

NEW YORK STATE BUILDING DEPARTMENT NOTES

ALL WORK SHALL COMPLY WITH APPLICABLE SECTIONS OF THE 2020 NEW YORK STATE ADOPTIONS OF THE INTERNATIONAL BUILDING, MECHANICAL, ENERGY CONSERVATION CONSTRUCTION CODE, ALL AMENDMENTS AND RULES AND REGULATIONS OF THE DEPARTMENT OF BUILDINGS TO DATE.

1. THESE PLANS ARE APPROVED ONLY FOR THE WORK INDICATED ON THE APPLICATION SPECIFICATION SHEET. ALL OTHER MATTERS SHOWN ARE NOT TO BE RELIED UPON OR TO BE CONSIDERED AS EITHER BEING APPROVED OR IN ACCORDANCE WITH APPLICABLE CODES.
2. TO THE BEST OF MY KNOWLEDGE, BELIEF AND PROFESSIONAL JUDGMENT, THESE PLANS AND SPECIFICATIONS ARE IN COMPLIANCE WITH THE 2020 INTERNATIONAL ENERGY CONSERVATION CONSTRUCTION CODE WITH AMENDMENTS.

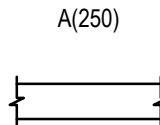
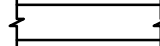
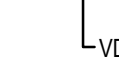
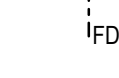
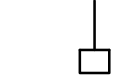
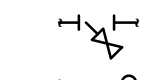
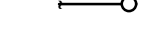
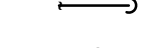

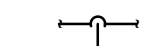
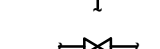
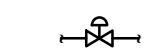
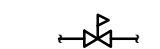
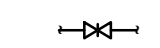



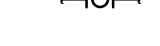
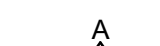


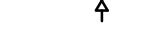
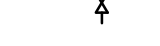


MECHANICAL NOTES

1. GENERAL
- A. PRIOR TO PROPOSAL SUBMISSION. THIS CONTRACTOR SHALL VISIT THE SITE TO REVIEW THE EXISTING CONDITIONS ASSOCIATED WITH THE SCOPE OF WORK AND ADJACENT AREAS TO ASCERTAIN THE DIFFICULTIES WHICH WILL AFFECT THE EXECUTION OF THE WORK OF THIS CONTRACT.
- B. SUBMISSION OF A PROPOSAL WILL BE CONSTRUED AS EVIDENCE THAT THE ABOVE SITE EXAMINATION HAS BEEN MADE AND LATER CLAIMS WILL NOT BE RECOGNIZED FOR EXTRA LABOR, EQUIPMENT OR MATERIALS REQUIRED BECAUSE OF DIFFICULTIES ENCOUNTERED WHICH COULD HAVE BEEN FORESEEN HAD SUCH AN EXAMINATION BEEN MADE.
2. SCOPE OF WORK.
- A. ALL EXISTING WORK REQUIRED TO REMAIN BUT INTERFERING WITH PROPOSED NEW MECHANICAL (AS WELL AS ELECTRICAL AND GENERAL CONSTRUCTION WORK) SHALL BE RELOCATED AND RECONNECTED USING MATERIALS CONFORMING TO STANDARDS OF THIS CONTRACT.
- B. ALL MATERIALS AND EQUIPMENT SHALL BE DISPOSED OF IN ACCORDANCE WITH APPLICABLE LAWS AND ENVIRONMENTAL REGULATIONS.
- C. COORDINATE WITH OWNER TO DETERMINE WHETHER EQUIPMENT IS TO BE TURNED OVER FOR FUTURE USE AND STORED IN THEIR ASSOCIATED STORAGE LOCATIONS.

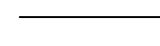
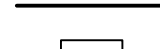
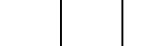

ABBREVIATIONS

ACUR	AIR CURTAIN (UNHEATED)
AD	ACCESS DOOR
AI	ANALOG INPUT (CONTROL POINT)
AFF	ABOVE FINISH FLOOR
AO	ANALOG OUTPUT (CONTROL POINT)
AS	AIR SEPARATOR
ATC	AUTOMATIC TEMPERATURE CONTROL
AV	ANALOG VALUE (CONTROL SOFTWARE POINT)
B	BOILER
BI	BINARY INPUT (CONTROL POINT)
BO	BINARY OUTPUT (CONTROL POINT)
BV	BINARY VALUE (CONTROL SOFTWARE POINT)
CFM	CUBIC FEET PER MINUTE
CD	CONDENSATE DRAIN
DD	DUCT DETECTOR
DDC	DIRECT DIGITAL CONTROLLER
DN	DOWN
DPS	DIFFERENTIAL PRESSURE SWITCH
DPT	DIFFERENTIAL PRESSURE TRANSDUCER
DSF	DESTRATIFICATION FAN
EC	ELECTRICAL CONTRACTOR
ESP	EXTERNAL STATIC PRESSURE
ET	EXPANSION TANK
F	FAN
FD	FIRE DAMPER
FSD	COMBINATION FIRE SMOKE DAMPER
FTR	FINNED TUBE RADIATOR (HOT WATER)
GC	GENERAL CONTRACTOR
GXF	GENERAL EXHAUST FAN
HWP	HOT WATER PUMP
HWMF	HOT WATER MANIFOLD (RADIANT FLOOR HEATING)
HWS&R	HOT WATER SUPPLY & RETURN
HWUH	HOT WATER UNIT HEATER
HV	HEATING & VENTILATING UNIT
LD	LEAK DETECTOR
MC	MECHANICAL CONTRACTOR
MD	MOTORIZED DAMPER
N.C.	NORMALLY CLOSED (FAIL STATE)
N.O.	NORMALLY OPEN (FAIL STATE)
OED	OPEN ENDED DUCT
PC	PUMPED CONDENSATE
RAG	RETURN AIR GRILLE
RAD	RETURN AIR DUCT
RF	RADIANT FLOOR HEATING
RTAC	ROOFTOP AIR CONDITIONING UNIT
SAG	SUPPLY AIR GRILLE
SD	SMOKE DAMPER
SHV	SMOKE HEAT VENT
TF	TRANSFER FAN
TXF	TOILET EXHAUST FAN
V	VENT
VAV	VARIABLE AIR VOLUME (BOX, AHU OR AC UNIT)
VAV-HW	VARIABLE AIR VOLUME BOX WITH HOT WATER COIL
VD	VOLUME DAMPER (OPPOSED BLADE DAMPER)
VFD	VARIABLE FREQUENCY DRIVE

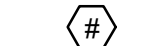
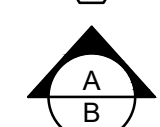




MECHANICAL LEGEND & SYMBOLS

	A(250) DIFFUSER TYPE AND CFM (CUBIC FEET PER MINUTE). REFER TO SCHEDULE.
	DOUBLE LINE DUCT
	VOLUME DAMPER
	FIRE DAMPER WITH DUCT ACCESS DOOR
	MOTORIZED DAMPER
	STRAINER WITH BLOW DOWN VALVE
	ELBOW TURNED UP
	ELBOW TURNED DOWN
	BOTTOM PIPE CONNECTION
	TOP PIPE CONNECTION
	GATE VALVE
	TWO-WAY CONTROL VALVE (ELECTRONIC)
	PRESSURE REDUCING VALVE
	COMBINATION BALANCING VALVE AND METER STATION
	CHECK VALVE
	BUTTERFLY VALVE
	BALL VALVE
	UNION
	AUTOMATIC AIR VENT
	MANUAL AIR VENT
	THERMOMETER WITH SHUTOFF VALVE
	PRESSURE GAUGE WITH SHUTOFF VALVE
	VACUUM BREAKER
	PIPE ANCHOR
	PIPE GUIDE

LINE REPRESENTATION

	EXISTING DUCTWORK/PIPING
	NEW DUCTWORK
	EXISTING MECHANICAL EQUIPMENT
	NEW MECHANICAL EQUIPMENT

DRAWING NOTATIONS

	KEYED NOTE
	SECTION DESIGNATION ON DRAWING WHERE SECTION IS CUT A-SECTION DESIGNATION B-DRAWING NO.
	POINT OF NEW CONNECTION TO EXISTING WORK
	POINT OF DEMOLITION
	REMOVE AND PATCH EXISTING WORK
	REVISION SYMBOL

MECHANICAL DRAWING LIST

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MANHATTAN BEER DISTRIBUTORS  
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SUFFERN, NEW YORK

KEY PLAN

REV	DESCRIPTION	DATE
	ISSUED FOR DOB SUBMISSION	09/10/2021
	ISSUED FOR BID	10/15/2021
	ISSUED FOR PROGRESS	01/18/2022

DRAWN BY :
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DATE :
SCALE :

DRAWING TITLE :

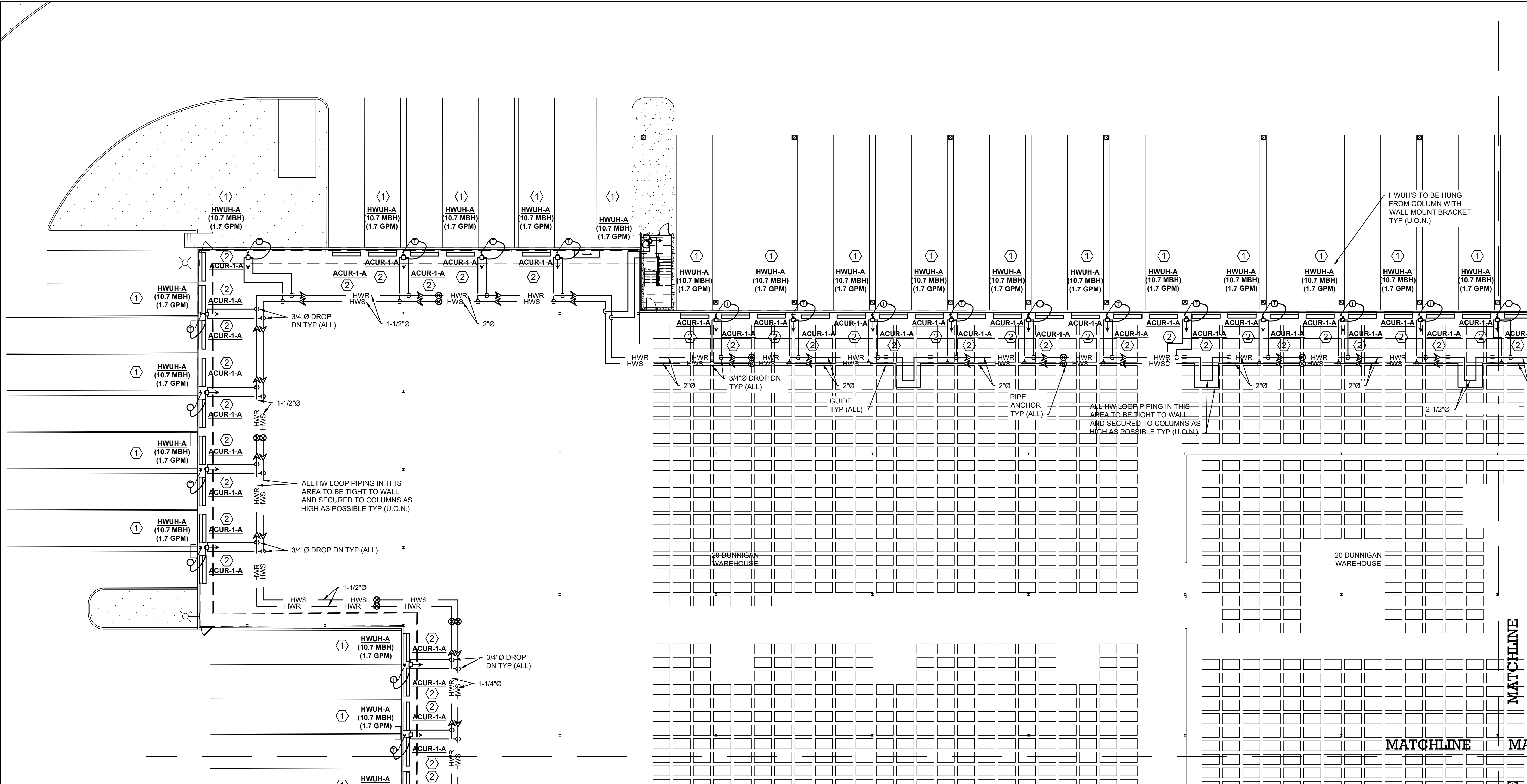
MECHANICAL ABBREVIATIONS,  
LEGEND, NOTES & SYMBOLS

DWG NUMBER :

M-001

TO THE BEST KNOWLEDGE, BELIEF AND PROFESSIONAL JUDGEMENT,  
THESE PLANS AND SPECIFICATIONS ARE IN COMPLIANCE WITH THE 2020  
ENERGY CONSERVATION CONSTRUCTION CODE OF NEW YORK STATE.





1  
M-101

## MECHANICAL L1 WAREHOUSE HEAT PLAN QUADRANT 1

SCALE: 1/16" = 1'-0"



### GENERAL MECHANICAL NOTES:

- ALL WORK SHALL CONFORM TO THE LATEST BUILDING STANDARDS. IT IS THE RESPONSIBILITY OF THE CONTRACTOR TO OBTAIN A COPY OF THE BUILDING STANDARDS AND MEET WITH BUILDING MANAGEMENT IN ORDER TO BECOME TOTALLY FAMILIAR WITH THE BUILDING CONSTRUCTION RULES. THERE SHALL BE NO DEVIATION FROM THE BUILDING STANDARDS WITHOUT PRIOR WRITTEN APPROVAL FROM THE BUILDING MANAGEMENT.
- WHEN MECHANICAL WORK IS SUBCONTRACTED IT SHALL BE THE MECHANICAL CONTRACTORS RESPONSIBILITY TO COORDINATE SUBCONTRACTORS AND THE ASSOCIATED CONTRACTS. WHEN DISCREPANCIES ARISE PERTAINING TO WHICH CONTRACTOR PROVIDES A PARTICULAR ITEM OF THE MECHANICAL CONTRACT OR WHICH CONTRACTOR PROVIDES FINAL CONNECTIONS FOR A PARTICULAR ITEM OF THE MECHANICAL CONTRACT, IT SHALL BE BROUGHT TO THE ATTENTION OF THE MECHANICAL CONTRACTOR, WHOSE DECISION SHALL BE FINAL.
- ALL MISCELLANEOUS STEEL REQUIRED TO ENSURE PROPER INSTALLATION AND AS SHOWN IN DETAILS FOR PIPING, DUCTWORK, AND EQUIPMENT SHALL BE FURNISHED AND INSTALLED BY THE MECHANICAL CONTRACTOR AND COORDINATED WITH THE GENERAL CONTRACTOR FOR COORDINATION AMONG ALL TRADES.
- FURNISH & INSTALL ALL MATERIALS, EQUIPMENT AND PERFORM ALL LABOR

- REQUIRED TO INSTALL COMPLETE MECHANICAL SYSTEMS AS INDICATED ON THE DRAWINGS, AS SPECIFIED AND AS REQUIRED BY CODE.
- INSTALL ALL MECHANICAL EQUIPMENT AND APPURTENANCES IN ACCORDANCE WITH MANUFACTURERS' RECOMMENDATIONS, CONTRACT DOCUMENTS, AND APPLICABLE CODES AND REGULATIONS.
  - FURNISH & INSTALL VIBRATION ISOLATORS FOR ALL PIPING SUPPORTS CONNECTED TO AND WITHIN 50 FEET OR 50 PIPE DIAMETERS IF ISOLATED EQUIPMENT REFER TO SPECIFICATIONS FOR EXACT REQUIREMENTS OF ALL PIPING, DUCTWORK AND EQUIPMENT VIBRATION ISOLATION.
  - LOCATE ALL TEMPERATURE, PRESSURE AND FLOW MEASURING DEVICES IN ACCESSIBLE LOCATIONS WITH STRAIGHT SECTION OF PIPE OR DUCT UP- AND DOWNSTREAM AS RECOMMENDED BY THE MANUFACTURER.
  - COORDINATE ALL EQUIPMENT CONNECTIONS WITH MANUFACTURER'S CERTIFIED DRAWINGS. COORDINATE AND PROVIDE ALL DUCT AND PIPING TRANSITIONS REQUIRED FOR THE FINAL EQUIPMENT CONNECTIONS TO FURNISHED EQUIPMENT. FIELD VERIFY COORDINATE ALL DUCT AND PIPING DIMENSIONS BEFORE FABRICATIONS.
  - THE LOCATIONS OF ALL ITEMS SHOWN ON THE DRAWINGS OR CALLED FOR IN THE SPECIFICATIONS THAT ARE NOT DEFINITELY FIXED BY DIMENSIONS ARE

- APPROXIMATELY ONLY. THE EXACT LOCATIONS NECESSARY TO SECURE THE BEST CONDITIONS AND RESULTS MUST BE DETERMINED BY THE PROJECT SITE CONDITIONS AND SHALL HAVE THE APPROVAL OF THE ENGINEER BEFORE BEING INSTALLED. DO NOT SCALE DRAWINGS.
- CERTAIN ITEMS SUCH AS RISERS AND DROPS IN DUCTWORK, ACCESS DOORS, VOLUME DAMPERS, ETC., ARE INDICATED ON THE CONTRACT DOCUMENT DRAWINGS FOR CLARITY FOR A SPECIFIC LOCATION REQUIREMENT AND SHALL NOT BE INTERPRETED AS THE EXTENT OF THE REQUIREMENTS FOR THESE ITEMS. LOCATIONS OF ALL SUCH ITEMS SHALL BE INDICATED ON SHOP DRAWINGS BY THE INSTALLING CONTRACTOR FOR REVIEW AND APPROVAL DURING THE SHOP DRAWING PROCESS.
  - INSTALL PIPING SO THAT ALL VALVES, STRAINERS, UNIONS, TRAPS, FLANGES, AND OTHER APPURTENANCES REQUIRING ACCESS ARE ACCESSIBLE.

### KEYED NOTES: (#)

- CONTRACTOR SHALL FURNISH & INSTALL HYDRONIC UNIT HEATER AS SCHEDULED & SHOWN ON PLAN. FINAL UNIT HEATER LOCATION TO BE WALL/COLUMN MOUNTED WITH BRACKET OR HUNG FROM STRUCTURAL BEAM.
- CONTRACTOR SHALL FURNISH & INSTALL ELECTRONIC AIR CURTAIN AS SCHEDULED & SHOWN ON PLAN. FINAL AIR CURTAIN LOCATION TO BE COORDINATED WITH AUTOMATIC DOOR ASSEMBLY.

TO THE BEST KNOWLEDGE, BELIEF AND PROFESSIONAL JUDGEMENT, THESE PLANS AND SPECIFICATIONS ARE IN COMPLIANCE WITH THE 2020 ENERGY CONSERVATION CONSTRUCTION CODE OF NEW YORK STATE.

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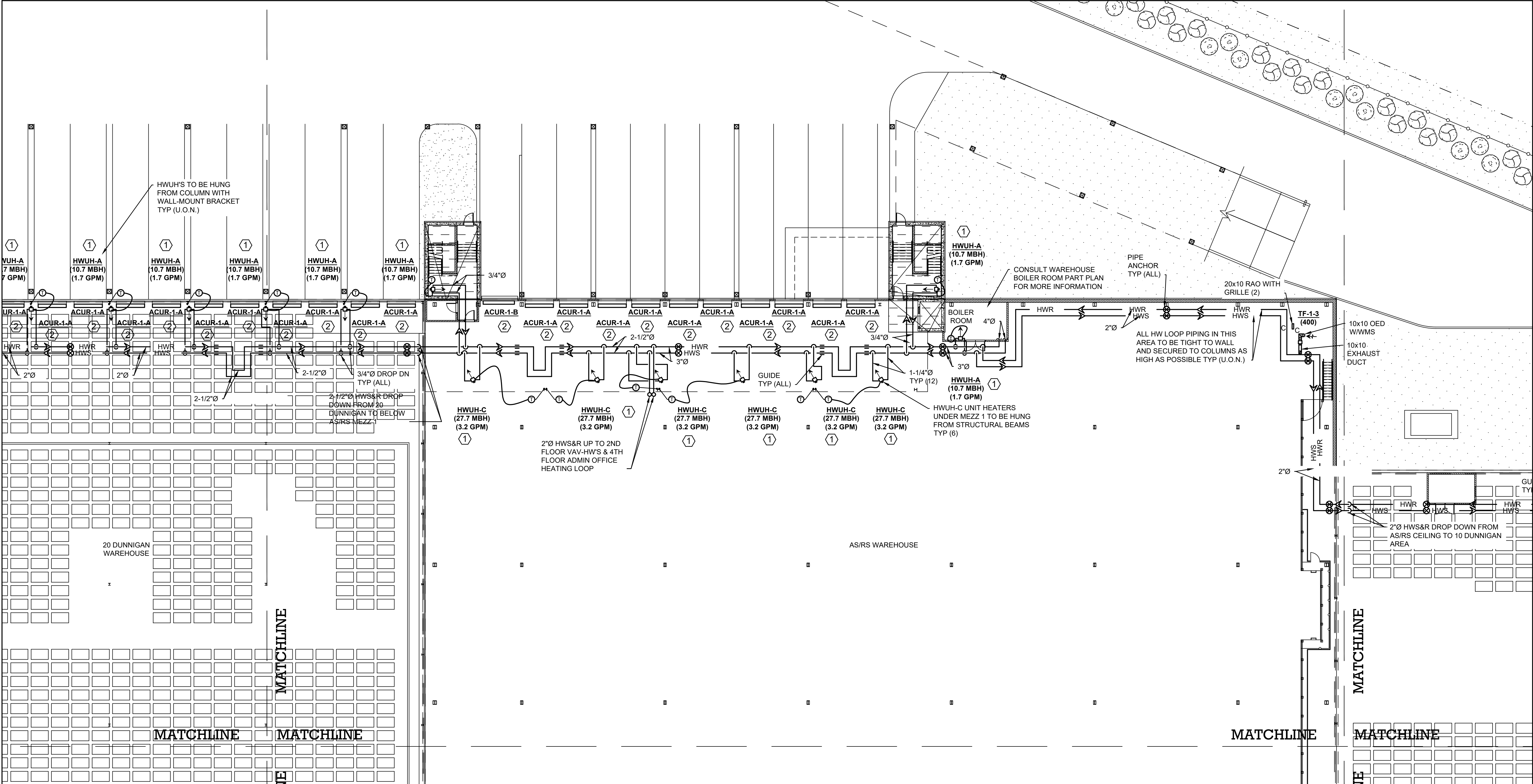
DRAWING TITLE :

**MECHANICAL L1 WAREHOUSE  
HEAT PLAN QUADRANT 1**

DWG NUMBER :

**M-101**





1  
M-102

## MECHANICAL L1 WAREHOUSE HEAT PLAN QUADRANT 2

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#### CIVIL PLANNING ENGINEER



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Architecture & Land Surveying, PLLC  
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#### MEP ENGINEER



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New York, New York 10001  
Tel 212-962-3503

#### STRUCTURAL ENGINEER



GEI50  
1385 Broadway, 20th FL  
New York, New York 10018  
Tel 212-687-8282



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#### KEY PLAN

REV	DESCRIPTION	DATE
	ISSUED FOR DOB SUBMISSION	09/10/2021
	ISSUED FOR BID	10/15/2021
	ISSUED FOR PROGRESS	01/18/2022

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DATE :

SCALE :

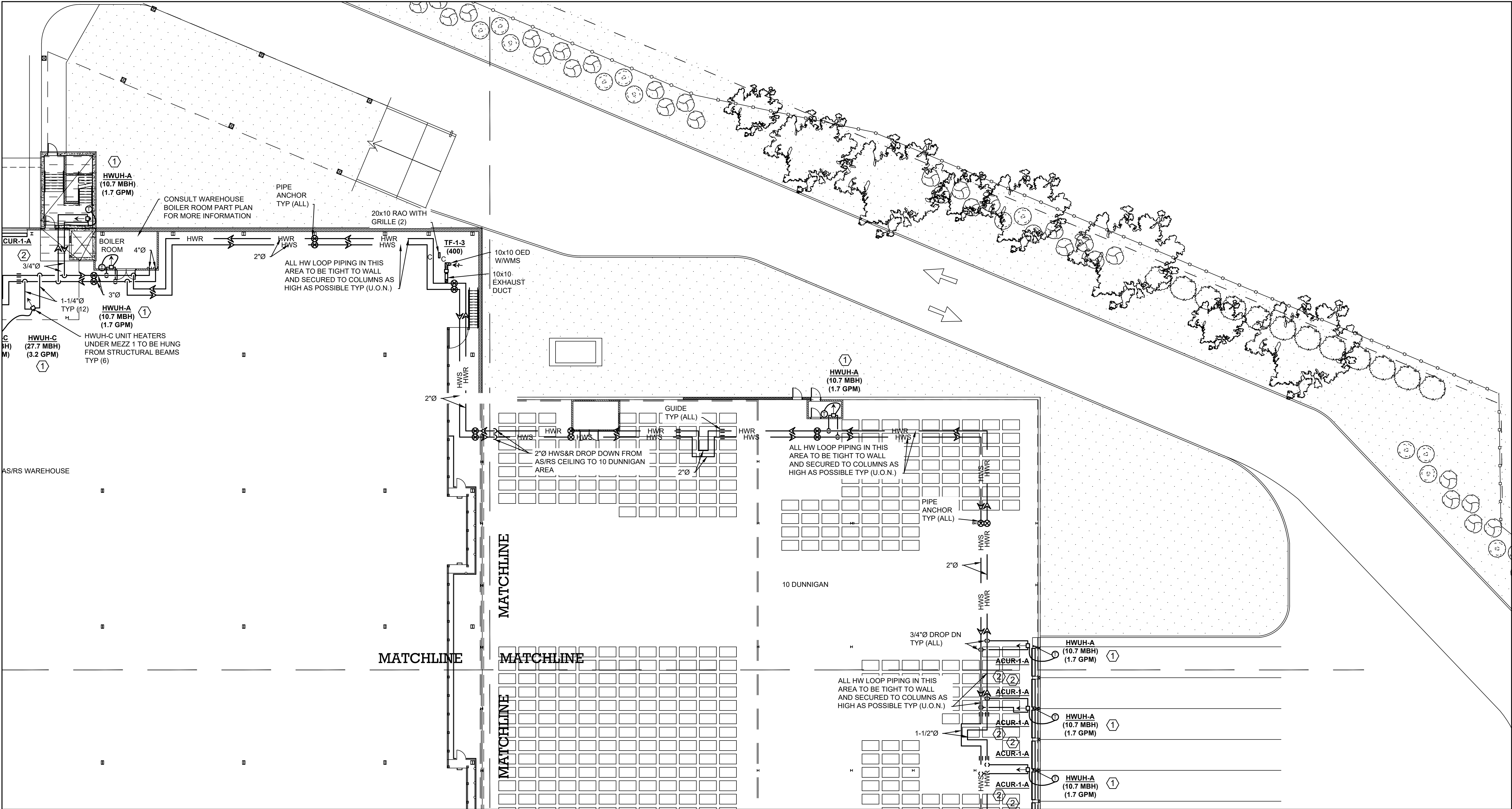
DRAWING TITLE :

MECHANICAL L1 WAREHOUSE  
HEAT PLAN QUADRANT 2

DWG NUMBER :

M-102





1 MECHANICAL L1 WAREHOUSE HEAT PLAN QUADRANT 3  
M-103 SCALE: 1/16" = 1'-0"

GENERAL MECHANICAL NOTES:

- ALL WORK SHALL CONFORM TO THE LATEST BUILDING STANDARDS. IT IS THE RESPONSIBILITY OF THE CONTRACTOR TO OBTAIN A COPY OF THE BUILDING STANDARDS AND MEET WITH BUILDING MANAGEMENT IN ORDER TO BECOME TOTALLY FAMILIAR WITH THE BUILDING CONSTRUCTION RULES. THERE SHALL BE NO DEVIATION FROM THE BUILDING STANDARDS WITHOUT PRIOR WRITTEN APPROVAL FROM THE BUILDING MANAGEMENT.
- WHEN MECHANICAL WORK IS SUBCONTRACTED IT SHALL BE THE MECHANICAL CONTRACTORS RESPONSIBILITY TO COORDINATE SUBCONTRACTORS AND THE ASSOCIATED CONTRACTS. WHEN DISCREPANCIES ARISE PERTAINING TO WHICH CONTRACTOR PROVIDES A PARTICULAR ITEM OF THE MECHANICAL CONTRACT OR WHICH CONTRACTOR PROVIDES FINAL CONNECTIONS FOR A PARTICULAR ITEM OF THE MECHANICAL CONTRACT, IT SHALL BE BROUGHT TO THE ATTENTION OF THE MECHANICAL CONTRACTOR, WHOSE DECISION SHALL BE FINAL.
- ALL MISCELLANEOUS STEEL REQUIRED TO ENSURE PROPER INSTALLATION AND AS SHOWN IN DETAILS FOR PIPING, DUCTWORK, AND EQUIPMENT SHALL BE FURNISHED AND INSTALLED BY THE MECHANICAL CONTRACTOR AND COORDINATED WITH THE GENERAL CONTRACTOR FOR COORDINATION AMONG ALL TRADES.
- FURNISH & INSTALL ALL MATERIALS, EQUIPMENT AND PERFORM ALL LABOR

- REQUIRED TO INSTALL COMPLETE MECHANICAL SYSTEMS AS INDICATED ON THE DRAWINGS, AS SPECIFIED AND AS REQUIRED BY CODE.
- INSTALL ALL MECHANICAL EQUIPMENT AND APPURTENANCES IN ACCORDANCE WITH MANUFACTURER'S RECOMMENDATIONS, CONTRACT DOCUMENTS, AND APPLICABLE CODES AND REGULATIONS.
- FURNISH & INSTALL VIBRATION ISOLATORS FOR ALL PIPING SUPPORTS CONNECTED TO AND WITHIN 50 FEET OR 50 PIPE DIAMETERS IF ISOLATED EQUIPMENT REFER TO SPECIFICATIONS FOR EXACT REQUIREMENTS OF ALL PIPING, DUCTWORK AND EQUIPMENT VIBRATION ISOLATION.
- LOCATE ALL TEMPERATURE, PRESSURE AND FLOW MEASURING DEVICES IN ACCESSIBLE LOCATIONS WITH STRAIGHT SECTION OF PIPE OR DUCT UP- AND DOWNSTREAM AS RECOMMENDED BY THE MANUFACTURER.
- COORDINATE ALL EQUIPMENT CONNECTIONS WITH MANUFACTURER'S CERTIFIED DRAWINGS. COORDINATE AND PROVIDE ALL DUCT AND PIPING TRANSITIONS REQUIRED FOR THE FINAL EQUIPMENT CONNECTIONS TO FURNISHED EQUIPMENT. FIELD VERIFY COORDINATE ALL DUCT AND PIPING DIMENSIONS BEFORE FABRICATIONS.
- THE LOCATIONS OF ALL ITEMS SHOWN ON THE DRAWINGS OR CALLED FOR IN THE SPECIFICATIONS THAT ARE NOT DEFINITELY FIXED BY DIMENSIONS ARE

- APPROXIMATELY ONLY. THE EXACT LOCATIONS NECESSARY TO SECURE THE BEST CONDITIONS AND RESULTS MUST BE DETERMINED BY THE PROJECT SITE CONDITIONS AND SHALL HAVE THE APPROVAL OF THE ENGINEER BEFORE BEING INSTALLED. DO NOT SCALE DRAWINGS.
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- INSTALL PIPING SO THAT ALL VALVES, STRAINERS, UNIONS, TRAPS, FLANGES, AND OTHER APPURTENANCES REQUIRING ACCESS ARE ACCESSIBLE.

KEYED NOTES: (#)

- CONTRACTOR SHALL FURNISH & INSTALL HYDRONIC UNIT HEATER AS SCHEDULED & SHOWN ON PLAN. FINAL UNIT HEATER LOCATION TO BE WALL/COLUMN MOUNTED WITH BRACKET OR HUNG FROM STRUCTURAL BEAM.
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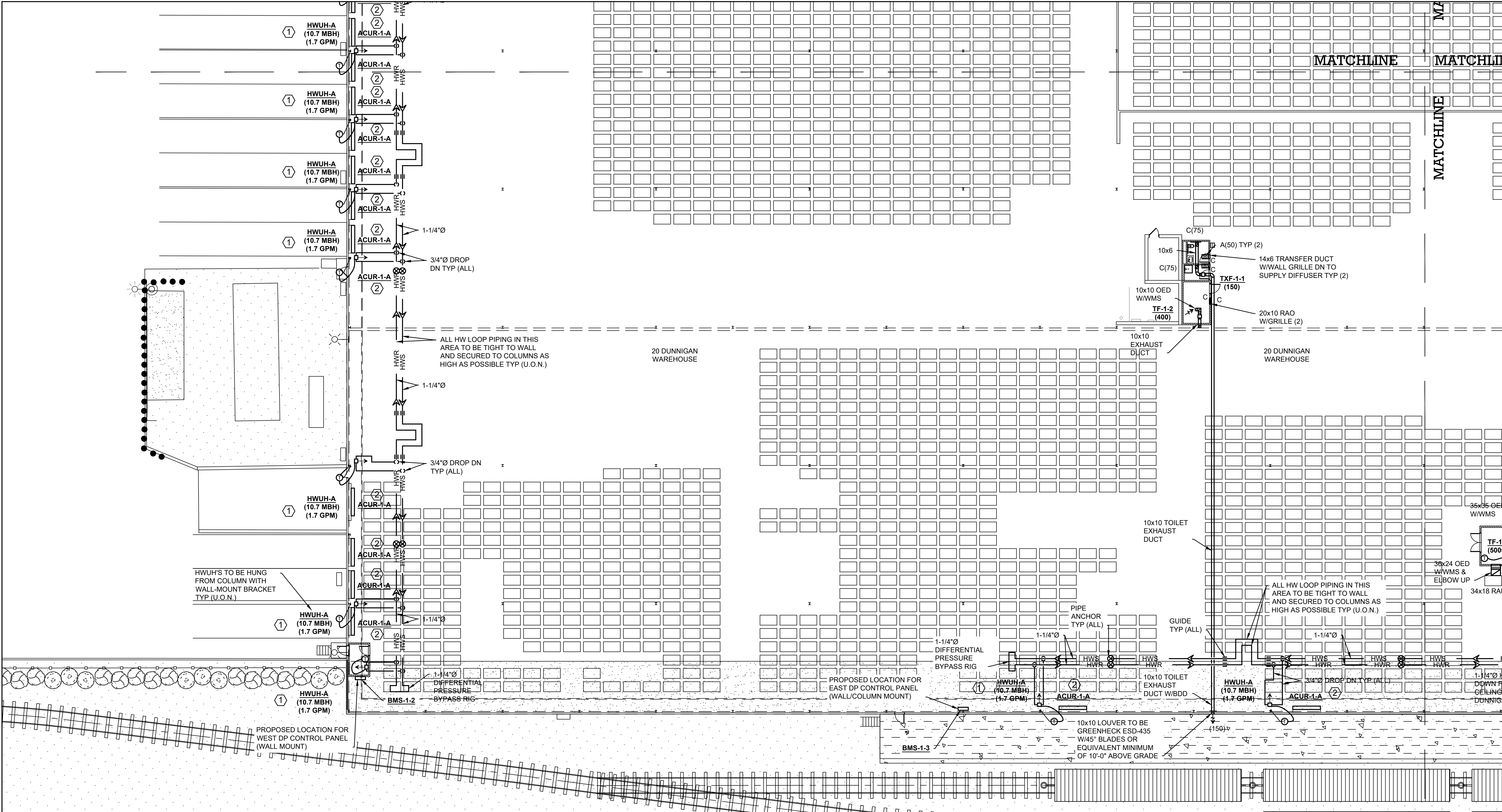
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DRAWING TITLE :  
**MECHANICAL L1 WAREHOUSE  
HEAT PLAN QUADRANT 3**

DWG NUMBER :  
**M-103**





1  
M-104

**MECHANICAL L1 WAREHOUSE HEAT PLAN QUADRANT 4**  
SCALE: 1/16" = 1'-0"



**GENERAL MECHANICAL NOTES:**

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**KEYED NOTES:** (#)

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KEY PLAN

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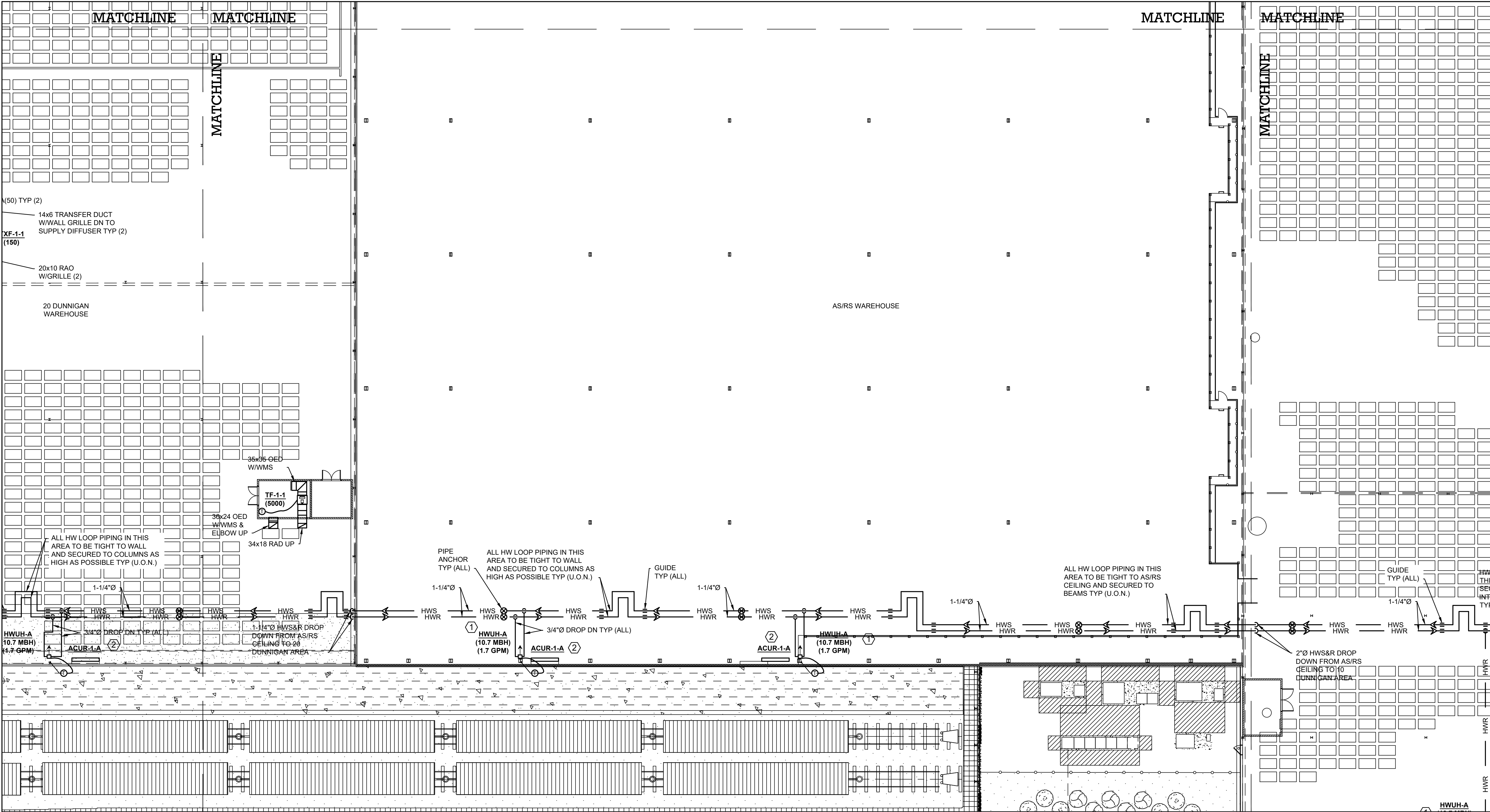
DRAWING TITLE :

**MECHANICAL L1 WAREHOUSE  
HEAT PLAN QUADRANT 4**

DWG NUMBER :

