MECHANICAL DUCT SYMBOLS

DESCRIPTION

16x8 | SQUARE DUCT SIZE TAG (WIDTH x HEIGHT)

SUPPLY AIR DIFFUSER (4-WAY)

RETURN AIR GRILLE WITH SOUND BOOT

POINT OF EXISTING TO NEW CONNECTION

POINT OF DISCONNECT TO EXISTING CONNECTION

THERMOSTAT / TEMP SENSOR (4'-0" AFF TO TOP)

CONNECTED TO FIRE ALARM SYSTEM BY ELECTRICAL CONTRACTOR

THERMOSTAT W/CO2 SENSING (4'-0" AFF TO TOP)

STRAINER WITH BLOWDOWN VALVE WITH HOSE CONN.

MECHANICAL ACCESSORIES SYMBOL LEGEND

RECTANGULAR DUCT SMOKE DAMPER. FURNISHED AND INSTALLED BY MECHANICAL CONTRACTOR,

MECHANICAL PIPING SYMBOLS

MECHANICAL PIPING SYSTEMS LEGEND

DESCRIPTION

RETURN AIR GRILLE

EXHAUST AIR GRILLE

MECHANICAL CONTRACTOR

ELECTRICAL CONTRACTOR

PLUMBING CONTRACTOR

ABOVE FINISHED FLOOR

NOT IN CONTRACT

SECTION CUT
REFERRING DETAIL NUMBER

χ / | ← REFERRING SHEET NUMBER

HUMIDISTAT (4'-0" AFF TO TOP)

EXISTING

DOWN

N.I.C.

(EX)

SYMBOL

SYMBOL

_____ BUTTERFLY VALVE

——⋈—— 3-PIECE BALL VALVE

____ BALANCING VALVE

——≽—— B&G CIRCUIT SETTER

____ THERMOMETER

_____ GAGE COCK

_____목___ FLOW SWITCH

ECCENTRIC REDUCER

_____CONCENTRIC REDUCER

—⊗—— STEAM TRAP, F&T

___⊠ STEAM TRAP, TB

____CONTROL VALVE

SOLENOID VALVE

CONDENSATE DRAINAGE

NATURAL GAS

REFRIGERANT

__NGAS COCK

SYMBOL

PRESSURE GAGE & COCK

______PRESSURE REDUCING/REGULATING VALVE

____CHECK VALVE

16/8 OVAL DUCT SIZE TAG (WIDTH / HEIGHT)

ROUND DUCT SIZE TAG (DIAMETER)

EXISTING DUCT TAG

DUCT BEING DEMOLISHED

O/A OUTDOOR AIR

ABBREVIATIONS

LWT

M/A

MD

MFR

MTR

MU/A

PRESS

PSI

PWR

R/A

VENT

WB

EQUIPMENT ABBREVIATIONS

LEAVING WATER TEMPERATURE

ONE THOUSAND BTU PER HOUR

MIXED AIR

MAXIMUM

MECHANICAL

MINIMUM

MAKE-UP/AIR

NOISE CRITERIA

NORMALLY CLOSED

NOT IN CONTRACT

NORMALLY OPEN

NOT TO SCALE

PRESSURE DROP

POUNDS PER SQUARE INCH

REVOLUTIONS PER MINUTE

POUNDS PER SQUARE INCH GAUGE

OUTSIDE AIR

PLUMBING

PRESSURE

RETURN AIR

SQUARE FOOT

SQUARE FOOT

SMOKE DAMPER

THERMOSTAT

TEMPERATURE

VENTILATION

WET BULB

FCU FAN COIL UNIT

FIRE PUMP

SUPPLY FAN

SUMP PUMP

UNIT HEATER

WH WATER HEATER

TYPICAL

STATIC PRESSURE

TEMPERATURE DROP

VARIABLE AIR VOLUME

EWH ELECTRIC WATER HEATER

GREASE INTERCEPTOR

GRV GRAVITY ROOF VENTILATOR

HEAT RECOVERY UNIT

POWER ROOF VENTILATOR

RETURN/EXHAUST FAN

SEWAGE EJECTOR PUMP

HWP HEATING WATER PUMP

HEAT EXCHANGER

SUPPLY AIR

RELIEF AIR

REMAIN

RELATIVE HUMIDITY

POWER

MOTOR

MANUFACTURER

MISCELLANEOUS

MOTORIZED DAMPER

ROUND

ADD ADDENDUM

ALT ALTERNATE

BLW BELOW

CAP CAPACITY

CLG CEILING

DN

DEGREE

DOWN

EACH

ELEC ELECTRICAL

EQUIP EQUIPMENT

E/A EXHAUST AIR

FIRE DAMPE

FOOT/FEET

GPM GALLONS PER MINUTE

HORSE POWER

LAT LEAVING AIR TEMPERATURE

LOW PRESSURE

AC AIR CONDITIONING UNIT

AHU AIR HANDLING UNIT

CUH CABINET UNIT HEATER

CHWP CHILLED WATER PUMP

DC DUCT MOUNTED COIL

EDC ELECTRIC DUCT COII

ET EXPANSION TANK

EF EXHAUST FAN

CWP CONDENSER WATER PUMP

DBP DOMESTIC WATER BOOSTER PUMP

DCP DOMESTIC WATER CIRCULATING PUMP

AS AIR SEPARATOR

BOILER

CT COOLING TOWER

CH CHILLER

ACC AIR COOLED CONDENSER

ACCU AIR COOLING CONDENSING UNIT

FLOOR

FPM FEET PER MINUTE

EXIST EXISTING

HTG HEATING

HTR HEATER

IN

LB

HW HOT WATER

POUND

DRY BULB

DIAMETER

AP ACCESS PANEL

AIR CONDITIONING

ABOVE FINISHED FLOOR

ARCH ARCHITECT/ARCHITECTURAL

BFF BELOW FINISHED FLOOR

BTU BRITISH THERMAL UNITS

CFM CUBIC FEET PER MINUTE

EAT ENTERING AIR TEMPERATURE

DEGREES FAHRENHEIT

GENERAL CONTRACTOR

EWT ENTERING WATER TEMPERATURE

AFUE ANNUAL FUEL UTILIZATION EFFICIENCY

BTUH BRITISH THERMAL UNITS PER HOUR

ABV ABOVE

MECHANICAL GENERAL NOTES

LOCATION OF DOORS, WINDOWS, CEILING DIFFUSERS, ETC.

DO NOT SCALE DRAWINGS. SEE ARCHITECTURAL DRAWINGS AND REFLECTED CEILING PLANS FOR EXACT

ASSOCIATED WITH SUBSTITUTED/NON-DESIGN BASIS EQUIPMENT TO COMPLY WITH BASIS OF DESIGN,

REQUIRED BY THIS SPECIFIC MANUFACTURER'S INSTALLATION INSTRUCTIONS.

WITH AN ALUMINUM OUTER ENCLOSURE AND SEAL WATER TIGHT.

COUNTERFLASHED IN A WATERPROOF MANNER.

OF THE SPECIFICATIONS, TO AVOID INTERFERENCE.

COMPLETELY OPERATIONAL AND ACCEPTABLE BY THE OWNER.

SHALL BE COVERED WITH AN OUTER ALUMINUM JACKET.

INDICATED ON THE DRAWINGS OR NOT.

WALL SEALED TO PREVENT INFILTRATION.

SHOP DRAWINGS.

OWNER, ARCHITECT, AND ENGINEER.

SPLASHBLOCK.

ALL EQUIPMENT LISTED IN PROJECT SCHEDULES IS TO BE CONSIDERED DESIGN BASIS EQUIPMENT. ALL COST

INCLUDING PROVIDING MAINTENANCE ACCESS, CLEARANCE, PIPING, SHEET METAL, ELECTRICAL, REPLACEMENT

OF OTHER SYSTEM COMPONENTS, BUILDING ALTERATIONS, ETC., SHALL BE INCLUDED IN THE ORIGINAL BASE

BID. NO ADDITIONAL COST ASSOCIATED WITH SUBSTITUTED/NON-DESIGN BASIS EQUIPMENT WILL BE APPROVED

THIS INCLUDES ANY MODIFICATIONS TO ANY ASSOCIATED MECHANICAL, PLUMBING, OR ELECTRICAL SYSTEMS

SMACNA STANDARDS. ALL SUPPLY, RETURN AND OUTSIDE AIR DUCTWORK SHALL BE WRAPPED WITH 2" THICK

MINIMUM INSTALLED R-VALUE OF 6.0. ROOFTOP UNIT RETURN DUCTWORK AND TRANSFER DUCTS SHALL BE

LINED WITH 1" THICK FIBERGLASS DUCT LINER FOR ACOUSTICAL PURPOSES. DUCT DIMENSIONS ON PLANS ARE

SUPPLY AND RETURN DUCTWORK LOCATED OUTSIDE THE BUILDING SHALL BE WRAPPED WITH 3" THICK DUCT

ALL DUCTWORK SHALL BE SEALED PER THE REQUIREMENTS OF THE NORTH CAROLINA INTERNATIONAL

ALL PIPING, DUCTS, VENTS, ETC., EXTENDING THROUGH WALLS AND ROOF SHALL BE FLASHED AND

WRAP WITH VAPOR BARRIER HAVING A MINIMUM INSTALLED R VALUE OF 8.0. COVER EXTERNAL INSULATION

MECHANICAL CODE. SEAL MEDIUM PRESSURE SUPPLY DUCTWORK FOR POSITIVE 3" PRESSURE CLASS, SMACNA

SEAL CLASS A, SMACNA LEAKAGE CLASS 4. SEAL LOW PRESSURE SUPPLY, RETURN, OUTSIDE AIR, AND EXHAUST

DUCTWORK FOR POSITIVE/NEGATIVE 2" PRESSURE CLASS, SMACNA SEAL CLASS A, SMACNA LEAKAGE CLASS 4.

