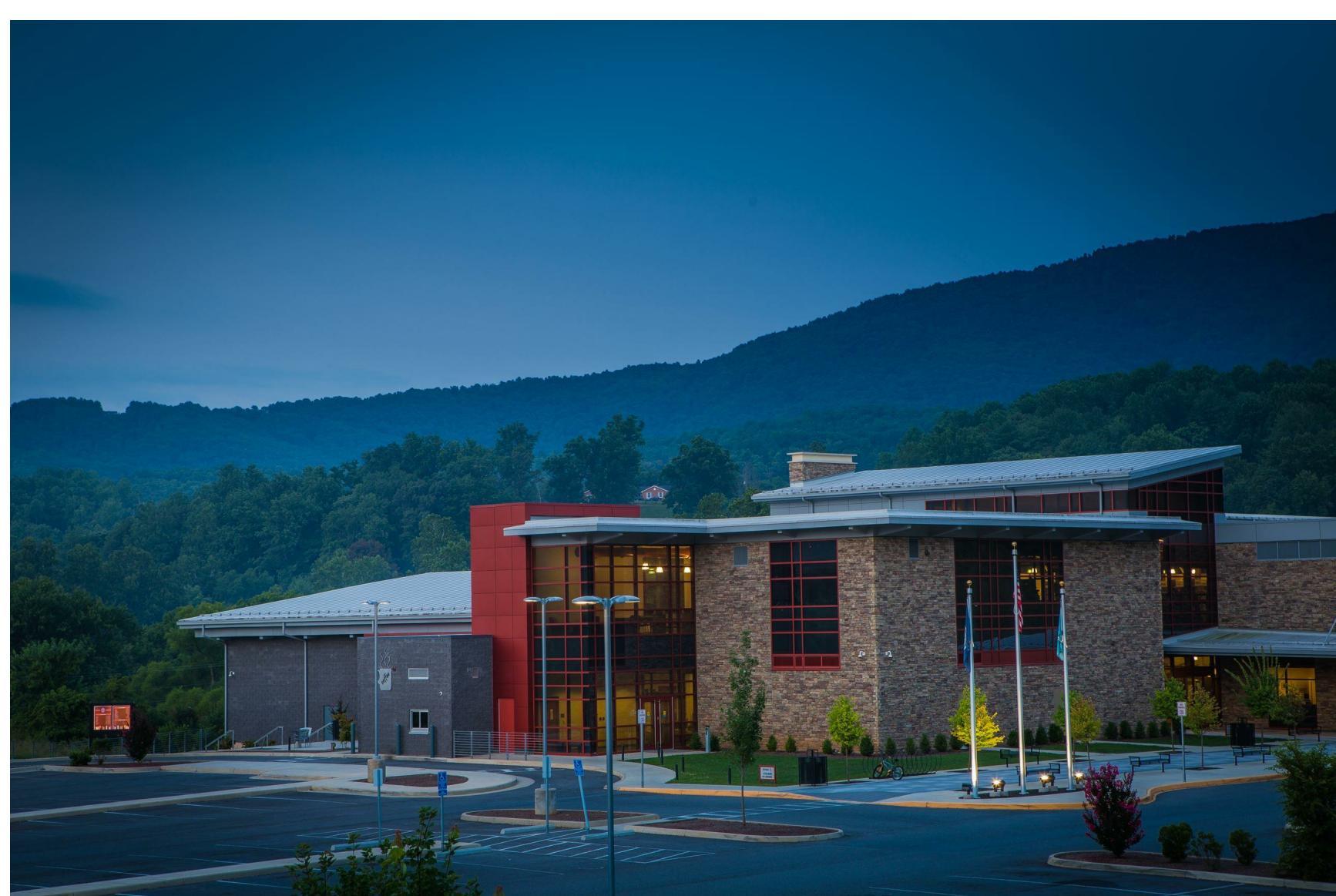


# ROANOKE COUNTY

## SOUTH COUNTY LIBRARY MEETING ROOM DEHUMIDIFICATION PROJECT



Contract Drawings -  
IFC Submission



10/21/19

118508

**BURNS**  
**MCDONNELL**

no.	date	by	ckd	description
A	10/11/19	CWS	RMB	DRAFT SUBMISSION
B	10/21/19	CWS	RMB	IFC SUBMISSION



Lic. No. 053647  
10/21/2019

MECHANICAL LEGEND	
	THERMOSTAT
	HUMIDITY SENSOR
12x10	RECTANGULAR DUCT DIMENSIONS (INCHES)
	FLEXIBLE ROUND DUCT (5'-0" MAX LENGTH) DOWNWARD DIRECTION OF SLOPED PIPING
	SUPPLY DUCT, SUPPLY DUCT DOWN/UP
	RETURN DUCT, RETURN DUCT DOWN/UP
	2-WAY CONTROL VALVE
	AUTOMATIC BALANCING VALVE
	CHECK VALVE
	MANUAL AIR VENT
	AUTOMATIC AIR VENT
	VACUUM BREAKER
	WYE STRAINER
	VALVE IN VERTICAL PIPING
	STRAINER WITH BLOWDOWN VALVE
	CLEAN OUT
	ECCENTRIC REDUCER
	PIPE REDUCER
	UNION
	THERMOMETER IN PIPE WELL
	PRESSURE GAUGE WITH SHUTOFF COCK
	PIPE CAP
	FLANGE
	FLEXIBLE PIPE CONNECTOR
	PARALLEL BLADE CONTROL DAMPER, MOTOR OPERATED
	OPPOSED BLADE CONTROL DAMPER, MOTOR OPERATED
	MANUAL BALANCE DAMPER

