

PART 1 - GENERAL

WORK INCLUDED:

- A. FURNISH ALL MATERIALS, EQUIPMENT, ACCESSORIES, LABOR, SUPERVISION AND ALL RELATED ITEMS NECESSARY TO COMPLETE THE SCOPE OF THE WORK AS INDICATED ON THE DRAWINGS AND/OR SPECIFIED HEREIN.
- B. THE FOLLOWING DATA WAS USED FOR THE THERMAL LOAD CALCULATIONS FOR THIS BUILDING:
 - INDOOR DESIGN: SUMMER 74 DB @ 50% RH

CODES AND STANDARDS:

- A. ALL MECHANICAL SYSTEMS, AS DESCRIBED BY THESE PLANS AND SPECIFICATIONS, SHALL BE INSTALLED IN ACCORDANCE WITH THE APPLICABLE STATE, COUNTY AND LOCAL ORDINANCES AND ALL APPLICABLE SECTIONS OF THE FOLLOWING STANDARDS: LATEST EDITION: "ASHRAE", "AMCA", "ANSI", "ARI", "ASME", "CTI", "NFPA", "SMACNA", "UL".
- B. THE ABOVE STANDARDS AND CODES ARE USED AS A MINIMUM DESIGN CRITERIA AND NO REDUCTIONS WILL BE PERMITTED. EVEN IF ALLOWED BY APPLICABLE CODES, WITHOUT WRITTEN PERMISSION BY ENGINEER. REFER TO CODE CRITERIA FOR FURTHER INFORMATION.

DRAWINGS:

- A. IN GENERAL MECHANICAL PLANS ARE DIAGRAMMATIC IN NATURE AND SHALL BE READ IN CONJUNCTION WITH THE ARCHITECTURAL, PLUMBING, ELECTRICAL, FIRE PROTECTION, STRUCTURAL AND ALL OTHER ASSOCIATED PLANS AND SHALL BE CONSIDERED AS ONE SET OF DOCUMENTS. DUCTWORK AND PIPING OFFSETS, BENDS AND TRANSITIONS OF EQUIVALENT SIZE WILL BE REQUIRED IN ORDER TO PROVIDE A COMPLETE FUNCTIONAL MECHANICAL SYSTEM AND SHALL BE PROVIDED BY THE CONTRACTOR WITH NO ADDITIONAL COST TO THE OWNER. PLANS SHALL NOT BE SCALED.
- IT SHALL BE THE RESPONSIBILITY OF THE GENERAL CONTRACTOR TO VERIFY THE APPARENT LOW BIDDERS FOR BOTH ELECTRICAL & MECHANICAL CONTRACTORS HAVE VERIFIED SCOPE, COORDINATED EQUIPMENT, AND HAVE PROPER VOLTAGES & AMPACITIES OF ALL MECHANICAL & PLUMBING EQUIPMENT CONTAINED WITH THESE DRAWINGS.
- B. AS-BUILT DRAWINGS AND RECORDS:
 - CONTRACTOR SHALL PROVIDE "AS-BUILT" DRAWINGS TO THE ARCHITECT/OWNER AT THE COMPLETION OF THE PROJECT REFLECTING THE ACTUAL CONDITION OF THE MECHANICAL SYSTEM INSTALLATION AND ANY DEVIATION FROM THE ORIGINAL CONSTRUCTION DOCUMENTS. MAINTAIN A COMPLETE SET OF MECHANICAL PRINTS INDICATING ALL CHANGES IN USE COLORS TO MAKE CHANGES AT THE TIME OF EXECUTION. DELIVER SET TO ARCHITECT PRIOR TO ISSUANCE OF FINAL PAYMENT AND/ OR CERTIFICATE OF OCCUPANCY. ELEVATIONS, INVERTS AND DIMENSIONED LOCATIONS OF UNDERGROUND WORK SHALL BE INDICATED, DIMENSION TO PERMANENT REFERENCES.

SUBMITTALS:

- A. SHOP DRAWINGS:
 - CONTRACTOR SHALL SUBMIT TO THE ENGINEER FOR REVIEW AND APPROVAL 7 (SEVEN) COPIES, INCLUDING MANUFACTURER SUBMITTAL DATA SHEET (MSDS) OF ALL EQUIPMENT, MATERIALS, DEVICES, ACCESSORIES AND FINISHES AS SPECIFIED BY THE ENGINEERING CONSTRUCTION DOCUMENTS. REVIEW OF EQUIPMENT AND MATERIAL SUBMITTAL SHALL IN NO WAY RELIEVE THE CONTRACTOR OF THE RESPONSIBILITY TO COMPLY WITH PLANS, SPECIFICATIONS AND CODE REQUIREMENTS. ANY SUBSTITUTIONS SHALL BE PRE-APPROVED BY ARCHITECT AND OWNER AND SHALL BE CONTRACTOR'S RESPONSIBILITY TO INSURE FULL COMPLIANCE WITH THE ORIGINAL DESIGN PER PLANS AND SPECIFICATIONS.
- B. MANUFACTURER'S MANUALS:
 - SUBMIT MANUALS FOR APPROVAL AS INDICATED. MANUALS SHALL INCLUDE OPERATING AND MAINTENANCE INSTRUCTIONS, PARTS LISTS, MANUFACTURER'S AND LOCAL SUPPLIERS ADDRESSES AND PERTINENT DESCRIPTIVE DATA. MANUALS SHALL BE LOOSELEAF BOUND AND INDEXED.

EXISTING CONDITIONS:

- A. THE EXTENT AND LOCATION OF EXISTING CONDITIONS AS SHOWN ON PLANS ARE NOT GUARANTEED AND SHALL BE INVESTIGATED AND VERIFIED IN THE FIELD BY CONTRACTOR. FIELD INVESTIGATION SHALL BE DONE IN SUCH A MANNER AS TO MAINTAIN AND PROTECT EXISTING EQUIPMENT / UTILITIES. THE CONTRACTOR IS RESPONSIBLE FOR AND SHALL PROMPTLY REPAIR AT HIS EXPENSE, ANY AND ALL DAMAGE TO EXISTING MECHANICAL SYSTEMS AND UTILITIES.

PERMITS AND FEES:

- A. THE CONTRACTOR SHALL PROVIDE ALL LABOR, MATERIALS, EQUIPMENT AND NECESSARY ACCESSORIES (I.E. WIRING CONTROLS, DEVICES, ETC.) AND SHALL PAY FOR ALL PERMITS, FEES, INSPECTIONS AND ALL OTHER INCIDENTAL COSTS AND SERVICES NECESSARY FOR THE INSTALLING AND TESTING OF A COMPLETE OPERABLE AND SERVICEABLE MECHANICAL SYSTEM.

MANUFACTURER'S WARRANTY:

- A. CONTRACTOR SHALL PROVIDE WARRANTY FOR A PERIOD OF (1) ONE YEAR AFTER BUILDING C.O. FOR ALL MECHANICAL SYSTEMS, DUCTWORK, CONTROLS, ACCESSORIES AND ALL OTHER EQUIPMENT, PARTS AND LABOR UNDER THESE DRAWINGS AND SPECIFICATIONS. CONTRACTOR SHALL PROVIDE WARRANTY FOR COMPRESSORS FOR (5) FIVE YEARS. ANY REPAIRS REQUIRING SYSTEM SHUT DOWN WILL BE DONE DURING NONOPERATIONAL PERIODS OR AS AGREED WITH OWNER.

CONTRACTOR'S GUARANTEE:

- A. ALL WORK AND MATERIALS TO BE PROVIDED UNDER THESE PLANS AND SPECIFICATIONS SHALL BE GUARANTEED FOR A PERIOD OF ONE YEAR FROM DATE OF BENEFICIAL OCCUPANCY.
- B. CONTRACTOR SHALL PROVIDE MAINTENANCE AND OPERATION MANUAL ON ALL MECHANICAL EQUIPMENT AND SYSTEMS AND TRAINING TO THE OWNER'S PERSONNEL AS NECESSARY OR REQUIRED FOR PROPER OPERATION.

PART 2 PRODUCTS

MATERIALS:

- A. ALL MATERIALS SHALL BE NEW AND OF GOOD QUALITY OF U.S. MANUFACTURING WHENEVER POSSIBLE. ALL WORKMANSHIP AND MATERIALS SHALL BE IN STRICT ACCORDANCE WITH ALL APPLICABLE CODES, PRODUCT APPROVALS, RULES AND ORDINANCES. ALL EMPLOYED INSTALLING PROCEDURES, METHODS AND TECHNOLOGIES SHALL CONFORM TO ESTABLISHED INDUSTRY STANDARDS AND GOOD ENGINEERING PRACTICE. ANY DAMAGED EQUIPMENT SHALL BE REPLACED OR RESTORED TO ITS ORIGINAL CONDITION WITH NO ADDITIONAL COST TO THE OWNER.
- B. ALL MECHANICAL EQUIPMENT AND MATERIALS SHALL BE RATED FOR THE REQUIRED SERVICE, PRESSURES, TEMPERATURES, VOLTAGE, ETC. AND SHALL BE CERTIFIED AND/OR LISTED WHERE APPLICABLE. PROVIDE ALL NECESSARY ACCESSORIES, CONTROLS, TRANSFORMERS, VALVES, CONNECTIONS, GAUGES, ETC. FOR PROPER OPERATION AND SERVICE.

HEATING, VENTILATION AND AIR CONDITIONING

PART 1 GENERAL

- C. SUBSTITUTIONS MUST BE REQUESTED IN CONFORMANCE WITH GENERAL CONDITIONS PER ARCH. SPECIFICATIONS.
- D. ALL HARDWARE AND ACCESSORY FITTINGS SHALL BE OF A TYPE DESIGNATED INTENDED OR APPROPRIATE FOR USE AND COMPLEMENT ITEMS WITH WHICH THEY ARE USED AND SHALL HAVE CORROSION PROTECTION SUITABLE FOR ATMOSPHERE IN WHICH THEY ARE INSTALLED. ALL SUCH HARDWARE SHALL BE U.S. STANDARD SIZES.
- E. EQUIPMENT OF A SIMILAR NATURE SHALL BE IDENTICAL AND FIT ALLOTTED SPACE PROVIDED.
- F. ALL MATERIALS USED IN RETURN AIR PLENUMS OR ABOVE CEILINGS USED AS RETURN AIR PLENUMS SHALL BE RATED AS SUCH. PROVISIONS SHALL BE MADE TO ALLOW AIR TRANSFER FROM ONE SIDE TO THE OTHER. FIRE DAMPERS OR COMBINATION FIRE-SMOKE DAMPERS AS REQUIRED BY THE LOCAL CODE SHALL PROTECT SUCH TRANSFER DUCTS OR OPENINGS AND SERVICE ACCESS SHALL BE PROVIDED AS NECESSARY.
- G. STORE AND PROTECT ALL MATERIALS FROM DAMAGE. MATERIALS SHALL NOT BE STORED DIRECTLY ON GROUND OR FLOOR AND SHALL BE KEPT CLEAN AND DRY, FREE FROM DETERIORATION BY ELEMENTS. DAMAGED MATERIALS SHALL NOT BE INSTALLED.
- H. ALL EQUIPMENT AND MATERIALS SHALL BE SET LEVEL, PROPERLY ALIGNED, SECURED IN PLACE AND BOLTED TOGETHER WHERE IN SECTIONS AND INSTALLED COMPLETE.
- I. ALL OUTSIDE EXPOSED, VISIBLE MECHANICAL EQUIPMENT AND DEVICES SUCH AS LOUVERS, GRILLES, DUCTWORK, PIPING, ETC. SHALL BE PAINTED TO MATCH SURROUNDING TEXTURES AND COLOR AS REQUIRED BY ARCHITECT AND/OR OWNER. PAINT ALL OUTSIDE EXPOSED MECHANICAL EQUIPMENT WITH CORROSION PROTECTIVE PAINT WHENEVER NECESSARY OR REQUIRED. ALL EXPOSED FASTENERS SHALL BE STAINLESS STEEL OR CADMIUM PLATED. ALL FASTENING DEVICES SHALL BE MADE UP TIGHT.
- J. FOLLOW INSTALLATION DIRECTIONS AND RECOMMENDATIONS OF MATERIAL AND EQUIPMENT MANUFACTURERS.
- K. MATERIALS DAMAGED DURING INSTALLATION SHALL BE REPAIRED TO A NEW CONDITION OR SHALL BE REPLACED. FINISHES ON EQUIPMENT WHICH HAVE BEEN SCRATCHED OR MARRED SHALL BE TOUCHED UP TO MATCH ORIGINAL FINISH OR SHALL BE COMPLETELY REFINISHED.
- L. ALL ENCLOSURES, ACCESS PANELS, CABINETS, FIXTURES AND ALL OTHER EXPOSED EQUIPMENT OR ACCESSORIES SHALL BE FACTORY PAINTED OR FINISHED EXCEPT AS INDICATED ON DRAWINGS.
- M. GROUP MOUNTED ITEMS SHALL BE SIMILAR IN FINISH AND COLOR.

PROVISIONS:

A. THE FOLLOWING CODES AND REGULATIONS SHALL IN ADDITION TO THOSE LISTED ABOVE, APPLY TO WORK AND SYSTEMS COVERED BY THIS SECTION.