ALL PIPING AND DUCTWORK LOCATIONS SHALL BE COORDINATED WITH THE WORK UNDER OTHER DIVISIONS

UPON PROJECT COMPLETION, THE MECHANICAL CONTRACTOR IS RESPONSIBLE FOR PROVIDING THE OWNER

INSTALLATION INFORMATION INCLUDING RECORD SUBMITTALS (WITH ANY SUBMITTAL REVIEW COMMENTS

ADDRESSED) AND O&M MANUALS FOR EACH PIECE OF EQUIPMENT INCLUDING ALL SELECTED OPTIONS, THE

NAME AND ADDRESS OF AT LEAST ONE SERVICE AGENCY, FULL CONTROL SYSTEM O&M AND CALIBRATION

PROGRAMMED SETPOINTS. IN ADDITION, THE MECHANICAL CONTRACTOR SHALL BE RESPONSIBLE TO HIRE A REGISTERED DESIGN PROFESSIONAL TO COMMISSION THE INSTALLED SYSTEM AND PROVIDE THE OWNER AND

PROVIDE MANUFACTURER'S RECOMMENDED CLEARANCES AROUND ALL EQUIPMENT FOR MAINTENANCE AND

ALL REFRIGERANT PIPE SHALL BE NITROGENIZED ACR COPPER TUBE. SIZE, INSULATE, AND INSTALL REFRIGERANT

PIPING PER MANUFACTURER'S RECOMMENDATIONS. REFRIGERANT PIPING INSULATION EXPOSED OUTDOORS

ANY DEVICE REQUIRING A THERMOSTAT FOR CONTROL SHALL BE FURNISHED WITH A THERMOSTAT WHETHER

14. INSTALL THE TOP OF ALL THERMOSTATS, SENSORS, AND SWITCHES AT 4'-0" (MAXIMUM) ABOVE FINISH FLOOR.

PERIMETER WALL SHALL BE MOUNTED ON A FOAM-FILLED ELECTRICAL BOX, WITH ALL GAPS BETWEEN BOX AND

COORDINATE EXACT THERMOSTAT LOCATION WITH OWNER PRIOR TO INSTALLATION, ANY DEVICE ON A

COORDINATION DRAWINGS

THE MECHANICAL CONTRACTOR SHALL ORGANIZE COORDINATION MEETINGS TO DEVELOP A SET OF

CONTRACTORS FOR THEM TO ADD THEIR SYSTEMS TO THIS SET OF COORDINATION DRAWINGS. THE

PLUMBING, ELECTRICAL, IT/DATA (INCLUDING CABLE TRAY) AND GENERAL. THIS SHALL ALSO BE THE

DRAWINGS SHALL BE COMPLETED PRIOR TO FABRICATION AND INSTALLATION OF DUCTWORK AND

PIPING SYSTEMS, OR PURCHASE OF EQUIPMENT. THE FOLLOWING ITEMS REPRESENT THE MINIMUM

DRAWINGS WILL BE ORIGINAL DRAWINGS AND NOT OVERLAYS OF THE CONTRACT/DESIGN

4. COORDINATION DRAWINGS ARE NOT SHOP DRAWINGS AND ARE REQUIRED IN ADDITION TO

ONCE THE COMPLETE COORDINATION DRAWINGS HAVE BEEN COMPILED, THE MECHANICAL CONTRACTOR WILL DISTRIBUTE ONE SIGNED SET TO EACH OF THE FOLLOWING CONTRACTORS:

ELECTRICAL, PLUMBING, FIRE PROTECTION, AND GENERAL. ADDITIONAL SETS WILL BE SENT TO THE

. COORDINATION DRAWINGS WILL BE DRAWN ON REPRODUCIBLE MATERIAL 48'x36".

WILL BE FOUND IN THE COORDINATION PHASE AND NOTICED BY EACH OF THE CONTRACTORS. THESE

ORDER OF PRECEDENCE FOR INSTALLATION OF SYSTEMS. ANY RELOCATION OF SYSTEM ROUTINGS

DRAWINGS WITH ALL CONTRACTORS (ELECTRICAL, MECHANICAL, PLUMBING, FIRE PROTECTION.

IT/DATA, AND GENERAL CONTRACTOR). THE MECHANICAL CONTRACTOR WILL HAVE THE LEAD

RESPONSIBILITY FOR THE COORDINATION DRAWINGS. THE MECHANICAL CONTRACTOR SHALL

CONTRACTORS WILL DEVELOP THE DRAWINGS IN THIS ORDER: MECHANICAL, FIRE PROTECTION,

DRAWINGS, WHEN COMPLETED, SHALL BE SIGNED OFF BY ALL OF THE ABOVE LISTED PARTIES.

REQUIREMENTS FOR SHOP DRAWINGS AND COORDINATION DRAWINGS:

ALL SHOP AND COORDINAGION DRAWINGS WILL BE 1/4" = 1'-0" SCALE

PRODUCE THE ORIGINAL DRAWINGS AND FORWARD THE DRAWINGS TO EACH OF THE OTHER

CONDENSATE DRAIN PIPING SHALL BE SCHEDULE 40 PVC PIPE AND FITTINGS. DRAINS FROM AIR HANDLING

INSULATION. MINIMUM DRAIN SIZE SHALL BE 3/4". TERMINATE ROOFTOP UNIT DRAINS ON A CONCRETE

UNITS SHALL BE TRAPPED. CONDENSATE DRAINS SHALL BE INSULATED WITH 1/2" THICK ARMAFLEX

INFORMATION INCLUDING WIRING DIAGRAMS, SCHEMATICS, FULL SEQUENCE OF OPERATION, AND

CODE REVIEWER A SEALED STATEMENT OF SYSTEM COMMISSIONING (PER 2018 NCECC APPENDIX C1).

PROVIDE A ONE YEAR WARRANTY FOR ALL WORK PERFORMED BEGINNING ON THE DAY THE SYSTEM IS

DUCT WRAP WITH VAPOR BARRIER. INSULATION (INCLUDING FLEXIBLE DUCT INSULATION) SHALL HAVE A

DURING CONSTRUCTION AND ALL COST WILL BE THE RESPONSIBILITY OF THE MECHANICAL CONTRACTOR.

ALL DUCTWORK SHALL BE GALVANIZED SHEET METAL CONSTRUCTED IN ACCORDANCE WITH THE LATEST

SEE SPECIFICATIONS FOR ADDITIONAL PROJECT REQUIREMENTS. THESE GENERAL NOTES ARE INTENDED TO SUPPLEMENT THE SPECIFICATIONS. IN THE EVENT THAT THE VERBIAGE IS IN CONFLICT OR

CONTRADICTS THE REQUIREMENTS LISTED HERE, THE QUESTION SHALL BE ASKED PRIOR TO BIDDING OR THE MORE STRINGENT SHALL APPLY AT THE ENGINEER'S DISCRETION.

OUTSIDE AIR INTAKE.

. MINIMUM GAS PIPING SIZE SHALL BE 3/4".

5. CONTRACTOR SHALL VERIFY LOCATION OF ALL ROOF PENETRATIONS WITH ARCHITECT & OWNER PRIOR TO

. ROOF CURBS SHALL ALLOW A MINIMUM OF 8" ABOVE ROOF INSULATION FOR FLASHING, OR AS INDICATED

RAILS THAT SUPPORT EQUIPMENT, PIPING, CONDUIT, ETC. EXPOSED ON THE ROOF SHALL HAVE SUFFICIENT

ON THE DRAWINGS, WHICHEVER IS GREATER. IN ADDITION, ALL ROOF CURBS OR EQUIPMENT SUPPORT

CONTRACTOR SHALL LOCATE EXHAUST FANS, OUTLETS, AND GAS FLUES A MINIMUM OF 15'-0" FROM ANY

STANDARD NO. 54. ALL PIPING TO BE SUPPORTED BY CLEVIS HANGERS WITH GALVANIZED ROD A MAXIMUM

OF 8' ON CENTER. PIPING SHALL BE SUPPORTED BY ROD HANGERS IN THE PIPE RUN 12" OR LESS IN LENGTH

FROM THE TOP OF THE PIPE TO THE SUPPORTING STRUCTURE PER THE STATE BUILDING CODE AND ASCE 7.

GAS PIPING SHALL BE TESTED IN ACCORDANCE WITH THE PROCEDURES DESCRIBED IN NFPA NO 54. ANY

OTHER TEST AS REQUIRED BY THE LOCAL GAS INSPECTION DEPARTMENT OR GAS COMPANY SHALL ALSO BE

NATURAL GAS PIPING AND FITTINGS ABOVE GRADE: SCHEDULE 40 BLACK STEEL PIPING, TYPE S, SEAMLESS,

PROVIDE A.G.A. CERTIFIED SHUT-OFF VALVES MINIMUM, 125 PSI RATED, NON- LUBRICATED PLUG TYPE WITH

BRONZE BODY AND BRONZE PLUG, STRAINERS AND REGULATORS (AS RECOMMENDED BY THE EQUIPMENT

PAINT ALL GAS PIPING WITH 2 COATS OF YELLOW ENAMEL PAINT APPLIED WITH A BRUSH (2 MIL THICKNESS

. DUCTWORK AND PIPING PASSING THROUGH/ABOVE ELECTRICAL ROOMS SHALL BE CLOSELY COORDINATED

WITH THE ELECTRICAL CONTRACTOR. DUCTWORK OR PIPING SHALL NOT BE LOCATED ABOVE ELECTRICAL

EQUIPMENT OPERATED DURING CONSTRUCTION SHALL USE FILTERED MEDIA TO PREVENT CONSTRUCTION

CONSTRUCTION, MECHANICAL CONTRACTOR SHALL CLEAN ALL SYSTEMS WITH ALL CONTROL DEVICES WIDE

OPEN AND REMOVE ANY REMAINING DEBRIS PRIOR TO TEST AND BALANCING. MECHANICAL CONTRACTOR

SHALL REPLACE ALL FILTRATION WITH NEW FILTERS AT COMPLETION OF CONSTRUCTION. ANY DUCTWORK,

AIR TERMINALS, AND/OR OTHER EQUIPMENT UPSTREAM OF FILTRATION SHALL BE CLEANED THOROUGHLY

MECHANICAL CONTRACTOR SHALL PROVIDE PRE-PRINTED COLOR-CODED PIPE LABELS WITH 1-1/2" HIGH

LETTERING INDICATING SERVICE AND FLOW DIRECTION. PLASTIC PIPE LABELS UTILIZED IN A RETURN AIR

FACILITIES STANDARD (IF APPLICABLE). OTHERWISE, PIPE LABELS SHALL MATCH THE FOLLOWING:

TESTING, ADJUSTING, AND BALANCING

THE MECHANICAL CONTRACTOR SHALL BALANCE ALL MECHANICAL SYSTEMS TO THE PERFORMANCE

COMPLETION. THE TEST AND BALANCE REPORT WILL BE SUBJECT TO REVIEW AND APPROVAL BY THE

REPORT TO BE COMPLETED BY AN INDEPENDENT. CERTIFIED TEST AND BALANCE CONTRACTOR.

4. SET HVAC SYSTEM AIRFLOW AND WATER FLOW RATES WITHIN THE FOLLOWING TOLERANCES:

STANDARDS FOR TESTING AND BALANCING HVAC SYSTEMS", LATEST EDITION.

USED PRIOR TO THE START OF WORK.

REQUIREMENTS.

B. AIR OUTLETS AND INLETS: 0 TO MINUS 10 PERCENT.

SPECIFICATIONS INDICATED ON PLANS AND PROVIDE THE ENGINEER WITH THREE COPIES OF A COMPLETE

TEST AND BALANCE REPORT. THE REPORT IS TO BE ISSUED A MINIMUM OF TWO WEEKS PRIOR TO PROJECT

ENGINEER. ANY ADDITIONAL TESTING, ADJUSTING AND BALANCING REQUIRED (AT ENGINEER'S REQUEST)

AFTER REVIEW OF THE INITIAL REPORT SHALL BE PROVIDED AT NO ADDITIONAL COST. TEST AND BALANCE

CONDUCT TESTING AND BALANCING IN ACCORDANCE WITH TECHNICAL PORTIONS OF THE AABC "NATIONAL

INSTRUMENTS USED FOR BALANCING MUST HAVE BEEN CALIBRATED WITHIN A PERIOD OF SIX (6) MONTHS

PRIOR TO BALANCING. SUBMIT SERIAL NUMBERS, AND DATES OF CALIBRATION OF ALL INSTRUMENTS TO BE

A. SUPPLY, RETURN, AND EXHAUST FANS AND EQUIPMENT WITH FANS: MINUS 5 TO PLUS 10 PERCENT.

REFER TO SPECIFICATION SECTION 230593 AND CONTRACT DRAWINGS IN THEIR ENTIRETY FOR ADDITIONAL

PLENUM SHALL BE LISTED/APPROVED FOR USE IN A RETURN AIR PLENUM. ALL PIPING TO MATCH EXISTING

MINIMUM). PROVIDE PRE-PRINTED LABELS WITH BLACK LETTERING INDICATING THE GAS PRESSURE AND

4. PROVIDE NON-CONDUCTING DIELECTRIC UNIONS WHENEVER CONNECTING DISSIMILAR METALS.

DEBRIS FROM ENTERING COILS, DUCTWORK SYSTEMS, AIR TERMINALS ETC. AT COMPLETION OF

GRADE B (ASTM A 53) AND 150 PSI MALLEABLE BLACK IRON FITTINGS, GRADE 32510, (ASTM B 16.3) OR

FORGED STEEL WELDING TYPE FITTINGS (ASTM A234). PROVIDE THREADED JOINTS FOR PIPE 2" AND

SMALLER. PROVIDE WELDED JOINTS (ASME B31.9) FOR PIPE 2 1/2" AND LARGER.

