ABBREVIATIONS AND TERMS

ø	DIAMETER, PHASE
°F	DEGREES FAHRENHEIT
A/C	AIR CONDITIONING
ACC	AIR COOLED CONDENSER
ACCU	AIR COOLED CONDENSING UNIT
AD	AREA DRAIN, ACCESS DOOR
AFF	ABOVE FINISHED FLOOR
AFMS	AIR FLOW MEASURING STATION
AGA	AMERICAN GAS ASSOCIATION
AHU	AIR HANDLING UNIT
AL	ACOUSTICALLY LINED; ALUMINUM
AMB	AMBIENT
ANSI	AMERICAN NATIONAL STANDARDS INSTITUTE
AO	ANALOG OUTPUT
AP	ACID PROOF, ACCESS PANEL
APD	AIR PRESSURE DROP (IN. WC.)
ARCH	ARCHITECT
ARI	AIR CONDITIONING AND REFRIGERATION INSTITUTE
ARV	AIR RELIEF VALVE
AS	AIR SEPARATOR
ASHRAE	AMERICAN SOCIETY OF HEATING, REFRIGERATING AND AIR CONDITIONING ENGINEERS
ASME	AMERICAN SOCIETY OF MECHANICAL ENGINEERS
ASPE	AMERICAN SOCIETY OF PLUMBING ENGINEERS
ASTM	AMERICAN SOCIETY FOR TESTING AND MATERIALS
ATM	ATMOSPHERE
AUTO	AUTOMATIC
AVG	AVERAGE
AVS	ACID VENT STACK
AW	ACID WASTE
AWWA	AMERICAN WATER WORKS ASSOCIATION
BD	BUTTERFLY DAMPER
BDD	BACKDRAFT DAMPER
BE	BOTTOM ELEVATION
BF	BARRIER FREE
BFC	BELOW FINISHED CEILING
BHP	BRAKE HORSEPOWER
BLDG	BUILDING
BOD	BOTTOM OF DUCT
BOP	BOTTOM OF PIPING
BSMT	BASEMENT
BT	BATHTUB
BTM	BOTTOM
BtuH	BRITISH THERMAL UNIT PER HOUR
CA	COMPRESSED AIR
CAV	CONSTANT AIR VOLUME
CB	CATCH BASIN
CC	CEILING CASSETTE
CCW	COUNTERCLOCKWISE
CD	CONDENSATE DRAIN
CO	CARBON DIOXIDE
CR	CEILING FAN
CFM	CUBIC FEET PER MINUTE
CH	CHILLER
CHWP	CHILLED WATER PUMP
CI	CAST IRON
CMP	CORRUGATED METAL PIPE
CO	CLEANOUT
COMPR	COMPRESSOR
COND	CONDENSER
CONV	CONVECTOR
CP	CONDENSATE PUMP
CPVC	CHLORINATED POLYVINYL CHLORIDE
CT	COOLING TOWER
CU	CONDENSING UNIT
CUH	CABINET UNIT HEATER
CUV	CLASSROOM UNIT VENTILATOR
CV	CONTROL VALVE
CW	CLOCKWISE
CWP	CONDENSER WATER PUMP
dB	DECIBEL
DB	DRY BULB
DF	DRINKING FOUNTAIN
DG	DOOR GRILLE
DH	DUCT HEATER
DI	DIGITAL INPUT
DIA	DIAMETER
DIFF	DIFFUSER
DN	DOWN
DO	DIGITAL OUTPUT
DS	DOWNSPOUT, DOWN STREAM
DW	DISTILLED WATER
DWG	DRAWING
DWH	DOMESTIC WATER HEATER
DWV	DRAIN, WASTE & VENT
DX	DIRECT EXPANSION
EA	EXHAUST AIR
EAT	ENTERING AIR TEMPERATURE (°F)
EC	ELECTRICAL CONTRACTOR
ECO	EXTERIOR CLEANOUT
EDR	EQUIVALENT DIRECT RADIATION
EER	ENERGY EFFICIENCY RATIO
EF	EXHAUST FAN
EFF	EFFICIENCY
EG	EXHAUST GRILLE
EL	ELEVATION
EOM	END OF MAIN DRIP
ES	EMERGENCY SHOWER
ESP	EXTERNAL STATIC PRESSURE (IN. WG.)
ET	EXPANSION TANK
EW	EMERGENCY EYEWASH
EWC	ELECTRIC WATER COOLER
EWT	ENTERING WATER TEMPERATURE (°F)
EXH	EXHAUST
EXIST	EXISTING
F	FURNACE
F&T	FLOAT AND THERMOSTATIC STEAM TRAP
FCO	FLOOR CLEANOUT
FCU	FAN COIL UNIT
FD	FLOOR DRAIN, FIRE DAMPER
FDC	FIRE DEPARTMENT CONNECTION
FDTN	FOUNDATION
FE	FIRE EXTINGUISHER
FHC	FIRE HOSE CABINET
FLR	FLOOR
FM	FACTORY MUTUAL
FOV	FUEL OIL VENT
FPM	FEET PER MINUTE
FPVAV	FAN POWERED VAV UNIT
FS	FLOOR SINK
FSC	FIRE SUPPRESSION CONTRACTOR
FSD	COMBINATION FIRE/SMOKE DAMPER
FT	FOOT, FEET
FTG	FOOTING
FTR	FINNED TUBE RADIATION
G	NATURAL GAS
GA	GAGE OR GAUGE
GAL	GALLON
GC	GENERAL CONTRACTOR
GIV	GRAVITY INTAKE VENTILATOR
GPD	GALLONS PER DAY
GPH	GALLONS PER HOUR
GPM	GALLONS PER MINUTE
GR	GRILLE, GRAINS
GRV	GRAVITY RELIEF VENTILATOR
GT	GREASE TRAP
HB	HOSE BIBB
HD	HEAD (FT.)
Hg	MERCURY
HHWP	HEATING HOT WATER PUMP
HO	HUB OUTLET
HORIZ	HORIZONTAL
HP	HORSEPOWER, HEAT PUMP
HR	HOUR(S)
HRTU	HEATING ONLY ROOFTOP UNIT
HX	HEAT EXCHANGER
Hz	HERTZ
IB	INVERTED BUCKET STEAM TRAP
ID	INSIDE DIAMETER
IE	INVERT ELEVATION
IN	INCH, INCHES
INT	INTERIOR
INV	INVERT
IPS	INTERNATIONAL PIPE STANDARD
IW	INDIRECT WASTE
K	KELVIN
KEC	KITCHEN EQUIPMENT CONTRACTOR
kW	KILOWATT
LAB	LABORATORY
LAT	LEAVING AIR TEMPERATURE (°F)
L	LAVATORY
LBS	POUNDS
LD	LINEAR DIFFUSER
LP	LIQUID PETROLEUM
LTG	LIGHTING
LWT	LEAVING WATER TEMPERATURE (°F)
MA	MIXED AIR
MAT	MIXED AIR TEMPERATURE (°F)
MAX	MAXIMUM
MB	MOP BASIN
MBH	THOUSAND Btu PER HOUR
MC	MECHANICAL CONTRACTOR
MCA	MINIMUM CIRCUIT AMPS
MCC	MOTOR CONTROL CENTER
MD	MOTORIZED DAMPER
MFR	MANUFACTURER
MH	MANHOLE
MIN	MINIMUM
MISC	MISCELLANEOUS
MS	MOP SINK
MTD	MOUNTED
MV	MANUAL VENT
N	NITROGEN
NA	NOT APPLICABLE
NC	NOISE CRITERIA, NORMALLY CLOSED
NEC	NATIONAL ELECTRIC CODE
NFC	NATIONAL FIRE CODE
NFPA	NATIONAL FIRE PROTECTION ASSOCIATION
NFWH	NON-FREEZE WALL HYDRANT
NIC	NOT IN CONTRACT
NO	NORMALLY OPEN, NITROUS OXIDE
NOM	NOMINAL
NPW	NON-POTABLE WATER
NTS	NOT TO SCALE
O	OXYGEN
OA	OUTSIDE AIR
OAI	OUTSIDE AIR INTAKE
OAT	OUTSIDE AIR TEMPERATURE (°F)
OBD	OPPOSED BLADE DAMPER
OD	OUTSIDE DIAMETER, OVERFLOW DRAIN
OF-CI	OWNER FURNISHED/CONTRACTOR INSTALLED
OSD	OPEN SITE DRAIN
OZ	OUNCE
P	PUMP
PBD	PARALLEL BLADE DAMPER
PC	PLUMBING CONTRACTOR
PD	PRESSURE DROP
PE	PNEUMATIC ELECTRIC
PH	PHASE
PIV	POST INDICATOR VALVE
PPM	PARTS PER MILLION
PRV	PRESSURE REDUCING VALVE
PSI	POUNDS PER SQUARE INCH
PSIA	POUNDS PER SQUARE INCH ABSOLUTE
PSIG	POUNDS PER SQUARE INCH GAUGE
PTAC	PACKAGED TERMINAL AIR CONDITIONER
PVC	POLYVINYL CHLORIDE
R	REGISTER
R12	REFRIGERANT (12, 22, ETC.)
RA	RETURN AIR
RADN	RADIATION
RAT	RETURN AIR TEMPERATURE (°F)
RCP	REINFORCED CONCRETE PIPE
RD	ROOF DRAIN
REV	REVOLUTIONS
RF	RETURN FAN
RG	RETURN GRILLE
RH	RELATIVE HUMIDITY, RODDING HOLE
RM	ROOM
RP	RADIANT PANEL
RPM	REVOLUTIONS PER MINUTE
RPS	REVOLUTIONS PER SECOND
RTU	ROOF TOP UNIT
RV	RELIEF VALVE, ROOF VENT
SA	SUPPLY AIR
SAN	SANITARY
SD	SUPPLY DIFFUSER, SMOKE DAMPER
SEER	SEASONAL ENERGY EFFICIENCY RATIO
SF	SQUARE FOOT, SUPPLY FAN, SAFETY FACTOR
SG	SUPPLY GRILLE
SU	SHOWER UNIT
SK	SINK
SMACNA	SHEET METAL AND AIR CONDITIONING CONTRACTORS NATIONAL ASSOCIATION
SP	STATIC PRESSURE
SPEC	SPECIFICATION
SQ	SQUARE
SR	SUPPLY REGISTER
SRV	SAFETY RELIEF VALVE
SS	SERVICE SINK, STAINLESS STEEL
STD	STANDARD
SV	STEAM VENT
TCC	TEMPERATURE CONTROL CONTRACTOR
TCP	TEMPERATURE CONTROL PANEL
TD	TEMPERATURE DIFFERENCE
TE	TOP ELEVATION
TEMP	TEMPERATURE
TF	TRANSFER FAN
TG	TRANSFER GRILLE
TMV	THERMOSTATIC MIXING VALVE
TONS	TONS OF REFRIGERATION
TP	TRAP PRIMER
TRANS	TRANSITION
TS	TAMPER SWITCH
TSP	TOTAL STATIC PRESSURE (IN. WC.)
TXV	THERMAL EXPANSION VALVE
TYP	TYPICAL
UCD	UNDERCUT DOOR
UH	UNIT HEATER
UL	UNDERWRITERS LABORATORIES
UON	UNLESS OTHERWISE NOTED
UR	URINAL
US	UP STREAM
UV	UNIT VENTILATOR
V	VOLTS, VENT
VAC	VACUUM
VAV	VARIABLE AIR VOLUME
VB	VACUUM BREAKER
VD	VOLUME DAMPER
VEL	VELOCITY
VERT	VERTICAL
VF	VENTILATION FAN
VFD	VARIABLE FREQUENCY DRIVE
VTR	VENT THROUGH ROOF
VUV	VERTICAL UNIT VENTILATOR
W	WASTE, WATT
WB	WET BULB
WC	WATER COLUMN, WATER CLOSET, WALL CASSETTE
WCO	WALL CLEANOUT
WH	WALL HYDRANT
WPD	WATER PRESSURE DROP (FT. HD.)
WSHP	WATER SOURCE HEAT PUMP
YD	YARD DRAIN

PIPING IDENTITY SYMBOLS

	FLOW DIRECTION ARROW, PITCH DIRECTION ARROW
	PIPE RISE
	PIPE DROP
	PIPE CAP
	PIPE CONTINUES (REFERENCE ELSEWHERE)
	PIPE GUIDE
	PIPE ANCHOR
	FLEXIBLE CONNECTOR
	EXPANSION COMPENSATOR
	EXPANSION LOOP
	CONCENTRIC, ECCENTRIC FITTINGS
	UNION, FLANGED UNION
	GATE VALVE
	BALL VALVE
	GLOBE VALVE
	BUTTERFLY VALVE
	PLUG VALVE
	CHECK VALVE
	PRESSURE REDUCING VALVE
	ANGLE VALVE
	RELIEF VALVE
	VALVE WITH OUTSIDE STEM & YOKE
	PNEUMATIC TWO-WAY CONTROL VALVE
	PNEUMATIC THREE-WAY CONTROL VALVE
	ELECTRIC TWO-WAY CONTROL VALVE
	ELECTRIC THREE-WAY CONTROL VALVE
S	SOLENOID VALVE
F	FLOW SWITCH
P	PRESSURE SWITCH
T	AQUASTAT
	ORIFICE FLOW METER
	VENTURI FLOW METER
	TURBINE FLOW METER
	CALIBRATED BALANCE VALVE
	AUTOMATIC FLOW CONTROL VALVE
	STRAINER
	STRAINER WITH CAPPED BLOWDOWN
	MANUAL AIR VENT
	AUTOMATIC AIR VENT
	VACUUM BREAKER
	TEMPERATURE/PRESSURE TAP
	THERMOMETER
	PRESSURE GAUGE
F&T	STEAM TRAP WITH DESIGNATION
	REFRIGERATION SIGHT GLASS
	AIR FILTER/DRYER
	REFRIGERATION THERMAL EXPANSION VALVE
	INLINE PUMP
DPT	DIFFERENTIAL PRESSURE TRANSMITTER
M	WATER METER
G	GAS METER

HVAC IDENTITY SYMBOLS

24/12	RECTANGULAR DUCTWORK DESIGNATION IN INCHES, FIRST DIMENSION IS SIDE SHOWN	24ø	ROUND SPIRAL DUCTWORK DESIGNATION IN INCHES	24/12 ø	FLAT OVAL DUCTWORK DESIGNATION IN INCHES, FIRST DIMENSION IS SIDE SHOWN
	RECTANGULAR SUPPLY AIR, OUTSIDE AIR DUCTWORK RISE		ROUND SPIRAL SUPPLY AIR, OUTSIDE AIR DUCTWORK RISE		FLAT OVAL SUPPLY AIR, OUTSIDE AIR DUCTWORK RISE
	RECTANGULAR SUPPLY AIR, OUTSIDE AIR DUCTWORK DROP		ROUND SPIRAL SUPPLY AIR, OUTSIDE AIR DUCTWORK DROP		FLAT OVAL SUPPLY AIR, OUTSIDE AIR DUCTWORK DROP
	RECTANGULAR RETURN AIR, TRANSFER AIR DUCTWORK RISE		ROUND SPIRAL RETURN AIR, TRANSFER AIR DUCTWORK RISE		FLAT OVAL RETURN AIR, TRANSFER AIR DUCTWORK RISE
	RECTANGULAR RETURN AIR, TRANSFER AIR DUCTWORK DROP		ROUND SPIRAL RETURN AIR, TRANSFER AIR DUCTWORK DROP		FLAT OVAL RETURN AIR, TRANSFER AIR DUCTWORK DROP
	RECTANGULAR EXHAUST AIR, RELIEF AIR DUCTWORK RISE		ROUND SPIRAL EXHAUST AIR, RELIEF AIR DUCTWORK RISE		FLAT OVAL EXHAUST AIR, RELIEF AIR DUCTWORK RISE
	RECTANGULAR EXHAUST AIR, RELIEF AIR DUCTWORK DROP		ROUND SPIRAL EXHAUST AIR, RELIEF AIR DUCTWORK DROP		FLAT OVAL EXHAUST AIR, RELIEF AIR DUCTWORK DROP
AL SS	DUCTWORK CONSTRUCTED OF ALUMINUM, STAINLESS STEEL	R	DUCTWORK RISE IN DIRECTION OF FLOW	D	DUCTWORK DROP IN DIRECTION OF FLOW
20° 30°	STANDARD DEGREE ANGLE TRANSITION IN DIRECTION OF FLOW		SUPPLY AIR, OUTSIDE AIR IN DIRECTION OF FLOW		RETURN AIR, EXHAUST AIR, TRANSFER AIR, RELIEF AIR IN DIRECTION OF FLOW
	ECCENTRIC DUCT TRANSITION		CONCENTRIC DUCT TRANSITION		RECTANGULAR TO ROUND, FLAT OVAL DUCT TRANSITION
	VOLUME DAMPER	AD	ACCESS DOOR		DUCTWORK CAP
M	MOTORIZED DAMPER WITH ACCESS DOOR	FD	FIRE DAMPER WITH ACCESS DOOR	SD	SMOKE DAMPER WITH ACCESS DOOR
BDD	BACK DRAFT DAMPER WITH ACCESS DOOR	AMS	AIRFLOW MEASURING STATION WITH ACCESS DOOR	FSD	FIRE AND SMOKE DAMPER WITH ACCESS DOOR
PS	PRESSURE SENSOR WITH ACCESS DOOR	TS	TEMPERATURE SENSOR WITH ACCESS DOOR	D	SMOKE DETECTOR WITH ACCESS DOOR
	STATIC PRESSURE CHANGE IN INCHES		FLEXIBLE DUCTWORK CONNECTION		
	45° BEVELED FITTING FOR RECTANGULAR TO RECTANGULAR DUCTWORK		RADIUS DUCTWORK ELBOW (CENTERLINE RADIUS 1.5xW)	SA	SOUND ATTENUATOR
	CONICAL FITTING FOR ROUND OR FLAT OVAL TO RECTANGULAR DUCTWORK		RADIUS DUCTWORK ELBOW WITH TURNING VANES		MITERED DUCTWORK ELBOW
	CONICAL FITTING FOR ROUND OR FLAT OVAL TO ROUND OR FLAT OVAL DUCTWORK		WYE RADIUS DUCTWORK ELBOW		MITERED DUCTWORK ELBOW WITH TURNING VANES
	STANDOFF DAMPER FORROUND TO RECTANGULAR DUCTWORK, LOW PRESSURE DUCTWORK		45° RADIUS DUCTWORK ELBOW (CENTERLINE RADIUS 1.5xW)		TRANSFER AIR ELBOW WITH DUCTWORK STUBS FOR SOUND ATTENUATION
	SPIN-IN FITTING FOR ROUND TO RECTANGULAR DUCTWORK, LOW PRESSURE DUCTWORK		CEILING PANEL SUPPLY AIR DIFFUSER		ROUND SUPPLY AIR DIFFUSER
	FLEXIBLE DUCTWORK CONNECTION TO DIFFUSER, MAXIMUM SIX FEET		RECTANGULAR SUPPLY AIR REGISTER		RETURN AIR, EXHAUST AIR, TRANSFER AIR REGISTER OR GRILLE
	SIDEWALL SUPPLY AIR REGISTER OR GRILLE		SIDEWALL RETURN AIR, EXHAUST AIR, TRANSFER AIR REGISTER OR GRILLE		LINEAR SLOT SUPPLY AIR DIFFUSER
T (TU-12.34)	THERMOSTAT WITH ASSOCIATED EQUIPMENT DESIGNATION (OPTIONAL)	TS	TEMPERATURE SENSOR		DOOR GRILLE OR UNDERCUT DOOR
H (TU-12.34)	HUMIDISTAT WITH ASSOCIATED EQUIPMENT DESIGNATION (OPTIONAL)	CO_2	CARBON DIOXIDE SENSOR		CEILING DESTRATIFICATION FAN
NO_2	NITROGEN DIOXIDE SENSOR	CO	CARBON MONOXIDE SENSOR		
	TEMPERATURE CONTROL PANEL		VARIABLE FREQUENCY DRIVE		CENTRIFUGAL ROOF EXHAUST FAN
	HYDRONIC REHEAT COIL WITH ACCESS DOOR		TERMINAL UNIT WITH HYDRONIC REHEAT COIL		INLINE FAN
	ELECTRIC REHEAT COIL WITH ACCESS DOOR		TERMINAL UNIT WITH ELECTRIC REHEAT COIL		SERIES/PARALLEL FAN POWERED TERMINAL UNIT
	BASE MOUNTED PUMP		UNIT VENTILATOR		UNIT HEATER
E	HEAT EXCHANGER		AIR SEPARATOR		FINNED TUBE RADIATION

GENERAL NOTES

A. ALL WORK SHALL BE IN ACCORDANCE WITH THE BEST QUALITY STANDARDS OF THE TRADE, AND SHALL CONFORM WITH ALL FEDERAL, STATE, AND LOCAL CODES AND STANDARDS. THE SAME ARE MADE A PART OF THESE CONTRACT DOCUMENTS AS IF REPEATED HEREIN.

B. CONTRACT DOCUMENTS CONSIST OF BOTH THE PROJECT MANUAL AND DRAWINGS, AND BOTH ARE INTENDED TO BE COMPLEMENTARY. ANYTHING APPEARING ON EITHER MUST BE EXECUTED THE SAME AS IF SHOWN ON BOTH.

C. THE CONTRACTOR SHALL INCLUDE IN BID PROPOSAL ALL COSTS REQUIRED TO COMPLETELY AND PROPERLY INSTALL ALL WORK REQUIRED FOR THE PROJECT, AND SHALL EXAMINE THE SCOPE OF WORK OF OTHER TRADES PRIOR TO SUBMITTING A BID PROPOSAL.

D. CONSTRUCTION DOCUMENTS SHALL BE FOLLOWED AS CLOSELY AS POSSIBLE, HOWEVER, SYSTEMS HAVE BEEN SHOWN DIAGRAMMATICALLY AND IN SOME CASES, ENLARGED FOR CLARITY. ANY OFFSETS, ADDITIONAL FITTINGS, AND/OR APPURTENANCES REQUIRED TO PROVIDE A COMPLETE AND COORDINATED SYSTEM SHALL BE BORNE BY THE CONTRACTOR.

E. THE ENGINEERING DRAWINGS ARE OF EQUAL IMPORTANCE WITH THE ARCHITECTURAL DRAWINGS IN DEFINING THE WORK OF THE CONTRACT DOCUMENTS. IT SHALL BE THE RESPONSIBILITY OF THE CONTRACTOR TO CHECK WITH THE ARCHITECTURAL DRAWINGS BEFORE THE INSTALLATION OF ENGINEERING WORK. SHOULD THERE BE A DISCREPANCY BETWEEN THE ARCHITECTURAL DRAWINGS AND THE ENGINEERING DRAWINGS THAT WOULD CAUSE AN AWKWARD OR IMPROPER INSTALLATION, THE DISCREPANCY SHALL BE BROUGHT TO THE ARCHITECTS/ENGINEERS ATTENTION FOR CLARIFICATION PRIOR TO INSTALLATION OF SAID WORK. ANY WORK INSTALLED IN CONFLICT WITH THE ARCHITECTURAL DRAWINGS SHALL BE CORRECTED BY THE CONTRACTOR AT HIS EXPENSE AND AT NO ADDITIONAL COST TO THE OWNER OR ARCHITECT/ENGINEER.

F. DO NOT SCALE THE DRAWINGS. THE DRAWINGS ARE NOT NECESSARILY TO SCALE. THE CONTRACTOR SHALL VERIFY ALL CONDITIONS AND DIMENSIONS AT THE JOB SITE PRIOR TO THE START OF CONSTRUCTION. IF DISCREPANCIES ARE FOUND, THE ARCHITECT/ENGINEER SHALL BE NOTIFIED FOR CLARIFICATION BEFORE COMMENCING THE WORK. EXPLICIT DIMENSIONS SHALL HAVE PRECEDENCE OVER SCALE.

G. CONTRACTOR SHALL FIELD VERIFY ALL EXISTING CONDITIONS PRIOR TO BIDDING OR BEGINNING WORK ON THIS PROJECT.

H. DETAILS NOT SHOWN ARE SIMILAR IN CHARACTER TO THOSE SHOWN. WHERE SPECIFIC DIMENSIONS, DETAILS OR DESIGN INTENT CANNOT BE DETERMINED, CONSULT THE ARCHITECT/ENGINEER BEFORE PROCEEDING WITH THE WORK.

I. ANY DETAILS, SYSTEMS AND/OR MATERIALS WHICH ARE PROPOSED TO BE CHANGED MUST FIRST BE REVIEWED BY THE OWNER AND ARCHITECT/ENGINEER PRIOR TO THE PREPARATION OF SHOP DRAWINGS.

J. REFER TO MANUFACTURER'S INSTALLATION INSTRUCTIONS AND TEMPLATE DRAWINGS FOR ALL MECHANICAL EQUIPMENT SUPPORTS, BOLT SETTING TEMPLATES, ISOLATORS, SPRING ISOLATION, ETC., NOT SHOWN ON THE DRAWINGS.

K. REFER TO ARCHITECTURAL REFLECTED CEILING PLANS FOR EXACT LOCATION OF CEILING MOUNTED MATERIALS INCLUDING ALL DIFFUSERS, GRILLES, AND REGISTERS.

L. CONTRACTOR SHALL CLOSE ALL UNUSED OPENINGS IN EXISTING DUCTWORK.

M. ALL DUCTWORK DESIGNATIONS REFER TO NET FREE AREA INSIDE THE DUCTWORK.

N. VOLUME DAMPERS SHALL BE LOCATED AT BRANCH CONNECTION TO THE MAIN.

O. A MAXIMUM OF SIX FEET OF FLEXIBLE DUCTWORK MAY BE USED AT ALL SUPPLY DIFFUSERS. BRANCH DUCTWORK TO DIFFUSER SHALL BE SAME SIZE AS DIFFUSER INLET UNLESS SPECIFICALLY LABELED OTHERWISE. REFER TO DIFFUSER SCHEDULE FOR INLET SIZES. AVOID SHARP BENDS IN FLEXIBLE DUCTWORK WHICH MAY CAUSE EXCESSIVE NOISE.

P. BRANCH DUCTWORK TO TERMINAL UNITS SHALL BE SAME SIZE AS TERMINAL UNIT INLET UNLESS SPECIFICALLY LABELED OTHERWISE. REFER TO TERMINAL UNIT SCHEDULE FOR INLET SIZES.

Q. IN ADDITION TO BEING UL 555 LISTED, ALL FIRE DAMPERS AND CEILING RADIATION DAMPERS SHALL ALSO BE LISTED BY UL TO MATCH THE FIRE RESISTANCE RATING AND CLASSIFICATION OF THE ASSEMBLY WITHIN WHICH THEY ARE INSTALLED. REFER TO ARCHITECTURAL PLANS FOR ASSEMBLY LISTING.

NOTATION DESIGNATORS

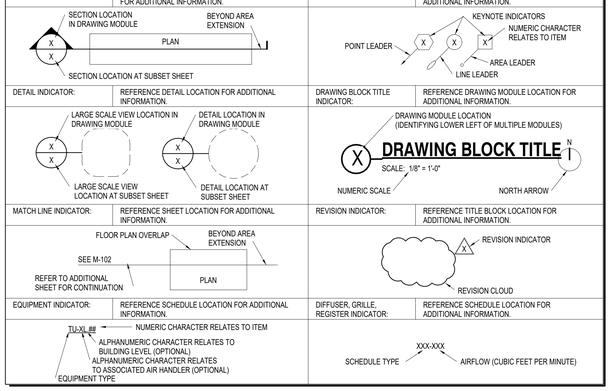
GENERAL NOTES:	NOTES THAT APPLY EQUALLY TO ALL DISCIPLINES WITHIN THE DRAWING SET.
GENERAL MECHANICAL NOTES:	NOTES THAT APPLY EQUALLY TO ALL SHEETS WITHIN THE DISCIPLINE.
GENERAL SHEET NOTES:	NOTES THAT APPLY ONLY TO THE SPECIFIC SHEET ON WHICH THEY APPEAR.
SHEET KEYNOTES:	NOTES THAT APPLY ONLY TO THE SPECIFIC SHEET ON WHICH THEY APPEAR AND USE A KEYNOTE INDICATOR TO IDENTIFY ITEMS.

