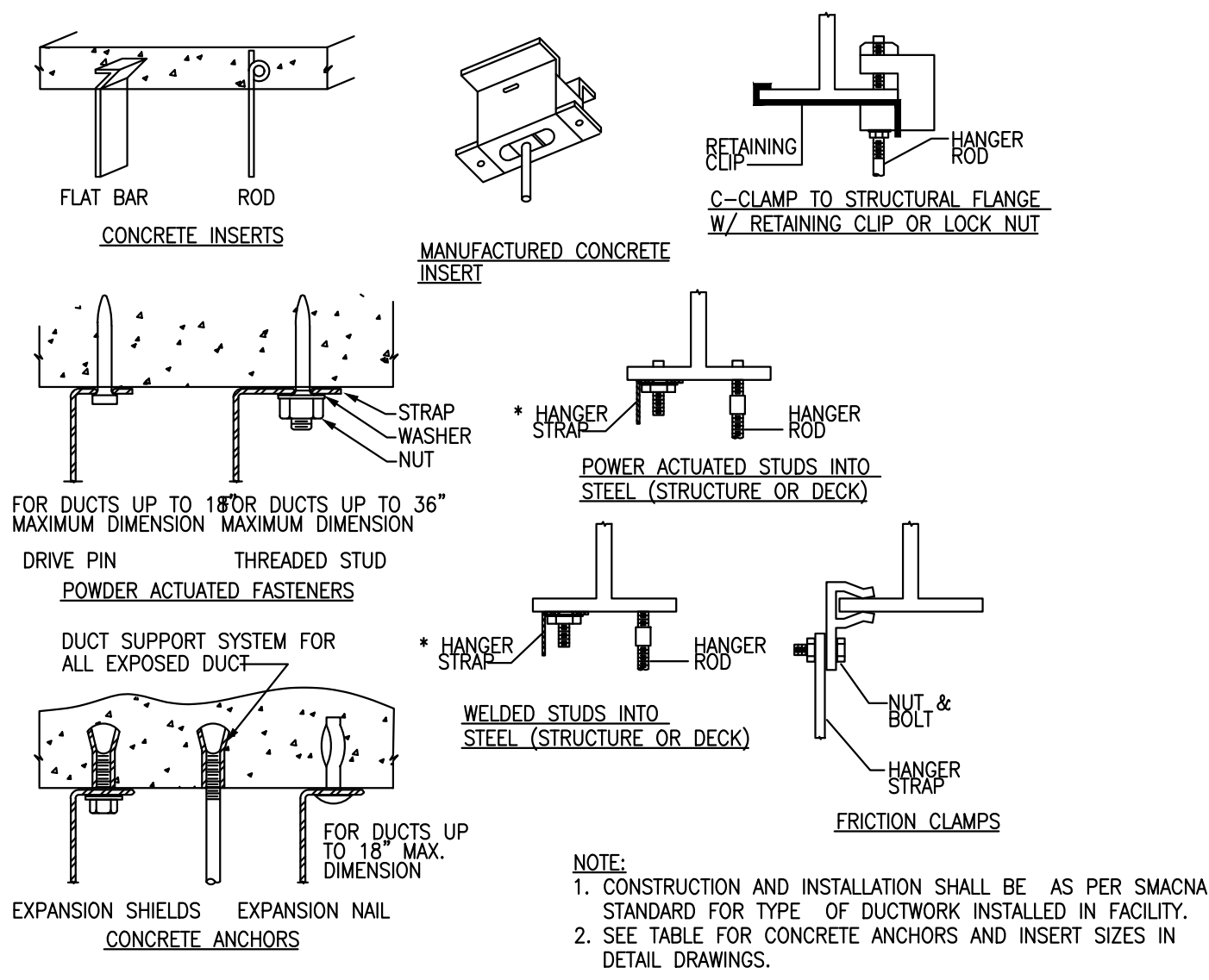
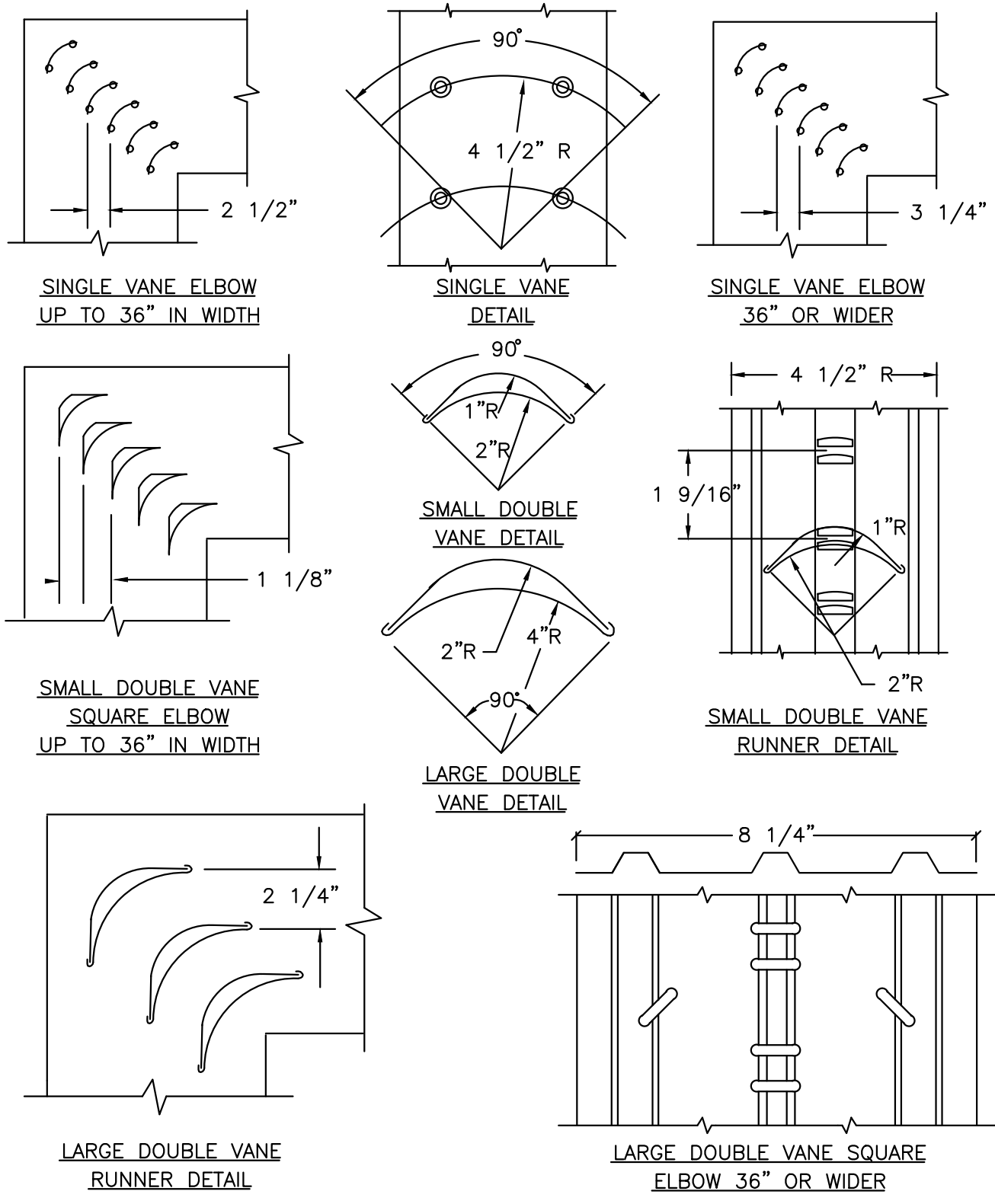
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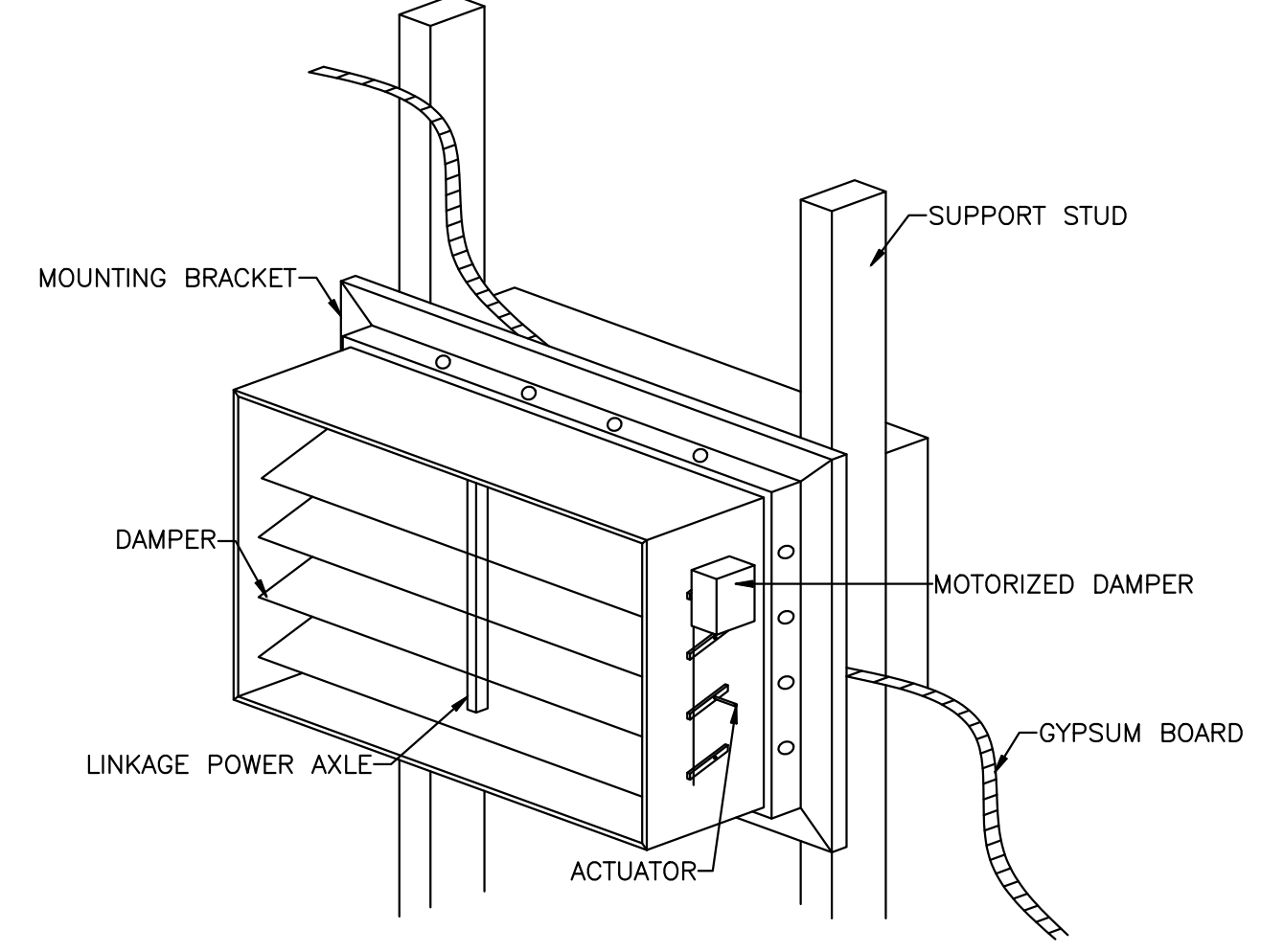
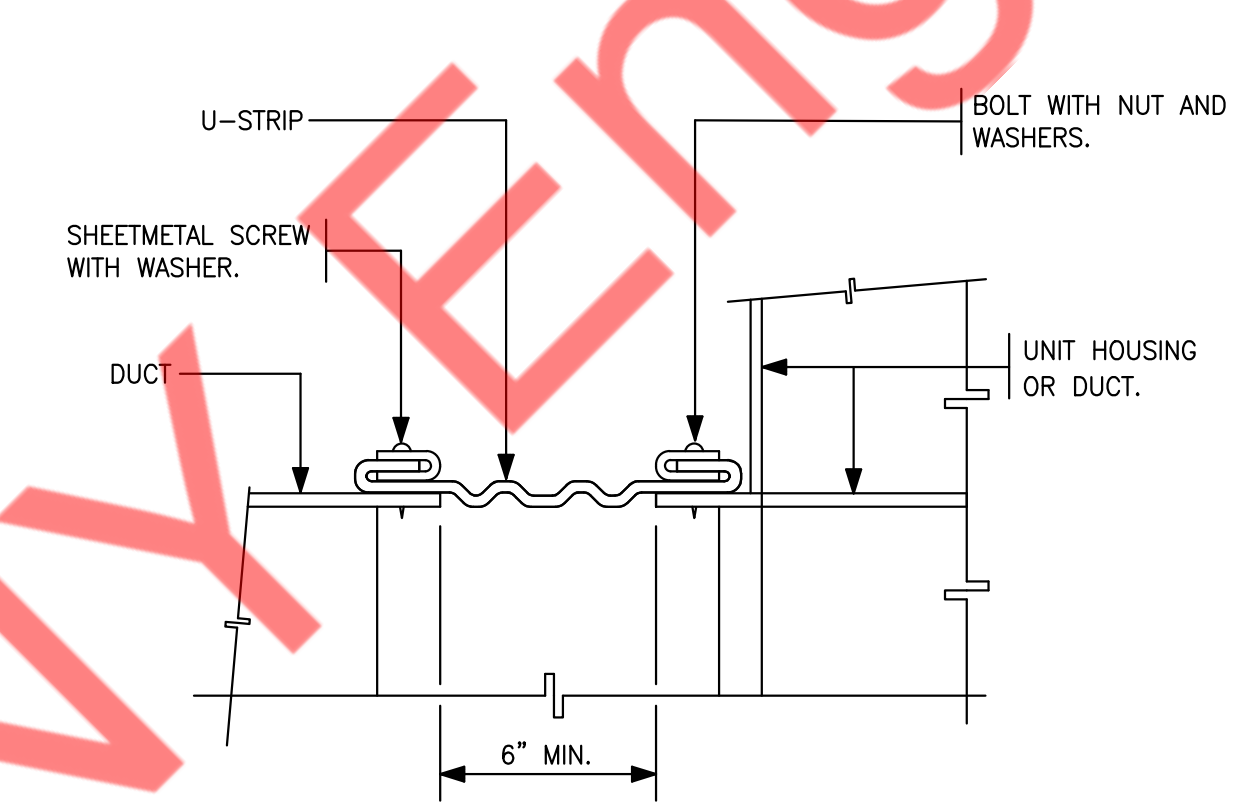
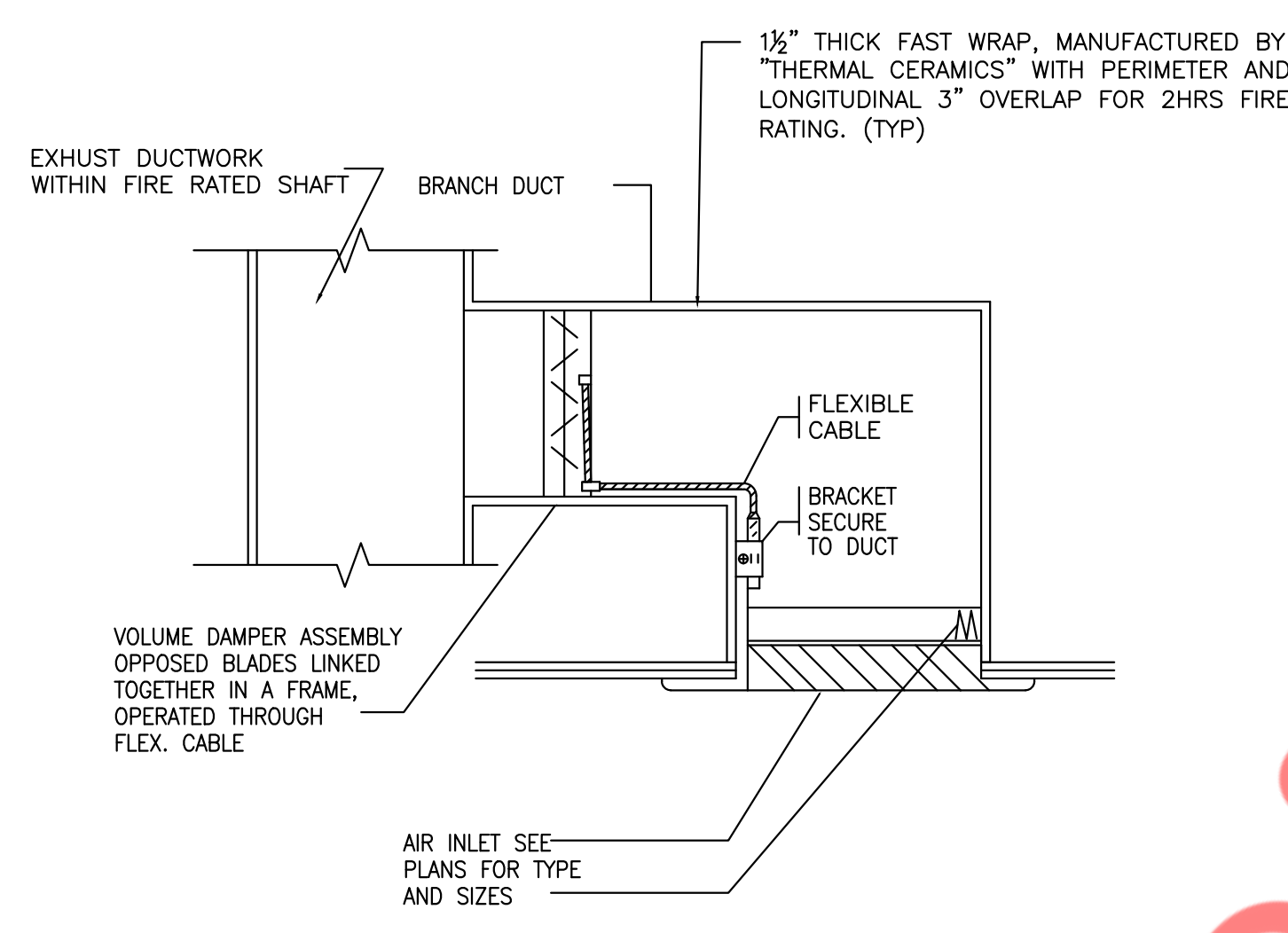
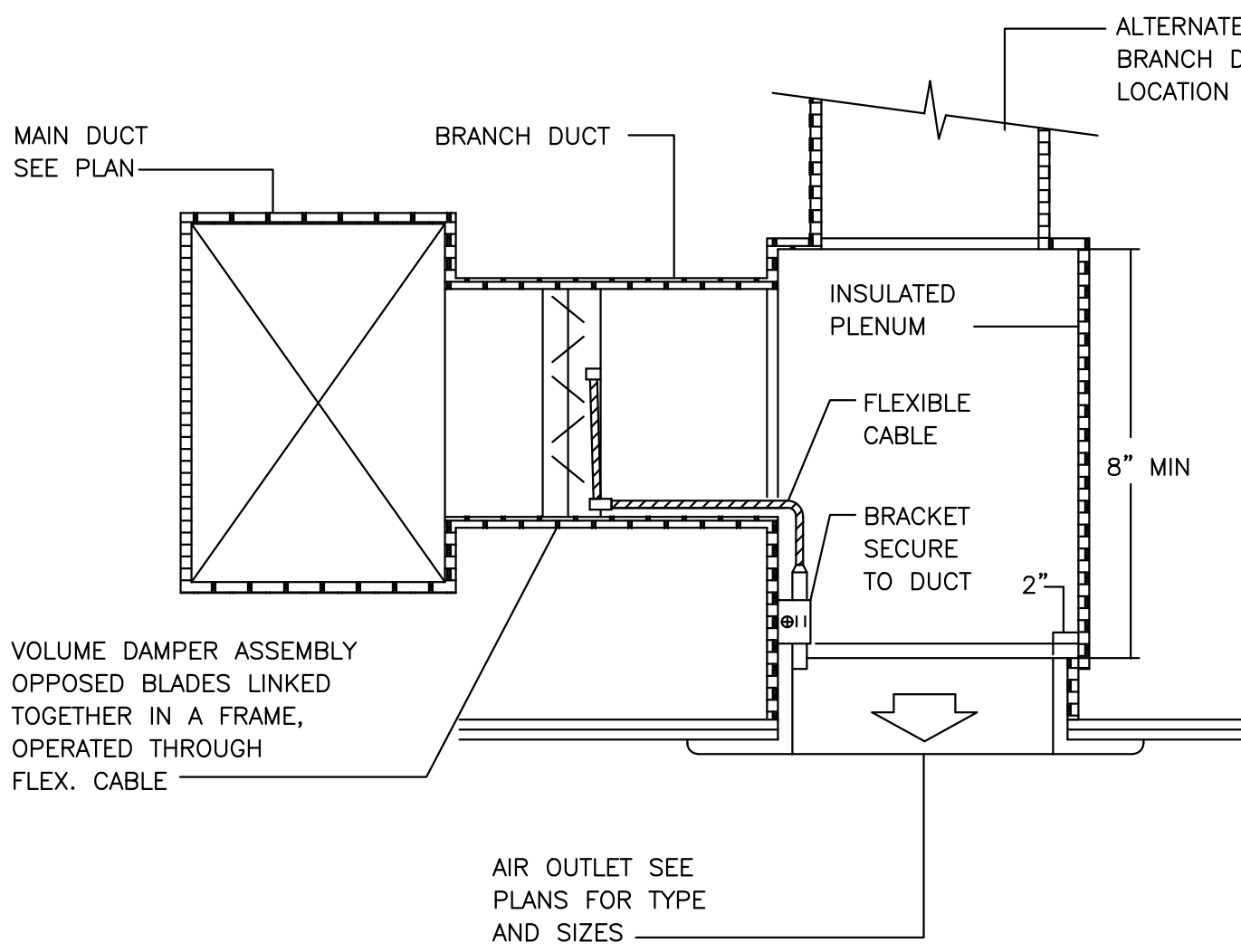
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1 LOW VELOCITY DUCTWORK ELBOWS  
M-5.1 N.T.S