MECHANICAL ABBREVIATIONS	
°	DEGREES
Ø	DIAMETER
AHU	AIR HANDLING UNIT
APD	AIR PRESSURE DROP
BD	BACKDRAFT DAMPER
BHP	BRAKE HORSEPOWER
BTUH	BRITISH THERMAL UNITS PER HOUR
C	COMMON
Cv	LOSS COEFFICIENT
CFM	CUBIC FEET PER MINUTE
CLG	CEILING
COP	COEFFICIENT OF PERFORMANCE
CHW	CHILLED WATER
DB	DRY BULB
DDC	DIRECT DIGITAL CONTROL
DEG	DEGREES
EAT	ENTERING AIR TEMPERATURE
EC	ELECTRONICALLY COMMUTATED
ECM	ELECTRONICALLY COMMUTATED MOTOR
EEF	ENERGY EFFICIENCY RATIO
EFF	EFFECTIVENESS
ERV	ENERGY RECOVERY VENTILATOR
ESP	EXTERNAL STATIC PRESSURE
EWT	ENTERING WATER TEMPERATURE
F	FARENBARTH
FT	FEET
FT WG	FEET WATER GAUGE
GPM	GALLONS PER MINUTE
HD	HEAD
HHW	HEATING HOT WATER
HHWC	HEATING HOT WATER COIL
HGT	HEIGHT
HP	HORSEPOWER
HR	HOUR
HW	HOT WATER
HX	HEAT EXCHANGER
IAW	IN ACCORDANCE WITH
IWG	INCHES WATER GAUGE
KW	KILOWATT
LAT	LEAVING AIR TEMPERATURE
LBS	POUNDS
LWT	LEAVING WATER TEMPERATURE
MAX	MAXIMUM
MIN	MINIMUM
NC	NORMALLY CLOSED
NO	NUMBER, NORMALLY OPEN
OA	OUTSIDE AIR
PH	PHASE
PSI	POUNDS PER SQUARE INCH
QTY	QUANTITY
RA	RETURN AIR
RG	RETURN GRILLE
RH	RELATIVE HUMIDITY
SA	SUPPLY AIR
SIM	SIMILAR
SP	STATIC PRESSURE
SQ	SQUARE
TDH	TOTAL HEAD
TYP	TYPE
UH	UNI-HEATER
UOI	UNLESS OTHERWISE INDICATED
V	VOLTS
VAV	VARIABLE AIR VOLUME
VFD	VARIABLE FREQUENCY DRIVE
W	WIDTH
WB	WET BULB
WG	WATER GAUGE
WPD	WATER PRESSURE DROP

