



Expires: 06-30-2026

DATE

REVISION

PROJECT NUMBER 201253R

MECHANICAL LEGEND

MP-000

GENERAL SYMBOLS LEGEND	MECHANICAL SYMBOLS LEGEND	MECHANICAL PIPING SYMBOLS LEGEND	GENERAL MECHANICAL NOTES	GENERAL MECHANICAL SEISMIC NOTES	
REVISION NUMBER - SHOWN ON PLANS POINT WHERE NEW CONNECTS TO EXISTING NUMBER OF DETAIL ON SHEET NUMBER OF SHEET WHERE DETAIL APPEARS KEYNOTE CONTINUATION SYMBOL ROOM NAME AND NUMBER ITEM TO BE DEMOLISHED AREA NOT IN CONTRACT PIPE SIZE TAG (DIAMETER) ABOVE GROUND PIPING PIPE SLOPE TAG BELOW GROUND PIPING PIPE INVERT ELEVATION TAG EXISTING PIPE TAG PIPING BEING DEMOLISHED	18x12" SQUARE DUCT SIZE TAG (WIDTH x HEIGHT) 18x12" OVAL DUCT SIZE TAG (WIDTH / HEIGHT) 18Ø ROUND DUCT SIZE TAG (DIAMETER) 18Ø SPIRAL DUCT SIZE TAG (DIAMETER) EXISTING DUCT TAG DUCT BEING DEMOLISHED SUPPLY AIR CONDITIONED OUTSIDE AIR OUTSIDE AIR RETURN AIR TRANSFER AIR EXHAUST AIR RELIEF AIR GREASE EXHAUST AIR CONDENSATE EXHAUST AIR SMOKE EXHAUST AIR 6Ø FLUE COMBUSTION AIR DROP 1/2" X 1/2" RECTANGULAR SUPPLY/OUTSIDE AIR DUCT RISE DROP 1/2" X 1/2" ROUND SUPPLY/OUTSIDE AIR DUCT RISE DROP 1/2" X 1/2" RECTANGULAR RETURN/TRANSFER AIR DUCT RISE DROP 1/2" X 1/2" ROUND RETURN/TRANSFER AIR DUCT RISE DROP 1/2" X 1/2" RECTANGULAR EXHAUST/RELIEF AIR DUCT RISE DROP 1/2" X 1/2" ROUND EXHAUST/RELIEF AIR DUCT RISE	CHILLED WATER RETURN CHILLED WATER SUPPLY CONDENSATE DRAINAGE CONDENSER WATER RETURN CONDENSER WATER SUPPLY GEOTHERMAL WATER RETURN GEOTHERMAL WATER SUPPLY HEATING WATER RETURN HEATING WATER SUPPLY NATURAL GAS PROPANE GAS REFRIGERANT-LIQUID REFRIGERANT-SUCTION REFRIGERANT-HOT GAS STEAM CONDENSATE RETURN	GENERAL MECHANICAL NOTES <p>CONTENT</p> <p>1 SUBMISSION OF PROPOSAL IN CONNECTION WITH THIS WORK SHALL IMPLY THAT THE BIDDER HAS EXAMINED THE JOB SITE UNDER WHICH HE WILL BE OBLIGATED TO OPERATE SHOULD HE BE AWARDED THE WORK UNDER THIS CONTRACT. NO EXTRA CHARGE WILL BE ALLOWED FOR FAILURE OF ANY BIDDER TO EXAMINE THE SITE PRIOR TO BID.</p> <p>2 DUCT SIZES SHOWN ARE CLEAR INNER DIMENSIONS. CONTRACTOR SHALL MAKE ALLOWANCE FOR ANY INTERIOR LINING, INSULATION, ETC. DUCT DIMENSIONS LISTED ON DRAWINGS REPRESENT THE AIRFLOW FREE AREAS AND DO NOT HAVE ALLOWANCES FOR INSULATION LINER, WHERE APPLICABLE, INSIDE THE DUCTS, OR DUAL WALL DIMENSIONS. DUCTS SHALL BE CONSTRUCTED TO INCLUDE INSULATION REQUIREMENTS AND MAINTAIN AIRFLOW SPECIFICATIONS INDICATED ON PLANS. FOR CLASH COORDINATION INCLUDE INSULATION THICKNESS PER SCHEDULE, INSTALL, SUPPORT, & BRACE NEW WIRING AND ACCESSORIES PER SMACNA GUIDELINES.</p> <p>3 ALL WORK SHALL CONFORM TO STATE AND LOCAL CODES, RULES, REGULATIONS, AND ORDINANCES WHICH SHALL TAKE PRECEDENCE OVER THE PLANS IF CONFLICTS EXIST BETWEEN THEM.</p> <p>4 THE DRAWINGS ESTABLISH THE GENERAL LAYOUT REQUIREMENTS FOR EQUIPMENT, FIXTURES, PIPING, DUCTWORK, ETC. FINAL LAYOUT SHALL BE MODIFIED TO FIT ACTUAL SITE CONDITIONS. INSTALL EQUIPMENT PER MANUFACTURER'S RECOMMENDATIONS. ROOFTOP EQUIPMENT SHALL BE LOCATED NO CLOSER THAN 10' FROM THE ROOF EDGE. ALL REQUIRED REVISIONS SHALL BE RECORDED ON A DESIGNATED HARD COPY SET OF REDLINE PLANS TO BE KEPT CURRENT TO JOBSITE PROGRESS. AT MINIMUM, THIS DOCUMENT SHALL BE UPDATED WEEKLY BY CONTRACTOR AND READILY AVAILABLE FOR REVIEW AND REFERENCE.</p> <p>5 COORDINATE ALL WORK WITH THE OWNER AND ALL OTHER CONTRACTORS. CONTRACTOR SHALL BE RESPONSIBLE FOR ALL RIGGING, HANDLING, AND PROTECTION OF MATERIALS. PROVIDE LABOR TO RECEIVE, UNLOAD, STORE, PROTECT, AND TRANSFER TO POINT OF INSTALLATION OF ANY OWNER-FURNISHED ITEMS.</p> <p>6 IN CASES OF EQUIPMENT SUBSTITUTION, CONTRACTOR IS RESPONSIBLE FOR VERIFYING THAT ALL SYSTEM COMPONENTS WILL BE PROPERLY INSTALLED. IF FIELD CONDITIONS ALLOW, INSTALLED DUCCTS MAY BE REBEDDED BY THE CONTRACTOR TO FIT FIELD CONDITIONS AS LONG AS THE INSTALLED DUCCTS SHALL HAVE EQUAL FRICTION LOSS AS THOSE SHOWN. PROVIDE COMPLETE SHEET METAL SHOP DRAWINGS TO ENGINEER SHOWING ACTUAL DUCT SIZES, ARRANGEMENTS, AND UNIT LOCATIONS TO BE INSTALLED. THIS SHALL BE DONE PRIOR TO FABRICATION OR INSTALLATION.</p> <p>7 INSTALL RADIUS TYPE ELBOWS IN RECTANGULAR DUCTS WHERE POSSIBLE.</p> <p>8 USE 45 DEGREE TAKE-OFF FITTINGS AT ALL ROUND SUPPLY BRANCH TAKEOFFS. PROVIDE BALANCE DAMPERS AT ALL SUPPLY DUCT RUNOUTS TO GRILLES. LOCATE AS FAR AS POSSIBLE FROM GRILLES IN AN ACCESSIBLE LOCATION. PROVIDE ACCESS PANELS IN SOLID WALLS AND CEILINGS FOR BALANCING DAMPERS.</p> <p>9 USE FLEX DUCTS FOR FINAL CONNECTION TO ALL CEILING DIFFUSERS, AND WHERE NECESSARY, SIDEWALL DIFFUSERS, AND LIMIT TO 3 MAX LENGTHS.</p> <p>10 PROVIDE A COMPLETE AND OPERATING MECHANICAL SYSTEM, INCLUDING ALL INCIDENTAL ITEMS AND CONNECTIONS NECESSARY FOR PROPER OPERATION OR CUSTOMARILY INCLUDED, EVEN THOUGH EACH AND EVERY ITEM MAY NOT BE INDICATED.</p> <p>11 THE MECHANICAL INSTALLATION SHALL BE GAFF, RELIABLE, ENERGY EFFICIENT AND EASILY MAINTAINED WITH ADEQUATE PROVISIONS ALLOWED FOR ACCESS TO EQUIPMENT. CONTRACTOR SHALL ENGAGE A TESTING AND BALANCING FIRM CERTIFIED BY AIA TO PERFORM TESTING AND BALANCING PROCEDURES ON EACH SYSTEM ACCORDING TO THE PROCEDURES CONTAINED IN AABC'S NATIONAL STANDARDS.</p> <p>12 THE MECHANICAL SYSTEM SHALL OPERATE QUIETLY WITH NOISE LEVELS BELOW THE CRITERIA RECOMMENDED FOR THE APPLICATION AS BY ASHRAE. PROVIDE CORRECTIVE ACTION AS REQUIRED TO REDUCE OBJECTIVE NOISE OR VIBRATION.</p> <p>13 UNDERCUT DOORS 3/4 INCH WHERE NO RETURN NOR EXHAUST GRILLE IS SHOWN TO ALLOW FOR AIR TRANSFER (DO NOT UNDERCUT FIREDOORS). ALL TRANSFER DUCTWORK SHALL BE INTERNALLY LINED WITH MINIMUM 1/2" ACOUSTIC LINING).</p> <p>14 REFER TO ARCH. PLANS AND DETAILS FOR EXACT LOCATION OF ALL WALL AND CEILING MOUNTED DEVICES. ADJUST LOCATION OF SIDEWALL DEVICES AS NECESSARY TO AVOID INTERFERENCE WITH MOLDING OR OTHER ELECTRICAL DEVICES.</p> <p>15 WHERE CONDUIT, CABLES, DUCTWORK OR PIPING PASSES THROUGH FIRE-RATED FLOORS OR WALLS, THE SLEEVES SHALL BE COMPLETELY SEALED WITH A FIRE STOP MATERIAL THAT IS UL LISTED AND ACCEPTED BY LOCAL AUTHORITIES HAVING JURISDICTION (AHJ) AS BEING SUITABLE FOR THIS SERVICE SUCH AS DOWN CORNING CORP. "SILICONE ELASTOMER, RTV FOAM, OR SIMILAR MATERIAL TO MAINTAIN FIRE RATING OF THE WALL OR FLOOR.</p> <p>16 CONTRACTOR SHALL BE RESPONSIBLE FOR ALL COORDINATING BEAM PENETRATIONS AS IT RELATED TO HIS WORK. ANY REQUIRED BEAM PENETRATIONS MUST BE COORDINATED WITH THE STRUCTURAL ENGINEER PRIOR TO BEGINNING WORK.</p> <p>17 PROVIDE FLAT BLADE MANUAL VOLUME DAMPERS AT ALL TERMINAL DUCT BRANCHES AND AS INDICATED. CONTRACTOR SHALL NOT INSTALL ANY MAINTENANCE ITEMS ABOVE HARD CEILINGS. THIS SHALL INCLUDE VALVES, DAMPERS, OR ANY OTHER ITEMS THAT REQUIRE ACCESS AFTER CONSTRUCTION IS COMPLETED. IF INSTALLATION ABOVE A HUNG CEILING OF THESE ITEMS CANNOT BE AVOIDED, THEN PROVIDE CEILING ACCESS DOORS EQUAL TO ACUDOR MODEL FW-505 WHERE REQUIRED. AT FIRE-RATED WALLS, USE EQUIVALENT OF ACUDOR MODEL FW-506. MINIMUM SIZE SHALL BE 12x12". USE 18x18" WHEN PERSONNEL ACCESS IS REQUIRED.</p> <p>18 PROVIDE AN INSULATED BACK ON ALL THERMOSTATS AND TEMPERATURE SENSORS THAT ARE MOUNTED ON CMU OR CONCRETE WALLS. PROVIDE SHALLOW DEVICE EXTENSION BOX BEHIND T-STATS AND SENSORS ON MASONRY WALLS IN COMMERCIAL/ RETAIL SPACES.</p> <p>19 PROVIDE FIRE DAMPERS AT ALL FIRE-RATED WALLS AND FLOOR PENETRATIONS. REFER TO ARCHITECTURAL DRAWINGS FOR FIRE BARRIER WALLS AND CEILINGS.</p> <p>20 IF A CENTRAL FIRE ALARM SYSTEM IS REQUIRED FOR THIS PROJECT, MECHANICAL CONTRACTOR SHALL COORDINATE DUCT WORK WITH THE SAME CONTRACTOR AS THE FIRE ALARM CONTRACTOR. REFER TO ELECTRICAL NOTES FOR EXACT REQUIREMENTS. MECHANICAL CONTRACTOR SHALL IDENTIFY A SET OF TERMINALS FOR EQUIPMENT SHUTDOWN ON ALL FAN POWERED EQUIPMENT REQUIRING SHUTDOWN CONTROLS. FIRE ALARM CONTRACTOR SHALL WIRE FROM DUCT MOUNTED SMOKE DETECTOR TO SHUTDOWN TERMINALS TO SHUT DOWN FAN OPERATION WHEN SMOKE IS DETECTED.</p> <p>21 AT PENETRATIONS THROUGH FIRE WALLS; ANY NON-METALLIC PIPE OR DUCT SHOULD BE EXTERNALLY SLEEVED WITH STEEL, FERROUS, OR COPPER MATERIALS, SECURELY FASTENED TO THE FIRE RATED ASSEMBLY, AND ANY SPACE BETWEEN THE SLEEVE AND THE ASSEMBLY PENETRATED SHALL BE PROTECTED USING MATERIAL THAT CONFORMS TO ASTM E 814 OR UL 1479, SUCH AS FIRE STOP FS-1900, OR FLAME STOPPER 500.</p> <p>22 MECHANICAL CONTRACTOR SHALL PROVIDE AND INSTALL ALL DAMPERS WITH MOTORIZED ACTUATORS AND INSMO SMOKE DETECTORS AND PROVIDE WIRING FOR FAN SHUTDOWN CONTROLS. COORDINATE WITH ELECTRICAL CONTRACTOR AND PROVIDE DAMPER ACTUATOR COMPATIBLE WITH ELECTRICAL WIRING PROVIDED. PROVIDE ANY WIRING OR COMPONENTS NOT PROVIDED BY THE ELECTRICAL CONTRACTOR THAT ARE REQUIRED TO PROVIDE A COMPLETE AND OPERATIONAL SYSTEM.</p> <p>23 AHEAD OF ALL VAV BOX INLETS, INSTALL STRAIGHT DUCT EQUIVALENT TO AT LEAST 4 DIAMETERS IN LENGTH WHETHER SHOWN ON PLANS OR NOT.</p> <p>24 NO RECTANGULAR DUCT SMALLER THAN 8x8"</p> <p>25 ANY LINE VOLTAGE WIRING ASSOCIATED WITH MECHANICAL SYSTEMS SHALL BE INSTALLED BY A LICENSED ELECTRICAL CONTRACTOR IN STRICT ACCORDANCE WITH THE ELECTRICAL PLANS, NOTES, AND SPECIFICATIONS.</p> <p>26 WHERE DUCT PASS THROUGH 1 HOUR FIRE RATED WALL A FIRE DAMPER SHALL BE INSTALLED, IF WALL IS RATED AT 2 HOURS OR MORE THERE SHALL BE A FIRE SMOKE DAMPER.</p>	<p>1 PROVIDE VIBRATION AND SEISMIC CONTROLS FOR MECHANICAL PIPING AND EQUIPMENT. COORDINATE ALL VIBRATION ISOLATION DEVICE INSTALLATION AND SEISMIC BRACING FOR MECHANICAL PIPING AND EQUIPMENT WITH OTHER SYSTEMS AND EQUIPMENT IN THE VICINITY, INCLUDING OTHER SUPPORTS AND RESTRAINTS, IF ANY.</p> <p>2 TESTING AGENCY QUALIFICATIONS: AN INDEPENDENT AGENCY, WITH THE EXPERIENCE AND CAPABILITY TO CONDUCT THE TESTING INDICATED, THAT IS AN NRTL AS DEFINED BY OSHA IN 29 CFR 1910.7 AND THAT IS ACCEPTABLE TO AUTHORITIES HAVING JURISDICTION.</p> <p>3 COMPLY WITH SEISMIC RESTRAINT REQUIREMENTS IN THE INTERNATIONAL BUILDING CODE.</p> <p>4 WELDING QUALIFICATIONS: QUALITY PROCEDURES AND PERSONNEL ACCORDING TO AWS D1.1/D1.1M. "STRUCTURE WELDING CODE-STEEL."</p> <p>5 SEISMIC-RESTRAINT DEVICES SHALL HAVE HORIZONTAL AND VERTICAL LOAD TESTING AND ANALYSIS AND SHALL BEAR ANCHORAGE PRE-APPROVAL OPA NUMBER FROM OSHPD, PRE-APPROVAL BY ICC-ES, OR PRE-APPROVAL BY ANOTHER AGENCY ACCEPTABLE TO AUTHORITIES HAVING JURISDICTION. SHALL NOT BE USED ON SHEET METAL. RATINGS BASED ON INDEPENDENT TESTING ARE PREFERRED TO RATINGS BASED ON CALCULATIONS. IF PRE-APPROVED RATINGS ARE UNAVAILABLE, SUBMITTALS BASED ON INDEPENDENT TESTING ARE PREFERRED. CALCULATIONS (INCLUDING COMBINING SHEAR AND TENSILE LOADS) TO SUPPORT SEISMIC RESTRAINT DESIGNS MUST BE SIGNED AND SEALED BY A QUALIFIED PROFESSIONAL ENGINEER.</p> <p>6 BUILDING IS CLASSIFIED AS SEISMIC DESIGN CATEGORY B. CONTRACTOR SHALL PROVIDE SEISMIC BRACING FOR PIPING, DUCTWORK AND EQUIPMENT TO MEET ALL LOCAL AND NATIONAL CODE REQUIREMENTS.</p> <p>7 CONTRACTOR'S RESPONSIBILITIES SHALL INCLUDE PROVIDING ALL SUBMITTALS AND DETAILS WITH STRUCTURAL ENGINEER'S CERTIFICATION FOR PERMITTING.</p> <p>8 SEISMIC PROTECTION FOR CONDUITS OF ALL BUILDING SYSTEMS INCLUDING BUT NOT LIMITED TO MECHANICAL, PLUMBING, AND ELECTRICAL MUST MEET MINIMUM REQUIREMENTS OF ALL APPLICABLE CODES FOR BUILDINGS CLASSIFIED SEISMIC PROTECTION MEASURES TO BE APPLIED SHALL BE INSTALLED IN STRICT ACCORDANCE WITH ALL APPLICABLE LOCAL, STATE, AND/OR FEDERAL CODES AND WITH MANUFACTURER'S REQUIREMENTS. THE MOST STRINGENT SHALL APPLY</p>	
ABBREVIATIONS			PROJECT GENERAL NOTES <p>A COORDINATE INSTALLATION OF PIPING, DUCTWORK, CONDUIT, LIGHTS, CABLE TRAY, STRUCTURE, EQUIPMENT TO PREVENT CONFLICTS.</p> <p>B FINAL PRODUCT SHALL BE A COMPLETE AND FUNCTIONING SYSTEM, AND SHALL CONFORM TO ALL REQUIREMENTS OF APPLICABLE FEDERAL, STATE, AND LOCAL CODES, INCLUDING BUT NOT LIMITED TO THE INTERNATIONAL BUILDING CODE AND INTERNATIONAL MECHANICAL CODE.</p> <p>C LOCATE EQUIPMENT REQUIRING ACCESS 2'-0" MAXIMUM ABOVE CEILING.</p> <p>D LOCATE DUCTWORK, PIPING AND MECHANICAL EQUIPMENT AWAY FROM THE SPACE ABOVE ELECTRICAL PANELS, TRANSFORMERS AND OTHER ELECTRICAL EQUIPMENT.</p> <p>E PENETRATIONS OF RATED ASSEMBLIES SHALL BE FIRE STOPPED. FIRE STOPPING SHALL BE APPROVED MATERIAL AS PRESCRIBED IN CSMF STANDARD 43-1 AND SHALL BE LISTED.</p> <p>F COORDINATE ALL EXTERIOR PENETRATIONS INCLUDING ROOF PENETRATIONS WITH OTHER TRADES TO PROVIDE A COMPLETE AND FULLY WEATHER-PROOF INSTALLATION. PROVIDE SLEEVES AND/OR OPENINGS TO RUN PIPES AND DUCTS THROUGH FOUNDATIONS, FLOORS, WALLS, AND ROOF.</p> <p>G MAINTAIN CLEAR ACCESS TO SERVICE EQUIPMENT AND OTHER ACCESSORIES REQUIRING SERVICE, VISUAL INSPECTION OR HAND OPERATION. WHERE INDICATED OR REQUIRED, PROVIDE ACCESS PANELS OF THE TYPE SELECTED TO SUIT MATERIALS IN WHICH INSTALLED.</p> <p>H ADJUST PIPING AND DUCTWORK SIZES TO PROPERLY CONNECT TO MECHANICAL EQUIPMENT.</p> <p>I REFER TO HVAC OR PLUMBING DRAWINGS FOR GAS AND A.C. CONDENSATE DRAIN PIPING. ALL PRIMARY CONDENSATE DRAIN PIPING SHALL BE INSULATED TO A MINIMUM THICKNESS OF 1/2" AND SHALL INCLUDE A VAPOR RETARDANT OUTSIDE THE INSULATION. SEAL ALL JOINTS AND PENETRATIONS.</p> <p>J PIPE SIZES SHOWN SHALL BE CONTINUED IN THE DIRECTION OF FLOW UNTIL ANOTHER SIZE IS SHOWN.</p> <p>K FOR DETAILS, EQUIPMENT CONNECTIONS, AND PIPE SIZES NOT SHOWN ON THE SEGMENTS, REFER TO DETAILS, SCHEDULES, AND SPECIFICATIONS.</p> <p>L INSTALL ALL EQUIPMENT IN ACCORDANCE WITH THE RESPECTIVE MANUFACTURER'S WRITTEN INSTALLATION INSTRUCTIONS, AT A LEVEL OF QUALITY AND WORKMANSHIP CONSISTENT WITH THE SPECIFICATIONS.</p> <p>M LOCATIONS OF PIPING, DUCTWORK AND EQUIPMENT AS INDICATED ON THE DRAWING, ARE APPROXIMATE AND SUBJECT TO MINOR ADJUSTMENTS IN THE FIELD. WORK SHALL BE COORDINATED WITH ALL OTHER TRADES TO AVOID INTERFERENCE IN THE FIELD.</p> <p>N INSTALL EXPOSED PIPING AND DUCTWORK AS HIGH AS PRACTICAL IN ROOMS WITHOUT CEILINGS.</p> <p>O THE CONTRACTOR'S WORK SCHEDULE SHALL BE SUBMITTED TO AND APPROVED BY THE OWNER.</p> <p>P PRIOR TO STARTING WORK, SUBMIT SHOP DRAWINGS FOR ALL MECHANICAL EQUIPMENT, PLUMBING FIXTURES, AND DIFFUSERS.</p> <p>Q CONTRACTOR SHALL OBTAIN AND PAY FOR ALL NECESSARY PERMITS AND SHALL ARRANGE FOR ALL INSPECTIONS AS REQUIRED.</p> <p>R PROVIDE ONE YEAR WARRANTY FOR ALL WORKMANSHIP AND MATERIALS AFTER THE DATE OF FINAL ACCEPTANCE.</p>	MECHANICAL EQUIPMENT TAG LEGEND <p>HEATING COIL FLOW → VAV-XX MECHANICAL EQUIPMENT TAGS Htg: 3.7 GPM VAV BOX → RTU-XX 590 lb BOTTOM OF EQUIPMENT ELEVATION → 10'-0" NOMINAL COOLING CAPACITY → 4.0 ton RTU-XX EXISTING EQUIPMENT TO REMAIN → VAV-XX EXISTING RELOCATED EQUIPMENT → VAV-XX FUEL INPUT GAS PIPE FLOW → 115000 Btu/h 115 CFH EQUIPMENT BY OTHERS (REFER TO OTHER DISCIPLINE FOR ADDITIONAL INFORMATION) → VAV-XX DATA DEVICE TAGS CARBON DIOXIDE SENSOR → C02 GI → RTU-XX TEMPERATURE & HUMIDITY SENSOR CARBON MONOXIDE SENSOR → CO TS → VAV-XX TEMPERATURE SENSOR NITROGEN DIOXIDE SENSOR → NO2 T → RTU-XX THERMOSTAT HUMIDITY SENSOR → HS MS → RTU-XX MANUAL SWITCH HUMIDISTAT → H S → RTU-XX SENSOR DAMPER TAGS COMB. FIRE/SMOKE DAMPER → F S → RTU-XX FS → RTU-XX MANUAL BALANCING DAMPER FIRE DAMPER → M D → RTU-XX MOTORIZED DAMPER BACKDRAFT DAMPER BMS CONTROL PANEL → HVAC-CP-X 12'x12" S/A </p>	M&P SHEET INDEX <p>MP-000 MECHANICAL LEGEND MP-001 PLUMBING LEGEND MP-101 M&P PLAN MP-500 MECHANICAL DETAILS MP-501 PLUMBING DETAILS MP-502 PLUMBING DETAILS MP-600 M&P SCHEDULES MP-900 PLUMBING RISERS MP-901 MECHANICAL SPECIFICATIONS MP-902 PLUMBERING SPECIFICATIONS MP-903 PLUMBING SPECIFICATIONS MP-904 PLUMBING SPECIFICATIONS</p>
EQUIPMENT ABBREVIATIONS					
<small>* NOTE *</small> ALL OF GENERAL NOTES ON THIS SHEET ARE TO BE APPLIED TO ALL OTHER DRAWINGS IN THIS SET. THE SYMBOLS AND ABBREVIATIONS SHOWN ON THIS SHEET MAY OR MAY NOT BE USED IN THIS SET OF DRAWINGS.					