2 UPPER ATTACHMENT METHODS OF HANGING DUCT AND EQUIPMENT DETAIL  
M-5.1 N.T.S

3 SUPPLY AIR DUCTWORK SUB-MAIN/BRANCH DUCT CONNECTION  
M-5.1 N.T.S

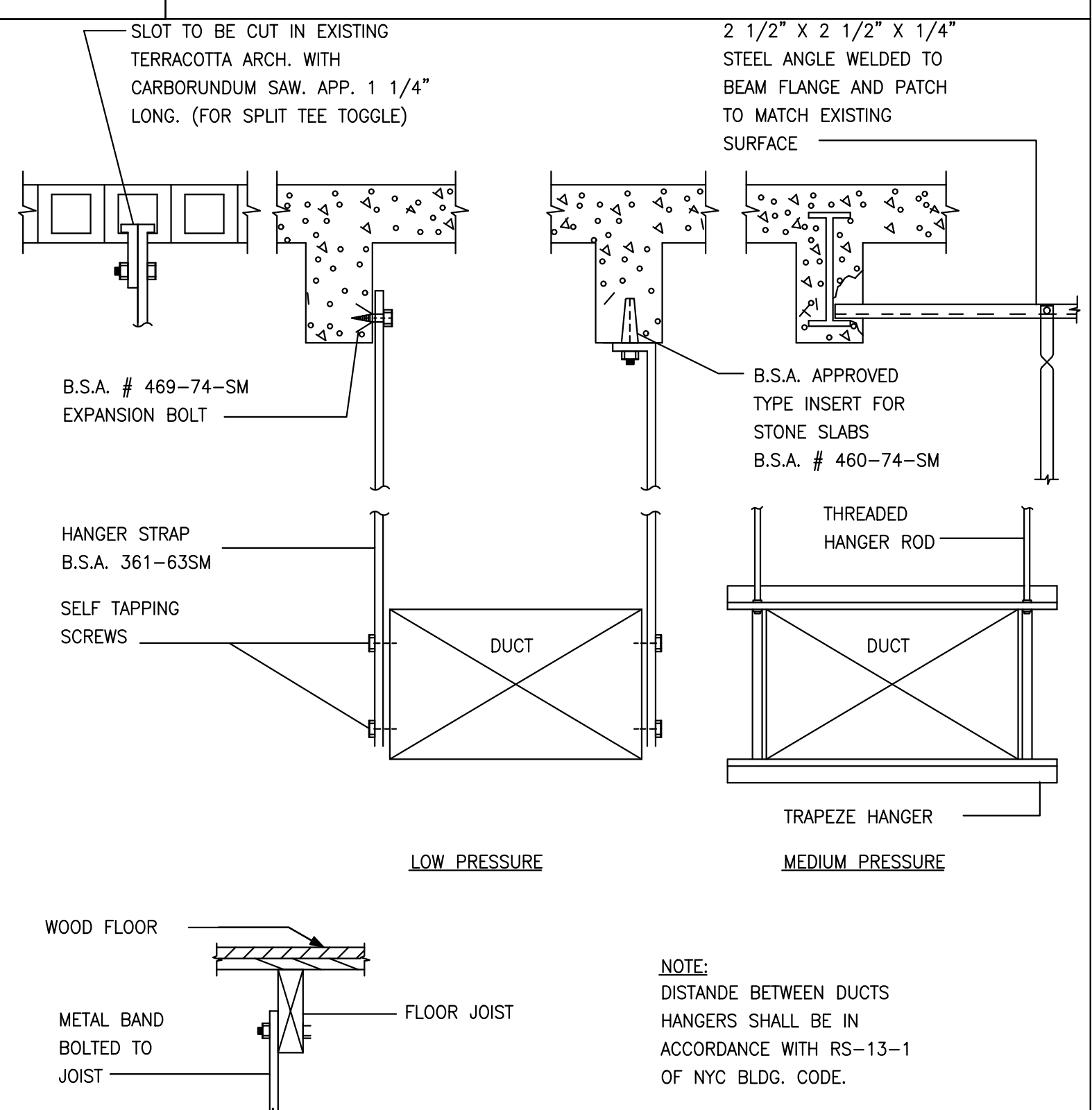
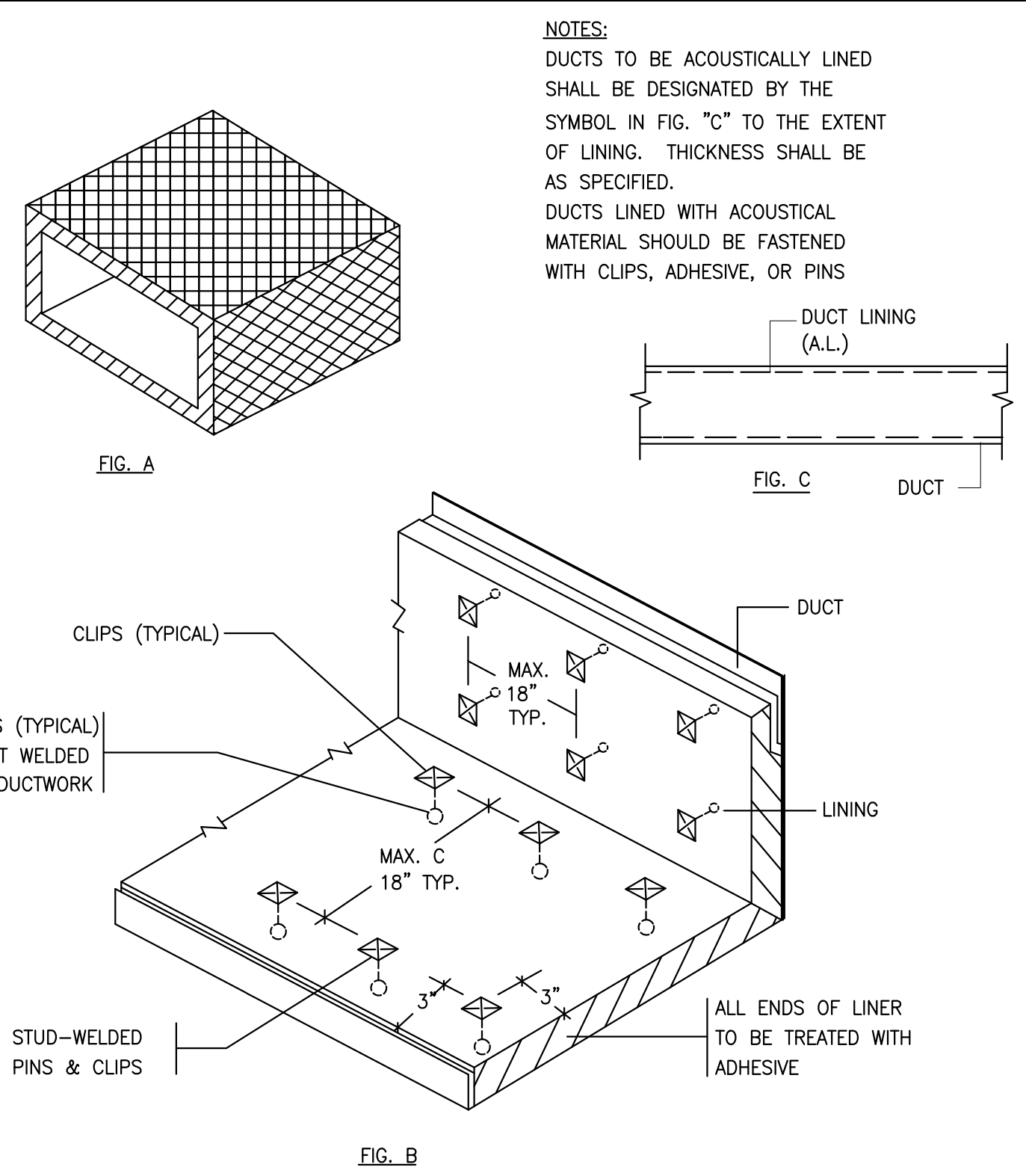
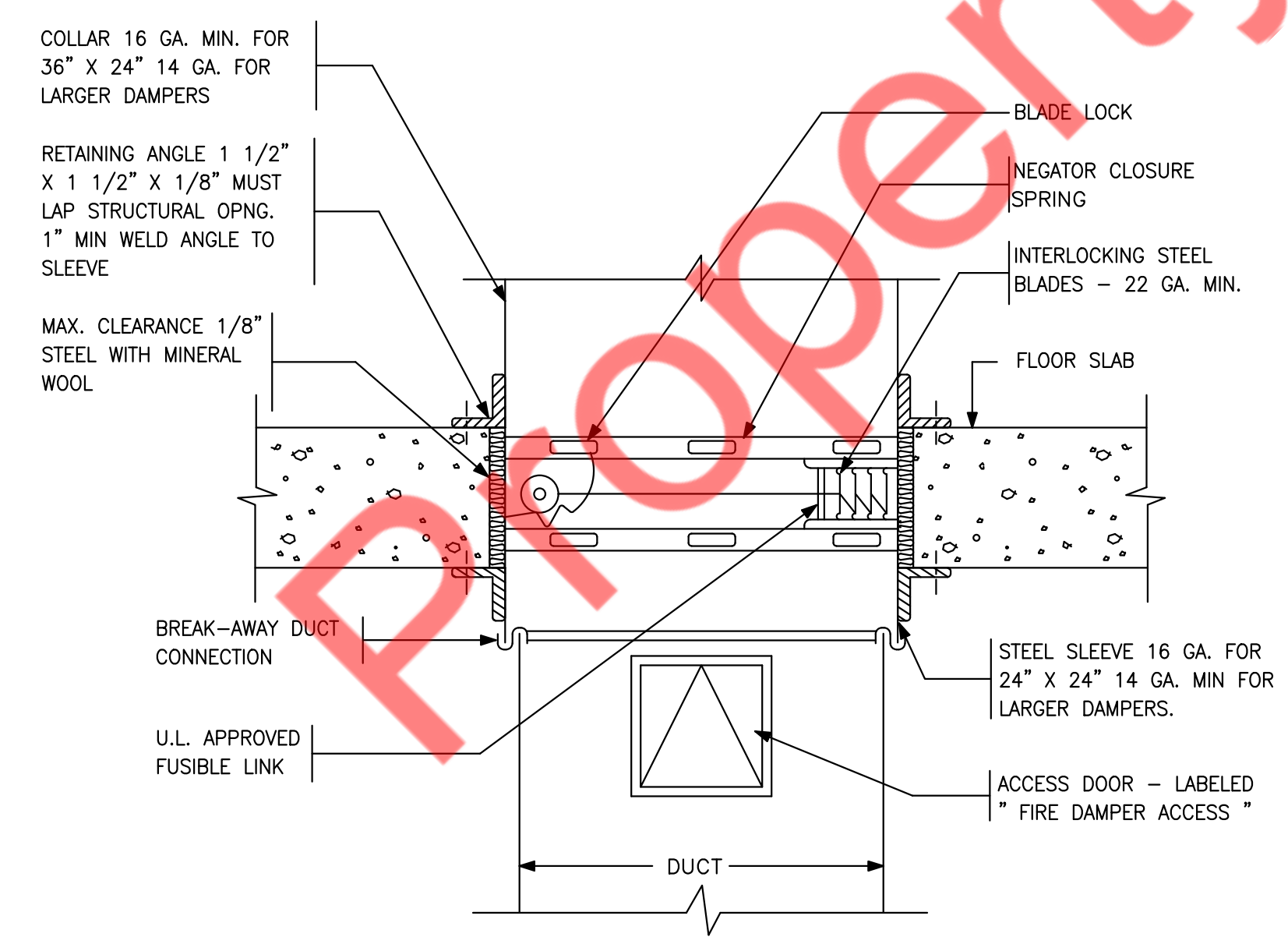
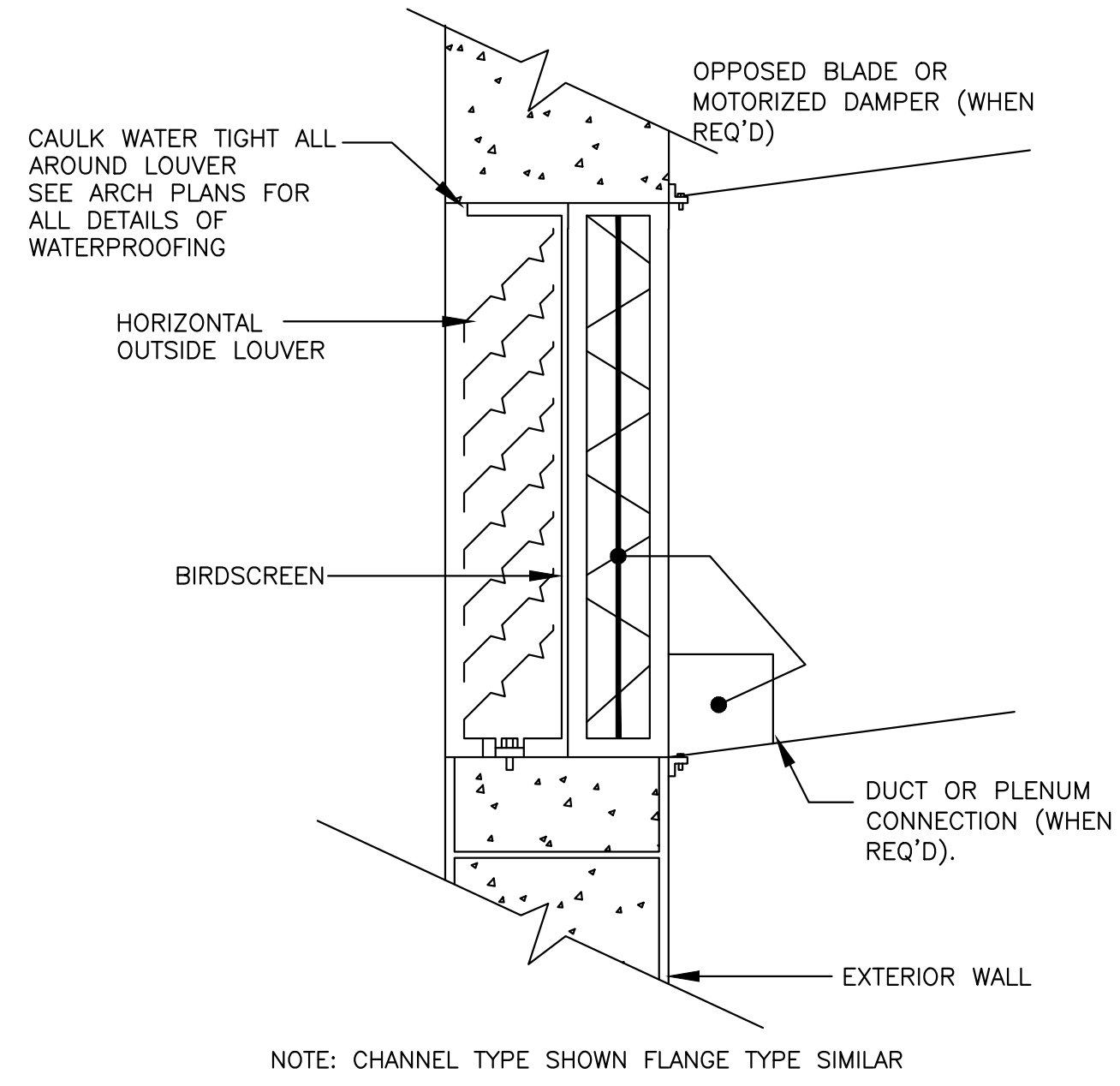


4 LINEAR DIFFUSER CONNECTION DETAILS  
M-5.1 N.T.S

5 EXHAUST GRILLE DETAILS  
M-5.1 N.T.S

6 FLEXIBLE CONNECTION (DUCT-EQUIPMENT)  
M-5.1 N.T.S

7 MOTORIZED DAMPER DETAIL  
M-5.1 N.T.S



8 LOUVER INSTALLATION DETAIL  
M-5.1 N.T.S

9 HORIZONTAL FIRE DAMPER DETAIL  
M-5.1 N.T.S

10 ACOUSTICAL TREATMENT DUCT LINING  
M-5.1 N.T.S

11 METHOD OF HANGING DUCTWORK  
M-5.1 N.T.S

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MECHANICAL  
DETAILS

M-5.1

VRF HEAT PUMP OUTDOOR UNIT SCHEDULE																	MAKE: LG	
UNIT TAG	LOCATION	INDOOR UNITS SERVED	CAP. TR.	COOLING MBH	HEATING MBH	UNIT DIMENSIONS IN. (HXWXD)	WEIGHT (LBS)	PIPING DIMENSION		ELECTRICAL		SOUND LEVEL			(DUCTED/NON-DUCTED)		MODEL NO.	
								LIQUID-H PRESSURE	GAS LOW-PRESSURE	(V/Hz/Ph)	MCA	MOP	(DBa)	EER	IEER	HSPF		
ACCU-1	SEE PLAN	SEE PLAN	4.0	48.0	54.0	54"x38"x16"	207.0	3/8"	5/8"	208-230/60/1	30.0	50.0	51.0	10.5/10.5	17/17	9.5/9.5	ARUN048GSS4	
ACCU-2	SEE PLAN	SEE PLAN	3.0	38.0	43.0	54"x38"x16"	207.0	3/8"	5/8"	208-230/60/1	25.0	40.0	50.0	11/11	17/17	9/9	ARUN038GSS4	
ACCU-3	SEE PLAN	SEE PLAN	4.0	48.0	54.0	54"x38"x16"	207.0	3/8"	5/8"	208-230/60/1	30.0	50.0	51.0	10.5/10.5	17/17	9.5/9.5	ARUN048GSS4	
ACCU-4	SEE PLAN	SEE PLAN	3.0	38.0	43.0	54"x38"x16"	207.0	3/8"	5/8"	208-230/60/1	25.0	40.0	50.0	11/11	17/17	9/9	ARUN038GSS4	
NOTES: OUTDOOR UNITS																		
1. UNIT SHALL HAVE TEN YEAR EXTENDED WARRANTY FOR COMPRESSORS/PARTS.																		
2. PROVIDE LOW AMBIENT CONTROL FOR CONDENSING UNIT OPERATION DOWN TO -4°F FOR ACCU-1, ACCU-2, ACCU-3 & ACCU-4.																		
3. PROVIDE COMPRESSOR CYCLE PROTECTOR.																		
4. PROVIDE STEEL RAILS FOR CONDENSER MOUNTING.																		
5. CONTRACTOR SHALL PROVIDE A LONG LINE SET FOR REFRIGERANT PIPING IN THE EVENT THAT TOTAL REFRIGERANT LENGTH EXCEED THE MANUFACTURER'S STANDARD RECOMMENDED LENGTH.																		
6. AIR CONDITIONER UNIT SHALL NOT PRODUCE NOISE LEVELS IN EXCESS OF 42 DB FOR A SINGLE AIR CIRCULATING DEVICE AND 45 DECIBELS FOR THE CUMULATIVE NOISE LEVEL OF MULTIPLE AIR CIRCULATING DEVICES AS MEASURED 3 FEET FROM THE NOISE SOURCE AT AN OPEN DOOR OR WINDOW OF A NEARBY RESIDENCE.																		

UNIT-B VRF HEAT PUMP OUTDOOR UNIT SCHEDULE																	MAKE: LG	
UNIT TAG	LOCATION	INDOOR UNITS SERVED	CAP-TR	COOLING MBH	HEATING MBH	UNIT DIMENSIONS IN. (H*W*XD)	WEIGHT (LBS)	PIPING DIMENSION LIQUID-HIGH PRESSURE	GAS LOW-PRESSURE	ELECTRICAL (V/Hz/Ph)	MCA	MOP	SOUND LEVEL (DBa)	EER	IEER	HSPF	MODEL NO.	
ACCU-5	SEE PLAN	SEE PLAN	4.0	48.0	54.0	54"x38"x16"	207.0	3/8"	5/8"	208-230/60/1	30.0	50.0	51.0	10.5/10.5	17/17	9.5/9.5	ARUN048GSS4	
ACCU-6	SEE PLAN	SEE PLAN	3.0	38.0	43.0	54"x38"x16"	207.0	3/8"	5/8"	208-230/60/1	25.0	40.0	50.0	11/11	17/17	9/9	ARUN038GSS4	
NOTES: OUTDOOR UNITS																		
1. UNIT SHALL HAVE TEN YEAR EXTENDED WARRANTY FOR COMPRESSORS/PARTS.																		
2. PROVIDE LOW AMBIENT CONTROL FOR CONDENSING UNIT OPERATION DOWN TO -4°F FOR ACCU-1, ACCU-2, ACCU-3 & ACCU-4.																		
3. PROVIDE COMPRESSOR CYCLE PROTECTOR.																		
4. PROVIDE STEEL RAILS FOR CONDENSER MOUNTING.																		
5. CONTRACTOR SHALL PROVIDE A LONG LINE SET FOR REFRIGERANT PIPING IN THE EVENT THAT TOTAL REFRIGERANT LENGTH EXCEED THE MANUFACTURER'S STANDARD RECOMMENDED LENGTH.																		
6. AIR CONDITIONER UNIT SHALL NOT PRODUCE NOISE LEVELS IN EXCESS OF 42 dB FOR A SINGLE AIR CIRCULATING DEVICE AND 45 DECIBELS FOR THE CUMULATIVE NOISE LEVEL OF MULTIPLE AIR CIRCULATING DEVICES AS MEASURED 3 FEET FROM THE NOISE SOURCE AT AN OPEN DOOR OR WINDOW OF A NEARBY RESIDENCE.																		

INDOOR AIR CONDITIONER SCHEDULE (DUCTED)														BASIS OF DESIGN: LG				
UNIT TAG	LOCATION	AREA SERVED	TYPE	CAP. (TON)	COOLING MBH	HEATING MBH	TOTAL CFM	MAX. ESP. (IN. WG)	MAX. SOUND	PH/VOLT/Hz	MCA	MOP	DIMENSIONS (HXWXD) (IN.)	PIPE SIZE LIQ. SUCTION	PIPE SIZE DRAIN (ID)	WEIGHT (LBS.)	MODEL NO.	
AC-1 (N)	SEE PLAN	SEE PLAN	MULTI V HIGH STATIC DUCTED	4.0	48.1	54.2	2019	0.98	47	1/208-230/60	6.50	15	19X62X29	3/8"	3/4"	1"	192.0	ARNU48388A4
AC-2 (N)	SEE PLAN	SEE PLAN	MULTI V HIGH STATIC DUCTED	3.5	42.0	43.8	1914	0.98	47	1/208-230/60	6.50	15	19X62X29	3/8"	3/4"	1"	192.0	ARNU42388A4
AC-3 (N)	SEE PLAN	SEE PLAN	MULTI V HIGH STATIC DUCTED	2.0	24.2	27.3	673	0.71	54	1/208-230/60	2.90	15	11x50x28	3/8"	5/8"	1"	82.9	ARNU243M2M
AC-4 (N)	SEE PLAN	SEE PLAN	MULTI V HIGH STATIC DUCTED	2.4	28.0	31.5	1250	0.79	64	1/208-230/60	3.10	15	15x51x28	3/8"	5/8"	1"	96.1	ARNU239M3A4
AC-5 (N)	SEE PLAN	SEE PLAN	MULTI V HIGH STATIC DUCTED	3.5	42.0	43.8	1914	0.98	47	1/208-230/60	6.50	15	19X62X29	3/8"	3/4"	1"	192.0	ARNU42388A4
NOTES FOR INDOOR VRF UNITS:																		
1) SUPPLY AIR CFM BASED ON HIGH SPEED.																		
2) REFRIGERANT R410A SHALL BE PROVIDED.																		
3) PROVIDE MOUNTING BRACKETS AND ALL ASSOCIATED ACCESSORIES.																		
4) ALL REFRIGERANT PIPING TO BE SIZED PER MANUFACTURERS RECOMMENDATIONS.																		
5) PROVIDE FILTER ON ALL RETURNS TO UNIT.																		
6) SEE FLOOR PLAN FOR QUANTITIES.																		
7) INDOOR UNIT ACCESS PANEL FIELD-PROVIDED.																		

ENERGY RECOVER VENTILATOR (ERV) SCHEDULE														BASIS OF DESIGN: ENERGY WALL	
UNIT TAG	QUANTITY	SUPPLY AIR CFM	EXHAUST AIR CFM	EXTERNAL STATIC PRESSURE FOR SUPPLY IN OF WC	EXTERNAL STATIC PRESSURE FOR RETURN IN OF WC	APPROXIMATE WEIGHT LBS	ELECTRICAL			SENSIBLE EFFICIENCY	SIZE IN INCH (HX)(WX)(D)	OPERATION	MODEL NO.	REMARKS	
ERV-1(N)	1	1165	890	2.0	2.0	187	15.1	20	V/B/H 208-277/1/60	73%	24X68X66	CONTINUOUS	U-ERV-1200	CEILING MOUNTED	
NOTES:															
1. SUPPLY FILTER - MERV 11															
2. RETURN FILTER- MERV 8															
3. FIELD WIRED FACTORY CONTROL PANEL															
4. PIPE CONDENSATE CONNECTION TO NEAREST DRAIN.															
5. PROVIDE UNIT WITH DISCONNECT SWITCH.															