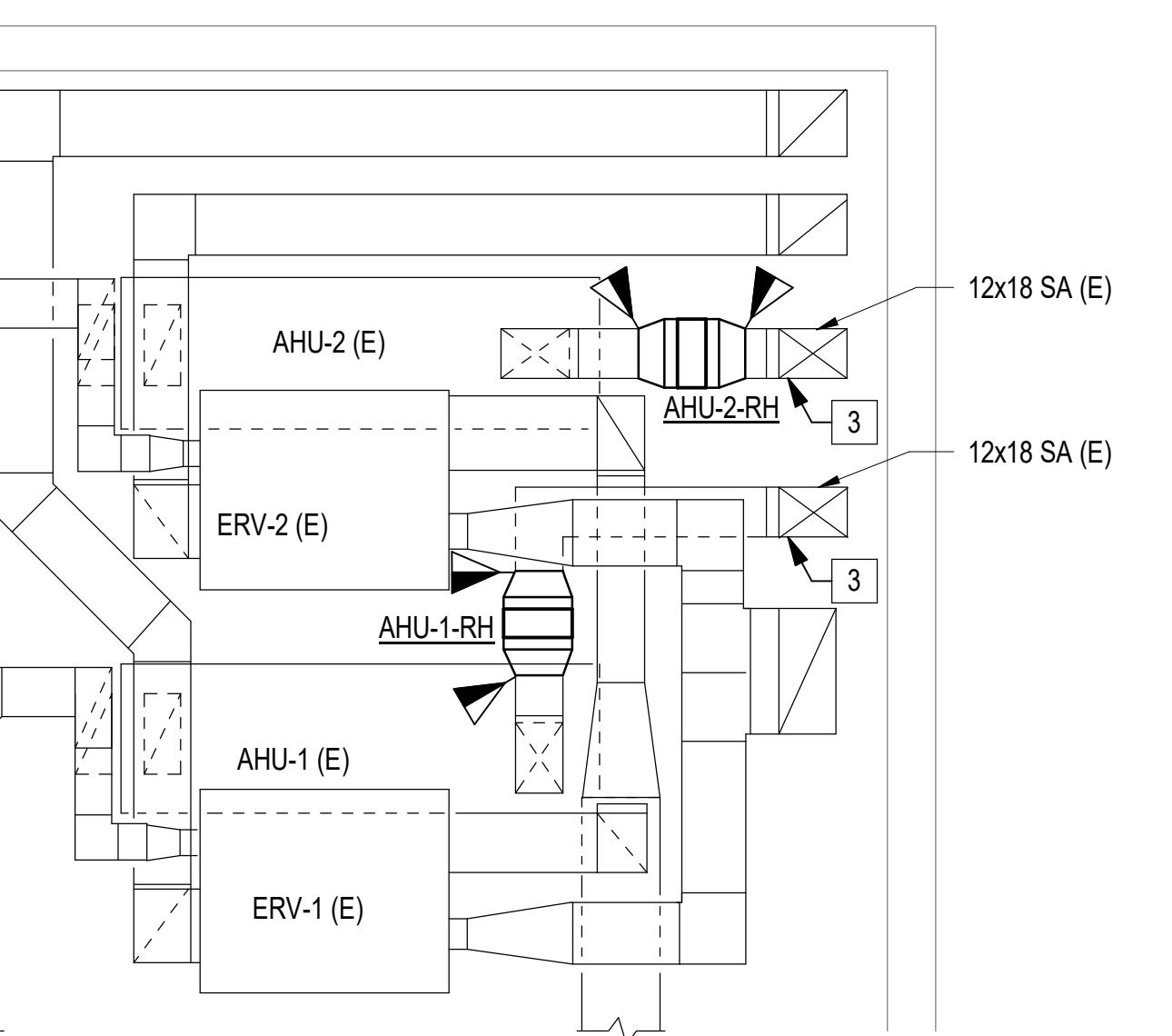
GENERAL MECHANICAL NOTES	
1. THESE GENERAL NOTES APPLY TO ALL MECHANICAL DRAWINGS IN THIS SET. SHEET SPECIFIC NOTES ARE INDICATED ON EACH SHEET UNDER GENERAL SHEET NOTES.	1.0 GENERAL INSTALL AND TEST COMPONENTS IN ACCORDANCE WITH THE MANUFACTURERS INSTRUCTIONS, AND APPROVED PRODUCT DATA SUBMITTALS.
2. PROVIDE ALL MATERIALS AND EQUIPMENT AND PERFORM ALL LABOR REQUIRED TO INSTALL, COMPLETE AND OPERABLE MECHANICAL SYSTEMS AS INDICATED ON THE DRAWINGS AND AS SPECIFIED AND AS REQUIRED BY CODE.	PIPING MATERIALS SHALL BE SEALED, STAMP, OR OTHER MARKINGS OF SPECIFIED TESTING. CLEAN INTERIOR OF PIPING AND DUCTWORK, REMOVE DIRT AND DEBRIS AS WORK PROGRESSES.
3. INSTALL ALL MECHANICAL EQUIPMENT AND APPURTENANCES IN ACCORDANCE WITH MANUFACTURER'S RECOMMENDATIONS, THIS CONTRACTOR'S DOCUMENTS, AND APPLICABLE CODES AND REGULATIONS.	PROTECT PIPING AND DUCTWORK DURING REMAINDER OF CONSTRUCTION PERIOD TO AVOID CLOGGING WITH DIRT AND DEBRIS AND TO PREVENT DAMAGE FROM TRAFFIC AND CONSTRUCTION WORK.
4. ALL OPENINGS IN FIRE WALLS DUE TO DUCTWORK, PIPING, CONDUIT, ETC., SHALL BE FIRE STOPPED.	1.1 GENERAL REQUIREMENTS SCOPE OF WORK: PROVIDE ALL REQUIRED LABOR, MATERIALS, EQUIPMENT AND CONTRACTOR'S SERVICES NECESSARY FOR COMPLETE AND SAFE INSTALLATION OF WORK IN CONFORMITY WITH REQUIREMENTS OF ALL AUTHORITIES HAVING JURISDICTION; AS INDICATED ON DRAWINGS AND/OR HEREIN SPECIFIED OR DESCRIBED.
5. AFTER THE PIPING IS INSULATED, PROVIDE FACTORY FABRICATED PIPE LABELS AS SPECIFIED, WITH DIRECTION OF FLOW ARROWS. ON THE FOLLOWING PIPING, AT 10 FOOT ON CENTER ON THE PIPING MAINS AND 5 FOOT ON CENTER ON THE BRANCH RUNOUTS FROM THE MAINS.	DAMAGE TO OTHER WORK: REPAIR ANY DAMAGE CAUSED BY ANY EXISTING BUILDING COMPONENT AT NO COST TO COUNTY.
6. PIPE RUNOUTS SHALL BE SIZED AS INDICATED ON EQUIPMENT SCHEDULES.	REQUIREMENTS OF OTHER SECTIONS: CAREFULLY CHECK THE DOCUMENTS OF OTHER SECTIONS TO ASCERTAIN THE REQUIREMENTS OF ANY INTERFACING MATERIALS OR EQUIPMENT BEING FURNISHED AND/OR INSTALLED BY THAT SECTION WHICH RELATED TO THIS SECTION, AND PROVIDE THE PROPER INSTALLATION AND/OR CONNECTION.
7. PIPING SHOWN ON DRAWINGS IS SCHEMATIC IN NATURE AND DOES NOT SHOW ALL FITTINGS, ELBOWS, AND COMPONENTS FOR DETAILED CONNECTION. CONTRACTOR IS RESPONSIBLE FOR PROVIDING ANY ADDITIONAL FITTINGS, ELBOWS, AND COMPONENTS TO PROVIDE A COMPLETE OPERABLE SYSTEM. PIPING CONNECTIONS SHALL ALLOW FOR ROUTINE MAINTENANCE INCLUDING REMOVAL AND REPLACEMENT OF FILTERS AND COILS.	PASSAGE OF EQUIPMENT: CHECK THE DIMENSIONAL REQUIREMENTS OF EQUIPMENT OF THIS SECTION TO ENSURE THAT SUCH EQUIPMENT CAN PASS THROUGH THE NECESSARY AREAS TO REACH ITS FINAL INSTALLED LOCATION. INCLUDE IN BID COSTS FOR ALL WORK REQUIRED, INCLUDING ANY WORK REQUIRED TO MOVE THE EQUIPMENT THROUGH THE SITE TO THIS FINAL LOCATION, INCLUDING ANY DISMANTLING AND RE-ASSEMBLY.
	SIGNAGE: PROVIDE SIGNAGE REQUIRED BY CODES AND AUTHORITIES HAVING JURISDICTION.
	POTENTIAL DELIVERY PROBLEMS: NOTIFY THE COUNTY IN WRITING, WITHIN FIVE DAYS OF AWARD OF CONTRACT, OF THE PROPOSED DELIVERY SCHEDULE OF ANY EQUIPMENT OR MATERIAL THAT MAY PREVENT THE INSTALLATION FROM BEING COMPLETED BY THE PROJECT COMPLETION DATE.
	WARRANTY: SUBMIT A SINGLE GUARANTEE STATING THAT ALL PORTIONS OF THE WORK ARE IN ACCORDANCE WITH CONTRACT REQUIREMENTS FOR ALL WORK AGAINST FAULTY AND IMPROPER MATERIAL AND WORKMANSHIP FOR A PERIOD OF ONE YEAR FROM DATE OF FINAL ACCEPTANCE BY OWNER, EXCEPT THAT WHERE GUARANTEES OR WARRANTIES FOR LONGER TERMS ARE SPECIFIED BY CONTRACT, SUCH LONGER TERM SHALL APPLY.
	RECTIFICATION: AT NO ADDITIONAL COST TO THE COUNTY, WITHIN 24 HOURS AFTER NOTIFICATION, CORRECT ANY DEFICIENCIES WHICH OCCUR DURING THE GUARANTEE PERIOD, ALL TO THE SATISFACTION OF THE OWNER. THE SUBCONTRACTOR SHALL BE RESPONSIBLE FOR ANY DAMAGE CAUSED BY SUCH DEFICIENCIES AND REPAIR THEREOF AND REIMBURSE THE OWNER FOR ALL COSTS INCURRED.
	2.0 PRODUCTS
	2.1 PIPE AND FITTINGS PROVIDE PIPE ACCORDING TO THE FOLLOWING SCHEDULE FOR THE FOLLOWING:
	MOTORIZED DAMPER
	ELECTRIC HEATING COIL
	HYDROSTATIC HEATING COIL
	COOLING COIL
	FILTER
	FAN
	HEAT RECOVERY WHEEL
	TEMPERATURE SENSOR
	TWO WAY CONTROL VALVE