**M-104**





**GENERAL MECHANICAL NOTES:**

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**KEYED NOTES: (#)**

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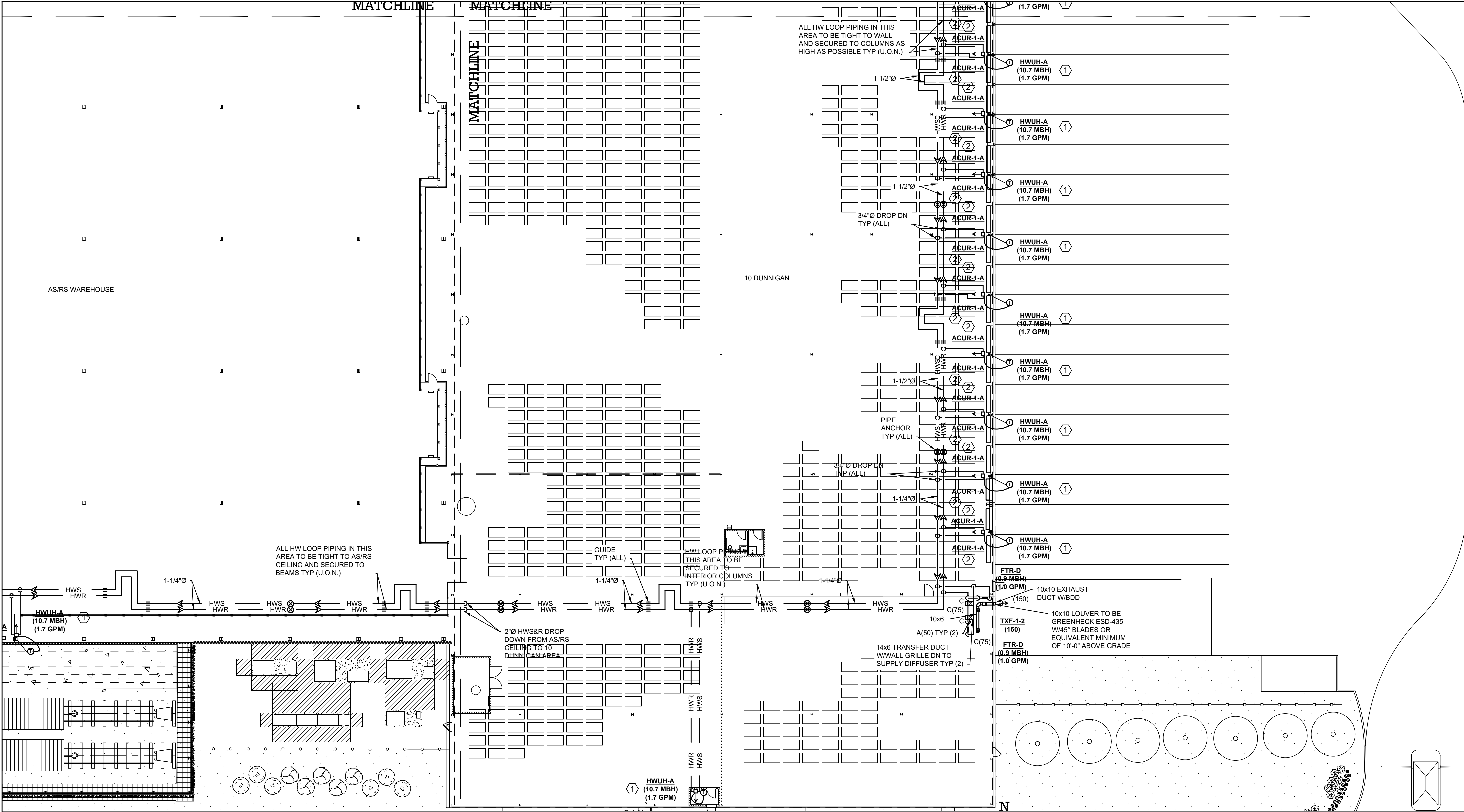
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DATE :  
SCALE :  
DRAWING TITLE :

MECHANICAL L1 WAREHOUSE  
HEAT PLAN QUADRANT 5

DWG NUMBER :  
  
**M-105**





1 MECHANICAL L1 WAREHOUSE HEAT PLAN QUADRANT 6  
M-106 SCALE: 1/16" = 1'-0"

GENERAL MECHANICAL NOTES:

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MECHANICAL L1 WAREHOUSE  
HEAT PLAN QUADRANT 6

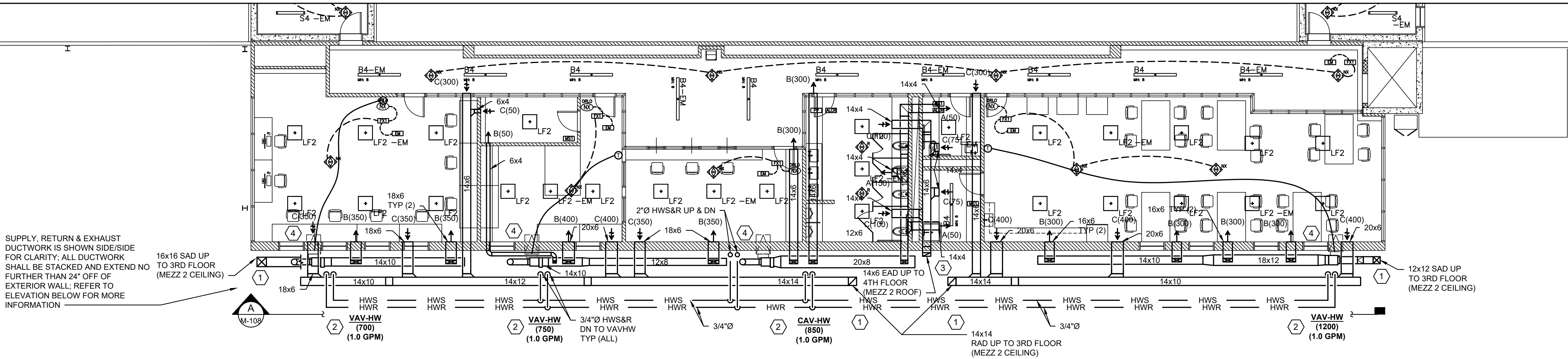
DWG NUMBER :

M-106









GENERAL MECHANICAL NOTES:

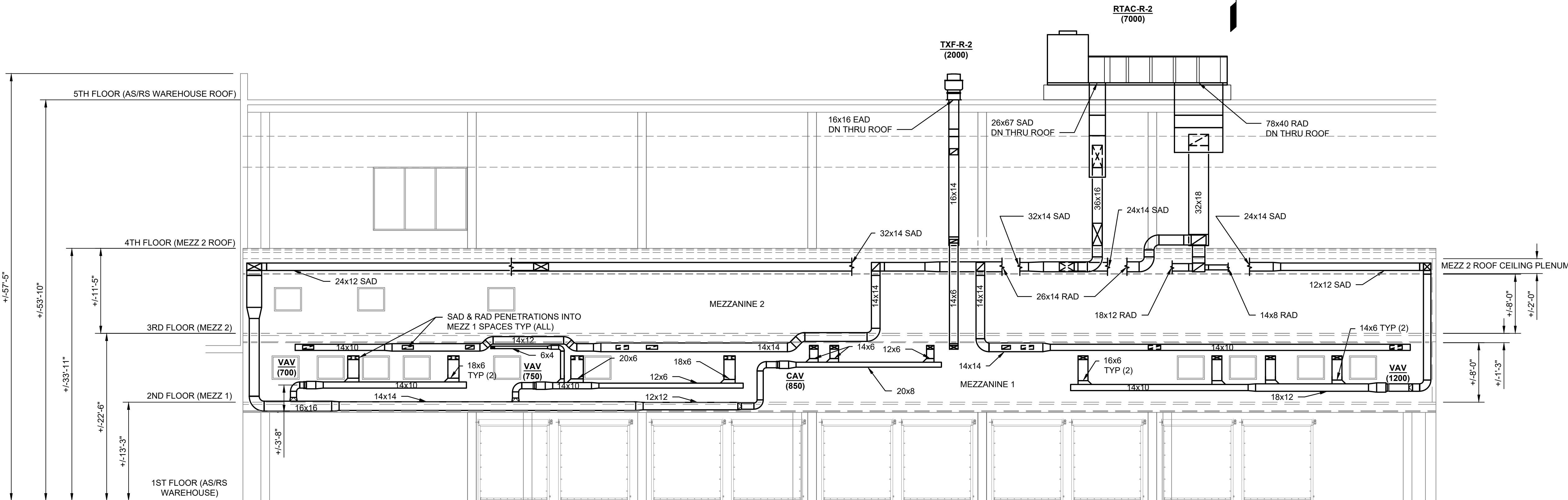
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- LOCATE ALL TEMPERATURE, PRESSURE AND FLOW MEASURING DEVICES IN ACCESSIBLE LOCATIONS WITH STRAIGHT SECTION OF PIPE OR DUCT UP- AND DOWNSTREAM AS RECOMMENDED BY THE MANUFACTURER.
- COORDINATE ALL EQUIPMENT CONNECTIONS WITH MANUFACTURER'S CERTIFIED DRAWINGS. COORDINATE AND PROVIDE ALL DUCT AND PIPING TRANSITIONS REQUIRED FOR THE FINAL EQUIPMENT CONNECTIONS TO FURNISHED EQUIPMENT. FIELD VERIFY COORDINATE ALL DUCT AND PIPING DIMENSIONS BEFORE FABRICATIONS.
- THE LOCATIONS OF ALL ITEMS SHOWN ON THE DRAWINGS OR CALLED FOR IN THE SPECIFICATIONS THAT ARE NOT DEFINITELY FIXED BY DIMENSIONS

- ARE APPROXIMATELY ONLY. THE EXACT LOCATIONS NECESSARY TO SECURE THE BEST CONDITIONS AND RESULTS MUST BE DETERMINED BY THE PROJECT SITE CONDITIONS AND SHALL HAVE THE APPROVAL OF THE ENGINEER BEFORE BEING INSTALLED. DO NOT SCALE DRAWINGS.
- CERTAIN ITEMS SUCH AS RISERS AND DROPS IN DUCTWORK, ACCESS DOORS, VOLUME DAMPERS, ETC., ARE INDICATED ON THE CONTRACT DOCUMENT DRAWINGS FOR CLARITY FOR A SPECIFIC LOCATION REQUIREMENT AND SHALL NOT BE INTERPRETED AS THE EXTENT OF THE REQUIREMENTS FOR THESE ITEMS. LOCATIONS OF ALL SUCH ITEMS SHALL BE INDICATED ON SHOP DRAWINGS BY THE INSTALLING CONTRACTOR FOR REVIEW AND APPROVAL DURING THE SHOP DRAWING PROCESS.
  - INSTALL PIPING SO THAT ALL VALVES, STRAINERS, UNIONS, TRAPS, FLANGES, AND OTHER APPURTENANCES REQUIRING ACCESS ARE ACCESSIBLE.

KEYED NOTES:

- CONTRACTOR TO FURNISH & INSTALL SUPPLY & RETURN DUCTWORK AS SHOWN ON PLAN. ALL DUCTWORK TO BE INTERNALLY LINED AND COORDINATED WITH PIPING AND VAV BOXES. ALL DUCTWORK EXTERNAL TO MEZZANINE 1 TO BE STACKED AND SHALL EXTEND NO FURTHER THAN 24" OFF OF MEZZANINE EXTERNAL WALL. CONSULT MECHANICAL ELEVATION BELOW FOR MORE INFORMATION.
- CONTRACTOR SHALL FURNISH & INSTALL VARIABLE AIR VOLUME BOX WITH HOT WATER REHEAT COILS (VAV-HW & CAV-HW) SUPPLY DUCTWORK, PIPING & DIFFUSERS AS SHOWN ON PLAN & SCHEDULED. FURNISH & INSTALL DDC CONTROLLER WITH ROOM SENSOR FOR BOX. REFER TO MECHANICAL CONTROL DIAGRAM FOR MORE INFORMATION.
- CONTRACTOR SHALL FURNISH & INSTALL EXHAUST DUCTWORK UP TO WAREHOUSE 3RD FLOOR (MEZZ 2). REFER TO L3 WAREHOUSE NEW DUCT & HEAT PLAN FOR MORE INFORMATION.
- CONTRACTOR SHALL FURNISH & INSTALL 24x24 WALL-MOUNTED ACCESS DOOR IN MEZZANINE EXTERIOR WALL TO ACCESS VAV BOX CONTROLS & PIPING; COORDINATE FINAL ACCESS DOOR LOCATION WITH VAVHW BOX LOCATION.

1 MECHANICAL L2 WAREHOUSE MEZZ 1 DUCT & HEAT PLAN  
SCALE: 1/8" = 1'-0"



2 ELEVATION A - MECHANICAL L2 THRU L5 DUCTWORK ROUTING  
SCALE: 1/8" = 1'-0"

TO THE BEST KNOWLEDGE, BELIEF AND PROFESSIONAL JUDGEMENT, THESE PLANS AND SPECIFICATIONS ARE IN COMPLIANCE WITH THE 2020 ENERGY CONSERVATION CONSTRUCTION CODE OF NEW YORK STATE.

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	ISSUED FOR BID	10/15/2021
	ISSUED FOR PROGRESS	01/18/2022

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CHECKED BY :

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DATE :

SCALE :

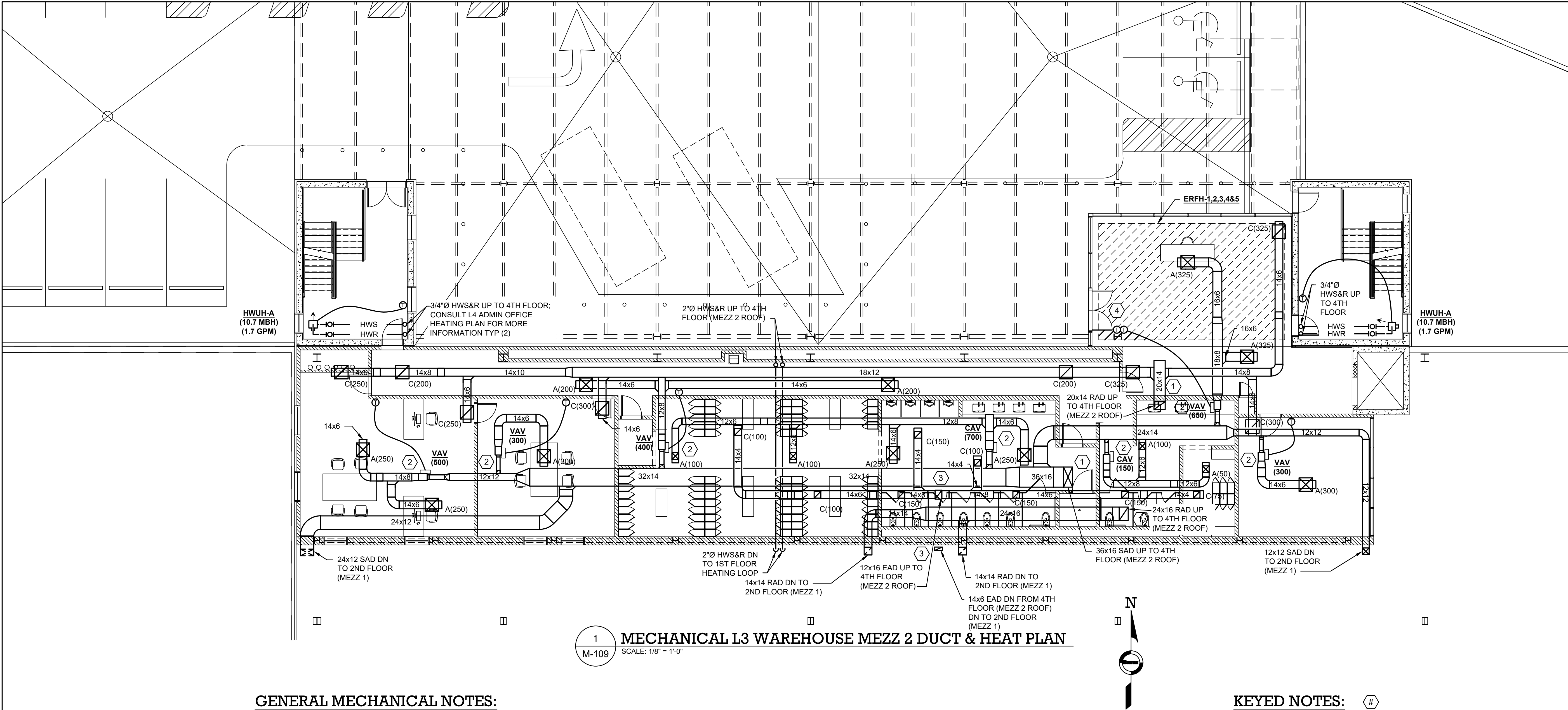
DRAWING TITLE :

MECHANICAL L2 WAREHOUSE  
MEZZ 1 DUCT & HEAT PLAN

DWG NUMBER :

M-108





1  
M-109  
MECHANICAL L3 WAREHOUSE MEZZ 2 DUCT & HEAT PLAN  
SCALE: 1/8" = 1'-0"

GENERAL MECHANICAL NOTES:

- ALL WORK SHALL CONFORM TO THE LATEST BUILDING STANDARDS. IT IS THE RESPONSIBILITY OF THE CONTRACTOR TO OBTAIN A COPY OF THE BUILDING STANDARDS AND MEET WITH BUILDING MANAGEMENT IN ORDER TO BECOME TOTALLY FAMILIAR WITH THE BUILDING CONSTRUCTION RULES. THERE SHALL BE NO DEVIATION FROM THE BUILDING STANDARDS WITHOUT PRIOR WRITTEN APPROVAL FROM THE BUILDING MANAGEMENT.
- WHEN MECHANICAL WORK IS SUBCONTRACTED IT SHALL BE THE MECHANICAL CONTRACTORS RESPONSIBILITY TO COORDINATE SUBCONTRACTORS AND THE ASSOCIATED CONTRACTS. WHEN DISCREPANCIES ARISE PERTAINING TO WHICH CONTRACTOR PROVIDES A PARTICULAR ITEM OF THE MECHANICAL CONTRACT OR WHICH CONTRACTOR PROVIDES FINAL CONNECTIONS FOR A PARTICULAR ITEM OF THE MECHANICAL CONTRACT. IT SHALL BE BROUGHT TO THE ATTENTION OF THE MECHANICAL CONTRACTOR, WHOSE DECISION SHALL BE FINAL.
- ALL MISCELLANEOUS STEEL REQUIRED TO ENSURE PROPER INSTALLATION AND AS SHOWN IN DETAILS FOR PIPING, DUCTWORK, AND EQUIPMENT SHALL BE FURNISHED AND INSTALLED BY THE MECHANICAL CONTRACTOR AND COORDINATED WITH THE GENERAL CONTRACTOR FOR COORDINATION AMONG ALL TRADES.
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KEYED NOTES:

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- CONTRACTOR SHALL FURNISH & INSTALL VARIABLE AIR VOLUME (VAV) BOX WITH SUPPLY DUCTWORK & DIFFUSERS AS SHOWN ON PLAN & SCHEDULED. FURNISH & INSTALL DDC CONTROLLER WITH ROOM SENSOR FOR BOX; REFER TO MECHANICAL CONTROL DIAGRAM FOR MORE INFORMATION.
- CONTRACTOR SHALL FURNISH & INSTALL EXHAUST DUCTWORK UP TO WAREHOUSE 4TH FLOOR. REFER TO L4 WAREHOUSE NEW DUCT & HEAT PLAN FOR MORE INFORMATION.
- CONTRACTOR SHALL FURNISH & INSTALL ELECTRIC RADIANT FLOOR HEATING CABLE IN RECEPTION LOBBY CONCRETE SLAB. INSTALL PER MANUFACTURER'S RECOMMENDATIONS AND COORDINATE WITH ELECTRICAL CONTRACTOR.

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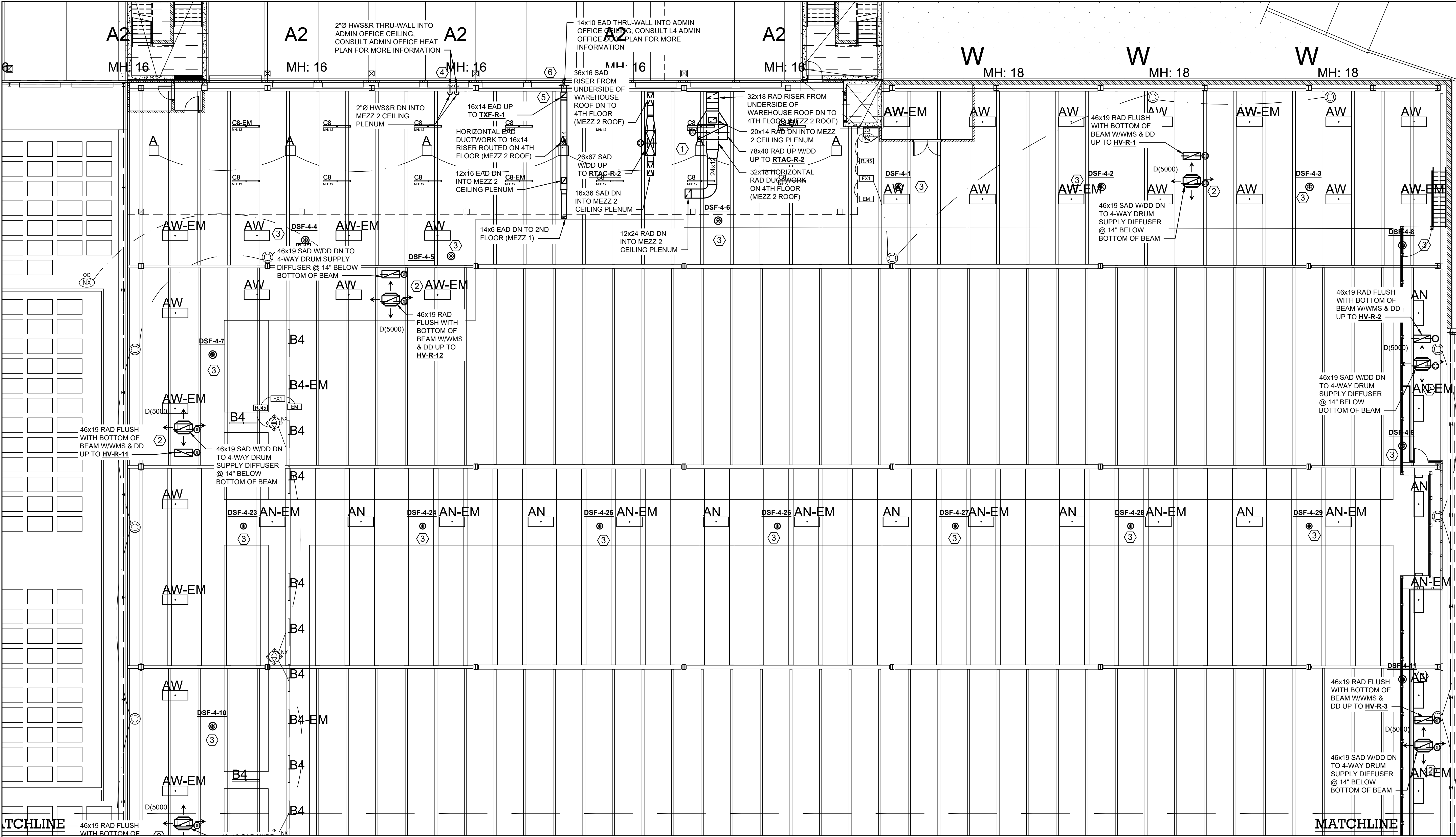
MECHANICAL L3 WAREHOUSE  
MEZZ 2 DUCT & HEAT PLAN

DWG NUMBER :

M-109

TO THE BEST KNOWLEDGE, BELIEF AND PROFESSIONAL JUDGEMENT,  
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### GENERAL MECHANICAL NOTES:

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- FURNISH & INSTALL VIBRATION ISOLATORS FOR ALL PIPING SUPPORTS CONNECTED TO AND WITHIN 50

- FEET OR 50 PIPE DIAMETERS IF ISOLATED EQUIPMENT REFER TO SPECIFICATIONS FOR EXACT REQUIREMENTS OF ALL PIPING, DUCTWORK AND EQUIPMENT VIBRATION ISOLATION.
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- INSTALL PIPING SO THAT ALL VALVES, STRAINERS, UNIONS, TRAPS, FLANGES, AND OTHER APPURTENANCES REQUIRING ACCESS ARE ACCESSIBLE.

### KEYED NOTES:

- CONTRACTOR SHALL FURNISH & INSTALL SUPPLY & RETURN DUCTWORK FROM ROOFTOP AIR CONDITIONING UNIT (RTAC-R-2) WITH DUCT DETECTORS DOWN TO 4TH FLOOR (MEZZ 2 ROOF). DUCTWORK TO BE ROUTED FROM ROOF PENETRATION TO AS/RS WAREHOUSE EXTERIOR WALL AND OFFSET ONTO 4TH FLOOR (MEZZ 2 ROOF).
- CONTRACTOR SHALL FURNISH AND INSTALL SUPPLY & RETURN DUCTWORK WITH DUCT DETECTORS FROM ROOFTOP HEATING & VENTILATING UNIT (HV). COORDINATE FINAL DUCTWORK LOCATION WITH SUPPLY DRUM DIFFUSER, FIRE PROTECTION LINES, LIGHTS & ROOFTOP UNIT.
- CONTRACTOR SHALL FURNISH & INSTALL DESTRATIFICATION FAN AS SHOWN ON PLAN & SCHEDULED. FAN TO BE CEILING-HUNG 4" BELOW ROOF AND CENTERED BETWEEN BEAM HAUNCHES; COORDINATE FINAL INSTALLATION WITH AS/RS RACK SYSTEM.
- CONTRACTOR SHALL FURNISH & INSTALL HOT WATER SUPPLY & RETURN (HWS&R) PIPING FROM 4TH FLOOR ADMIN CEILING. FINAL LOCATION TO BE COORDINATED WITH ALL OTHER TRADES. REFER TO L4 ADMIN OFFICE NEW HEATING PLAN FOR MORE INFORMATION.
- CONTRACTOR SHALL FURNISH & INSTALL EXHAUST DUCTWORK RISER UP TO ROOFTOP TOILET EXHAUST FAN (TXF-R-1). EXHAUST DUCTWORK TO BE ROUTED TIGHT TO AS/RS WAREHOUSE EXTERIOR WALL.
- CONTRACTOR SHALL FURNISH & INSTALL EXHAUST DUCTWORK FROM 4TH FLOOR ADMIN CEILING. FINAL LOCATION TO BE COORDINATED WITH ALL OTHER TRADES. REFER TO L4 ADMIN OFFICE NEW DUCTWORK PLAN FOR MORE INFORMATION.

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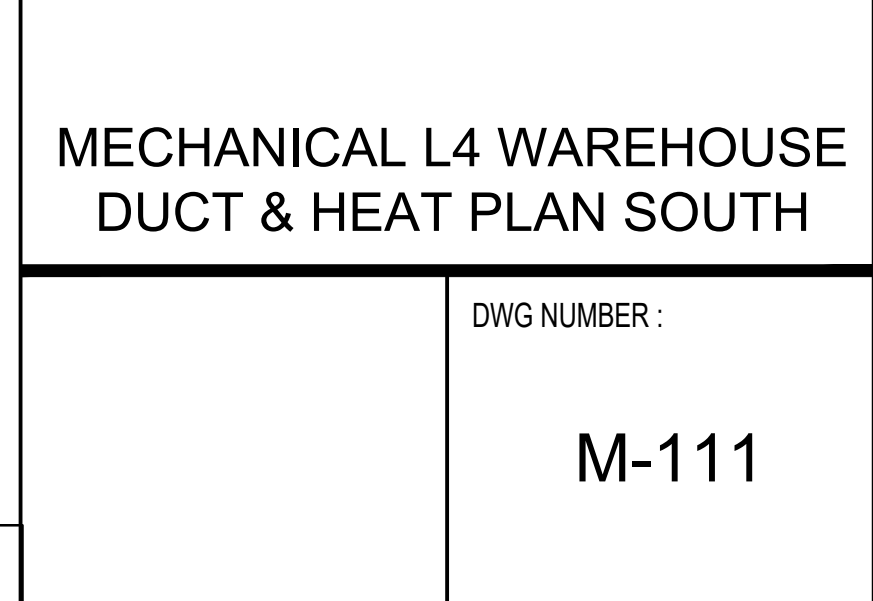
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DATE :  
SCALE :

DRAWING TITLE :  
**MECHANICAL L4 WAREHOUSE  
DUCT & HEAT PLAN NORTH**

DWG NUMBER :

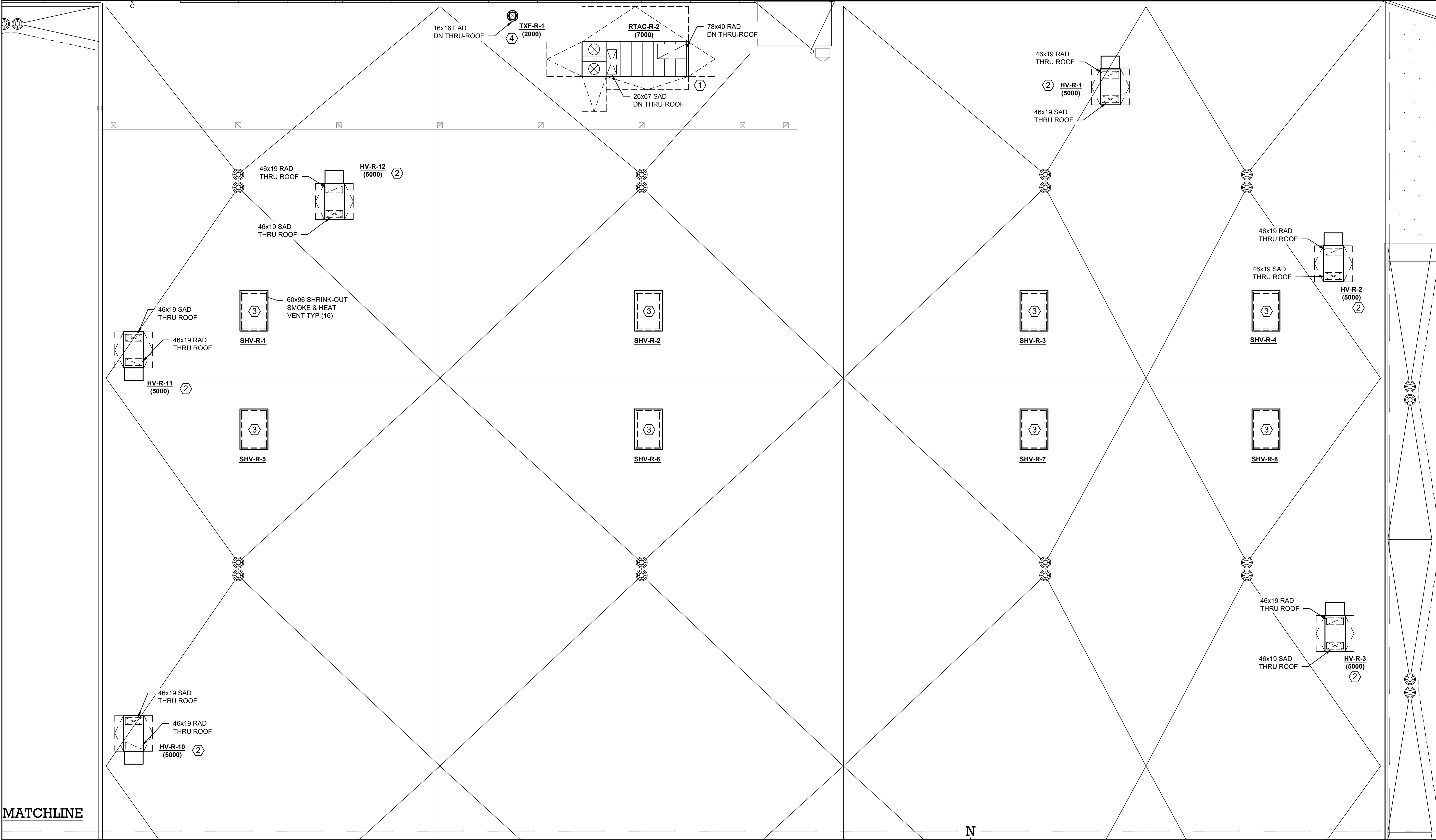
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MATCHLINE

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- ALL MISCELLANEOUS STEEL REQUIRED TO ENSURE PROPER INSTALLATION AND AS SHOWN IN DETAILS FOR PIPING, DUCTWORK, AND EQUIPMENT SHALL BE FURNISHED AND INSTALLED BY THE MECHANICAL CONTRACTOR AND COORDINATED WITH THE GENERAL CONTRACTOR FOR COORDINATION AMONG ALL TRADES.
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- INSTALL ALL MECHANICAL EQUIPMENT AND APPURTENANCES IN ACCORDANCE WITH MANUFACTURERS' RECOMMENDATIONS, CONTRACT DOCUMENTS, AND APPLICABLE CODES AND REGULATIONS.
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### KEYED NOTES: (#)

- CONTRACTOR SHALL FURNISH & INSTALL PACKAGED ROOFTOP AC UNIT WITH GAS FIRED FURNACE AS SHOWN ON PLAN & SCHEDULED. RTAC TO BE PLACED ON 24"H INSULATED ROOF CURB. FINAL LOCATION TO BE COORDINATED WITH STRUCTURAL.
- CONTRACTOR SHALL FURNISH & INSTALL PACKAGED ROOFTOP HEATING & VENTILATING WITH GAS FIRED FURNACE AS SHOWN ON PLAN & SCHEDULED. HV TO BE PLACED ON 24"H INSULATED ROOF CURB. FINAL LOCATION TO BE COORDINATED WITH STRUCTURAL.
- CONTRACTOR SHALL FURNISH & INSTALL CURB-MOUNTED SMOKE & HEAT VENT AS SHOWN ON PLAN & SCHEDULED. SMOKE & HEAT VENT TO BE PLACED ON 24"H INSULATED ROOF CURB. FINAL LOCATION TO BE COORDINATED WITH STRUCTURAL.
- CONTRACTOR SHALL FURNISH & INSTALL EXHAUST FAN AS SHOWN ON PLAN & SCHEDULED. EXHAUST FAN TO BE PLACED ON 24"H INSULATED ROOF CURB. FINAL LOCATION TO BE COORDINATED WITH STRUCTURAL.

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**MECHANICAL L5 WAREHOUSE  
ROOF DUCT PLAN NORTH**

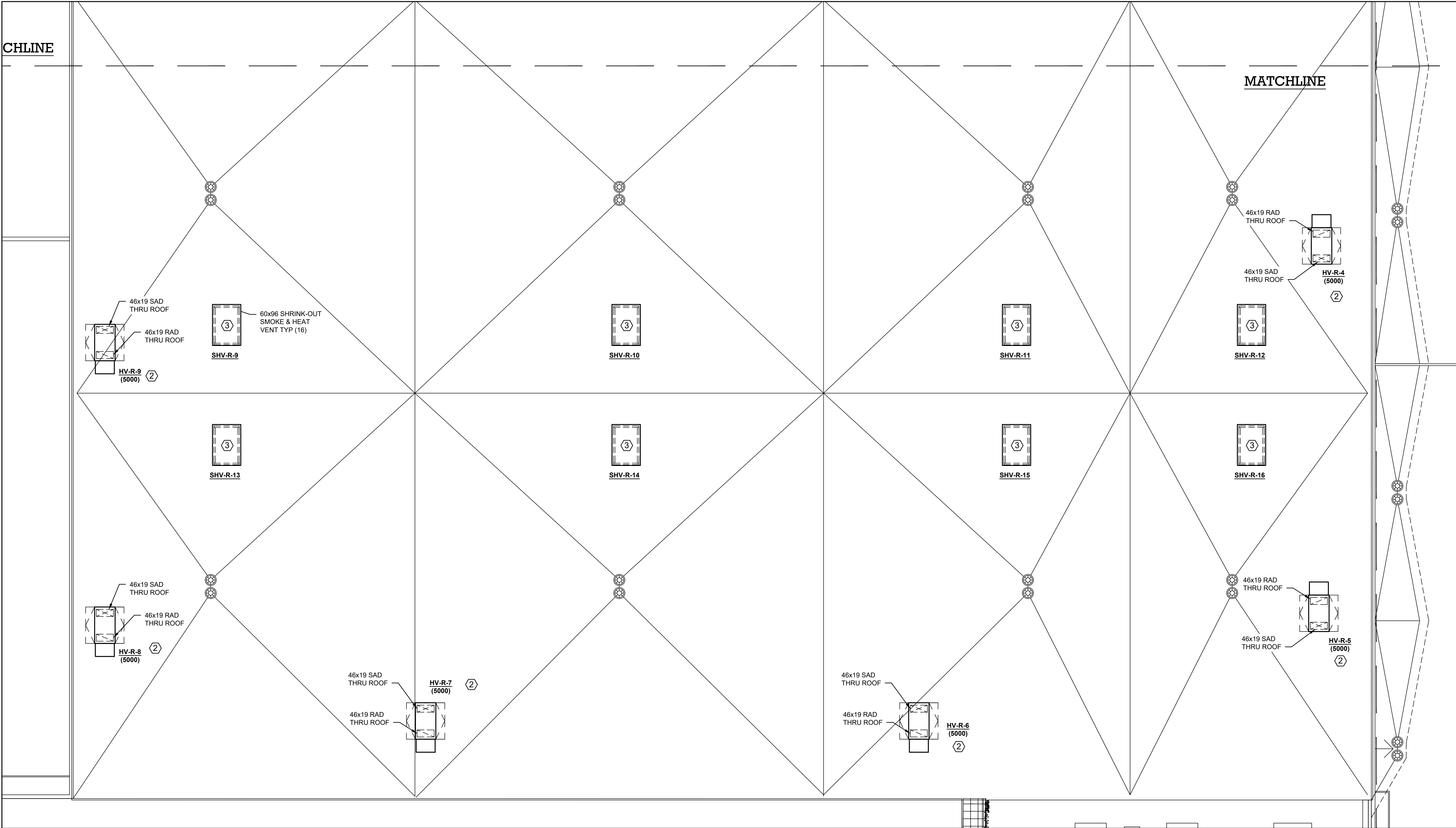
DWG NUMBER :

**M-112**



CHLINE

MATCHLINE



1  
M-113

MECHANICAL L5 WAREHOUSE ROOF DUCT PLAN SOUTH

SCALE: 3/32" = 1'-0"



KEYED NOTES: (#)

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- LOCATE ALL TEMPERATURE, PRESSURE AND FLOW MEASURING DEVICES IN ACCESSIBLE LOCATIONS WITH STRAIGHT SECTION OF PIPE OR DUCT UP- AND DOWNSTREAM AS RECOMMENDED BY THE MANUFACTURER.
- COORDINATE ALL EQUIPMENT CONNECTIONS WITH MANUFACTURER'S CERTIFIED DRAWINGS. COORDINATE AND PROVIDE ALL DUCT AND PIPING TRANSITIONS REQUIRED FOR THE FINAL EQUIPMENT CONNECTIONS TO FURNISHED EQUIPMENT. FIELD VERIFY COORDINATE ALL DUCT AND PIPING DIMENSIONS BEFORE FABRICATIONS.
- THE LOCATIONS OF ALL ITEMS SHOWN ON THE DRAWINGS OR CALLED FOR IN THE SPECIFICATIONS THAT ARE NOT DEFINITELY FIXED BY DIMENSIONS ARE APPROXIMATELY ONLY. THE EXACT LOCATIONS NECESSARY TO SECURE THE BEST CONDITIONS AND RESULTS MUST BE DETERMINED BY THE PROJECT SITE CONDITIONS AND SHALL HAVE THE APPROVAL OF THE ENGINEER BEFORE BEING INSTALLED. DO NOT SCALE DRAWINGS.
- CERTAIN ITEMS SUCH AS RISERS AND DROPS IN DUCTWORK, ACCESS DOORS, VOLUME DAMPERS, ETC., ARE INDICATED ON THE CONTRACT DOCUMENT DRAWINGS FOR CLARITY FOR A SPECIFIC LOCATION REQUIREMENT AND SHALL NOT BE INTERPRETED AS THE EXTENT OF THE REQUIREMENTS FOR THESE ITEMS. LOCATIONS OF ALL SUCH ITEMS SHALL BE INDICATED ON SHOP DRAWINGS BY THE INSTALLING CONTRACTOR FOR REVIEW AND APPROVAL DURING THE SHOP DRAWING PROCESS.