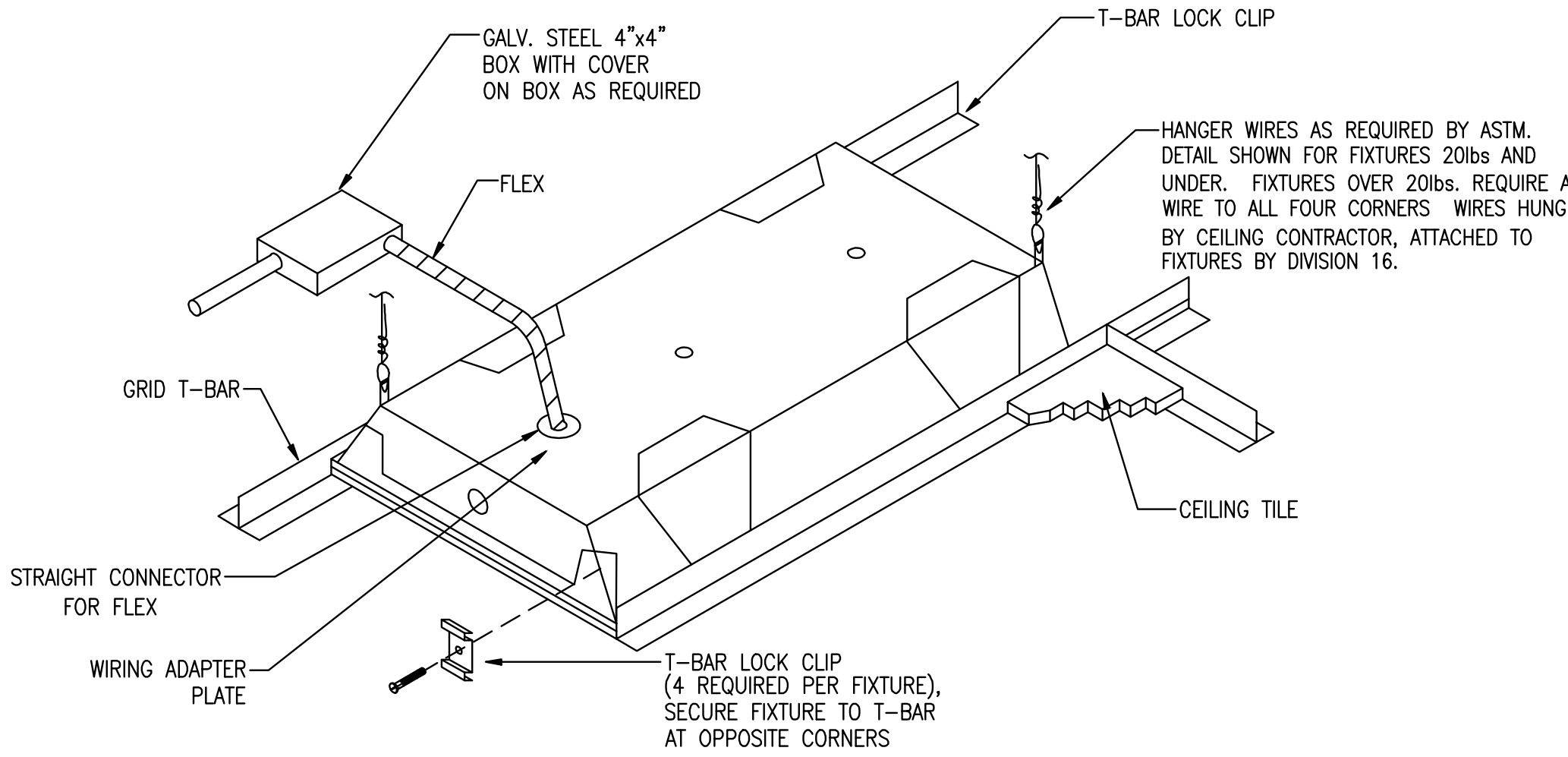
FAN SCHEDULE														
UNIT ID	MANUFACTURER	MODEL	CFM	TYPE	DRIVE	FAN RPM	WEIGHT (LBS)	E.S.P. (IN. W.G.)	MOTOR HP	VOLTS	PHASE	SERVICE	INTERLOCK/CONTROL	NOTES / ACCESSORIES
GEF-1 (N)	GREENHECK	SP-B150-QD	150	CEILING MOUNTED EXHAUST FAN	DIRECT	1240	30	0.8	0.2	115	1	SEE PLAN	TIME CLOCK	1,2,3,7
NOTES / ACCESSORIES:														
1. VIBRATION ISOLATORS, CANVAS CONNECTION														
2. THERMAL OVERLOAD PROTECTION														
3. AMCA SEAL														
4. GRAVITY DAMPER														

DIFFUSER SCHEDULE							
UNIT ID	MANUFACTURER	MODEL	SIZE	DESCRIPTION	CONSTRUCTION	FINISH	REMARKS
CD5	TITUS	TMS	24x24	SQUARE FACE CEILING DIFFUSER FOR SUPPLY	ALUMINIUM	WHITE	1,2,3,4,5,6
CDR	TITUS	TMS	24x24	SQUARE FACE CEILING DIFFUSER FOR RETURN	ALUMINIUM	WHITE	1,2,3,4,5
CD5-1	TITUS	TMS	20x20	SQUARE FACE CEILING DIFFUSER FOR SUPPLY	ALUMINIUM	WHITE	1,2,3,4,5,6
CDR-1	TITUS	TMS	20x20	SQUARE FACE CEILING DIFFUSER FOR RETURN	ALUMINIUM	WHITE	1,2,3,4,5
CD5-2	TITUS	TMS	12x12	SQUARE FACE CEILING DIFFUSER FOR SUPPLY	ALUMINIUM	WHITE	1,2,3,4,5,6
CDR-2	TITUS	TMS	12x12	SQUARE FACE CEILING DIFFUSER FOR RETURN	ALUMINIUM	WHITE	1,2,3,4,5
NOTES:							NECK SIZES:
1. MAXIMUM NOISE CRITERION RATING < 25 DBA.							Up To 100 Cfm - 6" DIA
2. BAKED ENAMEL FINISH, COLOR TO BE SELECTED BY ARCHITECT.							101 To 225 Cfm - 8" DIA
3. DIFFUSERS SHALL BE 4-WAY BLOW UNLESS OTHERWISE INDICATED ON PLANS.							226 To 375 Cfm - 10" DIA
4. MOUNTING FRAME TYPE SHALL BE COORD. WITH CEILING / WALL CONSTRUCTION TYPE.							376 To 500 Cfm - 12" DIA
5. NECK SIZE SHALL BE AS SCHEDULED.							601 To 700 Cfm - 14" DIA
6. PROVIDE MANUAL RADIAL DAMPER AT EACH SUPPLY DIFFUSER.							

ELECTRIC UNIT HEATER SCHEDULE										BASIS OF DESIGN: MARLEY					
UNIT TAG	LOCATION	QUANTITY	TYPE	CFM	ELECTRICAL SELECTION					WEIGHT				MODEL	NOTES
					kW	AMPs	V	PH	HZ	LBS	W	H	D		
EUH-1	SEE PLAN	3	FAN FORCED WALL HEATER	65	0.5	4.2	120	1	60	8.1	11	11	5	CHW11010DSF	1,2,3
NOTES:															
1. INSTALL ELECTRIC UNIT HEATER AS PER MANUFACTURER'S RECOMMENDATION.															
2. PROVIDE T-STAT AND WIRE TO HEATER.															
3. PROVIDE DISCONNECT SWITCH, VAPOR BARRIER, DUST TIGHT BOX & FAN INTERLOCK SWITCH.															

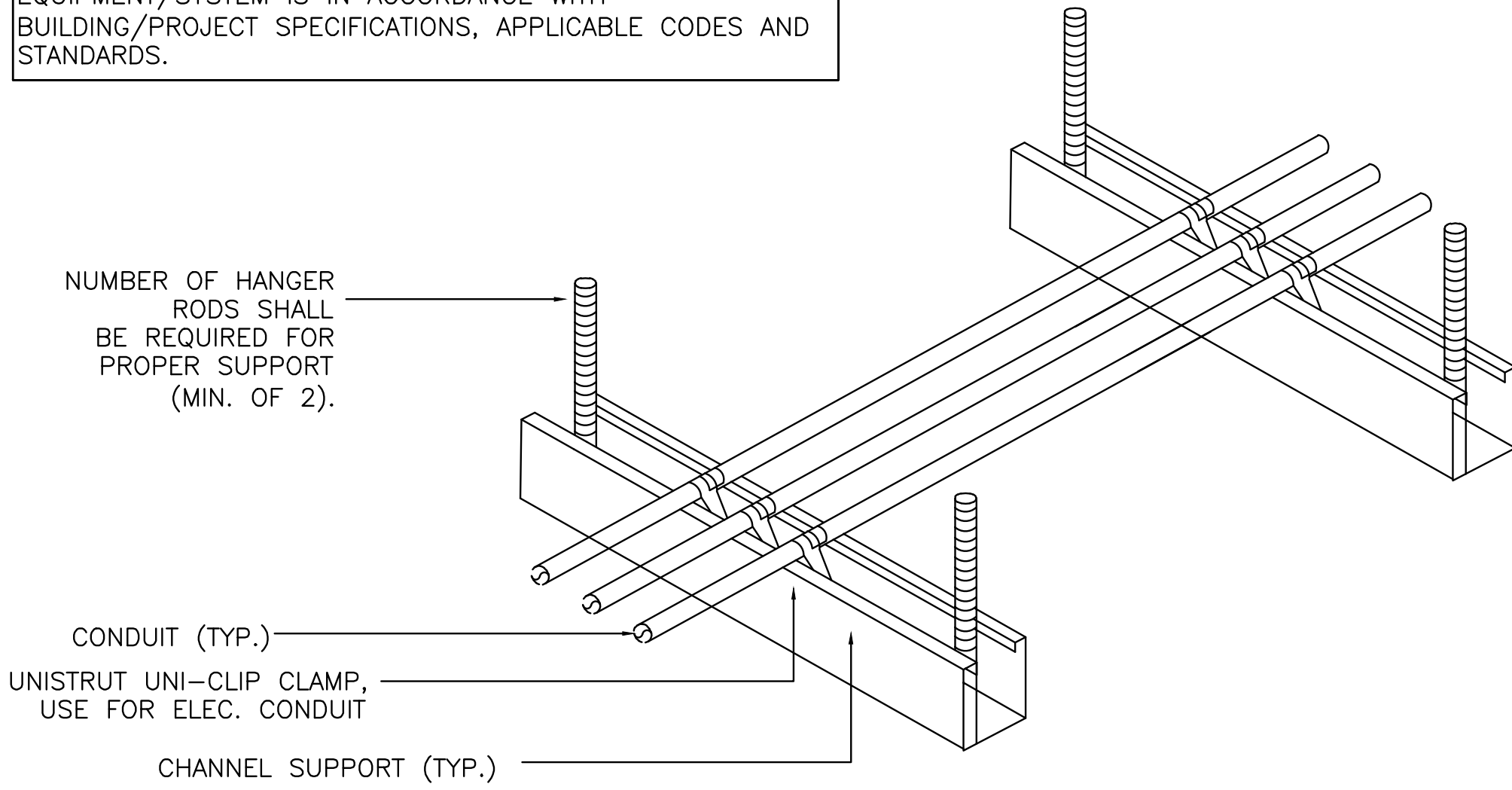
VENTILATION CALCULATION								
ROOM NAME	AREA (SQ.FT)	ACTUAL OCCUPANT	MIN OUTSIDE AIR AS PER IMC-2021/ASHRAE 62.1 ANIMAL		REQ. OUTSIDE AIR AS PER - IMC-2021	PROVIDED OUTSIDE AIR CFM TOTAL	PROVIDED EXHAUST	NOTES
			CFM/ PEOPLE	CFM/ SQ.FT				
100 LOBBY	780	15	5	0.06	122	125	0	1
101 CLIENT RESTROOM	59	0			0	0	70	1
104 COMFORT ROOM	116	3	10	0.12	44	45	0	2
114 STORAGE	66	0		0.12	8	20	0	1
107 HALL	63	0	5	0.06	4	10	0	1
102 EXAM 1	77	2	10	0.12	30	30	0	2
103 EXAM 2	75	2	10	0.12	29	30	0	2
108 EXAM 3	78	2	10	0.12	30	30	0	2
109 EXAM 4	78	2	10	0.12	30	30	0	2
110 BUSINESS OFFICE	69	2	5	0.06	15	15	0	1
111 VET OFFICE	70	2	5	0.06	15	15	0	1
112 TEAM ROOM	92	2	5	0.06	16	20	0	1
115 X-RAY ROOM	75	1	10	0.18	24	30	0	2
116 DENTAL EXAM	160	2	10	0.18	49	50	0	2
119 PREP	80	1	10	0.18	25	30	0	2
120 SURGERY	120	2	10	0.18	42	50	0	2
122 UTILITY ROOM	151	0		0.12	19	25	1	1
127 WARD	59	1	10	0.18	21	175	235	2
128 RUN	13	0	10	0.18	3		40	2
129 RUN	13	0	10	0.18	3		40	2
130 RUN	13	0	10	0.18	3		40	2
131 RUN	13	0	10	0.18	3		40	2
132 RUN	13	0	10	0.18	3		40	2
133 ISO ROOM	73	1	10	0.18	24	75	165	2
105 EXAM 6	82	2	10	0.12	30	30	0	2
108 EXAM 5	108	3	10	0.12	30	30	0	2
117 LAB HALL	0	51	0	5	0.06	4	10	0
113 LAB / RX	118	1	7.5	0.12	22	50	0	3
118 TREATMENT	431	4	10	0.12	92	100	0	2
121 TREATMENT 2	115	2	10	0.12	34	40	0	2
123 RESTROOM	59	0			0	0	70	1
124 RECOVERY	15	0	10	0.18	3	30	0	2
125 HALL	127	0	5	0.06	8	25	0	1
126 MED GAS	14	0		0.12	2		150	4
TOTAL	3511					1140	890	
NOTES REFERENCE								
1. IMC-2021- TABLE 4.3.3.1.1								
2. ASHRAE 62.1 2016								
3. ASHRAE 170-2021								
4. NFPA99-2018 CHAPTER 9-MEDICAL GAS STORAGE (FOR 3 H SIZE CYLINDER)								



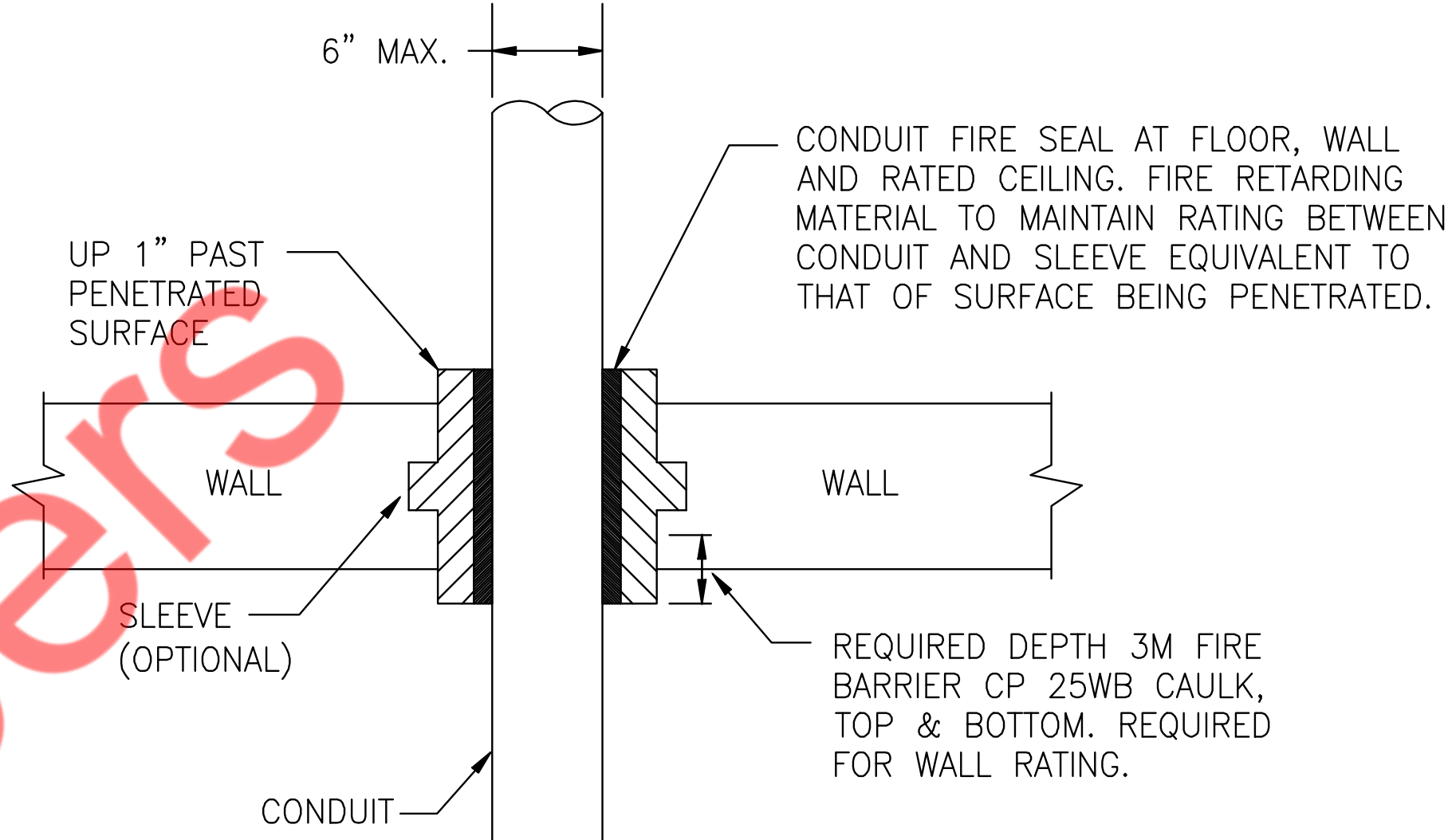


NOTE:  
1. USE THIS DETAILS IF ANY NEW LIGHT FIXTURES ARE PROVIDED.

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



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



PROVIDE FIRE STOPPING THRU ALL RATED (1 HOUR AND ABOVE) WALLS. FIRE STOPPING SHALL BE 3M CP 25WB CAULK OR FIREDAM 150 CAULK OR EQUAL. FIRE STOPPING SHALL BE AS REQUIRED TO MAINTAIN A U.L. SYSTEM 319 CLOSURE.

5 TYPICAL GRID MOUNTED FIXTURE  
E-1.1 N.T.S

3 CONDUIT SUPPORT DETAIL  
E-1.1 N.T.S

2 CONDUIT SLEEVE DETAIL THROUGH FIREWALL  
E-1.1 N.T.S

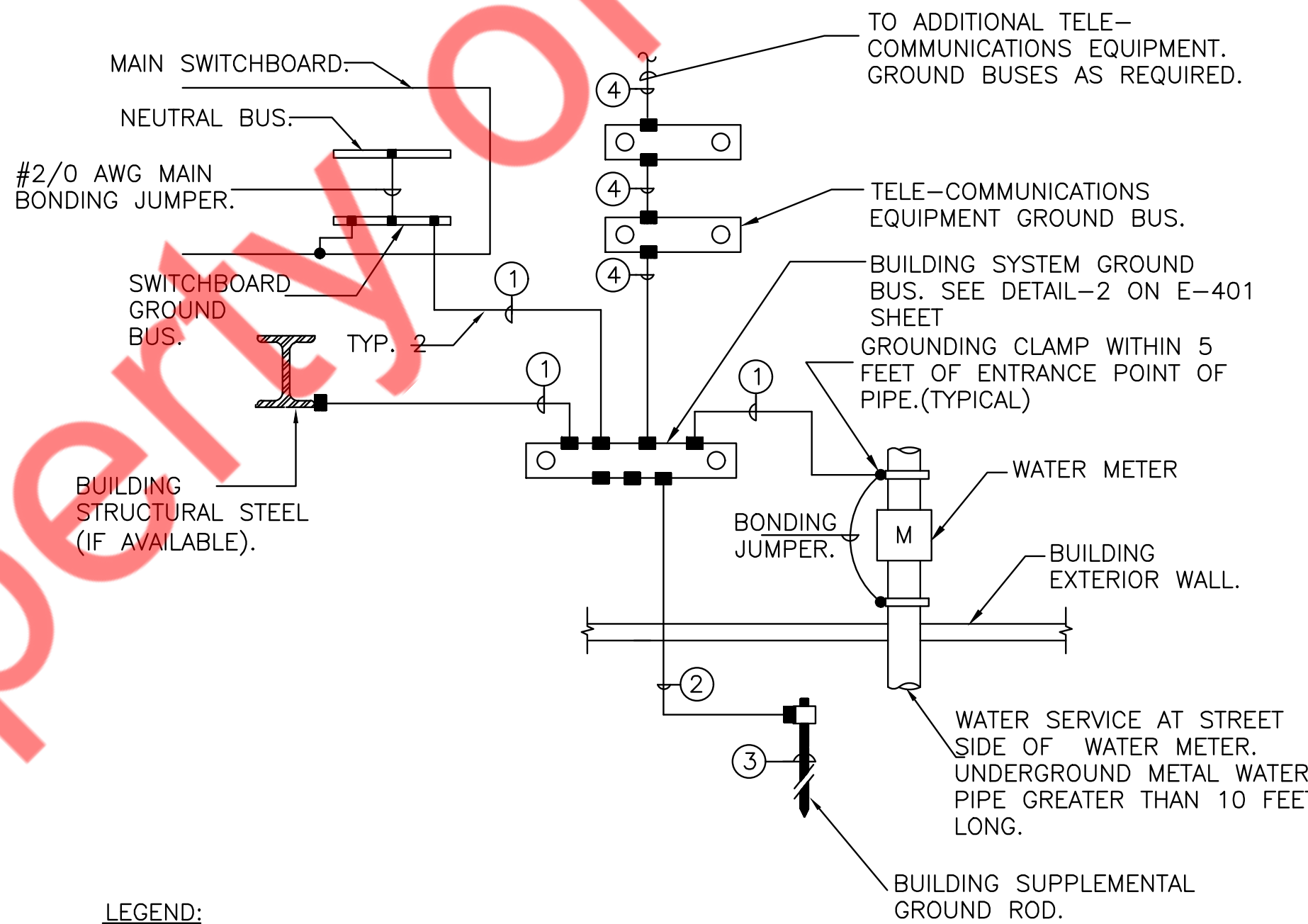
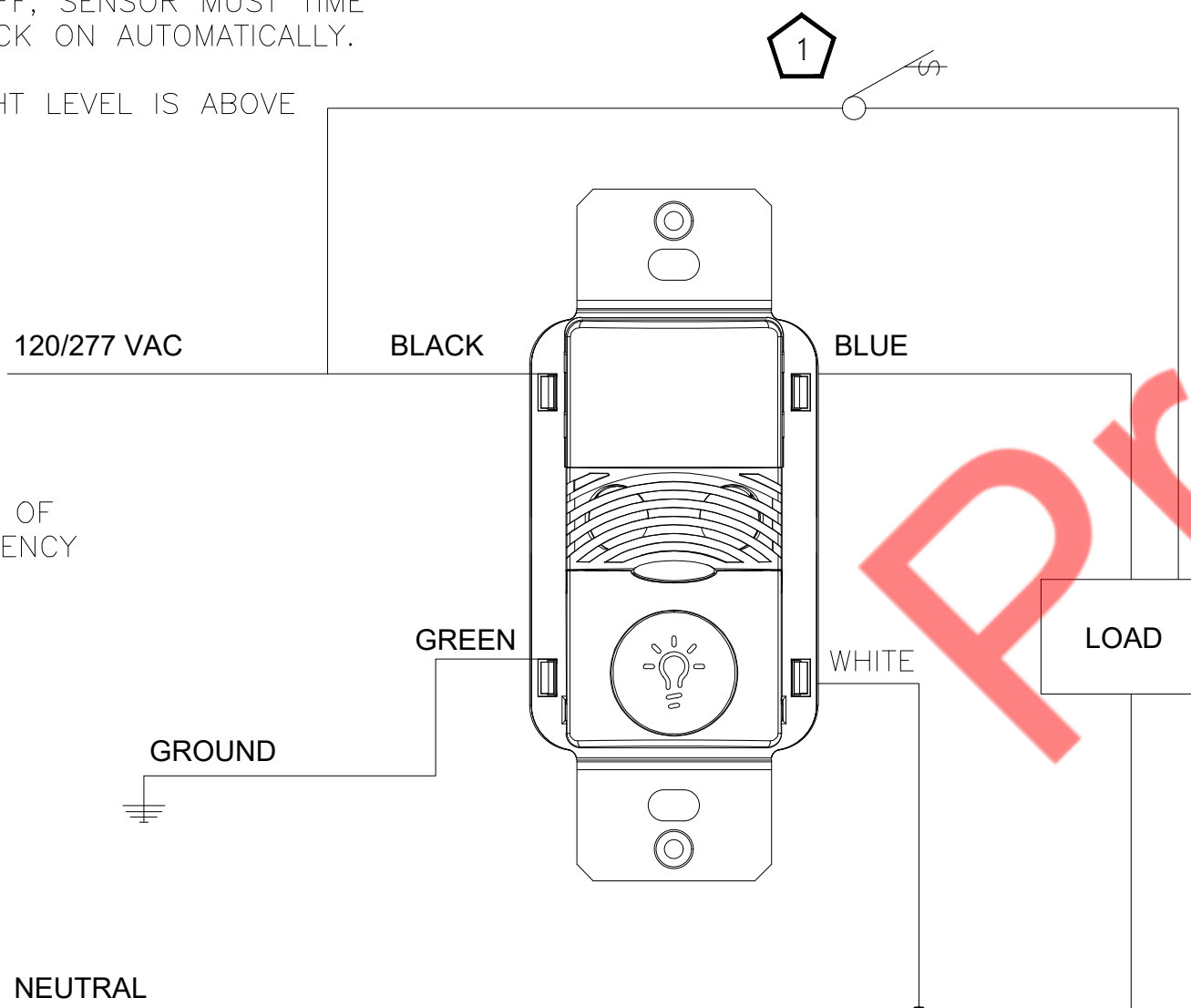
MANUAL MODE OPERATION:

1. PUSHBUTTON PRESS IS REQUIRED TO TURN LOAD ON.
2. LOAD TURNS OFF WHEN SENSOR TIMES OUT OR BY PRESSING PUSH BUTTON.
3. IF DAYLIGHT SENSOR IS ENABLED AND LIGHT LEVEL IS ABOVE SETPOINT, LOAD WILL NOT TURN ON.