MANUFACTURER) FOR ALL EQUIPMENT CONNECTED TO THE NATURAL GAS SYSTEM.

THE WORD "GAS" ON THE PIPE AT 5'-0" CENTERS FOR ALL GAS PIPING.

OF CONSTRUCTION DEBRIS BEFORE HANDING OVER TO OWNER.

REFRIGERANT PIPING: YELLOW BACKGROUD, BLACK LETTERING

HEIGHT TO MAINTAIN A MINIMUM OF 18" CLEARANCE BELOW SUPPORTED EQUIPMENT FOR ROOF

. GAS PIPING SHALL BE INSTALLED TO THE REQUIREMENTS OF THE STATE BUILDING CODE AND NFPA

ASHRAE 90.1-2013 PERFORMANCE N/A (EXISTING LIGHTING, HVAC, AND DOM. WATER HEATING SYSTEMS TO REMAIN)

C406 ADDITIONAL EFFICIENCY PACKAGE OPTIONS C406.2 EFFICIENT MECH EQUIPMENT

C406.3 REDUCED LTG DENSITY C406.6 DEDICATED OA SYSTEM C406.4 ENHANCED LTG CONTROLS C406.7 SERVICE WATER HEATING

4A - HARNETT COUNTY, NORTH CAROLINA DESIGN CONDITIONS

EXTERIOR (ASHRAE 90.1-2013 TABLE D-1) 18° F. winter dry bulb summer dry bulb 91° F. 74° F. summer wet bulb

171,390 BTUH (peak) BUILDING HEATING LOAD 537,240 BTUH (peak) **BUILDING COOLING LOAD** 639,900 BTUH **INSTALLED HEATING CAPACITY**

C403.2.3 & C406.2 - REQUIRED & INCREASED HVAC EQUIPMENT PERFORMANCE

EQUIP TYPE (BTUH)		SUBCATEGORY	MINIMUM EFFICIENCY (a)	INCREASED EFF. (a)	DESIGN EFFIC.	
TABLE C403.2.3	(1) - UNITARY AIR COI	NDITIONERS AND CONDE	NSING UNITS			
AIR COND, AIR COOLED	< 65,000 (<= 5 TONS)	SPLIT SYSTEM & SINGLE PACKAGE	13.0 SEER	14.3 SEER	SEE SCHEDULE	

SECTION OTHER THAN ELECTRIC RESISTANCE HEAT OR NO HEAT.

	TABLE C403.2.3((2) - ELECTRICALLY O	PERATED UNITARY AND A	PPLIED HEAT PUMP	5	
28. ALL MECHANICAL EQUIPMENT SHALL BE U.L. LISTED AND LABELED AS A COMPLETE PACKAGE, NOT THROUGH INDIVIDUAL COMPONENTS OR PARTS. PROVIDE REQUIRED 3RD PARTY FIELD UL LISTING SERVICES AS REQUIRED TO COMPLY.	AIR COOLED COOL MODE	>= 65,000 & < 135,000	SPLIT SYSTEM & SINGLE PACKAGE	11.0 EER 12.0 IEER	12.1 EER 13.2 IEER 10.4 EER 11.7 IEER	SEE SCHEDUL
REQUIRED TO COMPET.	AIR COOLED COOL MODE	>= 240,000	SPLIT SYSTEM & SINGLE PACKAGE	9.5 EER 10.6 IEER		SEE SCHEDUL
		-	EERS AND IEERS FOR UNIT	-		

ΙI						
	TABLE C403.2.3((4) - WARM AIR FURN	ACES			
]	WARM AIR GAS FURN	< 225,000	-	78% AFUE OR 80% Et	86% AFUE OR 88% Et	SEE SCHEDUL
	WARM AIR GAS FURN	>= 225,000	MAXIMUM CAPACITY	80% Et	88% Et	SEE SCHEDUL
ı i		•	·			

- CONTROL, VENTILATION, ENERGY RECOVERY, DUCT AND PLENUM INSULATION AND SEALING, PIPING INSULATION, AND SYSTEM COMPLETION.
- REQUIREMENTS.
- PROJECT INCLUDES AN AIR OR WATER ECONOMIZER COMPLIANT WITH C403.3

C403.4 - HYDRONIC AND MULTIPLE-ZONE HVAC SYSTEMS CONTROL AND EQUIPMENT (PRESCRIPTIVE)

REQUIREMENTS OF C403.4.

PROJECT CONSISTS OF HVAC SYSTEMS FULLY COMPLIANT WITH THE PRESCRIPTIVE

NOT APPLICABLE.

M-601

	MECHANICAL SHEET INDEX
SHEET NUMBER	SHEET NAME
M-001	MECHANICAL LEGEND AND NOTES
M-002	MECHANICAL SCHEDULES
M-101	ADDITION MECHANICAL PLAN
M-102	ADDITION ROOF MECHANICAL PLAN

ENERGY CONSERVATION CODE COMMERCIAL ENERGY EFFICIENCY - MECHANICAL SUMMARY

COMCHECK PROVIDED (2018 NCECC)

C301 CLIMATE ZONE

DESIGN CONDITIONS

INTERIOR (2018 NCECC SECTION C302.1)

72° F. winter dry bulb 75° F. summer dry bulb

C403.2 HEATING & COOLING LOADS AND EQUIPMENT & SYSTEM SIZING

INSTALLED COOLING CAPACITY 589,120 BTUH

SYSTEM DESCRIPTION - PACKAGED DX ROOFTOP UNITS WITH NATURAL GAS HEAT

MINIMUM HVAC EQUIP EFFICIENCY COMPLIANCE - TABLE C403.2.3

INCREASED HVAC EQUIP EFFICIENCY COMPLIANCE - 10% OVER TABLE C403.2.3

	EQUIP TYPE	SIZE CATEGORY (BTUH)	SUBCATEGORY	C403.2.3 MINIMUM EFFICIENCY (a)	10% INCREASED EFF. (a)	DESIGN EFFIC.
	TABLE C403.2.3	(1) - UNITARY AIR CON	IDITIONERS AND CONDEN	ISING UNITS		
	AIR COND, AIR COOLED	< 65,000 (<= 5 TONS)	SPLIT SYSTEM & SINGLE PACKAGE	13.0 SEER	14.3 SEER	SEE SCHEDULE

a. DEDUCT 0.2 FROM THE REQUIRED EERS AND IEERS FOR UNITS WITH A HEATING

AIR COOLED	>= 65,000 &	SPLIT SYSTEM &	11.0 EER	12.1 EER
COOL MODE	< 135,000	SINGLE PACKAGE	12.0 IEER	13.2 IEER
AIR COOLED	>= 240,000	SPLIT SYSTEM &	9.5 EER	10.4 EER
COOL MODE		SINGLE PACKAGE	10.6 IEER	11.7 IEER

	SECTION OTHE	ER THAN ELECTRIC RES	SISTANCE HEAT OR NO F	ILAI.		
	TABLE C403.2.3((4) - WARM AIR FURN	ACES			
]	WARM AIR GAS FURN	< 225,000	-	78% AFUE OR 80% Et	86% AFUE OR 88% Et	SEE SCHEDUI
	WARM AIR GAS FURN	>= 225,000	MAXIMUM CAPACITY	80% Et	88% Et	SEE SCHEDUI

C403.2.4 THRU C403.2.11

HVAC SYSTEMS ARE FULLY COMPLIANT WITH THE REQUIREMENTS FOR HVAC SYSTEM C403.2.12 - AIR SYSTEM DESIGN AND CONTROL

ALL FANS INSTALLED ON THE PROJECT ARE 5 HP OR LESS AND ARE EXEMPT FROM THESE

C403.3 - ECONOMIZERS (PRESCRIPTIVE)

PROJECT MEETS AN ECONOMIZER EXCEPTION LISTED IN C403.3

PROJECT CONSISTS OF ONLY SINGLE ZONE DX SYSTEMS, EXEMPT FROM THE PRESCRIPTIVE

REQUIREMENTS OF C403.4.

C405.8 - ELECTRICAL MOTORS (MANDATORY REQUIREMENTS).

ELECTRICAL MOTORS HAVE BEEN SPECIFIED TO MEET MINIMUM EFFICIENCY REQUIREMENTS PER C405.8, EXCEPT WHERE EXEMPT.

C408 - SYSTEM COMMISSIONING

PROJECT AREA IS LESS THAN 10,000 SQUARE FEET AND IS EXEMPT FROM THE SYSTEM COMMISSIONING REQUIREMENTS OF SECTION C408.

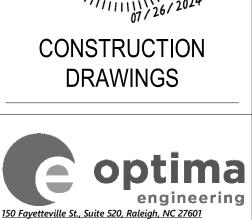
PROJECT AREA IS GREATER THAN 10,000 SQUARE FEET AND REQUIRES SYSTEM COMMISSIONING PER SECTION C408.

MECHANICAL CONTROL DIAGRAMS

	MECHANICAL SHEET INDEX
SHEET NUMBER	SHEET NAME
M-001	MECHANICAL LEGEND AND NOTES
M-002	MECHANICAL SCHEDULES
M-101	ADDITION MECHANICAL PLAN
M-102	ADDITION ROOF MECHANICAL PLAN
M-501	MECHANICAL DETAILS

Leading Designer of in the Nation with a Delivery Methods Fayetteville St, Ste 225 Raleigh, NC 27601 P: 919.573.6350 COMCHECK PROVIDED (90.1-2013) F: 919.573.6355 ENERGY MODELING DATA PROVIDED C406.5 ON-SITE RENEWABLE ENERGY





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LEGEND AND NOTES

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COOLING CAPACITY

CONDENSER LY

Leading Designer of

CAROLINATION CAROLINATION OF ESSION A	
040316 =	
10 VGINEER LANDING 1/1/1/1/1/1/1/1/1/1/1/1/1/1/1/1/1/1/1/	

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CONSTRUCTION

ISSUE DATE:	07-26-24
PROJECT #:	02110.300
DRAWN BY:	HFK
CHECKED BY:	TAL
	a Architects, PA

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EQUIVALENT MANUFACTURERS LISTING

LISTING OF MANUFACTURER'S NAME DOES NOT GUARANTEE APPROVAL. ALL EQUIPMENT MUST MEET OR EXCEED QUALITY AND CAPACITIES OF SPECIFIED EQUIPMENT. FINAL APPROVAL WILL BE BASED ON EQUIPMENT SUBMITTALS. ANY MANUFACTURER NOT LISTED BUT WISHING TO BID THIS PROJECT SHALL SUBMIT A WRITTEN REQUEST A MINIMUM OF 7 DAYS PRIOR TO BID DATE OR AS INDICATED IN THE SPECIFICATIONS, ALL EQUIPMENT LISTED IN THE PROJECT SCHEDULE IS TO BE CONSIDERED DESIGN BASIS EQUIPMENT. PRIOR APPROVAL IS REQUIRED FOR ALL MANUFACTURERS NOT LISTED.