MECHANICAL SPECIFICATIONS	
1.0 GENERAL	MECHANICAL SPECIFICATIONS - CONT'
INSTALL AND TEST COMPONENTS IN ACCORDANCE WITH THE MANUFACTURERS INSTRUCTIONS, AND APPROVED PRODUCT DATA SUBMITTALS.	2.3 DUCTWORK DUCTWORK AND ACCESSORIES
PIPING MATERIALS SHALL BE SEALED, STAMP, OR OTHER MARKINGS OF SPECIFIED TESTING. CLEAN INTERIOR OF PIPING AND DUCTWORK, REMOVE DIRT AND DEBRIS AS WORK PROGRESSES.	GENERAL: ALL DUCTS, HANGERS AND STIFFENERS IN ACCORDANCE WITH REQUIREMENTS OF SMACNA, "HVAC DUCT CONSTRUCTION STANDARDS," LATEST EDITION, AND ALL OTHER AUTHORITIES HAVING JURISDICTION AND AS DESCRIBED HEREIN.
PROTECT PIPING AND DUCTWORK DURING REMAINDER OF CONSTRUCTION PERIOD TO AVOID CLOGGING WITH DIRT AND DEBRIS AND TO PREVENT DAMAGE FROM TRAFFIC AND CONSTRUCTION WORK.	ALL SHEET METAL WORK SHALL HAVE A PRESSURE CLASSIFICATION AS FOLLOWS, UNLESS OTHERWISE SPECIFIED: SUPPLY AIR DUCTS +2 INCHES W.G. DUCTWORK: UNLESS OTHERWISE SPECIFIED. DUCTS SHALL BE SEALED CLASS "A".
5. AFTER THE PIPING IS INSULATED, PROVIDE FACTORY FABRICATED PIPE LABELS AS SPECIFIED, WITH DIRECTION OF FLOW ARROWS. ON THE FOLLOWING PIPING, AT 10 FOOT ON CENTER ON THE PIPING MAINS AND 5 FOOT ON CENTER ON THE BRANCH RUNOUTS FROM THE MAINS.	DUCTWORK UNLESS OTHERWISE SPECIFIED: COLD ROLLED 26 GA DIPPED GALVANIZED IN ACCORDANCE WITH ASTM NO. M25-67. DIMENSIONS SHOWN ON DRAWINGS ARE CLEAR INSIDE DIMENSIONS AND DO NOT TAKE INTO ACCOUNT DUCT INSULATION THICKNESS. FITTINGS: SAME GAUGE AND CONSTRUCTION AS DUCTS. DUCT SUPPORTS: DUCTS WITH TRANSVERSE AND LONGITUDINAL BRACINGS IN ACCORDANCE WITH SMACNA.
6. PIPE RUNOUTS SHALL BE SIZED AS INDICATED ON EQUIPMENT SCHEDULES.	2.3.1 DUCT HANGERS AND SUPPORTS: GENERAL: SUPPORT HORIZONTAL DUCTS WITH HANGERS OF SIZE AND SPACING AS INDICATED IN SMACNA DUCT CONSTRUCTION STANDARDS. HORIZONTAL DUCT SUPPORTS: INSTALL HANGERS AT EACH CHANGE IN DIRECTION OF DUCT.
7. PIPING SHOWN ON DRAWINGS IS SCHEMATIC IN NATURE AND DOES NOT SHOW ALL FITTINGS, ELBOWS, AND COMPONENTS FOR DETAILED CONNECTION. CONTRACTOR IS RESPONSIBLE FOR PROVIDING ANY ADDITIONAL FITTINGS, ELBOWS, AND COMPONENTS TO PROVIDE A COMPLETE OPERABLE SYSTEM. PIPING CONNECTIONS SHALL ALLOW FOR ROUTINE MAINTENANCE INCLUDING REMOVAL AND REPLACEMENT OF FILTERS AND COILS.	2.3.2 DUCT INSULATION A. MATERIALS: 1. INSULATION, JACKETS, FACINGS, ADHESIVES, COATINGS, AND ACCESSORIES FIRE HAZARD RATING BY UNDERWRITERS LABORATORIES, INC. STEINER TUNNEL TEST METHOD FOR FIRE HAZARD CLASSIFICATION OF BUILDING MATERIALS, STANDARD UL 723, ASTM E-84, NFPA-225. a. FLAMESPREAD: MAXIMUM 25. b. FUEL CONTRIBUTED AND SMOKE DEVELOPED: MAXIMUM 50. c. FLAMEPROOFING TREATMENTS SUBJECT TO DETERIORATION DUE TO MOISTURE OR HUMIDITY NOT ACCEPTABLE. 2. LABEL AS REQUIRED TO MATCH EXISTING. 3. INSULATION SHALL BE FOIL FACED AND SHALL MATCH EXISTING. a. ALL INSULATION APPLIED ACCORDING TO MANUFACTURER'S PUBLISHED RECOMMENDATIONS. B. INSULATE ALL NEW DUCTWORK.
	2.4 CONTROLS ALL NEW CONTROLS SHALL BE SUITABLE FOR AMBIENT TEMPERATURES OF 35°F TO 150°F. DEVICES SHALL BE SUITABLE FOR 5%RH TO 100%RH NON-CONDENSING. CONTROL VALVES: SEE 2.1 PIPE AND FITTINGS. TEMPERATURE SENSORS: 1°F TOLERANCE FOR RANGE OF 35°F TO 150°F. HUMIDITY SENSOR: 1°F TOLERANCE FOR RANGE OF 5%RH TO 100%RH. OUTSIDE AIR TEMPERATURE AND HUMIDITY SENSOR SHALL BE PROVIDED WITH WEATHERSHIELD TO PREVENT HEAT GAIN FROM RADIATION. SENSORS SHALL HAVE TOLERANCE INDICATED FOR TEMPERATURE AND HUMIDITY SENSORS.
	3.0 EXECUTION 3.0.1 INSTALLATION OF THE WORK A. THE CONTRACT DRAWINGS INDICATE THE GENERAL ARRANGEMENTS FOR THE HVAC SYSTEMS. 1. DRAWINGS ARE DIAGRAMMATIC AND DO NOT INDICATE NECESSARY OFFSETS, OBSTRUCTIONS OR STRUCTURAL CONDITIONS. 2. IT IS THE RESPONSIBILITY OF THE SUBCONTRACTOR TO INSTALL THE WORK IN SUCH A MANNER THAT IT WILL BE AT THE HIGHEST ELEVATION POSSIBLE, CONFORM TO THE STRUCTURE, AVOID OBSTRUCTIONS, MAINTAIN HEADROOM, LEAVE ADEQUATE CLEARANCES FOR LIGHT FIXTURES, MAINTENANCE AND REPAIRS, AND PROVIDE CLEARANCE AND ACCESS AS REQUIRED BY CODES.
	3. ABOVE ITEMS TO BE PERFORMED AT NO ADDITIONAL COST TO THE OWNER. 4. THOROUGHLY CLEAN ITEMS BEFORE INSTALLATION. CAP OPENINGS TO EXCLUDE DIRT UNTIL FINAL CONNECTIONS HAVE BEEN MADE. 5. CUT MATERIALS ACCURATELY, WORK INTO PLACE WITHOUT SPRINGING OR FORCING. PROPERLY CLEAR WINDOWS, DOORS AND OTHER OPENINGS. EXCESSIVE CUTTING OR OTHER WEAKENING OF THE BUILDING STRUCTURE WILL NOT BE PERMITTED. 6. MANUFACTURER'S DRAWINGS AND INSTRUCTIONS SHALL BE FOLLOWED IN ALL CASES WHERE THE MAKERS OF DEVICES AND EQUIPMENT FURNISH DIRECTIONS OR DETAILS NOT SHOWN ON THE DRAWINGS OR DESCRIBED IN THE SPECIFICATIONS.
	7. ALL WORK SHALL BE PROPERLY SUPPORTED FROM BUILDING STRUCTURE AND/OR FRAMING IN AN APPROVED MANNER, INDEPENDENT OF THE CEILING SUPPORT SYSTEM. WHERE OVERHEAD CONSTRUCTION DOES NOT PERMIT DIRECT FASTENING OF SUPPORTS, FURNISH ADDITIONAL.
	8. COORDINATE THE WORK OF THIS SECTION WITH THE WORK OF OTHER SECTIONS IN AMple TIME FOR PROPER INSTALLATION AND CONNECTION. 9. PREPARE DRAWINGS, ATTEND MEETINGS, OBTAIN ALL APPROVALS REQUIRED BY ALL AUTHORITIES HAVING JURISDICTION, CONDUCT REQUIRED TESTS AND OBTAIN REQUIRED PERMITS.
	3.0.2 TESTING AND BALANCING A. GENERAL: 1. ADJUSTMENT: EACH PIECE OF EQUIPMENT AND ALL OF THE SYSTEMS SHALL BE ADJUSTED TO ENSURE PROPER FUNCTIONING OF ALL CONTROLS, AND SHALL BE LEFT IN OPERATING CONDITION. 2. PRELIMINARY OPERATION: THE OWNER RESERVES THE RIGHT TO OPERATE ANY SYSTEMS OR EQUIPMENT PRIOR TO FINAL COMPLETION AND ACCEPTANCE OF THE WORK. SUCH PRELIMINARY OPERATION SHALL NOT BE CONSTRUED AS AN ACCEPTANCE OF ANY WORK. 3. PROVIDE (3)-HARDCOPIES OR (1)-ELECTRONIC COPY (PDF) OF POST-CONSTRUCTION/NEW WORK TAB REPORT TO THE ENGINEER FOR DISTRIBUTION AND REVIEW. B. SYSTEMS: 1. AIR BALANCING SHALL BE ACCOMPLISHED BY ADJUSTMENT OF DAMPERS. TESTING, ADJUSTING AND BALANCING SHALL BE DONE IN ACCORDANCE WITH THE ABC NATIONAL STANDARD FOR TOTAL SYSTEM BALANCE. 2. BALANCE AND ADJUST AIR DISTRIBUTION TO QUANTITIES INDICATED ON DRAWINGS IN ACCORDANCE WITH ASSOCIATED AIR BALANCE COUNCIL (ABC) MANUAL OR NATIONAL ENVIRONMENTAL BALANCING BUREAU (NEBB), LATEST EDITIONS. 3. BALANCE AND ADJUST WATER DISTRIBUTION TO QUANTITIES INDICATED ON DRAWINGS IN ACCORDANCE WITH ASSOCIATED AIR BALANCE COUNCIL (ABC) MANUAL OR NATIONAL ENVIRONMENTAL BALANCING BUREAU (NEBB), LATEST EDITIONS. 3. BALANCING AND TESTING SHALL BE PERFORMED AND SUPERVISED BY A CERTIFIED INDEPENDENT FIRM SPECIALIZING IN TESTING AND BALANCING. FIRM SHALL BE A MEMBER OF ABC OR NEBB. TEST REPORTS SHALL BE SUBMITTED IN BOUND FOLDERS AND ON ABC OR NEBB TYPE REPORT FORMS. 4. AIR AND WATER DELIVERY SHALL NOT BE LESS THAN THE SPECIFIED AIRFLOW AND WATER FLOW RATES, NOR EXCEED THE SPECIFIED AIRFLOW AND WATER FLOW RATES ON THE PLANS BY MORE THAN 5%.