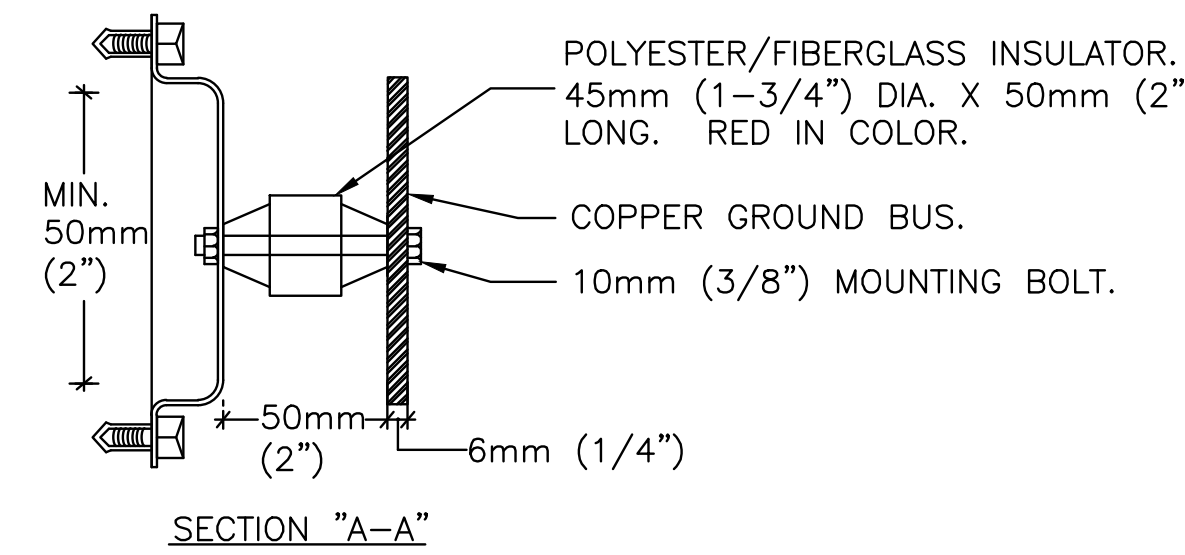
AUTOMATIC MODE OPERATION:

1. WHEN SENSOR ACTIVATES LOAD TURNS ON.
2. PUSHBUTTON CAN BE USED TO TURN LOAD ON OR OFF. IF PUSHBUTTON IS USED TO TURN LOAD OFF, SENSOR MUST TIME OUT FIRST, BEFORE LOAD CAN TURN BACK ON AUTOMATICALLY.
3. IF DAYLIGHT SENSOR IS ENABLED AND LIGHT LEVEL IS ABOVE SETPOINT, LOAD WILL NOT TURN ON.

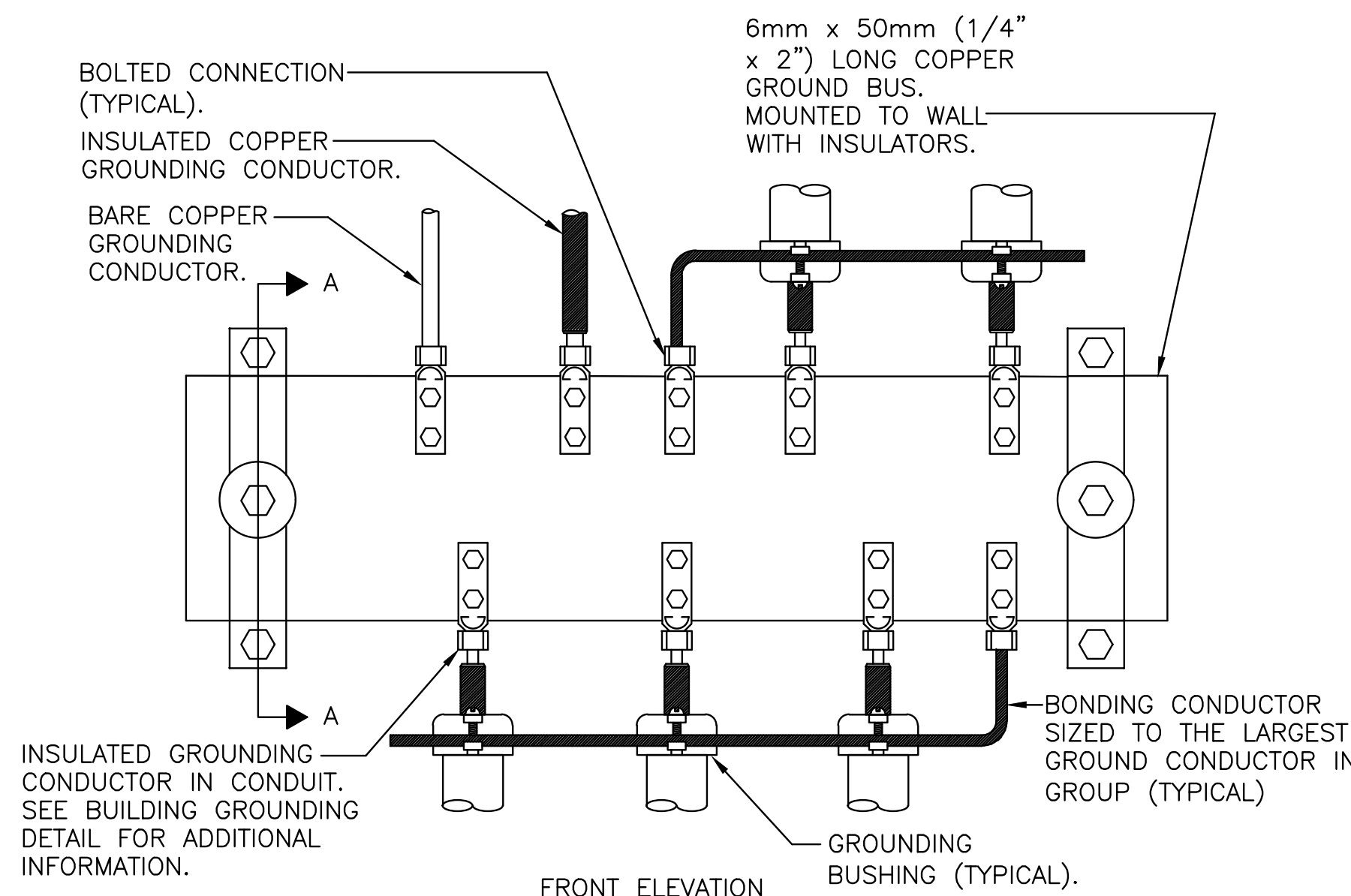
1 PROVIDE SENSING CONDUCTOR TAPPED AHEAD OF ANY SWITCHES WHERE SWITCH SERVES EMERGENCY FIXTURES.



- LEGEND:
- INDICATES BOLTED CONNECTION.
  - INDICATES EXOTHERMIC WELD CONNECTION, COMPATIBLE WITH MATERIALS BEING JOINED.
- 1 #2/0 AWG INSULATED COPPER GROUNDING ELECTRODE CONDUCTOR IN CONDUIT SIZED AS PER NEC ARTICLE 250.66.
  - 2 #2 IN 3/4" C BARE COPPER GROUND CONDUCTOR.
  - 3 3/4" x 10'-0" LONG COPPER-CLAD GROUND ROD DRIVEN WITH TOP 12" BELOW GRADE.
  - 4 #4/0 AWG IN 1" C INSULATED COPPER GROUND CONDUCTOR IN 30mm CONDUIT.



SECTION "A-A"



- NOTES:
1. REFER TO BUILDING GROUNDING ELECTRODE SYSTEM DETAIL FOR EXACT CONFIGURATION.

REVISIONS:

No.	Description	Date
1	PERMIT SET	07.12.2024
2	REVISED PERMIT SET	08.20.2024

PROJECT: 2024 AV2  
DATE: 08.20.2024  
DRAWN BY: NYE  
CHECKED BY: NYE

ELECTRICAL DETAILS

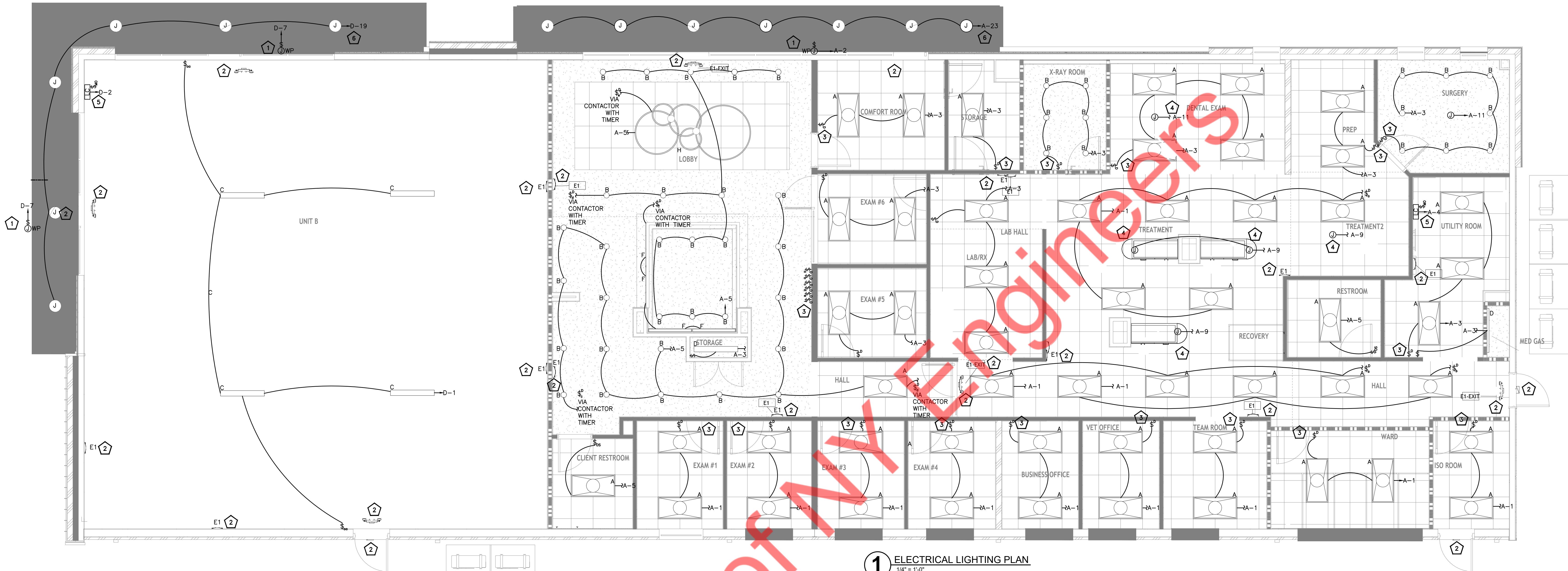
E-1.1

6 CONNECTION) OCCUPANCY/VACANCY-SINGLE LEVEL WIRING DIAGRAM-LOW VOLTAGE WALL SWITCH SENSOR(NEUTRAL)  
E-1.1 N.T.S

4 BUILDING GROUNDING ELECTRODE SYSTEM  
E-1.1 N.T.S

1 BUILDING ELECTRICAL SYSTEMS GROUND BUS  
E-1.1 N.T.S

E  
D  
C  
B  
A



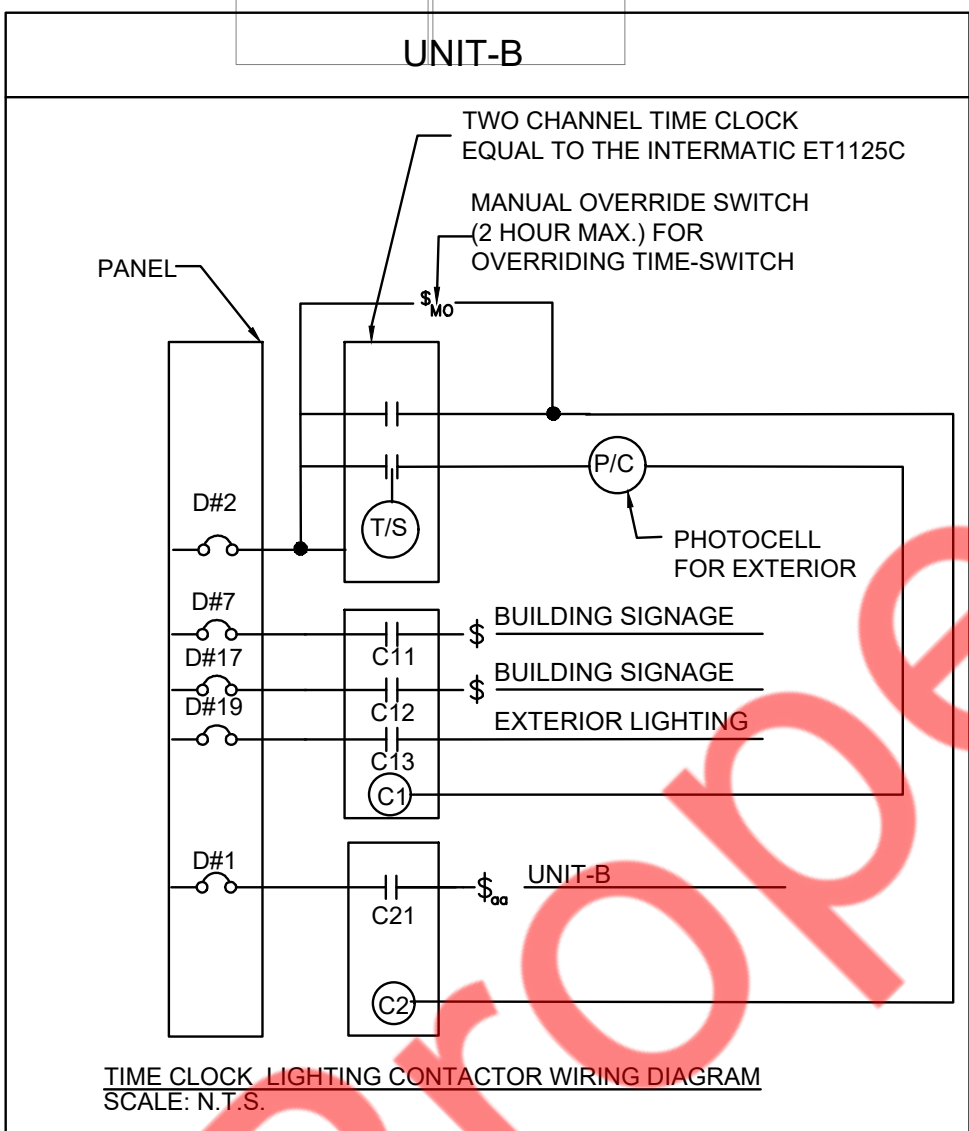
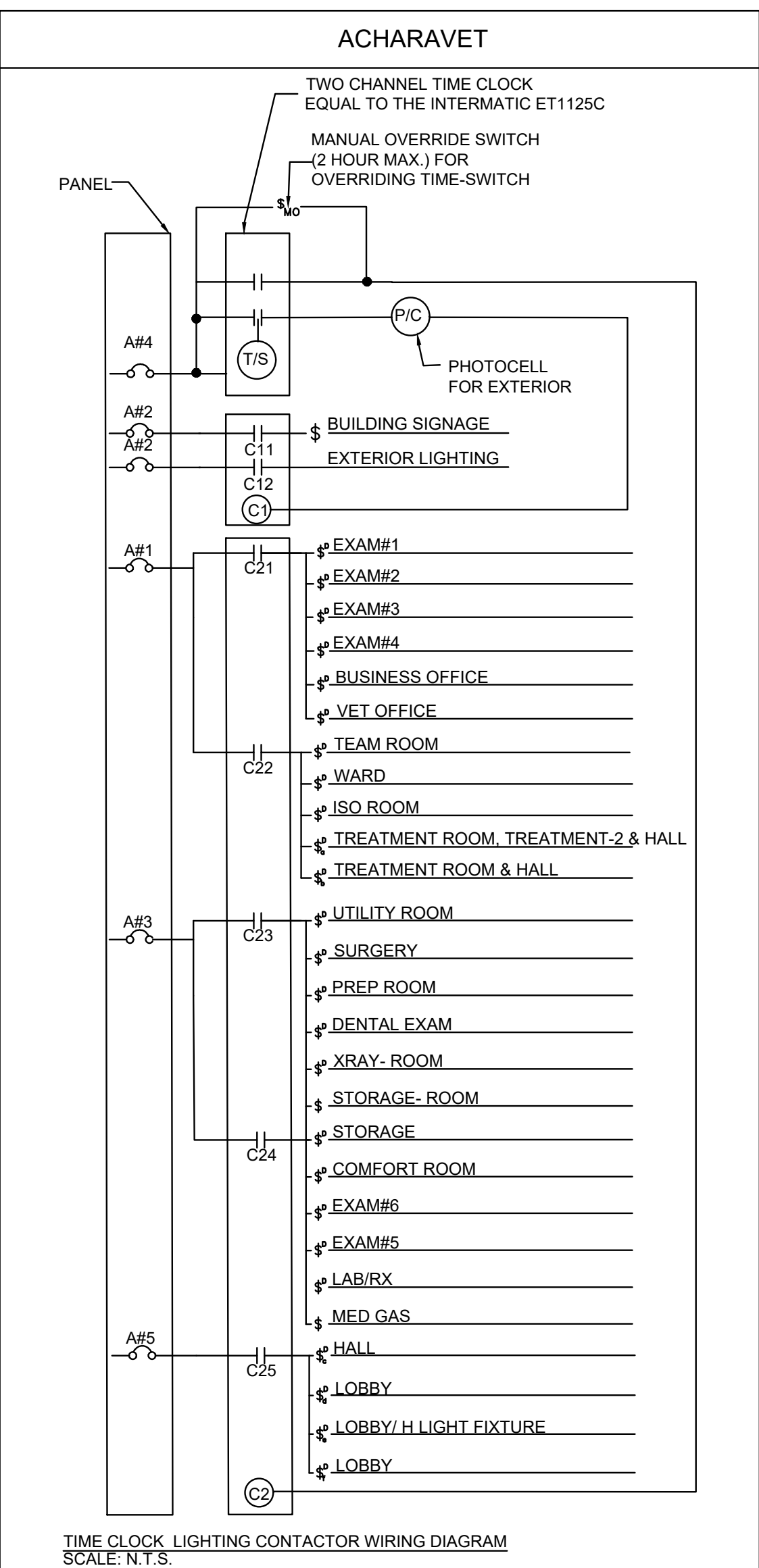
1 ELECTRICAL LIGHTING PLAN  
1/4" = 1'-0"

ELECTRICAL LIGHTING PLAN KEY NOTES

1. PROVIDE WEATHER PROOF JUNCTION BOX AND TOGGLE SWITCH FOR TENANT SIGN AND CIRCUIT VIA LIGHTING CONTACTOR WITH TIMECLOCK/PHOTOCELL. COORDINATE EXACT MOUNTING LOCATION WITH SIGN VENDOR PRIOR TO ROUGH-IN.
2. CONNECT ALL EGRESS LIGHTING FIXTURES TO THE NEAREST LIGHTING BRANCH CIRCUIT AHEAD OF ALL SWITCHING AND CONTROLS PER STATE AND LOCAL CODES.
3. ELECTRICAL CONTRACTOR SHALL COORDINATE THE EXACT LOCATION OF SWITCHES/DIMMER SWITCHES WITH ARCHITECT/OWNER. CONNECT ALL THE SWITCHES/DIMMER SWITCHES TO THE LIGHTING CONTACTOR WITH TIMER.
4. ELECTRICAL CONTRACTOR SHALL PROVIDE CEILING JUNCTION BOX AND MAKE CONNECTION TO SURGICAL/TREATMENT LIGHTS AS PER MANUFACTURER SPECIFICATIONS. BASE BID ACCORDINGLY.
5. ELECTRICAL CONTRACTOR SHALL PROVIDE LIGHTING CONTACTOR(LC). ALL THE LIGHT FIXTURES ARE CONTROLLED VIA LIGHTING CONTACTOR WITH TIMER. COORDINATE EXACT CONTROL REQUIREMENTS WITH LIGHTING VENDOR AND PROVIDE AUTOMATIC LIGHTING CONTROLS AS PER IECC 405.2. BASE BID ACCORDINGLY.
6. EXTERIOR LIGHTING SHALL BE CONTROLLED VIA LIGHTING CONTACTOR WITH TIMECLOCK/PHOTOCELL.

ELECTRICAL LIGHTING PLAN GENERAL NOTES

- A. ELECTRICAL CONTRACTOR SHALL VERIFY THE EXACT LOCATION & QUANTITY OF ALL THE LIGHT FIXTURES IN FIELD AND PROVIDE NEW LIGHTING CONTROLS AS SHOWN. ALSO VERIFY IF THE EXISTING LIGHT FIXTURES ARE IN OPERABLE CONDITION, REPLACE WITH NEW OF SAME TYPE, IF IN OPERABLE. BASE BID ACCORDINGLY.
- B. ELECTRICAL CONTRACTOR SHALL UPDATE THE EMERGENCY LIGHT FIXTURES QUANTITY AND LOCATION AS REQUIRED BY LOCAL AHJ.
- C. DIMMER TYPE, REQUIREMENT AND QUANTITY SHALL BE AS PER THE SITE REQUIREMENT IN COORDINATION WITH THE LIGHTING VENDOR/OWNER.
- D. EXTERIOR SIGNAGES WIRING SHALL BE RE ROUTED AND CONTROLLED VIA LIGHTING CONTACTOR (L.C) WITH TIME CLOCK/PHOTOCELL. CONTRACTOR SHALL PROVIDE LIGHTING CONTACTOR POLES IN COORDINATION WITH LIGHTING VENDOR AND BASE BID ACCORDINGLY.

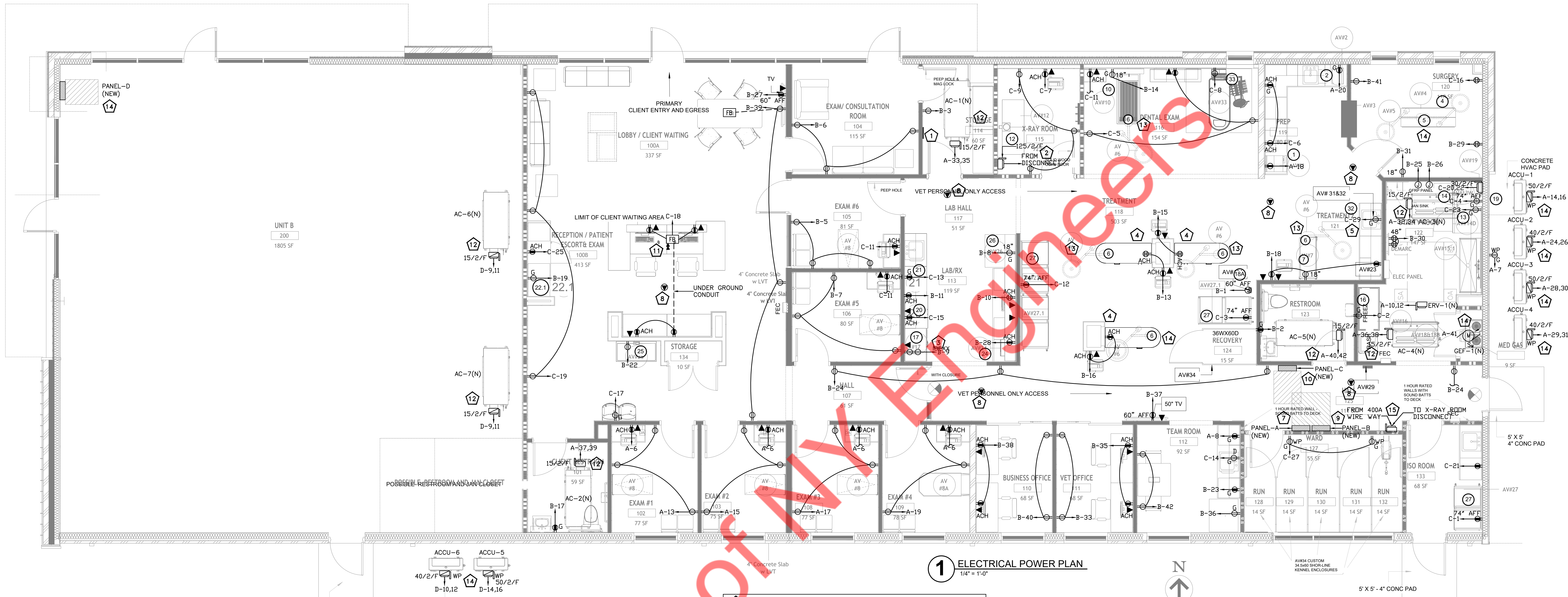


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1	PERMIT SET	07.12.2024
2	REVISED PERMIT SET	08.20.2024

PROJECT: 2024 AV2  
DATE: 08.20.2024  
DRAWN BY: NYE  
CHECKED BY: NYE

ELECTRICAL  
LIGHTING PLAN



1 ELECTRICAL POWER PLAN  
1/4" = 1'-0"

ELECTRICAL POWER PLAN KEY NOTES:

- ELECTRICAL CONTRACTOR SHALL COORDINATE THE MOUNTING HEIGHT OF DATA CABINET AND ITS RECEPTACLE WITH OWNER PRIOR TO ROUGH IN.
- ELECTRICAL CONTRACTOR SHALL COORDINATE FINAL POWER REQUIREMENTS WITH EQUIPMENT MANUFACTURER AND OWNER FOR X-RAY MACHINE.
- ELECTRICAL CONTRACTOR SHALL COORDINATE FINAL HEIGHTS WITH OWNER FOR POWER AND DATA OUTLETS FOR SELF MOUNTED LAB EQUIPMENT.
- ELECTRICAL CONTRACTOR SHALL PROVIDE (1) 3/4" CONDUIT FOR POWER AND (1) CONDUIT FOR DATA. PROVIDE PULL-STRINGS IN EMPTY DATA CONDUIT. CONNECT THE REQUIRED WIRING TO THE FURNITURE IN COORDINATION WITH EQUIPMENT MANUFACTURER.
- ELECTRICAL CONTRACTOR SHALL COORDINATE WITH EQUIPMENT MANUFACTURER FOR FAUCET SENSOR POWER & LOCATION.
- ELECTRICAL SUPPLY PROVISION FOR THE IGNITION OF WATER HEATER (HWHT-1) & RECIRCULATION PUMP (HWCP-1) E.C. SHALL COORDINATE EXACT POWER REQUIREMENTS WITH PLUMBING CONTRACTOR/MANUFACTURER SPECIFICATION. BASE BID ACCORDINGLY.
- NEW 200 (MCB), 208Y/120V, 3-PHASE, 4-WIRE ELECTRICAL PANEL "A". E.C. SHALL COORDINATE THE LOCATION WITH ARCHITECT/OWNER. BASE BID ACCORDINGLY.
- ELECTRICAL CONTRACTOR SHALL COORDINATE WITH ELV CONTRACTOR AND PROVIDE DATA AS REQUIRED FOR COMPLETE OPERATION OF ELV EQUIPMENT. BASE BID ACCORDINGLY. TYPICAL FOR ALL DATA POINTS.
- NEW 200 (MCB), 208Y/120V, 3-PHASE, 4-WIRE ELECTRICAL PANEL "B". E.C. SHALL COORDINATE THE LOCATION WITH ARCHITECT/OWNER. BASE BID ACCORDINGLY.
- NEW 60A (MCB), 208Y/120V, 3-PHASE, 4-WIRE ELECTRICAL PANEL "C". E.C. SHALL COORDINATE EXACT LOCATION WITH ARCHITECT/OWNER.
- ELECTRICAL CONTRACTOR SHALL PROVIDE TWO DUPLEX RECEPTACLES, TWO DATA AND TWO TELEPHONE AND ROUTE THE REQUIRED CONDUITS FROM THE NEAREST WALL AS PER SITE CONDITION.
- E.C. TO COORDINATE THE EXACT LOCATION AND ELECTRICAL REQUIREMENT OF MECHANICAL EQUIPMENTS WITH MECHANICAL CONTRACTOR. PROVIDE THE ELECTRICAL CONNECTION AS PER FINAL SELECTION OF MECHANICAL EQUIPMENTS IN FIELD. INFORM ENGINEERS FOR ANY DISCREPANCY FOUND BEFORE COMMENCING ANY WORK.
- ELECTRICAL CONTRACTOR SHALL REFER TO LIGHTING E-2.1 SHEET FOR MORE INFORMATION.
- NEW 200 (MCB), 208Y/120V, 3-PHASE, 4-WIRE ELECTRICAL PANEL "D". E.C. SHALL COORDINATE THE LOCATION WITH ARCHITECT/OWNER. BASE BID ACCORDINGLY.
- ELECTRICAL CONTRACTOR SHALL COORDINATE FINAL POWER REQUIREMENTS WITH EQUIPMENT MANUFACTURER AND OWNER FOR X-RAY MACHINE AND PROVIDE A FUSIBLE DISCONNECT NEAR WIRE WAY TO COMPLY WITH NEC AS PER FEEDER TAP CONDUCTOR.