(ALPHABETICAL ORDER)

AIR DISTRIBUTION: CARNES, KRUEGER, METAL*AIRE, NAILOR, PRICE, TITUS, TUTTLE & BAILEY <u>DDC CONTROLS:</u> SCHNEIDER ELECTRIC, AUTOMATED LOGIC CONTROLS, JOHNSON CONTROLS **DUCTLESS SPLIT SYSTEMS:** DAIKIN, MITSUBISHI, TRANE ELECTRIC WALL/UNIT HEATERS: BERKO, MARKEL, MODINE, QMARK, RAYWALL FANS: COOK, GREENHECK, PENN, TWIN CITY

PACKAGED ROOFTOP UNITS (UNDER 25 TONS): CARRIER, TRANE, YORK/JOHNSON

SPIRAL DUCTWORK: EASTERN SHEET METAL, HAMLIN, LINDAB, UNITED MCGILL

ALL COST ASSOCIATED WITH SUBSTITUTED/NON-DESIGN BASIS EQUIPMENT TO COMPLY WITH BASIS OF DESIGN, INCLUDING PROVIDING MAINTENANCE ACCESS, CLEARANCE, PIPING, SHEET METAL, ELECTRICAL, REPLACEMENT OF SYSTEM COMPONENTS, BUILDING ALTERATIONS, ETC., SHALL BE INCLUDED IN THE ORIGINAL BASE BID. NO ADDITIONAL COST ASSOCIATED WITH SUBSTITUTED/NON-DESIGN BASIS EQUIPMENT WILL BE APPROVED DURING CONSTRUCTION AND ALL COST WILL BE THE RESPONSIBILITY OF THE MECHANICAL CONTRACTOR.

	LOCATION			Number of	Outdoor Airflow Rate	Outdoor Airflow Rate Per	Breathing Zone	Zone Air Distribution	Required Outdoor Air		EXH Air Flow	Exhaust Air FLow	
NO.	NAME	Occupancy Category	Area	People_OPT	Per Person, Rp	Unit Area, Ra	Outdoor Airflow, Voz	Effectiveness, Ez	Intake Flow, Vot	Fixture Count	Rate (cfm/fix)	Provided (cfm)	Commen
100	GYMNASIUM	Gym, stadium (play area)	4222 SF	0	0.0 CFM	0.30 CFM/SF	1266.71 CFM	1	1267 CFM				
100	GYM SEATING AREA	Spectator areas	1292 SF	194	7.5 CFM	0.06 CFM/SF	1532.49 CFM	1	1532 CFM				
100	CORRIDOR	Corridors	2222 SF	0	0.0 CFM	0.06 CFM/SF	133.33 CFM	1	133 CFM				
RTU-1A and 1B									2933 CFM			0 CFM	
101	LOBBY	Lobbies/prefunction	1003 SF	31	7.5 CFM	0.06 CFM/SF	292.69 CFM	1	293 CFM				
101	LOBBY	Corridors	210 SF	0	0.0 CFM	0.06 CFM/SF	12.58 CFM	1	13 CFM				
102	MEN	Toilets (public)	263 SF					1		7	70	490 CFM	
103	WOMEN	Toilets (public)	316 SF					1		7	70	490 CFM	
104	CUSTODIAN	Janitor closets, trash rooms, recylcing ASHRAE	67 SF					1		1		70 CFM	
105	OFFICE	Office space	81 SF	1	5.0 CFM	0.06 CFM/SF	9.85 CFM	1	10 CFM				
105A	CLOSET	Storage rooms	26 SF	0	0.0 CFM	0.12 CFM/SF	3.16 CFM	1	3 CFM				
106	EQUIPMENT	Storage rooms	246 SF	0	0.0 CFM	0.12 CFM/SF	29.52 CFM	1	30 CFM				
C101	CORR.	Corridors	220 SF	0	0.0 CFM	0.06 CFM/SF	13.19 CFM	1	13 CFM				
RTU-2				•				•	361 CFM	•		1050 CFM	

NOTES: 1. COOLING CAPACITIES BASED ON 95° AMBIENT, 80/67 ENTERING AIR.

PROVIDE ALL UNITS WITH: ROOF CURB, 2" THROWAWAY FILTERS (MERV 8 MINIMUM), ECONOMIZER MOTORIZED OA DAMPER, INTERMITTENT PILOT IGNITION, CONDENSER COIL HAIL GUARDS AND HINGED ACCESS DOORS WITH "TOOL-LESS" ENTRY.

. ALL UNITS SHALL BE AGA CERTIFIED, U.L. LABELED, AND ASHRAE 90.1 COMPLIANT.

M. 2" WASHABLE ALUMINUM FILTERS

Q. VENTED ROOF CURB EXTENSION

S. INTERLOCK WITH FUME HOOD

R. COMBINATION KITCHEN HOOD FAN CURB

N. MOTORSIDE FAN GUARD

O. EXHAUST GRILLE

P. U.L. 762

4. PROVIDE EACH UNIT WITH A IONIZATION TYPE SMOKE DETECTOR, INSTALLED IN THE RETURN DUCT WIRED TO SHUT DOWN THE UNIT UPON ACTIVATION. ACTIVATION OF DUCT DETECTOR SHALL ACTIVATE AN AUDIO/VISUAL ALARM IN AN APPROVED LOCATION. DUCT DETECTOR TROUBLE CONDITIONS SHALL ACTIVATE THE VISUAL PORTION OF THE ANNUNCIATOR AND SHALL BE IDENTIFIED AS "AIR DETECTOR TROUBLE". SMOKE DETECTOR AND ALARM SHALL BE FURNISHED, INSTALLED, AND WIRED BY THE MECHANICAL CONTRACTOR. MECHANICAL CONTRACTOR SHALL PROVIDE POWER WIRING AND ALL ASSOCIATED ACCESSORIES (STEP DOWN TRANSFORMER, ETC.) FOR SMOKE DETECTOR, EITHER FED FROM POWER FEED TO UNIT OR ANOTHER APPROVED POWER SOURCE IN THE AREA.

(CFM) | (CFM) | E.S.P. (IN. H2O) | T.C. (BTUH) | S.C. (BTUH) | SEER | EER | INPUT | OUTPUT | AFUE | QTY | RLA | QTY | FLA | HP | MCA | MOCP | VOTAGE | PH

EXHAUST FAN SCHEDULE														
						APPROX.				E	LECTRICA	L DATA		
SYMBOL	LOCATION	MANUFACTURER	MODEL NO.	TYPE	CFM	ESP	DRIVE TYPE	FAN RPM	SONES	WATTS	H.P.	VOLTAGE-PHASEØ	ACCESSORIES	CONTROL TYPE
EF-1	ROOF	GREENHECK	G-095-E	DOWNBLAST	525	0.500	DIRECT	1550	9.8	100	0.13	115 V-1Ø	A,B,D,E	2
EF-2	ROOF	GREENHECK	G-095-E	DOWNBLAST	525	0.500	DIRECT	1550	9.8	100	0.13	115 V-1Ø	A,B,D,E	2
EF-3	CUSTODIAN 104	GREENHECK	SP-A200	CABINET	125	0.500	DIRECT	763	2.5	30	0.00	115 V-1Ø	A,B,F,G,O	2

EXHAUST FAN SCHEDULE ACCESSORIES:

A. DISCONNECT SWITCH B. GRAVITY BACKDRAFT DAMPER C. MOTORIZED BACKDRAFT DAMPER D. PREFAB, ROOF CURB

DESIGNO.A. MIN. O.A. SUPPLY FAN

1500 750 0.80 247330

400 0.80 94460

- E. BIRDSCREEN F. ACOUSTICAL LINING G. HANGING BRACKETS WITH VIBRATION ISOLATION H. WL, WALL LOUVER DISCHARGE
- T. PROVIDE DRAIN PLUG ACCESSORY I. RCC OR GRS ROOF CAP (FLAT ROOF) OR U. ROOF SUPPORT RAILS RJ ROOF CAP (PITCHED ROOF) V. VFD WALL MOUNTING COLLAR K. INLET GAURD
- **EXHAUST FAN SCHEDULE CONTROLS:**
- 1. WALL MOUNTED THERMOSTAT (REVERSE ACTING, SET FOR 80°) 2. INTERLOCK WITH ROOM LIGHT SWITCH (FAN SHALL OPERATE WHEN LIGHT IS ON IF ANY ROOM IS

OPERATING

WEIGHT

MANUFACTURER

TRANE

TRANE

ACCESSORIES:

MODEL

YSJ240A4S0M

YSJ240A4S0M

YSJ090A4S0M

B. LOW LEAKAGE ECONOMIZER

A. MODULATING HOT GAS REHEAT (HGRH)

ACCESSORIES

A,B

A,B

- SERVED BY FAN) 3. WALL MOUNTED ON/OFF SWITCH WITH IDENTIFICATION LABEL
- 4. WALL MOUNTED MUSHROOM PUSH BUTTON SWITCH/STARTER WITH IDENTIFICATION LABEL 5. CONTROLLED BY BUILDING AUTOMATION SYSTEM
- 6. CONTINUOUS OPERATION
- 7. CONTROLLED BY THE FACP AND FIREMAN'S MANUAL OVER-RIDE CONTROL PANEL IN FIRE COMMAND
- ROOM. NO MECHANICAL CONTROL POINTS REQUIRED BY M.C. FOR SMOKE CONTROL FANS

ROOFTOP UNIT SCHEDULE (DX COOLING, GAS HEAT, R-410 REFRIGERANT)

194050 | 13 | 9.8 | 320000 | 259200 | 81 | 2 | 21.3 | 2 | 2.2 | 3.0 | 54.0 | 70.0 | 480

194050 13 9.8 320000 259200 81 2 21.3 2 2.2 3.0 54.0 70.0 480 3

73150 | 14.6 | 11 | 150000 | 121500 | 81 | 2 | 8.2 | 1 | 1.5 | 3.0 | 21.0 | 25.0 | 480 | 3 | 1165 lb

EFFICIENCY HEATING CAPACITY | EFFICIENCY | COMPRESSOR (EA) | FAN | FAN |

EXHAUST FAN SCHEDULE NOTES:

- 1. ALL FANS SHALL BE U.L. LISTED AND LABELED AND SHALL BE AMCA CERTIFIED FOR SOUND AND AIR FLOW. ALL FANS INSTALLED INSIDE, ABOVE, OR ADJACENT TO OCCUPIED SPACES SHALL HAVE A MAXIMUM 9.0 INLET SONE
- 2. ALL FANS SHALL BE SUPPLIED BY ONE MANUFACTURER UNLESS NOTED OTHERWISE.
- 3. MECHANICAL CONTRACTOR SHALL PROVIDE MAGNETIC STARTER WITH AUXILIARY CONTACTS AS REQUIRED.