- CONTRACTOR SHALL FURNISH & INSTALL PACKAGED ROOFTOP AC UNIT WITH GAS FIRED FURNACE AS SHOWN ON PLAN & SCHEDULED. RTAC TO BE PLACED ON 24"H INSULATED ROOF CURB. FINAL LOCATION TO BE COORDINATED WITH STRUCTURAL.
- CONTRACTOR SHALL FURNISH & INSTALL PACKAGED ROOFTOP HEATING & VENTILATING WITH GAS FIRED FURNACE AS SHOWN ON PLAN & SCHEDULED. HV TO BE PLACED ON 24"H INSULATED ROOF CURB. FINAL LOCATION TO BE COORDINATED WITH STRUCTURAL.
- CONTRACTOR SHALL FURNISH & INSTALL CURB-MOUNTED SMOKE & HEAT VENT AS SHOWN ON PLAN & SCHEDULED. SMOKE & HEAT VENT TO BE PLACED ON 24"H INSULATED ROOF CURB. FINAL LOCATION TO BE COORDINATED WITH STRUCTURAL.
- CONTRACTOR SHALL FURNISH & INSTALL EXHAUST FAN AS SHOWN ON PLAN & SCHEDULED. EXHAUST FAN TO BE PLACED ON 24"H INSULATED ROOF CURB. FINAL LOCATION TO BE COORDINATED WITH STRUCTURAL.

TO THE BEST KNOWLEDGE, BELIEF AND PROFESSIONAL JUDGEMENT, THESE PLANS AND SPECIFICATIONS ARE IN COMPLIANCE WITH THE 2020 ENERGY CONSERVATION CONSTRUCTION CODE OF NEW YORK STATE.

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	ISSUED FOR BID	10/15/2021
	ISSUED FOR PROGRESS	01/18/2022

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SCALE :

DRAWING TITLE :

MECHANICAL L5 WAREHOUSE  
ROOF DUCT PLAN SOUTH

DWG NUMBER :

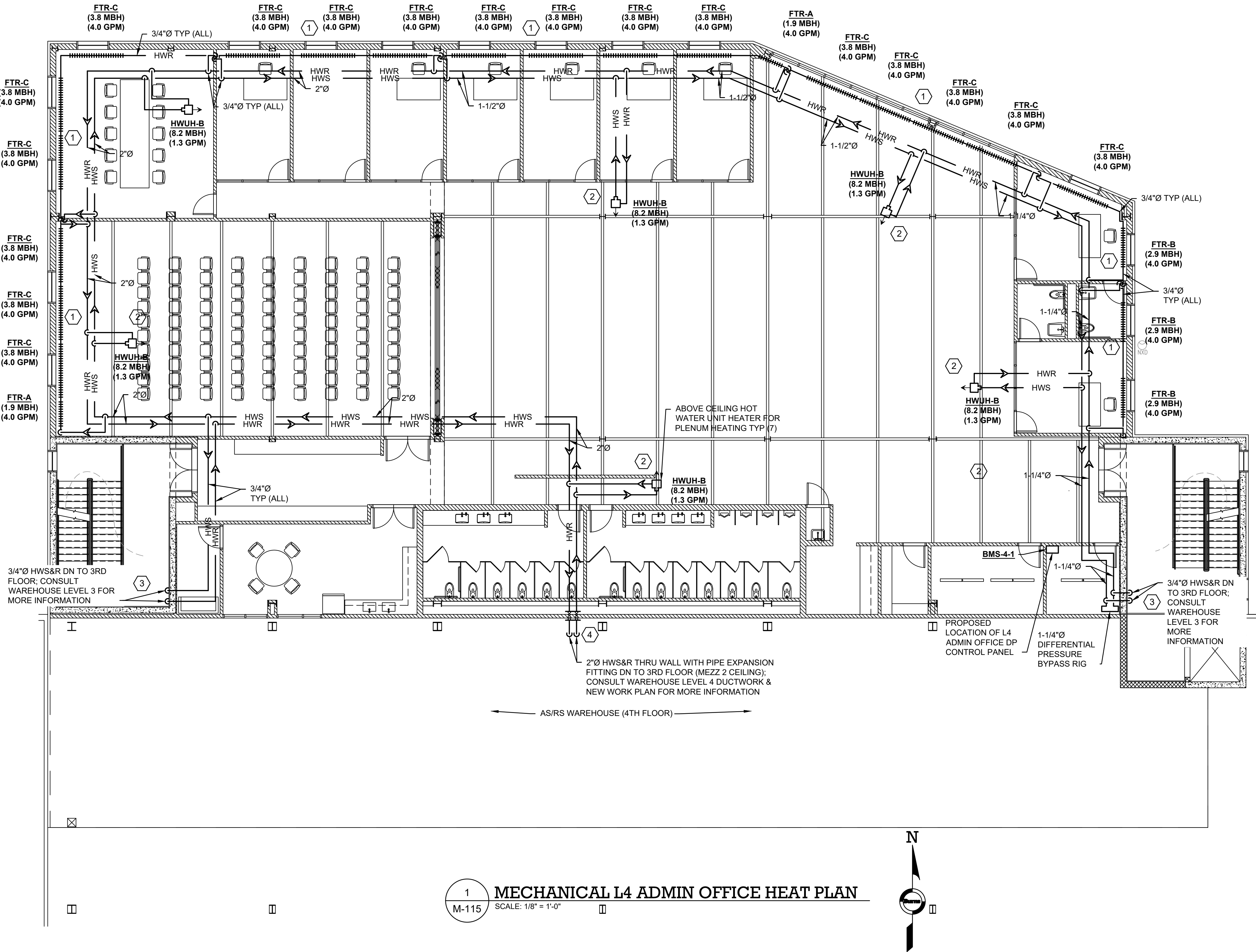
M-113





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GENERAL MECHANICAL NOTES:

1. ALL WORK SHALL CONFORM TO THE LATEST BUILDING STANDARDS. IT IS THE RESPONSIBILITY OF THE CONTRACTOR TO OBTAIN A COPY OF THE BUILDING STANDARDS AND MEET WITH BUILDING MANAGEMENT IN ORDER TO BECOME TOTALLY FAMILIAR WITH THE BUILDING CONSTRUCTION RULES. THERE SHALL BE NO DEVIATION FROM THE BUILDING STANDARDS WITHOUT PRIOR WRITTEN APPROVAL FROM THE BUILDING MANAGEMENT.
2. WHEN MECHANICAL WORK IS SUBCONTRACTED IT SHALL BE THE MECHANICAL CONTRACTORS RESPONSIBILITY TO COORDINATE SUBCONTRACTORS AND THE ASSOCIATED CONTRACTS. WHEN DISCREPANCIES ARISE PERTAINING TO WHICH CONTRACTOR PROVIDES A PARTICULAR ITEM OF THE MECHANICAL CONTRACT OR WHICH CONTRACTOR PROVIDES FINAL CONNECTIONS FOR A PARTICULAR ITEM OF THE MECHANICAL CONTRACT. IT SHALL BE BROUGHT TO THE ATTENTION OF THE MECHANICAL CONTRACTOR, WHOSE DECISION SHALL BE FINAL.
3. FURNISH & INSTALL ALL MATERIALS, EQUIPMENT AND PERFORM ALL LABOR REQUIRED TO INSTALL COMPLETE MECHANICAL SYSTEMS AS INDICATED ON THE DRAWINGS, AS SPECIFIED AND AS REQUIRED BY CODE.
4. INSTALL ALL MECHANICAL EQUIPMENT AND APPURTENANCES IN ACCORDANCE WITH MANUFACTURERS' RECOMMENDATIONS, CONTRACT DOCUMENTS, AND APPLICABLE CODES AND REGULATIONS.
5. LOCATE ALL TEMPERATURE, PRESSURE AND FLOW MEASURING DEVICES IN ACCESSIBLE LOCATIONS WITH STRAIGHT SECTION OF PIPE OR DUCT UP- AND DOWNSTREAM AS RECOMMENDED BY THE MANUFACTURER.
6. COORDINATE ALL EQUIPMENT CONNECTIONS WITH MANUFACTURER'S CERTIFIED DRAWINGS. COORDINATE AND PROVIDE ALL DUCT AND PIPING TRANSITIONS REQUIRED FOR THE FINAL EQUIPMENT CONNECTIONS TO FURNISHED EQUIPMENT. FIELD VERIFY COORDINATE ALL DUCT AND PIPING DIMENSIONS BEFORE FABRICATIONS.
7. THE LOCATIONS OF ALL ITEMS SHOWN ON THE DRAWINGS OR CALLED FOR IN THE SPECIFICATIONS THAT ARE NOT DEFINITELY FIXED BY DIMENSIONS ARE APPROXIMATELY ONLY. THE EXACT LOCATIONS NECESSARY TO SECURE THE BEST CONDITIONS AND RESULTS MUST BE DETERMINED BY THE PROJECT SITE CONDITIONS AND SHALL HAVE THE APPROVAL OF THE ENGINEER BEFORE BEING INSTALLED. DO NOT SCALE DRAWINGS.
8. CERTAIN ITEMS SUCH AS RISERS AND DROPS IN PIPING, VALVES, ETC., ARE INDICATED ON THE CONTRACT DOCUMENT DRAWINGS FOR CLARITY FOR A SPECIFIC LOCATION REQUIREMENT AND SHALL NOT BE INTERPRETED AS THE EXTENT OF THE REQUIREMENTS FOR THESE ITEMS. LOCATIONS OF ALL SUCH ITEMS SHALL BE INDICATED ON SHOP DRAWINGS BY THE INSTALLING CONTRACTOR FOR REVIEW AND APPROVAL DURING THE SHOP DRAWING PROCESS.
9. INSTALL PIPING SO THAT ALL VALVES, STRAINERS, UNIONS, TRAPS, FLANGES, AND OTHER APPURTENANCES REQUIRING ACCESS ARE ACCESSIBLE.

KEYED NOTES:

1. CONTRACTOR SHALL FURNISH & INSTALL PERIMETER FINNED TUBE RADIATORS AS SHOW ON PLAN & SCHEDULED. ALL FINNED TUBE ENCLOSURES TO EXTEND WALL TO WALL WITH ENCLOSURE ACCESS DOORS FOR PIPING TRIM. COORDINATE FINAL HWS&R DROPS TO FINNED TUBE RADIATOR (FTR) FROM CEILING PLENUM WITH PARTITIONS. CONSULT MECHANICAL DETAILS & FLOW DIAGRAMS FOR INFORMATION.
2. CONTRACTOR SHALL FURNISH & INSTALL CEILING-PLENUM HOT WATER UNIT HEATERS AS SHOWN ON PLAN & SCHEDULED. UNIT HEATER INSTALLATION & PIPING TO BE COORDINATED WITH ALL NEW DUCTWORK AND FULLY ACCESSIBLE.
3. CONTRACTOR SHALL FURNISH & INSTALL HWS&R DROP DOWN TO 3RD FLOOR STAIRWELL UNIT HEATER. COORDINATE FINAL DROP DOWN LOCATION WITH WALL-HUNG UNIT HEATER ON 3RD FLOOR AND REFER TO 3RD FLOOR WAREHOUSE PLANS FOR MORE INFORMATION.
4. CONTRACTOR SHALL FURNISH & INSTALL HOT WATER SUPPLY & RETURN (HWS&R) PIPING FROM 4TH FLOOR ADMIN CEILING. PIPING TO BE ROUTED DOWN AS/RS WAREHOUSE EXTERIOR WALL AND DOWN TO 3RD FLOOR (MEZZ 2 ROOF). FURNISH & INSTALL STAINLESS STEEL BELLAWS METAL EXPANSION JOINT AT PIPE WALL PENETRATION FROM OFFICE ADMIN BUILDING TO AS/RS WAREHOUSE AS SHOWN ON PLAN & SCHEDULED

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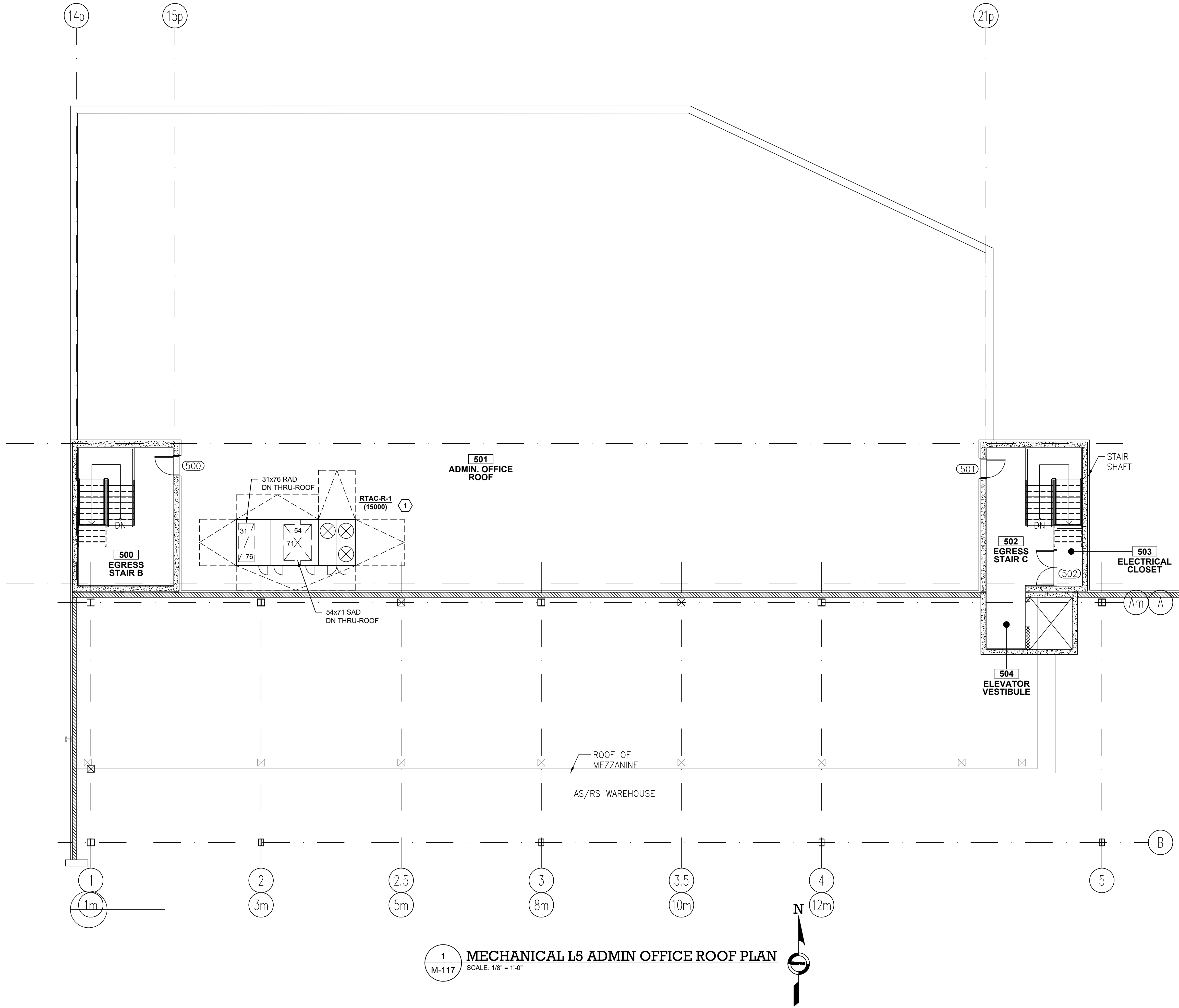
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SCALE :  
DRAWING TITLE :

MECHANICAL L4 ADMIN OFFICE  
HEAT PLAN

DWG NUMBER :

M-115





GENERAL MECHANICAL NOTES:

- ALL WORK SHALL CONFORM TO THE LATEST BUILDING STANDARDS. IT IS THE RESPONSIBILITY OF THE CONTRACTOR TO OBTAIN A COPY OF THE BUILDING STANDARDS AND MEET WITH BUILDING MANAGEMENT IN ORDER TO BECOME TOTALLY FAMILIAR WITH THE BUILDING CONSTRUCTION RULES. THERE SHALL BE NO DEVIATION FROM THE BUILDING STANDARDS WITHOUT PRIOR WRITTEN APPROVAL FROM THE BUILDING MANAGEMENT.
- WHEN MECHANICAL WORK IS SUBCONTRACTED IT SHALL BE THE MECHANICAL CONTRACTORS RESPONSIBILITY TO COORDINATE SUBCONTRACTORS AND THE ASSOCIATED CONTRACTS. WHEN DISCREPANCIES ARISE PERTAINING TO WHICH CONTRACTOR PROVIDES A PARTICULAR ITEM OF THE MECHANICAL CONTRACT OR WHICH CONTRACTOR PROVIDES FINAL CONNECTIONS FOR A PARTICULAR ITEM OF THE MECHANICAL CONTRACT, IT SHALL BE BROUGHT TO THE ATTENTION OF THE MECHANICAL CONTRACTOR, WHOSE DECISION SHALL BE FINAL.
- ALL MISCELLANEOUS STEEL REQUIRED TO ENSURE PROPER INSTALLATION AND AS SHOWN IN DETAILS FOR PIPING, DUCTWORK, AND EQUIPMENT SHALL BE FURNISHED AND INSTALLED BY THE MECHANICAL CONTRACTOR AND COORDINATED WITH THE GENERAL CONTRACTOR FOR COORDINATION AMONG ALL TRADES.
- FURNISH & INSTALL ALL MATERIALS, EQUIPMENT AND PERFORM ALL LABOR REQUIRED TO INSTALL COMPLETE MECHANICAL SYSTEMS AS INDICATED ON THE DRAWINGS, AS SPECIFIED AND AS REQUIRED BY CODE.
- INSTALL ALL MECHANICAL EQUIPMENT AND APPURTENANCES IN ACCORDANCE WITH MANUFACTURERS' RECOMMENDATIONS, CONTRACT DOCUMENTS, AND APPLICABLE CODES AND REGULATIONS.
- LOCATE ALL TEMPERATURE, PRESSURE AND FLOW MEASURING DEVICES IN ACCESSIBLE LOCATIONS WITH STRAIGHT SECTION OF PIPE OR DUCT UP- AND DOWNSTREAM AS RECOMMENDED BY THE MANUFACTURER.
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KEYED NOTES: #

- CONTRACTOR SHALL FURNISH & INSTALL PACKAGED ROOFTOP AC UNIT WITH GAS FIRED FURNACE AS SHOWN ON PLAN & SCHEDULED. RTAC TO BE PLACED ON 24"H INSULATED ROOF CURB. FINAL LOCATION TO BE COORDINATED WITH STRUCTURAL.

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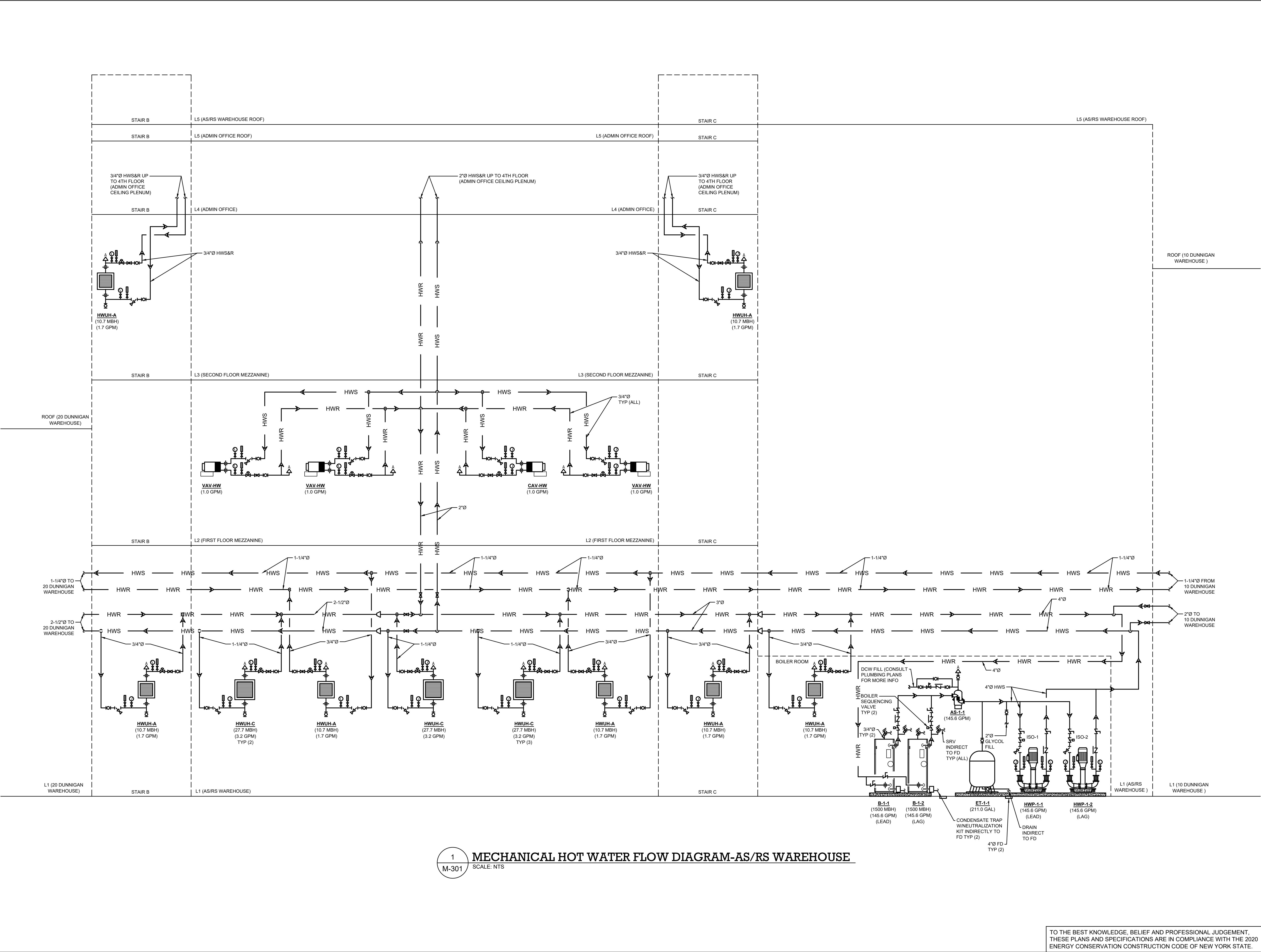
MECHANICAL L5 ADMIN OFFICE  
ROOF PLAN

DWG NUMBER :

M-116

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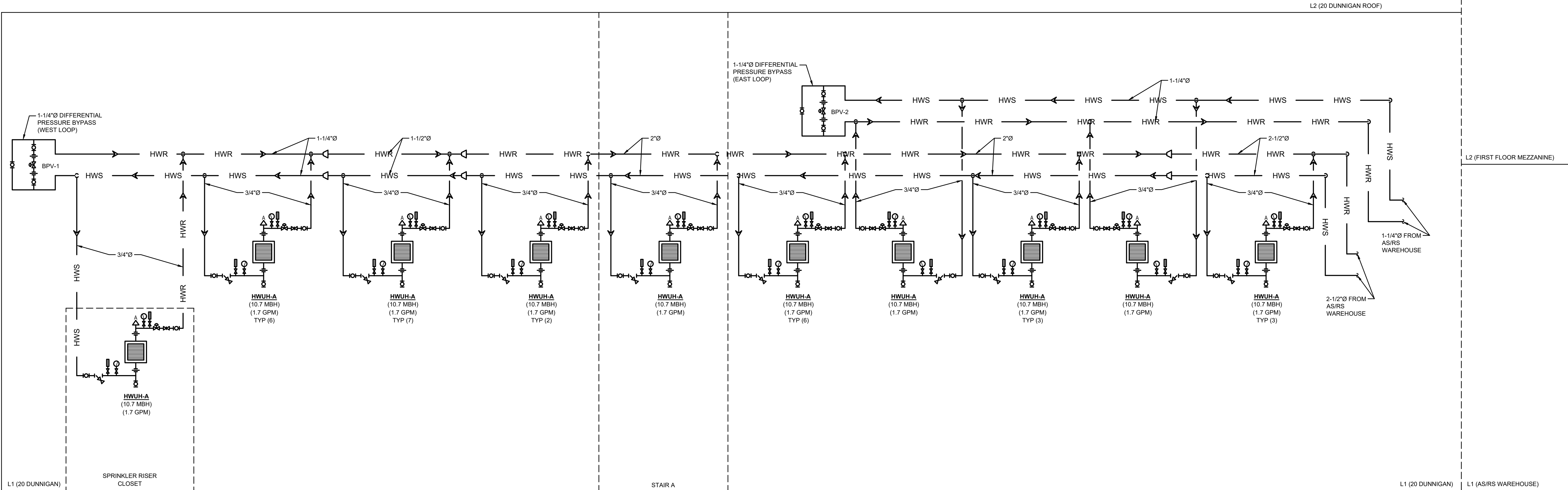
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SCALE :

DRAWING TITLE :  
**MECHANICAL HOT WATER  
FLOW DIAGRAM SHEET #1**

DWG NUMBER :  
**M-301**





1  
M-302

MECHANICAL HOT WATER FLOW DIAGRAM-20 DUNNIGAN WAREHOUSE

SCALE: NTS

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MECHANICAL HOT WATER  
FLOW DIAGRAM SHEET #2

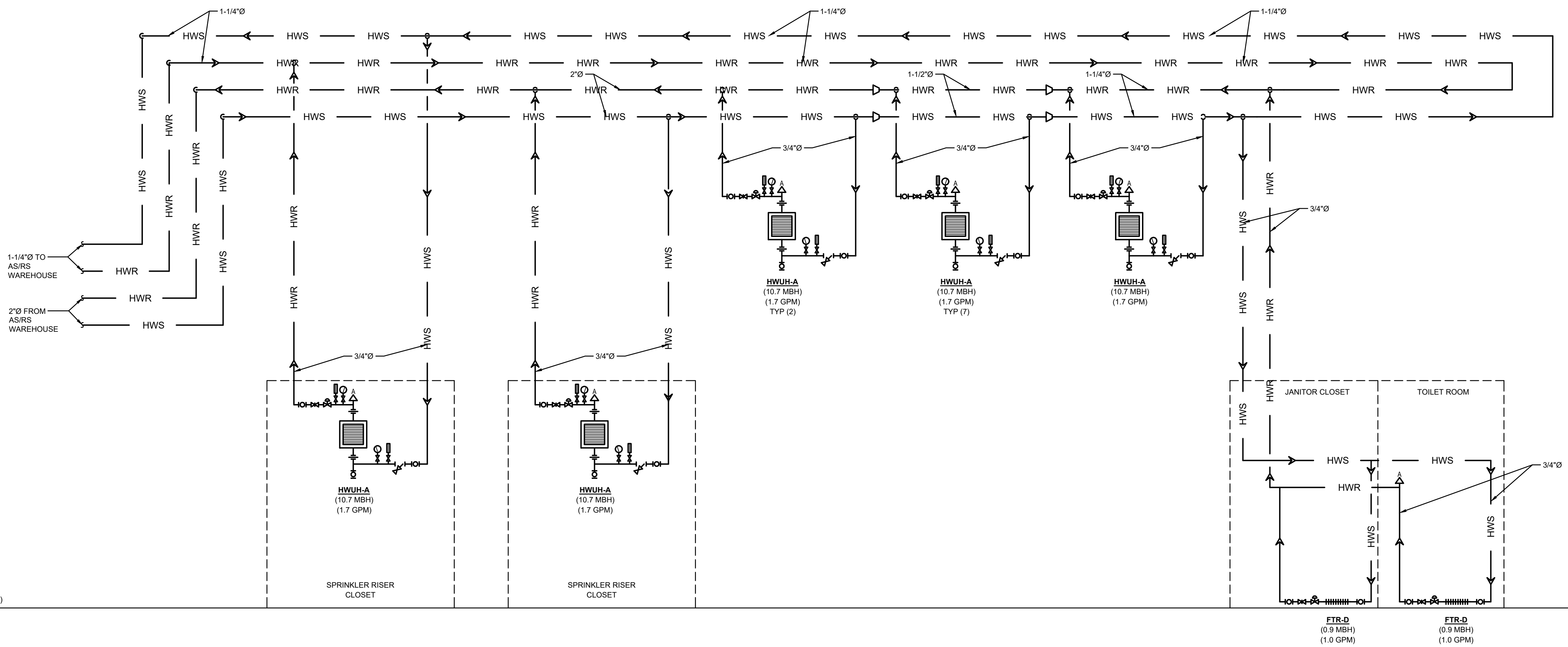
DWG NUMBER :

M-302



L5 (AS/RS WAREHOUSE ROOF)

L2 (10 DUNNIGAN ROOF)



L1 (AS/RS WAREHOUSE )

L1 (10 DUNNIGAN)

1  
M-303

**MECHANICAL HOT WATER FLOW DIAGRAM-10 DUNNIGAN WAREHOUSE**

SCALE: NTS

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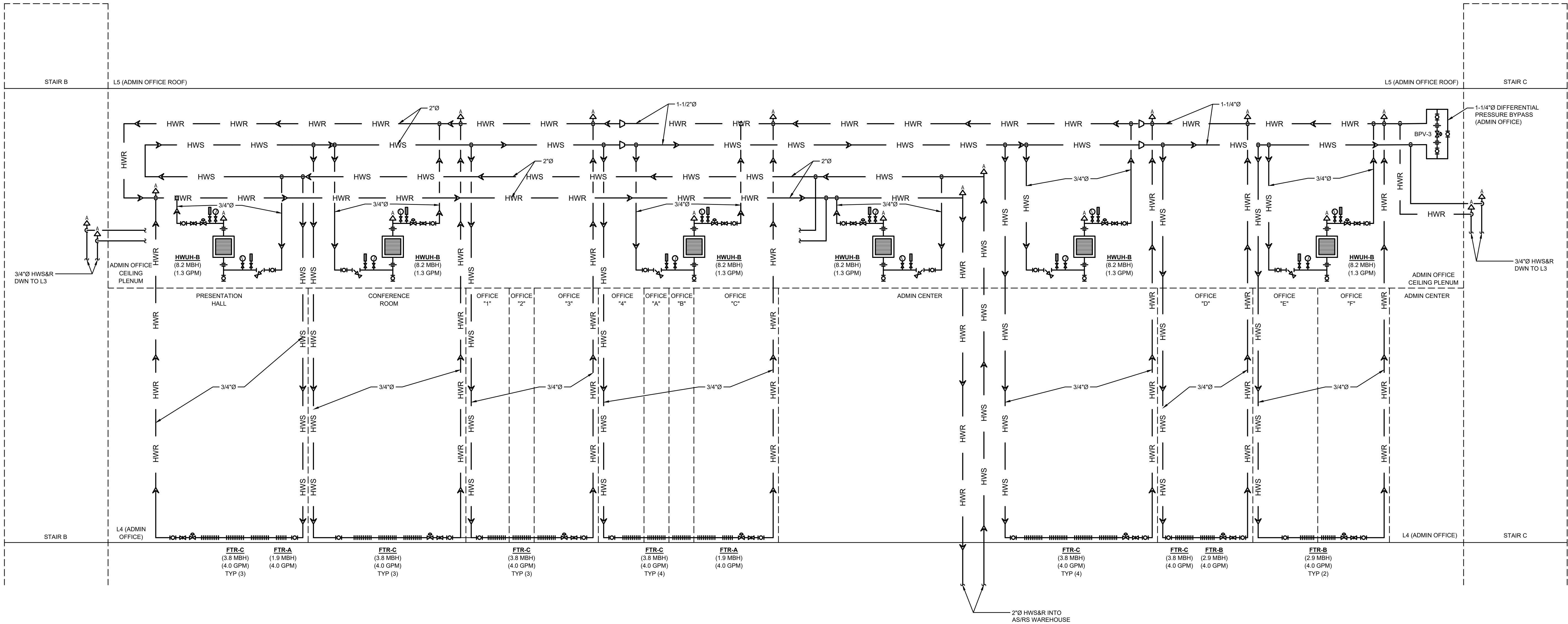
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**MECHANICAL HOT WATER  
FLOW DIAGRAM SHEET #3**

DWG NUMBER :

**M-303**





1  
M-304

**MECHANICAL HOT WATER FLOW DIAGRAM-ADMIN OFFICE**  
SCALE: NTS

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**MECHANICAL HOT WATER  
FLOW DIAGRAM SHEET #4**

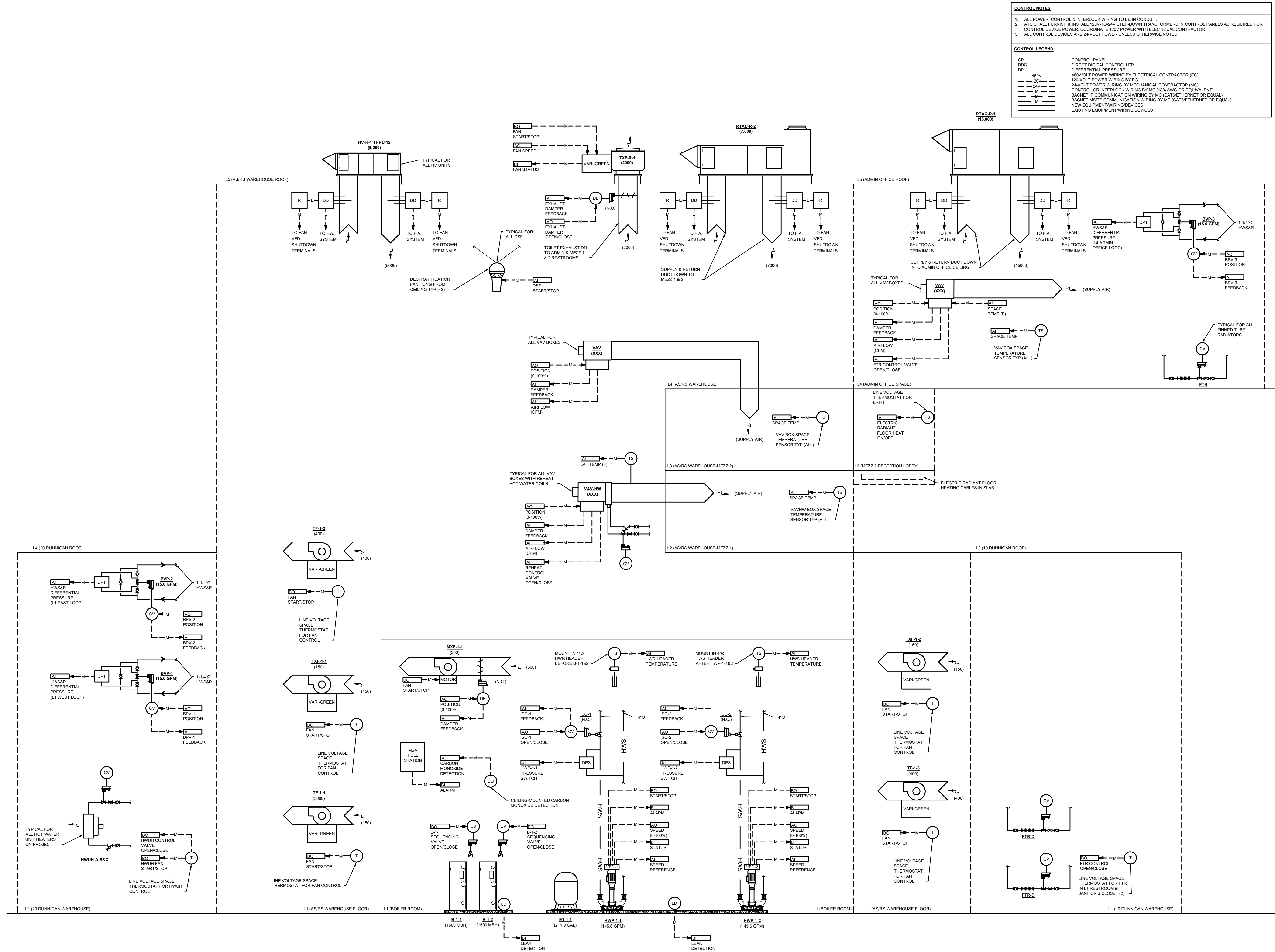
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MECHANICAL CONTROLS SHEET #2

DWG NUMBER :

M-306



LOCATED IN BMS-1-1 CP

POINT NAME	DDC-1-1 (BOILER PLANT CONTROLLER)							BMS GRAPHIC
	HARDWIRED POINTS				SOFTWARE POINTS			
	AI	AO	BI	BO	AV	BV	TREND	
CARBON DIOXIDE DETECTION ALARM			X			X		X
BOILER ROOM EMERGENCY PULL STATION ALARM			X			X		X
MXF-1-1 START/STOP			X			X		X
MXF-1-1 DAMPER OPEN/CLOSE		X						
MXF-1-1 DAMPER FEEDBACK	X				X			X
B-1-1 START/STOP						X		X
B-1-1 HWS TEMPERATURE SETPOINT					X			X
B-1-2 START/STOP						X		X
B-1-2 HWS TEMPERATURE SETPOINT					X			X
HWP-1-1 ISO-1 VALVE OPEN/CLOSE		X						
HWP-1-1 ISO-1 VALVE FEEDBACK	X				X			X
HWP-1-1 DIFFERENTIAL PRESSURE SWITCH PROVE			X			X		X
HWP-1-1 VFD START/STOP				X				
HWP-1-1- VFD COMMON ALARM			X			X		X
HWP-1-1 VFD SPEED (0-100%)		X						X
HWP-1-1 VFD SPEED REFERENCE (0-100%)	X				X			X
HWP-1-1 VFD STATUS			X			X		X
HWP-1-2 ISO-2 VALVE OPEN/CLOSE		X						
HWP-1-2 ISO-2 VALVE FEEDBACK	X				X			X
HWP-1-2 DIFFERENTIAL PRESSURE SWITCH PROVE			X			X		X
HWP-1-2 VFD START/STOP				X				
HWP-1-2- VFD COMMON ALARM			X			X		X
HWP-1-2 VFD SPEED (0-100%)		X						X
HWP-1-2 VFD SPEED REFERENCE (0-100%)	X				X			X
HWP-1-2 VFD STATUS			X			X		X
HWR HEADER TEMPERATURE (F)	X				X			X
HWS HEADER TEMPERATURE (F)	X				X			X
BOILER ROOM LEAK DETECTION #1 ALARM			X			X		X
BOILER ROOM LEAK DETECTION #2 ALARM			X			X		X
L1 WEST LOOP HWS&R DIFFERENTIAL PRESSURE					X			X
L1 WEST LOOP BPV-1 POSITION					X			X
L1 WEST LOOP BPV-1 FEEDBACK					X			X
L1 EAST LOOP HWS&R DIFFERENTIAL PRESSURE					X			X
L1 EAST LOOP BPV-2 POSITION					X			X
L1 EAST LOOP BPV-2 FEEDBACK					X			X
Totals	7	5	11	2	15	13	0	30
Totals	25				28			

LOCATED IN BMS-1-2 CP

POINT NAME	DDC-1-2 (L1 WEST LOOP DP CONTROL)							BMS GRAPHIC
	HARDWIRED POINTS				SOFTWARE POINTS			
	AI	AO	BI	BO	AV	BV	TREND	
L1 WEST LOOP HWS&R DIFFERENTIAL PRESSURE	X							
L1 WEST LOOP BPV-1 POSITON (0-100%)		X						
L1 WEST LOOP BPV-1 FEEDBACK (0-100%)	X							
Totals	2	1	0	0	0	0	0	0
Totals	3				0			

LOCATED IN BMS-1-3 CP

	DDC-1-3 (L1 EAST LOOP DP CONTROL)							BMS GRAPHIC
	HARDWIRED POINTS				SOFTWARE POINTS			
POINT NAME	AI	AO	BI	BO	AV	BV	TREND	
L1 EAST LOOP HWS&R DIFFERENTIAL PRESSURE	X							
L1 EAST LOOP BPV-2 POSITON (0-100%)		X						
L1 EAST LOOP BPV-2 FEEDBACK (0-100%)	X							
Totals	2	1	0	0	0	0	0	0
Totals	3				0			