ELECTRICAL POWER PLAN GENERAL NOTES:

- E.C. SHALL COORDINATE WITH OTHER TRADE CONTRACTORS FOR EXACT LOCATION AND POWER REQUIREMENT OF THE EQUIPMENT FROM OTHER TRADES. PROVIDE WIRING AND CONTROLS AS REQUIRED. BASE BID ACCORDINGLY.
- THE CLEAR WORKING SPACE SHALL BE PROVIDED FOR THE METERS, DISCONNECTS, PANEL BOARDS, AND OTHER ELECTRICAL EQUIPMENT AS PER SECTION 110.26 OF NEC.
- E.C. SHALL FOLLOW GROUNDING/BONDING AS PER NEC ARTICLE 250.
- ALL THE RECEPTACLES SHALL BE RATED PER CIRCUIT. E.C. SHALL VERIFY AND MAKE FINAL CONNECTIONS ACCORDINGLY.
- ELECTRICAL CONTRACTOR SHALL PROVIDE TYPED PANEL DIRECTORY FOR ALL THE ELECTRICAL PANELS AS PER NEC 408.4(A).
- CALL TELECOM/DATA LINES MUST BE IN CONDUIT TO DEMARC. NO FREE WIRE RUNS IS ALLOWED.
- VERIFY ELECTRICAL REQUIREMENTS OF X-RAY WITH EQUIPMENT CONSULTANT PRIOR TO ROUGH-IN.
- REFER CEILING LIGHT (EQUIPMENT #5 & #6) POWER REQUIREMENTS IN LIGHTING PLAN E-2.1.

EQUIPMENT SCHEDULE

Item	Manufacturer/Model #	MEP REQUIREMENT
1 Autoclave	Midmark M11-043	POWER OUTLET
2 Ultrasonic Cleaner	Midmark QC1-01	GFCI POWER OUTLET
4 Surgery Table-Electric	Midmark/100-3071-01	POWER OUTLET
5 Lights- M1750 LED double-ceiling mounted (surgery)	Medical Illumination/61425	100-240 VAC, 3.0A, 50/60 Hz, 65W JUNCTION BOX.
6 Lights- M1550 LED- Single head-ceiling mount (treatment and dental areas)	Medical Illumination/M1550	100-240 VAC, 1.5A, 50/60 Hz, 65W, 4-0 JUNCTION BOX.
7 Olympic Treatment Scissor Lift Gurney	Olympic Vet /50702	POWER OUTLET
10 Olympic Hi-Lo Wet Table	Olympic Vet 51001	GFCI POWER OUTLET
12 X-Ray Table	Summit HF30 model L843-00	DISCONNECTOR 125A.
13 Washer	TBD	GFCI POWER OUTLET
14 Dryer	TBD	DISCONNECTOR 30A
16 Chest Freezer	Whirlpool/WZC5216LW or similar	GFCI POWER OUTLET
17 IDEXX Equipment		IF ALL EQUIPMENT IS IN CABINET: POWER IN BACK OF EACH SHELF (2 TOTAL) AND 1 DATA. NEED ROOM AT BACK OF SLIDING SHELF FOR CORDS/CABLES. IF VETLAB STATION IS ON COUNTER- NEED POWER AT BACK OF EACH SHELF AND 1 POWER +1 DATA ON COUNTER. NEED GROMMET TO CONNECT FROM COUNTER TO LAB CABINET.
17 IDEXX VetLab Station		POWER OUTLET
17a IDEXX Capture Workstation Specs 2023		
17i IDEXX printer		
17h IDEXX tube rocker		
17c IDEXX Catalyst One		
17d IDEXX Procyte One		
17e IDEXX SediVue DX		
17f IDEXX UA Analyzer		
17g IDEXX Snap Pro		
18A O2 Alarm	BelMed	DEDICATED OUTLET
19 Central scavenger unit	Midmark 40162800	GFCI POWER OUTLET
20 Centrifuge-Jorvet E8 Combo Touch	JorVet J0501UMTC	POWER OUTLET
21 Microscope	VetOne Platinum G504	POWER OUTLET
22.1 Mini-Fridge	Insignia NS-BC1155S9	POWER OUTLET
24 Vaccine Fridge	Nobivac	POWER OUTLET
25 Platform Floor Scale	Midmark 110-3110-00	POWER OUTLET
26 Refrigerator	TBD	POWER OUTLET
27 Cages- double stack	Midmark	POWER OUTLET
32 Surgery Gooseneck Sensor Mixing Faucet	TS Brass 5EF-1D-DG-TMV	POWER OUTLET
33 DF Dental Table	Hanil Dolce Surgery HL-67000	DEDICATED OUTLET

REVISIONS:

No.	Description	Date
1	PERMIT SET	07.12.2024
2	REVISED PERMIT SET	08.20.2024

PROJECT: 2024 AV2  
DATE: 08.20.2024  
DRAWN BY: NYE  
CHECKED BY: NYE

ELECTRICAL POWER PLAN

E

D

C

B

A

PLUMBING LEGEND	
SYMBOL	DESCRIPTION
	SANITARY WASTE (ABOVE FLOOR)
	SANITARY SEWER (UNDER FLOOR)
	VENT PIPING
	GAS PIPING
	EXISTING GAS PIPING
	COLD WATER
	HOT WATER
	HOT WATER RETURN
	SCAVENGER PIPING
	OXYGEN PIPE
	P-TRAP
	PIPE DROP
	PIPE UP
	BALANCING VALVE
	CHECK VALVE
	WATER HAMMER ARRESTOR
	SHUT-OFF VALVE
	GAS PLUG VALVE
	GAS PRESSURE REGULATOR
	POINT OF NEW CONNECTION

PLUMBING ABBREVIATIONS

CO	CLEANOUT
COOP	CLEAN OUT DECK PLATE
CW	COLD WATER
HW	HOT WATER
HWR	HOT WATER RETURN
SAN	SANITARY
S	SOIL
ST	STORM
V	VENT
W	WASTE
LAV	LAVATORY
WC	WATER CLOSET
TYP.	TYPICAL
DN	DOWN
EXIST.	EXISTING
G	GAS
O2	OXYGEN
SC	SCAVENGER
FD	FLOOR DRAIN
SQ. FT.	SQUARE FEET
BFP	BACK FLOW PREVENTER
WM	WASHING MACHINE
HWHT	HOT WATER HEATER
MG	MEDICAL GAS
DISS	DIAMETER INDEX SAFETY SYSTEM
DF	DRINKING FOUNTAIN

PLUMBING DRAWING LIST	
P-0.1	PLUMBING SYMBOLS, ABBREVIATIONS, NOTES & SPECIFICATIONS
P-1.1	PLUMBING SANITARY AND STORM PLAN
P-1.2	PLUMBING WATER SUPPLY AND VENT PIPING PLAN
P-1.3	NATURAL GAS AND MEDICAL GAS PLAN
P-1.4	ROOF NATURAL GAS AND STORM PLAN
P-5.1	PLUMBING DETAILS
P-6.1	PLUMBING SCHEDULES
P-6.2	PLUMBING WATER SUPPLY, SANITARY AND STORM WATER RISER DIAGRAM
P-6.3	NATURAL GAS AND MEDICAL GAS RISERS DIAGRAM

PLUMBING NOTES	
1.	ALL PLUMBING SYSTEMS (SANITARY, STORM, WASTE, VENT, WATER, GAS, MEDICAL GAS) AND ASSOCIATED EQUIPMENT SHALL BE INSTALLED, OPERATED AND MAINTAINED IN ACCORDANCE WITH THE REQUIREMENTS OF 2021 SOUTH CAROLINA BUILDING CODE (BC 2021 AMENDED), 2021 SOUTH CAROLINA PLUMBING CODE (PC 2021 AMENDED), 2021 SOUTH CAROLINA FUEL GAS CODE (IFGC 2021 AMENDED), 2009 INTERNATIONAL ENERGY CONSERVATION CODE (IECC) & NFPA 99.
2.	PIPING MATERIAL OF UNDERGROUND SANITARY DRAINAGE AND VENT SHALL BE IN ACCORDANCE WITH THE REQUIREMENTS OF SECTION 1 PC 702.2
3.	PROTECTION OF PIPING AND PLUMBING SYSTEM COMPONENTS AS PER SECTION PC 608.
4.	MATERIALS USED IN PLUMBING SYSTEMS SHALL BE IN ACCORDANCE WITH THE REQUIREMENTS OF SECTION PC 302, PC 303, PC 605, PC 702, PC 902 & PC 1102.
5.	FIXTURES AND EQUIPMENT INSTALLATION, CONNECTIONS AND JOINING OF PIPING SHALL BE IN ACCORDANCE WITH THE REQUIREMENTS OF CHAPTER 4, 5, 6, 7, 8, 9, 10 & 11 OF PLUMBING CODE.
6.	DEEP SEAL TRAPS FOR FLOOR DRAINS SHALL BE PROVIDED AS PER SECTION PC 1002.
7.	DRAINAGE PIPE CLEANOUTS AS PER PC 708.
8.	VERTICAL AND HORIZONTAL PIPING SHALL BE SUPPORTED IN ACCORDANCE WITH THE REQUIREMENTS OF PC 308 & PC TABLE 308.5
9.	WATER SUPPLY SYSTEMS SHALL BE INSTALLED AND MAINTAINED IN ACCORDANCE WITH THE CHAPTER 6 SOUTH CAROLINA PLUMBING CODE.
10.	THE SANITARY DRAINAGE SYSTEM SHALL BE SIZED AND INSTALLED IN ACCORDANCE WITH THE CHAPTER 7 SOUTH CAROLINA PLUMBING CODE.
11.	VENT PIPING FOR THE SANITARY DRAINAGE SYSTEM SHALL BE INSTALLED IN ACCORDANCE WITH THE REQUIREMENTS OF CHAPTER 9 SOUTH CAROLINA PLUMBING CODE.
12.	INSPECTION AND TESTING OF PLUMBING SYSTEMS SHALL BE IN ACCORDANCE WITH SECTION 312 PLUMBING CODE.
13.	GAS PIPING INSTALLATION SHALL BE IN ACCORDANCE WITH CHAPTER 4 SOUTH CAROLINA FUEL GAS CODE.
14.	NONFLAMMABLE MEDICAL GAS PIPING DESIGN, INSTALLATION & TESTING SHALL BE IN ACCORDANCE WITH NFPA 99 & THE REQUIREMENTS WITH CHAPTER-12 SOUTH CAROLINA PLUMBING CODE

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

1.04	DEFINITIONS
A.	FURNISH: TO PURCHASE, PROCURE, ACQUIRE AND DELIVER, COMPLETE WITH RELATED ACCESSORIES.
B.	INSTALL: TO ERECT, MOUNT AND CONNECT, COMPLETE WITH RELATED ACCESSORIES.
C.	PROVIDE: TO FURNISH AND INSTALL.
D.	PLUMBING CONTRACTOR, THE CONTRACTOR, THIS CONTRACTOR: THE CONTRACTOR FOR PLUMBING WORK WHICH IS SPECIFIED HEREIN AND SHOWN ON THESE DRAWINGS.
E.	REFER TO THE 2021 SOUTH CAROLINA PLUMBING CODE FOR ADDITIONAL DEFINITIONS.
1.04	DRAWINGS
A.	THE DRAWINGS ARE DIAGRAMMATIC AND ARE INTENDED TO ILLUSTRATE THE GENERAL ARRANGEMENT AND ROUTING OF PIPING AND GENERAL LOCATIONS OF EQUIPMENT. PRECISE LOCATIONS OF EQUIPMENT, RISERS AND STACKS, AND ROUTING AND ELEVATION OF ALL PIPING SYSTEMS SHALL BE COORDINATED IN THE FIELD WITH THE ARCHITECT, ARCHITECTURAL DRAWINGS, THE WORK OF OTHER TRADES, EXISTING AND NEW BUILDING CONDITIONS AND/OR THE PREFERENCES OF THE OWNER/TENANT AS CONSTRUCTION PROCEEDS. ALL PIPING SHALL BE INSTALLED CONCEALED IN FINISHED SPACES, UNLESS NOTED OTHERWISE.
B.	PROVIDE ALL NECESSARY INCIDENTAL MATERIALS AND ACCESSORIES REQUIRED TO MAKE THE WORK COMPLETE IN ALL RESPECTS, EVEN IF NOT PARTICULARLY SHOWN OR SPECIFIED.
C.	REFER TO PLUMBING EQUIPMENT/FIXTURE SCHEDULE ON THE DRAWINGS FOR ALL FIXTURE AND EQUIPMENT SPECIFICATIONS.
D.	REFER TO FIXTURE CONNECTION SIZE SCHEDULE FOR ALL FIXTURE ROUGHING SIZE REQUIREMENTS.
E.	VERIFY ALL INDICATED CONDITIONS BEFORE STARTING WORK AND REPORT ANY DISCREPANCIES. THE DRAWINGS REFLECT CONDITIONS WHICH CAN BE REASONABLY IMPROVED FROM THE EXISTING CONDITIONS OR FROM DRAWINGS AND INFORMATION FURNISHED BY THE OWNER.
F.	LOCATE ALL FIXTURES AND EQUIPMENT AS PER THE FINAL ARCHITECTURAL DRAWINGS.
1.05	PRODUCTS
A.	SANITARY, STORM AND VENT PIPING:
1.	ABOVE GRADE/ UNDERGROUND PIPING SHALL BE CAST IRON PIPE WHICH SHOULD COMPLY WITH ASTM A74 STANDARD/CISPI 301.
2.	SLOPE OF DRAINAGE SYSTEM SHALL BE 1/8" PER FOOT OF RUN FOR PIPE OVER 3" (I.D.) AND 1/4" PER FOOT OF RUN FOR PIPE 3" AND SMALLER (I.D.).
3.	PVC OR OTHER COMBUSTIBLE PLASTIC PIPING SHALL NOT BE INSTALLED IN CEILING PLENUM SPACES.
4.	ALL CAST IRON SOIL PIPE AND FITTINGS SHALL BE MARKED WITH THE COLLECTIVE TRADEMARK OF THE CAST IRON SOIL PIPE INSTITUTE (CISPI) AND BE LISTED BY NSF INTERNATIONAL.
B.	DOMESTIC WATER PIPING:
1.	ABOVE GRADE WATER PIPING SHALL BE CROSS-LINKED POLYETHYLENE (PEX) PLASTIC TUBE OR TYPE "L" HARD-DRAWN COPPER TUBE.
2.	FITTINGS IN DOMESTIC WATER PIPING SHALL BE FITTING FOR CROSS-LINKED POLYETHYLENE (PEX) PLASTIC TUBING, COPPER OR COPPER ALLOY AS PER APPROVED STANDARDS.
3.	JOINTS SHALL BE MECHANICAL OR PUSH FIT JOINT FOR CROSS-LINKED POLYETHYLENE (PEX) PLASTIC TUBING AND MADE WITH LEAD-FREE SOLDER FOR COPPER TUBE.
4.	THE ENTIRE DOMESTIC WATER DISTRIBUTION SYSTEM SHALL BE INSULATED INCLUDING ALL VALVES, FITTINGS, ETC.
5.	COMPLY WITH NSF 61 FOR MATERIALS FOR WATER-SERVICE PIPING AND SPECIALTIES FOR DOMESTIC WATER.
6.	AS PER IECC 2009 EDITION, SECTION 504.2, WATER HEATING EQUIPMENT AND HOT WATER STORAGE TANKS SHALL MEET THE REQUIREMENTS OF TABLE 504.2. THE EFFICIENCY SHALL BE VERIFIED THROUGH DATA FURNISHED BY THE MANUFACTURER OR THROUGH CERTIFICATION UNDER AN APPROVED CERTIFICATION PROGRAM.
7.	AS PER IECC 2009 EDITION, SECTION 503.2.8, ALL PIPING SERVING AS PART OF A HEATING SYSTEM SHALL BE THERMALLY INSULATED IN ACCORDANCE WITH TABLE 503.2.8

MINIMUM PIPE INSULATION (THICKNESS IN INCHES)	NOMINAL PIPE DIAMETER
FLUID	≤1.5"
HOT WATER	1-1/2"
WATER	2"

1.	AS PER IECC 2009 EDITION, SECTION 504.6, AUTOMATIC-CIRCULATING HOT WATER SYSTEM PUMPS OR HEAT TRACE SHALL BE ARRANGED TO BE CONVENIENTLY TURNED OFF AUTOMATICALLY OR MANUALLY WHEN THE HOT WATER SYSTEM IS NOT IN OPERATION.
2.	THE CONTROL SHALL START THE PUMP UPON RECEIVING A SIGNAL FROM THE ACTION OF A USER OF A FIXTURE OR APPLIANCE, SENSING THE PRESENCE OF A USER OF A FIXTURE OR SENSING THE FLOW OF HOT OR TEMPERED WATER TO A FIXTURE FITTINGS OR APPLIANCE.
3.	THE CONTROL SHALL LIMIT THE TEMPERATURE OF THE WATER ENTERING THE COLD-WATER PIPING TO 104°F(40°C).
C.	DOMESTIC WATER HEATER (GAS FIRED)
1.	TANK-LESS WITH INTEGRAL RE-CIRCULATION PUMP TYPE WATER HEATER SHALL HAVE 150 PSI WORKING PRESSURE AND BE EQUIPPED WITH GLASS LINING PERMANENTLY BONDED TO TUBE INTERIOR SURFACE.
2.	BURNER SHALL BE ALUMINIZED STEEL OR CAST IRON, ADJUSTABLE, OR SELF-ADJUSTING AIR-GAS MIXTURE CONTROL.
3.	INSTALL THE WORK OF THIS SECTION IN ACCORDANCE WITH NFPA 54, NFPA 211, AND THE MANUFACTURER'S PRINTED INSTALLATION INSTRUCTIONS, UNLESS OTHERWISE SPECIFIED.
4.	THE OUTER JACKET SHALL BE STEEL WITH BAKED ENAMEL/ACRYLIC FINISH AND SHALL BE PROVIDED WITH ACCESS DOOR FOR SERVICING CONTROLS AND BURNER.
5.	THE DRAIN VALVE SHALL BE LOCATED IN THE FRONT FOR EASE OF SERVICING
D.	GAS PIPING
1	PROVIDE A COMPLETE GAS PIPING SYSTEM TO SERVE GAS FIRED EQUIPMENT AND EQUIPMENT FURNISHED BY OTHERS, AS NOTED ON DRAWINGS AS PER 2021 INTERNATIONAL FUEL GAS CODE.
2	NATURAL GAS PIPING SHALL BE AS FOLLOWS:  ASTM A-53 SCHEDULE 40 STEEL PIPE PAINTED WITH YELLOW ANTI-CORROSIVE PAINT, SREWED OR WELDED IN ACCORDANCE WITH CODE REQUIREMENT (FITTINGS) FOR LINES LARGER THAN 2" SHALL BE WELDED STEEL FITTINGS FOR LINES 2" AND SMALLER, EXCEPT WHEN LOCATED IN AIR PLENUMS, SHALL BE SREWED STANDARD WEIGHT BLACK MALLEABLE.
3	PROVIDE ALL UNIONS, SHUT-OFF VALVES AND DIRT LEGS REQUIRED BY NFPA-54 AND GOVERNING LOCAL CODES AND AT EACH GAS APPLIANCE CONNECTION.
4	PROVIDE ALL TESTS, METERS, INSPECTIONS, HANGERS AND EQUIPMENT CONNECTIONS REQUIRED FOR A COMPLETE OPERATING SYSTEM.
5	PAINT ALL GAS PIPING EXPOSED TO WEATHER WITH ONE COAT OF PRIMER, AND TWO COATS OF RUST-PROOF PAINT. COLOR OF PIPE ON ROOF SHALL BE YELLOW. COORDINATE COLOR OF PIPE ON EXTERIOR OF BUILDING WITH GC TO MATCH BUILDING COLORS.
6	GAS COCKS 1-1/2" AND SMALLER SHALL BE ALL BRONZE, SREWED, FLAT HEAD, BRASS PLUG AND WASHER 200 LB NOG PROVIDE LINE SIZE 6" LONG DIRT LEG DOWN STREAM OF GAS COCK AT ALL EQUIPMENT CONNECTIONS.

7	NO VALVES ARE TO BE LOCATED IN AIR PLENUMS.
8	PROVIDE GAS PIPE SUPPORTS IN ACCORDANCE WITH 2021 IFGC CODE REQUIREMENTS.
E.	MIXING VALVES
1.	VALVE BODY SHALL BE MADE OF CAST BRASS. THE INTERNAL COMPONENTS SHALL BE MADE OF BRASS OR STAINLESS STEEL.
2.	TYPES A, C & D VALVES: VALVE SHUTS OFF IN FULL COLD POSITION AND MUST PASS THROUGH COLD RANGE BEFORE DELIVERING WARM AND/OR HOT WATER. TEMPERATURE LIMIT SET AT 105°F MAXIMUM DELIVERY TEMPERATURE. IF ONE SUPPLY SHUT DOWN, THE OTHER WILL AUTOMATICALLY AND INSTANTLY SHUT DOWN. DELIVERY CAPACITY IS 5 GPM @ 45 PSIG DIFFERENTIAL.
3.	TYPES OF VALVES: TYPE A- THERMOSTATICALLY OPERATED BY MEANS OF BI-METALLIC STRIP, OR EXPANSION BELLOWS; TYPE B- SINGLE HANDLE MECHANICAL MIXER, OR INDIVIDUAL HOT AND COLD CONTROL VALVES; TYPE C- PRESSURE BALANCING SHOWER VALVE/PISTON OPERATED MIXING VALVE; TYPE D- BALANCED PRESSURE OPERATION, WITH INTEGRAL DIAL THERMOMETER INDICATING DELIVERED WATER TEMPERATURE.
4.	EACH ELEMENT SHALL BE CONTROLLED BY AN INDIVIDUALLY MOUNTED THERMOSTAT AND HIGH TEMPERATURE CUT-OFF SWITCH. ALL INTERNAL CIRCUITS SHALL BE FUSED. THE OUTER JACKET SHALL BE OF BAKED ENAMEL FINISH AND SHALL BE PROVIDED WITH FULL SIZE CONTROL COMPARTMENT FOR PERFORMANCE OF SERVICE AND MAINTENANCE THROUGH HINGED FRONT PANEL AND SHALL ENCLOSE THE TANK WITH FOAM INSULATION. ELECTRICAL JUNCTION BOX WITH HEAVY DUTY TERMINAL BLOCK SHALL BE PROVIDED. THE DRAIN VALVE SHALL BE LOCATED IN THE FRONT FOR EASE OF SERVICING.
F.	HANGERS AND SUPPORTS:
1.	HANGERS SHALL BE STANDARD STEEL, MALLEABLE OR WROUGHT IRON, AS MANUFACTURED BY GRINNELL OR APPROVED EQUAL, SUITABLE FOR THE TYPE OF CONSTRUCTION. PIPING SHALL NOT BE HUNG FROM OTHER PIPE.
2.	SECTIONS OF INDIVIDUAL PIPE RUNS SHALL BE SUPPORTED BY CLEVIS HANGERS.
3.	ALL EQUIPMENT SHALL BE PROVIDED WITH APPROVED SUPPORTS..
4.	SUPPORTS SHALL BE PROVIDED IN STRICT ACCORDANCE WITH THE RECOMMENDATIONS OF THE PIPING MANUFACTURER.