PROJECT NUMBER 201253R

PLUMBING LEGEND

MP-001

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GENERAL SYMBOLS LEGEND <ul style="list-style-type: none"> Revision number - shown on plans Point where new connects to existing Number of detail on sheet Number of sheet where detail appears Keynote Continuation symbol Room # Room name and number Item to be demolished Area not in contract 2" Pipe size tag (diameter) Above ground piping 1/8" / 12" slope pipe slope tag Below ground piping Invert: -105' - 1" Pipe invert elevation tag (E) Existing pipe tag Piping being demolished ABBREVIATIONS <table border="1"> <tr><td>Ø</td><td>ROUND</td><td>LVR</td><td>LOUVER</td></tr> <tr><td>ABV</td><td>ABOVE</td><td>LWT</td><td>LEAVING WATER TEMPERATURE</td></tr> <tr><td>AC</td><td>AIR CONDITIONING</td><td>M/A</td><td>MIXED AIR</td></tr> <tr><td>AD</td><td>AREA DRAIN</td><td>MAX</td><td>MAXIMUM</td></tr> <tr><td>ADD</td><td>ADDENDUM</td><td>MBH</td><td>ONE THOUSAND BTU PER HOUR</td></tr> <tr><td>AFF</td><td>ABOVE FINISHED FLOOR</td><td>MCF</td><td>ONE THOUSAND CUBIC FEET</td></tr> <tr><td>AFUE</td><td>ANNUAL FUEL UTILIZATION EFFICIENCY</td><td>MD</td><td>MOTORIZED DAMPER</td></tr> <tr><td>AL</td><td>ACCESS</td><td>MCH</td><td>MACHINERY</td></tr> <tr><td>AP</td><td>ACCESS PANEL</td><td>MFR</td><td>MANUFACTURER</td></tr> <tr><td>ARCH</td><td>ARCHITECT/ARCHITECTURAL</td><td>MIN</td><td>MINIMUM</td></tr> <tr><td>BFF</td><td>BELOW FINISHED FLOOR</td><td>MISC</td><td>MISCELLANEOUS</td></tr> <tr><td>BLW</td><td>BELLOW</td><td>MTR</td><td>MOTOR</td></tr> <tr><td>BTU</td><td>BRITISH THERMAL UNITS</td><td>MUJA</td><td>MAKE-UP/AIR</td></tr> <tr><td>BTUH</td><td>BRITISH THERMAL UNITS PER HOUR</td><td>NC</td><td>NOISE CRITERIA</td></tr> <tr><td>CAP</td><td>CAPACITY</td><td>NC</td><td>NORMALLY CLOSED</td></tr> <tr><td>CB</td><td>CATCH BASIN</td><td>NIC</td><td>NOT IN CONTRACT</td></tr> <tr><td>CFM</td><td>CUBIC FEET PER MINUTE</td><td>NO</td><td>NUMBER</td></tr> <tr><td>CLG</td><td>CEILING</td><td>NO</td><td>NORMALLY OPEN</td></tr> <tr><td>CO</td><td>CLEAN OUT</td><td>NTS</td><td>NOT TO SCALE</td></tr> <tr><td>CW</td><td>COLD WATER</td><td>O</td><td>OXYGEN</td></tr> <tr><td>D</td><td>DEGREE</td><td>O/A</td><td>OUTSIDE AIR</td></tr> <tr><td>DB</td><td>DRY BULB</td><td>ORD</td><td>OVERFLOW ROOF DRAIN</td></tr> <tr><td>DIA</td><td>DIAMETER</td><td>PD</td><td>PRESSURE DROP</td></tr> <tr><td>DN</td><td>DIAMETER</td><td>PIV</td><td>PIPE INDICATOR VALVE</td></tr> <tr><td>DW</td><td>DISTILLED WATER</td><td>PLB</td><td>PLUMBING</td></tr> <tr><td>EA</td><td>EACH</td><td>PRESS</td><td>PRESSURE</td></tr> <tr><td>EAT</td><td>ENTERING AIR TEMPERATURE</td><td>PRV</td><td>PRESSURE REDUCING VALVE</td></tr> <tr><td>ELEC</td><td>ELECTRICAL</td><td>PSI</td><td>POUNDS PER SQUARE INCH</td></tr> <tr><td>EQUIP</td><td>EQUIPMENT</td><td>PSIG</td><td>POUNDS PER SQUARE INCH GAUGE</td></tr> <tr><td>EWC</td><td>ELECTRIC WATER COOLER</td><td>PWR</td><td>POWER</td></tr> <tr><td>EWT</td><td>ENTERING WATER TEMPERATURE</td><td>R</td><td>DUCT RISER</td></tr> <tr><td>E/A</td><td>EXHAUST AIR</td><td>R/A</td><td>RETURN AIR</td></tr> <tr><td>EXIST</td><td>EXISTING</td><td>RCP</td><td>RADIANT CEILING PANEL</td></tr> <tr><td>F</td><td>DEGREES FAHRENHEIT</td><td>RD</td><td>ROOF DRAIN</td></tr> <tr><td>FCO</td><td>FLOOR CLEAN OUT</td><td>REC</td><td>RECESSED</td></tr> <tr><td>FDC</td><td>FIRE DEPARTMENT CONNECTION</td><td>RH</td><td>RELATIVE HUMIDITY</td></tr> <tr><td>FL</td><td>FLOOR</td><td>RUA</td><td>REFRESH AIR</td></tr> <tr><td>FO</td><td>FUEL OIL</td><td>RM</td><td>ROOM</td></tr> <tr><td>FOV</td><td>FUEL OIL VENT</td><td>RPM</td><td>REVOLUTIONS PER MINUTE</td></tr> <tr><td>FOR</td><td>FUEL OIL RETURN</td><td>RW</td><td>RAIN WATER</td></tr> <tr><td>FOS</td><td>FUEL OIL SUPPLY</td><td>SF</td><td>SQUARE FOOT</td></tr> <tr><td>FPM</td><td>FEET PER MINUTE</td><td>SIA</td><td>SUPPLY AIR</td></tr> <tr><td>FS</td><td>FLOOR SINK</td><td>SAN</td><td>SANITARY</td></tr> <tr><td>FT</td><td>FOOT/FEET</td><td>SF</td><td>SQUARE FOOT</td></tr> <tr><td>FTR</td><td>FIN TUBE RADIATION</td><td>SD</td><td>SMOKE DAMPER</td></tr> <tr><td>GAL</td><td>GALLON</td><td>SM</td><td>SURFACE MOUNT</td></tr> <tr><td>GF</td><td>GAS-FIRED</td><td>SP</td><td>STANDPIPE</td></tr> <tr><td>GC</td><td>GENERAL CONTRACTOR</td><td>SP</td><td>STATIC PRESSURE</td></tr> <tr><td>GPM</td><td>GALLONS PER MINUTE</td><td>STM</td><td>STEAM</td></tr> <tr><td>GW</td><td>GREASE WASTE</td><td>T</td><td>THERMOSTAT</td></tr> <tr><td>HW</td><td>HOSE BIB</td><td>TD</td><td>TEMPERATURE DROP</td></tr> <tr><td>HP</td><td>HORSE POWER</td><td>TDR</td><td>TOUCH DRAIN</td></tr> <tr><td>HTC</td><td>HTC</td><td>TEMP</td><td>TEMPERATURE</td></tr> <tr><td>HTR</td><td>HEATER</td><td>TYP</td><td>TYPICAL</td></tr> <tr><td>HW</td><td>HOT WATER</td><td>UG</td><td>UNDERGROUND</td></tr> <tr><td>HYD</td><td>HYDRANT</td><td>VAC</td><td>VACUUM</td></tr> <tr><td>ID</td><td>INDIRECT</td><td>V</td><td>VENT</td></tr> <tr><td>IN</td><td>INCH</td><td>VAV</td><td>VARIABLE AIR VOLUME</td></tr> <tr><td>INV</td><td>INVERT</td><td>VENT</td><td>VENTILATION</td></tr> <tr><td>LB</td><td>POUND</td><td>VTR</td><td>VENT THROUGH ROOF</td></tr> <tr><td>LB/HR</td><td>POUNDS PER HOUR</td><td>W</td><td>WASTE</td></tr> <tr><td>LAT</td><td>LEAVING AIR TEMPERATURE</td><td>WB</td><td>WET BULB</td></tr> <tr><td>LP</td><td>LOW PRESSURE</td><td>WCO</td><td>WALL CLEAN OUT</td></tr> <tr><td>LPG</td><td>LIQUEFIED PETROLEUM GAS</td><td>WH</td><td>WALL HYDRANT</td></tr> </table> EQUIPMENT ABBREVIATIONS <table border="1"> <tr><td>AC</td><td>AIR CONDITIONING UNIT</td><td>FCU</td><td>FAN COIL UNIT</td></tr> <tr><td>ACCU</td><td>AIR COOLING CONDENSING UNIT</td><td>FP</td><td>FIRE PUMP</td></tr> <tr><td>AHU</td><td>AIR HANDLING UNIT</td><td>GI</td><td>GREASE INTERCEPTOR</td></tr> <tr><td>AS</td><td>AIR SEPARATOR</td><td>GWH</td><td>GAS WATER HEATER</td></tr> <tr><td>B</td><td>BOILER</td><td>HWP</td><td>HEATING WATER PUMP</td></tr> <tr><td>CH</td><td>CHILLER</td><td>HRU</td><td>HEAT RECOVERY UNIT</td></tr> <tr><td>CT</td><td>COOLING TOWER</td><td>JS</td><td>JANITOR SINK</td></tr> <tr><td>CHU</td><td>CHILLED WATER HEATER</td><td>OB</td><td>OUTLET BOX</td></tr> <tr><td>CHWP</td><td>CHILLED WATER PUMP</td><td>PRV</td><td>POWER OF VENTILATOR</td></tr> <tr><td>CP</td><td>CIRCULATION PUMP</td><td>RE</td><td>RETURN/EXHAUST FAN</td></tr> <tr><td>DBP</td><td>DOMESTIC WATER BOOSTER PUMP</td><td>RTU</td><td>ROOFTOP UNIT</td></tr> <tr><td>DC</td><td>DUCT MOUNTED COIL</td><td>SP</td><td>SUMP PUMP</td></tr> <tr><td>DCP</td><td>DOMESTIC WATER CIRCULATING PUMP</td><td>UH</td><td>UNIT HEATER</td></tr> <tr><td>ET</td><td>EXPANSION TANK</td><td>WH</td><td>WATER HEATER</td></tr> <tr><td>EWH</td><td>ELECTRIC WATER HEATER</td><td></td><td></td></tr> </table> <p>*NOTE* ALL OF GENERAL NOTES ON THIS SHEET ARE TO BE APPLIED TO ALL OTHER DRAWINGS IN THIS SET. THE SYMBOLS AND ABBREVIATIONS SHOWN ON THIS SHEET MAY OR MAY NOT BE USED IN THIS SET OF DRAWINGS.</p>	Ø	ROUND	LVR	LOUVER	ABV	ABOVE	LWT	LEAVING WATER TEMPERATURE	AC	AIR CONDITIONING	M/A	MIXED AIR	AD	AREA DRAIN	MAX	MAXIMUM	ADD	ADDENDUM	MBH	ONE THOUSAND BTU PER HOUR	AFF	ABOVE FINISHED FLOOR	MCF	ONE THOUSAND CUBIC FEET	AFUE	ANNUAL FUEL UTILIZATION EFFICIENCY	MD	MOTORIZED DAMPER	AL	ACCESS	MCH	MACHINERY	AP	ACCESS PANEL	MFR	MANUFACTURER	ARCH	ARCHITECT/ARCHITECTURAL	MIN	MINIMUM	BFF	BELOW FINISHED FLOOR	MISC	MISCELLANEOUS	BLW	BELLOW	MTR	MOTOR	BTU	BRITISH THERMAL UNITS	MUJA	MAKE-UP/AIR	BTUH	BRITISH THERMAL UNITS PER HOUR	NC	NOISE CRITERIA	CAP	CAPACITY	NC	NORMALLY CLOSED	CB	CATCH BASIN	NIC	NOT IN CONTRACT	CFM	CUBIC FEET PER MINUTE	NO	NUMBER	CLG	CEILING	NO	NORMALLY OPEN	CO	CLEAN OUT	NTS	NOT TO SCALE	CW	COLD WATER	O	OXYGEN	D	DEGREE	O/A	OUTSIDE AIR	DB	DRY BULB	ORD	OVERFLOW ROOF DRAIN	DIA	DIAMETER	PD	PRESSURE DROP	DN	DIAMETER	PIV	PIPE INDICATOR VALVE	DW	DISTILLED WATER	PLB	PLUMBING	EA	EACH	PRESS	PRESSURE	EAT	ENTERING AIR TEMPERATURE	PRV	PRESSURE REDUCING VALVE	ELEC	ELECTRICAL	PSI	POUNDS PER SQUARE INCH	EQUIP	EQUIPMENT	PSIG	POUNDS PER SQUARE INCH GAUGE	EWC	ELECTRIC WATER COOLER	PWR	POWER	EWT	ENTERING WATER TEMPERATURE	R	DUCT RISER	E/A	EXHAUST AIR	R/A	RETURN AIR	EXIST	EXISTING	RCP	RADIANT CEILING PANEL	F	DEGREES FAHRENHEIT	RD	ROOF DRAIN	FCO	FLOOR CLEAN OUT	REC	RECESSED	FDC	FIRE DEPARTMENT CONNECTION	RH	RELATIVE HUMIDITY	FL	FLOOR	RUA	REFRESH AIR	FO	FUEL OIL	RM	ROOM	FOV	FUEL OIL VENT	RPM	REVOLUTIONS PER MINUTE	FOR	FUEL OIL RETURN	RW	RAIN WATER	FOS	FUEL OIL SUPPLY	SF	SQUARE FOOT	FPM	FEET PER MINUTE	SIA	SUPPLY AIR	FS	FLOOR SINK	SAN	SANITARY	FT	FOOT/FEET	SF	SQUARE FOOT	FTR	FIN TUBE RADIATION	SD	SMOKE DAMPER	GAL	GALLON	SM	SURFACE MOUNT	GF	GAS-FIRED	SP	STANDPIPE	GC	GENERAL CONTRACTOR	SP	STATIC PRESSURE	GPM	GALLONS PER MINUTE	STM	STEAM	GW	GREASE WASTE	T	THERMOSTAT	HW	HOSE BIB	TD	TEMPERATURE DROP	HP	HORSE POWER	TDR	TOUCH DRAIN	HTC	HTC	TEMP	TEMPERATURE	HTR	HEATER	TYP	TYPICAL	HW	HOT WATER	UG	UNDERGROUND	HYD	HYDRANT	VAC	VACUUM	ID	INDIRECT	V	VENT	IN	INCH	VAV	VARIABLE AIR VOLUME	INV	INVERT	VENT	VENTILATION	LB	POUND	VTR	VENT THROUGH ROOF	LB/HR	POUNDS PER HOUR	W	WASTE	LAT	LEAVING AIR TEMPERATURE	WB	WET BULB	LP	LOW PRESSURE	WCO	WALL CLEAN OUT	LPG	LIQUEFIED PETROLEUM GAS	WH	WALL HYDRANT	AC	AIR CONDITIONING UNIT	FCU	FAN COIL UNIT	ACCU	AIR COOLING CONDENSING UNIT	FP	FIRE PUMP	AHU	AIR HANDLING UNIT	GI	GREASE INTERCEPTOR	AS	AIR SEPARATOR	GWH	GAS WATER HEATER	B	BOILER	HWP	HEATING WATER PUMP	CH	CHILLER	HRU	HEAT RECOVERY UNIT	CT	COOLING TOWER	JS	JANITOR SINK	CHU	CHILLED WATER HEATER	OB	OUTLET BOX	CHWP	CHILLED WATER PUMP	PRV	POWER OF VENTILATOR	CP	CIRCULATION PUMP	RE	RETURN/EXHAUST FAN	DBP	DOMESTIC WATER BOOSTER PUMP	RTU	ROOFTOP UNIT	DC	DUCT MOUNTED COIL	SP	SUMP PUMP	DCP	DOMESTIC WATER CIRCULATING PUMP	UH	UNIT HEATER	ET	EXPANSION TANK	WH	WATER HEATER	EWH	ELECTRIC WATER HEATER			PLUMBING AND PIPING SYMBOLS LEGEND <table 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<tr><td>S-CW</td><td>SOFT COLD WATER</td></tr> <tr><td>F-CW</td><td>FILTERED COLD WATER</td></tr> <tr><td>RO</td><td>REVERSE OSMOSIS WATER</td></tr> <tr><td>HW</td><td>HOT WATER</td></tr> <tr><td>HW-140°</td><td>HOT WATER 140°</td></tr> <tr><td>HW-R</td><td>HOT WATER RECIRCULATION</td></tr> <tr><td>HW-R-140°</td><td>HOT WATER RECIRCULATION 140°</td></tr> <tr><td>GV</td><td>GREASE VENT</td></tr> <tr><td>GW</td><td>GREASE WASTE</td></tr> <tr><td>IW</td><td>INDIRECT WASTE</td></tr> <tr><td>OV</td><td>OV</td></tr> <tr><td>OW</td><td>OIL WASTE</td></tr> <tr><td>PD</td><td>PUMP DISCHARGE</td></tr> <tr><td>V</td><td>SANITARY VENT</td></tr> <tr><td>SS</td><td>SANITARY SEWER</td></tr> <tr><td>SHWR</td><td>SOLAR HOT WATER RETURN</td></tr> <tr><td>SHWS</td><td>SOLAR HOT WATER SUPPLY</td></tr> <tr><td>SD</td><td>STORM DRAINAGE</td></tr> <tr><td>OSD</td><td>OVERFLOW STORM DRAINAGE</td></tr> <tr><td>LAB-G</td><td>LABORATORY GAS</td></tr> <tr><td>MED</td><td>MED GAS</td></tr> <tr><td>NIT</td><td>NITROGEN</td></tr> <tr><td>VAC</td><td>VACUUM</td></tr> <tr><td>WAGD</td><td>WASTE ANESTHETIC GAS DISPOSAL</td></tr> <tr><td>N2O</td><td>NITROUS OXIDE</td></tr> <tr><td>H2O2</td><td>HYDROGEN PEROXIDE</td></tr> <tr><td>O2</td><td>OXYGEN</td></tr> <tr><td>DI</td><td>DE-IONIZED WATER</td></tr> </table> <p>PIPE ACCESSORY SYMBOLS</p> <p>PLUMBING EQUIPMENT TAG LEGEND</p> <table border="1"> <tr><td>DRAIN TAGS</td><td>DRAIN SIZE</td></tr> <tr><td>FLOOR DRAIN</td><td>4" FD-1 TYPE (SEE SCHEDULE)</td><td>4" AD-6 AREA DRAIN</td></tr> <tr><td>FLOOR DRAIN</td><td>4" FD-3P "P" INDICATES PRIMER CONNECTION</td><td>4" SD-29 DECK DRAIN</td></tr> <tr><td>FLOOR SINK</td><td>4" FS-4</td><td>4" SD-12 FLOW CONTROL DRAIN</td></tr> <tr><td>HUB DRAIN</td><td>4" FD-13</td><td>4" RD-1 STORM DRAIN</td></tr> <tr><td>PLUMBING FIXTURE TAGS</td><td>TYPE (SEE SCHEDULE)</td><td>6" SD-1 COMBINATION DRAINS</td></tr> </table> <p>PIPE ACCESSORY TAG</p>	CHWR	CHILLED WATER RETURN	CHWS	CHILLED WATER SUPPLY	CD	CONDENSATE DRAINAGE	CWR	CONDENSER WATER RETURN	CWS	CONDENSER WATER SUPPLY	GWR	GEOTHERMAL WATER RETURN	GWS	GEOTHERMAL WATER SUPPLY	HWR	HEATING WATER RETURN	HWS	HEATING WATER SUPPLY	G	NATURAL GAS	PG	PROPANE GAS	REF-L	REFRIGERANT-LIQUID	REF-S	REFRIGERANT-SUCTION	REF-HG	REFRIGERANT-HOT GAS	STM	STEAM	CDR	CONDENSATE RETURN	CWV	COMBINATION WASTE & VENT	CA	COMPRESSED AIR	CW	DOMESTIC COLD WATER	H-CW	HARD COLD WATER	S-CW	SOFT COLD WATER	F-CW	FILTERED COLD WATER	RO	REVERSE OSMOSIS WATER	HW	HOT WATER	HW-140°	HOT WATER 140°	HW-R	HOT WATER RECIRCULATION	HW-R-140°	HOT WATER RECIRCULATION 140°	GV	GREASE VENT	GW	GREASE WASTE	IW	INDIRECT WASTE	OV	OV	OW	OIL WASTE	PD	PUMP DISCHARGE	V	SANITARY VENT	SS	SANITARY SEWER	SHWR	SOLAR HOT WATER RETURN	SHWS	SOLAR HOT WATER SUPPLY	SD	STORM DRAINAGE	OSD	OVERFLOW STORM DRAINAGE	LAB-G	LABORATORY GAS	MED	MED GAS	NIT	NITROGEN	VAC	VACUUM	WAGD	WASTE ANESTHETIC GAS DISPOSAL	N2O	NITROUS OXIDE	H2O2	HYDROGEN PEROXIDE	O2	OXYGEN	DI	DE-IONIZED WATER	DRAIN TAGS	DRAIN SIZE	FLOOR DRAIN	4" FD-1 TYPE (SEE SCHEDULE)	4" AD-6 AREA DRAIN	FLOOR DRAIN	4" FD-3P "P" INDICATES PRIMER CONNECTION	4" SD-29 DECK DRAIN	FLOOR SINK	4" FS-4	4" SD-12 FLOW CONTROL DRAIN	HUB DRAIN	4" FD-13	4" RD-1 STORM DRAIN	PLUMBING FIXTURE TAGS	TYPE (SEE SCHEDULE)	6" SD-1 COMBINATION DRAINS	<p>GENERAL FIRE SPRINKLER NOTES</p> <ol style="list-style-type: none"> THE ENTIRE PLUMBING SYSTEM SHALL BE IN ACCORDANCE WITH THE LATEST EDITION OF THE INTERNATIONAL/ARKANSAS PLUMBING CODE REGULATIONS AND LOCAL PLUMBING INSPECTOR. IT IS THE PLUMBING CONTRACTOR'S RESPONSIBILITY TO COORDINATE WITH THE SITE CONTRACTOR TO CONFIRM THAT THE INVERT AND LOCATION OF THE SANITARY SERVICE IS COMPATIBLE WITH THE SITE UTILITIES PRIOR TO BEGINNING WORK. THE PIPING INDICATED ON THESE PLANS ARE DIAGRAMMATICAL. ALL WORK SHALL BE COORDINATED WITH ALL OTHER TRADES PRIOR TO INSTALLATION. CONTRACTOR SHALL COORDINATE ROUTING OF ALL PIPING WITH EXISTING CONDITIONS AND SHALL PROVIDE ANY NECESSARY OFFSETS, REROUTING, TEES, ELBOWS, ETC. REQUIRED FOR A COMPLETE AND COORDINATED INSTALLATION. THE CONTRACTOR SHALL OBTAIN AND PAY ALL FEES RELATED TO PERMITTING, INSPECTIONS, TAP-ON FEES, ETC. WATER HAMMER ARRESTORS SHALL NOT BE INSTALLED AT DISHWASHERS, WASHING MACHINES, SUPPLY BOXES, AND QUICK CLOSING VALVES NOT LISTED. INSTALL WHM-1 AS CLOSE TO QUICK CLOSING VALVE AS POSSIBLE PER NFPA 13. CONTRACTOR'S RESPONSIBILITY IS TO COORDINATE WITH ALL OTHER TRADES FOR PROPER FIXTURE GROUPS AND HOT/WATER MIXING VALVES. CONTRACTOR SHALL COORDINATE AND PROVIDE ALL NECESSARY PIPING & PLUMBING FITTINGS, PIPING, MISCELLANEOUS ITEMS REQUIRED FOR A COMPLETE INSTALLATION OF ALL PLUMBING RELATED ITEMS. DOMESTIC WATER AND SEWER LOCATED OUTSIDE OF FOOTING SHALL MAINTAIN A MINIMUM OF 10' SEPARATION UNLESS WRITTEN PERMISSION IS OBTAINED FROM LOCAL AUTHORITIES AND/OR PROPER CONTAMINATION PROVISIONS PER LOCAL CODE HAVE BEEN MET. ALL DOMESTIC WATER, NATURAL GAS, DEIONIZED WATER, CARBON DIOXIDE, COMPRESSED AIR, AND NITROGEN PIPING SHOWN IS ABOVE CEILING, EXPOSED OVERHEAD, AND WITHIN WALLS UNLESS OTHERWISE NOTED. ALL SANITARY, GREASE, LAB, AND ACID WASTE PIPING SHOWN IS BELOW SLAB, BELOW FLOOR, OR WITHIN WALLS UNLESS OTHERWISE NOTED. ALL SANITARY VENT PIPING SHOWN IS ABOVE CEILING, EXPOSED OVERHEAD, OR WITHIN WALLS UNLESS OTHERWISE NOTED. FROST PROOF HOSE BIBBS AND SUPPLY PIPING SHALL BE INSTALLED ON THE INSIDE OF THE INSULATION. SEAL SHEATHING PENETRATION TO PREVENT AIR FROM REACHING THE VALVE. FLOOR DRAIN CONNECTION SIZE TO BE THE SAME SIZE AS THE DRAIN LINE IT CONNECTS UNLESS NOTED OTHERWISE. IF SIZE IS NOT INDICATED ON DRAWINGS REFER TO PLUMBING ROUGH-IN SCHEDULE FOR PROPER SIZE. FLUSH CONTROLS FOR HANDICAPPED WATER CLOSETS ARE TO BE MOUNTED TO THE OPEN SIDE OF THE TOILET AREA. THE CONTRACTOR SHALL COORDINATE THE INSTALLATION OF ALL UNDER SLAB PIPING WITH EXISTING STRUCTURAL FOUNDATIONS. UNDERGROUND UTILITY LOCATIONS SHALL BE VERIFIED PRIOR TO ANY WORK BEING PERFORMED. CONTRACTOR SHALL REPAIR OR REPLACE ALL PIPING NOT IN PROPER WORK ORDER OR DAMAGED DURING INSTALLATION OF THE NEW UNDERGROUND PIPING. UNDERWRITERS LABORATORIES (UL) AND/OR FACTORY MUTUAL RESEARCH CORPORATION (FMRC) APPROVED EQUIPMENT SHOULD BE UTILIZED WHERE APPLICABLE, AND THE DETAILS OF THE INSTALLATION SHOULD CONFORM TO FACTORY MUTUAL ENGINEERING ASSOCIATION (FMEA) GOOD PRACTICES. THE PLUMBING SYSTEM SHALL BE TESTED AS REQUIRED BY LOCAL CODE OR BY THE REQUIREMENTS OF THE LOCAL PLUMBING INSPECTOR. THE ENTIRE DOMESTIC WATER SYSTEM (EXISTING/NEW) SHALL BE DISINFECTED IN ACCORDANCE TO THE LOCAL CODE & HEALTH DEPARTMENT REQUIREMENTS. FLUSHING FLOOR ELEVATION (F.F.E.) SHALL BE 0.00" FOR CALCULATION PURPOSES ONLY, UNLESS NOTED OTHERWISE. THE BACKFLOW PREVENTION DEVICE SHALL BE INSTALLED PER LOCAL CODE & PER AUTHORITY HAVING JURISDICTION REQUIREMENTS. NON-LEAD TYPE ONLY. ALL PIPING ON ROOF SHALL BE ANCHORED TO STEEL RIB FASTENERS APPROVED BY THE ROOF MANUFACTURER. INSTALL ANCHORS PER MANUFACTURER'S RECOMMENDATION. ALL PLUMBING & PIPING SYSTEMS SHALL BE SUPPORTED AS REQUIRED BY THE LOCAL CODE REQUIREMENTS AND PER MANUFACTURER'S RECOMMENDATIONS. ALL VENT THRU ROOF (VTR) PENETRATIONS INDICATED ON PLANS ARE PRELIMINARY FINAL LOCATIONS SHALL BE COORDINATED WITH ALL TRADES. ALL VTR'S SHALL BE A MINIMUM OF 10'-0" FROM ALL FRESH AIR INTAKE OPENINGS. ANY PVC PIPE PENETRATING A FIRE RATED ASSEMBLY SHALL BE EXTERNALLY SLEEVED WITH STEEL, FERROUS, OR COPPER MATERIALS, SECURELY FASTENED TO THE FIRE RATED ASSEMBLY. ANY SPACE BETWEEN THE SLEEVE AND THE FIRE RATED ASSEMBLY PENETRATED SHALL BE PROTECTED USING MATERIAL THAT CONFORMS TO ASTM E 814 OR UL 1479, SUCH AS FIRE STOP FS-1900 OR FLAME STOP 5000. CONTRACTOR SHALL MAKE ALL FINAL CONNECTIONS FOR DISHWASHER, WASHING MACHINE, REFRIGERATOR, ETC. PROVIDE SHUT-OFF VALVES FOR PROPER OPERATION AND SERVICING OF DOMESTIC WATER DISTRIBUTION SYSTEM. LOCATION SHALL INCLUDE BUT NOT BE LIMITED TO THE FOLLOWING: AT EACH FIXTURE GROUP, AT EACH BRANCH TAKE-OFF FROM MAINS AND AT THE BASE OF EACH RISER. COORDINATE WITH ARCHITECTURAL PLAN FOR ACCESS DOOR LOCATIONS. TEMPERED WATER, NOT EXCEDING A MAXIMUM OF 110° F, SHALL BE DELIVERED FROM PUBLIC HANDWASHING FACILITIES THROUGH AN APPROVED WATER TEMPERATURE LIMITING DEVICE THAT CONFORMS TO ASSE 101. VALVES SHALL BE LOCATED IN ABOVE-ACCESSIBLE CEILING WHEN AT ALL POSSIBLE AND SHALL BE CLEAR OF ANY OBSTRUCTIONS FROM OTHER TRADES. MAINTENANCE SHALL BE ABLE TO ACCESS VALVES WITH STANDARD LADDER. SHOULD LOCATION NOT BE APPLICABLE CONTRACTOR SHALL PROVIDE A CONTROL CHAIN AND/OR ARM. THE CONTRACTOR IS REQUIRED TO CONDUCT AND SUBMIT A FLOW TEST ALONG WITH THE BOOSTER PUMP SUBMITTAL. AS FLOW DATA WASN'T ACCESSIBLE DURING THE DESIGN PHASE, THE BOOSTER PUMP WAS SIZED BASED ON A 25 PSI INLET PRESSURE. REGULATORS INSTALLED ON THE INTERIOR OF THE BUILDING SHALL BE VENTED TO THE EXTERIOR PER LOCAL AND STATE CODES. IT IS THE PLUMBING CONTRACTOR'S RESPONSIBILITY TO COORDINATE WITH THE SITE CONTRACTOR TO CONFIRM THAT THE INVERTS AND LOCATIONS OF THE BUILDING UTILITIES ARE COMPATABLE WITH THE SITE UTILITIES PRIOR TO BEGINNING WORK. CONTRACTOR SHALL PROVIDE A PRESSURE REDUCING VALVE (PRV) SHOULD THE WATER PRESSURE EXCEED 75 PSI. CONTRACTOR SHALL CONFIRM WITH ON SITE CONDITIONS AND LOCAL UTILITY. PROVIDE BALANCING VALVES FOR PROPER OPERATION AND PRESSURE OF DOMESTIC WATER DISTRIBUTION SYSTEM. LOCATION SHALL INCLUDE BUT NOT BE LIMITED TO THE FOLLOWING: AT EACH FIXTURE GROUP, AT EACH BRANCH TAKE-OFF FROM MAINS AND AT THE EACH RISER. INSTALL PER MANUFACTURES REQUIREMENTS. PROVIDE AUTOMATIC SHUT-OFF VALVE ON GAS LINE FEEDING KITCHEN EQUIPMENT BELOW TYPE-1 HOOD PRIOR TO ANY TAKE OFF. VALVE SHALL BE CONNECTED TO FIRE ALARM SYSTEM. PROVIDE DRAIN PANS FOR ALL WATER LINES CROSSING OVER "IT" CLOSET/ROOM. ROUTE DRAIN PAN(S) TO NEAREST APPROVED WASTE RECEPICAL. PROVIDE DRAIN PANS FOR ALL OVER HEAD DRAIN PIPING CROSSING OVER KITCHEN. ROUTE DRAIN PAN(S) TO NEAREST APPROVED WASTE RECEPICAL. ANY LINE VOLTAGE WIRING THAT IS RUN BY THE PLUMBING CONTRACTOR SHALL BE COORDINATE WITH ELECTRICAL CONTRACTOR ON SITE, AND INSTALLED IN ACCORDANCE WITH THE ELECTRICAL PLANS, NOTES, AND SPECIFICATIONS. INSULATION JACKET SHALL BE PROVIDED WHEN PIPING INSULATION IS EXPOSED. <p>GENERAL PLUMBING SEISMIC NOTES</p> <ol style="list-style-type: none"> PROVIDE VIBRATION AND SEISMIC CONTROLS FOR PLUMBING PIPING AND EQUIPMENT. COORDINATE ALL VIBRATION ISOLATION DEVICE INSTALLATION AND SEISMIC BRACING FOR PLUMBING PIPING AND EQUIPMENT WITH OTHER SYSTEMS AND EQUIPMENT IN THE VICINITY, INCLUDING OTHER SUPPORTS AND RESTRAINTS, IF ANY. TESTING AGENCY QUALIFICATIONS: AN INDEPENDENT AGENCY, WITH THE EXPERIENCE AND CAPABILITY TO CONDUCT THE TESTING INDICATED, THAT IS AN NRTL AS DEFINED BY OSHA IN 29 CFR 1910.7 AND THAT IS ACCEPTABLE TO AUTHORITIES HAVING JURISDICTION. COMPLY WITH SEISMIC RESTRAINT REQUIREMENTS IN THE INTERNATIONAL BUILDING CODE. WELDING QUALIFICATIONS: QUALITY PROCEDURES AND PERSONNEL ACCORDING TO AWS D1.1/D1.1M, "STRUCTURAL WELDING CODE-STEEL". SEISMIC RESTRAINT DEVICES SHALL HAVE HORIZONTAL AND VERTICAL LOAD TESTING AND ANALYSIS AND SHALL BEAR ANCHORAGE PRE-APPROVAL NUMBER FROM OSHPD, PRE-APPROVAL BY ICC-ES, OR PRE-APPROVAL BY ANOTHER AGENCY ACCEPTABLE TO AUTHORITIES HAVING JURISDICTION, SHOWING MAXIMUM SEISMIC-RESTRAINT RATINGS. RATINGS BASED ON INDEPENDENT TESTING ARE PREFERRED TO RATINGS BASED ON CALCULATIONS. IF PRE-APPROVED RATINGS ARE UNAVAILABLE, SUBMITTALS BASED ON INDEPENDENT TESTING ARE PREFERRED. CALCULATIONS (INCLUDING COMBINING SHEAR AND TENSILE LOADS) TO SUPPORT SEISMIC-RESTRAINT DESIGNS MUST BE SIGNED AND SEALED BY A QUALIFIED PROFESSIONAL ENGINEER. BUILDING IS CLASSIFIED AS SEISMIC DESIGN CATEGORY B. CONTRACTOR SHALL PROVIDE SEISMIC BRACING FOR PIPING, DUCTWORK AND EQUIPMENT TO MEET ALL LOCAL AND NATIONAL CODE REQUIREMENTS. SEISMIC RESTRAINTS FOR M/E/P EQUIPMENT AND SYSTEMS. CONTRACTOR'S RESPONSIBILITIES SHALL INCLUDE PROVIDING ALL SUBMITTALS AND DETAILS WITH STRUCTURAL ENGINEER'S CERTIFICATION FOR PERMITTING. SEISMIC PROTECTION FOR CONCERN OF ALL BUILDING SYSTEMS INCLUDING BUT NOT LIMITED TO MECHANICAL, PLUMBING, AND ELECTRICAL MUST MEET MINIMUM REQUIREMENTS OF ALL APPLICABLE CODES FOR BUILDINGS CLASSIFIED SEISMIC PROTECTION MEASURES TO BE INSTALLED IN STRICT ACCORDANCE WITH ALL APPLICABLE LOCAL, STATE, AND/OR FEDERAL CODES AND WITH MANUFACTURERS'S REQUIREMENTS, THE MOST STRINGENT SHALL APPLY.
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F-CW	FILTERED COLD WATER																																																																																																																																																																																																																																																																																																																																																																																																																																														
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HUB DRAIN	4" FD-13	4" RD-1 STORM DRAIN																																																																																																																																																																																																																																																																																																																																																																																																																																													
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LA PRIVADA COMMUNITY PARK
N.E.C. OF 183RD AVENUE & YUMA ROAD
GOODYEAR, ARIZONA