1.0 GENERAL	MECHANICAL SPECIFICATIONS - CONT'
INSTALL AND TEST COMPONENTS IN ACCORDANCE WITH THE MANUFACTURERS INSTRUCTIONS, AND APPROVED PRODUCT DATA SUBMITTALS.	2.3 DUCTWORK DUCTWORK AND ACCESSORIES
PIPING MATERIALS SHALL BE SEALED, STAMP, OR OTHER MARKINGS OF SPECIFIED TESTING. CLEAN INTERIOR OF PIPING AND DUCTWORK, REMOVE DIRT AND DEBRIS AS WORK PROGRESSES.	GENERAL: ALL DUCTS, HANGERS AND STIFFENERS IN ACCORDANCE WITH REQUIREMENTS OF SMACNA, "HVAC DUCT CONSTRUCTION STANDARDS," LATEST EDITION, AND ALL OTHER AUTHORITIES HAVING JURISDICTION AND AS DESCRIBED HEREIN.
PROTECT PIPING AND DUCTWORK DURING REMAINDER OF CONSTRUCTION PERIOD TO AVOID CLOGGING WITH DIRT AND DEBRIS AND TO PREVENT DAMAGE FROM TRAFFIC AND CONSTRUCTION WORK.	ALL SHEET METAL WORK SHALL HAVE A PRESSURE CLASSIFICATION AS FOLLOWS, UNLESS OTHERWISE SPECIFIED: SUPPLY AIR DUCTS +2 INCHES W.G. DUCTWORK: UNLESS OTHERWISE SPECIFIED. DUCTS SHALL BE SEALED CLASS "A".
5. AFTER THE PIPING IS INSULATED, PROVIDE FACTORY FABRICATED PIPE LABELS AS SPECIFIED, WITH DIRECTION OF FLOW ARROWS. ON THE FOLLOWING PIPING, AT 10 FOOT ON CENTER ON THE PIPING MAINS AND 5 FOOT ON CENTER ON THE BRANCH RUNOUTS FROM THE MAINS.	2.3.1 DUCT HANGERS AND SUPPORTS: GENERAL: SUPPORT HORIZONTAL DUCTS WITH HANGERS OF SIZE AND SPACING AS INDICATED IN SMACNA DUCT CONSTRUCTION STANDARDS. HORIZONTAL DUCT SUPPORTS: INSTALL HANGERS AT EACH CHANGE IN DIRECTION OF DUCT.
6. PIPE RUNOUTS SHALL BE SIZED AS INDICATED ON EQUIPMENT SCHEDULES.	2.3.2 DUCT INSULATION A. MATERIALS: 1. INSULATION, JACKETS, FACINGS, ADHESIVES, COATINGS, AND ACCESSORIES FIRE HAZARD RATING BY UNDERWRITERS LABORATORIES, INC. STEINER TUNNEL TEST METHOD FOR FIRE HAZARD CLASSIFICATION OF BUILDING MATERIALS, STANDARD UL 723, ASTM E-84, NFPA-225