G.	VALVES:
1.	PROVIDE GATE VALVES, BUTTERFLY OR BALL VALVES FOR SHUT-OFF DUTY ON MAIN AND BRANCH SUPPLY LINES. FOR ALL PIPE RUNS 2" AND SMALLER, PROVIDE BALL FOR ALL PIPE RUNS LARGER THAN 2" AND SMALLER THAN 4". PROVIDE GATE VALVES. PIPING 4" AND LARGER, PROVIDE BUTTERFLY VALVES FOR SHUT-OFF DUTY.
2.	ALL FIXTURES WITH THE EXCEPTION OF FLUSHOMETER-EQUIPPED WATER CLOSETS AND URINALS SHALL HAVE STOP VALVES TO CONTROL SUPPLY TO THE FIXTURE. WHERE SUPPLIES ARE EXPOSED PROVIDE CHROME-PLATED SLEEVES WITH CHROME-PLATED ESCUTCHEONS ON PIPING PENETRATIONS.
3.	ALL PLUMBING FIXTURES AND EQUIPMENT TO HAVE SHUT-OFF VALVES ON SUPPLY LINES.
4.	ALL BRANCH LINES TO HAVE SHUT-OFF VALVES.
5.	ALL VALVES SHALL BE ACCESSIBLE. PROVIDE ACCESS DOORS WHERE REQUIRED FOR VALVE ACCESS.
6.	PROVIDE GLOBE VALVES FOR THROTTLING/BALANCING OF THE HOT WATER CIRCULATING SYSTEM.
H.	SLEEVES AND ESCUTCHEONS:
1.	SLEEVES THROUGH STRUCTURAL CONCRETE MEMBERS AND SLEEVES FOR WALLS BELOW GRADE AND FLOORS OR GRADE SHALL BE STANDARD WEIGHT GALVANIZED SCHEDULE 40 STEEL PIPE. SLEEVES THROUGH OTHER THAN STRUCTURAL COMPONENTS OF THE BUILDING SHALL BE 20 GAUGE GALVANIZED SHEET METAL WITH LOCK SEAM JOINTS. USE THERMAFIBER SHING INSULATION SHALL BE INSTALLED BETWEEN PIPE AND SLEEVE.
2.	PIPE ESCUTCHEON PLATES SHALL BE INSTALLED WHERE EXPOSED PIPING PASSES THROUGH WALLS, CEILINGS, AND FLOORS AND SHALL BE MINIMUM 20 GAUGE STEEL. PROVIDE CHROME PLATED ESCUTCHEON PLATES IN FINISHED AREAS.

I.	DRAINAGE ACCESSORIES
1.	GENERAL:
a.	INSTALL THE WORK OF THIS SECTION IN ACCORDANCE WITH THE MANUFACTURER'S PRINTED INSTALLATION INSTRUCTIONS, UNLESS OTHERWISE SPECIFIED.
b.	SECURE EXTERNAL COMPONENTS IN PLACE WITH VANDAL RESISTANT FASTENERS OR DEVICES WHICH CANNOT BE REMOVED WITHOUT SPECIAL TOOLS.
2.	DEVICES:
a.	CLEANOUT & CLEANOUT PLUG
•	THREADED PIPE FITTING OR CAST IRON FERRULE WITH GAS TIGHT CLEANOUT PLUG
•	PLUG SHOULD BE CAST BRASS OR BRONZE, WITH THREADED END, AND RAISED OR COUNTERSUNK HEAD.
•	LUBRICATE THREADS OF CLEANOUT PLUG WITH ANTI-SEIZE LUBRICANT BEFORE FINAL INSTALLATION.
b.	CLEANOUT WALL PLATE
c.	CLEANOUT DECK PLATE
•	IT SHOULD BE STANDARD DUTY FLOOR CLEANOUT FITTING WITH COATED CAST IRON BODY, ROUND, POLISHED NICKEL BRONZE SCORATED TOP SECURED TO CLEANOUT PLUG WITH STAINLESS STEEL VANDAL RESISTANT FASTENER. THREADED HEIGHT ADJUSTMENT, CAST IRON HEAD, GAS TIGHT CLEANOUT PLUG, AND CONNECTION TO MATCH PIPING OPTION SELECTED.
J.	IF WATER PRESSURE EXCEEDS 80 PSI, A WATER PRESSURE REDUCING VALVE SHALL BE INSTALLED IN WATER PIPING AT CONNECTION TO MAIN.
K.	PROVIDE DIELECTRIC FITTINGS BETWEEN DISSIMILAR METALS.
L.	PIPE BACKFLOW PREVENTER DRAINS TO FLOOR DRAIN OR OTHER APPROVED INDIRECT WASTE SOURCE.
M.	PROVIDE ACCESS DOORS/PANELS FOR SERVICE AND ACCESS TO ALL VALVES AND OTHER SYSTEM COMPONENTS ENCLOSED IN WALLS AND CEILINGS ACCESS DOORS SHALL BE FURNISHED BY THIS CONTRACTOR, INSTALLED BY THE GENERAL CONTRACTOR.
N.	ALL FIXTURES REQUIRING VACUUM BREAKERS SHALL BE EQUIPPED WITH INTEGRAL VACUUM BREAKERS.
O.	PROVIDE ANCHOR GUIDES AND EXPANSION JOINTS OR LOOPS IN ALL HOT WATER AND HOT WATER CIRCULATING MAIN SUPPLY PIPING AND SEGMENTS OF SUCH PIPE THAT EXCEED 30'-0" IN LENGTH.
P.	IN ALL AREAS WITH FINISHED SURFACES, SYSTEM PIPING AND COMPONENTS SHALL BE CONCEALED ABOVE OR WITHIN FINISHED SURFACES.
Q.	INSTALL VALVES WITH STEMS UPRIGHT OR HORIZONTAL. REMOVE PROTECTIVE COATINGS PRIOR TO INSTALLATION.
R.	REDUCTIONS IN PIPE SIZES SHALL BE MADE WITH ONE-PIECE REDUCING FITTINGS. BUSHINGS ARE NOT ACCEPTABLE. USE FLANGED FITTINGS AT THE BASE OF RISERS.

S.	ANY PENETRATIONS THROUGH FIRE RATED PARTITIONS, FLOORS, OR CEILINGS SHALL BE STEEL SLEEVED AND SEALED WITH 3M BRAND UL RATED FIRE BARRIER CAULK OR APPROVED EQUAL.
T.	WHEN THE WATER PIPING SYSTEM IS COMPLETE, THOROUGHLY FLUSH ALL DIRT, SEDIMENT, SOLDER, ETC., OUT OF THE SYSTEM, REMOVING ALL STRAINERS, VALVE STEMS, SEATS, ETC., REQUIRED TO ACCOMPLISH THE FLUSHING.
U.	AT ALL INDIRECT WASTE DRAINS, MAINTAIN AIR GAP AS REQUIRED BY CODE.
V.	ALL PIPING INSTALLED ON THE ROOF SHALL BE SUPPORTED BY "FLOW BLOCK" PIPE STANDS AS MANUFACTURED BY MIRO INDUSTRIES, OR APPROVED EQUAL. WOOD PIPE SUPPORTS SHALL NOT BE ACCEPTABLE. PROVIDE TRAFFIC/WALK PADS BELOW ALL PIPE STANDS.
W.	INSTALL SLEEVES FOR ALL PIPES WHICH PASS THROUGH WALLS, FLOORS, AND CEILINGS, WHERE PIPES ARE TO BE INSULATED, THE SLEEVE SHALL BE LARGE ENOUGH TO ACCOMMODATE INSULATION. SLEEVES SHALL BE FLUSH WITH FINISHED SURFACES AT BOTH ENDS. ON FINISHED SURFACES IN EXPOSED AREAS PROVIDE ESCUTCHEONS COMPATIBLE WITH FINISH.
X.	PROVIDE WATER HAMMER ARRESTERS ON SUPPLY PIPING TO ALL FLUSHOMETER VALVES AND QUICK-CLOSING VALVES.
Y.	UNLESS OTHERWISE INDICATED, TRAPS SEALS AT ALL FLOOR DRAINS SHALL BE MAINTAINED BY AN APPROVED TRAP SEALING DEVICE OR BARRIER TYPE TRAP SEAL PROTECTION DEVICE AS PER CODE APPLICABLE..
Z.	MAINTAIN ALL REQUIRED AND RECOMMENDED CLEARANCES FOR ALL PLUMBING SYSTEM COMPONENTS AND EQUIPMENT.
AA.	MAINTAIN MINIMUM 10'-0" CLEARANCE BETWEEN ALL PLUMBING V.T.R.S AND ALL OUTDOOR AIR INTAKES, EXHAUSTS, STACKS AND KITCHEN VENTS IF AND AS REQUIRED BELOW ROOF TO MAINTAIN SUCH CLEARANCE WHETHER OR NOT SUCH OFFICE IS INDICATED ON THE DRAWINGS. PROVIDE ALL REQUIRED SEISMIC SUPPORTS.

2.	INSTALLATION
2.01	GENERAL
A.	ALL WORK WHICH REQUIRES DISRUPTION OF THE ROOFING SHALL BE DONE BY A CONTRACTOR CERTIFIED BY THE ROOFING MANUFACTURER AS REQUIRED TO MAINTAIN ANY EXISTING ROOF WARRANTIES.
B.	EXTERIOR INSTALLATIONS TO BE WEATHER PROOF IN ALL RESPECTS.
C.	EXTERIOR MATERIALS AND EQUIPMENT SHALL BE PAINTED TO PREVENT CORROSION, COLOR PER ARCHITECT.
D.	COORDINATE THE PLUMBING WORK WITH ALL OTHER AFFECTED WORK AND THE CONSTRUCTION SCHEDULE.
E.	REAM PIPE AND TUBE ENDS. REMOVE BURRS. BEVEL PLAIN AND FERROUS END PIPE.
F.	REMOVE SCALE AND FOREIGN MATERIAL, FROM INSIDE AND OUTSIDE, BEFORE ASSEMBLY.
G.	PREPARE PIPING CONNECTIONS TO EQUIPMENT WITH FLANGES AND UNIONS.
H.	COORDINATION WITH THE WORK OF OTHER TRADES IS REQUIRED. PROVIDE OFFSETS IN PIPING SYSTEMS OR MINOR DEVIATIONS TO THE INDICATED PIPE ROUTING IN ORDER TO COORDINATE THE PLUMBING WORK WITH THE WORK OF ALL OTHER TRADES AND THE GENERAL BUILDING CONDITIONS.
I.	NO DOMESTIC WATER PIPING SHALL BE INSTALLED IN UNHEATED SPACES.
J.	PRIOR TO DISCONNECTING AND CONNECTING NEW WORK TO EXISTING SYSTEMS, THE PLUMBING CONTRACTOR SHALL NOTIFY THE PROPERTY MANAGER AND OFFER A PROPOSED SCHEDULE OF WORK. ESB WILL AUTHORIZE CONNECTIONS AND COORDINATE NECESSARY SHUT DOWNS AND DRAIN DOWNS AS REQUIRED. SHUT DOWNS AND DRAIN DOWNS MAY BE PERFORMED BY THE PLUMBING CONTRACTOR ONLY AFTER RECEIVING ESB AUTHORIZATION, AND SHOULD BE PERFORMED UNDER SUPERVISION OF ESB PERSONNEL. THREE (3) DAYS ADVANCE NOTICE TO THE PROPERTY MANAGER IS REQUIRED.
K.	THE PLUMBING CONTRACTOR IS ADVISED THAT DUE TO THE NATURE OF THE OPERATIONS AND TENANT REQUIREMENTS TO EXISTING SYSTEMS MAY HAVE TO BE MADE AFTER REGULAR WORKING HOURS. THE PROPERTY MANAGER WILL ADVISE THE PLUMBING CONTRACTOR OF THE TIME CONSTRAINTS. UPON RECEIPT AND APPROVAL OF THE PLUMBING CONTRACTOR'S REQUEST FOR SHUT DOWN AND CONNECTION TO EXISTING SYSTEMS.
L.	WHEN CONNECTING TO EXISTING STACKS AND RISERS, PROVISION IS TO BE MADE FOR FUTURE CONNECTIONS BY PROVIDING CAPPED AND VALVED OUTLETS ON DOMESTIC WATER RISERS AND PLUGGED OUTLETS ON THE SANITARY AND VENT STACKS.
2.02	ABOVE GRADE
A.	INSTALL PLUMBING PIPING IN ACCORDANCE WITH RECOGNIZED INDUSTRY PRACTICES TO ENSURE THAT PIPING COMPLIES WITH REQUIREMENTS AND SERVES INTENDED PURPOSES.
B.	ROUTE PIPING IN AN ORDERLY MANNER, PLUMB AND PARALLEL TO BUILDING STRUCTURE. MAINTAIN GRADIENT. SLOPE PIPING AND ARRANGE SYSTEMS TO DRAIN. IN DOMESTIC WATER SYSTEMS, PROVIDE DRAIN VALVES AT MAIN SHUT-OFF VALVES AND ALL LOW POINTS IN PIPING.
C.	USE EXISTING CONNECTIONS AT MAINS WHERE AVAILABLE FOR NEW BRANCH PIPING. LOCATE ALL RISERS AND PIPING BEFORE CONSTRUCTION COMPLETION AND TAKE CARE NOT TO DAMAGE SAME. ANY DAMAGE OCCURRING TO THE EXISTING PIPING WILL BE THE SOLE RESPONSIBILITY OF THE CONTRACTOR.

2.03	INSULATION
	COVER ALL HOT WATER AND HOT WATER RE-CIRCULATION PIPE WITH 1½" THICK FOR PIPE SIZE UP TO 1½" AND 2" THICK FOR PIPE SIZE GREATER THAN 1½". INSTALL ALL INSULATION AS PER MANUFACTURERS RECOMMENDATIONS. ALL PIPE INSULATION SHALL COMPLY WITH INTERNATIONAL ENERGY CONSERVATION CODE 2009 EDITION.
3.	TESTING
A.	AT THE COMPLETION OF THE PLUMBING WORK, COMPLETELY TEST THE ENTIRE INSTALLATION OF ALL SYSTEMS FOR PROPER OPERATION AND COMPLIANCE WITH APPLICABLE CODES AND LOCAL REQUIREMENTS. CORRECT ALL DEFICIENCIES FOUND.
B.	TESTING OF THE INSTALLED SYSTEMS SHALL BE MADE BY THE CONTRACTOR IN THE PRESENCE OF A REPRESENTATIVE OF THE OWNER.
C.	THE CONTRACTOR SHALL NOT COVER UP OR PERMANENTLY CONCEAL PIPING, DEVICES OR ANY PORTION OF NEWLY CONSTRUCTED PLUMBING SYSTEM(S) UNTIL SUCH SYSTEM, OR PORTION OF THE SYSTEM, HAS BEEN TESTED IN THE PRESENCE OF A REPRESENTATIVE OF THE OWNER AND INSPECTED BY THE LOCAL INSPECTOR AND APPROVED IN WRITING, EXCEPT PIPING PASSING THROUGH FLOORS, WALLS, PARTITIONS, OR BEAMS, FOR DISTANCES EQUAL TO THE THICKNESS OF SUCH FLOOR, WALL, PARTITION OR BEAM.
D.	THIS CONTRACTOR SHALL NOTIFY THE VARIOUS DEPARTMENTS, BUREAUS AND INDIVIDUALS AT LEAST TWO WEEKS IN ADVANCE OF THE TIME THAT THE TESTS ARE TO BE CONDUCTED.
E.	ALL DEFECTIVE PARTS SHALL BE REPLACED OR CORRECTED BY THIS CONTRACTOR AND AN EXTRA TEST OR TESTS SHALL BE MADE WHEN THE OPERATION IS SATISFACTORY. ALL ARRANGEMENTS AND EXPENSES NECESSARY TO CONDUCT ALL TESTS REQUIRED BY THESE SPECIFICATIONS AND THE VARIOUS AGENCIES OVER THE WORK INSTALLED UNDER THIS CONTRACT SHALL BE MADE BY THIS CONTRACTOR. NO EXTRA COMPENSATION WILL BE ALLOWED FOR THESE TESTS. THE COST THEREOF BEING INCLUDED IN THE LUMP SUM BID FOR THIS CONTRACT.
F.	WHERE ANY EVIDENCE OF STOPPAGE IS FOUND IN PIPING OR EQUIPMENT, THIS CONTRACTOR SHALL DISCONNECT, CLEAN, REPAIR AND RECONNECT ALL OBSTRUCTED PIPING OR EQUIPMENT AND SHALL ALSO PAY FOR ALL NECESSARY CUTTING AND REPAIRS TO ADJOINING WORK.
G.	ALL PIPING AND EQUIPMENT SHALL BE THOROUGHLY CLEANED INSIDE AND OUT, OF DIRT, CUTTINGS, OILS AND OTHER FOREIGN SUBSTANCES AND SHALL BE LEFT CLEAN.

ACHARA VET

REVISIONS:

No.	Description	Date
	PERMIT SET	07.12.2024
△	REVISED PERMIT SET	08.20.2024

PROJECT: 2024 AV2

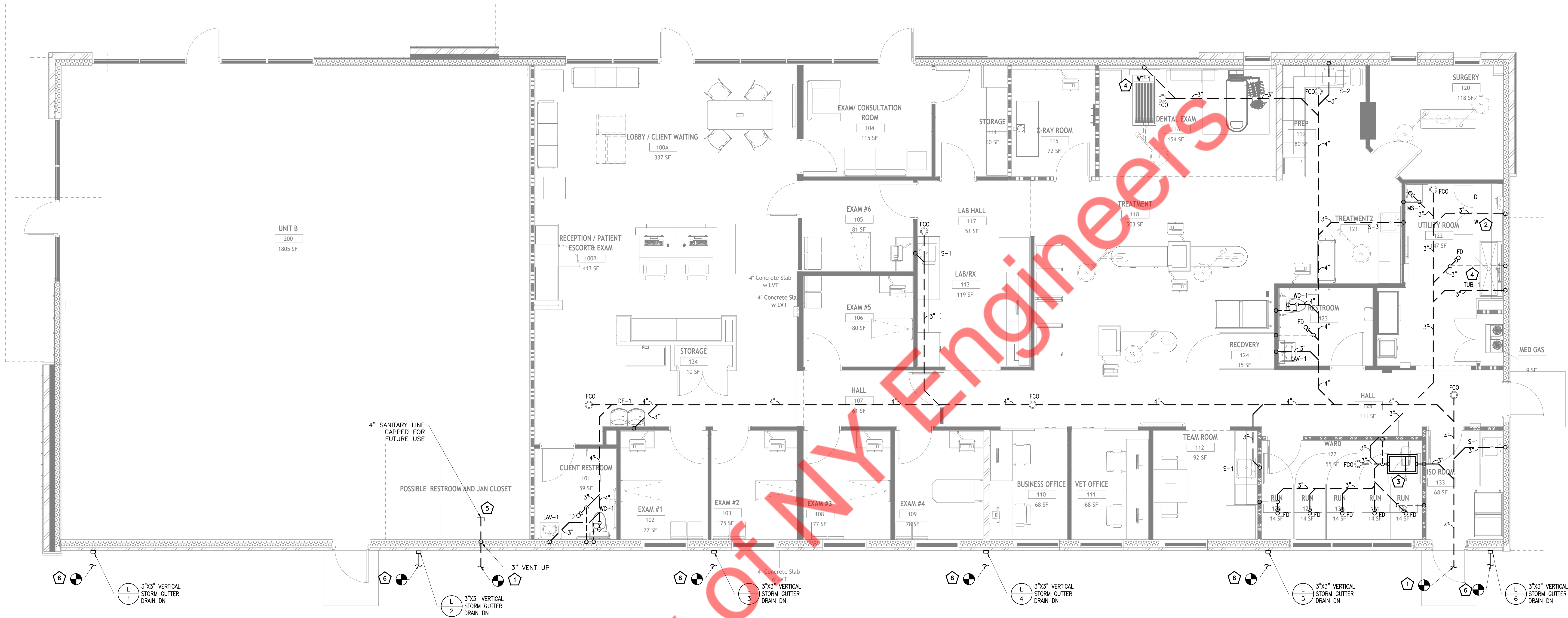
DATE: 08.20.2024

DRAWN BY: NYE

CHECKED BY: NYE

PLUMBING SYMBOLS, ABBREVIATIONS, NOTES & SPECIFICATIONS

P-0.1



1 PLUMBING SANITARY AND STORM PLAN  
1/4" = 1'-0"

- KEY NOTES:
- CONTRACTOR TO VERIFY ON FIELD EXACT LOCATION OF EXISTING SANITARY PIPE AND CONNECT NEW 4" SANITARY PIPE TO PROPOSED SANITARY SYSTEM. FOR CONTINUATION REFER CIVIL UTILITY PLAN.
  - PROVIDE FILTROIL 160 LINT INTERCEPTOR OR EQUAL TO WASHER DRAIN BEFORE CONNECTING TO SANITARY PIPE. CONTRACTOR TO COORDINATE WITH ARCHITECT & MANUFACTURER FOR LOCATION & ALL NECESSARY PIPING ACCESSORIES PRIOR TO CONNECTION. REFER SHEET P-5.1 DETAIL-10
  - PROVIDE LJI-20-FUR MODEL NEW 3" HAIR/FUR INTERCEPTOR FOR FLOOR DRAIN, TUB, MOP SINK, OF 20 GPM MAX FLOW. CONTRACTOR TO COORDINATE WITH ARCHITECT & MANUFACTURER FOR LOCATION & ALL NECESSARY PIPING ACCESSORIES PRIOR TO CONNECTION. REFER SHEET P-5.1 DETAIL-11
  - PROVIDE APPROVED HAIR TRAP FOR WET TABLE AND CROWING TUB IF ALREADY NOT PROVIDED.
  - 4" SANITARY STUB-OUT FOR FUTURE USE. REFER TENANT'S CONSTRUCTION DOCUMENT FOR CONTINUATION.
  - CONNECT NEW 3"x3" STORM PIPE TO PROPOSED STORM WATER PIPE OF ADEQUATE SIZE. CONTRACTOR TO FIELD VERIFY LOCATION, INVERT AND SIZE OF PROPOSED OUTGOING STORM SERVICE. FOR CONTINUATION REFER CIVIL UTILITY PLAN.

- GENERAL NOTES:
- 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".
  - CONTRACTOR TO FIELD VERIFY FEASIBILITY OF SLAB PENETRATION AS PER STRUCTURAL REQUIREMENT.
  - REFER RISER DIAGRAMS FOR ALL PIPE SIZES.
  - ALL MATERIAL INDICATED AND IMPLIED ON THESE DRAWINGS SHALL BE NEW UNLESS OTHERWISE NOTED.
  - ALL CLEANOUTS TO BE ACCESSIBLE.
  - ANY ROOF PENETRATION SHALL BE PERFORMED BY LANDLORD'S ROOFERS AT LANDLORD OPTION, A BONDED ROOFER APPROVED IN ADVANCE BY LANDLORD.
  - PROVIDE TRAP PRIMER/ SEAL ON FLOOR DRAIN AS PER LOCAL JURISDICTION.
  - CONTRACTOR TO CO-ORDINATE WITH MECHANICAL CONTRACTOR FOR CONDENSATE DRAIN. EXTEND AND SPILL THE CONDENSATE DRAIN TO NEAREST SINK/LAVATORY WITH AIR GAP FITTING.
  - IF REQUIRED EXTEND AND CONNECT AUTOCLAVE SYSTEM & ULTRASONIC CLEANER SYSTEM DRAIN TO NEAREST SINK DRAIN WITH DRAIN SADDLE VALVE AS PER CODE COMPLIANCE. CONTRACTOR TO COORDINATE WITH ARCHITECT & MANUFACTURER FOR LOCATION & ALL NECESSARY PIPING ACCESSORIES PRIOR TO CONNECTION.