- 1. NFPA 90A & 90B - AIR CONDITIONING AND VENTILATION SYSTEMS. 2020 ED.
- 2. NFPA 91 - BLOWER AND EXHAUST SYSTEMS. 2020 ED.
- 3. NFPA 101 - LIFE SAFETY CODE. 2020 ED.
- 5. NFPA 703 - FIRE RETARDANT TREATMENTS OF BUILDING MATERIALS.
- 6. NFPA 255 - BUILDING MATERIALS TEST OF SURFACE BURNING CHARACTERISTICS.
- 7. MECHANICAL REFRIGERATION CODE.
- 8. ASTM. E8475 - METHOD OF TEST FOR SURFACE BURNING CHARACTERISTICS OF BUILDING MATERIALS.
- 9. UL - 723.
- B. PROVIDE SMOKE DETECTORS WITH ACCESS DOORS IN ALL SUPPLY AIR DUCTS OF AHU'S AND FANS SERVING A COMMON PLENUM OF 2000 CFM AND ABOVE. PROVIDE ADDITIONAL SMOKE DAMPERS IN SUPPLY AND RETURN AIR DUCTS FOR UNITS SERVING A COMMON PLENUM OF 15000 CFM OR ABOVE. ALL SMOKE DETECTORS SHALL BE BY ONE MANUFACTURER. VOLTAGE AND FIRE ALARM SYSTEM REQUIREMENTS SHALL BE COORDINATED WITH THE RESPECTIVE SUBCONTRACTORS PRIOR TO PURCHASING AND INSTALLATION. THE SMOKE DETECTOR SHALL SHUT DOWN THE ASSOCIATED AIR MOVING EQUIPMENT AND ALL AIR MOVING EQUIPMENT SERVING THAT COMMON PLENUM OR SPACE, AS REQUIRED, UPON SMOKE DETECTION.
- C. PROVIDE TYPE "B" DYNAMIC FIRE DAMPERS WITH CURTAIN BLADES OUT OF THE AIR STREAM, IN ALL DUCTS OR OPENINGS PENETRATING FIRE-RATED WALLS, PARTITIONS, TENANT SEPARATIONS, ROOF ND FLOOR SLABS AND OUTSIDE AIR INTAKES AS REQUIRED. PROVIDE RADIATION DAMPERS IN RATED CEILINGS FOR ALL CEILINGS OPENINGS. PENETRATIONS, FANS, DIFFUSERS, GRILLES, ETC. RATED FOR USE IN THE CEILING ASSEMBLY.
- D. ALL THERMOSTATS, TEMPERATURE SENSORS AND HUMIDISTATS SHALL BE INSTALLED AS INDICATED ON PLANS OR AS REQUIRED/ APPROVED BY OWNER AND ENGINEER. ALL THERMOSTATS SHALL BE INSTALLED AS PER THE A.D.A. CODE REQUIREMENTS WHERE APPLICABLE.
- E. PROVIDE HIGH EFFICIENCY MOTORS WITH MATCHING NON-FUSIBLE DISCONNECT SWITCH TYPE COMBINATION MOTOR STARTERS (AS COORDINATED WITH ELECTRICAL CONTRACTOR) AS FOLLOWS, UNLESS OTHERWISE RECOMMENDED BY MOTOR OR EQUIPMENT MANUFACTURER:
 - ACROSS THE LINE VOLTAGE STARTING BELOW 25 HP
 - REDUCED VOLTAGE STARTING FROM 25 HP AND ABOVE
 - OVERLOAD PROTECTION - 1/3 HP AND ABOVE FOR ALL PHASES WHERE SPECIFIED. PROVIDE MOTORS WITH MATCHING VARIABLE FREQUENCY DRIVES FOR QUIET OPERATION. ALL STARTERS SHALL HAVE PHASE LOSS AND UNBALANCE PROTECTION.
- F. PROVIDE A MIN. OF 3'-0" CLEARANCE IN FRONT OF ALL 120-240 VOLT PANELS AND 4'-0" CLEARANCE IN FRONT OF ANY 480 VOLT PANELS WITH ADEQUATE SIDE CLEARANCE PER NEC REQUIREMENTS.
- G. PROVIDE ONE SET OF ADJUSTABLE PULLEYS FOR PRELIMINARY BALANCE FOR ALL BELT DRIVEN AHU'S OR FANS.
- H. ALL REQUIRED ELEVATOR SHAFT RELIEFS SHALL COMPLY WITH ANSI A17.1 STANDARD.
- I. ALL ROOFTOP EQUIPMENT SHALL BE INSTALLED FOR WIND LOADS AND MOUNTING AS SPECIFIED BY LOCAL CODE. CURBS SHALL EXTEND MIN. 12" ABOVE FINISHED ROOF.
- J. PROVIDE MIN. 10'-0" CLEARANCE BETWEEN OUTSIDE AIR INTAKES AND ANY EXHAUST OPENINGS, EQUIPMENT, VTR'S, ETC. COORDINATE WITH PREVAILING WIND DIRECTION FOR THE DESIGN AREA.
- K. ALL PIPING AND DUCTWORK SHALL BE SLEEVED THRU WALLS, BEAMS, SLABS, ETC. AS REQUIRED AND COORDINATED WITH THE STRUCTURAL ENGINEER. REWORK BAR JOIST CROSS BRACING AND PROVIDE NECESSARY TRANSITIONS AS REQUIRED FOR DUCTWORK INSTALLATION.
- L. FOR ALL IN-LINE FANS OR EXHAUST FANS PROVIDE BACKDRAFT DAMPERS WITH TIGHT SEAL. IF NOT OTHERWISE SPECIFIED ON SCHEDULES AND PLANS.
- M. ALL MECHANICAL EQUIPMENT SHALL BE PROVIDED WITH VIBRATION ISOLATORS AS SPECIFIED ON SCHEDULES AND PLANS OR AS RECOMMENDED BY MANUFACTURER FOR NORMAL OPERATION WITHIN PRESCRIBED NOISE AND VIBRATION LIMITS.
- N. PROVIDE FLEXIBLE CONNECTORS BETWEEN DISTRIBUTION SYSTEM AND AIR OR WATER MOVING EQUIPMENT: AHU'S, FANS, PUMPS, ETC.
- O. OUTDOOR INSTALLED EQUIPMENT SHALL COMPLY WITH ALL LOCAL NOISE REGULATIONS AND ORDINANCES. IT SHALL NOT EXCEED A NOISE LEVEL OF 65 DECIBELS AS MEASURED RADIALLY 30 FEET FROM THE EQUIPMENT IN ALL DIRECTIONS. IF REQUIRED, PROVIDE ACOUSTIC INSULATION.

PARTS EXECUTION

GENERAL:

- A. CONTRACTOR MUST COMMENCE HIS WORK AS SOON AS BUILDING HAS SUFFICIENTLY ADVANCED IN CONSTRUCTION LAYOUT.
- B. LOCATIONS OF EQUIPMENT AND PIPING MAY BE SHOWN ON DRAWINGS IN CERTAIN POSITIONS. CONTRACTOR SHALL BE GUIDED BY ARCHITECTURAL DETAILS AND CONDITIONS EXISTING AT JOB. CORRELATE THIS WORK WITH THAT OF OTHERS AND SHALL CAREFULLY EXAMINE ANY EXISTING CONDITIONS, EXISTING PIPING AND PREMISES AND COMPARE THE CONTRACT DOCUMENTS WITH EXISTING CONDITIONS.
- C. LOCATION OF ELECTRICAL OUTLETS, PIPING, DUCTS, CEILING DIFFUSERS, ETC. SHALL BE COORDINATED BEFORE MATERIAL OR EQUIPMENT IS INSTALLED SO THAT THERE WILL BE NO INTERFERENCE. IN CASE ANY INTERFERENCE DEVELOPS, THE ARCHITECT/ENGINEER WILL DECIDE WHICH EQUIPMENT SHALL BE RELOCATED AT NO COST TO OWNER, REGARDLESS OF WHICH EQUIPMENT WAS INSTALLED FIRST.
- D. CONTRACTOR SHALL CHECK ALL ELECTRICAL CONTROL CONNECTIONS OF EQUIPMENT FURNISHED UNDER THIS SECTION OF THE SPECIFICATIONS TO INSURE PROPER OPERATION OF EQUIPMENT.
- E. CONTRACTOR SHALL VERIFY FIELD CONDITIONS PRIOR TO BIDDING, ORDERING, FABRICATION AND INSTALLATION OF MATERIALS AND EQUIPMENT AND SHALL BRING ANY DISCREPANCIES TO THE ATTENTION OF ARCHITECT AND ENGINEER.
- F. SUBMITTAL OF BID SHALL INDICATE THE CONTRACTOR HAS INCLUDED ALL PERMITS AND FEES IN HIS BID. NO ALLOWANCE SHALL BE MADE FOR ANY ERROR RESULTING FROM CONTRACTOR'S FAILURE TO VISIT JOB SITE AND TO REVIEW DRAWINGS.
- G. LAYOUT, WORK LINES AND ESTABLISHED HEIGHTS SHALL BE IN STRICT ACCORDANCE WITH PLANS AND SPECIFICATIONS. SET ALL SLEEVES, ANCHORS, BOLTS AND/OR INSERTS BEFORE CONCRETE IS POURED.
- H. ALL MATERIALS AND LABOR REGARDING SITE WORK, STRUCTURAL STEEL, WEATHER PROOFING, PAINTING WALL AND ROOF OPENINGS, CUTTING, PATCHING, ETC. SHALL BE DONE BY THE GENERAL CONTRACTOR.
- I. WATERPROOFING: WHERE WORK MUST PIERCE WATERPROOFING, IT SHALL BE DONE WITH CARE AND AFTER ITEM PIERCING WATERPROOFING HAS BEEN SET IN PLACE. THE OPENING MADE FOR THIS PURPOSE SHALL BE SEALED AND MADE ABSOLUTELY WATERPROOF.
- J. BALANCING: ALL SYSTEMS UNDER THIS SECTION SHALL BE FULLY BALANCED BEFORE FINAL ACCEPTANCE TO ACHIEVE OPTIMUM PERFORMANCE CHARACTERISTICS. ALL WATER SYSTEMS SHALL BE FREE FROM WATER HAMMER UPON COMPLETION OF WORK.
- K. PROVIDE CONNECTIONS TO ALL EQUIPMENT (INCLUDING KITCHENS) FURNISHED BY OWNER OR OTHER CONTRACTORS, INCLUDING MATERIALS AND NECESSARY APPURTENANCES REQUIRED TO COMPLETE THE INSTALLATION.
- L. ALL OPENINGS IN BUILDING STRUCTURES FOR PASSING OF MECHANICAL DUCTWORK, PIPING, ETC. SHALL BE 1/2" LARGER ON ALL SIDES (OR AS REQUIRED FOR FIRE-STOPPING) THAN OUTSIDE DIMENSIONS OF PASSING ELEMENT. INTERSTITIAL VOIDS SHALL BE FILLED WITH FIRE RETARDANT MATERIAL AS MANUFACTURED BY "PYROSAFE", "THERMOFIRE", "3M" OR OTHER APPROVED MANUFACTURER.
- CONTRACTOR SHALL UNDERCUT DOORS 1/2" (MAX. 150 CFM) TO PROVIDE REQUIRED VENTILATION FOR UTILITY ROOMS, STORAGE ROOMS, ELECTRICAL ROOMS, TOILETS, ETC. WHEN TRANSFER GRILLES OR DUCTS ARE NOT PROVIDED.
- M. CONTRACTOR SHALL UNDERCUT DOORS 1/2" (MAX. 150 CFM) TO PROVIDE REQUIRED VENTILATION FOR UTILITY ROOMS, STORAGE ROOMS, ELECTRICAL ROOMS, TOILETS, ETC. WHEN TRANSFER GRILLES OR DUCTS ARE NOT PROVIDED.
- C. HANDLING: HANDLE PRODUCTS IN A MANNER THAT WILL PREVENT BREAKAGE OF CONTAINERS AND DAMAGE TO PRODUCTS.

HEATING, VENTILATION AND AIR CONDITIONING

PART 1 GENERAL

WORK INCLUDED:

- A. GENERAL REQUIREMENTS: THE GENERAL CONDITIONS AND PROVISIONS ARE HEREBY MADE A PART OF THIS SECTION OF THE SPECIFICATIONS.
- B. WORK INCLUDED: THIS SECTION IS INTENDED TO DESCRIBE A COMPLETE SYSTEM OF AIR CONDITIONING, VENTILATING AND ALL COMPONENTS THEREOF. SYSTEMS SHALL MEET REQUIREMENTS OF APPLICABLE CODES AND REGULATIONS AND SHALL BE COMPLETE IN EVERY RESPECT.

PROVISIONS:

A. THE FOLLOWING CODES AND REGULATIONS SHALL IN ADDITION TO THOSE LISTED ABOVE, APPLY TO WORK AND SYSTEMS COVERED BY THIS SECTION.