LOCATED IN BMS-4-1 CP

POINT NAME	DDC-4-1 (L4 ADMIN LOOP DP & FAN CONTROL)							BMS GRAPHIC
	HARDWIRED POINTS				SOFTWARE POINTS			
	AI	AO	BI	BO	AV	BV	TREND	
L4 ADMIN LOOP HWS&R DIFFERENTIAL PRESSURE	X				X			X
L4 ADMIN LOOP BPV-3 POSITON (0-100%)		X						
L4 ADMIN LOOP BPV-3 FEEDBACK (0-100%)	X				X			X
TXF-R-1 FAN START/STOP				X				
TXF-R-1 FAN SPEED	X				X			X
TXF-R-1 FAN STATUS			X			X		X
DESTRATIFICATION FAN START/STOP		X						
Totals	3	2	1	1	1	1	0	2
Totals	7				2			

TYPICAL FOR ALL

POINT NAME	VAV BOX DDC (COOLING ONLY)							BMS GRAPHIC
	HARDWIRED POINTS				SOFTWARE POINTS			
	AI	AO	BI	BO	AV	BV	TREND	
SPACE TEMPERATURE (F)	X				X			X
DAMPER POSITION (0-100%)		X						
DAMPER FEEDBACK (0-100%)	X				X			X
AIRFLOW (CFM)	X				X			X
SPACE TEMPERATURE OVERRIDE SETPOINT (F)					X			X
AIRFLOW OVERRIDE (CFM)					X			X
Totals	3	1	0	0	5	0	0	5
Totals	4				5			

TYPICAL FOR ALL

POINT NAME	VAV-HW BOX DDC (COOL & HEAT)							
	HARDWIRED POINTS				SOFTWARE POINTS			BMS GRAPHIC
	AI	AO	BI	BO	AV	BV	TREND	
SPACE TEMPERATURE (F)	X				X			X
DAMPER POSITION (0-100%)		X						
DAMPER FEEDBACK (0-100%)	X				X			X
AIRFLOW (CFM)	X				X			X
SAT (F)	X				X			X
REHEAT HW VALVE POSITION (0-100%)		X						
REHEAT HW VALVE FEEDBACK (0-100%)	X				X			X
REHEAT HW VALVE POSITION OVERRIDE					X			X
SPACE TEMPERATURE OVERRIDE SETPOINT (F)					X			X
AIRFLOW OVERRIDE (CFM)					X			X
Totals	5	2	0	0	8	0	0	8
Totals	7				8			

TYPICAL FOR ALL

POINT NAME	VAV BOX DDC (COOL & HEAT)							
	HARDWIRED POINTS				SOFTWARE POINTS			
	AI	AO	BI	BO	AV	BV	TREND	BMS GRAPHIC
SPACE TEMPERATURE (F)	X				X			X
DAMPER POSITION (0-100%)		X						
DAMPER FEEDBACK (0-100%)	X				X			X
AIRFLOW (CFM)	X				X			X
FTR HW VALVE OPEN/CLOSE				X				
FTR HW VALVE FEEDBACK			X			X		X
SPACE TEMPERATURE OVERRIDE SETPOINT (F)					X			X
AIRFLOW OVERRIDE (CFM)					X			X
Totals	3	1	1	1	5	1	0	6
Totals	6				6			

TYPICAL FOR ALL

POINT NAME	HWUH THERMOSTAT			
	HARDWIRED POINTS			
	AI	AO	BI	BO
HWUH FAN START/STOP				X
HWUH HW VALVE OPEN/CLOSE				X
Totals	0	0	0	2
Totals	2			

TYPICAL FOR ALL

POINT NAME	FTR THERMOSTAT			
	HARDWIRED POINTS			
	AI	AO	BI	BO
FTR HW VALVE OPEN/CLOSE				X
Totals	0	0	0	1
Totals	1			

TYPICAL FOR ALL

POINT NAME	FAN THERMOSTAT			
	HARDWIRED POINTS			
	AI	AO	BI	BO
FAN START/STOP				X
Totals	0	0	0	1
Totals	1			

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CONTROLS SHEET #3

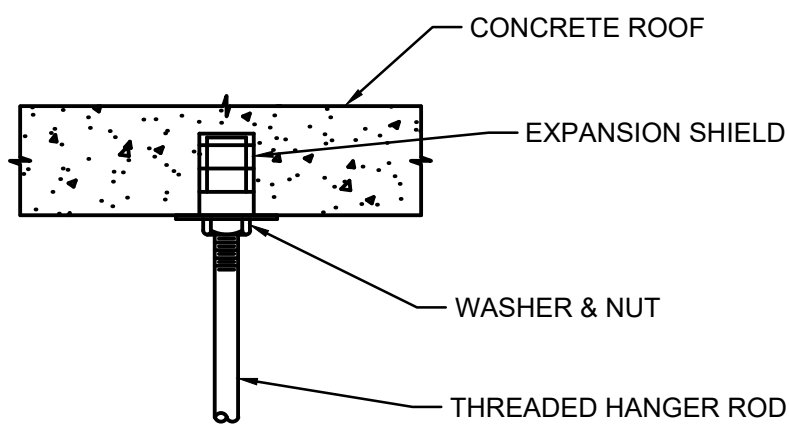
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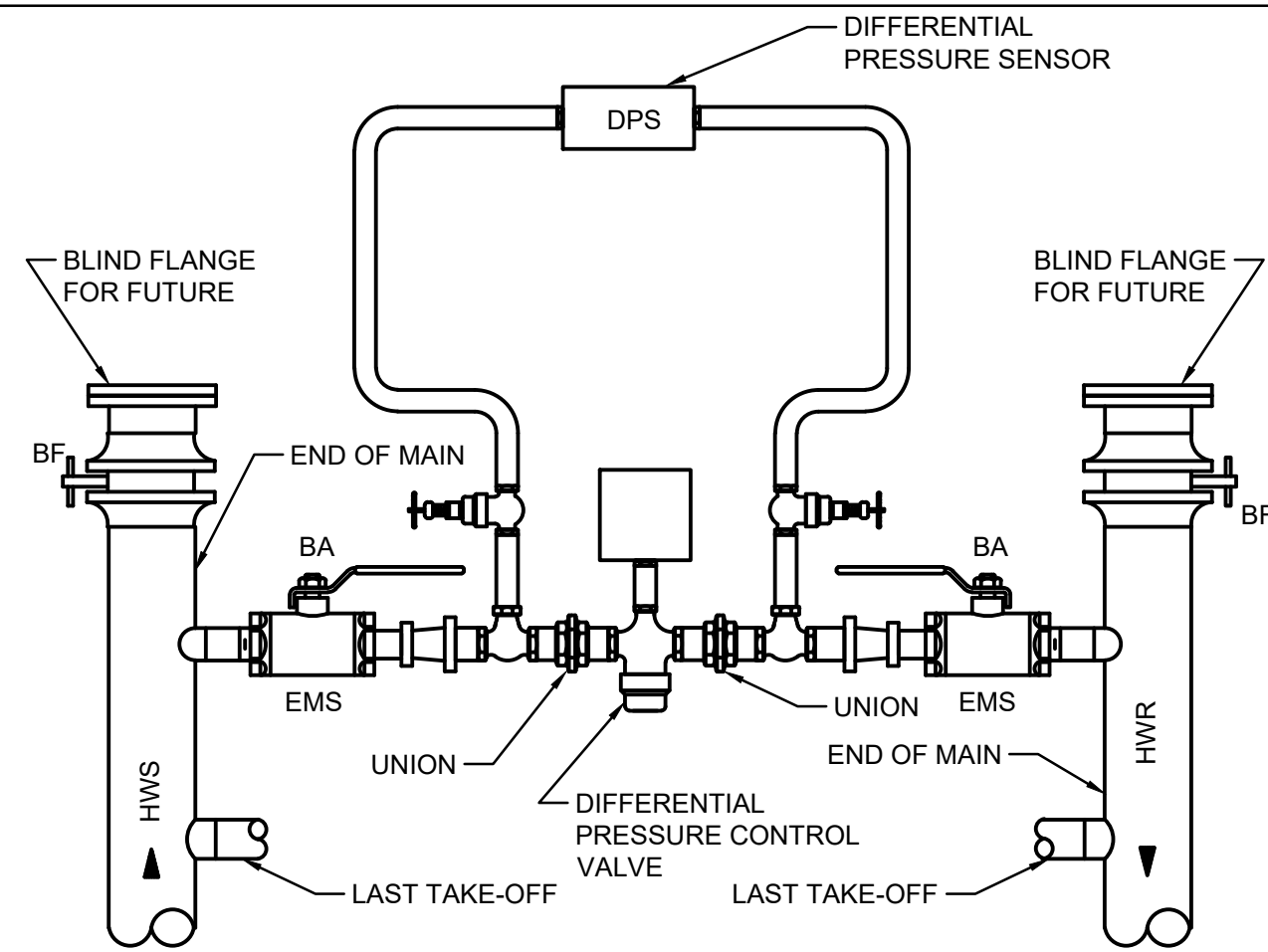






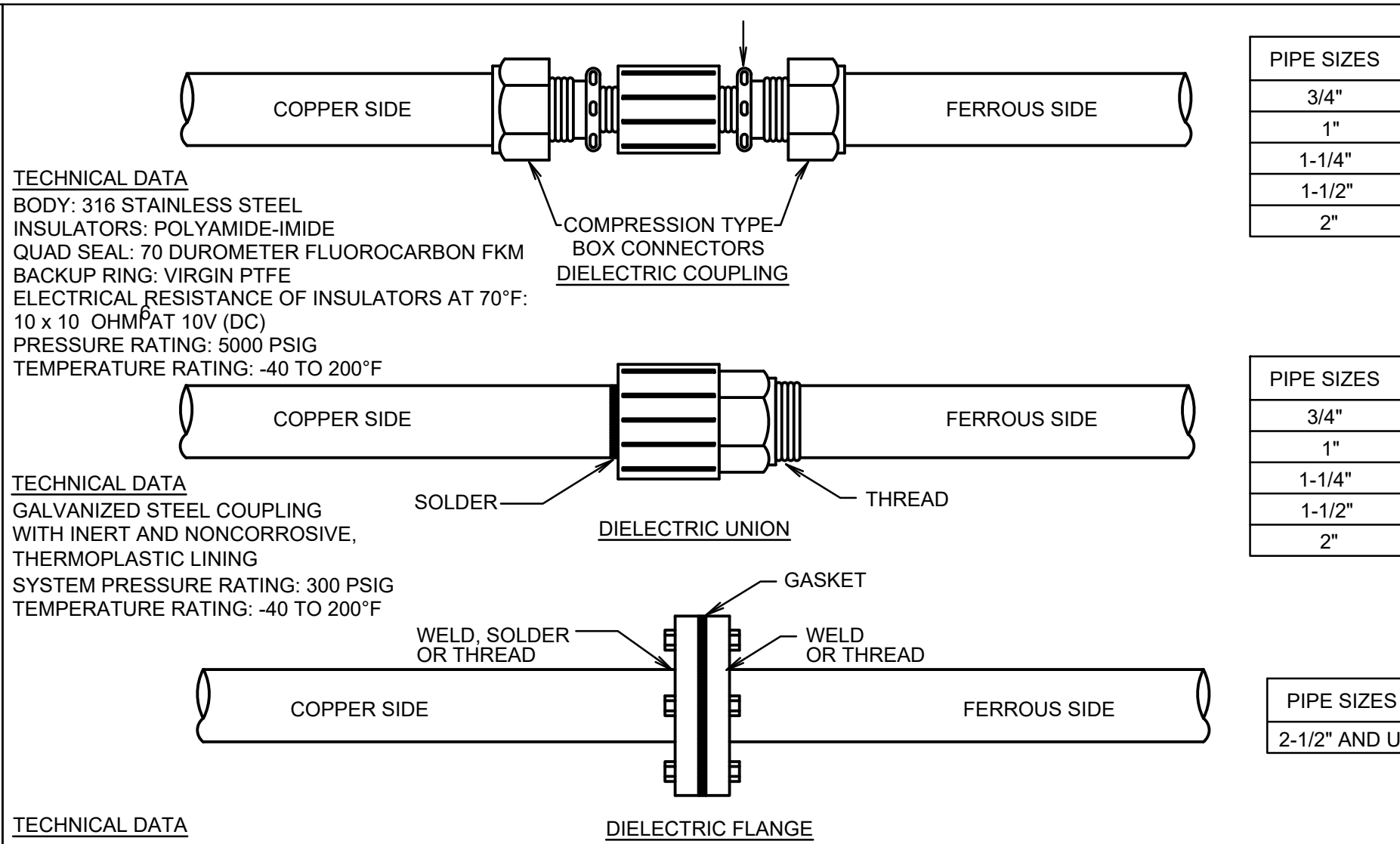


1 **TYPICAL HANGER EXPANSION SHIELD DETAIL**  
SCALE: NTS

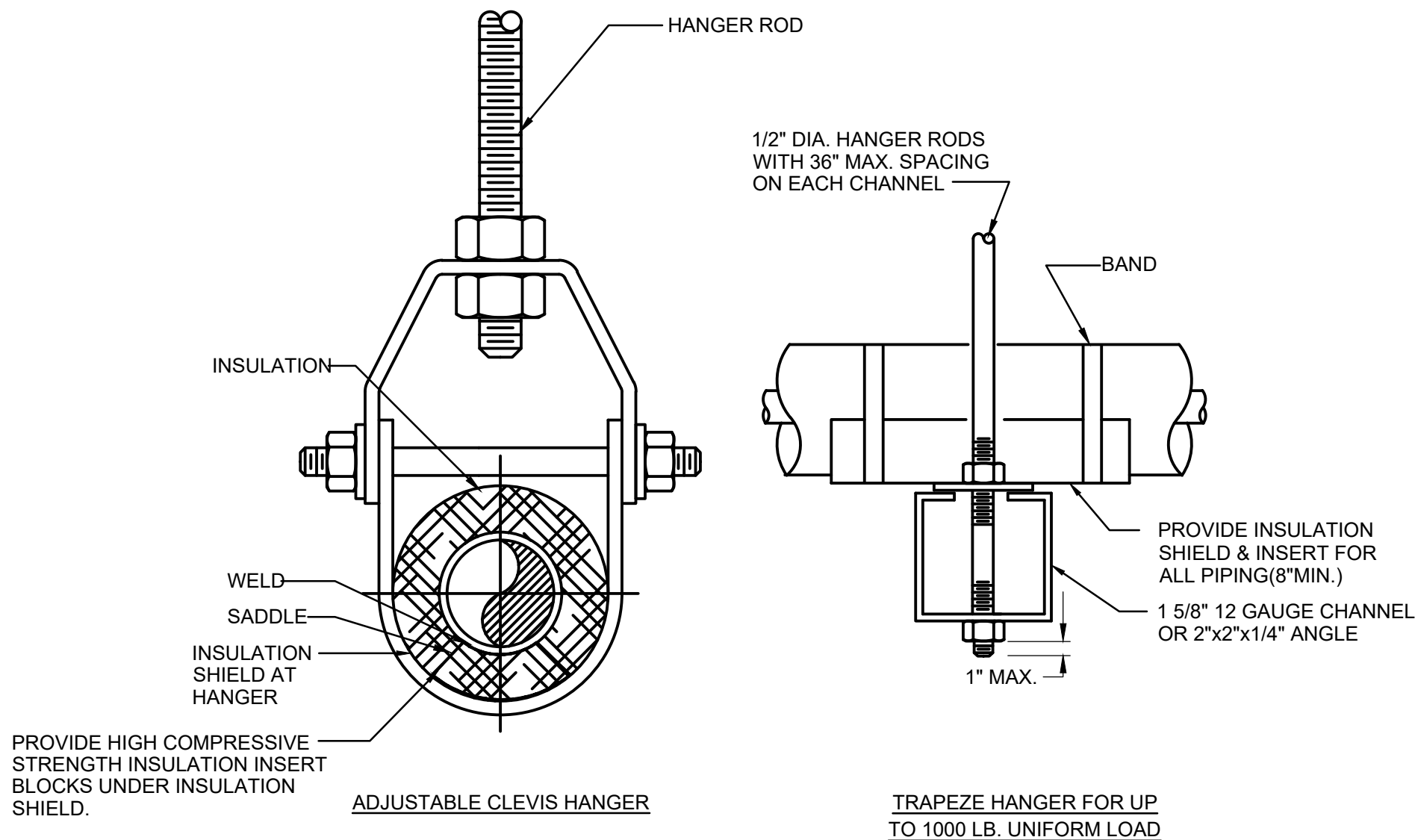


- NOTES:
1. PROVIDE DIFFERENTIAL PRESSURE CONTROL ON HOT WATER SYSTEMS.
  2. PROVIDE TEST PORTS TO ALLOW CALIBRATION FOR BALANCING CONTRACTOR.

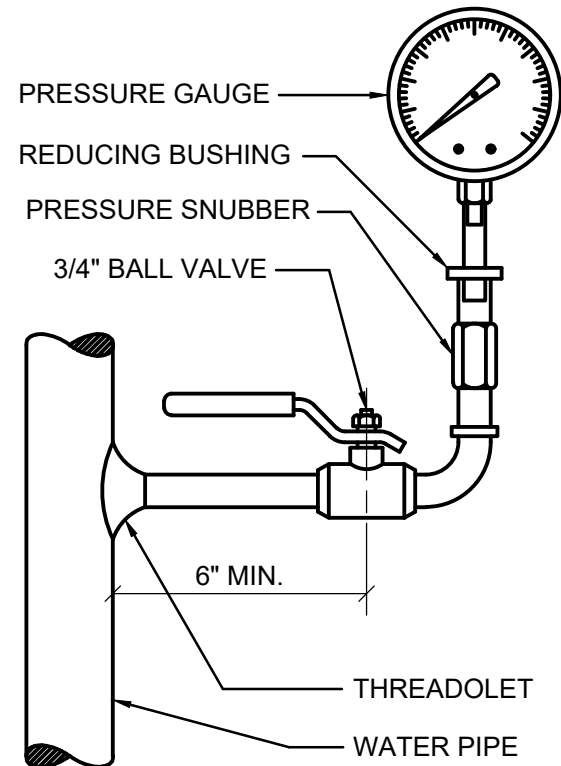
4 **TYPICAL HYDRONIC DIFFERENTIAL PRESSURE ASSEMBLY**  
SCALE: NTS



7 **DIELECTRIC PIPE FITTING**  
SCALE: NTS

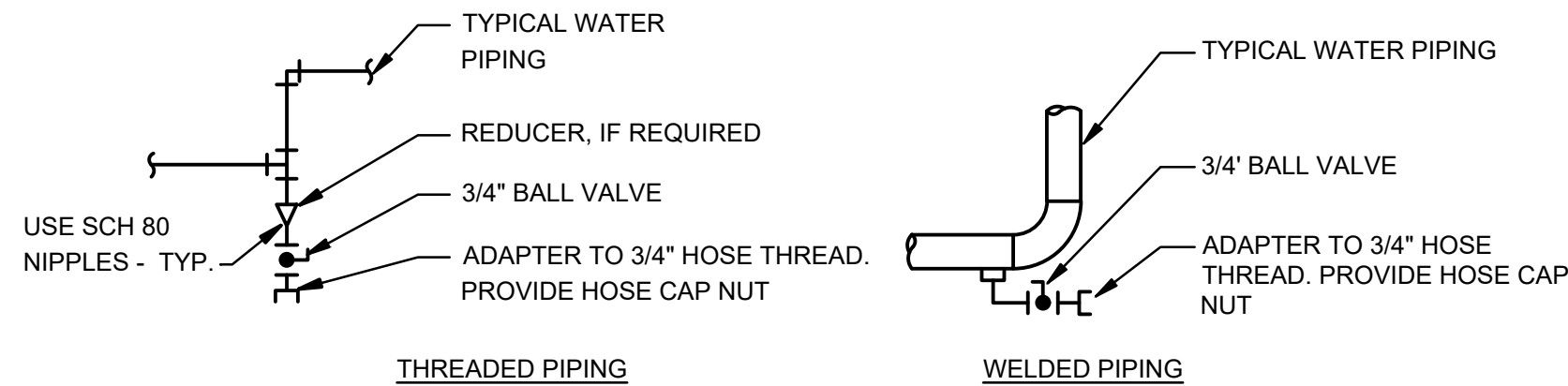


2 **TYPICAL PIPE CLEVIS HANGER DETAIL**  
SCALE: NTS

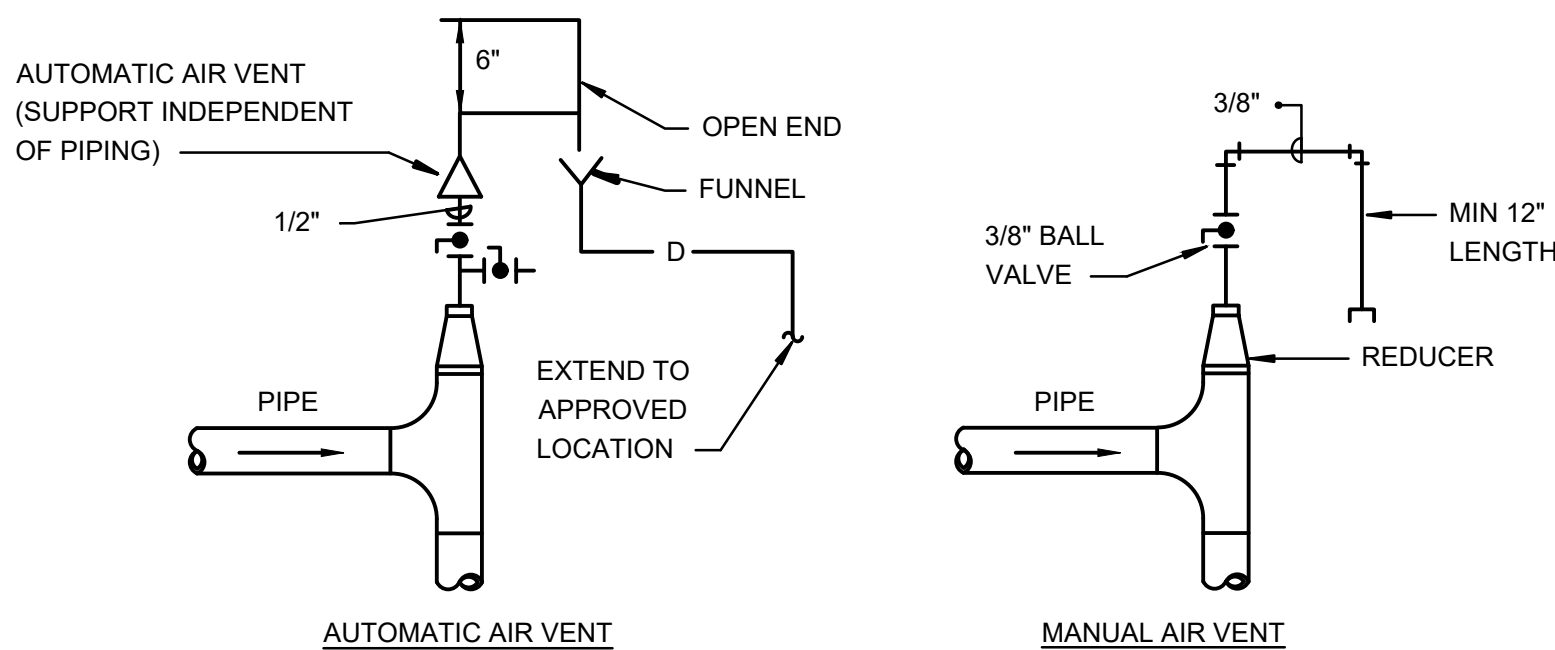


- NOTE:
1. FOR PIPES 2" AND SMALLER, USE FITTING INSTEAD OF THREADOLET OR WELDOLET.

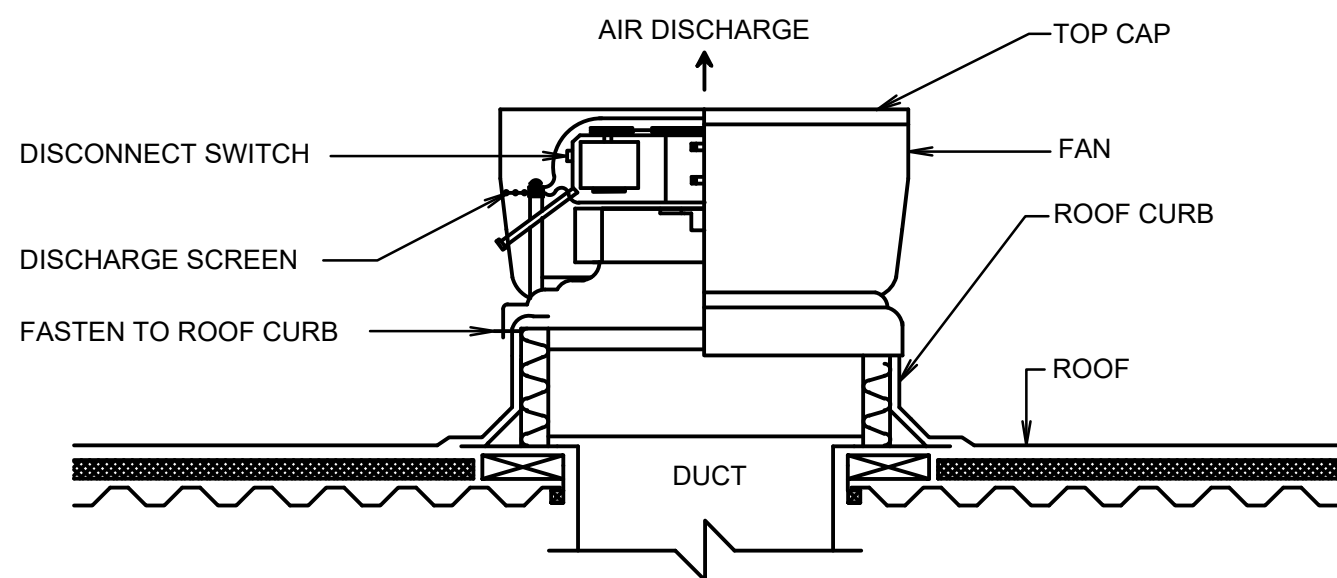
5 **PRESSURE GAUGE DETAIL**  
SCALE: NTS



8 **DRAIN VALVE CONNECTION DETAIL**  
SCALE: NTS

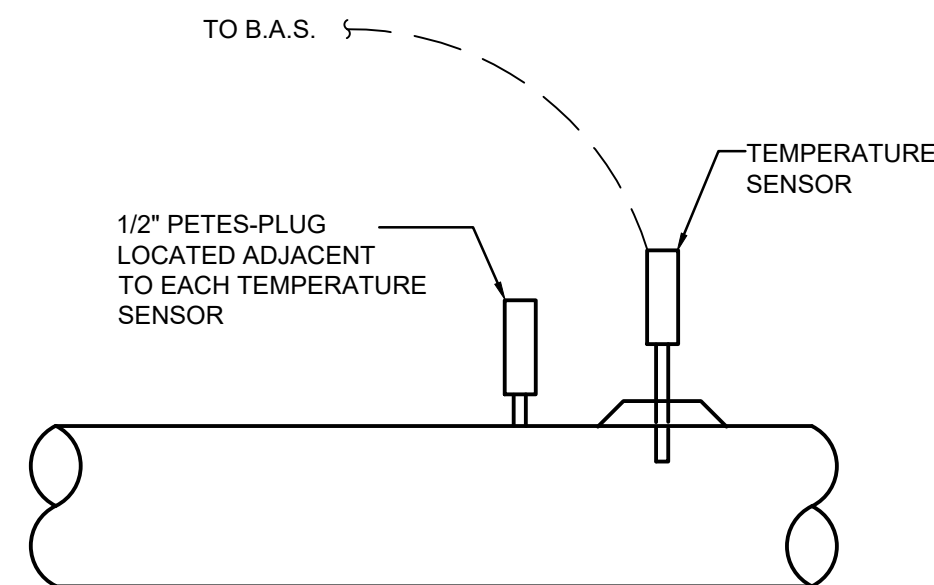


3 **TYPICAL AIR VENT DETAIL**  
SCALE: NTS



- NOTES:
1. EXHAUST FAN SHALL BE PROVIDED WITH FACTORY-MOUNTED CONTROLS.
  2. ALL DISCONNECTS & CONTROL PANELS MOUNTED OUTDOORS SHALL BE PROVIDED WITH A NEMA 4X ENCLOSURE.

6 **TYPICAL ROOFTOP EXHAUST FAN**  
SCALE: NTS



9 **TYPICAL TEMPERATURE SENSOR INSTALLATION**  
SCALE: NTS

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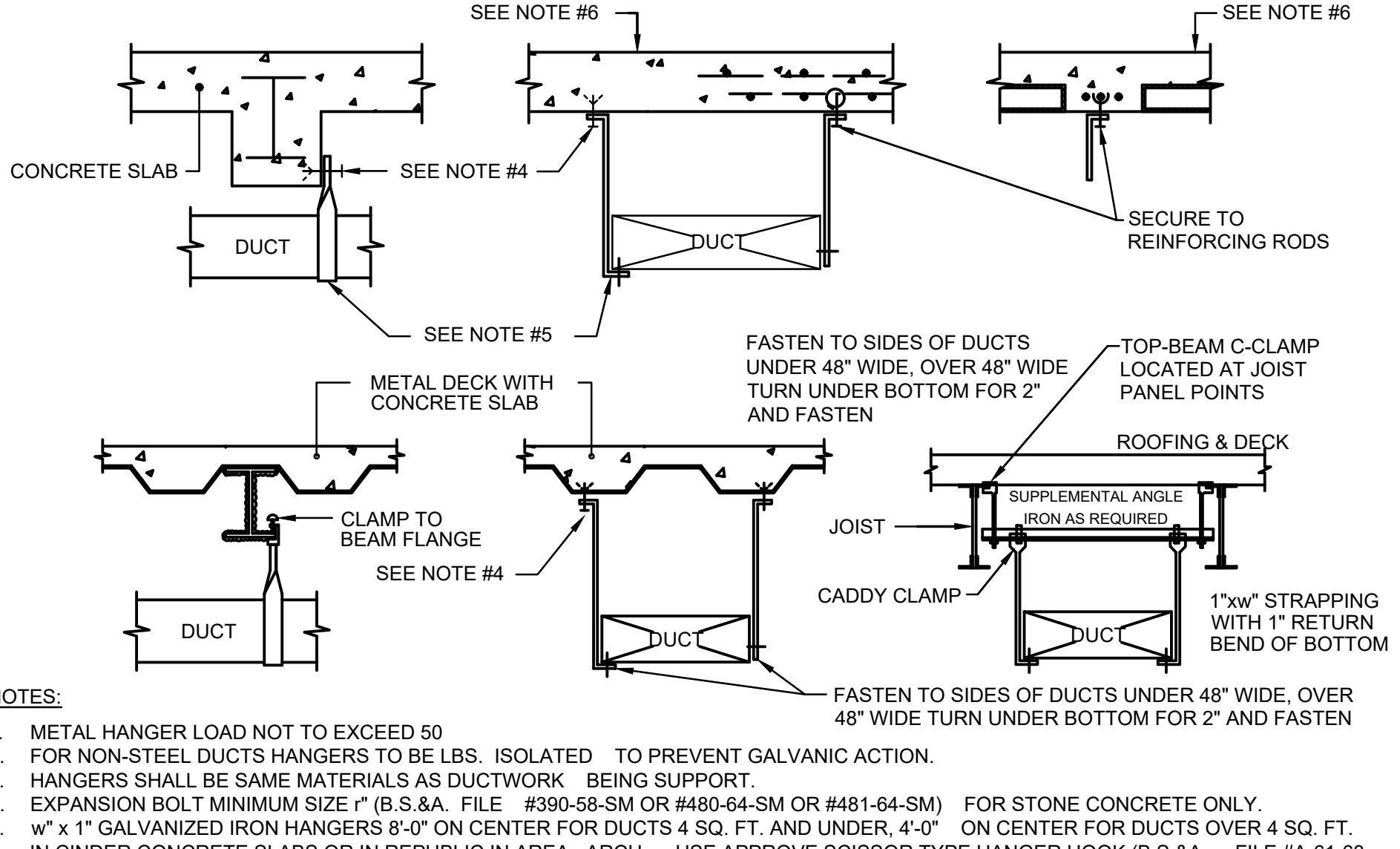
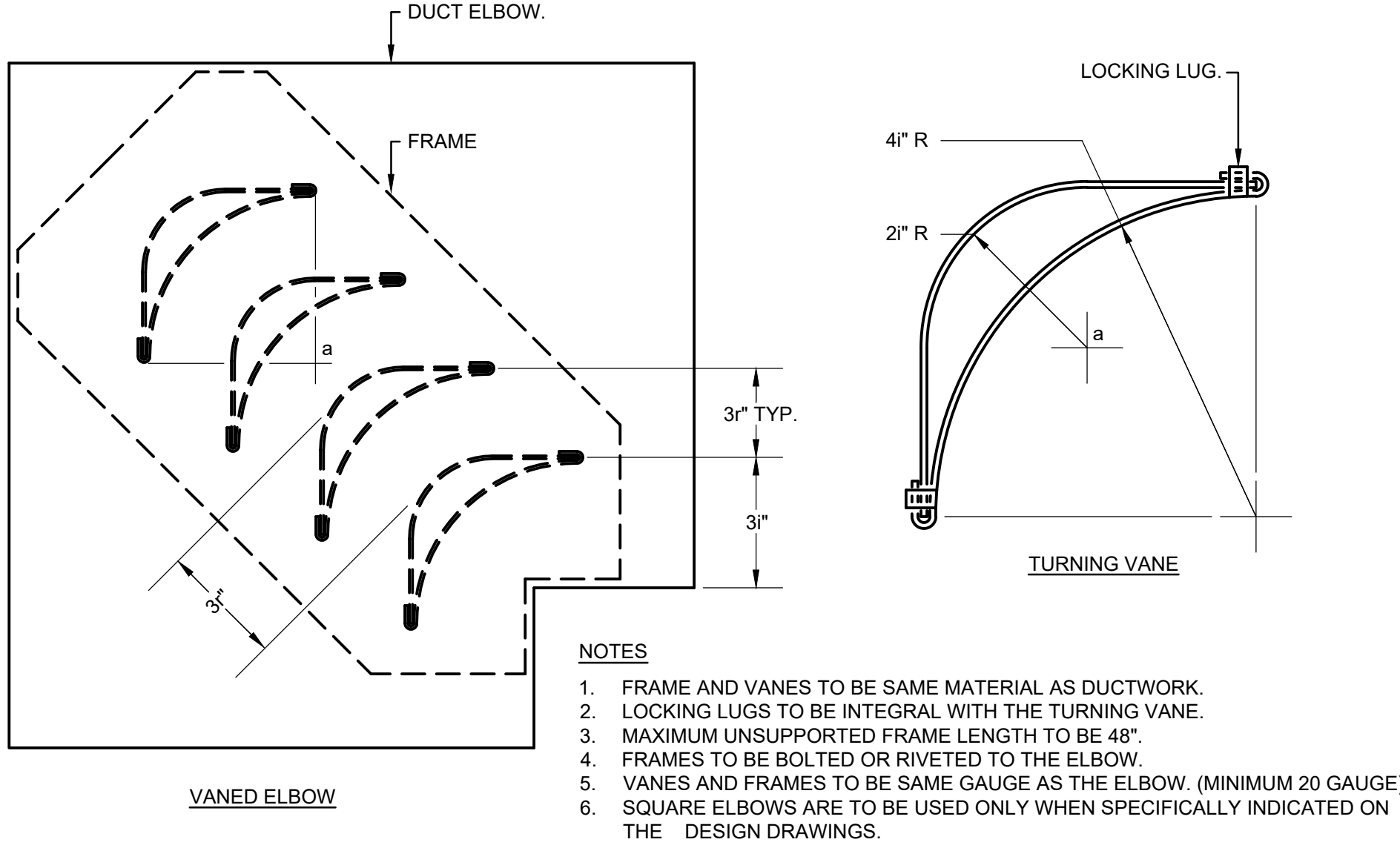
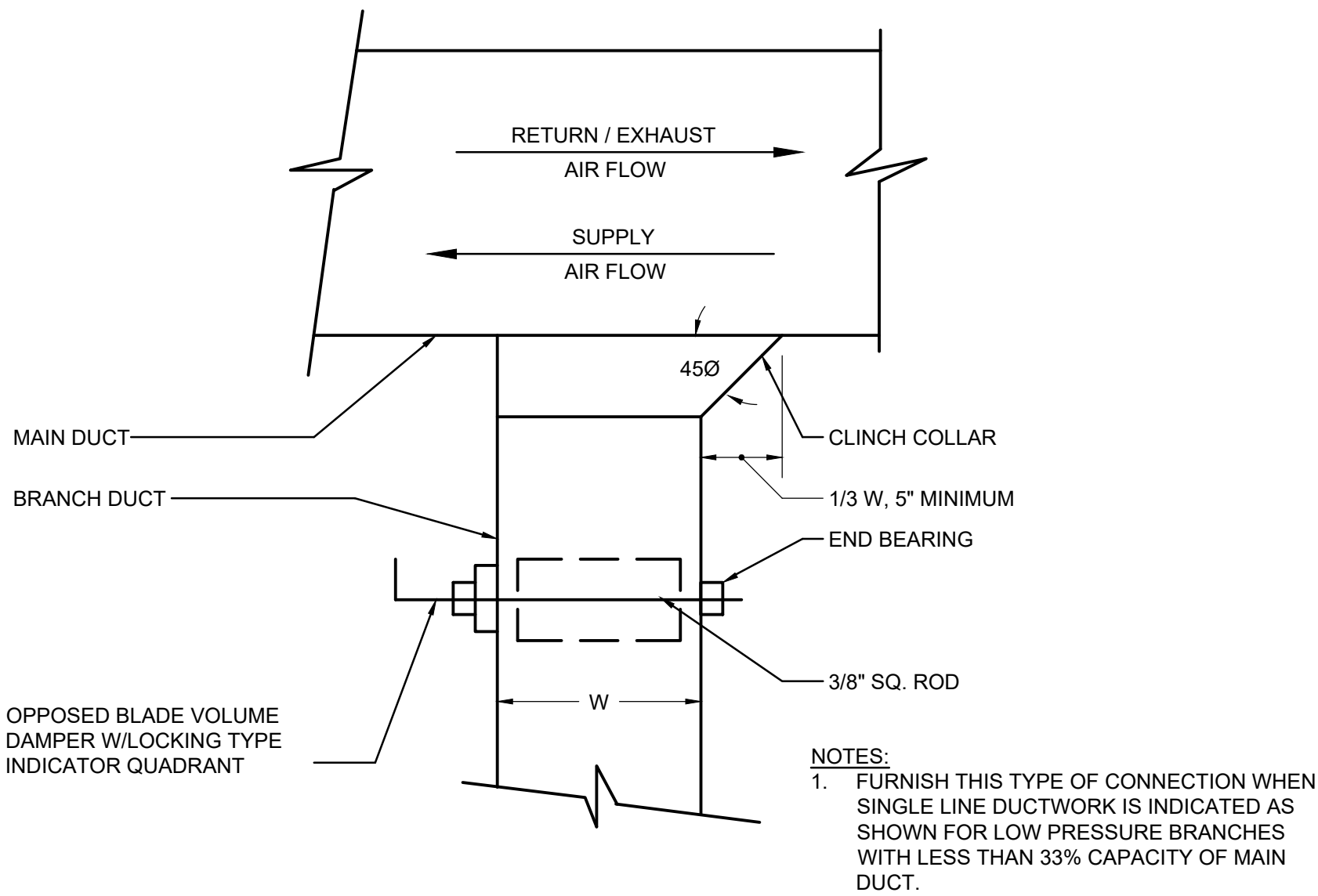
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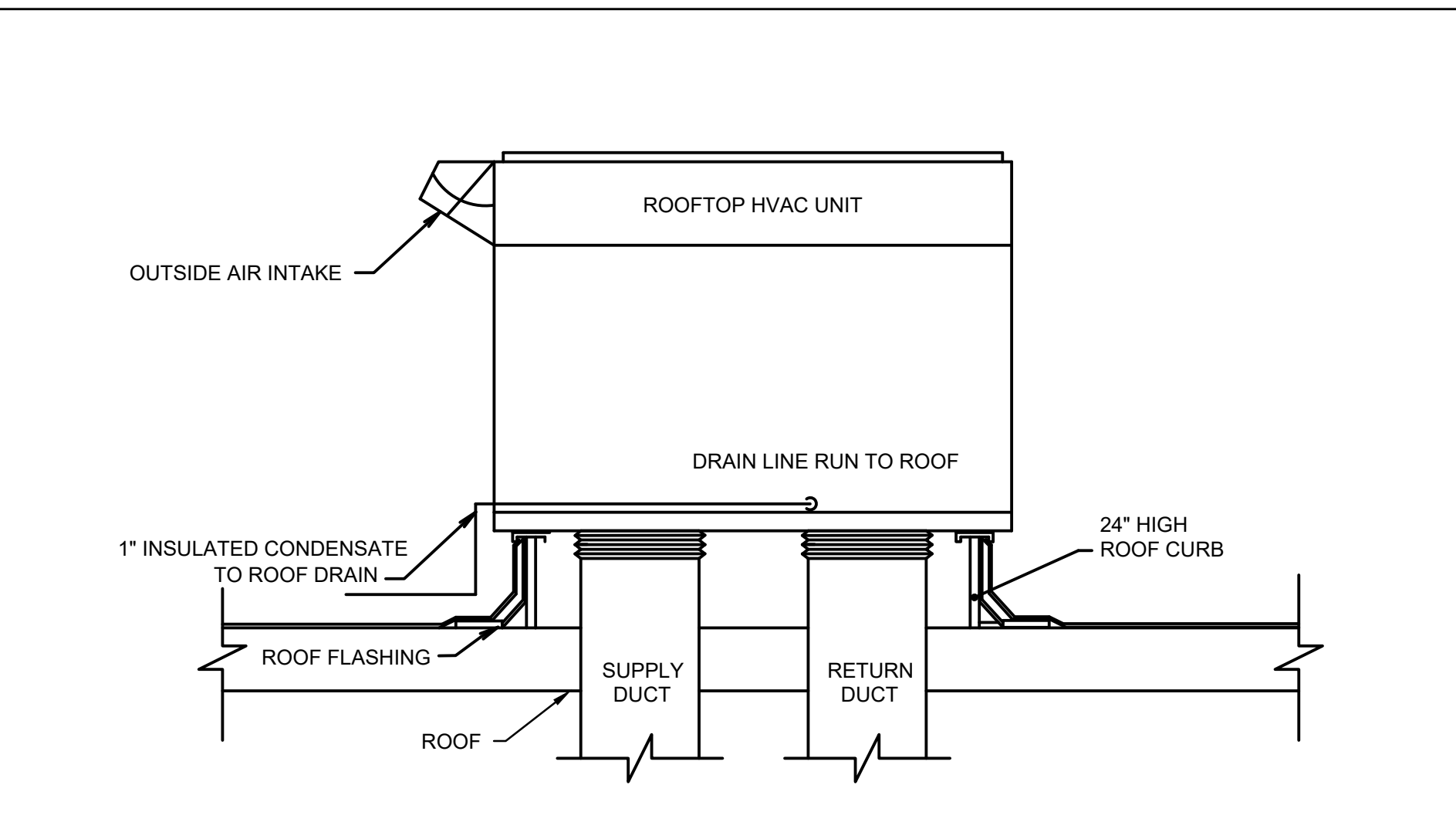
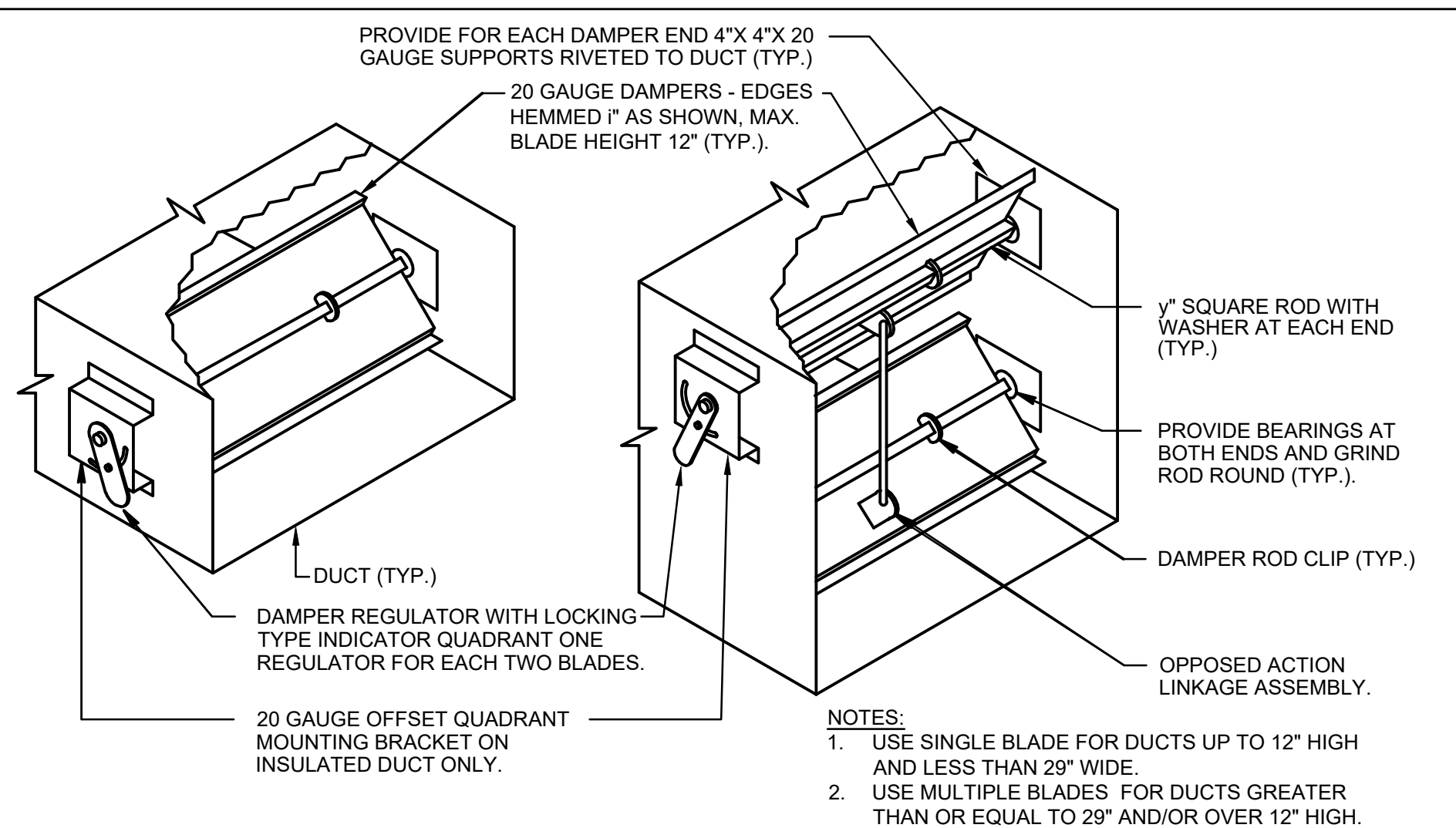
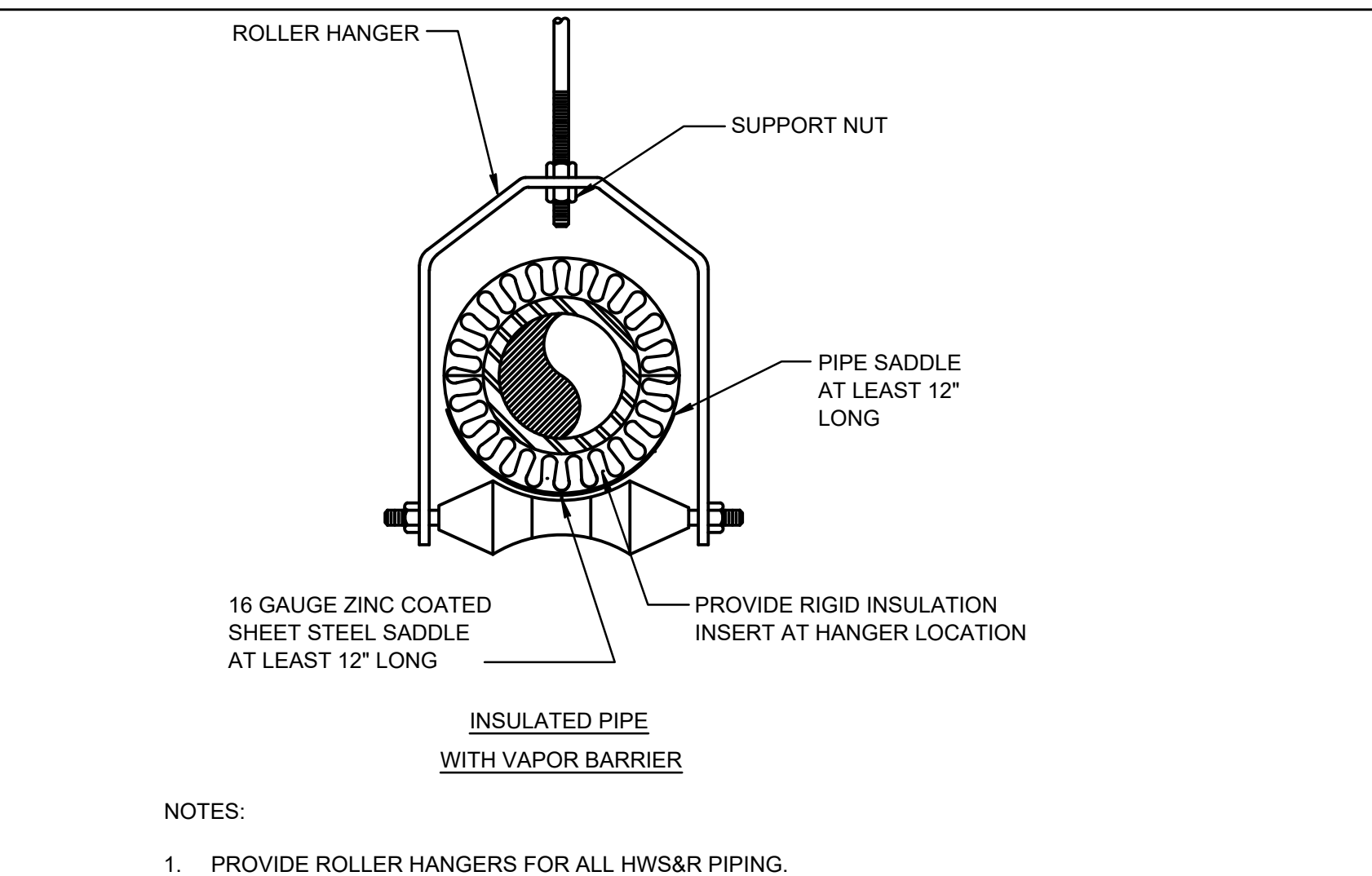