ISSUE FOR PERMIT - 07.12.2024



PROJECT NUMBER 201253R

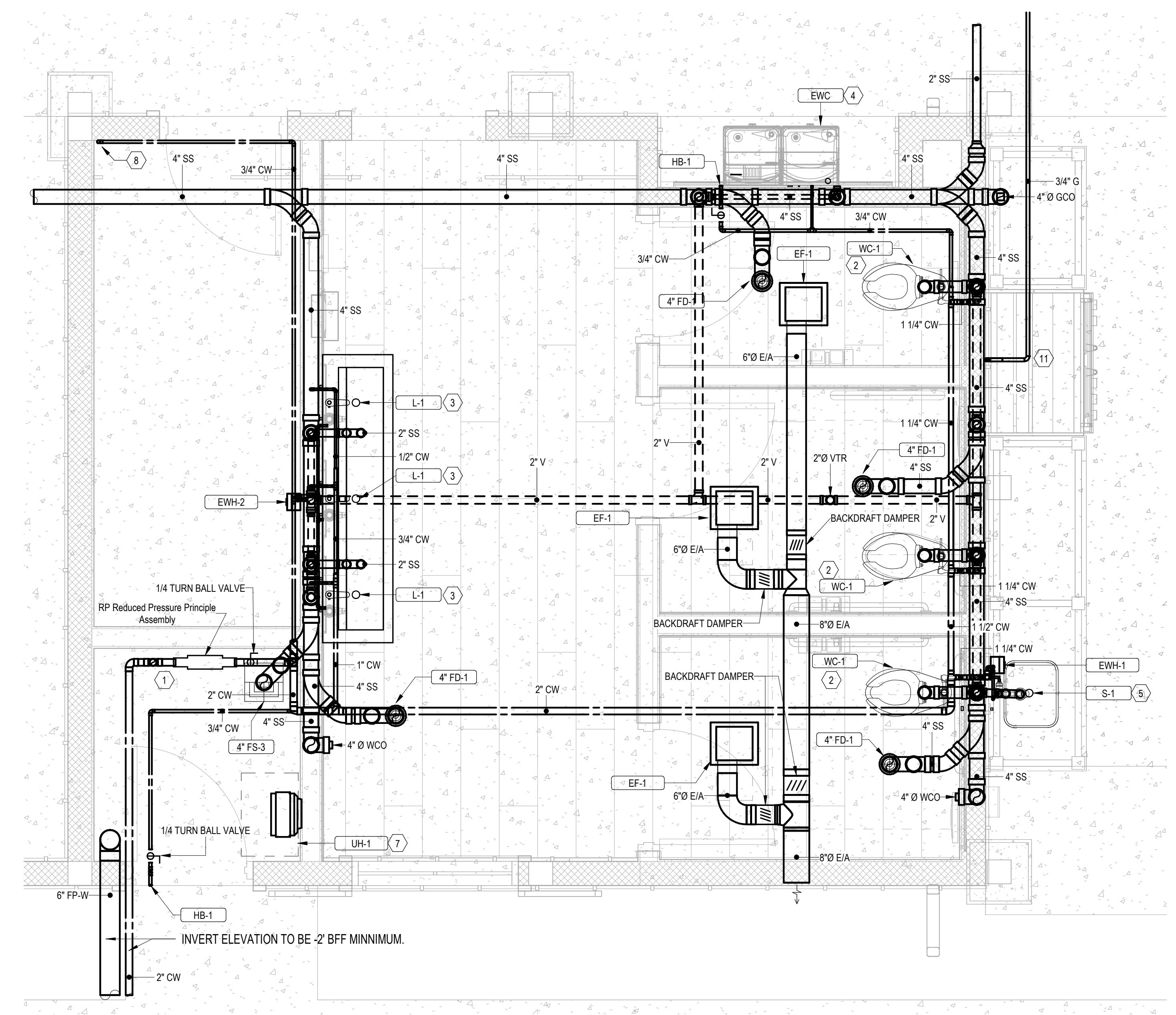
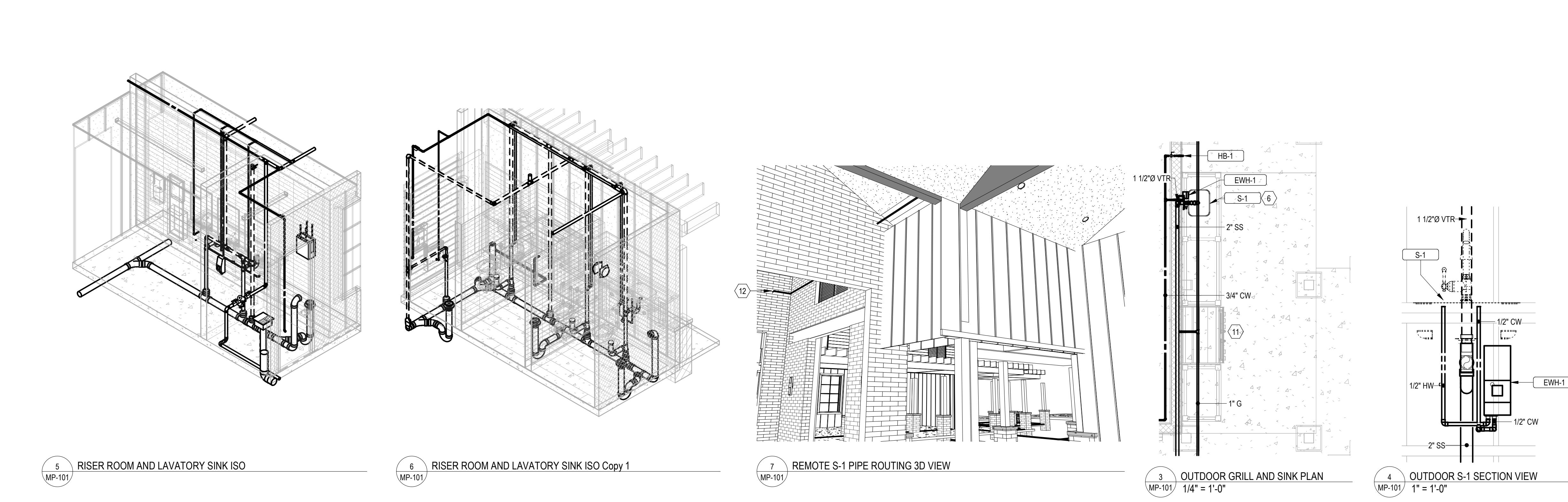
M&P PLAN

MP-101

KEYNOTES	
1	2" Ø DOMESTIC WATER TO BE BROUGHT IN TO FIRE RISER ROOM FROM UNDER SLAB TO RPZ SHOWN AND THEN ABOVE CEILING SPACE AND ROUTED AT SIZING SHOWN.
2	1-1/4" Ø COLD WATER LINE DOWN IN WALL TO CONNECT TO WC-1 FLUSH VALVE WATER CLOSET.
3	1/2" Ø COLD & HOT WATER LINES TO BE ROUTED DOWN IN WALL TO FIXTURE L-1.
4	3/8" Ø COLD WATER TO BE ROUTED AS SHOWN DOWN IN WALL TO EXTERIOR WATER COOLER.
5	1/2" Ø COLD WATER LINES TO BE ROUTED TO EWH-1 AND S-1. 1/2" Ø HOT WATER LINE TO BE ROUTED FROM EWH-1 TO S-1.
6	3/4" Ø COLD WATER LINE TO BE ROUTED THROUGH BUILDING AS SHOWN ON OVERALL PLANS TO FIXTURE S-1 SHOWN. PIPE ROUTED DOWN IN WALL TO ELECTRIC WATER HEATER MOUNTED UNDERCABINET AND TO FIXTURE S-1. 1/2" Ø HOT WATER LINE TO BE ROUTED FROM WATER HEATER DIRECTLY TO S-1.
7	ELECTRIC UNIT HEATER TO BE MOUNTED ABOVE DOOR.
8	3/4" Ø COLD WATER LINE ROUTED UP TO HEIGHT COORDINATED WITH BUILDING OWNER AND ARCHITECT TO BE ROUTED TO S-1 ON OPPOSITE SIDE OF BUILDING. SEE VIEW 7 ON MP-101 FOR EXAMPLE.
9	ROUTE GAS PIPING TO LOCATION OF OUTDOOR PROPANE TANK. SIZED AS SHOWN, AND INSTALL ALL COMPONENTS AND ACCESSORIES IN COMPLIANCE WITH CODE. CONFIRM LOCATION OF PROPANE TANK WITH LANDSCAPE DESIGN AND ARCHITECT PRIOR TO ROUTING OF GAS PIPING. ADJUST ROUTING OF GAS PIPING AS NEEDED FOR CONNECTION TO PROPANE TANK. GAS PIPING SIZED TO PROVIDE MAXIMUM 232,000 BTUS.
10	ROUTE GAS PIPING, SIZED AS SHOWN, BELOW GRADE TO SERVE THE OUTDOOR FIRE PIT. COORDINATE LOCATION OF GAS STUB UP WITH ARCHITECT AND THE FIRE PIT MANUFACTURER'S INSTALLATION MANUAL. PROVIDE SHUT-OFF VALVE PRIOR TO CONNECTION TO FIRE PIT. GAS PIPE SIZED TO PROVIDE MAXIMUM 66,000 BTUS.
11	ROUTE GAS PIPING, SIZED AS SHOWN, BELOW GRADE TO SERVE THE OUTDOOR GAS GRILL. COORDINATE LOCATION OF GAS STUB UP WITH ARCHITECT. PROVIDE SHUT-OFF VALVE PRIOR TO CONNECTION TO GAS GRILL. GAS PIPING SIZED TO PROVIDE MAXIMUM 66,000 BTUS.
12	EXPOSED DOMESTIC WATER PIPING TO BE ROUTED AS HIGH AS POSSIBLE AND COORDINATED WITH ARCHITECT PRIOR TO INSTALLATION.
13	PROVIDE AND INSTALL HVLS FAN IN LOCATION SHOWN. REFER TO MANUFACTURER'S INSTALLATION INSTRUCTIONS FOR CLEARANCE REQUIREMENTS. CONTRACTOR TO PROVIDE ALL NECESSARY EQUIPMENT AND ACCESSORIES FOR FULL INSTALLATION.

GENERAL NOTES:

DOMESTIC COLD AND HOT WATER PIPING SHALL BE WINTERIZED AND DRAINED IN THE OCCURRENCE OF A FREEZE EVENT. MAIN DOMESTIC WATER SERVICE LINE IS TO BE SHUT OFF WITHIN THE RISER ROOM AND THE DOMESTIC WATER FIXTURES ARE TO BE OPENED AND DRAINED TO PREVENT DAMAGE TO THE DOMESTIC WATER SYSTEM.