4.	PROVIDE ALL DIRECT DRIVE FANS WITH SPEED CONTROLLERS.
5.	BACKDRAFT DAMPER ON ROOF SUPPLY FANS SHALL BE MOTORIZED

					H	IEAT	PUM	1P S0	CHEC	DULE	(AIR C	00	LED)			
	NOMBA	COOLIN	NG COIL	EFFIC	CIENCY	COMPR	ESSOR	FAN		ELECTRIC	CAL DATA	I		MANUFACTURER		
	NOMINAL													(MITSUBISHI)		
SYMBOL	TONNAGE	TC (BTUH)	SHC (BTUH)	EER	SEER	LRA	RLA	FLA	MCA	FUSE	VOLTAGE	PH	REFRIG. TYPE	MODEL	WEIGHT	MATCHING INDOOR UNIT
ODU-1	1.5	18000	12240	9.9	18.5	12.0	7.0	0.5	11.0	28.0	208 V	1	R410A	PUY-A18NKA7(-BS)	99 lb	IDU-1

1. COOLING CAPACITY @ 95 AMBIENT.

- 2. ALL UNITS SHALL BE U.L. LISTED AND HAVE A MINIMUM SEER OF 13.
- 3. HEAT PUMP SUPPLEMENTARY ELECTRIC RESISTANCE HEAT SHALL BE PROVIDED WITH CONTROLS TO PREVENT OPERATION WHEN THE REVERSE CYCLE HEAT CAN MEET HEATING LOAD. SUPPLEMENTAL ELECTRIC HEAT SHALL BE ALLOWED TO OPERATE DURING HEAT PUMP DEFROST CYCLE. SUPPLEMENTAL ELECTRIC HEAT SHALL BE LOCKED OUT WHEN THE OUTDOOR TEMPERATURE IS BETWEEN 35°F AND 40°F AND THE INDOOR TEMPERATURE SETPOINT IS INCREASED.
- 4. MOUNT UNITS ON A 4" THICK CONCRETE PAD AND PROVIDE MANUFACTURER'S RECOMMENDED CLEARANCES AROUND UNITS.
- 5. PROVIDE UNITS WITH CONDENSER COIL HAIL GUARDS AND LOW AMBIENT CONTROLS.
- 6. FOR REFRIGERANT LINE APPLICATIONS WITH A TOTAL EQUIVALENT LENGTH BETWEEN 50'-0" AND 175'-0".
- THE FOLLOWING ACCESSORIES SHALL BE PROVIDED;
- -COMPRESSOR CRANKCASE HEATER
- -FOR HORIZONTAL CONFIGURATION: PROVIDE LIQUID LINE SOLENOID WITHIN 2'-0" OUTDOOR UNIT WITH FLOW ARROW POINTING TOWARD OUTDOOR UNIT. VAPOR LINE SHOULD SLOPE TOWARD INDOOR UNIT. -MECHANICAL CONTRACTOR & UNIT MANUFACTURER ARE TO REVIEW INSTALLATION, AND FOLLOW MANUFACTURER'S RECOMMENDATIONS FOR LONG REFRIGERANT LINE APPLICATIONS (AS DEFINED BY UNIT MFGR).

			DUCT	LESS A/G	CIND	OOR	UNIT S	CHE	DULE	- -		
			DESIGN	TOTAL			UNIT				INTERLOCK	
SYMBOL	MANUFACTURER	MODEL NO.	AIRFLOW	CAPACITY	EAT(db)	EAT(wb)	WEIGHT	MCA	VOLT	PH	ID	REMARKS
IDU-1	MITSUBISHI ELECTRIC	PKA-A18HA7	425 CFM	18000 Btu/h	90.0 °F	72.0 °F	29 lb	1.0 A	208 V	1	ODU-1	

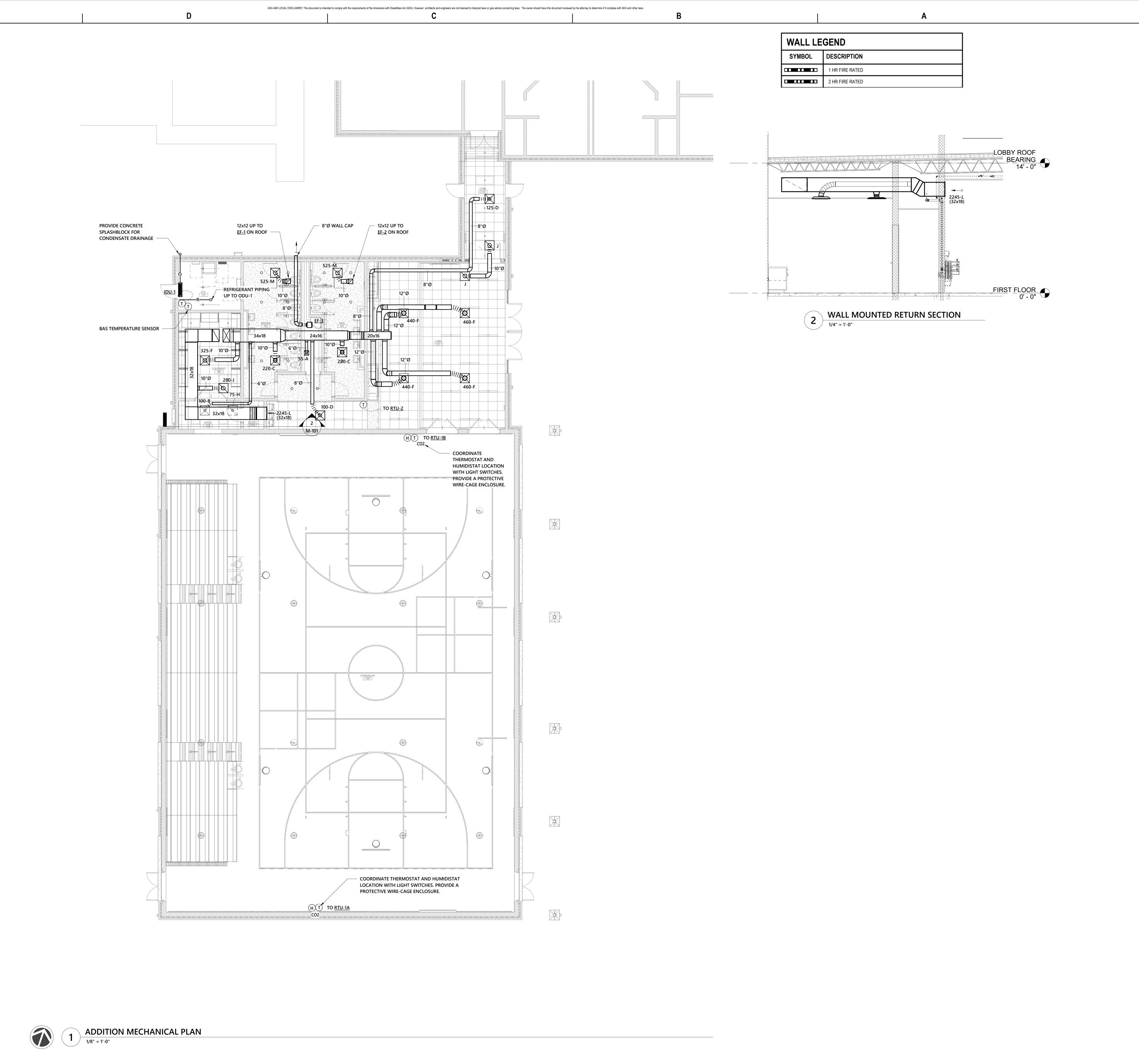
DUCTLESS A/C UNIT SCHEDULE NOTES:

- PROVIDE WITH FACTORY THERMOSTAT
- 2. INSTALL PER MANUFACTURER'S RECOMMENDATIONS.
- 3. SIZE AND INSTALL REFRIGERANT PIPING PER MANUFACTURER'S RECOMMENDATIONS. 4. INDOOR UNITS ARE POWERED BY THE CONDENSING UNITS.
- 5. IN EVERY ROOM SERVED BY A MINI-SPLIT INDOOR UNIT PROVIDE A TEMPERATURE SENSOR INTEGRATED INTO THE BAS WITH HIGH TEMPERATURE ALARM SET AT 80F (ADJ)

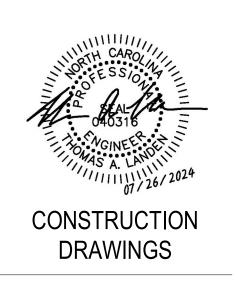
	GF	RILLES, R	EGIST	ERS AND	DIF	FUS	ERS	SCHE	DULE		
							NECK		INSTALLATION	OPTIONS	
SYMBOL	DESCRIPTION	MANUF.	MODEL	MATERIAL	FACE SIZE	SIZE	WIDTH	HEIGHT	BORDER TYPE	DAMPER DESCRIPTION	NOTES
Α	LOUVERED FACE DIFFUSER	Titus	OMNI-AA	ALUMINUM	12x12	6			TYPE 3 (LAY-IN)		SUPPLY
В	PLAQUE FACE DIFFUSER	TITUS	OMNI	STEEL	24x24	6			TYPE 3 (LAY-IN)		SUPPLY
С	PLAQUE FACE DIFFUSER	TITUS	OMNI-AA	ALUMINUM	24x24	8			TYPE 3 (LAY-IN)		SUPPLY
D	PLAQUE FACE DIFFUSER	TITUS	OMNI	STEEL	24x24	8			TYPE 3 (LAY-IN)		SUPPLY
F	PLAQUE FACE DIFFUSER	TITUS	OMNI	STEEL	24x24	10			TYPE 3 (LAY-IN)		SUPPLY
G	LOUVERED DOUBLE DEFLECTION GRILLE	TITUS	US300FS	ALUMINUM		0	18	6	DUCT-MOUNTED		SUPPLY
Н	PERFORATED DIFFUSER	TITUS	PAR	STEEL	24x24	6			TYPE 3 (LAY-IN)		RETURN
J	PERFORATED DIFFUSER	TITUS	PAR	STEEL	24x24	10			TYPE 3 (LAY-IN)		RETURN
K	HEAVY DUTY LOUVERED GRILLE	Titus	33RS	STEEL			36	48	TYPE 1 (SURFACE)		RETURN
L	HEAVY DUTY LOUVERED GRILLE	TITUS	33RL	STEEL			32	18	TYPE 1 (SURFACE)		RETURN
М	PERFORATED DIFFUSER	TITUS	PAR-AA	ALUMINUM	24x24	10			TYPE 3 (LAY-IN)		EXHAUST

AIR DISTRIBUTION SCHEDULE NOTES:

- 1. ALL CEILING AND WALL MOUNTED DEVICES SHALL BE FURNISHED WITH AN ENAMEL BRIGHT WHITE FINISH UNLESS NOTED OTHERWISE.
- 2. ALL DEVICES SHALL BE FURNISHED WITH FRAMES SUITABLE FOR THE TYPE OF INSTALLATION REQUIRED. 3. ALL LINEAR DIFFUSERS IN LAY-IN CEILINGS SHALL BE FURNISHED WITH END CAPS. ALL LINEAR DIFFUSERS IN HARD CEILINGS SHALL BE FURNISHED WITH END BORDERS.
- ALL LINEAR SUPPLY DIFFUSERS SHALL BE PROVIDED WITH INTEGRAL AIRFLOW PATTERN ADJUSTMENT BARS FOR HORIZONTAL/VERTICAL PATTERN ADJUSTMENT AT
- 4. ALL DOUBLE DEFLECTION SUPPLY GRILLES SHALL HAVE DAMPER BLADES ADJUSTED TO PROVIDE AIRFLOW PATTERN INDICATED BY FLOW ARROWS ON PLANS. DAMPERS