PIPING LINE SYMBOLS

HEAT RECLAIM PIPING	HR	HIGH PRESSURE STEAM (>61 PSIG)	HPS
HEATING WATER SUPPLY	HHS	MEDIUM PRESSURE STEAM (16-60 PSIG)	MPS
HEATING WATER RETURN	HHR	LOW PRESSURE STEAM (<15 PSIG)	LPS
REFRIGERANT DISCHARGE	RD	HIGH PRESSURE CONDENSATE	HPC
REFRIGERANT SUCTION	RS	MEDIUM PRESSURE CONDENSATE	MPC
REFRIGERANT LIQUID	RL	LOW PRESSURE CONDENSATE	LPC
REFRIGERANT HOT GAS	RHG	BOILER BLOW DOWN	BBD
CONDENSER WATER SUPPLY	CS	BOILER FEED	BF
CONDENSER WATER RETURN	CR	PUMPED CONDENSATE	PC
CHILLED WATER SUPPLY	CWS	VACUUM PUMP DISCHARGE	VPD
CHILLED WATER RETURN	CWR	HUMIDIFICATION	HI
DUAL TEMPERATURE SUPPLY	DTS	MAKE UP WATER	MU
DUAL TEMPERATURE RETURN	DTR	AIR RELIEF VENT	ARV
HEAT PUMP WATER SUPPLY	HPWS	CONDENSATE DRAIN	CD
HEAT PUMP WATER RETURN	HPWR	CONTROL WIRING	
GLYCOL HEATING SUPPLY	GHS	GLYCOL CONDENSOR WATER SUPPLY	GCWS
GLYCOL HEATING RETURN	GHR	GLYCOL CONDENSOR WATER RETURN	GCWR
GLYCOL CHILLED RETURN	GCR	GLYCOL CHILLED SUPPLY	GCS

REFERENCE SYMBOLS

SECTION INDICATOR:	REFERENCE SECTION LOCATION THROUGH AN AREA FOR ADDITIONAL INFORMATION.
KEYNOTE INDICATOR:	REFERENCE SHEET KEYNOTE LOCATION FOR ADDITIONAL INFORMATION.
DETAIL INDICATOR:	REFERENCE DETAIL LOCATION FOR ADDITIONAL INFORMATION.
DRAWING BLOCK TITLE INDICATOR:	REFERENCE DRAWING MODULE LOCATION FOR ADDITIONAL INFORMATION.
MATCH LINE INDICATOR:	REFERENCE SHEET LOCATION FOR ADDITIONAL INFORMATION.
REVISION INDICATOR:	REFERENCE TITLE BLOCK LOCATION FOR ADDITIONAL INFORMATION.
EQUIPMENT INDICATOR:	REFERENCE SCHEDULE LOCATION FOR ADDITIONAL INFORMATION.
DIFFUSER, GRILLE, REGISTER INDICATOR:	REFERENCE SCHEDULE LOCATION FOR ADDITIONAL INFORMATION.



DISCIPLINE DESIGNATORS

M-000	SYMBOLS AND ABBREVIATIONS
M-001	SPECS
MD100	MECHANICAL DEMOLITION
MH100	MECHANICAL DUCTWORK
MP100	MECHANICAL PIPING
M-301	SECTION AND ELEVATIONS
M-401	ENLARGED PLANS
M-501	DETAILS
M-601	SCHEDULES
M-901	FLOW DIAGRAMS AND TEMPERATURE CONTROL DIAGRAMS

LINETYPE DESIGNATORS

	THIN CONTINUOUS LINETYPE INDICATE EXISTING ITEMS TO REMAIN.
	INTERMEDIATE DASHED LINETYPE INDICATE EXISTING ITEMS TO BE REMOVED.
	INTERMEDIATE OR WIDE CONTINUOUS LINETYPE INDICATE NEW ITEMS.
	THIN HALFTONE LINETYPE INDICATE ITEMS BY OTHER DISCIPLINE.
	INDICATES POINT OF NEW CONNECTION TO EXISTING EQUIPMENT, PIPING OR MATERIALS.
	INDICATES POINT OF DISCONNECTION TO EXISTING EQUIPMENT, PIPING OR MATERIALS.

NOT ALL NOTES, DESIGNATORS, SYMBOLS OR ABBREVIATIONS MAY APPLY TO THIS PROJECT

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CONSTRUCTION DOCUMENTS

No.	Description	Date
1	CONSTRUCTION SET	01/19/2026

CLIENT PROJ. #: --
PROJECT #: 24-056
ISSUE DATE: 07/01/2025
DRW: Author | CHK: Checker

SYMBOLS AND ABBREVIATIONS

M000

SECTION 230700 HVAC INSULATION

1. INSULATION SHALL BE APPLIED TO PIPES AND DUCTS WHERE CALLED OUT IN THE MECHANICAL SCHEDULE. NOTE THAT JACKET TYPES AND OTHER PERTINENT INSULATION INFORMATION IS SCHEDULED THERE.
2. MINERAL FIBER PREFORMED PIPE INSULATION: TYPE I, 850 DEG F (454 DEG C) MATERIALS: MINERAL OR GLASS FIBERS BONDED WITH A THERMOSETTING RESIN. COMPLY WITH ASTM C 547, TYPE I, GRADE A. FLAME AND SMOKE DEVELOPED SHALL BE 25/50 PER ASTM E84.
   A. PIPING SUPPORTS SHALL PASS COMPLETELY AROUND THE EXTERIOR OF THE FINISHED INSULATION. USE APPROPRIATELY RIGID BLOCKS OF INSULATION MATERIAL SHALL BE PROVIDED AT ALL SUPPORT POINTS. IN ADDITION, SHEET METAL SADDLES SHALL BE PROVIDED AT SUPPORT POINTS.
   B. THE VAPOR BARRIER, INSULATION AND FINISH SHALL BE CONTINUOUS AT ALL SUPPORT POINTS.
   C. DENSITY: MIN 3.5 LB/FT3
   D. SERVICE TEMPERATURE: 250F
   E. K FACTOR: 0.25 BTU*IN / HR / FT2 / F AT 100F MEAN TEMPERATURE.
   F. WATER VAPOR TRANSMISSTION: 0.02 PERMS WITH JACKET.
3. MINERAL-FIBER BLANKET INSULATION: MINERAL OR GLASS FIBERS BONDED WITH A THERMOSETTING RESIN. COMPLY WITH ASTM C 553, TYPE II AND ASTM C 1290, TYPE III. FLAME AND SMOKE DEVELOPED SHALL BE 25/50 PER ASTM E84.
   A. MAINTAIN INTEGRITY OF VAPOR-BARRIER ON DUCTWORK INSULATION. PREVENT PUNCTURE AND OTHER DAMAGE, INSTALL ACCORDING TO MANUFACTURERS RECOMMENDATIONS.
   B. DENSITY: MIN 1.5 LB/FT3
   C. SERVICE TEMPERATURE: 250F
   D. K FACTOR: 0.26 BTU*IN / HR / FT2 / F AT 100F MEAN TEMPERATURE.
   E. WATER VAPOR TRANSMISSTION: 0.7 PERMS WITH FSK
4. MINERAL-FIBER BOARD INSULATION: MINERAL OR GLASS FIBERS BONDED WITH A THERMOSETTING RESIN. COMPLY WITH ASTM C 612, TYPE IA OR TYPE IB. FOR DUCT AND PLENUM APPLICATIONS, FLAME AND SMOKE DEVELOPED SHALL BE 25/50 PER ASTM E84.
   A. MAINTAIN INTEGRITY OF VAPOR-BARRIER ON DUCTWORK INSULATION. PREVENT PUNCTURE AND OTHER DAMAGE, INSTALL ACCORDING TO MANUFACTURERS RECOMMENDATIONS.
   B. DENSITY: MIN 3.0 LB/FT3
   C. SERVICE TEMPERATURE: 450F
   D. K FACTOR: 0.24 BTU*IN / HR / FT2 / F AT 100F MEAN TEMPERATURE.
   E. WATER VAPOR TRANSMISSTION: 0.02 PERMS WITH FSK.
5. USE ADHESIVES / MASTICS / SEALANTS AS RECOMMENDED BY INSULATION MFGR.

END OF SECTION

1. GENERAL REQUIREMENTS FOR VALVES
   A. SOURCE LIMITATIONS FOR VALVES: OBTAIN EACH TYPE OF VALVE FROM SINGLE SOURCE FROM SINGLE MANUFACTURER.
   B. ASME COMPLIANCE:
      1. ASME B16.1 FOR FLANGES ON IRON VALVES.
      2. ASME B16.10 AND ASME B16.34 FOR FERROUS VALVE DIMENSIONS AND DESIGN CRITERIA.
      3. ASME B31.9 FOR BUILDING SERVICES PIPING VALVES.
2. BALL VALVES
   A. BRONZE BALL VALVES, TWO-PIECE WITH FULL PORT AND STAINLESS-STEEL TRIM:
      1. STANDARD: MSS SP-110
      2. SWP RATING: 150 PSIG.
      3. CWP RATING: 600 PSIG.
      4. BODY MATERIAL: BRONZE
      5. SEATS: PTFE
      6. STEM: STAINLESS STEEL
      7. BALL: STAINLESS STEEL, VENTED
      8. PORT: FULL
3. BRONZE, CALIBRATED-ORIFICE, BALANCING VALVES:
   A. BODY: BRONZE, BALL OR PLUG TYPE WITH CALIBRATED ORIFICE OR VENTURI.
      1. BALL: BRASS OR STAINLESS STEEL
      2. PLUG: RESIN
      3. SEAT: PTFE
      4. PRESSURE GAUGE CONNECTIONS: INTEGRAL SEALS FOR PORTABLE DIFFERENTIAL PRESSURE METER.
      5. HANDLE STYLE: LEVER, WITH MEMORY STOP TO RETAIN SET POSITION
      6. CWP RATING: 125 PSIG.
      7. MAXIMUM OPERATING TEMPERATURE: 250F.

SECTION 230900 INSTRUMENTATION & CONTROL FOR HVAC

1. THE CONTRACTOR SHALL FURNISH AND INSTALL THE CONTROLS INCLUDING ALL NECESSARY HARDWARE AS WELL AS ALL OPERATING AND APPLICATIONS SOFTWARE NECESSARY TO PERFORM THE CONTROL SEQUENCES OF OPERATION.
   A. THE CONTROL SYSTEM SHALL INCLUDE ALL NECESSARY COMPONENTS SUCH AS RELAYS, SWITCHES, DAMPER MOTORS, THERMOSTATS, CONTROL WIRING, AND ALL OTHER NECESSARY COMPONENTS AS SPECIFIED OR AS REQUIRED FOR A COMPLETELY FUNCTIONAL AND OPERATIONAL SYSTEM.
   B. THE CONTROL SYSTEM SHALL OFFER REMOTE ACCESS TO THE OWNER AND SHALL INTEGRATE INTO THE RESIDENT DISTECH CONTROL SYSTEM FOR THE BUILDING TO PROVIDE THE OWNER WITH A SINGLE FRONT END.
   C. ALL MFGR CONTROLLED EQUIPMENT SHALL BE BROUGHT INTO THE CONTROLS SYSTEM VIA BACNET.
   D. THE CONTROLS CONTRACTOR SHALL SCHEDULE A MEETING WITH THE OWNER TO DETERMINE THE REQUIRED ALARMS. FOR BUDGETING PURPOSES, ASSUME THAT ANY POINT COULD BE REQUESTED TO ALARM.
2. INSTALL SYSTEMS AND MATERIALS IN ACCORDANCE WITH MANUFACTURER'S INSTRUCTIONS, ROUGH-IN DRAWINGS AND EQUIPMENT DETAILS.
3. IN EXPOSED AREAS INSTALL ALL CONTROL WIRING IN CABLE TRAY. COORDIANTE SPACE WITH DIV 28. IN CONCEALED CEILING AREAS CONTROL WIRING MAY BE ROUTED ON J-HOOKS. PROVIDE UL PLENUM RATED CABLE IN ALL CASES. COORDINATE CABLE COLOR WITH ARCHITECT AND OWNER.
4. STUB CONDUIT TO ABOVE LIFT OUT CEILINGS. PLASTIC BUSHING SHALL BE INSTALLED WHERE THE WIRING EXITS THE CONDUIT TO PREVENT DAMAGE.
5. PROPERLY SUPPORT AND RUN IN A NEAT WORKMAN LIKE MANNER ALL WIRING AND CONDUIT. RUN PARALLEL TO OR AT A RIGHT ANGLE TO BUILDING STRUCTURE.
6. THERMOSTATS SHALL BE AS REQUIRED ON PLANS.
   A. INSULATE BACK PLATE OF ALL THERMOSTATS ON EXTERIOR WALLS.
7. THE CONTRACTOR SHALL PROGRAM THE THERMOSTATS AT PROJECT COMPLETION. COORDINATE WITH OWNER FOR PROGRAM SETTINGS.
8. CONTRACTOR IS RESPONSIBLE FOR TRAINING OWNER OR FACILITIES MANAGER ON CORRECT OPERATION OF SYSTEM.

END OF SECTION

SECTION 230593 TESTING, ADJUSTING AND BALANCING

1. UTILIZE AN AABC OR NEBB CERTIFIED AGENT TO TEST, ADJUST, AND BALANCE ALL HVAC SYSTEMS. SUBMIT CERTIFICATIONS FOR APPROVAL.
2. THE TEST AND BALANCE COMPANY SHALL BE AN INDEPENDENT FIRM SEPARATE AND DISTINCT FROM AND NOT BE ASSOCIATED WITH OR BE A SUBSIDIARY OF A FIRM PERFORMING WORK UNDER DIVISION 22 OR 23 AND SHALL BE UNDER DIRECT CONTRACT TO THE GENERAL CONTRACTOR.
3. THE CONTRACTOR SHALL PROVIDE THE T&B FIRM WITH COPIES OF ALL DRAWINGS, SPECIFICATIONS, SHOP DRAWINGS, SUBMITTAL DATA, REVISIONS, CHANGE ORDERS, AND OTHER DATA REQUIRED FOR PLANNING FOR T&B WORK.
   A. THE MECHANICAL CONTRACTOR SHALL INSTALL ALL DAMPERS IN AN ACCESSIBLE AREA AND FLAG ALL DAMPERS FOR EASE OF IDENTIFYING LOCATION.
   B. THE CONTRACTOR SHALL CORRECT ANY DEFICIENCIES NOTED DURING THE T&B INCLUDING CONTROLS CALIBRATION, INSTALLATION OF BALANCING DEVICES, SHEAVE REPLACEMENTS, AND MOTOR REPLACEMENTS AT NOT ADDITIONAL COST TO THE OWNER.
   C. THE CONTRACTOR IS RESPONSIBLE TO NOTIFY THE T&B COMPANY IN WRITING WHEN ALL DEFICIENCY REPAIRS ARE COMPLETE.
   D. SHOULD THE SYSTEM NOT BE READY FOR RETESTING IT SHALL BE THE CONTRACTOR'S RESPONSIBILITY TO COMPENSATE THE T&B COMPANY FOR LOST TIME.
4. THE CONTRACTOR SHALL PROVIDE BALANCING FOR AIR AND WATER SYSTEMS. BALANCE AIR TERMINALS TO THE CFM INDICATED SO THAT AT LEAST ONE DAMPER ON A GIVEN SYSTEM IS ABLE TO BE WIDE OPEN. BALANCE WATER FLOW IN A SIMILAR MANNER.
5. AFTER SYSTEMS HAVE BEEN TESTED, BALANCED (WITHIN 5% OF DESIGN), AND PLACED IN PROPER WORKING ORDER, BUT BEFORE FINAL ACCEPTANCE OF THE MECHANICAL SYSTEMS, DEMONSTRATE THE SYSTEMS TO THE OWNER
   A. THE T&B FIRM SHALL LOCK AND MARK LOCATIONS OF ALL DAMPERS AFTER FINAL SETTING.
6. SUBMIT REPORT WITH CERTIFIED SIGNATURE AND SEAL TO ENGINEER FOR REVIEW AND COMMENTS. ALL FEATURES AND FUNCTIONS OF ALL SYSTEMS SHALL BE EXPLAINED AND THE OWNER SHALL BE INSTRUCTED IN PROPER OPERATION AND MAINTENANCE OF THE EQUIPMENT AND SYSTEMS.
   A. THE REPORT SHALL INCLUDE FOR EACH PIECE OF EQUIPMENT AND SYSTEM THE FOLLOWING INFORMATION.
      1. RECORD MANUFACTURER, MODEL, SERIAL, MOTOR NAMEPLATE AND ALL MANUFACTURER DATA RELATED INFORMATION.
      2. GPM FOR EACH TERMINAL UNIT.
      3. WATER PRESSURE DROP ACROSS EACH TERMINAL UNIT COIL.
      4. TEMPERATURE DIFFERENCE BETWEEN INLET AND OUTLET OF WATER COIL IN TERMINAL UNIT.
      5. TOTAL ACTUAL CFM BY TRAVERSE.
      6. ALL READINGS OF SUPPLY, RETURN, OUTSIDE AIR AND EXHAUST REGISTERS.
      7. MEASURE AND RECORD MOTOR FULL LOAD APMS, RPM 'S AND HORSE POWER.
      8. TEST SUPPLY, RETURN, EXHAUST, AND OSA FANS. ADJUST BLOWERS SPEEDS TO ACHIEVE SPECIFIED CFM.
      9. FAN AND MOTOR SHEAVE SIZES AND CENTER DISTANCE. INCLUDE ALL BELT SIZES.
      10. PILOT TUBE TRANSVERSE AT MIN OF 5 POINTS ON EACH DUCT SYSTEM
      11. MEASURE AND RECORD SPACE TEMPERATURE.
      12. OSA TEMPERATURE (DB / WB)
      13. WET BULB AND DRY BULB AIR TEMPERATURES ON THE ENTERING AND LEAVING SIDES OF ALL EQUIPMENT.
      14. TEST AND RECORD STATIC PRESSURES, INCLUDING ENTERING AND LEAVING STATIC PRESSURES OF EACH FAN, COIL, AND FILTER SECTION
      15. CALIBRATION CERTIFICATIONS OF ALL EQUIPMENT BEING UTILIZED.
      16. ALL DEFICIENCIES OF NONCONFORMANCE WITH THE DESIGN DOCUMENTS SHALL BE NOTATED.
   B. ALL DEFICIENCIES SHALL BE REPORTED TO THE ARCHITECT / ENGINEER AND SHALL BE REPAIRED BY THE MECHANICAL CONTRACTOR.
   C. AFTER ALL DEFICIENCIES ARE REPAIRED THE SYSTEM SHALL BE VERIFIED AND ADJUSTED AS NEEDED BY THE T&B CONTRACTOR.
7. TESTING AND BALANCING PROCEDURES SHALL BE PERFORMED WITH EQUIPMENT CLEANED AND CLEAN FILTER MEDIA.
8. INSTRUCT OWNER IN THE MAINTENANCE PROCEDURES TO DRAIN AND PROTECT WATER SYSTEMS FROM FREEZING DURING WINTER CONDITIONS.
9. FURNISH THE NECESSARY TRAINED PERSONNEL TO PERFORM THE DEMONSTRATIONS AND INSTRUCTIONS. THE MANUFACTURER'S REPRESENTATIVES FOR THE EQUIPMENT SHALL BE PRESENT TO ASSIST WITH THE DEMONSTRATIONS.

END OF SECTION

SECTION 238146 WATER-SOURCED UNITARY HEAT PUMP

1. GENERAL
   A. THE CONTRACTOR SHALL FURNISH AND INSTALL WHERE SHOWN ON THE PLANS, PACKAGED WATER SOURCE HEAT PUMP UNITS. SIZES, TYPES AND PERFORMANCE SHALL BE AS INDICATED IN THE UNIT SCHEDULE. EACH UNIT SHALL BE COMPLETE WITH FACTORY FURNISHED COMPONENTS AND ACCESSORIES AS SHOWN IN THE PLANS AND AS HEREIN SPECIFIED.
   B. PROVIDE LABOR, MATERIALS, AND EQUIPMENT AND SERVICES TO PERFORM OPERATIONS REQUIRED FOR THE COMPLETE INSTALLATION AND RELATED WORK AS REQUIRED IN CONTRACT DOCUMENTS.
   C. ELECTRICAL WORK REQUIRED AS AN INTEGRAL PART OF THE TEMPERATURE CONTROL WORK IS INDICATED ON THE MECHANICAL DRAWINGS, AND IS THE RESPONSIBILITY OF THIS CONTRACTOR TO PROVIDE THE COMPLETE SYSTEM TO PERFORM THE FULL SEQUENCE OF OPERATION SHOWN, OR AS DESCRIBED IN THIS SPECIFICATION.
2. QUALITY ASSURANCE: HEAT PUMP PERFORMANCE SHALL BE CERTIFIED IN ACCORDANCE WITH ARI/ISO STANDARD 13256-1 AND SHALL HAVE THE CORRECT ARI/ISO AND UL LABELS AFFIXED TO THE CABINET. HEAT PUMP PERFORMANCE AT SCHEDULED PROJECT OPERATING CONDITIONS SHALL BE SUBSTANTIATED BY COMPUTER GENERATED OUTPUT DATA. HEAT PUMPS SHALL BE LISTED BY A NATIONALLY RECOGNIZED SAFETY-TESTING LABORATORY OR AGENCY, SUCH AS UNDERWRITERS LABORATORY (UL), OR ELECTRICAL TESTING LABORATORY (ETL), OR CANADIAN STANDARDS ASSOCIATION (CSA).PRODUCTS
   A. UNITS SHALL BE SUPPLIED COMPLETELY FACTORY ASSEMBLED, PIPED, INTERNALLY WIRED, FULLY CHARGED WITH R-545B, HORIZONTAL UNIT AND CAPABLE OF OPERATING OVER AN ENTERING WATER TEMPERATURE RANGE FROM 45°F TO 120°F ON STANDARD RANGE MODELS, AND 30° TO 120°F ON EXTENDED RANGE MODELS. ALL EQUIPMENT MUST BE RATED AND CERTIFIED IN ACCORDANCE WITH AHRI/ISO 13256-1 AND MUST BE TESTED, INVESTIGATED, AND DETERMINED TO COMPLY WITH THE REQUIREMENTS OF THE STANDARDS FOR HEATING AND COOLING EQUIPMENT UL-1995 FOR THE US. EACH UNIT SHALL BE ETL, ETLC AND CE LISTED. EACH UNIT SHALL BE RUN TESTED AT THE FACTORY. THE INSTALLING CONTRACTOR SHALL BE RESPONSIBLE FOR FURNISHING AND INSTALLING WATER SOURCE HEAT PUMPS AS INDICATED ON THE PLANS AND PER INSTALLATION INSTRUCTIONS.
   B. CASING AND CABINET - THE CABINET SHALL BE FABRICATED FROM HEAVY GAUGE G-60 GALVANIZED SHEET METAL WITH INTERIOR SURFACES LINED WITH 1/2-INCH THICK, 1.5 LB., COATED FIBERGLASS INSULATION. THE INSULATION SHALL HAVE A FLAME SPREAD OF LESS THAN 25 AND A SMOKE DEVELOPED CLASSIFICATION OF LESS THAN 50 PER ASTM E-84 AND UL 723. ALL FIBERGLASS SHALL BE COATED AND HAVE EXPOSED EDGES TUCKED UNDER FLANGES TO PREVENT THE INTRODUCTION OF GLASS FIBERS INTO THE AIR STREAM. ALL INSULATION MUST MEET NFPA 90A REQUIREMENTS.
   C. FILTER RACK AND FILTERS - UNIT SHALL HAVE A 2" THROWAWAY FILTER AND A 2" FACTORY-INSTALLED COMBINATION FILTER RACK/RETURN AIR DUCT COLLAR. THE FILTERS SHALL BE REMOVABLE FROM EITHER SIDE OF THE UNIT.
   D. REFRIGERANT CIRCUIT - UNITS SHALL HAVE A R-454B SEALED REFRIGERANT CIRCUIT, WHICH INCLUDES A ROTARY, RECIPROCATING OR SCROLL COMPRESSOR, THERMOSTATIC EXPANSION VALVE, AN ALUMINUM LANCED-FIN AND RIFLED COPPER TUBE REFRIGERANT-TO-AIR HEAT EXCHANGER, REVERSING VALVE, COAXIAL, TUBE-IN-TUBE, REFRIGERANT-TO-WATER HEAT EXCHANGER. THE COAXIAL COIL SHALL BE MADE OF A COPPER INNER TUBE AND A STEEL OUTER TUBE AND SHALL BE DEEPLY FLUTED TO ENHANCE HEAT TRANSFER AND MINIMIZE FOULING AND SCALING. THE COAXIAL COIL SHALL BE MADE HAVE A WORKING PRESSURE OF 500 PSIG ON THE WATERSIDE OF THE UNIT AND 600 PSIG ON THE REFRIGERANT SIDE FOR ALL R-454B UNITS. THE COMPRESSOR SHALL HAVE THERMAL OVERLOAD PROTECTION.
   E. HERMETIC COMPRESSORS SHALL BE INTERNALLY SPRUNG. THE COMPRESSOR SHALL HAVE A DUAL LEVEL VIBRATION ISOLATION SYSTEM. THE COMPRESSOR WILL BE MOUNTED ON SPECIALLY ENGINEERED SOUND-TESTED EPDM VIBRATION ISOLATION GROMMETS TO A LARGE HEAVY GAUGE COMPRESSOR MOUNTING PLATE, WHICH IS THEN ISOLATED FROM THE CABINET BASE WITH RUBBER GROMMETS FOR MAXIMIZED VIBRATION ATTENUATION. ALL UNITS SHALL INCLUDE A DISCHARGE MUFFLER TO FURTHER ENHANCE SOUND ATTENUATION. COMPRESSOR SHALL HAVE THERMAL OVERLOAD PROTECTION. COMPRESSOR SHALL BE LOCATED IN AN INSULATED COMPARTMENT AWAY FROM AIR STREAM TO MINIMIZE SOUND TRANSMISSION.
   F. COMPRESSOR SAFETY - SAFETY CONTROLS SHALL INCLUDE A MINIMUM OF 3 SAFETY DEVICES; HIGH PRESSURE SWITCH, LOW PRESSURE SWITCH (LOSS OF CHARGE), WATER COIL LOW TEMPERATURE SENSOR, AND AIR COIL LOW TEMPERATURE SENSOR. THE LOW REFRIGERANT SUCTION TEMPERATURE SENSOR SHALL PROVIDE FREEZE PROTECTION FOR THE WATER COIL AND THE AIR COIL. REFRIGERANT GAUGE ACCESS FITTINGS SHALL BE FACTORY INSTALLED ON HIGH AND LOW PRESSURE REFRIGERANT LINES TO FACILITATE FIELD SERVICE. ACTIVATION OF ANY SAFETY DEVICE SHALL PREVENT THE COMPRESSOR FROM OPERATING VIA A MICROPROCESSOR LOCKOUT CIRCUIT. THE LOCKOUT CIRCUIT SHALL BE RESET AT THE THERMOSTAT OR AT THE UNIT DISCONNECT SWITCH.
   G. DRAIN PAN - THE CONDENSATE PAN SHALL BE CONSTRUCTED OF HIGH DENSITY POLYETHYLENE (HDPE) PLASTIC TO PREVENT CORROSION AND SWEATING. THE BOTTOM OF THE DRAIN PAN SHALL BE SLOPED ON TWO PLANES TO PROVIDE COMPLETE DRAINAGE OF WATER FROM THE PAN TO MEET IAQ REQUIREMENTS. THE WATER SOURCE HEAT PUMP UNIT AS STANDARD SHALL BE SUPPLIED WITH SOLID STATE ELECTRONIC CONDENSATE OVERFLOW PROTECTION. A MECHANICAL FLOAT SWITCH WILL NOT BE ACCEPTED.
   H. FAN AND MOTOR ASSEMBLY - UNIT SHALL HAVE A DIRECT DRIVE CENTRIFUGAL FAN MOTOR ASSEMBLY. THE FAN HOUSING SHALL HAVE A REMOVABLE ORIFICE RING TO FACILITATE FAN MOTOR AND FAN WHEEL REMOVAL WITHOUT REMOVING THE FAN HOUSING. THE FAN MOTOR SHALL BE AN ECM CONSTANT TORQUE VARIABLE SPEED BALL BEARING TYPE MOTOR. THE ECM FAN MOTOR SHALL PROVIDE SOFT STARTING MAINTAIN CONSTANT TORQUE OVER THE STATIC OPERATING RANGE, PROVIDE AIRFLOW ADJUSTMENT BASED OFF SPEED MOTOR TAPS. FAN SHALL BE ISOLATED FROM THE FAN HOUSING WITH VIBRATION GROMMETS AND INTERNAL THERMAL OVERLOAD PROTECTION. THE FAN AND MOTOR ASSEMBLY MUST BE CAPABLE OF OVERCOMING THE EXTERNAL STATIC PRESSURES AS SHOWN ON THE SCHEDULE.
   I. ELECTRICAL - A CONTROL BOX SHALL BE LOCATED WITHIN THE UNIT AND SHALL CONTAIN CONTROLS FOR COMPRESSOR, REVERSING VALVE AND FAN MOTOR OPERATION AND SHALL HAVE EITHER, A 50VA OR (OPTIONAL) 75VA TRANSFORMER AND A TERMINAL BLOCK FOR LOW VOLTAGE FIELD WIRING CONNECTIONS. UNIT SHALL BE NAME-PLATED TO ACCEPT TIME DELAY FUSES OR HACR CIRCUIT BREAKER FOR BRANCH OVER-CURRENT PROTECTION OF THE POWER SOURCE. UNIT CONTROL SYSTEM SHALL PROVIDE HEATING OR COOLING AS REQUIRED BY THE SET POINTS AS PROVIDED BY T.C.C. PER DETAILS. THE UNIT CONTROL SCHEME SHALL PROVIDE FOR FAN OPERATION SIMULTANEOUS WITH COMPRESSOR OPERATION (FAN INTERLOCK) REGARDLESS OF THE THERMOSTAT TYPE. THE UNIT SHALL BE CAPABLE OF PROVIDING AN OUTPUT SIGNAL TO AN LED ON THE THERMOSTAT OR TO A CENTRAL MONITORING PANEL TO INDICATE A "FAULT" CONDITION FROM THE ACTIVATION OF ANY ONE OF THE SAFETY SWITCHES. ALL UNITS SHALL HAVE A SHORT-CIRCUIT CURRENT RATING OF 5KA RMS SYMMETRICAL, 600V MAXIMUM.
   J. CONTROL SYSTEM - UNIT SHALL HAVE A MICROPROCESSOR- BASED CONTROL SYSTEM. THE UNIT CONTROL LOGIC SHALL PROVIDE HEATING AND COOLING OPERATION AS REQUIRED BY THE WALL THERMOSTAT SET POINT. THE CONTROL SYSTEM SHALL PROVIDE THE FOLLOWING FOR STAND-ALONE OPERATION:
      1. THE USE OF PROGRAMMABLE WALL THERMOSTATS.
      2. FAN OPERATION SIMULTANEOUS WITH THE COMPRESSOR (FAN INTERLOCK) REGARDLESS OF THERMOSTAT LOGIC.
      3. TIME DELAY COMPRESSOR OPERATION.
      4. DELAYED DE-ENERGIZING OF THE REVERSING VALVE FOR QUIET REVERSING VALVE OPERATION.
      5. COMPRESSOR SHORT CYCLE PROTECTION OF A MINIMUM OF THREE MINUTES BEFORE RESTART IS POSSIBLE.
      6. RANDOM UNIT START-UP AFTER COMING OFF ON UNOCCUPIED MODE.
      7. SINGLE GROUNDED WIRE CONNECTION FOR ACTIVATION OF THE UNOCCUPIED OR UNIT SHUTDOWN MODES.
      8. NIGHT SETBACK TEMPERATURE SETPOINT INPUT SIGNAL FROM THE WALL THERMOSTAT.
      9. OVERRIDE SIGNAL FROM WALL THERMOSTAT TO OVERRIDE UNOCCUPIED MODE FOR 2 HOURS.
      10. BROWNOUT PROTECTION TO SUSPEND UNIT OPERATION IF THE SUPPLY VOLTAGE DROPS BELOW 80% OF NORMAL.
      11. CONDENSATE OVERFLOW PROTECTION TO SUSPEND COOLING OPERATION IN AN EVENT OF A FULL DRAIN PAN.
      12. SUSPENDED COMPRESSOR OPERATION UPON ACTIVATION OF THE REFRIGERANT SAFETY DEVICES.
      13. COOLING OPERATION ACTIVATED FOR 60 SECONDS UPON ACTIVATION OF THE LOW SUCTION TEMPERATURE SENSOR - DEFROST CYCLE.
      14. METHOD OF DEFEATING COMPRESSOR, REVERSING VALVE AND FAN TIME DELAYS FOR FAST SERVICE DIAGNOSTICS.
      15. REMOTE RESET - PROVIDES MEANS TO REMOTELY RESET AUTOMATIC LOCK-OUTS GENERATED BY HIGH/LOW PRESSURE FAULTS AND/OR LOW TEMPERATURE FAULTS.
      16. FAULT RETRY CLEARS FAULTS THE FIRST TWO TIMES THEY OCCUR WITHIN A 24-HOUR PERIOD AND TRIGGERS AUTOMATIC LOCK-OUT ON 3RD FAULT.
   B. UNIT SHALL HAVE LED ANNUNCIATORS TO AID IN DIAGNOSING UNIT OPERATION BY INDICATING THE WATER SOURCE HEAT PUMP OPERATING MODE AND ALARM CONDITIONS. IF THERE ARE NO CURRENT ALARM CONDITIONS, A GREEN LED ON THE ANNUNCIATOR BOARD WILL INDICATE NORMAL UNIT OPERATING MODE. IF AN ALARM CONDITION EXISTS, THE UNIT CONTROLLER WILL SEND THE FAULT CONDITION TO THE LED ANNUNCIATOR, WHICH WILL ASSIST IN TROUBLESHOOTING THE UNIT.
   C. WARRANTY - MANUFACTURER SHALL WARRANTY EQUIPMENT FOR A PERIOD OF 12 MONTHS FROM START-UP OR 18 MONTHS FROM SHIPPING (WHICHEVER OCCURS FIRST).
3. EXECUTION INSTALLATION:
   A. INSTALL EQUIPMENT IN STRICT ACCORDANCE WITH MANUFACTURER'S INSTRUCTIONS AND TO AS TO BE COMPATIBLE WITH INTENT OF THE RESPECTIVE SYSTEM PERFORMANCE REQUIREMENTS.
   B. NO FIELD PROVIDED APPARATUS, ELECTRICAL OR MECHANICAL, SHALL BE FASTENED TO THE HEAT PUMP CABINET WITH SCREWS, WITHOUT THE PRIOR WRITTEN APPROVAL BY THE MANUFACTURER'S REPRESENTATIVE.
   C. PIPING, ELECTRICAL CONDUITS, LIGHTING FIXTURES, ETC. SHALL NOT BE LOCATED UNDER ANY CEILING SUSPENDED UNIT, SO AS TO INTERFERE WITH UNIT REMOVAL FOR SERVICE OR REPLACEMENT.
   D. PIPING AND ELECTRICAL CONNECTIONS SHALL BE LOCATED TO ELIMINATE ANY INTERFERENCE WITH REMOVAL AND REPLACEMENT OF THE FILTER.
   E. CONTRACTOR SHALL CLEAN EACH UNIT OF CONSTRUCTION DUST AND DEBRIS, AND/OR, (SELECT ONE OR BOTH)
      1. AND INSTALL NEW FILTERS AT TIME OF COMMISSIONING,
      2. AND SHALL SUPPLY TO THE OWNER ONE COMPLETE SET OF SPARE FILTERS FOR EACH UNIT ON THE PROJECT.