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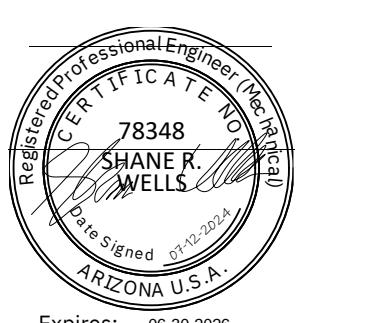
MP-500

MECHANICAL DETAILS

PROJECT NUMBER 201253R

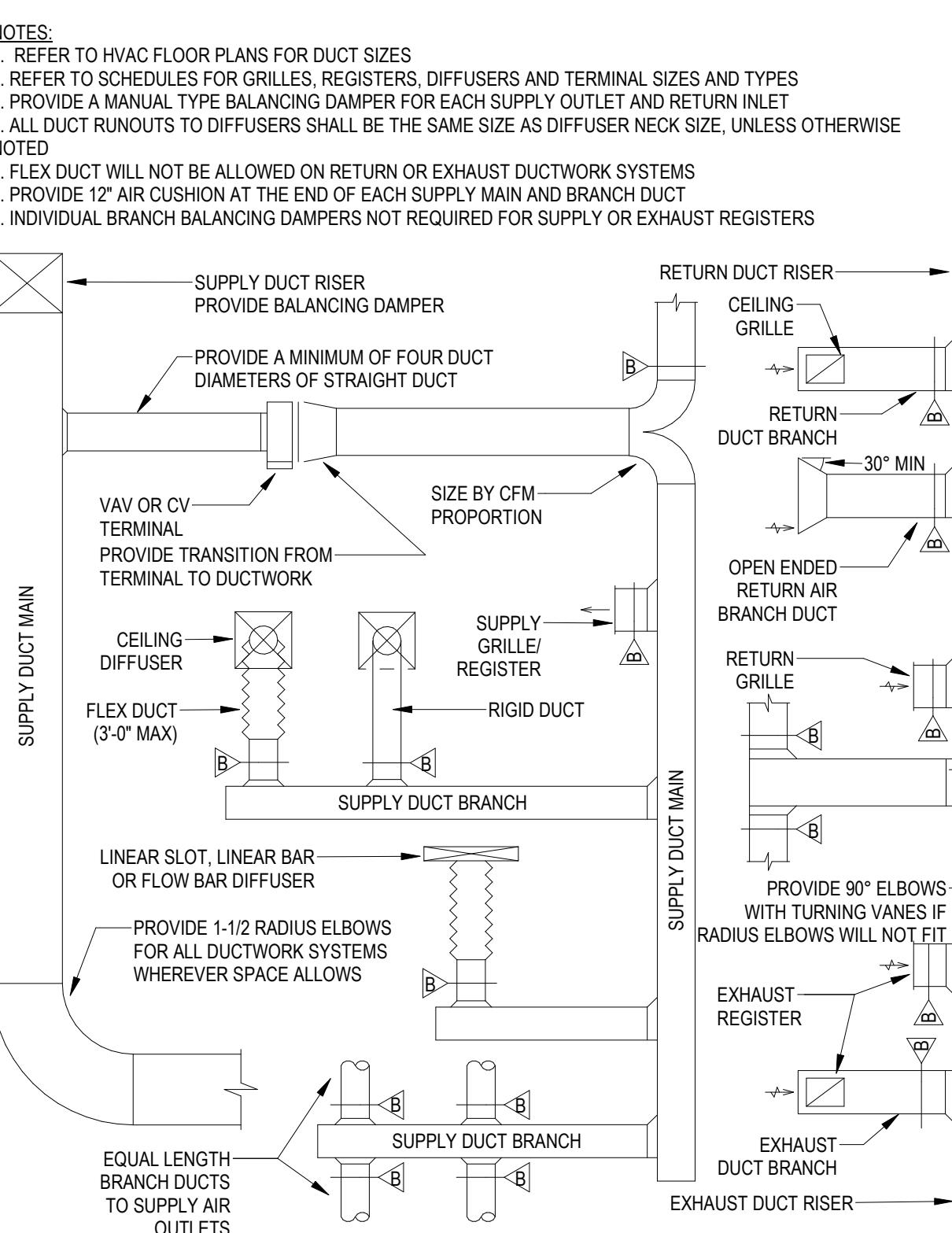
LA PRIVADA COMMUNITY PARK
N.E.C. OF 183RD AVENUE & YUMA ROAD
GOODYEAR, ARIZONA

ISSUE FOR PERMIT - 07.12.2024

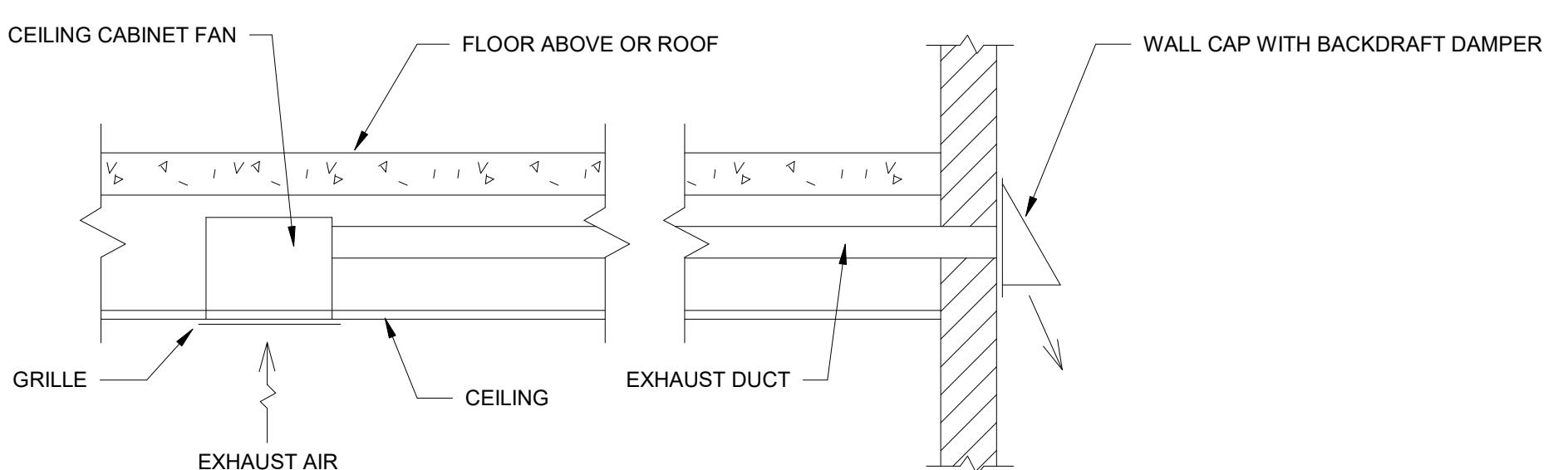


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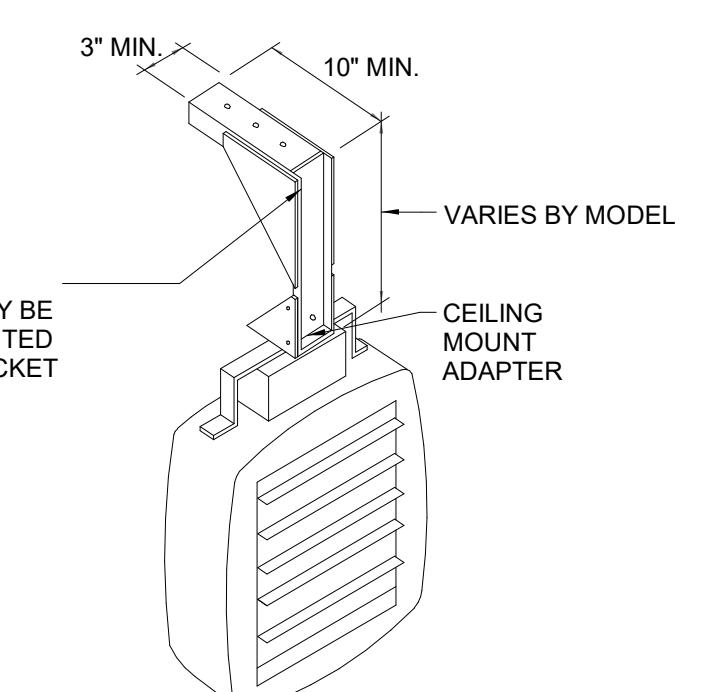
DATE REVISION



1 DUCTWORK INSTALLATION DIAGRAM
MP-500 N.T.S.



2 233416 EXHAUST FAN -BATHROOM-SIDEWALL DISCHARGE
MP-500 N.T.S.



3 M ELECTRIC UNIT HEATER
MP-500 1/8" = 1'-0"

FFKR ARCHITECTS
 58 S River Drive, Suite 300, Tempe, AZ 85288
 480.352.1361 FFKR.COM

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LA PRIVADA COMMUNITY PARK
N.E.C. OF 183RD AVENUE & YUMA ROAD
GOODYEAR, ARIZONA

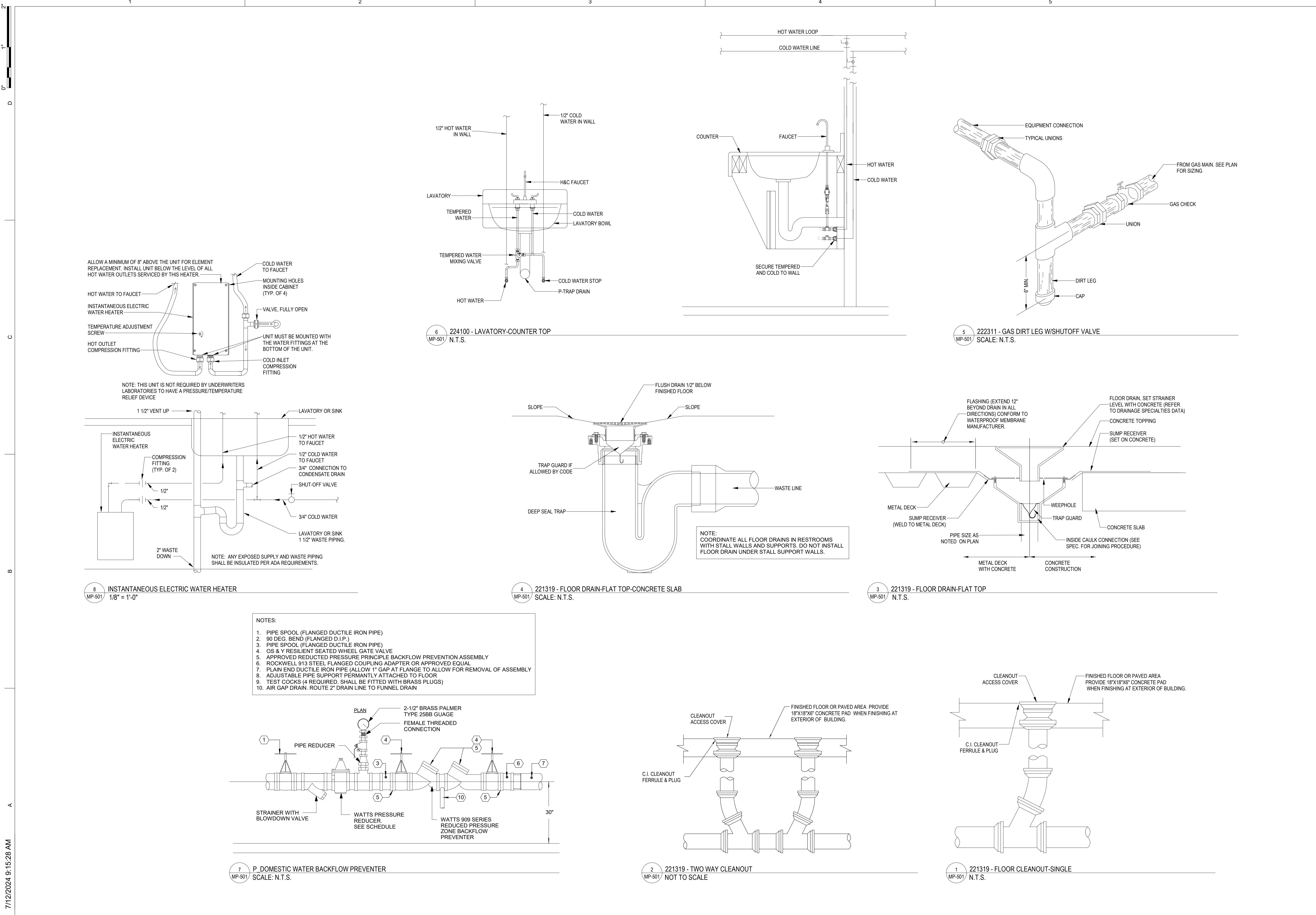
ISSUE FOR PERMIT - 07.12.2024

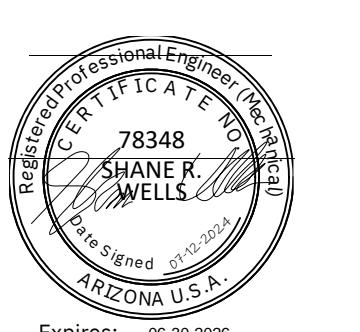


PROJECT NUMBER 201253R

PLUMBING DETAILS

MP-501





DATE: REVISION:

PROJECT NUMBER: 201253R

M&P
SCHEMES

MP-600

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Fixture Schedule											
Fixture Tag	Fixture				Faucet/Valve			Description			Notes
	Type	Manufacturer	Model	Material Description	Manufacturer	Model	Type				
EWC	WATER COOLER - DUAL HEIGHT- BOTTLE FILLER- ADA	ELKAY	VRCFLFR8SC	STEEL				ADA APPROVED, OUTDOOR RATED, W/ TOUCH PADS ON FRONT, FLEXIBLE SAFETY BUBBLER, P-TRAP, WATER VALVE, MLP200 CARRIER, MOUNT UNIT AT ADA COMPLIANT HEIGHT.	115V, 1PH, 370W		
HB-1	HOSE BIBB		HY-440				MANUAL	INTERIOR HOSE BIBB WITH VACUUM BREAKER, 3/4" HOSE THREAD OUTLET, LOCK SHIELD CAP AND REMOVABLE "TEE" HANDLE. PROVIDE SHUTOFF VALVE IN COLD WATER SUPPLY AHEAD OF HOSE BIBB.			
L-1	LAVATORY - COUNTER - ADA	SLOAN	ELGR-83000	STONE	SLOAN	EAF-150-BAT-CP-1.0G PM-AER-IQ-FCT	BATTERY	224000			
S-1	SINGLE BOWL SINK - DROP-IN	ELKAY	LRAD221955	STAINLESS STEEL	ELKAY	LK7921SS	MANUAL	224000			
WC-1	WATER CLOSET - FLOOR - FLUSH VALVE - ADA	ZURN	Z5665-BWL1	WHITE VITREOUS CHINA	ZURN	Z6000AV-HET	MANUAL	224000			

- NOTES:
 1. INSTALL PER MANUFACTURER GUIDELINES.
 2. CONTRACTOR SHALL COORDINATE WITH ARCHITECT FOR APPROVALS ON ALL FIXTURE MODELS, COLORS, AND FINISHES PRIOR TO ORDERING.
 3. PROVIDE OPTIONAL BUFFER TANK AND PRESSURE REDUCING VALVES FOR EACH FLOOR OF THE DOMESTIC WATER PIPING SYSTEM.

Floor Drain Schedule											
ID	Description	Manufacturer	Model	Material Description			Waste	PIPE SIZE	Specification		Notes
				DRAIN BODY	STRAINER	PIPE SIZE			CAST IRON BODY, ANCHOR FLANGE, SECURED ROUND ADJUSTABLE STRAINER HEAD WITH HOLE GRATE, LOOSE GRATE AND SEDIMENT BUCKETS, MIFAB TRAP GUARD OR EQUAL IF ALLOWED BY AHJ, REFER TO PLANS FOR SIZES.	4"	
FD-1	FLOOR DRAIN	MIFAB	F1000	EPOXY COATED CAST IRON	STAINLESS STEEL	4"					
FS-3	FLOOR SINK	WATTS	FS-730	EPOXY COATED CAST IRON	ALUMINUM	4"	12" SQUARE X 6" DEEP SANITARY FLOOR SINK WITH WHITE PORCELAIN ENAMEL COATED INTERIOR, LOOSE SET PORCELAIN ENAMEL COATED CAST IRON GRATE, ALUMINUM DOME BOTTOM STRAINER, AND NO HUB OUTLET. PROVIDE WITH MANUFACTURER RECOMMENDED TRAP GUARD.				

Electric Water Heater Schedule													
ID	Manufacturer	Model No.	Type	Electric Heat Exchanger			FLA	VOLT	PH	Unit Weight	MCA	MOCP	Remarks
				EWT	LWT	Max Temp Rise							
EWH-1	CHRONOMITE	CM-20L	TANKLESS	50 °F	105 °F	55 °F	4.8 kW	20.0 A	240 V	1	6 lb	25.0 A	30.0 A
EWH-1	CHRONOMITE	CM-20L	TANKLESS	50 °F	105 °F	55 °F	4.8 kW	20.0 A	240 V	1	6 lb	25.0 A	30.0 A
EWH-2	CHRONOMITE	CM-20L	TANKLESS	50 °F	105 °F	55 °F	4.8 kW	20.0 A	240 V	1	4 lb	25.0 A	30.0 A

NOTES:
 1. INSTALL PER MANUFACTURER GUIDELINES.

GENERAL NOTE:
 DUCT DIMENSIONS LISTED ON DRAWINGS REPRESENT THE AIRFLOW FREE AREAS AND DO NOT HAVE ALLOWANCES FOR INSULATION LINER, WHERE APPLICABLE, INSIDE THE DUCTS, OR DUAL WALL DIMENSIONS. DUCTS SHALL BE CONSTRUCTED TO INCLUDE INSULATION REQUIREMENTS AND MAINTAIN AIRFLOW DIMENSIONS INDICATED ON PLANS.
 ALL INSULATION SHALL BE PROVIDED AT ASHRAE 90.1 MINIMUM REQUIREMENTS, REGARDLESS OF INSULATION THICKNESS RECOMMENDATIONS NOTED.

NOTE: NO LINED DUCT IN KITCHEN

Mechanical Ductwork & Insulation Schedule										
Service	Duct Type		Insulation Type			Insulation Thickness				
RESTROOM EXHAUST DUCT	ROUND OR RECTANGULAR, AS INDICATED ON PLANS.	FIBERGLASS WRAP OR MATTE FACED FIBERGLASS LINER, AS INDICATED ON PLANS	2" WRAP OR 1-1/2" LINER, R VALUE=6.0							

Exhaust Fan Schedule															
ID	Manufacturer	Model No.	Type	Arrangement	Fan			FLA	VOLT	PH	Notes				
					Airflow Design	Press Esp	Drive Type								
EF-1	GREENHECK	SP-110-VG	CEILING	ROUND OUTLET	75 CFM	0.20 in-wg	DIRECT	0.01 hp	12 lb	0.2 A	0.3 A	15.0 A	120 V	1	1-7
EF-1	GREENHECK	SP-110-VG	CEILING	ROUND OUTLET	75 CFM	0.20 in-wg	DIRECT	0.01 hp	12 lb	0.2 A	0.3 A	15.0 A	120 V	1	1-7
EF-1	GREENHECK	SP-110-VG	CEILING	ROUND OUTLET	75 CFM	0.20 in-wg	DIRECT	0.01 hp	12 lb	0.2 A	0.3 A	15.0 A	120 V	1	1-7