1 DUCT BRANCH TAKEOFF FOR LOW PRESSURE DUCTWORK  
SCALE: NTS

4 MITERED ELBOWS WITH DOUBLE THICKNESS TURNING VANES  
SCALE: NTS

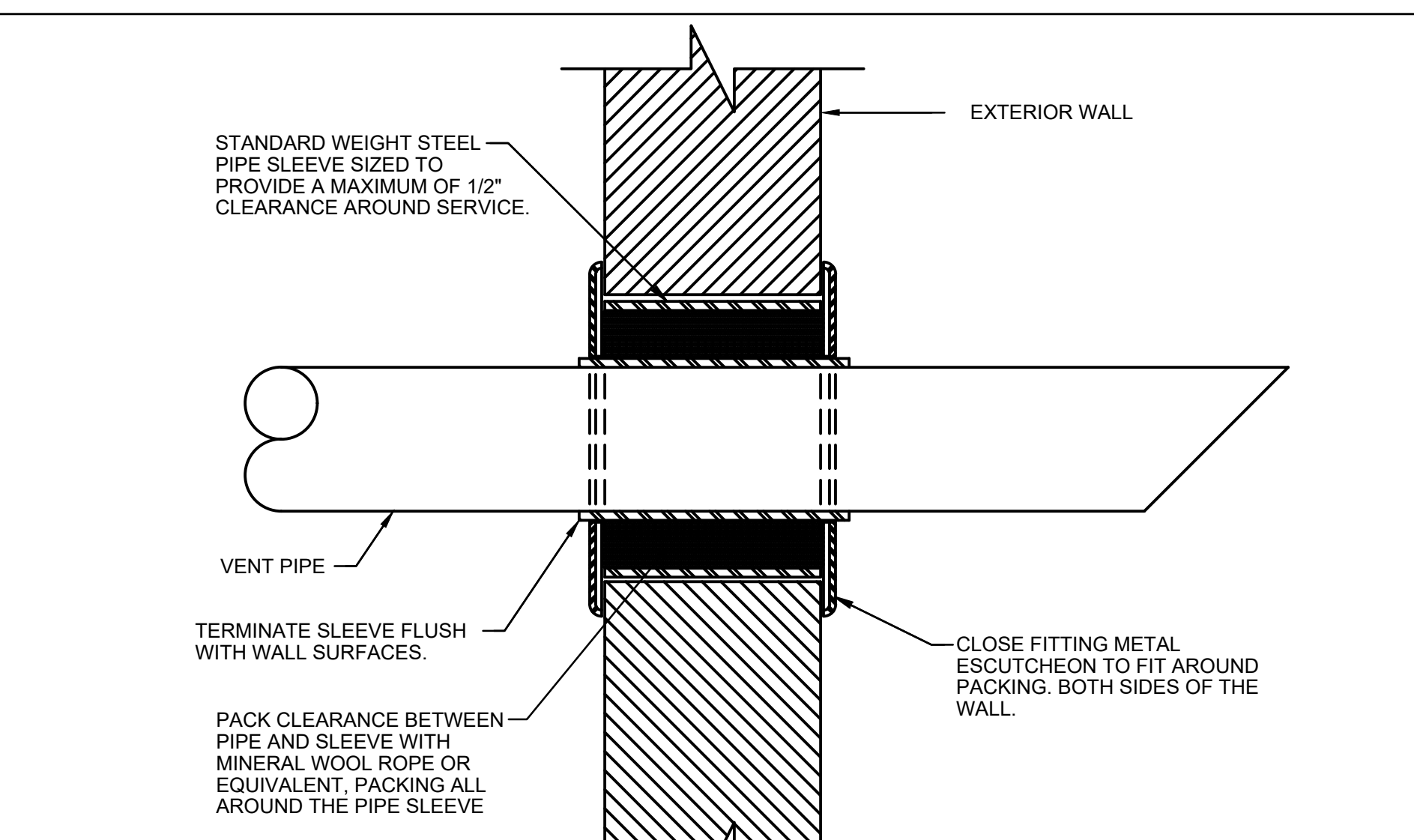
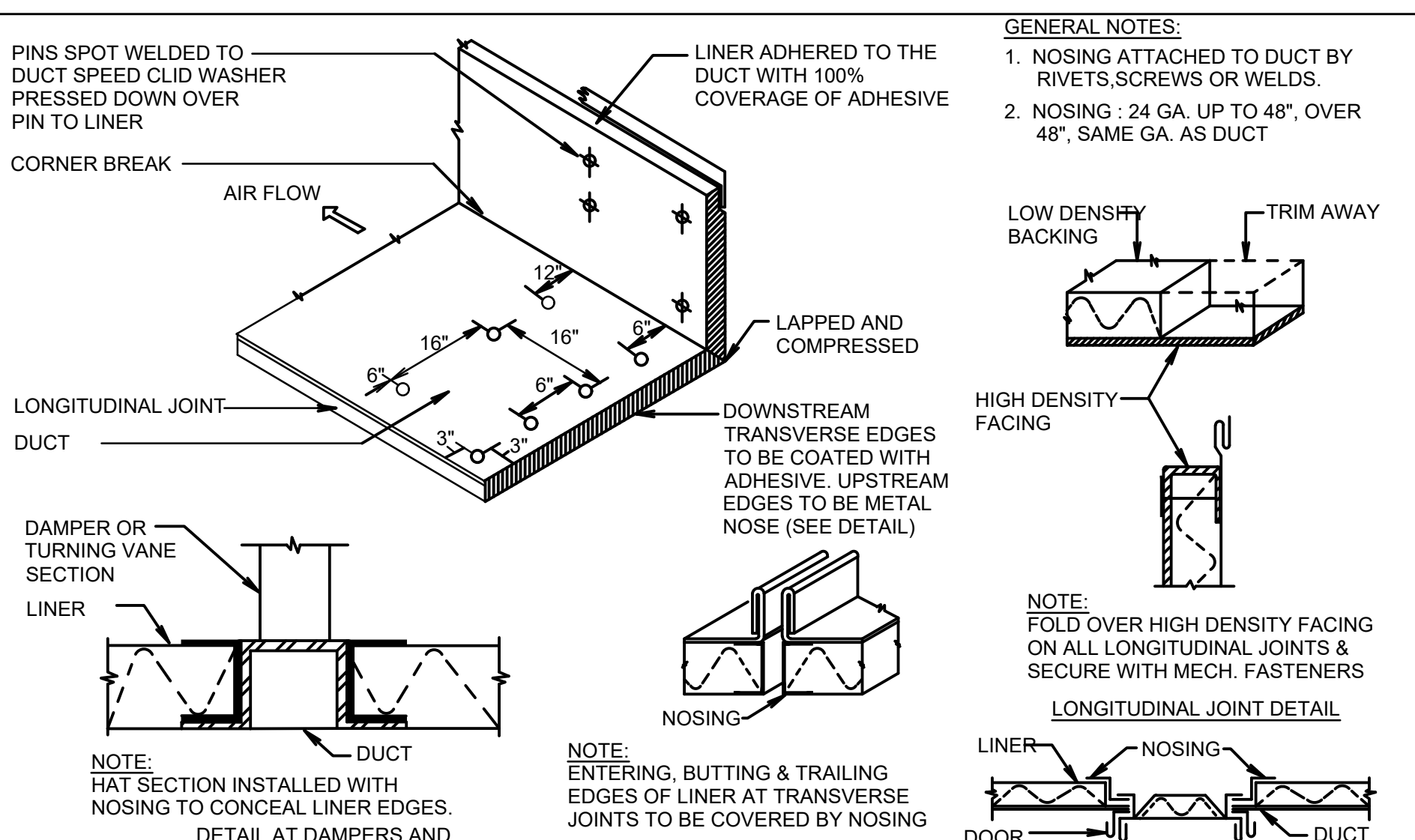
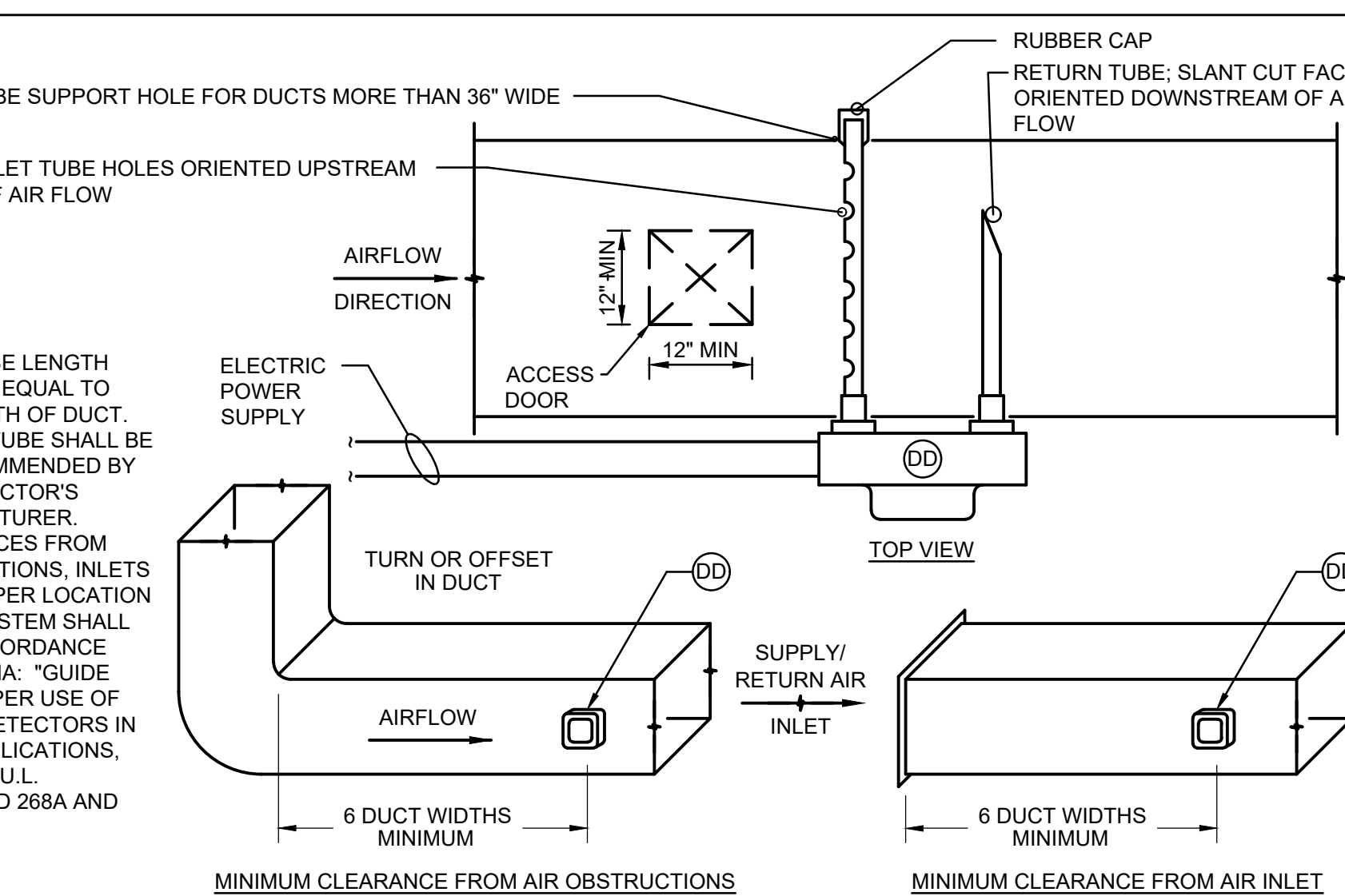
7 TYPICAL DUCT HANGING DETAILS  
SCALE: NTS



2 TYPICAL ROLLER HANGER SUPPORTS  
SCALE: NTS

5 VOLUME DAMPER DETAIL  
SCALE: NTS

8 TYPICAL ROOFTOP UNIT DETAIL  
SCALE: NTS



3 DUCT DETECTOR DETECTION INSTALLATION DETAIL  
SCALE: NTS

6 ACOUSTICAL DUCT LINER DETAIL  
SCALE: NTS

9 INTAKE & EXHAUST VENT THRU-WALL  
SCALE: NTS

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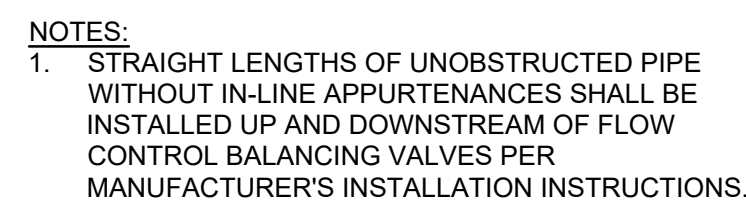
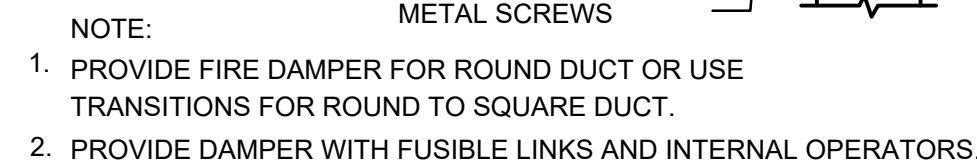
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## 2 **TYPICAL HOT WATER UNIT HEATER PIPING DETAIL**



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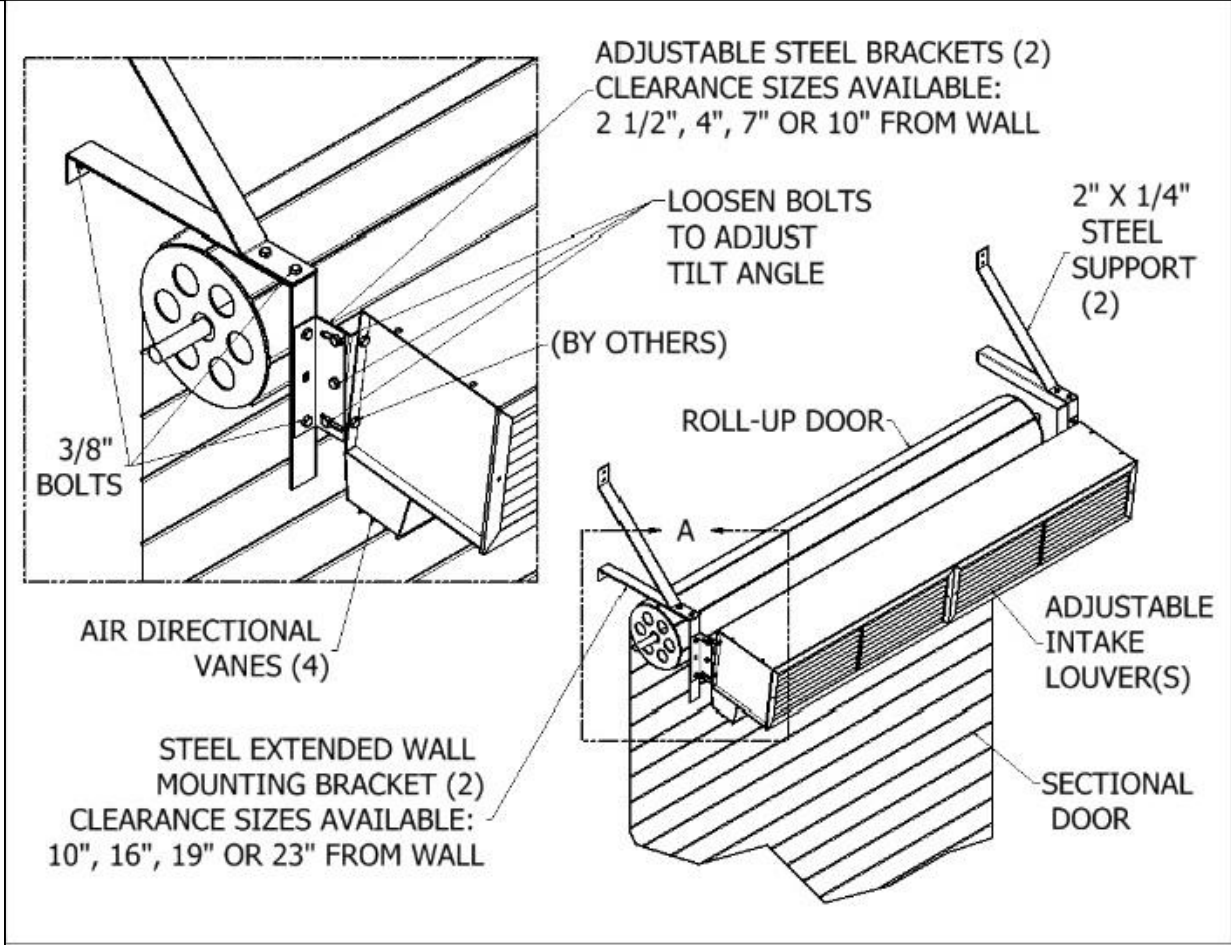
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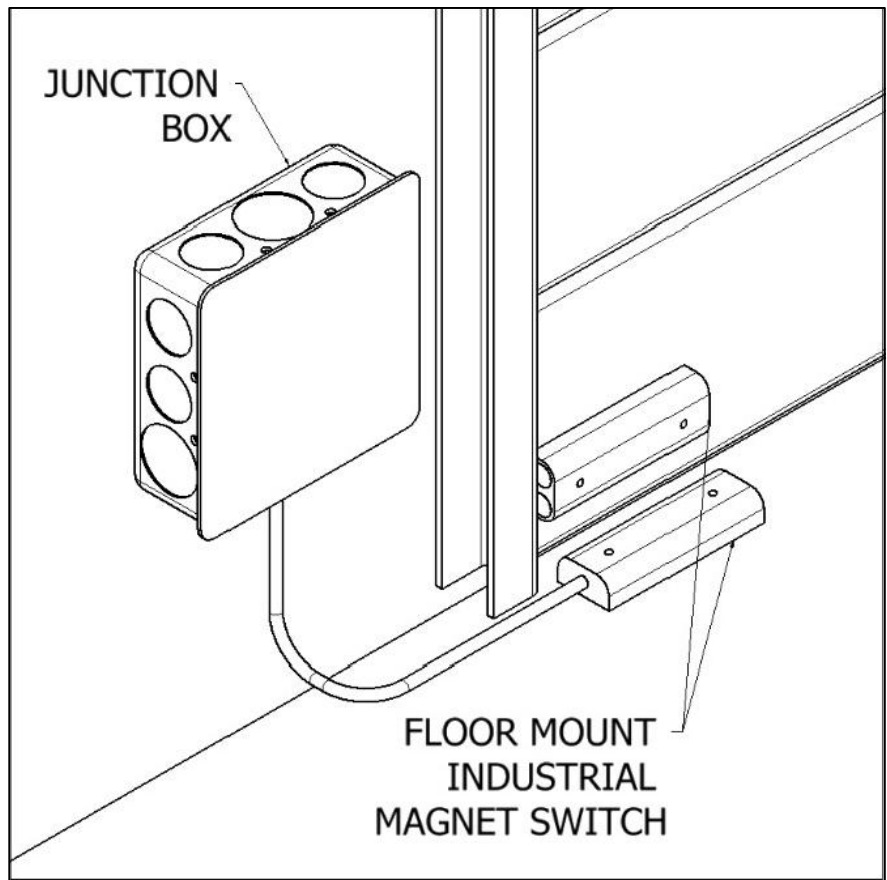
M-503





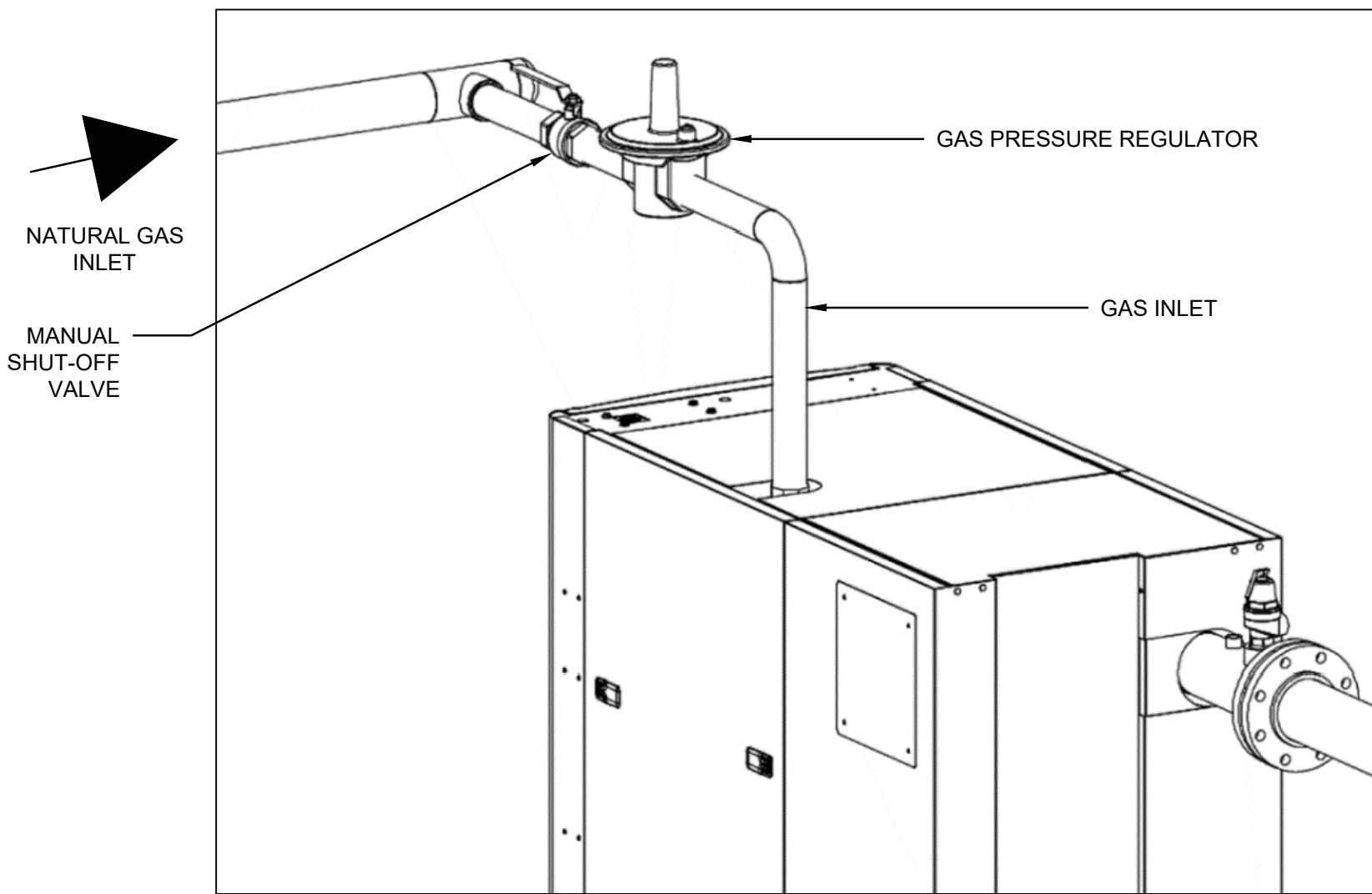
- NOTES:
- EXTENDED WALL MOUNTING: FOR TANDEM MOUNTING OF AIR CURTAIN OVER SECTIONAL STYLE DOOR, USE EITHER WALL MOUNTING ANGLE BRACKETS OR THREADED RODS.
  - TOP MOUNTING BRACKETS: FOR OVERHEAD INSTALLATION OF UNITS, USE IN CONJUNCTION WITH THE THREADED HOLES PROVIDED ON TOP OF UNIT. NOTE: ANGLE BRACKETS, THREADED RODS AND I BEAMS ARE PROVIDED BY OTHERS.

1 TYPICAL AIR CURTAIN MOUNTING DETAIL  
M-504 SCALE: NTS

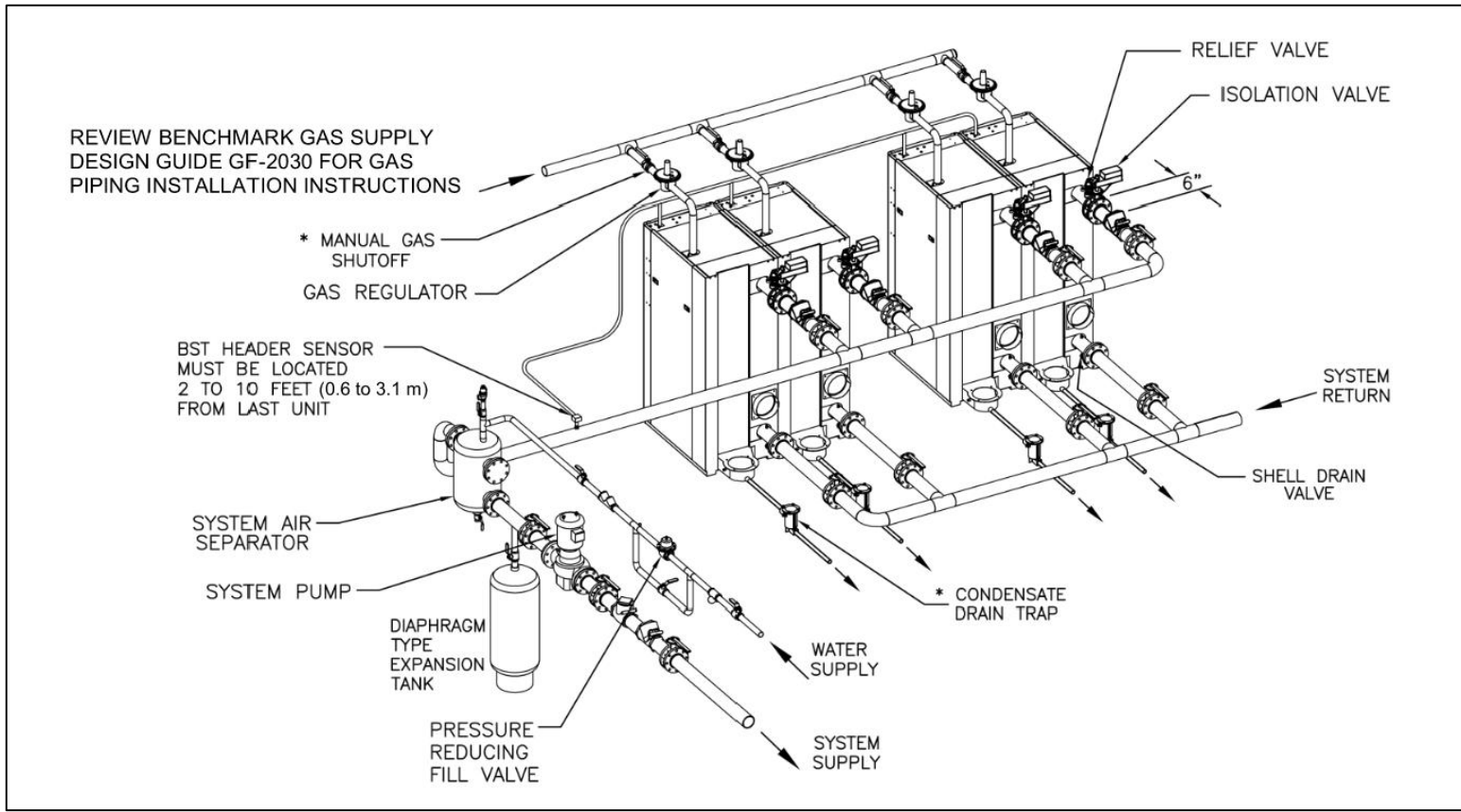


- NOTES:
- Mars door limit and magnetic reed switches are available with NEMA 1, 4X and 7 ratings. Contact the factory for additional ratings and details.
  - Use light gauge materials when field fabricating brackets to activate and deactivate the door limit switch(s).
  - All wiring must be per local and NEC (National Electric Code) codes.
  - Panels or controllers may be required. Refer to wiring diagram inside the control panel box.