SECTION 230500 COMMON WORK RESULTS

1. THE MECHANICAL HVAC SPECIFICATIONS ARE INTENDED TO BE USED TOGETHER AS CONSTRUCTION DOCUMENTS. THE ARE INTENDED TO DEFINE, NOT LIMIT, THE SCOPE OF WORK.THE CONTRACTOR SHALL PROVIDE ALL LABOR, MATERIAL, TOOLS, MACHINERY, AND SERVICES NECESSARY TO COMPLETE THE WORK. THE WORK SHALL BE COORDINATED AS TO NOT IMPEDE THE PROGRESS OF THE PROJECT.
2. THESE DOCUMENTS ARE DIAGRAMMATIC. THE CONTRACTOR SHALL COORDINATE ALL WORK SO THAT INTERFERENCES ARE AVOIDED.
3. THE MECHANICAL SYSTEM IS DESIGNED FOR A 100% SEALED ENVELOPE IN THE BUILDING FOR THE MECHANICAL SYSTEM TO FUNCTION AS DESIGNED AND TO ENSURE THERE IS NO HUMIDITY ISSUES CAUSED BY UNCONDITIONED AIR ENTERING THE BUILDING. THE GENERAL CONTRACTOR AND MECHANICAL CONTRACTOR ARE RESPONSIBLE TO COORDINATE THE VERIFICATION THAT THE BUILDING ENVELOPE IS SEALED. THE ENVELOPE IS THE AREA ON ANY EXTERIOR WALL OF THE SALON THAT COULD POTENTIALLY LEAK OUTSIDE AIR INTO THE SPACE. ALL AREAS ARE REQUIRED TO BE SEALED AND INSULATED TO PREVENT UNCONDITIONED OUTSIDE AIR IN THE BUILDING.
   THIS INCLUDES…
   -THE AREA WHERE THE ROOF MEETS THE OUTSIDE WALL.
   -ANY EXTERIOR WALL THAT HAS GAPS OR OPENINGS IN THE WALL COVERING SHOWING INSULATION. THIS IS FROM FLOOR TO ROOF DECK AND EXTERIOR DOOR SEALS.
   A. IF THE BUILDING ENVELOPE IS LEAKING IT IS THE RESPONSIBILITY OF THE GENERAL CONTRACTOR TO INCLUDE AS A SEPARATE LINE ITEM ON THE PROPOSAL TO SEAL THE ENVELOPE.
   B. IF THE ENVELOPE PASSES INSPECTION BEFORE BIDDING, THE GC IS TO PROVIDE A CERTIFICATION LETTER TO THE OWNER AND THE ENGINEER AT THE BID DATE.
   C. IF THE ENVELOPE IS LEAKING AND AN ISSUE OCCURS WITHOUT NOTIFYING THE OWNER BEFORE THE BIDDING PROCESS, IT WILL BE AT THE GENERAL CONTRACTORS EXPENSE TO CORRECT THIS ISSUE. THE COST SHALL NOT BE PASSED ONTO THE OWNER.
   D. THE GC IS RESPONSIBLE TO PROVIDE A REPORT TO THE MECHANICAL ENGINEER THAT THE LEAKING ENVELOPE ISSUE ISSUES ARE CORRECTED AND CERTIFIED. AT ANY TIME, POST CONSTRUCTION AT OCCUPANCY, THE OWNER FINDS THE ENVELOPE IS NOT SEALED, THE GC IS RESPONSIBLE TO CORRECT THE ISSUE AND ANY DAMAGES. THIS WILL BE AT THE COST TO THE GC AND NOT PASSED ONTO THE OWNER.
4. PROVIDE ALL EQUIPMENT, MATERIALS, LABOR, SUPERVISION, AND SERVICES NECESSARY FOR OR INCIDENTAL TO THE INSTALLATION OF A COMPLETE AND OPERATING REFRIGERATION AND AIR HANDLING SYSTEM AS INDICATED ON THE DRAWINGS AND AS SPECIFIED.
5. COORDINATE ALL WORK WITH ALL OTHER TRADES AND ANY EXISTING CONDITIONS TO PREVENT CONFLICTS CAUSING UNNECESSARY EXPENSE OR DELAYS IN THE INSTALLATION OF THE WORK. WHEN CONFLICTS ARISE, REMOVE AND RELOCATE ITEMS CAUSING SUCH CONFLICTS, AT NO ADDITIONAL COST TO THE OWNER. THE WORK SHALL BE ARRANGED IN A NEAT, WELL-ORGANIZED MANNER. LOCATE OPERATING AND CONTROL EQUIPMENT PROPERLY TO PROVIDE EASY ACCESS FOR OPERATION AND ACCESS FOR OPERATION AND MAINTENANCE.
6. SHOULD THERE BE ANY DOUBT TO THE INTENT OF THE CONTRACT DOCUMENTS (THESE DRAWINGS), OBTAIN AN INTERPRETATION FROM THE ARCHITECT.
7. THE CONTRACTOR SHALL OBTAIN ALL NECESSARY PERMITS, LICENSES, AND FEES TO COMPLETE THE WORK AT HIS/HER EXPENSE.
8. ANY FIRM OR INDIVIDUAL NOT HAVING THE NECESSARY EXPERIENCE AND EXPERTISE TO COMPLETE THE WORK SHALL NOT BE USED ON THIS PROJECT.
9. THE WORK SHALL CONFIRM TO THE LATEST EDITIONS OF THE FOLLOWING STANDARDS: APPLICABLE STATE AND LOCAL CODES, NFPA, AGA, ASME, ASHRAE, SBI, NSF, PDI, UL, NEC, NEMA, SMACNA, OSHA, AHRI, MSS, ANSI, FM, ADA.
10. THE CONTRACTOR SHALL ARRANGE AND COORDINATE WITH AUTHORITIES AND UTILITY COMPANIES FOR SERVICE CONNECTIONS IN ADDITION TO RESTORING ANY DEMOLITION REQUIRED FOR THE SAID CONNECTIONS.
11. WITHOUT THE PRIOR APPROVAL FORM THE ENGINEER AND OWNER, ALL MECHANICAL EQUIPMENT SHALL NOT BE OPERATED DURING CONSTRUCTION OF THE BUILDING PER MANUFACTURERS RECOMMENDATIONS. MECHANICAL CONTRACTOR IS RESPONSIBLE TO PROVIDE TEMPORARY HEATING OR COOLING AS NEEDED TO CLIMATIZE THE BUILDING.
12. PUNCH-LIST – DIVISION 23 SHALL SCHEDULE, THROUGH THE ARCHITECT WITH A MINIMUM OF 7-DAYS NOTICE, THE ENGINEER TO PERFORM THE FOLLOWING:
   A. PRE-PUNCH LIST: VERIFICATION OF MECHANICAL ITEMS SUCH AS, BUT NOT LIMITED TO, DUCTWORK SIZES, PIPING SIZES, LOCATIONS. METHODS OF ASSEMBLY / INSTALLATION, HANGING, BEFORE ITEMS ARE ENCLOSED BY CEILINGS, WALL, ETC.
      a. DIVISION 23 SHALL DELIVER TO BOTH THE ARCHITECT AND ENGINEER, A LETTER STATING THAT ALL ITEMS IN THE PRE-PUNCH LIST HAVE BEEN CORRECTED OR ADJUSTED ACCORDING TO THE GENERAL CONDITIONS OF THE CONTRACT BEFORE ANY CEILINGS, WALLS, ETC CAN BE INSTALLED TO ENCLOSE THE PLUMBING AND MECHANICAL ITEMS,
   B. FINAL PUNCH-LIST: VERIFICATION OF MECHANICAL ITEMS SUCH AS, BUT NOT LIMITED TO, UNIT OPERATION, SENSOR LOCATIONS, QUALITY OF INSTALLATION. ALL FINISHES AND COLORS SELECTED BY THE ARCHITECT.
      a. BEFORE PROCEEDING WITH THE FINAL PUNCH LIST, DIVISION 23 SHALL PROVIDE THE ENGINEER WITH A COMPLETE SIGNED AND SEALED TEST & BALANCE REPORT. THE ENGINEER SHALL NOT PERFORM A FINAL PUNCH LIST UNTIL A COMPLETE TEST & BALANCE REPORT IS RECEIVED.
      b. DIVISION 23 SHALL AT THE REQUEST OF THE ENGINEER, PROVIDE A LADDER AND ONE EMPLOYEE TO REMOVE AND REPLACE CEILING TILES, OPEN ACCESS DOORS, ETC. FOR THE INSPECTION OF MECHANICAL ITEMS. THE EMPLOYEE SHALL BE MADE IMMEDIATELY AVAILABLE TO REMOVE ITEMS REQUESTED BY THE ENGINEER. ANY CEILING TILES DAMAGED SHALL BE REPLACED WITH NEW (TO MATCH EXISTING) AT DIVISION 23'S EXPENSE.
      c. DIVISION 23 SHALL DELIVER TO BOTH THE ARCHITECT & ENGINEER A LETTER STATING THAT ALL ITEMS IN THE FINAL PUNCH LIST HAVE BEEN CORRECTED OR ADJUSTED ACCORDING TO THE GENERAL CONDITIONS OF THE CONTRACT.
1. DURING THE COURSE OF CONSTRUCTION, COLLECT AND COMPILE THREE (3) SETS OF OPERATING INSTRUCTIONS, WIRING DIAGRAMS, CATALOG CUTS, PREVENTATIVE MAINTENANCE INSTRUCTIONS, PARTS LISTS, ETC FOR ALL THE EQUIPMENT FURNISHED UNDER THIS CONTRACT, ALL LITERATURE INCLUDING WARRANTIES SHALL BE INCLUDED IN THE OPERATION AND MAINTENANCE MANUALS.
   A. AT COMPLETION OF WORK, AND PRIOR TO REQUEST FOR FINAL INSPECTION, SUBMIT THE MANUALS TO THE ARCHITECT IN ACCORDANCE WITH DIVISION 1 AND SPECIFIED HEREIN. MANUALS SHALL BE BOUND IN HEAVY DUTY, THREE-RING, VINYL COVERED, HARD-BACKED BINDERS, WITH CLEAR PLASTIC POCKET ON THE SPINE. THE SPINE OF EACH BINDER SHALL HAVE THE FOLLOWING TYPEWRITTEN LETTERING INSERTED…

      OPERATION
      AND
      MAINTENANCE
      MANUAL
      MECHANICAL SYSTEMS OF
      (NAME OF PROJECT)

   B. MANUALS SHALL INCLUDE THE FOLLOWING:
      a. A MASTER INDEX AT THE BEGINNING OF MANUAL SHOWING ITEMS INCLUDED. USE PLASTIC TAB INDEXES FOR EACH SECTION OF THE MANUAL.
      b. THE FIRST SECTION SHALL CONSIST OF THE NAME, ADDRESS AND PHONE NUMBER OF THE ARCHITECT, MECHANICAL AND ELECTRICAL ENGINEERS, AND ALL CONTRACTORS & SUB-CONTRACTORS. ALSO INCLUDE A COMPLETE LIST OF EQUIPMENT INSTALLED WITH NAME, ADDRESS, AND PHONE NUMBERS OF SUPPLIERS.
      c. COPY OF ALL ENGINEERS APPROVED SUBMITTAL FORM FOR ALL REQUIRED SUBMITTALS.
      d. A SECTION FOR EACH PIECE OF EQUIPMENT WHICH SHALL INCLUDE THE FOLLOWING: MANUFACTURERS CATALOG DATA INCLUDING CAPACITY, SIZE ETC. BY HIGHLIGHTING THE APPLICABLE DATA.; MANUFACTURERS INSTALLATION & MAINTENANCE MANUALS; PERFORMANCE CURVES FOR PUMPS, FANS ETC; RECOMMENDED LIST OF SPARE PARTS TO BE STACKED FOR PREVENTATIVE MAINTENANCE; EQUIPMENT PARTS IDENTIFICATION LIST FOR REPAIR AND REPLACEMENT PURPOSES; WIRING DIAGRAMS FOR THE SPECIFIC PIECE OF EQUIPMENT. GENERALIZED DOCUMENTS ARE NOT ACCEPTABLE.
      e. TEMPERATURE CONTROL DIAGRAMS, IDENTIFYING INDIVIDUAL COMPONENTS AND THEIR LOCATION. SEQUENCE OF OPERATION SHALL BE INCLUDED WITH THE DIAGRAM. IDENTIFY MODEL AND SERIAL NUMBER AT EACH LOCATION.
      f. COPY OF TEST & BALANCE REPORT.
      g. COPY OF EACH SHOP DRAWING/RED-LINE DRAWING.
      h. COPY OF MANUFACTURERS START-UP REPORT.
      i. ENGINEERS OBSERVATION REPORTS.
      j. COPY OF ALL INSPECTION TAGS/REPORTS.
      k. EXISTING ACTIVE SERVICES: WATER, SEWER, ELECTRICAL, TELEPHONE, ETC. WHEN ENCOUNTERED, SHALL BE PROTECTED AGAINST DAMAGE. DO NOT INTERRUPT OR DISTURB OPERATION OF ACTIVE SERVICES WHICH ARE TO REMAIN. IF ACTIVE SERVICES ARE ENCOUNTERED WHICH REQUIRE RELOCATION, RELOCATION SHALL BE IN CONFORMANCE WITH THE REQUIREMENTS OF THE UTILITY OR MUNICIPALITY WITH JURISDICTION. WHERE EXISTING SERVICES ARE TO BE ABANDONED, THEY SHALL BE TERMINATED IN CONFORMANCE WITH REQUIREMENTS OF THE UTILITY OR MUNICIPALITY WITH JURISDICTION.
1. ALL MATERIALS AND EQUIPMENT FURNISHED BY THIS CONTRACTOR SHALL OPERATE AND PERFORM AS DESIGNED WITH RESPECT TO EFFICIENCIES, CAPACITIES, AND QUIETNESS FOR ONE YEAR FROM SUBSTANTIAL COMPLETION. PROVIDE ALL SERVICES REQUIRED TO IMMEDIATELY REPAIR OR REPLACE, AT NO ADDITIONAL COST TO THE OWNER. ANY DEFECTIVE PART OF THE INSTALLATION RESULTING FROM THE SUPPLY OF FAULTY WORKMANSHIP OF MATERIAL. LACK OF MAINTENANCE, ACCIDENTS, OR CARELESSNESS ON THE PART OF THE OWNER SHALL NOT BE INCLUDED INTHIS WARRANTY.
2. CLEAN EQUIPMENT AND FIXTURES AT TIME OF COMPLETION USING MANUFACTURERS RECOMMENDED CLEANING METHODS AND MATERIALS.
3. UPON REQUEST, THE ENGINEER CAN PROVIDE CONSTRUCTION DOCUMENTS IN AUTOCAD 2000 SERIES FORMAT. UPON WRITTEN REQUEST, COMPLETION OF A RELEASE FORM, AND PAYMENT OF THE ENGINEERS STANDARD FEE OF $200 SET-UP CHARGE AND $50 PER DRAWING, ENGINEER WILL PROVIDE ELECTRONIC FILES ON DVD OR EMAIL. IF REQUESTED, ENGINEER WILL ALSO PROVIDE A LIST OF DRAWING LAYERS AND NAMES THAT WILL BE MAINTAINED.

END OF SECTION

SECTION 230010 SUBMITTAL PROCESS

1. PROVIDE SUBMITTALS, DRAWINGS, MANUALS, ETC. REQUIRED BY THE ARCHITECT IN DIVISION 1 AND ADDITIONAL COPIES TO THE ENGINEER.
   A. COMPLY WITH ALL SUBMITTAL PROVISIONS OF DIVISION 1.
   B. SUBMIT ELECTRONIC COPIES OF THE SUBMITTAL TO THE PRIME CONSULTANT (I.E. ARCHITECT) IN ORDER TO PROCESS AND TRACK THE SUBMITTALS PROPERLY IN ACCORDANCE WITH DIVISION 1 AND 23 SUBMITTAL PROCESS. ARCHITECTS AND CONSULTANTS ARE TO SUBMIT ALL SUBMITTALS AND RFI'S TO THE MECHANICAL ENGINEER ELECTRONICALLY. SUBMITTALS SHALL BE LABELED BY THEIR PROJECT SPECIFICATION OR CSI SPECIFICATION SECTION IF NOT LISTED IN PROJECT SPECIFICATIONS.
   C. CONTRACTOR IS RESPONSIBLE TO SEPARATE SUBMITTALS PER SPECIFICATION SECTION. UNSEPARATED SUBMITTALS ARE SUBJECT TO REJECTION WITHOUT REVIEW.
      a. PRODUCT DATA LISTING MANUFACTURER, MODEL NUMBER, MATERIALS AND MISC DATA AS REQUIRED TO DESCRIBE EQUIPMENT.
      b. CLEARLY IDENTIFY ALL PRODUCTS PROPOSED FOR SUBMITTAL.
      c. CAPACITY, PRESSURE DROP, RPM, MOTOR HORSEPOWER, AND OTHER MISC DATA TO QUANTIFY THE SIZE/PERFORMANCE OF THE EQUIPMENT.
      d. ACCESSORIES.
      e. DIMENSIONAL DRAWINGS SHOWING LAYOUT, CONNECTION POINTS AND SIZES, WEIGHTS, ETC.
      f. WIRING DIAGRAMS INCLUDING POWER AND CONTROL WIRING, DISTINGUISH BETWEEN FACTORY AND FIELD WIRING.
      g. PARTS LIST & REQUIRED SPARE PARTS LIST TO BE LEFT AT COMPLETION OF PROJECT.
      h. INSTALLATION AND MAINTENANCE MANUALS.
      i. WARRANTY STATEMENT.
   D. ALLOW FOR THE MINIMUM REQUIRED WORKING DAYS PER DIVISION 1 FOR REVIEW OF SUBMITTALS AND EACH RE-SUBMITTAL.
   E. SUBMITTALS THAT HAVE BEEN REVIEWED AND MARKED AS REJECTED (REJ) OR REVISE & RESUBMIT (RES) SHOULD BE RESUBMITTED WITH IN THE MINIMUM REQUIRED WORKING DAYS PER DIVISION 1 TO BE REVIEWED AGAIN.
   F. COMPLIANCE WITH THE CONTRACT DOCUMENTS SHALL BE THE SOLE RESPONSIBILITY OF THE CONTRACTOR. ITEMS ON EQUIPMENT THAT WERE NOT ACCEPTED BY THE ARCHITECT IN WRITING AS AN APPROVED EQUAL SHALL BE REPLACED OR REVISED TO COMPLY WITH THE CONTRACT DOCUMENTS AT THE CONTRACTORS EXPENSE.
2. REFERENCE TO ANY ARTICLE, DEVICE, PRODUCT, MATERIAL, FIXTURE, FORM OR TYPE OF CONSTRUCTION BY NAME, MAKE, OR CATALOG NUMBER, SHALL BE INTERPRETED AS HAVING ESTABLISHED A STANDARD OF QUALITY AND SHALL NOT BE CONSIDERED AS LIMITING COMPETITION. ARTICLES, FIXTURES, ETC. OF EQUAL QUALITY BY MANUFACTURERS LISTED IN THE SPECIFICATION FOR THE APPLICABLE USE, SHALL BE ACCEPTABLE, SUBJECT TO SPATIAL, STRUCTURAL, AND ELECTRICAL CONSTRAINTS OF THE PROJECT DESIGN, UNLESS NOTED OTHERWISE.
3. NO SUBSTITUTION WILL BE CONSIDERED UNLESS WRITTEN REQUEST FOR APPROVAL HAS BEEN RECEIVED BY THE ARCHITECT AT LEAST 10 DAYS PRIOR TO THE DATE FOR RECEIPT OF BIDS. EACH SUBSTITUTION REQUEST SHALL INCLUDE THE NAME OF THE MATERIAL OR EQUIPMENT FOR WHICH IT IS TO BE SUBSTITUTED AND COMPLETE DESIGN DESCRIPTION OF THE PROPOSED SUBSTITUTE INCLUDING SHOP DRAWINGS, PERFORMANCE AND TEST DATA, AND ANY OTHER INFORMATION NECESSARY FOR AN EVALUATION. A STATEMENT SETTING FORTH ANY CHANGES IN OTHER MATERIALS, EQUIPMENT, OR WORK THAT INCORPORATED OF THE PROPOSED SUBSTITUTE WOULD REQUIRE, SHALL BE INCLUDED. THE BURDEN OF PROOF OF THE MERIT OF THE PROPOSED SUBSTITUTE IS ON THE PROPOSER. THE ENGINEERS APPROVAL OR DISAPPROVAL OF A PROPOSED SUBSTITUTION IS FINAL.
4. THE ENGINEERS REVIEW OF SHOP DRAWINGS SHALL NOT RELIEVE ANY RESPONSIBILITY FOR DEVIATIONS, ERRORS, OR OMISSIONS WHICH MAY CAUSE AN ERROR IN INSTALLATION.

END OF SECTION

SECTION 232113 HYDRONIC PIPING

1. COPPER:
   A. SEAMLESS ACR COPPER TUBING, TYPE L, HARD DRAWN WITH WROUGHT OR BRONZE SOLDER JOINT FITTINGS. MINIMAL SOFT COPPER TUBING WILL BE ACCEPTABLE NEAR FCU'S ONLY.
2. STEEL:
   A. ASTM A-53 BLACK STEEL IRON PIPE.
3. DIELECTRIC TRANSITIONS:
   A. WHERE TRANSITIONING PIPE FROM STEEL TO COPPER USE DIELECTRIC FLANGE KITS. DO NOT USE DIELECTRIC THREADED NIPPLES. USE ASSE 1079 WITH A 150 PSIG RATING.
4. HANGERS, SUPPORTS & SLEEVES
   A. SUPPORTS, HANGERS, ANCHORS, GUIDES AND SUPPLEMENTARY STEEL SHALL BE PROVIDED FOR HORIZONTAL AND VERTICAL PIPING AND SHALL MEET OR EXCEED THE ASA CODE FOR PRESSURE PIPING.
   B. ALL HANGERS MUST SUPPORT OUTSIDE OF INSULATION, AND NOT ON PIPE DIRECTLY UNLESS PIPE IS UNISULATED.
   C. SUPPORTS FOR VERTICAL AND HORIZONTAL PIPING IN CHASES AND PARTITIONS SHALL BE SECURELY ANCHORED. PROVIDE SUPPORTS FOR PIPES SERVING EQUIPMENT NEAR THE AREA THE PIPE PENETRATES THE WALL.
   D. SLEEVES: PROVIDE SLEEVES WHERE PIPES PENETRATE FLOORS, WALLS, FOUNDATIONS, FIREPROOFING, ETC.
5. ALL CHANGES IN DIRECTION SHALL BE MADE WITH FITTINGS, EXCEPT THAT BENDING OF PIPE WILL BE PERMITTED PROVIDING A HYDRAULIC PIPE BENDER IS USED. BENT PIPE SHOWING KINKS, WRINKLES OR OTHER MALFORMATION WILL NOT BE ACCEPTABLE.
6. COPPER TUBING SHALL BE JOINED BY VIEGA PRO-PRESS. STEEL PIPE SHALL BE JOINED BY VICTAULIC GROOVED FITTINGS. SEE MECHANICAL SCHEDULE.
7. PROVIDE SLEEVES AROUND ALL PIPES PASSING THROUGH WALLS, FLOORS, CEILING, PARTITIONS, STRUCTURAL MEMBERS, OR OTHER BUILDING COMPONENTS.