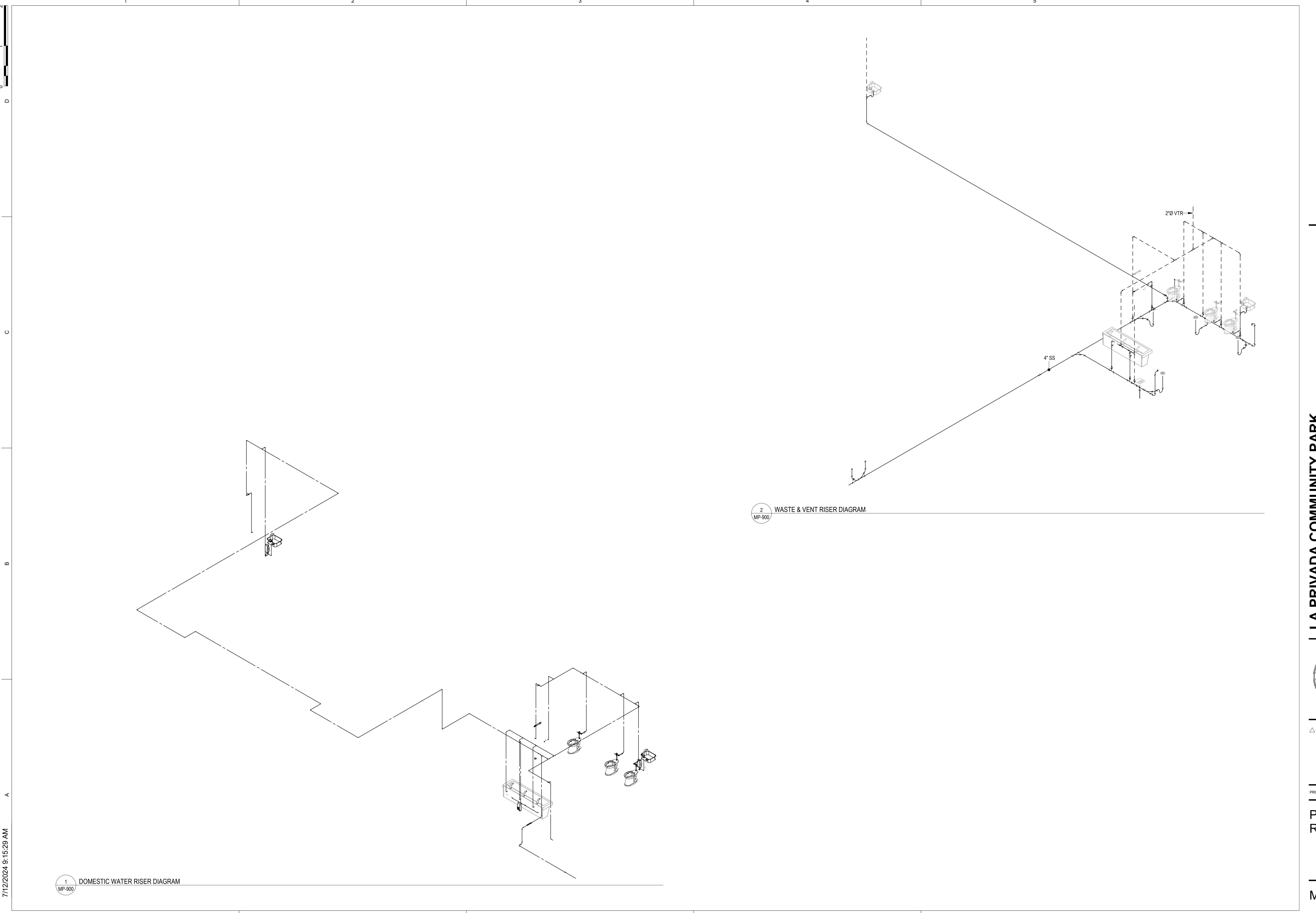
NOTES:
 1. PROVIDE FACTORY WIRED AND INSTALLED DISCONNECT SWITCH, FAN TIME DELAY SWITCH, AND SPEED CONTROLLER.
 2. PROVIDE BACKDRAFT DAMPER, VIBRATION ISOLATIONS ON MOTOR MOUNTS AND FLEX CONNECTIONS ON OUTLET.
 3. INTERLOCK FAN POWER WITH LIGHTS.
 4. PROVIDE BACKDRAFT DAMPER.
 5. PROVIDE MANUFACTURER'S WHITE ALUMINUM GRILLE.
 6. PROVIDE MANUFACTURER'S WALL CAP.
 7. PLASTIC HOUSING

Electric Unit Heater Schedule											
ID	Manufacturer	Model No.	Fan		Heating Element Dimensions		FLA	VOLT	PH	Unit Weight	Remarks
			AIRFLOW DESIGN	POWER	AFF ELEVATION	UNIT WEIGHT					
UH-1	MARLEY ENGINEERED PRODUCTS	MUH03-21	350 CFM	3.0 kW	8'-0"	27 lb	12.5 A	240 V	1		1-3

1. PROVIDE INTERNAL SINGLE STAGE THERMOSTAT 55° SET-POINT, INTERVAL DISCONNECT SWITCH, CEILING SUSPENSION KIT.
 2. PROVIDE MANUFACTURER'S HANGING BRACKET FOR MOUNTING UNIT AT DESIRED HEIGHT.
 3. PROVIDE EXTENSION SLEEVE FOR FULL SURFACE MOUNTING

HVLS Ceiling Fan Schedule										
ID	Manufacturer	Model No.	Fan Dia.	RPM	DB	Volt	PH	RLA	MCA	Unit Weight

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LA PRIVADA COMMUNITY PARK
N.E.C. OF 183RD AVENUE & YUMA ROAD
GOODYEAR, ARIZONA
ISSUE FOR PERMIT - 07.12.2024



DATE

REVISION

PROJECT NUMBER

201253R

PLUMBING
RISERS

MP-900



Expires: 06-30-2026

PROJECT NUMBER 201253R

MECHANICAL
SPECIFICATIONS

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23A HEATING, VENTILATING, AND AIR CONDITIONING
rev -20150529

23A 1 GENERAL INSTRUCTIONS

23A 1-1 GENERAL REQUIREMENTS

Requirements under Division 1 and the general and supplementary conditions of these specifications apply to this section and division. Where the requirements of this section and division exceed those of Division 1, this section and division take precedence. Become thoroughly familiar with all such contents as to requirements that affect this division, section or both. The work required under this section includes material, equipment, appliances, transportation, services, and labor required to complete the entire system as required by the drawings and specifications, or reasonably inferred to be necessary to facilitate each system's functioning as implied by the design and the equipment specified.

The specifications and drawings for the project are complementary, and portions of the work described in one, shall be provided as if described in both. In the event of discrepancies, notify the engineer and request clarification prior to proceeding with the work involved.

Drawings are graphic representations of the work upon which the contract is based. They show the materials and their relationship to one another, including sizes, shapes, locations, and connections. They also convey the scope of work, indicating the intended general arrangement of the equipment and other materials without showing all of the exact details as to elevations, offsets, control lines, and other installation requirements. Use the drawings as a guide when laying out the work to verify that materials and equipment will fit into the designated spaces, and which, when installed per manufacturers' requirements, will ensure a complete, coordinated, satisfactory and properly operating system. Determine exact locations by job measurements, by checking the requirements of other trades, and by reviewing all contract documents. Correct errors that could have been avoided by proper checking and inspection, at no additional cost to the owner.

Specifications define the qualitative requirements for products, materials, and workmanship upon which the contract is based.

23A 1-2 DEFINITIONS

Whenever used in these specifications or drawings, the following terms shall have the indicated meanings:

Furnish: "to supply and deliver to the project site, ready for unloading, unpacking, assembling, installing, and similar operations."

Install: "to perform all operations at the project site, including, but not limited to, and as required: unloading, unpacking, assembling, erecting, placing, anchoring, applying, working to dimension, finishing, curing, protecting, cleaning, testing, commissioning, starting up and similar operations; complete, and ready for the intended use."

Provide: "to furnish and install complete, and ready for the intended use."

Furnished by owner (or owner-furnished) or furnished by others: "an item furnished by the owner or under other divisions or contracts, and installed under the requirements of this division, complete, and ready for the intended use, including all items and services incidental to the work necessary for proper installation and operation. Include the installation under the warranty required by this division.

Engineer: where referenced in this division, "engineer" is the engineer of record and the design professional for the work under this division, and is a consultant to, and an authorized representative of, the architect, as defined in the general and/or supplementary conditions. When used in this division, it means increased involvement by, and obligations to, the engineer, in addition to involvement by, and obligations to, the "architect".

AHJ: the local code and/or inspection agency (authority) having jurisdiction over the work.

NRTL: nationally recognized testing laboratory, as defined and listed by OSHA in 29 CFR 1910.17 (e.g., UL, ETL, CSA), and acceptable to the AHJ over this project.

The terms "approved equal", "equivalent", or "equal" are used synonymously and shall mean "accepted by or acceptable to the engineer as equivalent to the item or manufacturer specified". The term "approved" shall mean labeled, listed, certified, or all three, by an NRTL, and acceptable to the AHJ over this project.

23A 1-3 PRE-BID SITE VISIT

Prior to submitting bid, visit the site of the proposed work and become fully informed as to the conditions under which the work is to be done. Failure to do so will not be considered sufficient justification to request or obtain extra compensation over and above the contract price.

23A 1-4 MATERIAL AND WORKMANSHIP

Provide all material and equipment new and in first class condition. Provide markings or a nameplate for all material and equipment identifying the manufacturer and providing sufficient reference to establish quality, size and capacity. In general, provide the following quality grade(s) for all materials and equipment:

Commercial Specification Grade

Light Duty and Residential Grade

Pipe, pipe fittings, pipe specialties and valves shall be manufactured in plants located in the United States.

Work performed under this contract shall provide a neat and "workmanlike" appearance when completed, to the satisfaction of the architect and engineer. Workmanship shall be the finest possible by experienced mechanics of the proper trade.

The complete installation shall function as designed and intended with respect to efficiency, capacity, noise level, etc. Abnormal or excessive noise from equipment, devices or other system components will not be acceptable.

Remove from the premises waste material present as a result of work. Clean equipment installed under this contract to present a neat and clean installation at the termination of the work.

Repair or replace public and private property damaged as a result of work performed under this contract to the satisfaction of authorities and regulations having jurisdiction.

23A 1-5 MANUFACTURERS

In other articles where lists of manufacturers are introduced, subject to compliance with requirements, provide products by one of the manufacturers specified.

Where a list is provided, manufacturers listed are not in accordance with any ranking or preference.

Where manufacturers are not listed, provide products subject to compliance with requirements from manufacturers that have been actively involved in manufacturing the specified product for no less than 5 years.

23A 1-6 COORDINATION

Coordinate all work with other divisions and trades so that the various components of the systems will be installed at the proper time, fit the available space, and will allow proper service access to those items requiring maintenance. Refer to all other division's drawings, and to relevant equipment submittals and shop drawings to determine the extent of clear spaces. Components which are installed without regard to the above shall be relocated at no additional cost to the owner.

Unless otherwise indicated, the general contractor will provide chases and openings in building construction required for installation of the systems specified herein. Contractor shall furnish the general contractor with information where chases and openings are required. Make all offsets required to clear equipment, beams and other structural members, and to facilitate concealing system components in the manner anticipated in the design. Keep informed as to the work of other trades engaged in the construction of the project, and execute work in a manner as not to interfere with or delay the work of other trades.

Figured dimensions shall be taken in preference to scale dimensions. Contractor shall take his own measurements at the building, as variations may occur. Contractor will be held responsible for errors that could have been avoided by proper checking and inspection.

Provide materials with trim that will properly fit the types of ceiling, wall, or floor finishes actually installed. Model numbers listed in the construction documents are not necessarily intended to designate the required trim.

23A 1-7 ORDINANCES, CODES, AND STANDARDS

Work performed under this contract shall, at minimum, be in conformance with applicable national, state and local codes having jurisdiction. Equipment and associated insulation work performed under this contract shall be in strict compliance with current applicable codes adopted by the local AHJ. Safety and Health Administration (OSHA), American Society of Mechanical Engineers (ASME), American Society of Heating, Refrigeration, and Air Conditioning Engineers (ASHRAE), American National Standards Institute (ANSI), American Society of Testing Materials (ASTM) and other national standards and codes where applicable. Additionally, comply with rules and regulations of public utilities and municipal departments affected by connection of services.

Where the contract documents exceed the requirements of the referenced codes, standards, etc., the contract documents shall take precedence.

Promptly bring all conflicts observed between codes, ordinances, rules, regulations, referenced standards, and these documents to the engineer's attention for final resolution. Contractor will be held responsible for any violation of the law.

Procure and pay for permits and licenses required for the accomplishment of the work herein described. Where required, obtain, pay for and furnish certificates of inspection to owner. Contractor will be held responsible for violations of the law.

23A 1-8 PROTECTION OF EQUIPMENT AND MATERIALS

Store and protect from damage equipment and materials delivered to job site, in accordance with manufacturers' recommendations. For materials and equipment susceptible to changing weather conditions, dampness, or temperature variations, store inside in conditioned spaces. For materials and equipment not susceptible to these conditions, cover with waterproof, tear-resistant, heavy tar or polyethylene plastic as required to protect from plaster, dirt, paint, water, or physical damage. Equipment and material that has been damaged by construction activities will be rejected, and contractor shall furnish new equipment and material as required at no additional cost to the owner.

Keep premises broom clean from foreign material created during work performed under this contract. Piping, equipment, etc. shall have a neat and clean appearance at the termination of the work.

Plug or cap open ends of ductwork and piping systems while stored and installed during construction when not in use to prevent the entrance of debris into the systems.

23A 1-9 SUBSTITUTIONS

Include in the bid base the products specifically named in these specifications or on the drawings. Submit, in form of alternates, with bid, products of other manufacturers for similar use, provided the differences in cost, if any, are included for each proposed alternate.

No substitutions will be considered with receipt of Bids, unless the Architect and Engineer have received from the Bidder a written request for approval to bid an alteration or change, and a date for receipt of Bids, and the proposed substitution is included, with the reason for such request, the name of the material or equipment for which substitution is being proposed, and a complete description of the proposed substitution, including drawings, cut sheets, performance and test data, and all other information necessary for an evaluation. Includes also a statement setting forth changes in cost, materials, equipment or other work that would be required to incorporate the substitution. The burden of proof of the merit of the proposed substitute is upon the proposer. The proposer of any substitutions shall compensate the Engineer at a rate of \$150.00 per hour for time spent evaluating proposed substitutions and/or the subsequent revisions to the design required to utilize the substitution.

The Architect's or Engineer's decision to approve or disapprove a substitution in a Bid is final.

If the proposed substitution is approved prior to receipt of Bids, such approval will be stated in an Addendum. Bidders shall not rely upon approvals made in any other manner, including verbal.

No substitutions will be considered after receipt of Bids and before award of the Contract.

No substitutions will be considered after the Contract is awarded unless specifically provided in the Contract Documents.

23A 1-10 SUBMITTALS

Assemble and submit to the architect, for engineer's review, manufacturers' product literature for material and equipment to be furnished, installed, or both, under this division, including shop drawings, manufacturers' product data and performance sheets, samples, and other submittals required by this division. Height mark, list or indicate the number, performance criteria and accessories, that are being proposed. Indicate the number of submittals required by division 1, minimum, at a minimum, submit two (2) sets.

Provide drawings and technical information certifying that all materials and equipment submitted are mutually compatible and suitable for the intended use, fit the available spaces, and allow ample and code-required room for access and maintenance. Submittals shall contain the following information. Submittals not so identified will be returned to the contractor without action:

The project name.

The applicable specification section and paragraph.

The submittal date.

The contractor's stamp, which shall certify that the stamped drawings have been checked by the contractor, comply with the drawings and specifications, and have been coordinated with other trades.

Submitter and shop drawings shall not contain HP Engineering's firm name or logo, nor shall it contain the HP Engineering's engineers' seal and signature. They shall not be copies of HP Engineering's work product.

Transmit submittals as early as required to support the project schedule. Allow for two week's engineer's review time, plus mailing time, plus a duplication of this for re-submittal, if required. The engineer's submittal reviews will not relieve the contractor from responsibility for errors in dimensions, details, size or quantities, or for omitting components or fittings, or for not coordinating items with actual building conditions.

Refer to division 1 acceptance of electronic submittals for this project. For electronic submittals, contractor shall submit the documents in accordance with the procedures specified in division 1. Contractor shall notify the architect and engineer that the shop drawings have been posted. If electronic submittal procedures are not defined in division 1, contractor shall include the website, user name and password information needed to access the submittals. For submittals sent by e-mail, contractor shall copy the architect and engineer's designated representatives. Contractor shall allow the engineer review time as specified above in the construction schedule. Contractor shall submit only the documents required to purchase the materials and/or equipment in the electronic submittal and shall clearly indicate the materials, performance criteria and accessories being proposed. General product catalog data not specifically noted to be part of the specified product will be rejected and returned without review.

23A 1-11 ELECTRONIC DRAWING FILES

In preparation of shop drawings or record drawings, contractor may, as an option, obtain electronic drawing files in Revit, AutoCAD, or DXF format from the engineer for a fee of \$200 for the first sheet and \$100 per sheet for each additional sheet. Contact the architect for written authorization; and, contact the engineer to obtain the necessary release agreement form and to indicate the desired shipping method and drawing format. In addition to payment, contractor's written authorization and engineer's release agreement form must be received before electronic drawing files will be sent.

23A 1-12 OPERATION AND MAINTENANCE MANUALS

Submit to the architect, for engineer's review, copies each of operations and maintenance instruction manuals, appropriately bound into manual form including approved copies of the following, revised if necessary to show system and equipment as actually installed. Paper clips, staples, rubber bands, and mailing envelopes are not considered approved binders. Provide the number of submittals required by Division 1; however, at a minimum, submit two (2) sets, and include, at a minimum, the following information:

Cover sheet that lists the project name, date, owner, architect, consulting engineer, general contractor, sub-contractor, and an index of contents.

Manufacturers' catalogs and product data sheets

Wiring diagrams

Operation and Maintenance Instructions

Parts lists

Approved shop drawings

Test reports as defined for the systems and equipment provided or furnished or installed under this contract.

Names, addresses, telephone numbers, and e-mail addresses of local contacts for warranty services and spare parts.

Submit manual prior to requesting the final punch list and before any requests for substantial completion. Final approval of this division's systems installed under this contract will be withheld until this equipment brochure is received and deemed complete by the architect and engineer.

Provide "as-built" drawings (see Division 1 and general conditions).

23A 1-13 TRAINING

At a time mutually agreed upon between the owner and contractor, provide the services of a factory trained and authorized representative to train owner's designated personnel on the operation and maintenance of the equipment provided for this project.

Provide training to include but not be limited to an overview of the system and/or equipment as it relates to the facility as a whole; operation and maintenance procedures and schedules related to startup and shutdown; troubleshooting, servicing, preventive maintenance and appropriate operator intervention; and review of data included in the operation and maintenance manuals.

Submit a certification letter to the architect stating that the owner's designated representative has been trained as specified herein. Letter shall include date, time, attendees and subject of training. The contractor and the owner's representative shall sign the certification letter indicating agreement that the training has been provided.

Schedule owner training with at least 7 days' advance notice.

23A 1-14 WARRANTY

Warrant each system and each element thereof against all defects due to faulty workmanship, design or material for a period of 12 months from date of substantial completion, unless specific items are noted to carry a longer warranty in the construction documents or manufacturer's standard warranty exceeds this duration. Warranties shall include labor and material. Remedy all defects, occurring within the warranty period(s), as stated in the general conditions and Division 1 without any additional costs to the owner.

Perform any required remedial work promptly, upon written notice from the engineer or owner.

At the time of substantial completion, deliver to the owner all warranties, in writing and properly executed, including term limits for warranties extending beyond the required period, each warranty instrument being addressed to the owner and stating the commencement date and term.

23A 1-15 CUTTING OF WALLS, FLOORS, CEILINGS, ETC. as required to install work under this section. Obtain permission from the architect prior to cutting. Do not cut or disturb structural members without prior approval from the architect. Cut holes as small as possible. General contractor shall patch walls, floors, etc. as required by work under this section. Patching shall match the original material and construction. Repair and refinish areas disturbed by work to the condition of adjoining surfaces in a manner satisfactory to the architect.

23A 1-16 ROUGH-IN

Coordinate without delay roughing-in with general construction. Conceal piping and conduit rough-in except in unfinished areas and where otherwise shown.

23A 1-17 CONCRETE BASES

Provide concrete bases for equipment where indicated on the drawings and as specified herein. Concrete bases shall have chamfered edges. Size of pad shall be a minimum of 4" greater than the footprint of the equipment that it is supporting and shall have a minimum height of 3-1/2".

Construct equipment bases and housekeeping pads shall be of a minimum 28 day, 4000 psi concrete conforming to American Concrete Institute standard building code for reinforced concrete (ACI 318-99) and the latest applicable recommendations of the ACI standard practice manual. Concrete shall be composed of cement conforming to ASTM C 150 Type I, aggregate conforming to ASTM C 33, and potable water. Exposed exterior concrete shall contain 5 to 7 percent air entrainment.