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- 2. NFPA 91 - BLOWER AND EXHAUST SYSTEMS. 2020 ED.
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- 5. NFPA 703 - FIRE RETARDANT TREATMENTS OF BUILDING MATERIALS.
- 6. NFPA 255 - BUILDING MATERIALS TEST OF SURFACE BURNING CHARACTERISTICS.
- 7. MECHANICAL REFRIGERATION CODE.
- 8. ASTM. E8475 - METHOD OF TEST FOR SURFACE BURNING CHARACTERISTICS OF BUILDING MATERIALS.
- 9. UL - 723.
- B. PROVIDE SMOKE DETECTORS WITH ACCESS DOORS IN ALL SUPPLY AIR DUCTS OF AHU'S AND FANS SERVING A COMMON PLENUM OF 2000 CFM AND ABOVE. PROVIDE ADDITIONAL SMOKE DAMPERS IN SUPPLY AND RETURN AIR DUCTS FOR UNITS SERVING A COMMON PLENUM OF 15000 CFM OR ABOVE. ALL SMOKE DETECTORS SHALL BE BY ONE MANUFACTURER. VOLTAGE AND FIRE ALARM SYSTEM REQUIREMENTS SHALL BE COORDINATED WITH THE RESPECTIVE SUBCONTRACTORS PRIOR TO PURCHASING AND INSTALLATION. THE SMOKE DETECTOR SHALL SHUT DOWN THE ASSOCIATED AIR MOVING EQUIPMENT AND ALL AIR MOVING EQUIPMENT SERVING THAT COMMON PLENUM OR SPACE, AS REQUIRED, UPON SMOKE DETECTION.
- C. PROVIDE TYPE "B" DYNAMIC FIRE DAMPERS WITH CURTAIN BLADES OUT OF THE AIR STREAM, IN ALL DUCTS OR OPENINGS PENETRATING FIRE-RATED WALLS, PARTITIONS, TENANT SEPARATIONS, ROOF ND FLOOR SLABS AND OUTSIDE AIR INTAKES AS REQUIRED. PROVIDE RADIATION DAMPERS IN RATED CEILINGS FOR ALL CEILINGS OPENINGS. PENETRATIONS, FANS, DIFFUSERS, GRILLES, ETC. RATED FOR USE IN THE CEILING ASSEMBLY.
- D. ALL THERMOSTATS, TEMPERATURE SENSORS AND HUMIDISTATS SHALL BE INSTALLED AS INDICATED ON PLANS OR AS REQUIRED/ APPROVED BY OWNER AND ENGINEER. ALL THERMOSTATS SHALL BE INSTALLED AS PER THE A.D.A. CODE REQUIREMENTS WHERE APPLICABLE.
- E. PROVIDE HIGH EFFICIENCY MOTORS WITH MATCHING NON-FUSIBLE DISCONNECT SWITCH TYPE COMBINATION MOTOR STARTERS (AS COORDINATED WITH ELECTRICAL CONTRACTOR) AS FOLLOWS, UNLESS OTHERWISE RECOMMENDED BY MOTOR OR EQUIPMENT MANUFACTURER:
 - ACROSS THE LINE VOLTAGE STARTING BELOW 25 HP
 - REDUCED VOLTAGE STARTING FROM 25 HP AND ABOVE
 - OVERLOAD PROTECTION - 1/3 HP AND ABOVE FOR ALL PHASES WHERE SPECIFIED. PROVIDE MOTORS WITH MATCHING VARIABLE FREQUENCY DRIVES FOR QUIET OPERATION. ALL STARTERS SHALL HAVE PHASE LOSS AND UNBALANCE PROTECTION.
- F. PROVIDE A MIN. OF 3'-0" CLEARANCE IN FRONT OF ALL 120-240 VOLT PANELS AND 4'-0" CLEARANCE IN FRONT OF ANY 480 VOLT PANELS WITH ADEQUATE SIDE CLEARANCE PER NEC REQUIREMENTS.
- G. PROVIDE ONE SET OF ADJUSTABLE PULLEYS FOR PRELIMINARY BALANCE FOR ALL BELT DRIVEN AHU'S OR FANS.
- H. ALL REQUIRED ELEVATOR SHAFT RELIEFS SHALL COMPLY WITH ANSI A17.1 STANDARD.
- I. ALL ROOFTOP EQUIPMENT SHALL BE INSTALLED FOR WIND LOADS AND MOUNTING AS SPECIFIED BY LOCAL CODE. CURBS SHALL EXTEND MIN. 12" ABOVE FINISHED ROOF.
- J. PROVIDE MIN. 10'-0" CLEARANCE BETWEEN OUTSIDE AIR INTAKES AND ANY EXHAUST OPENINGS, EQUIPMENT, VTR'S, ETC. COORDINATE WITH PREVAILING WIND DIRECTION FOR THE DESIGN AREA.
- K. ALL PIPING AND DUCTWORK SHALL BE SLEEVED THRU WALLS, BEAMS, SLABS, ETC. AS REQUIRED AND COORDINATED WITH THE STRUCTURAL ENGINEER. REWORK BAR JOIST CROSS BRACING AND PROVIDE NECESSARY TRANSITIONS AS REQUIRED FOR DUCTWORK INSTALLATION.
- L. FOR ALL IN-LINE FANS OR EXHAUST FANS PROVIDE BACKDRAFT DAMPERS WITH TIGHT SEAL. IF NOT OTHERWISE SPECIFIED ON SCHEDULES AND PLANS.
- M. ALL MECHANICAL EQUIPMENT SHALL BE PROVIDED WITH VIBRATION ISOLATORS AS SPECIFIED ON SCHEDULES AND PLANS OR AS RECOMMENDED BY MANUFACTURER FOR NORMAL OPERATION WITHIN PRESCRIBED NOISE AND VIBRATION LIMITS.
- N. PROVIDE FLEXIBLE CONNECTORS BETWEEN DISTRIBUTION SYSTEM AND AIR OR WATER MOVING EQUIPMENT: AHU'S, FANS, PUMPS, ETC.
- O. OUTDOOR INSTALLED EQUIPMENT SHALL COMPLY WITH ALL LOCAL NOISE REGULATIONS AND ORDINANCES. IT SHALL NOT EXCEED A NOISE LEVEL OF 65 DECIBELS AS MEASURED RADIALLY 30 FEET FROM THE EQUIPMENT IN ALL DIRECTIONS. IF REQUIRED, PROVIDE ACOUSTIC INSULATION.

DUCTWORK INSULATION

- A. INSULATION SHALL BE 1 1/2" THICK BLANKET TYPE AND INSTALLED ON DUCT EXTERIOR, MINIMUM R-VALUE SHALL BE 6.0
- B. MANUFACTURERS SHALL BE JOHNS-MANVILLE, OWENS-CORNING, ARMSTRONG OR APPROVED EQUAL.
- C. PROVIDE INSULATION OVER CLEAN DRY SURFACES WITH JOINTS FIRMLY BUTTED TOGETHER. FOR PRESIZED GLASS CLOTH OR VAPOR BARRIER JACKETS, LOGITUDINAL LAP SHALL OVERLAP NOT LESS THAN 1-1/2" BUTT JOINTS SHALL BE WRAPPED WITH A 3 INCH WIDE STRIP OF THE SAME MATERIAL AS JACKET.
- D. INSULATION SHALL BE AS SPECIFIED HEREIN AND AS PER MANUFACTURER'S RECOMMENDATIONS.
- E. INSULATION SHALL NOT BE APPLIED ENTIRE ANGLE SYSTEM HAS BEEN TESTED AND APPROVED.
- F. INSULATION SHALL HAVE A FIRE/SMOKE RATING LESS THAN 25/50.
- G. VAPOR BARRIER SHALL BE INTACT AND CONTINUOUS.

SHEET METAL DUCTWORK:

- A. ALL DUCTWORK OPERATING AT OR BELOW 2" W.G. STATIC PRESSURE, 2000 CFM VELOCITY AND 250°F AIR TEMPERATURE SHALL BE CONSTRUCTED OF GALVANIZED SHEET METAL MEETING THE REQUIREMENTS OF THE LATEST EDITION OF THE SMACNA SHEET METAL DUCT CONSTRUCTION STANDARD.
- B. FABRICATION AND INSTALLATION OF DUCT AND FITTINGS SHALL BE IN ACCORDANCE WITH THE LATEST EDITION OF THE SMACNA SHEET METAL DUCT CONSTRUCTION STADARD. FURTHERMORE, CLOSURE SYSTEMS FOR LONGITUDINAL SEAMS AND TRANSVERSE JOINTS SHALL BE IN ACCORDANCE WITH PROCEDURES NECESSARY TO COMPLY WITH SECTION II, CLOSURES.
- C. ALL DUCTWORK SHALL BE SINGLE WALL GALVANIZED SHEETMETAL WITH SEALED SEAMS AND JOINTS WITH EXTERNAL BLANKET INSULATION R-6 MIN. THE HVAC CONTRACTOR SHALL PROVIDE ALL SHEETMETAL DUCTWORK, HANGERS, AUX. SUPPORT STEEL, ETC., ALL FLEX DUCT SHALL BE RATED CLASS I, UL-181 LISTED WITH METALLIZED INNER AND OUTER FOIL LINERS, MIN. R-5 INSULATION. ALL METAL DUCTS SHALL BE FABRICATED IN ACCORDANCE WITH LATEST EDITION OF S.M.A.C.N.A.
- D. FIBERGLASS DUCTWORK NOT ALLOWED TO BE USED IN THIS PROJECT.

AIR DISTRIBUTION PRODUCTS:

- A. AIR DISTRIBUTION PRODUCTS: GRILLES, REGISTERS AND DIFFUSERS SHALL BE THE PRODUCTS OF ONE MANUFACTURER, SIZES AND PATTERNS INDICATED ON THE DRAWINGS AND SCHEDULES: EQUIVALENT MODELS AND UNITS ARE AS MANUFACTURED BY: TITUS, KRUEGER, TUTTLE & BAILEY, METALARE, MEETING THE SAME PERFORMANCE SOUND AND DIFFUSION CHARACTERISTICS. EACH OUTLET TO BE SIZED IN ACCORDANCE WITH MAXIMUM AND MINIMUM AIR VOLUME, THROW, PRESSURE DROP, SOUND (MAXIMUM NC RATING PER SCHEDULE) AND TERMINAL VELOCITY OF THE OUTLET USED. DIFFUSERS, GRILLES AND REGISTERS SHALL BE CONSTRUCTED ENTIRELY OF ALUMINUM WITH CLEAN ACRYLIC LACQUER FINISH (COLOR SUBJECT TO ARCHITECT'S APPROVAL).
- B. AIR MOTION IN EACH SPACE SHALL NOT BE LESS THAN 20 FPM OR MORE THAN 30 FPM OVER THE ENTIRE RANGE OF SUPPLY AIR TEMPERATURES FROM COOLING TO FULL HEATING.
- C. CEILING DIFFUSERS SHALL BE AS SCHEDULED WITH OPPOSED BLADE DAMPER KEY OPERATED THROUGH FACE OF REGISTER OR AS APPROVED WITH FRAME TYPE COMPATIBLE WITH CEILING TYPE.
- D. RETURN REGISTERS SHALL BE AS SCHEDULED OR AS APPROVED WITH SINGLE DEFLECTION BLADES AND OPPOSED BLADE DAMPER OPERABLE THRU FACE OF REGISTER. FRAME TYPE COMPATIBLE WITH CEILING TYPE. MINIMUM 70% FREE AREA.

PRODUCT DELIVERY, STORAGE AND HANDLING

- A. DELIVERY: DELIVER PRODUCTS TO JOB SITE IN THEIR ORIGINAL UNOPENED CONTAINERS CLEARLY LABELED WITH THE MANUFACTURER'S NAME AND BRAND DESIGNATION, REFERENCED SPECIFICATION NUMBER, TYPE AND CLASS AS APPLICABLE. AT DELIVERY FOR ALL EQUIPMENT, CONTRACTOR SHALL INSPECT ALL ELEMENTS AT DELIVERY FOR DAMAGE & CONTRACT DOCUMENT CONFORMANCE.
- B. STORAGE: STORE PRODUCTS IN AN APPROVED DRY AREA; PROTECT FROM CONTACT WITH SOIL AND FROM EXPOSURE TO THE ELEMENTS. KEEP PRODUCTS DRY AT ALL TIMES.
- C. HANDLING: HANDLE PRODUCTS IN A MANNER THAT WILL PREVENT BREAKAGE OF CONTAINERS AND DAMAGE TO PRODUCTS.

PART 2 - PRODUCTS

- I. DUCT SUPPORTS SHALL BE NOT LESS THAN THE SIZES IN THE FOLLOWING TABLE:

MAXIMUM DUCT DIMENSION	AND SPACING	AND SIZE
1 THRU 8"	8'-0" O.C.	18 GAUGE 1" WIDE
19 THRU 30"	8'-0" O.C.	18 GAUGE 1" WIDE
31 THRU 38"	6'-0" O.C.	18X1-1/2"
39 THRU 60"	6'-0" O.C.	3/18 X 1-1/2"
61 THRU 84"	6'-0" O.C.	1/2" ROD W/2.5"x2.5"x25"
85" AND OVER	-	SUBMIT DETAIL TO ENG.

- I. ALL DUCTS OVER 8" IN ANY DIMENSION SHALL BE CROSS BROKEN OR BEADED.
- L. FIRE DAMPERS AND FIRE-SMOKE DAMPERS:
 - PROVIDE NFPA APPROVED DYNAMIC FUSIBLE LINK FIRE DAMPERS WHEREVER SHOWN ON DRAWINGS. FIRE DAMPERS SHALL BE OF TYPE B WITH BLADES OUTSIDE THE AIR STREAM AND SHALL BE IN COMPLIANCE WITH UL STANDARD 555
 - PROVIDE UL 555 AND UL 555S CLASSIFIED MIN. 1-1/2 HR. COMBINATION FIRE-SMOKE DAMPERS. DAMPERS AND ACTUATORS SHALL BE BY A SINGLE ENTITY AND PROVIDED WITH A MIN. 16" SLEEVE, FUSIBLE LINK AND BLADE POSITION INDICATOR.
 - PROVIDE SUITABLE ACCESS TO ALL FIRE DAMPERS. SUITABLE ACCESS SHALL INCLUDE ACCESS DOORS WITH COMPATIBLE AND/OR APPROPRIATE FINISH IN WHICH ACCESS DEVICE IS LOCATED. IN GENERAL ACCESS DOORS SHALL BLEND INTO AND BE AS UNNOTICABLE AS POSSIBLE IN ALL FINISHED SPACES.
- M. VOLUME CONTROL DAMPERS:
 - AT ALL POINTS WHERE BRANCH DUCTS TAKE OFF FROM A MAIN TRUNK DUCT OR WHERE A DUCT DIVIDES, FURNISH AND INSTALL AN ADJUSTABLE SPLITTER DAMPER OF GALVANIZED STEEL. SECURELY FASTENED TO A 3/8" SQUARE STEEL OPERATING ROD. WHERE INDICATED ON THE DRAWINGS, FURNISH AND INSTALL BUTTERFLY TYPE AND OPPOSED BLADE TYPE MANUAL VOLUME DAMPERS IN BRANCH DUCTS. FURNISH AND INSTALL INDICATING TYPE DAMPER REGULATORS FOR ALL MANUAL VOLUME AND SPLITTER DAMPERS. VOLUME DAMPERS USED WITH AUTOMATIC CONTROLS SHALL BE AS SPECIFIED HEREINAFTER. REFER TO DRAWING KEY NOTES FOR CABLE BALANCING SYSTEM.