END OF SECTION

SECTION 233113 AIR DISTRIBUTION

1. THE SHEET METAL DUCTWORK SHALL BE CONSTRUCTED TO SMACNA PRESSURE CLASS AND STANDARDS. PROVIDE FIRE AND / OR COMBINATION FIRE/SMOKE DAMPERS AT ALL FIRE RATED WALLS AND AREA SEPARATIONS PER ALL CODE REQUIREMENTS.
2. RECTANGULAR ELBOWS, UNLESS INDICATED OTHERWISE, SHALL BE CONSTRUCTED WITH CENTERLINE RADIUS OF NOT LESS THAN 1.5 DUCT WIDTH. WHERE MITRED ELBOWS MUST BE PROVIDED, UTLIZE ELBOW WITH SINGLE THICKNESS VANES.
3. RETURN AIR ACOUSTICAL ELBOWS SHALL BE A SQUARE ELBOW WITH NO TURNING VANES.
4. SLOPES FOR TRANSITIONS OR OTHER CHANGES IN DIMENSIONS SHALL BE MINIMUM 1 TO 3.
5. TRANSVERSE JOINTS (WITH A SIDE WALL LARGER THAN 14") SHALL BE DUCTMATE, TDC, OR TYPES FABRICATED ACCORDING TO SMACNA'S "HVAC DUCT CONSTRUCTION STANDARDS.
6. ROUND STEEL DUCT SHALL BE SPIRAL DUCT CONSTRUCTION IN ALL COMMERCIAL APPLICATIONS. SNAP LOCK ROUND DUCT IS ACCEPTABLE IN RESIDENTIAL CONSTRUCTION ONLY.
7. EXPOSED DUCT SHALL BE CONSTRUCTED WITH PAINT GRIP SHEET METAL AND PAINTED WITH 2 COATS OF PAINT, COLOR TO BE CHOSEN BY ARCHITECT/OWNER
   A. EXPOSED DUCT IS NOT TO BE EXTERNALLY SEALED.
8. ALL CONCEALED AND INSULATED DUCTWORK SHALL BE SEALED WITH A HEAVY MASTIC TYPE SEALANT IN ACCORDANCE WITH "HVAC DUCT CONSTRUCTION STANDARDS," LATEST EDITION, SEAL CLASS A.
9. FLEXIBLE DUCTWORK SHALL BE PRE-INSULATED CPE LINER BONDED TO A COATED SPRING STEEL HELIX. JOINTS TO BE SEALED PER MANUFACTURER'S UL APPROVED RECOMMENDATIONS. INSULATION SHALL HAVE A "C" FACTOR OF 0.23 AT 60 DEGREES F WITH AN OUTER FIBERGLASS REINFORCED METALIZED FILM MOISTURE BARRIER. MAXIMUM 6" WC POSITIVE PRESSURE, 25 FLAME SPREAD, 50 SMOKE RATING PER NFPA, UL 181 CLASS I DUCT. TECHNAFLEX SERIES WK. MAXIMUM LENGTH FOR ANY FLEXIBLE DUCT SHALL NOT EXCEED 5'-0" EXTENDED LENGTH FOR COMMERCIAL BUILDINGS ONLY.
10. PROVIDE MANUFACTURER'S STANDARD DIFFUSERS, REGISTERS, AND GRILLES OF SIZE, SHAPE, CAPACITY, AND TYPE INDICATED ON THE DRAWINGS; CONSTRUCTED OF MATERIALS AND COMPONENTS AS INDICATED, AND REQUIRED FOR A COMPLETE INSTALLATION. UNDER NO CIRCUMSTANCES SHALL OBD'S OR BUTTERFLY DAMPERS BE USED ON ANY REGISTERS. IN ACCESSIBLE AREAS MANUAL DAMPERS SHALL BE USED. IN HARD LID CEILING AREAS, REMOTE CABLE DAMPERS SHALL BE USED. ACCESS PANELS SHALL NOT BE USED TO ACCESS ANY DAMPER IN A HARD LID CEILING.
11. DIFFUSERS, REGISTERS, AND GRILLES SHALL HAVE AS A MINIMUM, TEMPERATURE AND VELOCITY TRAVERSES, THROW AND DROP, AND NOISE CRITERIA RATINGS FOR EACH SIZE DEVICE AS LISTED IN MANUFACTURER'S CURRENT DATA.
12. ASSEMBLE AND INSTALL DUCTWORK IN ACCORDANCE WITH RECOGNIZED INDUSTRY PRACTICES WHICH WILL ACHIEVE AIR-TIGHT SYSTEMS. WHERE DUCT IS TO BE SEALED PER MECHANICAL SCHEDULE, SEAL TO THE LEVEL REQUIRED FOR A MAXIMUM OF 5% LEAKAGE. CONSTRUCT DUCT TO MINIMIZE TURNS AND BENDS TO MINIMIZE DUCT GENERATED NOISE. ALIGN DUCTWORK ACCURATELY WITH INTERNAL SURFACES SMOOTH. SUPPORT DUCTS RIGIDLY WITH SUITABLE STRAPS, BRACES, HANGERS AND ANCHORS IN ACCORDANCE WITH THE LATEST SMACNA "HVAC DUCT CONSTRUCTION STANDARDS" LATEST EDITION. DUCT HANGERS SHALL BE OF THE TYPE WHICH WILL HOLD DUCTS TRUE-TO-SHAPE AND TO PREVENT BUCKLING.
13. PROVIDE AUXILIARY STEEL AS REQUIRED TO ADEQUATELY SUPPORT DUCTWORK.
14. CLEAN DUCTWORK INTERNALLY, UNIT BY UNIT AS IT IS INSTALLED, OF DUST AND DEBRIS. CLEAN EXTERNAL SURFACES OF FOREIGN SUBSTANCES WHICH MIGHT CAUSE CORROSIVE DETERIORATION OF METAL OR WHERE DUCT IS TO BE PAINTED AT ENDS OF DUCTS WHICH ARE NOT CONNECTED TO EQUIPMENT OR AIR DISTRIBUTION DEVICES AT TIME OF DUCTWORK INSTALLATION, PROVIDE TEMPORARY CLOSURE OF POLYETHYLENE FILM OR OTHER COVERING WHICH WILL PREVENT ENTRANCE OF DUST AND DEBRIS UNTIL CONNECTIONS ARE TO BE COMPLETED.
15. AT ENDS OF DUCTS WHICH ARE NOT CONNECTED TO EQUIPMENT OR AIR DISTRIBUTION DEVICES AT TIME OF DUCTWORK INSTALLATION, PROVIDE TEMPORARY CLOSURE OF POLYETHYLENE FILM OR OTHER COVERING WHICH WILL PREVENT ENTRANCE OF DUST AND DEBRIS UNTIL CONNECTIONS ARE TO BE COMPLETED.
16. PROVIDE FIRE DAMPERS WHERE SHOWN ON THE DRAWINGS. ALL DAMPERS SHALL COMPLY WITH THE REQUIREMENTS OF UL-555S, 350°F TEMPERATURE RATING AND WITH PRESSURE AND VELOCITY LEVELS AS REQUIRED BY THE INSTALLATION. PROVIDE BREAKAWAY DUCT CONNECTS AS REQUIRED BY UL.
   A. EACH DAMPER SHALL HAVE A DUCT DOOR WITH-IN 6" OF THE OUTLET OF EACH DAMPER. THE MINIMAL SIZE DUCT DOOR SHALL BE NO LESS THAN 8X8. WHERE DAMPERS ARE INSTALLED IN WALLS WHERE THE DUCT TERMINATION ENDS IN A SIDEWALL GRILLE, THIS REMOVABLE GRILLE IS ACCEPTABLE TO SERVE AS THE ACCESS POINT INSTEAD OF A DEDICTED DUCT MOUNTED ACCESS PANEL.
   B. UTILIZE A FIELD FABRICATED SLEEVE AND COORDINATE DIMENSION TO CONCEAL DAMPER TO MAXIMUM EXTENT.
17. STEEL ACCESS DOORS AND FRAMES SHALL BE FACTORY-FABRICATED AND ASSEMBLED UNITS, COMPLETE WITH ATTACHMENT DEVICES AND FASTENERS READY FOR INSTALLATION. JOINTS AND SEAMS SHALL BE CONTINUOUSLY WELDED STEEL, WITH WELDS GROUND SMOOTH AND FLUSH WITH ADJACENT SURFACES. FRAMES SHALL BE 16-GAGE STEEL, WITH SUITABLE MEANS OF ANCHORING FRAME TO WALL CONSTRUCTION.
   A. PROVIDE A 1-INCH-WIDE EXPOSED PERIMETER FLANGE FOR UNITS INSTALLED IN UNIT MASONRY, PRE-CAST, CAST-IN-PLACE CONCRETE, CERAMIC TILE, OR WOOD PANELING.
   B. UNITS SHALL BE PROVIDED WITH PERFORATED FLANGES WITH DRY-WALL IN WALLBOARD BEAD FOR INSTALLATION IN GYPSUM WALL BOARD OR PLASTER. DOORS SHALL HAVE FLUSH PANEL, 14-GAGE SHEET STEEL, WITH CONCEALED SPRING HINGES OR CONCEALED CONTINUOUS PIANO HINGE SET TO OPEN 175 DEGREES.
   C. PROVIDE LOCKING DEVICE WHICH SHALL BE A SCREWDRIVER - OPERATED CAM LOCK. FINISH SHALL BE FACTORY APPLIED PRIME COST.
   D. FOR FIRE-RATED UNITS PROVIDE SELF-CLOSING MECHANISM, AND UL RATED FOR THE INSTALLATION ENCOUNTERED. PROVIDE UL LABEL ON EACH FIRE-RATED ACCESS DOOR.
18. SHEET METAL SEALANT MATERIALS
   A. MASTIC: NON-HARDENING, NON-MIGRATING MASTIC ELASTIC SEALANT SPECIFICALLY FOR SEALING JOINTS AND SEAMS IN DUCTWORK.
   B. WATER-BASED JOINT AND SEAM SEALANT: FLEXIBLE, ADHESIVE SEALANT, RESISTANT TO UV LIGHT WHEN CURED UL 723 LISTED, AND COMPLYING WITH NFPA REQUIREMENTS FOR CLASS 1 DUCTS.
   C. SOLVENT-BASED JOINT AND SEAM SEALANT: ONE-PART, NONSAG, SOLVENT-RELEASE-CURING, POLYMERIZED BUTYL SEALANT FORMULATED WITH A MINIMUM OF 75 PERCENT SOLIDS.

END OF SECTION

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KEY PLAN

CONSTRUCTION DOCUMENTS

No.	Description	Date
1	CONSTRUCTION SET	01/19/2026

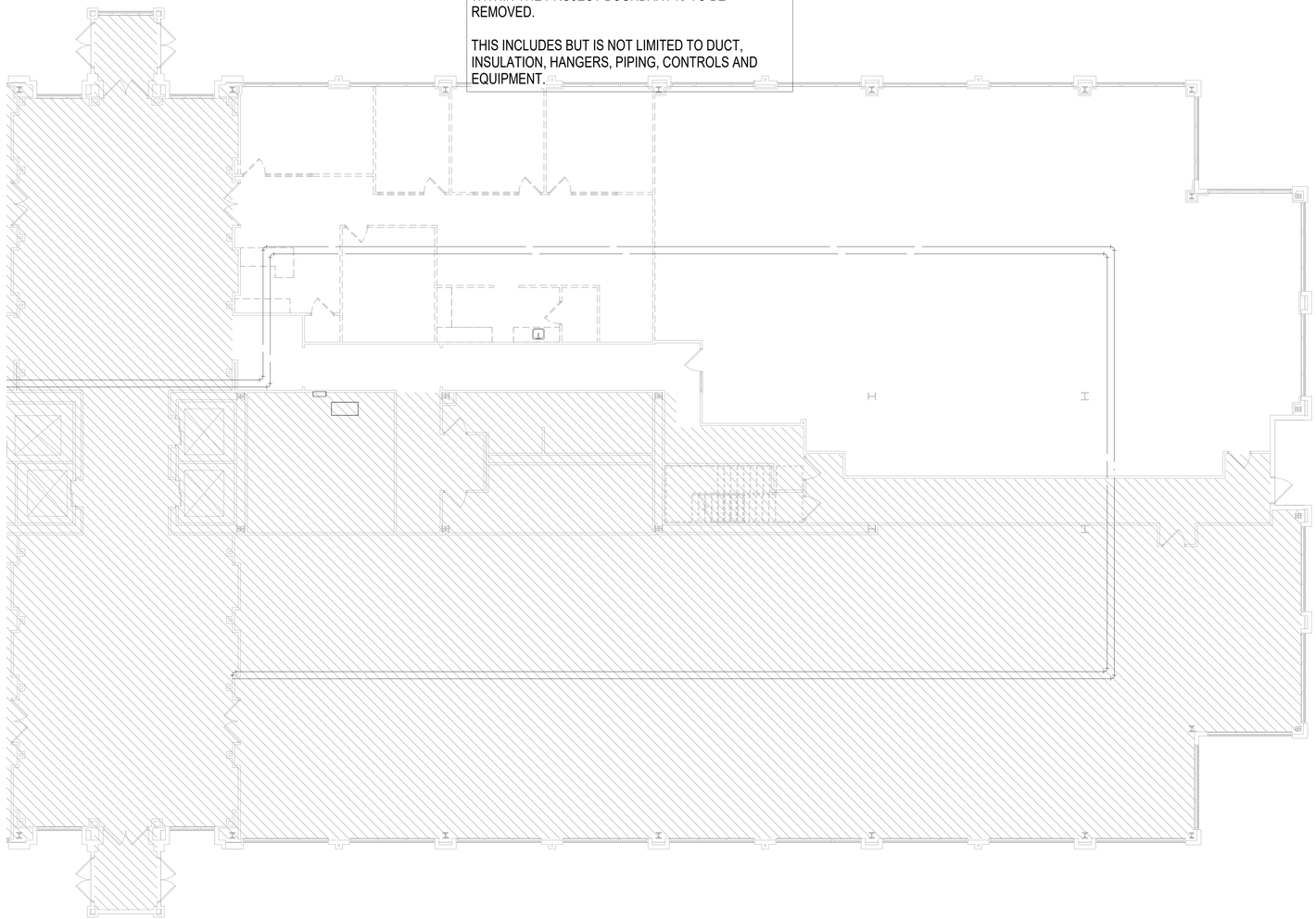
CLIENT PROJ. #: --
PROJECT #: 24-056
ISSUE DATE: 07/01/2025
DRW: Author | CHK: Checker

MECHANICAL SPECIFICATIONS

M001

EXISTING CS & CR WATER LOOP PIPING TO REMAIN. THE REMAINDER OF MECHANICAL EQUIPMENT WITHIN THE PROJECT BOUNDARY IS TO BE REMOVED.

THIS INCLUDES BUT IS NOT LIMITED TO DUCT, INSULATION, HANGERS, PIPING, CONTROLS AND EQUIPMENT.



1 LEVEL 01 - MECHANICAL DEMOLITION PLAN - AREA B
1/8" = 1'-0"

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GENERAL NOTES

A UNLESS NOTED OTHERWISE ALL DUCT MOUTNED SUPPLY GRILLES SHALL BE MOUNTED TO BLOW DOWNWARD AT A 35 DEGREE ANGLE BELOW HORIZONTAL.

B ALL RETURN AIR INLETS (EITHER CEILING MOUNTED OR SIDEWALL) SHALL BE INSTALLED WITH A LINED DUCT ELBOW PER DETAILS.

C ALL TRANSER DUCT ASSEMBLIES SHALL BE INTERNALLY LINED AND CONSTRUCTED WITH ELBOWS PER DETAILS.

D ALL EQUIPMENT SHALL BE ACCESSIBLE. WATER LOOP HEAT PUMPS (WLHP) SHALL BE INSTALLED SO THAT THE MFGR CLEARANCE IS NOT OBSTRUCTED. ALL ACCESS AND SERVICE CLEARANCE AREAS SHALL BE ABLE TO BE ACCESSED WITH A LADDER LOCATED ON THE FLOOR. ACCESS REQUIREMENTS SHALL INCLUDE ALL WATER LOOP (CS OR CR) PIPE ACCESSORIES.

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KEY PLAN

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CLIENT PROJ. #: --
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ISSUE DATE: 07/01/2025
DRW: Author | CHK: Checker

DEMOLITION PLAN

M091

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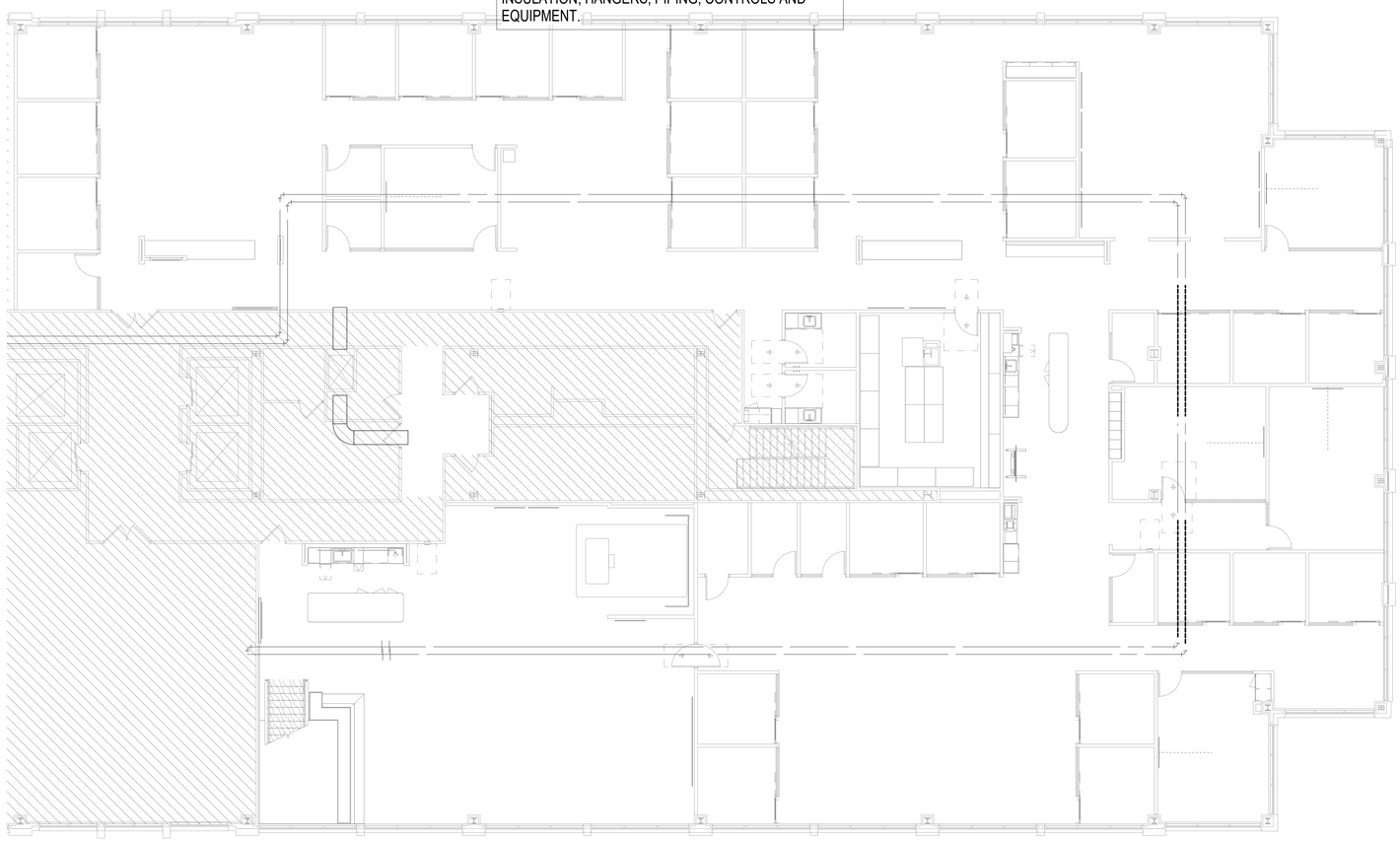

1 LEVEL 02 - MECHANICAL DEMOLITION PLAN - AREA B
1/8" = 1'-0"

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B ALL RETURN AIR INLETS (EITHER CEILING MOUNTED OR SIDEWALL) SHALL BE INSTALLED WITH A LINED DUCT ELBOW PER DETAILS.

C ALL TRANSER DUCT ASSEMBLIES SHALL BE INTERNALLY LINED AND CONSTRUCTED WITH ELBOWS PER DETAILS.

D ALL EQUIPMENT SHALL BE ACCESSIBLE. WATER LOOP HEAT PUMPS (WLHP) SHALL BE INSTALLED SO THAT THE MFGR CLEARANCE IS NOT OBSTRUCTED. ALL ACCESS AND SERVICE CLEARANCE AREAS SHALL BE ABLE TO BE ACCESSED WITH A LADDER LOCATED ON THE FLOOR. ACCESS REQUIREMENTS SHALL INCLUDE ALL WATER LOOP (CS OR CR) PIPE ACCESSORIES.

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KEY PLAN

CONSTRUCTION DOCUMENTS

No.	Description	Date
1	CONSTRUCTION SET	01/19/2026

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DEMOLITION PLAN

M092

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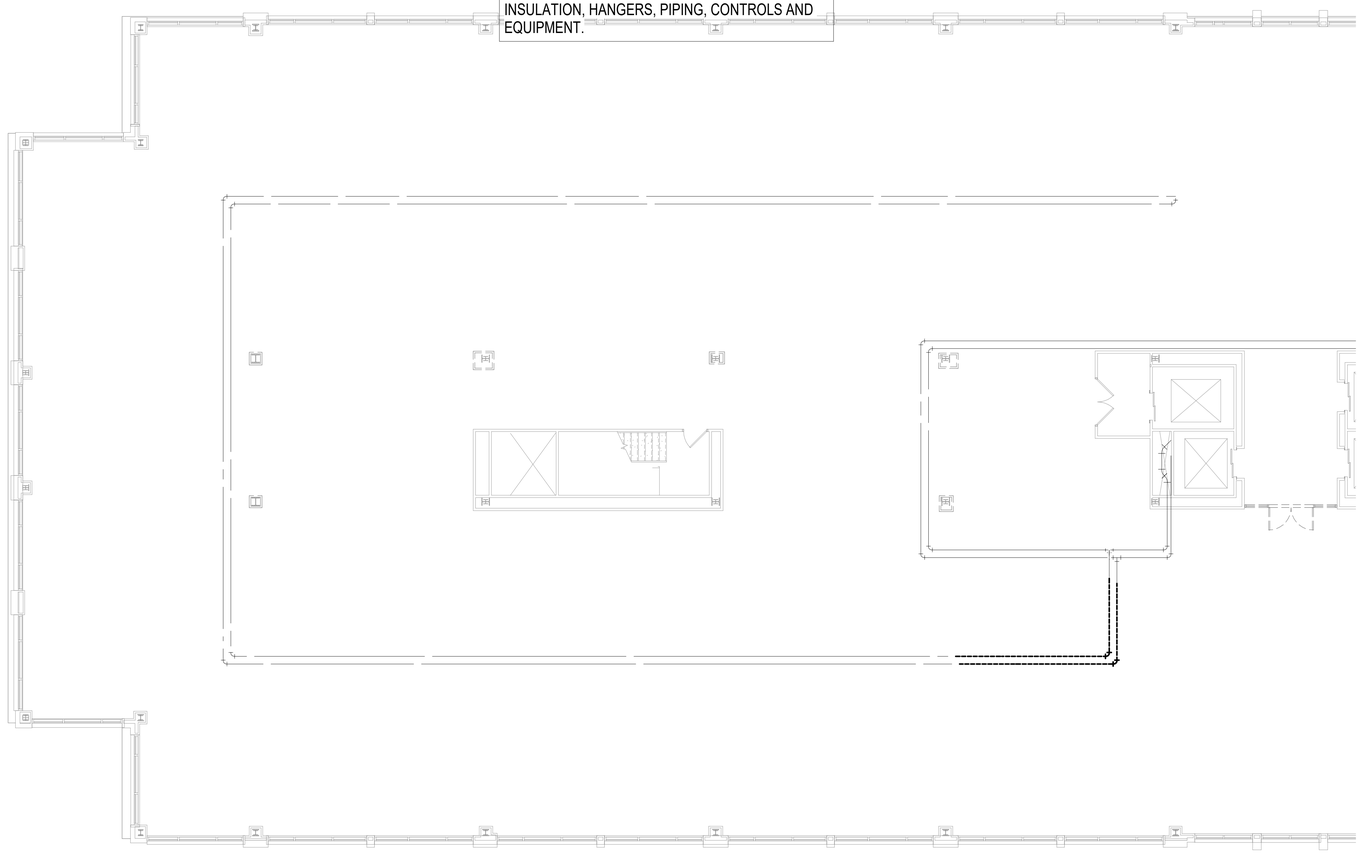
EXISTING CS & CR WATER LOOP PIPING TO REMAIN. THE REMAINDER OF MECHANICAL EQUIPMENT WITHIN THE PROJECT BOUNDARY IS TO BE REMOVED.

THIS INCLUDES BUT IS NOT LIMITED TO DUCT, INSULATION, HANGERS, PIPING, CONTROLS AND EQUIPMENT.



1 LEVEL 03 MECHANICAL DEMOLITION PLAN - AREA A
1/8" = 1'-0"

GENERAL NOTES

A UNLESS NOTED OTHERWISE ALL DUCT MOUTNED SUPPLY GRILLES SHALL BE MOUNTED TO BLOW DOWNWARD AT A 35 DEGREE ANGLE BELOW HORIZONTAL.

B ALL RETURN AIR INLETS (EITHER CEILING MOUNTED OR SIDEWALL) SHALL BE INSTALLED WITH A LINED DUCT ELBOW PER DETAILS.

C ALL TRANSER DUCT ASSEMBLIES SHALL BE INTERNALLY LINED AND CONSTRUCTED WITH ELBOWS PER DETAILS.

D ALL EQUIPMENT SHALL BE ACCESSIBLE. WATER LOOP HEAT PUMPS (WLHP) SHALL BE INSTALLED SO THAT THE MFGR CLEARANCE IS NOT OBSTRUCTED. ALL ACCESS AND SERVICE CLEARANCE AREAS SHALL BE ABLE TO BE ACCESSED WITH A LADDER LOCATED ON THE FLOOR. ACCESS REQUIREMENTS SHALL INCLUDE ALL WATER LOOP (CS OR CR) PIPE ACCESSORIES.

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KEY PLAN

CONSTRUCTION DOCUMENTS

No.	Description	Date
1	CONSTRUCTION SET	01/19/2026

CLIENT PROJ. #: --
PROJECT #: 24-056
ISSUE DATE: 07/01/2025
DRW: Author | CHK: Checker

DEMOLITION PLAN

M093A

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EXISTING CS & CR WATER LOOP PIPING TO REMAIN. THE REMAINDER OF MECHANICAL EQUIPMENT WITHIN THE PROJECT BOUNDARY IS TO BE REMOVED.

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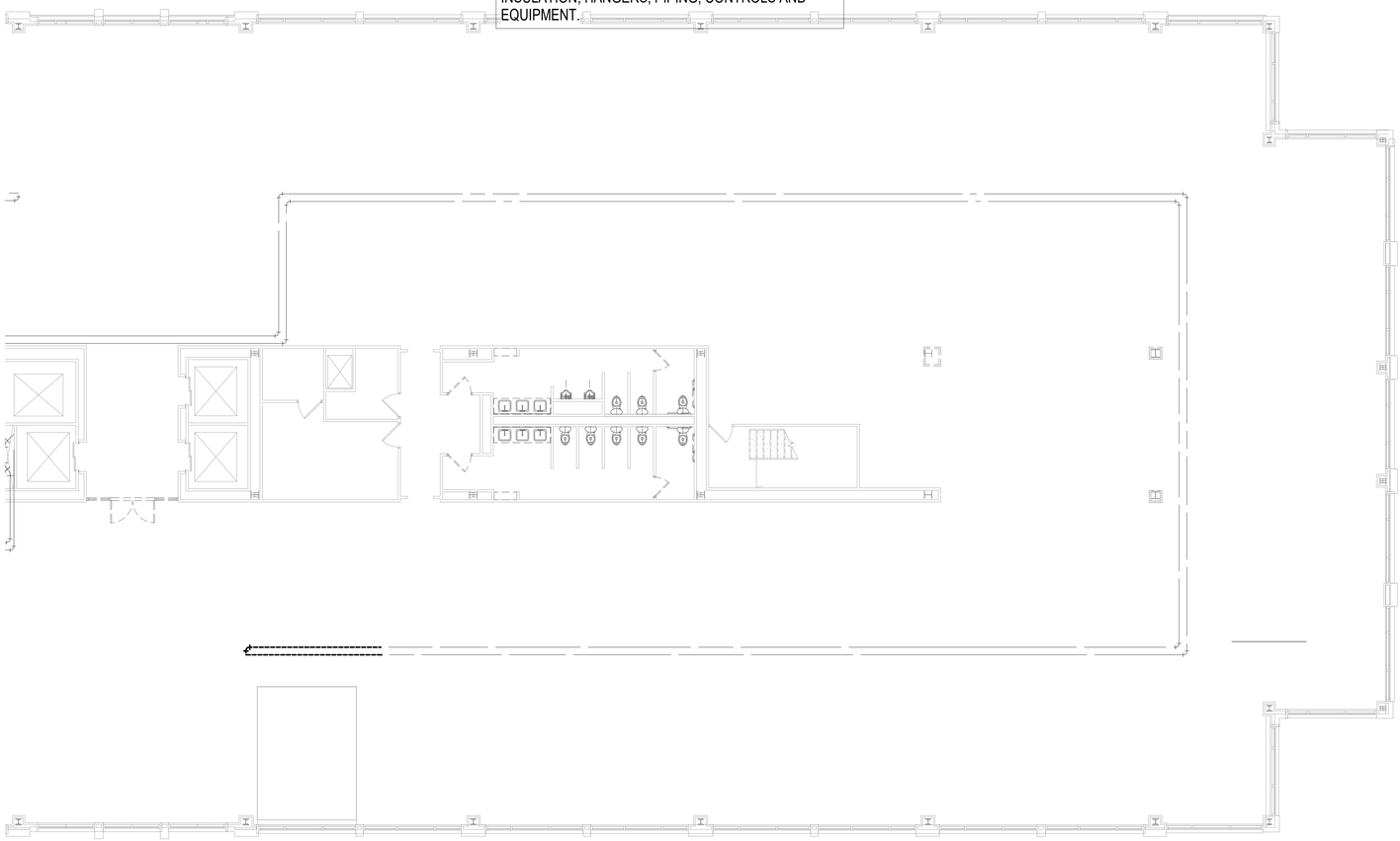

1 LEVEL 03 MECHANICAL DEMOLITION PLAN - AREA B
1/8" = 1'-0"

GENERAL NOTES

A UNLESS NOTED OTHERWISE ALL DUCT MOUTNED SUPPLY GRILLES SHALL BE MOUNTED TO BLOW DOWNWARD AT A 35 DEGREE ANGLE BELOW HORIZONTAL.