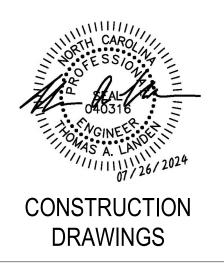


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MECHANICAL PLAN

M-101



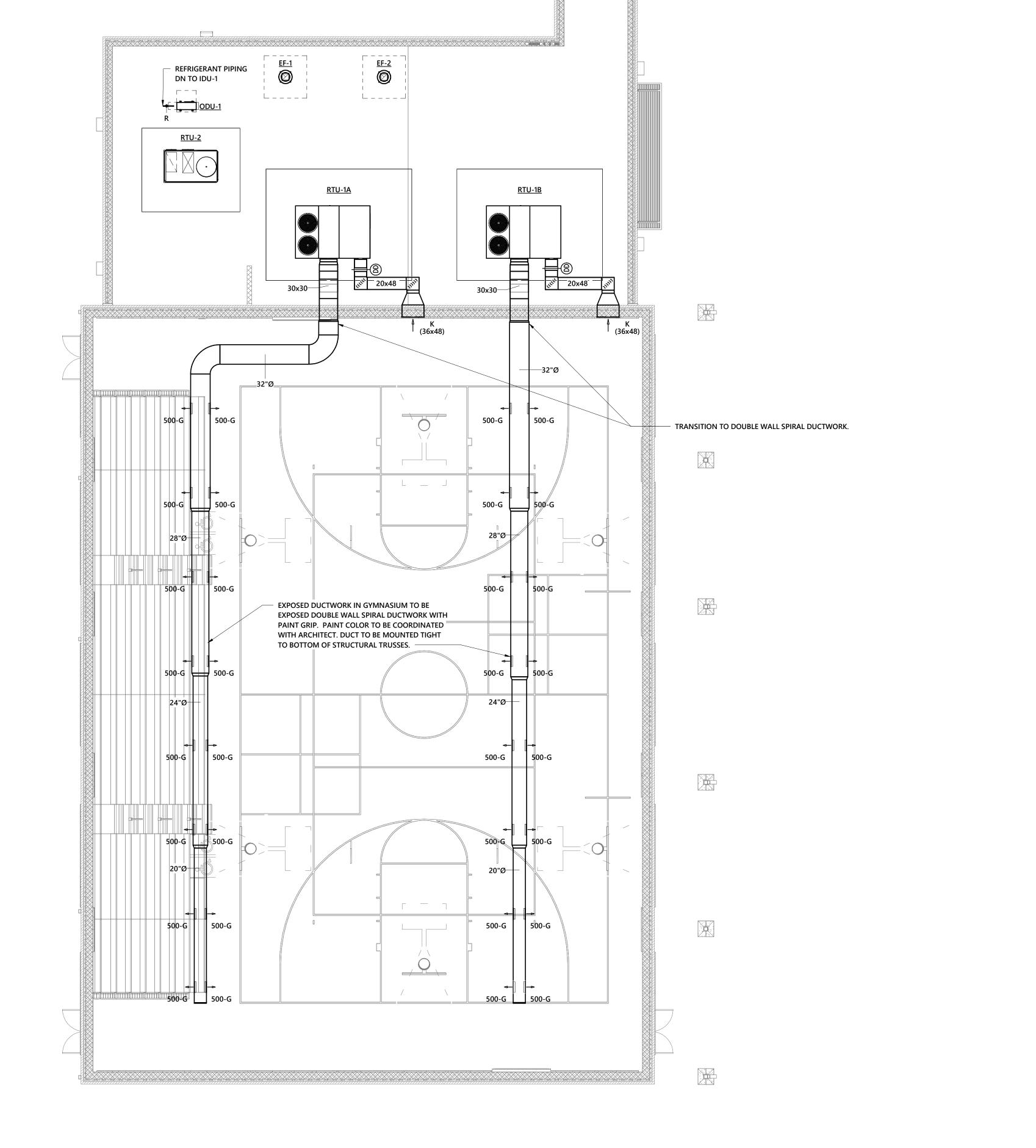




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ADDITION ROOF MECHANICAL PLAN

M-102



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CEILING

DUCTWORK SUPPORT ON ROOF

-SMOKE DETECTOR

RTU - GAS, HORIZONTAL SUPPLY

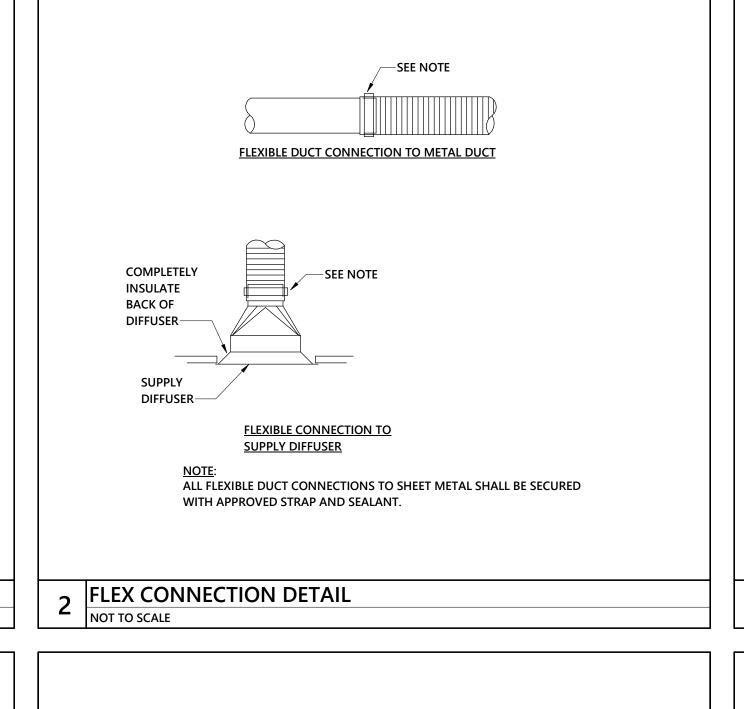
IN RETURN DUCT

DUCTWORK WITH LINER, SEE PLANS——

FOR ROUTING.

10 RTU - GAS

NOT TO SCALE



CONDENSING UNIT

EQUIPMENT SUPPORT RAILS AS MFG. BY

PREFABRICATED ROOF CURB WITH BUILT-IN

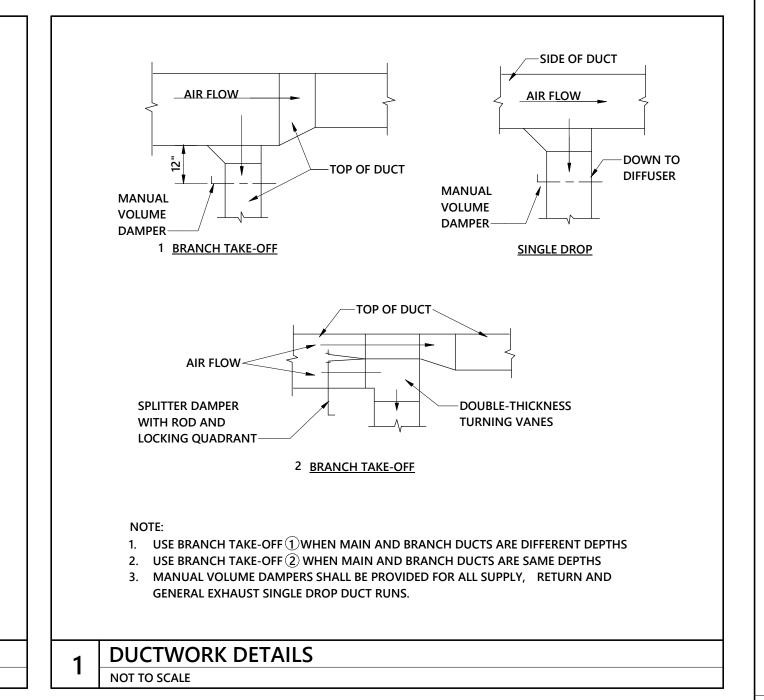
RAISED CAN'T. FLASH AND COUNTERFLASH

FOR ADDITIONAL INFORMATION

ROOF - MOUNTED CONDENSING UNIT

CURB IN WATERPROOF MANNER. SEE 10/M501

ROOF PRODUCTS AND SYSTEMS CORP. (OR





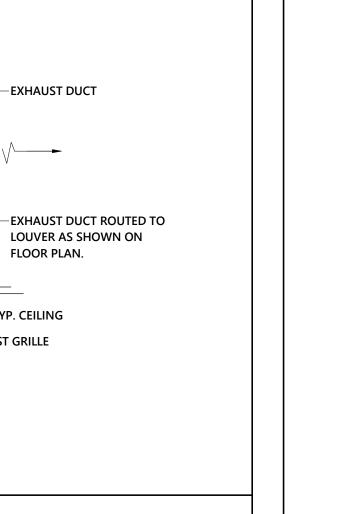
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ELEMENTARY

SHAWTOWN

LILLINGTON



GYP. CEILING

EXHAUST GRILLE



EXHAUST FAN

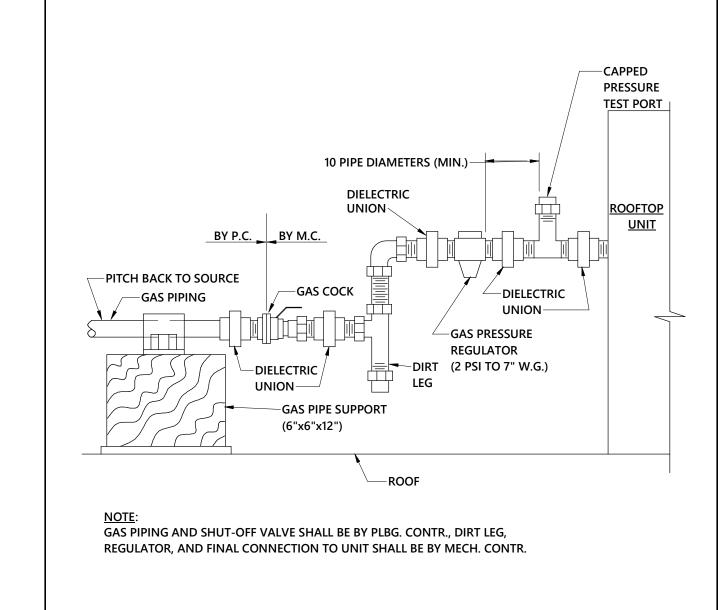
1/4 ALL THREAD

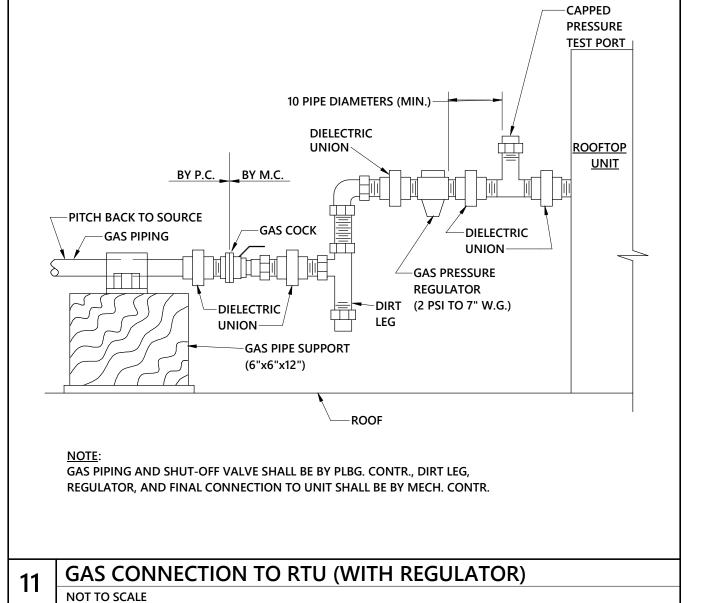
RODS SUPPORTED

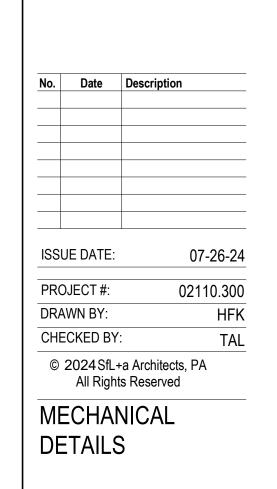
FROM STRUCTURE

SUPPORT ANGLES—

NEOPRENE ISOLATORS—







SEQUENCE OF OPERATION

A COMPLETE AND OPERATIONAL DDC CONTROL SYSTEM (BAS) SHALL BE INSTALLED AND TIE INTO THE EXISTING BAS FOR THE SCHOOL IN ACCORDANCE WITH THE SPECIFICATIONS (SECTION 230900) AND AS INTENDED ON THESE PLANS. ALL CONTROL POINTS AND EQUIPMENT SEQUENCES OF OPERATION LISTED IN SPECIFICATION SECTION 230900 SHALL BE CONSIDERED IN ADDITION TO THOSE LISTED HERE. IN THE EVENT THAT THE VERBIAGE IS IN CONFLICT OR CONTRADICTS THE REQUIREMENTS LISTED HERE, THE QUESTION SHALL BE ASKED PRIOR TO BIDDING OR THE MORE STRINGENT SHALL APPLY. MECHANICAL CONTRACTOR SHALL COORDINATE ALL BAS INTEGRATION REQUIREMENTS WITH EQUIPMENT VENDORS AND CONTROLS CONTRACTOR PRIOR TO PURCHASING EQUIPMENT AND PROVIDE ALL EQUIPMENT WITH COMMUNICATION/INTERFACE CARDS AS REQUIRED FOR SYSTEM INTEGRATION.