DUCTWORK INSULATION

- A. INSULATION SHALL BE 1 1/2" THICK BLANKET TYPE AND INSTALLED ON DUCT EXTERIOR, MINIMUM R-VALUE SHALL BE 6.0
- B. MANUFACTURERS SHALL BE JOHNS-MANVILLE, OWENS-CORNING, ARMSTRONG OR APPROVED EQUAL.
- C. PROVIDE INSULATION OVER CLEAN DRY SURFACES WITH JOINTS FIRMLY BUTTED TOGETHER. FOR PRESIZED GLASS CLOTH OR VAPOR BARRIER JACKETS, LOGITUDINAL LAP SHALL OVERLAP NOT LESS THAN 1-1/2" BUTT JOINTS SHALL BE WRAPPED WITH A 3 INCH WIDE STRIP OF THE SAME MATERIAL AS JACKET.
- D. INSULATION SHALL BE AS SPECIFIED HEREIN AND AS PER MANUFACTURER'S RECOMMENDATIONS.
- E. INSULATION SHALL NOT BE APPLIED ENTIRE ANGLE SYSTEM HAS BEEN TESTED AND APPROVED.
- F. INSULATION SHALL HAVE A FIRE/SMOKE RATING LESS THAN 25/50.
- G. VAPOR BARRIER SHALL BE INTACT AND CONTINUOUS.

SHEET METAL DUCTWORK:

- A. ALL DUCTWORK OPERATING AT OR BELOW 2" W.G. STATIC PRESSURE, 2000 CFM VELOCITY AND 250°F AIR TEMPERATURE SHALL BE CONSTRUCTED OF GALVANIZED SHEET METAL MEETING THE REQUIREMENTS OF THE LATEST EDITION OF THE SMACNA SHEET METAL DUCT CONSTRUCTION STANDARD.
- B. FABRICATION AND INSTALLATION OF DUCT AND FITTINGS SHALL BE IN ACCORDANCE WITH THE LATEST EDITION OF THE SMACNA SHEET METAL DUCT CONSTRUCTION STADARD. FURTHERMORE, CLOSURE SYSTEMS FOR LONGITUDINAL SEAMS AND TRANSVERSE JOINTS SHALL BE IN ACCORDANCE WITH PROCEDURES NECESSARY TO COMPLY WITH SECTION II, CLOSURES.
- C. ALL DUCTWORK SHALL BE SINGLE WALL GALVANIZED SHEETMETAL WITH SEALED SEAMS AND JOINTS WITH EXTERNAL BLANKET INSULATION R-6 MIN. THE HVAC CONTRACTOR SHALL PROVIDE ALL SHEETMETAL DUCTWORK, HANGERS, AUX. SUPPORT STEEL, ETC., ALL FLEX DUCT SHALL BE RATED CLASS I, UL-181 LISTED WITH METALLIZED INNER AND OUTER FOIL LINERS, MIN. R-5 INSULATION. ALL METAL DUCTS SHALL BE FABRICATED IN ACCORDANCE WITH LATEST EDITION OF S.M.A.C.N.A.
- D. FIBERGLASS DUCTWORK NOT ALLOWED TO BE USED IN THIS PROJECT.

AIR DISTRIBUTION PRODUCTS:

- A. AIR DISTRIBUTION PRODUCTS: GRILLES, REGISTERS AND DIFFUSERS SHALL BE THE PRODUCTS OF ONE MANUFACTURER, SIZES AND PATTERNS INDICATED ON THE DRAWINGS AND SCHEDULES: EQUIVALENT MODELS AND UNITS ARE AS MANUFACTURED BY: TITUS, KRUEGER, TUTTLE & BAILEY, METALARE, MEETING THE SAME PERFORMANCE SOUND AND DIFFUSION CHARACTERISTICS. EACH OUTLET TO BE SIZED IN ACCORDANCE WITH MAXIMUM AND MINIMUM AIR VOLUME, THROW, PRESSURE DROP, SOUND (MAXIMUM NC RATING PER SCHEDULE) AND TERMINAL VELOCITY OF THE OUTLET USED. DIFFUSERS, GRILLES AND REGISTERS SHALL BE CONSTRUCTED ENTIRELY OF ALUMINUM WITH CLEAN ACRYLIC LACQUER FINISH (COLOR SUBJECT TO ARCHITECT'S APPROVAL).
- B. AIR MOTION IN EACH SPACE SHALL NOT BE LESS THAN 20 FPM OR MORE THAN 30 FPM OVER THE ENTIRE RANGE OF SUPPLY AIR TEMPERATURES FROM COOLING TO FULL HEATING.
- C. CEILING DIFFUSERS SHALL BE AS SCHEDULED WITH OPPOSED BLADE DAMPER KEY OPERATED THROUGH FACE OF REGISTER OR AS APPROVED WITH FRAME TYPE COMPATIBLE WITH CEILING TYPE.
- D. RETURN REGISTERS SHALL BE AS SCHEDULED OR AS APPROVED WITH SINGLE DEFLECTION BLADES AND OPPOSED BLADE DAMPER OPERABLE THRU FACE OF REGISTER. FRAME TYPE COMPATIBLE WITH CEILING TYPE. MINIMUM 70% FREE AREA.

CONDENSATE PIPING:

- A. INSULATED FIRE-RATED CONDENSATE DRAINS TO BE PER PLANS. CONDENSATE DRAIN PIPING TO BE PVC (ASTM B88) WITH 1" THICK INSULATION, CLOSED CELL TYPE, ARMAFLEX AP OR EQUIVALENT.

AIR HANDLING UNITS:

- A. GENERAL COOLING PERFORMANCE SHALL BE RATED IN ACCORDANCE WITH ARI TESTING PROCEDURE. ALL UNITS SHALL BE FACTORY ASSEMBLED, INTERNALLY WIRED, FULLY CHARGED WITH R-410A AND 100% RUN TESTED TO CHECK COOLING OPERATION, FAN AND BLOWER ROTATION AND CONTROL SEQUENCE BEFORE LEAVING THE FACTORY.
- B. CASING UNIT CASING SHALL BE CONSTRUCTED OF ZINC COATED, HEAVY GAUGE, GALVANIZED STEEL. ALL COMPONENTS SHALL BE MOUNTED IN RUST RESISTANT STEEL CABINET WITH A PAINTED EXTERIOR. THE INDOOR AIR SECTION SHALL BE COMPLETELY INSULATED WITH FIRE RESISTANT, PERMANENT, ODORLESS GLASS FIBER MATERIAL.
- C. FILTERS ONE INCH, THROWAWAY FILTERS SHALL BE STANDARD ON ALL UNITS.
- D. COMPRESSORS ALL UNITS SHALL BE INVERTER DRIVEN HERMETIC TYPE COMPRESSORS WITH OIL PUMP PROVIDED POSITIVE LUBRICATION TO MOVING PARTS. CRANKCASE HEATER INTERNAL TEMPERATURE AND CURRENT SENSITIVE MOTOR OVERLOADS SHALL HAVE INTERNAL SPRING ISOLATION AND SOUND MUFFLING TO MINIMIZE VIBRATION TRANSMISSION AND NOISE. LOW PRESSURE SWITCHES SHALL BE STANDARD.
- E. REFRIGERANT CIRCUITS SHALL VARY IN FLOW/VOLUME EACH REFRIGERANT CIRCUIT SHALL HAVE INDEPENDENT THERMAL EXPANSION VALVES, SERVICE PRESSURE PORTS AND REFRIGERANT LINE FILTER DRIERS FACTORY- INSTALLED AS STANDARD. AN ACCESS AREA SHALL BE PROVIDED FOR REPLACEMENT OF SUCTION LINE DRIERS.
- F. EVAPORATOR AND CONDENSER COILS INTERNALLY FINNED COPPER TUBES MECHANICALLY BONDED TO CONFIGURED ALUMINUM PLATE FIN SHALL BE STANDARD. ON ALL MULTIPLE COMPRESSOR MODELS, THE EVAPORATOR COIL SHALL BE INTERTWINED CONFIGURATION OF FULL FACE ACTIVE DESIGN.
- G. OUTDOOR FANS THE OUTDOOR FAN SHALL BE ELECTRONICALLY CONTROLLED MOTORS STATICALLY AND DYNAMICALLY BALANCED, DRAIN THROUGH IN THE VERTICAL DISCHARGE POSITION. THE FAN MOTORS SHALL BE PERMANENTLY LUBRICATED AND HAVE BUILT-IN THERMAL OVERLOAD PROTECTION.
- H. INDOOR FAN UNITS SHALL HAVE ELECTRONICALLY CONTROLLED MOTORS, FC, CENTRIFUGAL FANS WITH ADJUSTABLE MOTOR SHEAVES. ALL MOTORS SHALL BE THERMALLY PROTECTED. OVERSIZED MOTORS WILL BE AVAILABLE FOR HIGH STATIC OPERATIONS.
- I. CONTROLS UNITS SHALL BE COMPLETELY FACTORY WIRED WITH NECESSARY CONTROLS AND TERMINAL BLOCK FOR POWER WIRING. UNITS SHALL PROVIDE AN EXTERNAL LOCATION FOR MOUNTING FUSED DISCONNECT DEVICE. MICRO-PROCESSOR CONTROLS SHALL BE PROVIDED FOR ALL 24 VOLT CONTROL FUNCTIONS AND SHALL PROVIDE ANTI-SHORT CYCLE TIMING AND TIME DELAY BETWEEN COMPRESSORS TO PROVIDE A HIGHER LEVEL OF MACHINE PROTECTION.
- J. ACCESSORIES
 - ELECTRIC HEATERS- ELECTRIC HEAT MODULES SHALL BE AVAILABLE FOR INSTALLATION WITHIN BLANK UNIT. ELECTRIC HEATER ELEMENTS SHALL BE CONSTRUCTED OF HEAVY DUTY NICKEL CHROMIUM ELEMENTS AND SHALL HAVE AUTOMATICALLY REST HIGH LIMIT CONTROL. OPERATING THROUGH HEATING ELEMENT CONTRACTORS, POWER ASSEMBLIES SHALL PROVIDE SINGLE-POINT CONNECTION. ELECTRIC MODULES SHALL BE UL LISTED OR CSA CERTIFIED.
 - INDOOR UNIT MOUNTING - THE INDOOR UNIT SHALL BE UPFLOW SUPPLY AIR. PROVIDE SUPPORT FOR UNIT AND PROVIDE AN AIR TIGHT INSTALLATION WHEN INSTALLED PROPERLY.
 - MANUAL SUPPLY AND RETURN AIR DAMPER - FIELD INSTALLED ON AIR DUCTS.
 - MOTORIZED OUTSIDE AIR DAMPERS - OUTSIDE AIR DAMPERS SHALL OPEN TO SET POSITION WHEN COMPRESSOR ENERGIZES.

PART 5 - EXECUTION

- A. INSTALL ALL EQUIPMENT, ACCESSORIES AND MATERIALS IN ACCORDANCE WITH MANUFACTURERS PUBLISHED RECOMMENDATIONS.
- B. PROTECTION OF DUCTWORK DURING CONSTRUCTION:
 - THE OPEN ENDS OF UNFINISHED SECTIONS OF DUCTWORK INCLUDING FAN OUT