B ALL RETURN AIR INLETS (EITHER CEILING MOUNTED OR SIDEWALL) SHALL BE INSTALLED WITH A LINED DUCT ELBOW PER DETAILS.

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DEMOLITION PLAN

M093B

SHEET PRINTED: 6/26/2025 2:33:31 PM

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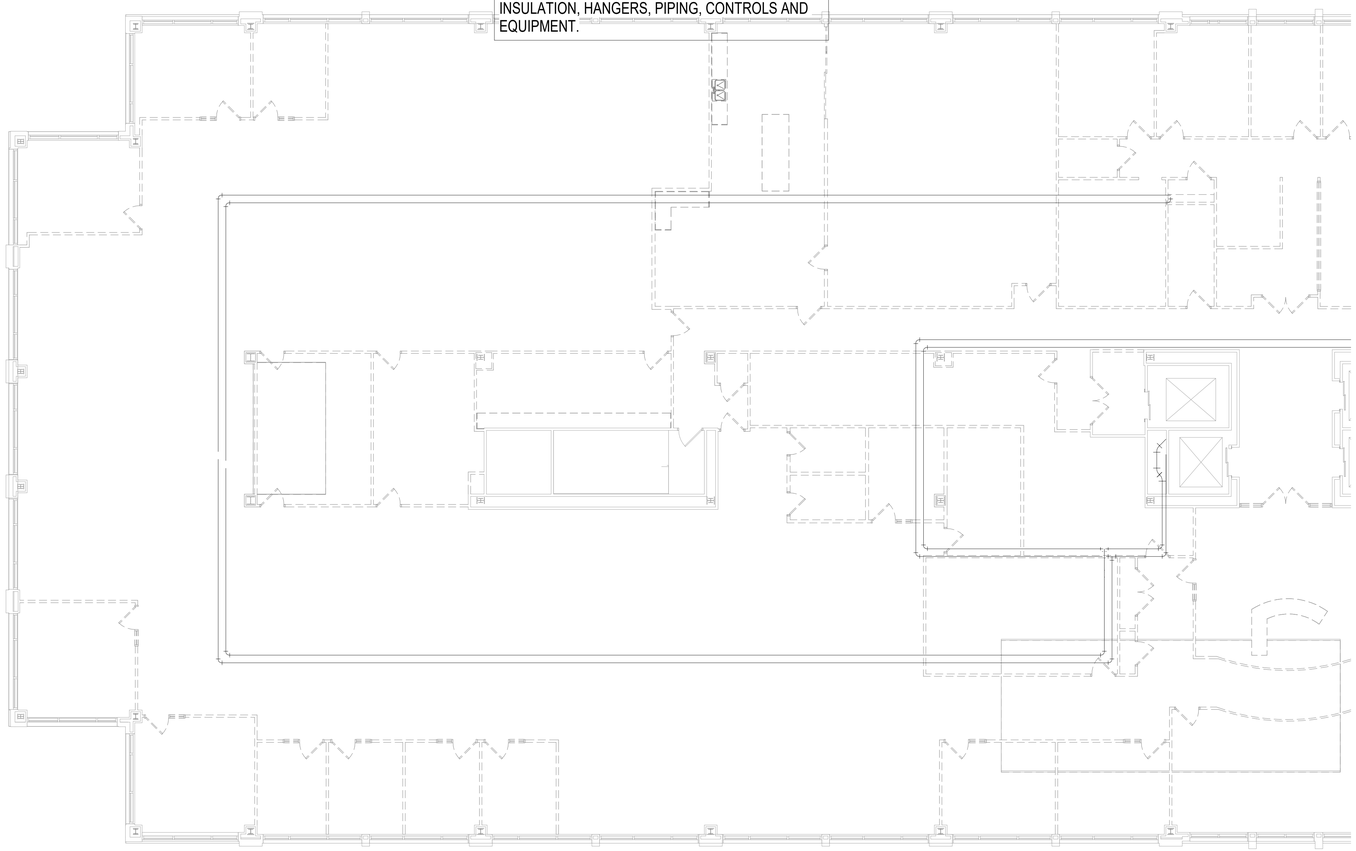

1 LEVEL 04 - MECHANICAL DEMOLITION PLAN - AREA A
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DEMOLITION PLAN

M094A

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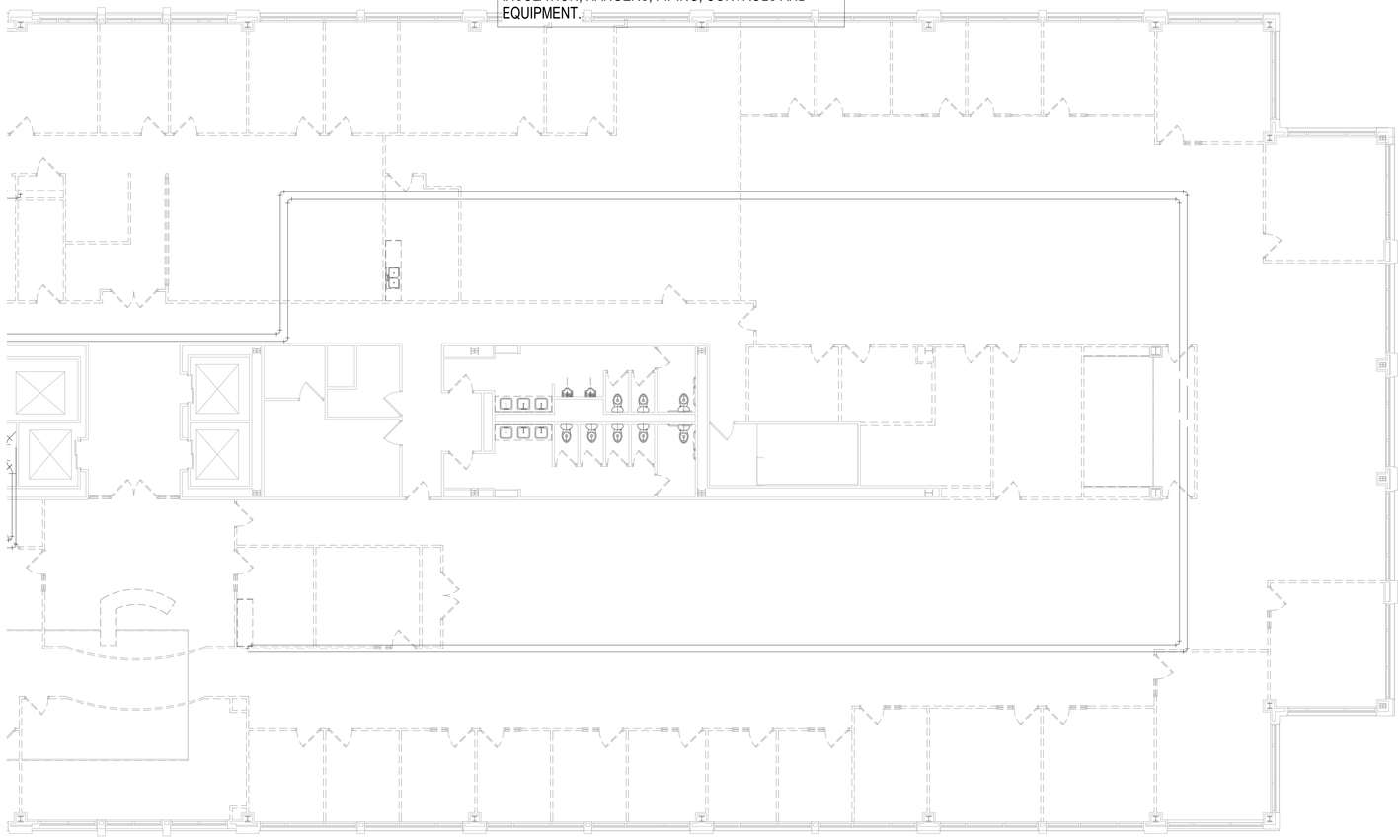

1 LEVEL 04 - MECHANICAL DEMOLITION PLAN - AREA B
1/8" = 1'-0"

GENERAL NOTES

A UNLESS NOTED OTHERWISE ALL DUCT MOUTNED SUPPLY GRILLES SHALL BE MOUNTED TO BLOW DOWNWARD AT A 35 DEGREE ANGLE BELOW HORIZONTAL.

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DEMOLITION PLAN

M094B

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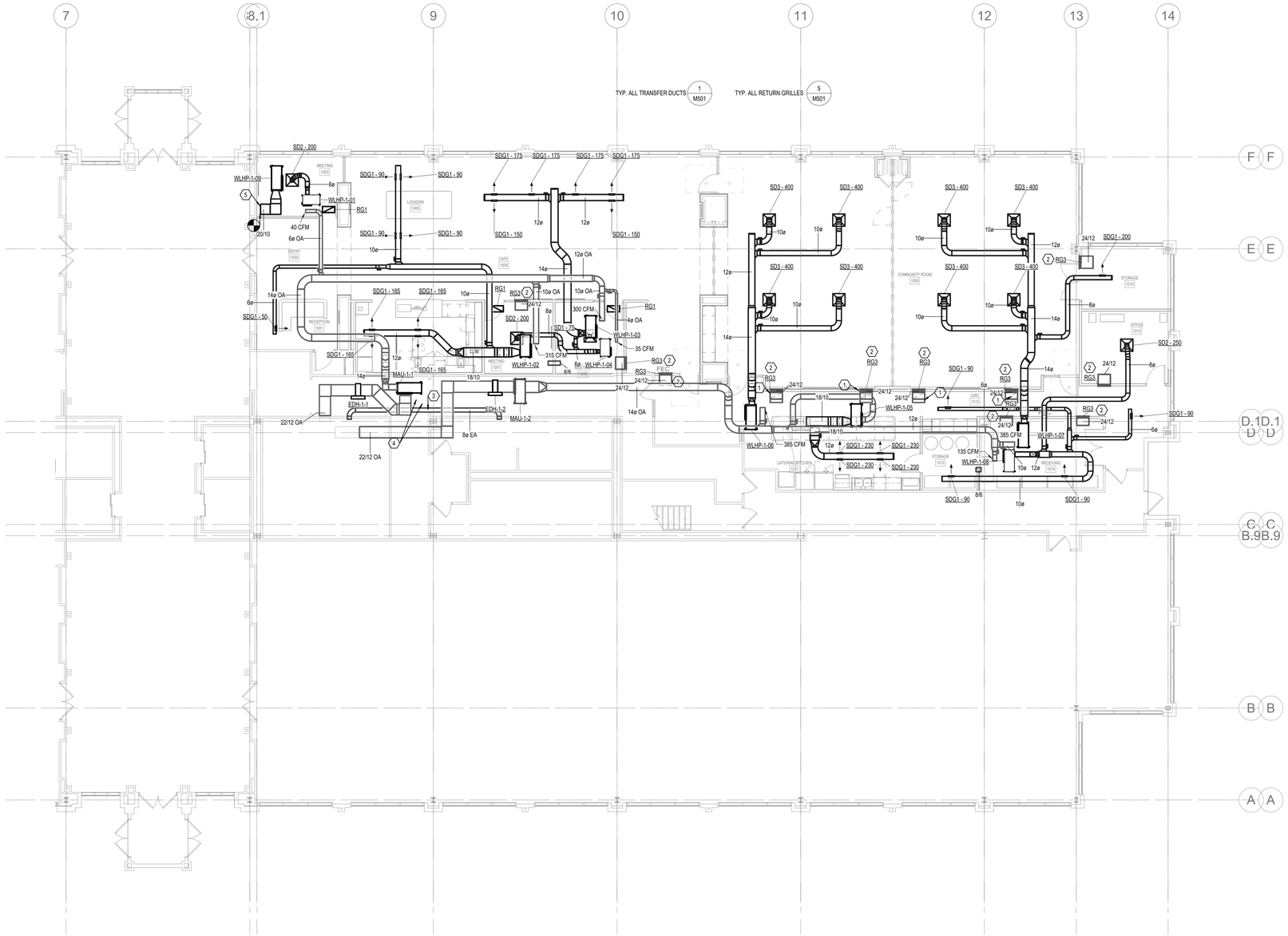

1 LEVEL 01 - MECHANICAL PLAN - AREA B
1/8" = 1'-0"

SHEET PRINTED: 1/19/2026 9:33:40 AM

GENERAL NOTES

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C ALL TRANSER DUCT ASSEMBLIES SHALL BE INTERNALLY LINED AND CONSTRUCTED WITH ELBOWS PER DETAILS.

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E THE OWNER WILL TAKE EACH REMOVED WLHP TO A REMOTE LOCATION FOR TESTING AND REFURBISHMENT. ANY HEAT PUMPS THAT PASS THE REFURBISHMENT PROCESS WILL BE ALLOWED TO BE REUSED AND MAY REPLACE A PROPOSED WLHP OF THE SAME CAPACITY. THE INTENT IS THAT THE REFURBISHMENT PROCESS IS FINALIZED PRIOR TO THE DATE THAT THE NEW WLHPS ARE ORDERED. COORDINATE SCHEDULES AND LEAD TIMES WITH OWNER AND COMMUNICATE THE "DROP DEAD" DATE REQUIRED TO KNOW WHAT EXISTING HEAT PUMPS CAN BE REUSED.

F SEE STRUCTURAL DRAWINGS FOR TYPICAL CONNECTION POINTS TO STRUCTURE ABOVE FOR MOUNTING OF ALL DUCT, PIPE, AND MECHANICAL EQUIPMENT.

SHEET KEYNOTES

1 PROVIDE TWO MITRED ELBOWS TO FORM A "Z" SHAPE FOR SOUND REDUCTION. INTERNALLY LINE DUCT PER DETAILS.

2 BOTTOM EDGE OF GRILLE SHALL BE 10' 0" AFF.

3 NEW EXPOSED EXHAUST DUCT CONNECTING JANITORS CLOSET TO THE RESTROOM EXHAUST SYSTEM. DUCT SHALL HAVE PAINTGRIP FINISH. JOIN PER MECHANICAL SCHEDULE "SUPPLY DUCT - EXPOSED".

4 EXISTING 3T UNIT SERVING THE ELECTRIC AND TELECOM ROOMS RESIDES IN THIS VICINITY. CONTRACTOR SHALL RELOCATE THIS UNIT AS REQUIED TO REMAIN SOUTH OF THE DIVIDING WALL BETWEEN THE KSM TENANT AND THE COMON CORRIDOR. COORDINATE DUCT, PIPE, AND CONDENSATE ROUTING TO AVOID NEW MAKE UP AIR UNITS MAU-1-1 AND MAU-1-2.

5 CONNECT TO EXISTING DUCTWORK SERVING THE LOBBY. ADJUST THE ROUTE FROM THAT SHOWN HERE TO INTERCEPT AND CONNECT TO THE EXISTING DUCT ROUTE.

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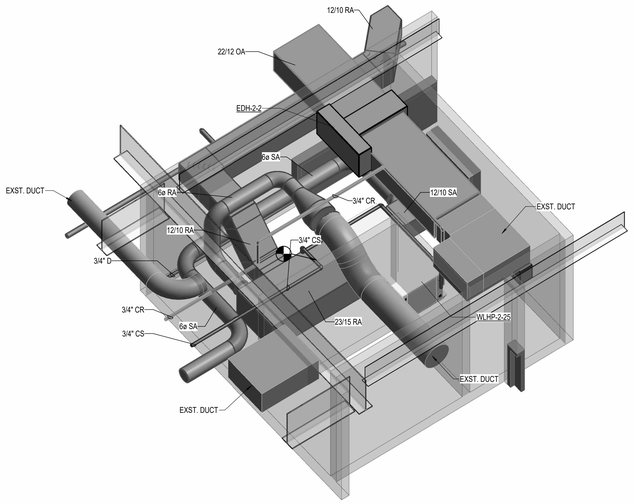
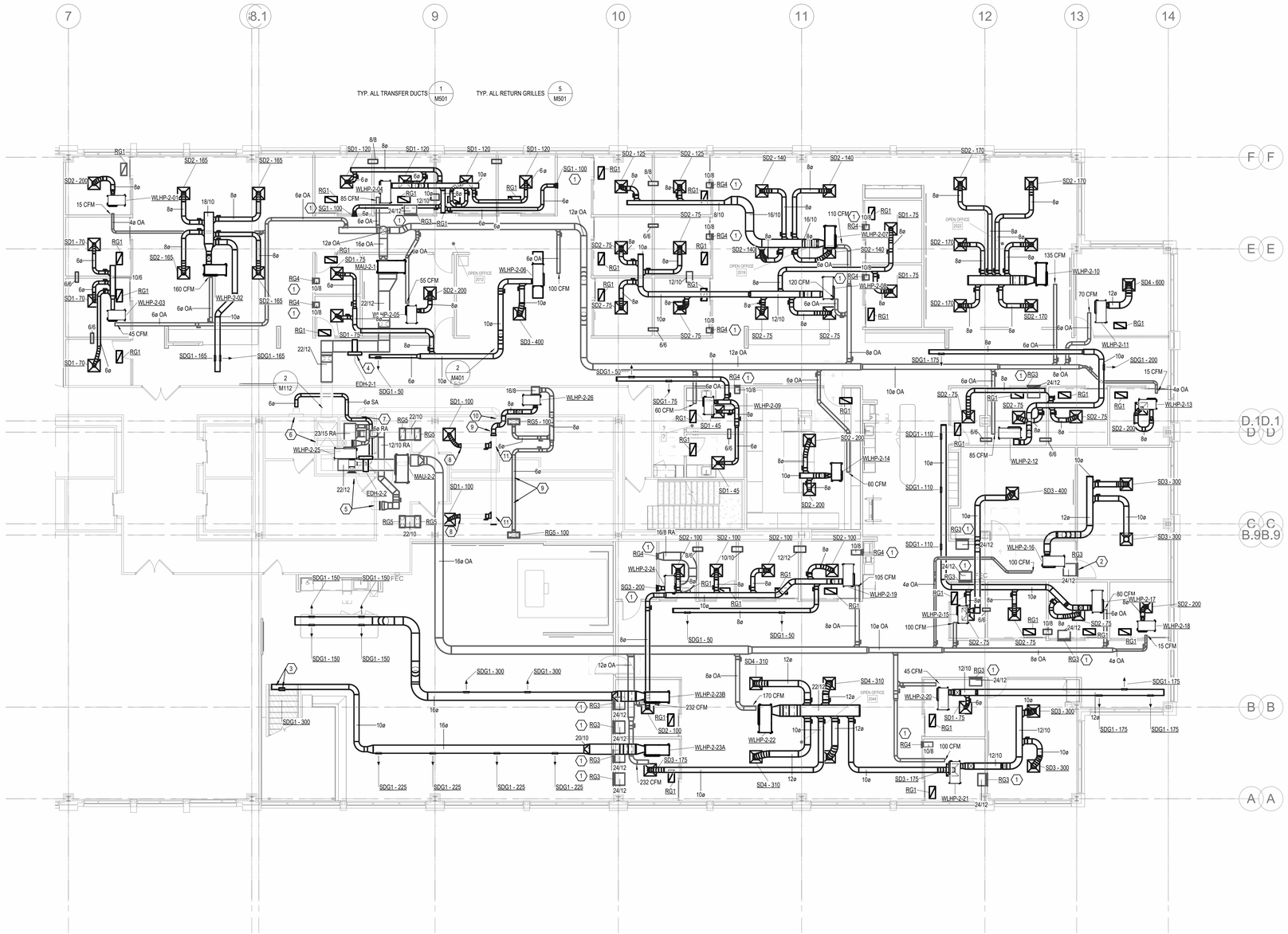
MECHANICAL PLAN

M111



2 3D VIEW OF JANITORS CLOSET LOOKING SE



1 LEVEL 02 - MECHANICAL PLAN - AREA B

1/8" = 1'-0"

SHEET PRINTED: 1/19/2026 9:35:21 AM

GENERAL NOTES

A UNLESS NOTED OTHERWISE ALL DUCT MOUTNED SUPPLY GRILLES SHALL BE MOUNTED TO BLOW DOWNWARD AT A 35 DEGREE ANGLE BELOW HORIZONTAL.

B ALL RETURN AIR INLETS (EITHER CEILING MOUNTED OR SIDEWALL) SHALL BE INSTALLED WITH A LINED DUCT ELBOW PER DETAILS.

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F SEE STRUCTURAL DRAWINGS FOR TYPICAL CONNECTION POINTS TO STRUCTURE ABOVE FOR MOUNTING OF ALL DUCT, PIPE, AND MECHANICAL EQUIPMENT.

SHEET KEYNOTES

1 BOTTOM EDGE OF GRILLE SHALL BE 10' 0" AFF.

2 BOTTOM EDGE OF GRILLE SHALL BE 10' 0" AFF. CENTER GRILLE ABOVE DOOR.

3 BOTOM OF DUCT TO BE AT 9'8" AFF. ANGLE GRILLE TO BE 35 DEGREES ABOVE HORIZONTAL. THE GRILLE SHOULD POINT AT THE UPPER EDGE OF THE EXTERIOR WINDOWS TO PROVIDE COOLING FOR THE STAIRWELL AREA.

4 INSULATE DUCT HEATER EXCEPT FOR THE FRONT SIDE OF THE ACCESS PANEL. DUCT HEATER IS EXPOSED, USE PAINTABLE PAPER FACED ASJ CONSISTENT WITH MECHANICAL SCHEDULE.

5 EXISTING GRILLE, FIRE DAMPER, AND PLENUM BOX TO REMAIN. CONNECT NEW DUCTWORK TO BACK OF PLENUM BOX AND SEAL. BALANCE TO 550 CFM.

6 EXISTING GRILLE AND PLENUM BOX TO REMAIN. CONNECT NEW DUCTWORK TO BACK OF PLENUM BOX AND SEAL. BALANCE TO 50 CFM.

7 RELOCATE EXHAUST GRILLE TO MAKE ROOM FOR NEW DUCT.

8 REPLACE FLEX WITH SMALLER SIZE. PROVIDE DUCT TRANSITION IN HARD DUCT.

9 ROUTE DUCT TO AVOID EXISTING EXHAUST DUCT SYSTEM.

10 ROUTE DUCT TO AVOID RETURN AND SUPPLY DUCT SYSTEMS. CONNECT TO EXISTING EXHAUST DUCT SYSTEM.

11 REMOVE BRANCH. CAP BRANCH DUCT FLUSH TO THE MAIN DUCT SO THERE IS MINIMAL AIRFLOW DISTURBANCE.

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KEY PLAN

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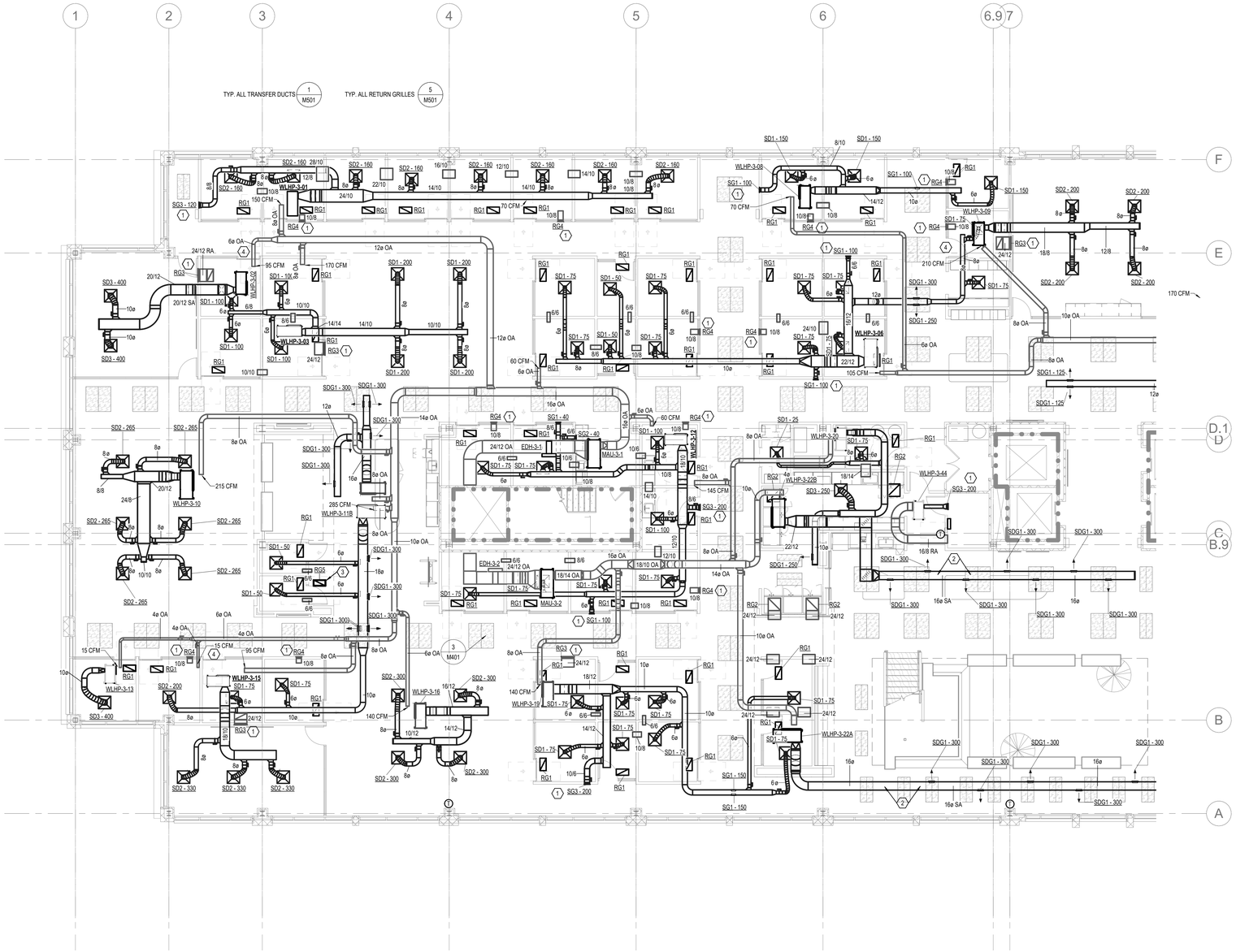
MECHANICAL PLAN

M112



1 LEVEL 03 MECHANICAL PLAN - AREA A
1/8" = 1'-0"

GENERAL NOTES

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SHEET KEYNOTES

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3 LOCATE GRILLE IN SOFFIT.