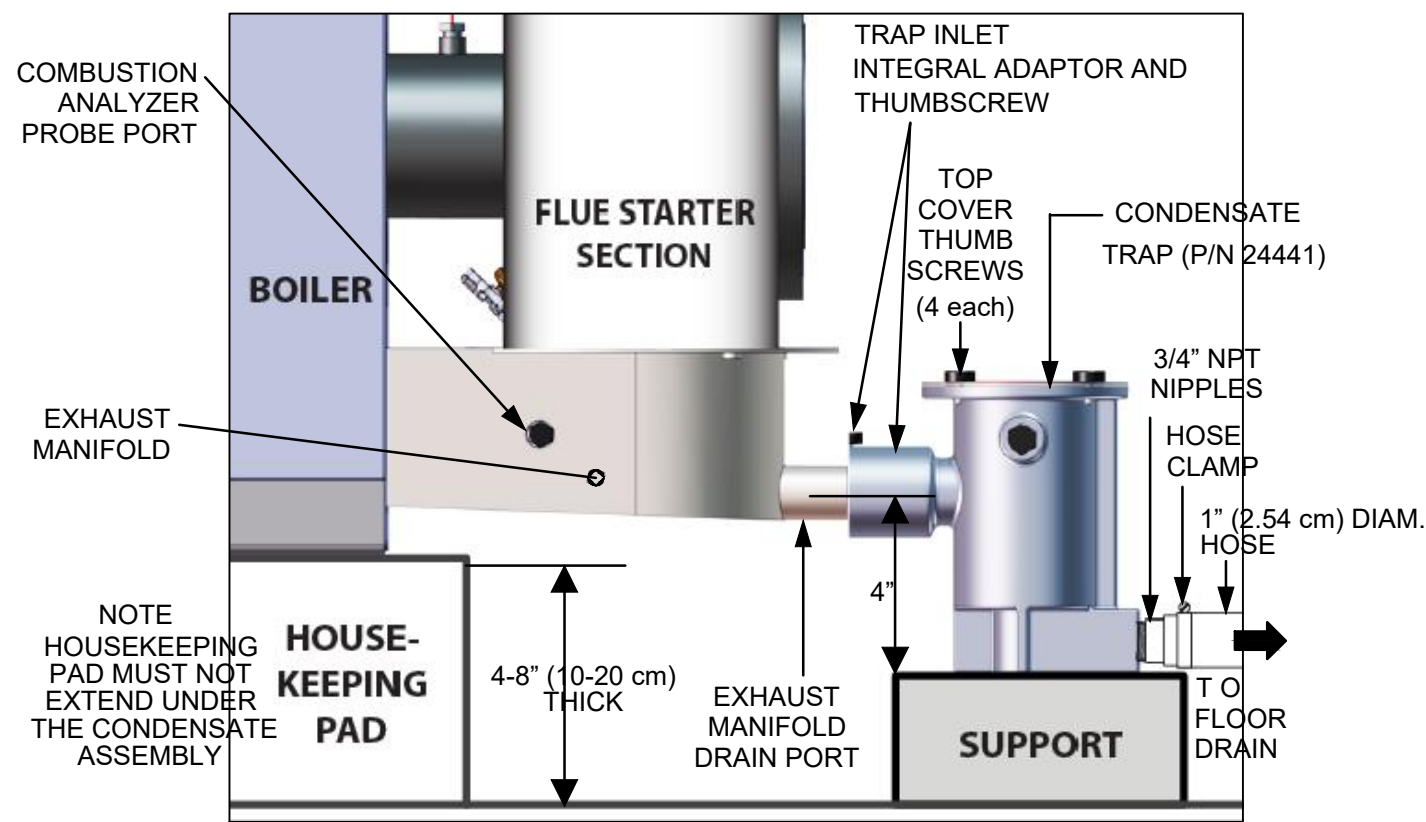
2 TYPICAL MAGNETIC DOOR SWITCH INSTALLATION DETAIL  
M-504 SCALE: NTS



3 TYPICAL BOILER GAS CONNECTION DETAIL  
M-504 SCALE: NTS



4 TYPICAL BOILER PIPING INSTALLATION DETAIL  
M-504 SCALE: NTS



5 TYPICAL BOILER CONDENSATE TRAP INSTALLATION DETAIL  
M-504 SCALE: NTS

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DETAILS SHEET #4

DWG NUMBER :

M-504



AIR CURTAIN SCHEDULE																		
UNIT TAG	LOCATION	SERVICE	AIRFLOW (CFM)	MAX CORE VELOCITY AT NOZZLE (FPM)	AVERAGE VELOCITY (FPM)	DIMENSIONS (LxWxH)	NOZZLE LENGTH (IN)	MOTOR						SOUND (dBA)	WEIGHT (LBS)	MANUFACTURER	MODEL #	COMMENTS
								QTY	HP	RPM	V/PH/Hz	FLA	POWER RATING (WATTS)					
ACUR-1-A	WAREHOUSE	WAREHOUSE DOORS	4,137	5,960	2,206	108"x13"x11"	108	3	0.50	1,725	460/3/60	2.4	1,500	71	175	MARS	STD2108-3UH-OB	SEE BELOW
ACUR-1-B	WAREHOUSE	WAREHOUSE DOORS	4,341	4,660	2,084	120"x13"x11"	120	3	0.50	1,725	460/3/60	2.4	1,570	71	185	MARS	STD2120-3UH-OB	SEE BELOW
AIR CURTAIN SCHEDULE NOTES (TYPICAL U.O.N.):																		
1. FURNISH & INSTALL MOTOR CONTROL PANEL WITH NON-FUSED PANEL MOUNTED DOOR DISCONNECT SWITCH & DOOR LIMIT SWITCH MODEL #99-125 OR EQUIVALENT.																		
2. FURNISH & INSTALL AIR CURTAIN & DOOR LIMIT SWITCH MOUNTING BRACKETS AS REQUIRED.																		
3. FURNISH & INSTALL HEAVY GAUGE OBSIDIAN BLACK CORROSION PROOF PAINT.																		
4. REFER TO SPECIFICATIONS FOR MORE INFORMATION.																		

AIR OUTLET SCHEDULE								
DESIGNATION	DESCRIPTION	NECK SIZE (IN)	FRAME SIZE (IN)	CFM RANGE	MAX NC	MANUFACTURER	MODEL #	COMMENTS
A	PLAQUE TYPE SUPPLY DIFFUSER	8"	24"x24"	0-200	<20	TITUS	OMNI	LAY-IN
	PLAQUE TYPE SUPPLY DIFFUSER	10"	24"x24"	201-350	<20	TITUS	OMNI	LAY-IN
	PLAQUE TYPE SUPPLY DIFFUSER	12"	24"x24"	351-450	<20	TITUS	OMNI	LAY-IN
	PLAQUE TYPE SUPPLY DIFFUSER	14"	24"x24"	451-600	<20	TITUS	OMNI	LAY-IN
	PLAQUE TYPE SUPPLY DIFFUSER	15"	24"x24"	601-750	<20	TITUS	OMNI	LAY-IN
B	DOUBLE DEFLECTION SUPPLY REGISTER	A"xB"	(A+1.5)"x(B+1.5)"	0-750	<20	TITUS	300RS	SURFACE-MOUNT
C	RETURN & EXHAUST DIFFUSER/GRILLE	A"xB"	(A+1.5)"x(B+1.5)"	0-750	<20	TITUS	350RL	CUT-IN & LIGHT SHIELD
D	DRUM LOUVER DIFFUSER	27.5"x27.5"	30"x30"	4000-5000	<40	RUSKIN	DLD-2010	DUCT-MOUNT
AIR OUTLET SCHEDULE NOTES (TYPICAL U.O.N.):								
1. INSTALL FOUR (4) WAY DIFFUSERS UNLESS OTHERWISE NOTED. FURNISH & INSTALL BLANK OFF PLATES FOR DIFFUSERS SHOWN TO HAVE 2-WAY OR 3-WAY PATTERNS.								
2. INCREASE NECK SIZES AS REQUIRED TO ACCOMMODATE BLANK-OFF PLATES.								
3. DIFFUSERS SHALL BE SUITABLE FOR THE TYPE OF CEILING CONSTRUCTION BEING INSTALLED IN.								
4. DIFFUSERS THAT SERVE AREAS WITHOUT HUNG CEILINGS SHALL BE SUITABLE FOR DUCTWORK MOUNTING.								
5. ALL ADJUSTABLE AIR OUTLET PATTERN DEFLECTORS SHALL BE FIELD ADJUSTED TO OPTIMIZE AIR DISTRIBUION TO PREVENT DRAFT.								
6. ARCHITECT TO CONFIRM FINAL AIR OUTLET COLOR & FINISHES.								
7. FURNISH & INSTALL INSULATED DUCT CAP ACCESSORY FOR EACH DRUM LOUVER DIFFUSER.								
8. REFER TO MECHANICAL SPECIFICATIONS FOR MORE INFORMATION.								

AIR SEPARATOR SCHEDULE												
UNIT TAG	LOCATION	SERVICE	CONNECTION INLET/OUTLET (IN)	DESIGN FLOW (GPM)	WATER PD (FT)	UNIT CONSTRUCTION	DIMENSIONS (D"xH")	WEIGHT (LBS)	MAX TEMP RATING (F)	MANUFACTURER	MODEL #	COMMENTS
AS-1-1	MER	BUILDING HW	4/4	145.6	0.55	CARBON STEEL	16x32	278.0	350.0	BELL & GOSSETT	R-4F	SEE BELOW
AIR SEPARATOR SCHEDULE NOTES:												
1. UNIT SHALL BE DESIGNED & CONSTRUCTED PER ASME CODE SECTION VIII, DIV. 1 STANDARDS & ASME RATED.												
2. FURNISH & INSTALL FLANGED CONNECTIONS WITH CARBON STEEL CONSTRUCTION AND 304SS STRAINER.												
3. FURNISH & INSTALL MANUAL BLOWDOWN VALVE; B&G MODEL MBV-1 OR EQUIVALENT.												
4. FURNISH & INSTALL AUTOMATIC AIR VENT; B&G MODEL 107A OR EQUIVALENT.												
5. UNIT TO BE RATED FOR A MAXIMUM WORKING PRESSURE OF 125 PSIG.												
6. REFER TO SPECIFICATIONS FOR MORE INFORMATION.												

DESTRATIFICATION FAN SCHEDULE																					
UNIT TAG	LOCATION	SERVICE	TYPE	DRIVE	AIRFLOW (CFM)	TOTAL SP (IN W.C.)	TOTAL ESP (IN W.C.)	OUTLET VELOCITY (FPM)	INLET/OUTLET SIZE (IN)	MOTOR						VFD	SOUND (dBA)	WEIGHT (LBS)	MANUFACTURER	MODEL #	COMMENTS
										BHP	HP	RPM	V/PH/Hz	FLA	MCA						
DSF-4-1 THRU 22	AS/RS WAREHOUSE CEILING	WAREHOUSE	PROPELLER	DIRECT	-	-	-	-	19/12	0.22	0.25	1,630	277/1/60	1.3	15.0	NO	45	22	AIRIUS	A-60-EC-277-B	SEE BELOW
DSF-4-23 THRU 43	AS/RS WAREHOUSE CEILING	WAREHOUSE	PROPELLER	DIRECT	-	-	-	-	15/15	0.13	0.25	1,660	208/1/60	0.8	15.0	NO	44	13	AIRIUS	ONYX-EC-240-B	SEE BELOW
DESTRATIFICATION FAN SCHEDULE NOTES (TYPICAL U.O.N.):																					
1. FURNISH & INSTALL SINGLE POINT POWER CONNECTION WITH DISCONNECT SWITCH.																					
2. FAN SHALL BE CAPABLE OF ACCEPTING A 0-10VDC CONTROL SIGNAL.																					
3. FURNISH & INSTALL MANUFACTURER HANGING KIT.																					
4. REFER TO MECHANICAL SPECIFICATIONS FOR MORE INFORMATION.																					

EXHAUST FAN SCHEDULE																					
UNIT TAG	LOCATION	SERVICE	TYPE	DRIVE	AIRFLOW (CFM)	TOTAL SP (IN W.C.)	TOTAL ESP (IN W.C.)	OUTLET VELOCITY (FPM)	INLET/OUTLET SIZE (IN)	MOTOR						VFD	SOUND (dBA)	WEIGHT (LBS)	MANUFACTURER	MODEL #	COMMENTS
										BHP	HP	RPM	V/PH/Hz	FLA	MCA						
TXF-R-1	WAREHOUSE ROOF	RESTROOMS	CENTRIFUGAL BI	DIRECT	2,000	-	0.50	1,163	16x16/29	0.42	0.75	1,312	120/1/60	10.0	15.0	NO	64	70	GREENHECK	CUE-140-VG	SEE BELOW
TF-4-1	RM 417	IT CLOSET	CENTRIFUGAL FC	DIRECT	400	-	0.30	889	19x19/8x8	0.10	0.10	1,070	120/1/60	2.5	15.0	NO	51	31	GREENHECK	SP-A510-VG	SEE BELOW
TF-4-2	RM 418	ELECTRIC RM	CENTRIFUGAL FC	DIRECT	400	-	0.30	889	19x19/8x8	0.10	0.10	1,070	120/1/60	2.5	15.0	NO	51	31	GREENHECK	SP-A510-VG	SEE BELOW
MXF-1-1	MECH RM	BOILER RM	CENTRIFUGAL BI	BELT	300	-	0.50	163	18x18	0.10	0.25	1,361	120/1/60	5.8	15.0	YES	56	191	GREENHECK	TCB-2-09	SEE BELOW
TF-1-1	RM 116	AIR COMPRESSOR RM	CENTRIFUGAL BI	BELT	5,000	-	0.30	596	35x35/35x35	0.65	2.00	600	208/1/60	12.5	15.0	YES	65	134	GREENHECK	SQ-18-07-0700-VG	SEE BELOW
TF-1-2	RM 117	RESTROOMS	CENTRIFUGAL FC	DIRECT	400	-	0.30	889	19x19/8x8	0.10	0.10	1,070	120/1/60	2.5	15.0	NO	51	31	GREENHECK	SP-A510-VG	SEE BELOW
TXF-1-1	RM 121	RESTROOMS	CENTRIFUAL FC	DIRECT	150	-	0.50	139	8x8/8x8	0.04	0.10	1,226	120/1/60	1.5	15.0	NO	37	24	GREENHECK	CSP-A390-VG	SEE BELOW
TXF-1-2	RM 122	RESTROOMS	CENTRIFUAL FC	DIRECT	150	-	0.50	139	8x8/8x8	0.04	0.10	1,226	120/1/60	1.5	15.0	NO	37	24	GREENHECK	CSP-A390-VG	SEE BELOW
TF-1-3	RM 107	EMERG. SERV. RM	CENTRIFUGAL FC	DIRECT	400	-	0.30	889	19x19/8x8	0.10	0.10	1,070	120/1/60	2.5	15.0	NO	51	31	GREENHECK	SP-A510-VG	SEE BELOW
FAN SCHEDULE NOTES (TYPICAL U.O.N.):																					
1. FURNISH & INSTALL SINGLE POINT POWER CONNECTION WITH EC VARIGREEN MOTOR AND HOA CONTROLLER.																					
2. FURNISH & INSTALL INSULATED 24"H ROOFCURB FOR TXF-R-1.																					
3. FURNISH & INSTALL MANUFACTURER HANGING KIT WITH VIBRATION ISOLATORS FOR TF-1-1&2, TXF-1&2, TF-4-1&2 & MXF-1-1.																					
4. FURNISH SPARK RESISTANT B CERTIFICATION FOR MXF-1-1.																					
5. REFER TO SPECIFICATIONS FOR MORE INFORMATION.																					

TO THE BEST KNOWLEDGE, BELIEF AND PROFESSIONAL JUDGEMENT, THESE PLANS AND SPECIFICATIONS ARE IN COMPLIANCE WITH THE 2020 ENERGY CONSERVATION CONSTRUCTION CODE OF NEW YORK STATE.

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SUFFERN, NEW YORK

KEY PLAN

REV	DESCRIPTION	DATE
	ISSUED FOR DOB SUBMISSION	09/10/2021
	ISSUED FOR BID	10/15/2021
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SCHEDULES SHEET #1

DWG NUMBER :

M-601



LOW PRESSURE HOT WATER CONDENSING BOILER SCHEDULE																											
UNIT TAG	LOCATION	SERVICE	UNIT TYPE	RATED CAPACITY			WATER CONDITIONS					BOILER INPUT - FIRING RATE					ELECTRICAL				INTAKE/ EXHAUST VENT SIZE (IN)	EFFICIENCY (%)	WEIGHT (LBS)	DIMENSIONS (WxDxH)	MANUFACTURER	MODEL #	COMMENTS
				BOILER HORSEPOWER (BHP)	INPUT (MBH)	OUTPUT (MBH)	OPERATING PRESSURE (PSIG)	FLOW RATE (GPM)	PRESURE DROP (FT)	ENTERING WATER TEMP (F)	LEAVING WATER TEMP (F)	FUEL OIL		GAS			V/PH/Hz	FLA	MCA	MOCp							
												TYPE	FLOW RATE (GPH)	TYPE	MIN/MAX PRESSURE (IN W.C.)	FLOW RATE (CFH)											
B-1-1	BOILER ROOM	SPACE HEATING	FIRETUBE	45	1500	1395	45	250	6.47	130	150	N/A	N/A	NG	4/14	1500	120/1/60	-	16	20	6/6	87	1406	28"x44"x78"	AERCO	BMK 1500	SEE BELOW
B-1-2	BOILER ROOM	SPACE HEATING	FIRETUBE	45	1500	1395	45	250	6.47	130	150	N/A	N/A	NG	4/14	1500	120/1/60	-	16	20	6/6	87	1406	28"x44"x78"	AERCO	BMK 1500	SEE BELOW
LOW PRESSURE HOT WATER CONDENSING BOILER SCHEDULE NOTES TYP (U.O.N.):																											
1. FURNISH & INSTALL SINGLE POINT ELECTRICAL CONNECTION WITH CIRCUIT BREAKER DISCONNECT.																											
2. FURNISH & INSTALL C-MORE CONTROLLER WITH BST FOR BOILER LEAD/LAG CONTROL & BACNET IP & MS/TP COMMUNICATION.																											
3. FURNISH & INSTALL CONDENSATE PH TREATMENT KIT FOR EACH BOILER.																											
4. FURNISH & INSTALL ALL INTAKE & VENT PIPING AS SHOWN ON MECHANICAL PLANS.																											
5. UNIT SHALL BE FACTORY MUTUAL (FM GLOBAL) CERTIFIED AND UL APPROVED.																											
6. FURNISH & INSTALL WALL-MOUNTED MSA TAMPER-PROOF EMERGENCY BOILER PLANT SHUTDOWN SWITCH OR EQUIVALENT AS SHOWN ON MECHANICAL PLANS.																											
7. FURNISH & INSTALL ELECTRONIC PILOT.																											
8. UNIT SHALL BE IN ACCORDANCE WITH ASME SECTION IV & PRESSURE VESSEL CODE.																											
9. EXHAUST VENT PIPING TO BE DOUBLE-WALL AL29-4C OR EQUIVALENT..																											
10. REFER TO SPECIFICATIONS FOR MORE INFORMATION.																											

HOT WATER FINNED TUBE RADIATOR SCHEDULE																								
UNIT TAG	LOCATION	SERVICE	HEATING CAPACITY (BTU/FT)	WATER-SIDE								RADIATOR								MANUFACTUER	MODEL #	COMMENTS		
				FLUID TYPE	% GLYCOL	FLOW (GPM)	ROWS HIGH	WATER PD (FT)	HWS TEMP (F)	HWR TEMP (F)	CONNECTION INLET/OUTLET (IN)	TUBE MATERIAL	TUBE DIAMETER (IN)	FIN MATERIAL	FIN SIZE (IN)	FIN THICKNESS (IN)	FINS PER FT	ENCLSOURE HEIGHT (IN)	MOUNTING HEIGHT (IN)				LENGTH (FT)	
FTR-A	SEE PLAN	SPACE HEATING	484.0	WATER	30	4.0	1	0.17	150.0	130.0	3/4	COPPER	3/4	ALUMINUM	3x3-1/4	0.024	48	14	8	4'-0"	SLANT FIN	350-14	SEE BELOW	
FTR-B	SEE PLAN	SPACE HEATING	484.0	WATER	30	4.0	1	0.26	150.0	130.0	3/4	COPPER	3/4	ALUMINUM	3x3-1/4	0.024	48	14	8	6'-0"	SLANT FIN	350-14	SEE BELOW	
FTR-C	SEE PLAN	SPACE HEATING	484.0	WATER	30	4.0	1	0.35	150.0	130.0	3/4	COPPER	3/4	ALUMINUM	3x3-1/4	0.024	48	14	8	8'-0"	SLANT FIN	350-14	SEE BELOW	
FTR-D	SEE PLAN	SPACE HEATING	455.0	WATER	30	1.0	1	0.35	150.0	130.0	3/4	COPPER	3/4	ALUMINUM	3x3-1/4	0.024	48	14	8	2'-0"	SLANT FIN	350-14	SEE BELOW	
HOT WATER FINNED TUBE RADIATOR SCHEDULES NOTES TYP (U.O.N.):																								
1. FURNISH & INSTALL ALL PIPING TRIM AS DETAILED ON MECHANICAL FLOW DIAGRAM & DETAILS.																								
2. ALL FINNED TUBE RADIATOR ENCLOSURES TO EXTEND WALL-TO-WALL UNLESS OTHERWISE NOTED; CONTRACTOR TO FIELD VERIFY FINAL ENCLOSURE LENGTH PRIOR TO RELEASE.																								
3. MECHANICAL CONTRACTOR SHALL CONSULT MECHANICAL NEW WORK PLANS FOR QUANITY & LOCATION.																								
4. CONTRACTOR SHALL FURNISH & INSTALL RADIATOR VALVE COVER SECTIONS FOR ALL PIPING TRIM SECTIONS AS REQUIRED; COORDINATE QUANTITIES WITH MECHANICAL FLOW DIAGRAMS.																								
5. FURNISH NU-WHITE FINISH.																								
6. REFER TO SPECIFICATIONS FOR MORE INFORMATION.																								

HOT WATER UNIT HEATER SCHEDULE																									
UNIT TAG	LOCATION	SERVICE	TOTAL HEATING (MBH)	WATERSIDE							AIRSIDE				ELECTRICAL			MOUNTING HEIGHT (FT)	ORIENTATION	THROW (FT)	WEIGHT (LBS)	DIMENSIONS (WxDxH)	MANUFACTUER	MODEL #	COMMENTS
				FLUID TYPE	% GLYCOL	FLOW (GPM)	WATER PD (IN FT)	HWS TEMP (F)	HWR TEMP (F)	CONNECTION INLET/OUTLET (IN)	FAN HP	RPM	AIRFLOW (CFM)	EAT/LAT (F)	V/PH/Hz	FLA	MCA								
HWUH-A	SEE PLAN	SPACE HEATING	10.7	WATER	30	1.7	0.01	150.0	130.0	3/4	0.1	1100	330	60/107	120/1/60	0.40	15	7'-0"	VERTICAL	16'-0"	44.0	17"x19"x17"	REZNOR	WS-22/33	SEE BELOW
HWUH-B	SEE PLAN	PLENUM HEATING	8.2	WATER	30	1.3	0.01	150.0	130.0	3/4	0.1	1100	270	60/104	120/1/60	0.30	15	9'-0"	VERTICAL	16'-0"	37.0	17"x19"x17"	REZNOR	WS-18/24	SEE BELOW
HWUH-C	SEE PLAN	SPACE HEATING	27.7	WATER	30	3.2	0.08	150.0	130.0	1-1/4	0.1	1100	560	60/113	120/1/60	0.60	15	10.0	VERTICAL	18'-0"	49.0	19"x19"x19"	REZNOR	WS-44/62	SEE BELOW
HOT WATER UNIT HEATER SCHEDULES NOTES (TYPICAL U.O.N.):																									
1. FURNISH & INSTALL ALL PIPING TRIM AS DETAILED ON MECHANICAL FLOW DIAGRAM & DETAILS.																									
2. FURNISH & INSTALL STEEL COILS WITH ALUMINUM FINS.																									
3. FURNISH & INSTALL HEAVY DUTY LINE VOLTAGE THERMOSTAT WITH GUARD COVER FOR EACH UNIT HEATER.																									
4. FURNISH & INSTALL 1" DEFLECTION SPRING HANGERS FOR EACH UNIT HEATER; MASON INDUSTRIES TYPE 30N OR EQUIVALENT.																									
5. FURNISH & INSTALL WALL-MOUNT BRACKET OR CEILING-HUNG HANGING KIT; REFER TO MECHANICAL PLANS FOR INFORMATION.																									
6. REFER TO SPECIFICATIONS FOR MORE INFORMATION.																									

PUMP SCHEDULE																			
UNIT TAG	LOCATION	SERVICE	TYPE	FLOW (GPM)	FLUID TYPE	TOTAL HEAD (FT)	SUCTION CONNECTION (IN)	DISCHARGE CONNECTION (IN)	IMPELLER DIAMETER (IN)	EFFICIENCY (%)	RPM	MOTOR				WEIGHT (LBS)	MANUFACTURER	MODEL #	COMMENTS
												BHP	HP	ELECTRICAL (V/PH/Hz)	VFD				
HWP-1-1&2	1ST FLOOR	BUILDING HW	VERTICAL INLINE	145.6	30% PG	150.0	3.00	3.00	-	65.6	1,750	8.49	10	460/3/60	YES	418	BELL & GOSSETT	46SV9/2	SEE BELOW
PUMP SCHEDULES NOTES TYP (U.O.N.):																			
1. FURNISH & INSTALL VARIABLE FREQUENCY DRIVE WITH DOOR CIRCUIT BREAKER DISCONNECT; ABB ACH580-PCR-014A-4+E213+K465.																			
2. FURNISH & INSTALL INERTIA BASE CONCRETE PAD UNDER EACH PUMP.																			
3. FURNISH CLASS 125 PUMP FLANGE RATING.																			
4. REFER TO SPECIFICATIONS FOR MORE INFORMATION.																			

PIPE MATERIAL SCHEDULE					
SERVICE	PIPE SIZE	MATERIAL	WEIGHT	STANDARD	JOINT TYPE
COLD CONDENSATE DRAINS & MISCELLANEOUS DRAINS	2" & BELOW	HARD COPPER	TYPE 'L'	ASTM A88	SOLDER
HOT WATER WITH GLYCOL	4" & BELOW	HARD COPPER	TYPE 'K'	ASTM B88	BRAZED
COLD WATER MAKEUP & FILL	4" & BELOW	HARD COPPER	TYPE 'L'	ASTM B88	BRAZED
PIPING TO GAUGES	ALL	RED BRASS	STANDARD	ASTM B43	THREADED
GAS (FINAL EQUIPMENT CONNECTIONS)	ALL	BLACK STEEL	SCHEDULE 40	ASTM A53 OR A106 SEAMLESS GRADE B	THREADED
PIPE MATERIAL SCHEDULE NOTES:					
1. REFER TO MECHANICAL SPECIFICATIONS FOR MORE INFORMATION					

PIPE FITTING SCHEDULE				
PIPE MATERIAL	PIPE SIZE	JOINT TYPE	FITTING MATERIAL	FITTING CLASS
BLACK STEEL	2" & SMALLER	THREADED FLANGE	CAST IRON	125 PSIG
COPPER TUBING (HARD DRAWN)	4" & SMALLER	BRAZED	WROUGHT COPPER OR CAST COPPER	300 PSIG @ 100F & 150 PSIG & 250F
RED BRASS	ALL SIZES	THREADED	CAST BRONZE	125 PSIG & 250 PSIG
PIPE FITTING SCHEDULE NOTES:				
1. REFER TO MECHANICAL SPECIFICATIONS FOR MORE INFORMATION				

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KEY PLAN

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MECHANICAL  
SCHEDULES SHEET #2

DWG NUMBER :

M-602



## PACKAGED ROOFTOP HEATING & VENTILATING UNIT SCHEDULE

UNIT TAG	LOCATION	SERVICE	TOTAL SUPPLY AIRFLOW (CFM)	TOTAL OUTSIDE AIRFLOW (CFM)	TOTAL SP (IN W.C.)	TOTAL ESP (IN W.C.)	GAS-FIRED FURNACE							SUPPLY FAN					UNIT ELECTRICAL				PREFILTER MERV# /EFFICIENCY	DIMENSIONS (LxWxH)	WEIGHT (LBS)	MANUFACTURER	MODEL #	COMMENTS
							TOTAL INPUT (MBH)	TOTAL OUTPUT (MBH)	EAT/LAT DB (F)	GAS FLOW (CFH)	NUMBER OF STAGES	GAS PRESSURE MIN/MAX (IN W.G.)	EFFICIENCY (%)	MOTOR					V/PH/Hz	FLA	MCA	MOCp						
														QTY	DRIVE TYPE	RPM	HP	VFD										
HV-R-1 THRU 12	AS/RS WAREHOUSE ROOF	AS/RS WAREHOUSE HEATING	5,000	670	0.97	0.50	300.0	240.0	50/75	300.0	10.0	5/10.5	80	1	DIRECT	1117	3	YES	460/3/60	-	7.49	11.5	8/85	8'-2"x4'-4"x3'-3"	1,540	TRANE	GRAA30PFJF0N2CY305N	SEE BELOW

PACKAGED ROOFTOP HEATING & VENTILATING UNIT SCHEDULE NOTES TYP (U.O.N.):

1. UNIT TO BE FURNISHED WITH SINGLE POINT POWER CONNECTION PRE-WIRED WITH CIRCUIT BREAKER DISCONNECT, VARIABLE FREQUENCY DRIVE, CONVENIENCE RECEPTACLE & SERVICE LIGHTS.
2. UNIT TO BE FURNISHED WITH ELECTRONIC MODULATING DUCT STAT, SPACE THERMOSTAT AND FACTORY MOUNTED & WIRED DDC CONTROLLER WITH BACNET IP & MS/TP COMMUNICATION PROTOCOL.
3. UNIT CASING TO BE ZINC COATED, HEAVY GAUGE GALVANIZED STEEL SUITABLE FOR OUTDOOR OPERATION.
4. UNIT TO BE FURNISHED WITH MODULATING GAS HEAT FURNANCE WITH STAINLESS STEEL HEAT EXCHANGER TUBES AND HEADERS WITH A TURNDOWN OF 10:1.
5. UNIT TO BE FURNISHED WITH AIRSIDE ECONOMIZING SECTION WITH ULTRA-LOW LEAKAGE DAMPERS AND 0-100 PERCENT MODULATING ECONOMIZING CONTROL VIA COMPARATIVE ENTHALPHY.
6. UNIT TO BE FURNISHED & INSTALLED WITH 24"H INSULATED ROOF CURB.
7. REFER TO MECHANICAL SPECIFICATIONS FOR MORE INFORMATION.

## PACKAGED ROOFTOP AC UNIT WITH GAS FIRED FURNACE SCHEDULE

UNIT TAG	LOCATION	SERVICE	TONS	TOTAL SUPPLY AIRFLOW (CFM)	TOTAL OUTSIDE AIRFLOW (CFM)	TOTAL SP (IN W.C.)	TOTAL ESP (IN W.C.)	DX COOLING COIL				GAS-FIRED FURNACE						
								TOTAL CAPACITY (MBH)	TOTAL SENSIBLE (MBH)	EAT/LAT DB (F)	EAT/LAT WB (F)	TOTAL INPUT (MBH)	TOTAL OUTPUT (MBH)	EAT/LAT DB (F)	GAS FLOW (CFPH)	NUMBER OF STAGES	GAS PRESSURE MIN/MAX (IN W.G.)	EFFICIENCY (%)
RTAC-R-1	ADMIN OFFICE ROOF	ADMIN OFFICE	45	15,000	1,230	2.93	1.50	544.5	412.23	76.7/54.6	64.0/52.6	350.0	280.0	60/77.7	350.0	5.0	7/14	80
RTAC-R-2	AS/RS ROOF	AS/RS MEZZANINES	22	7,000	800	2.12	1.50	267.9	196.46	77.3/54.0	64.5/52.2	235.0	188.0	60/84	235.0	2.0	7/14	80

### PACKAGED ROOFTOP AC UNIT WITH GAS FIRED FURNACE SCHEDULE (CONT'D)

SUPPLY FAN						CONDENSING SECTION										UNIT ELECTRICAL				PREFILTER MERV /EFFICIENCY	EER (@ AHRI)	IEER (@ AHRI)	DIMENSIONS (LxWxH)	WEIGHT (LBS)	MANUFACTURER	MODEL #	COMMENTS
MOTOR						COMPRESSORS					FAN MOTOR					V/PH/HZ	FLA	MCA	MOCP								
QTY	DRIVE TYPE	RPM	BHP	HP	VFD	QTY	TYPE	TONS/EACH	FLA/EACH	LRA/EACH	QTY	DRIVE TYPE	RPM	HP	VFD												
1	BELT	686	13.61	15	YES	3	SCROLL	10/15/15	18.6/27.5/27.5	142/197/197	4	DIRECT	1567	1.1	NO	460/3/60	-	112.5	125.0	14/90	10.4	14.5	19'-5"x7'-6"x6'-5"	5,932	TRANE	YCD600B4	SEE BELOW
1	BELT	1465	5	5	YES	2	SCROLL	-	19.1/19.1	142/197/198	2	DIRECT	1465	1.0	NO	460/3/60	-	55.97	70.0	14/90	11.0	14.0	24'-5"x7'-10"x3'-9"	5,716	TRANE	SFHLF20	SEE BELOW

PACKAGED ROOFTOP AC UNIT WITH GAS FIRED FURNACE SCHEDULE NOTES TYP (U.O.N.):

1. UNIT TO BE FURNISHED WITH SINGLE POINT POWER CONNECTION PRE-WIRED WITH CIRCUIT BREAKER DISCONNECT, VARIABLE FREQUENCY DRIVE, DDC CONTROLLER WITH BACNET IP & MS/TP COMMUNICATION PROTOCOL, CONVENIENCE RECEPTACLE & SERVICE LIGHTS.
2. UNIT TO BE FURNISHED WITH 5" COLOR TOUCHSCREEN.
3. UNIT CASING TO BE ZINC COATED, HEAVY GAUGE GALVANIZED STEEL WITH WEATHER RESISTANT PAINTED EXTERIOR.
4. UNIT TO BE FURNISHED WITH HIGH EFFICIENCY MULTI-STAGE MECHANICAL COOLING.
5. UNIT TO BE FURNISHED WITH R-410A REFRIGERANT.
6. UNIT TO BE FURNISHED WITH MODULATING GAS HEAT FURNANCE WITH STAINLESS STEEL DRUM & TUBE HEAT EXCHANGERS.
7. UNIT TO BE FURNISHED WITH AIRSIDE ECONOMIZING SECTION WITH ULTRA-LOW LEAKAGE DAMPERS AND 0-100 PERCENT MODULATING ECONOMIZING CONTROL VIA COMPARATIVE ENTHALPHY.
8. UNIT TO BE FURNISHED & INSTALLED WITH INSULATED 24"H ROOF CURB.
9. REFER TO MECHANICAL SPECIFICATIONS FOR MORE INFORMATION.

## VAV BOX SCHEDULE

DESIGNATION	BOX SIZE (INLET)	AIRFLOW RANGE (CFM)		LOWEST AIRFLOW SETTING (CFM)	MINIMUM STATIC PRESSURE (IN W.C.)	DISCHARGE SOUND LEVEL AT MAX CFM & 2" W.C. (NC)	RADIATED SOUND LEVEL AT MAX CFM & 2" W.C. (NC)	HOT WATER COIL					MANUFACTURER	MODEL #	COMMENTS
		MIN	MAX					FLOW (GPM)	FLUID	HEATING CAPACITY (MBH)	ROWS	PRESSURE DROP (FT)			
VAV	6"	100	375	80	0.130	25	17	-	-	-	-	-	TRANE	VCCF-06	SEE BELOW
VAV	8"	376	675	145	0.021	24	21	-	-	-	-	-	TRANE	VCCF-08	SEE BELOW
VAV	10"	676	1050	230	0.002	24	21	-	-	-	-	-	TRANE	VCCF-10	SEE BELOW
VAV	12"	1051	1500	325	0.002	24	21	-	-	-	-	-	TRANE	VCCF-12	SEE BELOW
VAV-HW	10"	676	1050	230	0.002	24	21	1.0	30% PG	21.0	1	3.13	TRANE	VCWF-10	SEE BELOW
VAV-HW	12"	1051	1500	325	0.002	24	21	1.0	30% PG	27.0	1	0.65	TRANE	VCWF-12	SEE BELOW

VARIABLE AIR VOLUME BOX SCHEDULE NOTES TYP (U.O.N.):

1. FURNISH & INSTALL DDC CONTROLLER WITH BACNET MS/TIP & IP COMMUNICATION PROTOCOL FOR EACH VAV BOX.
2. FURNISH & INSTALL SPACE SENSOR FOR EACH VAV BOX.
3. FURNISH & INSTALL ALL PIPING & TRIM AS SHOWN ON PLAN & FLOW DIAGRAMS FOR VAV BOXES WITH HOT WATER COILS (VAVHW).
4. CONTRACTOR SHALL COORDINATE CONTROL & POWER WIRING WITH CONTROL & ELECTRICAL CONTRACTOR.
5. REFER TO SPECIFICATIONS FOR MORE INFORMATION.

## AUTOMATICALLY OPERATED SMOKE & HEAT VENT SCHEDULE

DESIGNATION	DESCRIPTION	SHRINK-OUT MATERIAL	UL 793 OR FM 4430 COMPLIANCE	DIMENSIONS (WxLxH)	MOUNTING TYPE	MANUFACTURER	MODEL #	COMMENTS
SHW-R-1:16	SHRINK-OUT SMOKE & HEAT VENT	ACYRLIC DOUBLE DOME	UL 793	60"x96"x6"	CURB-MOUNT	WASCO-VELUX	66102	SEE BELOW

AUTOMATICALLY OPERATED SMOKE & HEAT VENT SCHEDULE NOTES TYP (U.O.N.):

1. FURNISH & INSTALL 1-1/2" INTEGRAL ROOF CURB.
2. FURNISH CLEAR OUTER ACRYLIC GLAZING.
3. CONTRACTOR SHALL COORDINATE ALL VENT INSTALLATIONS WITH STRUCTURAL CONTRACTOR; ALL FINAL LOCATIONS TO BE SUBMITTED TO ARCHITECT & ENGINEER FOR APPROVAL.
4. REFER TO SPECIFICATIONS FOR MORE INFORMATION.

## ELECTRIC RADIANT FLOOR HEATING SCHEDULE

UNIT TAG	LOCATION	SERVICE	TYPE	WSQFT	COVERAGE (SQFT)	LENGTH (FT)	SPACING (IN)	ELECTRICAL (V/PH/HZ)	WATTS	AMPS	MANUFACTURER	MODEL #	COMMENTS
ERFH-3-1	CONCRETE SLAB	RECEPTION LOBBY 314	CABLE	18	97	290	4	120/1/60	1740	14.5	THERMOSOFT	TS290-120	SEE BELOW
ERFH-3-2	CONCRETE SLAB	RECEPTION LOBBY 314	CABLE	18	97	290	4	120/1/60	1740	14.5	THERMOSOFT	TS290-120	SEE BELOW
ERFH-3-3	CONCRETE SLAB	RECEPTION LOBBY 314	CABLE	18	97	290	4	120/1/60	1740	14.5	THERMOSOFT	TS290-120	SEE BELOW
ERFH-3-4	CONCRETE SLAB	RECEPTION LOBBY 314	CABLE	18	97	290	4	120/1/60	1740	14.5	THERMOSOFT	TS290-120	SEE BELOW
ERFH-3-5	CONCRETE SLAB	RECEPTION LOBBY 314	CABLE	18	97	290	4	120/1/60	1740	14.5	THERMOSOFT	TS290-120	SEE BELOW

ELECTRIC RADIANT FLOOR HEATING SCHEDULE NOTES (TYPICAL U.O.N.):

1. FURNISH & INSTALL STANDARD PROGRAMMABLE THERMOSTAT; THERMOSEFT TH115-AF-GA/U OR EQUIVALENT.
2. FURNISH & INSTALL REQUIRED RELAYS TO CONTROL ALL HEATING CABLES IN NEMA 1 ENCLOSURE; COORDINATE WITH ELECTRICAL CONTRACTOR.
3. REFER TO SPECIFICATIONS FOR MORE INFORMATION.

TO THE BEST KNOWLEDGE, BELIEF AND PROFESSIONAL JUDGEMENT,  
THESE PLANS AND SPECIFICATIONS ARE IN COMPLIANCE WITH THE 2020  
ENERGY CONSERVATION CONSTRUCTION CODE OF NEW YORK STATE.