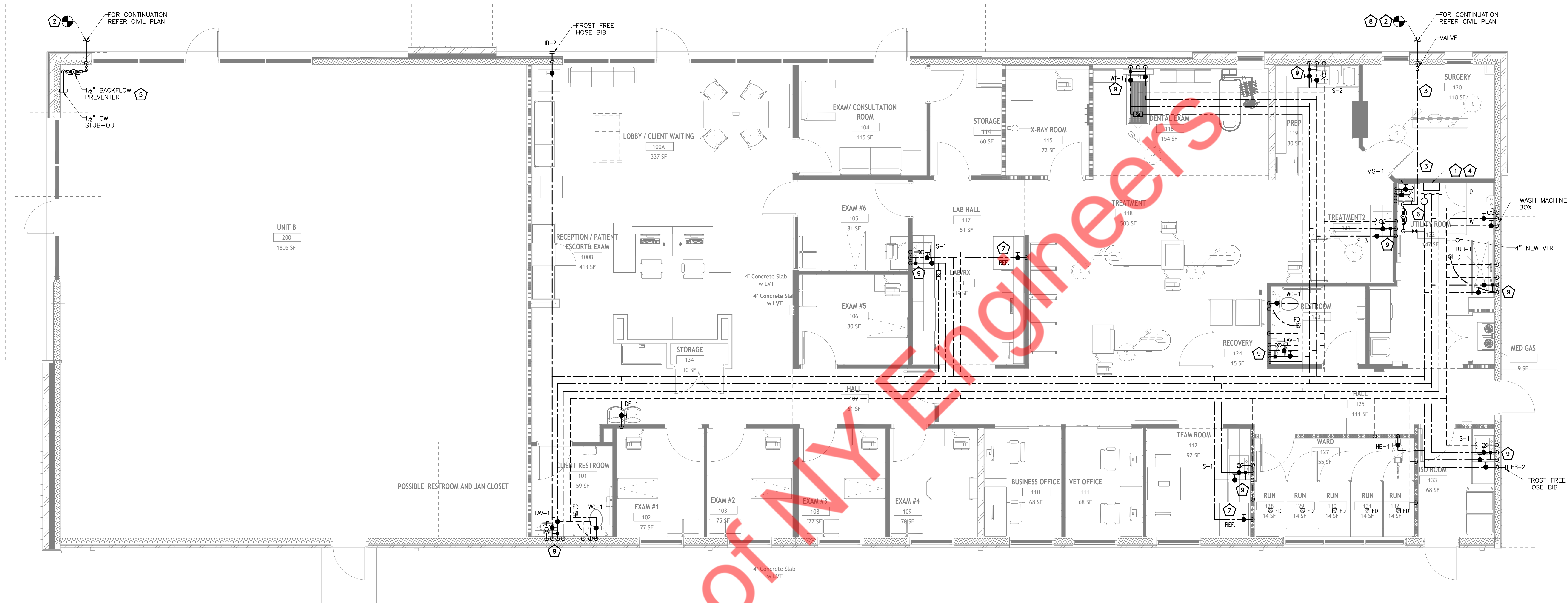
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PLUMBING  
SANITARY AND  
STORM PLAN

P-1.1



**1 PLUMBING WATER SUPPLY AND VENT PIPING PLAN**  
1/4" = 1'-0"

- KEY NOTES:**
- 1 NEW WALL MOUNTED TANKLESS TYPE WATER HEATER WITH INTEGRAL RE-CIRCULATION PUMP HWHT-1 W/ EXPANSION TANK (ET-1), (REFER SCHEDULE P-6.1)
  - 2 NEW 1/2" CW PIPING TIE-INTO THE PROPOSED COLD WATER LINE IN SPACE. CONTRACTOR TO COORDINATE WITH CIVIL CONTRACTOR AND FIELD VERIFY ROUTING, LOCATION AND SIZE OF PROPOSED CW BY CIVIL.
  - 3 NO TAP OFF TO BE TAKEN BEFORE BFP.
  - 4 SPILL WATER HEATER INDIRECT WASTE TO MOP SINK AS PER APPROVED AIR GAP.
  - 5 1/2" WATER LINE WITH 1/2" BACKFLOW PREVENTER INTO SPACE FOR FUTURE USE.
  - 6 SECONDARY BFP INDIRECT WASTE SPILL IN TO NEAREST MOP SINK AS PER APPROVED AIR GAP.
  - 7 EXTEND 1/2" CW TO WATER FILTER (SIMILAR TO AQUA-POOR MODEL AP200). EXTEND 1/2" CW TO REF SEE RISER DIAGRAM FOR MORE DETAILS
  - 8 CONTRACTOR SHALL VERIFY ACTUAL AVAILABLE WATER PRESSURE AT INCOMING WATER SERVICES. WATER PRESSURE SHOULD NOT BE LESS THEN 60 PSI AT THE REQUIRED FLOW. NOTIFY ENGINEER IF CONDITION DIFFERS.
  - 9 PROVIDE ASSE 1070 OR SIMILAR APPROVED THERMOSTATIC MIXING VALVE AT PLUMBING FIXTURE IF NOT ALREADY PROVIDED WITH THEM. SET TEMPERATURE AT 110°F MAXIMUM.

- GENERAL NOTES:**
- 1. CW/HW PIPING TO BE PROVIDED WITH INSULATION AS PER INTERNATIONAL ENERGY CONSERVATION CODE 2009 (REFER SHEET P-0.1)
  - 2. PROVIDE BRANCH PRV IF PRESSURE EXCEEDS 80 PSI.
  - 3. CONTRACTOR TO FIELD VERIFY FEASIBILITY OF SLAB PENETRATION AS PER STRUCTURAL REQUIREMENT.
  - 4. PROVIDE ACCESS PANELS FOR WATER HAMMER ARRESTOR, CLEANOUTS & SHUT-OFF VALVES AS REQUIRED.
  - 5. REFER RISER DIAGRAMS FOR ALL PIPE SIZES.
  - 6. ANY ROOF PENETRATION SHALL BE PERFORMED BY LANDLORD'S ROOFERS AT LANDLORD OPTION, A BONDED ROOFER APPROVED IN ADVANCE BY LANDLORD.
  - 7. PROVIDE TRAP PRIMER/ SEAL ON FLOOR DRAIN AS PER LOCAL JURISDICTION.
  - 8. ALL MATERIAL INDICATED AND IMPLIED ON THESE DRAWINGS SHALL BE NEW UNLESS OTHERWISE NOTED.
  - 9. ROUTE NEW WATER HEATER T&P RELIEF TO DRAIN IN NEAREST FLOOR DRAIN.
  - 10. PROVIDE ASSE 1070 OR SIMILAR APPROVED TEMPERING VALVE FOR LAVATORIES AND SINK. SET AT TEMPERATURE TO A MAXIMUM 110 °F.
  - 11. IF REQUIRED EXTEND CW TO AUTOCLAVE SYSTEM & ULTRASONIC CLEANER SYSTEM FROM NEAREST SINK CW SUPPLY. CONTRACTOR TO COORDINATE WITH ARCHITECT & MANUFACTURER FOR LOCATION & ALL NECESSARY PIPING ACCESSORIES PRIOR TO CONNECTION.

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PLUMBING WATER  
SUPPLY AND VENT  
PIPING PLAN

P-1.2

E  
D  
C  
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A



1 NATURAL GAS AND MEDICAL GAS PLAN  
1/4" = 1'-0"

- MEDICAL GAS GENERAL NOTES:**
- CONTRACTOR TO COORDINATE WITH MEDICAL GAS CONSULTANT AND MANUFACTURER FOR FINAL GAS PIPE SIZES AND CONNECTION DETAILS.
  - PIPING INSTALLATION SHALL BE AS PER MEDICAL GAS CONSULTANT AND MANUFACTURER.

**NATURAL GAS PIPING SYSTEM**

PROVIDE A COMPLETE GAS PIPING SYSTEM TO SERVE GAS EQUIPMENT FURNISHED BY OTHERS, AS NOTED ON THE DRAWINGS. PROVIDE EITHER THREADED STEEL OR MALLEABLE IRON PIPE WITH MALLEABLE FITTINGS OR WELDED STEEL. PROVIDE ALL UNIONS, SHUT-OFF VALVES AND DIRT LEGS REQUIRED BY SOUTH CAROLINA FUEL GAS CODE 2021 AND GOVERNING LOCAL CODES AND AT EACH GAS APPLIANCE CONNECTION. PROVIDE ALL TESTS, METERS, INSPECTIONS, HANGERS AND EQUIPMENT CONNECTIONS REQUIRED FOR A COMPLETE AND OPERATING SYSTEM.

- NATURAL GAS NOTES:**
- GAS PIPING TO BE SCHEDULE 40 STEEL PIPE W/125 CAST IRON SCREWD FITTINGS.
  - GAS SYSTEM TO BE INSTALLED BY QUALIFIED LICENSED CONTRACTOR.
  - VERIFY ALL EQUIPMENT BTUS'S PRIOR TO INSTALLATION. ADJUST PIPE SIZE ACCORDING TO SOUTH CAROLINA FUEL GAS CODE 2021, TABLE 402.4(2).
  - CONTRACTOR TO FIELD VERIFY EXACT LOCATION OF EXISTING GAS METER LOCATION, PRESSURE AND CAPACITY. UPGRADE IF REQUIRED.
  - CONTRACTOR SHALL VERIFY ACTUAL GAS PRESSURE AND LONGEST LENGTH OF RUN FROM METER TO FARTHEST APPLIANCE PRIOR TO INSTALLATION AND NOTIFY ENGINEER IF CONDITIONS DIFFER FROM THOSE SHOWN ON THE PLAN.

MEDICAL GAS EQUIPMENT SCHEDULE				
MARK	DESCRIPTION	CONNECTION TYPE	QUANTITY	NOTES
MG-1	OXYGEN TANKS & MANIFOLD	—	—	—
MG-2	OXYGEN CEILING OUTLET	DISS	3	1,2,3
MG-3	OXYGEN WALL OUTLET	DISS	6	1
MG-4	SC WALL OUTLET	—	5	—
MG-5	SC MACHINE	—	—	—
MG-6	SC OUTSIDE WALL OUTLET 48" AFF	—	1	—
MG-7	SC CEILING OUTLET	—	2	—

- NOTES**
- PROVIDE ROUGH-IN ASSEMBLY & TRIM PLATE.
  - PROVIDE 1/4" (32 MA) 1" CHANNEL FOR SUPPORT AND BRACE TO STRUCTURE.
  - PROVIDE COLORED HOSE ASSEMBLY WITH HEAVY DUTY RETRACTOR.

- KEY NOTES:**
- CONTRACTOR TO CONNECT 1/2" OXYGEN PIPE TO O2 CYLINDER MANIFOLD AND EMERGENCY SHUT OFF VALVE. V.I.F. EXACT ORIENTATION OF GAS MANIFOLD & RE-ROUTE GAS THE PIPING ACCORDINGLY. ALSO COORDINATE WITH MANUFACTURER FOR ALL NECESSARY PIPING ACCESSORIES PRIOR TO CONNECTION.
  - CONTRACTOR TO CONNECT 1/2" TRUNK LINE TO CENTRAL SCAVENGER. V.I.F. EXACT LOCATION AND RE-ROUTE THE PIPING ACCORDINGLY. ALSO COORDINATE WITH MANUFACTURER FOR ALL NECESSARY PIPING ACCESSORIES PRIOR TO CONNECTION.
  - CONNECT NEW 1/2" GAS PIPE WITH NEW GAS METER TO PROPOSED INCOMING GAS PIPE. GAS CONTRACTOR TO FIELD VERIFY AND CONFIRM SIZE, PRESSURE, LOCATION OF PROPOSED GAS MAIN PIPING.
  - CONTRACTOR TO COORDINATE WITH ARCHITECT FOR EXACT LOCATION OF OXYGEN SUPPLY EMERGENCY SHUT OFF VALVE & OXYGEN ALARM PRIOR TO CONNECTION.
  - CONTRACTOR TO COORDINATE WITH SCAVENGER MANUFACTURER FOR REQUIREMENTS OF VENT PIPE AND ACCESSORIES PRIOR TO CONNECTION.
  - NEW GAS METER WITH VALVE AND PRESSURE REGULATOR. CONTRACTOR TO COORDINATE FINAL SIZE AND LOCATION OF GAS PIPE STUB-OUT WITH TENANT'S CONSTRUCTION DOCUMENTS. GAS LOAD FOR SPACE IS CONSIDERED 8000BTU.

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NATURAL GAS AND MEDICAL GAS PLAN

P-1.3

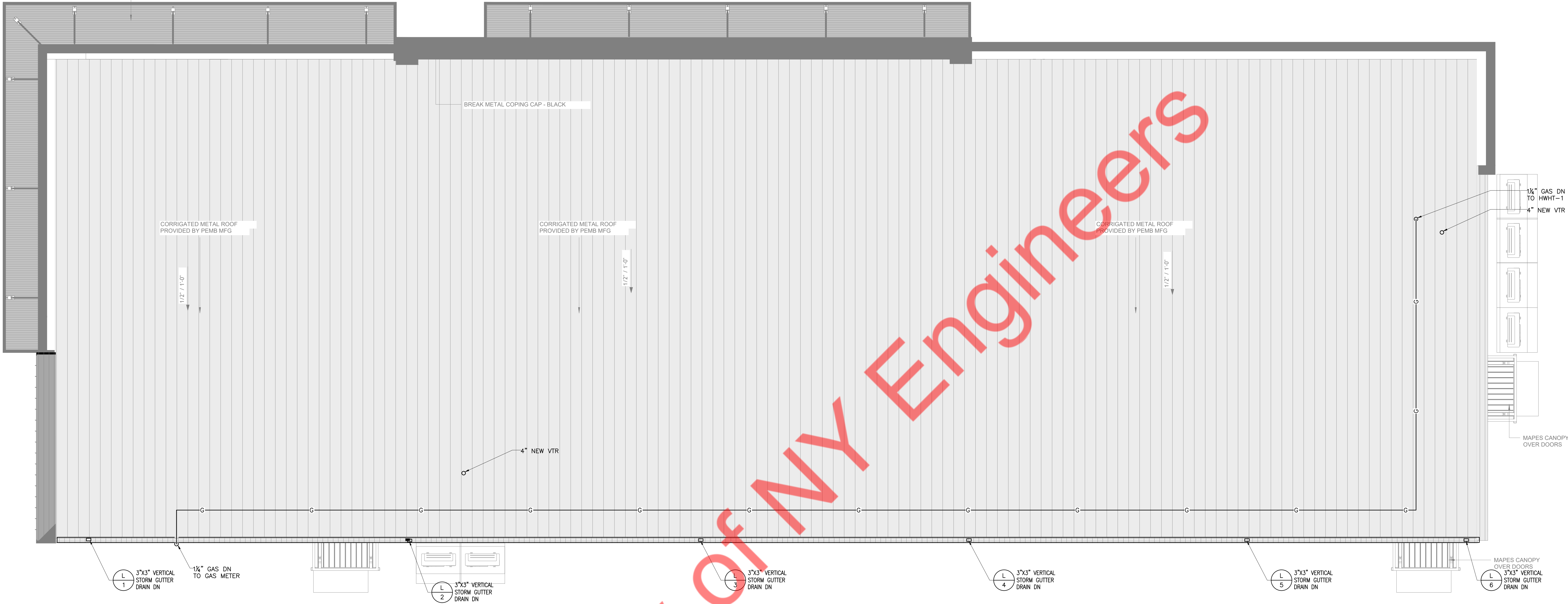
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**1** ROOF NATURAL GAS AND STORM PLAN  
1/4" = 1'-0"

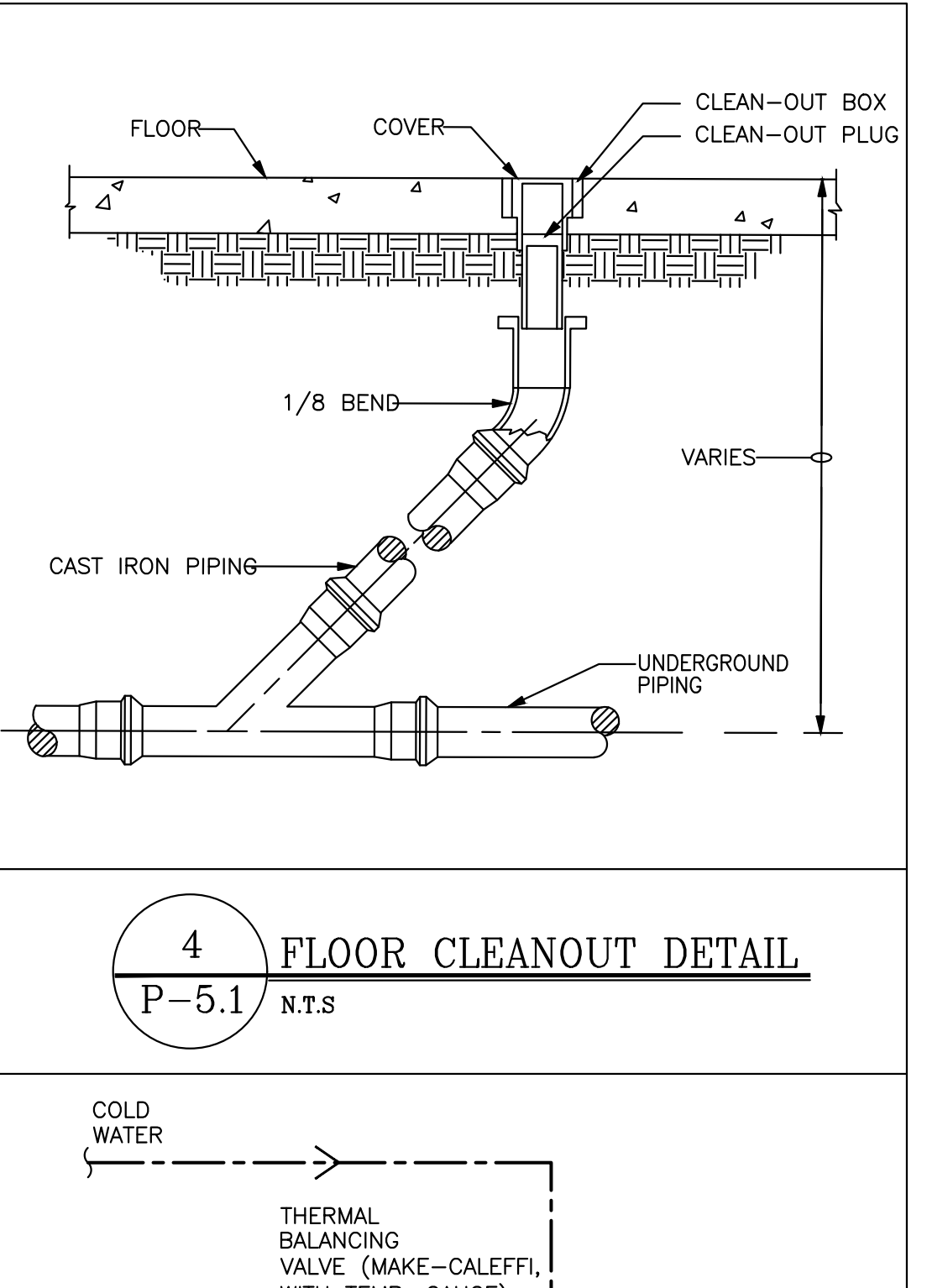
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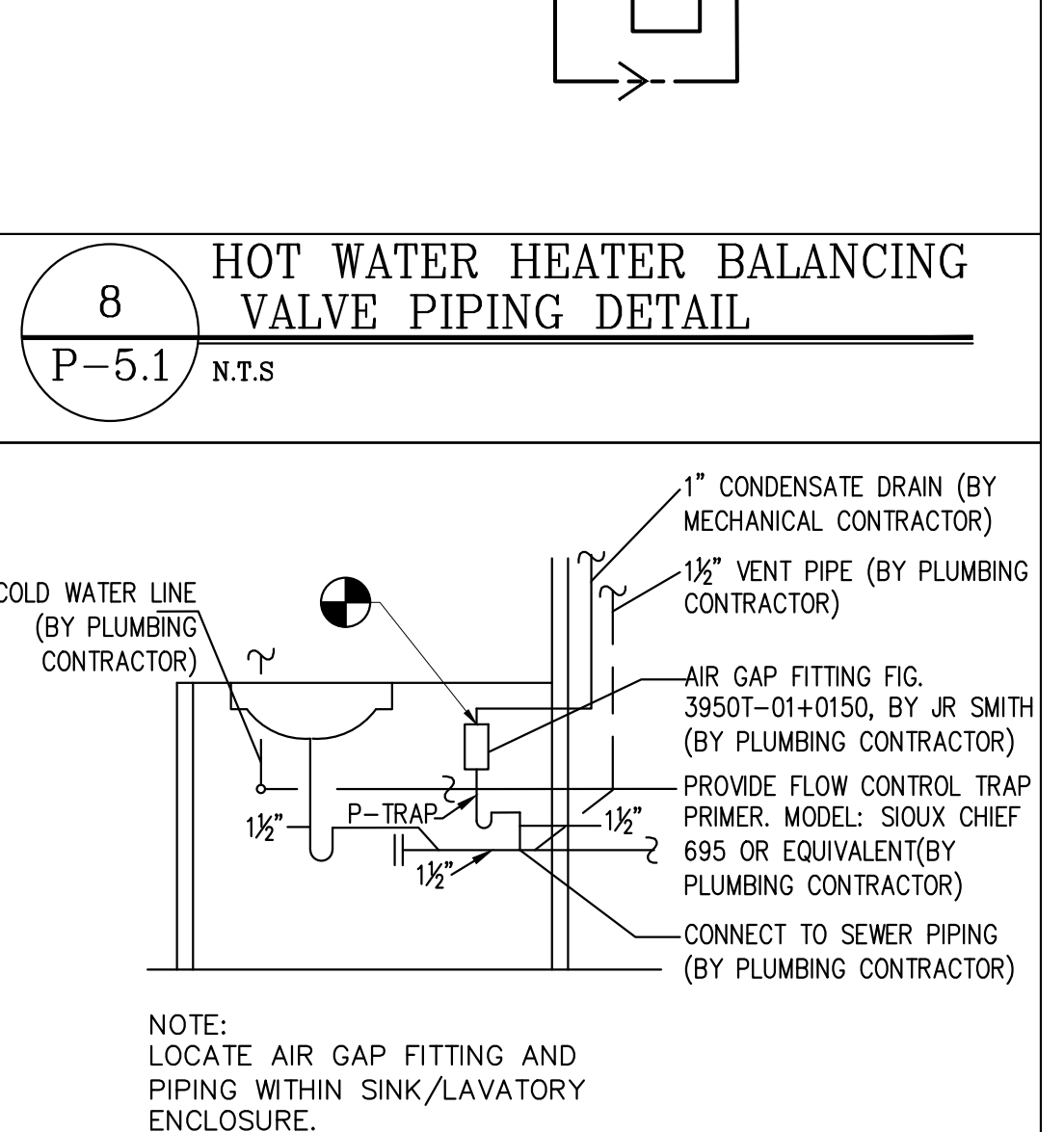
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ROOF NATURAL  
GAS AND STORM  
PLAN

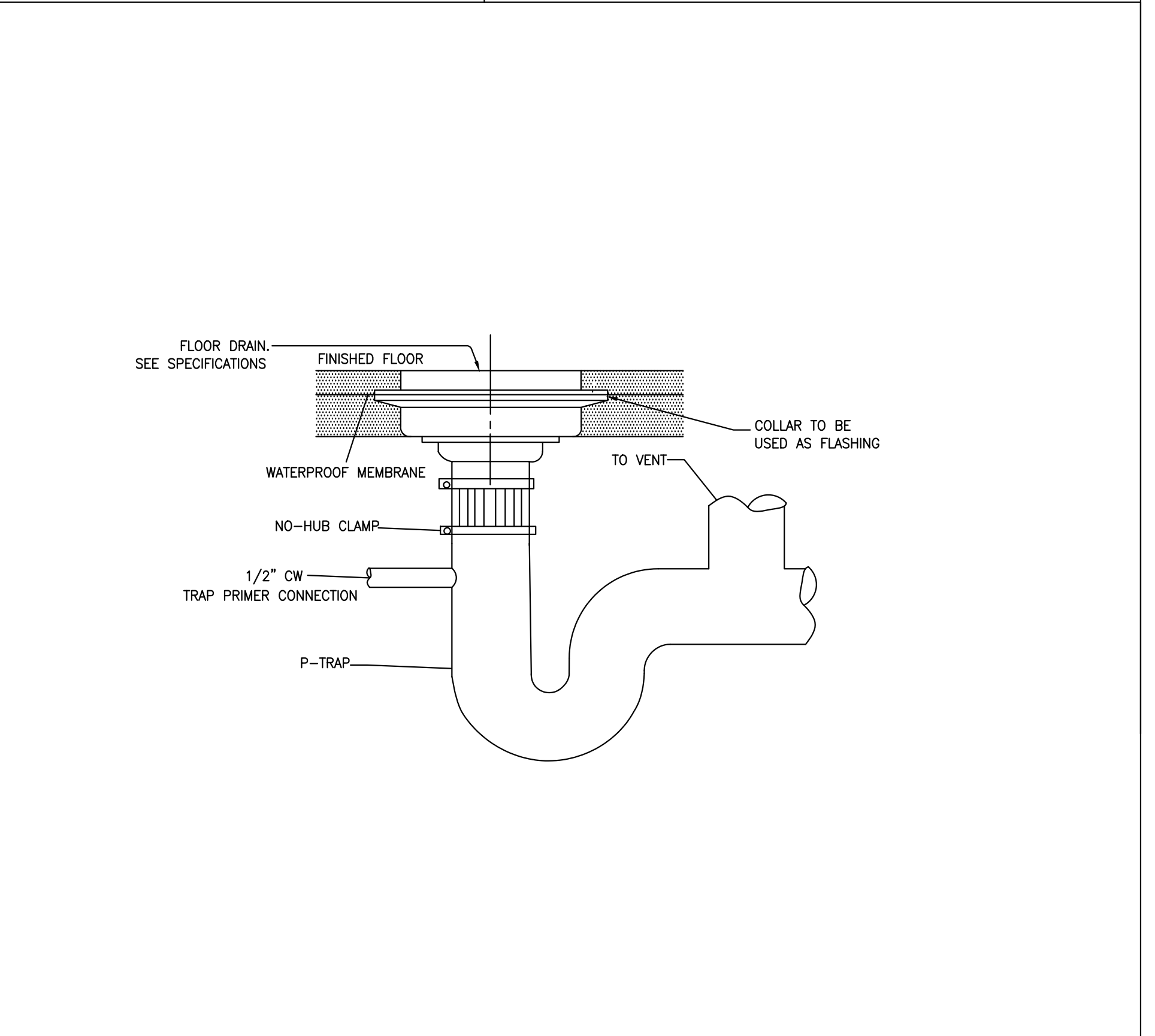
P-1.4



4 FLOOR CLEANOUT DETAIL  
P-5.1 N.T.S



9 AIR GAP FITTING DETAIL  
P-5.1 N.T.S



12 FLOOR DRAIN DETAILS  
P-5.1 N.T.S

GAS FIRED WATER HEATER SCHEDULE

WATER HEATER NO.	QUANTITY	LOCATION	NATURAL GAS INPUT (BTU/H) PER HEATER	GAS CONN.	WATER CONN.	MINIMUM GAS SUPPLY PRESSURE	MAXIMUM GAS SUPPLY PRESSURE	BASED ON	REMARKS
								MFR.& MODEL	
HHWT-1	1	UTILITY ROOM (WALL MOUNTED)	199900	¾"	¾"	3.5"WC	10.5"WC	NAVEN NPE-240 A2	- DIMENSION 17.3"(W)X27.4"(H)X13.2"(D) - PROVIDE CLEARANCES FOR HEATER AS PER MANUFACTURER'S RECOMMENDATION. - PROVIDE WITH INTEGRAL RE-CIRCULATION PUMP. - PROVIDE EXPANSION TANK (ET-1) AS PER SCHEDULE. - PROVIDE CONDENSATE DRAIN NEUTRALIZATION KIT - CO-ORDINATE WITH MECHANICAL CONTRACTOR FOR COMBUSTION AIR INTAKE & EXHAUST CONNECTIONS. - PROVIDE BALANCING VALVE FOR EACH WATER HEATER (INSTALLATION AS PER MANUFACTURER'S RECOMMENDATION.