Unless otherwise specified or shown on the structural drawings, reinforce equipment bases and housekeeping pads with No. 4 reinforcing bars conforming to ASTM A 615 or 6x6 - W2.9 x W2.9 welded wire mesh conforming to ASTM A185. Place reinforcing bars 24" on center with a minimum of two bars each direction.

Provide galvanized anchor bolts for equipment placed on concrete equipment bases and housekeeping pads or on concrete slabs. Anchor bolts size, number and placement shall be as recommended by the manufacturer of the equipment.

Structural steel used for support of equipment, ductwork and piping shall be new, clean, and conform to ASTM designation A-36.

Support mechanical components from the building structure. Do not support mechanical components from ceilings, other mechanical or electrical components, and other non-structural elements.

23A 1-19 ACCESS DOORS

Provide access doors in ceilings, walls, etc. where indicated or



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MECHANICAL
SPECIFICATIONS

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23A 2-2 DUCTWORK

Provide galvanized steel ductwork and housings as shown on drawings. Construct ductwork including fittings and transitions in conformance with current SMACNA standards relative to gauge, bracing, joints, etc. Minimum thickness of duct shall be 26-gauge sheet metal. Reinforce housings and ductwork over 30" with 1-1/4" angles not less than 5'-6" on centers, and closer if required for sufficient rigidity to prevent vibration. Support horizontal runs of duct from strap iron hangers on centers not to exceed 8'-0". Do not support ceiling grid, conduits, pipes, equipment, etc. from ductwork. Coordinate routing of ductwork with other contractors such that piping, electrical conduit, and associated supports are not routed through the ductwork.

Construct supply ducts to meet SMACNA positive pressure of 3" w.g. Construct return, outdoor and exhaust ductwork upstream of fans to meet SMACNA negative pressure of 2" w.g. Construct exhaust ductwork downstream of fans to meet SMACNA positive pressure of 2" w.g.

Provide mill phosphated or galvanized finish for exposed ductwork to be field painted. Shop treated sheet metal shall have galvanized metal primer applied in the shop after fabrication and prior to shipping.

Ductwork above roof or otherwise exterior to building shall be minimum #18 gauge with longitudinal and transverse joints welded.

Seal ductwork with heavy liquid sealant. Hardcast Irongrip 601, Design Polymer DP 1010, United McGill duct sealer or approved equal, applied according to sealant manufacturer's instructions. For ducts with pressure classification of 2" w.g. and greater seal longitudinal and transverse ductwork joints airtight to meet SMACNA Class B. For ducts with pressure classification less than 2" w.g. seal transverse joints airtight to meet SMACNA Class C. Tapes and mastics shall be listed and labeled in accordance with UL 161A.

Provide radius elbows, turns, and offsets with a minimum centerline radius of 1-1/2 times the duct width. Where space does not permit full radius elbows, provide short radius elbows with a minimum of two continuous splitter vanes. Vanes shall be the entire length of the bend. Provide mitered elbows where space does not permit radius elbows, where shown on the drawings, or at the option of the contractor with the engineer's approval. Mitered elbows shall be 45 degrees shall not require turn vanes. Mitered elbows 45-degrees and greater shall have single thickness turning vanes of same gauge as ductwork, rigidly fastened with guide strips in ductwork. Vanes for mitered elbows shall be provided in all supply and exhaust ductwork and in return and outside air ductwork that has an air velocity exceeding 1000 fpm. Do not install vanes in grease ductwork.

Ducts shall be connected to fans, fan casings and fan plenums by means of flexible connectors. Flexible connectors shall be neoprene coated glass cloth canvas connections, Duo-Dyne, Eigen, Venetabric or equal. Flexible connectors shall have a flame spread of 25 or less and smoke developed rating not higher than 50. Make airtight joints and install with minimum 1-1/2" slack.

Provide balancing dampers, manufactured by Ruskin, Greenheck, Nairn Industries, Cesco, Louvers & Dampers, Potter or approved equal, where shown on drawings and wherever necessary for complete control of air flow. Splitter dampers shall be controlled by locking quadrants, provide Young's Regulator or Ventlok end bearings for the damper rod. Rectangular volume dampers shall be opposed blade interlocking type. Round volume dampers shall be type consisting of circular blade mounted to a solid shaft. Damper leakage for outside air dampers shall not exceed 6.5 cfm/square foot in full closed position at 4" w.g. pressure differential across damper. Referencing manufacturer and model number for outside air dampers is Ruskin model CD-50.

Provide Flavemaster model STO or equal 45 degree rectangular round takeoff fitting with model SLBO double bearing damper with insulation build out for round ductwork branch takeoffs to individual air devices. Ormit damper at takeoff fitting when damper is located downstream of takeoff.

Where access to damper through a hard scaling is required, provide a Metalstil Air Technology model RT-290 or equal by Young's Regulator concealed, cable operated volume damper with remote operator. Damper shall be adjustable through the handle or remote with standard 1/4" nutrimer or flat screwdriver. Cable assembly shall attach to damper as one piece with no linkage adjustment. Positive, direct, two-way damper control shall be provided with no sleeves, springs or screw adjustments to come loose after installation. Support cable assembly to avoid bends and kinks in cable.

Where approved by architect, a ceiling cup with cover plate can be used for access to cable operator.

Round or oval ductwork shall be Senco, United, Wesco or equal, sheetmetal, with smooth interior surface, with low pressure (duct pressure class up to and including 2" w.g.) round ductwork follows the following table (reference SMACNA HVAC duct construction standards for gauges when pressures exceed 2" w.g.):

Size	Duct gauge	Fitting gauge
14" & under	26	24
15" thru 26"	24	22
28" thru 36"	22	20
38" thru 50"	20	20
52" thru 60"	18	18

Provide double wall insulated round ductwork where exposed or as otherwise indicated. Fabricate double-wall insulated ducts and fittings with an outer shell, insulation, and an inner liner as specified below. At dual wall ducts, the dimension shown is the outside metal duct size and already has allowances for the insulation thickness.

Outer shell shall be 2" longer than inner shell and insulation and shall be gauge as specified for single wall duct.

Insulation shall be fiberglass with thickness as required for thermal resistance of R-6.

Perforated inner liner shall be 24 gauge up to 34 inches, .22 gauge from 35 to 58 inches, and 20 gauge above 60 inches. Provide 3/32" perforations with an overall open area of 23 percent.

Maintain concentricity of liner to outer shell by mechanical means. Retain insulation from dislocation by mechanical means.

Lindab Spronale, Lewis & Lambert or approved equal factory manufactured round ductwork and fittings may be substituted for specified round branch ductwork, at contractor's option. Heavy liquid joint sealant may be omitted on factory-manufactured round ductwork.

Low pressure (duct pressure class up to and including 2" w.g.) fittings 24" in diameter and less shall be prefabricated, spotwelded and internally sealed. Continuously weld fittings larger than 24" in diameter. Fitting gauge shall be 22 gauge for 36" fittings and under, 20 gauge for larger sizes. 90 degree tee's shall be conical type. Seal longitudinal and transverse ductwork joints airtight with heavy liquid sealant according to manufacturer's instructions.

Provide gauge thickness in medium pressure (duct pressure class 3" to 6" w.g.) ductwork as recommended by SMACNA.

At contractor's option, provide Ductmate, Gripple, or approved equal wire rope duct hanging system. Provide Ductmate WR10 through WR40 or grapple No. 1 through No. 5 wire rope using 7x7 or X19 aircraft quality zinc coated cable or galvanized steel wire rope. Secure wire rope to duct using Ductmate Clutch or Gripple Hang Fast adjustable rope attachment. Where applicable for upper attachment, provide Ductmate EZ-Lock wire rope beam clamp with locking nut adjustment or Gripple ceiling, beam, or putin clips. Wire rope, adjustable duct attachment, and upper attachment to structure shall each have minimum 5 to 1 load safety factor.

23A 2-3 FLEXIBLE DUCT

Low pressure (duct pressure class up to and including 2" w.g.) and medium pressure (duct pressure class 3" to 6" w.g.) flexible duct shall be Flexmaster Type 88, Thermaflex Type G-KM, M-KC, or equal (fire retarded polyethylene) protective vapor barrier, UL181 Class 1, acoustical insulated duct, R-6.0 fiberglass insulation. Connect each end with stainless steel screw operated metal draw bands.

Flexible duct runs shall not exceed 5 feet in length, and shall be installed fully extended and straight as possible avoiding tight turns. Install flexible duct in accordance with manufacturer's instructions. Support flexible duct at maximum 5 feet on center and within 6 inches of bends. Bends shall not exceed a centerline radius of one duct diameter. Duct sag shall not exceed 1/2". Supporting material in direct contact with the duct shall not be less than 1-1/2" in width.

Connect flexible duct to rigid metal duct or air devices as recommended by the manufacturer. At a minimum, install two wraps of duct tape around the inner core connection and a metallic or non-metallic clamp over the tape and two wraps of duct tape or a clamp over the outer jacket. Duct clamps shall be labeled in accordance with UL-181b and marked 181b-c. Duct tape shall be labeled in accordance with UL 181b and marked 181b-fx.

23A 2-4 FLUES

Where flues are indicated on the drawings, provide Selkirk Metalbestos model QC or RV or equal by Metal-Fab, Simpson or Van-Packer, Type "B" double wall gas vent flues up to five caps above the roof. Single wall flues are unacceptable. Flues shall be complete with necessary fittings, connectors, flashing cone, storm collar, thimble supports, guy wires, and other accessories, and shall be installed as recommended by the manufacturer, and in conformance with applicable codes. Flash flues watertight at the roof line.

23A 2-5 SPECIAL GAS FLUES

Where special gas flues are indicated on the drawings, provide Selkirk Metalbestos model DCV double wall or equal by Heat-Fab Type 29-4 stainless steel special gas vent. Flues shall be complete with necessary fittings, connectors, flashing cone, storm collar, thimble supports, guy wires, and other accessories, and shall be installed as recommended by the manufacturer, and in compliance with applicable codes.

23A 2-6 CONDENSING GAS FURNACE AND APPLIANCE VENT

Vents and combustion air ducts for condensing type appliances shall be Schedule 40 PVC, DWV, meeting ASTM D1784 Grade 1, Type 1, with dimensions meeting ASTM D2665. Fittings shall be DWV, PVC meeting ASTM D2665 with solvent cement socket joints. Solvent used for joints shall meet ASTM D2594.

23A 2-7 AIR DEVICES

Provide air devices as scheduled on drawings, manufactured by Carnes, Price, Krueger, Nairn Industries, Titus, or Tuttle & Bailey. Select air devices to limit room noise level to no higher than NC-30 unless otherwise stated. Provide devices with a soft plastic gasket to make an airtight seal against the mounting surface. Coordinate final location, frame, and mounting type of air devices with architectural reflected ceiling plans.

Submit complete shop drawings including information on noise level, pressure drop, throw, cfm for each air device, styles, borders, etc. clearly marked with specified equipment number. Submit samples of each air device as requested by the engineer.

Provide wall supply air registers with double deflection blades and opposed blade dampers unless indicated otherwise. Provide wall return air grilles and exhaust air registers with horizontal 35 or 45 degree angle vision-proof bars. Provide concealed fasteners for wall mounted registers and grilles.

Provide ceiling supply air registers of aluminum curved blade type with blades parallel to long dimension and with throw pattern as indicated on drawings.

Provide opposed blade dampers for supply air registers and exhaust air registers unless indicated otherwise.

Provide ceiling supply air diffusers and return air grilles of lay-in or surface mounted type as required to be compatible with ceiling construction. Provide ceiling diffusers and grilles with white enamel finish unless noted otherwise.

Provide linear slot diffusers of standard one-piece lengths up to 6-feet and furnish in multiple sections greater than 6-feet. Join multiple sections together end-to-end with alignment pins to form a continuous slot appearance. Provide alignment components by the manufacturer. Provide plenums by the slot diffuser manufacturer.

Provide drop box diffusers with minimum 22 gauge galvanized steel construction, factory assembled and welded, and provided with standard duct connections and mounting brackets for field installation. Diffusers shall have double deflection grilles or drum louvers that are individually adjustable to customize horizontal and vertical throws and factory installed air diverters or turning vanes. Insulate diffusers with 1" thick, 1.5 lb duct liner insulation.

Provide drop box diffusers as manufactured by AES Industries, Can Fab, Custom Curb, Inc or Plenums, Inc.

23A 2-8 FIRE DAMPERS

Provide fire dampers where shown on drawings, and as required by code enforcing authority. Damper ratings shall be as required to maintain the fire and/or smoke ratings noted on the architectural drawings. Provide fire dampers conforming to NFPA-90A and UBC standard 43-7 with recommended steel sleeves of length as required to meet the installed location, 165 degrees Fahrenheit fusible link, spring catches and non-corrosive bearings. Dampers shall be UL listed, manufactured by Ruskin, Greenheck, Air Balance, Cesco, United Air or Nairn Industries.

Provide access door, sized per SMACNA with minimum size of 10" by 10", in duct for inspection and service to fire damper and fusible link. Provide duct access door(s) within 12 inches of the device to allow for testing and maintenance. Label each door (with minimum 1" lettering) indicating which damper type is served. Door should be capable of being fully opened or provide removable door. Provide removable section of duct where duct size is too small for 10" by 10" access door. Provide access door in roof as well as required to access damper.

23A 2-9 COMBINATION FIRE/SMOKE DAMPERS

Provide combination fire/smoke dampers where shown on drawings and as required by code enforcing authority with fire/smoke ratings as required to maintain the fire rating on the architectural drawings. Dampers shall meet UL 555 classification for fire rating and UL 555s classification of leakage class 1 smoke damper; damper shall bear a UL label attesting to these classifications.

Provide fire damper with a 165 degrees Fahrenheit resettable temperature device. Rate fire/smoke dampers for a minimum velocity of 2,000 fpm and pressure of 4" w.g. Provide manufacturer recommended steel sleeve of length as required to meet the installed location.

Provide a qualified 24 volt electric actuator installed by the manufacturer at time of damper fabrication. Actuators shall be rated for a minimum of 20,000 cycles of operation, shall comply with the locally adopted building code and shall open in 15 seconds or less and close in 15 seconds or less after alarm or smoke detection has occurred. Provide stainless steel spring loaded leakage seals in sides of casing, and

Damper shall be manufactured by Ruskin, Air Balance, Greenheck, Cesco, United Air or Nairn Industries.

Provide access door, sized per SMACNA with minimum size of 10" by 10", in duct for inspection and service to fire damper and fusible link. Provide duct access door(s) within 12 inches of the device to allow for testing and maintenance. Label each door (with minimum 1" lettering) indicating which damper type is served. Door should be capable of being fully opened or provide removable door. Provide removable section of duct where duct size is too small for 10" by 10" access door. Provide access door in roof as well as required to access damper.

23A 2-10 LOUVERS, PLLENS, SCREENS

Provide combination fire/smoke dampers where shown on drawings and as required by code enforcing authority with fire/smoke ratings as required to maintain the fire rating on the architectural drawings. Dampers shall meet UL 555 classification for fire rating and UL 555s classification of leakage class 1 smoke damper; damper shall bear a UL label attesting to these classifications.

Provide fire damper with a 165 degrees Fahrenheit resettable temperature device. Rate fire/smoke dampers for a minimum velocity of 2,000 fpm and pressure of 4" w.g. Provide manufacturer recommended steel sleeve of length as required to meet the installed location.

Provide a qualified 24 volt electric actuator installed by the manufacturer at time of damper fabrication. Actuators shall be rated for a minimum of 20,000 cycles of operation, shall comply with the locally adopted building code and shall open in 15 seconds or less and close in 15 seconds or less after alarm or smoke detection has occurred. Provide stainless steel spring loaded leakage seals in sides of casing, and

Damper shall be manufactured by Ruskin, Air Balance, Greenheck, Cesco, United Air or Nairn Industries.

Provide access door, sized per SMACNA with minimum size of 10" by 10", in duct for inspection and service to fire damper and fusible link. Provide duct access door(s) within 12 inches of the device to allow for testing and maintenance. Label each door (with minimum 1" lettering) indicating which damper type is served. Door should be capable of being fully opened or provide removable door. Provide removable section of duct where duct size is too small for 10" by 10" access door. Provide access door in roof as well as required to access damper.

23A 2-11 DUCT SILENCERS

Provide duct silencers as scheduled on drawings, manufactured by I.A.C., Aerometrics, Dynasonics or Vibro-Acoustics. Silencers shall be rated for low frequency attenuation and low air pressure drop.

23A 2-12 ROOF MOUNTED INTAKE AIR AND RELIEF AIR HOODS

Provide intake and relief hoods as scheduled on drawings. Hoods shall be low silhouette, aluminum, square curb cap, with birdscreen, roof curb, and damper or motorized backdraft damper as scheduled. Manufactured by Cook, Greenheck, Carnes, Cesco or equal.

Provide exhaust air louvers as scheduled on the drawings, or equal manufactured by Cook, Greenheck, Carnes, Twin City Fans, Acme or Penn-Barry complete with aluminum housing, aluminum centrifugal wheel, motor with integral thermal overload protection, disconnect switch mounted inside the housing, birdscreen, backdraft damper, and pre-prefabricated roof curb with minimum height of 12" inches for roofs with no insulation, 15" for roofs with insulation or as scheduled on the drawings. Three phase fans shall be furnished with magnetic starters with push button station.

Provide roof mounted upblast exhaust fans as scheduled on the drawings, or equal manufactured by Cook, Greenheck, Carnes, Twin City Fans, Acme or Penn-Barry complete with aluminum housing, aluminum centrifugal wheel, motor with integral thermal overload protection, disconnect switch mounted inside the housing, drain trough, birdscreen and pre-prefabricated roof curb with minimum height of 12" inches for roofs with no insulation, 15" for roofs with insulation or as scheduled on the drawings. Exhaust fans serving Type I kitchen exhaust hoods shall discharge a minimum of 40' above the roof surface, shall have hinged access including access for blade inspection and cleaning per NFPA 96, grease drain trough with cup and insulated curb, and shall be installed in accordance with NFPA 96 and local codes.

Provide roof mounted exhaust fans as scheduled on the drawings, or equal manufactured by Cook, Greenheck, Carnes, Twin City Fans, Acme or Penn-Barry complete with isolated blower unit and ceiling grille. Provide disconnect switch, backdraft damper, discharge duct,

wall louver, and neoprene vibration isolators with all-thread hanging rods.

Provide in-line (duct) mounted exhaust fans as scheduled on the drawings, or equal manufactured by Cook, Greenheck, Carnes, Twin City Fans, Acme or Penn-Barry complete with isolated blower unit and ceiling grille. Provide backdraft damper, discharge duct,

wall louver, vibration isolation as scheduled or shown on the drawings.