4 DOOR TO BE UNDERCUT 1" TO ALLOW AIRFLOW TO ADJACENT SPACE.

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MECHANICAL PLAN

M113A

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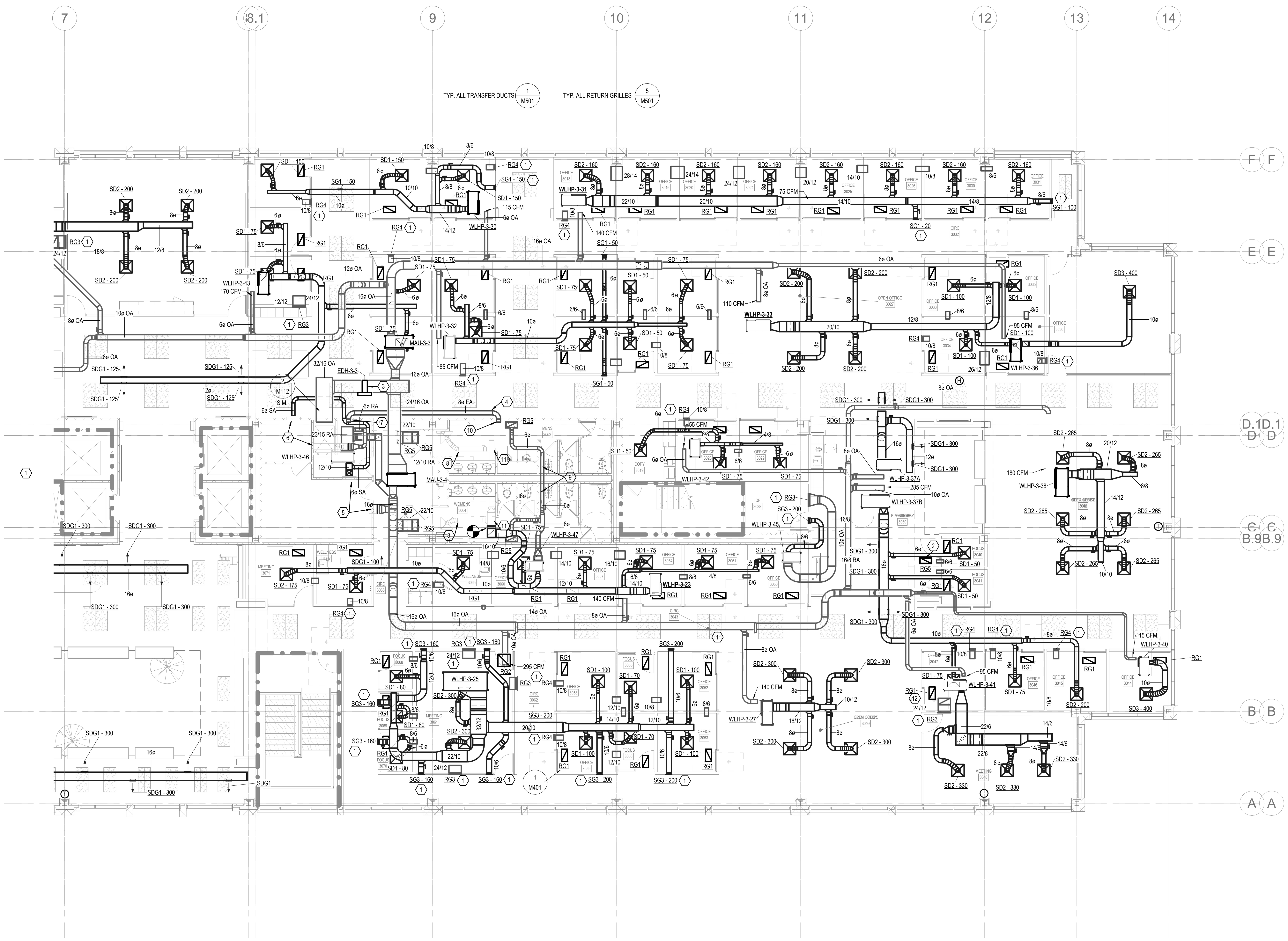

1 LEVEL 03 MECHANICAL PLAN - AREA B

1/8" = 1'-0"

SHEET PRINTED: 1/19/2026 9:35:57 AM

GENERAL NOTES

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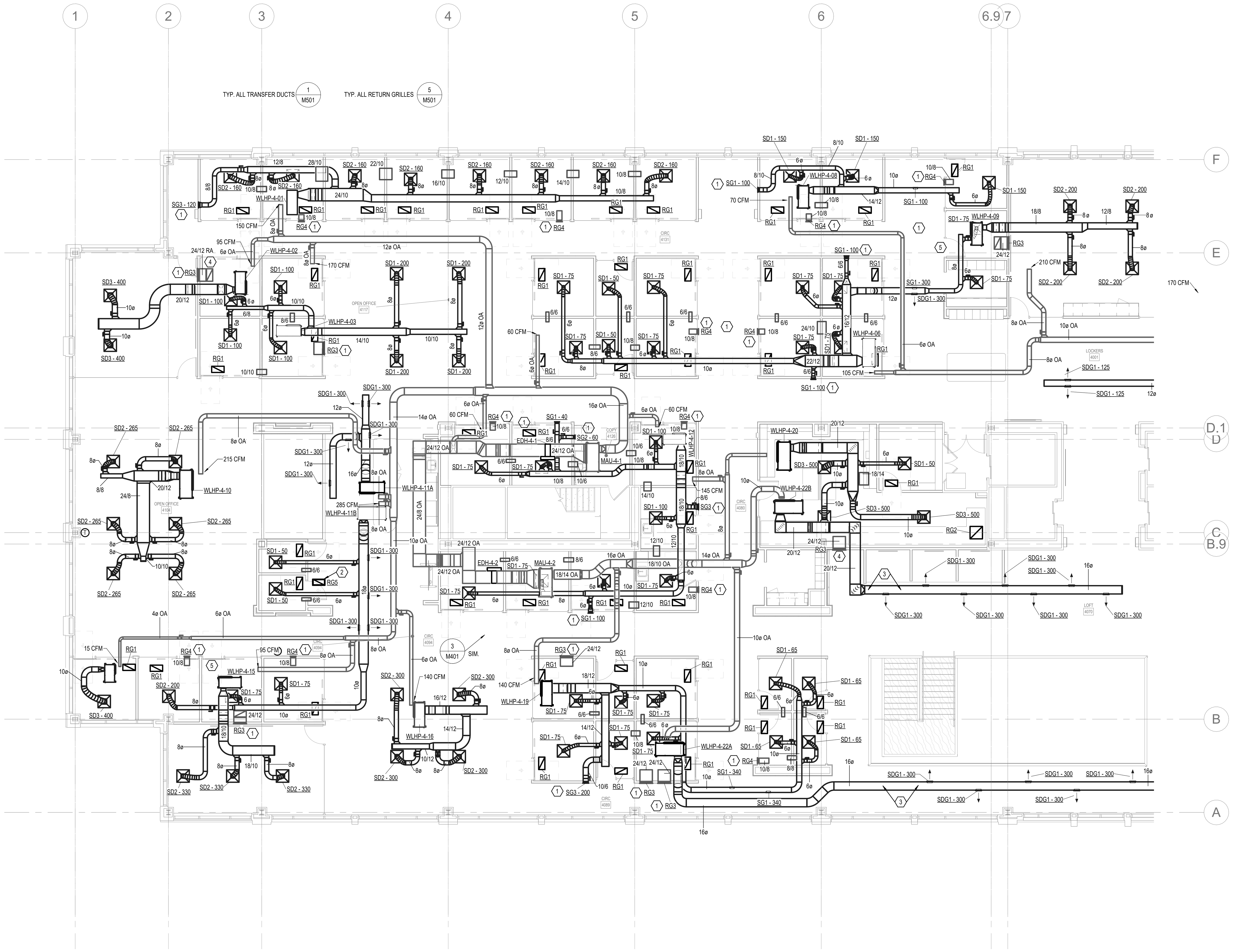
MECHANICAL PLAN

M113B



1 LEVEL 04 - MECHANICAL PLAN - AREA A
1/8" = 1'-0"

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- C ALL TRANSER DUCT ASSEMBLIES SHALL BE INTERNALLY LINED AND CONSTRUCTED WITH ELBOWS PER DETAILS.
- D ALL EQUIPMENT SHALL BE ACCESSIBLE. WATER LOOP HEAT PUMPS (WLHP) SHALL BE INSTALLED SO THAT THE MFGR CLEARANCE IS NOT OBSTRUCTED. ALL ACCESS AND SERVICE CLEARANCE AREAS SHALL BE ABLE TO BE ACCESSED WITH A LADDER LOCATED ON THE FLOOR. ACCESS REQUIREMENTS SHALL INCLUDE ALL WATER LOOP (CS OR CR) PIPE ACCESSORIES.
- E THE OWNER WILL TAKE EACH REMOVED WLHP TO A REMOTE LOCATION FOR TESTING AND REFURBISHMENT. ANY HEAT PUMPS THAT PASS THE REFURBISHMENT PROCESS WILL BE ALLOWED TO BE REUSED AND MAY REPLACE A PROPOSED WLHP OF THE SAME CAPACITY. THE INTENT IS THAT THE REFURBISHMENT PROCESS IS FINALIZED PRIOR TO THE DATE THAT THE NEW WLHPS ARE ORDERED. COORDINATE SCHEDULES AND LEAD TIMES WITH OWNER AND COMMUNICATE THE "DROP DEAD" DATE REQUIRED TO KNOW WHAT EXISTING HEAT PUMPS CAN BE REUSED.
- F SEE STRUCTURAL DRAWINGS FOR TYPICAL CONNECTION POINTS TO STRUCTURE ABOVE FOR MOUNTING OF ALL DUCT, PIPE, AND MECHANICAL EQUIPMENT.

SHEET KEYNOTES

1. BOTTOM EDGE OF GRILLE SHALL BE 10' 0" AFF.
2. LOCATE GRILLE IN SOFFIT.
4. BOTTOM EDGE OF GRILLE SHALL BE 9' 8" AFF.
5. DOOR TO BE UNDERCUT 1" TO ALLOW AIRFLOW TO ADJACENT SPACE.

DELV DESIGN

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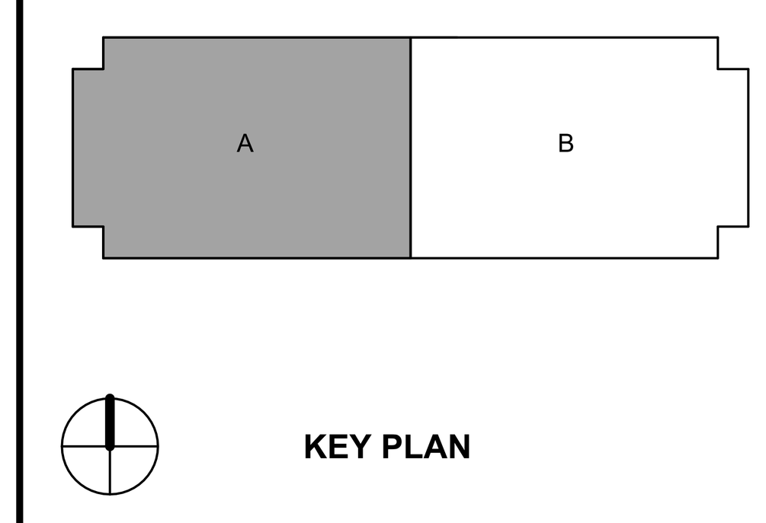

KEY PLAN

CONSTRUCTION DOCUMENTS

No.	Description	Date
1	CONSTRUCTION SET	01/19/2026

CLIENT PROJ. #: --
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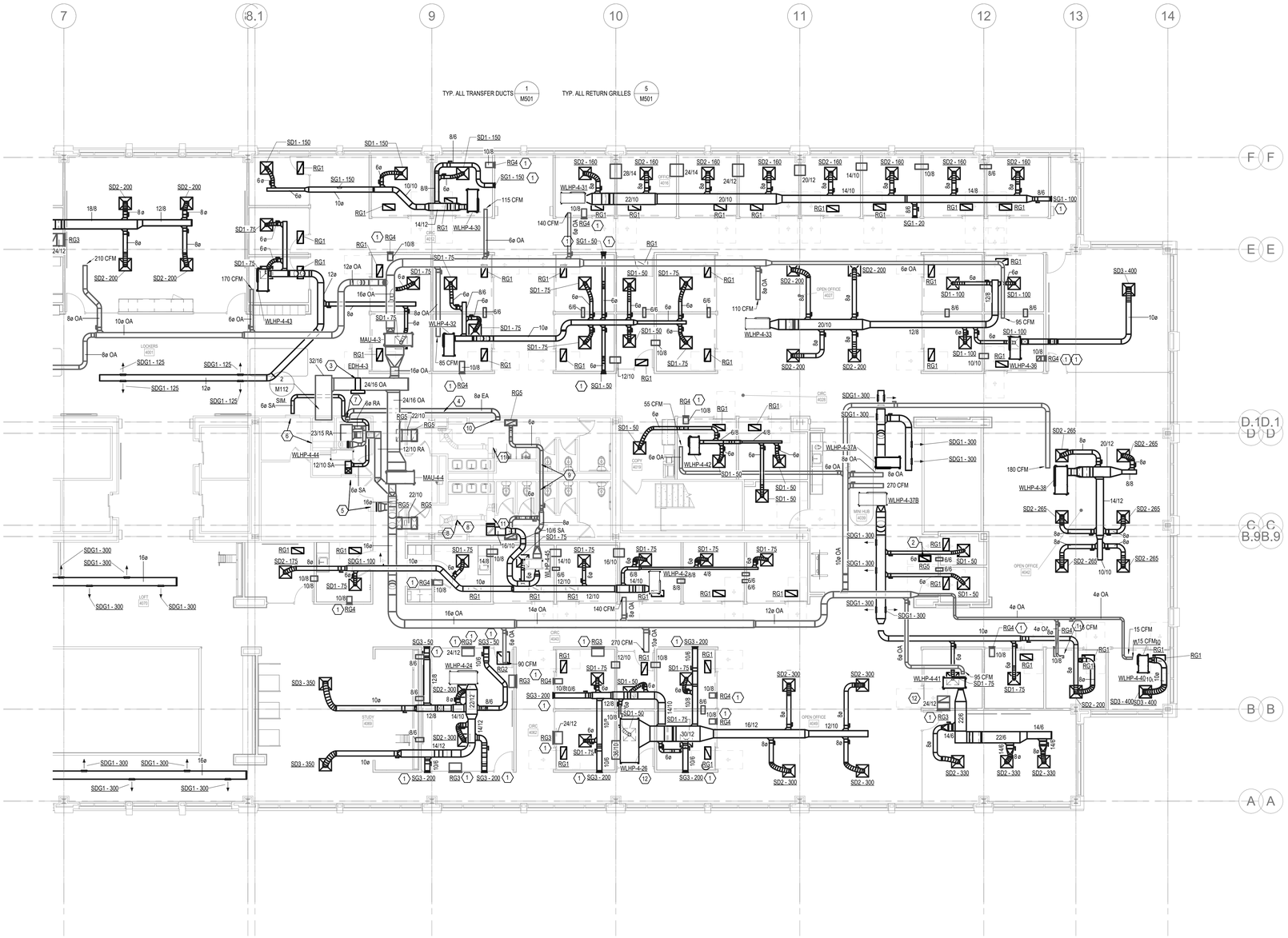
MECHANICAL PLAN

M114A

SHEET PRINTED: 1/19/2026 9:36:10 AM



1 LEVEL 04 - MECHANICAL PLAN - AREA B
1/8" = 1'-0"

SHEET PRINTED: 1/19/2026 9:36:29 AM

GENERAL NOTES

A UNLESS NOTED OTHERWISE ALL DUCT MOUTNED SUPPLY GRILLES SHALL BE MOUNTED TO BLOW DOWNWARD AT A 35 DEGREE ANGLE BELOW HORIZONTAL.

B ALL RETURN AIR INLETS (EITHER CEILING MOUNTED OR SIDEWALL) SHALL BE INSTALLED WITH A LINED DUCT ELBOW PER DETAILS.

C ALL TRANSER DUCT ASSEMBLIES SHALL BE INTERNALLY LINED AND CONSTRUCTED WITH ELBOWS PER DETAILS.

D ALL EQUIPMENT SHALL BE ACCESSIBLE. WATER LOOP HEAT PUMPS (WLHP) SHALL BE INSTALLED SO THAT THE MFGR CLEARANCE IS NOT OBSTRUCTED. ALL ACCESS AND SERVICE CLEARANCE AREAS SHALL BE ABLE TO BE ACCESSED WITH A LADDER LOCATED ON THE FLOOR. ACCESS REQUIREMENTS SHALL INCLUDE ALL WATER LOOP (CS OR CR) PIPE ACCESSORIES.

E THE OWNER WILL TAKE EACH REMOVED WLHP TO A REMOTE LOCATION FOR TESTING AND REFURBISHMENT. ANY HEAT PUMPS THAT PASS THE REFURBISHMENT PROCESS WILL BE ALLOWED TO BE REUSED AND MAY REPLACE A PROPOSED WLHP OF THE SAME CAPACITY. THE INTENT IS THAT THE REFURBISHMENT PROCESS IS FINALIZED PRIOR TO THE DATE THAT THE NEW WLHPS ARE ORDERED. COORDINATE SCHEDULES AND LEAD TIMES WITH OWNER AND COMMUNICATE THE "DROP DEAD" DATE REQUIRED TO KNOW WHAT EXISTING HEAT PUMPS CAN BE REUSED.

F SEE STRUCTURAL DRAWINGS FOR TYPICAL CONNECTION POINTS TO STRUCTURE ABOVE FOR MOUNTING OF ALL DUCT, PIPE, AND MECHANICAL EQUIPMENT.

SHEET KEYNOTES

1 BOTTOM EDGE OF GRILLE SHALL BE 10' 0" AFF.

2 LOCATE GRILLE IN SOFFIT.

5 EXISTING GRILLE, FIRE DAMPER, AND PLENUM BOX TO REMAIN. CONNECT NEW DUCTWORK TO BACK OF PLENUM BOX AND SEAL. BALANCE TO 550 CFM.

8 REPLACE FLEX WITH SMALLER SIZE. PROVIDE DUCT TRANSITION IN HARD DUCT.

12 DOOR TO BE UNDERCUT 1" TO ALLOW AIRFLOW TO ADJACENT SPACE.

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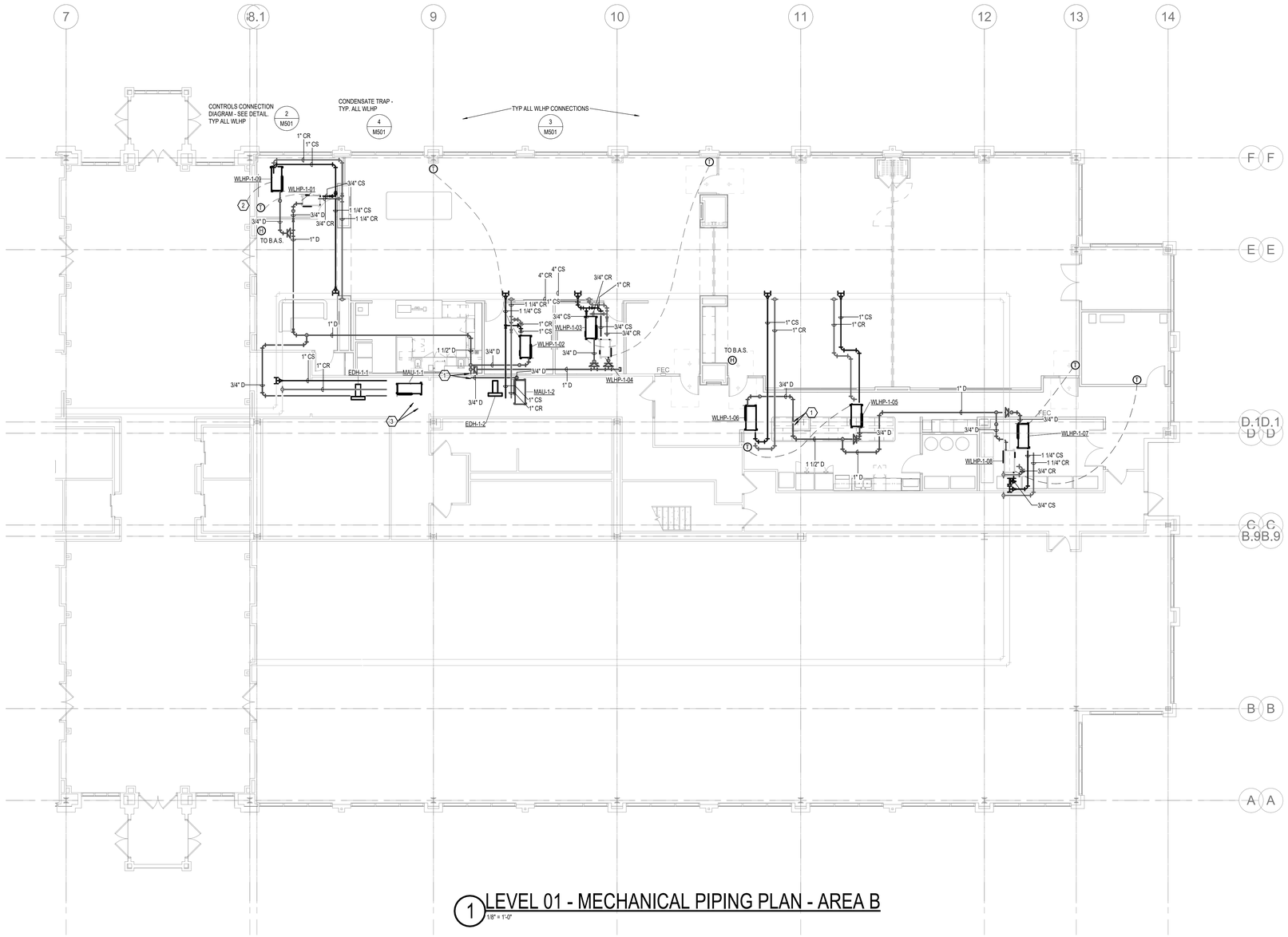
MECHANICAL PLAN

M114B



1 LEVEL 01 - MECHANICAL PIPING PLAN - AREA B
1/8" = 1'-0"

GENERAL NOTES

A REFER TO SHEET M-000 FOR GENERAL MECHANICAL NOTES, SYMBOLS AND ABBREVIATIONS.

B OPEN OFFICE, COMMON, AND HUB TYPE SPACES SHALL BE PROVIDED WITH A THERMOSTAT AS INDICATED. SETPOINT ADJUSTMENT SHALL BE LOCKED OUT FROM USERS, ONLY THE OWNER CAN ADJUST THERMOSTAT SETPOINT THROUGH FRONT END.

C CLOSED OFFICES, FOCUS ROOMS, AND CONFERENCE ROOMS SHALL HAVE USER ADJUSTABLE SPACE THERMOSTAT. SETPOINT SHALL BE ADJUSTABLE WITHIN A PREDEFINED BAND. COORDINATE WITH OWNER FOR ACCEPTABLE ADJUSTMENT BAND ALLOWED.

D ALL CONDENSATE PIPE SHALL PITCH DOWNWARD AT 1/8" PER FOOT.

SHEET KEYNOTES

1 PROVIDE ATMOSPHERIC VENTED AIR GAP FITTING ABOVE CEILING TO SERVE MECHANICAL CONDENSATE DRAINS. CONNECT TO VENT STACK.

2 CONNECT EXISTING LOBBY THERMOSTAT TO WLHP.

3 EXISTING 3T UNIT SERVING THE ELECTRIC AND TELECOM ROOMS RESIDES IN THIS VICINITY. CONTRACTOR SHALL RELOCATE THIS UNIT AS REQUIED TO REMAIN SOUTH OF THE DIVIDING WALL BETWEEN THE KSM TENANT AND THE COMON CORRIDOR. COORDINATE DUCT, PIPE, AND CONDENSATE ROUTING TO AVOID NEW MAKE UP AIR UNITS MAU-1-1 AND MAU-1-2.

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MECHANICAL PIPING PLAN

M211

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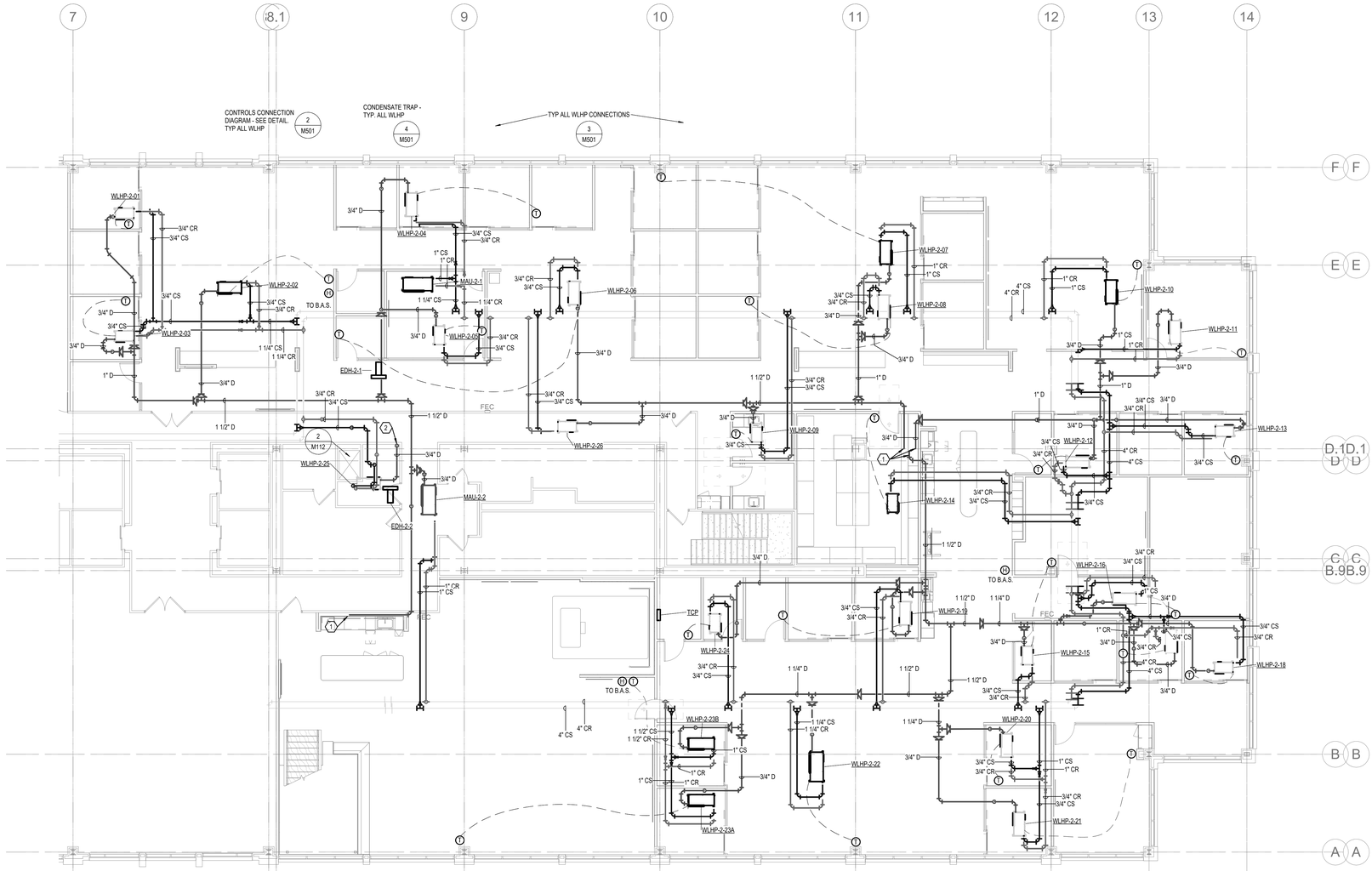

1 LEVEL 02 - MECHANICAL PIPING PLAN - AREA B
1/8" = 1'-0"

GENERAL NOTES

A REFER TO SHEET M-000 FOR GENERAL MECHANICAL NOTES, SYMBOLS AND ABBREVIATIONS.

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D ALL CONDENSATE PIPE SHALL PITCH DOWNWARD AT 1/8" PER FOOT.

SHEET KEYNOTES

1 PROVIDE ATMOSPHERIC VENTED AIR GAP FITTING ABOVE CEILING TO SERVE MECHANICAL CONDENSATE DRAINS. CONNECT TO VENT STACK.

2 TERMINATE WITH OPEN AIR DISCHARGE INTO MOP BASIN.

DELV DESIGN

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MECHANICAL PIPING PLAN

M212

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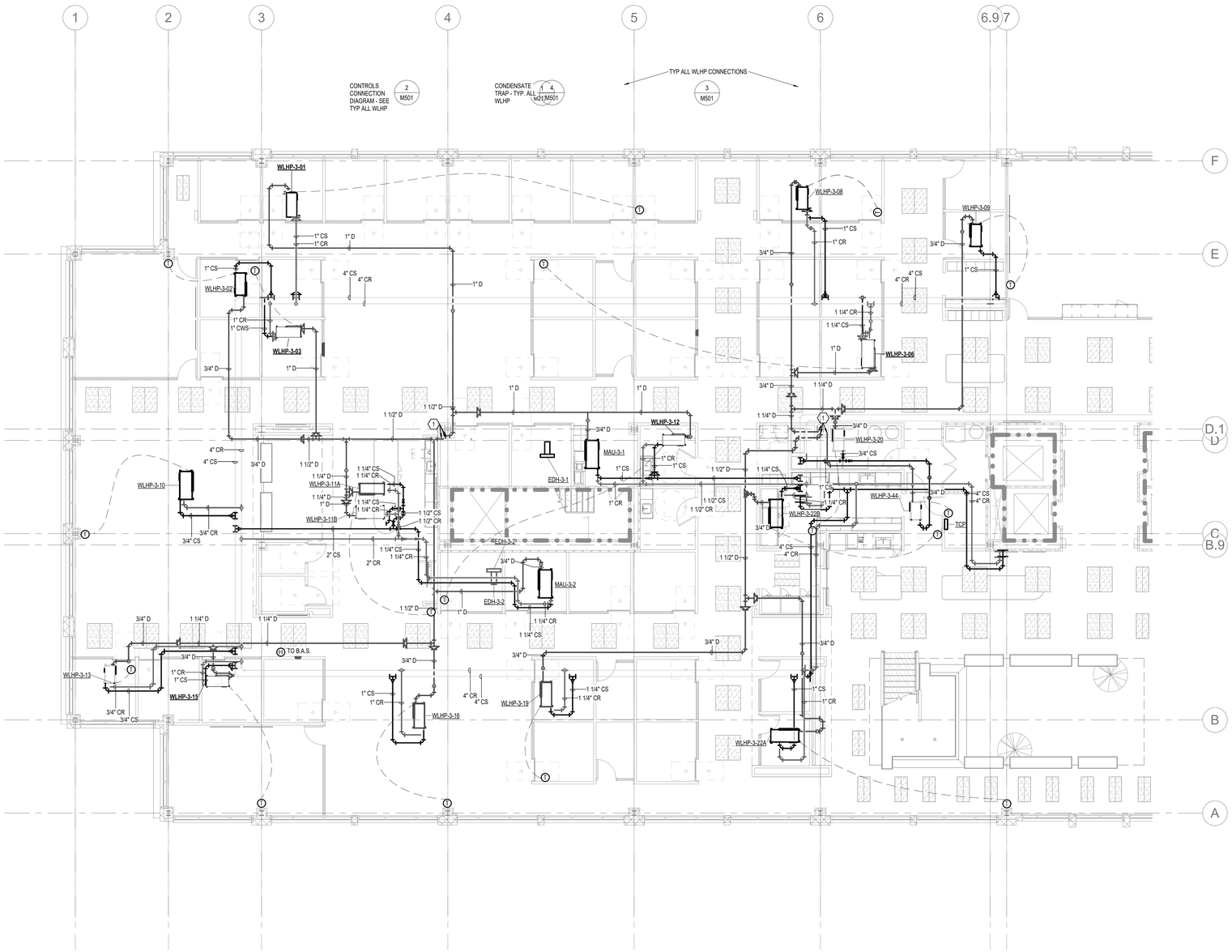

1 LEVEL 03 MECHANICAL PIPING PLAN - AREA A
1/8" = 1'-0"

SHEET PRINTED: 1/19/2026 9:37:59 AM

GENERAL NOTES

A REFER TO SHEET M-000 FOR GENERAL MECHANICAL NOTES, SYMBOLS AND ABBREVIATIONS.

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D ALL CONDENSATE PIPE SHALL PITCH DOWNWARD AT 1/8" PER FOOT.