HVAC GENERAL NOTES

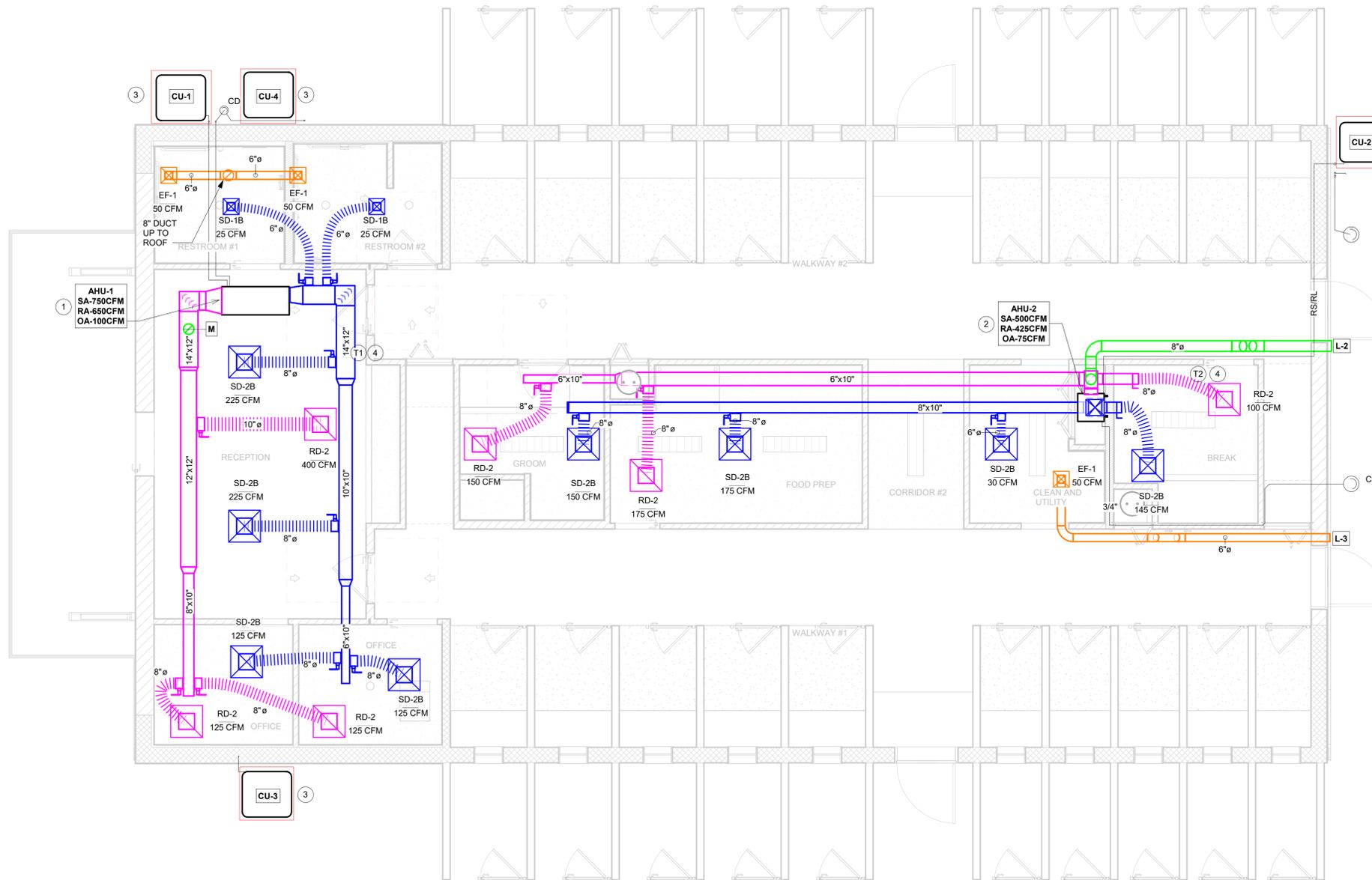
- THESE DRAWINGS WERE DESIGNED TO THE 2023 FBC, MECHANICAL 8TH EDITION.
- WHILE THE EOR IS ATTEMPTING TO SHOW ALL EXISTING CONDITIONS, VERIFICATION OF ALL EXISTING CONDITIONS AND NEW WORK INTERACTION TO SUCH SHALL BE THE RESPONSIBILITY OF THE BIDDING CONTRACTOR.
- PRIOR TO BIDDING, CONTRACTOR SHALL MAKE ITSELF AWARE OF ALL DESIGN SCOPE AND DESIGN INTENT, REVIEW DRAWINGS AND EXISTING SITE FOR DISCREPANCIES, ISSUES, AND QUESTIONS, AND NOTIFY THE EOR IMMEDIATELY FOR ANY DISCREPANCIES OR ISSUES.
- THESE DRAWINGS ARE DIAGRAMMATIC AND ARE INTENDED TO IMPLY DESIGN INTENT. THESE DRAWINGS ARE NOT INCLUSIVE OF EVERY DETAIL REQUIRED TO COMPLETE THE DESIGN INTENT SCOPE OF WORK. CODE COMPLIANCE, GOOD WORKMANSHIP, INDUSTRY STANDARD OF CARE, AND CONFORMITY TO LOCAL AHJ SHALL BE THE RESPONSIBILITY OF THE BIDDING & INSTALLING CONTRACTOR.
- ALL PIPING INSULATION SHALL COMPLY WITH FBC 2023, ENERGY CODE 8TH EDITION.
- ALL SHUT-DOWNS, TIE-INS, SAW CUTTING, AND PATCHING SHALL BE SCHEDULED WITH OWNER AND GC.
- M.C. SHALL FURNISH AND INSTALL NEW 7-DAY PROGRAMMABLE T-STATS TO ALL AHU'S. M.C. SHALL VERIFY MAKE, MODEL, AND COMPATIBILITY WITH T-STATS PRIOR TO ORDERING. COORDINATE FINAL LOCATIONS W/ TENANT.
- ALL SUPPLY AIR, RETURN AIR, EXHAUST AIR DIFFUSERS/REGISTERS, AND GRILLES SHALL HAVE BALANCE DAMPERS INSTALLED IN RUN OUT DUCTING OR AT THE THROAT. BALANCE DIFFUSERS TO CFM'S SHOWN ON THESE PLANS.
- ALL 90 DEGREE ELBOWS SHALL HAVE INTEGRAL TURNING VANES.
- SHEET METAL / RIGID DUCTWORK TO BE USED. DUCTBOARD TO BE AN ALTERNATIVE IF REQUESTED BY OWNER.
- ALL DUCTWORK SHALL BE CONSTRUCTED TO WITHSTAND 2" WATER COLUMN PRESSURE. DUCTWORK SHALL BE FLEX DUCT FOR RUN-OUT DUCTS TO TERMINALS SHEET METAL FOR MAINS AND TRUNK LINES.
- ALL DUCTWORK SHALL BE BUILT AND INSTALLED TO SMACNA STANDARDS AND HUNG & SUPPORTED IN ACCORDANCE WITH ALL STATE AND LOCAL CODES AS WELL AS BEST PRACTICES. FLEXIBLE DUCTWORK SHALL BE INSTALLED AND HUNG AS TO PREVENT BENDS, KINKS, AND SAGS IN DUCTWORK BETWEEN RIGID DUCTS AND AIR TERMINALS.
- NONMETALLIC DUCTS SHALL BE CONSTRUCTED WITH CLASS 0 OR CLASS 1 DUCT MATERIAL AND SHALL COMPLY WITH UL181.
- FLEX DUCT SHALL BE THERMAFLEX EVERELEAN OR SIMILAR, AND SHEET METAL SHALL BE PER M-3 GAUGE AND SIZING. ALL LAPS AND SEALING SHALL BE MECHANICALLY FASTENED FOR SHEET METAL. ALL LEAKAGE SHALL BE LESS THAN 2.5% OF TOTAL AIR FLOW.
- ALL OUTDOOR AIR DUCTS SHALL BE EQUIPPED WITH MOTORIZED OUTDOOR AIR DAMPERS. MOTORIZED OUTDOOR AIR DAMPERS SHALL BE INTERLOCKED WITH EP'S TO OPERATE WHEN EP'S ARE ENERGIZED.

HVAC DUCT LEGEND

SUPPLY AIR	SA
DEMO SUPPLY AIR	DSA
EXISTING SUPPLY AIR	(E)SA
RETURN AIR	RA
DEMO RETURN AIR	DRA
EXISTING RETURN AIR	(E)RA
EXHAUST AIR	EA
DEMO EXHAUST AIR	DEA
EXISTING EXHAUST AIR	(E)EA
OUTDOOR AIR	OA
EXISTING OUTDOOR AIR	(E)OA
DEMO OUTDOOR AIR	DOA

MECHANICAL KEY NOTES.

NO.	NOTE.
1.	INSTALL HORIZONTAL AIR HANDLER ABOVE CEILING WITH ACCESS. SUPPORT UNITS AS REQUIRED. REFER TO AHU SCHEDULE FOR FURTHER INFORMATION.
2.	INSTALL NEW VERTICAL AHU ON 30" HIGH FRAME ATTACHED TO FLOOR. REFER TO SCHEDULE FOR ADDITIONAL SPECIFICATIONS.
3.	INSTALL OUTDOOR CONDENSING UNIT ON 4" THICK CONCRETE BASE PADS. PROVIDE MANUFACTURER'S RECOMMENDED SPACING FOR AIRFLOWS & MAINTENANCE SEE DETAIL FOR EQUIPMENT HOLD-DOWN (TYP)
4.	TYPICAL ZONE SENSOR/THERMOSTAT. MOUNT AT 48" AFF. COORDINATE WITH OWNER/ARCHITECT FOR EXHACT LOCATION. DO NOT DIRECT AIRFLOW AT WALL SENSOR/THERMOSTAT.

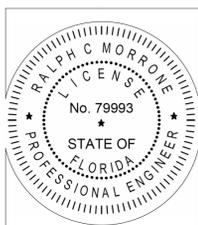


1 MECHANICAL DUCTWORK PLAN
1/4" = 1'-0"



NO.	DATE	DESCRIPTION

CLIENT NAME: SHARP DESIGN STUDIO
PROJECT NAME: PETROPOLIS PET CENTAR
PROJECT ADDRESS:



PROJECT STATUS	PROGRESS SET
PROJECT NUMBER	25-156
ISSUE DATE	09/08/2025

MECHANICAL DUCTWORK PLAN
DESIGNED BY: BS
CHECKED BY: RCM

M100

BID SET - NOT FOR CONSTRUCTION

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ROOF PLAN GENERAL NOTES

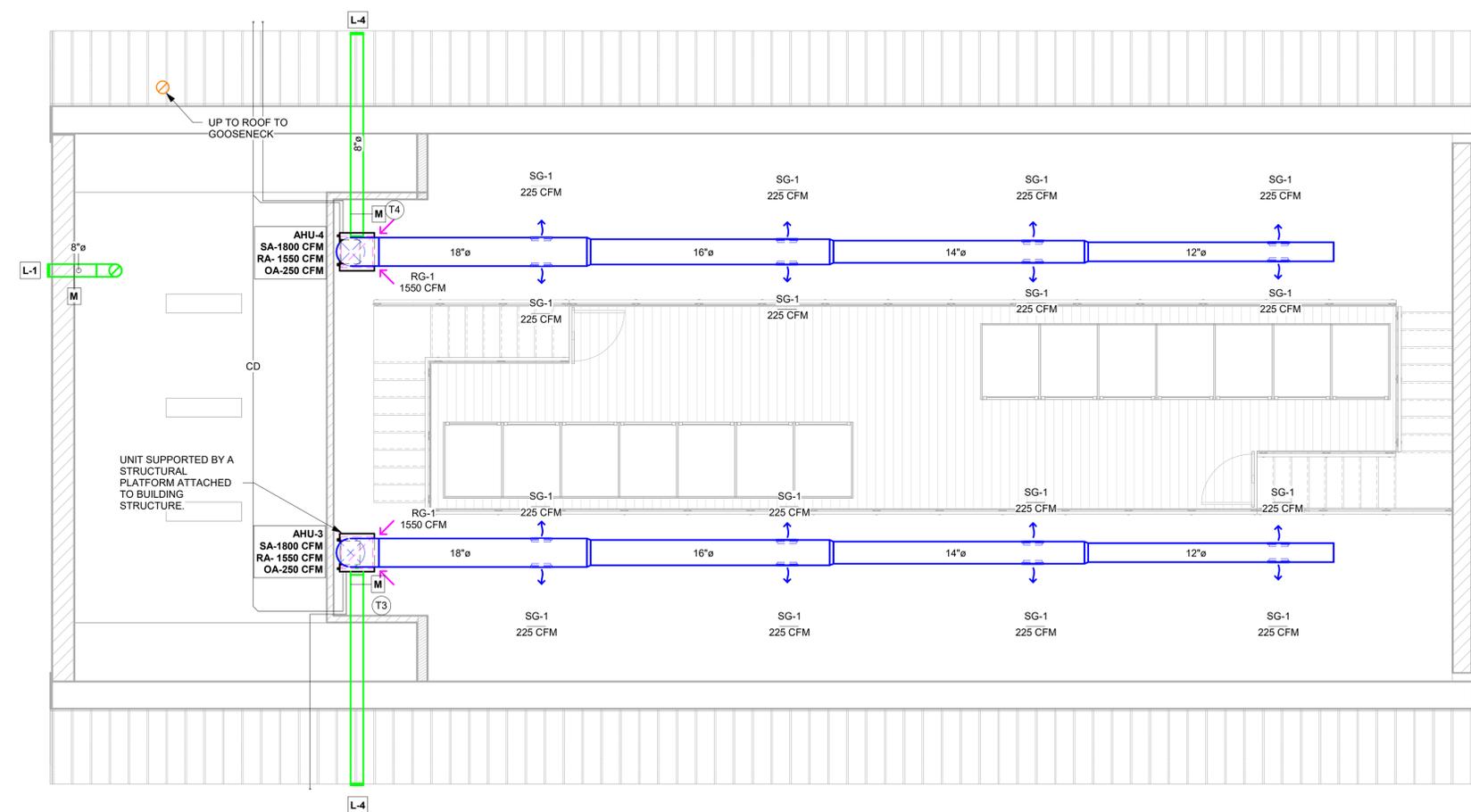
- PENETRATIONS IN ROOF MEMBRANE & FLASHING SHALL ONLY BE MADE AS INDICATED ON THE DRAWINGS OR SPECIFICATIONS.
- ALL SHEET METAL FLASHING SHALL BE 24 GAUGE MINIMUM & ALL SEAMS TO BE SOLDERED.
- REFER TO PROJECT SPECIFICATION MANUAL FOR SEALANT SPECIFICATIONS.
- ALL ROOFTOP EQUIPMENT SHALL BE LOCATED A MINIMUM OF 10'-0" FROM BUILDING EDGE U.O.N.
- ARCHITECT TO PROVIDE A PERMANENT AND APPROPRIATE MEANS OF ACCESS FOR MAINTENANCE OF ALL ROOFTOP EQUIPMENT. SEE ARCH. DRAWINGS FOR EXACT LOCATION AND TYPE OF ACCESS.
- ALL ROOFTOP EQUIPMENT SHALL BE PERMANENTLY SECURED TO ROOF CURBS OR PIPE STANDS. THE ROOF CURBS OR PIPE STANDS SHALL BE PERMANENTLY SECURED TO THE BUILDING STRUCTURE TO RESIST A MINIMUM WIND VELOCITY AS SPECIFIED ON STRUCTURAL DRAWINGS. REFER TO DETAILS.
- ALL OUTDOOR AIR INTAKES SHALL BE KEPT A MINIMUM DISTANCE OF 10'-0" FROM ANY PLUMBING VENTS OR EXHAUST AIR DISCHARGE POINTS.
- PVC CONDENSATE LINES SHALL BE ROUTED TO ROOF DRAINS OR ROOF SCUPPER. SLOPE DRAIN DOWN TOWARDS SCUPPER OR ROOF DRAIN A MINIMUM OF 1/8" PER FT. PROVIDE PIPE STANDS AT NO GREATER THAN 8 FT. O.C. U.O.N. PIPE STANDS SHALL BE SIMILAR TO "PIPE-PRO" OR APPROVED EQUAL.