DX/GAS ROOFTOP UNITS

AIR HANDLING UNITS SHALL BE STOPPED/STARTED ON A TIME OF DAY SCHEDULE THROUGH THE BAS. THIS SCHEDULE SHALL BE MODIFIED BY A START STOP OPTIMIZATION PROGRAM. UPON PROOF OF AIR FLOW THRU THE SUPPLY FAN, AS SENSED BY A RESPECTIVE CURRENT SENSING RELAY, THE NORMALLY CLOSED OUTSIDE AIR DAMPER SHALL BE ENABLED.

WHILE IN THE OCCUPIED MODE, THE SUPPLY FAN SHALL OPERATE CONTINUOUSLY. WHILE IN THE UNOCCUPIED MODE, THE UNIT SUPPLY FAN SHALL CYCLE WITH HEATING AND COOLING LOADS. UPON A CALL FOR HEATING OR COOLING TO MEET UNOCCUPIED SETPOINTS, THE UNIT FAN

SHALL BE STARTED AND THE UNIT SHALL OPERATE AS DESCRIBED BELOW AS REQUIRED BY THE SPACE TEMPERATURE. THE UNIT SHALL OPERATE FOR A MINIMUM OF 30 MINUTES (OR AS REQUIRED TO SATISFY UNOCCUPIED SETPOINT) AND SHALL NOT BE ALLOWED TO RESTART FOR A MINIMUM OF 15 MINUTES FOLLOWING SATISFACTION OF UNOCCUPIED SETPOINT AND SYSTEM PEMAND CONTROL VENTILATION (RTU-1A AND RTU-1B): OUTSIDE AIR INTAKE SHALL BE PROVIDED WITH A MOTORIZED DAMPER. ON UNIT START

UP, THE OUTSIDE AIR INTAKE DAMPER SHALL REMAIN CLOSED UNTIL THE RETURN AIR TEMPERATURE RISES ABOVE 65° F (ADJ) OR FALLS BELOW 75° F. (ADJ). ONCE RETURN AIR TEMPERATURE IS SATISFIED, THE OUTSIDE AIR DAMPER SHALL OPEN TO THE OCCUPIED

MINIMUM SETPOINT. OUTSIDE AIR DAMPERS AND AIR FLOW MONITORING STATIONS SHALLMISC. EXHAUST FANS MODULATE AS REQUIRED TO MAINTAIN MINIMUM OUTSIDE AIR FLOW. THE OUTSIDE AIR PROVIDE WALL SWITCHES, WALL THERMOSTATS, INTERLOCKS, ETC. AS INTAKE DAMPER SHALL BE CLOSED WHILE UNIT IS IN THE UNOCCUPIED MODE. BAS SHALL BE INDICATED ON THE FAN SCHEDULE TO CONTROL FANS AS INDICATED ON CAPABLE OF OPENING AND CLOSING OUTSIDE AIR DAMPERS. CO2 SENSOR MOUNTED IN THE PLANS. BOILER ROOM AND ELECTRICAL ROOM THERMOSTATS SHALL BE SET AT 85° F. (USER ADJUSTABLE, BAS REMOTE). RETURN DUCT SHALL MODULATE THE OUTSIDE AIR DAMPER BASED ON CO2 LEVELS IN THE SPACE. DAMPER SHALL MODULATE OPEN FROM THE OCCUPIED MINIMUM SETPOINT OF 800

PPM TO DESIGN MAXIMUM AT 1200 PPM. AN ALARM SHALL BE ACTIVATED IF THE SPACE CO2 LEVEL RISES ABOVE 1500 PPM. SEE AHU SCHEDULE FOR MINIMUM AND DESIGN AIRSIDE ECONOMIZER CYCLE:
BURNUETHE OCCUPIED PERIOD, WHEN THE OUTSIDE AIR TEMPERATURE IS BELOW 68° F AND THE OUTDOOR ENTHALPY IS BELOW THE RETURN AIR ENTHALPY; THE INTERNAL UNIT CONTROLS ECONOMIZER CYCLE SHALL BE ENABLED. UNDER THOSE CONDITIONS, THE OUTDOOR AIR DAMPER AND RETURN AIR DAMPER SHALL

MODULATE AS REQUIRED TO MAINTAIN SPACE TEMPERATURE SETPOINT. SMOKE DETECTION & AHU SHUTDOWN: UPON DETECTION OF SMOKE IN THE AIR HANDLING SYSTEM BY THE DUCT-MOUNTED RETURN AIR SMOKE DETECTOR, AN ALARM CONDITION SHALL BE SENT TO THE BUILDING FIRE ALARM SYSTEM AND ALL AIR HANDLING UNITS SHALL BE SHUTDOWN BY THE

BUILDING FIRE ALARM SYSTEM. ALL ASSOCIATED SMOKE DAMPERS SHALL CLOSE. THE BUILDING FIRE ALARM SYSTEM SHALL PROVIDE ONE DIGITAL OUTPUT TO THE BAS TO INDICATE ACTIVATION OR FAILURE OF ANY SMOKE DETECTOR. **MODULATING DAMPER CONTROL:**

MODULATING RETURN, RELIEF, AND OUTSIDE AIR DAMPERS SHALL OPERATE IN CONJUNCTION. RELIEF AND OUTSIDE AIR DAMPERS SHALL OPEN TO THE SAME POSITION (BASED ON DEMAND CONTROL VENTILATION OR ECONOMIZER CONTROL), AND RETURN DAMPER SHALL CLOSE TO THE INVERSE POSITION OF THE OUTSIDE AND RELIEF DAMPER SETTINGS.

WITH SYSTEM IN OCCUPIED OR UNOCCUPIED MODE, HUMIDITY CONTROL SYSTEM SHALL BE CAPABLE OF BEING ACTIVATED. UNDER NORMAL OPERATION, UNIT SHALL CONTROLLED AS OUTLINED BELOW. PROVIDE HUMIDISTAT AS INDICATED ON PLANS, IF SPACE OR RETURN AIR HUMIDITY REACHES 65% R.H. (ADJ), ALARM SHALL BE SENT AND HUMIDITY CONTROL SEQUENCE SHALL BE ACTIVATED. WHEN SPACE HUMIDITY DROPS BELOW 55% R.H. (ADJ), BAS SHALL DEACTIVATE HUMIDITY CONTROL SEQUENCE. CONTROL OF UNIT SHALL REVERT BACK AS INDICATED BELOW.

A TEMPERATURE SENSOR SHALL BE UTILIZED TO MAINTAIN SPACE TEMPERATURE. THE DX COMPRESSORS SHALL STAGE AS REQUIRED TO MAINTAIN SETPOINT ON A RISE IN TEMPERATURE ABOVE SPACE SENSOR SETPOINT. AS THE TEMPERATURE SPACE FALLS BELOW SETPOINT, GAS HEAT SHALL BE ENERGIZED IN STAGES TO MAINTAIN SPACE TEMPERATURE. THE TEMPERATURE SENSOR SHALL BE PROVIDED WITH AN OVERRIDE FUNCTION THAT WILL PLACE THE SYSTEM IN THE OCCUPIED MODE FOR A PERIOD OF UP TO 2 HOURS.

SINGLE ZONE VARIABLE VOLUME (SZVAV) AIR HANDLING UNITS:

HUMIDITY CONTROL:

SEQUENCE.

CONSTANT VOLUME (CV) ROOFTOP UNITS:

TEMPERAUTRE SENSOR SHALL BE UTILIZED TO MAINTAIN SPACE TEMPERATURE. THE UNIT SUPPLY FAN SHALL START AT LOW SPEED. ON A RISE IN TEMPERATURE ABOVE SETPOINT, THE DX COMPRESSORS SHALL STAGE ON. ON A CONTINUED RISE IN TEMPERATURE, VARIABLE FREQUENCY DRIVE SHALL INCREASE AIR FLOW TO SATISFY SPACE TEMPERATURE REQUIREMENTS. AS THE SPACE TEMPERATURE DROPS BELOW SETPOINT, THE FAN SPEED SHALL RESET FROM MAXIMUM TO MINIMUM. AS THE SPACE TEMPERATURE CONTINUES TO DROP, THE DX COMPRESSORS SHALL STAGE OFF AND THE GAS HEAT SHALL BE ENERGIZED ON. ON A CONTINUED DROP IN SPACE TEMPERATURE, THE SUPPLY FAN SPEED SHALL INCREASE TO MAINTAIN SETPOINT AND GAS HEAT SHALL STAGE UP. THE TEMPERATURE SENSOR SHALL BE PROVIDED WITH AN OVERRIDE FUNCTION THAT WILL PLACE THE SYSTEM IN THE OCCUPIED MODE FOR A PERIOD OF UP TO 2 HOURS.