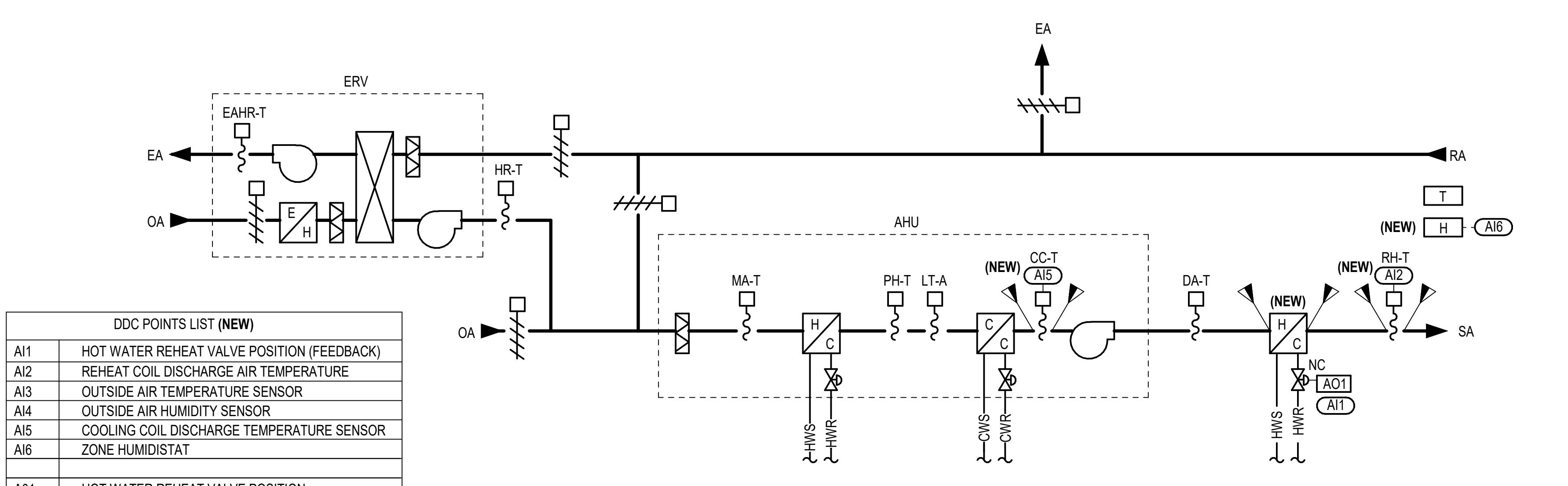
no.	date	by	ckd	description
A	10/1/19	CWS	RMB	DRAFT SUBMISSION
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C				
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J				
K				
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M				

HEATING HOT WATER REHEAT COIL													
MARK	CFM	EAT	LAT	EWT	LWT	CAPACITY (MBh)	GPM	MAX WATER PRESSURE DROP (FT WC)	COIL SIZE (WxH)	FOULING FACTOR (HR-FT <sup>2</sup> -F/BTU)	ROWS	COIL CONNECTION SIZE (IN)	
AHU-1-RH	1220	51.9	75.0	180	160	30.4	3.0	2.0	0.08	20x18"	0.00025	1	3/4
AHU-2-RH	1360	52.6	75.0	180	160	32.9	3.3	2.0	0.08	20x18"	0.00025	1	3/4



GENERAL NOTES	
1. SEE SHEET N-801 FOR MECHANICAL LEGEND, GENERAL NOTES, AND SPECIFICATIONS.	
KEYNOTES #	

1. PROVIDE NEW BALANCING VALVE SIZED FOR 13.0 GPM. CONFIRM BALANCE VALVE PRESSURE DIFFERENTIAL AND COOLING COIL TEMPERATURE OF 51.9°F DURING TAB.
2. PROVIDE NEW BALANCING VALVE SIZED FOR 14.5 GPM. CONFIRM BALANCE VALVE PRESSURE DIFFERENTIAL AND COOLING COIL TEMPERATURE OF 52.6°F DURING TAB.
3. LOCATE DUCT MOUNTED REHEAT COIL DISCHARGE TEMPERATURE SENSOR IN VERTICAL RISE IN SUPPLY AIR DUCT IN MECHANICAL ROOM BEFORE FLOOR PENETRATION.



#### AHU-1.2 and ERV-1.2 Sequence of Operations (existing)

**SUPPLY FAN CONTROL:**  
The constant speed supply fan will be started based on occupancy schedule. When the supply fan status indicates the fan started, the control sequence will be enabled. Upon a loss of airflow, the system will automatically restart.

**ECONOMIZER CONTROL:**  
When the outdoor air is cooler than the economizer setpoint, the economizer will act as the initial stage of cooling, working in sequence with the cooling coil.

**ENERGY RECOVERY VENTILATOR (ERV) CONTROL:**  
The energy recovery ventilator will be enabled to operate when the air-handling unit is in occupied mode. The fresh air intake of the unit will be limited to prevent the mixed air temperature from falling below the low limit setpoint. Upon a loss of ERV fan status, the system will automatically restart.

**ERV HEAT WHEEL FROST PROTECTION:**  
The energy recovery ventilator shall be disabled if the exhaust air heat recovery temperature (EAHR-T) falls below setpoint to prevent frost from collecting on the wheel when the EAHR-T rises above setpoint, plus a differential, the ERV shall be re-started.