ARCHITECT

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**MANHATTAN**  
BEER DISTRIBUTORS

MANHATTAN BEER DISTRIBUTORS  
20 DUNNIGAN DRIVE  
SUFFERN, NEW YORK

## KEY PLAN

REV	DESCRIPTION	DATE
	ISSUED FOR DOB SUBMISSION	09/10/2021
	ISSUED FOR BID	10/15/2021
	ISSUED FOR PROGRESS	01/18/2022

DRAWN BY :

CHECKED BY :

APPROVED BY :

DATE \_\_\_\_\_

SCALE :

DRAWING TITLE:

# MECHANICAL SCHEDULES SHEET #3

DWG NUMBER :

M-603



MECHANICAL SPECIFICATIONS		ARCHITECT	
PART 1- GENERAL		di Domenico + Partners LLP	
1.01 GENERAL	<p>A. THE LATEST EDITION OF AIA DOCUMENTS A201 GENERAL CONDITIONS OF THE CONTRACT FOR CONSTRUCTION, OR AS REQUIRED BY THE ARCHITECTURAL DOCUMENTS AND/OR THE STRUCTURAL ENGINEERS DOCUMENTS ARE PART OF THE CONTRACT.</p> <p>B. BIDDERS SHALL VISIT AND CAREFULLY EXAMINE THE AREA AFFECTED BY THIS WORK TO FAMILIARIZE THEMSELVES WITH THE EXISTING CONDITIONS AND THE DIFFICULTIES THAT WILL AFFECT THE EXECUTION OF THIS WORK BEFORE SUBMITTING PROPOSALS. SUBMISSION OF A PROPOSAL WILL BE CONSIDERED EVIDENCE THAT SUCH AN EXAMINATION HAS BEEN MADE AND LATER CLAIM WILL NOT BE RECOGNIZED FOR EXTRA LABOR, EQUIPMENT, MATERIALS, ETC., REQUIRED BECAUSE OF DIFFICULTIES ENCOUNTERED WHICH COULD HAVE BEEN FORESEEN HAD SUCH AN EXAMINATION BEEN MADE. ANY DISCREPANCIES SHALL BE BROUGHT TO THE ENGINEERS ATTENTION PRIOR TO BID. IF DISCREPANCIES ARE NOT RESOLVED TO CONTRACTORS SATISFACTION THEY SHALL BE QUALIFIED IN THEIR BID SUBMISSION.</p> <p>C. THIS CONTRACTOR SHALL REVIEW ALL CONSTRUCTION DOCUMENTS ASSOCIATED WITH THIS PROJECT INCLUDING GENERAL CONSTRUCTION, DEMOLITION, ARCHITECTURAL, MECHANICAL, ELECTRICAL, PLUMBING AND SPRINKLER PLANS AND SPECIFICATIONS. ALL WORK REQUIRED IN THE BID WHICH IS INDICATED OR IMPLIED TO BE PERFORMED BY THIS TRADE IN OTHER SECTIONS OF THE WORK SHALL BE INCLUDED IN THEIR BID. IF A CONFLICT OCCURS IN THE BID SPECIFICATIONS AND/OR ON THE DRAWINGS, THE MORE STRINGENT SITUATION SHALL APPLY.</p> <p>D. COORDINATE ALL WORK OF THE SECTION WITH EXISTING CONDITIONS AND THE WORK OF OTHER TRADES. THE CONTRACTOR SHALL THOROUGHLY ACQUAINT HIMSELF WITH THE WORK INVOLVED AND SHALL VERIFY AT THE BUILDING ALL MEASUREMENTS NECESSARY FOR THE PROPER INSTALLATION OF THE WORK, OBTAINING THE SAME WHEN NECESSARY FROM THE OTHER CONTRACTORS AND CHECK LOCATIONS AND ARRANGEMENTS SHALL BE DETERMINED IN THE FIELD ON THE BASIS OF DETAILS INDICATED ON SHOP DRAWINGS, AND SUPPLEMENTARY INFORMATION ISSUED BY THE ENGINEER, AND SHALL PROVIDE FOR OPERATING EFFICIENCY, NEATNESS OF APPEARANCE, AND EASE OF MAINTENANCE.</p> <p>E. THE SPECIFICATIONS ARE ACCOMPANIED BY DRAWINGS INDICATING THE GENERAL LOCATION OF EQUIPMENT AND CONNECTIONS THERETO, UNLESS SPECIFICALLY DIMENSIONED, LOCATIONS OF EQUIPMENT AND ROUTINGS ARE APPROXIMATE. SCALES ON DRAWINGS ARE INDICATED FOR BIDDING PURPOSES ONLY. DRAWINGS SHALL NOT BE SCALED FOR CONSTRUCTION AND MANUFACTURING DETAILS. CERTAIN SYSTEMS ARE DIAGRAMMATIC AND GIVE THE GENERAL ARRANGEMENT ONLY. NO ADDED COMPENSATION WILL BE PERMITTED FOR VARIATIONS DUE TO FIELD CONDITIONS. BALANCE LOCATIONS AND ARRANGEMENTS SHALL BE DETERMINED IN THE FIELD ON THE BASIS OF DETAILS INDICATED ON SHOP DRAWINGS, AND SUPPLEMENTARY INFORMATION ISSUED BY THE ENGINEER, AND SHALL PROVIDE FOR OPERATING EFFICIENCY, NEATNESS OF APPEARANCE, AND EASE OF MAINTENANCE.</p> <p>F. GUARANTEE: THE CONTRACTOR SHALL GUARANTEE AND SERVICE THE ENTIRE INSTALLATION FOR A PERIOD OF ONE YEAR FROM THE DATE OF THE FINAL ACCEPTANCE OF THE INSTALLATION. THE CONTRACTOR SHALL, DURING THE PERIOD OF THE GUARANTEE, REPLACE OR REPAIR AT HIS OWN EXPENSE ANY PIECE OF EQUIPMENT AND/OR MATERIAL WHICH IS FOUND TO BE DEFECTIVE. THE REPLACEMENT OR REPAIR SHALL BE PERFORMED THE SAME DAY OF NOTIFICATION. IN THE EMERGENCY FASHION WHEN NOTIFIED BY THE OWNER OR AUTHORIZED REPRESENTATIVE, THE CONTRACTOR SHALL ALSO REPAIR ALL DAMAGE TO SURROUNDING WORK CAUSED BY THE FAILURE, REPAIR OR REPLACEMENT OF DEFECTIVE EQUIPMENT. ALL REFRIGERATION COMPRESSORS SHALL HAVE A FACTORY GUARANTEE INCLUDING PARTS AND LABOR FOR FIVE YEARS TOTAL. THE FINAL ACCEPTANCE WILL BE MADE AFTER THE CONTRACTOR HAS ADJUSTED HIS EQUIPMENT, BALANCE LOCATIONS AND ARRANGEMENTS, AND HAS FULFILLED THE REQUIREMENTS OF THE DRAWINGS AND SPECIFICATION, AND HAS FURNISHED ALL THE REQUIRED CERTIFICATES OF INSPECTION AND APPROVALS.</p> <p>G. EQUIPMENT AND MATERIALS: MOST ITEMS OF MECHANICAL AND ELECTRICAL EQUIPMENT AND MATERIAL ARE NOTED ON THE DRAWINGS OR IN THE SPECIFICATIONS WITH A MANUFACTURER'S NAME AND CATALOG NUMBER. THIS DESIGNATION IS USED TO SET THE STANDARD FOR CONSTRUCTION, PERFORMANCE, OPERATION AND APPEARANCE. PRODUCTS OF OTHER MANUFACTURERS WILL BE CONSIDERED AND RULED UPON BY THE ENGINEER. THE SUBMISSION OF A SUBSTITUTION IMPLES THAT THE ITEM HAS ALL NECESSARY UNDERWRITERS LABORATORIES, BOARD OF STANDARDS AND APPEALS, NEW YORK CITY MEA, NATIONAL ELECTRICAL CODE, NEW YORK CITY ELECTRICAL CODE AND NEW YORK CITY ELECTRICAL ADVISORY BOARD, ETC. APPROVALS. SHOULD THE ITEM BE FOUND NOT TO HAVE SUCH APPROVAL, IT SHALL BE REPLACED BY THE CONTRACTOR AT NO ADDITIONAL COST TO THE OWNER</p> <p>H. SUBSTITUTIONS: DEVIATIONS FROM CONTRACT DOCUMENTS AND SUBSTITUTION OF MATERIALS OR EQUIPMENT FOR THOSE SPECIFIED SHALL BE REQUESTED INDIVIDUALLY IN WRITING. FURNISH INFORMATION AS REQUIRED TO DEMONSTRATE THAT THE ARTICLE, MATERIAL, APPARATUS, PRODUCT OR PROCESS TO BE USED IS ADEQUATELY COMPARABLE TO THAT SPECIFIED IN QUALITY, FINISH, DESIGN, EFFICIENCY, DURABILITY AND GENERAL APPEARANCE, AND HAS BEEN ELSEWHERE DEMONSTRATED TO BE SERVICEABLE FOR THE PURPOSES FOR WHICH IT IS INTENDED. IF TESTS OR DEMONSTRATIONS ARE REQUIRED BY THE OWNER'S REPRESENTATIVES, THE COST OF SUCH TESTS OR DEMONSTRATIONS SHALL BE BORNE BY THE CONTRACTOR. DESCRIBE REASON FOR CHANGE, CONNECTION TO ADJUSTED MATERIALS, ELECTRICAL SERVICES, SERVICE ACCESS, REQUIREMENTS, DIFFERENCES IN OPERATING CHARACTERISTICS OR CYCLES AND ALL OTHER POINTS OF DEVIATION. CONTRACTOR TO ASSUME FULL RESPONSIBILITY FOR SAFETY, COORDINATION WITH OTHER TRADES, OPERATION AND PERFORMANCE OF ALTERED SYSTEM.</p> <p>I. THIS CONTRACTOR IS TO OBTAIN A COPY OF THE BUILDING RULES AND REGULATIONS PRIOR TO BID SUBMISSION. ALL WORK MUST BE INSTALLED IN ACCORDANCE WITH THE BUILDING RULES AND REGULATIONS, DETERMINE REQUIREMENTS AND THE EXTENT OF PREMIUM TIME WORK REQUIRED BY THE PURPOSE OF THE BID ASSUME ANY NOISE OR VIBRATION, CHIPPING, CHOPPING, CORE DRILLING, WELDING, BRAISING, SOLDERING, ETC.) AND BASE BUILDING SYSTEMS INTERRUPTIONS ARE TO BE PERFORMED OUTSIDE NORMAL BUSINESS HOURS.</p> <p>J. REMOVAL, TEMPORARY CONNECTIONS AND RELOCATION OF CERTAIN EXISTING WORK WILL BE NECESSARY FOR THE INSTALLATION OF THE NEW SYSTEMS. ALL EXISTING CONDITIONS ARE NOT COMPLETELY DETAILED ON THE DRAWINGS. THE CONTRACTOR SHALL SURVEY THE SITE AND MAKE ALL NECESSARY CHANGES REQUIRED BASED ON EXISTING CONDITIONS FOR PROPER INSTALLATION OF NEW WORK.</p> <p>K. ALL NECESSARY CUTTING AND PATCHING IN FLOOR SLABS, ROOF SLABS, WALLS, AND CEILINGS FOR THE HVAC WORK SHALL BE PERFORMED BY THIS CONTRACTOR. RESTORE TO MATCH EXISTING CONDITIONS.</p> <p>L. WHERE PIPE AND/OR DUCTWORK PENETRATED RATED WALLS, THE SPACE BETWEEN THE INSULATION AND THE WALL SHALL BE CAULKED WITH NON-COMBUSTIBLE MATERIAL IN AN APPROVED MANNER. ALL PIPING AND/OR DUCTWORK TO BE INSTALLED ABOVE HUNG CEILING UNLESS OTHERWISE NOTED ON DRAWINGS. THE CONTRACTOR SHALL COORDINATE WITH ARCHITECTURAL DRAWINGS FOR ALL CEILING ELEVATIONS.</p> <p>M. ACCESS DOORS IN FINISHED CONSTRUCTION: THE CONTRACTOR SHALL PREPARE A LIST OF ALL ACCESS DOORS (MINIMUM 18"X18") REQUIRED FOR OPERATION AND MAINTENANCE OF ALL CONCEALED EQUIPMENT AND OTHER DEVICES, WHICH SHALL BE SUPPLIED TO THE GENERAL CONTRACTOR FOR INSTALLATION. THE COST TO FURNISH AND INSTALL ACCESS DOORS SHALL BE INCLUDED IN THIS CONTRACTORS BID. THIS CONTRACTOR IN ADVANCE OF CEILING INSTALLATIONS SHALL SUITABLY FIELD TAG AND IDENTIFY ALL CONCEALED EQUIPMENT, VALVES, DAMPERS, ETC., WHICH REQUIRE ACCESS DOOR PROVISIONS.</p> <p>N. NEW DUCTWORK SHALL ARRIVE ON THE CONSTRUCTION SITE SEALED AND REMAIN PROTECTED FROM DEBRIS THROUGHOUT CONSTRUCTION PRIOR TO FINAL INSTALLATION. AIR DISTRIBUTION ACCESSORIES AND INTERNAL COMPONENTS OF ALL HVAC EQUIPMENT SHALL BE SEALED AND PROTECTED FROM DEBRIS WHILE ON THE CONSTRUCTION SITE PRIOR TO FINAL CONNECTION AND START-UP.</p> <p>O. ALL VOLATILE ORGANIC COMPOUND (VOC) LIMITS OF ADHESIVES, SEALANTS AND SEALANT PRIMERS MUST COMPLY WITH SOUTH COAST AIR QUALITY MANAGEMENT DISTRICT (SCAQM) RULE #1168, AMENDMENT DATE OF JANUARY 7, 2005.</p>	CIVIL PLANNING ENGINEER	
1.02 SCOPE OF WORK	<p>A. THE CONTRACTOR SHALL FURNISH AND INSTALL AN HVAC SYSTEM COMPLETE WITH ALL EQUIPMENT, DUCTWORK, PIPING, INSULATION, CONTROLS, ACCESSORIES AND ASSOCIATED WORK IN ACCORDANCE WITH THE NEW YORK STATE BUILDING CODE, ALL NATIONAL, STATE AND LOCAL AUTHORITIES HAVING JURISDICTION, BUILDING MANAGEMENT, DESIGN DRAWINGS AND THIS SPECIFICATION.</p> <p>B. THE WORK SHALL INCLUDE ALL LABOR, MATERIALS, EQUIPMENT, HOISTING AND RIGGING, BREAKDOWN AND SETUP OF EQUIPMENT FOR INSTALLATION, SCAFFOLDING, AND SERVICES TO COMPLETE THE SYSTEM AND PROVIDE THE OWNER WITH A FULLY OPERATIONAL SYSTEM. ANY EQUIPMENT, PARTS, MATERIALS, ACCESSORIES, OR LABOR THAT IS NECESSARY FOR PROPER</p>	MEP ENGINEER	
		STRUCTURAL ENGINEER	
		KEY PLAN	
		MANHATTAN BEER DISTRIBUTORS	
		20 DUNNIGAN DRIVE	
		SUFFERN, NEW YORK	
		REV DESCRIPTION DATE	
		ISSUED FOR DOB SUBMISSION 09/10/2021	
		ISSUED FOR BID 10/15/2021	
		ISSUED FOR PROGRESS 01/18/2022	
		DRAWN BY :	
		CHECKED BY :	
		APPROVED BY :	
		DATE :	
		SCALE :	
		DRAWING TITLE :	
		MECHANICAL SPECIFICATIONS SHEET #1	
		DWG NUMBER :	
		M-801	
		TO THE BEST KNOWLEDGE, BELIEF AND PROFESSIONAL JUDGEMENT, THESE PLANS AND SPECIFICATIONS ARE IN COMPLIANCE WITH THE 2020 ENERGY CONSERVATION CONSTRUCTION CODE OF NEW YORK STATE.	



<p>2. ALL CONTROL WIRING TERMINATES AT TERMINAL STRIPS (SINGLE POINT CONNECTION) AND INCLUDE AN IDENTIFYING MARKER CORRESPONDING TO THE WIRING DIAGRAM. MOTOR AND CONTROL WIRING IS HARNESSSED WITH TERMINAL BLOCK CONNECTIONS. CASINGS ARE DIE FORMED, 18 GAUGE [1.3 MM] GALVANIZED STEEL AND FINISHED IN AIR DRY ENAMEL. SERVICE AND ACCESS PANELS ARE PROVIDED THROUGH EASILY REMOVABLE SIDE ACCESS PANELS WITH CAPTIVE FASTENERS. FAN SECTIONS AND SUPPLY PLENUMS (WHEN PROVIDED) ARE INSULATED WITH FIRE RESISTANT, ODORLESS, MATTE FACED 1" [25 MM] GLASS FIBER MATERIAL. OUTSIDE AIR HOODS, WHEN PROVIDED, SHIP WITH A WIRE MESH INLET SCREEN. STANDARD HEAT EXCHANGER CONSTRUCTION CONSISTS OF 20 GAUGE [1.0 MM] ALUMINIZED STEEL TUBES AND 18 GAUGE [1.3 M] ALUMINIZED STEEL HEADERS. STANDARD DRIP PAN CONSTRUCTION IS CORROSION RESISTANT ALUMINIZED STEEL.</p> <p>3. STANDARD FLUE COLLECTOR CONSTRUCTION IS CORROSION RESISTANT ALUMINIZED STEEL. BURNERS ARE DIE FORMED, CORROSION RESISTANT ALUMINIZED STEEL, WITH STAMPED PORTING AND STAINLESS STEEL PORT PROTECTORS. PORT PROTECTORS PREVENT FOREIGN MATTER FROM OBSTRUCTING THE BURNER PORTS. BURNERS ARE INDIVIDUALLY REMOVABLE FOR EASE OF INSPECTION AND SERVICING. THE ENTIRE BURNER ASSEMBLY IS EASILY REMOVED WITH ITS SLIDE OUT DRAWER DESIGN. THE PILOT IS ACCESSIBLE THROUGH AN ACCESS PLATE WITHOUT REMOVING THE BURNER DRAWER ASSEMBLY.</p> <p>4. FILTER RACK IS CONSTRUCTED OF GALVANIZED STEEL WITH ACCESS THROUGH THE SIDE SERVICE PANEL. ELECTRICAL CABINET IS ISOLATED FROM THE AIR STREAM WITH A NON REMOVABLE ACCESS PANEL INTERIOR TO THE OUTER SERVICE PANEL. THERE IS PROVISION IN THIS CABINET FOR COMPONENT MOUNTING, WIRE ROUTING AND HIGH VOLTAGE ISOLATION. MOTOR AND CONTROL WIRING IS HARNESSSED WITH TERMINAL BLOCK CONNECTIONS. STANDARD UNITS ARE PROVIDED WITH 24 VOLT COMBINATION SINGLE STAGE AUTOMATIC GAS VALVES, INCLUDING MAIN OPERATING VALVE AND PILOT SAFETY SHUTOFF. PRESSURE REGULATOR, MANUAL MAIN AND PILOT SHUTOFF VALVE, AND ADJUSTABLE PILOT VALVE. GAS VALVES ARE SUITABLE FOR NEC CLASS 2 USE FOR A MAXIMUM INLET GAS PRESSURE OF 0.5 PSI (14" W.C.) [3.4 KPA] ON NATURAL GAS. ALL ROOFTOP UNITS ARE PROVIDED WITH A LOW VOLTAGE CIRCUIT BREAKER RATED FOR 150% OF THE UNITS NORMAL 24 VOLT OPERATING LOAD.</p> <p>5. EACH DUCT FURNACE IS PROVIDED WITH A 24 VOLT HIGH TEMPERATURE LIMIT SWITCH, A (REDUNDANT) COMBINATION GAS VALVE AND A FAN TIME DELAY RELAY. THE FAN TIME DELAY RELAY DELAYS THE FAN START UNTIL THE HEAT EXCHANGER REACHES A PREDETERMINED TEMPERATURE. IT ALSO ALLOWS THE FAN TO OPERATE AFTER BURNER SHUTDOWN, REMOVING RESIDUAL HEAT FROM THE HEAT EXCHANGER. DOUBLE AND TRIPLE FURNACE UNITS CONTAIN A REVERSE AIRFLOW INTERLOCK SWITCH. THE NORMALLY CLOSED SWITCH, WHEN ACTIVATED, CAUSES THE GAS VALVES TO CLOSE AND CONTINUE BLOWER OPERATION. ALL UNITS PROVIDED WITH A SOLID STATE IGNITION CONTROL SYSTEM WHICH IGNITES THE INTERMITTENT PILOT BY SPARK DURING EACH CYCLE OF OPERATION. WHEN PILOT FLAME IS PROVEN, MAIN BURNER VALVE OPENS TO ALLOW GAS FLOW TO THE BURNERS. PILOT AND BURNERS ARE EXTINGUISHED DURING THE OFF CYCLE.</p> <p>III. STANDARD TEMPERATURE RISE FURNACE:</p> <p>1. EACH DUCT FURNACE SHALL HAVE A LOWER PRESSURE DROP ACROSS THE HEAT EXCHANGER, ALLOWING HIGHER AIR FLOW CAPACITIES AND AN 80% EFF RATING WITH DELTA T OF 20-60F PER FURNACE.</p> <p>IV. AIR HANDLING (FANS):</p> <p>1. CENTRIFUGAL FAN IS BELT DRIVEN, FORWARD CURVED WITH DOUBLE INLET, STATICALLY AND DYNAMICALLY BALANCED. THE BLOWER WHEEL IS FIXED ON A KEYED SHAFT, SUPPORTED WITH RUBBER GROMMET ON BEARING ONLY AND BALL BEARING SECURED. AN ACCESS INTERLOCK SWITCH IS INSTALLED IN THE BLOWER COMPARTMENT AND WILL DISENGAGE THE BLOWER UPON REMOVING THE SERVICE PANEL. AN OVERRIDE IS INCORPORATED INTO THE ACCESS INTERLOCK SWITCH FOR SERVICEABILITY.</p> <p>V. POWER VENT:</p> <p>1. POWER VENT UNITS ARE PROVIDED WITH A VENT FAN. OUTSIDE AIR FOR COMBUSTION AND PRODUCTS OF COMBUSTION HAVE INDIVIDUAL AIR INLET AND DISCHARGE GRILLES LOCATED IN THE UPPER SECTION OF THE FURNACE SERVICE PANEL. AN AIR PROVING SWITCH IS INSTALLED AND DISENGAGES GAS FLOW IF FOR ANY REASON THE DRAFTER HAS FAILED TO OPERATE. (POWER VENTING AND 100% SHUTOFF IGNITION SYSTEMS ARE REQUIRED FOR COMPLIANCE WITH IRI (INDUSTRIAL RISK INSURERS)).</p> <p>VI. ELECTRONIC MODULATING DUCT STAT WITH ROOM OVERRIDE GAS CONTROL:</p> <p>1. PROVIDE MODULATED HEAT OUTPUT. AN AUTOMATIC VALVE IN SERIES WITH THE MODULATING VALVE SHALL BE PROVIDED TO CYCLE THE UNIT. IGNITION IS AT FULL FIRE (100% INPUT) AND MODULATES THE GAS INPUT FROM 100% TO 40% RATED INPUT. AVAILABLE FOR USE WITH A DUCT THERMOSTAT WITH REMOTE SET POINT ADJUSTMENT. OVERRIDE ROOM THERMOSTAT CAUSES THE UNIT TO GO TO FULL FIRE WHEN THE ROOM TEMPERATURE FALLS BELOW THE OVERRIDE ROOM THERMOSTAT'S SET POINT.</p> <p>VII. TYPE 409 STAINLESS STEEL HEAT EXCHANGER:</p> <p>1. HEAT EXCHANGER TUBES AND HEADERS SHALL BE 20 GAUGE [1.0 MM] TYPE 409 STAINLESS STEEL. BURNERS AND FLUE COLLECTOR SHALL BE 409 STAINLESS STEEL. 409 STAINLESS STEEL IS RECOMMENDED WHERE OUTSIDE AIR IS USED FOR MAKE UP AIR IN AREAS WHERE OUTSIDE TEMPERATURES ARE 40 F [4 C] OR BELOW.</p> <p>VIII. DAMPERS-GENERAL:</p> <p>1. DAMPERS ARE OF THE OPPOSED BLADE TYPE, CONSTRUCTED OF GALVANIZED STEEL WITH NEOPRENE NYLON BUSHINGS, BLADES TO BE MECHANICALLY INTERLOCKED.</p> <p>2. TWO POSITION SPRING RETURN MOTOR WITH INTERLOCKED OUTSIDE AND RETURN AIR DAMPERS ARE PROVIDED. THE MOTOR POWERS EITHER THE OUTSIDE AIR DAMPER FULL OPEN AND THE RETURN AIR DAMPER FULL CLOSED OR THE OUTSIDE AIR DAMPER FULL CLOSED AND THE RETURN AIR DAMPER FULL OPEN IN RESPONSE TO AN OUTSIDE AIR TEMPERATURE SENSOR. WHEN THE UNIT IS OFF, THE MOTOR WILL DRIVE THE OUTSIDE AIR DAMPER FULL CLOSED AND THE RETURN AIR DAMPER FULL OPEN.</p> <p>IX. ROOF CURB:</p> <p>1. ROOF CURB IS SHIPPED UNASSEMBLED WITH HARDWARE PACKAGE AND GASKET ATTACHED. CURB AND RAIL SHALL TOTAL 24" HIGH AND SUPPLIED WITH A CROSS MEMBER WHICH ALLOWS THE ISOLATION OF THE RETURN AND SUPPLY AIR STREAMS (WHEN SUPPLIED).</p> <p>X. FACTORY INSTALLED VFD:</p> <p>1. A VARIABLE FREQUENCY DRIVE (VFD) SHALL BE PROVIDED. WHEN VARIABLE AIR VOLUME CONTROL IS REQUIRED FOR FAN OPERATION, THE VFD SHALL BE PROPERLY SIZED, FACTORY MOUNTED AND WIRED TO THE FAN MOTOR. THE VFD SHALL PROVIDE OVERLOAD PROTECTION AND SOFT START OPERATION. THE VFD SHALL BE COVERED BY UL 1995 STANDARDS AND MANUFACTURED WITH A NEMA 1 PLENUM RATED ENCLOSURE. IF OPERATING CONDITIONS ARE BELOW 14.0 F A SEPARATE VFD ENCLOSURE SHOULD BE SELECTED.</p> <p>XI. VFD ENCLOSURE:</p> <p>1. THE VFD SHALL BE FACTORY INSTALLED IN A COLD WEATHER ENCLOSURE INSTALLED ON THE DOOR OF THE UNIT. ENCLOSURE SHALL BE NEMA 3R RATED AND SHALL PROTECT THE DRIVE IN AMBIENT TEMPERATURES FROM -30°F TO 115°F.</p> <p>XJ. AIR CURTAIN (ACUR-ABB):</p> <p>I. MANUFACTURER:</p> <p>1. MARS AIR SYSTEMS</p> <p>2. SIMILAR</p> <p>II. AIR CURTAIN ASSEMBLIES:</p> <p>1. MOTOR FAN ASSEMBLY: DESIGN FOR EASY REMOVAL, ASSEMBLY, REPAIR, AND MAINTENANCE.</p> <p>III. MOTOR:</p> <p>1. TOTALLY ENCLOSED AIR OVER (TEAO) COOLED MOTOR WITH SEALED LIFETIME PRE-LUBRICATED BALL BEARINGS, MOTOR STARTER AND THERMAL OVERLOAD PROTECTION.</p> <p>IV. WIRED FOR SINGLE SPEED OPERATION.</p> <p>V. ELECTRICAL CHARACTERISTICS:</p> <p>1. 460V AC, THREE-PHASE; 0.8 AMP FULL LOAD PER MOTOR/FAN.</p> <p>2. MEETS NEC, ETL LISTED TO CONFORM TO UL 507 (US) AND CSA22.2 (CANADA) STANDARDS. AMCA 211 CERTIFIED.</p> <p>VI. FANS:</p> <p>1. FORWARD CURVED CENTRIFUGAL TYPE, DOUBLE WIDTH, AND DOUBLE INLET DESIGN, DIRECTLY DRIVEN TO AN ELECTRIC MOTOR.</p> <p>VII. PROVIDE RESILIENT ISOLATION DAMPENING MOUNTINGS BETWEEN MOTOR FRAME AND MOTOR MOUNTING PAN.</p> <p>VIII. FACTORY BALANCED BLOWER WHEEL ASSEMBLY STATICALLY AND DYNAMICALLY.</p> <p>IX. HOUSING:</p> <p>1. SELF-CONTAINED ONE-PIECE TYPE WITH SUFFICIENT STRENGTH FOR MOUNTING FROM PRE-PUNCHED MOUNTING HOLES AT BOTH ENDS TO ADJACENT WALLS OR CEILING WITHOUT</p>	<p>INTERMEDIATE SUPPORT.</p> <p>X. SIZE:</p> <p>1. UNHEATED: 12-3/4 INCHES DEEP BY 10-5/8 INCHES HIGH (INCLUDING DISCHARGE NOZZLE) BY WIDTH OF UNIT.</p> <p>XI. MOUNTING:</p> <p>1. UNHEATED INSIDE MOUNT.</p> <p>XII. MATERIAL:</p> <p>1. PROVIDE 18- AND 20-GAUGE ELECTRO OR HOT DIPPED GALVANIZED STEEL SHEET HOUSING CONFORMING TO ASTM A 879 AND/OR ASTM A 653.</p> <p>XIII. AIR INLET GRILLE AND/OR FILTERS: PROVIDE AIR INLET GRILLE AND/OR FILTERS SPECIFIED.</p> <p>XIV. DISCHARGE: PROVIDE INTEGRAL DISCHARGE NOZZLE SPECIFIED.</p> <p>XV. FINISH AND COLOR:</p> <p>1. PROVIDE WITH, NO VOC, CORROSION RESISTANT POLYURETHANE POWDER COATED FINISH FOR SHEET METAL HOUSINGS.</p> <p>2. UNIT TO BE OBSIDIAN BLACK.</p> <p>XVI. DISCHARGE NOZZLE:</p> <p>1. WEDGE-SHAPED DISCHARGE OUTLET NOZZLE WITH ADJUSTABLE AIR FOIL VANES WITH A PLUS/MINUS 40-DEGREE SWEEP FRONT TO BACK.</p> <p>XVII. AIR VELOCITY AT NOZZLE:</p> <p>1. STD2108-3: 108 INCH (2743 MM) WIDE UNITS: 2206 FEET/MIN (11.2 M/S) TWO 1/2HP MOTOR/FAN ASSEMBLIES.</p> <p>2. STD2120-3: 120 INCH (3050 MM) WIDE UNITS: 2084 FEET/MIN (10.6 M/S) THREE 1/2HP MOTOR/FAN ASSEMBLIES.</p> <p>XVIII. AIR SPEED AT FLOOR: MINIMUM OF 300 FPM (1.53 M/S) AT 3 FEET (914 MM) FROM THE FLOOR.</p> <p>XIX. AIR INLET GRILLE AND FILTERS:</p> <p>1. LOCATION: FRONT.</p> <p>2. TYPE: FIXED AIR INTAKE GRILLE.</p> <p>3. FILTER: ALUMINUM MESH, 1/4 INCH (6.4 MM), WASHABLE.</p> <p>XX. MOTOR/FAN ASSEMBLY:</p> <p>1. SOUND PRESSURE LEVEL AT 10 FEET (3 M) FROM NOZZLE:</p> <p>2. THREE MOTOR/FAN UNITS: 71 DBA.</p> <p>XXI. MOTOR CONTROL PANELS FOR UNHEATED UNITS:</p> <p>1. RECOMMENDED FOR ALL THREE-PHASE UNITS AND SINGLE PHASE UNITS WITH COMBINED MOTOR CAPACITIES OF MORE THAN 1 HP WHENEVER A DOOR LIMIT SWITCH IS USED TO AUTOMATICALLY START AND STOP THE AIR CURTAIN.</p> <p>2. PROVIDE MOTOR CONTROL PANELS AS FOLLOWS:</p> <p>1. MOUNTING: SHIPPED LOOSE TO BE FIELD MOUNTED.</p> <p>3. ELECTRICAL COMPONENTS UL/CUL LISTED.</p> <p>4. PANELS UL 508A LISTED.</p> <p>C. VERTICAL INLINE MULTISTAGE PUMP (HWP-1-1&amp;2):</p> <p>I. MANUFACTURER:</p> <p>1. BELL &amp; GOSSETT</p> <p>2. ARMSTRONG</p> <p>3. GRUNDFOS</p> <p>II. PUMP:</p> <p>1. THE PUMP SHALL BE A NON-SELF PRIMING VERTICAL MULTISTAGE PUMP COUPLED TO A MOTOR.</p> <p>2. THE LIQUID END, LOCATED BETWEEN THE UPPER COVER AND THE PUMP CASING, IS HELD IN PLACE BY TIE RODS.</p> <p>3. THE PUMP CASING IS AVAILABLE WITH DIFFERENT CONFIGURATIONS AND CONNECTION TYPES</p> <p>4. DIRECTION OF ROTATION: CLOCKWISE LOOKING AT THE PUMP FROM THE TOP DOWN (MARKED WITH AN ARROW ON THE ADAPTER AND ON THE COUPLING).</p> <p>III. MOTOR:</p> <p>1. STANDARD NEMA PREMIUM TC FRAME MOTORS IN TOTALLY ENCLOSED FAN COOLED (TEFC).</p> <p>2. 1750 RPM NOMINAL</p> <p>IV. STANDARD VOLTAGE:</p> <p>1. THREE-PHASE VERSION, 2 POLE: 208-230/460 V, 60 HZ</p> <p>V. GENERAL:</p> <p>1. VERTICAL MULTISTAGE CENTRIFUGAL PUMP WITH IMPELLERS, DIFFUSERS AND OUTER SLEEVE MADE ENTIRELY OF STAINLESS STEEL, AND WITH PUMP CASING AND MOTOR ADAPTER MADE OF CAST IRON IN THE STANDARD VERSION</p> <p>2. ROTATING COMPONENTS MADE ENTIRELY OF AISI 316 STAINLESS STEEL</p> <p>3. INNOVATIVE AXIAL LOAD COMPENSATION SYSTEM TO ENSURE REDUCED AXIAL THRUSTS</p> <p>4. BALANCED MECHANICAL SEAL ACCORDING TO EN 12756 (EX DIN 24960) AND ISO 3069, WHICH CAN BE REPLACED WITHOUT REMOVING THE MOTOR FROM THE PUMP</p> <p>5. SEAL HOUSING CHAMBER DESIGNED TO PREVENT THE ACCUMULATION OF AIR IN THE CRITICAL AREA NEXT TO THE MECHANICAL SEAL</p> <p>6. ALLOWABLE TEMPERATURE RANGE: -20°F TO 250°F</p> <p>7. PUMP BODY FITTED WITH TAPS FOR INSTALLING PRESSURE GAUGES ON BOTH SUCTION AND DELIVERY FLANGES</p> <p>D. VARIABLE AIR VOLUME BOXES (VAV, CAV &amp; VAV-HW):</p> <p>I. CASING:</p> <p>1. 22 GAUGE GALVANIZED STEEL.</p> <p>II. AGENCY LISTING:</p> <p>1. UNIT IS UL AND CANADIAN UL LISTED AS A ROOM AIR TERMINAL UNIT. CONTROL # 9N65, AHRI 880 CERTIFIED.</p> <p>III. INSULATION:</p> <p>1. 1-INCH (25.4 MM) MATTE-FACED INSULATION-INTERIOR SURFACE OF UNIT CASING IS ACOUSTICALLY AND THERMALLY LINED WITH 1-INCH, 1.0 LB/FT<sup>3</sup> (25.4 MM, 16.0 KG/M<sup>3</sup>) COMPOSITE DENSITY GLASS FIBER WITH A HIGH-DENSITY FACING. INSULATION R-VALUE IS 3.85. INSULATION IS UL LISTED AND MEETS NFPA-90A AND UL 181 STANDARDS. THERE ARE NO EXPOSED EDGES OF INSULATION (COMPLETE METAL ENCAPSULATION).</p> <p>2. WIRE PENETRATIONS ARE COVERED BY GROMMETS. THERE ARE NO EXPOSED EDGES OF INSULATION (COMPLETE METAL ENCAPSULATION).</p> <p>IV. PRIMARY AIR VALVE:</p> <p>1. AIR VALVE ROUND-THE-PRIMARY (VENTILATION) AIR INLET CONNECTION IS AN 18-GAUGE GALVANIZED STEEL CYLINDER SIZED TO FIT STANDARD ROUND DUCT. A MULTIPLE-POINT, AVERAGING FLOW SENSING RING IS PROVIDED WITH BALANCING TAPS FOR MEASURING +/-5% OF UNIT CATALOGED AIRFLOW.</p> <p>2. AN AIRFLOW VERSUS PRESSURE DIFFERENTIAL CALIBRATION CHART IS PROVIDED.</p> <p>3. THE DAMPER BLADE IS CONSTRUCTED OF A CLOSED-CELL FOAM SEAL THAT IS MECHANICALLY LOCKED BETWEEN TWO 22-GAUGE GALVANIZED STEEL DISKS.</p> <p>4. THE DAMPER BLADE ASSEMBLY IS CONNECTED TO A CAST ZINC SHAFT SUPPORTED BY SELF-LUBRICATING BEARINGS.</p> <p>5. THE SHAFT IS CAST WITH A DAMPER POSITION INDICATOR. THE VALVE ASSEMBLY INCLUDES A MECHANICAL STOP TO PREVENT OVER-STROKING. SEE , P. 16 FOR AIR LEAKAGE PERFORMANCE DATA.</p> <p>V. OUTLET CONNECTION:</p> <p>1. SLIP AND DRIVE CONNECTION-TERMINAL UNITS COME STANDARD WITH SLIP AND DRIVE CONNECTION.</p> <p>VI. HOT WATER COILS (IF APPLICABLE):</p> <p>1. ALL HOT WATER COILS ARE FACTORY-INSTALLED ON THE DISCHARGE OUTLET.</p> <p>2. FULL FIN COLLARS PROVIDED FOR ACCURATE FIN SPACING AND MAXIMUM FIN-TUBE CONTACT.</p> <p>3. THE 3/8" (9.5 MM) OD SEAMLESS COPPER TUBES ARE MECHANICALLY EXPANDED INTO THE FIN COLLARS. COILS SHALL BE SUBJECTED TO A PRESSURE DECAY TEST AT 450 PSIG FOR A MINIMUM OF 45 SECONDS.</p> <p>4. COILS SHALL THEN BE EVACUATED AND CHARGED WITH A HELIUM GAS MIXTURE AND PRESSURIZED TO 150 PSIG. WHILE PRESSURIZED WITH THE HELIUM GAS MIXTURE, THE COIL SHALL BE CHECKED WITH A GAS ANALYZER TO DETECT HELIUM LEAKS.</p>	<p>5. ALTERNATIVELY, THE COIL SHALL BE SUBJECTED TO A FINAL AIR-UNDER-WATER LEAK TEST AT 300 PSIG.</p> <p>6. THE 1-ROW COIL HAS 144 ALUMINUM FINS PER FOOT.</p> <p>7. FULL FIN COLLARS PROVIDED FOR ACCURATE FIN SPACING AND MAXIMUM FIN-TUBE CONTACT.</p> <p>8. COIL CONNECTIONS ARE LEFT-HAND. RIGHT-HAND CONNECTIONS ARE OPTIONAL.</p> <p>9. COILS ARE ASSEMBLED WITH EITHER 3/8" OR 7/8" (22.2 MM) OD BRAZE CONNECTIONS.</p> <p>E. PIPE EXPANSION FITTING (PIPE):</p> <p>I. MANUFACTURERS:</p> <p>1. FLEXICRAFT</p> <p>2. SIMILAR</p> <p>II. CONSTRUCTION:</p> <p>1. METAL EXPANSION JOINTS SHALL CONSIST OF A SINGLE HYDRAULICALLY FORMED METAL BELLOWS WITH FLANGE END FITTINGS.</p> <p>2. FLANGES SHALL BE CARBON STEEL AND ANSI B16.5 150#.</p> <p>3. THE BELLOWS SHALL BE 316 STAINLESS STEEL.</p> <p>III. JOINTS:</p> <p>1. JOINTS SHALL BE DESIGNED TO MEET THE DESIGN PRESSURES AND TEMPERATURE FOR THE SYSTEM AND SHALL BE CAPABLE OF ACCOMMODATING PIPING SYSTEM AND EQUIPMENT MOVEMENTS AS NEEDED.</p> <p>F. DUCT EXPANSION FITTING:</p> <p>I. MANUFACTURERS:</p> <p>1. FLEXICRAFT</p> <p>2. SIMILAR</p> <p>II. CONSTRUCTION:</p> <p>1. EPDM ELASTOMER FLEXIBLE ELEMENT MATERIAL FOR FABRIC EXPANSION JOINTS.</p> <p>2. REINFORCED WITH FIBERGLASS.</p> <p>3. FABRIC TO BE 1/4" THICKNESS AND RATED FOR 300F.</p> <p>4. FABRIC DUCT EXPANSION FITTING TO HAVE FLANGE CONNECTION FOR DUCTWORK CONNECTION.</p> <p>G. AIR SEPARATOR (AS-1-1):</p> <p>I. MANUFACTURER:</p> <p>1. BELL &amp; GOSSETT</p> <p>2. AMTROL</p> <p>II. COMPONENTS:</p> <p>1. THE AIR SEPARATOR SHALL BE DESIGNED, CONSTRUCTED, AND STAMPED IN ACCORDANCE WITH SECTION VIII, DIVISION I OF THE ASME BOILER AND PRESSURE VESSEL CODE, AND REGISTERED WITH THE NATIONAL BOARD OF BOILER AND PRESSURE VESSEL INSPECTORS.</p> <p>2. THE AIR SEPARATOR SHALL HAVE A MAXIMUM TEMPERATURE RATING OF 350°F (177°C).</p> <p>3. THE AIR SEPARATOR BODY SHALL BE MADE OF CAST IRON OR CARBON STEEL.</p> <p>4. THE AIR SEPARATOR BODY SHALL BE THREE TIMES THE NOMINAL INLET/OUTLET PIPE DIAMETER.</p> <p>5. THE AIR SEPARATOR SHALL INCLUDE THREADED BLOW DOWN CONNECTION TO ALLOW FOR SEDIMENT TO BE REGULARLY CLEANED OUT OF THE UNIT.</p> <p>6. THE AIR SEPARATOR SHALL INCLUDE A THREADED AIR REMOVAL CONNECTION ON TOP OF THE UNIT SO AN AIR VENT OR EXPANSION/COMPRESSION TANK CAN BE CONNECTED, ALLOWING COLLECTED AIR TO BE REMOVED FROM THE UNIT.</p> <p>7. THE AIR SEPARATOR SHALL INCLUDE A PERFORATED BAFFLE WITH 3/16" PERFORATIONS AND 51% OPEN AREA (R-MODELS ONLY). THE BAFFLE SHALL BE MADE OF CARBON STEEL (R-MODELS ONLY).</p> <p>8. THE AIR SEPARATOR SHALL INCLUDE A REMOVABLE PERFORATED STRAINER WITH 3/16" PERFORATIONS AND 51% OPEN AREA (R-MODELS ONLY).</p> <p>9. THE REMOVABLE STRAINER SHALL BE MADE OF 304 STAINLESS STEEL (R-MODELS ONLY).</p> <p>10. THE AIR SEPARATOR SHALL BE AVAILABLE WITH FLANGED END CONNECTIONS.</p> <p>11. FLANGE END CONNECTIONS SHOULD BE DESIGNED ACCORDING TO ANSI STANDARDS.</p> <p>III. ACCESSORIES:</p> <p>1. BLOWDOWN VALVE.</p> <p>2. AIR VENT</p> <p>H. FLOOR-MOUNTED EXPANSION TANK (ET-1-1):</p> <p>I. MANUFACTURER:</p> <p>1. BELL &amp; GOSSETT</p> <p>2. AMTROL</p> <p>II. GENERAL:</p> <p>1. PRE-CHARGED VERTICAL STEEL EXPANSION TANK WITH INTEGRAL HEAVY DUTY BUTYL RUBBER DIAPHRAGM</p> <p>2. TANK SHALL HAVE 0.302"-0.32" CHARGING VALVE CONNECTION (STANDARD TIRE VALVE) TO FACILITE THE ONSITE CHARGING OF THE TANK TO MEET SYSTEM REQUIREMENTS.</p> <p>3. THE TANK SHALL HAVE A MAX DESIGN TEMPERATURE OF 240F AND A MAX WORKING PRESSURE OF 125 PSIG.</p> <p>III. TANK:</p> <p>1. THE TANK SHALL BE CONSTRUCTED IN ACCORDANCE WITH SECTION VIII OF THE ASME BOILER AND PRESSURE VESSEL CODE AND STAMPED 125 PSI (862 KPA) WORKING PRESSURE.</p> <p>I. CEILING-MOUNTED INLINE EXHAUST FAN (TF-1-1,2&amp;3, TFX-1-1&amp;2, TF-4-1&amp;2):</p> <p>I. MANUFACTURER:</p> <p>1. GREENHECK</p> <p>2. PENN BARRY</p> <p>3. COOK</p> <p>II. GENERAL DESCRIPTION:</p> <p>1. BASE FAN PERFORMANCE AT STANDARD CONDITIONS (DENSITY 0.075 LB/FT<sup>3</sup>)</p> <p>2. EACH FAN SHALL BEAR A PERMANENTLY AFFIXED MANUFACTURE'S NAMEPLATE CONTAINING THE MODEL NUMBER AND INDIVIDUAL SERIAL NUMBER</p> <p>III. WHEEL:</p> <p>1. FORWARD CURVED OR BACKWARD INCLINED CENTRIFUGAL WHEEL</p> <p>2. CONSTRUCTED OF GALVANIZED STEEL.</p> <p>3. STATICALLY AND DYNAMICALLY BALANCED IN ACCORDANCE TO AMCA STANDARD 204-05</p> <p>IV. MOTOR:</p> <p>1. ELECTRONICALLY COMMUTATED MOTOR</p> <p>2. MOTOR ENCLOSURES: TOTALLY ENCLOSED FAN COOLED.</p> <p>3. ELECTRONIC COMMUTATION TYPE MOTOR (ECM) SPECIFICALLY DESIGNED FOR FAN APPLICATIONS. AC INDUCTION TYPE MOTORS ARE NOT ACCEPTABLE. EXAMPLES OF UNACCEPTABLE MOTORS ARE: SHADED POLE, PERMANENT SPLIT CAPACITOR (PSC), SPLIT PHASE, CAPACITOR START AND 3 PHASE INDUCTION TYPE MOTORS.</p> <p>4. MOTORS ARE PERMANENTLY LUBRICATED, HEAVY DUTY BALL BEARING TYPE TO MATCH WITH THE FAN LOAD AND PRE-WIRED TO THE SPECIFIC VOLTAGE AND PHASE.</p> <p>5. INTERNAL MOTOR CIRCUITRY TO CONVERT AC POWER SUPPLIED TO THE FAN TO DC POWER TO OPERATE THE MOTOR OR INTEGRATED VARIABLE FREQUENCY DRIVE.</p> <p>6. MOTOR SHALL BE SPEED CONTROLLABLE DOWN TO 20% OF FULL SPEED (80% TURNDOWN). SPEED SHALL BE CONTROLLED BY EITHER A POTENTIOMETER DIAL MOUNTED AT THE MOTOR OR BY A 0-10 VDC SIGNAL.</p> <p>7. MOTORS CAN ACHIEVE UP TO 95% EFFICIENCY, MODEL AND HORSEPOWER DEPENDENT.</p> <p>V. HOUSING:</p> <p>1. CONSTRUCTED OF HEAVY GAUGE GALVANIZED STEEL</p> <p>2. INTERIOR SHALL BE LINED WITH 0.5 INCHES OF ACOUSTICAL INSULATION</p> <p>VI. SPRING LOADED ALUMINUM BACKDRAFT DAMPER:</p> <p>1. PREVENTS AIR FROM ENTERING BACK INTO THE BUILDING WHEN FAN IS OFF.</p> <p>2. ELIMINATES RATTLING OR UNWANTED BACKDRAFTS.</p> <p>VII. MOUNTING BRACKETS:</p> <p>1. FULLY ADJUSTABLE FOR MULTIPLE INSTALLATION CONDITIONS</p>	<p>VIII. ACCESS PANEL:</p> <p>1. ONCE INSTALLED SHALL HAVE EASY ACCESS TO INTERNAL COMPONENTS</p> <p>IX. DISCONNECT SWITCHES:</p> <p>1. FACTORY MOUNTED AND SHIPPED LOOSE FOR FIELD MOUNTING</p> <p>2. NEMA 1: INDOOR APPLICATION NO WATER. (SINGLE POLE ROCKER SWITCH ASSEMBLY)(TWO POLE ROCKER SWITCH ASSEMBLY)</p> <p>3. WIRED FROM FAN MOTOR TO JUNCTION BOX INSTALLED WITHIN MOTOR COMPARTMENT</p> <p>4. ACCESS FOR WIRING SHALL BE EXTERNAL</p> <p>X. VIBRATION KIT:</p> <p>1. AVAILABLE FOR SUSPENDED INSTALLATIONS</p> <p>2. INCLUDES PREPUNCHED HOLE FOR EASE OF INSTALLATION AND SHALL HAVE ALL HARDWARE TO MOUNT ONE UNIT.</p> <p>J. INLINE TUBULAR EXHAUST FAN (MXF-1-1):</p> <p>I. MANUFACTURER:</p> <p>1. GREENHECK</p> <p>2. PENN BARRY</p> <p>3. COOK</p> <p>II. GENERAL:</p> <p>1. BASE FAN PERFORMANCE AT STANDARD CONDITIONS (DENSITY 0.075 LB./FT<sup>3</sup>).</p> <p>2. FANS SELECTED SHALL BE CAPABLE OF ACCOMMODATING STATIC PRESSURE AND FLOW VARIATIONS OF +/-15% OF SCHEDULED VALUES.</p> <p>3. EACH FAN SHALL BE BELT DRIVEN IN AMCA ARRANGEMENT 9 ONLY WITH WHEEL SECURED TO THE FAN SHAFT.</p> <p>4. FANS ARE TO BE EQUIPPED WITH LIFTING LUGS.</p> <p>5. AFTER FABRICATION ALL CARBON STEEL COMPONENTS SHALL BE CLEANED AND CHEMICALLY TREATED BY A PHOSPHATIZING PROCESS TO INSURE PROPER REMOVAL OF GREASE, OIL, SCALE, ETC. FAN SHALL THEN BE COATED WITH A MINIMUM OF 2-4 MILS OF PERMATECTOR (POLYESTER URETHANE), ELECTROSTATICALLY APPLIED AND BAKED. FINISH COLOR SHALL BE RAL 7023, CONCRETE GREY. COATING MUST EXCEED 1,000-HOUR SALT SPRAY UNDER ASTM B117 TEST METHOD.</p> <p>III. FAN HOUSING AND OUTLET:</p> <p>1. FAN HOUSING TO BE AERODYNAMICALLY DESIGNED WITH PUNCHED INLET AND OUTLET FLANGES FOR DUCTWORK CONNECTION ON INLINE FANS.</p> <p>2. FAN HOUSING SHALL BE CONSTRUCTED OF ROLLED STEEL WITH A CONTINUOUS SEAM WELD.</p> <p>3. HOUSING AND BEARING SUPPORT SHALL BE CONSTRUCTED OF WELDED STRUCTURAL STEEL MEMBERS TO PREVENT VIBRATION AND RIGIDLY SUPPORT THE SHAFT AND BEARINGS.</p> <p>4. EITHER AN OSHA COMPLIANT WEATHERHOOD, OR AN OSHA COMPLIANT BELT GUARD SHALL BE INCLUDED TO COMPLETELY COVER THE MOTOR PULLEY AND BELT(S).</p> <p>IV. FAN WHEEL:</p> <p>1. THE FAN WHEEL SHALL BE OF THE NON-OVERLOADING BACKWARD INCLINED CENTRIFUGAL TYPE. WHEELS SHALL BE STATICALLY AND DYNAMICALLY BALANCED TO BALANCE GRADE G6.3 PER ANSI S2.19.</p> <p>2. LEVEL 1: WHEEL SHALL BE CONSTRUCTED WITH HALF-WELDED AND HALF-RIVETED ALUMINUM. THE MAXIMUM PRESSURE CAPABILITIES SHALL BE 2 INCHES W.G.</p> <p>3. ALUMINUM PARTS SHALL NOT REQUIRE PROTECTIVE COATING.</p> <p>4. THE WHEEL AND FAN INLET SHALL BE CAREFULLY MATCHED AND SHALL HAVE PRECISE RUNNING TOLERANCES FOR MAXIMUM PERFORMANCE AND OPERATING EFFICIENCY.</p> <p>V. FAN MOTORS AND DRIVE:</p> <p>1. MOTORS TO BE NEMA T-FRAME, 1800 RPM, OPEN EXPLOSION PROOF-SPARK RESISTANT B CERTIFIED WITH A 1.15 SERVICE FACTOR.</p> <p>2. DRIVE BELTS AND SHEAVES SHALL BE SIZED FOR 150% OF THE FAN OPERATING BRAKE HORSEPOWER, AND SHALL BE READILY AND EASILY ACCESSIBLE FOR SERVICE, IF REQUIRED.</p> <p>3. FAN SHAFT TO BE TURNED AND POLISHED STEEL THAT IS SIZED SO THE FIRST CRITICAL SPEED IS AT LEAST 25% OVER THE MAXIMUM OPERATING SPEED FOR EACH PRESSURE CLASS.</p> <p>4. FAN SHAFT BEARINGS SHALL BE AIR HANDLING QUALITY, BEARINGS SHALL BE HEAVY-DUTY GREASE LUBRICATED, SELF-ALIGNING OR ROLLER PILLOW BLOCK TYPE.</p> <p>5. BEARINGS SHALL BE SELECTED FOR A BASIC RATING FATIGUE LIFE (L-10) OF 80,000 HOURS AT MAXIMUM OPERATING SPEED FOR EACH PRESSURE CLASS (AVERAGE LIFE OR (L-50) OF 400,000 HOURS).</p> <p>6. BEARINGS SHALL BE FIXED TO THE FAN SHAFT USING CONCENTRIC MOUNTING LOCKING COLLARS, WHICH REDUCE VIBRATION, INCREASE SERVICE LIFE, AND IMPROVE SERVICEABILITY. BEARINGS THAT USE SET SCREWS SHALL NOT BE ALLOWED.</p> <p>7. BEARINGS SHALL HAVE EXTENDED LUBE LINES WITH ZERK FITTINGS TO ALLOW FOR LUBRICATION.</p> <p>VI. DISCONNECT SWITCHES:</p> <p>1. FACTORY MOUNTED AND SHIPPED LOOSE FOR FIELD MOUNTING</p> <p>2. NEMA 1: INDOOR APPLICATION NO WATER. (SINGLE POLE ROCKER SWITCH ASSEMBLY)(TWO POLE ROCKER SWITCH ASSEMBLY)</p> <p>3. WIRED FROM FAN MOTOR TO JUNCTION BOX INSTALLED WITHIN MOTOR COMPARTMENT</p> <p>4. ACCESS FOR WIRING SHALL BE EXTERNAL</p> <p>K. CEILING-HUNG INLINE EXHAUST FAN (TF-1-1):</p> <p>I. MANUFACTURER:</p> <p>1. GREENHECK</p> <p>2. PENN BARRY</p> <p>3. COOK</p> <p>II. GENERAL:</p> <p>1. BASE FAN PERFORMANCE AT STANDARD CONDITIONS (DENSITY 0.075 LB/FT<sup>3</sup>)</p> <p>2. EACH FAN SHALL BEAR A PERMANENTLY AFFIXED MANUFACTURE'S ENGRAVED METAL NAMEPLATE CONTAINING THE MODEL NUMBER AND INDIVIDUAL SERIAL NUMBER</p> <p>III. WHEEL:</p> <p>1. NON-OVERLOADING, BACKWARD INCLINED CENTRIFUGAL WHEEL</p> <p>2. CONSTRUCTED OF ALUMINUM.</p> <p>3. STATICALLY AND DYNAMICALLY BALANCED IN ACCORDANCE TO AMCA STANDARD 204-05</p> <p>4. THE WHEEL CONE AND FAN INLET WILL BE MATCHED AND SHALL HAVE PRECISE RUNNING TOLERANCES FOR MAXIMUM PERFORMANCE AND OPERATING EFFICIENCY.</p> <p>5. SINGLE THICKNESS BLADES ARE SECURELY RIVETED OR WELDED TO A HEAVY GAUGE BACK PLATE AND WHEEL CONE.</p> <p>IV. MOTOR:</p> <p>1. ELECTRONICALLY COMMUTATED MOTOR</p> <p>2. MOTOR ENCLOSURES: TOTALLY ENCLOSED FAN COOLED.</p> <p>3. ELECTRONIC COMMUTATION TYPE MOTOR (ECM) SPECIFICALLY DESIGNED FOR FAN APPLICATIONS. AC INDUCTION TYPE MOTORS ARE NOT ACCEPTABLE. EXAMPLES OF UNACCEPTABLE MOTORS ARE: SHADED POLE, PERMANENT SPLIT CAPACITOR (PSC), SPLIT PHASE, CAPACITOR START AND 3 PHASE INDUCTION TYPE MOTORS.</p> <p>4. MOTORS ARE PERMANENTLY LUBRICATED, HEAVY DUTY BALL BEARING TYPE TO MATCH WITH THE FAN LOAD AND PRE-WIRED TO THE SPECIFIC VOLTAGE AND PHASE.</p> <p>5. INTERNAL MOTOR CIRCUITRY TO CONVERT AC POWER SUPPLIED TO THE FAN TO DC POWER TO OPERATE THE MOTOR OR INTEGRATED VARIABLE FREQUENCY DRIVE.</p> <p>6. MOTOR SHALL BE SPEED CONTROLLABLE DOWN TO 20% OF FULL SPEED (80% TURNDOWN). SPEED SHALL BE CONTROLLED BY EITHER A POTENTIOMETER DIAL MOUNTED AT THE MOTOR OR BY A 0-10 VDC SIGNAL.</p> <p>7. MOTORS CAN ACHIEVE UP TO 95% EFFICIENCY, MODEL AND HORSEPOWER DEPENDENT.</p> <p>V. HOUSING/CABINET CONSTRUCTION:</p> <p>1. CONSTRUCTION MATERIAL: GALVANIZED</p> <p>2. SQUARE DESIGN CONSTRUCTED OF HEAVY GAUGE GALVANIZED STEEL</p> <p>VI. HOUSING SUPPORT &amp; DRIVE FRAME:</p> <p>1. DRIVE FRAME IS CONSTRUCTED OF STRUCTURAL STEEL WITH FORMED FLANGES.</p> <p>VII. DISCONNECT SWITCH:</p>	<p>TO THE BEST KNOWLEDGE, BELIEF AND PROFESSIONAL JUDGEMENT, THESE PLANS AND SPECIFICATIONS ARE IN COMPLIANCE WITH THE 2020 ENERGY CONSERVATION CONSTRUCTION CODE OF NEW YORK STATE.</p>
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N. STARTERS AND VFD'S SHALL BE PROVIDED WITH ENCLOSURES RATED NEMA 1 FOR INDOOR APPLICATIONS. MEET THE FOLLOWING ADDITIONAL GASKETING FOR WEATHERPROOF RAINTIGHT OUTDOOR ENCLOSURE OR INDOOR ENVIRONMENTS SUBJECT TO MOISTURE.  
O. MOTORS SHALL BE HIGH EFFICIENCY, COMPLY WITH NEMA MG-1 STANDARD AND MEET THE 1992 EPA ENERGY EFFICIENCY ACT AND UTILITY COMPANY REBATE REQUIREMENTS.  
P. PROVIDE VARIABLE FREQUENCY DRIVES (VFD) AS MANUFACTURED BY ABB OR EQUIVALENT FOR CONTROL OF PUMPS AS SHOWN ON THE PLANS AND AS SPECIFIED HEREIN. VFD DISTORTION FACTOR SHALL NOT EXCEED 3% THD (VOLTAGE) AT POINT OF COMMON COUPLING, AS DEFINED BY IEEE 519.1992 AND IN NO CASE SHALL THE CURRENT THD EXCEED 10%. VFDs SHALL INCLUDE THE FOLLOWING:  
1. PWM TECHNOLOGY INCORPORATING IGBT.  
2. 40 CHARACTER FULL ENGLISH DIGITAL DISPLAY. CODES ARE NOT ACCEPTABLE.  
3. DC LINE CHOKe  
4. THREE SETS OF NORMALLY CLOSED OR NORMALLY OPEN CONTACTS.  
5. CIRCUIT BREAKER DISCONNECT.  
6. VFD DRIVE SERVICE SWITCH.  
7. SPEED CONTROL DIAL.  
8. THERMAL MOTOR OVERLOADS.  
9. 3% AC LINE REACTOR PRE-WIRED AND INSTALLED WITHIN VFD ENCLOSURE.  
10. FACTORY START-UP SERVICE INCLUDING COMPONENT TESTING, FIELD CHECK OF CONTROL CONNECTION, AND DOCUMENTS STATING THAT ALL WORK AND DRIVE FUNCTIONS ARE DEEMED ACCEPTABLE.  
11. PROGRAMMING OF ALL DRIVE PARAMETERS PARTICULAR TO THIS INSTALLATION.  
12. 2 YEAR SITE PARTS AND LABOR WARRANTY AFTER START-UP.  
Q. VARIABLE FREQUENCY DRIVE MOTORS SHALL COMPLY WITH NEMA MG-1 PART 31.40.4.2 STANDARD SUITABLE FOR VFD OPERATION. CONTRACTOR TO COORDINATE VFD AND MOTOR MANUFACTURERS.  
R. ALL VFD DRIVES FOR ALL EQUIPMENT SHALL BE OF THE SAME MANUFACTURER. MECHANICAL CONTRACTOR SHALL COORDINATE VFD DRIVE MANUFACTURER WITH EACH EQUIPMENT VENDOR.