PLUMBING FIXTURE SCHEDULE

LEGEND	PLUMBING FIXTURE	CONNECTION SIZE - INCHES						REMARKS
		DESCRIPTION	TRAP	SOIL/WASTE	VENT	COLD WATER	HOT WATER	
WC-1	WATER CLOSET	-	-	4"	2"	½"	-	FLUSH TANK
LAV-1	LAVATORY	-	1½"	1½"	1½"	½"	½"	P-TRAP
REF	REFRIGERATOR	-	-	-	-	½"	-	-
S-1	SINK	SINGLE BOWL DROP-IN SINK WITH GOOSENECK FAUCET MODEL: ELKAY LUSTERTONE (LR1720) OR SIMILAR SINK SS304 17" X 20" X 7-5/8"	1½"	2"	1½"	½"	½"	P-TRAP
S-2	SINK	SINGLE BOWL DROP-IN SINK WITH GOOSENECK FAUCET MODEL: ELKAY LUSTERTONE (LR1720) OR SIMILAR SINK SS304 17" X 20" X 7-5/8"	1½"	2"	1½"	½"	½"	P-TRAP
S-3	SINK	SURGERY SCRUB SINK WITH SENSOR FAUCET SINGLE BOWL DROP-IN SINK MODEL: ELKAY LUSTERTONE (DLR312210) SS304 31" x 22" x 10-1/8" SURGERY SENSOR FAUCET MODEL: EQUIP - 5EF-1D-DG-TMV	1½"	2"	1½"	½"	½"	P-TRAP
W/D	WASHER / DRYER	RESIDENTIAL TYPE FRONT LOAD W/D TYPICAL 46" H X 28" W X 28" D (WASHER) TYPICAL 46" H X 27" W X 31" D (DRYER)	2"	2"	1½"	¾"	¾"	I.W. FROM W/D SPILLS INTO STAND PIPE DRAIN THROUGH LINT INTERCEPTOR
MS-1	MOP SINK	FLOOR MOUNTED MOP SINK	3"	3"	2"	¾"	¾"	P-TRAP
DF-1	DRINKING FOUNTAIN	ADA COMPLIANT WITH BOTTLE FILL	1½"	1½"	1½"	½"	-	P-TRAP
TUB-1	GROOMING TUB	GROOMING TUB MODEL: 904.0702.34 60" H X 55.25" W X 24" D RIGHT SIDE FAUCET / SPRAYER / DRAIN	3"	3"	2"	¾"	¾"	P-TRAP
WT-1	WET TABLE	OLYMPIC HI-LO WET TABLE MODEL: OLYMPIC VET 51001 60" L X 25" W X 31"-43" H (TABLE). H TO TOP OF FAUCET= 44"-56", H TO TOP OF SPLASH= 38"-50" SPRAYER MOUNT ON RIGHT OF TABLE- ALLOW 4" W. NEED PLUMBING ACCESS TO CLEAN OUT PANEL ON BACK RIGHT (OR LEFT): 9" DOOR LOCATED IN COLUMN WHICH IS 11.25 INCHES FROM BACK OF TABLE.	1½"	2"	1½"	¾"	¾"	P-TRAP WET TABLE INCLUDES HAIR TRAP
HB-1	HOSE BIB	-	-	-	-	½"	-	-
HB-2	EXTERNAL HOSE BIB	-	-	-	-	½"	-	FROST FREE HOSE BIB

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

EXPANSION TANK SCHEDULE

UNIT	NUMBER	MANUFACTURER & MODEL NUMBER	SERVICE	TANK VOLUME (GAL)	ACCEPTANCE VOLUME (GAL)	PRESSURE RATING (PSI)	DIMENSIONS		OPERATING WEIGHT (LBS)	NOTES
							DIAMETER (INCH)	HEIGHT (INCH)		
ET-1	1	AMTROL	ST-5C-DD	2.0	0.9	150	8	14	10	1,2
GENERAL NOTES: 1. SET THE TANK PRESSURE TO EQUAL THE SYSTEM OPERATING PRESSURE. TANK MUST BE DRAINED BEFORE ADJUSTING SET PRESSURE. 2. INSTALL PER MANUFACTURER'S RECOMMENDATIONS ON INCOMING COLD WATER LINE.										

DRAIN ACCESSORIES & SCHEDULE

DRAIN ACCESSORIES & SCHEDULE																																						
DESIGNATION	REQUIRED	BODY																		STRAINER										REMARKS								
		<table border="1"><tr><td>SERIES NO.</td></tr><tr><td>• ZURN</td></tr><tr><td>WADE</td></tr><tr><td>SMITH</td></tr><tr><td>JOSAM</td></tr></table>		SERIES NO.	• ZURN	WADE	SMITH	JOSAM	CAST IRON	GALVANIZED	ALL BRONZE	HIGH DENSITY POLYETHYLENE	SECONDARY CLAMP	CLAMPING DEVICE	DECK CLAMP	BACK WATER VALVE	SUMP RECEIVER	FLASHING COLLAR	CAST IRON	GALVANIZED	ALL BRONZE	NICKEL-BRONZE (ADJUSTABLE)	CHROME PLATED	SEDIMENT BUCKET	SECONDARY STRAINER	POLISHED FINISH	SATIN FINISH	TRACTOR GRATE	ST. STEEL	FUNNEL TOP	FLAT TOP	DOME	RAISED LIP	EXTENSION (WHERE REQUIRED)	LESS GRATE	BRONZE TOP	IRON GRATE	POLYETHYLENE
SERIES NO.																																						
• ZURN																																						
WADE																																						
SMITH																																						
JOSAM																																						
FD	• ZURN-Z505	•				•										•																	REFER PLANS					
<b>NOTES:</b> 1. ALL FLOOR DRAINS IN FINISHED AREAS AND ALL ROOF DRAINS SHALL BE LOCATED AS PER THE ARCHITECTURAL DRAWINGS. 2. ALL FLOOR DRAINS IN MECHANICAL EQUIPMENT, ETC., SHALL BE LOCATED IN COORDINATION WITH THE MECHANICAL CONTRACTOR. 3. THE CONTRACTOR SHALL VERIFY THE COMPATIBILITY OF THE DRAINS WITH THE APPROVED ROOFING AND/OR WATER PROOFING SYSTEMS PRIOR TO SUBMITTING SHOP DRAWINGS. 4. THE TOP OF ALL FLOOR DRAINS SHALL BE FLUSH WITH THE ADJACENT FINISHED FLOOR. 5. PROVIDE ELECTRONIC TRAP PRIMER FOR MECHANICAL/TRASH ROOM FLOOR DRAINS & FUNNEL DRAIN. PROVIDE FLOW CONTROL TRAP PRIMER FOR ALL OTHER ROOM FLOOR DRAINS.																																						

FUR INTERCEPTOR SCHEDULE

ITEM	SERVICE	LOCATION	FLOW CAPACITY (GPM)	SOLID CAPACITY (GALLON / Cu. Ft.)	LIQUID CAPACITY (GALLON / Cu. Ft.)	MANUFACTURER AND MODEL	REMARKS
FUR INTERCEPTOR (FUR-1)	VETERINARY CARE	UNDER GROUND INTERIOR	20	8 / 1.10	16 / 2.1	MIFAB MODEL LI-20-FUR	- DIMENSION 32"(L)X21"(W)X15"(D)
NOTE:- CONTRACTOR TO PROVIDE ALL REQUIRED ACCESSORIES FOR SATISFACTORY WORKING OF LINT INTERCEPTOR AS PER SITE CONDITIONS.							

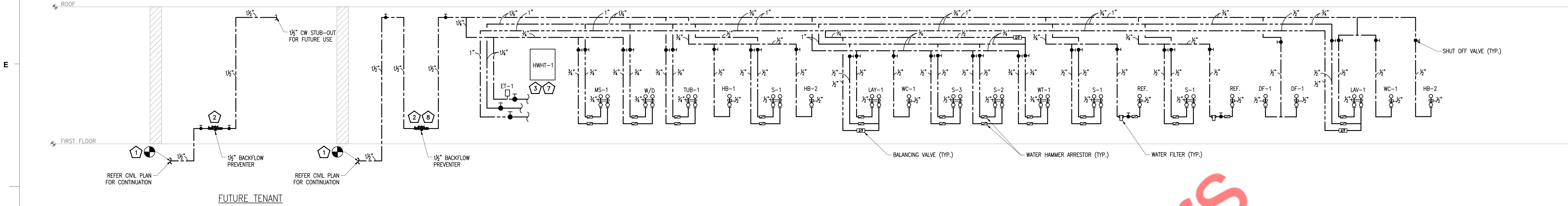
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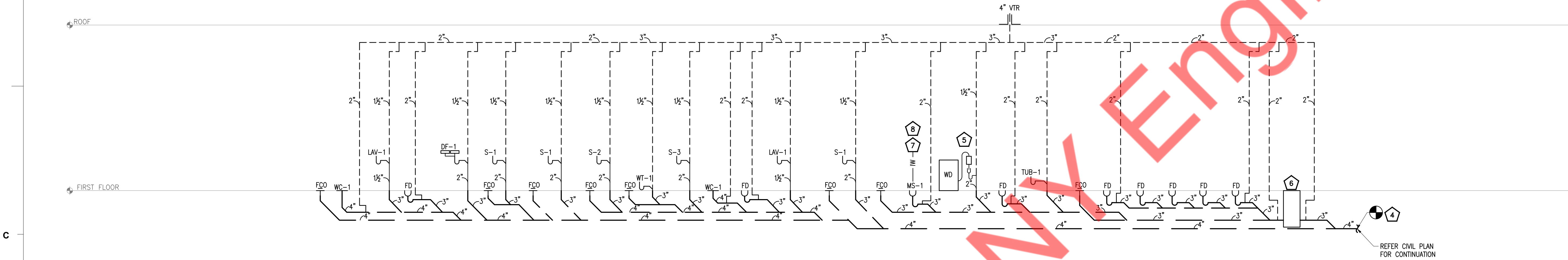
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PLUMBING SCHEDULES

P-6.1

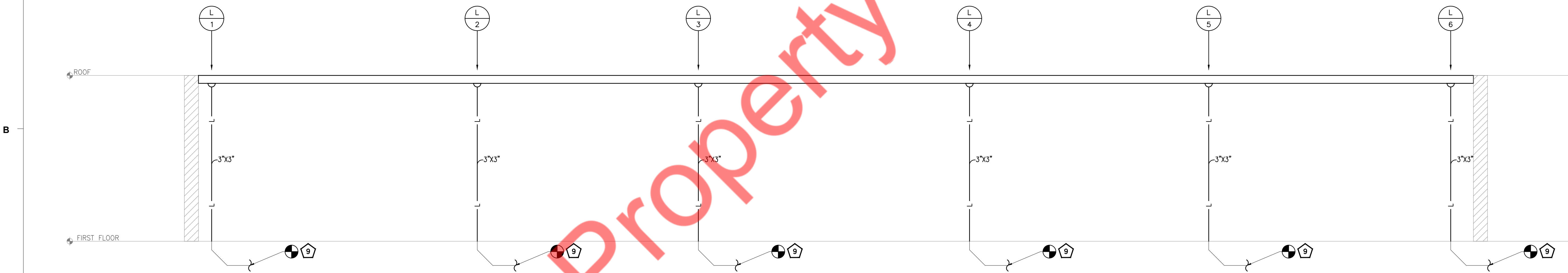


1 PLUMBING WATER SUPPLY RISER DIAGRAM  
NTS



2 PLUMBING SANITARY RISER DIAGRAM  
NTS

- KEY NOTES:
- 1 NEW 1/2" CW PIPING TIE-INTO THE PROPOSED COLD WATER LINE IN SPACE. CONTRACTOR TO COORDINATE WITH CIVIL CONTRACTOR AND FIELD VERIFY ROUTING, LOCATION AND SIZE OF PROPOSED CW BY CIVIL.
  - 2 CONTRACTOR TO COORDINATE AND PROVIDE SECONDARY BFP AS PER LOCAL CODE REQUIREMENT.
  - 3 NEW WALL MOUNTED TANKLESS TYPE WATER HEATER WITH INTEGRAL RE-CIRCULATION PUMP HWHT-1 W/ EXPANSION TANK (ET-1), (REFER SCHEDULE P-6.1)
  - 4 CONTRACTOR TO VERIFY ON FIELD EXACT LOCATION AND SIZE OF PROPOSED SANITARY PIPE AND CONNECT NEW 4" SANITARY PIPE TO PROPOSED SANITARY SYSTEM.
  - 5 PROVIDE FILTROIL 160 LINT INTERCEPTOR OR EQUAL TO WASHER DRAIN BEFORE CONNECTING TO SANITARY PIPE. CONTRACTOR TO COORDINATE WITH ARCHITECT & MANUFACTURER FOR LOCATION & ALL NECESSARY PIPING ACCESSORIES PRIOR TO CONNECTION. REFER SHEET P-S.1 DETAIL-10
  - 6 PROVIDE LB-20-FUR MODEL NEW 3" HAR/FUR INTERCEPTOR FOR FLOOR DRAIN, TUB, MOP SINK OF 20 GPM MAX FLOW. CONTRACTOR TO COORDINATE WITH ARCHITECT & MANUFACTURER FOR LOCATION & ALL NECESSARY PIPING ACCESSORIES PRIOR TO CONNECTION. REFER SHEET P-S.1 DETAIL-11
  - 7 SPILL WATER HEATER INDIRECT WASTE TO MOP SINK AS PER APPROVED AIR GAP.
  - 8 SECONDARY BFP INDIRECT WASTE SPILL IN TO NEAREST MOP SINK AS PER APPROVED AIR GAP.
  - 9 CONNECT NEW 3"x3" STORM PIPE TO PROPOSED STORM WATER PIPE OF ADEQUATE SIZE. CONTRACTOR TO FIELD VERIFY LOCATION, INVERT AND SIZE OF PROPOSED OUTGOING STORM SERVICE. FOR CONTINUATION REFER CIVIL UTILITY PLAN.



3 PLUMBING STORM WATER RISER DIAGRAM  
NTS

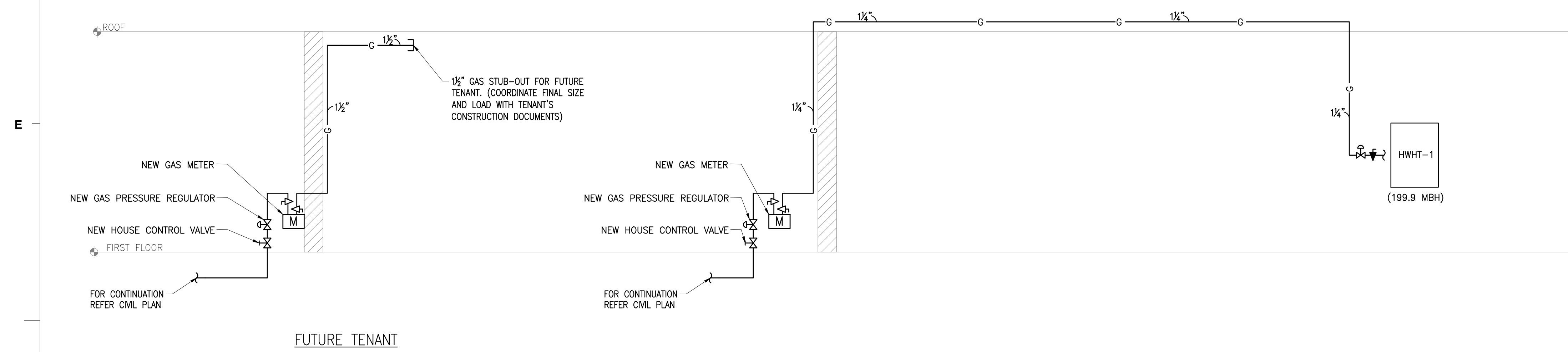
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PLUMBING WATER  
SUPPLY, SANITARY  
AND STORM WATER  
RISER DIAGRAM

P-6.2



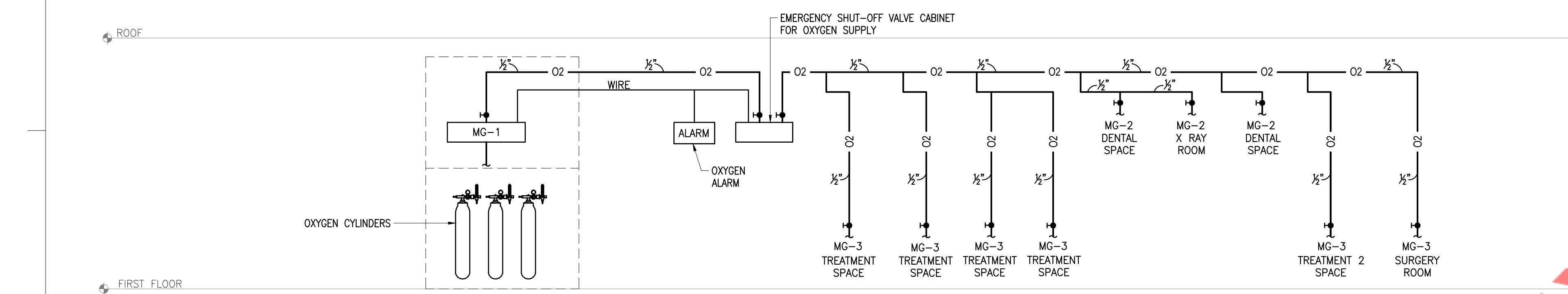
**GENERAL NOTES:**

1. CONTRACTOR TO COORDINATE WITH GAS UTILITY COMPANY AND PROVIDE MINIMUM REQUIRED GAS PRESSURE TO ALL EQUIPMENTS.
2. PROVIDE PRV IF REQUIRED FOR ALL EQUIPMENTS TO MAINTAIN PRESSURE BELOW MAXIMUM LIMIT.

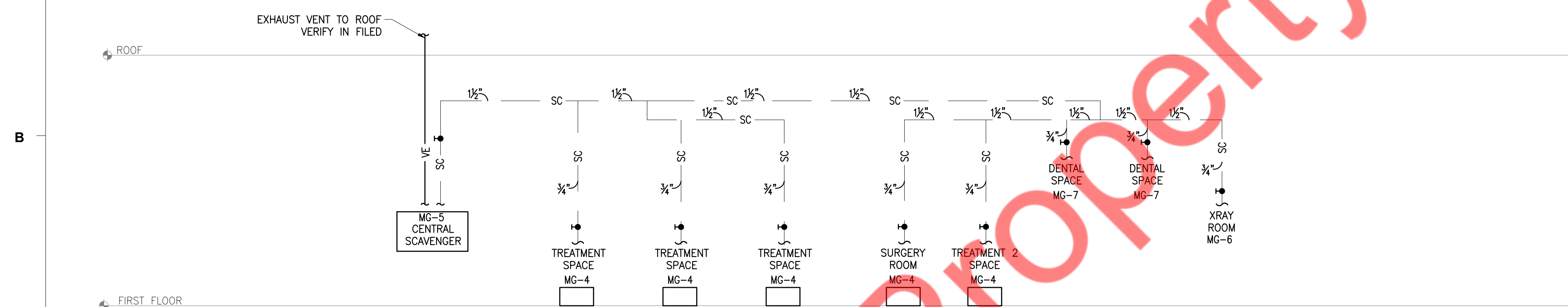
GAS PIPE SIZING PER TABLE 402.4(2) - 2021  
SOUTH CAROLINA FUEL GAS CODE (IFGC  
2021)  
GAS INLET PRESSURE- LESS THAN 2 PSI.  
PRESSURE DROP- 0.5 IN. W.C.  
SPECIFIC GRAVITY- 0.60  
EQUIVALENT LENGTH OF PIPE = 200 FT

GAS LOAD SUMMARY		
EQUIPMENT	MBH LOAD	SUPPLY PRESSURE
HWHT-1	199.9	3.5 TO 10.5 IN. WC
TOTAL LOAD	199.9	

## 1 PLUMBING NATURAL GAS RISER DIAGRAM



## 2 OXYGEN (O₂) GAS RISER DIAGRAM




### 3 SCAVENGER DISPOSAL RISER DIAGRAM

MEDICAL GAS GENERAL NOTES	
1.	CONTRACTOR TO COORDINATE WITH MEDICAL GAS CONSULTANT AND MANUFACTURER FOR FINAL GAS PIPE SIZES AND CONNECTION DETAILS.
2.	PIPING INSTALLATION SHALL BE AS PER MEDICAL GAS CONSULTANT AND MANUFACTURER.

MEDICAL GAS EQUIPMENT SCHEDULE				
MARK	DESCRIPTION	CONNECTION TYPE	QUANTITY	NOTES
MG-1	OXYGEN TANKS & MANIFOLD	—	—	—
MG-2	OXYGEN CEILING OUTLET	DISS	3	1,2,3
MG-3	OXYGEN WALL OUTLET	DISS	6	1
MG-4	SC WALL OUTLET	—	5	—
MG-5	SC MACHINE	—	—	—
MG-6	SC OUTSIDE WALL OUTLET 48"H AFF	—	1	—
MG-7	SC CEILING OUTLET	—	2	—

NOTES				
1. PROVIDE ROUGH-IN ASSEMBLY & TRIM PLATE				
2. PROVIDE 1/4" (32 MM) "U" CHANNEL FOR SUPPORT AND BRACE TO STRUCTURE.				
3. PROVIDE COLORED HOSE ASSEMBLY WITH HEAVY DUTY RETRACTOR.				

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# PLUMBING NATURAL GAS AND MEDICAL GAS RISER DIAGRAM

### P-6.3