**TEMPERATURE CONTROL: (humidity control - NEW)**  
The unit will control to maintain the zone temperature setpoint as sensed by the zone temperature sensor, unless the unit enters dehumidification mode in which case the unit shall control cooling coil valve to maintain zone humidity setpoint as sensed by the zone humidistat and unit shall control reheat coil valve to maintain zone temperature setpoint as sensed by the space temperature sensor.

**OCCUPIED MODE:**  
The occupancy mode will be controlled via a network input. The occupancy model can also be overridden by a temporary occupancy switch on the zone temperature sensor.

**UNOCCUPIED MODE:**  
The unit will cycle to maintain unoccupied zone setpoints during unoccupied periods.

**PREHEAT COIL:**  
The preheat coil will modulate to maintain the temperature setpoint. When the unit is shutdown, the preheat coil will be off. Upon a loss of airflow, the preheat coil will be commanded to a preset position should the outdoor air temperature fall below the low outdoor air temperature setpoint.

**COOLING COIL:**  
The cooling coil will modulate to maintain the temperature setpoint. When the unit is shutdown, the cooling coil will be off. Upon a loss of airflow, the cooling coil will be off.

**DEHUMIDIFICATION MODE: (NEW)**  
When the zone humidistat indicates space humidity is above setpoint, enable dehumidification mode. Economizer Control shall be locked out. The AHU cooling coil control valve will modulate to maintain room humidity at setpoint. The reheat coil control valve will modulate to maintain the space temperature at setpoint.

**UNIT ENABLE:**  
A network unit enable signal will control the mode of the unit.

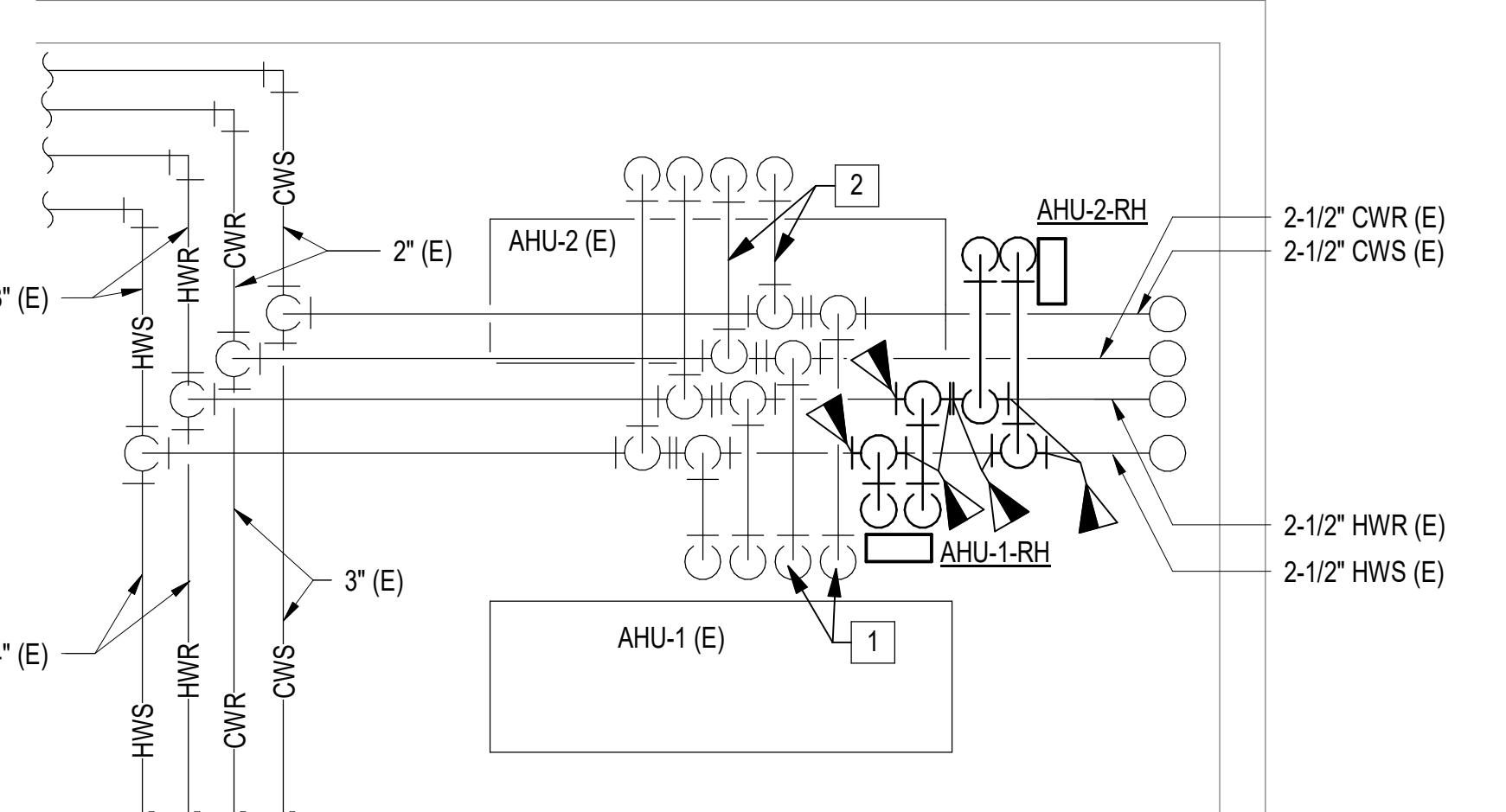
#### ADDITIONAL POINTS MONITORED BY THE EMS:

Preheat air temperature (PH-T)  
Discharge air temperature (DA-T)  
Heat Recover Temperature (HR-T)  
Exhaust air Heat Recovery Temperature (EAHR-T)  
Low temperature alarm (LT-A)  
ERV Heat Wheel Status (HRW-S)  
ERV Exhaust Fan Status (ER-S)  
Cooling Coil Discharge Air Temperature (CC-T) (NEW)  
Reheat Coil Discharge Air Temperature (RH-T) (NEW)  
Space Humidistat ZN-H, (user adjustable from 50%-60%) (NEW)