2.09 AUTOMATIC TEMPERATURE CONTROL

A. GENERAL  
1. PROVIDE ALL CONTROL, POWER, AND INTERLOCK WIRING INCLUDING CONDUITS AND INSTALL PER THE NEW YORK STATE AND NATIONAL ELECTRIC CODE. SUBMIT TERMINAL TO TERMINAL WIRING DIAGRAM, SEQUENCE OF OPERATION AND CUTS OF ALL COMPONENTS FOR APPROVAL. PROVIDE ALL RELAYS, SWITCHES, DAMPERS AND ACTUATORS, THERMOSTATS, PANELS, LIMIT SAFETIES, TRANSFORMERS, TIME CLOCKS, CONTROL VALVES AND OTHER DEVICES TO ACCOMPLISH THE DESIRED SEQUENCE OF OPERATION.  
2. FURNISH AND INSTALL AS HEREIN SPECIFIED, A COMPLETE AUTOMATIC TEMPERATURE CONTROL SYSTEM OF THE DDC TYPE WITH BAGNET COMMUNICATION PROTOCOL.  
3. THE MANUFACTURER SHALL BE ALBIREO ENERGY, ABM, AUTOMATED LOGIC, SCHNEIDER ELECTRIC, HONEYWELL OR APPROVED EQUAL BY THE ENGINEER. MANUFACTURER SHALL BE APPROVED BY ENGINEER BEFORE BID AWARD. THE ATC CONTRACTOR SHALL BE AN INDEPENDENT CONTRACTOR NOT AFFILIATED WITH THE MECHANICAL CONTRACTOR.  
4. ALL TEMPERATURE CONTROL SYSTEMS AND COMPONENTS ARE TO BE FULLY MODULATING TYPE, EXCEPT WHERE NOTED OTHERWISE.  
5. THE NEW BMS SYSTEM SHALL BE A WEB-BASED SYSTEM.  
6. BMS SOFTWARE & GRAPHICS:  
A) PROVIDE ENTERPRISE SERVER SOFTWARE TO ALLOW ALL NETWORK CONTROLLERS (INCLUDING GRAPHICS, ALARMS, SCHEDULES, ETC.) TO BE ACCESSIBLE FROM THE WORKSTATION SIMULTANEOUSLY FOR OPERATIONS AND ENGINEERING TASKS.  
B) WEB-STATION SHALL REQUIRE SECURE USERNAME AND PASSWORD LOGIN.  
C) PROVIDE A SYSTEM GRAPHIC PAGE ON THE WORKSTATION & WEB GRAPHICS FOR EACH HVAC SYSTEM WITH ALL MONITORING AND CONTROL POINTS AS SPECIFIED.  
D) THE BMS CONTRACTOR SHALL PROVIDE A GRAPHIC REPRESENTATION OF EACH FLOOR PLAN AND EACH SYSTEM, SHOWING DEVICES AND ALARMS INDICATED ON THE INPUT/OUTPUT SUMMARY.  
E) PROVIDE A GRAPHICAL FLOOR PLAN SHOWING LEAK DETECTORS AND INDICATE STATUS.  
F) THE BMS SHALL PROVIDE GRAPHICAL SUMMARY PAGES FOR EQUIPMENT AND THEIR CRITICAL POINTS, AC UNIT LEAK DETECTION.  
G) ALL EQUIPMENT GRAPHICS SHALL BE DYNAMIC  
H) THE FLOOR GRAPHICS SHALL INCLUDE UNIQUE COLOR CODES FOR TEMPERATURE VARIATIONS FROM SETPOINT.  
I) THE GRAPHIC INTERFACE SHALL BE SIMPLE POINT AND CLICK NAVIGATION AND ALLOW SCHEDULE CHANGES, SETPOINT CHANGES, ALARM ACKNOWLEDGEMENT, TREND CONFIGURATION, ETC.  
7. TRAINING  
A) THE BMS CONTRACTOR SHALL PROVIDE A MINIMUM OF (8) HOURS ON-SITE TRAINING FOR FACILITY STAFF ON-SITE. TRAINING CAN BE PERFORMED IN SEPARATE (4) HOUR INTERVALS AT THE DISCRETION OF THE OWNER.  
B) THE BMS CONTRACTOR SHALL PROVIDE HARDCOPY OF AS-BUILT DRAWINGS AND REVIEW ALL MAINTENANCE REQUIREMENTS AND PROCEDURES FOR ALL EQUIPMENT.  
8. ALL CONTROLS MUST BE THE PRODUCT OF ONE MANUFACTURER. ALL AUTOMATIC CONTROL VALVES AND DAMPER OPERATORS SHALL BE MANUFACTURED BY THE TEMPERATURE CONTROL MANUFACTURER.  
9. THE MANUFACTURER OF THE AUTOMATIC CONTROL EQUIPMENT SHALL SUBMIT THE FOLLOWING FOR APPROVAL: A SCHEMATIC DIAGRAM OF EACH CONTROL SYSTEM WHICH SHALL INDICATE THE PROPER SEQUENCE OF OPERATION AND RANGE OF THE CONTROLS FOR ALL CYCLES, PROVIDE TERMINAL POINT TO TERMINAL POINT ELECTRICAL WIRING DIAGRAMS FOR APPROVAL, A COMPLETE DESCRIPTION OF THE AUTOMATIC OPERATION OF EACH SYSTEM WHERE THE DESCRIPTION INCLUDES THE DUTY OF EACH THERMOSTAT, VALVE, SWITCH, ETC., INCORPORATED IN THE CONTROL SYSTEM WITH A SCHEDULE AND ILLUSTRATION OF ALL CONTROL INSTRUMENTS AND EQUIPMENT INCLUDING CONTROL PANELS AND DEVICES FOR EACH SYSTEM.  
10. INDIVIDUAL SMOKE DETECTORS SHALL BE INSTALLED (PROVIDED BY ELECTRICAL CONTRACTOR) IN THE RETURN DUCT OF ALL AIR HANDLING SYSTEMS SHARING A COMMON CEILING OR DUCT PLENUM AS REQUIRED BY CODE.  
11. FOR AIR DISTRIBUTION SYSTEMS 2,000 CFM OR LARGER, INSTALL SMOKE DETECTORS (PROVIDED BY ELECTRICAL CONTRACTOR) IN MAIN SUPPLY DUCT (DOWNSTREAM OF AIR FILTERS AND AHEAD OF ANY BRANCH CONNECTIONS) AND MAIN RETURN DUCT (UPSTREAM OF ANY FILTERS AND BEFORE RETURN AIR IS DILUTED WITH OUTDOOR AIR).  
12. ALL SMOKE DETECTORS SHALL BE TIED TO THE BUILDING FIRE ALARM SYSTEM. A SIGNAL FROM THE BUILDING FIRE ALARM SYSTEM SHALL AUTOMATICALLY SHUT DOWN SYSTEM FANS. SIGNAL, INTERLOCK WIRING, POWER WIRING AND FINAL CONNECTIONS WILL BE PROVIDED BY ELECTRICAL CONTRACTOR.  
  
B. ELECTRIC WIRING:  
1. ALL ELECTRIC WORK (EXCEPT FOR MOTOR FEEDERS, WIRING BETWEEN MOTORS, MOTOR CONTROLLERS, FEEDER PANELS, FUSES, CIRCUIT BREAKERS AND BUS BARS) REQUIRED FOR THE AUTOMATIC TEMPERATURE CONTROL SYSTEM SHALL BE PROVIDED BY THIS CONTRACTOR. WORK SHALL INCLUDE BUT NOT BE LIMITED TO TIME SWITCHES, DAMPER MOTORS, DAMPER SWITCHES, ELECTRIC THERMOSTAT, ELECTRIC RELAYS, EP SWITCHES, INTERLOCKING WIRING, WIRE, CONDUIT, ETC.  
2. ALL CONTROL, POWER, WIRING AND TRANSFORMERS FOR DAMPERS, ACUATORS, VAV BOXES, CONTROL PANELS, ETC. TO BE PROVIDED BY THE CONTROLS CONTRACTOR FROM A SOURCE DESIGNATED BY THE ELECTRICAL CONTRACTOR. CIRCUITS FOR CONTROL DEVICES HAVE BEEN DESIGNATED IN THE ELECTRICAL PANEL SCHEDULES.  
3. THE CONTROL MANUFACTURER SHALL INCLUDE WIRING DIAGRAMS IN HIS SHOP DRAWINGS SUBMITTALS FULLY COORDINATED WITH THE ELECTRICAL CONTRACTORS WORK. IT SHALL BE THE AUTOMATIC TEMPERATURE CONTROL CONTRACTORS RESPONSIBILITY TO PROVIDE ALL WIRING AND CONDUIT AS REQUIRED TO ACHIEVE THE FUNCTION CALLED FOR IN THESE SPECIFICATIONS, CONFORMING WITH LOCAL CODES FOR MATERIAL AND INSTALLATION. THE ELECTRICAL SPECIFICATION FOR THE PROJECT ELECTRICAL WORK IS TO BE FOLLOWED.

T. CONTROL PANELS SHALL BE NEMA 1 FOR INDOOR APPLICATIONS, NEMA 3R WITH ADDITIONAL GASKETING FOR WEATHERPROOF RAINTIGHT OUTDOOR ENCLOSURE OR INDOOR ENVIRONMENTS SUBJECT TO MOISTURE. THEY SHALL BE PROVIDED WITH WELDED ANGLE BRACKETS AND A BAKED PRIME COAT ENAMEL FINISH. THE PANEL DOORS SHALL BE HINGED LOCKING TYPE. CONTROL PANELS SHALL CONTAIN ALL CENTRAL CONTROL DEVICES, SUCH AS CONTROLLERS, RELAYS, SWITCHES, PILOT LIGHTS, TERMINAL BLOCKS, AND ALL OTHER ACCESSORIES AS REQUIRED FOR A WORKABLE ENVIRONMENTAL CONTROL SYSTEM. ALL COMPONENTS WITHIN THE CONTROL PANELS SHALL BE PRE-WIRED TO NUMBERED TERMINAL TRIPS, READY FOR FIELD CONNECTION FOR FIELD MOUNTED CONTROL COMPONENTS. PROVIDE LABELS WITH ADJUSTMENT TABS TO LABEL THE CONTROLLED EQUIPMENT. PROVIDE A PLASTIC LAMINATED CONTROL SCHEMATIC DRAWING HUNG NEXT TO EACH CONTROL PANEL.  
  
U. THE SYSTEM INSTALLATIONS SHALL BE SUPERVISED BY THE AUTOMATIC CONTROL MANUFACTURER, WHO SHALL COORDINATE WITH AND INSTRUCT PIPING OR SHEET METAL TRADES AS TO TEES OR TAPPIINGS TO BE INSTALLED IN PIPING OR EQUIPMENT AND OPENINGS THAT ARE REQUIRED IN SHEET METAL FOR THE SETTING AND INSTALLATIONS OF CONTROL DEVICES THEREIN BY THESE TRADES.  
  
V. ALL ROOM THERMOSTATS/SENSORS AND SWITCH LOCATIONS SHALL BE SUBMITTED FOR REVIEW BY THE ARCHITECT AND ENGINEER PRIOR TO INSTALLATION WHETHER THE DEVICES ARE SHOWN ON PLANS OR NOT.  
  
W. ALL ROOM THERMOSTATS/SENSORS SHALL HAVE OVERRIDE SWITCH, LOCAL READOUT AND LOCAL ADJUSTMENT. READOUT AND ADJUSTMENT SHALL BE CAPABLE OF BEING LOCKED OUT AT THE BMS.  
  
X. AUTOMATIC VALVES:  
1. ALL AUTOMATIC CONTROL AND ISOLATION VALVES SHALL BE OF THE ELECTRONIC TYPE, UNLESS OTHERWISE SPECIFIED, QUIET IN OPERATION, AND SHALL BE ARRANGED TO SPRING RETURN FAIL SAFE, IN A NORMALLY CLOSED POSITION. CONTROL VALVES SHALL BE FULLY PROPORTIONING AND ISOLATION VALVES SHALL BE 2-POSITION. VALVES TO HAVE ADJUSTABLE OPERATING RANGES AND STARTING POINTS TO PROVIDE FLEXIBILITY OF ADJUSTMENT IN SEQUENCING AND THROTTLING. MODULATING VALVES SHALL BE PROVIDED WITH PILOT POSITIOnERS.  
2. VALVES SHALL BE SIZED BY THE TEMPERATURE CONTROL MANUFACTURER AND GUARANTEED TO MEET THE HEATING OR COOLING REQUIREMENTS AS SPECIFIED. CONTROL VALVES SHALL BE SUITABLE FOR PRESSURE CONDITIONS AND CLOSE AGAINST 110% OF PUMP DIFFERENTIAL PRESSURE.  
3. ALL VALVE BODIES SHALL HAVE THE SAME PRESSURE CHARACTERISTICS AS THE PIPE IN WHICH IT IS INSTALLED.  
4. VALVES 2 INCHES AND SMALLER UNLESS OTHERWISE SPECIFIED SHALL HAVE BRONZE BODIES WITH SCREWED CONNECTIONS. VALVES SHALL BE FISHER TYPE ED, WARREN TYPE 207/0, K&M SERIES GCG, OR AS APPROVED.  
5. VALVES BETWEEN 2-1/2" AND 4 INCH UNLESS OTHERWISE SPECIFIED, SHALL HAVE CAST IRON OR CARBON STEEL BODIES WITH FLANGED CONNECTIONS IN ACCORDANCE WITH THE PIPING SPECIFICATIONS. VALVES SHALL BE FISHER STYLE ED, WARREN TYPE 207/0 OR 1800 SERIES GCG, K&M SERIES GCG OR AS APPROVED.

I. AUTOMATIC DAMPERS:  
1. PROVIDE CONTROLS FOR ALL THE AUTOMATIC DAMPERS, AS SPECIFIED IN THE DUCTWORK SECTION, AND SHOWN ON THE DRAWINGS.  
2. CONTROL MOTORS OR ACTUATORS SHALL BE OF THE ELECTRONIC TYPE, UNLESS OTHERWISE NOTED, OF APPROPRIATE SIZE AND QUANTITIES TO PROVIDE TWO-POSITION.  
  
J. SEQUENCES OF OPERATION - FURNISH AND MOUNT ALL DEVICES AS REQUIRED TO PERFORM THE FOLLOWING SEQUENCES OF OPERATION:  
1. CONSULT MECHANICAL CONTROL DIAGRAMS.

PART 3- EXECUTION

3.01 A. PROVIDE AND INSTALL ALL EQUIPMENT AND ACCESSORIES OF THE SIZES AND CAPACITIES AS SCHEDULED AND AS INDICATED ON THE DRAWINGS AND IN ACCORDANCE WITH APPROVED SHOP DRAWINGS AND MANUFACTURERS' RECOMMENDATIONS. PROVIDE ALL MOTOR STARTERS AS REQUIRED; MOTOR STARTERS WILL BE INSTALLED BY THIS CONTRACTOR AND WIRED BY ELECTRICAL TRADE.  
  
K. CONTRACTOR IS RESPONSIBLE FOR MAINTAINING ALL REQUIRED CLEARANCES FOR SERVICING AND MAINTENANCE. COORDINATE REQUIREMENTS WITH ALL TRADES.  
  
L. IDENTIFICATION OF EQUIPMENT AND CONTROLS:  
1. ALL EQUIPMENT SHALL BE STENCILED OR LABELED WITH LAMACOID PLATES SCREWED THEREON WHICH SHALL INDICATE SYSTEMS SERVICE.  
2. MOTOR STARTERS SHALL BE PROVIDED WITH LAMACOID PLATES WHICH INDICATE SYSTEM SERVED.  
3. CONTRACTOR TO SUBMIT LIST OF EQUIPMENT TO RECEIVE LABELS AND THE COORDINATED DESIGNATIONS, SIZE OF LABEL LETTERING, PLATE SIZE AND COLOR FOR REVIEW PRIOR TO INSTALLATION.  
  
M. FOR ALL FLOOR MOUNTED EQUIPMENT PROVIDE A 4" OR 6" HIGH CONCRETE HOUSE-KEEPING PAD; WHERE FLOOR STANDS ARE INDICATED PROVIDE FLOOR STAND OF STRUCTURAL STEEL OR STEEL PIPES AND FITTINGS AND BOLT TO PAD; FOR ROOF MOUNTED EQUIPMENT PROVIDE SUPPORTS WITH APPROVED ANCHORS DIRECTLY FROM BUILDING STEEL STRUCTURE. PROVIDE SUPPLEMENTARY STEEL AS REQUIRED TO ADEQUATELY SUPPORT THE LOAD.

3.02 CHEMICAL CLEANING AND PRETREATMENT  
A. CLEANING OF PIPING SHALL BE PERFORMED IN THE PRESENCE OF A BUILDING REPRESENTATIVE.  
B. PROVIDE ALL DISPERSANTS, SCALE INHIBITORS AND CORROSION INHIBITORS AS REQUIRED FOR CLEANING AND TREATING ALL PIPING SYSTEMS. CHROMATES SHALL NOT BE USED.  
C. ALL CHEMICALS TO BE USED FOR PIPE CLEANING SHALL BE APPROVED BY THE BASE BUILDING CHEMICAL TREATMENT COMPANY.  
D. FLUSH PIPING SYSTEMS WITH THE APPROVED CLEANING CHEMICAL TO REMOVE PIPE DOPE, SLUSHING COMPOUNDS, CUTTING OILS AND OTHER LOOSE EXTRANEIOUS MATERIALS. SEAL ENDS AFTER CLEANING.  
E. THE CONTRACTOR SHALL:  
1. SATISFY EACH CHEMICAL HAS THE PROPER FEED RATES FOR CLEANING AND PRETREATMENT OF EACH SYSTEM AND RECORD.  
2. CHECK THAT THE CLEANING SOLUTION IS ACTUALLY IN EACH SYSTEM.  
3. SATISFY WHEN TO FLUSH THE SYSTEM.  
4. CHECK EACH SYSTEM FOLLOWING FLUSHING TO ENSURE CLEANING CHEMICALS HAVE BEEN REMOVED FROM EACH SYSTEM AND TEST TO ENSURE PH OF NEW SYSTEM IS WITHIN 0.5 OF FRESH INCOMING WATER.  
F. BLOCK MODULATING VALVES, ZONE VALVES AND OTHER SYSTEM RESTRICTIONS. PROVIDE BY PASS PIPING AND VALVING TO ISOLATE NEW AND EXISTING TO BE RE-USED EQUIPMENT SUCH AS ChillERS, Coils, HEat ExChAngerS, etc. FROM THE CLEANING PROCESS.  
G. PROVIDE PORTABLE PUMPS TO CIRCULATE WATER FOR CLEANING PURPOSES AT RESPECTIVE FLOORS FOR FOUR (4) HOURS. REMOVE AND CLEAN STRAINERS. BLOW OFF LOW POINTS WITH STEAM AFTER CLEANING AND BEFORE TRAPS ARE INSTALLED. DRAIN ENTIRE SYSTEM.  
H. CHEMICAL USED FOR CLEANING OF SYSTEMS SHALL COMPLY WITH THE RECOMMENDATIONS OF THE MANUFACTURERS OF THE MAJOR COMPONENTS IN THE SYSTEM AND SHALL BE APPROVED FOR USE.  
I. UPON INITIAL FILL (FOLLOWING SYSTEM FLUSHING) THE APPROVED CHEMICALS WHICH PROVIDE A PROTECTIVE COATING TO PREVENT OXIDATION OF THE CLEANED SYSTEM SHALL BE ADDED.

3.03 WATER TREATMENT  
C. PROVIDE ALL BIOCIDES AND BIODISPERSANTS AS REQUIRED TO TREAT WATER SYSTEMS FOR THE PREVENTION OF MICROBIOLOGICAL GROwTH. ChRoMaTeS Shall NoT Be uSeD.  
D. PROVIDE A VENTURI CHEMICAL FEED FITTING AND SYSTEM OR EACH SYSTEM TO BE TREATED. FITTINGS SHALL BE NALCO BIODOCTOR OR APPROVED EQUAL.  
E. PROVIDE ALL CONTROLS AND EQUIPMENT REQUIRED FOR AN AUTOMATIC BLEED AND CHEMICAL FEED SYSTEM.  
F. AFTER CHEMICAL CLEANING AND PRETREATMENT OF PIPING SYSTEMS ANALYZE WATER SYSTEMS TO DETERMINE SPECIFIC BIOCIDES AND INHIBITORS TO BE USED.  
G. ADD THE NECESSARY BLEND OF