HVAC DUCT LEGEND

SUPPLY AIR	SA
DEMO SUPPLY AIR	DSA
EXISTING SUPPLY AIR	(E)SA
RETURN AIR	RA
DEMO RETURN AIR	DRA
EXISTING RETURN AIR	(E)RA
EXHAUST AIR	EA
DEMO EXHAUST AIR	DEA
EXISTING EXHAUST AIR	(E)EA
OUTDOOR AIR	OA
EXISTING OUTDOOR AIR	(E)OA
DEMO OUTDOOR AIR	DOA

MECHANICAL KEY NOTES

- | NUMBER | NOTE |
|--------|---|
| 1. | UNIT TO BE SUPPORTED BY A STRUCTURAL PLATFORM ATTACHED TO THE BUILDING STRUCTURE. COORDINATE EXACT INSTALLATION HEIGHT OF THE UNIT IN THE FIELD WITH THE ARCHITECT/OWNER. |
| 2. | TYPICAL ZONE SENSOR/THERMOSTAT. MOUNT AT 48" AFF. COORDINATE WITH OWNER/ARCHITECT FOR EXHAUST LOCATION. DO NOT DIRECT AIRFLOW AT WALL SENSOR/THERMOSTAT. |



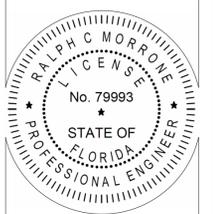
1 MEZZANINE PLAN
1/4" = 1'-0"

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NO.	DATE	DESCRIPTION

CLIENT NAME:	SHARP DESIGN STUDIO
PROJECT NAME:	PETROPOLIS PET CENTER
PROJECT ADDRESS:	

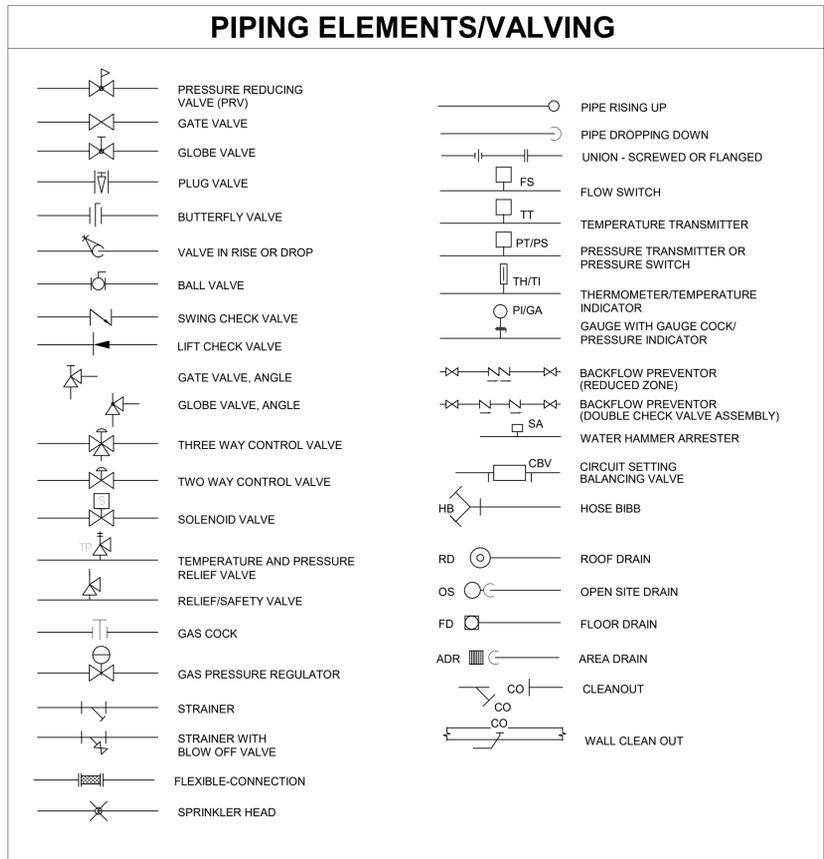


PROJECT STATUS	PROGRESS SET
PROJECT NUMBER	25-156
ISSUE DATE	09/08/2025

MEZZANINE PLAN
DESIGNED BY: BS
CHECKED BY: RCM

M200

BID SET - NOT FOR CONSTRUCTION



DRAINAGE FIXTURE UNIT SUMMARY

FIXTURE	QUANTITY	DRAINAGE FIXTURE UNITS	TOTAL DFU'S
WC	2	4	8
LAV	2	1	2
SHO-1	1	2	2
SHO-2	1	2	2
SINK-1	1	2	2
SINK-2	2	2	4
MOP	1	2	2
FD	6	2	12
TOTAL			34

WATER FIXTURE UNIT SUMMARY

FIXTURE	QUANTITY	WATER FIXTURE UNITS	TOTAL WATER FIXTURE UNITS
WC	2	5	10
LAV	2	1.5	3
SHO-1	1	3	3
SHO-2	1	3	3
SINK-1	1	3	3
SINK-2	2	3	6
MOP	1	2.25	2.25
HB	3	2.25	6.75
TOTAL			37

PLUMBING FIXTURE SCHEDULE

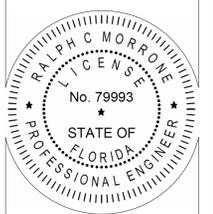
TAG	FIXTURE TYPE	MANUFACTURER	MODEL	CW	HW	SAN	VENT	NOTES
WC	WATER CLOSET (PRESSURE ASSIST)	AMERICAN STANDARD	2878.0162	1/2"ø	-	3"ø	-	YORKVILLE™ RIGHT HEIGHT® ELONGATED PRESSURE-ASSISTED TOILET 1.6 GPF / 6.0 LPF COORDINATE LEVER SIDE SEAT COLOR AND FINAL LAYOUT DIMENSIONS WITH ARCHITECT AND ARCHITECTURAL PLANS. BACK OUTLET
LAV	LAVATORY (WALL HUNG - ADA)	KOHLER	K-2084	1/2"ø	1/2"ø	2"ø	2"ø	(HANDICAPPED); KOHLER K-2005 "KINGSTON" 21"x18" WALL HUNG VITREOUS CHINA LAVATORY W/ HOLES ON 4" CENTERS AND DRILLED FOR CONCEALED ARM CARRIER - MOEN FAUCET MODEL 8420 FAUCET WITH 0.35 GPM FLOW RESTRICTOR AERATOR - OFFSET DRAIN W/ STRAINER 3/8" CHROME PLATED SUPPLIES W/ WHEEL HANDLE STOPS - 1 1/4" CHROME PLATED BRASS TP TRAP W/ CLEANOUT PLUG - WADE W-520-07 FLOOR SUPPORTED CONCEALED ARM CARRIER MOUNT RIM AT 34" A.F.F. AND INSTALL TO MEET ADA STANDARDS. COVER TP TRAP AND EXPOSED HOT & COLD WATER SUPPLY W/PREMANUFACTURED INSULATING COVER PER SPECIFICATIONS. EQUAL MANUFACTURERS - AMERICAN STANDARD, CRANE, ELJER.
SINK-2	SINK	ADVANCE TABCO	7-PS-60	1/2"ø	1/2"ø	2"ø	2"ø	HAND SINK, WALL MOUNTED 14" WIDE x 10" FRONT-TO-BACK x 5" DEEP BOWL; 20 GAUGE 304 STAINLESS STEEL, WITH SPLASH MOUNTED FAUCET, BASKET DRAIN, WALL BRACKET.
SINK-1	DUBLE SINK	KOHLER	K-28900-NA	1/2"ø	1/2"ø	2"ø	2"ø	KOHLER BUCKLEY 32-1/4" UNDERMOUNT DOUBLE BASIN STAINLESS STEEL KITCHEN SINK. FAUCET DELTA ESSA PULL-DOWN KITCHEN FAUCET WITH MAGNETIC DOCKING SPRAY HEAD - INCLUDES LIFETIME WARRANTY. MODEL 9113-AR-DST. 1.8 GPM.
MOP	MOP SINK	FIAT	MSB-2424	3/4"ø	3/4"ø	2"ø	2"ø	FIAT MSB-2424 MOLDED STONE MOP BASIN W/ #302 COMBINATION DOME STRAINER & LINT BASKET, COLOR #219 - #830-AA CHROME PLATED SERVICE FAUCET W/ VACUUM BREAKER, INTEGRAL STOPS, WALL BRACE, PAIL HOOK, AND 3/4" HOSE THREADED ON SPOUT.
DWH	DOMESTIC WATER HEATER	AO SMITH	E6-50R45DV	3/4"ø	3/4"ø	-	-	AO SMITH 50 GALLON SHORT WATER HEATER, TWO 4.5KW HEATING ELEMENTS. 240V 1PH. SUPPLY COMPLETE WITH VACUUM BREAKER AND T&P RELIEF VALVE. EQUAL MANUFACTURERS: STATE, RUUD, NATIONAL AND LOCHINVAR.
HB	HOSE BIBB	WADE	W-8600	3/4"ø	-	-	-	WADE NON-FREEZE #W-8600, BRONZE CASING W/NICKEL BRASS FACE, BACKFLOW PREVENTER, W/ LOOSE KEY SHUT-OFF. EQUAL MANUFACTURERS - JOSAM, WOODFORD, WATTS, ZURN. PROVIDE COLD WATER ONLY. CAP HW INLET.
ET	EXPANSION TANK	WATTS	DET-12	3/4"ø	-	-	-	FACTORY PRE-CHARGED DIAPHRAGM TYPE EXPANSION TANK FOR POTABLE WATER. WATTS MODEL DET-12, PROVIDE WITH WALL MOUNTING BRACKET AND INSTALL PER MANUFACTURER INSTRUCTION.
MV	MIXING VALVE	WATTS	SERIES LFMMV	1/2"ø	1/2"ø	-	-	WATTS LEAD FREE THERMOSTATIC MIXING VALVE.
WH	WATER HAMMER ARRESTOR	WATTS	LF15M2	1/2"ø	-	-	-	SHALL BE PLACED ON EVERY WC/EWC
SHO-1	SHOWER DRAIN	-	-	-	-	2"ø	2"ø	COORDINATE MAKE AND MODEL OF SHOWER SYSTEM WITH ARCHITECT AND OWNER.
FD	FLOOR DRAIN	JOSAM	FD-302J-5A	-	-	2"ø	-	LITE LINE PVC 2-PIECE DRAIN BODY W. ADJ RD NIKALOY STR. PVC 2-PIECE FLOOR DRAIN WITH 1/2" PRIMER TAP WITH PLUG, SOLVENT WELD BOTTOM OUTLET FOR SCH 40 PVC PIPE AND ADJUSTABLE ROUND NIKALOY STRAINER.
TP	TRAP PRIMER	ZURN	Z-1022	1/2"ø	-	-	-	TRAP PRIMER - ZURN Z-1022 SANI-GUARD. CONNECT TO CW WITH VALVE, EXTEND TP TO FLOOR DRAIN AS REQUIRED.
FCO	FLOOR CLEANOUT	WADE	W-6000Z-X	-	-	3"ø	-	CAST IRON W/ ADJUSTABLE HOUSING. ROUND HEAVY CAST IRON VANDAL PROOF TOP WITH STAINLESS STEEL SCREWS. EQUAL MANUFACTURERS: JOSAM, ZURN, J.R. SMITH.
WCO	WALL CLEANOUT	WADE	W-8480R	-	-	3"ø	-	WADE #W-8480R, WITH BRASS PLUG AND ROUND STAINLESS STEEL SECURED ACCESS COVER. EQUAL MANUFACTURERS: JOSAM, ZURN, J.R. SMITH.
ECO	EXTERIOR CLEANOUT	WADE	W-6000Z-X	-	-	3"ø	-	CAST IRON W/ ADJUSTABLE HOUSING. ROUND HEAVY CAST IRON VANDAL PROOF TOP WITH STAINLESS STEEL SCREWS. EQUAL MANUFACTURERS: JOSAM, ZURN, J.R. SMITH.
SHO-2	DOG SHOWER DRAIN	-	-	-	-	2"ø	2"ø	COORDINATE MAKE AND MODEL OF SHOWER SYSTEM WITH ARCHITECT AND OWNER.
TD	TRENCH DRAIN	-	-	-	-	3"ø	2"ø	SELECTED BY OWNER/ARCHITECT

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NO.	DATE	DESCRIPTION

CLIENT NAME: SHARP DESIGN STUDIO
 PROJECT NAME: PETROPOLIS PET CENTAR
 PROJECT ADDRESS: .