#### AHU CONTROLS

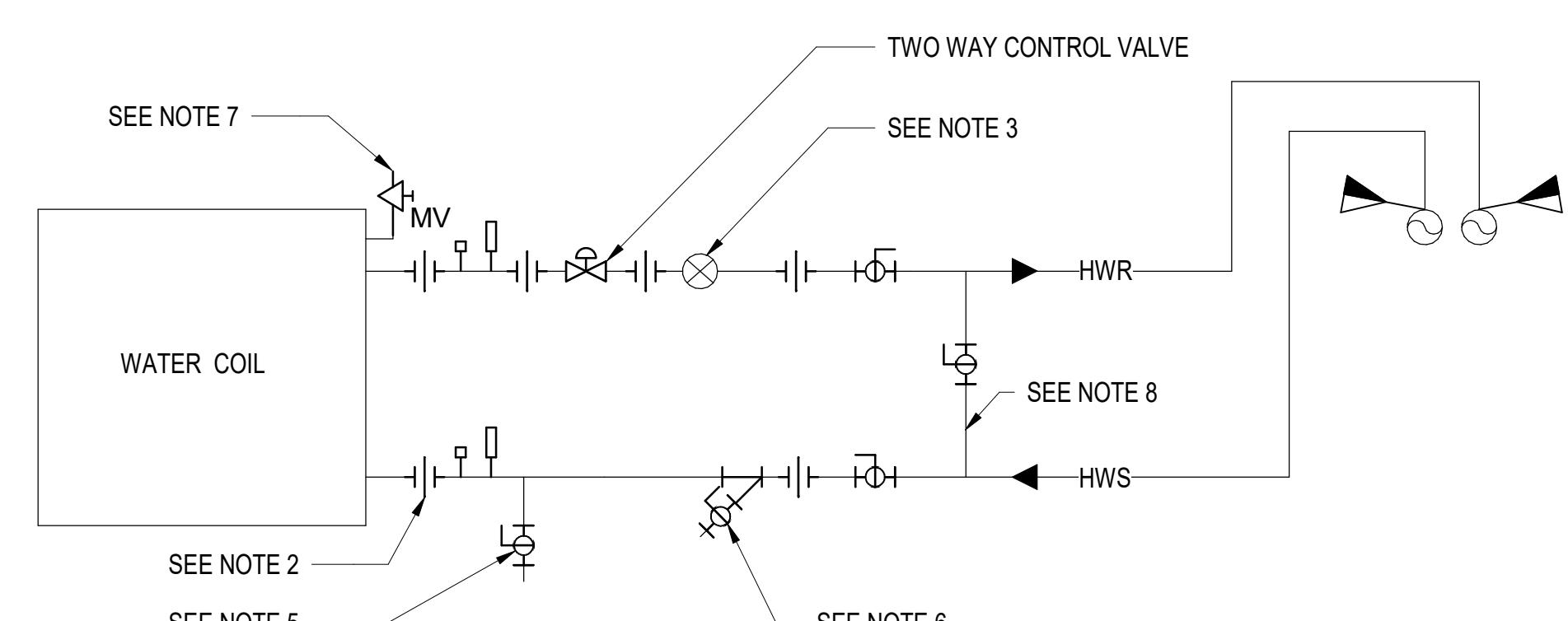
### 1 MECHANICAL ROOM DUCTWORK PLAN

1/4" = 1'-0" SCALE IN FEET



### 2 MECHANICAL ROOM PIPING PLAN

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

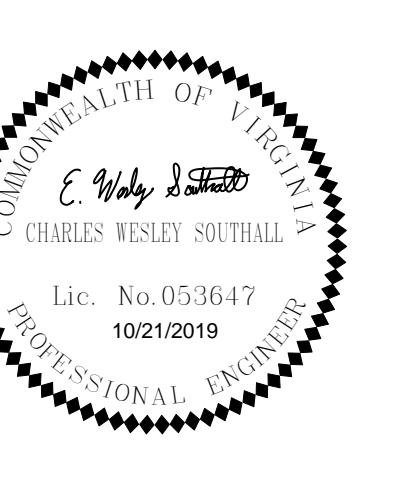


#### NOTES:

1. INDIVIDUAL PIPE SIZES SHALL BE SHOWN ON HEATING HOT WATER REHEAT SCHEDULE.
2. LOCATE FLANGES AND UNIONS TO ALLOW FOR REMOVAL OF ALL COILS AND CONTROL VALVES.
3. AUTOMATIC FLOW CONTROL BALANCING VALVES SHALL BE INSTALLED IN CONFORMANCE WITH MANUFACTURER'S RECOMMENDED SPACING PROVIDING STRAIGHT LENGTHS OF UNBLOCKED PIPING UPSTREAM AND DOWNSTREAM FROM "PIPE CHANGES IN DIRECTION" AND FROM "OTHER VALVES AND COMPONENTS" IN PIPING.
4. ALL COILS SHALL BE PIPED FOR COUNTERFLOW ARRANGEMENT; I.E. HOTTEST WATER ENTERS COIL NEAREST COIL FACE WHERE HOTTEST AIR LEAVES.
5. PROVIDE 3/4" BALL OR GATE VALVE WITH 3/4" HOSE CONNECTION FOR DRAINING AND FLUSHING. ALL COIL DRAIN CONNECTIONS SHALL BE INSTALLED THROUGH HVAC UNIT CASING TO PERMIT COMPLETE DRAINAGE OF COILS FROM UNIT EXTERIOR. TYPICAL ALL DRAIN AND FLUSH CONNECTIONS.
6. PROVIDE STRAINER WITH 3/4" BALL OR GATE VALVE WITH 3/4" HOSE CONNECTION FOR FLUSHING. TYPICAL ALL STRAINERS.
7. VENTS SHALL BE INSTALLED THROUGH HVAC UNIT CASING TO PERMIT COMPLETE VENTING OF COILS FROM UNIT EXTERIOR. TYPICAL ALL VENT CONNECTIONS.
8. PROVIDE FULL SIZE BYPASS FOR FLUSHING.
9. UTILIZE REDUCERS WHERE NEEDED FOR CONTROL VALVES AND AUTOMATIC BALANCING VALVES THAT ARE SMALLER THAN PIPE SIZE.

### 3 WATER COIL, 2-WAY CONTROL VALVE

SCALE: NOT TO SCALE



BURNS & MCDONNELL  
110 FRANKLIN ROAD SE SUITE 700  
ROANOKE, VA 24011

BMCD LICENSE NO

date 10/07/19 CWS  
designed CWS checked RMB

6303 MERRIMAN ROAD  
ROANOKE, VA 24018

PROJECT NAME  
MECHANICAL PLANS  
MEETING ROOM DEHUMIDIFICATION

project 118508 CONTRACT  
drawing M-101 - B rev.

sheet 3 of 3 sheets  
file