SHEET KEYNOTES

1 PROVIDE ATMOSPHERIC VENTED AIR GAP FITTING ABOVE CEILING TO SERVE MECHANICAL CONDENSATE DRAINS. CONNECT TO VENT STACK.

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KEY PLAN

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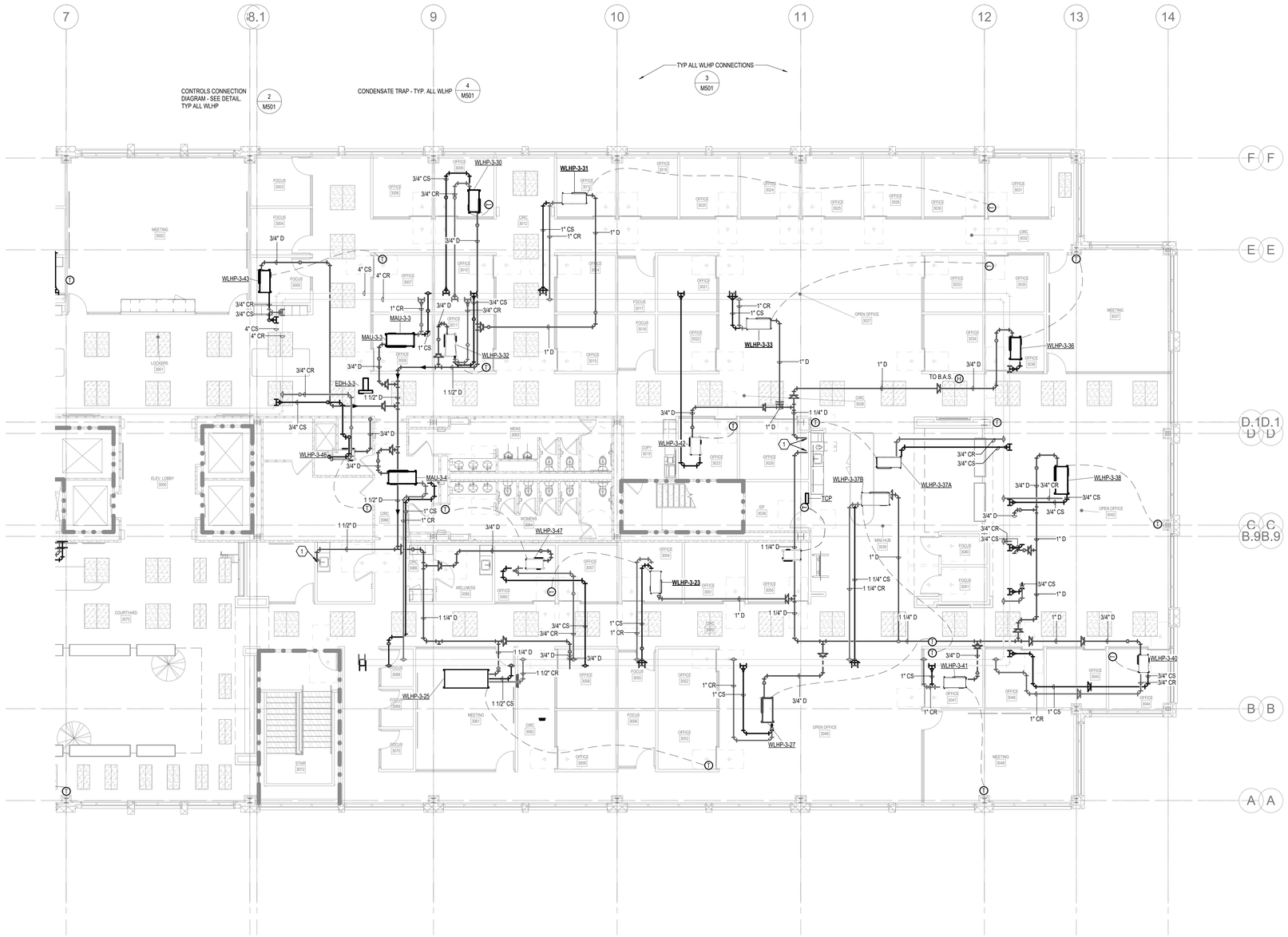
MECHANICAL PIPING PLAN

M213A



1 LEVEL 03 MECHANICAL PIPING PLAN - AREA B
1/8" = 1'-0"

SHEET PRINTED: 1/19/2026 9:38:12 AM

GENERAL NOTES

A REFER TO SHEET M-000 FOR GENERAL MECHANICAL NOTES, SYMBOLS AND ABBREVIATIONS.

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D ALL CONDENSATE PIPE SHALL PITCH DOWNWARD AT 1/8" PER FOOT.

SHEET KEYNOTES

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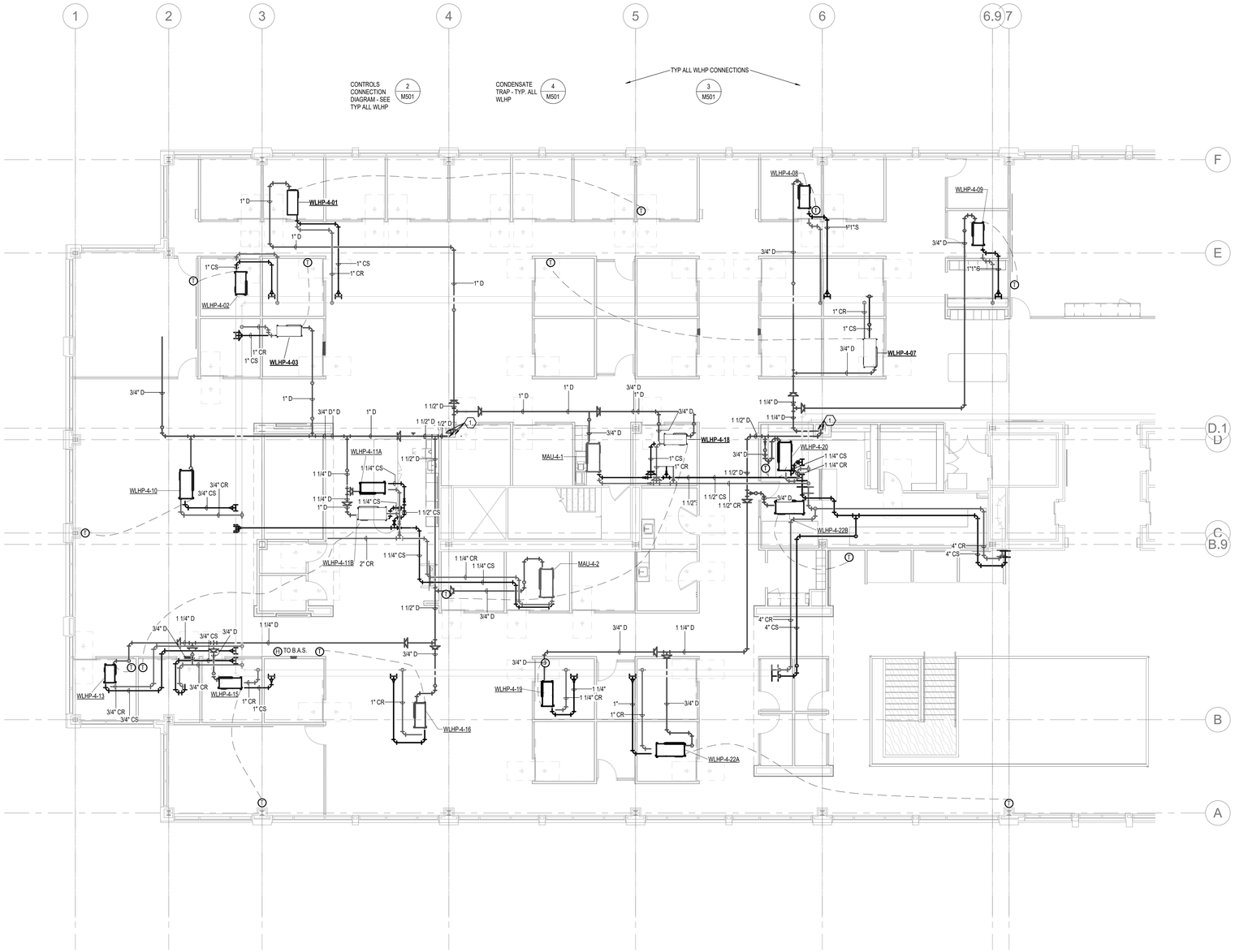
MECHANICAL PIPING PLAN

M213B



1 LEVEL 04 - MECHANICAL PIPING PLAN - AREA A
1/8" = 1'-0"

GENERAL NOTES

A REFER TO SHEET M-000 FOR GENERAL MECHANICAL NOTES, SYMBOLS AND ABBREVIATIONS.

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MECHANICAL PIPING PLAN

M214A

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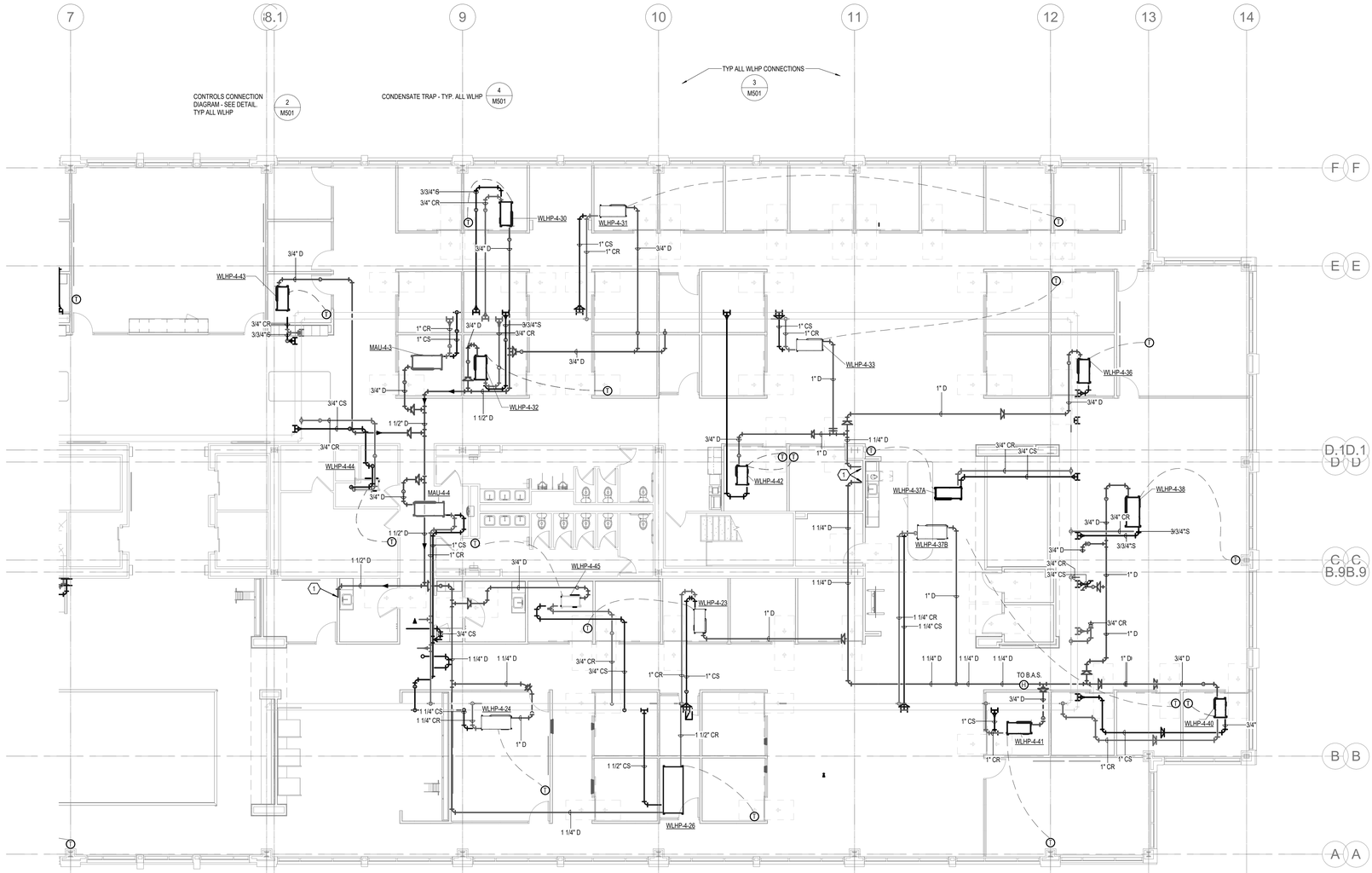

1 LEVEL 04 - MECHANICAL PIPING PLAN - AREA B
1/8" = 1'-0"

SHEET PRINTED: 1/19/2026 9:38:34 AM

GENERAL NOTES

A REFER TO SHEET M-000 FOR GENERAL MECHANICAL NOTES, SYMBOLS AND ABBREVIATIONS.

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D ALL CONDENSATE PIPE SHALL PITCH DOWNWARD AT 1/8" PER FOOT.

SHEET KEYNOTES

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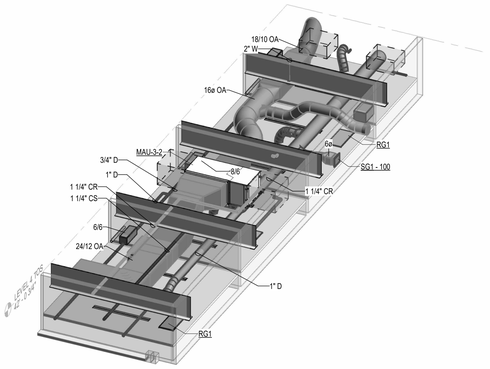
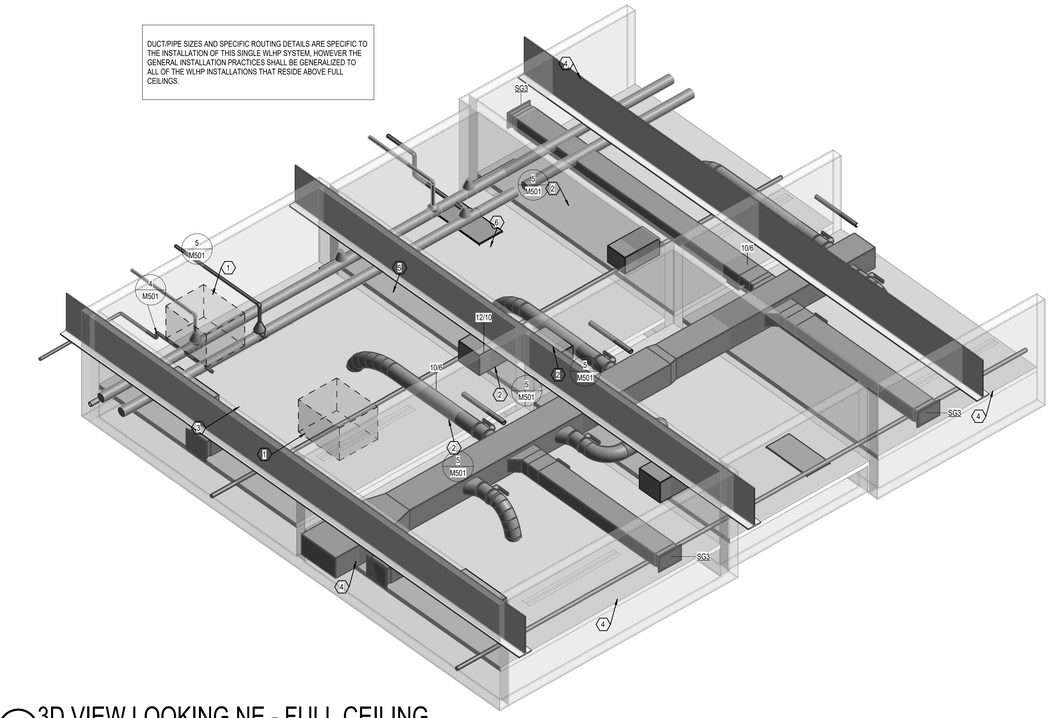
MECHANICAL PIPING PLAN

M214B



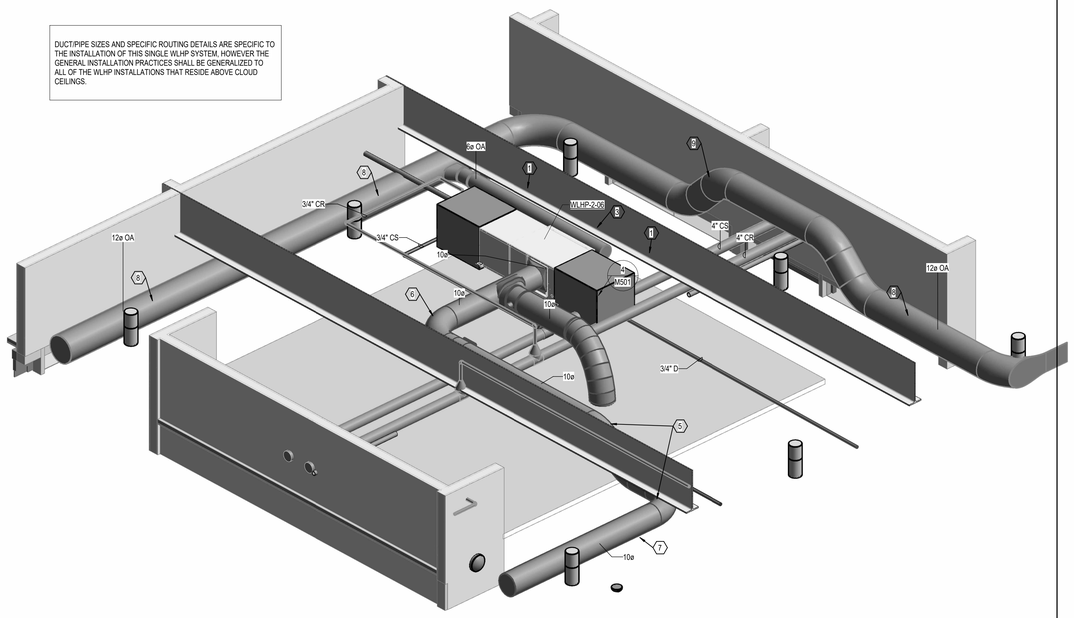
3 3D VIEW LOOKING NE - MAU CONNECTIONS

DUCT/PIPE SIZES AND SPECIFIC ROUTING DETAILS ARE SPECIFIC TO THE INSTALLATION OF THIS SINGLE WLHP SYSTEM, HOWEVER THE GENERAL INSTALLATION PRACTICES SHALL BE GENERALIZED TO ALL OF THE WLHP INSTALLATIONS THAT RESIDE ABOVE FULL CEILINGS.



1 3D VIEW LOOKING NE - FULL CEILING

DUCT/PIPE SIZES AND SPECIFIC ROUTING DETAILS ARE SPECIFIC TO THE INSTALLATION OF THIS SINGLE WLHP SYSTEM, HOWEVER THE GENERAL INSTALLATION PRACTICES SHALL BE GENERALIZED TO ALL OF THE WLHP INSTALLATIONS THAT RESIDE ABOVE CLOUD CEILINGS.



2 3D LOOKING NE - CLOUD CEILING

SHEET KEYNOTES

1. CONTRACTOR SHALL COORDINATE WITH THE WLHP MFGR TO LOCATE THE REQUIRED MAINTENANCE ACCESS CLEARANCE. BASIS OF DESIGN UNIT CLEARANCE IS SHOWN HERE. ENSURE CLEARANCE AREA CAN BE REACHED FROM BELOW BY A STEPLADDER.
2. ALL TRANSFER DUCTS SHALL ADHERE TO DETAIL WHICH INCLUDES ELBOWS (REGARDLESS IF SHOWN ON PLANS OR NOT).
3. MOUNT WLHP HIGH TO THE DECK ABOVE TO ALLOW FOR CONDENSATE DRAINAGE. CONDENSATE PIPING SHALL DROP AT 1/8" PER FOOT. CONDENSATE PIPING WAS SLOPED IN THE MODEL AND THE LOWEST PIPE ELEVATION AT THE TERMINATION LOCATION IS 9'3". ENSURE THAT COMPLETE CONDENSATE ROUTE CAN BE ROUTED AT THIS ELEVATION.
4. BOTTOM EDGE OF GRILLE SHALL BE 10' 0" AFF.
5. CONTRACTOR SHALL BUDGET FOR DUCT JOG DOWNWARD AS REQUIRED TO AVOID STEEL BEAMS.
6. DUCTS SHALL BE RADIUSED AT 1.5 R/W WHERE SPACE PERMITS. IF SPACE DOES NOT EXIST UTILIZE SINGLE THICKNESS TURNING VANES AT 1.25" SPACING.
7. BOTTOM OF EXPOSED DUCT SHALL BE AT LEAST 10'0" AFF. ALL EXPOSED DUCT SHALL RECEIVE PAINT-GRIP FINISH FOR FIELD PAINTING.
8. BOTTOM OF EXPOSED INSULATED DUCT SHALL BE AT LEAST 9'4" AFF. PROVIDE FIELD PAINTABLE JACKET OVER INSULATION. SEE MECHANICAL SCHEDULE.
9. DUCT SHALL JOG UPWARDS TO AVOID INTERFERENCES.

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MECHANICAL ENLARGED PLANS

M401

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WLHP SEQUENCE OF OPERATION:

WLHP SHALL OPERATE ON INTERNAL MFGR CONTROLS. THE CONTROL SHALL ACCEPT AN EXTERNALLY PROVIDED THERMOSTAT SIGNAL. THE WLHP SHALL BE PROVIDED WITH AN INTERNAL CONDENSATE OVERFLOW SWITCH (SEE SPECIFICATIONS). THIS SWITCH SHALL BE HARDWIRED TO SHUTDOWN UNIT ON THE EVENT OF OVERFLOW. IT IS THE RESPONSIBILITY OF T.C.C. TO VERIFY THE SWITCH IS FUNCTIONAL ON EACH WLHP.

EACH WLHP SHALL BE ALLOWED TO OPERATE ON LOW OR HIGH SPEED REGARDLESS OF OCCUPANCY STATUS.

FOR COMMON SPACES AND OPEN OFFICES:
THE THERMOSTAT ADJUSTMENT SHALL BE LOCKED OUT AND ONLY EDITABLE FROM THE FRONT END.

FOR INDIVIDUAL OFFICE, FOCUS ROOMS, AND CONFERENCE ROOMS:
THE MASTER THERMOSTAT SHALL BE ADJUSTABLE WITHIN A PREDEFINED RANGE OF 6F. THE REMAINDER OF SPACES ARE SERVED BY A SPACE SENSOR ONLY WITH NO ADJUSTMENT. SEE DIAGRAM THIS PAGE.

WHERE MULTIPLE SPACE SENSORS ARE SHOWN CONNECTED TO A SINGLE WLHP:
THE THERMOSTAT SIGNAL SHALL BE AVERAGED AMONG ALL SPACES WHERE THE ASSOCIATED OCC. SENSOR INDICATES "OCCUPIED". WHERE NO SENSOR INDICATES OCCUPIED ALL THE SPACE SENSORS SHALL BE AVERAGED. SEE DIAGRAM THIS SHEET.

CREATE AN INTERNAL PROPORTIONAL-INTEGRAL LOOP TO TAKE THE INCOMING THERMOSTAT SIGNALS AND PROVIDE A SMOOTH THERMOSTAT OUTPUT SIGNAL TO BE USED BY THE MFGR CONTROLLER.

EACH WLHP SHALL BE BROUGHT INTO THE FRONT END VIA BACNET. ALARM ALL TROUBLE ALARMS AT FRONT END. THE THERMOSTATS SERVING THE IDF ROOMS SHALL ALSO ALARM ON HIGH TEMPERATURE OF 78F (ADJ.)

T.C.C. SHALL COORDINATE A MEETING WITH OWNER TO DETERMINE ANY ADDITIONAL ALARM POINTS TO BE BROUGHT INTO FRONT END. ASSUME THAT ANY POINT MAY BE REQUESTED TO ALARM.

PROJECT LIGHTING MONITORING:

THE CONTROLS CONTRACTOR SHALL PROVIDE A CURRENT TRANSFORMER TO MONITOR EACH OF THE LIGHTING ELECTRICAL CIRCUITS NEAR THE ELECTRICAL PANEL FOR THAT CIRCUIT. FOR BUDGETING PURPOSES ASSUME A TOTAL QUANTITY OF LIGHTING CIRCUITS TO BE 16. BRING THE STATUS OF THE LIGHT CIRCUIT INTO THE FRONT END. COORDINATE WITH OWNER FOR ALARM, TREND, AND NOTIFICATION REQUIREMENTS.

COORDINATE LOCATION WITH DIV. 026.

MAU AND EDH SEQUENCE OF OPERATION:

WHENEVER THE BUILDING GOES INTO OCCUPIED MODE THE ISOLATION MOTORIZED DAMPER SHALL OPEN. ONCE DAMPER IS PROVEN OPEN BY DAMPER END SWITCHES THE MAU SHALL BE ALLOWED TO START. THE LOW STATIC PRESSURE SWITCH SHALL BE HARDWIRED TO SHUT DOWN MAU IF SUCTION STATIC PRESSURE IS TOO LOW (-1.0" ADJ.)

THE MAU SHALL RUN AT CONSTANT FAN SPEED. THE MAU SHALL OPERATE HEATING AND COOLING AS REQUIRED TO MAINTAIN A DUCT DISCHARGE AIR TEMPERATURE SETPOINT.

DUCT DISCHARGE TEMPERATURE SETPOINT IN SUMMER CONDITIONS: 55F (ADJ.)
DUCT DISCHARGE TEMPERATURE SETPOINT IN WINTER CONDITIONS: 55F (ADJ.)

SETPOINTS SHALL BE SEPARATELY ADJUSTABLE.

FOR INITIAL STARTUP SET BOTH SUMMER AND WINTER SETPOINTS TO 55F.

THE ELECTRIC DUCT HEATER (EDH) SHALL ENERGIZE AS REQUIRED TO PREHEAT THE AIRSTREAM TO 45F (ADJ) UPSTREAM OF THE MAU. UTILIZE SCR CONTROL TO AVOID SWINGS IN TEMPERATURE.

THE HUMIDISTATS SHOWN ON EACH FLOOR SHALL BE MONITORED AND SHALL ALARM AT THE FRONT END AT THE OWNER DEFINED RH LIMIT (INITIAL ALARM SETPOINT OF 60% RH).

WHEN BUILDING GOES TO UNOCCUPIED MODE THE MAU SHALL SHUT DOWN AND THE MOTORIZED ISOLATION DAMPER SHALL CLOSE.

SEE MAU CONTROLS DETAIL.

REBATES:

THE CONTRACTOR SHALL ASSIST THE OWNER IN FILING ENERGY REBATES WITH AES INDIANA. THIS WILL INCLUDE COMPILING DATA AND MODEL NUMBERS FOR EACH OF THE WLHP PROVIDED AS PART OF THIS PROJECT AND SUBMITTING THIS INFORMATION TO AES.

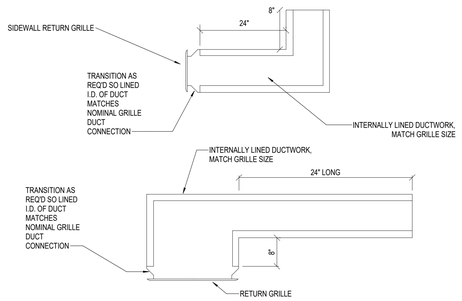
CONTROLS CHECKOUT PROCEDURE:

CONTACT ENGINEER TO COORDINATE A CONTROLS SYSTEM CHECKOUT. ALLOW 3 WORKING WEEKS NOTICE. ANTICIPATE TWO SEPARATE TESTING DAYS APPROXIMATELY 6 MONTHS APART.

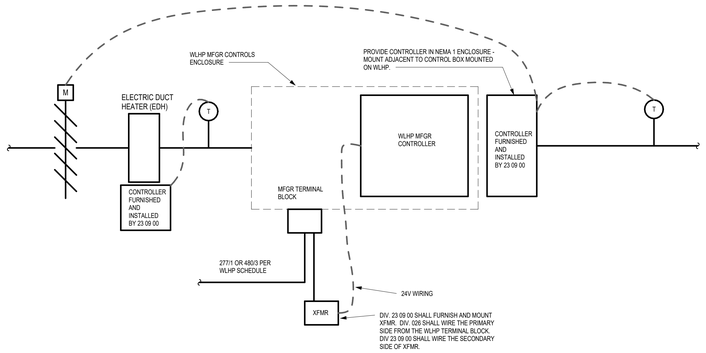
A RANDOM SAMPLE OF 10% OF THE WLHP ON THE JOB WILL BE TESTED. VERIFY THE FOLLOWING:
A. THE THERMOSTAT SETTING CAN BE ADJUSTED TO SEND THE UNIT INTO HEATING OR COOLING MODE AS APPROPRIATE.
B. THE ZONE SENSORS ARE AVERGING CORRECTLY WHEN USED AS INPUT TO THE WLHP CONTROLLER. ZONES THAT ARE INDICATING UNOCCUPIED ARE DROPPED FROM THE AVERAGE.

A RANDOM SAMPLE OF 3 OF THE MAU ON THE JOB WILL BE TESTED. VERIFY THE FOLLOWING:
A. THE MAU OPERATES WHEN ENTERING OCCUPIED MODE.
B. LOW STATIC PRESSURE SENSOR SHUTS MAU DOWN.
C. THE MAU VARIES ITS CAPACITY TO ACHIEVE THE DUCT DISCHARGE AIR TEMPERATURE SETPOINT.