PROJECT STATUS	PROGRESS SET
PROJECT NUMBER	25-156
ISSUE DATE	09/08/2025

PLUMBING & SANITARY SPECIFICATIONS

DESIGNED BY: BS
 CHECKED BY: RCM

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P000

PLUMBING GENERAL NOTES

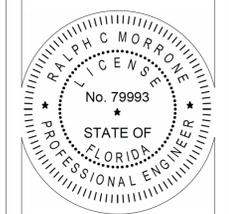
1. THESE DRAWINGS WERE DESIGNED TO THE 2023 FBC PLUMBING 8TH EDITION.
2. PRIOR TO BIDDING, CONTRACTOR SHALL MAKE ITSELF AWARE OF ALL DESIGN SCOPE AND DESIGN INTENT. REVIEW DRAWINGS AND EXISTING SITE FOR DISCREPANCIES, ISSUES, AND QUESTIONS. NOTIFY THE EOR IMMEDIATELY FOR ANY DISCREPANCIES OR ISSUES.
3. THESE DRAWINGS ARE DIAGRAMMATIC AND ARE INTENDED TO IMPLY DESIGN INTENT. THESE DRAWINGS ARE NOT INCLUSIVE OF EVERY DETAIL REQUIRED TO COMPLETE THE DESIGN INTENT. SCOPE OF WORK, CODE COMPLIANCE, GOOD WORKMANSHIP, INDUSTRY STANDARD OF CARE, AND CONFORMITY TO LOCAL AHJ SHALL BE THE RESPONSIBILITY OF THE BIDDING & INSTALLING CONTRACTOR.
4. ALL HOT WATER PIPING INSULATION SHALL COMPLY WITH FBC 2023 ENERGY CODE, 8TH EDITION. FOR ALL PIPING LESS THAN 1 1/2", INSULATION SHALL BE 1" THICK. FOR ALL OTHER PIPING, INSULATION SHALL BE 1 1/2" THICK.
5. ALL PIPING MATERIALS SHALL BE SCHEDULE 40 PVC FOR SAN & VENT AND CPVC, PEX, OR COPPER FOR WATER SUPPLY PIPING. SAN LINES SHALL BE RUN AT 1/4" PER FOOT SLOPE FOR ALL SIZES LESS THAN 3" AND 1/8" PER FOOT SLOPE FOR ALL OTHER SIZES UNLESS NOTED OTHERWISE. VENT LINES SHALL BE PLUMB IN THE VERTICAL DIRECTION AND SLOPED AT 1/16" PER FOOT BACK TO THE SAN STACK. WATER SUPPLY PIPING SHALL BE RUN PLUMB AND LEVEL.
6. ALL LAVS SHALL HAVE THERMOSTATIC MIXING VALVES INSTALLED PER 2023 FBC PLUMBING, 8TH EDITION 607.1.2.
7. SEE ARCHITECTURAL DRAWINGS FOR PLUMBING FIXTURE LAYOUTS, SECTIONS, AND ELEVATIONS.
8. ALL EQUIPMENT CONNECTIONS TO POTABLE WATER SUPPLY SHALL HAVE BACKFLOW PREVENTION PER 2023 FBC PLUMBING, 8TH EDITION TABLE 508.1.
9. ALL NEW FLOOR DRAINS SHALL HAVE TRAP PRIMERS INSTALLED FROM NEAREST HAND SINK OR LAV. ALL (E) FLOOR DRAINS SHALL BE RETROFIT TO HAVE TRAP PRIMERS INSTALLED PER ABOVE.

PLUMBING PLAN LEGEND

COLD WATER	---	CW	---
UNDERGROUND COLD WATER	---	UCW	---
HOT WATER	---	HW	---
HOT WATER RETURN	---	HWR	---
GREASE SANITARY	---	GSAN	---
SANITARY	---	SAN	---
VENT PIPING	---	VENT	---
NATURAL GAS PIPING	---	NGAS	---

NO.	DATE	DESCRIPTION

CLIENT NAME:	SHARP DESIGN STUDIO
PROJECT NAME:	PETROPOLIS PET CENTER
PROJECT ADDRESS:	



PROJECT STATUS	PROGRESS SET
PROJECT NUMBER	25-156
ISSUE DATE	09/08/2025

DESIGNED BY:	BS
CHECKED BY:	RCM

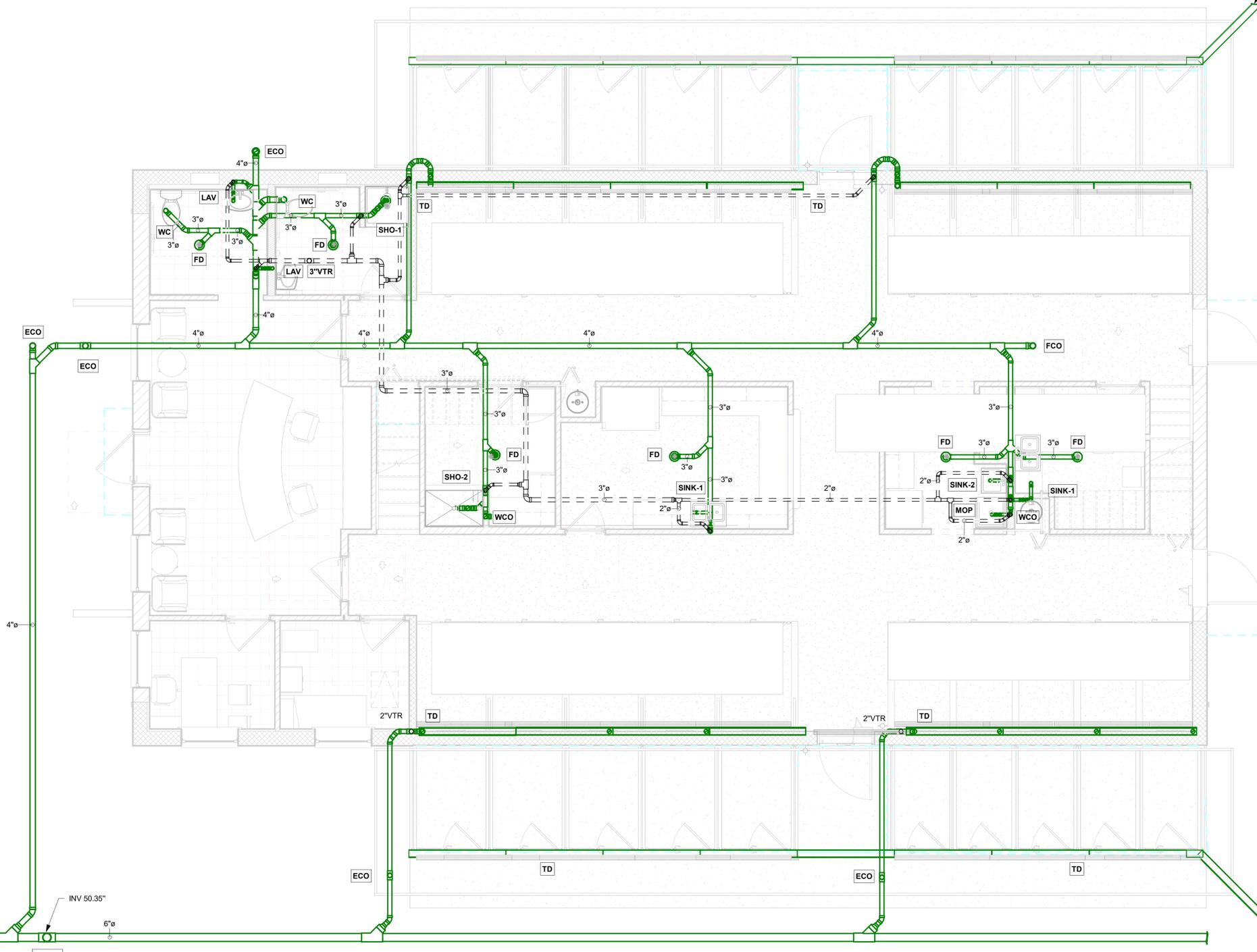
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CONNECT TO LOCAL SEPTIC SYSTEM. VERIFY EXACT LOCATION ON SITE.

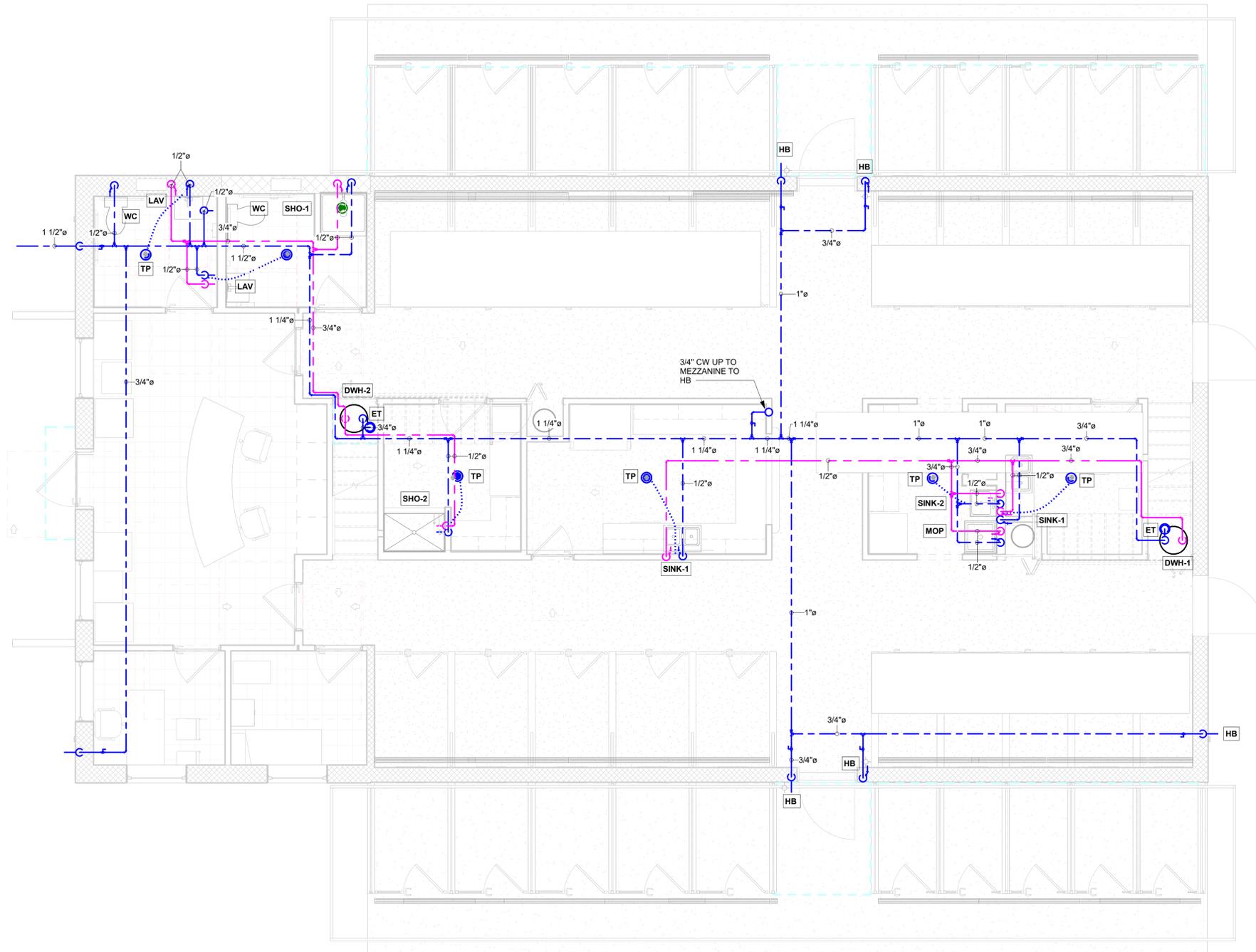
CONNECT TO LOCAL SEPTIC SYSTEM. VERIFY EXACT LOCATION ON SITE.

CONNECT INTO SEWER SERVICE REFER TO SITE PLAN



1 SANITARY & VENT PLAN
1/4" = 1'-0"

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1 PLUMBING PIPING PLAN
1/4" = 1'-0"

PLUMBING GENERAL NOTES

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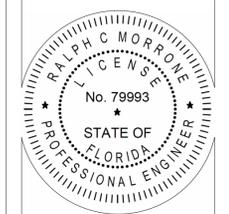
PLUMBING PLAN LEGEND

COLD WATER	---	CW	---
UNDERGROUND COLD WATER	---	UCW	---
HOT WATER	---	HW	---
HOT WATER RETURN	---	HWR	---
GREASE SANITARY	---	GSAN	---
SANITARY	---	SAN	---
VENT PIPING	---	VENT	---
NATURAL GAS PIPING	---	NGAS	---