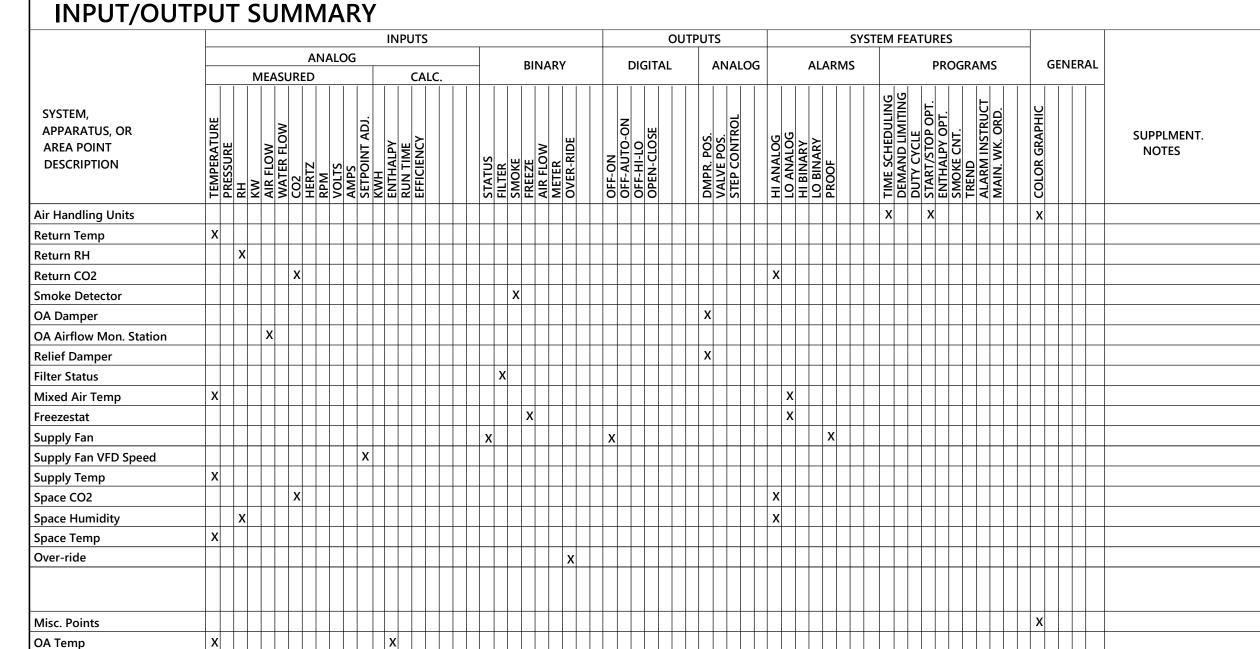
GYMNASUIM AIR HANDLING UNIT STAGING (RTU-1A AND RTU-1B. GYMNASIUM SHALL BE STAGED SUCH THAT RTU-1A SHALL ACT AS THE FIRST STAGE OF HEATING AND COOLING, AND LOW OCCUPANCY CONSTANT VENTILATION DURING OCCUPIED TIMES. RTU-1A SUPPLY FAN SHALL RUN CONTINUOUSLY IN THE OCCUPIED MODE AND OPERATE AS A SINGLE ZONE VAV UNIT AS SEQUENCED ABOVE. RTU-1B SHALL ACT AS THE SECOND STAGE OF HEATING, COOLING, DEHUMIDIFICATION, AND VENTILATION, OPERATING AS OUTLINED FOR A SINGLE ZONE VAV UNIT SEQUENCED ABOVE. THERMOSTAT SETPOINTS FOR RTU-1B SHALL BE SET 2° HOTTER/COLDER THAN SETPOINTS FOR PRIMARY UNIT RTU-1A, AND UNIT SHALL ONLY BE ACTIVATED UPON A CALL FOR HEATING AND COOLING FROM THE THERMOSTAT, BY THE CO2 SENSOR INSTALLED IN THE SPACE UTILIZING DEMAND CONTROLL VENTILATION AS DESCRIBED IN THE SEQUENCE, OR BY SPACE MOUNTED HUMIDISTAT ACTIVATING THE DEHUMIDIFICATION

THERMOSTATS & TEMPERATURE SENSORS

THERMOSTATS AND TEMPERATURE SENSORS SHALL BE PROVIDED WHERE INDICATED ON THE DRAWINGS, AND PER THE SPECIFICATIONS. THERMOSTATS TO 70°. THERMOSTATS SHALL HAVE A 3° RANGE IN WHICH THEY ARE SATISFIED (IF SET TO 70°, SATISFIED ANYWHERE BETWEEN 68.5° AND 71.5°). SLIDE BAR SHALL HAVE THE CAPABILITY TO ADJUST THE HEATING AND COOLING SETPOINTS BY 3° IN EITHER DIRECTION, BUT MAINTAIN A MINIMUM 4° SPREAD BETWEEN THE HEATING AND COOLING SETPOINT. UNOCCUPIED SETTINGS SHALL BE 85° COOLING AND 60° HEATING. ALL SETPOINTS SHALL BE VERIFIED WITH THE OWNER BEFORE PROGRAMMING, AND FULLY ADJUSTABLE

DUCTLESS SPLIT SYSTEMS:

DUCTLESS SPLIT SYSTEM UNITS SHALL BE PROVIDED WITH STAND ALONE CONTROLS PROGRAMMABLE THERMOSTATS BY UNIT MANUFACTURER, SEPARATE FROM THE CENTRAL DDC SYSTEM. DDC VENDOR SHALL PROVIDE TEMPERATURE SENSOR FOR THOSE ROOMS THAT WILL ALARM DDC SYSTEM WHEN TEMPERATURE RANGE IS OUT OF LIMITS. INDOOR UNIT FANS SHALL BE STARTED AND STOPPED WITH THERMOSTAT CALL FOR COOLING. UPON A RISE IN SPACE TEMPERATURE ABOVE THERMOSTAT SETPOINT, UNIT COMPRESSOR SHALL ACTIVATE TO SATISFY SPACE CONDITIONS.



Ductless Split Systems

Fire Alarm Status

THE POINTS LIST PROVIDED IS INTENDED TO COMMUNICATE THE GENERAL DESIGN INTENT TO THE CONTROLS SUBCONTRACTOR AND IS NOT INTENDED TO BE COMPLETE. IN THE CONTROLS SUBMITTAL, THE SUBCONTRACTOR SHALL FULLY DEVELOP THE POINTS LIST FOR ALL SYSTEMS IDENTIFIED AND SHALL PRESENT ALL SETPOINTS, CONTROL PARAMETERS, AND ALARM POINTS. THE CONTROLS SUBCONTRACTOR SHALL INCORPORATE STANDARD FEATURES SUCH AS MINIMUM RUN TIME DELAYS AND DEAD BANDS FROM SETPOINTS TO PREVENT EQUIPMENT FROM SHORT CYCLING WHEN NEAR SETPOINTS. ALL MONITORED POINTS SHALL INCLUDE EARLY HIGH/LOW ALARM NOTIFICATIONS PRIOR TO HAVING TO TAKE CORRECTIVE ACTIONS OR EQUIPMENT SHUTDOWNS. TRANSMITTERS SHALL INCLUDE OUT-OF-RANGE, FAIL-SAFE POSITIONING FOR OPEN CIRCUITS OR LOSS OF COMMUNICATION. CONTROL CONTRACTOR SHALL SPECIFY TO FAIL DE-ENERGIZER, HOLD LAST STATE, OR DEFAULT TO A PREDETERMINED SETPOINT. THESE BASIC FEATURES THAT ARE NECESSARY AND ARE PART OF A COMPLETE CONTROLS INSTALLATION SHALL BE INCLUDED IN THE SCOPE OF SERVICES FOR DELIVERABLES AT NO ADDITIONAL COSTS TO THE OWNER.

CONTROL SYSTEM NOTES

- SEE SPECIFICATIONS FOR ADDITIONAL REQUIREMENTS.
- HVAC CONTROLS FOR CLASSROOM ADDITION PROJECT TO BE INTEGRATED INTO THE SCHOOLS EXISTING BAS. ALL POINTS AND EQUIPMENT TO BE ACCESSIBLE FROM THE EXISTING BAS FRONT END AS INDICATED WITH ADDITIONAL GRAPHICS FOR EQUIPMENT AND FLOORPLANS.

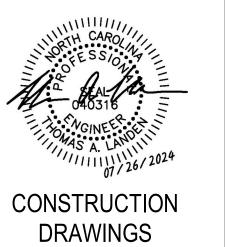
ALL CONTROL SETPOINTS SHALL BE ADJUSTABLE AND TRENDABLE BY THE USER AND

- MAINTENANCE DEPARTMENT. INDICATED SCHEDULES AND SETPOINTS SHOULD BE USED FOR ORIGINAL SYSTEM SET-UP. ANY CHANGES IN SETPOINT SETTINGS REQUIRED FOR INTENDED SYSTEM OPERATION SHALL BE APPROVED BY THE ENGINEER AND SHALL BE DISCREETLY INDICATED ON THE AS-BUILT DRAWINGS.
- CONTRACTOR AND WIRED TO SHUT-DOWN THE UNIT BY THE ELECTRICAL CONTRACTOR, INSTALLED IN THE DUCT BY THE MECHANICAL PHOTOELECTRIC TYPE DUCT SMOKE DETECTORS WILL BE PROVIDED BY THE CONTRACTOR.
- ELECTRICAL CONTRACTOR SHALL PROVIDE A DEDICATED 120V CIRCUIT IN A J-BOX FOR CONTROL POWER. CONTROLS CONTRACTOR SHALL EXTEND 120V POWER FROM J-BOX TO CONTROL PANELS, DAMPER ACTUATORS, TRANSFORMERS, ETC. AS REQUIRED FOR INSTALLATION OF THE CONTROL SYSTEM. ALL CONTROL TRANSFORMERS SHALL BE SEPARATELY INTERNALLY FUSED OR HAVE MANUAL RESETS.
- CONTROLS CONTRACTOR SHALL PROVIDE A MINIMUM OF 24 HOURS OF OWNER TRAINING PROVIDED BY A FACTORY CERTIFIED REPRESENTATIVE. COORDINATE THROUGH THE MECHANICAL CONTRACTOR AND CONSTRUCTION MANAGEMENT FIRM.
- ALL BAS CONTROLLERS ON CHILLERS, BOILERS, PUMPS AND AIR HANDLING UNITS SHALL HAVE MANUAL "ON/OFF" OVERRIDE SWITCHES, EITHER ON THE CONTROLLER OR THE PANEL LOCATED IN THE ROOM. SOFTWARE OVERRIDE ONLY IS NOT ACCEPTABLE.
- ALL CONTROL AND POWER WIRING SHALL BE PLENUM-RATED WITH A MINIMUM FIRE SPREAD

RATING OF 25 AND A MINIMUM SMOKE DEVELOPED RATING OF 50 PER ASTM E84.

- THE SEQUENCE OF OPERATION AND POINTS LIST IS INTENDED TO COMMUNICATE THE MINIMUM REQUIREMENTS AND GENERAL DESIGN INTENT TO THE CONTROLS CONTRACTOR AND IS NOT INTENDED TO BE A FULLY DEVELOPED OR COMPLETE SEQUENCE OF OPERATION. IN THE CONTROLS SUBMITTAL THE CONTROLS CONTRACTOR SHALL FULLY DEVELOP THE SEQUENCE OF OPERATIONS FOR ALL SYSTEMS IDENTIFIED AN SHALL PRESENT ALL SETPOINTS, CONTROL PARAMETERS, TIME DELAYS, ALARM POINTS, ETC. AS REQUIRED TO COMPLY WITH THE DESIGN INTENT. THE CONTROLS CONTRACTOR SHALL INCORPORATE STANDARD FEATURES SUCH AS MINIMUM RUN TIME DELAYS AND DEAD BANDS TO PREVENT SHORT CYCLING. ALL MONITORED POINTS SHALL INCLUDE EARLY HIGH/LOW ALARM NOTIFICATIONS PRIOR TO REQUIRED CORRECTIVE ACTIONS OR UNIT SHUT-DOWNS. CONTROL CONTRACTOR SHALL SPECIFY IN THE CONTROL SUBMITTAL FAIL SAFE POSITION FOR OUT OF RANGE, FAIL SAFE POSITIONING FOR OPEN CIRCUITS OR LOSS OF COMMUNICATION.
- 0. $\,$ Alarms through the bas system shall be visible on the individual graphics themselves, NOT ONLY ON THE SUMMARY PAGE.
- . LOCATE CONTROL HUBS FOR BAS IN MECHANICAL ROOM UTIL 107. COORDINATE EXACT LOCATION OF PANELS WITH ALL OTHER TRADES AND BUILDING OWNER'S FACILITIES DEPARTMENT PRIOR TO INSTALLATION.







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MECHANICAL CONTROL **DIAGRAMS**