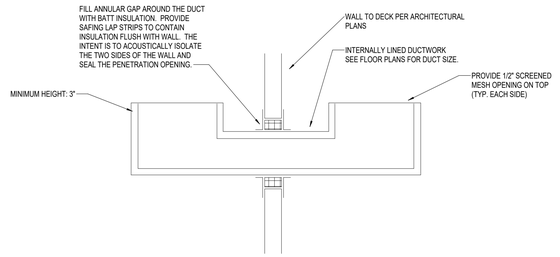
THESE RETURN AIR DUCT DETAILS ARE TYPICAL UNLESS SPECIFICALLY NOTED OTHERWISE ON PLANS



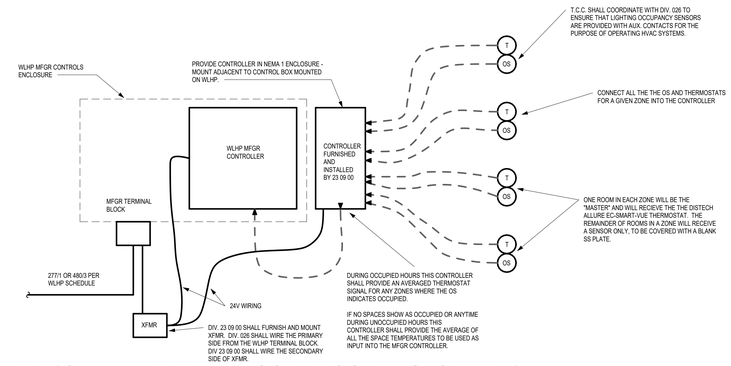
5 RETURN GRILLE DUCT DETAIL
NOT TO SCALE



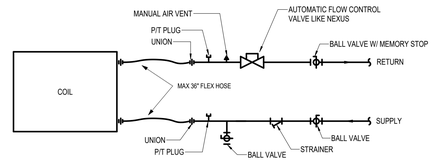
6 TYP MAU CONTROLS DETAIL
NOT TO SCALE



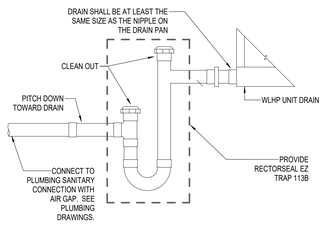
1 PLENUM TRANSFER DUCT DETAIL
NOT TO SCALE



2 TYPICAL WLHP THERMOSTAT CONTROLS DETAIL
NOT TO SCALE



3 WLHP PIPING DETAIL
NOT TO SCALE



4 NEGATIVE PRESSURE CONDENSATE DRAIN TRAP DETAIL
NOT TO SCALE

SHEET PRINTED: 1/19/2026 9:38:43 AM

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KATZ SAPPER MILLER

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KEY PLAN

CONSTRUCTION DOCUMENTS

No.	Description	Date
1	CONSTRUCTION SET	01/19/2026

CLIENT PROJ. #: --
PROJECT #: 24-056
ISSUE DATE: 07/01/2025
DRW: Author | CHK: Checker

MECHANICAL DETAILS

M501

ELECTRIC DUCT HEATER SCHEDULE

NOTES:

1. PROVIDE SCR CONTROL FOR CONTINUOUSLY VARIABLE OUTPUT.

UNIT ID	DUCT DIMENSIONS	CFM	HEATING DATA	STAGES	TEMPERATURE RISE (°F)	ELECTRICAL DATA			MANUFACTURER WITH MODEL NUMBER	NOTES
			MIN. KW			AMPS	VOLTAGE	PHASE		
EDH-1-1	24W x 12T	1200	23.9	SCR	63	27.6	480	3	INDEECO QUA	1
EDH-1-2	24W x 12T	1200	23.9	SCR	63	27.6	480	3	INDEECO QUA	1
EDH-2-1	24W x 12T	1200	23.9	SCR	63	27.6	480	3	INDEECO QUA	1
EDH-2-2	24W x 12T	1200	23.9	SCR	63	27.6	480	3	INDEECO QUA	1
EDH-3-1	24W x 12T	1200	23.9	SCR	63	27.6	480	3	INDEECO QUA	1
EDH-3-2	24W x 12T	1200	23.9	SCR	63	27.6	480	3	INDEECO QUA	1
EDH-4-1	24W x 12T	1200	23.9	SCR	63	27.6	480	3	INDEECO QUA	1
EDH-4-2	24W x 12T	1200	23.9	SCR	63	27.6	480	3	INDEECO QUA	1

DIFFUSERS & GRILLES SCHEDULE

NOTES:

1. PROVIDE ADJUSTABLE AIR SCOOP FOR BALANCING
2. GRILLE TO BE PAINTED BLACK BY FACTORY.

UNIT ID	MAX CFM	DIMENSIONAL DATA			THROW DATA (150 / 100 / 50 FPM)		MOUNT	PRESS DROP (IN. WC)	MAX NC SOUND LEVEL	ACCESSORIES			MANUFACTURER WITH MODEL NUMBER	NOTES
		FACE SIZE	SLOT INFO	CONN. SIZE	DIRECTION	DISTANCE @ NOM. CFM				BALANCE DAMPER	PLENUM BOX	TAMPER-PROOF SCREWS		
RG1	1070	24"x12"		22"x10"			CEILING	0.10	25	NO	NO	NO	PRICE PDR	
RG2	2350	24"x24"		22"x22"			CEILING	0.10	25	NO	NO	NO	PRICE PDR	
RG3	1070	26"x14"		24"x12"			SIDEWALL	0.06	30	NO	NO	NO	PRICE 510Z	
RG4	670	12"x10"		10"x8"			SIDEWALL	0.11	20	NO	NO	NO	PRICE 510Z	
RG5	1070	24"x12"		22"x10"			CEILING	0.1	25	NO	NO	NO	PRICE PDR	2
SD1	213	24"x24"		6" DIA					25				PRICE SPD	
SD2	332	24"x24"		8" DIA					25				PRICE SPD	
SD3	490	24"x24"		10" DIA					25				PRICE SPD	
SD4	628	24"x24"		12" DIA					25				PRICE SPD	
SDG1	205	12"x8"		10"x6"	SEE PLANS	12 / 18 / 27	DUCT	0.05	20	NO	NO	NO	PRICE SDGE	1
SG1	180	10"x8"		8"x6"	HORIZONTALLY	12 / 17 / 24	SIDEWALL	0.06	25	NO	NO	NO	PRICE 510	
SG2	160	8"x8"		6"x6"	HORIZONTALLY	12 / 16 / 26	SIDEWALL	0.05	25	NO	NO	NO	PRICE 510	
SG3	240	12"x6"		10"x6"	HORIZONTALLY	17 / 20 / 28	SIDEWALL	0.05	25	NO	NO	NO	PRICE 510	

MECHANICAL SCHEDULE

Service:	Material	Insulation (NOTE 2)	Joining Method	Vapor Barrier?	Jacket
Condensate drain piping	ASTM B-88 Type L Copper Tube	0.5" MFPPI	Soldered	No	ASJ
Supply Duct - Exposed	Galvanized Sheet Metal	-	NOTE 4	No	-
Supply Duct - Concealed	Galvanized Sheet Metal	1.5" MF BLK	-	Yes	-
Transfer Duct	Galvanized Sheet Metal	1" IL MF	NOTE 4	No	-
Water Loop Piping (CS & CR) 2" and under	ASTM B-88 Type L Copper Tube	-	Pro Press	No	-
Water Loop Piping (CS & CR) 2 1/2" and above	ASTM A-53 Black Steel	-	Grooved	No	-
Make up Air Duct (Downstream of MAU units) - Exposed Rect.	Galvanized Sheet Metal	1.5" MF BRD	NOTE 1	Yes	ASJ
Make up Air Duct (Downstream of MAU units) - Exposed Round	Galvanized Sheet Metal	1" MFPPI (NOTE 5)	NOTE 1	Yes	ASJ
Make up Air Duct (Downstream of MAU units) - Concealed	Galvanized Sheet Metal	1.5" MF BLK	-	Yes	FSK
Make up Air Duct (Upstream of MAU units)	Galvanized Sheet Metal	1.5" MF BRD	NOTE 1	Yes	ASJ

MF BLK = Mineral Fiber blanket for ductwork
MF BRD = Mineral Fiber board for ductwork
MF TNK = Mineral Fiber for tanks
MFPPI = Mineral Fiber preformed pipe insulation
FE = Flexible Elastomeric pipe insulation
FSK = Foil Scrim with Kraft Paper
ASJ = Paintable All Service Jacket
AL = Aluminum Jacket for outdoor service
IL MF = Internally lined mineral fiber – see duct specification
IL FE = Internally lined flexible elastomeric – see duct specification
Note 1: Provide sheet metal screws or slip and drive fittings for low profile appearance. Seal duct per specification requirements.
Note 2: Thickness is uncompressed thickness.
Note 3: Provide jacket only for the exterior portion of insulation.
Note 4: Provide sheet metal screws or slip and drive fittings for low profile appearance. Do not seal duct. Duct shall have paintgrip finish for field painting
Note 5: Provide insulation diameter that most closely aligns with the duct dimension

TYPICAL EXPOSED MAKE-UP-AIR ROUND DUCT

TYPICAL EXPOSED MAKE-UP-AIR RECTANGULAR DUCT

WATER LOOP HEAT PUMP (WLHP) SCHEDULE

NOTES:
1. UNITS SHALL BE PROVIDED WITH TWO STAGE COMPRESSOR AND FAN CONTROL. UNIT SHALL BE ABLE TO STAGE DOWN TO LESS THAN 60% OF DESIGN AIRFLOW.
2. UNITS SHALL BE EQUIPPED WITH ULTRA QUIET SOUND ATTENUATION PACKAGE.

UNIT ID	FAN DATA			COOLING COIL (90 °F EWT; HIGH FAN)				HEATING COIL (50 °F EWT; HIGH FAN)		FILTER DATA	ELECTRICAL DATA					WEIGHT	MFGR & MODEL NUMBER	NOTES
	SUPPLY AIR (CFM)	ESP (in.w.g.)	GPM (HTG & CLG)	TOTAL MBH	SENSIBLE MBH	EAT DB	EAT WB	OPERATING MBH	EAT		FLA	MCA	MOCP	VOLTAGE	PHASE			
MAU-1-1	1200 CFM	0.6	6.8	33.8	25.0	80.0 °F	66.2 °F	37.3	70.0 °F	NONE	9.3	10.4	15	460	3		CLIMATEMASTER SY036	1,2
MAU-1-2	1200 CFM	0.6	6.8	33.8	25.0	80.0 °F	66.2 °F	37.3	70.0 °F	NONE	9.3	10.4	15	460	3		CLIMATEMASTER SY036	1,2
MAU-2-1	1200 CFM	0.6	6.8	33.8	25.0	80.0 °F	66.2 °F	37.3	70.0 °F	NONE	9.3	10.4	15	460	3		CLIMATEMASTER SY036	1,2
MAU-2-2	1200 CFM	0.6	6.8	33.8	25.0	80.0 °F	66.2 °F	37.3	70.0 °F	NONE	9.3	10.4	15	460	3		CLIMATEMASTER SY036	1,2
MAU-3-1	1200 CFM	0.6	6.8	33.8	25.0	80.0 °F	66.2 °F	37.3	70.0 °F	NONE	9.3	10.4	15	460	3		CLIMATEMASTER SY036	1,2
MAU-3-2	1200 CFM	0.6	6.8	33.8	25.0	80.0 °F	66.2 °F	37.3	70.0 °F	NONE	9.3	10.4	15	460	3		CLIMATEMASTER SY036	1,2
MAU-4-1	1200 CFM	0.6	6.8	33.8	25.0	80.0 °F	66.2 °F	37.3	70.0 °F	NONE	9.3	10.4	15	460	3		CLIMATEMASTER SY036	1,2
MAU-4-2	1200 CFM	0.6	6.8	33.8	25.0	80.0 °F	66.2 °F	37.3	70.0 °F	NONE	9.3	10.4	15	460	3		CLIMATEMASTER SY036	1,2
WLHP-1-01	200 CFM	0.25	1.5	5.8	4.7	80.0 °F	67.0 °F	6.7	70.0 °F	PLEATED MERV 13	4.9	5.6	15	277	1		CLIMATEMASTER SC006	2
WLHP-1-02	1000 CFM	0.25	5.6	28.4	20.7	80.0 °F	66.2 °F	29.9	70.0 °F	PLEATED MERV 13	8.2	9.4	15	460	3		CLIMATEMASTER SY030	1,2
WLHP-1-03	1000 CFM	0.25	5.6	28.4	20.7	80.0 °F	66.2 °F	29.9	70.0 °F	PLEATED MERV 13	8.2	9.4	15	460	3		CLIMATEMASTER SY030	1,2
WLHP-1-04	200 CFM	0.25	1.5	5.8	4.7	80.0 °F	67.0 °F	6.7	70.0 °F	PLEATED MERV 13	4.9	5.6	15	277	1		CLIMATEMASTER SC006	2
WLHP-1-05	1000 CFM	0.25	5.6	28.4	20.7	80.0 °F	66.2 °F	29.9	70.0 °F	PLEATED MERV 13	8.2	9.4	15	460	3		CLIMATEMASTER SY030	1,2
WLHP-1-06	1200 CFM	0.25	6.8	33.8	25.0	80.0 °F	66.2 °F	37.3	70.0 °F	PLEATED MERV 13	9.3	10.4	15	460	3		CLIMATEMASTER SY036	1,2
WLHP-1-07	1400 CFM	0.25	7.9	42.9	0.93	80.0 °F	66.2 °F	41.0	70.0 °F	PLEATED MERV 13	11.3	12.9	15	460	3		CLIMATEMASTER SY042	1,2
WLHP-1-08	600 CFM	0.25	3.4	18.4	13.7	80.0 °F	67.0 °F	18.0	70.0 °F	PLEATED MERV 13	8.4	10.0	15	277	1		CLIMATEMASTER SC018	2
WLHP-1-09	1200 CFM	0.25	6.8	33.8	25.0	80.0 °F	66.2 °F	37.3	70.0 °F	PLEATED MERV 13	9.3	10.4	15	460	3		CLIMATEMASTER SY036	1,2
WLHP-2-01	200 CFM	0.25	1.5	5.8	4.7	80.0 °F	67.0 °F	6.7	70.0 °F	PLEATED MERV 13	4.9	5.6	15	277	1		CLIMATEMASTER SC006	2
WLHP-2-02	1000 CFM	0.25	5.6	28.4	20.7	80.0 °F	66.2 °F	29.9	70.0 °F	PLEATED MERV 13	8.2	9.4	15	460	3		CLIMATEMASTER SY030	1,2
WLHP-2-03	200 CFM	0.25	1.5	5.8	4.7	80.0 °F	67.0 °F	6.7	70.0 °F	PLEATED MERV 13	4.9	5.6	15	277	1		CLIMATEMASTER SC006	2
WLHP-2-04	600 CFM	0.25	3.4	18.4	13.7	80.0 °F	67.0 °F	18.0	70.0 °F	PLEATED MERV 13	8.4	10.0	15	277	1		CLIMATEMASTER SC018	2
WLHP-2-05	200 CFM	0.25	1.5	5.8	4.7	80.0 °F	67.0 °F	6.7	70.0 °F	PLEATED MERV 13	4.9	5.6	15	277	1		CLIMATEMASTER SC006	2
WLHP-2-06	600 CFM	0.25	3.4	18.4	13.7	80.0 °F	67.0 °F	18.0	70.0 °F	PLEATED MERV 13	8.4	10.0	15	277	1		CLIMATEMASTER SC018	2
WLHP-2-07	800 CFM	0.25	4.5	22.7	17.4	80.0 °F	66.2 °F	23.9	70.0 °F	PLEATED MERV 13	7.2	8.2	15	460	3		CLIMATEMASTER SY024	1,2
WLHP-2-08	600 CFM	0.25	3.4	18.4	13.7	80.0 °F	67.0 °F	18.0	70.0 °F	PLEATED MERV 13	8.4	10.0	15	277	1		CLIMATEMASTER SC018	2
WLHP-2-09	200 CFM	0.25	1.5	5.8	4.7	80.0 °F	67.0 °F	6.7	70.0 °F	PLEATED MERV 13	4.9	5.6	15	277	1		CLIMATEMASTER SC006	2
WLHP-2-10	1000 CFM	0.25	5.6	28.4	20.7	80.0 °F	66.2 °F	29.9	70.0 °F	PLEATED MERV 13	8.2	9.4	15	460	3		CLIMATEMASTER SY030	1,2
WLHP-2-10	1000 CFM	0.25	5.6	28.4	20.7	80.0 °F	66.2 °F	29.9	70.0 °F	PLEATED MERV 13	8.2	9.4	15	460	3		CLIMATEMASTER SY030	1,2
WLHP-2-11	600 CFM	0.25	3.4	18.4	13.7	80.0 °F	67.0 °F	18.0	70.0 °F	PLEATED MERV 13	8.4	10.0	15	277	1		CLIMATEMASTER SC018	2
WLHP-2-12	600 CFM	0.25	3.4	18.4	13.7	80.0 °F	67.0 °F	18.0	70.0 °F	PLEATED MERV 13	8.4	10.0	15	277	1		CLIMATEMASTER SC018	2
WLHP-2-13	200 CFM	0.25	1.5	5.8	4.7	80.0 °F	67.0 °F	6.7	70.0 °F	PLEATED MERV 13	4.9	5.6	15	277	1		CLIMATEMASTER SC006	2
WLHP-2-14	400 CFM	0.25	2.3	10.7	7.2	80.0 °F	67.0 °F	12.4	70.0 °F	PLEATED MERV 13	6.5	7.6	15	277	1		CLIMATEMASTER SC012	2
WLHP-2-15	400 CFM	0.25	2.3	10.7	7.2	80.0 °F	67.0 °F	12.4	70.0 °F	PLEATED MERV 13	6.5	7.6	15	277	1		CLIMATEMASTER SC012	2
WLHP-2-16	600 CFM	0.25	3.4	18.4	13.7	80.0 °F	67.0 °F	18.0	70.0 °F	PLEATED MERV 13	8.4	10.0	15	277	1		CLIMATEMASTER SC018	2
WLHP-2-17	600 CFM	0.25	3.4	18.4	13.7	80.0 °F	67.0 °F	18.0	70.0 °F	PLEATED MERV 13	8.4	10.0	15	277	1		CLIMATEMASTER SC018	2
WLHP-2-18	200 CFM	0.25	1.5	5.8	4.7	80.0 °F	67.0 °F	6.7	70.0 °F	PLEATED MERV 13	4.9	5.6	15	277	1		CLIMATEMASTER SC006	2
WLHP-2-19	600 CFM	0.25	3.4	18.4	13.7	80.0 °F	67.0 °F	18.0	70.0 °F	PLEATED MERV 13	8.4	10.0	15	277	1		CLIMATEMASTER SC018	2
WLHP-2-20	600 CFM	0.25	3.4	18.4	13.7	80.0 °F	67.0 °F	18.0	70.0 °F	PLEATED MERV 13	8.4	10.0	15	277	1		CLIMATEMASTER SC018	2
WLHP-2-21	600 CFM	0.25	3.4	18.4	13.7	80.0 °F	67.0 °F	18.0	70.0 °F	PLEATED MERV 13	8.4	10.0	15	277	1		CLIMATEMASTER SC018	2
WLHP-2-22	1600 CFM	0.25	9.0	45.4	35.6	80.0 °F	66.2 °F	47.8	70.0 °F	PLEATED MERV 13	11.6	13.3	15	480	3		CLIMATEMASTER SY048	1,2
WLHP-2-23A	1200 CFM	0.25	6.8	33.8	25.0	80.0 °F	66.2 °F	37.3	70.0 °F	PLEATED MERV 13	9.3	10.4	15	460	3		CLIMATEMASTER SY036	1,2
WLHP-2-23B	1200 CFM	0.25	6.8	33.8	25.0	80.0 °F	66.2 °F	37.3	70.0 °F	PLEATED MERV 13	9.3	10.4	15	460	3		CLIMATEMASTER SY036	1,2
WLHP-2-24	200 CFM	0.25	1.5	5.8	4.7	80.0 °F	67.0 °F	6.7	70.0 °F	PLEATED MERV 13	4.9	5.6	15	277	1		CLIMATEMASTER SC006	2
WLHP-2-25	600 CFM	0.25	3.4	18.4	13.7	80.0 °F	67.0 °F	18.0	70.0 °F	PLEATED MERV 13	8.4	10.0	15	277	1		CLIMATEMASTER SC018	2
WLHP-2-26	200 CFM	0.25	1.5	5.8	4.7	80.0 °F	67.0 °F	6.7	70.0 °F	PLEATED MERV 13	4.9	5.6	15	277	1		CLIMATEMASTER SC006	2
WLHP-3-01	1400 CFM	0.25	7.9	42.9	30.9	80.0 °F	66.2 °F	41.0	70.0 °F	PLEATED MERV 13	11.3	12.9	15	460	3		CLIMATEMASTER SY042	1,2
WLHP-3-02	800 CFM	0.25	4.5	22.7	17.4	80.0 °F	66.2 °F	23.9	70.0 °F	PLEATED MERV 13	7.2	8.2	15	460	3		CLIMATEMASTER SY024	1,2
WLHP-3-03	1200 CFM	0.25	6.8	33.8	25.0	80.0 °F	66.2 °F	37.3	70.0 °F	PLEATED MERV 13	9.3	10.4	15	460	3		CLIMATEMASTER SY036	1,2
WLHP-3-06	1600 CFM	0.25	9.0	45.4	35.6	80.0 °F	66.2 °F	47.8	70.0 °F	PLEATED MERV 13	11.6	13.3	15	480	3		CLIMATEMASTER SY048	1,2
WLHP-3-11A	1400 CFM	0.25	7.9	42.9	30.9	80.0 °F	66.2 °F	41.0	70.0 °F	PLEATED MERV 13	11.3	12.9	15	460	3		CLIMATEMASTER SY042	1,2
WLHP-3-11B	1600 CFM	0.25	9.0	45.4	35.6	80.0 °F	66.2 °F	47.8	70.0 °F	PLEATED MERV 13	11.6	13.3	15	480	3		CLIMATEMASTER SY048	1,2
WLHP-3-12	1000 CFM	0.25	6.8	33.8	25.0	80.0 °F	66.2 °F	37.3	70.0 °F	PLEATED MERV 13	9.3	10.4	15	460	3		CLIMATEMASTER SY030	1,2
WLHP-3-15	1200 CFM	0.25	6.8	33.8	25.0	80.0 °F	66.2 °F	37.3	70.0 °F	PLEATED MERV 13	8.2	10.4	15	460	3		CLIMATEMASTER SY030	1,2
WLHP-3-23	800 CFM	0.25	4.5	22.7	17.4	80.0 °F	66.2 °F	23.9	70.0 °F	PLEATED MERV 13	7.2	8.2	15	460	3		CLIMATEMASTER SY024	1,2
WLHP-3-25	3000 CFM	0.25	24.0	106.3	74.3	80.0 °F	66.2 °F	130.8	70.0 °F	PLEATED MERV 13	16.0	45.6	15	460	3		CLIMATEMASTER SB096	1,2
WLHP-3-31	1400 CFM	0.25	7.9	42.9	30.9	80.0 °F	66.2 °F	41.0	70.0 °F	PLEATED MERV 13	11.3	12.9	15	460	3		CLIMATEMASTER SY042	1,2
WLHP-3-33	1200 CFM	0.25	6.8	33.8	25.0	80.0 °F	66.2 °F	37.3	70.0 °F	PLEATED MERV 13	9.3	10.4	15	460	3		CLIMATEMASTER SY036	1,2
WLHP-3-36	800 CFM	0.25	4.5	22.7	17.4	80.0 °F	66.2 °F	23.9	70.0 °F	PLEATED MERV 13	7.2	8.2	15	460	3		CLIMATEMASTER SY024	1,2
WLHP-3-37A	1400 CFM	0.25	7.9	42.9	30.9	80.0 °F	66.2 °F	41.0	70.0 °F	PLEATED MERV 13	11.3	12.9	15	460	3		CLIMATEMASTER SY042	1,2
WLHP-3-37B	1600 CFM	0.25	9.0	45.4	35.6	80.0 °F	66.2 °F	47.8	70.0 °F	PLEATED MERV 13	11.6	13.3	15	480	3		CLIMATEMASTER SY048	1,2
WLHP-3-40	400 CFM	0.25	2.3	10.7	7.2	80.0 °F	67.0 °F	12.4	70.0 °F	PLEATED MERV 13	6.5	7.6	15	277	1		CLIMATEMASTER SC012	2
WLHP-3-41	1000 CFM	0.25	5.6	28.4	20.7	80.0 °F	66.2 °F	29.9	70.0 °F	PLEATED MERV 13	8.2	9.4	15	460	3		CLIMATEMASTER SY030	1,2
WLHP-3-47	200 CFM	0.25	1.5	5.8	4.7	80.0 °F	67.0 °F	6.7	70.0 °F	PLEATED MERV 13	4.9	5.6	15	277	1		CLIMATEMASTER SC006	2
WLHP-4-01	1400 CFM	0.25	7.9	42.9	30.9	80.0 °F	66.2 °F	41.0	70.0 °F	PLEATED MERV 13	11.3	12.9	15	480	3		CLIMATEMASTER SY042	1,2
WLHP-4-02	800 CFM	0.25	4.5	22.7	17.4	80.0 °F	66.2 °F	23.9	70.0 °F	PLEATED MERV 13	7.2	8.2	15	460	3		CLIMATEMASTER SY024	1,2
WLHP-4-03	1200 CFM	0.25	6.8	33.8	25.0	80.0 °F	66.2 °F	37.3	70.0 °F	PLEATED MERV 13	9.3	10.4	15	460	3		CLIMATEMASTER SY036	1,2
WLHP-4-06	1600 CFM	0.25	9.0	45.4	35.6	80.0 °F	66.2 °F	47.8	70.0 °F	PLEATED MERV 13	11.6	13.3	15	460	3		CLIMATEMASTER SY048	1,2
WLHP-4-09	800 CFM	0.25	4.5	22.7	17.4	80.0 °F	66.2 °F	23.9	70.0 °F	PLEATED MERV 13	7.2	8.2	15	460	3		CLIMATEMASTER SY024	1,2
WLHP-4-11B	1600 CFM	0.25	9.0	45.4	35.6	80.0 °F	66.2 °F	47.8	70.0 °F	PLEATED MERV 13	11.6	13.3	15	460	3		CLIMATEMASTER SY048	1,2
WLHP-4-12	1000 CFM	0.25	6.8	33.8	25.0	80.0 °F	66.2 °F	37.3	70.0 °F	PLEATED MERV 13	9.3	10.4	15	460	3		CLIMATEMASTER SY030	1,2
WLHP-4-15	1000 CFM	0.25	5.6	28.4	20.7	80.0 °F	66.2 °F	29.9	70.0 °F	PLEATED MERV 13	8.2	9.4	15	460	3		CLIMATEMASTER SY030	1,2
WLHP-4-23	800 CFM	0.25	4.5	22.7	17.4	80.0 °F	66.2 °F	23.9	70.0 °F	PLEATED MERV 13	7.2	8.2	15	460	3		CLIMATEMASTER SY024	1,2
WLHP-4-24	1800 CFM	0.25	15.0	62.3	43.4	80.0 °F	66.2 °F	67.2	70.0 °F	PLEATED MERV 13	12.5	14.1	15	460	3		CLIMATEMASTER SY060	1,2
WLHP-4-26	2400 CFM	0.25	18.0	74.9	52.5	80.0 °F	66.2 °F	91.2	70.0 °F	PLEATED MERV 13	6.0	30.4	15	460	3		CLIMATEMASTER SB072	1,2
WLHP-4-31	1400 CFM	0.25	7.9	42.9	30.9	80.0 °F	66.2 °F	41.0	70.0 °F	PLEATED MERV 13	11.3	12.9	15	480	3		CLIMATEMASTER SY042	1,2
WLHP-4-33	1200 CFM	0.25	6.8	33.8	25.0	80.0 °F	66.2 °F	37.3	70.0 °F	PLEATED MERV 13	9.3	10.4	15	460	3		CLIMATEMASTER SY036	1,2
WLHP-4-36	800 CFM	0.25	4.5	22.7	17.4	80.0 °F	66.2 °F	23.9	70.0 °F	PLEATED MERV 13	7.2	8.2	15	460	3		CLIMATEMASTER SY024	1,2
WLHP-4-37B	1600 CFM	0.25	9.0	45.4	35.6	80.0 °F	66.2 °F	47.8	70.0 °F	PLEATED MERV 13	11.6	13.3	15	460	3		CLIMATEMASTER SY048	1,2
WLHP-4-40	400 CFM	0.25	2.3	10.7	7.2	80.0 °F	67.0 °F	12.4	70.0 °F	PLEATED MERV 13	6.5	7.6	15	277	1		CLIMATEMASTER SC012	2
WLHP-4-41	1000 CFM	0.25	5.6	28.4	20.7	80.0 °F	66.2 °F	29.9	70.0 °F	PLEATED MERV 13	8.2	9.4	15	460	3		CLIMATEMASTER SY030	1,2
WLHP-4-45	200 CFM	0.25	1.5	5.8	4.7	80.0 °F	67.0 °F	6.7	70.0 °F	PLEATED MERV 13	4.9	5.6	15	277	1		CLIMATEMASTER SC006	2

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KEY PLAN

CONSTRUCTION DOCUMENTS

No.	Description	Date
1	CONSTRUCTION SET	01/19/2026

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PROJECT #: 24-056
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MECHANICAL SCHEDULES

M601