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CHECKED BY:	RCM

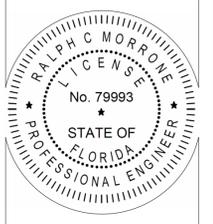
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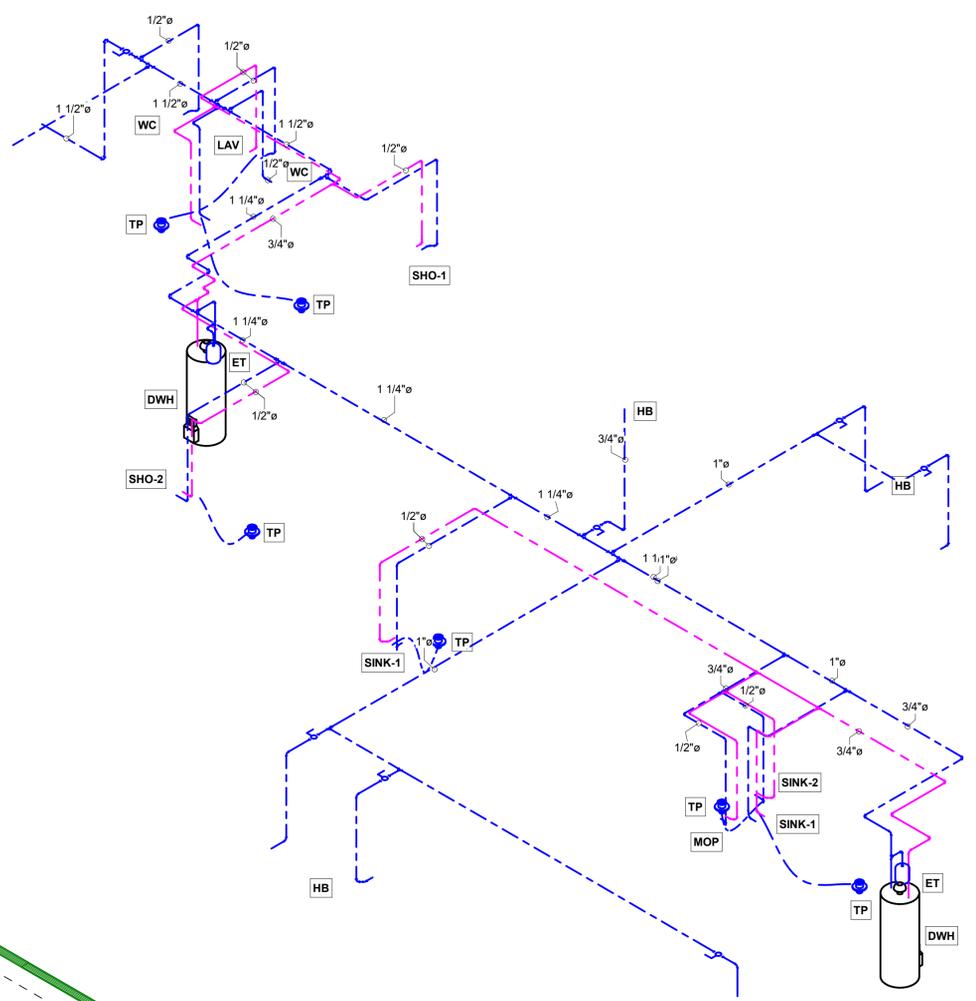


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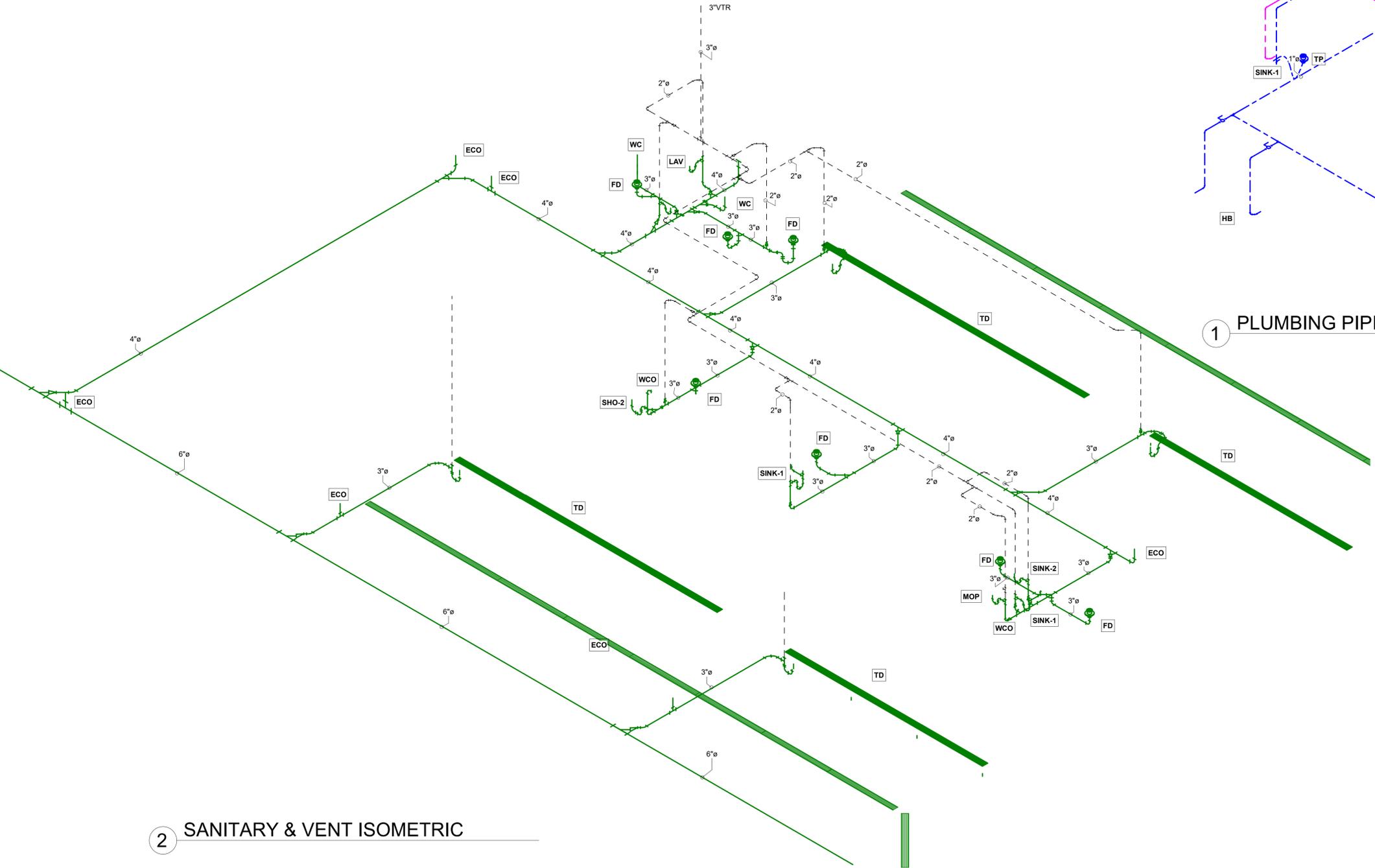
PLUMBING ISOMETRIC DIAGRAMS
DESIGNED BY: BS
CHECKED BY: RCM

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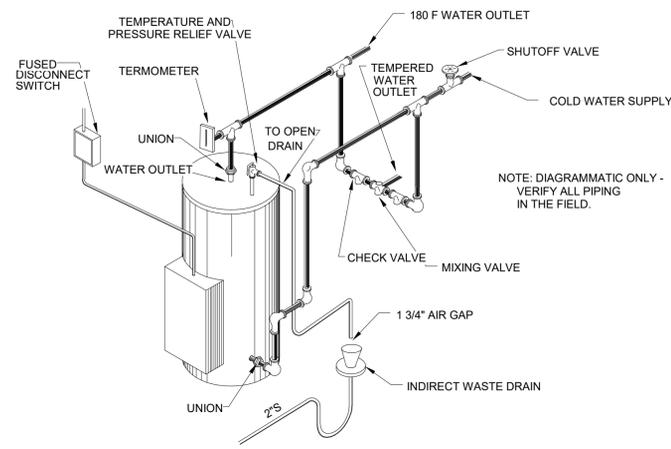


1 PLUMBING PIPING ISOMETRIC

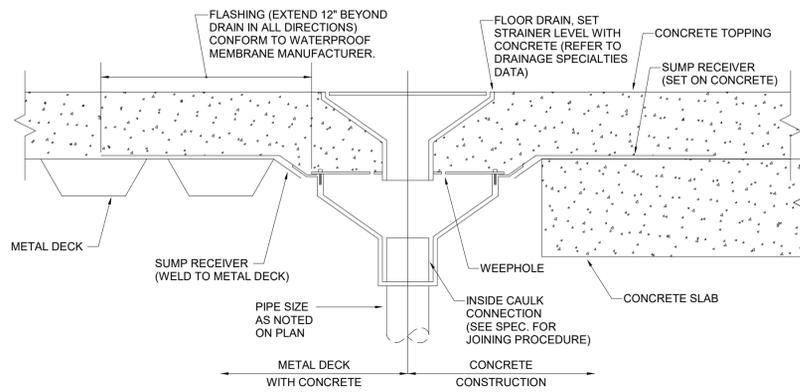


2 SANITARY & VENT ISOMETRIC

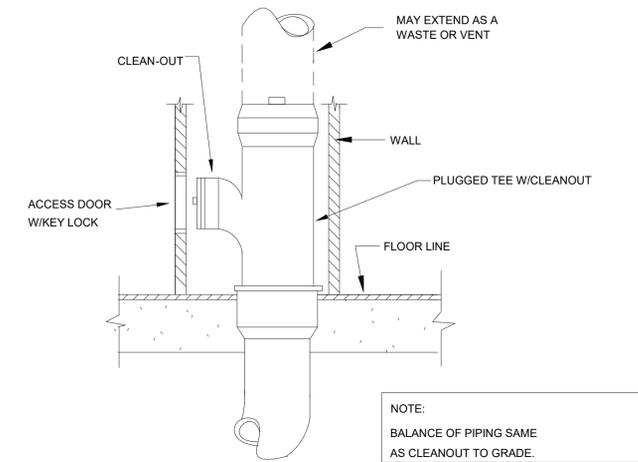
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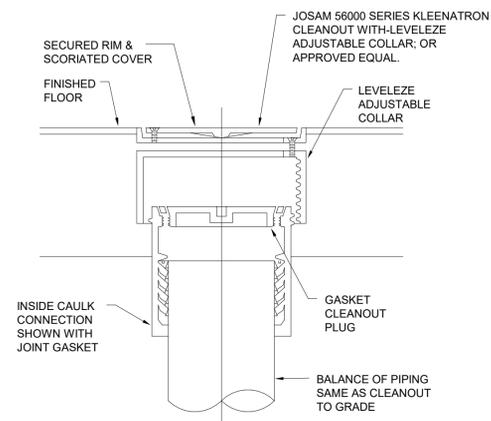
1 ELECTRIC WATER HEATER PIPING DETAIL
NOT TO SCALE



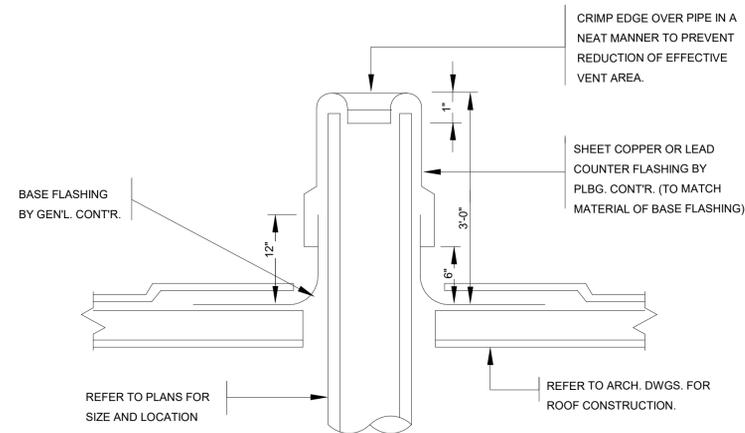
2 FLOOR DRAIN DETAIL
NOT TO SCALE



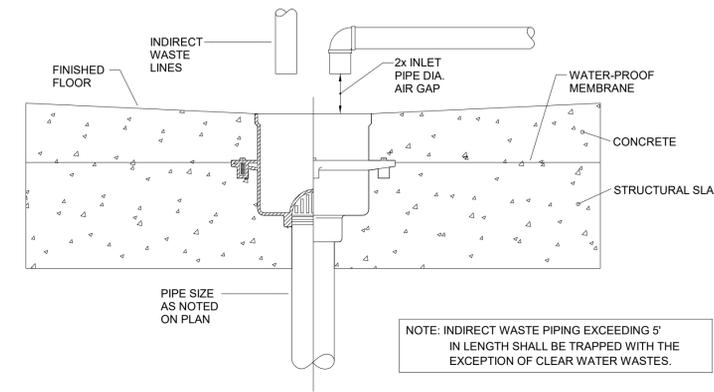
3 WALL CLEANOUT DETAIL
NOT TO SCALE



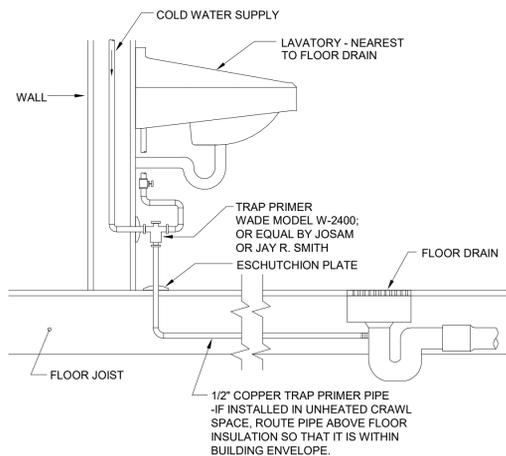
4 FLOOR CLEANOUT DETAIL
NOT TO SCALE



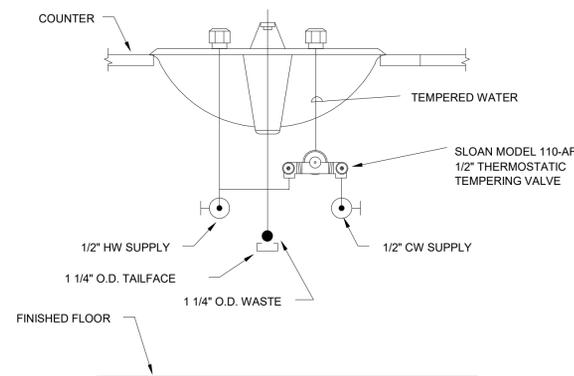
5 PLUMBING VENT THRU FLAT ROOF DETAIL
NOT TO SCALE



6 FLOOR SINK DETAIL
NOT TO SCALE



7 FLOOR DRAIN TRAP PRIMER DETAIL
NOT TO SCALE



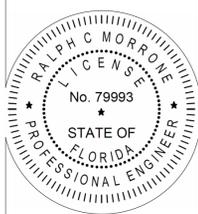
8 LOCAL MIXING VALVE DETAIL
NOT TO SCALE

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