23A



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PLUMBING SPECIFICATIONS

22A-2 PIPING AND EQUIPMENT INSULATION

Domestic cold water, hot water, indirect and condensate drain pipe (within building)
Interior horizontal storm drain piping above ceiling and exposed

Refer to pipe insulation schedule on drawings. Provide with self-sealing lap to provide a continuous vapor barrier by CertainTeed, Owens-Corning or Armstrong. For hot piping, provide pipe hangers and rimer clamps sized for the outside diameter of piping. But insulation to hanger or rimer clamp for vertical pipe. Seal exposed insulation with insulation sealer. Except for vertical piping: provide clamps sized for the outside diameter of the vertical pipe and extend clamps through insulation. Seal penetrations of insulation and vapor barrier with wet coat of vapor barrier cement. For cold piping at corners provide 8' long sections of high density, high temperature, thin silicone by Johns-Manville, fiberglass by Knauf or 1/2" long sections offered by Duro-Last. Circular insulation meeting ASTM C 534-01, Type I with integral high density pipe supports and ends in steel insulation listed by Cooper B-Line, Armstrong or equivalent. Insulation shall be continuous along the pipe surface, except at valves, unions, and where piping is exposed at fixtures. Provide insulation on vent piping within six feet of vent through the roof. Provide insulation on domestic cold and hot water pipes installed in walls and chase.

Roof drain bodies: 2' one-piece fiberglass covering with fire-resistant jacket with self-sealing lap to provide a continuous vapor barrier, by CertainTeed, Owens-Corning or Armstrong.

Provide insulation protection shield at each hanger for insulated piping.

Cover fittings with Zetcon, Knauf or equal one-piece PVC pre-molded insulating covers. Fitting covers, jackets and adhesives shall not exceed flame rating of 25 and smoke development rating of 50 per ASTM E84. At all elbows and tees, fill voids between covers and piping with fiberglass insulation and tape joints. Install pipe insulation in compliance with manufacturer's recommendations. Where pre-molded insulating fittings are not approved by local authorities, install insulation at fittings.

Provide 2' fiberglass thick insulation for water, sanitary, waste or grease waste piping in unheated spaces where indicated on the drawings.

22A-2-3 PIPING JOINTS

Copper Tubing: Joints in hard temper tubing shall be soldered joints using lead-free 95/5 solder except where tubing is installed below grade or below the base slab, in which case joints shall be soldered with silver solder (Silts). Joints in soft temper copper tubing shall be of the hard type installed in compliance with the fitting manufacturer's recommendations.

Threaded Steel Pipe: Threaded joints shall be full and clean, cut with not more than three (3) threads exposed beyond the fittings. Make joints tight with graphite base pipe joint compound and paint exposed threads of ferrule with anti-seizing paint after piping has been tested and proven tight. No caulk, lamp-wick or other material will be permitted for correction of defective joints.

Welded Steel Pipe: Welded joints shall be of the butt welded single "vee" type. Bevel pipe at a 45 degree angle to within 1/16" of the inside wall, and build up the weld to one fourth greater depth than the pipe wall thickness. Welding shall be either electric or oxy-acetylene, performed in conformance with the ASME code for pressure pipe welding, and only by experienced certified welders.

Cast Iron Pipe Below Grade: Joints in bell and spigot cast iron waste and vent pipe shall be neoprene compression gaskets, Tyscal or equal.

Cast Iron Pipe Above Grade: Joints in hubless pipe shall be standard CISPI 310 domestically manufactured by Anaco, AB & I Foundry, Charlotte, Husky, Ideal, Tyler, Mission or Fenco.

PVC Pipe: Clean joints free from debris and moisture. Apply PVC primer meeting ASTM F656 to each joint. Apply solvent cement meeting ASTM D2654 and make joint while wet and in accordance with ASTM D2655.

Pipe Adapters: Make connection of new waste pipe to new or existing dissimilar waste pipe using adapter couplings. Provide Fenco, Proflex 3000 series or Mission Flexseal MRS series with neoprene adapter gasket with stainless steel shield and hose clamps for connecting dissimilar pipes above grade. Provide Fenco, 1050 series or Mission sewer couplings with neoprene adapter gasket and hose clamps for connecting dissimilar pipes below grade and coat stainless steel bands with mastic.

22A-2-4 PIPING INSTALLATION

General: Clean pipe thoroughly prior to installation. Ream ends of pipe to remove burrs. Cut pipe accurately to measurements taken on the job. Install with adequate clearance for installation of coverings where required. Pipe shall not be sprung or bent. Neatly align pipe, connect it securely, and support it from the building structure with hangers as specified below. Provide chrome-plated escutcheons on pipes passing through ceilings, floors or walls of finished spaces. Run pipes freely through floor and wall penetrations using pipe sleeves. Do not groat in place unless required for structural fire integrity. Install pipe concealed in finished spaces wherever possible. Use a dielectric union where ferrous and copper pipe connect. Dielectric union shall have a zinc-plated steel body, a threaded nylon insert, and insulating pressure gasket. No ferrous metal-to-copper connection made without insulating unions will be allowed.

Hanger & Supports: Pipe hangers shall be as described in the specifications by B-Line or equal by Anvil, Michigan, Truscon, or Unistrut. Connect hangers to the structure with side beam connectors and all thread hanger rods. Provide engineering support strut between joints and other structural members as required to provide a rigid hanging installation. Do not hang pipes from other pipes, conduit or ductwork. Provide hanger rods and space hangers at intervals as specified in "hanger spacing". Provide support within 1' of each elbow and tee. Provide supports within 1' of each equipment connection. Provide two nuts on threaded supports to securely fasten the support. Install hanger types or supports for various piping as follows:

Copper Tube: Adjustable band hangers for bare copper tube 3' and smaller shall be B-Line #B3170 CT copper plated adjustable band swivel ring type. Adjustable band hangers for insulated copper tube and 3' smaller shall be B-Line #B3170 NF adjustable band swivel ring type. Clevis hangers for insulated copper tube 4" and larger shall be B-Line #B3100 galvanized steel clevis type. Support exposed copper tube 2" and smaller to walls or in chases with B-Line #B3198 RCT copper coated extension split ring pipe clamps, 3/8" threaded rod and B-Line #B3199 CT ceiling flanges. Support copper tube in chases and walls at plumbing fixtures with plastic or copper brackets secured to structure and u-bolts sized to bare on the pipe. Riser clamps to support vertical copper tube shall be B-Line #B3373 copper coated steel, cut insulation, seal vapor barrier, and attach to bare tube.

Steel Pipe: Adjustable band hangers for 2" and smaller shall be B-Line #B3170 NF adjustable band swivel ring type. Clevis hangers for 2-1/2" and larger shall be B-Line #B3100 galvanized steel clevis type. Riser clamps to support vertical pipe shall be B-Line #B3373 galvanized steel.

Cast Iron Pipe: Adjustable band hangers for 2" and smaller shall be B-Line #B3170 NF adjustable band swivel ring type. Clevis hangers for 3" and larger shall be B-Line #B3100 galvanized steel clevis type. Riser clamps to support vertical pipe shall be B-Line #B3373 galvanized steel.

PVC Pipe: Adjustable band hangers for 3" and smaller shall be B-Line #B3170 NF adjustable band swivel ring type. Clevis hangers for 4" and larger shall be B-Line #B3100 galvanized steel clevis type. Riser clamps to support vertical pipe shall be B-Line #B3373 galvanized steel.

Insulation Protection Shields: B-Line #B3151 of 18 gauge galvanized sheet metal. Shield shall cover half of the circumference of the pipe and shall be of length indicated by manufacturer for pipe size and thickness of insulation.

Hanger Spacing: Rod Sizes & Connectors: Connect rods to steel beams or posts with B-Line #B3031 or #B3033 beam clamps as required. Connect rods to concrete with B-Line #B3014 male/female iron single type inserts with male/female iron nut. Connect rods in wood construction with B-Line #B3058 side beam connectors. Hang and support piping with spacing and rod sizes as follows:

Copper Tube: 1-1/2" and smaller - every 8' with 3/8" hanger rods; 2' every 10' with 3/8" hanger rods; 2-1/2" every 10' with 3/8" hanger rods; 3' every 10' with 1/2" rods; 4" every 10' with 5/8" hanger rods. Support vertical copper tube every 10'.

Steel Pipe: 1" and smaller - every 8' with 3/8" hanger rods; 1-1/4" to 2" every 10' with 3/8" hanger rods; 2-1/2" and 3" every 10' with 1/2" hanger rods; 4" every 10' with 5/8" hanger rods. Support vertical cast steel pipe every 10'.

Cast Iron Pipe: Every 10' and within 1' of each joint. 2" and smaller with 3/8" hanger rods; 3" with 1/2" hanger rods; 4" with 5/8" hanger rods; 6" with 3/4" hanger rods; 8" and larger with 7/8" hanger rods. Support vertical cast iron pipe every 15'.

PVC Pipe: Support all pipes sizes every 4'; 1-1/2" and smaller with 3/8" hanger rods; 2" with 1/2" hanger rods; 2-1/2" and 3" with 1/2" hanger rods; 4" and larger with 5/8" hanger rods. Support vertical PVC pipe every 4'.

Supports On Roof: Support piping on roof with 4" x 12" long CCA rot-proof wood blocks. Set wood blocks on 18" x 18" x 3/16" thick roof walkway material. Connect pipe to wood blocks with galvanized steel pipe clamps and 1/4" x 1-1/2" long cadmium plated lag screws. Stack blocks and nail them together as required and support pipe as required to change pipe elevation. Support pipe with spacing as described above at a minimum 7' above the roof. Set blocks on 18" x 18" x 3/16" thick roof walkway material compatible with actual roof material.

Supports On Floor: Support piping from the floor where required for ferrous pipe or insulated copper tube, shall be B-Line #B3093 galvanized steel with pipe saddle, threaded shank for height adjustment and floor stand secured to the floor.

Below Ground Installation For Soil, Waste And Storm: Install soil and waste piping to a uniform slope of not less than 1/8" per foot for piping 3" or larger, and not less than 1/4" per foot for piping 2-1/2" or smaller.

Slope storm piping at 1/4" per foot. Lay pipe at uniform slope, free from sags, with hub end upstream. Make changes in direction from horizontal to vertical, at fixture branches and other branch connections with sanitary "tees" or short sweep "ells". Make changes in direction from vertical to horizontal or horizontal to horizontal with long radius fittings, long sweeping "ells", combination "y" and 1/8" bend" fittings, or 45 degree "ells" (1/8 bend fittings), 1/6 bend or 1/16 bend and "y" fittings. Install pipe with the barrel of the pipe on firm, solid earth for its entire length, and excavate holes for the pipe bents. Lay pipe in a straight line and install with uniform grade to line with batten boards set not more than 24"-0" apart. Close open ends of pipe with a stopper when pipe laying is not in progress. Center spigots accurately in bents for uniform caulking. Provide a smooth and uniform invert in the system. Drilling or tapping of soil and waste lines, and saddle hubs and bands are not permitted. Locate and install soil and waste lines as indicated on the drawings. Determine exact locations in such a manner as to maintain proper clearance. Prior to installation of any building drain pipe, verify elevation of connection point of existing sewer, service line or existing tenant connections indicated on the drawings. If the installation will not lie into the indicated invert elevation point while maintaining proper fit, notify architect so that an alternative may be determined.

Above Ground Installation For Soil, Waste And Storm: Install piping to a uniform slope of not less than 1/8" per foot for piping 3" or larger, and not less than 1/4" per foot for piping 2-1/2" or smaller. Lay pipe at uniform slope free from sags. Support pipe within 12" of each joint. Make changes in direction from horizontal to vertical, at fixture branches and other branch connections with sanitary "tees" or short sweep "ells". Make changes in direction from vertical to horizontal or horizontal to horizontal with long radius fittings, long sweeping "ells", combination "y" and 1/8" bend" fittings, or 45 degree "ells" (1/8 bend fittings), 1/6 bend or 1/16 bend and "y" fittings. Provide a smooth and uniform invert in the system. Drilling or tapping of soil and waste lines, and saddle hubs and bands are not permitted. Locate and install soil and waste lines as indicated on the drawings. Determine exact locations in such a manner as to maintain proper clearance.

PUMPLING VENT: Connect plumbing vent pipes to future drain pipes as indicated on the drawings or as required by the installation practices adopted and enforced by local codes official, and extend vent pipes full size through the roof line. Grade pipe to a uniform slope so as to drain back by gravity to the drainage piping system. Vents passing through the roof shall be minimum 3" size except in tropical climates, per local codes. Turn flashing down into stacks at least 2", and extend flashing 24" in all directions from the pipe at the roof line. Apply white lead pipe dope on male pipe threads. Vent lines shall be air and water tight. Vent floor drains individually or connect them to a horizontally vented line as shown on the drawings.

DOMESTIC WATER: Arrange cold, hot, and cold water recirculation piping to drain at the lowest point in each system. Install at least one pipe union adjacent to all shutoff valves, at connection points of each piece of equipment, and elsewhere in the system where required to allow proper maintenance. Provide unions of the ground joint type. Make allowance for expansion and contraction where required by the installation. Where water piping occurs in exterior walls, hold pipe as close as possible to the interior face of wall and install insulation beat or other insulation (minimum R-8) between the piping and the exterior wall face.

NATURAL GAS: Pitch natural gas piping, and provide accessible dirt legs at the low points. Take branch pipes off the top or sides of main pipes, to prevent accumulation of water in the branches. Install gas piping valves and unions only in accessible locations. Do not install gas pipe below the base slab.

22A-2-5 PIPING SANITATION

Sanitize the entire domestic water piping system (cold, hot, and hot water return) with a solution containing not less than 50 ppm available chlorine. Keep solution in the system for a minimum of 24 hours, with each valve being operated several times during the period. After completion, flush system with city water until chlorine residual is lowered to incoming city water level.

22A-2-6 PIPE AND VALVE MARKERS

Provide manufacturer's standard pre-printed, semi-rigid snap-on or permanent adhesive, pressure-sensitive vinyl pipe markers. Pipe markers shall be color-coded complying with ANSI A13.

Install pipe markers on each plumbing piping system and include arrows to show normal direction of flow.

Locate pipe markers and color bands wherever piping is exposed to view in occupied spaces, machine rooms, accessible maintenance spaces (shafts, tunnels, plenums) and exterior non-concealed locations.

Provide plastic laminate or brass valve tag on every valve, cock and control device in each plumbing piping system; exclude check valves, valves within factory-fabricated equipment units, plumbing fixture faucets, convenience and lawn-watering hose bibbs, and shutoff valves at plumbing fixtures and similar rough-in connections of end-use fixtures and units.

22A-2-9 AIR ADMITTANCE VALVES

Provide air admittance valves where indicated on drawings. Air admittance valves shall meet ASSE 1050 or 1051 where applicable by Studor or equal, by Oatey, Prostel, or Recorstat. Install per code and manufacturer requirements.

22A-3 PLUMBING SPECIALTIES

22A-3-1 WATER HAMMER ARRESTORS, AND TRAPS: Provide water hammer arrestors at valves or fixtures as indicated on the drawings to prevent water hammer. Arrestors shall be Jossom, Jay R. Smith, Precision Plumbing Products, Proflo, Sioux Chief, Watsco, Watts, or Zum, stainless steel bellows type, o-ring sealed and lubricated acetate piston. Install water hammer arrestors per the Plumbing and Drainage Institute PDI WH-201 installation instructions. Installation of arrestors at fixtures provides the requirement for individual air chambers at each fixture. Air chambers are not acceptable as a substitute for water hammer arrestors.

Provide water-seal traps on floor drains, fixtures and equipment with drain connections, including traps not furnished in combination with fixtures and equipment. Place trap as close to the fixture or drain as possible. Exposed traps in finished spaces shall be chrome-plated brass.

Provide conventional "y" type trap, water-seal cleaning design. Full "y" traps or trap standards shall be used only where specifically called for on drawings or elsewhere in this specification. Trap water seals shall not be less than 2", and deep seal traps shall be provided where specified or indicated. Each trap not integral with the fixture or floor drain or installed below the base slab shall be provided with an accessible cleanout of adequate size. Provide trap primers where required by code and where indicated on the drawings.

22A-3-2 CLEANOUTS, FLOOR DRAINS AND ROOF DRAINS

Cleanouts, floor drains and roof drains shall be by one manufacturer if possible. Acceptable manufacturers are Jossom, Jay R. Smith, Wade, Watts, Mifab, and Zum.

Provide long sweep fittings for cleanout extensions; short sweeps at start of runs or change in direction and combination wye and eighth bend fittings in horizontal runs. Install cleanouts with a minimum of 18" clear all around, consult local codes for other requirements, for easy system maintenance. Install plug with teflon joint compound.

FLOOR DRAINS: Shall be as scheduled on the drawings, manufactured by Zum or equivalent by ABT, Inc., Polydrain, Quazite, Mifab, Jay R. Smith - ACO or NDS.

TRENCH DRAINS: Shall be as scheduled on the drawings, manufactured by Zum or equivalent by ABT, Inc., Polydrain, Quazite, Jay R. Smith - ACO or NDS.

FLOOR CLEANOUTS: Shall be as scheduled on the drawings. Install cleanouts at points as noted on the drawings, at the building exit; at a minimum of every 50 feet in horizontal soil and waste lines; and at pipe of greater than 45 degrees cleanouts shall be full size of the pipe up to 4" and 4" size for pipes larger than 4". Determine the type of floor covering to be used at each floor cleanout location and provide top variations suitable for floor covering (carpet markers, recessed for tile and scorched for unfinished floor). Rough-in and install each floor cleanout flush with the finished floor construction.

EXTERIOR CLEANOUTS: Shall be as scheduled on the drawings. Install cleanouts at points as noted on the drawings, at the building exit; at a minimum of every 100 feet in horizontal soil, waste and storm service lines. Embed each exterior cleanout in a block of concrete, flush with finished grade. Coordinate size of block with construction documents.

WALL CLEANOUTS: Shall be as scheduled on the drawings. Install wall cleanouts at points as noted on the drawings; at the foot of each soil, waste or interior downspout stack; at horizontal soil and waste branches longer than five feet not served by a floor cleanout; secondary cleanouts within four feet of the floor and install extensions from the cleanout to the wall to locate the pitch within 2" of the wall where required. Install cleanouts on urinals and sinks where required by code.

ROOF DRAINS: Shall be as scheduled on the drawings. Provide with roof sump receiver, extension, secondary flashing clamps and underdeck clamp as required; provide expansion joints where required. Provide overflow roof drains where indicated on the drawings with inlet flow line 2' above the primary roof drain inlet.

BACKWATER VALVES – removable flapper type: Shall be as scheduled on the drawings by Cleancheck or equal, by Mainline Backflow Products or Spears.

22A-3-3 VALVES, STRAINERS, HOSE BIBBS, AND UNIONS

Plumbing system valves shall be Crane Company or Nibco of models herein specified, or equivalent by Hammond, Milwaukee, Stockham or Mueller Valves. Valves shall be of the best quality, designed for 125 psi steam working pressure. Install valves on the hot and cold water lines at the water heater connections and other items of equipment, at branches from mains serving groups of fixtures, and at other places indicated or required by the installation to allow ease of future maintenance

GATE VALVES: Class 125, size 2" and smaller shall be Nibco #S-113-LF non-rising stem, soldered lead free bronze body and parts, with wedge disc.